HANKSCRAFT RUNXIN

Innovative Solutions for Your Water

HD / HDL Valves & Systems Service Manual

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NSF

This valve is Tested and Certified by NSF International against NSF/ANSI Standard 44 for materials and structural integrity requirements

COMPONENT

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1. Introduction

Thank you for choosing a **Hankscraft Runxin Digital HD / HDL Valve**. Our HD / HDL valves take the next step forward in control design by offering improved construction, added features for more flexibility, higher performance, and easier operation and maintenance.

HD and HDL valves offer an intelligent preset reference mode, 3-button programming with adjustable cycle settings, quick-connect drain with optional offset, and an automatic reset feature with battery backup. Our innovative HDL valves combine the interfaces of our HL and HD valves, providing even more versatility during setup. Both valves are available in metered (programmable to extended metered), and filter time clock versions.

Hankscraft Runxin's HD / HDL digital control valves are manufactured using improved materials and are put through a rigid, 100% quality inspection before they leave the factory. Our products will give you peace of mind that will result in fewer warranty callbacks, and a longer system lifespan.

HD / HDL Valves Feature:

- Improved manufacturing and durability, lower power usage
- Standard metered option programmable to extended metered
- Quick-connect drain with optional offset

2. System Specifications Form for Record Keeping

Installer

Name: _____

Address: _____ City/State: _____

Phone: _____ Install Date: _____

Softener System Configuration

Tank Size: Dia. _____in. Height _____in. Resin Volume: _____cu/ft.

Brine Tank Capacity: ☐ 85L ☐ 100L ☐ 130L

Media: _____

Control Valve Serial Number (label located on valve body front): _____

Valve Style:

☐ HD-FTC ☐ HD-SMM

Day/Time of Regeneration: _____

Drain Line Flow Control (DLFC): _____ gpm Brine Line Flow Control (BLFC): _____ gpm

Injector Size: _____ Salt Setting: _____

Meter Gallon Setting: _____ gallons

Water Conditions and Quality

Total Hardness: _____ grains Iron (Fe): _____ ppm Acid (pH): _____ TDS: _____ ppm

Pressure of Inlet Water: _____ psi Other: _____

Water Source: ☐ Well Water ☐ City Water ☐ Other: _____

3. Pre-Installation Checklist

IMPORTANT NOTICE

Read through the instructions thoroughly and obtain all materials and tools before proceeding with the installation. Be sure to follow all applicable national, state, county and local plumbing codes and regulations.

All plumbing and electrical work should be performed by an accredited professional to ensure all local, state, and municipal guidelines are met.

During cold weather it is recommended that the installer warm the valve to room temperature before operating.

Required Operating Conditions

Working Conditions	Working Pressure	25psi ~ 120psi
	Water Temperature	40 °F ~ 100 °F
Working Environment	Environment Temperature	40 °F ~ 100 °F
	Relative Humidity	≤95%
	Power Source	AC100 ~ 240V / 50 ~ 60Hz

CAUTION

Do not exceed 120 psi water pressure.
Do not exceed 40° C / 100° F water temperature.
Do not subject unit to freezing conditions.

Failure to use this product within the described conditions may void the warranty.

- All plumbing and electrical work should be performed by an accredited professional to ensure all local, state, and municipal guidelines are met.

- An uninterrupted alternating current (A/C) supply is required. Please make sure voltage supply is compatible with unit before installation.

- Conditions of existing plumbing should not be clogged with lime or iron build-up. Replace piping that has heavy lime and/or iron build-up. If there is an iron concern, install an iron filter unit ahead of the water softener. Plumbing that has heavy lime and iron buildup inhibits the operation of softening system.

- When there is moderate to high turbidity, a filter should be installed on the inlet before the water softening system.

- If the water pressure exceeds 120psi, a pressure reducing valve must be installed before the water inlet. If the water pressure exceeds 80 psi, installing a pressure reducing valve before the water inlet is highly recommended. If the water pressure is under 25psi, a booster pump must be installed before the water inlet.

- Ensure there is salt in the brine tank at all times when this valve is used for softening. The brine tank should contain clean water and softening salt only, at least 99.5% pure. Do not use small grain salt.

- Always install a bypass valve.

- Replacement parts for the valve should only be purchased through Hankscraft Runxin resellers.

- Regular interval monitoring of the water quality and work environment is recommended to insure proper operation of the valve and system.

4. System Installation

Product Dimensions – HD / HDL Control Valves

Length (max.)	Width (max.)	Height (max.)	Regeneration Mode
7.5"	4"	7.5"	Down-flow

Inlet Port	Outlet Port	Drain Port	Brine Port	Base	Riser Pipe
3/4"	3/4"	1/2" NPTF	3/8"	2.5"NPSM	1.05"

These valve dimensions are for reference only.

Plumbing Rough-Ins – HD / HDL Control Valves

Bypass	Tank Center to End of Bypass	Inlet/ Outlet Center	Inlet/ Outlet Height 9x48 Tank	Inlet/ Outlet Height 10x44 Tank	Inlet/ Outlet Height 10x54 Tank	Inlet/ Outlet Height 12x52 Tank	Inlet/ Outlet Height 13x54 Tank
1" Metal Bypass	5-3/8"	2"	50"	46-5/8"	56-3/4"	54-7/8"	56-7/8"
3/4" Metal Bypass	5-1/4"	2"	50"	46-5/8"	56-3/4"	54-7/8"	56-7/8"

These valve dimensions are for reference only.

Unit Location

- Locate the filter or softener close to a clean working floor drain away from direct sunlight and any heat sources. This will minimize consumer impact in the event of malfunction.
- Ensure the unit is installed with enough space for operation and maintenance.
- The installation surface should be clean, level and stable for both the pressure tank and brine tank.

Plumbing and Mechanical Setup

- Complete all plumbing according to local, state, and federal plumbing codes.
    - A 1/2" (13mm) minimum drain pipe should be used. However, if the backwash flow rates exceed 7gpm or the length exceeds 20 feet (6m) then a 3/4" (19mm) drain pipe should be used.
    - There must be an air gap between the drain line and the drain to prevent siphoning of contaminated water back into the resin tank.
- Use only Teflon tape on the drain fitting.
- Solder joints should be completed prior to connecting piping to the valve. Solder joints near the drain must be done before connecting the Drain Line Flow Control fitting (DLFC). Leave at least 6" (152mm) between the DLFC and solder joints when soldering pipes that are connected on the DLFC. Failure to do this could cause interior damage to valve. The valve manufacturer is not responsible for damage incurred during installation.
- When turning threaded pipe fittings onto plastic fitting, take precaution not to cross thread or over tighten.
- Ensure the unit is installed with enough space for operation and maintenance.

Control Valve Installation

1. Cut the 1" (25mm) distributor tube (1.05" O.D.) flush with the top of the tank. Take care to keep foreign material out of mineral tank. If purchased as a complete system, the tube has already been cut and installed.

2. Insert distributor tube with lower basket into the center of the pressure tank.

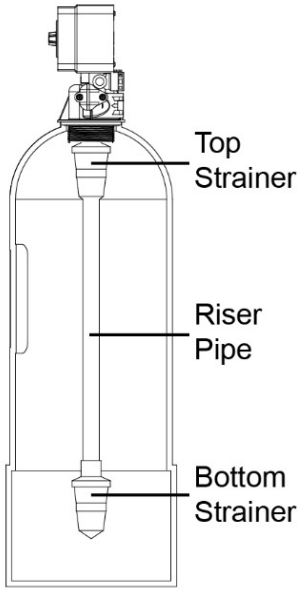
3. Plug the riser pipe and fill the pressure tank with resin. If purchased as a complete system from Hankscraft Runxin the media has been installed. Media quantity is relative to desired capacity and tank size.

4. Lubricate the valve center hub O-ring with silicone lubricant only.

5. Install the upper basket with a twist and lock action to center hub of the valve.

6. Lubricate, with silicone lubricant, and install the valve base O-ring around the neck of the valve.

7. Place valve on tank with the distributor tube inserted down the middle of the upper basket. Twist the valve on to the tank to secure valve to the tank.



System Sizing Chart

Tank Size	Injector	Slow Rinse @ 40 psi	Brine Draw @ 40 psi	[1]BLFC	[2]DLFC
9"	#1 White	.45 gpm	.28 gpm	.25 gpm	2.0 gpm
10"	#1 White	.45 gpm	.38 gpm	.5 gpm	2.4 gpm
12"	#2 Blue	.84 gpm	.56 gpm	1.0 gpm	3.5 gpm
13"	#2 Blue	.84 gpm	.56 gpm	1.0 gpm	4.0 gpm
14"	#4 Green	1.0 gpm	.63 gpm	1.0 gpm	5.0 gpm
16"	#4 Green	1.0 gpm	.63 gpm	1.0 gpm	7.0 gpm

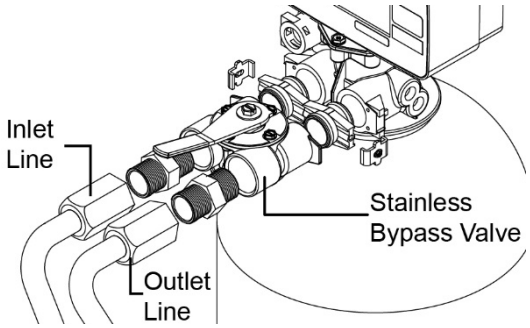
Due to varying water conditions, tank sizes, and water pressures, use the above as guidelines only.

[1]BLFC (Brine Line Flow Control), refill rate for filling brine tank.

[2]DLFC (Drain Line Flow Control), backwash and rapid rinse flow rates.

Bypass Installation

<u>Stainless Steel Bypass – 1606K/1606KB</u>



1. Grease bypass O-rings and press onto valve.
2. Secure with clips.

Before running the valve for the first time, flush out the water line and bypass:

3. Be sure the bypass is closed.
4. Turn the water source on at the inlet to the house.
5. Disconnect the bypass from the valve.
6. Put a container under the bypass. Open the bypass to remove any foreign material out of the water lines.
7. Close the bypass.
8. Re-connect the bypass to the valve.
9. Open the bypass slowly, to avoid water hammering.
10. Let water flow into the pressure tank. When water flow stops, slowly open a cold water tap nearby and let water run until it runs clear and air is purged from the unit. Then close tap.
11. Check for and repair any leaks.
12. Start-up procedures are shown on the following pages for each different valve type. Locate your valve type and follow the start-up procedures listed.

Plumbing Connections Installation

1. Connect inlet pipe with inlet connector of bypass.
2. Connect outlet pipe with outlet connector of bypass.
3. See Fig. 1

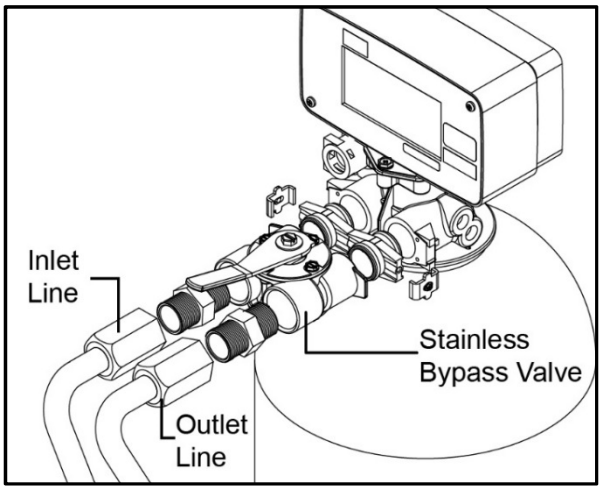


Fig. 1

Drain Line Installation

1. Install drain line with an air gap to the floor drain. *(Valve drain hose not supplied)*
2. See Fig. 2

CAUTION

An air gap is required between the drain line and the drain (sewer). This avoids a syphon effect and reverse contamination.

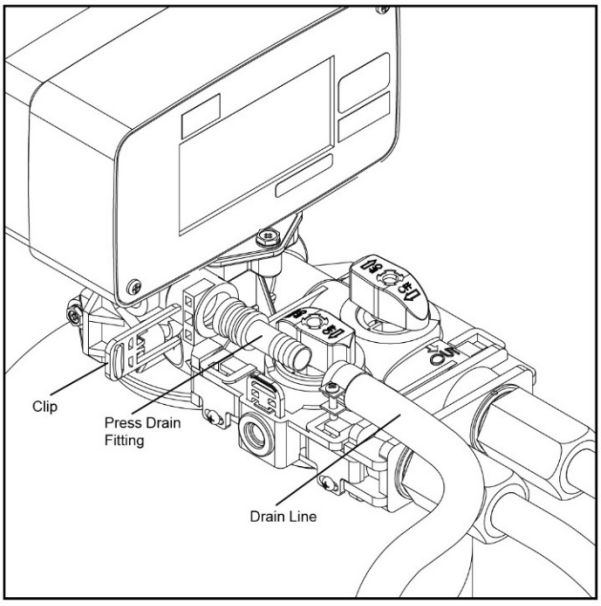


Fig. 2

Brine Line Installation

1. Slide brine nut and Ferrule (with the tapered end facing the inside of the brine nut) onto the 3/8" brine tubing.

2. Install the filter screen into the tube insert and press both into the end of brine tube.

3. Insert tube into brine connector and secure brine nut to the brine connector.

4. See Fig. 3

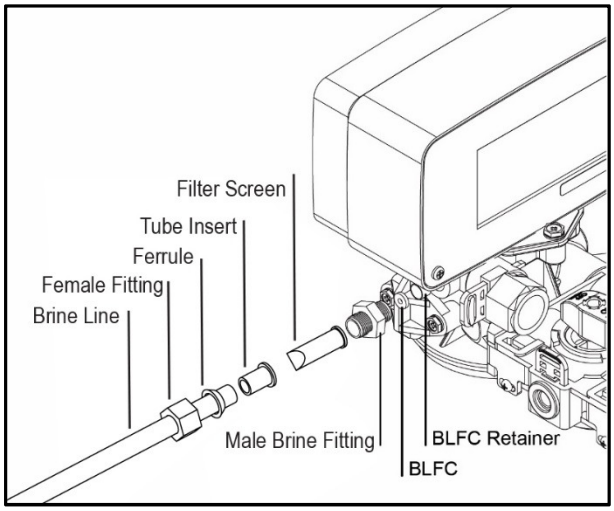


Fig. 3

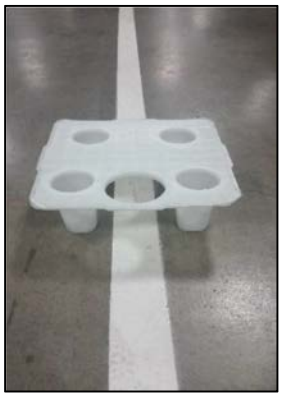
Brine Tank Installation

1. Unpack brine tank components

    - Brine tank standoff with nut and washer
    - Overflow elbow with nut and washer
    - Optional quick connect clips

2. Open brine well and remove float. Ensure the inside of the tank and brine well are free of debris.

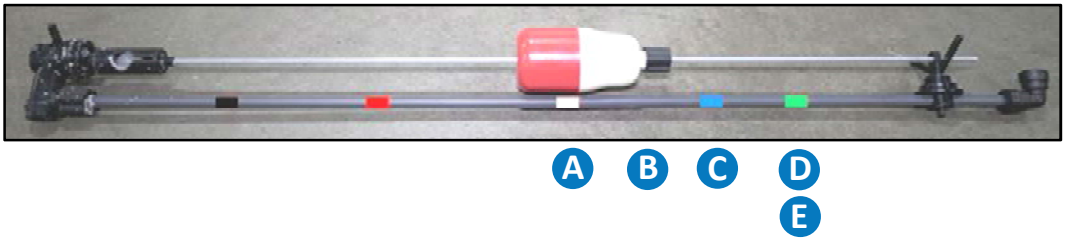
3. Assemble salt grid (4 feet, 1 base). Feet clip into the bottom of the base.



4. Insert assembled salt grid into brine tank by lining up the cut out hole with the drilled holes on the brine tank.

5. Hold float and connected ABS tubing (at the bottom; securing the ABS tubing), turn the black nut counterclockwise while the tubing is secured in place. Set to desired salt setting and retighten float nut.

Tank Size	Letter	Salt Level (See Fig. 4)	Salt Setting
9x48	A	To white tape or above	9 lbs.
10x44	B	Halfway between white/blue tape or above	~ 10.5 lbs.
10x54	C	To blue tape or above	12 lbs.
12x52	D	To green tape or above	15 lbs.
13x54	E	To green tape or above	> 15 lbs.



6. Insert the brine well, making sure the bottom brine well cap is attached. Insert the float assembly by lining up the top cut out holes.

Through testing there have been some instances where the bottom float assembly cap can come off of the tube when force is applied. Therefore we strongly suggest using Gorilla Glue or any equivalent glue to glue the bottom (only) float assembly cap to the tube to prevent this cap from coming off the tube.

7. Install brine tank standoff over the float assembly and insert into top cut out hole. Attach washer on outside of tank and secure unit.

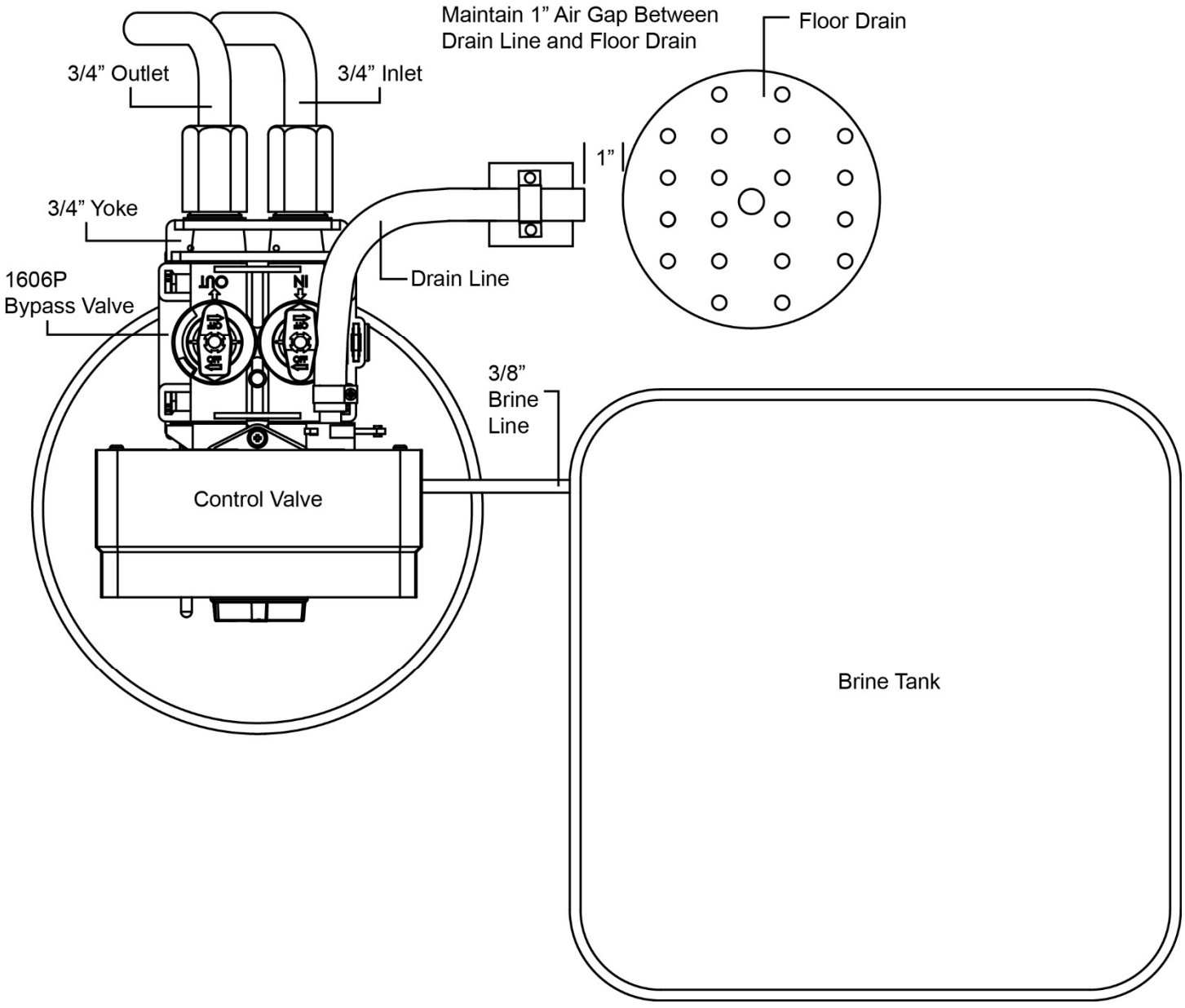
8. Insert brine line into the top cut out hole, through the standoff, and into the quick connect elbow (optional: attach blue clips). Press firmly to make sure brine line is fully inserted into the quick connect.

9. Install overflow elbow fitting with washer on the outside of tank. Fasten nut on the inside of the tank.

10. Replace brine well lid.

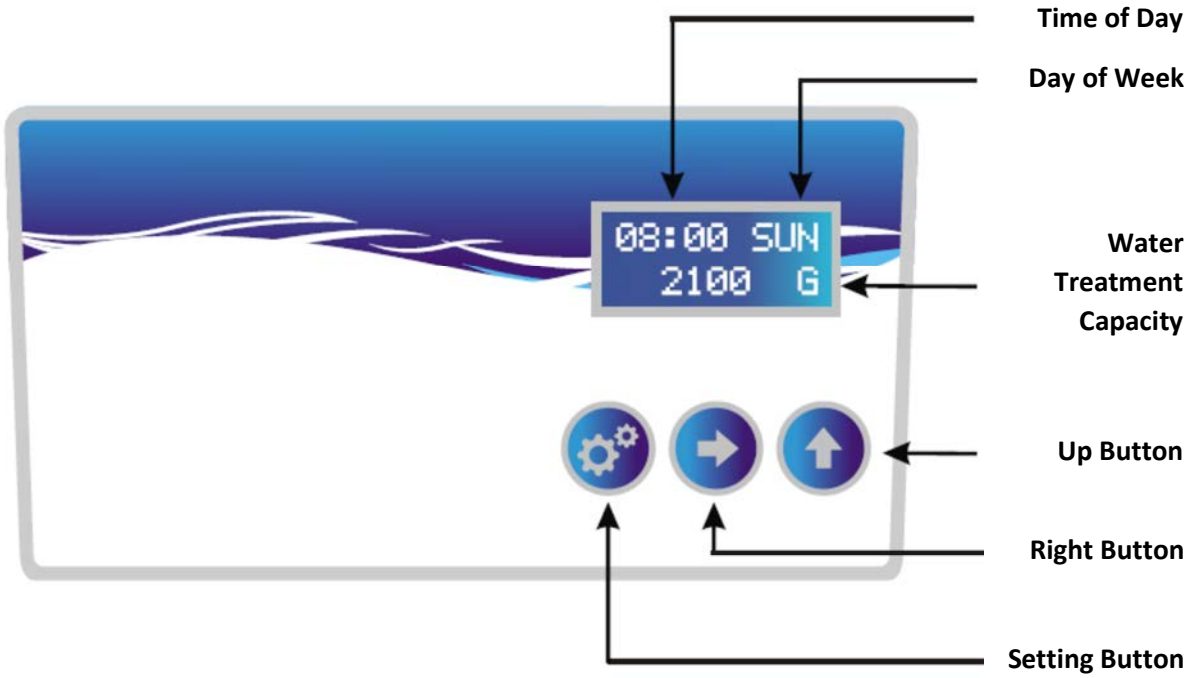
11. Replace brine tank lid.

System Installation Chart



5. Valve Programming & Start-Up Procedure

HD Standard Digital Meter Control Valve



Setting Button

1. Press for 5 seconds to enter Programming Mode.
2. When the valve is in Programming Mode, Press to confirm the setting and enter into next menu.

Right Button

1. Press for 5 seconds to start immediate manual regeneration.
2. Press during a Regeneration Cycle to immediately advance the valve to the next cycle position.
3. When the valve is in Programming Mode, press to move the cursor.

Up Button 

1. Press for 5 seconds to display existing configured parameters.
2. When the valve is in Programming Mode, press to adjust settings.

Factory Default Settings

Parameter	Unit	Default
Control Type		Meter Delayed
Time of Day	24-Hour Clock	08:00am
Day of Week		Sunday
Days Override	Days	30
Time of Regeneration	24-Hour Clock	2:00
Unit Mode	Gallons/Liters	Gallons
Feed Water Hardness	Grains	10
Number of People		4
Reference Setting	On or Off	On
Water Treatment Capacity	Grains	32,000 grains
Backwash Time	Minutes	10
Brine Draw Time	Minutes	60
Rapid Rinse Time	Minutes	10
Water Refill Time	Minutes	12

To reset valve to factory settings valve must be unplugged. Press and hold while plugging valve back in. The valve is now restored to factory settings.

Factory Default Settings

Press and hold for 5 seconds to enter the Programming Mode to adjust all of the following settings:

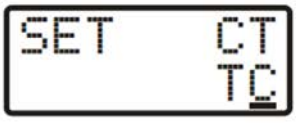
1. Time of Day/Day of Week

To set the Time of Day and Day of Week:

a. Use to adjust the hour.
b. Press to move to the minute, adjust using .
c. Press to move to the day, adjust using .
d. Press to accept and advance to next screen.

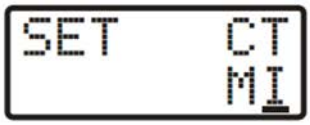
2. Control Type

a. Use to select Control Type. TC-Time Clock, MD-Meter Delayed, MI-Meter Immediate, or DW-Day(s) of Week. Meter Delayed is set as the default.

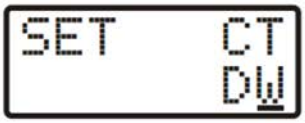


Time Clock

Meter Delayed



Meter Immediate

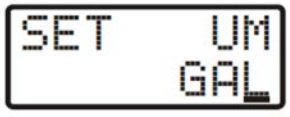


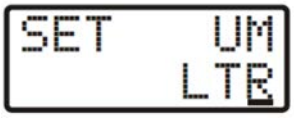
Day(s) of Week

b. Press to accept and advance to next screen.

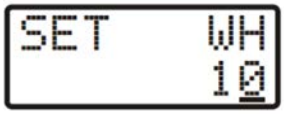
3. Unit Mode – Gallon or Liter

Gallon is set as the default. If you want to change to Liter, press .
Press to accept and advance to next screen.





4. Feed Water Hardness



Ten (10) grains hardness is set as the default. To change the Hardness:

a. Press until desired hardness is reached. The available hardness range is 1-50 grains.

b. Press to accept and advance to next screen.

To convert ppm hardness to grains hardness divide by 17.1; this will give you water hardness in grains.

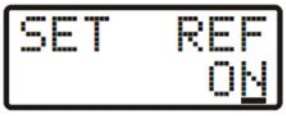
5. Number of People

Four (4) people is the default. To change the number of people:

a. Press until correct number of people in home is reached. The available range is 1-10 people.

b. Press to accept and advance to next screen.

6. Reference ON/OFF



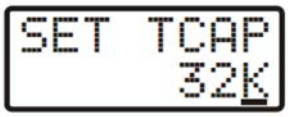
Reference ON will calculate the capacity automatically based on system size. Reference OFF allows you to set the capacity manually. Default is set as Reference ON.

a. Press to select Reference ON or OFF.

b. Press to accept and advance to next screen.

Reference settings change to the correct cycle times, however, the BLFC, DLFC, throat and nozzles will need to be changed for the systems larger than 32,000. Refer to the sizing chart on Page 9.

7. Water Treatment Capacity (Reference ON)



Reference ON Capacity default is set at 32K. To change the system capacity:

a. Press ⬆ until desired capacity is reached.
   i. 32,000 grains (32K)
   ii. 40,000 grains (40K)
   iii. 48,000 grains (48K)
   iv. 64,000 grains (64K)

b. Press ⚙ to accept and advance to next screen.

Reference	Backwash (BW)	Brine Slow Rinse (BSR)	Fast Rinse (FR)	Brine Refill (BR)
32K	10 minutes	60 minutes	10 minutes	12 minutes
40K	10 minutes	60 minutes	10 minutes	14 minutes
48K	10 minutes	60 minutes	10 minutes	8 minutes
64K	10 minutes	60 minutes	10 minutes	10 minutes

8. Water Treatment Capacity (Reference OFF)

User-Defined Capacity default is set at 32,000. Turning the reference off allows you to manually adjust the system capacity.

a. Press ⬆ until desired capacity is reached. The available range is 8,000-99,999 grains.

b. Press ⚙ to accept and advance to next screen. You will now be able to manually adjust each cycle time.

9. Day Override

Day Override default is set at 30 days. To change the number of days:

a. Press ↑ until the desired number of days is reached. The available range is 1-99 days/OFF.

b. Press ⚙ to accept and advance to next screen.

10. Day of Week Regenerate

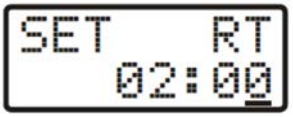
Used only when DW-Day(s) of Week Control Type is selected. To change the day:

a. Use the ↑ to select day and the → to move to the next day. Repeat until the desired schedule is reached.

b. Press ⚙ to accept and advance to next screen.

11. Regeneration Time

Default is set for 2:00am (24-hour clock). To change the time of regeneration:



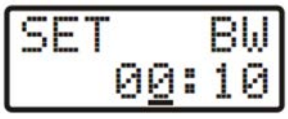
a. Press ↑ until the desired time of regeneration is reached.

b. Press ⚙ to accept and advance to next screen.

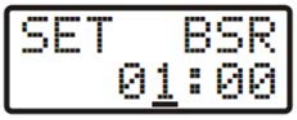
12. Regeneration Cycle Times

The cycle times are adjustable only when the reference setting has been turned off. When the reference setting is on, the times are automatically set for you.

Default settings:



Backwash - 10 Minutes



Brine Slow Rinse - 1 Hour

Fast Rinse – 10 Minutes

Brine Refill – 12 Minutes

Sand Filter	Sediment Turbidity	Mild					Average					Extreme					
Carbon Filters	Taste and Odor	Mild					Average					Extreme					
Iron Filters	PPM Ironx1 PPM Manganesex1 PPM Sulfurx1	.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
	No. Of People	Softeners - Calendar Clock Regeneration Frequency – Number Of Tab Pulls															
	2	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3
	3	1	1	2	2	3	3	3	3	3	3	4	4	4	4	4	4
	4	1	2	2	2	3	3	3	4	4	4	6	6	6	6	6	6
	5	2	2	3	3	4	4	4	4	6	6	6	6	12	12	12	12
	6	2	2	3	3	4	4	4	6	6	12	12	12	12	12	12	12
	7	2	3	3	4	4	6	6	6	12	12	12	12	12	12	12	12
	8	2	3	3	4	6	6	6	6	12	12	12	12	12	12	12	12
	9	3	3	4	4	6	6	12	12	12	12	12	12	12	12	12	12
	10	3	4	4	6	6	12	12	12	12	12	12	12	12	12	12	12

Capacity Reference Chart

Capacity 18,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	2,625	1,275	825	600	375	260	195
	2	2,550	1,200	750	525	300	185	120
	3	2,475	1,125	675	450	225	110	45
	4	2,400	1,050	600	375	150	35	0
	5	2,025	975	525	300	75	0	0
	6	1,950	900	450	225	0	0	0

Capacity 24,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	3,525	1,725	1,125	825	525	375	285
	2	3,450	1,650	1,050	750	450	300	210
	3	3,375	1,575	1,975	675	375	225	135
	4	3,300	1,500	900	600	300	150	60
	5	3,225	1,425	825	525	225	75	0
	6	3,100	1,350	750	450	150	0	0

Capacity 30,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	4,425	2,175	1,425	1,050	675	485	375
	2	4,350	2,100	1,350	975	600	410	300
	3	4,275	2,025	1,275	900	525	335	225
	4	4,200	1,950	1,200	825	450	260	150
	5	4,125	1,875	1,125	750	375	185	75
	6	4,050	1,800	1,050	675	300	110	0

Capacity 32,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	4,725	2,325	1,525	1,125	725	525	405
	2	4,650	2,250	1,450	1.050	650	450	330
	3	4,575	2,175	1,375	975	575	375	255
	4	4,500	2,100	1,300	900	500	300	180
	5	4,425	2,025	1,225	825	425	225	105
	6	4,350	1,950	1,150	750	350	150	30

Capacity Reference Chart (Continued)

Capacity 36,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	5,325	2,625	1,725	1,275	825	600	465
	2	5,250	2,550	1,650	1,200	750	525	390
	3	5,175	2,475	1,575	1,125	675	450	315
	4	5,100	2,400	1,500	1,050	600	375	240
	5	5,025	2,325	1,425	975	525	300	165
	6	4,950	2,250	1,350	900	450	225	90

Capacity 40,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	5,925	2,925	1,925	1,425	925	675	525
	2	5,850	2,850	1,850	1,350	850	600	450
	3	5,775	2,775	1,775	1,275	775	525	375
	4	5,700	2,700	1,700	1,200	700	450	300
	5	5,625	2,625	1,625	1,125	625	375	225
	6	5,550	2,550	1,550	1,050	550	300	150

Capacity 48,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	7,125	3,525	2,325	1,725	1,125	825	645
	2	7,050	3,450	2,250	1,650	1,050	750	570
	3	6,975	3,375	2,175	1,575	975	675	495
	4	6,900	3,300	2,100	1,500	900	600	420
	5	6,825	3,225	2,025	1,425	825	525	345
	6	6,750	3,150	1,950	1,350	750	450	270

Capacity 64,000		Hardness PPM (GPG)						
		85(5)	171(10)	256(15)	342(20)	513(30)	684(40)	855(50)
No. of People	1	9,525	4,725	3,125	2,325	1,525	1,125	885
	2	9,450	4,650	3,050	2,250	1,450	1,050	810
	3	9,375	4,575	2,975	2,175	1,375	975	735
	4	9,300	4,500	2,900	2,100	1,300	900	660
	5	9,225	4,425	2,825	2,025	1,225	825	585
	6	9,150	4,350	2,750	1,950	1,150	750	510

6. Sanitizing Procedure

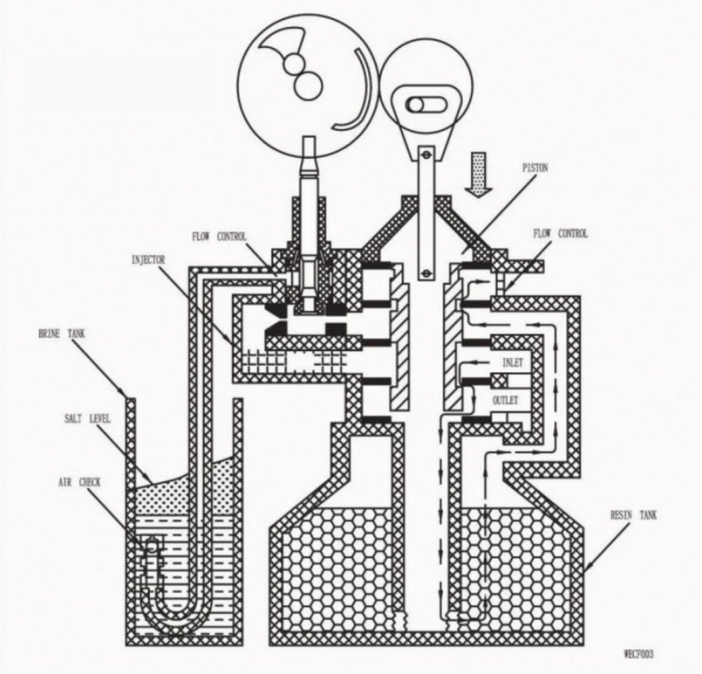
At the start up or after a period of one week the following procedure is recommended to remove the possibility of bacterial growth or contamination within the system. This procedure relates only to the original description of equipment and options described for this system. Any alterations to the configuration would require evaluation by a trained water professional.

1. Remove the brine tank cover and locate the brine well.
2. Remove the brine well cap.
3. Pour 1/3 cup of unscented bleach into the brine well.
4. Place cap back on brine well and cover back on brine tank.
5. The system must now be regenerated. At the control valve turn the knob clockwise until the indicator shows Regen.
6. Allow approximately 2 hours for the valve to complete its regeneration cycle and to return to service mode.

7. Water Flow Diagrams

Backwash Rinse Mode

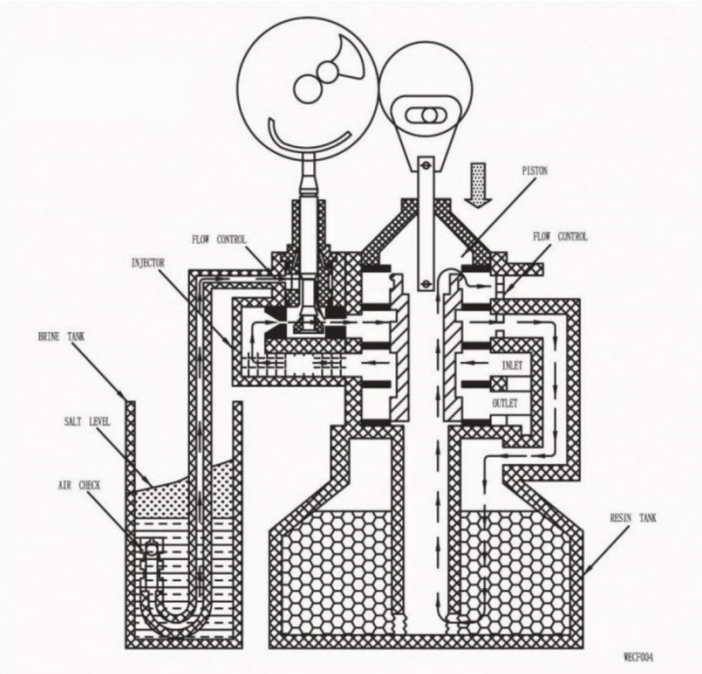
Hard water enters unit through the valve inlet, flows through the piston, down the center tube, through the distributor at the bottom, the up through the media and out the drain line.



Brine Rinse Mode (Softeners Only)

Hard water enters unit through the valve inlet, flows up into the injector housing, and down the nozzle/throat to draw brine from the brine tank.

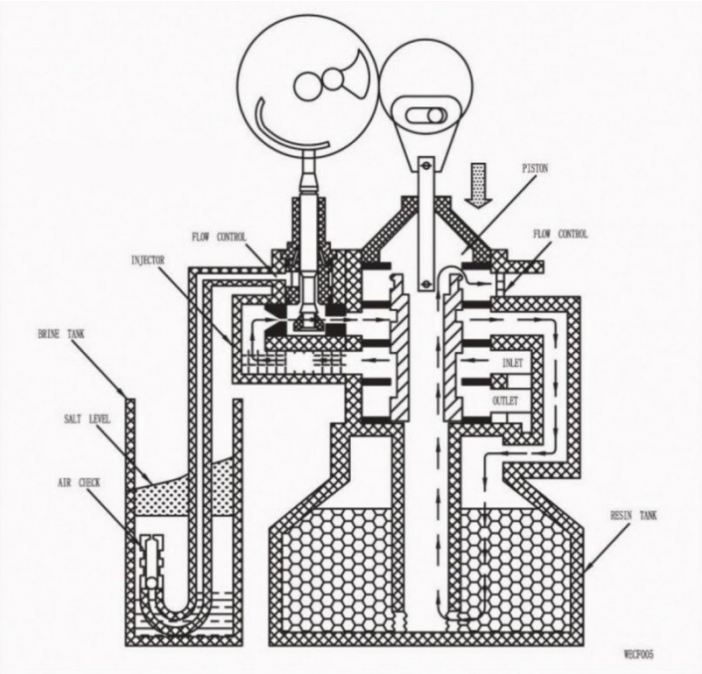
Brine flows down through the media, into the distributor at the bottom, and out the drain line. This cleans the resin bed of deposits by releasing the charge held by them to attract the mineral and iron deposits naturally found in the water source.



Slow Rinse Mode (Softeners Only)

Once the brine has been drawn out from the brine tank, hard water continues to enter through the inlet valve.

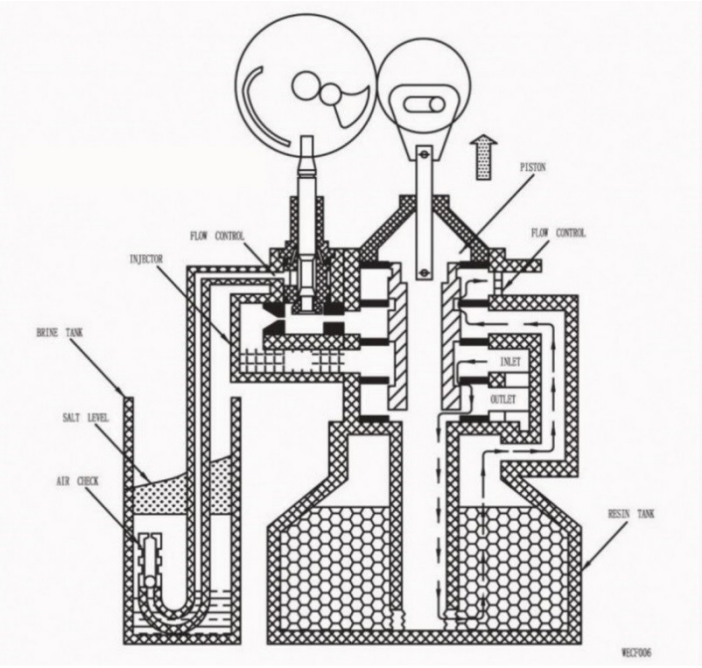
Water then flows around the lower piston groove, through the nozzle/throat, and down through the media. It then enters the distributor, travels through the center hole in the piston, and out to the drain line.



Rapid Rinse Mode (Second Backwash)

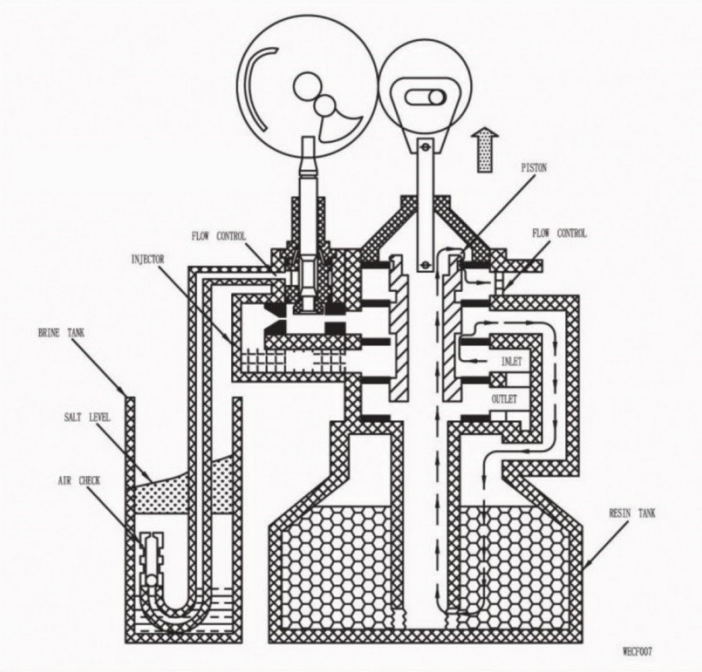
The media is rinsed to remove excess brine from the tank. After the process completes, the resin beads are once again ready to produce soft water.

Hard water enters unit through the valve inlet, flows through the piston, down the center tube, through the bottom distributor, up through the media, around the piston, and out the drain line.



Settling Rinse Mode

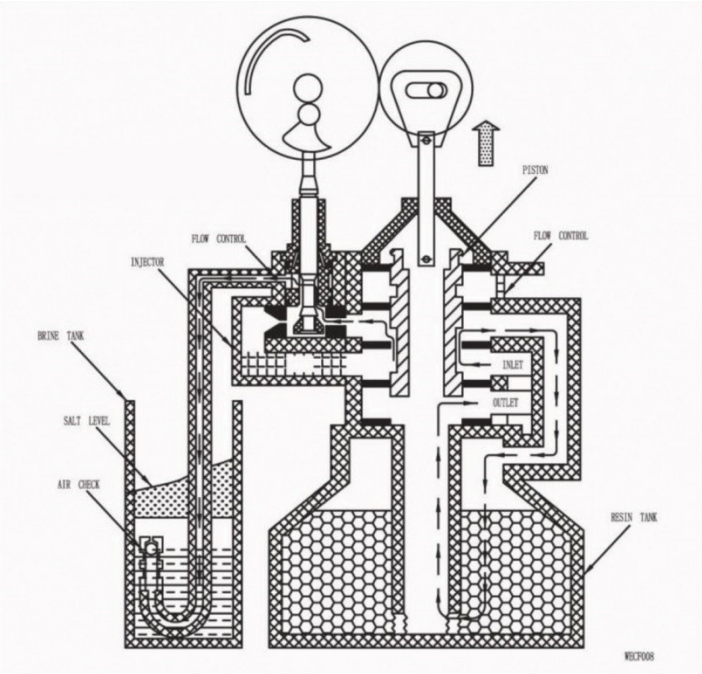
Slow rinse of the resin bed. Water flows down through the resin bed, up the bottom distributor, and out the drain line.



Brine Tank Refill Mode (Softeners Only)

Hard water enters unit through the valve inlet, flows up through the injector housing, and through the brine valve to refill the brine tank.

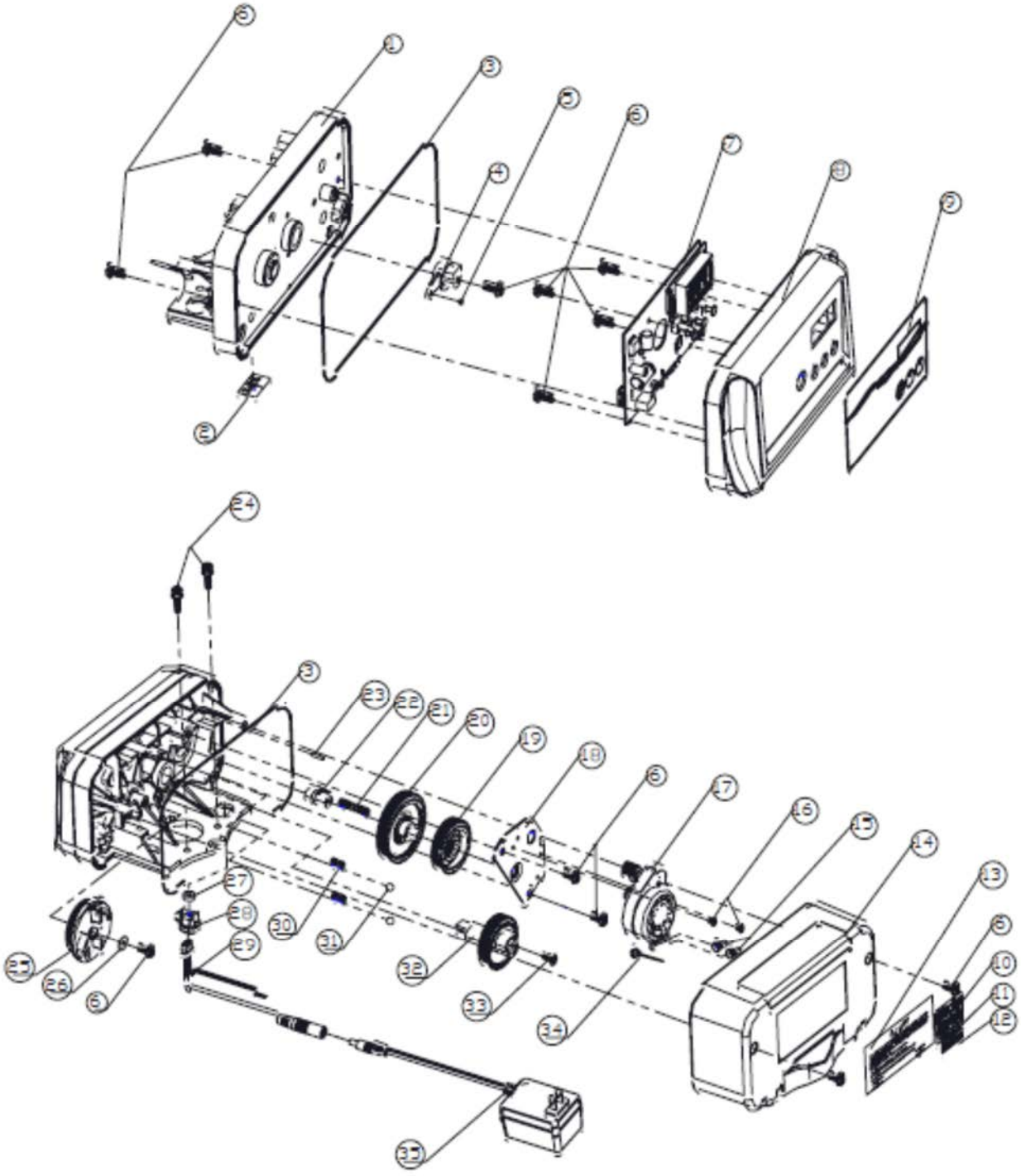
The system is now delivering soft water to the home. The brine tanks fills with untreated water in preparation for the next regeneration cycle.



When the valve is in regeneration, raw water is being passed to service until rapid rinse is complete.

8. Assembly Drawings and Parts List

HD-FTC Digital Filter Control Valve Assembly

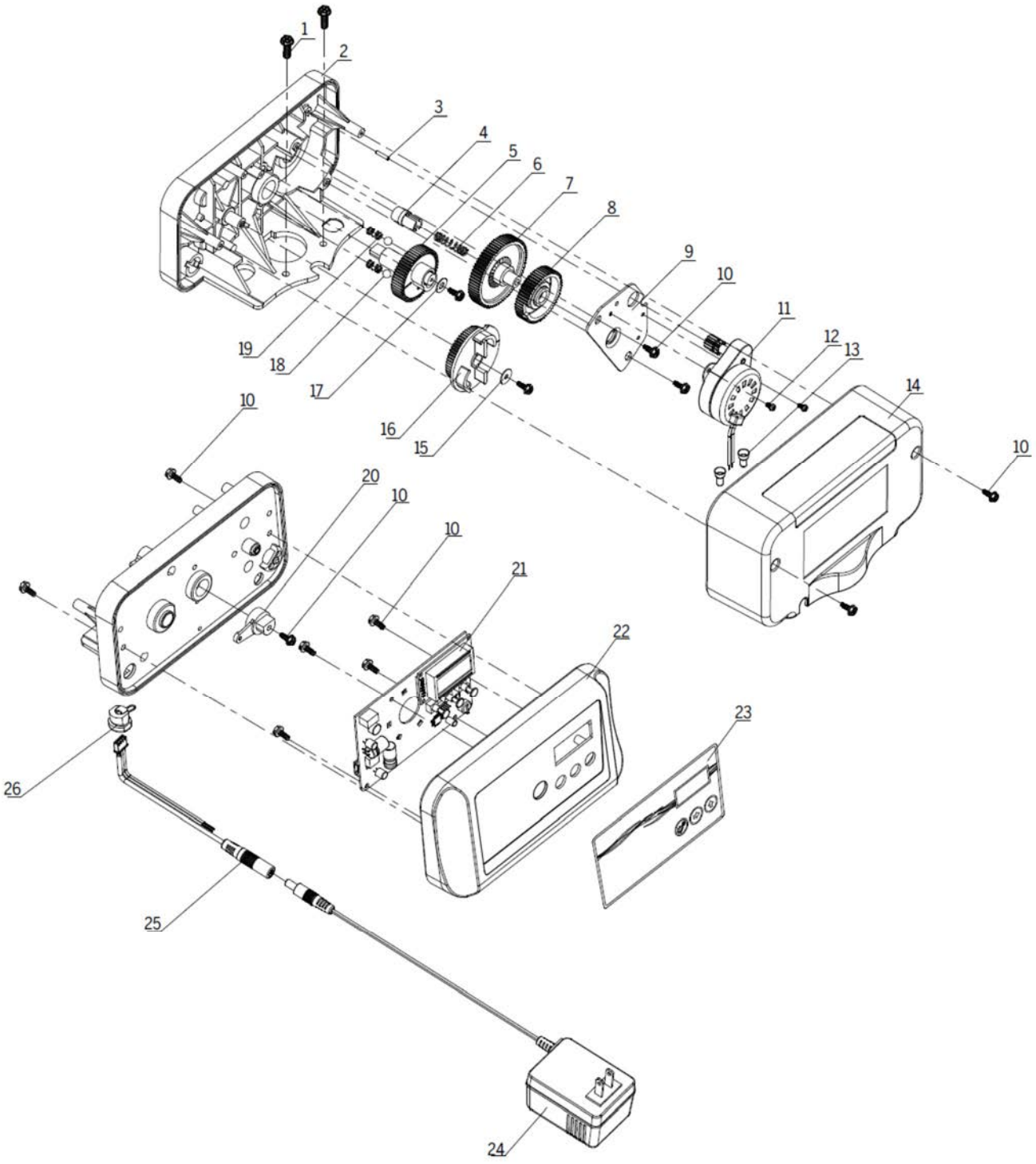


HD-FTC Digital Filter Control Valve Assembly Parts List

Item No.	Description	Quantity
1	Digital Bracket Frame	1
2	Label, Tested	1
3	Seal	2
4	Indicator	1
5	Magnet, Meter	1
6	Screws	12
7	PCB, HD	1
8	Cover, Front	1
9	Label, Front	1
10	Label, Flow	1
11	Label, Logo	1
12	Label, Serial #	1
13	Label, Back	1
14	Cover, Back	1
15	Wire Connectors	2
16	Screws, Motor	2
17	Motor	1
18	Motor Mount Plate	1

Item No.	Description	Quantity
19	Gear, Passive	1
20	Gear, Main Driving	1
21	Spring, Button	1
22	Button, White	1
23	Pin, Motor	1
24	Screws, Front Cover	2
25	Gear, Brine Piston	1
26	Washer	1
27	Clip Pad	1
28	Cord Clip	1
29	Power Cable	1
30	Spring, Main Piston Gear	2
31	Ball	2
32	Gear, Main Piston	1
33	Screw, Main Piston Gear	1
34	Zip Tie	1
35	Power Adaptor	1

HD-SMM Digital Mechanical Control Valve Assembly

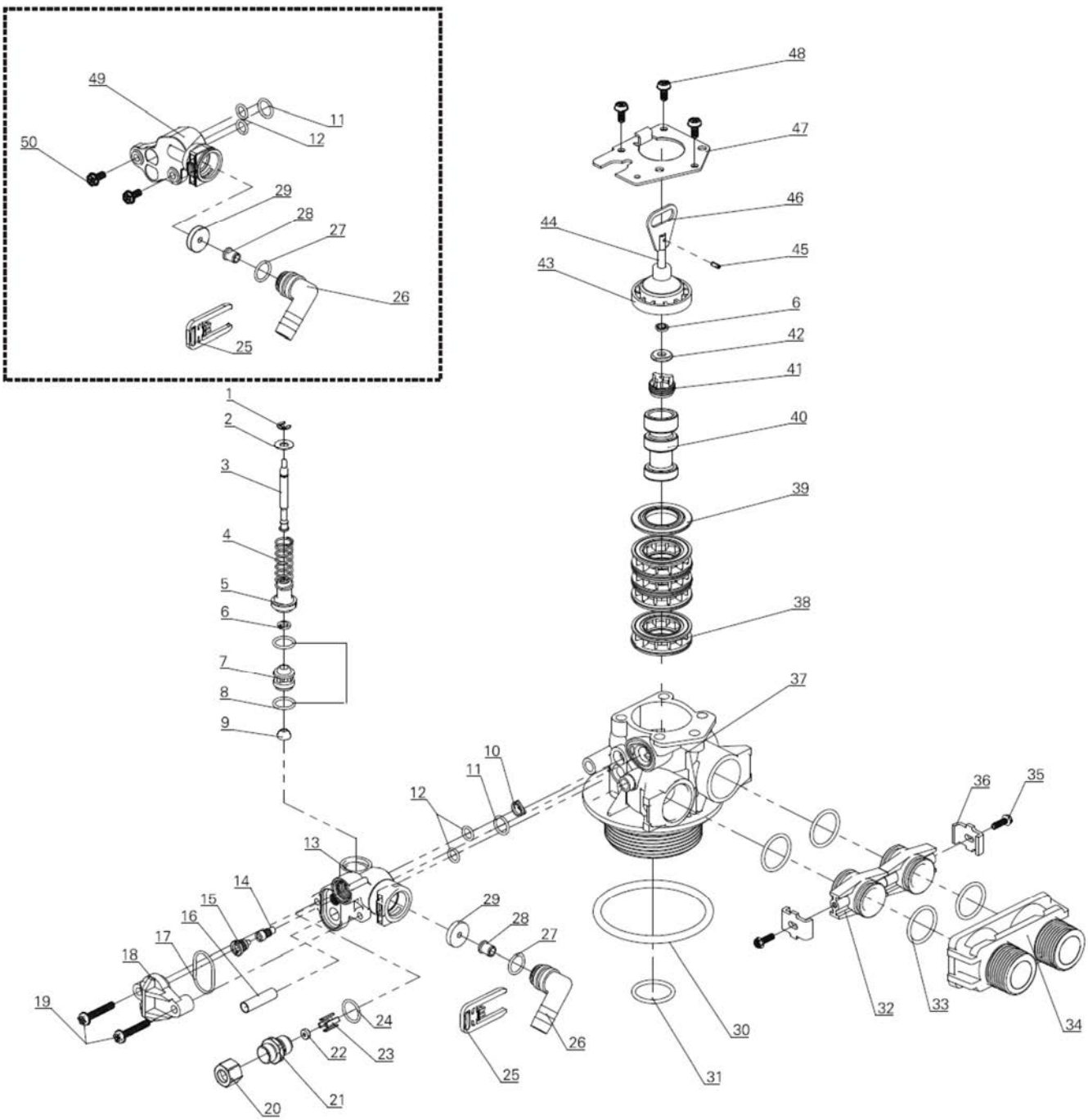


HD-SMM Digital Mechanical Control Valve Assembly Parts List

Item No.	Description	Quantity
1	Screw	2
2	Bracket	1
3	Pin	1
4	Pinion	1
5	Main Drive Gear & Shaft	1
6	Spring	1
7	Idler Gear	1
8	Drive Gear	1
9	Motor Mounting Plate	1
10	Screw	13
11	Motor	1
12	Screw	2
13	Wire Connector	2

Item No.	Description	Quantity
14	Back Cover	1
15	Gasket	1
16	Brine Cam	1
17	Gasket	1
18	Ball	2
19	Spring	2
20	Cycle Actuator Arm	1
21	Circuit Board Assembly	1
22	Front Cover	1
23	Panel Label	1
24	Transformer	1
25	Connector Assembly	1
26	Strain Relief	1

HD Valve Body Assembly

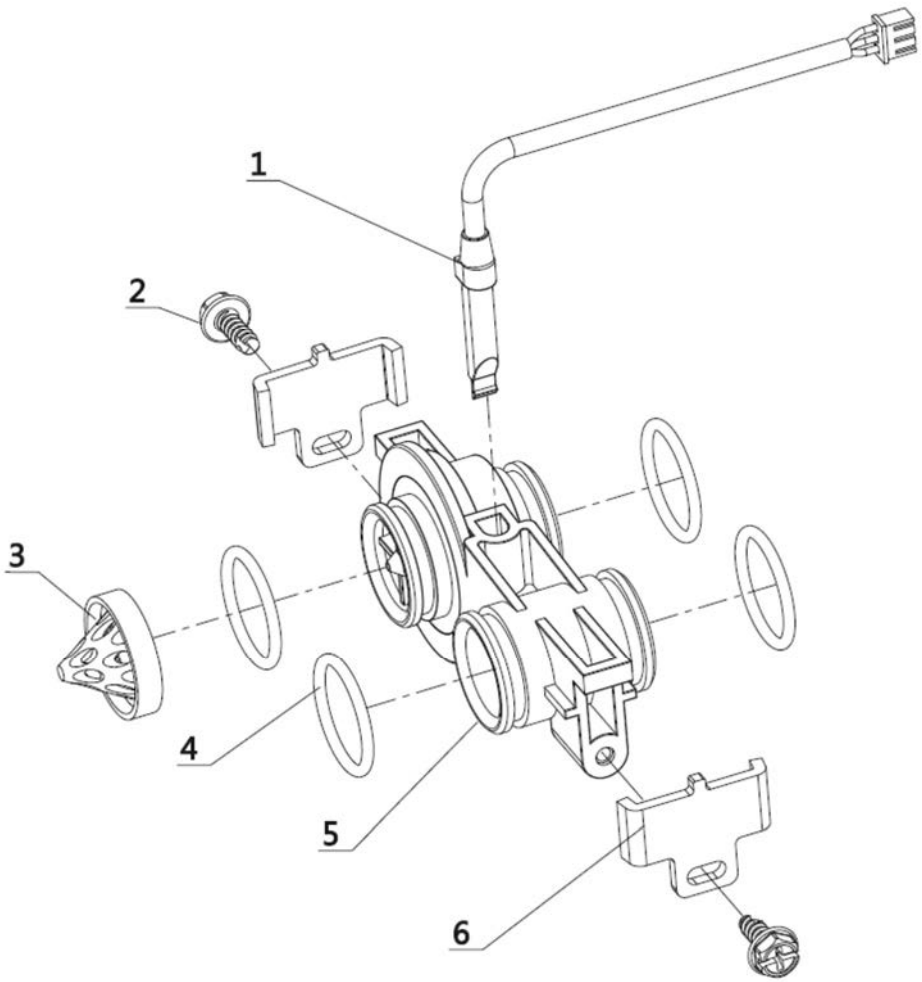


HD Valve Body Parts List

Item No.	Description	Quantity
1	Retainer Ring	1
2	Washer	1
3	Brine Valve Stem	1
4	Spring	1
5	Brine Valve Cap	1
6	O-Ring	2
7	Brine Valve Spacer	1
8	O-Ring	2
9	Brine Valve Seat	1
10	Air Disperser	1
11	O-Ring	1
12	O-Ring	2
13	Softener Injector Body	1
14	Injector Throat	1
15	Injector Nozzle	1
16	Injector Filter Screen	1
17	O-Ring	1
18	Injector Cover	1
19	Screw	2
20	Fitting Nut	1
21	BLFC Fitting	1
22	BLFC Button	1
23	BLFC Button Retainer	1
24	O-Ring	1
25	Retainer Latch	1

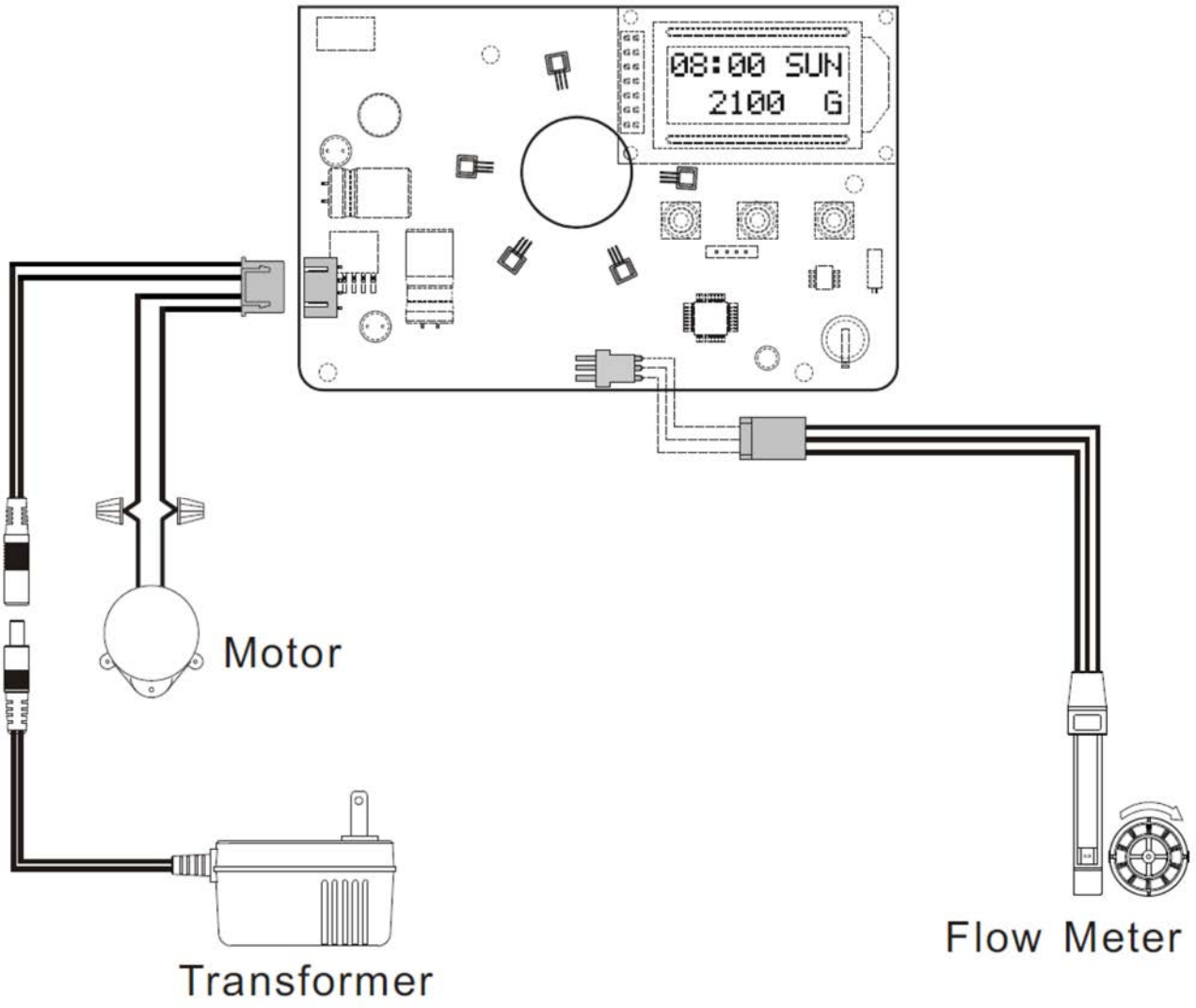
Item No.	Description	Quantity
26	Drain Elbow Barb	1
27	O-Ring	1
28	Bushing	1
29	DLFC Button	1
30	O-Ring	1
31	O-Ring	1
32	Adaptor Coupling	2
33	O-Ring	4
34	Yoke	1
35	Screw	2
36	Clip	1
37	Valve Body	1
38	Spacer	4
39	Seal	5
40	Piston	1
41	Piston Retainer	1
42	O-Ring Retainer	1
43	End Plug	1
44	Piston Rod	1
45	Pin	1
46	Drive Link	1
47	End Plug Retainer	1
48	Screw	3
49	Filter Injector Body	1
50	Screw	2

HD Meter Assembly and Parts List



Item No.	Description	Quantity
1	Harness Assembly	1
2	Screw	2
3	Flow Straightener	1
4	O-Ring	4
5	Meter Body Assembly	1
6	Clip	2

HD Wiring Diagram



Stainless Steel Bypass (Available in 3/4" and 1")

9. Service Instructions

Replacing Brine Valve, Injectors, and Screen

1. Unplug electrical cord from outlet.
2. Turn off water supply to system.
3. Relieve water pressure in the valve by advancing it to Backwash position momentarily.
4. Return the valve to the In Service position.
5. Disconnect brine tube and drain line connections at the injector body.
6. Remove the two injector body mounting screws. The injector and brine module can now be removed from the control valve.
7. Remove and discard valve body O-Rings.
8. Replace brine valve.
    a. Pull brine valve from injector body.
    b. Remove and discard O-Ring at bottom of brine valve hole.
    c. Apply silicone lubricant to new O-Ring and reinstall at bottom of brine valve hole.
    d. Apply silicone lubricant to O-Ring on new valve assembly and press into brine valve hole. The shoulder on bushing should be flush with the injector body.
9. Replace injectors and screen.
    a. Remove injector cap and screen, discard O-Ring.
    b. Unscrew injector nozzle and throat from injector body.
    c. Screw in new injector throat and nozzle, be sure they are seated tightly.
    d. Install a new screen.

e. Apply silicone lubricant to new O-Ring and install around oval extension on injector cap.

10. Apply silicone lubricant to three new O-Rings and install over three bosses on injector body.

11. Insert screws with washers through injector cap and injector.

12. Place this assembly through hole in timer housing and into mating holes in the valve body. Tighten screws.

13. Reconnect brine tube and drain line.

14. Return bypass to In Service position. Water pressure automatically builds in the system.

Be sure to shut off any bypass line.

15. Check for leaks at all seal areas.

16. Check drain seal with the valve in the Backwash position.

17. Plug electrical cord into outlet.

18. Set time of day.

19. Return the control valve to the In Service position.

Make sure there is enough brine in the brine tank.

20. Rotate program wheel counterclockwise until it stops at regeneration position.

21. Start regeneration cycle manually if water is hard.

Replacing Timer

1. Unplug electrical cord from outlet.

2. Turn off water supply to system.

3. Relieve water pressure in the system by putting the valve in the Backwash position momentarily.
4. Return the valve to the In Service position.
5. Pull cable out of meter cover.
6. Remove the valve back cover.
7. Remove screw and washer at drive yoke.
8. Remove timer mounting screws. The entire timer assembly should lift off easily.
9. Put new timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control know if necessary).
10. Replace timer mounting screws
11. Replace screw and washer at drive yoke.
12. Return bypass to normal In Service position. Water pressure automatically builds in the system.

Be sure to shut off any bypass line.

13. Plug electrical cord into outlet.
14. Set time of day.
15. Return the control valve to the In Service position.
16. Replace the control valve back cover. Be sure grommet at cable hole is in place.

Make sure there is enough brine in the brine tank.

17. Rotate program wheel counterclockwise until it stops at Regeneration position.
18. Start regeneration cycle manually if water is hard.
19. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

Replacing Piston Assembly

1. Unplug electrical cord from outlet.
2. Turn off water supply to system.
3. Relieve water pressure in the system by putting the valve in the Backwash position momentarily.
4. Return the valve to the In Service position.
5. Pull cable out of meter cover.
6. Remove the valve back cover.
7. Remove screw and washer at drive yoke.
8. Remove timer mounting screws. The entire timer assembly should lift off easily.
9. Remove end plug retainer plate.
10. Pull upward on end of piston yoke until assembly is out of valve.
11. Inspect the inside of the valve to make sure that all spacers and seals are in place, and that there is no foreign matter that would interfere with the valve operation.
12. Take new piston assembly as furnished and push piston into valve by means of the end plug.
13. Twist yoke carefully in a clockwise direction to properly align it with drive gear.
14. Replace end plug retainer plate.
15. Place timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
16. Replace timer mounting screws.
17. Replace screw and washer at drive yoke.
18. Return bypass to normal In Service position. Water pressure automatically builds in the system.

Be sure to shut off any bypass line.

19. Plug electrical cord into outlet.
20. Set time of day.
21. Return the control valve to the In Service position.
22. Replace the control valve back cover. Be sure grommet at cable hole is in place.

Make sure there is enough brine in the brine tank.

20. Rotate program wheel counterclockwise until it stops at Regeneration position.
21. Start regeneration cycle manually if water is hard.
22. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

Replacing Seals and Spacers

1. Unplug electrical cord from outlet.
2. Turn off water supply to system.
3. Relieve water pressure in the system by putting the valve in the Backwash position momentarily.
4. Return the valve to the In Service position.
5. Pull cable out of meter cover.
6. Remove the valve back cover.
7. Remove screw and washer at drive yoke.
8. Remove timer mounting screws. The entire timer assembly should lift off easily.

9. Remove end plug retainer plate.
10. Pull upward on end of piston rod yoke until assembly is out of valve.
11. Remove and replace seals and spacers with fingers.
12. Place timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
13. Replace timer mounting screws.
14. Replace screw and washer at drive yoke.
15. Return bypass to normal In Service position. Water pressure automatically builds in the system.

Be sure to shut off any bypass line.

16. Plug electrical cord into outlet.
17. Set time of day.
18. Return the control valve to the In Service position.
19. Replace the control valve back cover. Be sure grommet at cable hole is in place.

Make sure there is enough brine in the brine tank.

20. Rotate program wheel counterclockwise until it stops at Regeneration position.
21. Start regeneration cycle manually if water is hard.
22. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

Replacing Meter

1. Unplug electrical cord from outlet.
2. Turn off water supply to system.
3. Relieve water pressure in the system by putting the valve in the Backwash position momentarily.
4. Return the valve to the In Service position.
5. Pull cable out of meter cover.
6. Remove two screws and clips at bypass valve or yoke.
7. Pull resin tank away from plumbing connections.
8. Remove two screws and clips at control valve.
9. Pull meter module out of control valve.
10. Apply silicone lubricant to four new O-rings and assemble to four ports on new meter module.
11. Assemble meter to control valve.

Meter portion of module must be assembled at valve outlet.

12. Attach two clips and screws at control valve. Be sure clip legs are firmly engaged with lugs.
13. Push resin tank back to the plumbing connections and engage meter ports with bypass valve or yoke.
14. Attach two clips and screws at bypass valve or yoke. Be sure clip legs are firmly engaged with lugs.
15. Return bypass to normal In Service position. Water pressure automatically builds in the system.

 Be sure to shut off any bypass line.

16. Check for leaks at all seal areas.
17. Plug electrical cord into outlet.
18. Set time of day.
19. Return the control valve to the In Service position.
20. Replace the control valve back cover. Be sure grommet at cable hole is in place.

 Make sure there is enough brine in the brine tank.

21. Rotate program wheel counterclockwise until it stops at Regeneration position.
22. Start regeneration cycle manually if water is hard.
23. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

Replacing Meter Cover and Impeller

1. Unplug electrical cord from outlet.
2. Turn off water supply to system.
3. Relieve water pressure in the system by putting the valve in the Backwash position momentarily.
4. Return the valve to the In Service position.
5. Pull cable out of meter cover.
6. Remove four screws on cover.
7. Lift cover off of meter module, discard O-ring.

8. Remove and inspect impeller for gear or spindle damage, replace if necessary.
9. Apply silicone lubricant to new O-ring and assemble to the smallest diameter on meter cover.
10. Assemble cover to meter module. Be sure impeller spindle enters freely into cover. Press firmly on cover and rotate if necessary to assist in assembly.
11. Replace four screws and tighten.
12. Return bypass to normal In Service position. Water pressure automatically builds in the system.

 Be sure to shut off any bypass line.

13. Check for leaks at all seal areas.
14. Plug electrical cord into outlet.
15. Set time of day.
16. Return the control valve to the In Service position.
17. Rotate program wheel counterclockwise until it stops at Regeneration position.
18. Start regeneration cycle manually if water is hard.
19. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

10. Troubleshooting

Softener Systems

Problem	Cause	Correction
1. Softener Fails to Regenerate	a. Electrical service to unit has been interrupted. b. Timer is not operating properly. c. Defective valve drive motor. d. Timer programmed incorrectly.	a. Assure permanent electrical service, check fuse, plug, switch, etc. b. Replace timer. c. Replace drive motor. d. Check programming and reset as needed.
2. Softener Delivers Hard Water	a. Bypass valve is open. b. No salt in brine tank. c. Injectors or screen plugged. d. Insufficient water flowing into brine tank. e. Hot water tank hardness. f. Leak at distributor tube. g. Internal valve leak. h. Flow meter jammed. i. Flow meter cable disconnected or not plugged into meter. j. Programmed incorrectly.	a. Close bypass valve. b. Add salt to brine tank and maintain salt level above water level. c. Replace injectors and screens. d. Check brine tank fill time and clean brine line flow control if plugged. e. Drain the hot water tank. f. Make sure distributor tube is not cracked. Check O-ring and tube pilot. g. Replace Seals and spacers and/or piston. h. Remove obstruction from flow meter. i. Check meter cable connection to timer and meter. j. Reprogram the control to the proper regeneration type, inlet water hardness, capacity of flow meter size.
3. Unit Uses too Much Salt	a. Improper salt setting. b. Excessive water in brine tank. c. Programmed incorrectly.	a. Check salt usage and salt setting. b. See Problem 7. c. Check programming and reset as needed.
4. Loss of Water Pressure	a. Iron buildup in line to water conditioner. b. Iron buildup in water conditioner. c. Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	a. Clean line to water conditioner. b. Clean control and add resin cleaner to resin bed. Increase frequency of regeneration. c. Remove piston and clean control.

Problem	Cause	Correction
5. Loss of Resin Through the Drain Line	a. Air in water system.	a. Assure that well system has proper air eliminator control check for dry well condition.
6. Iron in Conditioned Water	a. Fouled resin bed. b. Iron content exceeds recommended parameters.	a. Check backwash, brine draw and brine tank fill. b. Increase frequency of regeneration. c. Increase backwash time. d. Add iron removal filter or system.
7. Excessive Water in Brine Tank	a. Plugged drain line flow control. b. Brine valve failure. c. Improper programming.	a. Clean flow control. b. Replace brine valve. c. Check programming and reset as needed.
8. Salt Water in Service Line	a. Plugged injector system. b. Timer not operating properly. c. Foreign material in brine valve. d. Foreign material in brine line flow control. e. Low water pressure. f. Improper programming.	a. Clean injector and replace screen. b. Replace timer. c. Clean or replace brine valve. d. Clean brine line flow control. e. Raise water pressure. f. Check programming and reset as needed.
9. Softener Fails to Draw Brine	a. Drain line flow control is plugged. b. Injector is plugged. c. Injector screen plugged. d. Line pressure is too low. e. Internal control leak. f. Improper programming. g. Timer not operating properly.	a. Clean drain line flow control. b. Clean or replace injectors. c. Replace screen. d. Increase line pressure (line pressure must be at least 25 psi at all times.) e. Change seals and spacers and/or piston assembly. f. Check programming and reset as needed. g. Replace timer.
10. Control Cycles Continuously	a. Time not operating properly. b. Faulty micro switches and or harness. c. Faulty cycle cam operation.	a. Replace timer. b. Replace faulty micro switch or harness. c. Replace cycle cam or reinstall.
11. Drain Flows Continuously	a. Foreign material in control. b. Internal control leak. c. Control valve jammed in brine or backwash position. d. Timer motor stopped or jammed. e. Timer not operating properly.	a. Remove piston assembly, inspect and remove foreign material. b. Replace seals and/or piston assembly. c. Replace piston and seals and spacers. d. Replace timer motor, check for missing teeth on gears. e. Replace timer.

Filter Systems

Problem	Cause	Correction
1. Filter Fails to Backwash	a. Electrical service to unit has been interrupted. b. Timer is defective. c. Power failure.	a. Assure permanent electrical service (check fuse, plug, pull chain or switch). b. Replace timer. c. Reset time of day.
2. Filter Bleeds Iron	a. Bypass valve is open. b. Excessive water usage. c. Hot water tank rusty. d. Leak at distributor tube. e. Fouled filter media bed. f. Inadequate backwash flow rate.	a. Close bypass valve. b. Increase days between regenerations (see timer instructions), make sure that there is not a leaking valve in the toilet or sinks. c. Flush out the hot water tank. d. Verify distributor tube is not cracked, check O-rings and tube pilot. e. Replace bed. f. Make sure filter has correct DLFC. Be sure flow control is not clogged or drain line restricted. Be sure water pressure has not dropped.
3. Loss of Water Pressure	a. Iron or turbidity build-up in water filter. b. Inlet plugged due to foreign material broken loose from pipes.	a. Reduce days between backwashing so filter backwashes more often, make sure filter is sized large enough to handle water usage. b. Remove piston and clean control.
4. Loss of Filter Media Through the Drain Line	a. Broken or missing upper or lower basket.	a. Replace install or replace basket.
5. Drain Flows Continuously	a. Foreign material in control. b. Internal control leak. c. Control valve jammed in rinse or backwash.	a. Remove piston assembly and inspect bore, remove foreign material and check control in various cycle positions. b. Replace seals and/or piston assembly. c. Replace piston, seals and spacers (and drive motor if necessary).

11. Hankscraft Runxin, LLC Warranty Statement

LIMITED WARRANTY

As described herein, Hankscraft Runxin, LLC ("Hankscraft Runxin"), warrants its products are free from defects in material and workmanship only, when properly installed, operated, and maintained. This warranty is subject to the exceptions herein.

Hankscraft Runxin warrants to the original owner that the items listed below, excluding but not limited to wear parts like O-rings, gaskets and seals, will be free from defects in materials and workmanship for the period of time specified below from the original purchase date.

Product or Component	Warranty Period
Control Valves	Five (5) Years
Storage Tanks	Five (5) Years
Media Tanks	Ten (10) Years
Any Other Components	One (1) Year
Ceramic Discs for Rotary Valves	Lifetime
RO and UF Filter Systems	One (1) Year

Media/resin is not warrantied due to water supply quality differences.

Any parts used for replacement are warrantied for the remainder of the original warranty period applicable to the part from the date of manufacture so long as the parts are installed by a Hankscraft Runxin factory trained and authorized installer.

Hankscraft Runxin's obligation by this Limited Warranty, at is option, is to repair or replace any warrantied product only. Labor for repair or replacement is not included as part of this warranty. Prior to returning the product to Hankscraft Runxin, a valid return materials authorization number must be obtained from Hankscraft Runxin. Any product returned to Hankscraft Runxin without a valid return authorization number will be rejected. Any product found to be defective will, at the sole discretion of Hankscraft Runxin, be repaired or replaced. Hankscraft Runxin is not responsible for shipping cost to the repair facility. This section lists the sole remedies for any valid warranty claim.

This warranty does not apply to defects reported to Hankscraft Runxin outside of the warranty period.

This warranty does not apply to defects caused by installing, operating, servicing, modifying, repairing or maintaining (or lack of maintaining) the product outside of Hankscraft Runxin's recommendations. Filters, membrane elements and flow restrictors that become fouled or plugged due to excessive turbidity, dissolved solids, or microorganisms are not covered by this warranty. This warranty does not apply to defects caused by damage during shipment, neglect, misuse, modification, accident,

noncompliance with local codes and ordinances, hot water, frozen water, sediment, corrosive liquids, gases, chemicals, bacteria, animals, sand, salt, flood, wind, fire, outdoor installations where the product is not reasonably covered, pneumatic use, natural disasters, war, terrorism or acts of God. No other person is authorized to make any other warranty on behalf of Hankscraft Runxin either during or after the applicable warranty period.

Hankscraft Runxin assumes no liability for determining the proper products and equipment or installation necessary to meet the requirements of the user of the product, and Hankscraft Runxin does not authorize others to assume such liability on its behalf.

THE WARRANTIES AND REMEDIES HEREIN ARE EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES OR REMEDIES EITHER EXPRESSED OR IMPLIED, HEREIN OR ELSEWHERE, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, NON-INFRINGEMENT OR WARRANTIES RESULTING FROM COURSE OF PERFORMANCE, COURSE OF DEALING OR FROM USAGE OF TRADE. HANKSCRAFT RUNXIN HEREBY DISCLAIMS ALL OTHER WARRANTIES. HANKSCRAFT RUNXIN'S LIABILITY SHALL NOT EXCEED THE COST OF THE PRODUCT. HANKSCRAFT RUNXIN IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR EXPENSES OF ANY KIND WHATSOEVER, INCLUDING LOSS OF PROFITS, UNDER ANY CIRCUMSTANCES AND REGARDLESS OF WHETHER HANKSCRAFT RUNXIN WAS AWARE OF THE POSSIBILITY OF ANY SUCH LOSS.

12. Contact Information

HANKSCRAFT RUNXIN

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