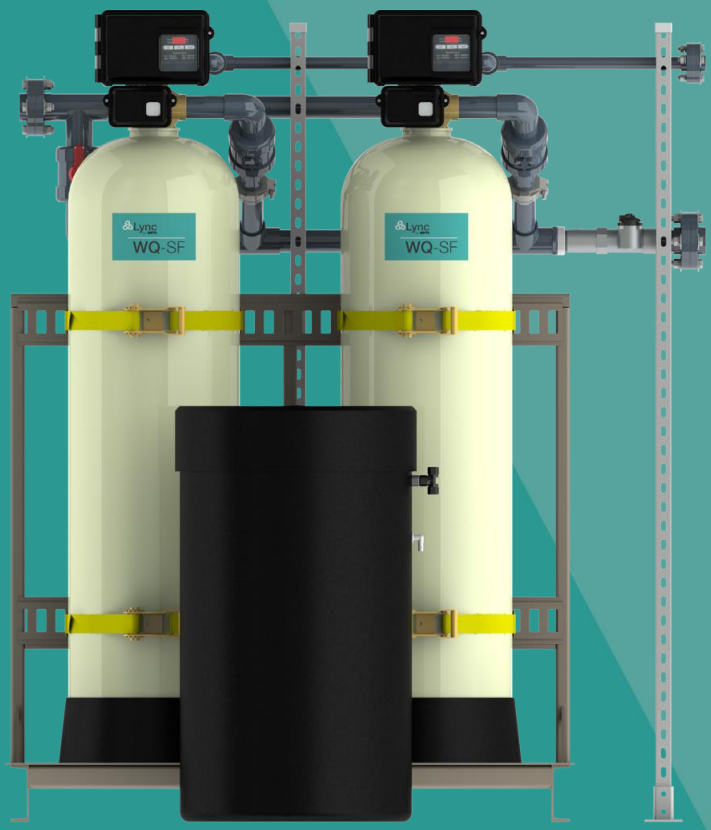
Installation, Operation and Maintenance Manual

Lync WQ-SF

Complete Water Quality Solutions



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L- OMM-004_A • 8/15/2022

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1. INTRODUCTION

WARNINGS!

Read carefully before installation. Failure to follow instructions or operating parameters may lead to the product's failure. Keep this Manual for future reference.

If you are unsure about installing your Lync water softener contact a Lync representative or consult a professional water treatment dealer or plumber.

You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product. FAILURE TO COMPLY WITH PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS COULD RESULT IN PRODUCT FAILURE WHICH CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY AND/OR DEATH.
Lync is not responsible for damages resulting from improper installation and/or maintenance. Local building or plumbing codes may require modifications to the information provided. You are required to consult the local building and plumbing codes prior to installation. If this information is not consistent with local building or plumbing codes, the local codes should be followed.

Refer to the enclosed for operating parameters to ensure proper use with your water supply.

- As with all plumbing projects, it is recommended that a trained professional water treatment dealer or contractor install the water conditioning system. Please follow all local plumbing codes.
- Inspect the water conditioning system for carrier shortage or shipping damage before beginning installation. Replace any damaged component immediately, before beginning installation.
- Use caution when installing soldered metal piping near the water conditioning system. Heat can adversely affect the system's components.
- Use only lead-free solder and flux for, as required by local and federal codes.
- Handle all components with care. Do not drop, drag or turn components upside down.
- Be sure the floor under the system is clean, level and strong enough to support the system.
- Install the system in a protected area.
- Do not attempt to treat water over 113°F (45°C) or under 34°F (1°C) with the system.
- Always connect the system to the main water supply pipe before the water heater.
- Do not install in direct sunlight as overheating of electronics may occur and ultraviolet rays from the sun may cause damage.
- Do not use on water that is microbiologically unsafe or of unknown quality. This system will not make microbiologically unsafe water safe. Water that is unsafe must be treated separately.
- Operating ambient temperature: 34° to 120°F (1° to 52°C).
- Operating water pressure range: 25 to 125psi (171 kPa to 8.6 bar).
- All plumbing connections to the system should be made using industry accepted best practices. Plumbing tape may be used on inlet, outlet and drain connections Do not use paste type pipe thread sealants on the valve body.
- Do not use petroleum-based lubricants such as Vaseline, oils or hydrocarbon-based lubricants on O-rings or valve seals. Use only 100% silicone lubricants.
- Use only the power transformer supplied with this water conditioning system.
- All electrical connections must be completed according to local codes.
- The power outlet must be grounded.
- If plastic plumbing is used, install an appropriate grounding strap across the inlet and outlet piping of the building's metal plumbing to ensure that a proper ground is maintained.
- To disconnect power, unplug the AC adapter from its power source.
- Observe drain line requirements.
- Support the full weight of the plumbing system with pipe hangers or other means.
- Do not allow this water conditioning system to freeze. Damage from freezing will void the warranty.
- When daytime water pressure exceeds 80 psi (5.5 bar), the maximum pressure rating of 125 psi (8.6 bar) can be exceeded. A pressure regulator must be installed on this system or warranty is voided.
- Periodic cleaning and maintenance be required for system to function properly.

- Observe all warnings that appear in this manual.
- Keep the media tank in the upright position. Do not turn upside down or drop. Turning the tank upside down or laying the tank on its side can cause media to enter the valve.
- Use only regenerants designed for water conditioning. Do not use melting salt, block salt or rock salt.

IMPORTANT: This manual is a reference and will not include every system installation situation The person installing this equipment should have:

- Training on the control valve.
- Knowledge of water conditioning and how to determine proper control settings.
- Adequate plumbing skills.

WARNING

Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

1.1. Principals of Softening and Ion Exchange

When water dissolves limestone rock the solid calcium and magnesium becomes ions. An ion with a positive electrical charge is called a cation. Calcium and magnesium hardness ions in water are positively charged cations. When water dissolves enough calcium and magnesium hardness cations, it is classified as hard water, which can cause lime scale build up in plumbing systems, water spots, and an increase in soap and cleaning product usage.

Ion exchange water softening is a process where an ion exchange resin is used to effectively exchange calcium and magnesium hardness cations for sodium cations in the water. Newly or freshly regenerated, ion exchange resin is saturated with sodium cations. As calcium and magnesium hardness cations come in contact with the ion exchange resin, they attach to the resin and sodium cations are released into the water. This is possible because the hardness cation are more attracted to the ion exchange resin than the sodium cations. Therefore, scale forming calcium and magnesium cations have been exchanged for non-scale forming sodium cations as the water is treated. If the calcium and magnesium content of the water is reduced to less than 17.1 mg/L, that water is classified as soft water. Eventually the ion exchange resin will become exhausted, depleted of sodium, and will need to be regenerated with a sodium brine solution to restore its capacity to soften water.

This system includes a flow meter to track treated water volume and initiate regeneration before resin exhaustion occurs. Regeneration occurs automatically and consists of 5 steps:

1. Backwash (approximately 10 Minutes) - Fresh water flow is directed upward through the resin bed, to remove solid particles, sending them to drain.
2. Brine Draw (approximately 15-20 Minutes) - Water is drawn from the brine tank and rinsed over the ion exchange resin, driving away calcium and magnesium cations and restoring sodium cations within the resin. Calcium and magnesium is sent to drain.
3. Slow Rinse (approximately 40-45 Minutes) - Once the brine tank is emptied, fresh water rinses over the resin and rinse calcium and magnesium cations to drain.
4. Rapid Rinse (approximately 10 Minutes) - After the conclusion of slow rinse, fresh water will rinse over the resin to ensure any residual sodium brine has been cleaned from the resin before it returns to service. At the conclusion of Rapid Rinse systems return to the “Stand By” position.
5. Brine Tank Refill (User Adjustable) - In this final step, water is added back into the brine tank so that a brine solution can be prepared for the next regeneration.

1.2. Lync WQ-SF Skids Specifications:

Skid Model	WQSF-025-N	WQSF-050-N	WQSF-075-N	WQSF-100-N	WQSF-200-N	WQSF-300-N
Operation Mode	Twin Alternating		Progressive Flow			
Inlet & Outlet / Drain Size	2" / 1"	2" / 1"	2" / 1"	2" / 1"	4" / 1"	4" / 1"
Number of Tanks - Tank Size	2 - 18" x 65"	2 - 21" x 62"	4 - 18" x 65"	4 - 21" x 62"	4 - 24" x 72"	4 - 30" x 72"
Resin [ft^3/tank]	5	7	5	7	10	15
Gravel [lbs./tank]	100	100	100	100	200	400
Max Hardness Removal Capacity [grains/tank]	150,000	210,000	150,000	210,000	300,000	450,000
Max Salt Usage [lb/tank]	75	105	75	105	150	225
Min Hardness Removal Capacity [grains/tank]	100,000	140,000	100,000	140,000	200,000	300,000
Min Salt Usage [lbs./tank]	30	42	30	42	60	90
Flow Rate at 15 to 25 psi Pressure Drop [GPM] [1]	57 to 65	60 to 77	216 to 247	228 to 292	296 to 388	320 to 400
Backwash [GPM]	10	13	10	13	15	25
Backwash Duration [min]	10	10	10	10	10	10
Brine and Slow Rinse Duration [min]	60	60	60	60	60	60
Fast Flush Duration [min]	10	10	10	10	10	10
Brine Fill Duration (Max Hardness Removal) [min]	15	20	15	20	30	45
Brine Fill Duration (Min Hardness Removal) [min]	6	8	6	8	12	18
Electrical Data						
Voltage [V], Phase, Frequency [Hz]	120, 1Ø, 60					
Amps [A]	5/unit					
Dimensions without Brine Tank(s)						
Width [in]	75	75	135	136	149	155
Depth [in]	38	39	38	39	45	49
Height [in]	86	86	86	86	97	103
Shipping Weight [lbs]	2000	2200	4200	4600	5200	6200

1. Flow rates listed above are based on pressure drop only. Selecting a system based on pressure drop alone does not guarantee the system will provide adequately softened water. System selection should be based on resin quantity, capacity required, feed water analysis, and application requirements.

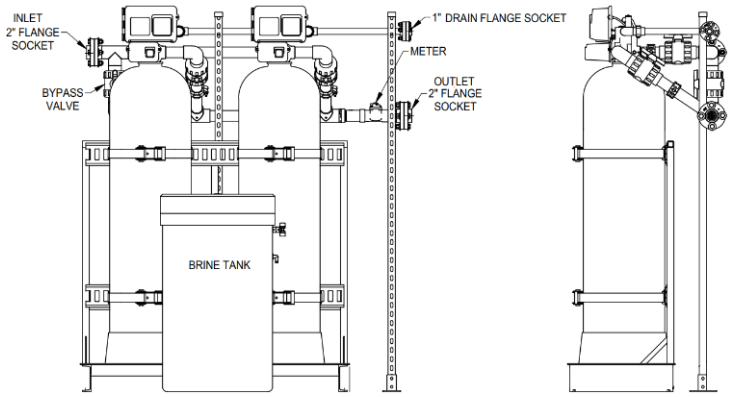
1.3. Feed Water Chemistry Requirements

pH	6 to 10
Hardness (maximum)	Depends on customer's acceptable hardness leakage level.
Water Pressure	25 psi to 125 psi
Temperature	34 - 110°F (1 - 43°C)
Free Chlorine maximum)	1mg/L
Iron (maximum)	1mg/L
Oil and H_2S	None Allowed
Turbidity	Less than 5.0 NTU
Total Dissolved Solids	Must be below 750 mg/l for the softener to produce less than 1 grain per gallon soft water.
Ambient Temperature	34°F/1°C to 122°F/52°C

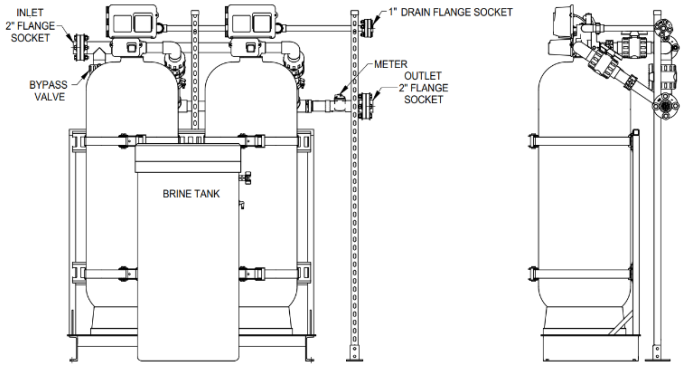
Water known to have heavy loads of dirt and debris may require pre-filtration prior to the water softening system. For all other guideline information please contact your Lync representative.

1.4. General Skid Components

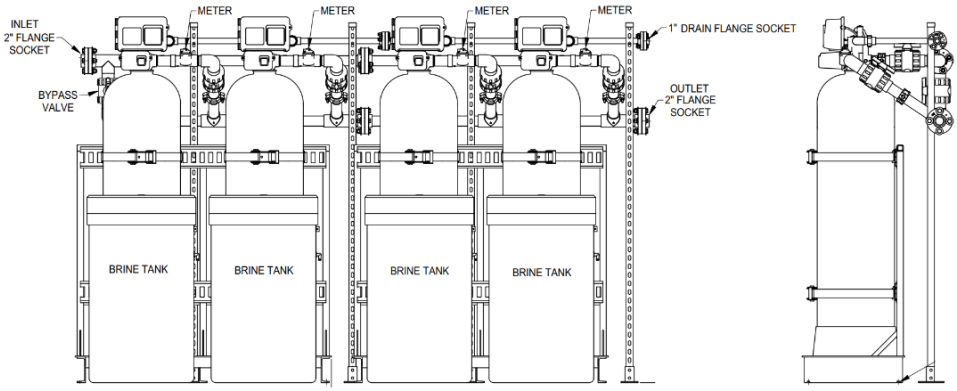
WQSF-025-N



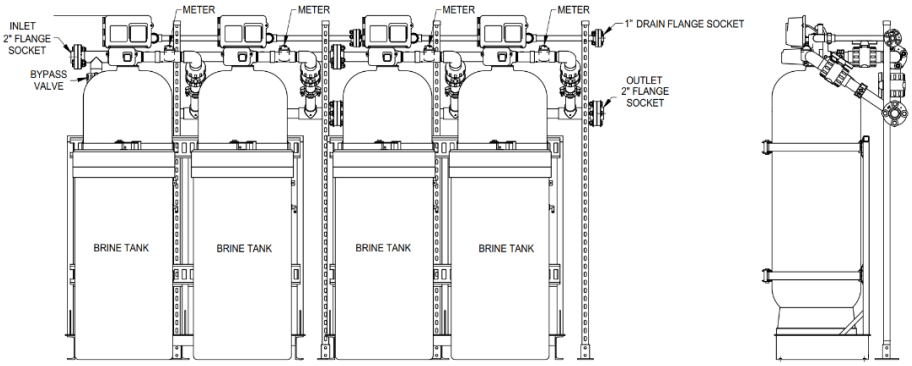
WQSF-050-N



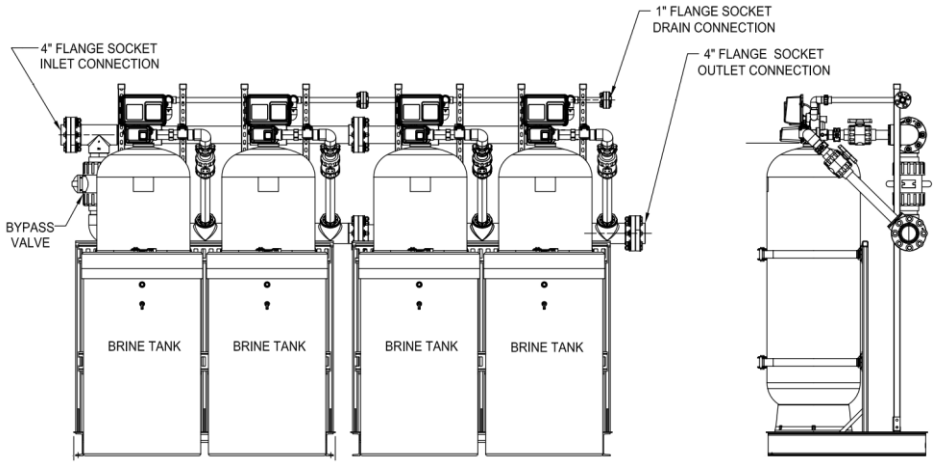
WQSF-075-N



WQSF-100-N



WQSF-200-N



WQSF-300-N

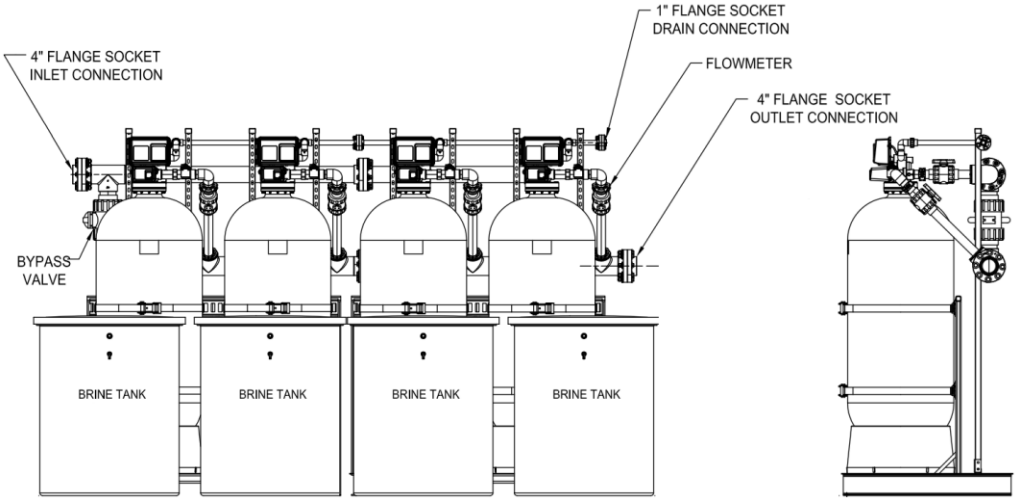


Figure 1-1: WQ-SF Skids Component Identification

2. INSTALLATION AND OPERATION

2.1. Pre-Installation Considerations

Unpack the crate(s) and pallets and make sure all components are accounted for according to the table below for each specific model. If any components are missing or damaged contact your Lync representative. If they cannot be reached contact Lync customer service at 1-800-433-5654.

Component	Shipped Loose	Pre-installed	Quantity					
			WQSF -025-N	WQSF -050-N	WQSF -075-N	WQSF -100-N	WQSF -200-N	WQSF -300-N
Water Softener Tanks		X	2	2	4	4	4	4
FLECK® Control Valves*		X	2	2	4	4	4	4
Drain Line Flow Control (DLFC) Valves		X	2	2	4	4	4	4
Flow Meter(s)		X	1	1	4	4	4	4
Assembled Inlet Piping Header(s)		X	1	1	2	2	2	2
Assembled Outlet Piping Header(s)		X	1	1	2	2	2	2
Assembled 1” Drain Piping Header(s)		X	1	1	2	2	2	2
Inlet/Outlet Headers Gasket/Bolt kit(s)	X		-	-	2	2	2	2
Drain Line Gasket/Bolt kit(s)	X		-	-	1	1	1	1
Unistrut Channels Package		X	1	1	1	1	1	1
Control Valve Transformer	X		2	2	4	4	4	4
Flowmeter Cable	X		1	1	4	4	4	4
CAT5 Communication Cable	X		1	1	3	3	3	3
Resin Bags**	X		10	14	20	28	40	60
Gravel Support Media bags**	X		4	4	8	8	16	32
Brine tanks	X		1	1	4	4	4	4
10ft Brine Solution Tube(s)	X		1	1	4	4	4	4
Brine Valve Fittings Package(s)	X		1	1	4	4	4	4
TEE Fitting for Brine Solution Tubes	X		1	1	-	-	-	-

* careful during uncrating and installation process to avoid any damage to the system components.

** Resin and gravel are supplied in bulk on pallets. The proper amount is supplied for the system. Divide resin and gravel equally between the number of mineral tanks.

- Make sure that the installation location of the skid and brine tanks is smooth, level, and sturdy enough to support the weight of the system once it is in operation.
- The softener should be located close to a drain. It is recommended to install the system no more than 10 ft away from a drain that can handle high flow rate backwash load.
- A minimum of 25 psi of water pressure is required for regeneration valve to operate effectively.
- It is established that when daytime water pressure exceeds 80 psi (5.5 bar), the water pressure risks exceeding the softener's maximum pressure rating of 125 psi (8.6 bar). A pressure regulator must be installed on this system to avoid pressures over 100 psi or warranty is voided.
- If suspended solids are present in the water, install a prefiltration system in the water supply line.
- A continuous 115 Volt, 60 Hertz current supply is required. Make certain the current supply is always energized and cannot be turned off with another switch.
- Condition of existing plumbing should be free from hardness scale and iron buildup. Piping that is built up heavily with hardness scale and/or iron should be replaced If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water softener.
- Always provide for the installation of a bypass valve.
- Do not install the system where it would block access to the water heater, main water shutoff, water meter, or electrical panels.
- Install the system in a place where water damage is least likely to occur if a leak develops.
- If risk of vacuum exists, install Lync vacuum relief valve (part number: 123318) in the supply line to protect the system against vacuum damage.

NOTES:

It is required to install a water sample port before and after the water softener system to monitor system's performance. Make sure water sample ports are closed during installation and operation.

If lubricant is required, a silicone compound is recommended. Dow Corning® Silicone Compound (available from Watts), is recommended for best results. Dow Corning 7 Release Compound is used in the manufacture of this control valve. The use of other types of lubricants may attack the control's plastic or rubber components. Petroleum-based lubricants can cause swelling in rubber parts, including O-rings and seals.

WARNINGS!

Do not exceed water pressure of 125psi (8.5 bar).

Do not exceed water temperature of 110°F (43°C).

Do not subject unit to freezing conditions.

2.2. Water Softener Skid Installation

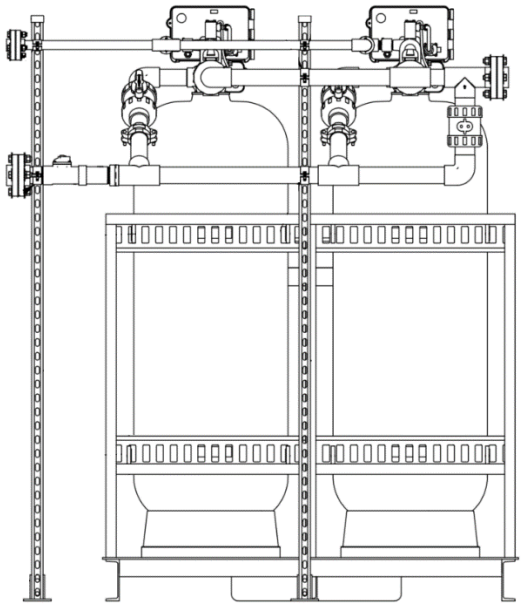
NOTES:

- For Progressive Flow systems, two skids require onsite connection to form a single water softener system consist of four tanks. The gasket kits are provided with the systems to connect the preassembled inlet, outlet, and drain piping headers of the two skids.
- All control valves are pre-installed in the factory and need to be removed at the installation site for the gravel and resin loading process.
- The control valve and all plumbing connections have right-hand threads. Turn clockwise to install.

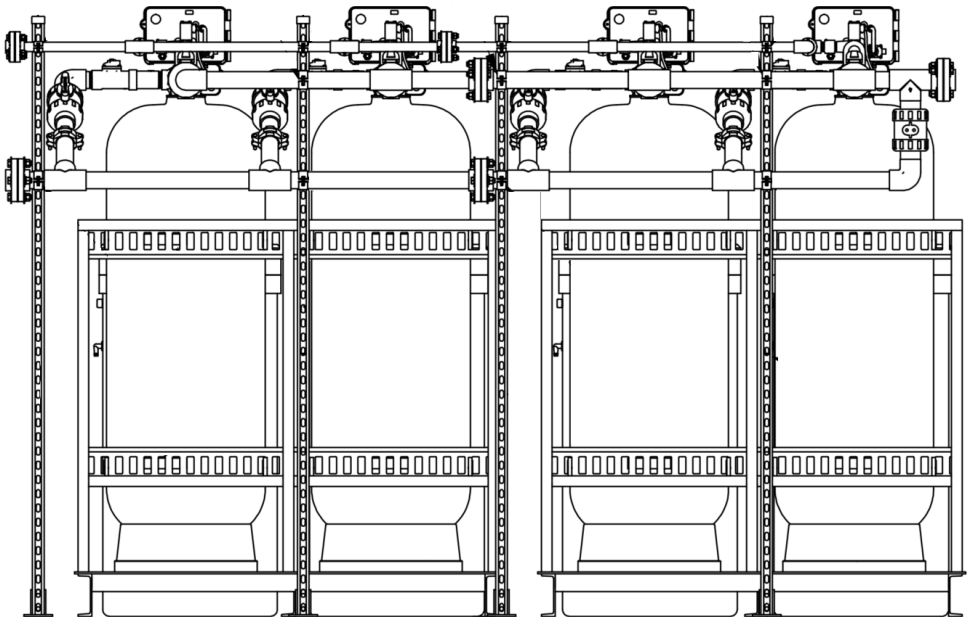
1. Turn off water heater(s), if there is any on the outlet side.
2. Turn off the main water supply to the building and open a treated water faucet (cold and hot) to relieve any pressure within the plumbing system.
3. Place the skid (skid#1 for progressive flow models) in installation location.
4. Carefully remove the Victaulic couplings and union fittings installed on inlet, outlet and drain lines. Carefully unthread and remove the pre-installed controlled valves.
5. Follow the steps in the section 2.3. of this manual to load the tanks with gravel and resin media and re-install the control valves, Victaulic couplings and union fittings.

NOTE: For installation of twin alternating systems (two tanks systems), skip steps 6 to 10. Steps 6 to 10 are for progressive flow systems (four tanks systems).

6. Use the provided bolts to place the rubber gaskets at all three outlet flanges of skid #1.
7. Slowly move skid#2 towards skid#1 and adjust its position to let PVC flanges meet the gasket of their pairs from skid#1.
8. Once the location of skid#2 is finalized, carefully unthread and remove its pre-installed controlled valves. Remove the piping headers from the Victaulic couplings, if it is necessary to remove the control valves.
9. Follow the steps in the section 2.3. to load the tanks with gravel and resin media and re-install the control valves.
10. Make sure all gaskets are still in place and use the bolt and nuts to connect the piping headers of the two skids.
11. Connect the inlet flange of the skid to upstream cold-water supply piping and outlet header flange to the downstream piping.
12. At the 1” drain line outlet, construct a 1” piping line and route it to an appropriate drain receptacle by abiding all local building and plumbing codes. DO NOT construct drain line to elevations that exceed 4 feet above the drain port of the control valve or reduce the drain line diameter to smaller than 1”. The drain line must be anchored to the floor.
13. If applicable, install a metal bonding strap across metal inlet and outlet plumbing lines to maintain electrical continuity.
14. Once all above installation steps are complete, if the Unistrut structure is removed during installation, re-install the Unistrut structure elements to support all piping headers. Figure 2-1 shows the back side of the skids and details of Unistrut support structure.



Twin Alternating Systems



Progressive Flow Systems

Figure 2-1: Unistrut Support for Piping Headers

2.3. Mineral Tanks Resin Loading Procedure

After the mineral tank skid(s) has been placed in the final position, and will not need to be moved again, load the mineral tanks with gravel and resin media following the instructions below:

1. Inspect the distributor tubes and screens for damage, and make sure all screens are present before loading the mineral tank with media. Before proceeding with installation, replace any damaged components immediately.
2. Cap the top open end of the distributor tube with tape and plastic sheeting to keep all media and foreign debris from entering the distributor tube. This cap must be secure and not come off during media loading.
3. Place the distributor tube, screen end down, into the mineral tank and center it in the bottom. The top of the distributor tube should be flush with the top of the tank. Test the tape cap to make sure it cannot come off during the media loading process.
4. Fill the mineral tank 1⁄3 full with water to prevent breakage of the distributor tube screens during the media loading process.
5. Make sure the plastic and tape cap is secure to the top of the distributor tube, place a funnel on the top of the tank and load first the gravel then the softening resin into the tank. The cap must not come off of the distributor tube during the loading of the media. Refer to Specifications table in section 1.2. for volume of resin required in each tank.
6. Remove the funnel from the top of the tank and remove the plastic cap and the tape from the top of the distributor tube. DO NOT PULL UP ON THE DISTRIBUTOR TUBE when removing the plastic cap and the tape. The distributor tube top must remain flush with the top of the tank.
7. Clean any media from the threads and top of the mineral tank. Media in the threads and on the O-ring sealing surface of the tank can cause tank thread damage and prevent the control valve's O-ring seal from sealing properly.
8. Lubricate the O-rings on the bottom of the control valve (distributor tube port O-ring and top of tank O-ring). Use the Lync provided nonpetroleum based silicone lubricant only.

WARNING

Avoid spilling any resin. The ion exchange resin is very slippery. Remove any spilled resin immediately.

10. Press the factory suppled black upper diffuser into the base of the control valve.
11. Place the control valve on top of the tank when performing this step, seat the top of the distributor tube inside the distributor port located on the bottom of the control valve first, then press the control valve down until the control valve threads come in contact with the tank threads. This ensures that the distributor tube is properly seated into the bottom of the control valve.
12. Tighten the control valve onto the tank with a clockwise rotation. Rotate the control valve freely without using force clockwise until it comes to a stop (this position is considered zero). Rotate the control valve clockwise from zero, between ¼ turn and 1/2 turn to fully tighten hand tight. Be careful not to cross thread the control valve to tank connection or over tighten it. A hand tight fit is appropriate for the control valve torque. DO NOT use a wrench. Tank or control valve damage could result. DO NOT apply thread sealant or plumbing tape on the control valve to tank threaded connection.

2.4. Brine Tank Installation

2.4.1. Installation Location

The brine tank(s) should set on a common elevation as the mineral tank and within distance so that it can be reached by the length of factory supplied brine tubing. If a smooth and level surface is not available, place brine tank(s) on a smooth piece of exterior plywood and level it by placing shims underneath the plywood. For WQSF-025-N and WQSF-075-N systems, make sure that the brine grid at the bottom of the brine tank is level and the brine well is near to vertical as possible. Brine tanks for WQSF-050-N, WQSF-100-N, WQSF-200-N, and WQSF-300-N systems do not have a brine grid.

2.4.2. Tubing Connections

1. For Twin Alternating systems, connect both 1/2" OD tubing to the TEE fitting installed on the brine tank (See Figure 2-2). For Progressive Flow systems, connect each tubing to one brine tank. Connect the other side of each tubing to the control valve on each mineral tank (see Figure 2-2). After connecting the tubing on both ends, verify that the brine line tubing is not kinked or restricted.

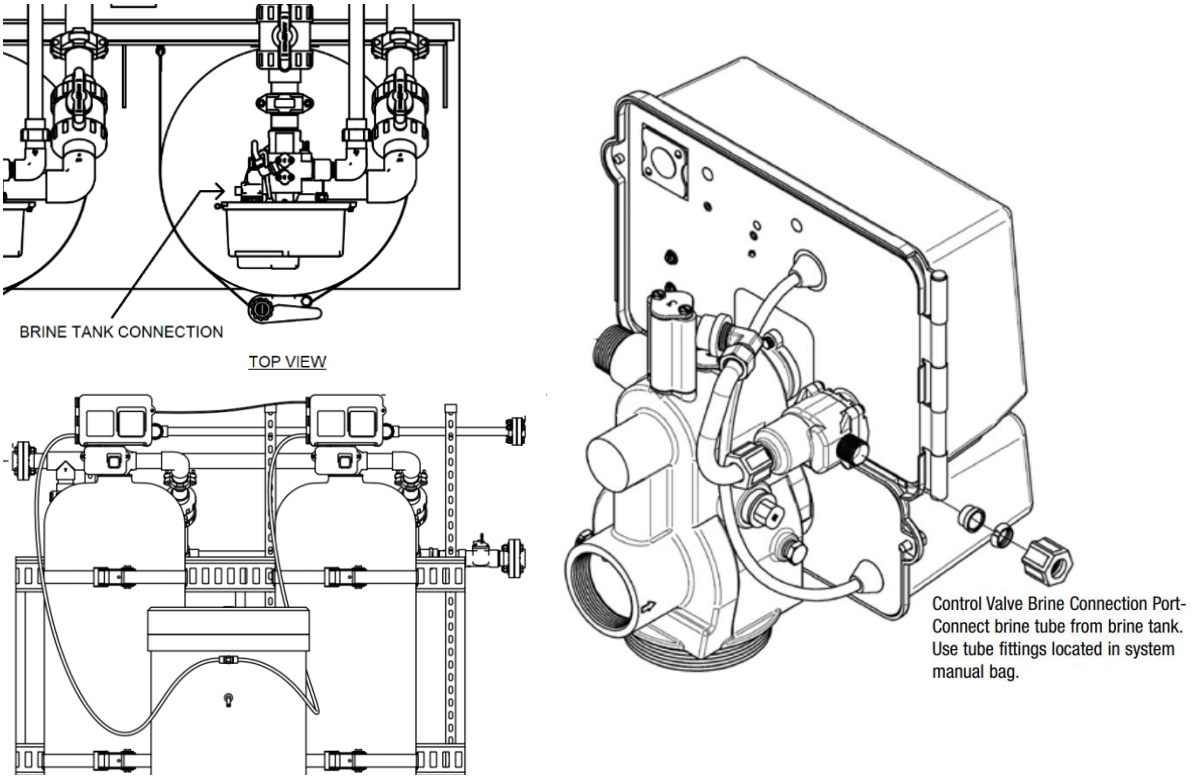
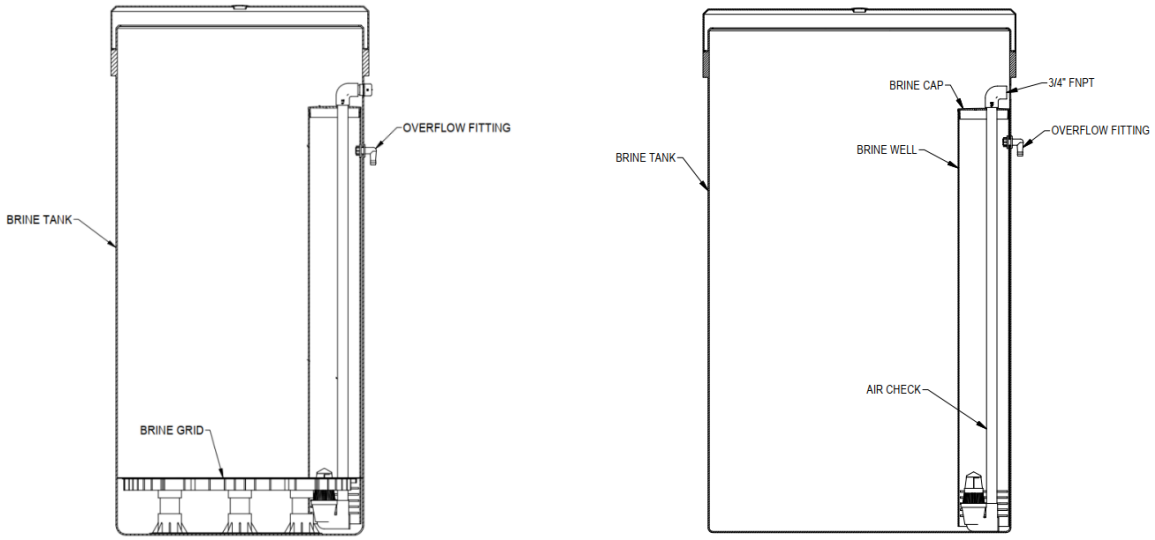


Figure 2-2: Brine Tube Connection Point on Control Valve

2. Run the provided 5/8" tubing from the brine tanks overflow fitting to an appropriate, non-elevated, open drain (see Figure 2-3).
3. Add enough water to the brine tank so that water covers the top of the air check (2" above brine grid). **DO NOT** add salt to the brine tank at this time. The salt will be added to tank during system startup.

NOTE: In the process of making brine for the first regeneration, the solution volume will increase (one gallon of water will be 1.2 gallons of brine). The final level of the liquid will be several inches above the brine grid.



WQSF-025-N and -075-N models **WQSF-050-N, -100-N, -200-N, and -300-N models**

Figure 2-3: WQ-SF Systems Brine Tanks

2.4.3. Recommended Type of Salt

Only purified salt should be used in the brining system. Palletized salt (“Button”, “Nugget”, and “Pellet”) or block salt (free binders) is recommended. Do not use granulated salt, as it will fall through the platform screen. Rock salt is not normally recommended. Most rock salt contains sludge-forming insoluble that collect on the platform and prevents proper salt-water contact. Only salt containing 0.5% or less of insoluble will provide continued satisfactory operation. If salt with more insoluble is used, the brine maker will require periodic cleaning.

2.5. Cables and Connections

Connect the meter cable to the control valve’s P5 port (the control valve that the meter is plumbed into). For Twin Alternating systems, connect the meter cable to the lead unit’s control valve (lead unit is control valve). See Figure 2-5 for location of P5 port.

Connect the 24V transformer power supply wire(s) to the P14 port(s) of the control valve controller(s). See Figure 2-5 for P14 location.

2.5.1 Meter Cable Connections

1. For Twin Alternating systems (two tank systems), the valve programmed as initially will be the lead unit or Unit 1 (in Lync Twin Alternating systems, the unit closer to the skid inlet is factory programmed as the lead unit.). Connect meter cable(s) to the cable port in the center of the meter dome and secure with screw provided in meter dome. For Progressive Flow systems, each unit has one dedicated meter.
2. Connect the other end of the meter cable to port P5 on the circuit board of control valve (refer to Figure 2-5).

2.5.2 Network/communication Cable Connections

1. Use the provided shielded CAT5 Network/Communication cable(s).
2. Connect each unit in series (do not form a loop) from one communication port to the next communication port.

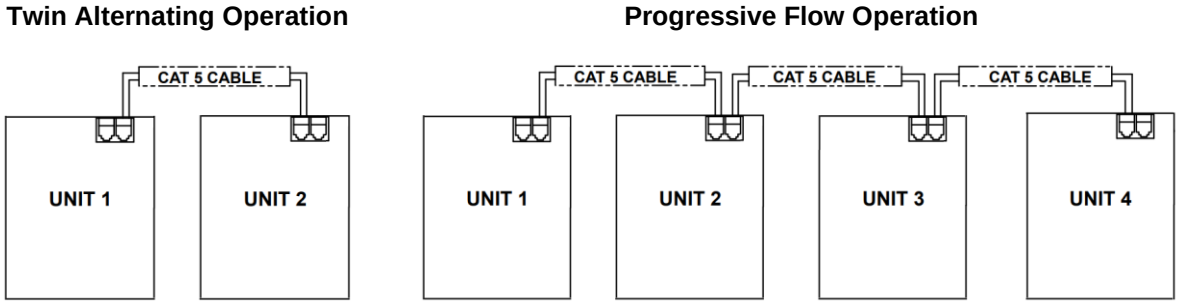
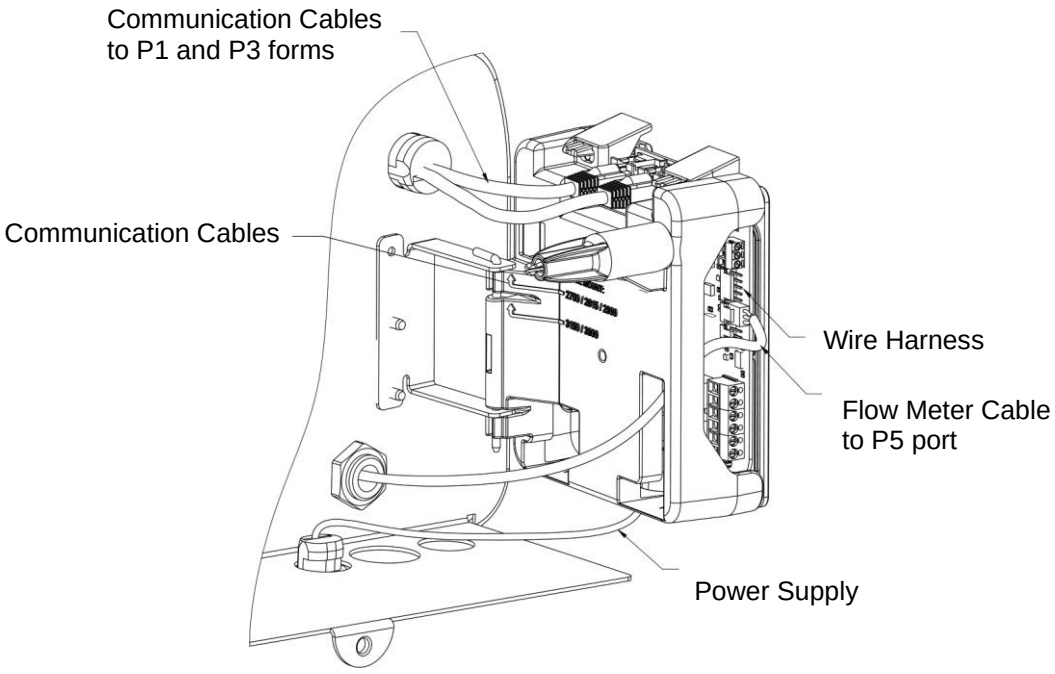


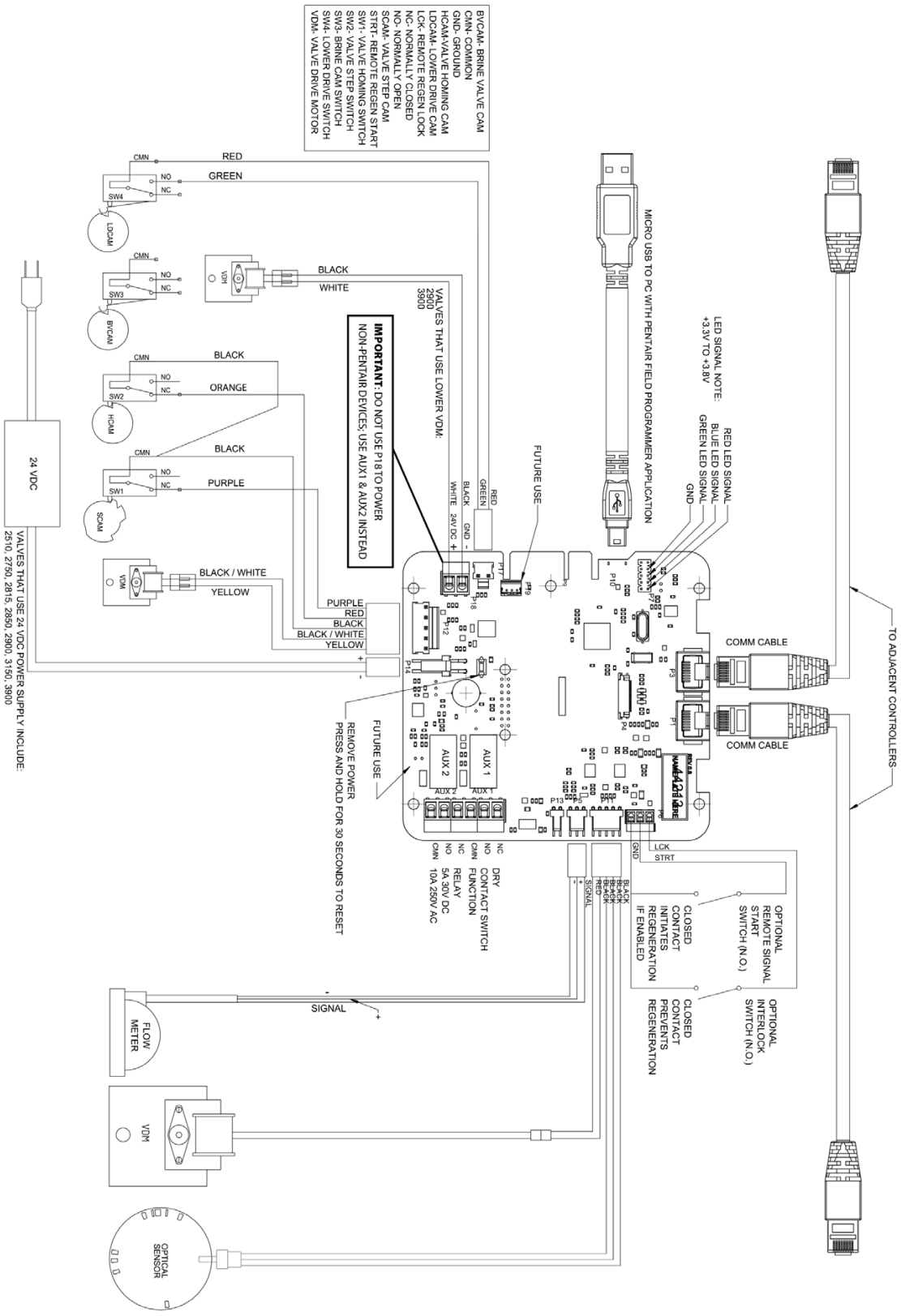
Figure 2-4: Network Timer Configuration Wiring

2.5.3 Power Supply Connections

NOTE: Power Supply includes a harness with 2 black wires that connect to circuit board, see Figure 2-6.

1. Insert black and black transformer wires into 24VDC input of control





Wiring diagrams are reference only. All wiring should be done by a certified electrician and meet all electrical codes

Figure 2-5: NXT2 Controller Cables and Connections

3. OPERATION

3.1. NXT2 Controller Operating Parameters and Features

Operating Parameters

- System Type
  - 4 - Single Unit
  - 5 - Parallel Interlock (2-8 Unit)
  - 6 - Parallel Series Regeneration (2-8 Units)
  - **7 - Alternating Interlock (2 Units) - Operation mode for WQSF-025-N and WQSF-050-N skids. See section 3.4. for more information.**
  - 8 - Alternating Delayed (2 Units)
  - 9 - Alternating with Standby Units (2-8 Units)
  - **14 - Demand Recall (2-8 Units) - Operation mode for WQSF-075-N, -100-N, -200-N, and -300-N systems. See section 3.4. for more information.**

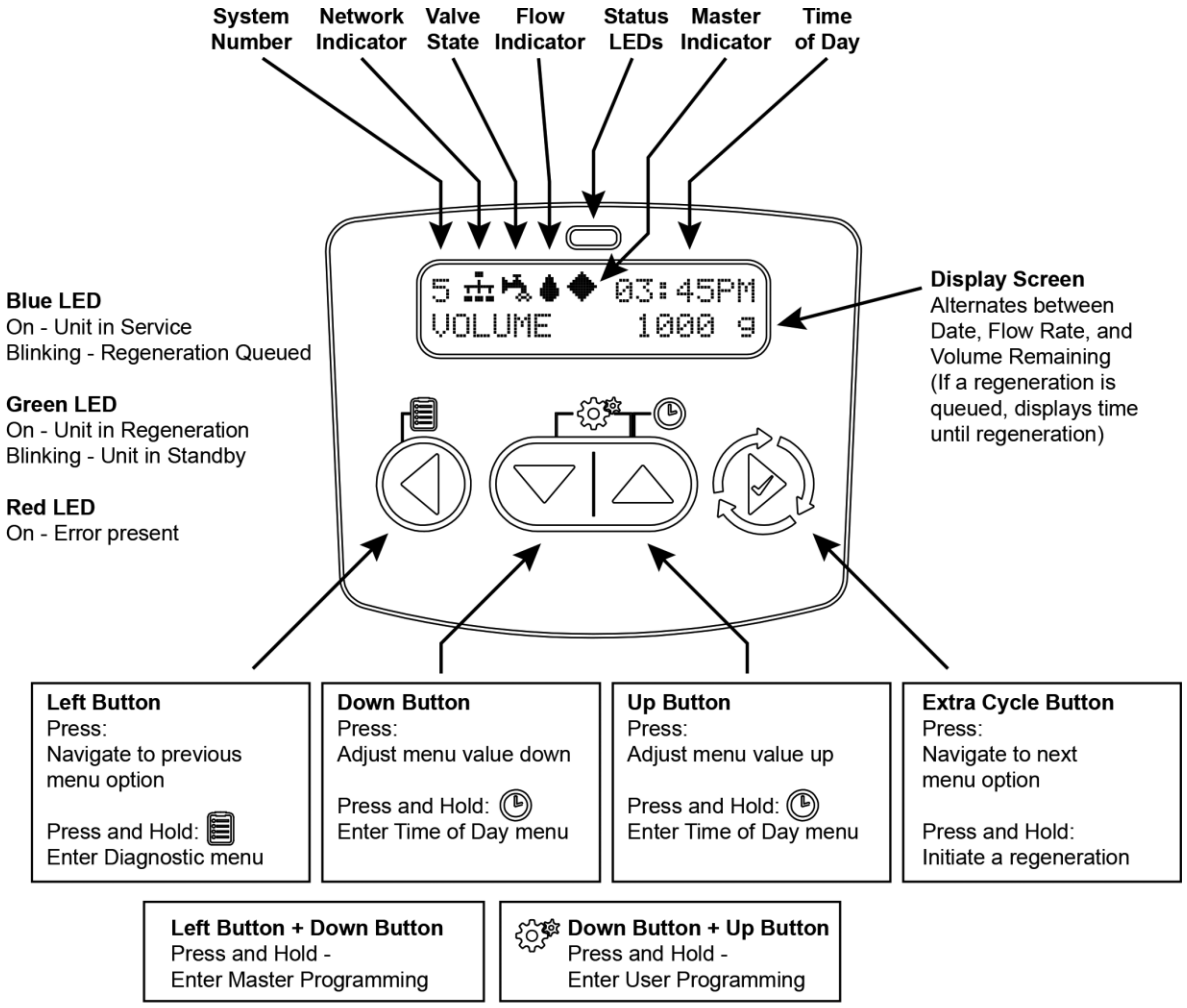
- Valve Type
  - 2510
  - 2750
  - 2815
  - 2850
  - 2900 **(All Lync WQ-SF Skids)**
  - 3150
  - 3900
- Regeneration Type
  - Softener/Filter Meter Delayed
  - Softener/Filter Meter Immediate **(All Lync WQ-SF Skids)**
  - Time Clock
  - Day of the Week
  - Remote Regeneration
- Regeneration Flow
  - Downflow **(All Lync WQ-SF Skids)**
  - Upflow
  - Filter

Features

- On-screen multilingual support:
  - English
  - Francais
  - Deutsch
  - Italiano
  - Espanol
  - Nederlands
  - Portugues
- Time of day super capacitor backup for 12-hour power loss
- 2 to 4 line scrolling text OLED display, high contrast easy to read in low light conditions and at a distance

- Full functional user interface with easy programming allowing forward and backwards menu navigation
- Network two to eight valves via shielded CAT5 cables
- LED Status Indicator
  - Blue: In Service
  - Flashing Blue: Regeneration Queued
  - Green: Regeneration
  - Flashing Green: Standby
  - Red: Error condition present
- Two Programmable Auxiliary relay outputs
  - Time-based
  - Volume based (Chemical pump)
  - Alarm-based
  - Cycle-based
  - Standby
- Remote input
  - Remote Lockout
  - Remote Regeneration
- Easy installation with plug-in wiring harnesses
- Assistance Name and Phone Number contact fields
- Error Log History
- Water Usage Daily (up to 13 weeks)
- Push Settings
- Capacitive Touch buttons
- Two Regeneration Lockout Windows
- Reset to factory default settings or from saveable custom settings
- Full calendar display
- Master Programming Lockout
  - Code-based
  - Time-based
  - Delayed
- Icons for easy system status identification
- Dynamic network addressing
- Diagnostics
  - Real-time Flow Rate
  - Peak Flow Rate (can be reset)
  - Totalizer (can be reset)
  - Reserve Capacity
  - Use Since Last Regeneration
  - Last Regeneration
  - Identifiable Software Version
  - Total Number of Regenerations
  - Regeneration Interval
  - Last Settings Change
  - Error Log History
  - Average Daily Usage (per weekday, 3 month history)

3.2. NXT2 Controller Display Features



Display Icons

- Valve State: Service
- Valve State: Standby
- Flow Indicator (flashing)
- Regeneration
- Master Unit (auto-assigned)
- Network Indicator - Connected
- Network Indicator - Disconnected
- Network Indicator - Unit Missing
- USB Connected (Field Programmer)
- Error Condition Present
- Remote Lock
- Lock Window
- Initializing
- Upper Drive Movement
- Lower Drive Movement
- Remote Regeneration
- Master Programming
- User Programming
- Diagnostics
- Time of Day Programming

3.3. NXT2 Controller Operation

Setting the Time of Day

NOTE: Set Time of Day on any unit and the rest of the units in the system will update the Time of Day automatically.

1. Press and hold the **Up** button for 2 seconds. The "Time" value is displayed. Press the **Up** or **Down** buttons to adjust as desired.
2. Press the **Extra Cycle** button to advance to the "Year" field. Press the **Up** or **Down** buttons to adjust as desired.
3. Press the **Extra Cycle** button to advance to the "Month" field. Press the **Up** or **Down** buttons to adjust as desired.
4. Press the **Extra Cycle** button to advance to the "Calendar Day" field. Press the **Up** or **Down** buttons to adjust as desired.
5. Press the **Extra Cycle** button to return to the normal display screen.

NOTE: Press and hold the **Left** button to exit without saving.

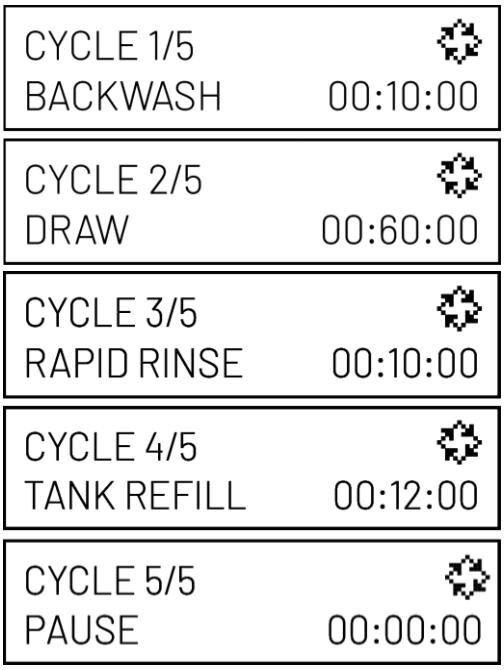
Manually Initiating a Regeneration

1. When timer is In Service or Standby, press and hold the **Extra Cycle** button on the main screen.
2. The timer advances to Regeneration Cycle Step #1, and begins programmed time count down.
3. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #2 (if active).
4. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #3 (if active).
5. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step #4 (if active).
6. Press the **Extra Cycle** button once to advance valve to Regeneration Cycle Step 5 (if active).
7. Press the **Extra Cycle** button once more to advance the valve back to In Service.

NOTE: A manually initiated or queued regeneration can be cleared by pressing and holding the Back button. A system queued regeneration can only be cleared by stepping through a manual regeneration. If regeneration occurs for any reason prior to the delayed regeneration time, the manual regeneration request shall be cleared. Pressing the Extra Cycle button while in regeneration will cause the upper drive to advance to the next step immediately.

Controller Operation During Regeneration

In the Regeneration Cycle step display, the timer shows the current regeneration cycle name the valve is in, or has reached, and the time remaining in that step. Once all regeneration steps are complete, the timer returns to In Service and resumes normal operation.



Press the **Extra Cycle** button during a system queued Regeneration Cycle to immediately advance the valve to the next cycle step position and resume normal step timing.

Controller Operation During Programming

The controller enters the Program Mode in Standby or Service Mode as long as it is not in regeneration. While in the Program Mode, the controller continues to operate normally monitoring water usage. Controller programming is stored in memory permanently.

Controller Operation During A Power Failure

All program settings are stored in permanent memory. Current valve position, cycle step time elapsed, and time of day are all stored during a power failure, and will be restored when power is re-applied. Time is kept during a power failure, and time of day is adjusted upon power up (as long as power is restored within 12 hours).

NOTE: The time of day on the main display screen will flash for 5 minutes when there has been a power outage. The flashing of the time of day can be stopped by pressing any button on the display.

Remote Lock

The controller does not allow the unit/system to go into Regeneration until the Regeneration Lockout Input signal to the unit is cleared. This requires a contact closure to activate the unit. The recommended gauge wire is 16 AWG with a maximum wire length run of 50 feet.

Regeneration Day Override Feature

If the Day Override option is turned on and the valve reaches the set Regeneration Day Override value, the Regeneration Cycle starts if no other unit is in Regeneration. If other units

are in regeneration, it is added to a regeneration queue. This occurs regardless of the remaining volume available.

Lock Settings (access to Master Programming)

Lock Settings prevents the user from accessing Master Programming. In Master Programming, select the desired Lock Settings option (Off, Time Based, Delayed, or Enter Code).

- ***Time Based*** - User must set clock to 12:01 pm to unlock
- ***Delayed*** - User must press and hold the **Left** and **Down** buttons for 60 continuous seconds to unlock
- ***Enter Code*** - User must input code "1201" to unlock

Flow Meter Equipped Controller

As treated water is used, the Volume Remaining display counts down from the calculated system capacity to zero. When zero is reached, a Regeneration Cycle begins if no other units are in regeneration.

Capacitive Buttons

Capacitive button entry warrant different consideration than tactile button entry. Do not wear gloves. Be sure to keep your hands and the capacitive buttons free of debris, grease, or water. Buttons may become temporarily unresponsive if environmental conditions change such as sudden humidity or temperature changes. If buttons become unresponsive, wait 5 to 10 minutes for the buttons to recalibrate.

LED Status indicator

- Blue - Unit in Service
- Flashing Blue - Regeneration Queued
- Green - Regeneration
- Flashing Green - Standby
- Red - Error with codes

Power Loss Backup

Time of day super capacitor backup for power loss; rated to last minimum 12 hours

Continuous Flow Detect

Alert appears when specified continuous flow rate is detected during service over a specified duration. Continuous flow rate is adjustable from 0.1 to 999.9 GPM/LPM (accuracy of flow rate detected will vary based on capability of meter). Duration range is adjustable from 1 to 255 hours.

Remote Regeneration

Ability to trigger a regeneration via a remote input.

Regeneration Types

Softener/Filter Meter Delayed - When volume remaining reaches zero and the scheduled regeneration time is reached (default 2 a.m. softener; 12 a.m. filter), the unit will regenerate.

Softener/Filter Meter Immediate - When volume remaining reaches zero, the unit will regenerate.

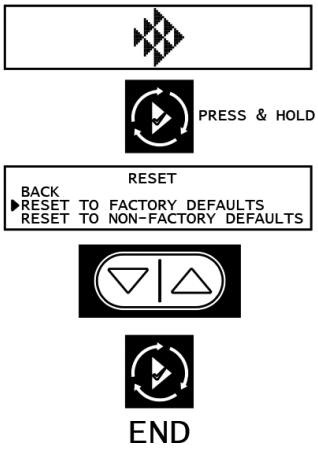
Time Clock - Once volume remaining reached zero and the selected regeneration time is reached (default 2 a.m. softener; 12 a.m. filter), the unit will regenerate.

Day of the Week - Once volume remaining reaches zero and the selected Day of the Week is reached, the unit will regenerate.

Remote Regeneration - Remote Regeneration is accomplished by a 3rd party device completing a contact closure connected to the remote regeneration input connector. The 3rd party device must complete the signal duration time that was set in the duration signal time in programming to start a regeneration. You can set the remote regeneration for immediate regeneration or delayed regeneration at the set time that was programmed for

Reset to Factory Defaults

While powering up the unit, when the Pentair logo appears, press and hold the **Extra Cycle** button to access the Reset menu then select Reset to Factory Defaults. Press the **Extra Cycle** button to confirm your selection and to advance to the service screen. Furthermore, you may select Reset to Non-Factory Defaults to save a set of unique control parameters.



Power on the unit. When Pentair logo appears, press and hold the **Extra Cycle** button. The Reset menu appears.

Use the up/down buttons to select.

Press the **Extra Cycle** button to set the desired option and return to the Service screen.

Lock Window

Lock Window prevents the unit from regenerating during a specified time frame. Two lock windows are available (Lock Window #1 and Lock Window #2). In Master Programming, enable a Lock Window then select the desired Lock Start time and Lock End time.

Settings Review

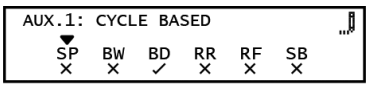
To prevent unintentional changes to Master Programming, enable Settings Review to view and navigate through Master Programming settings without the ability to edit.

Push Settings

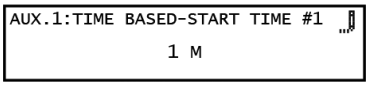
The ability to transmit user settings from one unit to all other connected units. Select the desired Master Programming settings on one unit then push the same settings to all other connected units. After the push settings have completed, you may still make unique changes to individual units.

Auxiliary Relays

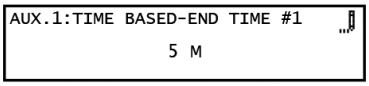
The NXT2 has two auxiliary relays that may be activated based on cycle, time, or volume.



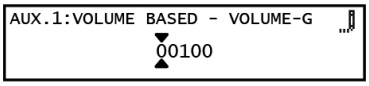
Activates during selected cycle step



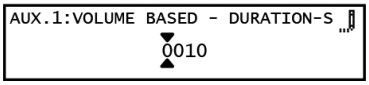
Activates upon selected start time (Range: 0-91 minutes)



Deactivates upon selected end time (Range: Start Time plus 1 minute)



Activates when selected volume (gallon) is reached (Range: 0-99999)



Selected duration in seconds (Range: 0-9999 seconds)

3.4. NXT2 Controller Systems Definition for WQ-SF Skids:

System 7 (2 Units) Alternating Immediate

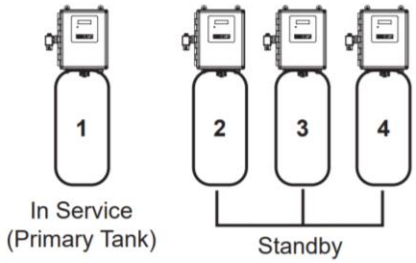
WQSF-025-N and **WQSF-050-N** skids get operated in Twin Alternating mode. In this system, one tank online supplying treated water, one tank in Standby. Only #1 control will monitor its flow meter/sensor input. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by the relay on the NXT2 circuit board.

System 14 (2-8 Units) Demand Recall

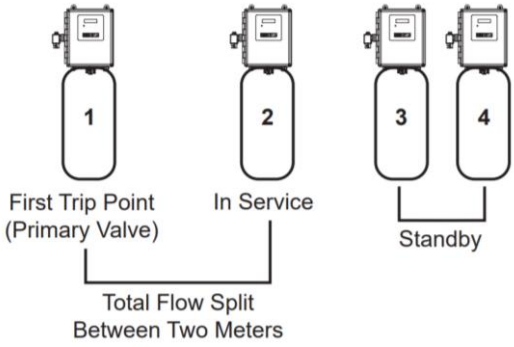
WQSF-075-N, **WQSF-100-N, WQSF-200-N, and WQSF-300-N** skids get operated with in Progressive Flow mode. In this system, meter input is required on each tank. Unit #1 will begin In Service with #2, #3, and #4 (if installed) will begin in Standby. At least one unit is In Service at all times. When the flow rate to the Primary Service Unit increases to a user specified rate, the next unit in sequence will move from Standby to Service. As the flow rate falls below the user specified rate, subsequent tanks will return to Standby. When the Primary Service Unit regenerates, the next unit in sequence will become the new Primary Service Unit. As each units capacity is reached, the controller will initiate a Regeneration of that unit. Depending on the number of units in the system and flow rate demand, the regenerated unit will then be placed either into Standby or Service. Only one unit will be in Regeneration at a time.

Example of Progressive Flow Operation by System 14-Demand Recall System

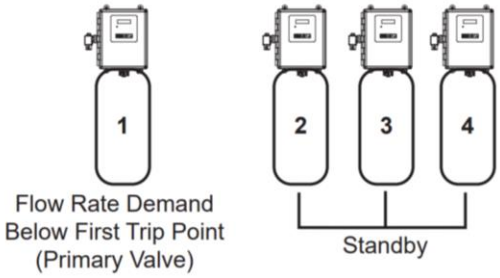
1. One Valve is in service at all times (the “primary valve”).



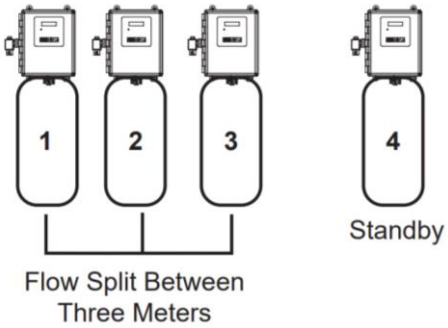
2. The total flow rate to the primary valve increased past the first trip point programmed rate. The flow stayed past the trip point delayed time. The next valve (least volume remaining) changes from Standby to In Service. This valve then splits the total flow between two meters.



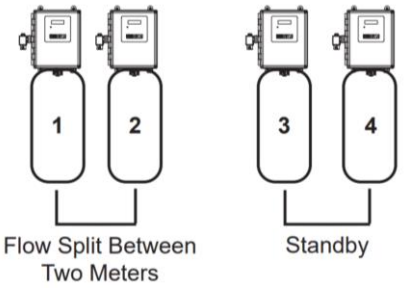
3. The flow rate demand decreased below the first trip point. The valve returns to Standby.



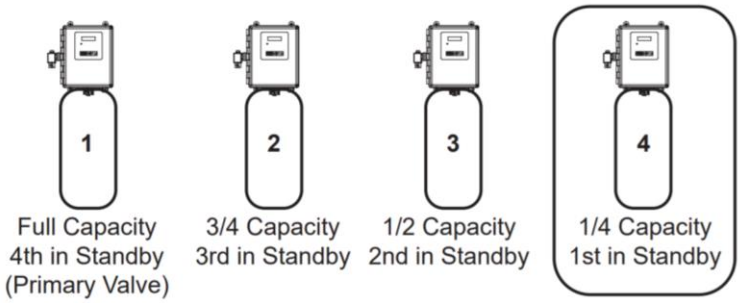
4. Total flow rate demand increased past a second trip point programmed rate. The second and third valve (least volume remaining) changes from Standby to In Service. The total flow is split between the three meters.



5. The third valves returns to stand by as demand decreases past the second trip point.



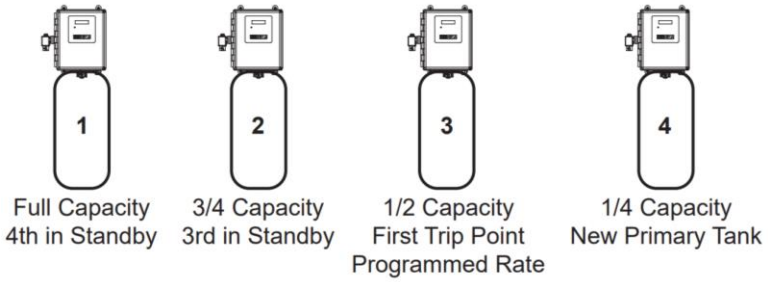
6. Valves return to stand by due to decreased total flow rate and trip points programmed. The valve with the most remaining volume will be the first to go into Standby.



7. The primary tank regenerates. The next tank with the least remaining volume becomes the new primary tank. The tank with the next least volume remaining will be the first trip point programmed rate. Tanks continue operating in this order.

Progressive Flow System Operation in Regeneration:

If two tanks are In Service and both reach Volume Remaining = 0, the other two tanks will shift from Standby to In Service. The lead tank with Volume Remaining = 0 will start Regeneration. The second tank with Volume Remaining = 0 will enter Standby. If flow increases past the trip point a third tank needs to enter In Service. The tank in Standby with Volume Remaining = 0 will shift into In Service to maintain a steady flow. Operating for extended periods in this mode may degrade the water quality.



3.5. Start Up

1. Ensure all meter and communication cables are properly installed and connected.
2. Ensure all inlet and outlet isolation valves and the bypass valves are in the closed position and the treated water faucet hot and cold side are in the open position.
3. Open the main water supply valve to the building. Check for leaks and repair as needed.

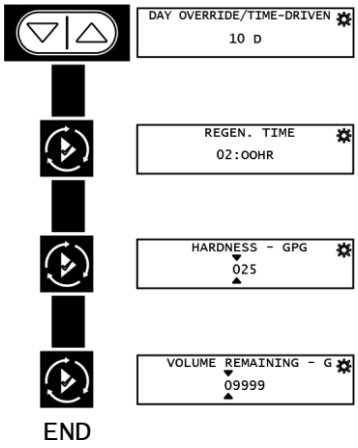
NOTE: Start up only one tank at a time. Repeat the following steps for every single tank of the skid separately:

4. Plug the power cord of the control valve to an electrical outlet to energize the system. Once the valve is powered it will drive to the service position. The LED light should be blue. If the LED light is red, it will turn in blue after valves programming is complete.
5. Program the NXT2 controller. The correct date and time, water hardness, day override, and time of regeneration will need to be set on site to the desired settings. (Refer to the table in Section 3.10.). The softener settings are pre-programmed at the factory to the settings mentioned in section 3.10. Instructions for changing these settings are in the Master Programming Guide section.
6. Locate “Initiating a Manual Regeneration” in section 3.3. of this manual and follow the steps to place the system in the Backwash position (CYCLE 1/5) by pressing and holding the Extra Cycle button on the NXT2 controller.
7. The LED light on the NXT2 timer should change from Blue (In Service color) to Green (In Regeneration color).
8. Make sure the outlet valves are closed and the drain line is installed properly. Slowly open the inlet valve of the tank to 5 percent until water can be heard flowing through the valve. **Do not open the valve fully**. Full flow of water could cause loss of mineral. Allow the mineral tank to fill with water. Air will come out of the drain line until the mineral tank is full of water. Once water flow at the drain line is observed, fully open the inlet valve and allow water flow to drain for 10 minutes to flush the resin bed of any color. If water at the drain shows any discoloration and Backwash cycle is about to be over, simply disconnect the control valve from power outlet and let the system stay in Backwash mode until water is clear and colorless. Once the control valve is plugged in to the power, the timer will resume the countdown.
9. Press the **Extra Cycle** push button to change the valve from Backwash position to Brine Draw/Rinse position (CYCLE 2/5). There is no water in the brine tank at this stage of a new system startup. Therefore, press **Extra Cycle** push button to change the valve from Brine Draw/Rinse position to Rapid Rinse position (CYCLE 3/5).
10. Press the **Extra Cycle** push button to change the valve from Rapid Rinse position to Brine Tank Refill (CYCLE 4/5) position. Allow the brine tank to fill with water for the duration of the step.
11. Press the **Extra Cycle** push button to change the valve from Brine Tank Refill position to the Service/Standby (CYCLE 5/5) position. The water level should be 1”-2” inches above the salt platform. Check the level in the brine tank.
12. Repeat steps 3 - 11 for the other tank(s).
13. Fill the brine tank with the proper amount and type of salt recommended for use with the system (see section 2.4.3. Recommended Type of Salt). Do Not fill the salt level past the brine well lid.
14. Close the manual bypass valve and open all outlet valves fully. The system is now in service.
15. Check for leaks and repair as needed.
16. Allow water to flow from the hot and cold side treated faucet until all air has been purged from the plumbing system. Then close both the hot and cold side treated water faucet.
17. Turn on water heaters.

3.6. User Mode Programming Flow Chart

- Press and hold the **Down** and **Up** buttons simultaneously for 3 seconds to enter User Programming mode.

- To navigate, press the **Extra Cycle** button to advance to the next value. Press the **Left** button to retreat to the previous value.
- Where applicable, use the **Up** and **Down** buttons to adjust a value as desired.
- After progressing through all available values, the controller will return to Normal operation.
- To exit diagnostic mode, progress through all available values, press and hold the **Left** button at any time, or after 5 minutes of inactivity the controller will return to normal operation automatically.
- Depending on the current controller programming, certain values may not be able to be viewed or set.
- The controller will display local information, not system information.
- In the event of a regeneration occurring while displaying user programming, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to the main screen.



Example:
Range: Off - 99 Days

Example:
Range: 0 - 23 Hours 59 Minutes

Example:
Range: 1 - 999 grains per gallon

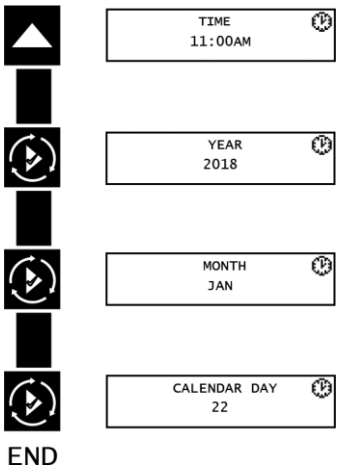
Example:
Range: 1 - 99999 gallons

3.7. Time of Day Programming Mode Flow Chart

NOTE: Set Time of Day on any unit and the rest of the units in the system will update the Time of Day automatically.

- Press and hold the **Up** button for 2 seconds. The “Time” value is displayed. Press the **Up** or **Down** buttons to adjust as desired.
- Press the **Extra Cycle** button to advance to the “Year” field. Press the **Up** or **Down** buttons to adjust as desired.
- Press the **Extra Cycle** button to advance to the “Month” field. Press the **Up** or **Down** buttons to adjust as desired.
- Press the **Extra Cycle** button to advance to the “Calendar Day” field. Press the **Up** or **Down** buttons to adjust as desired.
- Press the **Extra Cycle** button to return to the normal display screen.

NOTE: Press and hold the **Left** button to exit without saving.



Example:
12 or 24 hour formats available

Example:
Set current year

Example:
Set current month

Example:
Set current day

3.8. Diagnostic Programming Mode Flow Chart

- Press and hold the **Left** button to enter Diagnostic Programming mode.
- To navigate, press the **Extra Cycle** button to advance to the next value. Press the **Left** button to retreat to the previous value.
- Where applicable, use the **Up** and **Down** buttons to adjust a value as desired.
- To reset/clear a value (such as Totalizer or Error Log), while on the value, press and hold the **Up** and **Down** buttons simultaneously.
- After progressing through all available values, the controller will return to normal operation.
- To exit diagnostic mode, press and hold the **Left** button at any time or after 5 minutes of inactivity the controller will return to normal operation automatically.
- Depending on the current controller programming, certain values may not be able to be viewed or modified.
- The controller will display local information, not system information.
- In the event of a regeneration occurring while displaying diagnostics, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to the main screen.

FLOW RATE
29.7 GPM

Example:
Real-time flow rate reading

PEAK FLOW
30.1 GPM

Example:
Peak flow since last regeneration

TOTALIZER
482474 G

Example:
Gallons at the outlet since installation

RESERVE
1588 G

Example:
Reserve Capacity setting

USE SINCE REGEN
7331 G

Example:
Gallons at the outlet since last regeneration

LAST REGEN.
4 H

Example:
Time since last regeneration

SOFTWARE VERSION
13026

Example:
Installed software version

NO. OF REGENS
32

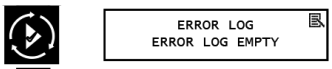
Example:
Total number of regenerations since installation

REGEN INTERVAL
3 D 21 H

Example:
Duration between regenerations

LAST SETTINGS CHANGE
14 H 0 M

Example:
Last time programming settings were changed.



Example:
Record of error events chronologically

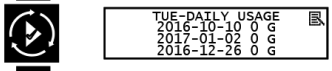
Example:
Average usage from past Sunday

Example:
Average usage from past 3 Sundays

Example:
Average usage from past Monday

Example:
Average usage from past 3 Mondays

Example:
Average usage from last Tuesday



Example:
Average usage from past 3 Tuesdays

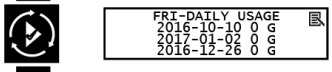
Example:
Average usage from last Wednesday

Example:
Average usage from past 3 Wednesdays

Example:
Average usage from last Thursday

Example:
Average usage from past 3 Thursdays

Example:
Average usage from last Friday



Example:
Average usage from past 3 Fridays.

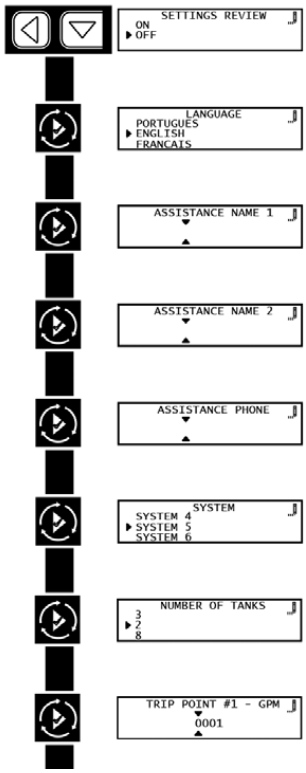
Example:
Average usage from last Saturdays

Example:
Average usage from past 3 Saturdays

END

3.9. Master Programming Mode Flow Chart

- Press and hold the **Left** and **Down** buttons simultaneously for 3 seconds to enter Master Programming mode.
- To navigate, press the **Extra Cycle** button to advance to the next value. Press the **Left** button to retreat to the previous value.
- Where applicable, use the **Down** and **Up** buttons to adjust a value as desired. When entering data into text fields (such as Assistance Name) or numerical fields (such as Hardness), press the **Extra Cycle** button to advance to the next character/ digit and press the **Left** button to retreat to the previous char- acter/digit. Proceed through all available characters/digits to advance to the next value.
- To reset/clear a value (such as Assistance Name), while on the value, press and hold the **Down** and **Up** buttons simultaneously for 5 seconds.
- To exit Master Programming Mode, progress through all available values or after 5 minutes of inactivity the controller will exit automatically.
- To exit master programming without saving changes, press the **Left** button until you return to the service screen.
- Depending on the current controller programming, certain values may not be able to be viewed or set.
- The controller will display local information, not system information.
- In the event of a regeneration occurring while displaying master programming, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to the main screen.



Example:
On: View settings without the ability to alter settings. Off: User has ability to alter settings.

Example:
English, Francais, Duetsch, Italiano, Espanol, Nederlandse, Portugues

Example:
12 characters maximum.

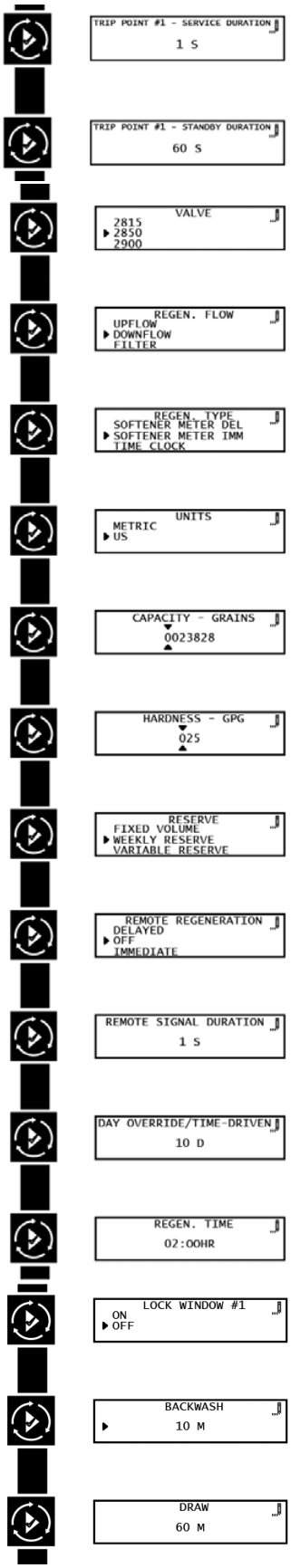
Example:
12 characters maximum.

Example:
14 characters maximum.

Example:
4, 5, 6, 7, 8, 9, 14

Example:
2, 3, 4, 5, 6, 7, 8

Example:
Trip Points only available/visible when System Type 14 is selected.



Example:
Range: 1-90 seconds

Example:
Range: 60-300 seconds

Example:
2510, 2750, 2815, 2900, 3150, 3900

Example:
Upflow Downflow Filter

Example:
Softener Meter Delayed Softener Meter Immediate Time Clock
Day of the Week

Example:
Metric US

Example:
Range: 0-9,999,999 grains

Example:
Range: 0-199 GPG

Example:
Fixed Volume Weekly Reserve Variable Reserve Fixed %

Example:
OFF Off, Immediate, Delayed

Example:
Range: 1-9999 seconds

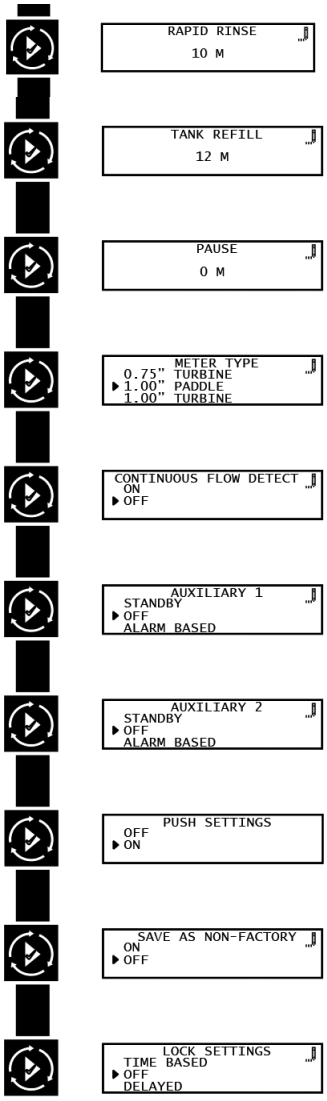
Example:
Range: Off - 99 Days

Example:
Range: 0 - 23 Hours 59 Minutes

Example:
Start Lock Window
End Lock Window

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M



END

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M

Example:
Paddle (0.75", 1", 1.5", 2", 3")
Turbine (0.75", 1.25", 1.5")
Generic

Example:
Range: 0.1 to 999.9 gpm/Lpm

Example:
Off, Alarm Based, Cycle Based, Time Based, Volume Based, Standby

Example:
Off, Alarm Based, Cycle Based, Time Based, Volume Based, Standby

Example:
Off, Delayed, Enter Code, Time Based

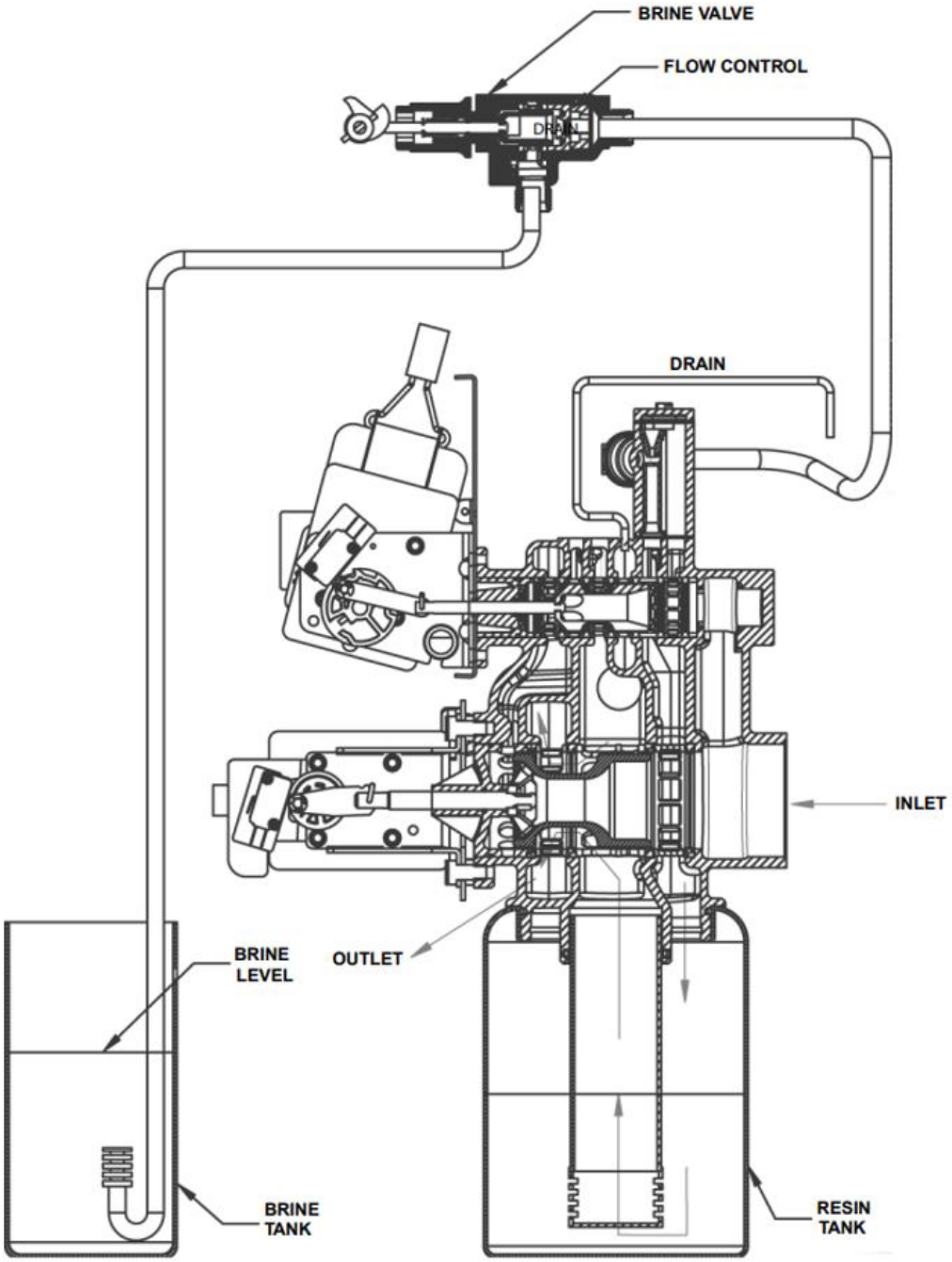
3.10. WQ-SF Skids Factory Master Programming Settings Guide

STEP	RANGE	WQSF -025-N	WQSF -050-N	WQSF -075-N	WQSF -100-N	WQSF -200-N	WQSF -300-N
SETTINGS REVIEW	On-Off	OFF					
LANGUAGE	English, Francais, Deutsch, Italiano, Espanol, Nederlands, Portugues	ENGLISH					
ASSISTANCE NAME 1		Defined by Operator					
ASSISTANCE NAME 2		Defined by Operator					
ASSISTANCE PHONE		Defined by Operator					
SYSTEM	System 4 (Single Unit) System 5 (2-8 Units) Parallel Interlock System 6 (2-8 Units) Parallel Series Regeneration System 7 (2 Units) Alternating (I) System 8 (2 Units) Alternating (D) System 9 (2-8 Units) Alternating with Standby Unit System 14 (2-8 Units) Demand Recall	System 7 (2 Units) Alternating		System 14 (2-8 Units) Demand Recall			
NUMBER OF TANKS	2 to 8	2		4			
TRIP POINT #1 – GPM	1-9999	Not for Twin Alternating		25	35	50	75
TRIP POINT #1 – SERVICE DURATION	1-90 seconds	Not for Twin Alternating		1			
TRIP POINT #1 – STANDBY DURATION	60-300 seconds	Not for Twin Alternating		60			
VALVE	2815, 2510, 2750, 2850, 2900, 3150, 3900	2900					
REGEN. FLOW	Filter Downflow	Downflow					
UNITS	US, Metric	US					
CAPACITY - GRAINS	0-9,999,999 Grains	**Max Capacity (high salt usage)**					
		150,000	210,000	150,000	210,000	300,000	450,000
		Min Capacity (low salt usage)					
		100,000	140,000	100,000	140,000	200,000	300,000
HARDNESS - GPG	0-199 gpg	Defined by Operator					
REMOTE REGENERATION	Off Delayed Immediate	Off					
DAY OVERRIDE/TIME DRIVEN	Off - 99 Days	7					
REGEN. TIME	Any Time	02:00AM					
LOCK WINDOW #1	Off, On	Off					
LOCK WINDOW #2	Off, On	Off					
BACKWASH	0-240 Mins	10 Minutes					
DRAW	0-240 Mins	60 Minutes					
RAPID RINSE	0-240 Mins	10 Minutes					
REFILL	0-240 Mins	**Max Capacity (high salt usage)**					
		15	20	15	20	30	45
		Min Capacity (low salt usage)					
		6	8	6	8	12	18
PAUSE	0-240 Mins	0 M					
METER TYPE	Generic Paddle (0.75", 1.00", 1.50", 2.00", 3.00") Turbine (0.75", 1.00", 1.25", 1.50")	2” Paddle					
CONTINUOUS FLOW DETECT	On, Off	Off					
AUXILIARY 1	Standby, Off, Alarm Based, Cycle Based, Time Based, Volume Based	Off					

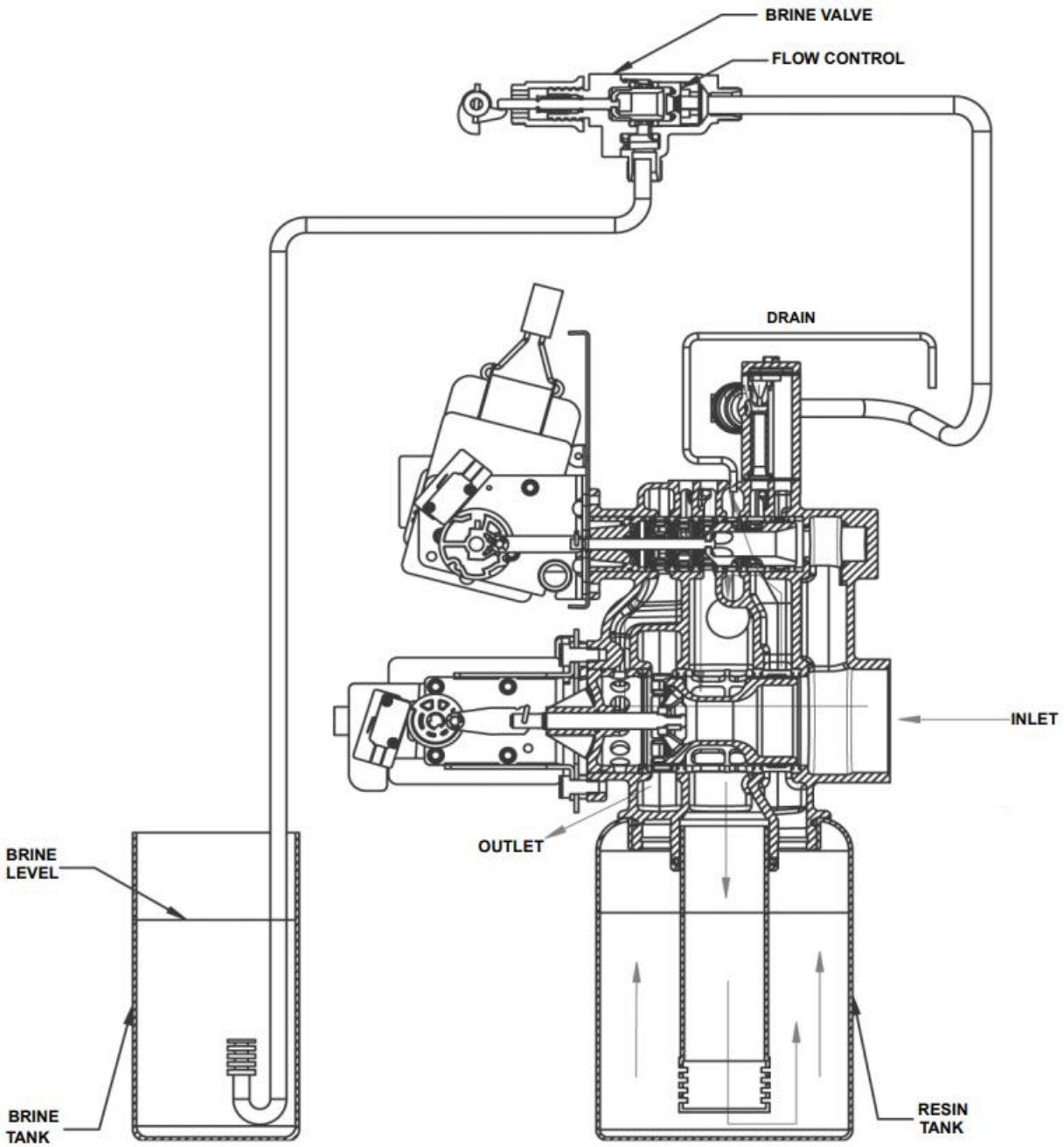
AUXILIARY 2	Standby, Off, Alarm Based, Cycle Based, Time Based, Volume Based	Off
PUSH SETTINGS	On, Off	On
SAVE AS NON-FACTORY	On, Off	On
LOCK SETTINGS	Time Based, Off, Delayed, Enter Code	Off

3.11. Water Softener Down-Flow Brining Diagram

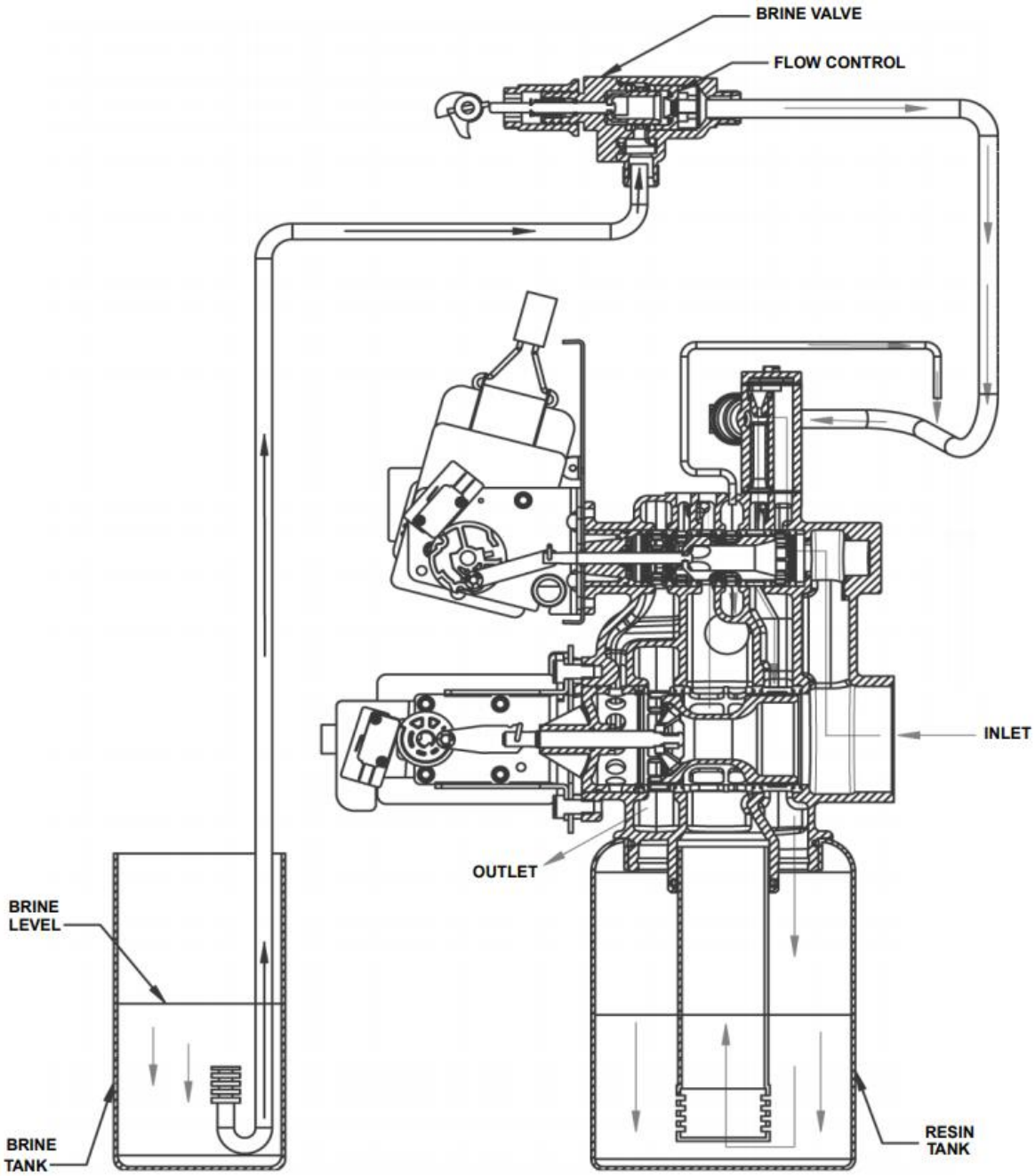
1 - Service Position: Hard water enters unit from the valve inlet and flows down through the minerals. The softened water enters the center tube from the bottom distributor and flows up. It flows around the piston and exits the system from the valve outlet.



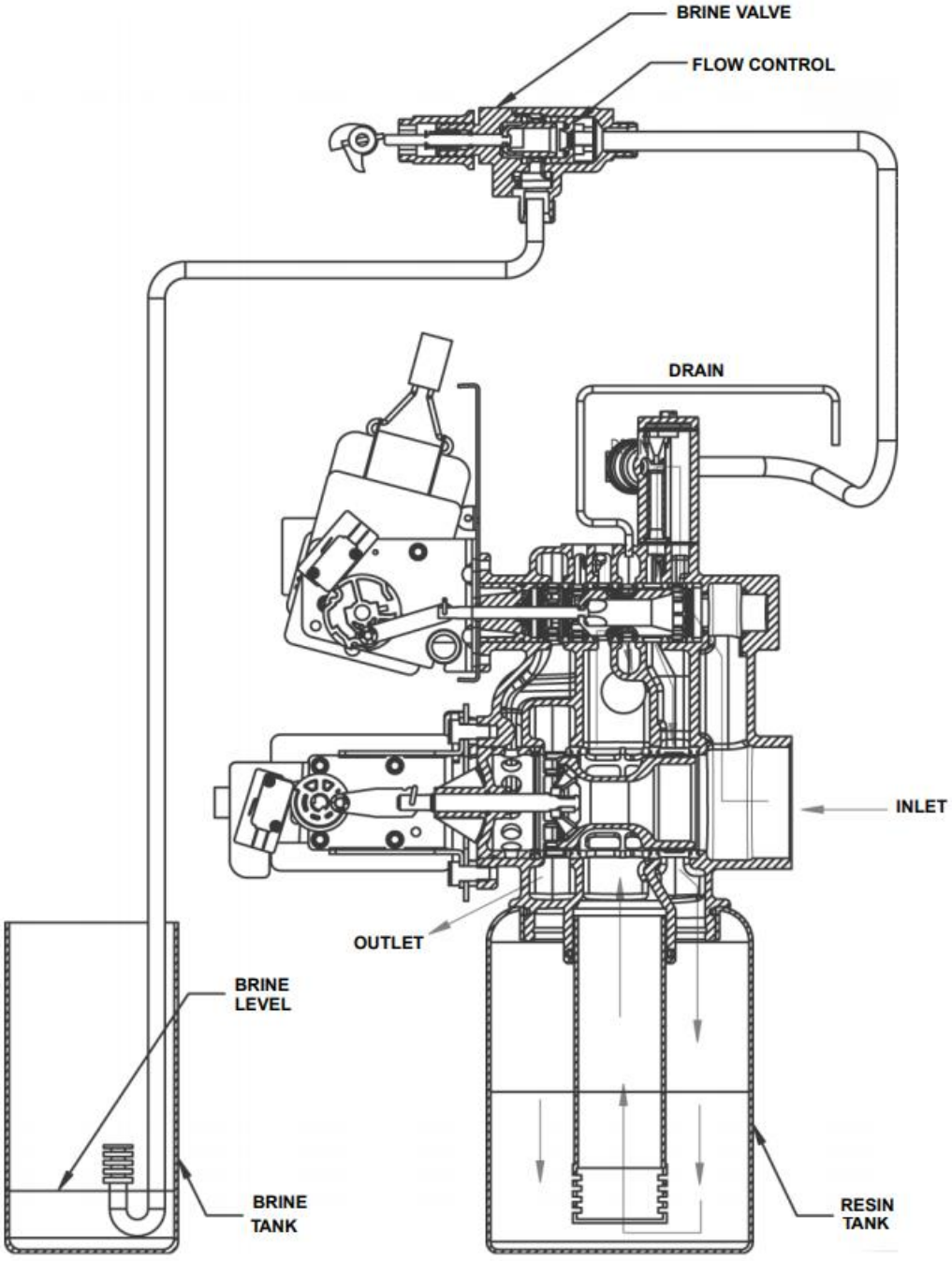
2 – Backwash Position: Hard water enters the unit from the valve inlet and flows through the regenerating valve. It flows down the center tube and flows up the tank through the minerals. The water flows around the piston and goes to the drain line.



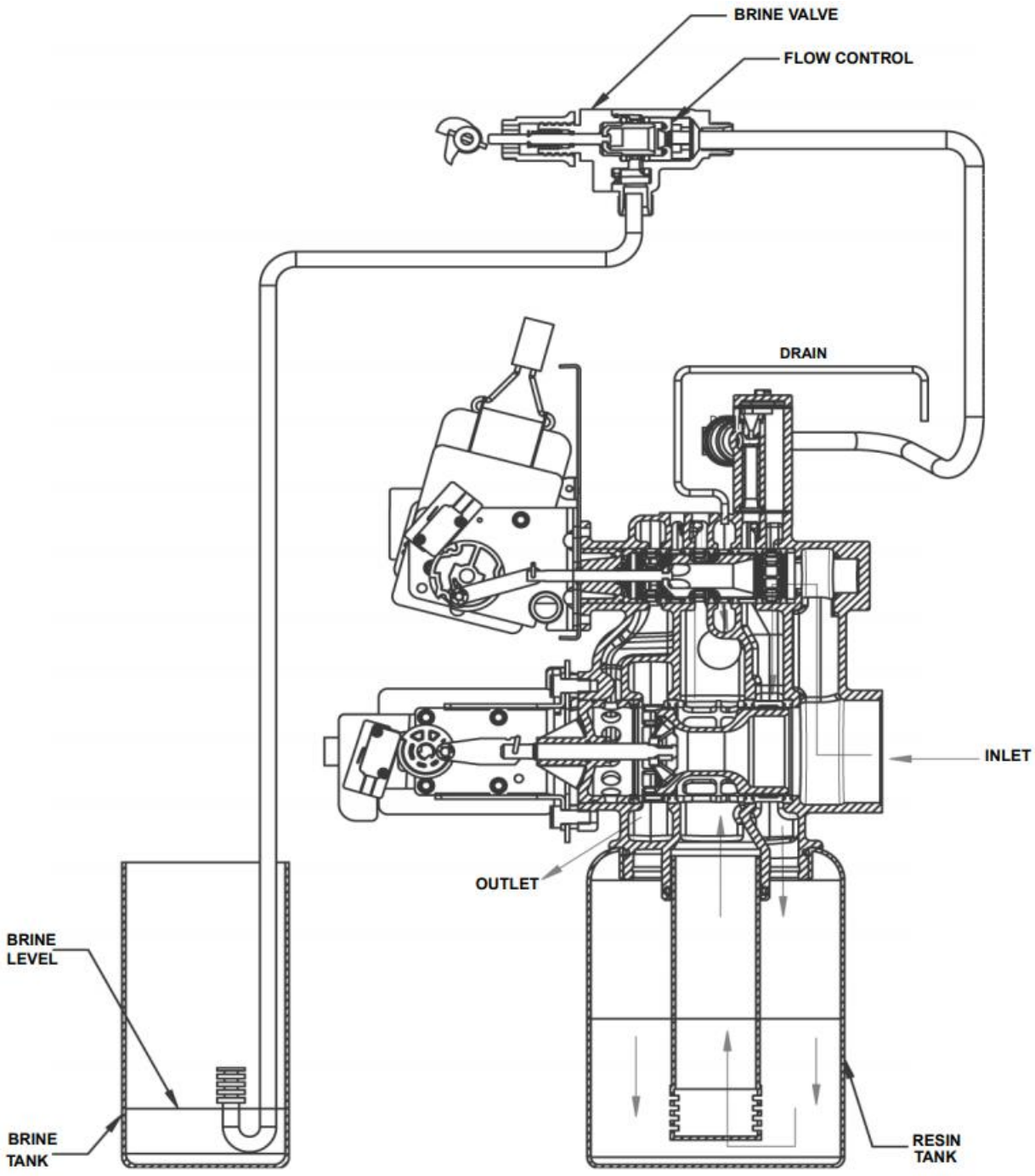
3- Brine Position: Hard water enters the unit from the valve inlet and flows up into the injector housing and down through the nozzle and orifice to draw brine from the brine tank. Brine solution flows down through the minerals and enters the center tube from the bottom distributor and flows up through the center tube. It flows around the piston and exits the unit through the drain line.



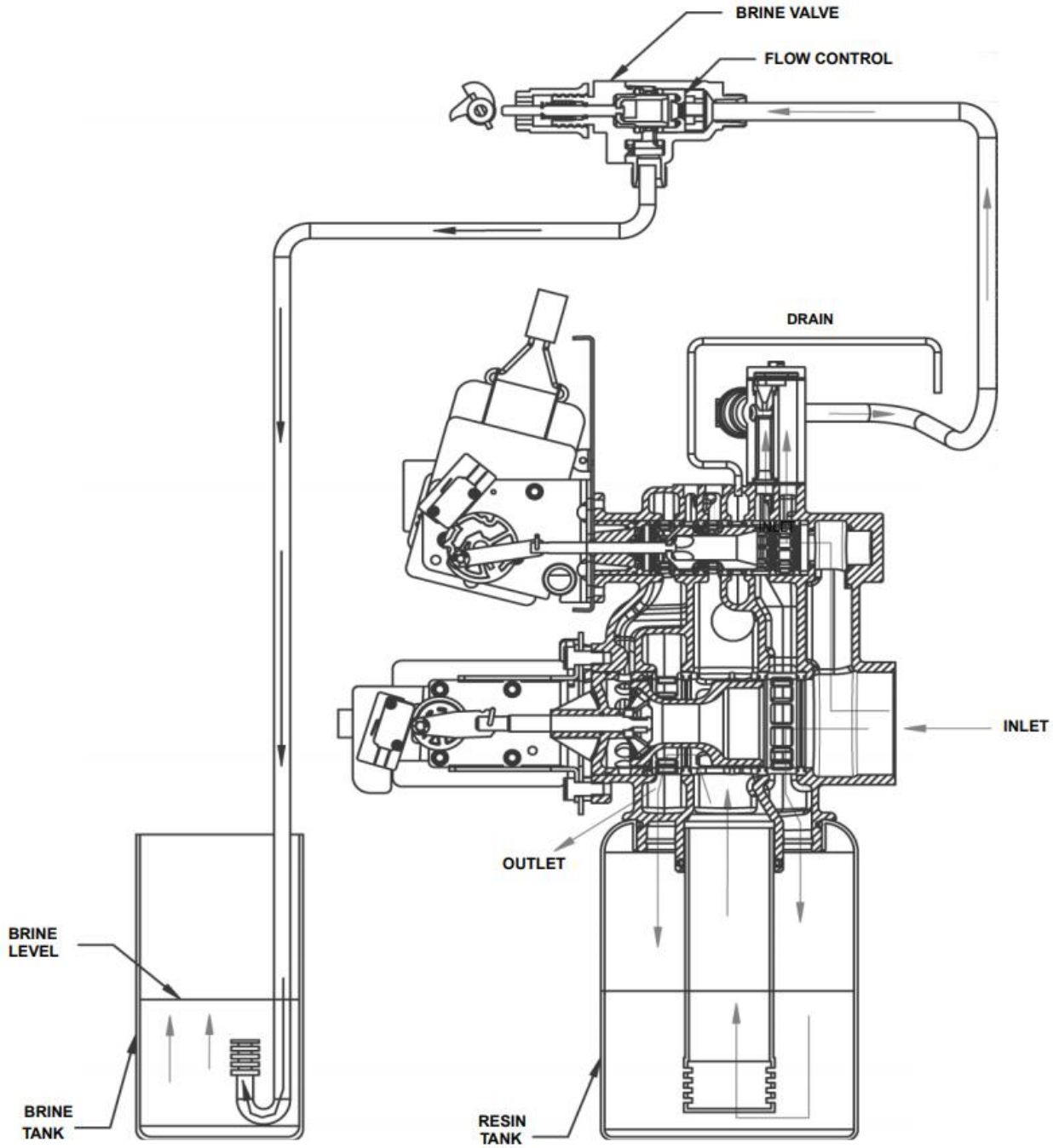
4- Slow Rinse Position: Hard water enters the unit from the valve inlet, flows up into injector housing and down through the nozzle and orifice. Hard water flows around the piston and flows down through the minerals and from there, it flows up from the center tube. Water flows around the piston and leaves the unit through the drain line.



5- Rapid Rinse Position: Hard water enters from the valve inlet and flows thru the regenerating valve. It directly flows down through the minerals and flows up from the center tube. The water flows around the piston and leaves the unit from the drain line.



6- Brine Tank Fill Position: Hard water enters from the valve inlet and flows through the service valve. Hard water flows down through the minerals and after getting conditioned, it enters the bottom distributor and flows up the center tube. The soft water flows around the piston and leaves the system through the valve outlet. A portion of hard water at inlet flows through the regenerating and brine valves and fills up the brine tank.



4. MAINTENANCE

4.1. Replacing the Ion Exchange Resin

NOTE: Ion exchange resin may need to be replaced periodically due to physical breakdown caused by chlorine/chloramine disinfectants, or fouling caused by certain metals such as iron and manganese.

1. Open the bypass valve.
2. Close the inlet and outlet isolation valves for the mineral tanks needing media replacement
3. Locate “Initiating a Manual Regeneration” in section 3.3. of this manual and follow the steps to place each mineral tank in the backwash position. This relieves any pressure inside the mineral tank. Once the system cycles into the backwash position, unplug the control valves from the power outlet to keep the systems in the backwash position.
4. For each mineral tank, disconnect the meter cable from the top of the meter dome and from the P5 port located on the back of the control valve controller. Store the meter cable(s) in a safe location.
5. Disconnect the brine tubing from the control valve’s brine connection port.
6. Disconnect the power supply cable from P14 port located on the back of the control valve controller.
7. Disconnect interconnecting communication cables from the P1 and P3 ports located on the back of the control valves.
8. Disconnect the inlet, outlet, and drain union plumbing fittings.
9. Remove the control valve from the mineral tank by turning the control valve counterclockwise when viewed from above. Keeping a firm grip on the control valve, continue to rotate until it can be lifted off from the top of the mineral tank. Store the control valve in a safe location.
10. Note the top of the distributor tube. It must be flush with the top of the tank. If it is above the top of the tank by more than 1/2" the distributor tube may have become disconnected from the distributor screen in the bottom of the mineral tank.
11. Obtain a length of 3/4" sch. 40 PCV that is the same height as the mineral tank and a length of 1" clear braided polyvinyl hose. The hose must be long enough to reach the nearest floor drain. (Both of these can be acquired at a local hard- ware store).
12. Insert one end of the pipe inside the hose and the other end of the pipe into the top of the mineral tank and down into the resin media. Put the other end of the hose inside a water permeable bag and locate the bag over the floor drain.
13. Insert a garden hose into the bag side of the polyvinyl hose to fill the hose and PVC pipe with water. Air will bubble out of the tank. Once all the air is out of the hose and pipe, remove the garden hose from the polyvinyl hose to establish a siphon. The resin can then be siphoned into the bag. Use the garden hose to maintain a full water level in the mineral tank. The bag end of the polyvinyl hose must remain lower in elevation then the end of the PVC pipe in the mineral tank to maintain the siphon. The bag will retain the resin while the water flows down the drain. Use caution not to allow resin to enter the floor drain.
14. Continue to siphon resin until it is completely evacuated from the mineral tank. Gravel will clog the siphon hose and, if it must be removed to repair or replace a damaged distributor tube and screen, must be evacuated by other means.
15. If replacing gravel, inspect lower distributor screens for damage and replace if necessary.

16. To add new media and reconnect control valve to mineral tank see section 2.3.
17. Reconnect inlet, outlet, and drain piping headers to the control valves and tighten the plumbing union fittings on each of these plumbing lines.
18. Reconnect brine tubing to brine connection port of control valve.
19. Reconnect meter cable to meter dome and secure with anchor screw. Then reconnect the other end of the meter cable to the P5 port located on the back of the control valve controller.
20. Reconnect any interconnecting communication cables to the P1 and P3 ports located on the back of the control valve controllers.
21. Open the inlet isolation valve slightly, until water can be heard flowing through the isolation valve and allow the mineral tank to fill with water. Air will come out of the drain line until the mineral tank is full of water. Once water flow at the drain line is observed, fully open the inlet valve, and allow water flow to drain for 10 minutes to flush the resin bed of any color. If water at the drain shows any discoloration, continue to flush the resin bed until water at the drain is clear.
22. After resin bed flushing is complete, reconnect the power supply cable to the P14 port located on the back of the control valve controller. Plug the system back in to the power outlet so that it will return to the service position.
23. Fully open inlet and outlet isolation valves and close bypass valve.
24. Check for leaks and repair as required.
25. Open hot and cold side of a treated water faucet to flush any air from the plumbing system.

4.2. System Troubleshooting

4.2.1 Detected Errors

NOTE: It can take up to 30 seconds for an error to be detected and displayed. All errors on each timer in the system must be displayed before the errors can be corrected.

If a communication error is detected, an Error Screen will appear.

- All units In Service remain in the In Service position.
- All units in Standby go to In Service.
- Any unit in Regeneration when the error occurs completes Regeneration and goes to In Service.
- No units are allowed to start a Regeneration Cycle while the error condition exists, unless they are manually forced into Regeneration.
- When an error is corrected, and the error no longer displays (it may take several seconds for all of the units in a system to stop displaying the error message), the system returns to normal operation.

NOTE: During the error condition the control continues to monitor the flow meter and update the volume remaining. Once the error condition is corrected all units return to the operating status they were in prior to the error. Regeneration queue is rebuilt according to the normal system operation. Or, if more than one unit has been queued for regeneration, then the queue is rebuilt according to which one communicates first.

Message Displayed	Causes for Error	Correction
Error Valve Count Mismatch	Number of NXT2 detected does not match selected system type in Master Programming	Push correct valve settings in Master Settings
Motor Stall No Changes Detected in the Optical Sensor for 6 Seconds	The motor is on but no encoder pulses are detected within a given duration while homing	Check the P11 connection and trigger a manual regeneration
Motor Run-On No CAM Switch Change Detected	The motor is on but no encloder pulses are detected or CAM Switches change state within a given duration	Verify correct valve type is chosen. Trigger a manual regeneration
Optical Sensor Undesired change detected by the Optical Sensor	The motor is off but additional encoder pulses are detected	Trigger a manual regeneration
Over-Current Motor Over Current is Detected	Motor current exceeds thresholds	Trigger a manual regeneration
Flow Meter Error Continuous Flow Detected	Flow exceeded specified threshold for a specific duration	Trigger a manual regeneration
Error Send/Receive Failure	During a setting push, a packet was missing	Reconnect communication cables and push setting in Master Settings
Error System Type Mismatch on Network	The system type among connected units does not match	Push correct system settings in Master Settings
Microcontroller Error	Calibration or manufacturing test was not performed	Contact your Pentair representative
100 Days Without Regen	100 Days have expired without a regeneration	Trigger a manual regeneration

4.2.3 Troubleshooting 2900 Valve

Problem	Cause	Correction
Water conditioner fails to regenerate	Electrical service to unit has been interrupted	Assure permanent electrical service (check circuit breaker, GFCI fuse, plug, pull chain, or switch)
	Controller is defective	Replace controller
	Power failure	Reset time of day
Softener delivers hard water	By-pass valve is open	Close by-pass valve
	No salt is in brine tank	Add salt to brine tank and maintain salt level above water level
	Injector screen plugged	Clean injector screen
	Insufficient water flowing into brine tank	Check brine tank fill time and clean brine line flow control if plugged
	Hot water tank hardness	Repeated flushing of the hot water tank is required
	Leak at distributor tube	Make sure distributor tube is not cracked. Check O-Ring and tube pilot
	Internal valve leak	Replace seals and spacers and/or piston

	Reserve capacity has been exceeded	Check salt dosage requirements and adjust program to provide additional reserve
	Meter is not measuring flow	Clean meter of foreign debris. Replace meter dome
Unit used too much salt	Improper salt setting	Check salt usage and salt setting
	Excessive water in brine tank	See “Excessive water in brine tank”
Loss of water pressure	Iron buildup in line to water conditioner	Clean line to water conditioner
	Iron buildup in water conditioner	Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration
	Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system	Remove piston and clean control
Loss of mineral through drain line	Air in water system	Assure that well system has proper air eliminator control. Check for dry well condition
	Improperly sized drain line flow control	Check for proper drain rate
Iron in conditioned water	Fouled mineral bed	Check backwash, brine draw, and brine tank fill. Increase frequency of regeneration. Increase backwash time.
Excessive water in brine tank	Plugged drain line flow control	Clean flow control
	Plugged injector system	Clean injector and screen
	Controller not cycling	Replace controller
	Foreign material in brine valve	Replace brine valve seat and clean valve
	Foreign material in brine line flow control	Clean brine line flow control
Softener fails to draw brine	Drain line flow control is plugged	Clean drain line flow control
	Injector is plugged	Clean injector
	Injector screen plugged	Clean screen
	Line pressure is too low	Increase line pressure to 20psi
	Internal control leak	Change seals, spacers, and piston assembly
	Service adapter did not cycle	Check drive motor and switches
Control cycles continuously	Misadjusted, broken, or shorted switch	Determine if switch or controller is faulty and replace it, or replace complete power head
Resin and gravel in outlet water	Damaged lower distributor screen	Replace distributor screen
High service flow rate pressure drop	Resin damaged by chlorine/chloramine	Replace resin
	Foreign material in distributor screen	Replace all media and distributor screens

General Service Hints For Meter Control:

Problem: Softener delivers hard water.

Cause could be: Reserve capacity has been exceeded.

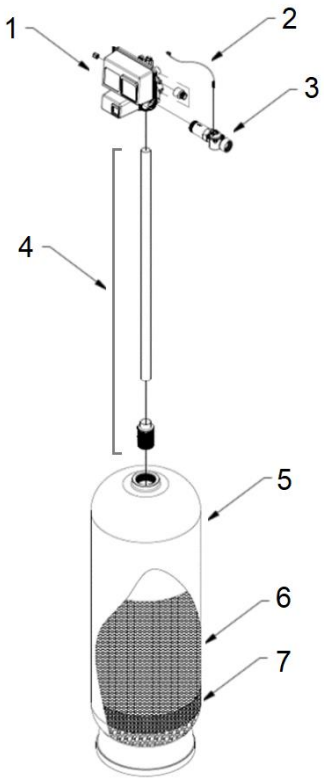
Correction: Check salt dosage requirements and reset program wheel to provide additional reserve.

Cause could be: Meter is not measuring flow.

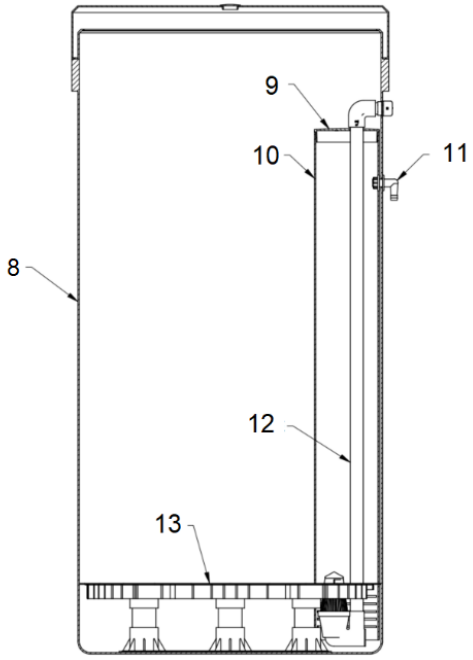
Correction: Check meter with meter checker

4.3. Replacement Parts

4.3.1 Water Softener and Brine Tanks



Water Softener Tank



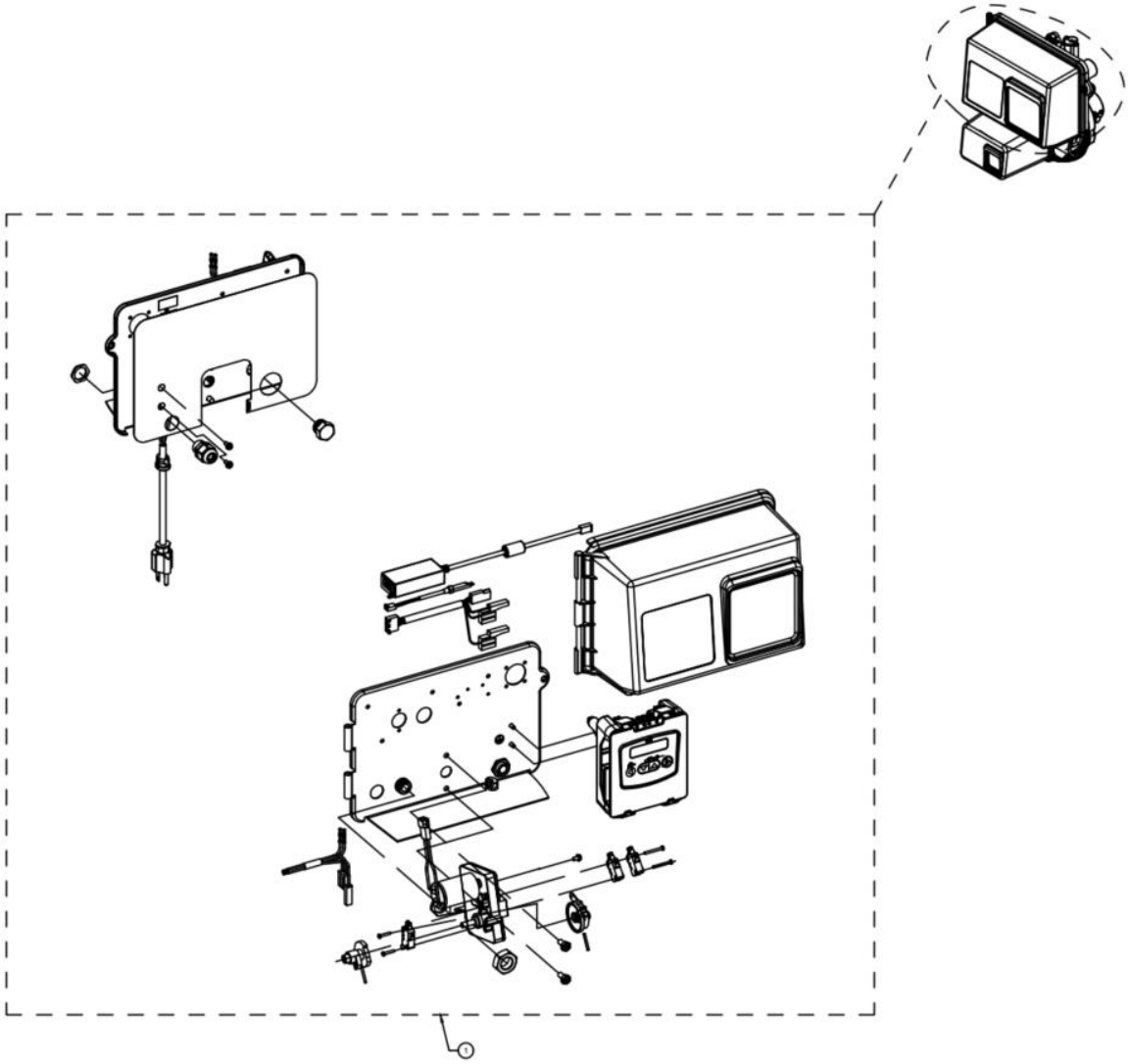
Brine Tank

Item	Part No.	Description	Quantity per Skid					
			WQSF -025-N	WQSF -050-N	WQSF -075-N	WQSF -100-N	WQSF -200-N	WQSF -300-N
1	68103823	Fleck Valve 2900 with Fleck 1710 Brine Valve NXT2 NHWBP W/O MTR, W/O CBL, W/O DLFC	2	2	4	4	4	4
-	68104471	Control Valve Transformer	2	2	4	4	4	4
2	68104399	Meter Cable Assembly - Turbine 25	1	1	4	4	4	4
3	68104756	2” Stainless Steel Meter	1	1	4	4	4	4
4	68101197	PVC Slotted Distributer - 1½” x 72”	2	2	4	4	-	-
5	68100691	Fiberglass Mineral Tank 18" x 65"- Almond Color - 4" Top Opening with Black Base	2	2	-	-	-	-
	68100694	Fiberglass Mineral Tank 21" x 62"- Almond Color - 4" Top Opening with Black Base	-	-	4	4	-	-

	68100698	Fiberglass Mineral Tank 24" x 72"- Almond Color - 4" Top Opening with Black Base	-	-	-	-	4	4
	68100703	Fiberglass Mineral Tank 30" x 72"- Almond Color - 4" Top Opening with Black Base	-	-	-	-	4	4
6	68100326	Resin - Watts Brand 8% crosslink - 1CF/Bag	10*	14*	20*	28*	40*	60*
7	68100354	Gravel 1/8"x1/16" – 50lbs/Bag	4*	4*	8*	8*	8	16
	68100356	Gravel 1/4"x1/8" – 50lbs/Bag	-	-	-	-	8	16
8	68102494	Brine Tank 24”X41” Black – Shell Only	1	-	4	-	-	-
	68102511	Brine Tank 30”X50” Black – Shell Only	-	1	-	4	4	-
	68102507	Brine Tank 39”X48” Black – Shell Only	-	-	-	-	-	4
-	68102494	Complete Brine Tank Assembly – 24”X41” Tank	1	-	4	-	-	-
	68102512	Complete Brine Tank Assembly – 30”X50” Tank	-	1	-	4	4	-
	68102509	Complete Brine Tank Assembly – 39”X48” Tank	-	-	-	-	-	4
9	68102606	Brine Well 5”X60” AWR	1	1	4	4	4	4
10	68102592	Brine Well Cap	1	1	4	4	4	4
11	68102593	Brine Overflow Fitting	1	1	4	4	4	4
12	68104473	Brine Air Check Valve	1	1	4	4	4	4
13	68102608	Brine Grid Set 24” for Minimum Salting (5 Legs)	1	-	4	-	-	-

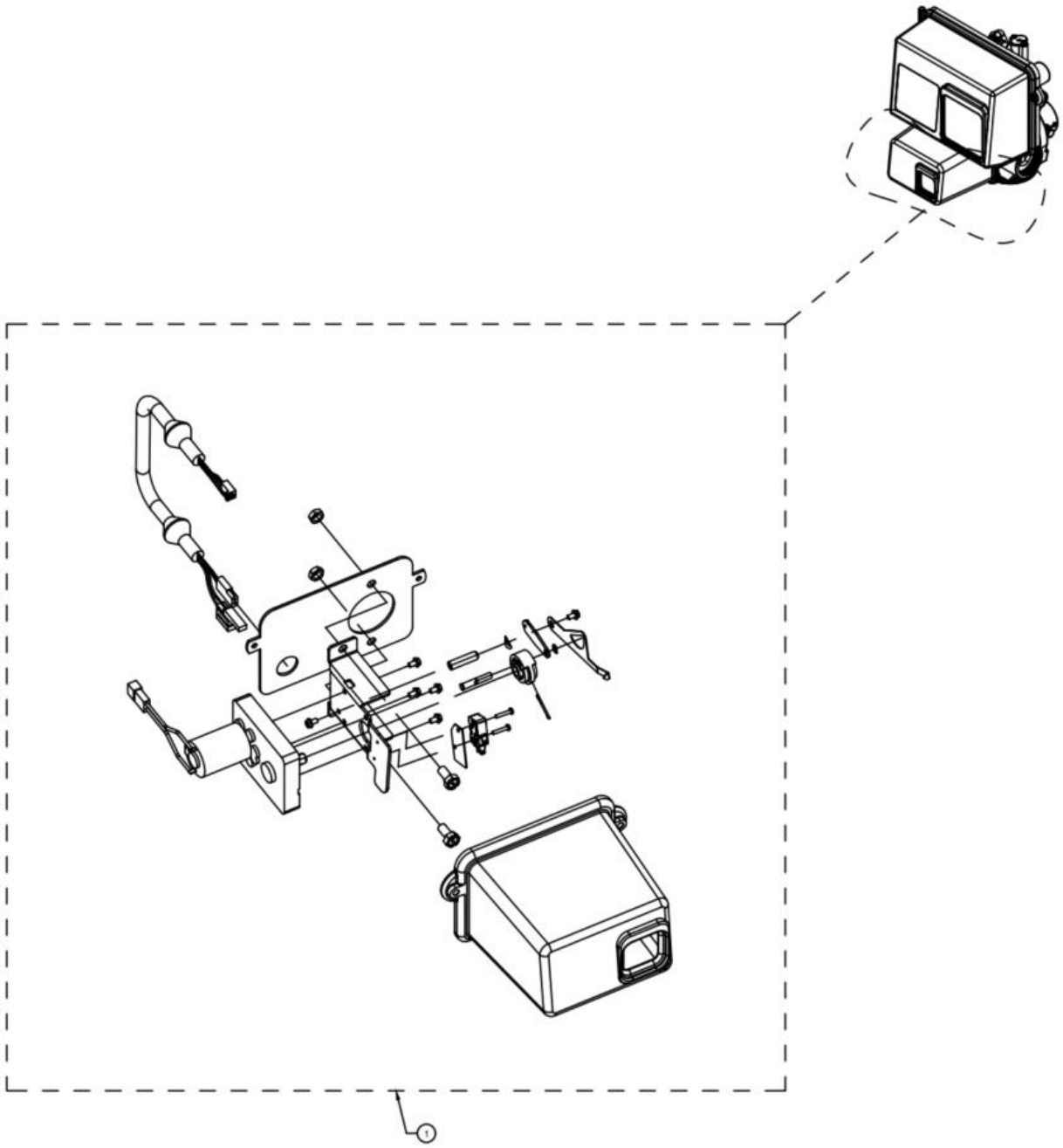
*Total number of bags for the entire skid.

4.3.2 2900 Upper Powerhead



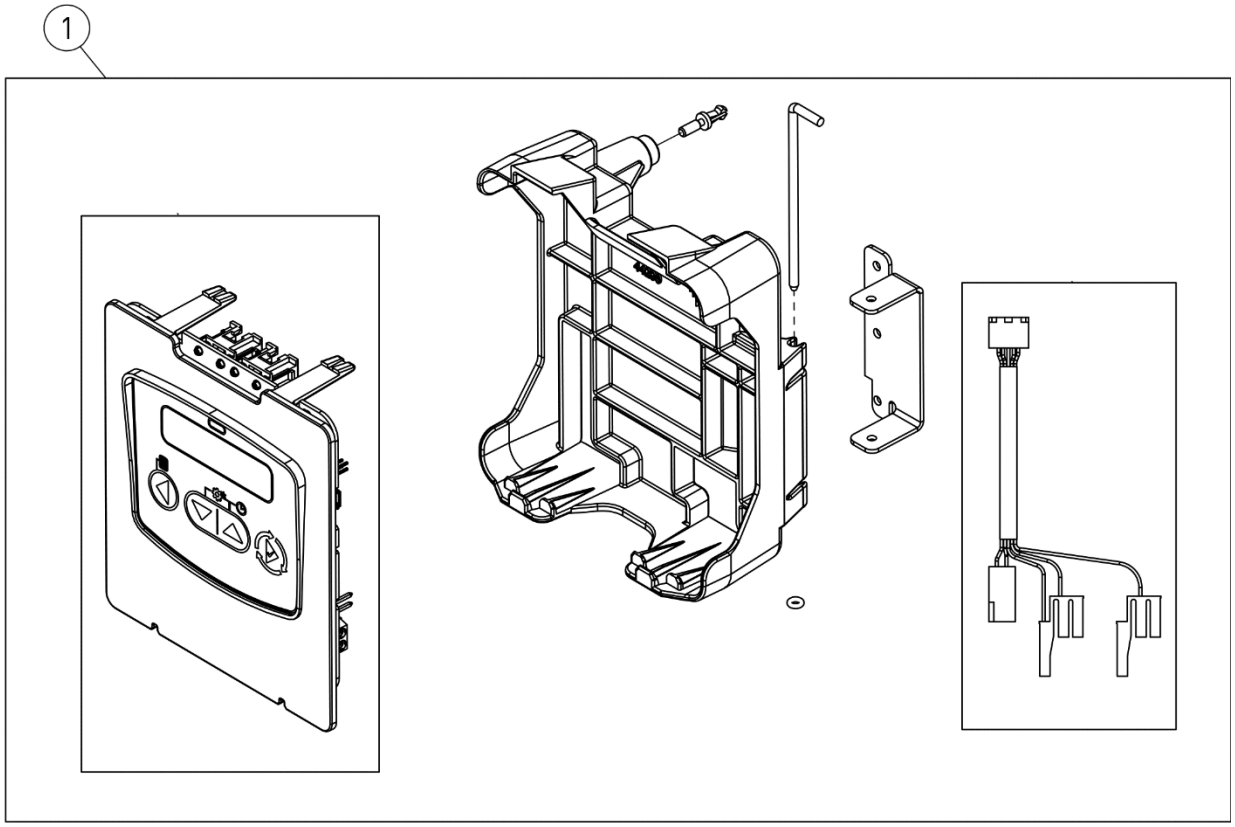
Item	Qty	Part No.	Description
1	1	68104633	2900 Upper Powerhead NXT2

4.3.3 2900 Lower Powerhead



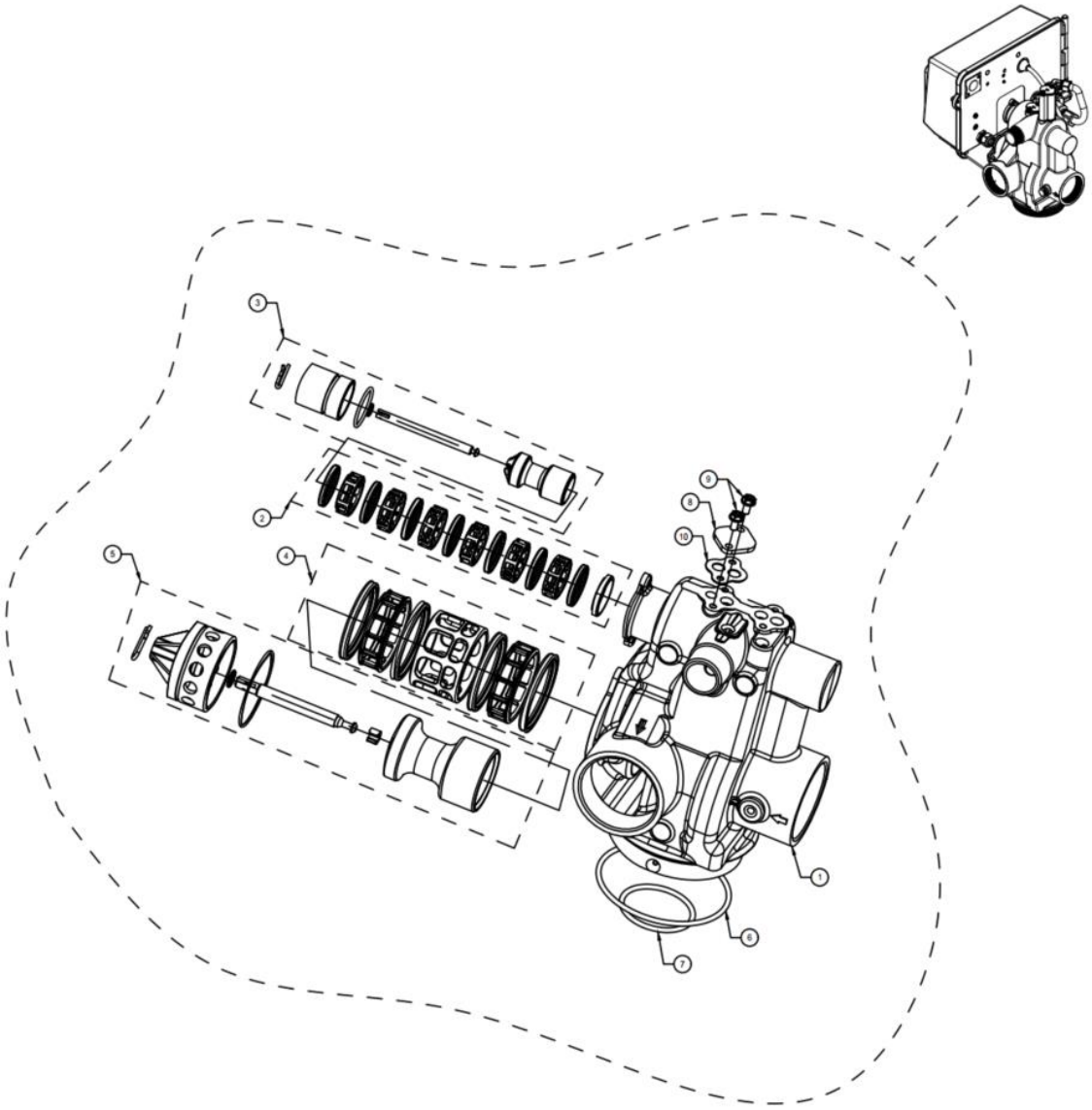
Item	Qty	Part No.	Description
1	1	68104635	2900 Lower Powerhead

4.3.4 NXT2 Controller



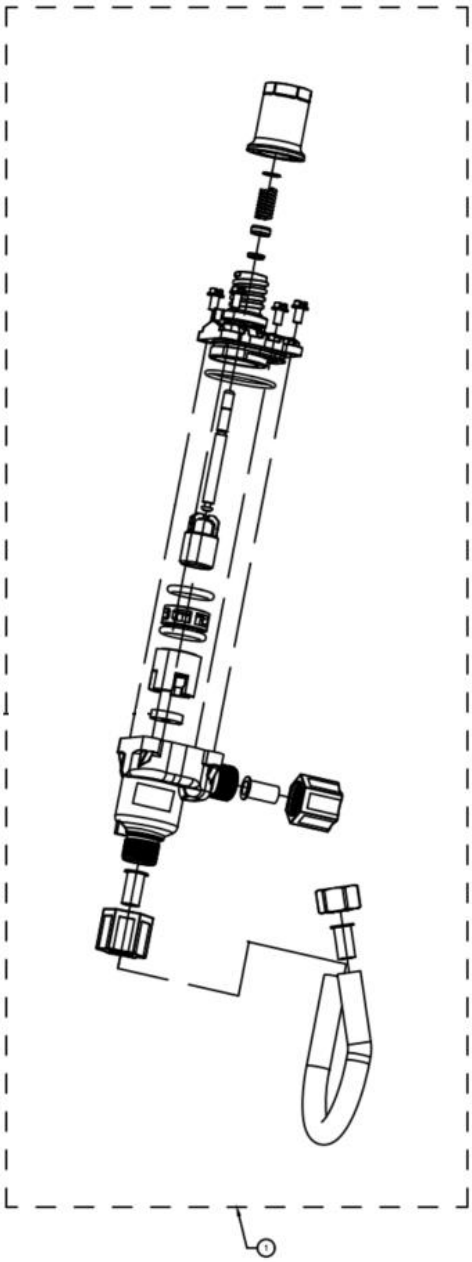
Item	Qty	Part No.	Description
1	1	68104777	Timer Assembly. NXT2

4.3.5 Fleck 2900 Valve Body



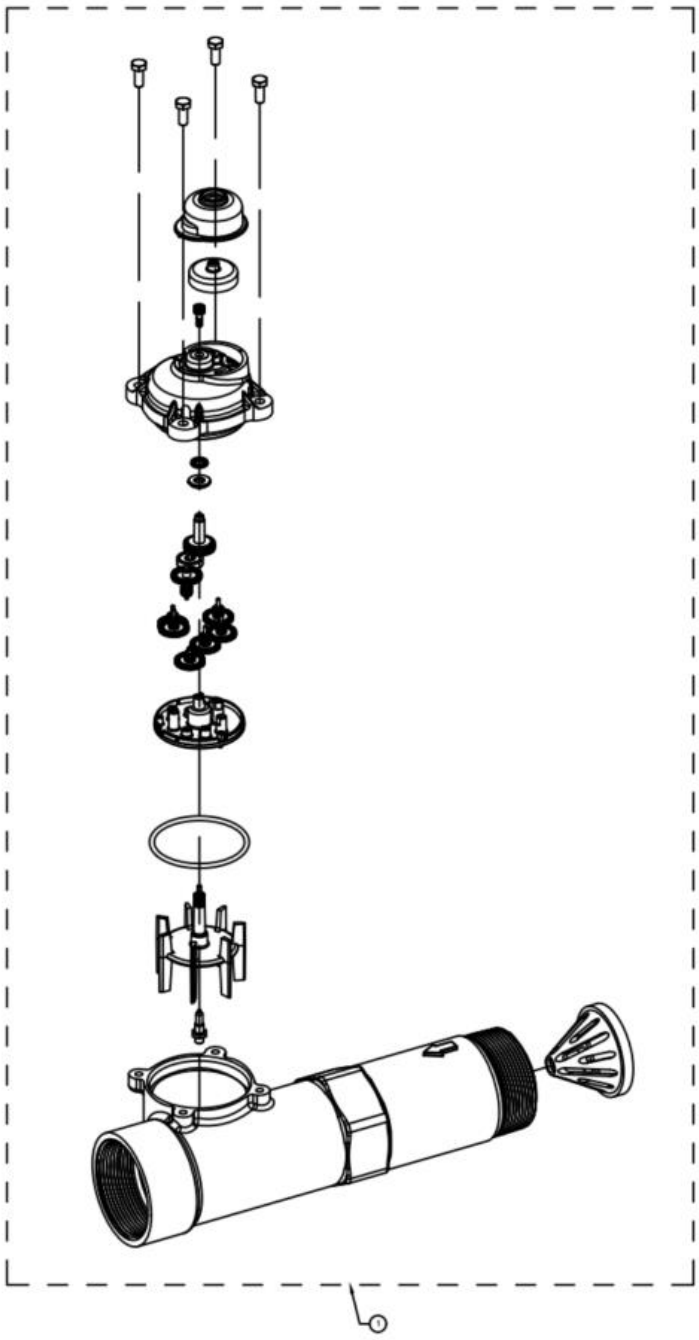
Item	Qty	Part No.	Description
1	1	68104729	Part FL Seal and Spacer Kit, 2900S, Upper
2	1	68104731	Piston Assembly, 2900S, Downflow, Upper
3	1	68104556	Part Seal & Spacer Kit 2900 Lower
4	1	68104733	Part Piston Assembly 2900S, Downflow, NHWBP, Lower
5	1	68104171	O-Ring #240 Tank to Valve SF F/2900/2930/3150
6	1	68104172	O-Ring #226 F/2900, 9500 Distributer
7	1	68104400	K4519925 Part FL Gasket, Injector Body, 1700 Regulator

4.3.6 Fleck 1710 Brine Valve and Injector



Item	Qty	Part No.	Description
1	1	68104658	1710 Brine VLV F/2750 2900 PLST W/ 2.0 GPM

4.3.7 2” Flow Meter



Item	Qty	Part No.	Description
1	1	68104756	Meter Assembly 2.0 SST MECH/ELEC CA