

Installation, Operation and Maintenance

1" & 1½" Commercial Water Softeners

Series: PWS10T & PWS15T

WATTS[®]
pure water



PWS10T Twin Alternating Systems



PWS15T Twin Alternating Systems

Congratulations on your purchase of this Watts® commercial water softening solution.

You have made a great choice to protect your plumbing system against the damaging effects of hard water. This system has been engineered for trouble free operation and produced using top quality components. Simple programming, corrosion resistant mineral tank(s) and an easy to service design ensures this system will be durable and easy to maintain.

Thank You!

The Watts Team

Softened water provides a wide variety of benefits such as reducing the potential of lime scale formation in boilers, water heaters and heat exchangers to protecting the remainder of the plumbing system from costly maintenance and down time associated with the negative effects of hard water.

⚠ WARNING

Please read carefully before proceeding with installation. Your failure to follow any attached instructions or operating parameters may lead to the product's failure. Keep this Manual for future reference.

**⚠ WARNING**

If you are unsure about installing your Watts water softener contact a Watts 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.** Watts 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.

Save manual for future reference.

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 for installing this water conditioning system.
- 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 sweat-solder connections, as required by state, province and federal codes.
- Handle all components of the system 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 while in operation.
- Install the system in a protected area.
- Do not attempt to treat water over 110°F (43°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.
- 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 or paste may be used on metal inlet and outlet plumbing connections. Do not use paste type pipe thread sealants on the system's plastic plumbing connections.

- 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.
- For installations where 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 this water conditioning system's warranty.
- It is established that when daytime water pressure exceeds 80psi (5.5 bar), the maximum pressure rating of 125psi (8.6 bar) can be exceeded. A pressure regulator must be installed on this system or warranty is voided.
- Periodic cleaning and maintenance is 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 ice melting salt, block salt or rock salt.

How To Use This Manual

This installation manual is designed to guide the installer through the process of installing and starting up this commercial water conditioning systems.

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.

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Introduction

Principals of Softening- Ion Exchange

In nature, water acts as a solvent that dissolves substances it comes in contact with such as solid rock. When water dissolves limestone rock, which is composed of calcium and magnesium, the solid calcium and magnesium become ions. This means they have been dissolved into the water and are now a liquid. 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.

New, 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 the regeneration process before resin exhaustion occurs.

Regeneration occurs automatically and consists of 5 steps:

Step 1- Backwash

Approximate Duration 10 Minutes- Fresh water flow is directed upward through the resin bed, to remove solid particles the resin bed has captured, sending them to drain.

Step 2- Brine Draw

Approximate Duration 15-20 Minutes- Brine water is drawn from the brine tank, rinsed over the ion exchange resin, driving away the calcium and magnesium cations and restoring sodium cations within the resin. Calcium and magnesium is sent to drain.

Step 3- Slow Rinse

Approximate Duration 40-45 Minutes- Once the brine tank is emptied of brine water, fresh water will continue to rinse over the resin and rinse calcium and magnesium cations to drain.

Step 4- Rapid Rinse

Approximate Duration 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.

Step 5- Brine Tank Refill

Approximate Duration User Adjustable- In this final step of regeneration, water is added back into the brine tank so that a brine solution can be prepared for the next regeneration.

At the conclusion of Brine Tank Refill, the tank that has just completed the regeneration process will remain in the stand by position until the tank on-line begins regeneration.

Project Data Sheet

Job Details

Job Number: _____

Model Number / Serial Number: _____

Water Hardness: _____ ppm or gpg

Capacity Per Unit: _____

Mineral Tank Size: _____ Diameter: _____ Height: _____

Salt Setting per Regeneration: _____

Regenerant Flow: _____ Upflow _____ Downflow _____

1. Meter Size:

A. ¾" Paddle Wheel

B. ¾" Turbine

C. 1" Paddle Wheel

D. 1" Turbine

E. 1½" Electronic Inline Plastic Turbine

F. 1½" Paddle Wheel

G. 2" Paddle Wheel: Stainless Steel _____ Brass _____ Plastic _____

H. Generic _____ Pulse Count _____ Meter Size _____

2. System Type:

A. System #4: 1 Mineral Tank, 1 Meter, Immediate, or Delayed Regeneration

B. System #7: 2 Mineral Tanks, 1 Meter, Immediate Regeneration

C. System #14: 2-8 Mineral Tanks, 2-8 Meters, Immediate Regeneration,
Progressive Flow Tank Staging- GPM Threshold for Progressive
Feature _____

D. _____ Other: System # Description _____

3. Controller Program Settings:

A. Backwash: _____ Minutes

B. Brine and Slow Rinse: _____ Minutes

C. Rapid Rinse: _____ Minutes

D. Brine Tank Refill: _____ Minutes

E. Pause Time: _____ Minutes

4. Drain Line Flow Control: _____ gpm

5. Brine Line Flow Control: _____ gpm

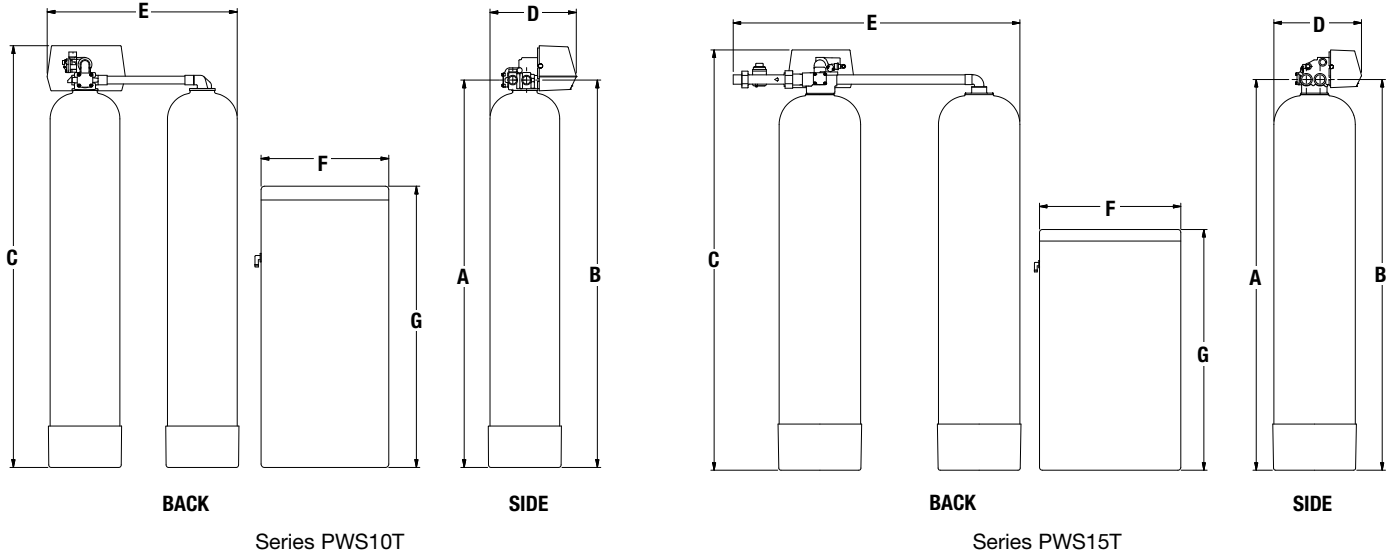
6. Injector Size#: _____

7. Water Pressure: _____

8. Water Temperature: _____

System Specifications

Dimensions - Weights



Series PWS10T

MODEL NO.	DIMENSIONS												WEIGHTS			
	A		B		C		D		E		F		G		lbs.	kgs.
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
PWS10T161A21	50	1270	50	1270	55	1397	12	305	27 ³ / ₈	695	18	457	40	1016	230	105
PWS10T161B21	56 ¹ / ₈	1425	56 ¹ / ₈	1425	61 ¹ / ₈	1552	12 ¹ / ₂	318	27 ⁷ / ₈	708	18	457	40	1016	290	132
PWS10T161C21	54 ¹ / ₂	1384	54 ¹ / ₂	1384	59 ¹ / ₂	1511	13 ¹ / ₂	343	29 ¹ / ₂	749	18	457	40	1016	350	159
PWS10T161D21	67 ³ / ₈	1711	67 ³ / ₈	1711	72 ¹ / ₄	1835	14 ⁵ / ₈	371	31 ¹ / ₂	800	18	457	40	1016	500	227
PWS10T161E21	66 ⁵ / ₈	1692	66 ⁵ / ₈	1692	71 ⁵ / ₈	1819	16 ¹ / ₈	409	33 ¹ / ₈	841	18	457	40	1016	650	295

Series PWS15T

MODEL NO.	DIMENSIONS												WEIGHTS			
	A		B		C		D		E		F		G		lbs.	kgs.
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
PWS15T171C21	55 ⁵ / ₈	1413	55 ⁵ / ₈	1413	60 ⁷ / ₈	1546	14 ¹ / ₄	362	48 ¹⁵ / ₁₆	1242	24	607	41	1041	370	168
PWS15T171D21	67 ⁵ / ₈	1718	67 ⁵ / ₈	1718	72 ¹⁵ / ₁₆	1852	15 ¹ / ₄	387	50	1270	24	607	41	1041	550	250
PWS15T171E21	67 ¹ / ₈	1705	67 ¹ / ₈	1705	72 ³ / ₈	1838	16 ¹ / ₄	413	50 ³ / ₄	1289	24	607	41	1041	720	327
PWS15T171F21	68 ¹⁵ / ₁₆	1750	68 ¹⁵ / ₁₆	1750	74	1880	18 ¹ / ₈	460	51 ³ / ₄	1314	24	607	41	1041	900	409
PWS15T171G21	70 ¹⁵ / ₁₆	1801	70 ¹⁵ / ₁₆	1801	76	1930	21 ¹ / ₈	536	53 ¹ / ₄	1353	24	607	50	1270	1215	552
PWS15T171H21	77 ¹ / ₈	1959	77 ¹ / ₈	1959	82 ³ / ₈	2092	24 ¹ / ₈	613	54 ³ / ₄	1391	30	762	50	1270	1750	795

System Specifications

Specifications

PWS10T

MODEL NO.	MINERAL TANK			BRINE TANK		SOFTENING CAPACITY KGR		LBS. SALT PER REGENERATION		FLOW RATE & PRESSURE		
	Tank Size	Resin Ft ³	Gravel #20	Tank Size	Salt Fill lbs.	Max	Min	Max	Min	Serv GPM	Drop PSI	BKW GPM
PWS10T161A21	9" x 48"	1.0	10 lbs.	18" x 40"	400	30 K	20 K	15	6	9/15	15/25	2.0
PWS10T161B21	10" x 54"	1.5	10 lbs.	18" x 40"	400	45 K	30 K	22.5	9	10/15	15/25	2.4
PWS10T161C21	12" x 52"	2.0	30 lbs.	18" x 40"	400	60 K	40 K	30	12	15/20	15/25	3.5
PWS10T161D21	14" x 65"	3.0	60 lbs.	18" x 40"	400	90 K	60 K	45	18	18/23	15/25	5.0
PWS10T161E21	16" x 65"	4.0	80 lbs.	18" x 40"	400	120 K	80 K	60	24	19/25	15/25	7.0

PWS15T

MODEL NO.	MINERAL TANK			BRINE TANK		SOFTENING CAPACITY KGR		LBS. SALT PER REGENERATION		FLOW RATE & PRESSURE		
	Tank Size	Resin Ft ³	Gravel #20 / 1/4x1/8	Tank Size	Salt Fill lbs.	Max	Min	Max	Min	Serv GPM	Drop PSI	BKW GPM
PWS15T171C21	12" x 52"	2.0	30/- lbs.	24" x 41"	600	60 K	40 K	30	12	15/20	15/25	3.5
PWS15T171D21	14" x 65"	3.0	60/- lbs.	24" x 41"	600	90 K	60 K	45	18	17/22	15/25	5.0
PWS15T171E21	16" x 65"	4.0	80/- lbs.	24" x 41"	600	120 K	80 K	60	24	25/40	15/25	7.0
PWS15T171F21	18" x 65"	5.0	100/- lbs.	24" x 41"	600	150 K	100 K	75	30	25/40	15/25	10.0
PWS15T171G21	21" x 62"	7.0	100/- lbs.	24" x 50"	800	210 K	140 K	105	42	35/53	15/25	12.0
PWS15T171H21	24" x 72"	10.0	100/100 lbs.	30" x 50"	1200	300 K	200 K	150	60	40/55	15/25	15.0

General System Information for 1" Twin Alternating PWS10T Softeners

MODEL NO.	ORDERING CODES	DESCRIPTION	PIPE SIZE	SPACE REQUIRED D X W X H	WEIGHT	
					LBS	KGS
PWS10T161A21	7100055	1 Cubic Foot Twin Alt. Water Softener with Flow Meter	1"	18" x 51" x 70"	230	105
PWS10T161B21	7100056	1.5 Cubic Foot Twin Alt. Water Softener with Flow Meter	1"	18" x 51" x 76"	290	132
PWS10T161C21	7100057	2 Cubic Foot Twin Alt. Water Softener with Flow Meter	1"	18" x 53" x 74"	350	159
PWS10T161D21	7100058	3 Cubic Foot Twin Alt. Water Softener with Flow Meter	1"	18" x 58" x 87"	500	227
PWS10T161E21	7100059	4 Cubic Foot Twin Alt. Water Softener with Flow Meter	1"	18" x 62" x 87"	650	295

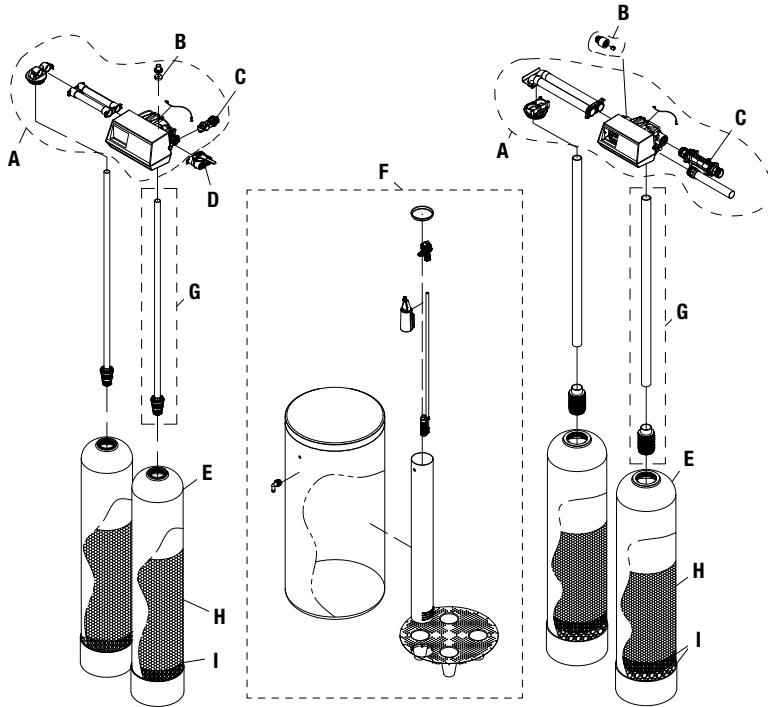
Notes: Capacities are based on resin manufacturer's data and are dependent upon influent water TDS, temperature, bed depth, and flow rates. Feed water must be free of oil and color. Pipe size, tank size, and space requirements are in inches. Capacities and flow rates expressed above are per tank. Flow rates listed at 25psi drops are for intermittent peak flow rates and are not to be used as continuous flows.

General System Information for 1½" Twin Alternating PWS15T Softeners

MODEL NO.	ORDERING CODES	DESCRIPTION	PIPE SIZE	SPACE REQUIRED D x W x H	WEIGHT	
					LBS	KGS
PWS15T171C21	7100060	2 Cubic Foot Twin Alt. Water Softener with Flow Meter	1½"	24" x 78" x 75"	370	168
PWS15T171D21	7100061	3 Cubic Foot Twin Alt. Water Softener with Flow Meter	1½"	24" x 79" x 87"	550	250
PWS15T171E21	7100062	4 Cubic Foot Twin Alt. Water Softener with Flow Meter	1½"	24" x 80" x 87"	720	327
PWS15T171F21	7100063	5 Cubic Foot Twin Alt. Water Softener with Flow Meter	1½"	24" x 81" x 89"	900	409
PWS15T171G21	7100064	7 Cubic Foot Twin Alt. Water Softener with Flow Meter	1½"	24" x 83" x 89"	1215	552
PWS15T171H21	7100065	10 Cubic Foot Twin Alt. Water Softener with Flow Meter	1½"	39" x 90" x 96"	1750	795

Set Up

Unpack system and make sure all components are accounted for according to the diagram below according to your specific series number. If any components are missing or damaged contact your Watts representative. If they can not be reached contact Watts customer service at 800-659-8400.



Series PWS10T

Series PWS15T

Operating Parameters

pH	6 to 10
Hardness (maximum)	Depends on customer's acceptable hardness leakage level
Water Pressure	25psi to 125psi (171 kPa to 8.6 bar)
Temperature	34 - 110°F (1 - 43°C)
Free Chlorine (maximum)	1mg/L
Iron (maximum)	1mg/L
Oil and H ₂ S	None Allowed
Turbidity	Less than 5.0 NTU
Total Dissolved Solids	Must be below 750mg/L for the softener to produce less than 1 grain per gallon soft water
Minimum Ambient Temperature	34°F/1°C
Maximum Ambient Temperature	120°F/52°C
Maximum Humidity	75%
Power Supply Input Voltage	100-240 VAC
Power Supply Input Frequency	50/60 Hz
Power Supply Output Voltage	24 VDC
Power Supply Output Current	2.7 amps (per control valve)
Maximum Altitude	2,000 meters above sea level

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 Watts representative.

QUANTITY OF MAJOR COMPONENTS			
COMPONENT LABEL	COMPONENT	PWS10T TWIN ALTERNATING	PWS15T TWIN ALTERNATING
A	Number of Control Valves	1	1
B	Number of Drain Line Flow Controllers*	1	1
C	Number of Flow Meters	1	1
D	Number of Bypass Valves	1	N/A
E	Number of Mineral Tanks	2	2
F	Number of Brine Tanks	1	1
G	Number of Distributor Tubes*	2	2
H	Resin**	Quantity Varies Depending On System Size	Quantity Varies Depending On System Size
I	Gravel**	Quantity Varies Depending On System Size	Quantity Varies Depending On System Size

* Drain line flow controller for PWS10T Series is factory installed in valve's drain port. Drain line flow controller for PWS15T may come loose or assembled on control valve's drain port depending on system size. Verify drain line flow controller is present before proceeding. See installation Diagrams page 12-13 Drain and Brine Connection Detail for assistance. Distributor tubes ship inside mineral tanks.

** Water softening systems that use mineral tanks larger than 12" in diameter are not factory loaded with resin and gravel. For unloaded systems, the media is in bags and ship on the system pallet. The proper amount of media is supplied for the mineral tank used.

System Installation

Pre-Installation Considerations

- A minimum of 25psi of water pressure is required for regeneration valve to operate effectively.
- A continuous 115 volt, 60 Hertz current supply is required. Make certain the current supply is always hot and cannot be turned off with another switch.
- Condition of existing plumbing should be free from lime and iron buildup. Piping that is built up heavily with lime and/or iron should be replaced. If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water softener.
- The softener should be located close to a drain.
- Always provide for the installation of a bypass valve.
- The full weight of the plumbing system must be supported by pipe hangers or other means.
- 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 applicable, use di-electric unions where dissimilar metals are present.

NOTICE

The main control valve and all plumbing connections have right-hand threads. Turn clockwise to install.

NOTICE

If O-ring lubricant is required, only use a silicone based compound formulated for potable water O-ring applications. Watts recommends Ordering Code #68102757 Silicone Lubricant. 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.

⚠ WARNING

Do not exceed water pressure of 125psi (8.6 bar). Do not exceed 110°F (43°C). Do not subject unit to freezing conditions.

General Installation Instructions

NOTICE

Installation diagrams and additional details are available on pages 12-13 of this manual.

1. Turn off water heater(s).
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 mineral tanks into their final position for installation. Make sure that the location is level and sturdy enough to support the weight of the system once it is in operation.
4. Unloaded mineral tanks will need to be loaded with resin and gravel media following the instructions below:
 - 4a. Inspect the distributor screens for damage, and make sure the screens are present before loading the mineral tanks with media. Before proceeding with installation, replace any damaged components immediately.
- 4b. Cap the top open end of the distributor tubes with tape and plastic sheeting to keep all media and foreign debris from entering the distributor tubes. This cap must be secure and not come off during media loading.
- 4c. Place the distributor tubes, screen end down, into the mineral tanks and center them in the bottom. The top of the distributor tubes should be flush with the top of the tanks. Test the tapes cap to make sure they can not come off during the media loading process.
- 4d. Make sure the plastic and tape caps are secure to the top of the distributor tubes, place a funnel on the top of the tanks and load first the gravel then the softening resin into the tanks. The caps must not come off of the distributor tubes during the loading of the media.
- 4e. Remove the funnel from the top of the tanks and plastic caps and tape from the top of the distributor tubes. DO NOT PULL UP ON THE DISTRIBUTOR TUBES when removing the caps. The distributor tube tops must remain flush with the top of the tank.
- 4f. Clean any media from the threads and top of the mineral tanks. Media in the threads and on the O-ring sealing surface of the tanks can cause tank thread damage and prevent the control valve's O-ring seal from sealing properly.
- 4g. Lubricate the O-rings on the bottom of the control valve (distributor tube port O-ring and top of tank O-ring). Use nonpetroleum based silicone lubricant only. For PWS15T series systems press the factory supplied black upper diffuser into the base of the control valve and then repeat this step using the second tank adapter.
- 4h. 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. Repeat this step using the other mineral tank and the second tank adapter.
- 4i. Tighten the control valve onto the tank with a clockwise rotation. 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. Repeat this step using the other mineral tank and the second tank adapter.
- 4j. Install the interconnecting tube assembly from the control valve to the second tank adapter. For PWS10T series systems tighten clips with screws provided using a nut driver. For PWS15T series systems tighten flanges (X2) to control valve and second tank adapter using a wrench.
5. **Meter Installation:** On PWS10T series systems the meter is pre-installed by the factory. Proceed to installation step 7. For PWS15T series systems, apply a suitable thread sealant to the male threads of the flow meter and with the meter's direction of flow arrow pointing in the direction of water flow, install the meter directly into the outlet port of the system control valve.
6. For PWS15T series systems, rotate meter clockwise to tighten, by gripping the meter on the end connector that attaches to the control valve with a wrench, and continue to tighten the flow meter end connector until tight. Then rotate plastic meter body so the meter cable can be aligned and inserted into the meter's cable port. DO NOT grip on the plastic meter body with the wrench when installing the flow meter.
7. For PWS10T series systems, attach bypass valve assembly using clips and screws provided. Hand tighten screws with a nut driver.

NOTICE

If 4" X 2½" PVC tank bushings are included with the system to adapt the control valve base to a larger control valve tank connection, ensure the bushings are tightened, fully hand tight, into the tanks at this time.

System Installation

8. Connect the cold water supply to the inlet port of the water softening system's control valve. When constructing the supply line, install an inlet water isolation valve and plumbing union fitting (user supplied) in the supply line of the control valve and close the isolation valve. The union fitting should be located between the isolation valve and the system's inlet port. For PWS15T series systems where installation plumbing is constructed of copper, a 1½" MNPT X 1' copper pipe plumbing adapter assembly is included to assist in connection of the inlet water. Apply plumbing tape to MNPT threads and install adapter assembly into control valve inlet port.
9. Install an inlet water sample port in the supply line and close it.
10. If risk of vacuum exists, install Watts # 0556031 vacuum relief valve in the supply line to protect the system against vacuum damage.
11. Connect the outlet water connection of the water meter to the water line requiring softened water. When constructing this outlet water line, install an outlet water isolation valve and plumbing union fitting (user supplied) in the outlet line and close the isolation valve. The union fitting should be located between the outlet of the control valve and the outlet isolation valve.
12. Install an outlet water sample port on the outlet water line of the system and close it.
13. For PWS15T series systems, install a bypass valve between the inlet and outlet plumbing water lines and close it.
14. If not already factory installed on the control valve, attach the drain line flow controller directly to the control valve's drain port. See pages 12-13 for Drain and Brine Connection Detail. The flow arrow on the drain line flow controller must point towards the drain receptacle. Only plumbing tape is allowed on the drain line flow controller fitting threads.
15. Construct the drain line routing it to an appropriate drain receptacle abiding by 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, exceed 20 feet in length, or reduce the drain line diameter to smaller than that of the drain line flow controller. For PWS10T series systems ½" inside diameter plumbing is the minimum pipe size allowed for the drain line. Install a plumbing union fitting in the drain line close to the drain line flow controller. The drain line must be anchored to the floor.
16. Connect the brine tank to the water softener's control valve brine port using the factory supplied fittings and tubing. See pages 12-13 for Drain and Brine Connection Detail. The brine tank 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. Add enough water (6") to the brine tank so that water covers the top of the air check. DO NOT add salt to the brine tank at this time.
17. Insert the meter cable's sensor into the sensor port in the meter according to Figure 2. Connect the plug end of the meter cable wire into the P1 port of SXT controller (See page 14 for location).
18. Connect the 24V transformer power supply wires to the control valve controller. Connect wires into the P2PWR port of SXT controller (See page 14 for location) .
19. If applicable, install a metal bonding strap across metal inlet and outlet plumbing lines to maintain electrical continuity.

The system is now ready for Start Up.

⚠ WARNING

Operating a system without a drain line flow controller will cause all media to flow out of the system through the drain line.

System Installation

Start Up Instructions

NOTICE

The mineral tank with the control valve is considered Tank 1 and the mineral tank with the tank adapter is considered Tank 2. See Control Valve Position Indicator image below for reference.

During cold weather, the installer should warm the valve to room temperature before operating.

1. Ensure all inlet and outlet isolation valves are in the closed position, the bypass valve is in the service position, and the treated water faucet hot and cold side are in the open position.
2. Open the main water supply valve to the building.
3. Check for leaks and repair as needed.
4. Plug the power cord of the control valve into an electrical outlet to energize system.
5. To Fill the first mineral tank with water, locate "Manually Initiating a Regeneration" in this manual and follow the steps to place the system in the backwash position. For SXT Controller see page 16. Reference the position indicator shown in Figure 1 below, located on the right side of the control valve's powerhead.

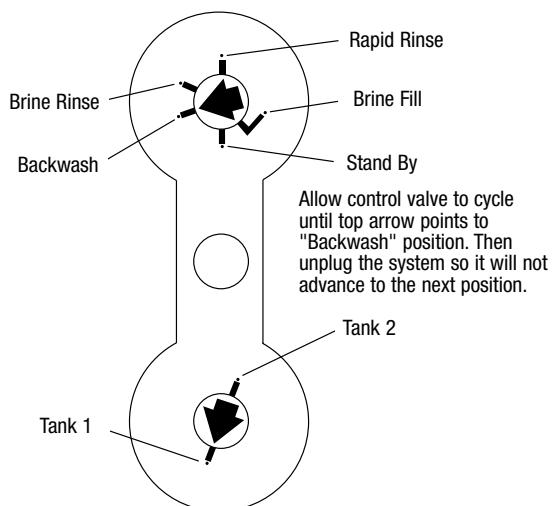


Figure 1 Control Valve Position Indicators

6. 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.
7. Once water flow at the drain line is observed, plug the system into the power outlet and advance the system through the remaining steps of regeneration by pressing the extra cycle button each time the control valve come to a stop until the position indicator arrives in the "Stand By" position. See Manually Initiating a Regeneration for help.
8. Fill the second mineral tank with water by manually initiating a regeneration and allowing the control valve to cycle into the backwash position, then unplug the system. Once water flow at the drain line is observed, fully open the inlet valve and allow water to flow to drain for 15 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. During this flush water is flowing through both tanks so a separate flush for the second tank is not necessary. Then plug the system into the power outlet and advance the system to the stand by position as shown on the position indicator.

9. Program the system according to the System Type following the Control Valve Programming section of this manual beginning on page 18.
10. Put the appropriate amount of water in the brine tank. This is accomplished by manually cycling the control valve to cycle step 4 "Brine Tank Refill" and allowing a complete brine tank refill cycle to conclude.
11. Put the appropriate amount of salt in the brine tank. Do Not fill the salt level past the brine well lid.
12. Fully open the outlet isolation valve.
13. Ensure the bypass valve is in the closed position.
14. Check for leaks and repair as needed.
15. 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.
16. Turn on water heaters.

Start up is now complete and the system is ready for operation.

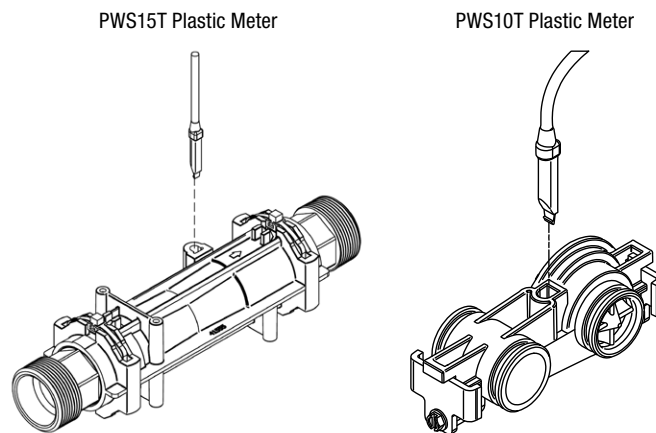


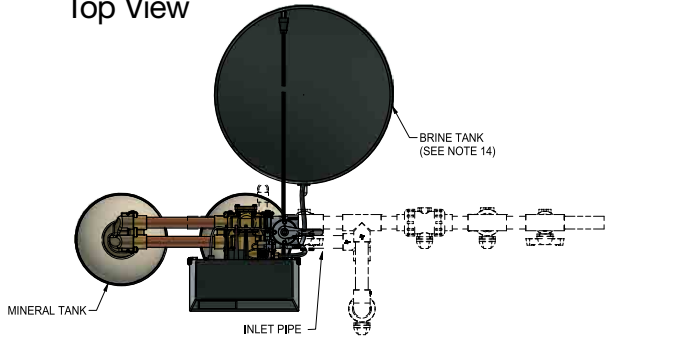
Figure 2 Plastic Meter Cable Installation

Installation Diagrams - Series PWS10T Twin Alternating Systems

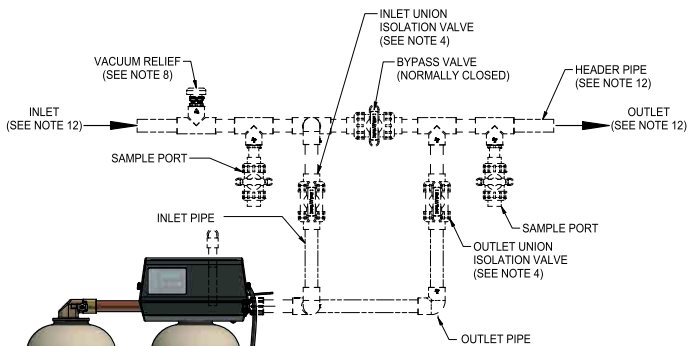
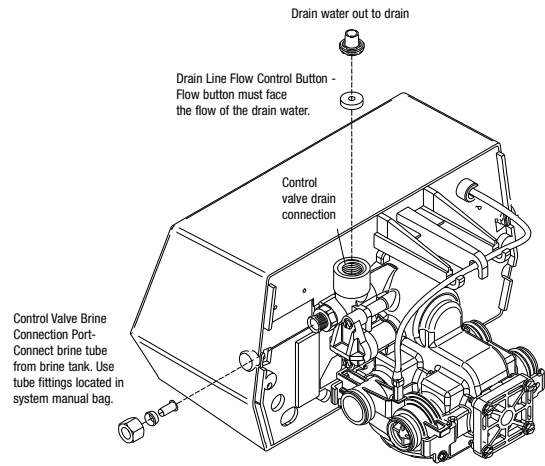
Installation Reference Notes For All System Installation Drawings:

1. All dimensions are on page 6 of this manual & unless otherwise noted & are ± 1 inch (25mm).
2. All items shown in phantom line are to be provided by others.
3. All dimensions are subject to change without any notice.
4. Install unions fittings on inlet, outlet & drain plumbing connections.
5. Provide a 2 feet minimum clearance above mineral tank for filling media.
6. A GFCI equip electrical outlet should be provided within 5 feet of equipment location.
7. Use dielectric unions on plumbing connections of control valve when dissimilar metals are present.
8. Provided system shall not be subject to any vacuum. If risk of vacuum is present, install siphon break on drain line & install vacuum relief valve Watts ordering code # 0556031 on inlet line.
9. Brine tank dimensions shown on table are factory selected for use with the specified system size.
10. Do not install drain line directly to a drain. For proper drain connection follow all national, state and local codes. Do not construct drain line to elevations that exceed 4 feet above the control valve's drain port.
11. The full weight of the piping and valves must be supported by pipe hangers or other means.
12. Inlet and outlet headers need to be sized according to flow rate requirements by others.
13. Power requirements: 115v/60hz 2.7 Amps per control valve unless otherwise specified.
14. Brine tank must be located within 10 feet of system control valve and on a common floor elevation with mineral tank to ensure proper brine draw operation.
15. Use factory supplied brine tubing. Do not use smaller diameter tubing than what is supplied.
16. Limit inlet pressure to not exceed maximum published operating pressure.

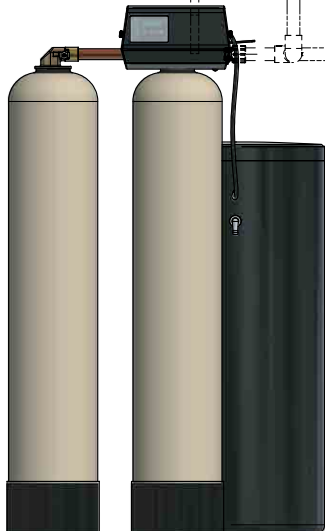
Top View



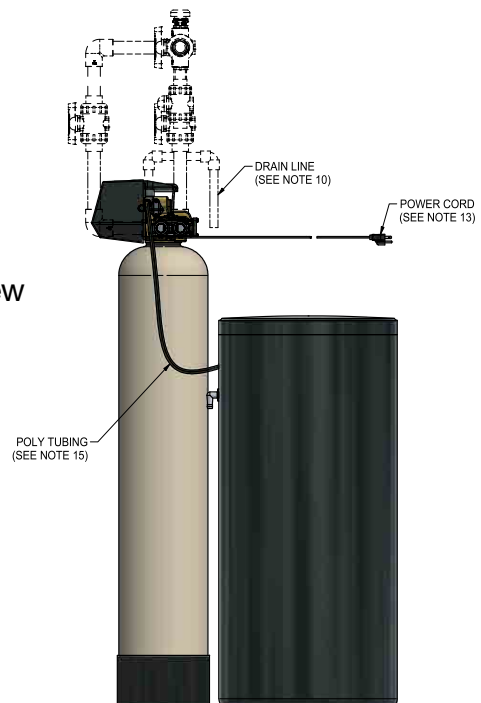
Drain and Brine Connection Detail



Front View



Side View

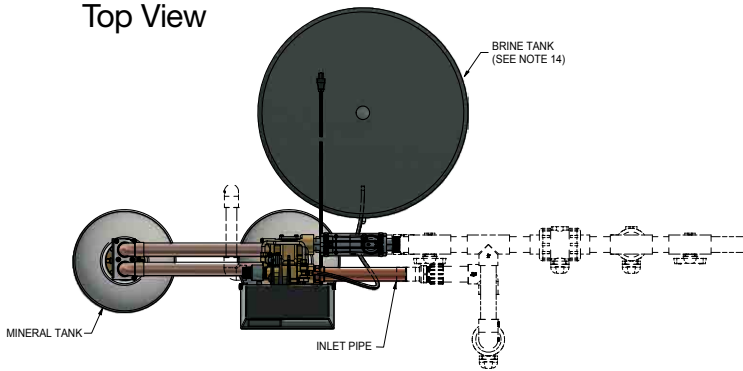


Installation Diagrams - Series PWS15T Twin Alternating Systems

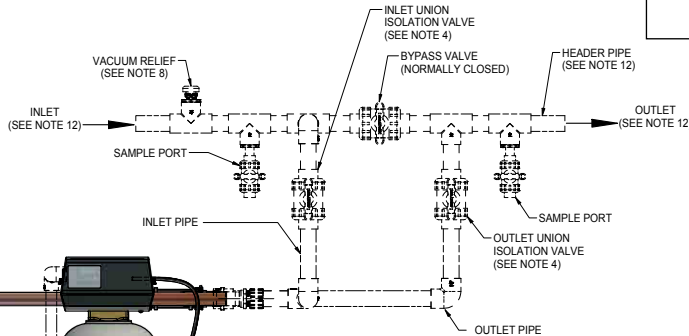
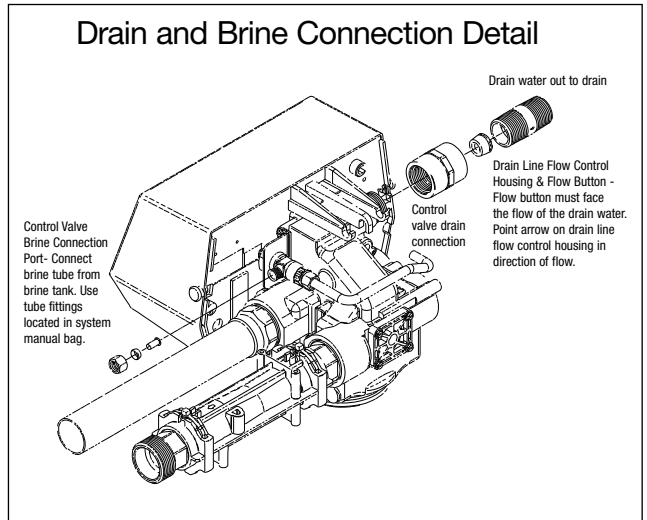
Installation Reference Notes For All System Installation Drawings:

1. All dimensions are on page 6 of this manual & unless otherwise noted are ± 1 inch (25mm).
2. All items shown in phantom line are to be provided by others.
3. All dimensions are subject to change without any notice.
4. Install unions fittings on inlet, outlet & drain plumbing connections.
5. Provide a 2 feet minimum clearance above mineral tank for filling media.
6. A GFCI equipt electrical outlet should be provided within 5 feet of equipment location.
7. Use dielectric unions on plumbing connections of control valve when dissimilar metals are present.
8. Provided system shall not be subject to any vacuum. If risk of vacuum is present, install siphon break on drain line & install vacuum relief valve Watts ordering code # 0556031 on inlet line.
9. Brine tank dimensions shown on table are factory selected for use with the specified system size.
10. Do not install drain line directly to a drain. For proper drain connection follow all national, state and local codes. Do not construct drain line to elevations that exceed 4 feet above the control valve's drain port.
11. The full weight of the piping and valves must be supported by pipe hangers or other means.
12. Inlet and outlet headers need to be sized according to flow rate requirements by others.
13. Power requirements: 115v/60hz 2.7 Amps per control valve unless otherwise specified.
14. Brine tank must be located within 10 feet of system control valve and on a common floor elevation with mineral tank to ensure proper brine draw operation.
15. Use factory supplied brine tubing. Do not use smaller diameter tubing than what is supplied.
16. Limit inlet pressure to not exceed maximum published operating pressure.

Top View

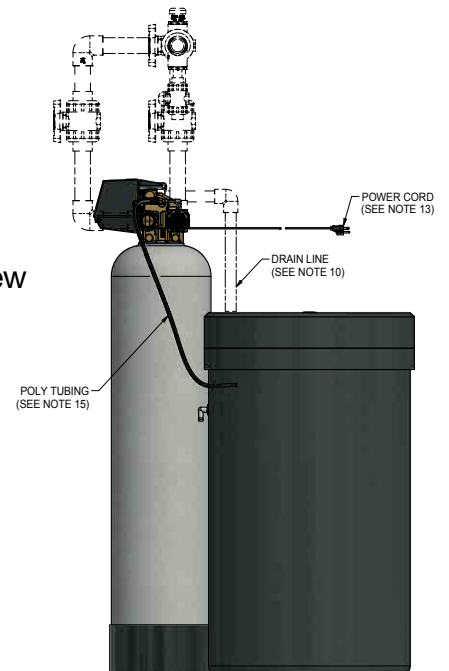


Drain and Brine Connection Detail

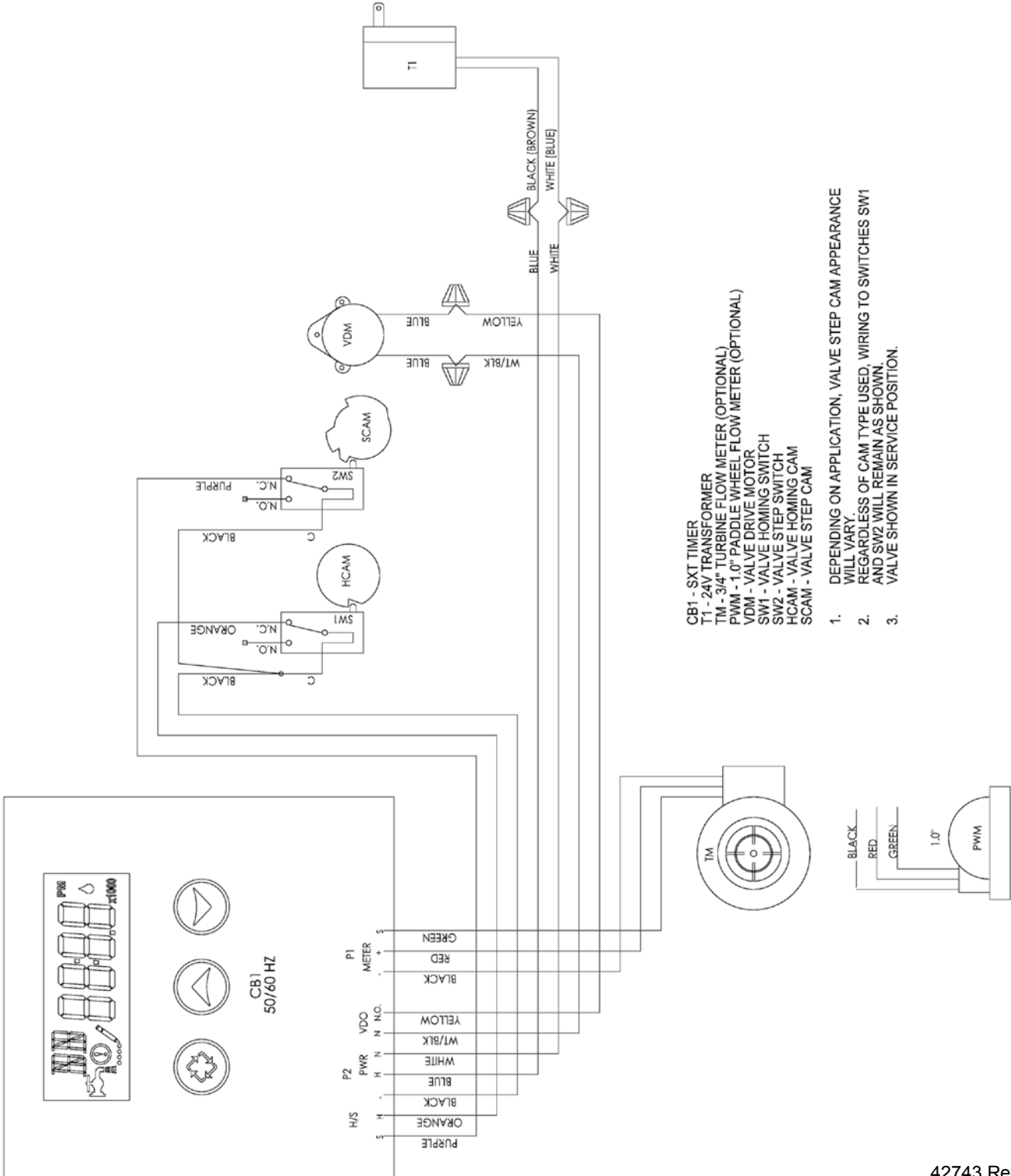


Front View

Side View



Wiring Diagram - SXT 9000 & 9500



42743 Rev A

SXT Controller Programming and Operation



Controller Display

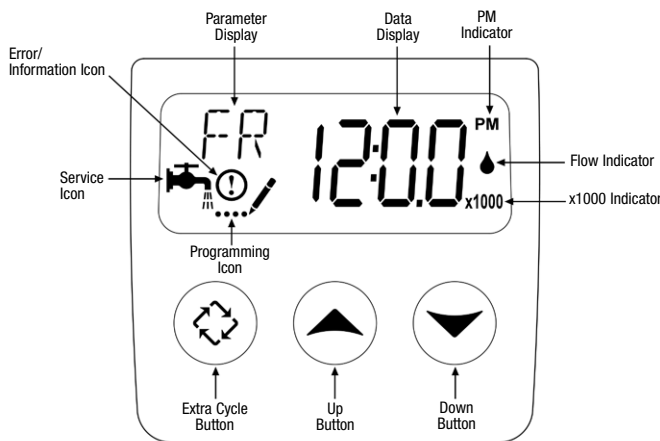


Figure 1

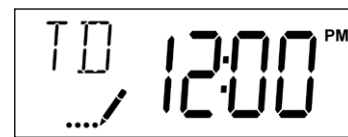
42637 Rev D

Features of the SXT:

- Power backup that continues to keep time and the passage of days for a minimum of 48 hours in the event of power failure. During a power outage, the control goes into a power-saving mode. It does not monitor water usage during a power failure, but it does store the volume remaining at the time of power failure.
- Settings for both valve (basic system) and control type (method used to trigger a regeneration).
- Day-of-the-Week controls.
- While in service, the display alternates between time of day, volume remaining or days to regeneration, and tank in service (twin tank systems only).
- The Flow Indicator flashes when outlet flow is detected.
- The Service Icon flashes if a regeneration cycle has been queued.
- A Regeneration can be triggered immediately by pressing the Extra Cycle button for five seconds.
- The Parameter Display displays the current Cycle Step (BW, BF, RR, etc) during regeneration, and the data display counts down the time remaining for that cycle step. While the valve is transferring to a new cycle step, the display will flash. The parameter display will identify the destination cycle step (BW, BF, RR, etc) and the data display will read "----". Once the valve reaches the cycle step, the display will stop flashing and the data display will change to the time remaining. During regeneration, the user can force the control to advance to the next cycle step immediately by pressing the extra cycle button.

Setting the Time of Day

1. Press and hold either the Up or Down buttons until the programming icon replaces the service icon and the parameter display reads TD.
2. Adjust the displayed time with the Up and Down buttons.
3. When the desired time is set, press the Extra Cycle button to resume normal operation. The unit will also return to normal operation after 5 seconds if no buttons are pressed.



Manually Initiating a Regeneration

1. Press the Extra Cycle button. The service icon will flash to indicate that a regeneration is queued.
2. To cancel a queued regeneration, press the Extra Cycle button.

Regenerating Immediately

Press and hold the Extra Cycle button for five seconds.

SXT Controller Operation

Meter Immediate Control

A Meter Immediate control measures water usage and regenerates the system as soon as the calculated system capacity is depleted. The control calculates the system capacity by dividing the unit capacity (typically expressed in grains/unit volume) by the feedwater hardness and subtracting the reserve. Meter Immediate systems generally do not use a reserve volume. However, in twin tank systems with soft-water regeneration, the reserve capacity should be set to the volume of water used during regeneration to prevent hard water break-through. A Meter Immediate control will also start a regeneration cycle at the programmed regeneration time if a number of days equal to the regeneration day override pass before water usage depletes the calculated system capacity.

Meter Delayed Control

A Meter Delayed Control measures water usage and regenerates the system at the programmed regeneration time after the calculated system capacity is depleted. As with Meter Immediate systems, the control calculates the system capacity by dividing the unit capacity by the feedwater hardness and subtracting the reserve. The reserve should be set to insure that the system delivers treated water between the time the system capacity is depleted and the actual regeneration time. A Meter Delayed control will also start a regeneration cycle at the programmed regeneration time if a number of days equal to the regeneration day override pass before water usage depletes the calculated system capacity.

Time Clock Delayed Control

A Time Clock Delayed Control regenerates the system on a timed interval. The control will initiate a regeneration cycle at the programmed regeneration time when the number of days since the last regeneration equals the regeneration day override value.

Day of the Week Control

This control regenerates the system on a weekly schedule. The schedule is defined in Master Programming by setting each day to either "off" or "on." The control will initiate a regeneration cycle on days that have been set to "on" at the specified regeneration time.

Control Operation During Regeneration

During regeneration, the control displays a special regeneration display. In this display, the control shows the current regeneration step number the valve is advancing to, or has reached, and the time remaining in that step. The step number that displays flashes until the valve completes driving to this regeneration step position. Once all regeneration steps are complete the valve returns to service and resumes normal operation.

Pressing the Extra Cycle button during a regeneration cycle immediately advances the valve to the next cycle step position and resumes normal step timing.

Control Operation During Programming

The control only enters the Program Mode with the valve in service. While in the Program Mode, the control continues to operate normally monitoring water usage and keeping all displays up to date. Control programming is stored in memory permanently, eliminating the need for battery backup power.

Manually Initiating a Regeneration

To occur that day at the next scheduled regeneration time:

1. Press the Extra Cycle button. The service icon will flash to indicate that a regeneration is queued.
2. To cancel a queued regeneration, press the Extra Cycle button.

To occur immediately:

1. When controller is in service, press the Extra Cycle button for 5 seconds on the main screen.
2. The controller advances to Regeneration Cycle Step #1 (Backwash), and begins programmed time count down.
3. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #2 (Brine Draw/Rinse).
4. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #3 (Rapid rinse).
5. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #4 (Brine Refill).
6. Press the Extra Cycle button once more to advance the valve back to in service.

NOTE: If the unit is a filter or upflow, the cycle step order may change.

NOTE: If regeneration occurs for any reason prior to the delayed regeneration time, the manual regeneration request shall be cleared.

Control Operation During A Power Failure

The SXT includes integral power backup. In the event of power failure, the control shifts into a power-saving mode. The control stops monitoring water usage, and the display and motor shut down, but it continues to keep track of the time and day for a minimum of 48 hours.

The system configuration settings are stored in a non-volatile memory and are stored indefinitely with or without line power. The Time of Day flashes when there has been a power failure. Press any button to stop the Time of Day from flashing.

If power fails while the unit is in regeneration, the control will save the current valve position before it shuts down. When power is restored, the control will resume the regeneration cycle from the point where power failed. Note that if power fails during a regeneration cycle, the valve will remain in its current position until power is restored. The valve system should include all required safety components to prevent overflows resulting from a power failure during regeneration.

The control will not start a new regeneration cycle without line power. If the valve misses a scheduled regeneration due to a power failure, it will queue a regeneration. Once power is restored, the control will initiate a regeneration cycle the next time that the Time of Day equals the programmed regeneration time. Typically, this means that the valve will regenerate one day after it was originally scheduled. If the treated water output is important and power interruptions are expected, the system should be setup with a sufficient reserve capacity to compensate for regeneration delays.

SXT Master Programming Mode Chart

⚠ CAUTION

Before entering Master Programming, please contact your local professional water dealer. To enter Master Programming, set time to 12:01 PM.

MASTER PROGRAMMING OPTIONS			
Abbreviation	Parameter	Option Abbreviation	Options
DF	Display Format	GAL	Gallons
		Ltr	Liters
VT	Valve Type	dF1b	Downflow/Upflow Single Backwash
		dF2b	Downflow Double Backwash
		Ftr	Filter
		Ufbd	Upflow Brine First
		Uftr	Upflow Filter
CT	Control Type	Othr	Other
		Fd	Meter (Flow) Delayed
		Fl	Meter (Flow) Immediate
		tc	Time Clock
NT	Number of Tanks	dAY	Day of Week
		1	Single Tank System
TS	Tank in Service	2	Two Tank System
		U1	Tank 1 in Service
C	Unit Capacity	U2	Tank 2 in Service
			Unit Capacity (Grains)
H	Feedwater Hardness		Hardness of Inlet Water
RS	Reserve Selection	SF	Percentage Safety Factor
		rc	Fixed Reserve Capacity
SF	Safety Factor		Percentage of the system capacity to be used as a reserve
RC	Fixed Reserve Capacity		Fixed volume to be used as a reserve
DO	Day Override		The system's day override setting
RT	Regen Time		The time of day the system will regenerate
BW, BD, RR, BF	Regen Cycle Step Times		The time duration for each regeneration step. Adjustable from OFF and 0-199 minutes. NOTE: If "Othr" is chosen under "Valve Type", then R1, R2, R3, etc, will be displayed instead
D1, D2, D3, D4, D5, D6, & D7	Day of Week Settings		Regeneration setting (On or OFF) for each day of the week on day-of-week systems
CD	Current Day		The current day of the week
FM	Flow Meter Type: All PWS10T systems use a 3/4" Turbine Meter. All PWS15T systems use a 1.5" Turbine Meter.	P0.7	¾" Paddle Wheel Meter
		Gen	Generic or Other Meter
		P2.0	2" Paddle Wheel Meter
		t1.5	1.5" Turbine Meter
		P1.5	1.5" Paddle Wheel Meter
		t1.2	1.25" Turbine Wheel Meter
		t1.0	1" Turbine Meter
		P1.0	1" Paddle Wheel Meter
K	Meter Pulse Setting	t0.7	¾" Turbine Meter
			Meter pulses per gallon for generic/other flow meter

NOTE: Some items may not be shown depending on controller configuration. The controller will discard any changes and exit Master Programming Mode if any button is not pressed for sixty seconds.

SXT Master Programming Mode

When Master Programming Mode is entered, all available option setting displays may be viewed and set as needed. Depending on current option settings, some parameters cannot be viewed or set.

Setting the Time of Day

1. Press and hold either the Up or Down buttons until the programming icon replaces the service icon and the parameter display reads TD.
2. Adjust the displayed time with the Up and Down buttons.
3. When the desired time is set, press the Extra Cycle button to resume normal operation. The unit will also return to normal operation after five seconds if no buttons are pressed.



Figure 2

Entering Master Programming Mode

Set the Time of Day display to 12:01 P. M. Press the Extra Cycle button (to exit Setting Time of Day mode). Then press and hold the Up and Down buttons together until the programming icon replaces the service icon and the display format screen appears.

Exiting Master Programming Mode

Press the Extra Cycle button to accept the displayed settings and cycle to the next parameter. Press the Extra Cycle button at the last parameter to save all settings and return to normal operation. The control will automatically disregard any programming changes and return to normal operation if it is left in Master Programming mode for 5 minutes without any keypad input.

Resets

Soft Reset

Press and hold the Extra Cycle and Down buttons for 25 seconds while in normal Service mode. This resets all parameters to the system default values. Not reset are the volume remaining in meter immediate or meter delayed systems and days since regeneration in the time clock system.

Master Reset

Hold the Extra Cycle button while powering up the unit. This resets all of the parameters in the unit. Check and verify the choices selected in Master Programming Mode.

1. Display Format (Display Code DF)

This is the first screen that appears when entering Master Programming Mode. The Display Format setting specifies the unit of measure that will be used for volume and how the control will display the Time of Day. This option setting is identified by "DF" in the upper left corner of the screen. There are two possible settings.

Display Format Setting	Display Format Setting	Time Display
GAL	U.S. Gallons	12-Hour AM/PM
Ltr	Liters	24-Hour



Figure 3

2. Valve Type (Display Code VT)

Press the Extra Cycle button. Use this display to set the Valve Type. The Valve Type setting specifies the type of cycle that the valve follows during regeneration. Note that some valve types require that the valve be built with specific subcomponents. Ensure the valve is configured properly before changing the Valve Type setting. This option setting is identified by "VT" in the upper left hand corner of the screen. Select dF1b for PWS10T and PWS15T series systems.

Abbreviation	Parameter
dF1b	Standard Downflow/Upflow, Single Backwash
dF2b	Standard Downflow/Upflow, Double Backwash
Fltr	Filter
UFbd	Upflow Brine First
UFtr	Upflow Filter
Othr	Other



Figure 4

3. Control Type (Display Code CT)

Press the Extra Cycle button. Use this display to set the Control Type. This specifies how the control determines when to trigger a regeneration. For details on how the various options function, refer to the "Timer Operation" section of this service manual. This option setting is identified by "CT" in the upper left hand corner of the screen. Select FI for PWS10T and PWS15T series systems.

Meter Delayed: Fd

Meter Immediate: FI

Time Clock: tc

Day of Week: dAY

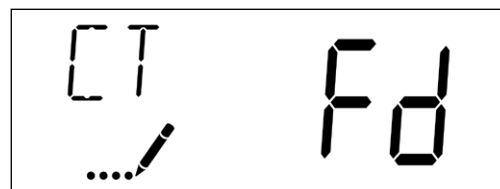


Figure 5

SXT Master Programming Mode - Cont'd

4. Number of Tanks (Display Code NT)

Press the Extra Cycle button. Use this display to set the Number of Tanks in your system. This option setting is identified by "NT" in the upper left hand corner of the screen. There are two possible settings:

Single Tank System: 1

Two-Tank System: 2

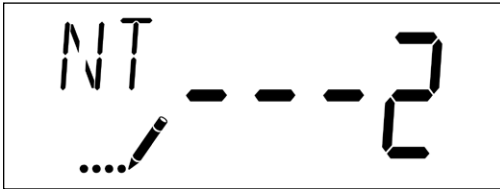


Figure 6

5. Tank in Service (Display Code TS)

Press the Extra Cycle button. Use this display to set whether tank one or tank two is in service. This option setting is identified by "TS" in the upper left hand corner of the screen. This parameter is only available if the number of tanks has been set to 2.

Tank One in Service: U1

Tank Two in Service: U2

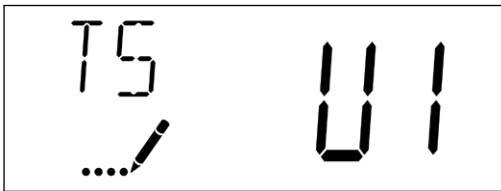


Figure 7

6. Unit Capacity (Display Code C)

Press the Extra Cycle button. Use this display to set the Unit Capacity. This setting specifies the treatment capacity of the system media. Enter the capacity of the media bed in grains of hardness when configuring a softener system, or desired volume capacity when configuring a filter system. This option setting is identified by "C" in the upper left corner of the screen (or by "V" if volume capacity for a filter). The Unit Capacity parameter is only available if the control type has been set to one of the metered options. Use the Up and Down buttons to adjust the value as needed.

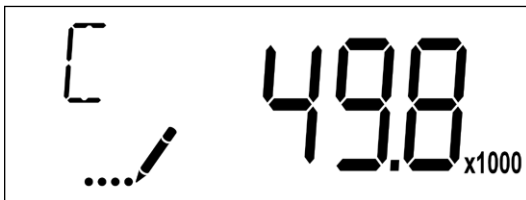


Figure 8

Range: 1-999.9 x 1000 grains/gallon (mg/liter)

7. Feed Water Hardness (Display Code H)

Press the Extra Cycle button. Use this display to set the Feed Water Hardness. Enter the feed water hardness in grains per gallon or degrees for softener systems. This option setting is identified by "H" in the upper left corner of the screen. The feed water hardness parameter is only available if the control type has been set to one of the metered softener options. Use the Up and Down buttons to adjust the value as needed.

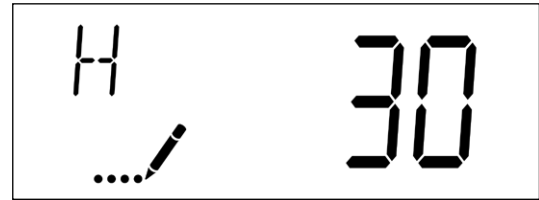


Figure 9

Range: 1-199 grains (degrees)

8. Reserve Selection (Display Code RS)

Press the Extra Cycle button. Use this display to set the Safety Factor and to select the type of reserve to be used in your system. This setting is identified by "RS" in the upper left corner of the screen. The reserve selection parameter is only available if the control type has been set to one of the metered options. There are three possible settings.

Abbreviation	Parameter
SF	Safety Factor
rc	Fixed Reserve Capacity
cr	Variable Reserve

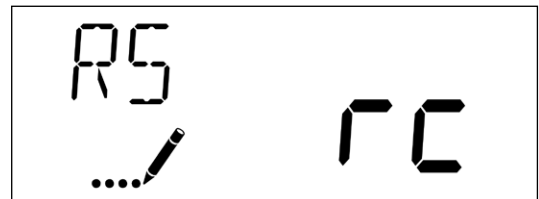


Figure 10

SXT Master Programming Mode - Cont'd

9. Safety Factor (Display Code SF)

Press the Extra Cycle button. Use this display to set the Safety Factor. This setting specifies what percentage of the system capacity will be held as a reserve. Since this value is expressed as a percentage, any change to the unit capacity or feed water hardness that changes the calculated system capacity will result in a corresponding change to the reserve volume. This option setting is identified by "SF" in the upper left corner of the screen. Use the UP and Down buttons to adjust the value from 0 to 50% as needed.

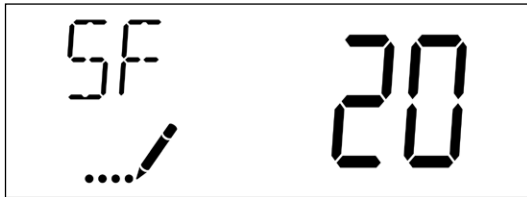


Figure 11

Range: 0-50%

10. Fixed Reserve Capacity (Display Code RC)

Press the Extra Cycle button. Use this display to set the Reserve Capacity. This setting specifies a fixed volume that will be held as a reserve. The Reserve Capacity cannot be set to a value greater than one-half of the calculated system capacity. The Reserve Capacity is a fixed volume and does not change if the unit capacity or feed water hardness are changed. This option setting is identified by "RC" in the upper left corner of the screen. Use the Up and Down buttons to adjust the value as needed.

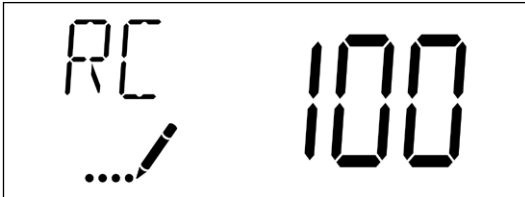


Figure 12

Range: 0-half of the calculated system capacity

11. Variable Reserve (Display Code CR)

Press the Extra Cycle button. Use this display to set the Variable Reserve. This setting is formulated to adjust the reserve dependant on the previous calendar day's water usage. During each regeneration, the reserve will change based on the old reserve capacity and the previous day's water usage. This option setting is identified by "CR" in the upper left corner of the screen.



Figure 13

12. Day Override (Display Code DO)

Press the Extra Cycle button. Use this display to set the Day Override. This setting specifies the maximum number of days between regeneration cycles. If the system is set to a timertype control, the day override setting determines how often the system will regenerate. A metered system will regenerate regardless of usage if the days since last regeneration cycle equal the day override setting. Setting the day override value to "OFF" disables this function. This option setting is identified by "DO" in the upper left corner of the screen. Use the Up and Down buttons to adjust the value as needed.

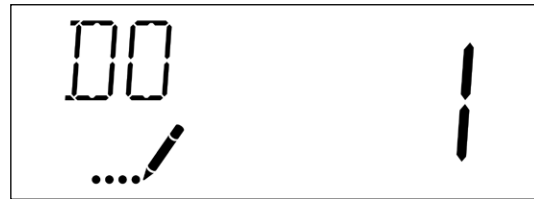


Figure 14

Range: Off-99 days

13. Regeneration Time

Press the Extra Cycle button. Use this display to set the Regeneration Time. This setting specifies the time of day the control will initiate a delayed, manually queued, or day override regeneration. This option setting is identified by "RT" in the upper left corner of the screen. Use the Up and Down buttons to adjust the value as needed.

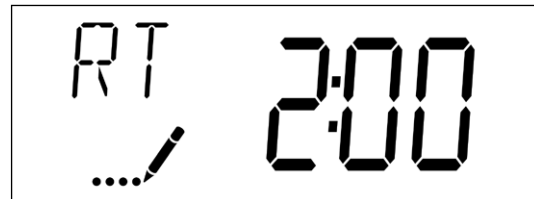


Figure 15

14. Regeneration Cycle Step Times

Press the Extra Cycle button. Use this display to set the Regeneration Cycle Step Times. The different regeneration cycles are listed in sequence based on the valve type selected for the system, and are identified by an abbreviation in the upper left corner of the screen. The abbreviations used are listed below.

Abbreviation	Cycle Step
BD	Brine Draw
BF	Brine Fill
AD	Air Draw
BW	Backwash
RR	Rapid Rinse
SV	Service

SXT Master Programming Mode - Cont'd

If the system has been configured with the "Other" valve type, the regeneration cycles will be identified as C1, C2, ..., C20. Cycle steps can be programmed in any order using the Up or Down buttons with the following selections. Up to 20 individual cycles can be set. Time for each cycle can be set from 0 to 199 minutes. Setting a cycle step time to 0 will cause the control to skip that step during regeneration, but keeps the following steps available. Use the Up and Down buttons to adjust the value as needed. Press the Extra Cycle button to accept the current setting and move to the next parameter. Program the last cycle step as LC which forces the valve back to the service position.

Abbreviation	Cycle Step
RR	Rapid Rinse
BD	Brine Draw
SR	Slow Rinse
BW	Backwash
RF	Refill
SP	Service Position
LC	Last Cycle



Figure 16

Range: 0-199 minutes

15. Day of Week Settings

Press the Extra Cycle button. Use this display to set the regeneration schedule for a system configured as Day of Week control. The different days of the week are identified as D1, D2, D3, D4, D5, D6, and D7 in the upper left corner of the display. Set the value to "ON" to schedule a regeneration or "OFF" to skip regeneration for each day. Use the Up and Down buttons to adjust the setting as needed. Press the Extra Cycle button to accept the setting and move to the next day. Note that the control requires at least one day to be set to "ON" If all 7 days are set to "Off", the unit will return to Day 1 until one or more days are set to "ON".

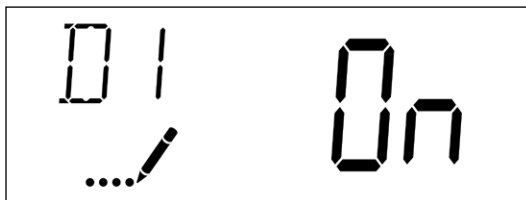


Figure 17

16. Current Day (Display Code CD)

Press the Extra Cycle button. Use this display to set the current day on systems that have been configured as Day of Week controls. This setting is identified by "CD" in the upper left corner of the screen. Use the Up and Down buttons to select from Day 1 through Day 7.

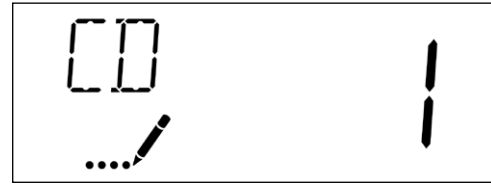


Figure 18

17. Flow Meter Type (Display Code FM)

Press the Extra Cycle button. Use this display to set the type of flow meter connected to the control. This option setting is identified by "FM" in the upper left corner of the screen. Use the Up and Down buttons to select one of the eight available settings. All PWS10T series systems use a 3/4" Turbine Meter. All PWS15T series systems use a 1.5" Turbine Meter.

Abbreviation	Description
P0.7	3/4" Paddle Wheel Meter
t0.7	3/4" Turbine Meter
P1.0	1" Paddle Wheel Meter
t1.0	1" Turbine Meter
P1.5	1.5" Paddle Wheel Meter
t1.5	1.5" Turbine Meter
P2.0	2" Paddle Wheel Meter
Gen	Generic or Other non-Fleck Meter
t1.2	1.25" Turbine Meter

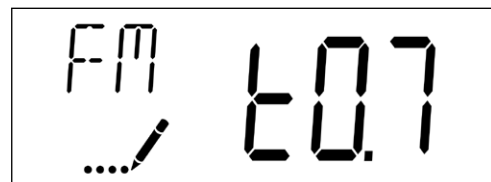


Figure 19

18. Meter Pulse Setting (Display Code K)

Press the Extra Cycle button. Use this display to specify the meter pulse setting for a non-standard flow meter. This option setting is identified by "K" in the upper left corner of the screen. Use the Up and Down buttons to enter the meter constant in pulses per unit volume.

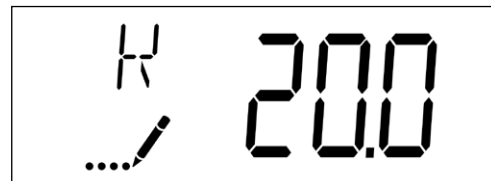


Figure 20

K Range: 0.1 to 999.9 pulses per gallon.

SXT Master Programming Mode - Cont'd

19. Relay Setting (Display Code RE)

Press the Extra Cycle button. Use this display to enable the relay output. This option setting is identified by "RE" in the upper left corner of the screen. Use the Up and Down buttons to enable the relay using **either** time based (tb) or flow based (Fb). **Only one method can be used at a time.**

For time based, set the desired Start Time (ST) and End Time (ET). Time ranges available are determined by the Regen Cycle Step Times. For flow based, set the desired Volume Interval (VO) and Time On (TO).

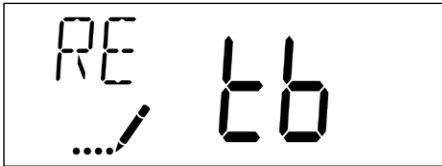


Figure 21

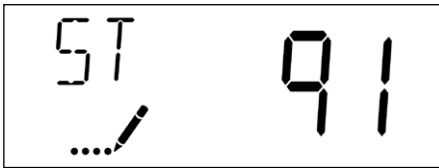


Figure 22

ST Range: 0 to total number of cycles minus 1

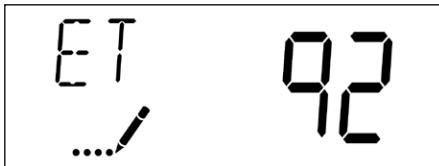


Figure 23

ET Range: Start time to total of all cycles

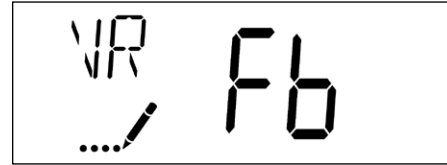


Figure 24

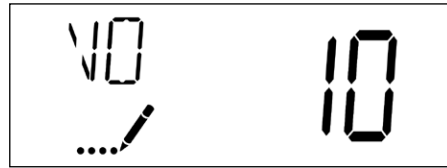


Figure 25

VO Range: 1 to Total Gallon Capacity

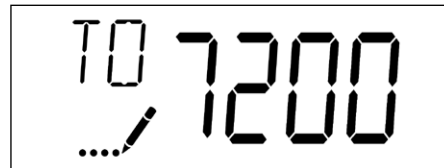


Figure 26

TO Range: 1 to 7200 (minutes)

20. End of Master Programming Mode

Press the Extra Cycle button to save all settings and exit Master Programming Mode.

SXT Diagnostics

Viewing Diagnostic Data

The SXT controller records and maintains diagnostic data to assist with servicing and troubleshooting the water treatment system.

Abbreviation	Parameter	Description
FR	Flow Rate	Displays the current outlet flow rate.
PF	Peak Flow Rate	Displays the highest flow rate measured since last regeneration.
HR	Hours in Service	Displays the total hours that the unit has been in service since last regeneration.
VU	Volume Used	Displays the total volume of water treated by the unit since last regeneration.
RC	Reserve Capacity	Displays the system's reserve capacity calculated from the system capacity, feed water hardness, and safety factor.
TV	Totalizer Volume	Displays the total volume of water used by the unit since last installation or last reset.
SV	Software Version	Displays the software version installed on the controller.

NOTE: Some items may not be shown depending on control configuration. The control will discard any changes and exit the Diagnostics View if a button is not pressed for 60 seconds.

Diagnostics View Steps

1. Press the Up and Extra Cycle buttons for five seconds while in service.
2. Use this display to view the current Flow Rate. This option setting is identified by "FR" in the upper left corner of the screen.

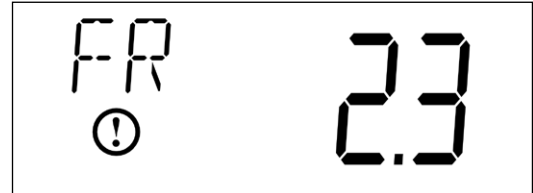


Figure 27

3. Press the Up button. Use this display to view the Peak Flow Rate since the last regeneration cycle. This option setting is identified by "PF" in the upper left corner of the screen.

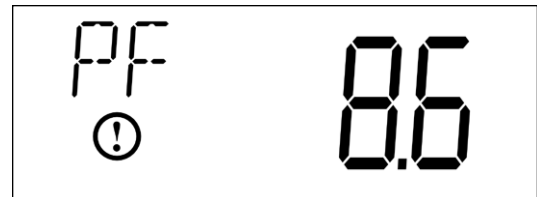


Figure 28

4. Press the Up button. Use this display to view the Hours in Service since the last regeneration cycle. This option setting is identified by "HR" in the upper left corner of the screen.

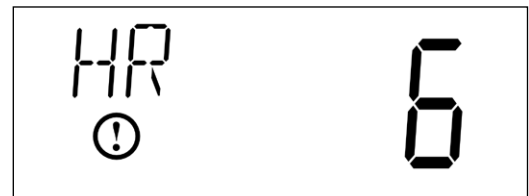


Figure 29

SXT Diagnostics - Cont'd

5. Press the Up button. Use this display to view the Volume Used since the last regeneration cycle. This option setting is identified by "VU" in the upper left corner of the screen.

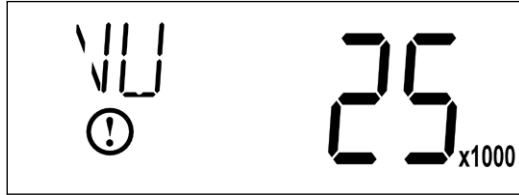


Figure 30

6. Press the Up button. Use this display to view the Reserve Capacity. This option setting is identified by "RC" in the upper left corner of the screen.



Figure 31

7. Press the Up button. Use this display to view the Total Volume data. This option is identified by "TV" in the upper left corner of the screen.

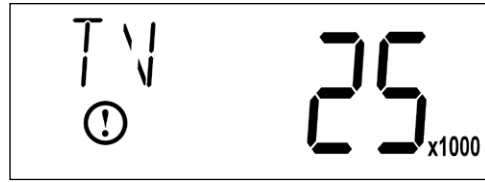


Figure 32

8. Press the Up button. Use this display to view the Software Version. This option setting is identified by "SV" in the upper left corner of the screen.

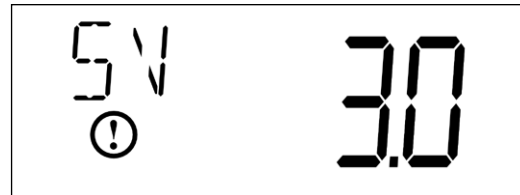


Figure 33

9. Press the Extra Cycle button to end Diagnostic Programming Mode.

Replacing the Media

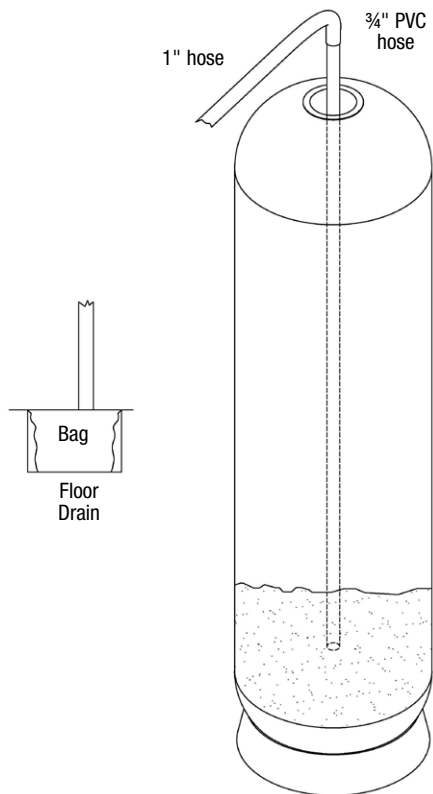
NOTICE

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. Dispose of old media and/or containers in accordance with local, regional, national, and/or international regulations.

1. Mark the location of the mineral tanks on the floor in case they need to be moved once all water, resin and gravel has been removed. This will help with realignment of the plumbing after media replacement. DO NOT attempt to move a mineral tank that contains media and/or water.
2. For PWS10T Series Systems- Place the bypass valve into the bypass position.
For PWS15T Series Systems open the bypass valve.
3. For PWS15T series systems, close the inlet and outlet isolation valves.
4. Locate "Manually Initiating a Regeneration" on page 16 for SXT controllers and follow the steps to place the system in the backwash position. This relieves any pressure inside both mineral tanks. Once the system cycles into the backwash position, confirm the top arrow of the control valve position indicator (See page 11 Figure 1) is pointing to Backwash, then unplug the control valve from the power outlet to keep the system in the backwash position.
5. Disconnect the interconnecting tube assembly between the main control valve and second tank adapter.
6. For PWS10T Series Systems- Disconnect the drain union plumbing fitting, then loosen the screws for the bypass mounting clips and separate the bypass valve from the control valve.
For PWS15T Series- Disconnect the inlet, outlet, and drain union plumbing fittings.
7. Disconnect the meter cable from the meter and from SXT P1 port located on the back of the control valve controller. Store the meter cable in a safe location.
8. Disconnect the brine tubing from the control valve's brine connection port.
9. Disconnect the power supply cable from SXT P2PWR port located on the back of the control valve controller.
10. Remove the control valve from the mineral tank by turning the control valve counter-clockwise when viewed from above. Keeping a firm grip on the control valve, continue to rotate until it can be lifted off of the top of the mineral tank. Repeat this step for the second tank adapter. Store the control valve and second tank adapter in a safe location.
11. 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 ½" the distributor tube may have become disconnected from the distributor screen in the bottom of the mineral tank and must be reconnected.
12. Obtain a length of ¾" sch. 40 PVC that is the same height as the mineral tank and a length of 1" clear braided poly-vinyl hose. The hose must be long enough to reach the nearest floor drain. (Both of these can be acquired at a local hardware store).
13. 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.
14. Insert a garden hose into the bag side of the poly-vinyl 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 to. The bag end of the poly-vinyl hose must remain lower in elevation than 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.
15. Continue to siphon resin until it is completely evacuated from both mineral tanks. Gravel will clog the siphon hose and, if it must be removed due to fouling, or to repair or replace a damaged distributor tube and screen, must be evacuated by other means.
16. If replacing gravel, inspect lower distributor screens for damage and replace if necessary.
17. To add new media and reconnect control valve to mineral tank follow General Installation steps 3-4J located on page 9 of this manual.
18. For PWS10T Series- Reconnect the control valve to the bypass valve assembly and drain line to the control valve. Then place the bypass valve into the service position.
For PWS15T Series- Reconnect inlet, outlet, and drain plumbing to the control valve and tighten the plumbing union fittings on each of these plumbing lines.
19. Reconnect brine tubing to brine connection port of control valve.
20. Reconnect meter cable to meter. Then reconnect the other end of the meter cable to the SXT P1 port located on the back of the control valve controller.
21. Reconnect the power supply cable to the SXT P2PWR port located on the back of the control valve controller.
22. 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.
23. Once water flow at the drain line is observed, plug the system into the power outlet and advance the system through the remaining steps of regeneration by pressing the extra cycle button each time the control valve come to a stop until the position indicator arrives in the "Stand By" position. See Manually Initiating a Regeneration for help.

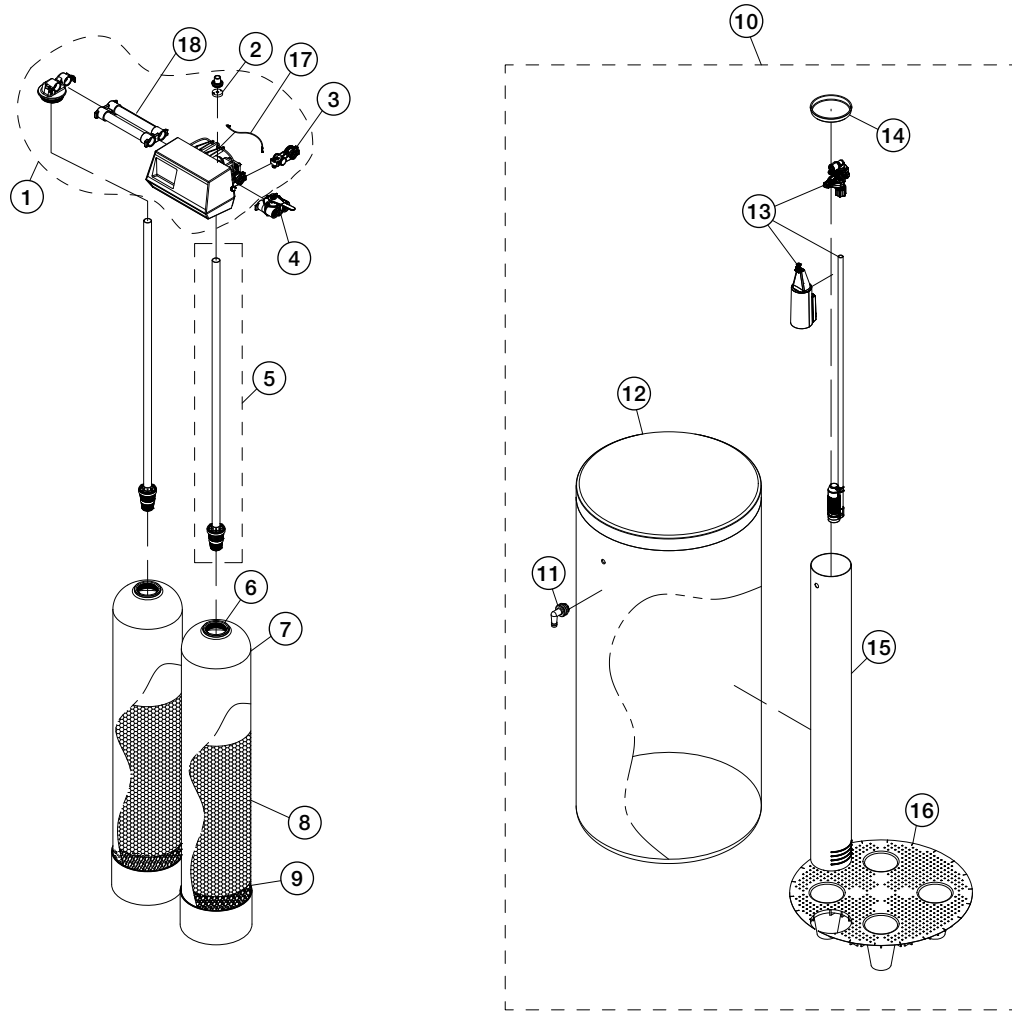
Replacing the Media - Cont'd

24. Fill the second mineral tank with water by manually initiating a regeneration and allowing the control valve to cycle into the backwash position, then unplug the system. Once water flow at the drain line is observed, fully open the inlet valve and allow water to flow to drain for 15 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. During this flush, water is flowing through both tanks so a separate flush for the second tank is not necessary.
25. Then plug the system into the power outlet and advance the system to the stand by position as shown on the position indicator.
26. Fully open inlet valve. For PWS15T series systems open outlet valve and close bypass valve.
27. Check for leaks and repair as required.
28. Open hot and cold side of a treated water faucet to flush any air from the plumbing system.



Replacement Parts - Major System Components PWS10T

Note: All PWS10T Series systems use 9000 Series control valves.

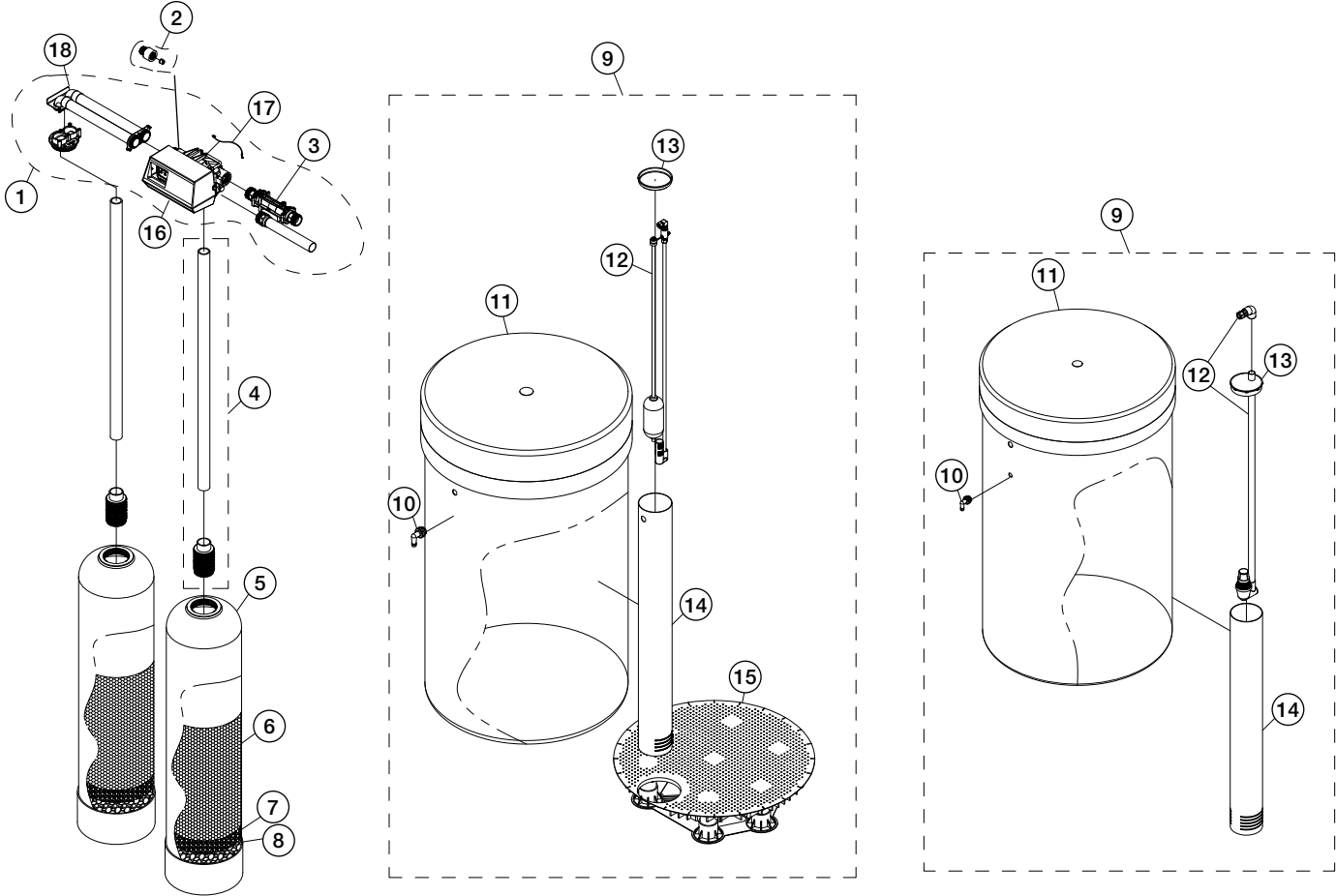


MAJOR SYSTEM COMPONENTS PWS10T

ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	7300258	K4026XSE VALVE 9000/1600 SXT 120V W/ METER & COVER NO BYPASS OR INTERCONNECTING TUBES
2	1	NA	DRAIN LINE FLOW CONTROLLER- SEE PAGE 32 FOR SELECTION
3	1	68104664	K4560626 METER ASSEMBLY 3/4" ELECTRONIC TURBINE W/ CLIPS & SCREWS
4	1	68104507	K4560040SS BYPASS VALVE ASSEMBLY 3/4" STAINLESS
4	1	68104508	K4560041SS BYPASS VALVE ASSEMBLY 1" STAINLESS
5	2	68101205	D5036 BELLED DIST TUBE ASSEMBLY FOR 9"-12" SOFTENERS
5	2	68101212	D5045 K4 DIST TUBE FOR 14"-16" SOFTENERS
6	2	7300425	Q9031 TANK ADAPT BUSHING 2.5" X 4"#8 THREAD PVC W/ORING FOR 14" & 16" SOFTENERS (NOT SHOWN)
7	2	7300134	C9084 FIBERGLASS MINERAL TANK 9X48 ALMOND W/ 2.5" #8 TOP
7	2	7300136	C9092 FIBERGLASS MINERAL TANK 10X54 ALMOND W/ 2.5" #8 TOP
7	2	7300139	C9094X FIBERGLASS MINERAL TANK 12X52 ALMOND W/ 2.5" #8 TOP
7	2	7300143	C9098 FIBERGLASS MINERAL TANK 14X65 ALMOND W/ 4" #8 TOP
7	2	7300144	C9099-4 FIBERGLASS MINERAL TANK 16X65 ALMOND W/ 4" #8 TOP
8	*	7300100	A4000 SOFTENING RESIN MEDIA WATTS BRAND HIGH CAPACITY SAC NA FORM 1 CUFT BAG
9	*	7300101	A7005A MEDIA GRAVEL #20 FLINT .06"X.125" 50# BAG
10	1	7300207	G2002BS BRINE TANK ASSY 18X40 BLK W/ GRID, SAFETY FLOAT & AIR CHECK FOR 3/8" BRINE HOSE
11	1	68102593	H1018 BRINE OVERFLOW SET
12	1	68102491	G2002B BRINE TANK 18X40 BLK EMPTY
13	1	68102634	H7007 BRINE SAFETY FLOAT BRINE VALVE AND AIR CHECK ASSY 2310 FOR 3/8" BRINE HOSE
14	1	68102591	H1016 BRINE WELL CAP 4"
15	1	68102598	H1030-36S BRINE WELL 4"X36" SLOTTED
16	1	68102607	H1072 BRINE GRID FOR 18" DIAMETER BRINE TANKS
17	1	68104397	K4519791-02 ELECTRONIC METER CABLE
18	1	NA	INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9000 SEE PAGE 36 SELECTION

Replacement Parts - Major System Components PWS15T

Note: All PWS15T Series systems use 9500 Series control valves.



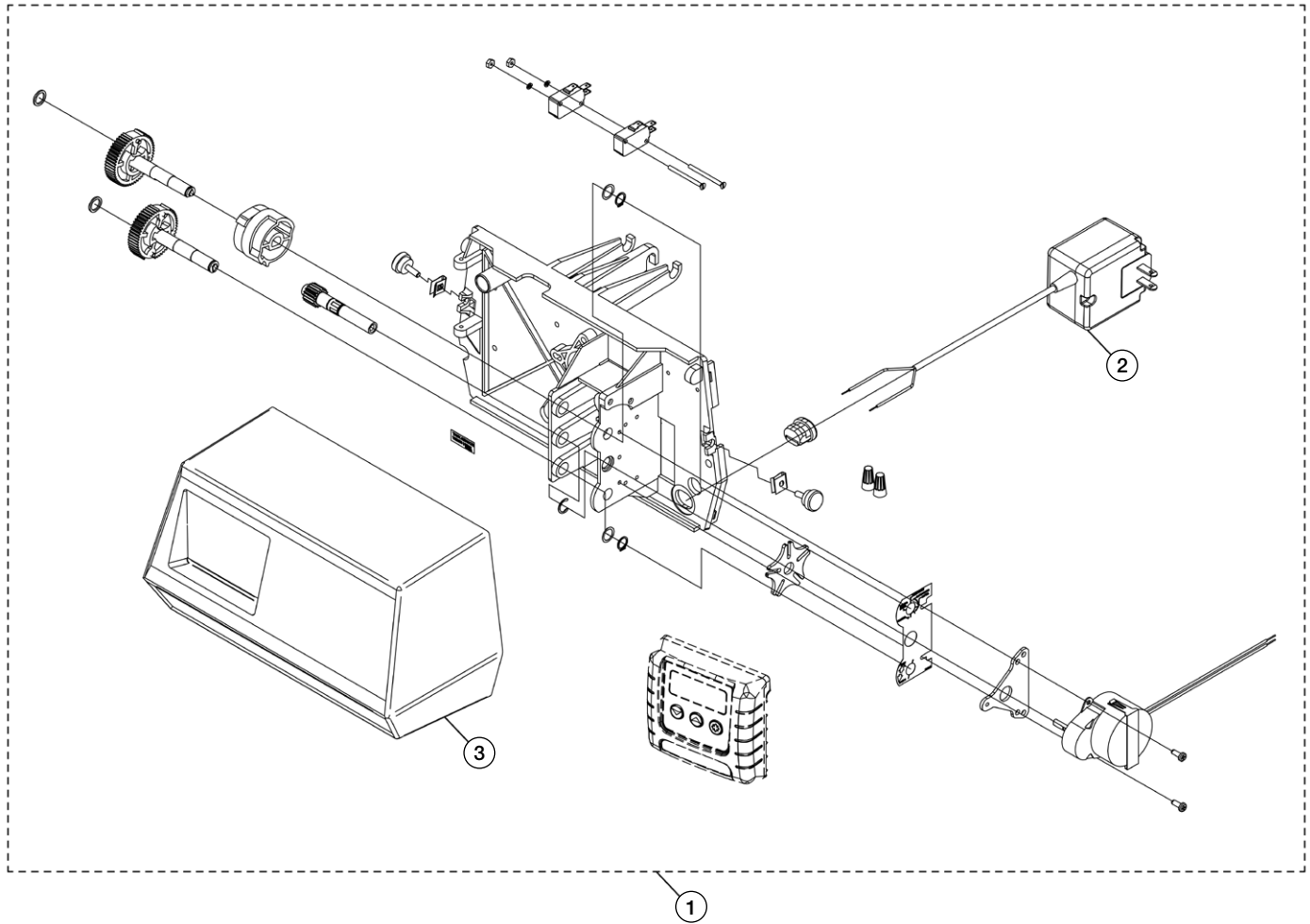
MAJOR SYSTEM COMPONENTS PWS15T

ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	7300259	K4028SE VLV 9500/1600 VALVE 120V SXT W/ 1/2" PLASTIC TURBINE METER, CABLE & COVER NO DLFC OR INTERCONNECTING TUBES
1	1	7300260	K4028SE1 VLV 9500/1710 VALVE 120V SXT W/ 1/2" PLASTIC TURBINE METER, CABLE & COVER NO DLFC OR INTERCONNECTING TUBES
2	1	68108489	V2003-C-MCH-02 PVC DRAIN FLOW CONTROL PVC 1" HOUSING F/ .25-3.5 GPM BUTTONS
2	1	68108492	V2003-MCH-02 PVC DRAIN FLOW CONTROL PVC 1" HOUSING F/ 5-10 GPM BUTTONS
2	1	68108488	V2003-A-MCH-02 PVC DRAIN FLOW CONTROL PVC 1" HOUSING F/ 12-20 GPM BUTTONS
2	1	68108568	V7102-3.5 FC BUTTON 3.5 GPM F/ 12" SOFTENER
2	1	68108569	V7103-05 FC BUTTON 5.0 GPM F/ 14" SOFTENER
2	1	68108571	V7103-07 FC BUTTON 7.0 GPM F/ 16" SOFTENER
2	1	68108574	V7103-10 FC BUTTON 10.0 GPM F/ 18" SOFTENER
2	1	68108575	V7103-12 FC BUTTON 12.0 GPM F/ 21" SOFTENER
2	1	68108576	V7103-15 FC BUTTON 15.0 GPM F/ 24" SOFTENER
3	1	68104737	K4561560-13 METER ASSEMBLY 1/2" TURBINE PLASTIC ELECTRONIC
4	2	7330953	D5007 R2A DIST TUBE ASSEMBLY FOR 12"-24" SOFTENERS
5	2	68100748	C1094-4N FIBERGLASS MINERAL TANK 12X52 ALMOND W/ 4" #8 TOP
5	2	7300143	C9098 FIBERGLASS MINERAL TANK 14X65 ALMOND W/ 4" #8 TOP
5	2	7300144	C9099-4 FIBERGLASS MINERAL TANK 16X65 ALMOND W/ 4" #8 TOP
5	2	7300112	C1029 FIBERGLASS MINERAL TANK 18X65 ALMOND W/ 4" #8 TOP
5	2	7300113	C1030 FIBERGLASS MINERAL TANK 21X62 ALMOND W/ 4" #8 TOP

Replacement Parts - Major System Components PWS15T - Cont'd

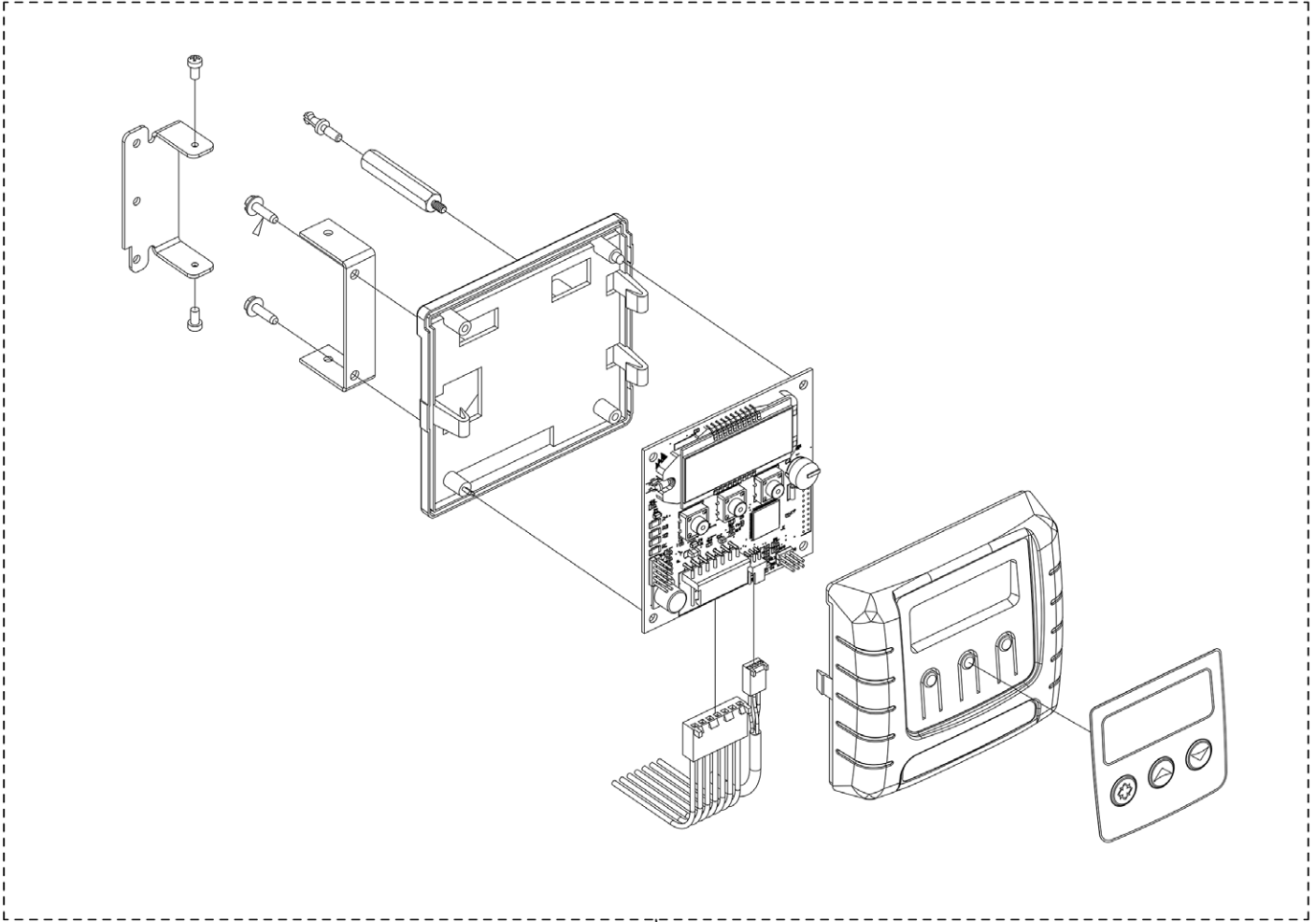
MAJOR SYSTEM COMPONENTS PWS15T			
ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
5	2	7300114	C1031 FIBERGLASS MINERAL TANK 24X72 ALMOND W/ 4" #8 TOP
6	*	7300100	A4000 SOFTENING RESIN MEDIA WATTS BRAND HIGH CAPACITY SAC NA FORM 1 CUFT BAG
7	*	7300101	A7005A MEDIA GRAVEL #20 FLINT .06"X.125" 50# BAG
8	*	7300102	A7006A MEDIA GRAVEL .25"X.125" 50# BAG
9	1	7300207	G2002BS BRINE TANK ASSY 18X40 BLK W/ GRID, SAFETY FLOAT & AIR CHECK FOR 3/8" BRINE HOSE
9	1	68110284	G2003E BRINE TANK ASSY 24X41 BLK W/ GRID & AIR CHECK FOR 1/2" BRINE HOSE
9	1	7300211	G2004B BRINE TANK ASSY 24X50 BLK W/ GRID & AIR CHECK FOR 1/2" BRINE HOSE
9	1	7300217	G2009A BRINE TANK ASSY 30X50 BLK W AIR CHECK FOR 1/2" BRINE HOSE
10	1	68102593	H1018 BRINE OVERFLOW SET
11	1	68102491	G2002B BRINE TANK 18X40 BLK EMPTY
11	1	68102494	G2003 BRINE TANK 24X41 BLK EMPTY
11	1	68102500	G2004 BRINE TANK 24X50 BLK EMPTY
11	1	68102511	G2009 BRINE TANK 30X50 BLK EMPTY
12	1	68102634	H7007 BRINE SAFETY FLOAT BRINE VALVE AND AIR CHECK ASSY 2310 FOR 3/8" BRINE HOSE
12	1	68110335	K4560009-KIT AIR CHECK 900 & FITTING FOR 1/2 BRINE HOSE
13	1	68102591	H1016 BRINE WELL CAP 4"
13	1	68102592	H1017 BRINE WELL CAP 5"
14	1	68102598	H1030-36S BRINE WELL 4"X36" SLOTTED
14	1	68102606	H1071 BRINE WELL 5"X60" SLOTTED
15	1	68102607	H1072 BRINE GRID FOR 18" DIAMETER BRINE TANKS
15	1	68102608	H1075 BRINE GRID SET FOR 24" DIAMETER BRINE TANKS INCLUDES 5" PVC LEGS
16	1	68104578	K4560232-112 COVER WITH LEFT WINDOW F/ 9000 & 9500
17	1	68104397	K4519791-02 METER CABLE 35" FOR SXT AND NXT2
18	1	NA	INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9500 SEE PAGE 37 SELECTION

Replacement Parts - 9000 & 9500 Powerhead Assembly



9000/9500 POWERHEAD			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	7300344	K4562103-76 9000 POWERHEAD ASSEMBLY F/ 9000 & 9500 SXT W/SXT CONTROLLER NO COVER OR TRANSFORMER
2	1	68104394	K4519674 TRANSFORMER, 120V/24V USA 9.6VA
3	1	68104578	K4560232-112 COVER WITH LEFT WINDOW F/ 9000 & 9500

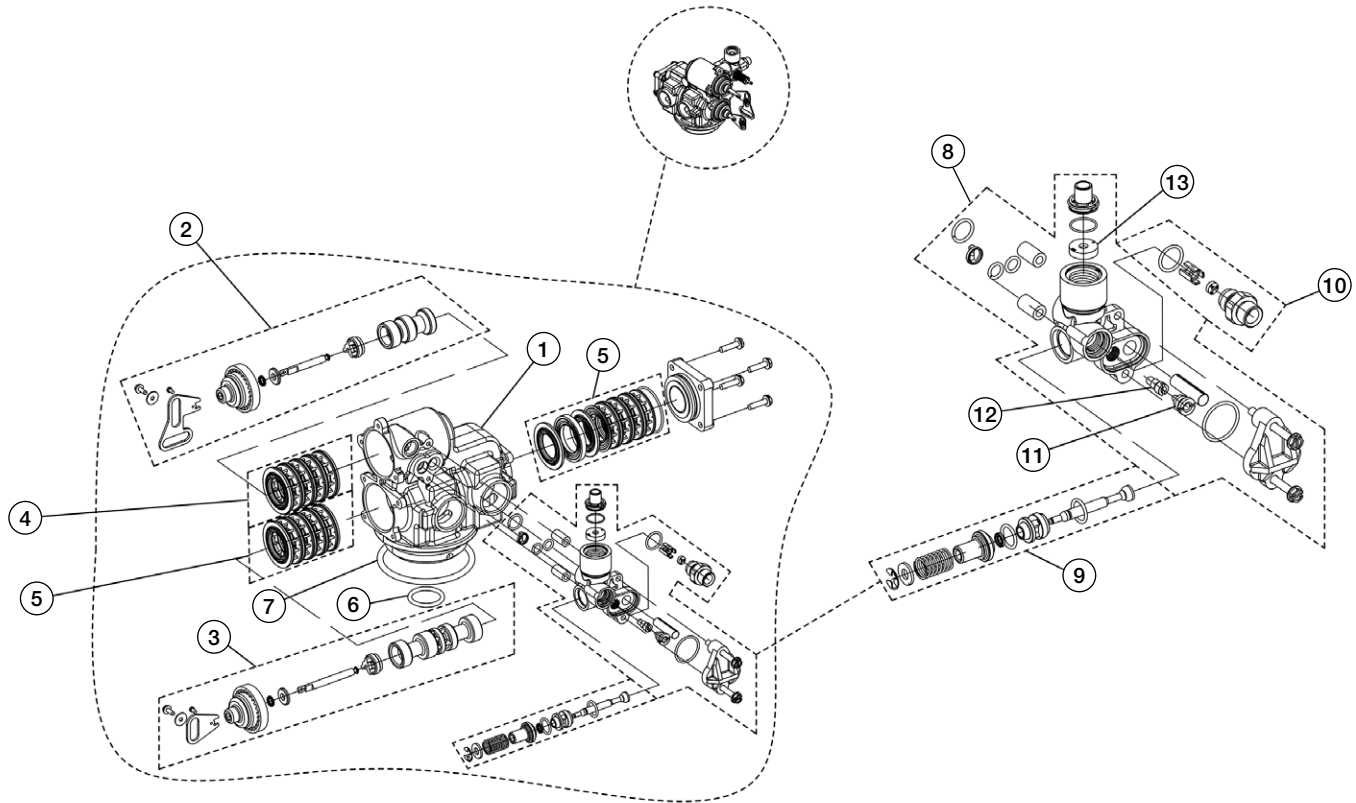
Replacement Parts - SXT Controller Assembly



1

SXT CONTROLLER ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	7300304	K4542777 SXT CONTROLLER F/ 9000 & 9500

Replacement Parts - 9000 Control Valve Body Assembly

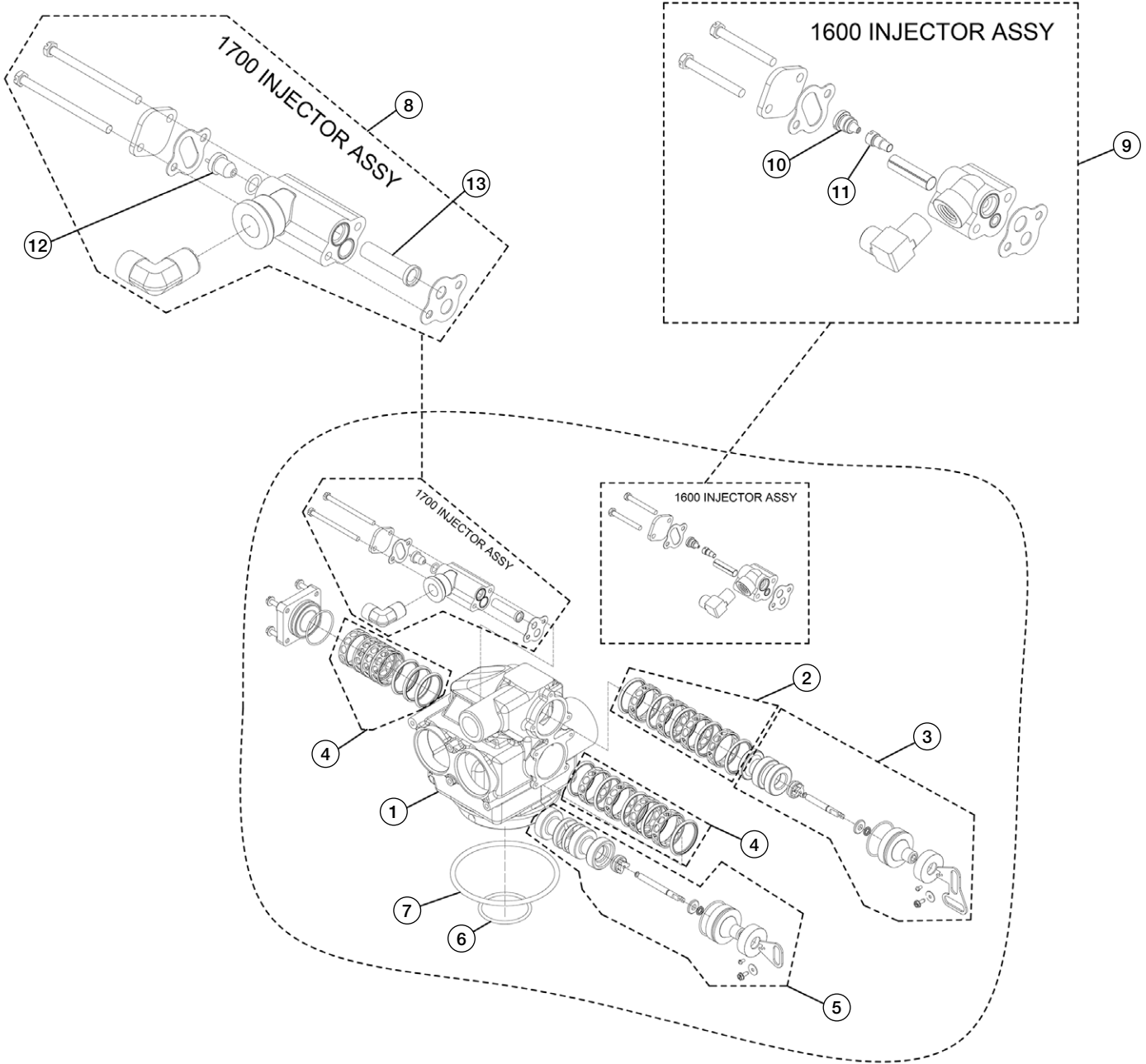


9000 VALVE BODY ASSEMBLY			
ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	-	VALVE BODY 9000 MACHINED, NPT U.S. TAP
2	1	68104620	K4560400 PISTON ASSEMBLY F/UPPER 9000
3	1	68104622	K4560401 PISTON ASSEMBLY F/ LOWER 9000
4	1	7300745	K4560125 SEAL & SPACER KIT F/ UPPER 9000
5	1	68104648	K4560421 SEAL & SPACER KIT F/ LOWER 9000
6	1	68104172	K4511710 O-RING #215 F/ 9000 DISTRIBUTOR PILOT
7	1	68104315	K4512281 O-RING #338 F/ 9000 TANK TO VALVE
8	1	68104617	K4560385 INJECTOR DRAIN ASSEMBLY F/ 9000 & 9100
8	1	68104618	K4560385-0122 INJECTOR DRAIN ASSEMBLY F/ 9000 & 9100 W/ .5 GPM BLFC & 1.5 GPM DLFC
9	1	68104595	K4560350 BRINE VALVE ASSEMBLY 9000
10	1	68104484	K4560022-100 BRINE FLOW CONTROL ASSEMBLY 1.00 GPM 3/8" F/ 9000
10	1	68104485	K4560022-25 BRINE FLOW CONTROL ASSEMBLY 0.25 GPM 3/8" F/ 9000
10	1	68104486	K4560022-50 BRINE FLOW CONTROL ASSEMBLY 0.50 GPM 3/8" F/ 9000
11	1	68104079	K4510913-00 INJECTOR NOZZLE #00 VIOLET
11	1	68104080	K4510913-000 INJECTOR NOZZLE #000 BROWN
11	1	68104081	K4510913-BL INJECTOR NOZZLE #2 BLUE
11	1	68104082	K4510913-G INJECTOR NOZZLE #4 GREEN
11	1	68104083	K4510913-R INJECTOR NOZZLE #0 RED
11	1	68104084	K4510913-W INJECTOR NOZZLE #1 WHITE
11	1	68104085	K4510913-Y INJECTOR NOZZLE #3 YELLOW
12	1	68104086	K4510914-00 INJECTOR THROAT #00 VIOLET
12	1	68104087	K4510914-000 INJECTOR THROAT #000 BROWN

Replacement Parts - 9000 Control Valve Body Assembly - Cont'd

9000 VALVE BODY ASSEMBLY			
ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
12	1	68104088	K4510914-BL INJECTOR THROAT #2 BLUE
12	1	68104089	K4510914-G INJECTOR THROAT #4 GREEN
12	1	68104090	K4510914-R INJECTOR THROAT #0 RED
12	1	68104091	K4510914-W INJECTOR THROAT #1 WHITE
12	1	68104092	K4510914-Y INJECTOR THROAT #3 YELLOW
13	1	68104109	K4512085 FLOW CONTROL WASHER 1.2 GPM F/ 6" TANK
13	1	68104110	K4512086 FLOW CONTROL WASHER 1.5 GPM F/ 8" TANK
13	1	68104111	K4512087 FLOW CONTROL WASHER 2.0 GPM F/ 9" TANK
13	1	68104112	K4512088 FLOW CONTROL WASHER 2.4 GPM F/ 10" TANK
13	1	68104114	K4512090 FLOW CONTROL WASHER 3.5 GPM F/ 12" TANK
13	1	68104115	K4512091 FLOW CONTROL WASHER 4.0 GPM F/ 13" TANK
13	1	68104116	K4512092 FLOW CONTROL WASHER 5.0 GPM F/ 14" TANK
13	1	68104122	K4512408 FLOW CONTROL WASHER 7.0 GPM F/ 16" TANK

Replacement Parts - 9500 Control Valve Body Assembly

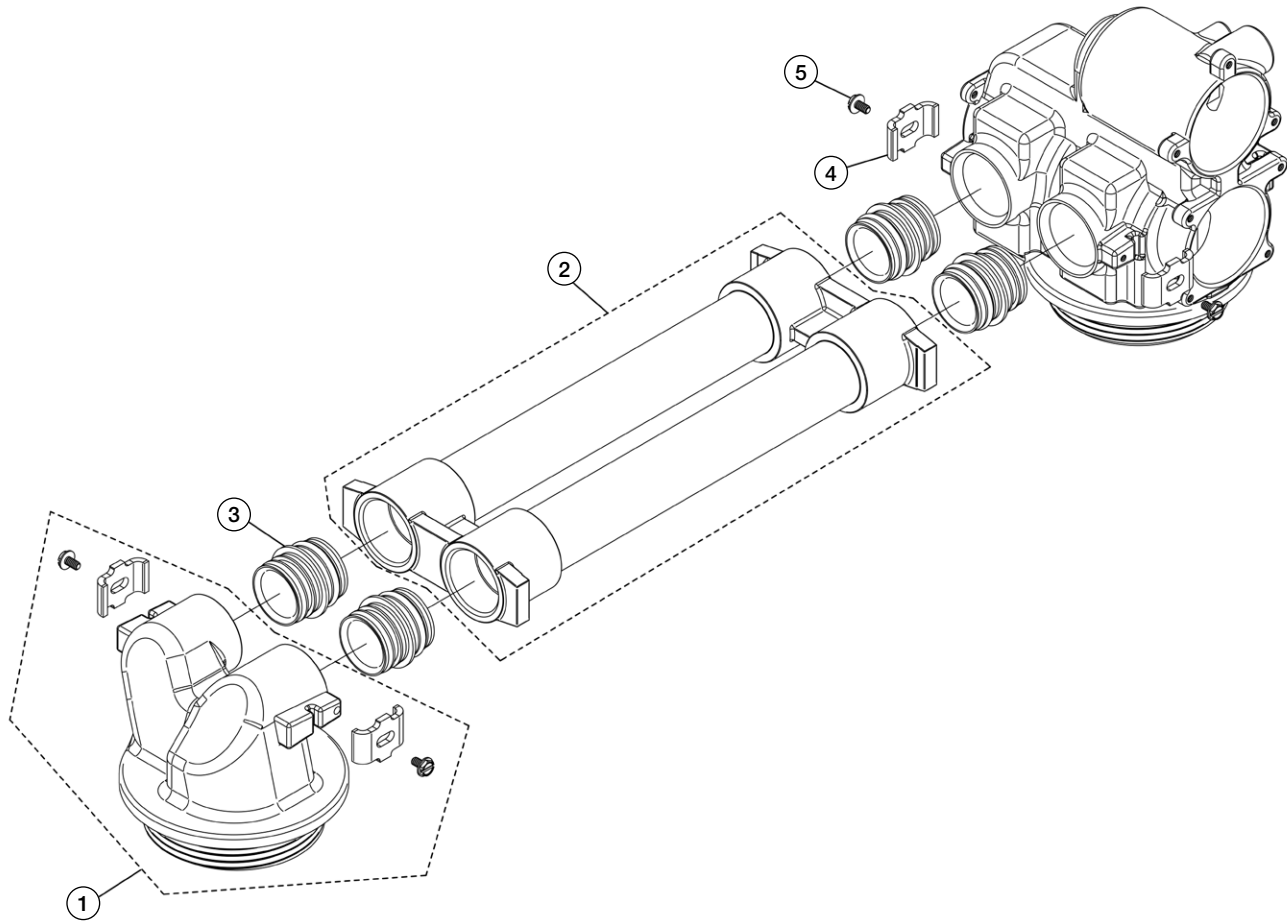


9500 VALVE BODY ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	-	VALVE BODY 9500 MACHINED, NPT U.S. TAP
2	1	68104567	K4560134 SEAL & SPACER KIT F/ UPPER 9500
2	1	68104568	K4560134-20 SEAL & SPACER KIT F/ UPPER 9500 NATURAL
3	1	68104544	K4560108 PISTON ASSEMBLY F/ UPPER 9500
4	1	68104565	K4560133-01 SEAL & SPACER KIT F/ LOWER 9500
5	1	68104545	K4560109 PISTON ASSEMBLY F/ LOWER 9500
6	1	68104172	K4513577 ORING #226 F/2900S, 9500, 2850 DISTRIBUTOR PILOT
7	1	68104315	K4516455 ORING #347 F/9500 TANK TO VALVE
8	1	68104614	K4560381 INJECTOR ASSEMBLY 1700 NO INJECTOR
8	1	68104615	K4560381-03 INJECTOR ASSEMBLY 1700 W/ #3C INJECTOR

Replacement Parts - 9500 Control Valve Body Assembly - Cont'd

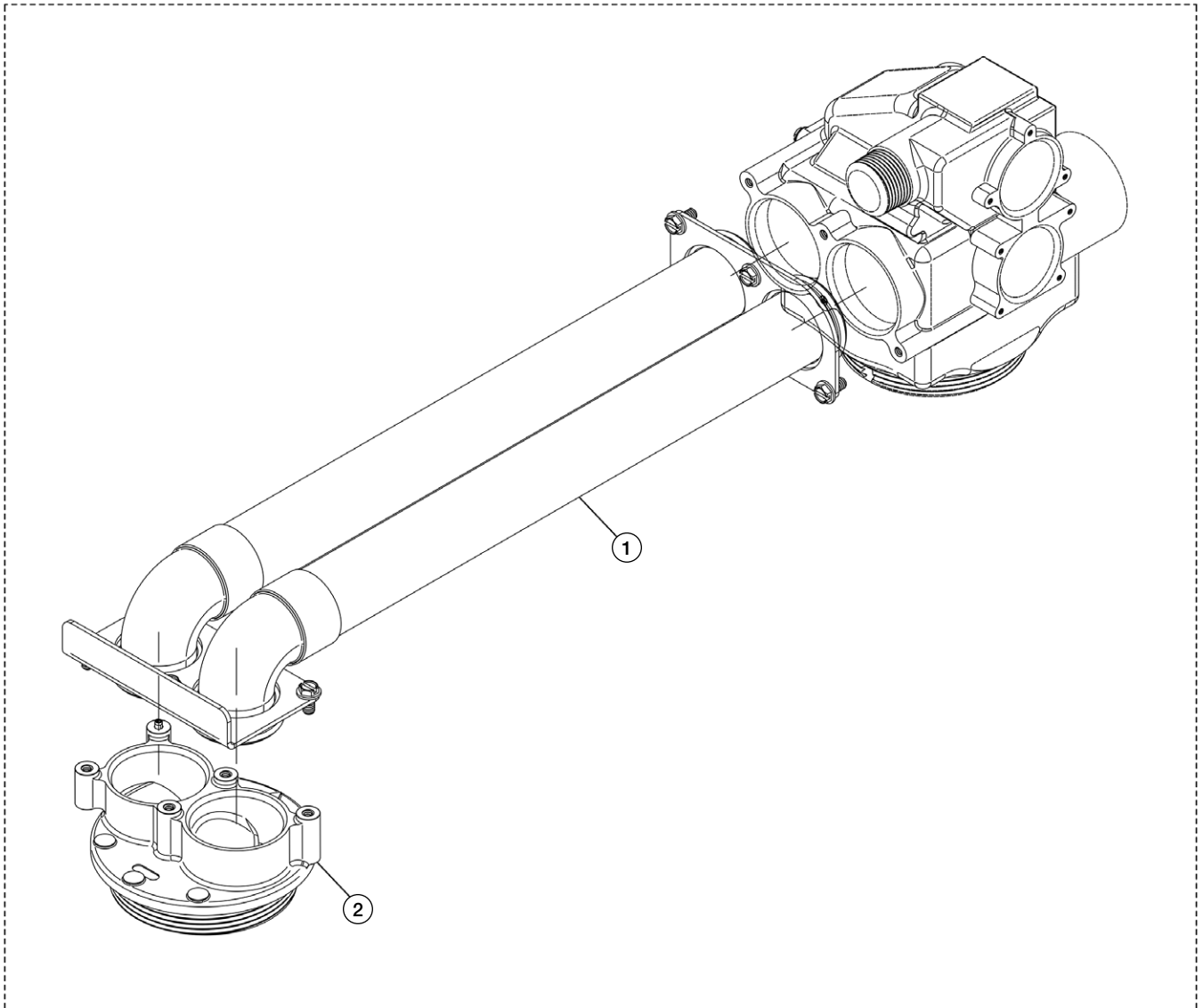
9500 VALVE BODY ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
9	1	68104654	K4560480-03 INJECTOR ASSEMBLY 1600 W/ #3 INJECTOR
10	1	68104079	K4510913-00 INJECTOR NOZZLE #00 VIOLET
10	1	68104080	K4510913-000 INJECTOR NOZZLE #000 BROWN
10	1	68104081	K4510913-BL INJECTOR NOZZLE #2 BLUE
10	1	68104082	K4510913-G INJECTOR NOZZLE #4 GREEN
10	1	68104083	K4510913-R INJECTOR NOZZLE #0 RED
10	1	68104084	K4510913-W INJECTOR NOZZLE #1 WHITE
10	1	68104085	K4510913-Y INJECTOR NOZZLE #3 YELLOW
11	1	68104086	K4510914-00 INJECTOR THROAT #00 VIOLET
11	1	68104087	K4510914-000 INJECTOR THROAT #000 BROWN
11	1	68104088	K4510914-BL INJECTOR THROAT #2 BLUE
11	1	68104089	K4510914-G INJECTOR THROAT #4 GREEN
11	1	68104090	K4510914-R INJECTOR THROAT #0 RED
11	1	68104091	K4510914-W INJECTOR THROAT #1 WHITE
11	1	68104092	K4510914-Y INJECTOR THROAT #3 YELLOW
12	1	68104209	K4514801-3CY INJECTOR NOZZLE #3C YELLOW
12	1	68104210	K4514801-4CG INJECTOR NOZZLE #4C GREEN
12	1	68104211	K4514801-5CW INJECTOR NOZZLE #5C WHITE
12	1	68104212	K4514801-6R INJECTOR NOZZLE #6C RED
12	1	68104213	K4514801-7CB INJECTOR NOZZLE #7C BLACK
13	1	68104214	K4514802-3Y INJECTOR THROAT #3C YELLOW
13	1	68104215	K4514802-4G INJECTOR THROAT #4C GREEN
13	1	68104216	K4514802-5W INJECTOR THROAT #5C WHITE
13	1	68104217	K4514802-6R INJECTOR THROAT #6C RED
13	1	68104218	K4514802-7C INJECTOR THROAT #7C BLACK

Replacement Parts - 9000 Second Tank Head Assembly



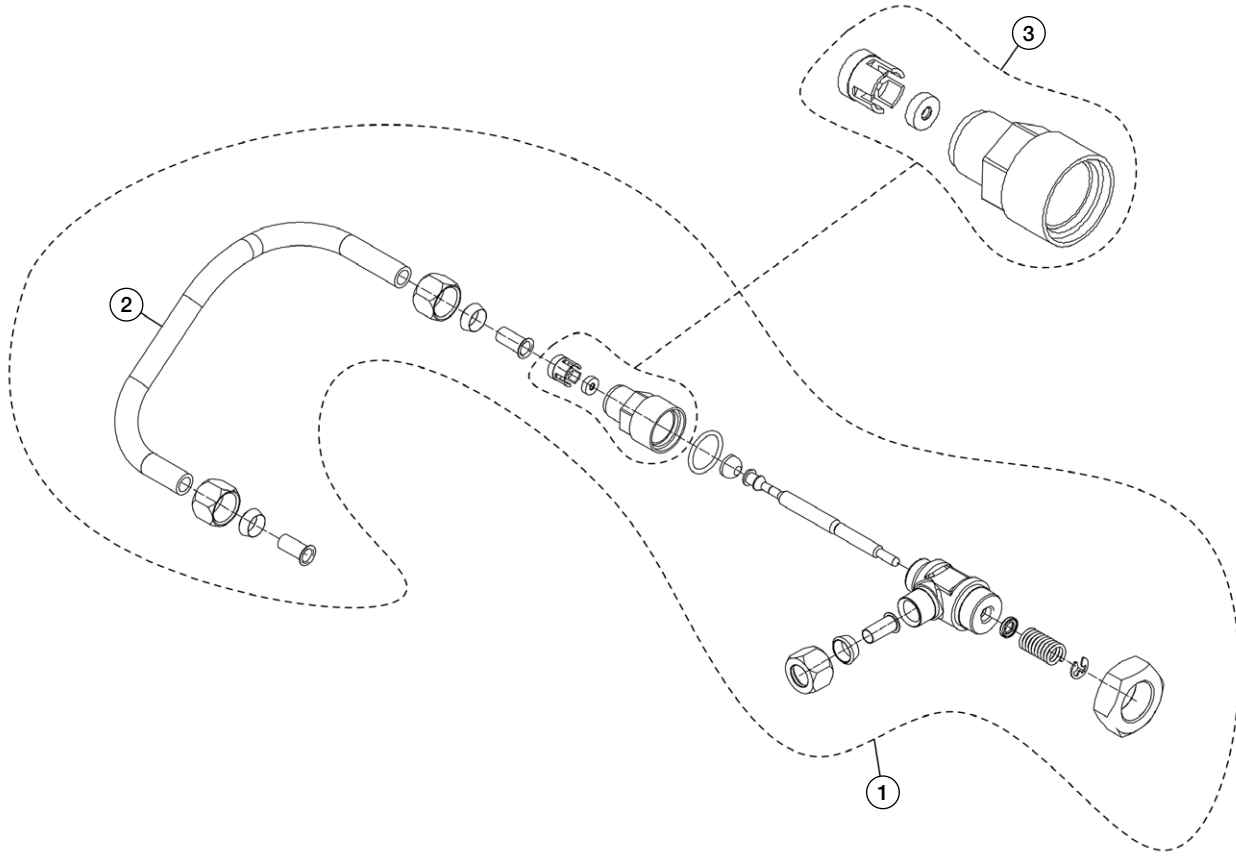
9000 SECOND TANK ADAPTER ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104222	K4514864 ADAPTER WITH O-RINGS F/ SECOND TANK F/ 9000
2	1	68104287	K4515823-12 INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9000 W/ 8.5:" TUBES F/ 12" TANKS
2	1	68104288	K4515823-14 INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9000 W/ 10.5:" TUBES F/ 14" TANKS
2	1	68104289	K4515823-16 INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9000 W/ 12.5:" TUBES F/ 16" TANKS
3	1	68104232	K4515078-01 ADAPTER COUPLING 1" W/ O-RINGS
4	1	68104150	K4513255 MOUNTING CLIP
5	1	68104617	K4514202 SCREW, 8-32 X 0.375

Replacement Parts - 9500 Second Tank Head Assembly



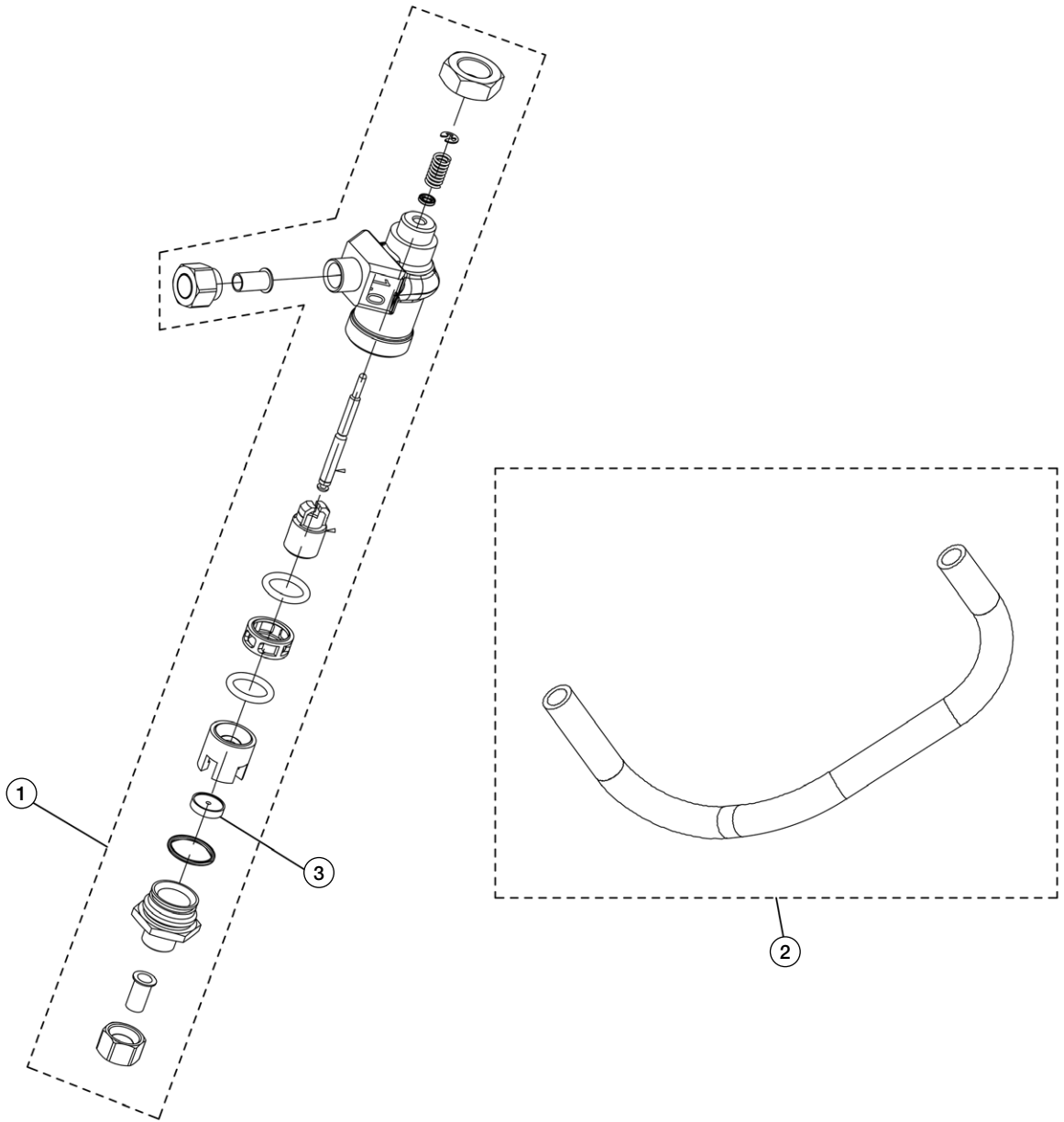
9500 SECOND TANK ADAPTER ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104705	K4560715-16 INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9500 F/ 14"-16" TANKS
1	1	68104706	K4560715-20 INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9500 F/ 18"-20" TANKS
1	1	68104707	K4560715-24 INTERCONNECTING TUBE ASSEMBLY TO 2ND TANK F/ 9500 F/ 20"-24" TANKS
2	1	68104336	K4516916 ADAPTER WITH O-RINGS F/ SECOND TANK F/ 9500

Replacement Parts - 9500/1600 Brine Valve Assembly



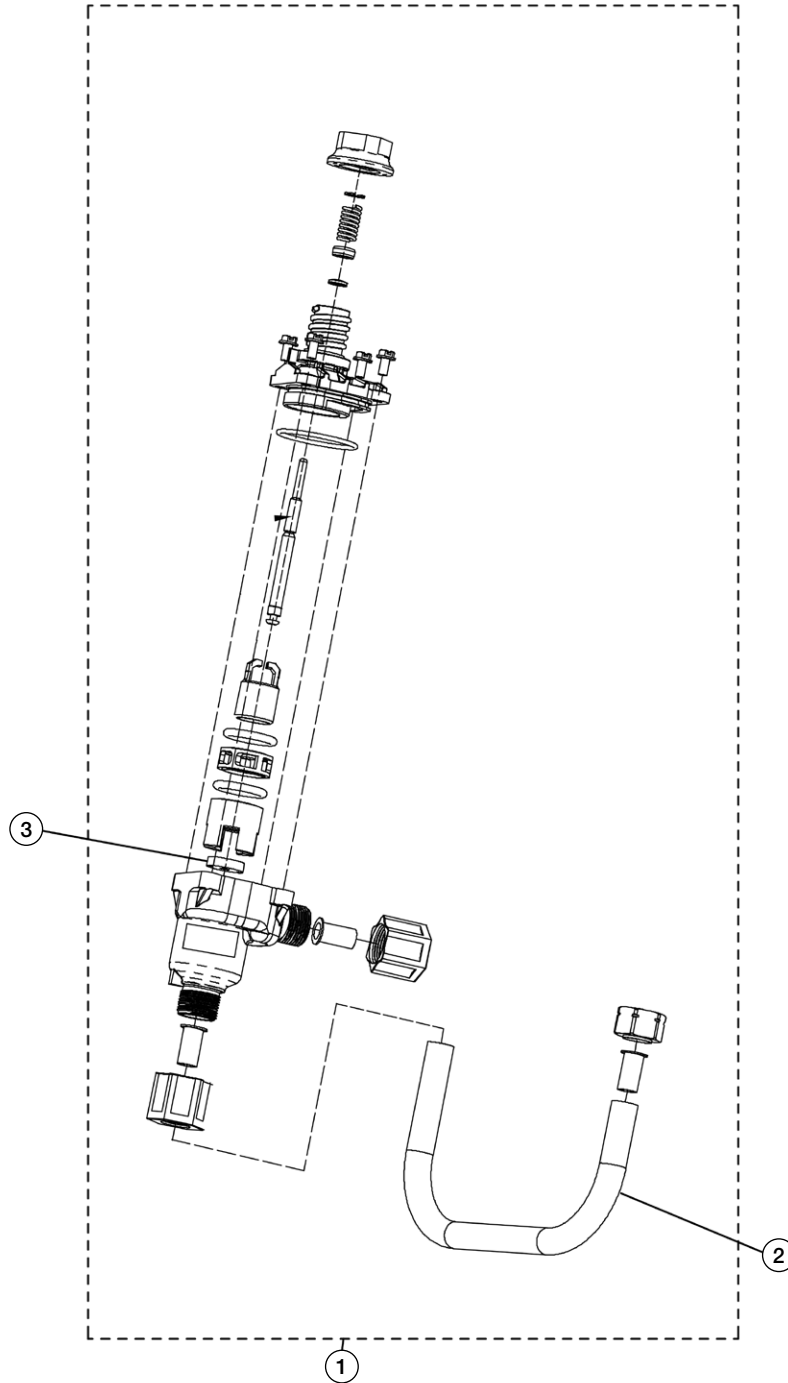
9500/1600 BRINE VALVE ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104502	K4560037 BRINE VALVE ASSEMBLY 1600 F/ 9500 NO FLOW CONTROLLER
1	1	68104503	K4560037-630 BRINE VALVE ASSEMBLY 1600 F/ 9500 W/ 1.0 GPM FLOW CONTROLLER
2	1	68104340	K4516960 BRINE TUBE 1600 F/ 9500
3	1	68104482	K4560020-25 BRINE FLOW CONTROL ASSEMBLY .25 GPM F/1600/3600
3	1	68104483	K4560020-50 BRINE FLOW CONTROL ASSEMBLY .50 GPM F/1600/3600
3	1	68104481	K4560020-100 BRINE FLOW CONTROL ASSEMBLY 1.0 GPM F/1600/3600

Replacement Parts - 9500/1700 Brine Valve Assembly



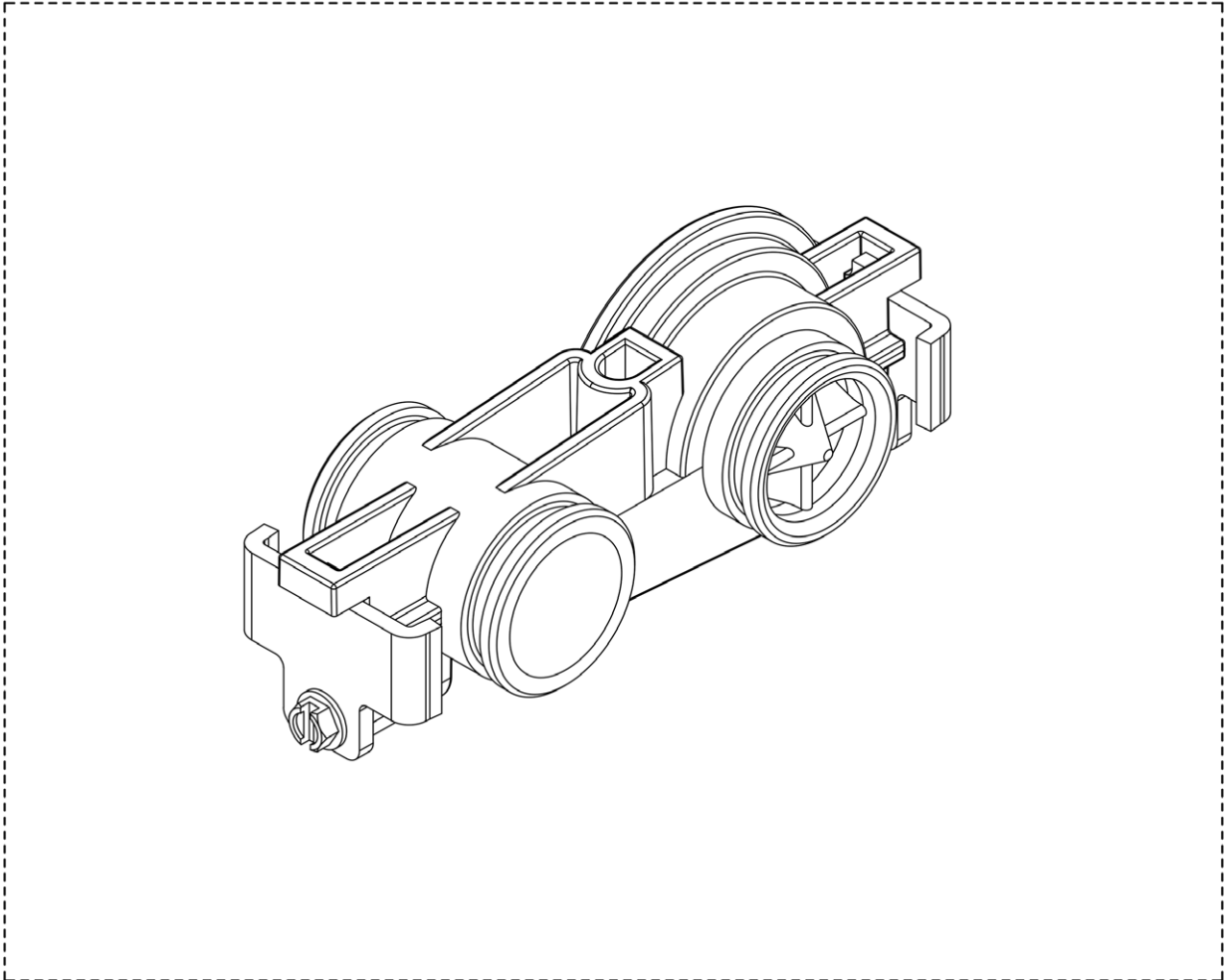
9500/1700 BRINE VALVE ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104505	K4560039 BRINE VALVE ASSEMBLY 1700 F/ 9500 W/ 2.0 GPM FLOW CONTROLLER
1	1	68104506	K4560039-00 BRINE VALVE ASSEMBLY 1700 F/ 9500 NO FLOW CONTROLLER
2	1	68104339	K4516959 BRINE TUBE 1700 F/ 9500
3	1	68104109	K4512085 FLOW CONTROL WASHER 1.2 GPM
3	1	68104110	K4512086 FLOW CONTROL WASHER 1.5 GPM
3	1	68104111	K4512087 FLOW CONTROL WASHER 2.0 GPM
3	1	68104112	K4512088 FLOW CONTROL WASHER 2.4 GPM
3	1	68104113	K4512089 FLOW CONTROL WASHER 3.0 GPM
3	1	68104114	K4512090 FLOW CONTROL WASHER 3.5 GPM
3	1	68104115	K4512091 FLOW CONTROL WASHER 4.0 GPM
3	1	68104116	K4512092 FLOW CONTROL WASHER 5.0 GPM

Replacement Parts - 9500/1710 Brine Valve Assembly



9500/1710 BRINE VALVE ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104659	K4560606-2.0 BRINE VALVE ASSEMBLY 1710 F/9500 W/ 2.0 GPM FLOW CONTROLLER
2	1	68104339	K4516959 BRINE TUBE 1700 F/9500
3	1	68104109	K4512085 FLOW CONTROL WASHER 1.2 GPM
3	1	68104110	K4512086 FLOW CONTROL WASHER 1.5 GPM
3	1	68104111	K4512087 FLOW CONTROL WASHER 2.0 GPM
3	1	68104112	K4512088 FLOW CONTROL WASHER 2.4 GPM
3	1	68104113	K4512089 FLOW CONTROL WASHER 3.0 GPM
3	1	68104114	K4512090 FLOW CONTROL WASHER 3.5 GPM
3	1	68104115	K4512091 FLOW CONTROL WASHER 4.0 GPM
3	1	68104116	K4512092 FLOW CONTROL WASHER 5.0 GPM

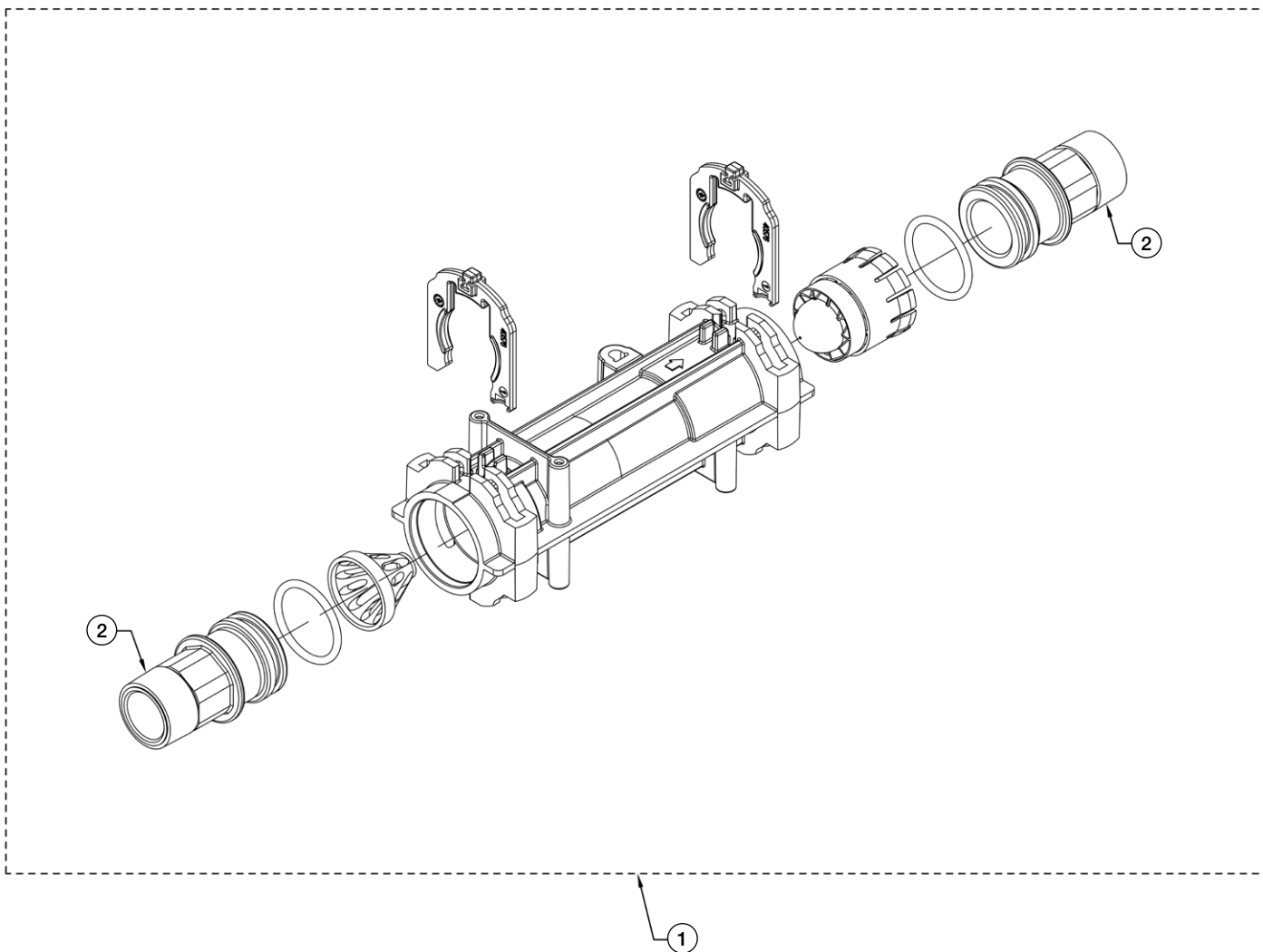
Replacement Parts - 3/4" Plastic Electronic Turbine Meter Assembly



1

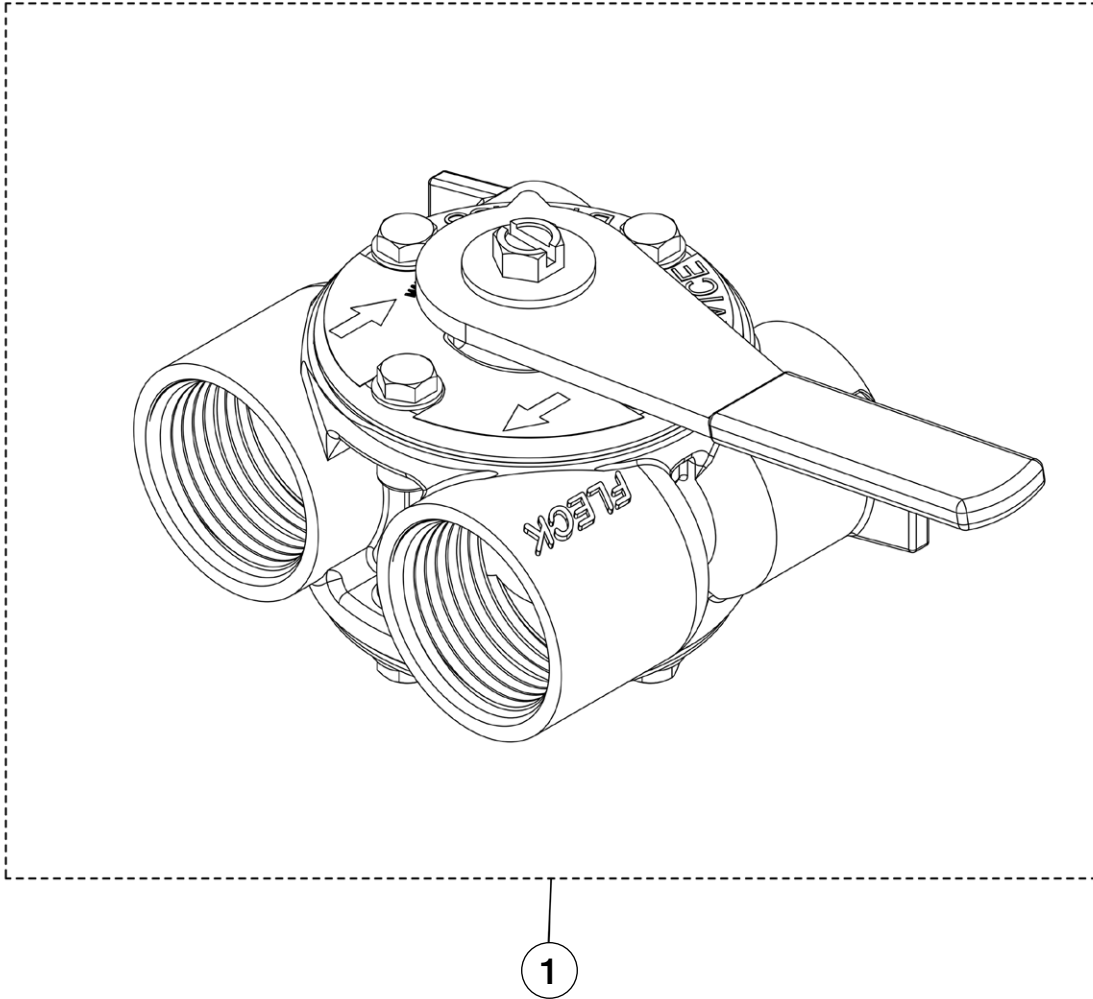
3/4" PLASTIC ELECTRONIC TURBINE METER ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104664	K4560626 METER ASSEMBLY 3/4" ELECTRONIC TURBINE W/ CLIPS & SCREWS

Replacement Parts - 1 1/2" Plastic Electronic Turbine Meter Assembly



1 1/2 INCH PLASTIC ELECTRONIC TURBINE METER ASSEMBLY			
ITEM NO.	QTY	ORDERING CODE	DESCRIPTION
1	1	68104737	K4561560-13 METER ASSEMBLY 1 1/2" PLASTIC ELECTRONIC
2	2	68110410	K4541597 PLUMBING ADAPTOR BRASS 1 1/2" MNPT

Replacement Parts - Bypass Valve Assembly Stainless Steel For 9000



BYPASS VALVE ASSEMBLY STAINLESS STEEL FOR 9000			
ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	7300307	K4560040SS BYPASS VALVE ASSEMBLY ¾" STAINLESS
1	1	7300308	K4560041SS BYPASS VALVE ASSEMBLY 1" STAINLESS

Troubleshooting

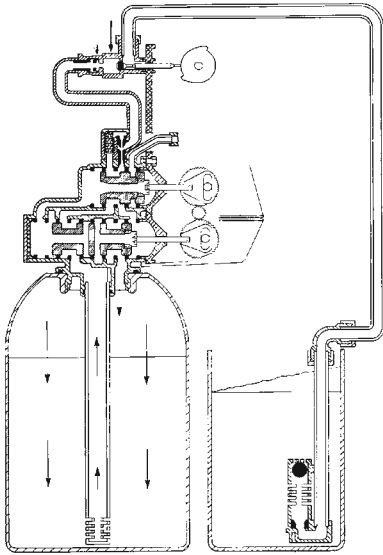
Problem	Cause	Correction
Water conditioner fails to regenerate	Electrical service to unit has been interrupted	Assure permanent electrical service (check circuit breaker, GFCI, fuse, plug, pull chain, or switch)
	Controller is defective	Replace controller
	Power failure	Reset time of day
Softener delivers 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 flushings 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- Problem "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 valve
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

Troubleshooting - SXT Controller Error Codes

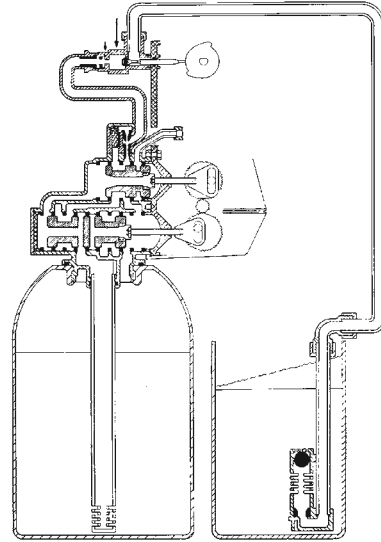
Error Code	Error Type	Cause	Reset and Recovery
0	Cam Sense Error	The valve drive took longer than 6 minutes to advance to the next regeneration position	<p>Unplug the unit and examine the powerhead. Verify that all cam switches are connected to the circuit board and functioning properly. Verify that the motor and drive train components are in good condition and assembled properly. Check the valve and verify that the piston travels freely. Replace/reassemble the various components as necessary.</p> <p>Plug the unit back in and observe its behavior. The unit should cycle to the next valve position and stop. If the error re-occurs, unplug the unit and contact technical support.</p>
1	Cycle Step Error	The control experienced an unexpected cycle input	<p>Unplug the unit and examine the powerhead. Verify that all cam switches are connected to the circuit board and functioning properly. Enter Master Programming mode and verify that the valve type and system type are set correctly with regard to the unit itself.</p> <p>Step the unit through a manual regeneration and verify that it functions correctly. If the error re-occurs unplug the unit and contact technical support.</p>
2	Regen Failure	The system has not regenerated for more than 99 days (or 7 days if the Control Type has been set to Day-of- Week)	<p>Perform a Manual Regeneration to reset the error code. If the system is metered, verify that it is measuring flow by running service water and watching for the flow indicator on the display. If the unit does not measure flow, verify that the meter cable is connected properly and that the meter is functioning properly.</p> <p>Enter a Master Programming Mode and verify that the unit is configured properly. As appropriate for the valve configuration, check that the correct system capacity has been selected, that the day override is set properly, and that meter is identified correctly. If the unit is configured as a Day-of-Week system, verify that at least one day is set ON. Correct the settings as necessary.</p>
3	Memory Error	Control board memory failure	<p>Perform a Master Reset and reconfigure the system via Master Programming Mode. After reconfiguring the system, step the valve through a manual regeneration. If the error re-occurs unplug the unit and contact technical support.</p>
UD	Upper Drive Sync	Power failure install programming change	Valve will automatically recover.

Water Softener Flow Diagrams

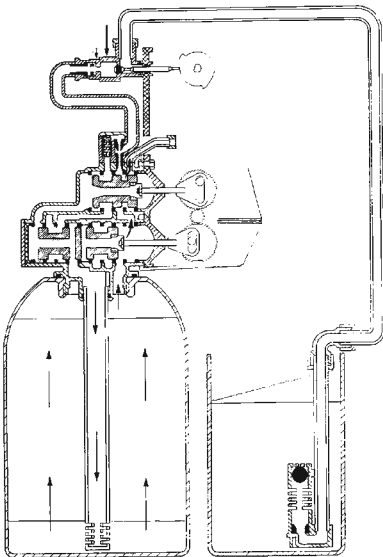
1. In Service Position



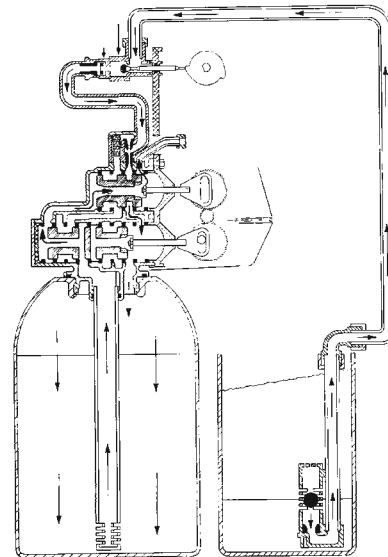
3. Tanks Switching Position
(Meter Initiated Regeneration)



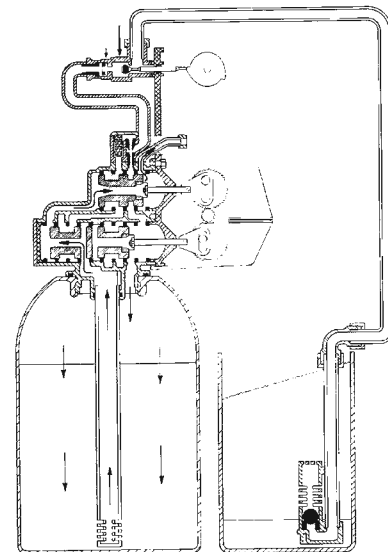
2. Backwash Position



4. Brine Draw Position

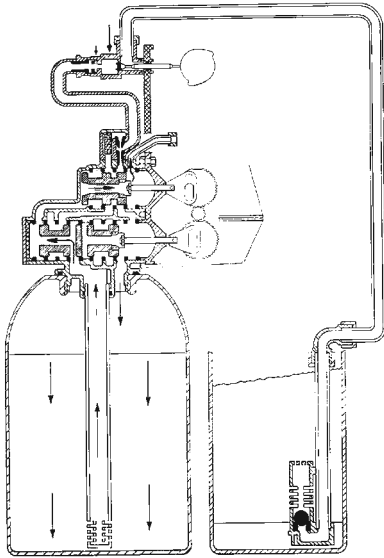


5. Slow Rinse

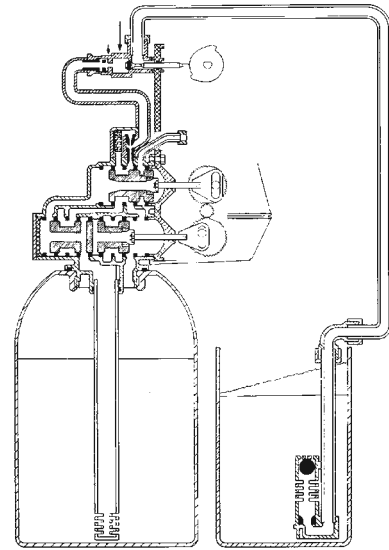


Water Softener Flow Diagrams

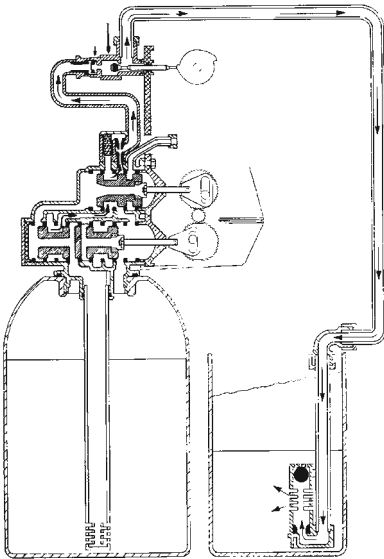
6. Rapid Rinse Position



8. In Service Position, Tanks Switched

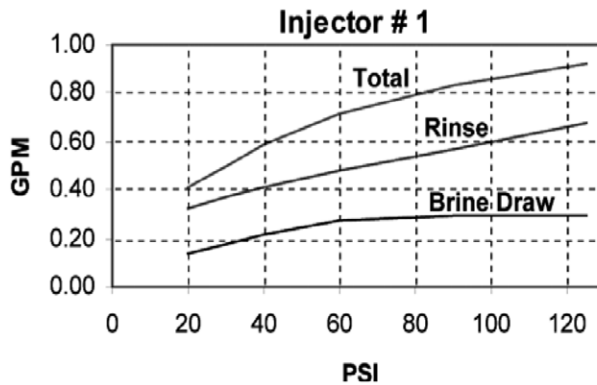
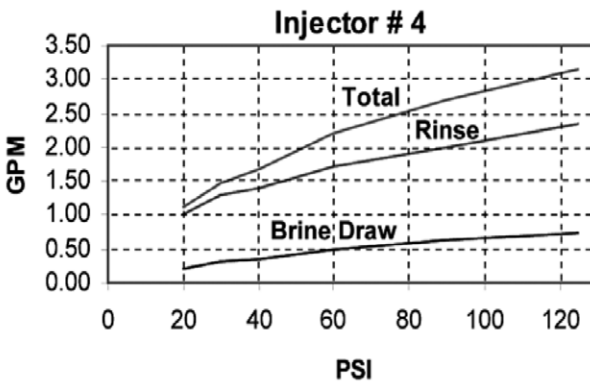
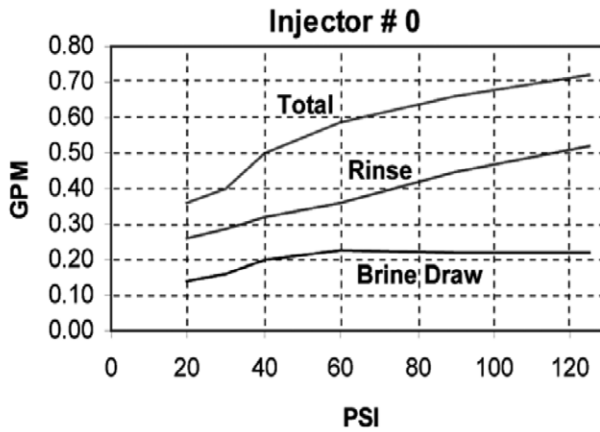
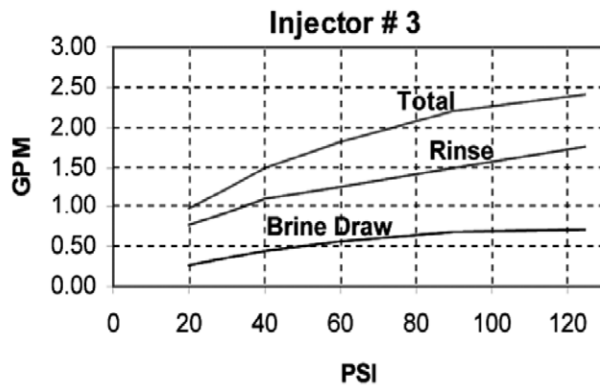
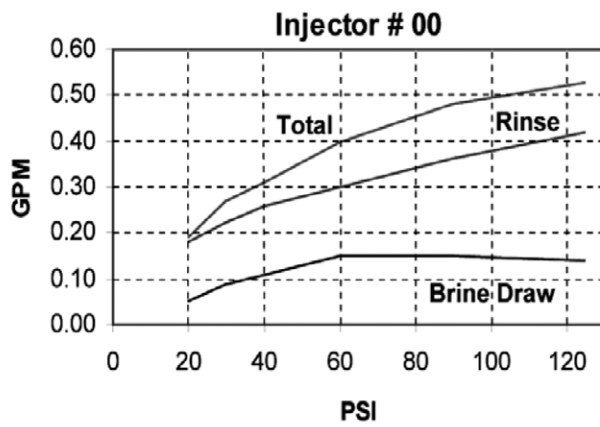
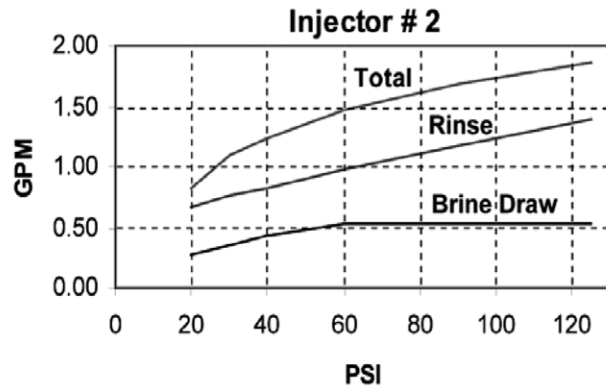
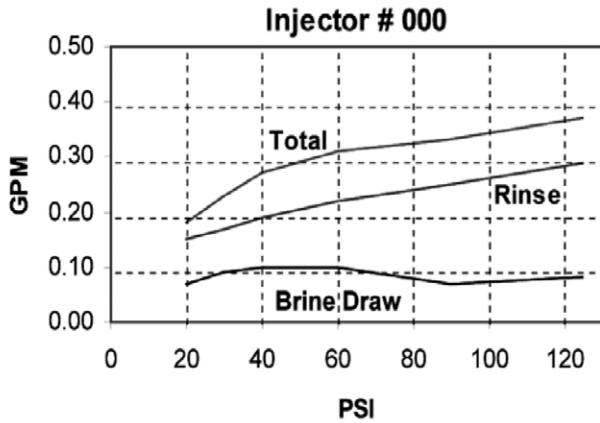


7. Brine Tank Fill Position



Flow Data and Injector Draw Rates - Down Flow

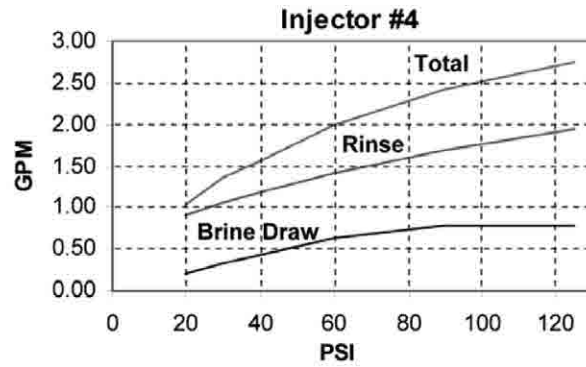
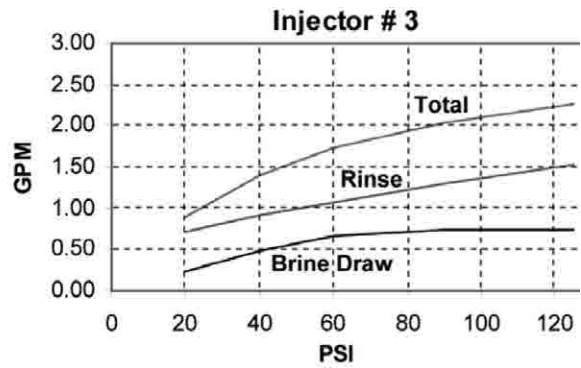
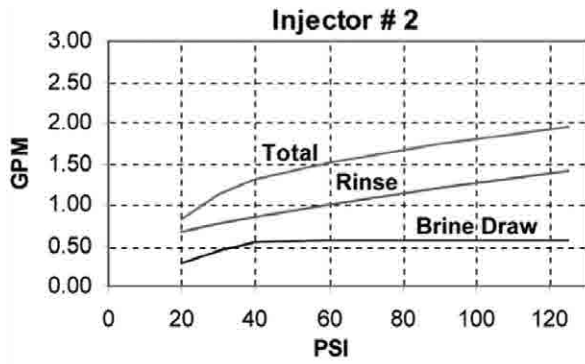
9000/9500 Injector Flow Data (1600 Series Injectors)



TR: 18467
41092

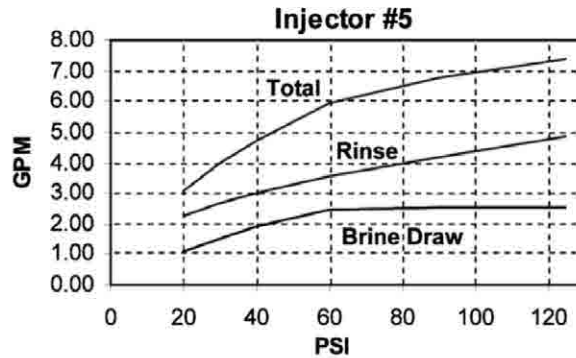
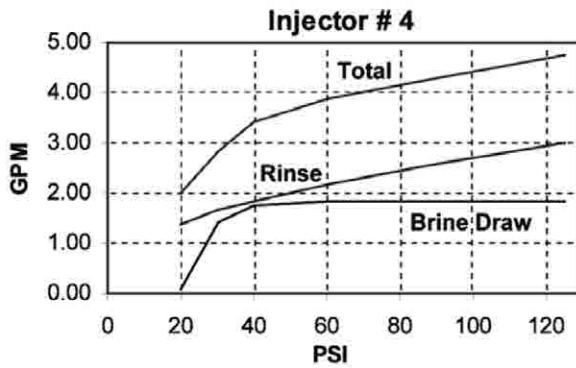
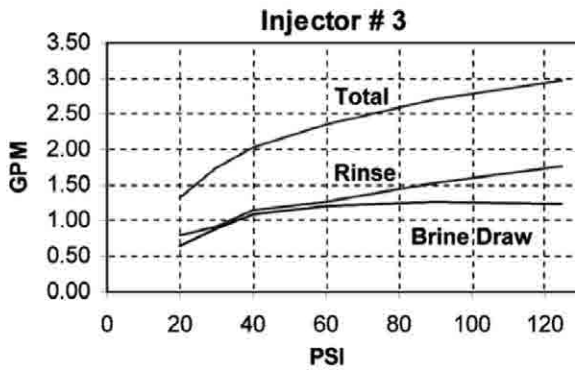
Flow Data and Injector Draw Rates - Down Flow

9500 Injector Flow Data (1600 & 1700 Series Injectors)



TR: 184
41092

1700 Series Injectors



TR: 18467
41092

Injector Nozzle and Throat Chart for 1600 & 1700 Brine Systems

1600 Brine System

Standard

Size	Color
#0	Red
#1	White
#2	Blue
#3	Yellow
#4	Green

1700 Brine System

Standard

Size	Color
#3C	Yellow
#4C	Green
#5C	White
#6C	Red

WATER SOFTENERS/FILTERS Limited Warranty:

The Company warrants each fiberglass tank 13 inches in diameter and smaller to be free from defects in material and workmanship under normal usage for a period of ten years from the date of original shipment.

The Company warrants each fiberglass tank 14 inches in diameter and larger to be free from defects in material and workmanship under normal usage for a period of five years from the date of original shipment.

The Company warrants any size Salt Tank (Brine Tank) to be free from defects in material and workmanship under normal usage for a period of five years from the date of original shipment.

The Company warrants each Control valve to be free from defects in material and workmanship under normal usage for a period of five years from the date of original shipment.

The Company warrants diaphragm valve nests and related controls to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment.

The Company warrants all other components to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment.

Water softener resins subjected to iron, manganese and chlorine levels greater than 1ppm are expressly not covered by this warranty. Manganese greensand media and expendable media such as activated carbon, Filox[®], Micro-Z[®] and neutralizing media are also not covered by this warranty. In the event of a covered defect within the warranty period, the Company will, at its option, replace or recondition the product without charge.

Disclaimer of Warranty. THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Limitation of Liability. The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product

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