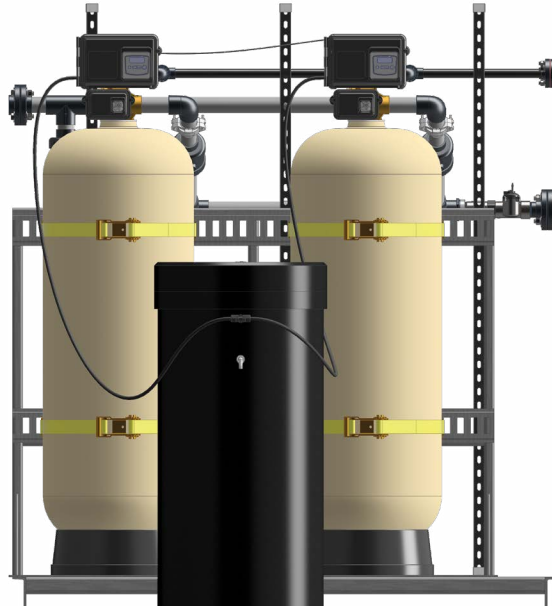


Installation, Operation, and Maintenance

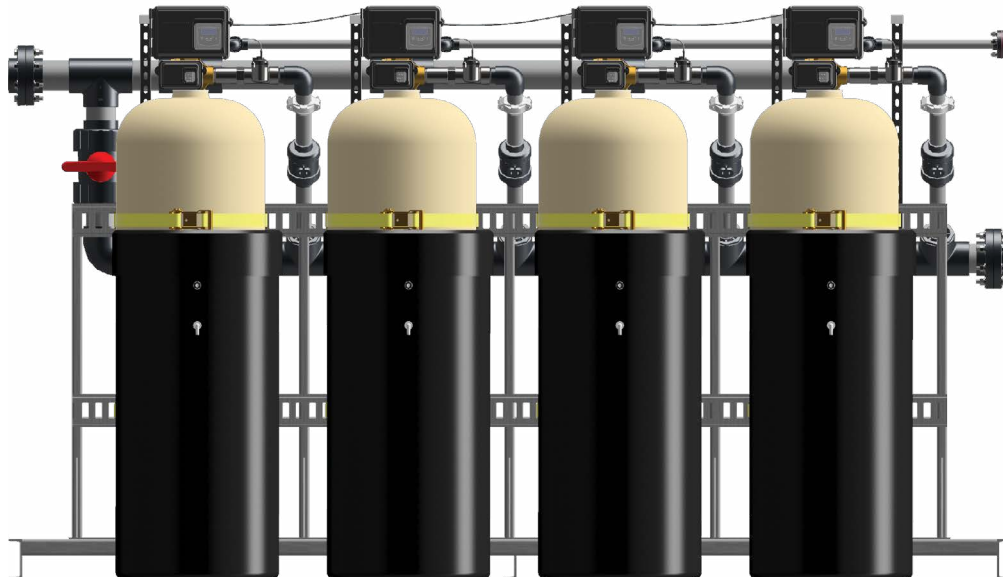
2" to 4" Commercial Water Softeners

Series: PWS20-2-PPSM & PWS20-P-PPSM

WATTS®
pure water



Series PWS20-2-PPSM Duplex Alternating



Series PWS20-P-PPSM Progressive Systems

Congratulations on your purchase of this Pure Water 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.

Safety Information

⚠ 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.
- Do not use on water that is microbiologically unsafe or of unknown quality. This system will not make microbiologically unsafe water safe. Water that is unsafe must be treated separately from this conditioner.
- 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.

⚠ WARNING

This equipment may weigh several thousand pounds. Only qualified personnel using properly rated lifting equipment may move or install this system. Do not attempt to attach lifting or hoisting equipment to control valves, mineral tanks, plumbing or plumbing support structures. Lifting or hoisting of the system must be done by lifting from beneath the skid base through the access points provided in the front and back of the skid. DO NOT attempt to move a system that is loaded with media or full of water. Remove all water and media from system if it needs to be moved from the original installation location. Failure to follow these instructions could result in property damage, serious injury, or death.

Contents

Safety Information	3
How To Use This Manual	3
Introduction	4
Project Data Sheet	5
System Specifications	6
Set Up	9
Operating Parameters	9
System Installation.	10
Installation Diagrams - Series PWS20-2-PPSM Duplex Alternating Systems.	13
Installation Diagrams - Series PWS20-P-PPSM Progressive 2-4 Tank Systems.	14
Controller Electrical Connections	15
Wiring Diagram	16
NXT2 Controller Programming and Operation	17
Controller Display	18
Controller Operation	19
Controller Features	20
Master Programming Mode Flow Chart	22
User Programming Mode Flow Chart.	23
Diagnostic Programming Mode Flow Chart	24
Time of Day Programming Mode Flow Chart	25
NXT2 Programming Parameters and Ranges	26
Replacing the Media	27
Replacement Parts - Major System Components	28
Replacement Parts - Skid & Plumbing Components	30
Replacement Parts - 2900 Upper Powerhead	31
NXT2 Controller Assembly.	32
NXT to NXT2 Conversion Kit	33
Replacement Parts - 2900 Lower Powerhead	34
Replacement Parts - 2900S Control Valve Body	35
Replacement Parts - 1700 Brine System.	36
Replacement Parts - 1710 Brine System.	37
Replacement Parts - 2" Stainless Steel Mech/Electronic Meter	38
Troubleshooting.	39
Water Softener Flow Diagrams - Down Flow Brining	41
Water Softener Flow Diagrams - Up Flow Brining.	42
Flow Data and Injector Draw Rates - Down Flow.	43
Injector Nozzle and Throat Chart for 1700 Brine Systems	44

Introduction

Principles 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 are 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.

At the conclusion of Rapid Rinse, the tank will remain in the Stand By position.

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.

Project Data Sheet

Job Details

Job Number: _____

Model 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,

D. Progressive Flow Tank Staging- GPM Threshold for Progressive Feature _____

E. 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#: _____

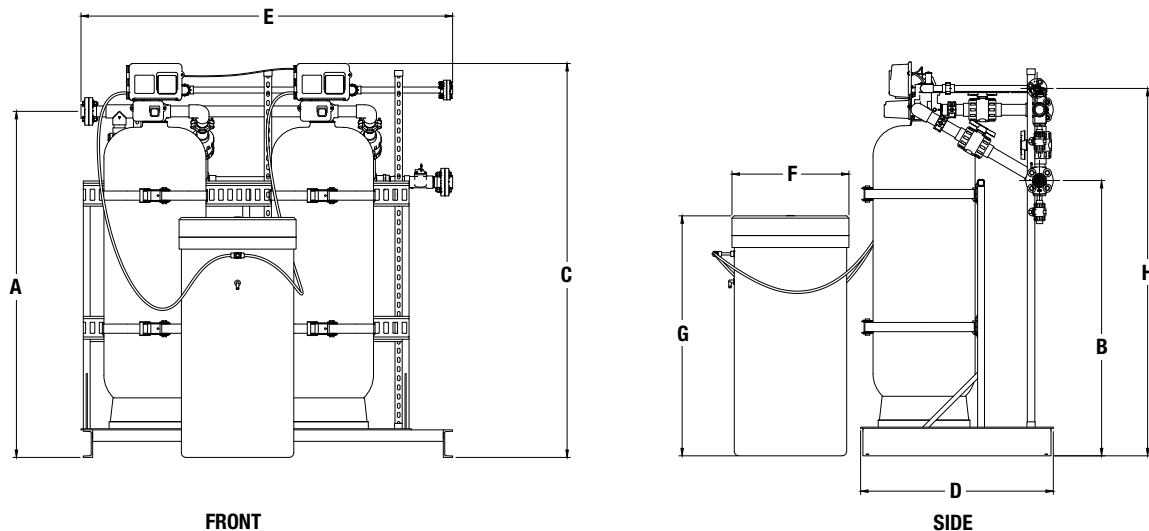
7. Water Pressure: _____

8. Water Temperature: _____

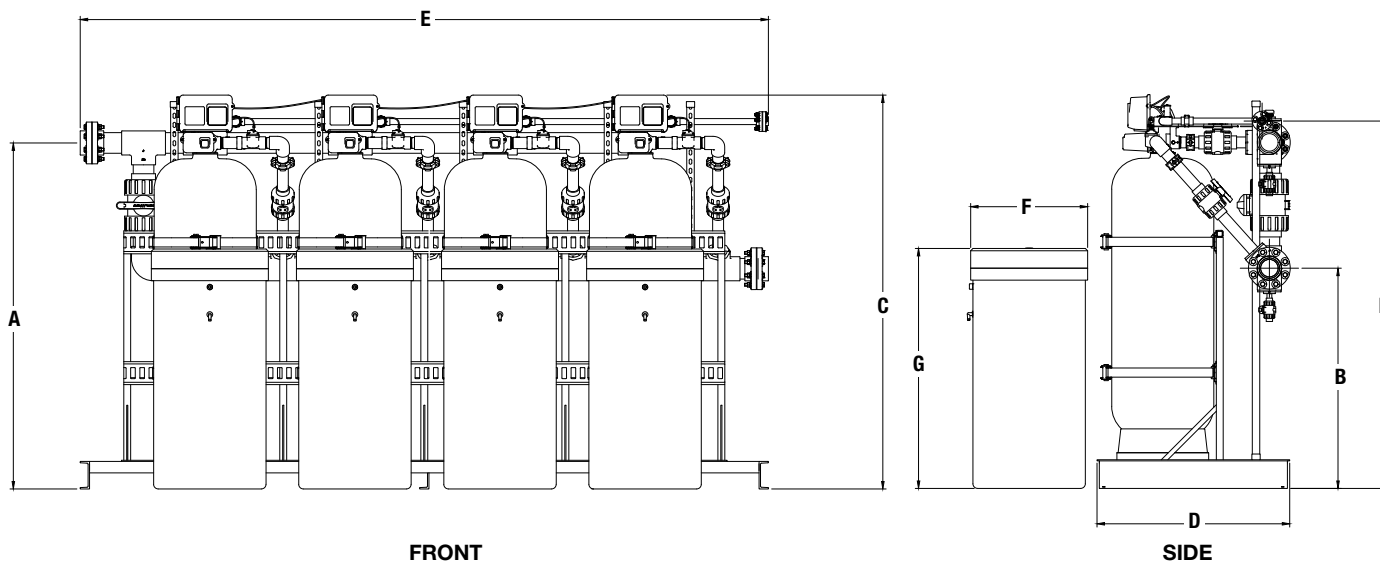
System Specifications

Dimensions - Weights

Series PWS20-2-PPSM Duplex Alternating



Series PWS20-P-PPSM Progressive Systems



Series PWS20-2-PPSM Duplex Alternating

Call customer service if you need assistance with technical details.

MODEL NO.	DIMENSIONS																WEIGHTS	
	A		B		C		D		E		F		G		H			
	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>lbs.</i>	<i>kgs.</i>
PWS20131F21-PPSM	72½	1842	57	1448	87	2210	42	1067	82	2083	24	610	41	1041	77	1956	1664	755
PWS20131G21-PPSM	75½	1918	60	1524	90	2286	42	1068	82	2083	24	610	50	1270	80	2032	2060	934
PWS20131H21-PPSM	78½	1994	63	1600	95	2413	42	1067	82	2083	30	762	50	1270	83	2108	2147	974
PWS20131I21-PPSM	84½	2146	69	1753	100	2540	48	1219	102	2591	39	991	48	1219	89	2261	3375	1531
PWS20131J21-PPSM	90	2286	75	1905	100	2540	48	1219	102	2591	39	991	60	1524	95	2413	4180	1896

System Specifications

Series PWS20-P-PPSM Duplex Progressive

MODEL NO.	DIMENSIONS																WEIGHTS	
	A		B		C		D		E		F		G		H		lbs.	kgs.
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
PWS20131F22-PPSM	72½	1842	57	1448	87	2210	42	1067	82	2083	24	610	41	1041	77	1956	1700	773
PWS20131G22-PPSM	75½	1918	60	1524	90	2286	42	1068	82	2083	24	610	50	1270	80	2032	2100	955
PWS20131H22-PPSM	78½	1994	63	1600	95	2413	42	1067	82	2083	30	762	50	1270	83	2108	2320	1055
PWS20131I22-PPSM	84½	2146	69	1753	100	2540	48	1219	102	2591	39	991	48	1219	89	2261	3520	1600
PWS20131J22-PPSM	90	2286	75	1905	100	2540	48	1219	102	2591	39	991	60	1524	95	2413	4350	1977

Series PWS20-P-PPSM Triplex Progressive

MODEL NO.	DIMENSIONS																WEIGHTS	
	A		B		C		D		E		F		G		H		lbs.	kgs.
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
PWS20131F33-PPSM	72½	1842	57	1448	87	2210	42	1067	114	2896	24	610	41	1041	77	1956	2450	1114
PWS20131G33-PPSM	75½	1918	60	1524	90	2286	42	1068	114	2896	24	610	50	1270	80	2032	3050	1386
PWS20131H33-PPSM	78½	1994	63	1600.2	95	2413	42	1067	114	2896	30	762	50	1270	83	2108	3380	1536
PWS20131I33-PPSM	84½	2146	69	1752.6	100	2540	48	1219	114	2896	39	991	48	1219	89	2261	4780	2173
PWS20131J33-PPSM	90	2286	75	1905	100	2540	48	1219	114	2896	39	991	60	1524	95	2413	5980	2718

Series PWS20-P-PPSM Quadplex Progressive

MODEL NO.	DIMENSIONS																WEIGHTS	
	A		B		C		D		E		F		G		H		lbs.	kgs.
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
PWS20131F44-PPSM	72½	1842	57	1448	87	2210	42	1067	150	3810	24	610	41	1041	77	1956	3100	1409
PWS20131G44-PPSM	75½	1918	60	1524	90	2286	42	1068	150	3810	24	610	50	1270	80	2032	3850	1750
PWS20131H44-PPSM	78½	1994	63	1600	95	2413	42	1067	150	3810	30	762	50	1270	83	2108	4290	1950
PWS20131I44-PPSM	84½	2146	69	1753	100	2540	48	1219	150	3810	39	991	48	1219	89	2261	6090	2768
PWS20131J44-PPSM	90	2286	75	1905	100	2540	48	1219	150	3810	39	991	60	1524	95	2413	7690	3496

Specifications

MODEL NO.	GRAIN CAPACITY PER TANK (MAX)	MAIN HEADERS - DRAIN PIPE SIZE (IN.)	NO. OF TANKS - METERS	MINERAL TANK			BRINE TANK		FLOW RATE & PRESSURE		
				TANK SIZE	RESIN FT ³ PER TANK	GRAVEL (LBS) ¼X½ / #20	NO.- SIZE	SALT FILL (LBS)	SERVICE (GPM)	DROP (PSI)	BKW (GPM)
PWS20131F21-PPSM	150,000	2-1	2-1	18" x 65"	5	- / 100	1- 24" x 41"	600	57-65	15-25	10
PWS20131F22-PPSM	150,000	3-1	2-2	18" x 65"	5	- / 100	2- 24" x 41"	1200	114-130	15-25	10
PWS20131F33-PPSM	150,000	3-1	3-3	18" x 65"	5	- / 100	3- 24" x 41"	1800	171-195	15-25	10
PWS20131F44-PPSM	150,000	4-1	4-4	18" x 65"	5	- / 100	4- 24" x 41"	2400	228-260	15-25	10
PWS20131G21-PPSM	210,000	2-1	2-1	21" x 62"	7	- / 100	1- 24" x 50"	800	60-77	15-25	12
PWS20131G22-PPSM	210,000	3-1	2-2	21" x 62"	7	- / 100	2- 24" x 50"	1600	120-154	15-25	12
PWS20131G33-PPSM	210,000	3-1	3-3	21" x 62"	7	- / 100	3- 24" x 50"	2400	180-231	15-25	12
PWS20131G44-PPSM	210,000	4-1	4-4	21" x 62"	7	- / 100	4- 24" x 50"	3200	240-308	15-25	12
PWS20131H21-PPSM	300,000	2-1	2-1	24" x 72"	10	100 / 100	1- 30" x 50"	1200	74-97	15-25	15
PWS20131H22-PPSM	300,000	3-1	2-2	24" x 72"	10	100 / 100	2- 30" x 50"	2400	148-194	15-25	15
PWS20131H33-PPSM	300,000	4-1	3-3	24" x 72"	10	100 / 100	3- 30" x 50"	3600	222-291	15-25	15
PWS20131H44-PPSM	300,000	4-1	4-4	24" x 72"	10	100 / 100	4- 30" x 50"	4800	296-388	15-25	15
PWS20131I21-PPSM	450,000	2-1	2-1	30" x 72"	15	200 / 200	1- 39" x 48"	2200	80-100	15-25	25
PWS20131I22-PPSM	450,000	3-1	2-2	30" x 72"	15	200 / 200	2- 39" x 48"	4400	160-200	15-25	25
PWS20131I33-PPSM	450,000	4-1	3-3	30" x 72"	15	200 / 200	3- 39" x 48"	6600	240-300	15-25	25
PWS20131I44-PPSM	450,000	4-1	4-4	30" x 72"	15	200 / 200	4- 39" x 48"	8800	320-400	15-25	25
PWS20131J21-PPSM	600,000	2-1½	2-1	36" x 72"	20	300 / 200	1- 39" x 60"	2200	84-105	15-25	35
PWS20131J22-PPSM	600,000	3-1½	2-2	36" x 72"	20	300 / 200	2- 39" x 60"	4400	168-210	15-25	35
PWS20131J33-PPSM	600,000	4-1½	3-3	36" x 72"	20	300 / 200	3- 39" x 60"	6600	252-315	15-25	35
PWS20131J44-PPSM	600,000	4-1½	4-4	36" x 72"	20	300 / 200	4- 39" x 60"	8800	336-420	15-25	35

System Specifications

General System Information for Skid Mounted Pre-Plumbed Duplex Alternating PWS20-2-PPSM Softeners

MODEL NO.	ORDERING CODES	DESCRIPTION	SPACE REQUIRED D X W X H	SHIPPING WEIGHT LBS
PWS20131F21-PPSM	1000001944	5 Cubic Foot Duplex Alternating Skid Mounted Softener with Flow Meter	74" x 82" x 90"	1664
PWS20131G21-PPSM	1000001948	7 Cubic Foot Duplex Alternating Skid Mounted Softener with Flow Meter	74" x 82" x 90"	2060
PWS20131H21-PPSM	1000001952	10 Cubic Foot Duplex Alternating Skid Mounted Softener with Flow Meter	80" x 82" x 95"	2147
PWS20131I21-PPSM	1000001956	15 Cubic Foot Duplex Alternating Skid Mounted Softener with Flow Meter	95" x 102" x 100"	3375
PWS20131J21-PPSM	1000001960	20 Cubic Foot Duplex Alternating Skid Mounted Softener with Flow Meter	95" x 102" x 100"	4180

General System Information for Skid Mounted Pre-Plumbed Duplex Progressive PWS20-P-PPSM Softeners

MODEL NO.	ORDERING CODES	DESCRIPTION	SPACE REQUIRED D X W X H	SHIPPING WEIGHT LBS
PWS20131F22-PPSM	1000001945	5 Cubic Foot Duplex Progressive Skid Mounted Softener with Flow Meters	74" x 82" x 90"	1700
PWS20131G22-PPSM	1000001949	7 Cubic Foot Duplex Progressive Skid Mounted Softener with Flow Meters	74" x 82" x 90"	2100
PWS20131H22-PPSM	1000001953	10 Cubic Foot Duplex Progressive Skid Mounted Softener with Flow Meters	80" x 82" x 95"	2320
PWS20131I22-PPSM	1000001957	15 Cubic Foot Duplex Progressive Skid Mounted Softener with Flow Meters	95" x 102" x 100"	3520
PWS20131J22-PPSM	1000001961	20 Cubic Foot Duplex Progressive Skid Mounted Softener with Flow Meters	95" x 102" x 100"	4350

General System Information for Skid Mounted Pre-Plumbed Triplex Progressive PWS20-P-PPSM Softeners

MODEL NO.	ORDERING CODES	DESCRIPTION	SPACE REQUIRED D X W X H	SHIPPING WEIGHT LBS
PWS20131F33-PPSM	1000001946	5 Cubic Foot Triplex Progressive Skid Mounted Softener with Flow Meters	74" x 114" x 90"	2450
PWS20131G33-PPSM	1000001950	7 Cubic Foot Triplex Progressive Skid Mounted Softener with Flow Meters	74" x 114" x 90"	3050
PWS20131H33-PPSM	1000001954	10 Cubic Foot Triplex Progressive Skid Mounted Softener with Flow Meters	80" x 114" x 95"	3380
PWS20131I33-PPSM	1000001958	15 Cubic Foot Triplex Progressive Skid Mounted Softener with Flow Meters	95" x 133" x 100"	4780
PWS20131J33-PPSM	1000001962	20 Cubic Foot Triplex Progressive Skid Mounted Softener with Flow Meters	95" x 133" x 100"	5980

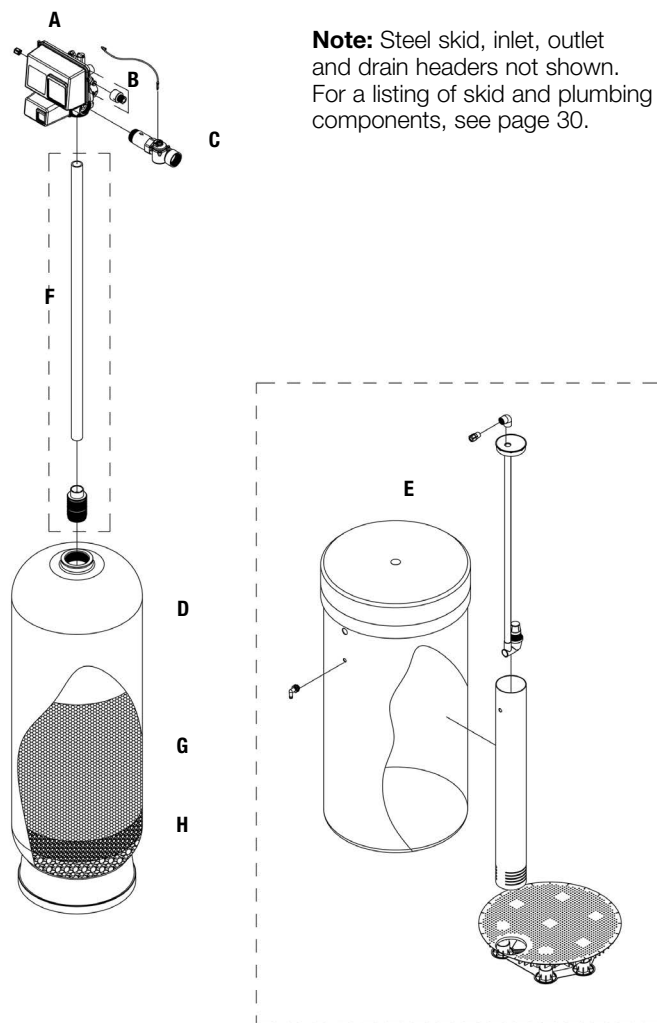
General System Information for Skid Mounted Pre-Plumbed Quadplex Progressive PWS20-P-PPSM Softeners

MODEL NO.	ORDERING CODES	DESCRIPTION	SPACE REQUIRED D X W X H	SHIPPING WEIGHT LBS
PWS20131F44-PPSM	1000001947	5 Cubic Foot Quadplex Progressive Skid Mounted Softener with Flow Meters	74" x 150" x 90"	3100
PWS20131G44-PPSM	1000001951	7 Cubic Foot Quadplex Progressive Skid Mounted Softener with Flow Meters	74" x 150" x 90"	3850
PWS20131H44-PPSM	1000001955	10 Cubic Foot Quadplex Progressive Skid Mounted Softener with Flow Meters	80" x 150" x 95"	4290
PWS20131I44-PPSM	1000001959	15 Cubic Foot Quadplex Progressive Skid Mounted Softener with Flow Meters	95" x 180" x 100"	6090
PWS20131J44-PPSM	1000001963	20 Cubic Foot Quadplex Progressive Skid Mounted Softener with Flow Meters	95" x 180" x 100"	7690

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 resin quantities expressed above are per mineral tank. For Series PWS20-P-PPSM systems, service flow rates are stated with all mineral tanks in service. During regeneration, the overall system service flow rate will be reduced by a factor of one mineral tank and must be sized accordingly. Flow rates listed at 25 psi drops are for intermittent peak flow rates and are not to be used as continuous flows.

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 cannot be reached contact Watts customer service at 800-659-8400.



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)
Water 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 BY SERIES

COMPONENT LABEL	COMPONENT	PWS20-2-PPSM DUPLEX ALTERNATING	PWS20-P-PPSM DUPLEX PROGRESSIVE	PWS20-P-PPSM TRIPLEX PROGRESSIVE	PWS20-P-PPSM QUADPLEX PROGRESSIVE
A	Number of Control Valves	2	2	3	4
B	Number of Drain Line Flow Controllers*	2	2	3	4
C	Number of Flow Meters	1	2	3	4
D	Number of Mineral Tanks	2	2	3	4
E	Number of Brine Tanks	1	2	3	4
F	Number of Distributor Tubes*	2	2	3	4
G	Resin**	Quantity Varies Depending on System Size			
H	Gravel**	Quantity Varies Depending on System Size			

*Drain line flow controllers come factory assembled on control valve's drain port depending on size. Distributor tubes ship inside mineral tanks.

**Resin and gravel are supplied in bulk on pallets. The proper amount is supplied for the system.

Divide resin and gravel equally between the number of mineral tanks. See page 7 Specifications table for media quantity by tank size.

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. A system bypass is included with this system.
- 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.

System Installation

General Installation Instructions

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 system in the desired installation location. Make sure that the location is level and sturdy enough to support the weight of the system once it is in operation.
4. After the system has been placed into its final position, and will not need to be moved again, load the mineral tanks with resin and gravel media following the instructions below repeating steps b – s. for each mineral tank on the skid:
 - a. Place all system ball valves (Inlet, outlet and bypass) into the closed position.
 - b. Remove a section of plumbing from both the inlet and outlet plumbing so the control valve can be removed. This is done by removing the Victaulic clamp and seal from both the inlet and outlet pipe connection to one of the system's control valves. Then loosen the union collar closest to the control valve of the inlet and outlet union ball valve. Then remove the loose section of inlet and outlet plumbing.
 - c. Disconnect the union fitting on the drain line next to the control valve.
 - d. If connected, disconnect the brine hose from the control valve. See page 13 for brine hose connection detail.
 - e. Disconnect the meter cable from the meter dome. See Figure 1 on page 12 for meter cable connection location.
 - f. Disconnect the communication cable(s) from the P1/P3 port(s) and the power supply cable from the P14 port of the control valve's controller. See pages 15 and 16 for port locations.
 - g. The control valve should now be free to rotate counter-clockwise, when viewed from above, to loosen. Then lift the control valve from top of tank. Additional plumbing may need to be moved depending on model.
 - h. Inspect the distributor screens for damage, and make sure all screens are present before loading the mineral tank with media. Before proceeding with installation, replace any damaged components immediately.
 - i. Cap the top open end of the distributor tube with tape and plastic sheeting to keep all media and foreign debris from entering the distributor tube. This cap must be secure and not come off during media loading.
 - j. Place the distributor tube, screen end down, into the mineral tank and center it in the bottom. The top of the distributor tube should be flush with the top of the tank. Test the tape cap to make sure it cannot come off during the media loading process.
 - k. For systems 24" in diameter and larger, fill the mineral tank $\frac{1}{3}$ full with water to prevent breakage of the distributor tube screens during the media loading process. This step is not required for tanks smaller than 24" in diameter.
 - l. Make sure the plastic and tape cap is secure to the top of the distributor tube, place a funnel on the top of the tank and load first the gravel (if different sizes of gravel are used load the largest gravel first, then the smaller gravel) then the softening resin into the tank. The cap must not come off of the distributor tube during the loading of the media.
 - m. Remove the funnel from the top of the tank and plastic cap and tape from the top of the distributor tube. DO NOT PULL UP ON THE DISTRIBUTOR TUBE when removing the cap. The distributor tube top must remain flush with the top of the tank.
 - n. Clean any media from the threads and top of the mineral tank. Media in the threads and on the O-ring sealing surface of the tank can cause tank thread damage and prevent the control valve's O-ring seal from sealing properly.
 - o. 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.
 - p. Press the factory supplied black upper diffuser into the base of the control valve.
 - q. 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.
 - r. 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.
 - s. Reinstall the inlet and outlet sections of plumbing removed in step 4b.
5. Connect the cold water supply to the inlet flange of the water softening system's inlet water header.*
6. Install an inlet water sample port in the supply line and close it.*
7. If risk of vacuum exists, install Watts # 0556031 vacuum relief valve in the supply line to protect the system against vacuum damage.*
8. Connect the outlet header flange to the water line requiring soft water.*
9. Install an outlet water sample port on the outlet water line of the system and close it.*

WARNING

The control valve and attached plumbing may exceed 50 lbs in weight. Practice appropriate lifting technique to avoid personal injury and use care not to drop control valve.

System Installation

10. Inspect drain line connection at system control valve to ensure the drain line flow controller is installed in the drain line. It is factory installed. See page 13 for 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.*

⚠ WARNING

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

11. 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, or reduce the drain line diameter to smaller than that of the drain line flow controller. The drain line must be anchored to the floor.*
12. Reconnect the brine tank to the water softener's control valve brine port using the factory supplied fittings and tubing. See page 13 for 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.*
13. Reconnect meter cable(s) into meter dome(s) according to Figure 1. NXT2 & SXT controller meter cable(s) must use side port on meter dome(s). Connect the other end of the meter cable(s) to the control valve's P5 port located on the control valve's controller of the control valve the meter is plumbed into. For PWS20-P-PPSM series systems, the meter cable connects to a single control valve controller. See pages 15 & 16 for P5 location.
14. Connect the 24V transformer power supply wires to the P14 ports of the control valve controllers. See pages 15 & 16 for P14 location.
15. If applicable, install a metal bonding strap across metal inlet and outlet plumbing lines to maintain electrical continuity.

The system is now ready for Startup.

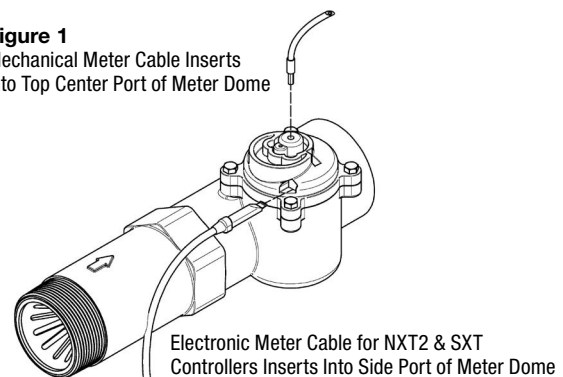
*See Installation Diagrams pages 13–14 of this manual for additional information.

Startup Instructions

1. Ensure all inlet and outlet isolation valves and the bypass valves are in the closed position and the treated water faucet hot and cold side are in the open position.
2. Open the main water supply valve to the building.
3. Check for leaks and repair as needed.
4. Plug the power cords of the control valves into an electrical outlet to energize system.
5. Locate "Manually Initiating a Regeneration" on page 19 of this manual and follow the steps to place the system into the backwash position. Once the system cycles into the backwash position, unplug the control valve from the power outlet to keep the system in the backwash position.

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. Once water flow at the drain line is observed, fully open the inlet valve and allow water flow to drain for 10 minutes to flush the resin bed of any color. If water at the drain shows any discoloration, continue to flush the resin bed until water at the drain is clear.
7. After resin bed flushing is complete, plug the system back in to the power outlet so that it will return to the service position. Repeat steps 4, 5, 6 and 7 on the other tanks.
8. Connect the factory supplied inner-connecting communication cable(s) between the P1 and P3 ports of the control valve's controllers shown on pages 15 & 16.
9. Program the system according to the System Type (see page 21) following the Control Valve Programming section beginning on page 22. Series PWS20-2-PPSM will be programmed as System 7 type systems and series PWS20-P-PPSM will be programmed as System 14 type systems.
10. Put the appropriate amount of water in the brine tank(s). This is accomplished by manually cycling the control valve(s) to cycle step 4 "Brine Tank Refill" and allowing a complete brine tank refill cycle to conclude. This step must be done for each brine tank in the system only after the proper brine tank refill time has been programmed into each controller.
11. Put the appropriate amount of salt in each brine tank. Do Not fill the salt level past the brine well lid.
12. Fully open the outlet isolation valves.
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.
17. Startup is now complete and the system is ready for operation.

Figure 1
Mechanical Meter Cable Inserts
Into Top Center Port of Meter Dome



Electronic Meter Cable for NXT2 & SXT
Controllers Inserts Into Side Port of Meter Dome

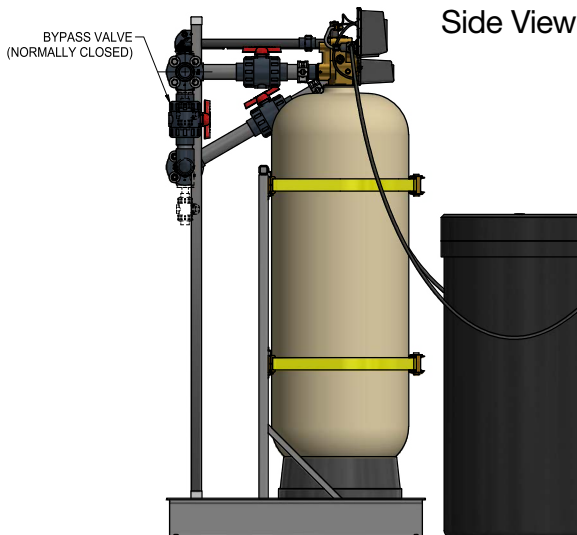
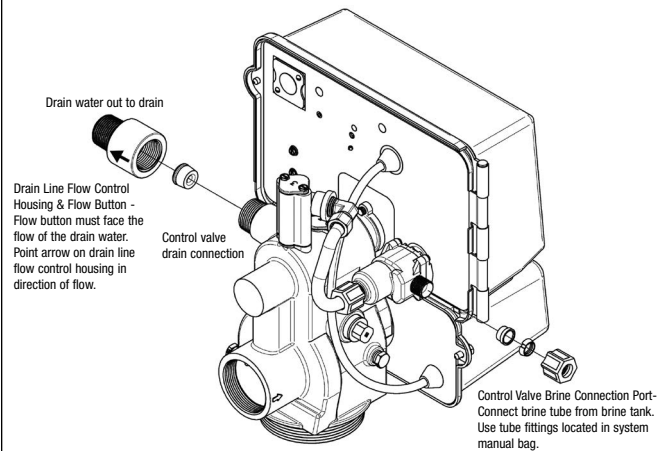
Installation Diagrams - Series PWS20-2-PPSM Duplex Alternating Systems

Installation Reference Notes For All System Installation Drawings:

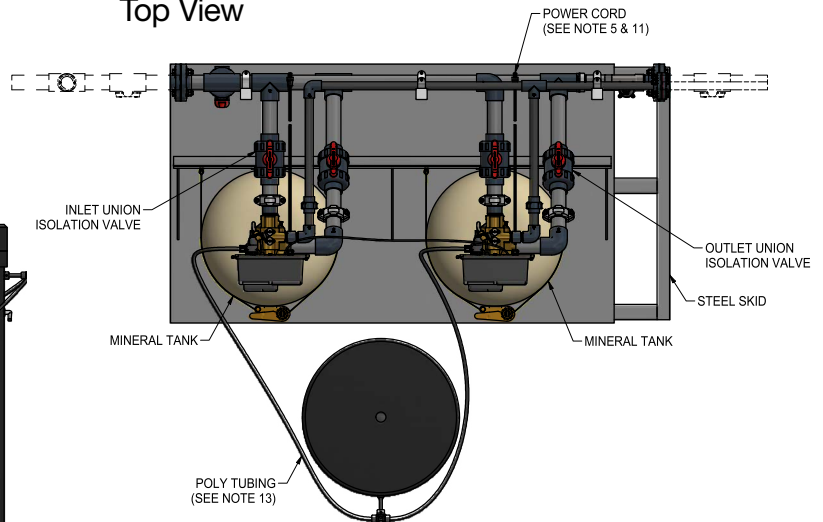
Notes: duplex alternating 2" water softeners

1. All dimensions shown in table are in inches, 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. Provide a 2 feet minimum clearance above mineral tank for filling media.
5. A GFCI electrical outlet should be provided within 5 feet of equipment location.
6. 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.
7. Brine tank dimensions shown on table are factory selected for use with the specified system size.
8. 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.
9. The full weight of the piping and valves must be supported by pipe hangers or other means.
10. Inlet and outlet supply piping needs to be sized according to flow rate requirements by others.
11. Power requirements: 115v/60hz 2.7 Amps per control valve unless otherwise specified.
12. 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.
13. Use factory supplied brine tubing. Do not use smaller diameter tubing than what is supplied.
14. Limit inlet pressure to not exceed maximum published operating pressure.

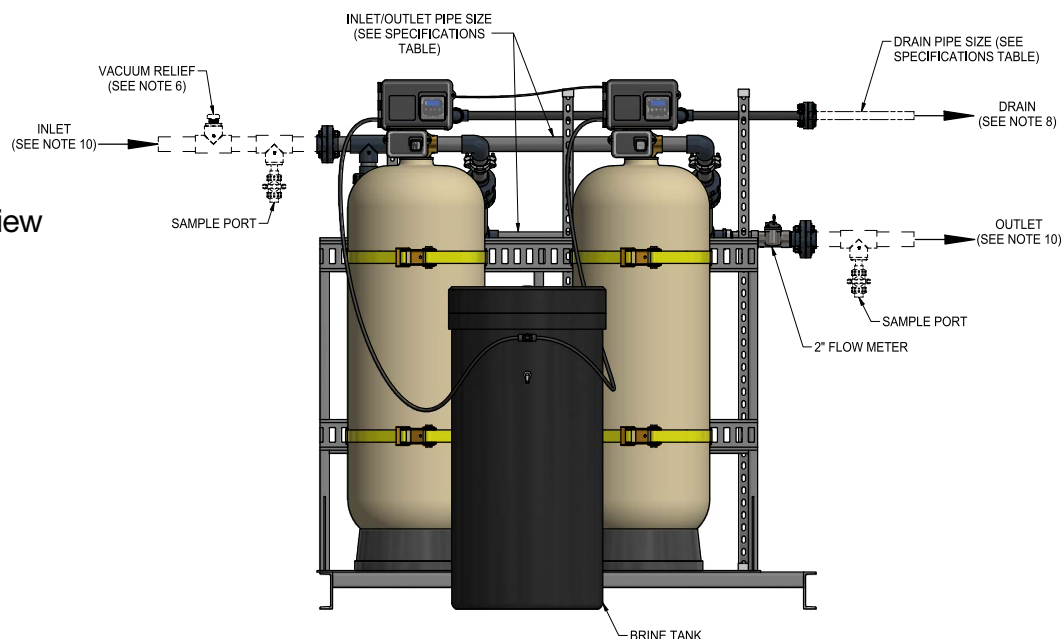
Drain and Brine Connection Detail



Top View

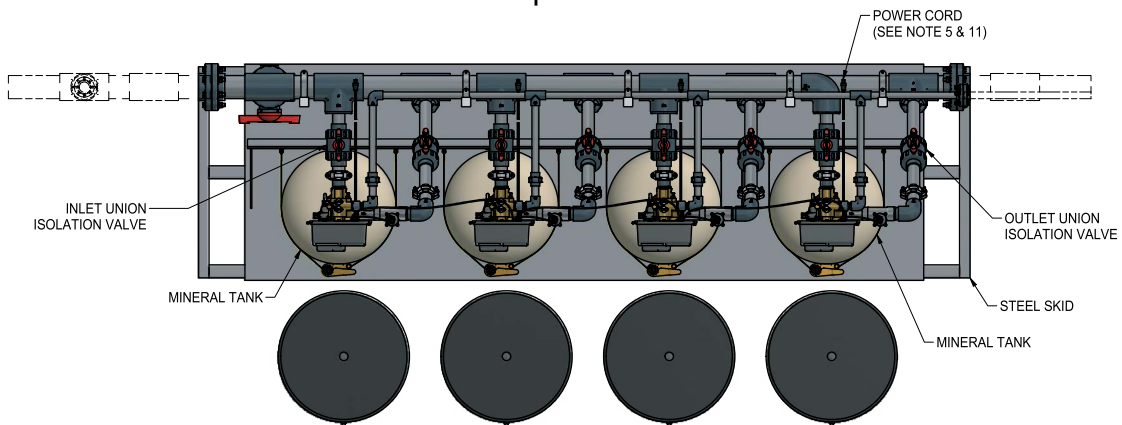


Front View

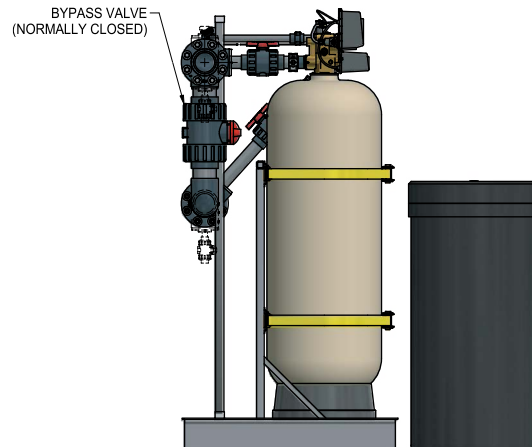


Installation Diagrams - Series PWS20-P-PPSM Progressive 2-4 Tank Systems

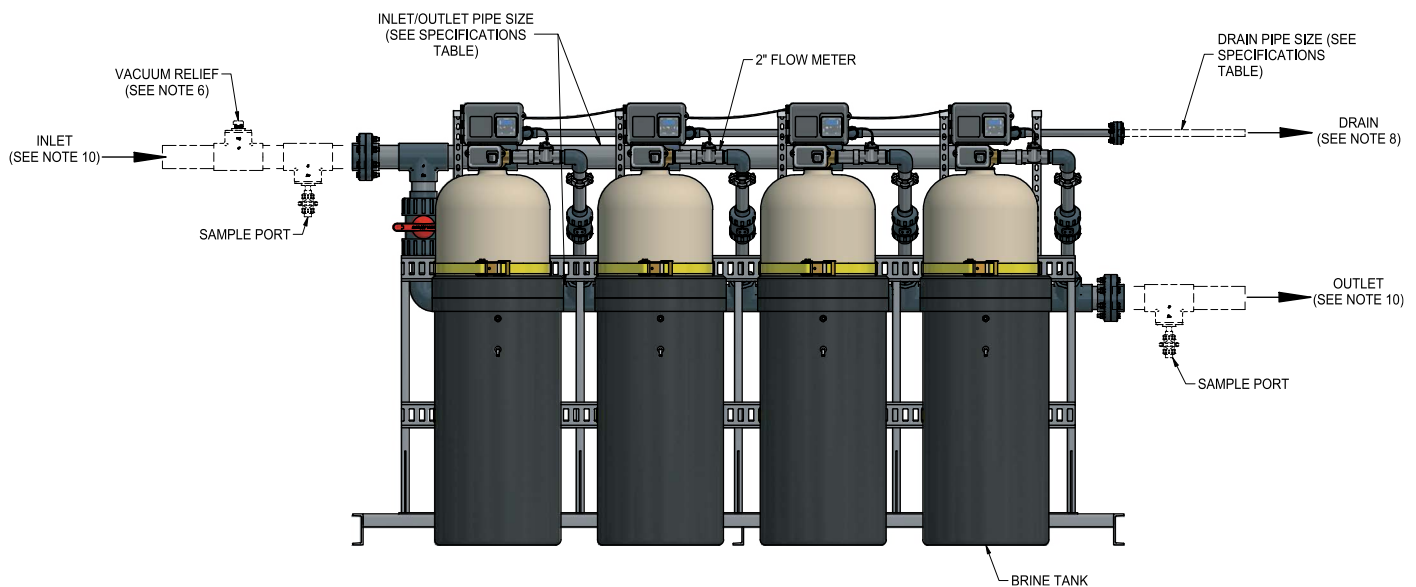
Top View



Side View



Front View



Controller Electrical Connections

Power Supply Connections

Installing the Power Supply:

Note: Power Supply includes a harness with 2 black wires that connect to circuit board, see page 16.

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

Network / Communication Cables and Connections

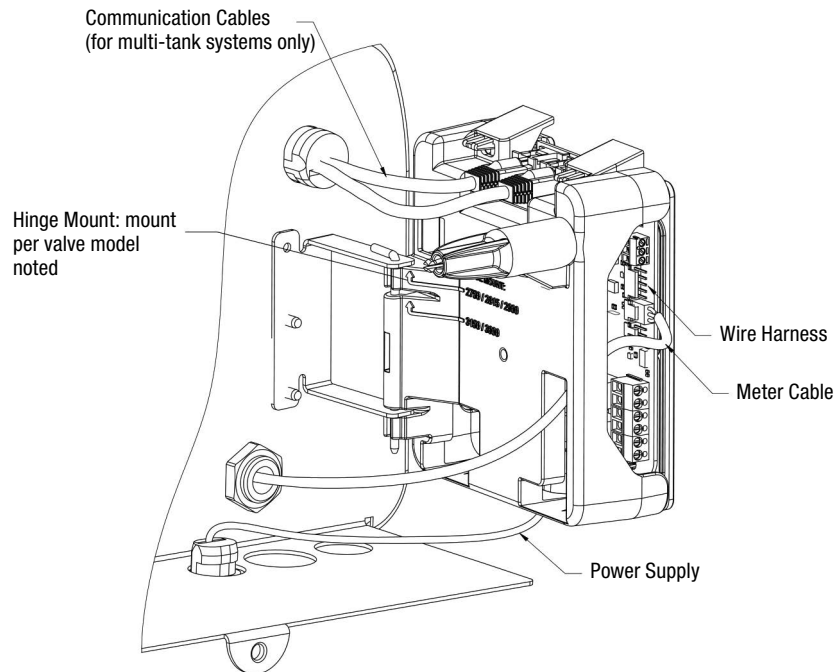
Use a shielded CAT5 Network/Communication cable.

Connect the network/communication cable first before programming.

Cable length between timers/units should not exceed 25 feet.

Connect each unit in series (do not form a loop) together from one communication port to the next communication port. It does not matter which one goes to the next one.

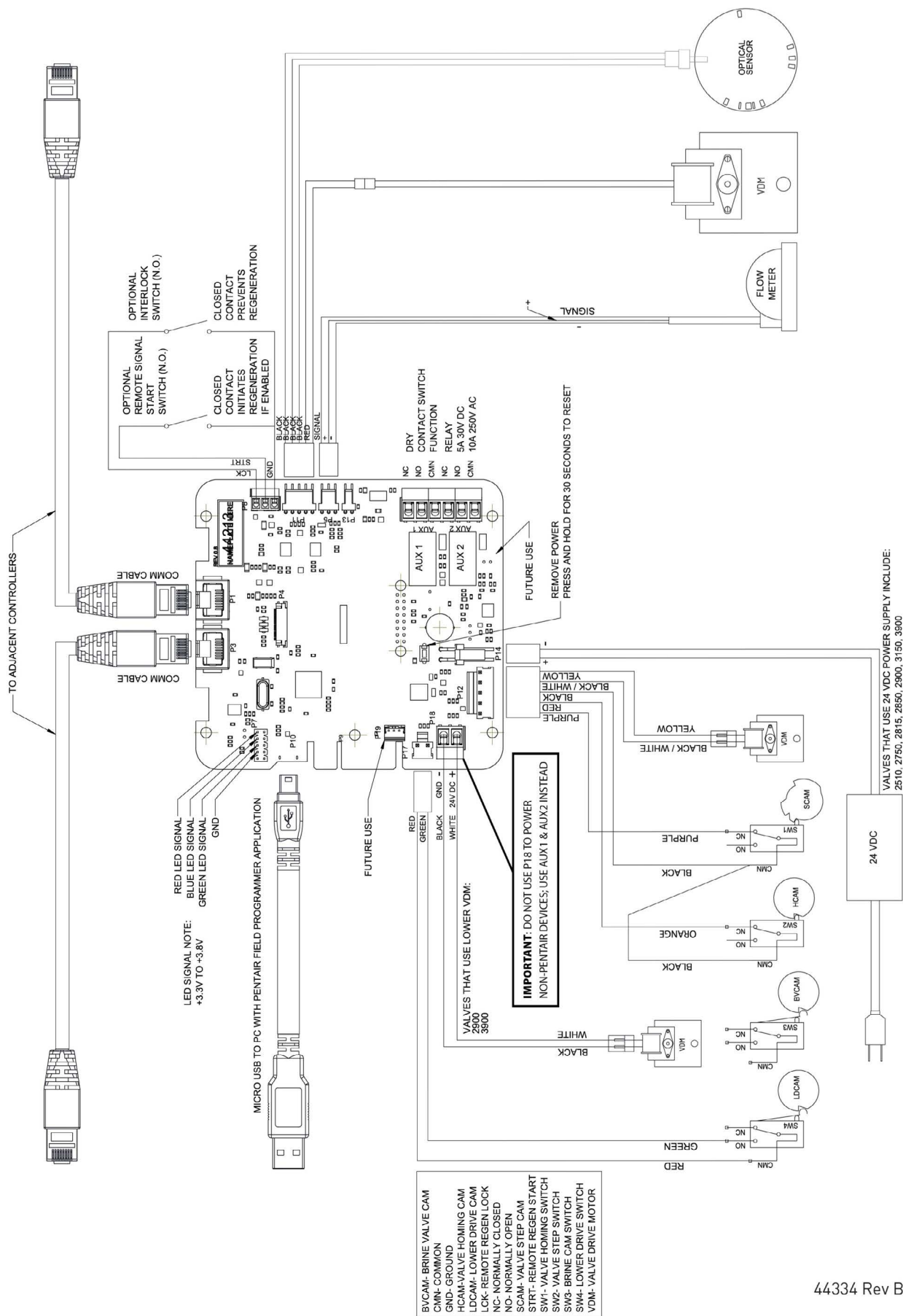
2510/2750/2815/2850/2900 Valves*:



44404 Rev A

Wiring Diagram

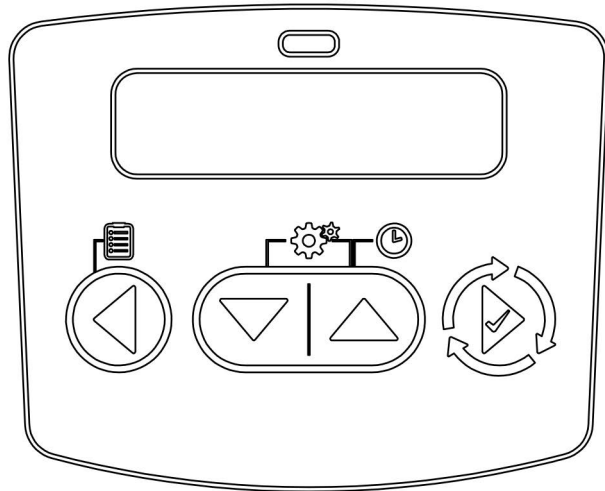
*WIRING DIAGRAMS ARE REFERENCE ONLY. ALL WIRING SHOULD BE DONE BY A CERTIFIED ELECTRICIAN AND MEET ALL ELECTRICAL CODES.



44334 Rev B

NXT2 Controller Programming and Operation

This system uses the NXT2 controller which is capable of operating single or multi-tank systems.



Modes of Operation

System Type	4 - Single Unit 5 - Parallel Interlock (2-8 Unit) 6 - Parallel Series Regeneration (2-8 Units) 7 - Alternating Interlock (2 Units) 8 - Alternating Delayed (2 Units) 9 - Alternating with Standby Units (2-8 Units) 14 - Progressive Demand Recall (2-8 Units)
Valve Type*	2510 2750 2815 2850 2900S 2910 (Europe only) 3150 3900
Regeneration Type	Softener/Filter Meter Delayed Softener/Filter Meter Immediate Time Clock Day of the Week Remote Regeneration
Regeneration Flow	Downflow Upflow Filter

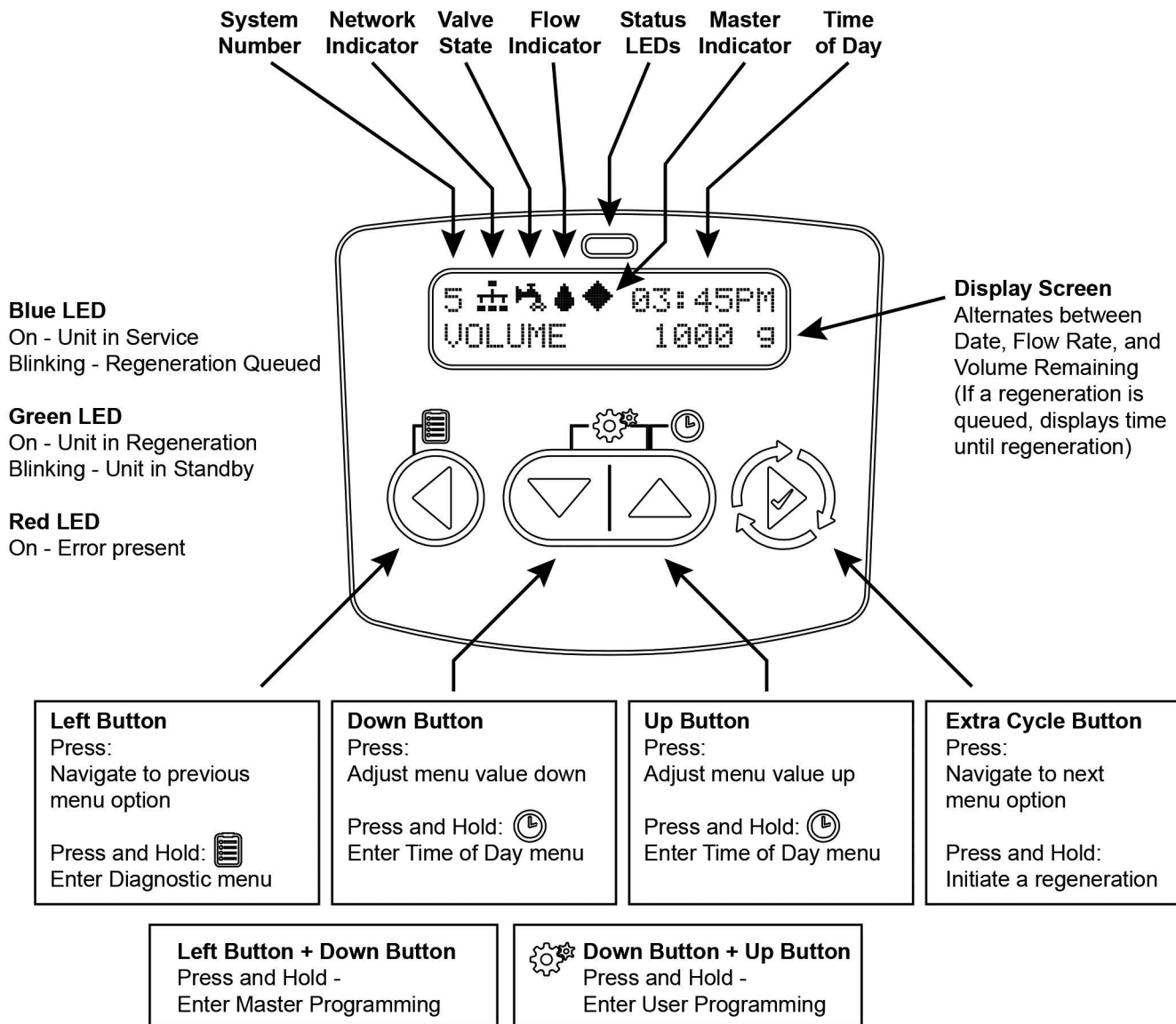
Features

On-screen multilingual support: English, Francais, Deutsch, Italiano, Espanol, Nederlands, Portugues

- Time of day super capacitor backup for 12-hour power loss
- 2 to 4 line scrolling text OLED display, high contrast easy to read in low light conditions and at a distance
- Full functional user interface with easy programming allowing forward and backwards menu navigation
- Network two to eight valves via shielded CAT5 cables
- LED Status Indicator
 - Blue: In Service
 - Flashing Blue: Regeneration Queued
 - Green: Regeneration
 - Flashing Green: Standby
 - Red: Error condition present
- Two Programmable Auxiliary relay outputs
 - Time-based
 - Volume based (Chemical pump)
 - Alarm-based
 - Cycle-based
 - Standby
- Remote input
 - Remote Lockout
 - Remote Regeneration
- Easy installation with plug-in wiring harnesses
- Assistance Name and Phone Number contact fields
- Error Log History
- Water Usage Daily (up to 13 weeks)
- Push Settings
- Capacitive Touch buttons
- Two Regeneration Lockout Windows
- Reset to factory default settings or from saveable custom settings
- Full calendar display
- Master Programming Lockout
 - Code-based
 - Time-based
 - Delayed
- Icons for easy system status identification
- Dynamic network addressing
- Diagnostics
 - Real-time Flow Rate
 - Peak Flow Rate (can be reset)
 - Totalizer (can be reset)
 - Reserve Capacity
 - Use Since Last Regeneration
 - Last Regeneration
 - Identifiable Software Version
 - Total Number of Regenerations
 - Regeneration Interval
 - Last Settings Change
 - Error Log History
 - Average Daily Usage (per weekday, 3 month history)

*PWS20-2-PPSM & PWS20-P-PPSM Systems use 2900/2900S Type Control Valves.

Controller Display



Display Icons

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

Controller Operation

Setting the Time of Day

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

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

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

Manually Initiating a Regeneration

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

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

Controller Operation During Regeneration

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

CYCLE 1/5
BACKWASH 00:10:00

CYCLE 2/5
DRAW 00:60:00

CYCLE 3/5
RAPID RINSE 00:10:00

CYCLE 4/5
TANK REFILL 00:12:00

CYCLE 5/5
PAUSE 00:00:00



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

Controller Operation During Programming

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

Controller Operation During A Power Failure

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

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

Flow Meter Equipped Controller

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

Controller Features

Remote Lock

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

Regeneration Day Override Feature

If the Day Override option is turned on and the valve reaches the set Regeneration Day Override value, the Regeneration Cycle starts if no other unit is in Regeneration. If other units are in regeneration, it is added to a regeneration queue. This occurs regardless of the remaining volume available.

Lock Settings (access to Master Programming)

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

Time Based - User must set clock to 12:01 pm to unlock

Delayed - User must press and hold the Left and Down buttons for 60 continuous seconds to unlock

Enter Code - User must input code "1201" to unlock

Capacitive Buttons

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

LED Status indicator

Blue - Unit in Service

Flashing Blue - Regeneration Queued

Green - Unit in Regeneration

Flashing Green - Unit in Standby

Red - Error with codes

Power Loss Backup

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

Continuous Flow Detect

Alert appears when specified continuous flow rate is detected during service over a specified duration. Continuous flow rate is adjustable from 0.1 to 99999.9 GPM/LPM (accuracy of flow rate detected will vary based on capability of meter). Duration range is adjustable from 1 to 255 hours.

Remote Regeneration

Ability to trigger a regeneration via a remote input.

Regeneration Types

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

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

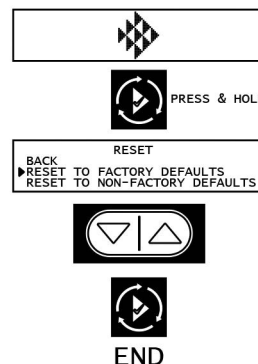
Time Clock - Once volume remaining reached zero and the selected regeneration time is reached (default 2 a.m. softener; 12 a.m. filter), the unit will regenerate.

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

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

Reset to Factory Defaults

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



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

Use the up/down buttons to select.

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

Lock Window

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

Settings Review

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

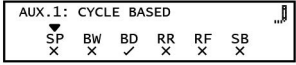
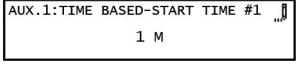
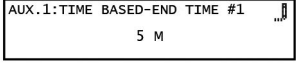
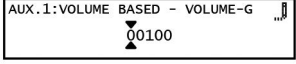
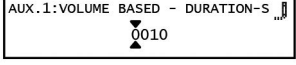
Controller Features

Push Settings

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

Auxiliary Relays

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

	Activates during selected cycle step
	Activates upon selected start time (Range: 0-91 minutes)
	Deactivates upon selected end time (Range: Start Time plus 1 minute)
	Activates when selected volume (gallon) is reached (Range: 0-99999)
	Selected duration in seconds (Range: 0-9999 seconds)

System 4 - Single Unit

Single Tank configuration Time Clock: No Meter Immediate:
One Meter Delayed: One Meter Remote Signal Start.

System 5 (2-8 Units) Parallel Interlock

All tanks in parallel supplying treated water. Each unit in the system will have its own flow meter/sensor input. The control will delay the start of Regeneration if another unit is already in Regeneration. Once that unit has completed a Regeneration cycle, and has returned to Service, the unit with the longest regeneration queue time will begin Regeneration. No more than one unit will be in Regeneration at time.

System 6 (2-8 Units) Parallel Series Regeneration

All tanks in parallel supplying treated water. Only #1 control will monitor flow meter/sensor input. When a regeneration is required for the system, it will regenerate valve address #1 first, immediately followed by #2, then #3, then #4 if installed. No more than one unit will be in Regeneration at a time.

System 7 (2 Units) Alternating Immediate

Program all PWS20-2-PPSM Series Systems as System 7.

One tank online supplying treated water, one tank in Standby. Only #1 control will monitor its flow meter/sensor input. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by the relay on the NXT2 circuit board.

System 8 (2 Units) Alternating Delayed

Immediate Transfer Delayed Regeneration One tank online supplying treated water, one tank in Standby. Only #1 control will monitor its flow meter/sensor input. Online unit depletes its volume. Once this occurs the offline unit comes online. The previously online unit goes offline and delays its regeneration until the programmed regeneration time has been reached.

System 9 (2-8 Units) Alternating with Standby Units

Up to 7 tanks online supplying treated water, one tank in Standby. Meter/sensor input is required on each tank. Regeneration of a unit will begin after the other control has left Standby and returned to Service. When the Regeneration cycle is complete, the regenerated unit will enter Standby. Standby on each tank is controlled by the relay on the NXT2 circuit board.

System 14 (2-8 Units) Progressive Demand Recall

Program all PWS20-P-PPSM Series Systems as System 14.

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

Master Programming Mode Flow Chart

CAUTION

Before entering Master Programming, please contact your local professional water dealer.

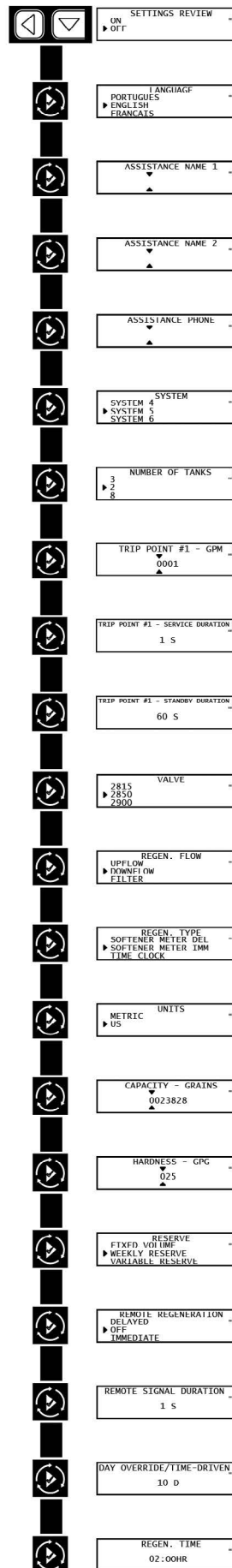
NOTICE

To identify your model softener, locate the diameter and height dimensions from the mineral tank label and check the specification charts within this manual to identify which model uses that size mineral tank.

NOTE: Depending on current option settings, some values cannot be viewed or set.

Master Programming Mode

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



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

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

Example:
12 characters maximum.

Example:
12 characters maximum.

Example:
14 characters maximum.

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

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

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

Example:
Range: 1-90 seconds

Example:
Range: 60-300 seconds

Example:
2510, 2750, 2815, 2900, 3150, 3900: HCTA-200-PPSM &
HCP-200-PPSM Systems use 2900/2900S Type Control
Valves.

Example:
Upflow
Downflow
Filter

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

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

Example:
Range: 0-199 GPG

Example:
Fixed Volume
Weekly Reserve
Variable Reserve
Fixed %

Example:
OFF Off, Immediate, Delayed

Example:
Range:
1-9999 seconds

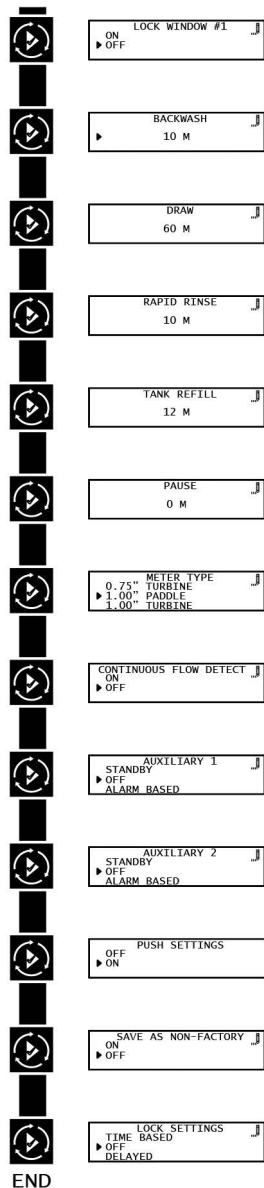
Example:
Range: Off - 99 Days

Example:
Range: 0 - 23 Hours 59 Minutes

Master Programming Mode Flow Chart - Cont'd

Example:

Range: 0 - 23 Hours 59 Minutes



Example:
Start Lock Window
End Lock Window

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M

Example:
Range: 0 - 240 M

Example:
Paddle (0.75", 1", 1.5", 2", 3")
Turbine (0.75", 1.25", 1.5")
Generic
All HCTA-200-PPSM & HCP-200-PPSM Systems use a 2"
Paddle Meter.

Example:
Range: 0.1 to 999.9 gpm/Lpm

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

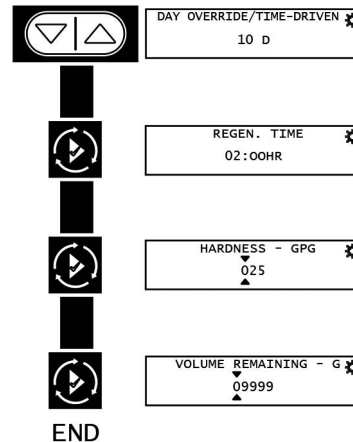
Example:
Off, Alarm Based, Cycle Based, Time Based,
Volume Based, Standby

Example:
Off, Delayed, Enter Code, Time Based

User Programming Mode Flow Chart

User Programming Mode

1. Press and hold the Down and Up buttons simultaneously for 3 seconds to enter the User Programming mode.
2. To navigate the menu, press the Extra Cycle button to advance to the next value. Press the Left button to retreat to the previous value.
3. Where applicable, use the Up and Down buttons to adjust a value as desired.
4. After progressing through all available values, the controller will return to Normal operation.
5. To exit diagnostic mode, progress through all cycles, or press & hold Left button at any time, or simply wait 5 minutes and controller will automatically return to normal operation.
6. Depending on the current controller settings, certain values may not be able to be viewed or set.
7. The controller will display local information, not system information.
8. In the event of a regeneration occurring while displaying user programming, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to the main screen.



Example:
Range: Off - 99 Days

Example:
Range: 0 - 23 Hours 59 Minutes

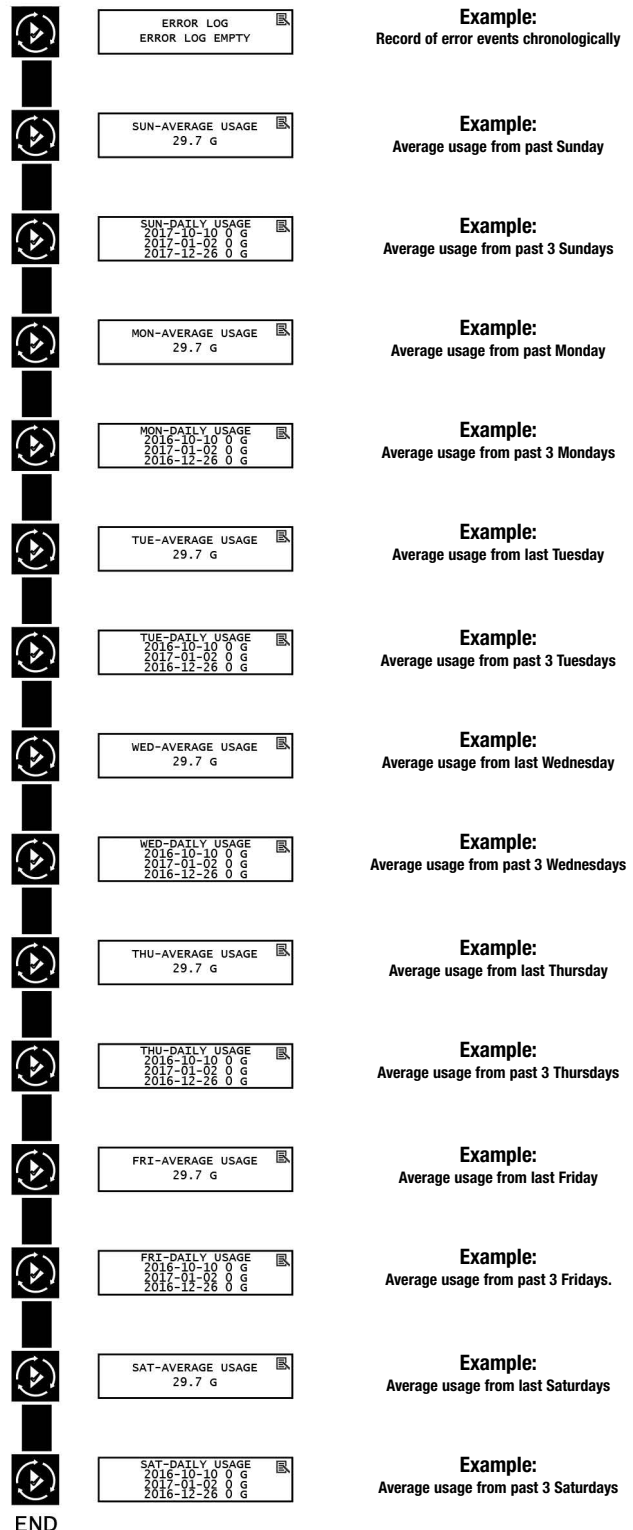
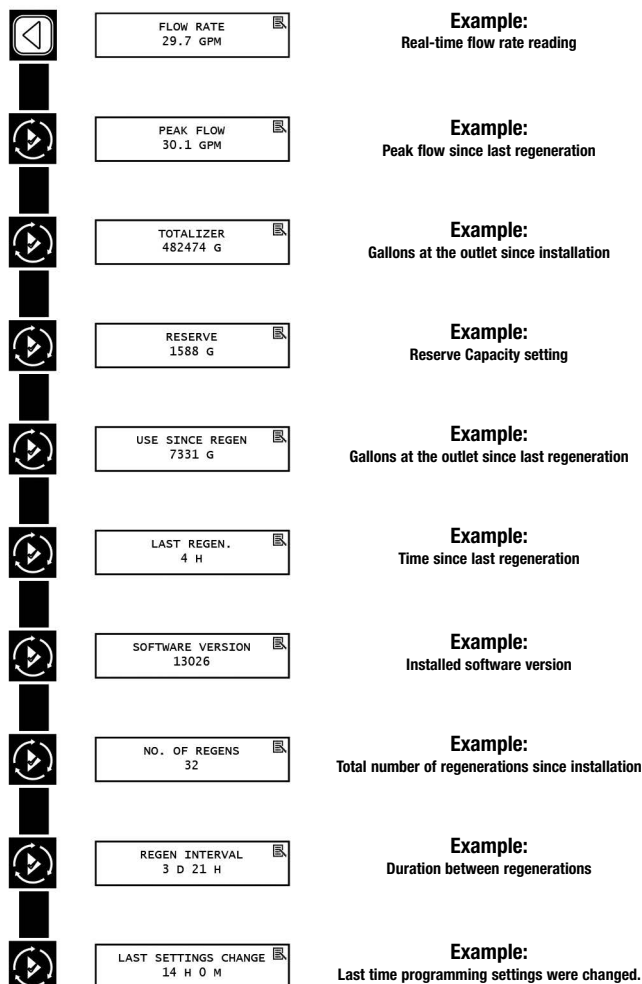
Example:
Range: 1 - 999 grains per gallon

Example:
Range: 1 - 99999 gallons

Diagnostic Programming Mode Flow Chart

Diagnostic Programming Mode

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



END

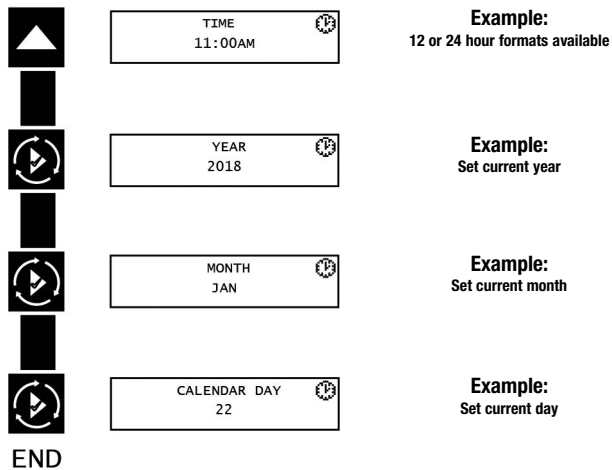
Time of Day Programming Mode Flow Chart

Setting the Time of Day

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

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

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



NXT2 Programming Parameters and Ranges

SYSTEM TYPE	4				5	6	7	8	9	14	PROGRAMMING PARAMETER RANGES	
REGEN TYPE	TIME CLOCK	DAY OF THE WEEK	SOFTENER/FILTER METERED IMMEDIATE	SOFTENER/FILTER METERED DELAYED	INTERLOCK	SERIES	ALTERNATING	ALTERNATING	ALTERNATING	PROGRESSIVE DEMAND RECALL	US	METRIC
Settings Review	X	X	X	X	X	X	X	X	X	X	On, Off	
Language	X	X	X	X	X	X	X	X	X	X	English Francais Deutsch Italiano Espanol Nederlands Portugues	
Assistance Name 1, 2	X	X	X	X	X	X	X	X	X	X	Custom	
Assistance Phone	X	X	X	X	X	X	X	X	X	X	Custom	
Regen Type	X	X	X	X	X	X	X	X	X	X	Time Clock Day of the Week Softener/Filter Metered Immediate Softener/Filter Metered Delayed	
Valve	X	X	X	X	X	X	X	X	X	X	2510 2750 2815 2850 2900 3150 3900	
Regen Flow	X	X	X	X	X	X	X	X	X	X	Uptlow, Downflow, Filter	
Units	X	X	X	X	X	X	X	X	X	X	US, Metric	
Remote Regeneration	X	X	X	X	X	X	X	X	X	X	Off, Immediate, Delayed	
Auxiliary 1, 2	X	X	X	X	X	X	X	X	X	X	Off, Alarm Based, Cycle Based, Time Based,	
Lock Window 1, 2	X	X	X	X	X	X	X	X	X	X	On, Off	
Meter Type			X	X	X	X	X	X	X	X	Paddle (0.75", 1", 1.5", 2", 3") Turbine (0.75", 1.25", 1.5") Generic	
Continuous Flow Detect			X	X	X	X	X	X	X	X	On, Off	
Save as Non Factory	X	X	X	X	X	X	X	X	X	X	On, Off	
Lock Settings	X	X	X	X	X	X	X	X	X	X	Off, Delayed, Enter Code, Time Based	
Day Override / Time Drive	X		X	X	X	X	X	X	X	X	Off-99 Days	
Regen Time	X	X		X		X		X			Any	
Day of the Week		X				X					SU, MO, TU, WE, TH, FR, SA	
Capacity			X	X	X	X	X	X	X	X	0-9,999,999 Grains	0-9,999,999 Grams, 0-560,287 Lx°DH, 0-1,000,000 Lx°FTH, 0-701,557 Lx°EH
Hardness			X	X	X	X	X	X	X	X	0-199 GPG	0-19,999 mg/L, 0-1,402 °EH, 0-199.9 °FTH, 0-112 °DH
International Hardness Units			X	X	X	X	X	X	X	X	mg/L, °EH, °FTH, °DH	
Reserve				X		X					Weekly Reserve, Variable Reserve, Fixed %, Fixed Volume	
Number of Tanks (Max)	1	1	1	1	8	8	2	2	8	8	2, 3, 4, 5, 6, 7, 8	
Push Settings					X	X	X	X	X	X	On, Off	
Trip Point #1-7 GPM										X	0-1,999 GPM	0-7,569 LPM
Trip Point #1-7 SD										X	1-90s	
Trip Point #1-7 STBD										X	60-300s	

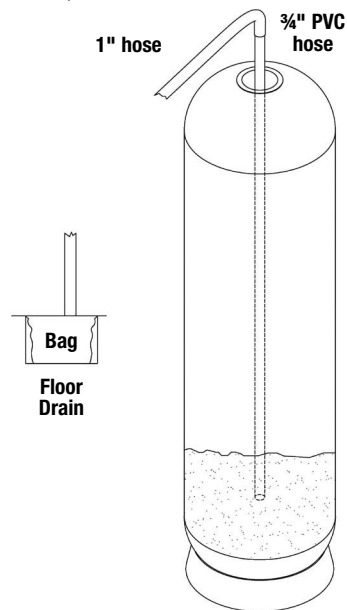
Replacing the Media

NOTICE

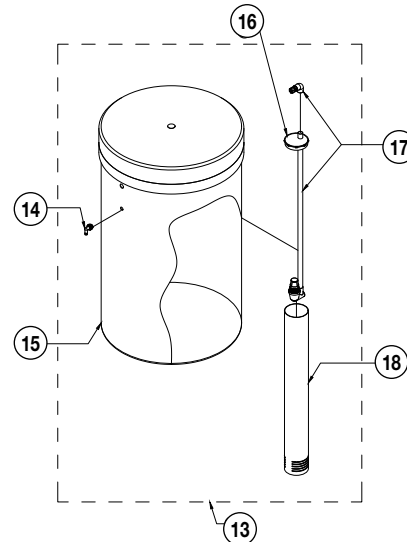
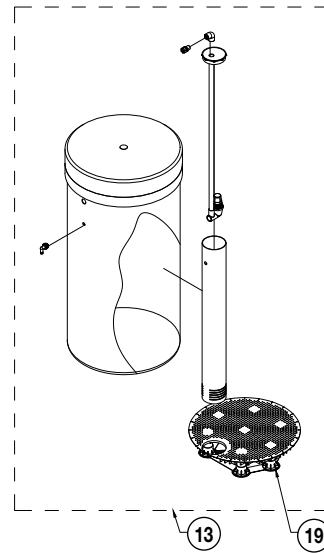
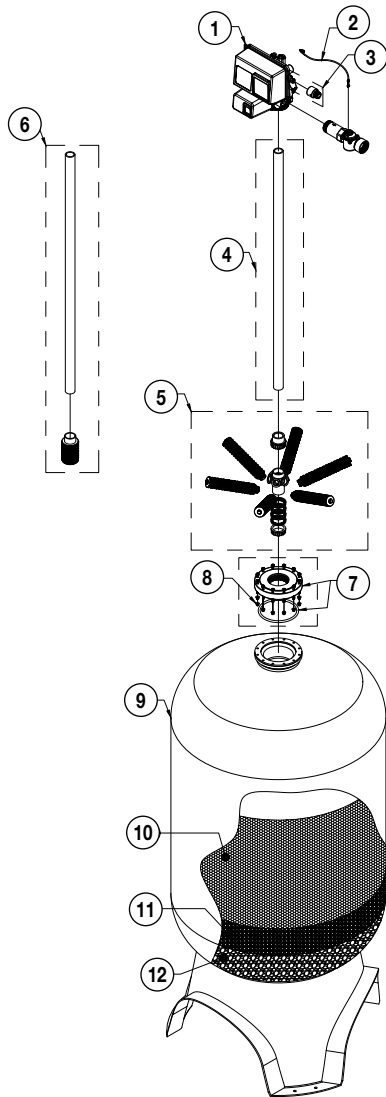
Ion exchange resin may need to be replaced periodically due to physical breakdown caused by chlorine/chloramine disinfectants, or fouling caused by certain metals such as iron and manganese.

1. Mark the location of the mineral tanks on the skid 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. Open the bypass valve.
3. Close the inlet and outlet isolation valves for the mineral tank needing media replacement.
4. Locate "Manually Initiating a Regeneration" on page 19 of this manual and follow the steps to place the system in the backwash position. This relieves any pressure inside the mineral tank. Once the system cycles into the backwash position, unplug the control valve from the power outlet to keep the system in the backwash position.
5. Remove a section of plumbing from both the inlet and outlet plumbing so the control valve can be removed. This is done by removing the Victaulic clamp and seal from both the inlet and outlet pipe connection to one of the system's control valves. Then loosen the union collar closest to the control valve of the inlet and outlet union ball valve. Then remove the loose section of inlet and outlet plumbing. Then disconnect the union fitting on the drain line next to the control valve.
6. Disconnect the meter cable from the from the from the meter dome and from the P5 port located on the back of the control valve controller. Store the meter cable in a safe location.
7. Disconnect the brine tubing from the control valve's brine connection port.
8. Disconnect the power supply cable from P14 port located on the back of the control valve controller.
9. Disconnect interconnecting communication cables from the P1 and P3 ports located on the back of the control valve controllers.
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. Store the control valve 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 1/2" the distributor tube may have become disconnected from the distributor screen in the bottom of the mineral and must be reconnected.
12. Obtain a length of 3/4" 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 then the end of the PVC pipe in the mineral tank to maintain the siphon. The bag will retain the resin while the water flows down the drain. Use caution not to allow resin to enter the floor drain.
15. Continue to siphon resin until it is completely evacuated from the mineral tank. Gravel will clogged 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 3-4R located on page 11 of this manual.
18. Reconnect inlet, outlet, and drain plumbing to the control valve. Tighten the plumbing union fittings and Victaulic clamps on each of these plumbing lines.
19. Reconnect brine tubing to brine connection port of control valve.
20. Reconnect meter cable to meter dome. Then reconnect the other end of the meter cable to the P5 port located on the back of the control valve controller.
21. Reconnect interconnecting communication cables to the P1 and P3 ports located on the back of the control valve controllers.
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. Once water flow at the drain line is observed, fully open the inlet valve and allow water flow to drain for 10 minutes to flush the resin bed of any color. If water at the drain shows any discoloration, continue to flush the resin bed until water at the drain is clear.
23. After resin bed flushing is complete, reconnect the power supply cable to the P14 port located on the back of the control valve controller. Plug the system back in to the power outlet so that it will return to the service position.
24. Fully open inlet and outlet isolation valves and close bypass valve.
25. Check for leaks and repair as required.
26. Open hot and cold side of a treated water faucet to flush any air from the plumbing system.

Replace media in each mineral tank according to this media replacement procedure.



Replacement Parts - Major System Components



MAJOR SYSTEM COMPONENTS

ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	7300251	K4017-NT VLV 2900/1710 120V NHWBP FOR ALTERNATING & PROGRESSIVE MODELS W/ 18" & LARGER MINERAL TANK
2	1	7300774	K4519791-02 ELECTRONIC METER CABLE 35"
3	1	7300551	V2003-MCH-02 PVC DRAIN FLOW CONTROL PVC 1" HOUSING F/ 5-10 GPM BUTTONS
3	1	7300547	V2003-A-MCH-02 PVC DRAIN FLOW CONTROL PVC 1" HOUSING F/ 12-20 GPM BUTTONS
3	1	7300572	V7103-10 FC BUTTON 10.0 GPM F/ 18" SOFTENER
3	1	7300573	V7103-12 FC BUTTON 12.0 GPM F/ 21" SOFTENER
3	1	7300574	V7103-15 FC BUTTON 15.0 GPM F/ 24" SOFTENER
3	1	7300359	K4560701-25 DRAIN FLOW CONTROL 1" W/ 25 GPM BUTTON F/ 30" SOFTENER
3	1	68108502	V2005-A-35 DRAIN FLOW CONTROL PVC 1.5" W/ BUTTONS FOR 35 GPM F/ 36" SOFTENER
4	7 FT	68103367	I7313 PIPE PVC SCH 40 1.5"
5	1	7300147	D2082 HUB & LATERAL S06- 8 TM DIST ASSEMBLY W/ 10.75" LATERALS F/30" SOFTENER
5	1	68101104	D2083 HUB & LATERAL S06-11 TM DIST ASSEMBLY W/ 14.25" LATERALS F/36" SOFTENER
6	1	7300953	D5007 R2A DIST TUBE ASSEMBLY FOR 18"-24" SOFTENERS
7	1	68106677	Q9058 TANK ADAPT BUSHING 6" FLANGE X 4"#8 THREAD PVC W/ORING FOR 30" & 36" SOFTENERS
8	1	68101188	D3341 BOLT SET FOR Q9058 TANK ADAPTOR INCLUDES 12 BOLTS
9	1	7300112	C1029 FIBERGLASS MINERAL TANK 18X65 ALMOND W/ 4" #8 TOP
9	1	68100694	C1030 FIBERGLASS MINERAL TANK 21X62 ALMOND W/ 4" #8 TOP
9	1	7300114	C1031 FIBERGLASS MINERAL TANK 24X72 ALMOND W/ 4" #8 TOP
9	1	7300117	C1037 FIBERGLASS MINERAL TANK 30X72 ALMOND W/ 6" FLANGE TOP

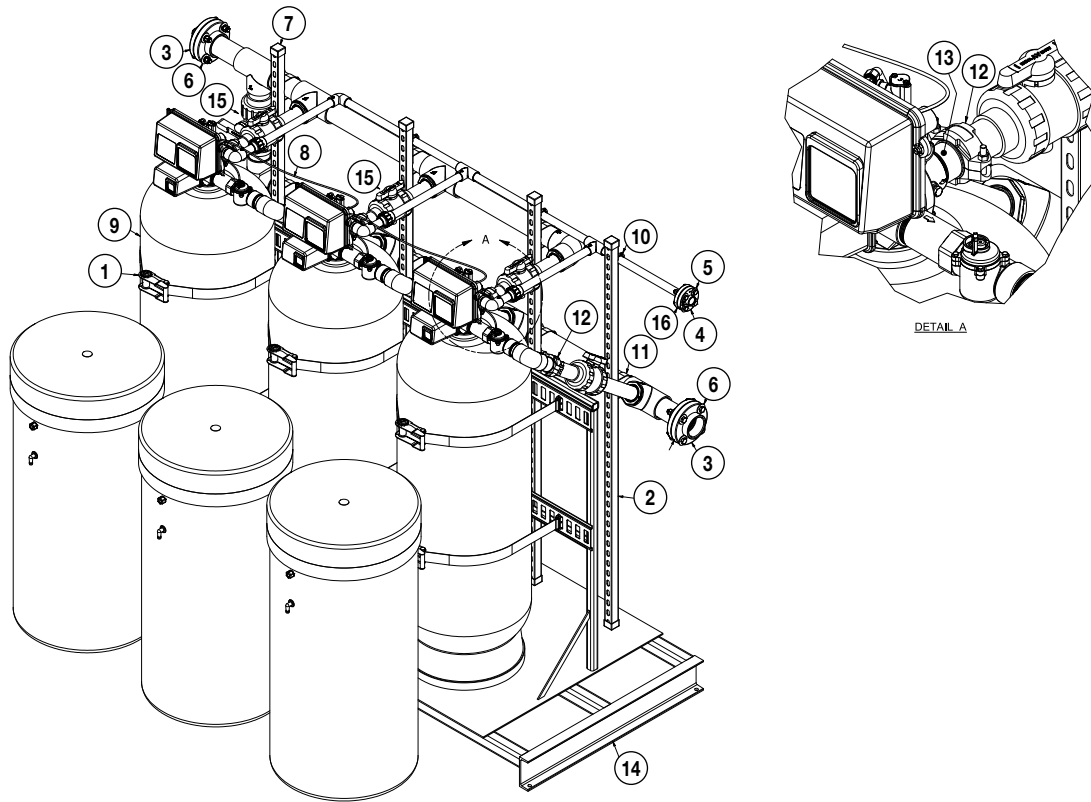
Continued on next page

Replacement Parts - Major System Components

Continued from previous page

ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
9	1	7300118	C1038 FIBERGLASS MINERAL TANK 36X72 ALMOND W/ 6" FLANGE TOP
10	*	7300100	A4000 SOFTENING RESIN MEDIA WATTS BRAND HIGH CAPACITY SAC NA FORM 1 CUBIC FOOT PER BAG
11	*	7300101	A7005A MEDIA GRAVEL #20 FLINT .06"X.125" 50 LBS PER BAG
12	*	7300102	A7006A MEDIA GRAVEL .25"X.125" 50 LBS PER BAG
13	1	68110284	G2003E BRINE TANK ASSY 24X41 BLK W/ GRID & AIR CHECK FOR ½" BRINE HOSE
13	1	68102503	G2004B BRINE TANK ASSY 24X50 BLK W/ GRID & AIR CHECK FOR ½" BRINE HOSE
13	1	7300217	G2009A BRINE TANK ASSY 30X50 BLK W AIR CHECK FOR ½" BRINE HOSE
13	1	68102509	G2008C BRINE TANK ASSY 39X48 BLK W AIR CHECK FOR ½" BRINE HOSE
13	1	68102554	G3015-1 BRINE TANK ASSY 39X60 BLK W AIR CHECK FOR ½" BRINE HOSE
14	1	7300224	H1018 BRINE OVERFLOW SET
15	1	7300208	G2003 BRINE TANK 24X41 BLK EMPTY
15	1	7300210	G2004 BRINE TANK 24X50 BLK EMPTY
15	1	7300213	G2009 BRINE TANK 30X50 BLK EMPTY
15	1	68102507	G2008 BRINE TANK 39X48 BLK EMPTY
15	1	68102553	G3015 BRINE TANK 39X60 BLK EMPTY
16	1	68102592	H1017 BRINE WELL CAP 5"
17	1	68110335	K4560009-KIT AIR CHECK 900 & FITTING FOR ½" BRINE HOSE
18	1	7300226	H1071 BRINE WELL 5"X60" SLOTTED
19	1	68102608	H1075 BRINE GRID SET FOR 24" DIAMETER BRINE TANKS INCLUDES 5" PVC LEGS

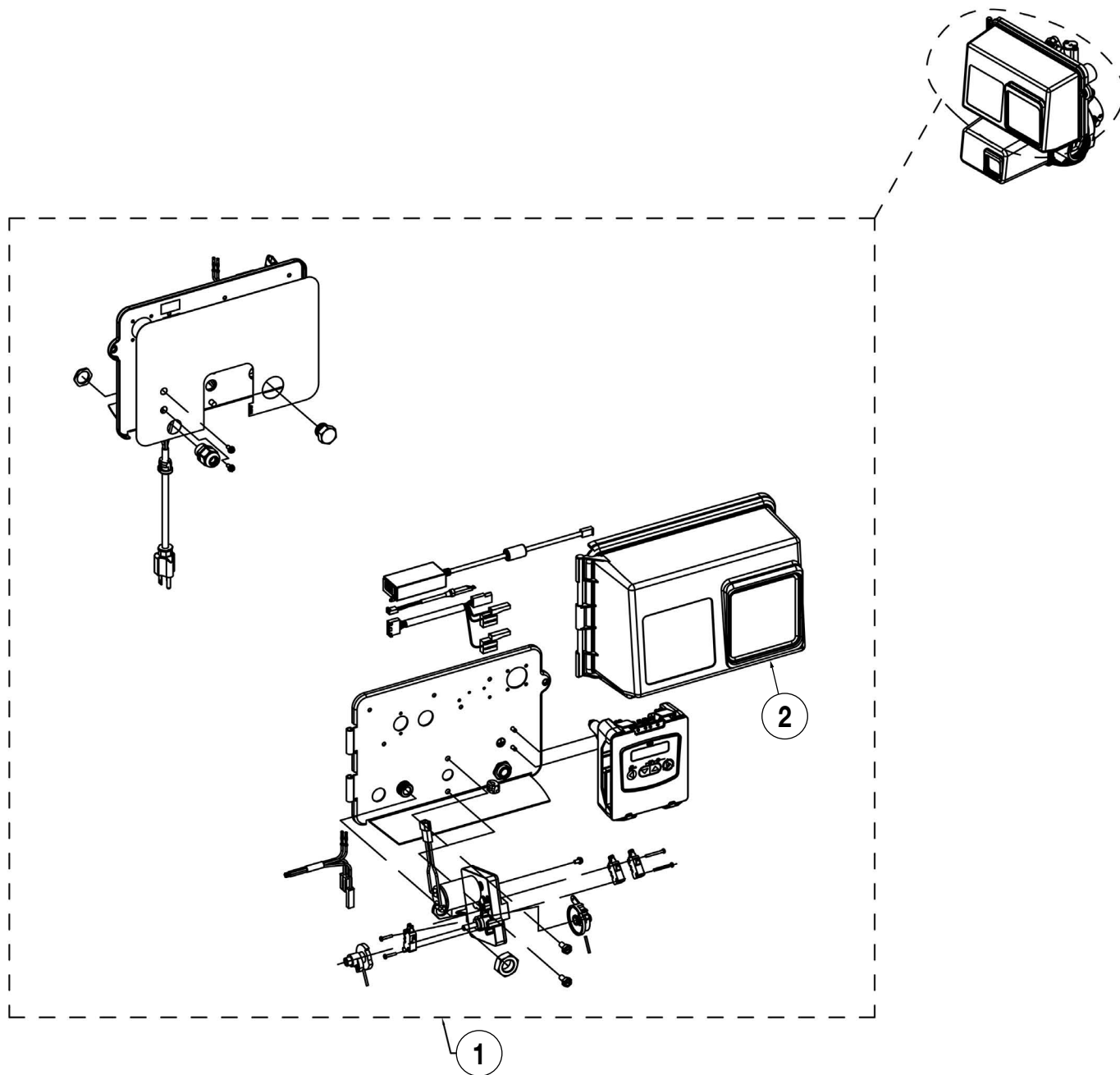
Replacement Parts - Skid & Plumbing Components



SKID & PLUMBING COMPONENTS

ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	68100606	B6000-STRAP RATCHET STRAP WITH E-TRACK CLIPS
2	1	68100607	B6000-US10 UNISTRUT 10 FOOT LENGTH
3	1	68102820	I1200F FLANGE SLIP PVC SCH 80 2"
3	1	68102819	I1200 FLANGE SLIP PVC SCH 80 3"
3	1	68102824	I1201 FLANGE SLIP PVC SCH 80 4"
4	1	68102820	I1200C FLANGE SLIP PVC SCH 80 1"
4	1	68102821	I1200E FLANGE SLIP PVC SCH 80 1.5"
5	1	68103030	I1904-1.5 BOLT SET F/1" & 1.5" FLANGE
6	1	68103033	I1904-2 BOLT SET ZINC F/ 2" FLANGE
6	1	68103035	I1904-3 BOLT SET ZINC F/ 3" FLANGE
6	1	68103037	I1904-4 BOLT SET ZINC F/ 4" FLANGE
7	1	68103411	I7810 UNISTRUT END COVER
8	1	68104444	K4541692 COMMUNICATION CABLE FOR NXT2 CONTROLLER
9	1	SEE PAGE 28 & 29	MINERAL TANK
10	1	68107033	R2552-F UNISTRUT CLAMP 1"
10	1	68107036	R2552E UNISTRUT CLAMP 1.5"
11	1	68107035	R2552D UNISTRUT CLAMP 2"
11	1	68107037	R2552G UNISTRUT CLAMP 3"
11	1	68107038	R2552I UNISTRUT CLAMP 4"
12	1	68107262	R9110-2 VICTAULIC COUPLING 2"
13	1	68110104	I1553-VXT VICTAULIC X MNPT 2" NIPPLE PVC SCH 80
14	1	CONTACT WATTS	SKID WITH E-TRACK TANK SUPPORT RAILS
15	1	68103049	I1910-2 BALL VALVE 2" SLIP XSLIP
15	1	68103050	I1910-3 BALL VALVE 3" SLIP XSLIP
15	1	68103051	I1910-4 BALL VALVE 4" SLIP XSLIP
16	1	68103018	I1902-1 GASKET F/ 1" FLANGE
16	1	68103020	I1902-1.5 GASKET F/ 1.5" FLANGE
16	1	68103021	I1902-2 GASKET F/ 2" FLANGE
16	1	68103025	I1902-3 GASKET F/ 3" FLANGE
16	1	68103026	I1902-4 GASKET F/ 4" FLANGE

Replacement Parts - 2900 Upper Powerhead

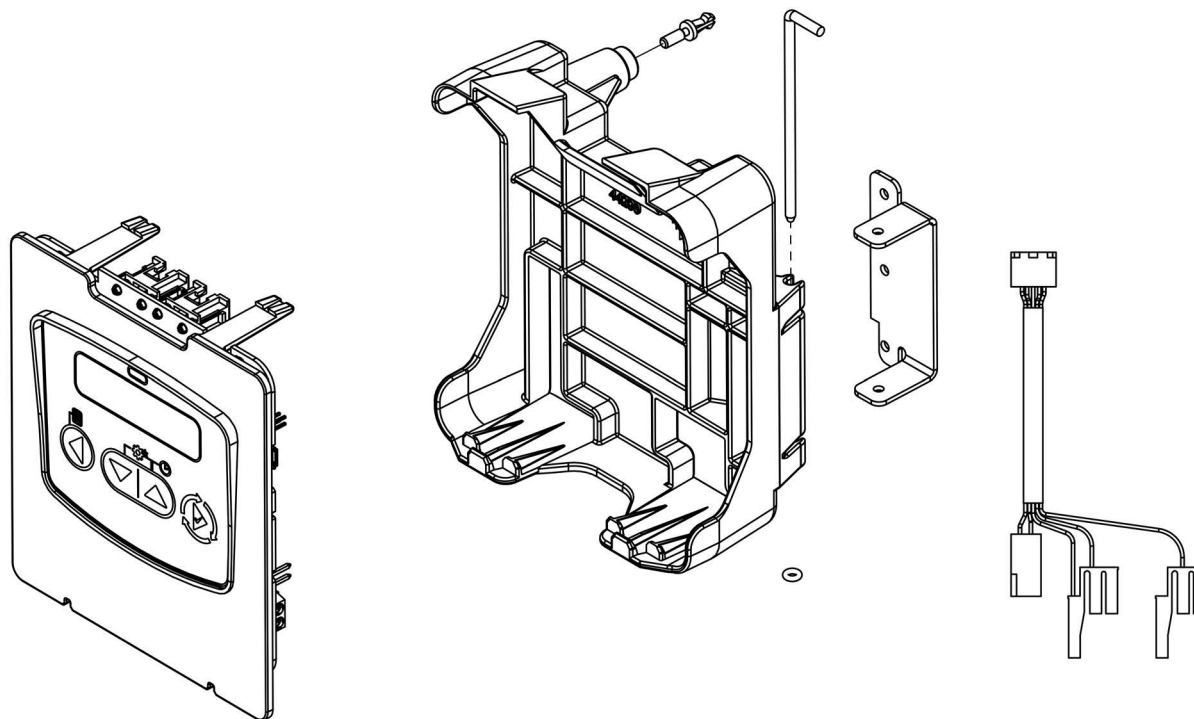


2900 UPPER POWERHEAD

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	7300338	K4560410-NT UPPER POWERHEAD F/2900S 24V NXT2 W/ POWER SUPPLY, NO TIMER
2	1	68104575	K4560219-02 COVER FOR 2750 & 2900 UPPER POWER HEAD

NXT2 Controller Assembly

1



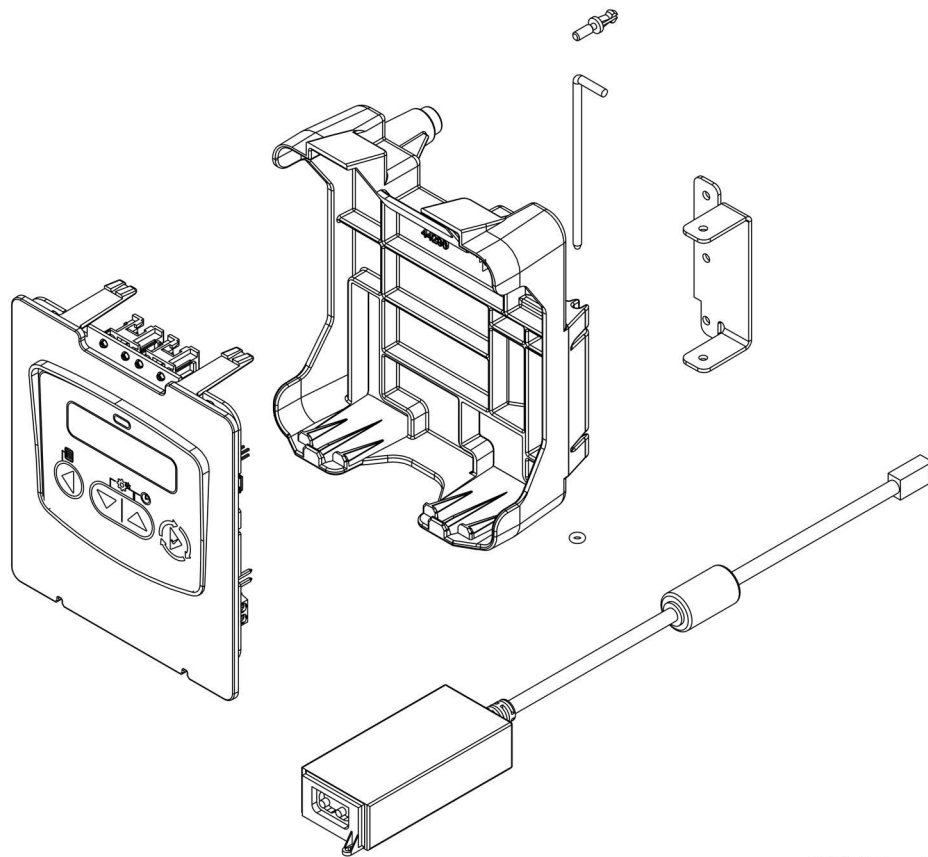
62115 Rev A

NXT2 CONTROLLER ASSEMBLY

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	7300962	K4562115 CONTROLLER ASSEMBLY NXT2

NXT to NXT2 Conversion Kit

1

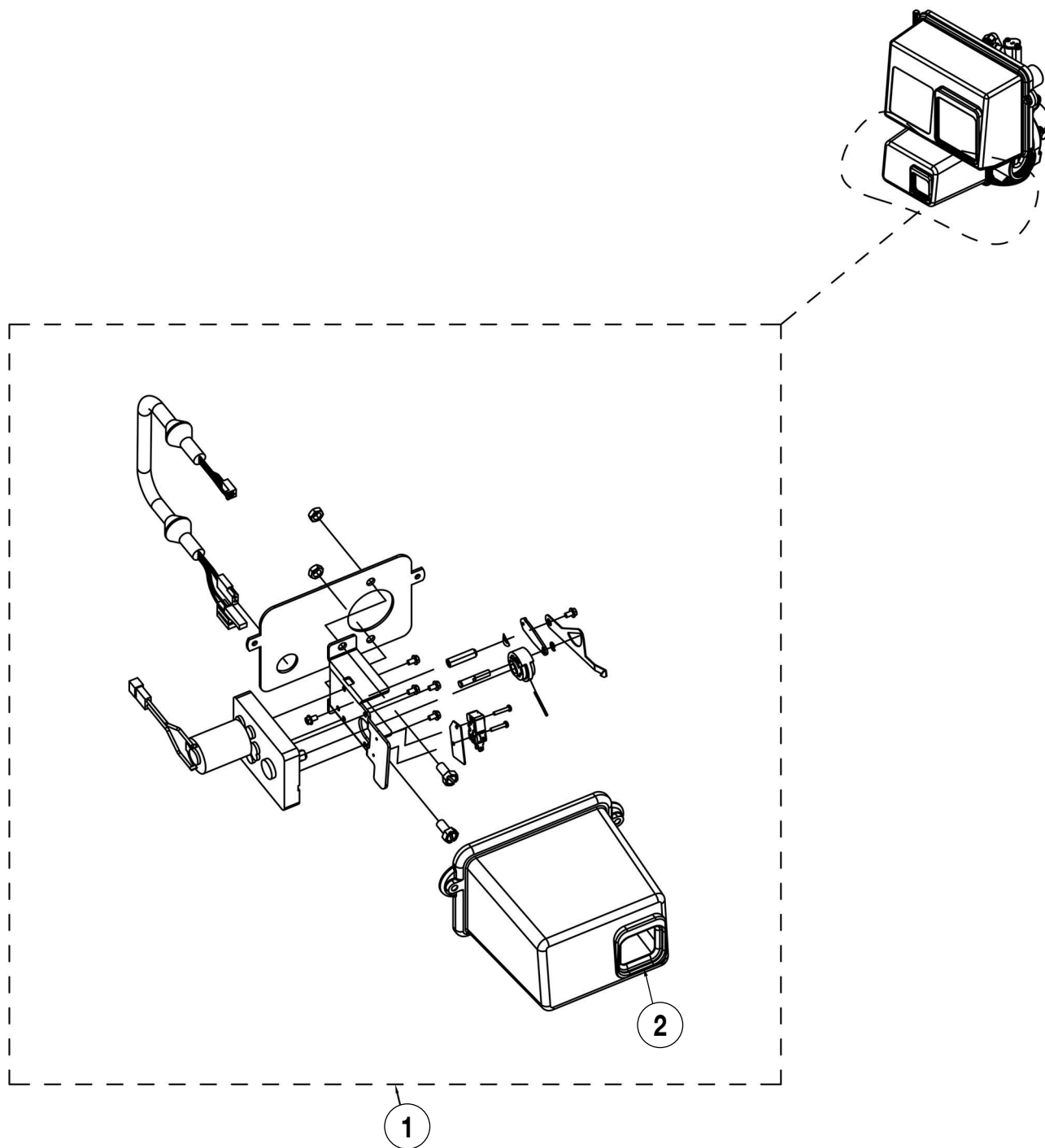


62121 Rev A

NXT TO NXT2 CONVERSION KIT

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	68104778	K4562121-01 CONTROLLER ASSY CONV KIT NXT TO NXT2 W/ 24V US POWER SUPPLY

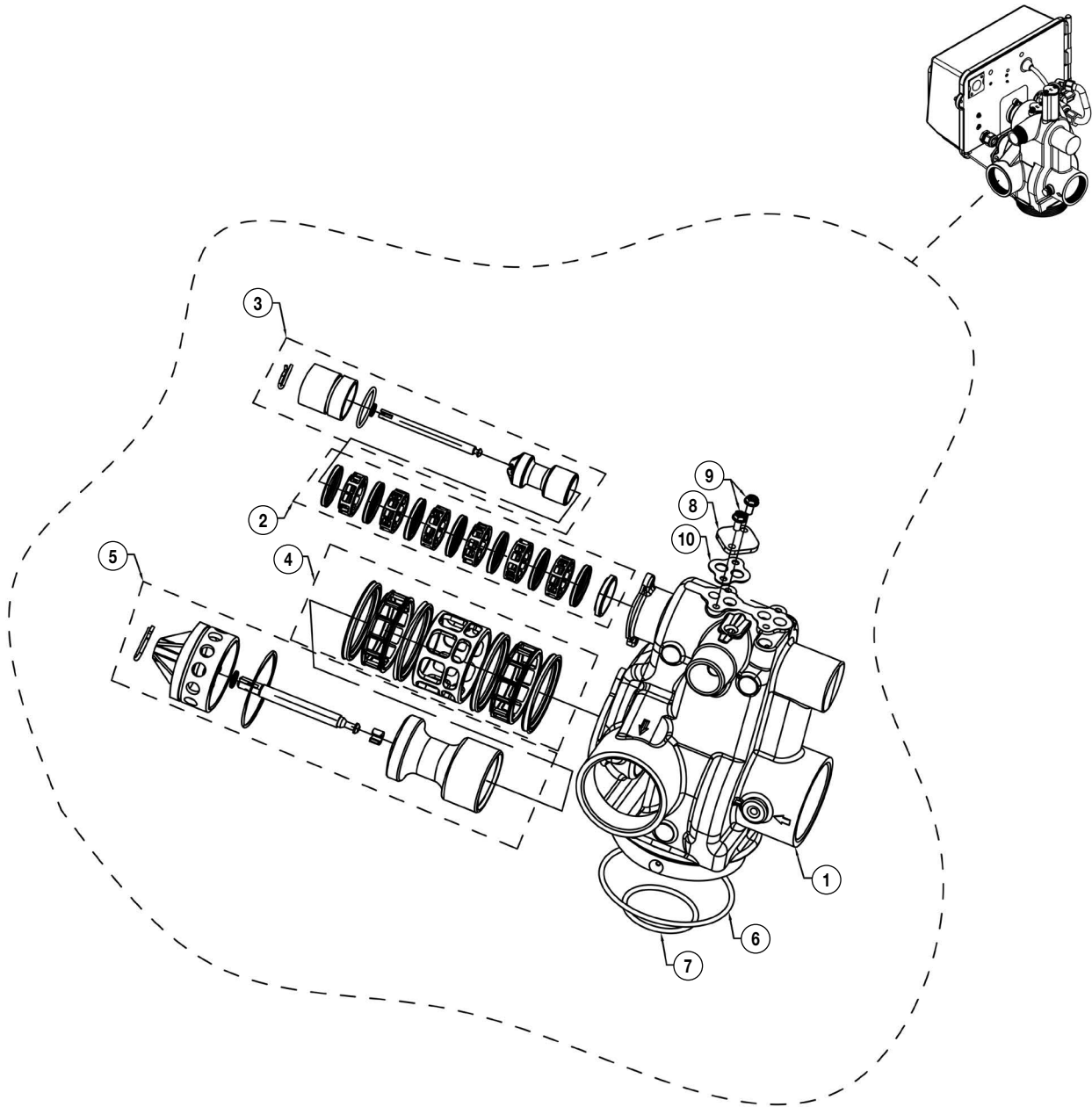
Replacement Parts - 2900 Lower Powerhead



2900 LOWER POWERHEAD

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	7300339	K4560411-NT LOWER POWERHEAD F/ 2900S 24V NTXT2, NO COVER
2	1	68104574	K4560217-02 COVER FOR 2900 LOWER POWER HEAD ENVIRO

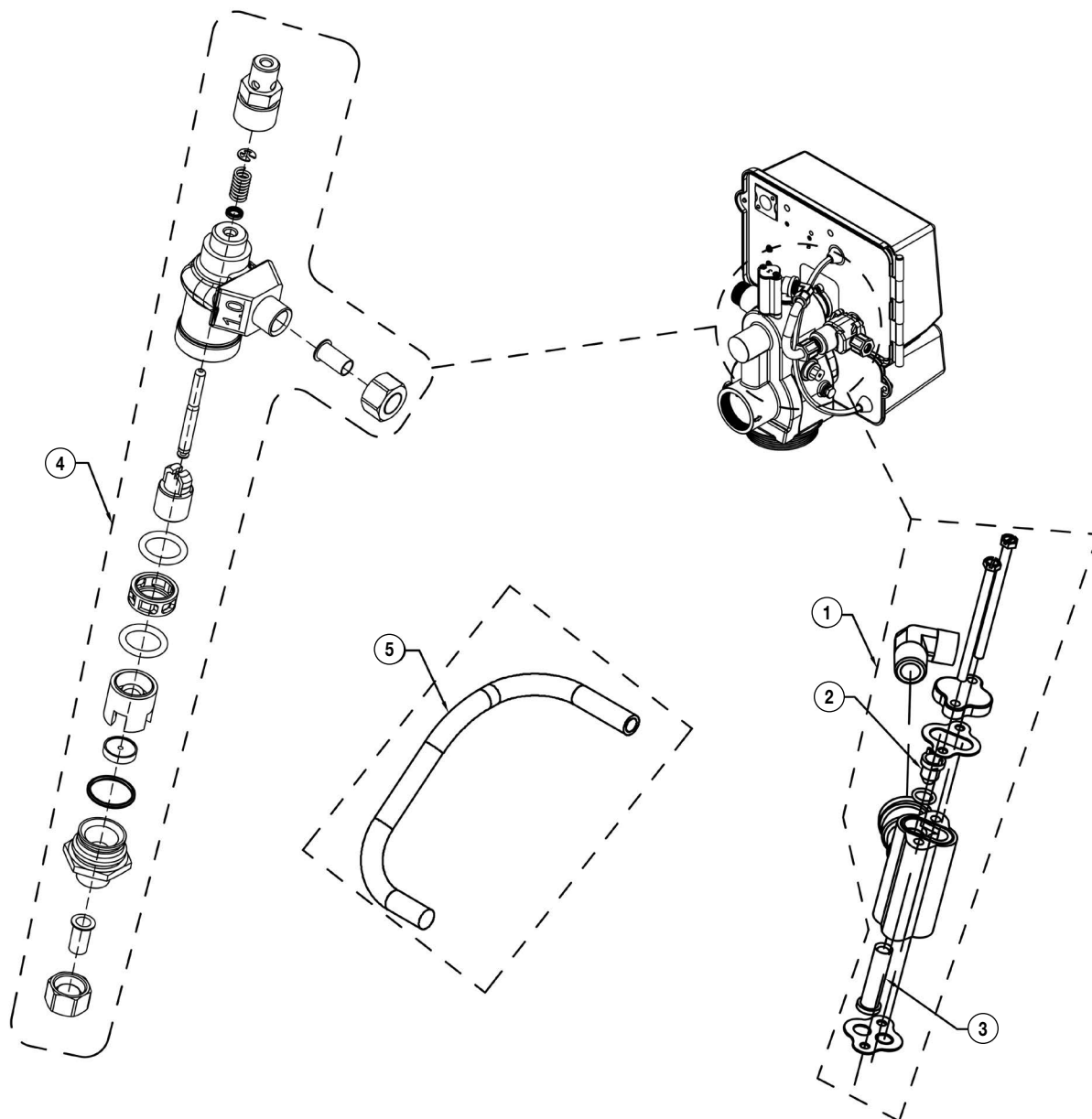
Replacement Parts - 2900S Control Valve Body



2900S DOWNFLOW CONTROL VALVE BODY ASSEMBLY

ITEM NO.	QTY	ORDERING CODES	DESCRIPTION
1	1	-	VALVE BODY 2900S MACHINED, NPT U.S. TAP
2	1	7300795	K4561530 SEAL & SPACER KIT F/ 2900S UPPER
3	1	7300794	K4561540 PISTON ASSEMBLY DOWNFLOW F/ 2900S UPPER
4	1	68104546	K4560128 SEAL & SPACER KIT F/ 2900S LOWER
5	1	7300797	K4561555 PISTON ASSEMBLY DOWNFLOW NHWP F/ 2900S LOWER
6	1	68104171	K4513575 ORING #240 TANK TO VALVE F/2900S/2930/3150
7	1	68104172	K4513577 ORING #226 F/2900S, 9500 DISTRIBUTOR PILOT
8	1	68104103	K4511893 PART INJECTOR COVER STAINLESS STEEL
9	2	68104255	K4515137 SCREW HEX WASHER HEAD
10	1	68104400	K4519925 INJECTOR COVER GASKET

Replacement Parts - 1700 Brine System

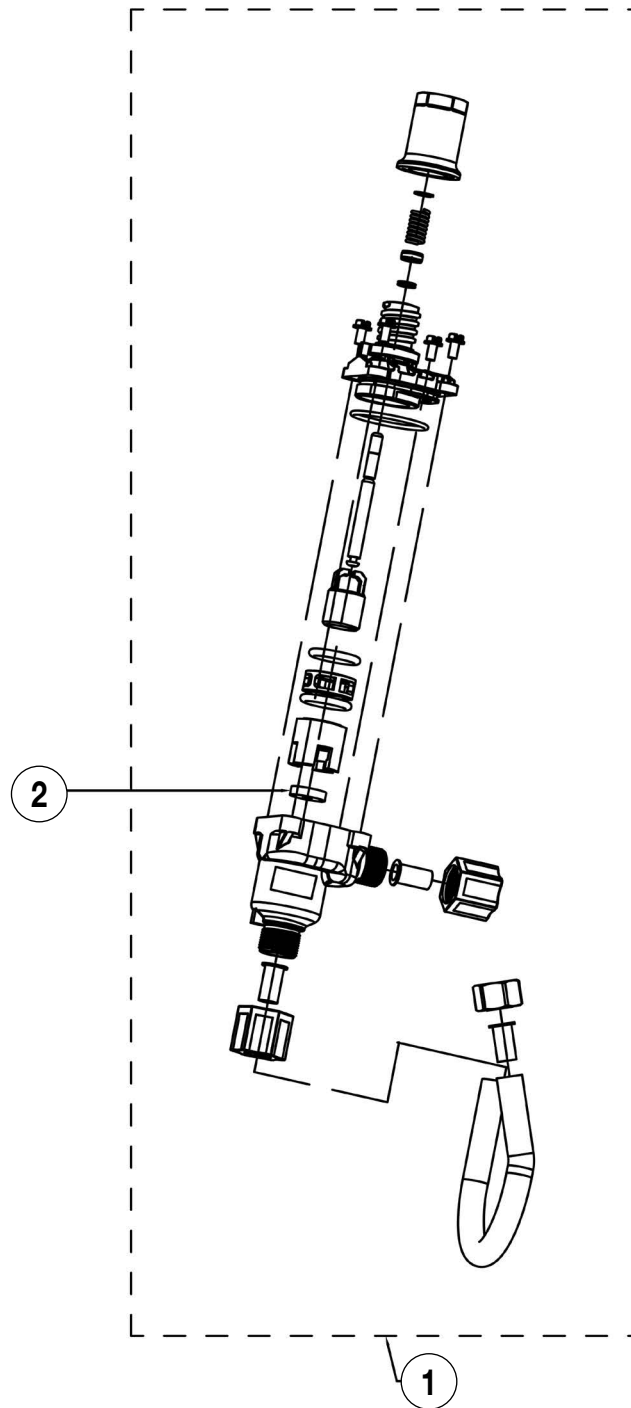


1700 INJECTOR & BRINE VALVE ASSEMBLY

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
*1	1	68104614	K4560381 PART 1700 INJECTOR ASSY .5 SPEC INJECTOR
2	1	68104209	K4514801-3CY INJECTOR NOZZLE #3C YELLOW
2	1	68104210	K4514801-4CG INJECTOR NOZZLE #4C GREEN
2	1	68104211	K4514801-5CW INJECTOR NOZZLE #5C WHITE
2	1	68104212	K4514801-6R INJECTOR NOZZLE #6C RED
2	1	68104213	K4514801-7CB INJECTOR NOZZLE #7C BLACK
3	1	68104214	K4514802-3Y INJECTOR THROAT #3C YELLOW
3	1	68104215	K4514802-4G INJECTOR THROAT #4C GREEN
3	1	68104216	K4514802-5W INJECTOR THROAT #5C WHITE
3	1	68104217	K4514802-6R INJECTOR THROAT #6C RED
3	1	68104218	K4514802-7C INJECTOR THROAT #7C BLACK
4	1	68104499	K4560034 BRINE VALVE 1700 W/ 2.0 GPM FLOW CONTROLLER
5	1	68104272	K4515416 BRINE TUBE 1700 F/ 2850 2900S
5	1	68104317	K4516460 BRINE TUBE ANNEALED 1700 F/ 2850 2900S

* 68104614 INJECTOR ASSEMBLY COMES WITH GREEN INJECTOR NOZZLE & THROAT. PLEASE SPECIFY TO ONE OF OUR SPECIALISTS IF YOU REQUIRE A DIFFERENT NOZZLE & THROAT.

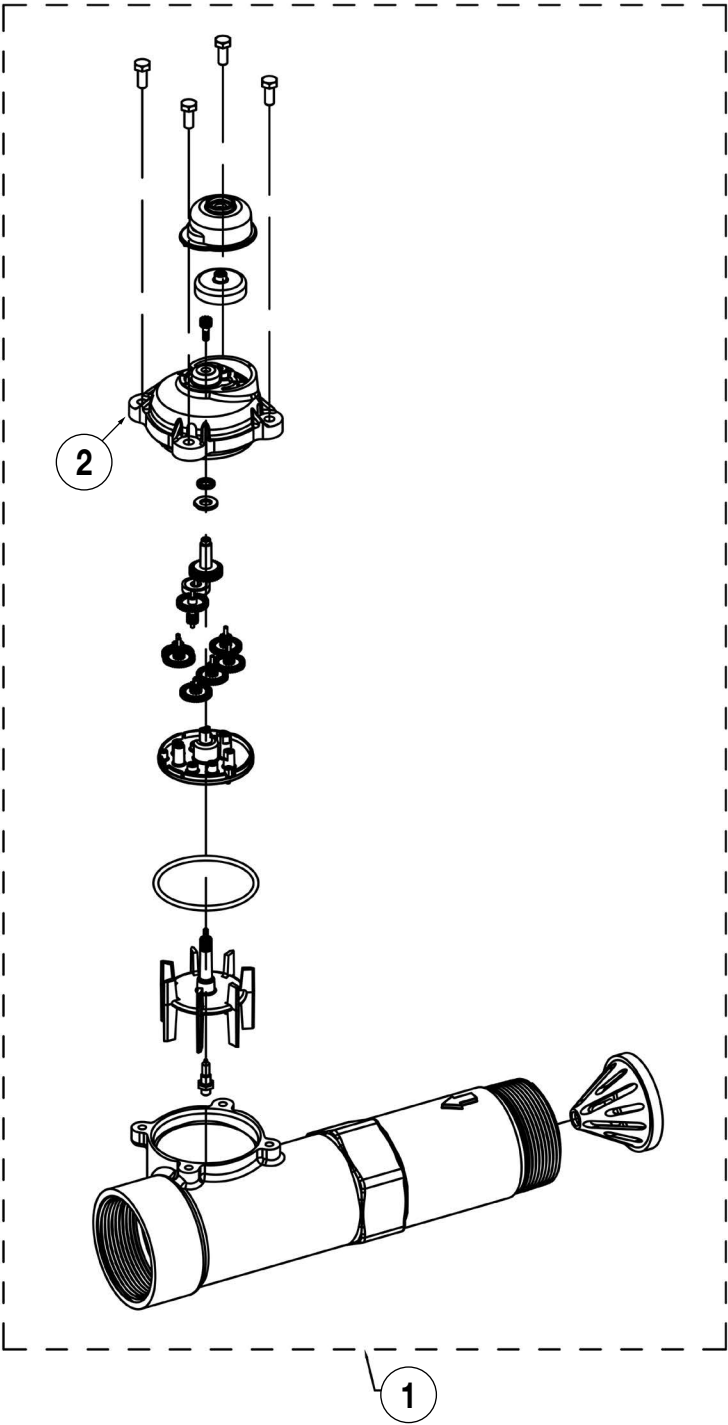
Replacement Parts - 1710 Brine System



1710 BRINE VALVE ASSEMBLY

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	68104658	K4560605-20 BRINE VALVE 1710 F/2750 2900S VALVES W/ 2.0 GPM FLOW CONTROLLER
2	1	68104109	K4512085 FLOW CONTROL WASHER 1.2 GPM
2	1	68104110	K4512086 FLOW CONTROL WASHER 1.5 GPM
2	1	68104111	K4512087 FLOW CONTROL WASHER 2.0 GPM
2	1	68104112	K4512088 FLOW CONTROL WASHER 2.4 GPM
2	1	68104113	K4512089 FLOW CONTROL WASHER 3.0 GPM
2	1	68104114	K4512090 FLOW CONTROL WASHER 3.5 GPM
2	1	68104115	K4512091 FLOW CONTROL WASHER 4.0 GPM
2	1	68104116	K4512092 FLOW CONTROL WASHER 5.0 GPM

Replacement Parts - 2" Stainless Steel Mech/Electronic Meter



2 INCH STAINLESS STEEL METER ASSY

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	1	7300347	K4561934-10 METER ASSEMBLY COMPLETE 2" STAINLESS STEEL MECH/ELEC
2	1	68104199	K4514716 METER DOME PLASTIC FOR 2" METER W/ O-RING MECH/ELEC

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

Error Codes and Troubleshooting

Detected Errors

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

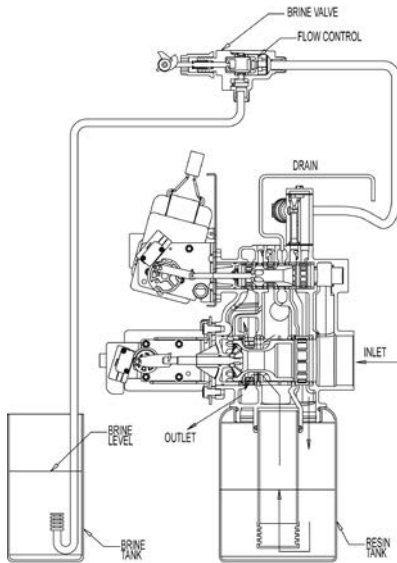
- All units In Service remain in the In Service position.
- All units in Standby go to In Service.
- Any unit in Regeneration when the error occurs completes Regeneration and goes to In Service.
- No units are allowed to start a Regeneration Cycle while the error condition exists, unless they are manually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

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

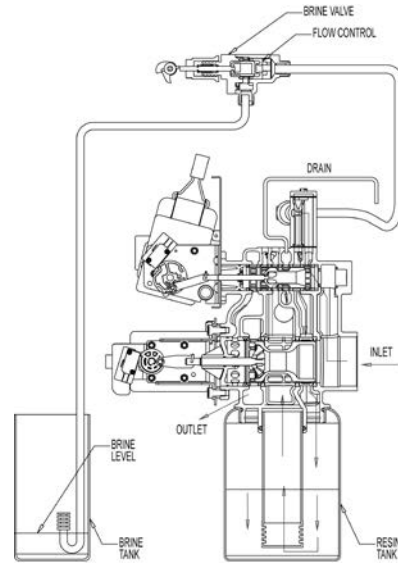
Message Displayed	Causes for Error	Correction
Error Valve Count Mismatch	Number of NXT2 detected does not match selected system type in Master Programming	Push correct valve settings in Master Settings
Motor Stall No Changes Detected in the Optical Sensor for 6 Seconds	The motor is on but no encoder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

Water Softener Flow Diagrams - Down Flow Brining

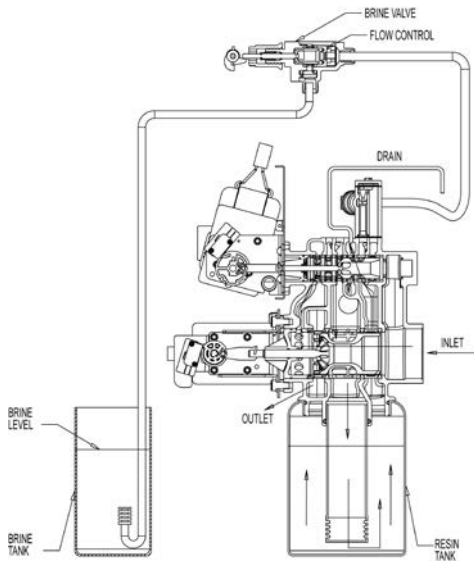
1 Service Position



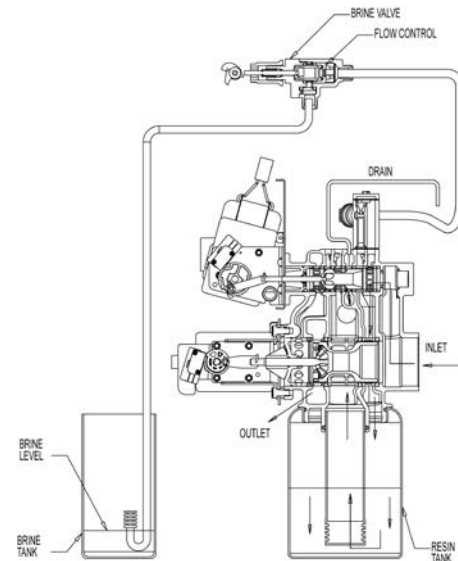
4 Slow Rinse Position



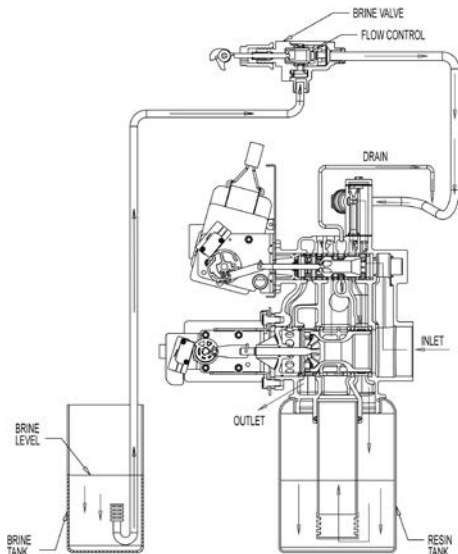
2 Backwash Position



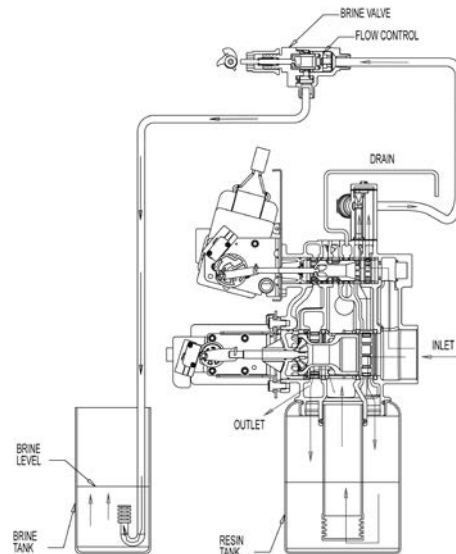
5 Rapid Rinse Position



3 Brine Position

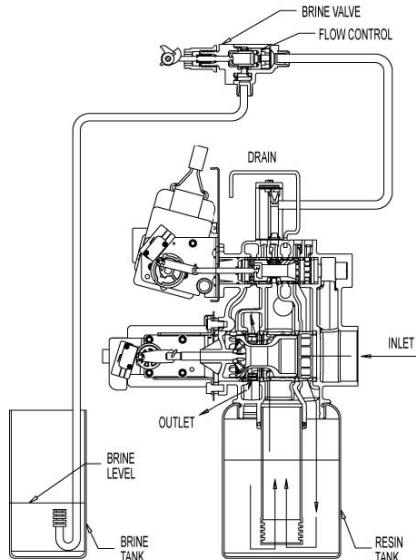


6 Brine Tank Refill Position

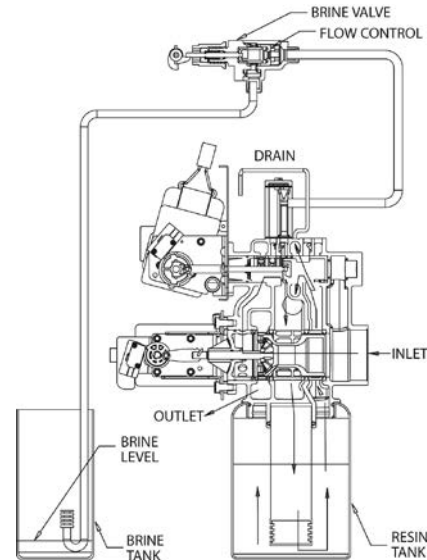


Water Softener Flow Diagrams - Up Flow Brining

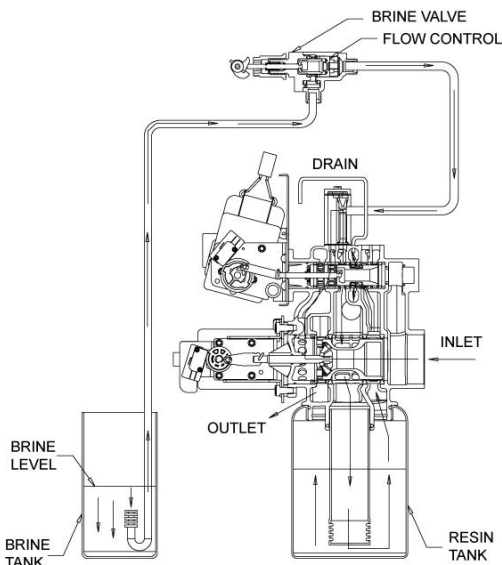
1 Service Position



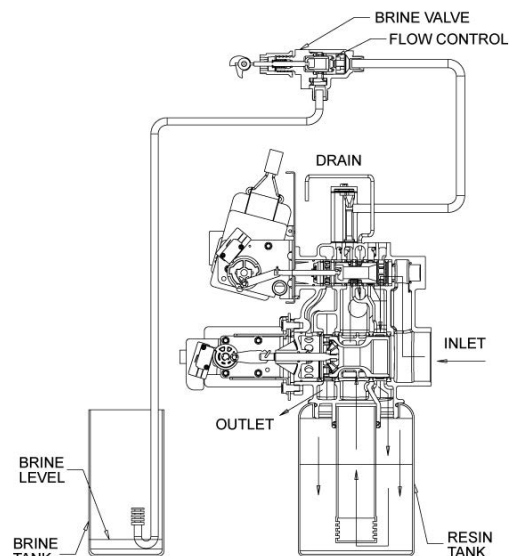
4 Backwash Position



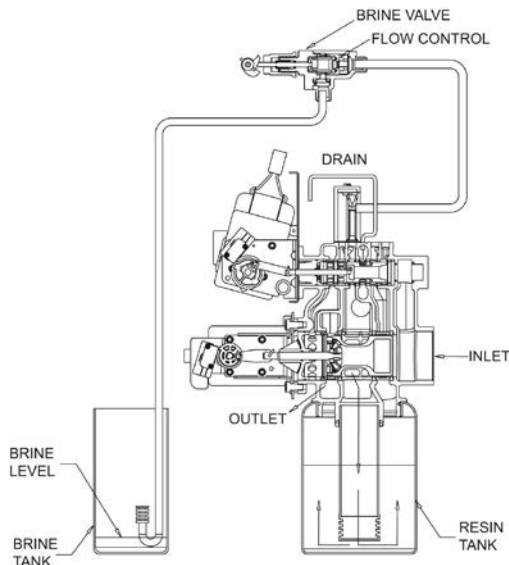
2 Brine Position



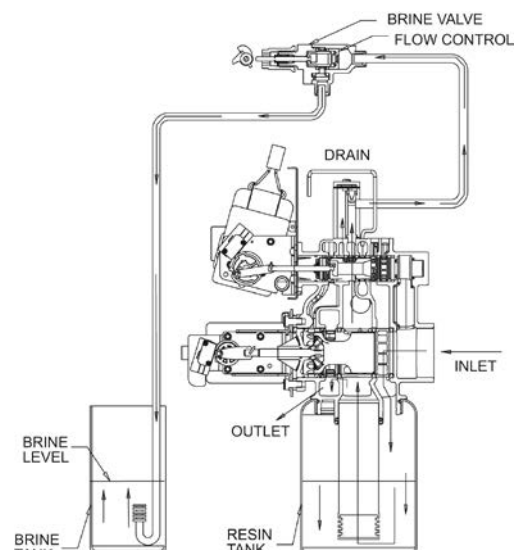
5 Rapid Rinse Position



3 Slow Rinse Position

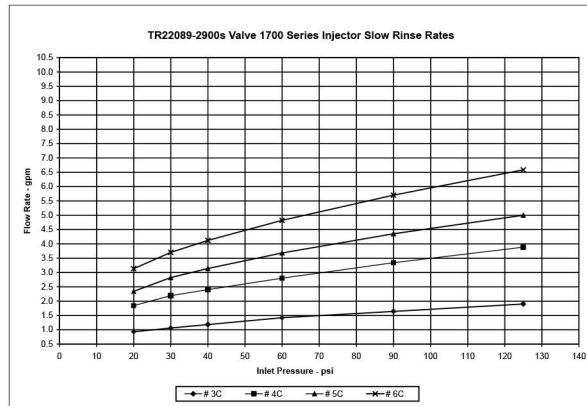


6 Brine Tank Fill Position



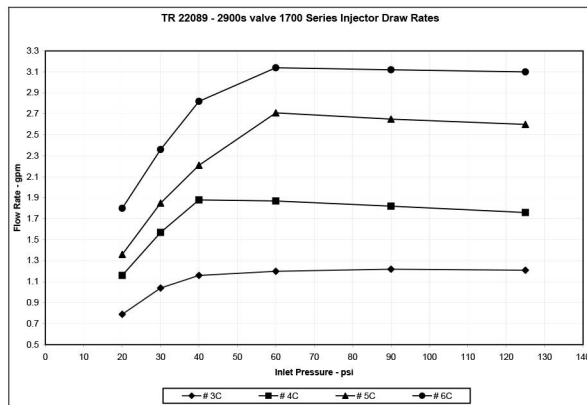
Flow Data and Injector Draw Rates - Down Flow

Call customer service if you need assistance with technical details.



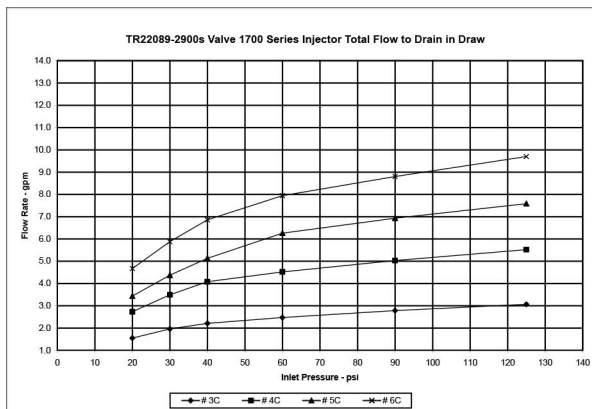
1700 series injectors		Slow Rinse - gpm			
pressure		# 3C	# 4C	# 5C	# 6C
20		0.93	1.84	2.34	3.13
30		1.06	2.19	2.82	3.70
40		1.18	2.40	3.14	4.12
60		1.42	2.80	3.68	4.82
90		1.64	3.34	4.35	5.70
125		1.90	3.88	5.00	6.58

3C - steel cap, no o-ring, air disperser
 # 4C & 5C - steel cap, o-ring, air disperser
 # 6C & 7C - brass cap, o-ring, no air disperser



1700 series injectors		Draw Rate - gpm			
pressure		# 3C	# 4C	# 5C	# 6C
20		0.79	1.16	1.36	1.80
30		1.04	1.57	1.85	2.36
40		1.16	1.88	2.21	2.82
60		1.20	1.87	2.71	3.14
90		1.22	1.82	2.65	3.12
125		1.21	1.76	2.60	3.10

3C - steel cap, no o-ring, air disperser
 # 4C & 6C - steel cap, o-ring, air disperser
 # 6C - brass cap, o-ring, no air disperser



Injector Nozzle and Throat Chart for 1700 Brine Systems

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.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**



Watts Regulator Co.

USA: T: (800) 659-8400 • N. Andover, MA 01845 • Watts.com/PureWater

Canada: T: (905) 332-4090 • Burlington, ON L7L 5H7 • Watts.ca/PureWater

Latin America: T: (52) 55-4122-0138 • Watts.com/PureWater

