

# ***SF SERIES***

## **WATER SOFTENERS**

## **OWNER'S MANUAL**



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## WARNINGS



SYSTEM MUST BE INSTALLED AND MAINTAINED PER THE MANUFACTURER'S RECOMMENDATIONS IN THIS MANUAL. FAILURE TO DO SO MAY CAUSE INJURY, EQUIPMENT FAILURE AND/OR DAMAGE, AND WILL RESULT IN WARRANTY BEING VOID.



RISK OF SHOCK! ELECTRICAL INSTALLATION SHOULD BE DONE BY QUALIFIED, TRAINED ELECTRICIANS. INSTALLATION SHOULD BE TO LOCAL CODES.



ALWAYS TURN OFF THE UNIT, SHUT OFF THE FEEDWATER, RELIEVE PRESSURE, AND DISCONNECT THE ELECTRICAL POWER BEFORE WORKING ON THE UNIT.



DO NOT USE WHERE THE WATER IS MICROBIOLOGICALLY UNSAFE OR OF UNKNOWN QUALITY WITHOUT ADEQUATE DISINFECTION BEFORE OR AFTER THE SYSTEM.



NEVER ALLOW THE UNIT TO FREEZE OR OPERATE WITH A FEEDWATER TEMPERATURE/PRESSURE OUTSIDE THE RECOMMENDED PARAMETERS (34-110°F / 20-125 PSI).



SYSTEM MUST BE INSTALLED IN ACCORDANCE WITH LOCAL PLUMBING CODES AND REGULATIONS. CONTACT WCC (WATER CONTROL CORPORATION) FOR MORE INFORMATION.



READ THE ENTIRE MANUAL BEFORE INSTALLING, OPERATING, OR MAINTAINING THIS EQUIPMENT.



THIS SYSTEM CONTAINS FLOWING WATER, UNDER PRESSURE. ENSURE THAT INSTALL LOCATION HAS ADEQUATE DRAINAGE AND WATERPROOFING TO ACCOMMODATE POTENTIAL LEAKAGE AND/OR OVERFLOW SITUATIONS. FAILURE TO DO SO COULD RESULT IN FLOODING/DAMAGE.



A VACUUM BREAK IS REQUIRED ANY TIME A VACUUM SITUATION MAY OCCUR. THIS IS COMMON ON WELLS, SYSTEMS WITH BOOSTER PUMPS AFTER THE UNIT, OR WHEN THE SYSTEM IS INSTALLED IN AREAS OF VARYING ALTITUDES. NO WARRANTY IS CONSIDERED IF THE SYSTEM HAS BEEN SUBJECTED TO A VACUUM. A VACUUM BREAK SHOULD BE INSTALLED BETWEEN THE SOFTENER AND THE POTENTIAL CAUSE OF A VACUUM.

## BASIC PRINCIPLES

A water softener works via a process known as Ion Exchange. In this process, a special media bed is used to exchange undesirable hardness minerals, including calcium, potassium, and magnesium (as well as low levels of iron and manganese) for something more desirable -- in this case, a small amount of sodium.

A water softener uses a mechanically driven control valve. During normal operation, this valve distributes the flow of raw (hard) water evenly over the top of the media bed. As the hard water passes down through the media, hardness minerals -- primarily calcium, which exists in solution in a calcium bicarbonate form -- are removed from solution and affixed to the media. In place of this calcium, trace amounts of sodium ions are released. What was calcium carbonate dissolved in the water becomes sodium bicarbonate (i.e., baking soda).

Once the resin has absorbed all the hardness minerals, and released all the sodium, that it can, regeneration is required. Regeneration is the process of removing calcium/hardness minerals from the media and resetting it with fresh sodium ions. To achieve this, a piston in the softener control valve changes position. The media is first backwashed, to lift and unpack the bed. Next, it is bathed in a supersaturated brine (sodium chloride) solution. This bombards the media with sodium ions, forcing the calcium/hardness minerals off and sending them down the drain. A relatively small percentage of sodium ions remain on the media, though the majority pass to the drain as well. After this brine cycle, the media is rinsed off, the brine tank is refilled, and the system goes back into service.

When a single tank water softener regenerates, an internal bypass is opened in the control valve. This allows the facility to be served by hard water during the regeneration period. Typically, this occurs in the middle of the night (2AM being the standard setting). Multi-tank systems regenerate one tank at a time, with the non-regenerating tanks remaining online (with no periods of hard water being sent to the facility).

Many multi-tank commercial softening systems feature a Progressive Flow functionality. When building flow rates are low, only one tank is online/active. As water usage increases, more and more units come online. Conversely, as usage decreases, tanks are progressively removed from service and put back into standby mode. By bringing tanks on and offline, based on demand, we can maximize the softening capacity and efficiency of the media in each tank. The electronics in the control valves keep track of usage time for each individual tank. Tanks are rotated on and offline in a manner that equalizes usage across all tanks over the course of 24 hours.

Another common option on larger commercial softening systems is Brine Reclamation, which utilizes an electronic control system and a 3-way motorized valve to recycle a portion of the supersaturated brine (salt) water that is normally sent down the drain during regeneration. When the recycle interval ends, the water eventually does go to drain. This ensures fresh brine for each new regeneration. By utilizing Brine Reclamation, a facility will normally see a salt usage reduction of around 25%-35%, without any negative effects on softener capacity, efficiency, or lifespan.

For more information on commercial water softening systems, please visit WCC's website at: [watercontrolinc.com](http://watercontrolinc.com) or call us at 763-427-9638.

We thank you for your business!

# SOFTENER OPERATION

As water enters the softener, it passes over a resin bed in a special tank. The resin consists of tiny beads of a plastic called styrene. These beads attract and hold sodium ions and exchange the sodium for hardness ions when encountered. Over time, the resin becomes saturated with hardness ions and no longer removes hardness materials. The softener goes into a “regeneration” to flush hardness materials to the drain and refresh the resin with sodium. Regeneration of single tank systems is typically programmed to take place in the middle of the night when little or no water is in use. Regeneration of individual tanks in a multi-tank system occurs immediately (as needed), with the other tanks remaining online/ available.

## REGENERATION CONSISTS OF FOUR CYCLES:

### 1. CYCLE: BACKWASH POSITION

Backwash is a rapid upward flow of water that loosens the resin bed and flushes iron particles, dirt and sediments filtered in the bed out to the drain.

### 2. CYCLE: BRINE DRAW / SLOW RINSE POSITION

Brine Draw is the process in which brine is drawn out of the brine cabinet and passed through the resin in a downward direction. This rinses the resin and large amounts of sodium ions re- place the hardness ions accumulated during service.

Slow Rinse. After brine is completely removed from the brine cabinet into the resin tank the brine valve closes. Water replaces any remaining brine from the resin, flushing hardness ions removed from the resin to drain.

### 3. CYCLE: FAST RINSE POSITION

Fast Rinse is a fast flow of water down through the resin tank that follows a Backwash. This flushes all remaining brine from the tank and packs the resin bed for softening efficiency.

### 4. CYCLE: BRINE FILL

Brine is water saturated with large amounts of a salt (sodium chloride). During Brine Fill, water flows into the salt storage area after each regeneration and dissolves salt. During the regeneration process, hardness ions on the resin beads are replaced or exchanged for sodium ions from the brine solution.

## NOTE: SERVICE

When the softener is in service, normal operation is occurring. Water is flowing through the softener and hardness minerals are being removed from the water.

# SF SERIES

## WATER SOFTENERS

WCC's "SF" Series softeners feature 1" service connections, heavy duty electronic control valves, high-strength fiberglass-reinforced mineral tanks, and long-lasting synthetic cation resin. This series is perfectly designed for retail spaces, restaurants, commercial laundry, and office complexes. Available options include steel resin tanks and specialty filtration systems.



### SPECIFICATIONS

Model Series Number	Exchange Capacity* (grains)			Valve Size (in)	Cv	Flow Rate (GPM)			Pipe Size (in)		Back Wash (GPM)	Resin (cu.ft.)	Brine Tank Capacity (lbs)	Regen. Time (min)	Tank Size (in)		Approx. Ship Weight (lbs)
	Min <sup>1</sup>	Mid <sup>2</sup>	Max <sup>3</sup>			7 psid	Cont. 15 psid	Peak 25 psid	Service	Drain					Resin	Salt	
SF-30	23000	27000	30000	1	5.2	14	20	26	1	3/4	2	1	250	88	10 X 44	18 X 33	150
SF-48	36800	43200	48000	1	4.9	13	19	25	1	3/4	4	1.6	225	88	12 X 52	18 X 33	175
SF-60	46000	54000	60000	1	4.8	13	18	24	1	3/4	3	2	225	88	12 X 52	18 X 33	200
SF-90	69000	81000	90000	1	5.4	14	19	27	1	3/4	5	3	650	90	14 X 65	24 X 50	300
SF-120	92000	108000	120000	1	5.4	14	20	27	1	3/4	7	4	650	94	16 X 65	24 X 50	375
SF-150	115000	135000	150000	1	5	13	18	25	1	3/4	4	5	625	96	16 X 65	24 X 50	450
SF-150X	115000	135000	150000	1	5.7	15	22	29	1	3/4	8	5	625	96	18 X 65	24 X 50	475

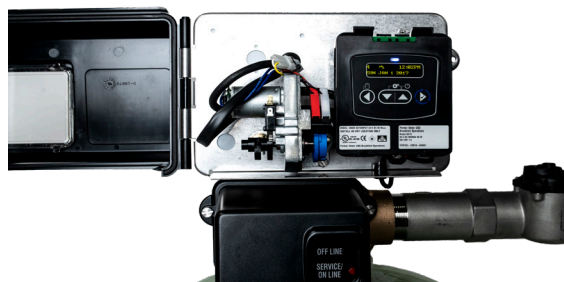
<sup>1</sup> Based on 7 lbs salt per cubic foot.

<sup>2</sup> Based on 10 lbs salt per cubic foot.

<sup>3</sup> Based on 13 lbs salt per cubic foot.

All "SF" Series softeners utilize series 2750 NXT2 controllers.

\* Exchange capacity based on treating water with 10 gpg total hardness as CaCo<sub>3</sub> and 400 ppm total dissolved solids. Capacities may vary with different influent water characteristics and other factors. Due to varying water conditions, tank sizes and water pressures, the above should only be used as a guideline.



### ADVANCED CONTROLLER

- Real-time diagnostics
  - Flow rates, totalizer, capacity, avg. usage, alarm history, and more
- Remote input for forced regeneration and regeneration lockout
- 2 programmable relays for auxiliary equipment, BAS indication, remote alarms, etc.

**WITH OVER 50 YEARS OF EXPERIENCE IN THE WATER CONDITIONING AND PLUMBING INDUSTRIES,** WCC CAN DESIGN AND MANUFACTURE EQUIPMENT FOR VIRTUALLY ANY APPLICATION. WE OFFER A COMPLETE MENU OF SERVICES, INCLUDING WATER TESTING, SYSTEM SIZING, BIM MODELING (REVIT®), DELIVERY, SETUP, STARTUP, AND AFTER-MARKET SERVICE PLANS. WE MAINTAIN A UNIQUE FOCUS ON MECHANICAL ENGINEERS, CONTRACTORS, AND THE PLUMBING INDUSTRY. DEPEND ON US TO PROVIDE QUALITY, INNOVATIVE SOLUTIONS FOR ALL YOUR COMMERCIAL WATER CONDITIONING NEEDS.

## HOW TO SPECIFY “SF” SERIES SOFTENERS:

ORDER CODE:

**SF** -  - **SIMPLEX (MR)**

MODEL (from other side)

SYSTEM SIZE

Single Tank:

**SIMPLEX (MR)**

### Additional Options: (check options below)

- ☐ Steel Tank(s) (optional ASME Rating)
- ☐ Accu-Pipe Skid-Mounted System (pre-plumbed\*, pre-wired system, mounted on heavy-duty powder-coated steel skid)
- ☐ Accu-Pipe LS: Same as Accu-Pipe System, less skid base (piping/wiring only)
- ☐ Brine Silo (large volume salt storage / brine generation & delivery system)
- ☐ Salt Sock and Access Door (lockable) for blow-in salt delivery

\*Standard piping is grooved, type L copper, other materials available.

For a detailed, model-specific specification, please contact WCC (Water Control Corporation). Detailed drawings also available upon request (CAD® or Revit®).

Water softening system requires a minimum inlet water pressure of 30 psig and maximum of 120 psig. If resin tank is subject to vacuum, an adequate vacuum relief valve must be properly installed. Tank warranty is void if subjected to vacuum. Feed water temperature shall be between 40°F and 100°F. Each control valve requires a 120 volt wall outlet (2-prong, 1.3FLA, 60Hz).



CONTACT YOUR LOCAL  
SALES REPRESENTATIVE

To find your authorized WCC representative,  
please visit: [www.watercontrolinc.com/  
representative-locator/](http://www.watercontrolinc.com/representative-locator/).



VISIT US ONLINE

Go to [www.watercontrolinc.com](http://www.watercontrolinc.com), where  
you'll find detailed product specification  
info and application design questionnaires.



SPEAK DIRECTLY WITH ONE OF  
WCC'S DESIGN ENGINEERS

Call 1-866-405-1268 or email  
[techsupport@watercontrolinc.com](mailto:techsupport@watercontrolinc.com).

*We look forward to working with you!*

Water Control Corporation  
7150 143rd Ave NW • Ramsey, MN 55303  
1-866-405-1268 • [www.watercontrolinc.com](http://www.watercontrolinc.com)

WC-SF © Water Control Corporation 0122



# Single Tank (MR) Models

## WATER SOFTENER DIMENSIONS

Model Series Number	(A) Resin Tank Diameter (+/-0.5 in)	(B) Resin Tank Height (+/-1 in)	(C) Inlet/Outlet Height (in)	(D) Overall Height (in)	(E) Brine Tank Diameter (in)	(F) Overall Length (in)
EF-30-MR	10.0	44.6	46.0	57.0	18.0	32.0
EF-48-MR	10.0	47.7	54.0	60.0	18.0	32.0
EF-60-MR	12.0	53.4	55.0	65.0	18.0	34.0
EF-90-MR	14.0	66.1	68.0	78.0	24.0	42.0
EF-120-MR	16.0	66.2	68.0	78.0	24.0	44.0
EF-150-MR	16.0	66.2	68.0	78.0	24.0	44.0
EF-150X-MR	18.0	67.0	69.0	79.0	24.0	46.0
EF-180-MR	21.0	67.0	69.0	79.0	24.0	49.0
XF-30-MR	10.0	44.6	46.0	57.0	18.0	32.0
XF-48-MR	10.0	47.7	54.0	60.0	18.0	32.0
XF-60-MR	12.0	53.4	55.0	65.0	18.0	34.0
XF-90-MR	14.0	66.1	68.0	78.0	24.0	44.0
XF-120-MR	16.0	66.2	68.0	78.0	24.0	44.0
XF-150-MR	16.0	66.2	68.0	78.0	24.0	44.0
XF-150X-MR	18.0	67.0	69.0	79.0	24.0	46.0
XF-180-MR	21.0	67.0	69.0	79.0	24.0	49.0
SF-30-MR	10.0	47.7	50.0	54.0	18.0	32.0
SF-48-MR	12.0	53.4	55.0	60.0	18.0	34.0
SF-60-MR	12.0	53.4	55.0	60.0	18.0	34.0
SF-90-MR	14.0	66.1	68.0	73.0	24.0	42.0
SF-120-MR	16.0	66.2	68.0	73.0	24.0	44.0
SF-150-MR	16.0	66.2	68.0	73.0	24.0	44.0
MF-48-MR	12.0	53.4	55.0	60.0	18.0	34.0
MF-60-MR	12.0	53.4	55.0	60.0	18.0	34.0
MF-90-MR	14.0	66.1	68.0	73.0	24.0	44.0
MF-120-MR	16.0	66.2	68.0	73.0	24.0	44.0
MF-150-MR	16.0	66.2	68.0	73.0	24.0	44.0
MF-180-MR	21.0	67.0	69.0	74.0	24.0	49.0
MF-210-MR	21.0	67.0	69.0	74.0	24.0	49.0
MF-240-MR	24.0	74.2	76.0	81.0	24.0	52.0
MF-300-MR	24.0	74.2	76.0	81.0	24.0	52.0



Model Series Number (con't)	(A) Resin Tank Diameter (+/-0.5 in)	(B) Resin Tank Height (+/-1 in)	(C) Inlet/Outlet Height (in)	(D) Overall Height (in)	(E) Brine Tank Diameter (in)	(F) Overall Length (in)
LF-90-MR	14.0	66.1	68.0	78.0	24.0	42.0
LF-120-MR	16.0	66.2	68.0	78.0	24.0	44.0
LF-150-MR	16.0	66.2	68.0	78.0	24.0	44.0
LF-150X-MR	18.0	67.0	69.0	79.0	24.0	46.0
LF-180-MR	21.0	67.0	69.0	79.0	24.0	49.0
LF-210-MR	21.0	67.0	69.0	79.0	24.0	49.0
LF-240-MR	24.0	74.2	76.0	86.0	24.0	52.0
LF-300-MR	24.0	74.2	76.0	86.0	24.0	52.0
LF-360-MR	30.0	78.9	81.0	91.0	30.0	64.0
LF-450-MR	30.0	78.9	81.0	91.0	30.0	64.0
LF-600-MR	36.0	80.4	83.0	92.0	39.0	79.0
HF-300-MR	24.0	77.0	82.0	92.0	24.0	52.0
HF-450-MR	30.0	79.7	85.0	95.0	30.0	64.0
HF-480-MR	30.0	79.7	85.0	95.0	30.0	64.0
HF-600-MR	36.0	82.3	87.0	97.0	39.0	79.0
HF-810-MR	42.0	72.5	78.0	88.0	39.0	85.0
HF-900-MR	42.0	72.5	78.0	88.0	50.0	96.0
HF-990-MR	48.0	72.5	87.0	97.0	50.0	102.0
HF-1200-MR	48.0	72.5	87.0	97.0	50.0	102.0
HF-1800-MR	63.0	86.0	104.0	114.0	50.0	117.0

All dimensions are approximate and subject to change without notice. Please consult our technical department for additional system information.



CONTACT YOUR LOCAL  
SALES REPRESENTATIVE

To find your authorized WCC representative,  
please visit: [www.watercontrolinc.com/  
representative-locator/](http://www.watercontrolinc.com/representative-locator/).



VISIT US ONLINE

Go to [www.watercontrolinc.com](http://www.watercontrolinc.com), where  
you'll find detailed product specification  
info and application design questionnaires.



SPEAK DIRECTLY WITH ONE OF  
WCC'S DESIGN ENGINEERS

Call 1-866-405-1268 or email  
[techsupport@watercontrolinc.com](mailto:techsupport@watercontrolinc.com).

*We look forward to working with you!*



# SET-UP PROCEDURES

Inspect distributor assembly inside of each tank for damage. The distributor assembly is shipped secured to the resin tank, but damage can occur during shipping. If the distributor is damaged, do not fill resin tank with gravel/media as it will need to be removed for distributor repair. Contact WCC at 763-427-9638.

1. Unpackage the resin tanks and place them into/near their installation location. Leave the knockout plug on the distributor tube. This will be removed after the gravel/media has been loaded into the resin tanks.
2. Load the gravel into the resin tanks using the supplied funnel. The funnel is shipped in the brine tank. See gravel chart for number of gravel bags per tank.
3. Load the softening media into the resin tanks using the supplied funnel. The funnel is shipped in the brine tank. See chart for number of resin bags to install per tank.
4. Remove the knockout plug on the distributor tube.
5. Snap on black deflector onto the bottom of valve.
6. Screw valve onto resin tank.
7. Install flow meter on outlet side of the softener valve
8. Contact WCC for setup instructions : (763) 427-9638.

MODEL SERIES NUMBER	# OF RESIN BAGS (per tank)	# OF GRAVEL BAGS (per tank)
SF-30	1	0.5
SF-48	1.6	0.5
SF-60	2	0.5
SF-90	3	1
SF-120	4	1
SF-150	5	1
SF-150X	5	2

# INSTALLATION PROCEDURES

- IDENTIFY INSTALLATION LOCATION FOR WATER SOFTENER.** Piping should be such that all hard water, except for outside hydrants, flows through softener. This system and installation must comply with state and local laws and regulations.
- CONNECT WATER PIPING.** See install diagrams for plumbing layout. Important: Make all sweat-solder connections within 6 inches of softener before applying threaded fittings. Overheating may cause damage to valve. Note: WCC recommends installing isolation valves on the inlet and outlet of each control valve, as well as a full system bypass.
- CONNECT DRAIN LINE.** Be sure not to submerge drain line end into drain, as a 1-1/2" minimum air gap must be maintained to prevent potential backflow hazard. Firmly secure at drain, while maintaining a minimum 1-1/2" air gap. Note: Floor drain must be capable of handling full backwash flow rate (see page 6 for backwash rates).
- CONNECT BRINE LINE.** Connect brine line (supplied in parts bag) to fitting on brine tank, and on the control valve. Tighten both fittings with an adjustable wrench. Note: If you have purchased a setup/startup service, startup agent will connect brine line on site.
- INSTALL BRINE TANK OVERFLOW LINE.** Install overflow fitting into hole inside of brine tank. An owner-supplied overflow line should then be attached and run to a nearby drain. Failure to run overflow line could cause flooding and water damage should the brine tank overflow. *See the table below for brine tank overflow recommended line size. Note: Line sizes over 0.5 inches are to be hard plumbed to the drain.*

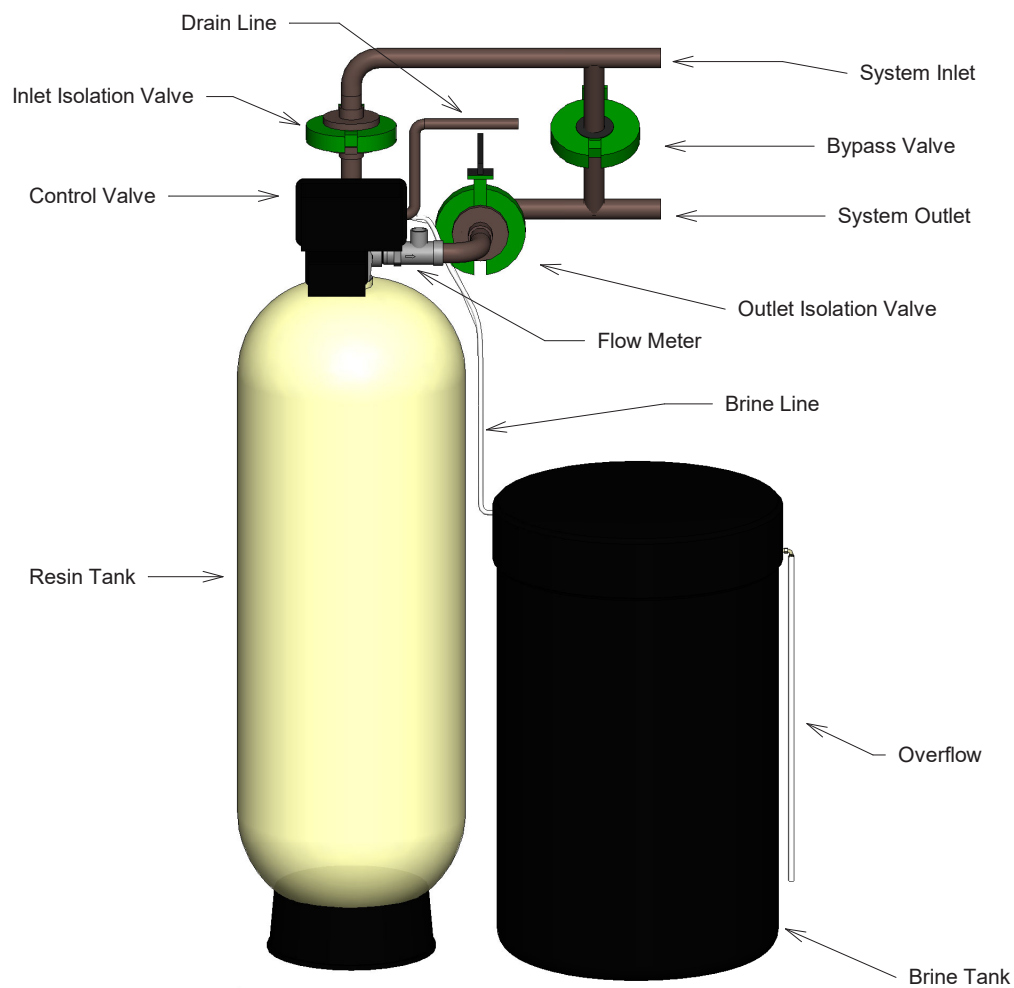
BLFC (gpm)	SOFTENER CAPACITY (kgrains)	BRINE TANK OVERFLOW (in)
1	up to 150	0.5
2	150X - 300	0.75
5	360 - 600	1
10	800 and up	1.5

- CONNECT TO ELECTRICAL POWER SOURCE.** Connect power cord to a separate 120v, 15-amp, ground fault interrupt (GFI) outlet. Note: Each control valve should have a dedicated 120V outlet

**NOTE:** *This system is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without disinfection before or after the system.*

*A vacuum break is required any time a vacuum situation may occur. This is common on wells, systems with booster pumps after the unit, or when the system is installed in areas of varying altitudes. No warranty is considered if the system has been subjected to a vacuum. A vacuum break should be installed between the softener and the potential cause of a vacuum.*

# SIMPLEX INSTALLATION DIAGRAM



## POWER SUPPLY CONNECTIONS

### Installing the Power Supply:

NOTE: Power Supply includes a harness with 2 black wires that connect to circuit board, see page 15.

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

## NETWORK/COMMUNICATION CABLES AND CONNECTIONS

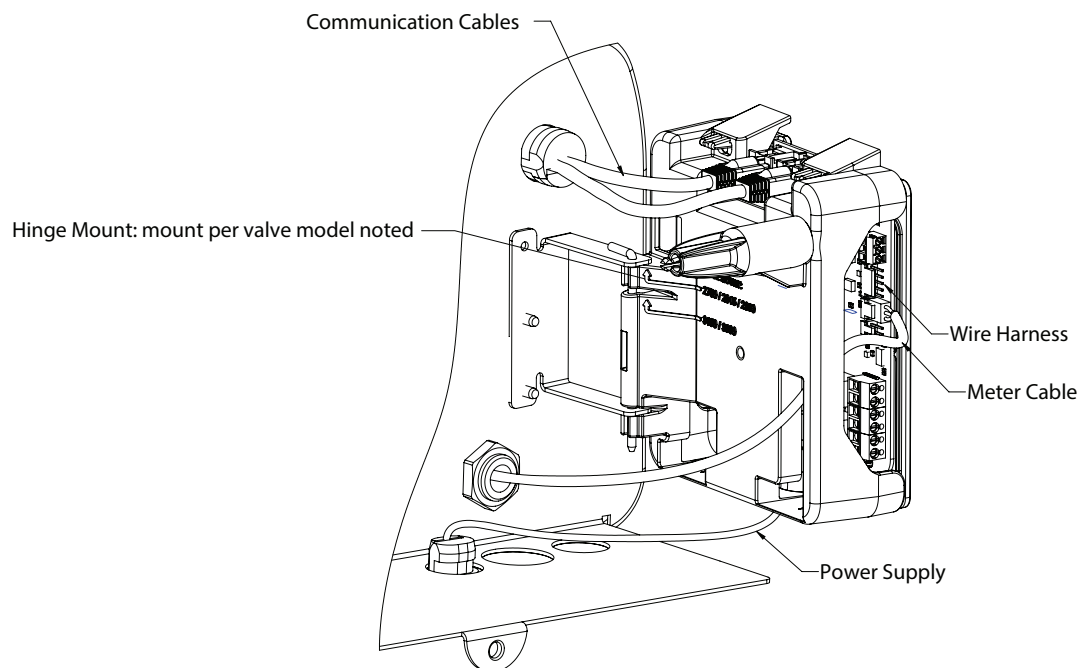
Use a CAT5 or better Network/Communication cable.

Connect the network/communication cable first before programming.

The maximum cable length between timers is 100 feet.

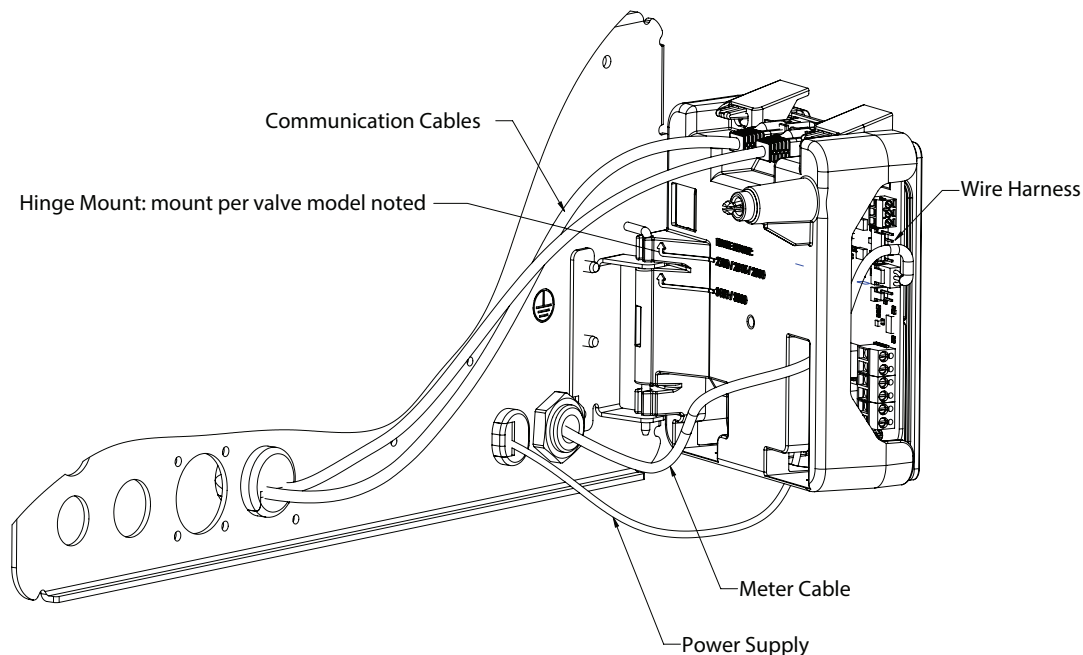
Connect each unit in series (do not form a loop) together from one communication port to the next communication port. It does not matter which one goes to the next one.

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



44404 Rev A

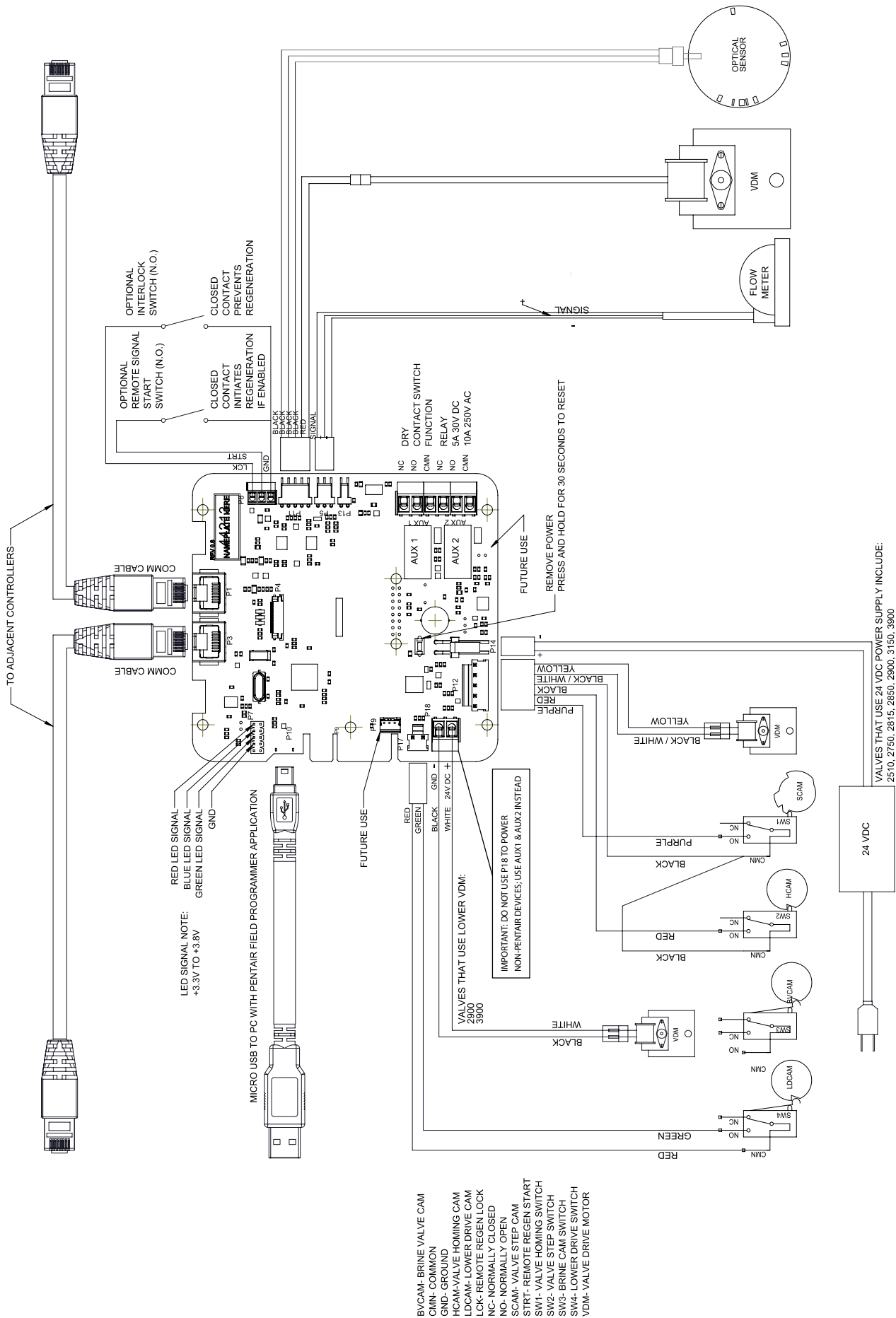
### 3150/3900 Valves:



44403 Rev A

# WIRING DIAGRAM

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



## NXT2 CONTROLLER

### ADVANCED SYSTEM NETWORK CONTROLLER



#### FEATURES • BENEFITS

- ◆ On-screen multilingual support: English, Français, Deutsch, Italiano, Español, Nederlands, Português
- ◆ 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 CAT5 or better 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 savable 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)

## VALVE SPECIFICATIONS

System Type 4, 5, 6, 7, 8, 9, 14

## VALVE TYPE

2750	3150
2850	3900
2900s	2815

## SPECIFICATIONS

SYSTEM	SYSTEM DESCRIPTION	NUMBER OF TANKS/CONTROLS	TYPE
4	Single Unit	1	Time Clock: No Meter Immediate: One Meter Delayed: One Meter Remote: No Meter
5	Interlocked	From 2 up to 8	Immediate: All Meters Remote: No Meter
6	Series Regeneration	From 2 up to 8	Immediate: One Meter Delayed: One Meter Remote: No Meter
7	Twin Alternating	2	Immediate: One Meter Remote: No Meter
8	Alternating Delayed	2	Immediate Transfer, Delayed Regeneration
9	Multiple Tank Alternating	From 2 up to 8	Immediate: All Meters Remote: No Meter
14	Demand Recall	From 2 up to 8	Immediate: All Meters

## REGENERATION TYPE

Meter Delayed Fixed Reserve  
Meter Immediate  
Remote Signal Start Immediate  
Time Clock Delayed

## REGENERATION TYPE

Downflow  
Upflow Fill First  
Upflow Brine First

## ELECTRICAL RATING

24V DC Power Supplies  
100V-240V AC input; 24V DC output

## GENERIC METER GUIDELINES

Open collector output  
Pulse rate generated must not exceed 100 pulses per second (100Hz) or 6,000 pulses per minute  
Support for meter outputs in the range of 1-255 gallons (25.5m<sup>3</sup>) for every 1-255 pulses  
Meter must operate at 5 VDC

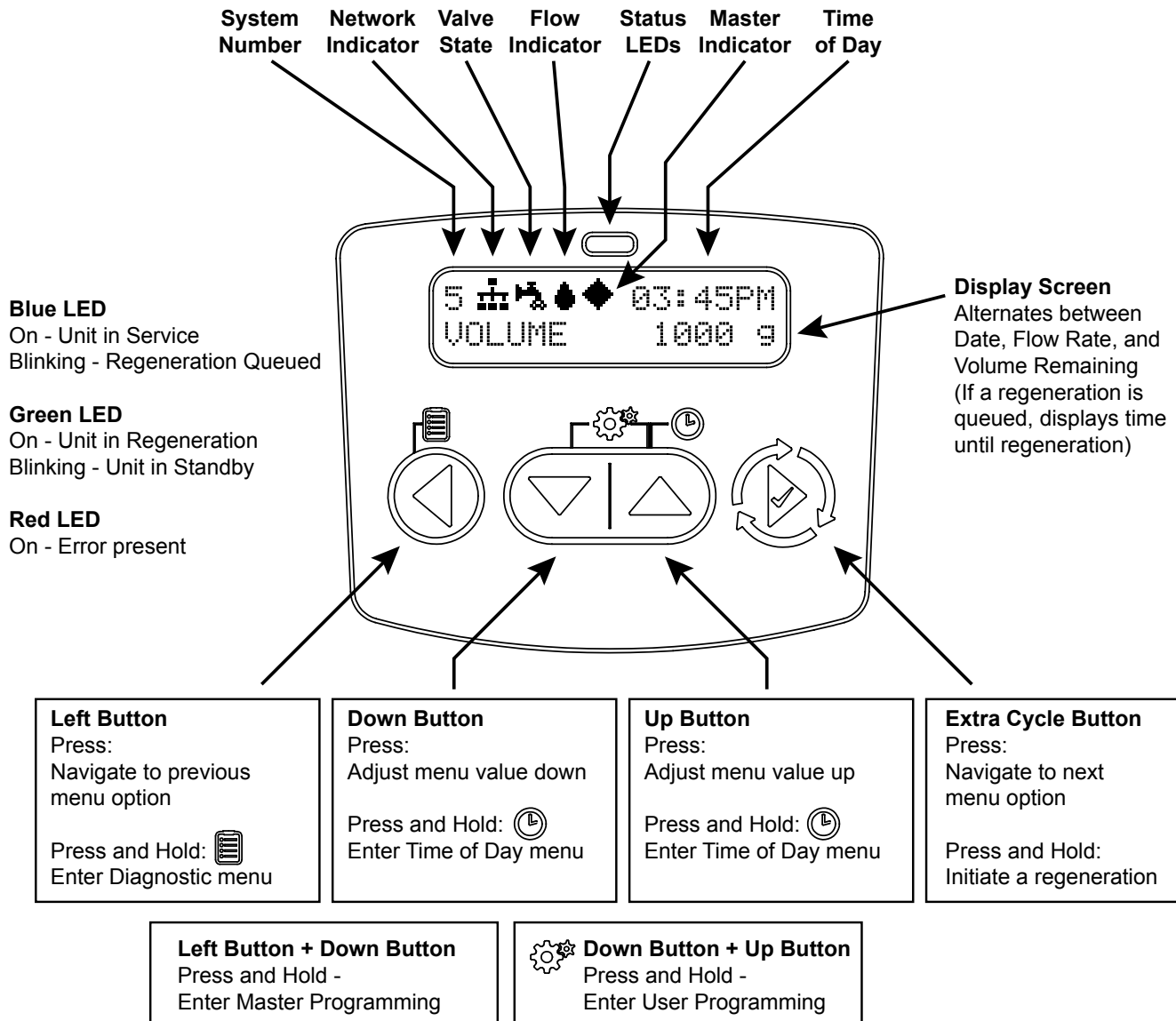


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4005307 Rev A JL18

## TIMER 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		



## TIMER OPERATION

### Setting the Time of Day

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

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

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

### Manually Initiating a Regeneration

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

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

### Timer Operation During Regeneration

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

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



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.

### Timer Operation During Programming

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

### Timer 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 Timer

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.

## TIMER FEATURES

### Remote Lock

The timer 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 - Regeneration  
Flashing Green - Standby  
Red - Error with codes

### Power Loss Backup

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

### Continuous Flow Detect

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

### Remote Regeneration

Ability to trigger a regeneration via a remote input.

### Regeneration Types

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

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

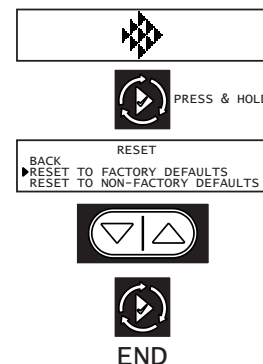
**Time Clock** - Once volume remaining reached zero and the selected regeneration time is reached (default 2 a.m. softener; 12 a.m. filter), the unit will regenerate.

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

**Remote Regeneration** - Regeneration begins or is queued after a contact closure meets or exceeds for the length of time specified in the Remote Signal Duration (Range 1-30 seconds Service; 60-300 seconds Standby). Unit regenerates will occur based on the Remote Regeneration specified method (Immediate or Delayed). Immediate Regeneration will immediately initiate a regeneration. Delayed Regeneration will initiate a regeneration based on the programmed regeneration time selected.

### Reset to Factory Defaults

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



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

Use the up/down buttons to select.

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

### Lock Window

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

### Settings Review

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

# TIMER FEATURES *continued...*

## Push Settings

The ability to transmit 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 push settings are complete, you may still make unique changes to individual units.

## Auxiliary Relays

The NXT2 has two auxiliary relays available based on cycle, time, or volume.

<div><div>AUX.1: CYCLE BASED</div><div><div>▼</div><div>SP</div><div>X</div><div>BW</div><div>X</div><div>BD</div><div>✓</div><div>RR</div><div>X</div><div>RF</div><div>X</div><div>SB</div><div>X</div></div></div>	Activates during selected cycle step
<div><div>AUX.1:TIME BASED-START TIME #1</div><div>1 M</div></div>	Activates upon selected start time (Range: 0-91 minutes)
<div><div>AUX.1:TIME BASED-END TIME #1</div><div>5 M</div></div>	Deactivates upon selected end time (Range: Start Time plus 1 minute)
<div><div>AUX.1:VOLUME BASED - VOLUME-G</div><div>00100</div></div>	Activates when selected volume (gallon) is reached (Range: 0-99999)
<div><div>AUX.1:VOLUME BASED - DURATION-S</div><div>0010</div></div>	Selected Duration in Seconds (Range: 0-9999 seconds)

## SYSTEM DEFINITIONS

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### 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 a 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

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) Demand Recall

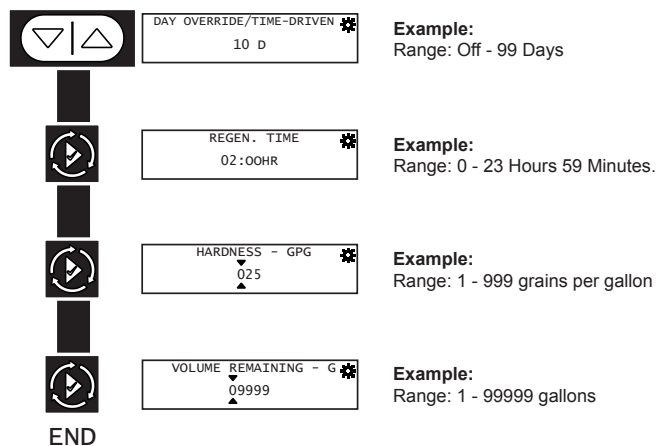
Meter input is required on each tank. Unit #1 will begin In Service with #2, #3, and #4 (if installed) will begin in Standby. At least one unit is In Service at all times. When flow rate to the Primary Service Unit increases to a user specified rate, the next unit in sequence will move from Standby to 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 unit's 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.

# USER PROGRAMMING MODE

## FLOW CHART

### User Programming Mode

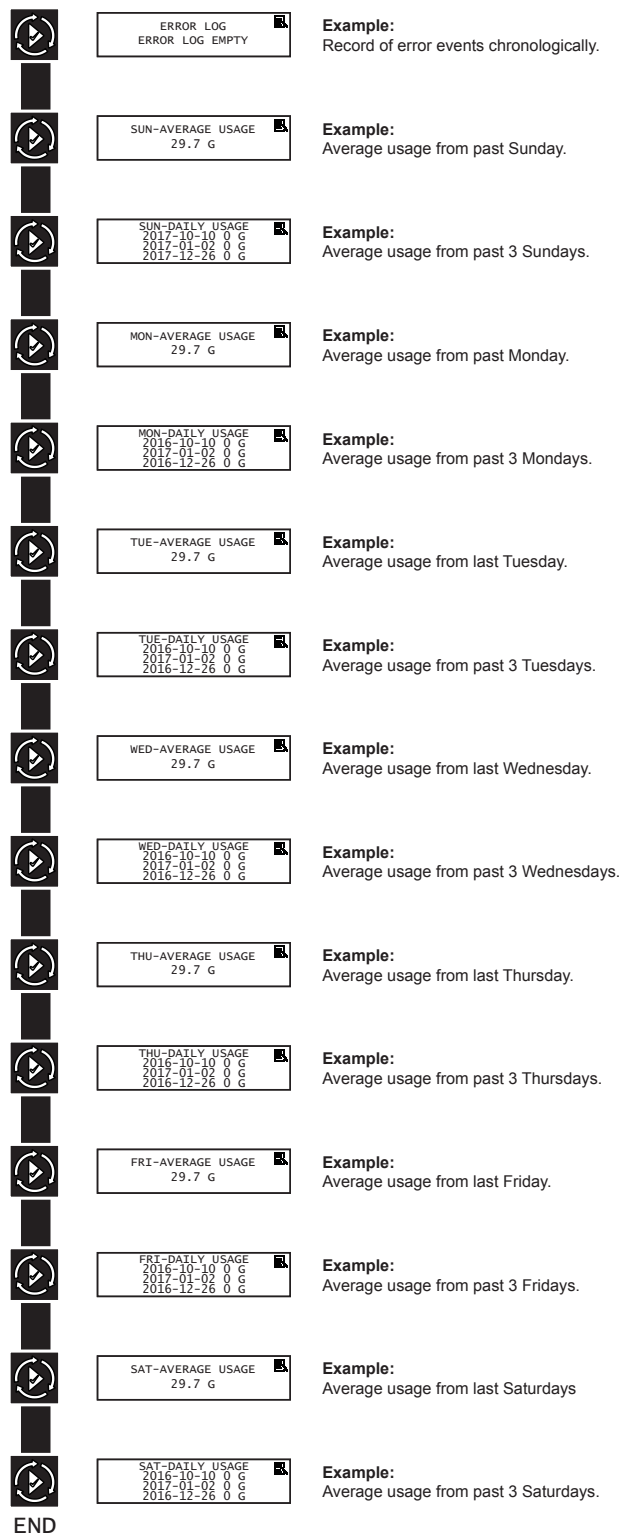
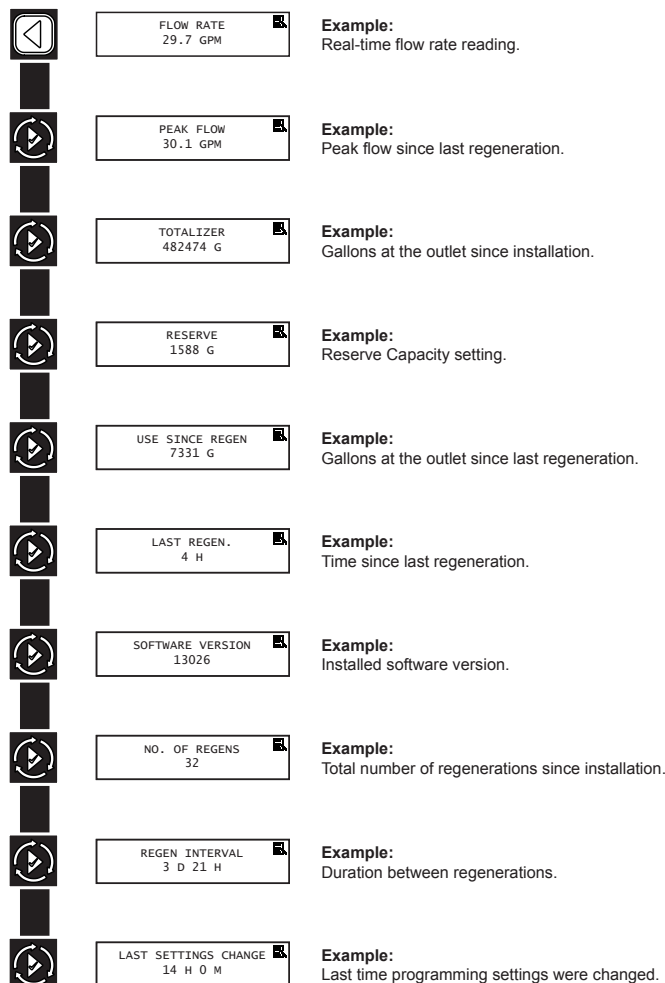
1. Press and hold the Down and Up buttons simultaneously for 3 seconds to enter User Programming mode.
2. To navigate, press the Extra Cycle button to advance to the next value. Press the Left button to retreat to the previous value.
3. Where applicable, use the Up and Down buttons to adjust a value as desired.
4. After progressing through all available values, the timer will return to Normal operation.
5. To exit diagnostic mode, progress through all available values, press and hold the left button at anytime, or after 5 minutes of inactivity the timer will return to normal operation automatically.
6. depending on the current controller programming, certain values may not be able to be viewed or set.
7. The timer 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.



# 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 timer 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 timer will return to normal operation automatically.
7. Depending on the current controller programming, certain values may not be able to be viewed or set.
8. The timer 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.



# TIME OF DAY PROGRAMMING MODE

## FLOW CHART

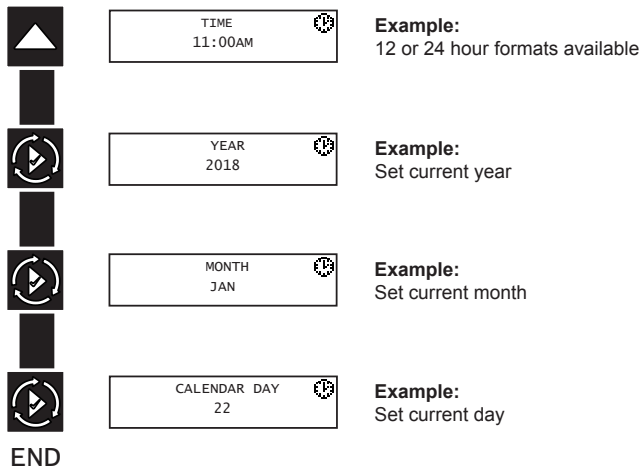
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### Setting the Time of Day

**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.**



# Commercial Water Softener Startup Procedures

(TECHNICIAN TO INITIAL EACH ITEM SUCCESSFULLY TESTED.)

Date \_\_\_\_\_

Project Name/Location \_\_\_\_\_

Technician \_\_\_\_\_

Model/Serial Number \_\_\_\_\_

Number/Size of Resin Tanks \_\_\_\_\_

Size of Brine Tank \_\_\_\_\_

Brine Reclaim System \_\_\_\_\_

☐ Meter

☐ Timeclock

☐ Progressive Flow

☐ Alternating

## Installation Verification

1. ☐ Confirm the system O&M manual is onsite.
2. ☐ Confirm 120 VAC power supplied.
3. ☐ Verify water lines are all properly plumbed, and water is available.
4. ☐ Verify drain lines properly plumbed.
5. ☐ Verify meter(s) plumbed in correct direction.
6. ☐ Verify brine reclamation properly plumbed (if applicable).
7. ☐ Verify salt is available onsite
8. ☐ Bypass installed? Yes ☐ No ☐ Master Bypass ☐ Each Valve ☐
9. ☐ Water test kit provided to end user (only if specified).
10. ☐ Fully photographed system and system plumbing.

## Pre-Startup

1. ☐ Install brine line tubing.
2. ☐ Install meter cables.



3. ☐ Wire brine reclamation valves (if applicable).
4. ☐ Install communication cables between valves
5. ☐ Plug in all valves to GFCI approved wall receptacle.
6. ☐ Open system bypass and isolate off softener inlets/outlets.

### Startup

1. ☐ Set time of day on Valve #1.
2. ☐ Initiate Manual Regeneration, advance to regeneration cycle 3 (Rapid Rinse) and slowly open softener inlet valve (roughly halfway) to fill mineral tank with water
3. ☐ Once water is running to the drain, advance from regeneration cycle 3 (Rapid Rinse) back to the home screen. Reinitiate a manual regeneration and remain in cycle 1 (Backwash). With inlet valve halfway open, allow water flow and air expulsion. Verify all air is purged.
4. ☐ Once all air is purged, fully open softener inlet valve to allow full backwash flow to drain. Continue until discharge water is free and clear of resin/debris.
5. ☐ Advance to regeneration cycle 4 (Brine Tank Refill). Allow approximately 6 inches of water to fill in brine tank.
6. ☐ Advance back through Service cycle (home screen) and cycle 1 (Backwash), to cycle 2 (Brine and Rinse). Verify water is properly drawn from brine tank.
7. ☐ Close softener inlet bypass valve again. Repeat steps 2 – 5 for any additional valves, addressing each valve individually.
8. ☐ When purging and testing the final valve, allow cycle 2 (Brine & Rinse) to run until brine tank is dry.
9. ☐ Once step 7 is complete, advance final valve to cycle 4 (Brine Tank Refill) and allow cycle to run completely, so that brine tank has correct service water level upon completion.
10. ☐ Open system inlets/outlets and close system bypass.

### Operation Verification

1. ☐ Run softened water fixtures in facility and verify proper meter operation for each valve, individually (use regen button to advance to different valves).
2. ☐ If possible, run larger loads in facility to verify Progressive Flow (tank staging) is functioning correctly, per the flow rates indicated in the system specifications (Note, if necessary, valves may be temporarily re-programmed to actuate Progressive Service at lower flow rates, for confirmation of operation. This requires entering the system Master Programming Functionality. It also requires returning all set points to their previous levels when completed! Contact WCC for more details).
3. ☐ If Brine Reclamation system is installed, initiate regeneration steps 2–4 (Brine Draw, Rapid Rinse, and Brine Refill) on Valve #1. Observe steps 2–4 to ensure that Brine Reclamation solenoid valves are functioning properly.

1. ☐ Add salt to brine tank. How many lbs.? \_\_\_\_\_
2. ☐ Other thoughts/concerns about this system  
\_\_\_\_\_  
\_\_\_\_\_
3. ☐ Warranty Activated? Yes ☐ No ☐ If no, list any items that must be addressed prior to warranty activation:  
\_\_\_\_\_  
\_\_\_\_\_

Trainees Present

Name	Organization	Email
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Signature(s) of Start-Up Agents

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Signature of Installing Contractor

***I CERTIFY THAT STARTUP AND TRAINING HAVE BEEN COMPLETED PER AGREEMENT.***

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

# Commercial Water Softener Maintenance Procedures

(TECHNICIAN TO INITIAL EACH ITEM SUCCESSFULLY TESTED.)

Date \_\_\_\_\_

Project Name/Location \_\_\_\_\_

Technician \_\_\_\_\_

Model/Serial Number \_\_\_\_\_

## Pre-Maintenance Audit Checklist

1. ☐ Test Water Quality Levels (Hardness on Cold/Hot)
2. ☐ Check for Blinking Time? Yes ☐ No ☐
3. ☐ Check Volume of Meter (Per System)
4. ☐ Verify Appropriate Inlet Pressure (If Applicable)
5. ☐ Verify System Outlet Pressure (If Applicable)
6. ☐ Inspect Brine Tank and Overflow
7. ☐ Check Brine Tank for Bridging/Salt Quality/Water Level
8. ☐ Verify Correct Solenoid Valve Operation (If Applicable)
9. ☐ Verify Correct Programming for Specific Softener
10. ☐ Test/Verify Brine Reclamation Operation
11. ☐ Check Inlet/Outlet Bypass

## Scheduled Maintenance Procedures

1. ☐ Cycle Test Water Softener (Manual Regeneration)
  - ☐ Check for Leaks
  - ☐ Check Meters Counts Down Properly
  - ☐ Check If Brine Line Draws Water
  - ☐ Check Brine Line Refill

2. ☐ Replace Any Parts That Have Failed
3. ☐ Inspect/Clean Injectors and Brine Line
4. ☐ Photograph System for Job Folder
5. ☐ Record Pentair Serial Number
6. ☐ Perform Any Work Covered by Warranty (If Applicable, see notes)
7. ☐ Include 12 postage-paid water sample bottles per year, plus testing by WCC lab (if needed) (Results will include testing for hardness, iron, TDS, pH)
8. ☐ Re-Examine Water Quality Levels (Hardness)

**Notes:**

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**Billing Information**

Name: \_\_\_\_\_

Phone: \_\_\_\_\_

Street: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Purchase Order #: \_\_\_\_\_

**Acceptance of Work:**

Tech. Signature: \_\_\_\_\_

Client Printed: \_\_\_\_\_

Client Signature: \_\_\_\_\_

# SERVICE

You must keep salt in the tank. The salt tank operates best when the salt level is below half full. If the tank is filled more than halfway, salt bridging may occur. The salt pellets wedge against each other and do not fall into the water at the bottom. Bridging will eventually provide no salt to make brine. The softener will re-charge but not recondition the media. A salt bridge can be broken up using a broom handle or similar rod. Carefully pound it into the salt and the pellets will collapse. After loosening the salt pellets, wait 2 hours and start a regeneration. A second recharge may be needed to fully recondition the media. You should also use sodium chloride pellet salt for water softeners. Other types of salt (rock or snow melting) will contain dirt or chemicals that will affect your softener.

## Checking for a Salt Bridge:

A hard crust or "salt bridge" can form in the lower half of the salt storage tank. This can be deceiving because the tank will appear to have plenty of salt, but underneath, salt is hardened and when the system regenerates, water cannot quite reach this level to be made into brine (water and salt).

## Breaking a Salt Bridge:

Take a wooden broom handle and carefully push it down into the salt, working it up and down. If the tool strikes a hard object, (be sure it's not the bottom or sides of the tank), it's probably a salt bridge. Carefully break the bridge with the broom handle. Do not pound on the walls of the tank.

***Note: Salt bridges are typically caused by high humidity or using the wrong kind of salt. And humid areas, it is best to fill the with less salt, more often. Use only nugget, pellet or coarse solar salt with a purity of 99.5% or higher. DO NOT use rock, block, granulated, and ice cream-making salts, or salt with iron removing additives.***

## Cleaning the Brine Injector Assembly:

It is recommended to clean the injector and injector screen annually to ensure proper system operation.

From time to time, a softeners brine water injection assembly can become clogged with dirt and debris. This resulted in for water softener regeneration, which, in-turn, can lead to poor softening performance. Plugging of a brine injector can also cause brine tanks to fill up with water, and eventually overflow.

Cleaning and unplugging a dirty brine injector is an easy process. For a detailed instructional video please visit <https://watercontrolinc.com/residential-technical-videos/>.

## Troubleshooting

<b>1. Softener Fails To Regenerate.</b>	A. Electrical service to unit has been interrupted.	A. Assure permanent electrical service (check fuse, plug, pull chain or switch).
	B. Timer programming bad (improper programming).	B. Check programming and reset as needed.
<b>2. Softener Delivers Hard Water.</b>	A. By-pass valve is open.	A. Close by-pass valve.
	B. No salt in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Injectors or screen plugged.	C. Clean or replace injectors and screen.
	D. Insufficient water flowing into brine tank.	D. Check brine tank fill time and clean brine line flow if plugged.
	E. Hot water tank hardness.	E. Repeated flushings of the hot water tank is required.
	F. Flow meter jammed.	F. Check flow indicator light for flow. Remove obstruction from flow meter.
	G. Flow meter cable disconnected or not plugged into meter.	G. Check meter cable connection to timer and meter.
	H. Improper programming.	H. Reprogram the control to the proper regeneration type, inlet water hardness, capacity or flow meter size.
	I. Plugged brine line or air check.	I. Remove and clean any sediment from brine tank and brine valve assembly.
	J. Salt bridge has formed.	J. Refer to <i>Breaking a Salt Bridge</i> section in manual.
	K. No water in brine tank.	K. Ensure safety float is not stuck.
	L. Unit is plumbed backwards.	L. Check that the unit is plumbed correctly.
	M. Water hardness has increased or is set incorrectly.	M. Retest hardness and change settings.
	N. Water pressure is too low.	N. Line pressure must be at least 20 PSI.
<b>3. Unit Uses Too Much Salt.</b>	A. Improper salt setting.	A. Check salt usage and salt setting.
	B. Excessive water in brine tank.	B. See problem No. 7.
	C. Improper programming.	C. Check programming and reset as needed.
<b>4. Loss of Water Pressure.</b>	A. Iron buildup in line to water conditioner.	A. Clean line to water conditioner.
	B. Iron buildup in water conditioner.	B. Clean control and add resin cleaner to resin bed. Increase frequency of regeneration.

## Troubleshooting (continued)

<b>5. Loss of Resin Through Drain Line.</b>	A. Air in water system.	A. Assure that well system has proper air eliminator control and check for dry well condition.
	B. Drain line flow control is too large.	B. Ensure drain line flow control is sized correctly.
<b>6. Iron in Conditioned Water.</b>	A. Fouled resin bed.	A. Check backwash, brine draw and brine tank fill. Increase frequency of regeneration. Increase backwash time.
	B. Iron content exceeds recommended parameters.	B. Add iron removal filter or system.
<b>7. Excessive Water in Brine Tank.</b>	A. Plugged drain line flow control.	A. Clean flow control.
	B. Brine valve failure.	B. Clean brine valve.
	C. Improper programming.	C. Check programming and reset as needed.
<b>8. Salt Water in Service Line.</b>	A. Plugged injector system.	A. Clean injector and replace screen.
	B. Improper programming.	B. Check programming and reset as needed.
	C. Foreign material in brine	C. Clean or replace brine valve.
	D. Foreign material in brine line	D. Clean brine line flow control.
	E. Low water pressure.	E. Raise water pressure.
<b>9. Softener Fails to Draw Brine.</b>	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean or replace injectors.
	C. Improper programming.	C. Check programming and reset as needed.
	D. Line pressure is too low.	D. Increase line pressure (line pressure must be at least 20 PSI at all times.)
<b>10. Drain Flows Continuously.</b>	A. Foreign material in control.	A. Remove piston assembly and inspect bore, remove foreign material & check control in various ports.
<b>12. Loss of capacity.</b>	A. Increased raw water hardness	A. Reset unit to the new capacity.
	B. Brine concentration and/or quantity.	B. Keep brine tank full of salt at all times. Clean it yearly. Salt may be bridged. If using a salt grid plate ensure refill water is over it.
	C. Resin fouling. Future fouling.	C. Call Water Control Corp, find out how to confirm it, clean the resin and prevent.
	D. Poor distribution, channeling (uneven bed surface).	D. Call Water Control Corp. Check distributors and backwash flow.

## NXT-2 VALVE ERROR CODE/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	Cause 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 Pentair representative.
100 Days Without Regen	100 Days have expired without a regeneration	Trigger a manual regeneration



## FLECK® 2750 1-INCH CONTROL VALVE

IDEAL FOR RESIDENTIAL OR COMMERCIAL FILTER AND SOFTENER APPLICATIONS

**MADE IN THE  
USA**  
OF FOREIGN & DOMESTIC PARTS



### FEATURES/BENEFITS

Lead-free brass valve body for superior strength and durability

Continuous service flow rate of 26 GPM with a backwash of 25 GPM

Backwash capability accommodates softener tanks up to 30" and filter up to 21" in diameter

Fully adjustable 3- or 5-cycle control for efficient and reliable water treatment system

Time-tested, hydraulically-balanced piston for service and regeneration

Rugged-built electromechanical timer designed with heavy duty 3/8" wide plastic gears

### OPTIONS

Filter or softener control valves

No hard water bypass piston

Brine cam auxiliary switch

Electromechanical timer auxiliary switch

Hot water

Electromechanical 7- or 12-day time clock, meter delayed, or meter immediate regeneration

Manual lever operations

**NXT-** Network controller uses on-board communication capabilities to link multiple valves (via off-the-shelf CAT3, CAT5, or better cables) for system types 4,5,6,7,9, and 14.

**SXT-** Large LCD display and user-selectable time clock or metered function; usable for filtration and softener systems.

**XT-** Offers a two-line, 16 character LCD backlit display for easy entering of master and user programming as well as view of diagnostics.

**Electromechanical Timer-** Simple to adjust and easy to service with quick access to all internal components.



TESTED and CERTIFIED by the WQA to NSF/ANSI Standard 61 Section 8 Material Safety Only.



TESTED and CERTIFIED by the WQA to NSF/ANSI Standard 372 for Lead Free Compliance.



UL recognized to 979



Restriction of Hazardous Substance Compliant

## VALVE SPECIFICATIONS

Valve Material	Lead-free brass*
Inlet/Outlet	1" NPTM/BSPM
Cycles	3 or 5

## FLOW RATES (50 PSI INLET) – VALVE ALONE

Continuous 15 psi drop	26 GPM (5.9 m <sup>3</sup> /h)
Peak 25 psi drop	33 GPM (7.5 m <sup>3</sup> /h)
Cv flow at 1 psi drop	6.8
Max. Backwash 25 psi drop	25 GPM (5.7 m <sup>3</sup> /h)

## REGENERATION

Downflow/Upflow	Downflow only
Adjustable Cycles	Yes
Time Available	
Electromechanical:	0 - 164 min/regeneration
SXT:	0 - 199 min/cycle
NXT:	0 - 240 min/cycle
XT:	0 - 240 min/cycle

## METER INFORMATION

Meter Accuracy	
3/4" Paddle:	0.25 - 15 GPM ± 5% (0.06 - 3 m <sup>3</sup> /h)
1" Paddle:	0.7 - 40 GPM ± 5% (0.16 - 9 m <sup>3</sup> /h)
1" Turbine:	2 - 40 GPM +5/-8% (0.45 - 9 m <sup>3</sup> /h)
Meter Capacity Range	
3/4" Standard:	125 - 2,125 gal (0.5 - 8 m <sup>3</sup> )
3/4" Extended:	625 - 10,625 gal (2.5 - 40 m <sup>3</sup> )
1" Standard:	310 - 5,270 gal (1.2 - 20 m <sup>3</sup> )
1" Extended:	1,550 - 26,350 gal (6 - 100 m <sup>3</sup> )
SXT:	1 - 999,900 gal (0 - 3,785 m <sup>3</sup> )
NXT:	1 - 9,900,000 gal (0 - 37,476 m <sup>3</sup> )
XT:	1,000 - 9,900,000 gal (3.8 - 37,476 m <sup>3</sup> )

## DIMENSIONS

Distributor Pilot	1.05" O.D. (26.7 mm)
Drain Line	3/4" NPTM
Brine Valve	
1600 or 1650:	3/8"
1700 or 1710:	1/2"
Injector System	1600 or 1700
Mounting Base	2.5" - 8 NPSM
Height from Top of Tank	6.5" (165 mm)
Riser Tube Diameter	3/4" (19 mm)
Riser Height	Flush with top of tank

## TYPICAL APPLICATIONS

Water Softener	10 - 30" diameter
Filters	10 - 21" diameter based on 10 GPM/ft <sup>2</sup>

## ADDITIONAL INFORMATION

Electrical Rating	24/110/220V 50/60 Hz
Estimated Shipping Weight	
Time Clock:	13 lbs
Metered Valve:	26 lbs
Pressure	
Hydrostatic:	300 psi (20 bar)
Working:	20 - 125 psi (1.4 - 8.5 bar)
Temperature	
Cold Water Valve:	34 - 110°F (1 - 43°C)
Hot Water Valve:	34 - 180°F (1 - 82°C)
Filter, Time Clock, 1600 Brine System	
Hot Water Valve:	34 - 150°F (1 - 66°C)
Meter, 1700 Brine System	

\*As defined in the U.S. EPA Safe Drinking Water Act; the product also meets California Proposition 65 Standards for lead-free brass.



## FILTRATION & PROCESS

5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209  
P: 262.238.4400 | WWW.PENTAIRAQUA.COM | CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

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## WATER PURIFICATION

### STAINLESS STEEL METERS

HIGH EFFICIENCY AND TIMELY REGENERATIONS



1"



1-1/2"



2"



3"

**Reduce your SKUs with Pentair's Stainless Steel Meters. Manufactured with truly lead-free stainless steel materials, SS meters are designed to meet today's water treatment needs.**

#### LEAD-FREE

Truly lead-free 316 grade stainless steel material eliminates the risk of lead leaching into the water

#### DURABLE MATERIALS

Rust-resistant  
Corrosion-resistant  
1", 1-1/2" and 2" models are hot-water rated to 150°F

#### MULTIPLE APPLICATIONS

Widely used in commercial and industrial applications  
Single and multi-tank system compatibility

#### BENEFITS

Simplified service and reduced inventory  
No tools needed to install sensor  
All-in-one electronic and mechanical flow sensing

#### RELIABILITY

Mechanical meters record water usage even during power outages

#### CONVENIENCE

Optional stainless steel union for ease of installation and maintenance (purchased separately)



TESTED and CERTIFIED by the WQA to NSF/ANSI Standard 61 Section 8 Material Safety Only.



TESTED and CERTIFIED by the WQA to NSF/ANSI Standard 372 for Lead Free Compliance.



Restriction of Hazardous Substance Compliant

## SPECIFICATIONS

METER TYPE	MAX FLOW RATE (GPM)	PRESSURE DROP @ MAX FLOW RATE (PSI)	K-FACTOR (PULSES/GALLON)	*ACCURACY RANGE +/- 5% (GPM)	STANDARD RANGE (GAL)	EXTENDED RANGE (GAL)	CV
1" PADDLE	40	4.9	8	.7-40	310-5,270	1,550-26,350	18
1-1/2" PADDLE	75	4.3	4	1.5-75	625-10,625	3,125-53,125	36
2" PADDLE	150	4.6	2	3.0-150	1,250-21,250	6,250-106,250	70
3" PADDLE	300	9.0	0.67	7.0-300	3,750-63,750	18,750-318,750	100

*\*Allow inlet straight pipe runs of at least ten pipe diameters and outlet pipe runs of at least five pipe diameters of the same size of the flow meter for best results.*

## WIRING

■ (black) = Ground  
■ (green) = Signal  
■ (red) = +VDC



### WATER QUALITY SYSTEMS

5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209

P: 262.238.4400 | F: 262.238.4404

WATERPURIFICATION.PENTAIR.COM

CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

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4004887 REV B OC16

# 18 Inch Round Brine Tanks



**18x40 Brine Tank with  
Blow Molded Cover**



**18x33 Brine Tank with  
Black Injection Molded Cover**

Clack's 18 inch blow molded round brine tanks offer a refreshing look in the residential and light commercial brine tank field. Durable materials and the latest in plastic processing technology provide trouble-free performance. Ultraviolet inhibitors (UVI) are now standard in all tanks except black, which has a natural resistance to the sun's rays. Three different sizes are available for up to 450 lbs. of salt capacity.

## Advantages:

- Attractive design to meet customer appeals with four modern stock colors to choose from — almond, blue, black and white. (Custom colors available.)
- Blow molded from high-density polyethylene to give exceptional environmental stress-crack properties providing years of trouble-free service.
- These tanks can be top loaded on other Clack water treatment components and drinking water systems to substantially reduce total shipping costs.
- All round brine tanks are individually shipped in a durable 150# test reshipper carton.
- Optional injection molded grid promotes uniform brining and reduced salt bridging.

ORDER NUMBER	DESCRIPTION
G21826BB1C00	18x36 Blue Brine Tank with Blow Molded Cover
G21833[*]B1C00	18x33 Brine Tank with Blow Molded Cover
G21833[*]G7CWG	18x33 Brine Tank with Black Injection Molded Cover
G21840[*]B1C00	18x40 Brine Tank with Blow Molded Cover
G21840[*]G7CWG	18x40 Brine Tank with Black Injection Molded Cover

[\*] Color code digit: A - Almond, B - Blue, C - Black, W - White

TANK SIZE	LIQUID CAPACITY		SALT CAPACITY		DIAMETER		HEIGHT W/ LID		SHIPPING WEIGHT		MASTER CARTON
in.	gal.	liters	lbs.	Kg	in.	cm	in.	cm	lbs.	Kg	ft. <sup>3</sup> /units per
18 x 26	27	102	275	125	18½	47	25	64	12	5.5	5.5/1
18 x 33	36	136	375	170	18½	47	33¾	84	12	5.5	7/1
18 x 40	43	163	450	205	18½	47	40¾	104	15	6.8	9/1

# Commercial/Industrial Rotationally Molded Brine Tanks



Commercial and industrial water softeners require a large volume of brine during each regeneration.

From a capacity of 95 gallons to 500 gallons, our Rotationally Molded Brine Tanks are built to last.

Molded out of durable, chemically resistant high density polyethylene, their ¼" seamless walls won't bulge.

Rotationally Molded Brine Tanks are strong enough to handle your toughest brine requirements. (All tanks and covers are black.)

## Also Available:

24" Plastic Grids

30" Plastic Grids

TANK SIZE	ORDER NUMBER	DIAMETER	HEIGHT	SALT CAPACITY	VOLUME	WEIGHT
24 x 48	G22448CB1P00	24"	48"	800 lbs.	95 gal.	30 lbs.
24 x 60	G22460CB1P00	24"	60"	1000 lbs.	115 gal.	32 lbs.
30 x 48	G23048CB1P00	30"	48"	1200 lbs.	145 gal.	48 lbs.
30 x 60	G23060CB1P00	30"	60"	1600 lbs.	180 gal.	56 lbs.
39 x 48	G23948CB1P00	39"	48"	2200 lbs.	250 gal.	67 lbs.
39 x 60	G23960CB1P00	39"	60"	2700 lbs.	300 gal.	80 lbs.
42 x 60	G24260CB1P00	42"	60"	3100 lbs.	350 gal.	84 lbs.
50 x 60	G25060CB1P00	50"	60"	4500 lbs.	500 gal.	107 lbs.

# Official Warranty

## Water Control Corporation

### Commercial Water Softeners

#### Limited Warranty

Water Control Corporation warrants the water softener control valve, plastic brine tank(s), and fiberglass-reinforced mineral tank(s) to be free of manufacturers defects for the lesser of 18 months from shipment or 12 months from system startup. Epoxy-lined steel mineral tank(s) shall be free from manufacturers defects for the lesser of 30 months from shipment or 24 months from system startup. We will, at our discretion, repair or replace defective products. This warranty does not include any costs associated with removal of defective products, or installation of replacement products. All replacement parts will be provided FOB Ramsey, MN. This warranty is transferable.

#### DISCLAIMER OF IMPLIED WARRANTIES

Water Control Corporation makes no warranties except those expressly stated in this document. To the extent permitted by the laws of the applicable state, **ALL WARRANTIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF, AND WATER CONTROL CORPORATION EXPRESSLY DISCLAIMS, ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

#### WHAT IS NOT COVERED BY THESE WARRANTIES

1. Conditions and damages resulting from any of the following:
  - Wear caused by unfavorable water conditions
  - Improper installation, delivery, or maintenance
  - Failure to provide system with adequate salt
  - Any repair, modification, alteration, or adjustment not authorized by the manufacturer or an authorized servicer
  - Misuse, abuse, accidents, or unreasonable use
  - Improper setting of any control
  - Incorrect electric current, voltage, or supply
2. Warranties are void if the original serial numbers have been removed, altered, or cannot be readily determined
3. The cost of service or service call to:
  - Correct installation errors
  - Instruct the user on proper use of the product
  - Transport the product to the servicer
4. Any costs associated with removal of defective products, or installation of replacement products.
5. Consequential, special, or incidental damages sustained by any person as a result of the breach of these warranties. Some states do not allow the exclusion or limitation of consequential or incidental damages, so the above exclusion may not apply to you.