

Crusader 5800 & 5810

Owner's Manual

Single-Tank Pro, Deluxe & Enhanced

2016 Model Year



CrusaderWater.com

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This Product is Made with Pride In The United States of America



Each 5800/5810 Valve is Tested and Certified by the WQA to NSF/ANSI Standard 44 & 372 for material safety and structural integrity & lead free compliance as well as CSA B483.1.

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Warnings & System Operational Requirements

The Crusader Water Quality Management System incorporates cutting-edge technology to bring you water that is perfectly soft, and free of inorganic minerals.

Your system is designed to address certain impurities in your water through the process of salt-based ion exchange.

Your system should only be installed on water that is microbiologically safe. To ensure best performance, and maintain warranty compliance, the following installation requirements should be met:

	Minimum	Maximum
Water Temperature	30 F	75 F
Water Pressure	30 psi	75 psi
Influent Water Hardness	0 gpg	100 gpg*
Influent pH	6.7	8.7
Influent TDS	10 ppm	1000 ppm*
Pathogenic Bacteria	N/A	0 CFU
Chlorine	0 ppm	3 ppm
Chloramine	0 ppm	1 ppm
Ambient Temperature	40 F	120 F

* Influent water hardness levels above 22gpg and TDS above 500ppm will negatively impact the taste of the water



Do not use with water that is unsafe or of unknown quality.
Test water periodically to verify that the system is performing satisfactorily.
Discard small parts remaining after installation.



Read and follow the information in this manual to minimize the risk of electric shock or personal injury.
If you are unsure about the installation of your system, contact technical support, a professional plumber, or certified water specialist.
This system must be installed in compliance with applicable state and local codes, applicable law, and regulations.



To bypass the system, turn bypass knob on both sides of the valve to bypass position. When returning to service, put the inlet into service before the outlet.

System Features & Benefits

By purchasing a Crusader Water Quality Management System, you can now enjoy clean, softened water utilizing robust water treatment technologies.

Efficient

The Crusader Water Quality Management System learns your lifestyle and quickly adapts itself to meet your needs, delivering exceptional water quality while saving you salt, water and electricity. The highly sensitive digital flow-meter installed in your System allows it to learn how much water you use and when you use it; adjusting reserves and salt consumption to match your water-usage lifestyle and minimize bacterial growth.

Upgradeable

Designed for the future, your Crusader Water Quality Management System is capable of being modularly upgraded, as new technologies are developed to accommodate for rapidly degrading water conditions. The onboard control center can be updated with the latest software updates & upgrades as they become available.

Reliable

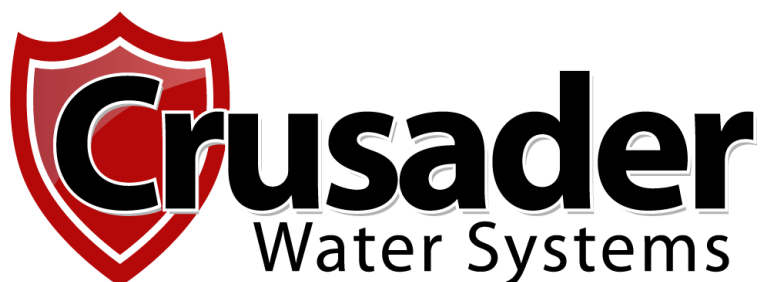
The mechanical subsystem in each Crusader Water Quality Management System is revolutionary in its own right. The Crusader Water Quality Management System is built around Open-platform™ technology, building on a 40-year legacy of reliable design and using 21st century composite materials to ensure reliable and dependable performance.

Safe

Every Crusader Water Quality Management System is handcrafted in the USA by skilled artisans in a world-class facility to provide you with a water treatment system that exceeds industry safety, manufacturing & quality control standards to give you peace of mind.

Simple

Advanced manufacturing methods and skillfully crafted computer hardware & software makes the Crusader Water Quality Management System one of the easiest water quality improvement systems to own and operate.



Your responsibilities as an equipment owner

Your Crusader Water Quality Management System is manufactured to be efficient and reliable.

To ensure continued performance while keeping your system operating within manufacturer's specifications, the following operating conditions must be ensured by you, the equipment owner/operator:

Water Pressure Regulator

The influent water pressure into this water system must be regulated by a code-compliant pressure-regulating device not to exceed 75 psi.

Power Protection

Power to this system must be supplied by an unswitched 110VAC supply. Surge protection is mandatory and is to be supplied by you, the equipment owner. The use of a UPS (Uninterruptible Power Supply) is encouraged.

Salt

This water system uses either sodium or potassium salt to clean itself. The brine tank must be filled with a high quality salt to ensure proper system operation. Consult with your local water professional to decide on the best salt for your area.

ProGuard

The ProGuard reservoir should be kept full to ensure proper system operation and maximum efficiency. ProGuard works synergistically with the Softening media to ensure the very best water feel and to maximize cleaning power. Check the level of your ProGuard feeder each time you fill your brine tank with salt.

Periodic replacement of media

While built to the highest standards, certain media in your Crusader Water Quality Management System will need to be replaced periodically.

Replacement intervals vary depending on your water chemistry and water consumption habits. Consult with your local water specialist to ensure that you always enjoy the very best water quality.

ProGuard

The ProGuard™ system incorporated into every Crusader Water Quality Management System ensures that you have the best water quality all year long. This simple dispensing system is specially engineered to work in all climates to easily introduce ProGuard into your brine tank while the system is waiting to clean itself.

Your Crusader Water Quality Management System will use varying amounts of ProGuard, depending on your water consumption habits; always maximizing efficiency and performance while providing you with the water quality that you deserve.

ProGuard is designed to:-

- Clean ion-exchange resin without damaging structured matrix media
- Clean all moving parts & create a temporary protective coating
- Create an unhealthy environment for bacteria in the system
- Remove oils and other hydrocarbons from resin
- Clean Activated Carbon Media
- Enhance self-sanitization processes on compatible systems

Always keep your ProGuard reservoir full to ensure proper system performance, longevity & efficiency.

Cleaning and Disinfection

Your Crusader Water Quality Management System is quite probably the hardest working appliance in your home, processing millions of gallons of water over its service life and in turn protecting you from countless amounts of inorganic calcium, magnesium, lead, copper, zinc, iron, manganese, and other contaminants that could be in your water.

In addition to capturing inorganic contaminants, your softener also accumulates sediment, bacteria, algae, mold, and fungus that can enter the system through safe city water, salt, or even from the air. These additional contaminants slowly accumulate in your softener and can even colonize it with a biofilm of Heterotrophic Plate Count (HPC) bacteria. These bacteria are usually benign, but they can create a food base as safe refuge for potentially harmful pathogens and seriously compromise the longevity and performance of your system. While weekly antibacterial rinses and supplementation with ProGuard help minimize bacterial growth, your system should also be cleaned and disinfected on a regular schedule to ensure that it is working to the best of its ability and to protect the safety of your family.

Your local dealer can perform the cleaning and disinfection service for you, or you can purchase a comprehensive cleaning and disinfection kit to perform this task yourself.

System Installation & Start-up Guidelines

Clear the installation area and carefully sweep the floor where the system will be installed.

Test incoming water pressure and make sure it is 30 – 75 psi static. A code-compliant pressure regulator must be installed to protect the system on all municipal water installations.

Check to confirm that the water heater has adequate heat expansion protection.

Install the system, drain and brine tank overflow according to manufacturer's instructions and prevailing local code.

Bypass System.

Run bathtub cold to purge piping of debris and chemical residue from installation,

This will take approximately 5 minutes at 3 gpm.

Leave bathtub running and slowly open the inlet valve to the system.

Slowly open the outlet valve from the system.

Observe flow of water from the bathtub. Water will become a dark brown/black color. This color is caused by the system disinfectant/preservative as well as dust from shipping & handling. Allow water to run until clear. Observe water for particles. If resin or other Softening media particles are found in the water, bypass the system and call tech-support. - Leave the bathtub running

Enter programming mode

Program the system to match the installation configuration and operating conditions

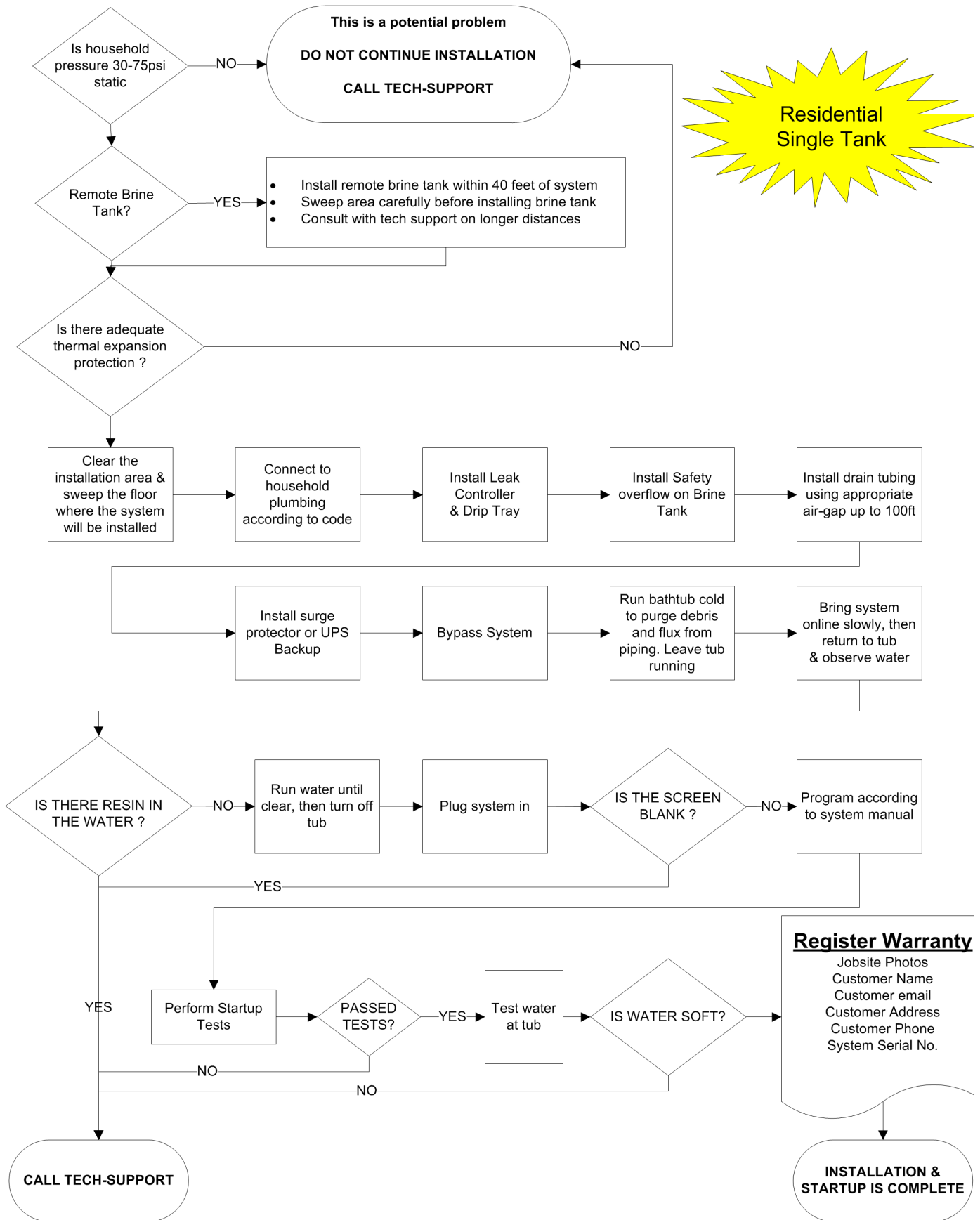
Begin a cleaning cycle by pressing the **CYCLE** button and holding for at least 5 seconds.

Advance the system through each cycle step by pressing the **CYCLE** button. Observe the system during each cycle and then progressively advance to the next until the regeneration terminates.

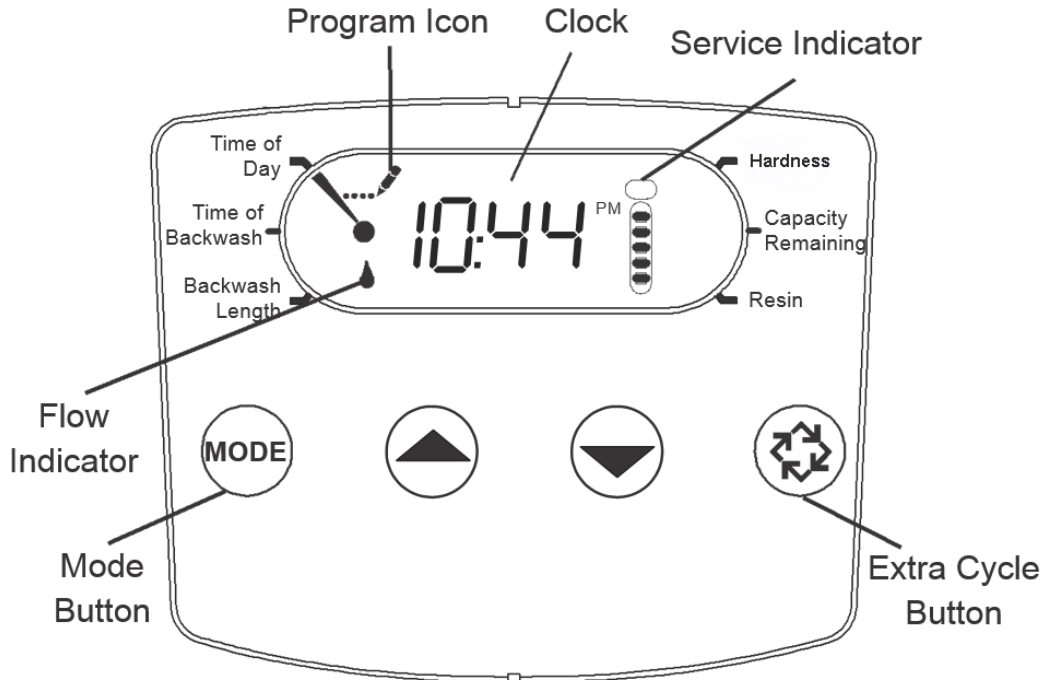
Once the system has been advanced to normal operating mode, observe the flow of water from the bathtub again for disinfectant and resin. Allow water to run clear – Turn off bathtub

Test water at any softened faucet to confirm acceptable water production from the system.

Installation And Startup Checklist



Understanding Your Controller LXTi



Service Indicator:

The Service Icon flashes if an automatic cleaning cycle has been scheduled, or if you request a delayed cleaning cycle.

Flow Indicator:

Flashes when flow is detected through the system—faster blinking indicates a higher flow rate.

Program Icon:

Displayed when the controller is in Programming Mode.

Data Display and Clock:

Displays clock, cycle times, diagnostic and other information as necessary.

PM Indicator:

Illuminates when the time is afternoon.

Mode Button:

Used to access various operation/programming modes.

Up & Down Buttons

Adjust digits up or down and select between alternate options when changing system settings.

Extra Cycle Button:

Press once to initiate a delayed cleaning cycle—Press and hold to clean now.

System Programming LXTi

End-user programming is generally not necessary. If you ever need to change programming, the following procedure should be used:-

To Set Time of Day:

Press and hold either the **Up** or **Down** buttons until the Time of Day icon appears. Make changes with the **Up** or **Down** Button as necessary and press the **CYCLE** button

Accessing the End-User Programming level:

Make sure that the system is in the service mode.
Press the **MODE** button to access programming mode (Program icon appears)
Use the **MODE** button to advance through program settings
Use the **UP** and **DOWN** arrows to make changes within individual settings.
Press the **CYCLE** button until the Programming Icon disappears.

Available programming parameters:

	Factory Default Setting	Notes
Time of Regen	11:00 PM	The system will begin cleaning itself at this time. Since it fills and percolates first, the system will not place itself offline until 3 hours after the beginning of the cleaning sequence.
Salt Amount	6 Lbs.	Minimum salt amount used to perform a cleaning
Hardness	20 GPG	Your dealer will adjust this to match the results of their testing on your untreated water.
Capacity Remaining	NOTE	Capacity Remaining cannot be changed
Resin	Varies	Factory-set. Do not adjust without consulting your dealer

Diagnosics Mode LXTi

Diagnosics mode is accessed as follows:-

Press the **UP and MODE** buttons simultaneously for 5 seconds.

The first diagnostic will display on the screen. Press the **UP** button to view.

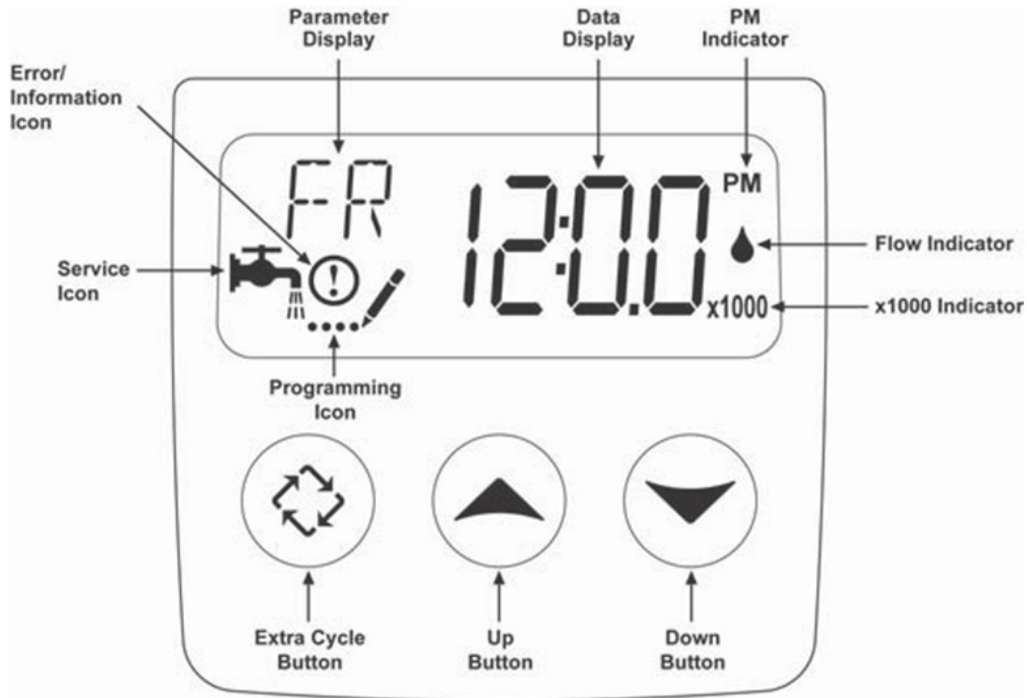
Press the **MODE** button twice to move to the next diagnostic display.

Press the **UP** button to advance through stored data.

Press and hold the **CYCLE** button for one minute to exit Diagnosics Mode

Diagnostic Code	Description
H1	Displays the days since last regeneration, 0-30.
H2	Displays the current flow rate, gallons per minute.
H3	Displays the current day of week, 1-7.
H4	Displays the total volume of water treated by the unit for the current day in gallons.
H5	Displays the total volume of water used since the last regeneration in gallons.
H6	Displays the software version. Version number of software. D = Downflow U = Upflow
A1	Displays the average water usage for day 1, in gallons.
A2	Displays the average water usage for day 2, in gallons.
A3	Displays the average water usage for day 3, in gallons.
A4	Displays the average water usage for day 4, in gallons.
A5	Displays the average water usage for day 5, in gallons.
A6	Displays the average water usage for day 6, in gallons.
A7	Displays the average water usage for day 7, in gallons.

Understanding Your Controller SXTi



Service Icon:

The Service Icon flashes if an automatic cleaning cycle has been scheduled, or if you request a delayed cleaning cycle.

Error/Information Icon:

Illuminates when the system detects a fault condition.

Parameter Display:

Displays cycle descriptors during cleaning.

Data Display:

Displays cycle times, diagnostic and other information as necessary.

PM Indicator:

Illuminates when the time is afternoon.

Flow Indicator:

Flashes when flow is detected through the system—faster blinking indicates a higher flow rate.

Programming Icon:

Illuminates when the control is in programming mode.

Up & Down Buttons

Adjust digits up or down and select between alternate options when changing system settings.

Extra Cycle Button:

Press once to initiate a delayed cleaning cycle—Press and hold to clean now.

System Programming SXTi

End-user programming is generally not necessary. If you ever need to change programming, the following procedure should be used:-

To Set Time of Day:

Press and hold the **Up** or **Down** button until the PROGRAMMING ICON illuminates.
Make changes with the **Up** or **Down** Button as necessary and press the **CYCLE** button

Accessing the End-User Programming level:

Make sure that the system is in the service mode.
the **UP** and **DOWN** buttons **simultaneously** and **hold for 5 seconds**
Use the **CYCLE** button to alternate between program settings
Use the **UP** and **DOWN** arrows to make changes within individual settings.
Use the **CYCLE** button to exit programming mode, and return to service mode

Available programming parameters:

	Factory Default Setting	Notes
(DO) Day Override	7 Days	Default setting allows your system to clean itself once a week to minimize bacterial contamination. The amount of salt used is related to the amount of water used, If you use no water in that week, the system will use no salt.
(RT) Cleaning Time	11:00 PM	The system will begin cleaning itself at this time. Since it fills and percolates first, the system will not place itself offline until 3 hours after the beginning of the cleaning sequence.
(H) Water Hardness	20 GPG	Your dealer will adjust this to match the results of their testing on your untreated water.

Diagnosics Mode SXTi

Diagnosics mode is accessed as follows:-

Press the **UP and EXTRA CYCLE** buttons simultaneously for 5 seconds.

Press the **UP** button to advance through stored data.

Press the **EXTRA CYCLE** button to exits Diagnosics Mode

FR— Current Flow Rate	The speed at which water is flowing through your system right now.
PF—Peak Flow Rate	The highest flow the system has detected since the most recent cleaning cycle.
HR—Hours in Service	Total number of hours that your system has been in-service
VU—Volume Used	Number od gallons processed through your system
RC—Reserve Capacity	Displays the system's Reserve Capacity calculated from operational and pre-programmed data, as
SV—Software Version	Display's the SXTi software version installed on your controller

XTR2 LCD Controller - Coming Soon



System Control & Operation

Your Crusader Water Quality Management System incorporates a highly sophisticated microprocessor control system, making it as efficient and reliable as possible. All system settings are pre-programmed at the factory and then carefully calibrated by your qualified installer for your specific application and area.

Your Crusader Water Quality Management System incorporates flash EEPROM memory and an innovative power backup system, which means that your system programming should never have to be reset, even in the event of an extended power outage. Your system can also be upgraded with the latest software and hardware revisions as they become available. Visit your local authorized dealer for more information.

Normal Operating Mode

In **normal operating mode**, the display shows the time of day, capacity remaining, and the system status. Your system continuously monitors the flow meter and makes decisions on when and how to clean based on its programming profile and observations of your water usage habits.

Flow meter

In **service mode**, the display will show the time of day and remaining capacity. The remaining capacity counts backwards in gallons as water is used. The flow display indicator can be used to determine if the flow meter is working by opening a faucet downstream of the system and observing the gallons count down as well as the flow glyph.

Power-Failure Handling

In the event of a power failure, your system's integrated Snapshot memory system will retain all programmed data indefinitely. The system will maintain the correct time of day during a period of several hours. In the case of a prolonged power failure, the time of day might not be maintained; if this happens, the time of day indicator will, when the power supply is re-established, be *flashing*, indicating that the time of day needs to be set. All other programming is unaffected.

Critical Software/Hardware failure

After a critical software or hardware failure, the **Error Information Icon** could illuminate solid or blinking. Call your local service provider for help.

Cleaning/Regeneration mode

Cycle times will vary depending on your water usage habits, the system operational history, pre-programmed settings and other environmental factors. In **regeneration mode** the display shows the current cleaning cycle description and the remaining time for that cycle to execute. The cleaning sequence is as follows:-

Tank Fill	Your system calculates the exact amount of brine solution required to properly clean itself, based on pre-programmed settings, operational history, your water usage habits and the age of the system. Your system is online and in service at this time.
Percolation	Your system remains online and in service while the water and salt slowly mix together to create a perfectly saturated sodium or potassium brine solution
Backwash	Your system rapidly discharges water upwards through the media bed and to the drain. This backwash step ensures that trapped sediment and broken media particles are flushed out of the system to minimize pressure loss and channelling.
Brine Draw	Your system will extract brine water from the brine tank and apply it to the ion exchange media in the tank.
Slow Rinse	Your system will continue injecting brine into the media tank. Once the brine supply is exhausted, your system will begin slowly rinsing contaminants through the media bed and out of tank to drain.
Rapid Rinse	A high velocity stream of water is directed downwards through the multimedia bed to compact each of the media layers, flush hard water from the tank and prepare for returning itself to service.
Return to Service	The system slowly drives the operating piston to the home position and gracefully brings itself back online, ready to work hard for you.

Your system will periodically perform an antibacterial deep cleaning. This cleaning cycle will occur after a designated period of time (we recommend at least every once a week). This cleaning cycle will inject ProGuard into your system and possibly even use salt to clean itself, depending on your water usage. If you haven't used any water during that interval, the system will not use any salt during the antibacterial cleaning cycle.

Understanding how your system operates

Every day, thousands of billions of tons of water evaporate from the earth's surface.

As the heat of the sun evaporates the water and draws it from the earth's surface into the atmosphere, many impurities are left behind. The water vapor eventually cools to form clouds and then falls back to earth as precipitation.

On its way from the clouds to your faucet, soft rain water dissolves and absorbs a part of almost everything it touches.

Falling rain cleans the air as it falls. Unfortunately the impurities that were removed from the air have not left; they have just been relocated through the water onto the ground. These gases and other airborne contaminants can cause undesirable tastes, colors and odors in water.

Rain falls onto the ground, collecting sediments like rust, sand and even algae. The water eventually finds its way to a surface water supply or percolates downward and collects in an aquifer. As it percolates through the earth, the water can absorb hardness minerals, iron, heavy metals, radioactivity, organic contaminants, and many other complex elements and compounds.

Water can also collect numerous harmful man-made chemical impurities during this cycle. These synthetic chemicals are generally odorless, colorless, and tasteless; and can sometimes be life-threatening. The statement: "my parents drank this water for 50 years and it never hurt them", is no longer a valid excuse to not be concerned with water quality. There has been a massive global increase in harmful chemical waste over the last 50 years.

The scientific and medical community has not had the time or budget to study the long-term health effects of the more than 70,000 harmful chemicals that can be found in use today.

Approximately 1,000 new synthetic chemical compounds are entering the industrial marketplace each and every year. Precipitation falls upon commercial and municipal dumpsites, toxic waste sites, industrial refuse depots, military test sites, leach fields, mining operations, farmer's fields etc... Where it dissolves minute amounts of the toxic chemicals present and carries them along.

The United States Government estimated in 1986 that close to two percent of the nation's ground water supplies were moderately polluted by sources such as hazardous waste dumps and leaking landfills.

Industrial wastewater is also a major source of water contamination. Chemicals that are considered generally acceptable in controlled amounts may react with other elements and/or chemicals to form new compounds that could be highly carcinogenic.

Chlorine is one of the best-publicized examples; it reacts with organic matter in water and forms deadly trihalomethanes.

Hard water is one of the major threats facing the American home in the 21st century. Hard water can coat you, your family, your home and your appliances with thousands of pounds of inorganic mineral rock-scale each and every year. Hard water slowly destroys everything it touches; left untreated, hard water costs you money, ruins your lifestyle and can even lower the value of your home.

No one needs to tell you that you're living with Hard Water though. Soap doesn't lather easily, glasses are cloudy after washing, a ring forms around the bathtub, faucets and shower heads are crusty, laundering results are poor and there are many other easily recognized signs.

There are several degrees of water hardness. Even moderately hard water can seriously damage the plumbing system in your home and, in time, cause inconvenient and expensive problems.

Hard water is a poor cleaner because it is loaded with a variety of impurities. These dissolved impurities react with certain chemicals found in soap to form a gummy, insoluble curd that clings stubbornly to everything it touches. The ring around your bathtub is curd. That same curd causes your hair to become dull and hard to manage.

Soap curd clogs skin pores and prevents your natural oils from properly moisturizing your skin. This dryness causes itching and also can aggravate skin conditions like psoriasis, eczema and acne.

Soap curd is especially noticeable by the scummy film it forms on dishes, glassware, walls and floors. Hardness and other dissolved solids combine to form the residue you see as spots on glasses, crockery, cutlery and shower enclosures.

How water hardness is measured

Water hardness is measured in imperial Grains per Gallon (gpg). A grain, is the weight of an average dry grain of wheat, approximately 1/7000th of a pound.

Soft Water	0 - 0.5 gpg
Slightly Hard Water	.5 - 3.5 gpg
Moderately Hard Water	3.5 - 7 gpg
Very Hard Water	7 - 10.5 gpg
Extremely Hard Water	10.5 gpg and greater

Water Softening Process

The smallest units that make up chemical compounds and still retain the properties of those compounds are called molecules. Molecules are made up of atoms or groups of atoms. Electrically charged atoms are called ions. The charge of a single ion can be either positive or negative - Ions of metals and minerals are usually positively charged and called cations. Ions such as chlorine, nitrate, phosphate, fluoride and sulfates are negatively charged and called anions.

Certain insoluble materials are made up of large ions forming a skeletal structure containing oppositely charged ions. These ions can be exchanged with other similar ions in an ion exchange.

The first commercial application of ion exchange was water softening in 1905. Since then, ion exchange has been the most reliable & cost-effective method of softening and conditioning water in homes and industry.

The Softening of water by ion exchange relies on the replacement of the calcium and magnesium ions in the water by an equivalent number of sodium ions.

The Softening process may be illustrated by the following equation:-

$R_2.Na +$	$Ca(HCO_3)_2 =$	$R_2 . Ca +$	$2NaHCO_3$
Sodium Ion Exchange Resin	Calcium Bicarbonate in water	Calcium Ion Exchange Resin	Sodium Bicarbonate in Water

Obviously, the system can only exchange a certain amount of hardness and other contaminants before becoming exhausted. This is referred to as the capacity of the resin. The capacity of the resin is referred to as grains of calcium carbonate hardness removed per cubic foot of resin or Milliequivalents per liter. When the capacity has been exhausted, the resin needs to be regenerated with a solution of sodium chloride (brine) as follows:

$R_2.Ca +$	$2NaCl =$	$2 R.Na +$	$CaCl_2$
Calcium Ion Exchange Resin	Sodium Chloride Brine	Sodium Ion Exchange Resin	Calcium Chloride Waste

Over the years the composition of ion exchange media has advanced, reflecting sophisticated global technological advances.

Ion exchange resins used in your Crusader Water Quality Management System are made without harmful toxic solvents. This media is designed to be physically and chemically strong while producing water that feels good, tastes great and works hard for you.



Your Crusader Water Quality Management System can be regenerated with Potassium Chloride salt if desired.

THE CRIMES OF HARD WATER, METALS & CHLORINE

Increased Water Heating Costs

Damaged Clothing

Excessive Soap Consumption

Pipe Scaling

Faucet and Fixture Damage

Skin Problems

Unpalatable Food

Undesirable Tastes and Odors

Premature Appliance Failure

Unsatisfactory Laundry Results

Unpleasant Tastes & Odors in Water

Staining on Faucets, Fixtures & Appliances

What is Hard Water Costing You?

Items affected by hard water	Average Family Cost		Average Family Savings		Average % Saved
	Per Year	Per Month	Per Year	Per Month	
Plumbing and Appliances Replacement and repairs of pipes, faucets, washer, dishwasher, and water heater, etc. <i>Water Quality Research Council Study</i>	\$120.00	\$10.00	\$90.00	\$7.50	75%
Cooking and coffee Tea, sugar, canning, etc. <i>National Restaurant Association</i>	\$118.56	\$9.88	\$22.44	\$1.87	25%
Personal Care Items Slips, lingerie, etc. <i>American Laundry Institute</i>	\$60.84	\$5.07	\$18.24	\$1.52	30%
Clothing and linens Washable items such as towels and linens <i>American Laundry Institute</i>	\$600.00	\$50.00	\$175.00	\$15.00	30%
Energy Consumption Heat loss due to scale <i>University of New Mexico and WQA Studies</i>	\$320.00	\$26.67	\$64.44	\$5.37	20%
Soaps and Cleaning Aids Laundry, cleaning, dishwashing, bathing, skin-care, shaving, shampoo etc... <i>Orange County Consumer Survey *10 or more hours of cleaning a month</i>	\$1,032.00	\$86.00	\$774.00	\$64.50	75%

What Could Soft Water Be Saving You?

TOTAL COSTS AND SAVINGS		
	Hard Water Cost	Soft Water Savings
Total Per Day	\$6.25	\$3.19
Total Per Month	\$187.62	\$95.76
Total Per Year	\$2,251.44	\$1,149.12
Total Over 10 Years	\$22,514.40	\$11,491.20

The figures above are National Average Figures based upon an average family of 4 persons with an average water hardness of 10 grains per gallon

System Troubleshooting Guidelines

These troubleshooting guidelines are not intended to be all-inclusive or to substitute the expert diagnosis of your local Certified Water Professional.

Hard (untreated) water to service

Cause	Solution
Open or defective bypass	Close or verify bypass
Loss of media	Refer to problem "Loss of media"
Unit fails to regenerate	Refer to problem "System fails to clean"
Valve fails to draw brine	Refer to problem "System fails to draw brine"
Decreasing exchange capacity of resin	Clean or replace resin bed
No salt in brine tank	Add salt
Leak at riser tube	Verify that riser tube is seated correctly and is not damaged by heat or high water pressure
ProGuard supply exhausted	Refill ProGuard feeder

System fails to regenerate

Cause	Solution
Faulty electrical supply	Verify electrical service – Confirm unswitched power outlet
Obstructed flow meter	Clean and/or replace flow meter
Damaged PCB	Replace PCB
Damaged drive motor	Replace drive motor

Loss of Water Pressure

Cause	Solution
Mineral or iron build-up in resin tank	Clean resin bed and control valve; increase regeneration frequency. Increase ProGuard dosage rate
Plugged lower and/or upper distributor	Verify that distributors are free of debris
Crushed lower and/or upper distributor	Replace distributor/s - Check for adequate temperature/pressure protection
Resin damaged due to natural attrition or chlorine/chloramine oxidation	Replace Resin

System runs continually down the drain

Cause	Solution
Piston stuck in brine/rinse or back-wash position	Inspect drivetrain and perform remedial action
Damaged Seals/Spacers	Inspect Seals/Spacers and perform remedial action
Damaged Piston	Inspect drivetrain and perform remedial action

Loss of media through drain line

Cause	Solution
Lower and/or upper distributor damaged	Replace distributor(s)
Leak between riser tube and upper distributor	Verify that riser tube is seated correctly and is not cracked
Heat and/or Pressure Damage	Inspect pressure regulating valve and hot water backup protection devices. Perform appropriate remedial action.

System Fails to Draw Brine—Not Using any Salt

Cause	Solution
Low operating pressure	Verify operating pressure; must exceed 30 psi dynamic
Plugged injector	Clean injector
Plugged injector filter	Clean injector filter
Piston/stuck in incorrect position	Inspect drivetrain and perform remedial action
Restricted/Obstructed drain line	Check drain line for kinks, restrictions or obstructions
Restricted/Obstructed brine line	Check brine line for kinks, restrictions or obstructions
Leak in brine line	Verify brine line and connections for air leakage
Insufficient water in brine tank	Refer to problem "System fails to refill brine tank"

Excessive water in brine tank

Cause	Solution
System fails to draw brine	Refer to problem "System fails to draw brine"
Improper brine refill time setting	Verify that brine refill time corresponds to the proper salt level and amount of ion exchange resin and other media
Missing brine refill flow control	Verify that flow control is installed and properly sized
Leak from valve to brine tank	Clean or replace Brine Valve
Brine Valve damaged	Replace Brine Valve

System uses too much salt

Cause	Solution
Excessive water in brine tank	Refer to problem "Excessive water in brine tank"
System cleaning frequently	Check household for excessive or unexpected water usage — leaky toilet fill valves, T&P Relief drainage, Reverse Osmosis processors, humidifiers, plumbing leaks etc...

Salty water to service

Cause	Solution
Excessive water in brine tank	Refer to problem "Excessive water in brine tank"
Injector undersized	Verify injector selection
Injector fouled	Remove and clean injector
Improper brine/slow rinse time setting	Verify that brine/slow rinse time corresponds to the proper salt level and amount of resin
Improper fast rinse time setting	Verify that fast rinse time corresponds to the proper salt level and amount of resin

System fails to refill brine tank

Cause	Solution
Improper brine refill time setting	Verify that refill time corresponds to salt level and amount of resin
Plugged refill flow control	Clean flow control

System Error Codes LXTi

During an error condition, the system will attempt to function as much as possible; at a minimum continuing to monitor the flow meter and update the remaining capacity. Once the error condition is corrected, the system will return to normal operating mode.

If an error is present, a cleaning cycle can only occur manually by pressing and holding the **CYCLE** button for 5 seconds. If the system was in a cleaning cycle when the error occurred, it will complete the regeneration cycle and attempt to return to service.

When the problem is corrected, and the error no longer displays (it may take several seconds for the system to stop displaying the error message), the system will return to normal operation.

Error Code	Error Type	Cause	Reset and Recovery
---0	Motor Stall / Cam Sense Error	No state changes in the optical sensor are detected for 6 seconds during regeneration.	Power Cycle Controller. Allow the control to attempt to find position again. Verify the optical sensor is in place with the wires connected to the circuit board. Verify the motor and drive train components are in good condition and assembled properly. Check the valve and verify that the piston travels freely. Replace/reassemble the various components as necessary. Plug the unit back in and observe its behavior. If the error reoccurs, unplug the unit, put it into bypass and contact technical support.
---1	Motor Error /Cycle Sense Error	An undesired optical sensor state change occurred.	Non-critical error. Extra optical sensor pulse detected. Press any button to clear the error. Press extra cycle button to advance motor to clear error.
---2	Regen Failure	The system has not regenerated in 30 days.	Perform a Manual Regeneration to reset the error code. Verify that the system is measuring flow by running service water and watching for the flow indicator on the display. If the unit does not measure flow, verify that the meter cable is connected properly and that the meter is functioning properly.
---4	Fail Safe Error	Valve has failed to find it's position	Unplug the unit and plug it back in. If error continues, contact your dealer.

System Error Codes SXTi

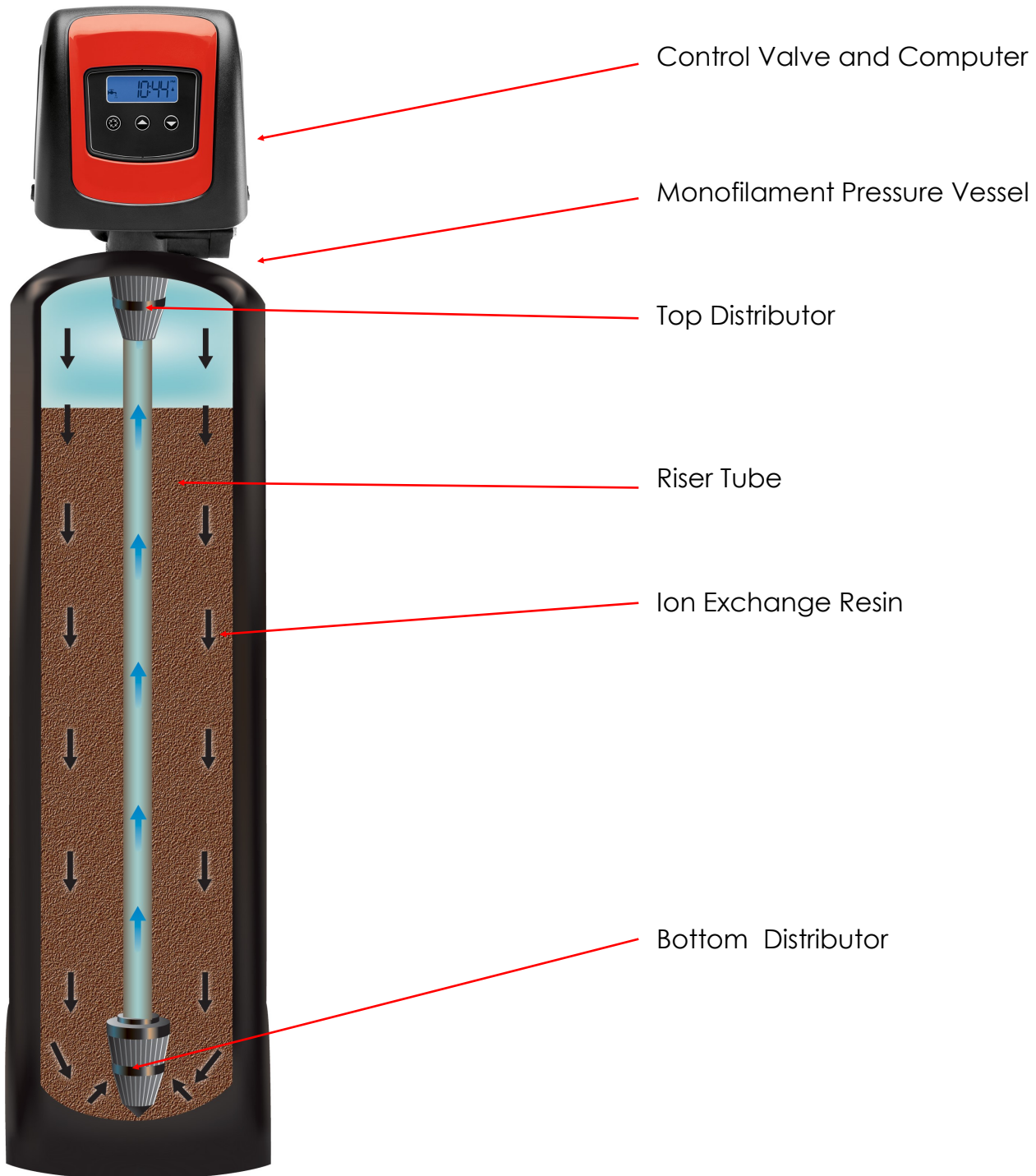
During an error condition, the system will attempt to function as much as possible; at a minimum continuing to monitor the flow meter and update the remaining capacity. Once the error condition is corrected, the system will return to normal operating mode.

If an error is present, a cleaning cycle can only occur manually by pressing and holding the **CYCLE** button for 5 seconds. If the system was in a cleaning cycle when the error occurred, it will complete the regeneration cycle and attempt to return to service.

When the problem is corrected, and the error no longer displays (it may take several seconds for the system to stop displaying the error message), the system will return to normal operation.

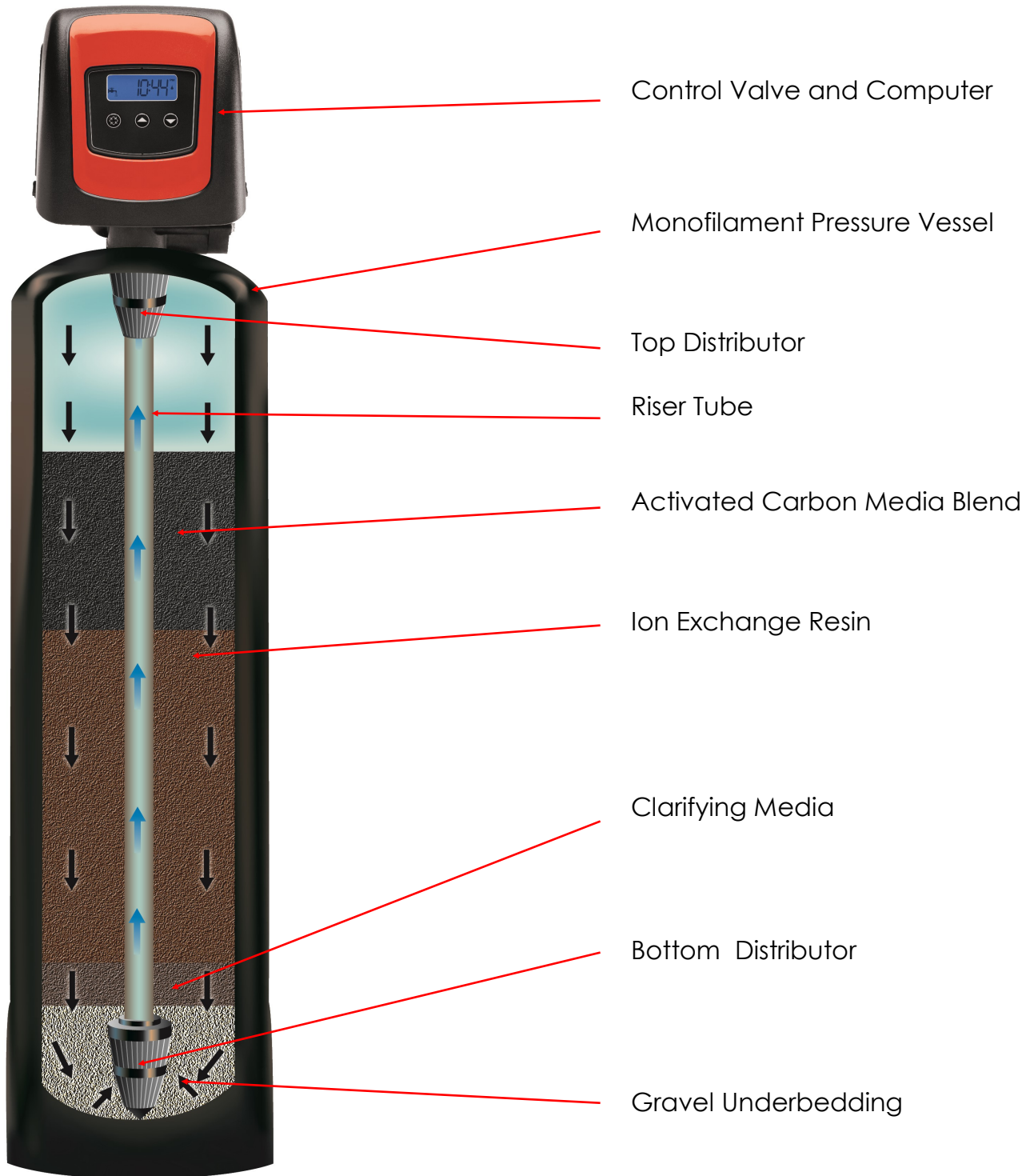
Error Code	Cause	Reset and Recovery
0	No state changes in the optical sensor are detected for 6 seconds.	Power Cycle and allow the control to attempt to find position again. Verify the optical sensor is in place with the wires connected to the circuit board. Verify the motor and drive train components are in good condition and assembled properly. Plug the unit back in and observe its behavior. If the error reoccurs, unplug the unit, put it into bypass and contact your dealer.
1	An undesired optical sensor state change occurred.	Non-critical error. Extra optical sensor pulse detected. Press any button to clear the error. Press extra cycle button to advance motor to clear error.
2	The system has not regenerated for more than 99 days	Perform a Manual Regeneration to reset the error code. Verify that the system is measuring flow by running service water and watching for the flow indicator on the display. If the unit does not measure flow, verify that the meter cable is connected properly and that the meter is functioning properly.
3	Control board memory failure.	Perform a Master Reset and reconfigure the system via Master Programming Mode. After reconfiguring the system, step the valve through a manual regeneration. If error continues, call your dealer.
4	Valve has failed to find position in 60 seconds	Unplug the unit and plug it back in. If error continues, Call your dealer.

System Components (Pro Model)



	<p>The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs</p>		<p>Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel</p>
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System Components (Deluxe Model)

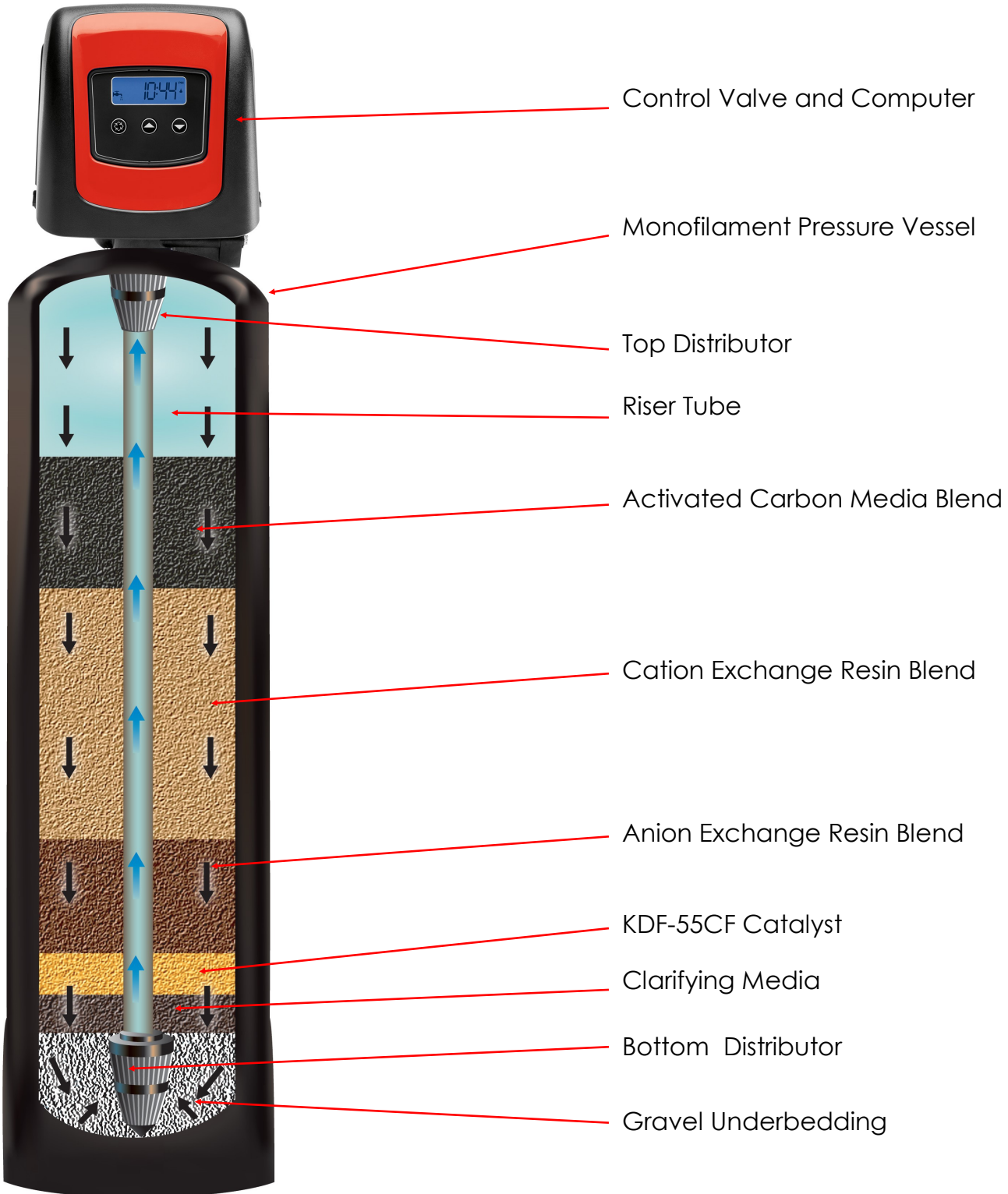


The System must be **BYPASSED, DEPRESSURIZED and DE-ENERGIZED** before disassembling or performing mechanical repairs



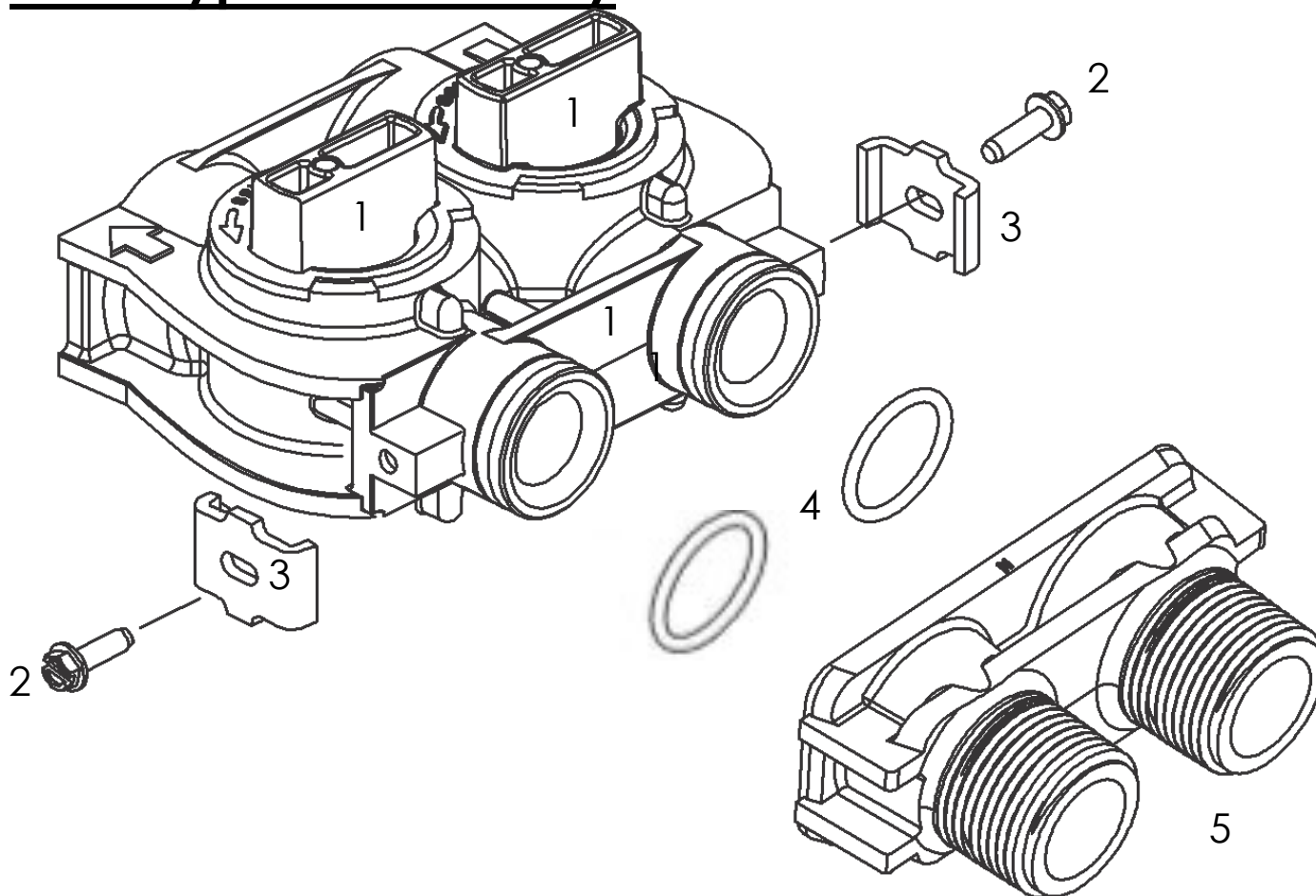
Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

System Components (Enhanced Model)



	<p>The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs</p>		<p>Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel</p>
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5800 Bypass Assembly



Item #	Qty	Part #	Description
1	1	60049	Composite Bypass Assembly
2	2	13314	Screw, Slot Ind Hex, 8-18 x 0.60
3	2	13255	Stainless Steel Mounting Clip
4	2	13305	O-Ring—119
5	2	18706	1" Composite NPT Yoke



To bypass the system, turn bypass knobs to bypass position. When returning to service, put the inlet into service before the outlet.

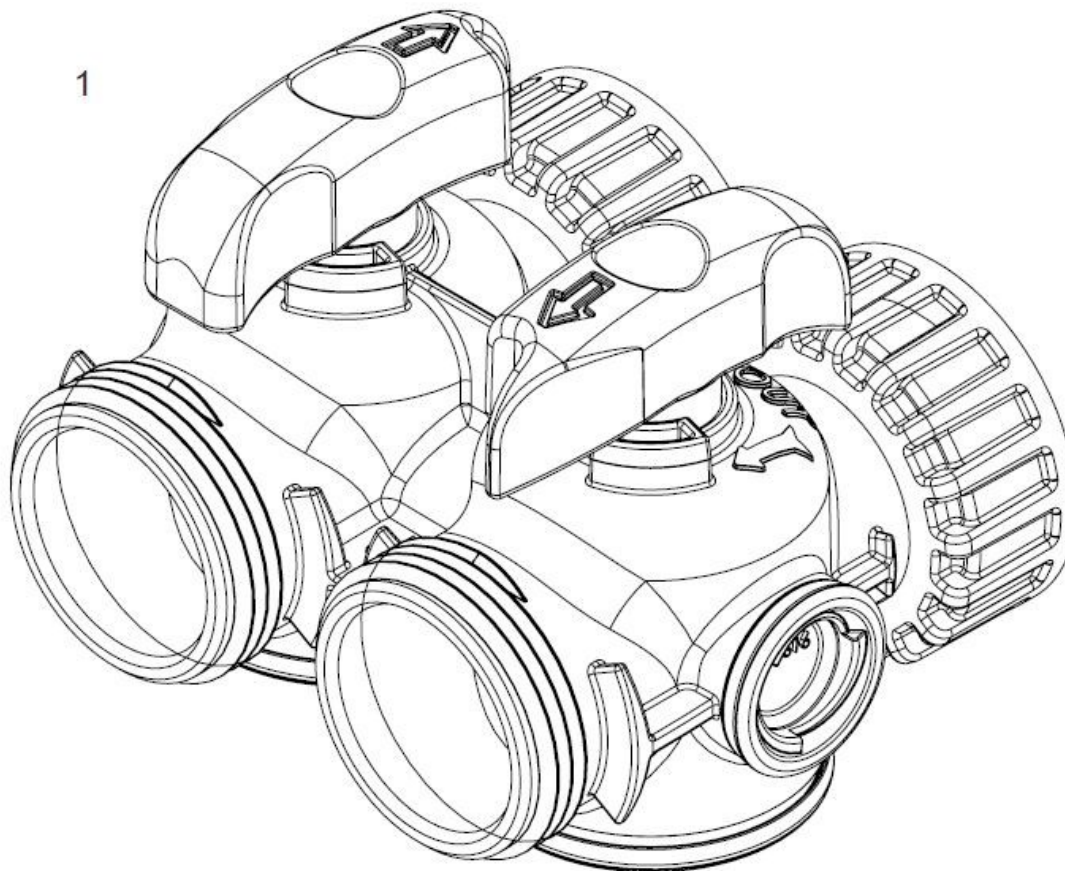


The System must be **BYPASSED, DEPRESSURIZED** and **DE-ENERGIZED** before disassembling or performing mechanical repairs



Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

5810 Bypass Assembly



Item #	Qty	Part #	Description
1	1	43644	Composite Bypass Assembly 5810/5812
	OPTIONAL	61991-01	Connector Assembly, 1" NPT
	OPTIONAL	61991-03	Connector Assembly, 1-1/4" NPT
	OPTIONAL	61991-05	Connector Assembly, 3/4" - 1" Sweat
	OPTIONAL	61992	Elbow Assembly



To bypass the system, turn bypass knobs to bypass position. When returning to service, put the inlet into service before the outlet.

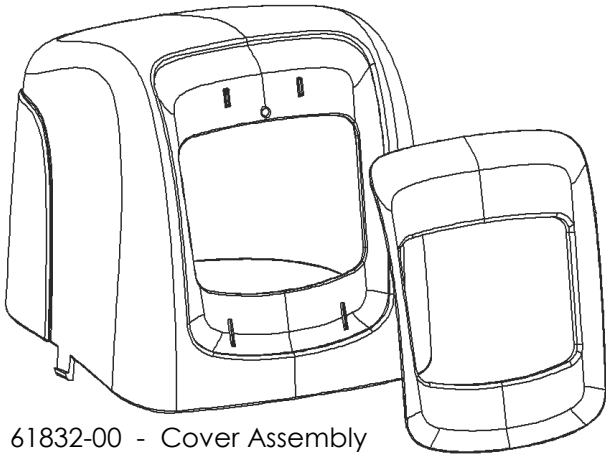


The System must be **BYPASSED, DEPRESSURIZED** and **DE-ENERGIZED** before disassembling or performing mechanical repairs



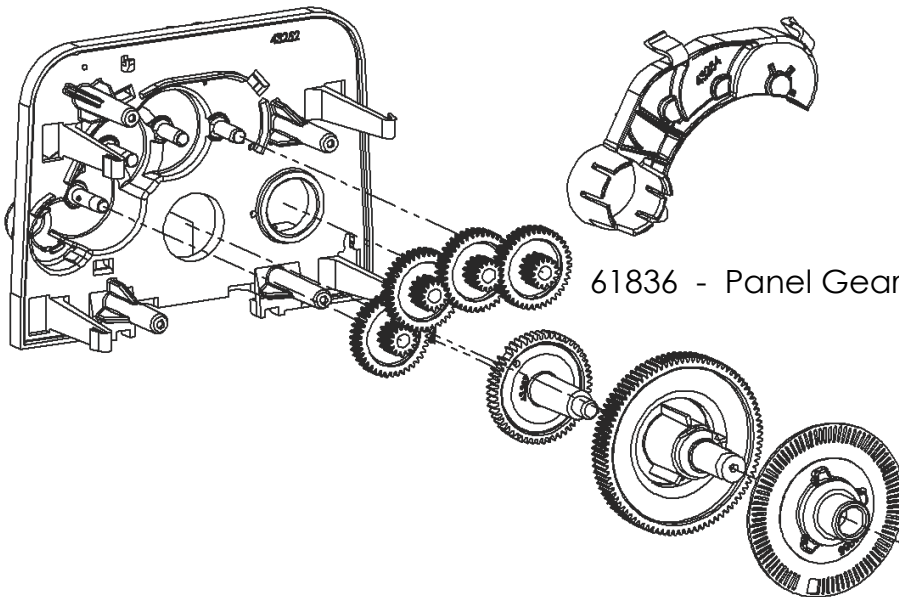
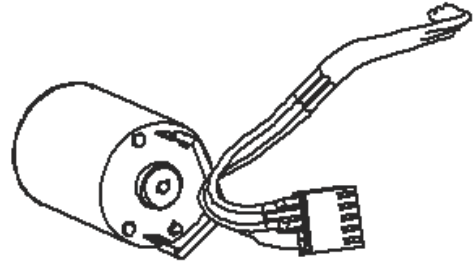
Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Powerhead Assembly LXTi

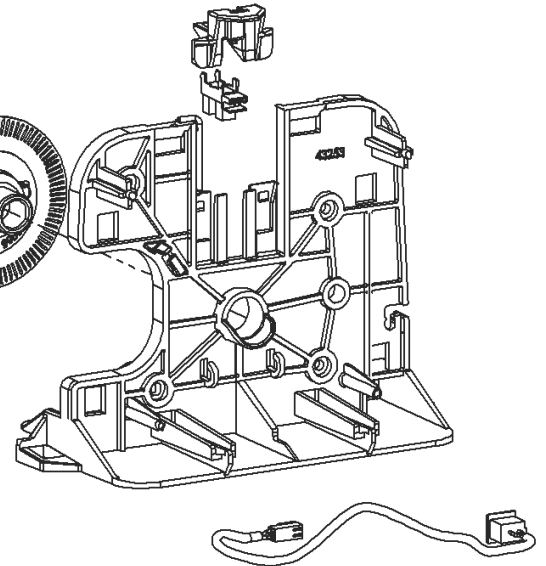
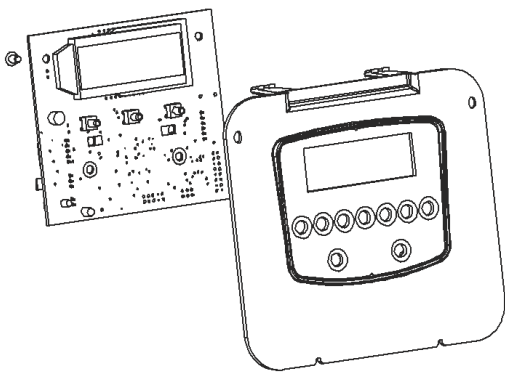


61832-00 - Cover Assembly

61835 - Motor Assembly



61836 - Panel Gear Assembly, Downflow/ Upflow

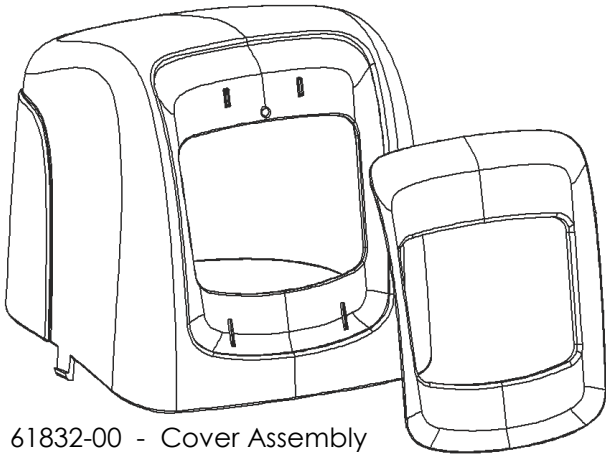


The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs



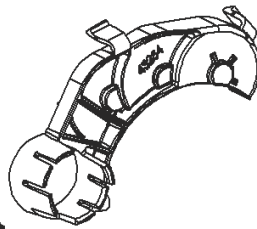
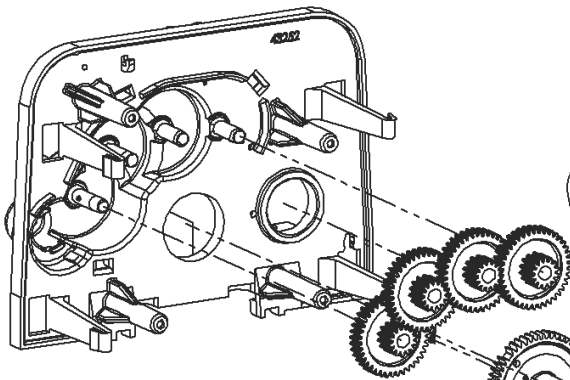
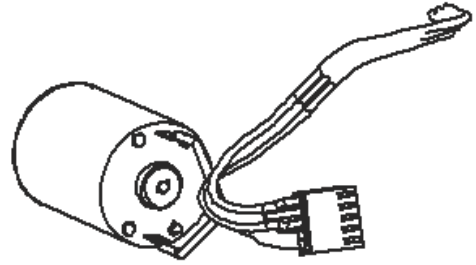
Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Powerhead Assembly SXTi

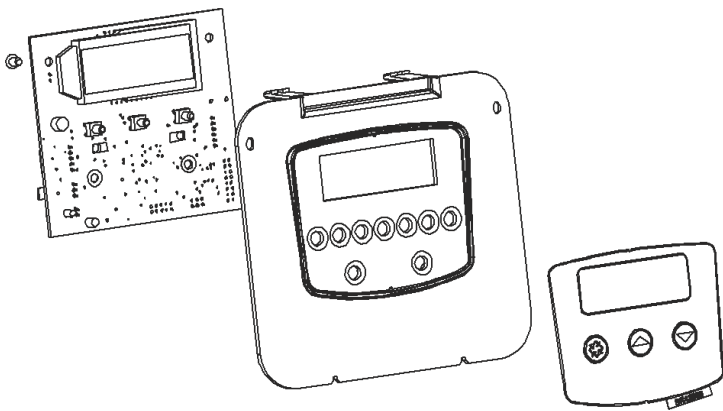
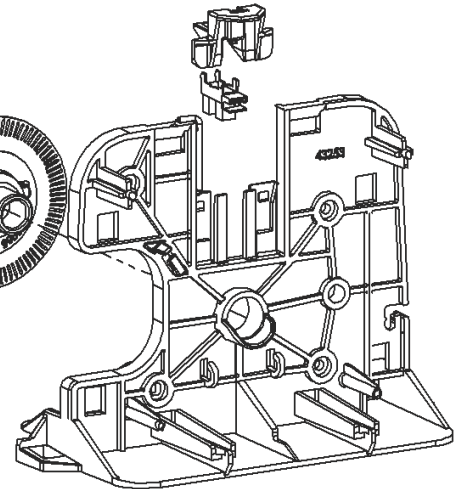
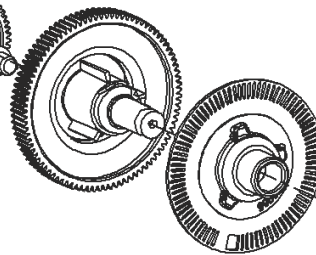


61832-00 - Cover Assembly

61835 - Motor Assembly



61836 - Panel Gear Assembly, Downflow/ Upflow

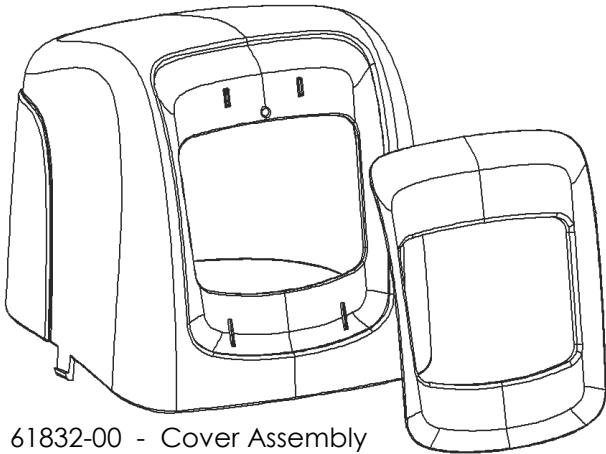


The System must be **BYPASSED, DEPRESSURIZED** and **DE-ENERGIZED** before disassembling or performing mechanical repairs



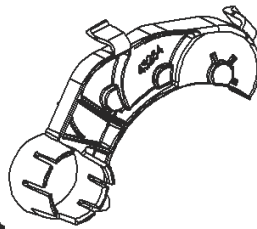
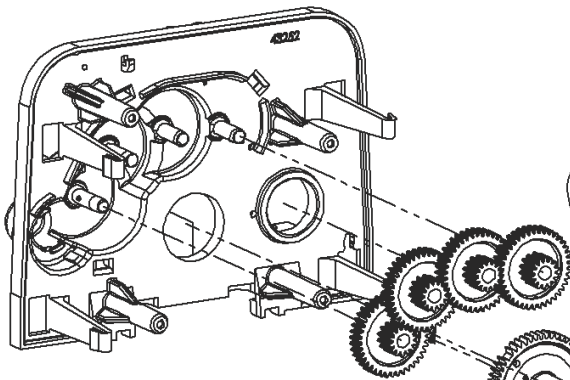
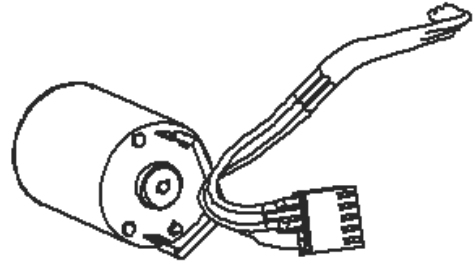
Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Powerhead Assembly XTR2

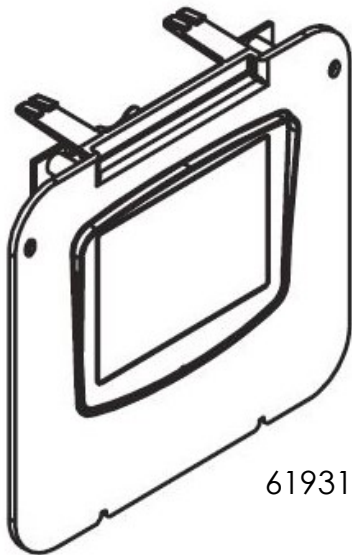
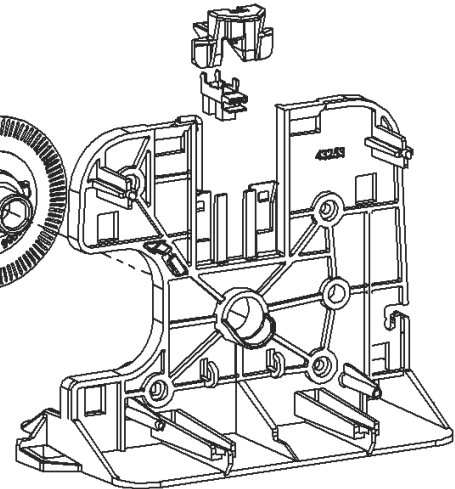
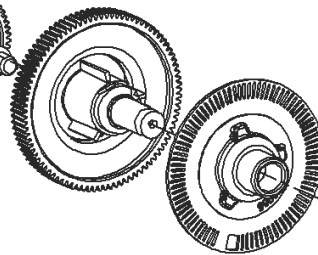


61832-00 - Cover Assembly

61835 - Motor Assembly



61836 - Panel Gear Assembly, Downflow/ Upflow



61931-02 XTR2 LCD Touchscreen Controller Assembly

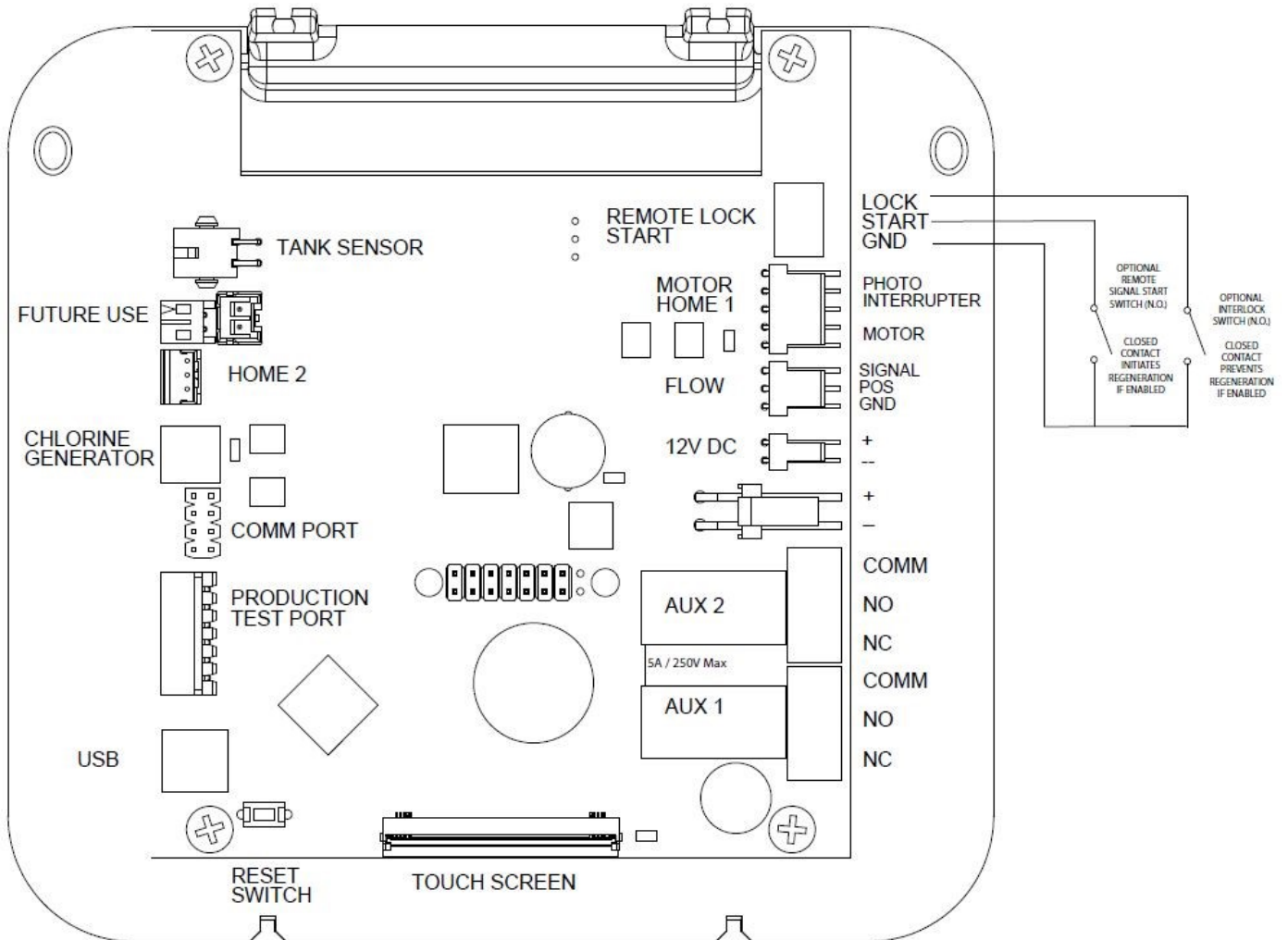


The System must be **BYPASSED, DEPRESSURIZED** and **DE-ENERGIZED** before disassembling or performing mechanical repairs



Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Circuit Board Overview— XTR2

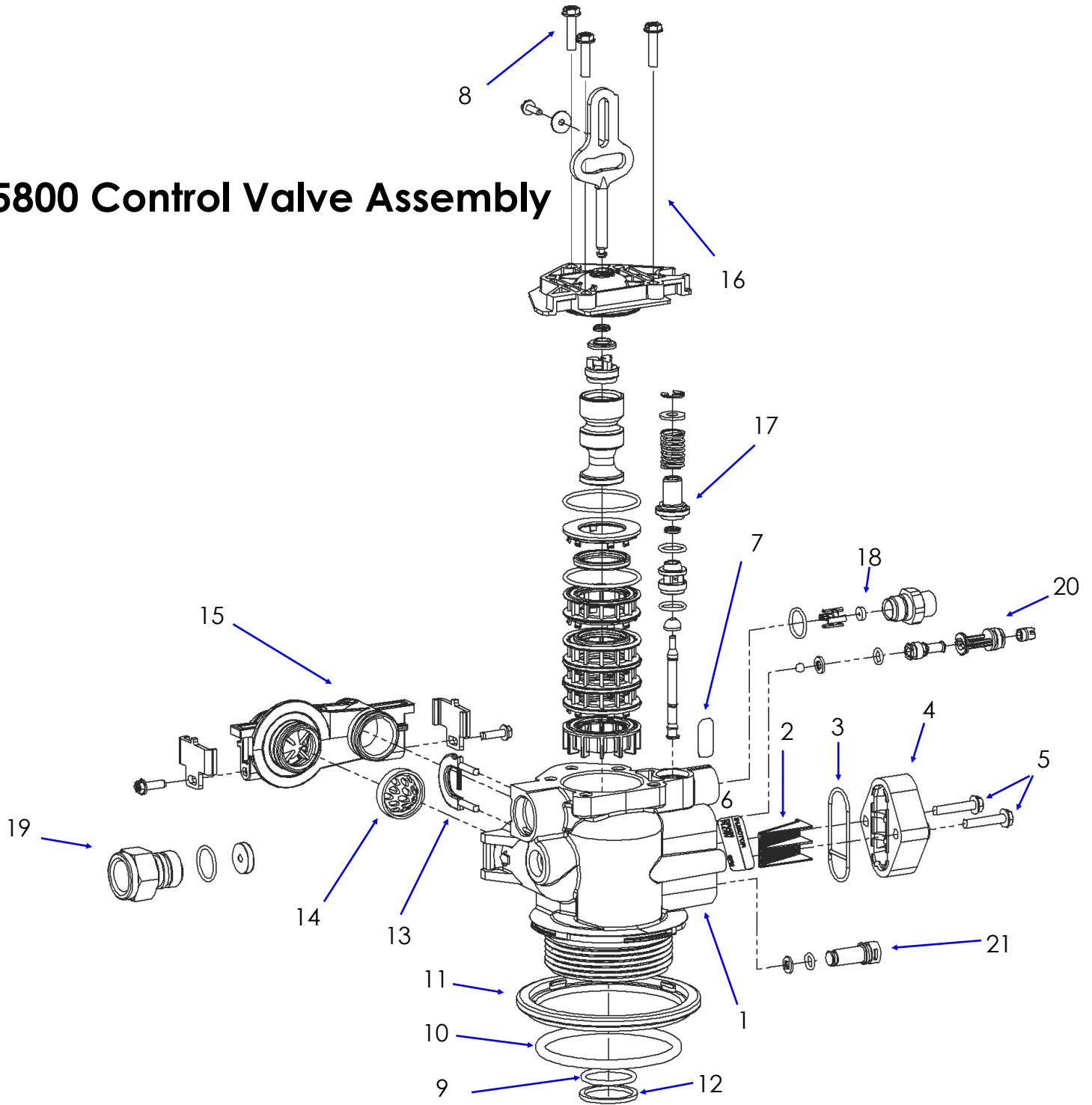


NOTE:

The reset switch discharges the super capacitor when power is removed from the circuit board. The super capacitor retains the current time of day in the event of a power failure for up to 6 hours (depending on age and ambient temperature).

Pressing the reset switch on the circuit board while power is applied to the control will have no effect on the control or stored settings.

5800 Control Valve Assembly



To bypass the system, turn bypass knob on both sides of the valve to bypass position. When returning to service, put the inlet into service before the outlet.



The System must be **BYPASSED, DEPRESSURIZED** and **DE-ENERGIZED** before disassembling or performing mechanical repairs



Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Control Valve Assembly

Item #	Qty	Part #	Description
1	1	61857-20	Valve Body Assembly (Includes Items 9, 10, 11 and 12)
2	1	18271	Injector Screen
3	1	40064	Injector Seal
4	1	18278-30	Injector Cap Assembly
5	2	18262	Screw, Hex Washer Head, #10-24 x 1.00
6	1	10759	BLFC Label—0,25GPM
7	1	13333	Injector Label
8	3	18261	Screw, Hex Washer Head, #10-24 x 0.81
9	1	13304	O-ring –121
10	1	18303-01	O-ring –336
11	1	18589	Tank seal retainer
12	1	13030	Distributor tube O-ring retainer
13	1	18312	Retaining Cup
14	1	14613	Flow Straightener
15	1	60628	Electronic meter turbine assembly
16	1	61838	Upflow piston assembly
17	1	60032	Brine valve assembly
18	1	60022-25	Brine Line Flow Control
19	1	60705-24	Drain Line Flow Control—2.4 GPM
20	1	18272-0	Injector Assembly 1610 #0
21	1	18276-01	Injector plug assembly with o-ring

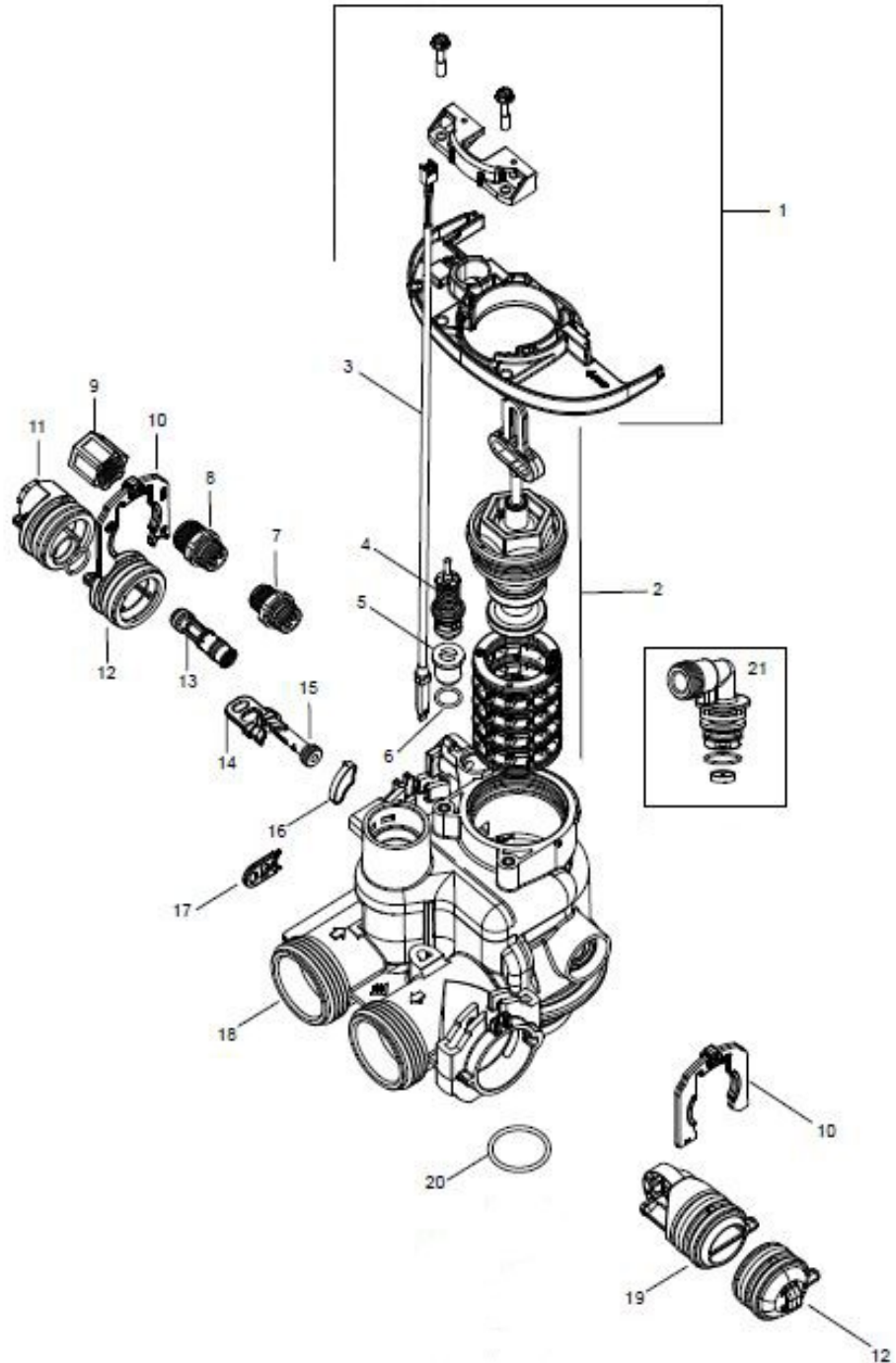


The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs



Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

5810 Control Valve Assembly



To bypass the system, turn bypass knob on both sides of the valve to bypass position. When returning to service, put the inlet into service before the outlet.



The System must be **BYPASSED, DEPRESSURIZED** and **DE-ENERGIZED** before disassembling or performing mechanical repairs



Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Control Valve Assembly

Item #	Qty	Part #	Description
1	1	61961	Kit, Mounting, 5810/5812
2	1	61956-02	Kit, Piston, Seal, and Spacer, 5810/5812, Upflow
3	1	19791-01	Meter Cable and Hall-Effect Sensor
4	1	60016	Brine Valve
5	1	40947	Brine Valve Plug
6	1	13302	O-ring -014
7	1	61450-25	Brine Line Flow Control Assembly 0.25 GPM
8	1	OPTIONAL	1/2" Brine Line Floc Control Assembly
9	1	41056	1/2" Nut Assembly
10	1	40576	Plastic retaining clip
11	1	OPTIONAL	Pressure regulated injector cap
12	1	61958	Injector cap assembly with O-ring
13	1	VARIABLES	Injector Assembly—Flow rate varies by model
14	1	40945	Drain retaining clip
15	1	61959	Injector plug with O-rings
16	1	43719	Injector Screen
17	1	40946	Brine retaining clip
18	1	61983-01	5810 Valve Body Assembly
19	1	61919	1.25" Meter Assembly
20	1	19054	O-ring -124
21	1	VARIABLES	Drain elbow assembly—Flow rate varies by model

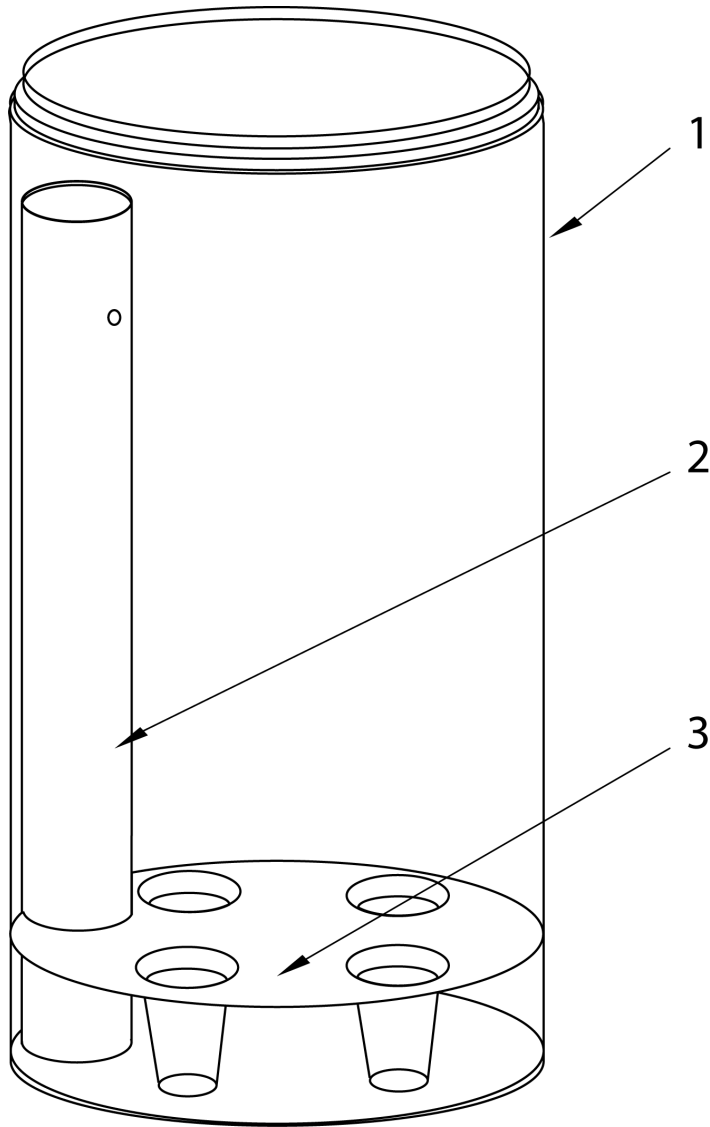


The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs



Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

Brine Tank



Item #	Qty	Part #	Description
1	1	BT0001	Brine Tank Shell—18x33
2	1	BT0002	Brine Well—18x33
3	1	BT0003	OPTIONAL—Brine Deck

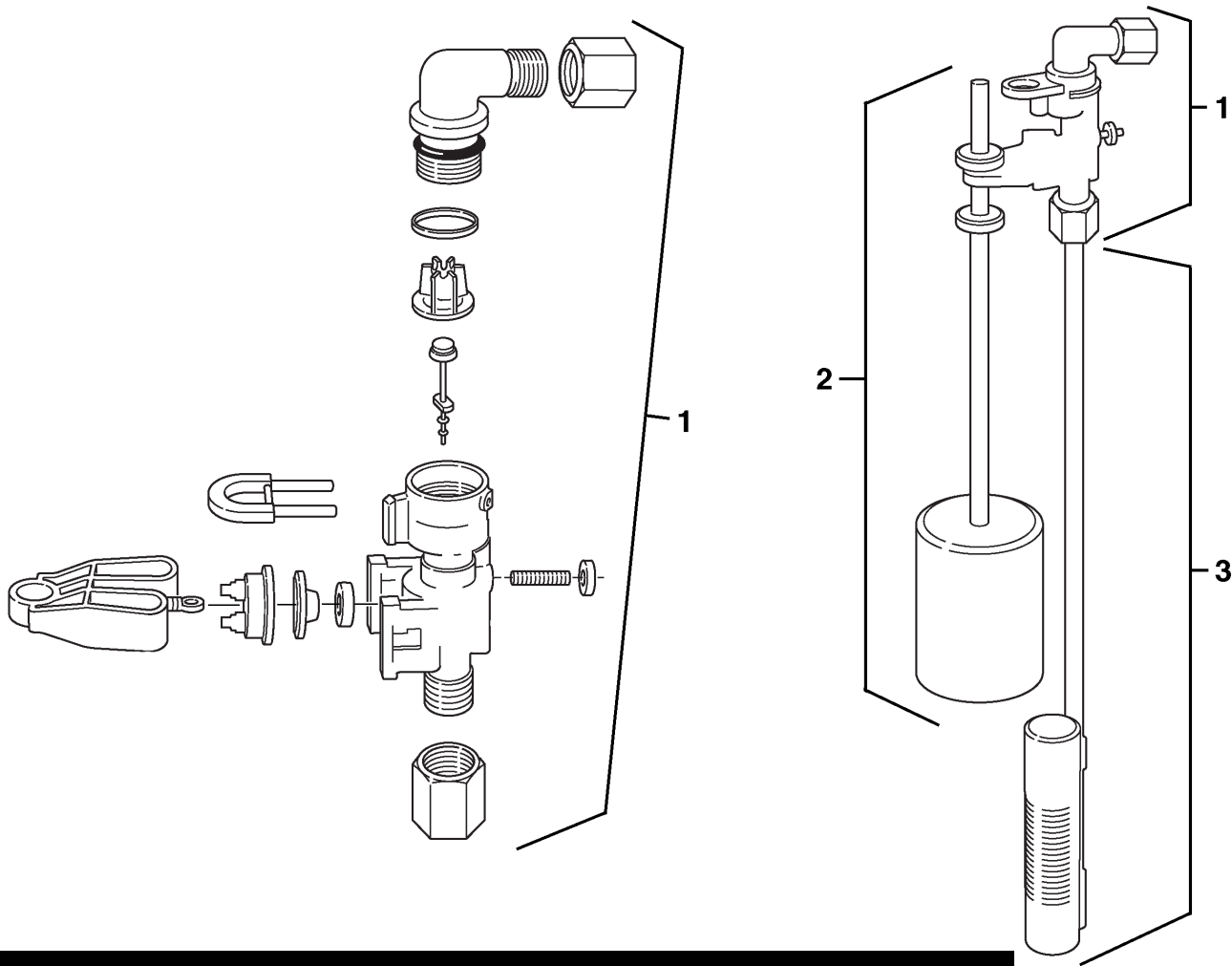


The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs





Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel

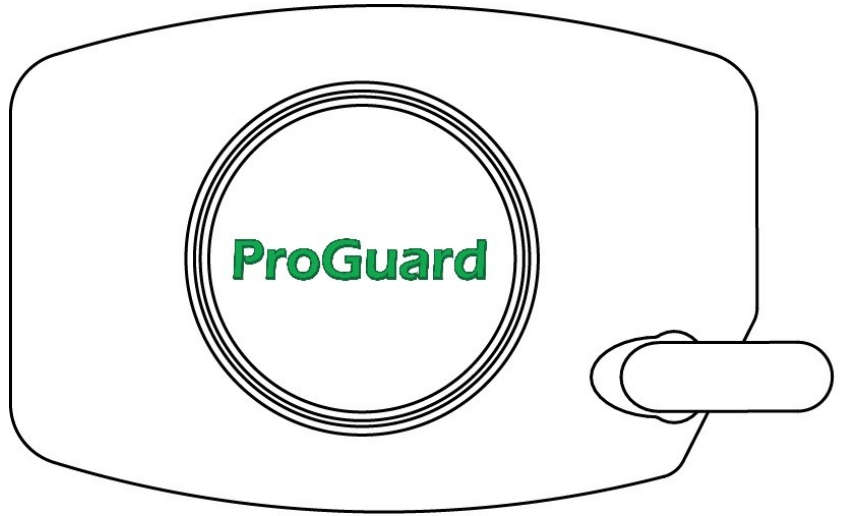
Safety Brine Valve



Item #	Qty	Part #	Description
1	1	60014	Safety Brine Valve Assembly
2	1	60068	Float Assembly
3	1	60002	Air Check Assembly

	<p>The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs</p>		<p>Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel</p>
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ProGuard Feeder



Item #	Qty	Part #	Description
1	1	PFPG01	ProGuard Feeder—1.0

	<p>The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs</p>		<p>Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel</p>
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Recommended Cleaning & Disinfection Schedule

Your Crusader Water Improvement System is quite probably the hardest working appliance in your home, processing millions of gallons of water over its service life and in turn protecting you from countless amounts of inorganic calcium, magnesium, lead, copper, zinc, iron, manganese, and other contaminants that could be in your water.

Your softener also accumulates sediment bacteria, algae, mold, and fungus that can enter the system through safe city water, salt, or even from the air. These contaminants slowly accumulate in your softener and can colonize it with a biofilm of Heterotrophic Plate Count bacteria (HPC). These bacteria are usually benign, but can create a food base for potentially harmful pathogens and seriously compromise the longevity and performance of your system. While weekly antibacterial rinses and supplementation with ProGuard help minimize bacterial growth, your system should be cleaned and disinfected on a regular schedule to ensure that it is working to the best of its ability and to protect the safety of your family. This chart shows the recommended monthly cleaning interval.

		PEOPLE IN HOME					
		1	2	3	4	5	6
WATER HARDNESS	1	12	12	12	12	12	12
	5	12	12	12	12	12	12
	10	12	12	12	12	12	12
	15	12	12	12	12	12	12
	20	12	12	12	12	12	12
	25	12	12	12	6	6	6
	30	12	12	6	6	6	6
	40	12	12	6	6	6	6

Your local dealer can perform the cleaning and disinfection service for you, or you can purchase a comprehensive cleaning and disinfection kit to perform this task yourself.

	The System must be BYPASSED, DEPRESSURIZED and DE-ENERGIZED before disassembling or performing mechanical repairs		Disassembly, Repair/Replacement/ Reassembly should only be performed by properly trained service personnel
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STATEMENT OF LIMITED PRODUCT WARRANTY

1st year of ownership

This residential water system is warranted as to workmanship and material for a period of one year from date of original installation at the original installation site, if properly installed by a Certified Installer. Should any component in your system prove defective in the first year, it will be repaired, rebuilt or replaced at our option, provided it is returned directly to us.

After the 1st year of ownership, and for 5 more years: should any component in your system prove defective, it will be repaired, rebuilt or replaced at our option for a maximum charge of \$50.00, provided it is returned directly to us. Labor, transportation, shipping or other charges incurred in the diagnosis, replacement or repair of defective components are not covered by this warranty. If you choose not to send a defective component back to us, repairs to your system can be conducted in your home by a factory authorized service technician if your home is within the operating radius of an authorized repair center. This warranty does not cover transportation, shipping, diagnosis, replacement and repair charges resulting from your in-home repair request. We will not be held responsible for loss or damage caused by any defective component.

Conditions

This warranty must be presented at time of claim and all claims must be presented within 30 days of occurrence.

This warranty is void if your water system is not installed in compliance with prevailing plumbing codes, according to our installation protocol, or if the influent water temperature is hotter than 90°F or where the static water pressure is less than 25psi, or more than 75psi. Intentional/malicious damage, misuse, neglect, unauthorized modifications or accidental damage to the system is not covered by this warranty. This warranty does not cover damage caused by pressure surges, water hammer, power surges or sags, lightning, fire, flood, freezing, earthquake, acts of God or other casualty.

Wear and Tear

Your water system is subject to normal wear and tear during its usable service life.

Wear and tear is not regarded as a product defect and is not covered by this warranty.

No Liability for Consequential Damages

Unless otherwise required by applicable law, we shall not be liable for any damages whatsoever (including without limitation, lost time, inconvenience, expenses such as telephone calls, labor or material charges incurred in connection with the removal or replacement of the part(s) or product(s), special, incidental, consequential, or indirect damages for personal injury, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use the defective part(s) or product(s), even if we have been advised of the possibility of such damages. Our entire liability under any provision of this Limited Warranty shall be limited to the amount actually paid for the part(s) or product(s).

No Other Warranties:

We specifically disclaim all other warranties; either express or implied, including, but not limited to implied warranties of merchantability and fitness for a particular purpose, with regard to the part(s), product(s) and/or any accompanying written materials. This limited warranty gives you specific legal rights. You may have other rights that vary from state/jurisdiction to state/jurisdiction.

ProGuard

Your water system includes a ProGuard dispensing system. The ProGuard performance-enhancing additive is essential to proper functioning of your system. If ProGuard is not added to the dispensing system at the prescribed interval in your owner's manual, this warranty will be void.

Periodic replacement of media

While built to the highest standards, certain media in your Water System will need to be replaced periodically by your local authorized service agent. Replacement intervals vary depending on your water chemistry and water consumption habits. Consult with your water specialist during your annual cleaning and disinfection service to ensure that you enjoy the very best water quality. Media replacement is not covered under this warranty.

In order for this limited lifetime warranty to be valid, you must:

- Be the original consumer purchaser, and have purchased the water equipment from an authorized reseller, and
- Provide a copy of the original purchase receipt with proof of date and purchase price

This limited warranty is only valid if registered within 10 days of initial installation.

If unregistered, this warranty is only valid for 1 year from the date of original manufacture.

Extended warranties are available—Consult with your Local Clean Water Crusader

Register your warranty now: www.CrusaderWater.com