evoqua
WATER TECHNOLOGIES

BLU-SENTINEL™ MEASUREMENT AND CONTROL SYSTEM

INSTRUCTION MANUAL

Please note

Original instruction manual!

Contents

1. Introduction

1.1 Documentation

1.1.1 Target groups

This instruction manual provides information to the installation, operating and maintenance personnel required for the operation and maintenance of the Blu-Sentinel™.

All persons working with the Blu-Sentinel™ must have read and understood the instruction manual, in particular, the safety instructions it contains.

1.1.2 Documentation Structure

This instruction manual is intended for operators of the Blu-Sentinel™. It contains important information for safe, trouble-free, and efficient operation of the Blu-Sentinel™. Observing these instructions will help prevent risk, reduce repair costs and downtimes, and increases the reliability and service life of the Blu-Sentinel™.

Chapters Installation, Commissioning, and Maintenance are intended only for trained and authorized service personnel. These chapters contain important information on the assembly, configuration, commissioning and start-up, maintenance and repair of the Blu-Sentinel™ that should only be performed by this target group.

Please consult the table of contents and the index to quickly find the information you require.

NOTICE

Minor part number changes may be incorporated into Evoqua Water Technologies products from time to time that are not immediately reflected in the instruction book. If such a change apparently has been made in your equipment and does not appear to be reflected in your instruction book, contact your local Evoqua Water Technologies sales office for information.

Please include the equipment serial number in all correspondence. It is essential for effective communication and proper equipment identification.

1.2 Conventions

NOTICE

This instruction manual contains a number of safety notes with different priorities, which are marked with safety panels and pictograms.

Pictogram	Safety Panel	Safety note
	DANGER	Immediate danger to life and limb! If the situation is not handled properly, death or serious injury is the result.
	WARNING	Danger to life and limb! If the situation is not handled properly, death or serious injury may be the result.
	CAUTION	If this warning is not observed, there is a medium or slight risk that injury or damage to the equipment may be the result.
	WARNING	Electrical hazard.
	WARNING	Chemical hazard.
	NOTICE	These notes assist in the operation of the system.

NOTICE

For detailed safety notes see chapter 2.4 “Warning notifications”.

1.3 Disclaimer

We are not liable for any damages incurred during installation or use of these hardware and software components. This applies specifically to trouble-free interaction with the software and hardware components you choose.

We are not liable for buyer damages (in particular, lost profits, lost information and service interruptions), which arise when using the Blu-Sentinel™ nor for other damages. You are solely responsible for the installation!

The contents of the instruction manual has been checked to make sure that it matches the detailed hardware and software. Deviations can nevertheless not be ruled out and we therefore assume no liability for full conformity. The details in this instruction manual are checked regularly and any necessary corrections are included in subsequent issues.

1.4 Warranty

Evoqua Water Technology warrants equipment of its manufacture and bearing its trademark to be free of defects in materials and workmanship and to materially conform to any applicable specifications and drawings approved in writing by Evoqua Water Technologies.

If the customer gives Evoqua Water Technologies prompt written notice of breach of this warranty within twelve months from the date of start-up for the controller in accordance with the below conditions (the "Warranty Period"), Evoqua Water Technologies will, at its sole option and as the customer's exclusive remedy, either repair or replace free of charge, or refund the purchase price paid with respect to, any material found to be defective during the warranty period.

No repair or replacement of defective products shall extend the warranty period, but any such repaired or replaced product shall be covered for the balance of the original warranty period. If Evoqua Water Technologies determines that any claimed breach is not, in fact, covered by this warranty, the customer shall pay Evoqua Water Technologies 's then customary charges for any repair or replacement.

The "Warranty Period" for Blu-Sentinel controller components shall be as follows: a) the controller electronics shall be five (5) years from the date of manufacture b) the Strantrol sensors shall be two (2) years from the date of shipment c) the Wallace & Tiernan sensors (if used) and flow cell shall be one (1) year from the date of shipment.

The foregoing warranty is subject to the following conditions: (i) initial start-up of the equipment shall be completed by a factory authorized representative within the first twelve months after shipment of the equipment, with such installation and start-up to be documented in a duly completed start-up and field test report to be returned to Evoqua Water Technologies by the customer within thirty (30) days of start-up.; (ii) the customer shall have operated and maintained the equipment in accordance with all instructions provided by Evoqua Water Technologies; (iii) the customer shall not have made any unauthorized repairs or alterations; (iv) the customer shall not be in default of any payment obligation to Evoqua Water Technologies; (v) if requested, the customer will deliver the equipment to Evoqua Water Technologies authorized service center the customer shall pay all inbound and outbound freight costs; (vi) the customer must provide a complete and detailed description of the problem including, without limitation the Evoqua Water Technologies job number, date of delivery, date of installation, date of start-up and the operating conditions of the unit (s); and (vii) for equipment which is destined for extended storage, such equipment must have been stored in the accordance with the storage requirements detailed in the operation and maintenance manual (storage of equipment does not extend the warranty period).

The foregoing warranty does not extend to, and Evoqua Water Technologies assumes no responsibility for, (i) the installation quality or any services defects resulting there from unless a Evoqua Water Technologies representative or designee supervised the installation; (ii) in the event that the unit size and location are predetermined by someone other than by Evoqua Water Technologies or our local representative, the serviceability and/or performance of the unit for the specified design and/or actual operating conditions (this exclusion shall not apply if all necessary design information is submitted to and approved in writing by Evoqua Water Technologies); (iii) any auxiliary equipment or accessories supplied by Evoqua Water Technologies but manufactured by others (the original manufacturer's warranty, if any, shall apply to such products); (iv) damage to the equipment or products resulting from normal wear, abuse, neglect or operation in a manner inconsistent with Evoqua Water Technologies' recommendations; and (v) damage to the equipment or products that have been modified, tampered with or altered without written consent from Evoqua Water Technologies.

In addition to the foregoing conditions and limitations, the following product-specific limitations and conditions must be satisfied for the foregoing warranty to apply:

- This warranty does not cover damage caused by chemical action or abrasive material, damage caused by handling or during transportation, or damage arising from misuse, installation or any other cause beyond Evoqua Water Technologies' control.
- Standard units not in outdoor configurations are not warranted in outdoor applications.

The warranties set forth above are Evoqua Water Technologies' sole and exclusive warranties. Evoqua Water Technologies makes no other warranties of any kind, express or implied, including without limitation, any warranty of merchantability or of fitness for a particular purpose, all warranties arising from course and dealing and usage of trade and all such express or implied warranties are hereby disclaimed. The remedies provided above are the customer's sole remedies for Evoqua Water Technologies' failure to comply with obligations. Correction of any nonconformity in the manner and for the period of the time provided above shall constitute complete fulfillment of all the warranty liabilities of Evoqua Water Technologies, whether the claims of the purchaser are based in contract, in tort (including negligence) or otherwise with respect to or arising out of the work performed hereunder.

Limitation of liability: notwithstanding anything else to the contrary, Evoqua Water Technologies and its suppliers and any affiliated companies shall not be liable for any consequential, incidental, special, punitive or other indirect damages, and Evoqua Water Technologies total liability arising at any time from the sales of use of the equipment shall not exceed the purchase price paid for the equipment. These limitations apply whether the liability is based on contract, tort, strict liability or any other theory.

2. Safety

2.1 Intended use

The Blu-Sentinel™ electronics module in conjunction with the flowcell and the integrated sensors is designed for pool water chemistry control, specifically disinfectant measurement and control as well as pH measurement and control in swimming pools and spas.

The operational safety of the Blu-Sentinel™ is only guaranteed if it is used in accordance with its intended application. It may only be used for the purpose defined in the order and under the installation, operating and ambient conditions specified in this instruction manual.

All inspection and maintenance work must be carried out in accordance at the specified intervals.

Compliance with the intended use also includes reading this instruction manual and observing all the instructions it contains.

The operator bears full and sole responsibility if this unit is put to any use which does not comply strictly and exclusively with this intended use.

2.2 General safety instructions

The manufacturer places great value upon safety when working with the unit. This was already taken into account in the design of the system, by the integration of safety features.

Safety regulations

The safety instructions in this documentation must be observed. Additional industry-wide or in-house safety regulations also continue to apply.

Safety warnings on the unit

All safety instructions attached to the unit itself must be observed. These instructions must always be clearly legible and complete.

State-of-the-art technology

The unit has been manufactured in accordance with state-of-the-art technology and the accepted safety regulations. However, if the unit is used by persons who have not been adequately trained, risks to life and limb of such persons or third parties and damage to the unit itself or to other property cannot be ruled out. Work described in this instruction manual must be performed only by authorized personnel.

Personnel

The operator of the overall system must ensure that only authorized and qualified specialized personnel are permitted to work with and on the unit within their defined scope of authority. "Authorized, specialized personnel" refers to trained technicians employed by the operator, the manufacturer, or, if applicable, the service partner. Only qualified electricians must perform work on electrical components.

Spare parts / components

Trouble-free operation of the unit is only guaranteed if original spare parts and components are used in precisely the combination described in this instruction manual. Failure to observe this instruction may incur the risk of malfunction or damage to the unit.

Extensions and conversions

Never attempt to perform any modifications, extensions or conversions on the unit that could have an adverse affect on safety.

⚠ DANGER

Risk of injury or death!

The device must not be used with flammable liquids.

Electrical power

Only qualified electricians or trained personnel supervised by a qualified electrician are permitted to perform any work on electrical components in accordance with valid electro-technical regulations.

During normal operation, the electronics enclosure must remain closed. Connect the power cables in accordance with the wiring diagram.

This equipment is connected to line voltage. It is essential that the utmost care is taken when work is carried out on equipment where line voltages are present. It is recommended that all power supplies are switched off while working on the equipment when ever possible.

⚠ DANGER

Risk of injury or death!

External voltages may be connected even with the operating voltage switched off. Disconnect all power sources before opening the Blu-Sentinel™.

Hazardous material

All users of this equipment should be made aware of the problems associated with handling hazardous materials in either liquid, gaseous or solid form and of the effects of exposure to their fumes. Reference should be made to the literature and safety data sheets available from the suppliers of these chemicals, particular attention being paid to the information and advice on protective clothing.

When dealing with hazardous material, it is the responsibility of the equipment user to obtain and follow all safety precautions recommended by the material manufacturer.

Do not discard this instruction book upon completion of installation. information provided is essential to proper and safe operation and maintenance.

IT security

The manufacturer offers IT security mechanisms for its products to support secure system operation. We recommend checking on a regular basis to see what information is available regarding IT security developments for your products. Information on this can be found on the Internet.

For the safe operation of an installation, it is furthermore necessary to integrate the automation components into a holistic IT security concept which comprises the entire system and is in accordance with latest state of the art technology. In the process, implemented products deriving from other manufacturers should be taken into account.

Upon start-up of the Blu-Sentinel™, it should be ensured that the factory-configured passwords and user names are replaced with individual ones.

Disposal

Ensure safe and environment-friendly disposal of agents as well as replacement parts.

2.3 Specific safety operating instructions

Normal operation

Never employ any working methods which could affect safety!

Only run the Blu-Sentinel™ when the housing is closed!

Inspect the Blu-Sentinel™ at least once daily for externally visible damage and faults! Inform the responsible person/authority immediately of any detected changes (including any changes in the operating performance)!

In the event of malfunctions, switch the Blu-Sentinel™ off immediately! Have malfunctions remedied immediately!

Installation and maintenance work

Secure the Blu-Sentinel™ against activation during installation and maintenance work!

If stipulated, disconnect all parts of the Blu-Sentinel™ from the power supply before performing any inspection, maintenance or repair work. Then first test the disconnected components to ensure they do not carry any voltage.

Do not use aggressive cleaning agents (e.g., alcohol, abrasive cleaners)! We recommend a damp cloth moistened with a commercially available neutral detergent.

2.4 Warning notifications

2.4.1 Never override sample flow switch

⚠ WARNING

Never override sample flow switch!

Uncontrolled feeding of chemicals can result in injury or death. Sample flow switch is a critical safety device which prevents uncontrolled chemical feed.
Follow instructions carefully!

Flow switches are provided with all Blu-Sentinel™ controllers and are an integral safety device to prevent the uncontrolled feed of chemicals, which could cause personal injury or death. The flow switch should NEVER be bypassed, even temporarily, as this critical safety device will not be available to protect the swimmers.

2.4.2 Test flow switch function

⚠ WARNING

Test flow switch function!

Uncontrolled feeding of chemicals can result in injury or death.
Assure flow switch prevents chemical feed in any circulation NO-FLOW or backwash condition.
Follow instructions carefully!

If flow switch does not stop and remain stopped during backwash, no-flow, or very low flow conditions, the controller cannot prevent the uncontrolled feed of chemicals, which could cause personal injury or death.

Testing of the flow switch installation is essential to assure the flow switch stops, remains stopped, and controller shows “NO-FLOW ALARM” within 20 seconds, whenever filter is in backwash or circulation flow stops. If the flow switch does not stop completely, plumbing corrections or the installation of additional safeguards will be necessary to avoid uncontrolled chemical feed.

2.4.3 Never connect feeder directly to power source

⚠ WARNING

Never connect feeder directly to power source!

Uncontrolled feeding of chemicals can result in injury or death.
Chemical metering pumps must be connected to the controller to enable safety controls.
Follow instructions carefully.

If the chemical feeders are connected to a wall outlet, the safety devices integral to your Blu-Sentinel™ controller, and to the safe feeding of chemicals, will be bypassed. It is very important that the chemical feeders are connected to the controller and never to a wall outlet. Potentially hazardous concentrations of chemicals can be fed into pool or spa if the chemical feeders are connected to a wall outlet. The chemicals will feed continuously, ignoring the following situations the flow of water to the pool stops due to filter backwash, the circulation pump losing prime or other causes, potentially hazardous concentrations of chemicals can be fed into pool or spa.

2.4.4 Always use anti-siphon devices

⚠ WARNING

Always use anti-siphon devices!

Uncontrolled feeding of chemicals can result in injury or death.
Anti-siphon devices must be installed to prevent uncontrolled chemical feed.
Follow instructions carefully.

If a vacuum is created in the water circulation line and no anti-siphon device is installed on the chemical feeders, potentially hazardous concentrations of chemicals can be drawn into pool or spa. Always use injection check valves and anti-siphon valves in the chemical feed lines to prevent this situation from occurring.

2.4.5 Electrical surges can damage your controller

⚠ WARNING

Electrical surges can damage your controller!

A damaged controller could feed chemicals in an uncontrolled manor.
Uncontrolled feeding of chemicals can result in injury or death.
If you suspect your controller is not operating properly, disconnect it from control of chemical feed.

Blu-Sentinel™ controllers, like all modern electronic devices can be damaged by severe electrical spikes and surges (think 'lightning'). Every effort has been made to protect your Blu-Sentinel™ controller against such surges, but no precautions are 100% effective. Additional surge protection can be installed at time of installation, but even that is not a guarantee that surge damage will not occur. If surge damage occurs, chemicals could be fed to your pool or spa, continuously with no safety controls. If you inspect your Blu-Sentinel™ controller after a possibly damaging power surge (thunderstorm or power outage) and suspect the controller is not operating properly, disconnect the chemical feeders at once, and contact your Blu-Sentinel™ dealer for service.

2.4.6 Hazardous voltage enclosed

⚠ WARNING

Hazardous voltage enclosed!

Voltage or current hazard sufficient to cause shock, burn, or death. Disconnect and lockout power before servicing.

Line voltage (125 VAC) can be present inside the Blu-Sentinel™ controller and caution should be used to prevent electrical shock, burns or electrocution. Be sure electric power is disconnected before opening the cover of any Blu-Sentinel™ controller. Follow all local safety policies, procedures and electrical codes, to prevent injury from electrical hazards, before opening the cover of this controller. If you are not trained and comfortable performing work on electrical equipment, contact a licensed electrician to perform the work.

2.4.7 Always install circulation pump interlock

⚠ WARNING

Always install interlock!

Chemical feed without water circulation can result in injury or death.
Circulation pump interlock with chemical feeders is a critical safety device which prevents unsafe chemical feed.
Recirculation pump must be interlocked to prevent chemical feed whenever pump power is removed.
Follow instructions carefully.

If concentrated Chlorine and Acid are combined, chlorine gas is released. Chlorine gas causes severe irritation to lungs and can be toxic in certain situations.

If water is not flowing in the return line to the pool, and both these concentrated chemicals are allowed to combine in still water, a chlorine gas bubble will be created. When the flow eventually resumes to the pool, the chlorine bubble would then be flushed into the pool and released into the air around the pool, beginning at the water surface. To help prevent this situation, a chemical pump interlock must be installed. An interlock removes power from the chemical feed pumps whenever the power to the recirculation pump power is switched off.

2.4.8 Warning regarding connecting ph & chlorine or bromine feeders

⚠ WARNING

Only connect a pH feeder to this outlet!

Connecting a Chlorine/Bromine feeder to this outlet can cause chemical interactions that may cause personal injury or death.
Caution must be used to insure feeders are connected properly to avoid hazardous chemical feed conditions.
Never connect Chlorine/Bromine feeder or any other device to this connector.
Blu-Sentinel™ pH Sensors are color coded as YELLOW.

⚠ WARNING

Only connect a Chlorine or Bromine feeder to this outlet!

Connecting a pH feeder to this outlet can cause chemical interactions that may cause personal injury or death.
Caution must be used to insure feeders are connected properly to avoid hazardous chemical feed conditions.
Never connect pH feeder or any other device to this connector.
Blu-Sentinel™ Chlorine/Bromine Sensors are color coded as BLUE.

Oxidizers (Chlorine or Bromine), acids (Muriatic or Carbon Dioxide) and caustics (Sodium Hydroxide, Caustic Soda, or Soda Ash) are common chemicals used to automatically maintain safe and healthy pool and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulating through the filter(s). Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, their connectors, and the feeder power cords, if present, are color coded. The YELLOW sensor is associated with the pH control channel which feeds an Acid or a Base (sometimes called caustic or alkaline) chemical. The BLUE sensor is associated with the feed of Chlorine or Bromine (sometimes called an oxidant or oxidizer). If these sensors or chemical feed pumps are not plugged into to the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.

3. Description

3.1 General information

The Blu-Sentinel™ electronics measurement and control system is designed for pool water chemistry control in swimming pools and spas.

The unit continuously measures the concentration of disinfectants using pH and redox measurement. It also controls the disinfectant and pH in the water, including protection from chemical feed during no flow conditions and chemical overfeed lockout.

The Blu-Sentinel™ electronics measurement and control system utilizes High Resolution Redox (HRR) sensing technology to directly measure the rate of oxidation in pool water regardless of the pH, temperature or bather load, feeding only the amount of chemicals needed. The controller responds continuously to actual pool conditions with precise chemical dosages.

Suitable for calcium hypochlorite, chlorine, stick bromine and a variety of feed devices.

3.2 Design

The Blu-Sentinel™ electronics measurement and control system is of modular design and consists of a „wet side" and an „electronic side".

The flowcell housing the pH and redox measuring sensor and the electronics module are the main components.

W3T395138	**Blu-Sentinel™ electronics measurement and control system, complete**
W3T395087	Flowcell cpl., incl. pH and redox sensors
W3T387337	Electronics module
W2T3067	Redox sensor (blue)
W2T4677	pH sensor (yellow)

As a further option we offer the flowcell without sensor:

W3T398215	Flowcell without sensor

NOTICE

Please see also chapter 8. Drawings for more details!

3.3 Technical data

3.3.1 Electronics module

Electronics module	W3T387337
Dimensions (h x w x d)	6.25” x 6.25” x 3.5” (15.8 x 15.8 x 8.89 cm)
Weight	3.5 lbs (1.3 kg)
Protection type	NEMA 4X (IP 65)
Storage temperature	-4 to 158° F (-20 to 70° C)
Ambient operating temperature	32 to 122° F (0 to 50° C)
Ambient humidity	30 % to 95 % relative humidity (non-condensing)
Power supply	100 ... 125 V, 50/60 Hz, 5 VA, 1ph
Relays (min. load)	100 ... 125 VAC, 50/60 Hz, 2.5 A max., 0.06 A min.
Sensor connections	BNC plug
Mains cable, length	2.3 m
Connecting cables to chlorine and pH feeders to NEMA 5-15, length	0.6 m

3.3.2 Flowcell

Flowcell	W3T395087
Typical sample water flow	3 gpm (11.4 l/min)
Pressure max.	100 Psi (6.8 bar) (tested)
Connections	1/2” NPT, female

3.3.3 Sensors

General	
Working temperature	23 to 122° F (-5 to +50° C)
Temperature drift	0.2 % / 10K max.
Calibration	pre-calibrated
Storage temperature	23 to 86° F (-5 to +30° C)
Input resistance	5×10^{11} Ohm
Redox sensor (HRR, blue)	**W2T3067**
Measuring range	-1000 mV to +1000 mV (720 to 780 mV typical)
pH sensor (yellow)	**W2T4677**
Measuring range	0 to 14 (7.2 – 7.5 typical)

4. Installation

⚠ WARNING

Risk of injury or damage to the installation!

Only authorized specialized personnel qualified for installation and start-up may install the measurement and controll system. All electrical work on the measurement and control system may only be performed by qualified electricians. Modifications to the system which go beyond those described in this manual are not permissible. See also chapter chapter 2.2 “General safety instructions”.

⚠ WARNING

Risk of injury or damage to the installation!

All electrical work on the equipment must be performed only by authorized and qualified electricians. Modifications to the device other than those described in this instruction manual are not permitted.

⚠ DANGER

Risk of injury or death!

External voltages may be connected even with the operating voltage switched off.

4.1 Mounting

4.1.1 Installation site

NOTICE

The controller should be in an area inaccessible by unauthorized personnel.

The following points must be taken into account when installing the Blu-Sentinel™:

- The Blu-Sentinel™ should be mounted to the wall, ensuring that the wall construction is suitable to support the weight of the enclosure plus any associated conduit, wiring, etc.
- Make sure that the Blu-Sentinel™ is mounted in a location that is easily accessible, free from chemical fumes and excessive heat, isolated from electrical interference, and powered by a power source protected by a ground fault interrupter.
- The Blu-Sentinel™ enclosure is weather resistant, but if mounting outdoors, locating the unit under a hood or overhang is recommended.
- Do not mount the Blu-Sentinel™ in a way that would make it difficult to disconnect the line power.
- Any unused conduit openings in the enclosure must be plugged.

4.1.2 Environmental Conditions

The Blu-Sentinel™ is mounted in a NEMA 4X (IP65) enclosure. The controller should not be used in explosive environments. The controller should be mounted in a way that adequate ventilation is achieved around the enclosure ensuring that general environmental specifications are not exceeded. These are listed below.

Specifications	Rating
Storage Temperature	-4 to 158°F
Ambient Operating Temperature	32 to 122°F
Ambient Humidity	30% to 95% Relative Humidity (Non-Condensing)

4.1.3 Operating Ranges

Parameter	Range
HRR (ORP)	-1000 mV to +1000 mV (720-780 mV typical)
pH	0 – 12 (7.2 – 7.5 typical)
Sample water flow, typical	3 gpm

4.2 Plumbing

4.2.1 Sample Stream General Recommendations and Precautions

The Blu-Sentinel™ sample flow switch is provided solely for the sample flow “enable” signal to the Blu-Sentinel™ controller. The flow switch provided is for the protection of swimmers when the sample stream flow stops. In this situation, the Blu-Sentinel™ controller is designed to stop the feed of chemicals and indicate a “No-Flow” Alarm to alert the operator that the sample stream is not flowing and automatic control has been interrupted. Under normal conditions the flow switch, when closed, (in the “sample flow active” position) signals the Blu-Sentinel™ controller that the sample is flowing and that automatic control can resume.

Evoqua Water Technologies recommends, and good facilities design dictates that an additional safety device also be installed. To avoid the formation of gaseous chlorine when concentrated Chlorine and acidic chemicals are combined in a stopped water line, a flow switch must be installed in the water line accepting the chemical injection. The filter circulation return piping is typically the place where this occurs. When this line slows or stops flowing at the normal rate, a flow switch must be installed and wired so that it will then interrupt the feed of chemicals. This safety device should be installed whether or not automated controls are connected to the chemical pumps.

In many cases, the Blu-Sentinel™ supplied sample flow switch is used as the only flow switch for the entire control system. If plumbed and connected properly, this arrangement can perform both tasks safely and reliably. If the water flow slows or stops in the water line where chemicals are being injected, all chemical feed must be prevented. Chemical feed must also be interrupted in the event of the sample stream being interrupted or slowed. It is the responsibility of the installer to assure the safe installation and operation of both the return line and sample stream flow switches.

The recommended installation diagrams chapter 8.3 „Flowcell Installation drawings (Pressure Filter)" illustrate how a single flow switch can be plumbed to perform both tasks. If the recommended installation cannot be accomplished due to site specific or application limitations, an additional return line flow switch must be installed to protect the people in the pool area.

Particular care should be taken during equipment installation or replacement, to assure these devices are plumbed, wired and functioning properly. The safety of the swimmers is also dependent upon the regular testing of these devices to assure they are in good working order. A good time to test these devices is whenever a filter backwash or any probe or sample flowcell maintenance is performed.

4.2.2 Assembling the Flowcell

For details, see assembly drawing chapter 8.2 Flowcell Assembly.

⚠ WARNING

Never override sample flow switch!

Uncontrolled feeding of chemicals can result in injury or death. Sample flow switch is a critical safety device which prevents uncontrolled chemical feed.
Follow instructions carefully!

Flow switches are provided with all Blu-Sentinel™ controllers and are an integral safety device to prevent the uncontrolled feed of chemicals, which could cause personal injury or death. The flow switch should NEVER be bypassed, even temporarily, as this critical safety device will not be available to protect the swimmers.

Proceed as follows:

- The Reed Flow Switch has a flow arrow sticker on the side. The flow switch arrow must be installed in the same direction on the flow through the flowcell. The flow switch requires at least 0.9 gpm to activate.
- The System Flow Switch must be installed downstream of (after) the filter.
- Once you have finished assembling the flowcell, close the valves.

4.2.3 Installing the Flowcell

For details, see installation drawings chapter 8.3 “Flowcell Installation Drawings (Pressure Filter)”.

⚠ WARNING

Always use anti-siphon devices!

Uncontrolled feeding of chemicals can result in injury or death. Anti-siphon devices must be installed to prevent uncontrolled chemical feed.
Follow instructions carefully.

If a vacuum is created in the water circulation line and no anti-siphon device is installed on the chemical feeders, potentially hazardous concentrations of chemicals can be drawn into pool or spa. Always use injection check valves and anti-siphon valves in the chemical feed lines to prevent this situation from occurring.

Proceed as follows:

- 1/2”-inch tubing is recommended for sample stream pickup and return.
- For the sampling point of the flowcell, tap downstream of (after) the filter and prior to the heater and chemical injection points.
- For the discharge point of the flowcell, tap upstream of (before) the re- circulation pump.
- Remove the cap from the pH and HRR sensors, clean tips with a toothbrush and dish soap and then a dilute acid. Wrap the sensor threads six times around clockwise with Teflon tape. Also, before installing the sensors, shake them down like a thermometer to get air out of the tip.
- Save the sensor caps for future sensor storage.
- Screw pH, HRR and optional temperature sensors into flowcell.

4.2.4 Checking the Flowcell

⚠ WARNING

Test flow switch function!

Uncontrolled feeding of chemicals can result in injury or death. Assure flow switch prevents chemical feed in any circulation NO-FLOW or backwash condition.
Follow instructions carefully!

If flow switch does not stop and remain stopped during backwash, no-flow, or very low flow conditions, the controller cannot prevent the uncontrolled feed of chemicals, which could cause personal injury or death. Testing of the flow switch installation is essential to assure the flow switch stops, remains stopped, and controller shows “NO-FLOW ALARM” within 20 seconds, whenever filter is in backwash or circulation flow stops. If the flow switch does not stop completely, plumbing corrections or the installation of additional safeguards will be necessary to avoid uncontrolled chemical feed.

Proceed as follows:

- Open the sample stream valves and check for leaks.
- Make sure the flowcell is under a positive and steady pressure.
- If not, adjust the valves, or if necessary relocate point at which the sample stream is connected to the recirculation system to ensure positive and steady pressure.
- Allow the sensors to rinse in the sample flowcell while you do the wiring.
- Open wet-test petcock and make sure that it generates a vigorous stream.
- Test flow switch function by closing the valve on the return line to the pool so that there is little or no flow to the pool. (Turning off the recirculation pump is not the same test).
- Assure the flow switch detects the low flow in the return line and the controller prohibits chemical feed.
- Test flow switch function by performing a filter backwash cycle.
- Assure the flow switch detects the low flow in the return line and prohibits chemical feed.

If any of the above tests do not pass, then the installation wiring or plumbing must be corrected, or additional safeguards must be installed. (Additional return line flow switch, etc.)

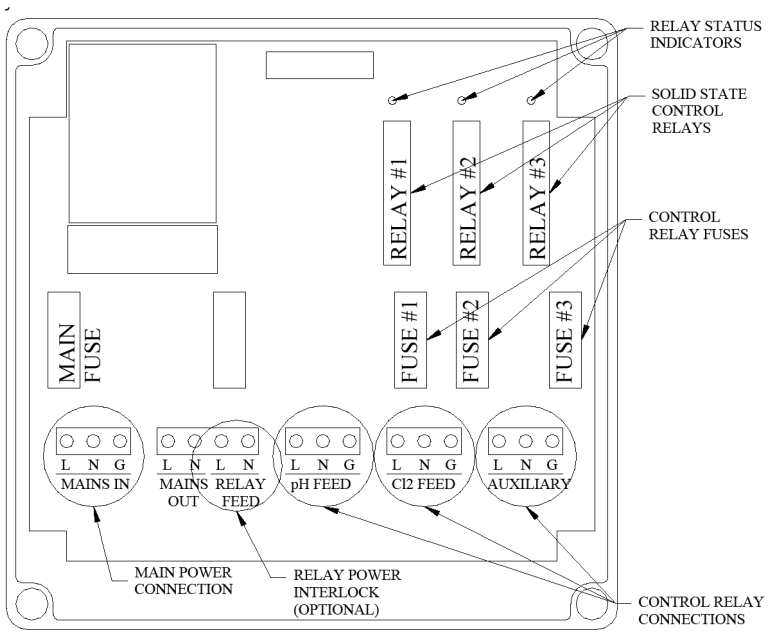
4.3 Electrical Installation

NOTICE

This page describes connections that your Blu-Sentinel™ representative needs to make in order for your Blu-Sentinel™ to function.

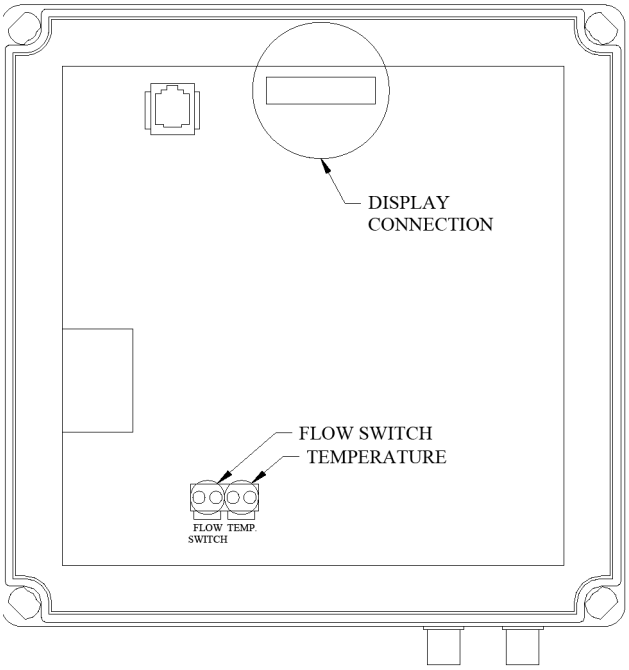
4.3.1 Power Board Layout

Connect the Blu-Sentinel™ in accordance with the following power board layout:



4.3.2 Display Board Layout

Connect the Blu-Sentinel™ in accordance with the following display board layout:



4.3.3 Connecting Power to the Blu-Sentinel™

See wiring diagrams chapter 9. “Wiring Diagrams”.

Perform the electrical installation according to the following:

- This unit must be installed and serviced by a qualified technician only.
- Remove the Blu-Sentinel™ cover by turning each of the four screws counter-clockwise.
- If you are planning to use pigtails for the power, be sure to use NEMA® 4X cord grips and plugs for unused holes. In addition, you must install warning labels on the pigtails. You may obtain these warning labels from the Evoqua Water Technologies Customer Service Department.
- Use only 14 AWG Copper 140 °F wire for connecting power.
- All connections must be mechanically secured independently from the electrical connection.

⚠ WARNING

Electrical surges can damage your controller!

A damaged controller could feed chemicals in an uncontrolled manor.
Uncontrolled feeding of chemicals can result in injury or death.
If you suspect your controller is not operating properly, disconnect it from control of chemical feed.

Blu-Sentinel™ controllers, like all modern electronic devices can be damaged by severe electrical spikes and surges (think 'lightning'). Every effort has been made to harden your Blu-Sentinel™ controller against such surges, but no precautions are 100% effective. Additional surge protection can be installed at time of installation, but even that is not a guarantee that surge damage will not occur.
If surge damage occurs, chemicals could be fed to your pool or spa, continuously with no safety controls. If you inspect your Blu-Sentinel™ controller after a possibly damaging power surge (thunderstorm or power outage) and suspect the controller is not operating properly, disconnect the chemical feeders at once, and contact your Blu-Sentinel™ dealer for service.

⚠ WARNING

Controller power and feed device power must be separated. This setup reduces noise inside the controller and eliminates controller damage due to transient spikes from the pumps.

⚠ CAUTION

Never connect controller power neutral to feed device power neutral or warranty will be void!

⚠ CAUTION

Controller power and pump power must be separated. This setup reduces noise inside the controller and eliminates controller damage due to transient spikes from the pumps. It also allows pump power to be interrupted without interrupting controller power.

Proceed as follows:

1 Locate Terminals L, N, and G (ground symbol).

2 Connect 120VAC, 60Hz, 15 AMP surge protected Line (Black) to terminal 01 labeled “L”.

3 Connect Neutral (White) to terminal 02 labeled “N”.

4 Connect Ground (Green) to terminal 03 labeled “G” and the ground symbol.

⚠ WARNING

Hazardous Voltage Enclosed.

Voltage or current hazard sufficient to cause shock, burn, or death. Disconnect and lockout power before servicing.

Line voltage (120/240VAC) can be present inside the Blu-Sentinel™ controller and caution should be used to prevent electrical shock, burns or electrocution. Be sure electric power is disconnected before opening the cover of any Blu-Sentinel™ controller. Follow all local safety policies, procedures and electrical codes, to prevent injury from electrical hazards, before opening the cover of this controller. If you are not trained and comfortable performing work on electrical equipment, contact a licensed electrician to perform the work.

⚠ WARNING

Disconnect all supply connections before servicing. This appliance has up to 3 supply connections.

⚠ CAUTION

For change of operating voltage, refer to authorized service personnel.

⚠ CAUTION

Relay wiring must have minimum ratings of 105°C, 600VAC, 14AWG and have insulation of PVC to comply with the maximum load ratings for this equipment. Consult your national or local electrical codes for proper wiring of lesser loads.

4.3.4 Interlocking Power to Blu-Sentinel™ Feed Relays (Optional)

See wiring diagrams chapter 9. “Wiring Diagrams”.

From the factory the relay power is connected the Blu-Sentinel™’s main power via the brown and blue jumpers. If relay interlock is required the Blu-Sentinel™ relay power can be configured to be interlock with the main recirculation pump. Recirculation pump interlock provides more protection from feeding chemicals during a no flow condition.

Proceed as follows:

1. Locate Brown and Blue jumpers in terminals “MAINS OUT” and “RELAY FEED”.
2. Remove Brown and Blue jumpers.
3. Locate L and N for terminal labeled “RELAY FEED”.
4. Connect main recirculation pump interlocked 120VAC to terminal labeled “L”.
5. Connect Neutral to terminal labeled “N”.

4.3.5 Connecting Feed Devices to the Blu-Sentinel™ Relays

For details, see chapter 9. “Wiring Diagrams”.

⚠ WARNING

Never connect feeder directly to power source!

Uncontrolled feeding of chemicals can result in injury or death. Chemical metering pumps must be connected to the controller to enable safety controls.
Follow instructions carefully.

If the chemical feeders are connected to a wall outlet, the safety devices integral to your Blu-Sentinel™ controller, and to the safe feeding of chemicals, will be bypassed. It is very important that the chemical feeders are connected to the controller and never to a wall outlet. Potentially hazardous concentrations of chemicals can be fed into pool or spa if the chemical feeders are connected to a wall outlet. The chemicals will feed continuously, ignoring the following situations the flow of water to the pool stops due to filter backwash, the circulation pump losing prime or other causes, potentially hazardous concentrations of chemicals can be fed into pool or spa.

NOTICE

The maximum allowable external load to the relays is 5 AMPS @ 120 VAC.

pH FEED (Relay #1)

Proceed as follows:

1. Locate terminals labeled “pH FEED”.
2. Connect Line (Black) from feed device to the terminal labeled “L”.
3. Connect Neutral (White) from feed device to the terminal labeled “N”.
4. Connect Ground from feed device to the terminal labeled with the ground symbol.

⚠ WARNING

Only connect a pH feeder to this outlet!

Connecting a Chlorine/Bromine feeder to this outlet can cause chemical interactions that may cause personal injury or death. Caution must be used to insure feeders are connected properly to avoid hazardous chemical feed conditions.
Never connect Chlorine/Bromine feeder or any other device to this connector.
Blu-Sentinel™ pH Sensors are color coded as YELLOW.

Oxidizers (Chlorine or Bromine), acids (Muriatic or Carbon Dioxide) and caustics (Sodium Hydroxide, Caustic Soda, or Soda Ash) are com- mon chemicals used to automatically maintain safe and healthy pool and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulating through the filter(s).
Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, their connectors, and the feeder power cords, if present, are color coded. The YELLOW sensor is associated with the pH control channel which feeds an Acid or a Base (sometimes called caustic or alkaline) chemical. If these sensors or chemical feed pumps are not plugged into to the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.

Cl2 FEED (Relay #2)

Proceed as follows:

1. Locate terminals labeled “Cl2 FEED”.
2. Connect Line (Black) from feed device to the terminal labeled “L”.
3. Connect Neutral (White) from feed device to the terminal labeled “N”.
4. Connect Ground from feed device to the terminal labeled with the ground symbol.

⚠ WARNING

Only connect a Chlorine or Bromine feeder to this outlet!

Connecting a pH feeder to this outlet can cause chemical interactions that may cause personal injury or death.
Caution must be used to insure feeders are connected properly to avoid hazardous chemical feed conditions.
Never connect pH feeder or any other device to this connector.
Blu-Sentinel™ Chlorine/Bromine Sensors are color coded as BLUE.

Oxidizers (Chlorine or Bromine), acids (Muriatic or Carbon Dioxide) and caustics (Sodium Hydroxide, Caustic Soda or Soda Ash) are common chemicals used to automatically maintain safe and healthy pool and spa water chemistry. The automatic feeding of these chemicals is performed using sensors, which continuously monitor the water circulating through the filter(s).
Each of the sensors is associated with a chemical it is monitoring and feeding. These sensors, their connectors, and the feeder power cords, if present, are color coded. The BLUE sensor is associated with the feed of Chlorine or Bromine (sometimes called an oxidant or oxidizer). If these sensors or chemical feed pumps are not plugged into to the proper connections, or are connected to opposite devices, the uncontrolled feeding of one or both chemicals can occur. Uncontrolled or improper feeding of these two chemicals can cause serious injury or death to swimmers in the pool area from the formation of chlorine gas. Use extreme caution when connecting chemical feeders and sensors.

Relay #3

Proceed as follows:

1. Locate terminals labeled “AUXILIARY” (Sensor Wash, pH up feed or Alarm).
2. Connect Line (Black) from feed device to the terminal labeled “L”.
3. Connect Neutral (White) from feed device to the terminal labeled “N”.
4. Connect Ground from feed device to the terminal labeled with the ground symbol.

4.3.6 Connecting Sensors to the Blu-Sentinel™

pH, HRR and optional Temperature Sensors

Proceed as follows:

1. Locate the BNC plugs on the bottom of the enclosure, nearest to the back of the enclosure and plug pH sensor into the BNC jack on the left side (yellow) of the Blu-Sentinel™ by twisting it a quarter of a turn to lock it.
2. Plug HRR sensor into the BNC jack on the right side (blue) of the Blu-Sentinel™ by twisting it a quarter of a turn to lock it.
3. Use a NEMA® 4X cord grip to insert the Temperature Sensor cable into the Blu-Sentinel™.
4. Locate two terminals labeled “Temp” on the back of the display board.
5. Connect the white wire to the first “Temp” terminal.
6. Connect the black wire to the second “Temp” terminal.

4.3.7 Connecting Flow Switches to the Blu-Sentinel™

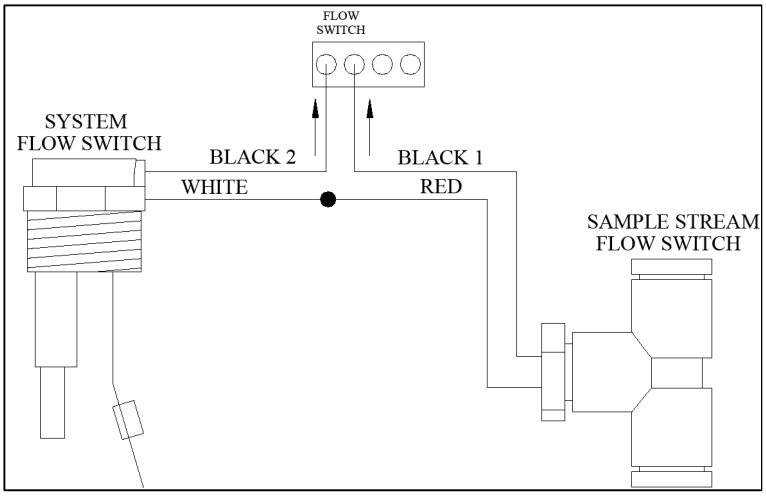
Once both the sample stream and system flow switches have been installed following the instructions in the plumbing section, the electrical connections will need to be made.

Flow Switch

Proceed as follows:

1. Connect the red wire from the sample stream flow switch to the white wire from the system flow switch.
2. The two black wires will be connected to the flow terminals in the controller.

Reed Flow Switch	Black 1 Wire	Black 2 Wire
Blu-Sentinel™ Terminal	12v	Flow



⚠ WARNING

Never override sample flow switch!

Uncontrolled feeding of chemicals can result in injury or death. Sample flow switch is a critical safety device which prevents uncontrolled chemical feed.
Follow instructions carefully!

Flow switches are provided with all Blu-Sentinel™ controllers and are an integral safety device to prevent the uncontrolled feed of chemicals, which could cause personal injury or death. The flow switch should NEVER be bypassed, even temporarily, as this critical safety device will not be available to protect the swimmers.

5. Operation

5.1 Control Inhibit

“Control Inhibit 180” will appear on the display. The control inhibit delays the feed of chemical for 180 seconds after the following conditions:

- Initial power up
- Flow is restored
- Over Feed time is reset

5.2 Blu-Sentinel™ Menu Structure

Press and Hold buttons for 3 seconds				
Cal ↑ ↓	**Cal ↑**	**Set Point**	**Set Point ↑**	**Set Point ↓**
Over Feed time	Cal pH	pH Set Point (View Only)	HRR Set Point	pH High Alarm
Sensor Wash	Cal Temp		pH Set Point	pH Low Alarm
pH Feed Direction	Cal ppm	HRR Set Point (View Only)		HRR High Alarm
pH + Cl Feed Mode				HRR Low Alarm
HRR span				Temp High Alarm
pH span				Temp Low Alarm
TBL time base				Temperature Units
Cl/Br Lockout Span				

5.3 Blu-Sentinel™ Button Functions

The following buttons for navigation appear:

Cal button	Select or Enter. Use the Cal button to select the parameter and then use the Cal button to enter the change.
Set Point button	Hold the Set Point button for 3 seconds to view Set Points.
↑ or ↓ button	Change value or menu scroll. To change numbers quickly hold down button.

5.4 Changing the Overfeed Lock time (Failsafe)

NOTICE

Setting the Overfeed Lock time (failsafe) to zero voids NSF certification of the controller.

Proceed as follows:

1 Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.

2 Press the ↓ button until “Overfeed Lock Time” appears.

3 Press the Cal button, to select the Overfeed Lock time.

4 Press the ↑ or ↓ button to change. Hold down the buttons, to scroll quickly. (in minutes)

5 Press the ↓ button to move to next parameter or to exit menu.

5.5 Resetting the Failsafe

Proceed as follows:

1 Press and hold for 3 seconds the ↑ and ↓ buttons to clear the alarm.

5.6 Enabling the Sensor Wash (Relay #3)

The Sensor Wash will begin 12 hours from power-up for approximately 2 minutes and come on again every 24 hours after that.

NOTICE

If power is lost the unit will begin a new cycle from when power is restored.

Proceed as follows:

1. Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.
2. Press the ↓ button until Sensor Wash appears.
3. Press the Cal button, to change from off to on.
4. Press the ↓ button to move to next parameter or to exit menu.

5.7 Changing the pH Feed Direction

Proceed as follows:

1. Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.
2. Press the ↓ button until pH Feed Chemical appears.
3. Press the Cal button, to change from Acid (pH down) to Acid + Alkali (pH down and up) or to Alkali (pH up).
4. Press the ↓ button to move to next parameter or to exit menu.

NOTICE

If Acid + Alkali is chosen Relay #1 will be Acid and Relay #3 will be Alkali.

5.8 Auxiliary Relay (Relay #3)

The auxiliary relay can be either Sensor Wash, pH feed up or Alarm.

5.9 Changing Feed Modes (ON/OFF or Time Based Proportional)

On/Off should be chosen for motor-driven chemical feeders and Time Based Proportional should be chosen for solenoid-driven or pulsed-diaphragm chemical feeders.

On/Off	(Feed down or up) When the measurement crosses this setpoint value, the chemical feed activates, and feeds continuously until the measurement returns to a point below or above setpoint.
Time Based Proportional (TBP)	(Feed down or up) TBP will adjust the feed of chemical proportionately based upon how far the measurement is above or below setpoint. This is done by turning on and off feeder power for portions of a one-minute time-base. As the measurement rises or falls even further from setpoint, the ratio of on and off times changes to increase the amount of chemical per minute dispensed.

Proceed as follows:

1 Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.

2 Press the ↓ button until “Control Type” appears.

3 Press the Cal button, to change the type of control.

4 Press the ↓ button to exit the menu.

5.10 Changing TBP span

NOTICE

In order for the countdown timer to be activated when the system goes into an alarm condition, alarm setpoints should be set to the time based proportional (TBP) span. This is a requirement for NSF 50 aquatic controller compliance.

Proceed as follows:

1. Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.
2. Press the ↓ button until desired span appears.
3. Press the Cal button, to select the span.
4. Press the ↑ or ↓ button to change.
5. Press the Cal button to enter value.
6. Press the ↓ button to move to next parameter or to exit menu.

5.11 Changing TBP Time Base

The Time Base is the total time of the on and off time.

Proceed as follows:

1. Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.
2. Press the ↓ button until desired span appears.
3. Press the Cal button, to select the span.
4. Press the ↑ or ↓ button to change.
5. Press the Cal button, to enter value.
6. Press the ↓ button to move to next parameter or to exit menu.

5.12 Changing Cl/Br Lockout span

The Cl/Br Lockout span is the distance from the pH setpoint in which the Blu-Sentinel™ will lockout the chlorine feed.
Example: Setpoint = 7.5, Cl/Br Lockout span = 0.5, the chlorine will be locked out at 7.0 and 8.0.

Proceed as follows:

1 Press and hold the Cal, ↑ and ↓ buttons for 3 seconds.

2 Press the ↓ button until desired Cl/Br Lockout span appears.

3 Press the Cal button, to select.

4 Press the ↑ or ↓ button to change.

5 Press the Cal button, to enter value.

6 Press the ↓ button to move to next parameter or to exit menu.

5.13 Changing the Sensor Calibration

Proceed as follows:

1 Press and hold the Cal and ↑ buttons for 3 seconds.

2 Press the ↓ button, until the desired parameter appears.

3 Press the Cal button, to select parameter calibration.

4 Press the ↑ or ↓ button, to change calibration.

5 Press the Cal button, to enter calibration.

6 Press the ↓ button to move to next parameter or to exit menu.

5.14 Viewing the Set Points

Proceed as follows:

1 Press and hold the Set Point button for 3 seconds.

2 Press the ↓ button to move to next parameter or to exit menu.

5.15 Viewing the Alarm Set Points

Proceed as follows:

1 Press and hold the Cal button for 3 seconds.

2 Press the ↓ button to move to next parameter or to exit menu.

5.16 Changing the Set Points

Proceed as follows:

1 Press and hold the Set Point and ↑ buttons for 3 seconds.

2 Press the ↓ button, until the desired parameter appears.

3 Press the Cal button, to select parameter set point.

4 Press the ↑ or ↓ button, to change set point.

5 Press the Cal button, to enter set point.

6 Press the ↓ button to move to next parameter or to exit menu.

5.17 Changing the Alarm Points

Proceed as follows:

1 Press and hold the Set Point and ↓ buttons.

2 Press the ↓ button, until desired alarm point appears.

3 Press the Cal button, to select alarm point.

4 Press the ↑ or ↓ button to change alarm point. Hold down the buttons, to scroll quickly.

5 Press the Cal button, to enter alarm point.

6 Press the ↓ button to move to next alarm point or to exit menu

NOTICE

In order for the countdown timer to be activated when the system goes into an alarm condition, alarm setpoints should be set to the time based proportional (TBP) span. This is a requirement for NSF 50 aquatic controller compliance.

5.18 Changing the Temperature Units

Proceed as follows:

1 Press and hold the Set Point and ⇓ buttons.

2 Press the ⇓ button, until „Temp Sensor” appears.

3 Press the Cal button, to change units.

4 Press the ⇓ button to move to next alarm point or to exit menu.

5.19 Alarm Messages

Alarm Message	Cause
Overfeed Alarm	pH and/or HRR measurements have failed to reach the set point within the overfeed lock time.
No Flow Alarm	Indication of flow status.
Cl/BR Lockout Alarm	pH measurement not within the pH alarm points.
Sensor Wash	Sensor wash process active.
HRR High Alarm	HRR measurement above high alarm setting.
HRR Low Alarm	HRR measurement below low alarm setting.
pH High Alarm	pH measurement above high alarm setting.
pH Low Alarm	pH measurement below low alarm setting.
Temp High Alarm	Temperature measurement above high alarm setting.
Temp Low Alarm	Temperature measurement below low alarm setting.

6. Maintenance

NOTICE

Liability for defects can only be accepted if maintenance work is performed as specified. Only authorized and trained technicians must perform the maintenance. Only qualified electricians must perform work on electrical components. Adhere to the applicable standards and national and regional regulations.

⚠ DANGER

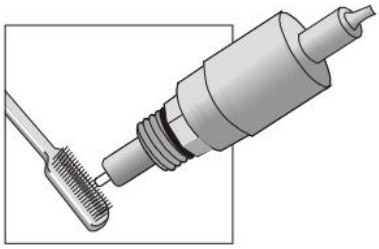
Risk of injury or death!

External voltages may be connected even with the operating voltage switched off. Disconnect all power sources before opening the Blu-Sentinel™.

6.1 Cleaning the Sensors

The Blu-Sentinel™ requires no maintenance other than a periodic calibration check and sensor cleaning.

Proceed as follows:



1. Isolate the Flowcell, and then remove the sensors.
2. Clean the tips with HRR® Cleaning Solution and a toothbrush.
3. Check Teflon® sealing tape on threads and reinstall sensor.
4. Open valves and let sensors rinse for 15 minutes in sample stream water before making any adjustments.

NOTICE

If the sample stream is shut down for more than a short time (particularly in freezing temperatures), remove the sensors from the flowcell and unplug the controller. Store the sensors in a heated, secure area, with the sensor caps in place or with the tips immersed in any small container of water to prevent them from drying out.

6.2 Cleaning the Blu-Sentinel™

Use a soft cloth damp with clean water to wipe outside of unit. Do not use harsh cleaners, or spray water directly on unit, or immerse the unit.

7. Spare Parts

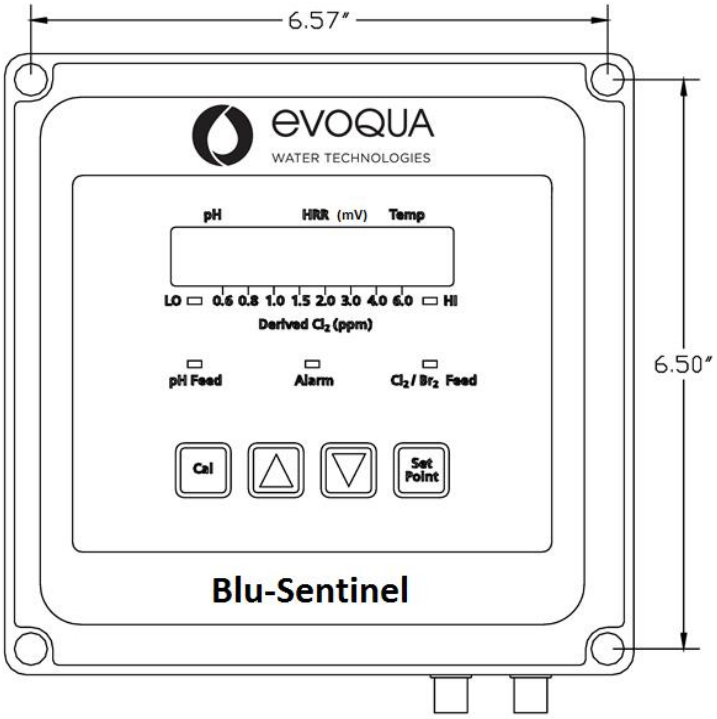
NOTICE

For reasons of safety, only use original spare parts. Please contact our customer service, if you need any other parts for your Blu-Sentinel™ controller.

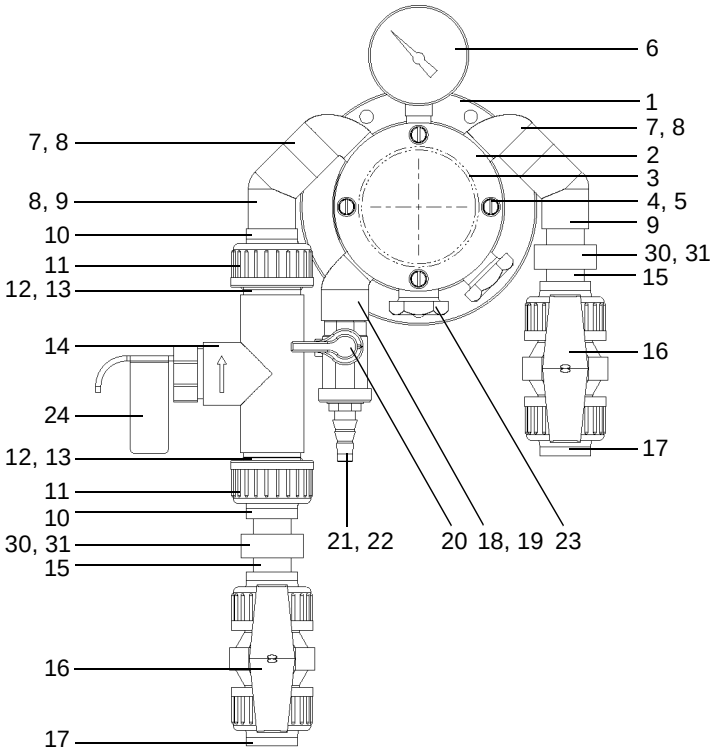
Part No.	Part Description	Part Reference
W2T4677	pH Sensor 32 inches	Acid/Caustic Sensor Short Yellow
W2T4675	pH Sensor 10 Feet	Acid/Caustic Sensor Long Yellow
W2T3067	HRR Sensor 32 inches	Chlorine/Bromine Sensor Short Blue
W2T3068	HRR Sensor 10 Feet	Chlorine/Bromine Sensor Long Blue
W2T4671	RTD, 100 ohm, 2 wire	Temperature Sensor
W3T394922	Flow switch complete	
W2T3275	Gauge	
W3T394981	Cover flowcell PMMA	
W2T506499	Fuse 1.6 A T	Mains input

8. Drawings

8.1 Blu-Sentinel™ controller W3T387337 Dimension drawing

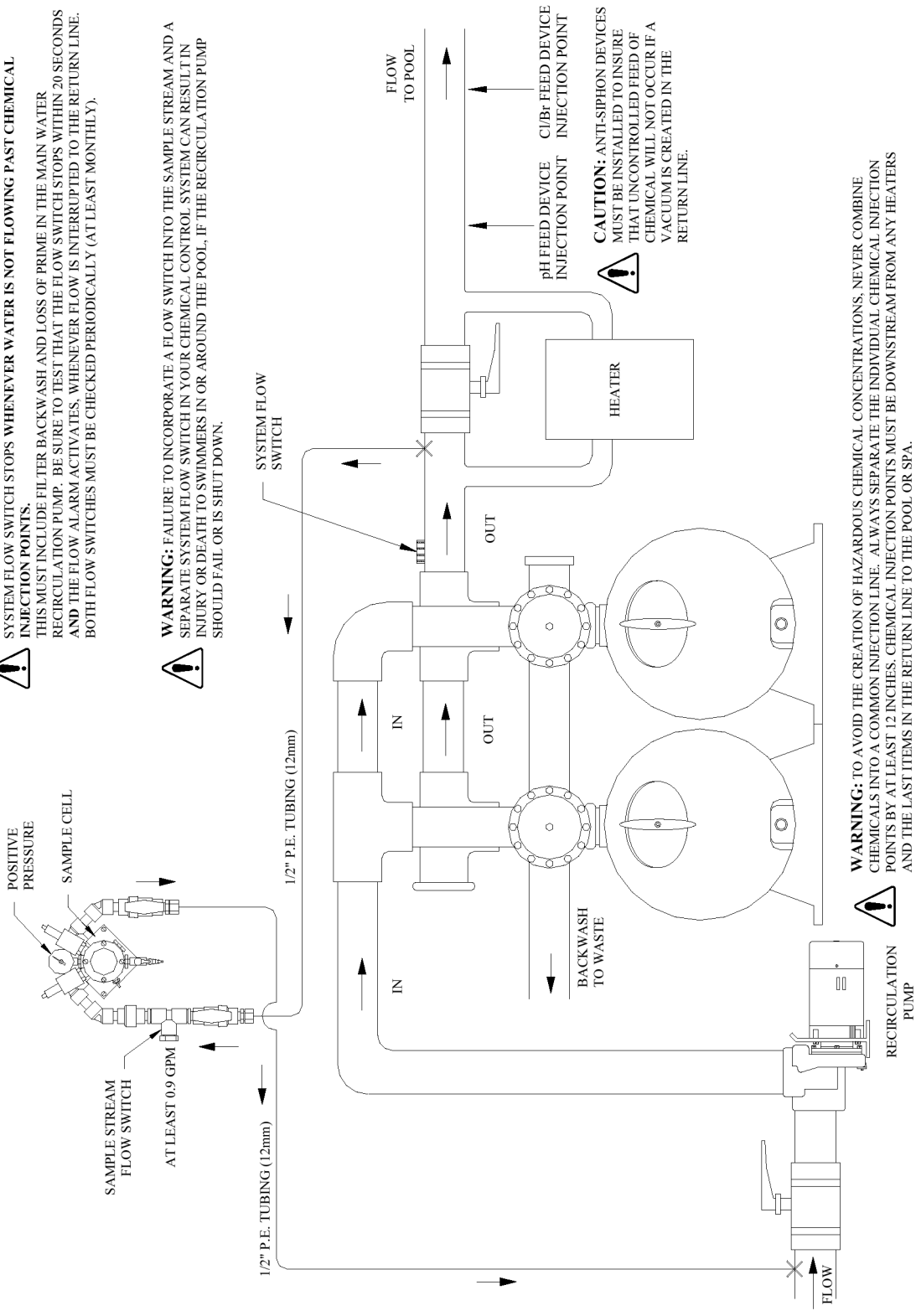


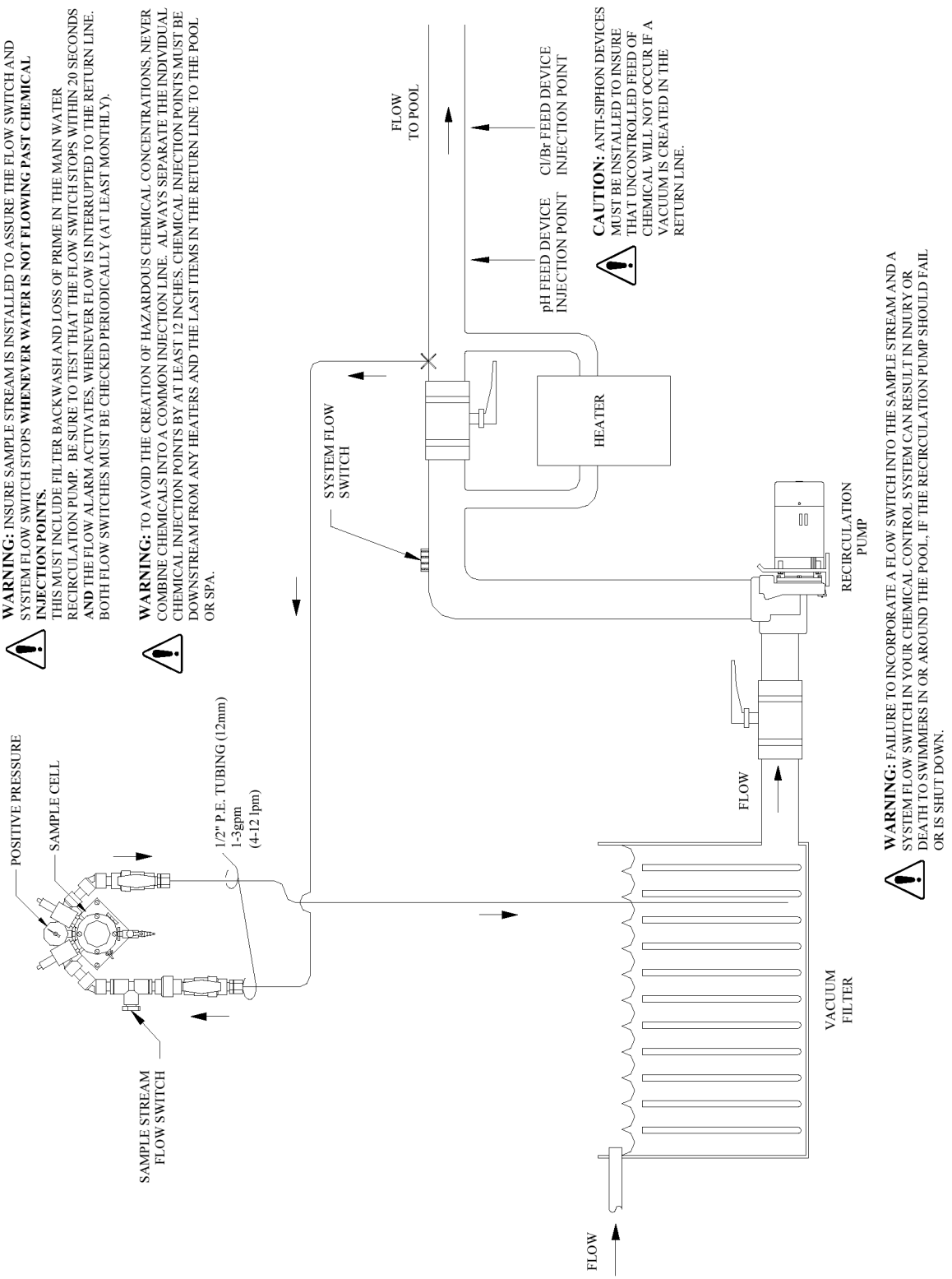
8.2 Flowcell Assembly



Item	Part No.	Description
1	W3T394810	Body flow cell, PVC-U
2	W3T394981	Cover flowcell, PMMA
3	W3T168572	O-ring, d 60.05 x 1.78, EPDM
4	W2T505771	Pan head screw, M5 x 20
5	W2T506019	Washer, 5.3 mm
6	W2T3275	Gauge, compound, HG, 0-30 PSI
7	W2T505960	Elbow 90°, PVC-U, d 20 - 16
8	W3T166089	Pipe d 20, l 32 mm, PVC-U
9	W2T507134	Elbow 45°, PVC-U, d 20
10	W2T507291	Union end, PVC-U, d 20
11	W2T506920	Union nut, PVC-U, d 20
12	W3T172719	O-ring d 20.22 x 3.53, EPDM
13	W3T394921	Adapter flow switch PVC-U
14	W2T3826	Flow switch 100 VAC, 10 W, NPT, SST
15	W2T506051	Pipe, PVC-U, PN 16, l 60 mm
16	W2T505944	Ball valve type 355
17	W2T633002	Union end, PVC 1/2”, NPT
18	W2T507098	Elbow 45°, PVC-U, d 20 - 16
19	W3T163500	Reducing nipple PVC, d 20 - 5.5
20	W3T168190	Ball valve type S4
21	W2T812816	Hose connector, Id 8-12
22	W2T812951	O-ring d 10 x 2.75 FPM-B V37
23	W2T507515	Plug R 1/2”, PVC
24	W3T108000	Warning label „FLOW SWITCH”
30	W3T165580	Pipe clamp PP, d 20
31	W3T163563	Spacer, PVC-U, d 20

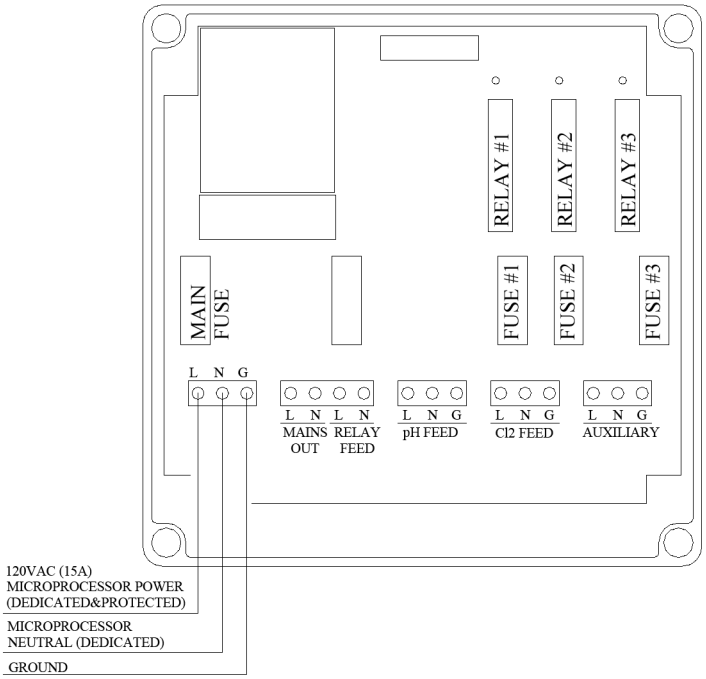
8.3 Flowcell Installation Drawings (Pressure Filter)



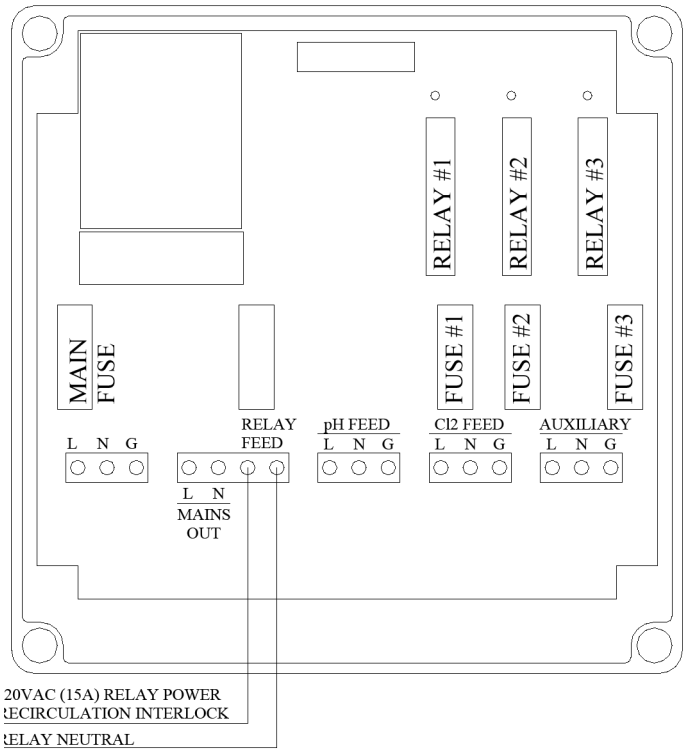

WARNING: INSURE SAMPLE STREAM IS INSTALLED TO ASSURE THE FLOW SWITCH AND SYSTEM FLOW SWITCH STOPS WHENEVER WATER IS NOT FLOWING PAST CHEMICAL INJECTION POINTS.
THIS MUST INCLUDE FILTER BACKWASH AND LOSS OF PRIME IN THE MAIN WATER RECIRCULATION PUMP. BE SURE TO TEST THAT THE FLOW SWITCH STOPS WITHIN 20 SECONDS AND THE FLOW ALARM ACTIVATES, WHENEVER FLOW IS INTERRUPTED TO THE RETURN LINE. BOTH FLOW SWITCHES MUST BE CHECKED PERIODICALLY (AT LEAST MONTHLY).
WARNING: TO AVOID THE CREATION OF HAZARDOUS CHEMICAL CONCENTRATIONS, NEVER COMBINE CHEMICALS INTO A COMMON INJECTION LINE. ALWAYS SEPARATE THE INDIVIDUAL CHEMICAL INJECTION POINTS BY AT LEAST 12 INCHES. CHEMICAL INJECTION POINTS MUST BE DOWNSTREAM FROM ANY HEATERS AND THE LAST ITEMS IN THE RETURN LINE TO THE POOL OR SPA.
POSITIVE PRESSURE
SAMPLE CELL
1/2" P.E. TUBING (12mm)
1-3gpm
(4-12 lpm)
SAMPLE STREAM
FLOW SWITCH
SYSTEM FLOW
SWITCH
FLOW
TO POOL
pH FEED DEVICE
INJECTION POINT
Cl/Br FEED DEVICE
INJECTION POINT
CAUTION: ANTI-SIPHON DEVICES MUST BE INSTALLED TO INSURE THAT UNCONTROLLED FEED OF CHEMICAL WILL NOT OCCUR IF A VACUUM IS CREATED IN THE RETURN LINE.
HEATER
RECIRCULATION
PUMP
FLOW
VACUUM
FILTER
FLOW
WARNING: FAILURE TO INCORPORATE A FLOW SWITCH INTO THE SAMPLE STREAM AND A SYSTEM FLOW SWITCH IN YOUR CHEMICAL CONTROL SYSTEM CAN RESULT IN INJURY OR DEATH TO SWIMMERS IN OR AROUND THE POOL, IF THE RECIRCULATION PUMP SHOULD FAIL OR IS SHUT DOWN.

9. Wiring Diagrams

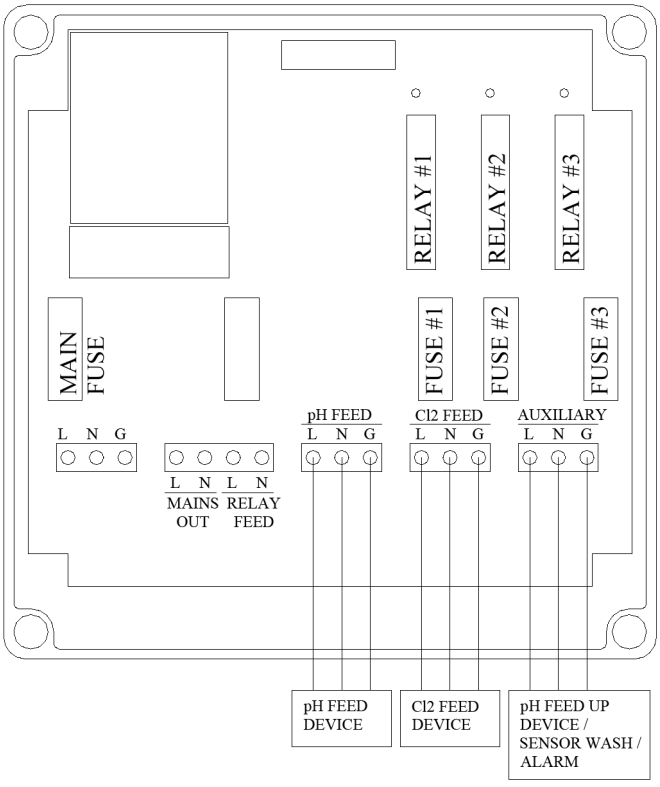
9.1 Blu-Sentinel™ Power Wiring



9.2 Blu-Sentinel™ Power Wiring (Optional)



9.3 Blu-Sentinel™ Relay Output Wiring



10.Index

Neptune Benson
an EVOQUA brand

EVOQUA
WATER TECHNOLOGIES

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