



## Swimming Pool Controllers

BL120 • BL121

&

BL122 • BL123

with Cloud Connectivity

## Dear Customer,

Thank you for choosing a Hanna Instruments® product.

Please read this instruction manual carefully before using this instrument as it provides the necessary information for correct use of this instrument and a precise idea of its versatility.

If you need additional technical information, do not hesitate to e-mail us at [tech@hannainst.com](mailto:tech@hannainst.com).

Visit [www.hannainst.com](http://www.hannainst.com) for more information about Hanna Instruments and our products.

### SW & FW DEVICE UPDATE NOTIFICATION

This manual has been written for **BL120**, **BL121**, **BL122** and **BL123** controllers with software version 2.0 and higher.  
USB-C firmware updates and data transfer.

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## 1. PRELIMINARY EXAMINATION

Remove the instrument and accessories from the packaging and examine it carefully. For further assistance, please contact your local Hanna Instruments® office or email us at [tech@hannainst.com](mailto:tech@hannainst.com).

There are two installation kit versions:

- **in-line configuration**  
ordering information: [BL120-10](#), [BL121-10](#), [BL122-10](#), [BL123-10](#)
- **user-panel flow cell configuration**  
ordering information: [BL120-20](#), [BL121-20](#), [BL122-20](#), [BL123-20](#)

Each instrument is delivered in a cardboard box and is supplied with:

| In-line configuration mounting kit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Flow cell configuration mounting kit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• <a href="#">HI1036-1802</a> Combined electrode (pH/ORP/Temperature)</li> <li>• Electrode fittings</li> <li>• Electrode saddle, Ø 50 mm pipe (1 pc.)</li> <li>• Injector (2 pcs.)</li> <li>• Injectors saddle, Ø 50 mm pipe (2 pcs.)</li> <li>• Peristaltic pump tubing (2 pcs.)</li> <li>• PVC aspiration and injection tubing, 10 m</li> <li>• Aspiration filter (2 pcs.)</li> <li>• 4.01 pH buffer solution (3 sachets)</li> <li>• 7.01 pH buffer solution (3 sachets)</li> <li>• 470 mV ORP test solution (3 sachets)</li> <li>• Power cable</li> <li>• Probe quality certificate</li> <li>• Instrument quality certificate</li> <li>• Quick reference guide with QR code for manual download</li> </ul> | <ul style="list-style-type: none"> <li>• <a href="#">HI1036-1802</a> Combined electrode (pH/ORP/Temperature)</li> <li>• Panel-mounted flow cell</li> <li>• Flow cell connection valve, with fittings and tubing, 10 m</li> <li>• Valve saddle, Ø 50 mm pipe (2 pcs.)</li> <li>• Injector (2 pcs.)</li> <li>• Injector saddle, Ø 50 mm pipe (2 pcs.)</li> <li>• Peristaltic pump tubing (2 pcs.)</li> <li>• PVC aspiration and injection tubing, 10 m</li> <li>• Aspiration filter (2 pcs.)</li> <li>• 4.01 pH buffer solution (3 sachets)</li> <li>• 7.01 pH buffer solution (3 sachets)</li> <li>• 470 mV ORP test solution (3 sachets)</li> <li>• Power cable</li> <li>• Probe quality certificate</li> <li>• Instrument quality certificate</li> <li>• Quick reference guide with QR code for manual download</li> </ul> |

**Note:** Save all packing material until you are sure that the instrument works correctly. Any damaged or defective item must be returned in its original packing material with the supplied accessories.

## 2. SAFETY MEASURES



- Do not use chlorine tablets, granular chlorine, or other non-liquid chlorine applications.
- Do not use the pool controller in a pool utilizing electrolytic chlorine generation (salt electrolysis).
- Do not add stabilizer (e.g. cyanuric acid) to the swimming pool while using the pool controller. To remove stabilizer from the pool, the pool must be drained and cleaned.
- Always disconnect the pool controller from power when making electrical connections.
- Do not access the larger rear panel.



- Do not run other cables with the power cable through the cable gland.

### Battery Safety

The coin-cell battery is replaceable by a professional service center only.

|  <b>WARNING</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• <b>INGESTION HAZARD:</b> This product contains a button cell or coin battery.</li> <li>• <b>DEATH</b> or serious injury can occur if digested.</li> <li>• A swallowed button cell or coin battery can cause <b>Internal Chemical Burns</b> in as little as <b>2 hours</b>.</li> <li>• <b>KEEP</b> new and used batteries <b>OUT OF REACH OF CHILDREN</b>.</li> <li>• <b>Seek immediate medical attention</b> if a battery is suspected to be swallowed or inserted inside any part of the body.</li> </ul> |  |

- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Coin-cell battery type CR2032 | Nominal voltage 3.0 V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above 85 °C (185 °F) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and –).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.

### 3. SPECIFICATIONS

#### 3.1. BL12X SERIES COMPARISON TABLE

|       | pH<br>measurement | ORP<br>measurement | Acid dosing<br>pump | Chlorine dosing<br>pump | Analog<br>outputs | Hanna Cloud<br>connectivity |
|-------|-------------------|--------------------|---------------------|-------------------------|-------------------|-----------------------------|
| BL120 | ✓                 | ✓                  | ✓                   | ✓                       |                   |                             |
| BL121 | ✓                 | ✓                  | ✓                   | ✓                       | ✓                 |                             |
| BL122 | ✓                 | ✓                  | ✓                   | ✓                       |                   | ✓                           |
| BL123 | ✓                 | ✓                  | ✓                   | ✓                       | ✓                 | ✓                           |

#### 3.2. TECHNICAL SPECIFICATIONS

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| pH                       | Range                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.00 to 14.00 pH*                    |
|                          | Resolution                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.01 pH                              |
|                          | Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                              | ±0.05 pH (@25 °C / 77 °F)            |
| mV                       | Range                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ±2000 mV                             |
|                          | Resolution                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 mV                                 |
|                          | Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                              | ±5 mV (@25 °C / 77 °F)               |
| Temperature              | Range                                                                                                                                                                                                                                                                                                                                                                                                                                                 | −5.0 to 105.0 °C (23.0 to 221.0 °F)* |
|                          | Resolution                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.1 °C / 0.1 °F                      |
|                          | Accuracy                                                                                                                                                                                                                                                                                                                                                                                                                                              | ±1.0 °C / ±1.8 °F (@25 °C / 77 °F)   |
| Calibration              | <ul style="list-style-type: none"> <li>pH buffer calibration               <ul style="list-style-type: none"> <li>automatic</li> <li>two points (4.01 pH, 7.01 pH, 10.01 pH)</li> </ul> </li> <li>pH process calibration               <ul style="list-style-type: none"> <li>adjustable, single point</li> </ul> </li> <li>ORP (mV) calibration               <ul style="list-style-type: none"> <li>adjustable, single point</li> </ul> </li> </ul> |                                      |
| Temperature compensation | <ul style="list-style-type: none"> <li>Automatic temperature compensation for pH</li> <li>Covers −5.0 to 105.0 °C (23.0 to 221.0 °F) range</li> </ul>                                                                                                                                                                                                                                                                                                 |                                      |
| pH Controller            | <ul style="list-style-type: none"> <li>Delay to start at power-on</li> <li>Proportional feed using adjustable set point and adjustable proportional band</li> <li>Overdosing protection using overfeed safety timer</li> </ul>                                                                                                                                                                                                                        |                                      |
| ORP Controller           | <ul style="list-style-type: none"> <li>Delay to start at power-on</li> <li>Proportional feed using adjustable set point and adjustable proportional band</li> <li>Overdosing protection using overfeed safety timer</li> <li>pH regulator interlocked</li> </ul>                                                                                                                                                                                      |                                      |
| Alarms                   | <ul style="list-style-type: none"> <li>High and Low with enable/disable option for all parameters</li> <li>Alarm is triggered after a user-specified time</li> </ul>                                                                                                                                                                                                                                                                                  |                                      |
| Pool startup             | Simplified pool startup procedure: <ul style="list-style-type: none"> <li>Ensures 12 hour dosing to reach a target setpoint</li> <li>Can be enabled or disabled manually from the controller menu</li> <li>Disabled automatically when set point is reached or 12 hour timeout has expired</li> </ul>                                                                                                                                                 |                                      |

\* Range will be reduced to probe's limits.

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Log feature                              | <ul style="list-style-type: none"> <li>• Automatic logging of pH/ORP/temperature measurements</li> <li>• Configurable logging interval:<br/>30 seconds; 1 minute; 5 minutes; 15 minutes; 30 minutes; 60 minutes</li> <li>• 300 days logging, depending on selected logging interval (capacity of 100 lots)</li> <li>• Logged data displayed as a plot:<br/>7 days or 6 hours zoom options<br/>overview of measure range registered values (minimum, maximum, average)</li> <li>• Logged event type: setup/alarms/errors/warnings/calibration/power outage (capacity of 100 records, oldest record is overwritten)</li> <li>• Export to USB flash drive (USB-C port) of log files in CSV format</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Cloud connectivity<br>BL122 & BL123 only | <p>The BL122 &amp; BL123 devices connect to Hanna Cloud via secured connection.</p> <ul style="list-style-type: none"> <li>• Ethernet (RJ45) 10/100 Mbps connection</li> <li>• Device identity registry</li> <li>• Policy-based authorization of security keys</li> </ul> <p>The instrument sends status information to Hanna Cloud with a defined period.</p> <ul style="list-style-type: none"> <li>• Readings: pH/ORP/Temperature</li> <li>• Events: Alarms/Warnings/Errors</li> <li>• Peripherals status: LEDs</li> <li>• Last dosed acid and chlorine volumes</li> <li>• GLP info</li> </ul> <p>The device sends setup information to Hanna Cloud at startup and whenever setup configuration changes.</p> <ul style="list-style-type: none"> <li>• Alarm settings</li> <li>• Dosing settings</li> <li>• General settings</li> <li>• System information:<br/>Meter — model, FW version, OS version, serial number<br/>Probe — type, FW version, serial number</li> </ul> <p>“Remote Hold” mode:</p> <ul style="list-style-type: none"> <li>• emergency mode, remotely triggered via web application</li> <li>• mode for pumps deactivation</li> <li>• can be cancelled manually from the controller menu</li> </ul> |
| Ethernet input<br>BL122 & BL123 only     | <ul style="list-style-type: none"> <li>• Ethernet connector (RJ-45) 10/100 Mbps connection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Additional Specifications</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Pump control                             | <ul style="list-style-type: none"> <li>• Pump flow control 0.5 to 3.5 L/h (0.13 to 0.92 gal/h)</li> <li>• Maximum output pressure 1 atm (14 psi)</li> <li>• Manual control for each pump</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Password protection                      | <ul style="list-style-type: none"> <li>• The setup, calibration, and log recall features are password protected<br/>Authenticated password is valid up to 15 seconds after controller returns to measure screen</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| USB-C port                               | <ul style="list-style-type: none"> <li>• Data export to USB flash drive</li> <li>• Software update</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| GLP                                      | <ul style="list-style-type: none"> <li>• pH/ORP</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Alarm system                             | <ul style="list-style-type: none"> <li>• Intuitive alert system based on LED color coded alarm system</li> <li>• Alarm filtering options</li> <li>• Alarm relay control based on user setup filters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Alarm relay output                       | <p>SPDT 5A/230 Vac</p> <p>Activated by selectable pH/ORP/Temperature and Hold Input alarm conditions</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                                      |                                                                                                                                                                                                                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analog outputs<br>BL121 & BL123 only | <ul style="list-style-type: none"> <li>• Three configurable 4 to 20 mA analog outputs, sourcing</li> <li>• Output impedance <math>\leq 500 \Omega</math></li> <li>• Accuracy <math>&lt; 0.5 \% \text{ FS}</math></li> <li>• Galvanic isolation, up to 50 V relative to earth</li> </ul>     |
| Three digital inputs                 | <ul style="list-style-type: none"> <li>• Galvanic isolation, powered contact type</li> <li>• One input for low level in acid/base tank (contact open)</li> <li>• One input for low level in chlorine tank (contact open)</li> <li>• One input for Hold mode (contact open/close)</li> </ul> |
| Single probe input                   | <ul style="list-style-type: none"> <li>• HI1036-18XX* multiparameter digital probe incorporates: pH/ORP/Temperature sensors along with a matching pin</li> <li>• DIN waterproof connector</li> <li>• Galvanic isolation</li> <li>• RS485 interface</li> </ul>                               |
| Power supply                         | <ul style="list-style-type: none"> <li>• Meter <ul style="list-style-type: none"> <li>■ 100-240 VAC; 50/60 Hz; 0.7A</li> </ul> </li> <li>• Relay (resistive load) <ul style="list-style-type: none"> <li>■ 250 VAC/30 VDC; 2A</li> </ul> </li> </ul>                                        |
| Power consumption                    | 30 VA 50/60 Hz                                                                                                                                                                                                                                                                              |
| Environment                          | <ul style="list-style-type: none"> <li>• 0-50 °C (32-122 °F)</li> <li>• Max. 95% RH non-condensing</li> </ul>                                                                                                                                                                               |
| Dimensions                           | 245 × 188 × 55 mm (73 mm with pumps)<br>9.6 × 7.4 × 2.2" (2.9" with pumps)                                                                                                                                                                                                                  |
| Weight                               | 1700 g (60 oz)                                                                                                                                                                                                                                                                              |
| Casing                               | Wall mounted, built-in pump, IP65 rated                                                                                                                                                                                                                                                     |

### 3.3. HI1036-18XX\* PROBE SPECIFICATIONS

|                         |                                                                                                                                                                                              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range                   | pH            0.00 to 12.00 pH<br>ORP           ± 2000 mV<br>Temperature 0.0 to 70.0 °C (32.0 to 158.0 °F)                                                                                   |
| Reference               | Ag / AgCl reference electrode (3.5M KCl)                                                                                                                                                     |
| Junction                | Cloth                                                                                                                                                                                        |
| Matching pin            | Yes                                                                                                                                                                                          |
| Body                    | PVDF                                                                                                                                                                                         |
| Top thread              | 3/4" NPT                                                                                                                                                                                     |
| Cable length            | 2, 5, 10, 15, 20 m (6'7", 16'5", 32'9", 49'3", 65'7") cable                                                                                                                                  |
| Connector               | DIN connector                                                                                                                                                                                |
| Maximum pressure @25 °C | 3 bar (43.5 psi)                                                                                                                                                                             |
| Probe ordering codes    | HI1036-1802 with 2 m (6'7") cable<br>HI1036-1805 with 5 m (16'5") cable<br>HI1036-1810 with 10 m (32'9") cable<br>HI1036-1815 with 15 m (49'3") cable<br>HI1036-1820 with 20 m (65'7") cable |

\* XX - cable length options

## 4. DESCRIPTION

### 4.1. GENERAL DESCRIPTION & INTENDED USE

The Hanna Instruments® **BL12X** swimming pool controllers are automatic systems, specially designed to measure and control pH and free-chlorine levels.

The chlorine level is measured based on the ORP or REDOX principle. An increase in the ORP value correlates with an increase in the free-chlorine level. pH and ORP testing are done together for efficient disinfection and control. The efficacy of sanitizers, such as chlorine, depends on a controlled pH value. The ORP value is the most consistent indicator of the sanitizing effectiveness of the pool or spa. Typically, 650-750 mV at 7.2 pH indicates proper water treatment.

The **BL122** & **BL123** offer the added benefit of allowing remote access and visualizing of measured data via Cloud connectivity. All measurements and main events are sent to Hanna Cloud through the Ethernet connection.

For **BL121** & **BL123** three analog outputs are available that allow connection to an external chart recorder or datalogger to monitor any of the three measured parameters. The outputs are scalable, offering increased flexibility and better resolution as needed.

Any of the controllers can be paired with the **HI1036-18XX** digital probe. The probe incorporates pH, ORP and temperature sensors along with a matching pin. It was specially designed to detect a broken electrode based on a shifted zero potential value, around 4 pH. The **HI1036-18XX** uses an Ag/AgCl reference with 3.5 M KCl. The ORP values are referenced to it. Measurement data stored on the probe is transferred to the controller via a digital connection; thus eliminating noise and static due to high impedance signals carried by the cable.

**BL12X** swimming pool controllers are available in two configurations:

- in-line, for direct probe installation and chemical injection fittings into existing piping
- flow cell, for calibration and probe maintenance without having to shut down the recirculation pump

For compliance monitoring, each of the **BL12X** family has a built-in datalogger. Measurement readings are logged periodically, based on configured interval, and a new log is initiated at the beginning of each day, upon instrument calibration, or when the settings are modified. Logged data include pH, ORP, and temperature values, last calibration data, setup configuration, and any event data. For review and storage, the users can transfer data to a PC using a flash drive and the USB-C port.

The **BL12X** swimming pool controller is an automatic system, but it is advisable that users check the controller and verify pH and free-chlorine levels (in mg/L or ppm) in the pool using a portable colorimeter.

#### Main Features

- Two built-in peristaltic dosing pumps with Proportional control
- Manual control for pump priming
- Pool startup with 12 hours dosing to reach target setpoint
- Overfeed protection using overtime safety timer
- Resumes dosing on restart in case of power failure
- Configurable Hold Input for increased system stability
- Level input to stop control without reagents
- Interlocked pH-ORP control (i.e. ORP control only runs when the pH set point has been reached)
- Extended logging capacity for configurable logging interval
- Dedicated Log Recall submenu
- LED indicators for dosing, meter status, and service
- Real-time graph display
- Programmable alarms
- USB-C firmware updates
- Remote firmware upgrade through Hanna Cloud (**BL122** & **BL123** only)
- Option to select operating language and language update
- Password protection for secured settings

#### Main Benefits

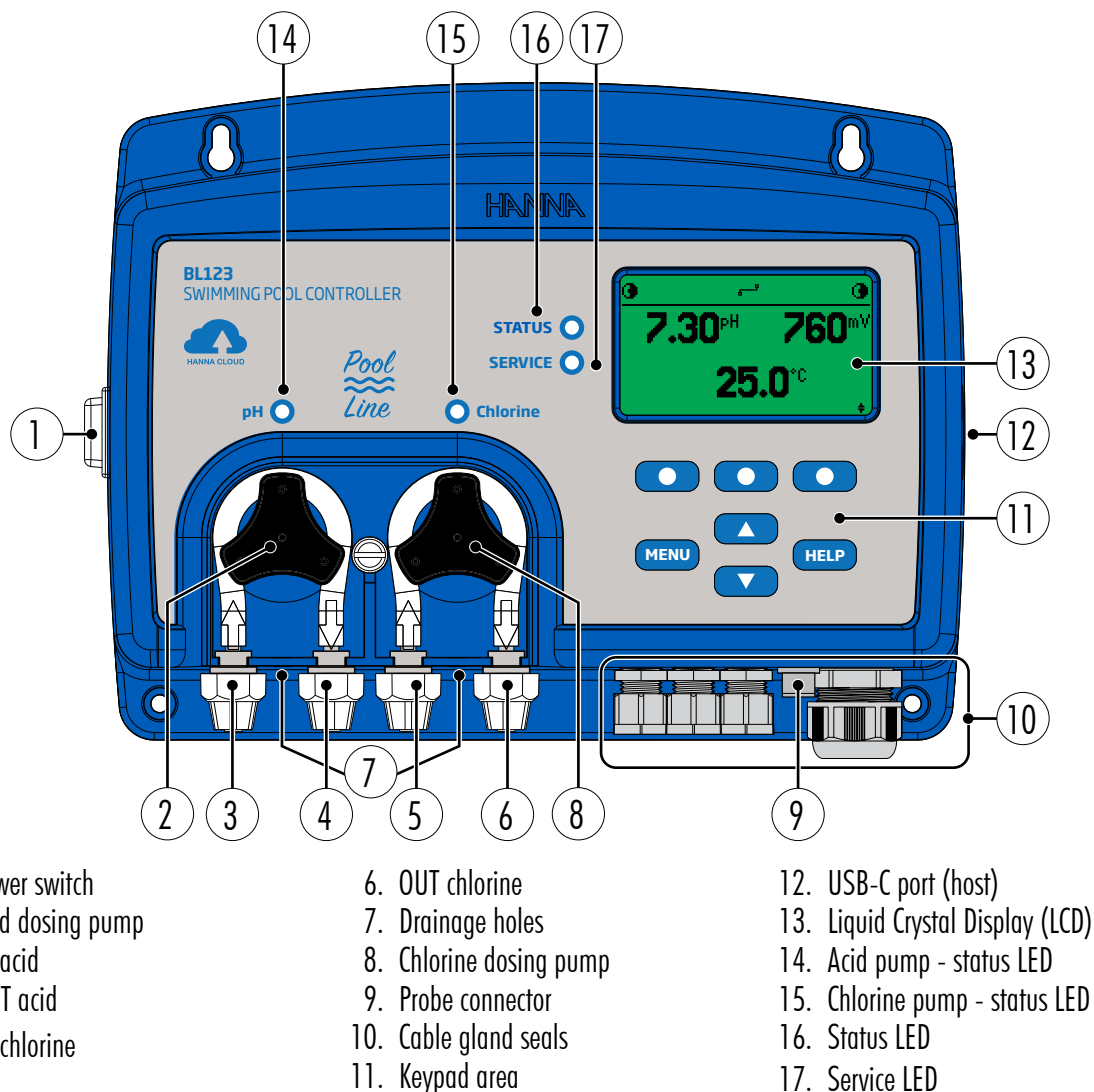
- All-in-one solution for automatic control of pH and chlorine levels
- ORP (chlorine) dosing consent ensures pH value is correct before dosing



## 4.2. FUNCTIONAL & DISPLAY DESCRIPTION

### Front Panel

- The front panel includes a custom display and keypad with tactile feedback.
- The first line displays measurement readings and the second line displays temperature readings.
- Two LEDs indicate alarm status and service conditions. A red LED indicates fault condition.
- Two additional blue LEDs flash, indicating pump activation.



### Keypad Functions

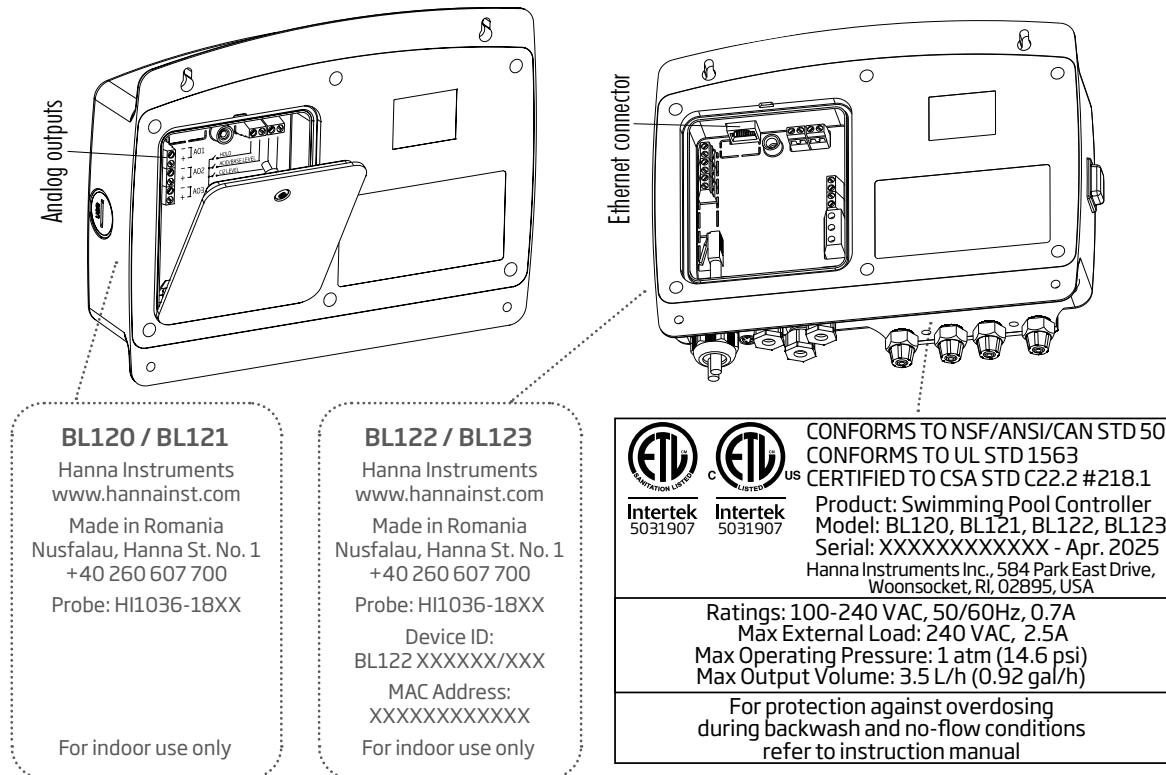
|             |                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------|
| <b>MENU</b> | Enter Setup mode and access manual pump control<br>Configure pH/ORP/Temperature options                |
| <b>▲</b>    | From Menu mode, navigate menu items and configure settings                                             |
| <b>▼</b>    | From Measurement mode, cycle between three parameter screen, single parameter screen, and plot display |
| <b>HELP</b> | Enter/exit Help menu                                                                                   |
| <b>●</b>    | Access contextual functionality                                                                        |

## Rear Sub Panel



**Warning!** Always disconnect the pool controller from power when accessing the small sub panel.  
Do not access the larger rear panel!

- Use a Phillips head screwdriver and remove the single screw attaching the small back cover.
- To replace the detachable rear panel, attach the bottom part of the panel to the controller and push to close. Tighten the screw that secures the panel to the housing.



**Note:** *BL121 & BL123 models have AO1, AO2, AO3 analog outputs.  
BL122 & BL123 models have Ethernet connector.*

## 4.3. WIRING



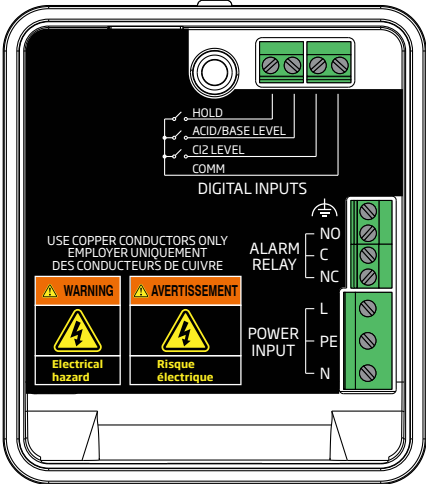
**Warning!** Always disconnect the pool controller from power when making electrical connections.  
Do not access the larger rear panel!  
User-serviceable terminals are found in the small sub panel only.

There are four openings for wiring:

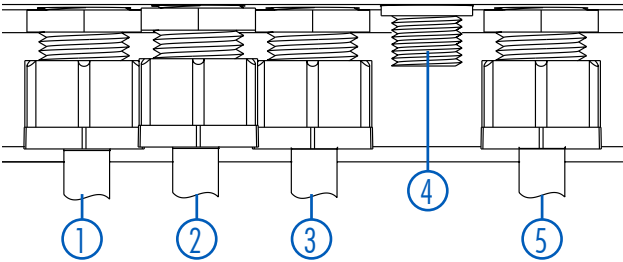
- The left rear openings, for power and digital input wiring
- The left front opening, for alarm relay wiring
- The larger right opening, for analog output wiring (**BL121 & BL123**) and the ethernet cable (**BL122 & BL123**)
- Sensor wiring is made using the connector with threaded seal

**Note:** *Do not run power cabling through the same opening as other cables.  
All unused openings must be sealed with conduit plugs.*

BL120

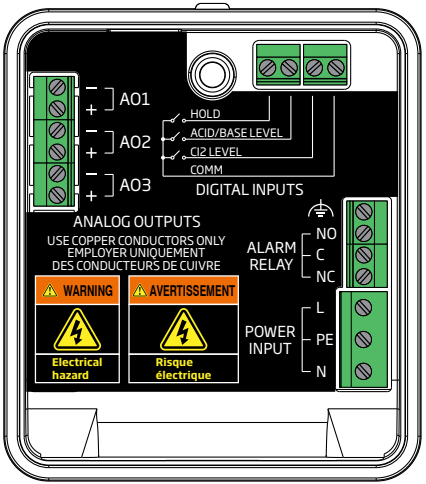


|                |                 |                             |
|----------------|-----------------|-----------------------------|
| DIGITAL INPUTS | Cl <sub>2</sub> | LOW LEVEL IN CHLORINE TANK  |
|                | HOLD            | RECIRCULATION PUMP          |
| ALARM RELAY    | ACID/BASE       | LOW LEVEL IN ACID/BASE TANK |
|                | COM             |                             |
| POWER INPUT    | L               | Line                        |
|                | PE              | Protective Earth            |
|                | N               | Neutral                     |

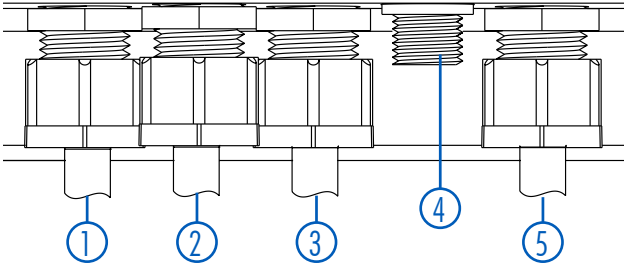


- 1 Power cable
- 2 Alarm relay cable
- 3 Gland seal for inputs cable
- 4 Probe input
- 5 Gland seal for inputs cable

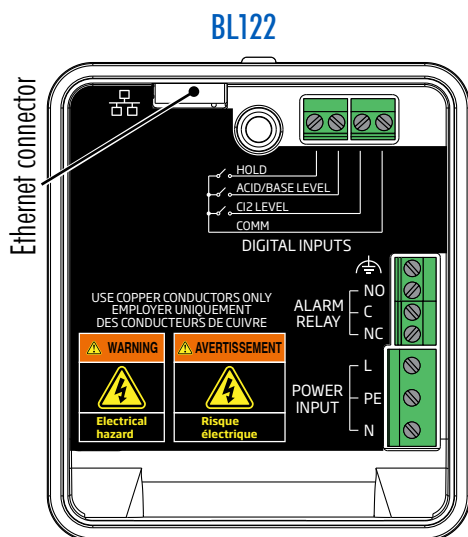
BL121



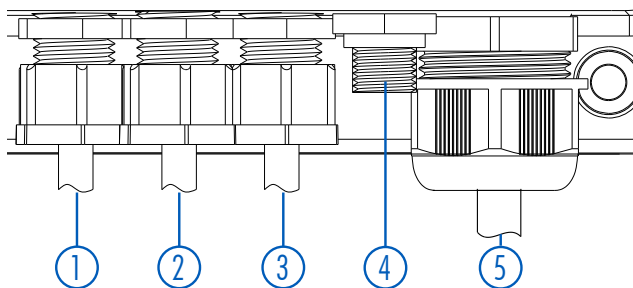
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |               |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|
| ANALOG OUTPUTS | A01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <div><div>+</div><div>—</div></div> | 4 - 20 mA OUT |
|                | A02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <div><div>+</div><div>—</div></div> | 4 - 20 mA OUT |
|                | A03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <div><div>+</div><div>—</div></div> | 4 - 20 mA OUT |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |               |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |               |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |               |
| DIGITAL INPUTS | <div><div><div>Cl<sub>2</sub></div><div>HOLD</div><div>ACID/BASE</div><div>COM</div></div><div><div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div></div><div><div>LOW LEVEL IN CHLORINE TANK</div><div>RECIRCULATION PUMP</div><div>LOW LEVEL IN ACID/BASE TANK</div></div></div></div> |                                     |               |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |               |
| ALARM RELAY    | <div><div><div>ALARM CONDITION</div><div>NO ALARM</div></div><div><div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div><div></div><div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div></div><div><div>NC</div><div>NO</div><div>NC</div><div>NO</div></div></div></div>                                                                                  |                                     |               |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                     |               |
| POWER INPUT    | L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Line                                |               |
|                | PE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Protective Earth                    |               |
|                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Neutral                             |               |



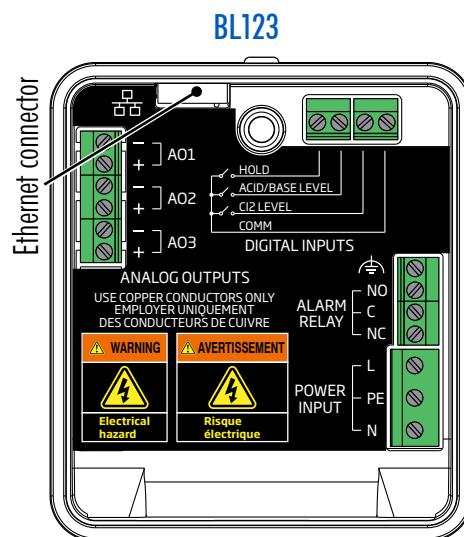
- 1. Power cable
- 2. Alarm relay cable
- 3. Gland seal for inputs cable
- 4. Probe input
- 5. Analog output cable



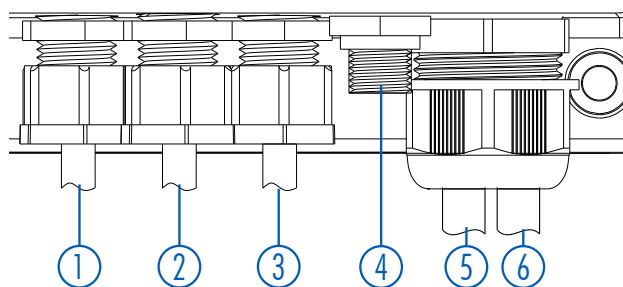
| ETHERNET       | RJ-45 connector                                                                                                                                   |   |      |    |                  |   |         |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---|------|----|------------------|---|---------|
| DIGITAL INPUTS |                                                                                                                                                   |   |      |    |                  |   |         |
| ALARM RELAY    |                                                                                                                                                   |   |      |    |                  |   |         |
| POWER INPUT    | <table border="1"> <tr> <td>L</td><td>Line</td></tr> <tr> <td>PE</td><td>Protective Earth</td></tr> <tr> <td>N</td><td>Neutral</td></tr> </table> | L | Line | PE | Protective Earth | N | Neutral |
| L              | Line                                                                                                                                              |   |      |    |                  |   |         |
| PE             | Protective Earth                                                                                                                                  |   |      |    |                  |   |         |
| N              | Neutral                                                                                                                                           |   |      |    |                  |   |         |



1. Power cable
2. Alarm relay cable
3. Gland seal for inputs cable
4. Probe input
5. Ethernet cable



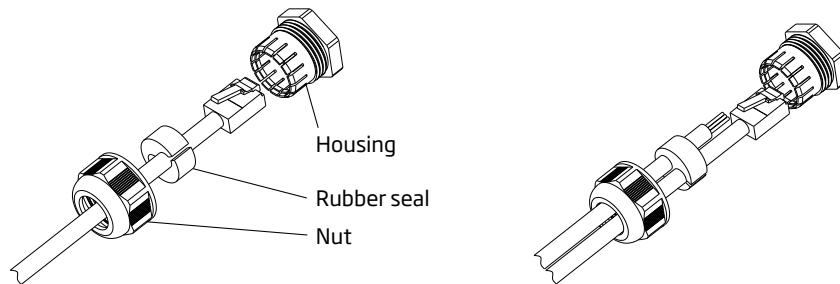
|                |                                                                                                                                                                                                                                |                                     |               |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|
| ANALOG OUTPUTS | A01                                                                                                                                                                                                                            | <div><div>+</div><div>—</div></div> | 4 - 20 mA OUT |
|                | A02                                                                                                                                                                                                                            | <div><div>+</div><div>—</div></div> | 4 - 20 mA OUT |
|                | A03                                                                                                                                                                                                                            | <div><div>+</div><div>—</div></div> | 4 - 20 mA OUT |
|                |                                                                                                                                                                                                                                |                                     |               |
| ETHERNET       | RJ-45 connector                                                                                                                                                                                                                |                                     |               |
| DIGITAL INPUTS | <div><div><div>CL<sub>2</sub></div><div>HOLD</div><div>ACID/BASE</div><div>COM</div></div><div><div><div>LOW LEVEL IN CHLORINE TANK</div><div>RECIRCULATION PUMP</div><div>LOW LEVEL IN ACID/BASE TANK</div></div></div></div> |                                     |               |
| ALARM RELAY    | <div><div><div>ALARM CONDITION</div><div>NO</div></div><div><div>NO ALARM</div><div>NO</div></div></div>                                                                                                                       |                                     |               |
| POWER INPUT    | L                                                                                                                                                                                                                              | Line                                |               |
|                | PE                                                                                                                                                                                                                             | Protective Earth                    |               |
|                | N                                                                                                                                                                                                                              | Neutral                             |               |



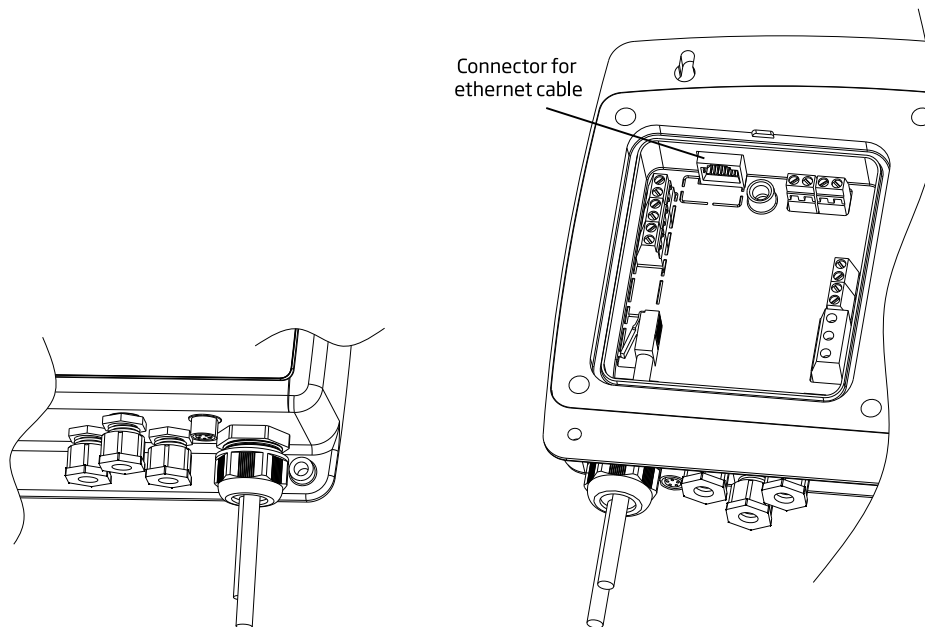
1. Power cable
2. Alarm relay cable
3. Gland seal for inputs cable
4. Probe input
5. Ethernet cable
6. Analog outputs cable

#### 4.4. ETHERNET CABLE WIRING (BL122 & BL123 ONLY)

1. Insert the ethernet cable through the knurled nut and the slotted rubber seal.
2. Insert the ethernet cable through the casing into the housing.
3. Insert the analog output connection cable through the same knurled nut and slotted rubber seal. Use a 6 conductor wire cable.
4. Feed the cables through the seal to reach intended terminals.
5. Insert the rubber seal into the housing, then tighten the connection by turning the knurled nut clockwise.



**Note:** For **BL123** always connect the analog output connections before connecting the ethernet cable.



- Always disconnect the pool controller from power when making electrical connections.
- Do not access the larger rear panel.
- Do not run other cables with the power cabling.
- User-serviceable terminals are found in the small sub panel only.
- Do not run power cabling through the same opening as other cables.

## 5. INSTALLATION

There are two available configurations:

- In-line, with the probe placed in saddle, mounted on pipe after the pool filter.
- Flow cell, with the probe mounted in the flow cell, close to the controller. The water sample is directed to the flow cell via a small diameter sample line with appropriate connections (provided).

With flow cell configurations, the water circulation can be stopped by closing the valve on the inlet while maintenance or calibration procedures are performed.

### 5.1. GENERAL GUIDELINES

Electrical connection, installation, start-up, operation and maintenance must be carried out by specialized personnel only.

- Select controller location so that it is shielded from direct sunlight, dripping water and excess vibrations.



*The swimming pool controller should not be installed in an area accessible to the public!*

- Keep flow rate as constant as possible for optimum sensor operation.
- Install cable gland fittings and plugs as needed, to properly seal the pump controller.
- For optimal operation, all tubing, cables, saddles and fittings must be properly connected.
- For in-line installation, the probe saddle should be positioned after the pool filter (within 2 m distance).

**Caution!** Use gloves, protective clothing, and eye protection goggles when working with injectors and tubing.

**Note:** Determine if a flow detector, alarm relays, or analog outputs (BL121, BL123) will be used before mounting flow cell panel or pool controller, as access to rear sub panel is needed.

### 5.2. INSTALLATION STEPS

**Note:** Recirculation pump must be off.

1. Check the acid and chlorine reagent tank level.
2. Calibrate the probe before use in the system.
3. Mount the probe into saddle (in-line configuration) or in a flow cell.
4. Mount the injector saddles (see procedure).
5. Measure and cut required length to connect tubing between filter in chemical tank and pump's inlet (aspiration tubing).\*
6. Measure and cut required length to connect tubing between pump's outlet and injector (injection tubing).
7. Check the level sensor's functionality (if used).
8. Check hold input functionality (if used).

### 5.3. OVERDOSING PROTECTION

Dosing pumps must be shut off during backwash cycles and periods of "no flow" because the lack of proper flow in the system causes conditions that may induce dosing inaccuracies.

A paddle switch flow detector is an automation component that's recommended to be connected to the meter **COMM** and **HOLD** terminals.

- Shut off power.
- Mount the switch in a straight pipe section. Always follow direction of the flow. See installation recommendations on pages 15 and 16.
- Connect the live wire to the **COMM** (Common) terminal and low-voltage wire to the **HOLD** (NO/NC contacts) terminal.

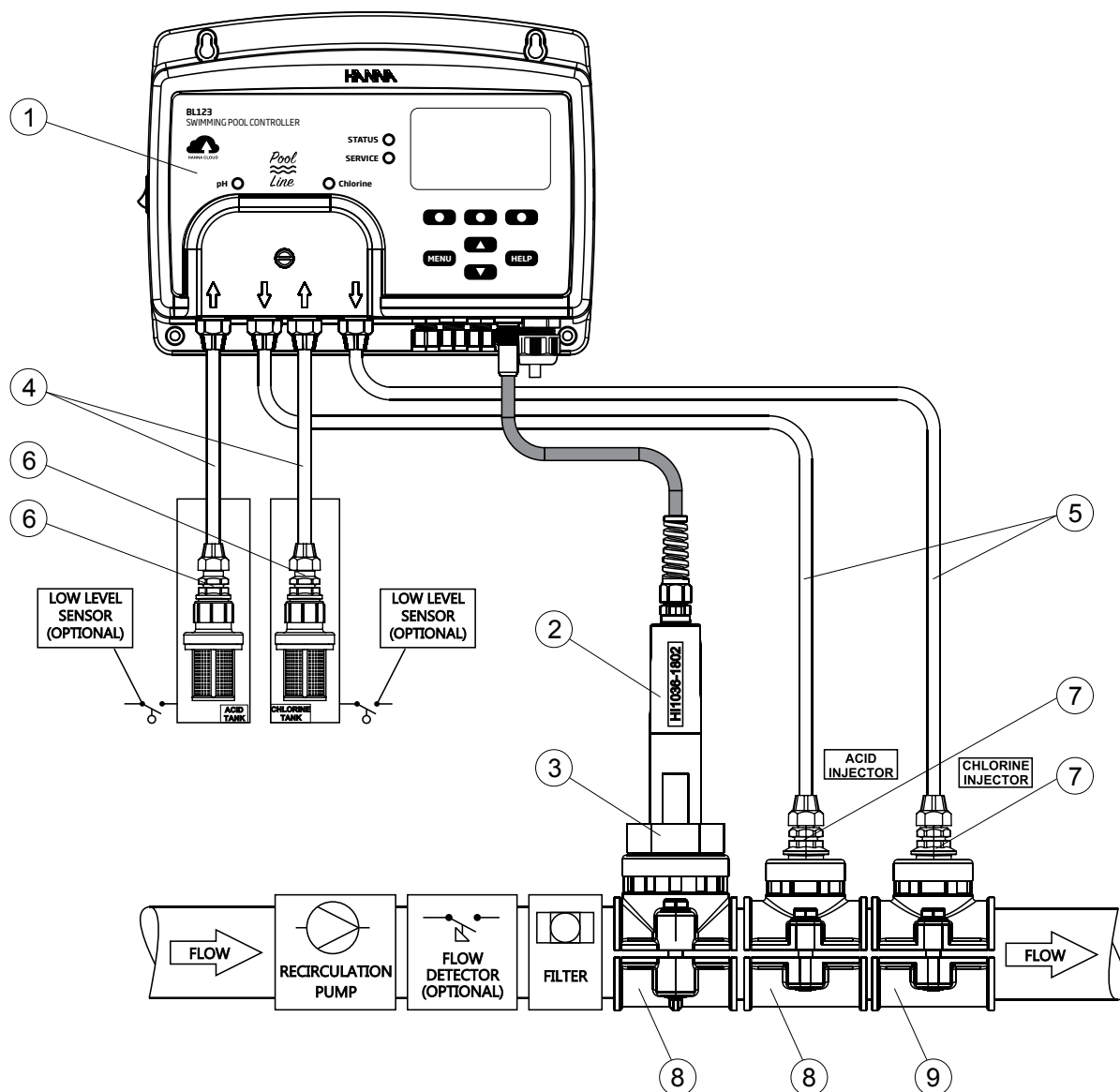
**Note:** Navigate to General Settings to set Hold Input as Enabled. See "6.2. General Menu Setup" on page 25.

During flow the paddle is pushed downstream but when the flow stops the paddle moves to a rest position and this makes the electrical contacts sending a signal to the controller. The controller interprets this signal and shuts down the dosing pumps.

\* Suggested maximum length for vertical installations is 5 m (16.4 ft).

## In-Line Installation Overview & Components Table

Below is an illustrated reference of a generic, in-line installation scheme with the relevant components.

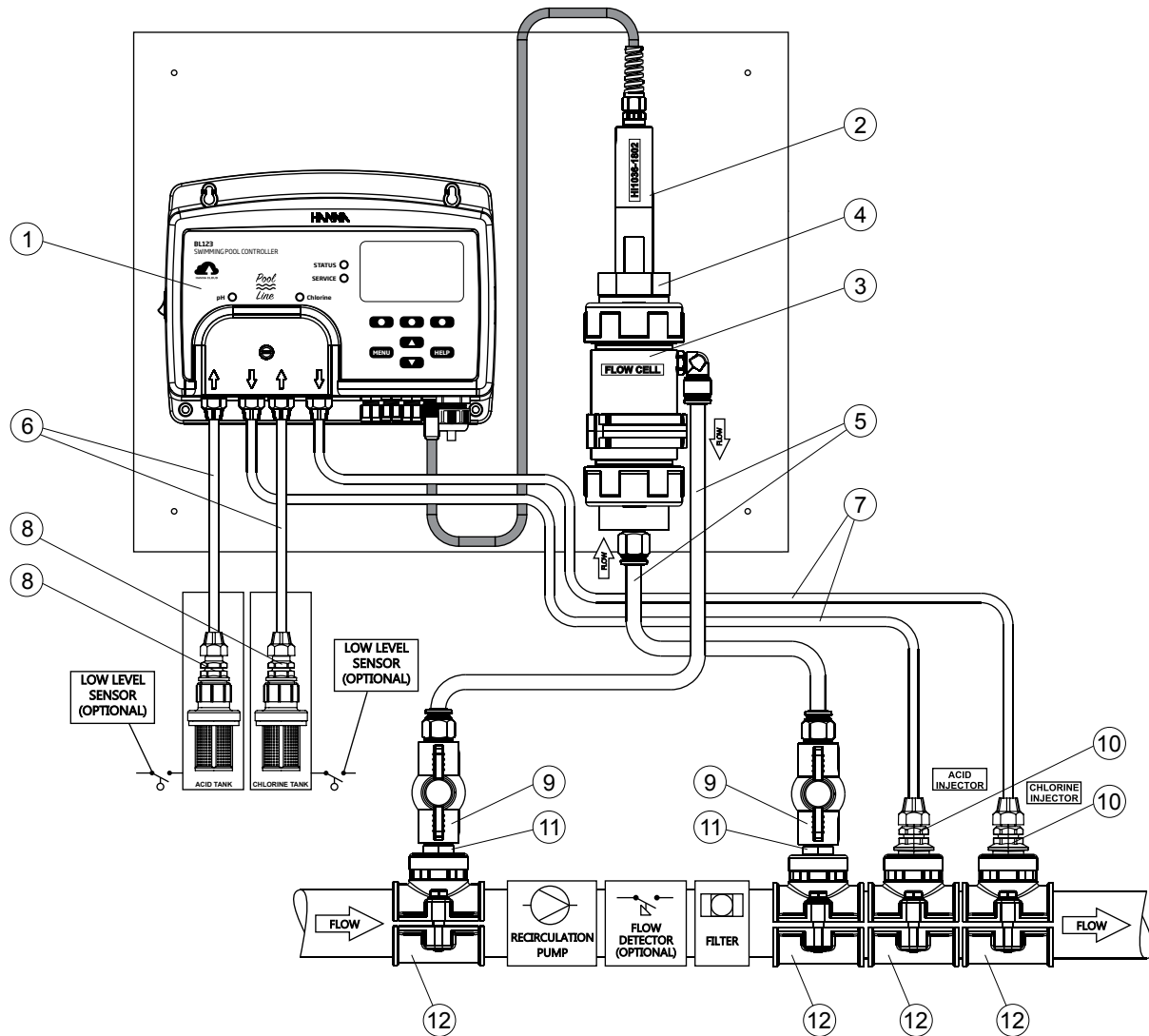


| Position | Component description                              |
|----------|----------------------------------------------------|
| 1        | Pool controller                                    |
| 2        | pH/ORP/temperature electrode                       |
| 3        | Electrode fitting                                  |
| 4        | PVC tubing for pump input                          |
| 5        | PVC tubing for pump output                         |
| 6        | Aspiration filter                                  |
| 7        | Injector, 1/2" thread                              |
| 8        | Probe saddle for Ø 50 mm pipe, using 1 1/4" thread |
| 9        | Injector saddle for pipe, using 1/2" thread        |

**Note:** Connections for flow detector and for level sensor (acid & chlorine tanks) are optional.

### Flow Cell Installation Overview & Components Table

Below is an illustrated reference of a generic, flow cell installation scheme with the relevant components.  
The maximum pressure of the flow cell system is 3 atm (44 psi).

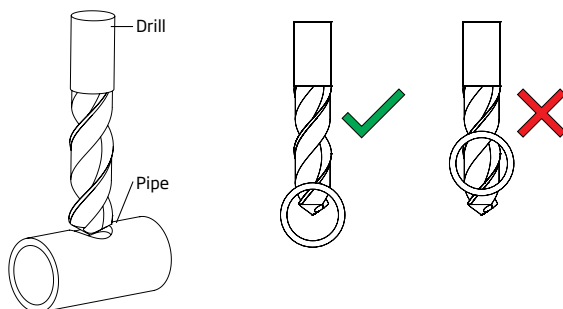


| Position | Component description                       |
|----------|---------------------------------------------|
| 1        | Pool controller                             |
| 2        | pH/ORP/temperature electrode                |
| 3        | Flow cell                                   |
| 4        | Flow cell adapter                           |
| 5        | Flow cell tubing                            |
| 6        | PVC tubing for pump input                   |
| 7        | PVC tubing for pump output                  |
| 8        | Aspiration filter                           |
| 9        | Flow cell valve                             |
| 10       | Injector, 1/2" thread                       |
| 11       | Plastic nipple, 1/2"                        |
| 12       | Injector saddle for pipe, using 1/2" thread |

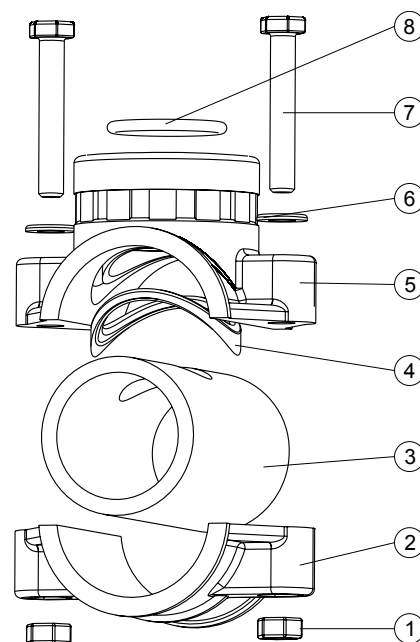


## 5.4. MOUNTING RECOMMENDATIONS FOR SADDLE

- Select required drill size. See table below for dimension details.



- Place the upper part of the saddle (5) on top of the pipe (3) with the seal (4) placed over the hole.
- Take the lower part of the saddle (2), together with inserted nuts (1) and align it under the upper part.
- Insert the screws (7) with washers (6) through the holes and hand tighten into the mounted nuts.
- With all the screws (7) in place, use a wrench to carefully tighten.
- Place the O-ring (8) provided into the upper saddle.



| Probe Saddle (In-line Configuration) |              | Thread Size | Drill Size                    |
|--------------------------------------|--------------|-------------|-------------------------------|
| BL120-550                            | Ø 50 mm pipe | 1 ¼"thread  | 29 mm - 32 mm / 1.14" - 1.26" |
| BL120-563                            | Ø 63 mm pipe | 1 ¼"thread  | 29 mm - 32 mm / 1.14" - 1.26" |
| BL120-575                            | Ø 75 mm pipe | 1 ¼"thread  | 29 mm - 32 mm / 1.14" - 1.26" |

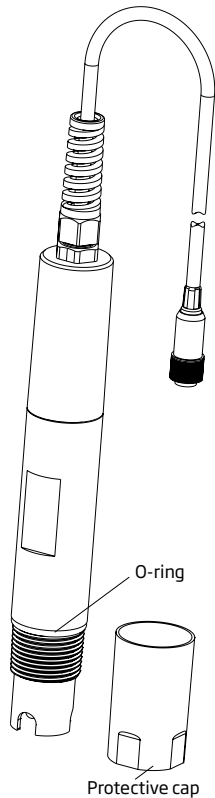
| Valve Fittings (Flow Cell Configuration) |              | Thread Size | Drill Size                      |
|------------------------------------------|--------------|-------------|---------------------------------|
| BL120-450                                | Ø 50 mm pipe | ½"thread    | 20 mm - 25.4 mm / 0.79" - 1.00" |
| BL120-463                                | Ø 63 mm pipe | ½"thread    | 20 mm - 25.4 mm / 0.79" - 1.00" |
| BL120-475                                | Ø 75 mm pipe | ½"thread    | 20 mm - 25.4 mm / 0.79" - 1.00" |

| Injector Saddle |              | Thread Size | Drill Size                      |
|-----------------|--------------|-------------|---------------------------------|
| BL120-250       | Ø 50 mm pipe | ½"thread    | 20 mm - 25.4 mm / 0.79" - 1.00" |
| BL120-263       | Ø 63 mm pipe | ½"thread    | 20 mm - 25.4 mm / 0.79" - 1.00" |
| BL120-275       | Ø 75 mm pipe | ½"thread    | 20 mm - 25.4 mm / 0.79" - 1.00" |

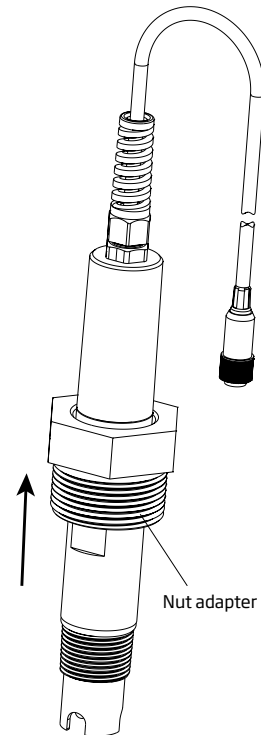
### 5.5. CONNECTING THE PROBE TO THE PUMP CONTROLLER

Ensure the probe is connected and calibrated before installation.

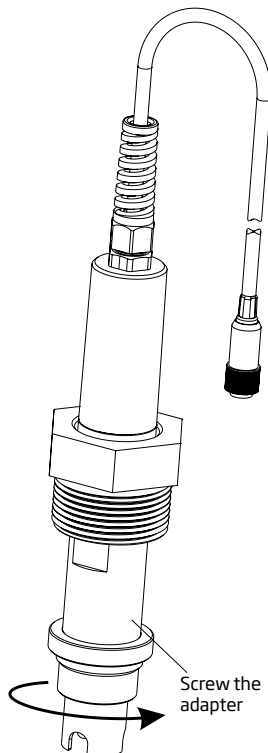
1. Remove protective cap and verify the O-ring is in place.



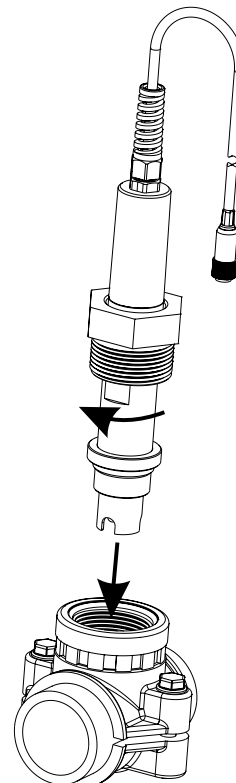
2. Insert the nut onto the probe.



3. Carefully screw the adapter onto the probe taking care not to damage the O-ring.



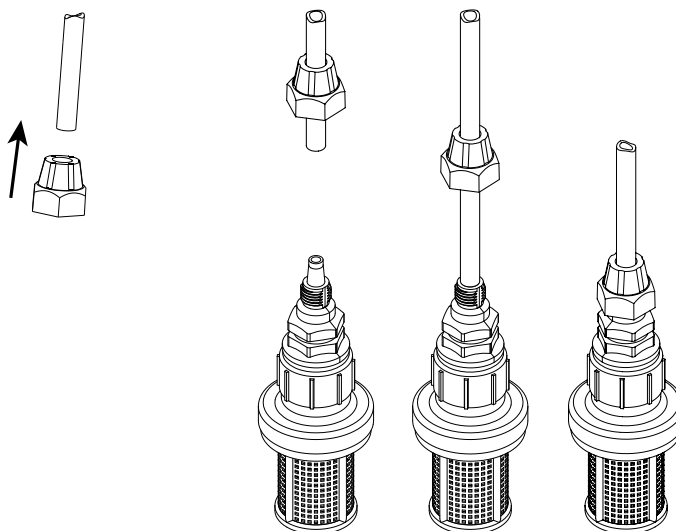
4. Insert the probe with the adapter and screw it carefully into the saddle.



## 5.6. INSTALLING THE ASPIRATION FILTER

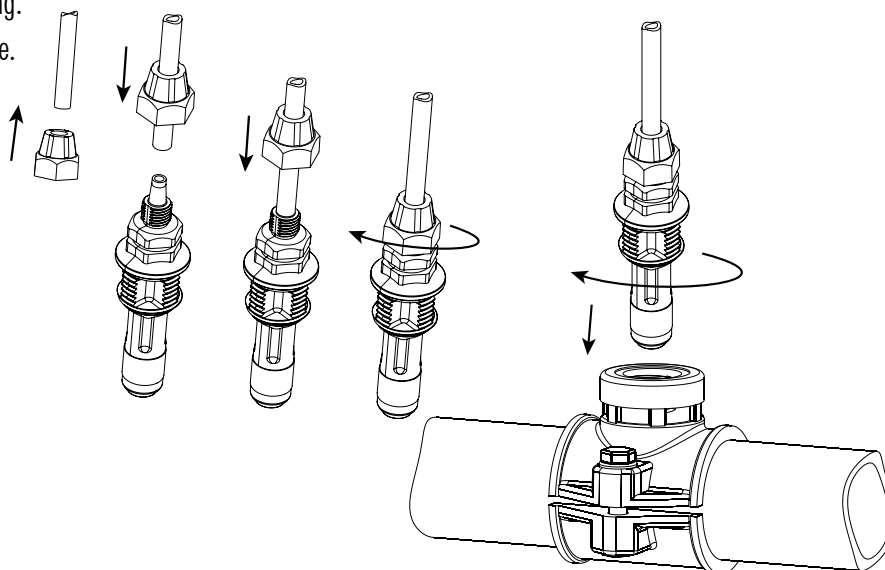
The aspiration filter is used in the reagent tank to filter and prevent debris from entering the tubing.

- Cut the required length of aspiration tubing (flexible) to reach between peristaltic pump inlet and aspiration filter.
- The nut should be placed on the tubing before it is connected. Place the end of tubing on the filter.
- The compression fitting has to be screwed in until tight on the filter.
- Slide the compression fitting from the peristaltic pump inlet onto the tubing.
- Slide the end of tubing over the fitting of the peristaltic pump tubing.
- Slide compression fitting up over tubing.
- Tighten the fitting.



## 5.7. INSTALLING THE INJECTOR

- Cut required length of injection tubing to reach between injector saddle and outlet of peristaltic pump.
- Place the compression fitting nut on the tubing.
- Place the end of tubing on the injector.
- The compression fitting has to be screwed in until tight on the injector.
- Screw the injector in the saddle.
- Slide compression fitting from pump tubing onto tubing.
- Slide the end of tubing over fitting of pump tubing.
- Slide compression fitting over tubing.
- Tighten the fitting to secure in place.

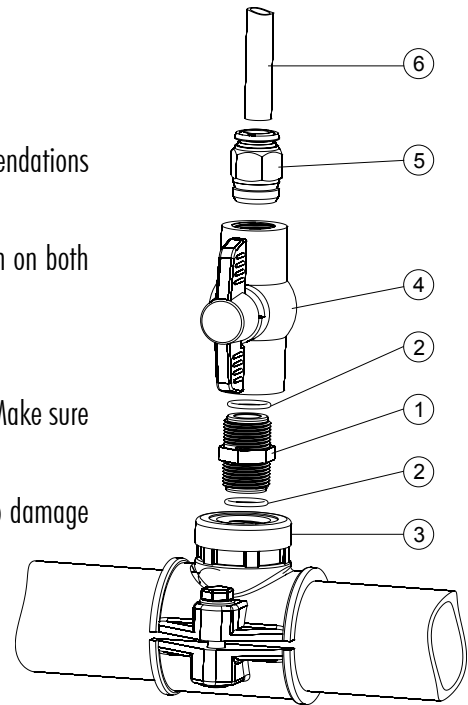


## 5.8. FLOW CELL INSTALLATION

In a flow cell configuration the water flows from the inlet valve to the flow cell and returns in the line via the outlet valve.

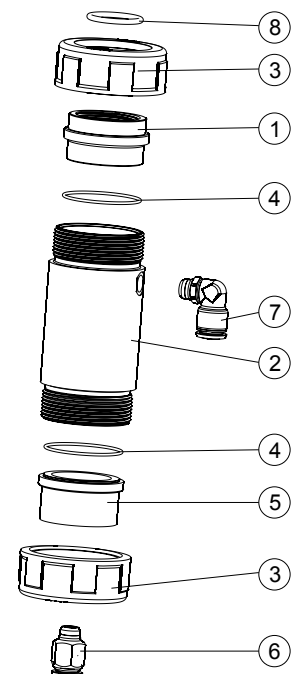
### PART A Preparing the inlet and outlet valve assemblies

- Mount the saddle for flow cell inlet and outlet valve (follow mounting recommendations for saddle).
- Sparingly lubricate two O-rings (2) with a thin film of grease and mount them on both sides of the nipple (1).
- Screw the nipple into the saddle (3).
- Screw the valve (4) into the open end of the nipple mounted into the saddle. Make sure it is tight and the lever is facing forward so that it can be operated.
- Carefully screw the straight tubing fitting (5) into the valve, taking care not to damage the O-ring.
- Insert the tubing (6) in the straight tubing fitting (5).



### PART B Assembling and mounting the flow cell

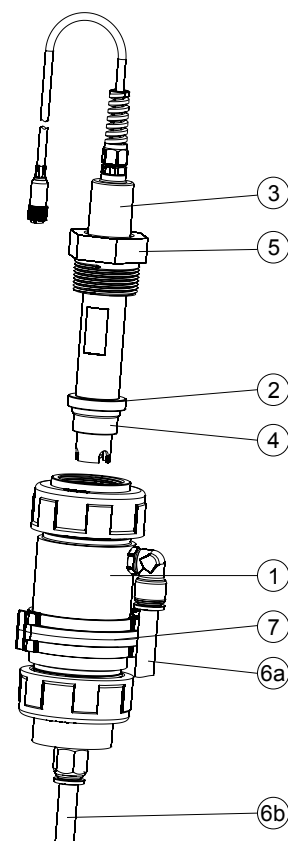
- Place an O-ring (4) onto the flow cell cap (5) and insert the cap to the end of the flow cell tubing (2) without the hole on the side. Screw the flow cell nut (3) into place over the flow cell cap.
- Screw the straight tubing fitting (6) into the hole of the flow cell cap.
- Place an O-ring (4) onto the flow cell cap (1) and insert the cap onto the end of the flow cell tubing (2) with the hole in the side. Screw the flow cell nut (3) into place over the flow cell cap (1).
- Screw the elbow tubing fitting (7) into the side hole of the flow cell tubing (2).
- Place the supplied O-ring (8) into the flow cell cap (1).



### PART C Connecting the probe to the controller

- Remove the protective cap and verify the O-ring (2) is in place.
- Insert the nut (5) into the probe. Carefully screw the adapter (4) into the probe, paying attention not to damage the O-ring.
- Mount the collar (7) onto the panel with the supplied screw.
- Insert the assembled flow cell (see part B) into the collar (7) and overlap the two collar wings. Hand press the overlapped wings until the collar clicks into position.
- Carefully insert the probe (3) into the flow cell, paying attention not to damage the O-ring. The adapter (4) mounted on the probe should now be inside the flow cell.
- Screw the nut (3) enough to secure the electrode and flow cell assembly in place.
- Insert the aspiration valve tubing (6a) into the saddle.
- Insert the dispensing valve tubing (6b) into the saddle.

**Note:** Prepare and calibrate the probe prior to installing in the flow cell.



### 5.9. CLOUD CONNECTIVITY (BL122 & BL123)

Hanna Cloud is a web-based application that connects users to the BL122 and BL123.

Multiple registered devices can be registered to a single Hanna Cloud account.

Measurements, trends, history, device settings, alarms, and messages are transmitted to the user's "Dashboard", as the instrument controls the process.

Multiple secondary users may also be added to one's device, to monitor measurements and receive notifications from the controller.

Go to [www.hannacloud.com](http://www.hannacloud.com) web page and follow the required steps to create an account.

After login, the Hanna Cloud user guide can be accessed, which contains detailed information on Hanna Cloud functionality.



**Note:** Hanna Cloud protects user information using technical and administrative security measures to reduce risks of loss or misuse. These include (but are not limited to) a secured connection, device identity registration, password encryption.

## 5.10. FIRMWARE UPDATES

### Remote Update Using Hanna Cloud

We aim to constantly improve our products and offer professional enhanced product features. As such, Hanna Instruments® periodically releases firmware updates.

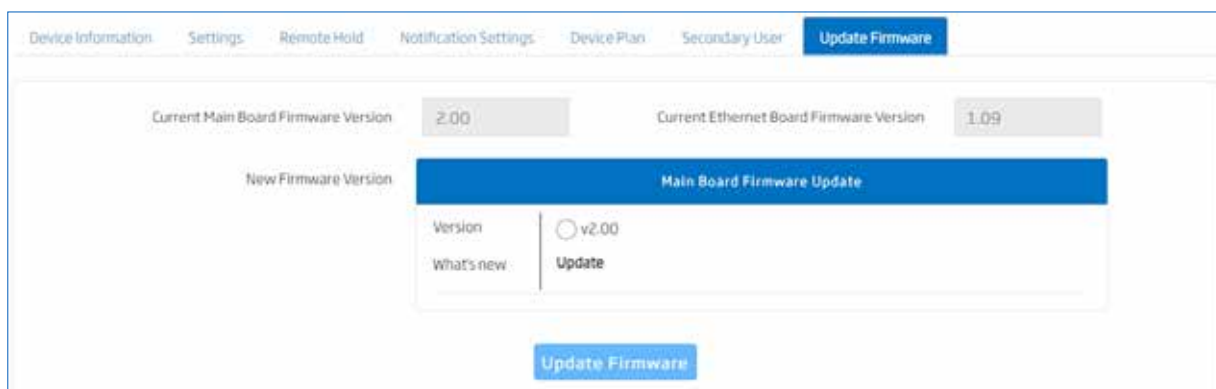
1. Go to [www.hannacloud.com](http://www.hannacloud.com)
2. Log into your account.
3. Locate device on the dashboard.

The firmware for BL122 and BL123 with v2 hardware can be updated remotely.

4. If an update is available for the device, the “Firmware update available” message will be displayed below the header. Click on the banner shortcuts to the Firmware update. Alternatively, click on Setting gear.



5. Select the firmware to update and press Update Firmware.

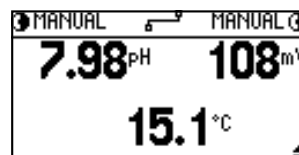
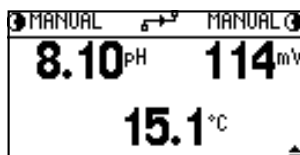
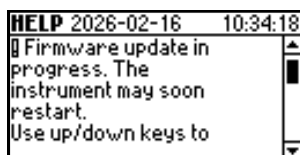


6. The update request will be confirmed and update will be installed.
7. The firmware update may take 8 to 10 minutes to complete and the device will restart automatically when it is complete.
8. At the completion, a banner with “Firmware update successful” is displayed.

Firmware update is available to primary users only.



**Note:** During the remote firmware update these screens will appear on instrument. When the installation is complete, the transmission icon will show a solid communications image (  ).



## USB Firmware Update

### Requirements

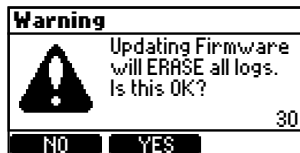
- Firmware update package file
- USB 2.0 or 3.2 flash drive

### Procedure

1. Copy the firmware update package file to the root directory of a USB-C drive.
2. Power off the meter.
3. Plug in the USB-C drive.
4. Power on the meter. Following message is displayed.



5. Press **MENU** key before the counter has elapsed. Following message is displayed:



6. Press **YES**.
7. Following messages confirm in-progress update procedure.  
Please wait while the system is updated.



8. Update complete screen confirms firmware update completion.



9. Wait until countdown (bottom right corner) reaches 0. Remove the USB drive.  
The device enters measurement screen.
10. Press **MENU** key and navigate to General Settings.
11. Press **Setup** and navigate to Controller Info.
12. Press **View**.  
Check main board and language version match newly installed firmware.

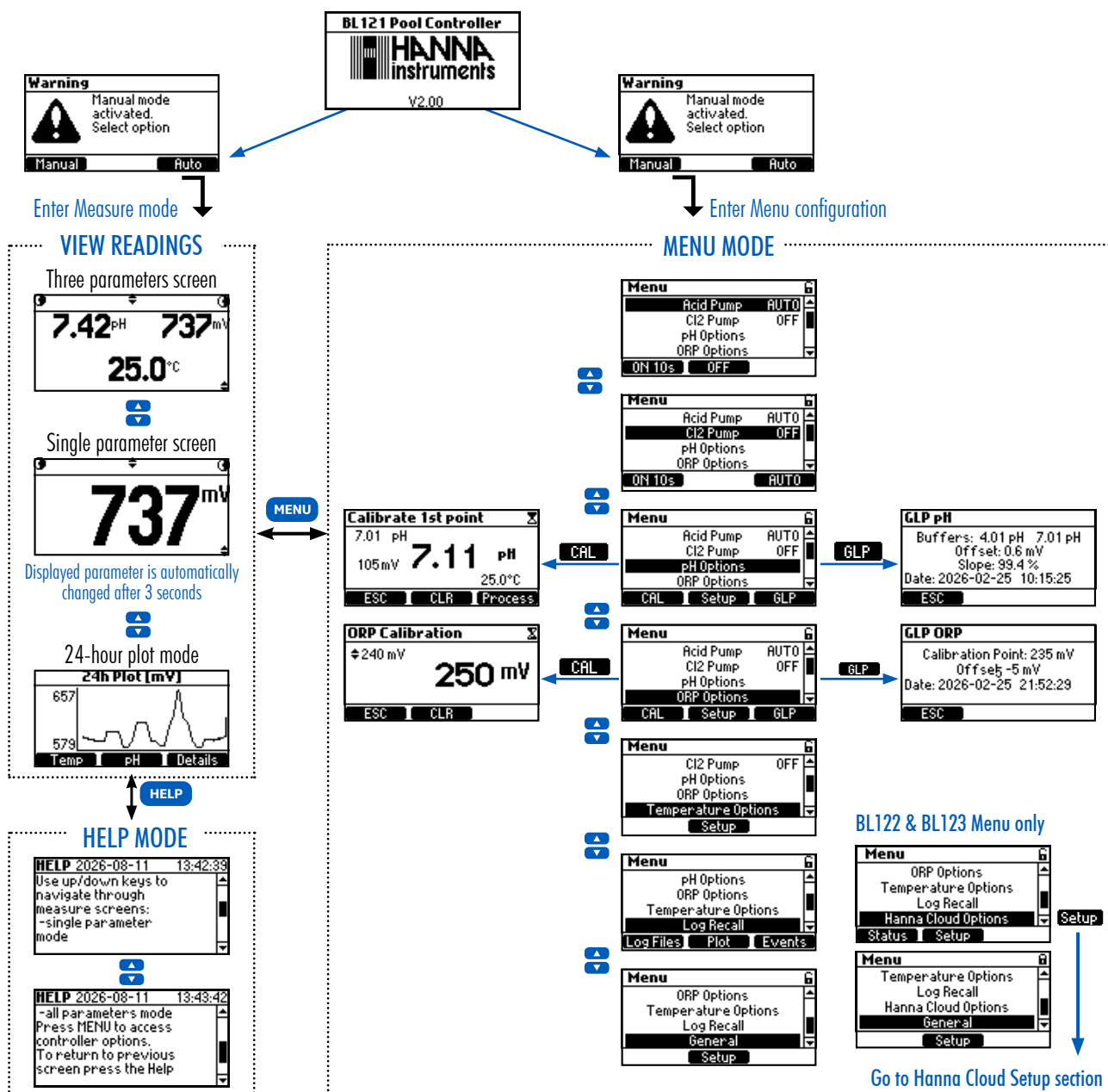
## 6. SETUP

### 6.1. USER INTERFACE

The pool controller menu is grouped into following categories:

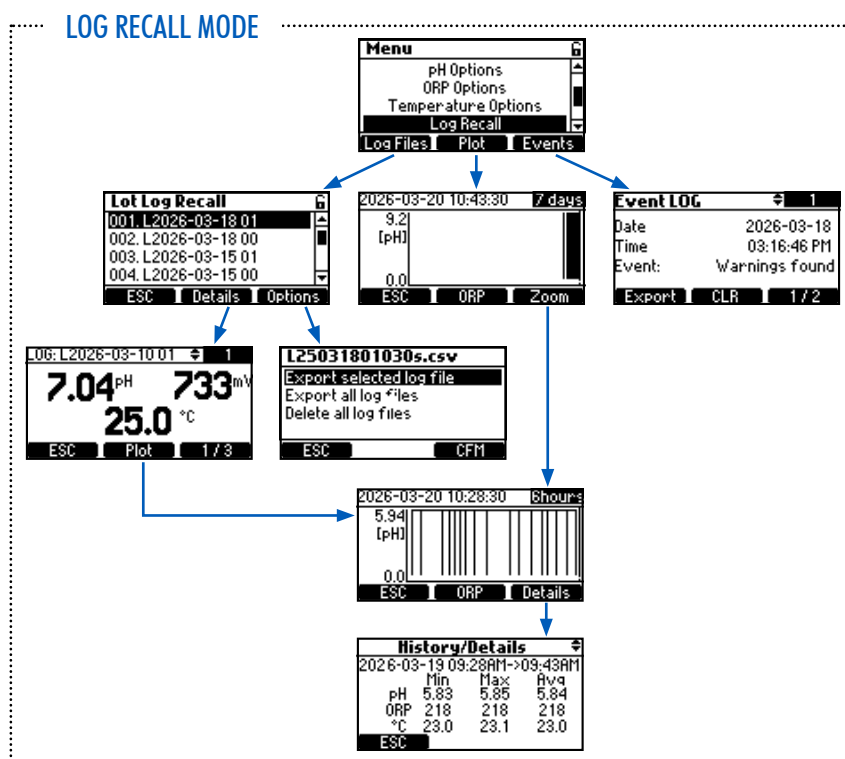
- Acid (Base) Pump control: OFF/AUTO. ON 10s
- Chlorine (Cl<sub>2</sub>) Pump control: OFF/AUTO. ON 10s
- pH Options: CAL, Setup, GLP
- ORP Options: CAL, Setup, GLP
- Temperature Options: Setup
- Log Recall: Log Files, Plot, Events
- BL122 & BL123 Hanna Cloud Options: Setup
- General: Setup

### BL12X Activity Overview Diagram



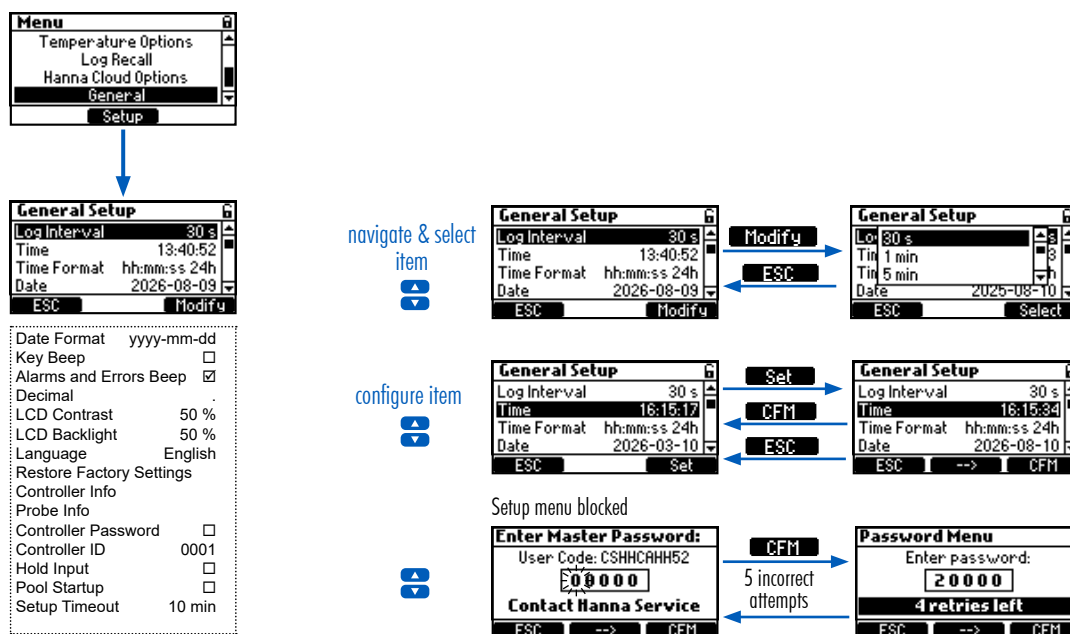


## BL12X Log Recall Overview



## 6.2. GENERAL MENU SETUP

## Menu Items Diagram



## Configurable Options

| General Settings              | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Default      |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Log Interval</b>           | Options: 30 sec., 1 min., 5 min., 15 min., 30 min., 60 min.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Modify</b> for options drop-down list.</li> <li>Press  keys to navigate options.</li> <li>Press <b>Select</b> to save.</li> </ul>                                                                                                                                                                           | 30 sec.      |
| <b>Time</b>                   | Options: Current set times<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With selected value flashing, press  key to navigate right between digits; use  keys to increase or decrease the value.</li> <li>Press <b>CFM</b> to save.</li> </ul>                                                         | —            |
| <b>Time Format</b>            | Options: hh:mm:ss 24h, hh:mm:ss 12h<br><ul style="list-style-type: none"> <li>With item selected, press <b>Modify</b> for options drop-down list.</li> <li>Press  keys to navigate options.</li> <li>Press <b>Select</b> to save.</li> </ul>                                                                                                                                                                                                   | hh:mm:ss 24h |
| <b>Date</b>                   | Options: year/month/date<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With selected value flashing, press  key to navigate right between year/month/day.</li> <li>Press  keys to increase or decrease the value (keep the key pressed to fast-forward).</li> <li>Press <b>CFM</b> to save.</li> </ul> | —            |
| <b>Date Format</b>            | Options: yyyy-mm-dd, dd-mm-yyyy, mm-dd-yyyy, yyyy/mm/dd, dd/mm/yyyy, mm/dd/yyyy<br><ul style="list-style-type: none"> <li>With item selected, press <b>Modify</b> for options drop-down list.</li> <li>Press  keys to navigate options.</li> <li>Press <b>Select</b> to save.</li> </ul>                                                                                                                                                     | yyyy-mm-dd   |
| <b>Key Beep</b>               | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><ul style="list-style-type: none"> <li>With item selected, press the toggle switch to enable or disable option.<br/>An acoustic signal confirms option enabled.</li> </ul>                                                                                                                                                                                                                                                             | Disabled     |
| <b>Alarms and Errors Beep</b> | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br>The check mark confirms option as enabled.                                                                                                                                                                                                                                                                                                                                                                                             | Enabled      |
| <b>Decimal</b>                | Options: Point, Comma<br>This option is a field separator for Log files.<br>It may be set as comma “,” or full stop “.” depending on region preferences.<br><ul style="list-style-type: none"> <li>With item selected, press the toggle switch to configure option.</li> </ul>                                                                                                                                                                                                                                                  | Point        |
| <b>LCD Contrast</b>           | Range: 0 % to 100 % / 1 %<br><ul style="list-style-type: none"> <li>With item selected press <b>Set</b> for the contrast control slider to display.</li> <li>Press  keys to drag the slider along the bar (keep key pressed to fast forward).</li> <li>Press <b>CFM</b> to save.</li> </ul>                                                                                                                                                  | 50 %         |

| General Settings         | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| LCD Backlight            | Range: 0 % to 100 % / 1 %<br><ul style="list-style-type: none"> <li>With item selected press <b>Set</b> for the brightness control slider to display.</li> <li>Press  keys to drag the slider along the bar (keep key pressed to fast forward).</li> <li>Press <b>CFM</b> to save.</li> </ul>                                                                                                                                                                                                                                                                                                                               | 50 %     |
| Language                 | Options: English, Deutsch, Espanol, Francais, Italiano, Nederlands, Portugues<br>This option allows the user to customize the meter to preferred language.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Modify</b> for options drop-down list.</li> <li>Press  keys to navigate options.</li> <li>Press <b>Select</b> to save.</li> </ul>                                                                                                                                                                                                                                                         | English  |
| Restore Factory Settings | This option allows the user to erase all user settings and reset the instrument to the default factory settings.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to restore default settings.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | —        |
| Controller Info          | With item selected, press <b>View</b> to display model version, model number, language version, and serial number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | —        |
| Probe Info               | With item selected, press <b>View</b> to display model version, language version, and serial number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | —        |
| Controller Password      | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><ul style="list-style-type: none"> <li>With item selected, press <b>Modify</b>.</li> <li>Press  keys to increment/decrement the digit (displayed flashing).</li> <li>Press  key to navigate right between digits.</li> <li>Press <b>CFM</b> to save.</li> </ul>                                                                                                                                                                               | Disabled |
| Controller ID            | Range: 0 to 9999/1<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>Press  keys to increase or decrease the value (keep key pressed to fast forward).</li> <li>Press <b>CFM</b> to save.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     | 0001     |
| Hold Input               | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br>When Enable is selected, the Hold is configurable.<br><a href="#">BL122</a> & <a href="#">BL123</a><br>Hold may be triggered with a user-supplied Hold relay switch or remotely.<br><b>Note:</b> Feature has to be enabled in Setup.<br> An in-line flow sensor has to be attached to the controller Hold input.<br>See section “4.3. Wiring” on page 10 for digital input connections.<br>When the recirculation pump doesn’t work, the flow sensor output should be open to trigger the HOLD mode and inactivate dosing pumps. | Disabled |

| General Settings     | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Default  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Pool Startup</b>  | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>The check mark confirms option as enabled.<br>Pool Startup allows the control pumps to run for a total of 12 hours with proportional control to reach the programmed Set Points for pH and ORP.<br>During this period, alarm conditions will not stop the pumps.<br>The timer › continuously counts down during this period.<br>› decreases during pump “On periods” or “Off periods”.<br>› stops when both Set Points are reached (pH first followed by ORP) or the 12 hour window expires.<br>A pump may stop briefly within the proportional band. Remote Hold can also stop pump action. During these times the counter continues counting down in the background.<br><ul style="list-style-type: none"> <li>• If Set Points are reached within the 12 hour window, the meter switches to direct control mode and the Pool Startup counter stops.</li> <li>• If Set Points are not reached during Pool Startup period, the meter reverts to direct control mode with overtime, and may turn off control pumps.</li> </ul> Pool Startup becomes disabled if power is lost, Set Points are reached, the pool setup timer expired, or feature is disabled. | Disabled |
| <b>Setup Timeout</b> | Range: 1 to 30 min./1 min.<br><br>Timer used to return the device to the measurement/control mode when no menu changes have occurred within the set time period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10 min.  |

### Hold Input submenu (with option enabled in General Settings)

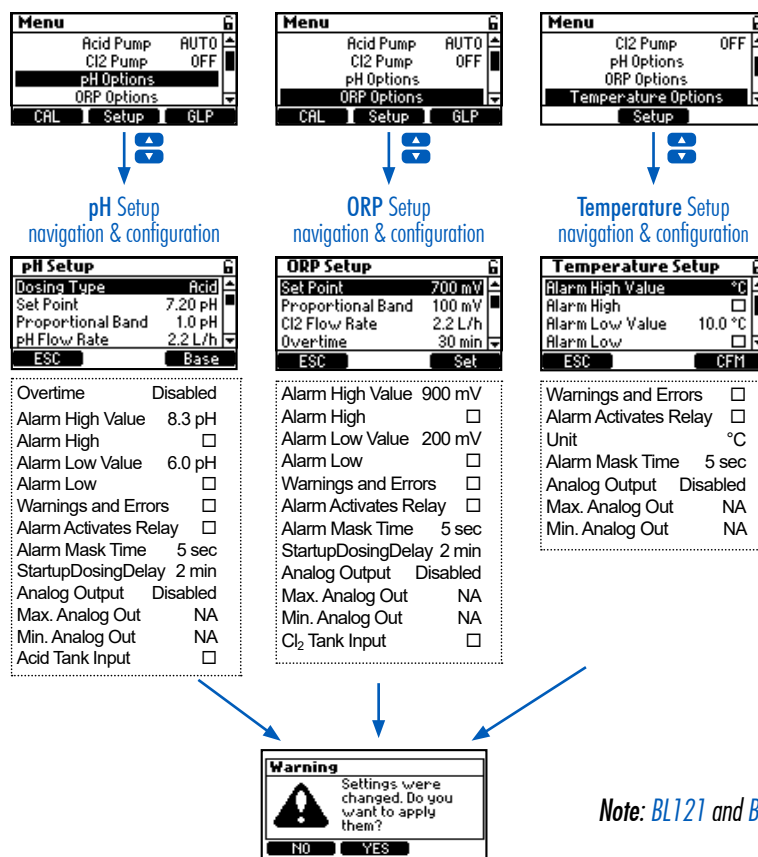
The Hold Input submenu is used to configure what should happen when the Hold Input is triggered.

- If Enabled, the Alarm will trigger when the Hold is triggered.
- If Disabled, the Alarm will not trigger when the Hold is enabled (useful for routine evening shut down without alarms).

This submenu can also be used to configure a remote hold feature that uses a digital-input trigger.

| Hold Input Submenu Item   | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                | Default  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Alarm</b>              | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>• With item selected, press the toggle switch to enable or disable option.</li> </ul> The check mark confirms option as enabled.                                                                                                                                                                                       | Disabled |
| <b>Contact</b>            | Options: Open, Close<br><br><ul style="list-style-type: none"> <li>• Hold input is active when the switch triggering Hold Input is configured as Open</li> <li>• Hold input is not active when the switch triggering Hold Input is configured as Close</li> </ul>                                                                                                                                                                                          | Open     |
| <b>Hold Release Delay</b> | Range: 0 to 300 seconds<br><br>Hold Release Delay is a timer that allows control function to remain in a Hold state for additional time after the Hold is released.<br><ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to enter edit mode.</li> <li>• Press  keys to configure value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul> | OFF      |

### 6.3. PARAMETERS SETUP DIAGRAM



#### Protection against unwarranted changes: save configuration changes

To protect against accidental changes, device enters Hold and instrument prompts for confirmation.

Select **YES** to save changes or **NO** to return to previously configured values.

#### pH Configurable Options

| pH Settings              | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                            | Default |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>Dosing Type</b>       | Options: Base, Acid <ul style="list-style-type: none"> <li>With item selected, press the toggle switch to configure option.</li> </ul>                                                                                                                                                                                                                                                                                                 | Acid    |
| <b>Set Point</b>         | Range: 6.00 to 8.00 pH/0.01 pH <p>The BL meter regulates the pH to the pH value set in this parameter.</p> <ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press  keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>                                                                                                          | 7.2 pH  |
| <b>Proportional Band</b> | Range: 0.1 to 2.0 pH/0.1 pH <p>The Proportional Band is pH zone adjacent to the Set Point where the pump "Off time" increases as the measurement approaches the Set Point. This is used to prevent over dosing.</p> <ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press  keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul> | 1.0 pH  |

| pH Settings                | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Default  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>pH Flow Rate</b>        | Range: 0.5 to 3.5 l/h / 0.1 l/h<br><br>pH Flow Rate is the maximum acid delivered in liters per hour when pH is above pH Proportional Band. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• With value flashing, press  keys to increase/decrease the value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul>                                                                                                                                                          | 2.2 l/h  |
| <b>Overtime</b>            | Range: 1 to 360 min.<br><br><i>Note: Set Point must be configured</i><br>Overtime is the maximum time in minutes the pH pump is permitted to continuously run outside the Proportional Band. Within the band, the time is increased as the pump "Off time" increases approaching the Set Point. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• With value flashing, press  keys to increase/decrease the value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul>      | 30 min.  |
| <b>Alarm High Value</b>    | Range: (pH Low+0.1) to 14.0 pH Acid / 0.1 pH<br><br>The High Alarm Value for pH is the minimum pH value that will trigger an alarm status and stop the control pumps (unless in Pool Startup mode). Mask time will delay alarm activation.*<br>Status (●) and service (●) LEDs are active. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• With value flashing, press  keys to increase/decrease the value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul>         | 8.3 pH   |
| <b>Alarm High</b>          | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>• With item selected, press the toggle switch to enable or disable pH high alarm option</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         | Disabled |
| <b>Alarm Low Value</b>     | Range: 0.0 to (pH High-0.1) pH Acid / 0.1 pH<br><br>If enabled, Alarm Low Value for pH is the maximum pH value that will trigger an alarm status and stop the control pumps (unless in Pool Startup mode). Mask time will delay alarm activation.**<br>Status (●) and service (●) LEDs are active. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• With value flashing, press  keys to increase/decrease the value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul> | 6.0 pH   |
| <b>Alarm Low</b>           | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>• With item selected, press the toggle switch to enable or disable pH low alarm option</li> </ul>                                                                                                                                                                                                                                                                                                                                                                          | Disabled |
| <b>Warnings and Errors</b> | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>The check mark confirms option as enabled.<br>If enabled, warnings and errors will be flagging during operation.<br><b>A warning</b> is an event generated when erroneous conditions appear; and when measured values or parameter values are outside the expected range.<br><b>An error</b> is an critical event that requires technical support.<br>A list of these events are listed later in this manual.                                                                                                     | Disabled |

\* The minimum adjustable value for alarm high is related to the value assigned to alarm low (if enabled).

\*\*The maximum adjustable value of alarm low is related to alarm high value (if enabled).

| pH Settings                                        | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                         | Default  |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Alarm Activates Relay</b>                       | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>The check mark confirms option as enabled.<br>If enabled, the Alarm Relay will be activated if an error or warning condition is detected.<br>• With item selected press the toggle switch to enable or disable the relay control for pH events.        | Disabled |
| <b>Alarm Mask Time</b>                             | Range: 5 to 999 sec./1 sec.<br><br>Mask Time is an alarm delay timer that prevents immediate alarm activation for the time set.<br>• With item selected, press <b>Set</b> to modify.<br>• Press  keys to configure value.<br>• Press <b>CFM</b> key to save.       | 5 sec.   |
| <b>Startup Dosing Delay</b>                        | Range: 1 to 180 min./1 min.<br><br>This timer is used after powering on the controller and prevents pump dosing for this time period.<br>• With item selected, press <b>Set</b> to modify.<br>• Press  keys to configure value.<br>• Press <b>CFM</b> key to save. | 2 min.   |
| <b>Analog Output</b><br><b>BL121 &amp; BL123</b>   | Range: A01, A02, A03, Disabled<br><br>Analog Outputs are used as part of process control system.<br>Disabled indicates that analog output has not been allocated to any function.<br>A01, A02, A03 assign an analog output to a pH reading.                                                                                                         | Disabled |
| <b>Max. Analog Out</b><br><b>BL121 &amp; BL123</b> | Range: 1.0 to 14.0 pH/0.1 pH<br><br>Maximum Analog Output can be adjusted to a maximum value of 20 mA.<br>High pH limit is assigned to 20 mA.                                                                                                                                                                                                       | 14.0 pH  |
| <b>Min. Analog Out</b><br><b>BL121 &amp; BL123</b> | Range: 0.0 to 13.0 pH/0.1 pH<br><br>Minimum Analog Output can be adjusted to a value of 4 mA.<br>Low pH limit is assigned to 4 mA.                                                                                                                                                                                                                  | 0.0 pH   |
| <b>Acid Tank Input</b><br><b>Base Tank Input</b>   | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>Enables/Disables the low input level in acid tank.<br>When enabled, works in conjunction with a level detector (user supplied) to notify user when acid level is low and will require replenishment.                                                   | Disabled |

## ORP Configurable Options

| ORP Settings                    | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Set Point</b>                | Range: 200 to 900 mV/1 mV<br><br>The BL meter will regulate the Chlorine (Cl <sub>2</sub> ) pump operation to get mV value set in this parameter.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press   keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>                                                                                                                                                  | 700 mV   |
| <b>Proportional Band</b>        | Range: 10 to 200 mV/1 mV<br><br>This is a mV range below the ORP Set Point where dosage from the Chlorine pump (Cl <sub>2</sub> ) is regulated to prevent over dosage of chlorine.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press   keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>                                                                                                                 | 100 mV   |
| <b>Cl<sub>2</sub> Flow Rate</b> | Range: 0.5 to 3.5 L/h/0.1 L/h<br><br>Cl <sub>2</sub> (dosing pump) Flow Rate is maximum chlorine delivered in liters per hour when measured ORP is lower than the mV range set in the Proportional Band.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press   keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>                                                                                         | 2.2 L/h  |
| <b>Overtime</b>                 | Options: 1 to 360 min., Disabled<br><br>Maximum time in minutes the chlorine pump is permitted to continuously run outside the Proportional Band. Within the band, the time increases as the "Pump Off" time increases while approaching the Set Point.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press   keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>                                        | 30 min.  |
| <b>Alarm High Value</b>         | Range: (Low + 1) to 1000 mV/1 mV<br><br>If enabled, the High Alarm Value for ORP is the minimum mV value that will trigger an alarm status and stop the control pumps (unless in Pool Startup mode).<br>Mask time will delay alarm activation.*<br>Status (●) and service (●) LEDs are active.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press   keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul> | 900 mV   |
| <b>Alarm High</b>               | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>With item selected, press the toggle switch to enable or disable ORP high alarm option</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Disabled |

\* The minimum adjustable value for alarm high is related to the value assigned to alarm low (if enabled).



| ORP Settings                               | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default  |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Alarm Low Value</b>                     | Range: 0 to (High–1) mV/1 mV<br><br>If enabled, the Low Alarm Value for ORP is the maximum mV value that will trigger an alarm status and stop the control pumps (unless in Pool Startup mode).<br>Mask time will delay alarm activation.*<br>Status (●) and service (●) LEDs are active. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• With value flashing, press  keys to increase/decrease the value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul>                                                          | 200 mV   |
| <b>Alarm Low</b>                           | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>• With item selected, press the toggle switch to enable or disable pH low alarm option</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                        | Disabled |
| <b>Warnings and Errors</b>                 | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>If enabled, warnings and errors will be flagging during operation.<br><b>A warning</b> is an event generated when erroneous conditions appear; and when measured values or parameter values are outside the expected range.<br><b>An error</b> is an critical event that requires technical support.<br>A list of these events are listed later in this manual. <ul style="list-style-type: none"> <li>• With item selected press the toggle switch to enable or disable notification of ORP events.<br/>The check mark confirms setting as enabled.</li> </ul> | Disabled |
| <b>Alarm Activates Relay</b>               | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>If enabled, the Alarm Relay will be activated if an error or warning condition is detected. <ul style="list-style-type: none"> <li>• With item selected press the toggle switch to enable or disable the relay control for ORP events.<br/>The check mark confirms setting as enabled.</li> </ul>                                                                                                                                                                                                                                                               | Disabled |
| <b>Alarm Mask Time</b>                     | Range: 1 to 999 sec./1 sec.<br><br>Mask Time is an alarm delay timer that prevents immediate alarm activation for the time set. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• Press  keys to configure value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul>                                                                                                                                                                                                                                                   | 5 sec.   |
| <b>Startup Dosing Delay</b>                | Range: 1 to 180 min./1 min.<br><br>This timer is used after powering on the controller and prevents pump dosing for this time period. <ul style="list-style-type: none"> <li>• With item selected, press <b>Set</b> to modify.</li> <li>• Press  keys to configure value.</li> <li>• Press <b>CFM</b> key to save.</li> </ul>                                                                                                                                                                                                                                             | 2 min.   |
| <b>Analog Output<br/>BL121 &amp; BL123</b> | Options: A01, A02, A03, Disabled<br><br>Analog Outputs are used as part of process control system.<br>Disabled indicates that analog output has not been allocated to any function.<br>A01, A02, A03 assign an analog output to an ORP reading.                                                                                                                                                                                                                                                                                                                                                                                                              | Disabled |

\*The maximum adjustable value of alarm low is related to alarm high value (if enabled).

| ORP Settings                                       | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                 | Default  |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Max. Analog Out</b><br><b>BL121 &amp; BL123</b> | Range: -1999 to 2000 mV/1 mV<br><br>Maximum Analog Output can be adjusted to a maximum value of 20 mA.<br>High ORP limit is assigned to 20 mA.*                                                                                                                                                                                                                                                                             | 2000 mV  |
| <b>Min. Analog Out</b><br><b>BL121 &amp; BL123</b> | Range: -2000 to 1999 mV/1 mV<br><br>Minimum Analog Output can be adjusted to a value of 4 mA.<br>Low ORP limit is assigned to 4 mA.*                                                                                                                                                                                                                                                                                        | -2000 mV |
| <b>Cl<sub>2</sub> Tank Input</b>                   | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>If enabled, works in conjunction with a level detector (user supplied) to notify user when chlorine level is low and requires replenishment.<br><ul style="list-style-type: none"> <li>With item selected, select Enable or Disable to enable or disable item.</li> <li>The check mark confirms setting as enabled.</li> </ul> | Disabled |

### Temperature Configurable Options

| Temp. Settings          | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Default             |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Alarm High Value</b> | Range: (Low + 0.1) to 100.0 °C/0.1 °C<br>(Low + 0.1) to 212.0 °F/0.1 °F<br><br>The High Alarm Value for temperature is the minimum temperature value that will trigger an alarm status and stop the control pumps. Mask time will delay alarm activation.**<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press  keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul> | 50.0 °C<br>122.0 °F |
| <b>Alarm High</b>       | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>With item selected, press the toggle switch to enable or disable Temperature high alarm option</li> </ul>                                                                                                                                                                                                                                                                                                                        | Disabled            |
| <b>Alarm Low Value</b>  | Range: 0.0 to (High - 0.1) °C/0.1 °C<br>32.0 to (High - 0.1) °F/0.1 °F<br><br>The Low Alarm Value for temperature is the minimum temperature value that will trigger an alarm status and stop the control pumps. Mask time will delay alarm activation.***<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>With value flashing, press  keys to increase/decrease the value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>  | 10.0 °C<br>49.9 °F  |
| <b>Alarm Low</b>        | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><ul style="list-style-type: none"> <li>With item selected, press the toggle switch to enable or disable Temperature low alarm option</li> </ul>                                                                                                                                                                                                                                                                                                                         | Disabled            |

\* The maximum Analog Out must always exceed the minimum Analog Out.

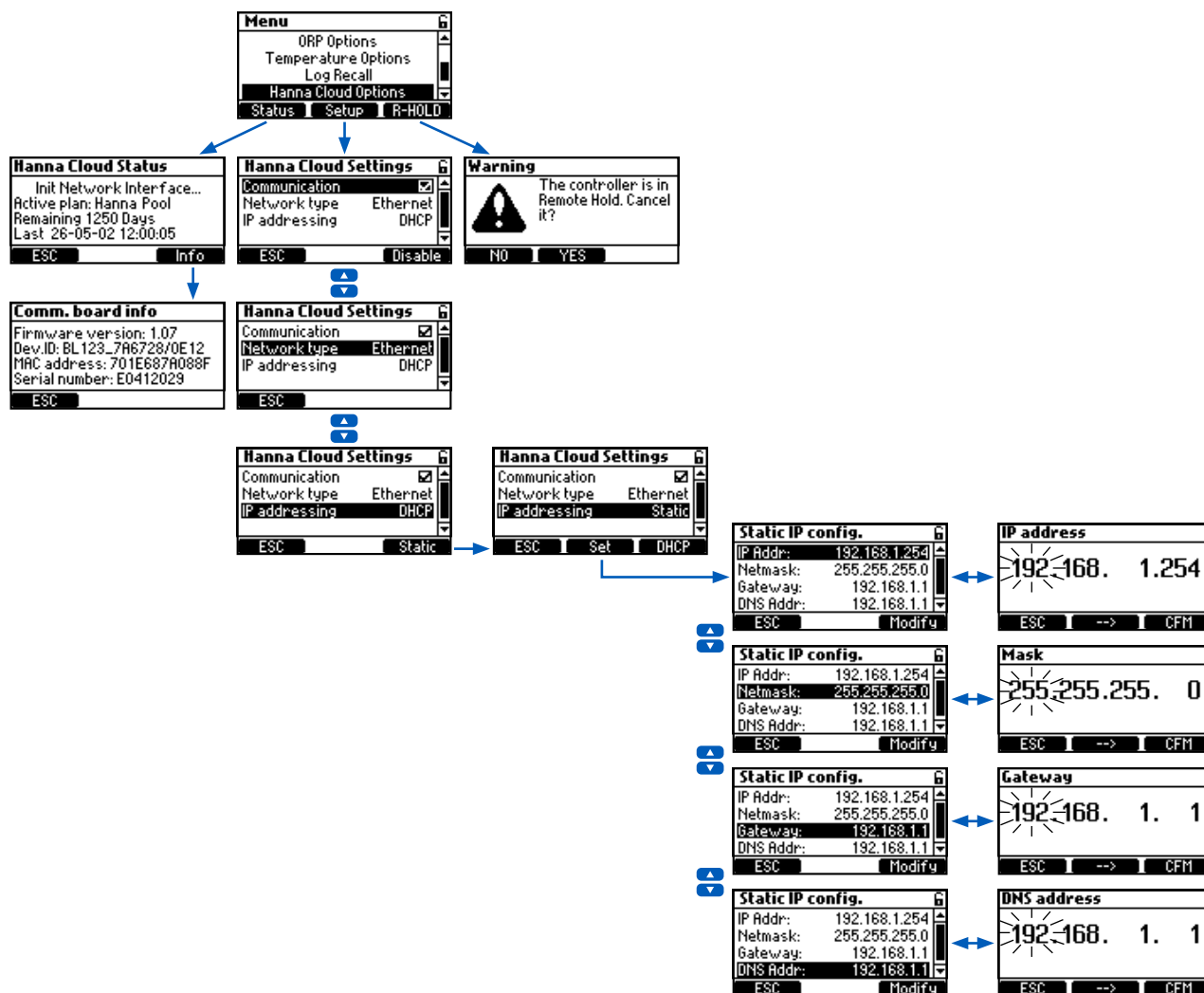
\*\*The minimum adjustable value for alarm high is related to the value assigned to alarm low (if enabled).

\*\*\* The maximum adjustable value of alarm low is related to alarm high value (if enabled).

| Temp. Settings                               | Description/Menu Navigation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Default              |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <b>Warnings and Errors</b>                   | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br><b>A warning</b> is an event generated when erroneous conditions appear; and when measured values or parameter values are outside the expected range.<br><b>An error</b> is an event that requires technical support.<br>A list of these events are listed later in this manual.<br><ul style="list-style-type: none"> <li>With item selected press the toggle switch to enable or disable notification of temperature events. The check mark confirms setting as enabled.</li> </ul> | Disabled             |
| <b>Alarm Activates Relay</b>                 | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br><br>If enabled, the Alarm Relay will be activated if an error or warning condition is detected.<br>With item selected, select Enable or Disable to enable or disable the alarm relay control for temperature events.<br>The check mark confirms setting as enabled.                                                                                                                                                                                                                       | Disabled             |
| <b>Unit</b>                                  | Options: °C, °F<br><br>Temperature measurement unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | °C                   |
| <b>Alarm Mask Time</b>                       | Range: 5 to 999 sec./1 sec.<br><br>Mask Time is an alarm delay timer that prevents immediate alarm activation for the time set for temperature related alarms conditions.<br><ul style="list-style-type: none"> <li>With item selected, press <b>Set</b> to modify.</li> <li>Press  keys to configure value.</li> <li>Press <b>CFM</b> key to save.</li> </ul>                                                                                                                                  | 5 sec.               |
| <b>Analog Output<br/>BL121 &amp; BL123</b>   | Options: A01, A02, A03, Disabled<br><br>Analog Outputs are used as part of process control system.<br>Disabled indicates that analog output has not been allocated to any function.<br>A01, A02, A03 assign an analog output to a temperature reading.                                                                                                                                                                                                                                                                                                                             | Disabled             |
| <b>Max. Analog Out<br/>BL121 &amp; BL123</b> | Range: -4.0 °C to 105.0 °C/0.1 °C<br>24.8 to 221.0 °F/0.1 °F<br><br>Maximum Analog Output can be adjusted to a maximum value of 20 mA.<br>High temperature limit is assigned to 20 mA.*                                                                                                                                                                                                                                                                                                                                                                                            | 105.0 °C<br>221.0 °F |
| <b>Min. Analog Out<br/>BL121 &amp; BL123</b> | Range: -5.0 °C to 104.0 °C/0.1 °C<br>23.0 to 219.2 °F/0.1 °F<br><br>Minimum Analog Output can be adjusted to a value of 4 mA.<br>Low temperature limit is assigned to 4 mA.*                                                                                                                                                                                                                                                                                                                                                                                                       | -5.0 °C<br>23.0 °F   |

\* The maximum Analog Out must always exceed the minimum Analog Out.

## 6.4. BL122 & BL123 HANNA CLOUD SETUP



### Hanna Cloud Options

These settings are required to permit Hanna Cloud monitoring.

**IP addressing:** an Internet Protocol address (IP address) is a numerical label assigned to each device connected to a network that uses the IP for communication.

**DHCP** (Dynamic Host Configuration Protocol) is a network management protocol whereby a DHCP server dynamically assigns IP addresses to the instrument.

**Static** means that the installer of the instrument assigns a unique fixed address to the controller. This involves entering:

- a four digit IP address
- a four digit netmask (almost always 255.255.255.0)
- the IP address of the gateway (the router used to connect BL122 or BL123 to the rest of the internet)
- the IP address of the DNS server

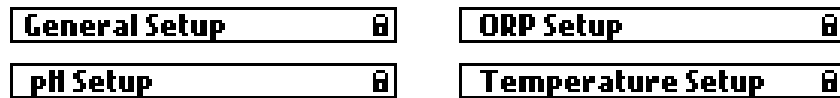
| Parameter            | Description/Menu Navigation                                                                                                                        | Default       |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Communication</b> | Options: <input checked="" type="checkbox"/> Enable, <input type="checkbox"/> Disable<br>Option to enable/disable Hanna Cloud communication module | Enabled       |
| <b>Network Type</b>  | Ethernet<br>BL122/BL123 network connection type                                                                                                    | Ethernet      |
| <b>IP addressing</b> | Static, DHCP<br>Option to select dynamic or static IP address                                                                                      | DHCP          |
| <b>IP Address</b>    | addr01. addr02. addr03. addr04<br>IP address                                                                                                       | 192.168.1.254 |
| <b>Netmask</b>       | netm01. netm02. netm03. netm04<br>Netmask address                                                                                                  | 255.255.255.0 |
| <b>Gateway</b>       | gate01. gate02. gate03. gate04<br>Gateway address                                                                                                  | 192.168.1.1   |
| <b>DNS Address</b>   | dns01. dns02. dns03. dns04<br>DNS server address                                                                                                   | 192.168.1.1   |

## 6.5. PASSWORD PROTECTED SETTINGS

The password protection feature protects against unauthorized configuration changes and deleting log files.

Once set, a series of functions cannot be subsequently modified.

This feature is represented by the lock icon —  — displayed on the functional key or on screen title.



- Select **Controller Password** from General Setup screen and press **Modify** to activate the feature.



- A five digit password has to be entered next.
- To change the digit value, press the  keys.
- To move to the next digit, press the arrow functional key.
- Press **CFM** functional key to confirm.

### Disable/change controller password

- Press  keys to select **Controller Password** from General Setup.
- Enter the correct password.
- Press **CFM** functional key.

To change the password

- Enter a new password and press **CFM** functional key.

To disable the password

- Enter 00000 and press **Disable**.

Once disabled the open lock icon is displayed .



**Note:** After five failed login attempts, the controller will require a master password. The master password can only be obtained from Hanna Instruments® Service. To issue the master password, Hanna® Service will request the user code displayed at the top of the screen.

|                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Password Menu</b><br>Enter password:<br><div style="border: 1px solid black; padding: 2px; text-align: center;">2 0 0 0 0</div> <div style="background-color: black; color: white; text-align: center; font-weight: bold;">4 retries left</div> <div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>--&gt;</span> <span>CFM</span> </div> | <b>Enter Master Password:</b><br>User Code: CSHHCAHH52<br><div style="border: 1px solid black; padding: 2px; text-align: center;">0 0 0 0 0</div> <div style="background-color: black; color: white; text-align: center; font-weight: bold;">Contact Hanna Service</div> <div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>--&gt;</span> <span>CFM</span> </div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6.6. BL121 & BL123 ANALOG OUTPUTS (AO)

The three 4-20 mA isolated current outputs are factory calibrated and can be configured through the Setup menu as pH/ORP or Temperature outputs.

|                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>pH Setup</b><br>Alarm Activates Relay <input type="checkbox"/><br>Alarm Mask Time 5 sec<br>StartupDosingDelay 2 min<br>Analog Output Disabled<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Modify</span> </div> | <b>ORP Setup</b><br>Alarm Activates Relay <input type="checkbox"/><br>Alarm Mask Time 5 sec<br>StartupDosingDelay 2 min<br>Analog Output Disabled<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Modify</span> </div> | <b>Temperature Setup</b><br>Alarm Activates Relay <input type="checkbox"/><br>Unit °C<br>Alarm Mask Time 5 sec<br>Analog Output Disabled<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Modify</span> </div> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Temperature Setup</b><br>Ala Disabled<br>Uni A01<br>Ala A02<br>Analog Output Disabled<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Select</span> </div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

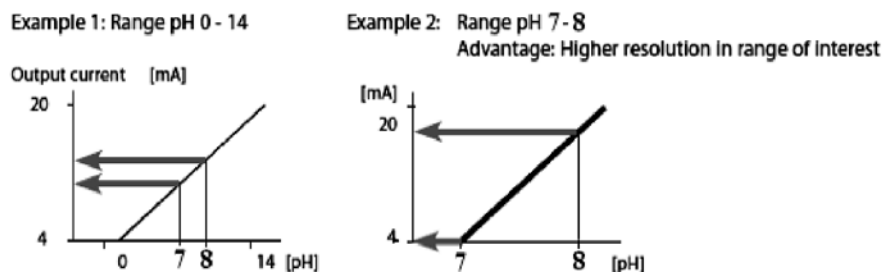
- Each output can be configured to a parameter (or disabled) and can be connected to a chart recorder or data logger.
- The current signal is proportional to the assigned scale of the assigned parameter e.g. A01 → pH, A02 → ORP, A03 → Temperature.
- To assign the output signal, select the minimum and maximum limit values for the parameter (minimum and maximum values are defined in the parameter Setup menu).

|                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>pH Setup</b><br>StartupDosingDelay 2 min<br>Analog Output A01<br>Max. Analog Out 14.0 pH<br>Min. Analog Out 0.0 pH<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Set</span> </div> | <b>ORP Setup</b><br>StartupDosingDelay 2 min<br>Analog Output A01<br>Max. Analog Out 2000 mV<br>Min. Analog Out -2000 mV<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Set</span> </div> | <b>Temperature Setup</b><br>Alarm Mask Time 5 sec<br>Analog Output A01<br>Max. Analog Out 105.0 °C<br>Min. Analog Out -5.0 °C<br><div style="display: flex; justify-content: space-between; padding: 2px;"> <span>ESC</span> <span>Set</span> </div> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Example

If the pH was assigned to A01 and the minimum and maximum analog output limits are 0 and 14 pH, the entire range will correspond to 4 and 20 mA, respectively (see Example 1).

A better resolution of analog output can be obtained if the limits are set, thus limiting the range of interest (see Example 2).



The output current is set to 0 mA when the analog output is disabled.

Under range condition generates 4 mA whereas an over range condition generates 20 mA output current value.

## 7. OPERATIONAL GUIDE

### 7.1. CALIBRATION

#### pH Calibration

The pH electrode can be calibrated on the controller using automatic, two-point calibration.

The electrode should be (re)calibrated:

- Before in-line or flow cell installation
- Whenever the pH electrode is replaced
- When higher accuracy is required
- After periodic maintenance

Always use fresh calibration buffers and perform recommended electrode maintenance prior to calibration.

**Note:** It is recommended to choose calibration buffer solutions that bracket the pH sample.

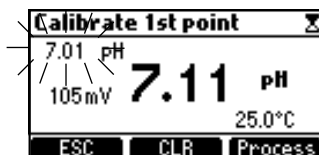
#### Preparation

- Pour small quantities of the buffer solutions into clean beakers.  
If possible, use plastic beakers to minimize any EMC interferences.  
For accurate calibration and to minimize cross-contamination, use two beakers for each buffer solution; one for rinsing the electrode and one for calibration.
- If measuring in the acidic range, use 7.01 pH as the first buffer and 4.01 pH as the second buffer.
- If measuring in the alkaline range, use 7.01 pH as the first buffer and 10.01 pH as the second buffer.

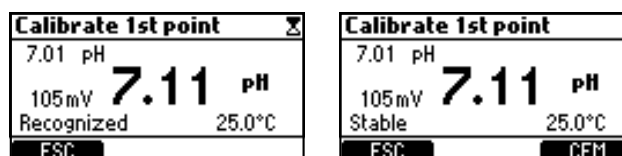
#### Procedure

A minimum of two-point calibration is required.

- Press **MENU** to enter calibration mode.
- Press **↔** keys to select **pH options**.
- Next, press **CAL** functional key. 7.01 pH value is displayed blinking.

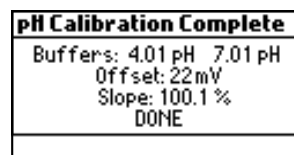
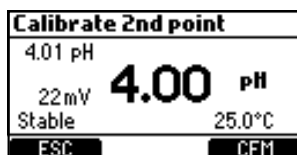
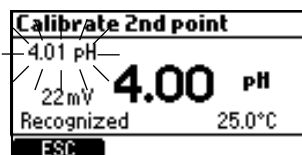


- Remove the electrode protective cap and place the probe into the first buffer solution.
- If the first buffer is 7.01 pH, "Recognized" is displayed followed by "Stable".
- Press **CFM** to accept the first calibration point.



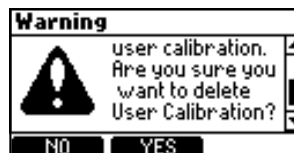
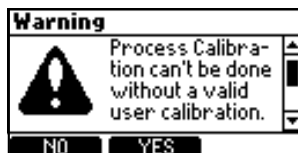
- Place the probe into either pH 4.01 or pH 10.01 calibration buffer.  
4.01 pH value starts blinking automatically.
- If the second buffer is 4.01 pH, "Recognized" is displayed followed by "Stable".
- Press **CFM** to end calibration.  
"pH Calibration Complete" screen is displayed briefly followed by the Menu screen.

- Press **MENU** to return to measurement mode.

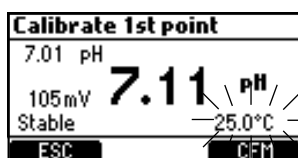


### Delete calibration

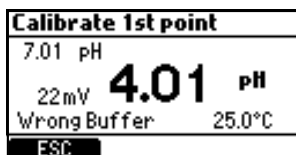
- Press **CLR** from calibration screen.  
Device prompts for confirmation
- Press **YES** to confirm or **NO** to exit and return to calibration screen.



If, during calibration, the temperature sensor detects extreme values, or the sensor broken, a blinking 25.0 °C is displayed (bottom right corner of the screen). This indicates that the controller compensates for this temperature variation.



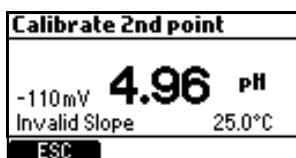
### pH Calibration Error Messages



#### Wrong Buffer

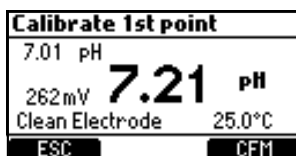
Displayed when the difference between the pH reading and the value of the selected buffer is too high.

Check that correct calibration buffer has been used.



#### Invalid Slope

Displayed when the calculated slope is outside of the acceptable range.

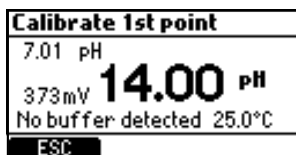


#### Clean Electrode

Message indicates poor electrode performance i.e. offset is outside of the accepted window or slope is under the accepted lower limit.

Clean the probe to improve the pH electrode's response and repeat calibration.

See [10.1. Electrode Conditioning & Maintenance](#) for details.



#### No buffer detected

Displayed if the probe has detected no buffer.



## pH Process Calibration

pH process calibration is a single point calibration performed with the probe installed in the process.

Process calibration allows users to adjust the measured pH value so that it matches the value determined with a hand held meter and without removing the probe from the saddle.

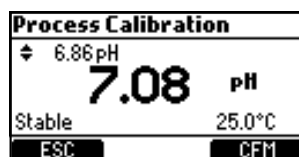
Prior to process calibration:

- Use a calibrated hand held meter and probe to determine the pH of the pool water.
- Write the value down.

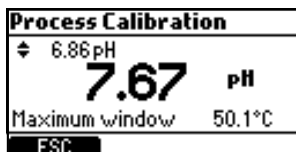
The controller and the probe should have previously been calibrated in two buffers (so an electrode slope has been determined).

- Press **MENU** from measurement mode.
- Press the  keys to select **pH options**.
- Press **CAL** to enter buffer calibration. Next, press the **Process** key.
- Use the  keys to change the calibration point. Press **CFM** to save the calibration.

**Note:** The **CLR** and **Process** keys are displayed only if the controller and the probe have been previously calibrated on the meter.

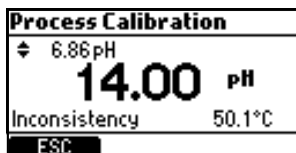


## pH Process Calibration Error Messages



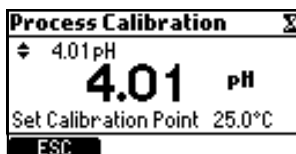
### Maximum window

Displayed if the limits (maximum or minimum) are reached.



### Inconsistency

Displayed if the pH value is out of range.



### Set Calibration Point

Displayed if the onscreen value changes when pressing the  keys.  
The displayed set point is automatically set to the current point limits.

## ORP Calibration

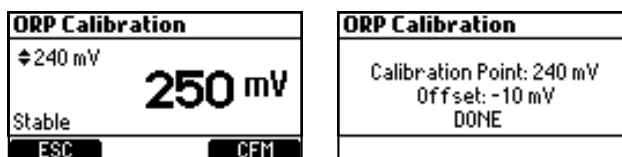
If both pH and ORP calibrations are required, calibrate the pH value first. A pH calibration can give inaccurate readings if the probe was used in ORP standard first.

### Preparation

- Pour small quantities of the ORP standard into clean beakers.
- If possible, use plastic beakers to minimize any EMC interferences.
- For accurate calibration and to minimize cross-contamination, use two beakers: one for rinsing the electrode and one for calibration.

### Procedure

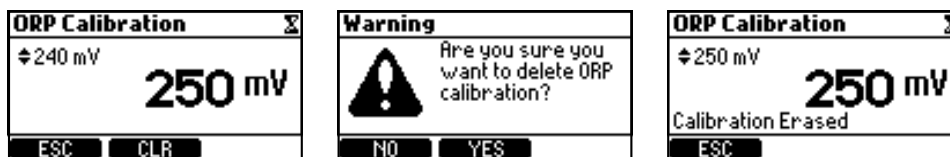
- Use the  keys to set the value.
- Wait for "Stable" message to be displayed.
- Press **CFM** to confirm calibration. "DONE" message is displayed.



### Delete calibration

- From calibration screen, press **CLR** key to clear a previous calibration.
- The device prompts for confirmation.
- Press **YES** to confirm or **NO** to exit and return in the calibration screen.

A confirmation message is displayed next.



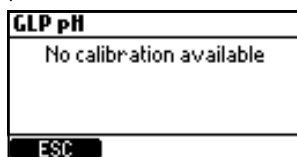
**Note:** Rinse the probe under a running stream of water to remove ORP standard before installing in the saddle or flow cell. It may take several minutes to equilibrate in the pool water after exposure to the ORP standard.

## GLP

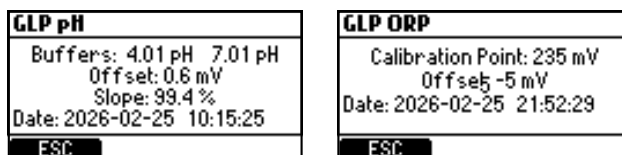
Good Laboratory Practice (GLP) refers to a quality control function used to ensure uniformity of probe calibrations and measurements.

- Press **MENU** key.
- Use the  keys to select **pH (ORP) options**.
- Press **GLP** key.

If no calibration or the calibration was cleared, "No calibration available" message is displayed.



GLP information for pH and ORP is displayed separately.



## 7.2. MEASUREMENT

- Start the recirculation pump.
- **BL12X-20 controllers:** verify the flow cell fills correctly.
- Set up the pump controller, probe, and required accessories. Controller is now ready.
- Turn on the controller.

After initialization has been completed, the controller enters measurement screen.



- Select the Manual mode to prime pumps.
- Verify the pumps are functioning properly and tubing connections are not leaking.

**Note:** Fittings may require tightening.

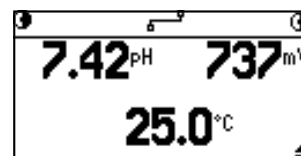
- Select pH pump, then Chlorine pump, to verify reagents are being pumped.
- To add additional time to Manual pump, press **Add 10s**.
- To verify probe is measuring, press **MENU**.  
pH, mV, and temperature values should be displayed.

Both the pH and Chlorine pumps may be configured as OFF or AUTO.

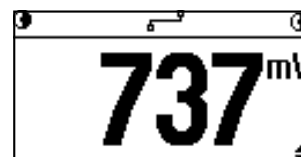
- To control the pH and disinfection level of the pool automatically, select AUTO for both pumps.
- After setting the pumps, press **MENU** to enter measurement mode.

In Measurement mode, there are three display configurations. Press the  keys to navigate configurations.

- **Three parameters screen** (default)  
displayed at start up with all measured parameters

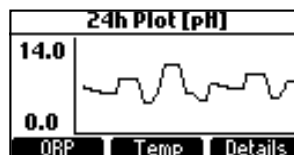
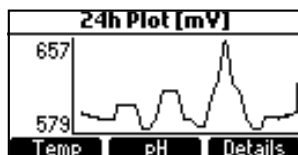


- **Single parameter screen** (allows better viewing from a distance)  
pH, ORP, temperature measurements automatically alternate every 3 seconds



- **24 hour plot screen** (a graphical representation of the measurements taken over the last 24 hours for selected parameter)  
Independent by when the plot is accessed, users can see last 24 hours information.

**Note:** The first and second functional keys are used to change the plotting parameter.



**Details** functional key opens up an overview screen displaying the minimum, maximum, and average values of the measurements taken over the last 24 hours.

| 24h Summary [pH] |         |       |  |
|------------------|---------|-------|--|
| Current:         | 6.53 pH |       |  |
| Maximum:         | 6.92 pH | 19:57 |  |
| Minimum:         | 0.0 pH  | 07:44 |  |
| Average:         | 6.76 pH |       |  |
| ORP Temp Plot    |         |       |  |

## On-display pump status when in measurement mode

| BL120 & BL121 status bar                                                                 |                                                                                           | BL122 & BL123 status bar                                                                                                                                                   |                                                                                   | Description                                                                  |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|  MANUAL | MANUAL   |  MANUAL  |  | Pumps set on OFF                                                             |
|         | TANK     |                                                                                           |  | Level detection indicates pH and Chlorine (Cl <sub>2</sub> ) volumes are low |
|         | WAIT pH  |                                                                                           |  | System waiting for pH to reach setpoint                                      |
|  ALARM  | WAIT pH  |  ALARM                                                                                    |  | Alarm status                                                                 |
|  !      | WAIT pH  |  !                                                                                        |  | Active warnings                                                              |
|  HOLD   | HOLD     |  HOLD                                                                                     |  | pH and Chlorine (Cl <sub>2</sub> ) pumps are stopped                         |
|                                                                                          |                                                                                           |  R-HOLD                                                                                   |  | Hold mode remotely activated.                                                |

## BL122 &amp; BL123

## On-display connection status

| Icon                                                                                | Description                           |
|-------------------------------------------------------------------------------------|---------------------------------------|
|    | Connecting (connection in-progress)   |
|    | Connected (connection established)    |
|  | Disconnected. Physical network issues |
|  | Disconnected. Cloud connection issues |
|  | Sending messages                      |
|  | Disabled                              |

### 7.3. OVERVIEW CONTROL MODE

**Control Mode** is the normal operational mode. During control, the device:

- Measures then converts probe's signal to a measurement (temperature corrected pH), the ORP voltage, and temperature.
- Provides proportional feed with an adjustable band for acid and chlorine additions.
- Displays active events on the LCD.
- Activates the LEDs for quick visual feedback.
- Runs pH-ORP control interlock i.e. the ORP control is running only when the pH set point is reached.
- Automatically logs pH/ORP/temperature measurements, last calibration data, setup configuration, event data.
- Allows access to the last 24 hours of data (as a graph) directly from the view mode.
- Automatically logs events.
- Supports data export.

#### BL121 & BL123 only

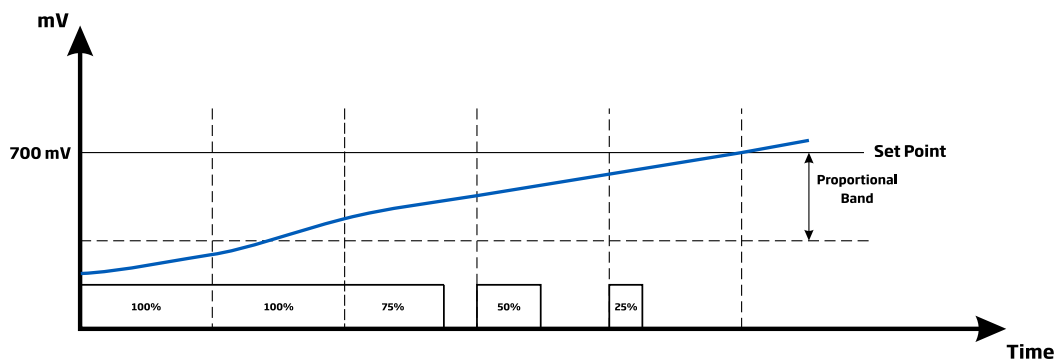
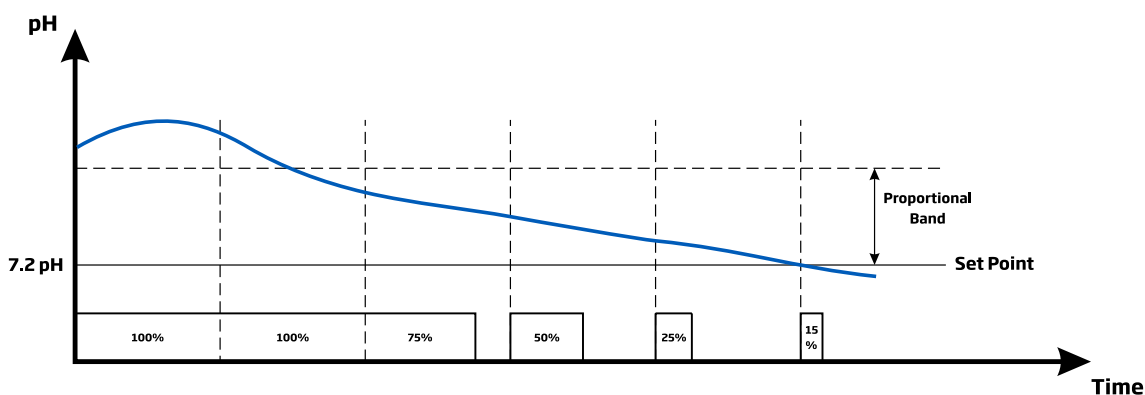
- Controls the alarm relay and analog outputs as per setup configuration.
- Sends data to Hanna Cloud.

#### Dosing pump mode of operation

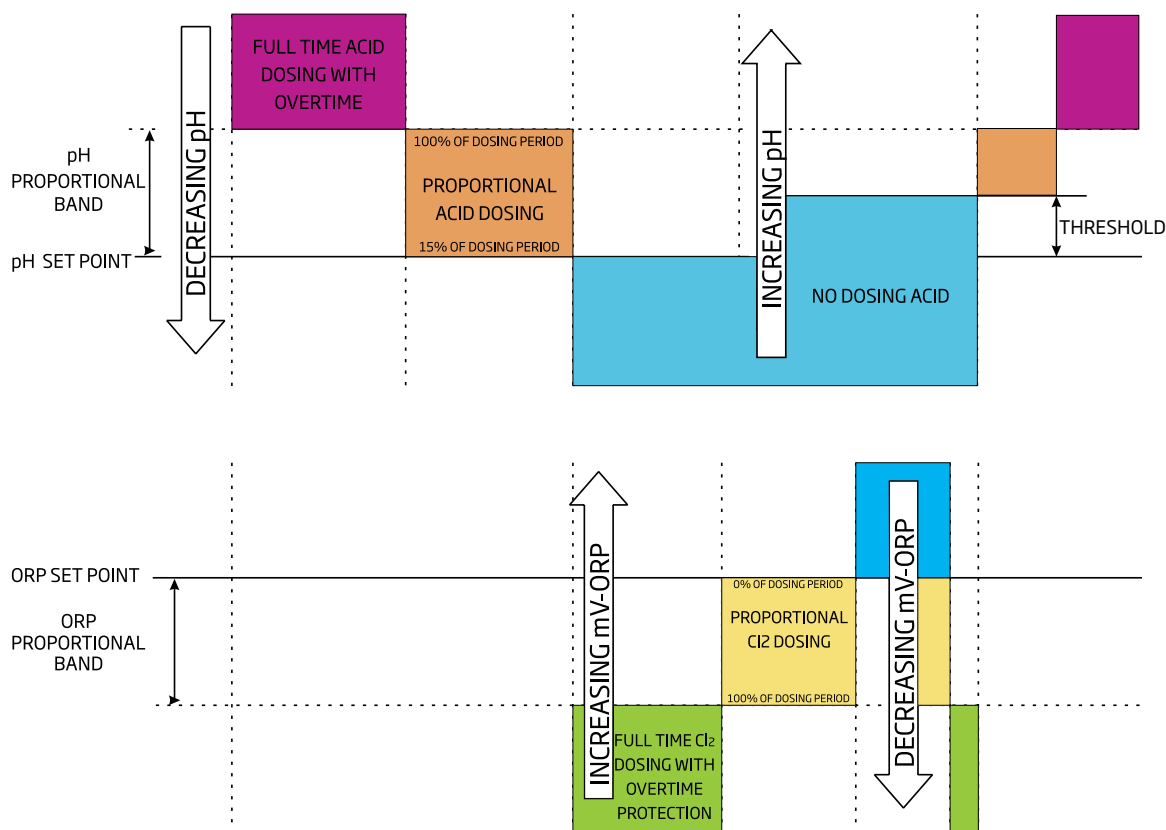
- The dosing pumps are regulated through proportional feed.  
The proportional feed regulates pump's On/Off time within the adjustable band.
- The pump remains on continuously at the setpoint with band added. As the setpoint is approached, the pump is on less.
- The **Overtime** safety timer will run during the pump "On" period and is reset when the setpoint is reached.

|                   | pH control     | ORP control |
|-------------------|----------------|-------------|
| Dosing Type       | ACID/BASE      |             |
| Setpoint          | 6.00 – 8.00 pH | 200– 900 mV |
| Proportional band | 0.1– 2.0 pH    | 10– 200 mV  |

The plot shows how the dosing time is affected by this difference.



## pH & ORP proportional control



|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notification LED                | STATUS ●                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                 | SERVICE ○                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Alarm Relay                     | pH/Chlorine pump LED → control and pump off ●                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                 | pH/Chlorine pump LED → control and pump running ☀                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Alarm Relay                     | Energized (no alarms)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Analog Outputs<br>BL121 & BL123 | Follow configured parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Reagent pumps disabled          | <ul style="list-style-type: none"> <li>• Immediately after power-on for time configured in pH/ORP Startup Dosing Delay</li> <li>• When acid pump is OFF (manually controlled)</li> <li>• If one or more high/low alarms and/or process errors are active (except during Pool Startup mode)</li> <li>• When the Hold Input or Remote Hold events are active</li> <li>• Pump operation has exceeded time configured in Overtime</li> <li>• During calibration or when Setup changes are being made</li> </ul> |

### Manual or Auto Pump Control for pH/Chlorine Control

- Select the **OFF** option to set (each) pump on **MANUAL**.  
When **On 10s** is selected the pump runs continuously for 10 seconds.  
Press **Add 10s** button to increase the time up to 90 seconds. Remaining time is displayed next to the selected pump in the menu.
- Press **OFF** to stop the pump.
- Select **Auto** for each pump to return to automatic mode.  
In Auto mode the pumps will be activated until the measurement reaches the setpoint value.

## 8. LOGGING

The controller logging system supports periodic and automatic save mode for all parameters as well as an events logging system. The log file stores a maximum of 100 events. Data is stored as per configured time interval. Once the 100 event limit is reached, the oldest logged event is deleted.

A new log is generated if controller ID, date or time, decimal, pH/ORP/Temperature menu configuration change, a calibration, or when the file exceeds 8430 records.

### 8.1. LOG RECALL

The controller can hold up to 100 lots. Logged data can be viewed in standard or plot mode.

If the settings change, logs recorded on the same day are displayed with a different index number.

#### View Log Recall

1. Press **MENU** key then use the ▼▲ keys to select **Log Recall** and access logged data.

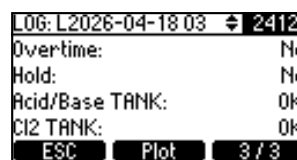
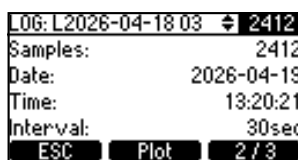
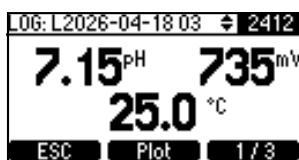


2. Press **Log Files** to enter Log Recall screen.

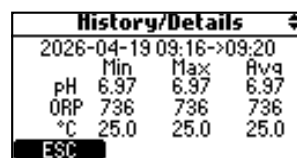
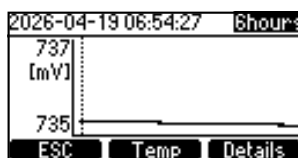
A logs list is displayed, with the most recent log at the top.



3. Press **Details** to view logged data in standard mode. pH, ORP and temperature values are displayed.
  - Press the ▼▲ keys, to scroll through the records. Current index number is displayed in the right corner of the title bar.
  - Use the right hand function key to view number of samples, date and time, log interval, overtime, hold status, acid/base tank, Chlorine (Cl<sub>2</sub>) tank status.



- Press **Plot** to view a day's logged data displayed as a plot. Use the arrow keys to modify the timestamp.
- Press **Details** for further information.



- Press **ESC** key to return to the Log Recall screen.

## Export Logged Data

1. Press **Options** from Log Recall screen. Users have the option to export a selected log file or all logs.



2. Insert the USB-C flash drive.
3. Press **CFM** to continue (**ESC** returns users to a previous screen).  
 "Transfer in progress" is displayed while the data is transferred and saved to the USB-C flash drive.  
 Data is saved in a folder named after the controller ID.  
 "Transfer completed" is displayed when completed.
4. Press **MENU** key to return to the previous screen.

Logged data is formatted as comma separated values (\*.CSV) and can be opened with any text editor or spreadsheet program. Click on the desired log to view data.

Logs are designated with year, month, day, index code, and log interval LYMMDDNN <interval> .csv.

E.g. L230810001030s.csv indicates the log with index number 01 from August 10, 2023 with log interval 30 seconds.

Suggested settings for correct formatting: comma or period, Western Europe character set (ISO-8859-1) and English language.

## Delete Logged Data

In Log Recall screen press **Options**. Use the arrow keys and select **Delete all log files**.



Press **CFM** to confirm or press **MENU** key to exit.



## 8.2. EVENT LOG

Alarms, warnings, and errors are logged in the event log. The log has a capacity of maximum 100 events. Recalled events display event index (title bar) and logging date along with time.

### EVENTS OVERVIEW

| TYPE                  | DEFINITION                                                                                                                                                                                                                                                                         |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(Fatal) Errors</b> | An error is a critical event that requires Hanna Instruments® technical support.                                                                                                                                                                                                   |
| <b>Alarms</b>         | <p>An alarm is an event generated when programmed alarm conditions have been met.</p> <p>Configurable triggers:</p> <ul style="list-style-type: none"> <li>• External Hold</li> <li>• Control alarm</li> <li>• Instrument restart</li> <li>• Alarms</li> <li>• Warnings</li> </ul> |
| <b>Warnings</b>       | <p>A warning is an event generated when erroneous conditions appear and when measured values are outside expected range</p> <ul style="list-style-type: none"> <li>• Control warning</li> <li>• User calibration</li> <li>• Process calibration</li> <li>• Setup update</li> </ul> |

| Event LOG 1 |                  |
|-------------|------------------|
| Date        | 2026-03-26       |
| Time        | 16:03:28         |
| Event:      | User calibration |
| Export      | CLR 1 / 2        |

| Event LOG 1 |                     |
|-------------|---------------------|
| Off:        | -0.9 mV             |
| CP1:        | 4.01 Slope: 100.0 % |
| CP2:        | 7.01                |
| CLR         | 2 / 2               |

| Event LOG 2 |                     |
|-------------|---------------------|
| Date        | 2026-03-26          |
| Time        | 16:08:42            |
| Event:      | Process Calibration |
| Export      | CLR 1 / 2           |

| Event LOG 2 |                     |
|-------------|---------------------|
| pH Off:     | 4.5 mV              |
| CP:         | 3.71 Slope: 100.0 % |
| CLR         | 2 / 2               |

| Event LOG 23 |               |
|--------------|---------------|
| Date         | 2026-03-14    |
| Time         | 10:46:43      |
| Event:       | Setup updated |
| Export       | CLR 1 / 2     |

| Event LOG 23     |       |
|------------------|-------|
| [29]-Dosing Type |       |
| Old value:       | Acid  |
| New value:       | Base  |
| CLR              | 2 / 2 |

**Note:** The “~~” mark in front of the event type name indicates the event is no longer active.

### Fatal Errors

Errors that prevent the controller from operating (logging).

When encountered, restart the controller. If the error persists, contact Hanna Instruments® technical support.

| Fatal Error      | Event Code | Description                                                                    |
|------------------|------------|--------------------------------------------------------------------------------|
| ERROR_EEP_CTRL   | 0x00001    | The interface with the EEP circuit does not work properly.<br>(EEPROM damaged) |
| ERROR_EEP_SN     | 0x10000    | Serial number checksum error.                                                  |
| ERROR_EEP_AO_CAL | 0x20000    | AO factory calibration error.                                                  |
| ERROR_3V_POWER   | 0x00010    | 3V power failure.<br>(3V power supply out of range)                            |
| ERROR_5V_POWER   | 0x00020    | 5V power failure.<br>(5V power supply out of range)                            |
| ERROR_AO_POWER   | 0x00100    | 24V AO power failure.<br>(power supply 24V out of range)                       |
| ERROR_DI_POWER   | 0x00800    | Digital input power failure.                                                   |

## Errors

When encountered, restart the controller. If the error persists, contact Hanna Instruments® technical support.

| Error                      | Description                                                                                                                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ERROR_EEP_CTRL_CHECKSUM    | Incorrect EEPROM checksum.                                                                                                                                                                                    |
| ERROR_FLASH_CTRL           | The interface with the internal storage device is not working properly.<br>Logging stopped, except Event logs.                                                                                                |
| ERROR_FLASH_CTRL_MFS       | System file management error.<br>Log files could be affected. Logging stopped.<br>Event logs are stored correctly.<br>If after restart the error disappears, save log and event files, then delete all files. |
| ERROR_24V_POWER            | 24V IO power failure.                                                                                                                                                                                         |
| ERROR_USB_HOST_POWER       | USB interface power failure.                                                                                                                                                                                  |
| ERROR_MICRO_TEMP           | Microprocessor over temperature error.<br>Power off the controller, wait 15 minutes then restart.                                                                                                             |
| ERROR_KTY_COVER_PROTECTION | Motor overheating.<br>Power off the controller, wait 15 minutes then restart.                                                                                                                                 |
| ERROR_KTY_SHORTINT         | Motor drive temperature sensor damaged.<br>Power off the controller, wait 15 minutes then restart.                                                                                                            |
| ERROR_RTC_BATTERY          | RTC battery error.<br>Replace the battery.                                                                                                                                                                    |
| ERROR_USB_HOST_I           | USB input power error.                                                                                                                                                                                        |

## Alarms

| Alarm                                | Description                                                                                                                                           |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALARM_HIGH_pH                        | Generated during measurement when pH reading is over set Alarm High value.                                                                            |
| ALARM_LOW_pH                         | Generated during measurement when pH reading is below set Alarm Low value.                                                                            |
| ALARM_HIGH_Temperature               | Generated during measurement when measured temperature is over set Alarm High value.                                                                  |
| ALARM_LOW_Temperature                | Generated during measurement when measured temperature is below Alarm Low value.                                                                      |
| ALARM_OVER_RANGE_pH                  | Generated during measurement when pH reading is over range specifications.                                                                            |
| ALARM_UNDER_RANGE_pH                 | Generated during measurement when pH reading is under range specifications.                                                                           |
| ALARM_OVER_RANGE_ORP                 | Generated during measurement when mV reading is over range specifications.                                                                            |
| ALARM_UNDER_RANGE_ORP                | Generated during measurement when mV reading is under range specifications.                                                                           |
| ALARM_OVER_RANGE_Temperature         | Generated during measurement when temperature reading is over range specifications.                                                                   |
| ALARM_UNDER_RANGE_Temperature        | Generated during measurement when temperature reading is under range specifications.                                                                  |
| ALARM_OVERTIME_pH                    | Generated when measured pH has not reached control Setpoint value after configured time has passed.<br>Place controller on Hold (manually) to reset.  |
| ALARM_OVERTIME_Cl <sub>2</sub>       | Generated when measured ORP has not reached control Setpoint value after configured time has passed.<br>Place controller on Hold (manually) to reset. |
| ALARM_PROBE_RECONNECTED              | Generated each time probe is reconnected.                                                                                                             |
| ALARM_NO_PROBE                       | Generated if no probe connected.                                                                                                                      |
| ALARM_PROBE_PARAMETER ARE_NOT_LOADED | Probe parameters not fully loaded.<br>Check probe connection/wiring.                                                                                  |
| ALARM_MAIN_POWER_FAILED              | Unplug device from power and reconnect it.                                                                                                            |
| ALARM_PROBE_ERROR                    | Probe is not measuring/reading correctly.                                                                                                             |
| ALARM_TEMP_SENSOR_BROKEN             | Temperature sensor not working.                                                                                                                       |

| Alarm                          | Description                                                                |
|--------------------------------|----------------------------------------------------------------------------|
| EXTERNAL HOLD<br>ALARM_HOLD_IN | Hold input condition is present.<br>To resume control, fix Hold condition. |
| ALARM_REMOTE_HOLD_IN           | Remote Hold Mode is On. To exit Hold, check & remove hold condition.       |
| ALARM_MAIN_POWER_FAILED        | Generated at power Off/On.                                                 |
| ALARM_HIGH_ORP                 | Measured ORP exceeds Alarm High value.                                     |
| ALARM_LOW_ORP                  | Measured ORP has dropped below Alarm Low value.                            |
| ALARM_OVER_RANGE_ORP           | Measured ORP exceeds probe specification range.                            |
| ALARM_UNDER_RANGE_ORP          | Measured ORP has dropped below probe specification range.                  |
| ALARM_LOW_LEVEL_ACID_TANK      | pH tank level is too low.<br>Refill the tank.                              |
| ALARM_LOW_LEVEL_CL2_TANK       | Cl <sub>2</sub> tank level is too low.<br>Refill the tank.                 |

## Warnings

| Warning                        | Description                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WARNING_NO_pH_UCAL             | pH is not user calibrated.                                                                                                                                                      |
| WARNING_NO_ORP_UCAL            | ORP is not user calibrated.                                                                                                                                                     |
| WARNING_pH_CONTROL_DELAY       | Start up of pH control is delayed. Control is not running.                                                                                                                      |
| WARNING_ORP_CONTROL_DELAY      | Start up of ORP control is delayed. Control is not running.                                                                                                                     |
| WARNING_HIGH_pH                | Measured pH exceeds Alarm High value.                                                                                                                                           |
| WARNING_LOW_pH                 | Measured pH has dropped below Alarm Low value.                                                                                                                                  |
| WARNING_HIGH_TEMPERATURE       | Measured temperature exceeds Alarm High value.                                                                                                                                  |
| WARNING_LOW_TEMPERATURE        | Measured temperature has dropped below Alarm Low value.                                                                                                                         |
| WARNING_HIGH_ORP               | Measured ORP above Alarm High value.                                                                                                                                            |
| WARNING_LOW_ORP                | Measured ORP below Alarm High value.                                                                                                                                            |
| WARNING_pH_PROCESS_CAL_RUN     | Access pH process calibration menu.                                                                                                                                             |
| WARNING_ORP_CAL_RUN            | Access ORP calibration menu.                                                                                                                                                    |
| WARNING_OVERTEMP_MOTOR         | Motor overheating.                                                                                                                                                              |
| WARNING_LOAD_ETH_FROM_USB      |                                                                                                                                                                                 |
| WARNING_OFFLINE_MSG_FROM_QUEUE |                                                                                                                                                                                 |
| WARNING_RTC_SET_TO_FIRST_VALUE |                                                                                                                                                                                 |
| WARNING_LOG_FULL               | Log files space is full (100 events recorded).<br>A new file will delete the oldest one.<br>Save all files on a USB flash drive then delete.                                    |
| WARNING_LOG_MAX_INDEX_ASSIGNED | Too many log files created in one day (100 events logged in one day)<br>Logging stopped until more logging space available.<br>Save all files on a USB flash drive then delete. |
| WARNING_CLOUD_DOESNT_WORK      | Honna Cloud does not work.                                                                                                                                                      |
| WARNING_CLOUD_DISABLED         | Hanna Cloud communication is disabled.                                                                                                                                          |

On-display but not logged

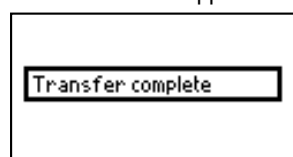
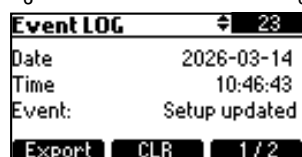
## Setup Codes

| Event code | Setup Parameter              |
|------------|------------------------------|
| 0          | Key beep                     |
| 1          | LCD contrast                 |
| 2          | LCD backlight                |
| 3          | Time format                  |
| 4          | Date format                  |
| 5          | Decimal point                |
| 6          | Temperature unit             |
| 8          | Log interval                 |
| 9          | Error beep                   |
| 10         | Language                     |
| 11         | Password enable              |
| 13         | LCD shut off time            |
| 16         | Controller ID                |
| 17         | Setup timeout                |
| 19         | Controller password          |
| 29         | pH dosing type               |
| 37         | Overtime pH                  |
| 38         | Overtime ORP                 |
| 45         | Setpoint pH                  |
| 46         | Setpoint ORP                 |
| 65         | Proportional band pH         |
| 66         | Proportional band ORP        |
| 77         | Alarm high pH                |
| 78         | Alarm high temperature       |
| 79         | Alarm high ORP               |
| 81         | Alarm low pH                 |
| 82         | Alarm low temperature        |
| 83         | Alarm low ORP                |
| 97         | Alarm high-value pH          |
| 98         | Alarm high-value temperature |
| 99         | Alarm high-value ORP         |
| 101        | Alarm low-value pH           |
| 102        | Alarm low-value temperature  |

| Event code | Setup Parameter                          |
|------------|------------------------------------------|
| 103        | Alarm low-value ORP                      |
| 153        | Hold Input Contact                       |
| 178        | Hold Input enable [Hold function enable] |
| 191        | A01 parameter to follow                  |
| 192        | A02 parameter to follow                  |
| 193        | A03 parameter to follow                  |
| 199        | A01 value for maximum output             |
| 200        | A02 value for maximum output             |
| 201        | A03 value for maximum output             |
| 203        | A01 value for minimum output             |
| 204        | A02 value for minimum output             |
| 205        | A03 value for minimum output             |
| 229        | pH flow rate                             |
| 230        | Cl <sub>2</sub> flow rate                |
| 231        | pH warnings & errors enable              |
| 232        | Temperature warnings & errors enable     |
| 233        | ORP warnings & errors enable             |
| 234        | pH alarm activates relay enable          |
| 235        | Temperature alarm activates relay enable |
| 236        | ORP alarm activates relay enable         |
| 237        | pH tank input enable                     |
| 238        | Cl <sub>2</sub> tank input enable        |
| 239        | pH startup control delay                 |
| 240        | ORP startup control delay                |
| 241        | Communication enable                     |
| 242        | Network type                             |
| 243        | IP addressing type                       |
| 244        | IP address                               |
| 245        | Netmask                                  |
| 246        | Gateway                                  |
| 247        | DNS Address                              |
| 248        | Pool Startup                             |
| 249        | Alarm - Hold input                       |
| 250        | Hold release relay                       |

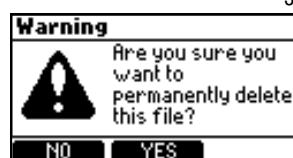
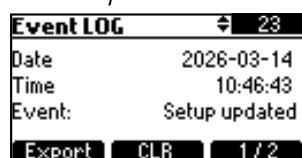
## Export Event Logs

1. Insert the USB-C flash drive.
2. Press **Export** from Event Log screen to save the event logs file. A confirmation screen appears when the transfer has finished.



## Delete Event Logs

To clear the event logs file, press **CLR** key. Press **YES** to confirm or **NO** to exit and return to Event Log screen.



## 9. EVENT MANAGEMENT

BL12X controllers have an intuitive and user-friendly events-management system that allows for quick event source identification. There are four event types filtered using controller Setup options. Press **HELP** key from measurement screen to view all active events.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>EVENT TYPE: WARNING</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | symbol on display "!" |
| Triggered by <b>non-critical events</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |
| <ul style="list-style-type: none"> <li>• <b>Start-up delay active</b><br/>pH control delayed (acid regulator in delay after power-on)<br/>ORP control delayed (Cl<sub>2</sub> regulator in delay after power-on)</li> <li>• <b>No user calibration</b><br/>No pH or ORP user calibration (calibration cleared), if Menu\pH (ORP) options\Warnings and Errors <input checked="" type="checkbox"/></li> <li>• <b>High or Low alarm warnings (Events timeout)</b><br/>High or Low warnings for pH/ORP/Temperature, if alarm is enabled, alarm level exceeded but set timeout value not exceeded</li> <li>• <b>Pump control disabled due to overheating</b><br/>Overheating dosing delay active, if the pump driver temperature is above accepted limit</li> <li>• <b>pH/ORP/Temperature warning events</b>, if enabled only; do not affect dosing, alarm relays, buzzer</li> <li>• <b>Power failure</b></li> <li>• <b>BL122 &amp; BL123 Cloud connectivity issues</b><br/>Communication disabled<br/>No connection to Hanna Cloud</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| <b>EVENT TYPE: ALARM</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | symbol on display "A" |
| Triggered by <b>measured data exceeding configured high or low limits</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| <p>Values are user selectable, and enabled or disabled from the parameter option Setup Menu.</p> <p><b>Evaluation criteria</b></p> <ul style="list-style-type: none"> <li>• Alarm condition is evaluated only if condition is enabled.</li> <li>• Alarm evaluation is done at 1 second interval after a new measurement cycle.</li> </ul> <p><b>Mask Time</b></p> <ul style="list-style-type: none"> <li>• An alarm is delayed as per configured Mask Time and is issued as a warning until configured period has elapsed. After that a warning becomes an alarm.</li> <li>• If a warning condition continues after the configured Mask Time has elapsed, the warning becomes an alarm.</li> </ul> <p><b>Alarm Relay</b></p> <ul style="list-style-type: none"> <li>• An active alarm deenergizes the Alarm Relay if the <b>Alarm Activates Relay</b> is enabled.<br/>e.g. for pH errors "Menu\pH options\Alarm Activates Relay <input checked="" type="checkbox"/></li> </ul> <p><b>Acoustic signal</b></p> <ul style="list-style-type: none"> <li>• If <b>Alarms and Errors Beep</b> is enabled, an acoustic signal is issued each time an alarm is triggered</li> </ul> <p><b>Logging</b></p> <ul style="list-style-type: none"> <li>• Alarms are logged and recalled from <b>Log Recall</b>.<br/><i>Note: The logging period lasts longer than the measure period. Any alarm condition that occurred between logging is recorded and logged even if the alarm conditions are no longer active on first log (event) after the alarm.</i></li> </ul> <p><b>On-screen symbols</b></p> <ul style="list-style-type: none"> <li>• (↑) high or (↓) low-alarm icon is displayed close to parameter value which triggered the alarm.</li> </ul> <p><b>On-screen messages</b></p> <ul style="list-style-type: none"> <li>• The ALARM message is displayed close to the pump icon.</li> <li>• Help on measurement screens displays the active alarms.</li> </ul> |                       |

**EVENT TYPE: PROCESS ERROR** symbol on display "☒"

Triggered **during process control and affects pH and/or ORP control**

A condition is evaluated only if it's enabled. See noted exceptions.

**Note:** "No probe", "Hold input active", and "Remote Hold" are not dependent on "Warnings and Errors ☒" settings.

Errors are logged and viewed in Log Recall.

After an error has been triggered, an error message is displayed next to the pump icon:

- **ERROR** — Out of range and overtime errors
- **TANK** — Low level in Acid/Base and/or Cl<sub>2</sub> tanks
- **R-HOLD** blinking — Hold mode remotely activated
- **HOLD** — Hold input (recirculation pump)
- Help accessed from measurement screen displays active errors

## EVENTS

- **Out of range**

**pH out of range** if "Menu\pH options\Warnings and Errors ☒"

**ORP out of range** if "Menu\ORP options\Warnings and Errors ☒"

**Temperature out of range** if "Menu\Temperature options\Warnings and Errors ☒"

- **Hold input active**, if Hold input is enabled

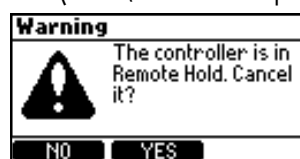
**Note:** the recirculation pump doesn't work.

- **Remote hold active**

Remotely triggered (notification message displayed) when remote Hold (R-HOLD) option is enabled.

Press **YES** to exit Hold mode.

Alternatively, press **R-HOLD** (Menu\Hanna Cloud options) to cancel the hold at a later stage.



**Note:** BL122 & BL123 pumps are deactivated.

R-HOLD deactivation function is password protected, if controller password has been correctly configured in General Setup.

- **Tank level input active**

**Low level in acid/base tank** if "Menu\pH options\Setup\Acid/base Tank Input ☒"

"Menu\pH options\Setup\Warnings and Errors ☒"

**Low level in Cl<sub>2</sub> tank** if "Menu\ORP options\Setup\Cl<sub>2</sub> Tank Input ☒"

"Menu\ORP options\Setup\Warnings and Errors ☒"

**Note:** level errors triggered only when la evel sensor is used.

- **Overtime**

**pH (ORP) dosing overtime** if acid (Cl<sub>2</sub>) pump is dosing full time or in proportional control band for more than configured value.

Go to: "Menu\pH (ORP) options\Setup\Overtime xxxmin"

**Note:** Overtime process errors are cleared only at controller restart or via Manual control.

The overtime counters are reset when Hold Input is active.

- **No probe** if probe is disconnected

**EVENT TYPE: SYSTEM ERROR**

Triggered by [critical events](#), [place the controller in ERROR mode](#). Events are continuously monitored.

When in ERROR mode, the device:

- Stops the dosing pumps
- Stops logging
- Activates the alarm relay (relay not energized)  
If **Alarms and Errors Beep** is enabled, an acoustic signal is issued each time an error is triggered
- Issues repetitive acoustic signals

**Note:** *A measurement alarm will shut off if the measurement reaches the setpoint within the overtime timer period.*

- Displays an error code (the OR of all errors detected) and access to the device is blocked.



## LED NOTIFICATIONS ON CONTROLLER STATUS

| LED TYPE                                              | LED notifications                                                                 |                                                                                                                                                                          | Description                    |
|-------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
|                                                       | Solidly illuminated                                                               | Flashes                                                                                                                                                                  |                                |
| STATUS LED                                            |  | not present                                                                                                                                                              | system running, no events      |
|                                                       |  | not present                                                                                                                                                              | system requires user attention |
|                                                       | not present                                                                       |                                                                                        | technical assistance required  |
| SERVICE LED                                           | not present                                                                       |                                                                                        | service required               |
| pH & Cl <sub>2</sub> pumps LEDs (condition dependent) |  |  (  ) |                                |
| Pump in Manual (condition dependent)                  |  |  (  ) |                                |

Note: LED off ○

| Pump running             |                 | Events                        | Dosing pump status with associated LED signal |                                                                                         |                      |                                                                                           | STATUS LED                                                                          | SERVICE LED                                                                           |
|--------------------------|-----------------|-------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                          |                 |                               | pH pump                                       | pump LED                                                                                | Cl <sub>2</sub> pump | pump LED                                                                                  |                                                                                     |                                                                                       |
| Pump in Auto             |                 | Dosing delay at start-up      | Off                                           |        | Off                  |        |    | ○                                                                                     |
|                          |                 | No dosing                     | Auto-Off                                      |        | Auto-Off             |        |    | ○                                                                                     |
|                          |                 | Dosing Acid                   | Auto-On                                       |        | Auto-Off             |        |    | ○                                                                                     |
|                          |                 | Dosing Chlorine               | Auto-Off                                      |        | Auto-On              |        |    | ○                                                                                     |
| Pump in Manual           | pH              | Active high/low alarm         | Manual Off/On                                 |        | Auto-Wait            | ○                                                                                         |    |    |
|                          |                 | No active alarm               | Manual Off/On                                 |        | Auto-Wait            |        |    |    |
|                          | Cl <sub>2</sub> | Active high/low alarm         | Auto-Wait                                     | ○                                                                                       | Manual Off / On      |        |    |    |
|                          |                 | No active alarm               | Auto-Wait                                     |       | Manual Off / On      |       |   |   |
| Warning                  | pH              | Active high-pH level warning  | Auto-On                                       |      | Off                  |      |  | ○                                                                                     |
|                          |                 | Active low-pH level warning   | Auto-Off                                      |      | On                   | (  ) |  | ○                                                                                     |
|                          | ORP             | Active high-ORP level warning | Auto-Off                                      |      | On                   |      |  | ○                                                                                     |
|                          |                 | Active low-ORP level warning  | Auto-Off                                      |      | On                   |      |  | ○                                                                                     |
|                          | Temp.           | Active high/low temp. warning | Auto                                          | (  ) | Auto                 | (  ) |  | ○                                                                                     |
|                          |                 |                               |                                               |                                                                                         |                      |                                                                                           |                                                                                     |                                                                                       |
| Pool startup             |                 | No alarms                     | Auto                                          |      | Auto                 |      |  | ○                                                                                     |
| Logging (all parameters) |                 | No logging, no alarms         | Auto                                          | (  ) | Auto                 | (  ) |  |  |
| Cloud connectivity       |                 | No connectivity, no alarms    | Auto                                          | (  ) | Auto                 | (  ) |  |  |

| Hold mode | Events                                   | Dosing pump status with associated LED signal |          |                      |          | STATUS LED                                                                          | SERVICE LED                                                                           |
|-----------|------------------------------------------|-----------------------------------------------|----------|----------------------|----------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|           |                                          | pH pump                                       | pump LED | Cl <sub>2</sub> pump | pump LED |                                                                                     |                                                                                       |
|           | In-progress pH or ORP user calibration   | Off                                           | ○        | Off                  | ○        |  |  |
|           | In-progress setup settings configuration | Off                                           | ○        | Off                  | ○        |  |  |

| Manual mode                     | Events                                  | Dosing pump status with associated LED signal |                                                                                         |                      |                                                                                           | STATUS LED                                                                          | SERVICE LED                                                                           |
|---------------------------------|-----------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |                                         | pH pump                                       | pump LED                                                                                | Cl <sub>2</sub> pump | pump LED                                                                                  |                                                                                     |                                                                                       |
| Acid (base) pump control On     | Active high/low alarm                   | Manual On                                     |      | Manual Off           | ○                                                                                         |  |  |
|                                 | No alarm                                | Manual On                                     |      | Manual Off           | ○                                                                                         |  |  |
| Chlorine pump control On        | Active high/low alarm                   | Manual Off                                    | ○                                                                                       | Manual On            |      |  |  |
|                                 | No alarm                                | Manual Off                                    | ○                                                                                       | Manual On            |      |  |  |
| Acid & Chlorine pump control On | Active high/low alarm                   | Manual On                                     |      | Manual On            |      |  |  |
|                                 | No alarm                                | Manual On                                     |      | Manual On            |      |  |  |
| No probe connected              | "No probe connected" warning on display | Manual                                        | (  ) | Manual               | (  ) |  |  |



| Alarm & Errors Events               |                                          |                       | Dosing pump with associated LED signal |          |                      |          | STATUS LED | SERVICE LED |
|-------------------------------------|------------------------------------------|-----------------------|----------------------------------------|----------|----------------------|----------|------------|-------------|
|                                     |                                          |                       | pH pump                                | pump LED | Cl <sub>2</sub> pump | pump LED |            |             |
| High/Low Alarm                      | pH                                       |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     | ORP                                      |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     | Temperature                              |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
| Measured parameter under/over range | pH outside specifications range          |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     | ORP outside specifications range         |                       | Auto-Off                               | (✖)      | Auto-Off             | ○        | ✖          | ☀           |
|                                     | Temperature outside specifications range |                       | Auto-Off                               | (✖)      | Auto-Off             | (✖)      | ✖          | ☀           |
| Calibration                         | No Factory Calibration                   |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     | No User Calibration                      |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     | No probe                                 |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
| Overtime                            | pH                                       | Active high/low alarm | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     |                                          | No alarm              | Auto-Off                               | ○        | Auto-Off             | ○        | ●          | ☀           |
|                                     | Cl <sub>2</sub>                          | Active high/low alarm | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     |                                          | No alarm              | Auto-Off                               | (✖)      | Auto-Off             | ○        | ●          | ☀           |
| Low tank-level                      | Acid                                     | Active high/low alarm | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     |                                          | No alarm              | Auto-Off                               | ○        | Auto-Off             | ○        | ●          | ☀           |
|                                     | Cl <sub>2</sub>                          | Active high/low alarm | Auto                                   | ○        | Auto-Off             | ○        | ✖          | ☀           |
|                                     |                                          | No alarm              | Auto                                   | (✖)      | Auto-Off             | ○        | ●          | ☀           |
| Hold Input                          | Active high/low alarm                    |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
| Hold Alarm Disabled                 | No alarm                                 |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ●          | ○           |
| Hold Input                          | Active high/low alarm                    |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ✖          | ☀           |
| Hold Alarm Enabled                  | No alarm                                 |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ●          | ☀           |
| Remote Hold                         | Device place on hold remotely            |                       | Auto-Off                               | ○        | Auto-Off             | ○        | ●          | ☀           |
| System error                        | Critical hardware errors                 |                       | Off                                    | ○        | Off                  | ○        | ✖          | ☀           |

**Note:** Placing the system on Hold Input stops data measurement and logging. The other warnings and events do not stop measurement. Logging is supported throughout, apart from when controller is configured as not logging or a hardware error stops logging.

## 10. MAINTENANCE

### 10.1. ELECTRODE CONDITIONING & MAINTENANCE

#### Preparation

- Remove the electrode protective cap. Do not be alarmed if any salt deposits are present. This is normal with pH/ORP electrodes and they will disappear when rinsed with water.
- Shake down the probe as you would do with a clinical thermometer to eliminate any air bubbles inside the glass bulb.
- If the bulb and/or junction are dry, soak the electrode in [storage solution](#) for at least one hour.

#### Storage

- To minimize clogging and ensure a quick response, the glass bulb and the junction should be kept moist and not allowed to dry. This can be achieved by installing the electrode in such a way that it is constantly in the flow cell or the pipe filled with the sample.
- When not in use, replace the solution in the protective cap with a few drops of [storage solution](#).
- Follow the Preparation procedure above before taking any measurements.

**Note:** Never store the electrode in distilled or deionized water.

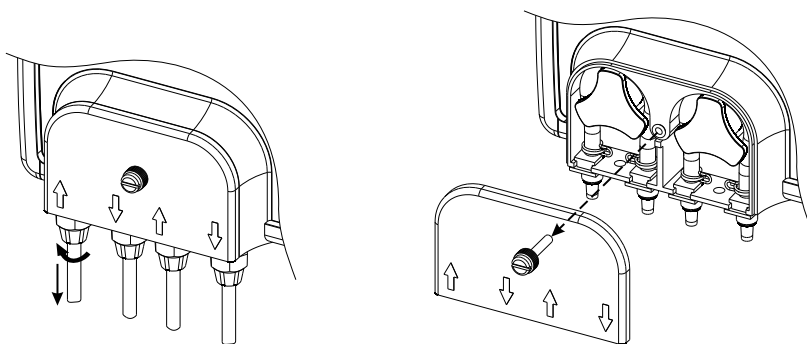
### 10.2. PUMP TUBING REPLACEMENT



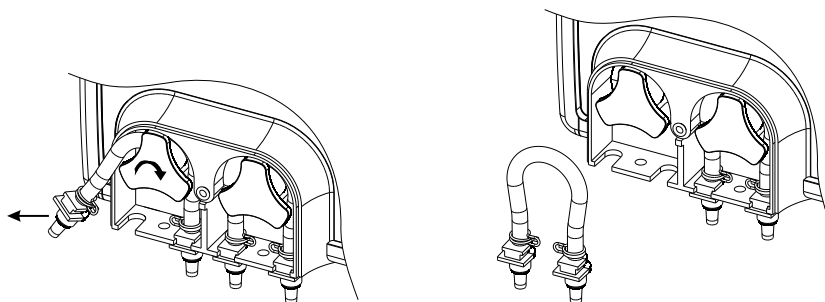
#### General safety considerations

Always wear protective clothing, including gloves and eye protection when replacing pump tubing.

1. Power off the controller.
2. Disconnect the tubing from the pumps.
3. Unscrew and remove the plastic cover from the pumps.

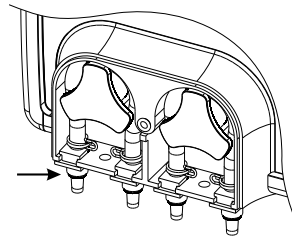
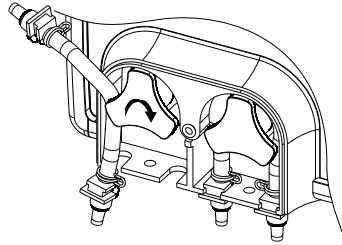


4. Starting from the left side of the pump, grab the tubing and rotate the pump rotor manually to the right, until the tubing is removed.

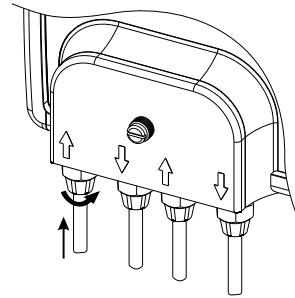
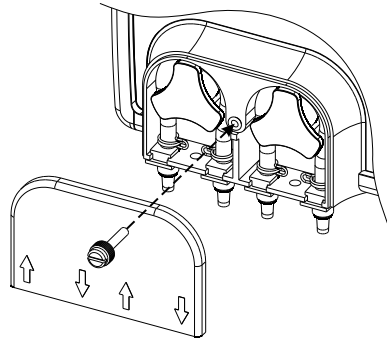


5. Grease the replacement pump tubing with silicone oil supplied in the [BL120-300](#) peristaltic pump tubing kit.
6. Place the tubing on the left side of the pump and start to manually rotate the pump rotor to the right until the tubing is on the pump.

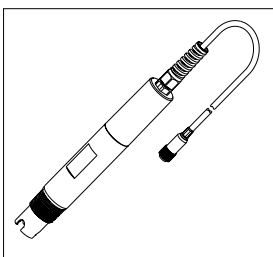
7. Fix the plastic holder in its place on the right and left side.



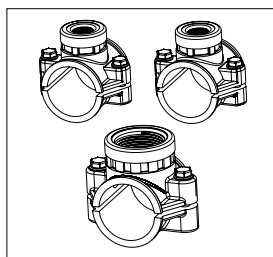
8. Place the plastic cover. Reattach the tubings to the pumps.



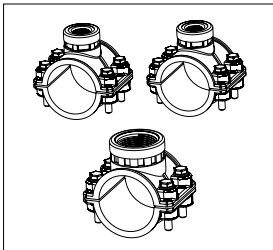
## 11. ACCESSORIES



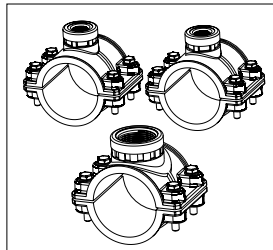
**HI1036-18XX\***  
Industrial pH / ORP /  
Temperature / Matching Pin  
combined probes



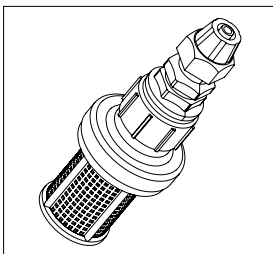
**BL120-150**  
Fittings kit for Ø 50 mm pipe



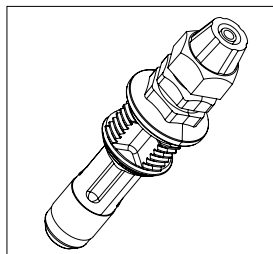
**BL120-163**  
Fittings kit for Ø 63 mm pipe



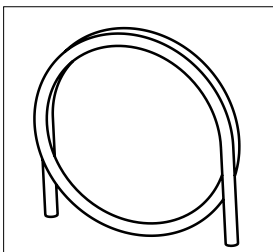
**BL120-175**  
Fittings kit for Ø 75 mm pipe



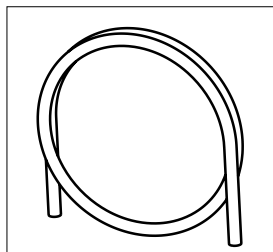
**BL120-200**  
Pool controller aspiration filter



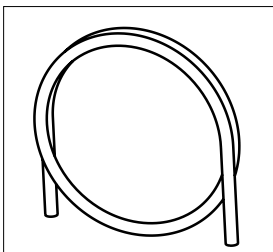
**BL120-201**  
Pool controller injector,  
1/2" thread



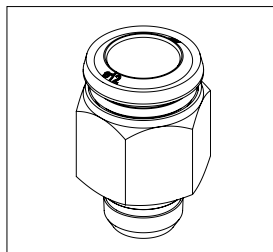
**BL120-202**  
PVC aspiration and injection  
tubing (10 m)



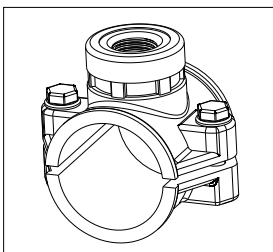
**BL120-204**  
Aspiration tubing (100 m)



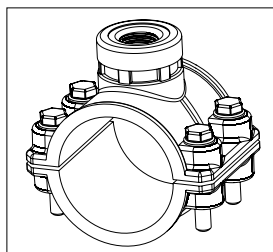
**BL120-205**  
Injection PE tubing (100 m)



**BL120-605**  
Metal nipple for flow cel

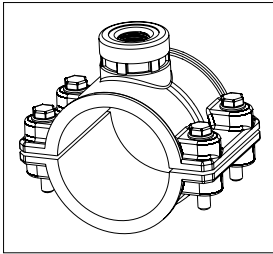


**BL120-250**  
Injector saddle for Ø 50 mm  
pipe, 1/2" thread

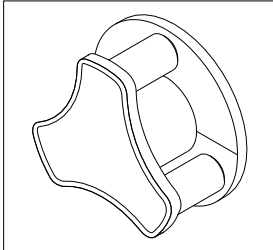


**BL120-263**  
Injector saddle for Ø 63 mm  
pipe, 1/2" thread

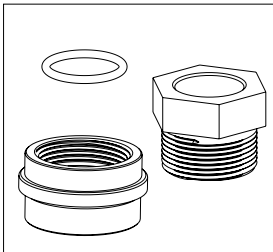
\* where XX is: 02, 05, 10, 15, 20 attached cable length



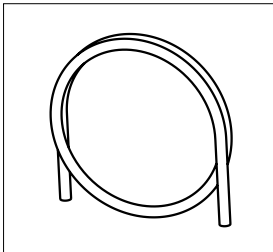
**BL120-275**  
Injector saddle for Ø 75 mm  
pipe, 1/2" thread



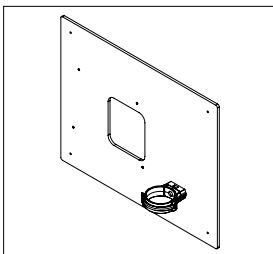
**BL120-301**  
Pool controller peristaltic pump  
rotor



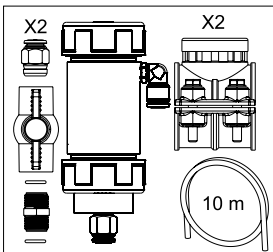
**BL120-400**  
Flow cell probe adapter kit



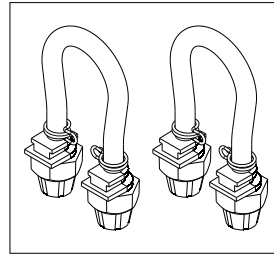
**BL120-402**  
Flow cell tubing (10 m)



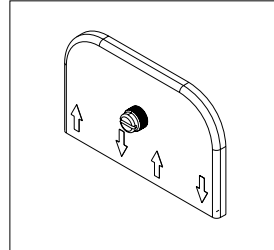
**BL120-411**  
Flow cell panel spare part



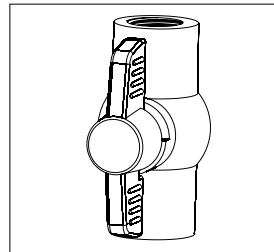
**BL120-463**  
Flow cell kit for Ø 63 mm pipe



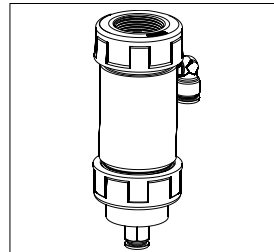
**BL120-300**  
Pool controller peristaltic  
pump tubing kit (2 pcs.)



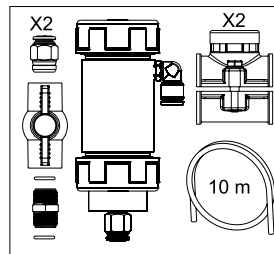
**BL120-302**  
Pool controller pump cover  
with screw



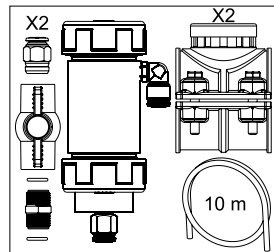
**BL120-401**  
Flow cell valve



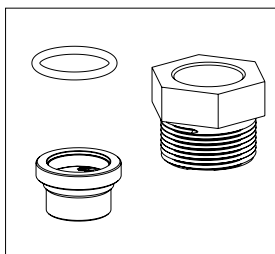
**BL120-410**  
Flow cell for BL120, BL121,  
BL122, BL123



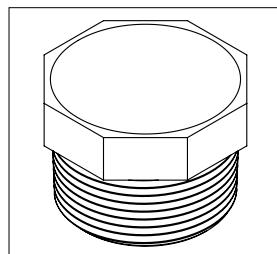
**BL120-450**  
Flow cell kit for Ø 50 mm pipe



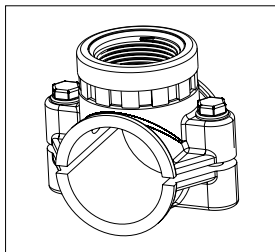
**BL120-475**  
Flow cell kit for Ø 75 mm pipe



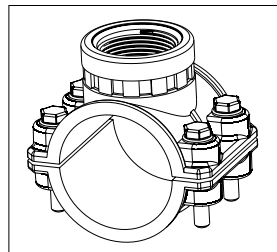
**BL120-500**  
Probe fitting kit



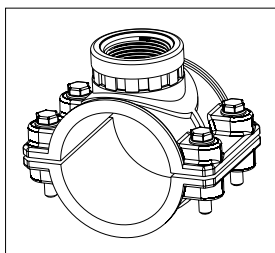
**BL120-501**  
Protective saddle cap,  
1 - 1/4" thread



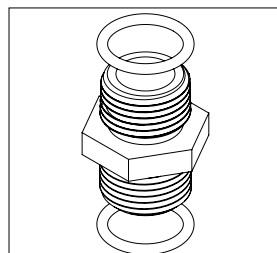
**BL120-550**  
Probe saddle for Ø 50 mm pipe,  
1 - 1/4" thread



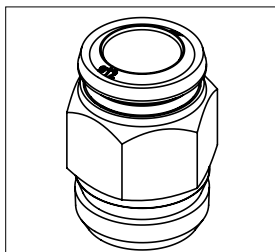
**BL120-563**  
Probe saddle for Ø 63 mm  
pipe, 1 - 1/4" thread



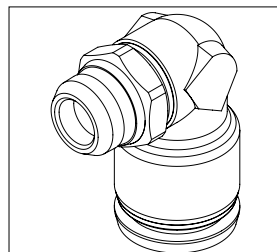
**BL120-575**  
Probe saddle for Ø 75 mm pipe,  
1 - 1/4" thread



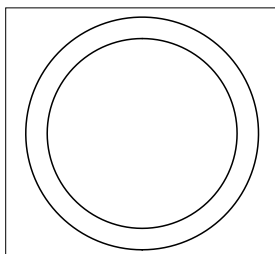
**BL120-601**  
Plastic nipple 2 x 1/2" with  
O-rings



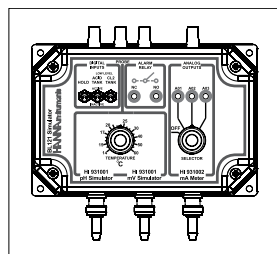
**BL120-602**  
Metal nipple 12 x 1/2" (2 pcs.)



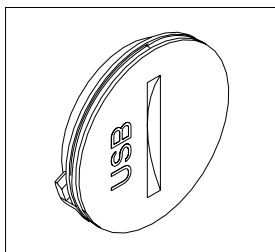
**BL120-603**  
Elbow for glass flow cell



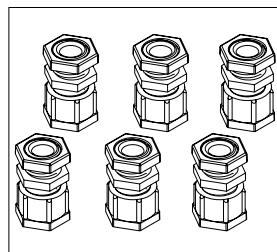
**BL120-604**  
O-ring for glass flow cell



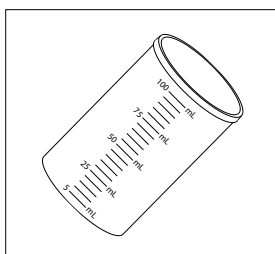
**BL120-901**  
Simulator for BL120, BL121,  
BL122, BL123



**BL120-902**  
USB protective cap



**BL120-903**  
Cable gland protective kit  
(6 pcs.)



**HI740036P**  
Plastic beaker set, 100 mL  
(10 pcs.)

### Electrode Storage Solutions

|            |                                                                                |
|------------|--------------------------------------------------------------------------------|
| HI703004L  | Storage solution for pH and ORP electrodes (Pool Line), 500 mL                 |
| HI7003004P | Storage solution for pH and ORP electrodes (Pool Line), 20 mL sachet (25 pcs.) |

### Buffer Solutions

|           |                                                              |
|-----------|--------------------------------------------------------------|
| HI700044P | pH 4.01 buffer sachet ( Pool Line), 20 mL sachet (25 pcs.)   |
| HI700074P | pH 7.01 buffer sachets (Pool Line ), 20 mL sachet (25 pcs.)  |
| HI700104P | pH 10.01 buffer sachets (Pool Line ), 20 mL sachet (25 pcs.) |

### ORP Solutions

|           |                                                                                         |
|-----------|-----------------------------------------------------------------------------------------|
| HI70224L  | 470 mV ORP solution for platinum and gold electrodes (Pool Line), 500 mL                |
| HI700224P | 470 mV ORP solution for platinum and gold electrodes (Pool Line) 20 mL sachet (25 pcs.) |

### Cleaning Solutions

|            |                                                                           |
|------------|---------------------------------------------------------------------------|
| HI70614L   | Cleaning solution for general purpose (Pool Line), 500 mL                 |
| HI7006014P | Cleaning solution for general purpose (Pool Line), 20 mL sachet (25 pcs.) |
| HI70774L   | Cleaning solution for oils and fats (Pool Line), 500 mL                   |



### Calibration and Maintenance Kits

|             |                                                                                                                                                                                                                                                                                                                |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BL123-70    | Calibration and maintenance kit consisting of:                                                                                                                                                                                                                                                                 |
|             | <ul style="list-style-type: none"> <li>• pH 7.01 buffer solution (20 mL sachet)</li> <li>• pH 4.01 buffer solution (20 mL sachet)</li> <li>• electrode cleaning solution (20 mL sachet)</li> <li>• electrode storage solution (20 mL)</li> <li>• ORP test solution (20 mL)</li> </ul>                          |
| BL123-70-30 | Calibration and maintenance kit consisting of:                                                                                                                                                                                                                                                                 |
|             | <ul style="list-style-type: none"> <li>• pH 7.01 buffer solution (30 × 20 mL sachet)</li> <li>• pH 4.01 buffer solution (30 × 20 mL sachet)</li> <li>• electrode cleaning solution (30 × 20 mL sachet)</li> <li>• electrode storage solution (30 × 20 mL)</li> <li>• ORP test solution (30 × 20 mL)</li> </ul> |

## 12. ABBREVIATIONS

|       |                                     |
|-------|-------------------------------------|
| DHCP  | Dynamic Host Configuration Protocol |
| IP    | Internet Protocol (address)         |
| LED   | Light Emitting Diode                |
| ORP   | Oxidation-Reduction Potential       |
| REDOX | Reduction & Oxidation               |
| SPDT  | Single Pole Double Throw            |

## CERTIFICATION

### ETL / INTERTEK CERTIFICATION

BL120-10, BL120-20, BL121-10, BL121-20, BL122-10, BL122-20, BL123-10, BL123-20 Swimming Pool Controllers have been tested and found to conform to the North American set safety standards.

|                                                                                                          |                                                                                                          |                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Intertek<br>5031907 | <br>Intertek<br>5031907 | CONFORMS TO NSF/ANSI/CAN STD 50<br>CONFORMS TO UL STD 1563<br>CERTIFIED TO CSA STD C22.2 #218.1<br>Product: Swimming Pool Controller<br>Model: BL120, BL121, BL122, BL123<br>Serial: XXXXXXXXXXXX - Apr. 2025<br>Hanna Instruments Inc., 584 Park East Drive,<br>Woonsocket, RI, 02895, USA |
|                                                                                                          |                                                                                                          | Ratings: 100-240 VAC, 50/60Hz, 0.7A<br>Max External Load: 240 VAC, 2.5A<br>Max Operating Pressure: 1 atm (14.6 psi)<br>Max Output Volume: 3.5 L/h (0.92 gal/h)                                                                                                                              |
|                                                                                                          |                                                                                                          | For protection against overdosing<br>during backwash and no-flow conditions<br>refer to instruction manual                                                                                                                                                                                  |

|               |                          |
|---------------|--------------------------|
| Manufacturer: | Hanna Instruments SRL    |
| Address:      | Nusfalau, Hanna St. No.1 |
| Country:      | Romania                  |
| Phone number: | +40 260 607 700          |

### EU CERTIFICATION

All Hanna® instruments conform to the **CE European Directives**.



RoHS  
compliant



**Disposal of Electrical & Electronic Equipment.** The product should not be treated as household waste. Instead, hand it over to the appropriate collection point for the recycling of electrical and electronic equipment, which will conserve natural resources.

**Disposal of waste batteries.** This product contains batteries, do not dispose of them with other household waste. Hand them over to the appropriate collection point for recycling.

Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health, which may be caused by inappropriate handling. For more information, contact your city, your local household waste disposal service, or the place of purchase.

## RECOMMENDATIONS FOR USERS

Before using this product, make sure it is entirely suitable for your specific application and for the environment in which it is used. Any variation introduced by the user to the supplied equipment may degrade the controller's performance. For your and the controller's safety do not use or store the controller in hazardous environments.

## WARRANTY

This controller is warranted for two years (the probe for six months) against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. This warranty is limited to repair or replacement free of charge. Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered.

If service is required, contact your local Hanna Instruments® office. If under warranty, report the model number, date of purchase, serial number (engraved on the bottom of the meter) and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packed for complete protection.