bluelab®
pro controller
connect

Care and use guide

For integration
with any Bluelab® doser

FREE
Bluelab® connect™ stick
included **(MSRP $150 USD)**

WIRELESS DATA LOGGING

LIMITED PRODUCT GUARANTEE
2 year
WITH PROOF OF PURCHASE

(6 months for pH probe)

Probe cable lengths:
2 meters / 6.5 feet

CE FC

bluelab.com

English

Contents

1.0 Introduction & Overview

1.1 Features

ONE Bluelab® Connect™ Stick included. Use with multiple Bluelab® Connect™ products	Data logging capability (download Free Bluelab® Connect™ Software)
Local and remote adjustment of control settings via Bluelab® Connect™ software	Bright, plant safe green LED with adjustable brightness
Easy to navigate menu to program and adjust settings	Simple push button pH calibration
High and low alarm control lockouts	Auto resume dosing on restart after power loss
Compressor protection on temperature control	Use Bluelab® Powerpod™ to connect to other mains operated dosers
Dosing lockouts to protect from over-dosing	Separate stainless steel Bluelab® Temperature Probe
Control of temperature requires use of Bluelab® Powerpod™	Large, easy to read displays
Water resistant, wall mount design	Replaceable double junction Bluelab®pH Probe
Replaceable Bluelab® Conductivity Probe	

1.2 What's in the box?

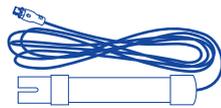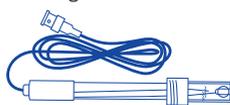Please check and verify the box contents match the below list:
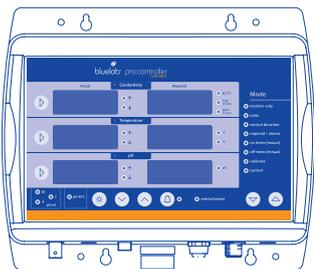
Bluelab® Pro Controller

Getting Started Guide

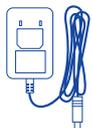Bluelab® Conductivity Probe

Bluelab® pH Probe

Bluelab® Temperature/ATC Probe

Bluelab® Connect™ Stick & Getting Started Guide

24V DC 0.4Amp power supply

Europe

UK

North America

NZ/Aus

Dosing cable

Alarm & External Lockout Cable

Solution sachets 3 each of pH 7.0, pH 4.0, EC 2.77

4x mounting screws

1.3 How the Bluelab® Pro Controller works

The Bluelab® Pro Controller is designed to continually monitor and control the conductivity, temperature and pH values of a solution.

It measures these using a separate probe for each and using a connected dosing system it can dose nutrient and pH correction solutions. The Bluelab® Pro Controller may also control a heating or cooling system via a connected Bluelab® Powerpod™.

Actual readings / values

These are the current values measured by the conductivity, temperature, and pH probes.

Required readings / values

These are the target values or set points the Bluelab® Pro Controller will maintain within the reservoir for conductivity, temperature, and pH.

Dosing cycles

Automated control of conductivity, pH and temperature is achieved by dosing. The Bluelab® Pro Controller does this with a dosing cycle method that consists of an On time and an Off time.

The **On time** is the length of time that nutrient or pH stock solution is dosed into the reservoir in each dosing cycle. Or in the case of temperature, how long the heater or cooler is turned on for.

The **Off time** is the delay time between each dose (or On time). This gives the system time to mix the stock solution into the reservoir thoroughly, so that the Bluelab® Pro Controller measures the solution accurately before it determines if the required values have been reached. In the case of temperature the Off time allows time for changes in temperature to equalise throughout the reservoir before heating or cooling is triggered again.

1 Setting On Times

As a guide, three dosing cycles should change the reservoir by 0.1 EC (50 TDS,70 ppm) or 1°C (~2°F) or 0.1 pH points over around three dosing cycles.

IMPORTANT

If the On time is too short, it is possible that the Bluelab® Pro Controller won't be able to dose enough to keep up with the changing nutrient/pH levels, even if it doses every dosing cycle.

If the On time is too long, the value is likely to overshoot; i.e. a single dose changes the value so much it goes over the desired value.

2 Setting Off Times

The dosing Off time needs to be long enough to allow thorough mixing of the dosed solution in the reservoir. Start with a longer off time and reduce it over time. Mixing times (and therefore the off time) can be reduced by installing mixing pumps, air injection or other mechanical means of mixing into the reservoir.

IMPORTANT

If the Off time is too short, the pH or nutrient stock solution will not have been properly mixed in the reservoir. The Bluelab® Pro Controller may dose again, which can result in overshoot of the required value.

If the off time is too long, it is possible that the nutrient/pH levels may change too much between doses.

Hint: The mixing time of the reservoir can be estimated by manually adding sufficient nutrient to significantly shift the conductivity value, while timing how long it takes from adding the nutrient, to when the conductivity value becomes stable.

English

Dosing lockouts

Some conditions will cause the Bluelab® Pro Controller to stop controlling. These are called dosing lockouts. This is how the five types of dosing lockouts work:

① **Measurement range limits**

Each of the measurement types (conductivity, temperature and pH) have a measurement range within which they can measure. Conductivity, for example, can be measured between 0.0 EC and 5.0 EC; temperature between 0°C and 50°C.

If values outside these limits are sensed, the Pro Controller will indicate that it is under or over range by flashing the display, and displaying "ur" or "or" in the affected measurement type. Dosing will immediately stop in that measurement type. pH "or/ur" will also stop the EC dosing.

② **Alarms**

When alarms are turned on, and the Bluelab® Pro Controller senses that any of the three measurement types (conductivity, temperature or pH) is beyond the set high or low alarm values, all dosing will stop across all measurement types. The Bluelab® Pro Controller will indicate that it is in alarm by flashing the display, and displaying a code in the affected measurement type - for example "EC LO" to indicate that the conductivity has reached the low alarm value.

> **IMPORTANT**
>
> Alarms are not just warnings that values have shifted away from the required value - they stop all dosing. Be careful not to set alarm values which are too close to the required values, as they may result in the Bluelab® Pro Controller going into alarm because of small variations in measured values.

When the values return to within the limits of the set alarms, the alarm state ceases, and after a 60 second countdown, the Bluelab® Pro Controller begins controlling again, dosing as required. The alarm state can also be cancelled by switching alarms off (pressing the alarm button). After a 60 second countdown the Bluelab® Pro Controller will begin controlling again.

③ **Ineffective Control Lockout**

The Bluelab® Pro Controller continually checks to ensure that dosing is having an effect. It will go into lockout if 15 dosing cycles of any of the three measurement types (conductivity, temperature or pH) does not move the measured value by at least 0.1 EC, 1°C, or 0.1 pH in the desired direction. This is called the ineffective control lockout, and is enabled by default, but can be disabled via the Bluelab® Connect™ Software.

The Bluelab® Pro Controller will indicate it is in ineffective control lockout by flashing the display, and displaying a code in the affected measurement type - for example "PH IC" to indicate that pH is in ineffective control.

> **IMPORTANT**
>
> The ineffective control lockout is useful to stop dosing pump operation if stock solution tanks have emptied, or a hose has fallen out of a reservoir, for example.
>
> However for a batch dosing system where fresh water is added to the reservoir at the same time dosing is to be carried out it may be better to disable this feature.

English

Dosing lockouts continued

④ **Low EC Lockout**

The Bluelab® Pro Controller will stop dosing nutrient solution if the measured conductivity drops below 0.2EC (2CF, 100TDS, 140ppm). This is called the Low EC Lockout, and is enabled by default, but can be disabled via the Bluelab® Connect™ Software.

The Bluelab® Pro Controller will indicate it is in low EC lockout by flashing the conductivity display, and displaying "EC 0.2LO." As soon as the measured conductivity rises above 0.2, the Pro Controller will resume dosing again after a 60 second countdown.

IMPORTANT

The Low EC Lockout is useful to stop dosing if the conductivity probe is taken out of the reservoir, or if the solution level falls below the probe level.

However when dosing into fresh water is required this lockout may need to be disabled.

⑤ **External Lockout**

Dosing can be stopped by external flow switches, float switches, or other sensors connected to the Bluelab® Pro Controller via the Alarm and External Lockout cable. This is called an external lockout.

When the Pro Controller is in external lockout, the external lockout LED will light, and the displays will flash "EL" and either "nc" or "no," depending on which switch has been activated.

As soon as the switch position returns to normal, the Bluelab® Pro Controller will resume controlling after a 60 second countdown.

IMPORTANT

The External lockout feature can be used to stop dosing when a tank level gets too low, a pump stops, or solution feeding out is taking place.

Please refer to these sections of the manual for more information:
- Section 6.2 - Bluelab® Pro Controller status displays
- Section 4.0 - Alarms & External Lockout
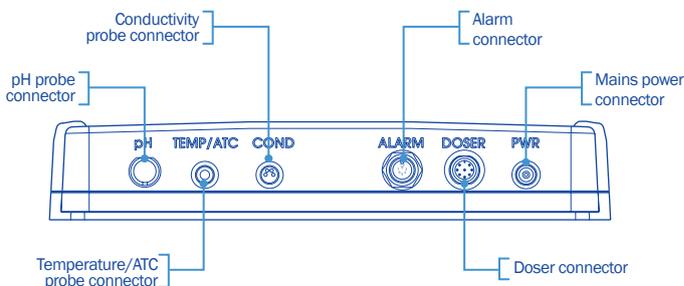
2.0 Setting up the Bluelab® Pro Controller

2.1 Set up the Bluelab® Connect™ Software

1 **Prior to installing,** note the 4 character KEY CODE on the base of the Bluelab® Pro Controller, just above the serial number.

key code: abcd

2 Follow the getting started instructions supplied with the Bluelab® Connect™ Stick to install the Connect™ Stick and Connect™ Software.

3 Power up the Bluelab® Pro Controller near your computer with the Connect Stick. Add the Bluelab® Pro Controller as a device. See section 2.4 for instructions on powering up the Bluelab® Pro Controller.
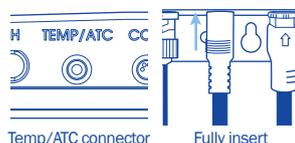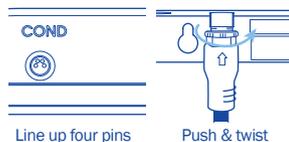
2.2 Bluelab® Pro Controller connection panel

Conductivity probe connector

Alarm connector

pH probe connector

Mains power connector

pH   TEMP/ATC   COND   ALARM   DOSER   PWR

Temperature/ATC probe connector

Doser connector

2.3 Connect the probes

It is recommended to test the Bluelab® Pro Controller prior to mounting. Attach all three probes to the controller, plug in the power adaptor, place probes into solution and wait a few minutes for the readings to stabilise.

1 **pH Probe**
Line up the lugs of the BNC probe connector with the receptacle on the Bluelab® Pro Controller labelled 'pH'.
Fasten securely by pushing the pH probe connector on and twisting one quarter turn.

Push connector   Twist & attach

2 **Conductivity Probe**
Line up the four pin connector on the conductivity probe with the receptacle on the Bluelab® Pro Controller labelled 'COND'. Push and screw the collar fully into the receptacle.

COND

Line up four pins   Push & twist

3 **Temperature / ATC Probe**
Fully insert the temperature probe connector into the Bluelab® Pro Controller receptacle marked 'TEMP/ATC'.

H   TEMP/ATC   CO

Temp/ATC connector   Fully insert
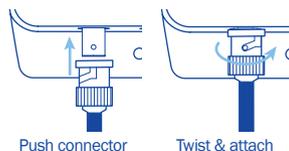
2.4 Power up

1. Select and connect the appropriate mains plug adaptor for your country to the power supply unit.
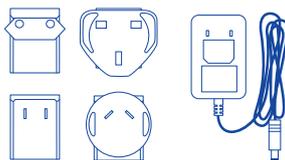
2. Connect the power adaptor into the Bluelab® Pro Controller receptacle marked 'PWR'.

   connect power adaptor

3. Plug the power adaptor into a mains outlet and switch it on. The Bluelab® Pro Controller will complete a display test sequence.

4. The default setting, when the unit is first powered up, is 'monitor only' mode.

   Note: pH calibration should be completed before first use to ensure pH readings are accurate.

2.5 Bluelab® Pro Controller control panel

Control direction indicators

Required readings

Actual readings

Units

Measurement selection buttons

Conductivity readings

Mode menu

Temperature readings

pH readings

Mode selection buttons

pH calibration indicators

External lockout indicator

pH ATC indicator

Alarm button & indicator

pH probe connector

Key code

Power supply connector

Temperature / ATC probe connector

Doser connector

Display brightness button

Value increase/ decrease buttons

Alarm & external lockout connector

Conductivity probe connector

2.6 Bluelab® Pro Controller modes

Easy navigation

The Bluelab® Pro Controller has two modes of operation (monitor and control) and six set-up modes.

Use the **Mode Selection** buttons ('▽' and '△') to select the mode. Once in the required mode, select the measurement to adjust with the **Measurement Selection** buttons ('▷') and adjust the value up and down with the **Value Increase/Decrease** buttons (' ' and ' ').

We recommend familiarising yourself with the different settings before installing/ mounting the controller.

The Mode is selected using the Mode Selection buttons below the Mode menu.

2.6.1 monitor only

Monitor only mode shows only the actual values/readings from the conductivity, temperature and pH probes. No control action occurs.


Monitor only mode selected

2.6.2 units

Units mode allows the units of measurement to be changed for conductivity and temperature.

1 Select 'Units' mode.

2 Select measurement to adjust ('▷').

3 Press the value increase/decrease buttons to select the desired unit of measurement.
Note: To change between EC and CF, press the measurement button twice when this indicator is lit. CF is 10x EC e.g. 2.8EC = 28CF. pH has no selectable units.

Units

Units mode selected

2

1

3
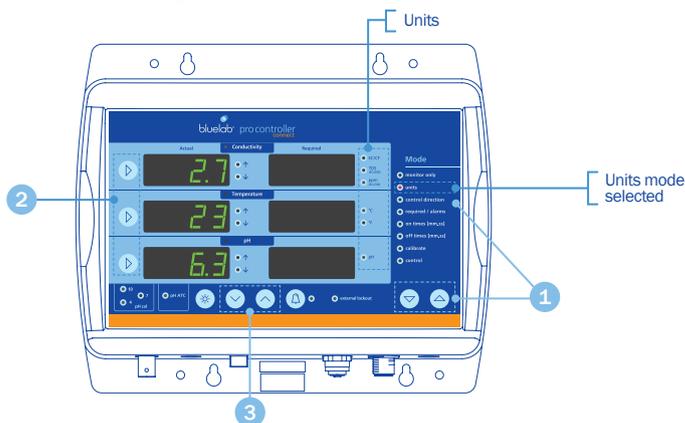
2.6.3 control direction

Control Direction mode allows the dosing direction to be set for the measurement value.

1 Select 'Control Direction' mode

2 Select measurement to adjust ('▷')

3 Press the value increase/decrease buttons to change the control direction

Units

Control direction mode selected

2

1

3
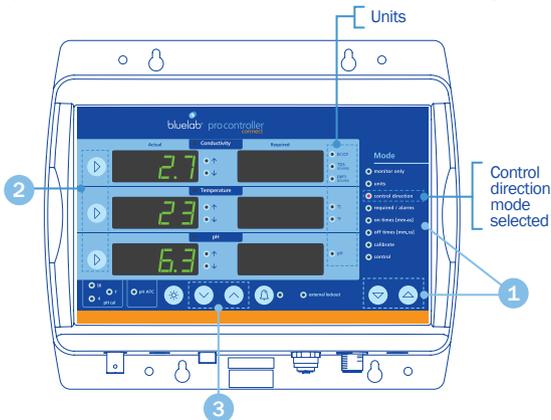
Control direction options:
Raise ↑ or lower ↓ or **OFF**

Note: OFF means that control of this measurement is turned off. This allows some measurements to be controlled while others are not just monitored.

IMPORTANT

The control direction for each measurement value must be selected based on the requirements of the system, and the correct stock solutions, pH adjusters and temperature device must be used.

2.6.4 required / alarms

This mode is used to set the 'required' or 'target' levels for conductivity, temperature and pH in your system. It is also used to set alarm levels.

'Required' is the value you need the Bluelab® Pro Controller to maintain through dosing.

High and low alarm levels can be set. Alarms can be turned on or off in any mode with the Alarm button. The LED indicator next to the Alarm button indicates alarms are switched on.

Setting conductivity, temperature and pH required and alarm levels.

1. Select 'Required/alarms' mode.

2. Select measurement to adjust ('▷')
   (see following page for setting temperature values).

3. Press the same measurement selection button to toggle between to following values; required level (rd) for conductivity and pH (or on and off values for temperature), high alarm value (AL.HI), and low alarm value (AL.LO) for that measurement.

   The value selected to edit will be display brightest.

4. Adjust values using the value increase/decrease buttons.

Note: If the value you are changing reaches another alarm high, alarm low or required value, these value will be automatically pushed so they do not overlap.

IMPORTANT

For more information on setting the temperature on or off and high or low values, please refer to the next page.
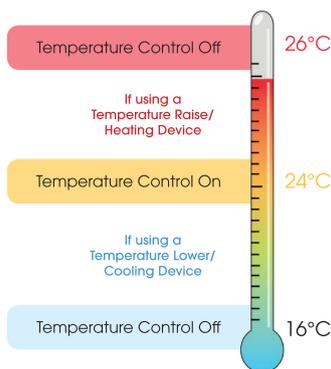
Temperature required / alarms

Temperature is difficult to maintain at a constant level so the Bluelab® Pro Controller manages it differently compared to conductivity and pH.

It is normal practice to set your temperature on time to 'continuous', which allows the heater/cooler to operate until the temperature off value is reached.

For example, if you are heating a tank or reservoir, when the "temperature on" value is reached, heating will be turned on. When the "temperature off" value is reached, it will be turned off.

To set the temperature values, refer to steps 1-4 on the previous page.

Temperature Control Off	26°C
If using a Temperature Raise/ Heating Device	
Temperature Control On	24°C
If using a Temperature Lower/ Cooling Device	
Temperature Control Off	16°C

- Alarm high value
- **Temperature on value**
- Alarm low value
- **Temperature off value**

Alarm 'Quick-set'

Use the Quick-set features to quickly set the "required", "alarm high" and "alarm low" values for all three measurements. The required and alarm values are taken from the actual current readings, so ensure your system is stable before using the Quick-set function.

1 In 'Required / Alarms' mode select the measurement you want to 'quick-set'.

2 Press the alarm button.

3 Quick-set only sets the required and alarm vales for the selected measurement, so repeat steps 1 & 2 for the other measurements required.

This table shows the values that are applied when 'quick-set' is used.

'Quick-set' Alarm Values

|	Alarm Low	Required	Alarm High
Conductivity	Actual value – 2 CF / 0.2 EC 100 TDS 140 ppm	Actual value	Actual value + 2 CF / 0.2 EC 100 TDS 140 ppm
Temperature	Actual value – 3°C / 5°F	Actual value	Actual value + 3°C / 5°F
pH	Actual value – 0.5pH	Actual value	Actual value + 0.5pH

2.6.5 on times

The 'On Time' can be set from one second to ten minutes in one second intervals.
During dosing (On Time), the dose direction indicators next to the Actual values will flash.

Setting 'On Times'

1 Select 'on times' mode.

2 Select measurement to adjust ('▷').

3 Press (or hold down) the Value Increase/Decrease buttons to change the on time value.

Note: 0 seconds = continuous (cont), which means the Bluelab® Pro Controller will dose until the required value is reached WITHOUT stopping to allow the tank to mix. This should only be used under special circumstances, as unless closely monitored, overshooting is likely.

On times mode selected
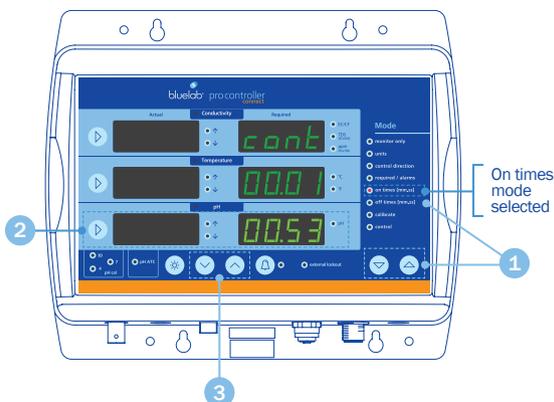
Programmable from 0-10 minutes in one second increments.

2.6.6 off times

'Off Time' is the delay time between each dose. The 'Off Time' can be set from 1 to 60 minutes.

Start with a long 'Off Time' and reduce gradually, ensuring the system is not overshooting. The more thorough the mixing in the tank, the shorter the 'Off Time' can be.

Setting 'Off Times'

1 Select 'off times' mode.

2 Select measurement to adjust ('▷').

3 Press (or hold down) the Value Increase/Decrease buttons to change the off time.

Off times mode selected

Programmable from 0-59 minutes and 50 seconds in ten second increments.

2.6.7 calibrate

Calibrate mode allows calibration of the Bluelab® Pro Controller to conductivity and pH probes.

1 Select 'Calibrate' mode.

2 Select measurement to calibrate ('▷').

3 Follow the directions below to calibrate conductivity or pH.

Calibrate mode selected

Conductivity calibration

The Conductivity probe is factory calibrated. It is unlikely that you will need to calibrate it, but it can be calibrated if required.

For accurate calibration and measurement the probe should be cleaned before calibration. See Conductivity probe cleaning in Section 5.4.

Conductivity accuracy is dependent on the accuracy of the calibration solution used.

Conductivity solution should always be fresh.

1 **Ensure the probe has been cleaned, and rinsed well with fresh water.**

Shake as much water as possible off the probe. Water still on the probe after rinsing can lower the reading, and cause an inaccurate calibration.

2 **Place some 2.77 EC calibration solution into a clean dry container.**

Place the conductivity probe into the solution, and leave to allow the probe to reach the same temperature as the solution.

clean the conductivity probe

2.77 EC Conductivity Standard Solution

3 **Select calibrate mode.**

Press the conductivity measurement button. The current reading will be shown on the actual display, and EC CAL on the right. A calibration offset value will be displayed brighter than the other numbers at the top of the right hand display.

4 **Calibrate by pressing the value increase/decrease buttons to bring the actual reading to the value of the calibration solution.** Each press of the buttons will shift the reading by 0.1EC. The calibration offset value will also increase or decrease as this is done.

5 **When the actual value is the same as the calibration solution (2.8 EC),** press the mode select buttons to exit calibration mode. This saves the calibration, and calibration is complete.

Note: For Bluelab 2.77 EC solution, a display of 2.8 EC should be expected.

2.6.7 calibrate continued

pH calibration

pH calibration is important before first use.
It ensures pH measurements and dosing are accurate.

For accurate pH readings the pH probe is cleaned and calibration carried out when:

• it has been 30 days since the last pH calibration, and the calibration indicators are flashing.

• the reading is different to what you were expecting.

• the Bluelab® Pro Controller is reset to factory default, and the calibration indicators are not lit.

• the pH probe is replaced with a new one.

If the pH probe has been in use it should be cleaned before pH calibration. See section 5.2 for pH probe cleaning. New pH probes do not need to be cleaned.

If you are calibrating to TWO points, remember:

If a reading below pH 7.0 is expected, use pH 7.0 and pH 4.0 calibration solutions.

If a reading above pH 7.0 is expected, use pH 7.0 and pH 10.0 calibration solutions.
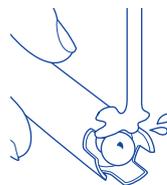
Three point calibration would be recommended if:

Readings above and below pH 7.0 are expected. Use pH 7.0, pH 4.0 then pH 10.0 calibration solutions.

To carry out pH calibration:

Temperature/ATC probe is required for accurate calibration and measurement.
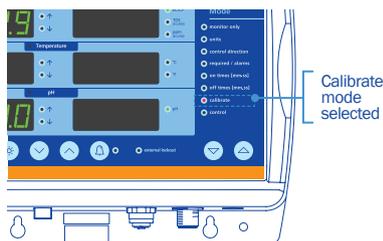
1 Clean pH probe tip if required.

Refer to Section 5.2 for pH probe cleaning.

clean the pH probe

2 Select Calibrate mode.

Placing in 'Calibrate' mode will stop all dosing.

Calibrate mode selected

3 In several separate plastic containers, prepare a small amount of: fresh tap water, pH 7.0, pH 4.0 and/or pH 10.0 calibration solutions.

water   pH 7.0   pH 4.0

2.6.7 calibrate continued

pH calibration continued

④ pH 7.0 calibration

a) Rinse pH and temperature probes in fresh water and place both probes in a small amount of fresh pH 7.0 calibration solution.

b) Press and hold the pH measurement button and wait for PH CAL to be displayed. Release button.

c) PH 7 and the first '[]' will flash on screen. Calibration in now in progress.

d) When all 4 '[][][][]' have appeared, PASS or FAIL will be displayed. PASS indicates a successful calibration at pH 7.0, and the pH 7 LED will be displayed. If FAIL is displayed, see section 6.0.

pH 7.0 calibration solution

pH 7.0 calibration progress

⑤ pH 4.0 and/or pH 10.0 calibration

a) Rinse pH and temperature probes in fresh water, place both probes in a small amount of fresh pH 4.0 or pH 10.0 calibration solution.

b) Repeat the calibration steps above using pH 4 or pH 10 solution.

c) If a 3 point calibration is required, (you are expecting to measure both above and below pH 7) repeat the calibration procedure with the remaining solution value.

The Pro Controller is now calibrated, and ready for use.

pH 4.0 calibration solution

pH 4.0 calibration progress

Calibration status

|		
○ ○ ○	○	Using factory default calibration values
○ ○ ○	●	pH 7 calibrated ok
○ ○ ●	●	pH 7 & pH 4 calibrated ok
○ ●	●	Indicators flashing - 30 days have passed since last full calibration. **Calibration due**

2.6.8 control

When in control mode, the Bluelab® Pro Controller monitors the actual readings from the probes and triggers dosing cycles to reach and maintain the measurement values set in the 'Required/Alarms' mode.

For dosing to occur a separate doser (not included) must be connected to the Bluelab® Pro Controller with the dosing cable provided.

① Select 'Control' mode.

② The Bluelab® Pro Controller triggers dosing in order to reach and maintain the nutrient, pH and temperature values set in the required/alarms mode.

When the system is dosing the control direction indicator LEDs will flash.

Actual · Required · Control mode selected
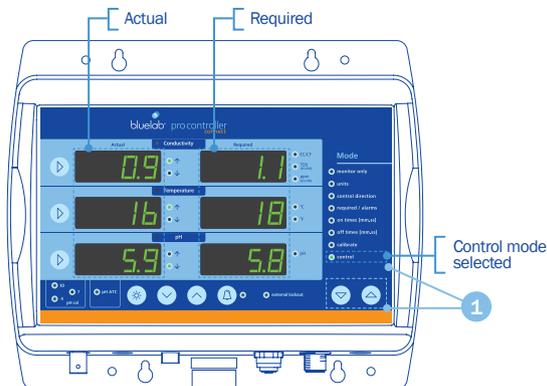
3.0 Installing the Bluelab® Pro Controller

3.1 Mounting the Bluelab® Pro Controller

1 **Select a suitable location for the Pro Controller:**

- So the probes can comfortably reach the tank/reservoir or sample pot and be immersed in solution at all times.
- Near an electrical mains outlet.
- At a suitable height to see the display and for easy operation.
- Position the Pro Controller away from direct sunlight and risk of water, nutrient or pH adjuster damage.
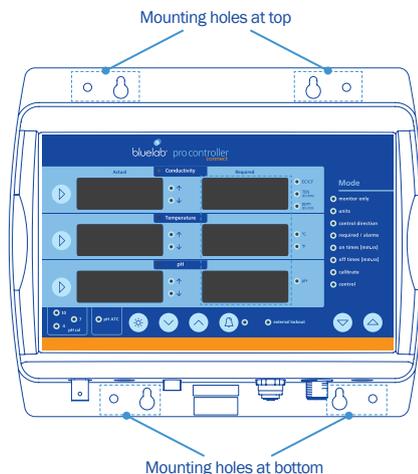
2 Fix the fasteners through the desired mounting holes in the top and bottom of the case.

Mounting holes at top

Mounting holes at bottom

3.2 Placement of probes

All probes must be submerged in the solution for measurement. The Bluelab® temperature probe measures solution temperature and provides automatic temperature compensation (ATC) for the pH measurement.

- Do not pour concentrated nutrient solution or pH adjuster directly onto probes when in the reservoir, as very strong acid may damage the probes or trigger alarms.
- For accuracy, ensure the probes are in an area where the reservoir/tank solution is well mixed or in a sample pot.

1 Remove storage cap from pH probe by gripping the top of the cap and gently twisting the base one rotation to loosen. Slide the storage cap off the pH probe.
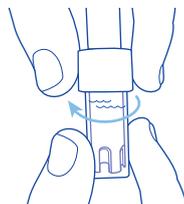
2 Fit the (optional) pH probe holder to the stem of the pH probe using a gentle twisting motion. Be careful not to bend or flex the probe stem.

3 Place pH probe into tank/reservoir and push suction cup onto side of tank/reservoir so the pH probe tip will stay submerged in the solution and will not get damaged. The pH probe can be fully submerged.
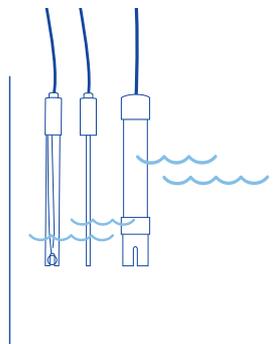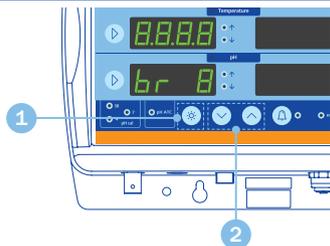
4 Place the conductivity and the temperature probes into the tank/reservoir alongside the pH probe.

English

3.3 Brightness control

1 Press and hold down the brightness button.

2 Adjust brightness using increase/decrease buttons. This can be done at any time.

3.4 Manual override control

Manual override lets you manually dose conductivity, temperature or pH. This can be used to prime dosers or to manually bring a system to required levels quickly.

1 Select 'Monitor mode'

2 Press and hold the measurement button you want to change.

3 Press both mode buttons together.

4 Continue to hold buttons while dosing and release button to stop.

Monitor mode selected

3.5 Connecting dosers

The Bluelab® Pro Controller must be connected to a Bluelab® doser (not included) via the dosing cable for dosing to occur. Other mains-powered dosers and temperature control systems can be connected via the Bluelab® PowerPod™ (not included).

1 Line up the dosing cable connector with the receptacle on the Bluelab® Pro Controller labelled 'DOSER'. Push and screw the collar fully into the receptacle.

2 Connect the other end of the dosing cable to a Bluelab® doser or Bluelab® PowerPod™.
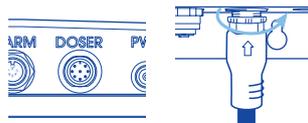
Line up connector pins   Push & twist

Note: Temperature control devices and mains powered pumps must be compatible with the Bluelab® PowerPod™. Please refer to Bluelab® PowerPod™ and third party product documentation before connecting these devices.

3.6 Record your system set up

Make a note of your system set up values here:

Nutrient

On times:

Temperature

On times:

pH

On times:

Nutrient

Off times:

Temperature

Off times:

pH

Off times:

Nutrient

Alarm High:

Required:

Alarm Low:

Temperature

Alarm High:

Start: Stop:

Alarm Low:

pH

Alarm High:

Required:

Alarm Low:

4.0 Alarms & External Lockouts

4.1 Connecting alarm & external lockout cable

The Bluelab® Pro Controller can be connected to an external alarm or lockout device using the alarm & external lockout cable supplied.

1 Line up the dosing cable connector with the receptacle on the Bluelab® Pro Controller labelled 'ALARM'. Push and screw the collar fully into the receptacle.
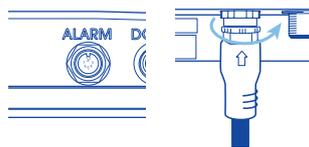
2 Connect the other end of the cable to an external alarm device. Refer to section 4.2 for functionality details.

Line up connector pins   Push & twist

## 4.2 Alarm & lockout cable functionality

The Bluelab® Pro Controller is supplied with an alarm and external lockout cable.
It has two purposes:

1. It enables an external alarm to be fitted to the Bluelab® Pro Controller, such as a light or horn. This could be useful in a larger growing area, for example, where the controller is housed in a pump room, and not easily viewed.

2. It enables external devices such as flow switches and float switches to be used, so that external conditions can interrupt dosing.

External alarm connection

The controller closes a (normally open) electronic relay contact when in an alarm condition. This relay contact can be used as a switch to allow the function of an external alarm.

The internal relay operates between the **Grey** and **Pink** wires of the Alarm & Lockout cable. An example circuit is shown to the right.

Power source

Alarm or Sounder

Grey wire

Pink wire
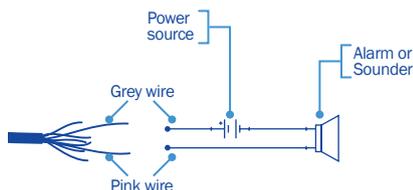
Note: that the maximum voltage that the internal relay can be used to switch is 24VAC or DC with a maximum current of 250mA. These ratings must not be exceeded. If higher voltages or currents are to be switched, then an external relay, rated correctly for the desired device, must be used, driven by the internal relay.

External dosing lockout connection

The Bluelab® Pro Controller can be inhibited (locked out) from dosing in response to an external condition, such as a pump being switched off or having failed, or a float switch indicating a level is above or below a particular level.

There are two lockout circuits available: a normally open circuit (NO) which will inhibit the Bluelab® Pro Controller when a contact is closed, or a normally closed circuit (NC) which will inhibit the Bluelab® Pro Controller if a contact is opened. Multiple sensors/switches may be used in both circuits: in parallel with the NO circuit, and in series, with the NC circuit.

A cable sensing circuit is used to detect that the Alarm and Lockout cable is fitted.

The normally open circuit is between the **White** and **Yellow** wires. An example circuit is shown to the right.

Note:

- If only Normally open switches are being used, the brown and yellow wires must also be connected.

- to enable the lockout functionality, the **Green** and **Yellow** wires must be connected.
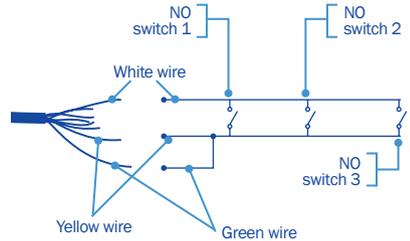
The normally closed circuit is between the **Brown** and **Yellow** wires. An example circuit is shown to the right.

Note: to enable the lockout functionality, the **Green** and **Yellow** wires must be connected.
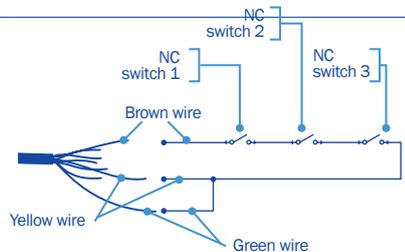
A combination of the above two circuits is also possible using the **Brown**, **White** and **Yellow** wires as shown to the right.

Note: to enable the lockout functionality, the **Green** and **Yellow** wires must be connected.
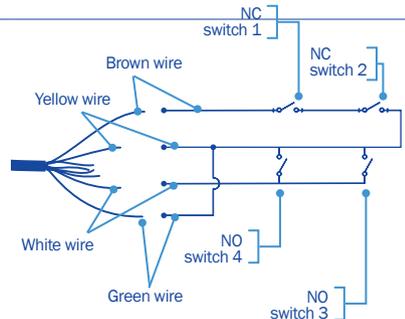
4.2 Alarm & lockout cable functionality continued

Alarm Cable wire key

Connector Pin #	Wire colour	Function
1	White	NO lockout switch
2	Brown	NC lockout switch
3	Green	Cable sense
4	Yellow	Ground
5	Grey	Alarm relay NO
6	Pink	Alarm relay COM
7	Blue	Not used
8	Red	Not used
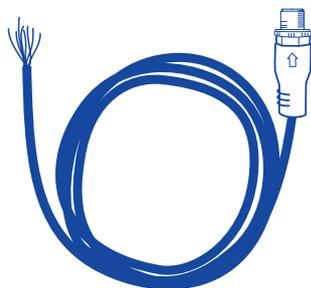
4.3 External lockout indicator

External lockout

The LED indicator is lit when a lockout condition is sensed via the alarm and external lockout cable. When sensed, all dosing will be stopped.

External lockout indicator

external lockout
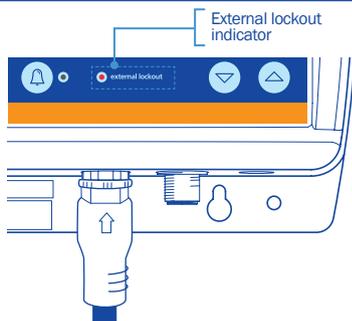
5.0 Probe Care & Maintenance

5.1 Bluelab® pH Probe care

pH probes DO NOT last forever. They age through normal use and will eventually fail. The life time of a pH probe depends on the environment it is used in and the way that it is treated. To receive a long life from your Bluelab® pH Probe, please ensure you follow the guide below.

pH probes contain glass and are therefore FRAGILE.
With good care, they will give a long service life.

Bluelab® pH Probe

pH probe holder
suction cup

pH probe tip

BNC connector

pH probe
storage cap

pH probe KCl
storage solution

Glass tube inside
plastic barrel

Glass bulb

DO NOT let the pH probe tip dry.

DO NOT bend the probe; this will break its internal glass tube.

DO NOT knock the probe; this will break its internal glass tube or external glass bulb.

DO NOT plunge a cold pH probe into a hot liquid, or a hot probe into cold liquid. Sudden temperature changes can crack the glass and permanently damage the probe.

DO NOT immerse in oils, proteins or suspended solids that will leave a coating on the glass bulb.

DO NOT 'kink' or bend the lead sharply.

DO NOT attempt to lengthen the lead on the pH probe.

DO NOT wet the BNC connector at the end of the lead.

Always remove pH probe storage cap before use

1. Grip the top of the cap and gently twist the base one rotation clockwise to loosen slightly.
2. Next slowly slide the cap off the pH probe. DO NOT completely remove the base of the cap from the top of the cap.
3. Store the storage cap in a safe place.
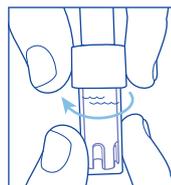
Removing pH probe
storage cap

Storing the pH probe

When storing the pH probe, the pH probe tip must be kept moist.

To prepare the pH probe for storage, add enough Bluelab® pH Probe KCl Storage Solution to the storage cap so the probe tip is covered. Then replace the cap and store in a secure place. DO NOT use RO (Reverse Osmosis), Distilled or De-ionized water. Pure water changes the chemistry of the glass, damaging the probe.

If the pH probe has been accidentally allowed to dry out; the pH probe must be 'hydrated' for 24 hours in KCl storage solution (never use RO, Distilled or De-ionized water). Following this; carry out a calibration. If the calibration fails, the probe may be permanently damaged.

Ensure probe tip is covered by
the KCl storage solution in cap

5.2 Cleaning the Bluelab® pH Probe

To ensure accurate readings the pH probe tip needs to be rinsed in water after each use and cleaned prior to calibration using the following instructions.

The storage cap must always be put back on after cleaning. Always ensure it contains enough Bluelab® pH Probe KCl Storage Solution to cover the probe tip.

1 Remove storage cap from pH probe.
Hold the top of the storage cap, twist the cap to loosen then remove.
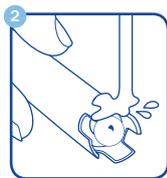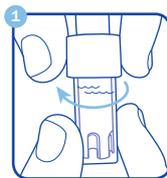
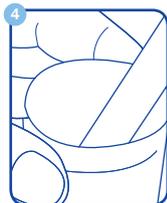**2 Rinse pH probe tip under fresh tap water.**
Never use RO (Reverse Osmosis), Distilled or De-ionized water.

**3 Fill a small plastic container with clean tap water.**
Add a small amount of Bluelab® pH Probe Cleaner or mild detergent (dishwashing liquid).

4 Gently stir the probe tip in the mixture.
Ensure that you do not 'knock' the soil pH probe on the side of the container as this may cause damage to the probe.

5 If the probe tip requires removal of heavy contamination: Gently brush around the glassware with a few drops of Bluelab® pH Probe Cleaner or mild detergent (dishwashing liquid) and a soft toothbrush.
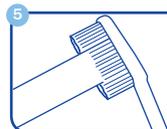
6 Rinse well under fresh running tap water to remove all traces of the detergent mixture.

7 Calibrate after cleaning, see section 2.6.7.
After calibration, store pH probe in the storage cap, ensuring there is enough KCl Storage Solution to cover the probe tip.
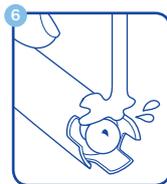
5.3 Hydrating the Bluelab® pH Probe

Hydrate the pH probe in Bluelab® pH Probe KCl Storage Solution when the probe tip has not always been stored in KCl storage solution, to improve the reading response speed, or the probe tip has been accidentally allowed to dry out.

1 Loosen, then remove the storage cap. Place the pH probe upright in a plastic container.

2 Clean the pH probe tip. Ensure the probe tip is cleaned before hydrating. See section 5.2 for instructions.

3 Add enough Bluelab® pH Probe KCl Storage Solution to a plastic container to submerge the pH probe tip.

4 Leave to soak for at least 24 hours. After hydration, always carry out a calibration to ensure accuracy. See section 2.6.7.

Bluelab® pH Probe KCl Storage Solution
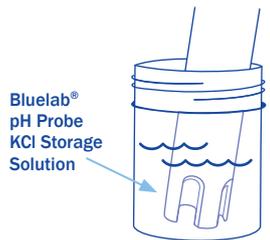
5.4 Cleaning the Bluelab® Conductivity Probe

Cleaning the conductivity probe periodically ensures accurate readings.

The conductivity probe is cleaned using the Bluelab® Conductivity Probe Cleaner, or "Jif" a trade name for a liquid scourer cream used in home bathrooms and kitchens. Similar products are called "Liquid Vim", "Soft Scrub", "Cif cream", or "Viss". Never use scented varieties as they may contain oils that contaminate the conductivity probe.

1 Remove shroud.

Hold the body and pull the shroud off.

2 Clean the conductivity probe face.

Place one or two drops of Bluelab® Conductivity Probe Cleaner onto the probe face and rub with the Bluelab® Chamois or your finger firmly and vigorously.

3 Rinse the conductivity probe face.

Rinse off all traces of cleaner under running tap water while scrubbing the probe face with the other side of the Bluelab® Chamois or the same finger.

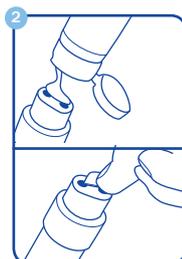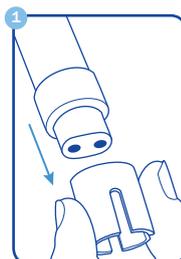**4 Check that the water forms a smooth film on the probe face. Ensure you have a clean, smooth film without any beads of water.**

If you have beads of water, repeat steps 2 and 3.

clean, smooth film of water   uneven beads of water
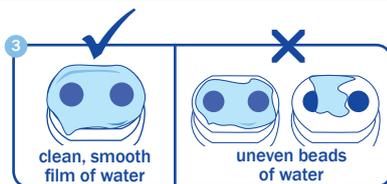
5 Refit the shroud and test in 2.77 EC Conductivity Standard Solution to ensure adequate cleaning.

Place the probe tip into the solution, wait for the reading to stabilise to a constant value. This can take a few minutes while the probe adjusts to the temperature of the solution.

Repeat the cleaning process if the reading given is not within 0.1 EC, 1 CF, 50 ppm or 70 ppm of the values in the table below.

Bluelab® 2.77 EC Conductivity Standard Solution
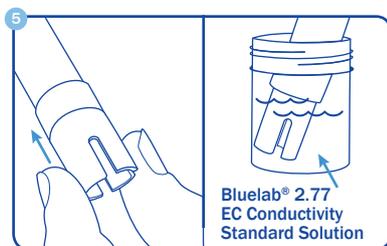
Testing the Bluelab® Conductivity Probe

The conductivity probe is tested in either 2.77EC/ 27.7CF/1385 ppm or 1939 ppm solution depending on the unit of conductivity chosen.

Use the standard solutions in the table to the right. Bluelab® solutions are recommended.

NOTE: The shroud MUST be on the probe when taking readings.

Unit chosen	EC	CF	ppm 500	ppm 700
Solution required	2.77	27.7	1385	1939
Expected reading	2.8	28	1400	1960
Acceptable error	± 0.1	± 1	± 50	± 70

6.0 Troubleshooting & Specifications

6.1 Troubleshooting guide

TROUBLE	REASON	CORRECTION
pH reading inaccurate	pH calibration old or not calibrated.	Carry out at least a 2 point pH calibration.
	pH probe dirty.	Clean and carry out pH calibration.
	pH probe damaged or old.	Replace pH probe.
	Previous pH calibration attempt has failed, and Bluelab® Pro Controller is using factory pH calibration.	Find cause of failed pH calibration, and recalibrate.
	Probe tip is not immersed.	Ensure pH probe tip is always immersed in the solution being measured.
pH calibration indicators flashing	pH calibration is over 30 days old.	Carry out a pH calibration.
pH calibration fails	Attempting to calibrate to pH 7 or pH 10 more than an hour after pH 7 calibration.	Carry out pH 7 calibration, then pH 4 or pH 10 calibration within 1 hour.
	pH probe dirty.	Clean and carry out pH calibration.
	pH probe damaged or old.	Replace pH probe.
Conductivity reading inaccurate	Conductivity probe or 2.77 EC solution contaminated.	Clean conductivity probe and check with Conductivity Standard solution.
	An air bubble is present on the conductivity probe surface.	Tap the conductivity probe to dislodge air bubble. Place conductivity probe in a position where air bubbles won't collect on its probe surface.
	Conductivity probe tip not immersed in solution.	Ensure conductivity probe tip is always immersed in the solution being measured.
Conductivity reading not what expected after EC calibration	2.77 EC solution old. Conductivity solution will change value over time, usually becoming stronger, as water evaporates.	Always use fresh solution, from well-sealed bottles/new sachets.
	Conductivity probe was wet when placed into EC solution, lowering value.	Ensure conductivity probe is dry before calibrating/checking, or rinse in conductivity solution first.
Temperature reading is inaccurate	Temperature probe not immersed in solution.	Ensure temperature probe is always immersed in the solution being measured.
	Temperature Probe damaged.	Replace temperature probe.
Bluelab® Pro Controller is overshooting required values	Dose on time is too long.	Reduce on time so 2-3 doses shifts 0.1EC/1CF/50TDS/70ppm or 0.1pH.
	Off time too short to allow reservoir to mix.	Increase off time. Can estimate mixing time by adding nutrient, and timing until new value stable.
	Dosing pump is too large for reservoir - minimum dose time (1 sec) is too long.	Choose smaller dosing system or dilute stock solutions.

6.1 Troubleshooting guide continued

TROUBLE	REASON	CORRECTION
An alarm value has been reached, but dosing in other measurements is still occurring	Alarms only lock out dosing in other measurement types if a control direction has been set in the measurement type in alarm.	Set a control direction so the alarm will lock out other measurement types, and set the required value so that dosing will not occur.
I want to reset all settings to factory defaults		Hold the brightness button down, and apply power. Release the brightness button when "FAC dEF" appears.

6.2 Bluelab® Pro Controller status displays

VALUE	DISPLAY		CONDITION
	Actual	Required	
EC	EC	HI	Conductivity has reached the high alarm value, in control or monitor mode, with alarms on.
	EC	LO	Conductivity has reached the low alarm value, in control or monitor mode, with alarms on.
	EC	or	Conductivity has exceeded 5.0EC in control or monitor mode.
	EC	ur	Conductivity has become less than 0.0EC in control or monitor mode. May indicate a damaged probe.
	EC	0.2LO	Conductivity has become less than 0.2EC in control or monitor mode, while the Low EC lockout is enabled.
	EC	Err	Conductivity probe is disconnected or damaged. Control or monitor mode.
Temperature	°C	HI	Temperature (in Celsius) has reached the high alarm value, in control or monitor mode, with alarms on.
	°C	LO	Temperature (in Celsius) has reached the low alarm value, in control or monitor mode, with alarms on.
	°C	or	Temperature (in Celsius) has exceeded 50°C.
	°C	ur	Temperature (in Celsius) has become less than 0°C.
	°C	Err	Temperature probe is disconnected or damaged, when a control direction is set

VALUE	DISPLAY		CONDITION
	Actual	**Required**	
Temperature	°F	HI	Temperature (in Fahrenheit) has reached the high alarm value, in control or monitor mode, with alarms on.
	°F	LO	Temperature (in Fahrenheit) has reached the low alarm value, in control or monitor mode, with alarms on.
	°F	or	Temperature (in Fahrenheit) has exceeded 50°C.
	°F	ur	Temperature (in Fahrenheit) has become less than 0°C.
	°F	Err	Temperature probe is disconnected or damaged, when a control direction is set.
pH	PH	HI	pH has reached the high alarm value, in control or monitor mode, with alarms on.
	PH	LO	pH has reached the low alarm value, in control or monitor mode, with alarms on.
	PH	or	pH has reached a value lower than 0.0. May also indicate probe disconnected or damaged.
	PH	ur	pH less than 0. Monitor and Control mode.
EC	EC	IC	Conductivity is in ineffective control lockout (has dosed 15 times without sensing 0.1EC/1CF/50TDS/70ppm change, when IC lockout is enabled).
pH	PH	IC	pH is in ineffective control lockout (has dosed 15 times without sensing a 0.1pH change, when IC lockout is enabled).
Temperature	°C	IC	Temperature (in Celsius) is in ineffective control lockout (has dosed 15 times without sensing a 1°C change, when IC lockout is enabled).
	°F	IC	Temperature (in Fahrenheit) is in ineffective control lockout (has dosed 15 times without sensing a 2°F change, when IC lockout is enabled).
	EL	no	The Bluelab® Pro Controller is in external lockout, caused by the normally open switch circuit.
	EL	nc	The Bluelab® Pro Controller is in external lockout, caused by the normally closed switch circuit.

English

6.3 Technical specifications

	pH	Conductivity	Temperature
Units	pH	EC, CF, TDS (ECx500), ppm (ECx700)	°C, °F
Measurement Range	0.0 - 14.0 pH	0 - 5.0 EC, 0 - 50 CF, 0 - 2500 TDS (ECx500), 0 - 3500 ppm (ECx700)	0 - 50 °C, 32 - 122 °F
Control Range	0.1 - 13.9 pH	0.1 - 4.9 EC, 1 - 49 CF, 50 - 2450 TDS (ECx500), 70 - 3430 ppm (ECx700)	1 - 49 °C, 34 - 120 °F
Resolution	0.1 pH	0.1 EC, 1 CF, 50 TDS, 70 ppm	1 °C, 1 °F
Accuracy at 25°C/77°F	±0.1 pH	±0.1 EC, ±1 CF ±50 TDS, ±70 ppm	±1 °C, ±2 °F
Calibration	One, two or three point (pH 7.0, pH 4.0 and/or pH 10.0)	Optional	Not required (factory calibrated)
Temperature Compensation	Yes (if ATC probe is connected)	Yes	n/a
Operating Environment	0 - 50°C / 32 - 122°F, splash proof		
Power Source	**Input:** 100-240 Vac, 50-60 Hz, 5 VA, 4 interchangeable plug types (USA, Euro, UK, NZ/AUS) **Output:** 24VDC 0.4amp.		
Alarms & Lockouts	**Alarm:** visual, settings retained if power failure occurs. Settable high and low alarm lockout values.		
Dosing	**On-time dosing:** settable from 1 to 10 minutes in one-second steps. **Off-time dosing:** settable from 0 to 59 minutes and 50 seconds in 10 second steps.		
Signal Range	**Indoor / Urban:** 66 feet / 20 meters **Outdoor / RF line-of-sight:** 164 feet / 50 meters		
Frequency Band	2.4 GHz ISM		
System Requirements	Microsoft Windows XP or greater for Bluelab® Connect™ Software. Internet connection for remote access & data-logging to the cloud.		
Certifications	CE, FCC, IC. Contains Model XBEE2 Radio, IC: 4214A-XBEE2, FCC ID: OUR-XBEE2		

English

Bluelab® pH Up and pH Down Solutions

Optimum growth needs optimum pH. And we make optimum simple.

If your pH isn't in the right range – and that's 5.5-6.5 for most plant varieties – your nutrients are likely wasted.

We say that's a problem you don't need. At Bluelab®, we want our customers to have optimum growth and the best plants possible. So we've made it easy to raise or lower pH levels, whenever you need, and keep them just where they should be.

Bluelab®'s pH Up and pH Down are formulated to the highest standards. Just add what's required to lift or reduce growing solution acidity. Your plants will thank you for it. The main thing is, you'll see the difference in your harvest. Optimum inputs. Optimum results. Simple.

Available in:	
› Bluelab® pH Up 500ml	› Bluelab® pH Down 500ml
› Bluelab® pH Up 1 Liter	› Bluelab® pH Down 1 Liter
› Bluelab® pH Up 1 Gallon	› Bluelab® pH Down 1 Gallon

Bluelab® pH Probe replacement

pH probes do not last forever.

They age through normal use and will eventually fail.

To ensure you receive a long life from your pH probe, please read the instructions provided with it.

When the time comes to replace your Bluelab® pH Probe all you have to do is order a replacement from your supplier!

Bluelab® Probe Care Kits

The instrument is only as accurate as the probe is clean!

Probe cleaning is one of the most important parts of owning and operating any Bluelab® meter, monitor or controller.

If the probe is contaminated (dirty) it affects the accuracy of the reading displayed.

Bluelab® Probe Care Kit range is available for:

• pH probe care
• pH & conductivity probe care
• Conductivity probe care

All the tools you need are included in each kit.

To re-stock your care kit, choose from the Bluelab® Solutions range.

Bluelab® Connect™ Range Extender

A Bluelab® Connect™ Range Extender boosts the data signal strength.

Extend the wireless range by positioning a range extender between your Bluelab® Connect™ devices and your Bluelab® Connect™ stick.

Using the Bluelab® Connect™ Range Extender requires you to already have a Bluelab® Connect™ Stick and one or more Bluelab® Connect™ enabled devices.

Bluelab® pH Probe KCl Storage Solution

The perfect solution to store and hydrate your Bluelab® pH products.

Bluelab® pH Probe KCl Storage Solution is designed to increase response time and maximize the life of Bluelab® pH pens and pH probes.

For best results, use the KCl solution to store the pH pen/probe after use and hydrate monthly. *Instructions are on the label of the bottle.*

Use Bluelab® pH Probe KCl Storage Solution with:	⚙
› Bluelab® pH Pen	› Bluelab® pH Probes
› Bluelab® Soil pH Pen	› Bluelab® Soil pH Probes

Bluelab® Pro Controller limited product guarantee

Bluelab® Corporation Limited guarantees the Bluelab® Pro Controller for a period of 2 years (24 months) from the date of sale to the original purchaser.

2 year LIMITED PRODUCT GUARANTEE WITH PROOF OF PURCHASE

Standard Terms and Conditions of the Bluelab® Limited Product Guarantee:

How Long Does The Coverage Last? 1) The product guarantee becomes effective from the date of purchase by the first purchaser. Coverage terminates if you sell or otherwise transfer the product, 2) The repair of your product under guarantee will not extend the period of the guarantee.

How Do You Get Service? 1) Products are to be returned to point of purchase; 2) Any parts replaced will become the property of Bluelab® Corporation Limited ("Bluelab®").

What is covered? Provided you supply proof of purchase via a store-printed receipt, we will repair or replace your product if your product is found, within the guarantee period, to be defective due to defective materials or workmanship existing at the time of purchase. If any part is no longer available or out of manufacture, Bluelab® will replace it with a functionally-equivalent replacement part.

What is not covered? Bluelab® shall not be liable for costs of repair or replacement of a product incurred as a result of: 1) Normal wear and tear; 2) Accidental damage, faults caused by negligent use or care, neglect, careless operation or handling of the product which is not in accordance with the Bluelab® Instruction Manuals; 3) Use of parts not assembled or installed in accordance with the instructions of Bluelab®; 4) Use of parts or accessories other than those produced or recommended by Bluelab®; 5) External sources such as transit damage or weather; 6) Repairs or alterations carried out by parties other than Bluelab® or its authorised agents; 7) Serial numbers defaced or missing.

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS GUARANTEE AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES AND REMEDIES, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW (INCLUDING, WITHOUT LIMITATION, MERCHANTABILITY) ARE LIMITED IN DURATION TO THE PERIOD OF THIS LIMITED GUARANTEE.

How Does State Law Relate to This Warranty? Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Additionally, some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This guarantee gives you specific legal rights, and you may also have other rights, which vary from state to state.

Register your guarantee online at bluelab.com

Limitation of liability

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