

# Bluelab Combo Meter™

## Instruction Manual



  
bluelab® simple solutions  
combo meter™

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## 1.0 Introduction to Bluelab Combo Meter

The battery operated Combo Meter measures nutrient, temperature and pH levels by using the Nutrient/Temperature and/or the pH Probe connected to the electronic meter. The meter has a liquid crystal display (LCD) digital readout.

### 1.1 Button Functions

- The meter has three press buttons; pH/Calibrate, Nutrient/Cal7.0 and Temp/Cal4/10. A short press of any button turns the meter on. The meter automatically turns off after four minutes if no buttons are pressed. If the meter turns off before the reading is taken, a short press of the ON/OFF button will turn the meter on again.

The meter is manually turned off by holding the pH button down until the display starts flashing. Press again while the display is flashing, and OFF will display.

The buttons have a short press and long press function.

A short press means a button is released in about one second. The long press is a button being held for at least three seconds and released when the display starts flashing.

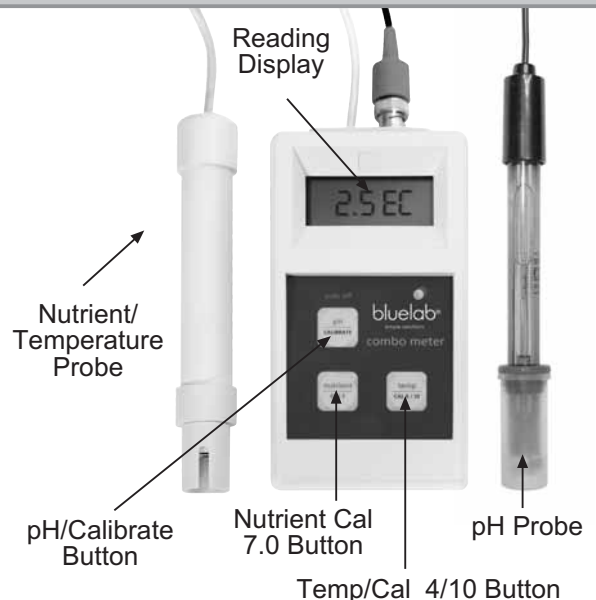


Figure 1. Bluelab Combo Meter

### 1.2 Meter Calibration

- The nutrient/temperature probe does NOT require calibration. The pH of the meter does require calibration. Solutions used for calibration are carefully stored and replaced three months after opening. pH reading accuracy is dependant on the accuracy of the calibration solutions used and also age, use and cleanliness of the pH Probe.

If measuring a pH below 7.0 is expected, the meter is calibrated using pH7.0 and pH4.0 calibration solutions. If measuring a pH above 7.0 is expected, pH7.0 and pH10.0 solutions are used for calibration.

### 1.3 Storage of Meter

- The meter is kept out of direct sunlight to prevent irreparable damage to the LCD reading display; this includes storing in a cool, dry and clean place when not in use.

The meter unit is not waterproof but will withstand occasional water splashes. If the meter does get splashed, it is wiped dry as soon as possible. Batteries are removed if the unit is to be stored for a prolonged period.

Storing the meter without use for longer than two to three weeks requires removal of the pH probe. Place a small amount of pH 4.0 solution or fresh water into the wetting cap, tip out the excess, then replace the wetting cap on to the probe tip and store the probe in a secure place. The pH probe is never stored in de-ionized or distilled water as this will permanently damage it.

### 1.4 ppm Scale

- In relation to the ppm scale, 500 ppm = 10 CF.

## 2.0 Preparing Bluelab Combo Meter for Use

Preparing the Bluelab Combo Meter for use involves hydrating the pH probe, inserting 2 x AAA batteries, connecting the pH probe and calibrating the pH. These tasks are performed before the meter is used for the first time.

### 1 Hydrate pH Probe

Carefully remove pH probe wetting cap ensuring the body does not bend. Bending the body of the pH probe can break the glass tube inside. Soak the probe tip in fresh water for at least one hour. Soaking the tip for 24 hours will improve the probe's activity and is recommended if the probe tip has been allowed to dry.

**CAUTION:** Do not use de-ionized or distilled water. When probe is not in use, place a small amount of pH 4.0 solution or fresh water into the wetting cap, tip out the excess, then replace the cap onto the probe tip and store the probe in a secure place.

### 2 Insert Batteries

Open battery compartment by sliding back cover down and insert 2 x AAA batteries as shown on the battery holder. Slide cover back on.

**NOTE:** Alkaline batteries are recommended.

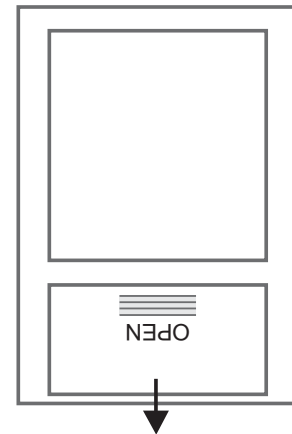
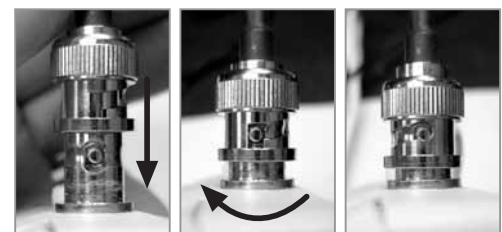


Figure 2. Battery Cover

### 3 Connect pH Probe

Connect the pH probe to the meter by lining up the meter lugs of the BNC fitting. Fasten securely by pushing probe connector on and twisting one quarter turn.



Inserting      Twisting      Attached

Figure 3. Probe Attachment

### 4 Calibrate the pH

Calibrate the Combo Meter by following the instructions in section 3.1 of this manual. This should be done before the meter is used for the first time.

## 3.0 Calibration, Cleaning Probes and Battery Replacement

Cleaning the Bluelab Combo Meter probes periodically ensures accurate readings. Cleaning includes using a mild detergent (dishwashing liquid), a small container, a toothbrush and some clean fresh running water. Perform the following tasks to clean pH and nutrient/temperature probes.

### 3.1 pH Calibration

For accurate pH readings the pH probe is cleaned and recalibrated when:

- The reading you were expecting is different
- The probe is replaced with a new one
- It has been one month since the last calibration
- Typically more than 30 readings have taken place
- The meter is reset after an error message

The pH calibration involves cleaning the pH probe and then calibrating in TWO SOLUTIONS. If a reading below pH7.0 is expected, use pH7.0 and pH4.0 calibration solutions. If a reading above pH7.0 is expected, use pH7.0 and pH10.0 calibration solutions.

Follow the steps below for meter pH calibration.

#### 1 Clean pH Probe (if required)

Clean the probe as in section 3.2.

#### 2 pH7.0 Calibration

Turn meter on. Rinse probe thoroughly in fresh water, shake off excess water and place probe in a pH7.0 calibration solution for at least one minute for reading to stabilize.

Long press the CALIBRATE button. When the display starts flashing, release the button and short press the CAL 7.0 button once. '7.0pH' is displayed.

If a message appears during the calibration process, such as 'E2: PH' then calibration was unreliable. See section 6.0.



Figure 4. Reading stabilized

#### 3 pH4.0/10.0 Calibration

Rinse the pH probe thoroughly in fresh water, shake off excess water and place the probe in either pH4.0 or pH10.0 calibration solution. Wait for a period of at least one minute for reading to stabilize.

Long press the CALIRBATE button until the display starts flashing. Release the button and short press CAL 4/10 button once. '4.0pH' or '10.0pH' is displayed.

The meter is now calibrated and ready for use.

## 3.0 Calibration, Cleaning Probes and Battery Replacement cont..

### 3.2 Clean pH Probe

#### 1 Preparation

Rinse the pH probe tip under fresh running water. Fill a small container with clean water and add a small amount of mild detergent (dishwashing liquid).

#### 2 Clean Glassware

Place the probe into the container and slowly stir it through the liquid several times - rinse well under fresh running water to remove all traces of detergent. If the probe tip is heavily contaminated gently brush around the glassware with a few drops of mild detergent (dishwashing liquid) and a soft toothbrush, then rinse well under fresh running water to remove all traces of detergent.

CAUTION: Do not touch probe glassware with fingers. This will contaminate the probe.

### 3.3 Clean Nutrient/Temperature Probe

#### 1 Remove Shroud

Dismantle by holding the body and pulling away the shroud. Figure 5 shows the shroud removed.

#### 2 Clean Probe Face

Use an unscented liquid scourer such as 'Jif' or 'Soft Scrub'. Place one to two drops on to the probe face and using a finger or the Bluelab Chamois, rub firmly and vigorously across the probe face.

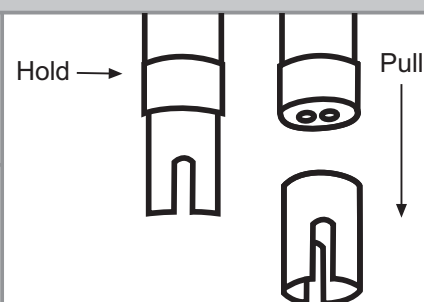


Figure 5. Shroud Removed

#### 3 Rinse Probe

Place probe under fresh running water. Using the same finger or other side of Bluelab Chamois, remove ALL traces of cleaner.

#### 4 Check Probe Cleanliness

Check that water forms an even film on the probe face. The water should not form beads. If beading is present, repeat the cleaning process until the face retains an even film of water.

#### 5 Replace Shroud and Test

Refit the shroud firmly onto the probe face and test in a sample of 27.7CF / 2.77EC / 1385ppm Bluelab Standard Solution to ensure the probe has been adequately cleaned. Repeat the cleaning process if the reading is not within 1CF / 0.1EC / 50ppm.

### 3.4 Battery Replacement

#### 1 Batteries are replaced in the unit when the message 'LO BAT' appears in the top left-hand corner of the LCD display. See section 2.2.

NOTE: Batteries are checked at least once every six months for signs of deterioration, rusting or swelling. If signs of deterioration are found, battery holder contacts are cleaned and batteries replaced.

## 4.0 Changing Nutrient or Temperature Display Units

Nutrient and temperature can be displayed in different units. The units available are shown in the tables below.

### 4.1 Change Nutrient Display Units

**1 To Program**

Press and hold the NUTRIENT button until the display starts flashing, then release the button.

**2 Select Values**

While the display is flashing, each short button press changes units between EC, CF and ppm (500 scale).

The display flashes four times after the last button press and then returns back to a normal display, showing the unit selected.

Display	Nutrient Units
-- E C	EC (electrical conductivity)
-- C F	CF (conductivity factor)
--- P	ppm (parts per million) TDS (total dissolved solids)

### 4.2 Change Temperature Display Units

**1 To Program**

Press and hold the TEMP button until the display starts flashing, then release the button.

**2 Select Values**

While the display is flashing, each short button press changes units between °C and °F (Celsius and Fahrenheit).

The display flashes four times after the last button press and then returns back to a normal display showing the unit selected.

Display	Temperature Units
-- C	°C (degrees Celsius)
-- F	°F (degrees Fahrenheit)

## 5.0 Measuring Hydroponic Elements

The values measured within hydroponics by the Combo meter include nutrient (conductivity), temperature and pH levels.

### 5.1 Nutrient Readings

#### 1 Obtain Conductivity Value

Short press the 'nutrient' button to select conductivity. Insert white nutrient/temperature probe into solution where there is strong movement of the solution, or stir the solution with the probe. Wait 1-2 minutes for the probe to reach solution temperature. The conductivity value is displayed.

NOTE: The nutrient/temperature probe is cleaned at least once a month to remove salt build-up ensuring accurate readings. If oily additives are being used the probe is cleaned after each use. See section 3.3.



Figure 4. Nutrient Conductivity

### 5.2 Temperature Readings

#### 1 Obtain Temperature Value

Short press the 'temp' button to select temperature. Insert white nutrient/temperature probe into solution. Wait 1-2 minutes for probe to reach solution temperature. The temperature value is displayed.

NOTE: For very cold or very hot temperatures it will take 4-5 minutes for the probe to reach solution temperature. To help decrease time taken to reach the solution temperature, place the probe in an area where there is strong movement of solution, or stir solution with the probe.

### 5.3 pH Readings

#### 1 Obtain pH Value

Short press the 'pH' button to select pH.

Place 2 to 3cm of the pH probe tip into the solution. Wait 1-2 minutes for value to stabilize. The pH value is displayed.

NOTE: If taking readings of more than one solution, rinse the probe thoroughly in fresh water between solutions to avoid cross contamination.

To decrease time taken to reach the solution temperature, place probe in an area where there is strong movement of solution, or stir the solution gently with the probe.

#### 2 Storing pH Probe

Store pH probe tip in a container of fresh water between measurements or uses or place wetting cap back over the probe tip with a small amount of pH4.0 solution or fresh water in it. The pH probe is never stored in de-ionized or distilled water as this will permanently damage it.



## 6.0 Error Messages

Error messages will only appear following pH calibration failure. The following table describes error messages, the reason and cause for an error message.

To clear an error message press any button once. The meter will reset to the factory set calibration and will need to be recalibrated successfully before use.

Error Display	Indicates	Possible Causes
<b>E 1 : PH</b>	Not enough difference between pH7.0 and pH4.0 readings.	pH4.0 calibration solution contaminated or wrong solution used. Probe contaminated, not properly attached, worn out or damaged.
<b>E 2 : PH</b>	Not enough difference between pH7.0 and pH10.0 readings.	pH10.0 calibration solution contaminated or wrong solution used. Probe contaminated, not properly attached, worn out or damaged.
<b>E 3 : PH</b>	Not enough difference between the readings.	Calibrate pH7.0 FIRST then to pH4.0/10.0.
<b>E 4 : PH</b>	pH7.0 calibration unreliable.	pH7.0 calibration solution contaminated or wrong solution used. Probe contaminated, not properly attached, worn out or damaged.

## 7.0 Troubleshooting Guide

Trouble	Possible reason	Possible solution
Nutrient readings inaccurate	Contaminated probe. Temperature low/high.	Clean probe as described in Section 3.3. Wait 5 to 10 minutes for reading to stabilize.
Temperature readings inaccurate	Temperature of probe very different to solution temperature.	Wait 5 to 10 minutes for probe to reach solution temperature.
pH readings inaccurate	Contaminated probe. Incorrect calibration. Broken glass bulb, stem or connector.	Clean pH probe as described in Section 3.2. Ensure calibration solutions are accurate. Replace if in doubt. Wait longer for readings to stabilize before calibrating. Check pH probe for damage.
Display shows LO BAT in top left hand corner	Insufficient power to take a reliable reading.	Replace the batteries. DO NOT use rechargeable batteries.
Meter will not turn on	Batteries dead or inserted incorrectly.	Check batteries are inserted correctly. Replace if necessary.
Display shows 'E2 : PH' or similar	Problem with pH calibration or the meter is damaged.	See error message descriptions Section 6.0 of this document.
orPH urPH	Over range pH Under range pH	Solution > 14.0pH Solution < 0.0pH Check pH probe connection. pH probe could be faulty. Meter could be wet inside.
or°C/or°F/ ur°C/ ur°F	Over range temperature Under range temperature	Solution >51°C/122°F Solution <0°C/32°F Conductivity probe or meter faulty.
orEC/orCF/or P	Over range conductivity/nutrient	Over range conductivity >9.9 EC, 99 CF, 1990 ppm Conductivity probe or meter faulty

## 8.0 Technical Specifications

	pH	Nutrient	Temperature
<b>Range</b>	0 - 14 pH	0 - 9.9 EC 0 - 99 CF 0 - 1990 ppm	0 - 50°C 32 - 122°F
<b>Resolution</b>	0.1 pH	0.1 EC 1 CF 10 ppm	1°C 1°F
<b>Accuracy (at 25°C)</b>	± 0.1 pH	± 0.1 EC ± 1 CF ± 50 ppm	± 1°C ± 2°F
<b>Calibration</b>	Manual Calibration	Factory Calibrated	Factory Calibrated
<b>Temperature Compensation</b>	Not applicable	Automatic temperature compensation	Not applicable
<b>Operating Temperature Range</b>	0 - 45°C 32 - 113°F		
<b>Power Source</b>	2 x AAA Alkaline Batteries		
<b>Other Features</b>	Low battery warning Auto turn off function Over range and under range indicators		

## Contact Details

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

# Bluelab cleaning kits

Probe cleaning is one of the most important parts of owning and operating any Bluelab Trunccheon<sup>®</sup>, meter, monitor or controller. If the probe is contaminated (dirty), it affects the accuracy of the reading displayed.

The probe surface is where the instrument takes the reading of the solution. The information is sent back from the probe to the electronic brain of the instrument. A calculation is then done in the instruments brain or micro computer and a reading is then displayed. If the information sent back from the probe is inaccurate due to probe surface contamination then the reading will be inaccurate.

Cleaning the probes is a very easy task and prolongs the life of the probes.

## The Bluelab cleaning kits have it all there for you:

pH cleaning and calibration kit:

full colour instructions

calibration solutions

decanter vessels

probe cleaner

toothbrush



conductivity probe cleaning kit

full colour instructions

conductivity standard solution

decanter vessel

Bluelab probe cleaner

Bluelab chamois (probe cleaning instrument)

