

English

Instruction Manual

Version 1 / 120809_bl

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bluelab®
simple solutions

Guardian Monitor

www.getbluelab.com

Congratulations for purchasing the Bluelab Guardian™ Monitor

The Guardian Monitor is a continuous indicator of the current levels of EC, pH and temperature, enabling you to optimise these parameters as your crop progresses through each growing phase.

Features:

- Measures 0.0– 14.0 pH, 0– 5.0 EC, 0– 50 CF, 0–2500 TDS, 0–3500 ppm, 0-50 °C , 32-122 °F
- Large easy to read displays
- 'Plant Safe' green LED display
- Selectable units for conductivity and temperature
- Simple push button pH calibration
- No calibration required for conductivity or temperature
- Visual alarm for both high and low settings
- Settings retained when power lost (non volatile memory)
- Automatic Temperature Compensation
- International power supply
- Adjustable display brightness
- Water resistant design

2 year guarantee (6 months for pH probe)

What is Plant Safe? Green LED's are safe for continued growth during a plant's fruiting stage when hours of darkness are required.

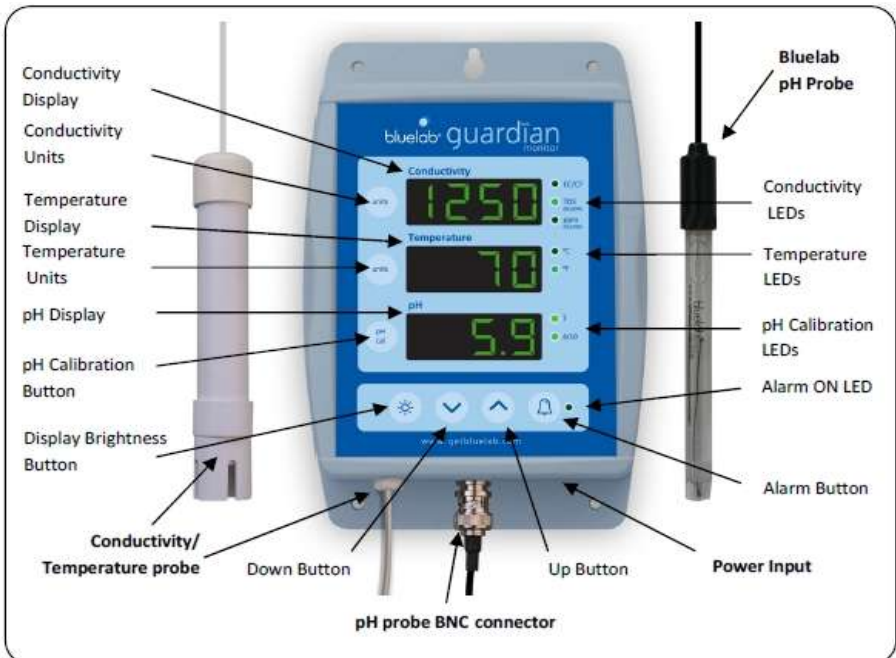


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What's in the box?

Please verify the box contents from the information below.



1.	Bluelab Guardian Monitor	8.	European plug adaptor
2.	Bluelab pH Probe with wetting cap	9.	UK plug adaptor
3.	Conductivity / temperature probe	10.	4 x mounting fasteners
4.	pH probe holder with suction cup	11.	2 x cable ties
5.	5V DC Power Supply	12.	pH 4.0 & pH 7.0 single use calibration solution sachets
6.	North American plug adaptor	13.	Instructions and Guarantees
7.	NZ / Australian plug adaptor		

PLEASE FOLLOW THE MANUAL STEP BY STEP BEFORE FIRST USE BEGINS

IMPORTANT - pH Probe Care

The pH Probe is the only part of the Guardian Monitor that should ever require replacing. 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 ensure you receive a long life from your 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.



DO NOT allow the probe tip to dry. **IF IT DRIES IT DIES!**

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

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

DO NOT plunge a cold pH probe into a hot 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 probe.

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

Preparing the pH probe for use

Remove the wetting cap by gently sliding/twisting the cap off without bending the pH probe. Store the wetting cap in a safe place.

When storing the pH Probe;

The probe tip must be kept moist. To prepare the probe for storage, place a very small amount clean water (never distilled or deionised water) or pH 4.0 solution into the wetting cap, then place wetting cap over the probe tip. If for some reason the probe tip has been allowed to dry out, then the probe must be 'hydrated' for 24 hours in fresh clean water or pH 4.0 solution. Following this; carry out a calibration to check operation, as the probe may have already suffered permanent damage.

STEP 1 – Mounting the Monitor

If wall mounting;

Select a suitable location that is less than 2 meters from your tank, and less than 1.5 meters from an electrical mains outlet.

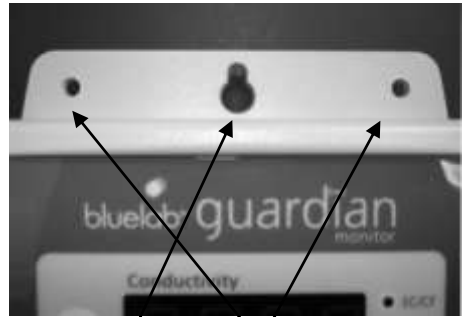
NOTE: Avoid placing the monitor where it can be damaged by direct sunlight, water or nutrient salts.

Option 1

1. Install both top and bottom centre fasteners to the wall. (172mm / 6.¾" apart)
2. Slide the monitor onto the fasteners.

Option 2

1. Fix the four fasteners through each mounting hole in each corner of the case.



Option 1;
Mounting keyholes
top and bottom

Option 2;
Mounting holes
top and bottom

If mounting on a support or bar;

1. Select a suitable location that is less than 2 meters from your tank, and less than 1.5 meters from an electrical mains outlet.

NOTE: Avoid placing the Monitor where it can be damaged by nutrient salts.

2. Fix each of the cable ties provided through the small mounting holes in the top of the case and wrap around the support/bar and secure.



Cable ties fixed through small mounting holes around a support or bar

STEP 2 - Install correct plug adaptor

1. Select the appropriate mains plug adaptor for your country.
2. Connect the plug adaptor to the power supply.

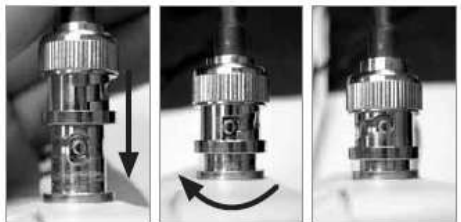
STEP 3 – Connect power adaptor and pH Probe

1. Connect power adaptor into base of monitor where 'Power Input' is labelled, and plug adaptor into mains power supply.
2. Connect the pH Probe to the monitor.



STEP 4 – Power up

1. Switch on power adaptor at the mains.
2. When power is applied the Guardian will complete a display test sequence.



Inserting

Twisting

Attached

STEP 5 - Select the desired conductivity unit

Conductivity readings can be displayed in EC, CF, TDS or ppm700. The selected unit is indicated by one of the 3 LEDs next to the Conductivity window. When the EC/CF LED is on, the monitor is displaying conductivity in units of EC or CF. If there is a decimal point present in the conductivity display, the units are EC. If there is no decimal point the units are CF.

To change the units to be displayed;

1. Press and hold the conductivity 'units' button and after 3 seconds it will change to the next unit indicated by the glowing LED.
2. Release.
3. Repeat step 1 and 2 until the desired unit is selected.



STEP 6 - Select the desired temperature unit

Temperature readings can be displayed in either degrees Celsius (°C) or degrees Fahrenheit (°F). The selected unit is indicated by one of the two LEDs next to the Temperature window.

To change the unit to be displayed;

1. Press and hold the temperature 'units' button and after 3 seconds it will change to the next unit indicated by the glowing LED.
2. Release.
3. Repeat step 1 and 2 until the desired unit is selected.



STEP 7 - Select the desired brightness level of the LED displays

These can be adjusted to best suit the light levels of the environment. There are eight (8) levels of 'brightness' that can be selected.

To change the brightness;

1. Press and hold the **brightness** button and at the same time press either the **up** or **down** buttons to change the brightness. Brightness levels are shown in the pH window. 1=least bright, 8=brightest



STEP 8 - pH Calibration

pH calibration is required before first use to ensure that the first reading is accurate. pH probes require repeated calibration. Calibration is advised when;

- Typically more than 30 readings have taken place
- The reading is different to that expected
- The pH probe is replaced with a new one
- It has been a month since the last successful calibration
- The monitor is reset to factory default

When calibrating the pH probe after first use, the probe may require cleaning. See probe cleaning on page 13.



For best pH calibration;

- Ensure probe is clean and rinse with clean water/distilled water to reduce contamination of the pH calibration solutions
- Only fresh uncontaminated solutions should be used
- Conductivity/temperature probe should also be placed in the same solution as the pH probe while calibration is taking place. This is so the monitor can measure the temperature of the calibration solution. Wait until the conductivity / temperature probe is at the same temperature as the calibration solution
- Calibrate the pH at the same temperature as the solution to be measured
- If you expect to measure a pH below 7.0, the monitor is calibrated using pH 7.0 and pH 4.0 calibration solutions. If you expect to measure a pH above 7.0, pH 7.0 and pH 10.0 solutions are used
- **ALWAYS Calibrate the pH Probe with pH 7.0 then pH 4.0 or pH 10.0**

NOTE: The conductivity/temperature probe does not need to be calibrated, but must be cleaned to remove any build up of nutrient salts.

To calibrate the pH probe follow these steps;

1. In three separate containers prepare a small amount of fresh water, pH 7.0 solution and either pH 4.0 or pH 10.0 solution.
2. Rinse the pH probe in fresh water and place the probe tip into the pH 7.0 buffer solution and wait for the reading in the pH window to stabilise. Press and hold the **pH cal** button for a few seconds until PH CAL appears in the windows, then release the **pH cal** button. The '7' LED will glow green. All three windows will return to monitoring mode with all current values being displayed. If ERR is displayed see the troubleshooting guide on page 15.
3. Rinse the pH Probe in fresh water by gently stirring.

Place the probe tip into the pH 4.0 or pH 10.0 solution and wait for the reading in the pH window to stabilise. Press and hold the **pH cal** button for a few seconds until PH CAL appears in the windows, then release the **pH cal** button. The 4/10 LED will glow green. All three windows will return to monitoring mode with all current values being displayed. If ERR is displayed see the troubleshooting guide on page 15.



pH Calibration LEDs

The LEDs next to the pH window will let you know the status of calibration. See the table at right.

NOTE: The pH probe and hence calibration will eventually fail due to;

- Contamination and age of pH Probe
- pH Probe used to measure solutions at temperatures above 50 °C (122 °F) or below 0 °C (32 °F)
- pH probe exposed to aggressive chemicals
- Internal damage to the pH probe from rough treatment
- Damage to the cable of the pH probe from rough treatment
- Probe repeatedly drying out
- Moisture getting inside the BNC connector on the pH probe cable

<input type="radio"/> 7 <input type="radio"/> 4/10	Using factory default calibration values. Both LEDs off
<input checked="" type="radio"/> 7 <input type="radio"/> 4/10	pH 7 calibrated OK. Using factory default for pH 4/10
<input checked="" type="radio"/> 7 <input checked="" type="radio"/> 4/10	pH 7 & pH 4 or pH 10 calibrated OK.
<input checked="" type="radio"/> 7 <input checked="" type="radio"/> 4/10	30 days passed since last full calibration - calibration due.
<input checked="" type="radio"/> 7 <input type="radio"/> 4/10	If 7 is flashing and 4/10 is off, calibration is also required as 4/10 was never calibrated

STEP 9 - Placement of probes

Both the pH and conductivity/temperature probes require submersion in the liquid for measurement.

1. Fit the (optional) pH probe holder to the stem of the pH probe using a gentle twisting motion.
2. Place the pH Probe into the reservoir and push the suction cup onto the side of the reservoir but far enough down so the probe tip is in the solution. The holder prevents damage to the pH probe from banging onto the side of the reservoir with movement of the solution.
3. Place the conductivity probe into the reservoir.

NOTE: Do not pour concentrated nutrient solution or pH adjuster directly onto probes when in the reservoir.



STEP 10 – Set Alarms (optional)

The alarm function warns you when the solution deviates from the desired levels you have chosen for each measurement. When an alarm condition is present, the display of the affected measurement will flash. If the measurement changes back to within the limits you have chosen, the flashing will stop.



There are two ways to set the alarm, 'quick-set' or 'Detailed'.

Alarm 'Quick-set'

This allows you to quickly set the 'alarm HIGH' and 'alarm LOW' values for all of the three measurements. The table below shows the values that are pre-set when 'quick-set' is used.

NOTE: Before you set the alarms, ensure the solution in the tank/reservoir is adjusted to the desired/actual levels for all three parameters and that these are displayed in each of the windows.

	<i>Alarm Low</i>	<i>Alarm High</i>
Conductivity	<i>actual value – 2 CF / 0.2 EC 100 TDS 140 ppm</i>	<i>actual value + 2 CF / 0.2 EC 100 TDS 140 ppm</i>
Temperature	<i>actual value – 3 °C / 5 °F</i>	<i>actual value + 3 °C / 5 °F</i>
pH	<i>actual value – 0.5 pH</i>	<i>actual value + 0.5 pH</i>

To activate the 'quick-set' alarm;

1. Press and hold the **alarm** button until **AL H** is displayed in all three windows.
2. Release the **alarm** button.
3. Press the **brightness** button once.
4. All three windows will display **Auto** for 1 second and then **SAVE** will be displayed in the conductivity window. The alarms are now auto set and the alarm mode will be turned on. The alarm LED will glow.

Turn alarm ON/OFF

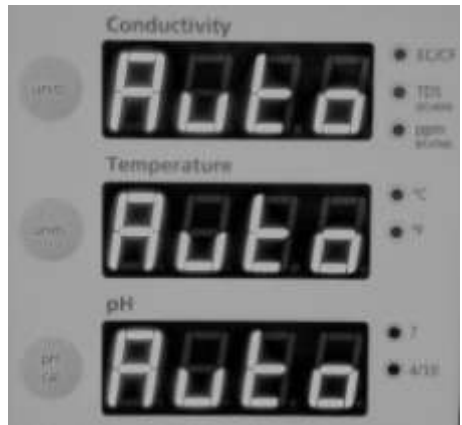
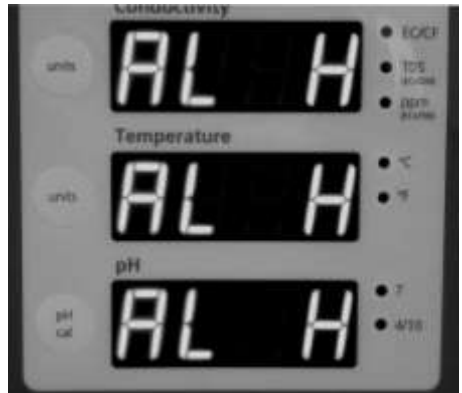
Press the **alarm** button to change between alarm ON and alarm OFF. When the alarm is ON the alarm LED will glow.

NOTE: If you press and hold the alarm button you will enter the alarm setting mode.

Detailed Alarm Set

To set the detailed 'alarm HIGH' and 'alarm LOW' values;

1. Press and hold the **alarm** button until **AL H** is displayed in all three windows.
2. Release the button and the current 'alarm HIGH' values are displayed in each window.
3. To set conductivity alarm high value, press the conductivity **unit** button then the **up** and **down** buttons to change its value.
4. To set temperature alarm high value, press the temperature **unit** button then the **up** and **down** buttons to change its value.
5. To set pH alarm high value, press the pH **unit** button then the **up** and **down** buttons to change its value.
6. Press the **alarm** button to now select the low alarm values.
7. Set the low alarm values the same way as you did the high alarms.
8. Press the **alarm** button. **SAVE** is briefly displayed in the conductivity window and the Monitor will return to its normal monitoring mode.



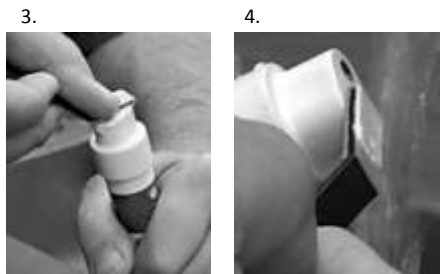
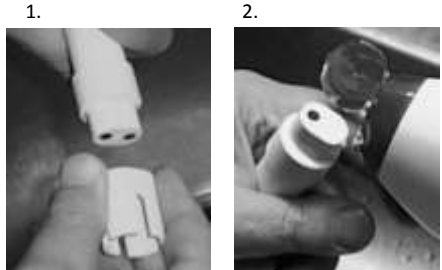
NOTES:

- To review current alarm settings without changing the values, repeatedly press the alarm button to step through the high & low alarms.
- If you want to exit the alarm settings mode without keeping any changes you have made DO NOT press any keys. The Monitor will 'timeout' and return to its normal monitoring mode without saving any changes after 1 minute.
- The software will prevent you from setting low alarm values higher than the high alarm values.

MAINTENANCE

Conductivity / temperature probe cleaning

1. Remove shroud by holding the body and pulling away the shroud.
2. Using an unscented liquid scourer such as Jif or Soft Scrub place one or two drops onto the probe face and using a finger or Bluelab chamois, rub firmly and vigorously to clean the probe face.
3. Check that water forms an even film across the surface of the probe. If beading of water is present, clean again. Beading indicates the presence of oil on the probe surface.
4. Refit the shroud and test in 27.7CF/2.77EC solution as set out below.



Clean, smooth film Contaminated, uneven film Oily, beading visible

TO TEST

Please use the following standard solutions when testing. Bluelab solutions are recommended.

CF	EC	TDS (EC x 500)	Ppm (EC x 700)
27.7	2.77	1385 ppm	1940 ppm

1. Place a small amount of the correct standard solution into a clean container.
2. Place the conductivity/temperature probe into the solution; ensuring that it is adequately submerged.



3. Wait until the conductivity reading stabilises. The conductivity reading should be within 1 CF, 0.1 EC, 50 TDS or 70 ppm of the values in the table above.

If the reading is lower than 2.77 EC;

1. Ensure that the 2.77 EC standard solution is fresh and uncontaminated and of a qualified brand; if you are unsure, use new solution. NEVER add water to solutions.
2. Wait 1 – 2 minutes for the probe to reach the solution temperature. In extreme temperatures 5 – 10 minutes may be necessary.

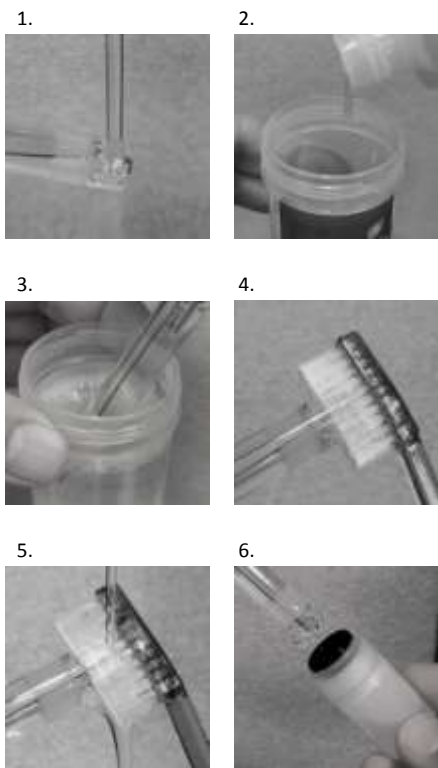
NOTE: Probes that read low generally only require cleaning.

3. If the reading remains higher than 2.9 EC after testing all of the above, check solution has not evaporated during storage.

Cleaning the pH Probe

To ensure accurate pH readings Bluelab recommend that the pH Probe is rinsed in clean fresh water before replacing the wetting cap and that it is cleaned when required by following the instructions below;

1. Rinse pH probe tip under fresh water.
2. Fill a small container with clean water and add a small amount of mild detergent (dishwashing liquid).
3. Gently stir the pH probe tip in the mixture. Ensure that you do not 'knock' the probe on the side of the container as this may cause damage to the probe. Rinse well under fresh running water to remove all traces of the detergent mixture.
4. ONLY if the probe tip requires removal of heavy contamination, gently brush around the glassware with a few drops of mild detergent (dishwashing liquid) and a soft toothbrush. DO NOT pull out or touch the wick.
5. Rinse well under fresh running water to remove all traces of the detergent mixture.
6. Recalibrate the pH probe. See the pH calibration section on page 8 or place wetting cap back onto probe tip.



Troubleshooting Guide

Trouble	Possible reason	Possible solution
Nutrient reading low	Contaminated probe	Clean probe (see page 13)
	Temperature of probe and solution different	Wait 5-10 minutes for conductivity / temperature probe to reach solution temperature
Temperature reading inaccurate	Temperature of probe different to solution temperature	Wait 5-10 minutes for probe to reach solution temperature
pH reading inaccurate	Contaminated probe	Clean pH probe (see page 13). Replace probe if in doubt Wait longer for reading to stabilize before calibrating
	Using factory default calibration	Calibrate pH probe – see page 8
	Calibration old	Calibrate pH probe – see page 8
Display shows ERR during calibration	An attempt was made to calibrate with pH 4.0 or pH 10.0 calibration solution more than one hour after calibration with the pH7.0 solution	Calibrate to pH 7.0 again then do pH 4.0 / pH 10.0 calibration within one hour
	Old or contaminated solutions used for calibration	Use fresh calibration solutions
	Dirty or contaminated probe	Clean probe – see page 13
	pH Probe tip been allowed to dry	Hydrate pH probe – see page 5
	Probe damaged or old	Replace pH Probe
No Display	Mains not switched on	Switch mains power on
	Power adaptor not plugged into the monitor	Plug power adaptor into the base of the monitor labeled Power Inlet
A display shows or -----	Over range value Under range value EC and pH cannot be determined as temperature range is over / under (see technical specification range page 14)	Check all equipment for faults. Check probes for signs of damage. Test pH probe in calibration solutions and conductivity / temperature probe in a known conductivity standard solution to eliminate these as a cause of this problem. Check solution tank / reservoir for problems.

Technical Specifications

	pH	Conductivity	Temperature
Range	0.0 – 14.0 pH	0.0 – 5.0 EC 0 – 50 CF 0 – 2500 TDS (EC x 500) 0 – 3500 ppm (EC x 700)	0 – 50 °C 32 – 122 °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
Temperature Compensation	Yes - (if conductivity probe is in same solution as pH probe)	Yes	Not applicable
Operating Environment	0 - 50 °C / 32 – 122 °F		
Power Source	Input: 100 – 240 Vac 50-60Hz, 5 VA, Output: 5Vdc 1Amp 4 interchangeable plug types (USA, Euro, UK, NZ/AUS)		
Calibration	Two point (pH 7.0 & pH 4.0 or pH 10.0)	Not required (factory calibrated)	Not required (factory calibrated)
Other Features	Silent visual alarm, adjustable display brightness water resistant, non-volatile memory, over 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 Truncheon®, 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)

