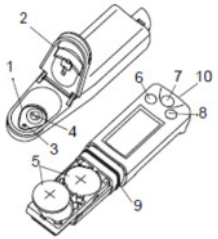
HORIBA Scientific LAQUAtwin

Instruction Manual (Operation)

LAQUAtwin CA-11 / K-11 / NA-11 / NO3-11

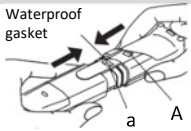
Part Names

1. Sensor
2. Sensor cover
3. Liquid Junction
4. Membrane
5. Lithium batteries
6. MEAS key
7. ON/OFF key
8. CAL key
9. Waterproof gasket
10. Strap eyelet



Attach the sensor

1. Power OFF the meter.
2. Confirm that the waterproofing gasket is clean and undamaged.
3. Slide the sensor onto the meter, catch "A" on the meter should fit into hole "a" on the sensor.



Note

Be careful not to twist the waterproof gasket.

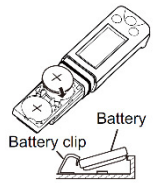
Detach the sensor

1. Power OFF the meter.
2. Lift the sensor tongue tip and slide the sensor a little away from the meter.
3. Pull out the sensor all the way from the meter.

Insert batteries

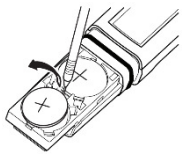
1. Power OFF the meter.
2. Detach the sensor.
3. Slide both batteries into the battery case as shown.
4. Attach the sensor.

Use 2x CR2032 batteries, place the plus sides (+) upwards.



Remove batteries

1. Power OFF the meter.
2. Detach the sensor.
3. Use a ball-point pen or other tool to pry the batteries out from the clips.
4. Attach the sensor.



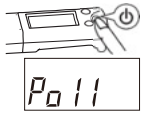
Electrode conditioning

- *Perform electrode conditioning before using the sensor for the first time or after several days of disuse.*
- *Perform calibration after conditioning.*

1. Power OFF the meter.
2. Place some drops of 2000 ppm standard solution on the sensor.
3. Wait a few hours.
4. Dispose of the standard solution.
5. Rinse the sensor with DI- or tap water.

Power on / off

1. Press **ON/OFF** key to switch the meter on or off.



IMPORTANT

Keys must be pressed for 1 second to function.

Settings menu

Customize the meter to the specific needs.

Operating keys functions

- **MEAS**: Select options in the menu.
- **CAL**: Confirm settings, go to next option.
- **ON/OFF**: Escape without saving.

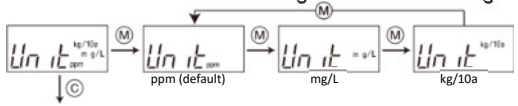
Open settings menu

1. Power OFF the meter.
2. Simultaneously press and hold **MEAS** and **ON/OFF** keys (approx. 3 seconds).

Set units of measurement

Unit options vary with different meter models.

3. Press **MEAS** to scroll.
4. Press **CAL** to confirm and go to the next setting.



Set Low calibration point

Set the value to match the standard solution.
Value can be set from 5 to 990ppm.

5. Press **MEAS** to scroll. Keep pressed to increase scrolling speed.
6. Press **CAL** to confirm and go to the next setting.

Set High calibration point

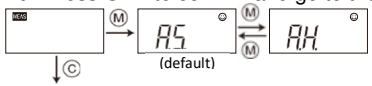
Set the value to match the standard solution.
Value can be set from 160 to 9990ppm.

7. Press **MEAS** to scroll. Keep pressed to increase scrolling speed.
8. Press **CAL** to confirm and go to the next setting.

Stability mode

Choose A.S. (Auto Stable) or A.H. (Auto Hold).
A.S. mode: *☺ appears at stable value. If the value changes ☺ disappears until new stability is reached (continuous measurement).*
A.H. mode: *☺ appears at stable value and holds it in the display. Press **MEAS** to do another measurement.*

9. Press **MEAS** to scroll.
10. Press **CAL** to confirm and go to the next setting.



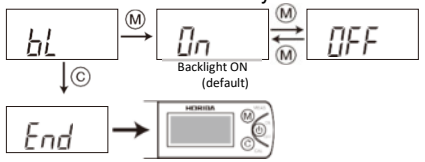
Multiplying compensation

Apply compensation coefficient (0.01 to 9.90) to the measured value. The compensated result is displayed as the measured value.

11. Press **MEAS** to scroll. Keep pressed to increase scrolling speed.
12. Press **CAL** to confirm and go to the next setting.

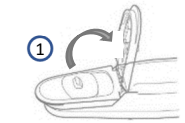
Backlight on/off

13. Press **MEAS** to scroll.
14. Press **CAL** to confirm and go to **END**. Meter will shut down automatically.



Calibration

- *Calibration is required before measurement.*
- *Use standard solutions within the measurement range in the specifications.*
- *Calibration values are saved even if the meter is switched OFF.*
- *Calibration value is rewritten if calibration is repeated using the same standard solution.*
- *Calibrate with solutions close to the expected value.*



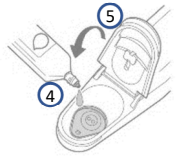
1. Open the sensor cover.
2. Rinse the sensor with DI– or tap water.

3. Dry the sensor with a tissue.

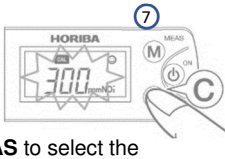
Tip

Rinse again with some of the next standard solution for increased accuracy.

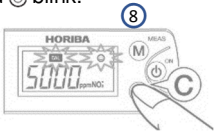
4. Cover the complete sensor with standard solution.



5. Close the sensor cover.
6. Switch on the meter.
7. Press **CAL** key. Set calibration value blinks and CAL is shown.



8. Press **CAL** to calibrate or **MEAS** to select the other calibration point. CAL and ☺ blink. After calibration complete, CAL and ☺ stop blinking and the measured value is displayed.



The 1st point has now been calibrated.

9. Repeat step 1 to 8 for the 2nd calibration point.

Clear Calibration data

Clear calibration data in the following cases:

- *If the number of previous calibration points is uncertain.*
- *After the sensor is replaced.*
- *When Er4 persists.*

1. Power OFF the meter.
2. Simultaneously press and hold **MEAS** and **CAL** keys (approx. 3 seconds).
3. Press **CAL** to confirm or **ON/OFF** to cancel.

Temperature adjustment

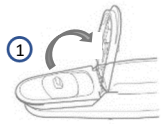
*Only available in **A.S. Stability mode**, see Setting Menu. Normally this is not necessary. Adjust the temperature only when the value is not correct.*

1. Prepare a reference thermometer.
2. Allow the meter and thermometer to reach the same temperature.
3. Make sure you are in A.S. mode.
4. Press **MEAS** to view temperature.
5. Press **CAL**, value blinks.
6. Press **MEAS** to adjust the value to match the thermometer.

Press **CAL** to confirm. CAL and **ºC** will blink until adjustment is done.

Measurement

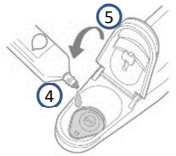
1. Open the sensor cover.
2. Rinse the sensor with DI– or tap water.
3. Dry the sensor with a tissue.



Tip

Rinse again with some of the next standard solution for increased accuracy.

4. Cover the complete sensor with sample solution.
5. Close the sensor cover.
6. Switch on the meter.



The meter will start measurement immediately. ☺ will appear once the value is stable.
A.S. mode: If the value changes ☺ disappears until new stability is reached (continuous measurement).
A.H. mode: Holds the last value in the display. Press **MEAS** to do another measurement.

Using Sampling Sheet B

Using this sheet, the sensor can be covered with only 50 µL to 100 µL sample.

1. Take the sheet with tweezers.
2. Wipe across the sample.
3. Follow the steps for normal measurement.

Using Sampling Sheet B and holder

Tiny particles in samples (e.g. extract from soil) influence the measurement result. Use the sampling sheet holder cover and sampling sheet B to counteract the influence.

1. Replace the sensor cover with the sheet holder.
2. Open the sheet holder.
3. Place a sampling sheet on the sensor.
4. Close the sheet holder.
5. Put a few drops of sample in the sheet holder.
6. Follow the steps for normal measurement.

View mV or Temperature

*Only available in **A.S. Stability mode**, see Setting Menu. From measurement:*

1. Press **MEAS** to view temperature.
2. Press **MEAS** again to view mV.
3. Press **MEAS** again to view units.

Reset to factory defaults

All settings will be reset to the factory default settings. Calibration data will be deleted.

1. Power OFF the meter.
2. Simultaneously press and hold **MEAS**, **ON/OFF** and **CAL** keys (approx. 3 seconds).
3. Press **CAL** to confirm or **ON/OFF** to cancel.

Maintenance and Storage

- *Clean the sensor after use with DI- or tap water.*
- *Gently remove moisture from the sensor by dapping with a tissue.*
- *Close the sensor cap and slide cap when storing.*
- *Sensor can be stored dry. Perform sensor conditioning when the meter has been out of use for a longer period.*
- *Store at room temperature.*

Specifications

Features for all meters	
Measurement Principle	Ion Selective Electrode
Minimum Volume	0.3ml (0.05ml with sampling sheet B)
Resolution	0 to 99 ppm: 1 ppm 100 to 990 ppm: 10 ppm 1000 to 9900 ppm: 100 ppm
Calibration Points	Up to 2
Temperature Calibration	5 to 40.0 °C
Temperature Display	0 to 50.0 °C
Operating Temperature	5 to 40.0 °C
Operating Humidity	85% or less relative humidity (no condensation)
Power	CR2032 batteries (2)
Battery Life	Approx. 400 hours in continuous use
Material	ABS epoxy
Dimensions	164 x 29 x 20 mm (excluding projections)
Mass	Approx. 55 g (including sensor and batteries)
Measurement modes	Auto Hold / Auto Stable Measurement
Automatic Power Off	After 8 minutes
Low Battery Indicator	•
IP67 Dust/Waterproof	•
Replaceable Sensor	•
Display	LCD with backlight
Warranty	Meter 24 months / sensor 6 months

Parameter	CALCIUM	POTASSIUM	SODIUM	NITRATE
Model	CA-11	K-11	NA-11	NO3-11
PART #	3200689161	3200689160	3200689159	3200689162
Range ppm / mg/L	4 to 9900		2 to 9900	6 to 9900 NO3 / 1.4 to 2200 NO3-N
Range mmol/L	0.1 to 250		0.1 to 430	
Range kg/10a		2 to 5000		0.7 to 1100
Accuracy	±20% of actual value	±10% of actual value		
Interfering ions and selective coefficients	Fe^{2+}, Zn^{2+}: 1 Fe^{3+}: 10 Cu^{2+}: 1 ▯ 10^{-2} (at 10^{-3} mol/L Ca^{2+})	Rb^{+}: 1 ▯ 10^{-1} (at 10^{-3} mol/L K^{+})	K^{+}, Rb^{+}: 1▯10^{-2} (at 10^{-3} mol/L Na^{+})	I^{-}: 10 NO_2^{-}: 7 ▯ 10^{-1} Cl^{-}: 4 ▯ 10^{-2} Br^{-}: 9 ▯ 10^{-1} (at 10^{-3} mol/L NO_3^{-})
pH range	4 to 12 pH (at 10^{-3} mol/L Ca^{2+})	2 to 9 pH (at 10^{-3} mol/L K^{+})	3 to 9pH (at 10^{-3} mol/L Na^{+})	3 to 8 pH (at 10^{-3} mol/L NO_3^{-})

Error	Solution
Er1	The meter may be defective. • Reset to factory defaults. If resetting does not work the meter needs to be replaced. Repair is not possible.
Er2	Internal board is defective. • Meter needs to be replaced, repair is not possible.
Er3	Internal board is defective. Meter needs to be replaced, repair is not possible.
Er4	Calibration error • **CAL** is pressed in mV mode. • Temperature offset is too large, wait longer to perform temperature adjustment.
Er4 + CAL blinks	Calibration error • Retry calibration. • Ensure the standard solution complies with the set values for LOW and HIGH calibration points. • Clean and recondition the sensor. • Try new, fresh solutions. • Clear Calibration data. • Reset to factory defaults. If the above does not work, the sensor might need replacement.
Or or Ur	Over or Under Range: value is higher (Or) or lower (Ur) than the meter's limits. • Measure a standard, if Or/Ur shows again, the sensor needs to be replaced.

Replacement sensors		
Part	**Art. number**	**Description**
S022	3200459867	Sodium (Na) sensor for B-722 and NA-11
S030	3200459868	Potassium (K) sensor for B-731 and K-11
S040	3200459870	Nitrate (NO3) sensor for B-74x and NO3-11
S050	3200459869	Calcium (Ca) sensor for B-751 and CA-11
Standard solutions 6 x 14ml		
Y022H *	3200457723	Na Sodium 2000ppm
Y022L *	3200457724	Na Sodium 150ppm
Y041	3200053433	NO3 Nitrate 5000 ppm
Y042	3200053514	NO3 Nitrate 300 ppm
Y043 *	3200053532	NO3 Nitrate 2000 ppm
Y044	3200053535	NO3 Nitrate 30 ppm
Y045 *	3200053536	NO3 Nitrate 150 ppm
Y031H *	3200457719	K Potassium 2000ppm
Y031L *	3200457720	K Potassium 150ppm
Y051H *	3200457727	Ca Calcium 2000ppm
Y051L *	3200457728	Ca Calcium 150ppm
Accessories		
Y-011A	3014053435	Sampling sheet C-5 Rolls, 11mm x 6m
Y046	3200053858	Sampling sheet B-100pcs
Y048	3200459736	Sampling sheet holder for LAQUAtwin series
Crop Press	3200254910	Crop sap press

* Solutions are included with the meter.

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