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Operating instructions

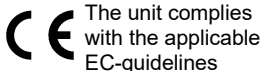


Fig. 1: 12914-00 Cobra SMARTsense Chloride Ion

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1 SAFETY PRECAUTIONS



Caution!

- Carefully read these operating instructions completely before operating this instrument. This is necessary to avoid damage to it, as well as for user-safety.
- Only use the instrument for the purpose for which it was designed.
- Only use the instrument in dry rooms in which there is no risk of explosion.
- Protect the instrument from dust, moisture and vapours. Use a slightly moist lint-free cloth to clean the instrument. Do not use aggressive cleaning agents or solvents.

2 PURPOSE AND CHARACTERISTICS

The sensor is used for the measurement of chloride ion concentrations in liquids and the wireless transmission of the measured values via Bluetooth to any end device such as tablets, smartphones, etc.

3 FUNCTIONAL AND OPERATING ELEMENTS

3.1 Operating elements

The sensor has an on-button and two LEDs for indicating the Bluetooth and battery charge status.

On-Button 

Pressed for longer 3s	Switch sensor on/off
Pressed 3x quickly	Start offline measurement
Pressed 2x quickly	Stop offline measurement

Bluetooth-LED 

Flashing red every 2 seconds	Not connected
Flashing green every 2 seconds	Connected to the terminal device
Flashing green every 4 seconds	Running measurement

Battery charge LED 

Flashing red every 5 seconds	Low battery
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3.2 Measurement inputs

On the front side of the sensor there is a BNC connector to which the supplied chloride ion-selective electrode (PCI-2-010) can be connected.

4 NOTES ON OPERATION

The device fulfils all of the technical requirements that are compiled in current EC guidelines. The characteristics of this product qualify it for the CE mark.

This instrument is only to be put into operation under specialist supervision in a controlled electromagnetic environment in research, educational and training facilities (schools, universities, institutes and laboratories).

The individual connecting leads are each not to be longer than 2 m.

The instrument can be so influenced by electrostatic charges and other electromagnetic phenomena (HF, bursts, indirect lightning discharges) that it no longer works within the given specifications. Carry out the following measures to reduce or eliminate the effect of such disturbance: Ensure potential equalization at the PC (especially with Laptops). Use screening. When a total failure of the instrument occurs, unplug it and plug it back in again for a reset.

5 HANDLING

This section describes the start-up of the sensor and the recording of measurement data. Please read this section thoroughly in order to avoid failures or operating errors.



The sensor may only be used in liquids with a pH value of 2...6. Use outside this range will result in incorrect measurements and possibly damage to the sensor.

5.1 Start-up

Switch the sensor on by pressing the on-button for more than 3 seconds. The Bluetooth LED lights up red. Start the software and select the sensor.

There is a 9-digit code on the back of the sensor (Fig.2). The last 4 digits of the code corresponds to the last four digits of the sensor name in the software (Fig.3).



Fig.2

This allows an exact assignment of the sensors with the software.

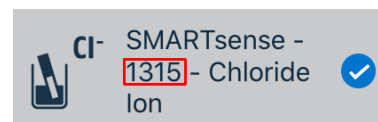


Fig.3

After the sensor has been selected in the software, the LED flashes green to indicate a correct connection. If the sensor is switched on and not connected, it switches off automatically after 5 minutes

Connect the supplied chloride electrode PCI-2-010 to the BNC connector of the sensor.



Fig.4

5.2 Preparation

Please note the following instructions for using the chloride ion sensor.

Required for activation, calibration, and measurement:

- Deionized water (Art. No. CHE-882041145)
- 0.001 mol/L potassium chloride solution (1 mM KCl), prepared by diluting the 1 mol/L potassium chloride solution
- 5 mol/L sodium nitrate solution (NaNO₃) as ionic strength adjuster
- 1 mol/L potassium chloride solution as standard solution (or optionally 3 mol/L potassium chloride solution as standard solution)

Electrode Activation

The electrode must be activated before first use and after prolonged storage. Use only a 0.001 mol/L potassium chloride solution (1 mM KCl) for this purpose. Other substances such as calcium chloride (CaCl₂) or sodium nitrate (NaNO₃) are not required for activation.

Proceed as follows:

1. Remove the protective cap from the electrode.
2. Immerse the electrode in the activation solution for at least 2 hours.
3. Ensure that the electrode tip does not rest on the bottom of the vessel.
4. Rinse the electrode thoroughly with deionized water afterwards.

Ionic Strength Adjuster

The 5 mol/L sodium nitrate solution serves as an ionic strength adjuster.

It is used exclusively during calibration and measurement to ensure a constant ionic strength.

Mixing ratio:

Test/measurement solution : 5 mol/L NaNO_3 = 50 : 1

Example:

Add 1 ml of 5 mol/L NaNO_3 to 50 ml of test or measurement solution.

5.3 Calibration

A 2-point calibration must be performed before the first measurement and before each measurement series. Perform the calibration using measureAPP or measureLAB. The sensor measures chloride ions (Cl^-). Calibration is therefore carried out at chloride ion concentrations within the specified measurement range. To avoid preparation and mixing errors, concentrated standard solutions are used, from which the calibration standards are prepared by dilution.

Preparation of Calibration Solutions

Two calibration solutions are used for the 2-point calibration. Potassium chloride standard solutions are used for their preparation. Concentration values refer to the chloride ion concentration Cl^- .

Calibration Solution 1: approx. 142 mg/L Cl^- Required for 1 liter of calibration solution:

- 4.0 ml of 1 mol/L KCl
- Deionized water to make up to 1000 ml

Mix the solution thoroughly afterwards. Before calibration, add 5 mol/L NaNO_3 to the calibration solution in a ratio of 50 : 1.

Example:

- 50 ml calibration solution
- 1 ml of 5 mol/L NaNO_3

Calibration Solution 2: approx. 1420 mg/L Cl^- Required for 1 liter of calibration solution:

- 40.0 ml of 1 mol/L KCl
- Deionized water to make up to 1000 ml

Mix the solution thoroughly afterwards. Before calibration, add 5 mol/L NaNO_3 to the calibration solution in a ratio of 50 : 1.

Example:

- 50 ml calibration solution
- 1 ml of 5 mol/L NaNO_3

Notes

The 3 mol/L KCl solution is not required for this calibration, but may be used as a concentrated stock solution. To avoid dosing errors, the use of the 1 mol/L KCl solution is recommended for preparing the calibration solutions.

To ensure measurement accuracy, the measuring electrode should be immersed in the respective solutions for 60 seconds at constant temperature, buffer solution and stirring speed before calibration and measurement.

Before changing samples, the electrode should be completely cleaned and the residual water carefully dried to avoid cross-contamination between samples.

5.4 Measured value recording

For the ion measurement of the media to be examined, they must first be mixed with the strengthening solution (medium:strengthening solution, factor 50:1).

The ion electrode is completely immersed in the medium to be measured at the measuring head. If a number of different test solutions are to be measured, it is advisable to rinse the ion electrode with deionized water between two measurements and carefully shake off the water to avoid cross-contamination of the samples.

5.5 Offline measurement

Switch the sensor on by pressing the on button for more than 3 seconds. To start an offline measurement, press the power button 3 times in quick succession. The Bluetooth LED then flashes green 3 times in rapid succession to acknowledge the successful start. To stop a measurement, press the switch-on button 2x in quick succession. The Bluetooth LED also acknowledges this by flashing quickly.

Offline measurements can be read out via the measureAPP or measureLAB software. Furthermore, offline parameters such as data rate and measurement duration can be set. After the set measurement duration has elapsed, the offline measurement is automatically terminated. However, the measurement can always be ended prematurely by pressing the switch-on button.

5.6 Maintenance and cleaning of the electrode

After use, clean the electrode with deionized water and dry carefully. Fit the protective cover, but make sure that the lower end of the electrode does not rest on the bottom of the protective cover.

5.7 Replacing the battery

Remove the battery

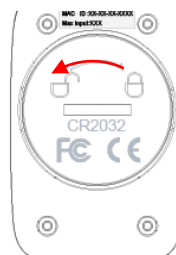


Fig. 5

Open the sensor by turning the screw cap on the back of the sensor counter-clockwise, e.g. with a coin.

Lever the battery sensitively, e.g. with the help of a small screwdriver or a small pair of scissors, out of its socket. Insert the screwdriver as shown in Fig. 6.



Fig. 6

Insert new battery

Slide the battery under the golden metal nose (Fig.7-1). Make sure that the battery is completely under the metal nose and completely pushed to the upper edge.

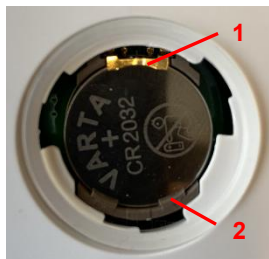


Fig. 7

Push the battery into the socket by pressing lightly on the opposite side.

The battery slips under the two plastic lugs (Fig. 7-2), which is also noticed by a short "click".



Fig. 8

Before closing, make sure that the seal in the lid is not bent and lies neatly on the edge of the lid. Then tighten the cover clockwise.

6 TECHNICAL DATA

Operating temperature range: 5 - 40°C

Relative humidity < 80%.

Measuring range	1.8... 3550 mg/l
Resolution	1 mg/l
Accuracy*	±10%
Max. data transfer rate	10 Hz
Battery type	CR2032
Max. wireless range (open field)	30 m
Dimensions (WxHxD)	90 x 44 x 23 mm
Weight (incl. electrode)	93 g

*After calibration

7 SCOPE OF DELIVERY

The scope of delivery includes:

- Cobra SMARTsense Chloride Ion 12914-00
- Chloride Ion-selective electrode PCI-2-010
- Instruction manual

8 ACCESSORIES

The following accessories are available:

- Button cell CR2032, 3 V 07922-15
- Cobra SMARTlink 12998-99
- Chloride Ion-selective electrode PCI-2-010 12914-10
- Free measureApp available from supplier portals

iOS



Android



Windows



9 CONFORMITY



PHYWE Systeme GmbH & Co.KG hereby declares that the radio system type 12914-00 complies with the 2014/53/EU directive. The complete text of the EC Declaration of Conformity is available at the following Internet address:

www.phywe.com/en/ec-declaration

10 DISPOSAL

The packaging mainly consists of environmentally-friendly materials that should be returned to the local recycling stations.



Do not dispose of this product with normal household waste. If this unit needs to be disposed of, please return it to the address that is stated below for proper disposal

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