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Cobra SMARTsense Nitrate Ion

12912-00

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Fig. 1: 12912-00 Cobra SMARTsense Nitrate Ion

Operating instructions

CE The unit complies with the applicable EC-guidelines

TABLE OF CONTENTS

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.
- Take care that no liquid penetrates in through the housing openings, as such penetration would result in damage to Sensor.

2 PURPOSE AND CHARACTERISTICS

The sensor is used for the measurement of nitrate 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 ᛒ

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

3.2 Measurement inputs

On the front side of the sensor there is a BNC connector to which the supplied nitrate ion-selective electrode (PNO3-2-002) 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 4...9. 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 seect 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).

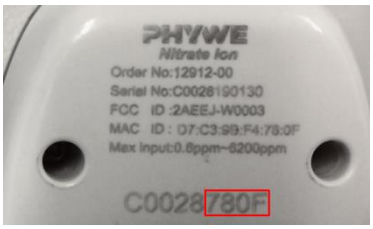

Fig.2

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

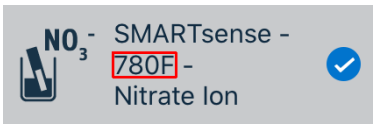

Fig.3

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 nitrate electrode PNO3-2-002 to the BNC connector of the sensor.

Fig. 4

5.2 Preparation

Important: The indicated molar masses refer to substances in the anhydrous state!

Preparation of the activation solution:
1 M $NaNO_3$ (one-molar sodium nitrate solution), 2 M $(NH_4)_2SO_4$ (two-molar ammonium sulphate solution) and H_20 deionised are required as stock solutions.
The concentration of the activation solution should be 1 mM $NaNO_3$, 40 mM $(NH_4)_2SO_4$. Due to the strong dilution of the activation solution, we recommend preparing it in larger quantities. For the preparation of 1 litre activation solution, you need:

- 979 ml H_20 deionised
- 1 ml 1 M $NaNO_3$
- 20 ml 2 M $(NH_4)_2SO_4$

Remove the protective cap from the lower end of the electrode. The electrode must be immersed in the activation solution for more than 2 hours before use. Make sure that the lower part of the electrode does not rest on the bottom of the container, this may damage the electrode.
Rinse the electrode in deionised water.

5.3 Calibration

Perform a 2-point calibration using measureAPP. Use 550 mg/l for the 1st measuring point and 5500 mg/l for the 2nd measuring point. Use a magnetic stirrer with uniform stirring speed for uniform mixing.
You need a strengthening solution to prepare the calibration solution and to carry out measurements. For the preparation of 1 litre of strengthening solution you need:

- 1000 ml H_20 deionised
- 264.28 g ammonium sulphate

Recipe for calibration solutions:
To prepare 1 litre of calibration solution you will need:

- 950 ml H_20 deionised
- 5500 mg sodium nitrate
- 50 ml strengthening solution

Take 100 ml of the prepared solution and add 900 ml of distilled water to it. You now have 900 ml calibration solution with 5500 mg/l and 1000 ml calibration solution with 550 mg/l available.

Hints:

- 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

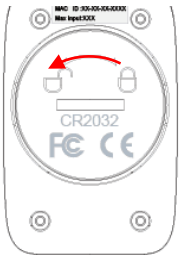

Fig. 5

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.

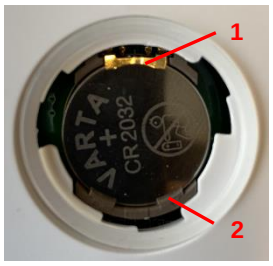

Fig. 7

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".

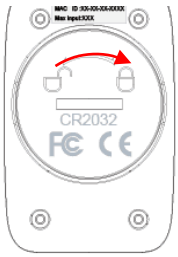

Fig. 8

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	0.6... 6200 mg/l
Resolution	2 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)	97 g

*After calibration

7 SCOPE OF DELIVERY

The scope of delivery includes:

- Cobra SMARTsense Nitrates Ion 12912-00
- Nitrate Ion-selective electrode PNO3-2-002
- Instruction manual

8 ACCESSORIES

The following accessories are available:

- Button cell CR2032, 3 V 07922-15
- Cobra SMARTlink 12999-99
- Nitrate Ion-selective electrode PNO3-2-002 12912-10
- USB-Bluetooth-Adapter 07936-00
- Software measureLAB 14580-61
- Free measureApp available from supplier portals

iOS **Android** **Windows**

9 CONFORMITY

CE

PHYWE Systeme GmbH & Co.KG hereby declares that the radio system type 12912-00 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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