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## Operating instructions

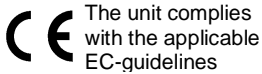


Fig. 1: 12932-01 Cobra SMARTsense CO<sub>2</sub>

## TABLE OF CONTENTS

1	SAFETY PRECAUTIONS
2	PURPOSE AND CHARACTERISTICS
3	FUNCTIONAL AND OPERATING ELEMENTS
4	NOTES ON OPERATION
5	HANDLING
6	TECHNICAL DATA
7	SCOPE OF DELIVERY
8	ACCESSORIES
9	CONFORMITY
10	DISPOSAL

## 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.
- Do not open the unit.

## 2 PURPOSE AND CHARACTERISTICS

The sensor is used for measuring the concentration of gaseous carbon dioxide and for transferring the values to a terminal device, e.g. a tablet computer, smartphone, etc., via Bluetooth or USB


### 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* 

To switch the sensor on and off in Bluetooth mode, the power button must be pressed for longer than 3s. If the sensor is to be connected via USB, it is not necessary to press the power button.

*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 2 seconds	Low battery
Illuminated red	Active charging process
Illuminated green	Charging process completed

#### 3.2 USB port

The battery, which is permanently installed in the sensor, is charged via the type C USB port. Furthermore, communication with a computer takes place via this interface.

### 4 NOTES ON OPERATION

This 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.

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. Do not operate high frequency emitters (e.g. radio equipment or mobile radiotelephones) in the immediate vicinity. 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.

#### 5.1 Charging process

Use a USB-C cable to connect the sensor to a computer or USB charger (not included).

During the charging process, the battery charge LED lights up red. When the charging process is complete, the battery charge LED lights up green. The charging time for a completely discharged battery is 3 hours maximum.



Disconnect the charger at the latest four hours after the completion of the charging process. Otherwise, the service life of the battery may be negatively affected.

#### 5.2 Start-up

Switch on the sensor by pressing the power button for more than 3s. Now the Bluetooth LED flashes red. Start the software and select the sensor.

If the sensor is to be used via the USB interface, it does not need to be switched on. The sensor is connected directly to the end device using the supplied USB cable.

There is a 9-digit code on the back of the sensor (Fig.2). The last 4 digits of the code are displayed as the sensor name in the software (Fig.3). This enables the precise assignment of the sensors within the software.

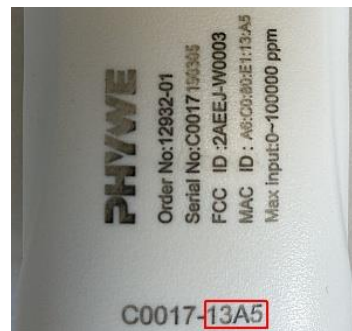


Fig. 2



Fig. 3

#### Selection of the sensor via the Bluetooth interface

Make sure that the Bluetooth interface is activated on the terminal device (PC/Tablet/Smartphone) and that the software is allowed to access the interface.

After the sensor has been selected in the software, the LED flashes green to indicate that the connection has been established correctly. After the sensor has been coupled with the software, the sensor is no longer visible to other users in the software, and therefore can no longer be selected.

If the sensor is switched on and not connected, it switches off automatically after 5 minutes.

#### Selection of the sensor via the USB interface

For this purpose the sensor must be plugged into the USB port of the end device. It is not necessary to switch on the sensor. The sensor is automatically recognized and displayed. It can be selected and connected directly.

#### 5.3 Recording of measurement data

##### Measuring principle:

The tip of the measuring tube is equipped with an infrared LED. The radiation of this LED is registered by an infrared sensor at the end of the measuring tube (at the front of the sensor). The gaseous CO<sub>2</sub> diffuses through the opening in the measuring tube from the atmosphere into the measuring tube. Ensure that the openings are not covered or blocked. The more CO<sub>2</sub> is present in the measuring tube, the more the infrared radiation will be absorbed, which is the basis for calculating the CO<sub>2</sub> concentration values in the sensor.

##### Measurement:

To measure the concentration of gaseous CO<sub>2</sub>, the sensor can be completely brought into the measurement environment (e.g. a classroom, terrarium, etc.) or it can be fastened to a vessel (e.g. an Erlenmeyer flask) with the aid of the rub-

ber stopper. Due to the measuring principle and the mechanical design of the system (flow through the measuring tube), a response time of the system of approx. 5 minutes is to be expected. It is not until after this delay that reliable measurement values can be read off. In addition, it must be taken into account that the measurement sensor (infrared sensor) requires a warm-up phase of 3 minutes.

The exchange of the air inside the measuring tube with the environment can be promoted by moving the sensor.

#### 5.4 Calibration

Lay the sensor down outside in fresh air for approx. 30 minutes (not in direct sunlight). In this situation, the CO<sub>2</sub> concentration is approx. 400 ppm. Then, press the ON button for more than 7 seconds. The sensor will be automatically calibrated based on the value of 400 ppm.

## 6 TECHNICAL DATA

Operating temperature range: 5 - 40°C

Rel. humidity < 80%

Measuring range	0...100000ppm
Resolution	2 ppm
Accuracy:	
0...5000 ppm	3 %
5000...50000 ppm	4 %
50000...100000 ppm	6 %
Max. data rate	1 Hz
Battery capacity	1000 mAh
Max. wireless range (open field)	30 m
Dimensions (length x width x height)	72 x 40 x 28 mm
Weight	77 g

## 7 SCOPE OF DELIVERY

The extent of delivery is as follows

- Cobra SMARTsense CO<sub>2</sub> 12932-01
- USB connecting cable type C 07935-00
- Operating instructions

## 8 ACCESSORIES

The following accessories are available:

- USB connecting cable type C 07935-00
- USB-charger 07934-99
- USB-Bluetooth-Adapter 07936-00
- Software measureLAB 14580-61
- Erlenmeyer flask, 250 ml 46142-00
- Rubber plug with hole 12932-10
- Free measureApp available from supplier portals

iOS



Android



Windows



## 9 CONFORMITY



PHYWE Systeme GmbH & Co.KG hereby declares that the radio system type 12932-01 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](http://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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