PHYWE excellence in science

Cobra SMARTsense Photogate

12909-00

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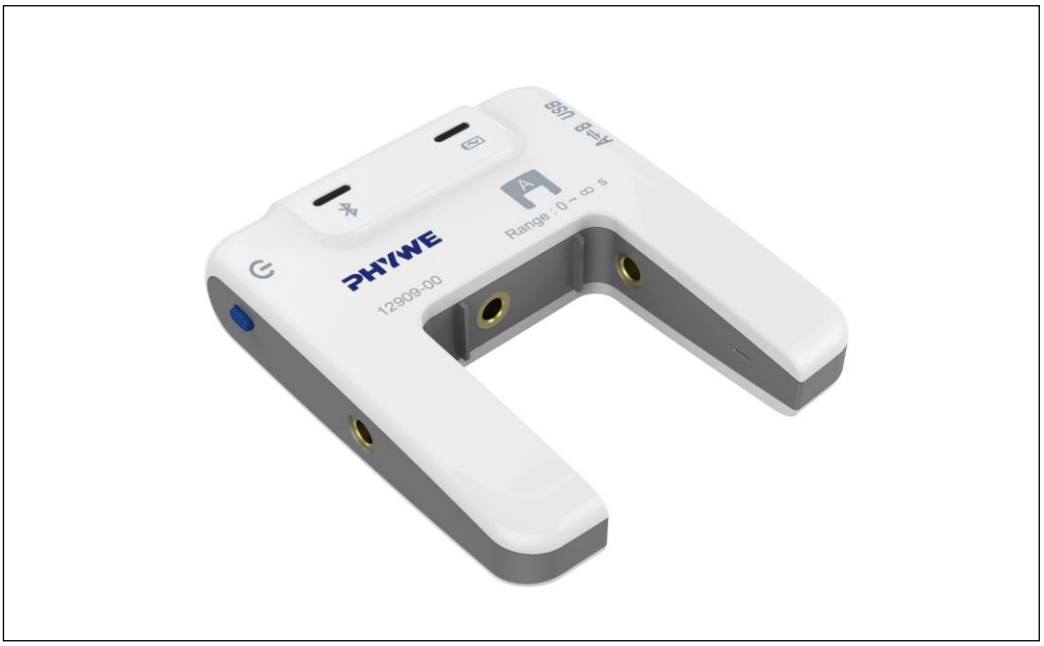

Fig. 1: 12909-00 Cobra SMARTsense Photogate

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.
- Do not open the unit.

2 PURPOSE AND CHARACTERISTICS

The sensor is used for measuring time and counter values and for transferring the values to a terminal device, e.g. a tablet computer, smartphone, etc., via Bluetooth.

3 FUNCTIONAL AND OPERATING ELEMENTS

The Cobra SMARTsense Photogate system includes two sensors. They are marked with the following symbols:

The sensors are connected by way of a 3.5 mm jack plug. In addition, both sensors have numerous threaded bushes into which threaded rods can be screwed to ensure a secure and precise experiment set-up.

3.1 Sensor A

3.1.1 Operating elements

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

On-button

Press the on-button for more than 3 seconds to switch the sensor on and off

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

3.1.2 USB port

The battery, which is permanently installed in the sensor, is charged via the type C USB port.

3.1.3 Connection interface A⇌B

The supplied cable for connecting the sensors "A" and "B" must be plugged into the socket.

3.2 Sensor B

3.2.1 Operating elements

The sensor has two LEDs for indicating the operating state and functional state.

Function of the operating LED

The sensor has two LEDs for indicating the operating state and functional state.

Function signal LED

This LED lights up when the optical path is uninterrupted. In the case of an interruption, i.e. if there is an object between the infrared transmitter and receiver, the LED goes out.

3.2.2 Connection interface A⇌B

The supplied cable for connecting the sensors "A" and "B" must be plugged into the socket.

4 NOTES ON OPERATION

This Cobra SMARTsense Photogate 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.

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

Connect sensor "A" to sensor "B" by way of the supplied connecting cable.

Switch sensor "A" on by pressing the ON button for more than 3 seconds. The Bluetooth LED flashes red. At the same time, the operation LED of sensor "B" lights up. Start the measureApp application and select the sensor. There is a four-digit code on the back of the sensor. This code corresponds to the last four digits of the sensor name in the measureApp application. This enables the precise assignment of the sensors within the measureApp application. After the sensor has been selected in the measureApp application, the LED flashes green, thereby signalling that the connection has been correctly established.If the sensor is switched on, but not connected, it will switch off automatically after five minutes.

5.3 Recording of measurement data

Measuring principle

The infrared light receiver of the sensor, which is located in a recess for protection against the ambient light, can only be reached by a very narrow beam of light. As a result, an object with an effective diameter of less than d = 0.5 mm at any position of the beam is sufficient for shading the receiver.

Measurement

The sensor supports four operating modes:

1. Run times
2. Shade times
3. Pendeulum
4. Counter

1. The runtime measurement (or propagation time measurement) is a measurement of the time between the start of the measurement (software switch of the app) and the moment when the light reaches sensor "A" and sensor "B".

2. The shading time measurement is a measurement of the time between the moment an object enters the infrared beam and the moment when it exits the beam.

3. In the "Pendulum" mode, the measurement is started when the pendulum enters the beam. The second entry of the pendulum into the beam is ignored and the third entry into the beam stops the measurement. As a result, it is possible to measure the full period of oscillation of a pendulum.

4. In the "Counter" mode, the number of times an object enters the beam is counted.

6 TECHNICAL DATA

Operating temperature range: 5 - 40°C
Rel. humidity < 80%

Measuring range	0…∞ s
Resolution	10 µs
Wavelength	infrared
Max. date rate	1000 Hz
Battery capacity	1000 mAh
Dimensions (LxWxH)	10 x 93 x 28 mm
Width of fork	50 mm
Max. wireless range (open field)	30 m
Thread for rod installation	M6
Weight	120 g

7 SCOPE OF DELIVERY

The extent of delivery is as follows

- 2 x Cobra SMARTsense Photogate 12909-00
- Connection cable (2x jack plugs)
- Operating instructions

8 ACCESSORIES

The following accessories are available:

- Cobra SMARTlink 12999-99
- USB connecting cable type C 07935-00
- USB-charger 07934-99
- Rod M6 x 100mm 02020-10
- Free measureApp available from supplier portals

iOS **Android** **Windows**

9 CONFORMITY

PHYWE Systeme GmbH & Co.KG hereby declares that the radio system type 12909-00 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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