Cobra SMARTsense Dual Photogate

12945-00
12945-01/-02

PHYWE Systeme GmbH & Co. KG
Robert-Bosch-Breite 10
D–37079 Göttingen

Telefon +49 (0) 551 604–0
Fax +49 (0) 551 604–107
E-mail info@phywe.de
Internet www.phywe.com

Fig. 1: 12945-00 Cobra SMARTsense Dual 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 to measure kinematic physical quantities such as time, movement, speed and acceleration. The measured values are transmitted via Bluetooth or USB to any end devices such as tablets, smartphones etc.

3 FUNCTIONAL AND OPERATING ELEMENTS

3.1 Operating elements

The sensor has a power button, two arrow keys for navigation and 3 LEDs whose function is described below.

Function of the power button ⏻

Short press	Confirmation at navigation
Long press (>1s)	Switch device on/off

Function of the up-button ⩓

Call up the menu, navigate up

Function of the down-button ⩔

Call up the menu, navigate down

Laser detection LED ⌖

Illuminated red	No Laser signal detected
Off	Laser signal detected

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

3.2 Functional elements

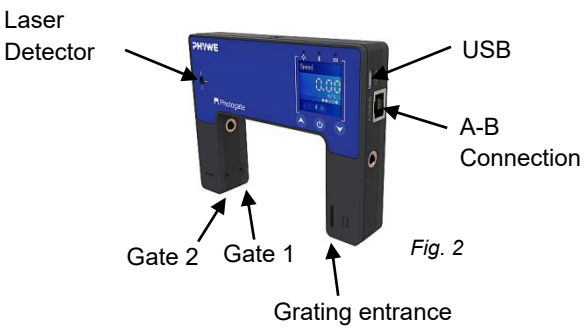


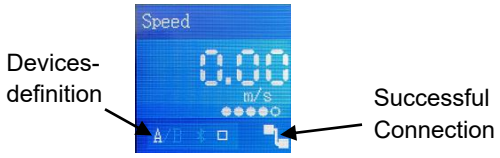
Fig. 2

3.3 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

3.4 Connection interface

2 Photogates can be connected together. Use the supplied RJ-45 cable for the connection. After plugging in the cable and switching on a device, you will be asked to specify which device is "A" and which device is "B". The confirmation is made by briefly pressing the power button.



3.5 Laser receiver

If a laser pointer is aligned with the receiver, the laser detection LED (see 3.1) will signal this. An interruption of the laser beam is now detected and evaluated accordingly by the device. (see modes in chapter 5.2)

3.6 Grating entrance

Here the grating can be threaded in. With the help of the grating, continuous data acquisition can be carried out, e.g. for drop tests.

Fig.3

3.7 Incremental wheel base (only in 12945-01)

Fit the base to the housing of the photogate using the screw provided (Fig.4) and then push the incremental wheel onto the base until a click is heard (Fig.5).

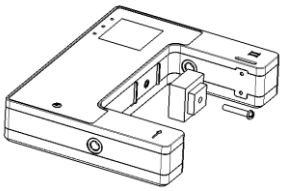


Fig.4

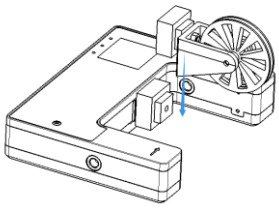


Fig.5

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.
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.

5.1 Charging process

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

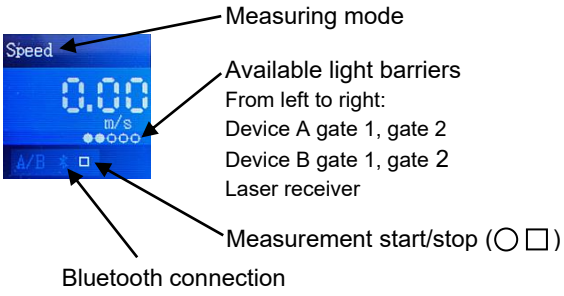
During the charging process, the battery charge LED lights up red. When the charging process is complete, the battery charge LED lights up green. The charging time for a completely discharged battery is 3 hours maximum.

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

Use without software / App

Switch on the sensor by pressing and holding the power button for more than 3s. The start screen is now displayed.



A measurement can be started (◯) or stopped (☐) by pressing the power button ⏻.

Press the arrow keys △▽ to access the selection of modes or settings. The modes are also confirmed by pressing the power button ⏻.

The following modes can be selected:

Mode	Name	Used light barrier
1	Speed	Dual Photogate
2	Counts	Gate 1 / Laser light barrier
3	Acceleration	2x Dual Photogate (Device A and Device B necessary)
4	Distance	Grating / optional Gate 1 with incremental wheel
5	Dark Time	Gate 1 / Laser light barrier
6	Pendelum	Gate 1
7	Running Time	Gate 1

Measured value recording

A measurement can be started (◯) or stopped (☐) by pressing the power button ⏻.

Use with software / App

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

A 9-digit code is printed on the back of the sensor (Fig.6). The last 4 digits of the code are displayed as sensor designation in the software (Fig.7). This enables an exact assignment of the sensors with the software.

Fig. 6

Fig. 7

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.

6 TECHNICAL DATA

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

Time:	
Range	0…∞ s
Resolution	1 µs
Accuracy	± 10 µs
Speed:	
Range	± 100 m/s
Resolution	0,01 m/s
Acceleration:	
Range	± 100 m/s²
Resolution	0,01 m/s²
Max. date rate	100 Hz
Battery	LiPo 3.7 V / 250 mAh
Max. wireless range (open field)	30 m
Dimensions (length x width x height)	130 x 105 x 26 mm
Weight	165 g

7 SCOPE OF DELIVERY

The scope of delivery 12945-00 includes:

- Cobra SMARTsense Dual Photogate 12945-00
- USB-connecting cable type C
- RJ-45 connecting cable
- 2x Grating
- Threaded rod (length 10cm)
- Operating instructions

The scope of delivery 12945-01 includes:

- 2x knurled screw
- 2x mounting brackets for track mounting
- Incremental Base socket (clamping socket)
- Incremental wheel
- Operating instructions

The scope of delivery 12945-02 includes:

- 10 x Replacement grid strap

8 ACCESSORIES

The following accessories are available:

- Cobra SMARTlink 12998-99
- USB charger 07934-99
- USB-connecting cable type C 07922-15
- USB-Bluetooth-Adapter 07936-00
- Grating (10 pieces) 12945-02
- Software measureLAB 14580-61
- Free measureApp available from supplier portals

iOS **Android** **Windows**

9 CONFORMITY

PHYWE Systeme GmbH & Co.KG hereby declares that the radio system type 12945-00 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.

PHYWE Systeme GmbH & Co. KG
Abteilung Kundendienst
Robert-Bosch-Breite 10
D–37079 Göttingen

Telefon +49 (0) 551 604-0
Fax +49 (0) 551 604-107

11 NOTES ON BATTERY AND RECHARGEABLE BATTERY DISPOSAL

As we sell batteries and rechargeable batteries or devices containing batteries and rechargeable batteries, we are obliged under the Battery Act to inform you of the following: Batteries and rechargeable batteries may not be disposed of with household waste, but you are legally obliged to return used batteries and rechargeable batteries. Used batteries may contain harmful substances that can damage the environment or your health if they are not stored or disposed of properly. Batteries also contain important raw materials such as iron, zinc, manganese or nickel and are recycled. You can either send the batteries back to us after use or return them free of charge in the immediate vicinity (e.g. in shops or at municipal collection centres). Batteries or rechargeable batteries that contain harmful substances are labelled with the symbol of a crossed-out dustbin.