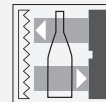




## Retroreflective sensor (glass)

### OBG4000-R103-EP-IO-0,3M-V3



- Miniature design with versatile mounting options
- Detects transparent objects, i.e., clear glass, PET and transparent films
- Two machines in one: clear object detection or reflection operating mode with long range
- High degree of protection IP69K
- IO-Link interface for service and process data

Retroreflective sensor with polarization filter for clear object detection



### Function

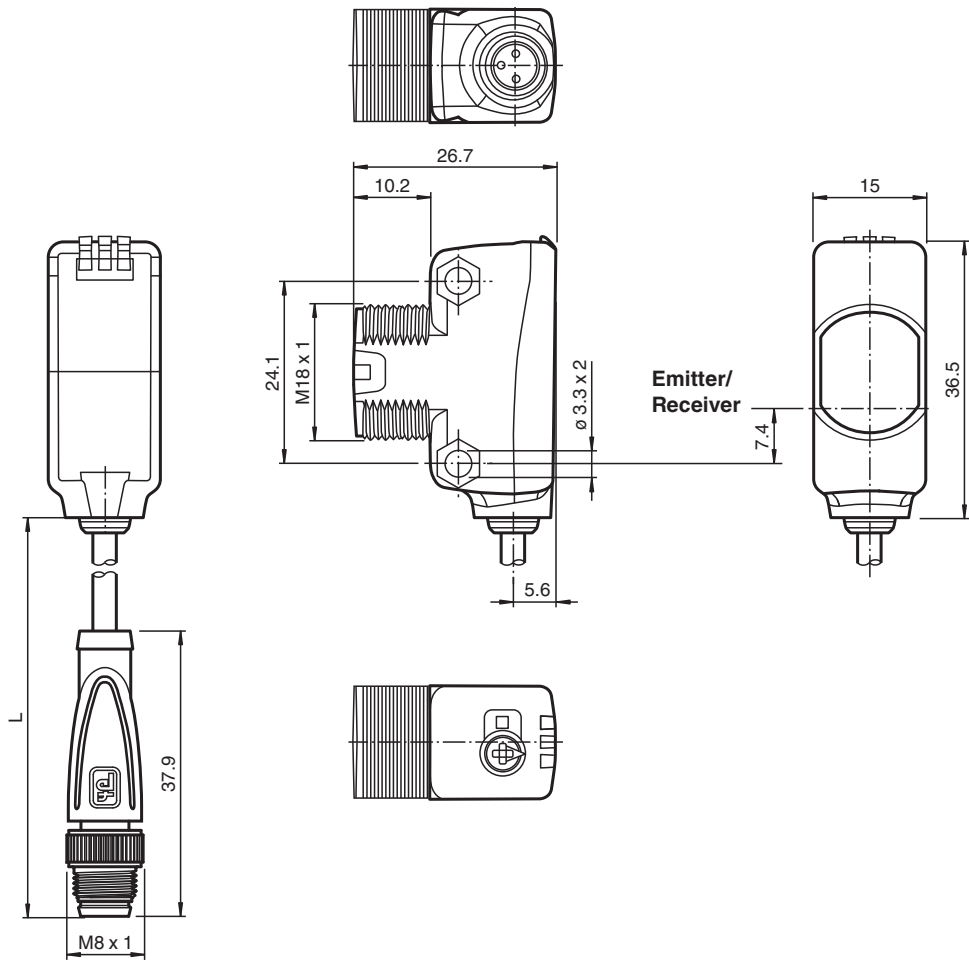
The R103 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation tasks.

The entire series enables sensors to communicate via IO-Link.

The DuraBeam laser sensors are durable and can be used in the same way as a standard sensor.

The use of Multi Pixel Technology gives the standard sensors a high level of flexibility and enables them to adapt more effectively to their operating environment.

Dimensions



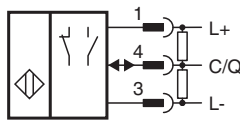
Technical Data

|                                      |  |                                                                                                                                            |
|--------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------|
| General specifications               |  |                                                                                                                                            |
| Effective detection range            |  | 0 ... 3.5 m in TEACH mode ; 0 ... 4 m at switch position "N"                                                                               |
| Reflector distance                   |  | 0 ... 3.5 m in TEACH mode ; 0 ... 4 m at switch position "N"                                                                               |
| Threshold detection range            |  | 5 m                                                                                                                                        |
| Reference target                     |  | H85-2 reflector                                                                                                                            |
| Light source                         |  | LED                                                                                                                                        |
| Light type                           |  | modulated visible red light                                                                                                                |
| LED risk group labelling             |  | exempt group                                                                                                                               |
| Diameter of the light spot           |  | approx. 170 mm at a distance of 3.5 m                                                                                                      |
| Opening angle                        |  | approx. 5 °                                                                                                                                |
| Ambient light limit                  |  | EN 60947-5-2                                                                                                                               |
| Functional safety related parameters |  |                                                                                                                                            |
| MTTF <sub>d</sub>                    |  | 600 a                                                                                                                                      |
| Mission Time (T <sub>M</sub> )       |  | 20 a                                                                                                                                       |
| Diagnostic Coverage (DC)             |  | 0 %                                                                                                                                        |
| Indicators/operating means           |  |                                                                                                                                            |
| Operation indicator                  |  | LED green:<br>constantly on - power on<br>flashing (4Hz) - short circuit<br>flashing with short break (1 Hz) - IO-Link mode                |
| Function indicator                   |  | Yellow LED:<br>Permanently lit - light path clear<br>Permanently off - object detected<br>Flashing (4 Hz) - insufficient operating reserve |

## Technical Data

|                                   |       |                                                                                                                                                             |
|-----------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control elements                  |       | Teach-In key                                                                                                                                                |
| Control elements                  |       | 5-step rotary switch for operating modes selection                                                                                                          |
| Contrast detection levels         |       | 10 % - clean, water filled PET bottles<br>18 % - clear glass bottles<br>40 % - colored glass or opaque materials<br>Adjustable via rotary switch            |
| <b>Electrical specifications</b>  |       |                                                                                                                                                             |
| Operating voltage                 | $U_B$ | 10 ... 30 V DC                                                                                                                                              |
| Ripple                            |       | max. 10 %                                                                                                                                                   |
| No-load supply current            | $I_0$ | < 25 mA at 24 V supply voltage                                                                                                                              |
| Protection class                  |       | III                                                                                                                                                         |
| <b>Interface</b>                  |       |                                                                                                                                                             |
| Interface type                    |       | IO-Link ( via C/Q = pin 4 )                                                                                                                                 |
| IO-Link revision                  |       | 1.1                                                                                                                                                         |
| Device ID                         |       | 0x110A03 (1116675)                                                                                                                                          |
| Transfer rate                     |       | COM2 (38.4 kBit/s)                                                                                                                                          |
| Min. cycle time                   |       | 2.3 ms                                                                                                                                                      |
| Process data width                |       | Process data input 2 Bit<br>Process data output 2 Bit                                                                                                       |
| SIO mode support                  |       | yes                                                                                                                                                         |
| Compatible master port type       |       | A                                                                                                                                                           |
| <b>Output</b>                     |       |                                                                                                                                                             |
| Switching type                    |       | The switching type of the sensor is adjustable. The default setting is:<br>C/Q - Pin4: NPN normally open / dark-on, PNP normally closed / light-on, IO-Link |
| Signal output                     |       | 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected                                                     |
| Switching voltage                 |       | max. 30 V DC                                                                                                                                                |
| Switching current                 |       | max. 100 mA , resistive load                                                                                                                                |
| Usage category                    |       | DC-12 and DC-13                                                                                                                                             |
| Voltage drop                      | $U_d$ | $\leq 1.5$ V DC                                                                                                                                             |
| Switching frequency               | $f$   | 500 Hz                                                                                                                                                      |
| Response time                     |       | 1 ms                                                                                                                                                        |
| <b>Conformity</b>                 |       |                                                                                                                                                             |
| Communication interface           |       | IEC 61131-9                                                                                                                                                 |
| Product standard                  |       | EN 60947-5-2                                                                                                                                                |
| <b>Approvals and certificates</b> |       |                                                                                                                                                             |
| UL approval                       |       | E87056 , cULus Listed , class 2 power supply , type rating 1                                                                                                |
| <b>Ambient conditions</b>         |       |                                                                                                                                                             |
| Ambient temperature               |       | -20 ... 60 °C (-4 ... 140 °F) , movable cable not appropriate for conveyor chains                                                                           |
| Storage temperature               |       | -40 ... 70 °C (-40 ... 158 °F)                                                                                                                              |
| <b>Mechanical specifications</b>  |       |                                                                                                                                                             |
| Housing width                     |       | 15 mm                                                                                                                                                       |
| Housing height                    |       | 36.5 mm                                                                                                                                                     |
| Housing depth                     |       | 26.7 mm                                                                                                                                                     |
| Degree of protection              |       | IP67 / IP69 / IP69K                                                                                                                                         |
| Connection                        |       | 300 mm fixed cable with M8 x 1, 3-pin connector                                                                                                             |
| Material                          |       |                                                                                                                                                             |
| Housing                           |       | PC (Polycarbonate)                                                                                                                                          |
| Optical face                      |       | PMMA                                                                                                                                                        |
| Mass                              |       | approx. 17 g                                                                                                                                                |
| Cable length                      |       | 0.3 m                                                                                                                                                       |

Connection



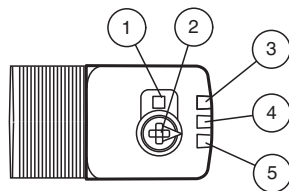
Connection Assignment



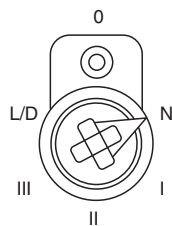
Wire colors in accordance with EN 60947-5-2

|   |    |         |
|---|----|---------|
| 1 | BN | (brown) |
| 3 | BU | (blue)  |
| 4 | BK | (black) |

Assembly



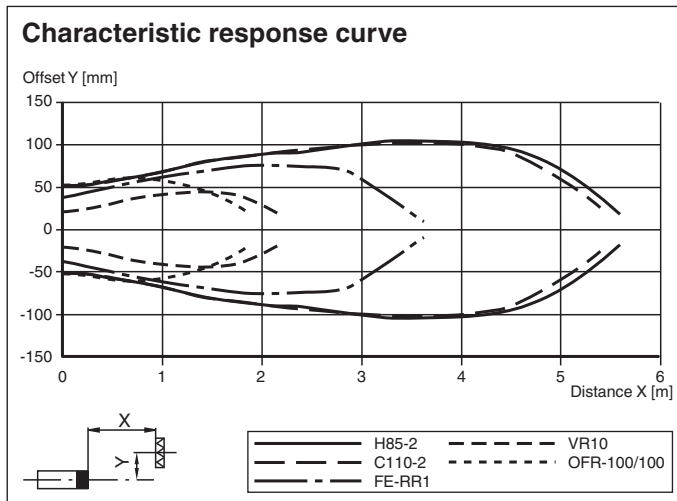
|   |                                |
|---|--------------------------------|
| 1 | Teach-in button                |
| 2 | Mode rotary switch             |
| 3 | Operating indicator / dark on  |
| 4 | Signal indicator               |
| 5 | Operating indicator / light on |



|     |                         |
|-----|-------------------------|
| N   | Normal mode             |
| I   | 10 % contrast detection |
| II  | 18 % contrast detection |
| III | 40 % contrast detection |
| L/D | Switching type          |
| 0   | Keylock                 |

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## Characteristic Curve



### Relative received light strength

Reflector type:

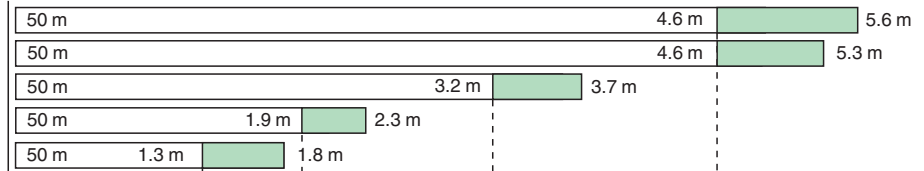
H85-2

C110-2

FE-RR1

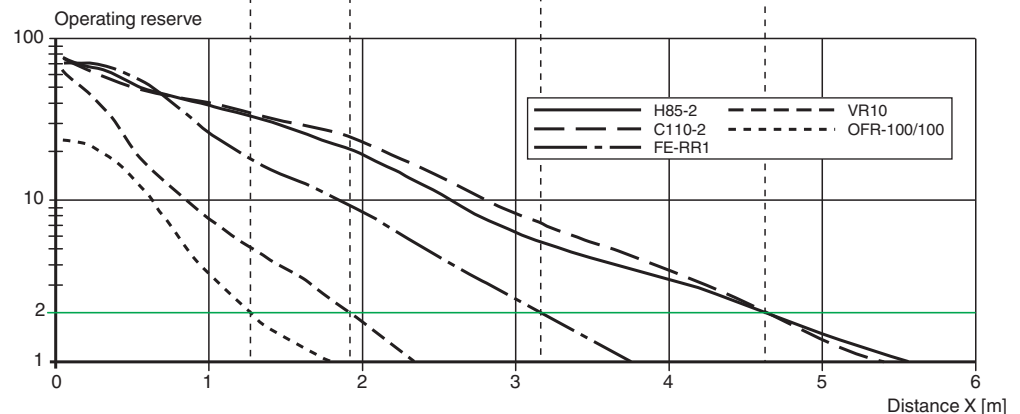
VR10

OFR-100/100



Operating reserve > 2

Operating reserve < 2



## Commissioning

### Teach-in

Use the rotary switch to select the required operating mode: Normal mode (N) or contrast level I – III.

To teach in a threshold or activate an operating mode, press the "TI" button until the yellow and green LEDs flash in phase (approx. 1 s). Release the "TI" button. Teach-in starts.

Successful teach-in is indicated by alternating flashing (2.5 Hz) of the yellow and green LEDs. The sensor will now operate in the selected operating mode with the taught-in threshold.

An unsuccessful teach-in is indicated by rapidly alternating flashing (8 Hz) of the yellow and green LEDs. After an unsuccessful teach-in, the sensor continues to operate with the previous valid setting after the relevant visual fault signal is issued.

Every taught-in switching threshold can be re-taught (overwritten) by pressing the "TI" button again.

Note: To ensure that the device functions reliably in Contrast mode, the device must be powered on at least 30 s before teach-in.

### Setting the Device to Maximum Sensitivity

- Use the rotary switch to select the Normal mode (N) position.
- Press the "TI" button for > 4 s. The yellow and green LEDs will go out.
- Release the "TI" button.

The settings will be reset to maximum sensitivity. After successfully resetting, the yellow and green LEDs will flash alternately (2.5 Hz).

### Switching between light on/dark on

- Use the rotary switch to select the light on/dark on (L/D) position.
- Press the "TI" button for > 1 s. The respective operating indicator LED (L/D) will illuminate green and the switching type will change.
- To reset the switching type, press the "TI" button for > 4 s. The respective operating indicator LED (L/D) will illuminate green and the operating indicator will be reset to the most recently active switching type.

### Reset to Default Settings

- Use the rotary switch to select the O position.

## Commissioning

- Press the "TI" button for > 10 s. The yellow and the green LEDs will both switch off.
- Release the "TI" button. The yellow LED is on. After resetting, the sensor will operate with the following default settings:

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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