



## Thru-beam sensor (pair) OBE20M-R103-S2EP-IO-L



- Miniature design with versatile mounting options
- DuraBeam Laser Sensors - durable and employable like an LED
- IO-Link interface for service and process data
- Various frequencies for avoiding mutual interference (cross-talk immunity)
- Extended temperature range  
-40 °C ... 60 °C
- High degree of protection IP69K

### Laser thru-beam sensor



### Function

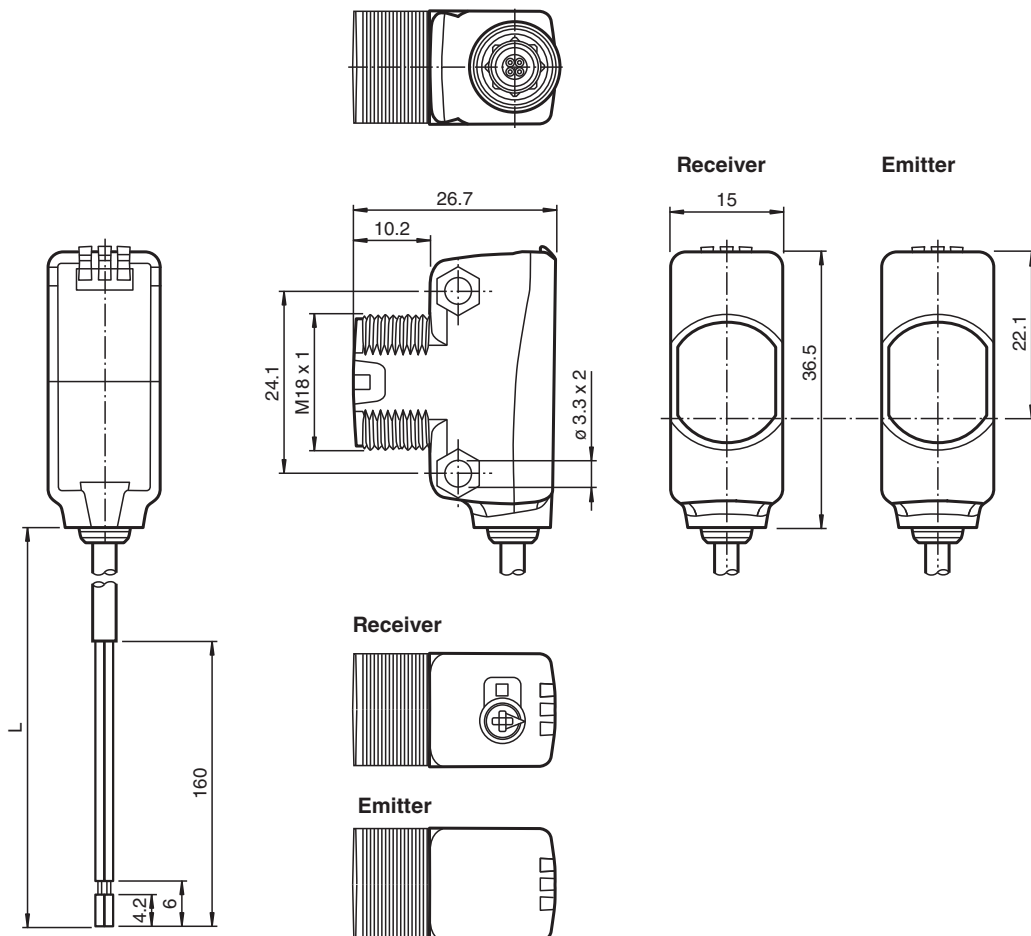
The R103 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation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



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

Pepperl+Fuchs Group  
www.pepperl-fuchs.com

USA: +1 330 486 0001  
fa-info@us.pepperl-fuchs.com

Germany: +49 621 776 1111  
fa-info@de.pepperl-fuchs.com

Singapore: +65 6779 9091  
fa-info@sg.pepperl-fuchs.com

**PEPPERL+FUCHS**

## Technical Data

|                                             |                |                                                                                                                                            |
|---------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>System components</b>                    |                |                                                                                                                                            |
| Emitter                                     |                | OBE20M-R103-S-IO-L                                                                                                                         |
| Receiver                                    |                | OBE20M-R103-2EP-IO-L                                                                                                                       |
| <b>General specifications</b>               |                |                                                                                                                                            |
| Effective detection range                   |                | 0 ... 20 m                                                                                                                                 |
| Threshold detection range                   |                | 30 m                                                                                                                                       |
| Light source                                |                | laser diode                                                                                                                                |
| Light type                                  |                | modulated visible red light                                                                                                                |
| Laser nominal ratings                       |                |                                                                                                                                            |
| Note                                        |                | LASER LIGHT , DO NOT STARE INTO BEAM                                                                                                       |
| Laser class                                 |                | 1                                                                                                                                          |
| Wave length                                 |                | 680 nm                                                                                                                                     |
| Beam divergence                             |                | > 5 mrad ; d63 < 2 mm in the range of 250 mm ... 750 mm                                                                                    |
| Pulse length                                |                | 1.6 µs                                                                                                                                     |
| Repetition rate                             |                | max. 17.6 kHz                                                                                                                              |
| max. pulse energy                           |                | 9.6 nJ                                                                                                                                     |
| Diameter of the light spot                  |                | approx. 50 mm at a distance of 20 m                                                                                                        |
| Opening angle                               |                | approx. 0.3 °                                                                                                                              |
| Ambient light limit                         |                | EN 60947-5-2 : 30000 Lux                                                                                                                   |
| <b>Functional safety related parameters</b> |                |                                                                                                                                            |
| MTTF <sub>d</sub>                           |                | 440 a                                                                                                                                      |
| Mission Time (T <sub>M</sub> )              |                | 20 a                                                                                                                                       |
| Diagnostic Coverage (DC)                    |                | 0 %                                                                                                                                        |
| <b>Indicators/operating means</b>           |                |                                                                                                                                            |
| 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 |
| Control elements                            |                | Receiver: light/dark switch                                                                                                                |
| Control elements                            |                | Receiver: sensitivity adjustment                                                                                                           |
| Parameterization indicator                  |                | IO link communication: green LED goes out briefly (1 Hz)                                                                                   |
| <b>Electrical specifications</b>            |                |                                                                                                                                            |
| Operating voltage                           | U <sub>B</sub> | 10 ... 30 V DC                                                                                                                             |
| Ripple                                      |                | max. 10 %                                                                                                                                  |
| No-load supply current                      | I <sub>0</sub> | Emitter: ≤ 13 mA<br>Receiver: ≤ 13 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                                   |                | Emitter: 0x110404 (1115140)<br>Receiver: 0x110304 (1114884)                                                                                |
| Transfer rate                               |                | COM2 (38.4 kBit/s)                                                                                                                         |
| Min. cycle time                             |                | 2.3 ms                                                                                                                                     |
| Process data width                          |                | Emitter:<br>Process data output: 2 Bit<br>Receiver:<br>Process data input: 2 Bit<br>Process data output: 2 Bit                             |
| SIO mode support                            |                | yes                                                                                                                                        |
| Compatible master port type                 |                | A                                                                                                                                          |
| <b>Input</b>                                |                |                                                                                                                                            |
| Test input                                  |                | emitter deactivation at +U <sub>B</sub>                                                                                                    |

## Technical Data

### Output

|                     |       |                                                                                                                                                                                                                                   |
|---------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switching type      |       | The switching type of the sensor is adjustable. The default setting is:<br>C/Q - BK: NPN normally open / dark-on, PNP normally closed / light-on, IO-Link<br>/Q - WH: NPN normally closed / light-on, PNP normally open / dark-on |
| Signal output       |       | 2 push-pull (4 in 1) outputs, 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 | $f$   | 1250 Hz                                                                                                                                                                                                                           |
| Response time       |       | 0.4 ms                                                                                                                                                                                                                            |

### Conformity

|                         |  |                 |
|-------------------------|--|-----------------|
| Communication interface |  | IEC 61131-9     |
| Product standard        |  | EN 60947-5-2    |
| Laser safety            |  | EN 60825-1:2014 |

### Approvals and certificates

|              |  |                                                                                                                                                             |
|--------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UL approval  |  | E87056 , cULus Listed , class 2 power supply , type rating 1                                                                                                |
| FDA approval |  | IEC 60825-1:2014 Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice 56, dated May 8, 2019. |

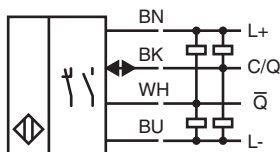
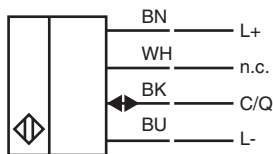
### Ambient conditions

|                     |  |                                                                                                                                                  |
|---------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature |  | -40 ... 60 °C (-40 ... 140 °F) , cable, fixed installation<br>-25 ... 60 °C (-13 ... 140 °F) , movable cable not appropriate for conveyor chains |
| Storage temperature |  | -40 ... 70 °C (-40 ... 158 °F)                                                                                                                   |

### Mechanical specifications

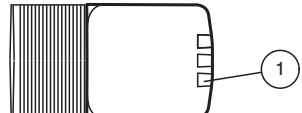
|                      |  |                                              |
|----------------------|--|----------------------------------------------|
| Degree of protection |  | IP67 / IP69 / IP69K                          |
| Connection           |  | 2 m fixed cable                              |
| Material             |  |                                              |
| Housing              |  | PC (Polycarbonate)                           |
| Optical face         |  | PMMA                                         |
| Mass                 |  | Emitter: approx. 38 g receiver: approx. 38 g |
| Dimensions           |  |                                              |
| Height               |  | 36.5 mm                                      |
| Width                |  | 15 mm                                        |
| Depth                |  | 26.7 mm                                      |
| Cable length         |  | 2 m                                          |

## Connection



Assembly

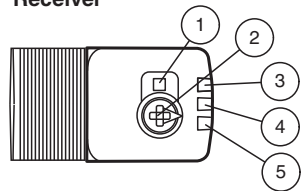
**Emitter**



1

|   |                     |
|---|---------------------|
| 1 | Operating indicator |
|---|---------------------|

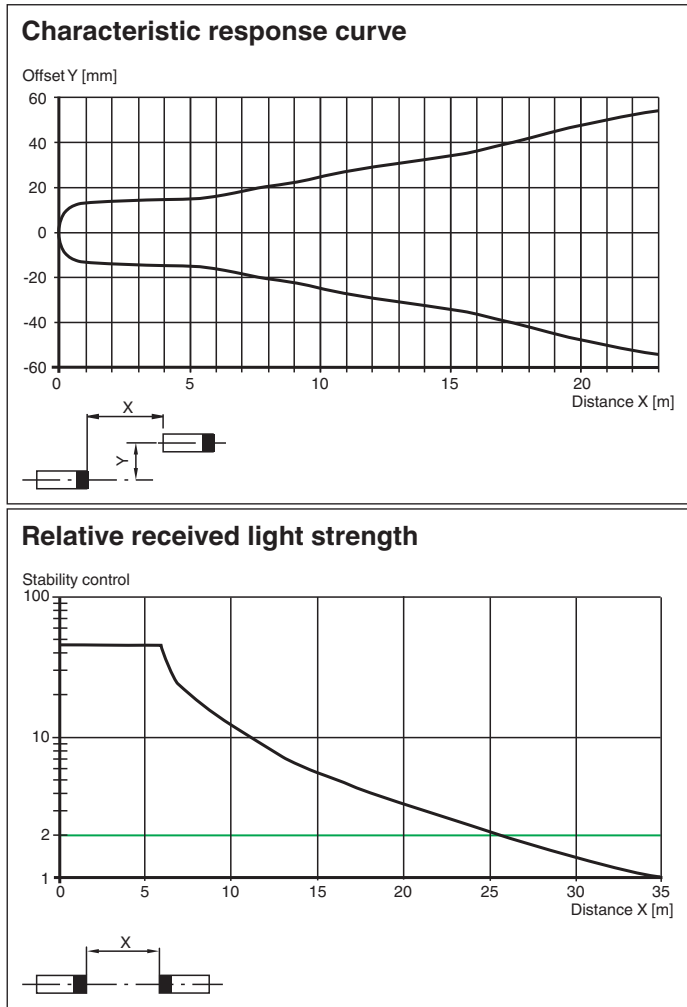
**Receiver**



1 2 3 4 5

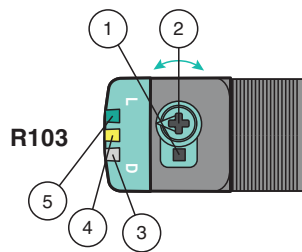
|   |                                |
|---|--------------------------------|
| 1 | Light-on/Dark-on switch        |
| 2 | Sensitivity adjuster           |
| 3 | Operating indicator / dark on  |
| 4 | Signal indicator               |
| 5 | Operating indicator / light on |

Characteristic Curve



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## Configuration



- 1 - Light-on / dark-on changeover switch
- 2 - Sensing range / sensitivity adjuster
- 3 - Operating indicator / dark on
- 4 - Signal indicator
- 5 - Operating indicator / light on

To unlock the adjustment functions turn the sensing range adjuster / sensitivity adjuster for more than 180 degrees.

### Sensing Range/ Sensitivity

Turn sensing range / sensitivity adjuster clockwise to increase sensing range / sensitivity.

Turn sensing range / sensitivity adjuster counter clockwise to decrease sensing range / sensitivity.

If the end of the adjustment range is reached, the signal indicator starts flashing with 8 Hz.

### Light-on / Dark-on Configuration

Press the light-on / dark-on changeover switch for more than 1 second (less than 4 seconds). The light-on / dark-on mode changes and the operating indicators are activated accordingly.

If you press the light-on / dark-on changeover switch for more than 4 seconds, the light-on / dark-on mode changes back to the original setting. On release of the light-on / dark-on changeover switch the current state is activated.

### Restore Factory Settings

Press the light-on / dark-on changeover switch for more than 10 seconds (less than 30 seconds) until all LEDs turn off. On release of the light-on / dark-on changeover switch the signal indicator turns on. After 5 seconds the sensor resumes operation with factory default settings.

After 5 minutes of inactivity the sensing range / sensitivity adjustment is locked. In order to reactivate the sensing range / sensitivity adjustment, turn the sensing range / sensitivity adjuster for more than 180 degrees.