



**Model Number**

**OBE20M-R103-S2EP-IO-V31-L**

Laser thru-beam sensor  
with 4-pin, M8 x 1 connector

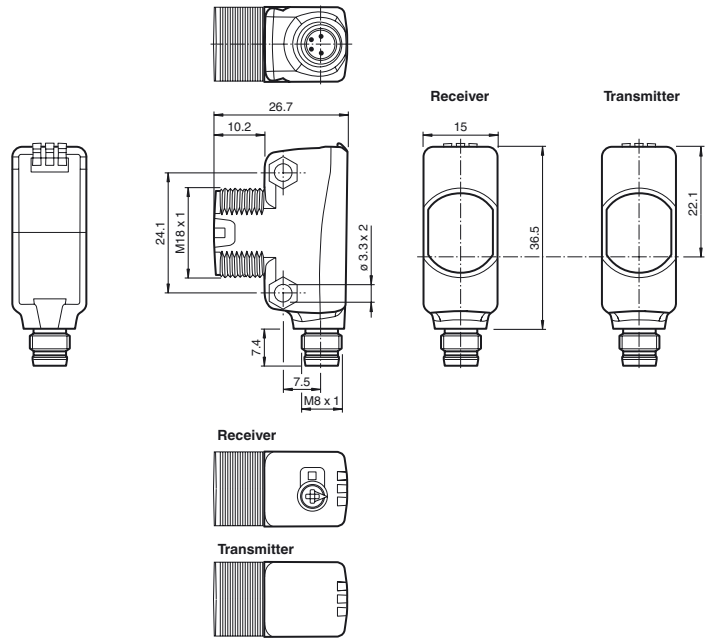
**Features**

- 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

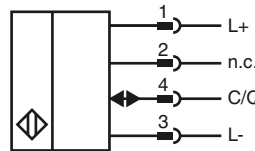
**Product information**

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.

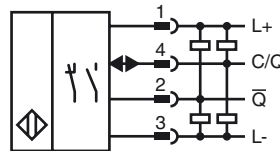
**Dimensions**



**Electrical connection emitter**



**Electrical connection receiver**



**Pinout**



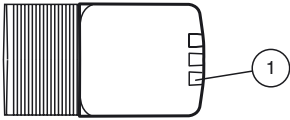
Wire colors in accordance with EN 60947-5-2

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

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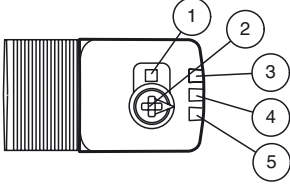
**Indicators/operating means**

**Emitter**



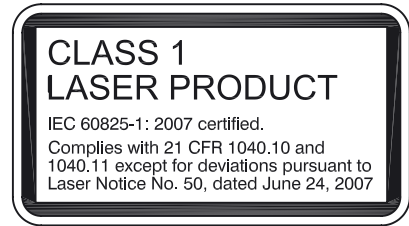
|   |                     |
|---|---------------------|
| 1 | Operating indicator |
|---|---------------------|

**Receiver**



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

**Laserlabel**



**Accessories**

**IO-Link-Master02-USB**

IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

**OMH-R103-01**

Mounting bracket

**V31-GM-2M-PUR**

Female cordset, M8, 4-pin, PUR cable

**V31-WM-2M-PUR**

Female cordset, M8, 4-pin, PUR cable

**OMH-R101-Front**

Mounting Clamp

**OMH-R101**

Mounting Clamp

**OMH-4.1**

Mounting Clamp

**OMH-ML6**

Mounting bracket

**OMH-ML6-U**

Mounting bracket

**OMH-ML6-Z**

Mounting bracket

Other suitable accessories can be found at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

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**Technical data****System components**

|          |                          |
|----------|--------------------------|
| Emitter  | OBE20M-R103-S-IO-V31-L   |
| Receiver | OBE20M-R103-2EP-IO-V31-L |

**General specifications**

|                            |   |
|----------------------------|---|
| 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 $\mu$ s   |
| 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                     |
| Angle of divergence        | approx. 0.3 °   |
| Ambient light limit        | EN 60947-5-2 : 30000 Lux                                |

**Functional safety related parameters**

|                                |       |
|--------------------------------|-------|
| MTTF <sub>d</sub>              | 440 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 |
| Control elements           | Receiver: light/dark switch  |
| Control elements           | Receiver: sensitivity adjustment   |
| Parameterization indicator | IO link communication: green LED goes out briefly (1 Hz)   |

**Electrical specifications**

|                        |                |  |
|------------------------|----------------|--|
| 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  |

**Interface**

|                             |  |
|-----------------------------|--|
| Interface type              | IO-Link ( via C/Q = pin 4 )  |
| Transfer rate               | COM 2 (38.4 kBaud)   |
| IO-Link Revision            | 1.1  |
| 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  |
| Device ID                   | Emitter: 0x110404 (1115140)<br>Receiver: 0x110304 (1114884)  |
| Compatible master port type | A  |

**Input**

|            |   |
|------------|---|
| Test input | emitter deactivation at +U <sub>B</sub> |
|------------|---|

**Output**

|                     |   |
|---------------------|---|
| 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<br>/Q - Pin2: 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 <sub>d</sub> ≤ 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 |

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

Pepperl+Fuchs Group  
www.pepperl-fuchs.comUSA: +1 330 486 0001  
fa-info@us.pepperl-fuchs.comGermany: +49 621 776 4411  
fa-info@de.pepperl-fuchs.comSingapore: +65 6779 9091  
fa-info@sg.pepperl-fuchs.com

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**Ambient conditions**

|                     |                                |
|---------------------|--------------------------------|
| Ambient temperature | -40 ... 60 °C (-40 ... 140 °F) |
| Storage temperature | -40 ... 70 °C (-40 ... 158 °F) |

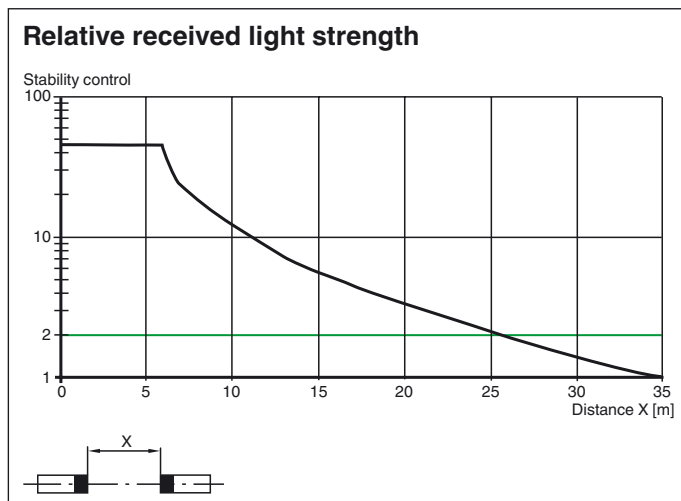
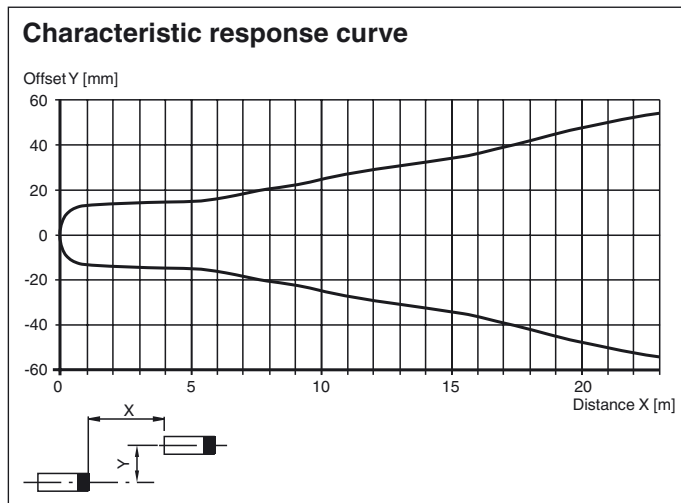
**Mechanical specifications**

|                      |  |
|----------------------|--|
| Housing width        | 15 mm  |
| Housing height       | 43.9 mm                                      |
| Housing depth        | 26.7 mm                                      |
| Degree of protection | IP67 / IP69 / IP69K                          |
| Connection           | M8 x 1 connector, 4-pin                      |
| Material             |  |
| Housing              | PC (Polycarbonate)                           |
| Optical face         | PMMA   |
| Mass                 | Emitter: approx. 12 g receiver: approx. 12 g |

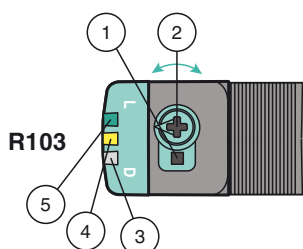
**Approvals and certificates**

|              |  |
|--------------|--|
| UL approval  | E87056 , cULus Listed , class 2 power supply , type rating 1   |
| FDA approval | IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 |

**Curves/Diagrams**



**Functions and Operation**



- 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

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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.