## 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.

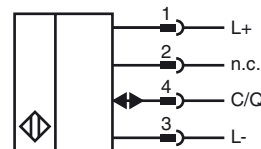The entire series enables sensors to communicate via IO-Link.

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.
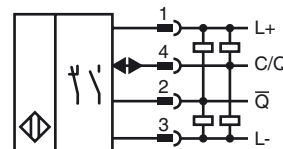
## Dimensions
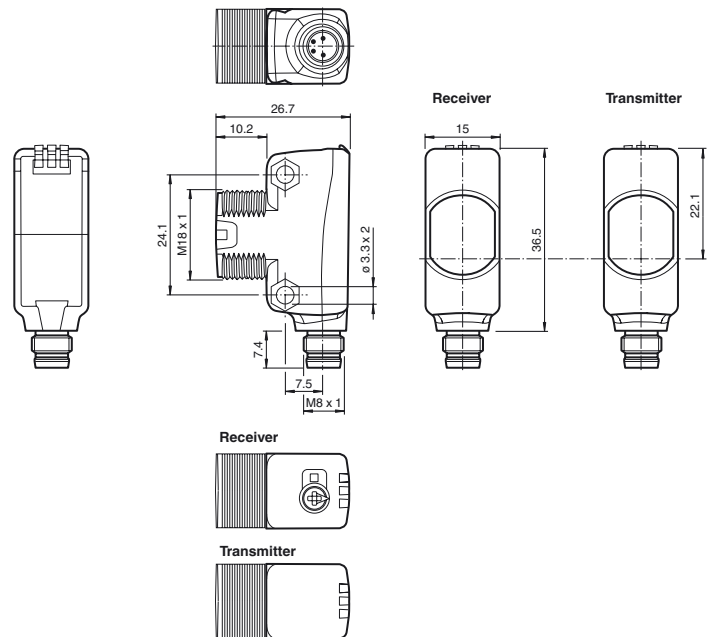


## Electrical connection emitter



## 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) |

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

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## Indicators/operating means

**Emitter**
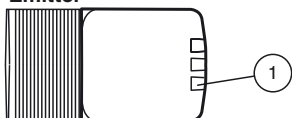
| 1 | Operating indicator |
|---|---|

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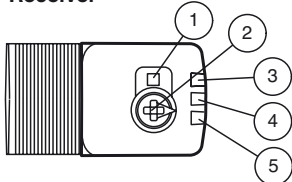
| 1 | Light-on/Dark-on switch |
|---|---|
| 2 | Sensitivity adjuster |
| 3 | Operating indicator / dark on |
| 4 | Signal indicator |
| 5 | Operating indicator / light on |

## Laserlabel

CLASS 1
LASER
PRODUCT

CLASS 1
LASER PRODUCT
IEC 60825-1: 2007 certified.
Complies with 21 CFR
1040.10 and 1040.11 except
for deviations pursuant to
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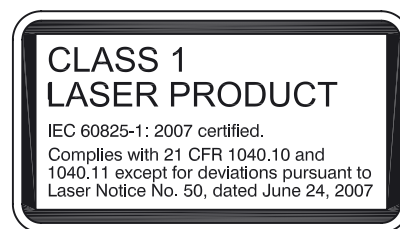
## Accessories

**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
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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 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 |
| Angle of divergence | approx. 0.3 ° |
| Ambient light limit | EN 60947-5-2 : 30000 Lux |

### Functional safety related parameters

| | |
|---|---|
| $MTTF_d$ | 440 a |
| Mission Time ($T_M$) | 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 | $U_B$ | 10 ... 30 V DC |
| Ripple | | max. 10 % |
| No-load supply current | $I_0$ | 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 witdh | 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 $+U_B$ |

### 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 | $U_d$ | ≤ 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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**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

### Characteristic response curve

Offset Y [mm]

Distance X [m]
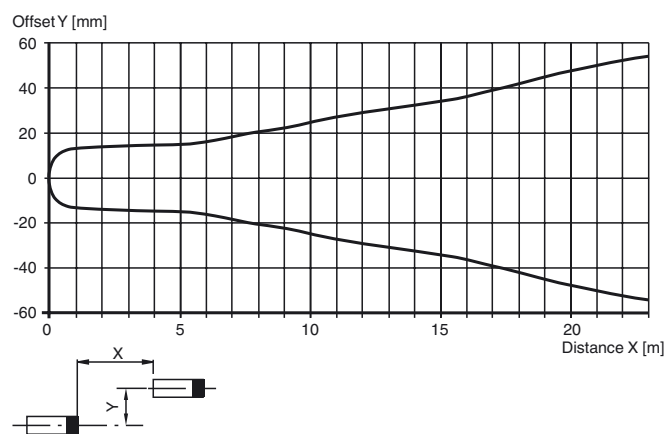
### Relative received light strength

Stability control

Distance X [m]
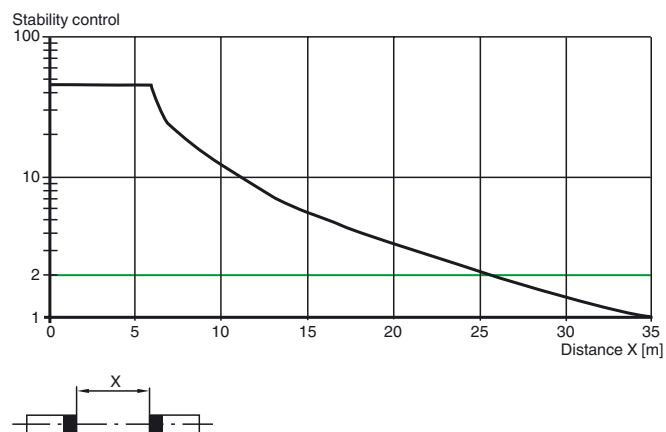
## Functions and Operation

**R103**
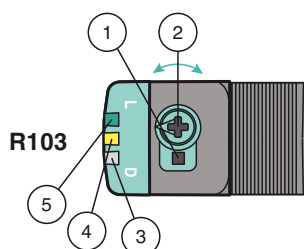
1 - Light-on / dark-on changeover switch

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.

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