## Dimensions



## Model Number

**OBR12M-R100-2EP-IO-V31-L**

Laser retroreflective sensor

with 4-pin, M8 x 1 connector

## Features

- Miniature design with versatile mounting options
- DuraBeam Laser Sensors - durable and employable like an LED
- Extended temperature range -40°C ... 60°C
- High degree of protection IP69K
- IO-link interface for service and process data

## Electrical connection



## Pinout

Wire colors in accordance with EN 60947-5-2



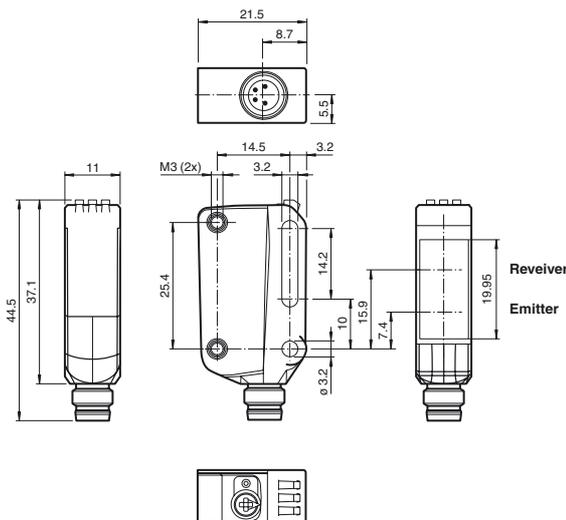| | | |
|---|---|---|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue) |
| 4 | BK | (black) |

## Product information

The R100 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.

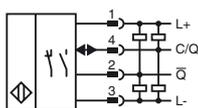The entire series enables sensors to communicate via IO-Link.

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.
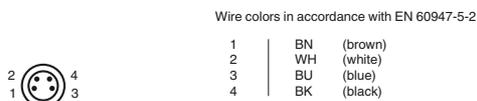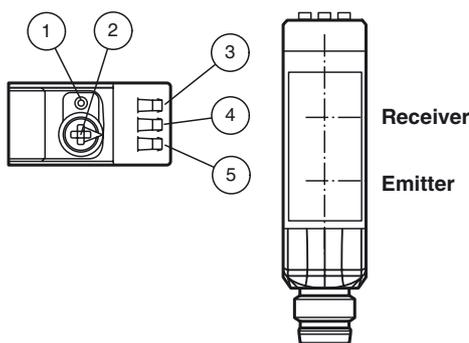
## Indicators/operating means



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

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

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## Technical data

### General specifications

| | |
|---|---|
| Effective detection range | 0 ... 12 m |
| Reflector distance | 0.2 ... 12 m |
| Threshold detection range | 15 m |
| Reference target | H50 reflector |
| Light source | laser diode |
| Light type | modulated visible red light |
| Polarization filter | yes |
| 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 250 ... 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. 30 mm at a distance of 12 m |
| Angle of divergence | approx. 0.3 ° |
| Ambient light limit | EN 60947-5-2 |

### Functional safety related parameters

| | |
|---|---|
| $MTTF_d$ | 672 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)—operating reserve not reached |
| Control elements | Light-on/dark-on changeover switch |
| Control elements | 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 | $I_0$ | < 20 mA at 24 V supply voltage |
| Protection class | | III |

### Interface

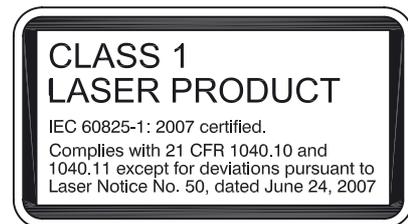| | |
|---|---|
| Interface type | IO-Link ( via C/Q = pin 4 ) |
| Transfer rate | COM 2 (38.4 kBaud) |
| IO-Link Revision | 1.1 |
| Min. cycle time | 2.3 ms |
| Process data witdh | Process data input 2 Bit<br>Process data output 2 Bit |
| SIO mode support | yes |
| Device ID | 0x110202 (1114626) |
| Compatible master port type | A |

### 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 | 2000 Hz |
| Response time | | 250 µs |

### Ambient conditions

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

### Mechanical specifications

| | |
|---|---|
| Degree of protection | IP67 / IP69 / IP69K |
| Connection | M8 x 1 connector, 4-pin |
| Material | |
| Housing | PC (Polycarbonate) |
| Optical face | PMMA |
| Mass | approx. 10 g |

## 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
Laser Notice No. 50,
dated June 24, 2007

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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

**REF-MH82**
Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes

**REF-MH50**
Reflector with Micro-structure, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap

**REF-MVR10**
Reflector with Micro-structure, rectangular 60 mm x 19 mm, mounting holes

**REF-MH20**
Reflector with Micro-structure, rectangular 32 mm x 20 mm, mounting holes

**V31-GM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

**V31-WM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

Other suitable accessories can be found at www.pepperl-fuchs.com

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**Compliance with standards and directives**

| Directive conformity | |
|---|---|
| EMC Directive 2004/108/EC | EN 60947-5-2:2007+A1:2012 |
| **Standard conformity** | |
| Product standard | EN 60947-5-2:2007+A1:2012<br>IEC 60947-5-2:2007 + A1:2012 |
| Standards | UL 60947-5-2: 2014<br>IEC 61131-9:2013<br>IEC 60825-1:2007<br>EN 60825-1:2007<br>EN 61131-9:2013 |

| **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<br>1040.11 except for deviations pursuant to Laser Notice No. 50,<br>dated June 24, 2007 |

## Curves/Diagrams

### Characteristic response curve



### Relative received light strength
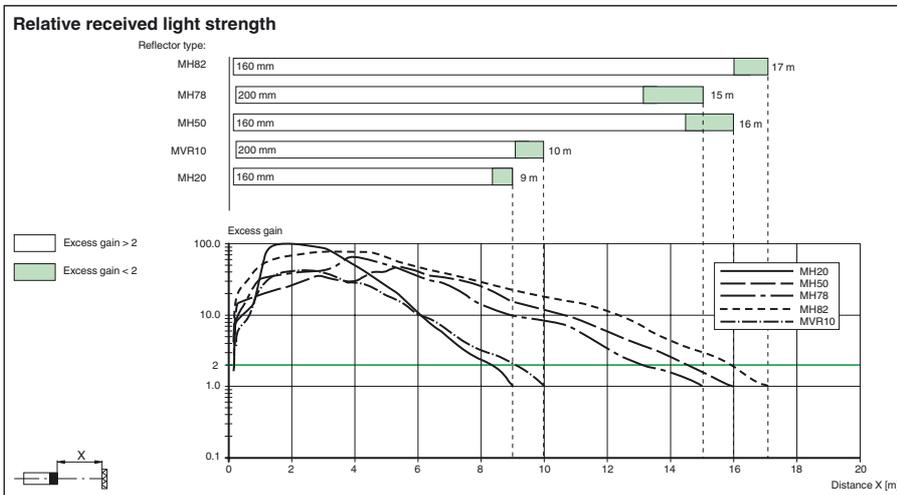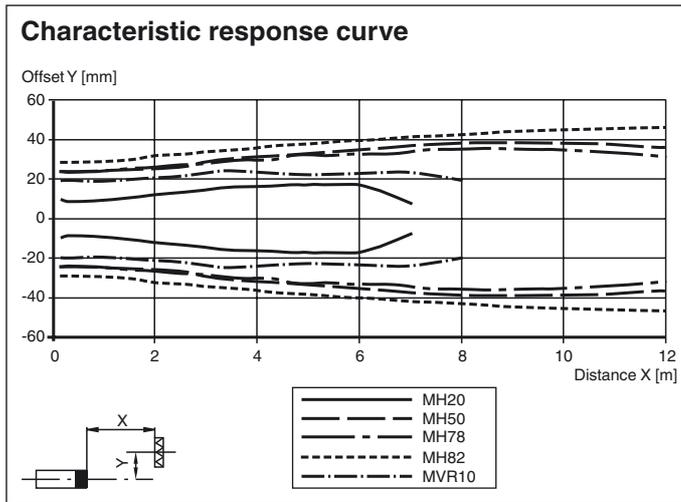


## Functions and Operation
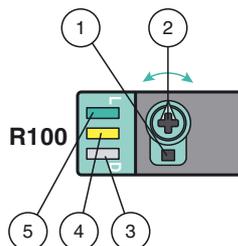


1 - Light-on / dark-on changeover switch

2 - Sensing range / sensitivity adjuster

3 - Operating indicator / dark on

4 - Signal indicator

5 - Operating indicator / light on

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

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## 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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