



**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**

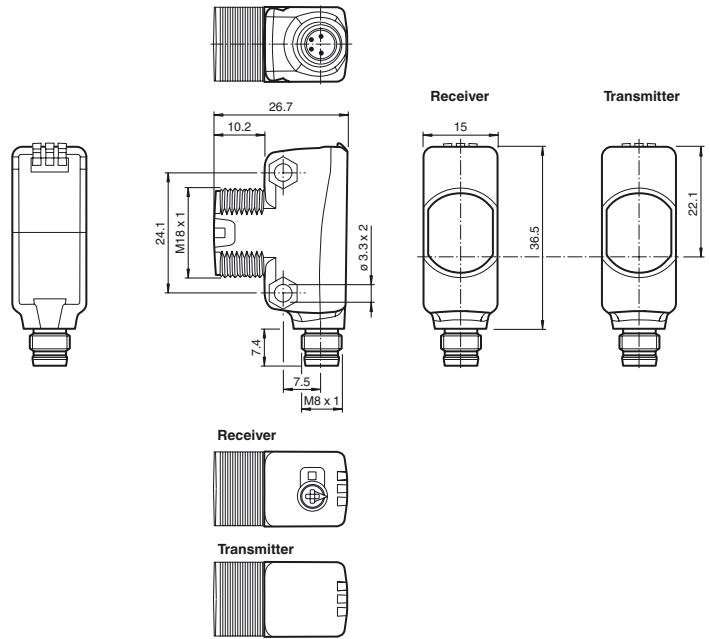
The R103 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation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

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

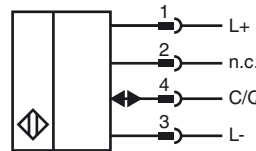
The DuraBeam laser sensors are durable and can be used in the same way as a standard sensor.

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.

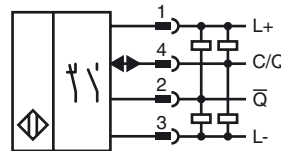
**Dimensions**



**Electrical connection emitter**



**Electrical connection receiver**



**Pinout**



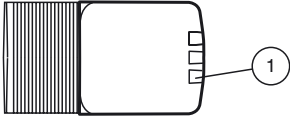
Wire colors in accordance with EN 60947-5-2

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

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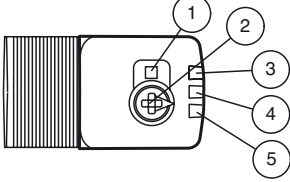
**Indicators/operating means**

**Emitter**



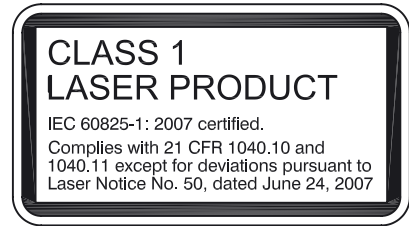
1	Operating indicator
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**Receiver**



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

**Laserlabel**



**Accessories**

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

Female cordset, M8, 4-pin, PUR cable

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

Female cordset, M8, 4-pin, PUR cable

**IO-Link-Master02-USB**

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

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 250 ... 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: constantly on - power on flashing (4Hz) - short circuit flashing with short break (1 Hz) - IO-Link mode
Function indicator	Yellow LED: Permanently lit - light path clear Permanently off - object detected Flashing (4 Hz) - operating reserve not reached
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 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: Process data output: 2 Bit Receiver: Process data input: 2 Bit Process data output: 2 Bit
SIO mode support	yes
Device ID	Emitter: 0x110404 (1115140) Receiver: 0x110304 (1114884)
Compatible master port type	A

**Input**

Test input	emitter deactivation at +U <sub>B</sub>
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**Output**

Switching type	The switching type of the sensor is adjustable. The default setting is: C/Q - Pin4: NPN normally open / dark-on, PNP normally closed / light-on, IO-Link /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

**Ambient conditions**

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

**Mechanical specifications**

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

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
<b>Material</b>	
Housing	PC (Polycarbonate)
Optical face	PMMA
Mass	Emitter: approx. 12 g receiver: approx. 12 g

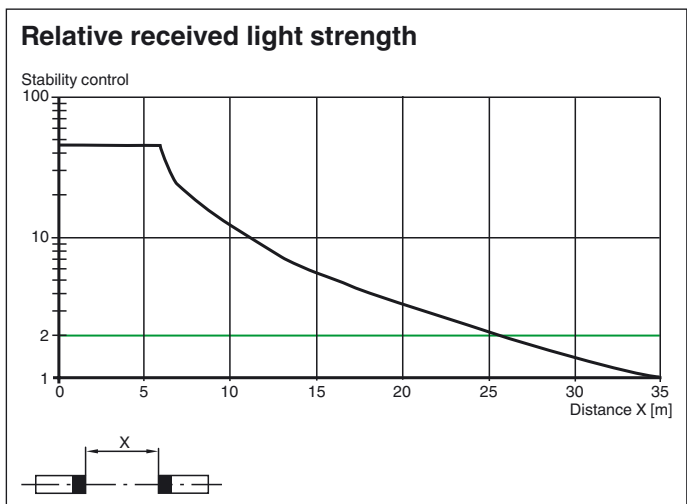
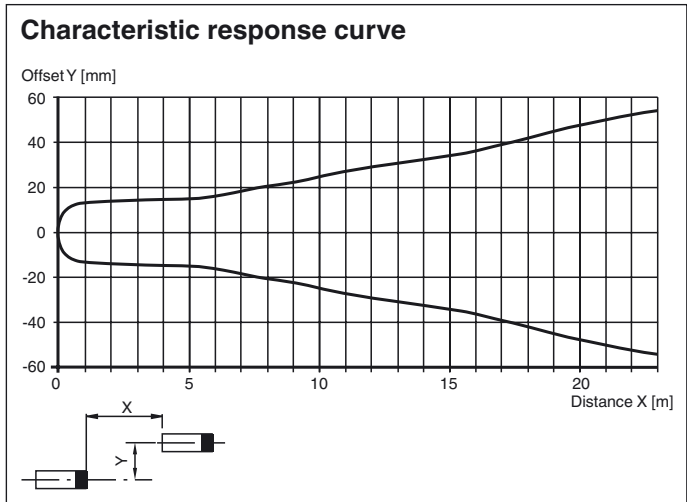
**Compliance with standards and directives**

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

**Approvals and certificates**

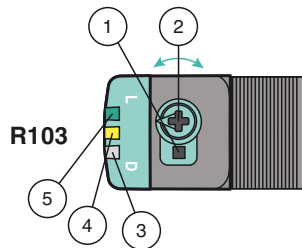
UL approval	E87056 , cULus Listed , class 2 power supply , type rating 1
FDA approval	IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

**Curves/Diagrams**



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## 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 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.