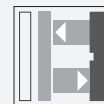




## Triangulation sensor (BGS) OBT250-R103-2EP-IO-L



- 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

Triangulation sensor with background suppression



**IO-Link**

### Function

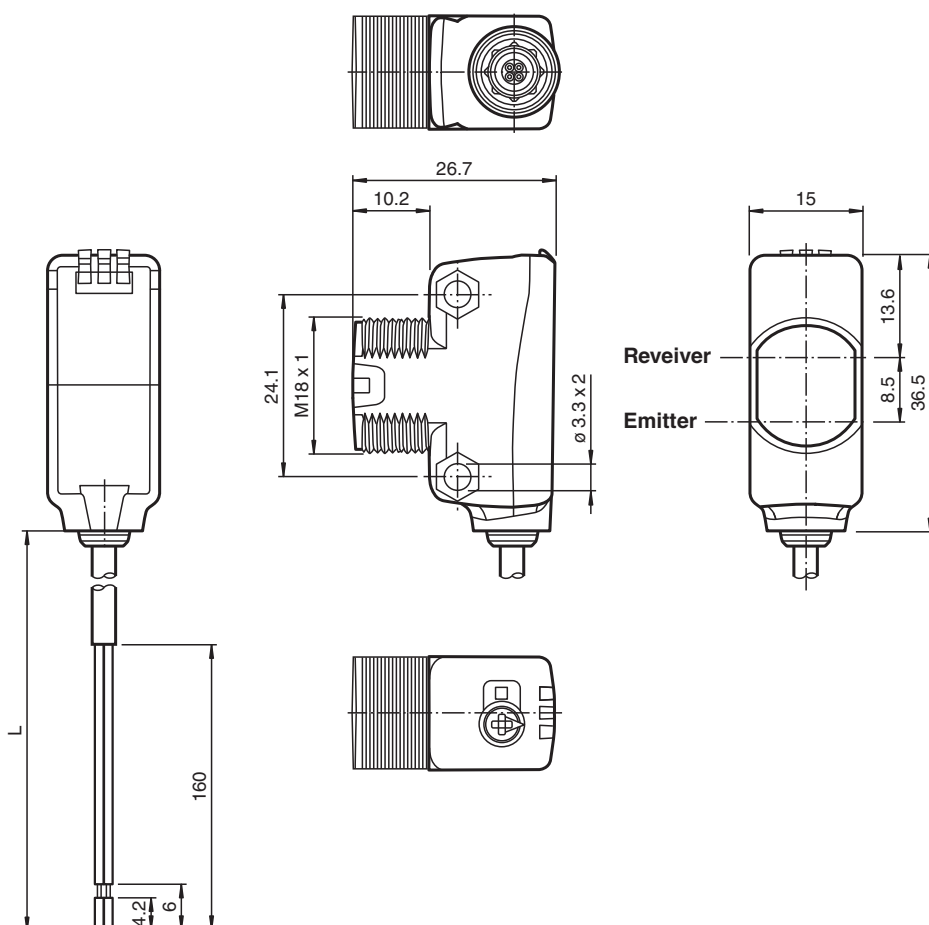
The R103 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation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

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**PEPPERL+FUCHS**

## Technical Data

### General specifications

|                                   |                                                       |
|-----------------------------------|-------------------------------------------------------|
| Detection range                   | 7 ... 250 mm                                          |
| Detection range min.              | 7 ... 25 mm                                           |
| Detection range max.              | 7 ... 250 mm                                          |
| Adjustment range                  | 25 ... 250 mm                                         |
| Reference target                  | standard white, 100 mm x 100 mm                       |
| 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 < 1 mm in the range of 150 mm ... 250 mm |
| Pulse length                      | 3 µs                                                  |
| Repetition rate                   | approx. 13 kHz                                        |
| max. pulse energy                 | 10.4 nJ                                               |
| Black-white difference (6 %/90 %) | < 5 % at 120 mm                                       |
| Diameter of the light spot        | approx. 1 mm at a distance of 200 mm                  |
| Opening angle                     | approx. 0.3 °                                         |
| Ambient light limit               | EN 60947-5-2 40000 Lux                                |

### Functional safety related parameters

|                                |       |
|--------------------------------|-------|
| MTTF <sub>d</sub>              | 560 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  | LED yellow:<br>constantly on - object detected<br>constantly off - object not detected                                      |
| Control elements    | Light-on/dark-on changeover switch                                                                                          |
| Control elements    | Sensing range adjuster                                                                                                      |

### Electrical specifications

|                        |                |                                |
|------------------------|----------------|--------------------------------|
| Operating voltage      | U <sub>B</sub> | 10 ... 30 V DC                 |
| Ripple                 |                | max. 10 %                      |
| No-load supply current | I <sub>0</sub> | < 20 mA at 24 V supply voltage |
| Protection class       |                | III                            |

### Interface

|                             |                                                       |
|-----------------------------|-------------------------------------------------------|
| Interface type              | IO-Link ( via C/Q = BK )                              |
| IO-Link revision            | 1.1                                                   |
| Device profile              | Smart Sensor                                          |
| Device ID                   | 0x110605 (1115653)                                    |
| Transfer rate               | COM2 (38.4 kBit/s)                                    |
| Min. cycle time             | 2.3 ms                                                |
| Process data width          | Process data input 1 Bit<br>Process data output 2 Bit |
| SIO mode support            | yes                                                   |
| Compatible master port type | A                                                     |

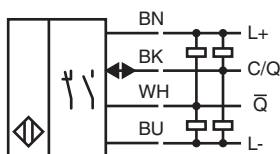
### Output

|                |                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switching type | The switching type of the sensor is adjustable. The default setting is:<br>C/Q - BK: NPN normally open / light-on, PNP normally closed / dark-on, IO-Link / Q - WH: NPN normally closed / dark-on, PNP normally open / light-on |
| Signal output  | 2 push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected, overvoltage protected                                                                                                                        |

## Technical Data

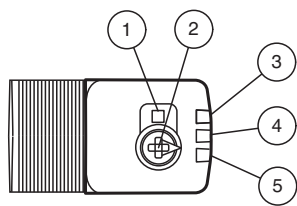
|                                   |       |                                                                                                                                                             |
|-----------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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               | $f$   | 1650 Hz                                                                                                                                                     |
| Response time                     |       | 300 $\mu$ s                                                                                                                                                 |
| <b>Conformity</b>                 |       |                                                                                                                                                             |
| Communication interface           |       | IEC 61131-9                                                                                                                                                 |
| Product standard                  |       | EN 60947-5-2                                                                                                                                                |
| Laser safety                      |       | EN 60825-1:2014                                                                                                                                             |
| <b>Approvals and certificates</b> |       |                                                                                                                                                             |
| 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. |
| <b>Ambient conditions</b>         |       |                                                                                                                                                             |
| 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)                                                                                                                              |
| <b>Mechanical specifications</b>  |       |                                                                                                                                                             |
| Degree of protection              |       | IP67 / IP69 / IP69K                                                                                                                                         |
| Connection                        |       | 2 m fixed cable                                                                                                                                             |
| Material                          |       |                                                                                                                                                             |
| Housing                           |       | PC (Polycarbonate)                                                                                                                                          |
| Optical face                      |       | PMMA                                                                                                                                                        |
| Mass                              |       | approx. 38 g                                                                                                                                                |
| Dimensions                        |       |                                                                                                                                                             |
| Height                            |       | 36.5 mm                                                                                                                                                     |
| Width                             |       | 15 mm                                                                                                                                                       |
| Depth                             |       | 26.7 mm                                                                                                                                                     |
| Cable length                      |       | 2 m                                                                                                                                                         |

## Connection



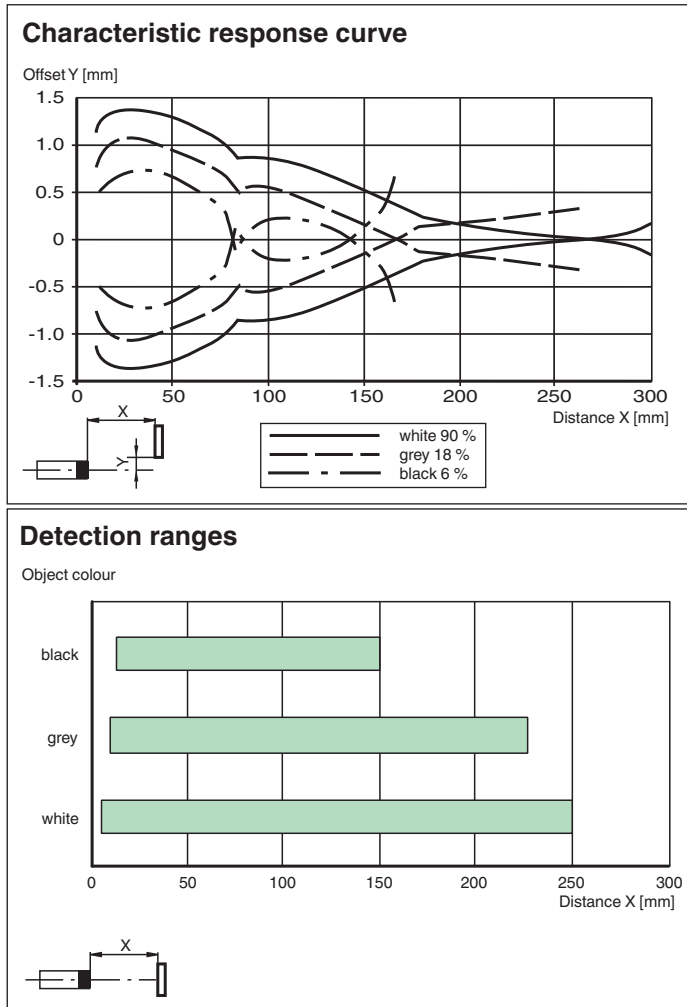
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Assembly



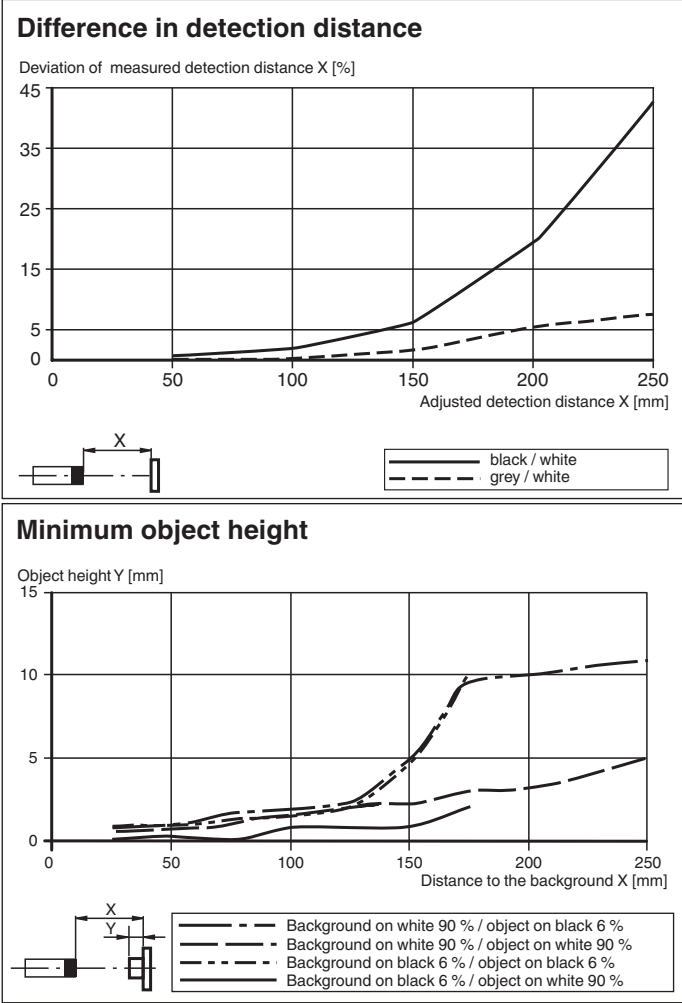
|   |                                    |
|---|------------------------------------|
| 1 | Light-on/dark-on changeover switch |
| 2 | Sensing range adjuster             |
| 3 | Operating indicator / dark on      |
| 4 | Function indicator                 |
| 5 | Operating indicator / light on     |

Characteristic Curve

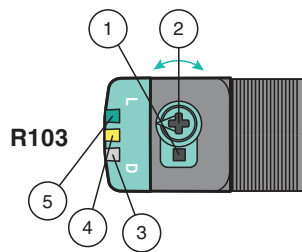


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Characteristic Curve



## 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.