



# Triangulation sensor (BGE)

## OBT250-R103-2EP-IO-1T-L



- Miniature design with versatile mounting options
- Secure and gapless detection, even near the surface through background evaluation
- 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

Laser diffuse mode sensor with background evaluation



**IO-Link**

### Function

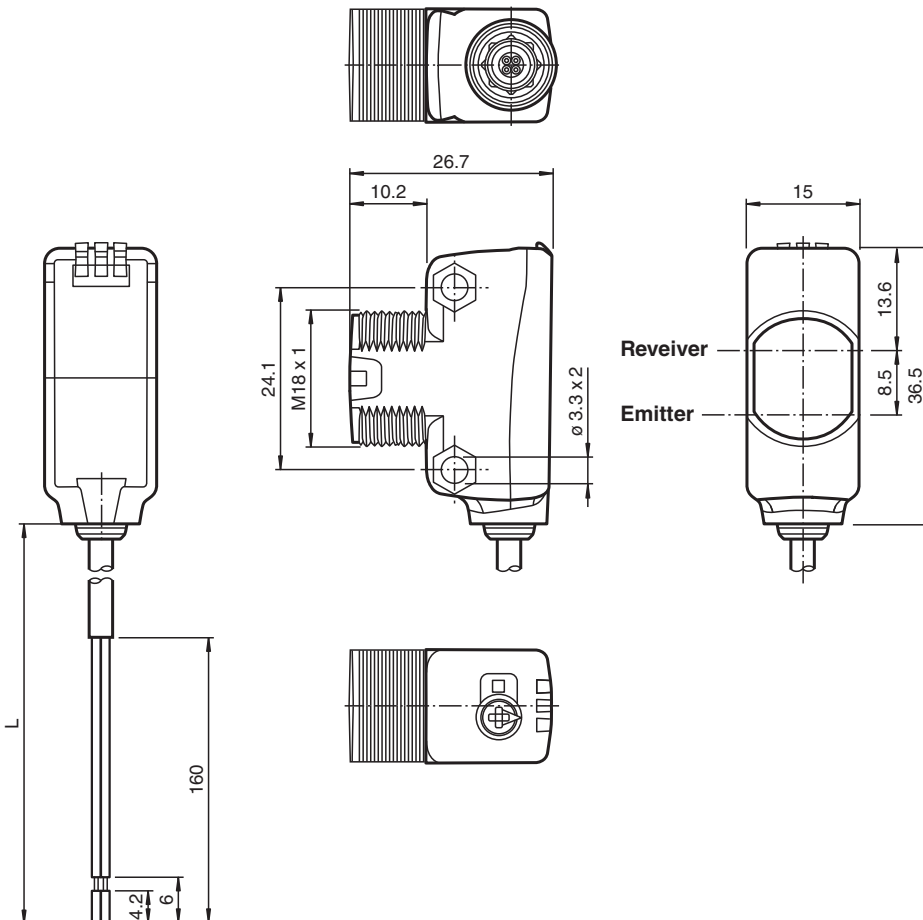
The R103 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation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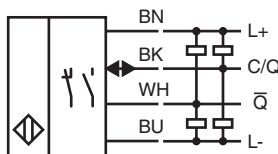
## Technical Data

| 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 $\mu$ s   |
| 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                            | 0x110705 (1115909)  |
| 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<br>/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  |

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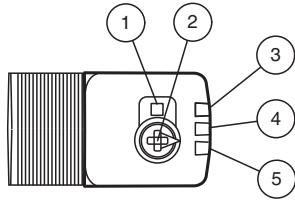
|                                   |       |   |
|-----------------------------------|-------|---|
| Switching voltage                 |       | max. 30 V DC  |
| Switching current                 |       | max. 100 mA , resistive load  |
| Usage category                    |       | DC-12 and DC-13   |
| 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. 35 g  |
| Dimensions                        |       |   |
| Height                            |       | 36.5 mm   |
| Width                             |       | 15 mm   |
| Depth                             |       | 26.7 mm   |
| Cable length                      |       | 2 m   |

## Connection



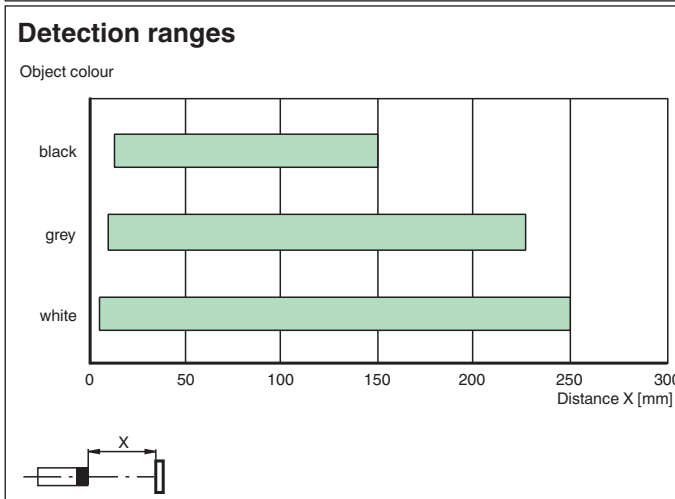
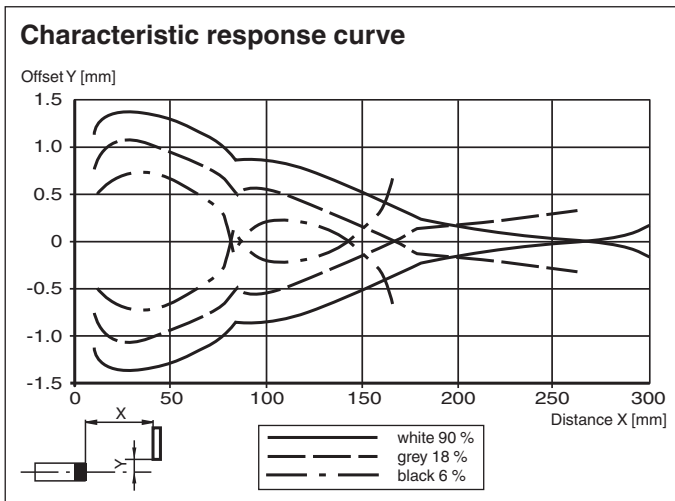
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**Assembly**



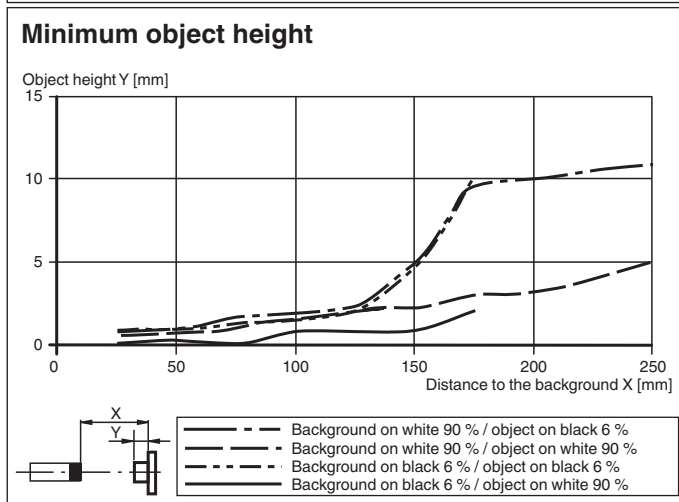
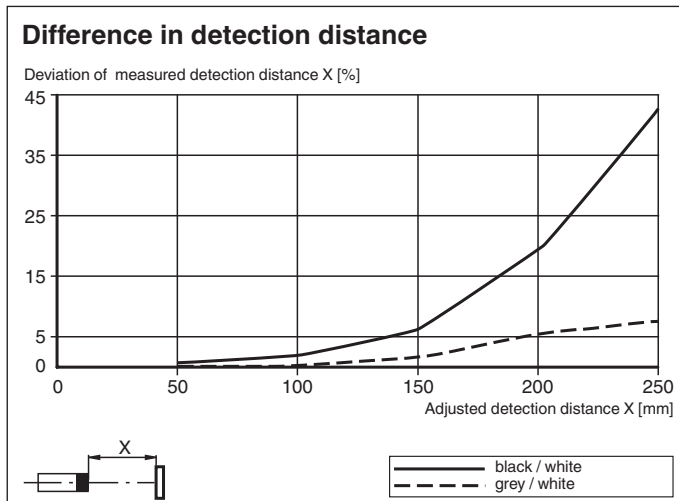
|   |                                    |
|---|------------------------------------|
| 1 | Light-on/dark-on changeover switch |
| 2 | Sensing range adjuster             |
| 3 | Operating indicator / dark on      |
| 4 | Function indicator                 |
| 5 | Operating indicator / light on     |

**Characteristic Curve**



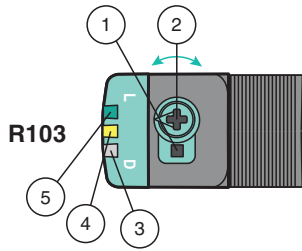
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## Configuration



- 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.