



## Triangulation sensor (BGE) OBT250-R103-2EP-IO-1T-L-Y0330



- 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

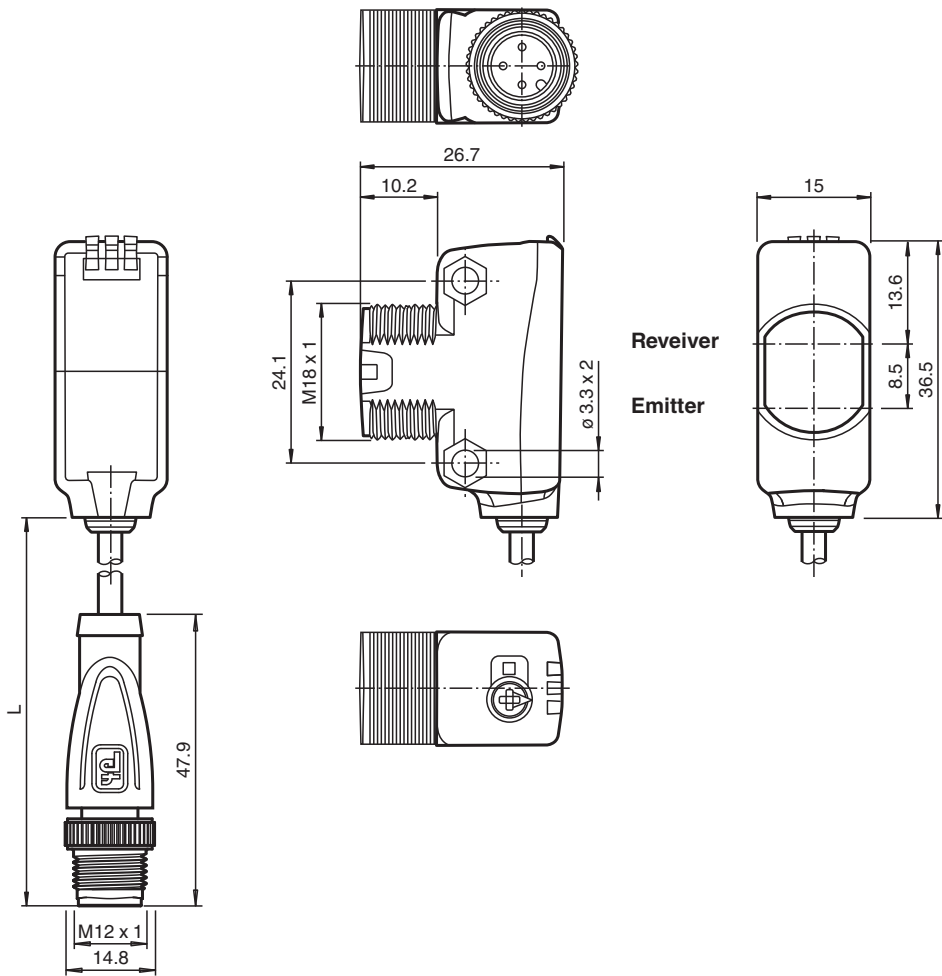
The R103 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation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



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                                                 |

## Technical Data

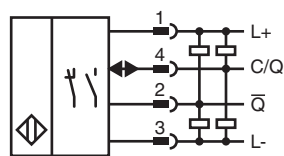
|                                   |                |                                                                                                                                                                                                                                       |
|-----------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mission Time (T <sub>M</sub> )    |                | 20 a                                                                                                                                                                                                                                  |
| Diagnostic Coverage (DC)          |                | 0 %                                                                                                                                                                                                                                   |
| <b>Indicators/operating means</b> |                |                                                                                                                                                                                                                                       |
| 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                                                                                                                                                                                                                |
| <b>Electrical specifications</b>  |                |                                                                                                                                                                                                                                       |
| 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                                                                                                                                                                                                                                   |
| <b>Interface</b>                  |                |                                                                                                                                                                                                                                       |
| Interface type                    |                | IO-Link ( via C/Q = pin 4 )                                                                                                                                                                                                           |
| 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                                                                                                                                                                                                                                     |
| <b>Output</b>                     |                |                                                                                                                                                                                                                                       |
| Switching type                    |                | The switching type of the sensor is adjustable. The default setting is:<br>C/Q - Pin4: NPN normally open / light-on, PNP normally closed / dark-on, IO-Link<br>/Q - Pin2: 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                                                                                                                              |
| 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              | 1650 Hz                                                                                                                                                                                                                               |
| Response time                     |                | 300 μs                                                                                                                                                                                                                                |
| <b>Conformity</b>                 |                |                                                                                                                                                                                                                                       |
| Communication interface           |                | IEC 61131-9                                                                                                                                                                                                                           |
| Product standard                  |                | EN 60947-5-2                                                                                                                                                                                                                          |
| Laser safety                      |                | IEC 60825-1:2007                                                                                                                                                                                                                      |
| <b>Approvals and certificates</b> |                |                                                                                                                                                                                                                                       |
| 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                                                                                                  |
| <b>Ambient conditions</b>         |                |                                                                                                                                                                                                                                       |
| Ambient temperature               |                | -40 ... 60 °C (-40 ... 140 °F) , fixed cable<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>  |                |                                                                                                                                                                                                                                       |
| Housing width                     |                | 15 mm                                                                                                                                                                                                                                 |
| Housing height                    |                | 36.5 mm                                                                                                                                                                                                                               |
| Housing depth                     |                | 26.7 mm                                                                                                                                                                                                                               |
| Degree of protection              |                | IP67 / IP69 / IP69K                                                                                                                                                                                                                   |

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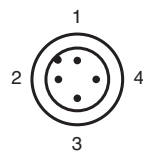
Technical Data

|              |                                                  |
|--------------|--------------------------------------------------|
| Connection   | 300 mm fixed cable with M12 x 1, 4-pin connector |
| Material     |                                                  |
| Housing      | PC (Polycarbonate)                               |
| Optical face | PMMA                                             |
| Mass         | approx. 17 g                                     |
| Cable length | 0.3 m                                            |

Connection



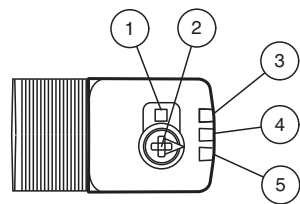
Connection Assignment



Wire colors in accordance with EN 60947-5-2

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

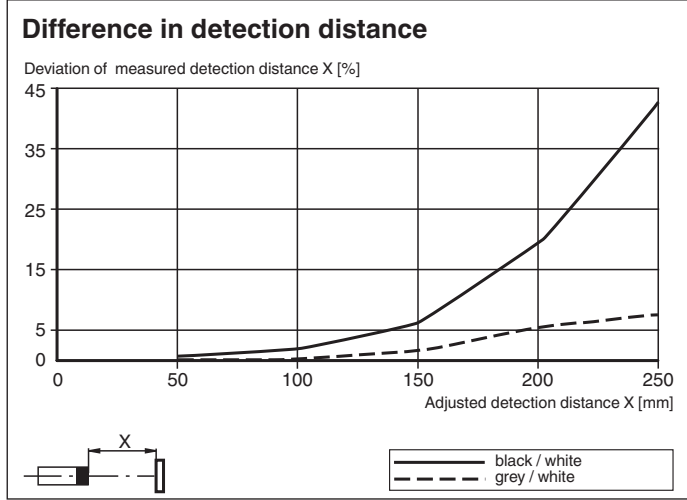
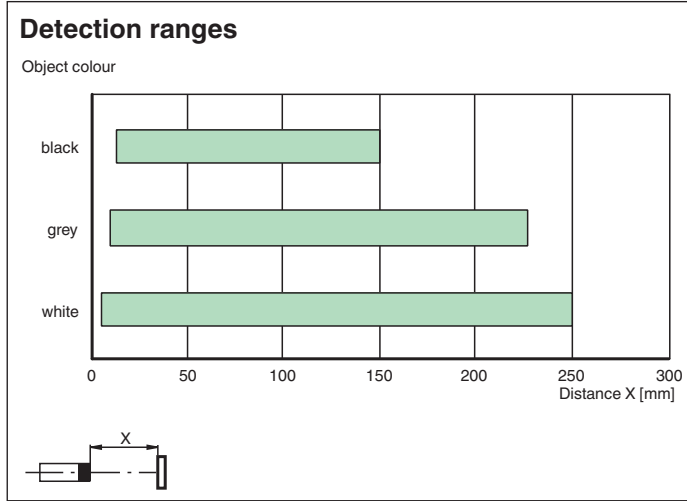
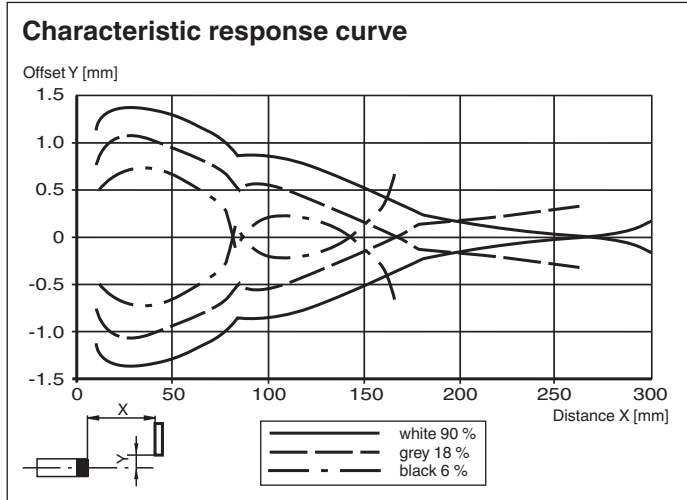
Assembly



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

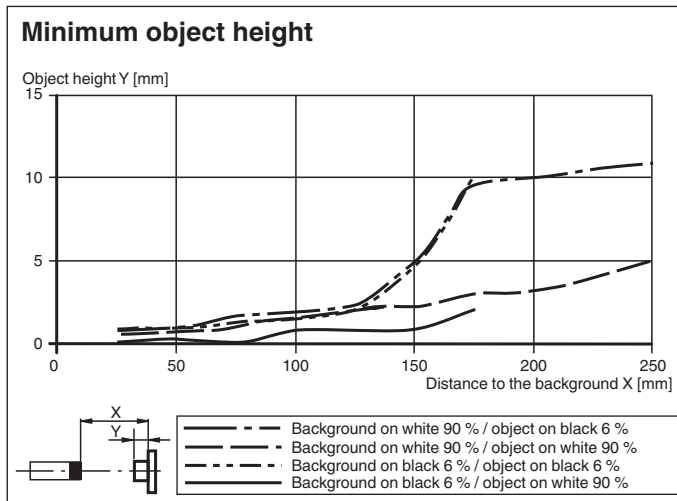
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Characteristic Curve



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## Characteristic Curve



## Accessories

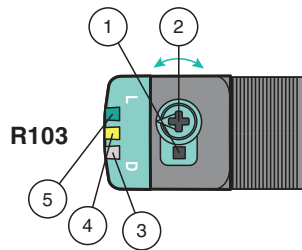
|  |                           |                                                                                |
|--|---------------------------|--------------------------------------------------------------------------------|
|  | <b>OMH-ML100-09</b>       | Mounting aid for round steel $\varnothing$ 12 mm or sheet 1.5 mm ... 3 mm      |
|  | <b>OMH-R103-01</b>        | Mounting bracket                                                               |
|  | <b>OMH-ML6</b>            | Mounting bracket                                                               |
|  | <b>OMH-ML6-U</b>          | Mounting bracket                                                               |
|  | <b>OMH-ML6-Z</b>          | Mounting bracket                                                               |
|  | <b>OMH-R10X-01</b>        | Mounting bracket                                                               |
|  | <b>OMH-R10X-04</b>        | Mounting bracket                                                               |
|  | <b>OMH-R10X-10</b>        | Mounting bracket                                                               |
|  | <b>OMH-ML100-031</b>      | Mounting aid for round steel $\varnothing$ 10 ... 14 mm or sheet 1 mm ... 5 mm |
|  | <b>OMH-ML100-03</b>       | Mounting aid for round steel $\varnothing$ 12 mm or sheet 1.5 mm ... 3 mm      |
|  | <b>ICE2-8IOL-G65L-V1D</b> | EtherNet/IP IO-Link master with 8 inputs/outputs                               |
|  | <b>ICE3-8IOL-G65L-V1D</b> | PROFINET IO IO-Link master with 8 inputs/outputs                               |
|  | <b>ICE1-8IOL-G30L-V1D</b> | Ethernet IO-Link module with 8 inputs/outputs                                  |
|  | <b>ICE1-8IOL-G60L-V1D</b> | Ethernet IO-Link module with 8 inputs/outputs                                  |

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## Accessories

|                                                                                   |                             |                                                                                                              |
|-----------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------|
|  | <b>ICE2-8IOL-K45P-RJ45</b>  | EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, push-in connectors                               |
|  | <b>ICE2-8IOL-K45S-RJ45</b>  | EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, screw terminal                                   |
|  | <b>ICE3-8IOL-K45P-RJ45</b>  | PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, push-in terminals                                |
|  | <b>ICE3-8IOL-K45S-RJ45</b>  | PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, screw terminal                                   |
|  | <b>IO-Link-Master02-USB</b> | IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection |

## 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.