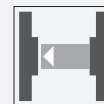




## Thru-beam sensor (pair) OBE10M-R3-SE0-P-L



- Ultra-small housing design
- DuraBeam Laser Sensors - durable and employable like an LED
- 45° cable outlet for maximum mounting freedom under extremely tight space constraints

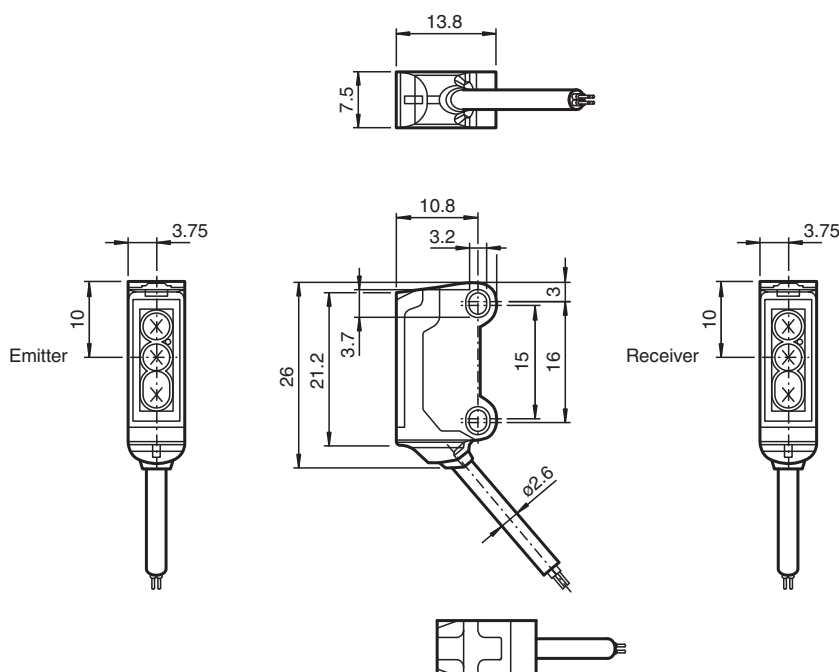
Laser thru-beam sensor, ultra-small design with M3 mounting, 10 m detection range, dark on, NPN output, 2 m fixed cable



### Function

The R3 series nano sensor has been developed for a broad range of applications. It offers excellent durability and is exceptionally easy to install. The housing is compact and, with its 45° cable outlet, can be installed in the smallest spaces. New functional principles and functionality open up a range of new options. The DuraBeam laser sensors are durable and can be used in the same way as a standard sensor.

### Dimensions



### Technical Data

#### System components

|          |                  |
|----------|------------------|
| Emitter  | OBE10M-R3-S-P-L  |
| Receiver | OBE10M-R3-E0-P-L |

#### General specifications

|                           |            |
|---------------------------|------------|
| Effective detection range | 0 ... 10 m |
|---------------------------|------------|

## Technical Data

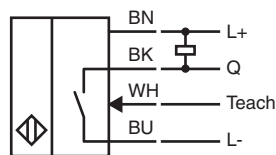
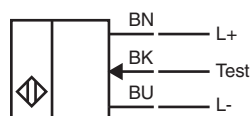
|                                             |                |                                                                                                                                                   |
|---------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Threshold detection range                   |                | 15 m                                                                                                                                              |
| Light source                                |                | laser diode                                                                                                                                       |
| Light type                                  |                | modulated visible red light , 680 nm                                                                                                              |
| Laser nominal ratings                       |                |                                                                                                                                                   |
| Note                                        |                | LASER LIGHT , DO NOT STARE INTO BEAM                                                                                                              |
| Laser class                                 |                | 1                                                                                                                                                 |
| Wave length                                 |                | 680 nm                                                                                                                                            |
| Beam divergence                             |                | > 5 mrad                                                                                                                                          |
| Pulse length                                |                | approx. 3 µs                                                                                                                                      |
| Repetition rate                             |                | approx. 16.6 kHz                                                                                                                                  |
| max. pulse energy                           |                | 9.5 nJ                                                                                                                                            |
| Diameter of the light spot                  |                | approx. 20 mm at a distance of 10 m                                                                                                               |
| Opening angle                               |                | approx. 0.5 °                                                                                                                                     |
| Optical face                                |                | frontal                                                                                                                                           |
| Ambient light limit                         |                | EN 60947-5-2 : 30000 Lux                                                                                                                          |
| <b>Functional safety related parameters</b> |                |                                                                                                                                                   |
| MTTF <sub>d</sub>                           |                | 806 a                                                                                                                                             |
| Mission Time (T <sub>M</sub> )              |                | 20 a                                                                                                                                              |
| Diagnostic Coverage (DC)                    |                | 0 %                                                                                                                                               |
| <b>Indicators/operating means</b>           |                |                                                                                                                                                   |
| Operation indicator                         |                | LED green, statically lit Power on , short-circuit : LED green flashing (approx. 4 Hz)                                                            |
| Function indicator                          |                | Receiver: LED yellow, lights up when light beam is free, flashes when falling short of the operating reserve ; OFF when light beam is interrupted |
| <b>Electrical specifications</b>            |                |                                                                                                                                                   |
| Operating voltage                           | U <sub>B</sub> | 12 ... 24 V                                                                                                                                       |
| No-load supply current                      | I <sub>0</sub> | Emitter: ≤ 10 mA<br>Receiver: ≤ 8 mA                                                                                                              |
| Protection class                            |                | III                                                                                                                                               |
| <b>Input</b>                                |                |                                                                                                                                                   |
| Test input                                  |                | Test of switching function at 0 V                                                                                                                 |
| Switching threshold                         |                | Teach-In input                                                                                                                                    |
| <b>Output</b>                               |                |                                                                                                                                                   |
| Switching type                              |                | NO contact / dark on                                                                                                                              |
| Signal output                               |                | 1 NPN output, short-circuit protected, reverse polarity protected, open collector                                                                 |
| Switching voltage                           |                | max. 30 V DC                                                                                                                                      |
| Switching current                           |                | max. 50 mA , resistive load                                                                                                                       |
| Voltage drop                                | U <sub>d</sub> | ≤ 1.5 V DC                                                                                                                                        |
| Switching frequency                         | f              | approx. 2 kHz                                                                                                                                     |
| Response time                               |                | 250 µs                                                                                                                                            |
| <b>Conformity</b>                           |                |                                                                                                                                                   |
| Product standard                            |                | EN 60947-5-2                                                                                                                                      |
| Laser safety                                |                | EN 60825-1:2007                                                                                                                                   |
| <b>Approvals and certificates</b>           |                |                                                                                                                                                   |
| UL approval                                 |                | E87056 , cULus Recognized, Class 2 Power Source                                                                                                   |
| CCC approval                                |                | CCC approval / marking not required for products rated ≤36 V                                                                                      |
| 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                         |                | -20 ... 60 °C (-4 ... 140 °F)                                                                                                                     |
| Storage temperature                         |                | -30 ... 70 °C (-22 ... 158 °F)                                                                                                                    |
| <b>Mechanical specifications</b>            |                |                                                                                                                                                   |
| Housing width                               |                | 7.5 mm                                                                                                                                            |
| Housing height                              |                | 26 mm                                                                                                                                             |
| Housing depth                               |                | 13.8 mm                                                                                                                                           |

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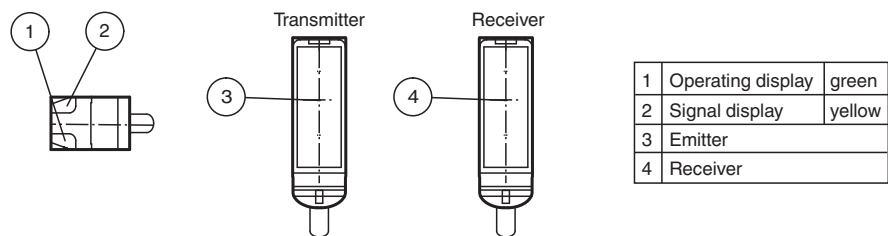
Technical Data

|                      |                         |
|----------------------|-------------------------|
| Degree of protection | IP67                    |
| Connection           | 2 m fixed cable         |
| Material             |                         |
| Housing              | PC/ABS and TPU          |
| Optical face         | PC                      |
| Cable                | PUR                     |
| Mass                 | approx. 20 g per sensor |
| Cable length         | 2 m                     |

Connection

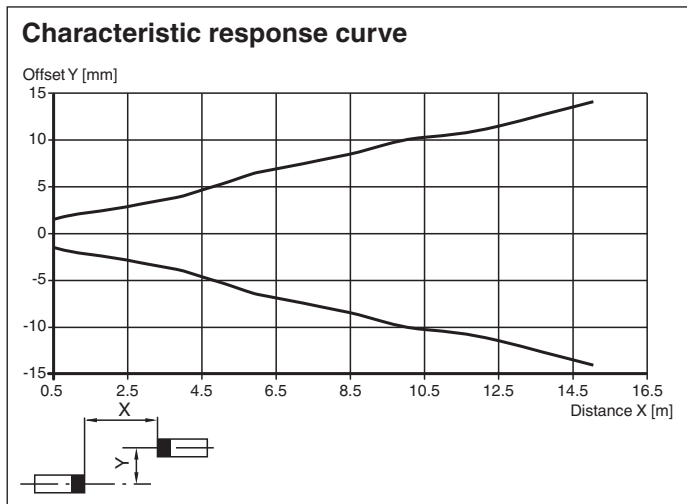


Assembly



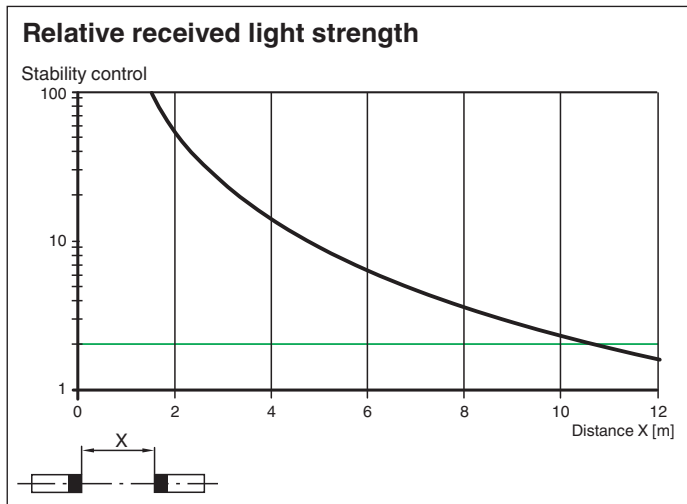
|   |                   |        |
|---|-------------------|--------|
| 1 | Operating display | green  |
| 2 | Signal display    | yellow |
| 3 | Emitter           |        |
| 4 | Receiver          |        |

Characteristic Curve

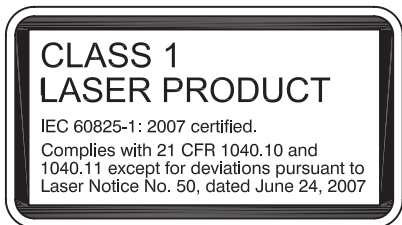


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Characteristic Curve



Safety Information



Safety Information

**Laser Class 1 Information**  
The irradiation can lead to irritation especially in a dark environment. Do not point at people!  
Maintenance and repairs should only be carried out by authorized service personnel!  
Attach the device so that the warning is clearly visible and readable.  
The warning accompanies the device and should be attached in immediate proximity to the device.  
Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Accessories

|  |                 |                                                               |
|--|-----------------|---------------------------------------------------------------|
|  | <b>MH-R3-01</b> | Mounting aid for sensors from the R3 series, mounting bracket |
|  | <b>MH-R3-02</b> | Mounting aid for sensors from the R3 series, mounting bracket |

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Accessories

|                                                                                   |          |                                                               |
|-----------------------------------------------------------------------------------|----------|---------------------------------------------------------------|
|  | MH-R3-03 | Mounting aid for sensors from the R3 series, mounting bracket |
|  | MH-R3-04 | Mounting aid for sensors from the R3 series, mounting bracket |

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## Teach-In

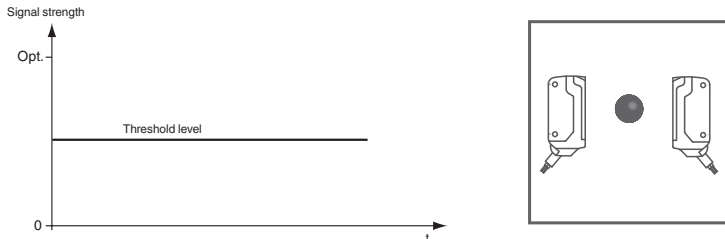
The thru-beam sensor enables the switching points to be taught in for optimum adaptation to specific applications. This eliminates the need for additional components such as apertures.

The sensitivity of the thru-beam sensor can be adjusted using three Teach-in methods:

### Position Teach

When using this Teach-in method, the following settings are made on the thru-beam sensor:

- The gain is set to an optimum value
- The signal threshold is set to a minimum



Recommended application:

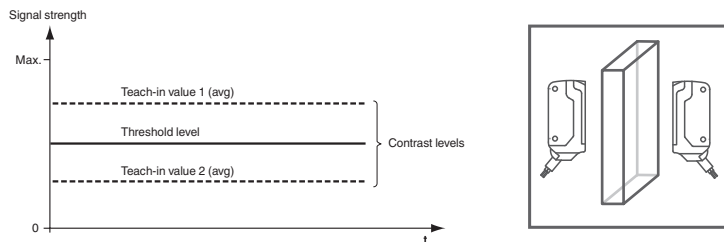
This method enables minuscule particles in the beam path to be detected, and provides exceptional positioning accuracy. Make sure that there are no objects in the beam path and that the sensor is connected to the power supply.

1. Connect the white cable on the receiver (WH/IN) to the blue cable (BU/0 V) on the receiver.  
The green and yellow LED indicators flash simultaneously at 2.5 Hz
2. Disconnect the white cable on the receiver (WH/IN) from the blue cable (BU/0 V) on the receiver.  
The green and yellow LED indicators flash alternately at 2.5 Hz
3. The end of the Teach-in process is indicated when the green LED indicator lights up static and yellow LED blinks.

### Two-Point Teach-In

When using this Teach-in method, the following settings are made on the thru-beam sensor:

- The gain is set to an optimum value
- The signal threshold is set in the center between the two taught signal values



1. Make sure that there are no objects in the beam path and that the sensor is connected to the power supply.
2. Connect the white cable on the receiver (WH/IN) to the blue cable (BU/0 V) on the receiver.  
The green and yellow LED indicators flash simultaneously at 2.5 Hz
3. Position the object in the beam path.
4. Disconnect the white cable on the receiver (WH/IN) from the blue cable (BU/0 V) on the receiver.  
The green and yellow LED indicators flash alternately at 2.5 Hz
5. The end of the Teach-in process is indicated when the green LED indicator lights up static.

### Maximum Teach-In

When using this Teach-in method, the following settings are made on the thru-beam sensor:

- The gain is set to a maximum
- The signal threshold is set to a minimum



Recommended application:

Enables an object to be detected with a high excess gain. This can be useful if there is severe environmental contamination or to achieve long operating times.

Make sure that there are no objects in the beam path and that the sensor is connected to the power supply.

6. Cover the receiver or transmitter.
7. Connect the white cable on the receiver (WH/IN) to the blue cable (BU/0 V) on the receiver.

The green and yellow LED indicators flash simultaneously at 2.5 Hz

8. Disconnect the white cable on the receiver (WH/IN) from the blue cable (BU/0 V) on the receiver.  
The green and yellow LED indicators flash alternately at 2.5 Hz
9. The end of the Teach-in process is indicated when the green LED indicator lights up static.