# Background suppression sensor
# ML100-8-H-100-RT/103/115a
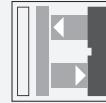
- Miniature design
- Small, sharp light spot
- Can be adapted to the application in question thanks to the adjustable detection range
- Precision object detection, almost irrespective of the color
- Full metal thread mounting

Triangulation sensor with background suppression, 100 mm adjustable sensing range, red light, light on, PNP output, 0.3 m fixed cable with M8 plug

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## Function

The optical sensors of this series are suitable for both standard and demanding applications.
The series features a miniature housing design, two M3 metal-threaded mounting holes and a highly visible LED status indicator.
Each device is equipped with a sensitivity adjuster and a light-on/dark-on changeover switch for increased flexibility.
A wide variety of versions are available in both infrared light and red light with PowerBeam for easy alignment.
Special versions with BlueBeam are suitable for challenging applications like those in the solar and battery industries.

## Dimensions

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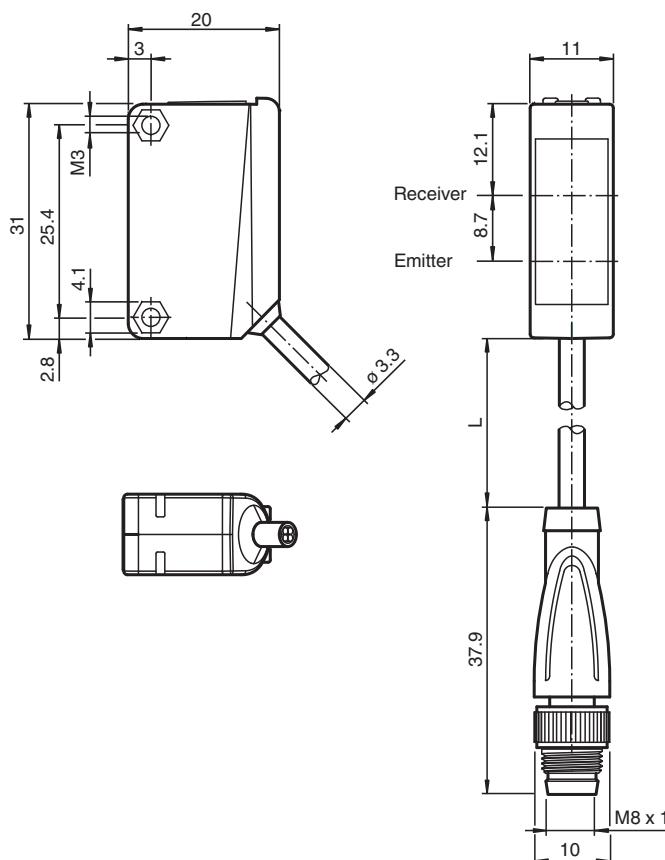
## Technical Data

**General specifications**

| | |
|---|---|
| Detection range | 5 ... 100 mm |
| Detection range min. | 5 ... 25 mm |
| Detection range max. | 5 ... 100 mm |
| Adjustment range | 25 ... 100 mm |
| Reference target | standard white, 100 mm x 100 mm |
| Light source | LED |
| Light type | modulated visible red light |
| Polarization filter | no |
| Black-white difference (6 %/90 %) | < 20  % |
| Diameter of the light spot | approx. 4 mm at a distance of 100 mm |
| Opening angle | approx. 2.5 ° |
| Optical face | frontal |
| Ambient light limit | EN 60947-5-2 |

**Functional safety related parameters**

| | |
|---|---|
| $MTTF_d$ | 860 a |
| Mission Time ($T_M$) | 20 a |
| Diagnostic Coverage (DC) | 0 % |

**Indicators/operating means**

| | |
|---|---|
| Operation indicator | LED green: power on |
| Function indicator | LED yellow: lights when object is detected |
| Control elements | Sensing range  adjuster |
| Control elements | Light-on/dark-on changeover switch |

**Electrical specifications**

| | | |
|---|---|---|
| Operating voltage | $U_B$ | 10 ... 30 V DC |
| Ripple | | max. 10  % |
| No-load supply current | $I_0$ | < 15 mA |

**Output**

| | | |
|---|---|---|
| Switching type | | The switching type of the sensor is adjustable. The default setting is: light-on |
| Signal output | | 1 PNP output, short-circuit protected, reverse polarity protected, open collector |
| Switching voltage | | max. 30 V DC |
| Switching current | | max. 100 mA , resistive load |
| Voltage drop | $U_d$ | ≤ 1.5 V DC |
| Switching frequency | f | 1000 Hz |
| Response time | | 0.5 ms |

**Conformity**

| | |
|---|---|
| Product standard | EN 60947-5-2 |

**Approvals and certificates**

| | |
|---|---|
| UL approval | cULus Listed, Class 2 Power Source or listed Power Supply with a limited voltage output with (maybe integrated) fuse (max. 3.3 A according UL248), Type 1 enclosure |
| CCC approval | CCC approval / marking not required for products rated ≤36 V |

**Ambient conditions**

| | |
|---|---|
| Ambient temperature | -30 ... 60 °C (-22 ... 140 °F) |
| Storage temperature | -40 ... 70 °C (-40 ... 158 °F) |

**Mechanical specifications**

| | |
|---|---|
| Housing width | 11 mm |
| Housing height | 31 mm |
| Housing depth | 20 mm |
| Degree of protection | IP67 |
| Connection | 300 mm fixed cable with 4-pin, M8 x 1 connector |
| Material | |
| Housing | PC (Polycarbonate) |
| Optical face | PMMA |

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## Technical Data

| Mass | approx. 20 g |
|---|---|
| Tightening torque, fastening screws | 0.6 Nm |
| Cable length | 0.3 m |

## Connection
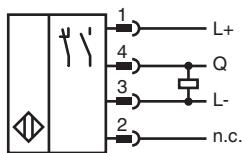


## Connection Assignment



Wire colors in accordance with EN 60947-5-2

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

## Assembly
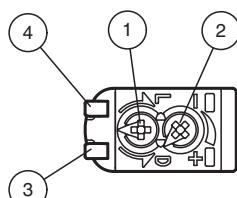


| 1 | Light-Dark-switching | |
|---|---|---|
| 2 | Sensitivity adjuster | |
| 3 | Signal display | yellow |
| 4 | Operating display | green |

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

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## Characteristic Curve

### Characteristic response curve

Offset Y [mm]



white 90 %
grey 18 %
black 6 %

Distance X [mm]
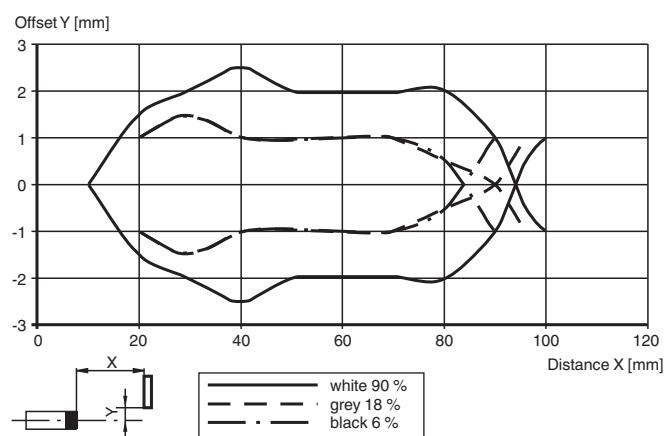
### Detection ranges

Object colour



AL
black
grey
white

Distance X [mm]

Detection
Suppression

## Accessories

| | | |
|---|---|---|
| | OMH-ML100-09 | Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm |
| | OMH-ML100-01 | Mounting aid for ML100 series, mounting bracket |
| | OMH-ML100-02 | Mounting aid for ML100 series, mounting bracket |
| | OMH-ML100-03 | Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm |
| | OMH-ML100-04 | Mounting aid for ML100 series, mounting bracket |
| | OMH-ML100-05 | Mounting aid for ML100 series, mounting bracket |
| | OMH-F10-ML100 | Mounting aid for ML100 series |
| | OMH-10 | Mounting aid for ML100 series |

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## Accessories

| | OMH-ML100-S1 | Mounting bracket |
|---|---|---|

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## System Description

**System Description**

The triangulation sensor with background suppression (BGS) contains both an emitter and a receiver in a single housing. Targeted blanking of objects outside the scanning range is made possible by a corresponding angle arrangement between emitter and receiver (2 receiver elements). The triangulation sensor (BGS) detects objects regardless of their surface structure, brightness and color, as well as the brightness of the background.

**Mounting**

The sensors can be mounted directly with fixing screws or by using a mounting bracket. Mounting brackets are available as accessories.
Ensure that the surface is flat to avoid housing distortion during mounting and fixing.
Secure nut and bolt with spring washers to prevent misalignment of the sensor.

**Adjusting the Sensor:** Apply the operating voltage to the sensor. The power indicator lights green.
Adjust the sensor to the background.
Yellow signal indicator permanently lights up: Use the sensing range adjuster to adjust the sensor to correct sensing range. Once the correct sensing range is set, the yellow signal indicator goes out.

**Commissioning**

**Check Object Detection:** Check as follows if the sensor detects objects as intended.
Position the object in the required sensing range of the sensor and align the light spot towards the object.
The yellow signal indicator is off. The indicator lights up only when the object is detected.
Troubleshooting: If the sensor does not respond as expected, change the sensing range setting until the signal indicator lights up during object detection.

**Maintenance**

**Cleaning:** Clean the optical surface of the sensor at regular intervals.
**Servicing:** Check the mounting screw connections and the electrical connections regularly.

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