## Model Number

**ML100-54-F/95/102**

Retroreflective sensor
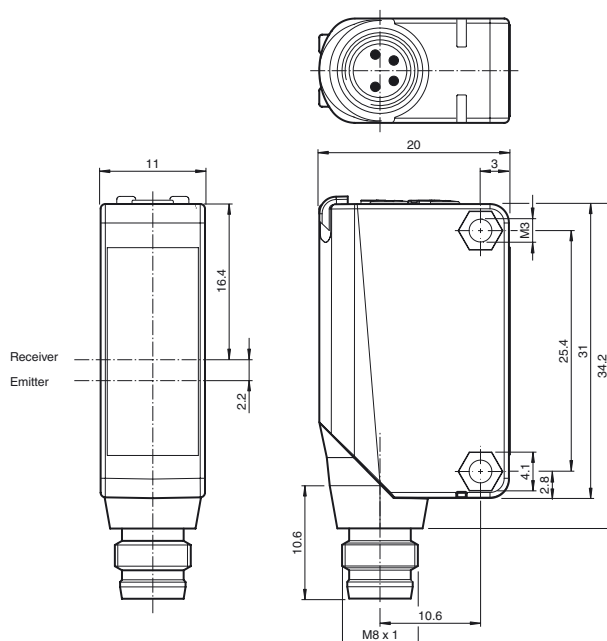with 4-pin, M8 x 1 connector

## Features

- Miniature design
- Easy to use
- Very bright, highly visible light spot
- Full metal thread mounting
- Clearly visible LEDs for Power ON, switching state and weak signal indication
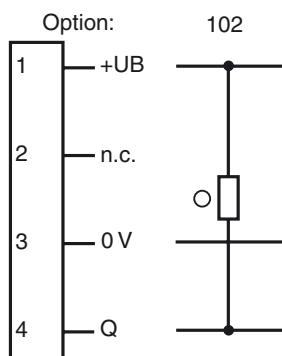- Not sensitive to ambient light

## Product information

The ML100 series is characterized by its miniature housing with integral, all-metal threaded bushings. All versions are equipped with a visible red transmitter LED. This greatly simplifies installation and commissioning. The switching states are easily visible from all directions thanks to the highly visible LEDs.
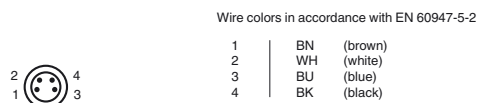
## Dimensions



Receiver
Emitter

## Electrical connection

Option: 102



| 1 | +UB |
| 2 | n.c. |
| 3 | 0 V |
| 4 | Q |

○ = Light on
● = Dark on

## Pinout

Wire colors in accordance with EN 60947-5-2

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

## Indicators/operating means
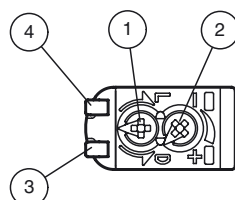


| 1 | Light-Dark-switching | |
| 2 | Sensitivity adjuster | |
| 3 | Signal display | yellow |
| 4 | Operating display | green |

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

Pepperl+Fuchs Group          USA: +1 330 486 0001          Germany: +49 621 776 4411          Singapore: +65 6779 9091
www.pepperl-fuchs.com        fa-info@us.pepperl-fuchs.com  fa-info@de.pepperl-fuchs.com       fa-info@sg.pepperl-fuchs.com

**PEPPERL+FUCHS**
*SENSING YOUR NEEDS*          **1**

## Technical data

### General specifications

| | |
|---|---|
| Effective detection range | 0 ... 2.7 m |
| Reflector distance | 0.02 ... 2.7 m |
| Threshold detection range | 3 m |
| Reference target | H50 reflector |
| Light source | LED |
| Light type | modulated visible red light |
| Polarization filter | yes |
| Diameter of the light spot | approx. 200 mm at a distance of 3 m |
| Angle of divergence | approx. 4 ° |
| Optical face | frontal |
| Ambient light limit | EN 60947-5-2:2007+A1:2012 |

### 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 up when receiving the light beam ; flashes when falling short of the stability control; OFF when light beam is interrupted |
| Control elements | sensitivity adjustment |
| 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 | $I_0$ | < 20 mA |

### Output

| | | |
|---|---|---|
| Switching type | | The switching type of the sensor is adjustable. The default setting is: light on |
| Signal output | | 1 NPN 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 |

### 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 | Connector M8 x 1 , 4-pin |
| Material | |
|   Housing | PC (Polycarbonate) |
|   Optical face | PMMA |
| Mass | approx. 10 g |
| Tightening torque, fastening screws | 0.6 Nm |

### Compliance with standards and directives

| | |
|---|---|
| Directive conformity | |
|   EMC Directive 2004/108/EC | EN 60947-5-2:2007+A1:2012 |
| Standard conformity | |
|   Standards | UL 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 |

## Accessories

**OMH-F10-ML100**
Mounting aid for ML100 series

**OMH-ML100-01**
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-10**
Mounting aid

**REF-H85-2**
Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes

**REF-C110-2**
Reflector, round ø 84 mm, central mounting hole

**REF-H60-2**
Reflector with mounting holes

**REF-H50**
Reflector, rectangular 51 mm x 61 mm, mounting holes, fixing strap

**REF-H33**
Reflector with screw fixing

**OFR-70-2**
Reflective tape 70 mm x 70 mm

**REF-MH23-2**
Reflector with Micro-structure, rectangular 23 mm x 14 mm, diagonal mounting hole

**V31-WM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

**V31-GM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

**OMH-ML100-S1**
Mounting bracket

**OMH-ML100-08**
Mounting aid for ML100 series, Snap-in

Other suitable accessories can be found at www.pepperl-fuchs.com

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

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0001
fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411
fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
fa-info@sg.pepperl-fuchs.com

**PEPPERL+FUCHS**
*SENSING YOUR NEEDS*

## Curves/Diagrams

### Characteristic response curve

Offset Y [mm]

Distance X [m]

- —— H85-2
- — — C110-2
- —·— H50
- ······ OFR-100/100
- —··— OFR 20 mm x 20 mm

### Relative received light strength (typical)

Reflector type:

| Reflector type | | |
|---|---|---|
| H85-2 | 20 mm | 4 m |
| C110-2 | 20 mm | 3.5 m |
| H50 | 20 mm | 3 m |
| OFR-100/100 | 20 mm | 1.2 m |
| OFR 20 mm x 20 mm | 20 mm | 0.8 m |

☐ Stability control > 1.5
▨ Stability control < 1.5

Stability control

- —— H85-2
- — — C110-2
- ······ H50
- —·— OFR-100/100
- —··— OFR 20 mm x 20 mm

Distance X [m]

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

**PEPPERL+FUCHS**
SENSING YOUR NEEDS