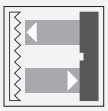
# Retroreflective sensor

## ML100-54-F/25/95/102/154



- No controls
- Miniature design
- Easy to use
- Clearly visible LEDs for Power ON, switching state and weak signal indication
- Very bright, highly visible light spot
- Full metal thread mounting
- Not sensitive to ambient light
- Optimized for small distances to any reflector
- Mounting optical reflective films down to a distance of 20 mm possible

Retroreflective sensor with polarization filter, plastic housing, 3 m detection range, red light, light on, DC version, NPN output, M8 plug

## 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.

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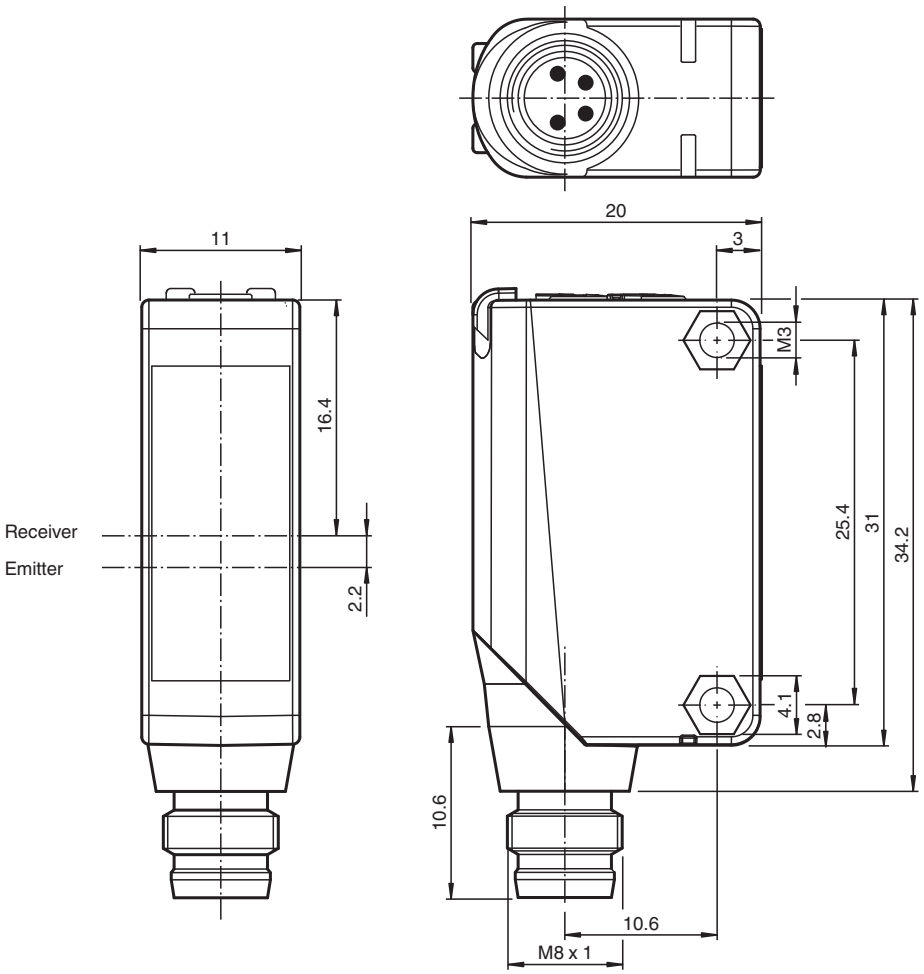
## Dimensions




## Technical Data

| | | |
|---|---|---|
| **General specifications** | | |
| Effective detection range | | 0 ... 2.7 m |
| Reflector distance | | 0.02 ... 2.7 m ( 0.02 ... 1 m on OFR-100/100 optical reflective film ) |
| 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 |
| Opening angle | | 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 operating reserve; OFF when light beam is interrupted |
| **Electrical specifications** | | |
| Operating voltage | $U_B$ | 10 ... 30 V DC |

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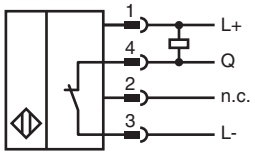
## Technical Data

| | | |
|---|---|---|
| Ripple | | max. 10 % |
| No-load supply current | $I_0$ | < 20 mA |
| **Output** | | |
| Switching type | | 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 |
| **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 | | Connector M8 x 1 , 4-pin |
| Material | | |
| Housing | | PC (Polycarbonate) |
| Optical face | | PMMA |
| Mass | | approx. 10 g |
| Tightening torque, fastening screws | | 0.6 Nm |

## Connection




## Connection Assignment

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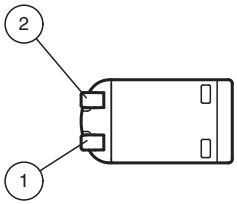
## Connection Assignment

Wire colors in accordance with EN 60947-5-2

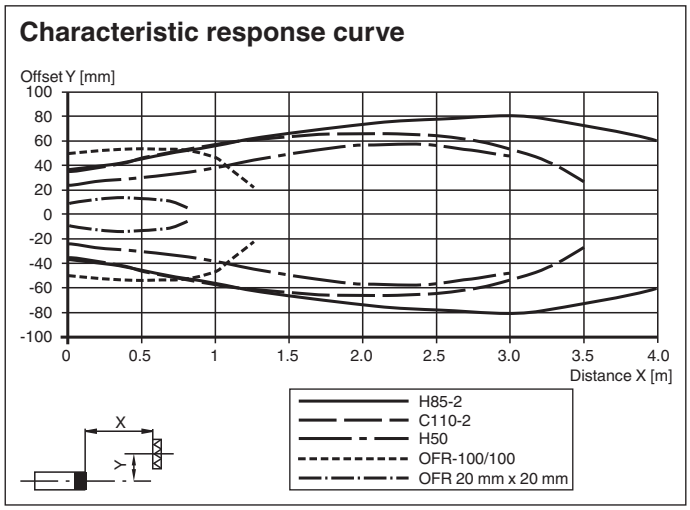
| | | |
|---|---|---|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue) |
| 4 | BK | (black) |

## Indication




| | | |
|---|---|---|
| 1 | Signal display | yellow |
| 2 | Operating display | green |

## Characteristic Curve

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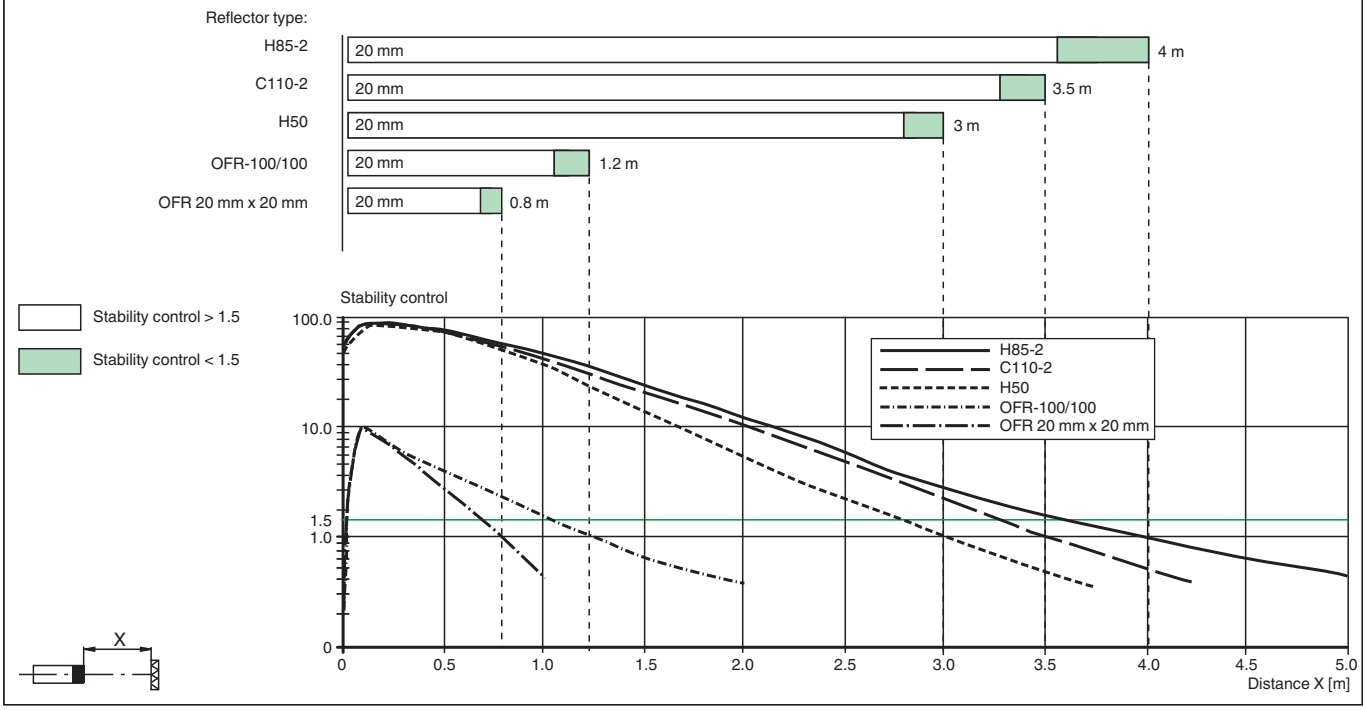
## Characteristic Curve

### Relative received light strength (typical)




## Accessories

| | | |
|---|---|---|
| | **OMH-ML100-09** | Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm |
| | **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-ML100-05** | Mounting aid for ML100 series, mounting bracket |
| | **OMH-10** | Mounting aid for ML100 series |
| | **REF-C110-2** | Reflector, round ø 84 mm, central mounting hole |
| | **REF-H60-2** | Reflector with mounting holes |
| | **REF-H33** | Reflector with screw fixing |
| | **OFR-70-2** | Reflective tape 70 mm x 70 mm |

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## Accessories

| | | |
|---|---|---|
| | **OMH-ML100-08** | Mounting aid for ML100 series, Snap-in |
| | **REF-H85-2** | Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes |
| | **REF-H50** | Reflector, rectangular 51 mm x 61 mm, mounting holes, fixing strap |
| | **OFR-100/100** | Reflective tape 100 mm x 100 mm |
| | **V31-GM-2M-PUR** | Female cordset single-ended M8 straight A-coded, 4-pin, PUR cable grey |
| | **V31-WM-2M-PUR** | Female cordset single-ended M8 angled A-coded, 4-pin, PUR cable grey |

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