



**Model Number**

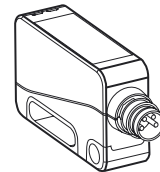
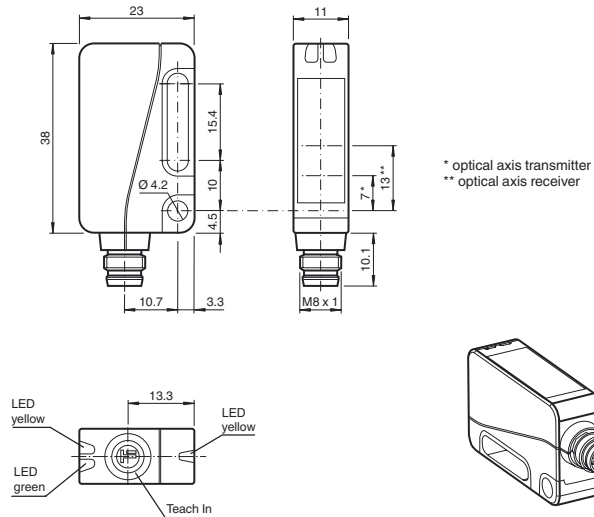
**ML9-54/59/103/123/143**

Retroreflective sensor  
with 4-pin, M8 x 1 connector

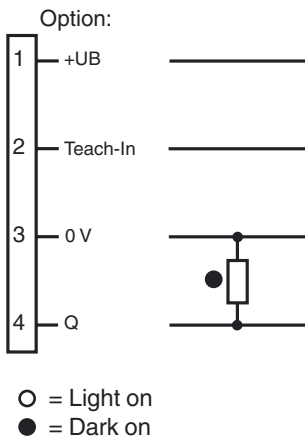
**Features**

- Ultra bright LEDs for power on, pre fault indication and switching state
- Flashing power on LED in case of short-circuit
- TEACH-IN
- Not sensitive to ambient light, even with switched energy saving lamps
- Protected against mutual interference (no cross-talk)
- Protection class II

**Dimensions**



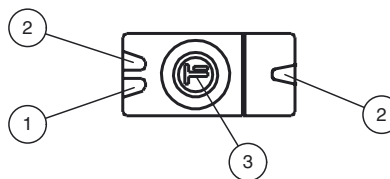
**Electrical connection**



**Pinout**



**Indicators/operating means**



1	LED green
2	LED yellow
3	Teach-In

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

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**Technical data****General specifications**

Effective detection range	0 ... 5 m
Threshold detection range	6 m
Reference target	H85-2 reflector
Light source	LED
Light type	modulated visible red light
Polarization filter	yes
Diameter of the light spot	approx. 110 mm at a distance of 3 m
Angle of divergence	approx. 2.1 °
Ambient light limit	30000 Lux

**Functional safety related parameters**

MTTF <sub>d</sub>	1240 a
Mission Time (T <sub>M</sub> )	20 a
Diagnostic Coverage (DC)	0 %

**Indicators/operating means**

Operation indicator	LED green, statically lit Power on , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)
Function indicator	LED yellow, lights up when light beam is free, flashes when falling short of the stability control
Control elements	Teach-In key

**Electrical specifications**

Operating voltage	U <sub>B</sub>	10 ... 30 V DC , class 2
Ripple		max. 10 %
No-load supply current	I <sub>0</sub>	< 20 mA at 24 V

**Input**

Function input	Ext. Teach-In input (ET)
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**Output**

Switching type	dark 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	
Voltage drop	U <sub>d</sub>	≤ 2 V DC
Switching frequency	f	1000 Hz
Response time		0.5 ms

**Ambient conditions**

Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)

**Mechanical specifications**

Degree of protection	IP67
Connection	M8 x 1 connector, 4-pin
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Connector	plastic
Mass	approx. 15 g

**Compliance with standards and directives**

Standard conformity	
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007
Standards	EN 50178, UL 508

**Approvals and certificates**

Protection class	II, rated voltage ≤ 50 V AC with pollution degree 1-2 according to IEC 60664-1
UL approval	cULus
CCC approval	CCC approval / marking not required for products rated ≤36 V

**Accessories****OMH-ML9**

Mounting bracket

**OMH-ML9-01**

Threaded bolt M3

**V31-GM-2M-PVC**

Female cordset, M8, 4-pin, PVC cable

**V31-WM-2M-PVC**

Female cordset, M8, 4-pin, PVC cable

**V31-GM-5M-PUR**

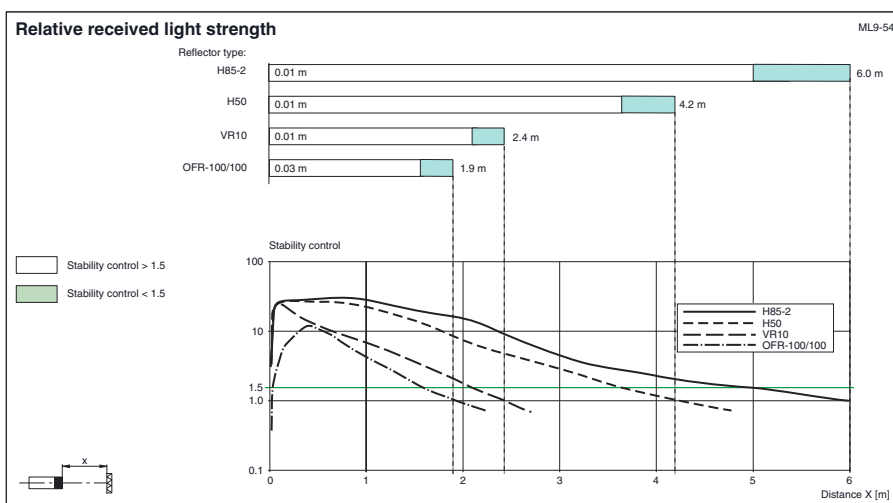
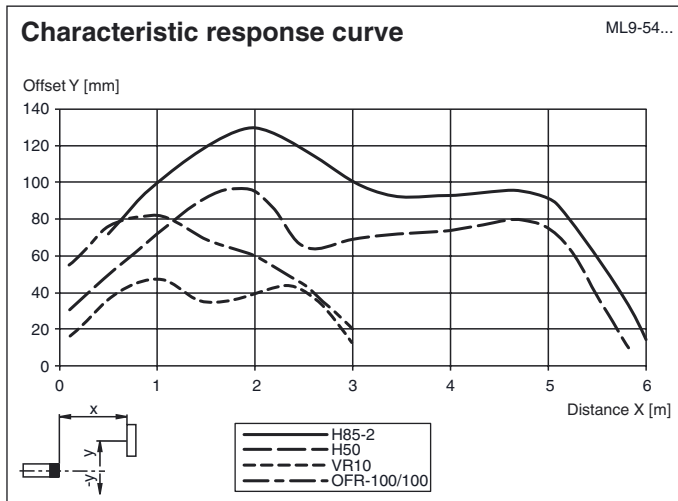
Female cordset, M8, 4-pin, PUR cable

**V31-WM-5M-PUR**

Female cordset, M8, 4-pin, PUR cable

Other suitable accessories can be found at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

## Curves/Diagrams



## Setting Instructions

**Setting Instructions for Devices with Teach-In**

After the operating voltage is applied, the green LED lights up. The sensor is automatically in max. sensitivity status (state as supplied) or in the status of the most recent Teach-In setting.

Mount a suitable reflector opposite the photoelectric sensor.

**Teach-In with the Teach key**

- Align the sensor to a suitable reflector.
- Press the Teach key. The green LED indicator light goes off briefly to confirm this.
- Hold down the Teach key until the yellow and green indicator LEDs flash synchronously (about 2.5 Hz). Then release the Teach key
- During internal setup of the sensor, the green and yellow indicator LEDs flash alternately (about 2.5 Hz).
- Teach-In successful: The green and yellow indicator LEDs are lit. The device is ready for operation.
- Teach-In not successful: The green and yellow indicator LEDs flash quickly and alternately (about 8 Hz) for about 5 seconds. Then the sensor switches to the status with maximum sensitivity. After that, repeat the Teach-In procedure, starting with step 1.

**Teach-In via external Teach-In input (ET)**

Teach-In can also be initiated via the external Teach-In input (ET)

To do this, the ET must be open (or at 0 V) for at least 50 ms, after which +UB is applied for a duration of 50 to 80 ms.

Teach-In lasts for a maximum of 11 seconds (if not successful)

