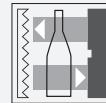




## Retroreflective sensor

### ML9-54-G/25/110/123/143

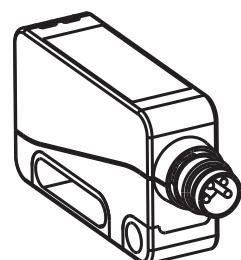
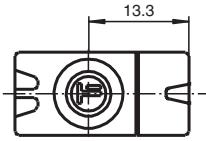
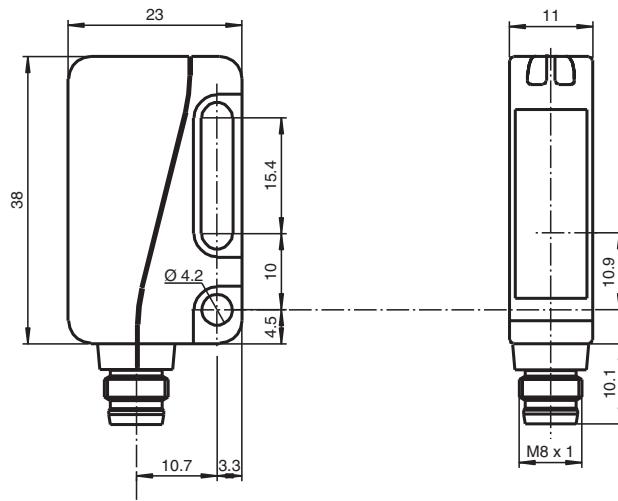


- Ultra bright LEDs for power on, weak signal indication and switching state
- Flashing power on LED in case of short-circuit
- TEACH-IN
- Automatic adjustment in case of soiling in contrast detection mode
- Not sensitive to ambient light, even with switched energy saving lamps
- Protected against mutual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

Retroreflective sensor with polarization filter for clear object detection



#### Dimensions



#### Technical Data

##### General specifications

Release date: 2023-03-28 Date of issue: 2023-03-28 Filename: 194204\_eng.pdf

Effective detection range	0 ... 3.5 m in TEACH mode 0 ... 5.7 m in normal mode
Reflector distance	0 ... 3.5 m in TEACH mode 0 ... 5.7 mm in normal mode
Threshold detection range	7.6 m

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

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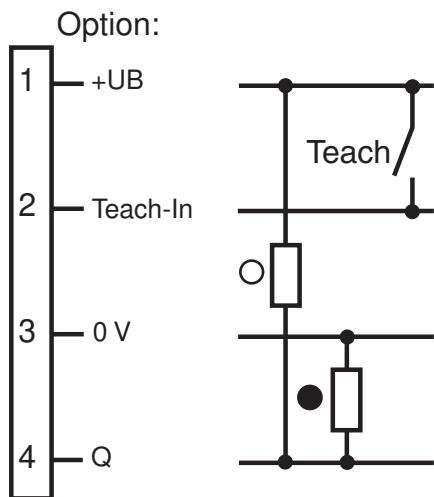
Singapore: +65 6779 9091  
fa-info@sg.pepperl-fuchs.com

 PEPPERL+FUCHS

## Technical Data

Reference target	H85-2 reflector	
Light source	LED	
Light type	modulated visible red light , 660 nm	
Polarization filter	yes	
Angle deviation	max. $\pm 1^\circ$	
Diameter of the light spot	approx. 40 mm at detection range 1 m	
Opening angle	1.7 °	
Ambient light limit	40000 Lux	
<b>Functional safety related parameters</b>		
MTTF <sub>d</sub>	1050 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 , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)	
Function indicator	LED yellow: switching state ; Operating reserve ; Teach-In	
Control elements	Teach-In key	
Contrast detection levels	10 % - clean, water filled PET bottles	
<b>Electrical specifications</b>		
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 DC
<b>Input</b>		
Function input	Ext. Teach-In input (ET)	
<b>Output</b>		
Switching type	light-on	
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	
Switching voltage	max. 30 V DC	
Switching current	max. 100 mA	
Switching frequency	f	1000 Hz
Response time	500 $\mu$ s	
<b>Conformity</b>		
Product standard	EN 60947-5-2	
<b>Approvals and certificates</b>		
Protection class	II, rated voltage $\leq$ 50 V AC with pollution degree 1-2 according to IEC 60664-1 functional insulation acc. to DIN EN 50178	
UL approval	cULus	
CCC approval	CCC approval / marking not required for products rated $\leq$ 36 V	
<b>Ambient conditions</b>		
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)	
<b>Mechanical specifications</b>		
Housing width	23 mm	
Housing height	38 mm	
Housing depth	11 mm	
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. 25 g	

## Connection Assignment



○ = Light on  
 ● = Dark on

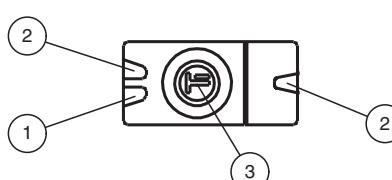
## Connection Assignment



Wire colors in accordance with EN 60947-5-2

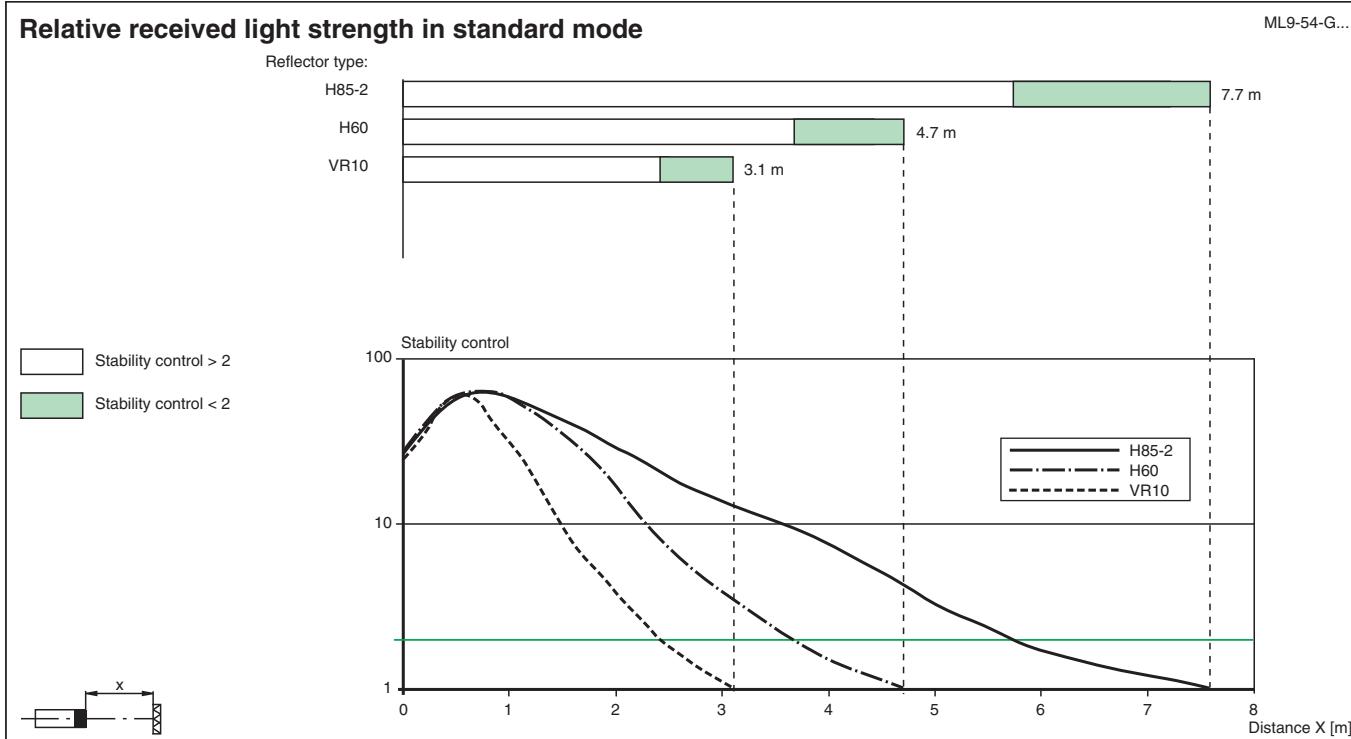
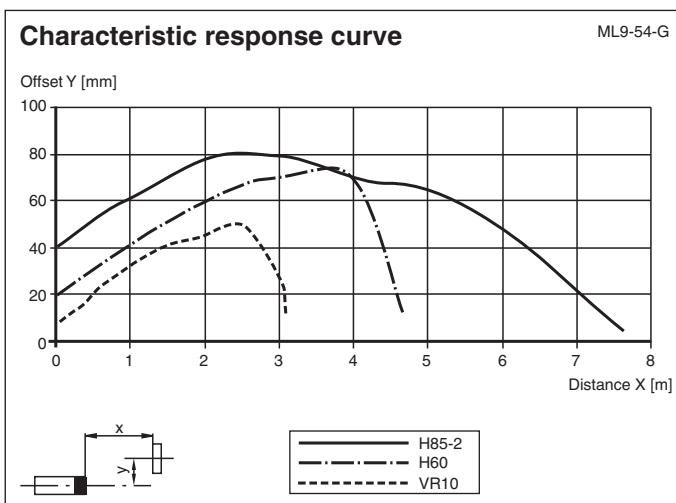
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

## Assembly



1	LED green
2	LED yellow
3	Teach-In

## Characteristic Curve

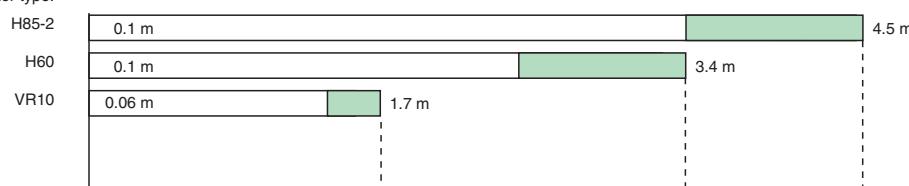


## Characteristic Curve

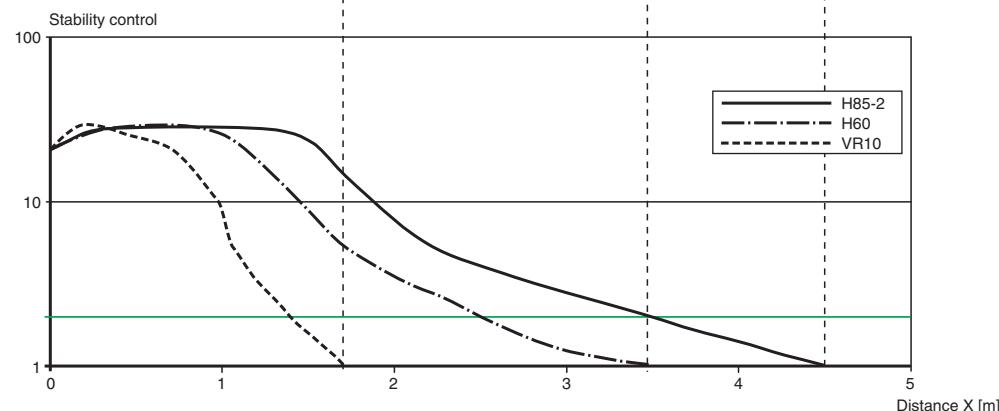
### Relative received light strength in glass detection mode

ML9-54-G...

Reflector type:



Stability control > 2  
 Stability control < 2



## Accessories

	<b>OMH-ML9</b>	Mounting aid for ML9 series, Mounting bracket
	<b>OMH-ML9-01</b>	Mounting aid for ML9 series, Threaded bolt M3
	<b>V31-GM-2M-PVC</b>	Female cordset single-ended M8 straight A-coded, 4-pin, PVC cable grey
	<b>V31-WM-2M-PVC</b>	Female cordset single-ended M8 angled A-coded, 4-pin, PVC cable grey
	<b>V31-GM-5M-PUR</b>	Female cordset single-ended M8 straight A-coded, 4-pin, PUR cable grey
	<b>V31-WM-5M-PUR</b>	Female cordset single-ended M8 angled A-coded, 4-pin, PUR cable grey

## Teach-In

### Adjustment instructions for devices with Teach-In

After the operating voltage has been applied, the LED is lit green. The sensor is automatically set to a state of maximum sensitivity (state as supplied) or the state of the most recent Teach-In setting.

Assemble the appropriate reflector opposite the light barrier.

#### Teach-In using the Teach key

- Align the sensor to an appropriate reflector.
- Press the Teach key - as confirmation, the green display LED is briefly turned off once.
- Hold the Teach key down until the yellow and green display LED is flashing at regular intervals (about 2.5 Hz). Then release the Teach key
- During the internal set-up of the sensor, the green and yellow display LEDs flash alternately (about 2.5 Hz).
- Teach-In successful: The green and yellow display LEDs are lit. Contrast detection 10% is activated. The device is ready for operation.
- Teach-In not successful: The green and yellow display LEDs flash alternately and rapidly (about 8 Hz) for about 5 seconds. Then the sensor goes to the state with maximum sensitivity. After this happens, repeat the Teach-In procedure, starting with step 1.

#### Teach-In using the External Teach-In process (ET)

Teach-In can also be triggered by the External Teach-In input (ET).

To do this, the ET must remain open (at 0 V) for at least 50 ms and must then be applied to +UB for a duration of from 50 to 80 ms.

The Teach process lasts for a maximum of 11 seconds (if not successful).

