Model Number

ML7-54-G/25/110/123/143

Retroreflective sensor
with 4-pin, M8 x 1 connector

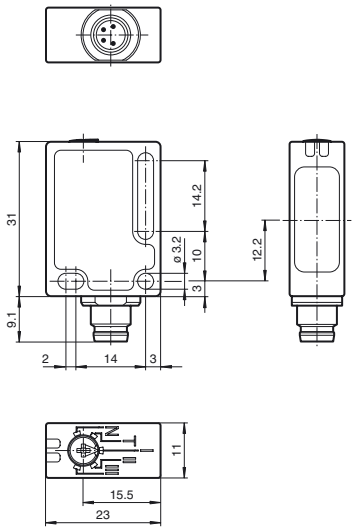
Features

- Reliable sensor for standard applications
- Miniature design with versatile mounting options
- Reliable recognition of reflective objects and clear glass
- Two machines in one: clear object detection or reflection operating mode with long range
- TEACH-IN switch for setting the contrast detection levels
- Automatic adjustment in case of soiling in contrast detection mode
- Certified by ECOLAB

Product information

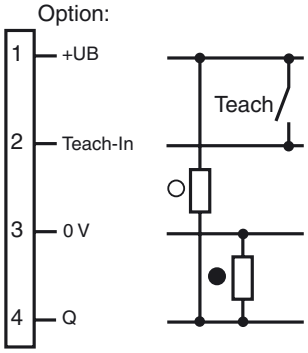
Small, robust, effective, and reliable - these are the properties of the ML7 sensor series. Due to their small size, number of versions, and two different lens positions, they are particularly suited for installation in tight spaces. The robust design and high quality of Pepperl+Fuchs mean they can also be used under harsh environmental conditions. The efficient technology, switching frequencies up to 1000 Hz, high resistance to ambient light, and 4-in-1 output make the series suitable for non-contact object detection.

Dimensions



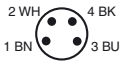
Electrical connection

Option:

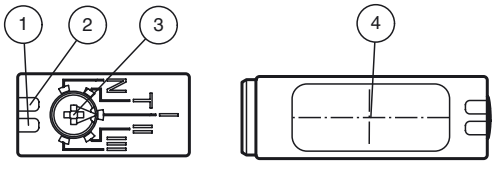


○ = Light on
● = Dark on

Pinout



Indicators/operating means



1	Operating display	green
2	Signal display	yellow
3	Teach-In	
4	Optical center	

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Technical data

General specifications		
Effective detection range		0 ... 3.5 m in TEACH mode 0 ... 5.7 m at switch position "N"
Reflector distance		0 ... 3.5 m in TEACH mode 0 ... 5.7 m at switch position "N"
Threshold detection range		7.6 m
Reference target		H85-2 reflector
Light source		LED
Light type		modulated visible red light , 660 nm
Polarization filter		yes
Angle deviation		max. ± 1°
Diameter of the light spot		approx. 40 mm at detection range 1 m
Angle of divergence		1.7 °
Ambient light limit		40000 Lux
Functional safety related parameters		
$MTTF_d$		980 a
Mission Time (T_M)		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: switching state ; Stability control ; Teach-In
Control elements		5-step switch for setting the contrast detection levels.
Contrast detection levels		10 % - clean, water filled PET bottles 18 % - clear glass bottles 40 % - colored glass or opaque materials adjustable due to Teach-In switch
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
Ripple		max. 10 %
No-load supply current	I_0	< 20 mA at 24 V DC
Input		
Function input		Ext. Teach-In input (ET)
Output		
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	1 kHz
Response time		500 µs
Conformity		
Product standard		EN 60947-5-2
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Storage temperature		-40 ... 75 °C (-40 ... 167 °F)
Mechanical specifications		
Housing width		11 mm
Housing height		31 mm
Housing depth		23 mm
Degree of protection		IP67 / IP69K
Connection		M8 x 1 connector, 4-pin
Material		
Housing		PC (glass-fiber-reinforced Makrolon)
Optical face		PMMA
Connector		plastic
Mass		10 g
Approvals and certificates		
Protection class		II, rated voltage ≤ 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 ≤36 V

Accessories

Montagekit OMH-ML7-01
Mounting set consisting of bracket OMH-ML-01 sheet OMH-ML7-03, and fastening material

Montagekit OMH-ML7-02
Mounting set consisting of bracket OMH-ML-02 sheet OMH-ML7-03, and fastening material

OMH-ML7-01
Mounting aid for ML7 and ML8 series, Mounting bracket

OMH-ML7-02
Mounting aid for ML7 and ML8 series, Mounting bracket

OMH-ML7-03
Mounting aid for ML7 and ML8 series, Fixing plate

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

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

Suitable reflectors and cable sockets can be found in the Internet

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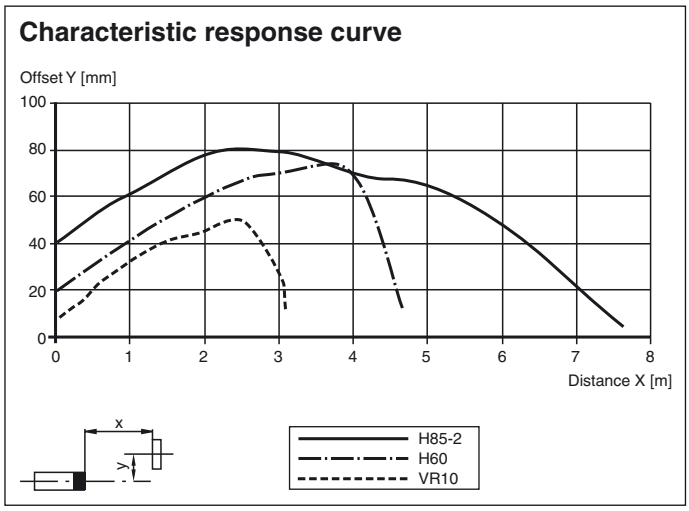
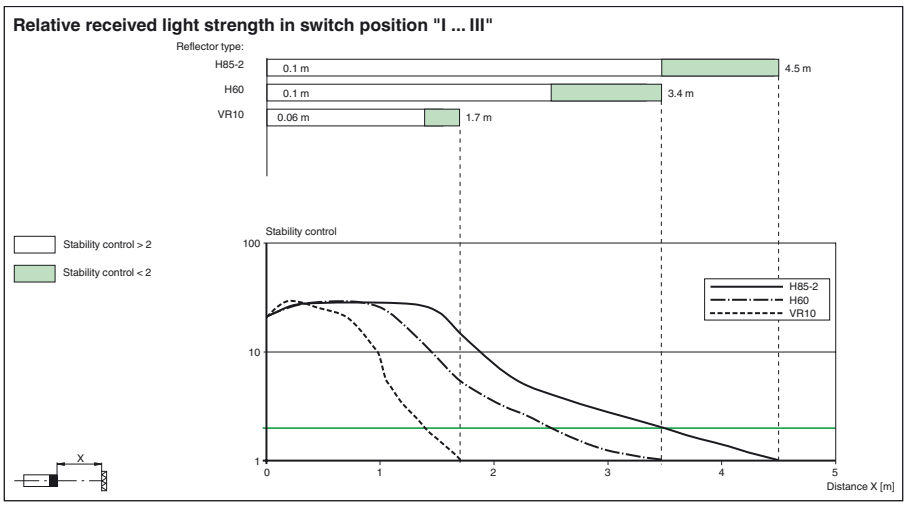
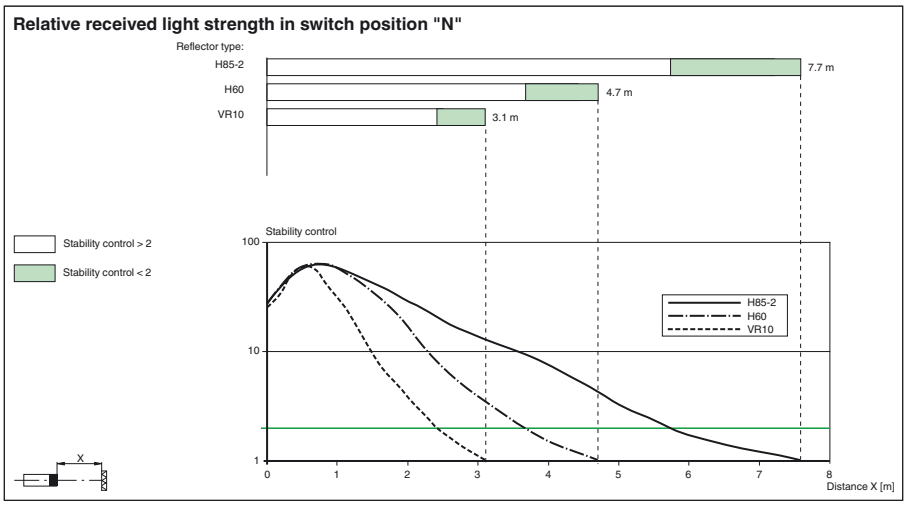
Curves/Diagrams



Curves/Diagrams





Additional information

Instructions for the Teach-In mode:

Step	Switch position	LED green	LED yellow	Time/ Frequency	Explanations/ Remarks
1	N	on	flashes	4/s	In switch position "N" aligned with reflector. Reflector detected **without functional reserve**.

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	N	on	on	-	In switch position "N" aligned with reflector. Reflector detected **with functional reserve** (recommended).
2	T	off/on	on	200 ms	A new switch position is indicated by the green LED going out briefly. This applies also for the selection of the other switch positions.
	T	flashes	flashes	2.5/s	*Slow* alternating flashing: Teach-In process **correctly** executed. Max. duration of the Teach-In process: 2 s
	T	flashes	flashes	8/s	*Rapid* alternating flashing: Teach-In process **not correctly** executed. (e.g. receiver signal not sufficient, sensor not correctly aligned with reflector). Status is terminated by turning switch to position N.
3/1	I	on	on	-	Contrast detection 10 % is activated. (e.g. clean PET bottles filled with water)
3/2	II	on	on	-	Contrast detection 18 % is activated. (e.g. bottles made of clear glass)
3/3	III	on	on	-	Contrast detection 40 % is activated. (e.g. tinted glass or intransparent materials)

Ext. TEACH input:

In switch position "T" it is possible to trigger a Teach-In process and to select the corresponding contrast detection level by the external application of a High pulse of a certain width:

I: 50 ms (30 ... 80 ms)

II: 150 ms (120 ... 180 ms)

III: 250 ms (220 ... 280 ms)

N: 350 ms (320 ... 380 ms)

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