Model Number

ML7-54-G/25/136/143

Retroreflective sensor
with 4-pin, M8 x 1 connector

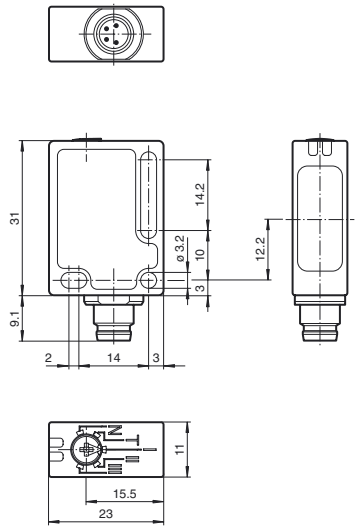
Features

- 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

Product information

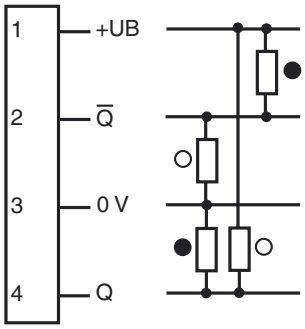
Small, robust, effective, and reliable - these are the properties of the ML7 sensor series. Due to their small size, number of versions, and two different lens positions, they are particularly suited for installation in tight spaces. The robust design and high quality of Pepperl+Fuchs mean they can also 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

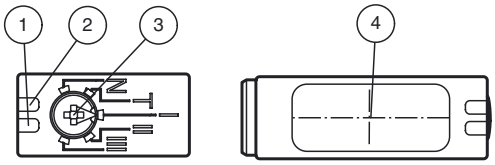
Option:



○ = 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
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		
Operating display		LED green, statically lit Power on , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)
Function display		LED yellow: switching state ; Stability control ; Teach-In
Controls		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
Output		
Switching type		light on
Signal output		2 push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching voltage		max. 30 V DC
Switching current		max. 100 mA
Switching frequency	f	1 kHz
Response time		500 µs
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Storage temperature		-40 ... 75 °C (-40 ... 167 °F)
Mechanical specifications		
Protection degree		IP67 / IP69K
Connection		M8 x 1 connector, 4-pin
Material		
Housing		PC (glass-fiber-reinforced Makrolon)
Optical face		PMMA
Connector		plastic
Mass		10 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 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 bracket

OMH-ML7-02
Mounting bracket

OMH-ML7-03
Fixing plate

ORR50G
Reflector, rectangular 50.9 mm x 60.9 mm, mounting holes, fixing strap and polarization filter

V31-WM-2M-PUR
4-pin, M8 socket, PUR cable

V31-GM-2M-PUR
4-pin, M8 socket, PUR cable

Suitable reflectors and cable sockets can be found in the Internet

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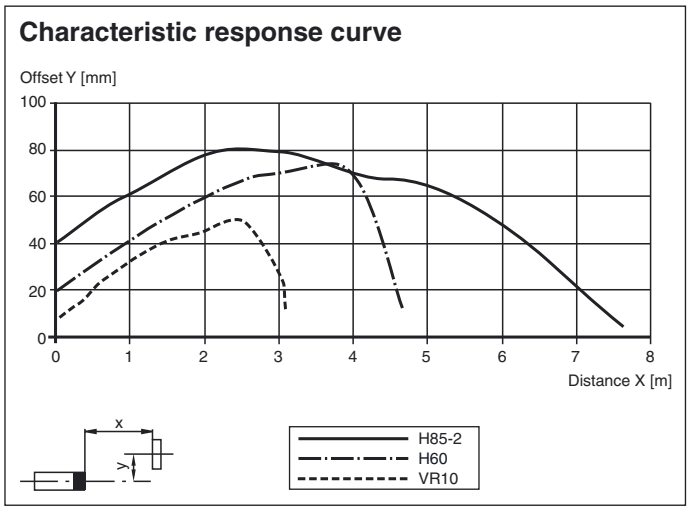
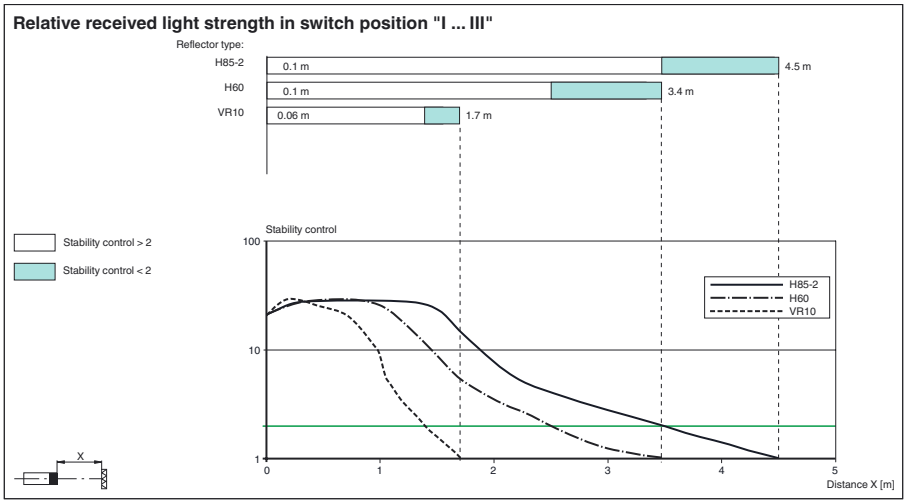
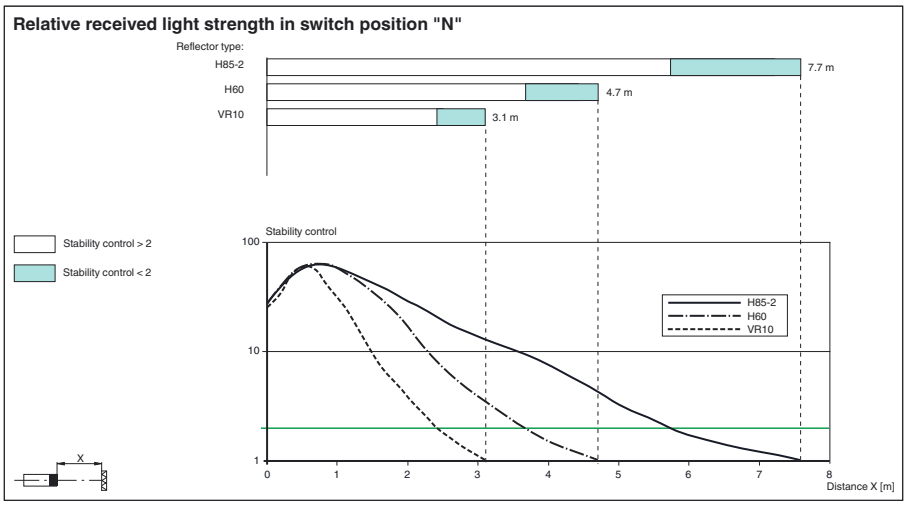
Curves/Diagrams



Curves/Diagrams





Additional information

Adjustment instructions for Teach-In operation:

Step	Switch position	LED green	LED yellow	Time/ frequency	Explanations/ comments

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1	N	on	flashes	4/s	In switch position "N" directed towards reflector. Reflector detected **without function reserve**.
	N	on	on	-	In switch position "N" directed towards reflector. Reflector detected **with function reserve** (recommended).
2	T	off/on	on	200 ms	The selection of a new switch position is indicated by the green LED going out for a short time. This also applies to the selection of the other switch positions.
	T	flashes	flashes	2.5 s	*Slow* alternating flashing: Teach-In process has been performed **correctly**. Max. duration of the Teach-In process: 2 s
	T	flashes	flashes	8/s	*Quick* alternating flashing: Teach-In process has **not** been performed **correctly**. (e.g. receiver signal not sufficient, sensor not directed correctly towards 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. clear glass bottles)
3/3	III	on	on	-	Contrast detection 40 % is activated. (e.g. coloured glass or non-transparent materials)

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Refer to “General Notes Relating to Pepperl+Fuchs Product Information”.
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