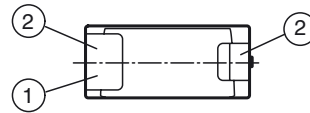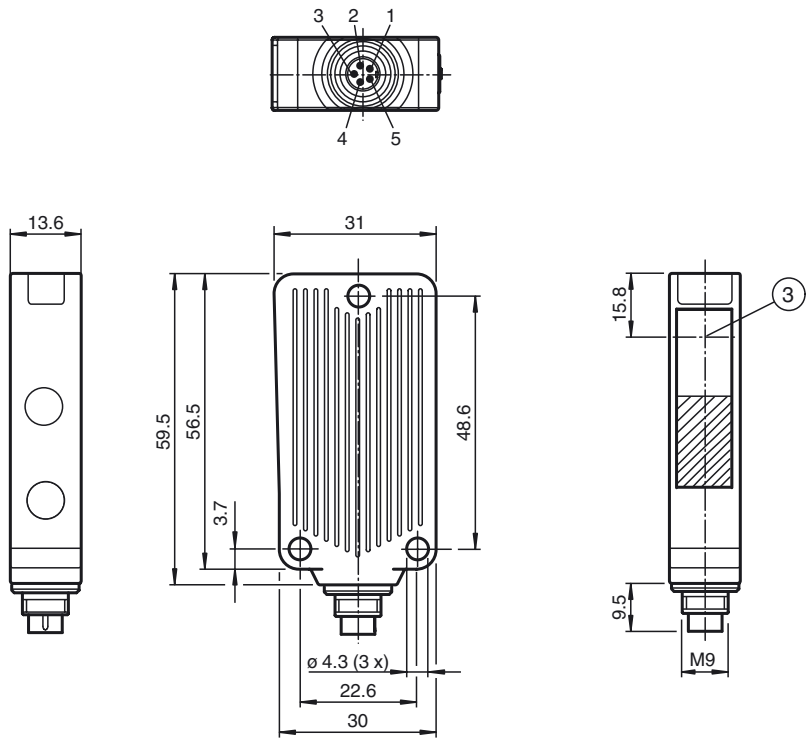## Model Number

MLV41-54-G-2453

Retroreflective sensor
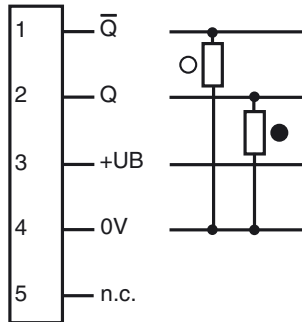
with M9, 5-pin metal connector

Features

- Rugged series in corrosion-resistant metal housing

- 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

- Resistant against noise: reliable operation under all conditions

Dimensions

1	Operating display green
2	Function display yellow
3	Optical center emitter and receiver

Electrical connection

1	$\overline{Q}$
2	Q
3	+UB
4	0V
5	n.c.

○ = Light on
● = Dark on

Subject to modifications without notice

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Technical data

General specifications

Effective detection range	0 ... 3 m in TEACH mode 0 ... 4 m at switch position "N"
Reflector distance	0 ... 3 m in TEACH mode 0 ... 4 m at switch position "N"
Threshold detection range	5 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. 80 mm at detection range 3000 mm
Angle of divergence	1.5 °
Ambient light limit	40000 Lux

Functional safety related parameters

$MTTF_d$	900 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	2 LEDs yellow for switching state, stability control, TEACH-IN and contrast detection mode
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 by TEACH-IN key or external wire

Electrical specifications

Operating voltage	U_B	10 ... 30 V DC
Ripple		max. 10 %
No-load supply current	I_0	max. 35 mA

Input

Function input	Ext. Teach-In input (ET)

Output

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
Voltage drop	U_d	≤ 2.5 V DC
Switching frequency	f	1000 Hz
Response time		0.5 ms

Ambient conditions

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

Mechanical specifications

Protection degree	IP67
Connection	M12 x 1 connector, 5-pin
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Connector	metal
Mass	50 g

Compliance with standards and directives

Directive conformity	
EMC Directive 2004/108/EC	EN 60947-5-2:2007
Standard conformity	
Product standard	EN 60947-5-2:2007 IEC 60947-5-2:2007

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 Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)
CCC approval	CCC approval / marking not required for products rated ≤36 V

Additional information

Instructions for the Teach-In mode:

Step	Switch position	LED green	LED yellow	Time/ Frequency	Explanations/ Remarks

Accessories

OMH-41
Mounting bracket

OMH-09
Mounting bracket for Sensors series MLV41 for M12 rod mounting

Suitable reflectors and cable sockets can be found in the Internet

1	N	on	flashes	4/s	In switch position "N" aligned with reflector. Reflector detected **without functional reserve**.
	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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