



# Retroreflective sensor

## MLV41-54-G-IO/25/92/136



- 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
- IO-Link interface for service and process data
- TEACH-IN switch for setting the contrast detection levels
- Resistant against noise: reliable operation under all conditions

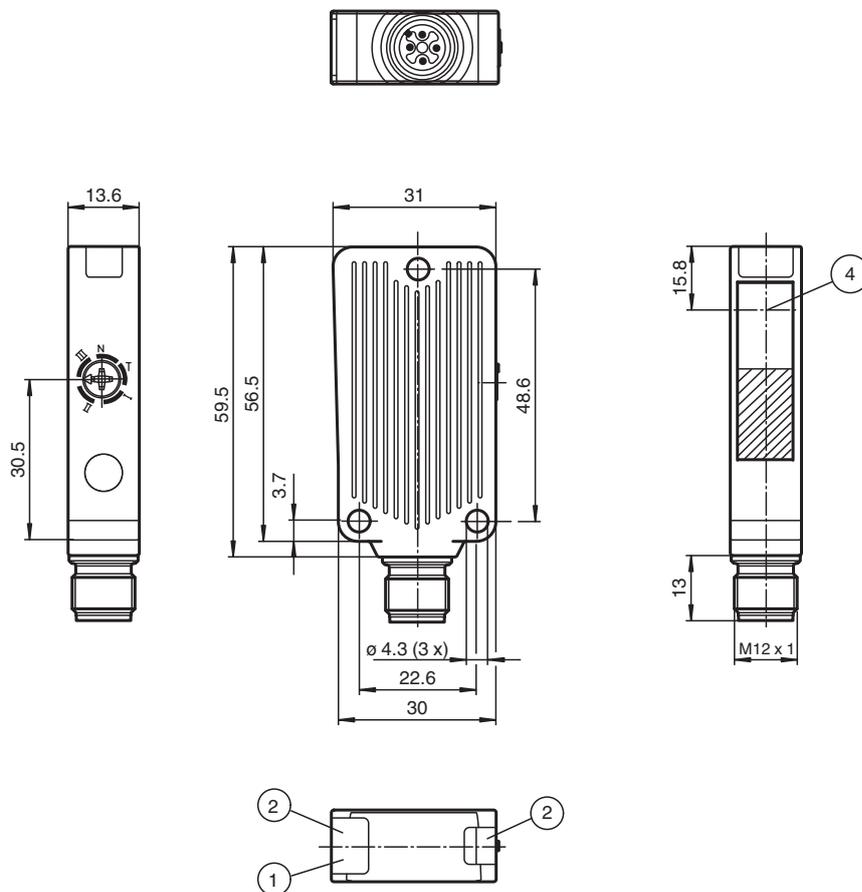
Robust retroreflective sensor for glass detection, compact housing design, IO-Link interface, 4 m detection range, red light, light on, 2 push-pull outputs, M12 plug



### Function

With the MLV41-54-G reflex sensor with IO-Link interface for the first time a universal communication is available for diagnosis and parameterization through to the sensor level. This provides particular advantages in the service area (fault elimination, maintenance and device replacement), during commissioning (cloning, identification, configuration and localization) and during operation (job changeover, continuous parameter monitoring and online diagnosis).

### Dimensions



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

Pepperl+Fuchs Group  
www.pepperl-fuchs.com

USA: +1 330 486 0001  
fa-info@us.pepperl-fuchs.com

Germany: +49 621 776 1111  
fa-info@de.pepperl-fuchs.com

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

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## Technical Data

General specifications		
Effective detection range		0 ... 4 m in TEACH mode 0 ... 5.2 m at switch position "N"
Reflector distance		0 ... 4 m in TEACH mode 0 ... 5.2 m at switch position "N"
Threshold detection range		6.5 m
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. 100 mm at detection range 4 m
Opening angle		1.5 °
Optical face		frontal
Ambient light limit		40000 Lux
Functional safety related parameters		
MTTF <sub>d</sub>		900 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		2 LEDs yellow for switching state, stability control, TEACH-IN and contrast detection mode
Control elements		5-step switch for setting the contrast detection levels.
Contrast detection levels		switch position I: 10 % - clean, water filled PET bottles switch position II: 18 % - clear glass bottles switch position III: 40 % - coloured glass or opaque materials adjustable due to Teach-In switch
Parameterization indicator		IO link communication: green LED goes out briefly (1 Hz)
Electrical specifications		
Operating voltage	U <sub>B</sub>	10 ... 30 V DC when operating in IO-Link mode: 18 ... 30 V
Ripple		max. 10 %
No-load supply current	I <sub>0</sub>	max. 35 mA
Interface		
Interface type		IO-Link
Protocol		IO-Link V1.0
Mode		COM2 (38.4 kBit/s)
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 <sub>d</sub>	≤ 2.5 V DC
Switching frequency	f	1000 Hz
Response time		0.5 ms
Conformity		
Product standard		EN 60947-5-2
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
Ambient conditions		

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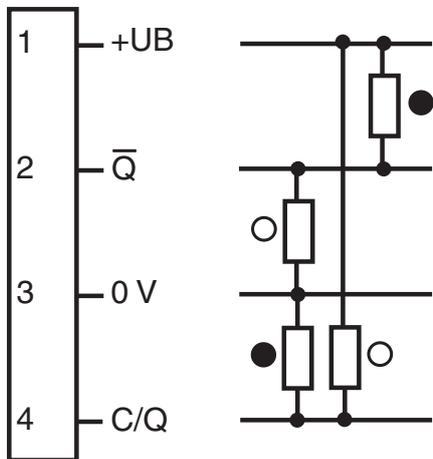
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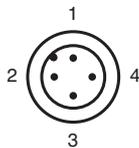
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)
<b>Mechanical specifications</b>	
Housing width	31 mm
Housing height	56.5 mm
Housing depth	13.6 mm
Degree of protection	IP67
Connection	4-pin, M12 x 1 connector
<b>Material</b>	
Housing	Aluminum , Delta-Seal coated
Optical face	glass pane
Connector	metal
Mass	50 g

**Connection Assignment**



○ = Light on  
● = Dark on

**Connection Assignment**

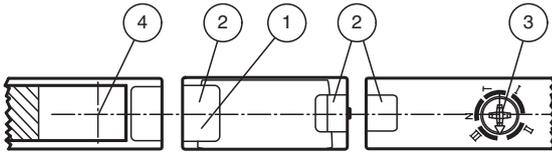


Wire colors in accordance with EN 60947-5-2

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

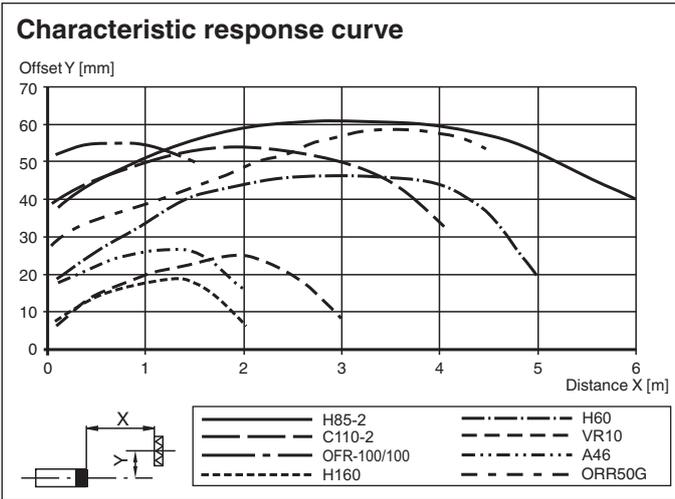
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**Assembly**

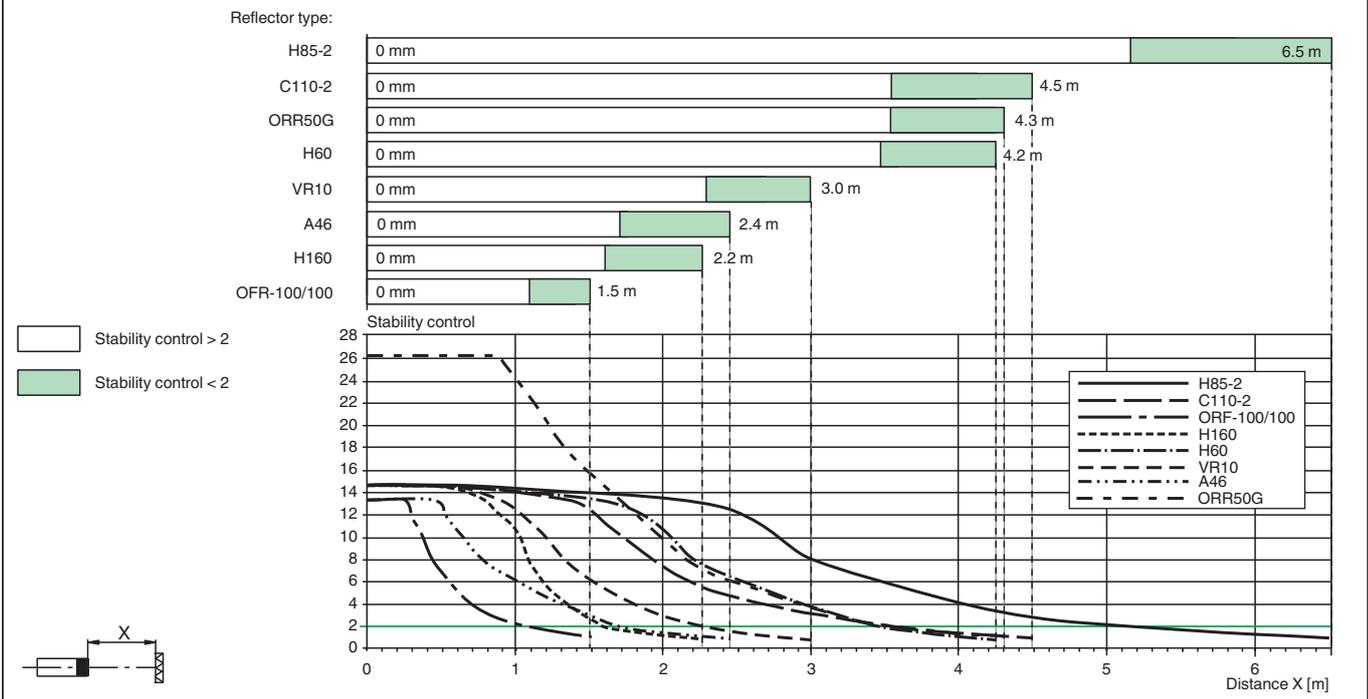


1	Operating display	green
2	Functional display	yellow
3	Teach-In switch	
4	Optical center emitter and receiver	

**Characteristic Curve**



**Relative received light strength**



**Accessories**

	<b>OMH-09</b>	Mounting bracket for Sensors series MLV41 for M12 rod mounting
	<b>V1-G-2M-PUR</b>	Female cordset single-ended M12 straight A-coded, 4-pin, PUR cable grey

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## Accessories

	<b>V1-W-2M-PUR</b>	Female cordset single-ended M12 angled A-coded, 4-pin, PUR cable grey
	<b>REF-H85-2</b>	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
	<b>REF-H50</b>	Reflector, rectangular 51 mm x 61 mm, mounting holes, fixing strap
	<b>REF-VR10</b>	Reflector, rectangular 60 mm x 19 mm, mounting holes
	<b>ORR50G</b>	Reflector, rectangular 50.9 mm x 60.9 mm, mounting holes, fixing strap and polarization filter
	<b>OFR-100/100</b>	Reflective tape 100 mm x 100 mm
	<b>ICE2-8IOL-G65L-V1D</b>	EtherNet/IP IO-Link master with 8 inputs/outputs
	<b>ICE3-8IOL-G65L-V1D</b>	PROFINET IO IO-Link master with 8 inputs/outputs
	<b>ICE1-8IOL-G30L-V1D</b>	Ethernet IO-Link module with 8 inputs/outputs
	<b>ICE1-8IOL-G60L-V1D</b>	Ethernet IO-Link module with 8 inputs/outputs
	<b>ICE2-8IOL-K45P-RJ45</b>	EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, push-in connectors
	<b>ICE2-8IOL-K45S-RJ45</b>	EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, screw terminal
	<b>ICE3-8IOL-K45P-RJ45</b>	PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, push-in terminals
	<b>ICE3-8IOL-K45S-RJ45</b>	PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, screw terminal
	<b>IO-Link-Master02-USB</b>	IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

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### IO link function

The IO link operating mode is indicated by the green LED indicator with a short interruption ( $f = 1 \text{ Hz}$ ). IO link communication simultaneously provides process data (measurement data from the sensor) and access to requirement data.

The requirement data contains the following information:

#### Identification:

- Manufacturer information
- Product ID
- User-specific ID

#### Device parameters:

- Teach-in parameters
- Operating parameters
- Configuration parameters
- Device commands

#### Diagnostic messages and warnings

## Teach-In

### Adjustment instructions for Teach-In operation:

Step	Switch position	LED green	LED yellow	Time/frequency	Explanations/comments
1	N	on	flashes	4/s	In switch position "N" directed towards reflector. Reflector detected <b>without function reserve</b> .
	N	on	on	-	In switch position "N" directed towards reflector. Reflector detected <b>with function reserve</b> (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	<i>Slow</i> alternating flashing: Teach-In process has been performed <b>correctly</b> . Max. duration of the Teach-In process: 2 s
	T	flashes	flashes	8/s	<i>Quick</i> alternating flashing: Teach-In process has <b>not</b> been performed <b>correctly</b> . (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)

