



# Retroreflective sensor

## RL28-54-G/47/105

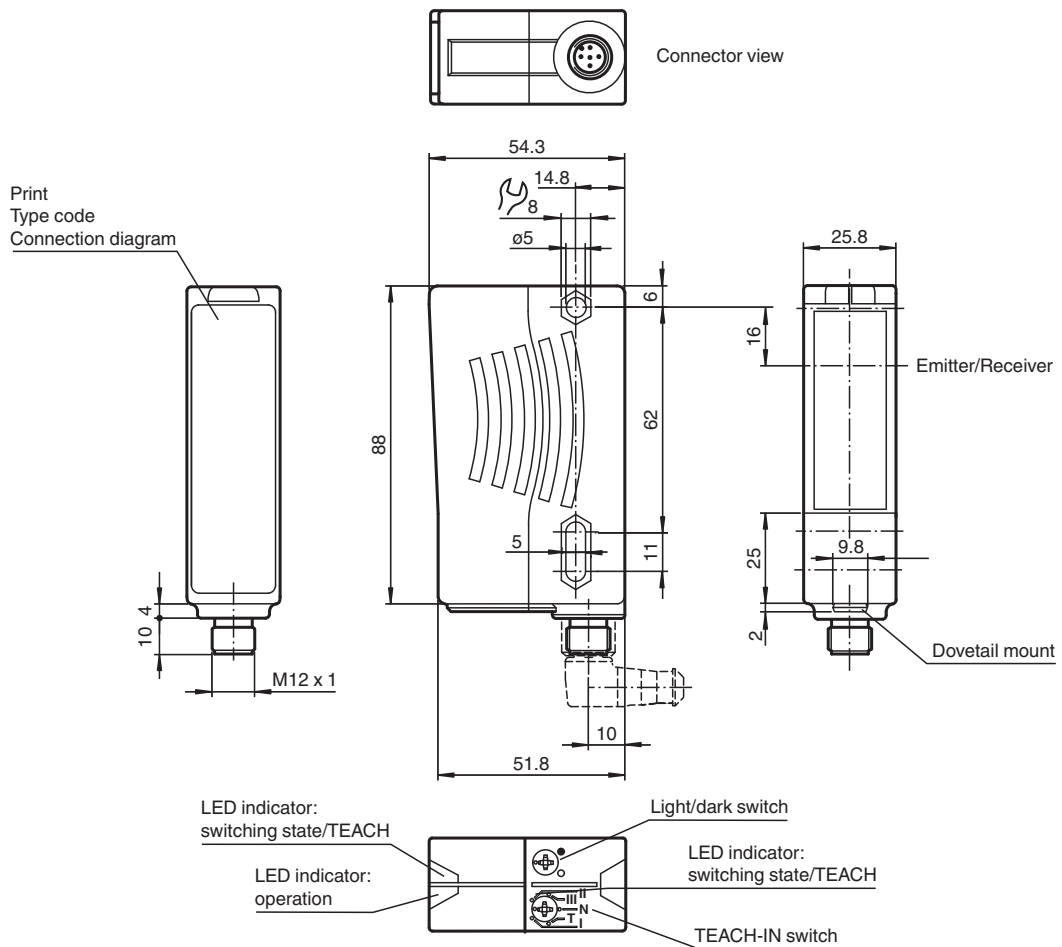


- Detects transparent objects, i.e., clear glass, PET and transparent films
- TEACH-IN switch for setting the contrast detection levels
- Automatic adjustment in case of soiling in contrast detection mode
- Ultra bright LEDs for power on, weak signal indication and switching state
- Flashing power on LED in case of short-circuit
- Not sensitive to ambient light, even with energy saving lamps
- Waterproof, degree of protection IP67
- Protection class II

Retroreflective sensor with polarization filter for clear object detection



### Dimensions



### Technical Data

#### General specifications

Effective detection range 0 ... 5.6 m

Release date: 2023-04-04 Date of issue: 2023-04-04 Filename: 113040\_eng.pdf

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

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## Technical Data

Reflector distance		0 ... 5.6 m
Threshold detection range		7 m
Reference target		H85-2 reflector
Light source		LED
Light type		modulated visible red light , 660 nm
Polarization filter		yes
Diameter of the light spot		approx. 90 mm at a distance of 5.6 m
Opening angle		Emitter: 1 ° Receiver: 1.2 °
Ambient light limit		50000 Lux
<b>Functional safety related parameters</b>		
MTTF <sub>d</sub>		1020 a
Mission Time (T <sub>M</sub> )		20 a
Diagnostic Coverage (DC)		0 %
<b>Indicators/operating means</b>		
Operation indicator		LED green, flashes in case of short-circuit
Function indicator		2 LEDs yellow for switching state, stability control, TEACH-IN and contrast detection mode
Control elements		rotary switch for light/dark, 5-step switch for contrast recognition adjustment
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
<b>Electrical specifications</b>		
Operating voltage	U <sub>B</sub>	10 ... 30 V DC
Ripple		10 %
No-load supply current	I <sub>0</sub>	≤ 50 mA
<b>Input</b>		
Function input		Ext. Teach-In input (ET)
<b>Output</b>		
Switching type		light/dark on switchable
Signal output		2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors
Switching voltage		max. 30 V DC
Switching current		max. 200 mA
Voltage drop	U <sub>d</sub>	≤ 2.5 V DC
Switching frequency	f	1000 Hz
Response time		0.5 ms
<b>Conformity</b>		
Product standard		EN 60947-5-2
<b>Approvals and certificates</b>		
Protection class		II, rated voltage ≤ 250 V AC with pollution degree 1-2 according to IEC 60664-1
UL approval		cULus
CCC approval		CCC approval / marking not required for products rated ≤36 V
<b>Ambient conditions</b>		
Ambient temperature		-40 ... 60 °C (-40 ... 140 °F)
Storage temperature		-40 ... 60 °C (-40 ... 140 °F)
<b>Mechanical specifications</b>		
Housing width		25.8 mm
Housing height		88 mm
Housing depth		54.3 mm
Degree of protection		IP67
Connection		5-pin, M12 x 1 connector
<b>Material</b>		
Housing		Plastic ABS

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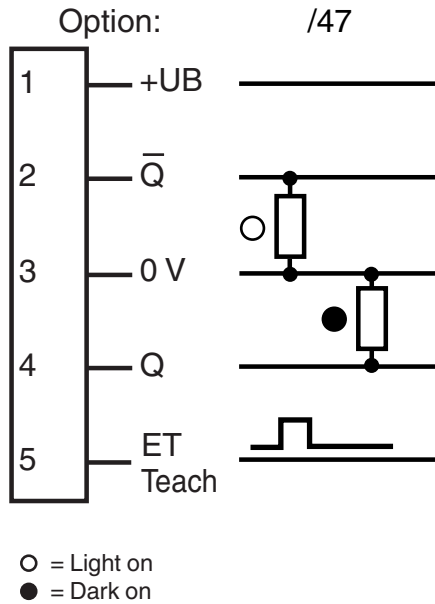
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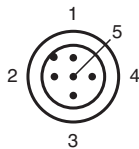
### Technical Data

Optical face	Plastic pane
Connector	plastic
Mass	70 g

### Connection Assignment



### Connection Assignment

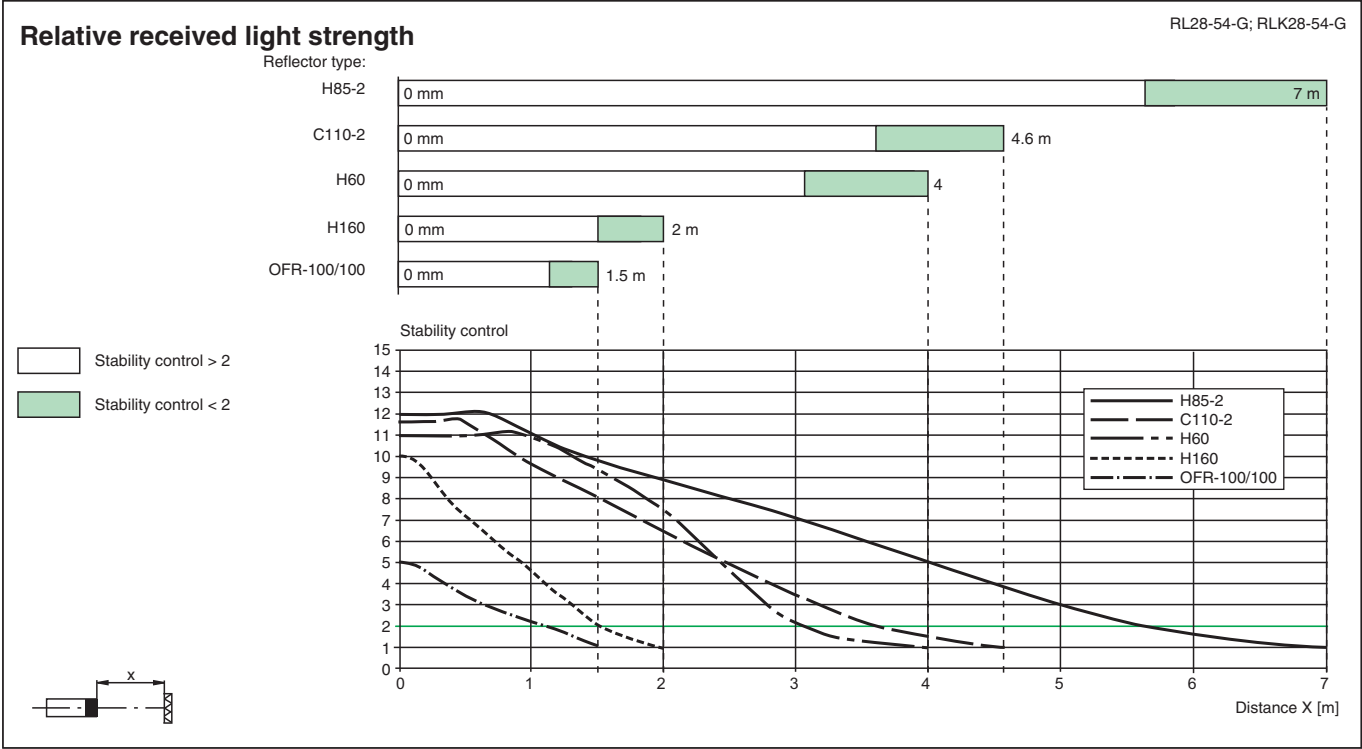
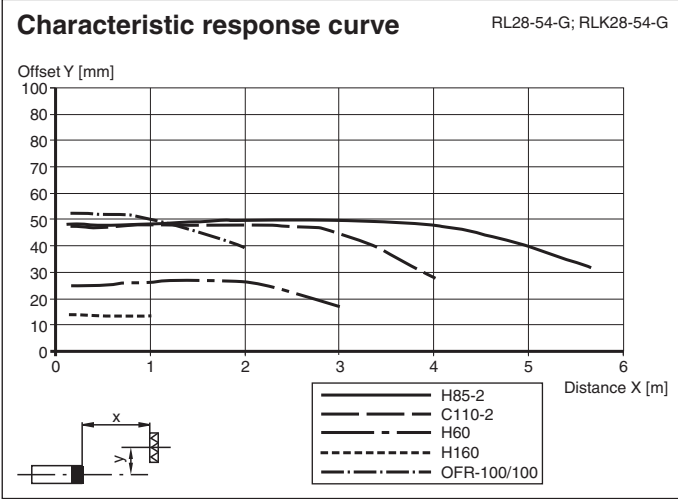


Wire colors in accordance with EN 60947-5-2






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

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**Characteristic Curve**



**Accessories**

	<b>OMH-05</b>	Mounting aid for round steel $\varnothing$ 12 mm or sheet 1.5 mm ... 3 mm
	<b>OMH-21</b>	Mounting bracket: mounting aid for sensors in the RL* series
	<b>OMH-22</b>	Mounting aid for RL* series
	<b>OMH-RLK29-HW</b>	Mounting bracket for rear wall mounting
	<b>OMH-RL28-C</b>	Weld slag cover model

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## Teach-In

### Switch position "N" (standard operation):

LEDs are lit when the light beam is unobstructed, they flash when the value falls short of the function reserve and they go out when the beam is interrupted.

### Switch position "T" (Teach-in mode):

After 1 s, the LED flashes slowly (approx. 1.5 Hz). The sensor is now ready to be set for a specific contrast detection value either via the mechanical switch (pos. I, II or III) or an external signal.

### Switch positions "I", "II" and "III" (contrast detection mode):

Contrast recognition values: I for 10 %, II for 18 %, III for 40 %

1. LED permanently lit: light path unobstructed
2. LED off: element to be sensed detected
3. LED flashes rapidly: detection failure, excessive soiling, function reserve too low.

### Ext. TEACH-IN input

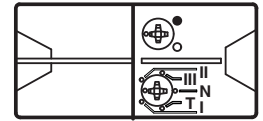
The desired contrast recognition capability can be adjusted by applying of a logic „high“ pulse with a certain pulse length when the switch is in position T.

I: 50 ms (30 ms ... 100 ms)

II: 150 ms (100 ms ... 200 ms)

III:> 200 ms

It is possible to change the contrast detection level without re-teaching. For contrast detection mode (Teach-Mode) the stability reserve must be at least 2.5 (see curve „relative received light strength“).



## Additional Information

### Mounting instructions:

The sensor is held in place by two pass-through drill holes for M5. The surface underneath must be flat to prevent the housing from moving when it is tightened into position. We recommend securing the nuts in place with spring screws to prevent the sensor from going out of adjustment.

### Outdoor mounting:

The sensors must be protected from shock and splashed water. It may be necessary to provide a covering.

### Adjustment:

Align the unit to the reflector in the "N" switch setting. The yellow LED must be lit constantly. Move the switch to the "T" setting and wait for about 1 sec. until the yellow LED starts flashing slowly.

Move the switch to the setting for the desired contrast detection level: "I" for 10 %, "II" for 18 %, "III" for 40 %.

or

In switch setting "T", select the appropriate contrast detection level by applying a pulse through the control lead to connection pin 5 (see "TEACH-IN").

### Contrast detection levels:

The output becomes inactive if dirt and dust make it impossible to readjust the setting. In this case the yellow LED will flash quickly.

If dirt and dust continue to accumulate, detection of slight contrasts can no longer be guaranteed.