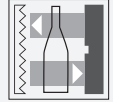




# Retroreflective sensor RL28-54-G-Z/47/112

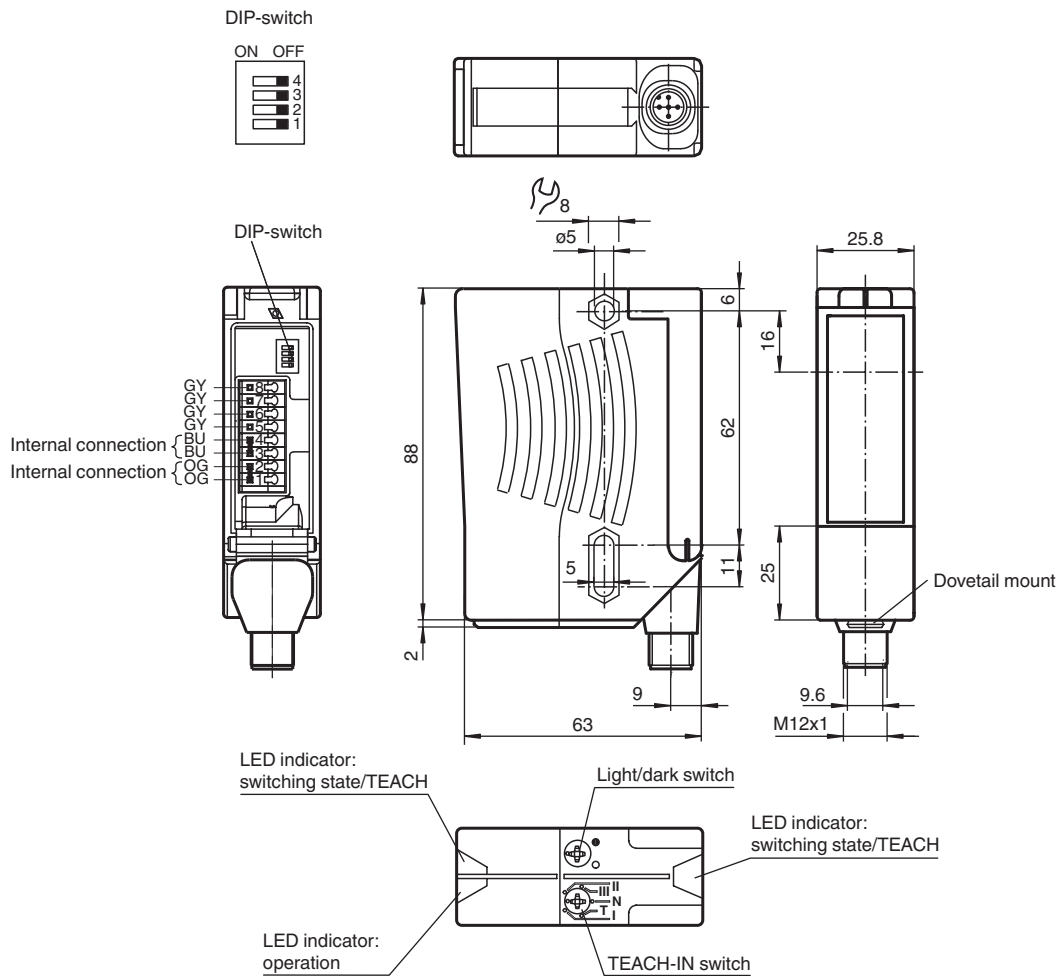


- Detects transparent objects, i.e., clear glass, PET and transparent films
- TEACH-IN switch for setting the contrast detection levels
- Automatic adjustment in case of soiling in contrast detection mode
- Ultra bright LEDs for power on, weak signal indication and switching state
- Flashing power on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

Retroreflective sensor with polarization filter for clear object detection



## Dimensions



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

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## Technical Data

General specifications			
Effective detection range			0 ... 5.6 m
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
Angle of divergence			Emitter: 1 ° Receiver: 1.2 °
Ambient light limit			50000 Lux
Functional safety related parameters			
MTTF <sub>d</sub>			1020 a
Mission Time (T <sub>M</sub> )			20 a
Diagnostic Coverage (DC)			0 %
Indicators/operating means			
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
Electrical specifications			
Operating voltage	U <sub>B</sub>		10 ... 30 V DC
Ripple			10 %
No-load supply current	I <sub>0</sub>		≤ 50 mA
Input			
Function input			Ext. Teach-In input (ET)
Output			
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
Timer function			Impulsed time element off-delay 20 ms
Conformity			
Product standard			EN 60947-5-2
Approvals and certificates			
EAC conformity			TR CU 020/2011
UL approval			cULus
CCC approval			CCC approval / marking not required for products rated ≤36 V
Ambient conditions			
Ambient temperature			-40 ... 60 °C (-40 ... 140 °F)
Storage temperature			-40 ... 75 °C (-40 ... 167 °F)
Mechanical specifications			
Housing width			25.8 mm
Housing height			88 mm
Housing depth			65.5 mm
Degree of protection			IP67

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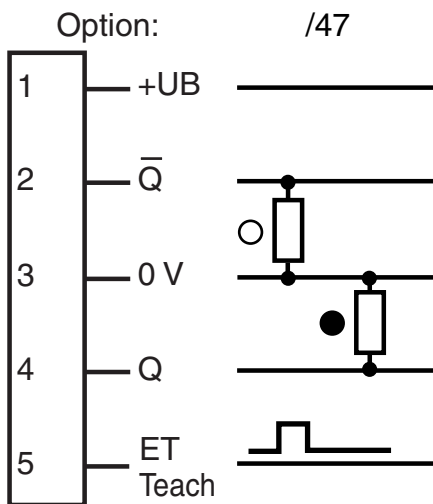
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### Technical Data

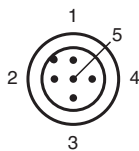
Connection	5-pin, M12 x 1 connector, 90° rotatable
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Connector	metal
Mass	90 g

### Connection Assignment



○ = Light on  
● = Dark on

### Connection Assignment

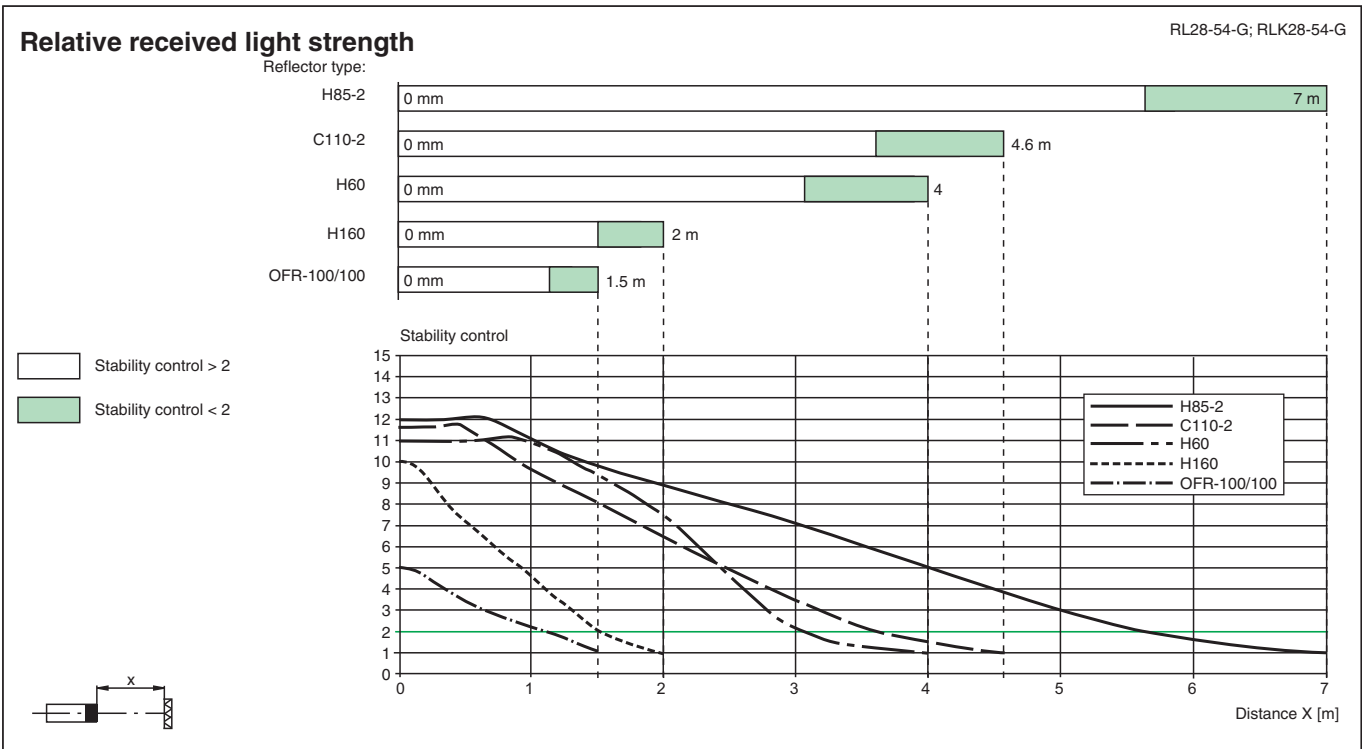
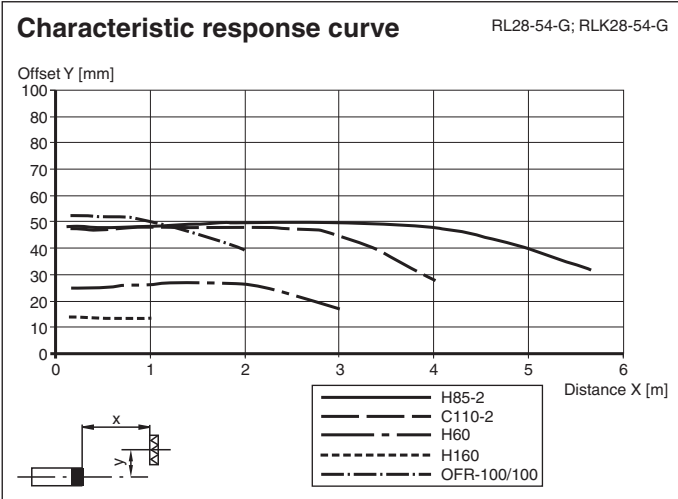


Wire colors in accordance with EN 60947-5-2

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

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**Characteristic Curve**



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Mounting

Zeitfunktionen / Timer functions / Fonctions de temporisation / Funciones de tiempo / Funzioni di temporizzazione

<b>Zeitfunktion</b>	<b>Schaltungsart</b>		<b>Empfänger belichtet</b> <b>Empfänger dunkel</b>
ON  Ohne	Hell Dunkel		EIN AUS
ON  IAB	Hell Dunkel		EIN AUS EIN AUS

Der H/D-Schalter (Schalter links außen) ist in Stellung Dunkelschaltung dargestellt.

<b>Timer function</b>	<b>Switching type</b>		<b>Receiver exposed</b> <b>Receiver dark</b>
ON  Without	Light Dark		ON OFF
ON  one shot	Light Dark		ON OFF ON OFF

The Light/Dark-Switch (Left, outer switch) is shown in the "Dark ON" position.

<b>Fonction de temporisation</b>	<b>Mode de commutation</b>		<b>Récepteur éclairé</b> <b>Récepteur non éclairé</b>
ON  sans	clair foncé		activé désactivé
ON  IAB	clair foncé		activé désactivé activé désactivé

Le commutateur H/D (commutateur à l'extrême gauche) est représenté en position commutation obscur.

<b>Función de tiempo</b>	<b>Modo de conmutación</b>		<b>Receptor recibiendo luz</b> <b>Receptor oscuro</b>
ON  Sin	Claro Oscuro		ON OFF
ON  IAB	Claro Oscuro		ON OFF ON OFF

El conmutador H/D (conmutador exterior izquierdo) está representado en posición de recucción de la luz.

<b>Funzione tempo</b>	<b>Modo di commutazione</b>		<b>Ricevitore illuminato</b> <b>Ricevitore scuro</b>
ON  Senza	Chiaro Scuro		Un Disattivo
ON  IAB	Chiaro Scuro		Un Disattivo Un Disattivo

L'interruttore chiaro/scuro (interruttore sul lato esterno sinistro) è rappresentato in posizione di azionamento in scuro.

Accessories

	<b>OMH-05</b>	Mounting aid for round steel ø 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 %

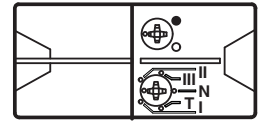
1. LED permanently lit: light path unobstructed
2. LED off: element to be sensed detected
3. LED flashes rapidly: detection failure, excessive soiling, function reserve too low.

**Ext. TEACH-IN input**

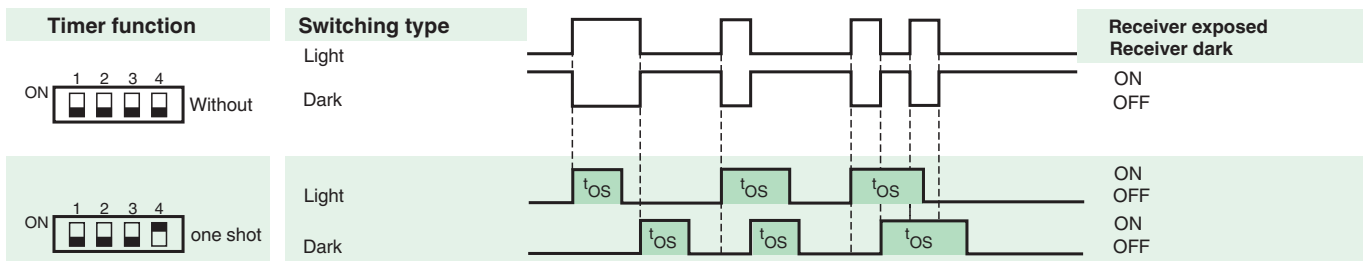
The desired contrast recognition capability can be adjusted by applying of a logic „high“ pulse with a certain pulse length when the switch is in position T.

- 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“).



**Timer functions**



The Light-/Dark-Switch (Left, outer switch) is shown in the "Dark ON" position.

Type	Description	Notes
-Z	one shot timer	Fixed time interval 0.02 s

**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.

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