

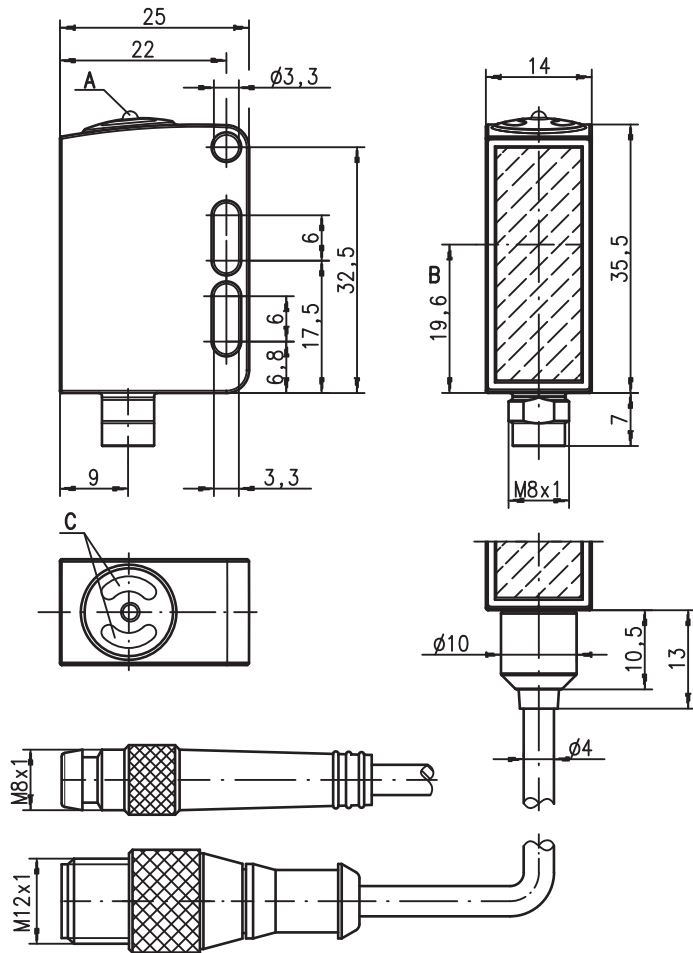


PRKL 55 Laser retro-reflective photoelectric sensor with polarisation filter

Part No. 501 06860



Dimensioned drawing



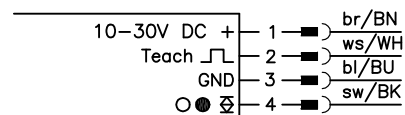
- A Teach button
- B Optical axis
- C Indicator diode

0 ... 3m
 2 kHz
 T_1
 10 - 30 V DC

 stainless steel 316 L

- Polarised, laser retro-reflective photoelectric sensor, autocollimation optics
- 316L stainless steel housing in Wash-Down-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and ECOLAB+ tested
- Paperless device identification
- Scratch resistant and non-diffusive plastic front cover
- Laser safety class 1
- Easy adjustment via lockable teach button or teach input

Electrical connection



Accessories:

(available separately)

- Cable with M8 or M12 connector (K-D ...)
- Cable for food and beverages
- Reflectors for the foods industry
- Reflectors for the pharmaceutical industry
- Reflective tapes

We reserve the right to make changes • 55_b04gb.fm



Specifications

Optical data

Typ. op. range limit (MTKS 50 x 50) ¹⁾	0 ... 3m
Operating range ²⁾	see tables
Light beam characteristic	collimated, ≤ 3 mrad
Light spot diameter	approx. 2mm at light beam gate
Light source ³⁾	Laser (pulsed)
Wavelength	655nm (visible red light, polarised)
Output power	0.29mW
Pulse duration	$\leq 5,5\mu\text{s}$

Timing

Switching frequency	2000Hz
Response time	0.25ms
Delay before start-up	≤ 300 ms

Electrical data

Operating voltage U_B ⁴⁾	10 ... 30VDC (incl. residual ripple)
Residual ripple	$\leq 15\%$ of U_B
Bias current	≤ 15 mA
Switching output	.../6.22 1 push-pull switching output pin 4: PNP light switching, NPN dark switching pin 2: teach input light/dark reversible
Function characteristics	$\geq (U_B - 2V) / \leq 2V$
Signal voltage high/low	max. 100mA
Output current	setting via teach-in
Sensitivity	

Indicators

LED green	ready
LED yellow	light path free
LED yellow flashing	light path free, no performance reserve ⁵⁾

Mechanical data

Housing	AlSi 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Housing design	WASH-DOWN-Design
Housing roughness ⁶⁾	$R_a \leq 2.5$
Connector	AlSi 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Optics cover	coated plastic (PMMA), scratch resistant and non-diffusive
Operation	plastic (TPV - PE), non-diffusive
Weight	with M8 connector: 60g with 200mm cable and M12 connector: 70g
Connection type	M8 connector, 4-pin 0.2m cable with M12 connector, 4-pin

Environmental data

Ambient temp. (operation/storage)	$-10^\circ\text{C} \dots +55^\circ\text{C}^{7)}/-30^\circ\text{C} \dots +70^\circ\text{C}$
Protective circuit ⁸⁾	2, 3
VDE safety class ⁹⁾	III
Protection class	IP 67, IP 69K
Environmentally tested acc. to	ECOLAB, ECOLAB+
Laser class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2
Certifications	CDRH 21 CFR 1040 ¹⁰⁾ , UL 508 ⁴⁾
Chemical resistance	tested in accordance with ECOLAB and ECOLAB+ (see remarks)

Options

Teach-in input/activation input

Transmitter active/not active	$\geq 8V / \leq 2V$
Activation/disable delay	≤ 1 ms
Input resistance	30k Ω

- 1) Typ. operating range limit: max. attainable range without performance reserve
- 2) Operating range: recommended range with performance reserve
- 3) Average life expectancy 50,000h at an ambient temperature of 25°C
- 4) For UL applications: for use in class 2 circuits according to NEC only
- 5) Display "no performance reserve" as yellow flashing LED is only available in standard teach setting
- 6) Typical value for the stainless steel housing
- 7) Unmounted, max. +50°C; with screw mounting on metal part up to +55°C is permissible
- 8) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 9) Rating voltage 50V
- 10) Applied for

Tables

Reflectors			Operating range	
1	MTKS	50x50	0 ... 2.0m	
2	MTKS	15x30	0 ... 1.6m	
3	MTKS	20x40.1	0 ... 1.0m	
1	0		2,0	3,0
2	0	1,6	2,2	
3	0	1,0	1,5	

- Operating range [m]
 Typ. operating range limit [m]

MTKS ... = micro triple, screw type

Diagrams

Remarks

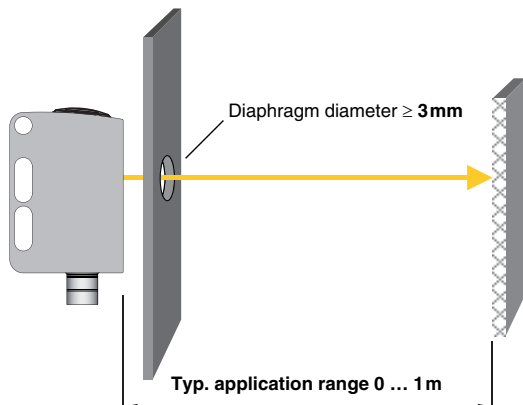
A list of tested chemicals can be found in the product description.

PRKL 55 Laser retro-reflective photoelectric sensor with polarisation filter
Order guide

Selection table		Order code →			
Equipment ↓		PRKL 55/6.22-S8 Part No. 501 05796	PRKL 55/6.22, 200-S12 Part No. 501 05797		
Switching output	1 x Push-pull switching output	●	●		
Switching function	light/dark switching configurable	●	●		
Connection	M8 connector, metal, 4-pin	●			
	cable 200mm with M8 connector, 4-pin		●		
Configuration	teach-in via button (lockable) and teach input	●	●		
Indicators	green LED: ready	●	●		
	yellow LED: switching output	●	●		

General information

- The laser retro-reflective photoelectric sensors PRKL 55/... have an optimised light beam propagation in the typical range of application of 0 ... 1 m (not to be confused with the operating range, which is 0 ... 3m in combination with a reflector MTKS 50x50). This permits the reliable recognition of the smallest of parts or the positioning of objects with maximum precision across the entire area.
- The sensor is constructed on the basis of the autocollimation principle, i.e., light being transmitted and light being received propagate along the same light axis. This permits the photoelectric sensor to be installed directly behind small holes or diaphragms. The smallest permissible diaphragm diameter for secure functioning is 3mm.



- The achievable resolution depends significantly on the unit's configuration. Depending on the teach mode, the following values are possible:

Setting	Detection from object size ¹⁾	Sensor switches at a light occlusion of
max. operating range (factory setting)	1.5mm	50%
normal sensor sensitivity (standard teaching)	1mm	25%
maximum sensor sensitivity (dynamic teaching)	0.1 ... 0.2mm	5%

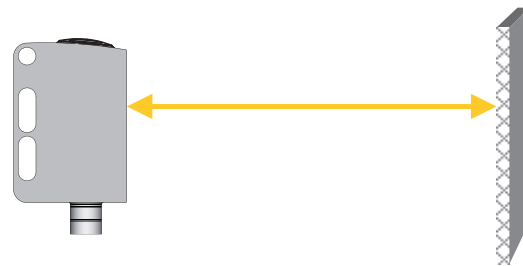
1) All specifications are typical values and may vary by a small amount for each unit.

- For safety reasons, the laser transmitter is equipped with a monitor, which automatically switches off the transmitter in case of a component defect. In case of failure, the yellow LED flashes rapidly and the green LED is off. The state is irreversible and the sensor must be exchanged.

Sensor adjustment (teach) via teach button



- **Prior to teaching:**
Clear the light path to the reflector!
The device setting is stored in a fail-safe way. A reconfiguration following voltage interruption or switch-off is thus not required.



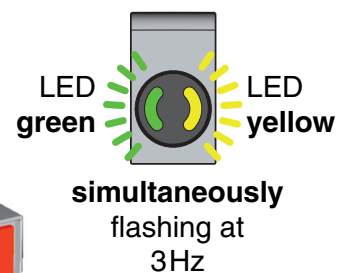
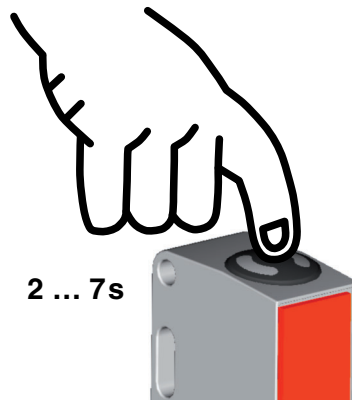
Standard teaching for average sensor sensitivity

- Press teach button until both LEDs flash **simultaneously**.
- Release teach button.
- Ready.



After standard teaching, the sensor switches for objects with a minimum size of 1 mm (see table under "General Information").

If both LEDs flash rapidly after the teaching event, a teaching error has happened. Please check the alignment of the light beam onto the reflector and carry out another teaching event.



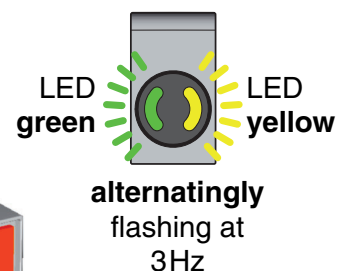
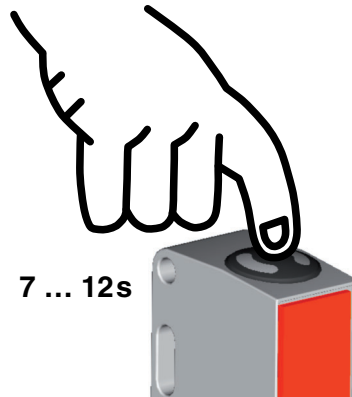
Teaching for maximal sensor sensitivity (dynamic teaching)

- Press teach button until both LEDs flash **alternatingly**. Sensor remains in teaching mode even after the teach button has been released.
- Move some objects through the light path or swing a single object slowly back and forth through the light path.
- Briefly press the teach button to terminate the teach event.
- Ready.



After teaching for maximum sensor sensitivity, the sensor switches for objects with a minimum size of 0.1 ... 0.2mm (see table under "General Information").

If both LEDs flash rapidly after the teaching event, a teaching error has happened. Please check the alignment of the light beam onto the reflector and carry out another teaching event.

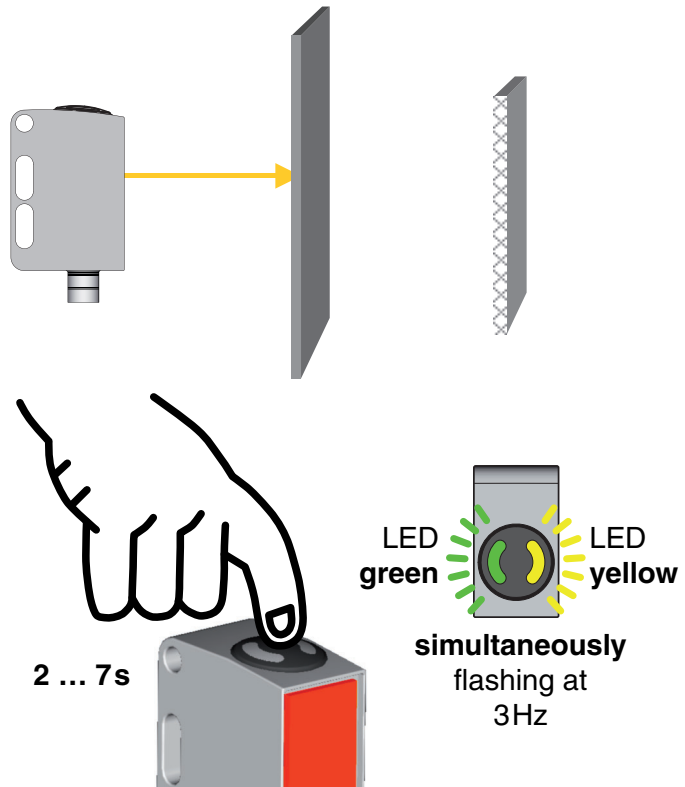




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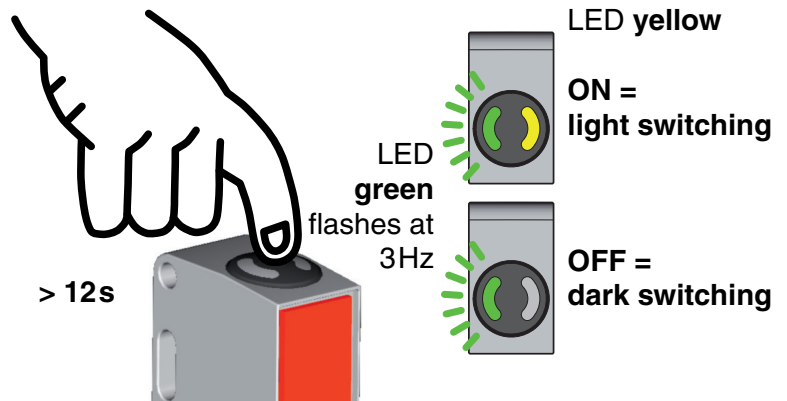
Teaching for maximum operating range (factory setting at delivery)

- Prior to teaching:
Cover the light path to the reflector!
- Procedure as for standard teaching.



Adjusting the switching behaviour of the switching output – light/dark switching

- Press teach button until the green LED flashes. The yellow LED displays the current setting of the switching output:
ON = output switches on light
OFF = output switches on dark
- Continue to press the teach button in order to change the switching behaviour.
- Release teach button.
- Ready.

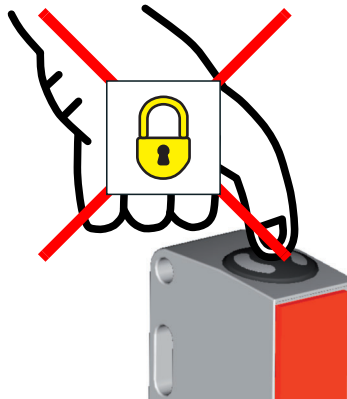


Locking the teach button via the teach input



A **static high signal** (≥ 4 ms) at the teach input locks the teach button on the device if required, such that no manual operation is possible (e.g., protection from erroneous operation or manipulation).

If the teach input is not connected or if there is a static low signal, the button is unlocked and can be operated freely.



Sensor adjustment (teach) via teach input



The following description applies to PNP switching logic!

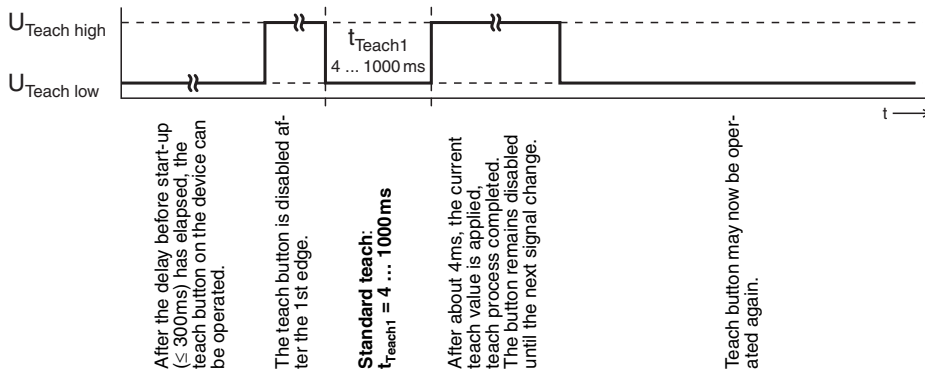
$$U_{\text{Teach low}} \leq 2V$$

$$U_{\text{Teach high}} \geq (U_B - 2V)$$

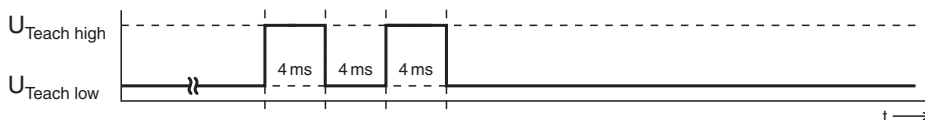
Prior to teaching: Clear the light path to the reflector!

The device setting is stored in a fail-safe way. A reconfiguration following voltage interruption or switch-off is thus not required.

Standard teaching for average sensor sensitivity



Quick standard teach



shortest teaching duration for standard teaching: approx. 12ms

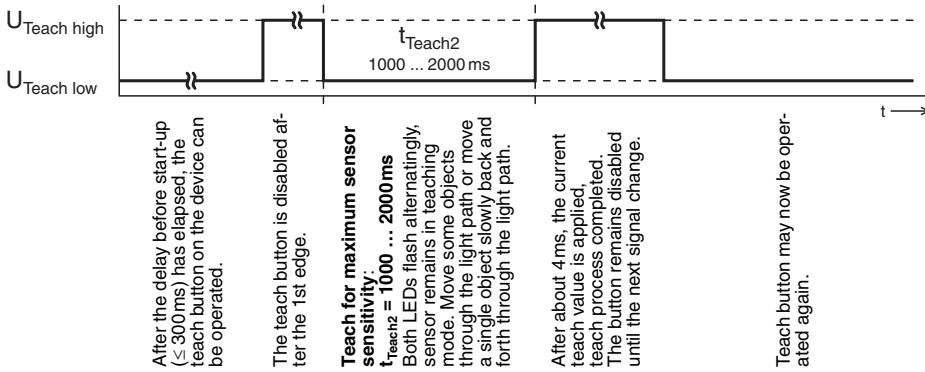


After standard teaching, the sensor switches for objects with a minimum size of 1 mm (see table under "General Information").



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Teaching for maximal sensor sensitivity (dynamic teaching)



After the delay before start-up (≤ 300ms) has elapsed, the teach button on the device can be operated.

The teach button is disabled after the 1st edge.

Teach for maximum sensor sensitivity:
t_{Teach2} = 1000 ... 2000 ms
Both LEDs flash alternatingly, sensor remains in teaching mode. Move some objects through the light path or move a single object slowly back and forth through the light path.

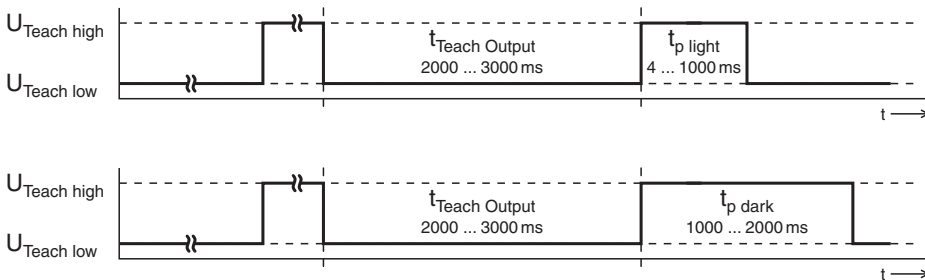
After about 4ms, the current teach value is applied, teach process completed. The button remains disabled until the next signal change.

Teach button may now be operated again.



After teaching for maximum sensor sensitivity, the sensor switches for objects with a minimum size of 0.1 ... 0.2mm (see table under "General Information").

Adjusting the switching behaviour of the switching output – light/dark switching



After the delay before start-up (≤ 300ms) has elapsed, the teach button on the device can be operated.

The teach button is disabled after the 1st edge.

Setting the switching behaviour of the switching output:
t_{Teach Output} = 2000 ... 3000 ms

Switching output switches on light:
t_{p light} = 4 ... 1000ms

Switching output switches on dark:
t_{p dark} = 1000 ... 2000ms

The button remains disabled until the next signal change.

