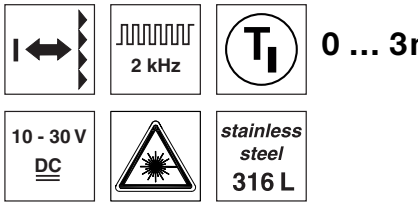
PRKL 55 Laser retro-reflective photoelectric sensor with polarization filter



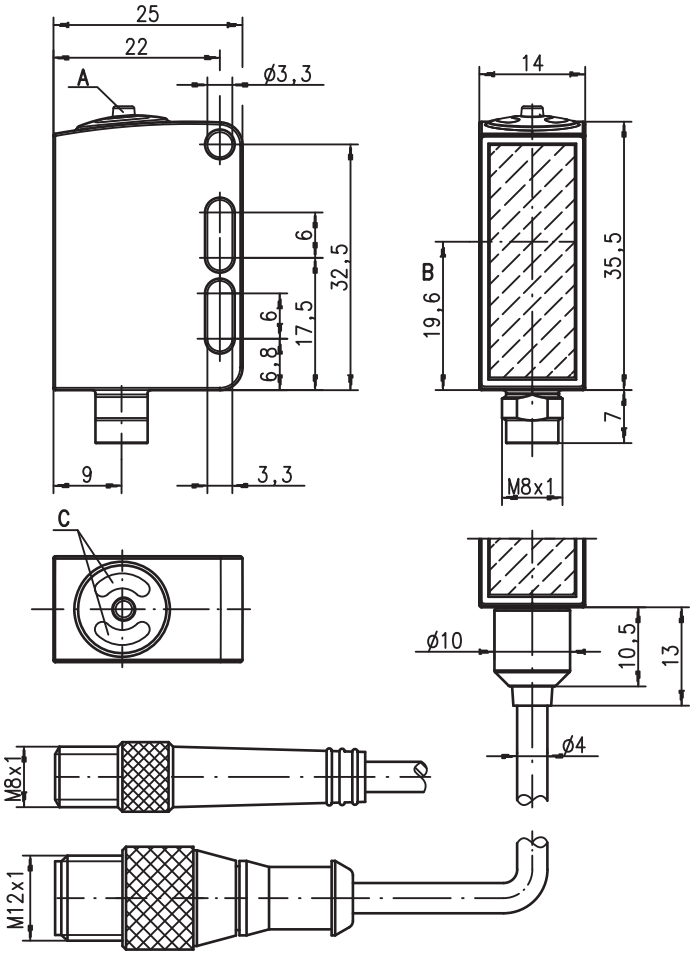
- Polarized, laser retro-reflective photoelectric sensor, autocollimation optics
- 316L stainless steel housing in WASH-DOWN-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and Clean*Proof*+ tested
- Paperless device identification
- Scratch resistant and non-diffusive plastic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

Accessories:

(available separately)

- Cables with M8 or M12 connector (K-D …)
- Cables for food and beverages
- Reflectors for the foods industry
- Reflectors for the pharmaceutical industry
- Reflective tapes
- Mounting devices

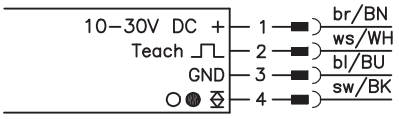
Dimensioned drawing



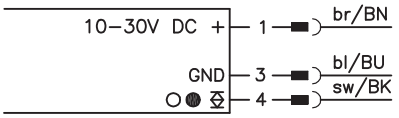
A Teach button
B Optical axis
C Indicator diodes

Electrical connection

Plug connection, 4-pin (with/without cable)



Connector, 3-pin



en 06-2012/11 50106860-01

Specifications

Optical data

Typ. op. range limit (MTKS 50 x 50) [1]		0 … 3m
Operating range [2]		see tables
Light beam characteristic		collimated, ≤ 3mrad
Light spot diameter		approx. 2mm at light beam gate
Light source [3]		laser (pulsed)
Wavelength		655nm (visible red light, polarized)
Output power		0.29mW
Pulse duration		≤ 5.5µs

Timing

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

Electrical data

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

Indicators

Green LED	ready
Yellow LED	light path free
Yellow LED, flashing	light path free, no performance reserve [5]

Mechanical data

Housing	AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Housing design	WASH-DOWN-Design
Housing roughness [6]	Ra ≤ 2.5
Connector	AISI 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: 40g with 200mm cable and M12 connector: 60g with 5000mm cable: 110g
Connection type	M8 connector, 4-pin, 0.2m cable with M12 connector, 4-pin 5m cable, 4 x 0.20mm²

Environmental data

Ambient temp. (operation/storage)	-10°C … +55°C[7]/-30°C … +70°C
Protective circuit [8]	2, 3
VDE safety class [9]	III
Protection class	IP 67, IP 69K [10]
Environmentally tested acc. to	ECOLAB, Clean*Proof*+
Laser class	1 (in accordance with EN 60825-1)
Standards applied	IEC 60947-5-2
Certifications	CDRH 21 CFR 1040, UL 508 [4]
Chemical resistance	tested in accordance with ECOLAB and Clean*Proof*+ (see Remarks)

Options

Teach-in input/activation input

Transmitter active/not active	≥ 8V/≤ 2V
Activation/disable delay	≤ 1ms
Input resistance	30kΩ

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) Without mounting max. +50°C, with screw mounting on metal part up to +55°C permissible
8) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
9) Rating voltage 50V
10) Only in combination with M12 connector

Approved purpose

This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.

Tables

	Reflectors in food quality		Operating range
1	MTKS	50x50.1	0 … 2.0m
2	MTKS	15x30	0 … 1.6m
3	MTKS	20x40.1	0 … 1.0m
4	Tape 6	50x50	0 … 1.0m

1	0	2.0	3.0
2	0	1.6	2.2
3	0	1.0	1.5
4	0	1.0	1.2

	Pharmaceutical reflectors		Operating range
1	MTK(S)	14x23.P	0 … 0.2m

1	0	0.2	0.25

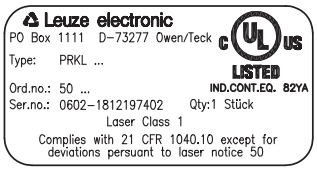
Operating range [m]
Typ. operating range limit [m]

MTKS … = micro triple, screw type

Diagrams

Remarks

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



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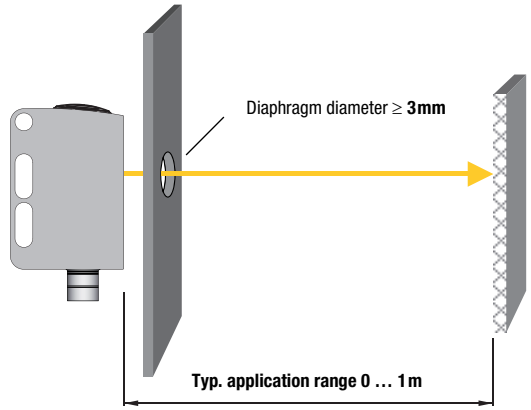
Order guide

Selection table Equipment ↓	Order code →	PRKL 55/6.22-S8 Part no. 50105796	PRKL 55/6.22, 200-S12 Part no. 50105797	PRKL 55/6.22-S8.3 Part no. 50107602	PRKL 55/6.22, 5000 Part no. 50114072
Switching output	1 x push-pull switching output	●	●	●	●
Switching function	light/dark switching configurable	●	●	●	●
Connection	M8 connector, metal, 4-pin	●			
	M8 connector, metal, 3-pin			●	
	cable 200mm with M12 connector, 4-pin		●		
	cable 5000mm, 4-wire				●
Configuration	teach-in via button (lockable) and teach input[1)]	●	●	●	●
Indicators	green LED: ready	●	●	●	●
	yellow LED: switching output	●	●	●	●

1) Teach input not present with 3-pin connector

General information

- The laser retro-reflective photoelectric sensors PRKL 55/… have an optimized light beam propagation in the typical range of application of 0 … 1m (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.
- For foil 6, the sensor's side edge must be aligned parallel to the side edge of the reflective tape.
- 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:

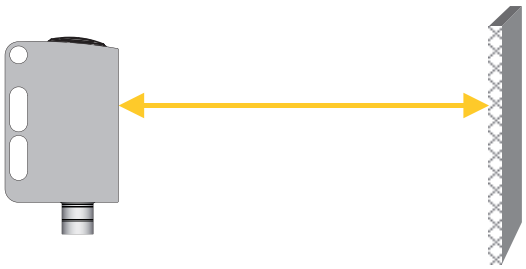
Setting	Detection from object size [1)]	Sensor switches at a light occlusion of
max. operating range (factory setting)	1.5mm	50%
normal sensor sensitivity (standard teaching)	1mm	25%
maximum sensor sensitivity (dynamic teaching)	0.1 … 0.2mm	5%

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.

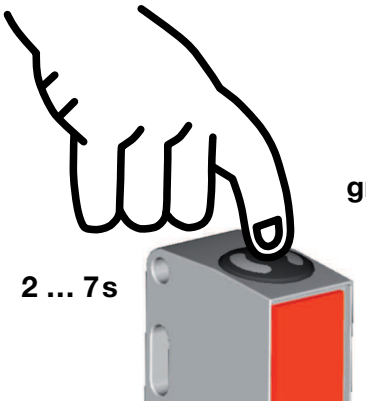


Standard teaching for average sensor sensitivity

- **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.



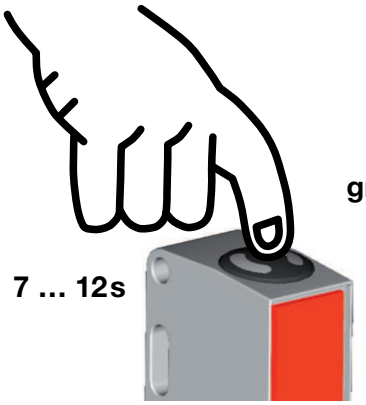
simultaneously
flashing at
3 Hz

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 … 0.2 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.



alternatingly
flashing at
3 Hz

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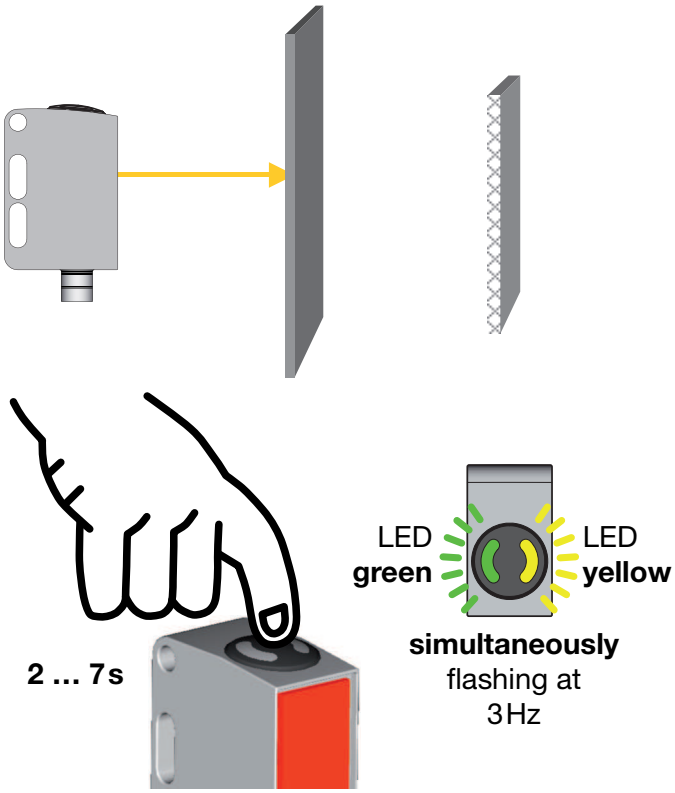
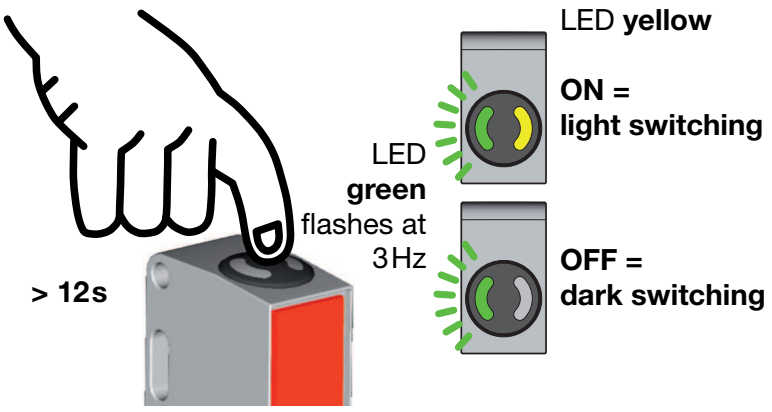
Teaching for maximum operating range (factory setting at delivery)

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



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

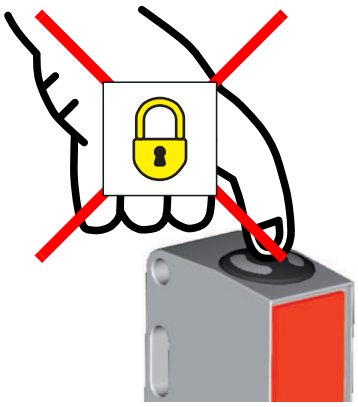
- **Press teach button until the green LED flashes. The yellow LED displays the current setting of the switching output:**
  ON = output switches on light
  OFF = output switches on dark
- **Continue to press the teach button in order to change the switching behavior.**
- **Release teach button.**
-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

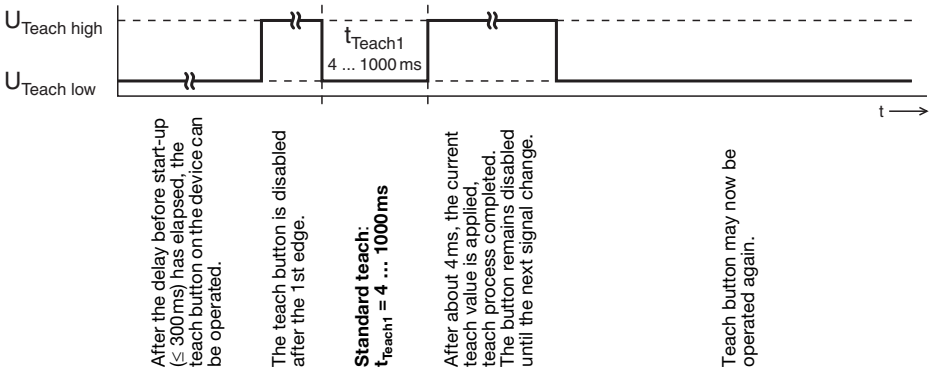
$U_{Teach\ low} \leq 2V$

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

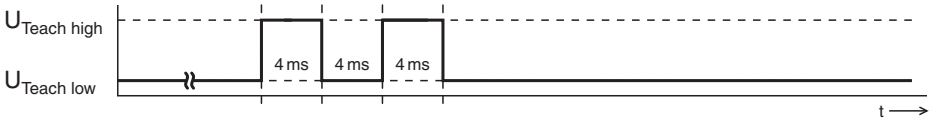
Prior to teaching: Clear the light path to the reflector!

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. 12 ms

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

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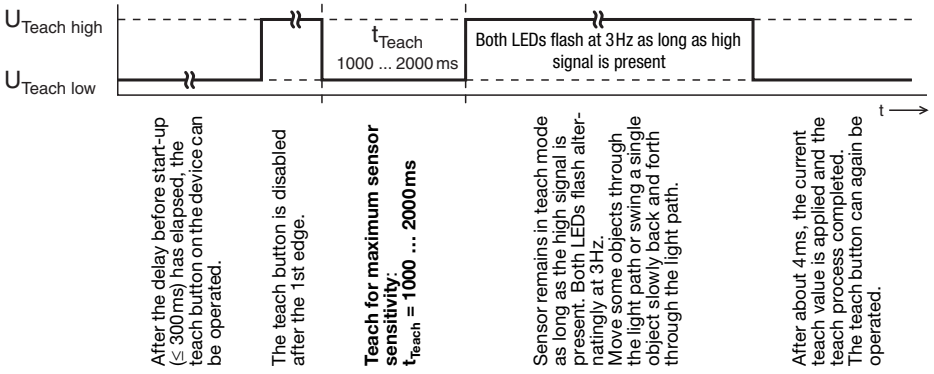
Teaching for maximal sensor sensitivity (dynamic teaching)



In the event of a teach error (e.g. no teach object or a teach object which is too small or too transparent is moved through the light path), the two LEDs flash at the same rate. Check the system, repeat the teach process, if necessary use a larger or less transparent teach object.

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

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