

PRKL 53

Laser-retro-reflective photoel. sensors with polariz. filter for bottles

en 02-2019/02/26 50115009-02



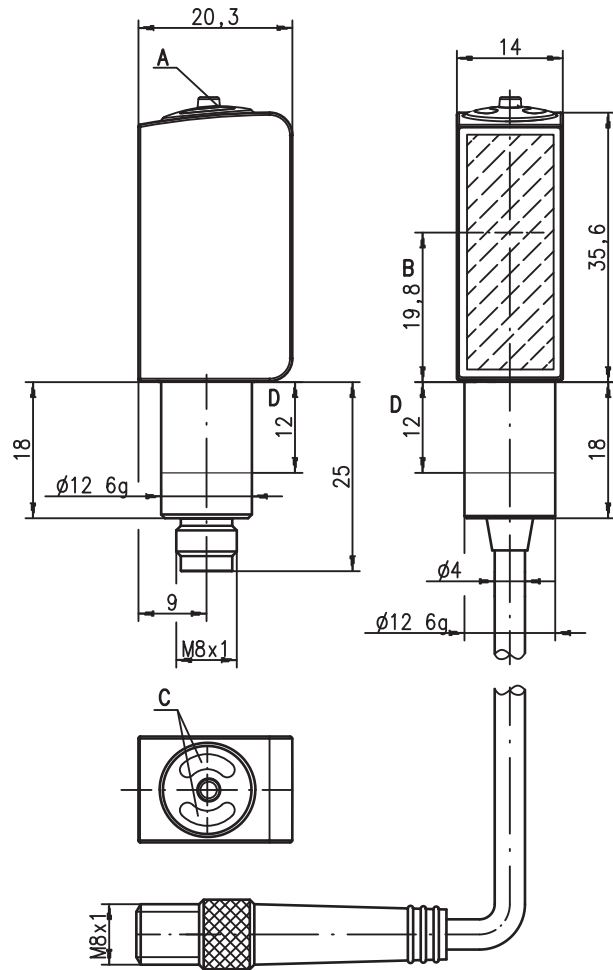
- Polarized, laser retro-reflective photoelectric sensor, autocollimation optics
- Trigger sensor for highly transparent bottles (PET and glass)
- 316L stainless steel housing in HYGIENE-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and CleanProof+ tested
- Paperless device identification
- Scratch resistant and non-diffusive plastic front cover
- Laser class 1
- Easy adjustment via lockable teach button or teach input

Accessories:

(available separately)

- Cables with M8 connector (KD ...)
- Cables for food and beverages
- Reflectors for the foods industry
- Reflectors for the pharmaceutical industry
- Reflective tapes
- Mounting devices

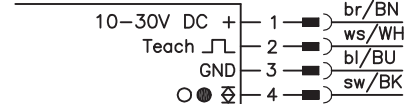
Dimensioned drawing



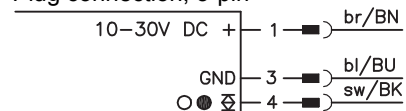
- A Teach button
- B Optical axis
- C Indicator diode
- D Permissible clamping range

Electrical connection

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



Plug connection, 3-pin



We reserve the right to make changes • PAL_PRKL53642_en_50115009_02.fm

Specifications

Optical data

Typ. operating range limit (TK series 53) ¹⁾	0 ... 500mm
Operating range ^{2) 3)}	see tables
Light beam characteristic	collimated, ≤ 3mrad
Light spot diameter	approx. 2mm at light beam gate
Light source ⁴⁾	laser (pulsed)
Laser class	1 in accordance with IEC 60825-1:2007
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 ⁵⁾	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 15mA
Switching output	.../6.42 1 push-pull switching output pin 4: PNP light switching, NPN dark switching pin 2: teach input light/dark reversible
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
Flashing yellow LED	light path free, no performance reserve ⁶⁾

Mechanical data

Housing	AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Housing design	HYGIENE-Design
Housing roughness ⁷⁾	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: 50g with 200mm cable and M8 connector: 60g
Connection type	M8 connector, 4-pin or 3-pin 0.2m cable with M8 connector, 4-pin via fit (see "Remarks")
Fastening	
Max. tightening torque	3 Nm (permissible range, see dimensioned drawing)

Environmental data

Ambient temp. (operation/storage) ⁸⁾	-30 °C ... +70 °C/-30 °C ... +70 °C
Protective circuit ⁹⁾	2, 3
VDE safety class ¹⁰⁾	III
Protection class	IP 67, IP 69K ¹¹⁾
Environmentally tested acc. to	ECOLAB, CleanProof+
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 ^{5) 8) 12)}
Chemical resistance	tested in accordance with ECOLAB and CleanProof+ (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) At a reflector distance of < 50mm, highly transparent bottle are no longer detected
- 4) Average life expectancy 50,000h at an ambient temperature of 25 °C
- 5) For UL applications: for use in class 2 circuits according to NEC only
- 6) Display "no performance reserve" as yellow flashing LED is only available in standard teach setting
- 7) Typical value for the stainless steel housing
- 8) UL certified in the temperature range -30 °C to 55 °C, operating temperatures of +70 °C permissible only briefly (≤ 15min)
- 9) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 10) Rating voltage 50V
- 11) Only with internal tube mounting of the M8 connector
- 12) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.24A min, in the field installation



UL REQUIREMENTS

Enclosure Type Rating: Type 1
For Use in NFPA 79 Applications only.
 Adapters providing field wiring means are available from the manufacturer. Refer to manufacturers information.
CAUTION – the use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
ATTENTION! Si d'autres dispositifs d'alignement que ceux préconisés ici sont utilisés ou s'il est procédé autrement qu'indiqué, cela peut entraîner une exposition à des rayonnements et un danger pour les personnes.

Tables

Reflectors			Operating range ³⁾
1	TK	series 53	0 ... 0.4m
2	REF	6-S-20x40	0 ... 0.4m
3	Tape 6	25x25	0 ... 0.4m




1	0	0.4	0.5
2	0	0.4	0.5
2	0	0.4	0.5

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

Diagrams

Remarks

Operate in accordance with intended use!

-  This product is not a safety sensor and is not intended as personnel protection.
-  The product may only be put into operation by competent persons.
-  Only use the product in accordance with the intended use.

- A list of tested chemicals can be found in the first part of the product description.
- Only secure in designated area using set screw. Max. tightening torque 3Nm.

Laser safety notices

ATTENTION, LASER RADIATION – LASER CLASS 1

The device satisfies the requirements of IEC 60825-1:2007 (EN 60825-1:2007) safety regulations for a product in **laser class 1** as well as the U.S. 21 CFR 1040.10 regulations with deviations corresponding to "Laser Notice No. 50" from June 24th, 2007.

↳ Adhere to the applicable legal and local regulations regarding protection from laser beams.

↳ The device must not be tampered with and must not be changed in any way.

There are no user-serviceable parts inside the device.

Repairs must only be performed by Leuze electronic GmbH + Co. KG.

Order guide

Selection table					
Order code →					
Equipment ↓					
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 M8 connector, 4-pin				
Configuration	teach-in via button (lockable) and teach input ¹⁾	●	●		
Indicators	green LED: ready	●	●		
	yellow LED: switching output	●	●		

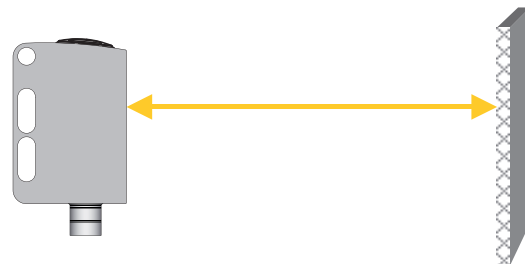
PRKL 53/6 42-S8.3
Part No. 50114884

PRKL 53/6 42/IS8
Art.-Nr. 50133403

1) Teach input not present with 3-pin connector

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.

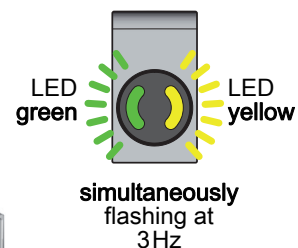
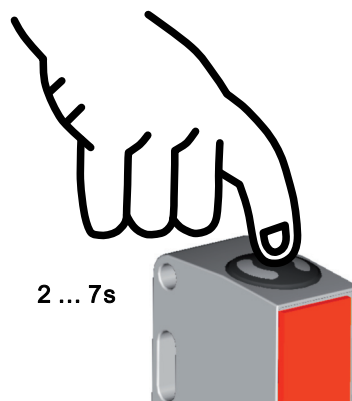


Teach for 11% sensor sensitivity (highly transparent bottles and foils with thickness > 20µm)

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



After the teaching, the sensor switches when about 11% of the light beam are covered by the object.

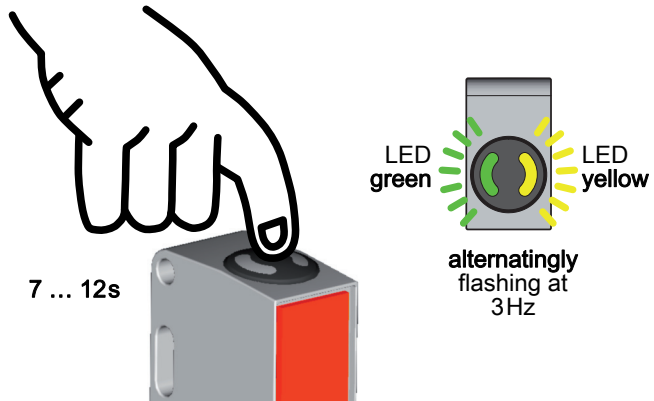


Teach for 18% sensor sensitivity (standard bottles)

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

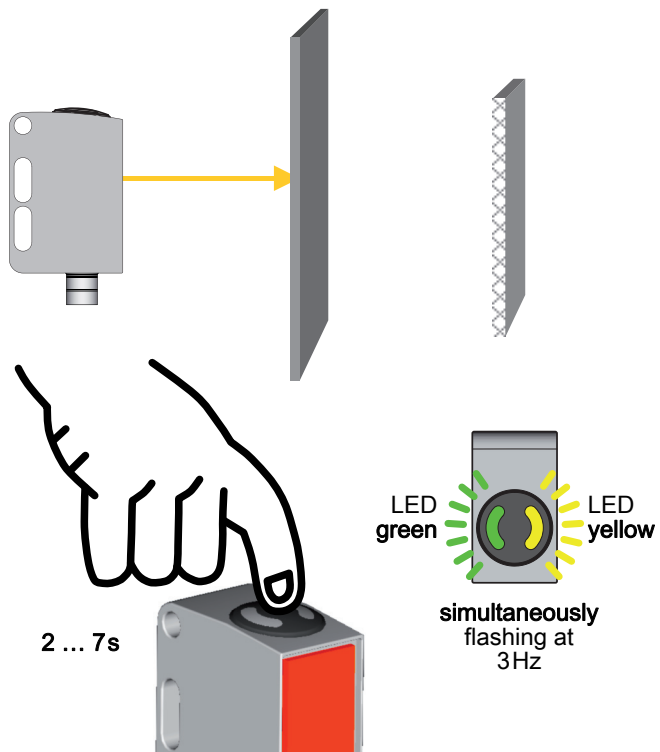


After the teaching, the sensor switches when about 18% of the light beam are covered by the object.



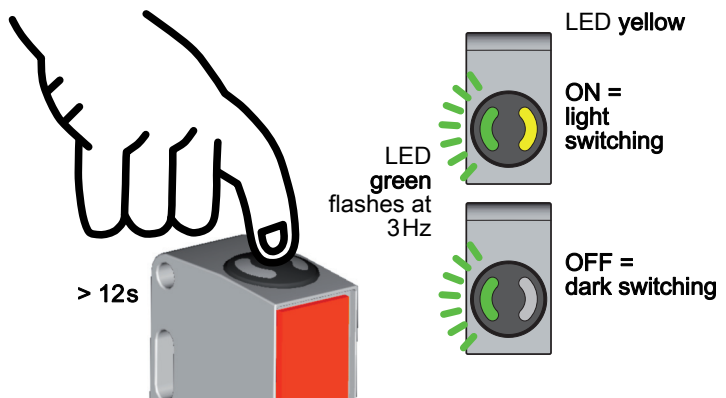
Teaching for maximum operating range (factory setting at delivery)

- Prior to teaching: **Cover** the light path to the reflector!
- Press teach button until both LEDs flash **simultaneously**.
- Release teach button.
- Ready.



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.

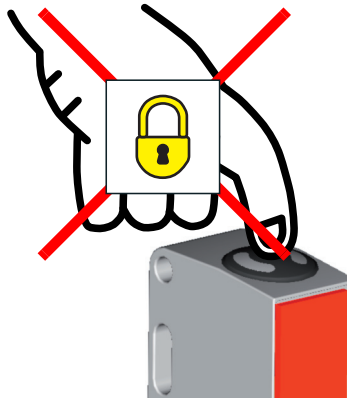


Locking the teach button via the teach input



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!

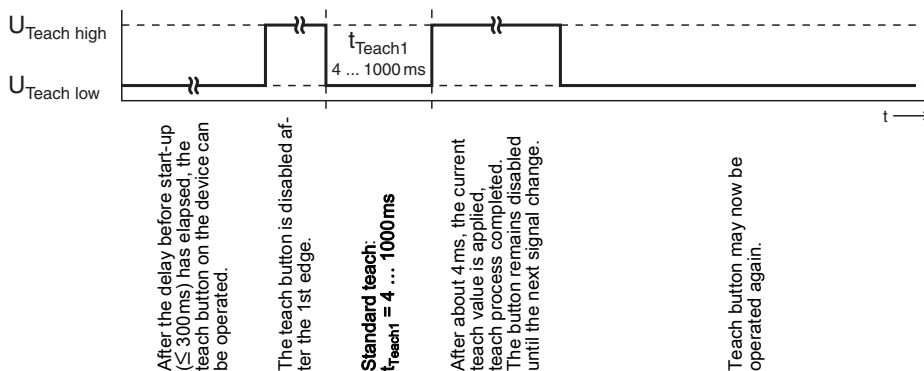
$U_{\text{Teach low}} \leq 2V$

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

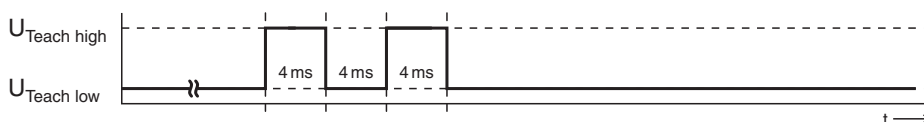
Prior to teaching: Clear the light path to the reflector!

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

Teach for 11% sensor sensitivity
(highly transparent bottles and foils with thickness > 20µm)



Quick teach for 11% sensor sensitivity
(highly transparent bottles and foils with thickness > 20µm)

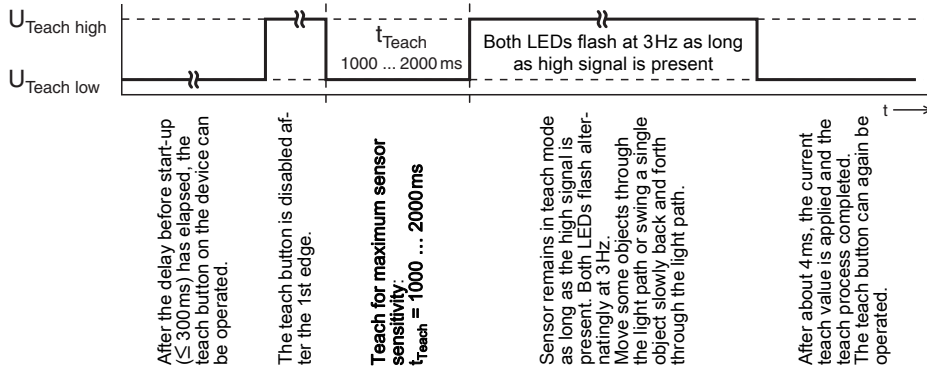


Shortest teaching duration for standard teaching: approx. 12ms



After teaching for 11% sensor sensitivity, the sensor switches for objects with a minimum size of 1mm.

Teach for 18% sensor sensitivity (standard bottles)

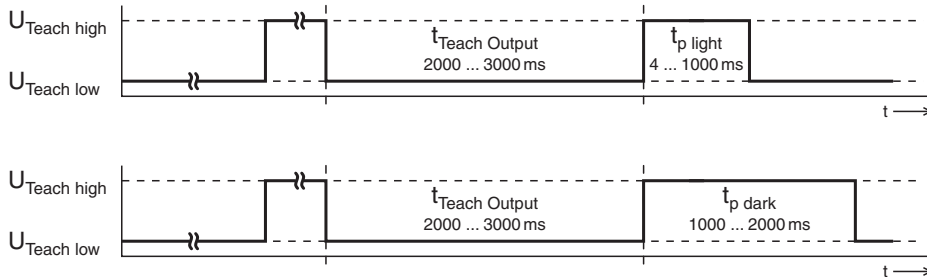


In the event of a teach error (e.g. no teach object or a teach object which is too small or too transparent is moved through the light path), the two LEDs flash at the same rate. Check the system, repeat the teach process, if necessary use a larger or less transparent teach object.



After teaching for 18% sensor sensitivity, the sensor switches for objects with a minimum size of 0.1 mm ... 0.2mm.

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



After the delay before start-up ($\leq 300\text{ms}$) has elapsed, the teach button on the device can be operated.

The teach button is disabled after the 1st edge.

Setting the switching behavior of the switching output:
 $t_{\text{Teach Output}} = 2000 \dots 3000\text{ms}$

Switching output switches on light:
 $t_{\text{p light}} = 4 \dots 1000\text{ms}$

Switching output switches on dark:
 $t_{\text{p dark}} = 1000 \dots 2000\text{ms}$
 The button remains disabled until the next signal change.