PRK 55 Retro-reflective photoelectric sensors with polarisation filter

en 03-2017/11 50110264

0 ... 5m

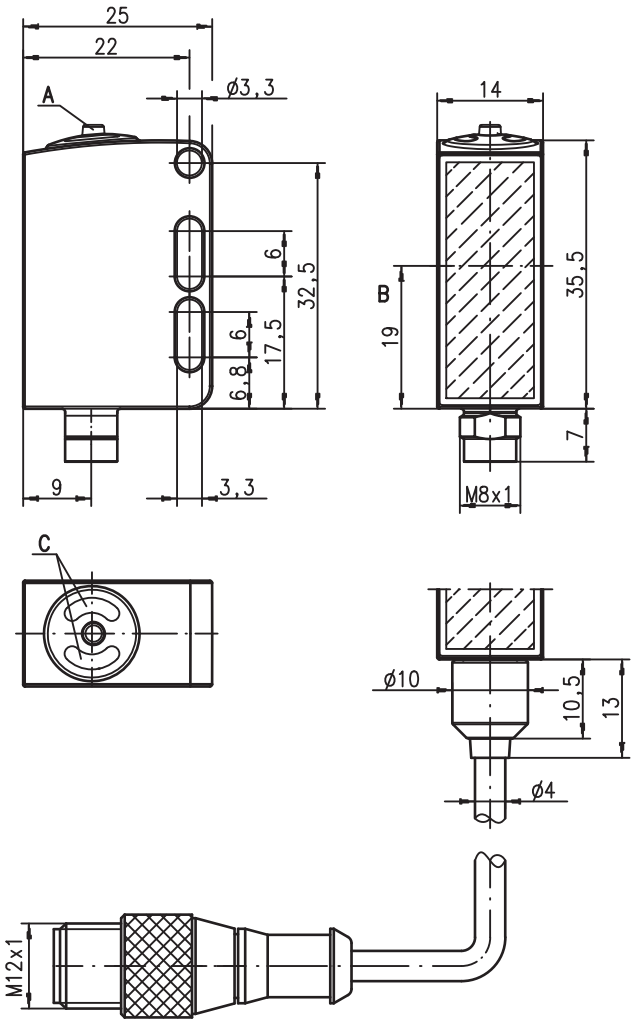
- Polarised retro-reflective photoelectric sensor, autocollimation optics with visible red light
- Fine tuning with "easy tune"
- Reliable detection of PET and glass bottles
- For precise positioning of objects and reflector markers
- 316L stainless steel housing in Wash-Down-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and Clean*Proof*+ tested
- A²LS - Active Ambient Light Suppression
- Easy adjustment via lockable teach button or teach input or "easy tune"

Accessories:

(available separately)

- Cables with M12 connector (KD ...)
- Cables for food and beverages
- Reflectors for the foods industry
- Reflectors for the pharmaceutical industry
- Reflective tapes
- Mounting devices

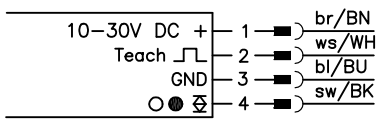
Dimensioned drawing



A Teach button
B Optical axis
C Indicator diode

Electrical connection

Plug connection, 4-pin (with cable)



Specifications

Optical data

Typ. op. range limit (TK(S) 100x100) [1]		0 … 5m
Operating range [2]		see tables
Light source [3]		LED (modulated light)
Wavelength		620nm (visible red light, polarised)

Timing

Switching frequency		1000Hz
Response time		0.5ms
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		≤ 18mA
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
Flashing green LED	"easy tune" display [5]
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	WASH-DOWN-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: 40g with 200mm cable and M12 connector: 60g
Connection type	M8 connector, 4-pin 0.2m cable with M12 connector, 4-pin

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
Environmentally tested acc. to	ECOLAB, Clean*Proof*+
Light source	exempt group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 [4] [8] [11]
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 100,000h at an ambient temperature of 25°C
4) For UL applications: for use in class 2 circuits according to NEC only
5) see "easy tune - fine tuning of the sensitivity"
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 certification for a temperature range of -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) 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
1	TK(S)	100x100	0 … 4.0m
2	TK	40x60	0 … 2.6m
3	TK	20x40	0 … 1.3m
4	Tape 4	50x50	0 … 0.7m

1	0			4	5
2	0		2,6	3,2	
3	0		1,3	1,5	
4	0	0,7	1,0		

	Pharmaceutical reflectors		Operating range
1	TK(S)	40x60.P	0 … 1.6m
2	TK(S)	20x40.P	0 … 1.0m
3	TK(S)	20.P	0 … 0.7m
4	MTK(S)	14x23.P	0 … 0.4m
5	TK	10.P	0 … 0.3m

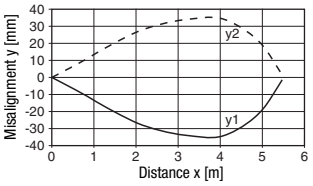
1	0			1,6	1,8
2	0			1,0	1,2
3	0		0,7	0,8	
4	0		0,4	0,5	
5	0	0,3	0,4		

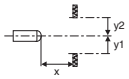
Operating range [m]
Typ. operating range limit [m]

TK … = adhesive
TKS … = screw type

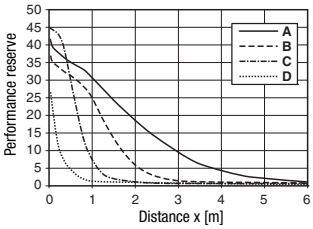
Diagrams

Typ. response behaviour





Typ. performance reserve



A TK 100x100
B TKS 40x60
C TKS 20x40
D Tape 4: 50x50

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.

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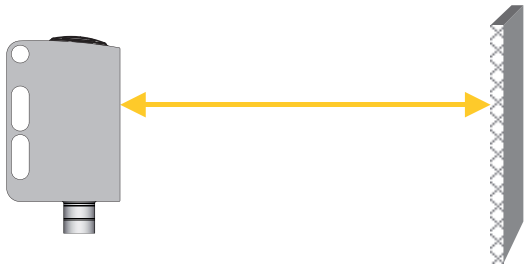
Order guide

Selection table Equipment ↓	Order code →	PRK 55/6.002, 200-S12 Part No. 501 09870			
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 200 mm with M12 connector, 4-pin	●			
Configuration	teach-in via button (lockable) and teach input[1)]	●			
	fine tuning with "easy tune"	●			
Indicators	LED green: ready + teach sequence + "easy tune"	●			
	yellow LED: switching output	●			
Special area of application	optimised for detection of foils < 20 µm				
	optimised for detection of PET and glass bottles	●			

1) Teach input not present with 3-pin connector

Sensor adjustment (teach) via teach button

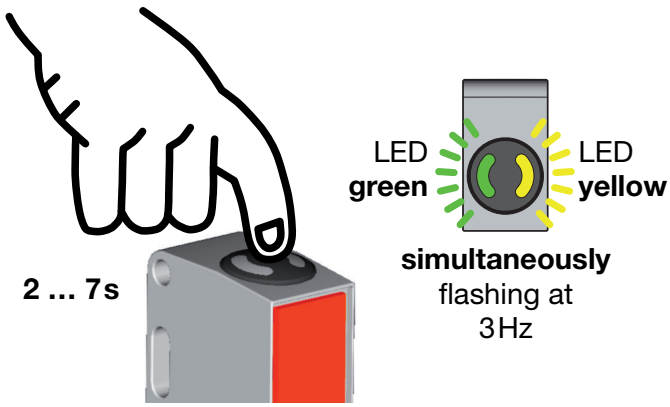
- **The sensor is factory-adjusted for maximum operating range.**
  Recommendation: teach only if the desired objects are not reliably detected.
- **Prior to teaching:**
  Clear the light path to the reflector!
  The device setting is stored in a fail-safe way. A reconfiguration following voltage interruption or switch-off is thus not required.
- **"easy tune"**
  The teach setting can be changed via "easy tune".



Standard teaching for average sensor sensitivity for detection of shrink-wrapped containers

- **Press teach button until both LEDs flash simultaneously.**
- **Release teach button.**
- **Ready – containers can be detected.**

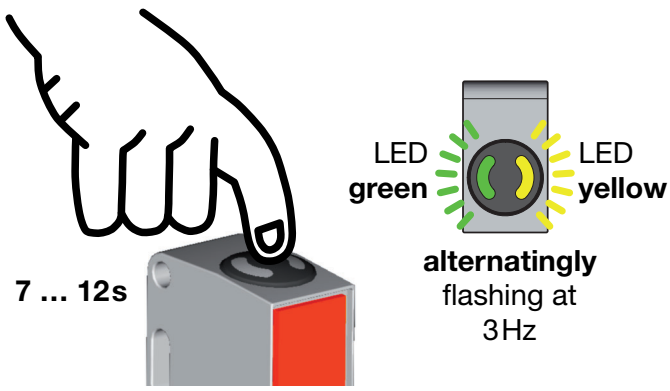
After the standard teaching, the sensor switches when half of the light beam is covered by the object.



Teaching for increased sensor sensitivity for bottle detection

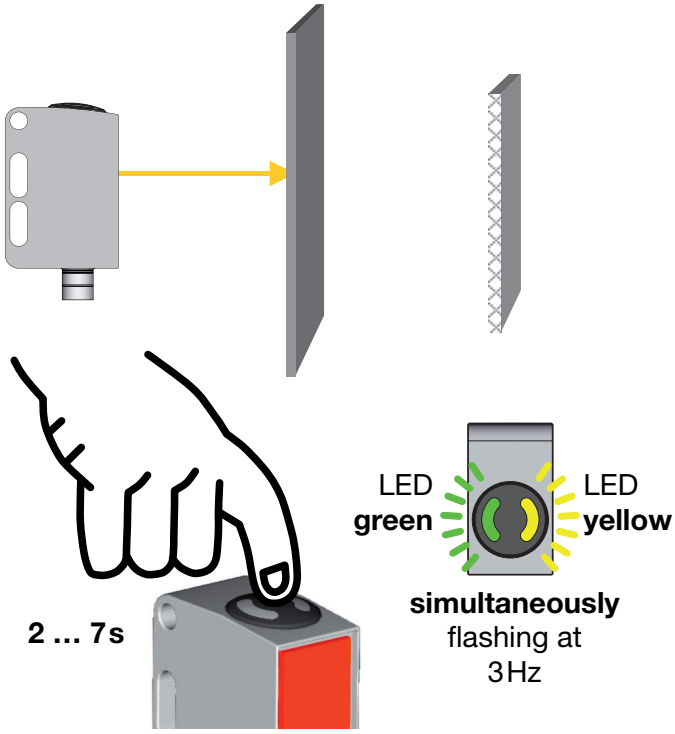
- **Press teach button until both LEDs flash alternatingly.**
- **Release teach button.**
- **Ready – bottles can be detected.**

After the teaching for increased sensor sensitivity, 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!
- **Procedure as for standard teaching.**



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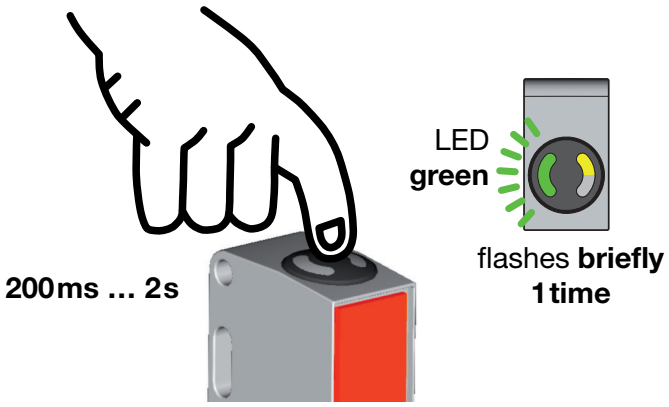
"easy tune" - fine tuning of the sensitivity in 4% increments

- **After power-on and concluded teach process:**
  Green LED - continuous light: operational readiness
  Yellow LED: light path clear/interrupted
- **Increasing sensitivity by +4% (increment):**
  Each time the button is pressed between 200ms and 2s, the switching threshold is incremented.
  For example: switching threshold 18% –> 22% after easy tune.

  The press of the button is confirmed by **one green flash of the green LED** - the new switching threshold is now valid.

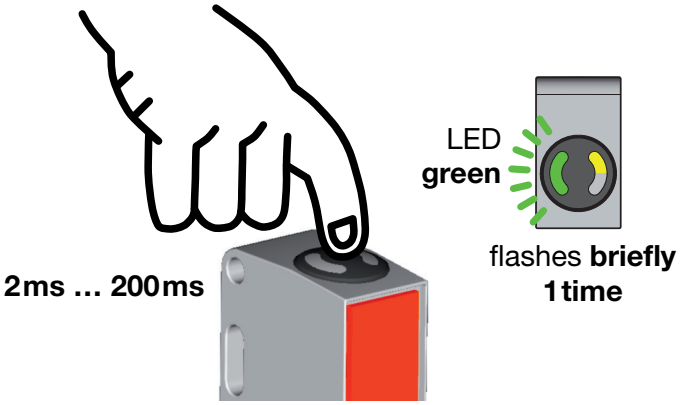
Button pressed down for long time =
Pressed hard = Sensitivity +4%



- **Decreasing sensitivity by -4% (decrement):**
  Each time the button is pressed between 2ms and 200ms, the switching threshold is decremented.
  For example: switching threshold 18% –> 14% after easy tune.

  The press of the button is confirmed by **one green flash of the green LED** - the new switching threshold is now valid.

Button pressed down for short time =
Pressed lightly = Sensitivity -4%

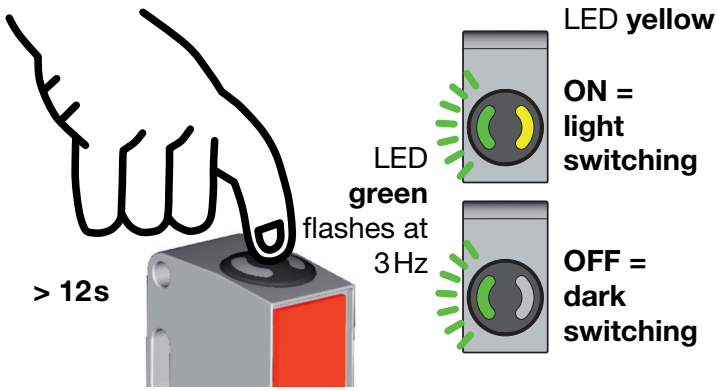


If the upper or lower end of the adjustment range is reached, the green LED flashes at a considerably higher frequency of approx. 6Hz.

The yellow LED always indicates the state of the light path!

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

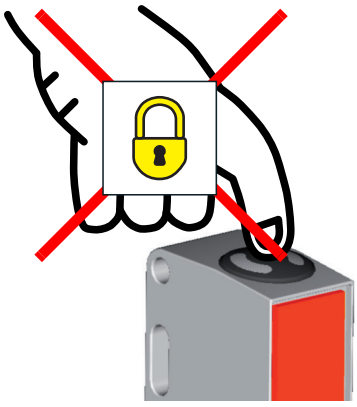
- **Press teach button until the green LED flashes. The yellow LED displays the current setting of the switching output:**
  ON = output switches on light
  OFF = output switches on dark
- **Continue to press the teach button in order to change the switching behaviour.**
- **Release teach button.**
-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



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Sensor adjustment (teach) via teach input

The following description applies to PNP switching logic!

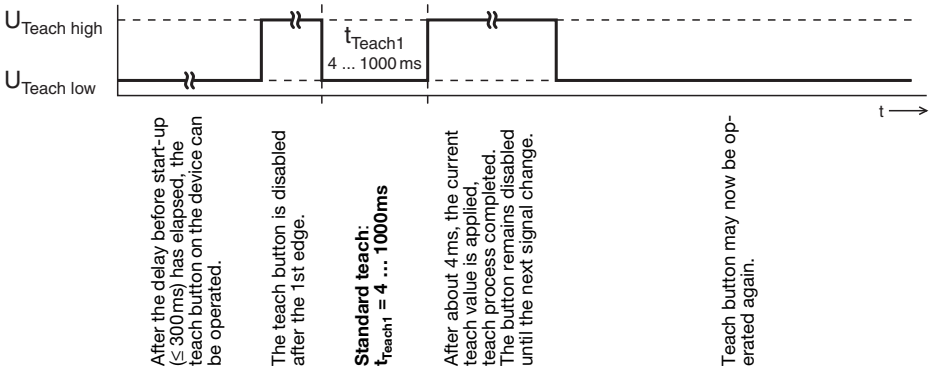
$U_{Teach\ low} \leq 2V$

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

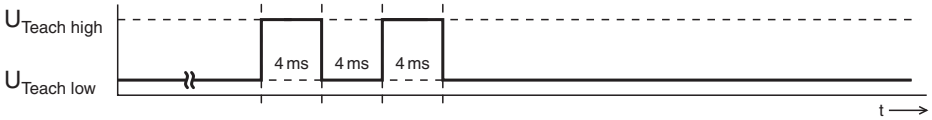
Prior to teaching: Clear the light path to the reflector!

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 for detection of shrink-wrapped containers



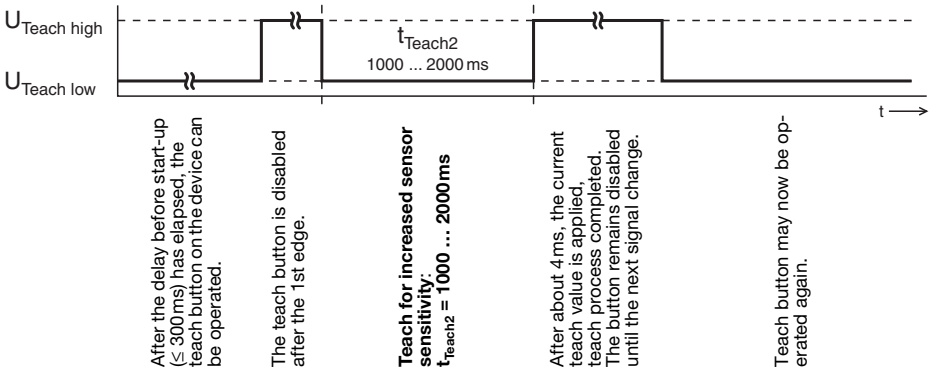
Quick standard teach



Shortest teaching duration for standard teaching: approx. 12 ms

After the standard teaching, the sensor switches when half of the light beam is covered by the object.

Teaching for increased sensor sensitivity for bottle detection



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

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