

PRK 53

Retro-reflective photoelectric sensors with polarization filter

en 05-2017/11 50107824-02



0 ... 5m



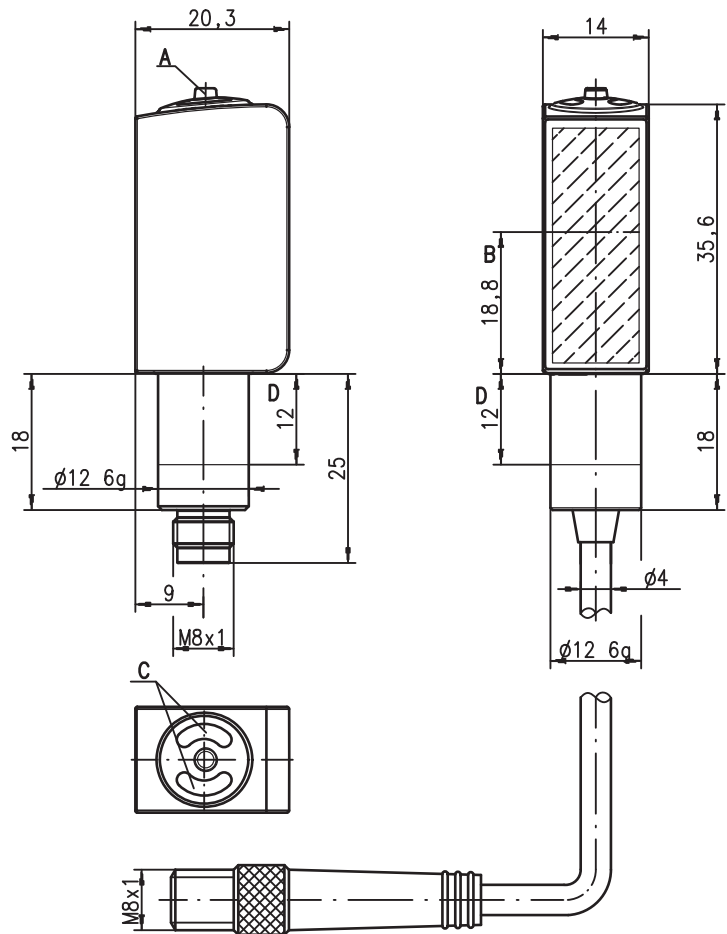
- Polarized retro-reflective photoelectric sensor, autocollimation optics with visible red light
- 316L stainless steel housing in HYGIENE-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and CleanProof+ tested
- Paperless device identification
- Scratch resistant and non-diffusive plastic front cover
- A²LS- Active Ambient Light Suppression
- High switching frequency for detection of fast events
- Easy adjustment via lockable teach button or teach input

Accessories:

(available separately)

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

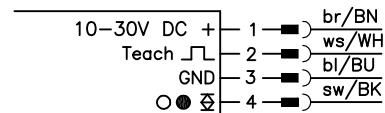
Dimensioned drawing



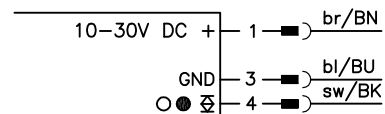
- A** Teach button
- B** Optical axis
- C** Indicator diodes
- D** Permissible clamping range

Electrical connection

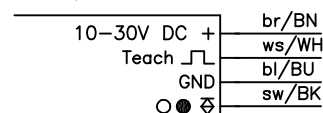
Plug connection, 4-pin (with/without cable)



Connector, 3-pin



Cable, 4 wires



We reserve the right to make changes • PAL_PRK536_en_50107824_02.fm

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, polarized)

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
 light/dark reversible
 Signal voltage high/low ≥ ($U_B - 2V$) ≤ 2V
 Output current max. 100mA
 Operating range setting via teach-in

Function characteristics
 Signal voltage high/low
 Output current
 Operating range

Indicators

LED green 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 HYGIENE-Design
 Housing roughness ⁶⁾ $R_a \leq 2.5$
 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
 with 5000mm cable: 110g
 Connection type M8 connector, 4-pin or 3-pin,
 0.2m cable with M8 connector, 4-pin,
 5m cable, 4 x 0.20mm²
 via fit (see "Remarks")
 Fastening 3 Nm (permissible range, see dimensioned drawing)
 Max. tightening torque

Environmental data

Ambient temp. (operation/storage) ⁷⁾ -30°C ... +70°C/-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, CleanProof+
 Light source exempt group (in acc. with EN 62471)
 Standards applied IEC 60947-5-2
 Certifications UL 508, C22.2 No.14-13 ⁴⁾ ⁷⁾ ¹¹⁾
 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) 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) Display "no performance reserve" as yellow flashing LED is only available in standard teach setting
- 6) Typical value for the stainless steel housing
- 7) UL certified in the temperature range -30°C to 55°C,
 operating temperatures of +70°C permissible only briefly (≤ 15min)
- 8) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
- 9) Rating voltage 50V
- 10) Only with internal tube mounting of the M8 connector
- 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 in food quality		Operating range
1	TK(S) 100x100	0 ... 4.0m
2	TK 40x60	0 ... 2.6m
3	Tape 6 50x50	0 ... 2.0m
4	TK 20x40	0 ... 1.3m
5	Tape 4 50x50	0 ... 0.7m

1	0		4	5
2	0	2.6	3.2	
3	0	2.0	2.4	
4	0	1.3	1.5	
5	0	0.7	1.0	

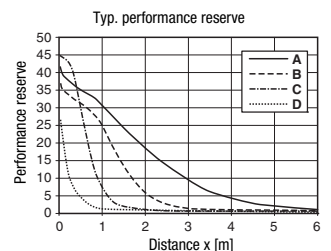
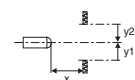
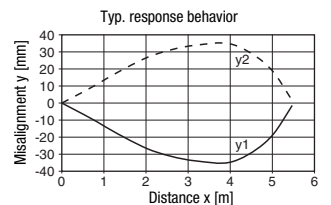
Pharmaceutical reflectors		Operating range
1	TK(S) 40x60.P	0 ... 1.6m
2	TK BR53	0 ... 1.3m
3	TK(S) 20x40.P	0 ... 1.0m
4	TK(S) 20.P	0 ... 0.7m
5	MTK(S) 14x23.P	0 ... 0.4m
6	TK 10.P	0 ... 0.3m

1	0		1.6	1.8
2	0		1.3	1.6
3	0		1.0	1.2
4	0		0.7	0.8
5	0	0.4	0.5	
6	0	0.3	0.4	

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

TK ... = adhesive
 TKS ... = screw type

Diagrams



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

Remarks

Observe 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.

PRK 53 **Retro-reflective photoelectric sensors with polarization filter**

Order guide

Selection table		Order code →			
Equipment ↓		PRK 53/6.22-S8 Part No. 50107603	PRK 53/6.22, 200-S8 Part No. 50105789	PRK 53/6.22-S8.3 Part No. 50107604	PRK 53/6.22-5000 Part no. 50121898
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		●		
	cable 5000mm, 4-wire				●
Configuration	teach-in via button (lockable) and teach input ¹⁾	●	●	●	●
Indicators	green LED: ready + teach sequence	●	●	●	●
	yellow LED: switching output	●	●	●	●

1) Teach input not present with 3-pin connector

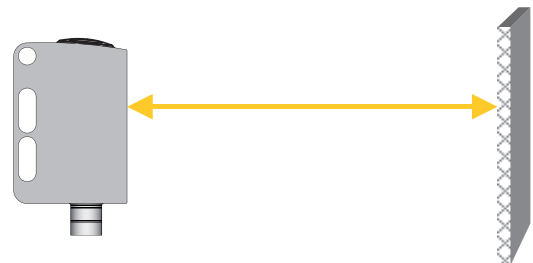
Remarks

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.

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.

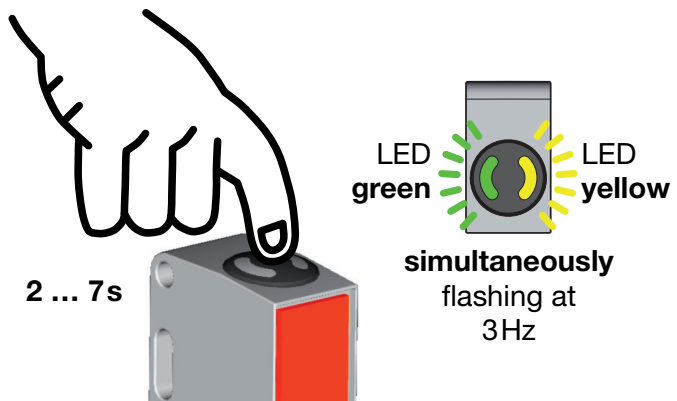


Standard teaching for average sensor sensitivity

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



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

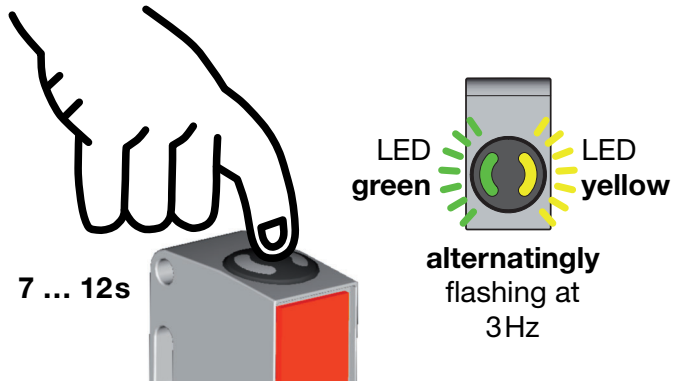


Teaching for increased sensor sensitivity

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

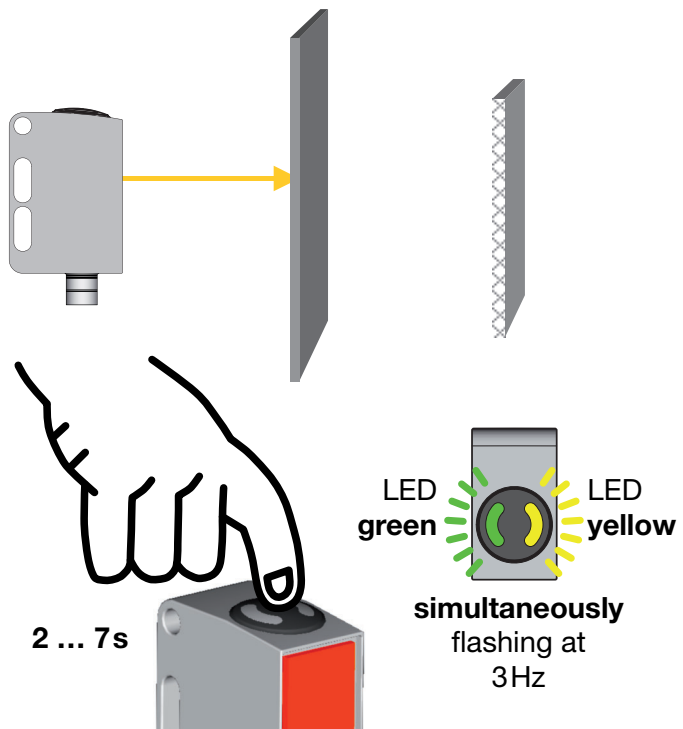


After the teaching for increased sensor sensitivity, the sensor switches when about 18% of the light beam are covered by the object.



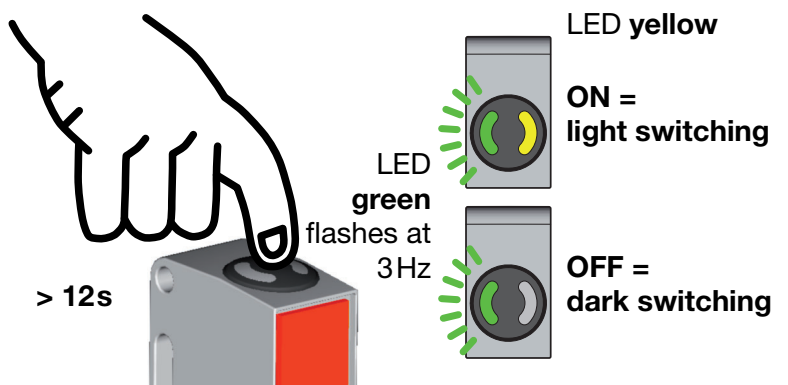
Teaching for maximum operating range (factory setting at delivery)

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



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.



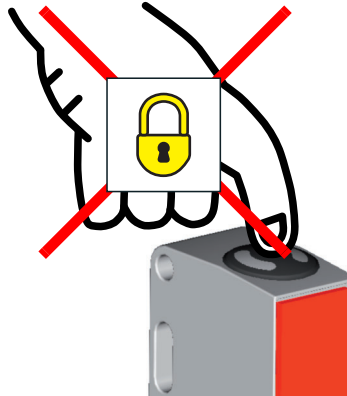
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Locking the teach button via the teach input



A **static HIGH signal** ($\geq 4\text{ms}$) 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 enabled and can be operated freely.



Sensor adjustment (teach) via teach input



The following description applies to PNP switching logic!

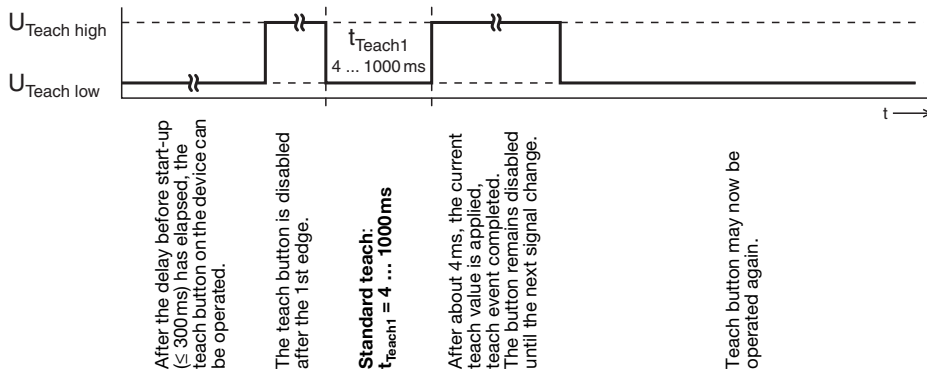
$U_{\text{Teach low}} \leq 2\text{V}$

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

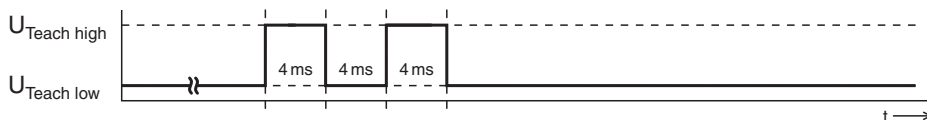
Prior to teaching: Clear the light path to the reflector!

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

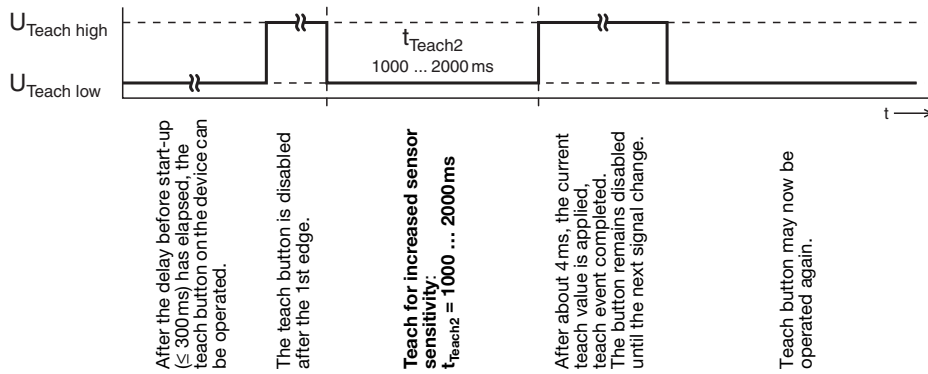


shortest teaching duration for standard teaching: approx. 12ms



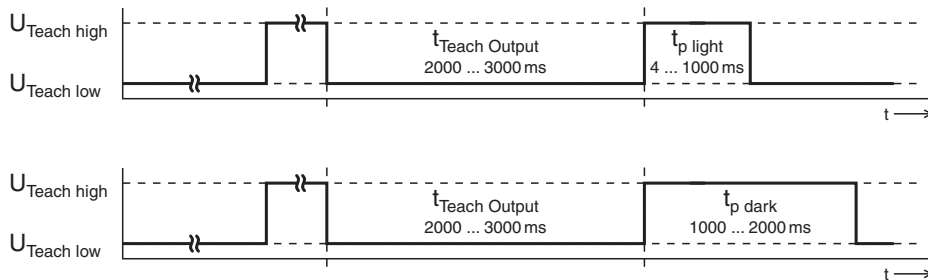
After the standard teaching, the sensor switches when half of the light beam is covered by the object.

Teaching for increased sensor sensitivity



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 behavior 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 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.