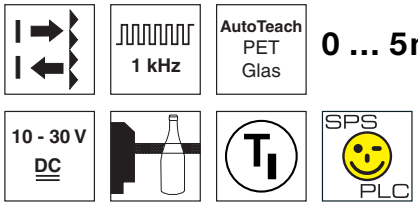
PRK 3B AutoTeach Retro-reflective photoelectric sensors with polarization filter

en 08-2014/05 50107259-01



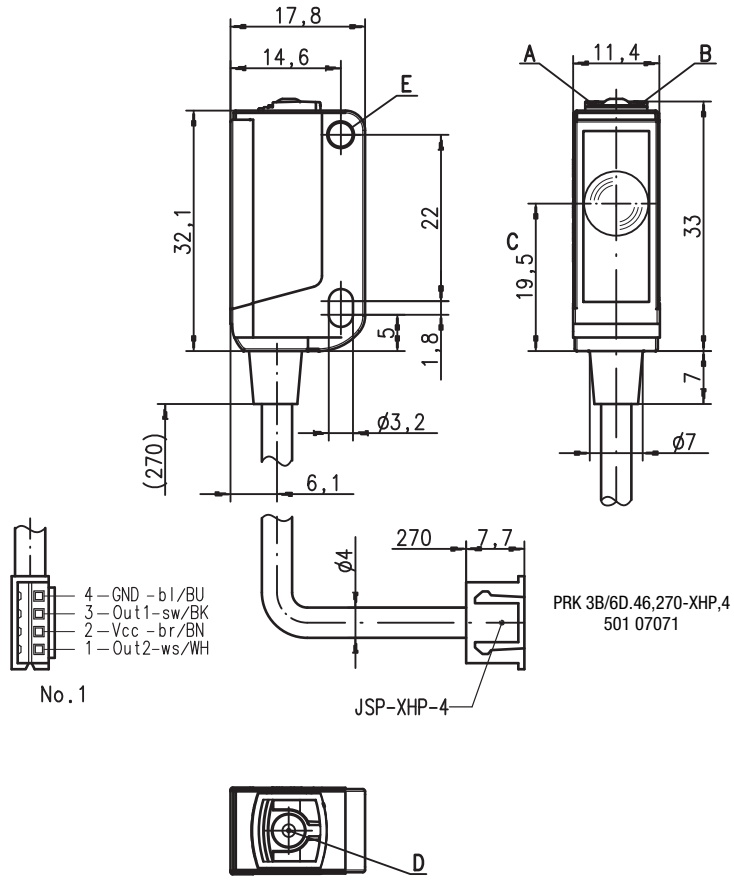
- Polarized retro-reflective photoelectric sensor with visible red light
- Especially for transparent PET and glass bottles
- AutoTeach (cyclic automatic teach event) for contamination compensation
- A²LS- Active Ambient Light Suppression
- Push-pull switching output
- High switching frequency for detection of fast events
- Autocollimation principle

Accessories:

(available separately)

- Mounting systems (BT 3…)
- Reflectors
- Reflective tapes

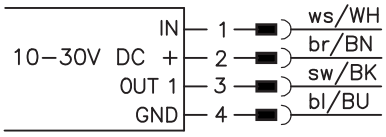
Dimensioned drawing



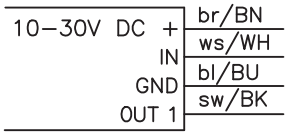
A Green indicator diode
B Yellow indicator diode
C Optical axis
D Teach button
E Mounting sleeve

Electrical connection

XHP plug connection, 4-pin



Cable, 4-wire



We reserve the right to make changes • DS_PRK3BAutoTeach_en_50107259_01.fm

Specifications

Optical data

Typ. operating 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

Object frequency	max. 100Hz with gap duration ≥ 10ms
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/warning output [5]…/6D.46	1 push-pull output pin 3: PNP dark switching, NPN light switching pin 1: teach input
Switching function	dark switching
Warning function	change signal of 2Hz at the switching output (see remarks)
Signal voltage high/low	≥ (U_B-2V)/≤ 2V
Output current	max. 100mA
Operating range [6]	automatic setting cyclically performed by AutoTeach every 60s or manual teach-in

Indicators

Green LED	ready
Yellow LED	light path free
Yellow and green LEDs flash	error: reflector not present during teach-in or prefailure message for AutoTeach

Mechanical data

Housing	plastic (PC-ABS); 1 attachment sleeve, nickel-plated steel
Optics cover	plastic (PMMA)
Weight	20g
Connection type	270mm cable with XHP plug connection, 4-pin 2m cable (cross section 4x0.20mm²)

Environmental data

Ambient temp. (operation/storage)	-30°C … +55°C/-30°C … +70°C
Protective circuit [7]	2, 3
VDE safety class	III
Protection class	IP 67
Light source	Free group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 [4] [8]

Options

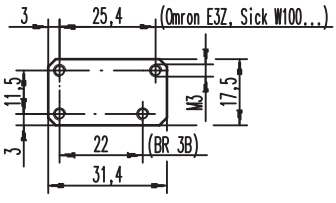
Teach-in input/activation input

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) The push-pull switching outputs must not be connected in parallel
6) Life expectancy typically 100,000 storage cycles
7) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
8) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

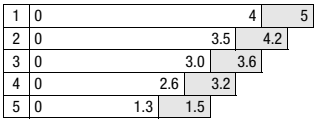
Remarks

Adapter plate: BT 3.2 (part no. 50103844) for alternate mounting on 25.4mm hole spacing (Omron E3Z, Sick W100…)



Tables

Reflectors			Operating range
1	TK(S)	100x100	0 … 4.0m
2	MTKS	50x50.1	0 … 3.5m
3	Tape 6	50x50	0 … 3.0m
4	TK	40x60	0 … 2.6m
5	TK	20x40	0 … 1.3m



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

TK … = adhesive
TKS … = screw type

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.

- If the receive signal from the reflector is too weak, the sensor indicates the error status by means of fast and simultaneous flashing of the green and yellow LEDs as well as by a change signal of 2Hz at the switching output. Please check the alignment, operating range, and soiling and carry out another teaching.
- Mounting system:

① = BT 3
(part no. 50060511)

②+③ = BT 3.1 [1]
(part no. 50105585)

①+②+③ = BT 3B
(part no. 50105546)

1) Packaging unit: PU = 10 pcs.

PRK 3B AutoTeach Retro-reflective photoelectric sensors with polarization filter

Order guide

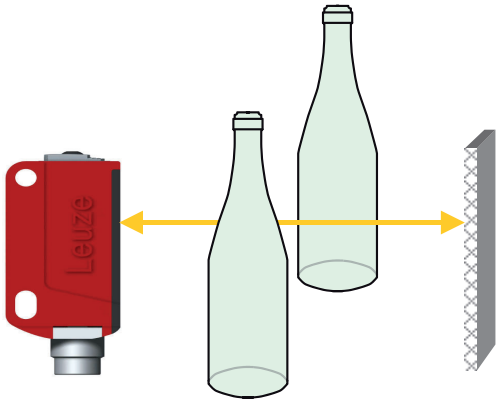
Selection table Equipment ↓			Order code →	PRK 3B/6D.46, 270-XHP.4 Part no. 50107071	PRK 3B/6D.46 Part no. 50108026		
Output 1 (OUT 1)	Push-pull switching output	⇕	PNP, dark switching ●	●	●		
			NPN, light-switching ○	●	●		
Function characteristics	Switching output			●	●		
	warning output (change signal of 2 Hz at the switching output)			●	●		
Input (IN)	teach input			●	●		
Connection	270 mm cable with XHP plug connection, 4-pin			●			
	2,000 mm cable, 4-pin				●		
Configuration	AutoTeach, cyclic every 60 s			●	●		
	Teach-in via button (lockable) and teach input			●	●		

General information

- After power-on, an **automatic teach-in** occurs **every 60 s** (**AutoTeach**).
- The light spot may not exceed the reflector.
- Preferably use MTK(S) or tape 6.
- For foil 6, the sensor's side edge must be aligned parallel to the side edge of the reflective tape.
- Following an AutoTeach, the device setting is only saved if contamination differences > 8 % were detected. Therefore, the typical life expectancy of the device is not affected in practical use.

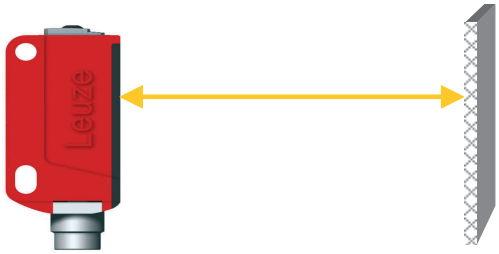
AutoTeach (cyclic automatic teach event)

- **The sensor performs a cyclic AutoTeach every 60 s.**
  The sensor waits until the light path is free (e.g. between two bottles). An appropriate safety window is taken into account.
  Afterwards, an AutoTeach occurs and the sensor compensates for all contamination parameters. The new teach value is only saved if a system contamination > 8 % was detected.
- If the receive signal from the reflector is too weak, the sensor indicates the error status by means of fast and simultaneous flashing of the green and yellow LEDs as well as by a change signal of 2 Hz at the switching output. Please check the alignment, operating range, and soiling and carry out another teaching.



Teach via teach button for PET and glass bottles

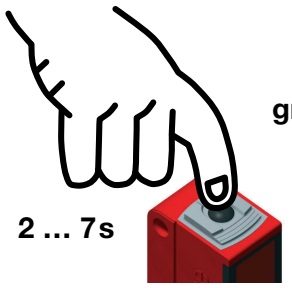
- **Prior to teaching:**
  Clear the light path to the reflector!
  The device setting is stored in a fail-safe way. A reconfiguration following voltage interruption or switch-off is thus not required.



Teach process (teach button) for PET and glass bottles

- **Press teach button until both LEDs flash simultaneously.**
- **Release teach button.**
- **Finished - AutoTeach remains active.**

If the receive signal from the reflector is too weak, the sensor indicates the error status by means of fast and simultaneous flashing of the green and yellow LEDs as well as by a change signal of 2 Hz at the switching output. Please check the alignment, operating range, and soiling and carry out another teaching.

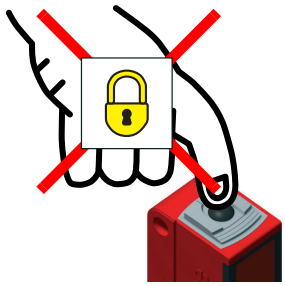


simultaneously flashing at 3 Hz

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.



Teach via teach input for PET and glass bottles

The following description applies to PNP switching logic!

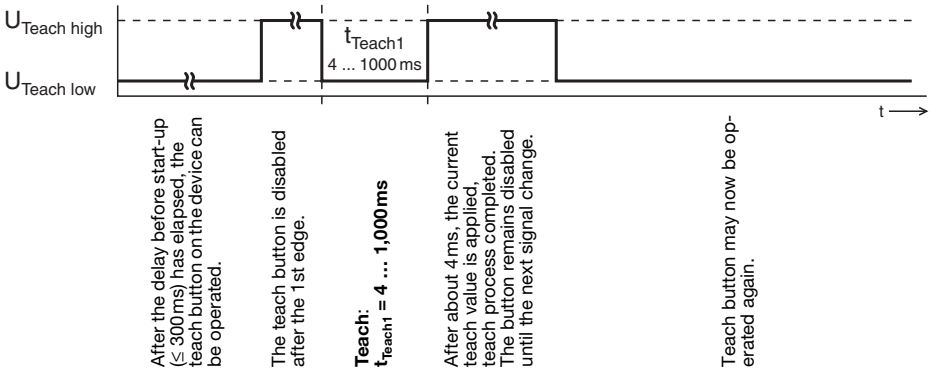
$U_{Teach\ low} \leq 2V$

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

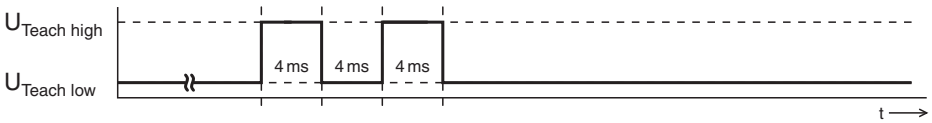
Prior to teaching: Clear the light path to the reflector!

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

Teach process (teach input) for PET and glass bottles



Quick teach



Shortest teaching duration for standard teaching: approx. 12 ms

If the receive signal from the reflector is too weak, the sensor indicates the error status by means of fast and simultaneous flashing of the green and yellow LEDs as well as by a change signal of 2 Hz at the switching output. Please check the alignment, operating range, and soiling and carry out another teaching.