

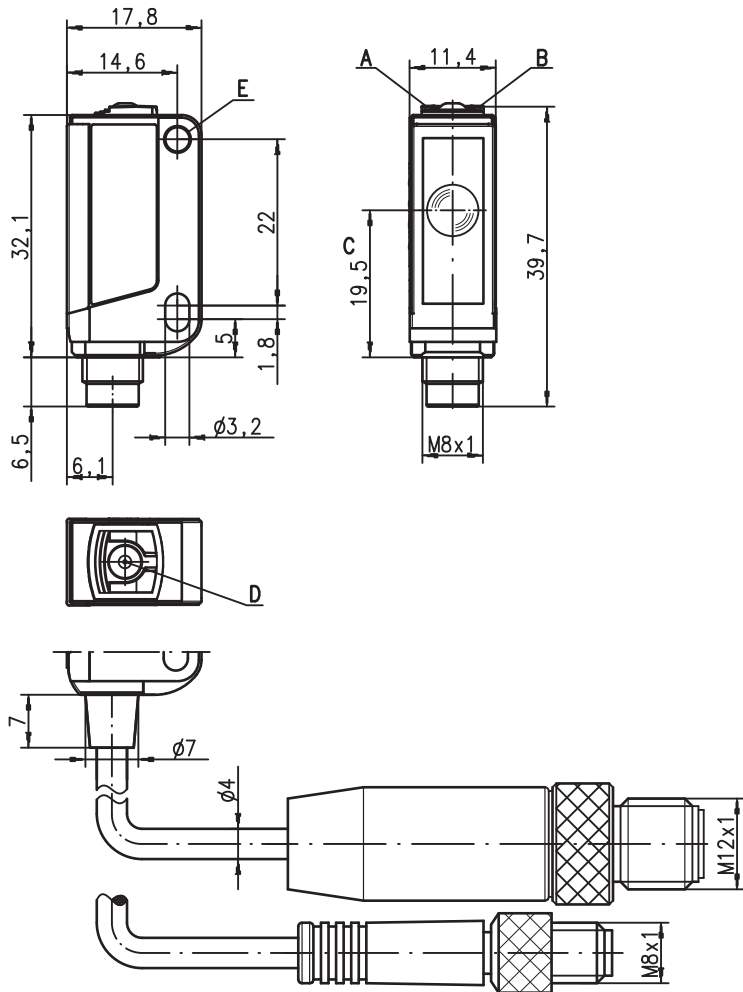
**PRK 3B**

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

en 11-2014/05 50105364-01



**Dimensioned drawing**

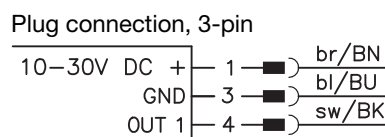
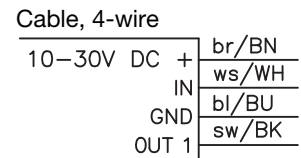
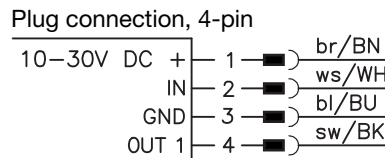


- A Green indicator diode
- B Yellow indicator diode
- C Optical axis
- D Teach button
- E Attachment sleeve

			<b>0 ... 5m</b>
<b>10 - 30 V</b> DC			

- Polarized retro-reflective photoelectric sensor, autocollimation optics with visible red light
- For precise positioning of objects and reflector markers
- Small and compact construction with robust plastic housing, protection class IP 67 for industrial application
- A<sup>2</sup>LS- Active Ambient Light Suppression
- Push-pull output with light/dark switching via teach-in button
- High switching frequency for detection of fast events
- Easy adjustment via lockable teach button or teach input

**Electrical connection**




**Accessories:**

(available separately)

- Mounting systems (BT 3...)
- Cable with M8 or M12 connector (K-D ...)
- Reflectors
- Reflective tapes

We reserve the right to make changes • DS\_PRK3BstandardEL\_en\_50105364\_01.fm

### Specifications

#### Optical data

Typ. op. range limit (TK(S) 100x100) <sup>1)</sup> 0 ... 5m  
 Operating range <sup>2)</sup> see tables  
 Light source <sup>3)</sup> LED (modulated light)  
 Wavelength 620nm (visible red light, polarized)

#### Timing

Switching frequency 1,000Hz  
 Response time 0.5ms  
 Delay before start-up ≤ 300ms

#### Electrical data

Operating voltage  $U_B$  <sup>4)</sup> 10 ... 30VDC (incl. residual ripple)  
 Residual ripple ≤ 15% of  $U_B$   
 Open-circuit current ≤ 18mA  
 Switching output <sup>5)</sup> .../6.22 1 push-pull switching output  
 pin 4: PNP light switching, NPN dark switching  
 pin 2: teach input  
 .../6D.22 1 push-pull switching output  
 pin 4: PNP dark switching, NPN light switching  
 pin 2: teach input  
 .../6.22...-S8.3 1 push-pull switching output  
 pin 4: PNP light switching, NPN dark switching  
 pin 2: teach input  
 .../4D.22 1 PNP switching output, dark switching,  
 pin 2: teach input  
 light/dark reversible  
 ≥  $(U_B - 2V) / \leq 2V$   
 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 <sup>6)</sup>

#### Mechanical data

Housing plastic (PC-ABS); 1 attachment sleeve, nickel-plated steel  
 Optics cover plastic (PMMA)  
 Weight with connector: 10g  
 with 200mm cable and connector: 20g  
 with 2m cable: 50g  
 Connection type 2m cable (cross section 4x0.20mm<sup>2</sup>),  
 connector M8 metal,  
 0.2m cable with connector M8 or M12

#### Environmental data

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

#### Options

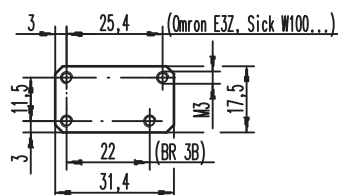
##### Teach-in input/activation input

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) Display "no performance reserve" as yellow flashing LED is only available in standard teach setting
- 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

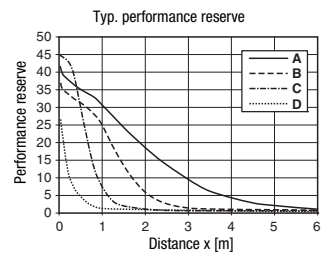
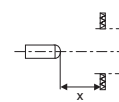
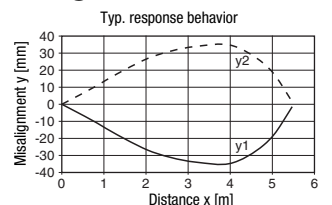
Reflectors			Operating range
1	TK(S)	100x100	0 ... 4.0m
2	TK	40x60	0 ... 2.6m
3	TK	20x40	0 ... 1.3m
4	Tape 4	50x50	0 ... 0.7m

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

□ 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

Mounting system:



- ① = BT 3 (part no. 50060511)
- ②+③ = BT 3.1 <sup>1)</sup> (part no. 50105585)
- ①+②+③ = BT 3B (part no. 50105546)

1) Packaging unit: PU = 10 pcs.

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

**Order guide**

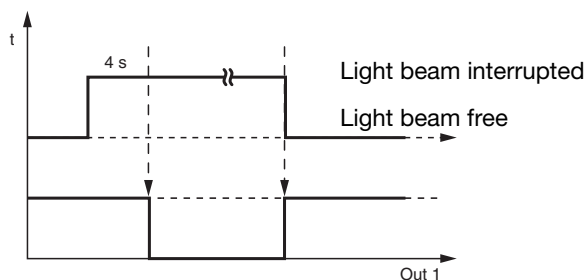
Selection table				Order code →	PRK 3B/6.22 Part No. 50104699	PRK 3B/6.22-S8 Part No. 50104700	PRK 3B/6.22, 200-S8 Part No. 50104701	PRK 3B/6.22, 200-S12 Part No. 50105762	PRK 3B/6D.22-S8 Part No. 50106418	PRK 3B/6.2-S8.3 Part No. 50109385	PRK 3B/6.2, 200-S8.3 Part No. 50114099	PRK 3B/6D.22.03, 200-S12 Part No. 50109488	PRK 3B/4D.22, 200-S8 Part No. 50110775	PRK 3B/4D.22Z, 200-S8 Part No. 50108373
Equipment ↓	Output 1 (OUT 1)	push-pull switching output, configurable	light switching	○	● <sup>1)</sup>	● <sup>1)</sup>	● <sup>1)</sup>	● <sup>1)</sup>	●	● <sup>1)</sup>	● <sup>1)</sup>	●		
			dark switching	●	●	●	●	● <sup>1)</sup>	●	●	● <sup>1)</sup>			
	PNP transistor output	start-up delay (special function)	light switching	○										
			dark switching	●									● <sup>1)</sup>	● <sup>1)</sup>
Input (IN)	teach input			●	●	●	●	●				●	●	●
	activation input													
Connection	cable 2,000mm	4-wire		●										
	M8 connector, metal	3-pin							●					
	M8 connector, metal	4-pin			●				●					
	200mm cable with M8 connector	3-pin								●				
	200mm cable with M8 connector	4-pin				●							●	●
	200mm cable with M12 connector	4-pin					●					● <sup>3)</sup>		
Configuration	teach-in via button (lockable) and teach input			●	●	●	●	●				●	●	●
	teach-in via button									●	●			

- 1) Presetting, light/dark switching, adjustable
- 2) Start-up delay (special function)  
The sensor output does not switch until an object has interrupted the light beam for at least 4 seconds. The output switches off without a time delay.
- 3) Connector without Ultra-Lock™ fast locking

**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.

● **Special function: start-up delay, only for PRK 3B/4D.22Z, 200-S8**



**Sensor adjustment (teach) via teach button**

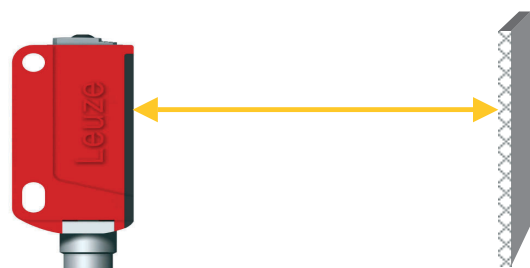


- **The sensor is factory-adjusted for maximum operating range.**

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.

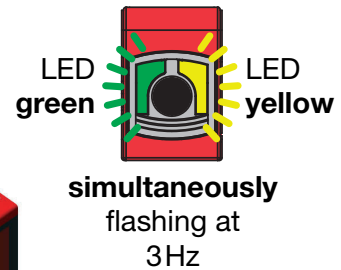
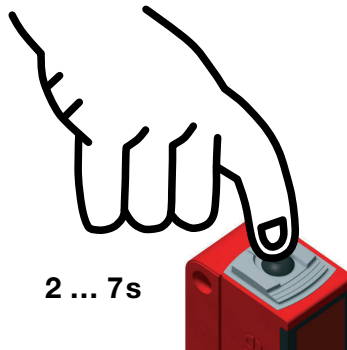


**Standard teaching for average sensor sensitivity**

- 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.

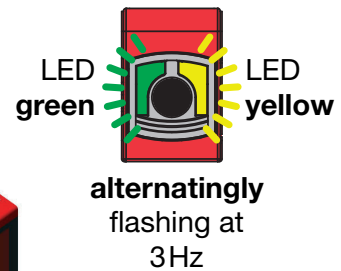
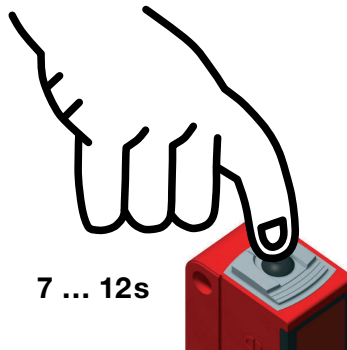


**Teaching for increased sensor sensitivity**

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

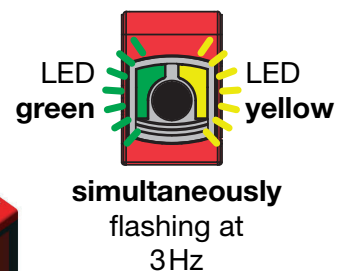
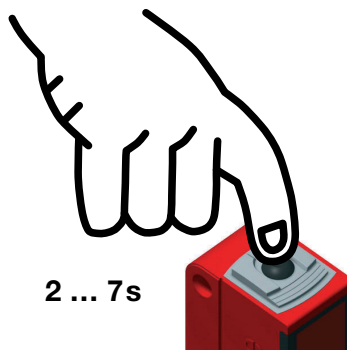
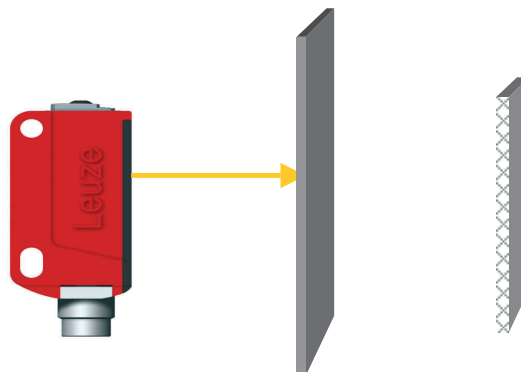


After the teaching for increased sensor sensitivity, the sensor switches when about 18% of the light beam are covered by the object.



**Teaching for maximum operating range (factory setting at delivery)**

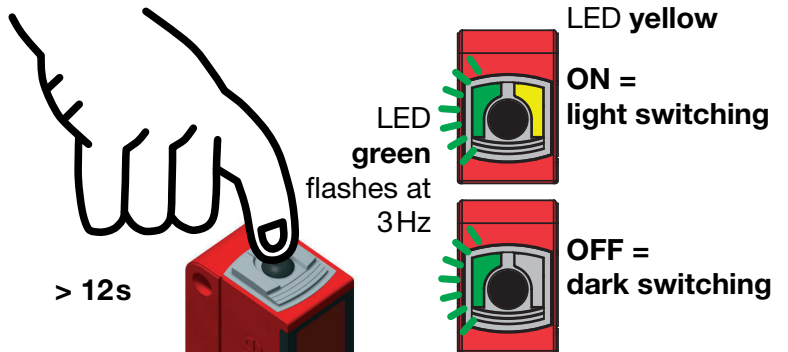
- **Prior to teaching:**  
Cover the light path to the reflector!
- Procedure as for standard teaching.



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

***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.

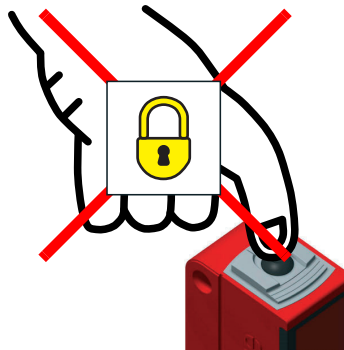


**Locking the teach button via the teach input**



A **static high signal** ( $\geq 4$  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!

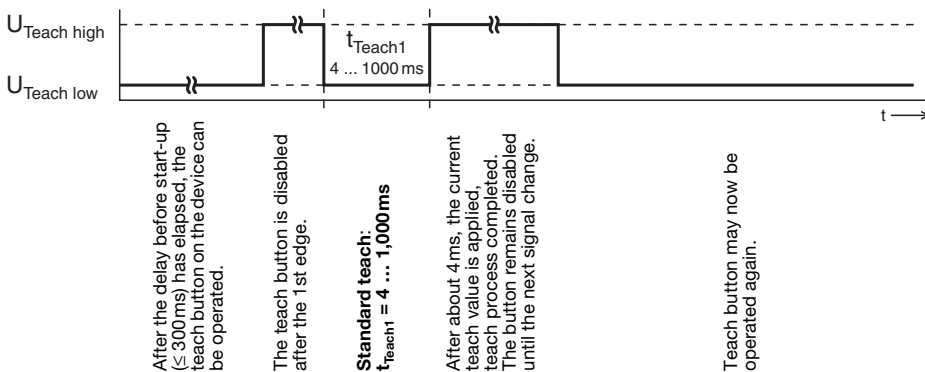
$U_{Teach\ low} \leq 2V$

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

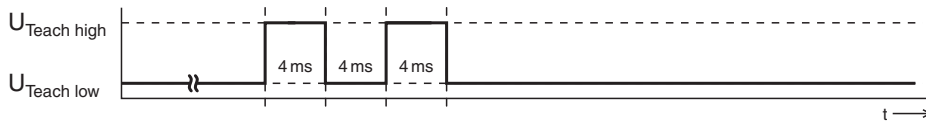
**Prior to teaching: Clear the light path to the reflector!**

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**

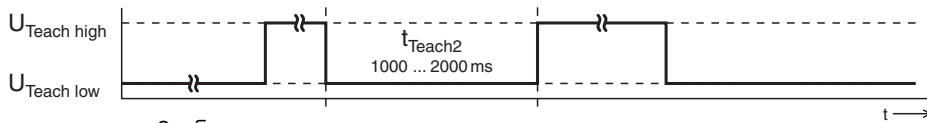


shortest teaching duration for standard teaching: approx. 12ms



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

The teach button is disabled after the 1st edge.

Teach for increased sensor sensitivity:  
 $t_{Teach2} = 1,000 \dots 2,000$  ms

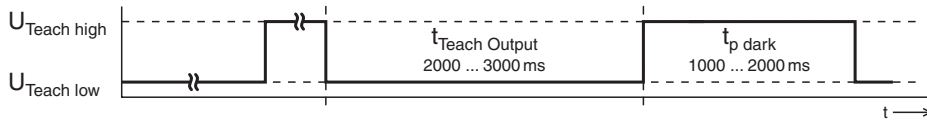
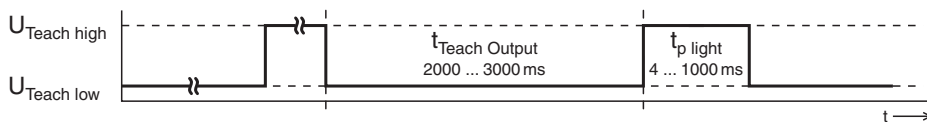
After about 4ms, the current teach value is applied, teach process completed. The button remains disabled until the next signal change.

Teach button may now be operated again.



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 ( $\leq 300$ 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:  
 $t_{Teach Output} = 2,000 \dots 3,000$  ms

Switching output switches on light:  
 $t_{p light} = 4 \dots 1,000$  ms

Switching output switches on dark:  
 $t_{p dark} = 1,000 \dots 2,000$  ms

The button remains disabled until the next signal change.