PRK18B

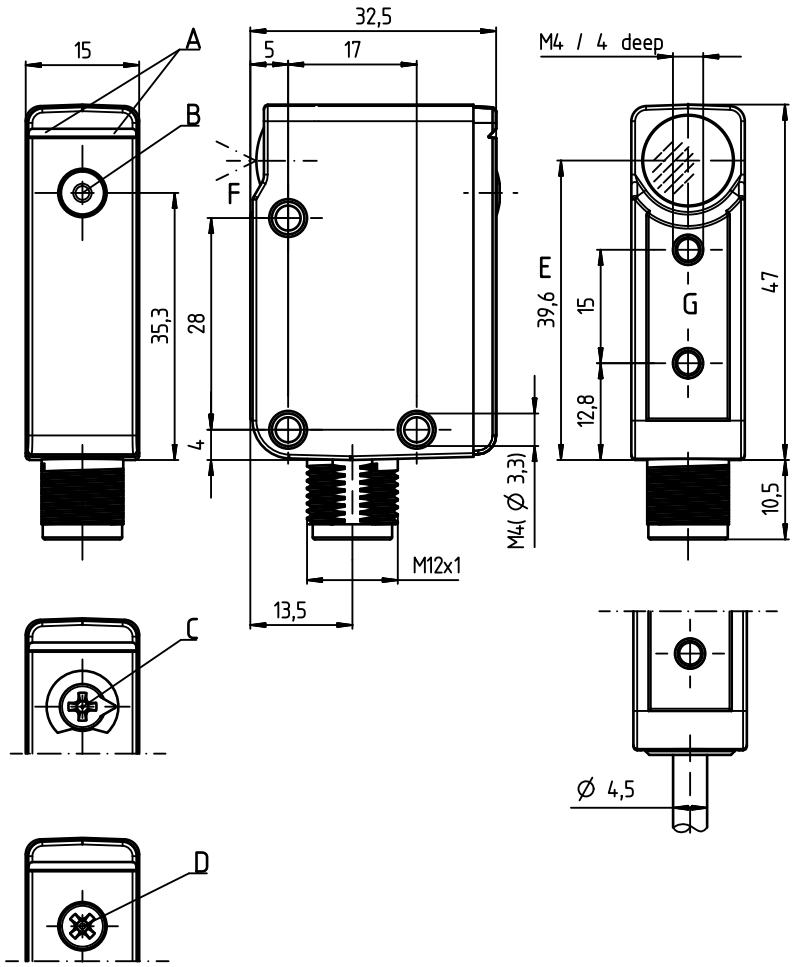
Trigger high-speed, retro-reflective sensors for bottles

en 2020/01/28 50121192-03

0 … 3.6m

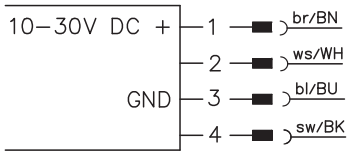
- Trigger high-speed, retro-reflective photoelectric sensors with autocollimation optics for reliable detection of highly transparent bottles
- Sensitivity adjustment via teach button or teach input
- Temperature compensation ±20°C
- High optical accuracy through calibrated optical system
- Very short response time and optimized signal jitter

Dimensioned drawing



A Display
B Teach button
C 270° potentiometer
D 11-turn potentiometer
E Optical axis
F Optical accuracy
G Reference plane for **F**

Electrical connection



	Pin 1	Pin 2	Pin 3	Pin 4
PRK18B.FXT3/4P-M12	+	PNP dark	GND	PNP light
PRK18B.FXT3/2N-M12	+	NPN dark	GND	NPN light
PRK18B.FXT3/4P-6000	+	PNP dark	GND	PNP light
PRK18B.FXT3/2N-6000	+	NPN dark	GND	NPN light
PRK18B.FXT3/2T-6000	+	Teach/ multifunction	GND	NPN light

Accessories:

(available separately)

- Mounting system (BTU 200, BT 95)
- M12 connection technology (K-D M12)
- Reflectors (TK, MTK)
- Reflective tape (REF)
- Deflecting mirror (US18B)

Technical data

Optical data

Typ. op. range limit (TK(S) 100x100) [1]		0 … 3.6m
Operating ranges [2]		See tables
Light source [3]		LED (modulated light)
Wavelength		620nm (visible red light)
Optical accuracy		Type dependent (see order guide)

Time behavior

Switching frequency		5000Hz
Response time		100µs
Jitter time		32µs
Readiness delay		< 300ms

Electrical data

Operating voltage UB [4]		10 … 30VDC (incl. residual ripple)
Residual ripple		≤ 15 % of U_B
Open-circuit current		≤ 18mA
Switching outputs/functions	/4P	2 PNP switching outputs, antivalent
	/4X	1 PNP switching output, light switching
	/PX	1 PNP switching output, dark switching
	/2N	2 NPN switching outputs, antivalent
	/2X	1 NPN switching output, light switching
	/NX	1 NPN switching output, dark switching
	/2T	1 NPN switching output, light switching, 1 multifunction input (teach)
Signal voltage high/low		≥ (UB-2V)/≤ 2V
Output current		Max. 100mA
Sensitivity		Adjustment via teach button (see order guide)

Indicators

Green LED	Ready
Yellow LED	Light path free
Yellow/green LED, flashing synchronously (9Hz)	Error

Mechanical data

Housing [5]	Diecast zinc, chemically nickel-plated
Connector	Diecast zinc, chemically nickel-plated
Optics	Glass
Operation	Teach button
Weight	With M12 connector: 60g With 6000mm cable: 240g
Connection type	M12 connector, 4-pin Cable 6000mm, 4 x 0.20mm²

Environmental data

Ambient temp. (operation/storage)	-40°C … +60°C/-40°C … +70°C
Protective circuit [6]	2, 3
VDE protection class [7]	III
Degree of protection	IP67, IP 69K
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]
Chemical resistance	Tested in accordance with ECOLAB

Additional functions

Input pin 2

Function	Keyboard lockout / line teach / light/dark switching
Input active/not active	≥ 8 V / ≤ 2 V or not connected

1) Typ. operating range limit: max. attainable range without function reserve
2) Operating range: recommended range with function reserve
3) Average life expectancy 100,000h at an ambient temperature of 25°C
4) For UL applications: use is permitted exclusively in Class 2 circuits according to NEC
5) Color changes due to cleaning agents do not adversely affect the coating
6) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
7) Rating voltage 50V
8) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.24A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Tables

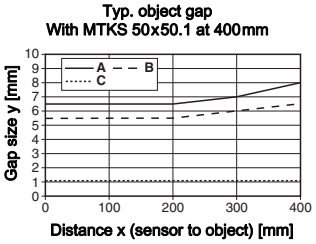
	Reflectors		Operating range
1	TK(S)	100x100	0 … 3.0m
2	MTKS	50x50.1	0 … 2.8m
3	TK(S)	40x60	0 … 2.5m
4	TK(S)	30x50	0 … 1.1m
5	TK(S)	20x40	0 … 1.1m
6	Film 6	50x50	0 … 0.8m

1	0		3.0	3.6
2	0		2.8	3.3
3	0		2.5	3.0
4	0	1.1		1.3
5	0	1.1		1.3
6	0	0.8		1.0

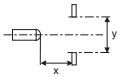
Operating range [m]
Typ. operating range limit [m]

TK … = adhesive
TKS … = screw type
Film 6 = adhesive

Diagrams



A 11% sensor sensitivity
B 18% sensor sensitivity
C 100% sensor sensitivity



Notes

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 its intended use.

- **Reflectors**;
  The light spot may not exceed the reflector. Preferably use MTK(S) reflectors or reflective tape 6.

PRK18B — Trigger high-speed, retro-reflective sensors for bottles

Part number code

P	R	K	1	8	B	.	F	X	T	T	3	/	4	P	-	M	1	2

Operating principle

PRK	Retro-reflective photoelectric sensor for bottles
RK	Retro-reflective photoelectric sensor for films (Function against any reflective tapes and glass triple reflectors)

Series

18B	18B series

Time behavior

F	High Speed
Free	Standard

Optical accuracy

X	Optical axis aligned, error angle < ±0.25°
Free	Standard

Detection properties

T	Setting of 11% is possible
Free	Setting of 11% is not possible

Tracking function available

T [1)]	Tracking function/contamination compensation
Free	No tracking function

Setting

1	270° potentiometer
2	11-turn potentiometer
3	Teach button
Free	No setting

Pin assignment of connector pin 4 / black cable wire

2	NPN, light switching
N	NPN, dark switching
4	PNP, light switching
P	PNP, dark switching
L	IO-Link

Pin assignment of connector pin 2 / white cable wire

X	Not assigned
2	NPN, light switching
N	NPN, dark switching
4	PNP, light switching
P	PNP, dark switching
T	Teach input

Connection technology

M12	M12 connector, 4-pin
6000	Cable, 6 m

1) Only possible in conjunction with the detection property "**T**".

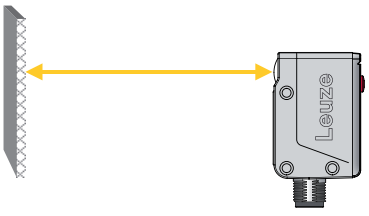
Order guide

The sensors listed here are preferred types; current information at **www.leuze.com**.

Selection table Equipment ↓	Order code →	PRK18B.FXT3/4P-M12 Part no. 50117371	PRK18B.FXT3/2N-M12 Part no. 50117369	PRK18B.FXT3/4P-6000 Part no. 50121232	PRK18B.FXT3/2N-6000 Part no. 50117368	PRK18B.FXT3/2T-6000 Part no. 50121231
Switching output	1x PNP, light switching					
	1x PNP, dark switching					
	2 x PNP, antivalent	●		●		
	1x NPN, light switching					●
	1x NPN, dark switching					
	2x NPN, antivalent		●		●	
	1 x IO-Link, 1 x PNP, dark switching					
	1 x IO-Link, 1 x NPN, dark switching					
Optical accuracy	Calibrated ≤ ±0.25°	●	●	●	●	●
Switching frequency/response time/jitter	500 Hz/1 ms/320 µs					
	1500 Hz/333 µs/110 µs					
	5000 Hz/100 µs/32 µs	●	●	●	●	●
Detection properties	Highly transparent bottles and glasses	●	●	●	●	●
	Highly transparent film < 20 µm thick					
	Transparent containers	●	●	●	●	●
Tracking function	Exists					
Setting	270° potentiometer					
	11-turn potentiometer					
	Teach button	●	●	●	●	●
	Multifunction input (pin 2) for teach-in, keyboard lockout, light/dark switching					●
Connection technology	M12 connector	●	●			
	Cable, 6000 mm			●	●	●

Sensor setting via teach button

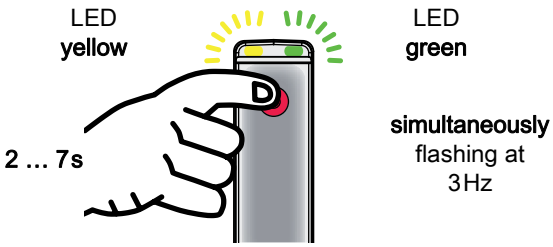
- **The sensor is factory-adjusted for maximum operating range.**
  Recommendation: teach only if the desired objects are not reliably detected.
- **Prior to teaching:**
  Clear the light path to the reflector!
  The device setting is stored in a fail-safe way. A reconfiguration following power failure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



Teach for 11% sensor sensitivity (full single bottles or tape 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.



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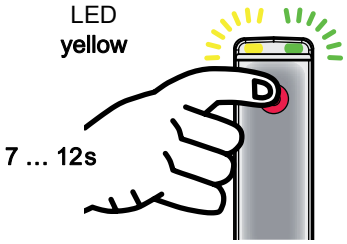
Teaching for 18% sensor sensitivity (empty single bottles and other partially transparent objects)

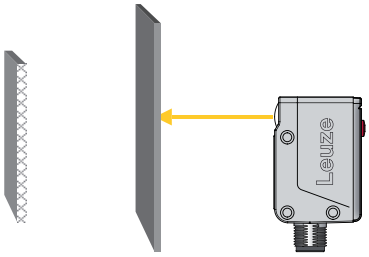
- **Press teach button until both LEDs flash alternately.**
- **Release teach button.**
- **Ready.**

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

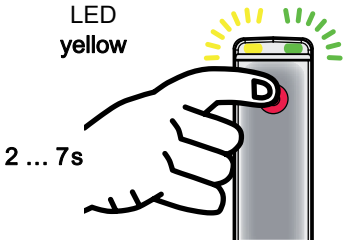


Teaching for maximum operating range (factory setting at delivery)

- **Prior to teaching:**
  Interrupt the light path to the reflector!

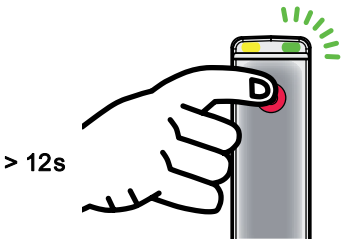


- **Press teach button until both LEDs flash simultaneously.**
- **Release teach button.**
- **Ready.**



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

- **Press teach button until only the green LED flashes**
- **Release teach button. The yellow LED displays the light/ dark switching status for 2s:**
  - Yellow LED ON = switching outputs inverted
  - Yellow LED OFF = switching outputs not inverted (factory settings)
- **After 2s: ready**



Yellow LED

ON = **switching outputs inverted**

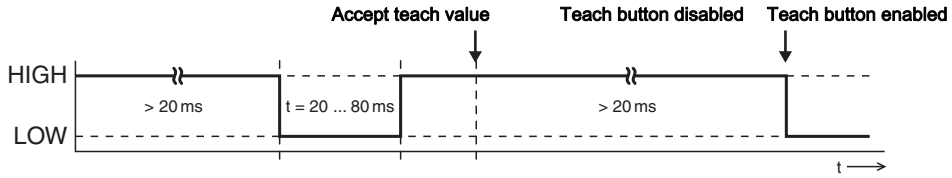
OFF = **switching outputs not inverted**

Sensor adjustments via the multifunction input (pin 2)

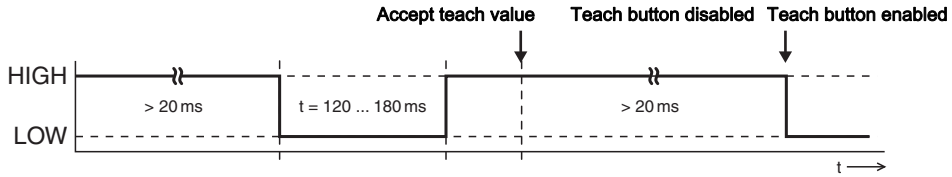
Prior to teaching: Clear the light path to the reflector!
The device setting is stored in a fail-safe way. A reconfiguration following power failure or switch-off is thus not required.

The following description applies to PNP switching logic!
Signal level LOW £ 2V
Signal level HIGH ³ (UB-2V)
With the NPN models, the signal levels are inverted!

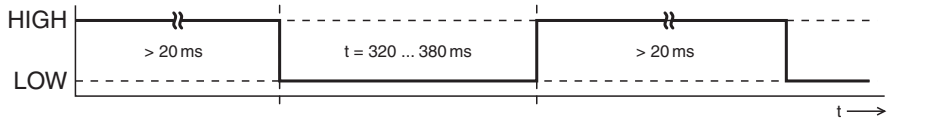
Teach for 11 % sensor sensitivity(full single bottles or tape with thickness > 20 µm)



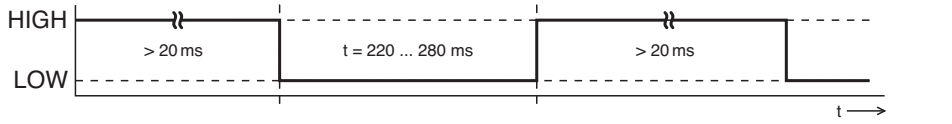
Teaching for 18 % sensor sensitivity (empty single bottles and other partially transparent objects)



Switching behavior: light switching



Switching behavior: dark switching



Locking the teach button via multifunction input (pin 2)

A **static high signal** (≥ 20 ms) at the teach input locks the teach button on the sensor 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.