PRK18B — Tracking retro-reflective sensor for bottles and tape

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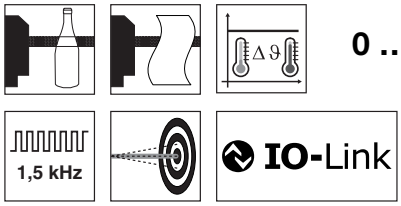
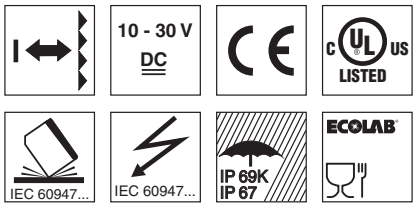


- Retro-reflective photoelectric sensors with autocollimation optics for reliable detection of highly transparent bottles and tape
- Sensitivity adjustment via teach button
- Sensitivity adjustment from control via IO-Link interface
- Comprehensive diagnostic options via IO-Link interface
- Button locking
- Temperature compensation ±20°C
- Automatic contamination compensation (tracking function) for longer intervals between cleanings

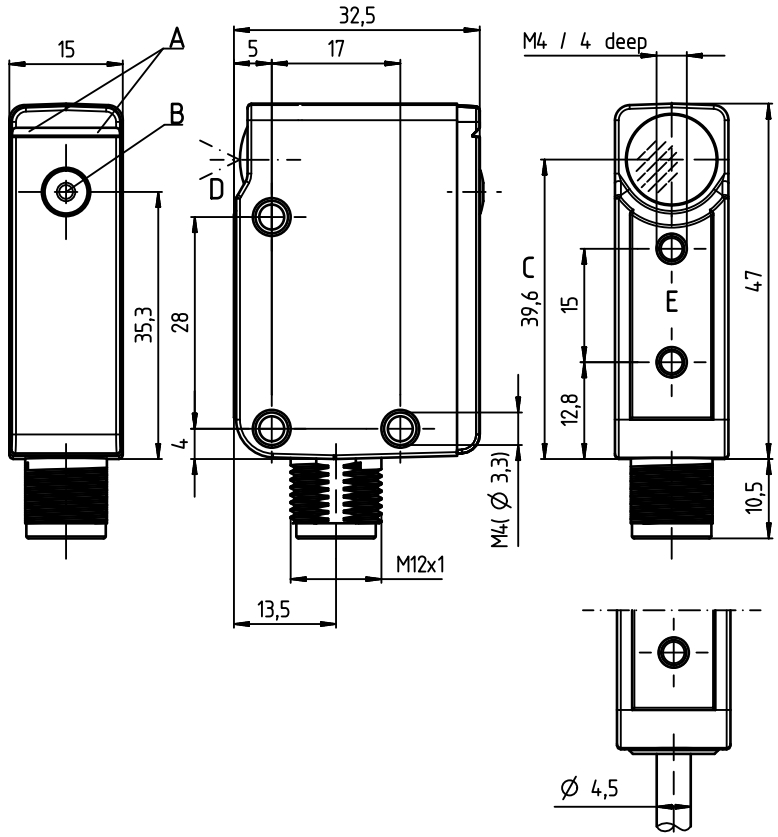


Accessories:

(available separately)

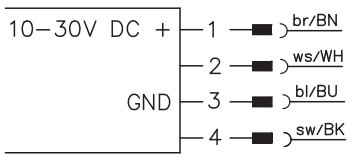
- Mounting system (BTU 200, BT 95)
- M12 connection technology (K-D M12)
- Reflectors (TK, MTK)
- Reflective tape (REF)
- Deflecting mirrors (US18B)
- IO-Link master set
  SET MD12-US2-IL1.1 + accessories - diagnostics set (part no. 50121098)

Dimensioned drawing



A Display
B Teach button
C Optical axis
D Optical accuracy
E Reference plane for **D**

Electrical connection



	Pin 1	Pin 2	Pin 3	Pin 4
PRK18B.TT3/LP-M12	+	PNP dark [1]	GND	IO-Link / SIO

1) Factory setting; function configurable via IO-Link.

Specifications

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)

Sensor operating modes

IO-Link		COM2 (38.1kBaud, Frame 2.5, Vers. 1.1, min. cycle time 2.3 ms)
SIO		is supported
Configuration		direct configuration / system commands; attention: data storage is not supported!

Timing

Switching frequency		1500Hz
Response time		0.333ms
Jitter time		110µs
Readiness delay		< 300ms

Electrical data

Operating voltage UB [4]		10 … 30VDC (incl. residual ripple)
Residual ripple		≤ 15% of UB
Open-circuit current		≤ 18mA
Switching outputs/functions	/LP	pin 2: 1 PNP switching output, dark switching pin 4: IO-Link data, in SIO push-pull mode [5]
Signal voltage high/low		≥ (UB-2V)/≤ 2V
Output current		max. 100mA
Sensitivity		adjustable via teach button (see IO-Link service data)

Indicators

Green LED	ready
Yellow LED	light path free
Yellow/green LED, flashing synchronously (9Hz)	error

Mechanical data

Housing [6]	diecast zinc, chemically nickel-plated
Connector	diecast zinc, chemically nickel-plated
Optics	glass
Operation	teach button
Weight	approx. 60g
Connection type	M12 connector, 4-pin

Environmental data

Ambient temp. (operation/storage)	-40°C … +60°C/-40°C … +70°C
Protective circuit [7]	2, 3
VDE safety class [8]	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] [9]
Chemical resistance	tested in accordance with ECOLAB

Options

Via teach button:
Teach-in, activate/deactivate tracking function, *Easy Tune* (after activating via IO-Link).
Via IO-Link:
Teach-in, teach button lock, **autocontrol** warning message for signaling low function reserve (counting principle), light/dark changeover, tracking function on/off,
function of switching output Q2 (pin 2), configurable time functions.

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) The push-pull switching outputs must not be connected in parallel
6) Color changes due to cleaning agents do not adversely affect the coating
7) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
8) Rating voltage 50V
9) 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)

Order guide

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

Description	Product name	Part no.
Tracking retro-reflective photoelectric sensor for highly transparent bottles and tape, tracking function, teach button, IO-Link interface, 4-pin M12 connector	PRK18B.TT3/LP-M12	50121230

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	Tape 6	50x50	0 … 1.0m

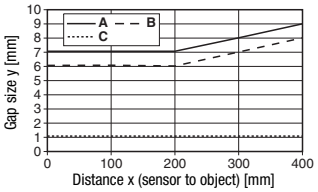
1	0	3.0	3.6
2	0	2.8	3.3
3	0	2.5	3.0
4	0	1.1	1.3
5	0	1.1	1.3
6	0	1.0	1.2

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

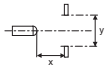
TK … = adhesive
TKS … = screw type
Tape 6 = adhesive

Diagrams

Min. object gap for tracking with MTKS 50x50.1 at 400mm



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



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.

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.

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

PRK18B — Tracking retro-reflective sensor for bottles and tape

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 tape (Function against any reflective tapes and glass triple reflectors)

Series

18B	18B series

Timing

F	High speed
Free	Standard

Optical accuracy

X	Optical axis aligned, shift 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**".

IO-Link process data

Output data device

Data bit								Assignment	Meaning
7	6	5	4	3	2	1	0		
								Switching output Q1	0 = inactive, 1 = active
								Warning output autoControl	0 = no warning, 1 = warning
								Sensor operation[1)]	0 = off, 1 = on
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free

1) Sensor operation off when detection is not possible (e.g during the teach event)

Input data device

Data bit								Assignment	Meaning
7	6	5	4	3	2	1	0		
								Deactivation	0 = transmitter active, 1 = transmitter inactive
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free
								Not assigned	Free

IO-Link device parameters

With Leuze **Sensor Studio** (download at *www.leuze.com*), all sensors that are equipped with an IO-Link interface can be configured and diagnosed with the aid of the IO-Link service data.

Configuration

Enabling/locking teach button

This function can be used to lock the teach button to prevent tampering with the sensor setting.

Easy Tune

Activate and deactivate the Easy Tune function of the teach button.

L/D switching

Configuration of the switching logic of the sensor.

Tracking

Activates or deactivates the tracking function of the sensor.

Logical function of the second switching output Q2 (pin 2)

Set the second switching output to the following functions:
- Switching output
- Inverted switching output
- Warning output

Switching delay

Activates or deactivates the switching delay function.

Function selection of the switching delay

The following functions can be selected:
- Start-up delay
- Switch-off delay
- Pulse stretching
- Pulse suppression

Time base of the switching delay

Defines the base of the switching delay, which, for the calculation of the switching delay, is multiplied by the factor.
Possible time intervals for the time base are

- 1 ms
- 10 ms
- 100 ms
- 1000 ms

Factor for time base of the switching delay

The time base is multiplied by this factor. If, for example, a time base of 10 ms was selected and the factor is 5, the switching delay is 50 ms.

IO-Link system commands

The switching threshold of the sensor can be set via commands; the process is referred to as teaching.
The teach level should be selected appropriately for the object that is to be detected. A teach event is always performed with a free light path to the reflector.

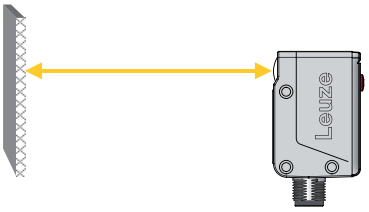
The following commands can be executed:

- **Teach 11% (full single bottles or tape)**:
  Sensor sets the switching threshold to 11% of the free signal; is used for detecting tapes and full bottles made of clear glass or PET.
- **Teach 18% (empty single bottles)**:
  Sensor sets the switching threshold to 18% of the free signal; is used for detecting, e.g., unfilled single bottles.
- **Teach 50% (opaque medium)**:
  Sensor sets the switching threshold to 50% of the free signal; is used for detecting non-transparent objects.
- **Switch on tracking**:
  Activates the tracking function, which increases the transmitting power in the event of soiling.
- **Switch off tracking**:
  Deactivates the tracking function.
- **Light switching**:
  Sets the switching logic to light switching (sensor switches if reflector is detected).
- **Dark switching**:
  Sets the switching logic to dark switching (sensor switches if reflector is no longer detected).
- **Switch process data to analog value**:
  Outputs the signal values as analog data in a graph.
  Attention: The depiction of process data is intended only for service operation for testing the application, not as an analog output.
  The function can only be deactivated by interrupting the voltage supply of the sensor.

The sensors offer no data storage and no ISDU support.

Sensor setting via teach button

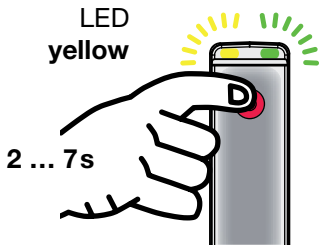
- **The sensor is factory-adjusted for maximum operating range.**
  Recommendation: teach only if the desired objects are not reliably detected.
- **Prior to teaching:**
  Clear the light path to the reflector!
  The device setting is stored in a fail-safe way. A reconfiguration following voltage interruption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



Teaching for 11% sensor sensitivity (full single bottles or tape)

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

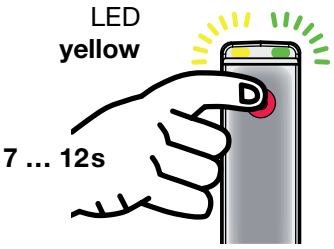
After the teaching, the sensor switches when about 11% of the light beam are covered by the object.



Teaching for 18% sensor sensitivity (empty single bottles)

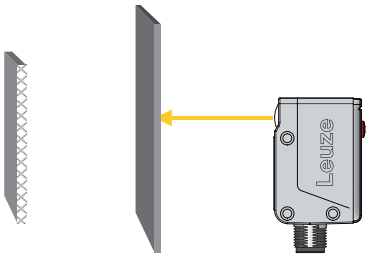
- **Press teach button until both LEDs flash alternatingly.**
- **Release teach button.**
- **Ready.**

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

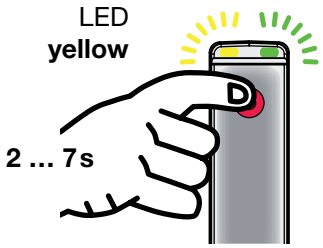


Teaching for maximum operating range (factory setting at delivery)

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

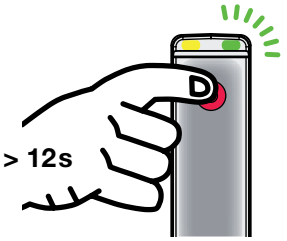


- **Press teach button until both LEDs flash simultaneously.**
- **Release teach button.**
- **Ready.**



Activating/deactivating the tracking function

- **Press teach button until only the green LED flashes**
- **Release the teach button. The yellow LED displays the tracking function status for 2s:**
  - Yellow LED ON = tracking activated (factory settings)
  - Yellow LED OFF = tracking deactivated
- **After 2s: ready**



LED **green**
flashes at 3Hz

LED **yellow**

ON = tracking activated

OFF = tracking deactivated