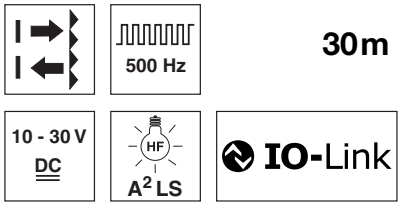
PRK46C IO-Link Retro-reflective photoelectric sensors with polarization filter



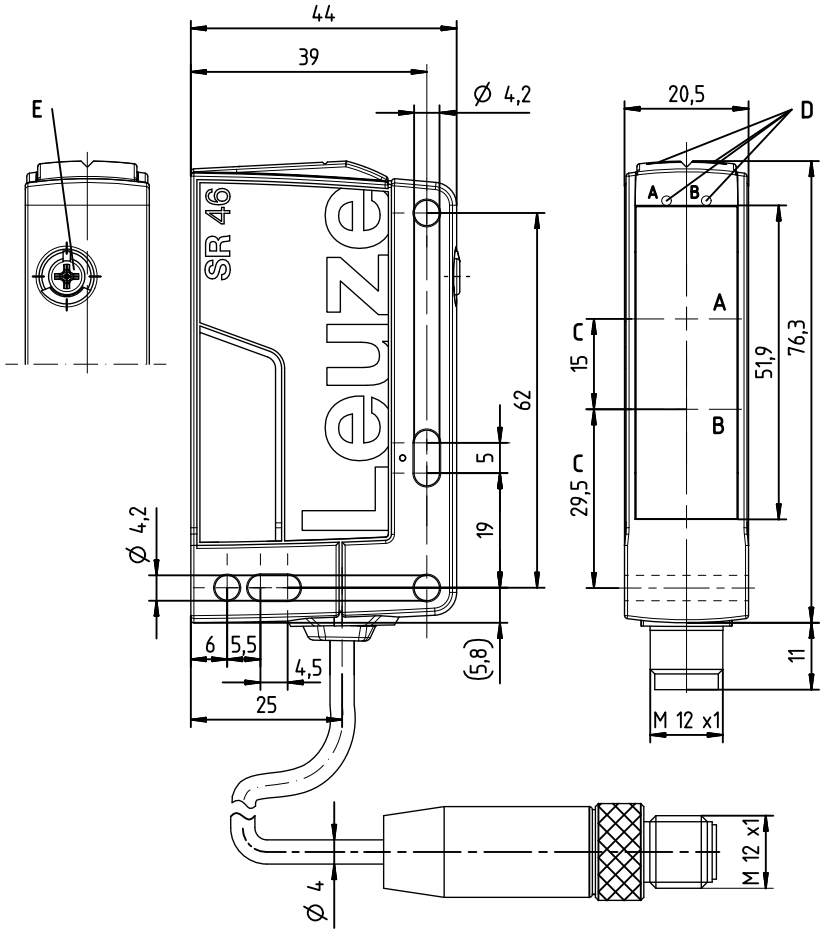
- Polarized retro-reflective photoelectric sensor with large operating range and high function reserve in visible red light
- Time-saving alignment through *brightVision®*
- Highly visible status displays
- Easy configuration / adaptation to the application and diagnostics via IO-Link interface
- Various switching output functions for universal connection to existing control environment
- A²LS active ambient light suppression for avoiding mutual interference
- Robust plastic housing in degrees of protection IP67 and IP69K

Accessories:

(available separately)

- Mounting systems (BT 46, BTU 300M, BT 300, BTU 346, BTU 900M)
- M12 connectors (KD …)
- Ready-made cables (K-D …)
- Reflectors
- Reflective tapes
- IO-Link master set SET MD12-US2-IL1.1 + accessories - diagnostics set (part no. 50121098)

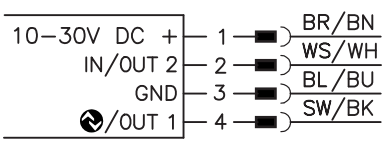
Dimensioned drawing



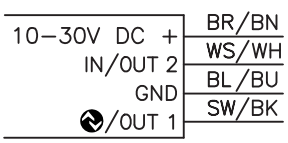
A Receiver
B Transmitter
C Optical axis
D_A Green indicator diode
D_B Yellow indicator diode
E Sensitivity adjustment

Electrical connection

Connector, 4-pin



Cable, 4 wires



en 01-2017/05 50136912

Technical data

Optical data

Typ. op. range limit (TK(S) 100x100) [1]	30m
Operating range [2]	See tables
Operating range adjustment	225° potentiometer (PRK46C.1… only)
Light source [3]	LED (modulated light)
Wavelength	630nm (visible red light, polarized)

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	500Hz
Response time	1ms
Readiness delay	≤ 300ms

Electrical data

Operating voltage U_B [4]	10 … 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 20mA
Switching outputs/functions	See part number code on page 3
Signal voltage high/low	≥ (U_B-2V)/≤ 2V
Output current	Max. 100mA

Indicators

Green LED	Ready
Yellow LED	Light path free
Yellow LED, flashing	Light path free, no function reserve

Mechanical data

Housing	Plastic	
Optics cover	Plastic	
Weight	With M12 connector:	approx. 60g
	With 200mm cable and M12 connector:	approx. 65g
	With 2000mm cable:	approx. 100g
Connection type	M12 connector, 4-pin	
	Cable 200mm with M12 connector, 4-pin	
	Cable 2000mm, 4 x 0.21mm²	

Environmental data

Ambient temp. (operation/storage)	-40°C … +60°C [5]/-40°C … +70°C
Protective circuit [6]	2, 3
VDE protection class [7]	II, all-insulated
Degree of protection	IP 67, IP 69K
Light source	Exempt group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, CSA C22.2 No.14-13 [4] [8]

Additional functions

Warning output	PNP transistor, counting principle
Signal voltage high/low	≥ (U_B-2V)/≤ 2V
Output current	Max. 100mA
Activation input	
Transmitter active/not active	≥ 8V/≤ 2V
Activation/disable delay	≤ 1 ms/≤ 2 ms
Input resistance	10kΩ ± 10%

1) Typ. operating range limit: max. attainable range without function reserve
2) Operating range: recommended range with function reserve
3) Average life expectancy 100,000 h at an ambient temperature of 25°C
4) For UL applications: for use in class 2 circuits only
5) Permissible operating temperature range during IO-Link operation: -10°C to +40°C
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, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Tables

	Reflectors		Operating range
1	TK(S)	100x100	0.3 … 24m
2	TK	82.2	0.3 … 15m
3	MTKS	50x50.1	0.3 … 15m
4	TK(S)	40x60	0.3 … 12m
5	TK(S)	20x40	0.3 … 8m
6	Film 4	50x50	0.3 … 4m

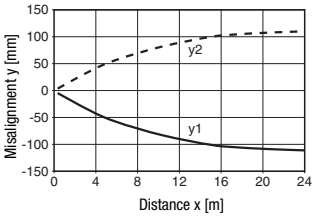
1	0.3																					24		30
2	0.3																			15			18	
3	0.3																			15			18	
4	0.3												12				15							
5	0.3							8			10													
6	0.3			4			5																	

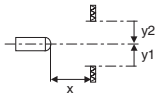
Operating range [m]
Typ. operating range limit [m]

TK … = adhesive
TKS … = screw type
Film 4 = adhesive

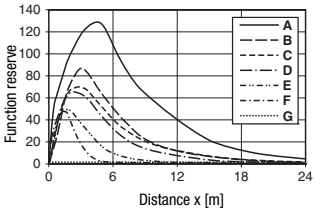
Diagrams

Typ. response behavior (TK 100x100)





Typ. function reserve



A TK 100x100
B TK 82.2
C MTKS 50x50.1
D TKS 40x60
E TKS 20x40
F Film 4 50x50
G Switching point

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.

PRK46C IO-Link Retro-reflective photoelectric sensors with polarization filter

Part number code

P	R	K	4	6	C					/	L	P	-	M	1	2

Operating principle

PRK	Retro-reflective photoelectric sensors with polarization filter

Series

46C	46C series

Light type

Free	Red light
I	Infrared light

Equipment

D	Depolarizing media

Setting

1	Sensitivity adjustment via potentiometer

Pin assignment of OUT1 (connector pin 4 / black cable wire) / Function

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

Pin assignment of OUT/IN (connector pin 2 / white cable wire) / Function

X	Not used
2	NPN, light switching
N	NPN, dark switching
4	PNP, light switching
P	PNP, dark switching
8	Activation input (active high)
W	Warning output, PNP light switching

Connection technology

M12	M12 connector, 4-pin
200-M12	Cable 200mm with M12 connector, 4-pin
Free	Cable 2000mm

Order guide

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

Red-light retro-reflective photoelectric sensors with polarization filter	Designation	Part no.
With M12 connector, 4-pin		
OUT1: IO-Link [1], OUT2: PNP dark switching [2]	PRK46C/LP-M12	50136904

1) In SIO mode: PNP switching output, light switching (factory setting)
2) Factory setting configurable via IO-Link

IO-Link interface

Sensors in the PRK46C…/**L**… variant have a dual-channel architecture. The IO-Link interface in accordance with specification 1.1.1 (October 2011) is provided on pin 4 (OUT 1). This allows the devices to be configured quickly and easily and, therefore, cost-effectively. Furthermore, the sensor transmits its process data and makes diagnostic information available through it.

Parallel to the IO-Link communication, the sensor can output the continuous switching signal for object detection on OUT 2. The IO-Link communication does not interrupt this signal.

Note: In Leuze Sensor Studio, the following applies with regard to the designations: **Q1 = OUT 1**, **Q2 = OUT 2**.

IO-Link process data

Device output data

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

1) Sensor operation off when detection is not possible

Device input data

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

Device-specific IODD

At www.leuze.com in the download area for IO-Link sensors you will find the **IODD zip file** with all data required for the installation.

IO-Link parameter documentation

A complete description of the IO-Link parameters is given in the *.html files. Please double-click one of the two language variants: ***IODD*-de.html** for **German** or ***IODD*-en.html** for **English**.

Functions configurable via IO-Link

PC configuration and visualization is performed comfortably with the USB-IO-Link Master SET US2-IL1.1 (part no. 50121098) and the Leuze Sensor Studio (in the download area of the sensor at *www.leuze.com*).

Function block	Function	Description
Configuration	Logical function of Q2	If the function **Q2 = switching output** is selected, the switching function corresponds to the current setting which was selected via the L/D changeover. If **Q2 = inv. switching output** is selected, the switching behavior of the output is inverted.
	L/D switching	In the factory setting, outputs Q1 and Q2 are antivalent switching outputs: Light switching: Q1 = light switching, Q2 = dark switching. Dark switching: Q1 = dark switching, Q2 = light switching.
	Switching delay	**On** activates the **internal time function**.
	Function selection of the switching delay	Activation of a suitable switching delay is possible. It is not possible to combine switching delays.
	Time base of the switching delay	Possibility of selecting a time base.
	Factor for the time base of the switching delay	To adapt the time base, it is multiplied by the entered factor. Only whole-number factors from 1 to 15 are permitted.

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.