RKR 53 — Retro-reflective photoelectric sensor for foils

en 05-2017/11 50108252-02

0 … 1.8m

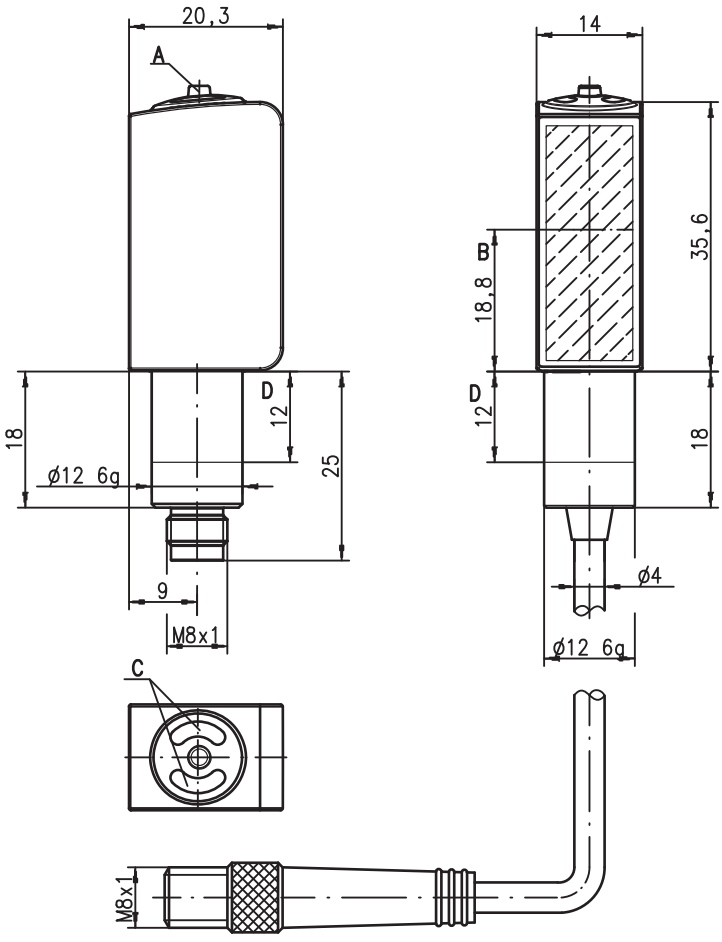
- Retro-reflective photoelectric sensor, auto-collimation optics with visible red light
- Particularly suited for thin, highly transparent foils with thickness < 20µm
- 316L stainless steel housing in HYGIENE-Design
- Enclosed optics design prevents bacterial carry-overs
- ECOLAB and Clean*Proof*+ tested
- Paperless device identification
- Scratch resistant and non-diffusive plastic front cover
- High switching frequency for detection of fast events
- May also be used with glass reflectors (TG)
- Easy adjustment via lockable teach button or teach input

Accessories:

(available separately)

- Cables with M8 or M12 connector (KD …)
- Cables for food and beverages
- Reflectors for the foods industry
- Reflectors for the pharmaceutical industry
- Reflective tapes
- Mounting devices

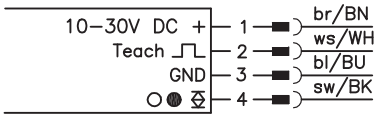
Dimensioned drawing



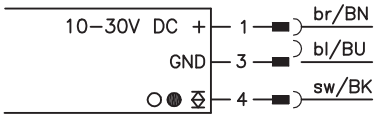
A Teach button
B Optical axis
C Indicator diodes
D Permissible clamping range

Electrical connection

Plug connection, 4-pin (with/without cable)



Plug connector, 3-pin



Specifications

Optical data

Typ. op. range limit (TK(S) 100x100) [1]		0 … 1.8m
Operating range [2]		see tables
Light source [3]		LED (modulated light)
Wavelength		620nm (visible red light)

Timing

Switching frequency		1000Hz
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		≤ 15mA
Switching output	…/6.42	1 push-pull switching output pin 4: PNP light switching, NPN dark switching pin 2: teach input
Function characteristics		light/dark reversible
Signal voltage high/low		≥ (U_B-2V)/≤ 2V
Output current		max. 100mA
Operating range		setting via teach-in

Indicators

Green LED	ready
Yellow LED	light path free

Mechanical data

Housing	AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Housing design	HYGIENE-Design
Housing roughness [5]	Ra ≤ 2.5
Connector	AISI 316L stainless steel, DIN X2CrNiMo17132, W.No1.4404
Optics cover	coated plastic (PMMA), scratch resistant and non-diffusive
Operation	plastic (TPV-PE), non-diffusive
Weight	with M8 connector: 50g with 200mm cable and M8 connector: 60g
Connection type	M8 connector, 4-pin or 3-pin 0.2m cable with M8 connector, 4-pin
Fastening	via fit (see "Remarks")
Max. tightening torque	3 Nm (permissible range, see dimensioned drawing)

Environmental data

Ambient temp. (operation/storage) [6]	-30°C … +70°C/-30°C … +70°C
Protective circuit [7]	2, 3
VDE safety class [8]	III
Protection class	IP 67, IP 69K[9]
Environmentally tested acc. to	ECOLAB, Clean*Proof*+
Light source	exempt group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, C22.2 No.14-13 [4] [6] [10]
Chemical resistance	tested in accordance with ECOLAB and Clean*Proof*+ (see Remarks)

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) Typical value for the stainless steel housing
6) UL certified in the temperature range -30°C to 55°C, operating temperatures of +70°C permissible only briefly (≤ 15min)
7) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
8) Rating voltage 50V
9) Only with internal tube mounting of the M8 connector
10) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.24A min, in the field installation

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.

Tables

Reflectors in food quality			Operating range
1	TK(S)	100x100	0 … 1.5m
2	TK	40x60	0 … 1.0m
3	MTKS	50x50.1	0 … 1.0m
4	Tape 6	50x50	0 … 0.6m
5	TK	20x40	0 … 0.5m

1	0	1.5	1.8
2	0	1	1.2
3	0	1	1.2
4	0	0.6	0.7
5	0	0.5	0.6

Pharmaceutical reflectors			Operating range
1	TK(S)	40x60.P	0 … 0.6m
2	TK	BR53	0 … 0.4m
3	TK(S)	20x40.P	0 … 0.35m
4	TK(S)	20.P	0 … 0.25m
5	MTK(S)	14x23.P	0 … 0.15m
6	TK	10.P	0 … 0.1m

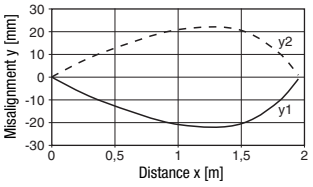
1	0		0.6	0.7
2	0	0.4		0.5
3	0	0.35		0.42
4	0	0.25		0.3
5	0	0.15		0.18
6	0	0.1		0.12

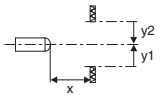
Operating range [m]
Typ. operating range limit [m]

TK … = adhesive
TKS … = screw type
MTKS … = micro triple, screw type

Diagrams

Typ. response behavior





Remarks

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 the intended use.

- A list of tested chemicals can be found in the first part of the product description.
- Only secure in designated area using set screw. Max. tightening torque 3Nm.

RKR 53 Retro-reflective photoelectric sensor for foils

Order guide

Selection table Equipment ↓	Order code →	RKR 53/6.42-S8 Part no. 50107607	RKR 53/6.42, 200-S8 Part no. 50105790	RKR 53/6.42-S8.3 Part no. 50107608	
Switching output	1 x push-pull switching output	●	●	●	
Switching function	light/dark switching configurable	●	●	●	
Connection	M8 connector, metal, 4-pin	●			
	cable 200 mm with M8 connector, 4-pin		●		
	M8 connector, metal, 3-pin			●	
Configuration	teach-in via button (lockable) and teach input[1)]	●	●	●	
Indicators	green LED: ready	●	●	●	
	yellow LED: switching output	●	●	●	
Detection	foils < 20 µm thick	●	●	●	
	foils > 20 µm thick	●	●	●	
	bottles (PET and glass)	●	●	●	

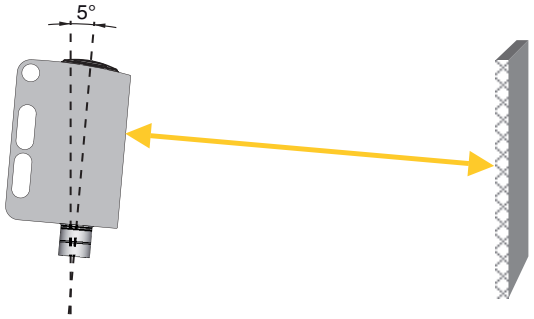
1) Teach input not present with 3-pin connector

General information

- The sensor is factory-adjusted for the detection of colored glass.
  Recommendation: teach only if the desired objects are not reliably detected.
- 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.
- For reflecting objects, the sensor has to be mounted approx. 5° angular towards the object.

Sensor adjustment (teach) via teach button

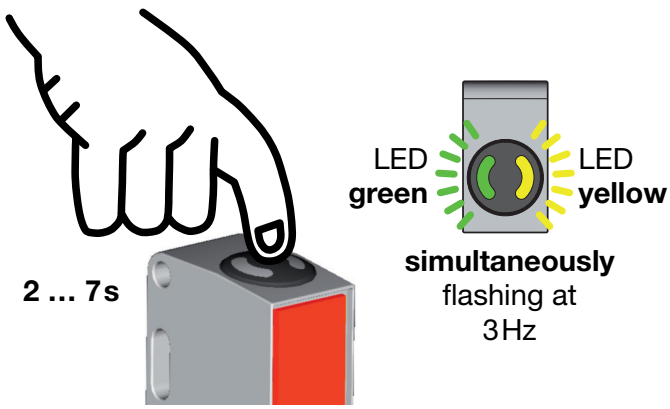
- **Prior to teaching:**
  Clear the light path to the reflector!
  The device setting is stored in a fail-safe way. A reconfiguration following voltage interruption or switch-off is thus not required.



Standard teaching for average sensor sensitivity (standard bottles)

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

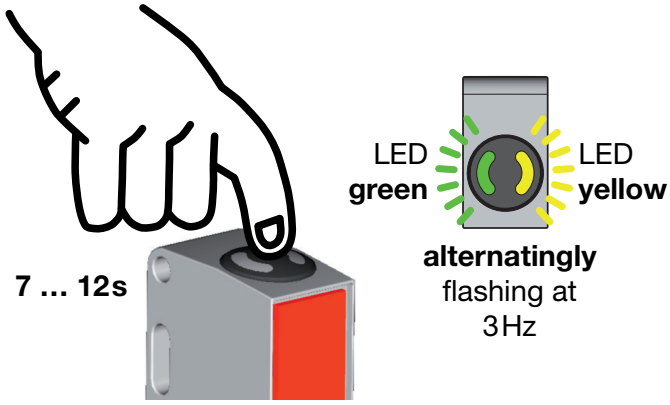
If the receive signal from the reflector is too weak, the sensor indicates the error status by means of fast and simultaneous flashing of the green and yellow LEDs. Please check the alignment, operating range, and soiling and carry out another teaching.



Teach for increased sensor sensitivity (highly transparent bottles and foils with thickness < 20µm)

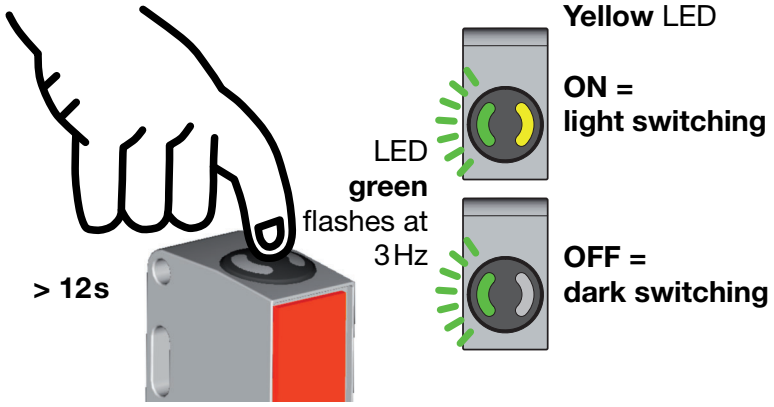
- **Press teach button until both LEDs flash alternatingly.**
- **Release teach button.**
- **Ready.**

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. Please check the alignment, operating range, and soiling and carry out another teaching.



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

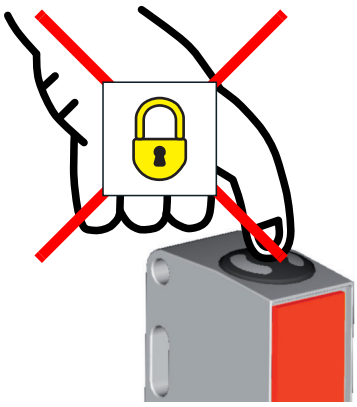
- **Press teach button until the green LED flashes. The yellow LED displays the current setting of the switching output:**
  ON = output switches on light
  OFF = output switches on dark
- **Continue to press the teach button in order to change the switching behavior.**
- **Release teach button.**
- **Ready.**



Locking the teach button via the teach input

A **static high signal** (≥ 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!

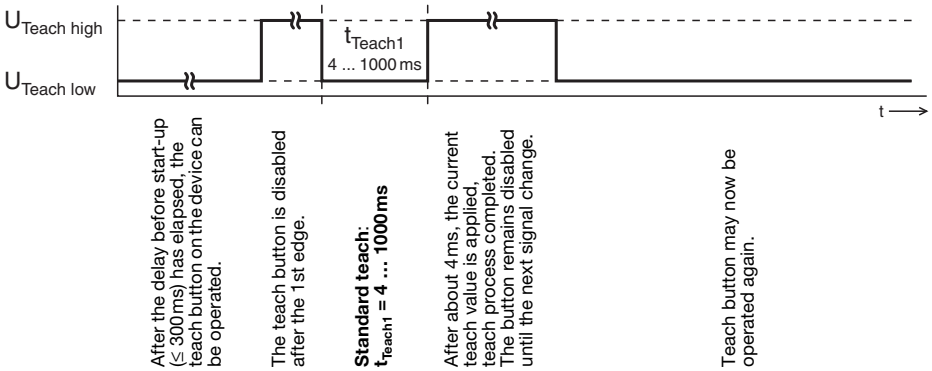
$U_{Teach\ low} \leq 2V$

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

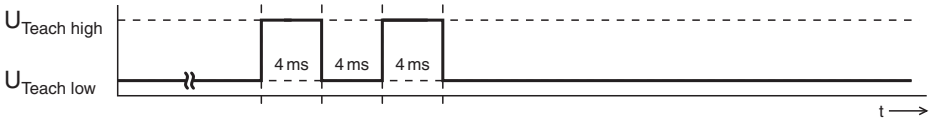
Prior to teaching: Clear the light path to the reflector!

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

Standard teaching for average sensor sensitivity (standard bottles)



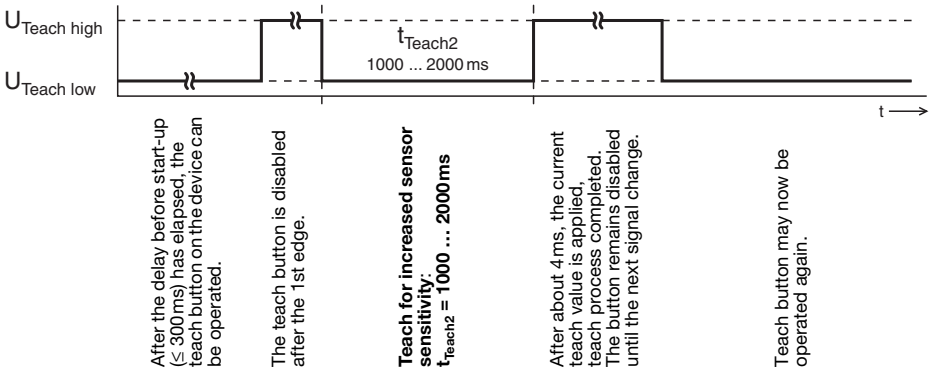
Quick standard teach (standard bottles)



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. Please check the alignment, operating range, and soiling and carry out another teaching.

Teach for increased sensor sensitivity (highly transparent bottles and foils with thickness < 20µm)



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. Please check the alignment, operating range, and soiling and carry out another teaching.

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