

# Forked sensors and trigger photoelectric sensors

## Product description



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# *Forked sensors for labelling*

## *Overview and advantages*

Wide range of models with robust metal housing and glass cover

Switching, optical, capacitive and ultrasonic sensors for a wide range of materials and applications

Push-pull, PNP or NPN switching outputs

High switching frequency of up to 8000Hz for detection of fast events

Mouth widths from 1 mm to 5 mm

Connection via M8 or M12 connector or cable

Simple sensitivity adjustment by means of potentiometer or teach-in for optimal adaptation to the application

Applications:

- Detection of labels
- Detection of transparent labels
- Detection of metallic labels



# *Features of Forked sensors for labelling*

- Detection of
  - foil and paper labels
  - transparent and opaque labels
  - metallic labels
  - thin metal foils
  - gaps
  - fast events



### **Optical label forked sensors GS 06, GS 12**

- ✓ **Advantage 1:** Simple adjustment via teach-in by pressing a button or remote calibration
- ✓ **Advantage 2:** Large mouth width e.g. for booklets
- ✓ **Advantage 3:** Protected against ambient light through light modulation



### **Capacitive label forked sensors GK 14**

- ✓ **Advantage 1:** Detection of paper and transparent labels
- ✓ **Advantage 2:** Conveyor speeds up to 10m/s
- ✓ **Advantage 3:** Attractive cost/performance ratio



### **Ultrasonic label forked sensors GSU 06, GSU 14**


- ✓ **Advantage 1:** Detection of paper, transparent and metallic labels
- ✓ **Advantage 2:** Conveyor speeds up to 2m/s
- ✓ **Advantage 3:** Simple adjustment via teach-in by pressing a button or remote calibration



*The optimal forked sensor  
for every type of label*

Using the sensors with different label materials				
Sensors	Base material	Label material		
		PAPER	TRANSPARENT	METALLIC
<b>Optical</b> forked sensors GS 06, GS 12	PAPER	●		
	TRANSPARENT	●		
<b>Capacitive</b> forked sensors GK 14	PAPER	●	●	
	TRANSPARENT	●	●	
<b>Ultrasonic</b> forked sensors GSU 06, GSU 14	PAPER	●	●	●
	TRANSPARENT	●	●	●



Operating principle	Designation	Mouth width [mm]	Mouth depth [mm]	Operating voltage		Output				Switching frequency	Switching	
				10 ... 30VDC	24VDC	PNP transistor	NPN transistor	2 x push-pull	1 x push-pull		Light	Dark
	Optical label forked sensors											
	GS 06/66-2	2	40	•				•		8000Hz	•	•
	GS 06/66-2, 150-S12	2	40	•				•		8000Hz	•	•
	GS 06/66-2-S8	2	40	•				•		8000Hz	•	•
	GS 06/66D-2, 430-S12	2	40	•				•		8000Hz	•	•
	GS 06/66.2-2	2	40	•				•		8000Hz	•	•
	GS 06/66.2-2-S8	2	40	•				•		8000Hz	•	•
	GS 06/6.3-2-S8	2	40	•					•	8000Hz	•	•
	GS 06/6D.3-2-S8	2	40	•					•	8000Hz	•	•
	GS 06/6-2-S8.3	2	40	•				•		8000Hz	•	•
	GS 06/66.6-2	2	40	•				•		8000Hz	•	•
	GS 06/66.26-2	2	40	•				•		8000Hz	•	•
	GS 06/66.26-2-S8	2	40	•				•		8000Hz	•	•
	GS 06/66-5	5	40	•				•		8000Hz	•	•
	GS 06/66-5, 360	5	40	•				•		8000Hz	•	•
	GS 06/66-5-S8	5	40	•					•	8000Hz	•	•
	GS 06/66.2-5	5	40	•				•		8000Hz	•	•
	GS 06/66.2-5-S8	5	40	•				•		8000Hz	•	•
	GS 06/66.2-5, 150-S12	5	40	•				•		8000Hz	•	•
	GS 06/6.3-5-S8	5	40	•				•		8000Hz	•	•
GS 12/24 GL	5	75	•		•	•			5000Hz	•		
	Capacitive label forked sensors											
	GK 14/24 L	1	85	•		•	•			5000Hz	•	•
	GK 14/24 L.2	1	85	•		•	•			5000Hz	•	•
	Ultrasonic label forked sensors											
	GSU 06/24-2-S8	2.5	48	•		•	•			500Hz	•	
	GSU 06/24-2	2.5	48	•		•	•			500Hz	•	
	GSU 06/24D-2-S8	2.5	48	•		•	•			500Hz		•
	GSU 06/4D.3-S8	2.5	48	•		•				500Hz		•
	GSU 06/24D-2	2.5	48	•		•	•			500Hz		•
	GSU 06/24D.1-2-S8	2.5	48	•		•	•			500Hz		•
	GSU 14/24 L	4	67	•		•	•			500Hz	•	
	GSU 14/24 L.1	4	67	•		•	•			500Hz	•	
	GSU 14/24 DL	4	67	•		•	•			500Hz		•



Connection				Detection of				Options			Page
M8 connector	M12 connector	Cable with M12 connector	Cable	Paper labels	Transparent labels	Metallic labels	Tape-tear monitoring	Sensitivity adjustment via potentiometer	Teach button	Teach input	
			•	•				•			9
•		•		•				•			9
		•		•				•			9
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	•			•	•	•			•	•	17
	•			•	•	•			•	•	17

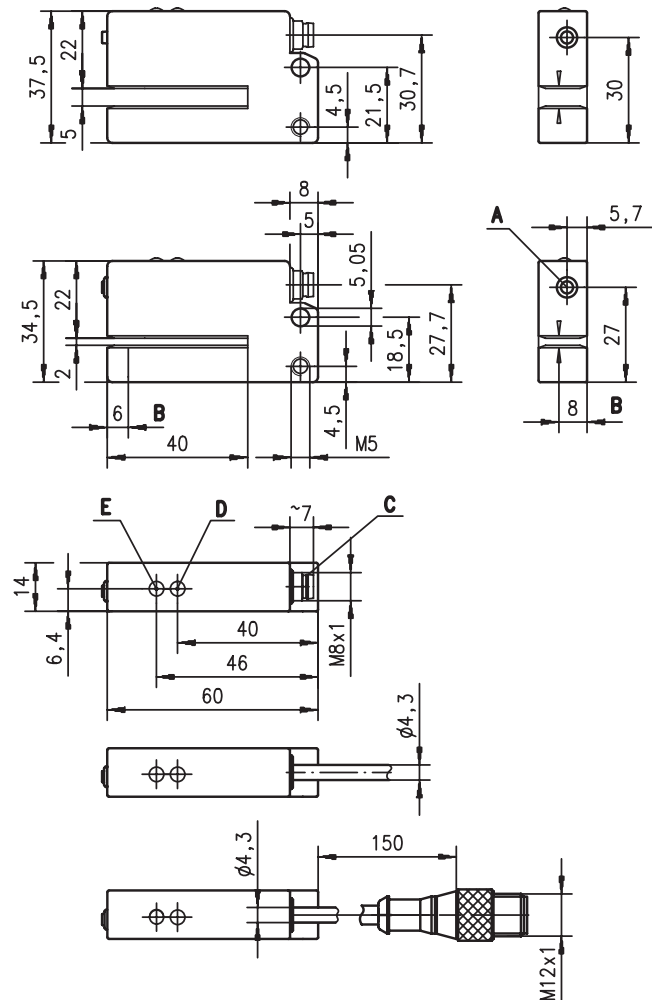


GS 06

Forked photoelectric sensors



Dimensioned drawing



- A Teach-in button or potentiometer
- B Optical axis
- C Connector M8x1
- D Indicator diode ready/teach-in (green)
- E Indicator diode switching output/teach-in (yellow)

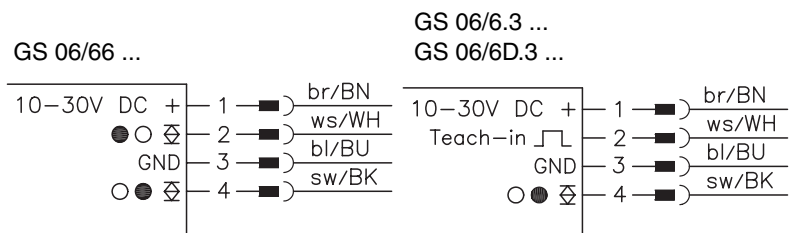


2mm  
5mm



- Forked photoelectric sensor for precise detection of labels on stock material
- Easy and reliable setting via multiturn potentiometer or, as an option, via teach-in button (two-value teach-in)
- Setting to bearer/label gap or during operation
- Robust metal housing with bevelled inlet edges
- Mounting holes for fast installation
- M8 connector, cable with M12 connector or cable for individual connection
- Protected against ambient light through light modulation
- Push-pull switching outputs

Electrical connection



Accessories:

(available separately • see page 66)

- M8 / M12 connectors (KD ...)
- Cable with M8 connector (K-D...)
- Cable with M12 connector (K-D...)

We reserve the right to make changes • gs\_a36e.fm







## Specifications

### Optical data

Mouth width 2mm or 5mm (see table)

### Timing

Switching frequency 8000Hz  
Response time 0.0625ms  
Delay before start-up  $\leq 100\text{ms}$

### Electrical data

Operating voltage  $U_B$  10 ... 30VDC (incl. residual ripple)  
Residual ripple  $\leq 15\%$  of  $U_B$   
Bias current  $\leq 40\text{mA}$   
Switching output 1) see table  
Signal voltage high/low  $\geq (U_B - 2V) / \leq 2V$   
Output current 100mA  
Sensitivity may be set via teach-in button, teach-in input or potentiometer (see table)

### Indicators

LED yellow light path free/switching point in the label gap  
LED green ready

### Mechanical data

Housing diecast zinc  
Weight see order guide  
Connection type M8 connector or cable 150mm with M12 connector or cable 360mm or cable 2000mm (see order guide)

### Environmental data

Ambient temp. (operation/storage)  $-20^\circ\text{C}$  ...  $+60^\circ\text{C}$  /  $-30^\circ\text{C}$  ...  $+70^\circ\text{C}$   
Protective circuit 2) 1, 2  
VDE safety class III  
Protection class IP 65

### Teach-in input

Active/not active  $\geq 8V / \leq 2V$   
Activation/disable delay  $\leq 0.2\text{ms}$   
Input resistance  $10\text{k}\Omega$

1) The push-pull switching outputs must not be connected in parallel  
2) 1=polarity reversal protection, 2=short-circuit protection for all outputs

## Tables

## Diagrams

## Order guide

See table on page 9 !

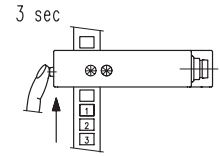
## Remarks

- To achieve a proper operation, an electric connection between sensor and machine earth must be ensured.
- The sensor ships with the standard switching hysteresis.
- For the detection of slightly transparent labels, the minimum switching hysteresis may be used.

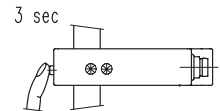
**GS 06**
**Teaching during operation, teaching for bearer and label (dynamic teach)**

The sensor can be taught while the plant is running. The plant should be operated at commissioning speed.

	Operation	LED green	LED yellow	Sensor
1.	Insert the label tape into the forked sensor	On	On/Off	
2.	Press teach button for 3s	Off → On	On/Off	Acknowledgement button press
3.		Flash simultaneously		
4.	Release teach button	Flash alternately		Teach process has been started
5.	Transport the label tape so that 3 ... 5 label gaps pass the sensor	Flash alternately		The difference between the label and the bearer material is measured
6.	Briefly press teach button	On → Off	On/Off	Optimal values of the material have been saved
7.	Sensor is in operating mode	On	On/Off	Switching threshold has been saved


**Teaching for bearer if the label tape cannot be transported (static teach)**

	Operation	LED green	LED yellow	Sensor
1.	Insert label tape with empty bearer material or with gap	On	On/Off	
2.	Press teach button for 3s	Off → On	On/Off	Acknowledgement button press
3.		Flash simultaneously		
4.	Release teach button	Flash alternately		Bearer material is measured
5.	Briefly press teach button	On → Off	On/Off	Optimal values of the material have been saved
6.	Sensor is in operating mode	On	On	Switching threshold has been saved


**Teach for maximum transmitting power (availability dependent on level of production)**

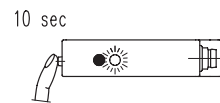
- Interrupt light path in the forked sensor (piece of sheet metal, cardboard, or similar).
- Perform static teach.

**Toggling the switching hysteresis**

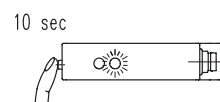
Via the switching hysteresis, the basic sensitivity (standard/minimal) can be set. No label tape has to be inserted. A new teach is not required.

**Standard switching hysteresis**

	Operation	LED green	LED yellow	Sensor
1.	Press teach button for 10s	Off → On	On/Off	
2.		Flash fast simultaneously		Acknowledgement button press
3.	After a further 3s	Fast	On	Standard switching hysteresis
4.	Release teach button	On	On/Off	Switching hysteresis has been set
5.	Sensor is in operating mode	On	On/Off	


**Minimum switching hysteresis**

	Operation	LED green	LED yellow	Sensor
1.	Press teach button for 10s	Off → On	On/Off	Acknowledgement button press
2.		Flash fast simultaneously		
3.	After a further 3s	Fast	On	Standard switching hysteresis
4.	After a further 3s	Fast	Off	Minimum switching hysteresis
5.	Release teach button	On	On/Off	Switching hysteresis has been set
6.	Sensor is in operating mode	On	On/Off	



If the teach button continues to be pressed, both LEDs flash with high frequency. The toggle mode is terminated and the sensor retains the previously set switching hysteresis. The sensor only returns to operational readiness after the teach button is released.



Order guide

Selection table		Order code →																			
Equipment ↓		GS 06/66-2 Part No. 500 39567	GS 06/66-2, 150-S12 Part No. 500 39558	GS 06/66-2-S8 Part No. 500 39565	GS 06/66D-2, 430-S12 Part No. 500 39562	GS 06/66.2-2 Part No. 500 39569	GS 06/66.2-2-S8 Part No. 500 39571	GS 06/6.3-2-S8 Part No. 500 39573	GS 06/6D.3-2-S8 Part No. 501 01691	GS 06/66-5 Part No. 500 39568	GS 06/66-5, 360 Part No. 500 39560	GS 06/66-5-S8 Part No. 500 39566	GS 06/66.2-5 Part No. 500 39570	GS 06/66.2-5-S8 Part No. 500 39572	GS 06/66.2-5, 150-S12 Part No. 501 02994	GS 06/6.3-5-S8 Part No. 500 39575	GS 06/6-2-S8.3 Part No. 501 03601	GS 06/66.6-2 Part No. 500 41261	GS 06/66.26-2 Part No. 501 03524	GS 06/66.26-2-S8 Part No. 501 03495	
Colour	red RAL 3000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	black RAL 9004																		●	●	●
Mouth width	2mm	●	●	●	●	●	●	●	●									●	●	●	●
	5mm									●	●	●	●	●	●	●	●				
Connection (weight)	M8 connector (80g)			●			●	● <sup>1)</sup>	●			●		●			●	● <sup>2)</sup>			●
	cable 360mm (90g)										●										
	cable 2000mm (125g)	●				●				●			●						●	●	
	cable 150mm with M12 connector (95g)		●												●						
	cable 430mm with M12 connector (100g)				●																
Configuration	potentiometer	●	●	●	●					●	●	●						●	●		
	teach button					●	●						●	●	●					●	●
	teach button + teach input (pin 2)							●	●								●				
Switching output	2 x Push-Pull Pin 2: PNP dark switching, NPN light switching Pin 4: PNP light switching, NPN dark switching	●	●	●		●	●			●	●	●	●	●	●			● <sup>3)</sup>	●	●	●
	1 x Push-Pull Pin 2: teach input Pin 4: PNP light switching, NPN dark switching							●									●				
	1 x Push-Pull Pin 2: teach input Pin 4: PNP dark switching, NPN light switching								●												
	2 x Push-Pull Pin 2: PNP dark switching, NPN light switching Pin 4: PNP dark switching, NPN light switching				●																
UL		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○ <sup>4)</sup>	○ <sup>4)</sup>	○ <sup>4)</sup>	○ <sup>4)</sup>	○ <sup>4)</sup>

- 1) When using right-angle plugs: cable outlet should point upward!
- 2) 3-pin connector M8
- 3) 1 x push-pull, PNP light switching, NPN dark switching
- 4) In preparation



## GS 12

## Forked photoelectric sensors



5mm

10 - 30 V  
DC

- Fast amplifier with high switching frequency for detection of short events (e.g. gaps between labels)
- Universal application due to short-circuit and polarity reversal protected PNP and NPN switching output, with M12 connector
- Robust aluminium housing with bevelled inlet edges, protection class IP 65
- Indicator diode with large viewing area displays the switching state

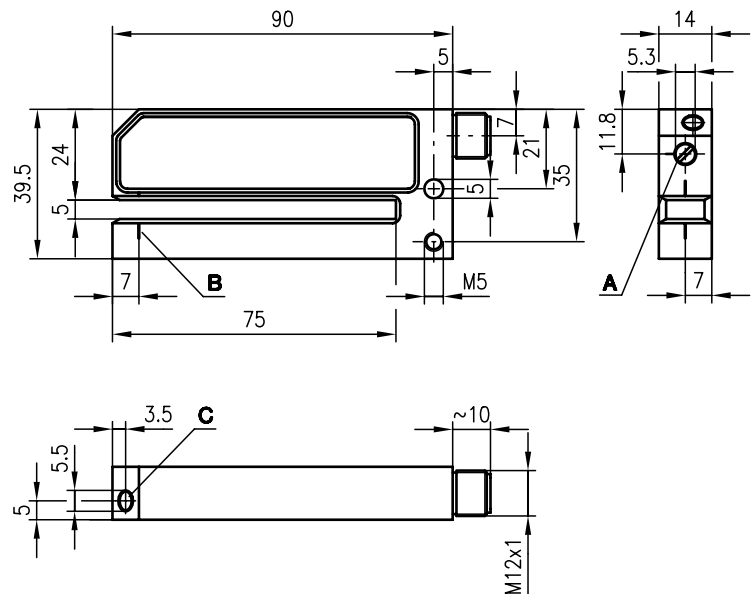


### Accessories:

(available separately • see page 66)

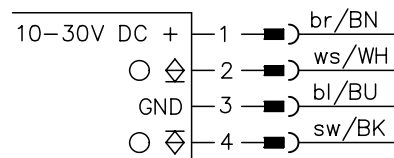
- M12 connectors (KD ...)
- Cable with M12 connector (K-D...)

### Dimensioned drawing



- A** Sensitivity adjustment
- B** Optical axis
- C** Indicator diode

### Electrical connection





### Specifications

<b>Optical data</b>	
Mouth width	5mm
<b>Timing</b>	
Switching frequency	5000Hz
Response time	0.1ms
Delay before start-up	≤ 200ms
<b>Electrical data</b>	
Operating voltage $U_B$ <sup>1)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 40mA
Switching output	1 PNP transistor output 1 NPN transistor output
Function characteristics	light switching
Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
Output current	250mA
Sensitivity	range selection using 3-turn potentiometer
<b>Indicators</b>	
LED yellow	light path free
<b>Mechanical data</b>	
Housing	aluminium, anodised
Weight	120g
Connection type	M12 connector
<b>Environmental data</b>	
Ambient temp. (operation/storage)	-20°C ... +60°C / -30°C ... +70°C
Protective circuit <sup>2)</sup>	1, 2
VDE safety class	III
Protection class	IP 65

1) Functional extra-low voltage with reliable disconnection or protective extra-low voltage (VDE 0100/T 410)  
2) 1=polarity reversal protection, 2=short-circuit protection for all outputs

### Tables

### Diagrams

### Order guide

Designation	Part No.
GS 12/24 GL	500 22724

### Remarks

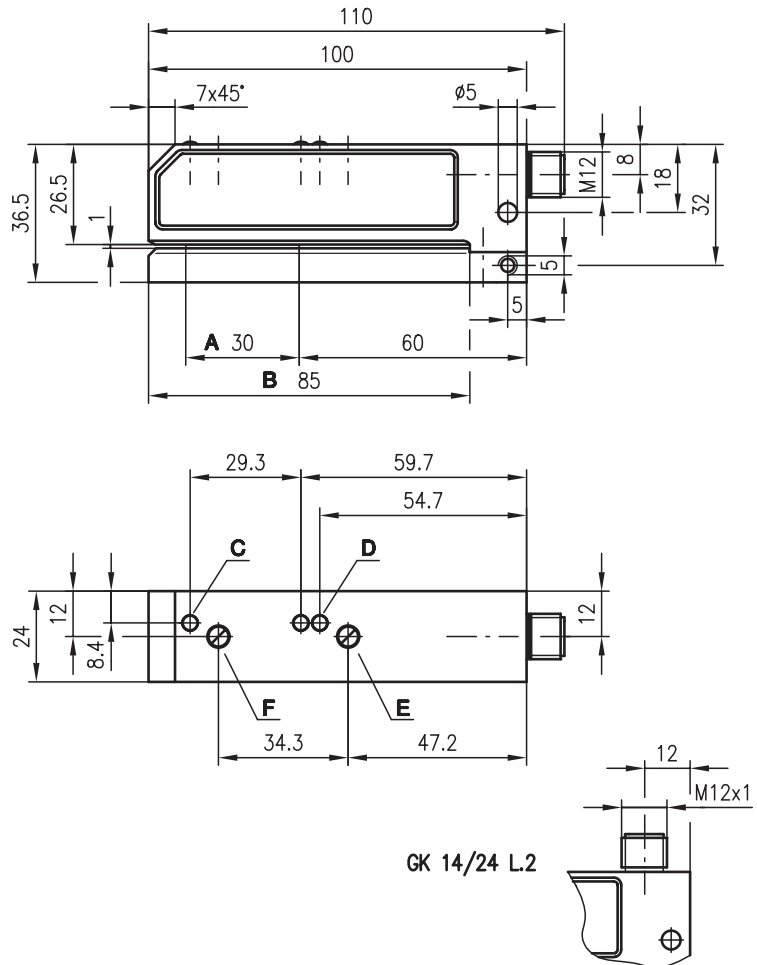


GK 14

Capacitive forked sensor



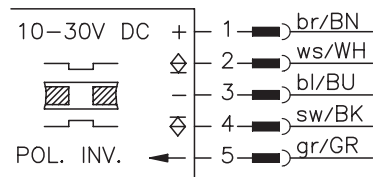
Dimensioned drawing



GK 14/24 L.2

- A Sensor
- B Mouth depth
- C Display switching output
- D Display base adjustment
- E Base adjustment
- F Sensitivity adjustment:  
Clockwise rotation = increase sensitivity

Electrical connection



1 mm



- Forked sensor for reliable detection of transparent and opaque labels
- PNP and NPN transistor output for optimum adaptation to the controller
- Robust metal housing with bevelled inlet edges
- Inverting input for easy adaptation of the output signal level



Accessories:

(available separately • see page 66)

- M12 connectors (KD ...)
- Cable with M12 connector (K-D...)

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## Specifications

### Optical data

Mouth width	0.9mm ± 0.1 mm
Mouth depth	85mm

### Timing

Switching frequency <sup>1)</sup>	5000Hz
Response time	0.1 ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 35mA
Switching output	1 PNP transistor output 1 NPN transistor output
Function characteristics	direction dependent, reversible
Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
Output current	200 mA
Sensitivity	adjustable with multiturn potentiometer
Base adjustment	adjustable with multiturn potentiometer

### Indicators

LED yellow	label/gap
LED yellow (2x)	Base adjustment

### Mechanical data

Housing	aluminium, anodised
Weight	175g
Connection type	M12 connector, 5-pin

### Environmental data

Ambient temp. (operation/storage)	0°C ... +60°C
Protective circuit <sup>2)</sup>	1, 2
VDE safety class	III
Protection class	IP 65

### Options

Inverting input high/low	$\geq 8V / \leq 2V$
Input resistance	10k $\Omega$

1) Max. label speed 10m/s, min. label gap 2mm

2) 1=polarity reversal protection, 2=short-circuit protection for all outputs

## Order guide

	Designation	Part No.
Rear connector	GK 14/24 L	500 26371
Top connector	GK 14/24 L.2	500 31714

## Tables

## Diagrams

## Remarks

- **Base setting**
  - Set sensitivity to max. (turn potentiometer to the right), then turn back 1/2 turn to the left.
  - Base adjustment without label tape such that both LEDs are equally bright.
  - If necessary, reduce the sensitivity setting (in steps of 1/4 turn to the left).
- **Base adjustment**
  - Perform after new mounting, cleaning, sensitivity increase.
- **Switching behaviour**
  - A signal change on the switching output occurs when a label enters at the minimum velocity. The output signal remains constant until the next edge of an existing or entering label is detected.

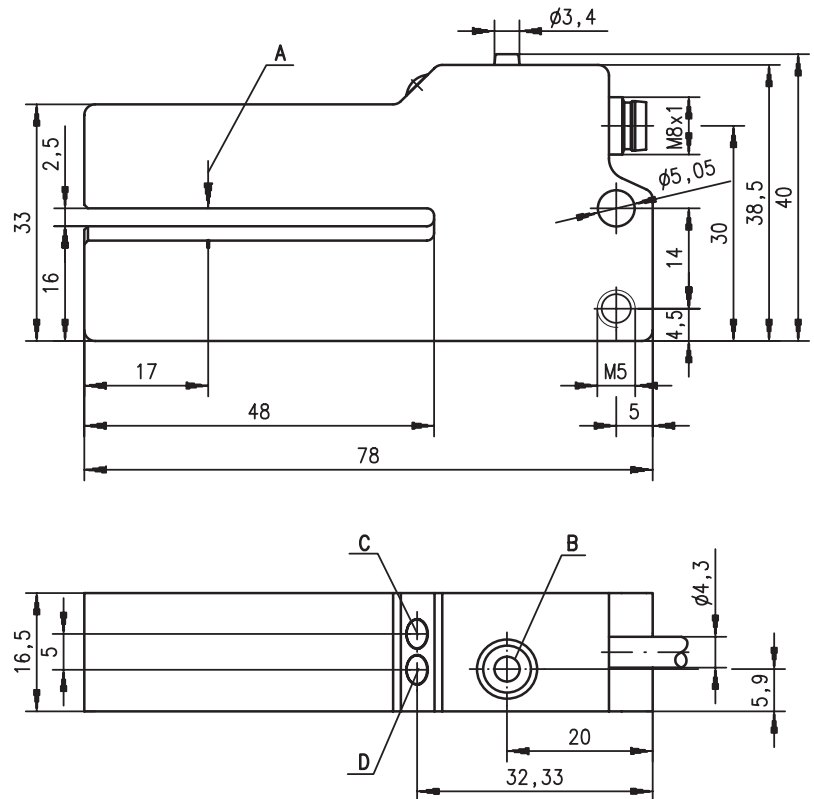


GSU 06

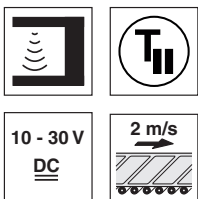
Ultrasonic Label Fork



Dimensioned drawing



- A Sensor marker
- B Teach-in button 1)
- C Teach-in indicator diode 1)
- D Indicator diode switching output

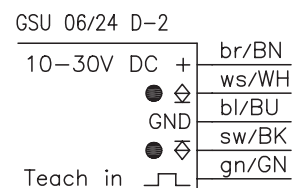
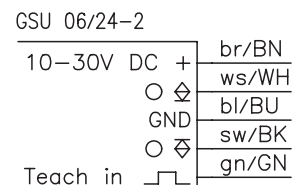
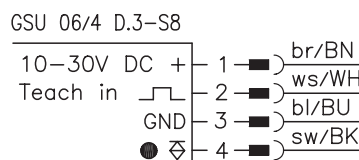
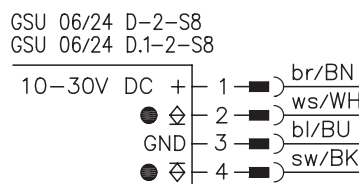
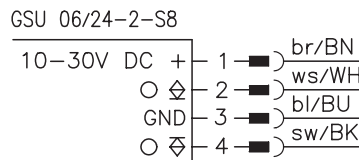


2.5mm

- Forked sensor for reliable detection of:
  - foil labels on foil carrier
  - foil labels on paper carrier
  - paper labels on paper carrier
  - metallic foil labels
  - thin metal foils
- Special variant for tape-tear monitoring
- Simple adjustment via teach-in by pressing a button or remote calibration<sup>1)</sup>
- Static PNP and NPN transistor outputs for optimum adaptation to the controller
- Robust metal housing with bevelled inlet edges
- M8 connector or cable version

1) Not applicable for GSU 06/24D.1-2-S8

Electrical connection



Accessories:

(available separately • see page 66)

- M8 connectors (KD ...)
- Ready-made cables M8 (K-D ...)

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## Specifications

### Physical data

Mouth width	2.5mm
Mouth depth	48mm
Label length <sup>1)</sup>	≥ 2mm
Label gap <sup>1)</sup>	≥ 2mm
Conveyor speed	≤ 2m/s (120m/min)
Repeatability <sup>1) 2)</sup>	± 0.3mm
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 40mA
Switching outputs	PNP and NPN transistor output
Function characteristics	light or dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	2x100mA

### Indicators

LED green	ready
LED green flashing	teach-in activated
LED yellow	switching point in the label gap

### Mechanical data

Housing	aluminium, anodised
Colour	red/black
Weight	150g (connector/cable 60g)
Connection type	M8 connector, 4-pin or cable 2000mm, 5-pin

### Environmental data

Ambient temp. (operation/storage)	+5°C ... +50°C / -40°C ... +70°C
Protective circuit <sup>3)</sup>	1, 2
VDE safety class	III
Protection class	IP 62
Standards applied	IEC 60947-5-2

### Options (cable version)

<b>Teach-in input</b>	
Active/not active	≥ 8V / ≤ 2V
Activation/disable delay	≤ 0.2ms
Input resistance	10kΩ

1) Not applicable for GSU 06/24D.1-2-S8

2) Material dependent

3) 1=polarity reversal protection, 2=short-circuit protection for all outputs

## Order guide

### Light switching

(signal in the label gap)

With M8 connector,  
teach-in by pressing a button

With 2m cable,  
teach-in by pressing a button or via remote calibration

### Dark switching

(signal on the label)

With M8 connector,  
teach-in by pressing a button

With M8 connector,  
teach-in by pressing a button or via remote calibration <sup>1)</sup>

With 2m cable,  
teach-in by pressing a button or via remote calibration

With M8 connector,  
specifically for tape-tear monitoring, without adjustment

1) When using right-angle plugs: cable outlet should point upward!

Designation	Part No.
GSU 06/24-2-S8	500 39638
GSU 06/24-2	500 40191
GSU 06/24D-2-S8	500 40190
GSU 06/4D.3-S8	501 02921
GSU 06/24D-2	500 40192
GSU 06/24D.1-2-S8	501 05735

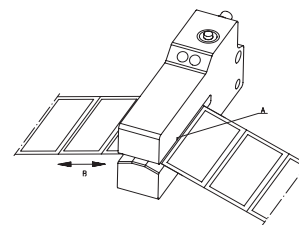
## Calibration <sup>1)</sup>

### Manual teach-in

- Insert label tape.
- The button on the device is pressed to teach - green LED flashes.
- Label tape advances so that 5 ... 10 label gaps pass through the measuring zone.
- The button is then pressed again. The green LED illuminates continuously. The teaching process is concluded.

### Remote teach-in

- Insert label tape.
- Apply voltage at "Teach in" control input. Teach-in is activated.
- Advance 5 ... 10 label gaps through the sensor.
- Remove voltage. Teach-in is finished



A Sensor centre, marker  
B Label run

## Remarks

- The centre of the label tape should be positioned above the sensor's marker (A).
- To achieve high repeatability, the label tape must be slightly under tension (B).
- The label material used determines the achievable precision and the reliability of gap detection!
- With special variant GSU 06/24D.1-2-S8 for tape-tear monitoring, no adjustment is necessary.

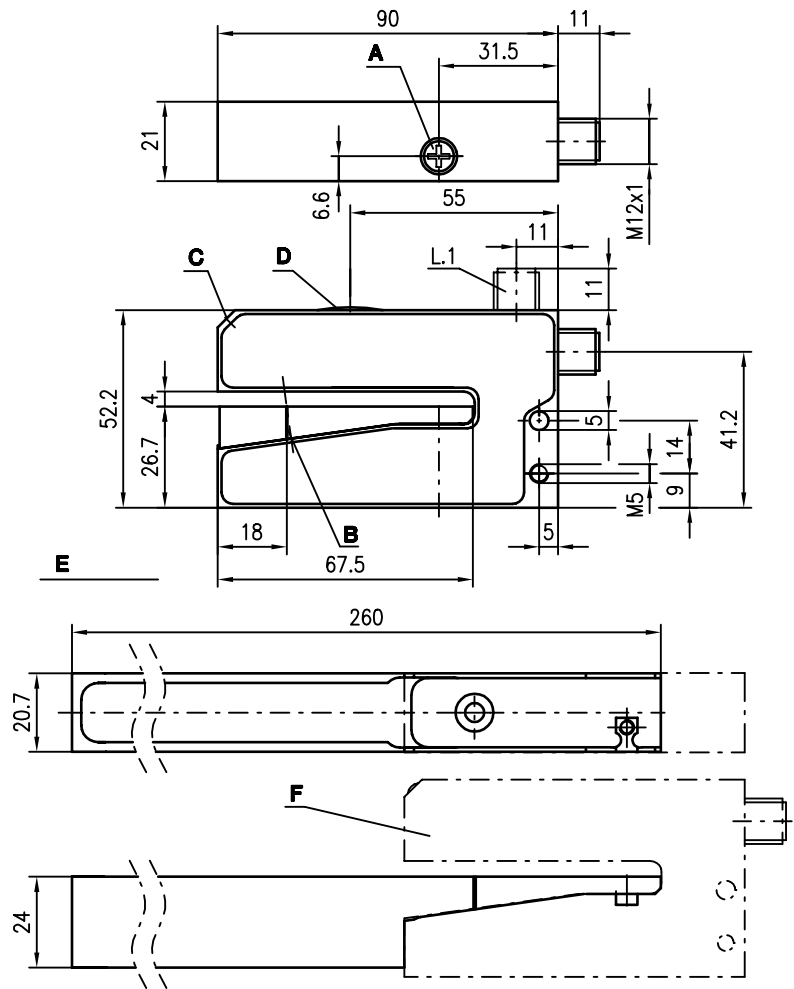


GSU 14/24

Ultrasonic Label Fork



Dimensioned drawing



- A** The support table can be removed and cleaned after loosening the screw
- B** Sensor marker (centre of label tape)
- C** Indicator diodes
- D** Teach-in button
- E** View with mounted extended carriage
- F** Sensor

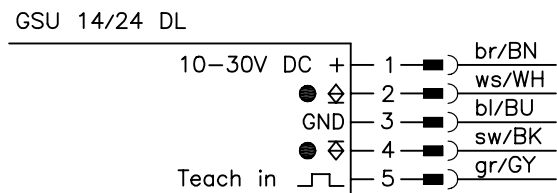
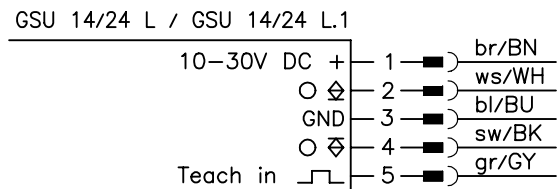


4mm



- Forked sensor for reliable detection of:
  - foil labels on foil carrier
  - foil labels on paper carrier
  - paper labels on paper carrier
  - metallic foil labels
  - thin metal foils
- Simple adjustment via teach-in by pressing a button or via the teach-in input
- Static PNP and NPN transistor outputs for optimum adaptation to the controller
- Robust metal housing with bevelled inlet edges and M12 connector

Electrical connection



Accessories:

(available separately • see page 66)

- Extended carriage, short (Part No. 501 05211)  
As replacement for the series part.
- Extended carriage, long (Part No. 501 03855)  
For improved guiding of oversized labels.  
The rails can be shortened at any point.
- M12 connectors (KD ...)
- Cable with M12 connector (K-D...)

We reserve the right to make changes • GS\_a01e.fm



## Specifications

### Physical data

Mouth width	4mm
Mouth depth	67mm
Label length	≥ 2mm
Label gap	≥ 2mm
Conveyor speed	≤ 2m/s (120m/min)
Repeatability <sup>1)</sup>	± 0.2mm
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage U <sub>B</sub>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U <sub>B</sub>
Bias current	≤ 60mA
Switching outputs	PNP and NPN transistor output
Function characteristics	light or dark switching
Signal voltage high/low	≥ (U <sub>B</sub> -2V)/≤ 2V
Output current	200mA

### Indicators

LED green	ready
LED green flashing	teach-in activated
LED yellow	switching point in the label gap

### Mechanical data

Housing	aluminium, anodised
Colour	red/black
Weight	300g
Connection type	M12 connector, 5-pin

### Environmental data

Ambient temp. (operation/storage)	0°C ... +60°C/-40°C ... +70°C
Protective circuit <sup>2)</sup>	1, 2
VDE safety class	III
Protection class	IP 65
Standards applied	IEC 60947-5-2

### Options

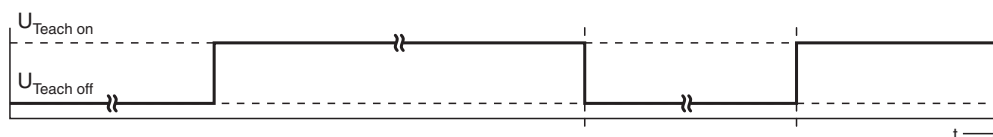
#### Teach-in input

Active/not active	≥ 8V/≤ 2V
Activation/disable delay	≤ 0.2ms
Input resistance	10kΩ

1) Material dependent

2) 1=polarity reversal protection, 2=short-circuit protection for all outputs

## Diagram



After switching on the supply voltage and after the delay before start-up has concluded (≤ 100ms), the teach button on the device can be operated.	A high level triggers the teach process: To do this, transport 5 ... 10 labels through the sensor. As long as a signal is present, the device remains in the teach mode.	The edge change (1->0) ends the current teach process. The device returns to normal operating mode.	A positive edge switches the device back to the teach mode and triggers a new teach process.
	The teach button is blocked on the first ascending edge (0->1). <b>Attention:</b> The button is blocked until the device is switched to a voltage-free state (=switched off).	Button remains blocked until device is switched off.	Button remains blocked until device is switched off.

## Order guide

	Designation	Part No.
<b>Light switching</b> (signal in the label gap), Rear connector	GSU 14/24 L	500 61406
<b>Light switching</b> (signal in the label gap), Top connector	GSU 14/24 L.1	500 36972
<b>Dark switching</b> (signal on the label), Rear connector	GSU 14/24 DL	500 37974

## Operation

### Manual teach-in

1. Insert label tape at the correct position (align centre of tape with sensor's marker).
2. Press teach button on the device - green LED flashes.
3. Advance label tape so that 5 ... 10 label gaps pass through the measuring zone.
4. Press teach button again. The green LED illuminates continuously. The teach process is concluded.

### External teach-in

#### (via teach-in input) with blocking of the teach button

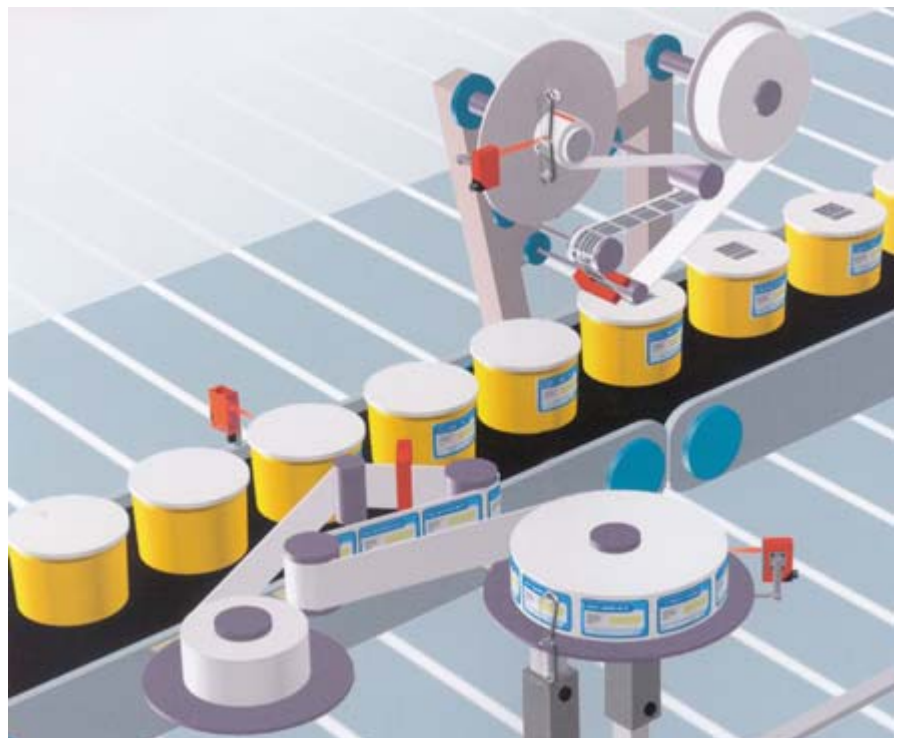
1. Insert label tape at the correct position (align centre of tape with sensor's marker).
2. Apply signal response to pin 5 of external teach-in input (see diagram).

## Remarks

- To achieve high repeatability, the label tape must be slightly under tension.
- The centre of the label tape should be positioned above the sensor's marker (see also marking on sensor).
- The label material used determines the achievable precision and the reliability of gap detection!

## *Features of trigger sensors*

- Trigger a label event when the product to be labelled is in position
- Monitor the diameter of the label tape roll
- Detection of the tape end



### **Retro-reflective photoelectric sensors for triggering labelling on standard materials**

- ✓ **Advantage 1:** High performance reserve
- ✓ **Advantage 2:** High operational reliability through active ambient light suppression A<sup>2</sup>LS
- ✓ **Advantage 3:** High switching frequency for detection of fast events



### **Retro-reflective photoelectric sensors for triggering labelling on clear glass**

- ✓ **Advantage 1:** Retro-reflective photoelectric sensor with visible red laser light and autocollimation principle
- ✓ **Advantage 2:** For all transparent objects: glass, PET, foils
- ✓ **Advantage 3:** Easy setting via potentiometer, lockable teach button or teach input



### **Retro-reflective photoelectric sensors for monitoring the roll diameter**

- ✓ **Advantage 1:** High performance reserve
- ✓ **Advantage 2:** High operational reliability through active ambient light suppression A<sup>2</sup>LS
- ✓ **Advantage 3:** Universal connection options:
  - M8 / M12 connector
  - Cable
  - Cable with M8 / M12 connector

*for nearly all control tasks  
associated with labelling*

Recommended trigger sensors for labelling					
Control task		Sensor / connector			
		Series 3 / M8	Series 25 / M8	Series 25 / M12	
Triggering the labelling event	MATERIAL TO BE LABELLED	STANDARD	PRK 3B/66-S8 PRK 3B/66, 200-S8	PRK 25B/66-S8	PRK 25B/66-S12 PRK 25B/66, 200-S12
		CLEAR GLASS	RKR 3B/6.42-S8 RKR 3B/6.42, 200-S8	PRK 25/66.41-S8	PRK 25/66.41-S12
Monitoring the roll diameter	SENSOR TYPE	DIFFUSE REFLECTION LIGHT SCANNER	HRTR 3/44-150-S8	HRTR 25/66-300-S8	HRTR 25/66-300-S12
		RETRO-REFLECTIVE PHOTOELECTRIC SENSOR	PRK 3B/66-S8 PRK 3B/66, 200-S8	PRK 25B/66-S8	PRK 25B/66-S12 PRK 25B/66, 200-S12
Detection of the tape end	SENSOR TYPE	DIFFUSE REFLECTION LIGHT SCANNER	RTR 3/44-300-S8	RTR 25/66-700-S8	RTR 25/66-700-S12



#### Energetic diffuse reflection light scanner for the detection of the tape end

- ✓ **Advantage 1:** Simple alignment with visible red light
- ✓ **Advantage 2:** High operational reliability through active ambient light suppression A<sup>2</sup>LS
- ✓ **Advantage 3:** Sensitivity adjustment via potentiometer



#### Diffuse reflection light scanner with background suppression for monitoring the roll diameter

- ✓ **Advantage 1:** Scanner with adjustable background suppression
- ✓ **Advantage 2:** High operational reliability through active ambient light suppression A<sup>2</sup>LS
- ✓ **Advantage 3:** Special solution available: light scanner with elongated light spot

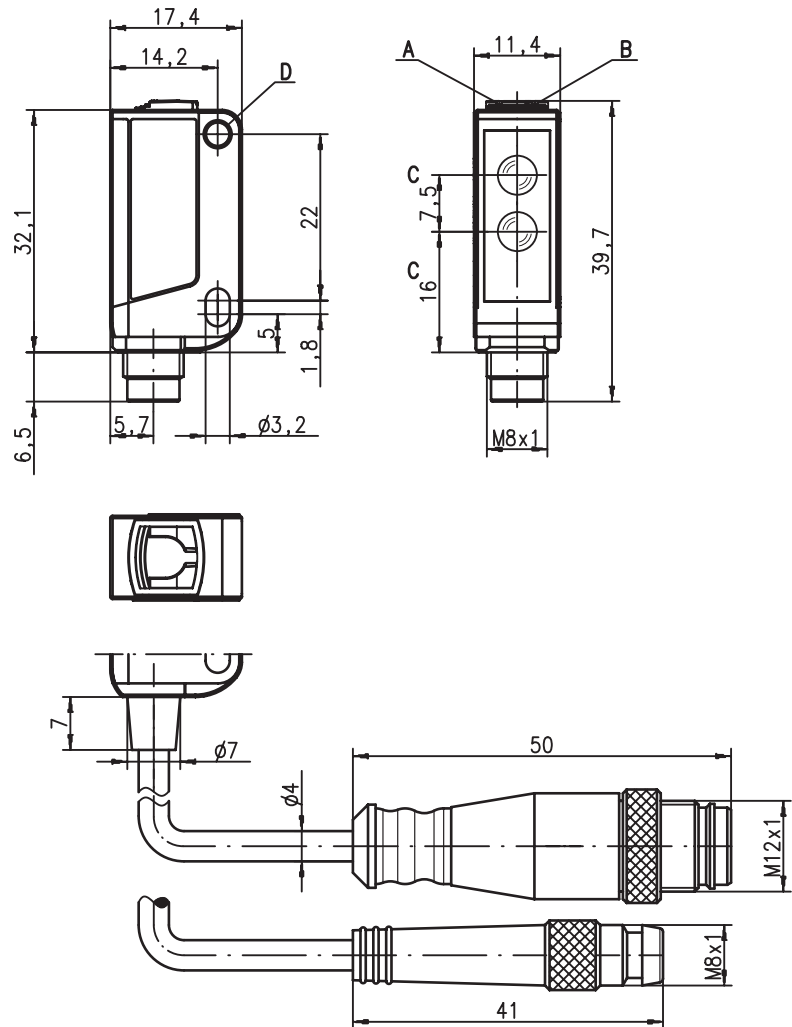


# PRK 3B

# Retro-reflective photoelectric sensors with polarisation filter



## Dimensioned drawing



- A Indicator diode green
- B Indicator diode yellow
- C Optical axis
- D Attachment sleeve



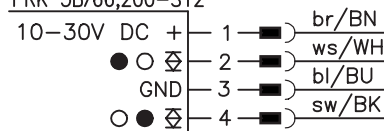
0.02 ... 6m



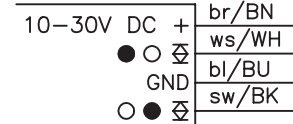
- Polarised retro-reflective photoelectric sensor with visible red light
- High performance reserve
- Small and compact construction with robust plastic housing, protection class IP 67/ IP 69K for industrial application
- Fast alignment through *brightVision*®
- A²LS - Active Ambient Light Suppression
- Push-pull switching outputs
- High switching frequency for detection of fast events
- Warning output for increased availability

## Electrical connection

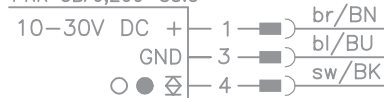
PRK 3B/66-S8  
 PRK 3B/66,200-S8  
 PRK 3B/66,200-S12



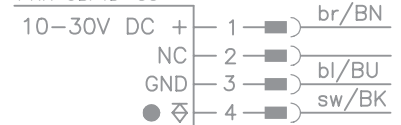
PRK 3B/66



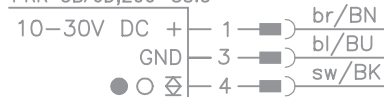
PRK 3B/6-S8.3  
 PRK 3B/6,200-S8.3



PRK 3B/4D-S8



PRK 3B/6D-S8.3  
 PRK 3B/6D,200-S8.3



IPRK 3B/4-S8



## Accessories:

(available separately • see page 70)

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

We reserve the right to make changes • 3B\_b01e.fm

## Specifications

### Optical data

Typ. op. range limit (TK(S) 100x100) <sup>1)</sup>	0.02 ... 6m
Operating range <sup>2)</sup>	see tables
Light source <sup>3)</sup>	LED (modulated light)
Wavelength	620nm (visible red light, polarised)

### Timing

Switching frequency	1000Hz
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 $U_B$
Bias current	≤ 14mA
Switching output <sup>5)</sup>	.../66 2 push-pull switching outputs pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching
	.../6 1 push-pull switching output pin 4: PNP light switching, NPN dark switching
	.../6D 1 push-pull switching output pin 4: PNP dark switching, NPN light switching
	.../4 1 PNP switching output light switching, 1 warning output
	.../4D 1 PNP switching output dark switching, pin 2: not connected <sup>6)</sup> light/dark switching
Function characteristics	
Signal voltage high/low	≥ ( $U_B - 2V$ ) ≤ 2V
Output current	max. 100mA
Sensitivity	fixed setting

### Indicators

LED green	ready
LED yellow	light path free
LED yellow flashing	light path free, no performance reserve

### 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	cable 2m (cross section 4x0.21 mm <sup>2</sup> ), connector M8 metal, cable 0.2m 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 <sup>8)</sup>	II for cable, III for metal plug
Protection class	IP 67, IP 69K
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2
Certifications	UL 508 <sup>4)</sup>

### Options

<b>Warning output autoControl warn</b>	PNP transistor, counting principle
Signal voltage high/low	≥ ( $U_B - 2V$ ) ≤ 2V
Output current	max. 100mA

- 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) Pin 2: unassigned, hence especially suitable for the connection to AS-interface I/O coupling modules
- 7) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 8) Rating voltage 50V

## Tables

Reflectors			Operating range	
1	TK(S)	100x100	0.02 ... 5.0m	
2	TK	40x60	0.02 ... 3.0m	
3	TK	20x40	0.02 ... 1.5m	
4	Tape 4	50x50	0.02 ... 1.2m	

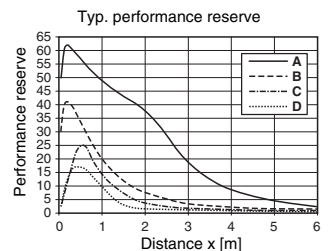
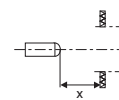
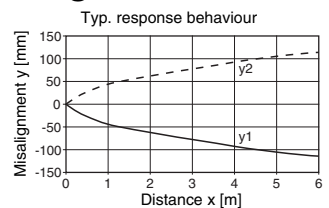
  

1	0.02			5	6
2	0.02		3	3.6	
3	0.02	1.5		2	
4	0.02	1.2	1.6		

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

TK ... = adhesive  
 TKS ... = screw type

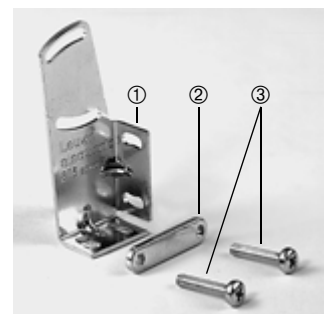
## Diagrams



- A TK 100x100
- B TKS 40x60
- C TKS 20x40
- D Tape 4: 50x50

## Remarks

Mounting system:



- ① = BT 3  
(Part No. 500 60511)
- ②+③ = BT 3.1 <sup>1)</sup>  
(Part No. 501 05585)
- ①+②+③ = BT 3B  
(Part No. 501 05546)

1) Packaging unit: PU = 10 pcs.



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

**Order guide**

Selection table		Order code →									
Equipment ↓		PRK 3B/66 Part No. 501 04693	PRK 3B/66-S8 Part No. 501 04694	PRK 3B/66, 200-S8 Part No. 501 04695	PRK 3B/66, 200-S12 Part No. 501 04696	PRK 3B/4D-S8 on request	IPRK 3B/4-S8 on request	PRK 3B/6-S8.3 on request	PRK 3B/6, 200-S8.3 on request	PRK 3B/6D-S8.3 on request	PRK 3B/6D, 200-S8.3 on request
Switching output	2 x Push-pull switching output	●	●	●	●						
	1 x Push-pull switching output							●	●	●	●
	1 x PNP output					●	●				
Switching function	1 PNP light switching and NPN dark switching output	●	●	●	●			●	●		
	1 PNP dark switching and NPN light switching output	●	●	●	●					●	●
	1 x PNP light switching output						●				
	1 x PNP dark switching output					●					
	1 warning output						●				
Connection	M8 connector, metal, 3-pin							●		●	
	M8 connector, metal, 4-pin		●			●	●				
	cable 2000mm	●									
	cable 200mm with M8 connector, 3-pin								●		●
	cable 200mm with M8 connector, 4-pin			●							
	cable 200mm with M12 connector, 4-pin				●						
	pin 2: not assigned, for connection to coupling modules					●					
Indicators	green LED: ready	●	●	●	●	●	●	●	●	●	●
	yellow LED: switching output	●	●	●	●	●	●	●	●	●	●





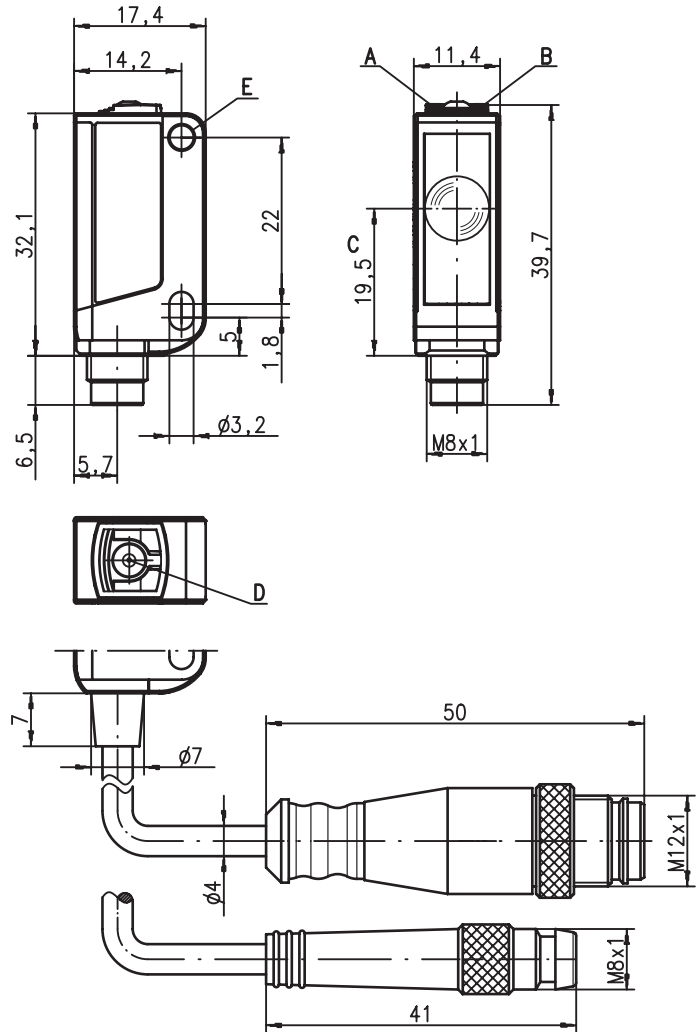


RKR 3B

Retro-reflective photoelectric sensor



Dimensioned drawing



- A Indicator diode green
- B Indicator diode yellow
- C Optical axis
- D Teach button
- E Attachment sleeve



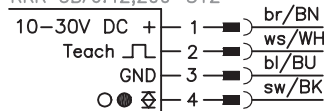
0 ... 1.8m



- Retro-reflective photoelectric sensor with visible red laser light and autocollimation principle
- Small and compact construction with robust plastic housing, protection class IP 67/ IP 69K for industrial application
- Low current consumption
- Push-pull output with light/dark switching via teach-in button
- High switching frequency for detection of fast events
- Specifically for transparent media (glass, PET, foils)
- Easy setting via lockable teach button or teach input
- May also be used with glass reflectors (TG)

Electrical connection

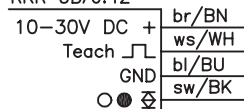
RKR 3B/6.42-S8  
 RKR 3B/6.42,200-S8  
 RKR 3B/6.42,200-S12



RKR 3B/4.48-S8



RKR 3B/6.42



RKR 3B/6.42-S8 .3  
 RKR 3B/6.42,200-S8 .3



Accessories:

- (available separately • see page 70)
- Mounting systems (BT 3...)
- Cable with M8 or M12 connector (K-D ...)
- Reflectors
- Reflective tapes

We reserve the right to make changes • 3B\_b04e.fm

## Specifications

### Optical data

Typ. op. range limit (TK(S) 100x100) <sup>1)</sup>	0 ... 1.8m
Operating range <sup>2)</sup>	see tables
Light source <sup>3)</sup>	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 $U_B$ <sup>4)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 15mA
Switching output <sup>5)</sup>	.../6.42
	1 push-pull switching output
	pin 4: PNP light switching, NPN dark switching
	pin 2: teach input
	.../6.42...-S8.3
	1 push-pull switching output
	pin 4: PNP light switching, NPN dark switching
	pin 2: activation input
	light/dark reversible
	.../4.48
	1 PNP switching output, light switching
	pin 2: activation input
	light/dark reversible
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 100mA
Sensitivity	setting via teach-in

### Indicators

LED green	ready
LED yellow	light path free

### 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	cable 2m (cross section 4x0.20mm <sup>2</sup> ), connector M8 metal, cable 2m with connector M8 or M12

### Environmental data

Ambient temp. (operation/storage)	-30°C ... +55°C / -30°C ... +70°C
Protective circuit <sup>6)</sup>	2, 3
VDE safety class <sup>7)</sup>	II for cable, III for metal plug
Protection class	IP 67, IP 69K
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2
Certifications	UL 508 <sup>4)</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) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 7) Rating voltage 50V

## Tables

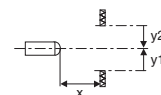
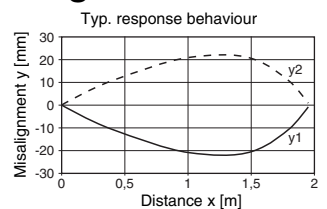
Reflectors			Operating range
1	TK(S)	100x100	0 ... 1.5m
2	TK	40x60	0 ... 1.0m
3	MTKS	50x50	0 ... 1.0m
4	TK	20x40	0 ... 0.5m

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

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

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

## Diagrams



## Remarks

Mounting system:



- ① = BT 3  
(Part No. 500 60511)
- ②+③ = BT 3.1 <sup>1)</sup>  
(Part No. 501 05585)
- ①+②+③ = BT 3B  
(Part No. 501 05546)

1) Packaging unit: PU = 10 pcs.

**RKR 3B**
**Retro-reflective photoelectric sensor**
**Order guide**

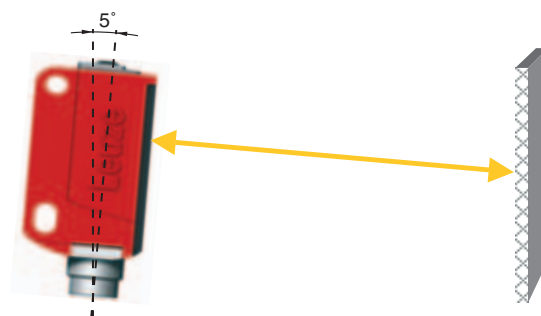
Selection table		Order code →						
Equipment ↓		RKR 3B/6.42 Part No. 501 04702	RKR 3B/6.42-S8 Part No. 501 04703	RKR 3B/6.42, 200-S8 Part No. 501 04704	RKR 3B/6.42, 200-S12 on request	RKR 3B/6.42-S8.3 on request	RKR 3B/6.42, 200-S8.3 on request	RKR 3B/4.48-S8 on request
Switching output	1 x Push-pull switching output	●	●	●	●	●	●	
	1 x PNP output							●
Switching function	light/dark switching configurable	●	●	●	●	●	●	
	light switching							●
Connection	M8 connector, metal, 3-pin					●		
	M8 connector, metal, 4-pin		●					●
	cable 2000mm	●						
	cable 200mm with M8 connector, 3-pin						●	
	cable 200mm with M8 connector, 4-pin			●				
	cable 200mm with M12 connector, 4-pin				●			
Configuration	teach-in via button (lockable) and teach input	●	●	●	●			
	teach-in via button (lockable)					●	●	●
Options	activation input							●
Indicators	green LED: ready	●	●	●	●	●	●	●
	yellow LED: switching output	●	●	●	●	●	●	●

**General information**

- The sensor is factory-adjusted for the detection of coloured glass.  
Recommendation: teach only if the desired objects are not reliably detected.
- The light spot may not exceed the reflector.
- Preferably use MTKS 50x50 reflectors.
- 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.

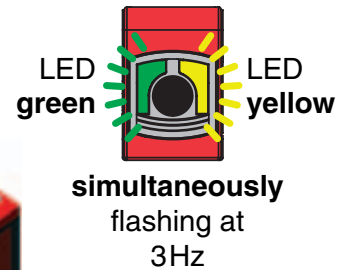
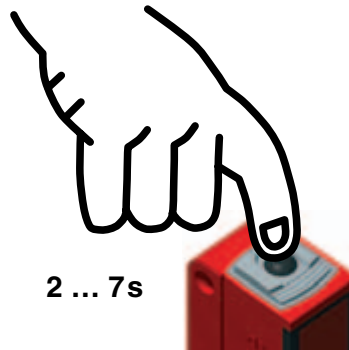


### Standard teaching for average sensor sensitivity (coloured glass)

- 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.

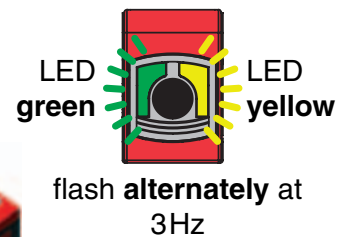
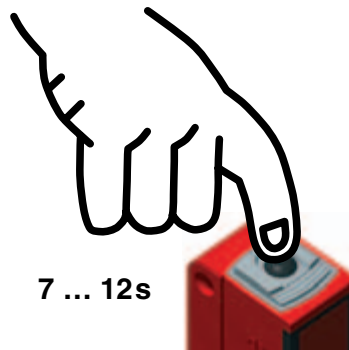


### Teaching for increased sensor sensitivity (clear glass, PET, foils)

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

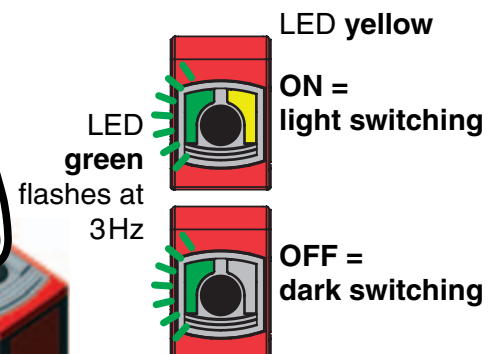
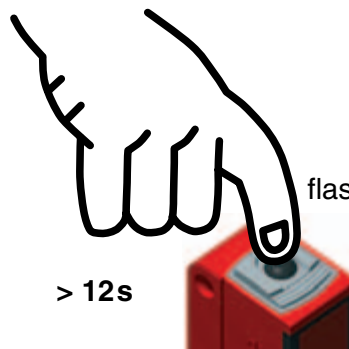


If the receive signal from the reflector is too weak, the sensor indicates the error status by means of fast and simultaneous flashing of the green and yellow LEDs. Please check the alignment, operating range, and soiling and carry out another teaching.



### Adjusting the switching behaviour of the switching output – light/dark switching

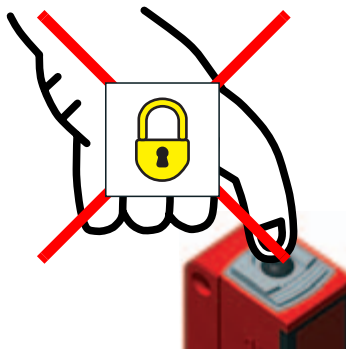
- Press teach button until the green LED flashes. The yellow LED displays the current setting of the switching output:  
ON = output switches on light  
OFF = output switches on dark
- Continue to press the teach button in order to change the switching behaviour.
- Release teach button.
- Ready.



**RKR 3B**
**Retro-reflective photoelectric sensor**
**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**

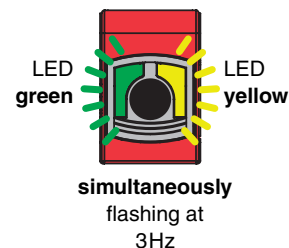
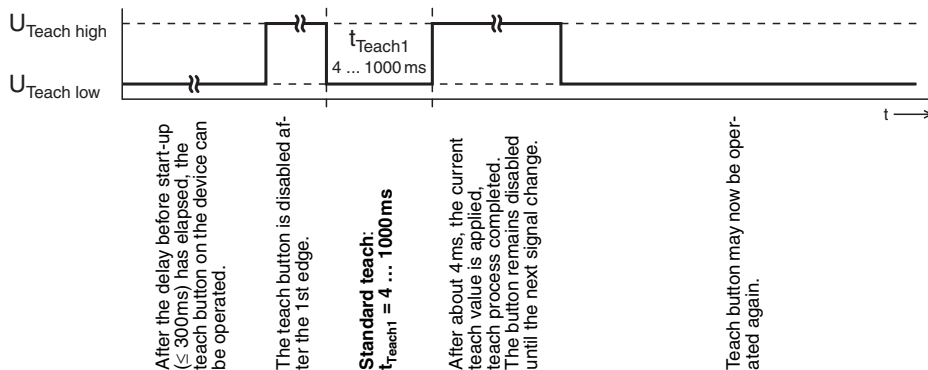
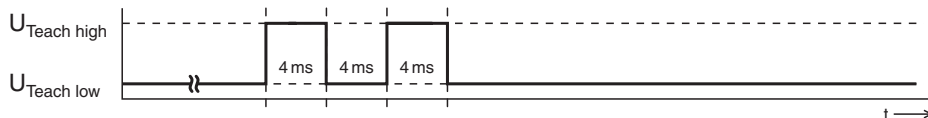

The following description applies to PNP switching logic!

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

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

**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 (coloured glass)**

**Quick standard teach**


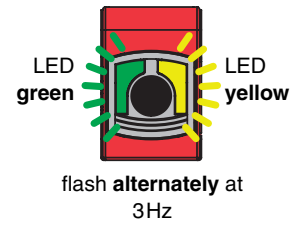
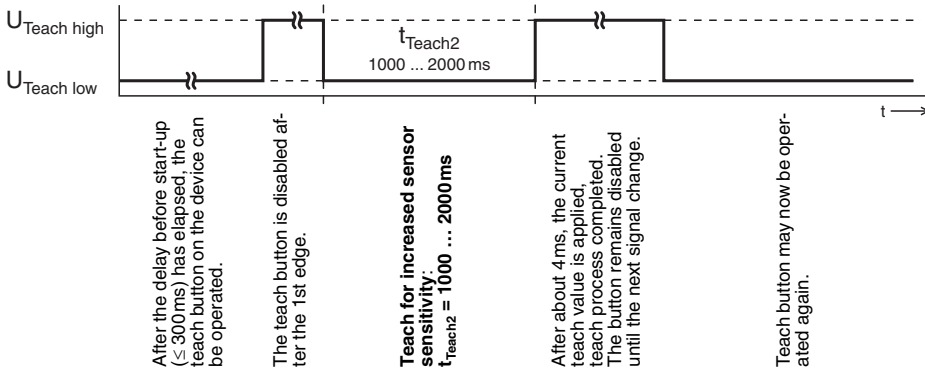
**shortest teaching duration for standard teaching: approx. 12ms**



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.

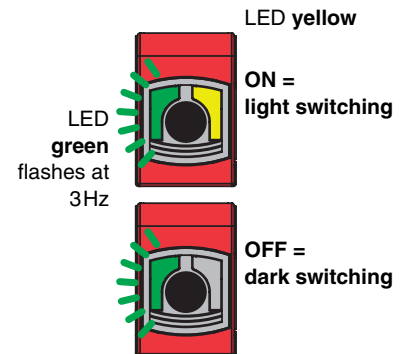
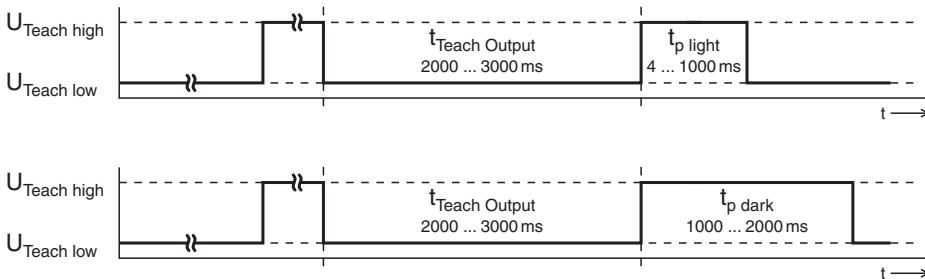


**Teaching for increased sensor sensitivity (clear glass, PET, foils)**



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 behaviour 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 behaviour of the switching output:**  
t<sub>Teach Output</sub> = 2000 ... 3000ms

**Switching output switches on light:**  
t<sub>p light</sub> = 4 ... 1000ms

**Switching output switches on dark:**  
t<sub>p dark</sub> = 1000 ... 2000ms

The button remains disabled until the next signal change.

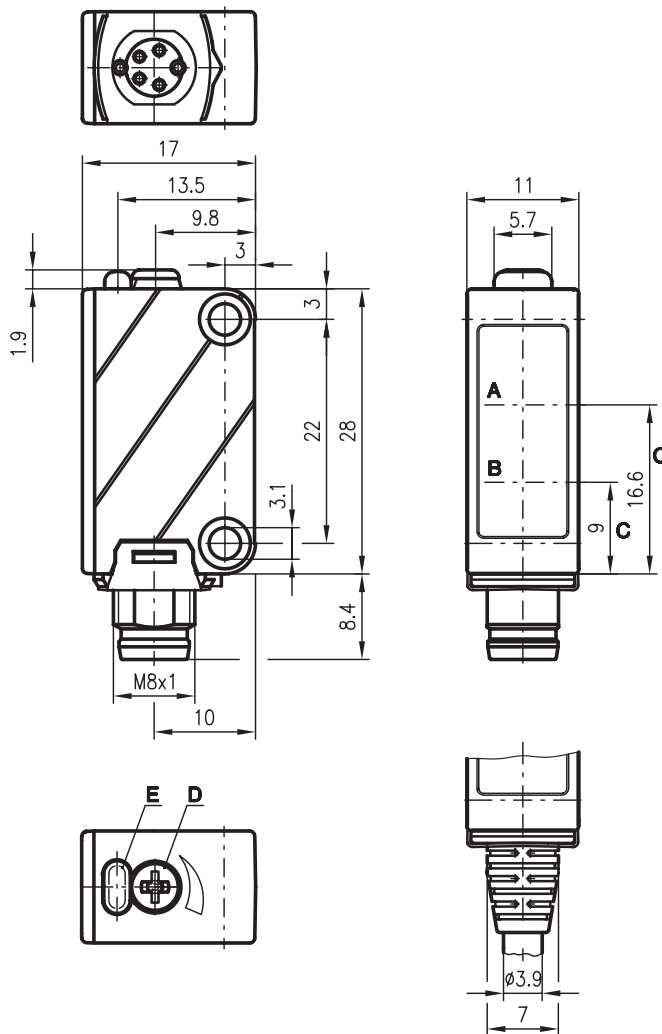


RTR 3

Energetic diffuse reflection light scanner



Dimensioned drawing



- A Receiver
- B Transmitter
- C Optical axis
- D Adjustment screw
- E Indicator diode

5 ... 500mm

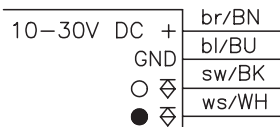


10 - 30 V  
DC

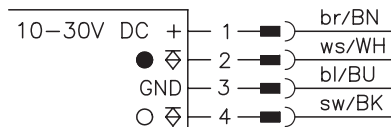
- Energetic scanner with sensitivity adjustment
- Visible red light for fast and easy alignment
- Small construction with robust plastic housing, protection class IP 67/IP 69K for industrial application
- High switching frequency for detection of fast events
- Complementary switching outputs for light/dark switching or as a control function

Electrical connection

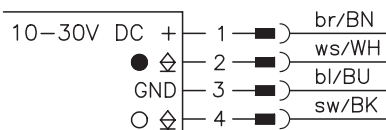
RTR 3/44-300



RTR 3/44-300-S8



RTR 3/22-300-S8



Accessories:

(available separately • see page 70)

- Mounting systems (BT 3...)
- M8 connectors (D M8A...)
- Ready-made cables (K-D ...)

We reserve the right to make changes • 3\_c01e.fm



## Specifications

### Optical data

Typ. scanning range limit <sup>1)</sup>	5 ... 500mm
Scanning range <sup>2)</sup>	see tables
Adjustment range	60 ... 500mm
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

### Timing

Switching frequency	1000Hz
Response time	0.5ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 25mA
Switching output	2 transistor outputs, complementary
Function characteristics	light/dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 100mA
Sensitivity	adjustable with multturn potentiometer

### Indicators

LED yellow	reflection
LED yellow flashing	reflection, no performance reserve

### Mechanical data

Housing	plastic
Optics cover	plastic (PMMA)
Weight	20g
Connection type	M8 connector (4-pin) or PUR cable 2m (cross section 4x0.2mm <sup>2</sup> )

### Environmental data

Ambient temp. (operation/storage)	-25°C ... +55°C / -40°C ... +70°C
Protective circuit <sup>3)</sup>	2, 3
VDE safety class <sup>4)</sup>	II, all-insulated
Protection class	IP 67, IP 69K <sup>5)</sup>
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 4) Rating voltage 250VAC
- 5) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

## Order guide

	Designation	Part No.
<b>With cable</b>		
With complementary PNP switching outputs	RTR 3/44-300	500 30921
<b>With M8 connector</b>		
With complementary PNP switching outputs	RTR 3/44-300-S8	500 30920
With complementary NPN switching outputs	RTR 3/22-300-S8	500 33310

## Tables

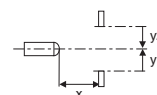
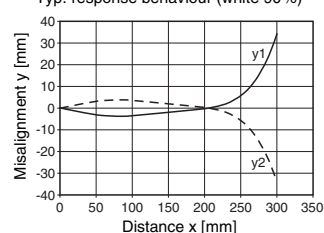
1	5	300	500
2	8	145	220
3	10	110	120

1	white 90%
2	grey 18%
3	black 6%

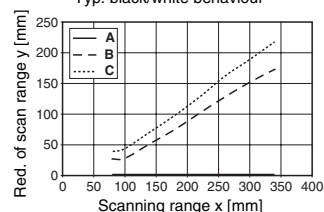
	Scanning range [mm]
	Typ. scanning range limit [mm]

## Diagrams

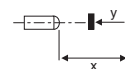
Typ. response behaviour (white 90%)



Typ. black/white behaviour



- A white 90%
- B grey 18%
- C black 6%



## Remarks

- With the set scanning range, a tolerance of the upper scanning range limit is possible depending on the reflection properties of the material surface.



# HRTR 3

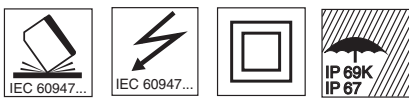
# Diffuse reflection light scanner with background suppression



7 ... 180mm

10 - 30 V  
DC

- Scanner with adjustable background suppression
- Very good black/white performance, exact adjustment via multiturn potentiometer
- Small construction with robust plastic housing, protection class IP 67/IP 69K for industrial application
- High switching frequency for detection of fast events

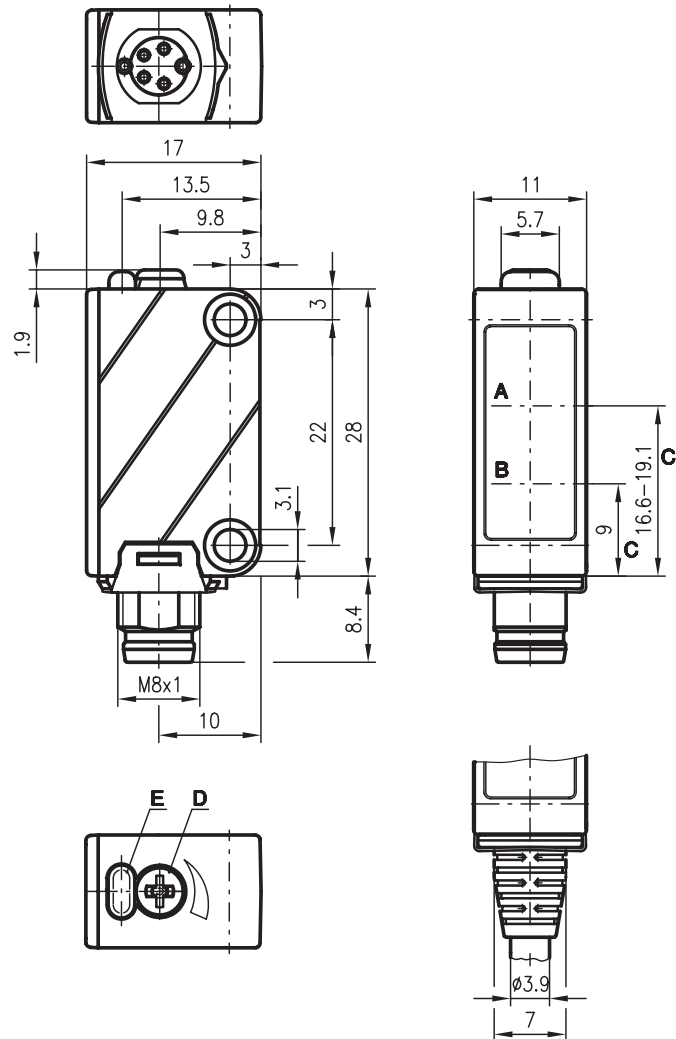


## Accessories:

(available separately • see page 70)

- Mounting systems (BT 3...)
- M8 connectors (D M8A...)
- Ready-made cables (K-D ...)

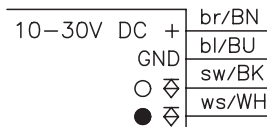
## Dimensioned drawing



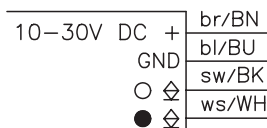
- A Receiver
- B Transmitter
- C Optical axis
- D Adjustment screw
- E Indicator diode

## Electrical connection

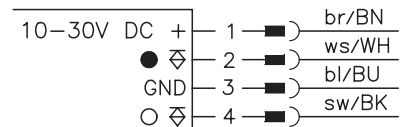
HRTR 3/44-150, 5000  
HRTR 3/44-150



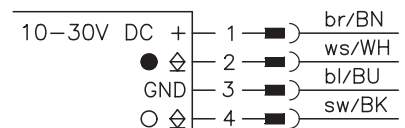
HRTR 3/22-150



HRTR 3/44-65-S8  
HRTR 3/44-150-S8



HRTR 3/22-150-S8



We reserve the right to make changes • 3\_d02e.fm

### Specifications

#### Optical data

Typ. scanning range limit <sup>1)</sup>	7 ... 180mm
Scanning range <sup>2)</sup>	see tables
Adjustment range	25 ... 180mm
Light beam characteristic	focussed at 110mm
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

#### Timing

Switching frequency	1000Hz
Response time	0.5ms
Delay before start-up	≤ 100ms

#### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 25mA
Switching output	2 transistor outputs, complementary
Function characteristics	light/dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) ≤ 2V
Output current	max. 100mA

#### Indicators

LED yellow	reflection
------------	------------

#### Mechanical data

Housing	plastic
Optics cover	plastic (PMMA)
Weight	20g
Connection type	M8 connector (4-pin) or PUR cable 2m/5m (cross section 4x0.2mm <sup>2</sup> )

#### Environmental data

Ambient temp. (operation/storage)	-25 °C ... +55 °C / -40 °C ... +70 °C
Protective circuit <sup>3)</sup>	2, 3
VDE safety class <sup>4)</sup>	II, all-insulated
Protection class	IP 67, IP 69K <sup>5)</sup>
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 4) Rating voltage 250VAC
- 5) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

### Tables

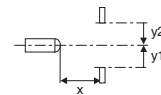
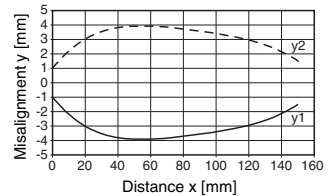
1	7	150	180
2	10	148	175
3	15	144	169

1	white 90%
2	grey 18%
3	black 6%

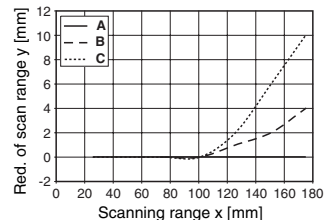
- Scanning range [mm]
- Typ. scanning range limit [mm]

### Diagrams

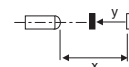
Typ. response behaviour (white 90%)



Typ. black/white behaviour



- A white 90%
- B grey 18%
- C black 6%



### Order guide

Selection table		Order code →	HRTR 3/44-150 Part No. 500 30925	HRTR 3/44-150-S8 Part No. 500 30924	HRTR 3/44-150, 5000 Part No. 500 37144	HRTR 3/22-150 Part No. 500 32368	HRTR 3/22-150-S8 Part No. 500 82277	HRTR 3/44-65-S8 Part No. 500 39581
Equipment ↓	Switching output	PNP transistor	●	●	●			●
		NPN transistor				●	●	
		light/dark switching	●	●	●	●	●	●
Connection	M8 connector			●			●	●
	cable 5000mm			●				
	cable 2000mm	●			●			
Scanning range preset to 65mm								●

### Remarks

- With the set scanning range, a tolerance of the upper scanning range limit is possible depending on the reflection properties of the material surface.

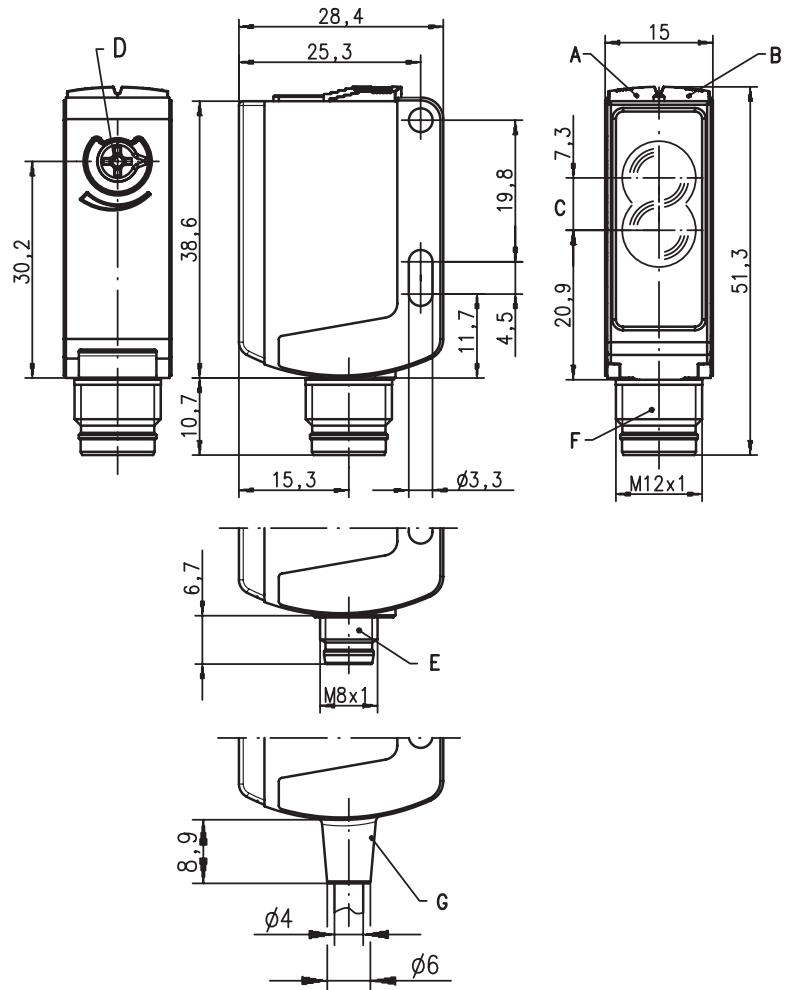


PRK 25B

Retro-reflective photoelectric sensors with polarisation filter



Dimensioned drawing



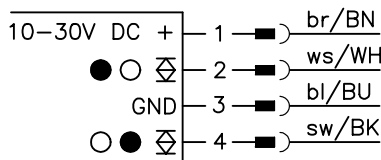
- A Indicator diode green
- B Indicator diode yellow
- C Optical axis
- D Sensitivity adjustment
- E Connector M8x1
- F Connector M12x1
- G Cable

0.05 ... 10m

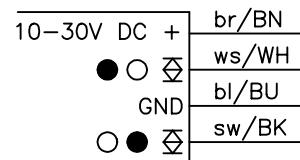
- Polarised retro-reflective photoelectric sensor with visible red light
- High performance reserve
- Small and compact construction with robust plastic housing, protection class IP 67/ IP 69K for industrial application
- Fast alignment through *brightVision*®
- A²LS - Active Ambient Light Suppression
- Push-pull switching outputs
- High switching frequency for detection of fast events
- Warning output for increased availability
- Sensitivity adjustment

Electrical connection

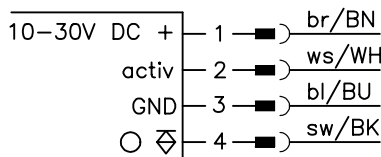
PRK 25B/66-S8  
 PRK 25B/66-S12  
 PRK 25B/66, 200-S12  
 PRK 25B/66.1-S12



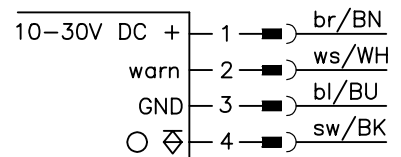
PRK 25B/66



PRK 25B/4.8-S12



IPRK 25B/4-S12  
 IPRK 25B/4, 200-S12



Accessories:

(available separately • see page 70)

- Mounting systems (BT 25, UMS 25...)
- Cable with M8 or M12 connector (K-D ...)
- Reflectors
- Reflective tapes

We reserve the right to make changes • 25B\_b01e.fm

## Specifications

### Optical data

Typ. op. range limit (TK(S) 100x100) <sup>1)</sup>	0.05 ... 10m
Operating range <sup>2)</sup>	see tables
Light source <sup>3)</sup>	LED (modulated light)
Wavelength	620nm (visible red light, polarised)

### Timing

Switching frequency	500Hz
Response time	1ms
Delay before start-up	≤ 300ms

### Electrical data

Operating voltage $U_B$ <sup>4)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 20mA
Switching output <sup>5)</sup>	2 push-pull switching outputs
	pin 2: PNP dark switching, NPN light switching
	pin 4: PNP light switching, NPN dark switching
IPRK.../4	1 PNP switching output light switching, 1 warning output
.../4.8	1 PNP switching output light switching, 1 activation input
Function characteristics	light/dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 100mA
Sensitivity	fixed setting, adjustable with potentiometer for ".1 types"

### Indicators

LED green	ready
LED yellow	light path free
LED yellow flashing	light path free, no performance reserve

### Mechanical data

Housing	plastic (PC-ABS)
Optics cover	plastic (PMMA)
Weight	with connector: 15g
	with 200mm cable and connector: 30g
	with 2m cable: 55g
Connection type	cable 2m (cross section 4x0.21 mm <sup>2</sup> ), connector M8 or M12, cable 0.2m with connector M12

### Environmental data

Ambient temp. (operation/storage)	-30°C ... +55°C / -30°C ... +60°C
Protective circuit <sup>6)</sup>	2, 3
VDE safety class <sup>7)</sup>	II
Protection class	IP 67, IP 69K
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2
Certifications	UL 508 <sup>4)</sup>

### Options

<b>Warning output autoControl warn</b>	PNP transistor, counting principle
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 100mA
<b>Activation input activ</b>	
Transmitter active/not active	≥ 8V / ≤ 2V
Activation/disable delay	≤ 1ms
Input resistance	10KΩ ± 10%

- 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) 2=polarity reversal protection, 3=short-circuit protection for all transistor outputs
- 7) Rating voltage 50V

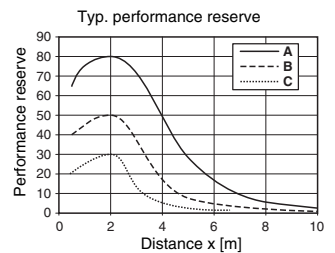
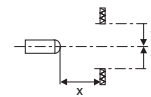
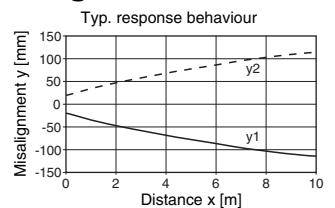
## Tables

Reflectors			Operating range	
1	TK(S) 100x100		0.05 ... 8.0m	
2	TK(S) 40x60		0.05 ... 4.0m	
3	TK(S) 20x40		0.05 ... 2.5m	
1	0.05		8	10
2	0.05	4		5
3	0.05	2.5		3

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

TK ... = adhesive  
 TKS ... = screw type

## Diagrams




- A TK(S) 100x100
- B TK(S) 40x60
- C TK(S) 20x40

## Remarks



**PRK 25B Retro-reflective photoelectric sensors with polarisation filter**

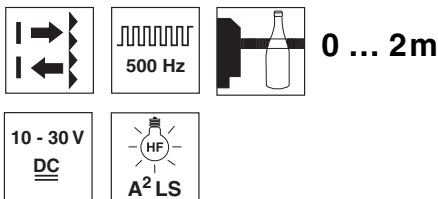
**Order guide**

Selection table		PRK 25B/66-S12 Part No. 501 04223	PRK 25B/66-S8 Part No. 501 04224	PRK 25B/66 Part No. 501 04225	PRK 25B/66, 200-S12 Part No. 501 04226	PRK 25B/4.8-S12 Part No. 501 04227	IPRK 25B/4-S12 Part No. 501 04228	IPRK 25B/4, 200-S12 Part No. 501 04229	PRK 25B/66.1-S12 Part No. 501 04230	
Equipment ↓		Order code →								
Switching output	2 x Push-pull switching output	●	●	●	●				●	
	1 x PNP output					●				
	2 x PNP output						●	●		
Switching function	1 PNP light switching and NPN dark switching output	●	●	●	●				●	
	1 PNP dark switching and NPN light switching output	●	●	●	●				●	
	1 x PNP light switching output					●	●	●		
	1 warning output						●	●		
Connection	M8 connector, 4-pin		●							
	M12 connector, 4-pin	●				●	●		●	
	cable 2000mm			●						
	cable 200mm with M12 connector, 4-pin				●			●		
Indicators	green LED: ready	●	●	●	●	●	●	●	●	
	yellow LED: light path free	●	●	●	●	●	●	●	●	
Options	sensitivity adjustment via potentiometer								●	
	 activation input					●				
	high performance reserve	●	●	●	●	●	●	●	●	

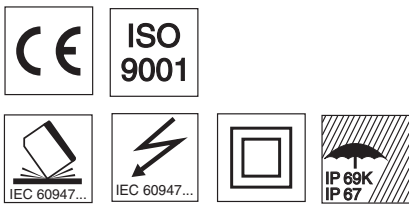


## PRK 25

## Retro-reflective photoelectric sensors



- Polarised retro-reflective photoelectric sensors for safe detection of transparent media (e.g. clear glass or PE bottles)
- The autocollimation principle used ensures that the device functions reliably over the entire range (0 ... max.)
- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- Sensitivity adjustment

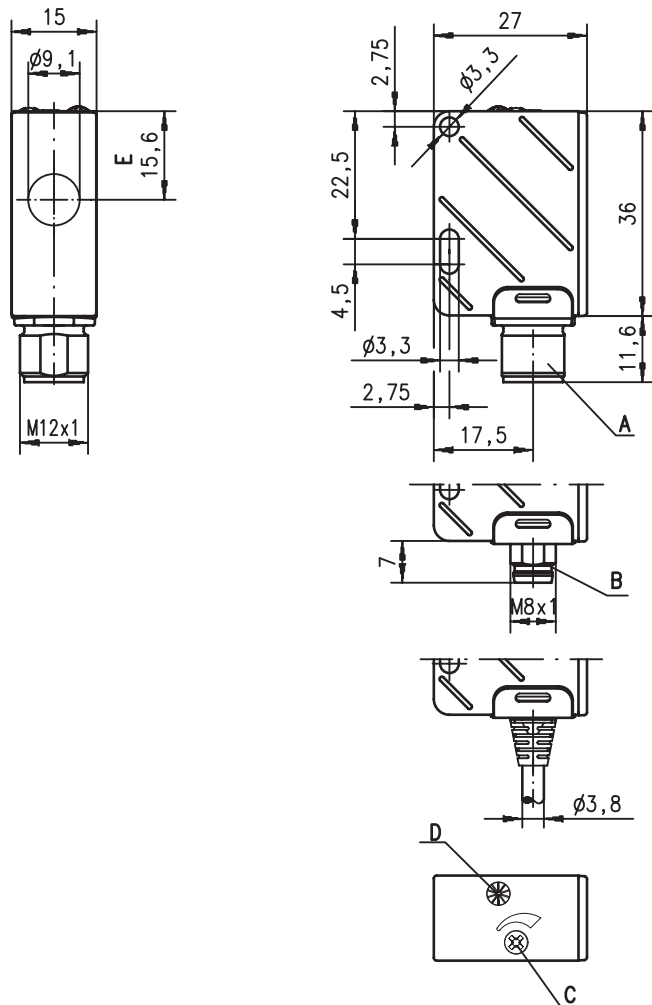


### Accessories:

(available separately • see page 70)

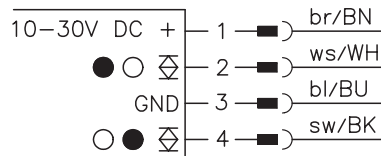
- M12 connectors (KD ...)
- Ready-made cables (K-D ...)
- Mounting systems
- Reflectors
- Reflective tapes

### Dimensioned drawing



- A M12 connector
- B M8 connector
- C Sensitivity adjustment
- D Indicator diode
- E Optical axis

### Electrical connection







## Specifications

### Optical data

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

### Timing

Switching frequency	500Hz
Response time	1ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 20mA
Switching output/function	/66 ... 2 push-pull switching outputs <sup>3)</sup> pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching ≥ ( $U_B - 2V$ )/≤ 2V max. 100mA adjustable with multiturn potentiometer
Signal voltage high/low	
Output current	
Sensitivity	

### Indicators

LED yellow	light path free
------------	-----------------

### Mechanical data

Housing	plastic
Optics cover	plastic
Weight (plug/cable)	15g/55g
Connection type	M8 and M12 connector, 4-pin, or cable: 2000mm, 4x0.2mm <sup>2</sup>

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit <sup>4)</sup>	2, 3
VDE safety class <sup>5)</sup>	II, all-insulated
Protection class	IP 67, IP 69K <sup>6)</sup>
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. operating range limit: max. attainable range without performance reserve
- 2) Operating range: recommended range with performance reserve
- 3) The push-pull switching outputs must not be connected in parallel
- 4) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 5) Rating voltage 250VAC
- 6) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

## Order guide

	Designation	Part No.
With M12 connector	PRK 25/66.41-S12	501 01457
With M8 connector	PRK 25/66.41-S8	501 01978
With 2m cable	PRK 25/66.41	501 01977

## Tables

Reflectors			Operating range
1	TK(S)	100x100	0 ... 1.7m
2	MTK(S)	50x50	0 ... 1.2m
3	TK(S)	30x50	0 ... 0.9m
4	TK(S)	20x40	0 ... 0.7m
5	Tape 2	100x100	0 ... 0.2m

1	0		1.7	2
2	0	1.2	1.4	
3	0	0.9	1.1	
4	0	0.7	0.8	
5	0	0.2	0.25	

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

- TK ... = adhesive  
 TKS ... = screw type  
 Tape 2 = adhesive

## Diagrams

## Remarks

- Preferably use MTK(S) ...

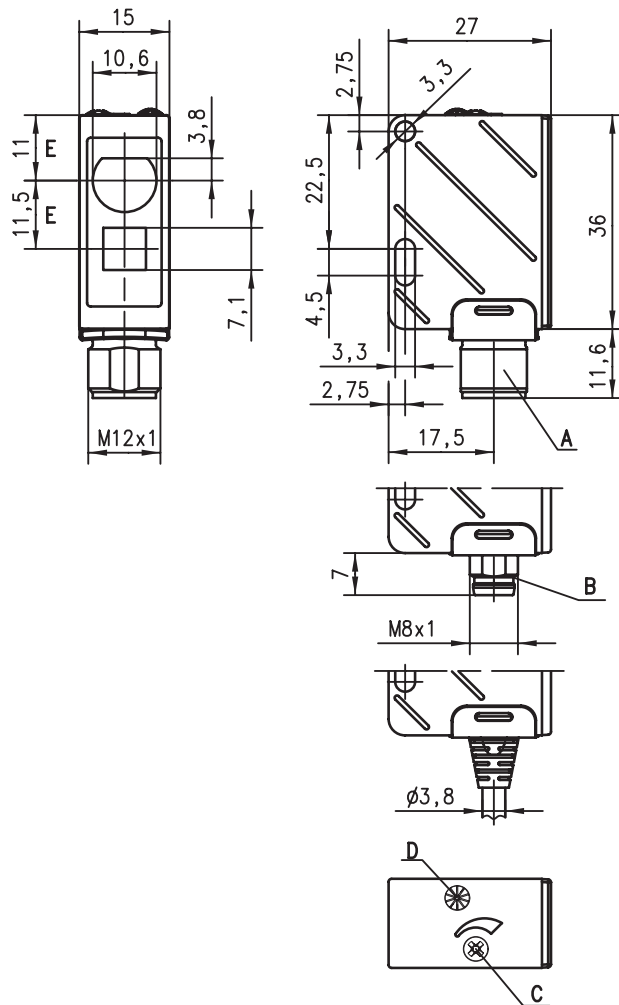


RTR 25

Energetic diffuse reflection light scanner



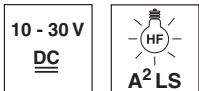
Dimensioned drawing



- A M12 connector
- B M8 connector
- C Scanning range adjustment
- D Indicator diode
- E Optical axis

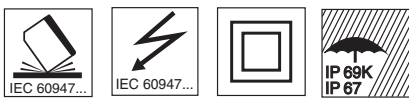
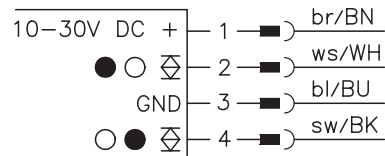


5 ... 800 mm



- Adjustable scanning range
- A<sup>2</sup>LS - active suppression of extraneous light
- Push-pull switching outputs

Electrical connection



Accessories:

(available separately • see page 70)

- M12 connectors (KD ...)
- Ready-made cables (K-D ...)
- Mounting systems

We reserve the right to make changes • 25\_d03e.fm

## Specifications

### Optical data

Typ. scanning range limit (white 90%) <sup>1)</sup>	5 ... 800mm
Scanning range <sup>2)</sup>	see tables
Mechanical adjustment range	40 ... 800mm
Light source	LED (modulated light)
Wavelength	660nm (red light)

### Timing

Switching frequency	500Hz
Response time	1ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 20mA
Switching output/function	2 push-pull switching outputs <sup>3)</sup> pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) ≤ 2V
Output current	max. 100mA
Scanning range adjustment	mechanical via multiturn potentiometer

### Indicators

LED yellow	object detected
------------	-----------------

### Mechanical data

Housing	plastic
Optics cover	plastic
Weight (plug/cable)	15g/55g
Connection type	M8 and M12 connector, 4-pin, or cable 2000mm, 4x0.25mm <sup>2</sup>

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit <sup>4)</sup>	2, 3
VDE safety class <sup>5)</sup>	II, all-insulated
Protection class	IP 67, IP 69K <sup>6)</sup>
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) The push-pull switching outputs must not be connected in parallel
- 4) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 5) Rating voltage 250VAC
- 6) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

## Order guide

	Designation	Part No.
With M12 connector	RTR 25/66-700-S12	500 39545
With M8 connector	RTR 25/66-700-S8	500 39544
With 2m cable	RTR 25/66-700	500 39543

## Tables

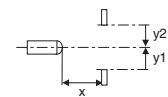
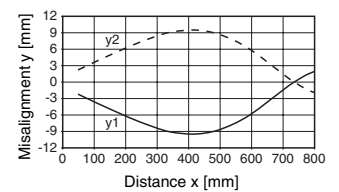
1	7	700	800
2	9	480	530
3	12	380	400

1	white 90%
2	grey 18%
3	black 6%

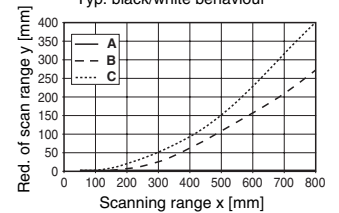
<input type="checkbox"/>	Scanning range [mm]
<input type="checkbox"/>	Typ. scanning range limit [mm]

## Diagrams

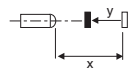
Typ. response behaviour (white 90%)



Typ. black/white behaviour



- A white 90%
- B grey 18%
- C black 6%



## Remarks

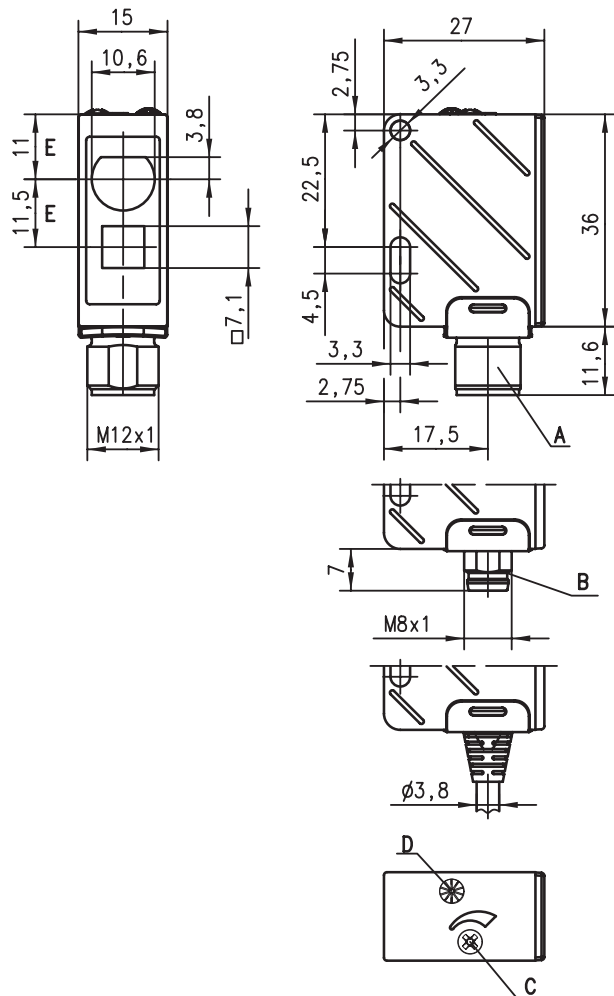


# HRTR 25

# Diffuse reflection light scanner with background suppression



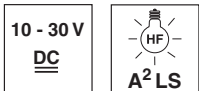
## Dimensioned drawing



- A M12 connector
- B M8 connector
- C Scanning range adjustment
- D Indicator diode
- E Optical axis

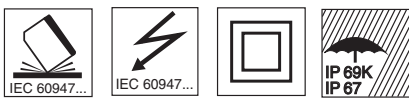
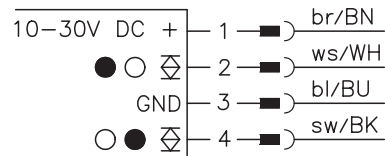


5 ... 400 mm  
(800mm)



- Adjustable background suppression
- A²LS - active suppression of extraneous light
- Push-pull switching outputs

## Electrical connection



### Accessories:

(available separately • see page 70)

- M12 connectors (KD ...)
- Ready-made cables (K-D ...)
- Mounting systems

We reserve the right to make changes • 25\_d02e.fm

## Specifications

### Optical data

Typ. scanning range limit (white 90%) <sup>1)</sup>	5 ... 400mm (800mm)
Scanning range <sup>2)</sup>	see tables
Mechanical adjustment range	40 ... 400mm
Light source	LED (modulated light)
Wavelength	660nm (red light)

### Timing

Switching frequency	500Hz
Response time	1ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 20mA
Switching output/function	2 push-pull switching outputs <sup>3)</sup> pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) ≤ 2V
Output current	max. 100mA
Scanning range adjustment	mechanical via multiturn potentiometer

### Indicators

LED yellow	object detected
------------	-----------------

### Mechanical data

Housing	plastic
Optics cover	plastic
Weight (plug/cable)	15g/55g
Connection type	M8 and M12 connector 4-pin or cable 2000mm, 4x0.2mm <sup>2</sup>

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit <sup>4)</sup>	2, 3
VDE safety class <sup>5)</sup>	II, all-insulated
Protection class	IP 67, IP 69K <sup>6)</sup>
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) The push-pull switching outputs must not be connected in parallel
- 4) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 5) Rating voltage 250VAC
- 6) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

## Tables

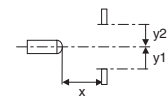
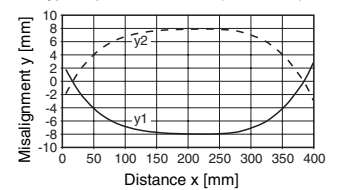
1	7	300	400 ... 800
2	9	270	340 ... 530
3	12	250	300 ... 400

1	white 90%
2	grey 18%
3	black 6%

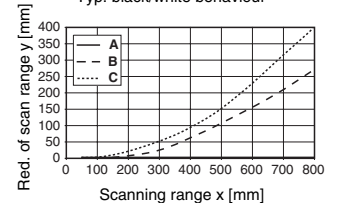
	Scanning range [mm]
	Typ. scanning range limit [mm]

## Diagrams

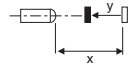
Typ. response behaviour (white 90%)



Typ. black/white behaviour



- A white 90%
- B grey 18%
- C black 6%



## Order guide

	Designation	Part No.
With M12 connector	HRTR 25/66-300-S12	500 39548
With M8 connector	HRTR 25/66-300-S8	500 39547
With 2m cable	HRTR 25/66-300	500 39546

## Remarks



# *Forked sensors for the detection of small parts*

## *Overview and advantages*

Wide range of models with robust metal housing and glass cover

LED and laser models available

PNP or NPN switching outputs

High switching frequency of up to 3000Hz for detection of fast events

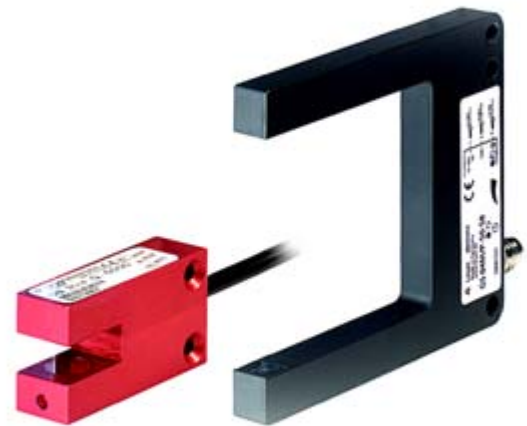
Mouth widths from 8mm to 220mm

Connection via M8 connector or cable

Sensitivity adjustment and light/dark switching on back side of fork

Applications:

- Detection of small parts > 0.3mm
- Detection of very small parts > 0.06mm
- Counting function

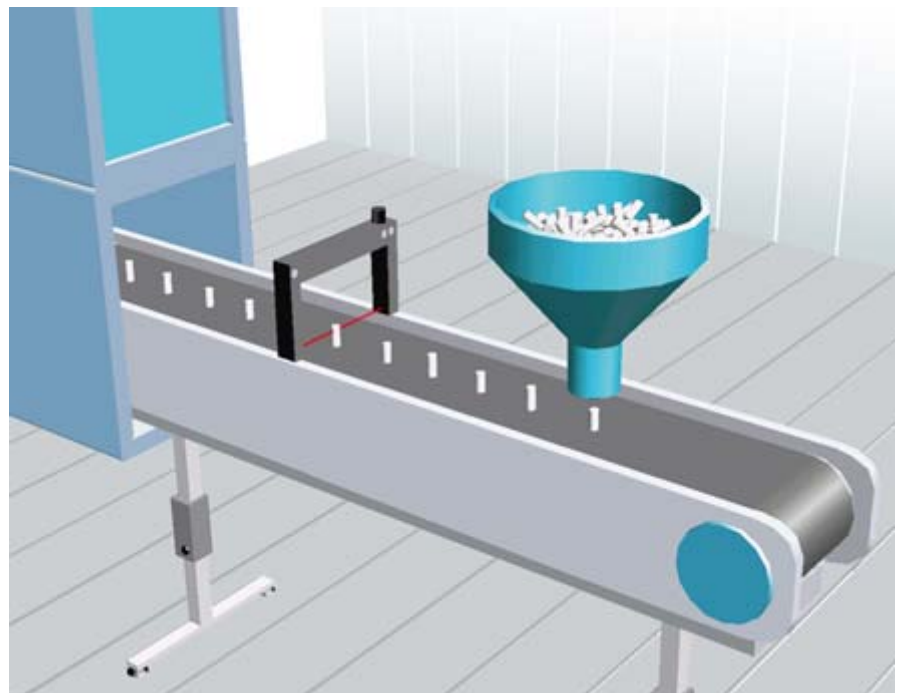






## *Features of forked sensors for the detection of small parts*

- Detection of small and very-small parts
- Counting parts



### **Optical forked sensors for the detection of small parts GS 04, GS 21**




- ✓ **Advantage 1:** High switching frequency for detection of fast events
- ✓ **Advantage 2:** Broad range of models with all common fork widths
- ✓ **Advantage 3:** Sensitivity adjustment and light/dark switching on back side of fork



### **Optical laser forked sensors for the detection of small parts GSL 04**

- ✓ **Advantage 1:** Laser-generated red light for high-precision applications
- ✓ **Advantage 2:** High switching frequency: 3000Hz
- ✓ **Advantage 3:** Highest resolution and reproducibility with small switching hysteresis for high-precision applications



Operating principle	Designation	Mouth width [mm]	Mouth depth [mm]	Operating voltage			Output								
				10 ... 30VDC	18 ... 30VDC	24VDC	1xAnalogue Output (Voltage)	1xAnalogue Output (Current)	2xAnalogue Output (Voltage)	2xAnalogue Output (Current)	1xRS 232	1xRS 422/RS 485	1xOutput PNP	1xOutput NPN	2xOutput PNP
	Optical forked sensors for the detection of small parts														
	GS 21/4 G	8	17			•							•		
	GS 04M/P-20-S8	20	24	•									•		
	GS 04M/P-30-S8	30	34	•									•		
	GS 04M/N-30-S8	30	34	•										•	
	GS 04M/P-50-S8	50	54	•									•		
	GS 04M/N-50-S8	50	54	•										•	
	GS 04M/P-80-S8	80	54	•									•		
	GS 04M/N-80-S8	80	54	•										•	
	GS 04M/P-120-S8	120	54	•									•		
	GS 04M/N-120-S8	120	54	•										•	
	GS 04M/P-220-S8	220	114	•									•		
	GS 04M/N-220-S8	220	114	•										•	
	Optical laser forked sensors for the high-precision detection of small parts														
	GSL 04M/P-30-S8	30	34	•									•		
	GSL 04M/P-50-S8	50	54	•									•		
	GSL 04M/P-80-S8	80	54	•									•		

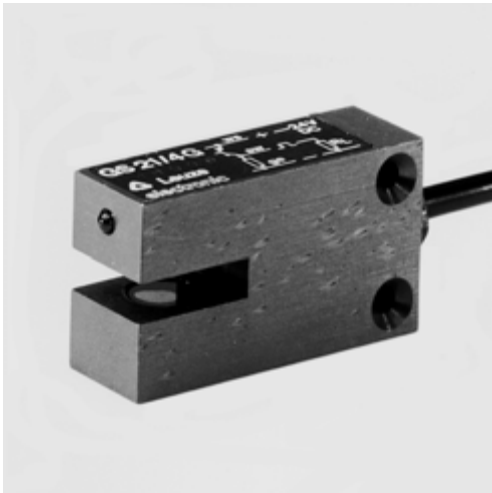


Switching frequency	Connection				Detection of			Options Configuration interface	Page
	M8 connector (3-pin)	M12 connector (5-pin)	M12 connector (8-pin)	Cable (3-wire), 5m long	Small parts	Very small parts	Edge / diameter / multiple objects		
1000Hz				•	•				<b>51</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
1500Hz	•				•				<b>53</b>
3000Hz	•				•	•			<b>55</b>
3000Hz	•				•	•			<b>55</b>
3000Hz	•				•	•			<b>55</b>

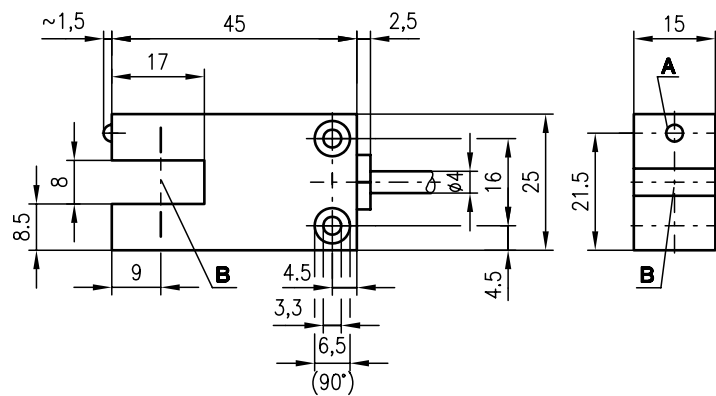


GS 21

Forked photoelectric sensors



Dimensioned drawing



A Indicator diode
B Optical axis

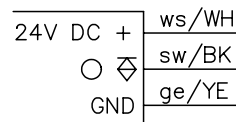


8mm



- GaAs top photoelectric sensor in constant light operation with gallium arsenide transmitter diode ensures a long lifetime
• Fast amplifier with high switching frequency for detection of short events (e.g. gaps between labels)
• Transistor output - separate switching amplifier not required
• Insensitive to interference due to low impedance output
• Indicator diode displays the switching state

Electrical connection



Accessories:

We reserve the right to make changes • GS\_a13e.fm



### Specifications

<b>Optical data</b>	
Mouth width	8mm
<b>Timing</b>	
Switching frequency	1000Hz
Response time	0.5ms
<b>Electrical data</b>	
Operating voltage $U_B$ <sup>1)</sup>	24VDC, filtered $\pm 10\%$
Residual ripple	$\leq 15\%$ of $U_B$
Bias current	$\leq 90mA$
Switching output	1 PNP transistor output
Function characteristics	light switching
Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
Output current	100mA
<b>Indicators</b>	
LED red	light path free
<b>Mechanical data</b>	
Housing	aluminium, anodised
Weight	120g
Connection type	cabl 5000mm (cross section 3x0.25mm <sup>2</sup> )
<b>Environmental data</b>	
Ambient temp. (operation/storage)	-20°C ... +60°C / -30°C ... +70°C
Protective circuit <sup>2)</sup>	1, 2
VDE safety class	III
Protection class	IP 65

### Tables

### Diagrams

### Remarks

### Order guide

Designation	Part No.
GS 21/4 G	500 13967



## GS 04

## Forked photoelectric sensors



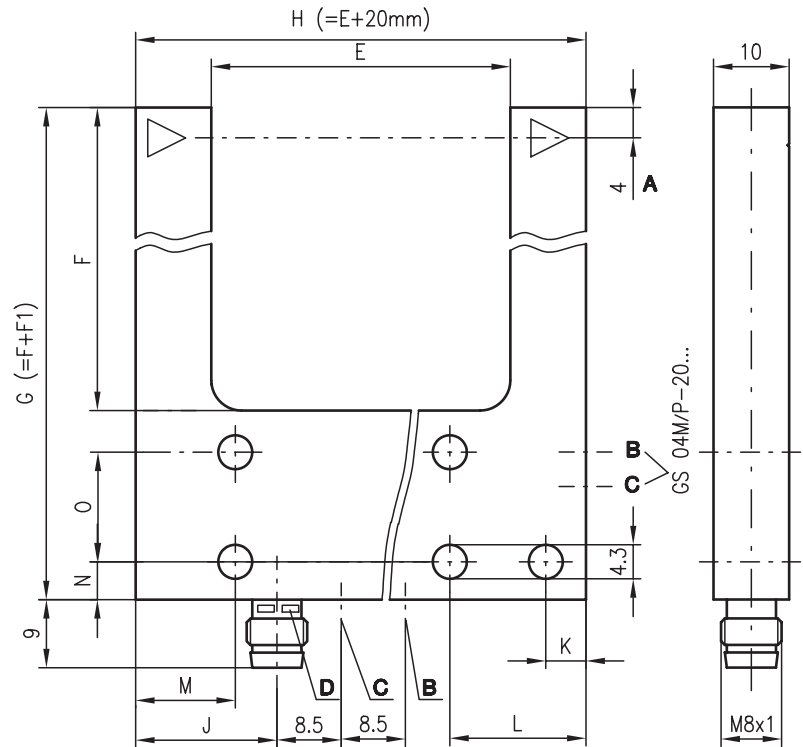
20/30/50/80/120/220 mm

10 - 30 V  
DC

1,5 kHz

- Sensitivity adjustment and light/dark switching for optimal adaptation to the application
- Sensitivity adjustment on the back of the fork
- Robust metal housing and glass optics for protection against environmental influences
- Transmitter and receiver are installed in the same housing, therefore easy and fast mounting (excessive mounting brackets and extensive alignment not necessary)

### Dimensioned drawing

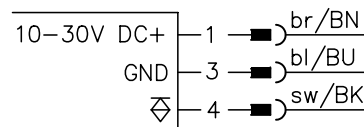


- A** Optical axis
- B** Sensitivity adjustment
- C** Light/dark switching
- D** Indicator diode

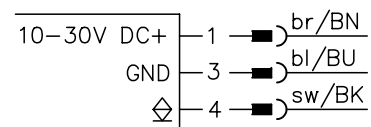
	E Mw	F Mt	F1	G	H	J	K	L	M	N	O
GS 04M/...-20...	20	24	25	49	40	6	4.5	12.5	-	4.5	-
GS 04M/...-30...	30	34	25	59	50	12	4.5	12.5	4.5	4.5	-
GS 04M/...-50...	50	54	25	79	70	12	4.5	12.5	4.5	4.5	-
GS 04M/...-80...	80	54	25	79	100	12	4.5	12.5	4.5	4.5	-
GS 04M/...-120...	120	54	30	84	140	37	-	18	22	5	20
GS 04M/...-220...	220	114	30	144	240	37	-	18	22	5	20

### Electrical connection

GS 04 M/P....



GS 04 M/N....



### Accessories:

(available separately • see page 66)

- M8 connectors (KD ...)
- Cable with M8 connector (K-D...)

We reserve the right to make changes • gs\_a33e.fm





## Specifications

### Optical data

Mouth width	20/30/50/80/120/220 mm
Light source	LED (modulated light)
Wavelength	640nm red light

### Timing

Switching frequency	1500Hz
Response time	0.33ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$ <sup>1)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 35mA
Switching output	PNP/NPN transistor output
Function characteristics	light/dark switching reversible
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	200 mA
Sensitivity	adjustable

### Indicators

LED red	light path free
---------	-----------------

### Mechanical data

Housing	aluminium, anodised
Weight	see order guide
Optics cover	glass
Connection type	M8 connector, 3-pin

### Environmental data

Ambient temp. (operation/storage)	-10 °C ... +60 °C / -20 °C ... +70 °C
Protective circuit <sup>2)</sup>	1, 2
VDE safety class	III
Protection class	IP 65

1) Functional extra-low voltage with reliable disconnection or protective extra-low voltage (VDE 0100/T 410)

2) 1=polarity reversal protection, 2=short-circuit protection for all outputs

Resolution (smallest object)

Mouth width [mm]	Resolution [mm]	Reproducibility [mm]	Switching hysteresis [mm]
20	0.3	0.02	≤ 0.1
30	0.3	0.02	≤ 0.1
50	0.5	0.04	≤ 0.15
80	0.5	0.06	≤ 0.2
120	0.8	0.08	≤ 0.2
220	0.8	0.08	≤ 0.2

## Order guide

Selection table		GS 04MP-20-S8 Part No. 501 02550	GS 04MP-30-S8 Part No. 500 41520	GS 04MN-30-S8 Part No. 500 41679	GS 04MP-50-S8 Part No. 500 41521	GS 04MN-50-S8 Part No. 500 41677	GS 04MP-80-S8 Part No. 500 41522	GS 04MN-80-S8 Part No. 500 41678	GS 04MP-120-S8 Part No. 500 41523	GS 04MN-120-S8 Part No. 500 41552	GS 04MP-220-S8 Part No. 500 41524	GS 04MN-220-S8 Part No. 500 41553
Order code →												
Equipment ↓												
Mouth width [mm]		20	30	30	50	50	80	80	120	120	220	220
Weight in g		28	36	36	54	54	77	77	118	118	220	220
Transistor output	PNP	●	●		●		●		●		●	
	NPN			●		●		●		●		●

## Tables

## Diagrams

## Remarks



GSL 04

Laser forked photoelectric sensors



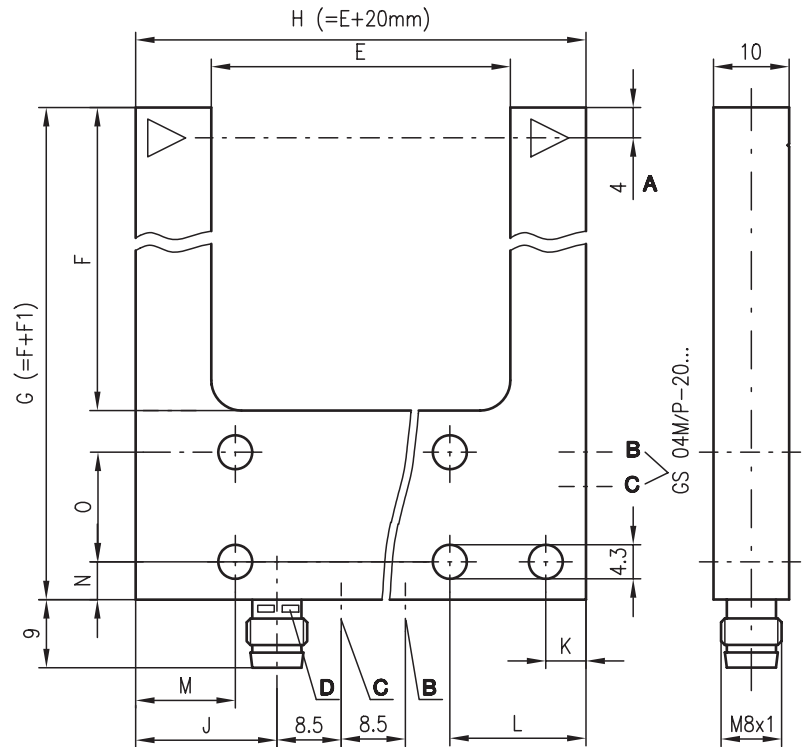
30/50/80 mm

10 - 30 V  
DC



- Laser-generated red light for high-precision applications
- Sensitivity adjustment and light/dark switching for optimal adaptation to the application
- Sensitivity adjustment on the back of the fork
- Robust metal housing and glass optics for protection against environmental influences

Dimensioned drawing

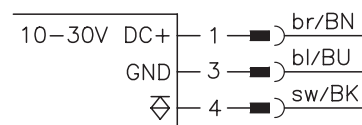


- A** Optical axis
- B** Sensitivity adjustment
- C** Light/dark switching
- D** Indicator diode

	E Mw	F Mt	F1	G	H	J	K	L	M	N	O
GSL 04M/...-30...	30	34	25	59	50	12	4.5	12.5	4.5	4.5	-
GSL 04M/...-50...	50	54	25	79	70	12	4.5	12.5	4.5	4.5	-
GSL 04M/...-80...	80	54	25	79	100	12	4.5	12.5	4.5	4.5	-

Electrical connection

GSL 04M/P...



Accessories:

(available separately • see page 66)

- M8 connectors (KD ...)
- Cable with M8 connector (K-D...)

We reserve the right to make changes • gs\_a37e.fm





## Specifications

### Optical data

Mouth width	30/50/80mm
Light source	laser, pulsed
Wavelength	650nm red light

### Timing

Switching frequency	3000Hz
Response time	0.16ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$ <sup>1)</sup>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 35mA
Switching output	PNP transistor output
Function characteristics	light/dark switching reversible
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	200 mA
Sensitivity	adjustable

### Indicators

LED red	light path free
---------	-----------------

### Mechanical data

Housing	aluminium, anodised
Weight	see order guide
Optics cover	glass
Connection type	M8 connector, 3-pin

### Environmental data

Ambient temp. (operation/storage)	-10°C ... +60°C / -20°C ... +70°C
Protective circuit <sup>2)</sup>	1, 2
VDE safety class	III
Protection class	IP 65
Laser class	2 (acc. to EN 60825-1)

- 1) Functional extra-low voltage with reliable disconnection or protective extra-low voltage (VDE 0100/T 410)  
 2) 1=polarity reversal protection, 2=short-circuit protection for all outputs

Resolution (smallest object)

Mouth width [mm]	Resolution [mm]	Reproducibility [mm]	Switching hysteresis [mm]
30	0.06	0.015	≤ 0.01
50	0.1	0.015	≤ 0.01
80	0.2	0.015	≤ 0.01

## Order guide

Selection table	Order code →		
	<b>GSL 04M/P-30-S8</b> Part No. 501 03737	<b>GSL 04M/P-50-S8</b> Part No. 501 03738	<b>GSL 04M/P-80-S8</b> Part No. 501 03739
<b>Equipment ↓</b>			
Mouth width [mm]	30	50	80
Weight in g	36	54	77

## Tables

## Diagrams

## Remarks

LASER LIGHT	
DO NOT STARE INTO BEAM	
Maximum Output:	<1mW
Pulse duration:	
Wavelength:	650nm
CLASS 2 LASER PRODUCT	
EN60825-1:2003-10	



# *Measuring forked sensors*

## *Overview and advantages*



Wide range of models with robust metal housing and glass cover



Measuring, optical CCD forked sensors for a wide range of applications



Analogue outputs, serial interfaces and PNP switching outputs



Adjustable measurement range and measurement mode



Mouth widths of 29mm and 100mm



Connection via M12 connector



Calculation of arithmetic mean or single-value measurement



Applications:

- Object detection of up to 3 objects in the 25mm wide light band
- Edge positioning
- Object and gap measurement
- Positioning of punched holes
- Detection of broken objects

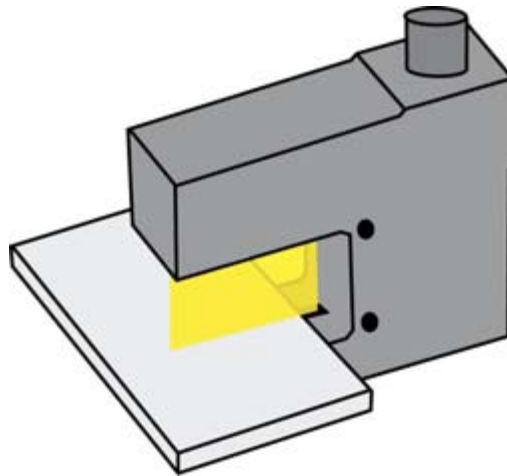




# *Features of measuring forked sensors*

- Detection of small parts
- Edge detection and height monitoring
- Object and gap measurement
- Positioning of punched holes
- Detection of broken objects
- Multiple object detection

## Measurement principle




The transmitted light is spread into a parallel light band by means of a lens and received by the opposing CCD line. By shadowing this light band, it is possible to e.g. measure the edge position or width of an object.



## Measuring optical CCD forked sensors

- ✓ **Advantage 1:** Edge and object detection of up to 3 objects in the 25mm wide light band
- ✓ **Advantage 2:** Resolution 0.014mm
- ✓ **Advantage 3:** Measurement range and mode adjustable
- ✓ **Advantage 4:** Detection of multiple objects



Operating principle	Designation	Mouth width [mm]	Mouth depth [mm]	Operating voltage			Output									
				10 ... 30VDC	18 ... 30VDC	24VDC	1 x Analogue Output (Voltage)	1 x Analogue Output (Current)	2 x Analogue Output (Voltage)	2 x Analogue Output (Current)	1 x RS 232	1 x RS 422/RS 485	1 x Output PNP	1 x Output NPN	2 x Output PNP	1 x input
	Measuring optical CCD forked sensors															
	GS 754M/D-29/42-104-S12	29	42		•						•		•			
	GS 754M/D-29/42-204-S12	29	42		•						•					
	GS 754M/V-29/42-504-S12	29	42		•			•					•			
	GS 754M/V-29/42-604-S12	29	42		•			•					•			
	GS 754M/D-100/42-104-S12	100	42		•						•	•	•			
	GS 754M/V-100/42-504-S12	100	42		•				•						•	•
GS 754M/V-100/42-604-S12s	100	42		•					•					•	•	



Switching frequency	Connection				Detection of			Options	Page
	M8 connector (3-pin)	M12 connector (5-pin)	M12 connector (8-pin)	Cable (3-wire), 5m long	Small parts	Very small parts	Edge / diameter / multiple objects	Configuration interface	
50Hz		•			•		•	•	<b>63</b>
50Hz		•			•		•	•	<b>63</b>
50Hz		•			•		•	•	<b>63</b>
50Hz		•			•		•	•	<b>63</b>
50Hz			•		•		•	•	<b>65</b>
50Hz			•		•		•	•	<b>65</b>
50Hz			•		•		•	•	<b>65</b>



GS 754

Forked photoelectric CCD sensors



29 mm



- CCD line array sensor with 25 mm measurement range
- Analogue, digital or serial interfaces
- Measurement range and mode adjustable
- Teach-in function
- Detection of multiple objects
- Soiling detection

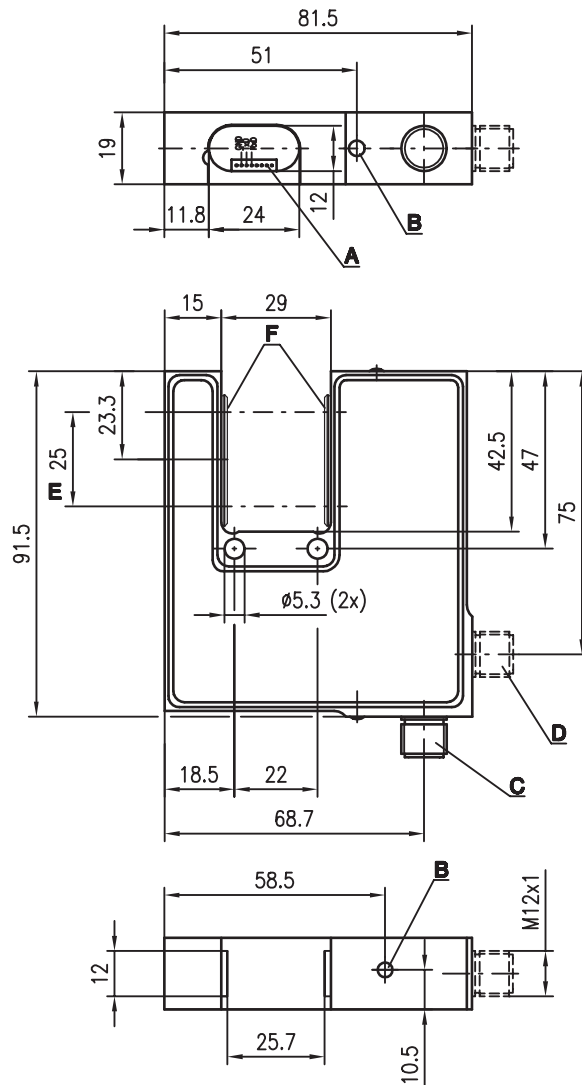


Accessories:

(available separately • see page 66)

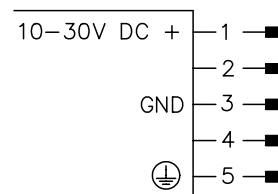
- M12 connectors (KD ...)
- Cable with M12 connector (K-D...)
- Configuration cable for PC (KB-ODS 96-1500, Part No. 500 82007)

Dimensioned drawing



- A Interface
- B Indicator diode
- C Rear connector
- D Lateral connector
- E Optical detection area
- F Protective glass

Electrical connection



	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5
RS 232	+	I/O	GND	TxD	Earth
RS 422	+	Tx-	GND	Tx+	Earth
Bus	+	Bus L	GND	Bus H	Earth
Analogue voltage	+	I/O	GND	analogue	Earth
Analogue current	+	I/O	GND	analogue	Earth

We reserve the right to make changes • gs\_a02e.fm





## Specifications

### Optical data

Mouth width	29 mm
Mouth depth	42 mm
Measurement field (M)	25 mm
Minimum object diameter	0.5 mm
Object position	random (see remarks)
Resolution <sup>1)</sup>	a: 0.1 mm (mode 1 ... 5) b: 0.014 mm (mode 7)
Light source	LED (modulated light)
Wavelength	880 nm

### Timing

Switching frequency	max. 50 Hz
Response time	min. 10 ms
Output cycle	0.02 ... 3.00 s
Delay before start-up	≤ 300 ms

### Electrical data

Operating voltage $U_B$ <sup>2)</sup>	18 ... 30 VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 150 mA

### Output versions

Active/not active	≥ 8V/≤ 2V or not connected
Activation/disable delay	≤ 1 ms
Input resistance	4.7 kΩ ± 10%
Output current	max. 100 mA per transistor output
Analogue output current	1 output 0 ... 20 mA ( $R_L \leq 500 \Omega$ )
Analogue output voltage	1 output 0 ... 10 V ( $R_L \geq 2 k\Omega$ )
Serial interface	RS 232/RS 422/RS 485
Teaching input	max. 1 output reversible
Warning output	max. 1 output reversible

### Indicators

LED green continuous light	ready
LED green flashing	fault

### Mechanical data

Housing	aluminium, anodised
Weight	260 g
Optics cover	glass (see remarks)
Connection type	M12 connector, 5-pin

### Environmental data

Ambient temp. (operation/storage)	-20 °C ... +50 °C / -30 °C ... +70 °C
Protective circuit <sup>3)</sup>	1, 2, 3
VDE safety class	III
Protection class	IP 54
Standards applied	IEC 60947-5-2

1) System resolution, i.e. smallest practical value for the last digit of the display

2) Functional extra-low voltage with reliable disconnection or protective extra-low voltage (VDE 0100/T 410)

3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs

## Tables

## Diagrams

## Order guide

Selection table		Order code →								
Equipment ↓		GS 754MD-29/42-104-S12 Part No. 501 04280	GS 754MD-29/42-204-S12 Part No. 501 04281	GS 754MV-29/42-504-S12 Part No. 501 03206	GS 754MV-29/42-604-S12 Part No. 501 02981					
Connector location	at the back	●	●	●	●					
Output versions	RS 232	●								
	RS 422/RS 485		●							
	analogue voltage			●						
	analogue current				●					
Assignment Pin #2	teaching input									
	PNP output	●		●	●					
Protective glass	pre-installed	●	●	●	●					

## Remarks

- Functional earth must be connected.
- Sources of extraneous light must not radiate on the receiver from the front.
- Objects ≤ 1 mm should be scanned in front of the receiver.
- Only use fibre-free cloth for cleaning the optics covers. Hard and pointed objects destroy the optics.

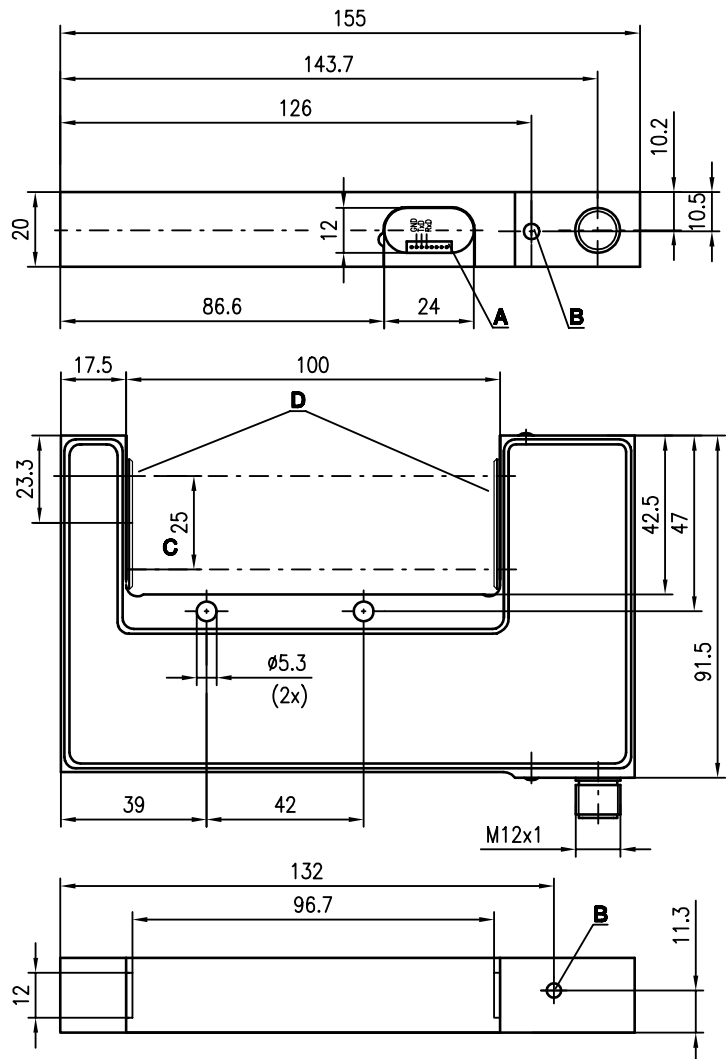


GS 754

Forked photoelectric CCD sensors



Dimensioned drawing



- A Interface
- B Indicator diode
- C Optical detection area
- D Protective glass

Electrical connection

GS 754M/D-100/42-104-S12

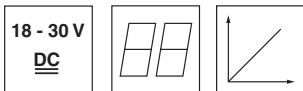
18-30V DC +	1	ws/WH
O1: fault	2	br/BN
GND	3	gn/GN
Tx +	4	ge/YE
Tx -	5	gr/GR
Tx D	6	rs/PK
Rx D	7	bl/BU
⊕	8	rt/RD

GS 754M/V-100/42-504-S12  
GS 754M/V-100/42-604-S12

18-30V DC +	1	ws/WH
I1: teach in	2	br/BN
GND	3	gn/GN
A2: diameter	4	ge/YE
A1: edge	5	gr/GR
O3:	6	rs/PK
O2: fault	7	bl/BU
⊕	8	rt/RD



100mm



- CCD line array sensor with 25 mm measurement range
- Analogue, digital or serial interfaces
- Measurement range and mode adjustable
- Teach-in function
- Detection of multiple objects



Accessories:

(available separately • see page 66)

- M12 connectors (KD ...)
- Cable with M12 connector (K-D...)
- Configuration cable for PC (KB-ODS 96-1500, Part No. 500 82007)

We reserve the right to make changes • GS\_a03e.fm



## Specifications

### Optical data

Mouth width	100mm
Mouth depth	42mm
Measurement field (M)	25mm
Minimum object diameter	0.5mm
Object position	random (see remarks)
Resolution <sup>1)</sup>	a: 0.1mm (mode 1 ... 5) b: 0.014mm (mode 7)
Light source	LED (modulated light)
Wavelength	880nm

### Timing

Switching frequency	max. 50Hz
Response time	min. 10ms
Output cycle	0.02 ... 3.00s
Delay before start-up	≤ 300ms

### Electrical data

Operating voltage $U_B$ <sup>2)</sup>	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 150mA

### Output versions

Active/not active	≥ 8V/≤ 2V or not connected
Activation/disable delay	≤ 1ms
Input resistance	4.7kΩ ± 10%
Output current	max. 100mA per transistor output
Analogue output current	2 outputs 0 ... 20mA ( $R_L \leq 500\Omega$ )
Analogue output voltage	2 outputs 0 ... 10V ( $R_L \leq 2k\Omega$ )
Serial interface	RS 232/RS 422/RS 485
Inputs	max. 3 inputs
Outputs	max. 3 outputs

### Indicators

LED green continuous light	ready
LED green flashing	fault

### Mechanical data

Housing	aluminium, anodised
Weight	260g
Optics cover	glass
Connection type	M12 connector, 8-pin

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +50°C / -30°C ... +70°C
Protective circuit <sup>3)</sup>	1, 2, 3
VDE safety class	III
Protection class	IP 54
Standards applied	IEC 60947-5-2

- 1) System resolution, i.e. smallest practical value for the last digit of the display  
 2) Functional extra-low voltage with reliable disconnection or protective extra-low voltage (VDE 0100/T 410)  
 3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs

## Order guide

Selection table		GS 754M/D-100/42-104-S12 Part No. 501 04283	GS 754M/V-100/42-504-S12 Part No. 501 03488	GS 754M/V-100/42-604-S12 Part No. 501 03487				
	<b>Order code →</b>							
<b>Equipment ↓</b>								
Connector location	at the back	●	●	●				
Output versions	RS 232	●						
	RS 422/RS 485	●						
	1x analogue voltage							
	2x analogue voltage		●					
	2x analogue current			●				
	1x input		●	●				
	1x output	●						
	2x output		●	●				
Protective glass	pre-installed	●	●	●				

## Tables

## Diagrams

## Remarks

- Functional earth must be connected.
- Sources of extraneous light must not radiate on the receiver from the front.
- Objects ≤ 1mm should be scanned in front of the receiver.
- Only use fibre-free cloth for cleaning the optics covers. Hard and pointed objects destroy the optics.



Forked sensors

Accessories

Connectors, cables

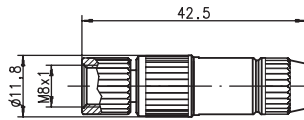


For devices with M8/M12 connectors, there are connectors with ready-made cable and connectors with screw connection available.

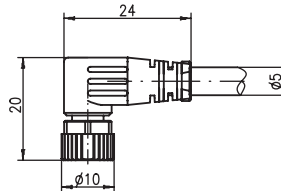
Protection class IP 67 (DIN 40050) is provided with both the connector cable accessories and the field-wireable connectors.

Dimensioned drawings M8

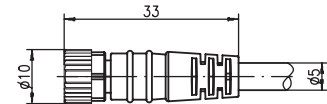
D M8A-3P-SK  
D M8A-4P-SK



K-D M8W-...

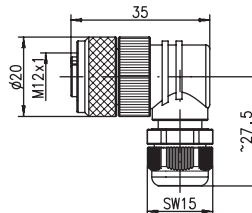


K-D M8A-...

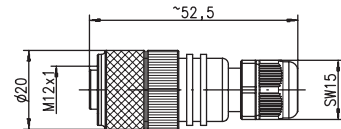


Dimensioned drawings M12

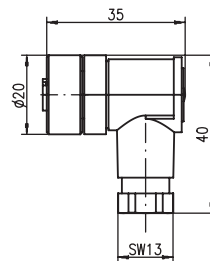
KD 095-4



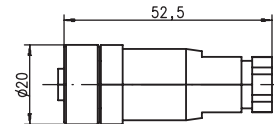
KD 095-4A



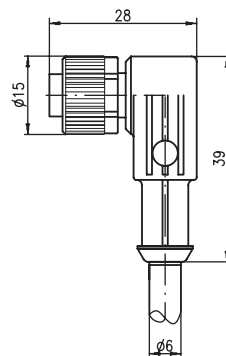
KD 095-5



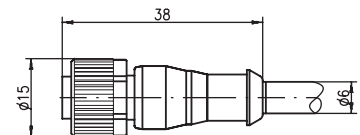
KD 095-5A



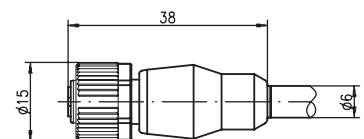
K-D M12W-4P-...  
K-D M12W-5P-...  
K-D M12W-4P-...-DP-...



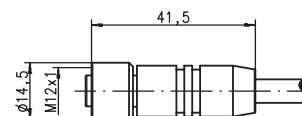
K-D M12A-4P-...  
K-D M12A-5P-...



K-D M12A-4P-...-DP-...

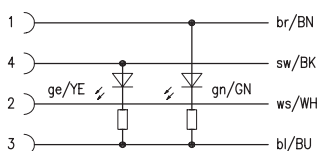


K-D M12A-8P-...



Remarks

LED circuit diagram (K-D M12...-DP-...):




We reserve the right to make changes • GS\_zu\_e.fm




Accessories

Forked sensors

Selection table

M8/M12 connector, user-configurable		
		
Connection	M8, without cable, 3-pin	
Insulation displacement connection	-	<b>D M8A-3P-SK</b> Part No. 501 04582
M8, without cable, 4-pin		
Insulation displacement connection	-	<b>D M8A-4P-SK</b> Part No. 501 04583
M12, without cable, 4-pin		
Screw terminals	<b>KD 095-4</b> Part No. 500 31324	<b>KD 095-4A</b> Part No. 500 31323
M12, without cable, 5-pin		
Screw terminals	<b>KD 095-5</b> Part No. 500 20502	<b>KD 095-5A</b> Part No. 500 20501

M8 connection cable with connector, single-sided		
		
Length	PVC cable sheath, 3-pin	
2m	<b>K-D M8W-3P-2m-PVC</b> Part No. 501 04521	<b>K-D M8A-3P-2m-PVC</b> Part No. 501 04520
5m	<b>K-D M8W-3P-5m-PVC</b> Part No. 501 04523	<b>K-D M8A-3P-5m-PVC</b> Part No. 501 04522
Length	PVC cable sheath, 4-pin	
2m	<b>K-D M8W-4P-2m-PVC</b> Part No. 501 04525	<b>K-D M8A-4P-2m-PVC</b> Part No. 501 04524
5m	<b>K-D M8W-4P-5m-PVC</b> Part No. 501 04527	<b>K-D M8A-4P-5m-PVC</b> Part No. 501 04526
10m	<b>K-D M8W-4P-10m-PVC</b> Part No. 501 04529	<b>K-D M8A-4P-10m-PVC</b> Part No. 501 04528
Length	PUR cable sheath, 4-pin	
2m	<b>K-D M8W-4P-2m-PUR</b> Part No. 501 04531	<b>K-D M8A-4P-2m-PUR</b> Part No. 501 04530
5m	<b>K-D M8W-4P-5m-PUR</b> Part No. 501 04761	<b>K-D M8A-4P-5m-PUR</b> Part No. 501 04532
10m	<b>K-D M8W-4P-10m-PUR</b> Part No. 501 04534	<b>K-D M8A-4P-10m-PUR</b> Part No. 501 04533

Connectors, cables







Forked sensors



Accessories

Connectors, cables



Selection table

M12 connection cable with connector, single-sided		
		
Length	PVC cable sheath, 4-pin	
2m	K-D M12W-4P-2m-PVC Part No. 501 04543	K-D M12A-4P-2m-PVC Part No. 501 04542
5m	K-D M12W-4P-5m-PVC Part No. 501 04545	K-D M12A-4P-5m-PVC Part No. 501 04544
10m	K-D M12W-4P-10m-PVC Part No. 501 04547	K-D M12A-4P-10m-PVC Part No. 501 04546
20m	-	K-D M12A-4P-20m-PVC Part No. 501 04753
Length	PUR cable sheath, 4-pin	
2m	K-D M12W-4P-2m-PUR Part No. 501 04562	K-D M12A-4P-2m-PUR Part No. 501 04561
5m	K-D M12W-4P-5m-PUR Part No. 501 04564	K-D M12A-4P-5m-PUR Part No. 501 04563
10m	K-D M12W-4P-10m-PUR Part No. 501 04566	K-D M12A-4P-10m-PUR Part No. 501 04565
Length	PVC cable sheath, 5-pin	
2m	K-D M12W-5P-2m-PVC Part No. 501 04556	K-D M12A-5P-2m-PVC Part No. 501 04555
5m	K-D M12W-5P-5m-PVC Part No. 501 04558	K-D M12A-5P-5m-PVC Part No. 501 04557
10m	K-D M12W-5P-10m-PVC Part No. 501 04560	K-D M12A-5P-10m-PVC Part No. 501 04559
Length	PUR cable sheath, 5-pin	
2m	K-D M12W-5P-2m-PUR Part No. 501 04568	K-D M12A-5P-2m-PUR Part No. 501 04567
5m	K-D M12W-5P-5m-PUR Part No. 501 04762	K-D M12A-5P-5m-PUR Part No. 501 04569
Length	PUR cable sheath, 8-pin	
2m	-	K-D M12A-8P-2m-PUR Part No. 501 04591
5m	-	K-D M12A-8P-5m-PUR Part No. 501 04590

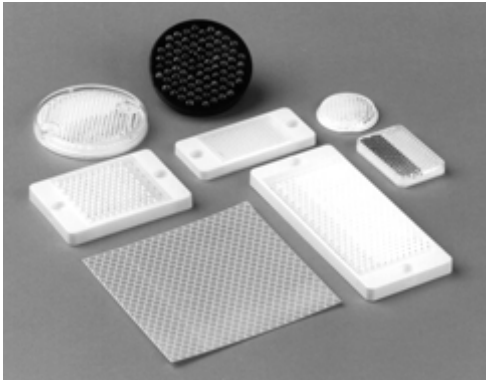
M8 / M12 connection cable with connector, single-sided, with 2 integrated LEDs in transparent connector		
		
Length	M8, PUR cable sheath, 4-pin	
2m	K-D M8W-4P-2m-DP-PUR Part No. 501 04535	-
5m	K-D M8W-4P-5m-DP-PUR Part No. 501 04536	-
Length	M12, PUR cable sheath, 4-pin	
2m	K-D M12W-4P-2m-DP-PUR Part No. 501 04549	K-D M12A-4P-2m-DP-PUR Part No. 501 04548
5m	K-D M12W-4P-5m-DP-PUR Part No. 501 04551	K-D M12A-4P-5m-DP-PUR Part No. 501 04550
10m	K-D M12W-4P-10m-DP-PUR Part No. 501 04553	K-D M12A-4P-10m-DP-PUR Part No. 501 04552

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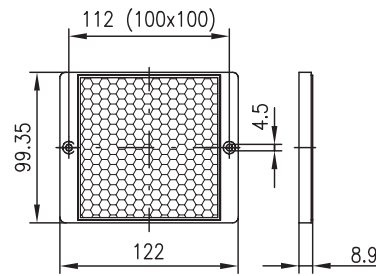
Reflectors



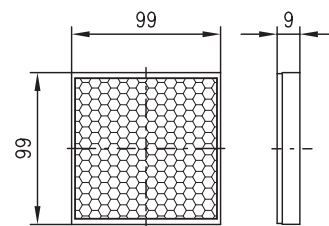
- Reflectors and reflective tapes are ideally suited for Leuze retro-reflective photoelectric sensors. The performance data refer to the use of Leuze reflectors and reflective tapes. The range of retro-reflective photoelectric sensors depends on the type and size of the reflector.
- Adhesive and screw type versions permit universal installation.
- Precise optical alignment is not required, as the reflector may be slightly inclined relative to the optical axis.
- For retro-reflective photoelectric sensors with polarisation filters, only triad-type reflectors made of plastic or reflective tape No. 4 may be used.

Dimensioned drawings

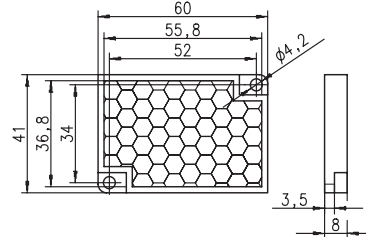
TKS 100 x 100



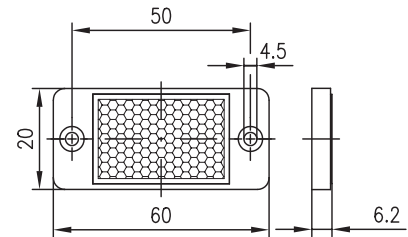
TK 100x100



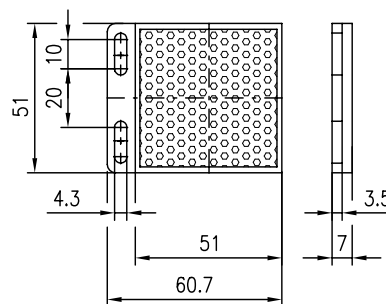
TKS 40 x 60



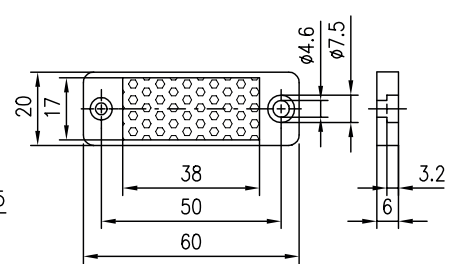
TKS 20 x 40



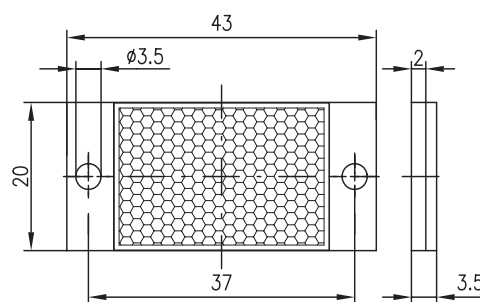
MTKS 50 x 50



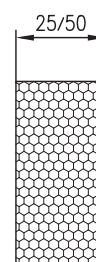
MTKS 20 x 40.1



MTKS 20 x 30



Reflective tape No. 4



Order codes:

Designation	Part No.
TKS 100x100	500 22816
TK 100x100	500 03192
TKS 40x60	500 40820
TKS 20x40	500 81283
MTKS 50x50	500 36188
MTKS 20x40.1	501 04130
MTKS 20x30	500 40894
Reflective tape no. 4, roll 50x1000	500 38060
Reflective tape no. 4, roll 50x22800	500 38062

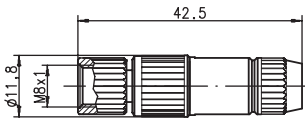
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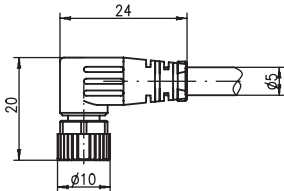


Dimensioned drawings M8

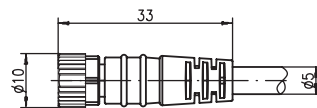
D M8A-3P-SK  
D M8A-4P-SK



K-D M8W-...

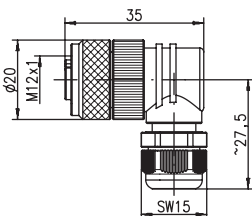


K-D M8A-...

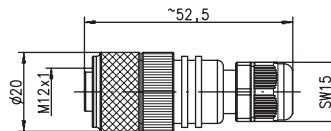


Dimensioned drawings M12

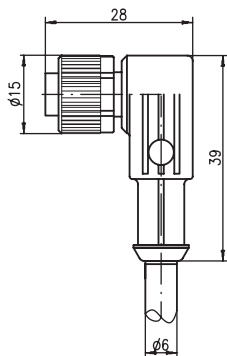
KD 095-4



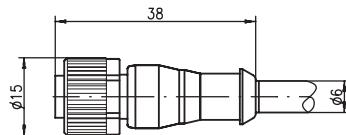
KD 095-4A



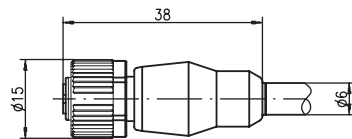
K-D M12W-4P-...  
K-D M12W-4P-...-DP-...



K-D M12A-4P-...



K-D M12A-4P-...-DP-...



Connectors, cables



For devices with M8/M12 connectors, there are connectors with ready-made cable and connectors with screw connection available.

Protection class IP 67 (DIN 40050) is provided with both the connector cable accessories and the field-wireable connectors.

Important:



With throughbeam photoelectric sensors, a connector is required both for the transmitter and the receiver.





Connectors, cables



Selection table

M8/M12 connector, user-configurable		
 		
Connection	M8, without cable, 3-pin	
Insulation displacement connection	-	D M8A-3P-SK Part No. 501 04582
M8, without cable, 4-pin		
Insulation displacement connection	-	D M8A-4P-SK Part No. 501 04583
M12, without cable, 4-pin		
Screw terminals	KD 095-4 Part No. 500 31324	KD 095-4A Part No. 500 31323

M8 connection cable with connector, single-sided		
 		
Length	PVC cable sheath, 3-pin	
2m	K-D M8W-3P-2m-PVC Part No. 501 04521	K-D M8A-3P-2m-PVC Part No. 501 04520
5m	K-D M8W-3P-5m-PVC Part No. 501 04523	K-D M8A-3P-5m-PVC Part No. 501 04522
Length	PVC cable sheath, 4-pin	
2m	K-D M8W-4P-2m-PVC Part No. 501 04525	K-D M8A-4P-2m-PVC Part No. 501 04524
5m	K-D M8W-4P-5m-PVC Part No. 501 04527	K-D M8A-4P-5m-PVC Part No. 501 04526
10m	K-D M8W-4P-10m-PVC Part No. 501 04529	K-D M8A-4P-10m-PVC Part No. 501 04528
Length	PUR cable sheath, 4-pin	
2m	K-D M8W-4P-2m-PUR Part No. 501 04531	K-D M8A-4P-2m-PUR Part No. 501 04530
5m	K-D M8W-4P-5m-PUR Part No. 501 04761	K-D M8A-4P-5m-PUR Part No. 501 04532
10m	K-D M8W-4P-10m-PUR Part No. 501 04534	K-D M8A-4P-10m-PUR Part No. 501 04533

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Selection table

M12 connection cable with connector, single-sided		
Length	PVC cable sheath, 4-pin	
2m	<b>K-D M12W-4P-2m-PVC</b> Part No. 501 04543	<b>K-D M12A-4P-2m-PVC</b> Part No. 501 04542
5m	<b>K-D M12W-4P-5m-PVC</b> Part No. 501 04545	<b>K-D M12A-4P-5m-PVC</b> Part No. 501 04544
10m	<b>K-D M12W-4P-10m-PVC</b> Part No. 501 04547	<b>K-D M12A-4P-10m-PVC</b> Part No. 501 04546
20m	–	<b>K-D M12A-4P-20m-PVC</b> Part No. 501 04753
Length	PUR cable sheath, 4-pin	
2m	<b>K-D M12W-4P-2m-PUR</b> Part No. 501 04562	<b>K-D M12A-4P-2m-PUR</b> Part No. 501 04561
5m	<b>K-D M12W-4P-5m-PUR</b> Part No. 501 04564	<b>K-D M12A-4P-5m-PUR</b> Part No. 501 04563
10m	<b>K-D M12W-4P-10m-PUR</b> Part No. 501 04566	<b>K-D M12A-4P-10m-PUR</b> Part No. 501 04565

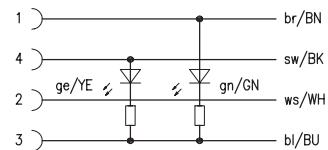
M8 / M12 connection cable with connector, single-sided, with 2 integrated LEDs in transparent connector		
Length	M8, PUR cable sheath, 4-pin	
2m	<b>K-D M8W-4P-2m-DP-PUR</b> Part No. 501 04535	–
5m	<b>K-D M8W-4P-5m-DP-PUR</b> Part No. 501 04536	–
Length	M12, PUR cable sheath, 4-pin	
2m	<b>K-D M12W-4P-2m-DP-PUR</b> Part No. 501 04549	<b>K-D M12A-4P-2m-DP-PUR</b> Part No. 501 04548
5m	<b>K-D M12W-4P-5m-DP-PUR</b> Part No. 501 04551	<b>K-D M12A-4P-5m-DP-PUR</b> Part No. 501 04550
10m	<b>K-D M12W-4P-10m-DP-PUR</b> Part No. 501 04553	<b>K-D M12A-4P-10m-DP-PUR</b> Part No. 501 04552

Connectors, cables



Remarks

LED circuit diagram (K-D M12...-DP...):





3 Series / 25 Series

Accessories

Mounting systems

BT 3...



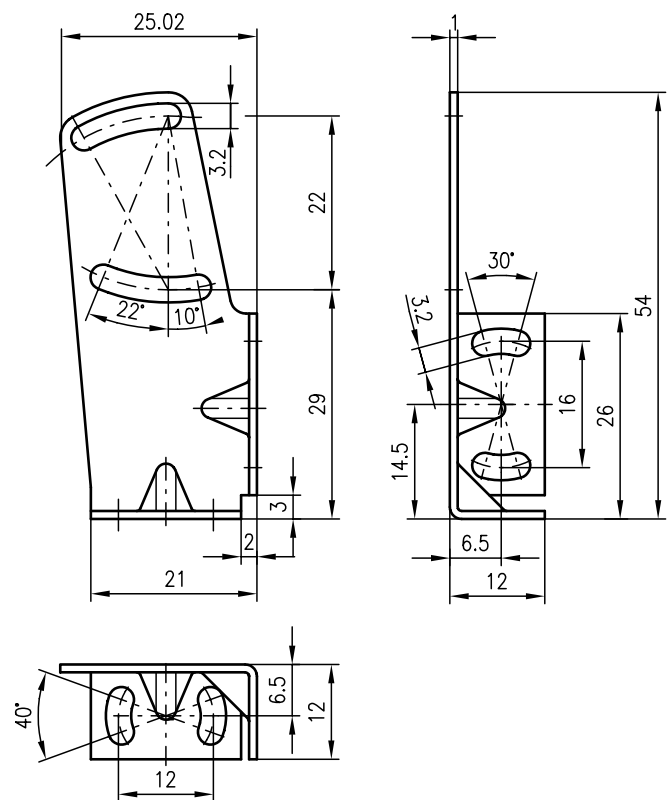
- ① = BT 3  
(Part No. 500 60511)
- ②+③ = BT 3.1 <sup>1)</sup>  
(Part No. 501 05585)
- ①+②+③ = BT 3B  
(Part No. 501 05546)

BT 25 (Part No. 500 40269)

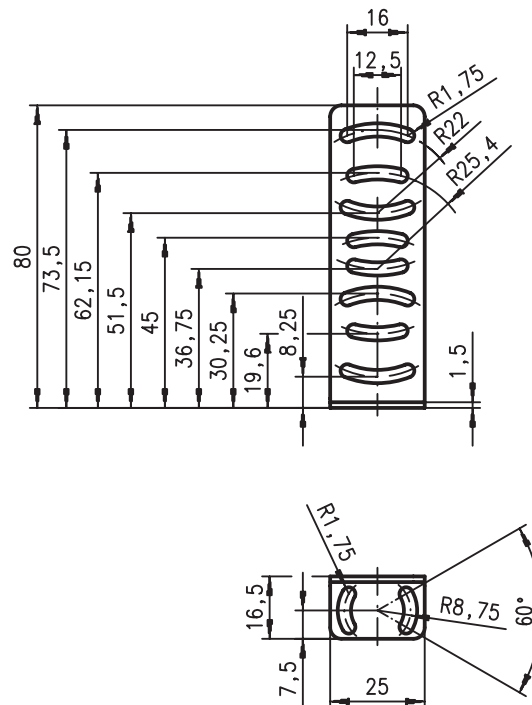


Dimensioned drawings

BT 3



BT 25



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1) Packaging unit: PU = 10 pcs.

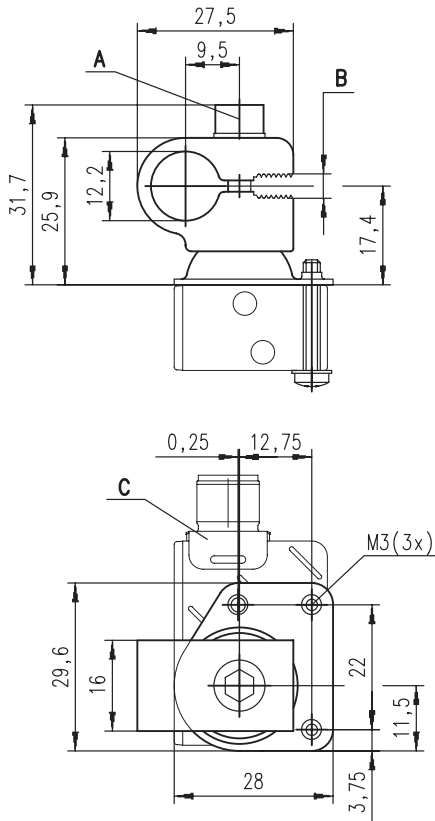


Accessories

3 Series / 25 Series

Dimensioned drawings

UMS 25-D12



- A Screw DIN 912-M4
- B Slit for clamping sheet metal  
sheet metal thickness:  
1.5 to 3mm
- C Sensor

Mounting systems

UMS 25-D12 (Part No. 500 40270)









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- Accessories



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- Optical data transmission systems
- Laser distance measuring devices
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