Throughbeam photoelectric sensors

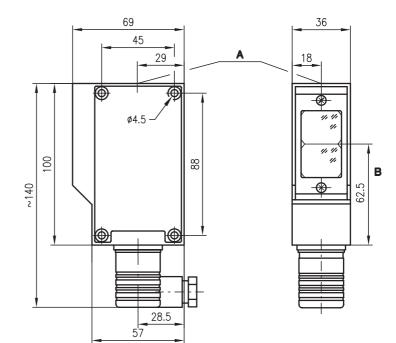


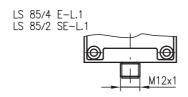


0 ... 65 m



- Voltage ranges: 10 ... 30 VDC and 24 VDC
- Light switching and delay before start-up for optimal adaptation to applications
- Connection via M12 connector or standard plug with screw connector up to 1.5 mm²

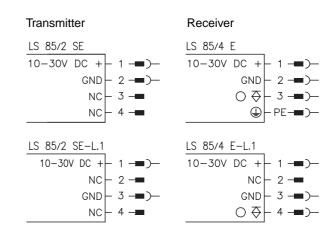




Dimensioned drawing

- A Indicator diode only at receiver
- B Optical axis

Electrical connection













Accessories:

- Mounting systems (BT 85)
- M12 connectors (KD ...)
- Alignment aid ARH 2

Specifications

Optical data

Typ. operating range limit 1) 0 ... 65 m Operating range 2 0 ... 50m

LED (modulated light) Light source

Wavelength 880nm

Timing

Sensor switching frequency 100Hz Sensor response time 2.5 ms Delay before start-up ≤ 200 ms

Electrical data

10 ... 30 VDC (incl. residual ripple) \leq 15% of U_B Operating voltage U_B

Residual ripple Bias current ≤ 30 mA

PNP transistor output light switching ≥ (U_B-2V)/≤ 2V max. 100mA Switching output Function characteristics Signal voltage high/low Output current

Indicators

light path free, alignment aid LED yellow

Mechanical data

diecast aluminium Housing

transmitter 350g, receiver 350g Weight

Optics cover Connection type glass M12 connector or

standard plug with screw connector up to 1.5 mm²

Environmental data

-20°C ... +60°C/-30°C ... +70°C 1, 2, 3 Ambient temp. (operation/storage) ³⁾ Protective circuit ⁴⁾ VDE safety class

I, all-insulated (standard plug), III, all-insulated (M12 connector)

Protection class IP 65

1 (acc. to EN 60825-1) IEC 60947-5-2 LED class Standards applied

Options De-humidifying system

to prevent condensation on the optics (due to temperature

changes)

Typ. operating range limit: max. attainable range without performance reserve
 Operating range: recommended range with performance reserve
 -30 °C with operating voltage continuously applied

4) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection

Tables

Diagrams

Order guide

Selection table Equipment	Order code →	LS 85/4 Part No. 500 00246 (Tr) Part No. 500 00248 (Re)	LS 85/4 L.1 Part No. 500 20263 (Tr) Part No. 500 20264 (Re)		
Housing	metal	•	•		
Connection	standard plug	•			
	M12 connector 1)		•		
Features					
Voltage supply	10 30VDC	•	•		
Switching output	PNP	•	•		
Dehumidification		•	•		

¹⁾ not part of the delivery contents



Energetic diffuse reflection light scanner



10 - 30 V <u>DC</u> 0 ... 0.3m 0 ... 0.8m 0 ... 2.0m

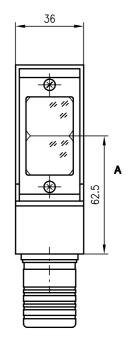
- Wide voltage range 10 ... 30 VDC with PNP switching output for PLC applications
- General light/dark switching, sensitivity adjustment and delay before start-up provide for optimal adaptation to the application
- Connection via standard plug with screw connector up to 1.5mm²

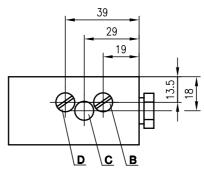
00 04.5 88 28.5 57

Dimensioned drawing

69

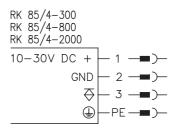
45





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

Electrical connection













Accessories:

(available separately)

Mounting systems (BT 85)



Specifications

Optical data

Scanning range (white 90%)1) 0 ... 300mm, 0 ... 800mm, 0 ... 2000mm

Adjustment range

5 ... 100% LED (modulated light) Light source

Wavelength 880nm

Timing

Sensor switching frequency 100 Hz Sensor response time 2.5 ms Delay before start-up ≤ 200 ms

Electrical data

10 ... 30 VDC (incl. residual ripple) \leq 15% of U_B Operating voltage U_B

Residual ripple

Bias current

Switching output Function characteristics

≥ 40mA PNP transistor output light or dark switching (reversible) ≥ (U_B-2V)/≤ 2V max. 100mA Signal voltage high/low Output current Sensitivity adjustable

Indicators

LED red reflection

LED red flashing reflection, no performance reserve

Mechanical data

Housing diecast aluminium

Weight 350g

Optics cover glass

Connection type standard plug with screw connector up to 1.5 mm²

Environmental data

Ambient temp. (operation/storage) ²⁾ Protective circuit ³⁾ -20°C ... +60°C/-30°C ... +70°C

I, all-insulated VDE safety class

IP 65 Protection class 1 (acc. to EN 60825-1) IEC 60947-5-2 LED class

Standards applied

Options

De-humidifying system to prevent condensation on the optics (due to temperature

changes)

1) Scanning range: recommended range with performance reserve

2) -30°C with operating voltage continuously applied
3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection

Tables

Diagrams

Order guide

Equipment ♥	Order code →	RK 85/4-300 Part No. 500 00494	RK 85/4-800 Part No. 500 00495	RK 85/4-2000 Part No. 500 00496		
Housing	metal	•	•	•		
Scanning range	300mm	•				
	800mm		•			
	2000mm			•		
Connection	standard plug	•	•	•		
Features	,		,	,	,	
Voltage supply	10 30VDC	•	•	•		
Switching output	PNP	•	•	•		
Dehumidification		•	•	•		

Remarks

The upper and lower scanning range limits can change with poorly reflecting materials.

Retro-reflective photoelectric sensor with polarisation filter



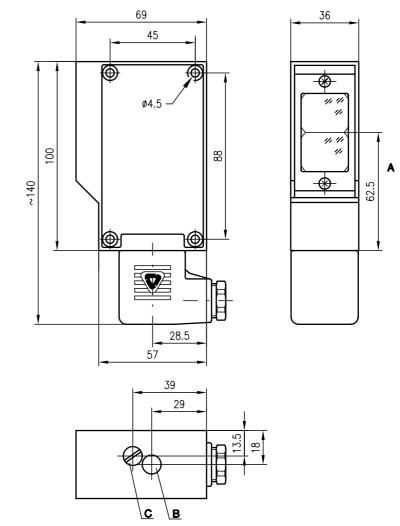


7.5 m



- All-mains design
 22 ... 250 VAC/DC with relay output
- General light/dark switching and delay before start-up for optimal adaptation to applications
- Connection via standard plug with screw connector up to 1.5mm²

Dimensioned drawing



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

Electrical connection





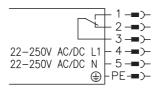






Accessories:

- Mounting systems (BT 85)
- Reflectors
- Reflective tapes





Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) 1) 7.5m Operating range 2

Light source LED (modulated light)

Wavelength 660nm (visible red light, polarised)

Timing

Switching frequency 20Hz Response time 25ms Delay before start-up ≤ 200 ms

Electrical data

22 ... 250 VAC 50/60 Hz 22 ... 250 VDC \pm 10% \leq 1.5 VA Operating voltage U_B

Power consumption

relay, 1 change-over contact light or dark switching (reversible) Switching output Function characteristics

Switching voltage, relay 250 VAC/DC Switching current, relay 250VAC 3A/30VDC 3A 250VAC - 50W 250VAC 60VA ind. load Switching power, relay

Indicators

LED red light path free

LED red flashing light path free, no performance reserve

Mechanical data

Housing diecast aluminium

glass 350g Optics cover Weight

Connection type standard plug with screw connector up to 1.5 mm²

Environmental data

Ambient temp. (operation/storage) ³⁾ Protective circuit ⁴⁾ -20°C ... +55°C/-30°C ... +55°C 1, 2, 3, 4 I, all-insulated

VDE safety class Protection class ÍP 65

1 (acc. to EN 60825-1) IEC 60947-5-2 LFD class

Standards applied

Options

De-humidifying system to prevent condensation on the optics (due to temperature

changes)

1) Typ. operating range limit: max. attainable range without performance reserve

2) Operating range: recommended range with performance reserve

3) -30 °C with operating voltage continuously applied

1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking

Tables

Reflectors		Operating range
TK(S)	100x100	0.3 6.0m
TK(S)	50x100	0.3 5.5m
TK(S)	50x50	0.3 4.5m
TK	82	0.5 6.0m
Tape 2	100x100	0.4 3.5m

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

Diagrams

Order guide

Designation Part No. PRK 85/7 UC 500 21127

Retro-reflective photoelectric sensor with polarisation filter



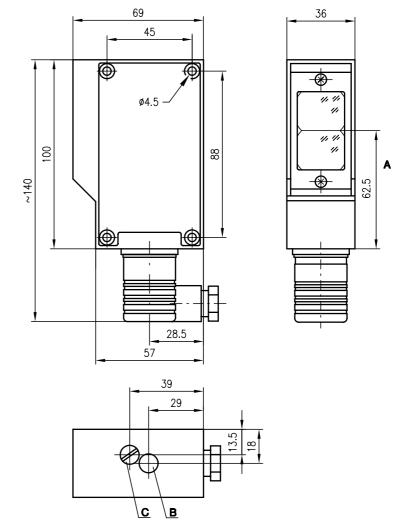






- Wide voltage range 10 ... 30 VDC with PNP switching output for PLC applications
- General light/dark switching and delay before start-up for optimal adaptation to applications
- Connection via standard plug with screw connector up to 1.5mm²

Dimensioned drawing



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









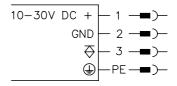


Accessories:

(available separately)

- Mounting systems (BT 85)
- Reflectors
- Reflective tapes

Electrical connection





Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) 1) 7.5m Operating range 2

Light source LED (modulated light)

Wavelength 660nm (visible red light, polarised)

Timing

Switching frequency 200 Hz Response time 2.5 ms Delay before start-up ≤ 200 ms

Electrical data

10 ... 30 VDC (incl. residual ripple) \leq 15% of U_B Operating voltage U_B

Residual ripple Bias current ≤ 40 mA

Switching output Function characteristics

PNP transistor output light or dark switching (reversible) ≥ (U_B-2V)/≤ 2V max. 100mA

Signal voltage high/low Output current

Indicators

light path free LED red LED red flashing

light path free, no performance reserve

Mechanical data

diecast aluminium

Housing Optics cover glass 350g

Weight

Connection type standard plug with screw connector up to 1.5 mm²

Environmental data

-20°C ... +55°C/-30°C ... +55°C 1, 2, 3, 4 Ambient temp. (operation/storage) ³⁾ Protective circuit ⁴⁾

I, all-insulated IP 65 VDE safety class Protection class

1 (acc. to EN 60825-1) LED class

Standards applied IEC 60947-5-2

Options

De-humidifying system to prevent condensation on the optics (due to temperature

1) Typ. operating range limit: max. attainable range without performance reserve

Operating range: recommended range with performance reserve
 -30°C with operating voltage continuously applied
 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference

Tables

Reflectors		Operating range
TK(S)	100x100	0.3 6.0m
TK(S)	50x100	0.3 5.5m
TK(S)	50x50	0.3 4.5m
TK	82	0.5 6.0m
Tape 2	100x100	0.4 3.5m

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

Diagrams

Order guide

Designation Part No. PRK 85/4 500 00599

Retro-reflective photoelectric sensors



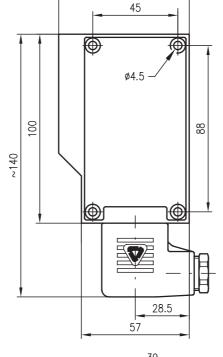




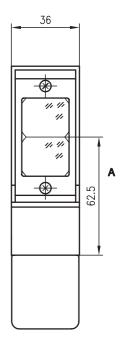


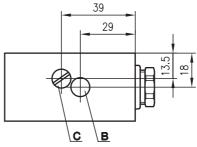


- All-mains design
 22 ... 250 VAC/DC with relay output
- Special voltages for universal application
- General light/dark switching and delay before start-up for optimal adaptation to applications
- Connection via standard plug with screw connector up to 1.5mm²



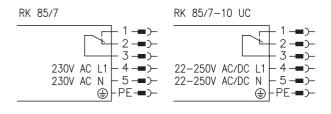
Dimensioned drawing





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

Electrical connection













Accessories:

- Mounting systems (BT 85)
- Reflectors
- Reflective tapes



Specifications

Optical data

Operating range 1) Light source LED (modulated light)

Wavelength 880nm

Timing

Switching frequency 20Hz Response time 25ms Delay before start-up $\leq 200\,ms$

Electrical data

Operating voltage U_B 22 ... 250 VAC (50/60 Hz) 22 ... 250 VDC ± 10% 230 VAC ± 10% 50/60 Hz

 $\leq 1.5 \, VA$

Power consumption relay, 1 change-over contact light or dark switching (reversible) Switching output Function characteristics

Switching voltage, relay 250 VAC/DC

Switching current, relay 250VAC 3A/30VDC 3A 250VAC - 50W 250VAC 60VA ind. load

Switching power, relay

Indicators 2)

LED green LED yellow ready light path free

LED red flashing light path free, no performance reserve

Mechanical data

Housing diecast aluminium

glass 340g Optics cover Weight

standard plug with screw connector up to 1.5 mm² Connection type

Environmental data

-20°C ... +55°C/-30°C ... +55°C 1, 2, 3, 4 I, all-insulated IP 65 Ambient temp. (operation/storage) ³⁾ Protective circuit ⁴⁾

VDE safety class

Protection class

LED class 1 (acc. to EN 60825-1) Standards applied IEC 60947-5-2

Options

De-humidifying system to prevent condensation on the optics (due to temperature

changes)

1) Operating range: recommended range with performance reserve

2) RK 85/7-10UC LED red: receive indicator

LED red flashing: switching state (LEDs illuminate at interruption)

3) -30°C with operating voltage continuously applied

1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking

Tables

RK 85/7 RK 85/7 UC

Reflector	S	Operating range
TK(S)	100x100	0.3 6.0m
TK(S)	50x100	0.3 5.5m
TK(S)	50x50	0.3 4.5m
TK	82	0.5 6.0m
Tape 2	100x100	0.4 3.5m

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

Diagrams

Remarks

Order guide

Selection table					
Equipment Ψ	Order code →	RK 85/7 Part No. 500 00497	RK 85/7-10 UC Part No. 500 21126		
Housing	metal	•	•		
Operating range	6m	•	•		
Connection	standard plug	•	•		
Features	· -		•		
Voltage supply	230 V A C	•			
	22 250 V AC/DC		•		
	special voltage	•			
Switching output	Relay	•	•		
Dehumidification	·	•	•		

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11 11

RK 85

Retro-reflective photoelectric sensors

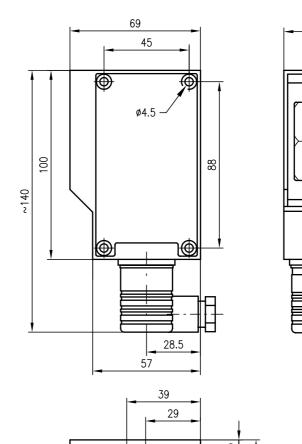




7.5 m



- Wide voltage range 10 ... 30 VDC with PNP switching output for PLC applications
- General light/dark switching and delay before start-up for optimal adaptation to applications
- Connection via standard plug with screw connector up to 1.5mm²



Dimensioned drawing

A Optical axis

Indicator diode Light/dark switching

Electrical connection





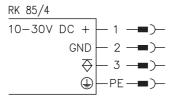






Accessories:

- Mounting systems (BT 85)
- Reflectors
- Reflective tapes





Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) 1) 7.5m Operating range 2 see tables

Light source LED (modulated light)

Wavelength 880nm

Timing

Switching frequency 200 Hz Response time 2.5 ms Delay before start-up ≤ 200 ms

Electrical data

10 ... 30 VDC (incl. residual ripple) \leq 15% of U_B Operating voltage U_B

Residual ripple

Bias current ≤ 40 mA

Switching output Function characteristics

PNP transistor output light or dark switching (reversible) ≥ (U_B-2V)/≤ 2V max. 100mA

Signal voltage high/low Output current

Indicators

light path free LED red LED red flashing

light path free, no performance reserve

Mechanical data

diecast aluminium

Housing Optics cover glass 340g Weight

Connection type standard plug with screw connector up to 1.5 mm²

Environmental data

Ambient temp. (operation/storage) ³⁾ Protective circuit ⁴⁾ -20°C ... +55°C/-30°C ... +55°C 1, 2, 3, 4

I, all-insulated IP 65 VDE safety class

Protection class

1 (acc. to EN 60825-1) LED class

Standards applied IEC 60947-5-2

Options

De-humidifying system to prevent condensation on the optics (due to temperature

1) Typ. operating range limit: max. attainable range without performance reserve

2) Operating range: recommended range with performance reserve
 3) -30°C with operating voltage continuously applied

4) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs,

4=interference blanking

Tables

Reflectors		Operating range
TK(S)		0.3 6.0m
TK(S)		0.3 5.5m
TK(S)	50x50	0.3 4.5m
TK	82	0.5 6.0m
Tape 2	100x100	0.4 3.5m

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

Diagrams

Order guide

Designation Part No.

RK 85/4 500 00492 Retro-reflective photoelectric sensor

Throughbeam photoelectric sensors

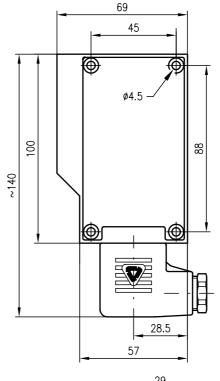




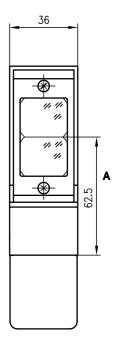
65 m

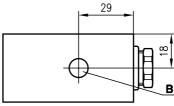


- AC version 230 VAC with relay output
- Special voltages for universal application
- Light switching and delay before start-up for optimal adaptation to applications
- Connection via standard plug with screw connector up to 1.5 mm²



Dimensioned drawing





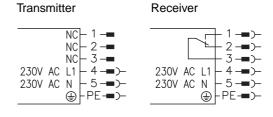
- Optical axis
- В Indicator diode

Electrical connection



Accessories:

- Mounting systems (BT 85)
- Alignment aid ARH 2





Specifications

Optical data

Typ. operating range limit 1) 0 ... 65 m 0 ... 50m LED (modulated light) Operating range 2 Light source

880nm

Wavelength

Timing

Sensor switching frequency 20Hz Sensor response time 25ms $\leq 200\,\text{ms}$ Delay before start-up

Electrical data

Operating voltage U_B Power consumption 230VAC ± 10% 50/60Hz 2.5VA/3VA Switching output relay, 1 change-over contact light switching 250 VAC/DC

Function characteristics Switching voltage, relay Switching current, relay Switching power, relay 250 VAC/DC 250 VAC 3A / 30 V DC 3A 250 VAC – 50 W 250 VAC 60 VA ind. load

Indicators

LED yellow light path free, alignment aid

Mechanical data

diecast aluminium Housing Weight \ transmitter 460g, receiver 480g

Optics cover

glass standard plug with screw connector up to 1.5 mm² Connection type

Environmental data

Ambient temp. (operation/storage) ³⁾ Protective circuit ⁴⁾ -20°C ... +60°C/-30°C ... +70°C 1, 2, 3

I, all-insulated IP 65 VDE safety class Protection class 1 (acc. to EN 60825-1) LED class IEC 60947-5-2

Standards applied

Options De-humidifying system to prevent condensation on the optics (due to temperature

1) Typ. operating range limit: max. attainable range without performance reserve

2) Operating range: recommended range with performance reserve
 3) -30°C with operating voltage continuously applied

4) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection

Tables

Diagrams

Order guide

Designation Part No. Transmitter and receiver LS 85/7 Transmitter LS 85/7 SE 500 00250 Receiver LS 85/7 E 500 00251

FRK 85

Diffuse reflection light scanner with background suppression



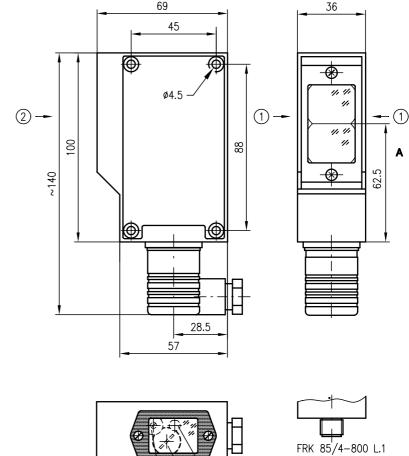


0.1 ... 0.8 m



- Wide voltage range 10 ... 30 VDC with PNP switching output for PLC applications
- General light/dark switching, sensitivity adjustment and delay before start-up provide for optimal adaptation to the application
- Connection via M12 connector or standard plug with screw connector up to 1.5 mm²

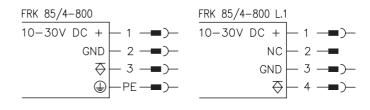
Dimensioned drawing



- Optical axis Α
- Indicator diode В
- Scanning range adjustment С
- Light/dark switching

Preferred entry direction for objects ① + ②

Electrical connection













Accessories:

- Mounting systems (BT 85)
- M12 connectors (KD ...)



FRK 85

Specifications

Optical data

Scanning range (white 90%)1) 100 ... 800mm, 120 ... 800mm LED (modulated light) Adjustment range Light source

Wavelength 880nm

Timing

Sensor switching frequency 100 Hz 5ms ≤ 200ms Sensor response time Delay before start-up

Electrical data

10 ... 30 VDC (incl. residual ripple) \leq 15% of U_B Operating voltage U_B

Residual ripple Bias current ≤ 40 mA

PNP transistor output light or dark switching (reversible) ≥ (U_B-2V)/≤ 2V max. 100mA Switching output Function characteristics

Signal voltage high/low Output current

Indicators

LED yellow on LED yellow off reflection no reflection

Mechanical data

diecast aluminium Housing

340g Weight Optics cover

M12 connector or standard plug with screw connector up Connection type

to 1.5 mm²

Environmental data

Ambient temp. (operation/storage) ²⁾ Protective circuit ³⁾ -20°C ... +60°C/-30°C ... +70°C

I, all-insulated (FRK 85/2-800, FRK 85/4-800) III, all-insulated (FRK 85/4-800 L.1) VDE safety class

Protection class LED class Standards applied 1 (acc. to EN 60825-1) IEC 60947-5-2

Options

De-humidifying system to prevent condensation on the optics (due to temperature

changes)

1) Scanning range: recommended range with performance reserve

-30°C with operating voltage continuously applied

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

Tables

Diagrams

Order guide

Selection table Equipment	Order code →	FRK 85/4-800 Part No. 500 11203	FRK 85/4-800 L.1 Part No. 500 21434			
Housing	metal	•	•			
Scanning range	800mm	•	•			
Connection	standard plug	•				
	M12 connector 1)		•			
Features		•		•	•	
Voltage supply	10 30VDC	•	•			
Switching output	PNP	•	•			

¹⁾ not part of the delivery contents

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.

Energetic diffuse reflection light scanner

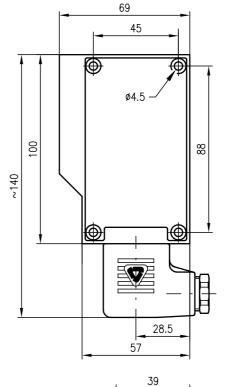


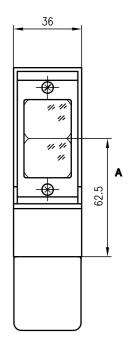
0 ... 0.3m 0 ... 0.8m 0 ... 2.0m

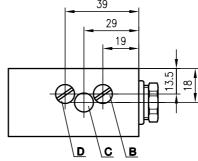


- AC version 230VAC with relay output
- General light/dark switching, sensitivity adjustment and delay before start-up provide for optimal adaptation to the application
- Connection via standard plug with screw connection up to 1.5 mm²

Dimensioned drawing

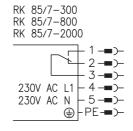






- Optical axis
- В Sensitivity adjustment
- С Indicator diode
- Light/dark switching

Electrical connection











Accessories:

(available separately)

Mounting systems (BT 85)

Specifications

Optical data

Scanning range (white 90 %) 1) 0 ... 300mm, 0 ... 800mm, 0 ... 2000mm

Adjustment range 100%

Light source LED (modulated light)

Wavelength 880 nm

Timing

Sensor switching frequency 20Hz Sensor response time 25ms Delay before start-up ≤ 200 ms

Electrical data

Operating voltage UB 230VAC ± 10% 50/60Hz Power consumption Switching output relay, 1 change-over contact light or dark switching (reversible) 250VAC/DC Function characteristics Switching voltage, relay Switching current, relay

250VAC 3A/30VDC 3A Switching power, relay 250VAC 50 watts 250VAC 60VA ind. load

Sensitivity adjustable

Indicators

Red LED no reflection, operating voltage connected LED green reflection, with performance reserve LED yellow reflection, no performance reserve

Mechanical data

Housing diecast aluminium

Weight 490g Optics cover

standard plug with screw connection up to 1.5 mm² Connection type

Environmental data

Ambient temp. (operation/storage) ²⁾ Protective circuit ³⁾ -20°C ... +60°C/-30°C ... +70°C

VDE safety class

I, all-insulated IP 65 Protection class

LED class 1 (acc. to EN 60825-1)

IEC 60947-5-2 Standards applied

Ontions

De-humidifying system to prevent fogging of the optics (temperature change)

1) Scanning range: recommended range with performance reserve

-30°C with continuously applied operating voltage

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

Tables

Diagrams

Order guide

Selection table Equipment	Order code →	RK 85/7-300 Part No. 500 00507	RK 85/7-800 Part No. 500 00512	RK 85/7-2000 Part No. 500 00517		
Housing	Metal	•	•	•		
Scanning range	300 mm	•				
	800 mm		•			
	2000 mm			•		
Connection	Connectors	•	•	•		
Features						
Voltage supply	230 VAC	•	•	•		
Switching output	Relay	•	•	•		
Dehumidification		•	•	•		

Remarks

- In the case of badly reflecting materials, the lower and upper scanning limits may change.
- Approved purpose:

This product may only be used by qualified personnel and must only be used for the approved purpose. This sensor is not a safety sensor and is not to be used for the protection of persons.