

25 Series

Product description





Contents:

25 Series - overview and advantages

Special features of Series 25

Sensor selection table

Data sheets

25 Series Overview and advantages

Complete series with powerful light scanners in plastic housings

Operating principles:

- Throughbeam photoelectric sensors
- Retro-reflective photoelectric sensors with polarisation filter
- Retro-reflective photoelectric sensors for transparent media
- Energetic diffuse reflection light scanners
- Diffuse reflection light scanners for contrast detection
- Diffuse reflection light scanners with background suppression
- Diffuse reflection light scanner for shiny objects with background suppression
- CCD diffuse reflection light scanners with background suppression

Switching outputs:

- Low impedance push-pull outputs with very high immunity to interference
- PNP and NPN compatible (All-In-One)
- Symmetric response behaviour

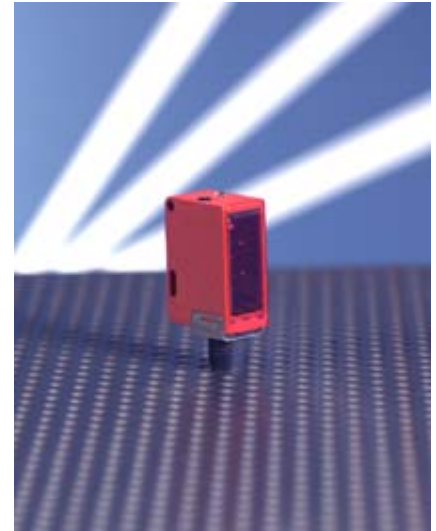
Switching frequency up to 1 kHz

Housing materials:

- Glass fiber reinforced plastic housing

Various accessories

- Wobble fixture for rod mounting
- Mounting bracket
- Cable
- Reflectors



Special features of Series 25

Powerful and competitively priced sensors

Versatile and easy to integrate

- Standard and special sensors in small housings
- Flexible connection to all control systems by means of push/pull output
- Three different connection variants M8/M12 connector or cable ensure easy installation
- Adjustable mounting system



Throughbeam photoelectric sensors

- ✓ **Advantage 1:** Visible light spot
- ✓ **Advantage 2:** Long operating range
- ✓ **Advantage 3:** Suppression of reflector problems
- ✓ **Advantage 4:** Very comfortable alignment
- ✓ **Advantage 5:** With activation input for muting function



Retro-reflective photoelectric sensors for the detection of PET and beverage bottles

- ✓ **Advantage 1:** Long operating range
- ✓ **Advantage 2:** Easy to adjust with multiturn potentiometer
- ✓ **Advantage 3:** Short response time



Retro-reflective photoelectric sensors with polarisation filter

- ✓ **Advantage 1:** Adjustable sensitivity
- ✓ **Advantage 2:** A variable warning output indicates the soiling status of the sensor
- ✓ **Advantage 3:** With activation input for muting function

*Optical sensors for storage systems,
materials handling, the packaging industry,
electronics production...*

**Energetic diffuse reflection light scanners**

- ✓ **Advantage 1:** Simple contrast detection
- ✓ **Advantage 2:** Adjustable via potentiometer
- ✓ **Advantage 3:** Long scanning range

**Diffuse reflection light scanners with background suppression**

- ✓ **Advantage 1:** Mechanical background suppression
- ✓ **Advantage 2:** Increased scanning range
- ✓ **Advantage 3:** Very good black/white behaviour

**CCD diffuse reflection light scanners with background suppression**

- ✓ **Advantage 1:** CCD technology for colour-independent object detection
- ✓ **Advantage 2:** Adjustment via button or line
- ✓ **Advantage 3:** Excellent black/white behaviour
- ✓ **Advantage 4:** Exact background suppression



Operating principle	Designation	Typ. oper. range limit/ scan. range limit	Optical power			Detection properties											
			For long distances	For medium distances	For short distances	Object detection from 0 ... max. operating range	Detection of standard objects or gaps	Detection of small objects or gaps	Detection of smallest objects or gaps	Repetition accuracy standard	Repetition accuracy accurate	Repetition accuracy very accurate	No dependence on colour or surface	Small dependence on colour or surface	Significant dependence on colour or surface	Shining surfaces	
	LSR 25/66.8...	M12	•	•	•	•	•					•					•
	ILSR 25/4.8...	M12	•	•	•	•	•					•					•
	PRK 25/66...	0.05 ... 6m		•	•		•	•				•					•
	PRK 25/66.1...	0.05 ... 6m		•	•		•	•	•			•					•
	IPRK 25/4...	0.05 ... 6m		•	•		•	•				•					•
	PRK 25/4.8...	0.05 ... 6m		•	•		•	•				•					•
	PRK 25/66.2...	0 ... 5m		•	•	•	•	•				•					•
	PRK 25/66.41...	0 ... 2m		•	•	•	•	•				•					•
	RTR 25/66-300...	55 ... 310mm			•		•	•				•					•
	RTR 25/66-700...	5 ... 800mm			•		•	•				•					•
 	HRTR 25/66...	5 ... 400mm (800mm)			•		•	•				•					•
	HRTR 25/6.2...	10 ... 200mm			•		•	•	•			•					•
	HRT 25/66.....	5 ... 400mm (750mm)			•		•	•				•					•

...: Possible connection variations, cf. data sheet • : suitable for this application case



Environmental influences					Installation effort			Wiring effort			Auxiliary components		Special features										Page
Heavy partial soiling	Average partial soiling	Light partial soiling	Dew deposit, drop formation	Fog, smoke	Low	Medium	High	On one side	On both sides	None	None	Reflector	PE and glass detection	Warning output PNP	Activation input	Adjustment with potentiometer	Adjustment via teach button	Adjustment via teach line	Detection of shining surfaces	Contrast detection	Further details		
•	•	•	•	•			•		•		•				•						7		
•	•	•	•	•			•		•		•			•	•						7		
	•	•				•						•									9		
	•	•				•						•									9		
	•	•				•						•		•							9		
	•	•				•						•			•						9		
	•	•				•						•									11		
	•	•				•						•	•								13		
	•	•			•				•		•									•	15		
	•	•			•				•		•									•	17		
		•			•				•		•										19		
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		•			•				•		•								•		25		

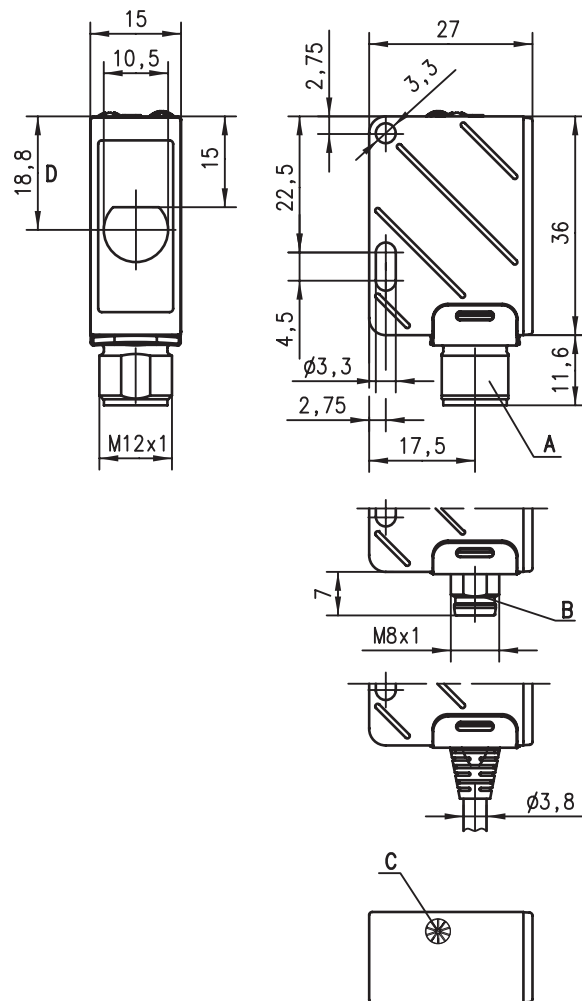


LSR 25

Throughbeam photoelectric sensors



Dimensioned drawing



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

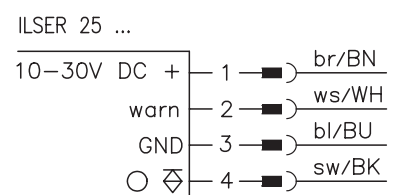
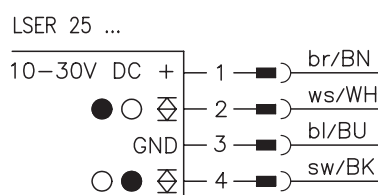
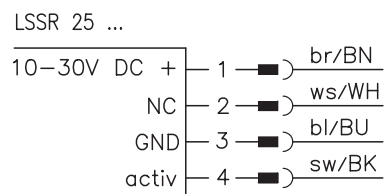


M12



- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M8 and M12 connector or cable connection
- Visible red light
- Transmitter with activation input
- Very comfortable alignment

Electrical connection



Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems

We reserve the right to make changes • 25_a01e.fm

Specifications

Optical data

Typ. operating range limit ¹⁾	M12
Operating range ²⁾	8m
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

Switching frequency	500Hz
Response time	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/function	.../66 2 push-pull switching outputs ³⁾ pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching
	.../4 1 PNP switching output pin 4: light switching
Signal voltage high/low	≥ ($U_B - 2V$) / ≤ 2V
Output current	max. 100mA
Sensitivity	not adjustable

Indicators

LED yellow, receiver	light path free
LED yellow flashing, receiver	light path free, no performance reserve

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 ²

Environmental data

Ambient temp. (operation/storage)	-20 °C ... +55 °C / -40 °C ... +70 °C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
Standards applied	IEC 60947-5-2

Options

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

- 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

Order guide

	Designation	Part No.
with M12 connector		
Transmitter and receiver	LSR 25/66.8-S12	
Transmitter	LSSR 25.8-S12	500 39528
Receiver	LSER 25/66-S12	500 39529
with 2m cable		
Transmitter and receiver	LSR 25/66.8	
Transmitter	LSSR 25.8	500 39524
Receiver	LSER 25/66	500 39525
with M8 connector		
Transmitter and receiver	LSR 25/66.8-S8	
Transmitter	LSSR 25.8-S8	500 39526
Receiver	LSER 25/66-S8	500 39527
with warning output		
with M12 connector		
Transmitter and receiver	ILSR 25/4.8-S12	
Transmitter	LSSR 25.8-S12	500 39528
Receiver	ILSER 25/4-S12	500 39531

LSR 25/66(8) ... - 03
ILSR 25/4(8) ... - 03

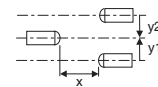
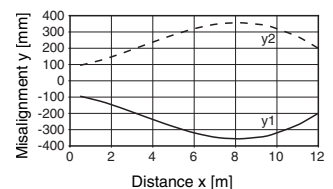
Tables

0	8	12
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	Operating range [m]
	Typ. operating range limit [m]

Diagrams

Typ. response behaviour



Remarks

Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) ¹⁾	0.05 ... 6m
Operating range ²⁾	see tables
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

Switching frequency	500Hz
Response time	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	≤ 20 mA
Switching output/function	/66 ... 2 push-pull switching outputs ³⁾ pin 2: PNP dark switching, NPN light switching pin 4: PNP light switching, NPN dark switching /4 ... 1 PNP switching output pin 4: light switching ≥ ($U_B - 2V$) / ≤ 2V max. 100mA adjustable with multi-turn potentiometer for ".1-models"
Signal voltage high/low	
Output current	
Sensitivity	

Indicators

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

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 ²

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
Standards applied	IEC 60947-5-2

Options

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

- 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

Order guide

	Designation	Part No.
with M12 connector	PRK 25/66-S12	500 39534
with M8 connector	PRK 25/66-S8	500 39533
with 2m cable	PRK 25/66	500 39532
with sensitivity adjustment		
with M12 connector	PRK 25/66.1-S12	500 39537
with M8 connector	PRK 25/66.1-S8	500 39536
with 2m cable	PRK 25/66.1	500 39535
with activation input		
with M12 connector	PRK 25/4.8-S12	500 39539
with warning output		
with M12 connector	IPRK 25/4-S12	500 39538

Tables

Reflectors	Operating range
1 TK(S) 100x100	0.05 ... 5.0m
2 MTK(S) 50x50	0.12 ... 3.3m
3 TK(S) 30x50	0.05 ... 2.0m
4 TK(S) 20x40	0.12 ... 1.6m
5 Tape 2 100x100	0.15 ... 1.8m
6 TK(S) 50 x 100	0.05 ... 4.0m
7 TK(S) 82	0.10 ... 3.0m
8 TK(S) 82.2	0.05 ... 4.5m

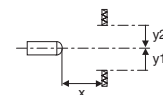
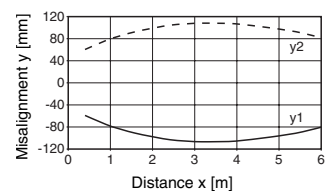
1	0.05			5	6
2	0.12	3.3		4	
3	0.05		2	2.5	
4	0.12	1.6		1.8	
5	0.15		1.8	2.2	
6	0.05			4	5
7	0.10		3	3.8	
8	0.05			4.5	5.5

<input type="checkbox"/>	Operating range [m]
<input type="checkbox"/>	Typ. operating range limit [m]

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

Diagrams

Typ. response behaviour (TK 100x100)



Remarks

Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) ¹⁾ 0 ... 5m
 Operating range ²⁾ 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 2 push-pull switching outputs ³⁾
 pin 2: PNP dark switching, NPN light switching
 pin 4: PNP light switching, NPN dark switching
 $\geq (U_B - 2V) / \leq 2V$
 max. 100mA

Signal voltage high/low
 Output current

Indicators

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

Mechanical data

Housing plastic
 Optics cover plastic
 Weight (plug/cable) 15g/55g
 Connection type M8 or M12 connector, 4-pin, or cable with M12 connector, cable length: 150mm

Environmental data

Ambient temp. (operation/storage) -20°C ... +55°C/-40°C ... +70°C
 Protective circuit 2, 3
 VDE safety class ⁵⁾ II, all-insulated
 Protection class IP 67
 LED class 1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
 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

Tables

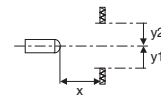
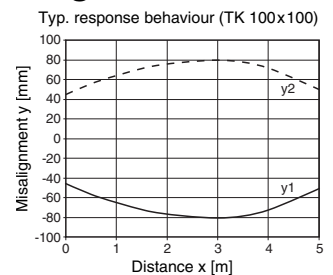
Reflectors			Operating range
1	TK(S)	100x100	0 ... 4.5m
2	MTK(S)	50x50	0 ... 3.0m
3	TK(S)	30x50	0 ... 1.7m
4	TK(S)	20x40	0 ... 1.5m
5	Tape 2	100x100	0 ... 0.7m
6	TK(S)	50x100	0 ... 3.0m
7	TK(S)	82.2	0 ... 2.5m

1	0	4.5	5.0
2	0	3.0	3.5
3	0	1.7	2.0
4	0	1.5	1.7
5	0	0.7	0.9
6	0	3.0	3.5
7	0	2.5	3.0

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

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

Diagrams



Order guide

	Designation	Part No.
with M12 connector	PRK 25/66.2-S12	500 41395
with M8 connector	PRK 25/66.2-S8	500 41394
cable with M12 connector, cable length: 150mm	PRK 25/66.2-150-S12	500 41396

Remarks

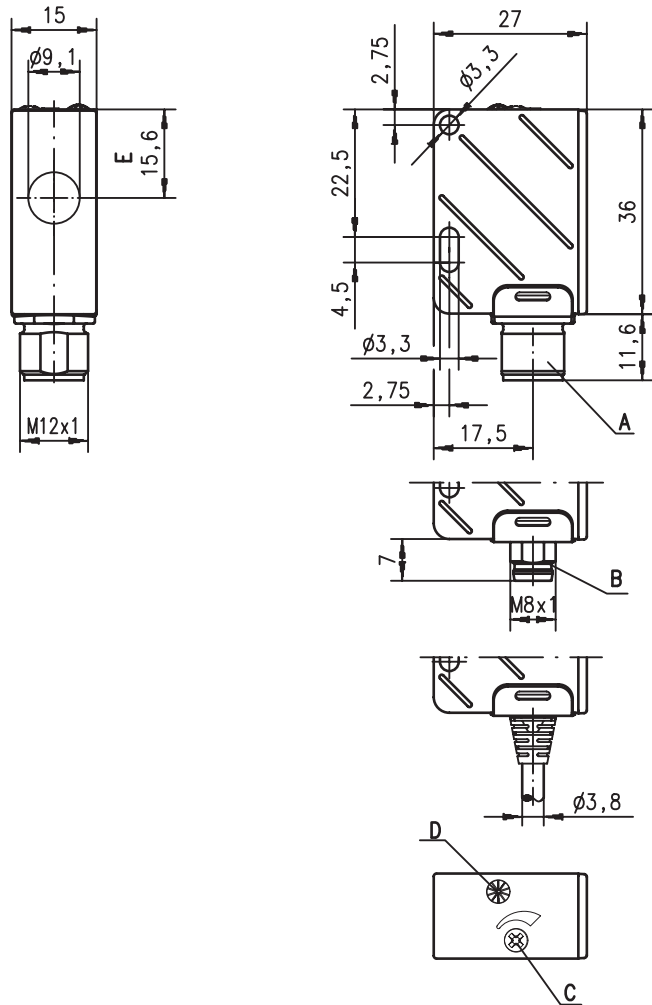


PRK 25

Retro-reflective photoelectric sensors



Dimensioned drawing

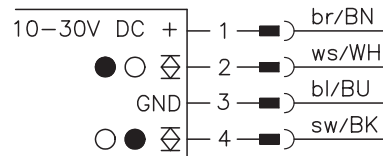


- A M12 connector
- B M8 connector
- C Sensitivity adjustment
- D Indicator diode
- E Optical axis

0 ... 2m
 500 Hz
 10 - 30 V DC
A²LS

- 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

Electrical connection



Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Reflectors
- Reflective tapes

We reserve the right to make changes • 25_b04e.fm



Specifications

Optical data

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

Timing

Switching frequency	500 Hz
Response time	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	≤ 20 mA
Switching output/function	/66 ... 2 push-pull switching outputs ³⁾ 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
Sensitivity	adjustable with multiterm potentiometer

Indicators

LED yellow	light path free
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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 ²

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
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

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) ...

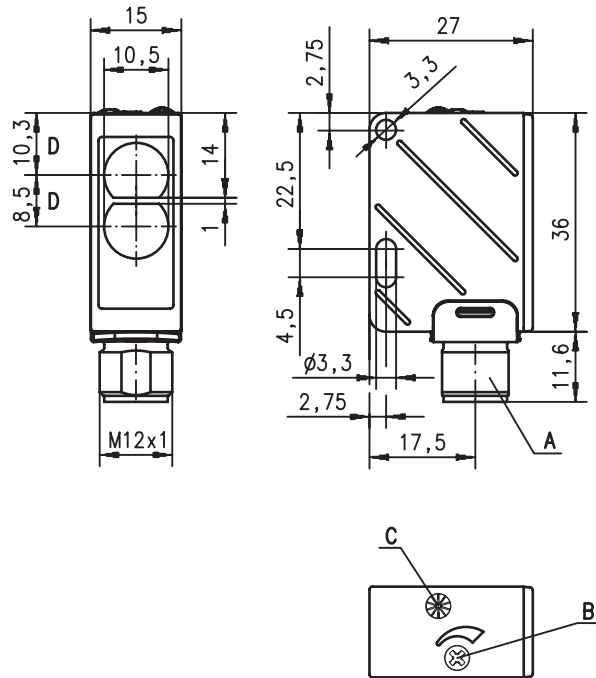


RTR 25

Energetic diffuse reflection light scanner

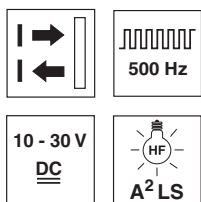


Dimensioned drawing



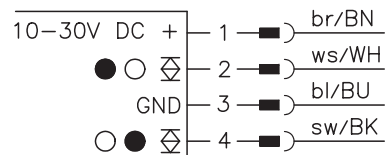
- A M12 connector
- B Sensitivity adjustment
- C Indicator diode
- D Optical axis

55 ... 310mm



- Contrast detection
- Adjustable scanning range
- A²LS - active suppression of extraneous light
- Push-pull switching outputs

Electrical connection



Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems

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Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	55 ... 310 mm
Scanning range ²⁾	see tables
Electrical adjustment range	0 ... 310 mm
Light source	LED (modulated light)
Wavelength	660nm (red light)

Timing

Switching frequency	500Hz
Response time	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	≤ 20mA
Switching output/function	2 push-pull switching outputs ³⁾ 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	adjustable with multiturn potentiometer

Indicators

LED yellow	object detected
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Mechanical data

Housing	plastic
Optics cover	plastic
Weight (plug/cable)	15g
Connection type	M12 connector, 4-pin

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
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

Tables

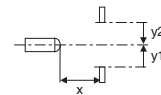
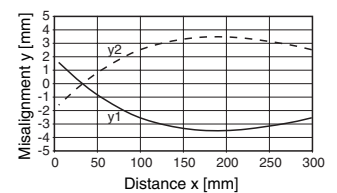
1	55	300	310
2	100	120	140
3	-	-	-

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%)



Order guide

	Designation	Part No.
with M12 connector	RTR 25/66-300-S12	500 40354

Remarks

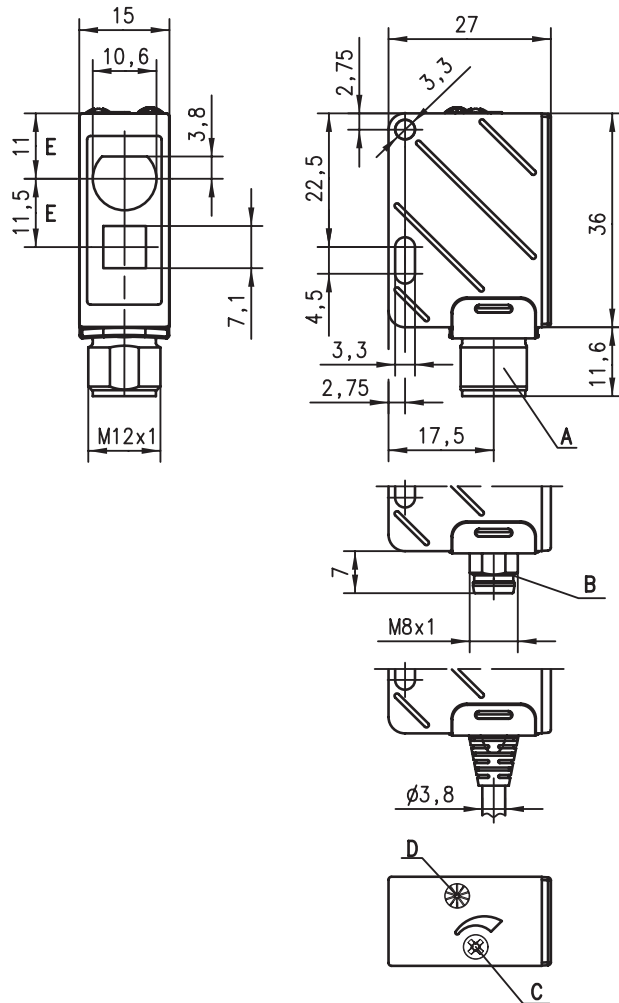


RTR 25

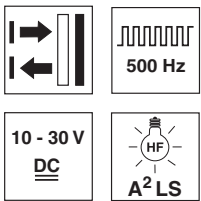
Energetic diffuse reflection light scanner



Dimensioned drawing



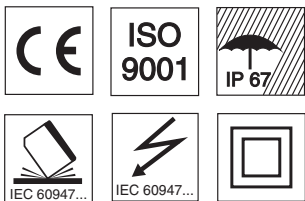
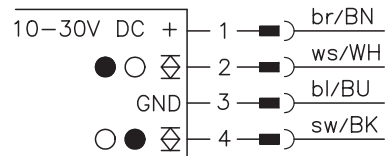
- A M12 connector
- B M8 connector
- C Scanning range adjustment
- D Indicator diode
- E Optical axis



5 ... 800mm

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

Electrical connection



Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems

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

Specifications

Optical data

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

Timing

Switching frequency	500Hz
Response time	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	≤ 20mA
Switching output/function	2 push-pull switching outputs ³⁾ 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, 4 x 0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
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

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

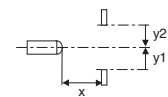
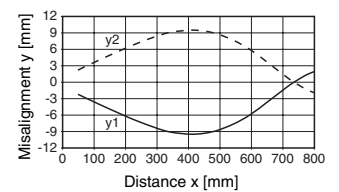
1	7	700	800
2	9	480	530
3	12	380	400

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

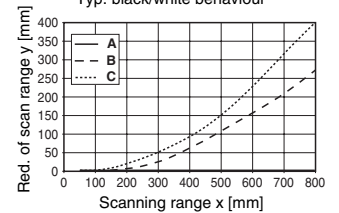
<input type="checkbox"/>	Scanning range [mm]
<input type="checkbox"/>	Typ. scanning range limit [mm]

Diagrams

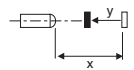
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



Remarks

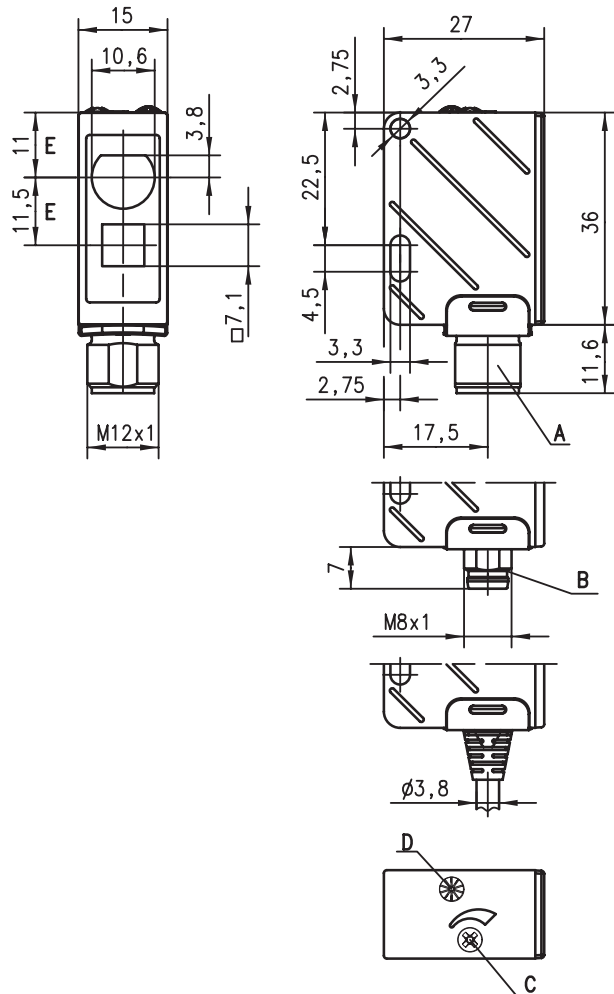


HRTR 25

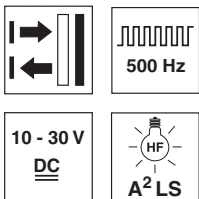
Diffuse reflection light scanner with background suppression



Dimensioned drawing



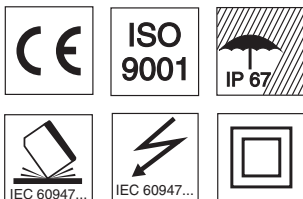
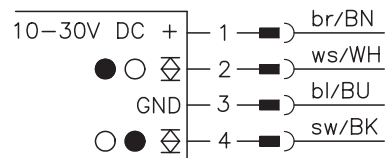
- A M12 connector
- B M8 connector
- C Scanning range adjustment
- D Indicator diode
- E Optical axis



5 ... 400mm
(800mm)

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

Electrical connection



Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems

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

Specifications

Optical data

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

Timing

Switching frequency	500Hz
Response time	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	≤ 20 mA
Switching output/function	2 push-pull switching outputs ³⁾ 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 ²

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
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

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

Tables

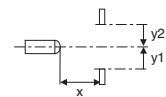
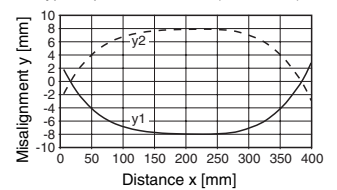
1	7	300	400 ... 800
2	9	270	340 ... 530
3	12	250	300 ... 400

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

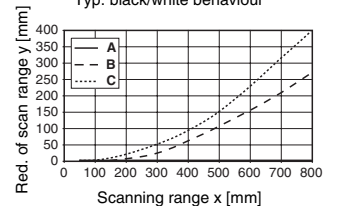
	Scanning range [mm]
	Typ. scanning range limit [mm]

Diagrams

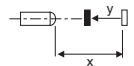
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



Remarks



HRTR 25 Diffuse reflection light scanner with teachable background suppression



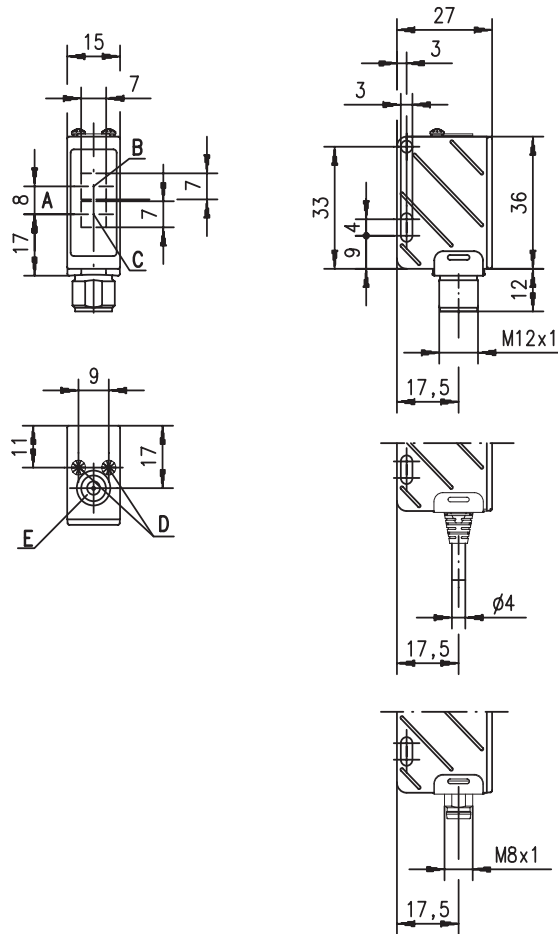
Dimensioned drawing



10 ... 200mm

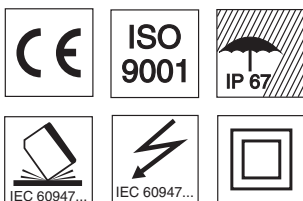


- CCD technology for colour-independent object detection
- Concise teachable background suppression
- Excellent black/white behaviour
- Visible red light
- Push-pull switching output



- A Optical axis
- B Transmitter
- C Receiver
- D Indicator diode
- E Teach button

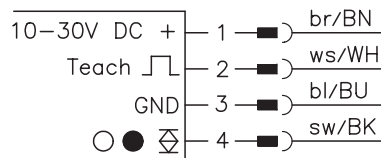
Electrical connection



Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems



We reserve the right to make changes • 25_d05e.fm

Specifications

Optical data

Typ. scanning range limit (6% ... 90%) ¹⁾	10 ... 200mm
Scanning range ²⁾	see tables
Teach range / adjustment range	25 ... 200mm
Light source	LED
Wavelength	660nm (red light)
Receiver	CCD line

Timing

Switching frequency	100Hz ... 200Hz ³⁾
Response time	5ms
Delay before start-up	≤100ms

Electrical data

Operating voltage U_B	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Power consumption	≤ 0.5W
Switching output/function	pin 4: PNP light switching, NPN dark switching or PNP dark switching, NPN light switching reversible via the teach button, or teach line (see remarks)
Signal voltage high/low	≥ ($U_B - 2V$) / ≤ 2V
Output current	max. 100mA
Scanning range adjustment	via teach button, or teach line (see remarks)

Indicators

LED green	ready
LED yellow	object detected

additional display functions of the LEDs during the teaching process - see the "teaching process" description

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 ²

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
Standards applied	IEC 60947-5-2

Options

Teach input

Input resistance	10kΩ ± 10%
Active/not active	U_B /0V or not connected
Teach delay	≤0.5ms

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) Depends on the contrast difference between object and background
- 4) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 5) Rating voltage 250VAC

Order guide

	Designation	Part No.
with M12 connector	HRTR 25/6.2-200-S12	500 39551
with M8 connector	HRTR 25/6.2-200-S8	500 39550
with 2m cable	HRTR 25/6.2-200	500 39549

Tables

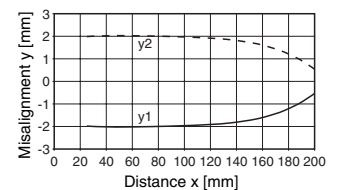
1	25	200	200
2	25	200	200
3	25	200	205
4	25	150	160

1	white 90%
2	grey 18%
3	black 6%
4	black 4%

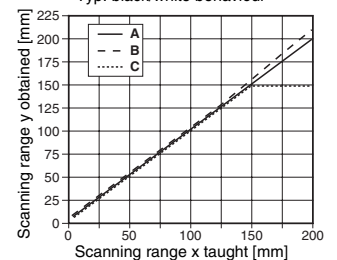
<input type="checkbox"/>	Scanning range [mm]
<input type="checkbox"/>	Typ. scanning range limit [mm]

Diagrams

Typ. response behaviour
(black 6% ... white 90%)

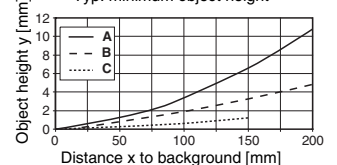


Typ. black/white behaviour



- A white 90% ... grey 18%
- B black 6%
- C black 4%

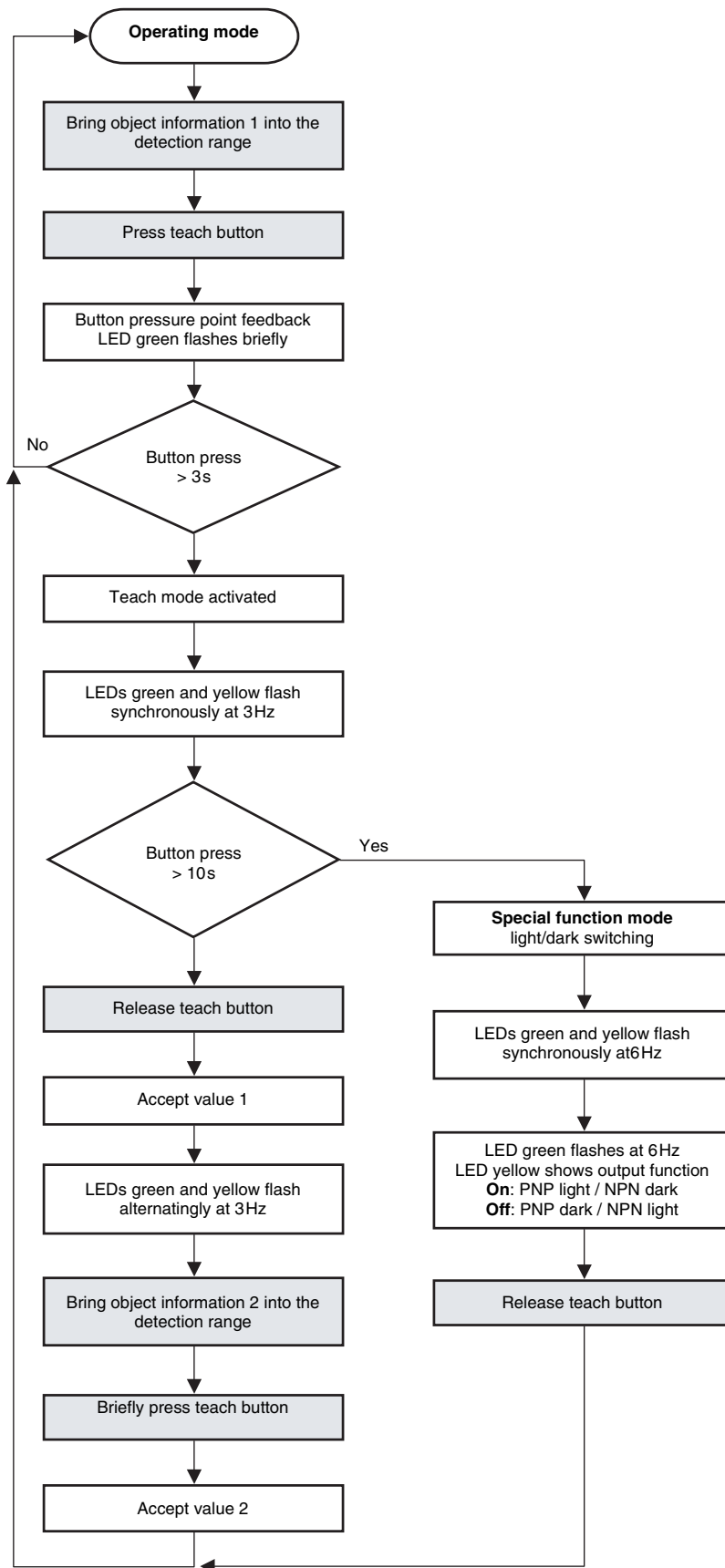
Typ. minimum object height



- A white 90% ... grey
- B black 6%
- C black 4%

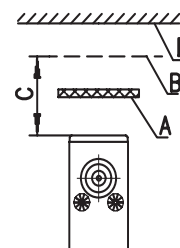
Remarks

- Do not operate the teach button with a pointed object.
- The teach process via teach line corresponds to that of the teach button.
- The maximum scanning range is reduced for objects with reflectivity ≤ 6% (see table and diagrams).
- The hysteresis changes depending on the reflectivity of the scanned object and the scanning range.



Object detection in front of a background

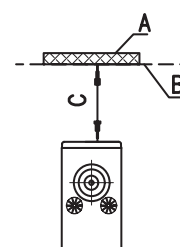
	Operation 1)	LED green	LED yellow	Sensor
1.	Bring object into detection range	On	On/Off	
2.	Press teach button for 3s	Off → On	On/Off	Acknowledgement button press
3.		3Hz synchronously		
4.	Release teach button	3Hz alternatingly		Accept object distance
5.	Bring background into detection range	3Hz alternatingly		
6.	Briefly press teach button	On	Off	Accept background distance
7.	Sensor is in operating mode	On	Off	Switching point lies midway between object and background



A Object
B Switching point
C Scanning range
D Background

Object detection without background

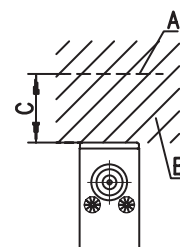
	Operation 1)	LED green	LED yellow	Sensor
1.	Bring object into detection range	On	On/Off	
2.	Press teach button for 3s	Off → On	On/Off	Acknowledgement button press
3.		3Hz synchronously		
4.	Release teach button	3Hz alternatingly		Accept object distance
5.	Briefly press teach button	On	On	Again, accept object distance
6.	Sensor is in operating mode	On	On	Switching point = object distance



A Object
B Switching point
C Scanning range

Setting the max. scanning range (max. sensitivity)

	Operation 1)	LED green	LED yellow	Sensor
1.	Remove object and background	On	On/Off	
2.	Press teach button for 3s	Off → On	On/Off	Acknowledgement button press
3.		3Hz synchronously		
4.	Release teach button	3Hz alternatingly		Accept free light path (200mm)
5.	Briefly press teach button	On	Off	Accept free light path again (200mm)
6.	Sensor is in operating mode	On	Off	Maximum possible scanning range is set



A Switching point at 200mm
B Free light path
C Scanning range

Programming light/dark switching

	Operation ¹⁾	LED green	LED yellow	Sensor
1.	Press teach button for 12 ... 18s	On	On/Off	
2.	Hold down teach button	Off → On	On/Off	Acknowledgement button press
3.	Hold down teach button	3Hz synchronously		
4.	Hold down teach button	6 Hz synchronously		
5.	Release teach button for PNP light switching NPN dark switching	6Hz	On	Output function 1 is programmed
6.	Release teach button for PNP dark switching NPN light switching	6Hz	Off	Output function 2 is programmed
7.	Sensor is in operating mode	On	On/Off	Switching point remains unchanged

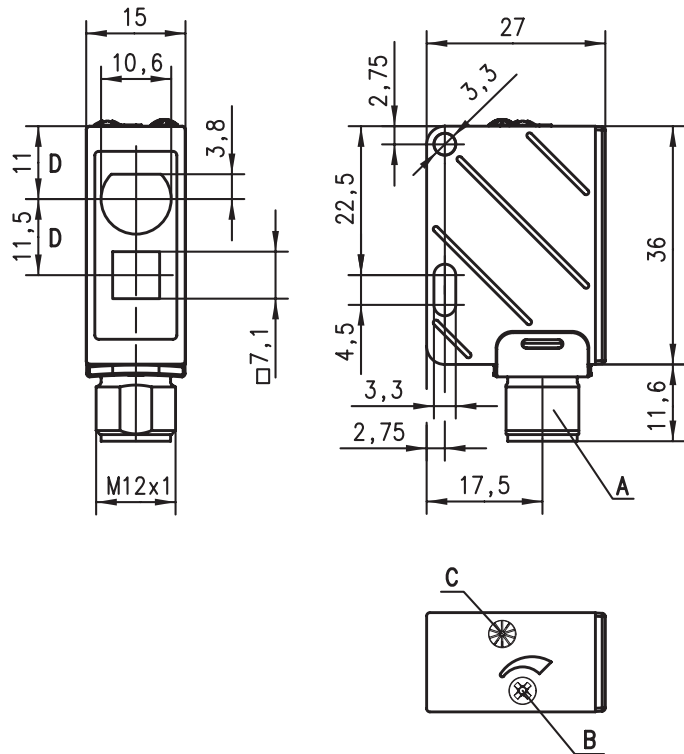
1) The teach process via teach line corresponds to that of the teach button



HRT 25 Diffuse reflection light scanner for shiny objects with background suppr.



Dimensioned drawing



5 ... 400mm
(750mm)

- Detects objects with shiny surfaces
- Adjustable background suppression
- A²LS - active suppression of extraneous light
- Push-pull switching outputs

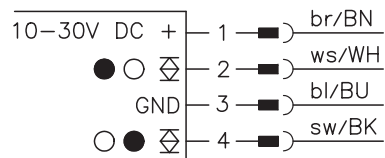
- A M12 connector
- B Scanning range adjustment
- C Indicator diode
- D Optical axis

Electrical connection

Accessories:

(available separately • see page 26)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems



We reserve the right to make changes • 25_d01e.fm

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	5 ... 400mm (750mm)
Scanning range ²⁾	see tables
Mechanical adjustment range	40 ... 750mm
Light source	LED (modulated light)
Wavelength	880nm (infrared light)

Timing

Switching frequency	200Hz
Response time	2.5ms
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/function	2 push-pull switching outputs ³⁾ 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
Connection type	M12 connector, 4-pin

Environmental data

Ambient temp. (operation/storage)	-20°C ... +55°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
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

Tables

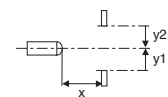
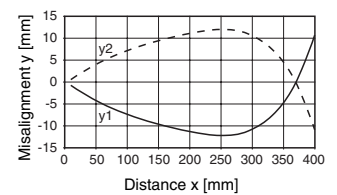
1	7	300	400 ... 750
2	9	275	370 ... 600
3	12	265	310 ... 400

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

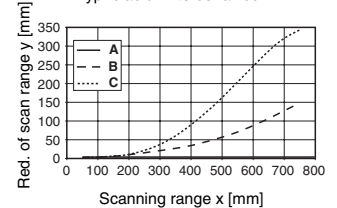
<input type="checkbox"/>	Scanning range [mm]
<input type="checkbox"/>	Typ. scanning range limit [mm]

Diagrams

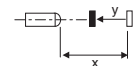
Typ. response behaviour (white 90%)



Typ. black/white behaviour



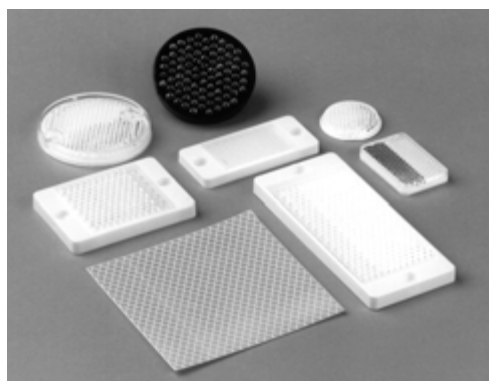
- A white 90%
- B grey 18%
- C black 6%



Order guide

	Designation	Part No.
with M12 connector	HRT 25/66-300-S12	500 40466

Remarks

25 Series
Accessories
Reflectors


- Adhesive and screw type versions permit universal installation
- Material PMMA 8N (plexiglass) - no corrosion, long working life and high mechanical firmness
- Various format for optimal adaptation to all possible applications and mounting environments
- Micro triple version suitable for e.g. laser retro-reflective photoelectric sensors
- Unproblematic cleaning, because surface is resistant against current cleaners
- Precise optical alignment is not required, as the reflector may be slightly inclined relative to the optical axis

Order codes:

Designation	Part No.
TK 82	500 03187
TK 82.2	500 24127
TK 60	500 03186
TK 45	500 03185
TK 35	500 03184
TK 25	500 03183
TKS 25	500 27696
TK 20	500 03182
TK 100x100	500 03192
TK 50x100	500 03191
TK 40x180	500 03190
TK 40x180.1	500 22811
TK 30x50	500 03189
TK 20x75	500 03188
TKS 100x100	500 22816
TKS 50x100	500 22815
TKS 50x50	500 22814
TKS 30x500	500 27097
TKS 30x60	500 30433
TKS 30x50	500 23525
TKS 20x40	500 81283
MTKS 50x50	500 36188
UMS 96-82	500 27191
ET 045-01	500 09419
HTK 82	500 00068/69/71
Reflective tape 5870	500 09812/13
Reflective tape No. 2	500 11523
Reflective tape No. 4	500 38062

Selection table

Series/ construction	Designation	Mounting type		Dimensions [mm]
		screw-type	adhesive ¹⁾	
TK/round	TK 82	●		Ø84
	TK 82.2	●		Ø84
	TK 60	●	●	Ø65
	TK 45		●	Ø46
	TK 35		●	Ø36
	TK 25		●	Ø26
	TKS 25	●		Ø26
	TK 20		●	Ø21
TK/TKS ²⁾	TK 100x100	●	●	99x99
	TKS 50x100	●	●	50x99
	TK 40x180	●		41x181
	TK 40x180.1	●		41x181
	TK 30x50		●	30x46
	TK 20x75		●	20x75
	TKS 100x100	●	●	103x125
	TKS 50x100	●	●	54x125
	TKS 50x50	●	●	54x75
	TKS 30x500	●	●	35x505
	TKS 30x60	●	●	35x83
	TKS 30x50	●	●	35x75
TKS 20x40	●	●	20x60	
MTKS	MTKS 50x50	●		51x61
Other	UMS 96-82	●		mounting system with reflector TK 82
	ET 045-01	●		metal mounting bracket for TK 100x100 and TK 50x100
	HTK 82	●		
	Reflective tape 5870		● ³⁾	
	Reflective tape No. 2		● ³⁾	
	Reflective tape No. 4		● ³⁾	

1) Not self-adhesive

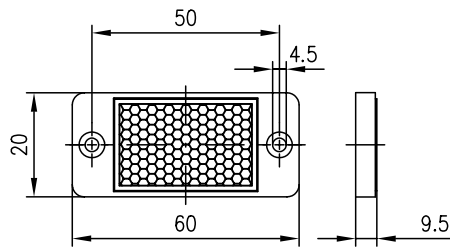
2) Screw mounting with mounting bracket ET 045-01 (2 pieces included in shipment)

3) Self-adhesive

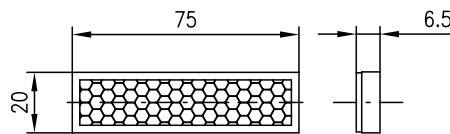


Dimensioned drawings

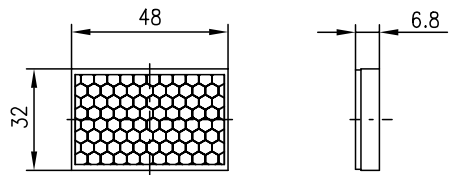
TKS 20x40



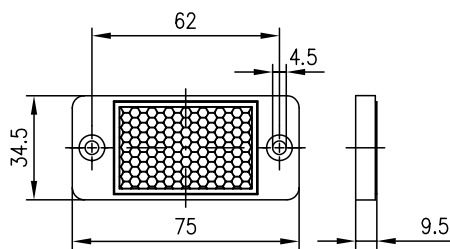
TK 20x75



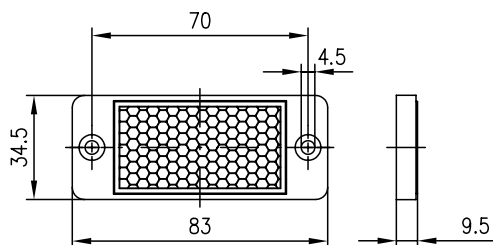
TK 30x50



TKS 30x50



TKS 30x60



Explanations

Reflector TKS 20x40 (Part No. 500 81283)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type, adhesive

Reflector TK 20x75 (Part No. 500 03188)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: adhesive

Reflector TK 30x50 (Part No. 500 03189)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: adhesive

Reflector TKS 30x50 (Part No. 500 23525)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type, adhesive

Reflector TKS 30x60 (Part No. 500 30433)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type, adhesive

Explanations
Reflector TKS 30x500 (Part No. 500 27097)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type

Reflector TK 40x180 (Part No. 500 03190)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type, adhesive

Reflector TK 40x180.1 (Part No. 500 22811)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

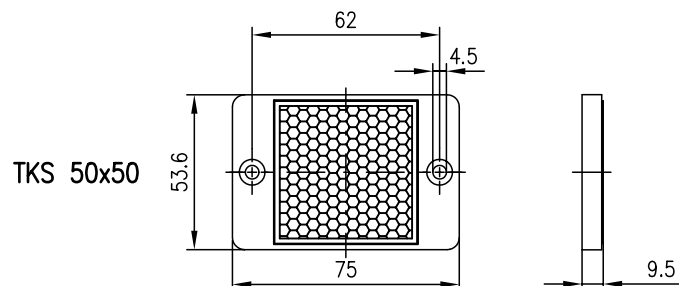
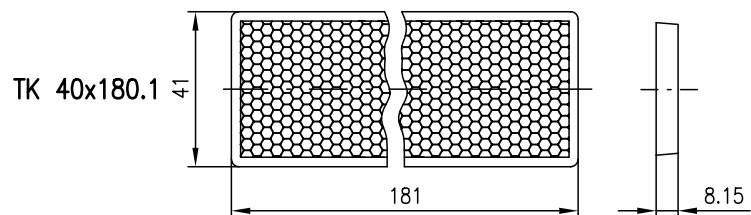
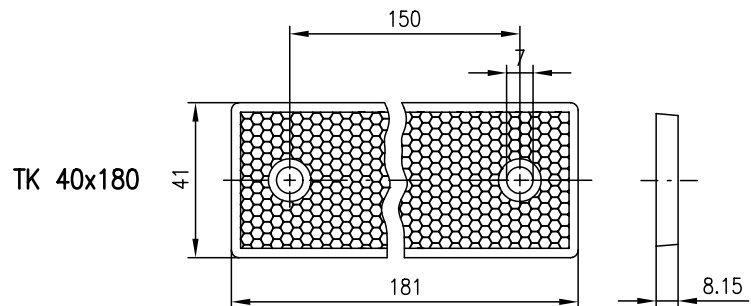
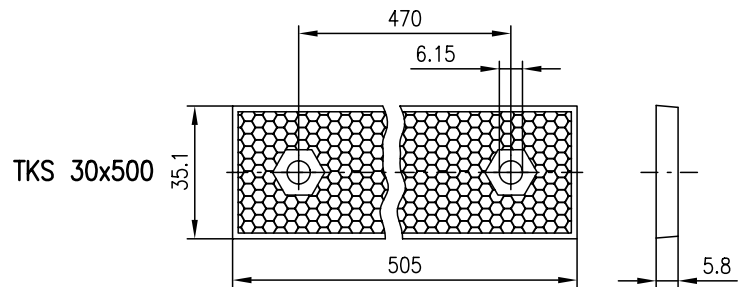
Mounting: adhesive

Reflector TKS 50x50 (Part No. 500 22814)

Material: plastic PMMA 8N (plexiglass)

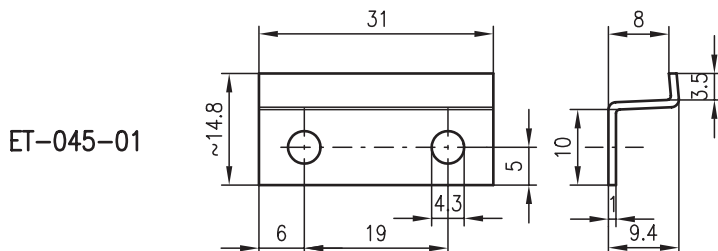
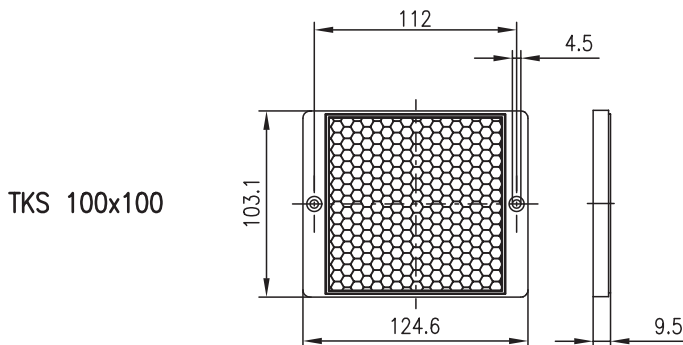
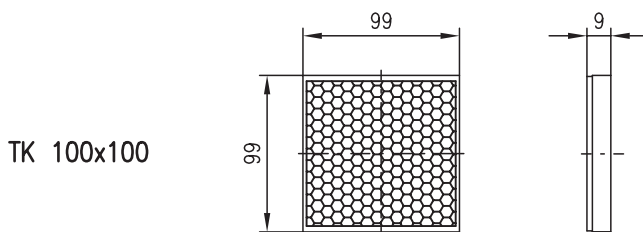
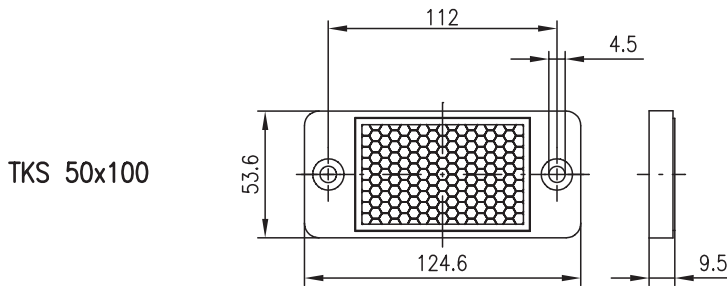
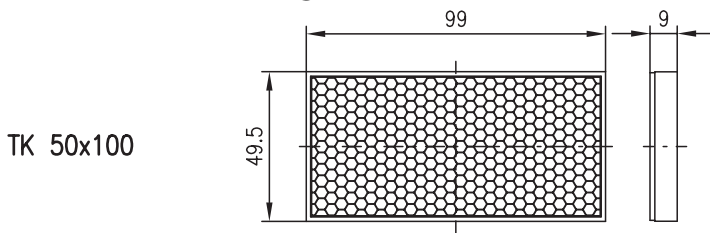
Temperature range: -20°C ... +80°C

Mounting: screw type, adhesive

Dimensioned drawings




Dimensioned drawings



Explanations

Reflector TK 50x100 (Part No. 500 03191)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: screw type (with mounting bracket ET-045-01), adhesive

Reflector TKS 50x100 (Part No. 500 22815)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: screw type, adhesive

Reflector TK 100x100 (Part No. 500 03192)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: screw type (with mounting bracket ET-045-01), adhesive

Reflector TKS 100x100 (Part No. 500 22816)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: screw type, adhesive

Mounting bracket ET-045-01
 (Part No. 500 09419)
 for screw mounting of TK 50x100 and TK 100x100 (2 pieces included in shipment)



25 Series

Accessories

Explanations

Reflector TK 20 (Part No. 500 03182)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: adhesive

Reflector TK 25 (Part No. 500 03183)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: adhesive

Reflector TKS 25 (Part No. 500 27696)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: thread bolt

Reflector TK 35 (Part No. 500 03184)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: adhesive

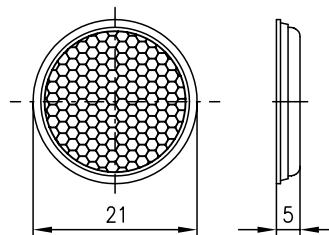
Reflector TK 45 (Part No. 500 03185)
 Material: plastic PMMA 8N (plexiglass)
 Temperature range: -20°C ... +80°C
 Mounting: adhesive

Remarks

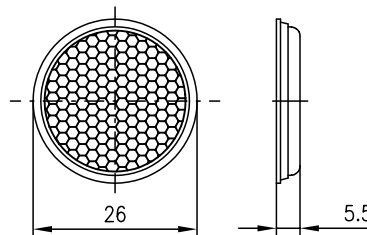
Based on the oriented prism structure, a higher range resp. performance reserve can be obtained through turning with reflectors which are slightly inclined towards the optical axis (preferred direction).

Dimensioned drawings

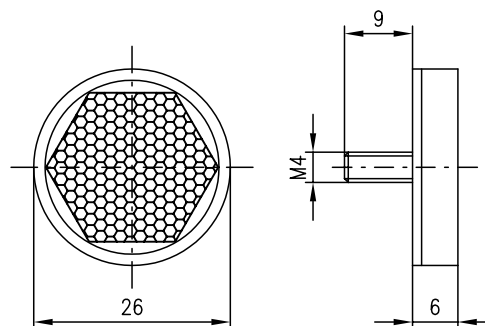
TK 20



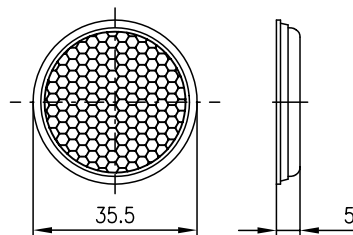
TK 25



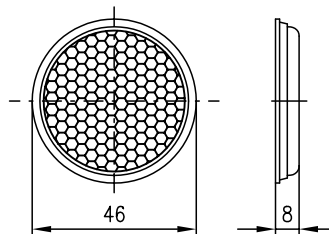
TKS 25

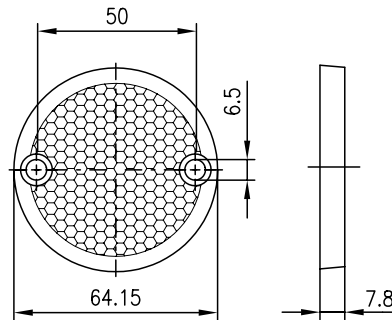
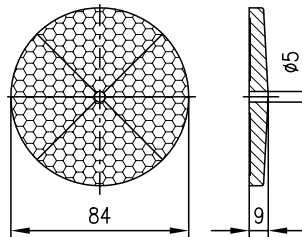
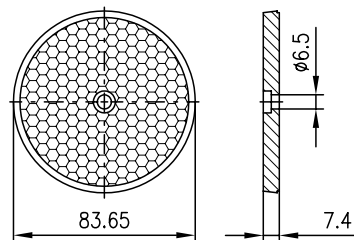
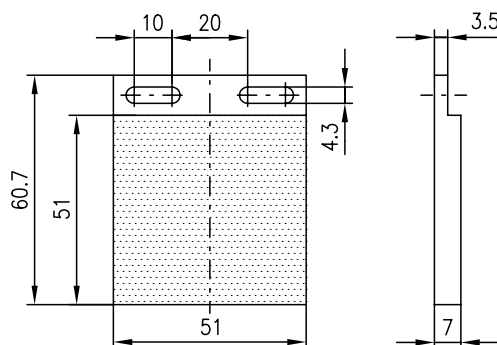


TK 35



TK 45



Dimensioned drawings
TK 60

TK 82

TK 82.2

MTKS 50x50

Explanations
Reflector TK 60 (Part No. 500 03186)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type, adhesive

Reflector TK 82 (Part No. 500 03187)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type

Note:

Constant reflection values through segmented triple areas (no preferred direction)

Reflector TK 82.2 (Part No. 500 24127)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type

Micro triple MTKS 50x50

(Part No. 500 36188)

Material: plastic PMMA 8N (plexiglass)

Temperature range: -20°C ... +80°C

Mounting: screw type

Explanations
Heatable reflectors
HTK 82 (Part No. 500 00068)

HTK 82-115V (Part No. 500 00069)

HTK 82-24V (Part No. 500 00071)

Material: plastic

Temperature range: -20°C ... +80°C

Mounting: screw type

Cable length: 2000mm

 Cable cross-section: 2x0.75mm²

Voltage (HTK 82...) Power consumption

24VAC/DC 2.8W

110VAC 2.0W

230VAC 3.4W

Reflective tape 5870 (Part No. 500 09812/500 09813)

 suitable for retro-reflective photoelectric sensors **without** polarisation filter

Material: plastic, cuttable

Width: - 25mm or 50mm

- cut goods

- other dimensions upon request

Thickness: 0.4mm

Temperature range: -20°C ... +60°C

Mounting: self-adhesive

Reflective tape No. 2 (Part No. 500 11523)

 suitable for retro-reflective photoelectric sensors **with/without** polarisation filter

Material: plastic, cuttable

Width: - 100x100mm

- Sheet 914x749mm

Thickness: 0.5mm

Temperature range: -20°C ... +60°C

Mounting: self-adhesive

Note:

The highest reflection values are reached with vertical alignment of the optical axis.

Reflective tape No. 4 (Part No. 500 38062)

Data: see reflective tape No. 2

Note:

The highest reflection values are reached with vertical alignment of the optical axis.

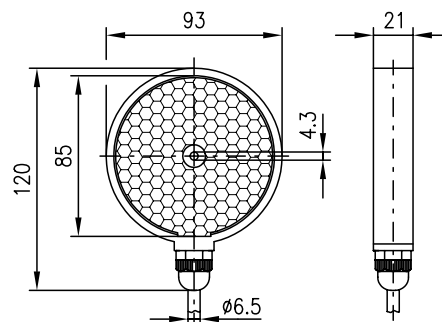
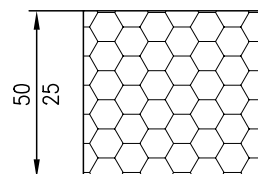
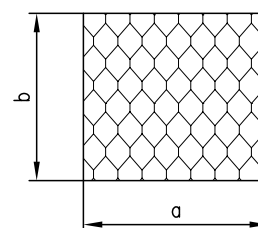
No preferred direction

Dimensioned drawings

HTK 82 (230V AC)

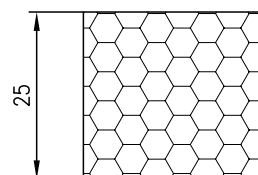
HTK 82-115V

HTK 82-24V

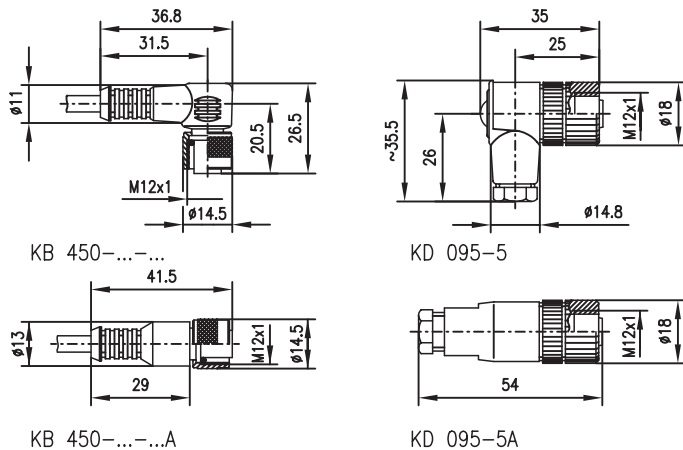

Reflective tape 5870

Reflective tape Nr.2


a	b
914	749
100	100
54	24
25	15
20	15

Important note!

Reflective tape Nr.4


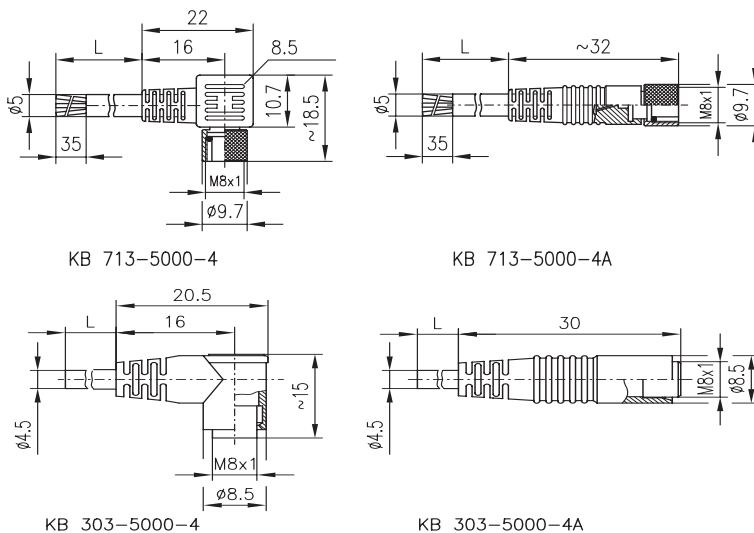
Dimensioned drawings M 12



Selection table

M12 connectors				
with cable		without cable		
M12	KB 450-2000-4	KB 450-2000-4A	KD 095-5	KD 095-5A
M12	KB 450-5000-4	KB 450-5000-4A		
M12	KB 450-10000-4	KB 450-10000-4A		

Dimensioned drawings M 8



Selection table

M8 connectors	
with cable (5m), 4-pin	
KB 713-5000-4 screw type	KB 713-5000-4A screw type
KB 303-5000-4 plug-in type	KB 303-5000-4A plug-in type

Connectors, plugs, cables



There are 2 connectors available for devices with M12 connectors: angled or straight, with and without cable.

Protection class (DIN 40050)
plugged and screwed: IP 67

Important:

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



For devices with M8 connectors, 4 connectors with ready-made 5m cable are available.

KB 713 plugged and screwed: IP 67
KB 303 plugged: IP 65

Important:

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



25 Series

Accessories

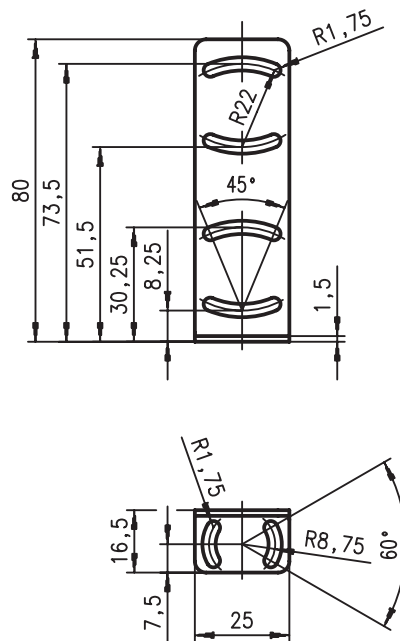
Mounting systems

BT 25 (Part No. 500 40269)



Dimensioned drawings

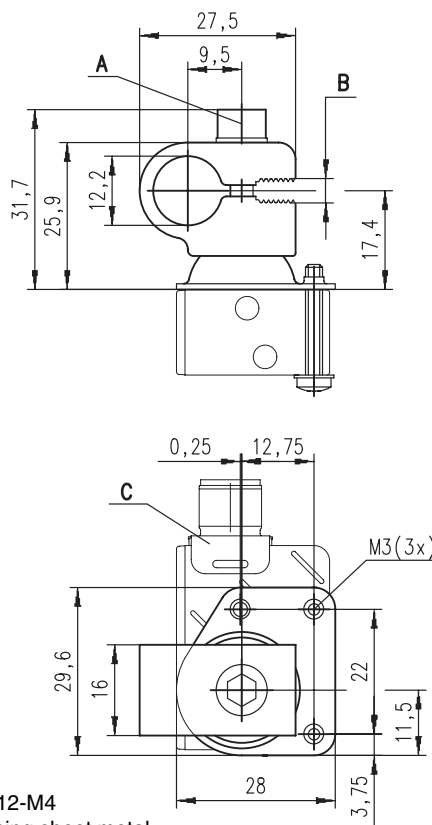
BT 25



UMS 25-D12 (Part No. 500 40270)



UMS 25-D12



- A Screw DIN912-M4
- B Slit for clamping sheet metal
sheet metal thickness:
1.5 to 3mm
- C Sensor



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- Forked photoelectric sensors
- Contrast, colour, luminescence scanners
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- Double sheet monitoring/splice detection
- Accessories



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- Data matrix code readers
- Hand-held readers
- RF identification systems
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- Optical data transmission systems
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- Safety multiple-beam light barriers
- Safety laser scanners
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