



8 Series

Product description





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8 Series

Overview and advantages

Multifunctional series with metal housing featuring all operating principles

Operating principles:

- Throughbeam photoelectric sensors
- Protective throughbeam photoelectric sensors
- Laser throughbeam photoelectric sensors with adjustable light spot
- Retro-reflective photoelectric sensors with polarisation filter
- Retro-reflective photoelectric sensors for transparent media
- Retro-reflective photoelectric sensors with tracking function for transparent media
- Laser retro-reflective photoelectric sensors with adjustable light spot
- Energetic diffuse reflection light scanners
- Diffuse reflection light scanners with background suppression
- Diffuse reflection light scanner for shiny objects with background suppression
- Diffuse reflection light scanners with foreground suppression
- Laser diffuse reflection light scanners with background suppression
- Fiber optic cable control devices for glass fiber optic cable
- Fiber optic cable control devices for plastic fiber optic cable
- Luminescence scanner
- Contrast scanner
- Contrast scanner for glass fiber optic cable
- Measuring CCD sensor with analogue output
- Ultrasonic throughbeam sensor
- Ultrasonic diffuse reflection scanner
- Ultrasonic diffuse reflection scanner with background suppression
- Optical distance sensor
- Bar code reader

Switching outputs:

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

Increased temperature range -40°C ... +60°C



Switching frequency up to 8kHz

Housing materials:

- Safe to use in applications involving foodstuffs
- No diffusion leakage
- Resistant to chemicals

Various mounting options:

- Mounting holes
- Blind holes
- Dovetail

Various accessories:

- Clamp for rod mounting
- Wobble fixture for rod mounting
- Mounting block
- Mounting on DIN rail
- Wobble plate with integrated alignment aid
- Pin and slit diaphragms
- Control guard covering the operational controls

Special features of Series 8

Advantages galore

Operating principles

Apart from the standard throughbeam photoelectric sensor, retro-reflective photoelectric sensor, and diffuse reflection light scanner products, the devices of Series 8 also offer many additional advantages over other products.



Laser throughbeam and retro-reflective photoelectric sensors with adjustable light spot

- ✓ **Advantage 1:** Clearly visible light spot
- ✓ **Advantage 2:** Detection of small parts over the entire detection range
- ✓ **Advantage 3:** Suppression of reflector problems



Laser diffuse reflection light scanners with background suppression

- ✓ **Advantage 1:** Mechanical adjustment via multiturn potentiometer for precise background suppression
- ✓ **Advantage 2:** Detection nearly independent of colour and surface properties
- ✓ **Advantage 3:** Devices with various light spot diameters for the scanning of very small and very coarse components
- ✓ **Advantage 4:** Energetic detection of very small shining components over a large scanning distance



Retro-reflective photoelectric sensors for detection of transparent foils, PE and glass bottles

- ✓ **Advantage 1:** A special light spot optimises the gap detection
- ✓ **Advantage 2:** A special light spot improves the detection of non-homogeneous glass containers
- ✓ **Advantage 3:** A step tracking function compensates for the soiling of sensor and reflector, and thus extends the maintenance interval by up to 1000 times
- ✓ **Advantage 4:** Peek tracking function permits the cleaning of the system without having to 'stop the engines' beforehand
- ✓ **Advantage 5:** A variable warning output indicates the soiling status of the sensor
- ✓ **Advantage 6:** Teach-in line permits device calibration without operator action
- ✓ **Advantage 7:** Plug-and-play function permits fully automated sensor commissioning



Diffuse reflection light scanner with background or foreground suppression

- ✓ **Advantage 1:** Foreground suppression for the detection of dark objects against a bright background
- ✓ **Advantage 2:** Scanners with lustre function for detection of typical packaging materials
- ✓ **Advantage 3:** Enlarged detection area up to 400mm



Luminescence scanners

- ✓ **Advantage 1:** Optimal detection performance within short range due to automatic collimator optics
- ✓ **Advantage 2:** Optimal detection performance within distant range due to a divergent light beam
- ✓ **Advantage 3:** Adjustable sensitivity for background suppression of interfering luminescences
- ✓ **Advantage 4:** Filter variations for the detection of different luminescence colours

Multifunctional series with metal housing featuring all operating principles



Contrast scanners

- ✓ **Advantage 1:** V-optics for easier detection of very shiny materials
- ✓ **Advantage 2:** Teach-in function via button and connector interface
- ✓ **Advantage 3:** Internal temperature compensation for detection of minute differences in contrast
- ✓ **Advantage 4:** Different teach variants for optimum process integration
- ✓ **Advantage 5:** Optional pulse stretching for signal buffering
- ✓ **Advantage 6:** Model with fiber optic cable connection



Measuring Laser distance sensors

- ✓ **Advantage 1:** Highly dynamic measurement range of up to 400mm
- ✓ **Advantage 2:** Fast linearised output of measurement values 0 ... 10V, 4 ... 20mA, RS 232, RS 485
- ✓ **Advantage 3:** Range adjustment between measurement range and measurement value output
- ✓ **Advantage 4:** Separate switching outputs for the monitoring of minimum and maximum values
- ✓ **Advantage 5:** Extremely simple commissioning due to teach-in function



Ultrasonic sensors

- ✓ **Advantage 1:** New transformer technology for the suppression of interference in critical environments
- ✓ **Advantage 2:** Switching frequency of up to 250Hz for fast events
- ✓ **Advantage 3:** Optimised, narrow ultrasound lobe
- ✓ **Advantage 4:** Adjustment via teach button
- ✓ **Advantage 5:** Synchronisation pin for standalone operation



Bar code reader

- ✓ **Advantage 1:** Smallest construction
- ✓ **Advantage 2:** Protection class IP 67
- ✓ **Advantage 3:** Front or lateral beam exit
- ✓ **Advantage 4:** High resolution optics
- ✓ **Advantage 5:** Fail-safe parameter memory



Operating principle	Designation	Typ. oper. range limit/ typ. 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 8/xx...	0 ... 20m	•	•	•	•	•	•			•			•			•
	SLSR 8/xx...	0 ... 14m	•	•	•	•	•	•			•			•			•
	PRK 8/xx...	50 ... 8000mm		•	•		•	•			•			•			•
	PRK 8/xx.11...	0 ... 7000mm		•	•	•	•	•			•			•			•
	PRK 8/xx.41...	0 ... 2400mm		•	•	•	•	•			•				•		•
	PRK 8/xx.42...	0 ... 2400mm		•	•	•	•	•			•				•		•
	RTR 8/xx...	5 ... 800mm			•		•	•			•					•	
	HRTR 8/xx...	5 ... 400mm			•		•	•			•				•		
	HRT 8/xx...	5 ... 400mm			•		•	•			•				•		•
	VRTR 8/xx...	0 ... 250mm			•		•	•			•				•		
	LSRL 8/xx...	0 ... 100m	•	•	•	•	•	•	•			•	•				
	PRKL 8/xx...	0 ... 21m	•	•	•	•	•	•	•			•			•		
	HRTL 8/xx-150...	10 ... 200mm			•		•	•	•			•			•		
	HRTL 8/xx-350...	10 ... 400mm			•		•	•	•			•			•		
	LRT 8...	0 ... 150 mm			•		•				•				•		•
	KRTG 8/xx...	9 ... 11mm			•		•	•	•			•				•	•
	LKRTG 8/xx...	1 ... 4mm			•		•	•	•			•				•	•
	LVSR 8/xx-KF...	0 ... 200mm			•		•	•	•			•				•	
	LVSR 8/xx-GF...	0 ... 600mm			•		•	•	•			•				•	
	LSU 8/xx...	0 ... 800mm			•		•	•	•			•				•	
	RKU 8/xx...	0 ... 400mm			•		•	•	•			•				•	
	HRTU 8/xx...	50 ... 400mm			•		•	•	•			•				•	
	ODSL 8/xx...	20 ... 400mm			•		•	•	•			•				•	
	BCL 8...	40 ... 160mm			•							•				•	

xx: Possible variations of output configuration, 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	Fiber optic cable	Recognition of PET, glass and foil	Automatic contamination compensation	Light spot diameter mechanically adjustable	Application in Ex areas	Ambient temperature > 60 °C	Activation input	Distance measurement with a resolution of 0.1mm	Barcode reading with a resolution of 0.1mm	Serial data interfaces	Further details
•	•	•	•	•			•		•		•												7
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	•	•				•		•				•											11
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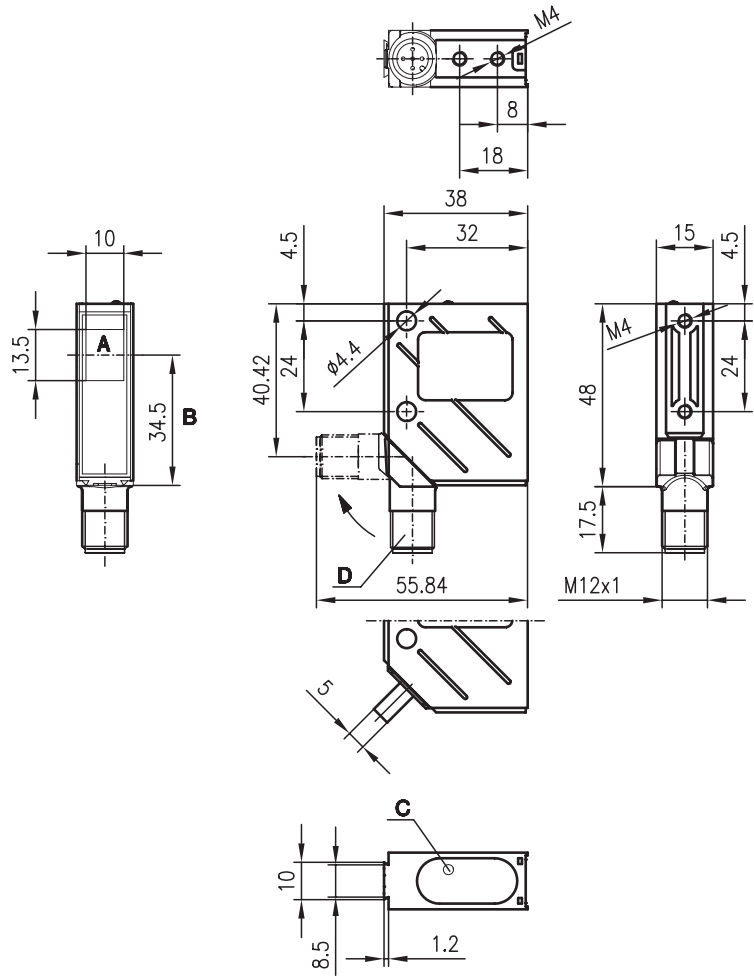


LSR 8

Throughbeam photoelectric sensors



Dimensioned drawing



- A Transmitter/receiver
- B Optical axis
- C LED yellow
- D 90° turning connector

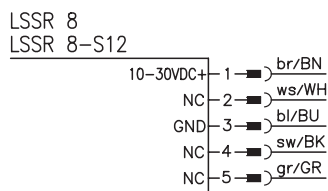
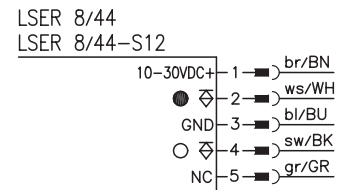
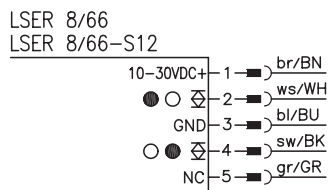


20 m



- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector or cable connection
- Visible red light

Electrical connection



Accessories:

(available separately • see page 72)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Diaphragms
- Control guard

We reserve the right to make changes • 8_a01e.fm

Specifications

Optical data

Typ. operating range limit ¹⁾	20m
Operating range ²⁾	12m
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

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

Electrical data

Operating voltage U_B	10 ... 30VDC
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
	.../44 2 PNP switching outputs pin 2: dark switching 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	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M 12 connector, 5-pin (turning), or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector		
Transmitter and receiver	LSR 8/44-S12	
Transmitter	LSSR 8-S12	500 36354
Receiver	LSER 8/44-S12	500 36356
with 2m cable		
Transmitter and receiver	LSR 8/44	
Transmitter	LSSR 8	500 36355
Receiver	LSER 8/44	500 36357
with M12 connector		
Transmitter and receiver	LSR 8/66-S12	
Transmitter	LSSR 8-S12	500 36354
Receiver	LSER 8/66-S12	500 36569
with 2m cable		
Transmitter and receiver	LSR 8/66	
Transmitter	LSSR 8	500 36355
Receiver	LSER 8/66	500 36570

Tables

without diaphragm:

0	12	20
---	----	----

with pin diaphragm in front of receiver¹⁾:

0	1.8	2
---	-----	---

with pin diaphragm in front of transmitter and receiver ¹⁾:

0	0.5	0.6
---	-----	-----

with slit diaphragm in front of receiver ¹⁾:

0	4.5	5
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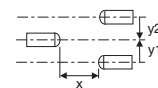
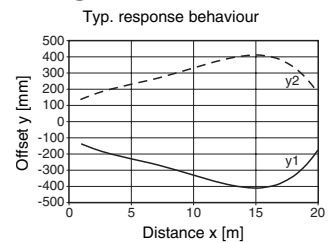
with slit diaphragm in front of transmitter and receiver ¹⁾:

0	2.5	3
---	-----	---

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

1) see remarks

Diagrams



Remarks

- Smallest object for the complete operating range with
 - pin diaphragm: $\varnothing=0.7$ mm,
 - slit diaphragm: $\varnothing=1.5$ mm

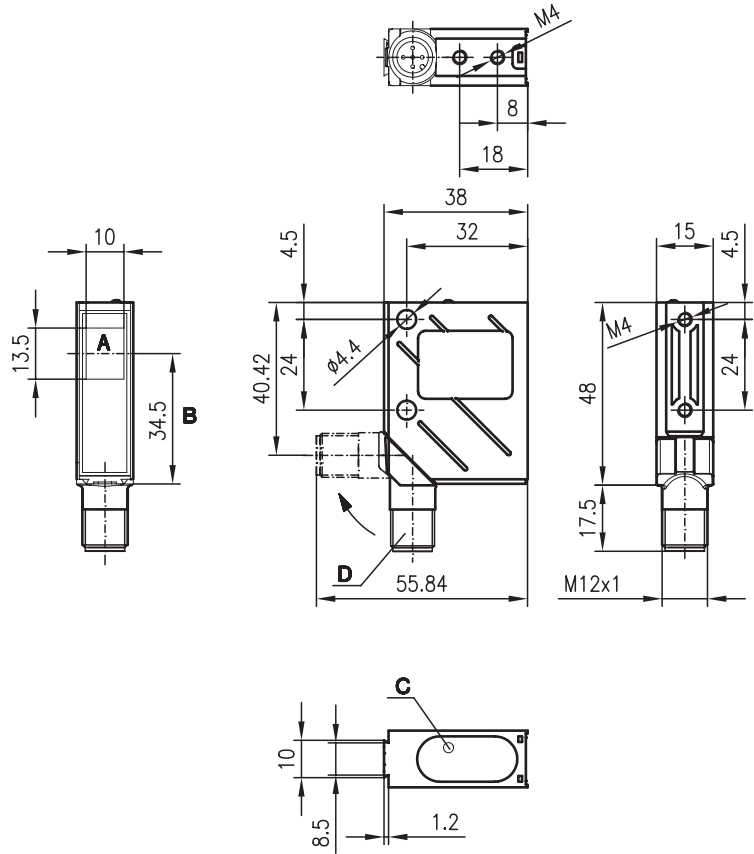


SLSR 8

Protective throughbeam photoelectric sensors



Dimensioned drawing



- A Transmitter/receiver
- B Optical axis
- C LED yellow
- D 90° turning connector

- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector
- Visible red light

Electrical connection



Accessories:

(available separately • see page 72)

- M12 connectors (KD ...)
- Mounting systems
- Control guard

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Specifications

Optical data

Typ. operating range limit ¹⁾	14 m
Operating range ²⁾	10 m
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

Switching frequency	250Hz
Response time	2ms
Delay before start-up	≤ 100ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
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
Sensitivity	not adjustable

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M 12 connector, 5-pin (turning)

Environmental data

Ambient temp. (operation/storage)	-20 °C ... +60 °C/-40 °C ... +70 °C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector		
Transmitter and receiver	SLSR 8/66.8-S12	
Transmitter	SLSSR 8.8-S12	500 38791
Receiver	SLSER 8/66-S12	500 38792

Tables

0	10	14
---	----	----

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

Diagrams

Remarks

The protective throughbeam photoelectric sensor is a contactless active protective device only in connection with a safety-relevant control system, in which the cyclical testing of transmitter and receiver is carried out according to EN 61496-1, category 2 (testing).

The power supply unit used to operate the photoelectric sensor has to be able to compensate for changes and interruptions of the supply voltage acc. to EN 61496-1. Minimum blackening object: Ø13mm.

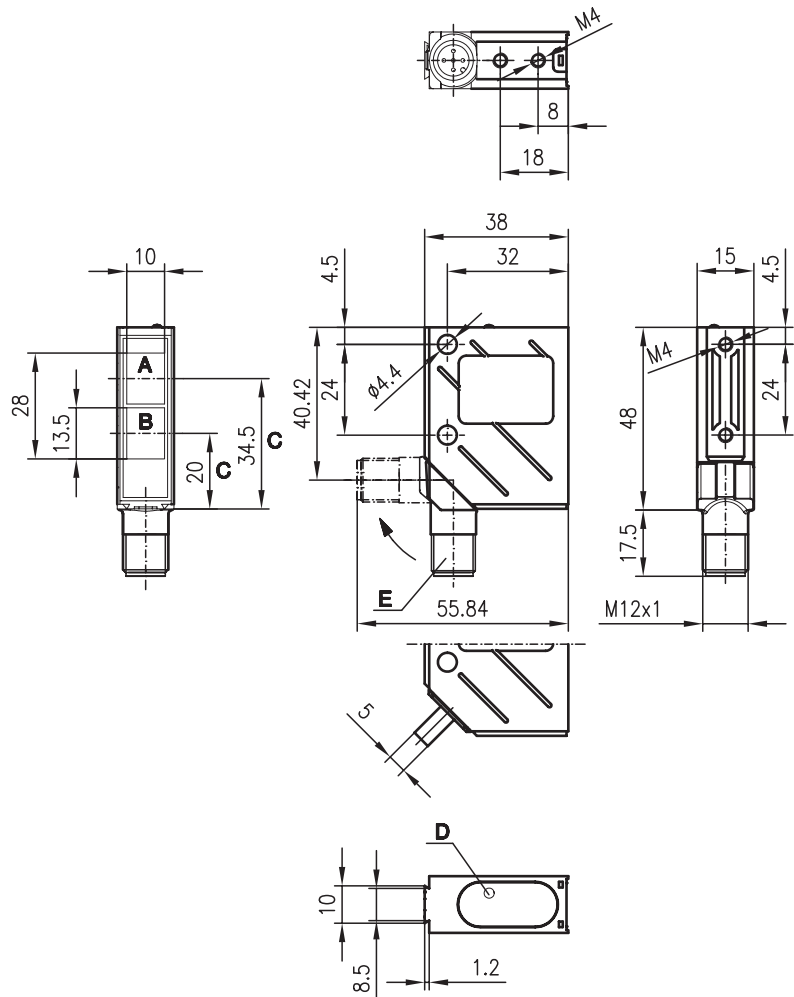


PRK 8

Retro-reflective photoelectric sensors

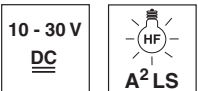


Dimensioned drawing



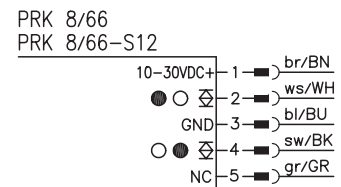
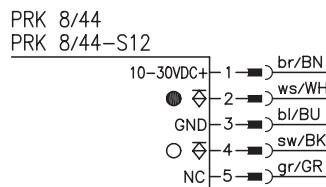
- A Receiver
- B Transmitter
- C Optical axis
- D LED yellow
- E 90° turning connector

0.05 ... 8m



- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector or cable connection
- Visible red light

Electrical connection



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_b01e.fm

Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) ¹⁾	0.05 ... 8 m
Operating range ²⁾	see tables
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

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

Electrical data

Operating voltage U_B	10 ... 30VDC
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
	.../44 2 PNP switching outputs pin 2: dark switching 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	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin (turning), or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	PRK 8/44-S12	500 36360
with 2m cable	PRK 8/44	500 36361
with M12 connector	PRK 8/66-S12	500 36362
with 2m cable	PRK 8/66	500 36363

Tables

Reflectors	Operating range
1 TK(S) 100x100	0.10 ... 6.4m
2 MTK(S) 50x50	0.12 ... 4.8m
3 TK(S) 30x50	0.10 ... 2.8m
4 TK(S) 20x40	0.13 ... 2.4m
5 Tape 2 100x100	0.15 ... 2.8m

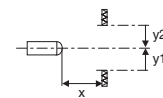
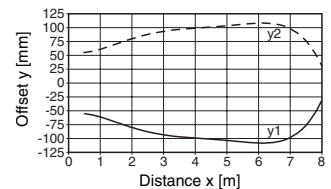
1	0.10	6.4	8
2	0.12	4.8	6
3	0.10	2.8	3.5
4	0.13	2.4	3
5	0.15	2.8	3.5

Operating range [m]
 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 ... 7m
Operating range ²⁾	see tables
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

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

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
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 ≥ ($U_B - 2V$) / ≤ 2V max. 100mA adjustable with 12-turn potentiometer
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	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin (turning)

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	PRK 8/66.11-S12	500 37133

Tables

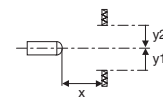
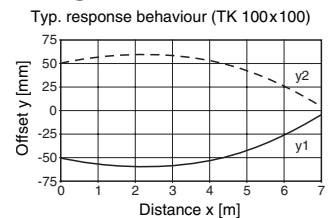
Reflectors	Operating range
1 TK(S) 100x100	0 ... 5.0m
2 MTK(S) 50x50	0 ... 3.5m
3 TK(S) 30x50	0 ... 2.0m
4 TK(S) 20x40	0 ... 1.5m
5 Tape 2 100x100	0 ... 1.0m

1	0	5.0	7.0
2	0	3.5	4.5
3	0	2.0	2.4
4	0	1.5	2.0
5	0	1.0	1.3

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

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

Diagrams



Remarks

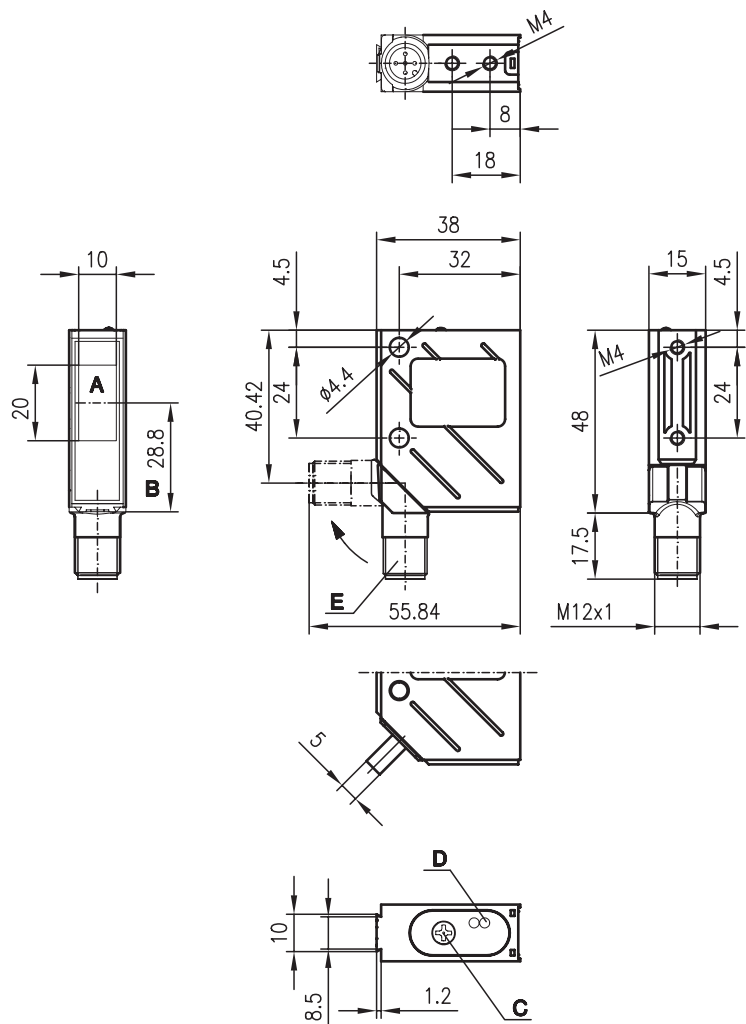


PRK 8

Retro-reflective photoelectric sensors



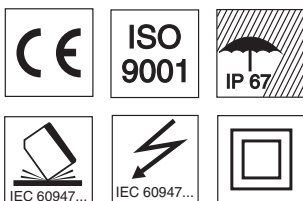
Dimensioned drawing



- A Transmitter/receiver
- B Optical axis
- C Operational control
- D LED yellow
- E 90° turning connector



- Detection of transparent media (e. g. clear glass, PE, foil)
- The autocollimation principle used ensures that the device functions reliably over the entire range (0 ... max.)
- Push-pull switching outputs
- M12 turning connector
- Visible red light
- Square light spot

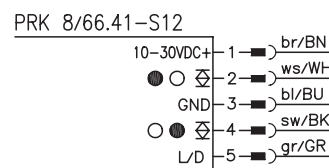


Accessories:

(available separately • see page 72)

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

Electrical connection



We reserve the right to make changes • 8_b03e.fm



Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) ¹⁾	0 ... 2.4m
Operating range ²⁾	see tables
Recommended reflector	MTK(S) 50x50
Light source	LED (modulated light)
Wavelength	660nm (visible red light)
Light spot	square, focussed at 200mm

Timing

Switching frequency	1500Hz
Response time	0.33ms
Delay before start-up	≤ 650ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
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
Sensitivity	adjustable with 12-turn potentiometer

Indicators

LED yellow	light path free operating point of tape, PE – transition from flashing to continuous light light path free, no performance reserve
LED yellow flashing	

Mechanical data

Housing	metal
Optics cover	glass
Weight	70g
Connection type	M12 connector, 5-pin (turning)

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
Standards applied	IEC 60947-5-2

Options

L/D input	
Dark switching/light switching	$U_B/0V$ or not connected
L/D delay	< 0.5ms

- 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) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	PRK 8/66.41-S12	500 37134

Tables

Reflectors			Operating range
1	TK(S)	100x100	0 ... 2.0m
2	MTK(S)	50x50	0 ... 1.5m
3	TK(S)	30x50	0 ... 0.6m
4	TK(S)	20x40	0 ... 0.6m
5	Tape 2	100x100	0 ... 0.3m

1	0		2.0	2.4
2	0		1.5	1.8
3	0	0.6	0.8	
4	0	0.6	0.8	
5	0	0.3	0.5	

Operating range [m] *

Typ. operating range limit [m] *

*) For sensitivity set to operating point 3

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

Diagrams

Remarks

- preferably use MTK(S) 50x50.
- note the light spot geometry and installation conditions

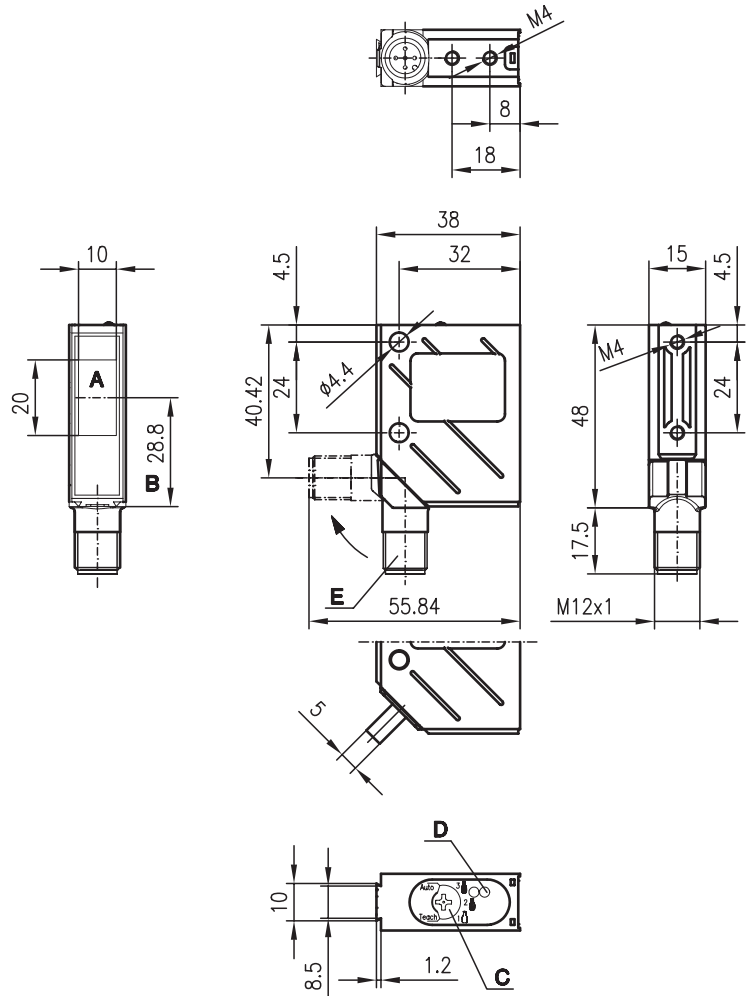


PRK 8

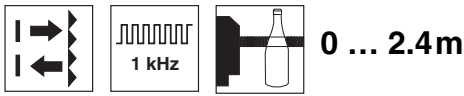
Retro-reflective photoelectric sensors with tracking function



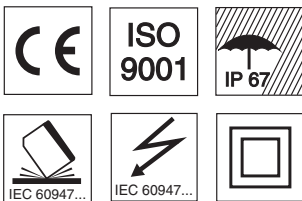
Dimensioned drawing



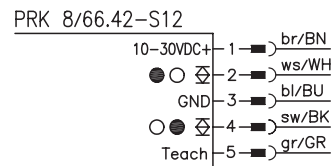
- A Receiver
- B Optical axis
- C Operational control
- D LED yellow, LED green
- E 90° turning connector



- Detection of transparent media (e. g. clear glass, PE, foil)
- Automatic contamination compensation (tracking function) for longer intervals between cleanings
- The autocollimation principle used ensures that the device functions reliably over the entire range (0 ... max.)
- Push-pull switching outputs
- M12 turning connector
- Visible red light



Electrical connection



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_b05e.fm

Specifications

Optical data

Typ. operating range limit (TK(S) 100x100) ¹⁾	0 ... 2.4m
Operating range ²⁾	see tables
Recommended reflector	MTK(S) 50x50
Light source	LED (modulated light)
Wavelength	660nm (visible red light)
Light spot	square, focussed at 200mm

Timing

Switching frequency	1000Hz
Response time	0.5ms
Delay before start-up	≤ 650ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
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
	≥ ($U_B - 2V$) / ≤ 2V
	max. 100mA
	adjustable with step switch
Signal voltage high/low	
Output current	
Sensitivity	

Switch positions

Position teach-in	activation of the teach procedure
Position 1 (PE bottle)	operating point PE bottle
Position 2 (clear glass bottle)	operating point clear glass bottle
Position 3 (coloured glass bottle)	operating point coloured glass bottle
Position Auto	tracking ON/OFF

Indicators

LED green	ready, user acknowledge (page 19)
LED green flashing	Teach process running, switching to AUTO
LED yellow	light path free, status display tracking function
LED yellow flashing	device error, teach error, no performance reserve

Mechanical data

Housing	metal
Optics cover	glass
Weight	70g
Connection type	M12 connector, 5-pin (turning)

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
Standards applied	IEC 60947-5-2

Options

Teach input	
Active/not active	Edge from 0V to U_B /0V or floating
Teach delay	< 500ms

- 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) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	PRK 8/66.42-S12	500 37135

Tables

Reflector	Operating range
1 TK(S) 100x100	0 ... 2.0m
2 MTK(S) 50x50	0 ... 1.5m
3 TK(S) 30x50	0 ... 0.6m
4 TK(S) 20x40	0 ... 0.6m
5 Tape 2 100x100	0 ... 0.3m

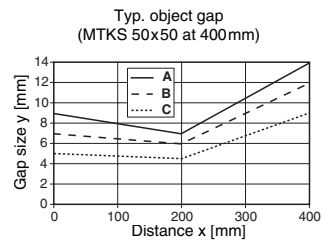
1	0	2.0	2.4
2	0	1.5	1.8
3	0	0.6	0.8
4	0	0.6	0.8
5	0	0.3	0.5

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

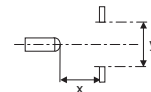
*) For sensitivity set to operating point 3

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

Diagrams



- A Switch position 1
- B Switch position 2
- C Switch position 3



Remarks

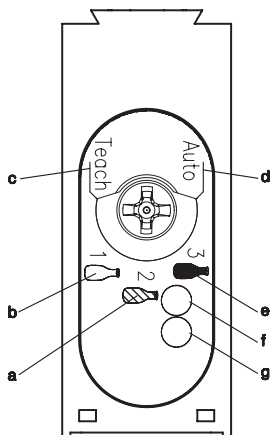
- preferably use MTK(S) 50x50.
- note the light spot geometry and installation conditions

PRK 8
1. Operating principle of contamination compensation (tracking function)

This transparency sensor (clear-glass sensor) is a device which automatically compensates system contamination at the reflector and sensor by means of continuous measurement of the receiving level. The control rate depends on the number of gaps in the process. This tracking function increases the interval between cleaning sessions considerably.

The sensor does not need to be recalibrated after the system has been cleaned. In typical applications, cleaning can be performed during system operation. This means higher system efficiency.

The system is calibrated ("teach-in") once only at initial setup. The appropriate object is then selected (PE, clear glass or coloured glass). The "teach-in" process does not have to be performed again if a different object is selected.

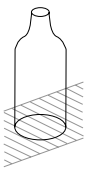
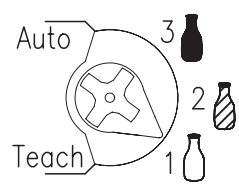
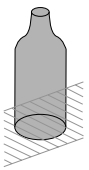
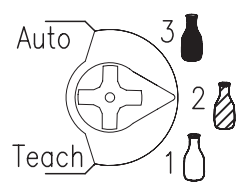
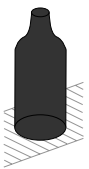
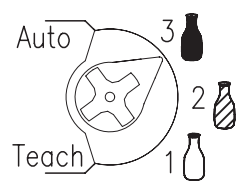
2. Controls and indicators


- a Switch position 2 (clear-glass bottle)
- b Switch position 1 (PE bottle, glass pane, foil)
- c Switch position Teach
- d Switch position, tracking ON/OFF
- e Switch position 3 (coloured-glass bottle)
- f Operation and teach indicator (LED green)
- g Light path free (LED yellow)

3. Adjustment procedure (teach-in) via step switch

	Correct adjustment procedure:	Important to note:
	<ol style="list-style-type: none"> 1. There must be no objects in the beam path between the retro-reflective photoelectric sensor and the reflector during the adjustment procedure. 2. Align the sensor with the reflector so that the beam is visible in the middle of the reflector 	<p>The Teach-in procedure must be conducted without any objects !</p> <p>The beam must not fall outside the reflector area. The mounted reflector should always be larger than the visible beam!</p>
	<ol style="list-style-type: none"> 3. Turn the step switch to the "Teach" position for about 2s. 4. Turn the step switch back to positions 1, 2 or 3. 5. To turn the tracking function on/off, turn the step switch to "Auto" for about 10s. 6. Turn the step switch back to positions 1, 2 or 3. 	<p>The adjustment procedure must be conducted without objects!</p> <p>The step switch must be turned to positions 1, 2 or 3 during operation!</p>

4. Setting operating mode

Object to be identified	Material, e.g.:	Switch position	Correct adjustment procedure:
① Transparent objects 	<ul style="list-style-type: none"> ● PE bottle ● PEN bottle ● Clear plate glass ● Tape 		<ol style="list-style-type: none"> 1. Turn the step switch to the "Teach" position for about 2s. 2. Turn the step switch back to position 1 <p>Tracking can be turned on or off by switching to "Auto"</p>
② Less transparent objects 	<ul style="list-style-type: none"> ● Clear glass bottle ● Coloured plate glass 		<ol style="list-style-type: none"> 1. Turn the step switch to the "Teach" position for about 2s. 2. Turn the step switch back to position 2 <p>Tracking can be turned on or off by switching to "Auto"</p>
③ Opaque objects 	<ul style="list-style-type: none"> ● Coloured glass bottle ● Opaque objects 		<ol style="list-style-type: none"> 1. Turn the step switch to the "Teach" position for about 2s. 2. Turn the step switch back to position 3 <p>Tracking can be turned on or off by switching to "Auto"</p>

5. Calibration procedure (teach-in) by wire

1. Set step switch to desired operating mode (PE, clear-glass or coloured-glass bottle).
2. Activate teach-in wire (pin 5, edge triggered from 0V to U_B).
3. Deactivate teach-in wire (pin 5).

6. Switching the tracking function on or off

	Operation	LED green	LED yellow
1	Step switch is in position 1, 2, or 3	ON	ON or OFF depending on switching state
2	Set step switch from 1, 2, or 3 -> Auto	OFF	ON or OFF depending on switching state
3	Status display of the tracking function	6Hz	Status display: ON=tracking active OFF=tracking not active
4	Delay before switching: 10s After 10s, the tracking is changed	6Hz	Status display: ON=tracking active OFF=tracking not active
5	Set step switch from Auto -> 1, 2, or 3	ON	ON/OFF

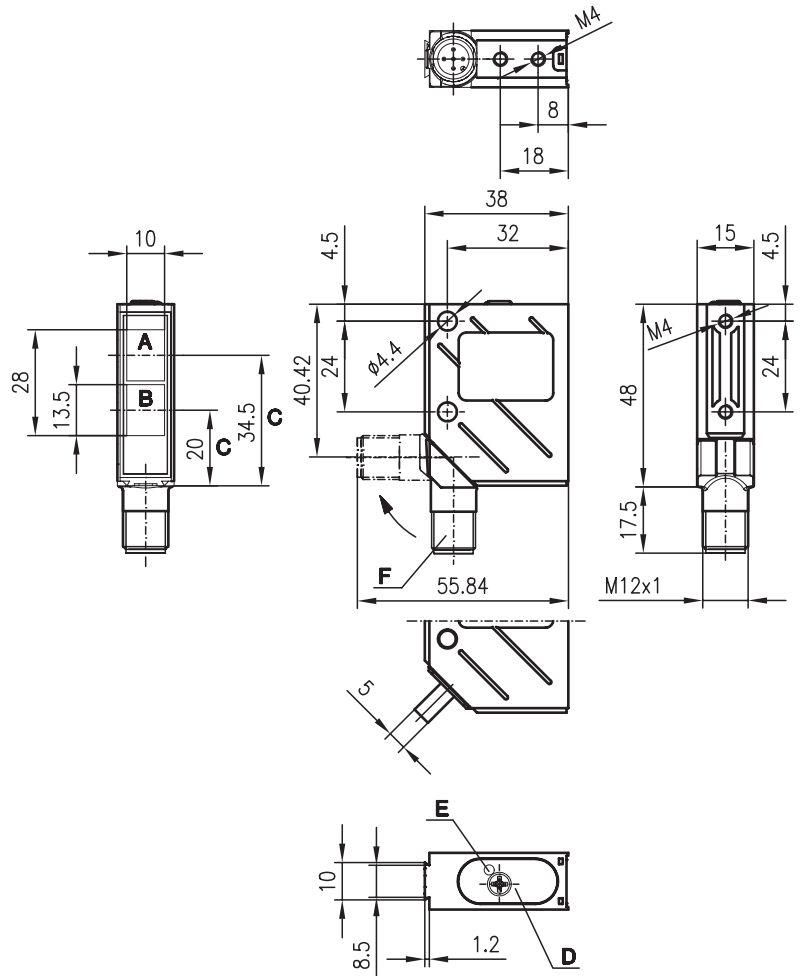


RTR 8

Energetic diffuse reflection light scanner



Dimensioned drawing

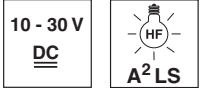


- A Receiver
- B Transmitter
- C Optical axis
- D Operational control
- E LED yellow
- F 90° turning connector



1,5 kHz

5 ... 800 mm

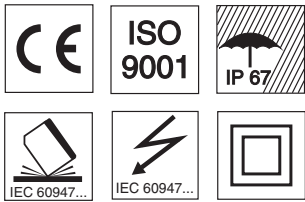
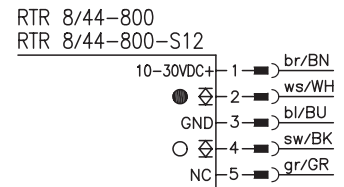
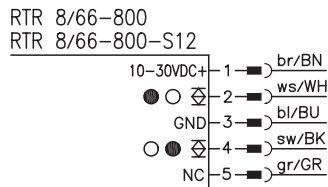


10 - 30 V
DC

A²LS

- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector or cable connection
- Visible red light

Electrical connection



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_c01e.fm

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	5 ... 800mm
Scanning range ²⁾	see tables
Electrical adjustment range	0 ... 800mm
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

Timing

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

Electrical data

Operating voltage U_B	10 ... 30VDC
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
	.../44 2 PNP switching outputs pin 2: dark switching pin 4: light switching
Signal voltage high/low	≥ ($U_B - 2V$) ≤ 2V
Output current	max. 100mA
Sensitivity	adjustable with 270° potentiometer

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin (turning), or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	RTR 8/44-800-S12	500 36366
with 2m cable	RTR 8/44-800	500 36367
with M12 connector	RTR 8/66-800-S12	500 36368
with 2m cable	RTR 8/66-800	500 36369

Tables

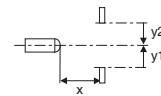
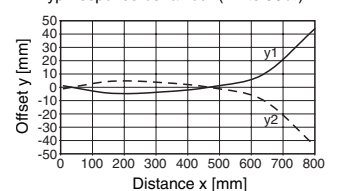
1	10	600	800
2	15	210	320
3	25	-	220

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

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

Diagrams

Typ. response behaviour (white 90%)



Remarks

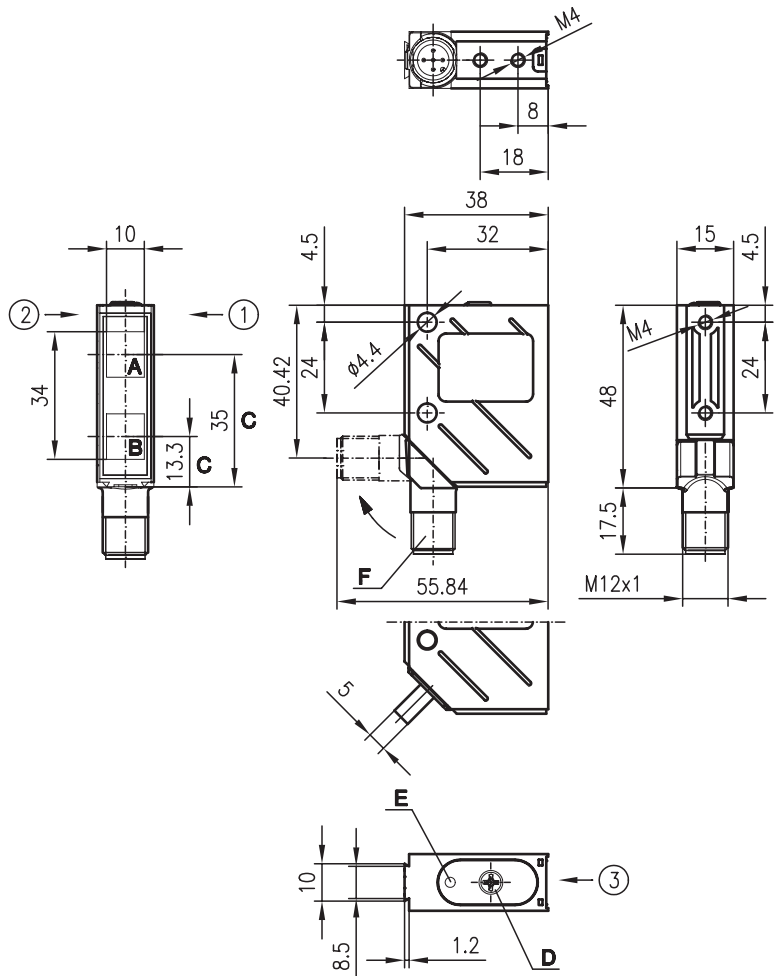


HRTR 8

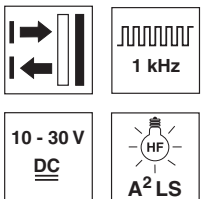
Diffuse reflection light scanner with background suppression



Dimensioned drawing

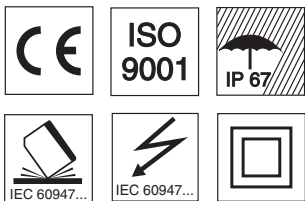


- A Receiver
 - B Transmitter
 - C Optical axis
 - D Operational control
 - E LED yellow
 - F 90° turning connector
- Preferred entry direction for objects ① + ② + ③



5 ... 400mm

- Adjustable background suppression
- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector or cable connection
- Visible red light



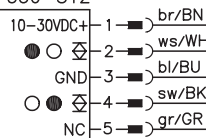
Accessories:

(available separately • see page 72)

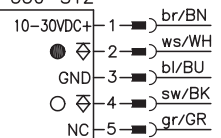
- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Control guard

Electrical connection

HRTR 8/66-350
HRTR 8/66-350-S12



HRTR 8/44-350
HRTR 8/44-350-S12



We reserve the right to make changes • 8_d01e.fm

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	5 ... 400mm
Scanning range ²⁾	see tables
Mechanical adjustment range	50 ... 400mm
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
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
	.../44 2 PNP switching outputs pin 2: dark switching pin 4: light switching $\geq (U_B - 2V) \leq 2V$ max. 100mA
Signal voltage high/low	
Output current	
Scanning range adjustment	mechanical via multiturn potentiometer

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector with 2m cable	HRTR 8/44-350-S12	500 36350
	HRTR 8/44-350	500 36351
with M12 connector with 2m cable	HRTR 8/66-350-S12	500 36352
	HRTR 8/66-350	500 36353

Tables

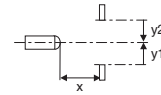
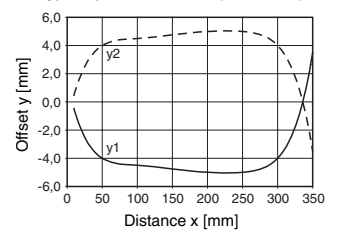
1	7	350	400
2	10	330	370
3	12	300	340

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

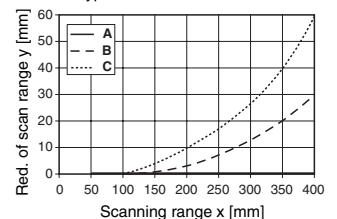
	Scanning range [mm]
	Typ. scanning range limit [mm]

Diagrams

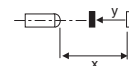
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



Remarks

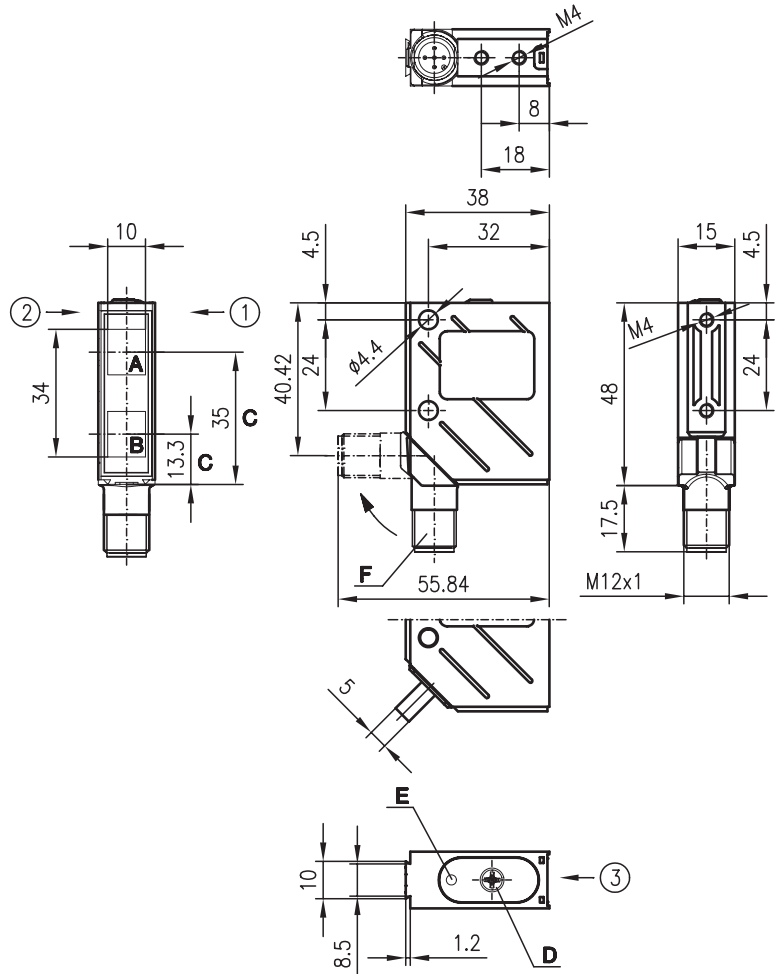


HRT 8

Diffuse reflection light scanner with background suppression

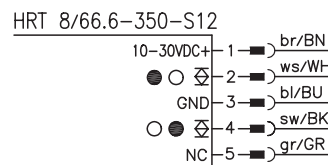


Dimensioned drawing

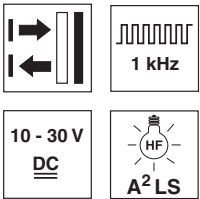


- A Receiver
 - B Transmitter
 - C Optical axis
 - D Operational control
 - E LED yellow
 - F 90° turning connector
- Preferred entry direction for objects ① + ② + ③

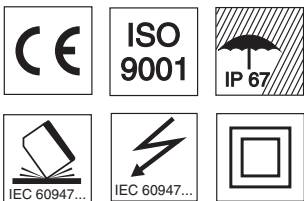
Electrical connection



5 ... 400mm



- Detection of shining objects
- Adjustable background suppression
- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector or cable connection



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_d05e.fm

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	5 ... 400mm
Scanning range ²⁾	see tables
Mechanical adjustment range	50 ... 400mm
Light source	LED (modulated light)
Wavelength	880nm (infrared)

Timing

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

Electrical data

Operating voltage U_B	10 ... 30VDC
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
Signal voltage high/low	≥ ($U_B - 2V$) ≤ 2V
Output current	max. 100mA
Scanning range adjustment	mechanical via multturn potentiometer

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C/-40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	HRT 8/66.6-350-S12	500 39650

Tables

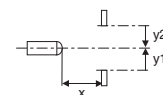
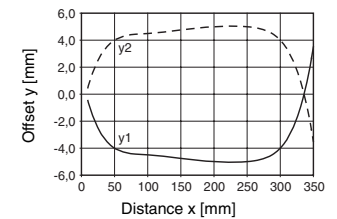
1	7	350	400
2	10	330	370
3	12	300	340

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

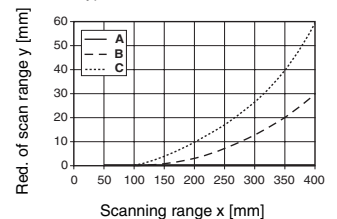
	Scanning range [mm]
	Typ. scanning range limit [mm]

Diagrams

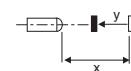
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



Remarks

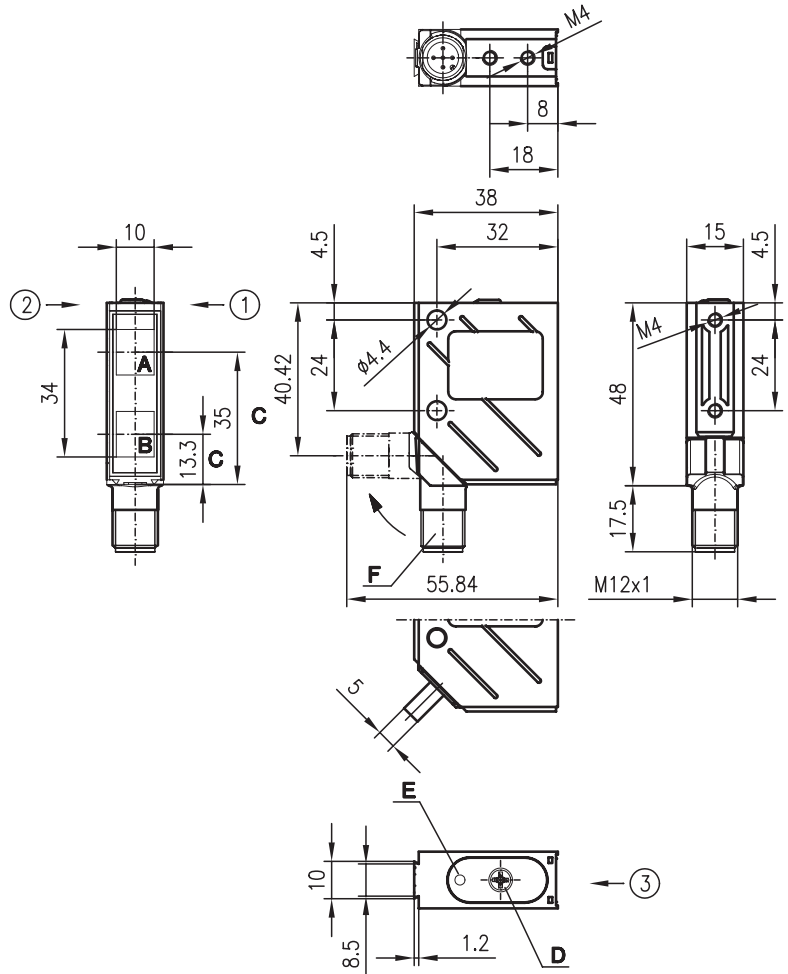


VRTR 8

Diffuse reflection light scanner with foreground suppression



Dimensioned drawing



- A Receiver
 - B Transmitter
 - C Optical axis
 - D Operational control
 - E LED yellow
 - F 90° turning connector
- Preferred entry direction for objects ① + ② + ③

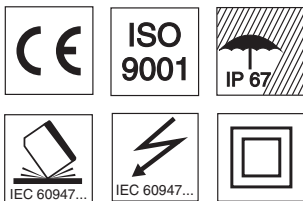


0 ... 250mm



- Adjustable foreground suppression
- A²LS - active suppression of extraneous light
- Push-pull switching outputs
- M12 turning connector or cable connection
- Visible red light

Electrical connection



Accessories:

(available separately • see page 72)

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

VRTR 8/44-250	VRTR 8/44-250-S12	10-30VDC+	1	br/BN
			2	ws/WH
		GND	3	bl/BU
			4	sw/BK
		NC	5	gr/GR

VRTR 8/66-250	VRTR 8/66-250-S12	10-30VDC+	1	br/BN
			2	ws/WH
		GND	3	bl/BU
			4	sw/BK
		NC	5	gr/GR

We reserve the right to make changes • 8_d04e.fm

Specifications

Optical data

Typ. scanning range limit ¹⁾	0 ... 250mm
Scanning range ²⁾	see tables
Mechanical adjustment range	50 ... 250mm
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
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
	.../44 2 PNP switching outputs pin 2: dark switching pin 4: light 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	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C / -40°C ... +70°C
Protective circuit ⁴⁾	2, 3
VDE safety class ⁵⁾	II, all-insulated
Protection class ⁶⁾	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
- 6) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector with 2m cable	VRTR 8/44-250-S12	500 36372
	VRTR 8/44-250	500 36373
with M12 connector with 2m cable	VRTR 8/66-250-S12	500 36374
	VRTR 8/66-250	500 36375

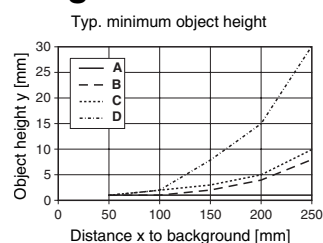
Tables

1	0	250	250
2	0	250	250
3	0	250	250

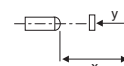
1	white 90%
2	grey 18%
3	black 6%

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

Diagrams



- A Background/object 90%/6%
- B Background/object 90%/90%
- C Background/object 6%/6%
- D Background/object 6%/90%



Remarks

- **Adjustment:**
 1. Mount sensor at distance of max. 250mm away from constant background. Yellow LED must be OFF.
 2. Keep turning adjusting screw clockwise until stop is reached (25 turns).
 3. Turn adjusting screw anticlockwise until yellow LED lights up.
- Distance between sensor and background must not change.

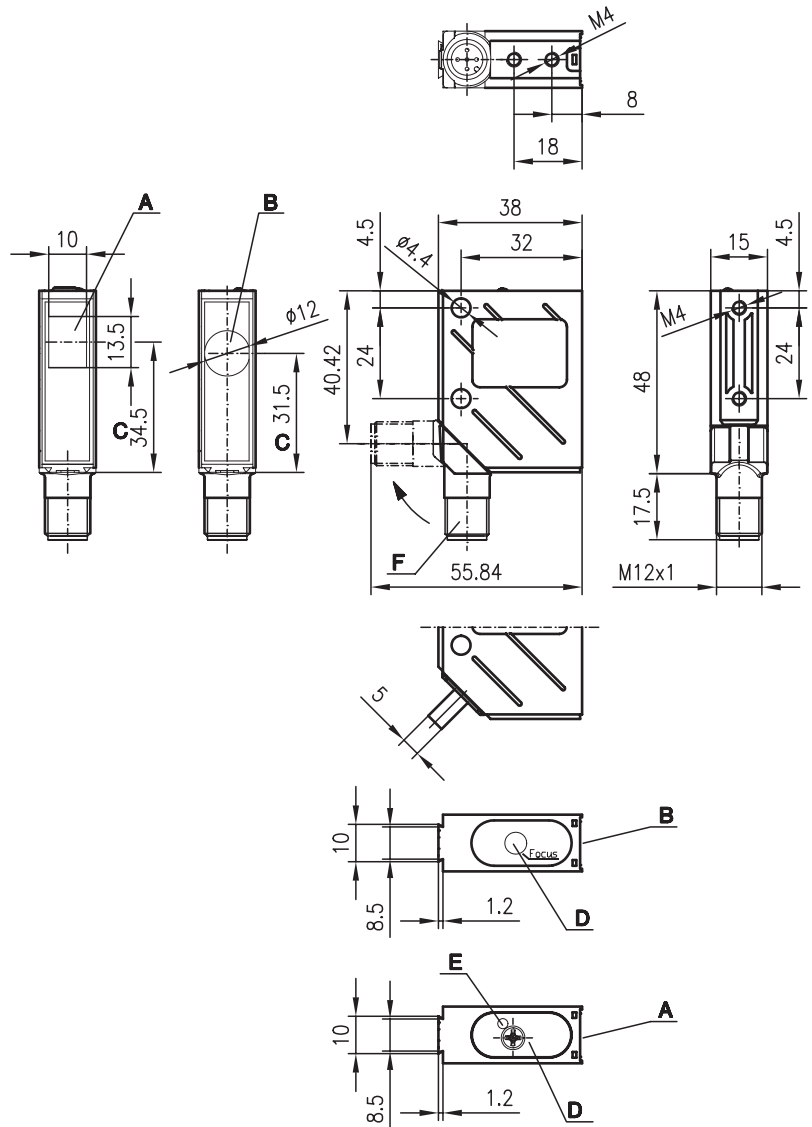


LSRL 8

Laser throughbeam photoelectric sensors



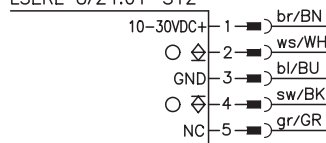
Dimensioned drawing



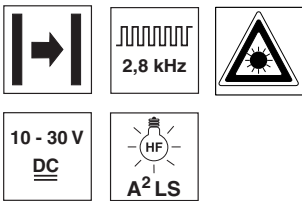
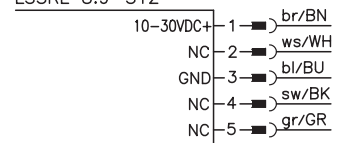
- A Receiver
- B Transmitter
- C Optical axis
- D Operational control
- E LED yellow
- F 90° turning connector

Electrical connection

LSRL 8/24.01
LSRL 8/24.01-S12

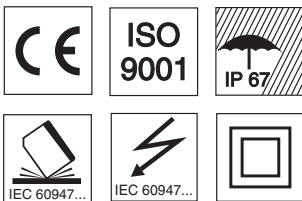


LSSRL 8.9
LSSRL 8.9-S12



100m

- Laser, red light
- A²LS - active suppression of extraneous light
- Adjustable focus
- M12 turning connector or cable connection



Accessories:

(available separately • see page 72)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Diaphragms
- Control guard

We reserve the right to make changes • 8_a02e.fm

Specifications

Optical data

Typ. operating range limit ¹⁾	100m
Operating range ²⁾	60m
Light spot diameter	≥ 0.1mm adjustable (see diagrams)
Focus adjustment range	140mm ... ∞ (see diagrams)
Beam spread	≥ 0.5mrad
Light source	laser, class 2
Wavelength	670nm (visible red light, polarised)
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Timing

Switching frequency	2800Hz
Response time	0.18ms
Delay before start-up	≤ 100ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
Switching output	PNP and NPN transistor output
Function characteristics	light switching
Signal voltage high/low	≥ ($U_B - 2V$) ≤ 2V
Output current	max. 100mA
Sensitivity	adjustable with 270° potentiometer

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin (turning), or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-10°C ... +40°C/-40°C ... +70°C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class ⁵⁾	IP 67
Standards applied	IEC 60947-5-2

- 1) Typ. operating range limit: max. attainable range without performance reserve, focus = ∞
- 2) Operating range: recommended range with performance reserve, focus = 2m
- 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 4) Rating voltage 250VAC
- 5) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector		
Transmitter and receiver	LSRL 8/24.91-S12	
Transmitter	LSSRL 8.9-S12	500 36358
Receiver	LSERL 8/24.01-S12	500 36359
with 2m cable		
Transmitter and receiver	LSRL 8/24.91	
Transmitter	LSSRL 8.9	500 37083
Receiver	LSERL 8/24.01	500 37084

Tables

without diaphragm:

0	60	100
---	----	-----

with pin diaphragm in front of receiver ¹⁾:

0	8	10
---	---	----

with slit diaphragm in front of receiver ¹⁾:

0	16	20
---	----	----

Operating range [m] *

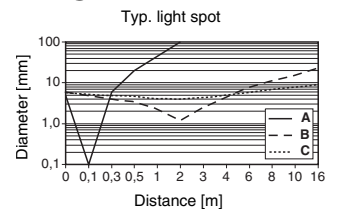
Typ. operating range limit [m] **

* for focus adjusted to 2m

** for focus adjusted to ∞

1) see remarks

Diagrams



A focus = 0.125m

B focus = 2m

C focus = 16m

Remarks

- Smallest object for the complete operating range with
 - pin diaphragm: $\varnothing=0.7$ mm,
 - slit diaphragm: $\varnothing=1.0$ mm

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	2.6mW
Pulse duration:	6µs
Wavelength:	670nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	

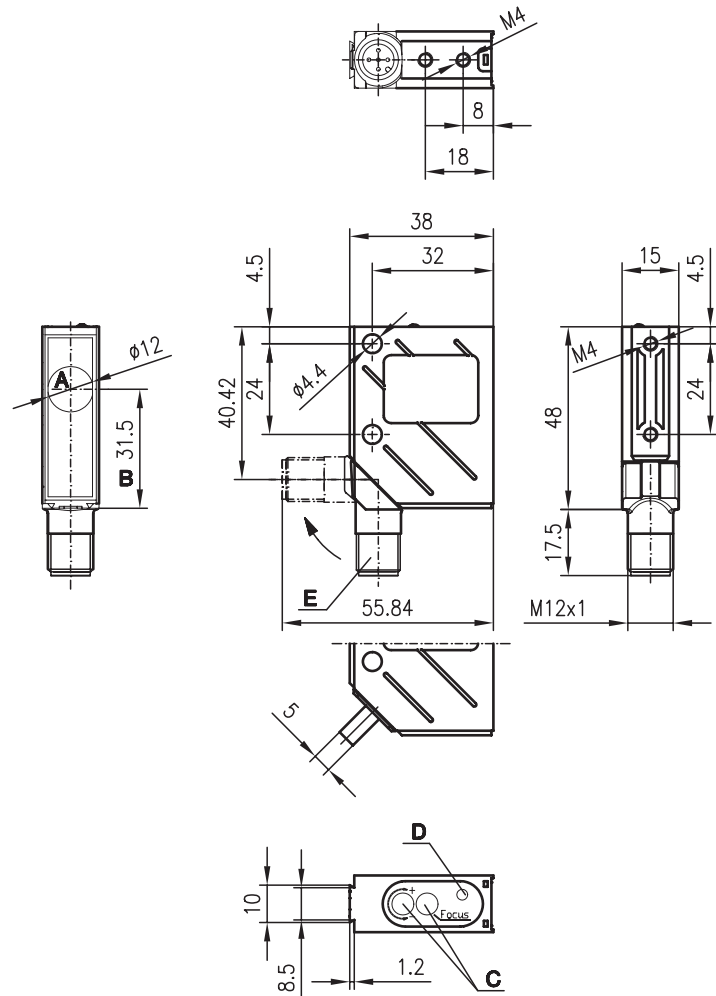


PRKL 8

Laser retro-reflective photoelectric sensor



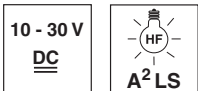
Dimensioned drawing



- A Transmitter and receiver
- B Optical axis
- C Operational control
- D LED yellow
- E 90° turning connector



0 ... 21 m



- Laser, red light
- The autocollimation principle used ensures that the device functions reliably over the entire range (0 ... max.)
- A²LS - active suppression of extraneous light
- Adjustable focus
- M12 turning connector or cable connection

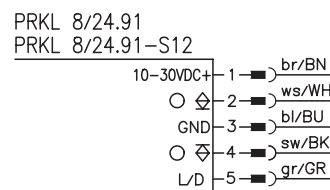


Accessories:

(available separately • see page 72)

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

Electrical connection



We reserve the right to make changes • 8_b02e.fm



Specifications

Optical data

Typ. operating range limit (MTK(S) 50x50) ¹⁾	0 ... 21 m
Operating range ²⁾	see tables
Light spot diameter	≥ 0.1 mm adjustable (see diagrams)
Focus adjustment range	140 mm ... ∞ (see diagrams)
Beam spread	≥ 0.5 mrad
Light source	laser, class 2
Wavelength	670 nm (visible red light, polarised)
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Timing

Switching frequency	2800 Hz
Response time	0.18 ms
Delay before start-up	≤ 100 ms

Electrical data

Operating voltage U_B	10 ... 30 VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35 mA
Switching output	PNP and NPN transistor output
Function characteristics	light switching (dark switching for + U_B connected to pin 5)
Signal voltage high/low	≥ ($U_B - 2V$) ≤ 2 V
Output current	max. 100 mA
Sensitivity	adjustable with 12-turn potentiometer

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70 g/140 g
Connection type	M 12 connector, 5-pin or cable: 2000 mm, 5x0.25 mm ²

Environmental data

Ambient temp. (operation/storage)	-10 °C ... +40 °C / -40 °C ... +70 °C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class ⁵⁾	IP 67
Standards applied	IEC 60947-5-2

Options

L/D input	
Dark switching/light switching	$U_B/0V$ or not connected
L/D delay	< 0.5 ms

- 1) Typ. operating range limit: max. attainable range without performance reserve, focus = 16 m
- 2) Operating range: recommended range with performance reserve, focus = 16 m
- 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 4) Rating voltage 250 VAC
- 5) In stop position of the turning connector (turning connector locked)

Order guide

	Designation	Part No.
with M12 connector	PRKL 8/24.91-S12	500 36364
with 2m cable	PRKL 8/24.91	500 36365

Tables

Reflectors	Operating range
1 TK(S) 100 x 100	0 ... 16.0 m
2 MTK(S) 50 x 50	0 ... 17.0 m
3 TK(S) 30 x 50	0 ... 6.0 m
4 TK(S) 20 x 40	0 ... 7.0 m
5 Tape 2 100 x 100	0 ... 1.5 m

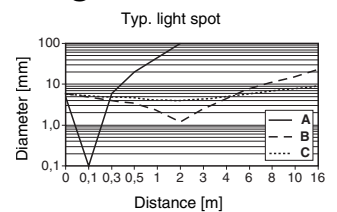
1	0	16	20
2	0	17	21
3	0	6	8
4	0	7	9
5	0	1.5	2

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

* for focus adjusted to 16 m

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

Diagrams



- A focus = 0.144 m
- B focus = 2 m
- C focus = 16 m

Remarks

- Use reflectors with small triple structures – MTK(S)

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	1.8 mW
Pulse duration:	6 μs
Wavelength:	670 nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	



HRTL 8 Laser diffuse reflection light scanner with background suppression

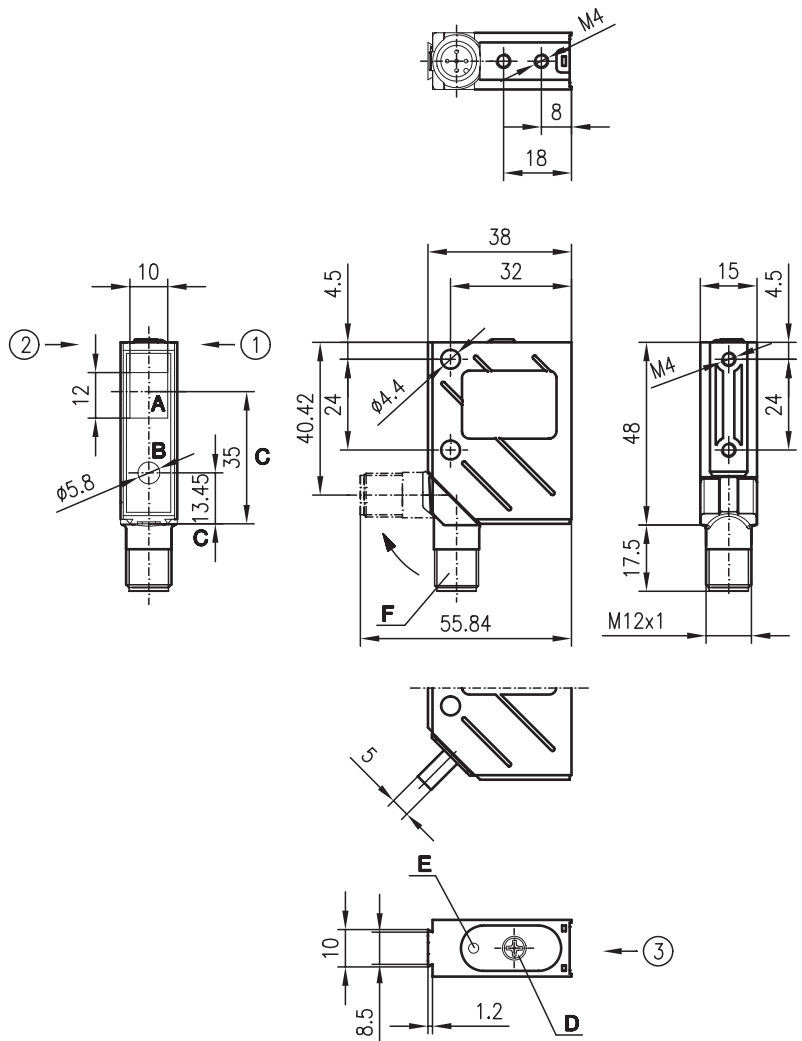


10 ... 200mm



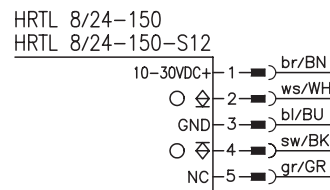
- Laser, red light
- Adjustable background suppression
- A²LS - active suppression of extraneous light
- M12 turning connector or cable connection

Dimensioned drawing



- A Receiver
 - B Transmitter
 - C Optical axis
 - D Operational control
 - E LED yellow
 - F 90° turning connector
- Preferred entry direction for objects ① + ② + ③

Electrical connection



We reserve the right to make changes • 8_d03e.fm



Accessories:

(available separately • see page 72)

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

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	10 ... 200mm
Scanning range ²⁾	see tables
Mechanical adjustment range	50 ... 200mm
Light beam characteristic	focused
Beam spread	≥ 0.5mrad
Light source	laser, class 2
Wavelength	670nm (visible red light)
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Timing

Switching frequency	2000Hz
Response time	0.25ms
Delay before start-up	≤ 100ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
Switching output	PNP and NPN transistor output
Function characteristics	light 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
------------	-----------------

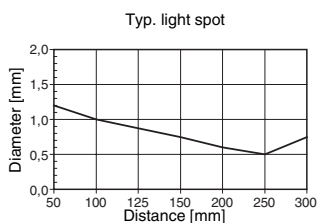
Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-10°C ... +40°C/-40°C ... +70°C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class ⁵⁾	IP 67
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) In stop position of the turning connector (turning connector locked)



Order guide

with M12 connector
with 2m cable

Designation

HRTL 8/24-150-S12
HRTL 8/24-150

Part No.

500 38482
500 38483

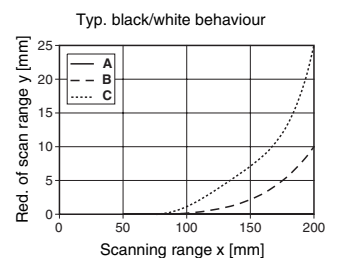
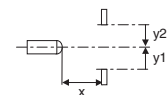
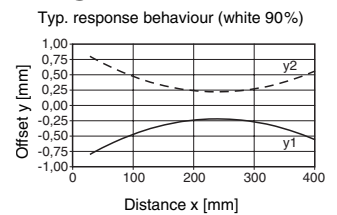
Tables

1	10	150	200
2	25	148	190
3	30	143	175

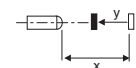
1	white 90%
2	grey 18%
3	black 6%

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

Diagrams



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



Remarks

- Install sensor inclined at angle of approx. 10° if used to detect objects with shiny surfaces.

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	2.6mW
Pulse duration:	8µs
Wavelength:	670nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	



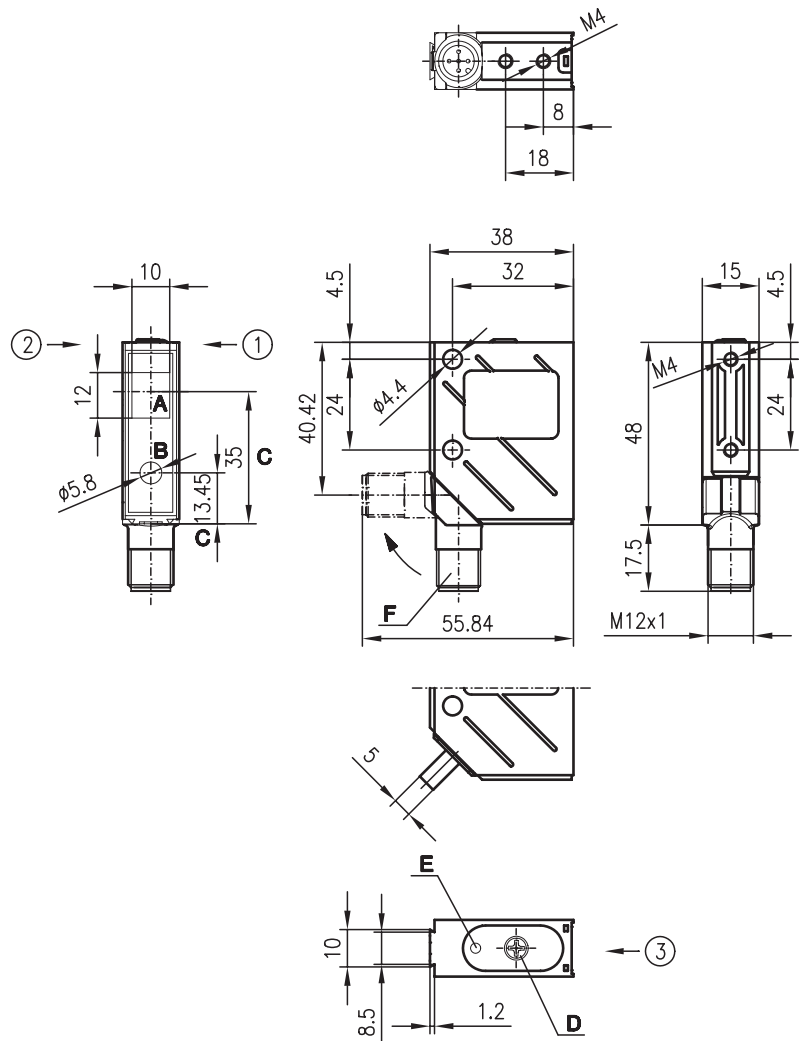
HRTL 8 Laser diffuse reflection light scanner with background suppression



5 ... 400mm
 2 kHz
 Laser
 10 - 30 V DC
 A²LS

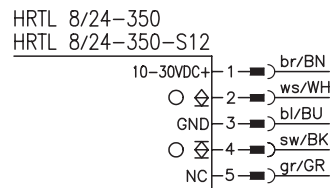
- Laser, red light
- Adjustable background suppression
- A²LS - active suppression of extraneous light
- M12 turning connector or cable connection

Dimensioned drawing



- A** Receiver
 - B** Transmitter
 - C** Optical axis
 - D** Operational control
 - E** LED yellow
 - F** 90° turning connector
- Preferred entry direction for objects ① + ② + ③

Electrical connection



We reserve the right to make changes • 8_d02e.fm

CE
 ISO 9001
 IP 67

IEC 60947-1
 IEC 60947-2

- Accessories:**
(available separately • see page 72)
- M12 connectors (KD ...)
 - Cable (KB ...)
 - Mounting systems
 - Control guard

Specifications

Optical data

Typ. scanning range limit (white 90%) ¹⁾	5 ... 400mm
Scanning range ²⁾	see tables
Mechanical adjustment range	50 ... 400mm
Light beam characteristic	focused
Beam spread	≥ 0.5mrad
Light source	laser, class 2
Wavelength	670nm (visible red light)
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Timing

Switching frequency	2000Hz
Response time	0.25ms
Delay before start-up	≤ 100ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
Switching output	PNP and NPN transistor output
Function characteristics	light 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
------------	-----------------

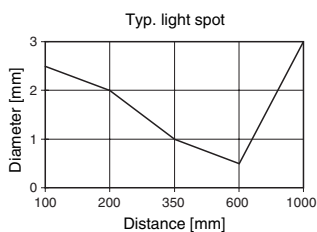
Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin or cable: 2000mm, 5x0.25mm ²

Environmental data

Ambient temp. (operation/storage)	-10°C ... +40°C/-40°C ... +70°C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class ⁵⁾	IP 67
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) In stop position of the turning connector (turning connector locked)



Order guide

with M12 connector
with 2m cable

Designation

HRTL 8/24-350-S12
HRTL 8/24-350

Part No.

500 36370
500 36371

Tables

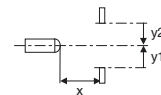
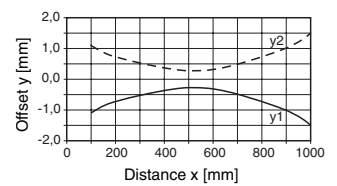
1	7	350	400
2	10	330	370
3	12	300	340

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

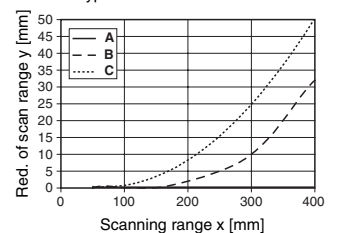
Scanning range [mm]
Typ. scanning range limit [mm]

Diagrams

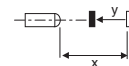
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



Remarks

- Install sensor inclined at angle of approx. 10° if used to detect objects with shiny surfaces.

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	2.6mW
Pulse duration:	8µs
Wavelength:	670nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	

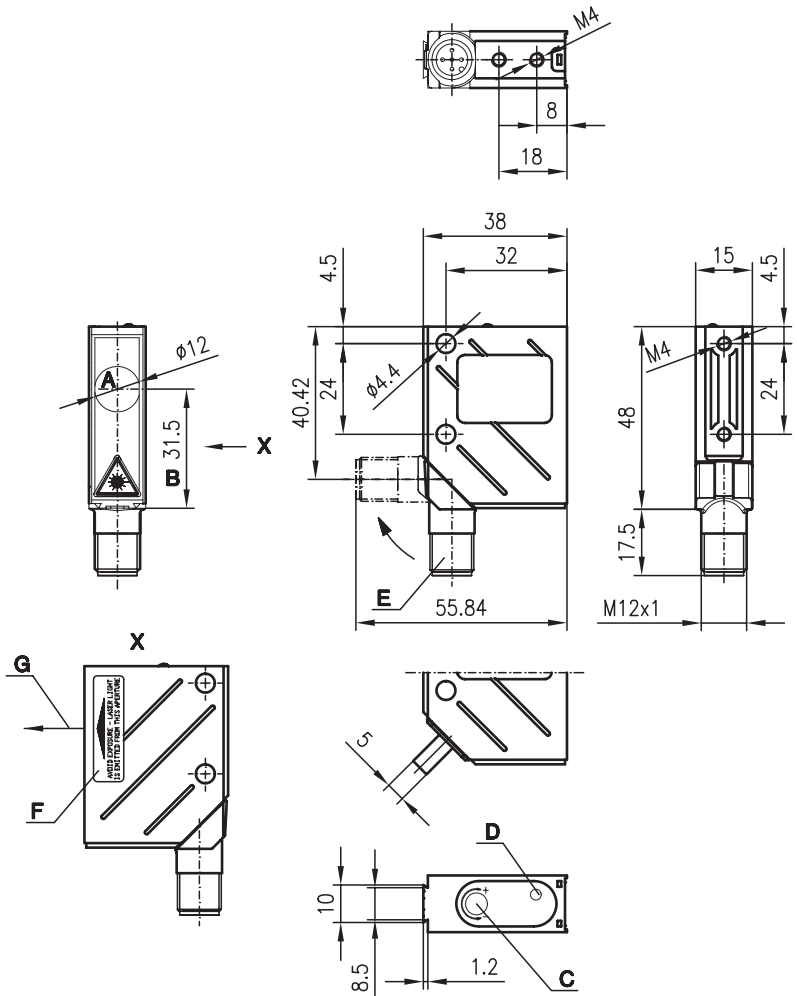


LRT 8

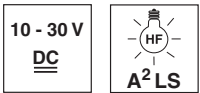
Luminescence scanner



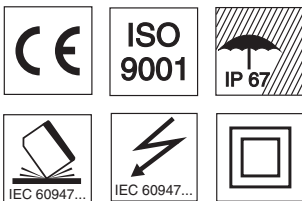
Dimensioned drawing



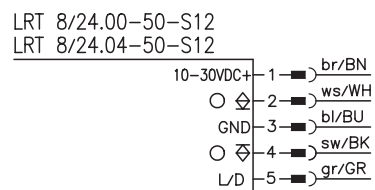
- A Transmitter and receiver
- B Optical axis
- C Operational control
- D LED yellow
- E 90° turning connector
- F Position for warning label
- G Beam exit



- LED with UV light
- The autocollimation principle used ensures that the device functions reliably over the entire range (0 ... max.)
- A²LS - active suppression of extraneous light
- M12 turning connector or cable connection



Electrical connection



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_e08e.fm



Technical Data

Optical data

Typ. scanning range limit ¹⁾	0 ... 150mm
Light spot diameter	see diagram
Light source	LED
Wavelength	380nm (UV light)
Beam spread	220mrad
Optical power	≤ 0.75mW
Pulse duration	10µs
Laser safety class	1 M acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks
Average life ²⁾	100,000h

Timing

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

Electrical data

Operating voltage U _B	10 ... 30VDC
Residual ripple	≤ 15% of U _B
Bias current	≤ 35mA (10mA)
Switching output	PNP and NPN transistor output
Function characteristics	light switching (dark switching for +U _B connected to pin 5)
Signal voltage high/low	≥ (U _B -2V)/≤ 2V
Output current	max. 100mA
Sensitivity	adjustable with 12-turn potentiometer

Indicators

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

Mechanical data

Housing	metal
Optics cover	glass
Weight (plug/cable)	70g/140g
Connection type	M12 connector, 5-pin

Environmental data

Ambient temp. (operation/storage)	-20°C ... +60°C/-40°C ... +70°C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class ⁵⁾	IP 67
Standards applied	IEC 60947-5-2

Options

L/D input	
Dark switching/light switching	U _B /0V or not connected
L/D delay	< 0,5 ms

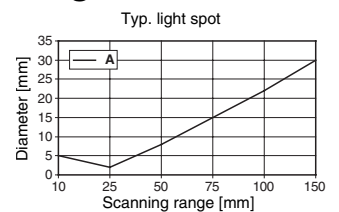
- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) at +25°C
- 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 4) Rating voltage 250VAC
- 5) In stop position of the turning connector (turning connector locked)

Order guide

Selection table		Order code →								
Equipment ↓		LRT 8/24.04-50-S12 Part No. 500 41840	LRT 8/24.00-50-S12 Part No. 500 41839							
Luminescence detection of	blue/colourless	●								
	red	●	●							
	yellow	●								
	yellowish green	●								
	orange									

Tables

Diagrams



Remarks

LED-STRAHLUNG
NICHT DIREKT MIT OPTISCHEN
INSTRUMENTEN BETRACHTEN

Max. Leistung: 0,75mW
Impulsdauer: 10µs
Wellenlänge: 380nm

LED KLASSE 1M
DIN EN60825-1:2003-10

LASER RADIATION
DO NOT VIEW DIRECTLY
WITH OPTICAL INSTRUMENTS

Maximum Output: 0,75mW
Pulse duration: 10µs
Wavelength: 380nm

CLASS 1M LASER PRODUCT
EN60825-1:2003-10

AVOID EXPOSURE - LASER LIGHT
IS EMITTED FROM THIS APERTURE

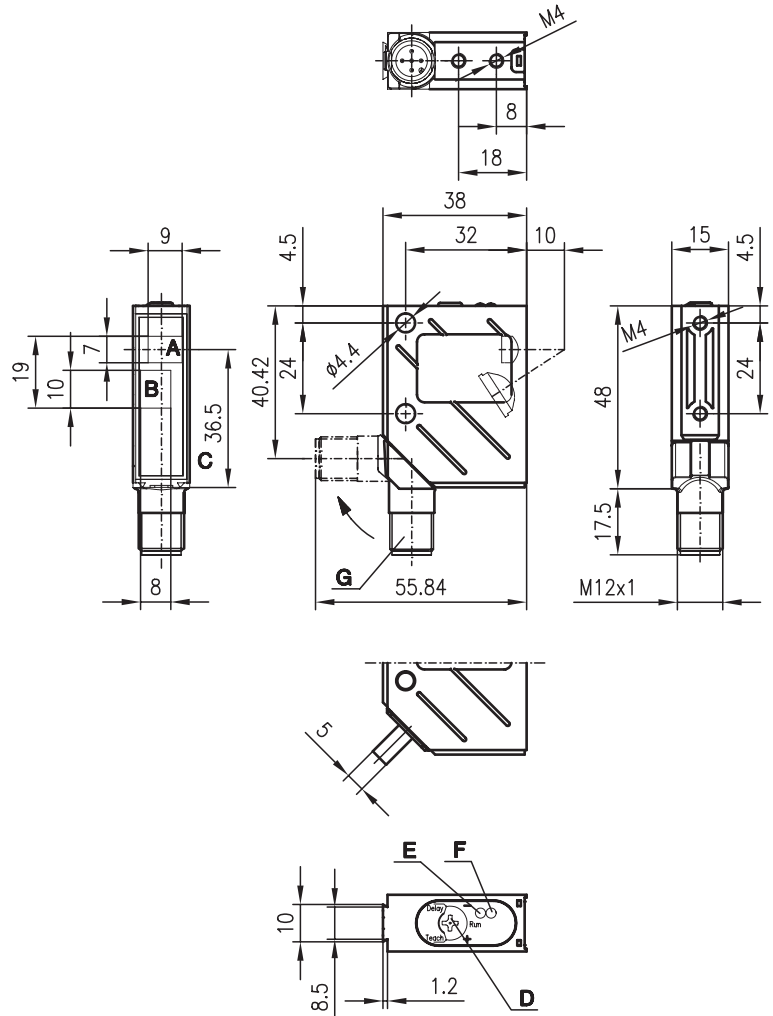


KRTG 8

Green light contrast scanner



Dimensioned drawing



- A Transmitter
- B Receiver
- C Optical axis
- D Operational control
- E LED green
- F LED yellow
- G 90° turning connector



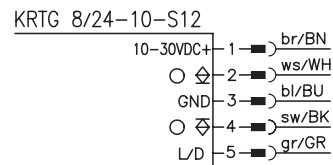
10mm



- Static teach-in procedure
- Green transmission LED
- M12 turning connector



Electrical connection



Accessories:

(available separately • see page 72)

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

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Specifications

Optical data

Scanning range ¹⁾	10mm ± 1 mm
Light spot dimensions	2mmx2mm
Light source	LED green

Timing

Switching frequency	8 kHz
Response time	62.5µs
Delay before start-up	≤ 650ms

Electrical data

Operating voltage U_B	10 ... 30VDC
Residual ripple	≤ 15% of U_B
Bias current	≤ 35mA
Switching output	1 PNP and 1 NPN switching output
Function characteristics	light/dark reversible
Signal voltage high/low	≥ (U_B -2V) ≤ 2V
Output current	max. 100mA

Indicators

LED green	ready for operation
LED green flashing	teaching in progress
LED yellow	object detected
LED yellow flashing	device or teach error

Mechanical data

Housing	metal
Optics cover	glass
Weight	70g
Connection type	M 12 connector, 5-pin

Environmental data

Ambient temp. (operation/storage)	-40°C ... +60°C/-40°C ... +70°C
Protective circuit ²⁾	2, 3
VDE safety class ³⁾	II, all-insulated
Protection class ⁴⁾	IP 67
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
Electromagnetic compatibility	IEC 60947-5-2

Options

L/D input ⁵⁾	
Dark switching/light switching	U_B /0V or not connected
L/D delay	< 0.5ms
Pulse delay ⁶⁾	10ms, can be activated via step switch

- 1) Scanning range: recommended range with performance reserve
 2) 2=polarity reversal protection, 3=short-circuit protection for all outputs
 3) Rating voltage 250VAC
 4) In stop position of the turning connector (turning connector locked)
 5) L/D switching is activated after "teach-in" or "power on"
 6) Relative to object

Tables

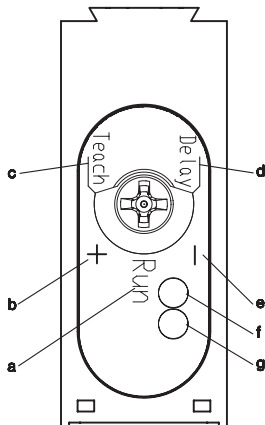
Diagrams

Remarks

- With shiny objects, the sensor is to be mounted perpendicular to the object surface.

Order guide

Designation	Part No.
KRTG 8/24-10-S12	500 36376

KRTG 8
Controls and indicators


- a Switch position **Run**
- b Switch position **+**
- c Switch position **Teach**
- d Switch position **Delay**
- e Switch position **-**
- f Operation and teach indicator (LED green)
- g Object/light path (LED yellow)

Step switch		Function
	Run	Teach and Run position for marker contrast
	Teach	Teach position for background contrast
	+	Switching threshold is increased by +5%
	-	Switching threshold is reduced by -5%
	Delay	Activation/deactivation of 10ms pulse stretching

The step switch must be set to > 1 s to allow the individual functions to be activated.

Signal propagation


**Teach procedure for statical teach-in**

	Operation	Transmitter	LED green	LED yellow
1	Position the light spot on the background	Green light spot visible	ON	ON/OFF
2	Switch the step switch from Run -> Teach	Green light spot visible	3Hz	OFF
3	Position the light spot on the marker	Green light spot visible	3Hz	OFF
4	Switch the step switch from Teach -> Run	Green light spot visible	3Hz	OFF
	Teach-in successful	Green light spot visible	ON	ON
	Teach-in error	Green light spot flashes with 3Hz	OFF	3Hz

The step switch must be set to > 1 s to allow the individual functions to be activated.

Changing the switching threshold

	Operation	Transmitter	LED green	LED yellow
1	Step switch is in run position	Green light spot visible	ON	ON/OFF
2	Set the step switch from run -> (+/-)	Green light spot visible	OFF	OFF
3	Sensitivity is changed in steps of 5% each	Green light spot visible	1 Hz	OFF
4	Set the step switch from (+/-) -> run	Green light spot visible	ON	ON/OFF

In switch position (+), the switching threshold is increased by 5% every second.

In switch position (-), the switching threshold is increased by 5% every second.

Modification of switching threshold activated: LED green = 1 Hz

Maximum value switching threshold reached: LED green = ON

Minimum switching threshold reached: LED green = OFF

Pulse stretching on/off

	Operation	Transmitter	LED green	LED yellow
1	Step switch is in run position	Green light spot visible	ON	ON/OFF
2	Set step switch from run -> delay	Green light spot visible	OFF	ON/OFF
3	Status display of the pulse stretching	Green light spot OFF	6Hz	Status display: ON=Delay active OFF=Delay not active
4	10s waiting time before switching After 10s delay value modified	Green light spot OFF	6Hz	Status display: ON=Delay active OFF=Delay not active
5	Set step switch from delay -> run	Green light spot visible	ON	ON/OFF

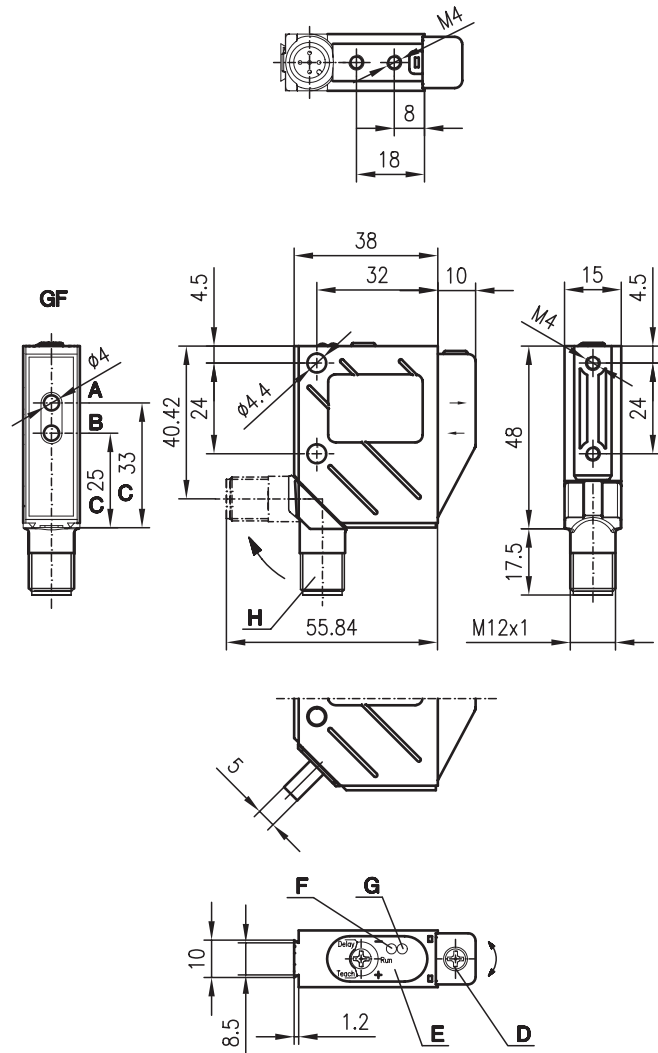


LKRTG 8

Fiber optic cable control devices

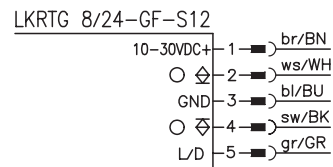


Dimensioned drawing



- A Transmitter
- B Receiver
- C Optical axis
- D Fiber optic cable lock
- E Operational control
- F LED green
- G LED yellow
- H 90° turning connector

Electrical connection



1 ... 4mm



- Glass fiber optic cable
- Light/dark switching
- M12 turning connector
- Adjustment via teach-in
- Adjustable sensitivity



Accessories:

(available separately • see page 72)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Control guard
- Fiber optic cable accessories
 - Glass fiber optic cable GFA.../1RT-MS

We reserve the right to make changes • 8_e07e.fm

Specifications

Optical data

Operating range/scanning range ¹⁾
Light source

Scanning operation

1 ... 4 mm (glass fiber optic cable)
LED green

Timing

Switching frequency
Response time
Delay before start-up

8 kHz
62.5 μs
≤ 650 ms

Electrical data

Operating voltage U_B
Residual ripple
Bias current
Switching output
Function characteristics
Signal voltage high/low
Output current

10 ... 30 VDC
≤ 15% of U_B
≤ 35 mA
1 PNP and 1 NPN switching output
light/dark reversible
≥ ($U_B - 2V$) / ≤ 2V
max. 100 mA

Indicators

LED green
LED green flashing
LED yellow
LED yellow flashing

ready for operation
teaching in progress
object detected
device or teach error

Mechanical data

Housing
Weight (plug/cable)
Connection type
Fiber optic cable lock

metal
70 g/140 g
M12 connector, 5-pin
closed: right stop
open: left stop

Environmental data

Ambient temp. (operation/storage)
Protective circuit ²⁾
VDE safety class ³⁾
Protection class ⁴⁾
LED class
Standards applied

-40 °C ... +60 °C / -40 °C ... +70 °C
2, 3
II, all-insulated
IP 67
1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)
IEC 60947-5-2

Options

L/D input

Dark switching/light switching
L/D delay

$U_B/0V$ or not connected
< 0.5 ms

Pulse delay ⁵⁾

10 ms, can be activated via step switch

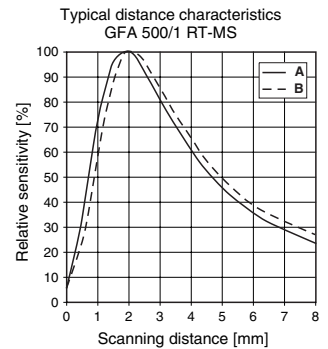
- 1) Operating range/scanning range: recommended range/scanning range with performance reserve
- 2) 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 3) Rating voltage 250 VAC; only with fiber optic cables of type KF... and GFA...
- 4) Only for locked, suitable optical fiber, in the final position of the rotating plug (rotating plug snapped in)
- 5) Relative to object

Order guide

	Designation	Part No.
with M12 connector	Amplifier for glass fiber optic cables LKRTG 8/24-GF-S12	500 36377

Tables

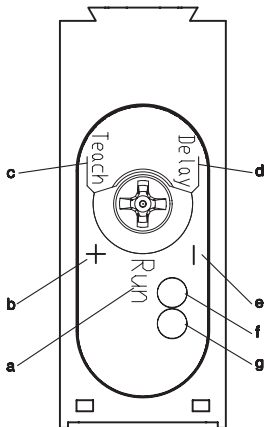
Diagrams



- A** grey 18%
B black 6%

Remarks

Take care to achieve a precise fiber optic cable locking!

LKRTG 8
Controls and indicators


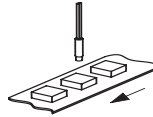
- a Switch position **Run**
- b Switch position **+**
- c Switch position **Teach**
- d Switch position **Delay**
- e Switch position **-**
- f Operation and teach indicator (LED green)
- g Object/light path (LED yellow)

Step switch		Function
	Run	Operating position
	Teach	Sensor detects background and object
	+	Switching threshold is increased by 5%
	-	Switching threshold is reduced by 5%
	Delay	Activation/deactivation of 10ms pulse stretching

The step switch must be set to > 1 s to allow the individual functions to be activated.

Signal propagation


Teach procedure for statical teach-in



	Operation	Transmitter	LED green	LED yellow
1	Position the light spot on the background	Green light spot visible	ON	ON/OFF
2	Switch the step switch from Run -> Teach	Green light spot visible	3Hz	OFF
3	Position the light spot on the marker/object	Green light spot visible	3Hz	OFF
4	Switch the step switch from Teach -> Run	Green light spot visible	3Hz	OFF
	Teach-in successful	Green light spot visible	ON	ON
	Teach-in error	Green light spot flashes with 3Hz	OFF	3Hz

The step switch must be set to > 1s to allow the individual functions to be activated.

Changing the switching threshold

	Operation	Transmitter	LED green	LED yellow
1	Step switch is in run position	Green light spot visible	ON	ON/OFF
2	Set the step switch from run -> (+/-)	Green light spot visible	OFF	OFF
3	Sensitivity is changed in steps of 5% each	Green light spot visible	1Hz	OFF
4	Set the step switch from (+/-) -> run	Green light spot visible	ON	ON/OFF

In switch position (+), the switching threshold is increased by 5% every second.

In switch position (-), the switching threshold is increased by 5% every second.

Modification of switching threshold activated: green LED = 1Hz

Maximum value switching threshold reached: LED green = ON

Minimum switching threshold reached: LED green = OFF

Pulse stretching on/off

	Operation	Transmitter	LED green	LED yellow
1	Step switch is in run position	Green light spot visible	ON	ON/OFF
2	Set step switch from run -> delay	Green light spot visible	OFF	ON/OFF
3	Status display of the pulse stretching	Green light spot OFF	6Hz	Status display: ON=Delay active OFF=Delay not active
4	10s waiting time before switching After 10s delay value modified	Green light spot OFF	6Hz	Status display: ON=Delay active OFF=Delay not active
5	Set step switch from delay -> run	Green light spot visible	ON	ON/OFF

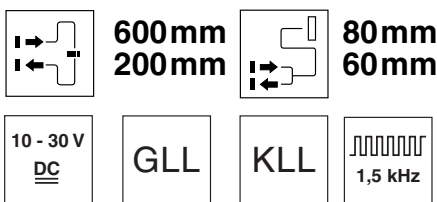


LVSr 8

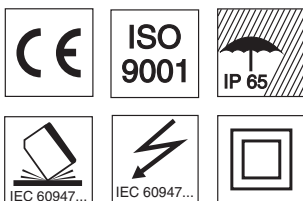
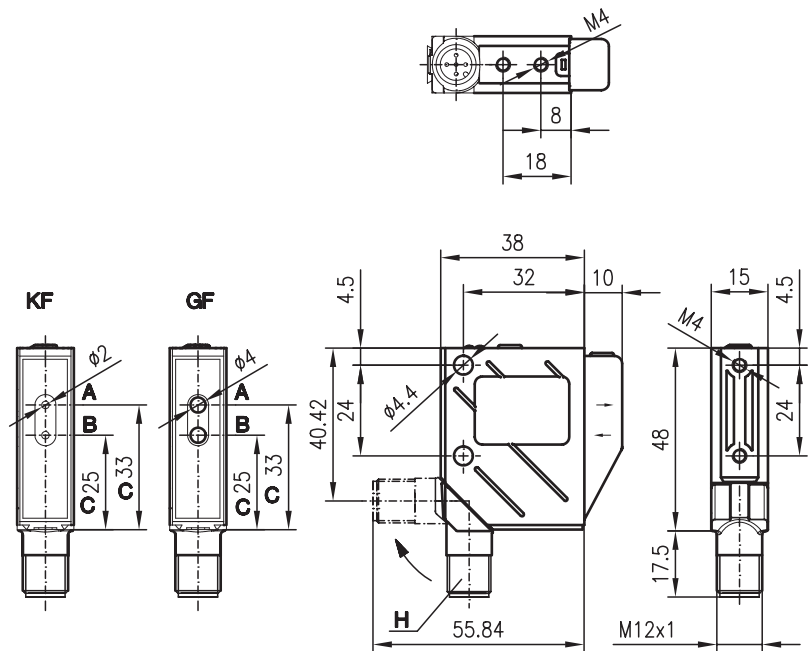
Fiber optic cable control devices



Dimensioned drawing

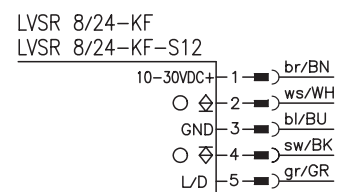
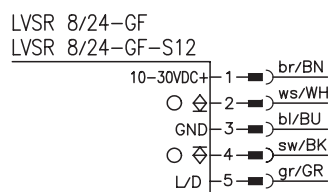


- Fiber optic cables made of plastic and glass
- Light/dark switching
- M12 turning connector or cable connection
- Adjustment via teach-in
- Adjustable sensitivity



- A Transmitter
- B Receiver
- C Optical axis
- D Fiber optic cable lock
- E Operational control
- F LED green
- G LED yellow
- H 90° turning connector

Electrical connection



Accessories:

(available separately • see page 72)

- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Control guard
- Fiber optic cable accessories
 - Glass fiber optic cable
 - Plastic fiber optic cable

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Specifications

Optical data	Throughbeam operation	Scanning operation
Operating range/scanning range ¹⁾	600mm (glass FOC) 200mm (plastic FOC)	80mm (glass FOC) 60mm (plastic FOC)
Light source	LED (modulated light)	
Wavelength	620nm (visible red light)	
Timing		
Switching frequency	1500Hz	
Response time	330µs	
Delay before start-up	≤ 650ms	
Electrical data		
Operating voltage U _B	10 ... 30VDC	
Residual ripple	≤ 15% of U _B	
Bias current	≤ 35mA	
Switching output	1 PNP and 1 NPN switching output	
Function characteristics	light/dark reversible	
Signal voltage high/low	≥ (U _B -2V)/≤ 2V	
Output current	max. 100mA	
Indicators		
LED green	ready for operation	
LED green flashing	teaching in progress	
LED yellow	object detected	
LED yellow flashing	device or teach error	
Mechanical data		
Housing	metal	
Weight (plug/cable)	70g/140g	
Connection type	M12 connector, 5-pin or cable: 2000mm, 5x0.25mm ²	
Fiber optic cable lock	closed: right stop open: left stop	
Environmental data		
Ambient temp. (operation/storage)	-40°C ... +60°C/-40°C ... +70°C	
Protective circuit ²⁾	2, 3	
VDE safety class ^{3) 4)}	II, all-insulated	
Protection class ^{5) 6)}	IP 65	
LED class	1 (acc. to EN 60825-1:1994 +A1:2002 +A2:2001)	
Standards applied	IEC 60947-5-2	
Options		
L/D input		
Dark switching/light switching	U _B /0V or not connected	
L/D delay	< 0.5ms	
Pulse delay	10ms, can be activated via step switch	

- 1) Operating range/scanning range: recommended range/scanning range with performance reserve
2) 2=polarity reversal protection, 3=short-circuit protection for all outputs
3) Rating voltage 250VAC
4) Only with fiber optic cables of type KF... and GFA...
5) Only in the case of locked and suitable fiber optic cable
6) In stop position of the turning connector (turning connector locked)

Order guide

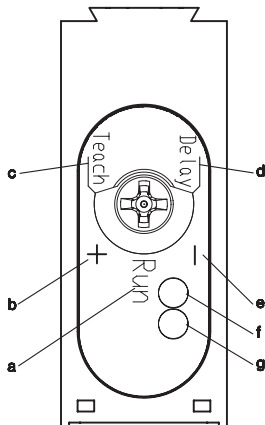
	Designation	Part No.
with M12 connector	Amplifier for plastic fiber optic cables	
with 2m cable	LVSR 8/24-KF-S12	500 36378
	LVSR 8/24-KF	500 36379
	Amplifier for glass fiber optic cables	
with M12 connector	LVSR 8/24-GF-S12	500 36380
with 2m cable	LVSR 8/24-GF	500 36381

Tables

Diagrams

Remarks

Take care to achieve a precise fiber optic cable locking!

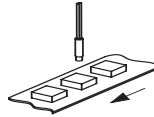
LVSr 8
Controls and indicators


- a Switch position **Run**
- b Switch position **+**
- c Switch position **Teach**
- d Switch position **Delay**
- e Switch position **-**
- f Operation and teach indicator (LED green)
- g Object/light path (LED yellow)

Step switch		Function
	Run	Operating position
	Teach	Sensor detects background and object
	+	Switching threshold is increased by 5%
	-	Switching threshold is reduced by 5%
	Delay	Activation/deactivation of 10ms pulse stretching

The step switch must be set to > 1 s to allow the individual functions to be activated.

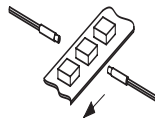
Teach-in for scanning operation



Object detection in front of a background (two-point teach-in)	Object detection without background (single-point teach-in)	Setting of the maximum scan width (maximum sensitivity)
1. Move object into the detection range	1. Move object into the detection range	1. Remove object and background
2. Switch to teach position	2. Switch to teach position	2. Switch to teach position
3. Move background into the detection range	3. Switch to run position	3. Switch to run position
4. Switch to run position		
The switching threshold lies half-way between background level and object level	The switching threshold lies close to the object level	The switching threshold lies at the maximum scanning width

The step switch must be set to > 1 s to allow the individual functions to be activated.

Teach-in for throughbeam operation



Object detection with maximal performance reserve/alignment operation	Detection of transparent objects	Positioning operation with minimum performance reserve
1. Interrupt the light beam	1. Remove the object	1. Remove the object
2. Switch to teach position	2. Switch to teach position	2. Switch to teach position
3. Switch to run position	3. Switch to run position	3. Position the front edge of the object
		4. Switch to run position
The sensor operates at maximum sensitivity	The sensor operates with minimum performance reserve	The sensor operates with minimum performance reserve

The step switch must be set to > 1 s to allow the individual functions to be activated.

Changing the switching threshold

	Operation	Transmitter	LED green	LED yellow
1	Step switch is in run position	Light spot ON	ON	ON/OFF
2	Set the step switch from run -> (+/-)	Light spot ON	OFF	OFF
3	Changing the sensitivity in steps of 5%	Light spot 1Hz	1Hz	OFF
4	Set the step switch from (+/-) -> run	Light spot ON	ON	ON/OFF

In switch position (+), the switching threshold is increased by 5% every second.

In switch position (-), the switching threshold is increased by 5% every second.

Modification of switching threshold activated: LED green = 1Hz

Maximum value switching threshold reached: LED green = ON

Minimum switching threshold reached: LED green = OFF

Pulse stretching on/off

	Operation	Transmitter	LED green	LED yellow
1	Step switch is in run position	Light spot ON	ON	ON/OFF
2	Set step switch from run -> delay	Light spot ON	OFF	ON/OFF
3	Status display of the pulse stretching	Light spot OFF	6Hz	Status display: ON=Delay active OFF=Delay not active
4	Delay before switching: 10s After 10s, the delay is changed	Light spot OFF	6Hz	Status display: ON=Delay active OFF=Delay not active
5	Set step switch from delay -> run	Light spot ON	ON	ON/OFF

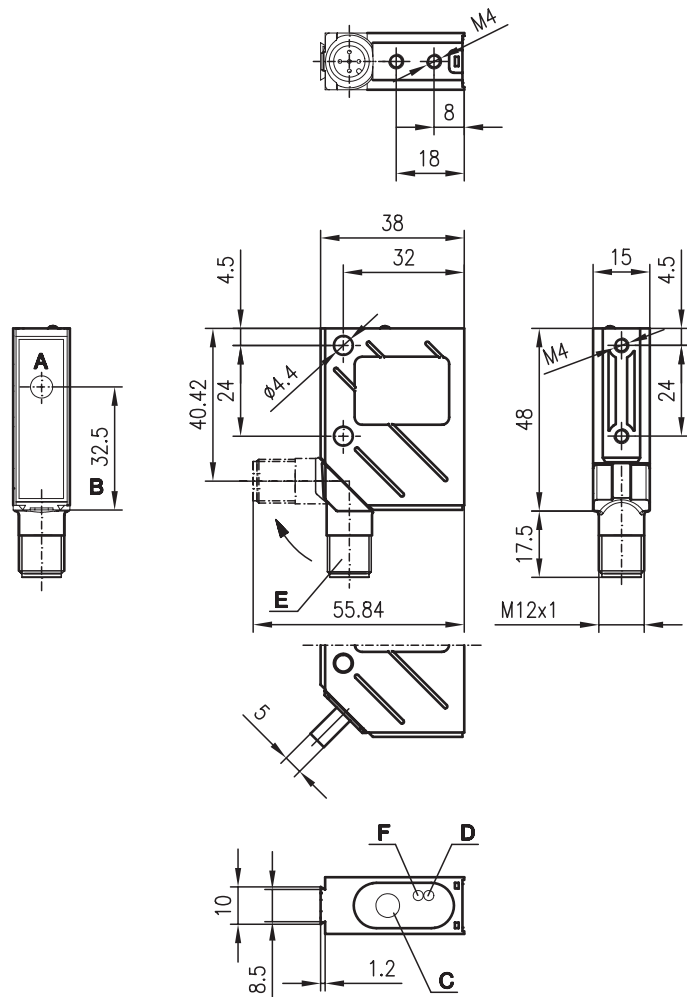


LSU 8

Throughbeam ultrasonic sensor



Dimensioned drawing



- A Converter
- B Ultrasonic axis
- C Step switch (receiver)
- D LED green
- E 90° turning connector
- F LED yellow



0 ... 800 mm



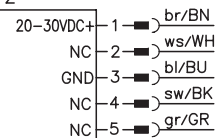
- Colour and transmission independent detection of objects, even in wet and foggy environment
- Detection of narrow gaps
- Detection of fast moving objects
- Switching frequency 250Hz
- M12 turning connector

Electrical connection

LSEU 8/24-S12



LSSU 8-S12



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_e06e.fm



Specifications

Ultrasonic specifications

Operating range ¹⁾	0 ... 800mm
Adjustment range	0 ... 800mm in steps
Ultrasonic frequency	300kHz
Typ. opening angle	see diagrams
Temperature drift	± 0.17%/K, see remarks

Timing

Switching frequency	max. 250Hz
Delay before start-up	2ms

Electrical data

Operating voltage U_B	20 ... 30V DC (incl. ± 10% residual ripple)
Residual ripple	± 10% of U_B
Bias current	receiver ≤ 25mA, transmitter ≤ 35mA
Switching output	1 PNP and 1 NPN transistor
Function characteristics	object detected
Output current	max. 150mA
Switch positions	positions 1 ... 5, see Tables

Indicators

LED green	ready for operation
LED yellow	object detected

Mechanical data

Housing	metal
Weight	70g each
Connection type	M 12 connector, 5-pin (turning)

Environmental data

Ambient temp. (operation/storage)	0°C ... +70°C/-40°C ... +85°C
Protective circuit ²⁾	1, 2, 3
VDE safety class	III
Protection class	IP 67
Standards applied	IEC 60947-5-2
Fitting position	any

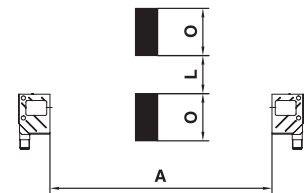
1) For the complete temperature range, measured object ≥ 20x20mm

2) 1=short-circuit and overload protection, 2=polarity reversal protection (not for analogue inputs), 3=wire break and inductive protection

Tables

Switch position ¹⁾	Switching frequency [Hz]	Typical values ¹⁾		
		A_{max} [mm]	O_{min} [mm]	L_{min} [mm]
1	250	200	10	2.5
2	200	350	15	3.0
3	150	500	25	5.0
4	100	650	30	5.0
5	50	800	60	3.5

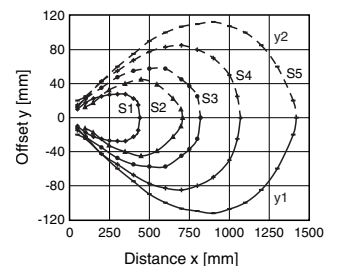
1) Different adjustments may produce better values



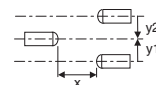
O Object
L Gap
A Distance transmitter/receiver

Diagrams

Typ. response behaviour



S1 Switch position 1
S2 Switch position 2
S3 Switch position 3
S4 Switch position 4
S5 Switch position 5



Order guide

	Designation	Part No.
with M12 connector	LSU 8/24-S12	
Transmitter	LSSU 8-S12	500 38914
Receiver	LSEU 8/24-S12	500 38915

Remarks

- **Temperature drift**
+0.17%/K
for temperature rise
-0.17%/K
for temperature fall

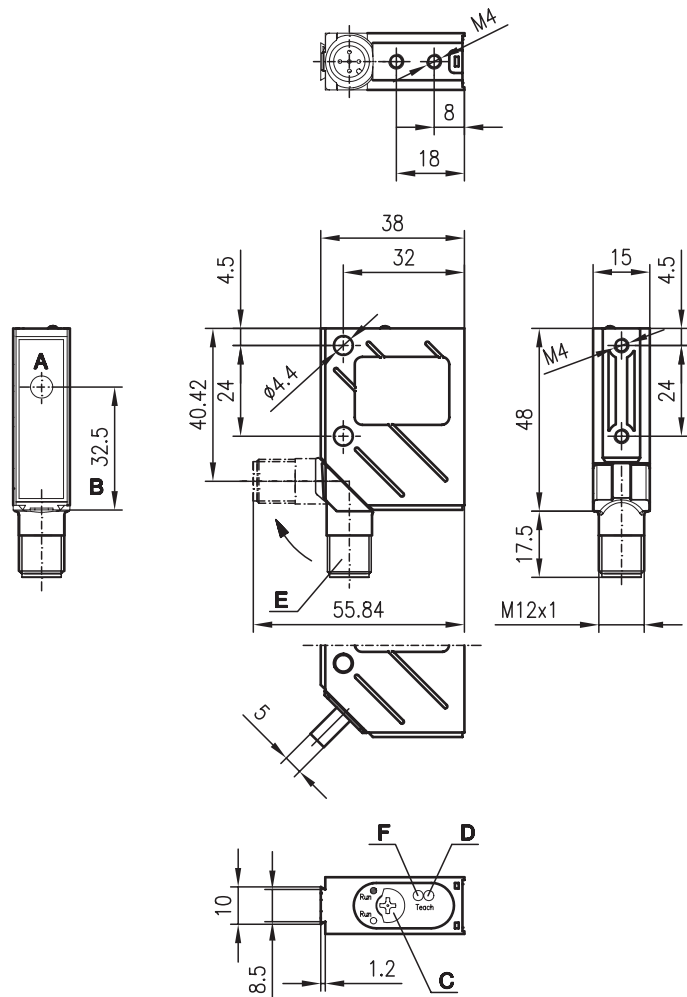


RKU 8

Retro-reflective ultrasonic sensor



Dimensioned drawing



- A Converter
- B Ultrasonic axis
- C Operational control
- D LED green
- E 90° turning connector
- F LED yellow

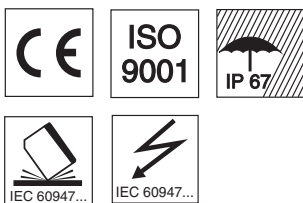
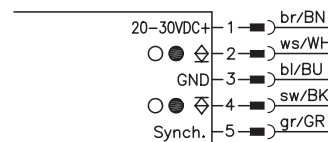


0 ... 400mm



- Colour and transmission independent detection of objects, even in wet and foggy environment
- Switching behaviour almost surface-independent
- Teach function for adjustment
- M12 turning connector

Electrical connection



Accessories:

(available separately • see page 72)

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

We reserve the right to make changes • 8_e04e.fm

Specifications

Ultrasonic specifications

Operating range ¹⁾	0 ... 400mm
Adjustment range	160 ... 435mm
Dead zone	≤ 35mm
Ultrasonic frequency	300kHz
Typ. opening angle	see diagrams
Resolution	1mm
Reproducibility	± 1mm
Temperature drift	± 0.17%/K

Timing

Switching frequency	8Hz
Delay before start-up	250ms

Electrical data

Operating voltage U_B	20 ... 30V DC (incl. ± 10% residual ripple)
Residual ripple	± 10% of U_B
Bias current	≤ 25mA
Switching output	1 PNP and 1 NPN transistor
Function characteristics	reversible, object detected/not detected
Output current	max. 150mA

Indicators

LED green	ready for operation
LED green flashing	teaching in progress
LED yellow	reversible, object detected/not detected
LED yellow flashing	device or teach error

Mechanical data

Housing	metal
Weight	70g
Connection type	M12 connector, 5-pin

Environmental data

Ambient temp. (operation/storage)	-25°C ... +70°C/-40°C ... +85°C
Protective circuit ²⁾	1, 2, 3
VDE safety class	III
Protection class	IP 67
Standards applied	IEC 60947-5-2
Fitting position	any

Options

Synch. input

Sensor synchronisation	see remarks
Sensor active/not active	U_B or not connected/0V
Activation delay	< 100ms

- 1) For the complete temperature range, measured object ≥ 20x20mm
 2) 1=short-circuit and overload protection, 2=polarity reversal protection (not for analogue inputs), 3=wire break and inductive protection

Teach process

	Operation	LED green	LED yellow
1.	Mount reflector at the desired distance (switching distance + dead zone)	ON	ON/OFF
2.	Put step switch in position "Teach"	-	-
3.	Wait for acknowledge signal	-	-
	"Teach-in was successful"	1Hz	ON
	"Teach-in was not successful"	ON	1Hz
4.	Put step switch in position "Run"	-	-
	Run ○ Output and yellow LED are active when object was detected	ON	ON
	Run ● Output and yellow LED are not active when object was detected	ON	OFF

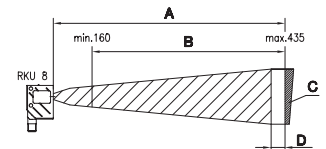
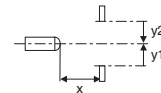
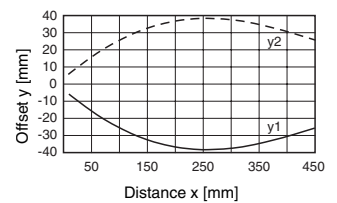
Order guide

Designation	Part No.
RKU 8/24-400-S12	500 38913

Tables

Diagrams

Typ. response behaviour (object 20x20mm)



- A Operating range
- B Adjustment range
- C Reflector
- D Dead zone

Remarks

- **Synchronisation:**
Max. 10 sensors may be synchronised by connecting the Synch inputs. Thus, mutual interference can be avoided.
- **Temperature drift**
+0.17%/K
for temperature rise
-0.17%/K
for temperature fall



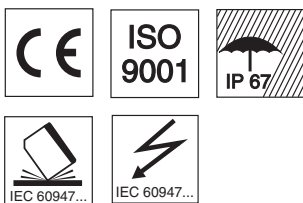
HRTU 8 Diffuse reflection ultrasonic scanner with background suppression



50 ... 400mm



- Colour and transmission independent detection of objects, even in wet and foggy environment
- Switching behaviour almost surface-independent
- Teach function for adjustment
- M12 turning connector

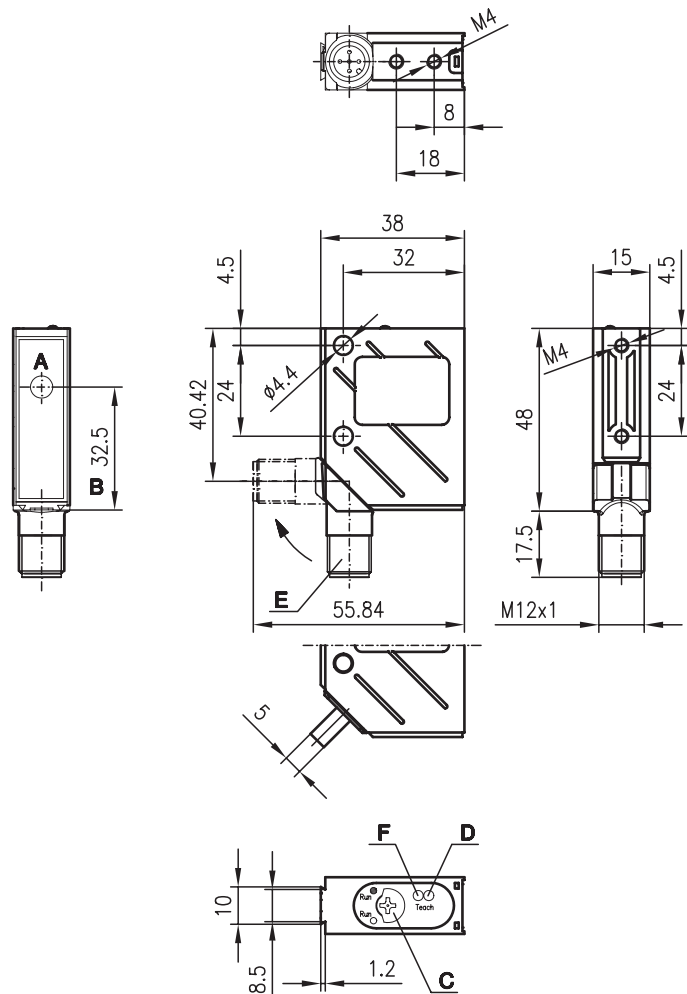


Accessories:

(available separately • see page 72)

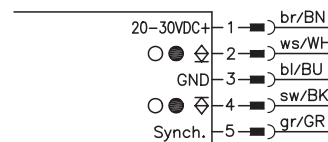
- M12 connectors (KD ...)
- Cable (KB ...)
- Mounting systems
- Control guard

Dimensioned drawing



- A Converter
- B Ultrasonic axis
- C Operational control
- D LED green
- E 90° turning connector
- F LED yellow

Electrical connection



We reserve the right to make changes • 8_e05e.fm

Specifications

Ultrasonic specifications

Operating range ¹⁾	50 ... 400mm
Adjustment range	60 ... 400mm
Ultrasonic frequency	300kHz
Typ. opening angle	see diagrams
Resolution	1 mm
Reproducibility	± 1 mm
Temperature drift	± 0.17%/K

Timing

Switching frequency	8Hz
Delay before start-up	250ms

Electrical data

Operating voltage U_B	20 ... 30V DC (incl. ± 10% residual ripple)
Residual ripple	± 10% of U_B
Bias current	≤ 25mA
Switching output	1 PNP and 1 NPN transistor
Function characteristics	reversible, object detected/not detected
Output current	max. 150mA

Indicators

LED green	ready for operation
LED green flashing	teaching in progress
LED yellow	reversible, object detected/not detected
LED yellow flashing	device or teach error

Mechanical data

Housing	metal
Weight	70g
Connection type	M12 connector, 5-pin

Environmental data

Ambient temp. (operation/storage)	-25°C ... +70°C/-40°C ... +85°C
Protective circuit ²⁾	1, 2, 3
VDE safety class	III
Protection class	IP 67
Standards applied	IEC 60947-5-2
Fitting position	any

Options

Synch. input	
Sensor synchronisation	see remarks
Sensor active/not active	U_B or not connected/0V
Activation delay	< 100ms

- 1) For the complete temperature range, measured object $\geq 20 \times 20$ mm
 2) 1=short-circuit and overload protection, 2=polarity reversal protection (not for analogue inputs), 3=wire break and inductive protection

Teach process

	Operation	LED green	LED yellow
1.	Place object at desired distance	ON	ON/OFF
2.	Put step switch in position "Teach"	-	-
3.	Wait for acknowledge signal	-	-
	"Teach-in was successful"	1Hz	ON
	"Teach-in was not successful"	ON	1Hz
4.	Put step switch in position "Run"	-	-
	Run ○ Output and yellow LED are not active when object was detected	ON	OFF
	Run ● Output and yellow LED are active when object was detected	ON	ON

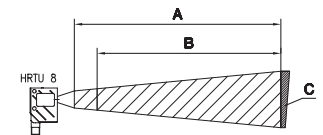
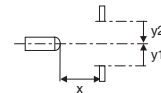
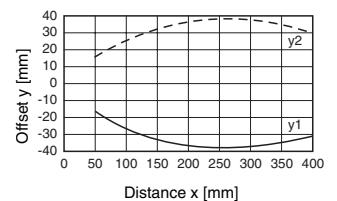
Order guide

Designation	Part No.
HRTU 8/24-400-S12	500 38912

Tables

Diagrams

Typ. response behaviour (object 20x20mm)



- A Operating range
- B Adjustment range
- C Object

Remarks

- **Synchronisation:**
Max. 10 sensors may be synchronised by connecting the Synch inputs. Thus, mutual interference can be avoided.
- **Temperature drift**
+0.17%/K
for temperature rise
-0.17%/K
for temperature fall

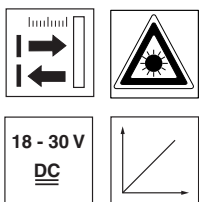


ODSL 8

Optical laser distance sensors

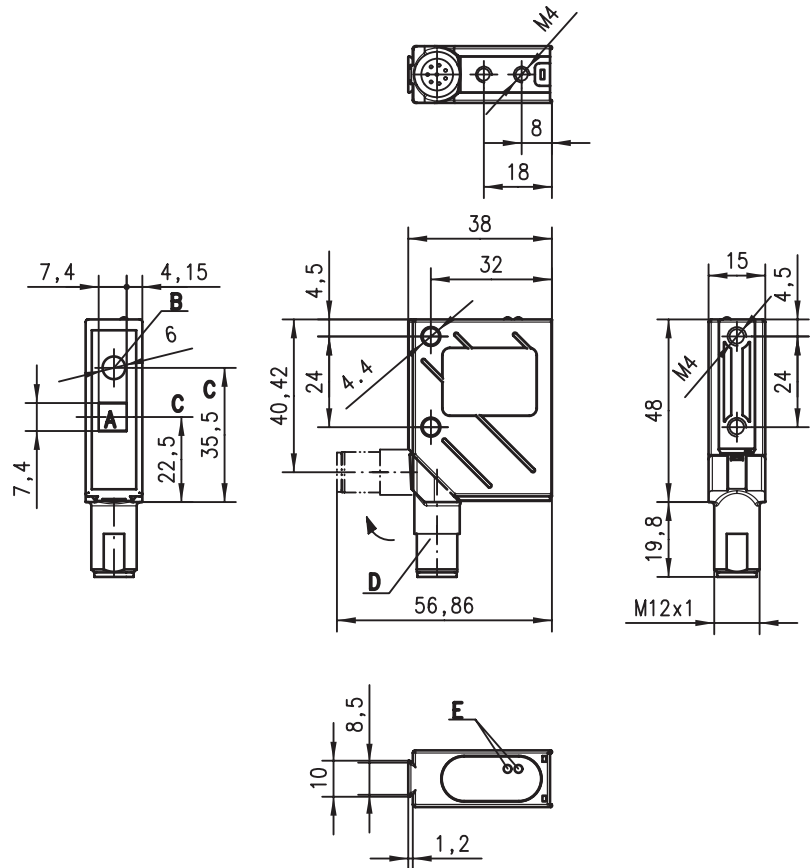


Dimensioned drawing



20 ... 400mm

- Reflection-independent distance information
- Highly insensitive to extraneous light
- Analogue current and voltage output
- Measurement range and mode adjustable
- Teachable switching output
- M12 turning connector



- A Transmitter
- B Receiver
- C Optical axis
- D 90° turning connector
- E LED yellow, green

Electrical connection

18-30V DC +	1	ws/WH
	2	br/BN
GND	3	gn/GN
1.	4	ge/YE
teach in	5	gr/GR
4-20mA	6	rs/PK
1-10V	7	bl/BU
Analog GND	8	rt/RD



Accessories:

(available separately • see page 72)

- Mounting systems
- Programming software
- Ready-made cable KB 448-2000-8A
- Control guard

We reserve the right to make changes • ods_12e.fm

Specifications

Optical data

Measurement range ¹⁾	20 ... 400mm
Resolution	0.1 mm
Light source	laser (modulated light)
Wavelength	650 nm (visible red light)
Light spot diameter	divergent, 1 x 6mm at 400m
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Error limits

Absolute measurement accuracy ¹⁾	± 1% up to 200mm / ± 2% 200 ... 400mm (6 ... 90% diffuse reflection)
Repeatability ²⁾	± 0.25% up to 200mm / ± 1% 200 ... 400mm (6 ... 90% diffuse reflection)
Linearity	0.5% at 90% (white)

Timing

Measurement frequency	200Hz / 5ms measurement time
Response time	≤ 20 ms
Delay before start-up	≤ 300ms

Electrical data

Operating voltage U_B	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Bias current	≤ 50mA
Switching output	PNP transistor, high-active
Signal voltage high/low	≥ ($U_B - 2V$) / ≤ 2V
Analogue output	$R_L \geq 2k\Omega$ (voltage) $R_L \leq 500\Omega$ (current)

Indicators

LED green	continuous light	teach-in on GND	teach-in on +U_B
	flashing	ready for operation	
	off	error	teaching procedure
LED yellow	continuous light	no voltage	
	flashing	object inside teach-in measurement distance	teaching procedure
	off	object outside teach-in measurement distance	

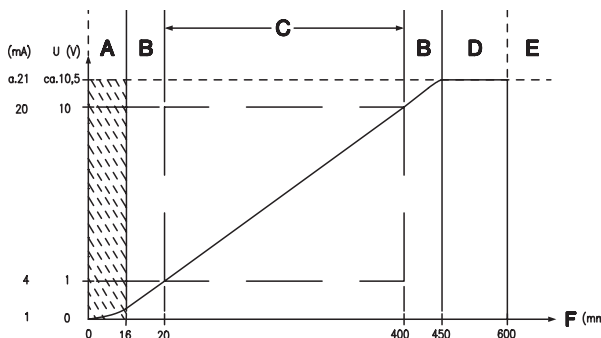
Mechanical data

Housing	metal
Optics cover	glass
Weight	70g
Connection type	M12 connector, 8-pin, turning

Environmental data

Ambient temp. (operation/storage)	-20°C ... +50°C / -40°C ... +70°C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class	IP 67
Standards applied	IEC 60947-5-2

- 1) Luminosity coefficient 6% ... 90%, over complete temperature range, measured object ≥ 50x50mm²
 2) Same object, measured object ≥ 50x50mm²
 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
 4) Rating voltage 250VAC



- A** Area not defined
B Linearity not defined
C Measurement range
D Object present
E No object detected
F Measurement distance

Order guide

	Designation	
M12 connector	ODSL 8/V4-400-S12	500 39614
Programming terminal	UPG 5	500 39627

Tables

Diagrams

Remarks

- Switching frequency depends on the reflectivity of the measured object and on the measurement mode.
- Teaching procedure:** Position measured object at desired measurement distance. Connect teach input to + U_B for ≥ 2s. Reconnect teach input to GND, switching output is programmed.
- In the analogue version, the voltage output is calibrated.

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	1.2mW
Pulse duration:	4ms
Wavelength:	650nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	1.2mW
Pulse duration:	4ms
Wavelength:	650nm
CLASS 2 LASER PRODUCT IEC 60825-1:1993+A2:2001 Complies with 21 CFR 1040.10	

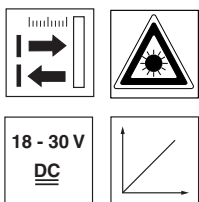


ODSL 8

Optical laser distance sensors

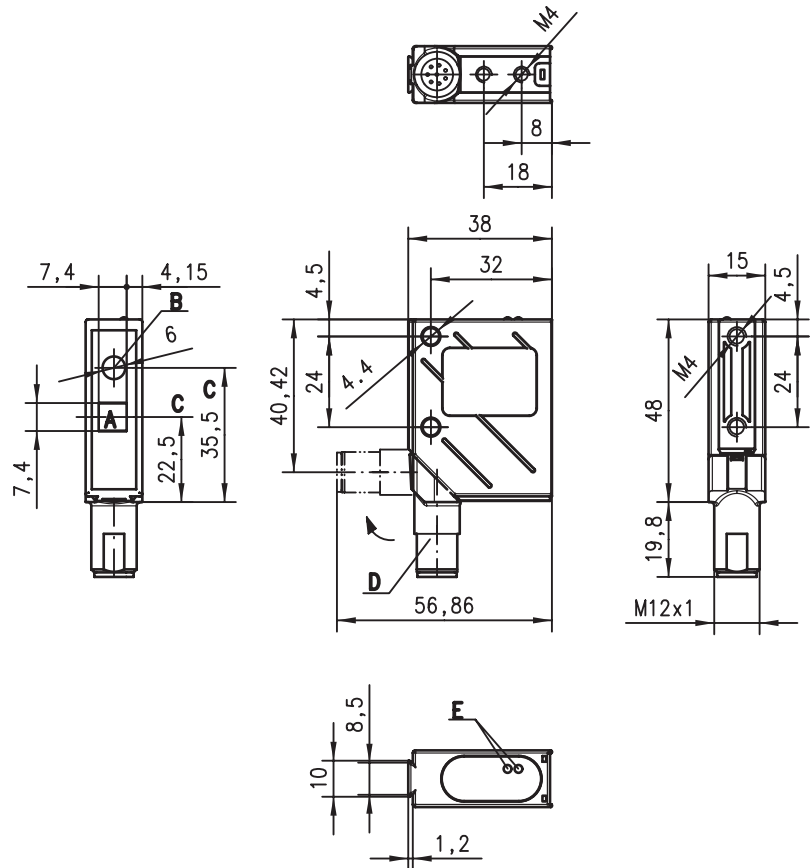


Dimensioned drawing



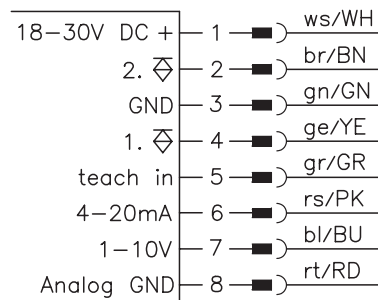
25 ... 45 mm

- Reflection-independent distance information
- Highly insensitive to extraneous light
- Analogue current and voltage output
- Measurement range and mode adjustable
- Teachable switching output
- M12 turning connector



- A Transmitter
- B Receiver
- C Optical axis
- D 90° turning connector
- E LED yellow, green

Electrical connection



Accessories:

(available separately • see page 72)

- Mounting systems
- Programming software
- Ready-made cable KB 448-2000-8A
- Control guard

We reserve the right to make changes • ods_21e.fm

Specifications

Optical data

Measurement range ¹⁾	25 ... 45mm
Resolution	0.01mm
Light source	laser (modulated light)
Wavelength	650nm (visible red light)
Light spot diameter	divergent, 1x6mm at 400m
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Error limits

Absolute measurement accuracy ¹⁾	0.5% of measurement value (6 ... 90% rem.)
Repeatability ²⁾	0.1% of measurement value (6 ... 90% rem.)
Linearity	0.5% at 90% (white)

Timing

Measurement frequency	200Hz / 5ms measurement time
Response time	≤ 20 ms
Delay before start-up	≤ 300ms

Electrical data

Operating voltage U_B	18 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Bias current	≤ 50mA
Switching output	PNP transistor, high-active
Signal voltage high/low	≥ ($U_B - 2V$) / ≤ 2V
Analogue output	$R_L \geq 2k\Omega$ (voltage) $R_L \leq 500\Omega$ (current)

Indicators

LED green	continuous light	teach-in on GND	teach-in on $+U_B$
	flashing	ready for operation	
	off	error	teaching procedure
LED yellow	continuous light	no voltage	
	flashing	object inside teach-in measurement distance	teaching procedure
	off	object outside teach-in measurement distance	

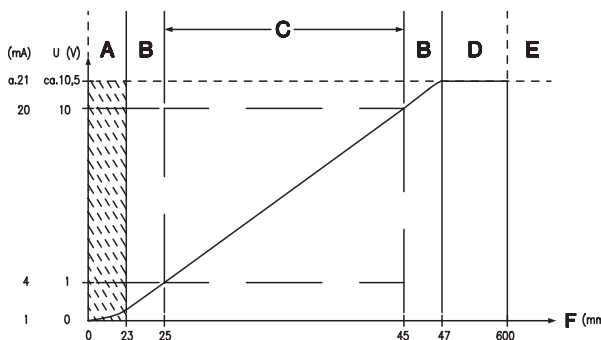
Mechanical data

Housing	metal
Optics cover	glass
Weight	70g
Connection type	M12 connector, 8-pin, turning

Environmental data

Ambient temp. (operation/storage)	-20°C ... +50°C / -40°C ... +70°C
Protective circuit ³⁾	2, 3
VDE safety class ⁴⁾	II, all-insulated
Protection class	IP 67
Standards applied	IEC 60947-5-2

- 1) Luminosity coefficient 6% ... 90%, over complete temperature range, measured object ≥ 50x50mm²
 2) Same object, measured object ≥ 50x50mm²
 3) 2=polarity reversal protection, 3=short-circuit protection for all outputs
 4) Rating voltage 250VAC



- A** Area not defined
B Linearity not defined
C Measurement range
D Object present
E No object detected
F Measurement distance

Order guide

	Designation	
M12 connector	ODSL 8/V4-45-S12	501 01883
Programming terminal	UPG 5	500 39627

Tables

Diagrams

Remarks

- Switching frequency depends on the reflectivity of the measured object and on the measurement mode.
- Teaching procedure:** Position measured object at desired measurement distance. Connect teach input to $+U_B$ for ≥ 2s. Reconnect teach input to GND, switching output is programmed.
- In the analogue version, the voltage output is calibrated.

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	1.2mW
Pulse duration:	4ms
Wavelength:	650nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	1.2mW
Pulse duration:	4ms
Wavelength:	650nm
CLASS 2 LASER PRODUCT IEC 60825-1:1993+A2:2001 Complies with 21 CFR 1040.10	

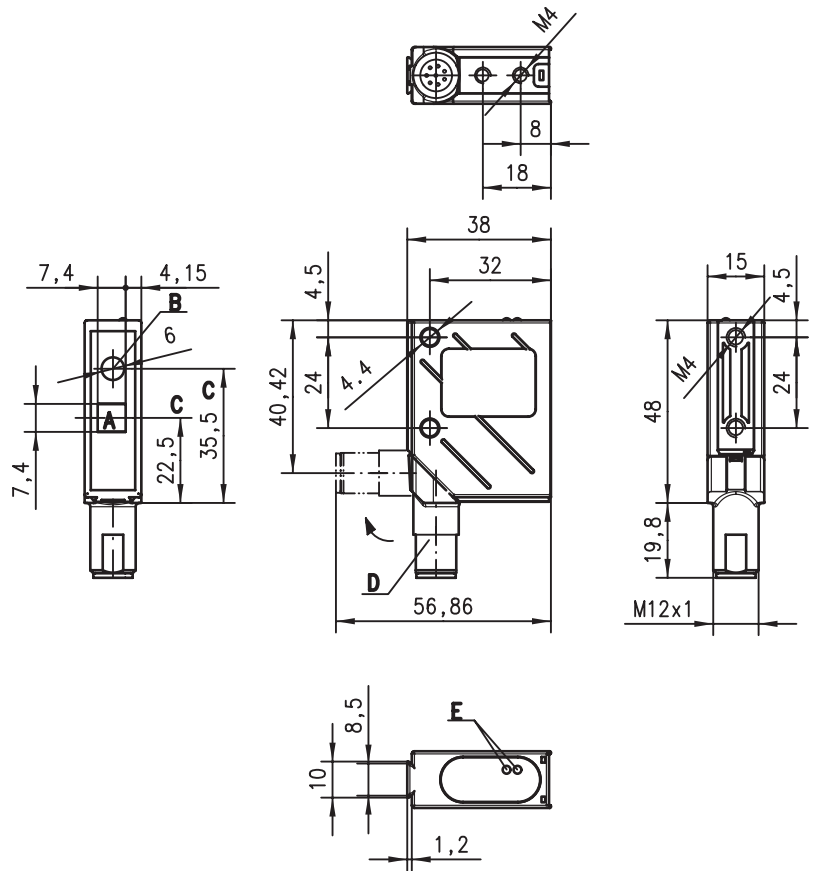


ODSL 8

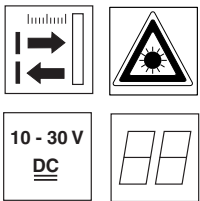
Optical laser distance sensors



Dimensioned drawing



- A Transmitter
- B Receiver
- C Optical axis
- D 90° turning connector
- E LED yellow, green

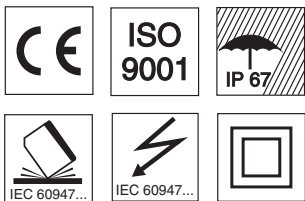


20 ... 400mm

- Reflection-independent distance information
- Highly insensitive to extraneous light
- Measurement range and mode adjustable
- Teachable switching output
- Digital RS 232 and RS 485 interface
- M12 turning connector

Electrical connection

10-30V DC +	1	ws/WH
RxD RS232	2	br/BN
GND	3	gn/GN
1. ∇	4	ge/YE
teach in	5	gr/GR
TxD RS232	6	rs/PK
Tx+ RS485	7	bl/BU
TX- RS485	8	rt/RD



Accessories:

(available separately • see page 72)

- Mounting systems
- Programming software
- Ready-made cable KB 448-2000-8A
- Control guard

We reserve the right to make changes • ods_15e.fm



Specifications

Optical data

Measurement range ¹⁾	20 ... 400mm
Resolution	0.1mm
Light source	laser (modulated light)
Wavelength	650 nm (visible red light)
Light spot diameter	divergent, 1x6mm at 400m
Laser class	2 acc. to EN 60825-1 (2003/10)
Laser warning notice	see remarks

Error limits

Absolute measurement accuracy ¹⁾	± 1% up to 200mm / ± 2% 200 ... 400mm (6 ... 90% diffuse reflection)
Repeatability ²⁾	± 0.25% up to 200mm / ± 1% 200 ... 400mm (6 ... 90% diffuse reflection)
Linearity	0.5% at 90% (white)

Timing

Measurement frequency	200Hz / 5ms measurement time
Response time	≤ 20 ms
Delay before start-up	≤ 300ms

Electrical data

Operating voltage U _B	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U _B
Bias current	≤ 50mA
Switching output	PNP transistor, high-active
Signal voltage high/low	≥ (U _B -2V)/≤ 2V
Digital output RS 232 ³⁾	9600 Baud
RS 485 ³⁾	9600 Baud, no termination
Transmission protocol ⁴⁾	2 byte transmission, continuous data flow

Indicators

LED green	continuous light	ready for operation
	flashing	error
	off	teaching procedure
LED yellow	continuous light	no voltage
	flashing	object inside teach-in measurement distance
	off	teaching procedure
		object outside teach-in measurement distance

Mechanical data

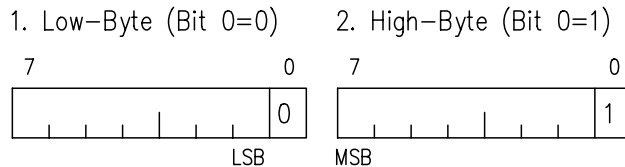
Housing	metal
Optics cover	glass
Weight	70g
Connection type	M12 connector, 8-pin, turning

Environmental data

Ambient temp. (operation/storage)	-20°C ... +50°C/-40°C ... +70°C
Protective circuit ⁵⁾	1, 2, 3
VDE safety class ⁶⁾	II, all-insulated
Protection class	IP 67
Standards applied	IEC 60947-5-2

- 1) Luminosity coefficient 6% ... 90%, over complete temperature range, measured object ≥ 50x50mm²
- 2) Same object, measured object ≥ 50x50mm²
- 3) Higher baud rates can be set
- 4) 2byte transmission protocol
- 5) 1=transient protection, 2=polarity reversal protection, 3=short-circuit protection for all outputs
- 6) Rating voltage 250VAC

Measurement value = 14 Bit



Order guide

M12 connector

Designation

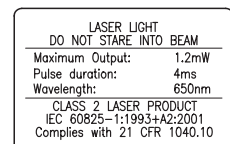
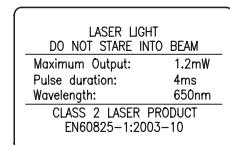
ODSL 8/D4-400-S12 500 39615

Tables

Diagrams

Remarks

- **Parameterisation**
 - Connect the device to voltage and simultaneously apply +24VDC to teach-in (PIN 5)
 - Connect RS 232
 - Start ODS 96 programming software
 - Password "ODS_96"
- **Switching frequency** depends on the reflectivity of the measured object and on the measurement mode.
- **Teaching procedure:** Position measured object at desired measurement distance. Connect teach input to +U_B for ≥ 2s. Reconnect teach input to GND, switching output is programmed.



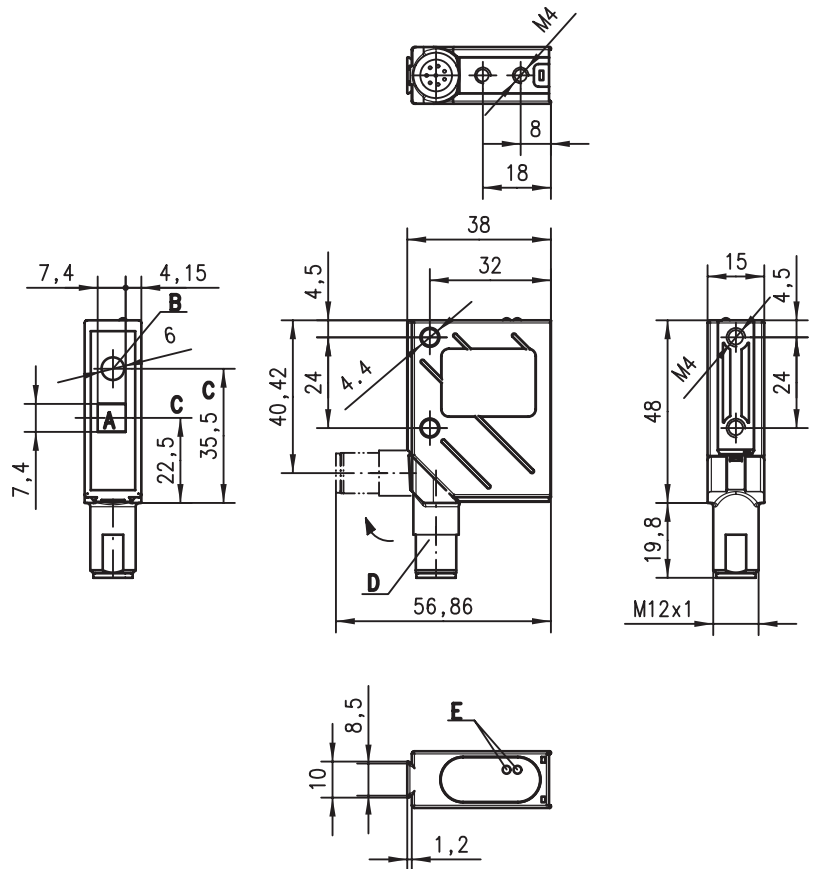


ODSL 8

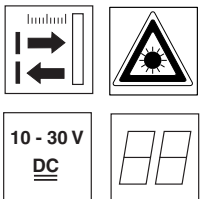
Optical laser distance sensors



Dimensioned drawing



- A Transmitter
- B Receiver
- C Optical axis
- D 90° turning connector
- E LED yellow, green

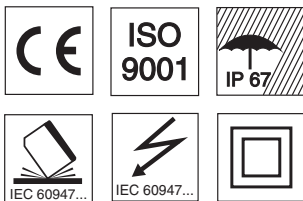


25 ... 45 mm

- Reflection-independent distance information
- Highly insensitive to extraneous light
- Measurement range and mode adjustable
- Teachable switching output
- Digital RS 232 and RS 485 interface
- M12 turning connector

Electrical connection

10-30V DC +	1	ws/WH
RxD RS232	2	br/BN
GND	3	gn/GN
1. ∇	4	ge/YE
teach in	5	gr/GR
TxD RS232	6	rs/PK
Tx+ RS485	7	bl/BU
TX- RS485	8	rt/RD



Accessories:

(available separately • see page 72)

- Mounting systems
- Programming software
- Ready-made cable KB 448-2000-8A
- Control guard

We reserve the right to make changes • ods_22e.fm

Glass fiber optic cables
Specifications
Optical data

Standard length	approx. 500mm and approx. 1000mm (special lengths on request)
Fiber optic cable outer diameter	approx. 5mm
Minimum bending radius	40mm

Materials of sheathing and end piece

...-MS	brass/aluminium anodised or V2A
...-SI	silicone/V2A
...-VA	V2A/V2A

Operation and storage temperature

...-MS	-30°C ... +140°C
...-SI	-30°C ... +160°C
...-VA	-30°C ... +300°C (transient)

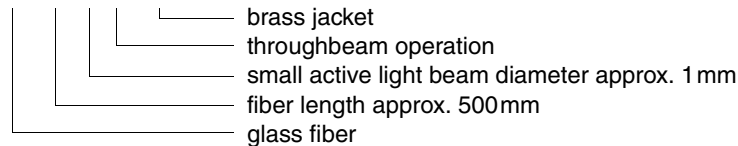
Order guide
Glass fiber optic cables in throughbeam operation

Designation	GF 500/1 LS-... GF 1000/1 LS-...	GF 500/4 LS-...	GF 1000/4 LS-...
Operating range ¹⁾	200mm	600mm	1000mm
Operating range ²⁾	250mm	300mm	300mm
Operating range ³⁾	250mm	600mm	600mm
With GF-L1 ¹⁾	400mm	300mm	300mm
With GF-U1 ¹⁾	700mm	500mm	700mm
Active light beam diameter [mm]	1.1 mm	2.3mm	2.3mm

1) Operating range in connection with (I)LVS 9/... and (I)LVS 19/...

2) Operating range in connection with LVSR 325

3) Operating range in connection with LVSR 8

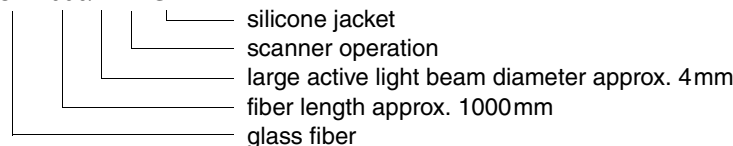
Example code:
GF 500/1 LS-MS

Glass fiber optic cables in scanner operation

Designation	GF 500/1 RT-... GF 1000/1 RT-...	GF 500/4 RT-... GF 1000/4 RT-...	GF 1000/1 RT-MS.1
Scanning range ¹⁾	50mm	80mm	10mm
Scanning range ²⁾	50mm	80mm	-
Scanning range ³⁾	50mm	80mm	10mm
Active light beam diameter [mm]	1.8mm	3.5mm	0.5mm

1) Scanning range in connection with (I)LVS 9/... and (I)LVS 19/... relative to white 90%

2) Scanning range in connection with LVSR 325 relative to white 90%

3) Scanning range in connection with LVSR 8 relative to white 90%

Example code:
GF 1000/4 RT-SI

Remarks

- **Mounting**
When mounting the fiber optic cable, a minimum bending radius of 40mm must be guaranteed for reliable function.
- **Connection**
The fiber optic cables must be inserted securely into the corresponding openings in the control device. The fiber optic cable is fixed in place using the set screw.
- **Optical attachments**
For larger operating ranges using .../1 type cable (beam exit approx. 1mm), or changes in cable direction, optical attachments are available.
Attention:
When mounting attachments, ensure that the optics are not contaminated by adhesive substances. The adhesive must fulfil the temperature requirements.
- Shipment is done in pairs for throughbeam (LS) applications.
- Fiber optic cables with other lengths, head pieces and cross sections on request.



Special types

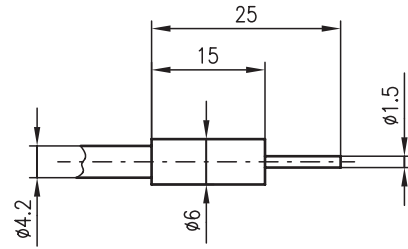
Glass fiber optic cables



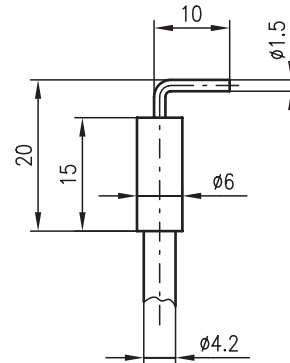
- Glass fiber optic cables in throughbeam or scanner operation
- Fiber optic cables with various cross sections and end pieces
- Connection pieces suitable for all control devices of the series (I)LVS 19, (I)LVS 9, LVSR 8, LKRTG 8 and LVSR 325
- Silicone coated metal sheathing results in a high protection class (IP 65) and allows use in the food industry

Dimensioned drawing

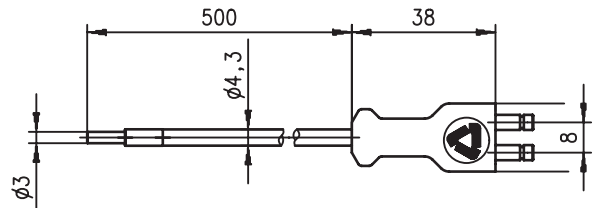
GF 600/1-RT-SI-1,5
GF 600/1-LS-SI-1,5



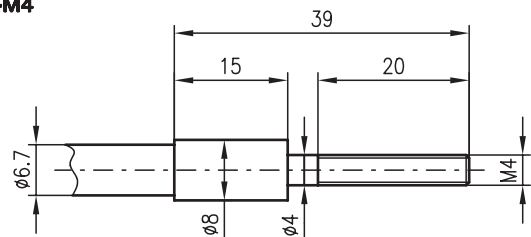
GF 600/1-RT-SI-W-1,5
GF 600/1-LS-SI-W-1,5



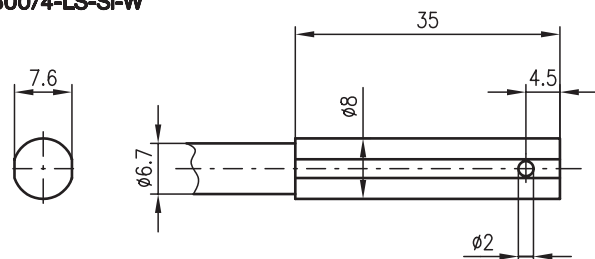
GFA 500/1RT-MS



GF 600/4-RT-SI-M4
GF 600/4-LS-SI-M4



GF 600/4-RT-SI-W
GF 600/4-LS-SI-W



We reserve the right to make changes * lsg_e08e.fm

Accessories:
(available separately)



Glass fiber optic cables

Order guide

Glass fiber optic cables in throughbeam operation

Selection table		Order code →	GF 500/1 LS-MS Part No. 500 01030	GF 500/1 LS-SI Part No. 500 06779	GF 1000/1 LS-MS Part No. 500 01032	GF 1000/1 LS-SI Part No. 500 00036	GF 500/4 LS-MS Part No. 500 01031	GF 500/4 LS-VA Part No. 500 00043	GF 1000/4 LS-MS Part No. 500 01033	GF 1000/4 LS-SI Part No. 500 00037	GF 1000/4 LS-VA Part No. 500 00045
Equipment ↓	Sheathing/end piece	brass/aluminium	●		●		●		●		
		silicone/V2A		●		●				●	
		V2A/V2A						●			●
Length	500mm		●	●			●	●			
	1000mm				●	●			●	●	●
Light beam diameter	approx. 1 mm		●	●	●	●					
	approx. 4mm						●	●	●	●	●

Glass fiber optic cables in scanner operation

Selection table		Order code →	GF 500/1 RT-MS Part No. 500 01034	GF 500/1 RT-SI Part No. 500 00038	GF 500/1 RT-VA Part No. 500 00046	GF 1000/1 RT-MS Part No. 500 01036	GF 500/4 RT-MS Part No. 500 01035	GF 500/4 RT-VA Part No. 500 00047	GF 1000/4 RT-MS Part No. 500 01037	GF 1000/4 RT-SI Part No. 500 00041	GF 1000/4 RT-MS.1 Part No. 500 11508
Equipment ↓	Sheathing/end piece	brass/aluminium	●			●	●		●		●
		silicone/V2A		●						●	
		V2A/V2A			●			●			
Length	500mm		●	●	●		●	●			
	1000mm					●			●	●	●
Light beam diameter	approx. 1 mm		●	●	●	●			●	●	●
	approx. 4mm						●	●	●	●	●

Special types - Glass fiber optic cables in throughbeam or scanner operation

Selection table		Order code →	GF 600/1-LS-SI-1,5 Part No. 500 34365	GF 600/1-RT-SI-1,5 Part No. 500 34352	GF 600/1-LS-SI-W-1,5 Part No. 500 34363	GF 600/1-RT-SI-W-1,5 Part No. 500 34368	GF 600/4-LS-SI-M4 Part No. 500 34361	GF 600/4-RT-SI-M4 Part No. 500 34356	GF 600/4-LS-SI-W Part No. 500 34359	GF 600/4-RT-SI-W Part No. 500 34367	GFA 500/1RT-MS Part No. 500 39123
Operating mode	Throughbeam operation		●		●		●		●		
	Scanner operation			●		●		●		●	●
Sheathing/end piece	brass/aluminium										●
	silicone/V2A		●	●	●	●	●	●	●	●	
	V2A/V2A										
Length	500mm										●
	600mm		●	●	●	●	●	●	●	●	
Light beam diameter	approx. 1 mm		●	●	●	●					
	approx. 4mm						●	●	●	●	●

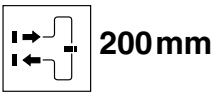
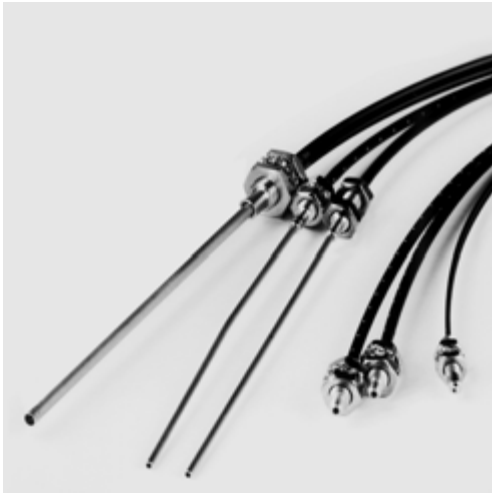
Remarks

- Fiber optic cables with other lengths, head pieces and cross sections on request.



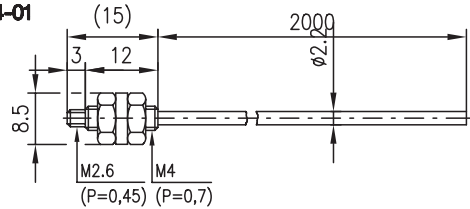
Plastic fiber optic cables in throughbeam operation

Dimensioned drawing

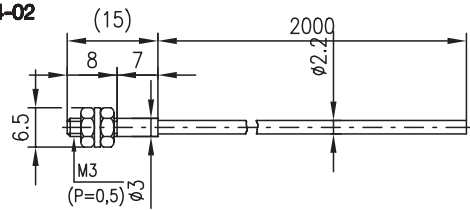


- Plastic fiber optic cables in throughbeam operation
- Fiber optic cables with various cross sections and end pieces
- Length can be cut by the user
- Connection pieces suitable for fiber optic cable amplifiers LVS 420/P, LVSR 8 and LVSR 325
- With ".5" versions, the end piece is bendable and can be adjusted to every mounting position

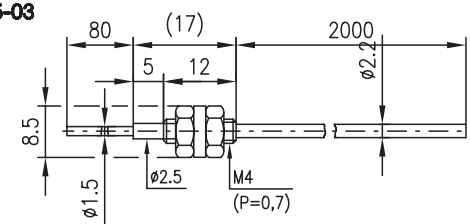
KF 2000/2 LS.4-01



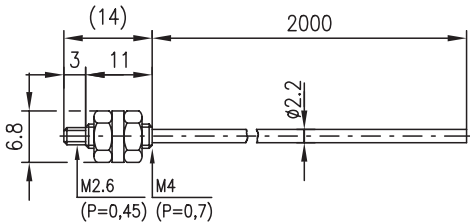
KF 2000/2 LS.4-02



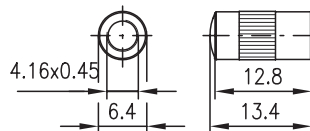
KF 2000/2 LS.5-03



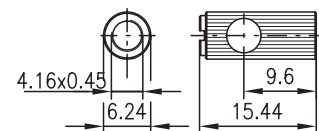
KF 2000/2 LS.4-08



KF - L1



KF - U1



Accessories:

(available separately)

- Angles and optics attachments
 - KF-L1 (Part No. 500 34065)
 - KF-U1 (Part No. 500 34064)

(part of the delivery contents)

- Fiber optic cable cutting device (except for KF 2000/2 LS.4-08)
- Adapter (for fiber optic cables with $\phi 1$ mm)

We reserve the right to make changes *lsg_e09e.fm



Plastic fiber optic cables in throughbeam operation

Specifications

Optical data

Standard length	2000mm
Reinforcement	PVC
Operating temperature	-25 °C ... +80 °C
Minimum bending radius	15mm

Remarks

- **Mounting**
When mounting the fiber optic cable, a minimum bending radius of 15mm must be guaranteed for reliable function. Moreover, the fiber optic cable must not be bent within 15mm of the sensor and cable head. The minimum bending radius of the stainless steel sleeve on the cable head is 10mm.
- **Connection**
The fiber optic cables must be inserted securely into the corresponding openings in the control device (connection length approx. 15mm). The fastening screw is used for fixation of the fiber optic cables.
- **Cutting**
The plastic fiber optic cable can be cut to the desired length using the fiber optic cable cutting device. Each cut opening may only be used once.
- **Adapter**
The included adapter must be used with fiber optic cables having a fiber diameter of 1mm. The fiber optic cable must extend more than 0.5mm beyond the adapter.
- **First installation**
Before using the fiber optic cable for the first time, the fiber must be cut at the end to provide a smooth surface.
- **Optical attachments**
Screw-on type for KF 2000/2 LS.4-01 (throughbeam operation). With optical attachment KF-L1 for longer operating ranges. With optical attachment KF-U1 for 90° deflection. Operating range see table.
- Shipment is done in pairs for throughbeam (LS) applications.

Order guide

Plastic fiber optic cables in throughbeam operation

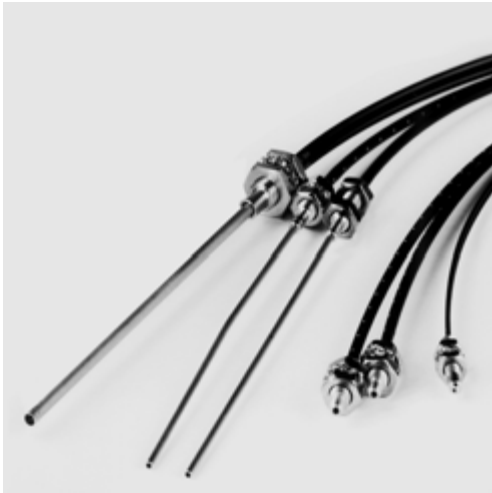
Order code	KF 2000/2 LS.4-01 Part No. 500 27775 KF 2000/2 LS.4-08 Part No. 500 35309			KF 2000/2 LS.4-02 Part No. 500 27780	KF 2000/2 LS.5-03 Part No. 500 27781
		KF-L1	KF-U1		
Operating range ¹⁾	80mm	800mm	100mm	100mm	100mm
Operating range ²⁾	200mm	2500mm	250mm	200mm	200mm
Operating range ³⁾	200mm	2000mm	200mm	200mm	200mm
Fiber optic cable outer diameter	2mm			2mm	2mm

1) Operating range in connection with LVS 420/P
 2) Operating range in connection with LVSR 325
 3) Operating range in connection with LVSR 8



Plastic fiber optic cables in scanner operation

Dimensioned drawing



80 mm



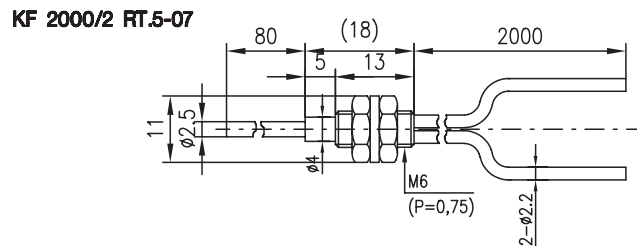
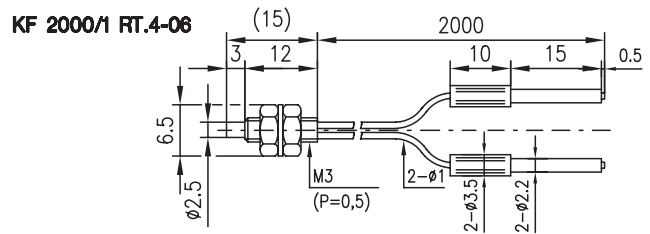
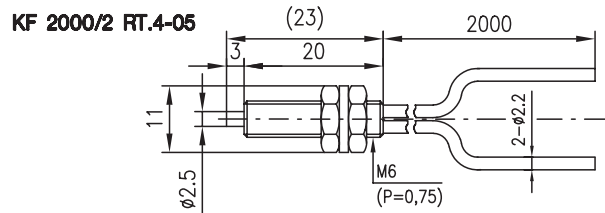
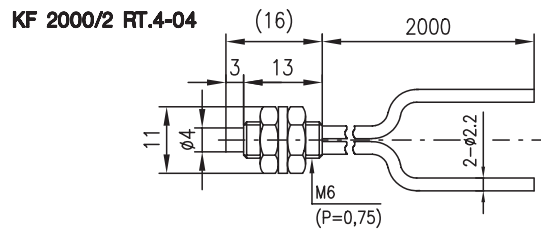
- Plastic fiber optic cables in scanner operation
- Fiber optic cables with various cross sections and end pieces
- Length can be cut by the user
- Connection pieces suitable for fiber optic cable amplifiers LVS 420/P, LVSR and LVSR 325
- With ".5" versions, the end piece is bendable and can be adjusted to every mounting position

We reserve the right to make changes *!sg_e09e.fm

Accessories:

(part of the delivery contents)

- Fiber optic cable cutting device
- Adapter (for fiber optic cables with Ø 1 mm)





Plastic fiber optic cables in scanner operation

Specifications

Optical data

Standard length	2000mm
Reinforcement	PVC
Operating temperature	-25 °C ... +80 °C
Minimum bending radius	15mm

Remarks

- **Mounting**
When mounting the fiber optic cable, a minimum bending radius of 15mm must be guaranteed for reliable function. Moreover, the fiber optic cable must not be bent within 15mm of the sensor and cable head. The minimum bending radius of the stainless steel sleeve on the cable head is 10mm.
- **Connection**
The fiber optic cables must be inserted securely into the corresponding openings in the control device (connection length approx. 15mm). The fastening screw is used for fixation of the fiber optic cables.
- **Cutting**
The plastic fiber optic cable can be cut to the desired length using the fiber optic cable cutting device. Each cut opening may only be used once.
- **Adapter**
The included adapter must be used with fiber optic cables having a fiber diameter of 1 mm. The fiber optic cable must extend more than 0.5mm beyond the adapter.
- **First installation**
Before using the fiber optic cable for the first time, the fiber must be cut at the end to provide a smooth surface.
- Shipment is done in pairs for throughbeam (LS) applications.

Order guide

Plastic fiber optic cable in scanner operation

Order code	KF 2000/2 RT.4-04 Part No. 500 27782	KF 2000/2 RT.4-05 Part No. 500 27783	KF 2000/1 RT.4-06 Part No. 500 27784	KF 2000/2 RT.5-07 Part No. 500 27785
Scanning range ¹⁾	25mm	30mm	6mm	30mm
Scanning range ²⁾	65mm	80mm	15mm	65mm
Scanning range ³⁾	50mm	60mm	10mm	50mm
Fiber optic cable outer diameter	2mm	2mm	1mm	2mm

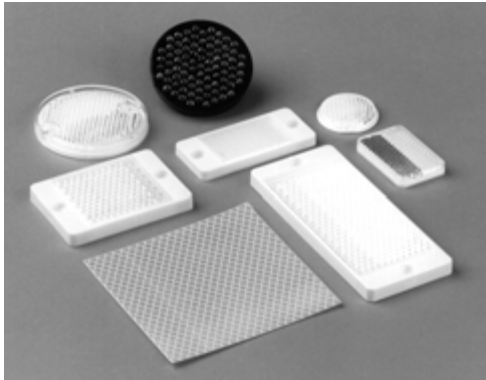
1) Scanning range in connection with LVS 420/P relative to white 90%
 2) Scanning range in connection with LVSR 325 relative to white 90%
 3) Scanning range in connection with LVSR 8 relative to white 90%



8 Series

Accessories

Reflectors

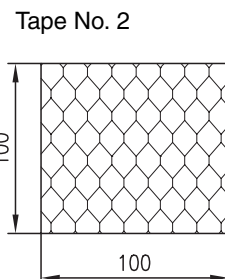
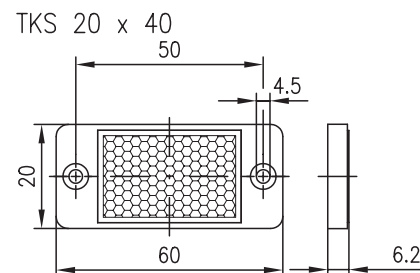
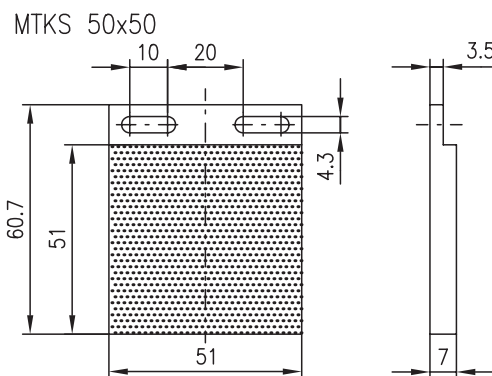
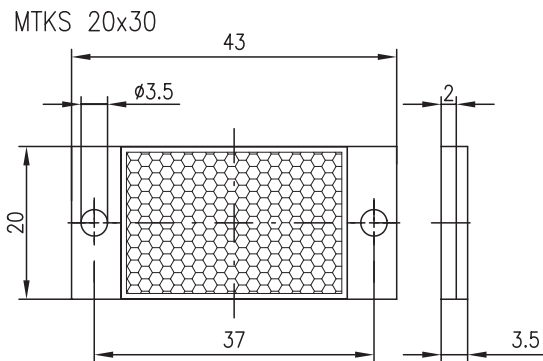
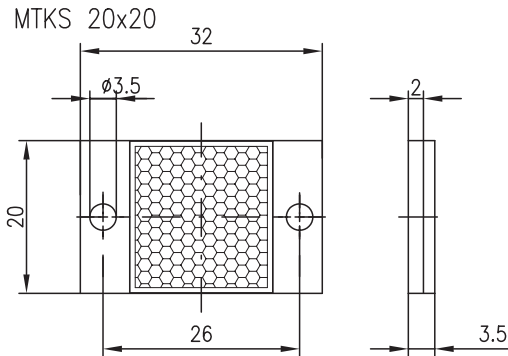
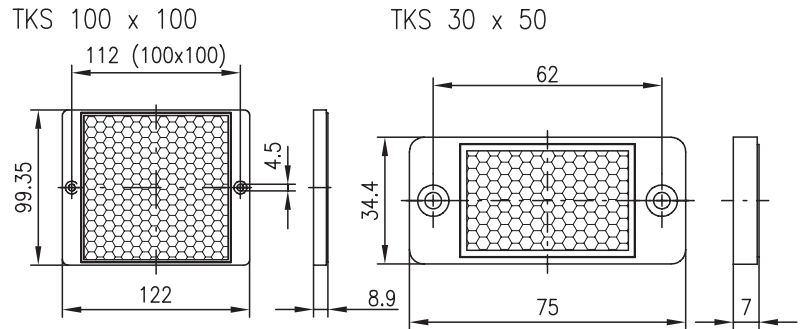


- Reflectors and reflective tapes are ideally suited for Leuze retro-reflective photoelectric sensors. The performance data refer to the use of Leuze reflectors and reflective tapes. The range of retro-reflective photoelectric sensors depends on the type and size of the reflector.
- Adhesive and screw-type models enable universal mounting.
- 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. 2 may be used.

Order codes:

Designation	Part No.
TKS 100x100	500 22816
MTKS 20x20	500 40895
MTKS 20x30	500 40894
MTKS 50x50	500 36188
TKS 30x50	500 23525
TKS 20x40	500 81283
Tape 2	500 11523
KB 095-5000-5	500 20500
KB 095-5000-5A	500 20499
KB 450-2000-4	500 80838
KB 450-2000-4A	500 80841
KB 450-5000-4	500 80839
KB 450-5000-4A	500 80842
KB 450-10000-4	500 80840
KB 450-10000-4A	500 80843
KD 095-5	500 20502
KD 095-5A	500 20501

Dimensioned drawings

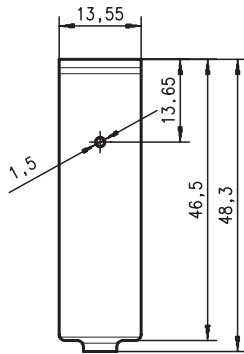


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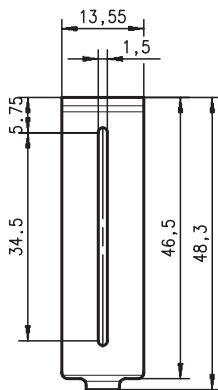


Dimensioned drawings

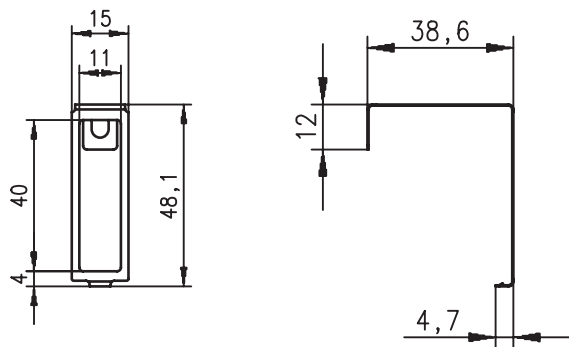
BL 8



BL 8.1



BS 8



Diaphragms

BL 8 (Part No. 500 40279)



BL 8.1 (Part No. 500 40280)



Control guard

BS 8 (Part No. 500 41067)





8 Series

Accessories

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.

Mounting systems

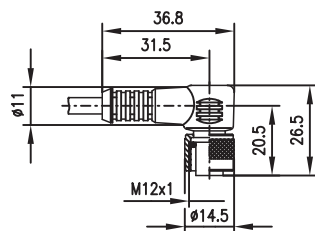
BT 8-0 (Part No. 500 36196)



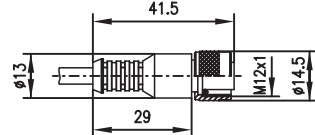
BT 8 (Part No. 500 36195)



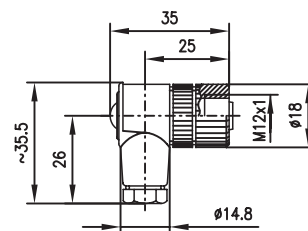
Dimensioned drawings



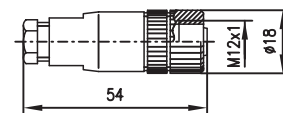
KB 450-...-...



KB 450-...-...A



KD 095-5



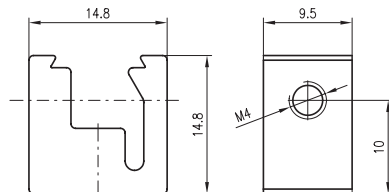
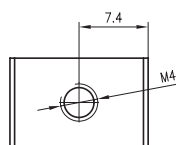
KD 095-5A

Selection table

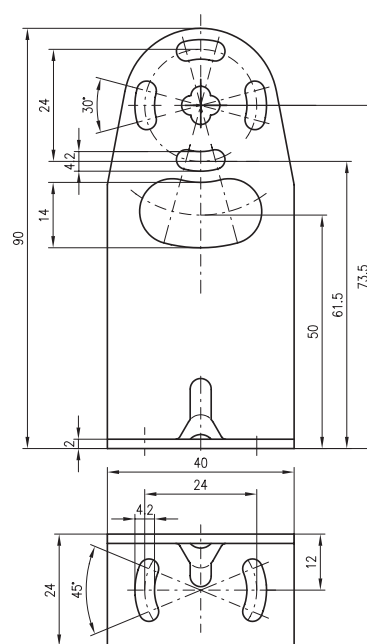
M12 connectors				
with cable		without cable		
M12	KB 095-5000-5	KB 095-5000-5A	KD 095-5	KD 095-5A
M12	KB 450-2000-4	KB 450-2000-4A		
M12	KB 450-5000-4	KB 450-5000-4A		
M12	KB 450-10000-4	KB 450-10000-4A		

Dimensioned drawings

BT 8-0



BT 8



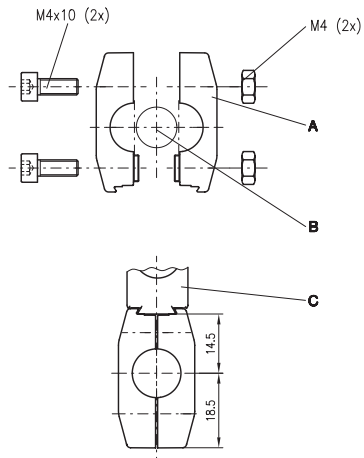


Accessories

8 Series

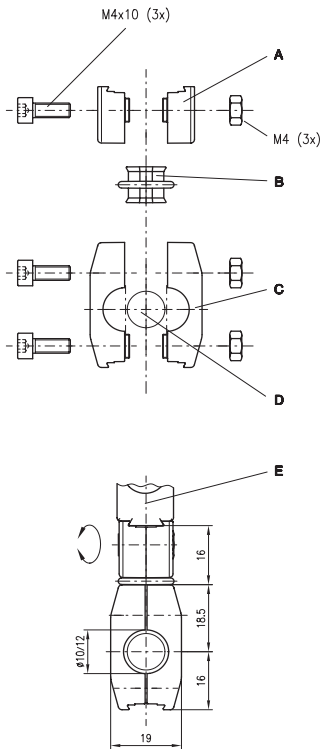
Dimensioned drawings

UMS 8-D...



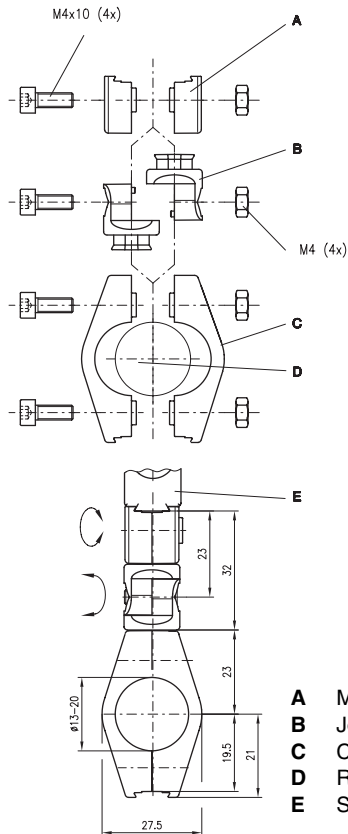
- A Clamp
- B Rod
- C Sensor

UMS 8.1-D...



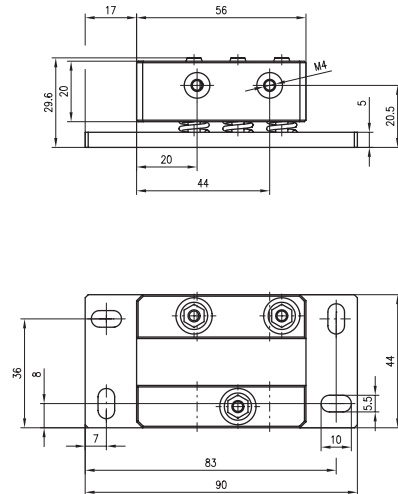
- A Mount
- B Joint
- C Clamp
- D Rod
- E Sensor

UMS 8.2-D...



- A Mount
- B Joint
- C Clamp
- D Rod
- E Sensor

BT 8-ARH



Mounting systems

UMS 8-D10 (Ø10mm, Part No. 500 35020)
 UMS 8-D12 (Ø12mm, Part No. 500 35021)
 UMS 8-D14 (Ø14mm, Part No. 500 35022)



UMS 8.1-D10 (Ø10mm, Part No. 500 35023)
 UMS 8.1-D12 (Ø12mm, Part No. 500 35024)
 UMS 8.1-D14 (Ø14mm, Part No. 500 35025)



UMS 8.2-D10 (Ø10mm, Part No. 500 35026)
 UMS 8.2-D12 (Ø12mm, Part No. 500 35027)
 UMS 8.2-D14 (Ø14mm, Part No. 500 35028)



BT 8-ARH (Part No. 500 35030)





8 Series

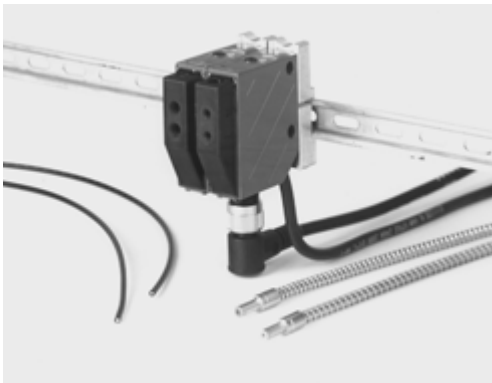
Accessories

Mounting systems

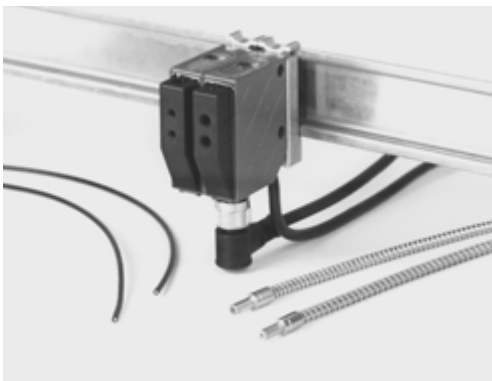
BT 8-D10 (Ø10mm, Part No. 500 35017)
BT 8-D12 (Ø12mm, Part No. 500 35018)
BT 8-D14 (Ø14mm, Part No. 500 35019)



BT 8-C15 (Part No. 500 35016)

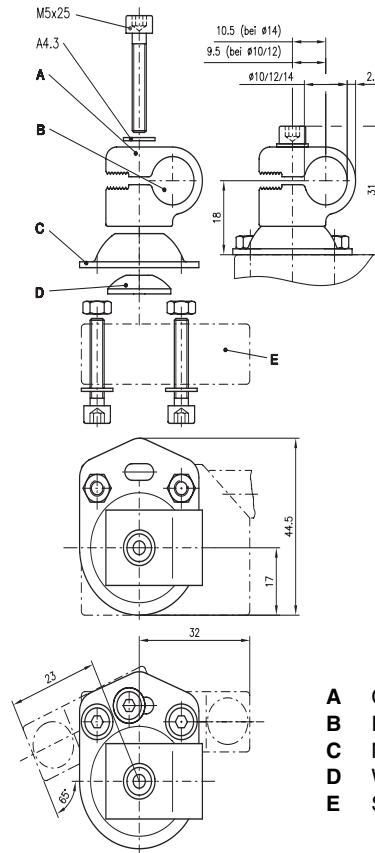


BT 8-C35x7.5 (Part No. 500 35015)



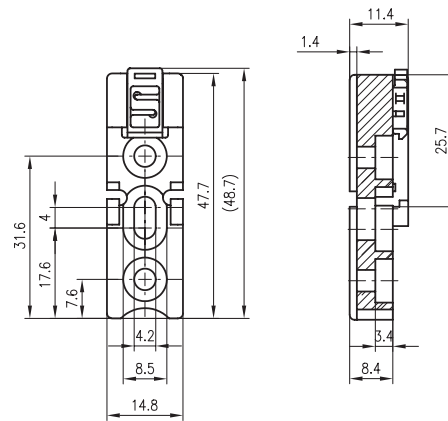
Dimensioned drawings

BT 8-D...

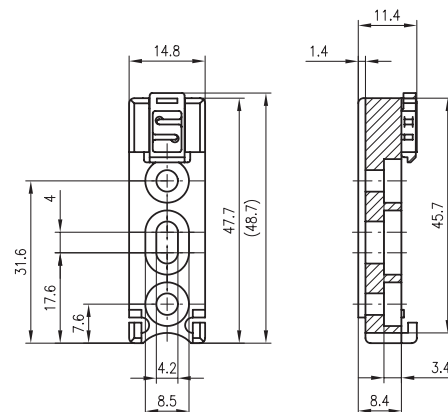


- A** Clamp
- B** Rod diameter
- C** Mounting plate
- D** Washer
- E** Sensor

BT 8-C15



BT 8-C35x7,5





Specifications

Optical data

Light source	Laser diode 650nm
Scanning rate	600 scans/s
Resolution	m = 0.150mm ... 0.5mm / 6mil ... 20mil
Beam deflection	by means of rotating polygon mirror wheel
Beam exit	at front, alternatively on the side with deflection mirror (105°)
Reading distance	see reading fields
Laser class	2 acc. to EN 60825-1 (2003/10), Class 2 acc. to 21 CFR 1040.10 Notice No. 50, July 25, 2001
Code types	2/5 Interleaved, Code 39, Code 128, EAN 128, EAN/UPC, EAN Addendum, Codabar, Pharma Code, Code 93
Software features	selectable output format, autoConfig, reference code comparison, multiple read, real time decoding, adjustment mode, control of switching input or switching output, etc.

Electrical data

Interface type	RS 232
Service interface	RS 232 with fixed data format
	9600Bd, 8 data bits, no parity, 1 stop bit
	STX "Data", CR, LF
Baud rate	4800 ... 57600Bd
Data formats	data bits: 7, 8
	parity: None, Even, Odd
	stop bits: 1, 2
Protocols	framing protocol with/without handshake
	software handshake X ON / X OFF
Ports	1 switching input 5VDC or 1 switching output 5 ... 30V, 20mA
LEDs	1 device status, 1 read status
Operating voltage	4.9 ... 5.4VDC, low voltage acc. to IEC 742
Current consumption	max. 250mA (2W power supply unit recommended)

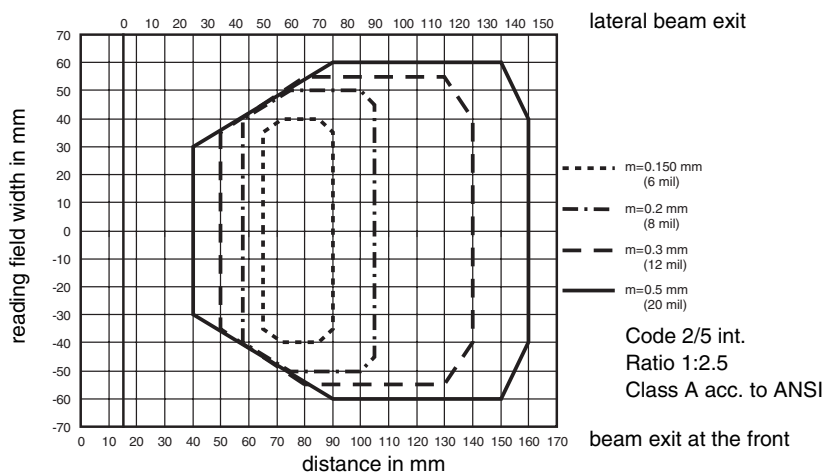
Mechanical data

Protection class	IP 67
Connection type	M12 connector, 5-pin, turning or fixed cable, 2m long, 5 x 0.25mm ²
Weight	70g
Dimensions (H x W x D)	beam exit at front: 48x40.3x15mm beam exit on the side: 48x58x17.4mm
Housing	metal (diecast zinc)

Environmental data

Ambient temp. (operation/storage)	0°C ... +40°C/-20°C ... +60°C
Air humidity	max. 90% rel. humidity, non-condensing
Vibration	IEC 60068-2-6, test FC
Shock	IEC 60068-2-27, test Ea
Electromagnetic compatibility	EN 61326-1, IEC 6100-4-2, -3, -4 and -6,

Reading curves



Order guide

Single line scanner with beam exit at the front

with M12 connector
with 2m cable

Single line scanner with lateral beam exit

with M12 connector
with 2m cable

Designation	Part No.
BCL 8 SM 102	500 38949
BCL 8 SM 552	500 38948
BCL 8 SM 100	500 40229
BCL 8 SM 550	500 40230

Tables

Status LED

Colour	Meaning
Green flashing	initialisation phase
Green continuous	Ready to operate
Red flashing (200ms)	warning
Red continuous	error, no function
Orange flashing (200ms)	service operation

Decode LED

Colour	Meaning
Orange continuous	reading gate active
Green (200ms)	reading successful
Red (200ms)	no reading result

Remarks

LASERSTRAHLUNG
NICHT IN DEN STRAHL BLICKEN
Max. Leistung: 1,3mW
Impulsdauer: 420µs
Wellenlänge: 650nm
LASER KLASSE 2
DIN EN60825-1:2003-10

LASER LIGHT
DO NOT STARE INTO BEAM
Maximum Output: 1.3mW
Pulse duration: 420µs
Wavelength: 650nm
CLASS 2 LASER PRODUCT
EN60825-1:2003-10

LASER LIGHT
DO NOT STARE INTO BEAM
Maximum Output: 1.3mW
Pulse duration: 420µs
Wavelength: 650nm
CLASS 2 LASER PRODUCT
IEC 60825-1:1993+A2:2001
Complies with 21 CFR 1040.10

RAYONNEMENT
NE PAS REGARDER DANS LE FAISCEAU
Puissance max.: 1.3mW
Durée d'impulse: 420µs
Longueur d'onde émise: 650nm
APPAREIL A LASER DE CLASSE 2
EN60825-1:2003-10

AVOID EXPOSURE - LASER LIGHT IS EMITTED FROM THIS APERTURE





MA 8

Connector unit for BCL 8

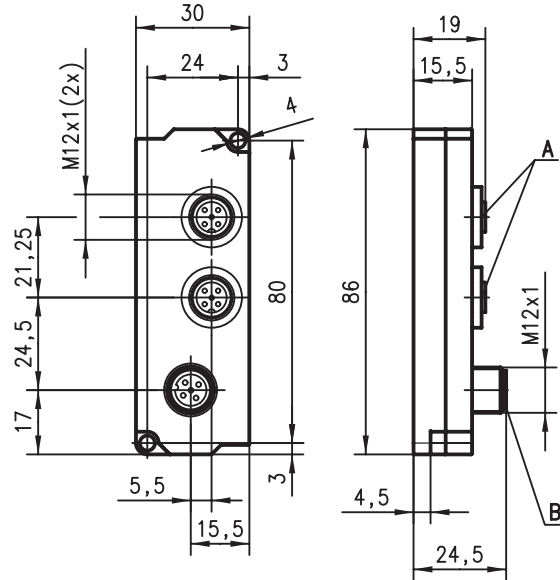


10 - 30 V
DC



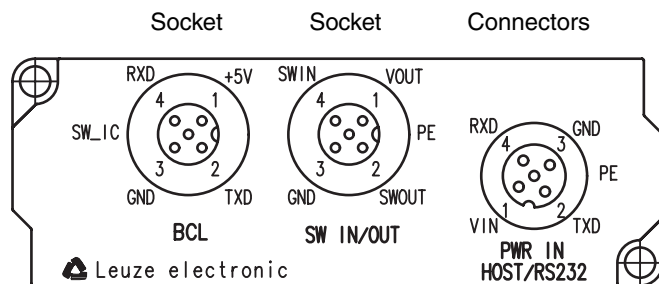
- Connector unit for easy connection of the BCL 8
- M12 connector
- Operating temperature 0°C ... +50°C

Dimensioned drawing



- A 5-pin socket
- B 5-pin plug

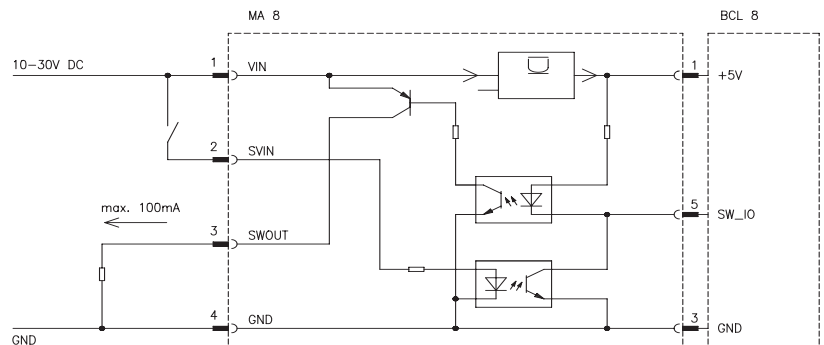
Electrical connection



Accessories:

(available separately)

- Cable KB 008 ... for the connection of the connector unit to the BCL 8 also provides connections for RS 232, Power, and I/O, see separate data sheet



We reserve the right to make changes * ma8_e.fm



Specifications

Electrical data

Operating voltage U_B	10 ... 30VDC
Power consumption	max. 0.5W

Mechanical data

Housing	plastic
Dimensions	86x30x25mm ³ (WxHxD)
Weight	70g
Connection type	M12 connector

Environmental data

Ambient temp. (operation/storage)	0°C ... +50°C/-30°C ... +80°C
Protection class	IP 67
Standards applied	acc. to IEC 801
Air humidity	max. 90% rel. humidity, non-condensing

Connector pin assignment

Plug PWR IN-HOST/RS232

Pin No.	In-/output (MA perspective)	Signal	
1	E	Supply voltage	10 ... 30VDC
2	A	RS 232/TxD	Data from the BCL 8 to the host
3	E	Ground	
4	E	RS 232/RxD	Data from the host to the BCL 8
5	E	PE	Protective Earth

Socket SW IN/OUT

Pin No.	In-/output (MA perspective)	Signal	
1	A	Sensor/actuator supply voltage	10 ... 30VDC, coupled to supply voltage on the system
2	A	SWOUT	Switching output
3	A	Ground	
4	E	SWIN	Switching input
5	A	PE	Protective Earth

Socket BCL

Pin No.	In-/output (MA perspective)	Signal	
1	A	BCL supply voltage	5.2 ... 5.6VDC
2	E	RS 232/TxD	Data from the BCL 8 to the host
3	A	Ground	
4	A	RS 232/RxD	Data from the host to the BCL 8
5	I/O	SWIN/SWOUT	Programmable switching input/output of the BCL 8

Order guide

	Type	Part No.
Connector unit for BCL 8	MA 8	500 40091



BCL 8

Mounting systems

Mounting systems

UMS 8-D10 (Ø10mm, Part No. 500 35020)
UMS 8-D12 (Ø12mm, Part No. 500 35021)
UMS 8-D14 (Ø14mm, Part No. 500 35022)



UMS 8.1-D10 (Ø10mm, Part No. 500 35023)
UMS 8.1-D12 (Ø12mm, Part No. 500 35024)
UMS 8.1-D14 (Ø14mm, Part No. 500 35025)

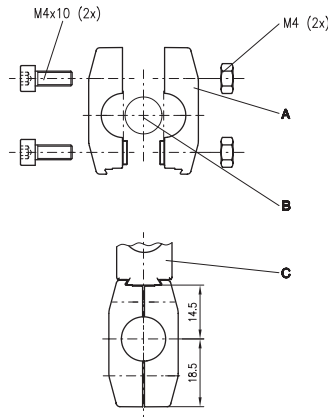


UMS 8.2-D10 (Ø10mm, Part No. 500 35026)
UMS 8.2-D12 (Ø12mm, Part No. 500 35027)
UMS 8.2-D14 (Ø14mm, Part No. 500 35028)



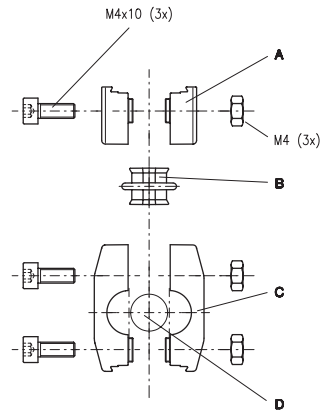
Dimensioned drawings

UMS 8-D...



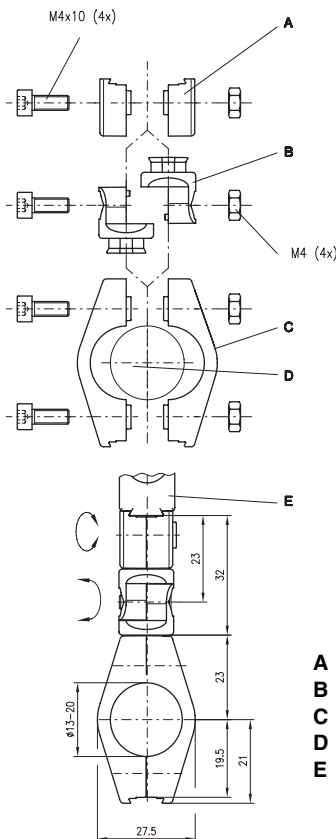
- A Clamp
- B Rod
- C Sensor

UMS 8.1-D...



- A Mount
- B Joint
- C Clamp
- D Rod
- E Sensor

UMS 8.2-D...



- A Mount
- B Joint
- C Clamp
- D Rod
- E Sensor

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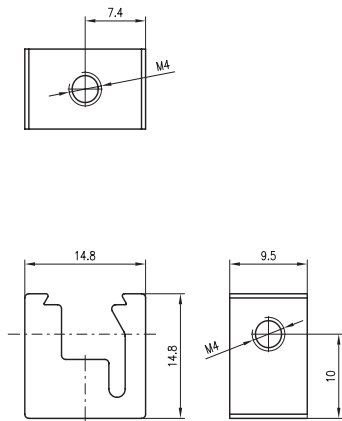


Mounting systems

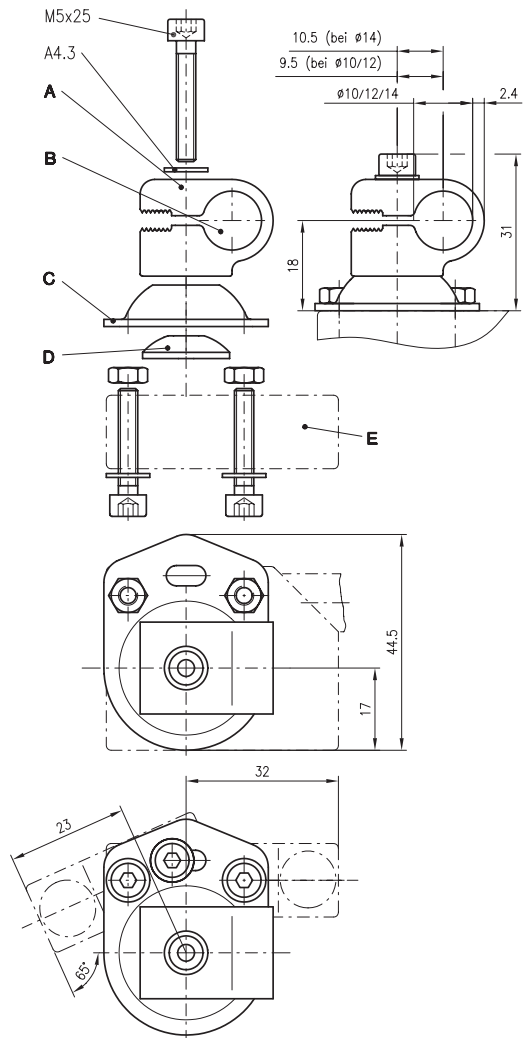
BCL 8

Dimensioned drawings

BT 8-0



BT 8-D ...



- A Clamp
- B Rod diameter
- C Mounting plate
- D Washer
- E Sensor

Mounting systems

BT 8-0 (Part No. 500 36196)



BT 8-D10 (Ø10mm, Part No. 500 35017)
 BT 8-D12 (Ø12mm, Part No. 500 35018)
 BT 8-D14 (Ø14mm, Part No. 500 35019)





BCL 8

Connectors, plugs, cables

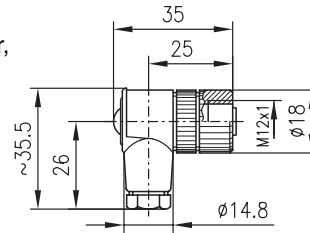
Connectors

KD 095-5 (Part No. 500 20502)



Dimensioned drawings

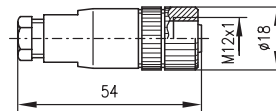
KD 095-5
Female angled connector,
plastic locking system



KD 095-5A (Part No. 500 20501)



KD 095-5A
Female cable connector,
plastic locking system



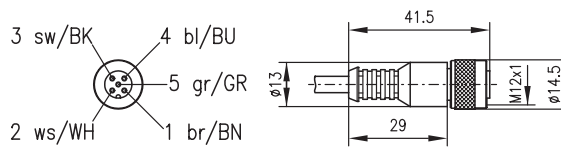
Connection cable

KB 008-3000A (Part No. 500 40757)



KB 008-3000A

Connection cable BCL 8 and MA 8, M12, 5-pin with one axial socket, 3m long, PUR cable, UL, 5x0.25mm²

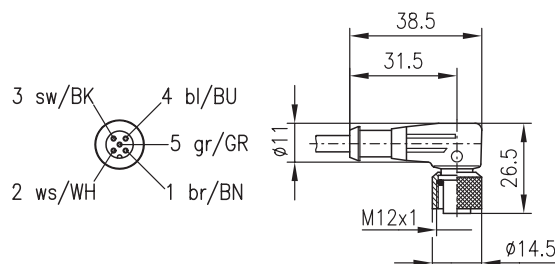


KB 008-3000R (Part No. 500 40756)



KB 008-3000R

Connection cable BCL 8 and MA 8, M12, 5-pin with one angled socket, 3m long, PUR cable, UL, 5x0.25mm²



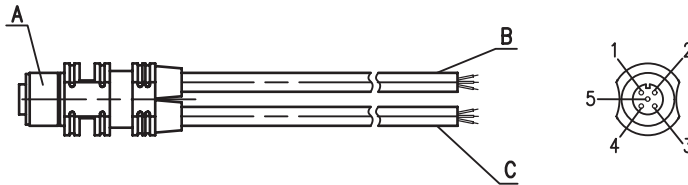
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Connectors, plugs, cables

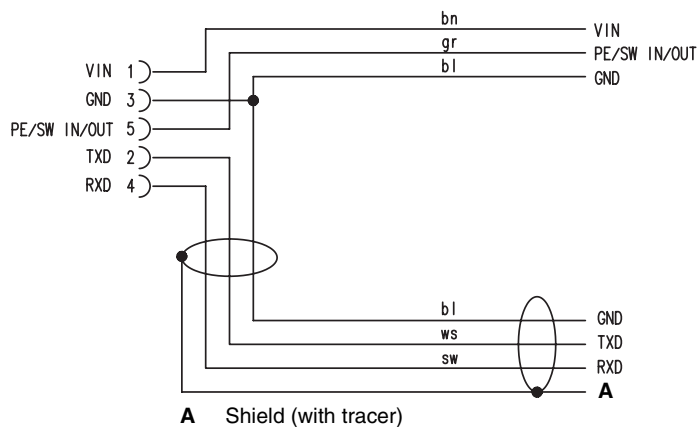
BCL 8

Connection drawing

KB 008-3000-YB



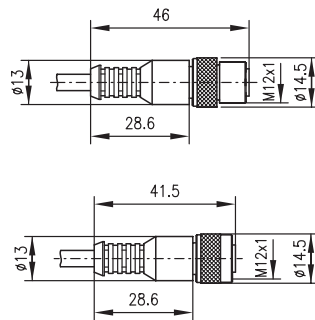
- A** Coupler plug and socket connection M12 x 1, 5-pin
- B** Line, 3-wire, flexcord (PVC) P000, 3x0.34mm²
- C** Line, 3-wire shielded, flexcord (PVC) P000, 3x0.34mm²



Dimensioned drawings

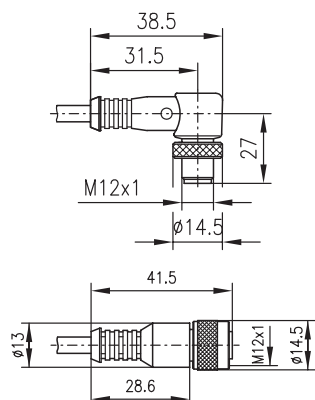
KB 008-x000AA

Connection cable BCL 8 to MA 8, M12, 5-pin with one axial socket and one axial plug, 3m long, PUR cable, UL, 5x0.25mm²



KB 008-x000AR

Connection cable BCL 8 to MA 8, M12, 5-pin with one axial socket and one angled plug, 3m long, PUR cable, UL, 5x0.25mm²



Y connection cable

KB 008-3000-YB (Part No. 500 40579) 3m long



Connection cable

KB 008-1000AA (Part No. 500 40763) 1 m long
 KB 008-2000AA (Part No. 500 40762) 2 m long
 KB 008-3000AA (Part No. 500 40761) 3 m long



KB 008-1000AR (Part No. 500 40760) 1 m long
 KB 008-2000AR (Part No. 500 40759) 2 m long
 KB 008-3000AR (Part No. 500 40758) 3 m long





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