

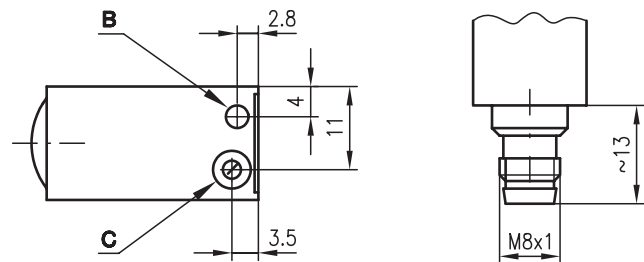
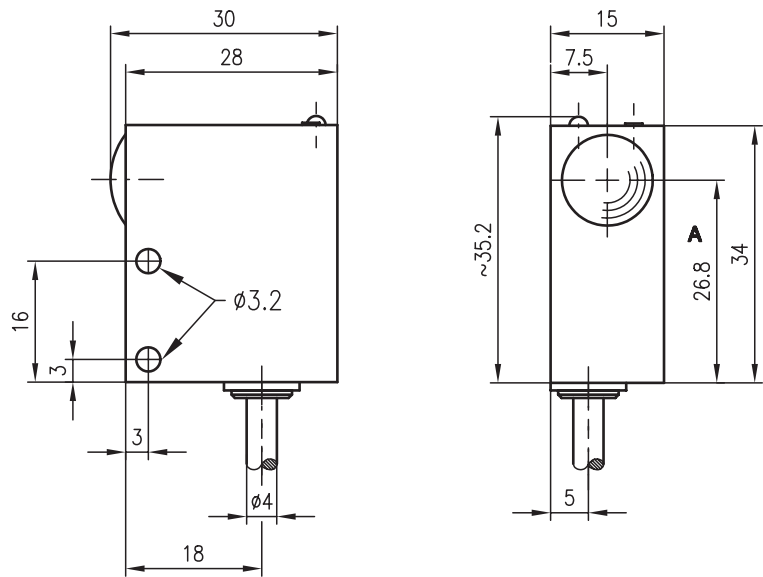


## LSR 713

## Throughbeam photoelectric sensors



### Dimensioned drawing



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

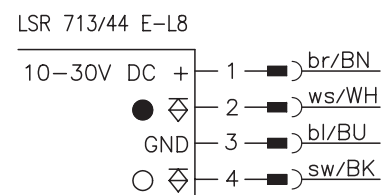
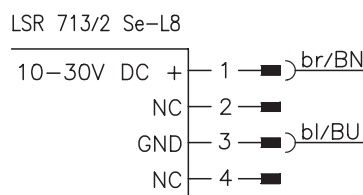
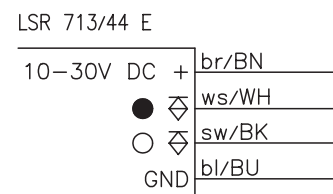
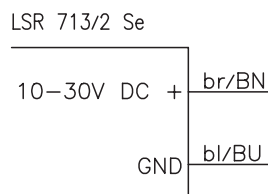


0 ... 9m



- Throughbeam photoelectric sensor with high performance reserve in red light
- High switching frequency of 5 kHz
- Slow operation

### Electrical connection



### Accessories:

(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- Diaphragm BL 713
- M8 connectors (KD ...)
- Ready-made cables (KB ...)

We reserve the right to make changes • 713\_a01e.fm



## Specifications

### Optical data

Typ. operating range limit <sup>1)</sup>	0 ... 9m
Operating range <sup>2)</sup>	see tables
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

### Timing

Switching frequency	1 kHz
Switching frequency limit <sup>3)</sup>	5 kHz
Response time	0.5 ms
Response time limit <sup>3)</sup>	0.1 ms
Delay before start-up	≤ 100 ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 30mA
Switching output	2 PNP transistor outputs, complementary
Function characteristics	light/dark switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 200mA
Sensitivity	adjustable with 270° potentiometer
Slow operation (see order guide)	pin 4: 100ms (light switching)

### Indicators

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

### Mechanical data

Housing	metal
Optics	glass
Weight	100g
Connection type	M8 connector (4-pin) or cable: 2000mm, 2x0.14mm <sup>2</sup> for transmitter; 2000mm, 4x0.14mm <sup>2</sup> for receiver

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +60°C / -40°C ... +70°C
Protective circuit <sup>4)</sup>	1, 2, 3
VDE safety class	III
Protection class	IP 67
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. operating range limit: max. attainable range without performance reserve
- 2) Operating range: recommended range with performance reserve
- 3) Maximum switching frequency/minimum response time with sensitivity adaptation
- 4) 1=transient protection, 2=polarity reversal protection, 3=short-circuit protection for all outputs

## Order guide

Selection table		Order code →					
Equipment ↓		LSR 713/44 Part No. 500 25818 (Tr) Part No. 500 25819 (Re)	LSR 713/44 L8 Part No. 500 80315 (Tr) Part No. 500 80316 (Re)	LSR 713/44 L8.3 Part No. 500 80315 (Tr) Part No. 500 35150 (Re)			
Light spot	divergent	●	●	●			
LED	on top	●	●	●			
Connection	cable	●					
	M8 connector		●	●			
Features	collimator short range						
	collimator distant range						
	slow operation			●			

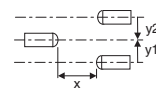
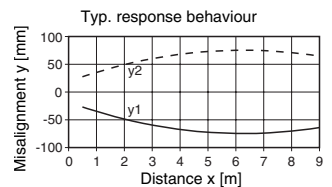
## Tables

1	0	7	9
2	0	1.1	1.4

1	w/o diaphragm
2	With BL 713 at receiver

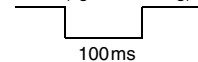
□	Operating range [m]
■	Typ. operating range limit [m]

## Diagrams



## Remarks

- Pulse stretching for: LSR713/44 E-L8.3
- Pin 4 (light switching)





## LSRL 713

## Laser throughbeam photoelectric sensors

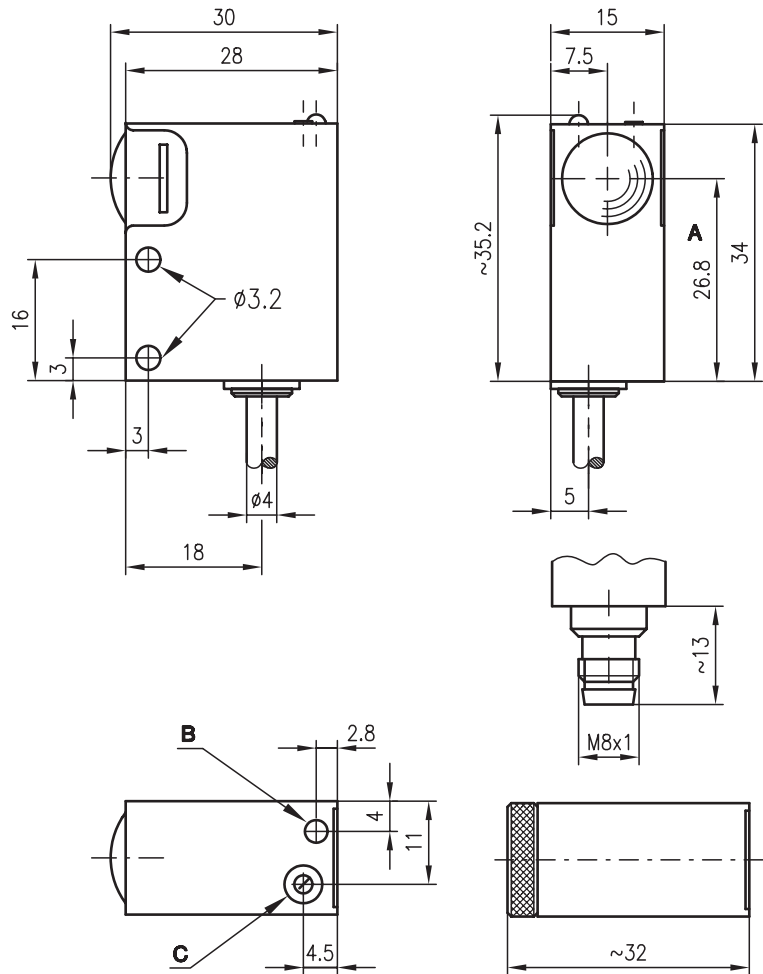


0 ... 65m



- Throughbeam photoelectric laser sensor with high performance reserve in red light
- Adjustable laser collimator for adaptation of the light beam to the application
- Detection of small objects or gaps
- High switching frequency of 5 kHz
- Activation input for interlinking a number of sensors or standby of the laser system

### Dimensioned drawing

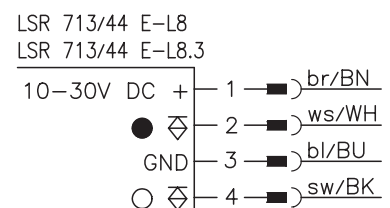
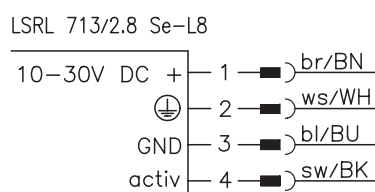
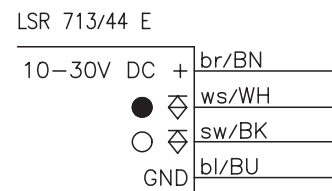
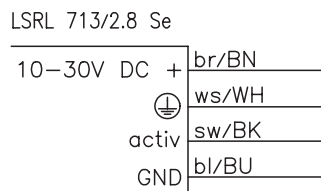


LSR 713/44 E

LSRL 713/2.8 Se

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

### Electrical connection



### Accessories:

(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- Diaphragm BL 713
- M8 connectors (KD ...)
- Ready-made cables (KB ...)

We reserve the right to make changes • 713\_a02e.fm



### Specifications

#### Optical data

Typ. operating range limit <sup>1)</sup>	0 ... 65m
Operating range <sup>2)</sup>	see tables
Adjustment range	focussing adjustable in the range of 200mm ... 50m
Light source	laser/pulsed (modulated light)
Wavelength	670nm (visible red light)
Laser warning notice	see remarks

#### Timing

Switching frequency	1 kHz
Switching frequency limit <sup>3)</sup>	5 kHz
Response time	0.5 ms
Response time limit <sup>3)</sup>	0.1 ms
Delay before start-up	≤ 100 ms

#### Electrical data

Operating voltage U <sub>B</sub>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U <sub>B</sub>
Bias current	≤ 50mA
Switching output	2 PNP transistor outputs, complementary
Function characteristics	light/dark switching
Signal voltage high/low	≥ (U <sub>B</sub> -2V)/≤ 2V
Output current	max. 200mA
Sensitivity	adjustable with 270° potentiometer

#### Indicators

LED yellow	light path free
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#### Mechanical data

Housing	metal
Optics	glass
Weight	100g
Connection type	M8 connector (4-pin) or cable: 2000mm, 3x0.14mm <sup>2</sup> for transmitter; 2000mm, 4x0.14mm <sup>2</sup> for receiver

#### Environmental data

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

#### Options

Activation input activ	
Transmitter active/not active	≥ 8V/≤ 2V
Activation/disable delay	≤ 0.5ms
Input resistance	10KΩ ± 10%

- 1) Typ. operating range limit: max. attainable range without performance reserve
- 2) Operating range: recommended range with performance reserve
- 3) Maximum switching frequency/minimum response time with sensitivity adaptation
- 4) 1=transient protection, 2=polarity reversal protection, 3=short-circuit protection for all outputs

### Order guide

Selection table		Order code →					
Equipment ↓		LSRL 713/44.8 Part No. 500 27053 (Tr) Part No. 500 25819 (Re)	LSRL 713/44.8 L8 Part No. 500 80317 (Tr) Part No. 500 80316 (Re)	LSRL 713/44.8 L8.3 Part No. 500 80317 (Tr) Part No. 500 35150 (Re)			
Light source	laser	●	●	●			
Light spot	adjustable	●	●	●			
LED	on top	●	●	●			
Connection	cable	●					
	M8 connector		●	●			
Features	collimator short range						
	collimator distant range	●	●	●			
	slow operation			●			

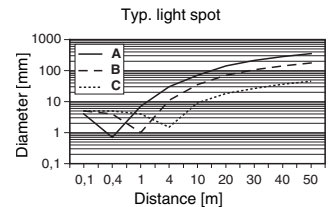
### Tables

1	0	50	65
2	0	18	22

1	w/o diaphragm
2	With BL 713 at receiver

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

### Diagrams



- A focus = 0.4m
- B focus = 1m
- C focus = 4m

### Remarks

- Functional earth must be connected.
- Pulse stretching for: LSR713/44 E-L8.3  
Pin 4 (light switching)  
  
100ms
- Laser notices

LASER LIGHT  
DO NOT STARE INTO BEAM

Maximum Output:	1.2mW
Pulse duration:	12µs
Wavelength:	670nm

CLASS 2 LASER PRODUCT  
EN60825-1:2003-10

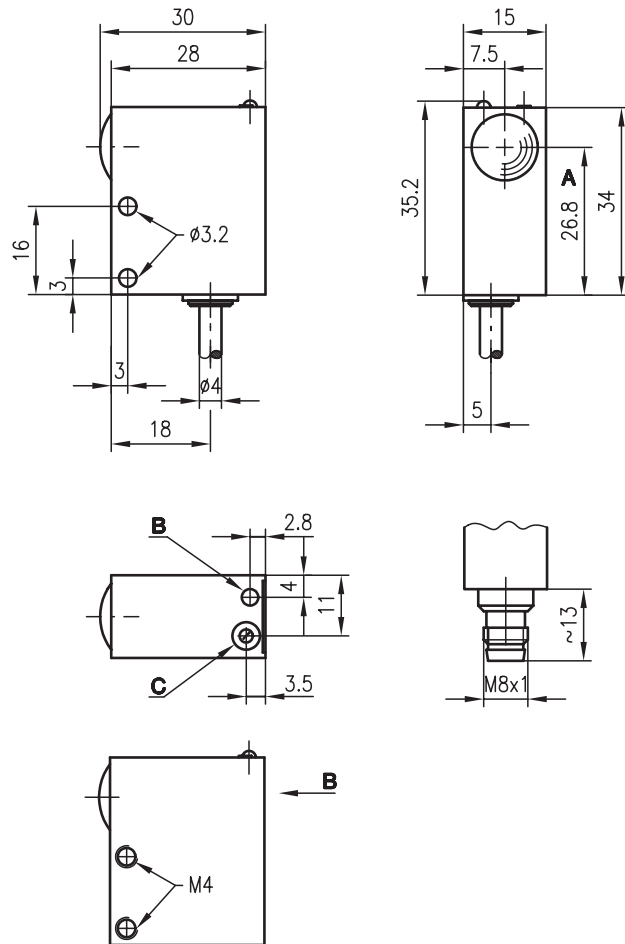


## PRK 713

## Retro-reflective photoelectric sensors with polarisation filter



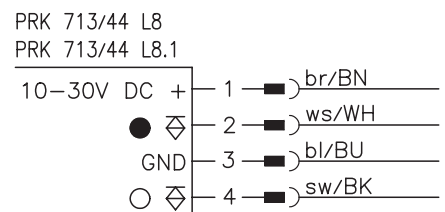
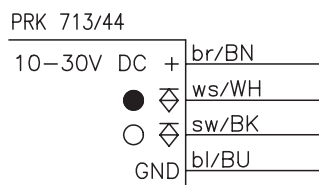
### Dimensioned drawing



PRK 713/xx L8.1

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

### Electrical connection



0 ... 5m



- Retro-reflective photoelectric sensors using visible red light
- High switching frequency of 2.5kHz for detection of fast events
- Sensitivity adjustment



### Accessories:

(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- M8 connectors (KD ...)
- Ready-made cables (KB ...)
- Reflectors
- Reflective tapes

We reserve the right to make changes • 713\_b01e.fm



### Specifications

#### Optical data

Typ. operating range limit (TK(S) 100x100) <sup>1)</sup> 0 ... 5m  
 Operating range <sup>2)</sup> see tables  
 Light source LED (modulated light)  
 Wavelength 660nm (visible red light)

#### Timing

Switching frequency 2.5kHz  
 Response time 0.2ms  
 Delay before start-up ≤ 100ms

#### Electrical data

Operating voltage  $U_B$  10 ... 30VDC (incl. residual ripple)  
 Residual ripple ≤ 15% of  $U_B$   
 Bias current ≤ 30mA  
 Switching output 2 PNP transistor outputs, complementary  
 Function characteristics light/dark switching  
 Signal voltage high/low ≥ ( $U_B$ -2V) ≤ 2V  
 Output current max. 200mA  
 Sensitivity see order guide

#### Indicators

LED yellow light path free

#### Mechanical data

Housing metal  
 Optics glass  
 Weight 100g  
 Connection type M8 connector (4-pin)  
 cable 2000mm, 4x0.14mm<sup>2</sup>

#### Environmental data

Ambient temp. (operation/storage) -20°C ... +60°C/-40°C ... +80°C  
 Protective circuit <sup>3)</sup> 1, 2, 3, 4  
 VDE safety class III  
 Protection class IP 67  
 LED class 1 (acc. to EN 60825-1)  
 Standards applied IEC 60947-5-2

1) Typ. operating range limit: max. attainable range without performance reserve  
 2) Operating range: recommended range with performance reserve  
 3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking

### Tables

Reflectors			Operating range
1	TK(S)	100x100	0 ... 4.0m
2	TK(S)	47x47	0 ... 3.5m
3	TK(S)	30x50	0 ... 1.7m
4	TK(S)	20x40	0 ... 1.5m
5	Tape 2	100x100	0 ... 0.7m

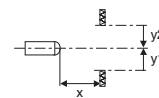
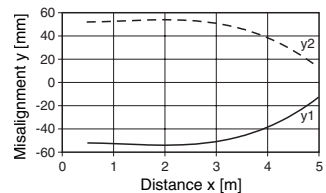
1	0.01		4	5
2	0.01		3.5	4
3	0.01	1.7	2.2	
4	0.01	1.5	2	
5	0.01	0.7	1	

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

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

### Diagrams

Typ. response behaviour (TK 100x100)



### Order guide

Selection table		Order code →							
Equipment ↓		PRK 713/44 Part No. 500 25820	PRK 713/44 L8 Part No. 500 80320	PRK 713/44 L8.1 Part No. 500 80691					
Light spot	divergent	●	●	●					
	focussed								
LED	on top	●	●						
	at the back			●					
Connection	cable	●							
	M8 connector		●	●					
Features	shiny reflection			●					
	polarisation	●	●	●					
	sensitivity adjustment	●	●						

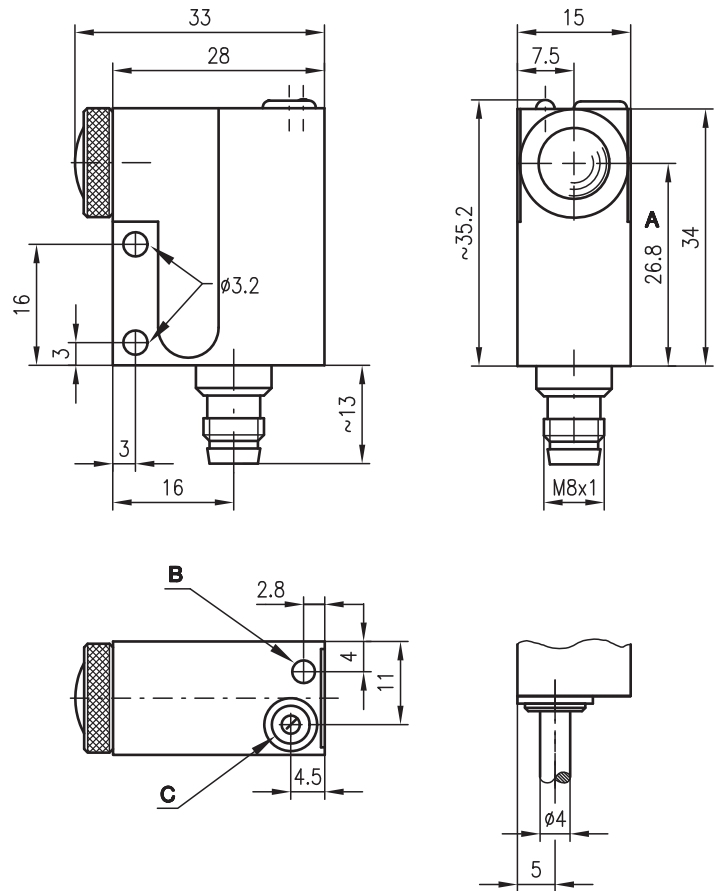
### Remarks



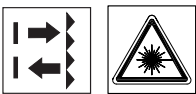
# PRKL 713 Laser retro-reflective photoelectric sensors with polarisation filter



## Dimensioned drawing



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

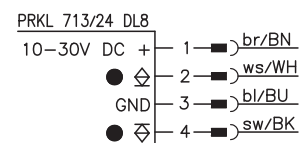
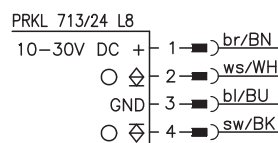
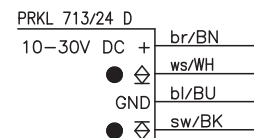
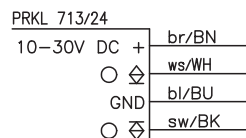
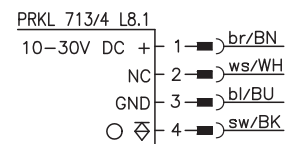
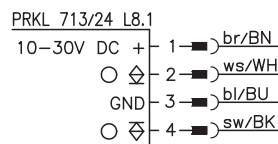


0 ... 17m  
0 ... 4.5m



- Laser retro-reflective photoelectric sensor
- Adjustable laser collimator for adaptation of the light beam (focus) to the application
- Detection of smallest objects or gaps
- High switching frequency of 5 kHz

## Electrical connection



## Accessories:

(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- M8 connectors (KD ...)
- Ready-made cables (KB ...)
- Reflectors
- Reflective tapes

We reserve the right to make changes • 713\_b02e.fm



### Specifications

#### Optical data

Typ. operating range limit (MTK(S) 50x50) <sup>1)</sup> 0 ... 17m (distant focus) 0 ... 4.5m (close focus)  
 Operating range <sup>2)</sup> see tables  
 Light spot diameter < 1mm adjustable via collimator (see diagrams)  
 Light source laser (modulated light)  
 Wavelength 670nm (visible red light, polarised)  
 Laser warning notice see remarks

#### Timing

Switching frequency 5kHz  
 Response time 0.1ms  
 Delay before start-up ≤ 100ms

#### Electrical data

Operating voltage U<sub>B</sub> 10 ... 30VDC (incl. residual ripple)  
 Residual ripple ≤ 15% of U<sub>B</sub>  
 Bias current ≤ 16mA  
 Switching output PNP and NPN transistor output  
 Function characteristics light/dark switching  
 Signal voltage high/low ≥ (U<sub>B</sub>-2V) ≤ 2V  
 Output current max. 200mA  
 Sensitivity adjustable with 270° potentiometer

#### Indicators

LED yellow light path free

#### Mechanical data

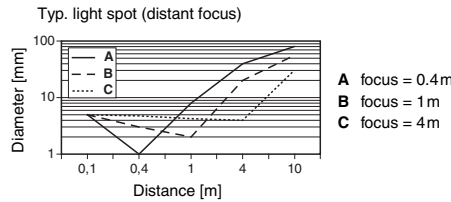
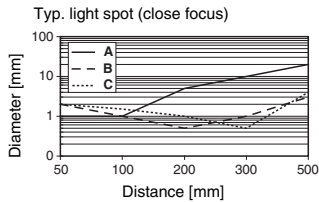
Housing metal  
 Optics glass  
 Weight 100g  
 Connection type M8 connector (4-pin)  
 cable 2000mm, 4x0.14mm<sup>2</sup>

#### Environmental data

Ambient temp. (operation/storage) -20°C ... +40°C/-40°C ... +80°C  
 Protective circuit <sup>3)</sup> 1, 2, 3  
 VDE safety class III  
 Protection class IP 67  
 Laser class 2 (acc. to EN 60825-1)  
 Standards applied IEC 60947-5-2

- 1) Typ. operating range limit: max. attainable range without performance reserve
- 2) Operating range: recommended range with performance reserve
- 3) 1=transient protection, 2=polarity reversal protection, 3=short-circuit protection for all outputs

### Diagrams



### Order guide

Selection table		PRKL 713/24 L8 Part No. 500 37120	PRKL 713/24 DL8 Part No. 500 37118	PRKL 713/24 Part No. 500 37119	PRKL 713/24 D Part No. 500 36954	PRKL 713/24 L8.1 Part No. 500 38541	PRKL 713/4 L8.1 Part No. 500 41352
	Order code →						
	Equipment ↓						
Light source	laser	●	●	●	●	●	●
Light spot	adjustable	●	●	●	●	●	●
LED	on top	●	●	●	●	●	●
Connection	cable			●	●		
	M8 connector	●	●				●
Switching output	PNP	●	●	●	●	●	●
	PNP and NPN						
Function characteristics	light switching	●	●	●	●	●	●
	dark switching		●		●		
Features	short range focussing					●	●
	distant range focussing	●	●	●	●		

### Tables

distant range focussing

Reflectors	Operating range
1 TK(S) 100x100	0 ... 11m
2 MTK(S) 50x50	0 ... 13m
3 TK(S) 30x50	0 ... 5m
4 TK(S) 20x40	0 ... 5m
5 Tape 2 100x100	0 ... 1.5m

1	0	11	14
2	0	13	17
3	0	5	7
4	0	5	7
5	0	1.5	2

short range focussing

Reflectors	Operating range
1 TK(S) 100x100	0 ... 3m
2 MTK(S) 50x50	0 ... 3.5m
3 TK(S) 30x50	0 ... 1.5m
4 TK(S) 20x40	0 ... 1.5m
5 Tape 2 100x100	0 ... 0.4m

1	0	3	4
2	0	3.5	4.5
3	0	1.5	2
4	0	1.5	2
5	0	0.4	0.5

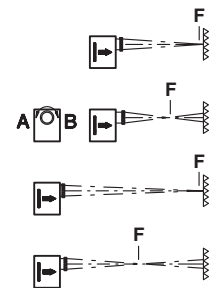
- Operating range [m] \*
- Typ. operating range limit [m] \*

\* for focus adjusted to ∞

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

### Remarks

- Use reflectors with small triple structures – MTK(S).
- A conductive connection between sensor housing and machine is to be established in order to discharge electrostatic charges.



- A close
- B distant
- F focal plane

#### ● Laser notices

LASER LIGHT  
DO NOT STARE INTO BEAM

Maximum Output: 1.2mW  
 Pulse duration: 12µs  
 Wavelength: 670nm

CLASS 2 LASER PRODUCT  
EN60825-1:2003-10

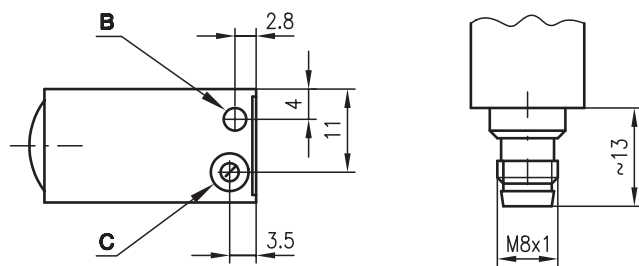
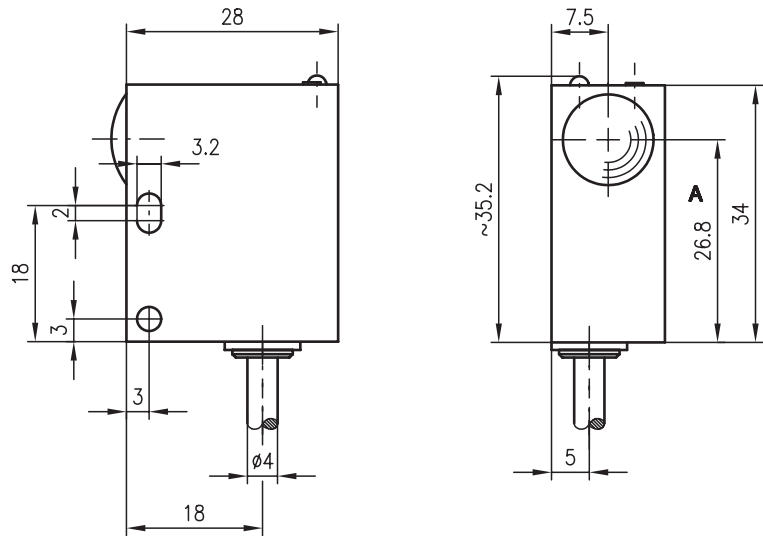


RK 713

Diffuse reflection light scanner with lustre function

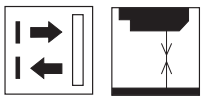


Dimensioned drawing



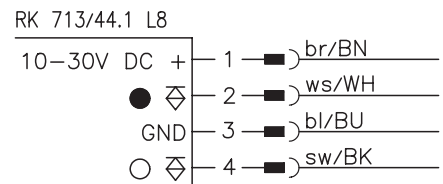
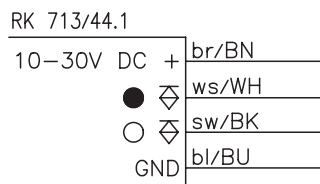
- A Optical axis
- B Indicator diode
- C Sensitivity adjustment

50 ... 150mm



- Detection of objects with metallic lustre
- Focussed light spot at 90mm scanning distance
- High switching frequency of 2.5kHz

Electrical connection

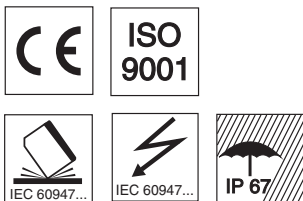


Accessories:

(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- M8 connectors (KD ...)
- Ready-made cables (KB ...)
- Reflectors
- Reflective tapes

We reserve the right to make changes • 713\_c01e.fm





### Specifications

#### Optical data

Typ. scanning range limit (for stainless steel) <sup>1)</sup> 50 ... 150mm  
 Scanning range <sup>2)</sup> 80 ... 120mm  
 Light spot diameter approx. 2mm at a distance of 90mm  
 Light source LED (modulated light)  
 Wavelength 660nm (visible red light)

#### Timing

Switching frequency 2.5kHz  
 Response time 0.2ms  
 Delay before start-up ≤ 100ms

#### Electrical data

Operating voltage U<sub>B</sub> 10 ... 30VDC (incl. residual ripple)  
 Residual ripple ≤ 15% of U<sub>B</sub>  
 Bias current ≤ 30mA  
 Switching output 2 PNP transistor outputs, complementary  
 Function characteristics light/dark switching  
 Signal voltage high/low ≥ (U<sub>B</sub>-2V) ≤ 2V  
 Output current max. 200mA  
 Sensitivity adjustable with 270° potentiometer

#### Indicators

LED yellow light path free

#### Mechanical data

Housing metal  
 Optics glass  
 Weight 100g  
 Connection type M8 connector (4-pin)  
 cable 2000mm, 4x0.14mm<sup>2</sup>

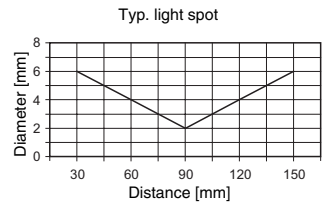
#### Environmental data

Ambient temp. (operation/storage) -20°C ... +60°C/-40°C ... +70°C  
 Protective circuit <sup>3)</sup> 1, 2, 3, 4  
 VDE safety class III  
 Protection class IP 67  
 LED class 1 (acc. to EN 60825-1)  
 Standards applied IEC 60947-5-2

1) Typ. scanning range limit: max. attainable range without performance reserve  
 2) Scanning range: recommended range with performance reserve  
 3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking

### Tables

#### Diagrams



### Order guide

Selection table		Order code →								
Equipment ↓		RK 713/44.1 Part No. 500 22813	RK 713/44.1 L8 Part No. 500 80319							
Light spot	divergent									
	focussed	●	●							
LED	on top	●	●							
	at the back									
Connection	cable	●								
	M8 connector		●							
Features	shiny reflection	●	●							
	polarisation									
	sensitivity adjustment	●	●							

### Remarks

- Light spot focussed at 90mm. Shiny surfaces (e.g. polished metal) can be used as reflective surface at distances of approx. 80mm to approx. 120mm.

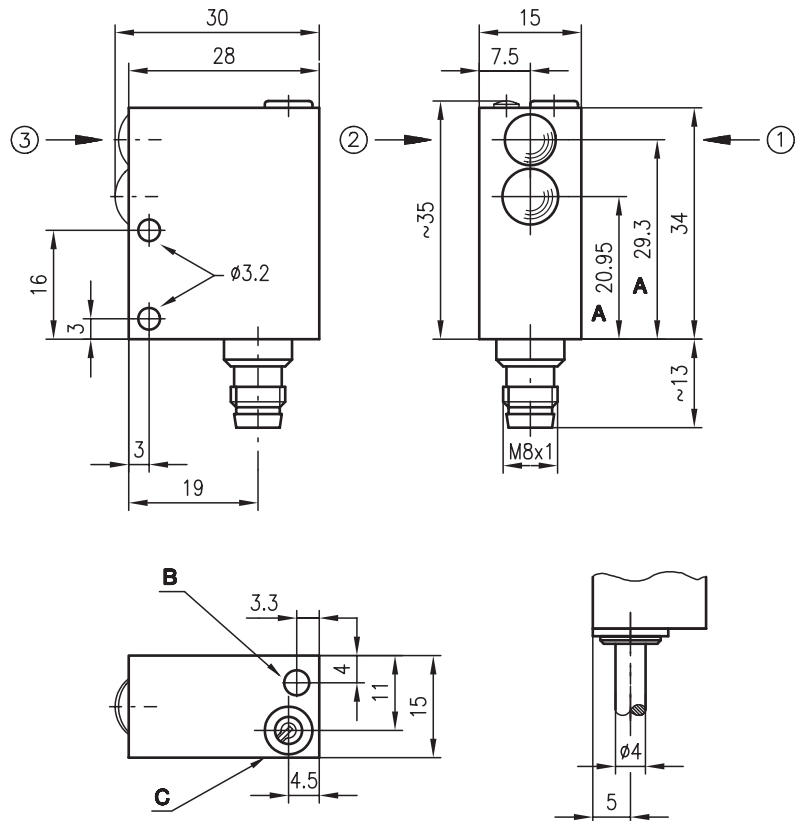


## FRKR 713

## Diffuse reflection light scanner with background suppression



### Dimensioned drawing



0 ... 120 mm

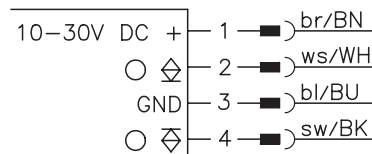


- Scanner with electrically adjustable background suppression using visible red light
- Small visible light spot for detection of small parts  $\geq 1$  mm

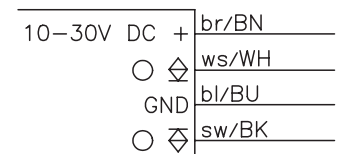
- A** Optical axis
  - B** Indicator diode
  - C** Sensitivity adjustment
- Preferred entry direction for objects ① + ② + ③

### Electrical connection

FRKR 713/24-100 L8



FRKR 713/24-100



### Accessories:

(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- M8 connectors (KD ...)
- Ready-made cables (KB ...)





### Specifications

#### Optical data

Typ. scanning range limit (white 90%) <sup>1)</sup>	0 ... 120mm
Scanning range <sup>2)</sup>	see tables
Adjustment range	25 ... 120mm
Light beam characteristic	divergent
Light source	LED (modulated light)
Wavelength	660nm (visible red light)

#### Timing

Switching frequency	1 kHz
Response time	0.5ms
Delay before start-up	≤ 100ms

#### Electrical data

Operating voltage U <sub>B</sub>	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U <sub>B</sub>
Bias current	≤ 30mA
Switching output	PNP and NPN transistor output
Function characteristics	light switching
Signal voltage high/low	≥ (U <sub>B</sub> -2V)/≤ 2V
Output current	max. 200mA
Scanning range adjustment	adjustable with 270° potentiometer

#### Indicators

LED yellow	reflection
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#### Mechanical data

Housing	metal
Optics	glass
Weight	100g
Connection type	M8 connector (4-pin) cable 2000mm, 4x0.14mm <sup>2</sup>

#### Environmental data

Ambient temp. (operation/storage)	-20°C ... +60°C/-40°C ... +80°C
Protective circuit <sup>3)</sup>	1, 2, 3, 4
VDE safety class	III
Protection class	IP 67
LED class	1 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. scanning range limit: max. attainable range without performance reserve
- 2) Scanning range: recommended range with performance reserve
- 3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking

### Order guide

Selection table		Order code →					
<b>Equipment ↓</b>		<b>FRKR 713/24-100</b> Part No. 500 38475	<b>FRKR 713/24-100 L8</b> Part No. 500 38476				
Light source	red light	●	●				
Light spot	divergent						
	adjustable						
	focussed	●	●				
LED	on top	●	●				
Connection	cable	●					
	M8 connector		●				
Features	electrical background suppression	●	●				

### Tables

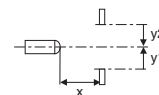
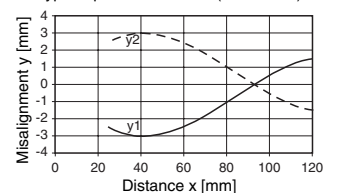
1	25	100	120
2	25	95	110
3	25	85	95

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

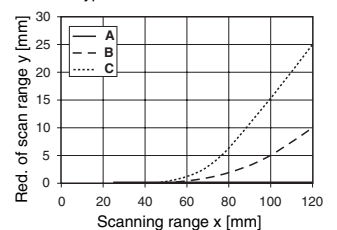
Scanning range [mm]  
 Typ. scanning range limit [mm]

### Diagrams

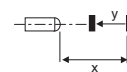
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



### Remarks

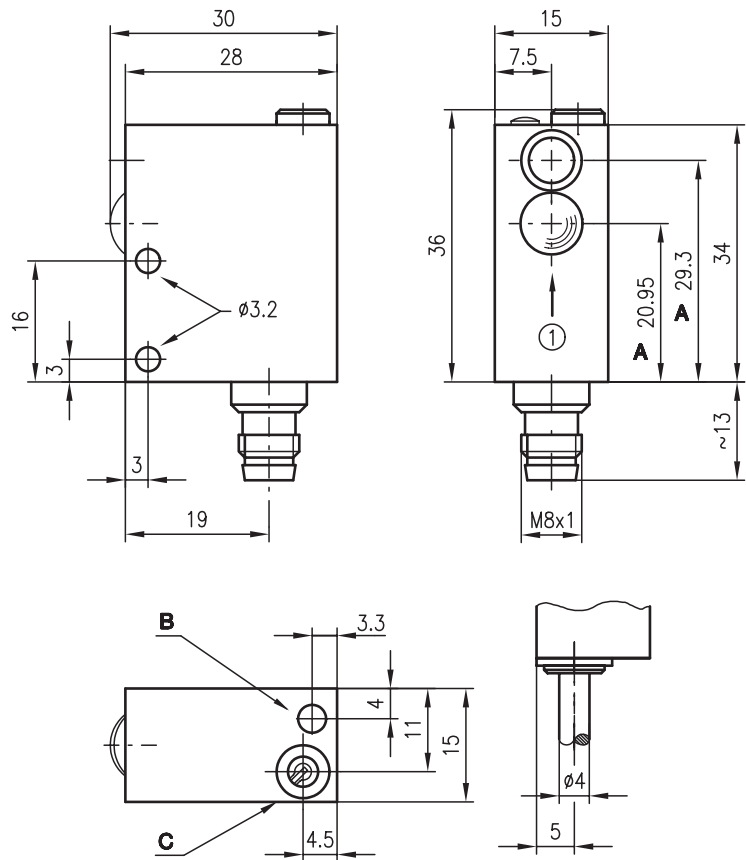
- Install sensor inclined at angle of approx. 10° if used to detect objects with shiny surfaces.



## FRKL 713 Laser diffuse reflection light scanners with background suppression



### Dimensioned drawing



0 ... 150mm



- Scanner with electrically adjustable background suppression using visible red laser light
- Reflection dependent laser power regulation for detection of metal surfaces
- Very small visible light spot for detection of small parts  $\geq 0.2\text{mm}$
- High switching frequency of 5kHz for detection of fast events

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

Scanning direction ① see remarks

### Electrical connection

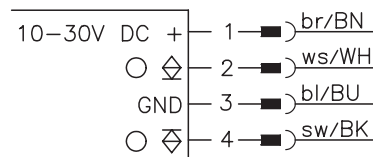


### Accessories:

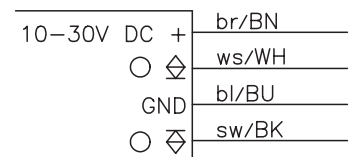
(available separately)

- Mounting system (BT 713)
- Wobble plate (SET BT 713-66 + BT 66)
- M8 connectors (KD ...)
- Ready-made cables (KB ...)

FRKL 713/24-100 L8



FRKL 713/24-100



## Specifications

### Optical data

Typ. scanning range limit (white 90%) <sup>1)</sup>	0 ... 150mm
Scanning range <sup>2)</sup>	see tables
Adjustment range	25 ... 150mm
Scanning range hysteresis	≤ 10% (relative to white 90%)
Light beam characteristic	divergent
Light source	laser (modulated light)
Wavelength	670nm (visible red light)
Laser warning notice	see remarks

### Timing

Switching frequency	5kHz
Response time	0.1ms
Delay before start-up	≤ 100ms

### Electrical data

Operating voltage $U_B$	10 ... 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of $U_B$
Bias current	≤ 25mA
Switching output	PNP and NPN transistor output
Function characteristics	light switching
Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
Output current	max. 200mA
Scanning range adjustment	adjustable with 270° potentiometer

### Indicators

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

### Mechanical data

Housing	metal
Optics	glass
Weight	100g
Connection type	M8 connector (4-pin) cable 2000mm, 4x0.14mm <sup>2</sup>

### Environmental data

Ambient temp. (operation/storage)	-20°C ... +40°C / -40°C ... +80°C
Protective circuit <sup>3)</sup>	1, 2, 3, 4
VDE safety class	III
Protection class	IP 67
Laser class	2 (acc. to EN 60825-1)
Standards applied	IEC 60947-5-2

- 1) Typ. scanning range limit: max. attainable range without performance reserve  
 2) Scanning range: recommended range with performance reserve  
 3) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs, 4=interference blanking

## Order guide

Selection table		Order code →					
<b>Equipment ↓</b>		<b>FRKL 713/24-100</b> Part No. 500 38473	<b>FRKL 713/24-100 L8</b> Part No. 500 38474				
Light source	laser	●	●				
Light spot	divergent						
	adjustable						
	focussed	●	●				
LED	on top	●	●				
Connection	cable	●					
	M8 connector		●				
Features	electrical background suppression	●	●				

## Tables

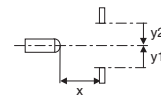
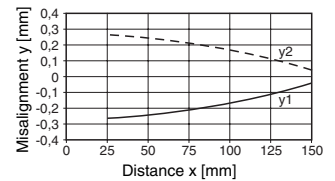
1	25	100	150
2	25	95	130
3	25	87	100

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

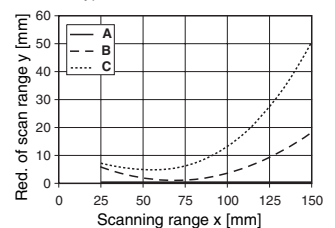
- Scanning range [m]  
 □ Typ. scanning range limit [m]

## Diagrams

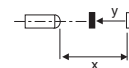
Typ. response behaviour (white 90%)



Typ. black/white behaviour



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



## Remarks

- A conductive connection between sensor housing and machine is to be established in order to discharge electrostatic charges.
- Use scanning direction ① for detection of objects ≤ 0.5mm.
- Scanning ranges ≥ 50mm require a background for detections ≤ 0.5mm.
- Install sensor inclined at angle of approx. 10° if used to detect objects with shiny surfaces.
- Laser notices

LASER LIGHT DO NOT STARE INTO BEAM	
Maximum Output:	1.2mW
Pulse duration:	12µs
Wavelength:	670nm
CLASS 2 LASER PRODUCT EN60825-1:2003-10	