

**Catalog 2011**




**Optoelectronic Sensors  
Inductive Switches**

# How to find the product you're looking for

## The series/product group overview pages ...

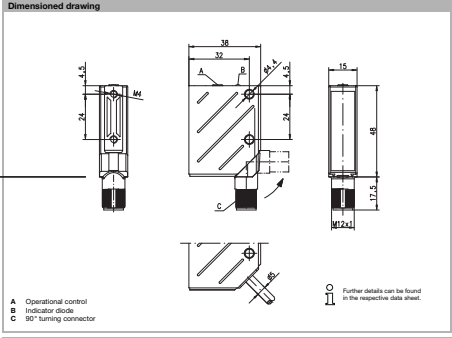
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### OVERVIEW



Mark detection    Extension control    Bar code reading

#### Dimensioned drawing



A Operational control  
B Indicator disc  
C 90° turning connector

Further details can be found in the respective data sheet.

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### 8 SERIES

Throughbeam sensors

Operating principle	Typ. operating range limits	Page
Throughbeam sensors	0 ... 200 m	62
Retro-reflective sensors	0 ... 20 m	64
Diffuse reflection scanners	5 ... 600 mm	66

**Other 8 Series products:**

Optical distance sensors	ODSL 8	236
Ultrasonic sensors	LSU 8, RLU 8, HRTU 8	300

**Common technical data**

Electrical data	Operating voltage U <sub>0</sub>	10 ... 30VDC
	Residual ripple	≤ 15% of U <sub>0</sub>
	Open-circuit current	≤ 35mA
	Signal voltage high/low	> (U <sub>0</sub> -2V)/≤ 2V
Indicators	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
Mechanical data	Housing	Metal
	Optics cover	Glass
	Weight (connector/cable)	70g/140g
Environmental data	Ambient temperature (operation)	-40°C ... +60°C
	Laser: -10°C ... +40°C	
	VDE safety class	IP 67, IP 69K
	Protection class	IP 67, IP 69K
	Standards applied	IEC 60947-5-2, UL 508

**Features**

- Metal housing
- IP 67 and IP 69K
- Active ambient light suppression AALS
- Interference-immune push-pull outputs
- Laser devices
- Expanded temperature range: -40°C to +60°C
- M12 turning connector

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564
- A/LS Page 571

Mounting systems for this series can be found from page 514 onwards

www.leuze.com/8series/

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## The product selection tables ...

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### THROUGHBEAM SENSORS

Part description	Operating range [m]	Switching	Light source	Output	Switching	Connection	Option	Accessories	Typ. light spot
<b>Throughbeam sensors</b>									
▶ Transmitter ◀ Receiver									
▶ LSSR 8 - S12	50036354	0 ... 12	1500Hz	Red light	2xPNP/DC	Light/dark anti-variant	M12 connector	3	a, b, c, d, e, f
◀ LLSR 8 / 44 - S12	50036356	0 ... 12	1500Hz	Red light	2xPNP/DC	Light/dark anti-variant	Cable, 2m	3	
▶ LSSR 8	50036355	0 ... 12	1500Hz	Red light	2xPNP/DC	Light/dark anti-variant	M12 connector	3	a, b, c, d, e, f
◀ LLSR 8 / 44	50036357	0 ... 12	1500Hz	Red light	2xPush-pull/DC	Light/dark anti-variant	Cable, 2m	3	
▶ LSSR 8 - S12	50036354	0 ... 12	1500Hz	Red light	2xPush-pull/DC	Light/dark anti-variant	M12 connector	3	a, b, c, d, e, f
◀ LLSR 8 / 66 - S12	50036359	0 ... 12	1500Hz	Red light	2xPush-pull/DC	Light/dark anti-variant	Cable, 2m	3	
▶ LSSR 8	50036355	0 ... 12	1500Hz	Red light	2xPush-pull/DC	Light/dark anti-variant	M12 connector	1, 2, 3	a, b, c, d, e, f
◀ LLSR 8 / 66	50036370	0 ... 12	1500Hz	Red light	2xPush-pull/DC	Light/dark anti-variant	Cable, 2m	3	
<b>Throughbeam laser sensors</b>									
▶ LSSRL 8.9 - S12	50036358	0 ... 60	2800Hz	Laser class 2	PNP/DC NPN/DC	Light	M12 connector	1, 2, 3	a, b, c, d, e, f
◀ LLSRL 8 / 24.01 - S12	50036359	0 ... 60	2800Hz	Laser class 2	PNP/DC NPN/DC	Light	Cable, 2m	1, 2, 3	
▶ LSSRL 8.9	50037083	0 ... 60	2800Hz	Laser class 2	PNP/DC NPN/DC	Light	M12 connector	1, 2, 3	a, b, c, d, e, f
◀ LLSRL 8 / 24.01	50037084	0 ... 60	2800Hz	Laser class 2	PNP/DC NPN/DC	Light	Cable, 2m	1, 2, 3	

**Accessories / connection cables**

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

**Options**


- Adjustable focus
- Sensitivity adjustment via potentiometer
- UL approval

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### 8 SERIES

Throughbeam sensors



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568
- Sensors w. laser transmitter Page 569

**Electrical connection**

LSR 8/44	LSR 8/66
LSR 8/44-S12	LSR 8/66-S12
<pre> 1-+---+---+---+---+ 2-+---+---+---+---+ 3-+---+---+---+---+ 4-+---+---+---+---+ </pre>	<pre> 1-+---+---+---+---+ 2-+---+---+---+---+ 3-+---+---+---+---+ 4-+---+---+---+---+ </pre>
LSR 8/44-S12	LSR 8/66-S12
<pre> 1-+---+---+---+---+ 2-+---+---+---+---+ 3-+---+---+---+---+ 4-+---+---+---+---+ </pre>	<pre> 1-+---+---+---+---+ 2-+---+---+---+---+ 3-+---+---+---+---+ 4-+---+---+---+---+ </pre>
LSR 8/44-S12	LSR 8/66-S12
<pre> 1-+---+---+---+---+ 2-+---+---+---+---+ 3-+---+---+---+---+ 4-+---+---+---+---+ </pre>	<pre> 1-+---+---+---+---+ 2-+---+---+---+---+ 3-+---+---+---+---+ 4-+---+---+---+---+ </pre>

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- Dimensioned drawing
- Current subchapter
- Current chapter
- Available function principles
- Other products in this series/product group
- Technical data
- Special features

- Reference to explanations in Optical Sensor ABCs
- Web link
- Product selection table with specific data
- Table with connection accessories
- Electrical connection diagrams
- Product-specific options



At Leuze electronic, we are "the sensor people": For almost 50 years we have been the specialists for innovative and practical solutions in the area of optical sensors for factory automation. Our systems are used in the automobile industry and in conveyor and storage technology as well as in printing machines and in packing material and analysis technologies.

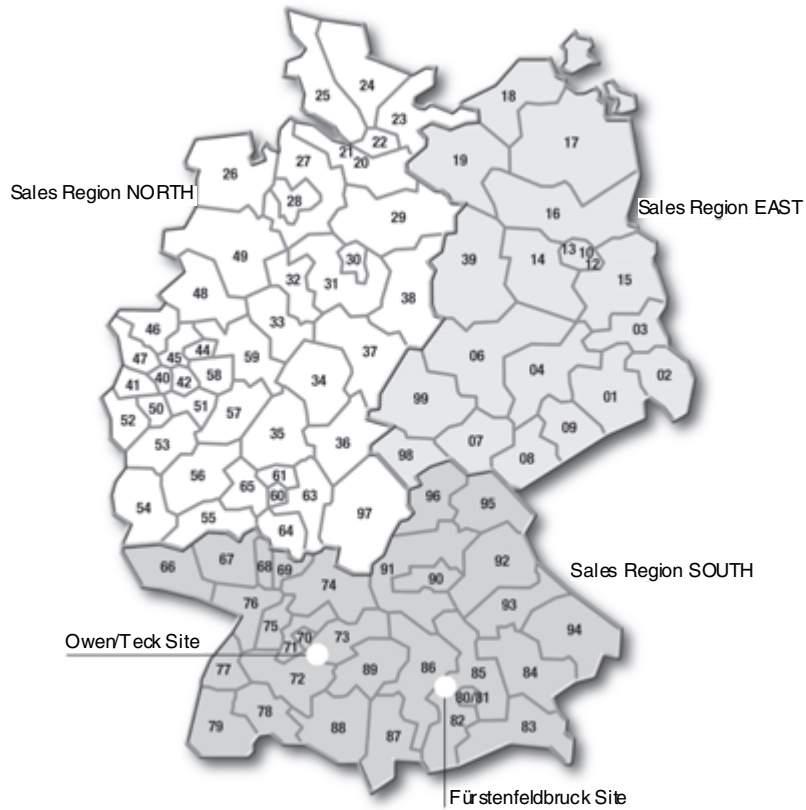
Our dedicated employees are characterised, above all, by their customer focus. There's one thing Leuze electronic customers can count on – on us.

The range of products extends from optical electronic sensors, inductive switches and identification and data transmission systems to image processing systems and optical electronic solutions for workplace safety.

On the basis of extensive research and development work and the large application know-how possessed by our engineers, we are constantly further developing our systems. All with the goal of being able to offer our customers increasingly efficient and higher performance solutions at an optimal price / performance ratio.

We are the right partner for both standard applications as well as for custom, high-end solutions, and with an extensive sales and service network we can always be reached quickly.

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With a staff of qualified field representatives and our capable Customer Support Center, we are able to provide you with service around the clock. Our dedication to qualified service and focus on the customer have always been among our distinguishing characteristics.

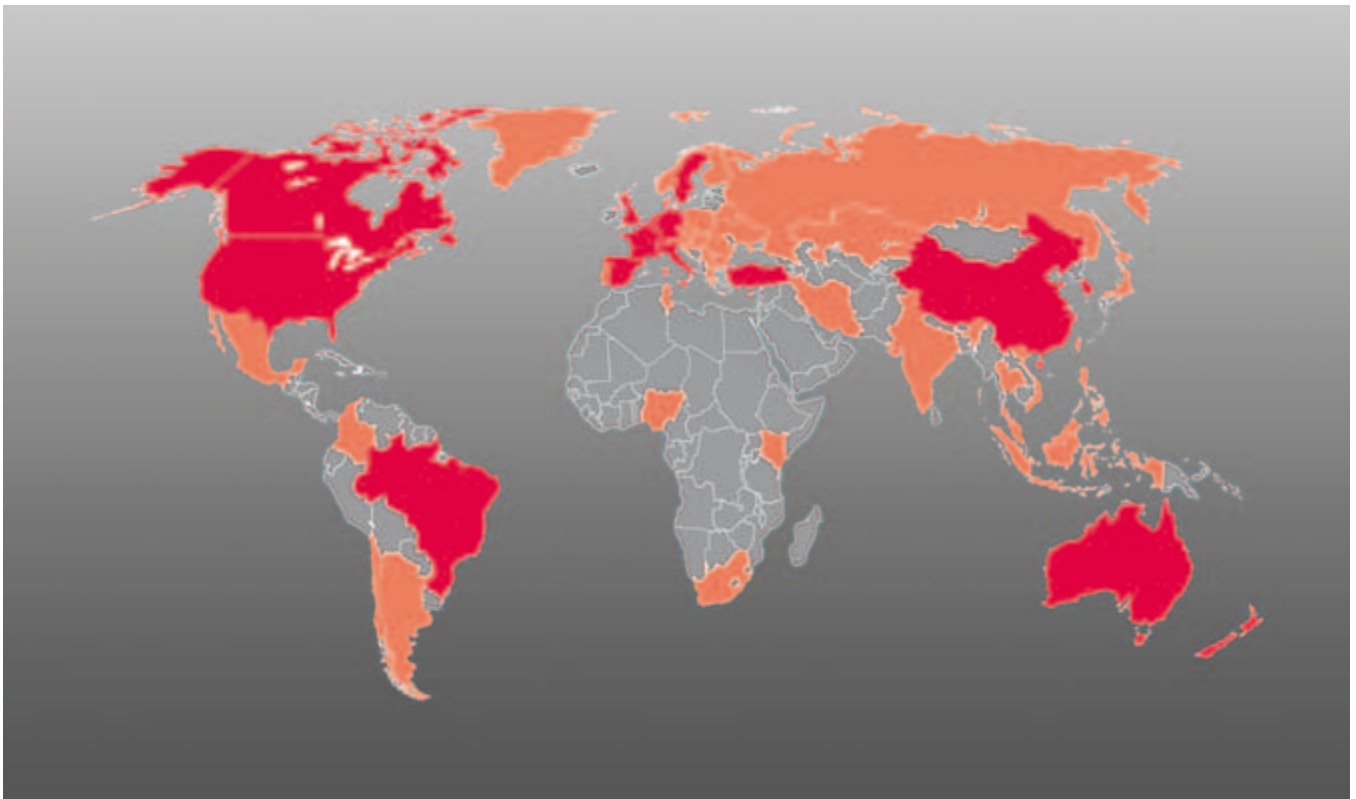
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Sales Region South	Tel.	+49 7021 / 573-307
Sales Region East	Tel.	+49 7021 / 573-308
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Logistics Division	Tel.	+49 7021 / 573-123
Workplace Safety Division	Tel.	+49 8141 / 5350-111

# GLOBAL SALES



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- Standard Sensors
- Measuring Sensors
- Ultrasonic Sensors
- Inductive Switches
- Forked Sensors
- Special Sensors
- Fiber Optic Sensors
- Light Curtains
- Protective Sensors
- Ex Sensors

## TABLE OF CONTENTS

	Page
<b>Standard Sensors</b>	<b>6</b>
<b>Series selection table</b> .....	.6
<b>Throughbeam sensors selection table</b> .....	.8
<b>Retro-reflective sensors selection table</b> .....	.12
<b>Diffuse reflection scanners selection table</b> .....	.16
2 Series optical sensors .....	.20
3B Series optical sensors .....	.32
8 Series optical sensors .....	.60
18 Series optical sensors .....	.72
25B Series optical sensors .....	.80
46B Series optical sensors .....	.102
53 Series optical sensors .....	.118
55 Series optical sensors .....	.130
95 Series optical sensors .....	.144
96 / DC Series optical sensors .....	.152
96 / UC Series optical sensors .....	.178
318 Series optical sensors .....	.188
412 Series optical sensors .....	.216
618 Series optical sensors .....	.224
<b>Measuring Sensors</b>	<b>230</b>
<b>Selection guide</b> .....	.230
<b>Optical distance sensors selection table</b> .....	.234
Optical distance sensors .....	.236
Ultrasonic distance sensors .....	.270
Measuring CCD forked sensors .....	.278
Optical surface distance sensors .....	.282
Light section sensors .....	.288
<b>Ultrasonic Sensors</b>	<b>296</b>
<b>Ultrasonic sensors selection table</b> .....	.296
Series 8 switching ultrasonic sensors .....	.298
Series 18 switching ultrasonic sensors .....	.302
Series 420 switching ultrasonic sensors .....	.306
Series 412 switching ultrasonic sensors .....	.312
Series 418 switching ultrasonic sensors .....	.316
Series 430 switching ultrasonic sensors .....	.322
<b>Inductive switches</b>	<b>326</b>
<b>Series selection table</b> .....	.326
IS 240 Series inductive switches .....	.330
IS 244 Series inductive switches .....	.334
IS 255 Series inductive switches .....	.338
IS 288 Series inductive switches .....	.342
IS 204 Series inductive switches .....	.346
IS 205 Series inductive switches .....	.350
IS 206 Series inductive switches .....	.354
IS 208 Series inductive switches .....	.358
IS 212 Series inductive switches .....	.366
IS 218 Series inductive switches .....	.376
IS 230 Series inductive switches .....	.386

# SENSORS

	Page
<b>Forked Sensors</b>	<b>392</b>
<b>Selection guide</b> . . . . .	392
Optical forked sensors . . . . .	394
Capacitive forked sensors . . . . .	412
Ultrasonic forked sensors . . . . .	416
<b>Special Sensors</b>	<b>422</b>
<b>Selection guide</b> . . . . .	422
Contrast scanners . . . . .	424
Color sensors . . . . .	450
Luminescence scanners . . . . .	456
<b>Fiber Optic Sensors</b>	<b>464</b>
Fiber optic amplifiers . . . . .	464
Glass fiber optics . . . . .	468
Plastic fiber optics . . . . .	474
<b>Light Curtains</b>	<b>478</b>
<b>Selection guide</b> . . . . .	478
VARIO B light curtains . . . . .	480
KONTURflex light curtains . . . . .	486
<b>Protective Sensors</b>	<b>494</b>
Protective throughbeam sensors . . . . .	494
Safety relays . . . . .	500
<b>Ex Sensors</b>	<b>502</b>
Sensors for potentially explosive areas of zone 1, zone 21 . . . . .	502
Sensors for potentially explosive areas of zone 2, zone 22 . . . . .	504
<b>AS-interface Sensors</b>	<b>510</b>
<b>Accessories</b>	<b>514</b>
Mounting systems / other . . . . .	514
Connection technology . . . . .	530
Reflectors . . . . .	542
Reflector range tables . . . . .	552
<b>Sevices</b>	<b>560</b>
<b>Optical Sensor ABC</b>	<b>562</b>
<b>Inductive Switch ABC</b>	<b>574</b>
<b>Part Index by Type Designation</b>	<b>580</b>
<b>Part Index by Order No.</b>	<b>598</b>

 Standard  
Sensors

 Measuring  
Sensors

 Ultrasonic  
Sensors

 Inductive  
Switches

 Forked  
Sensors

 Special  
Sensors

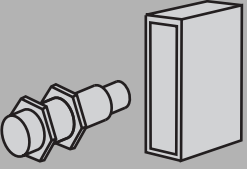












 Fiber Optic  
Sensors

 Light  
Curtains

 Protective  
Sensors

 Ex  
Sensors

## SERIES SELECTION TABLE

Series	Dimensions in mm (WxHxD)	Housing material		Operating principle	Typ. op. range limit	Light source		
		Plastic	Metal			Infrared light	Red light	Laser
	8 x 23 x 12	●		Throughbeam sensor	0 ... 2m		●	
				Retro-reflective sensor	0.05 ... 3.1m		●	
				Diff. refl. scanner with backgr. suppr.	15 / 30 / 50mm		●	
	11 x 32 x 17	●		Throughbeam sensor	0 ... 10m		●	
				Retro-reflective sensor	0 ... 6m		●	●
				Diffuse reflection scanner	0 ... 750mm		●	
				Diff. refl. scanner with backgr. suppr.	5 ... 400mm		●	
	14 x 54 x 20		●	Throughbeam sensor	0 ... 10m		●	
				Retro-reflective sensor	0 ... 5m		●	●
				Diff. refl. scanner with backgr. suppr.	5 ... 400mm		●	
	14 x 36 x 25		●	Throughbeam sensor	0 ... 10m		●	
				Retro-reflective sensor	0.02 ... 6m		●	●
				Diff. refl. scanner with backgr. suppr.	5 ... 400mm		●	
	15 x 39 x 29	●		Throughbeam sensor	0 ... 24m		●	
				Retro-reflective sensor	0.05 ... 15m		●	●
				Diffuse reflection scanner	5 ... 800mm		●	
				Diff. refl. scanner with backgr. suppr.	5 ... 800mm	●	●	
	15 x 50 x 33		●	Retro-reflective sensor	0 ... 5m		●	
	15 x 48 x 38		●	Throughbeam sensor	0 ... 100m		●	●
				Retro-reflective sensor	0 ... 20m		●	●
				Diffuse reflection scanner	5 ... 800mm		●	
				Diff. refl. scanner with backgr. suppr.	5 ... 400mm		●	●
	17 x 66 x 35		●	Throughbeam sensor	0 ... 20m	●	●	
				Retro-reflective sensor	0 ... 9m		●	
				Diffuse reflection scanner	10 ... 900mm	●	●	
				Diff. refl. scanner with backgr. suppr.	20 ... 500mm	●	●	
	18 x 75 x 43	●		Throughbeam sensor	0 ... 60m		●	
				Retro-reflective sensor	0.05 ... 18m		●	
				Diffuse reflection scanner	30 ... 1100mm		●	
				Diff. refl. scanner with backgr. suppr.	0 ... 2500mm	●	●	●
	30 x 90 x 70	●	●	Throughbeam sensor	0 ... 150m	●	●	
				Retro-reflective sensor	0 ... 28m	●	●	
				Diffuse reflection scanner	20 ... 1200mm	●	●	
				Diff. refl. scanner with backgr. suppr.	10 ... 5500mm	●	●	●
	M12 x 55		●	Throughbeam sensor	0 ... 8m		●	
				Retro-reflective sensor	0.05 ... 1.6m		●	
				Diffuse reflection scanner	0 ... 400mm		●	
	M18 x 50	●	●	Throughbeam sensor	0 ... 120m	●	●	●
				Retro-reflective sensor	0.02 ... 15m	●	●	●
				Diffuse reflection scanner	0 ... 700mm	●	●	●
				Diff. refl. scanner with backgr. suppr.	1 ... 140mm		●	
	M18 x 60		●	Throughbeam sensor	0 ... 12m	●	●	
				Retro-reflective sensor	0 ... 7m		●	
				Diffuse reflection scanner	0 ... 300mm	●	●	







# STANDARD SENSORS

	Max. switching frequency	Response time	Special object features			Resistance in industrial environment			Page
			Shiny surface (metallic, foil coated object)	Transparent medium (glass, PET, foil)	Small part	High insensitivity towards soiling / performance reserve	Temperatures < -35°C	Protection class	
	385Hz	1.3ms			●			IP 67	20
	700Hz	0.72ms			●			IP 67	
	700Hz	0.72ms	●		●			IP 67	
	1000Hz	0.5ms						IP 67, IP 69K	32
	1000Hz	0.5ms	●	●	●	●		IP 67, IP 69K	
	1000Hz	0.5ms	●					IP 67, IP 69K	
	1000Hz	0.5ms	●		●			IP 67, IP 69K	
	1000Hz	0.5ms						IP 67, IP 69K	118
	2000Hz	0.25ms		●	●	●		IP 67, IP 69K	
	1000Hz	0.5ms	●					IP 67, IP 69K	
	1000Hz	0.5ms						IP 67, IP 69K	130
	2000Hz	0.25ms		●	●	●		IP 67, IP 69K	
	1000Hz	0.5ms	●		●			IP 67, IP 69K	
	500Hz	1ms						IP 67, IP 69K	80
	500Hz	1ms	●	●	●	●		IP 67, IP 69K	
	500Hz	1ms						IP 67, IP 69K	
	500Hz	1ms	●					IP 67, IP 69K	
	1500Hz	0.33ms		●	●			IP 67, IP 69K	72
	2800Hz	0.18ms			●		● <sup>1)</sup>	IP 67, IP 69K	60
	2800Hz	0.18ms		●	●		● <sup>1)</sup>	IP 67, IP 69K	
	1500Hz	0.33ms					● <sup>1)</sup>	IP 67, IP 69K	
	2000Hz	0.25ms	●		●		● <sup>1)</sup>	IP 67, IP 69K	
	1000Hz	0.5ms						IP 67, IP 69K	144
	1000Hz	0.5ms		●	●			IP 67, IP 69K	
	1000Hz	0.5ms						IP 67, IP 69K	
	1000Hz	0.5ms	●					IP 67, IP 69K	
	500Hz	1ms				●	●	IP 67, IP 69K	102
	500Hz	1ms	●			●	●	IP 67, IP 69K	
	500Hz	1ms				●	●	IP 67, IP 69K	
	1000Hz	0.5ms	●		●	●	●	IP 67, IP 69K	
	500Hz	1ms					●	IP 67, IP 69K <sup>2)</sup>	152
	1000Hz	0.5ms		●		●	●	IP 67, IP 69K <sup>2)</sup>	
	1000Hz	0.5ms					●	IP 67, IP 69K <sup>2)</sup>	
	300Hz	1.67ms	●				●	IP 67, IP 69K <sup>2)</sup>	
	500Hz	1ms						IP 67	216
	700Hz	0.7ms						IP 67	
	700Hz	0.7ms						IP 67	
	5000Hz	0.1ms			●			IP 67	188
	5000Hz	0.1ms			●			IP 67	
	5000Hz	0.1ms			●			IP 67	
	1000Hz	0.5ms						IP 67	
	500Hz	1ms						IP 67	224
	500Hz	1ms						IP 67	
	500Hz	1ms						IP 67	

Measuring Sensors
Ultrasonic Sensors
Inductive Switches
Forked Sensors
Special Sensors
Fiber Optic Sensors
Light Curtains
Protective Sensors
Ex Sensors

## SELECTION TABLE - ACC. TO OPERATING PRINCIPLE

	Series	Dimensions in mm (WxHxD)	Housing material		Typ. op. range limit [m]					
			Plastic	Metal	10	25	50	100	150	
	2	8 x 23 x 12	●		0.2					
	3B	11 x 32 x 17	●		0.8.5					
	53	14 x 54 x 20		●	0.10					
	55	14 x 36 x 25		●	0.10					
	25	15 x 39 x 29	●		0.24					
	18	15 x 50 x 33								
	8	15 x 48 x 38		●	0.100					






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# THROUGHBEAM SENSORS

Standard Sensors

	Light source			Switching output/ Operating voltage						Connection						Page	
	Infrared light	Red light	Laser	PNP/DC	NPN/DC	Push-pull/DC	Relay/AC	Relay/DC	Relay/AC-DC	M8 connector	M12 connector	Terminals	Cable	Cable + M8 connector	Cable + M12 connector		
		●		●	●								●	●	●	20	Inductive Switches
		●		●						●			●	●		32	Forked Sensors
		●				●				●						118	Special Sensors
		●				●				●					●	130	Fiber Optic Sensors
		●				●				●	●		●			80	Light Curtains
																	Protective Sensors
		●	●	●	●	●					●		●			60	Ex Sensors

## SELECTION TABLE - ACC. TO OPERATING PRINCIPLE

Series	Dimensions in mm (Ø x L)	Housing material		Typ. op. range limit [m]				
		Plastic	Metal	10	25	50	100	150
 <b>95</b>	17 x 66 x 35		●	0	20			
 <b>46B</b>	18 x 75 x 43	●		0	60			
 <b>96</b>	30 x 90 x 70	●	●	0 150				
 <b>412</b>	M12 x 55		●	0	8			
 <b>318</b>	M18 x 50	●	●	0 120				
 <b>618</b>	M18 x 60		●	0	12			

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# THROUGHBEAM SENSORS

Standard Sensors

	Light source			Switching output/ Operating voltage							Connection						Page
	Infrared light	Red light	Laser	PNP/DC	NPN/DC	Push-pull/DC	Relay/AC	Relay/DC	Relay/AC-DC	M8 connector	M12 connector	Terminals	Cable	Cable + M8 connector	Cable + M12 connector		
	●	●		●							●					144	
		●		●		●					●		●		●	102	
	●	●		●	●				●		●	●				152	
		●		●							●					216	
	●		●	●	●						●		●			188	
	●			●							●					224	

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors




Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## SELECTION TABLE - ACC. TO OPERATING PRINCIPLE

Series	Dimensions in mm (WxHxD)	Housing material		Typ. op. range limit [m]					
		Plastic	Metal	2	5	16	20	30	
 <b>2</b>	8 x 23 x 12	●		0.05	4				
 <b>3B</b>	11 x 32 x 17	●		0.02	6				
 <b>53</b>	14 x 54 x 20		●	0	5				
 <b>55</b>	14 x 36 x 25		●	0.02	6				
 <b>25</b>	15 x 39 x 29	●		0	15				
 <b>18</b>	15 x 50 x 33		●	0	5				
 <b>8</b>	15 x 48 x 38		●	0	20				

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# RETRO-REFLECTIVE SENSORS

Standard Sensors

	Light source			Switching output/ Operating voltage						Connection						Page
	Infrared light	Red light	Laser	PNP/DC	NPN/DC	Push-pull/DC	Relay/AC	Relay/DC	Relay/AC-DC	M8 connector	M12 connector	Terminals	Cable	Cable + M8 connector	Cable + M12 connector	
		●		●	●								●	●	●	20
	●	●	●	●	●	●				●			●	●	●	32
		●	●			●				●				●		118
		●	●			●				●					●	130
		●	●	●		●				●	●		●	●	●	80
		●		●	●					●	●		●			72
		●	●	●	●	●					●		●			60

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## SELECTION TABLE - ACC. TO OPERATING PRINCIPLE

Series	Dimensions in mm (Ø x L)	Housing material		Typ. op. range limit [m]					
		Plastic	Metal	2	5	16	21	30	
 <b>95</b>	17 x 66 x 35		●	0 — 9					
 <b>46B</b>	18 x 75 x 43	●		0.05 — 18					
 <b>96</b>	30 x 90 x 70	●	●	0 — 28					
 <b>412</b>	M12 x 55		●	0.16					
 <b>318</b>	M18 x 50	●	●	0.02 — 15					
 <b>618</b>	M18 x 60		●	0 — 7					

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# RETRO-REFLECTIVE SENSORS

Standard Sensors

	Light source			Switching output/ Operating voltage						Connection						Page
	Infrared light	Red light	Laser	PNP/DC	NPN/DC	Push-pull/DC	Relay/AC	Relay/DC	Relay/AC-DC	M8 connector	M12 connector	Terminals	Cable	Cable + M8 connector	Cable + M12 connector	
		●		●	●						●					144
		●		●		●		●			●		●		●	102
	●	●		●	●				●		●	●				152
		●		●							●		●			216
	●	●	●	●	●						●		●			188
		●		●							●					224

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors








Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## SELECTION TABLE - ACC. TO OPERATING PRINCIPLE

	Series	Dimensions in mm (WxHxD)	Housing material		Typ. scan range limit [mm]				
			Plastic	Metal	500	1000	2500	5500	
	2	8 x 23 x 12	●		15 30 50				
	3B	11 x 32 x 17	●		10	750			
	53	14 x 54 x 20		●	5	400			
	55	14 x 36 x 25		●	5	400			
	25	15 x 39 x 29	●		10	800			
	18	15 x 50 x 33							
	8	15 x 48 x 38		●	5	800			

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# DIFFUSE REFLECTION SCANNERS



Standard Sensors

	Light source			Switching output/ Operating voltage						Connection						Page
	Infrared light	Red light	Laser	PNP/DC	NPN/DC	Push-pull/DC	Relay/AC	Relay/DC	Relay/AC-DC	M8 connector	M12 connector	Terminals	Cable	Cable + M8 connector	Cable + M12 connector	
		●		●	●								●	●	●	20
		●		●	●	●				●			●	●	●	32
		●				●				●				●		118
		●				●				●				●		130
	●	●		●	●	●				●	●		●		●	80
		●	●	●	●	●					●		●			60

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors







Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## SELECTION TABLE - ACC. TO OPERATING PRINCIPLE

Series	Dimensions in mm (Ø x L)	Housing material		Typ. scan range limit [mm]			
		Plastic	Metal	500	1000	2500	5500
 <b>95</b>	17 x 66 x 35		●	0	900		
 <b>46B</b>	18 x 75 x 43	●		10	2500		
 <b>96</b>	30 x 90 x 70	●	●	20	5500		
 <b>412</b>	M12 x 55		●	0	400		
 <b>318</b>	M18 x 50	●	●	0	700		
 <b>618</b>	M18 x 60		●	0	300		

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# DIFFUSE REFLECTION SCANNERS



Standard Sensors

	Light source			Switching output/ Operating voltage						Connection						Page
	Infrared light	Red light	Laser	PNP/DC	NPN/DC	Push-pull/DC	Relay/AC	Relay/DC	Relay/AC-DC	M8 connector	M12 connector	Terminals	Cable	Cable + M8 connector	Cable + M12 connector	
	●	●		●	●						●					144
	●	●	●	●		●		●			●		●		●	102
	●	●	●	●	●				●		●	●				152
		●		●							●		●			216
	●	●	●	●	●	●					●		●			188
	●			●							●					224

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

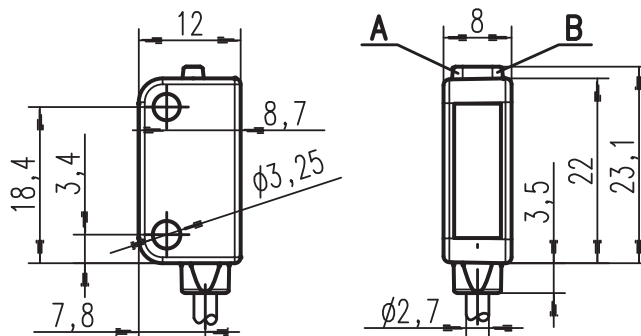
Light Curtains

Protective Sensors

Ex Sensors














# OVERVIEW

## Dimensioned drawing






- A** Yellow indicator diode
- B** Green indicator diode

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 2 SERIES

Operating principle	Typ. operating range limits	Page
 Throughbeam sensors	0 ... 2 m	22
 Retro-reflective sensors	0.05 ... 4 m	24
 Diffuse reflection scanners	15 / 30 / 50 mm permanent	26



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 20\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Flashing green LED	Overload - output
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Plastic (TPE)
	Optics cover	Plastic (PC)
	Weight (connector/cable)	20g/50g
<b>Environmental data</b>	Ambient temperature (operation)	$-20^\circ\text{C} \dots +55^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2

### Features

- Miniature sensors with visible red light
- Homogeneous, highly visible light spot by means of pin-point LED
- Universal connection options
- Temperature-stable plastic housing with inlaid metal attachment sleeves for secure mounting



Forked Sensors

Special Sensors

Fiber Optic Sensors

### Optical Sensor ABC

- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564

Light Curtains

Protective Sensors

Mounting systems for this series can be found from page 514 onwards

Ex Sensors

# THROUGHBEAM SENSORS

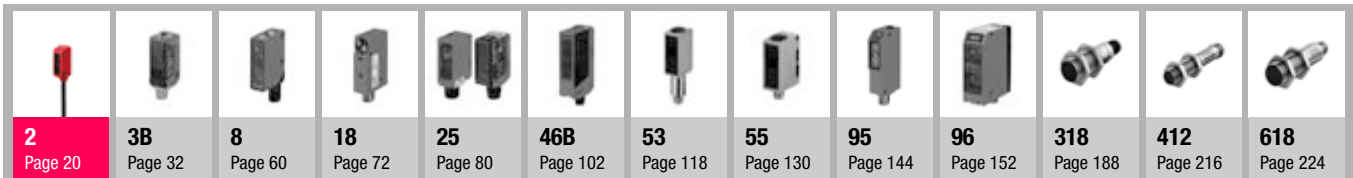
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b> ▶ = Transmitter ◀ = Receiver						
▶LSSR 2 ◀LSER 2/42	50112127 50112130	<input type="text" value="0"/> <input type="text" value="1.6"/> <input type="text" value="0"/> <input type="text" value="2"/>	385Hz	Red light	1 x PNP 1 x NPN	Light
▶LSSR 2, 150 - S8 ◀LSER 2/42, 150 - S8	50112128 50112131	<input type="text" value="0"/> <input type="text" value="1.6"/> <input type="text" value="0"/> <input type="text" value="2"/>	385Hz	Red light	1 x PNP 1 x NPN	Light
▶LSSR 2, 150 - S12 ◀LSER 2/42, 150 - S12	50112129 50112132	<input type="text" value="0"/> <input type="text" value="1.6"/> <input type="text" value="0"/> <input type="text" value="2"/>	385Hz	Red light	1 x PNP 1 x NPN	Light
▶LSSR 2 ◀LSER 2/42D	50112127 50112133	<input type="text" value="0"/> <input type="text" value="1.6"/> <input type="text" value="0"/> <input type="text" value="2"/>	385Hz	Red light	1 x PNP 1 x NPN	Dark
▶LSSR 2, 150 - S8 ◀LSER 2/42D, 150 - S8	50112128 50112134	<input type="text" value="0"/> <input type="text" value="1.6"/> <input type="text" value="0"/> <input type="text" value="2"/>	385Hz	Red light	1 x PNP 1 x NPN	Dark
▶LSSR 2, 150 - S12 ◀LSER 2/42D, 150 - S12	50112129 50112135	<input type="text" value="0"/> <input type="text" value="1.6"/> <input type="text" value="0"/> <input type="text" value="2"/>	385Hz	Red light	1 x PNP 1 x NPN	Dark

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

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**2 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
Cable, 2m	1		
Cable, 0.15m, with M8 connector	1	a, b, c, d	
Cable, 0.15m, with M12 connector	1	e, f	
Cable, 2m	1		
Cable, 0.15m, with M8 connector	1	a, b, c, d	
Cable, 0.15m, with M12 connector	1	e, f	



Measuring Sensors

Ultrasonic Sensors

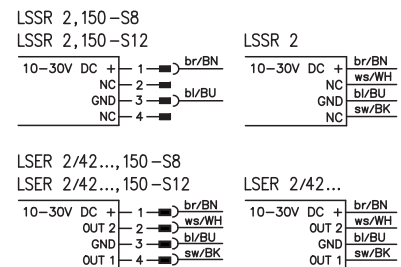
Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 UL Recognized Component Mark

Ex Sensors

[www.leuze.com/2series/](http://www.leuze.com/2series/)

## RETRO-REFLECTIVE SENSORS

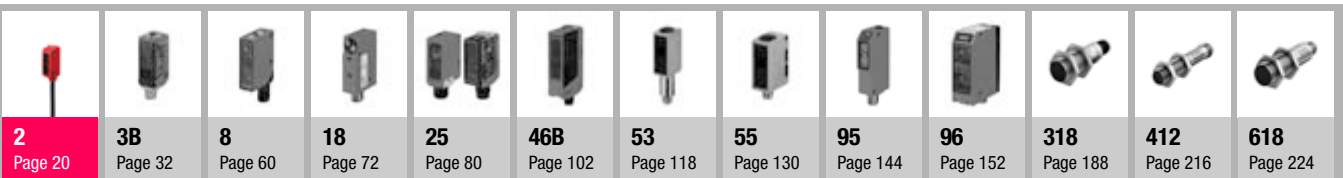
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 2 / 42</b> 50112136		<input type="checkbox"/>	700Hz	Red light	1 x PNP 1 x NPN	Light
<b>PRK 2 / 42, 150 - S8</b> 50112137		<input type="checkbox"/>	700Hz	Red light	1 x PNP 1 x NPN	Light
<b>PRK 2 / 42, 150 - S12</b> 50112138		<input type="checkbox"/>	700Hz	Red light	1 x PNP 1 x NPN	Light
<b>PRK 2 / 42D</b> 50112139		<input type="checkbox"/>	700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>PRK 2 / 42D, 150 - S8</b> 50112140		<input type="checkbox"/>	700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>PRK 2 / 42D, 150 - S12</b> 50112141		<input type="checkbox"/>	700Hz	Red light	1 x PNP 1 x NPN	Dark

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 552

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### Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



## 2 SERIES

Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
Cable, 2m	1		
Cable, 0.15m, with M8 connector	1	a, b, c, d	
Cable, 0.15m, with M12 connector	1	e, f	
Cable, 2m	1		
Cable, 0.15m, with M8 connector	1	a, b, c, d	
Cable, 0.15m, with M12 connector	1	e, f	



Measuring Sensors

Ultrasonic Sensors

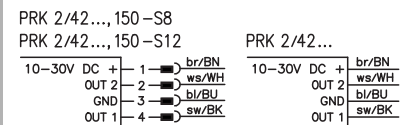
Inductive Switches

### Optical Sensor ABC

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

### Electrical connection



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

### Options

- 1 UL Recognized Component Mark

Ex Sensors

[www.leuze.com/2series/](http://www.leuze.com/2series/)

# DIFFUSE REFLECTION SCANNERS

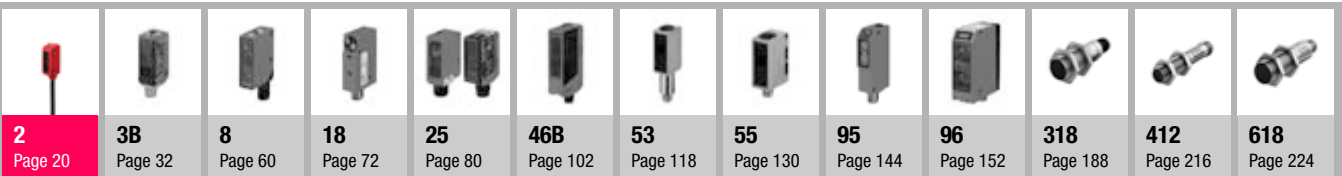
Part description Part No.:	Scanning range <sup>1)</sup> [mm] <input type="checkbox"/> Typ. scan range limit [mm] <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>					
<b>HRTR 2 / 42 - 50F</b> 50112121	<input type="checkbox"/> 8 24 <input type="checkbox"/> 1 60	700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42 - 50F, 150 - S8</b> 50112122	<input type="checkbox"/> 8 24 <input type="checkbox"/> 1 60	700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42 - 50F, 150 - S12</b> 50112123	<input type="checkbox"/> 8 24 <input type="checkbox"/> 1 60	700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42D - 50F</b> 50112124	<input type="checkbox"/> 8 24 <input type="checkbox"/> 1 60	700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>HRTR 2 / 42D - 50F, 150 - S8</b> 50112125	<input type="checkbox"/> 8 24 <input type="checkbox"/> 1 60	700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>HRTR 2 / 42D - 50F, 150 - S12</b> 50112126	<input type="checkbox"/> 8 24 <input type="checkbox"/> 1 60	700Hz	Red light	1 x PNP 1 x NPN	Dark

1) Measured against a black object with 6% diffuse reflection

We reserve the right to make changes • BR2\_HRTR1\_EN.fm

**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



## 2 SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
Cable, 2m	1, 2, 3		
Cable, 0.15m, with M8 connector	1, 2, 3	a, b, c, d	
Cable, 0.15m, with M12 connector	1, 2, 3	e, f	
Cable, 2m	1, 2, 3		
Cable, 0.15m, with M8 connector	1, 2, 3	a, b, c, d	
Cable, 0.15m, with M12 connector	1, 2, 3	e, f	



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

### Electrical connection

HRTR 2/42..., 150-S8

HRTR 2/42..., 150-S12

HRTR 2/42...



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

### Options

- 1 Scanning range permanently set to 50mm
- 2 Laser-like, focussed light spot: Ø 0.5mm @ 16mm, Ø 6.5mm @ 50mm
- 3 UL Recognized Component Mark

Ex Sensors

[www.leuze.com/2series/](http://www.leuze.com/2series/)

# DIFFUSE REFLECTION SCANNERS

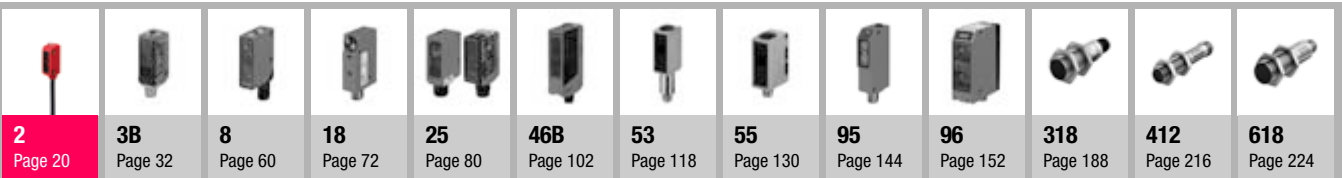
Part description Part No.:	Scanning range <sup>1)</sup> [mm] <input type="checkbox"/> Typ. scan range limit [mm] <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>					
<b>HRTR 2 / 42 - 30F</b> 50112115		700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42 - 30F, 150 - S8</b> 50112116		700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42 - 30F, 150 - S12</b> 50112117		700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42D - 30F</b> 50112118		700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>HRTR 2 / 42D - 30F, 150 - S8</b> 50112119		700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>HRTR 2 / 42D - 30F, 150 - S12</b> 50112120		700Hz	Red light	1 x PNP 1 x NPN	Dark

1) Measured against a black object with 6% diffuse reflection

We reserve the right to make changes • BR2\_HRTR2\_EN.fm

**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



## 2 SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
Cable, 2m	1, 2, 3		
Cable, 0.15m, with M8 connector	1, 2, 3	a, b, c, d	
Cable, 0.15m, with M12 connector	1, 2, 3	e, f	
Cable, 2m	1, 2, 3		
Cable, 0.15m, with M8 connector	1, 2, 3	a, b, c, d	
Cable, 0.15m, with M12 connector	1, 2, 3	e, f	



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

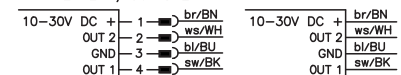
Forked Sensors

### Electrical connection

HRTR 2/42..., 150-S8

HRTR 2/42..., 150-S12

HRTR 2/42...



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

### Options

- 1 Scanning range permanently set to 30mm
- 2 Laser-like, focussed light spot: Ø 0.5mm @ 16mm, Ø 3mm @ 30mm
- 3 UL Recognized Component Mark

[www.leuze.com/2series/](http://www.leuze.com/2series/)

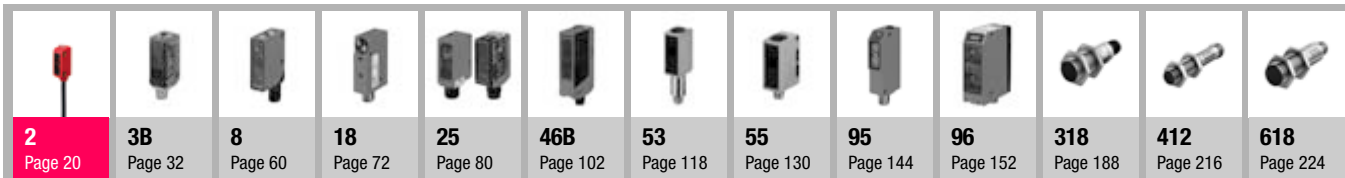
# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] <input type="checkbox"/> Typ. scan range limit [mm] <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>					
<b>HRTR 2 / 42 - 15F</b> 50112109		700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42 - 15F, 150 - S8</b> 50112110		700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42 - 15F, 150 - S12</b> 50112111		700Hz	Red light	1 x PNP 1 x NPN	Light
<b>HRTR 2 / 42D - 15F</b> 50112112		700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>HRTR 2 / 42D - 15F, 150 - S8</b> 50112113		700Hz	Red light	1 x PNP 1 x NPN	Dark
<b>HRTR 2 / 42D - 15F, 150 - S12</b> 50112114		700Hz	Red light	1 x PNP 1 x NPN	Dark

1) Measured against a black object with 6% diffuse reflection

We reserve the right to make changes • BR2\_HRTR3\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC





**2 SERIES**

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
Cable, 2m	1, 2, 3		
Cable, 0.15m, with M8 connector	1, 2, 3	a, b, c, d	
Cable, 0.15m, with M12 connector	1, 2, 3	e, f	
Cable, 2m	1, 2, 3		
Cable, 0.15m, with M8 connector	1, 2, 3	a, b, c, d	
Cable, 0.15m, with M12 connector	1, 2, 3	e, f	



Measuring Sensors

Ultrasonic Sensors

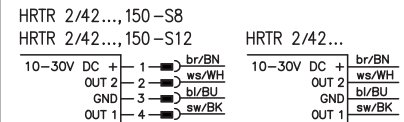
Inductive Switches

**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

**Options**

- 1 Scanning range permanently set to 15mm
- 2 Laser-like, focussed light spot: Ø 0.4mm @ 10mm, Ø 1.5mm @ 15mm
- 3 UL Recognized Component Mark

[www.leuze.com/2series/](http://www.leuze.com/2series/)

# OVERVIEW



Product measurement

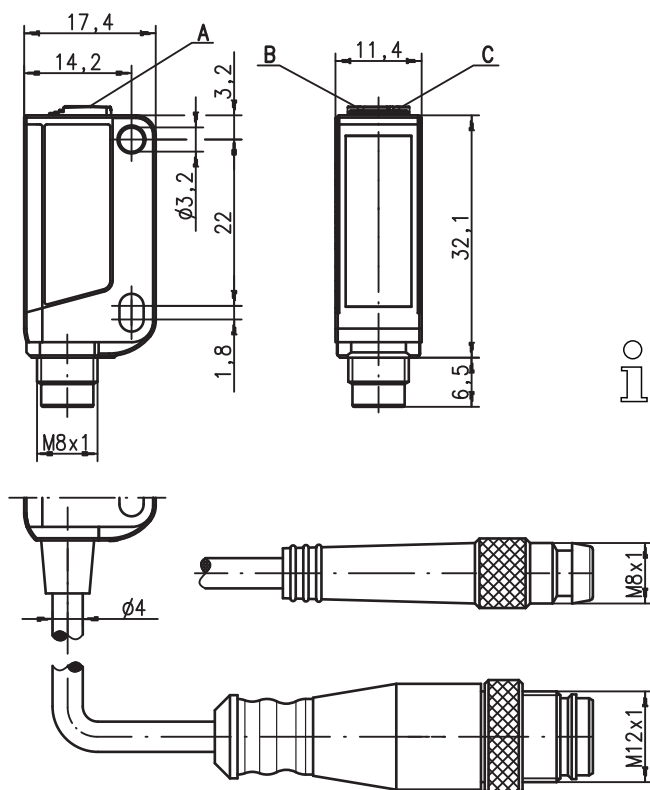


Circuit board detection



Container detection

## Dimensioned drawing






Further details can be found in the respective data sheet.

- A** Green indicator diode
- B** Yellow indicator diode
- C** Operational control

We reserve the right to make changes • BR3\_Overview\_EN.fm

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 3B SERIES

Operating principle	Typ. operating range limits	Page
 Throughbeam sensors	0 ... 10 m	34
 Retro-reflective sensors	0 ... 7 m	36
 Diffuse reflection scanners	0 ... 750 mm	46

### Other 3B Series products:

 Contrast scanners	KRT... 3B	424
---	-----------	-----



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 25\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Plastic
	Optics cover	Plastic (PMMA)
	Weight (connector/cable)	10g/40g
<b>Environmental data</b>	Ambient temperature (operation)	-25(-30)°C ... +55°C Laser: -10°C ... +55°C
	VDE safety class	II, all-insulated (cable) III (metal connector)
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 514 onwards

### Features

- Active ambient light suppression A<sup>2</sup>LS
- Application-specific, special solutions available: e.g. diffuse reflection scanner with elongated light spot
- Highest functional reliability
- Laser with autocollimation principle
- M8 metal connector



### Optical Sensor ABC

- |                               |          |
|-------------------------------|----------|
| ● Throughbeam sensors         | Page 563 |
| ● Retro-reflective sensors    | Page 563 |
| ● Diffuse reflection scanners | Page 564 |
| ● A <sup>2</sup> LS           | Page 571 |

# THROUGHBEAM SENSORS

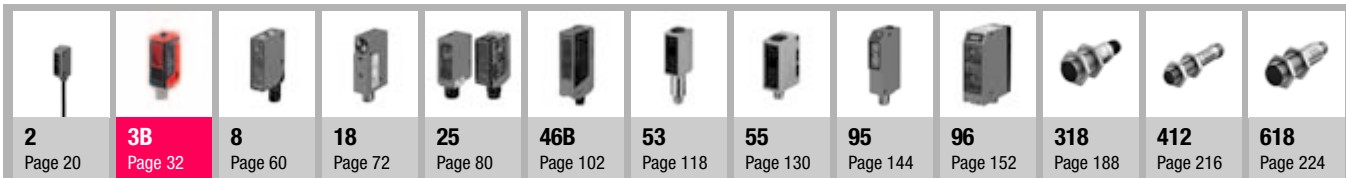
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b> ▶ = Transmitter ◀ = Receiver						
▶ LSSR 3B.8 - S8 ◀ ILSER 3B/4 - S8	50108509 50108517		1000Hz	Red light	1xPNP/DC	Light
▶ LSSR 3B.8, 5000 ◀ LSER 3B/44.1, 5000	50108511 50111732		1000Hz	Red light	2xPNP/DC	Light/dark antivalent
▶ LSSR 3B.8, 200 - S8 ◀ ILSER 3B/4, 200 - S8	50108512 50108518		1000Hz	Red light	1xPNP/DC	Light
▶ LSSR 3B - S8 ◀ LSER 3B/66 - S8	50108508 50108514		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 3B.8 - S8 ◀ LSER 3B/66 - S8	50108509 50108514		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 3B - S8 ◀ LSER 3B/66.1 - S8	50108508 50108515		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 3B.8 ◀ LSER 3B/66	50108510 50108516		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 3B.8, 5000 ◀ LSER 3B/66, 5000	50108511 50108519		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 3B, 200 - S12 ◀ LSER 3B/66, 200 - S12	50111440 50111442		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 3B.8, 200 - S12 ◀ LSER 3B/66, 200 - S12	50111441 50111442		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR3\_LSR\_EN.fm



**3B SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

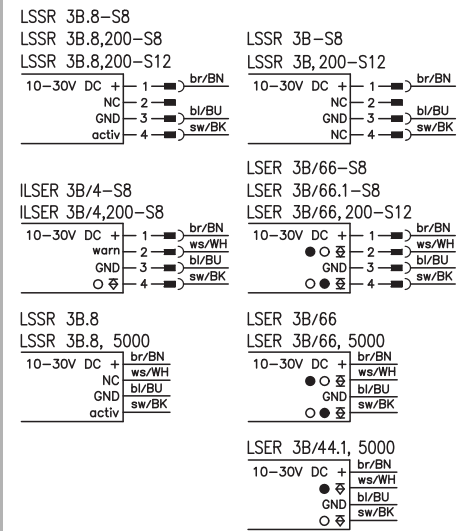
Connection	Option	Accessories	Typ. light spot
M8 connector	2, 3, 4	a, b, c, d	
Cable, 5m	1, 2, 4		
Cable, 0.2m, with M8 connector	2, 3, 4	a, b, c, d	
M8 connector	4	a, b, c, d	
M8 connector	2, 4	a, b, c, d	
M8 connector	1, 4	a, b, c, d	
Cable, 2m	2, 4		
Cable, 5m	2, 4		
Cable, 0.2m, with M12 connector	4	e, f	
Cable, 0.2m, with M12 connector	2, 4	e, f	



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Transmitter with activation input
- 3 Receiver with warning output
- 4 UL approval (class 2 acc. to NEC)

[www.leuze.com/3series/](http://www.leuze.com/3series/)

# RETRO-REFLECTIVE SENSORS

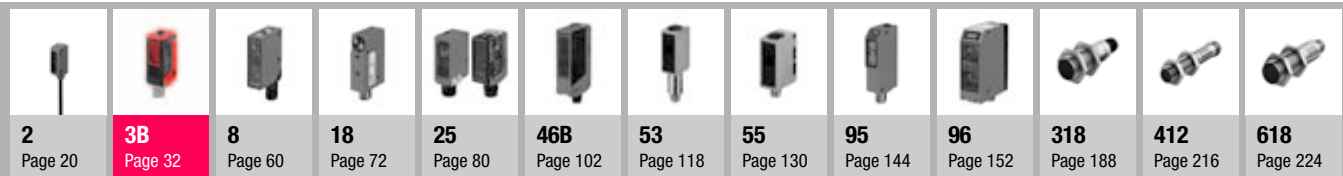
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors</b>						
<b>RKR 3B / 44D.01</b> 50106511	0.02 4 0.02 5	<input type="checkbox"/>	1500Hz	Red light	2xPNP/DC	Dark/light antivalent
<b>RKR 3B / 22D.01</b> 50106512	0.02 4 0.02 5	<input type="checkbox"/>	1500Hz	Red light	2xNPN/DC	Dark/light antivalent
<b>RKR 3B / 22D.01, 200 - S8</b> 50113267	0.02 4 0.02 5	<input type="checkbox"/>	1500Hz	Red light	2xNPN/DC	Dark/light antivalent
<b>RKR 3B / 66.11</b> 50109023	0.02 6.5 0.02 7	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RKR 3B / 6.42 - S8</b> 50104703	0 1.5 0 1.8	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>RKR 3B / 6.42</b> 50104702	0 1.5 0 1.8	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>RKR 3B / 6D.42</b> 50107914	0 1.5 0 1.8	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>RKR 3B / 6.42, 200 - S8</b> 50104704	0 1.5 0 1.8	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>RKR 3B / 6.42, 200 - S12</b> 50105763	0 1.5 0 1.8	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>RK 3B / 66.1</b> 50106852	0.02 4.5 0.02 5.5	<input type="checkbox"/>	1000Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent

We reserve the right to make changes • BR3\_RKR\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**3B SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. performance reserve
Cable, 2m	4, 6		
Cable, 2m	4, 6		
Cable, 0.2m, with M8 connector	4, 6	a, b, c, d	
Cable, 2m	4, 6		
M8 connector	2, 3, 5, 6	a, b, c, d	
Cable, 2m	2, 3, 5, 6		
Cable, 2m	2, 3, 5, 6		
Cable, 0.2m, with M8 connector	2, 3, 5, 6	a, b, c, d	
Cable, 0.2m, with M12 connector	2, 3, 5, 6	e, f	
Cable, 2m	4, 6		

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 552

**Options**

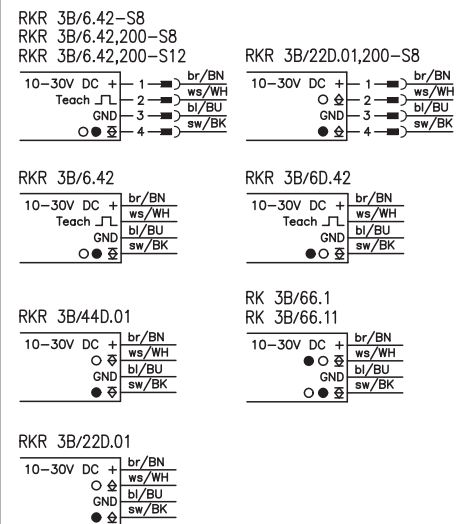
- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Teach-in via teach button or teach input
- 3 Especially for transparent foils  $\leq 20\mu\text{m}$
- 4 Shiny objects
- 5 Autocollimation principle
- 6 UL approval (class 2 acc. to NEC)



**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 3B / 6.7 - S8</b> 50104698	0.02 5 0.02 6		1000Hz	Red light	1xPush-pull/DC	Light
<b>PRK 3B / 6D.7 - S8</b> 50106865	0.02 5 0.02 6		1000Hz	Red light	1xPush-pull/DC	Dark
<b>PRK 3B / 6.7</b> 50104697	0.02 5 0.02 6		1000Hz	Red light	1xPush-pull/DC	Light
<b>PRK 3B / 6 - S8.3</b> 50109581	0.02 5 0.02 6		1000Hz	Red light	1xPush-pull/DC	Light
<b>PRK 3B / 66 - S8</b> 50104694	0.02 5 0.02 6		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 3B / 66</b> 50104693	0.02 5 0.02 6		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 3B / 66, 200 - S8</b> 50104695	0.02 5 0.02 6		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 3B / 66, 200 - S12</b> 50104696	0.02 5 0.02 6		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 3B / 66.1 - S8</b> 50106078	0.02 5 0.02 6		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

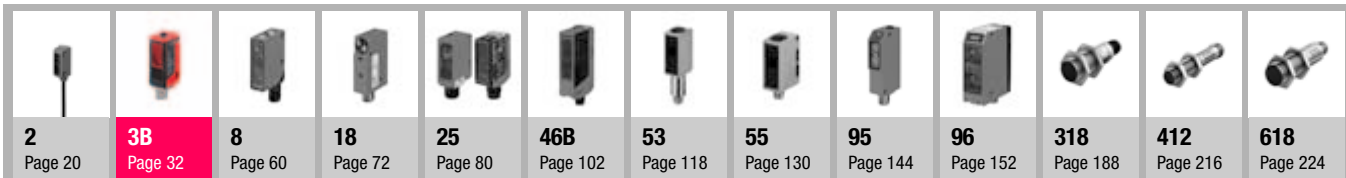
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 552

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR3\_PPRKB1\_EN\_fm



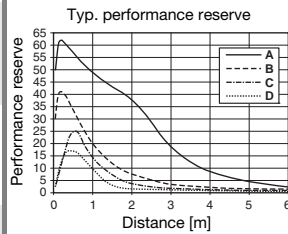


**3B SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 3, 4	a, b	
M8 connector	2, 3, 4	a, b	
Cable, 2m	2, 4		
M8 connector	3, 4	a, b	
M8 connector	4	c, d	
Cable, 2m	4		
Cable, 0.2m, with M8 connector	4	c, d	
Cable, 0.2m, with M12 connector	4	e, f	
M8 connector	1, 4	c, d	



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



Measuring Sensors

Ultrasonic Sensors

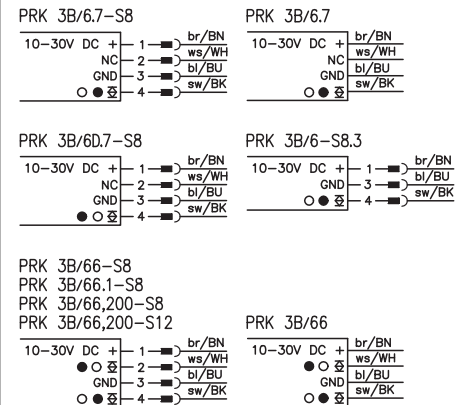
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Economy version (plastic connector, 1 LED, without metal sleeve in housing)
- 3 Direct connection to AS-interface I/O coupling modules
- 4 UL approval (class 2 acc. to NEC)

Ex Sensors

# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input checked="" type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 3B / 4D.22, 200 - S8</b> 50110775	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPNP/DC	Dark/light configurable
<b>PRK 3B / 6.2 - S8.3</b> 50109385	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>PRK 3B / 6.2, 200 - S8.3</b> 50114099	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>PRK 3B / 6.22 - S8</b> 50104700	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>PRK 3B / 6D.22 - S8</b> 50106418	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Dark/light configurable
<b>PRK 3B / 6.22</b> 50104699	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>PRK 3B / 6.22, 200 - S8</b> 50104701	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>PRK 3B / 6.22, 200 - S12</b> 50105762	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Light/dark configurable
<b>PRK 3B / 6D.46</b> 50108026	<input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="0"/> <input type="text" value="5"/>		1000Hz	Red light	1xPush-pull/DC	Dark/light antivalent

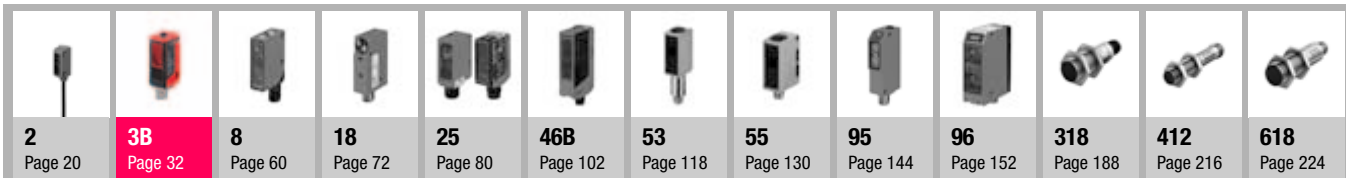
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 552

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR3\_PPRKB2\_EN\_fm

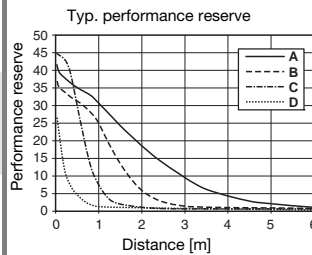


**3B SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
Cable, 0.2m, with M8 connector	2, 5, 6	c, d	
M8 connector	1, 5, 6	a, b	
Cable, 0.2m, with M8 connector	1, 5, 6	a, b	
M8 connector	2, 5, 6	c, d	
M8 connector	2, 5, 6	c, d	
Cable, 2m	2, 5, 6		
Cable, 0.2m, with M8 connector	2, 5, 6	c, d	
Cable, 0.2m, with M12 connector	2, 5, 6	e, f	
Cable, 2m	2, 3, 4, 5, 6,		



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



Measuring Sensors

Ultrasonic Sensors

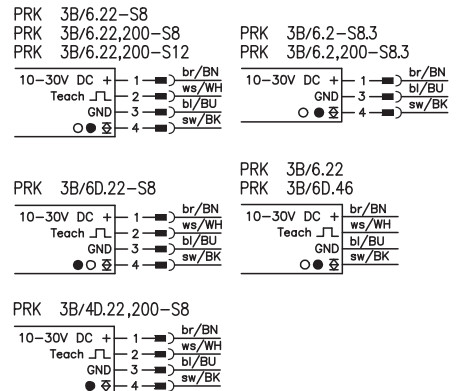
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

**Options**

- 1 Teach-in via teach button
- 2 Teach-in via teach button (lockable) or teach input
- 3 Transparent media (e.g. bottles)
- 4 AutoTeach - cyclical, automatic teach event
- 5 Autocollimation principle
- 6 UL approval (class 2 acc. to NEC)

Light Curtains

Protective Sensors

Ex Sensors

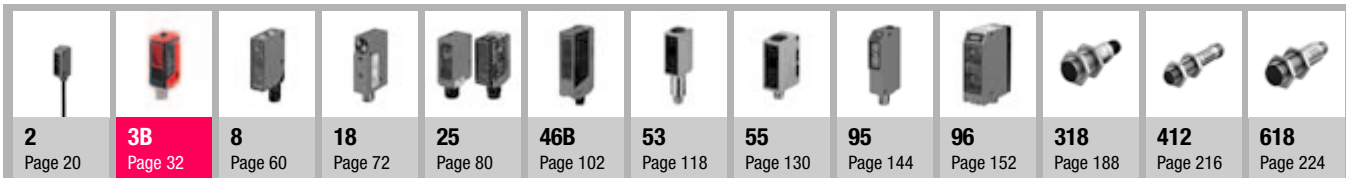
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input checked="" type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 3B / 6.42 - S8</b> 50112473	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3.6"/>	<input type="checkbox"/>	1000Hz	Red light	1 x Push-pull/DC	Light/dark configurable
<b>PRK 3B / 6.42</b> 50113327	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3.6"/>	<input type="checkbox"/>	1000Hz	Red light	1 x Push-pull/DC	Light/dark configurable
<b>PRK 3B / 6.42, 200 - S8</b> 50113325	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3.6"/>	<input type="checkbox"/>	1000Hz	Red light	1 x Push-pull/DC	Light/dark configurable
<b>PRK 3B / 6.42, 200 - S12</b> 50113326	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3.6"/>	<input type="checkbox"/>	1000Hz	Red light	1 x Push-pull/DC	Light/dark configurable
<b>PRK 3B / 6D.42 - S8</b> 50112474	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3.6"/>	<input type="checkbox"/>	1000Hz	Red light	1 x Push-pull/DC	Dark/light configurable
<b>PRK 3B / 6D.42, 200 - S12</b> 50113324	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="3.6"/>	<input type="checkbox"/>	1000Hz	Red light	1 x Push-pull/DC	Dark/light antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 552

We reserve the right to make changes • BR3\_PPRKB3\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC	
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC	
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC	
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC	
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	

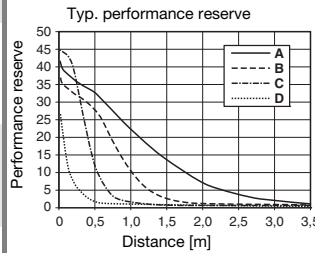


**3B SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	1, 2, 3, 4	a, b, c, d	
Cable, 2m	1, 2, 3, 4		
Cable, 0.2m, with M8 connector	1, 2, 3, 4	a, b, c, d	
Cable, 0.2m, with M12 connector	1, 2, 3, 4	e, f	
M8 connector	1, 2, 3, 4	a, b, c, d	
Cable, 0.2m, with M12 connector	1, 2, 3, 4	e, f	



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



Measuring Sensors

Ultrasonic Sensors

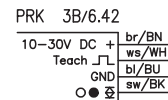
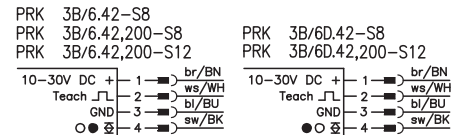
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Teach-in via teach button (lockable) or teach input
- 2 Highly transparent bottles (PET and glass)
- 3 Autocollimation principle
- 4 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/3series/](http://www.leuze.com/3series/)

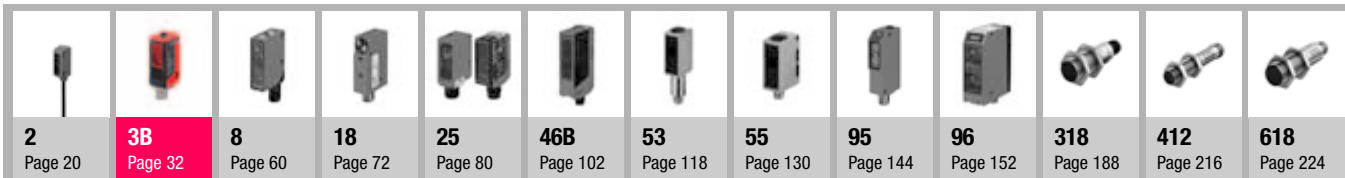
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective laser sensors with polarization filter</b>						
<b>PRKL 3B / 6.2 - S8.3</b> 50109484	<input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="3"/>		2000Hz	Red light laser class 1	Push-pull/DC	Light/dark configurable
<b>PRKL 3B / 6D.22 - S8</b> 50106475	<input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="3"/>		2000Hz	Red light laser class 1	Push-pull/DC	Dark/light configurable
<b>PRKL 3B / 6.22 - S8</b> 50104706	<input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="3"/>		2000Hz	Red light laser class 1	Push-pull/DC	Light/dark configurable
<b>PRKL 3B / 6.22</b> 50104705	<input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="3"/>		2000Hz	Red light laser class 1	Push-pull/DC	Light/dark configurable
<b>PRKL 3B / 6.22, 200 - S8</b> 50104707	<input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="3"/>		2000Hz	Red light laser class 1	Push-pull/DC	Light/dark configurable
<b>PRKL 3B / 6.22, 200 - S12</b> 50105764	<input type="text" value="0"/> <input type="text" value="2"/> <input type="text" value="0"/> <input type="text" value="3"/>		2000Hz	Red light laser class 1	Push-pull/DC	Light/dark configurable

1) The specified values apply in combination with reflectors MTKS 50 x 50, additional reflectors with range specifications can be found on page 552

We reserve the right to make changes • BR3\_PPRKB4\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC	
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC	
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	



**3B SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	1, 3, 4	a, b	
M8 connector	2, 3, 4	c, d	
M8 connector	2, 3, 4	c, d	
Cable, 2m	2, 3, 4		
Cable, 0.2m, with M8 connector	2, 3, 4	c, d	
Cable, 0.2m, with M12 connector	2, 3, 4	e, f	



Measuring Sensors

Ultrasonic Sensors

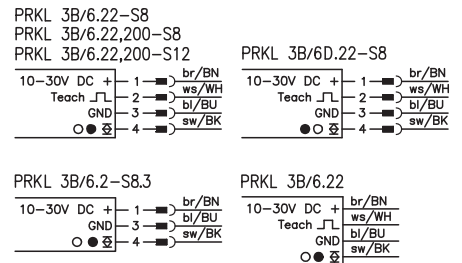
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors





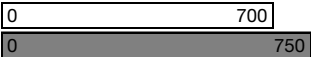

**Options**

- 1 Teach-in via teach button
- 2 Teach-in via teach button (lockable) or teach input
- 3 Autocollimation principle
- 4 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/3series/](http://www.leuze.com/3series/)

## DIFFUSE REFLECTION SCANNERS














Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners</b>						
<b>RTR 3B / 2.7 - S8</b> 50109065			1000Hz	Red light	1xNPN/DC	Light
<b>RTR 3B / 2.7</b> 50109251			1000Hz	Red light	1xNPN/DC	Light
<b>RTR 3B / 6.7 - S8</b> 50109061			1000Hz	Red light	1xPush-pull/DC	Light
<b>RTR 3B / 6.7</b> 50109250			1000Hz	Red light	1xPush-pull/DC	Light
<b>RTR 3B / 66 - S8</b> 50108505			1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTR 3B / 66</b> 50108506			1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

We reserve the right to make changes • BR3\_RTRB\_EN.fm

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
d 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
e 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
f 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



# 3B SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

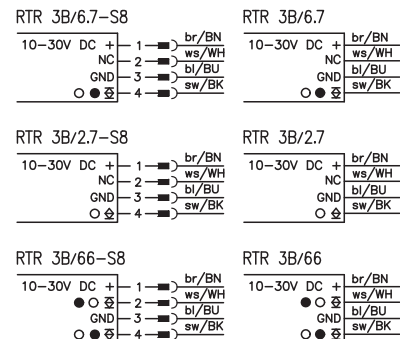
Connection	Option	Accessories	Typ. b/w behavior
M8 connector	1, 2, 3, 4	a, b	
Cable, 2m	1, 2, 4		
M8 connector	1, 2, 3, 4	a, b	
Cable, 2m	1, 2, 4		
M8 connector	1, 4	c, d, e, f	
Cable, 2m	1, 4		



### Optical Sensor ABC

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Sensitivity adjustment
- 2 Economy version (plastic connector, 1 LED, without metal sleeve in housing)
- 3 Direct connection to AS-interface I/O coupling modules
- 4 UL approval (class 2 acc. to NEC)

[www.leuze.com/3series/](http://www.leuze.com/3series/)

# DIFFUSE REFLECTION SCANNERS

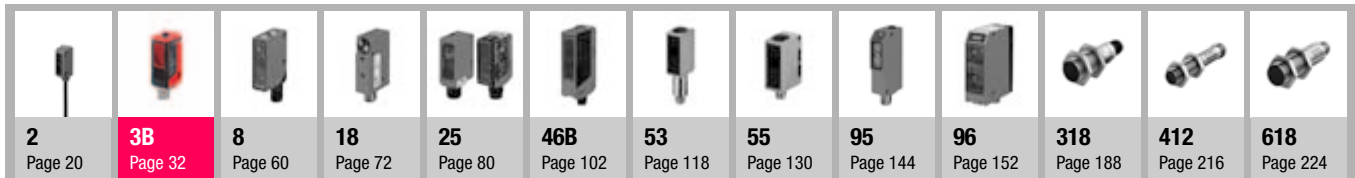
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection light scanners with fading</b>						
<b>RTFR 3B / 2.7</b> 50108502	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	1xNPN/DC	Light
<b>RTFR 3B / 6.7 - S8</b> 50108497	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
<b>RTFR 3B / 6D.7 - S8</b> 50108500	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Dark
<b>RTFR 3B / 6.7</b> 50108501	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
<b>RTFR 3B / 6 - S8.3</b> 50108498	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
<b>RTFR 3B / 6D - S8.3</b> 50108499	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Dark
<b>RTFR 3B / 66 - S8</b> 50108495	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTFR 3B / 66</b> 50108496	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTFR 3B / 66, 200 - S8</b> 50108504	10 420 5 450	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

We reserve the right to make changes • BR3\_RTFRB\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
d 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
e 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
f 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC



# 3B SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

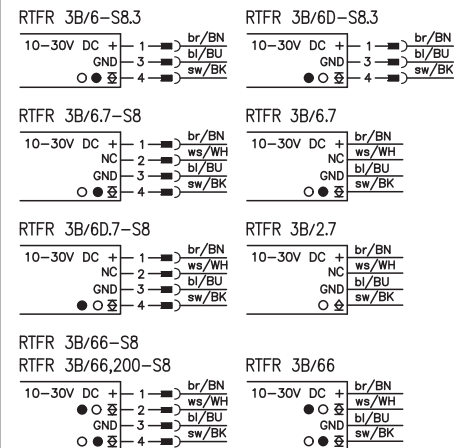
Connection	Option	Accessories	Typ. b/w behavior
Cable, 2m	1, 2, 4		< 50%
M8 connector	1, 2, 3, 4		< 50%
M8 connector	1, 2, 3, 4		< 50%
Cable, 2m	1, 2, 4		< 50%
M8 connector	1, 4	a, b	< 50%
M8 connector	1, 4	a, b	< 50%
M8 connector	1, 4	c, d, e, f	< 50%
Cable, 2m	1, 4		< 50%
Cable, 0.2m, with M8 connector	1, 4	c, d, e, f	< 50%



### Optical Sensor ABC

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Sensitivity adjustment
- 2 Economy version (plastic connector, 1 LED, without metal sleeve in housing)
- 3 Direct connection to AS-interface I/O coupling modules
- 4 UL approval (class 2 acc. to NEC)

[www.leuze.com/3series/](http://www.leuze.com/3series/)

# DIFFUSE REFLECTION SCANNERS

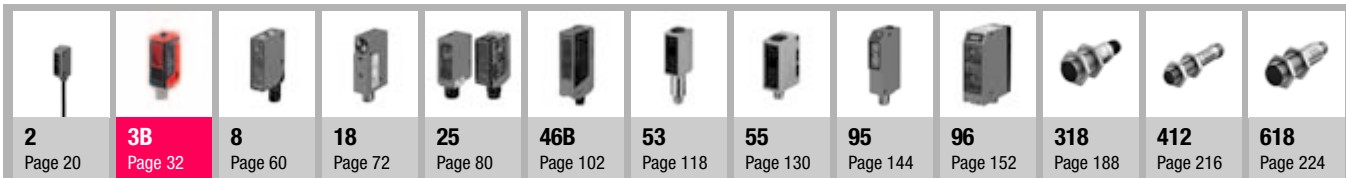
Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRTR 3B / 4, 200 - S8.3</b> 50107232	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	1xPNP/DC	Light
<b>HRTR 3B / 44 - S8</b> 50107233	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 3B / 44</b> 50107235	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 3B / 44, 5000</b> 50109753	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 3B / 44, 200 - S12</b> 50107236	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 3B / 2.7</b> 50107918	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	1xNPN/DC	Light
<b>HRTR 3B / 22 - S8</b> 50107239	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent
<b>HRTR 3B / 22</b> 50107238	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent
<b>HRTR 3B / 6.7 - S8</b> 50107241	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
<b>HRTR 3B / 6.7</b> 50107240	<input type="text" value="5"/> <input type="text" value="200"/> <input type="text" value="5"/> <input type="text" value="400"/>	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR3\_HRTRB1\_EN.fm



**3B SERIES**  
Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

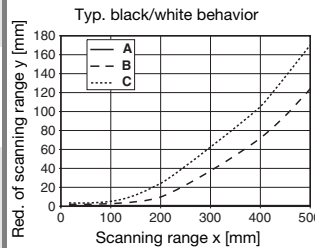
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M8 connector	1, 4	a, b	
M8 connector	1, 4	c, d	
Cable, 2m	1, 4		
Cable, 5m	1, 4		
Cable, 0.2m, with M12 connector	1, 4	e, f	
Cable, 2m	1, 2, 3, 4		
M8 connector	1, 4	c, d	
Cable, 2m	1, 4		
M8 connector	1, 2, 3, 4	a, b	
Cable, 2m	1, 2, 3, 4		

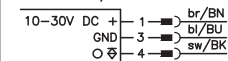


**Optical Sensor ABC**

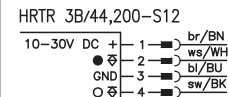
- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

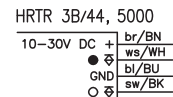
HRTR 3B/4,200-S8.3



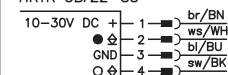
HRTR 3B/44-S8



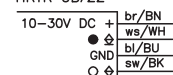
HRTR 3B/44



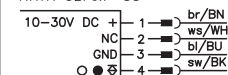
HRTR 3B/22-S8



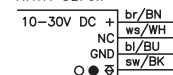
HRTR 3B/22



HRTR 3B/6.7-S8



HRTR 3B/6.7



1) Typical scanning range with a black/white error < 10%

**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Economy version (plastic connector, 1 LED, without metal sleeve in housing)
- 3 Direct connection to AS-interface I/O coupling modules
- 4 UL approval (class 2 acc. to NEC)

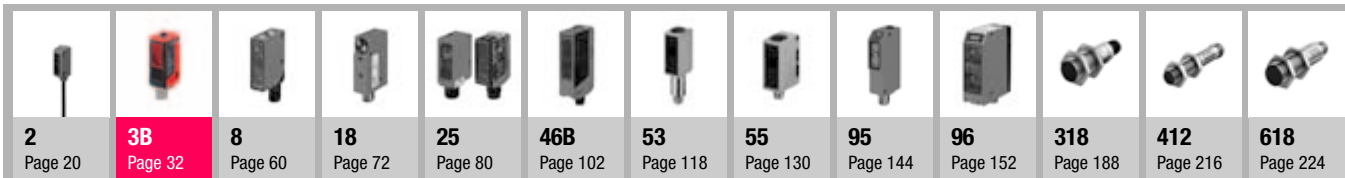
[www.leuze.com/3series/](http://www.leuze.com/3series/)

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] <input type="checkbox"/> Typ. scan range limit [mm] <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>					
<b>HRTR 3B / 6D.7</b> 50107922	<input type="checkbox"/> 5 200 <input checked="" type="checkbox"/> 5 400	1000Hz	Red light	1xPush-pull/DC	Dark
<b>HRTR 3B / 6 - S8.3</b> 50108408	<input type="checkbox"/> 5 200 <input checked="" type="checkbox"/> 5 400	1000Hz	Red light	1xPush-pull/DC	Light
<b>HRTR 3B / 66 - S8</b> 50107229	<input type="checkbox"/> 5 200 <input checked="" type="checkbox"/> 5 400	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66</b> 50107228	<input type="checkbox"/> 5 200 <input checked="" type="checkbox"/> 5 400	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66, 200 - S8</b> 50107230	<input type="checkbox"/> 5 200 <input checked="" type="checkbox"/> 5 400	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66, 200 - S12</b> 50107298	<input type="checkbox"/> 5 200 <input checked="" type="checkbox"/> 5 400	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

We reserve the right to make changes • BR3\_HRTRB2\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC	
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC	
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	



**3B SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

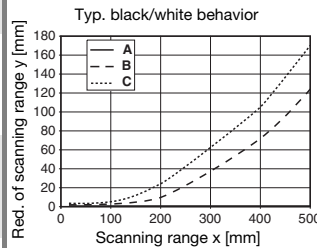
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

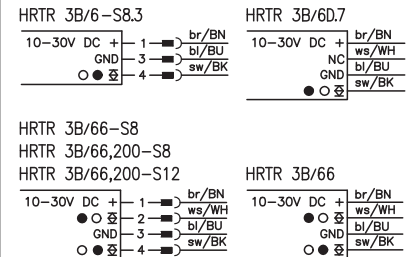
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
Cable, 2m	1, 2, 3, 4		
M8 connector	1, 4	a, b	
M8 connector	1, 4	c, d	
Cable, 2m	1, 4		
Cable, 0.2m, with M8 connector	1, 4	c, d	
Cable, 0.2m, with M12 connector	1, 4	e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



1) Typical scanning range with a black/white error < 10%

**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Economy version (plastic connector, 1 LED, without metal sleeve in housing)
- 3 Direct connection to AS-interface I/O coupling modules
- 4 UL approval (class 2 acc. to NEC)

# DIFFUSE REFLECTION SCANNERS

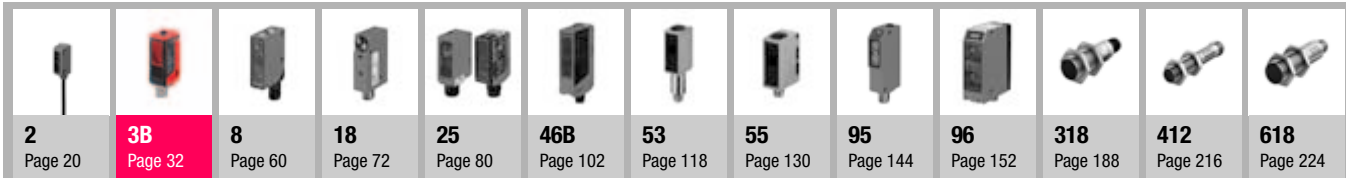
Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRTR 3B / 6 - S - S8.3</b> 50108407		<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
<b>HRTR 3B / 6 - S, 200 - S8.3</b> 50109051		<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
<b>HRTR 3B / 66 - S - S8</b> 50107243		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66 - S</b> 50107242		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66 - S, 5000</b> 50110809		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66 - S, 200 - S8</b> 50107244		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 66 - S, 200 - S12</b> 50107245		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 3B / 44 - L - S8</b> 50111443		<input type="checkbox"/>	150Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 3B / 44 - L, 200 - S8</b> 50113317		<input type="checkbox"/>	150Hz	Red light	2xPNP/DC	Light/dark antivalent

**Accessories / connection cables**

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

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**3B SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M8 connector	1, 2, 4	a, b	
Cable, 0.2m, with M8 connector	1, 2, 4	a, b	
M8 connector	1, 2, 4	c, d	
Cable, 2m	1, 2, 4		
Cable, 5m	1, 2, 4		
Cable, 0.2m, with M8 connector	1, 2, 4	c, d	
Cable, 0.2m, with M12 connector	1, 2, 4	e, f	
M8 connector	1, 3, 4	c, d	
Cable, 0.2m, with M8 connector	1, 3, 4	c, d	

1) Typical scanning range with a black/white error < 10%

**Options**

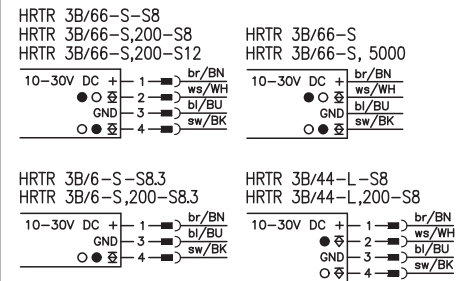
- Scanning range adjustment via multiturn potentiometer
- Small, homogenous light spot for detecting small parts
- Broad rectangular light spot 3 x 33mm<sup>2</sup> (at a distance of 50mm) guarantees the reliable detection of objects with openings, grid structures, holes, grooves and of objects with changeable position as well as transparent foils/bottles
- UL approval (class 2 acc. to NEC)



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Diffuse reflection scanners with background suppression</b>										
<b>HRTR 3B / 4 - XL - S8</b> 50107299	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	1xPNP/DC	Light
5	60									
5	100									
<b>HRTR 3B / 44 - XL - S8</b> 50107250	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
5	60									
5	100									
<b>HRTR 3B / 44 - XL, 200 - S12</b> 50107251	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
5	60									
5	100									
<b>HRTR 3B / 6 - XL - S8.3</b> 50109485	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Light
5	60									
5	100									
<b>HRTR 3B / 6D - XL - S8.3</b> 50111444	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	1xPush-pull/DC	Dark
5	60									
5	100									
<b>HRTR 3B / 66 - XL - S8</b> 50107247	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5	60									
5	100									
<b>HRTR 3B / 66 - XL</b> 50107246	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5	60									
5	100									
<b>HRTR 3B / 66 - XL, 200 - S8</b> 50107248	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5	60									
5	100									
<b>HRTR 3B / 66 - XL, 200 - S12</b> 50107249	<table border="1"><tr><td>5</td><td>60</td></tr><tr><td>5</td><td>100</td></tr></table>	5	60	5	100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5	60									
5	100									

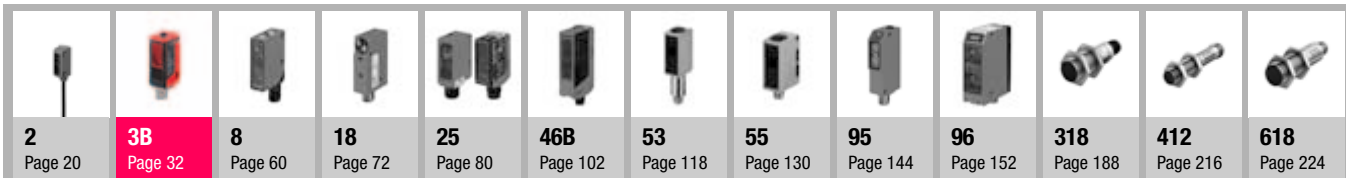
1) Typical scanning range with a black/white error < 10%

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

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**3B SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

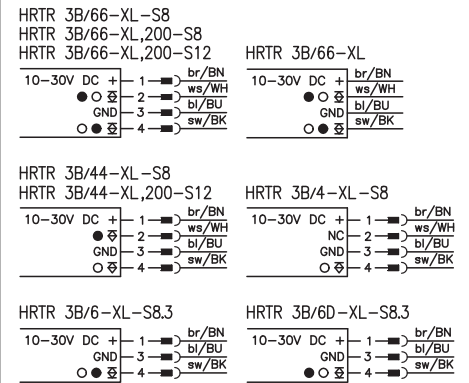
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M8 connector	1, 2, 3, 4	c, d	
M8 connector	1, 3, 4	c, d	
Cable, 0.2m, with M12 connector	1, 3, 4	e, f	
M8 connector	1, 3, 4	a, b	<p>Typ. black/white behavior</p>
M8 connector	1, 3, 4	a, b	
M8 connector	1, 3, 4	c, d	
Cable, 2m	1, 3, 4		
Cable, 0.2m, with M8 connector	1, 3, 4	c, d	
Cable, 0.2m, with M12 connector	1, 3, 4	e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**
















- Options**
- 1 Scanning range adjustment via multiturn potentiometer
  - 2 Direct connection to AS-interface I/O coupling modules
  - 3 Broad rectangular light spot 3 x 40mm<sup>2</sup> (at a distance of 50mm) guarantees the reliable detection of objects with openings, grid structures, holes, grooves and of objects with changeable position as well as transparent foils/bottles
  - 4 UL approval (class 2 acc. to NEC)

[www.leuze.com/3series/](http://www.leuze.com/3series/)

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Diffuse reflection scanners with background suppression</b>										
<b>HRT 3B / 44</b> 50110659	<table border="1"> <tr> <td>5</td> <td>250</td> </tr> <tr> <td>5</td> <td>600</td> </tr> </table>	5	250	5	600		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
5	250									
5	600									

1) Typical scanning range with a black/white error < 10%

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 3B SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90%                      B gray 18%                      C black 6%</p>
Cable, 2m	1, 2		<p>Typ. black/white behavior</p>



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

### Electrical connection

HRTR 3B/44-XL-S8	
10-30V DC	br/BN
+	ws/WH
●	bi/BU
CND	sw/BK
○	

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

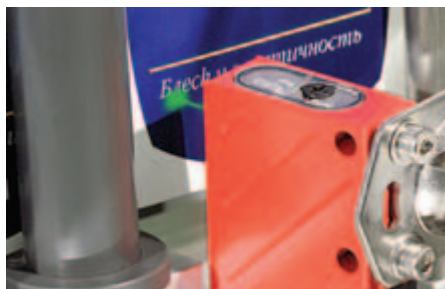
### Options

- 1 Scanning range adjustment via multiturn potentiometer
- 2 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/3series/](http://www.leuze.com/3series/)

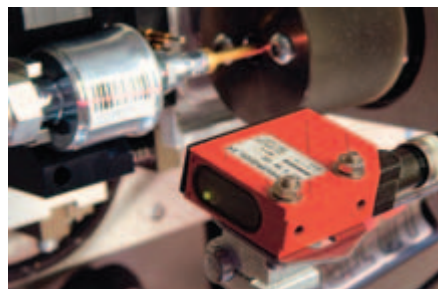
# OVERVIEW



Mark detection

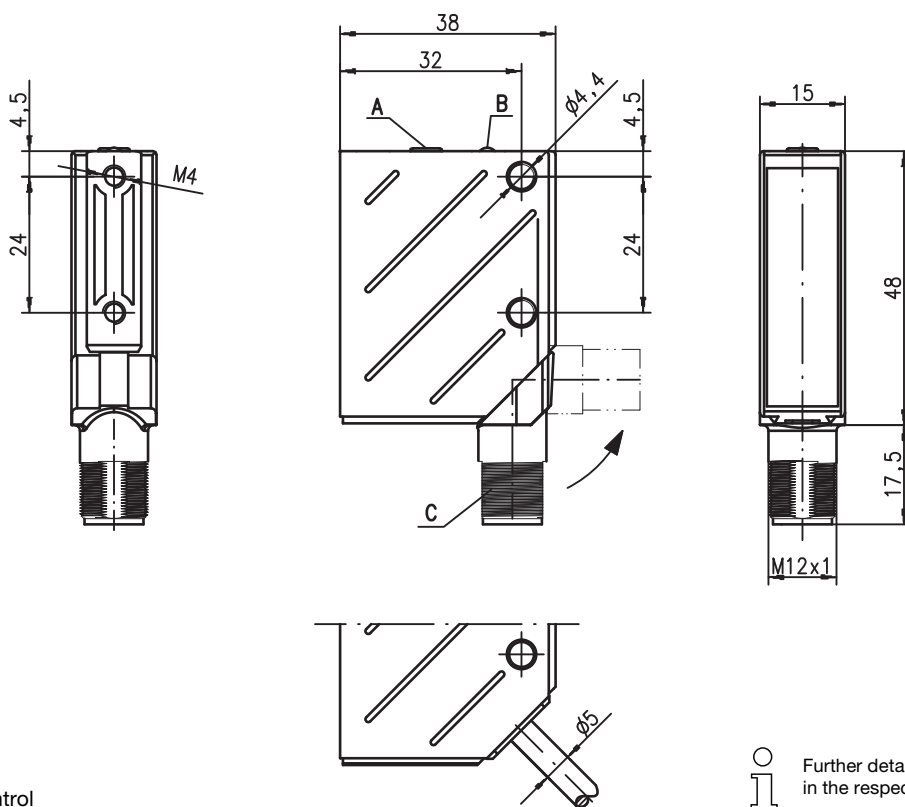


Extension control




Bar code reading














## Dimensioned drawing






- A** Operational control
- B** Indicator diode
- C** 90° turning connector

 Further details can be found in the respective data sheet.

We reserve the right to make changes • BR8\_Overview\_EN.fm

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 8 SERIES

Operating principle	Typ. operating range limits	Page
 Throughbeam sensors	0 ... 100 m	62
 Retro-reflective sensors	0 ... 20 m	64
 Diffuse reflection scanners	5 ... 800 mm	66

### Other 8 Series products:

 Optical distance sensors	ODSL 8	236
 Ultrasonic sensors	LSU 8, RKU 8, HRTU 8	300



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight (connector/cable)	70g/140g
<b>Environmental data</b>	Ambient temperature (operation)	-40°C ... +60°C Laser: -10°C ... +40°C
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 514 onwards

### Features

- Metal housing
- IP 67 and IP 69K
- Active ambient light suppression A<sup>2</sup>LS
- Interference-immune push-pull outputs
- Laser devices
- Expanded temperature range: -40°C to +60°C
- M12 turning connector



### Optical Sensor ABC

- |                               |          |
|-------------------------------|----------|
| ● Throughbeam sensors         | Page 563 |
| ● Retro-reflective sensors    | Page 563 |
| ● Diffuse reflection scanners | Page 564 |
| ● A <sup>2</sup> LS           | Page 571 |

# THROUGHBEAM SENSORS

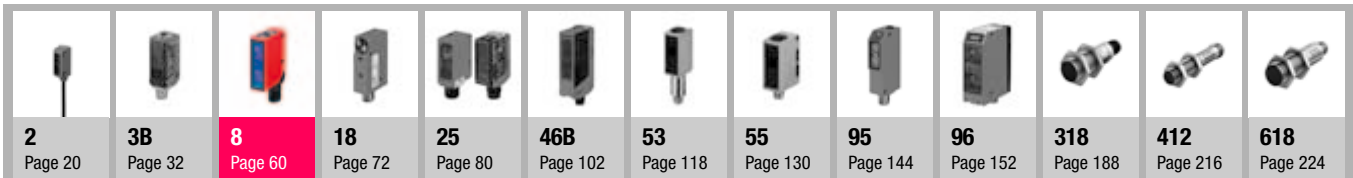
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b>						
▶ = Transmitter ◀ = Receiver						
▶ LSSR 8 - S12 ◀ LSER 8 / 44 - S12	50036354 50036356	<input type="text" value="0"/> <input type="text" value="12"/> <input type="text" value="0"/> <input type="text" value="20"/>	1500Hz	Red light	2xPNP/DC	Light/dark antivalent
▶ LSSR 8 ◀ LSER 8 / 44	50036355 50036357	<input type="text" value="0"/> <input type="text" value="12"/> <input type="text" value="0"/> <input type="text" value="20"/>	1500Hz	Red light	2xPNP/DC	Light/dark antivalent
▶ LSSR 8 - S12 ◀ LSER 8 / 66 - S12	50036354 50036569	<input type="text" value="0"/> <input type="text" value="12"/> <input type="text" value="0"/> <input type="text" value="20"/>	1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 8 ◀ LSER 8 / 66	50036355 50036570	<input type="text" value="0"/> <input type="text" value="12"/> <input type="text" value="0"/> <input type="text" value="20"/>	1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>Throughbeam laser sensors</b>						
▶ LSSRL 8.9 - S12 ◀ LSERL 8 / 24.01 - S12	50036358 50036359	<input type="text" value="0"/> <input type="text" value="60"/> <input type="text" value="0"/> <input type="text" value="100"/>	2800Hz	Laser class 2	PNP/DC NPN/DC	Light
▶ LSSRL 8.9 ◀ LSERL 8 / 24.01	50037083 50037084	<input type="text" value="0"/> <input type="text" value="60"/> <input type="text" value="0"/> <input type="text" value="100"/>	2800Hz	Laser class 2	PNP/DC NPN/DC	Light

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR8\_LSR\_EN.fm





**8 SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

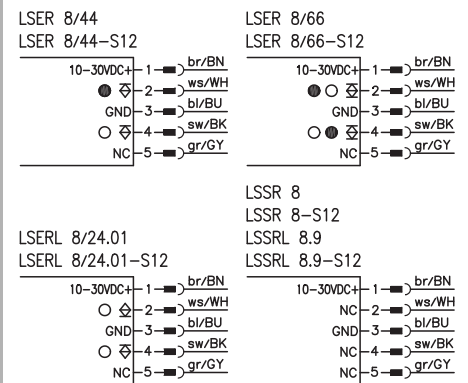
Connection	Option	Accessories	Typ. light spot
M12 connector	3	a, b, c, d, e, f	
Cable, 2m	3		
M12 connector	3	a, b, c, d, e, f	
Cable, 2m	3		
M12 connector	1, 2, 3	a, b, c, d, e, f	<p><b>A</b> Focus at 0.125m <b>B</b> Focus at 2m <b>C</b> Focus at 16m</p>
Cable, 2m	1, 2, 3		



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568
- Sensors w. laser transmitter Page 569

**Electrical connection**



**Options**

- 1 Adjustable focus
- 2 Sensitivity adjustment via potentiometer
- 3 UL approval

# RETRO-REFLECTIVE SENSORS

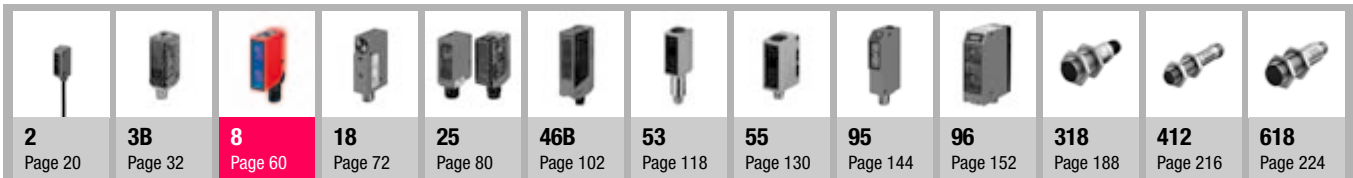
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Retro-reflective sensors with polarization filter</b>										
<b>PRK 8 / 44 - S12</b> 50036360	<table border="1"><tr><td>0.1</td><td>6.4</td></tr><tr><td>0.05</td><td>8</td></tr></table>	0.1	6.4	0.05	8	<input type="checkbox"/>	1500Hz	Red light	2xPNP/DC	Light/dark antivalent
0.1	6.4									
0.05	8									
<b>PRK 8 / 44</b> 50036361	<table border="1"><tr><td>0.1</td><td>6.4</td></tr><tr><td>0.05</td><td>8</td></tr></table>	0.1	6.4	0.05	8	<input type="checkbox"/>	1500Hz	Red light	2xPNP/DC	Light/dark antivalent
0.1	6.4									
0.05	8									
<b>PRK 8 / 66 - S12</b> 50036362	<table border="1"><tr><td>0.1</td><td>6.4</td></tr><tr><td>0.05</td><td>8</td></tr></table>	0.1	6.4	0.05	8	<input type="checkbox"/>	1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
0.1	6.4									
0.05	8									
<b>PRK 8 / 66</b> 50036363	<table border="1"><tr><td>0.1</td><td>6.4</td></tr><tr><td>0.05</td><td>8</td></tr></table>	0.1	6.4	0.05	8	<input type="checkbox"/>	1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
0.1	6.4									
0.05	8									
<b>PRK 8 / 66.11 - S12</b> 50037133	<table border="1"><tr><td>0</td><td>5</td></tr><tr><td>0</td><td>7</td></tr></table>	0	5	0	7	<input type="checkbox"/>	1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
0	5									
0	7									
<b>PRK 8 / 66.41 - S12</b> 50037134	<table border="1"><tr><td>0</td><td>2</td></tr><tr><td>0</td><td>2.4</td></tr></table>	0	2	0	2.4	<input type="checkbox"/>	1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
0	2									
0	2.4									
<b>PRK 8 / 66.42 - S12</b> 50037135	<table border="1"><tr><td>0</td><td>2</td></tr><tr><td>0</td><td>2.4</td></tr></table>	0	2	0	2.4	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
0	2									
0	2.4									
<b>Retro-reflective laser sensors with polarization filter</b>										
<b>PRKL 8 / 24.91 - S12</b> 50036364	<table border="1"><tr><td>0</td><td>16</td></tr><tr><td>0</td><td>20</td></tr></table>	0	16	0	20	<input type="checkbox"/>	2800Hz	Laser class 2	PNP/DC NPN/DC	Light Dark
0	16									
0	20									
<b>PRKL 8 / 24.91</b> 50036365	<table border="1"><tr><td>0</td><td>16</td></tr><tr><td>0</td><td>20</td></tr></table>	0	16	0	20	<input type="checkbox"/>	2800Hz	Laser class 2	PNP/DC NPN/DC	Light Dark
0	16									
0	20									

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 552

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
b 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC



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# 8 SERIES

Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

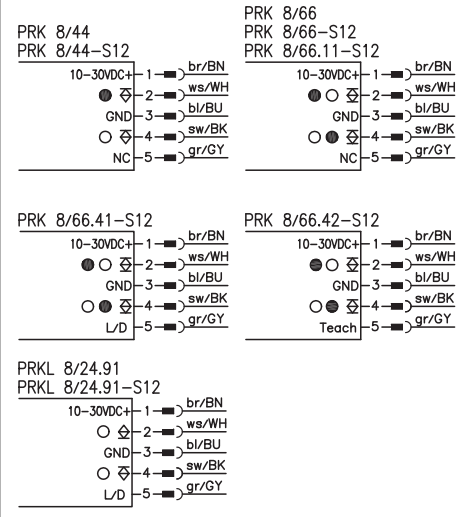
Connection	Option	Accessories	Typ. light spot
M12 connector	7	a, b	
Cable, 2m	7		
M12 connector	7	a, b	
Cable, 2m	7		
M12 connector	1, 3, 7	a, b	
M12 connector	1, 3, 4, 7	c, d	
M12 connector	2, 3, 4, 5, 7	c, d	



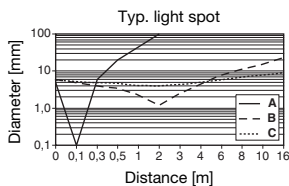
### Optical Sensor ABC

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

### Electrical connection



- A** Focus at 0.144m
- B** Focus at 2m
- C** Focus at 16m










### Options

- 1 Sensitivity adjustment via potentiometer
- 2 Sensitivity adjustment via teach-in
- 3 Autocollimation principle
- 4 Transparent media (foil < 20µm and bottles)
- 5 Tracking function
- 6 Adjustable focus
- 7 UL approval

[www.leuze.com/8series/](http://www.leuze.com/8series/)

# DIFFUSE REFLECTION SCANNERS














Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners</b>						
<b>RTR 8 / 44 - 800 - S12</b> 50036366			1500Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>RTR 8 / 44 - 800</b> 50036367			1500Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>RTR 8 / 66 - 800 - S12</b> 50036368			1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTR 8 / 66 - 800</b> 50036369			1500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>Diffuse reflection scanners with foreground suppression</b>						
<b>VRTR 8 / 44 - 250 - S12</b> 50036372			1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>VRTR 8 / 66 - 250 - S12</b> 50036374			1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>VRTR 8 / 66 - 250</b> 50036375			1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 8 SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	2, 3	a, b, c, d, e, f	
M12 connector	2, 3	a, b, c, d, e, f	
Cable, 2m	2, 3		



Measuring Sensors

Ultrasonic Sensors

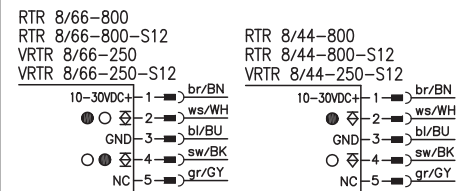
Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

### Electrical connection



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

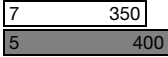
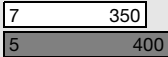
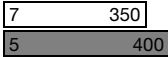
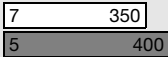
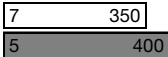
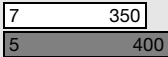


### Options

- 1 Scanning range adjustment via potentiometer
- 2 Scanning range adjustment via multiturn potentiometer
- 3 UL approval

Ex Sensors

[www.leuze.com/8series/](http://www.leuze.com/8series/)

# DIFFUSE REFLECTION SCANNERS

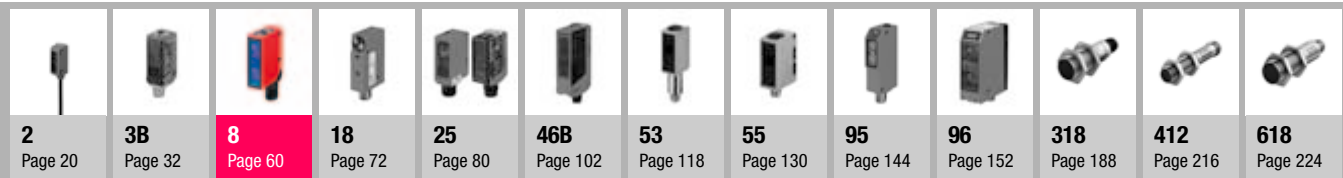
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRTR 8 / 44 - 350 - S12</b> 50036350		<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 8 / 44 - 350</b> 50036351		<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 8 / 66 - 350 - S12</b> 50036352		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 8 / 66 - 350</b> 50036353		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 8 / 66 - 350, 5000</b> 50108224		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 8 / 66.6 - 350 - S12</b> 50039650		<input type="checkbox"/>	1000Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>IHRT 8 / 4 - 200 - S12</b> 50103361		<input type="checkbox"/>	200Hz	Infrared light	1xPNP/DC	Light
<b>IHRT 8 / 4 - 100 - S12</b> 50103360		<input type="checkbox"/>	200Hz	Infrared light	1xPNP/DC	Light

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## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



# 8 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

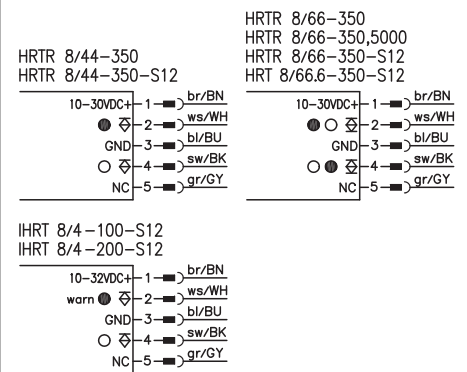
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
Cable, 5m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
M12 connector	2, 3	a, b, c, d, e, f	
M12 connector	2, 3	a, b, c, d, e, f	



### Optical Sensor ABC

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Warning output (wire break monitoring/contamination control)
- 3 UL approval

# DIFFUSE REFLECTION SCANNERS

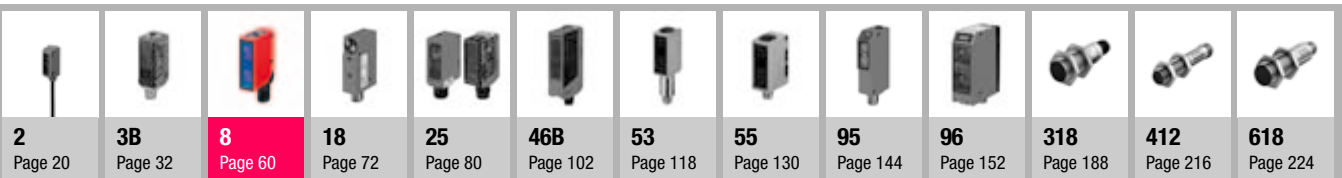
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source Light spot <sup>1)</sup>	Output	Switching
<b>Diffuse reflection laser scanners with background suppression</b>						
<b>HRTL 8 / 24 - 350 - S12</b> 50036370		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 1.0mm	PNP/DC NPN/DC	Light
<b>HRTL 8 / 24 - 350</b> 50036371		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 1.0mm	PNP/DC NPN/DC	Light
<b>HRTL 8 / 66 - 350 - S12</b> 50102705		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 1.0mm	2xPush-pull/DC	Light/dark antivalent
<b>HRTL 8 / 66 - 350, 5000</b> 50103709		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 1.0mm	2xPush-pull/DC	Light/dark antivalent
<b>HRTL 8 / 24 - 150 - S12</b> 50038482		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 0.75mm	PNP/DC NPN/DC	Light
<b>HRTL 8 / 24 - 150</b> 50038483		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 0.75mm	PNP/DC NPN/DC	Light
<b>HRTL 8 / 66 - 150 - S12</b> 50102704		<input type="checkbox"/>	2000Hz	Red light laser class 2 Ø 0.75mm	2xPush-pull/DC	Light/dark antivalent

1) At the specified scanning range

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**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC





**8 SERIES**

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 2	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2		
M12 connector	1, 2	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 5m	1, 2		
M12 connector	1, 2	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2		
M12 connector	1, 2	a, b, c, d, e, f	<p>Typ. black/white behavior</p>



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**

HRTL 8/24-150		HRTL 8/66-150-S12																														
HRTL 8/24-150-S12		HRTL 8/66-350, 5000																														
HRTL 8/24-350		HRTL 8/66-350-S12																														
HRTL 8/24-350-S12																																
<table border="0"> <tr> <td>10-30VDC+</td> <td>1</td> <td>br/BN</td> </tr> <tr> <td>○ ⊗ 2</td> <td>2</td> <td>ws/WH</td> </tr> <tr> <td>GND 3</td> <td>3</td> <td>bl/BU</td> </tr> <tr> <td>○ ⊗ 4</td> <td>4</td> <td>sw/BK</td> </tr> <tr> <td>NC 5</td> <td>5</td> <td>gr/GY</td> </tr> </table>	10-30VDC+	1	br/BN	○ ⊗ 2	2	ws/WH	GND 3	3	bl/BU	○ ⊗ 4	4	sw/BK	NC 5	5	gr/GY		<table border="0"> <tr> <td>10-30VDC+</td> <td>1</td> <td>br/BN</td> </tr> <tr> <td>● ○ ⊗ 2</td> <td>2</td> <td>ws/WH</td> </tr> <tr> <td>GND 3</td> <td>3</td> <td>bl/BU</td> </tr> <tr> <td>● ○ ⊗ 4</td> <td>4</td> <td>sw/BK</td> </tr> <tr> <td>NC 5</td> <td>5</td> <td>gr/GY</td> </tr> </table>	10-30VDC+	1	br/BN	● ○ ⊗ 2	2	ws/WH	GND 3	3	bl/BU	● ○ ⊗ 4	4	sw/BK	NC 5	5	gr/GY
10-30VDC+	1	br/BN																														
○ ⊗ 2	2	ws/WH																														
GND 3	3	bl/BU																														
○ ⊗ 4	4	sw/BK																														
NC 5	5	gr/GY																														
10-30VDC+	1	br/BN																														
● ○ ⊗ 2	2	ws/WH																														
GND 3	3	bl/BU																														
● ○ ⊗ 4	4	sw/BK																														
NC 5	5	gr/GY																														

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 UL approval

Ex Sensors

[www.leuze.com/8series/](http://www.leuze.com/8series/)

## OVERVIEW



Bottle cleaning

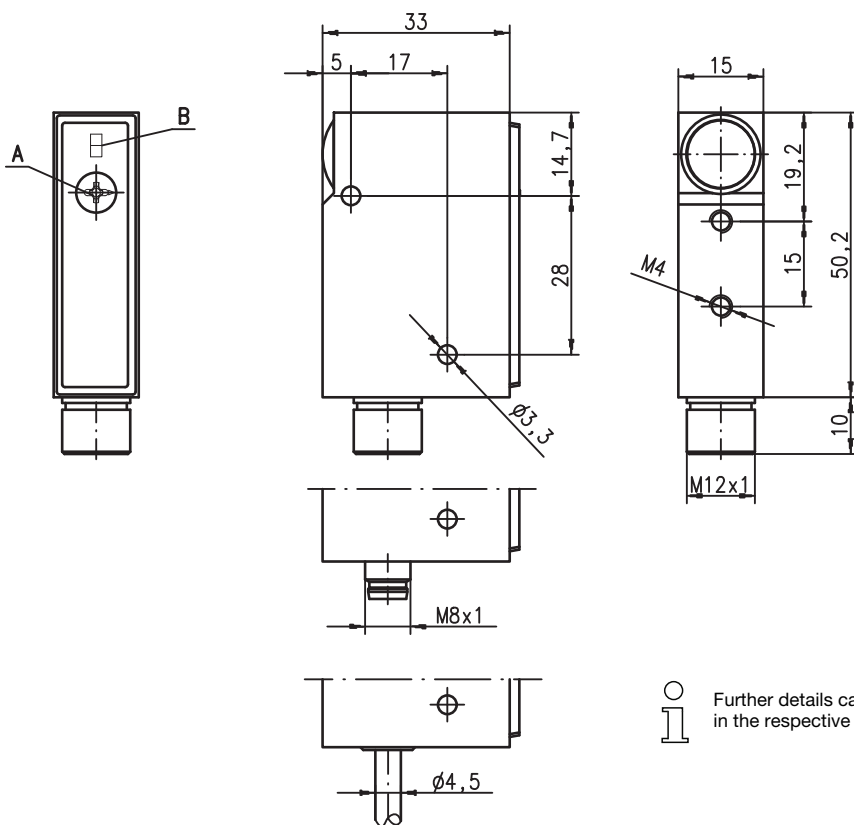


Suspended bottle transport
















Bottle inspection

### Dimensioned drawing




- A** Sensitivity adjustment
- B** Indicator diode

We reserve the right to make changes • BR18\_Overview\_EN.fm

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 18 SERIES

Operating principle	Typ. operating range limits	Page
 Retro-reflective sensors	0 ... 5 m	74

**Other 18 Series products:**

 Ultrasonic sensors	LSU 18	304
 AS-interface sensors	IPRK 18	510



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Yellow LED	Switching output
<b>Mechanical data</b>	Housing	Diecast zinc
	Optics cover	Glass
	Weight (connector/cable)	90g/150g
<b>Environmental data</b>	Ambient temperature (operation)	$-25^\circ\text{C} \dots +55^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 67, IP 69K
	Standards applied	IEC 60947-5-2, UL 508
<b>Mounting systems for this series can be found from page 517 onwards</b>		

## Features

- Stainless steel and metal housing
- Glass optics
- IP 67 and IP 69K
- Detection of PET, foil, and glass



Forked Sensors

Special Sensors

Fiber Optic Sensors

## Optical Sensor ABC

- |  |          |
|--|----------|
| ● Retro-reflective sensors                         | Page 563 |
| ● Retro-reflective sensor with polarization filter | Page 563 |
| ● A <sup>2</sup> LS                                | Page 571 |

Light Curtains

Protective Sensors

Ex Sensors

## RETRO-REFLECTIVE SENSORS

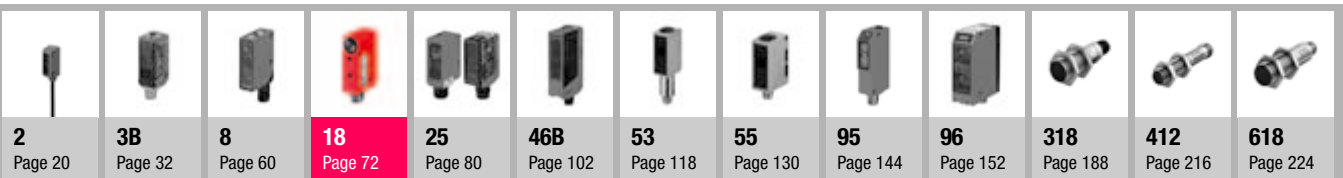
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors</b>						
<b>RKR 18 / 4 L</b> 50102731	0 <input type="text" value="4"/> 4 0 <input type="text" value="5"/> 5	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>RKR 18 / 4, 6000</b> 50102730	0 <input type="text" value="4"/> 4 0 <input type="text" value="5"/> 5	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>RKR 18 / 4 DL8.45.1</b> 50041448	0 <input type="text" value="2.4"/> 2.4 0 <input type="text" value="3"/> 3	<input type="checkbox"/>	1500Hz	Red light	PNP/DC	Light/dark reversible
<b>RKR 18 / 4 DL8.45</b> 50041446	0 <input type="text" value="2.4"/> 2.4 0 <input type="text" value="3"/> 3	<input type="checkbox"/>	1500Hz	Red light	PNP/DC	Light/dark reversible
<b>RK 18 / 4 DL.45</b> 50081364	0 <input type="text" value="2.4"/> 2.4 0 <input type="text" value="3"/> 3	<input type="checkbox"/>	1500Hz	Red light	PNP/DC	Light/dark reversible

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553

We reserve the right to make changes • BR18\_PRK1\_EN.fm

### Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**18 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	4, 6	c, d, e, f	
Cable, 6 m	4, 6		
M8 connector	1, 2, 3, 4, 5, 6	a, b	
M8 connector	1, 2, 3, 4, 6	a, b	
M12 connector	1, 2, 3, 4, 6	c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

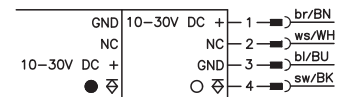
**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

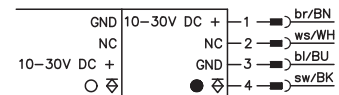
Forked Sensors

**Electrical connection**

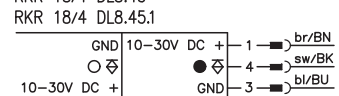
RKR 18/4, 6000  
RKR 18/4 L



RK 18/4 DL.45



RKR 18/4 DL8.45



Special Sensors

Fiber Optic Sensors

**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Transparent media (foil < 20µm and bottles)
- 3 Green LED for precise adjustment of the operating point
- 4 Autocollimation principle
- 5 Stainless steel housing
- 6 UL approval

Light Curtains

Protective Sensors

[www.leuze.com/18series/](http://www.leuze.com/18series/)

Ex Sensors

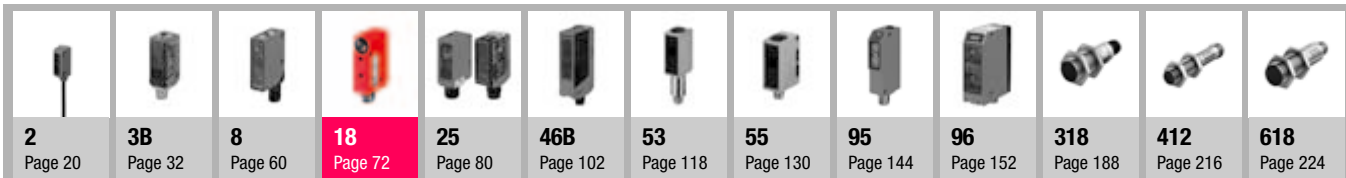
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 18 / 4 L</b> 50081254	0 <input type="text" value="4"/> <sup>1)</sup> 0 <input type="text" value="5"/> <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 18 / 4, 6000</b> 50033244	0 <input type="text" value="4"/> <sup>1)</sup> 0 <input type="text" value="5"/> <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>IPRK 18 / 4 DL.41</b> 50033552	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="4"/> <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 18 / 24 DL.42</b> 50033554	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="4"/> <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC NPN/DC	Dark
<b>PRK 18 / 24 DL.46</b> 50032798	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="4"/> <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC NPN/DC	Light/dark reversible

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553

We reserve the right to make changes • BR18\_PRK2\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC	
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC	



**18 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

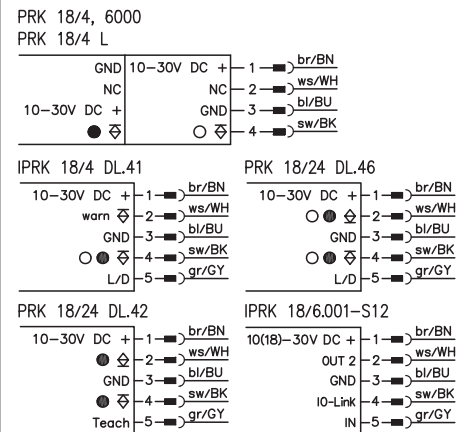
Connection	Option	Accessories	Typ. light spot
M12 connector	4, 9	a, b, c, d	
Cable, 6 m	4, 9		
M12 connector	2, 3, 5, 7, 8, 9	e, f	
M12 connector	2, 3, 5, 6, 7, 9	e, f	
M12 connector	2, 3, 5, 7, 9	e, f	



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Extensive configuration of input and outputs via IO-Link
- 2 Transparent media (foil < 20µm and bottles)
- 3 LEDs for the operating mode/setting the operating point
- 4 Autocollimation principle
- 5 Teach-in via step switch
- 6 Teach-in via control cable
- 7 Dirt/cleaning compensation (step/peak tracking)
- 8 Warning output
- 9 UL approval

[www.leuze.com/18series/](http://www.leuze.com/18series/)

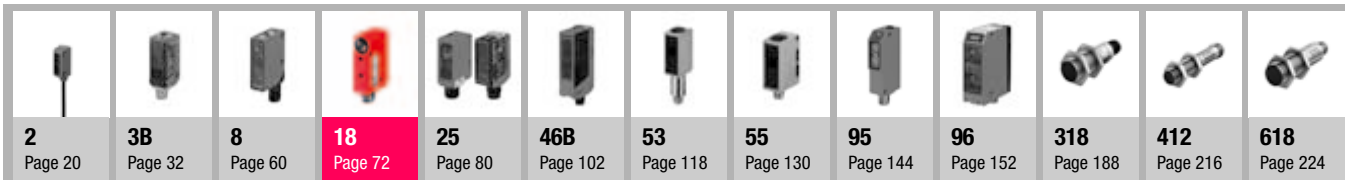
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching						
<b>Retro-reflective sensors with polarization filter</b>												
<b>PRK 18 / 4 L.4</b> 50104415	<table border="1"> <tr><td>0</td><td>2.4</td><td><sup>1)</sup></td></tr> <tr><td>0</td><td>3</td><td><sup>1)</sup></td></tr> </table>	0	2.4	<sup>1)</sup>	0	3	<sup>1)</sup>	<input type="checkbox"/>	1500Hz	Red light	PNP/DC	Light/dark reversible
0	2.4	<sup>1)</sup>										
0	3	<sup>1)</sup>										
<b>PRK 18 / 4 DL.4</b> 50080153	<table border="1"> <tr><td>0</td><td>2.4</td><td><sup>1)</sup></td></tr> <tr><td>0</td><td>3</td><td><sup>1)</sup></td></tr> </table>	0	2.4	<sup>1)</sup>	0	3	<sup>1)</sup>	<input type="checkbox"/>	1500Hz	Red light	PNP/DC	Dark/light reversible
0	2.4	<sup>1)</sup>										
0	3	<sup>1)</sup>										
<b>PRK 18 / 2 DL.4</b> 50081153	<table border="1"> <tr><td>0</td><td>2.4</td><td><sup>1)</sup></td></tr> <tr><td>0</td><td>3</td><td><sup>1)</sup></td></tr> </table>	0	2.4	<sup>1)</sup>	0	3	<sup>1)</sup>	<input type="checkbox"/>	1500Hz	Red light	NPN/DC	Dark/light reversible
0	2.4	<sup>1)</sup>										
0	3	<sup>1)</sup>										
<b>IPRK 18 / V L.03</b> 50106974	<table border="1"> <tr><td>0</td><td>1</td><td><sup>2)</sup></td></tr> <tr><td>0</td><td>1.2</td><td><sup>2)</sup></td></tr> </table>	0	1	<sup>2)</sup>	0	1.2	<sup>2)</sup>	<input type="checkbox"/>	–	Red light	Analog/mA, 1 x PNP/DC	–
0	1	<sup>2)</sup>										
0	1.2	<sup>2)</sup>										

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553  
 2) The specified values apply in combination with reflectors MTKS 50 x 50, additional reflectors with range specifications can be found on page 553

We reserve the right to make changes • BR18\_PRK3\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC	
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC	





**18 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2, 3, 4, 7	a, b, c, d	
M12 connector	1, 2, 3, 4, 7	a, b, c, d	
M12 connector	1, 2, 3, 4, 7	a, b, c, d	
M12 connector	3, 5, 6, 7	e, f	



Measuring Sensors

Ultrasonic Sensors

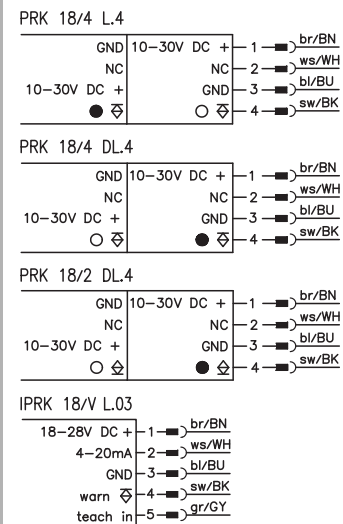
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Transparent media (foil < 20µm and bottles)
- 3 LEDs for the operating mode/setting the operating point
- 4 Autocollimation principle
- 5 Teach-in via control cable
- 6 Warning output
- 7 UL approval

Ex Sensors

[www.leuze.com/18series/](http://www.leuze.com/18series/)

**OVERVIEW**



Object detection in distribution systems



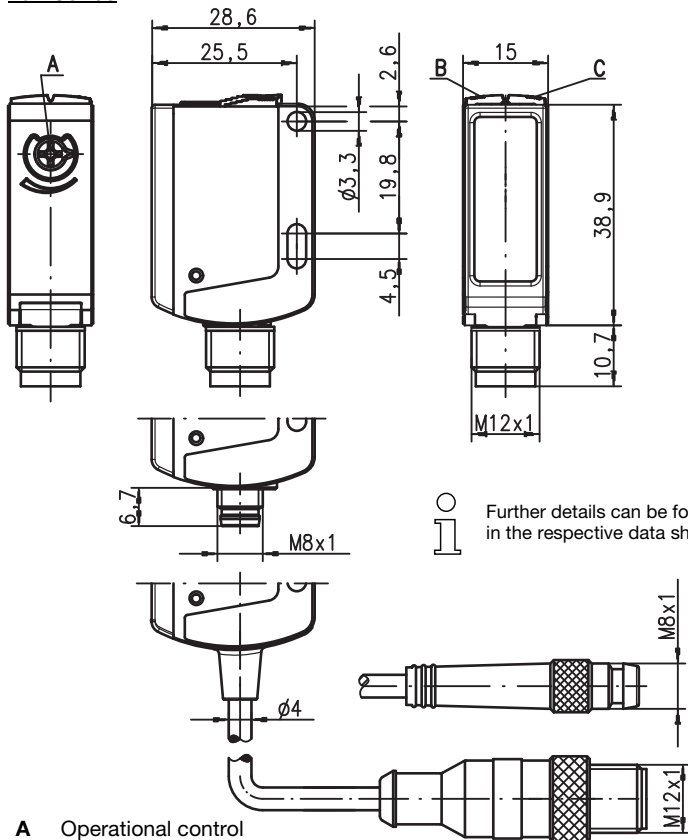
Detection of shiny and round objects



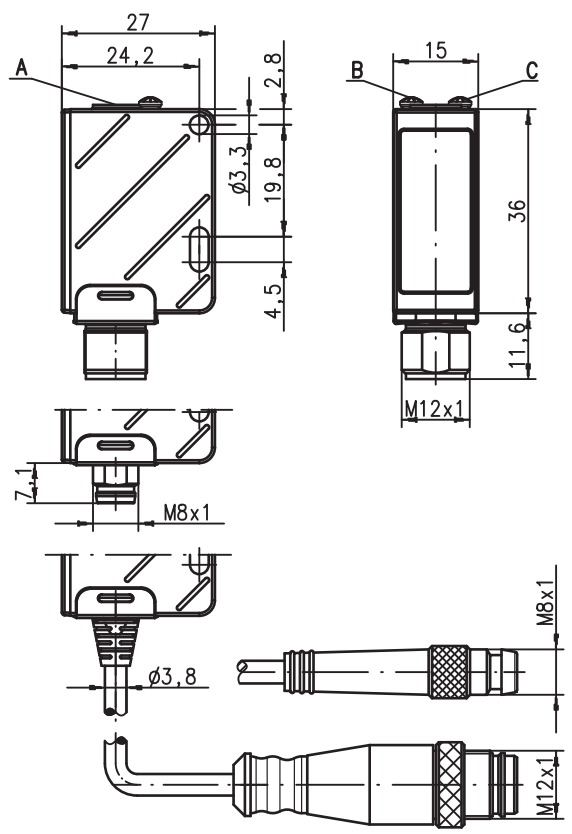
Detection of stack edges

**Dimensioned drawing**

**25B Series**



**25 Series**






Further details can be found in the respective data sheet.

- A Operational control
- B Green indicator diode
- C Yellow indicator diode

We reserve the right to make changes • BR25\_Overview\_EN.fm

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 25 SERIES

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 — 24 m	82
 <b>Retro-reflective sensors</b>	0 — 15 m	84
 <b>Diffuse reflection scanners</b>	5 ... 800 mm	94

### Other 25 Series products:

 Optical distance sensors	ODS 25	246
 Protective sensors	SLSR 25B	494



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Plastic
	Optics cover	Plastic
	Weight (connector/cable)	15g/55g
<b>Environmental data</b>	Ambient temperature (operation)	$-30^\circ\text{C} \dots +60^\circ\text{C}$
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 66
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 517 onwards

### Features

- IP 67 and IP 66
  - Active ambient light suppression A<sup>2</sup>LS
- New retro-reflective sensor PRK 25B:**
- Highest performance reserve
  - Reliable function with shrink-wrapped objects or containers
  - Very bright light spot, indicator diodes visible from all sides



Forked Sensors

Special Sensors

Fiber Optic Sensors

### Optical Sensor ABC

- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564
- A<sup>2</sup>LS Page 571

Light Curtains

Protective Sensors

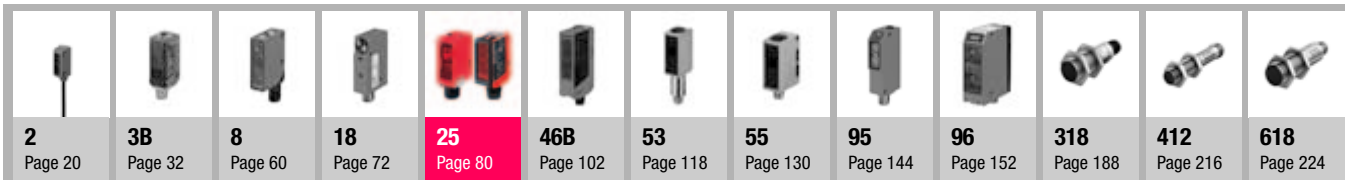
Ex Sensors

# THROUGHBEAM SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b> ▶ = Transmitter ◀ = Receiver						
▶ LSSR 25B.8 - S12      50108478 ◀ ILSER 25B / 4 - S12      50108487		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	1xPNP/DC	Light
▶ LSSR 25B - S12      50108477 ◀ ILSER 25B / 4 - S12      50108487		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	1xPNP/DC	Light
▶ LSSR 25B, 200 - S8.1      50110872 ◀ LSER 25B / 4, 200 - S8.1      50110873		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	1xPNP/DC	Light
▶ LSSR 25B, 200 - S12      50110922 ◀ LSER 25B/4, 200 - S12      50110923		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	1xPNP/DC	Light
▶ LSSR 25B.8      50108480 ◀ LSER 25B / 66      50108486		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 25B.8 - S12      50108478 ◀ LSER 25B / 66 - S12      50108483		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 25B - S12      50108477 ◀ LSER 25B / 66 - S12      50108483		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 25B.8 - S8      50108479 ◀ LSER 25B / 66 - S8      50108485		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 25B - S12      50108477 ◀ LSER 25B / 66.1 - S12      50108484		<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**25B SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	2, 3, 5	c, d, e, f	
M12 connector	3, 5	c, d, e, f	
Cable, 0.2m, with M8 connector <sup>1)</sup>	4, 5	a, b	
Cable, 0.2m, with M12 connector	4, 5	c, d, e, f	
Cable, 2m	2, 5		
M12 connector	2, 5	c, d, e, f	
M12 connector	5	c, d, e, f	
M8 connector	2, 5	a, b	
M12 connector	1, 5	c, d, e, f	

1) Acc. to IEC 61076-2-101, NM construction with snap locking

**Options**

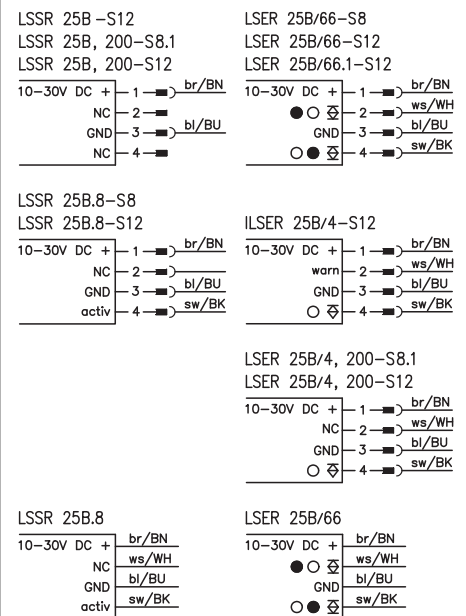
- 1 Sensitivity adjustment via potentiometer
- 2 Transmitter with activation input
- 3 Receiver with warning output
- 4 Direct connection to AS-interface I/O coupling modules
- 5 UL approval (class 2 acc. to NEC)



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



# RETRO-REFLECTIVE SENSORS

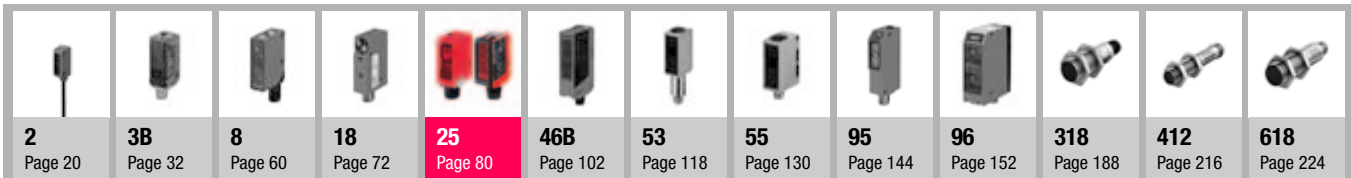
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 25B / 4.8 - S12</b> 50104227		<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>IPRK 25B / 4 - S12</b> 50104228		<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>PRK 25B / 4, 200 - S8.1</b> 50113771		<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>IPRK 25B / 4, 200 - S12</b> 50104229		<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>PRK 25B / 44 - S12</b> 50109432		<input type="checkbox"/>	500Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 25B / 66 - S8</b> 50104224		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66 - S12</b> 50104223		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.1 - S12</b> 50104230		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66</b> 50104225		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66, 100 - S8</b> 50105739		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66, 200 - S12</b> 50104226		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

**Accessories / connection cables**

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR25\_PRKB1\_EN.fm



**25B SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

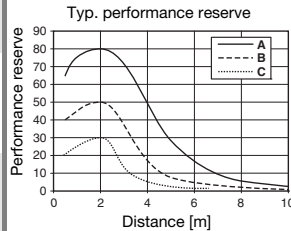
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. performance reserve
M12 connector	2, 5	c, d	
M12 connector	3, 5	c, d	
Cable, 0.2m, with M8 connector <sup>2)</sup>	3, 4, 5	a, b	
Cable, 0.2m, with M12 connector	3, 5	c, d	
M12 connector	5	c, d	
M8 connector	5	a, b	
M12 connector	5	c, d	
M12 connector	1, 5	c, d	
Cable, 2m	5		
Cable, 0.1 m, with M8 connector	5	a, b	
Cable, 0.2m, with M12 connector	5	c, d	



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

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553

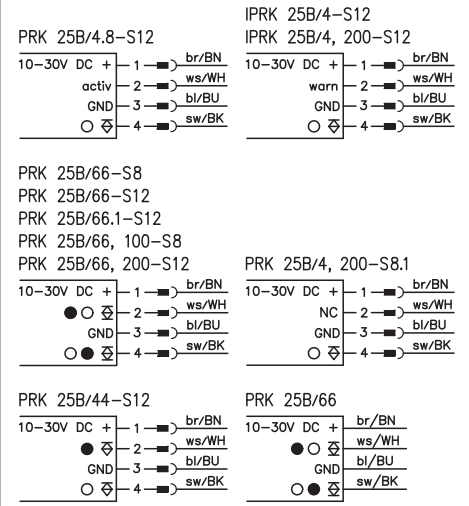
2) Acc. to IEC 61076-2-101, NM construction with snap locking



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



- Options**
- 1 Sensitivity adjustment via potentiometer
  - 2 Activation input
  - 3 Warning output
  - 4 Direct connection to AS-interface I/O coupling modules
  - 5 UL approval (class 2 acc. to NEC)

[www.leuze.com/25series/](http://www.leuze.com/25series/)

# RETRO-REFLECTIVE SENSORS

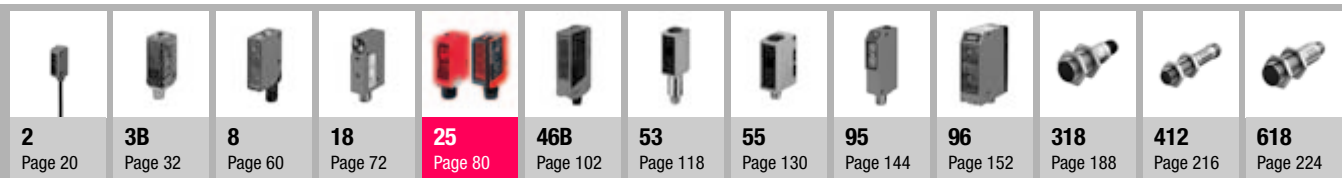
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 25B / 4.38 - S12</b> 50104247	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>IPRK 25B / 4.3 - S12</b> 50104246	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>PRK 25B / 4.3, 200 - S8.1</b> 50110874	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>PRK 25B / 4.3, 200 - S12</b> 50110924	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>IPRK 25B / 4.3, 200 - S12</b> 50108111	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>PRK 25B / 4D.3 - S8</b> 50104241	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Dark
<b>PRK 25B / 4D.3 - S12</b> 50104242	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Dark
<b>PRK 25B / 4D.3, 200 - S12</b> 50108549	0.12 6 0.07 8	<input type="checkbox"/>	500Hz	Red light	PNP/DC	Dark

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553  
 2) Acc. to IEC 61076-2-101, NM construction with snap locking

We reserve the right to make changes • BR25\_PRKB2\_EN.fm

**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC





**25B SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

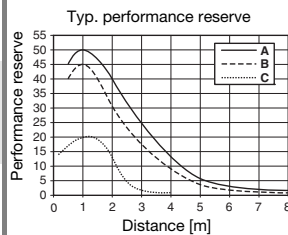
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. performance reserve
M12 connector	2, 3, 6	c, d, e, f	
M12 connector	2, 4, 6	c, d, e, f	
Cable, 0.2m, with M8 connector <sup>2)</sup>	2, 5, 6	a, b	
Cable, 0.2m, with M12 connector	2, 5, 6	c, d, e, f	
Cable, 0.2m, with M12 connector	2, 4, 6	c, d, e, f	
M8 connector	2, 5, 6	a, b	
M12 connector	2, 5, 6	c, d, e, f	
Cable, 0.2m, with M12 connector	2, 5, 6	c, d, e, f	



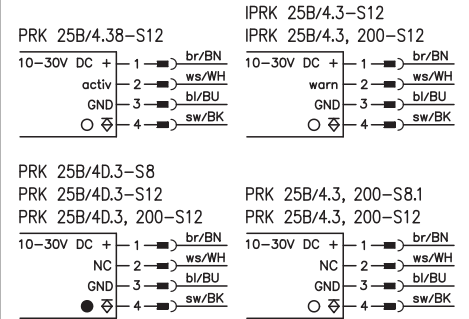
- A** TK(S) 100x100
- B** TK(S) 40x60
- C** TK(S) 20x40



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



- Options**
- 1 Sensitivity adjustment via potentiometer
  - 2 Depolarizing media (e.g. foil packaging)
  - 3 Activation input
  - 4 Warning output
  - 5 Direct connection to AS-interface I/O coupling modules
  - 6 UL approval (class 2 acc. to NEC)

[www.leuze.com/25series/](http://www.leuze.com/25series/)

# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 25B / 66.3 - S8</b> 50104237	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.31 - S8</b> 50104244	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.3 - S12</b> 50104236	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.31 - S12</b> 50104243	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.3</b> 50104238	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.31</b> 50104245	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.3, 200 - S8</b> 50104239	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.3, 200 - S12</b> 50104240	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25B / 66.30, 200 - S12</b> 50106203	0.12 6 0.07 8		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

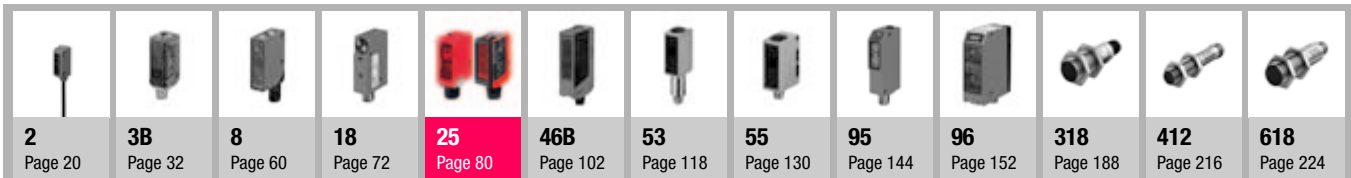
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR25\_PRKB3\_EN.fm

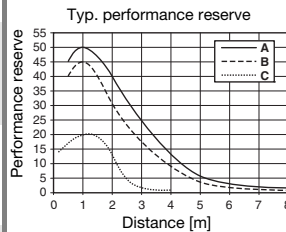


**25B SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 4	a, b	
M8 connector	1, 2, 4	a, b	
M12 connector	2, 4	c, d, e, f	
M12 connector	1, 2, 4	c, d, e, f	
Cable, 2m	2, 4		
Cable, 2m	1, 2, 4		
Cable, 0.2m, with M8 connector	2, 4	a, b	
Cable, 0.2m, with M12 connector	2, 4	c, d, e, f	
Cable, 0.2m, with M12 connector	2, 3, 4	c, d, e, f	



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



Measuring Sensors

Ultrasonic Sensors

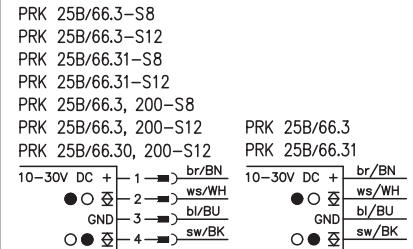
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Depolarizing media (e.g. foil packaging)
- 3 Connection plug, yellow, extruded
- 4 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/25series/](http://www.leuze.com/25series/)

# RETRO-REFLECTIVE SENSORS

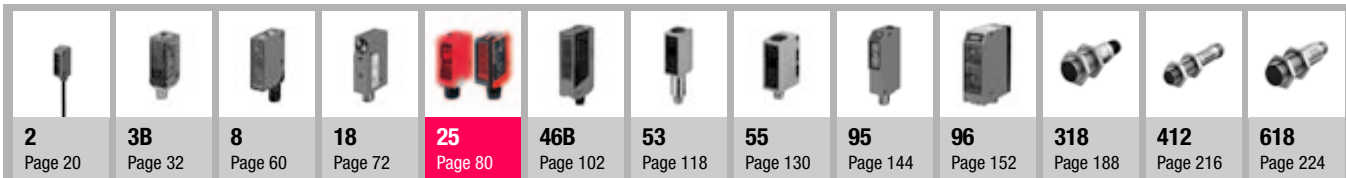
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 25 / 66.2 - S8</b> 50041394	<input type="text" value="0"/> <input type="text" value="4.5"/> <input type="text" value="0"/> <input type="text" value="5"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.2 - S12</b> 50041395	<input type="text" value="0"/> <input type="text" value="4.5"/> <input type="text" value="0"/> <input type="text" value="5"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.2</b> 50104202	<input type="text" value="0"/> <input type="text" value="4.5"/> <input type="text" value="0"/> <input type="text" value="5"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.2, 150 - S12</b> 50041396	<input type="text" value="0"/> <input type="text" value="4.5"/> <input type="text" value="0"/> <input type="text" value="5"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.41 - S8</b> 50101978	<input type="text" value="0"/> <input type="text" value="1.7"/> <input type="text" value="0"/> <input type="text" value="2"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.41 - S12</b> 50101457	<input type="text" value="0"/> <input type="text" value="1.7"/> <input type="text" value="0"/> <input type="text" value="2"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.41</b> 50101977	<input type="text" value="0"/> <input type="text" value="1.7"/> <input type="text" value="0"/> <input type="text" value="2"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 25 / 66.41, 150 - S12</b> 50108049	<input type="text" value="0"/> <input type="text" value="1.7"/> <input type="text" value="0"/> <input type="text" value="2"/>	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553

We reserve the right to make changes • BR25\_PRK1\_EN.fm

**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**25 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M8 connector	2, 4	a, b	
M12 connector	2, 4	c, d, e, f	
Cable, 2m	2, 4		
Cable, 0.15m, with M12 connector	2, 4	c, d, e, f	
M8 connector	1, 2, 3, 4	a, b	
M12 connector	1, 2, 3, 4	c, d, e, f	
Cable, 2m	1, 2, 3, 4		
Cable, 0.15m, with M12 connector	1, 2, 3, 4	c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

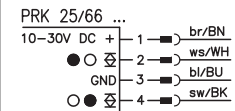
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Autocollimation principle
- 3 Transparent media
- 4 UL approval

Ex Sensors

[www.leuze.com/25series/](http://www.leuze.com/25series/)

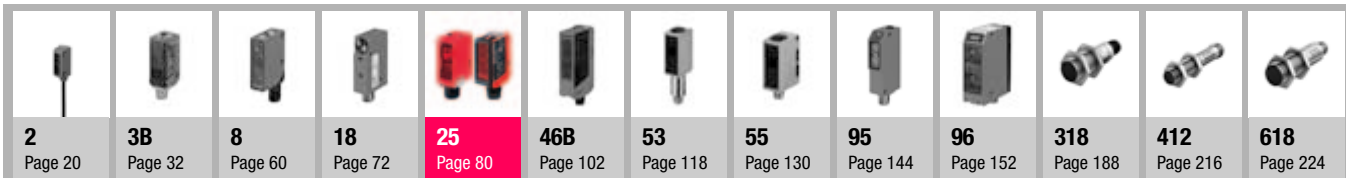
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective laser sensors with polarization filter</b>						
<b>PRKL 25B / 4D.1 - S12</b> 50104232	0.30 12 0.05 15	<input type="checkbox"/>	2000Hz	Red light laser class 2	PNP/DC	Dark
<b>PRKL 25B / 4.1, 200 - S12</b> 50110921	0.30 12 0.05 15	<input type="checkbox"/>	2000Hz	Red light laser class 2	PNP/DC	Light
<b>PRKL 25B / 6.81 - S12</b> 50104233	0.30 12 0.05 15	<input type="checkbox"/>	2000Hz	Red light laser class 2	Push-pull/DC	PNP/light NPN/dark
<b>PRKL 25B / 66.1 - S8</b> 50104234	0.30 12 0.05 15	<input type="checkbox"/>	2000Hz	Red light laser class 2	2xPush-pull/DC	Light/dark antivalent
<b>PRKL 25B / 66.1 - S12</b> 50104231	0.30 12 0.05 15	<input type="checkbox"/>	2000Hz	Red light laser class 2	2xPush-pull/DC	Light/dark antivalent
<b>PRKL 25B / 66.1</b> 50104235	0.30 12 0.05 15	<input type="checkbox"/>	2000Hz	Red light laser class 2	2xPush-pull/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 553

We reserve the right to make changes • BR25\_PRKLB\_EN.fm

Accessories / connection cables		More accessories can be found from page 514 onwards	
Part No.	Designation	Features	
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC	
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC	
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
g 50108005	PRKL 25B - S12	Laser pointer as alignment aid (see electr. connection)	

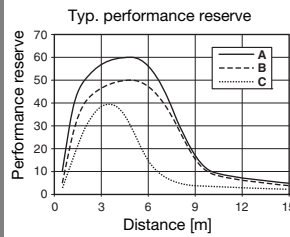


**25B SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M12 connector	1, 3, 4	c, d, e, f, g	
Cable, 0.2m, with M12 connector	1, 3, 4	c, d, e, f, g	
M12 connector	1, 2, 4	c, d, e, f, g	
M8 connector	1, 4	a, b, g	
M12 connector	1, 4	c, d, e, f, g	
Cable, 2m	1, 4	g	



- A** TK(S) 100x100
- B** MTKS 50x50
- C** MTKS 20x20



Measuring Sensors

Ultrasonic Sensors

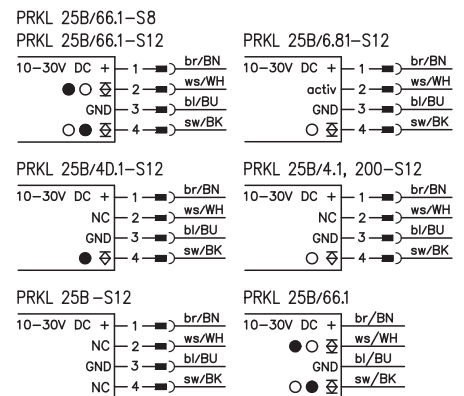
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Activation input
- 3 Direct connection to AS-interface I/O coupling modules
- 4 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/25series/](http://www.leuze.com/25series/)

## DIFFUSE REFLECTION SCANNERS














Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Energetic diffuse reflection scanners</b>										
<b>RTR 25B / 66 - S12</b> 50108476	<table border="1"><tr><td>20</td><td>500</td></tr><tr><td>10</td><td>500</td></tr></table>	20	500	10	500	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
20	500									
10	500									
<b>RTR 25 / 66.1 - 200, 150 - S12</b> 50102839	<table border="1"><tr><td>15</td><td>200</td></tr><tr><td>10</td><td>250</td></tr></table>	15	200	10	250	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
15	200									
10	250									

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR25\_RTR\_EN.fm

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



**25(B) SERIES**

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90%                      B gray 18%                      C black 6%</p>
M12 connector	1, 5	c, d, e, f	
Cable 0.15m, with M12 connector	1, 2, 3, 4	c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

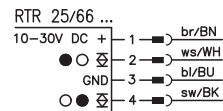
Inductive Switches

**Optical Sensor ABC**

- Diffuse reflection scanners energetic Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors



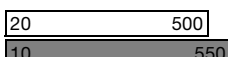

**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Detection of foil-coated objects
- 3 Vertical positioning, also suitable for holes (< 10mm) in columns
- 4 UL approval
- 5 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/25series/](http://www.leuze.com/25series/)

## DIFFUSE REFLECTION SCANNERS














Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection light scanners with fading</b>						
<b>RTFR 25B / 66 - S8</b> 50108474		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTFR 25B / 66 - S12</b> 50108472		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTFR 25B / 66</b> 50108475		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTFR 25B / 66, 200 - S12</b> 50108473		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 25B SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
M8 connector	1, 2	a, b	< 50%
M12 connector	1, 2	c, d, e, f	< 50%
Cable, 2m	1, 2		< 50%
Cable, 0.2m, with M12 connector	1, 2	c, d, e, f	< 50%



Measuring Sensors

Ultrasonic Sensors

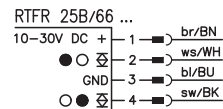
Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners with fading Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

### Electrical connection



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

### Options

- 1 Scanning range adjustment via potentiometer
- 2 UL approval (class 2 acc. to NEC)

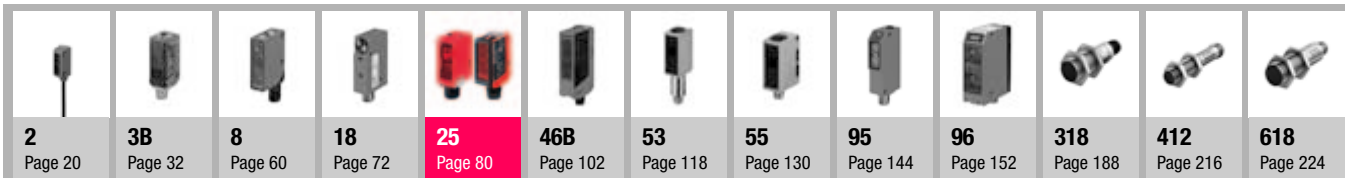
Ex Sensors

# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRTR 25 / 4D - 300, 200 - S8.1</b> 50110876	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	1xPNP/DC	Dark
<b>HRTR 25 / 4D - 300, 300 - S12</b> 50110925	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	1xPNP/DC	Dark
<b>HRTR 25 / 44 - 300 - S12</b> 50110102	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRTR 25 / 66 - 300 - S8</b> 50039547	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 25 / 66 - 300 - S12</b> 50039548	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 25 / 66 - 300</b> 50039546	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 25 / 66 - 300, 100 - S8</b> 50105803	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 25 / 66 - 300, 300 - S12</b> 50105210	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 25 / 66 - 300, 500 - S12</b> 50109062	<input type="checkbox"/> 5 300 <input checked="" type="checkbox"/> 5 400 ... 800	<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**25 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

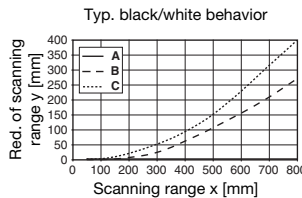
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

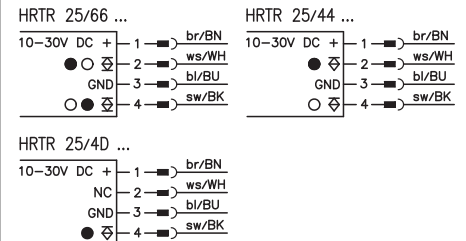
Connection	Option	Accessories	Typ. b/w behavior
Cable, 0.2m, with M8 connector <sup>1)</sup>	1, 2, 3	a, b	
Cable, 0.3m, with M12 connector	1, 2, 3	c, d, e, f	
M12 connector	1, 3	c, d, e, f	
M8 connector	1, 3	a, b	
M12 connector	1, 3	c, d, e, f	
Cable, 2m	1, 3		
Cable, 0.1m, with M8 connector	1, 3	a, b	
Cable, 0.3m, with M12 connector	1, 3	c, d, e, f	
Cable, 0.5m, with M12 connector	1, 3	c, d, e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



1) Acc. to IEC 61076-2-101, NM construction with snap locking

**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Direct connection to AS-interface I/O coupling modules
- 3 UL approval

# DIFFUSE REFLECTION SCANNERS

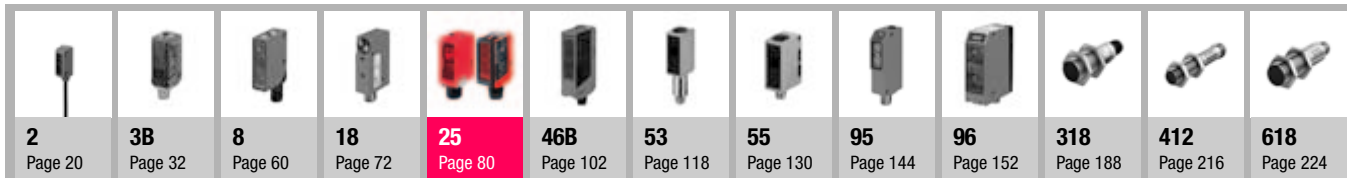
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRT 25 / 6.03 - 300 - S12</b> 50108240	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	100Hz	Infrared light	Push-pull/DC	Light/dark reversible
<b>HRT 25 / 66.03 - 300 - S8</b> 50108239	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	100Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 25 / 66 - 300 - S12</b> 50040466	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 25 / 66 - 300</b> 50110209	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 25 / 66 - 300, 5000</b> 50107368	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 25 / 66 - 300, 150 - S12</b> 50040465	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 25 / 66 - 300, 300 - S12</b> 50110208	<input type="text" value="5"/> <input type="text" value="300"/> <input type="text" value="5"/> 400 ... 750	<input type="checkbox"/>	200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent

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## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
b 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
c 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
d 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



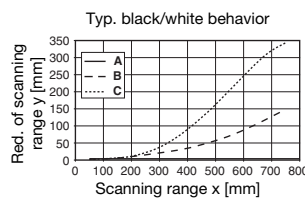
**25 SERIES**

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 3, 5	c, d, e, f	
M8 connector	1, 3, 5	a, b	
M12 connector	1, 4, 5	c, d, e, f	
Cable, 2m	1, 4, 5		
Cable, 5m	1, 4, 5		
Cable, 0.15m, with M12 connector	1, 4, 5	c, d, e, f	
Cable, 0.3m, with M12 connector	1, 4, 5	c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

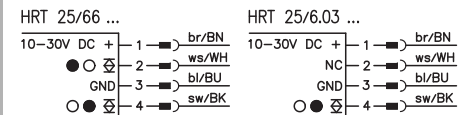
Inductive Switches

**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Scanning range pre-set
- 3 Optimized to detect dark/glossy objects
- 4 Detection of shining objects
- 5 UL approval

Ex Sensors

[www.leuze.com/25series/](http://www.leuze.com/25series/)

# OVERVIEW



Material flow tracking

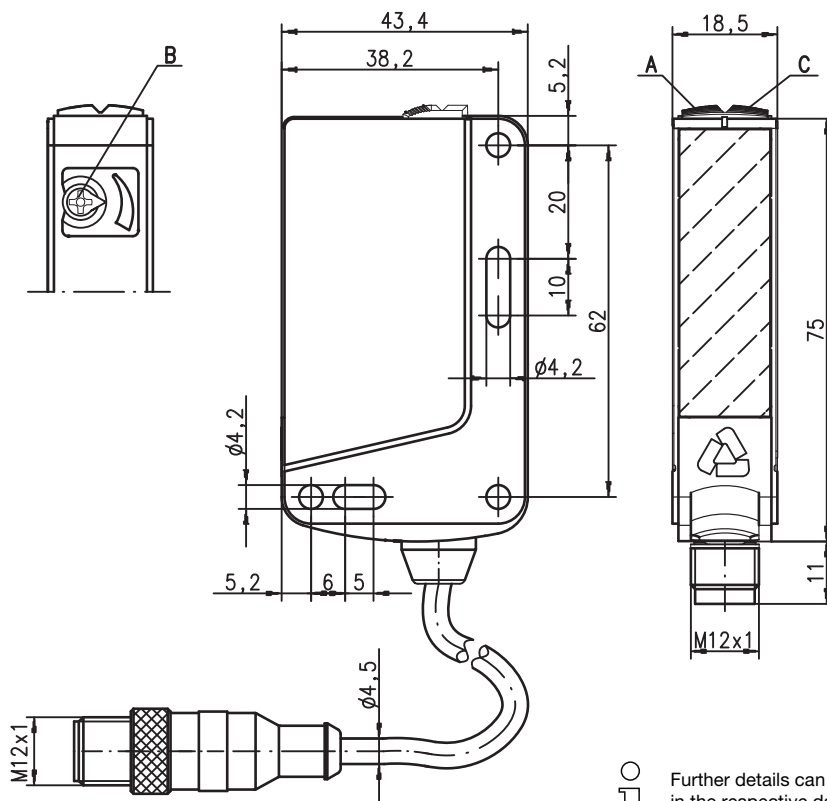


Container detection



Pallet detection

## Dimensioned drawing






- A** Green indicator diode
- B** Scanning range adjustment
- C** Yellow indicator diode

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



## 46B SERIES

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 ... 60 m	104
 <b>Retro-reflective sensors</b>	0.05 ... 18 m	106
 <b>Diffuse reflection scanners</b>	10 ... 2500 mm	110

### Other 46B Series products:

 Protective sensors	SLS 46B	494
 Ex Sensors	PRK 46B ... Ex n, HRT 46B ... Ex n	506



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 30\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Plastic
	Optics cover	Plastic
	Weight (connector/cable)	50g/130g
<b>Environmental data</b>	Ambient temperature (operation)	-40°C ... +60°C
		Laser: -30°C ... +55°C
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 518 onwards

### Features

- Active ambient light suppression A<sup>2</sup>LS
- Good operability from the optics side
- IP 67 and IP 69K
- Highest performance reserve
- Reliable function with shrink-wrapped pallets
- Very bright light spot, indicator diodes visible from all sides



### Optical Sensor ABC

- |                               |          |
|-------------------------------|----------|
| ● Throughbeam sensors         | Page 563 |
| ● Retro-reflective sensors    | Page 563 |
| ● Diffuse reflection scanners | Page 564 |
| ● A <sup>2</sup> LS           | Page 571 |

# THROUGHBEAM SENSORS

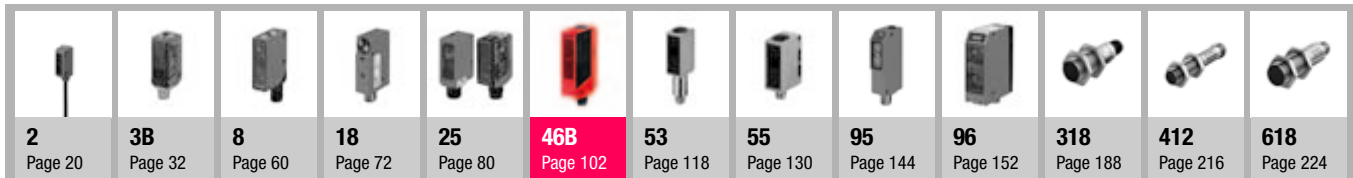
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b>						
▶ = Transmitter ◀ = Receiver						
▶ LSSR 46B - S12 ◀ ILSER 46B/4 - S12	50108526 50108536		500Hz	Red light	PNP/DC	Light
▶ LSSR 46B ◀ LSER 46B/66	50108529 50108535		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 46B, 200 - S12 ◀ LSER 46B/66, 200 - S12	50108528 50108534		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 46B.8 - S12 ◀ ILSER 46B/4 - S12	50108527 50108536		500Hz	Red light	PNP/DC	Light
▶ LSSR 46B - S12 ◀ LSER 46B/66 - S12	50108526 50108532		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 46B.8 - S12 ◀ LSER 46B/66 - S12	50108527 50108532		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 46B - S12 ◀ LSER 46B/66.1 - S12	50108526 50108533		500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶ LSSR 46B - S - S12 ◀ LSER 46B/66 - S - S12	50110929 50110930		100Hz	Red light	2xPush-pull/DC	Light/dark antivalent

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

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**46B SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

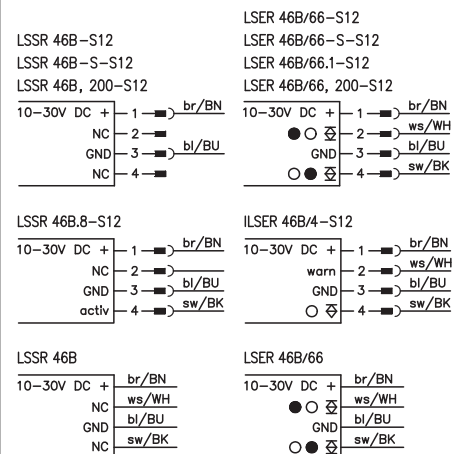
Connection	Option	Accessories	Typ. light spot
M12 connector	3, 4, 6	a, b, c, d, e, f	
Cable, 2m	4, 6		
Cable, 0.2m, with M12 connector	4, 6	a, b, c, d, e, f	
M12 connector	2, 3, 4, 6	a, b, c, d, e, f	
M12 connector	4, 6	a, b, c, d, e, f	
M12 connector	2, 4, 6	a, b, c, d, e, f	
M12 connector	1, 4, 6	a, b, c, d, e, f	
M12 connector	4, 5, 6	a, b, c, d, e, f	



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Sensitivity adjustment via potentiometer
- Transmitter with activation input
- Receiver with warning output
- Highly visible, additional LED assists with alignment
- Narrow light beam for preventing reflections caused by shiny objects
- UL approval (class 2 acc. to NEC)

[www.leuze.com/46series/](http://www.leuze.com/46series/)

# RETRO-REFLECTIVE SENSORS

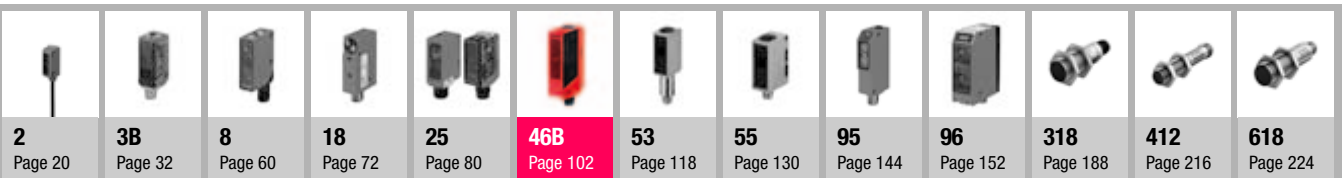
Part description Part No.:	Operating range <sup>1)</sup> [m] <input type="checkbox"/> Typ. op. range limit <sup>1)</sup> [m] <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>					
<b>IPRK 46B / 4 - S12</b> 50103074	0.05 15 0.05 18	500Hz	Red light	PNP/DC	Light
<b>PRK 46B / 44 - S12</b> 50105986	0.05 15 0.05 18	500Hz	Red light	2xPNP/DC	Light/dark
<b>PRK 46B / 66 - S12</b> 50103070	0.05 15 0.05 18	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 46B / 66.01 - S12</b> 50103082	0.05 15 0.05 18	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 46B / 66</b> 50107068	0.05 15 0.05 18	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 46B / 66, 200 - S12</b> 50103071	0.05 15 0.05 18	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 46B / 66D - S12</b> 50113009	0.05 15 0.05 18	500Hz	Red light	2xPush-pull/DC	Dark/light antivalent
<b>PRK 46B / 7D - S12</b> 50103080	0.05 15 0.05 18	20Hz	Red light	Relay/make- contact/DC	Dark

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 554

We reserve the right to make changes • BR46\_PRKB1\_EN.fm

**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**46B SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

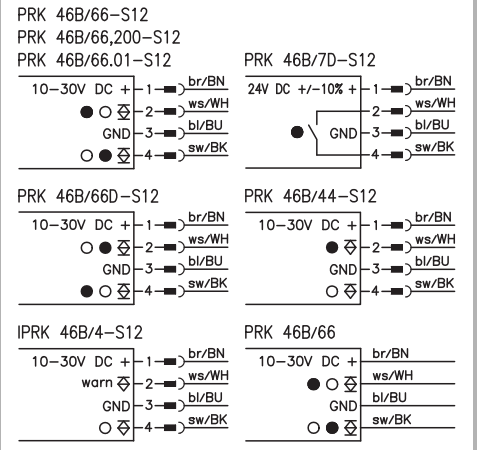
Connection	Option	Accessories	Typ. performance reserve
M12 connector	2, 4, 7	a, b, c, d, e, f	<p>Typ. performance reserve</p> <p>A TK 100x100 B TK 82.2 C TKS 50x50 D TKS 40x60 E TKS 20x40 F Tape 4 50x50 G Switching point</p>
M12 connector	2, 7	a, b, c, d, e, f	
M12 connector	2, 7	a, b, c, d, e, f	
M12 connector	1, 2, 7	a, b, c, d, e, f	
Cable, 2m	2, 7		
Cable, 0.2m, with M12 connector	2, 7	a, b, c, d, e, f	
M12 connector	2, 7	a, b, c, d, e, f	
M12 connector	2, 7	a, b, c, d, e, f	



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Sensitivity adjustment via potentiometer
- Fast alignment through *brightVision*
- Activation input
- Warning output
- Direct connection to AS-interface I/O coupling modules
- Highest functional reliability for depolarizing media
- UL approval (class 2 acc. to NEC)

[www.leuze.com/46series/](http://www.leuze.com/46series/)

# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 46B / 4.82 - S12</b> 50103084	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>IPRK 46B / 4.2 - S12</b> 50103076	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	PNP/DC	Light
<b>PRK 46B / 4D.2 - S12</b> 50105987	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	PNP/DC	Dark
<b>IPRK 46B / 4D.2 - S12</b> 50111655	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	PNP/DC	Dark
<b>PRK 46B / 44.2 - S12</b> 50105106	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 46B / 6.2 - S12</b> 50105156	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	Push-pull/DC	PNP/light NPN/dark
<b>PRK 46B / 66.2 - S12</b> 50103072	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 46B / 66.2, 200 - S12</b> 50103073	<input type="text" value="0.1"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent

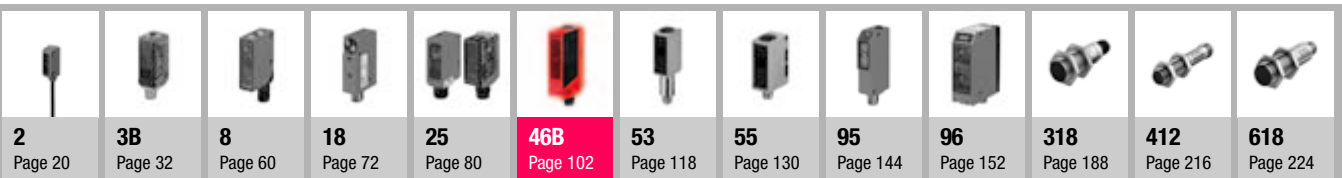
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 554

We reserve the right to make changes • BR46\_PRCB2\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**46B SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

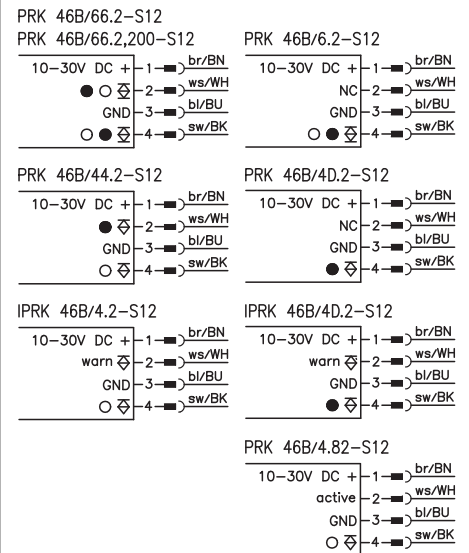
Connection	Option	Accessories	Typ. performance reserve
M12 connector	2, 3, 6, 7	a, b, c, d, e, f	<p>Typ. performance reserve</p> <p>Performance reserve</p> <p>Distance [m]</p> <p> <b>A</b> TK 100x100  <b>B</b> TK 82.2  <b>C</b> TKS 50x50  <b>D</b> TKS 40x60  <b>E</b> Tape 4 50x50  <b>F</b> Switching point                 </p>
M12 connector	2, 4, 6, 7	a, b, c, d, e, f	
M12 connector	2, 5, 6, 7	a, b, c, d, e, f	
M12 connector	2, 4, 6, 7	a, b, c, d, e, f	
M12 connector	2, 6, 7	a, b, c, d, e, f	
M12 connector	2, 5, 6, 7	a, b, c, d, e, f	
M12 connector	2, 6, 7	a, b, c, d, e, f	
Cable, 0.2m, with M12 connector	2, 6, 7	a, b, c, d, e, f	



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

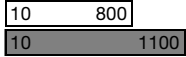
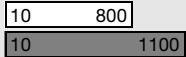
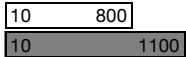
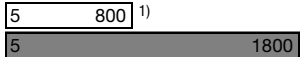
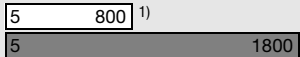
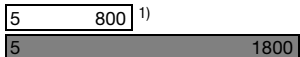
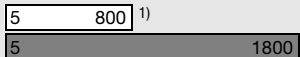
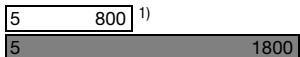
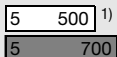


**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Fast alignment through *brightVision*
- 3 Activation input
- 4 Warning output
- 5 Direct connection to AS-interface I/O coupling modules
- 6 Highest functional reliability for depolarizing media, e.g. with pallets that have been stretch-wrapped with foil
- 7 UL approval (class 2 acc. to NEC)

[www.leuze.com/46series/](http://www.leuze.com/46series/)

# DIFFUSE REFLECTION SCANNERS

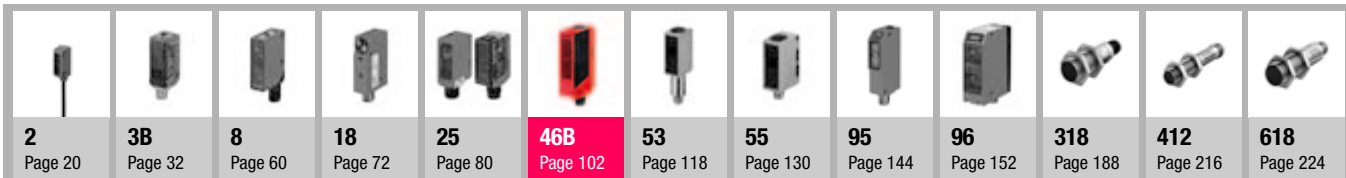
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners</b>						
<b>RTR 46B / 66 - S12</b> 50108522		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTR 46B / 66</b> 50108524		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>RTR 46B / 66, 200 - S12</b> 50108523		<input type="checkbox"/>	500Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRTR 46B / 4 - S12</b> 50106557		<input type="checkbox"/>	200Hz	Red light	PNP/DC	Light
<b>HRTR 46B / 4D - S12</b> 50106558		<input type="checkbox"/>	200Hz	Red light	PNP/DC	Dark
<b>HRTR 46B / 4D, 200 - S12</b> 50113432		<input type="checkbox"/>	200Hz	Red light	PNP/DC	Dark
<b>HRTR 46B / 66 - S12</b> 50106555		<input type="checkbox"/>	200Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 46B / 66, 200 - S12</b> 50106556		<input type="checkbox"/>	200Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 46B / 66 - S - S12</b> 50106559		<input type="checkbox"/>	200Hz	Red light	2xPush-pull/DC	Light/dark antivalent

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR46\_HRTRB\_EN.fm





**46B SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

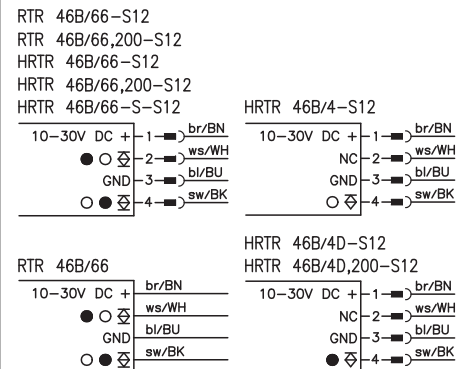
Connection	Option	Accessories	Typ. b/w behavior
M12 connector	2, 5, 6	a, b, c, d, e, f	
Cable, 2m	2, 5, 6		
Cable, 0.2m, with M12 connector	2, 5, 6	a, b, c, d, e, f	
M12 connector	1, 4, 5, 6	a, b, c, d, e, f	<p>1) Typical scanning range with a black/white error &lt; 10%</p>
M12 connector	1, 4, 5, 6	a, b, c, d, e, f	
Cable, 0.2m, with M12 connector	1, 4, 5, 6	a, b, c, d, e, f	
M12 connector	1, 5, 6	a, b, c, d, e, f	
Cable, 0.2m, with M12 connector	1, 5, 6	a, b, c, d, e, f	
M12 connector	1, 3, 5, 6	a, b, c, d, e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

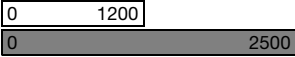
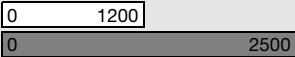
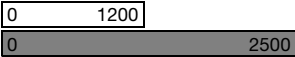
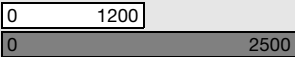
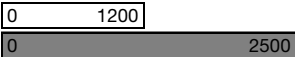
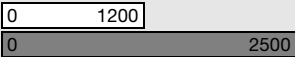
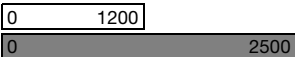
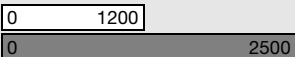


**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Sensitivity adjustment via potentiometer
- 3 Optimized, small light spot for reliable detection of objects with colored structure (focus at approx. 200mm)
- 4 Direct connection to AS-interface I/O coupling modules
- 5 Fast alignment through *brightVision*
- 6 UL approval (class 2 acc. to NEC)

[www.leuze.com/46series/](http://www.leuze.com/46series/)

# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRT 46B / 4 - S12</b> 50106549		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Light
<b>IHRT 46B / 4 - S12</b> 50106551		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Light
<b>IHRT 46B / 4, 200 - S12</b> 50106553		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Light
<b>HRT 46B / 4D - S12</b> 50106550		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Dark
<b>IHRT 46B / 4D - S12</b> 50106552		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Dark
<b>HRT 46B / 4D, 200 - S12</b> 50109551		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Dark
<b>IHRT 46B / 4D, 200 - S12</b> 50106554		<input type="checkbox"/>	200Hz	Infrared light	PNP/DC	Dark
<b>HRT 46B / 44 - S12</b> 50106546		<input type="checkbox"/>	200Hz	Infrared light	2xPNP/DC	Light/dark antivalent

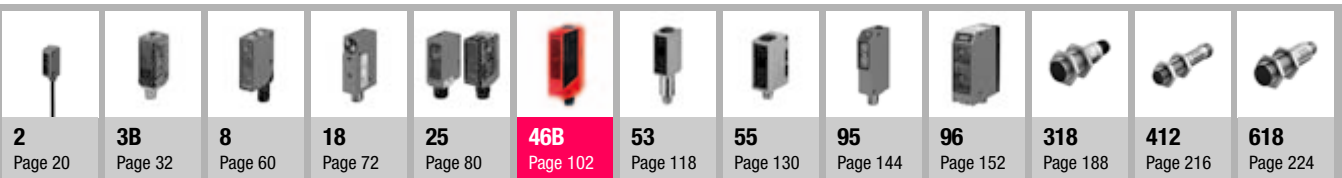
1) Typical scanning range with a black/white error < 10%

We reserve the right to make changes • BR46\_HRTB1\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**46B SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

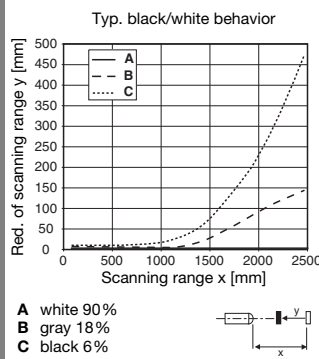
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

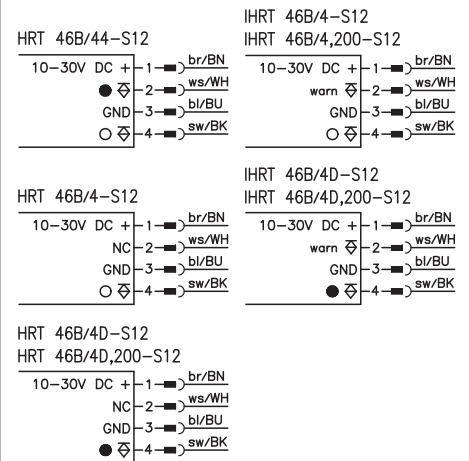
Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 3, 4, 5	a, b, c, d, e, f	
M12 connector	1, 2, 4, 5	a, b, c, d, e, f	
Cable, 0.2m, with M12 connector	1, 2, 4, 5	a, b, c, d, e, f	
M12 connector	1, 3, 4, 5	a, b, c, d, e, f	
M12 connector	1, 2, 4, 5	a, b, c, d, e, f	
M12 connector	1, 3, 4, 5	a, b, c, d, e, f	
Cable, 0.2m, with M12 connector	1, 2, 4, 5	a, b, c, d, e, f	
M12 connector	1, 4, 5	a, b, c, d, e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Warning output
- 3 Direct connection to AS-interface I/O coupling modules
- 4 Reliable detection of light, dark, inclined/sloped surfaces
- 5 UL approval (class 2 acc. to NEC)

[www.leuze.com/46series/](http://www.leuze.com/46series/)

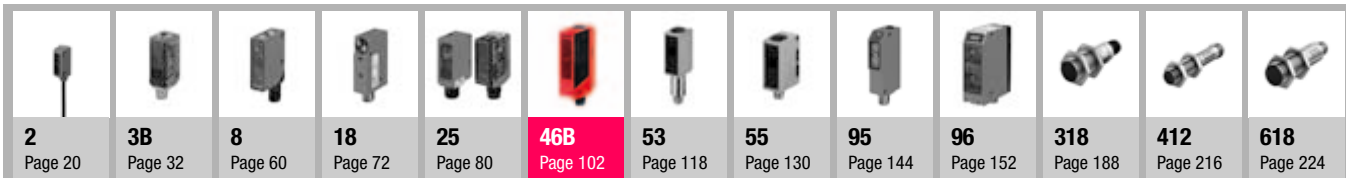
# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRT 46B / 66 - S12</b> 50106547	0 1200 0 2500		200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 46B / 66</b> 50112805	0 1200 0 2500		200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 46B / 66, 200 - S12</b> 50106548	0 1200 0 2500		200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>HRT 46B / 7 - S12</b> 50106562	0 1200 0 2500		20Hz	Infrared light	Relay/make-contact/ DC	Light

1) Typical scanning range with a black/white error < 10%

We reserve the right to make changes • BR46\_HRTB2\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	



**46B SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

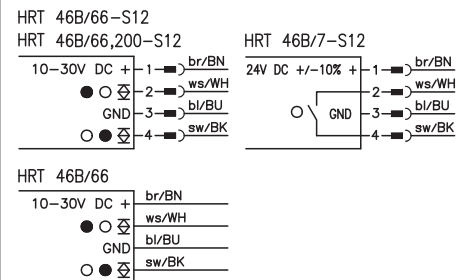
Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 2, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p> <p>A white 90% B gray 18% C black 6%</p>
Cable, 2m	1, 2, 3		
Cable, 0.2m, with M12 connector	1, 2, 3	a, b, c, d, e, f	
M12 connector	1, 2, 3	a, b, c, d, e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

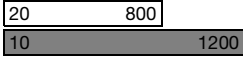
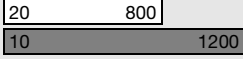
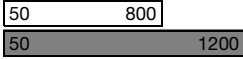
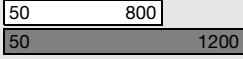
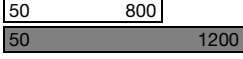
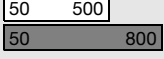
**Electrical connection**



**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Reliable detection of light, dark, inclined/sloped surfaces
- 3 UL approval (class 2 acc. to NEC)

# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRT 46B / 4.1 - S12</b> 50111618		<input type="checkbox"/>	200Hz	Infrared light	1xPNP/DC	Light
<b>HRT 46B / 66.1 - S12</b> 50111640		<input type="checkbox"/>	200Hz	Infrared light	2xPush-pull/DC	Light/dark antivalent
<b>Diffuse reflection laser scanners with background suppression</b>						
<b>HRTL 46B / 6.8 - S12</b> 50110806		<input type="checkbox"/>	1000Hz	Red light laser class 2	1xPush-pull/DC	Light
<b>HRTL 46B / 66 - S12</b> 50106560		<input type="checkbox"/>	1000Hz	Red light laser class 2	2xPush-pull/DC	Light/dark antivalent
<b>HRTL 46B / 66, 200 - S12</b> 50106561		<input type="checkbox"/>	1000Hz	Red light laser class 2	2xPush-pull/DC	Light/dark antivalent
<b>HRTL 46B / 66.1 - S12</b> 50113308		<input type="checkbox"/>	1000Hz	Red light laser class 1	2xPush-pull/DC	Light/dark antivalent

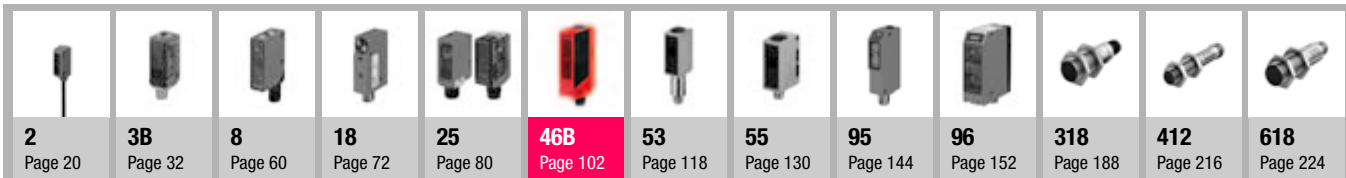
1) Typical scanning range with a black/white error < 10%

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR46\_HRTB3\_EN.fm



# 46B SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

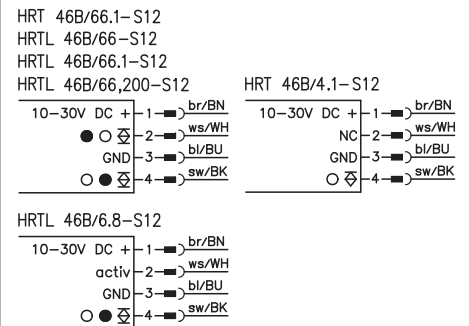
Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 2, 3, 5, 7	a, b, c, d, e, f	
M12 connector	1, 2, 3, 7	a, b, c, d, e, f	
M12 connector	1, 4, 6, 7	a, b, c, d, e, f	
M12 connector	1, 4, 7	a, b, c, d, e, f	
Cable, 0.2m, with M12 connector	1, 4, 7	a, b, c, d, e, f	
M12 connector	1, 4, 7	a, b, c, d, e, f	



### Optical Sensor ABC

- Diffuse reflection scanners with background suppression Page 564
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

### Electrical connection



### Options

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Reliable detection of objects between the rollers of a roller conveyor (smallest-possible gap: 6mm)
- 3 Reliable detection of light, dark, inclined/sloped surfaces
- 4 Precise positioning and detection of small parts
- 5 Direct connection to AS-interface I/O coupling modules
- 6 Activation input
- 7 UL approval (class 2 acc. to NEC)

[www.leuze.com/46series/](http://www.leuze.com/46series/)

## OVERVIEW



Meat processing

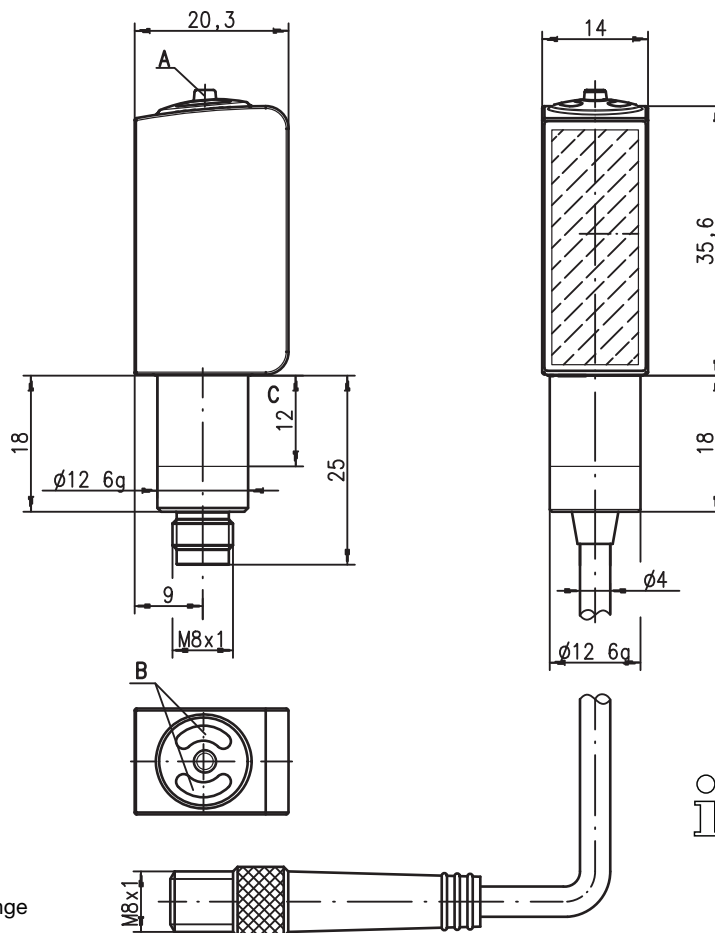


Filling of dairy products




Medical technology














### Dimensioned drawing



- A** Operational control
- B** Indicator diodes
- C** Permissible clamping range




 Further details can be found in the respective data sheet.

We reserve the right to make changes • BR53\_Overview\_EN.fm

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



## 53 SERIES

Operating principle	Typ. operating range limits	Page
 Throughbeam sensors	0 ... 10 m	120
 Retro-reflective sensors	0 ... 5 m	122
 Diffuse reflection scanners	5 ... 400 mm	128



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 18\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	AISI 316L stainless steel, DIN X2CrNiMo17132, 1.4404, Ra $\leq 2.5$
	Housing design	Hygiene design
	Optics cover	Plastic (PMMA)
	Weight (connector/cable)	50g/60g
<b>Environmental data</b>	Ambient temperature <sup>1)</sup> (operation and storage)	-30°C ... +70°C <small>Operating temperatures of +70°C permissible only briefly (<math>\leq 15\text{min}</math>).</small>
	VDE safety class	III
	Protection class	IP 67, IP 69K
	Environmental test	ECOLAB, CleanProof+
	Standards applied	IEC 60947-5-2, UL 508

### Features

- 316L stainless steel housing in hygiene design
- Scratch resistant and non-diffusive plastic front cover
- Enclosed optics design prevents bacterial carry-overs
- Paperless device identification
- ECOLAB and CleanProof+ tested
- Active ambient light suppression A<sup>2</sup>LS



### Optical Sensor ABC













- |                               |          |
|-------------------------------|----------|
| ● Throughbeam sensors         | Page 563 |
| ● Retro-reflective sensors    | Page 563 |
| ● Diffuse reflection scanners | Page 564 |
| ● A <sup>2</sup> LS           | Page 571 |

## THROUGHBEAM SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b> ▶ = Transmitter ◀ = Receiver						
▶ <b>LSSR 53.8 - S8</b> ◀ <b>LSER 53/66 - S8</b>	50108736 50108742	<input type="text" value="0"/> <input type="text" value="8.5"/> <input type="text" value="0"/> <input type="text" value="10"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

We reserve the right to make changes • BR53\_LSR\_EN.fm

Accessories / connection cables			More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features	
a 50106154	K - D M8W - 4P - 2m - FAB	Connection cable 2000mm, M8 angular, 4-pin, Food+Bev.	
b 50106152	K - D M8A - 4P - 2m - FAB	Connection cable 2000mm, M8 axial, 4-pin, Food+Bev.	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**53 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M8 connector	1, 2	a, b, c, d	



Measuring Sensors

Ultrasonic Sensors

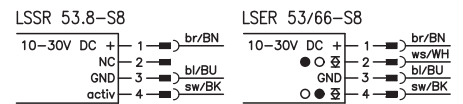
Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Transmitter with activation input
- 2 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/53series/](http://www.leuze.com/53series/)

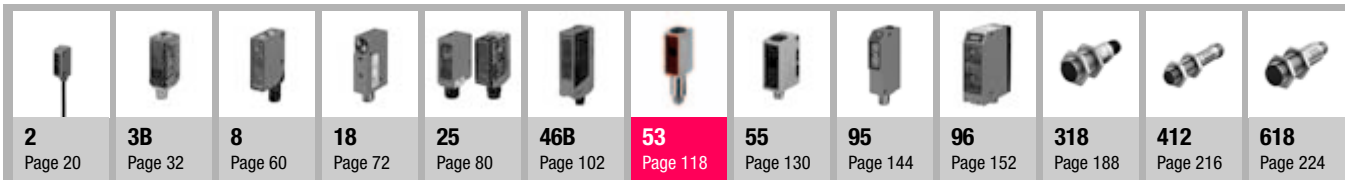
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors</b>						
<b>RKR 53 / 6.42 - S8.3</b> 50107608	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>RKR 53 / 6.42 - S8</b> 50107607	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>RKR 53 / 6.42, 200 - S8</b> 50105790	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 554

We reserve the right to make changes • BR53\_RKR\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50106154	K - D M8W - 4P - 2m - FAB	Connection cable 2000mm, M8 angular, 4-pin, Food+Bev.	
d 50106152	K - D M8A - 4P - 2m - FAB	Connection cable 2000mm, M8 axial, 4-pin, Food+Bev.	
e 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
f 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	



**53 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 3, 4, 5	a, b	
M8 connector	1, 3, 4, 5	c, d, e, f	
Cable 0.2m, with M8 connector	1, 3, 4, 5	c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

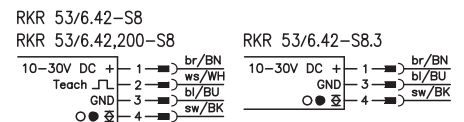
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Teach-in via teach input or lockable teach button
- 2 Teach-in via teach button
- 3 Transparent media, especially for foils  $\leq 20\mu\text{m}$
- 4 Autocollimation principle
- 5 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/53series/](http://www.leuze.com/53series/)

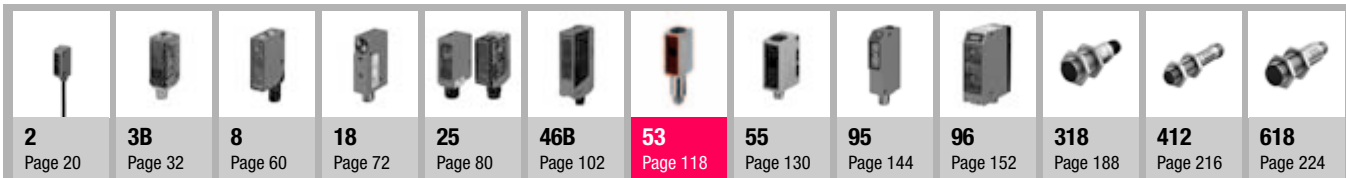
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 53 / 6.22 - S8.3</b> 50107604	0 4 <sup>1)</sup> 0 5 <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 53 / 6.22 - S8</b> 50107603	0 4 <sup>1)</sup> 0 5 <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 53 / 6.22, 200 - S8</b> 50105789	0 4 <sup>1)</sup> 0 5 <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 53 / 6.42 - S8</b> 50112475	0 3 <sup>1)</sup> 0 3.6 <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 53 / 6D.42 - S8</b> 50112476	0 3 <sup>1)</sup> 0 3.6 <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Dark/light antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 554

We reserve the right to make changes • BR53\_PRK\_EN.fm

Accessories / connection cables			More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	



**53 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 4, 6, 7	a, b	<p>Typ. performance reserve</p> <p>Performance reserve</p> <p>Distance [m]</p> <p>A TK 100x100 B TKS 40x60 C TKS 20x40 D Tape 4: 50x50</p>
M8 connector	1, 4, 6, 7	c, d	
Cable 0.2m, with M8 connector	1, 4, 6, 7	c, d	<p>Typ. performance reserve</p> <p>Performance reserve</p> <p>Distance [m]</p> <p>A TK 100x100 B TKS 40x60 C TKS 20x40 D Tape 4: 50x50</p>
M8 connector	1, 5, 6, 7	c, d	
M8 connector	1, 5, 6, 7	c, d	



Measuring Sensors

Ultrasonic Sensors

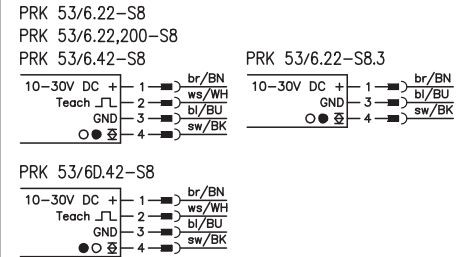
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Teach-in via teach input or lockable teach button
- 2 Teach-in via teach button
- 3 Detection of small parts and very fast events
- 4 Precise positioning of objects and reflector markers
- 5 Highly transparent bottles (PET and glass)
- 6 Autocollimation principle
- 7 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/53series/](http://www.leuze.com/53series/)













# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective laser sensors with polarization filter</b>						
<b>PRKL 53 / 6.22 - S8.3</b> 50107606	0 <input type="text" value="2"/> <sup>1)</sup> 0 <input type="text" value="3"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent
<b>PRKL 53 / 6.2P - S8.3</b> 50114179	0 <input type="text" value="2"/> <sup>1)</sup> 0 <input type="text" value="3"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent
<b>PRKL 53 / 6.22 - S8</b> 50107605	0 <input type="text" value="2"/> <sup>1)</sup> 0 <input type="text" value="3"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent
<b>PRKL 53 / 6.22, 200 - S8</b> 50105791	0 <input type="text" value="2"/> <sup>1)</sup> 0 <input type="text" value="3"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors MTKS 50 x 50, additional reflectors with range specifications can be found on page 554

We reserve the right to make changes • BR53\_PRKL\_EN.fm

Accessories / connection cables			More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



**53 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 3, 5, 6	a, b	
M8 connector	2, 3, 4, 5, 6	a, b	
M8 connector	1, 3, 5, 6	c, d	
Cable 0.2m, with M8 connector	1, 3, 5, 6	c, d	



Measuring Sensors

Ultrasonic Sensors

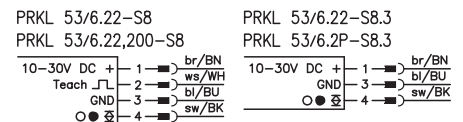
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

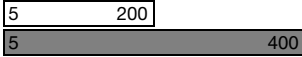
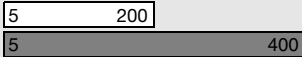
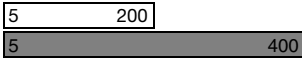
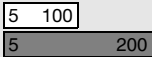
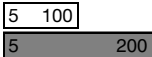
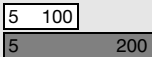



**Options**

- 1 Teach-in via teach input or lockable teach button
- 2 Teach-in via teach button
- 3 Detection of small parts and very fast events
- 4 Typical squint angle: Y-axis < 0.2°, X-axis not calibrated
- 5 Autocollimation principle
- 6 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/53series/](http://www.leuze.com/53series/)

# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>						
<b>HRTR 53 / 6 - S8.3</b> 50107500		<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>HRTR 53 / 66 - S8</b> 50107499		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 53 / 66, 200 - S8</b> 50107501		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 53 / 6 - S - S8.3</b> 50107504		<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>HRTR 53 / 66 - S - S8</b> 50107503		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 53 / 66 - S, 200 - S8</b> 50107505		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 53 / 6 - XL - S8.3</b> 50107508		<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>HRTR 53 / 66 - XL - S8</b> 50107507		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 53 / 66 - XL, 200 - S8</b> 50107509		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

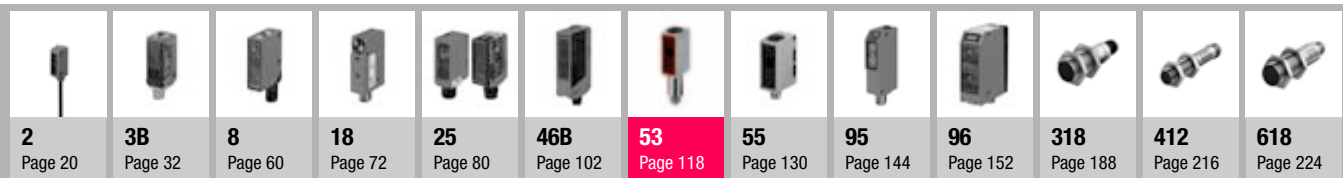
1) Typical scanning range with a black/white error < 10%

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50106154	K - D M8W - 4P - 2m - FAB	Connection cable 2000mm, M8 angular, 4-pin, Food+Bev.
d 50106152	K - D M8A - 4P - 2m - FAB	Connection cable 2000mm, M8 axial, 4-pin, Food+Bev.
e 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.
f 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.

We reserve the right to make changes • BR53\_HRTR1\_EN.fm



**53 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

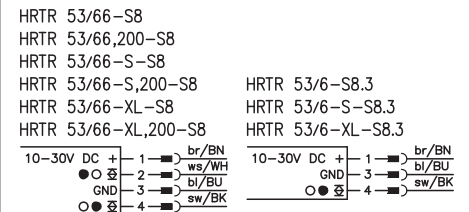
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M8 connector	1, 2, 6	a, b	
M8 connector	1, 2, 6	c, d, e, f	
Cable, 0.2m, with M8 connector	1, 2, 6	c, d, e, f	
M8 connector	1, 3, 4, 6	a, b	
M8 connector	1, 3, 4, 6	c, d, e, f	
Cable, 0.2m, with M8 connector	1, 3, 4, 6	c, d, e, f	
M8 connector	1, 5, 6	a, b	
M8 connector	1, 5, 6	c, d, e, f	
Cable, 0.2m, with M8 connector	1, 5, 6	c, d, e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



- Options**
- 1 Scanning range adjustment via multiturn potentiometer
  - 2 Reliable switching nearly independent of object/background properties
  - 3 Reliable switching even on glossy objects and objects with colored structure
  - 4 Small, homogenous light spot for detecting small parts
  - 5 Broad rectangular light spot guarantees the reliable detection of objects with openings, grid structures, holes, grooves and of objects with changeable position as well as transparent foils/bottles
  - 6 UL approval (class 2 acc. to NEC)

[www.leuze.com/53series/](http://www.leuze.com/53series/)

# OVERVIEW



Filling of food containers

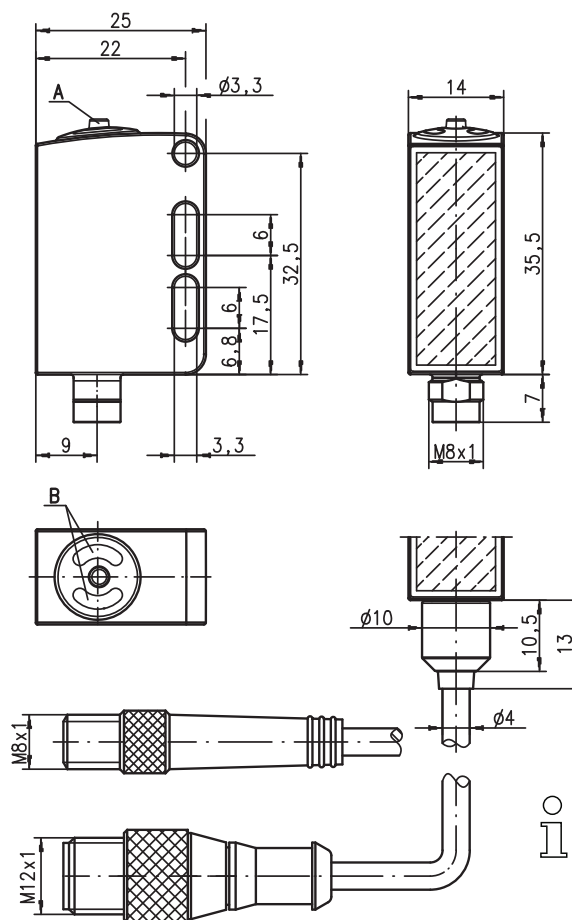


Detection of baked goods



Filling of beverage containers

## Dimensioned drawing






Further details can be found in the respective data sheet.

We reserve the right to make changes • BR55\_Overview\_EN.fm

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 55 SERIES

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 <input type="text" value="10"/> m	132
 <b>Retro-reflective sensors</b>	0 <input type="text" value="6"/> m	134
 <b>Diffuse reflection scanners</b>	<input type="text" value="5"/> ... 400 mm	140



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 18\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	AISI 316L stainless steel, DIN X2CrNiMo17132, 1.4404, Ra $\leq 2.5$
	Housing design	WASH-DOWN-Design
	Optics cover	Plastic (PMMA)
	Weight (connector/cable)	40g/60g
<b>Environmental data</b>	Ambient temp. (operation and storage)	-30°C ... +70°C <small>Operating temperatures of +70°C permissible only briefly (<math>\leq 15\text{min}</math>).</small>
	VDE safety class	III
	Protection class	IP 67, IP 69K
	Environmental test	ECOLAB, CleanProof+
	Standards applied	IEC 60947-5-2, UL 508

**Mounting systems for this series can be found from page 515 onwards**

### Features

- **316L stainless steel housing in Wash-Down-Design**
- **Scratch resistant and non-diffusive plastic front cover**
- **Enclosed optics design prevents bacterial carry-overs**
- **Paperless device identification**
- **ECOLAB and CleanProof+ tested**
- **Active ambient light suppression A<sup>2</sup>LS**



### Optical Sensor ABC

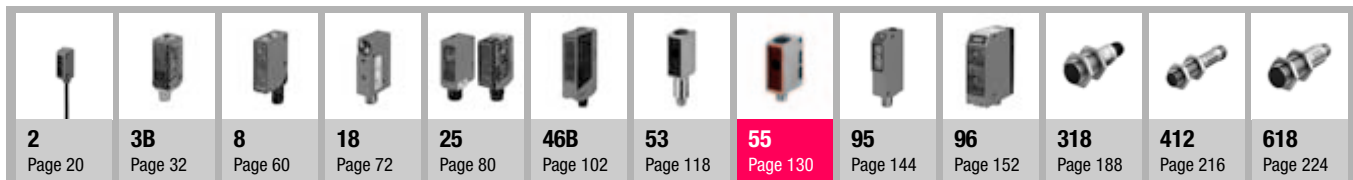
- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564
- A<sup>2</sup>LS Page 571

## THROUGHBEAM SENSORS

Part description Part No.:	Operating range [m]	Typ. op. range limit [m]	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b> ▶ = Transmitter ◀ = Receiver						
▶LSSR 55.8 - S8 ◀LSER 55/66 - S8	50108715 50108721		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶LSSR 55.8, 200 - S12 ◀LSER 55/66, 200 - S12	50108717 50108723		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
▶LSSR 55.8, 5000 ◀LSER 55/66, 5000	50111969 50111970		1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50106154	K - D M8W - 4P - 2m - FAB	Connection cable 2000mm, M8 angular, 4-pin, Food+Bev.	
b 50106152	K - D M8A - 4P - 2m - FAB	Connection cable 2000mm, M8 axial, 4-pin, Food+Bev.	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.	
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.	



**55 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M8 connector	1, 2	a, b, c, d	
Cable 0.2m, with M12 connector	1, 2	e, f	
Cable 5m	1, 2		



Measuring Sensors

Ultrasonic Sensors

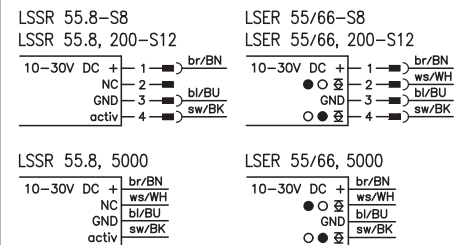
Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Transmitter with activation input
- 2 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/55series/](http://www.leuze.com/55series/)

# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors</b>						
<b>RKR 55 / 6.42 - S8.3</b> 50107601	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>RKR 55 / 6.42 - S8</b> 50105794	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>RKR 55 / 6.42, 5000</b> 50114073	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>RKR 55 / 6.42, 200 - S12</b> 50105795	<input type="text" value="0"/> <input type="text" value="1.5"/> <input type="text" value="0"/> <input type="text" value="1.8"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 55 / 6 - S8.3</b> 50107600	<input type="text" value="0.02"/> <input type="text" value="5"/> <input type="text" value="0.02"/> <input type="text" value="6"/>	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 66 - S8</b> 50105804	<input type="text" value="0.02"/> <input type="text" value="5"/> <input type="text" value="0.02"/> <input type="text" value="6"/>	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 55 / 66, 200 - S12</b> 50105805	<input type="text" value="0.02"/> <input type="text" value="5"/> <input type="text" value="0.02"/> <input type="text" value="6"/>	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>PRK 55 / 66, 5000</b> 50111966	<input type="text" value="0.02"/> <input type="text" value="5"/> <input type="text" value="0.02"/> <input type="text" value="6"/>	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

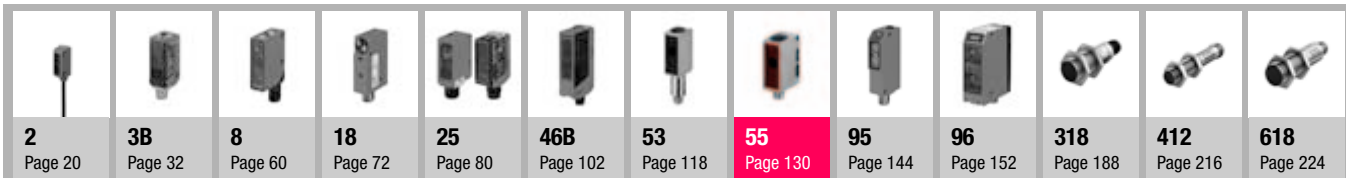
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 555

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.

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**55 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

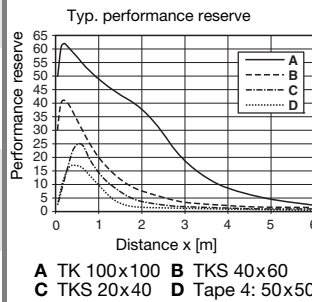
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 3, 4, 5	a, b	
M8 connector	1, 3, 4, 5	c, d	
Cable 5m	1, 3, 4, 5		
Cable 0.2m, with M12 connector	1, 3, 4, 5	e, f	
M8 connector	5	a, b	
M8 connector	5	c, d	
Cable 0.2m, with M12 connector	5	e, f	
Cable 5m	5		



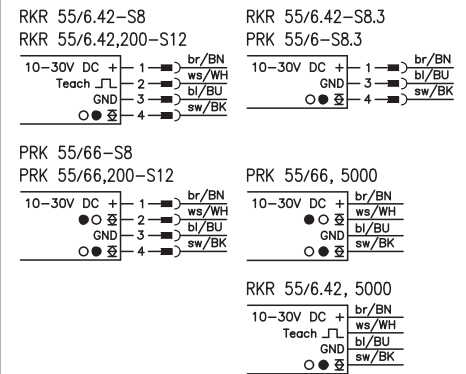
**A** TK 100x100 **B** TKS 40x60  
**C** TKS 20x40 **D** Tape 4: 50x50



**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in via teach input or lockable teach button
- 2 Teach-in via teach button
- 3 Transparent media, especially for foils  $\leq 20\mu\text{m}$
- 4 Autocollimation principle
- 5 UL approval (class 2 acc. to NEC)

[www.leuze.com/55series/](http://www.leuze.com/55series/)

# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 55 / 6.22 - S8.3</b> 50107599	0 <input type="text" value="4"/> <sup>1)</sup> 0 <input type="text" value="5"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6.22 - S8</b> 50105792	0 <input type="text" value="4"/> <sup>1)</sup> 0 <input type="text" value="5"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6.22, 5000</b> 50111967	0 <input type="text" value="4"/> <sup>1)</sup> 0 <input type="text" value="5"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6.22, 200 - S12</b> 50105793	0 <input type="text" value="4"/> <sup>1)</sup> 0 <input type="text" value="5"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6.42 - S8</b> 50112991	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="3.6"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6.42, 5000</b> 50114071	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="3.6"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6.42, 200 - S12</b> 50112477	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="3.6"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>PRK 55 / 6D.42 - S8</b> 50112992	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="3.6"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Dark/light antivalent
<b>PRK 55 / 6D.42, 200 - S12</b> 50112478	0 <input type="text" value="3"/> <sup>1)</sup> 0 <input type="text" value="3.6"/> <sup>1)</sup>	<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Dark/light antivalent

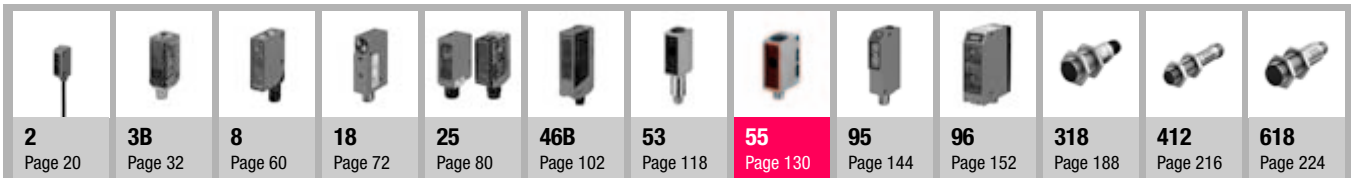
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 555

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.

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**55 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 3, 5, 6	a, b	<p>Typ. performance reserve</p> <p>A TK 100x100 B TKS 40x60 C TKS 20x40 D Tape 4: 50x50</p>
M8 connector	1, 3, 5, 6	c, d	
Cable 5m	1, 3, 5, 6		<p>Typ. performance reserve</p> <p>A TK 100x100 B TKS 40x60 C TKS 20x40 D Tape 4: 50x50</p>
Cable 0.2m, with M12 connector	1, 3, 5, 6	e, f	
M8 connector	1, 4, 5, 6	c, d	<p>Typ. performance reserve</p> <p>A TK 100x100 B TKS 40x60 C TKS 20x40 D Tape 4: 50x50</p>
Cable 5m	1, 4, 5, 6		
Cable 0.2m, with M12 connector	1, 4, 5, 6	e, f	<p>Typ. performance reserve</p> <p>A TK 100x100 B TKS 40x60 C TKS 20x40 D Tape 4: 50x50</p>
M8 connector	1, 4, 5, 6	c, d	
Cable 0.2m, with M12 connector	1, 4, 5, 6	e, f	



Measuring Sensors

Ultrasonic Sensors

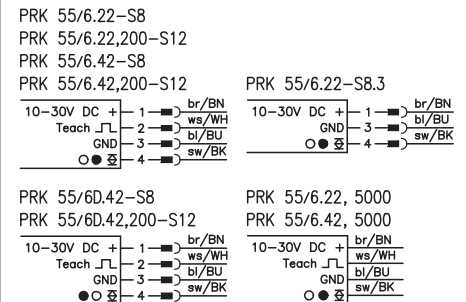
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

**Options**

- 1 Teach-in via teach input or lockable teach button
- 2 Teach-in via teach button
- 3 Precise positioning of objects and reflector markers
- 4 Highly transparent bottles (PET and glass)
- 5 Autocollimation principle
- 6 UL approval (class 2 acc. to NEC)

Light Curtains

Protective Sensors

[www.leuze.com/55series/](http://www.leuze.com/55series/)

Ex Sensors














# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective laser sensors with polarization filter</b>						
<b>PRKL 55 / 6.22 - S8.3</b> 50107602	0 <input type="text" value="2"/> <sup>1)</sup> 0 <input type="text" value="3"/> <sup>2)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent
<b>PRKL 55 / 6.22 - S8</b> 50105796	0 <input type="text" value="2"/> <sup>2)</sup> 0 <input type="text" value="3"/> <sup>2)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent
<b>PRKL 55 / 6.22, 5000</b> 50114072	0 <input type="text" value="2"/> <sup>2)</sup> 0 <input type="text" value="3"/> <sup>2)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent
<b>PRKL 55 / 6.22, 200 - S12</b> 50105797	0 <input type="text" value="2"/> <sup>2)</sup> 0 <input type="text" value="3"/> <sup>2)</sup>	<input type="checkbox"/> <input type="checkbox"/>	2000Hz	Red light laser class 1	Push-pull/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors MTKS 50 x 50, additional reflectors with range specifications can be found on page 555

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.	
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**55 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. performance reserve
M8 connector	2, 3, 4, 5	a, b	
M8 connector	1, 3, 4, 5	c, d	
Cable 5m	1, 3, 4, 5		
Cable 0.2m, with M12 connector	1, 3, 4, 5	e, f	



Measuring Sensors

Ultrasonic Sensors

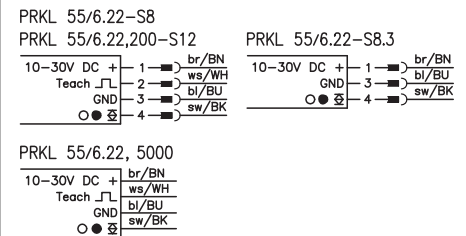
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

**Options**

- 1 Teach-in via teach input or lockable teach button
- 2 Teach-in via teach button
- 3 Detection of small parts and very fast events
- 4 Autocollimation principle
- 5 UL approval (class 2 acc. to NEC)

Light Curtains

Protective Sensors

[www.leuze.com/55series/](http://www.leuze.com/55series/)

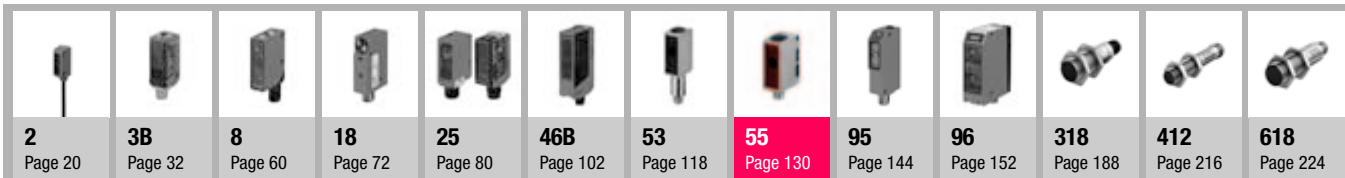
Ex Sensors

# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners with background suppression</b>		1) typical scanning range with a black/white error < 10%				
<b>HRTR 55 / 6 - S8.3</b> 50107491		<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>HRTR 55 / 66 - S8</b> 50107484		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 55 / 66, 5000</b> 50111968		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 55 / 66, 200 - S12</b> 50107492		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 55 / 6 - S - S8.3</b> 50107494		<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
<b>HRTR 55 / 66 - S - S8</b> 50107493		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 55 / 66 - S, 5000</b> 50107493		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 55 / 66 - S, 200 - S12</b> 50107495		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.	
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.	



**55 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

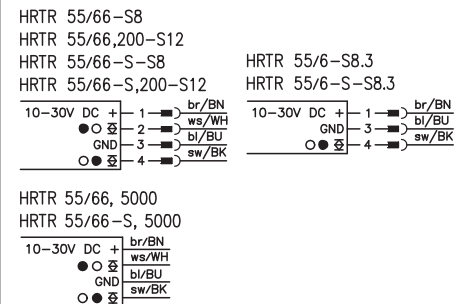
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M8 connector	1, 2, 6	a, b	<p>Typ. black/white behavior</p>
M8 connector	1, 2, 6	c, d	
Cable, 5m	1, 2, 6		<p>Typ. black/white behavior</p>
Cable, 0.2m, with M12 connector	1, 2, 6	e, f	
M8 connector	1, 3, 4, 6	a, b	<p>Typ. black/white behavior</p>
M8 connector	1, 3, 4, 6	c, d	
Cable, 5m	1, 3, 4, 6		<p>Typ. black/white behavior</p>
Cable, 0.2m, with M12 connector	1, 3, 4, 6	e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Reliable switching nearly independent of object/background properties
- 3 Reliable switching even on glossy objects and objects with colored structure
- 4 Small, homogenous light spot for detecting small parts
- 5 Broad rectangular light spot guarantees the reliable detection of objects with openings, grid structures, holes, grooves and of objects with changeable position as well as transparent foils/bottles
- 6 UL approval (class 2 acc. to NEC)

[www.leuze.com/55series/](http://www.leuze.com/55series/)

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup> [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching		
<b>Diffuse reflection scanners with background suppression</b>		1) typical scanning range with a black/white error < 10%						
<b>HRTR 55 / 6 - XL - S8.3</b> 50107497	<table border="1"><tr><td>5 60</td></tr><tr><td>5 100</td></tr></table>	5 60	5 100	<input type="checkbox"/>	1000Hz	Red light	Push-pull/DC	Light/dark antivalent
5 60								
5 100								
<b>HRTR 55 / 66 - XL - S8</b> 50107496	<table border="1"><tr><td>5 60</td></tr><tr><td>5 100</td></tr></table>	5 60	5 100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5 60								
5 100								
<b>HRTR 55 / 66 - XL, 5000</b> 50114070	<table border="1"><tr><td>5 60</td></tr><tr><td>5 100</td></tr></table>	5 60	5 100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5 60								
5 100								
<b>HRTR 55 / 66 - XL, 200 - S12</b> 50107498	<table border="1"><tr><td>5 60</td></tr><tr><td>5 100</td></tr></table>	5 60	5 100	<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
5 60								
5 100								

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50106155	K - D M8W - 4P - 5m - FAB	Connection cable 5000mm, M8 angular, 4-pin, Food+Bev.	
d 50106153	K - D M8A - 4P - 5m - FAB	Connection cable 5000mm, M8 axial, 4-pin, Food+Bev.	
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.	
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.	

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



**55 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

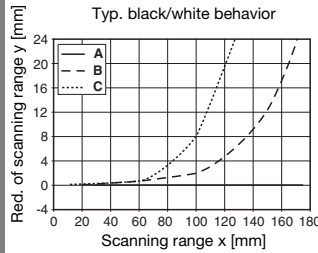
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

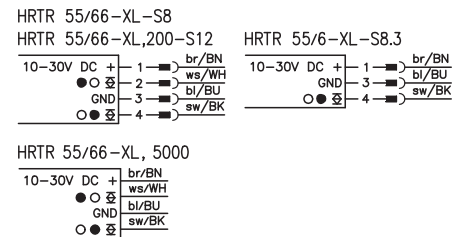
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M8 connector	1, 5, 6	a, b	
M8 connector	1, 5, 6	c, d	
Cable, 5m	1, 5, 6		
Cable, 0.2m, with M12 connector	1, 5, 6	e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

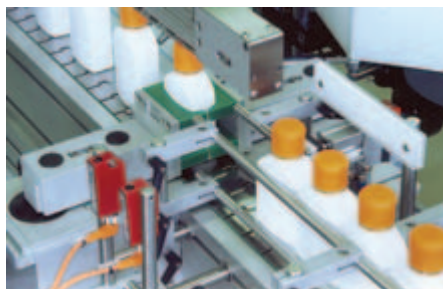
- 1 Scanning range adjustment via multiturn potentiometer
- 2 Reliable switching nearly independent of object/background properties
- 3 Reliable switching even on glossy objects and objects with colored structure
- 4 Small, homogenous light spot for detecting small parts
- 5 Broad rectangular light spot guarantees the reliable detection of objects with openings, grid structures, holes, grooves and of objects with changeable position as well as transparent foils/bottles
- 6 UL approval (class 2 acc. to NEC)

[www.leuze.com/55series/](http://www.leuze.com/55series/)

# OVERVIEW



Cover control

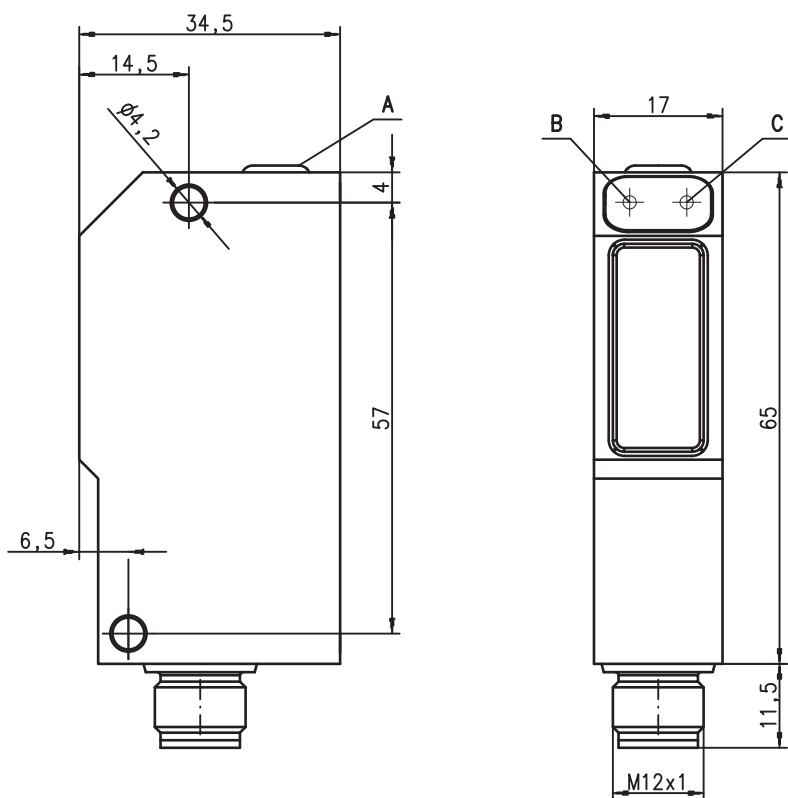


Product separation



Postpress applications

## Dimensioned drawing






Further details can be found in the respective data sheet.

- A** Scanning range adjustment
- B** Yellow switching indicator
- C** Green operation indicator



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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 95 SERIES

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 — 20 m	146
 <b>Retro-reflective sensors</b>	0 — 9 m	148
 <b>Diffuse reflection scanners</b>	□ 10 ... 900 mm	150

### Other 95 Series products:

 Protective sensors	SLSR 95	494
 AS-interface sensors	PRK 95	512



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10(18) ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Diecast zinc
	Optics cover	Glass
	M12 connector	Stainless steel
	Weight	90g
<b>Environmental data</b>	Ambient temperature (operation)	$-30^\circ\text{C} \dots +55^\circ\text{C}$
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 519 onwards

### Features

- Metal housing
- Glass optics
- IP 67 and IP 69K
- Active ambient light suppression A<sup>2</sup>LS
- Detection of PET, foil, and glass



Forked Sensors

Special Sensors

Fiber Optic Sensors

### Optical Sensor ABC

- |                               |          |
|-------------------------------|----------|
| ● Throughbeam sensors         | Page 563 |
| ● Retro-reflective sensors    | Page 563 |
| ● Diffuse reflection scanners | Page 564 |
| ● A <sup>2</sup> LS           | Page 571 |

Light Curtains

Protective Sensors














Ex Sensors

## THROUGHBEAM SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors</b> ▶ = Transmitter ◀ = Receiver						
▶ LSR 95 / 2.8 SE - L.1 50034509	0 12	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
◀ ILSR 95 / 44 E - L.1 50034510	0 18	<input type="checkbox"/>				
▶ LS 95 / 2.8 SE - L.1 50026835	0 12	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ ILS 95 / 44 E - L.1 50026836	0 20	<input type="checkbox"/>				

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC	
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC	
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC	
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC	
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC	
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**95 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2, 3, 4	a, b, c, d, e, f	
M12 connector	2, 3, 4	a, b, c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

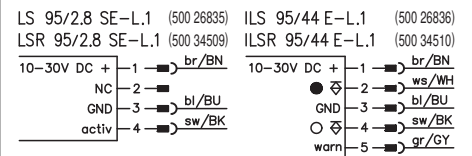
Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Transmitter with activation input
- 3 Receiver with warning output
- 4 UL approval

Ex Sensors

[www.leuze.com/95series/](http://www.leuze.com/95series/)

# RETRO-REFLECTIVE SENSORS

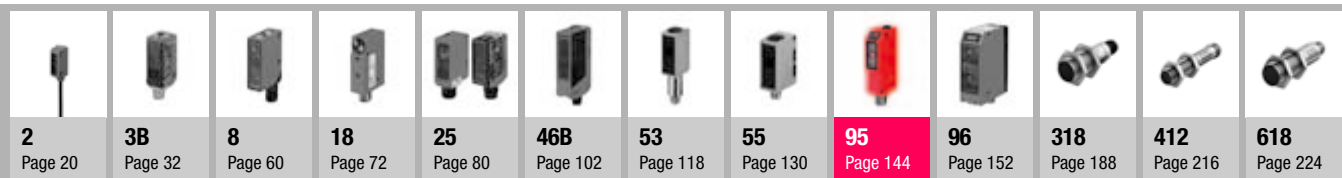
Part description Part No.:	Operating range <sup>1)</sup> [m] <input type="checkbox"/> Typ. op. range limit <sup>1)</sup> [m] <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>					
<b>PRK 95 / 44 L</b> 50034511	<input type="checkbox"/> 0.2 ... 6 <input type="checkbox"/> 0.2 ... 9	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>IPRK 95 / 44 L.5</b> 50034512	<input type="checkbox"/> 0.2 ... 6 <input type="checkbox"/> 0.2 ... 9	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>IPRK 95 / 4.8 L.2</b> 50030257	<input type="checkbox"/> 0 ... 4.2 <input type="checkbox"/> 0 ... 6	1000Hz	Red light	PNP/DC	Light
<b>IPRK 95 / 44 L.2</b> 50022680	<input type="checkbox"/> 0 ... 4.2 <input type="checkbox"/> 0 ... 6	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>IPRK 95 / 44 L.21</b> 50102613	<input type="checkbox"/> 0 ... 4.2 <input type="checkbox"/> 0 ... 6	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 95 / 4 L.2</b> 50027993	<input type="checkbox"/> 0 ... 3.4 <input type="checkbox"/> 0 ... 5	200Hz	Red light	PNP/DC	Light
<b>IPRK 95 / 44 L.3</b> 50022681	<input type="checkbox"/> 0 ... 0.3 (with refl. tape 4, 10x10) <input type="checkbox"/> 0 ... 0.3 (with refl. tape 4, 10x10)	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 95 / 44 L.4</b> 50025609	<input type="checkbox"/> 0 ... 1.8 <input type="checkbox"/> 0 ... 3	1000Hz	Red light	2xPNP/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 555

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**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC



**95 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

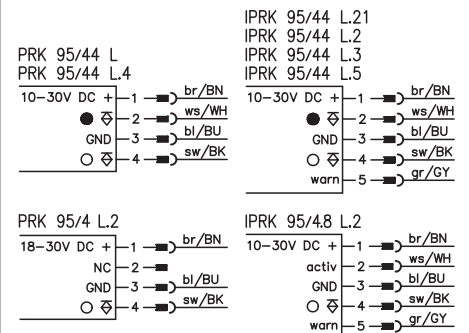
Connection	Option	Accessories	Typ. light spot
M12 connector	8	a, b, c, d	
M12 connector	1, 5, 8	e, f	
M12 connector	3, 4, 5, 8	e, f	
M12 connector	3, 5, 8	e, f	
M12 connector	1, 3, 5, 8	e, f	
M12 connector	3, 6, 8	a, b, c, d	
M12 connector	3, 5, 7, 8	e, f	
M12 connector	1, 2, 3, 8	a, b, c, d	



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

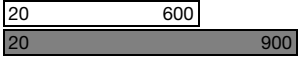
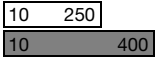
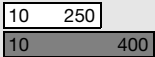


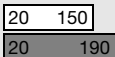
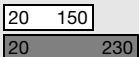
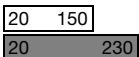
**Electrical connection**



**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Transparent media
- 3 Autocollimation principle
- 4 Activation input
- 5 Warning output
- 6 Direct connection to AS-interface I/O coupling modules
- 7 Focus at 100mm
- 8 UL approval

# DIFFUSE REFLECTION SCANNERS

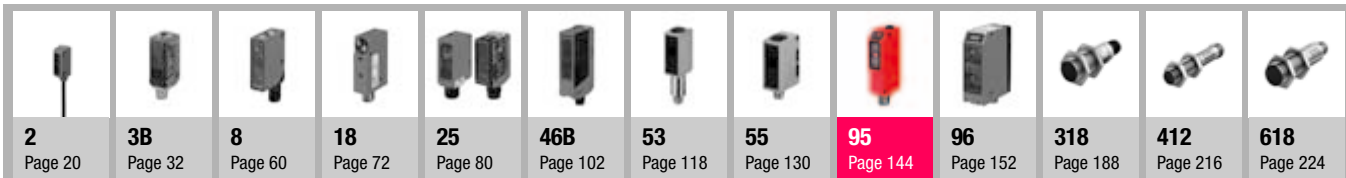
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners</b>						
<b>RKR 95 / 44 - 600 L</b> 50034513		<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>IRKR 95 / 44 - 250 L</b> 50025612		<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>IRK 95 / 44 - 250 L</b> 50025611		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>Diffuse reflection scanners with background suppression</b>						
<b>FRKR 95 / 44 - 350 L</b> 50034514		<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>FRK 95 / 44 - 350 L</b> 50034515		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>FRKR 95 / 44 - 150 L</b> 50025610		<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>FRK 95 / 44 - 150 L</b> 50019925		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>FRK 95 / 22 - 150 L</b> 50022794		<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
b 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC

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Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90% <b>B</b> gray 18% <b>C</b> black 6%</p>
M12 connector	1, 5	a, b	<p>Typ. black/white behavior</p>
M12 connector	1, 2, 5	c, d	<p>Typ. black/white behavior</p>
M12 connector	1, 2, 5	c, d	<p>Typ. black/white behavior</p>
			<p><b>A</b> white 90% <b>B</b> gray 18% <b>C</b> black 6%</p>
M12 connector	1, 4, 5	a, b	<p>Typ. black/white behavior</p>
M12 connector	1, 3, 5	a, b	<p>Typ. black/white behavior</p>
M12 connector	1, 4, 5	a, b	<p>Typ. black/white behavior</p>
M12 connector	1, 5	a, b	<p>Typ. black/white behavior</p>
M12 connector	1, 5	a, b	<p>Typ. black/white behavior</p>

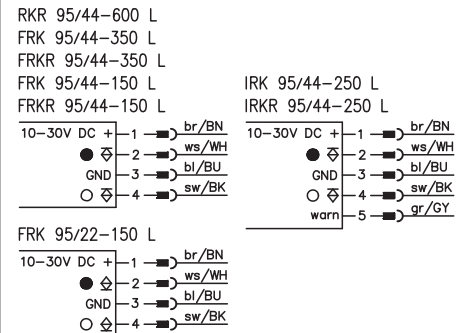
**Options**

- 1 Scanning range adjustment via potentiometer/multiturn potentiometer
- 2 Warning output
- 3 Shiny/inclined surfaces
- 4 Focussed light beam
- 5 UL approval

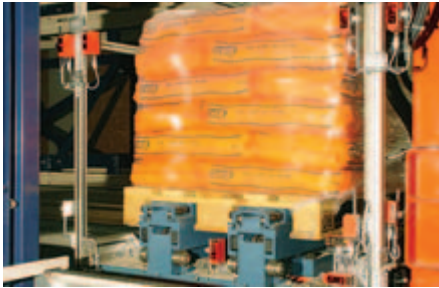
**Optical Sensor ABC**

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

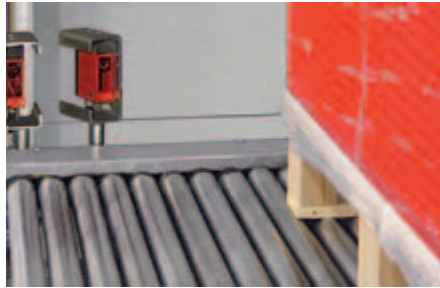
**Electrical connection**



# OVERVIEW



Compartment occupancy monitoring



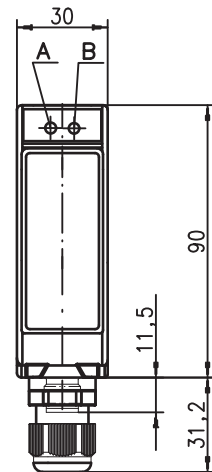
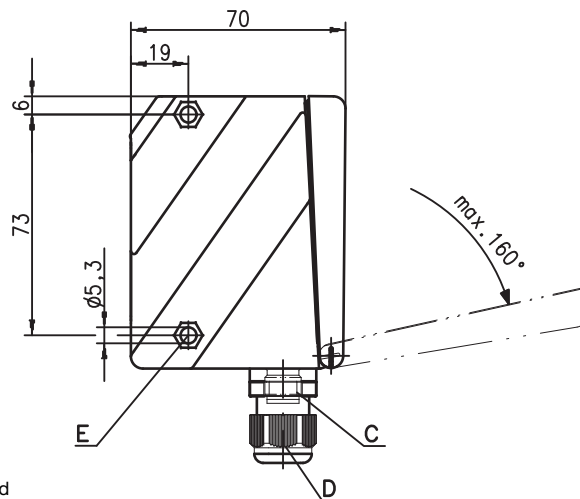
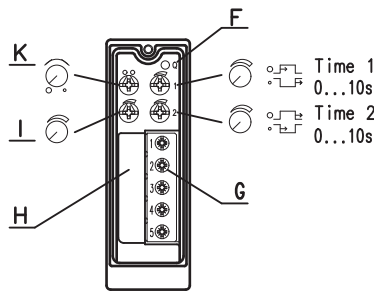
Pallet detection




Pallet repositioning














## Dimensioned drawing

- A Green indicator diode
- B Yellow indicator diode
- C Device plug M12x1
- D Screwed cable gland M16x1.5 for Ø 5 ... 10mm
- E Countersinking for SK nut M5, 4.2 deep
- F Output with switching delay option
- G Connection terminals
- H Cable entry
- I Scanning range adjustment
- K Light/dark switching






 Further details can be found in the respective data sheet.




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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 96 SERIES / DC

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 ... 150 m	154
 <b>Retro-reflective sensors</b>	0 ... 28 m	158
 <b>Diffuse reflection scanners</b>	10 ... 6500 mm	164

### Other 96 Series products:

 AC-DC versions	LS 96, (P)RK 96, (H)RT 96	178
 Optical distance sensors	ODS 96, ODSL 96	254
 Protective sensors	SLS 96	496



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circ. curr. (heating)	$\leq 50\text{mA}$ ( $\leq 130\text{mA}$ )
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Metal or plastic
	Optics cover	Glass or plastic
	Weight (metal/plastic)	380g/150g
<b>Environmental data</b>	Ambient temperature (operation)	-30°C ... +55°C Laser: 0°C ... +40°C
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K <sup>1)</sup>
	Standards applied	IEC 60947-5-2, UL 508

1) IP 69K only with metal housing

Mounting systems for this series can be found from page 520 onwards

### Features

- Metal or plastic housing
- Large, dirt-resistant optical surface
- IP 67 and IP 69K
- Active ambient light suppression A<sup>2</sup>LS
- Universally usable due to long operating ranges and high performance reserve
- Connection via terminals or M12 connectors



### Optical Sensor ABC

- |                               |          |
|-------------------------------|----------|
| ● Throughbeam sensors         | Page 563 |
| ● Retro-reflective sensors    | Page 563 |
| ● Diffuse reflection scanners | Page 564 |
| ● A <sup>2</sup> LS           | Page 571 |

# THROUGHBEAM SENSORS / DC

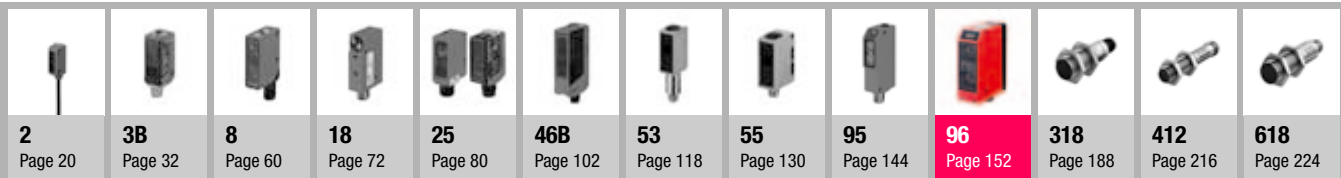
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors in metal housing</b>						
▶ = Transmitter ◀ = Receiver						
▶ LSS 96 M - 120W - 43 ◀ LSE 96 M/P - 181W - 41	50031574 50031575	<input type="checkbox"/> 0 30 <input type="checkbox"/> 0 39	500Hz	Red light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1206 - 43 ◀ LSE 96 M/P - 1816 - 41	50032129 50032128	<input type="checkbox"/> 0 30 <input type="checkbox"/> 0 39	500Hz	Red light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1200 - 23 ◀ LSE 96 M/P - 1170 - 22	50025217 50025195	<input type="checkbox"/> 0 30 <input type="checkbox"/> 0 39	500Hz	Red light	PNP/DC	Light
▶ LSS 96 M - 1070 - 43 ◀ LSE 96 M/P - 3010 - 41	50025228 50034128	<input type="checkbox"/> 0 120 <input type="checkbox"/> 0 150	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1090 - 43 ◀ LSE 96 M/P - 3012 - 41	50103290 50103291	<input type="checkbox"/> 0 120 <input type="checkbox"/> 0 150	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1070 - 23 ◀ LSE 96 M/P - 3010 - 21	50025225 50082296	<input type="checkbox"/> 0 120 <input type="checkbox"/> 0 150	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1090 - 24 ◀ LSE 96 M/P - 3012 - 21	50025223 50033328	<input type="checkbox"/> 0 120 <input type="checkbox"/> 0 150	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1070 - 43 ◀ LSE 96 M/P - 1040 - 42	50025228 50025205	<input type="checkbox"/> 0 50 <input type="checkbox"/> 0 65	500Hz	Infrared light	PNP/DC	Light
▶ LSS 96 M - 1090 - 24 ◀ LSE 96 M/P - 1130 - 22	50025223 50025201	<input type="checkbox"/> 0 50 <input type="checkbox"/> 0 65	500Hz	Infrared light	PNP/DC	Light
▶ LSS 96 M - 1070 - 23 ◀ LSE 96 M/N - 1010 - 27	50025225 50031295	<input type="checkbox"/> 0 50 <input type="checkbox"/> 0 65	500Hz	Infrared light	2xNPN/DC	Light/dark antivalent

**Accessories / connection cables**

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR96\_DC\_LS1\_EN.fm



**96 SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

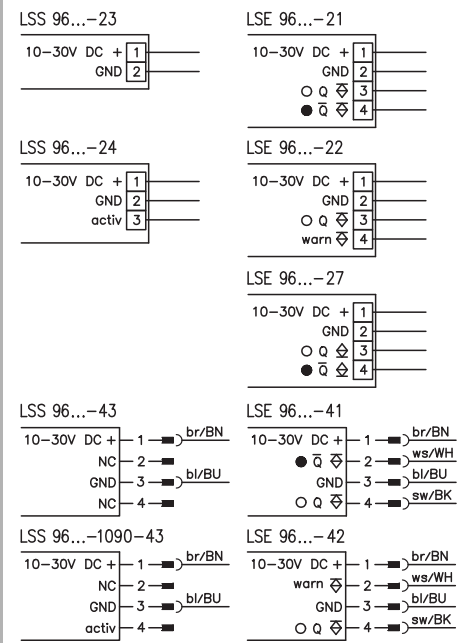
Connection	Option	Accessories	Typ. light spot
M12 connector	2, 7	a, b, c, d, e, f	
M12 connector	2, 5, 7	a, b, c, d, e, f	
Terminals	1, 4, 6, 7		
M12 connector	1, 7	a, b, c, d, e, f	
M12 connector	1, 3, 5, 7	a, b, c, d, e, f	
Terminals	1, 7		
Terminals	1, 3, 5, 7		
M12 connector	1, 4, 6, 7	a, b, c, d, e, f	
Terminals	1, 3, 4, 5, 6, 7		
Terminals	1, 7		



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Wide angle version for easy alignment
- 3 Transmitter with activation input
- 4 Receiver with warning output
- 5 Low-temperature version with optics heating
- 6 Switching delay
- 7 UL approval

# THROUGHBEAM SENSORS / DC

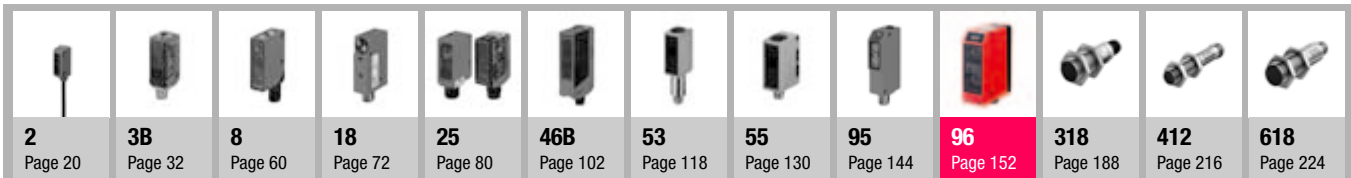
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors in metal housing</b>						
▶ = Transmitter ◀ = Receiver						
▶ LSS 96 M - 1093 - 24 50106871 ◀ LSE 96 M/P 3012 - 21 50033328	<input type="text" value="0"/> <input type="text" value="120"/> <input type="text" value="0"/> <input type="text" value="150"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 M - 1206 - 43 50032129 ◀ LSE 96 M/P - 1170 - 42 50025197	<input type="text" value="0"/> <input type="text" value="30"/> <input type="text" value="0"/> <input type="text" value="39"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>Throughbeam sensors in plastic housing</b>						
▶ = Transmitter ◀ = Receiver						
▶ LSS 96 K - 1213 - 24 50080657 ◀ LSE 96 K/P - 1140 - 21 50030269	<input type="text" value="0"/> <input type="text" value="30"/> <input type="text" value="0"/> <input type="text" value="39"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Red light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 K - 1070 - 43 50025254 ◀ LSE 96 K/P - 1015 - 45 50103004	<input type="text" value="0"/> <input type="text" value="50"/> <input type="text" value="0"/> <input type="text" value="65"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Infrared light	PNP/DC	Dark
▶ LSS 96 K - 1070 - 43 50025254 ◀ LSE 96 K/P - 1010 - 41 50025258	<input type="text" value="0"/> <input type="text" value="50"/> <input type="text" value="0"/> <input type="text" value="65"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 K - 1070 - 43 50025254 ◀ LSE 96 K/P - 1030 - 41 50080483	<input type="text" value="0"/> <input type="text" value="50"/> <input type="text" value="0"/> <input type="text" value="65"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 K - 1070 - 23 50025255 ◀ LSE 96 K/P - 1030 - 21 50025259	<input type="text" value="0"/> <input type="text" value="50"/> <input type="text" value="0"/> <input type="text" value="65"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Infrared light	2xPNP/DC	Light/dark antivalent
▶ LSS 96 K - 1079 - 43 50108812 ◀ LSE 96 K/P - 1039.1 - 41 50108813	<input type="text" value="0"/> <input type="text" value="30"/> <input type="text" value="0"/> <input type="text" value="35"/>	<input type="checkbox"/> <input type="checkbox"/>	500Hz	Infrared light	1xPNP/DC	Light/dark reversible

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR96\_DC\_LS2\_EN.fm



**96 SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

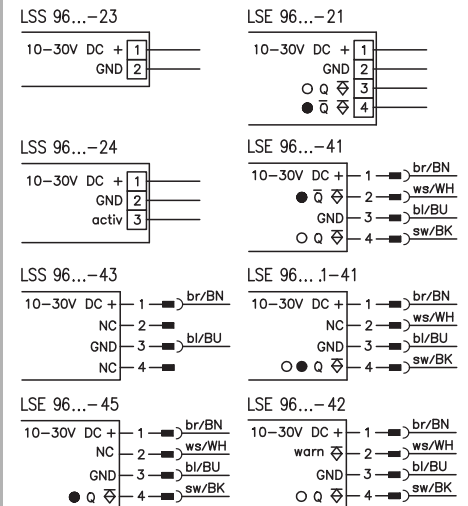
Connection	Option	Accessories	Typ. light spot
Terminals	1, 5, 7, 8		
M12 connector	1, 4, 6, 8	a, b, c, d, e, f	
Terminals	1, 3, 8		
M12 connector	1, 2, 8	a, b, c, d, e, f	
M12 connector	1, 8	a, b, c, d, e, f	
M12 connector	1, 6, 8	a, b, c, d, e, f	
Terminals	1, 6, 8		
M12 connector	1, 2, 6, 8	a, b, c, d, e, f	



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Direct connection to AS-interface I/O coupling modules
- 3 Transmitter with activation input
- 4 Warning output
- 5 Low-temperature version with optics heating
- 6 Switching delay
- 7 Active = low
- 8 UL approval

# RETRO-REFLECTIVE SENSORS / DC

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in metal housing</b>						
<b>RK 96 M/P - 1440 - 21</b> 50030648	0,3 15 0.1 18	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>Retro-reflective sensors in metal housing with polarization filter</b>						
<b>PRK 96 M/P - 3380 - 41</b> 50061452	0,3 15 0.1 18	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 M/P - 3360 - 21</b> 50082065	0,3 15 0.1 18	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 M/N - 3366 - 27</b> 50102379	0,3 15 0.1 18	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent
<b>PRK 96 M/P - 1361.1 - 47</b> 50104279	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 96 M/P - 1362 - 47</b> 50080477	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 M/P - 1361 - 47</b> 50082092	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 M/P - 1370 - 42</b> 50025186	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 M/P - 1375 - 22</b> 50109208	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Dark

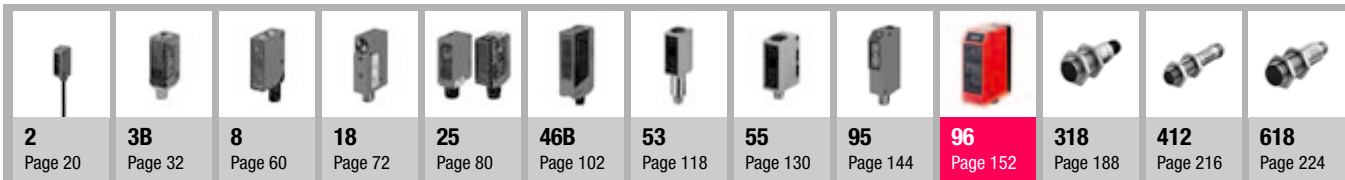
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 556

We reserve the right to make changes • BR96\_DC\_PPRK1\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC





**96 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

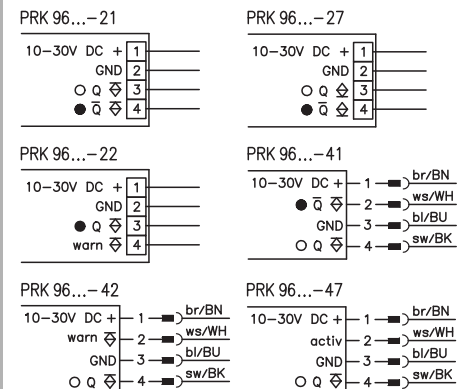
Connection	Option	Accessories	Typ. light spot
Terminals	1, 7		
M12 connector	1, 5, 7	a, b, c, d	
Terminals	1, 7		
Terminals	1, 4, 7		
M12 connector	1, 2, 7	a, b, c, d	
M12 connector	1, 2, 4, 7	a, b, c, d	
M12 connector	1, 2, 7	a, b, c, d	
M12 connector	1, 3, 7	a, b, c, d	
Terminals	1, 3, 7		



**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Sensitivity adjustment via potentiometer
- Activation input
- Warning output
- Low-temperature version with optics heating
- Switching delay
- Direct connection to AS-interface I/O coupling modules
- UL approval

[www.leuze.com/96series/](http://www.leuze.com/96series/)

## RETRO-REFLECTIVE SENSORS / DC

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in metal housing with polarization filter</b>						
<b>PRK 96 M/P - 1400 - 42</b> 50031549	<input type="text" value="0,3"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 M/P - 1370 - 22</b> 50025182	<input type="text" value="0,3"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 M/P - 1400 - 22</b> 50025178	<input type="text" value="0,3"/> <input type="text" value="8"/> <input type="text" value="0.1"/> <input type="text" value="10"/>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 M/P - 1832 - 41</b> 50105622	<input type="text" value="0"/> <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="8.5"/>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 96 M/P - 1838 - 41</b> 50080760	<input type="text" value="0"/> <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="8.5"/>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 96 M/P - 1838 - 21</b> 50029880	<input type="text" value="0"/> <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="8.5"/>	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 96 M/P - 2838 - 28</b> 50082060	<input type="text" value="0"/> <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="8.5"/>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 M/P - 1830 - 41</b> 50080469	<input type="checkbox"/> 0 ... 1.5 <input type="checkbox"/> 0 ... 1.85	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 96 M/P - 1830 - 21</b> 50028975	<input type="checkbox"/> 0 ... 1.5 <input type="checkbox"/> 0 ... 1.85	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible

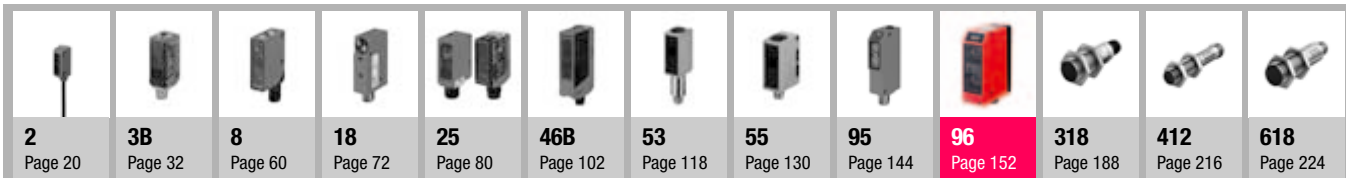
1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 556

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR96\_DC\_PRK2\_EN.fm



**96 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

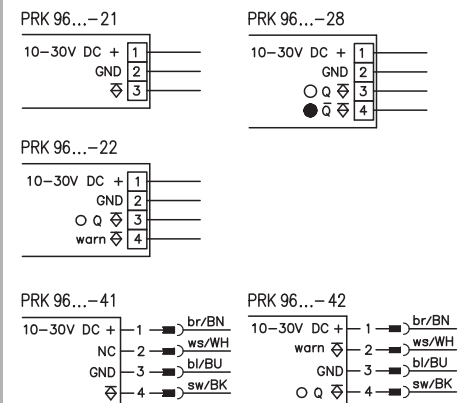
Connection	Option	Accessories	Typ. light spot
M12 connector	2, 3, 4, 5, 9	a, b, c, d	
Terminals	2, 3, 9		
Terminals	2, 3, 4, 5, 9		
M12 connector	3, 9	a, b, c, d, e, f	
M12 connector	1, 6, 7, 9	a, b, c, d, e, f	
Terminals	1, 6, 7, 9		
Terminals	2, 6, 7, 9		
M12 connector	1, 6, 7, 8, 9	a, b, c, d, e, f	
Terminals	1, 6, 7, 8, 9		



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Intelligent sensitivity adjustment via 10-turn-potentiometer
- Sensitivity adjustment via potentiometer
- Warning output
- Low-temperature version with optics heating
- Switching delay
- Autocollimation principle
- Transparent media
- Integrated slit diaphragm for detection of the smallest gaps
- UL approval

## RETRO-REFLECTIVE SENSORS / DC

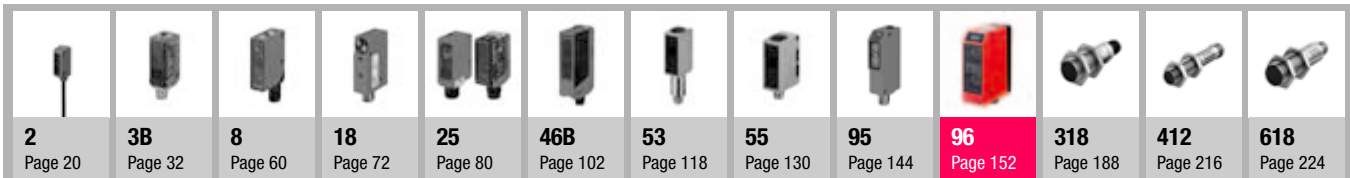
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in plastic housing with polarization filter</b>						
<b>PRK 96 K/P - 3368 - 41</b> 50041042	0,3 26 0.1 28	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 K/P - 1363 - 29</b> 50080656	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 K/P - 1361 - 29</b> 50080476	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light
<b>PRK 96 K/P - 1360.1 - 41</b> 50103216	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 96 K/P - 1360 - 41</b> 50025165	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 K/P - 1380 - 41</b> 50025166	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 K/P - 1360 - 21</b> 50025163	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 96 K/N - 1380 - 46</b> 50081325	0,3 8 0.1 10	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 556

We reserve the right to make changes • BR96\_DC\_PPK3\_EN.fm

### Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**96 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

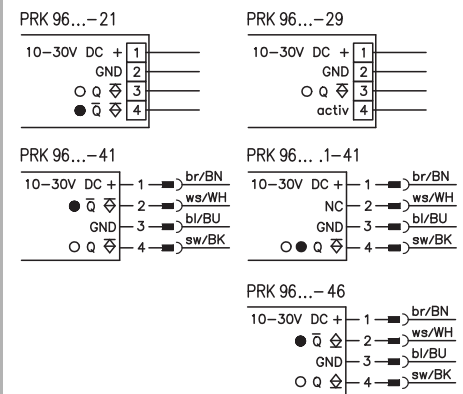
Connection	Option	Accessories	Typ. light spot
M12 connector	1, 6	a, b, c, d, e, f	
Terminals	1, 3, 6		
Terminals	1, 2, 6		
M12 connector	1, 5, 6	a, b, c, d, e, f	
M12 connector	1, 6	a, b, c, d, e, f	
M12 connector	1, 4, 6	a, b, c, d, e, f	
Terminals	1, 6		
M12 connector	1, 4, 6	a, b, c, d, e, f	



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Activation input (active high)
- 3 Activation input (active low)
- 4 Switching delay
- 5 Direct connection to AS-interface I/O coupling modules
- 6 UL approval

## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners in metal housing</b>						
<b>RT 96 M/P - 1474 - 800 - 42</b> 50041597			1000Hz	Infrared light	PNP/DC	Light
<b>Energetic diffuse reflection scanners in plastic housing</b>						
<b>RT 96 K/P - 1444 - 800 - 41</b> 50081178			1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 96 K/P - 1444 - 800 - 21</b> 50081177			1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 96 K/N - 1444 - 800 - 46</b> 50041595			1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

We reserve the right to make changes • BR96\_DC\_RT\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 96 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

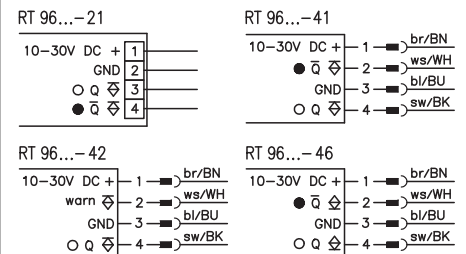
Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 2, 3, 4, 5	a, b, c, d, e, f	
M12 connector	1, 3, 5	a, b, c, d, e, f	
Terminals	1, 3, 5		
M12 connector	1, 3, 5	a, b, c, d, e, f	



### Optical Sensor ABC

- Diffuse reflection scanners energetic Page 564
- Connection types Page 568
- Outputs Page 568

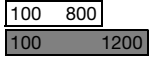
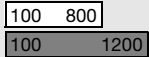
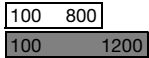
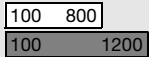
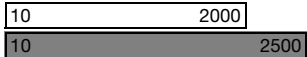


### Electrical connection



### Options

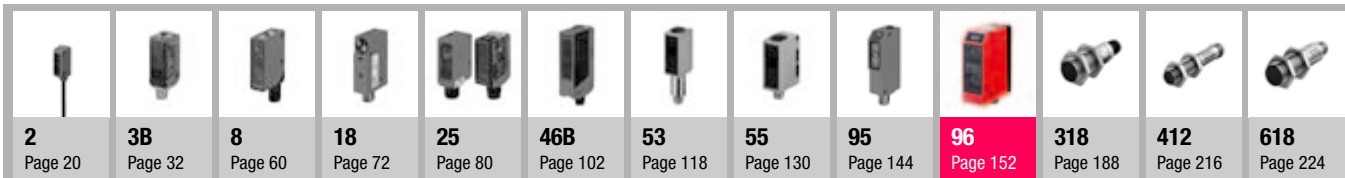
- 1 Scanning range adjustment via potentiometer
- 2 Warning output
- 3 Short range 20mm
- 4 Switching delay
- 5 UL approval

## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input checked="" type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners in metal housing with background suppression</b>						
<b>HRT 96 M/P - 1630 - 800 - 41</b> 50080047		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1636 - 800 - 41</b> 50032127		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1640 - 800 - 41</b> 50025126		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1640 - 800 - 21</b> 50025124		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 3604 - 2000 - 42</b> 50060858		<input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light, configurable
<b>HRT 96 M/P - 1600 - 2000 - 42</b> 50060857		<input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1620 - 1800 - 41</b> 50113909		<input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent

We reserve the right to make changes • BR96\_DC\_HRT1\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC





**96 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

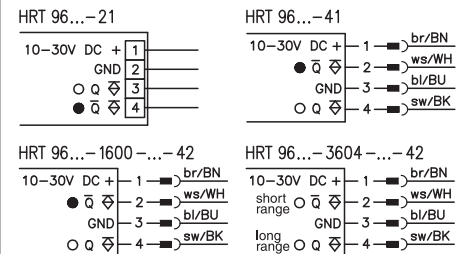
Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 5	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
M12 connector	1, 3, 5	a, b, c, d, e, f	
M12 connector	1, 4, 5	a, b, c, d, e, f	
Terminals	1, 4, 5		<p>Typ. black/white behavior</p>
M12 connector	1, 2, 4, 5	a, b, c, d, e, f	
M12 connector	1, 4, 5	a, b, c, d, e, f	
M12 connector	1, 3, 5	a, b, c, d, e, f	<p>Typ. black/white behavior</p>



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 2 switching points for short/distant range, programmable switching outputs
- 3 Low-temperature version with optics heating
- 4 Switching delay
- 5 UL approval

[www.leuze.com/96series/](http://www.leuze.com/96series/)

## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners in metal housing with background suppression</b>						
<b>HRT 96 M/P - 1610 - 1200 - 41</b> 50025118		<input type="checkbox"/> <input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1620 - 1200 - 41</b> 50061102		<input type="checkbox"/> <input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1610 - 1200 - 21</b> 50025116		<input type="checkbox"/> <input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/P - 1620 - 1200 - 21</b> 50025114		<input type="checkbox"/> <input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 M/N - 1606 - 1200 - 27</b> 50040358		<input type="checkbox"/> <input type="checkbox"/>	300Hz	Infrared light	2xNPN/DC	Light/dark antivalent

We reserve the right to make changes • BR96\_DC\_HRT2\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**96 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

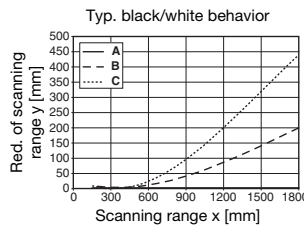
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M12 connector	1, 3, 4	a, b, c, d, e, f	
M12 connector	1, 2, 3, 4	a, b, c, d, e, f	
Terminals	1, 3, 4		
Terminals	1, 2, 3, 4		
Terminals	1, 2, 4		

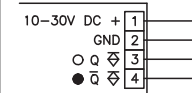


**Optical Sensor ABC**

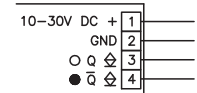
- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

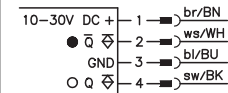
HRT 96...-21



HRT 96...-27



HRT 96...-41



**Options**

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Low-temperature version with optics heating
- 3 Switching delay
- 4 UL approval

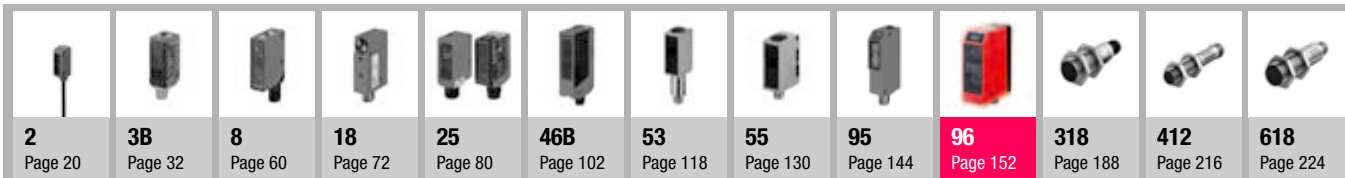
## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	Switching frequency	Light source	Output	Switching				
<b>Diffuse reflection laser scanners in metal housing with background suppression</b>									
<b>HRT 96 M/P - 3360 - 5000 - 426</b> 50039470	<table border="1"> <tr><td>100</td><td>5000</td></tr> <tr><td>100</td><td>5500</td></tr> </table>	100	5000	100	5500	20Hz	Red light laser class 2	Analog/V 2xPNP/DC	Light/dark
100	5000								
100	5500								
<b>HRT 96 M/P - 336W.21 - 5000 - 426</b> 50102286	<table border="1"> <tr><td>50</td><td>2500<sup>1)</sup></td></tr> <tr><td>50</td><td>2500</td></tr> </table>	50	2500 <sup>1)</sup>	50	2500	10Hz	Red light laser class 2	Analog/V 2xPNP/DC	Light/dark
50	2500 <sup>1)</sup>								
50	2500								
<b>HRT 96 M/P - 3360 - 2500 - 426</b> 50104825	<table border="1"> <tr><td>100</td><td>2000</td></tr> <tr><td>80</td><td>2200</td></tr> </table>	100	2000	80	2200	30Hz	Red light laser class 2	Analog/V 2xpush-pull/DC	Light/dark
100	2000								
80	2200								

1) Configurable range adjustment, in combination with reflective tape (standard): 0.1 ... 5m

We reserve the right to make changes • BR96\_DC\_HRT3\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC



# 96 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

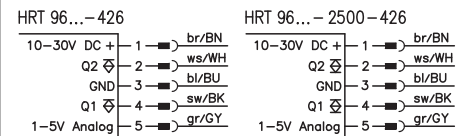
Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 5, 6, 8, 10	a, b, c, d, e, f	
M12 connector	2, 5, 6, 8, 10	a, b, c, d, e, f	
M12 connector	1, 5, 6, 8, 10	a, b, c, d, e, f	



### Optical Sensor ABC

- Diffuse reflection scanners Page 564
- Sensors w. laser transmitter Page 569
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Switching point adjustment via potentiometer
- 2 Switching point adjustment via teach buttons
- 3 2 independently adjustable switching points
- 4 3 independently adjustable switching points
- 5 2 independently adjustable switching points + analog output 1 ... 5V
- 6 Adjustable switching behavior: light/dark
- 7 Deactivation input
- 8 Switching state indicator diodes for each switching output
- 9 Preset reserve + hysteresis for optimum, reliable switching behavior
- 10 UL approval

[www.leuze.com/96series/](http://www.leuze.com/96series/)

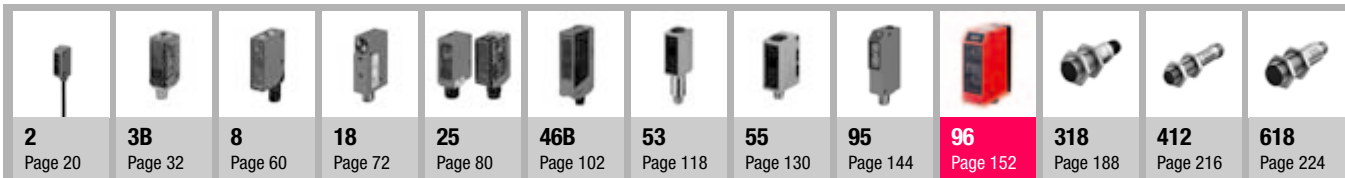
## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Diffuse reflection laser scanners in metal housing with background suppression</b>										
<b>HRTL 96B M/66.01S - S12</b> 50108889	<table border="1"><tr><td>100</td><td>6000</td></tr><tr><td>50</td><td>6500</td></tr></table>	100	6000	50	6500	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	2xPush-pull/DC	Light
100	6000									
50	6500									
<b>HRTL 96B M/666.01S - S12</b> 50112804	<table border="1"><tr><td>100</td><td>6000</td></tr><tr><td>50</td><td>6500</td></tr></table>	100	6000	50	6500	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	3xPush-pull/DC	Light
100	6000									
50	6500									
<b>HRTL 96B M/6.9S - S12</b> 50110990	<table border="1"><tr><td>100</td><td>6000</td></tr><tr><td>50</td><td>6500</td></tr></table>	100	6000	50	6500	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	1xPush-pull/DC	Light
100	6000									
50	6500									
<b>HRTL 96B M/6.49.02S - S12</b> 50112803	<table border="1"><tr><td>100</td><td>6000</td></tr><tr><td>50</td><td>6500</td></tr></table>	100	6000	50	6500	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	1xPush-pull/DC	Light
100	6000									
50	6500									
<b>HRTL 96B M/V66.01S - S12</b> 50110952	<table border="1"><tr><td>100</td><td>6000</td></tr><tr><td>50</td><td>6500</td></tr></table>	100	6000	50	6500	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	Analog/V 2xpush-pull/DC	Light
100	6000									
50	6500									
<b>HRTL 96B M/C66.01S - S12</b> 50111208	<table border="1"><tr><td>100</td><td>6000</td></tr><tr><td>50</td><td>6500</td></tr></table>	100	6000	50	6500	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	Analog/mA <sup>1)</sup> 2xpush-pull/DC	Light
100	6000									
50	6500									
<b>HRTL 96B M/66.9.03S - S12</b> 50112862	<table border="1"><tr><td>150</td><td>25000<sup>2)</sup></td></tr></table>	150	25000 <sup>2)</sup>	<input type="checkbox"/> <input type="checkbox"/>	100Hz	Red light laser class 2	2xPush-pull/DC	Light		
150	25000 <sup>2)</sup>									

1) Analog output 4 ... 20mA corresponding to 150 ... 12000mm / reference: white 90%  
2) Teach range against HG foil (high gain) REF 7-A-100x100 (50111527)

We reserve the right to make changes • BR96\_DC\_HRT4\_EN.fm

Accessories / connection cables		More accessories can be found from page 514 onwards	
Part No.	Designation	Features	
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC	
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC	
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC	
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC	
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC	
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC	
g 50111527	REF 7 - A - 100 x 100	HG foil 100x100mm <sup>2</sup> for realizing large scanning ranges	



**96 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

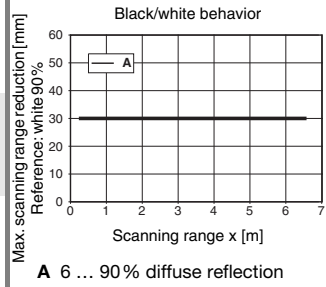
Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

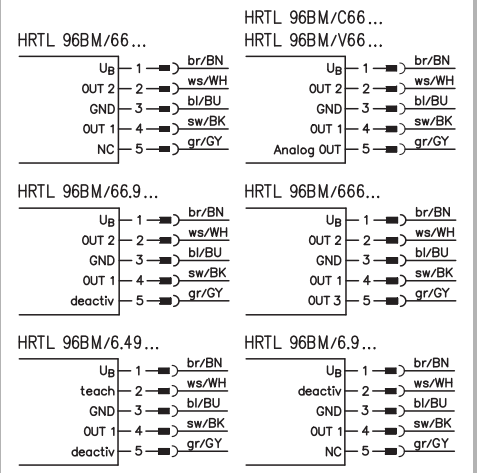
Connection	Option	Accessories	Typ. b/w behavior
M12 connector	2, 3, 6, 8, 9	a, b, c, d, e, f	
M12 connector	2, 4, 6, 9	a, b, c, d, e, f	
M12 connector	2, 6, 7, 8, 9	a, b, c, d, e, f	
M12 connector	2, 6, 7, 8, 9, 10, 11	a, b, c, d, e, f	
M12 connector	2, 5, 6, 8, 9	a, b, c, d, e, f	
M12 connector	2, 5, 6, 8, 9	a, b, c, d, e, f	
M12 connector	2, 3, 6, 7, 8, 9	a, b, c, d, e, f, g	



**Optical Sensor ABC**

- Diffuse reflection scanners Page 564
- Sensors w. laser transmitter Page 569
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



- Options**
- 1 Switching point adjustment via potentiometer
  - 2 Switching point adjustment via teach buttons
  - 3 2 independently adjustable switching points
  - 4 3 independently adjustable switching points
  - 5 2 independently adjustable switching points + analog output
  - 6 Adjustable switching behavior: light/dark
  - 7 Deactivation input
  - 8 Switching state indicator diodes for each switching output
  - 9 Preset reserve + hysteresis for optimum, reliable switching behavior
  - 10 Input for external teach with window function
  - 11 External mode changeover via deactivation input

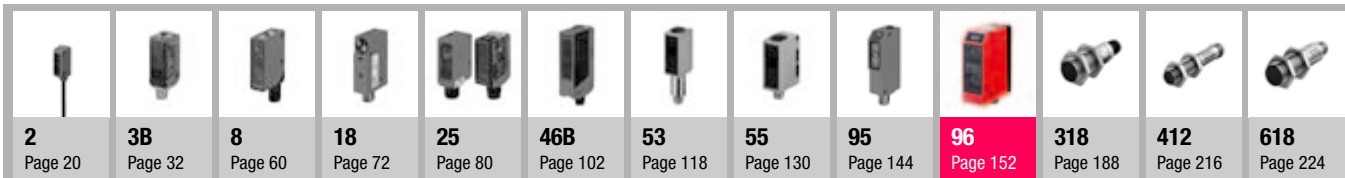
[www.leuze.com/96series/](http://www.leuze.com/96series/)

## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners in plastic housing with background suppression</b>						
<b>HRT 96 K/P - 1631 - 800 - 47</b> 50038471		<input type="checkbox"/>	300Hz	Red light	PNP/DC	Light
<b>HRT 96 K/P - 1630 - 800 - 41</b> 50080242		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 K/P - 1640 - 800 - 41</b> 50081464		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 K/P - 1630 - 800 - 21</b> 50080327		<input type="checkbox"/>	300Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 K/P - 1600 - 1800 - 41</b> 50105667		<input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC





**96 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

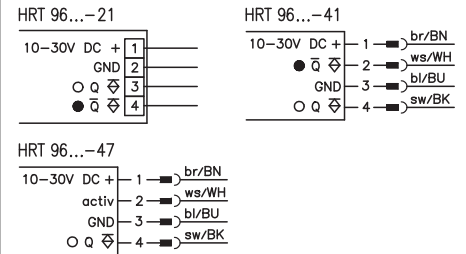
Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 2, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
M12 connector	1, 4	a, b, c, d, e, f	
M12 connector	1, 3, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Terminals	1, 4		
M12 connector	1, 4	a, b, c, d, e, f	



**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

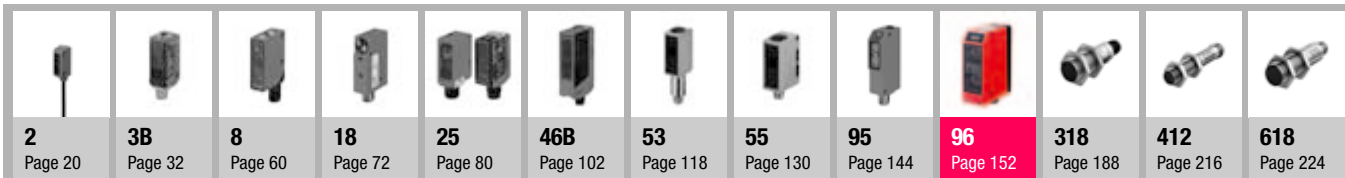
- 1 Scanning range adjustment via multiturn potentiometer
- 2 Activation input
- 3 Switching delay
- 4 UL approval

## DIFFUSE REFLECTION SCANNERS / DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners in plastic housing with background suppression</b>						
<b>HRT 96 K/P - 1607 - 1200 - 49</b> 50103090		<input type="checkbox"/>	300Hz	Infrared light	PNP/DC	Light
<b>HRT 96 K/P - 1600.1 - 1200 - 41</b> 50103217		<input type="checkbox"/>	300Hz	Infrared light	PNP/DC	Light/dark reversible
<b>HRT 96 K/P - 1600 - 1200 - 41</b> 50025133		<input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>HRT 96 K/P - 1600 - 1200 - 21</b> 50025135		<input type="checkbox"/>	300Hz	Infrared light	2xPNP/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	



**96 SERIES**

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M12 connector	1, 2, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
M12 connector	1, 2, 3	a, b, c, d, e, f	
M12 connector	1, 3	a, b, c, d, e, f	
Terminals	1, 3		



Measuring Sensors

Ultrasonic Sensors

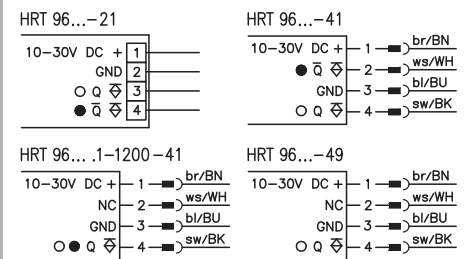
Inductive Switches

**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

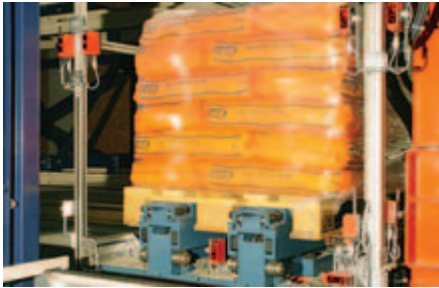
Protective Sensors

**Options**

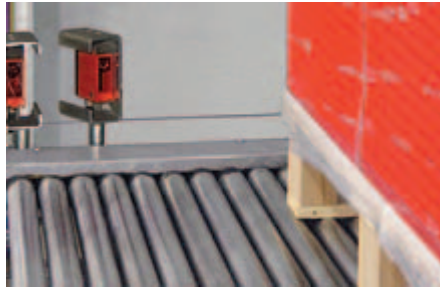
- 1 Scanning range adjustment via multiturn potentiometer
- 2 Direct connection to AS-interface I/O coupling modules
- 3 UL approval

Ex Sensors

# OVERVIEW



Compartment occupancy monitoring



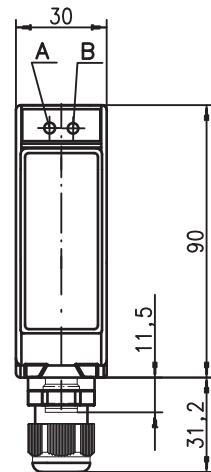
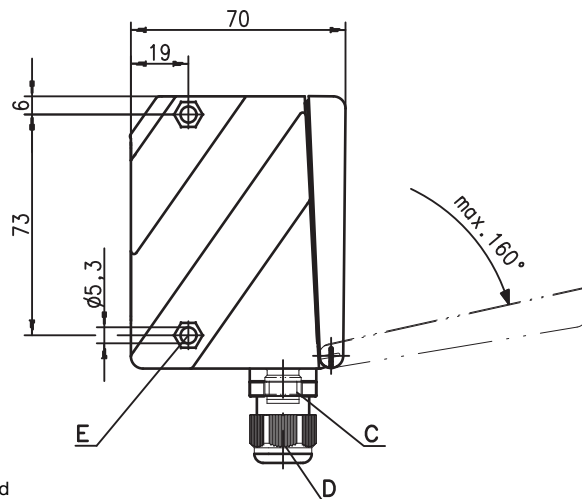
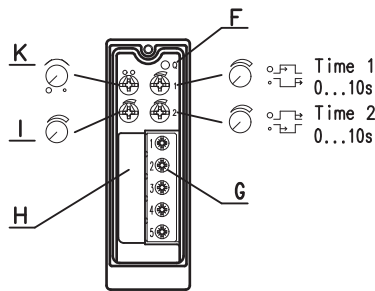
Pallet detection




Pallet repositioning














## Dimensioned drawing

- A Green indicator diode
- B Yellow indicator diode
- C Device plug M12x1
- D Screwed cable gland M16x1.5 for Ø 5 ... 10mm
- E Countersinking for SK nut M5, 4.2 deep
- F Output with switching delay option
- G Connection terminals
- H Cable entry
- I Scanning range adjustment
- K Light/dark switching






 Further details can be found in the respective data sheet.

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**96 SERIES / AC-DC**

Standard Sensors

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 ... 150 m	180
 <b>Retro-reflective sensors</b>	0 ... 24 m	182
 <b>Diffuse reflection scanners</b>	□ 20 ... 1800 mm	186

**Other 96 Series products:**

 DC versions	LS 96, (P)RK 96, (H)RT 96	152
 Optical distance sensors	ODS 96, ODSL 96	254
 Protective sensors	SLS 96	496



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

**Common technical data**

<b>Electrical data</b>	Operating voltage $U_B$	20 ... 230VAC, 50/60Hz 20 ... 230VDC
	Power consumption	≤ 2VA
	Switching voltage	250VAC/DC
	Switching current	3A (at 250VAC/30VDC)
	Switching power	750VA, $\cos\phi=1$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	Flashing yellow LED	No performance reserve
<b>Mechanical data</b>	Housing	Metal or plastic
	Optics cover	Glass or plastic
	Weight (metal/plastic)	380g/150g
<b>Environmental data</b>	Ambient temperature (operation)	-30°C ... +55°C
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K <sup>1)</sup>
	Standards applied	IEC 60947-5-2, UL 508
		1) IP 69K with metal housing

**Features**

- Metal or plastic housing
- Large, dirt-resistant optical surface
- IP 67 and IP 69K
- Active ambient light suppression A<sup>2</sup>LS
- AC-DC version (20 ... 230VAC-DC) with relay output
- Universally usable due to long operating ranges and high performance reserve



Forked Sensors

Special Sensors

Fiber Optic Sensors

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564
- A<sup>2</sup>LS Page 571

Light Curtains

Protective Sensors














Mounting systems for this series can be found from page 520 onwards

Ex Sensors

## THROUGHBEAM SENSORS / AC-DC

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam sensors in metal housing</b>			▶ = Transmitter ◀ = Receiver			
▶ LSS 96 M - 175W - 26 ◀ LSE 96 M/R - 176W - 25	50032004 50032003	<input type="checkbox"/> 0 30 <input checked="" type="checkbox"/> 0 39	20Hz	Red light	Relay	NC/NO
▶ LSS 96 M - 1350 - 26 ◀ LSE 96 M/R - 3310 - 25	50080081 50031651	<input type="checkbox"/> 0 120 <input checked="" type="checkbox"/> 0 150	20Hz	Infrared light	Relay	NC/NO
▶ LSS 96 M - 1350 - 26 ◀ LSE 96 M/R - 1310 - 25	50080081 50080080	<input type="checkbox"/> 0 50 <input checked="" type="checkbox"/> 0 65	20Hz	Infrared light	Relay	NC/NO
<b>Throughbeam sensors in plastic housing</b>			▶ = Transmitter ◀ = Receiver			
▶ LSS 96 K - 1350 - 26 ◀ LSE 96 K/R - 1310 - 25	50025253 50025257	<input type="checkbox"/> 0 50 <input checked="" type="checkbox"/> 0 65	20Hz	Infrared light	Relay	NC/NO
▶ LSS 96 K - 1350 - 26 ◀ LSE 96 K/R - 1320 - 25	50025253 50025256	<input type="checkbox"/> 0 50 <input checked="" type="checkbox"/> 0 65	20Hz	Infrared light	Relay	NC/NO

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**96 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
Terminals	1, 2, 4		
Terminals	1, 4		
Terminals	1, 4		
Terminals	1, 4		
Terminals	1, 3, 4		



Measuring Sensors

Ultrasonic Sensors

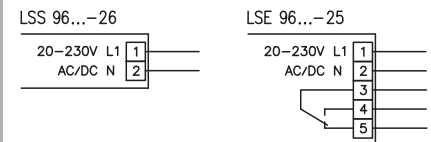
Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Wide angle version for easy alignment
- 3 Switching delay
- 4 UL approval

Ex Sensors














[www.leuze.com/96series/](http://www.leuze.com/96series/)

## RETRO-REFLECTIVE SENSORS / AC-DC

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in plastic housing</b>						
<b>RK 96 K/R - 1560 - 25</b> 50080484	<input type="text" value="0,3"/> <input type="text" value="15"/> <input type="text" value="0.1"/> <input type="text" value="18"/>	<input type="checkbox"/>	20Hz	Infrared light	Relay	NC/NO
<b>Retro-reflective sensors in metal housing with polarization filter</b>						
<b>PRK 96 M/R - 3420 - 25</b> 50082066	<input type="text" value="0,3"/> <input type="text" value="15"/> <input type="text" value="0.1"/> <input type="text" value="18"/>	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 M/R - 3430 - 25</b> 50061111	<input type="text" value="0,3"/> <input type="text" value="15"/> <input type="text" value="0.1"/> <input type="text" value="18"/>	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 M/R - 1858 - 25</b> 50029881	<input type="text" value="0"/> <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="8.5"/>	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 M/R - 1850 - 25</b> 50080470	<input type="checkbox"/> 0 ... 1.5 <input type="checkbox"/> 0 ... 1.85	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 557

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



**96 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
Terminals	2, 7, 8		
Terminals	2, 8		
Terminals	2, 5, 8		
Terminals	1, 3, 4, 5, 8		
Terminals	1, 3, 4, 5, 6, 8		



Measuring Sensors

Ultrasonic Sensors

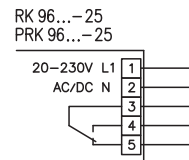
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Intelligent sensitivity adjustment via 10-turn-potentiometer
- 2 Sensitivity adjustment via potentiometer
- 3 Autocollimation principle
- 4 Transparent media
- 5 Switching delay
- 6 Integrated slit diaphragm 3.7x20mm
- 7 Light/dark switching reversible
- 8 UL approval

Ex Sensors














[www.leuze.com/96series/](http://www.leuze.com/96series/)

## RETRO-REFLECTIVE SENSORS / AC-DC

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in plastic housing with polarization filter</b>						
<b>PRK 96 K/R - 3428 - 25</b> 50035351	0,3 20 0.1 24	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 K/R - 3428.1 - 25</b> 50107216	0,3 20 0.1 24	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 K/R - 1420 - 25</b> 50025167	0,3 8 0.1 10	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 K/R - 1420.1 - 25</b> 50105587	0,3 8 0.1 10	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO
<b>PRK 96 K/R - 1430 - 25</b> 50025168	0,3 8 0.1 10	<input type="checkbox"/>	20Hz	Red light	Relay	NC/NO

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 557

We reserve the right to make changes • BR96\_UC\_PPK2\_EN.fm

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**96 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
Terminals	1, 4		
Terminals	1, 3, 4		
Terminals	1, 4		
Terminals	1, 3, 4		
Terminals	1, 2, 4		



Measuring Sensors

Ultrasonic Sensors

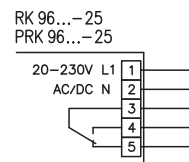
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

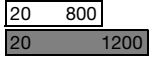
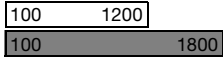
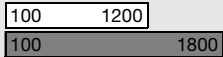
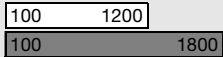
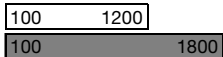
**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Switching delay
- 3 Light/dark switching reversible
- 4 UL approval














Ex Sensors

[www.leuze.com/96series/](http://www.leuze.com/96series/)

## DIFFUSE REFLECTION SCANNERS / AC-DC

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners in metal housing</b>						
<b>RT 96 M/R - 1574 - 800 - 25</b> 50041598		<input type="checkbox"/>	20Hz	Infrared light	Relay	NC/NO
<b>Diffuse reflection scanners in metal housing with background suppression</b>						
<b>HRT 96 M/R - 1680 - 1200 - 25</b> 50080076		<input type="checkbox"/>	20Hz	Infrared light	Relay	NC/NO
<b>HRT 96 M/R - 1690 - 1200 - 25</b> 50080075		<input type="checkbox"/>	20Hz	Infrared light	Relay	NC/NO
<b>Diffuse reflection scanners in plastic housing with background suppression</b>						
<b>HRT 96 K/R - 1680 - 1200 - 25</b> 50025132		<input type="checkbox"/>	20Hz	Infrared light	Relay	NC/NO
<b>HRT 96 K/R - 1690 - 1200 - 25</b> 50025131		<input type="checkbox"/>	20Hz	Infrared light	Relay	NC/NO

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**96 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

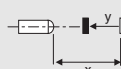
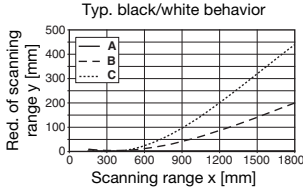
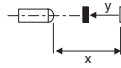
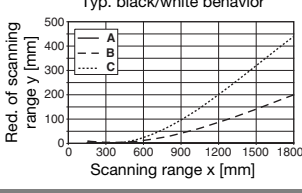
Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

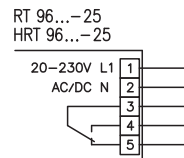
Connection	Option	Accessories	Typ. b/w behavior
Terminals	1, 2, 3, 4		
			<b>A</b> white 90% <b>B</b> gray 18% <b>C</b> black 6% 
Terminals	1, 4		Typ. black/white behavior 
Terminals	1, 3, 4		
			<b>A</b> white 90% <b>B</b> gray 18% <b>C</b> black 6% 
Terminals	1, 4		Typ. black/white behavior 
Terminals	1, 3, 4		



**Optical Sensor ABC**

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Scanning range adjustment via potentiometer
- 2 Short range (20mm)
- 3 Switching delay
- 4 UL approval

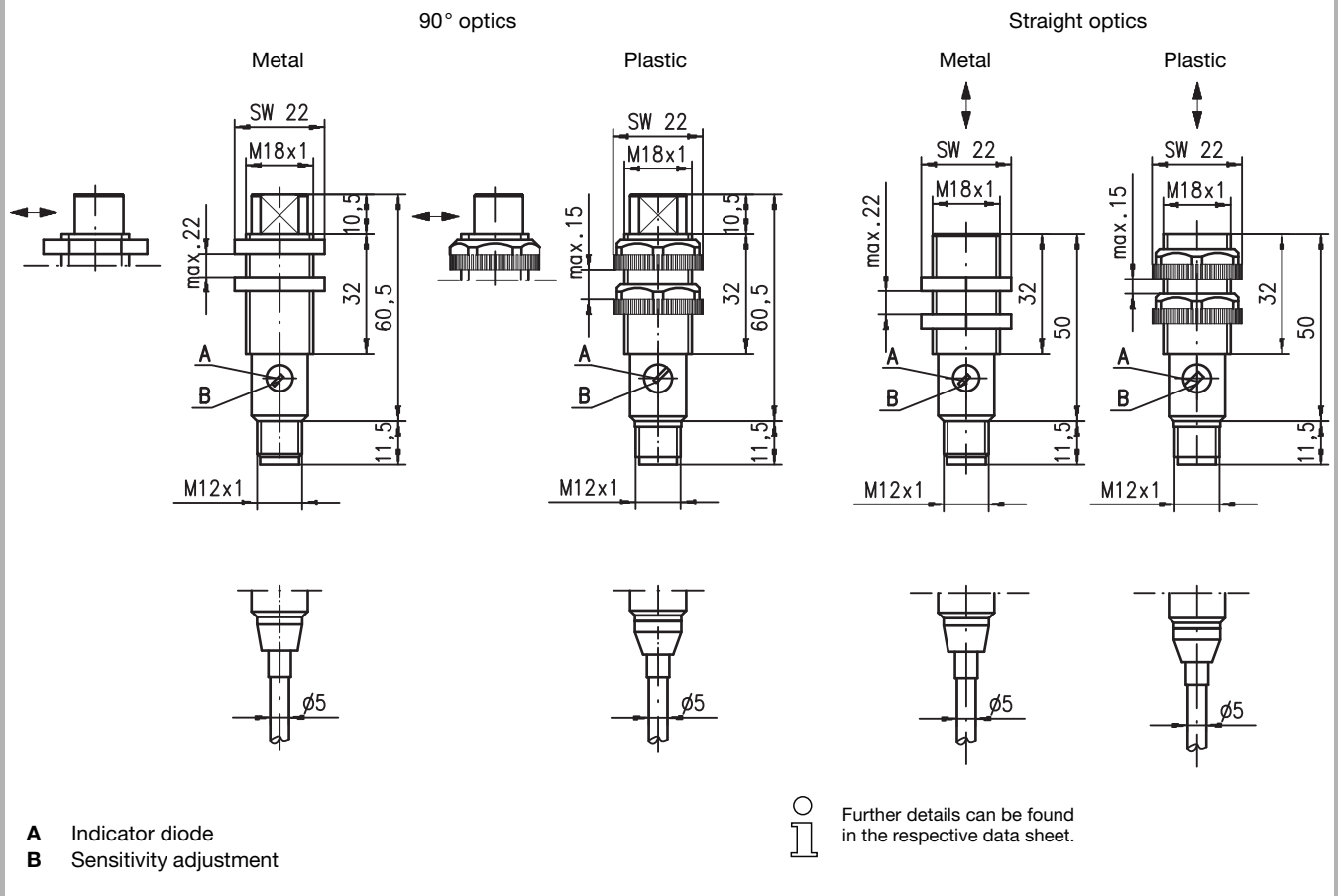
[www.leuze.com/96series/](http://www.leuze.com/96series/)

# OVERVIEW



Mould-removal monitoring




## Dimensioned drawing



We reserve the right to make changes • BR318\_Overview\_EN.fm

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 318 SERIES

Operating principle	Typ. operating range limits	Page
 <b>Throughbeam sensors</b>	0 ... 120 m	190
 <b>Retro-reflective sensors</b>	0.02 ... 15 m	196
 <b>Diffuse reflection scanners</b>	0 ... 700 mm	204

### Other 318 Series products:

 <b>Protective sensors</b>	SLS 318	498
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### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 25\text{mA}$
	Signal voltage high/low	$\geq (U_B - 1,6\text{V}) / \leq 1,6\text{V}$
<b>Indicators</b>	Red LED	Switching output
	Flashing red LED	No performance reserve
<b>Mechanical data</b>	Housing	PA 12 or stainless steel
	Optics cover	PA 12
	Weight (connector/cable)	20g/90g
<b>Environmental data</b>	Ambient temperature (operation)	-25°C ... +65°C Laser: -25°C ... +60°C
	VDE safety class	II, all-insulated
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 521 onwards

### Features

- Very small construction for limited spaces
- Available in plastic and stainless steel housing
- Available with straight and angular optics
- Powerful laser devices available in M18 cylindrical housing



### Optical Sensor ABC

- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564

# THROUGHBEAM SENSORS

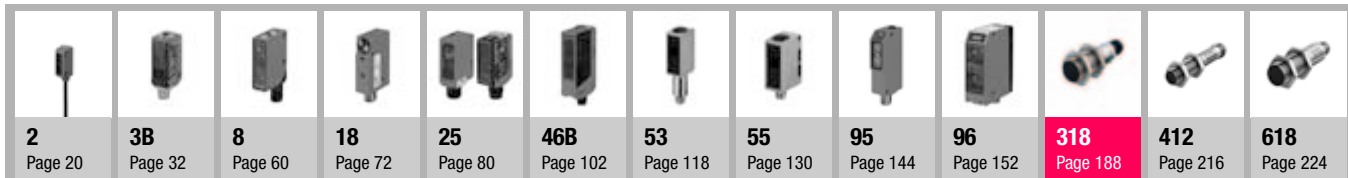
Part description		Operating range [m]	<input type="checkbox"/>	Switching frequency	Light source	Output	Switching
Part No.:		Typ. op. range limit [m]	<input type="checkbox"/>				
<b>Throughbeam sensors in metal housing</b>				▶ = Transmitter ◀ = Receiver			
▶ LSS 318 M - 70 - S12	50082177	0 35	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 M/P - S12	50081340	0 45	<input type="checkbox"/>				
▶ LSS 318 M - 70	50082188	0 35	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 M/P	50081342	0 45	<input type="checkbox"/>				
▶ LSS 318 M - S12	50081339	0 15	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 M/P - S12	50081340	0 20	<input type="checkbox"/>				
▶ LSS 318 M	50081341	0 15	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 M/P	50081342	0 20	<input type="checkbox"/>				
▶ LSS 318 M	50081341	0 15	<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
◀ LSE 318 M/N	50108613	0 20	<input type="checkbox"/>				
▶ LSS 318 WM - S12	50082154	0 10	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 WM/P - S12	50082158	0 13	<input type="checkbox"/>				
▶ LSS 318 WM	50082152	0 10	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 WM/P	50082156	0 13	<input type="checkbox"/>				
▶ LSS 318 WM	50082152	0 10	<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
◀ LSE 318 WM/N	50083246	0 13	<input type="checkbox"/>				

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • BR318\_LSI\_EN.fm





**318 SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

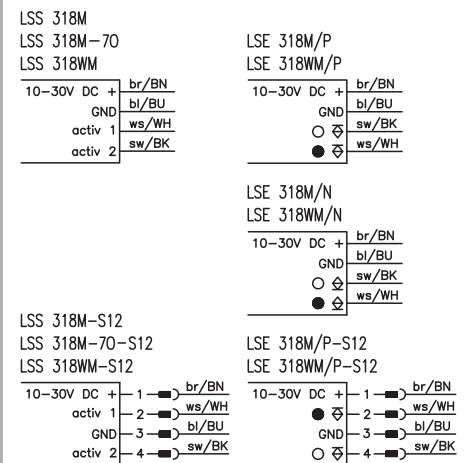
Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2, 4	a, b, c, d, e, f	
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 4	a, b, c, d, e, f	
Cable, 2m	1, 2, 4		
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 3, 4	a, b, c, d, e, f	
Cable, 2m	1, 2, 3, 4		
Cable, 2m	1, 2, 3, 4		



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Transmitter with 2 activation inputs
- 3 90° optics
- 4 UL approval (class 2 acc. to NEC)

[www.leuze.com/318series/](http://www.leuze.com/318series/)

# THROUGHBEAM SENSORS

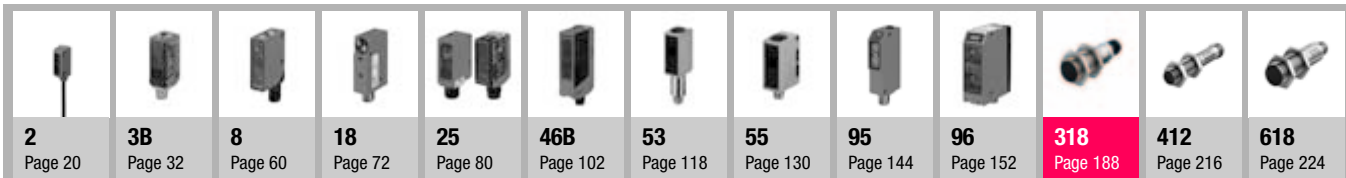
Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Throughbeam laser sensors in metal housing</b>			▶ = Transmitter ◀ = Receiver			
▶ LSSL 318 M - S12 ◀ LSEL 318 M/P - S12	50083172 50083176	<input type="text" value="0"/> <input type="text" value="100"/> <input type="text" value="0"/> <input type="text" value="120"/>	5000Hz	Red light laser class 1	2xPNP/DC	Light/dark antivalent
▶ LSSL 318 M ◀ LSEL 318 M/P	50083171 50083175	<input type="text" value="0"/> <input type="text" value="100"/> <input type="text" value="0"/> <input type="text" value="120"/>	5000Hz	Red light laser class 1	2xPNP/DC	Light/dark antivalent
▶ LSSL 318 M - S12 ◀ LSEL 318 M/P - B5 - S12	50083172 50083180	<input type="text" value="0"/> <input type="text" value="15"/> <input type="text" value="0"/> <input type="text" value="18"/>	5000Hz	Red light laser class 1	2xPNP/DC	Light/dark antivalent
▶ LSSL 318 M ◀ LSEL 318 M/P - B5	50083171 50083179	<input type="text" value="0"/> <input type="text" value="15"/> <input type="text" value="0"/> <input type="text" value="18"/>	5000Hz	Red light laser class 1	2xPNP/DC	Light/dark antivalent

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

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**318 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2, 4	a, b, c, d, e, f	<p>Typ. light spot</p>
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 3, 4	a, b, c, d, e, f	
Cable, 2m	1, 2, 3, 4		



Measuring Sensors

Ultrasonic Sensors

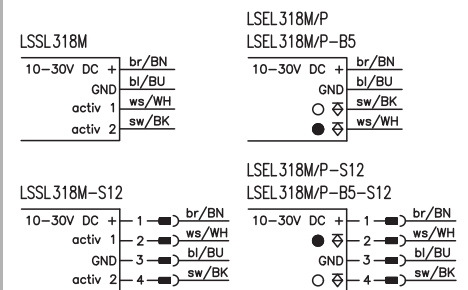
Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Transmitter with 2 activation inputs
- 3 Integrated pin diaphragm Ø 1.0mm for detection of small parts
- 4 UL approval (class 2 acc. to NEC)

Ex Sensors

[www.leuze.com/318series/](http://www.leuze.com/318series/)

# THROUGHBEAM SENSORS

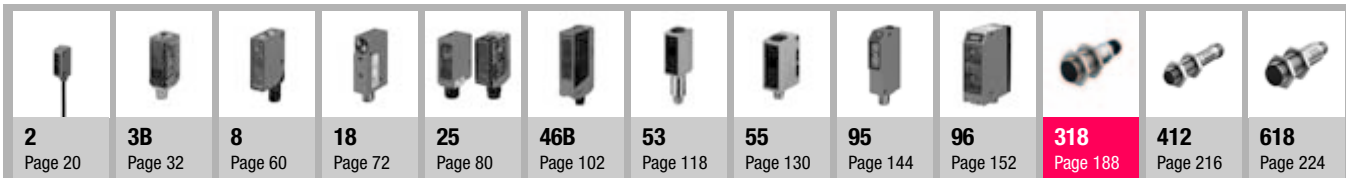
Part description		Operating range [m]	Switching frequency	Light source	Output	Switching
Part No.:		Typ. op. range limit [m]				
<b>Throughbeam sensors in plastic housing</b>						
			▶ = Transmitter ◀ = Receiver			
▶ LSS 318 K - 70 - S12	50082195		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 K/P - S12	50081336					
▶ LSS 318 K - 70	50082176		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 K/P	50081338					
▶ LSS 318 K - 70	50082176		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
◀ LSE 318 K/N	50083111					
▶ LSS 318 K - S12	50081335		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 K/P - S12	50081336					
▶ LSS 318 K	50081337		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 K/P	50081338					
▶ LSS 318 K - S12	50081335		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
◀ LSE 318 K/N - S12	50082140					
▶ LSS 318 WK - S12	50082153		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
◀ LSE 318 WK/P - S12	50082157					
▶ LSS 318 WK - S12	50082153		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
◀ LSE 318 WK/N - S12	50083232					

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

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**318 SERIES**  
Throughbeam sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

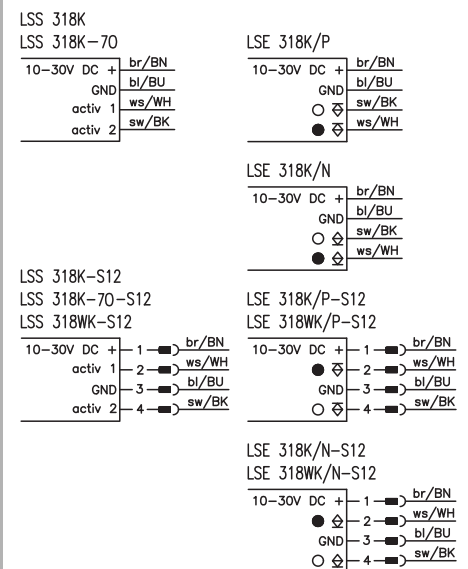
Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2, 4	a, b, c, d, e, f	
Cable, 2m	1, 2, 4		
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 4	a, b, c, d, e, f	
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 4	a, b, c, d, e, f	
M12 connector	1, 2, 3, 4	a, b, c, d, e, f	
M12 connector	1, 2, 3, 4	a, b, c, d, e, f	



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Transmitter with 2 activation inputs
- 3 90° optics
- 4 UL approval (class 2 acc. to NEC)

[www.leuze.com/318series/](http://www.leuze.com/318series/)














## RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in metal housing</b>						
<b>RK 318 M/P - S12</b> 50081345	0.03 4,6 0.02 6	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RK 318 M/P</b> 50081346	0.03 4,6 0.02 6	<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RK 318 M/N - S12</b> 50082143	0.03 4,6 0.02 6	<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RK 318 M/N</b> 50083234	0.03 4,6 0.02 6	<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 558

We reserve the right to make changes • BR318\_RK1\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**318 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2	a, b, c, d, e, f	
Cable, 2m	1, 2		
M12 connector	1, 2	a, b, c, d, e, f	
Cable, 2m	1, 2		



Measuring Sensors

Ultrasonic Sensors

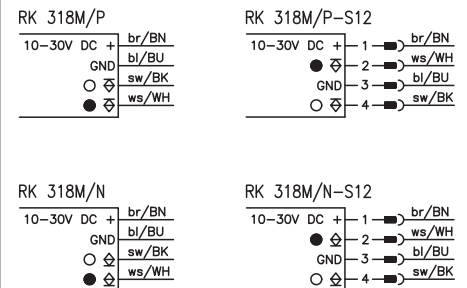
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 UL approval (class 2 acc. to NEC)

[www.leuze.com/318series/](http://www.leuze.com/318series/)

# RETRO-REFLECTIVE SENSORS

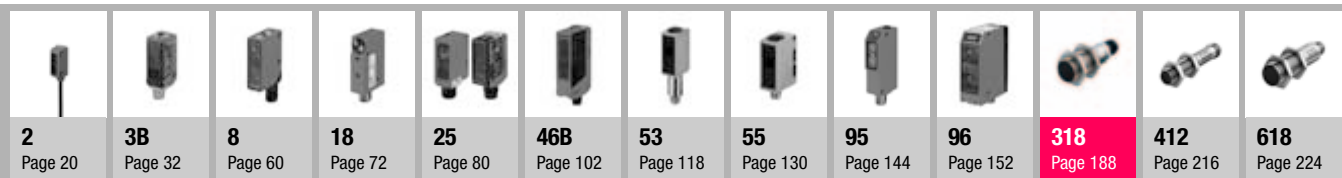
Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in plastic housing</b>						
<b>RK 318 K/P - S12</b> 50081343		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RK 318 K/P</b> 50081344		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RK 318 K/N - S12</b> 50082142		<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RK 318 K/N</b> 50083162		<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RK 318 WK/P - S12</b> 50082161		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RK 318 WK/P</b> 50082159		<input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RK 318 WK/N - S12</b> 50082185		<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RK 318 WK/N</b> 50082186		<input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 558

We reserve the right to make changes • BR318\_RK2\_EN.fm

## Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC





**318 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

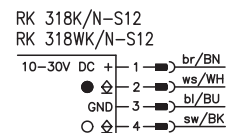
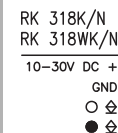
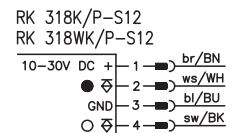
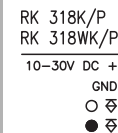
Connection	Option	Accessories	Typ. light spot
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 2, 3	a, b, c, d, e, f	
Cable, 2m	1, 2, 3		
M12 connector	1, 2, 3	a, b, c, d, e, f	
Cable, 2m	1, 2, 3		



**Optical Sensor ABC**

- Retro-reflective sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 90° optics
- 3 UL approval (class 2 acc. to NEC)

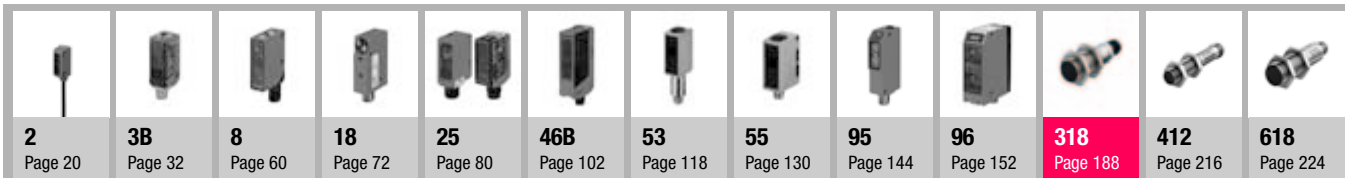
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in metal housing with polarization filter</b>						
<b>PRK 318 M/4D - S12</b> 50110932	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	1xPNP/DC	Dark
<b>PRK 318 M/P - S12</b> 50081349	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 318 M/P</b> 50081350	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 318 M/N - S12</b> 50082145	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent
<b>PRK 318 M/N</b> 50083140	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent
<b>Retro-reflective laser sensors in metal housing with polarization filter</b>						
<b>PRKL 318 M/P - S12</b> 50083184	0.12 12 <sup>2)</sup> 0.10 15 <sup>2)</sup>	<input type="checkbox"/>	5000Hz	Red light laser class 1	2xPNP/DC	Light/dark antivalent
<b>PRKL 318 M/P</b> 50083183	0.12 12 <sup>2)</sup> 0.10 15 <sup>2)</sup>	<input type="checkbox"/>	5000Hz	Red light laser class 1	2xPNP/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 558  
 2) The specified values apply in combination with reflectors MTK(S) 50 x 50, additional reflectors with range specifications can be found on page 558

We reserve the right to make changes • BR318\_PRK1\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	



**318 SERIES**  
Retro-reflective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

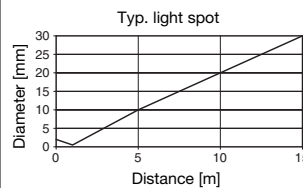
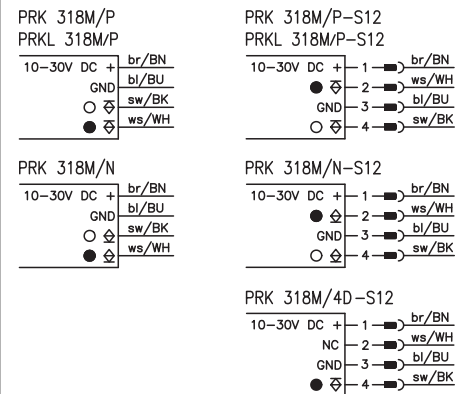
Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2, 3	a, b, c, d, e, f	
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		



**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Direct connection to AS-interface I/O coupling modules
- 3 UL approval (class 2 acc. to NEC)

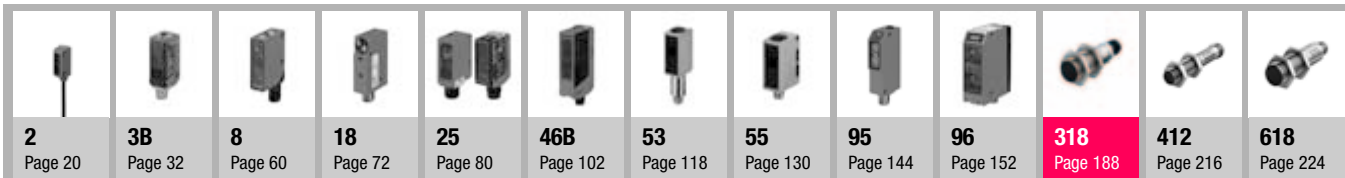
# RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in plastic housing with polarization filter</b>						
<b>PRK 318 K/P - S12</b> 50081347	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 318 K/P</b> 50081348	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xPNP/DC	Light/dark antivalent
<b>PRK 318 K/N - S12</b> 50083151	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent
<b>PRK 318 K/N</b> 50082187	0.03 4,6 <sup>1)</sup> 0.02 6 <sup>1)</sup>	<input type="checkbox"/>	1000Hz	Red light	2xNPN/DC	Light/dark antivalent

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 558  
 2) The specified values apply in combination with reflectors MTK(S) 50 x 50, additional reflectors with range specifications can be found on page 558

We reserve the right to make changes • BR318\_PRK2\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	



**318 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2	a, b, c, d, e, f	
Cable, 2m	1, 2		
M12 connector	1, 2	a, b, c, d, e, f	
Cable, 2m	1, 2		



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

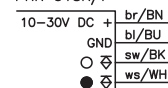
**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

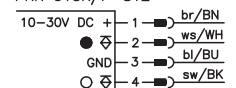
Forked Sensors

**Electrical connection**

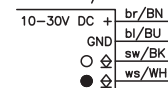
PRK 318K/P



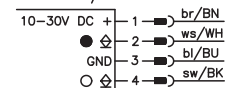
PRK 318K/P-S12



PRK 318K/N



PRK 318K/N-S12



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 UL approval (class 2 acc. to NEC)

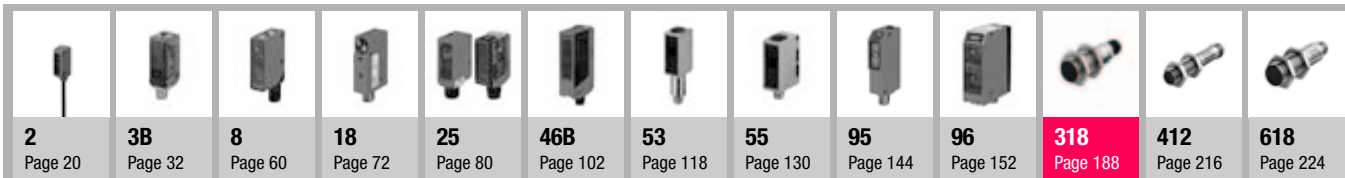
[www.leuze.com/318series/](http://www.leuze.com/318series/)

# DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners in metal housing</b>						
<b>RT 318 M/P - 550 - S12</b> 50082196		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/P - 550</b> 50082198		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/P - 400 - S12</b> 50081353		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 WM/P - 400 - S12</b> 50082174		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/P - 400</b> 50081354		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/N - 400 - S12</b> 50082147		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 M/N - 400</b> 50083112		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



# 318 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

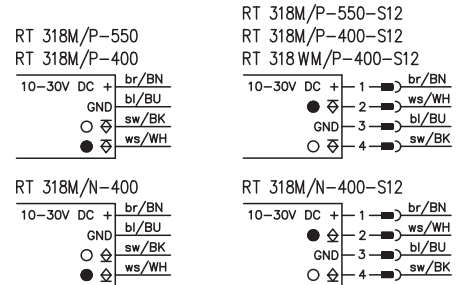
Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
M12 connector	1, 2, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
Cable, 2m	1, 3		



### Optical Sensor ABC

- Diffuse reflection scanners energetic Page 564
- Connection types Page 568
- Outputs Page 568

### Electrical connection



Options	
1	Scanning range adjustment via potentiometer
2	90° optics
3	UL approval (class 2 acc. to NEC)

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# DIFFUSE REFLECTION SCANNERS

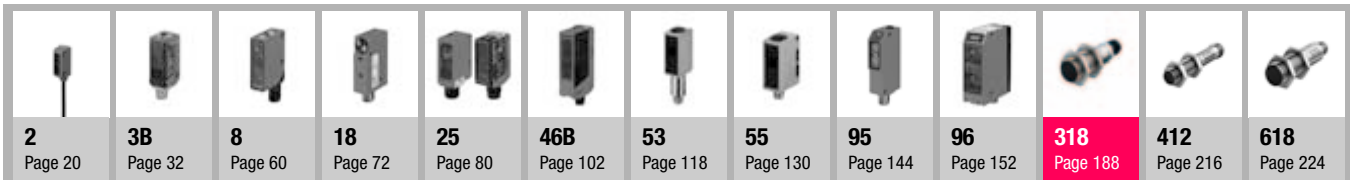
Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners in metal housing</b>						
<b>RT 318 M/P - 200 - S12</b> 50081357	<input type="checkbox"/> 0 200 <input type="checkbox"/> 0 250		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/P - 200</b> 50081358	<input type="checkbox"/> 0 200 <input type="checkbox"/> 0 250		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/N - 200 - S12</b> 50083102	<input type="checkbox"/> 0 200 <input type="checkbox"/> 0 250		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 M/N - 200</b> 50082050	<input type="checkbox"/> 0 200 <input type="checkbox"/> 0 250		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 WM/P - 100 - S12</b> 50082170	<input type="checkbox"/> 0 ... 100 <input type="checkbox"/> 0 ... 130		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/P - 100 - S12.11</b> 50109471	<input type="checkbox"/> 0 ... 100 <input type="checkbox"/> 0 ... 120		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/P - 100.11</b> 50109470	<input type="checkbox"/> 0 ... 100 <input type="checkbox"/> 0 ... 120		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 M/N - 100 - S12.11</b> 50083249	<input type="checkbox"/> 0 ... 100 <input type="checkbox"/> 0 ... 120		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 M/N - 100.11</b> 50108611	<input type="checkbox"/> 0 ... 100 <input type="checkbox"/> 0 ... 120		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

**Accessories / connection cables**

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

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**318 SERIES**

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 4		
M12 connector	1, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 4		
M12 connector	1, 3, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2, 4		



**Optical Sensor ABC**

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

RT 318M/P-100-S12.11	RT 318M/N-100-S12.11																								
RT 318WM/P-100-S12	RT 318M/N-200-S12																								
RT 318M/P-200-S12																									
<table border="0"> <tr> <td>10-30V DC +</td> <td>1</td> <td>br/BN</td> </tr> <tr> <td>●</td> <td>2</td> <td>ws/WH</td> </tr> <tr> <td>GND</td> <td>3</td> <td>bl/BU</td> </tr> <tr> <td>○</td> <td>4</td> <td>sw/BK</td> </tr> </table>	10-30V DC +	1	br/BN	●	2	ws/WH	GND	3	bl/BU	○	4	sw/BK	<table border="0"> <tr> <td>10-30V DC +</td> <td>1</td> <td>br/BN</td> </tr> <tr> <td>●</td> <td>2</td> <td>ws/WH</td> </tr> <tr> <td>GND</td> <td>3</td> <td>bl/BU</td> </tr> <tr> <td>○</td> <td>4</td> <td>sw/BK</td> </tr> </table>	10-30V DC +	1	br/BN	●	2	ws/WH	GND	3	bl/BU	○	4	sw/BK
10-30V DC +	1	br/BN																							
●	2	ws/WH																							
GND	3	bl/BU																							
○	4	sw/BK																							
10-30V DC +	1	br/BN																							
●	2	ws/WH																							
GND	3	bl/BU																							
○	4	sw/BK																							
RT 318M/P-100.11	RT 318M/N-100.11																								
RT 318M/P-200	RT 318M/N-200																								
<table border="0"> <tr> <td>10-30V DC +</td> <td>br/BN</td> </tr> <tr> <td>GND</td> <td>bl/BU</td> </tr> <tr> <td>○</td> <td>sw/BK</td> </tr> <tr> <td>●</td> <td>ws/WH</td> </tr> </table>	10-30V DC +	br/BN	GND	bl/BU	○	sw/BK	●	ws/WH	<table border="0"> <tr> <td>10-30V DC +</td> <td>br/BN</td> </tr> <tr> <td>GND</td> <td>bl/BU</td> </tr> <tr> <td>○</td> <td>sw/BK</td> </tr> <tr> <td>●</td> <td>ws/WH</td> </tr> </table>	10-30V DC +	br/BN	GND	bl/BU	○	sw/BK	●	ws/WH								
10-30V DC +	br/BN																								
GND	bl/BU																								
○	sw/BK																								
●	ws/WH																								
10-30V DC +	br/BN																								
GND	bl/BU																								
○	sw/BK																								
●	ws/WH																								

**Options**

- 1 Scanning range adjustment via potentiometer
- 2 V-optics for background suppression (Fading)
- 3 90° optics
- 4 UL approval (class 2 acc. to NEC)

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## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source Light spot <sup>1)</sup>	Output	Switching				
<b>Energetic diffuse reflection laser scanners in metal housing</b>										
<b>RTL 318 M/P - 300 - S12</b> 50083188	<table border="1"> <tr> <td>0</td> <td>300</td> </tr> <tr> <td>0</td> <td>350</td> </tr> </table>	0	300	0	350		5000Hz	Red light laser class 2 Ø 5mm	2xPNP/DC	Light/dark antivalent
0	300									
0	350									

1) At the specified scanning range

We reserve the right to make changes • BR318\_RTL\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 318 SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 2, 4	a, b, c, d, e, f	<p>Typ. black/white behavior</p>



Measuring Sensors

Ultrasonic Sensors

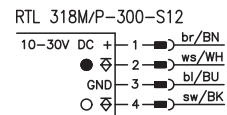
Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners energetic Page 564
- Connection types/Outputs Page 568
- Sensors w. laser transmitter Page 569

Forked Sensors

### Electrical connection



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

### Options

- 1 Scanning range adjustment via potentiometer
- 2 UL approval (class 2 acc. to NEC)

Ex Sensors

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners in plastic housing</b>						
<b>RT 318 K/P - 550 - S12</b> 50082175		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/P - 550</b> 50082197		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/N - 550 - S12</b> 50083194		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 K/P - 400 - S12</b> 50081351		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/P - 400</b> 50081352		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 WK/P - 400 - S12</b> 50082173		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 WK/P - 400</b> 50082171		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/N - 400 - S12</b> 50082146		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 K/N - 400</b> 50083113		<input type="checkbox"/> <input type="checkbox"/>	1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 318 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

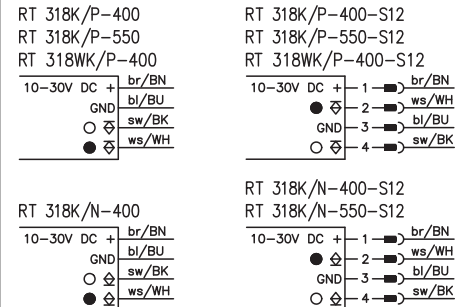
Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 3		
M12 connector	1, 3	a, b, c, d, e, f	
M12 connector	1, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 3		
M12 connector	1, 2, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2, 3		
M12 connector	1, 3	a, b, c, d, e, f	<p>Typ. black/white behavior</p>
Cable, 2m	1, 3		



### Optical Sensor ABC

- Diffuse reflection scanners Page 564
- Energetic Page 568
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Scanning range adjustment via potentiometer
- 2 90° optics
- 3 UL approval (class 2 acc. to NEC)

## DIFFUSE REFLECTION SCANNERS














Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners in plastic housing</b>						
<b>RT 318 K/P - 200 - S12</b> 50081355	<input type="text" value="0"/> <input type="text" value="200"/> <input type="text" value="0"/> <input type="text" value="250"/>		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/P - 200</b> 50081356	<input type="text" value="0"/> <input type="text" value="200"/> <input type="text" value="0"/> <input type="text" value="250"/>		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/N - 200 - S12</b> 50082148	<input type="text" value="0"/> <input type="text" value="200"/> <input type="text" value="0"/> <input type="text" value="250"/>		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 K/N - 200</b> 50083163	<input type="text" value="0"/> <input type="text" value="200"/> <input type="text" value="0"/> <input type="text" value="250"/>		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 WK/P - 100 - S12</b> 50082169	<input type="text" value="0"/> ... 100 <input type="text" value="0"/> ... 130		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 WK/P - 100</b> 50082167	<input type="text" value="0"/> ... 100 <input type="text" value="0"/> ... 130		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 WK/N - 100 - S12</b> 50083139	<input type="text" value="0"/> ... 100 <input type="text" value="0"/> ... 130		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent
<b>RT 318 K/P - 100 - S12.11</b> 50083244	<input type="text" value="0"/> ... 100 <input type="text" value="0"/> ... 120		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/P - 100.11</b> 50109473	<input type="text" value="0"/> ... 100 <input type="text" value="0"/> ... 120		1000Hz	Infrared light	2xPNP/DC	Light/dark antivalent
<b>RT 318 K/N - 100.11</b> 50108612	<input type="text" value="0"/> ... 100 <input type="text" value="0"/> ... 120		1000Hz	Infrared light	2xNPN/DC	Light/dark antivalent

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### Accessories / connection cables

 More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 318 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Option	Accessories	Typ. b/w behavior
			<p><b>A</b> white 90%  <b>B</b> gray 18%  <b>C</b> black 6%</p>
M12 connector	1, 4	a, b, c, d	<p>Typ. black/white behavior</p>
Cable, 2m	1, 4		
M12 connector	1, 4	a, b, c, d	<p>Typ. black/white behavior</p>
Cable, 2m	1, 4		
M12 connector	1, 3, 4	a, b, c, d	<p>Typ. black/white behavior</p>
Cable, 2m	1, 3, 4		
M12 connector	1, 3, 4	a, b, c, d	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2, 4		
M12 connector	1, 2, 4	a, b, c, d	<p>Typ. black/white behavior</p>
Cable, 2m	1, 2, 4		



### Optical Sensor ABC

- Diffuse reflection scanners Page 564
- Connection types Page 568
- Outputs Page 568

### Electrical connection


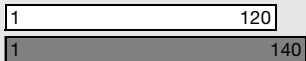
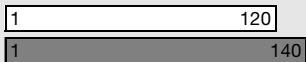
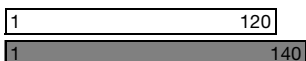
<p>RT 318K/P-100.11                  RT 318WK/P-100                  RT 318K/P-200</p>	<p>RT 318K/P-100-S12.11                  RT 318WK/P-100-S12                  RT 318K/P-200-S12</p>
<p>RT 318K/N-100.11                  RT 318K/N-200</p>	<p>RT 318WK/N-100-S12                  RT 318K/N-200-S12</p>

### Options

- 1 Scanning range adjustment via potentiometer
- 2 V-optics for background suppression (Fading)
- 3 90° optics
- 4 UL approval (class 2 acc. to NEC)














[www.leuze.com/318series/](http://www.leuze.com/318series/)

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Diffuse reflection scanners in metal housing with background suppression</b>						
<b>HRTR 318 M/66 - 120 - S12</b> 50106086		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 318 M/66 - 120</b> 50106090		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>Diffuse reflection scanners in plastic housing with background suppression</b>						
<b>HRTR 318 K/66 - 120 - S12</b> 50106085		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent
<b>HRTR 318 K/66 - 120</b> 50106089		<input type="checkbox"/>	1000Hz	Red light	2xPush-pull/DC	Light/dark antivalent

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



# 318 SERIES

Diffuse reflection scanners



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

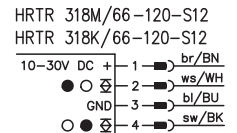
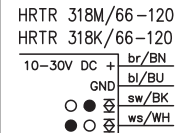
Connection	Option	Accessories	Typ. b/w behavior
			<p>A white 90% B gray 18% C black 6%</p>
M12 connector	1, 2, 3	a, b, c, d, e, f	
Cable, 2m	1, 2, 3		
			<p>Typ. black/white behavior</p>
M12 connector	1, 2, 3	a, b, c, d, e, f	
Cable, 2m	1, 2, 3		



### Optical Sensor ABC

- Diffuse reflection scanners with background suppression Page 564
- Connection types Page 568
- Outputs Page 568

### Electrical connection

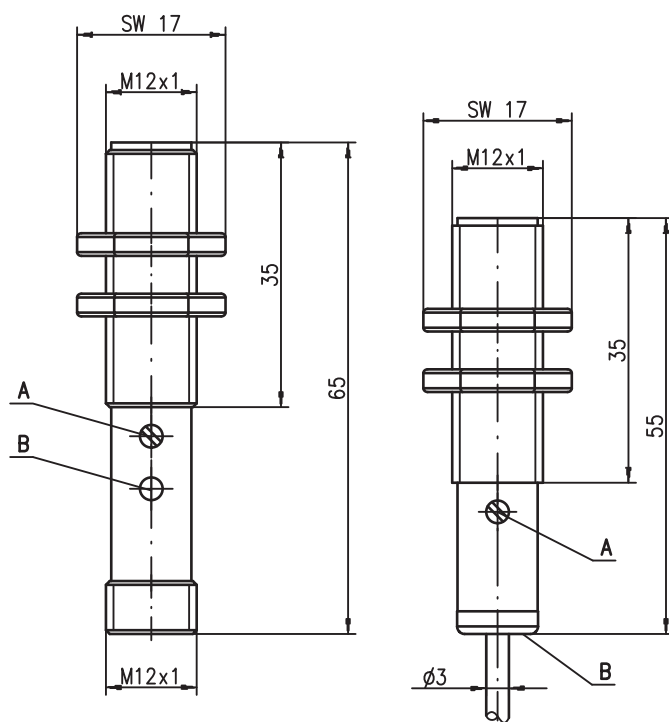


### Options

- 1 Scanning range adjustment via multiturn potentiometer
- 2 Reliable switching nearly independent of object/background properties
- 3 UL approval (class 2 acc. to NEC)

# OVERVIEW














## Dimensioned drawing






Further details can be found in the respective data sheet.

- A** Sensitivity adjustment
- B** Indicator diode

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<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 412 SERIES

Operating principle	Typ. operating range limits	Page
 Throughbeam sensors	0 ... 8 m	218
 Retro-reflective sensors	0.05 ... 1.6 m	220
 Diffuse reflection scanners	0 ... 400 mm	222



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 20\text{mA}$
	Signal voltage high/low	$\geq (U_B - 3V) / \leq 3V$
<b>Indicators</b>	Yellow LED	Switching output
<b>Mechanical data</b>	Housing	Nickel-faced brass
	Optics cover	Plastic
	Weight (connector/cable)	18g/46g
<b>Environmental data</b>	Ambient temperature (operation)	$-25^\circ\text{C} \dots +55^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2

### Features

- Slim and short M12 construction
- Robust metal housing
- Visible red light for easy alignment



Forked Sensors

Special Sensors

Fiber Optic Sensors

### Optical Sensor ABC

- Throughbeam sensors Page 563
- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564

Light Curtains

Protective Sensors














Mounting systems for this series can be found from page 522 onwards

Ex Sensors

## THROUGHBEAM SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Throughbeam sensors</b>										
<b>LS 412 M/P</b> <sup>1)</sup> 50081432	<table border="1"> <tr> <td>0</td> <td>6</td> </tr> <tr> <td>0</td> <td>8</td> </tr> </table>	0	6	0	8		500Hz	Red light	PNP/DC	Light/dark reversible
0	6									
0	8									

1) Set with transmitter and receiver

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**412 SERIES**  
Throughbeam sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
Cable, 2m	1, 2		



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**

LSS 412M

10-30V DC +	br/BN
GND	bl/BU
NC	ws/WH
NC	sw/BK

LSE 412M/P

10-30V DC +	10-30V DC +	br/BN
GND	GND	bl/BU
● ↻	○ ↻	sw/BK
GND	10-30V DC +	ws/WH

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Light/dark switching via control cable

Ex Sensors

[www.leuze.com/412series/](http://www.leuze.com/412series/)














## RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors in metal housing with polarization filter</b>						
<b>PRK 412 M/P - S12</b> 50081407	0.15 1,3 0.05 1,6		700Hz	Red light	PNP/DC	Light/dark reversible
<b>PRK 412 M/P</b> 50081408	0.15 1,3 0.05 1,6		700Hz	Red light	PNP/DC	Light/dark reversible

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 559

We reserve the right to make changes • BR412\_PRK\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**412 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2	a, b, c, d, e, f	
Cable, 2m	1, 2		



Measuring Sensors

Ultrasonic Sensors

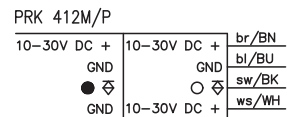
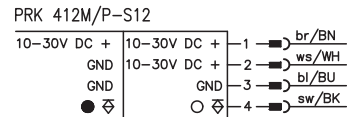
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Light/dark switching via control cable

Ex Sensors














[www.leuze.com/412series/](http://www.leuze.com/412series/)

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Energetic diffuse reflection scanners</b>						
<b>RT 412 M/P - 200 - S12</b> 50081409	<input type="text" value="0"/> <input type="text" value="200"/> <input type="text" value="0"/> <input type="text" value="400"/>	<input type="checkbox"/>	700Hz	Red light	PNP/DC	Light/dark reversible
<b>RT 412 M/P - 200</b> 50081410	<input type="text" value="0"/> <input type="text" value="200"/> <input type="text" value="0"/> <input type="text" value="400"/>	<input type="checkbox"/>	700Hz	Red light	PNP/DC	Light/dark reversible

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224



# 412 SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 2	a, b, c, d, e, f	
Cable, 2m	1, 2		



Measuring Sensors

Ultrasonic Sensors

Inductive Switches

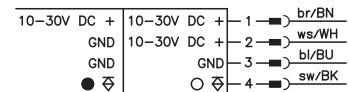
### Optical Sensor ABC

- Diffuse reflection scanners energetic Page 564
- Connection types Page 568
- Outputs Page 568

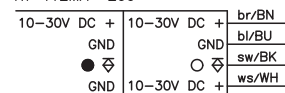
Forked Sensors

### Electrical connection

RT 412M/P-200-S12



RT 412M/P-200



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

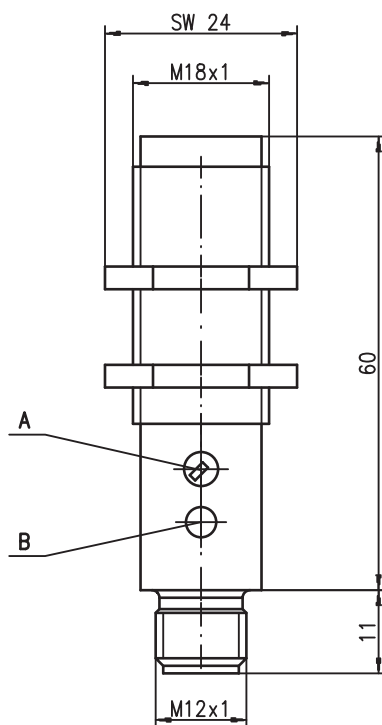
Ex Sensors


### Options

- 1 Scanning range adjustment via potentiometer
- 2 Light/dark switching via control cable

# OVERVIEW














## Dimensioned drawing





 Further details can be found in the respective data sheet.

- A** Sensitivity adjustment
- B** Indicator diode

We reserve the right to make changes • BR618\_Overview\_EN.fm

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

## 618 SERIES

Operating principle	Typ. operating range limits	Page
 <b>Retro-reflective sensors</b>	0 ... 7 m	226
 <b>Diffuse reflection scanners</b>	0 ... 300 mm	228



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 30\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2,5\text{V}) / \leq 2,5\text{V}$
<b>Indicators</b>	Green dual LED	Ready to operate
	Yellow dual LED	Switching output
	Flashing yellow dual LED	No performance reserve
<b>Mechanical data</b>	Housing	Nickel-faced brass
	Optics cover	Plastic
	Weight	40g
<b>Environmental data</b>	Ambient temperature (operation)	$-25^\circ\text{C} \dots +55^\circ\text{C}$
	Protective circuit	Short circuit and overload protection
	Protection class	IP 67
	Standards applied	IEC 60947-5-2

### Features

- Short M18 construction for limited spaces
- Robust metal housing
- Dual LED display for easy commissioning



### Optical Sensor ABC

- Retro-reflective sensors Page 563
- Diffuse reflection scanners Page 564

Mounting systems for this series can be found from page 521 onwards

[www.leuze.com/618series/](http://www.leuze.com/618series/)














## RETRO-REFLECTIVE SENSORS

Part description Part No.:	Operating range <sup>1)</sup> [m] Typ. op. range limit <sup>1)</sup> [m]	<input type="checkbox"/> <input type="checkbox"/>	Switching frequency	Light source	Output	Switching
<b>Retro-reflective sensors with polarization filter</b>						
<b>PRK 618 / 4 - S12</b> 50038450	<input type="text" value="0"/> <input type="text" value="5"/> <input type="text" value="0"/> <input type="text" value="7"/>		500Hz	Red light	PNP/DC	Light/dark reversible

1) The specified values apply in combination with reflectors TK(S) 100 x 100, additional reflectors with range specifications can be found on page 559

We reserve the right to make changes • BR618\_PRK\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

**618 SERIES**  
Retro-reflective sensors



Standard Sensors

Connection	Option	Accessories	Typ. light spot
M12 connector	1, 2	a, b, c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

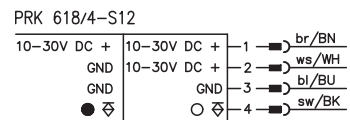
Inductive Switches

**Optical Sensor ABC**

- Retro-reflective sensors with polarization filter Page 563
- Connection types Page 568
- Outputs Page 568

Forked Sensors

**Electrical connection**



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Light/dark switching via control cable

Ex Sensors














[www.leuze.com/618series/](http://www.leuze.com/618series/)

## DIFFUSE REFLECTION SCANNERS

Part description Part No.:	Scanning range [mm] Typ. scan range limit [mm]	<input type="checkbox"/> <input checked="" type="checkbox"/>	Switching frequency	Light source	Output	Switching				
<b>Energetic diffuse reflection scanners</b>										
<b>RT 618 / 4 - 200 - S12</b> 50038449	<table border="1"> <tr> <td>0</td> <td>200</td> </tr> <tr> <td>0</td> <td>300</td> </tr> </table>	0	200	0	300		500Hz	Infrared light	PNP/DC	Light/dark reversible
0	200									
0	300									

We reserve the right to make changes • BR618\_RT\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC	
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC	
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC	
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC	

												
<b>2</b> Page 20	<b>3B</b> Page 32	<b>8</b> Page 60	<b>18</b> Page 72	<b>25</b> Page 80	<b>46B</b> Page 102	<b>53</b> Page 118	<b>55</b> Page 130	<b>95</b> Page 144	<b>96</b> Page 152	<b>318</b> Page 188	<b>412</b> Page 216	<b>618</b> Page 224

# 618 SERIES

Diffuse reflection scanners



Standard Sensors

Connection	Option	Accessories	Typ. b/w behavior
M12 connector	1, 2	a, b, c, d, e, f	



Measuring Sensors

Ultrasonic Sensors

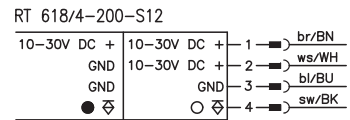
Inductive Switches

### Optical Sensor ABC

- Diffuse reflection scanners energetic Page 564
- Connection types Page 568
- Outputs Page 568

Forked Sensors

### Electrical connection



Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

### Options

- 1 Scanning range adjustment via potentiometer
- 2 Light/dark switching via control cable

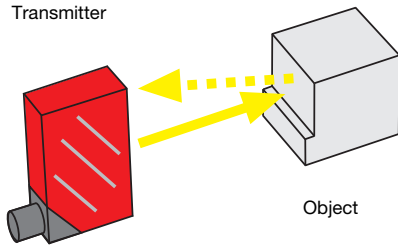
Ex Sensors

[www.leuze.com/618series/](http://www.leuze.com/618series/)

## SELECTION GUIDE

### Optical distance sensors






#### Measurement principle



**Selection table ODS(L) on page 234**

The diffuse light reflected by the object is analysed using various measurement techniques. The results are used to determine the distance from the object to the sensor.

#### Products and typ. measurement ranges [mm]

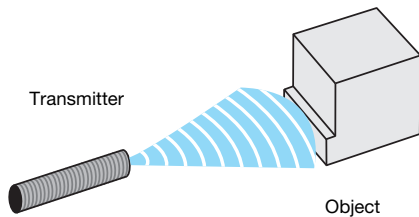
	<b>ODS 25</b> 25 200	from <b>page 246</b> onwards
	<b>ODSL 8</b> 20 500	from <b>page 236</b> onwards
	<b>ODSL 9</b> 50 450	from <b>page 240</b> onwards
	<b>ODS(L) 96(B) / ODKL 96B</b> 60 25000	from <b>page 254</b> onwards
	<b>ODSL 30</b> 200 30000	from <b>page 250</b> onwards

#### Features

- To a large extent, the measurement technique is independent of the color and structure of the object
- Measurement of small object in the entire measurement range
- Up to 1000 measurements per second
- Three different measurement principles:
  1. Triangulation principle for measurement ranges between 20mm and 5000mm
  2. Time of Flight Prinzip for measurement ranges up to 25,000mm
  3. Phase measurement principle for measurement ranges up to 30,000mm



### Ultrasonic distance sensors

#### Measurement principle



Ultrasonic distance sensors measure the propagation time of the ultrasonic waves which are reflected back to the sensor. The distance to the object is then calculated using this propagation time.

#### Products and typ. measurement ranges [mm]

	<b>HRTU 418</b> 50 1000	from <b>page 270</b> onwards
	<b>VRTU 430</b> 60 6000	from <b>page 274</b> onwards

#### Features

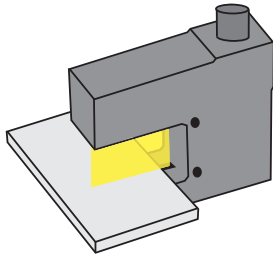
- Detection of diffuse, transparent and shiny as well as solid, liquid or powdered objects
- Detection of objects with overhanging material
- Can be used at low measurement rates (typically 10 measurements per second)
- Not affected by dust, fog and smoke





**Measuring forked sensors**

Measurement principle



The transmitted light is spread into a parallel light band by means of a lens and received by the opposing CCD line. Interrupting this light band allows, for example, the edge of an object to be determined or the width of an object to be measured.

Products and typ. measurement ranges [mm]



**GS 754**  
0 25

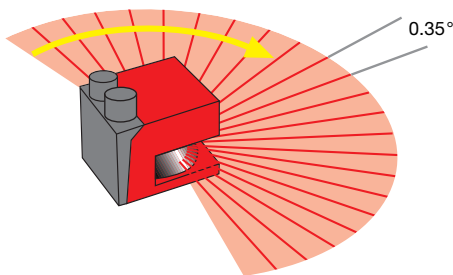
from page 278 onwards

Features

- Edge and object detection of up to 3 objects in 25mm wide light band
- Minimum object diameter 0.5mm
- Resolution 14µm
- Analogue, digital and switching outputs
- Typical applications
  - Edge detection and height verification
  - Gap measurement with and without projecting edge
  - Position determination of punched holes
  - Detection of broken objects

**Optical surface distance sensors**

Measurement principle



The surface distance sensor scans its surroundings within a 190° arc by transmitting 529 laser beams per cycle. The distances to the objects located in the scanning range are determined using the pulse propagation time technique.

Products and typ. measurement ranges [mm]



**ROD 4 / ROD 4plus**


from page 282 onwards

0 65000

Features

- To a large extent, the measurement technique is independent of the color and structure of the object
- Scanning angle 190°
- Scanning rate 25 scans per second
- Measurement value resolution 5mm
- Typical applications
  - Collision prevention on driverless transportation systems
  - Fill-level monitoring of bulk materials
  - Projection monitoring

## SELECTION GUIDE

Line Profile Sensors			
Measurement principle	Products and typ. measurement ranges [mm]		
 <p>In the light-section method, a linear, deflected laser beam is used to measure the profile of moving or static objects. When scanning moving objects, an additional encoder connection facilitates the creation of 3D data.</p>	<p><b>LPS 36</b> from <b>page 288</b> onwards</p> <table border="1"> <tr> <td>200</td> <td>800</td> </tr> </table>	200	800
200	800		
Features			
<ul style="list-style-type: none"> <li>● Laser measurement technology with the light-section method for object measurement</li> <li>● Laser line 600mm at a distance of 800mm</li> <li>● Resolution 1 ... 3mm, measurement time 10ms</li> <li>● Sensor activation/trigerring and ability to cascade up to 9 sensors</li> <li>● Compact construction 160 x 74 x 56mm</li> <li>● Ethernet interface</li> <li>● Encoder optional</li> </ul>			



**Line Range Sensors**

Measurement principle



In the light-section method, a linear, deflected laser beam is used to detect the presence of moving or static objects. Up to 16 objects can be simultaneously detected with one sensor.

Products and typ. scanning areas [mm]

**LRS 36**

from **page 292** onwards

200

800






Features

- Laser scanning with light-section method for object detection
- Minimum object size 3 ... 6mm, response time 10ms
- Sensor activation/triggering and ability to cascade up to 9 sensors
- Data calculation and processing directly inside the sensor
- Compact construction 160 x 74 x 56mm
- Ethernet and I/O interface
- Serial interfaces and bus systems optional



Detailed product information can be found at [www.leuze.com](http://www.leuze.com).

## SELECTION TABLE

Series	Dimensions in mm (WxHxD)	Housing material		Typ. measurement range [mm]				
		Plastic	Metal	200	500	5000	65000	
 <b>ODS 25</b>	15 x 36 x 27	●		25	200			
 <b>ODSL 8</b>	15 x 48 x 38		●	20	500			
 <b>ODSL 9</b>	21 x 50 x 50	●		50	450			
 <b>ODS 96(B) ODKL 96B</b>	30 x 90 x 70	●	●	60	25000			
 <b>ODSL 30</b>	79 x 70 x 150		●	200	30000	65000		

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# OPTICAL DISTANCE SENSORS



	Operating voltage		Light source			Switching output								Connection		Page
	10 ... 30VDC	18 ... 30VDC	Infrared light	Red light	Laser	Analog / Current	Analog / Voltage	Serial / RS 232	Serial / RS 485	PNP switching outputs	NPN switching outputs	Push-pull switching outputs	Warning outp. PNP / NPN	M12 connector	Terminals	
		●		●										●		246
	●	●			●	●	●	●	●	●	●	●	●	●		236
	●	●			●	●	●	●	●	●	●	●		●		240
	●	●	●	●	●	●	●	●	●	●	●	●	●	●		254
	●	●			●	●	●	●	●	●	●			●		250

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## OVERVIEW OF OPTICAL DISTANCE SENSORS



Stack positioning

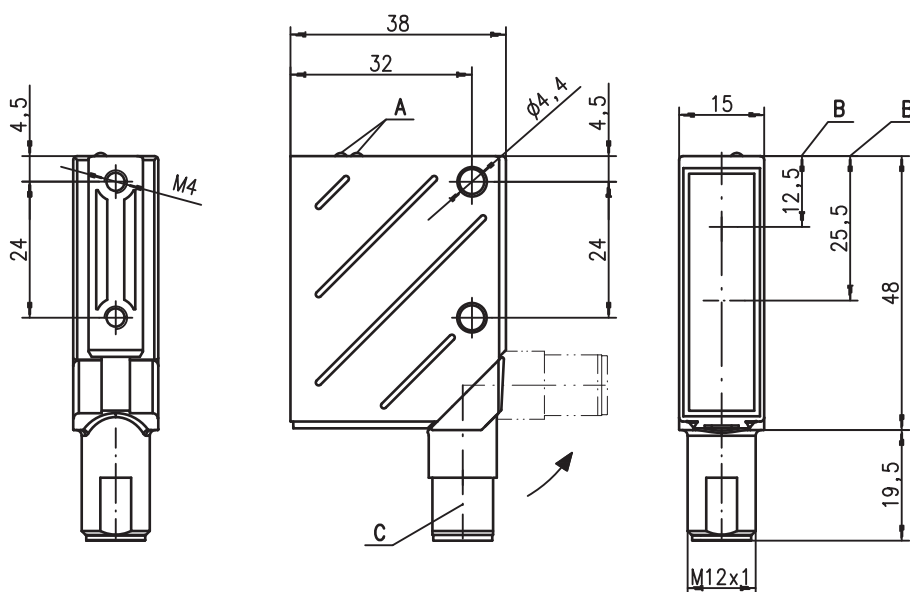



Diameter determination



Orientation position inspection












### Dimensioned drawing



 Further details can be found in the respective data sheet.

- A** Green, yellow indicator diode
- B** Optical axis
- C** 90° turning connector

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<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

## ODSL 8

Optical distance sensors	Measurement range	Page
 <b>Optical distance sensors ODSL 8</b>	20 ... 500mm	238

### Other 8 Series products:

	Throughbeam sensors	LSR 8, LSRL 8	62
	Retro-reflective sensors	PRK 8, PRKL 8	64
	Diffuse reflection scanners	RTR 8, VRTR 8, HRTR 8, HRTL 8	66
	Ultrasonic sensors	LSU 8, RKU 8, HRTU 8	300
	Luminescence scanners	LRT 8	458



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 50\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Obj. detected, teach-in
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight (connector/cable)	70g
<b>Environmental data</b>	Ambient temperature (operation)	$-20^\circ\text{C} \dots +50^\circ\text{C}$
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K
	Laser class	2 acc. to EN 60825-1
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 514 onwards

### Features

- Measurement range 20 ... 500mm
- Resolution up to 0.01 mm
- High measurement accuracy
- PC configuration provides high flexibility



### Optical Sensor ABC

- Optical distance sensors Page 565

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors</b>						
<b>ODSL 8 / C66 - 45 - S12</b> 50108364	<input type="checkbox"/> 25 ... 45 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 Ø 1 mm	Analog/mA 2x push-pull	M12 connector	≤ 7
<b>ODSL 8 / V66 - 45 - S12</b> 50108363	<input type="checkbox"/> 25 ... 45 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 Ø 1 mm	Analog/V 2x push-pull	M12 connector	≤ 7
<b>ODSL 8 / C66 - 200 - S12</b> 50108362	<input type="checkbox"/> 20 200 <sup>3)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 6 mm <sup>2</sup>	Analog/mA 2x push-pull	M12 connector	≤ 7
<b>ODSL 8 / V66 - 200 - S12</b> 50105761	<input type="checkbox"/> 20 200 <sup>3)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 6 mm <sup>2</sup>	Analog/V 2x push-pull	M12 connector	≤ 7
<b>ODSL 8 / C66 - 500 - S12</b> 50108361	<input type="checkbox"/> 20 500 <sup>3)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 6 mm <sup>2</sup>	Analog/mA 2x push-pull	M12 connector	≤ 7
<b>ODSL 8 / V66 - 500 - S12</b> 50101879	<input type="checkbox"/> 20 500 <sup>3)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 6 mm <sup>2</sup>	Analog/V 2x push-pull	M12 connector	≤ 7
<b>ODSL 8 / 66 - 500 - S12</b> 50101880	<input type="checkbox"/> 20 500 <sup>3)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 6 mm <sup>2</sup>	2 x push-pull	M12 connector	≤ 7

1) At the measurement range end value

2) Luminosity coefficient 6 ... 90 %, at 20 °C, measurement object ≥ 20x20mm<sup>2</sup>












3) Luminosity coefficient 6 ... 90 %, at 20 °C, measurement object ≥ 50x50mm<sup>2</sup>

We reserve the right to make changes • ODSL8\_1\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50039627	UPG 5	Configuration adaptor

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



# ODSL 8

Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability <sup>4)</sup>	Resolution [mm]	Option	Accessories
± 1.5% <sup>2)</sup>	± 0.2%	0.03	1, 3	a, b
± 1.5% <sup>2)</sup>	± 0.2%	0.03	1, 3	a, b
± 2% <sup>3)</sup>	± 1%	0.1 ... 0.2 <sup>5)</sup>	1, 3	a, b
± 2% <sup>3)</sup>	± 1%	0.1 ... 0.2 <sup>5)</sup>	1, 3	a, b
± 2 ... ± 4% <sup>3)</sup>	± 1 ... ± 3%	0.1 ... 0.5 <sup>5)</sup>	1, 3	a, b
± 2 ... ± 4% <sup>3)</sup>	± 1 ... ± 3%	0.1 ... 0.5 <sup>5)</sup>	1, 3	a, b
± 2 ... ± 4% <sup>3)</sup>	± 1 ... ± 3%	0.1 ... 0.5 <sup>5)</sup>	1, 2, 3	a, b

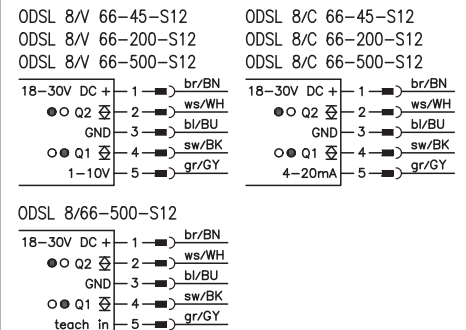
4) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>  
 5) Minimum and maximum value depend on measurement distance



### Optical Sensor ABC

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

### Electrical connection

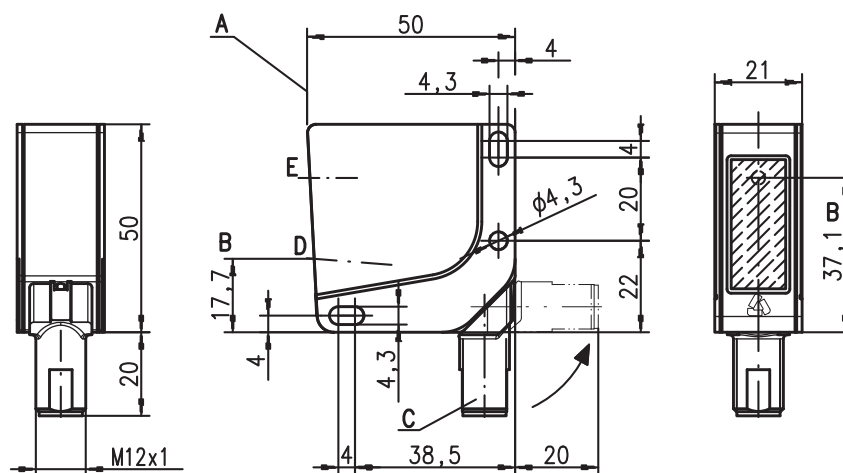


### Options

- 1 Teach-in via rotary switch
- 2 Teach-in via teach input
- 3 UL approval

# OVERVIEW OF OPTICAL DISTANCE SENSORS

## Dimensioned drawing














- A** Reference edge for the measurement
- B** Optical axis
- C** M12 device plug, can be turned 90°
- D** Receiver
- E** Transmitter
- F** LCD display
- G** Yellow indicator diode
- H** Green indicator diode
- J** Control buttons



Further details can be found in the respective data sheet.

We reserve the right to make changes • ODSL9\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

# ODSL 9





Optical distance sensors	Measurement range	Page
 <b>Optical distance sensors ODSL 9</b>	50 ... 450mm	242



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 180\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V})/\leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Obj. detected, teach-in
<b>Mechanical data</b>	Housing	Plastic
	Optics cover	Glass
	Weight	Approx. 50g
<b>Environmental data</b>	Ambient temperature (operation)	$-20^\circ\text{C} \dots +50^\circ\text{C}$
	VDE safety class	II, all-insulated
	Protection class	IP 67
	Laser class	2 acc. to EN 60825-1
	Standards applied	IEC 60947-5-2, UL 508
<b>Mounting systems for this series can be found from page 514 onwards</b>		

**Features**

- LCD measurement value display in mm
- Measurement range 50 ... 450mm
- Resolution up to 0.01mm
- High measurement accuracy
- Menu-driven configuration via LCD display/control buttons or via configuration software

Optical Sensor ABC	
● Optical distance sensors	Page 565

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Measurement time [ms] <sup>2)</sup>
<b>Optical laser distance sensors</b>						
<b>ODSL 9 / C6 - 100 - S12</b> 50111167	50 100 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	2
<b>ODSL 9 / V6 - 100 - S12</b> 50111168	50 100 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	2
<b>ODSL 9 / C66 - 100 - S12</b> 50111171	50 100 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/mA 2 x push-pull	M12 connector	2
<b>ODSL 9 / V66 - 100 - S12</b> 50111172	50 100 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/V 2 x push-pull	M12 connector	2
<b>ODSL 9 / D26 - 100 - S12</b> 50111169	50 100 <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Serial/RS 232 1 x push-pull	M12 connector	2
<b>ODSL 9 / D36 - 100 - S12</b> 50111170	50 100 <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Serial/RS 485 1 x push-pull	M12 connector	2
<b>ODSL 9 / 66 - 100 - S12</b> 50111173	50 100 <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	2 x push-pull	M12 connector	2

1) At the measurement range end value

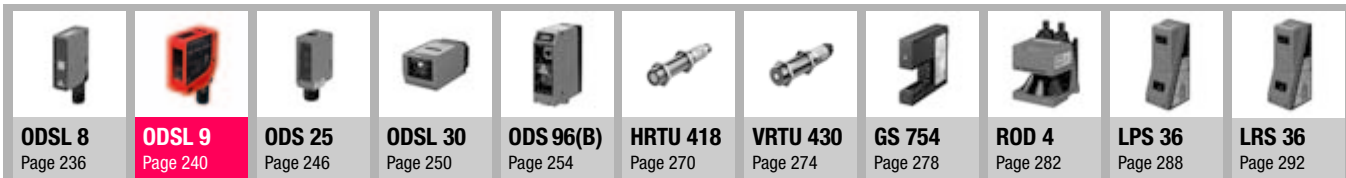
2) Luminosity coefficient 6% ... 90%, complete measurement range, "Standard" operating mode, at 20 °C, medium range of U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>

3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>

We reserve the right to make changes • ODSL9\_1\_EN.fm

## Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B



**ODSL 9**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

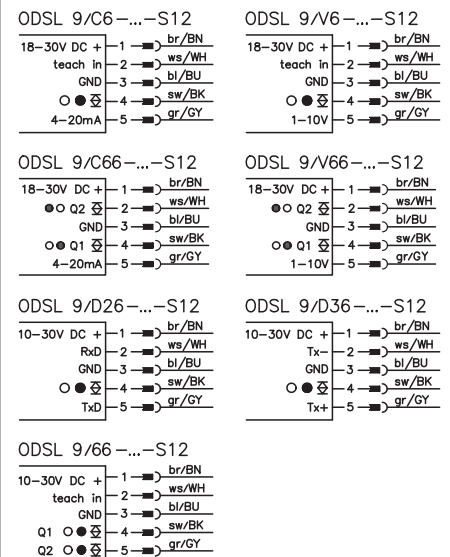
Abs. meas. accuracy	Repeatability <sup>3)</sup>	Resolution [mm]	Option	Accessories
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 2, 3, 4	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 2, 3, 4	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 3, 4	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 3, 4	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 3, 4	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 3, 4	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	±0.25%	0,01	1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



Configuration software - free download at [www.leuze.com](http://www.leuze.com).

**Options**

- 1 Configuration via LCD/control buttons
- 2 Teach-in via teach input
- 3 Measurement range and measurement mode configurable via PC
- 4 UL approval

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Measurement time [ms] <sup>2)</sup>
<b>Optical laser distance sensors</b>						
<b>ODSL 9 / C6 - 450 - S12</b> 50111157	50 450 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	2
<b>ODSL 9 / V6 - 450 - S12</b> 50111158	50 450 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	2
<b>ODSL 9 / C66 - 450 - S12</b> 50111161	50 450 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/mA 2 x push-pull	M12 connector	2
<b>ODSL 9 / V66 - 450 - S12</b> 50111162	50 450 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Analog/V 2 x push-pull	M12 connector	2
<b>ODSL 9 / D26 - 450 - S12</b> 50111159	50 450 <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Serial/RS 232 1 x push-pull	M12 connector	2
<b>ODSL 9 / D36 - 450 - S12</b> 50111160	50 450 <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	Serial/RS 485 1 x push-pull	M12 connector	2
<b>ODSL 9 / 66 - 450 - S12</b> 50111163	50 450 <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 1 x 1 mm <sup>2</sup>	2 x push-pull	M12 connector	2

1) At the measurement range end value

2) Luminosity coefficient 6% ... 90%, complete measurement range, "Standard" operating mode, at 20 °C, medium range of U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>

3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>

We reserve the right to make changes • ODSL9\_2\_EN.fm

## Accessories / connection cables More accessories can be found from page 514 onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B

<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**ODSL 9**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

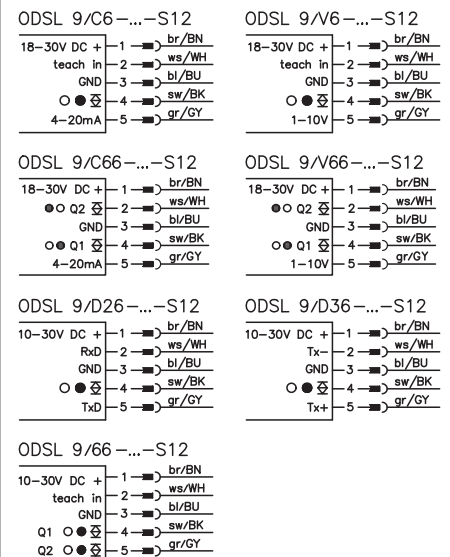
Abs. meas. accuracy	Repeatability <sup>3)</sup>	Resolution [mm]	Option	Accessories
± 1.0% <sup>2)</sup>	±0.5%	0.1	1, 2, 3, 4	a, b, c, d, e, f
± 1.0% <sup>2)</sup>	±0.5%	0.1	1, 2, 3, 4	a, b, c, d, e, f
± 1.0% <sup>2)</sup>	±0.5%	0.1	1, 3, 4	a, b, c, d, e, f
± 1.0% <sup>2)</sup>	±0.5%	0.1	1, 3, 4	a, b, c, d, e, f
± 1.0% <sup>2)</sup>	±0.5%	0.1	1, 3, 4	a, b, c, d, e, f
± 1.0% <sup>2)</sup>	±0.5%	0.1	1, 3, 4	a, b, c, d, e, f
± 1.0% <sup>2)</sup>	± 0.5%	0.1	1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



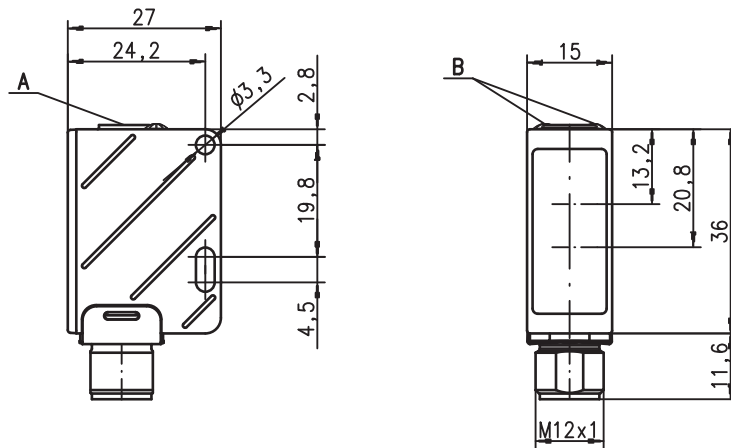
Configuration software - free download at [www.leuze.com](http://www.leuze.com).

**Options**

- 1 Configuration via LCD/control buttons
- 2 Teach-in via teach input
- 3 Measurement range and measurement mode configurable via PC
- 4 UL approval

# OVERVIEW OF OPTICAL DISTANCE SENSORS












## Dimensioned drawing



Further details can be found in the respective data sheet.

- A Teach button
- B Indicator diode

We reserve the right to make changes • ODS25\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



# ODS 25

Optical distance sensors	Measurement range	Page
 <b>Optical distance sensors ODS 25</b>	25 ... 200mm	248

**Other 25 Series products:**



	Throughbeam sensors	LSR 25, ILSR 25	82
	Retro-reflective sensors	PRK 25	84
	Diffuse reflection scanners	RTR 25, HRT 25, HRTR 25	94



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 25\text{mA}$
	Voltage output	1 ... 10V
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Obj. detected, teach-in
<b>Mechanical data</b>	Housing	Plastic
	Optics cover	Plastic
	Weight (connector/cable)	15g
<b>Environmental data</b>	Ambient temperature (operation)	-20°C ... +40°C
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K
	Standards applied	IEC 60947-5-2, UL 508
<b>Mounting systems for this series can be found from page 517 onwards</b>		

**Features**

- Compact construction
- Measurement range 25 ... 200mm
- Resolution 1 mm
- Simple operation with teach-in on sensor or via control cable

**Optical Sensor ABC**

● Optical distance sensors	Page 565
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[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range <sup>1)</sup> [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>2)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors</b>						
<b>ODS 25 / V - 200 - S12</b> 50102824	<input type="checkbox"/> 25 <input checked="" type="checkbox"/> 200	18 ... 30VDC	Red light 8x8mm <sup>2</sup>	Analog/V	M12 connector	≤ 10












- 1) Absolute value measurement, luminosity coefficient 6 ... 90%, 20°C, measurement object ≥ 50x50mm<sup>2</sup>  
 2) At a distance of 200mm  
 3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>

We reserve the right to make changes • ODS25\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

# ODS 25

Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

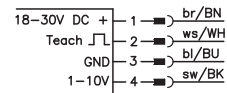
Linearity <sup>1)</sup>	Repeatability <sup>3)</sup>	Resolution [mm]	Option	Accessories
± 2.5% <sup>3)</sup>	± 2%	1	1, 2, 3	a, b, c, d, e, f



### Optical Sensor ABC

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

### Electrical connection

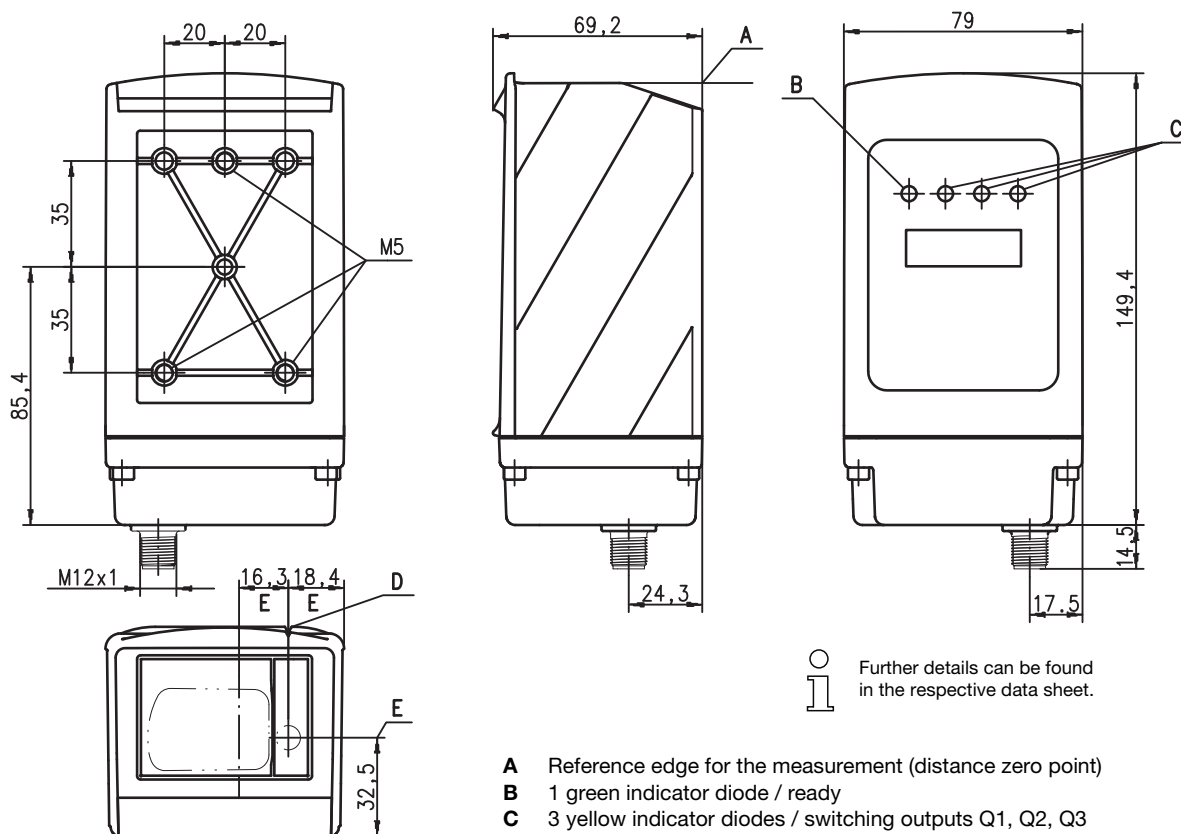



### Options

- 1 Teach-in via teach button
- 2 Teach-in via teach input
- 3 UL approval

# OVERVIEW OF OPTICAL DISTANCE SENSORS












## Dimensioned drawing




 Further details can be found in the respective data sheet.

- A** Reference edge for the measurement (distance zero point)
- B** 1 green indicator diode / ready
- C** 3 yellow indicator diodes / switching outputs Q1, Q2, Q3
- D** Sight for coarse alignment
- E** Optical axes

We reserve the right to make changes • ODSL30\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

# ODSL 30





Optical distance sensors	Measurement range	Page
 <b>Optical distance sensors ODSL 30</b>	0.2 ... 30m	252



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Power consumption	$\leq 4W$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LEDs	Switching outputs
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight	650g
<b>Environmental data</b>	Ambient temperature (operation)	$-10^\circ C \dots +45^\circ C$
	VDE safety class	II, all-insulated
	Protection class	IP 65
	Standards applied	IEC 60947-5-2, UL 508
<b>Mounting bracket BT 30 included in delivery contents</b>		

**Features**

- Measurement range up to 30m
- Resolution 1 mm
- High measurement accuracy through internal referencing
- LCD display and key pad for configuration and measurement value display

Optical Sensor ABC	
● Optical distance sensors	Page 565

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [m] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors</b>						
<b>ODSL 30 / V - 30M - S12</b> 50039447	0.2 [ 30 ] <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 Ø 6mm	Analog/mA/V 1 PNP/NPN	M12 connector	≤ 100
<b>ODSL 30 / D 232 - 30M - S12</b> 50041203	0.2 [ 30 ] [ 65 ] <sup>2)4)</sup>	10 ... 30VDC	Red light laser, class 2 Ø 6mm	Serial/RS 232 2 PNP/NPN	M12 connector	≤ 100
<b>ODSL 30 / D 485 - 30M - S12</b> 50041204	0.2 [ 30 ] [ 65 ] <sup>2)4)</sup>	10 ... 30VDC	Red light laser, class 2 Ø 6mm	Serial/RS 485 2 PNP/NPN	M12 connector	≤ 100
<b>ODSL 30 / 24 - 30M - S12</b> 50040720	0.2 [ 30 ] <sup>2)</sup>	10 ... 30VDC	Red light laser, class 2 Ø 6mm	3 PNP/NPN	M12 connector	≤ 100












- 1) At a distance of 10mm
- 2) Luminosity coefficient 6 ... 90%, temperature range 0°C ... +45°C, measurement object ≥ 50x50mm<sup>2</sup>, with referencing
- 3) Same object, identical environmental conditions
- 4) ODSL 30 / D... up to 65m, luminosity coefficient 50 ... 90%
- 5) Display and output resolution 0.1 mm configurable

We reserve the right to make changes • ODSL30\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104591	K - D M12A - 8P - 2m - PUR	Connection cable 2000mm, M12 axial, 8-pin, PUR
b 50104590	K - D M12A - 8P - 5m - PUR	Connection cable 5000mm, M12 axial, 8-pin, PUR
c 50104599	CTS 100 x 100	Cooperative target, 100mm x 100mm, screw type

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**ODSL 30**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

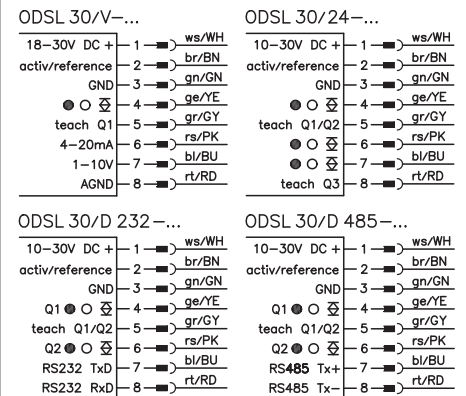
Abs. meas. accuracy <sup>2)</sup>	Repeatability <sup>3)</sup>	Resolution [mm] <sup>5)</sup>	Option	Accessories
± 1%	± 0.5%	0.1 / 1	1, 2, 3, 4	a, b, c
± 2mm	± 2mm	0.1 / 1	1, 2, 3, 4	a, b, c
± 2mm	± 2mm	0.1 / 1	1, 2, 3, 4	a, b, c
± 2mm	± 2mm	0.1 / 1	1, 2, 3, 4	a, b, c



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in of the switching points via teach input or keyboard entry
- 2 Configurable activation/referencing input
- 3 Menu-driven configuration via LC display and key pad
- 4 UL approval

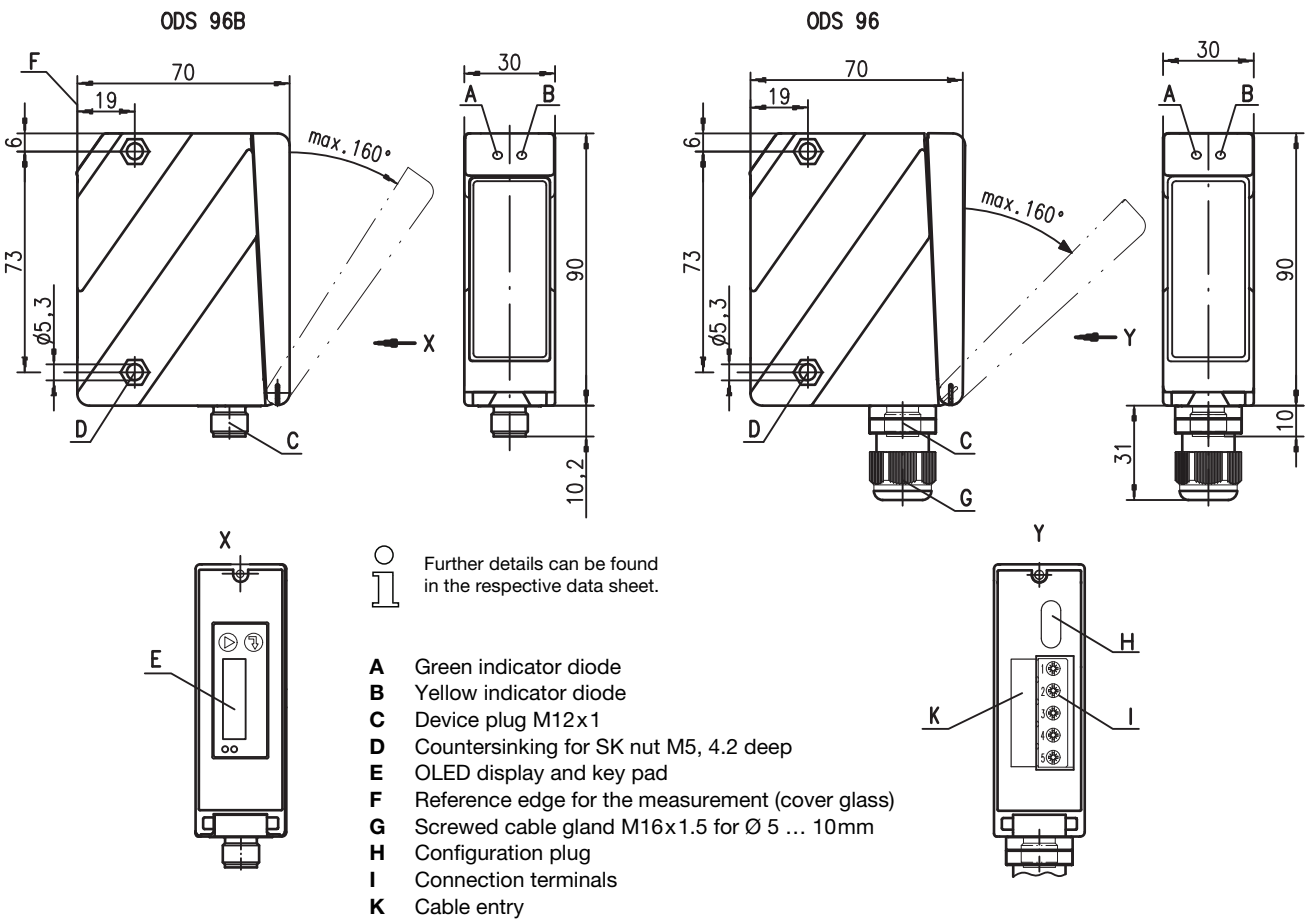
[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

# OVERVIEW OF OPTICAL DISTANCE SENSORS



Pallet detection

## Dimensioned drawing




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<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



## ODS 96(B)

Optical distance sensors	Measurement range	Page
 <b>Optical distance sensors ODS... 96(B)</b>	60 ... 25000mm	256

### Other 96 Series products:

 Throughbeam sensors	LS 96	154
 Retro-reflective sensors	RK 96, PRK 96	158
 Diffuse reflection scanners	RT 96, HRT 96	164
 Protective sensors	SLS 96	496
 Ex Sensors	LS 96, SLS 96, PRK 96, HRT 96, ODS 96	504
 AS-interface sensors	LS 96, PRK 96, HRT 96	510

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 150\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Obj. detected, teach-in
<b>Mechanical data</b>	Housing	Metal or plastic
	Optics cover	Glass or plastic
	Weight (metal/plastic)	380g/140g
<b>Environmental data</b>	Ambient temperature (operation)	-20°C ... +50°C
		ODSL 96 K...:
		-20°C ... +40°C
	VDE safety class	II, all-insulated
	Protection class	IP 67, IP 69K <sup>1)</sup>
	Standards applied	IEC 60947-5-2, UL 508

1) IP 69K only with metal housing

**Mounting systems for this series can be found from page 520 onwards**



### Features

- **Measurement range 60 ... 25000mm**
- **Resolution up to 0.1 mm**
- **High measurement accuracy**
- **OLED display and key pad for configuration (ODS 96B)**
- **PC configuration provides high flexibility**



### Optical Sensor ABC

- Optical distance sensors Page 565

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical distance sensors with visible red light in metal housing</b>						
<b>ODSR 96B/M/C6 - 600 - S12</b> 50106730	100 600 <sup>2)</sup>	18 ... 30VDC	Red light 15 x 15 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSR 96B/M/V6 - 600 - S12</b> 50106731	100 600 <sup>2)</sup>	18 ... 30VDC	Red light 15 x 15 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>

1) At measurement distance of 600mm












2) Luminosity coefficient 6 ... 90%, complete measurement range, at 20°C, medium range U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>.  
With serial interface: depending on the measurement transmission mode and the baud rate

We reserve the right to make changes • ODS96B\_1\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**ODS 96B**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability	Resolution [mm]	Option	Accessories
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	1, 3, 6, 7	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	1, 3, 6, 7	a, b, c, d, e, f

3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>  
4) Minimum and maximum value depend on measurement distance

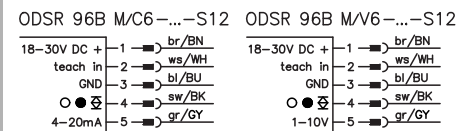


Configuration software - free download at [www.leuze.com](http://www.leuze.com).

**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in of the outputs via teach input or keyboard entry
- 2 Teach-in of the outputs via keyboard entry
- 3 Adjustable measurement range and measurement mode
- 4 Adjustable measurement value transmission and measurement mode
- 5 2 warning outputs (for signaling 4 different device states)
- 6 PC/OLED display and key pad for configuration
- 7 UL approval (class 2 acc. to NEC)

[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical distance sensors with invisible infrared light in metal housing</b>						
<b>ODS 96B/M/C6 - 600 - S12</b> 50106720	100 600 <sup>2)</sup>	18 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODS 96B/M/V6 - 600 - S12</b> 50106721	100 600 <sup>2)</sup>	18 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODS 96B/M/D26 - 600 - S12</b> 50106722	100 600 <sup>2)</sup>	10 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	Serial/RS 232 1 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODS 96B/M/D36 - 600 - S12</b> 50106723	100 600 <sup>2)</sup>	10 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	Serial/RS 485 1 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODS 96B/M/66 - 600 - S12</b> 50106724	100 600 <sup>2)</sup>	10 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	2 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODS 96B/M/C66.01 - 1400 - S12</b> 50106727	120 1400 <sup>2)</sup>	18 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	Analog/mA 2 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODS 96B/M/V6 - 1400 - S12</b> 50110231	120 1400 <sup>2)</sup>	18 ... 30VDC	Infrared light 15 x 15 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>

1) At measurement distance of 600mm












2) Luminosity coefficient 6 ... 90%, complete measurement range, at 20°C, medium range  $U_B$ , measurement object  $\geq 50 \times 50 \text{ mm}^2$ .  
With serial interface: depending on the measurement transmission mode and the baud rate

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B

We reserve the right to make changes • ODS96B\_4\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**ODS 96B**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability	Resolution [mm]	Option	Accessories
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	1, 3, 6, 7	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	1, 3, 6, 7	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	2, 4, 6, 7	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	2, 4, 6, 7	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	1, 3, 6, 7	a, b, c, d, e, f
± 2% <sup>2)</sup>	± 1% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	2, 3, 5, 6, 7	a, b, c, d, e, f
± 2% <sup>2)</sup>	± 1% <sup>3)</sup>	0.1 ... 0.5 <sup>4)</sup>	1, 3, 6, 7	a, b, c, d, e, f

3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>  
4) Minimum and maximum value depend on measurement distance



Configuration software - free download at [www.leuze.com](http://www.leuze.com).

**Options**

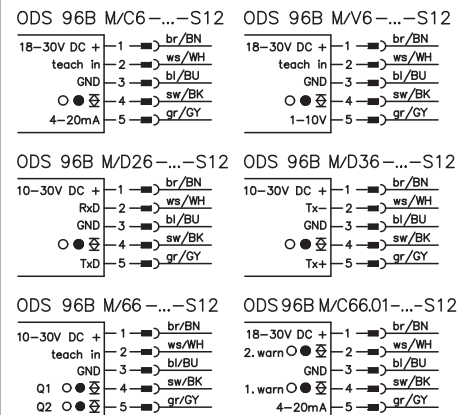
- 1 Teach-in of the outputs via teach input or keyboard entry
- 2 Teach-in of the outputs via keyboard entry
- 3 Adjustable measurement range and measurement mode
- 4 Adjustable measurement value transmission and measurement mode
- 5 2 warning outputs (for signaling 4 different device states)
- 6 PC/OLED display and key pad for configuration
- 7 UL approval (class 2 acc. to NEC)



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors with visible red light in metal housing</b>						
<b>ODSL 96B M/C6.S - 800 - S12</b> 50106728	150 800 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 1 x 1 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/V6.S - 800 - S12</b> 50106729	150 800 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 1 x 1 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/D26.S - 800 - S12</b> 50111035	150 800 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 1 x 1 mm <sup>2</sup>	Serial/RS 232 1 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/D36.S - 800 - S12</b> 50112065	150 800 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 1 x 1 mm <sup>2</sup>	Serial/RS 485 1 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/C6-1200-XL-S12</b> 50106736	150 1200 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 15 x 4 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/V6-1200-XL-S12</b> 50106737	150 1200 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 15 x 4 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>

1) At measurement distance of 800mm

2) Luminosity coefficient 6% ... 90%, complete measurement range, at 20°C, medium range of U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>



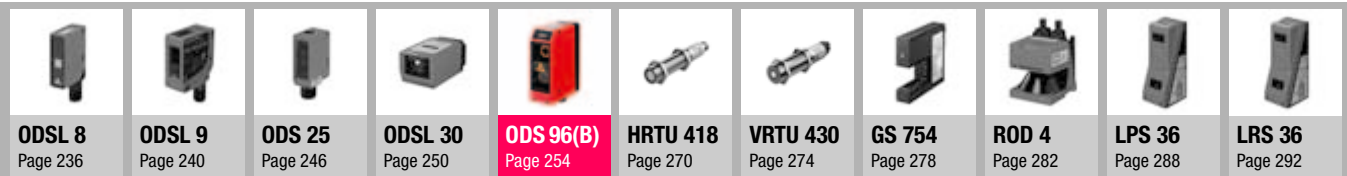
Configuration software - free download at [www.leuze.com](http://www.leuze.com).

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B

We reserve the right to make changes • ODS96B\_2\_EN.fm



**ODS 96B**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability	Resolution [mm]	Option	Accessories
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.8 <sup>4)</sup>	1, 3, 4, 5	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 0.8 <sup>4)</sup>	1, 3, 4, 5	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	2, 3, 4, 5	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	2, 3, 4, 5	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 1.5 <sup>4)</sup>	1, 3, 4, 5	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	0.1 ... 1.5 <sup>4)</sup>	1, 3, 4, 5	a, b, c, d, e, f

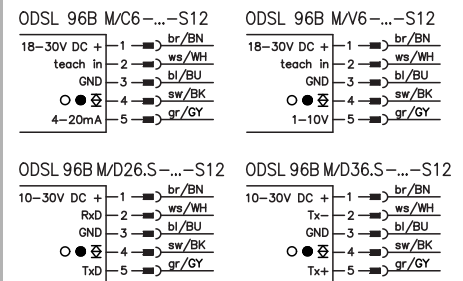
3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>  
4) Minimum and maximum value depend on measurement distance



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in of the outputs via teach input or keyboard entry
- 2 Teach-in of the outputs via keyboard entry
- 3 Adjustable measurement range and measurement mode
- 4 PC/OLED display and key pad for configuration
- 5 UL approval (class 2 acc. to NEC)

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors with visible red light in metal housing</b>						
<b>ODSL 96B M/C6 - 2000 - S12</b> 50106593	150 2000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/V6 - 2000 - S12</b> 50106594	150 2000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/D26 - 2000 - S12</b> 50106597	150 2000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6mm <sup>2</sup>	Serial/RS 232 1 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/D36 - 2000 - S12</b> 50106598	150 2000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6mm <sup>2</sup>	Serial/RS 485 1 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSL 96B M/66 - 2000 - S12</b> 50106599	150 2000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6mm <sup>2</sup>	2 push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSLR 96B M/C6 - 2000 - S12</b> 50106732	60 2000 <sup>2)</sup>	18 ... 30VDC	Red light, LED + laser class 2 2 x 6mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>
<b>ODSLR 96B M/V6 - 2000 - S12</b> 50106733	60 2000 <sup>2)</sup>	18 ... 30VDC	Red light, LED + laser class 2 2 x 6mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1 ... 5 <sup>2)</sup>

1) At measurement distance of 2000mm

2) Luminosity coefficient 6 ... 90%, complete measurement range, at 20°C, medium range U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>.  
With serial interface: depending on the measurement transmission mode and the baud rate














Configuration software - free download at [www.leuze.com](http://www.leuze.com).

We reserve the right to make changes • ODS96B\_3\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



**ODS 96B**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability	Resolution [mm]	Option	Accessories
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	1, 3, 5, 6	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	1, 3, 5, 6	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	2, 4, 5, 6	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	2, 4, 5, 6	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	1, 3, 5, 6	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	1, 3, 5, 6	a, b, c, d, e, f
± 1.5% <sup>2)</sup>	± 0.5% <sup>3)</sup>	1 ... 3 <sup>4)</sup>	1, 3, 5, 6	a, b, c, d, e, f

3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>  
4) Minimum and maximum value depend on measurement distance

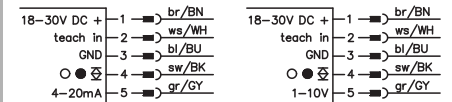


**Optical Sensor ABC**

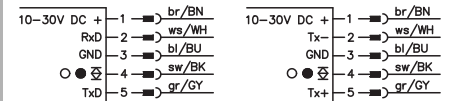
- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

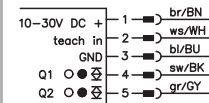
ODSL 96B M/C6-...-S12    ODSL 96B M/V6-...-S12  
ODSLR 96B M/C6-...-S12    ODSL 96B M/V6-...-S12



ODSL 96B M/D26-...-S12    ODSL 96B M/D36-...-S12



ODSL 96B M/66-...-S12



**Options**

- 1 Teach-in of the outputs via teach input or keyboard entry
- 2 Teach-in of the outputs via keyboard entry
- 3 Adjustable measurement range and measurement mode
- 4 Adjustable measurement value transmission and measurement mode
- 5 PC/OLED display and key pad for configuration
- 6 UL approval (class 2 acc. to NEC)












# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors in plastic housing</b>						
<b>ODSL 96 K/V66 - 2300 - S12</b> 50101881	150 2300 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 3x8 mm <sup>2</sup>	Analog/V Push-pull	M12 connector	≤ 7
<b>ODSL 96 K/66 - 2300 - S12</b> 50101882	150 2300 <sup>2)</sup>	18 ... 30VDC	Red light laser, class 2 3x8 mm <sup>2</sup>	Push-pull	M12 connector	≤ 7

- 1) At 2300 mm
- 2) Luminosity coefficient 6 ... 90%, at 20°C, measurement object ≥ 50x50mm<sup>2</sup>
- 3) Same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>
- 4) Minimum and maximum value depend on meas. distance/configuration of the analog output

We reserve the right to make changes • ODS96\_3\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC	
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC	
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC	
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC	
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC	
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC	

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

# ODS 96

Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

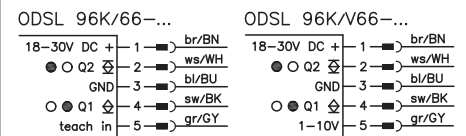
Abs. meas. accuracy	Repeatability <sup>3)</sup>	Resolution [mm]	Option	Accessories
± 3% <sup>2)</sup>	± 2%	1 ... 5 <sup>4)</sup>	2, 3	a, b, c, d, e, f
± 3% <sup>2)</sup>	± 2%	1 ... 5 <sup>4)</sup>	1, 2, 3	a, b, c, d, e, f



### Optical Sensor ABC

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

### Electrical connection



Configuration software - free download at [www.leuze.com](http://www.leuze.com).

### Options

- 1 Teach-in of the switching points via teach input
- 2 Teach-in of the switching points via teach button
- 3 UL approval

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm]	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors with visible red light in metal housing</b>						
<b>ODSL 96B M/C6 - S12</b> 50109290	300 10000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODSL 96B M/V6 - S12</b> 50109291	300 10000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODSL 96B M/C66 - S12</b> 50109295	300 10000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Analog/mA 2 x push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODSL 96B M/D26 - S12</b> 50109292	300 10000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Serial/RS 232 1 push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODSL 96B M/D36 - S12</b> 50109293	300 10000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Serial/RS 485 1 push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODSIL 96B M/C6 - S12</b> 50109302	300 10000 <sup>2)</sup>	18 ... 30VDC	Infrared light laser class 1 2 x 6 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	2.8 ... 100 <sup>3)</sup>
<b>ODSIL 96B M/V6 - S12</b> 50109303	300 10000 <sup>2)</sup>	18 ... 30VDC	Infrared light laser class 1 2 x 6 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	2.8 ... 100 <sup>3)</sup>

1) At measurement distance of 5000mm  
 2) Luminosity coefficient 6 ... 90%, entire measurement range, operating mode "precision", sliding window average over 30 measurement values, at 20 °C after 20min. warmup time, median range U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>. With serial interface: depending on the measurement transmission mode and the baud rate  
 3) Dependent on selected operating mode, factory setting: "Precision" = 50ms (ODSL...) or 100ms (ODSIL...)

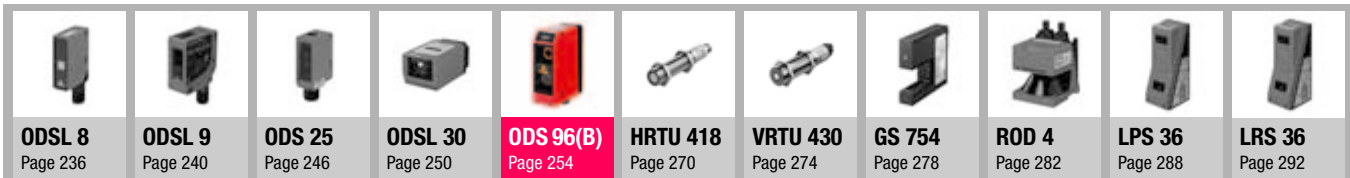


Configuration software - free download at [www.leuze.com](http://www.leuze.com).

## Accessories / connection cables More accessories can be found from page 514 onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50107223	UPG 10	Configuration adaptor for ODS 96B

We reserve the right to make changes • ODS96B\_5\_EN\_fm



# ODS 96B

Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability	Resolution [mm]	Option	Accessories
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	1, 3, 4, 6	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	1, 3, 4, 6	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	2, 3, 4, 6	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	2, 3, 4, 6	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	2, 3, 4, 6	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	1, 3, 4, 5, 6	a, b, c, d, e, f
± 0.5% <sup>2)</sup>	± 5mm <sup>4)</sup>	3	1, 3, 4, 5, 6	a, b, c, d, e, f

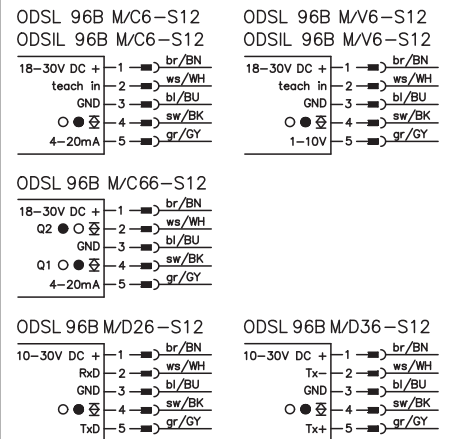
4) Same object, identical environmental conditions, "Precision" operating mode, floating average calculation taking 30 measurement values into account, at 20°C after 20min. warmup time, measurement object ≥ 50x50mm<sup>2</sup>



### Optical Sensor ABC

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Teach-in of the outputs via teach input or keyboard entry
- 2 Teach-in of the outputs via keyboard entry
- 3 Adjustable measurement range and measurement mode
- 4 PC/OLED display and key pad for configuration
- 5 Switchable red light laser alignment aid
- 6 UL approval (class 2 acc. to NEC)

# OPTICAL DISTANCE SENSORS

Part description Part No.:	Meas. range [mm]	Operating voltage	Light source Light spot <sup>1)</sup>	Output	Connection	Meas. time [ms]
<b>Optical laser distance sensors with visible red light in metal housing</b>						
<b>ODKL 96B M/C6 - S12</b> 50109297	300 — 25000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Analog/mA 1 x push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODKL 96B M/V6 - S12</b> 50109298	300 — 25000 <sup>2)</sup>	18 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Analog/V 1 x push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODKL 96B M/D26 - S12</b> 50109299	300 — 25000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Serial/RS 232 1 push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>
<b>ODKL 96B M/D36 - S12</b> 50109300	300 — 25000 <sup>2)</sup>	10 ... 30VDC	Red light laser class 2 2 x 6 mm <sup>2</sup>	Serial/RS 485 1 push-pull	M12 connector	1.2 ... 50 <sup>3)</sup>

- 1) At measurement distance of 5000mm  
 2) Measurement against high-gain reflective tape, entire measurement range, operating mode "precision", sliding window average over 30 measurement values, at 20°C after 20min. warmup time, median range U<sub>B</sub>, measurement object ≥ 50x50mm<sup>2</sup>. With serial interface: depending on the measurement transmission mode and the baud rate  
 3) Dependent on the selected operating mode, factory setting: "Precision" = 50ms

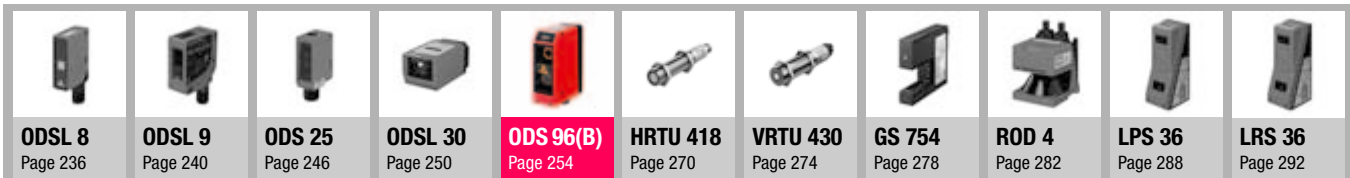


Configuration software - free download at [www.leuze.com](http://www.leuze.com).

We reserve the right to make changes • ODS96B\_6\_EN.fm

## Accessories / connection cables More accessories can be found from page 514 onwards

Part No.	Designation	Features
a 50111527	REF 7 - A - 100 x 100	High-gain reflective tape, width 100 mm, length 100 mm
b 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
c 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
d 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
e 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
f 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
g 50107223	UPG 10	Configuration adaptor for ODS 96B



**ODS 96B**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Abs. meas. accuracy	Repeatability	Resolution [mm]	Option	Accessories
± 0.5% <sup>2)</sup>	± 5 mm <sup>3)</sup>	3	1, 3, 4, 5	a, b, c, d, e, f, g
± 0.5% <sup>2)</sup>	± 5 mm <sup>3)</sup>	3	1, 3, 4, 5	a, b, c, d, e, f, g
± 0.5% <sup>2)</sup>	± 5 mm <sup>3)</sup>	3	2, 3, 4, 5	a, b, c, d, e, f, g
± 0.5% <sup>2)</sup>	± 5 mm <sup>3)</sup>	3	2, 3, 4, 5	a, b, c, d, e, f, g

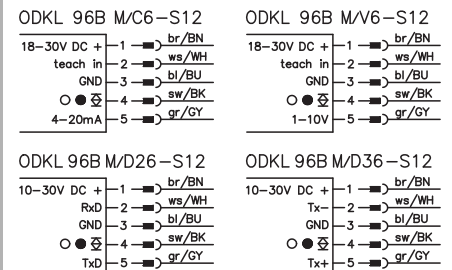
3) Same object, identical environmental conditions, "Precision" operating mode, floating average calculation taking 30 measurement values into account, at 20°C after 20 min. warmup time, measurement object ≥ 50x50 mm<sup>2</sup>



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

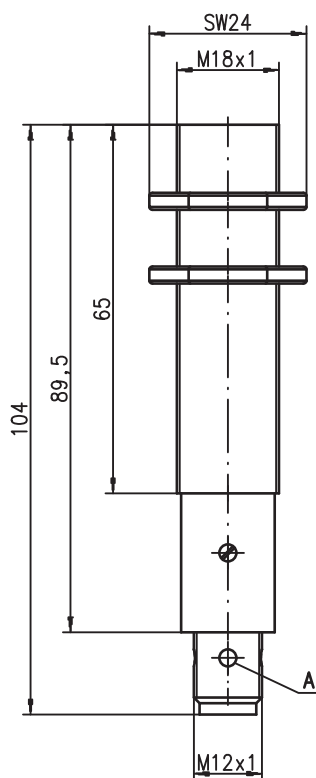



**Options**

- 1 Teach-in of the outputs via teach input or keyboard entry
- 2 Teach-in of the outputs via keyboard entry
- 3 Adjustable measurement range and measurement mode
- 4 PC/OLED display and key pad for configuration
- 5 UL approval (class 2 acc. to NEC)

# OVERVIEW OF ULTRASONIC DISTANCE SENSORS












## Dimensioned drawing



 Further details can be found in the respective data sheet.


A Indicator diode Q1

We reserve the right to make changes • HRTU418\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



# HRTU 418

Ultrasonic distance sensors	Measurement range	Page
 <b>Ultrasonic distance sensors HRTU 418</b>	50 ... 1000mm	272



Other 418 Series products:			
	Switching ultrasonic sensors	HRTU 418	316



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	20 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 60\text{mA}$
	Characteristic output curve	Ascending
<b>Indicators</b>	Yellow LED	Object detected
<b>Mechanical data</b>	Housing	Metal (CuZn)
	Weight	50g
<b>Environmental data</b>	Ambient temperature (operation)	$-25^\circ\text{C} \dots +70^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508

**Features**

- Sensors in M18 cylindrical housing
- Measurement range up to 1000mm
- Configuration with PC software and programming terminal
- Temperature compensation

Optical Sensor ABC
<ul style="list-style-type: none"> <li>● Ultrasonic distance sensors Page 565</li> </ul>

# ULTRASONIC DISTANCE SENSORS

Part description Part No.:	Meas. range <sup>1)</sup> [mm] <input type="checkbox"/>	Ultrasonic frequency	Opening angle	Output	Connection
<b>Ultrasonic distance sensors</b>					
<b>HRTU 418 M/V - 5010 - 300 - S12</b> 50036259	<input type="text" value="50"/> <input type="text" value="300"/>	400kHz	6°	Analog/mA	M12 connector
<b>HRTU 418 M/V - 5310 - 300 - S12</b> 50040616	<input type="text" value="50"/> <input type="text" value="300"/>	400kHz	6°	Analog/V	M12 connector
<b>HRTU 418 M/V - 3010 - 1000 - S12</b> 50036260	<input type="text" value="150"/> <input type="text" value="1000"/>	200kHz	6°	Analog/mA	M12 connector
<b>HRTU 418 M/V - 3310 - 1000 - S12</b> 50040618	<input type="text" value="150"/> <input type="text" value="1000"/>	200kHz	6°	Analog/V	M12 connector












1) Over complete temperature range, measurement object  $\geq 10 \times 10 \text{mm}^2$   
 2) Of the measurement range end value

We reserve the right to make changes • HRTU418\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50036559	PGU 01	Programming unit incl. software

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**HRTU 418**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

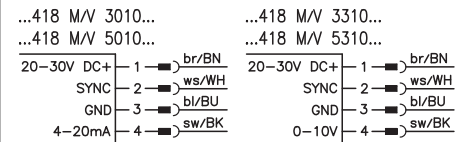
Abs. meas. accuracy <sup>2)</sup>	Repeatability	Resolution [mm]	Option	Accessories
± 2.5%	± 1mm	1	1, 2, 3, 4	a, b, c, d, e
± 2.5%	± 1mm	1	1, 2, 3, 4	a, b, c, d, e
± 2.5%	± 2mm	1	1, 2, 3, 4	a, b, c, d, e
± 2.5%	± 2mm	1	1, 2, 3, 4	a, b, c, d, e



**Optical Sensor ABC**

- Ultrasonic distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**


- 1 Configurable via programming unit and software
- 2 Sensor synchronization via SYNC input
- 3 Configurable multiplex operation
- 4 UL approval

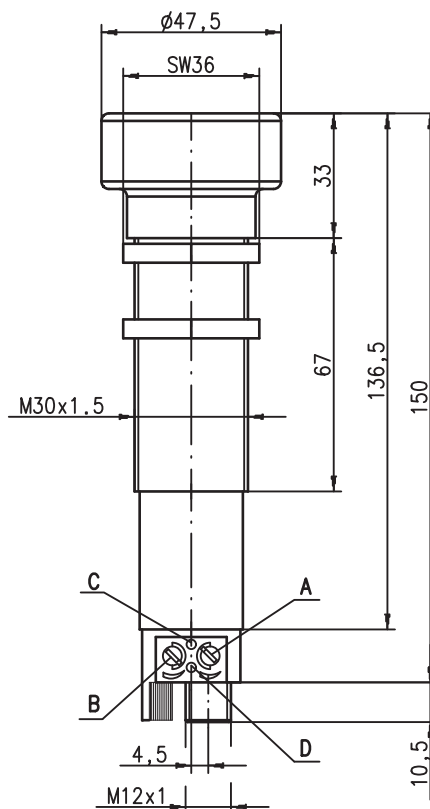
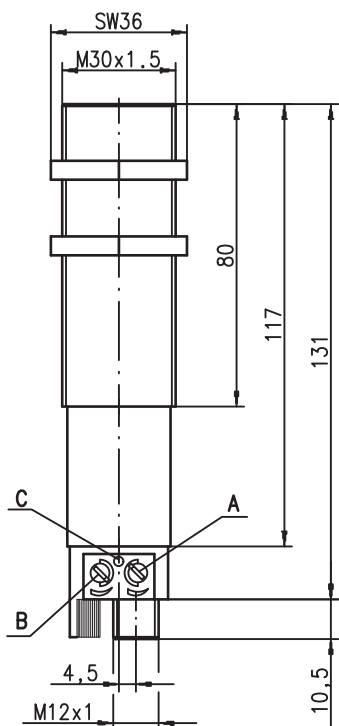
[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

# OVERVIEW OF ULTRASONIC DISTANCE SENSORS












## Dimensioned drawing

- A** Adjustment of end of switching range
- B** Adjustment of start of switching range
- C** Indicator diode Q1
- D** Indicator diode Q2 (...430 M/P... only)


 Further details can be found in the respective data sheet.



We reserve the right to make changes • VRTU430\_Overview\_EN.fim

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

# VRTU 430

Ultrasonic distance sensors	Measurement range	Page
 <b>Ultrasonic distance sensors VRTU 430</b>	60 ... 6000mm	276



Other 430 Series products:		
 Switching ultrasonic sensors	VRTU 430	322



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	20 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 60\text{mA}$
	Characteristic output curve	Ascending
<b>Indicators</b>	Yellow LED	Switching output
	Flashing yellow LED	Programming error
<b>Mechanical data</b>	Housing	Metal (CuZn)
	Weight	210g ... 380g
<b>Environmental data</b>	Ambient temperature (operation)	$-25^\circ\text{C} \dots +70^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 65
	Standards applied	IEC 60947-5-2, UL 508

**Features**

- Sensors in M30 cylindrical housing
- Measurement range up to 6000mm
- Configuration with PC software and programming terminal
- Temperature compensation

Optical Sensor ABC
<ul style="list-style-type: none"> <li>● Ultrasonic distance sensors Page 565</li> </ul>

[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# ULTRASONIC DISTANCE SENSORS












Part description Part No.:	Meas. range [mm] <input type="checkbox"/>	Ultrasonic frequency	Opening angle	Output	Connection
<b>Ultrasonic distance sensors</b>					
<b>VRTU 430 M/V - 5710 - 300 - S12</b> 50036266	<input type="checkbox"/> 60 ... 300 <sup>1)</sup>	400kHz	6°	Analog/mA PNP	M12 connector
<b>VRTU 430 M/V - 5510 - 300 - S12</b> 50040771	<input type="checkbox"/> 60 ... 300 <sup>1)</sup>	400kHz	6°	Analog/V PNP	M12 connector
<b>VRTU 430 M/V - 3710 - 1300 - S12</b> 50036267	<input type="checkbox"/> 200 ... 1300 <sup>1)</sup>	200kHz	6°	Analog/mA PNP	M12 connector
<b>VRTU 430 M/V - 3510 - 1300 - S12</b> 50040772	<input type="checkbox"/> 200 ... 1300 <sup>1)</sup>	200kHz	6°	Analog/V PNP	M12 connector
<b>VRTU 430 M/V - 2710 - 3000 - S12</b> 50036268	<input type="checkbox"/> 400 ... 3000 <sup>2)</sup>	120kHz	6°	Analog/mA PNP	M12 connector
<b>VRTU 430 M/V - 2510 - 3000 - S12</b> 50107096	<input type="checkbox"/> 400 ... 3000 <sup>2)</sup>	120kHz	6°	Analog/V PNP	M12 connector
<b>VRTU 430 M/V - 1710 - 6000 - S12</b> 50036269	<input type="checkbox"/> 600 ... 6000 <sup>3)</sup>	80kHz	6°	Analog/mA PNP	M12 connector

- 1) Over complete temperature range, measurement object  $\geq 10 \times 10 \text{mm}^2$   
 2) Over complete temperature range, measurement object  $\geq 50 \times 50 \text{mm}^2$   
 3) Over complete temperature range, measurement object  $\geq 100 \times 100 \text{mm}^2$   
 4) Of the measurement range end value

We reserve the right to make changes • VRTU430\_EN.fm

## Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC
f 50036559	PGU 01	Programming unit incl. software

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**VRTU 430**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

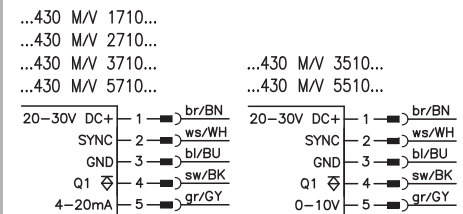
Abs. meas. accuracy <sup>4)</sup>	Repeatability	Resolution [mm]	Option	Accessories
± 1.5%	± 0.45mm	≤ 1	1, 2, 3, 4	a, b, c, d, e, f
± 1.5%	± 0.45mm	≤ 1	1, 2, 3, 4	a, b, c, d, e, f
± 1.5%	± 2mm	≥ 1	1, 2, 3, 4	a, b, c, d, e, f
± 1.5%	± 2mm	≥ 1	1, 2, 3, 4	a, b, c, d, e, f
± 1.5%	± 5mm	≥ 1	1, 2, 3, 4	a, b, c, d, e, f
± 1.5%	± 5mm	≥ 1	1, 2, 3, 4	a, b, c, d, e, f
± 1.5%	± 9mm	≥ 1	1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**




**Options**

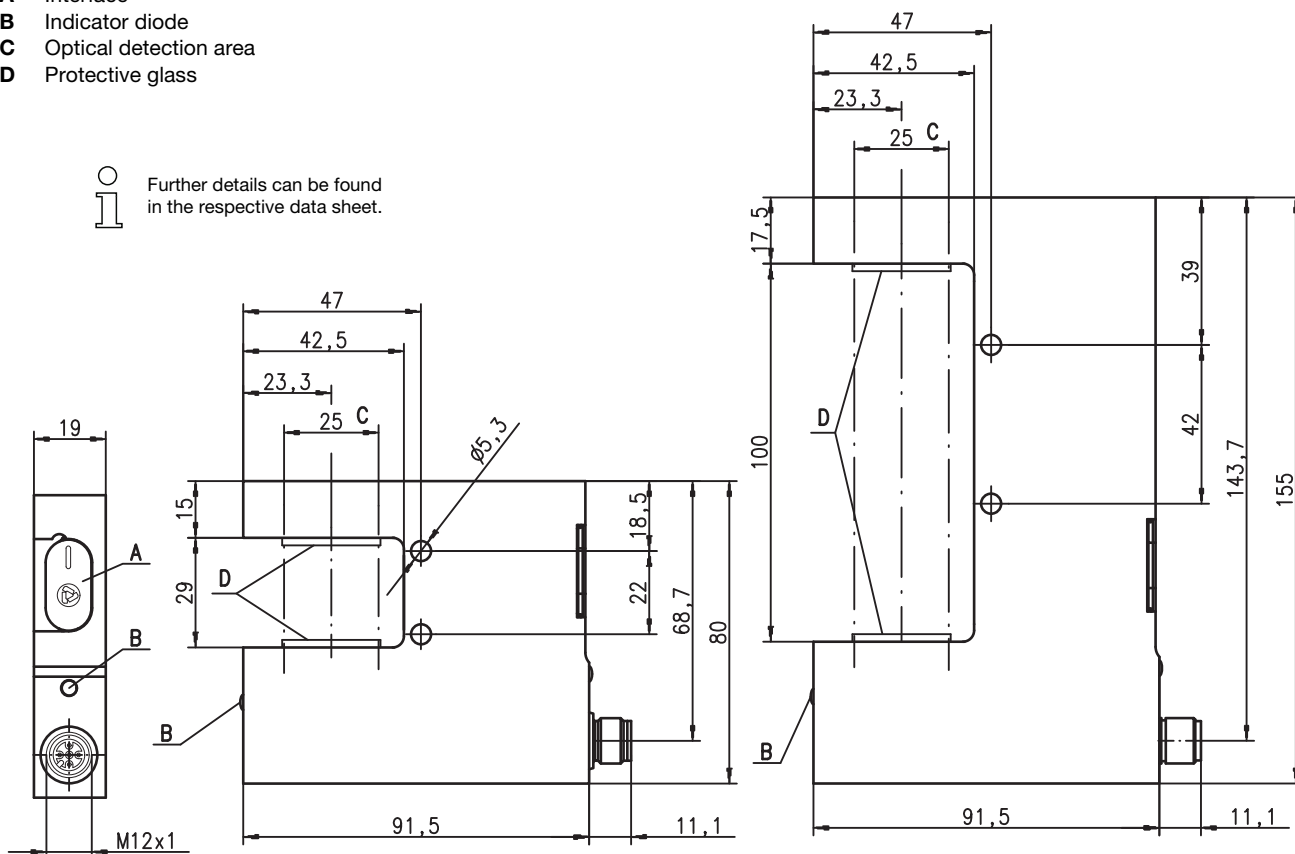
- 1 Configurable via programming unit and software
- 2 Sensor synchronization via SYNC input
- 3 Configurable multiplex operation
- 4 UL approval

# OVERVIEW OF MEASURING CCD FORKED SENSORS












## Dimensioned drawing

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

 Further details can be found in the respective data sheet.




We reserve the right to make changes • GS754\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



## GS 754

Measuring CCD forked sensors	Mouth width	Page
 <b>Measuring CCD forked sensors GS 754</b>	29 / 100mm	280

### Additional products - forked sensors:

 Optical forked sensors	GS 04, GS 06, GS 21	394
 Capacitive forked sensors	GK 14	412
 Ultrasonic forked sensors	GSU 06, GSU 14	416



### Common technical data

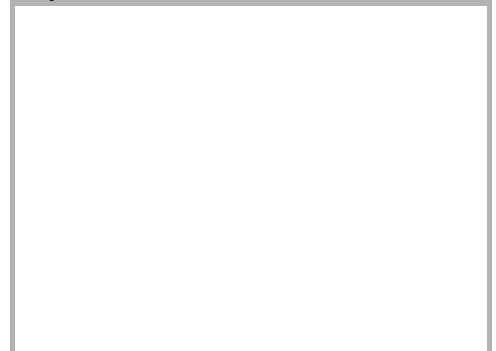
<b>Electrical data</b>	Operating voltage $U_B$	18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 150\text{mA}$
	Signal voltage high/low	$\geq 8\text{V}/\leq 2\text{V}$
<b>Measurement data</b>	Measurement field length	25mm
	Measurement cycle	$\geq 20\text{ms}$
	Maximum resolution	$\geq 14\mu\text{m}$
<b>Indicators</b>	Green LED	Ready to operate
	Flashing green LED	Interference
<b>Mechanical data</b>	Housing	Aluminum, anodised
	Optics cover	Glass
	Weight	260g
<b>Environmental data</b>	Ambient temperature (operation)	$-20^\circ\text{C} \dots +50^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 54
	Standards applied	IEC 60947-5-2

### Features

- Edge and object detection of up to 3 objects in 25mm wide light band
- Resolution 14 $\mu\text{m}$
- Adjustable measurement range and measurement mode
- Teach-in function and warning output
- Detection of multiple objects
- Calculation of arithmetic mean or single-value measurement



### Optical Sensor ABC



## MEASURING CCD FORKED SENSORS












Part description Part No.:	Mouth width [mm]	Operating voltage	Light source	Output
<b>Measuring CCD forked sensors</b>				
<b>GS 754 M/V - 100/42 - 604 - S12</b> 50103487	100	18 ... 30VDC	Infrared light	2 x analog/mA PNP
<b>GS 754 M/V - 100/42 - 504 - S12</b> 50103488	100	18 ... 30VDC	Infrared light	2 x analog/V PNP
<b>GS 754 M/D - 100/42 - 104 - S12</b> 50104283	100	18 ... 30VDC	Infrared light	Serial/RS 232 PNP
<b>GS 754 M/V - 29/42 - 604 - S12</b> 50102981	29	18 ... 30VDC	Infrared light	Analog/mA PNP
<b>GS 754 M/V - 29/42 - 504 - S12</b> 50103206	29	18 ... 30VDC	Infrared light	Analog/V PNP
<b>GS 754 M/D - 29/42 - 104 - S12</b> 50104280	29	18 ... 30VDC	Infrared light	Serial/RS 232 PNP
<b>GS 754 M/D - 29/42 - 204 - S12</b> 50104281	29	18 ... 30VDC	Infrared light	Serial / RS 422

We reserve the right to make changes • GS754\_EN\_fm

### Accessories / connection cables

 More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 50104591	K - D M12A - 8P - 2m - PUR	Connection cable 2000mm, M12 axial, 8-pin, PUR
d 50104590	K - D M12A - 8P - 5m - PUR	Connection cable 5000mm, M12 axial, 8-pin, PUR
e 50082007	KB - ODS 96 - 1500	Configuration cable to PC, 1500mm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**GS 754**  
CCD forked sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

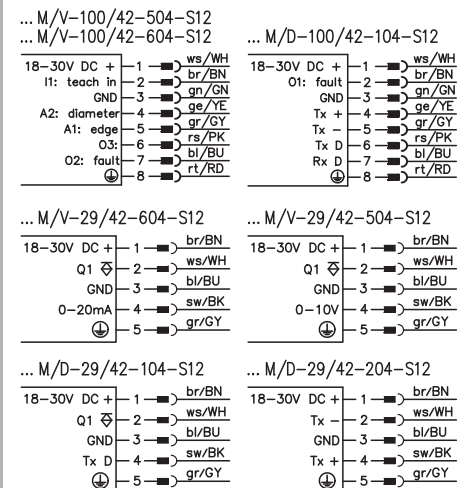
Connection	Option	Accessories
M12 connector, 8-pin	1, 2, 3	c, d, e, f
M12 connector, 8-pin	1, 2, 3	c, d, e, f
M12 connector, 8-pin	1, 3	c, d, e, f
M12 connector, 5-pin	1	a, b, e, f
M12 connector, 5-pin	1	a, b, e, f
M12 connector, 5-pin	1	a, b, e, f
M12 connector, 5-pin	1	a, b, e, f



**Optical Sensor ABC**

- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Adjustable measurement range and measurement mode
- Teach-in via teach input
- Warning output

[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

# OVERVIEW OF SURFACE DISTANCE SENSORS



Compartment occupancy monitoring



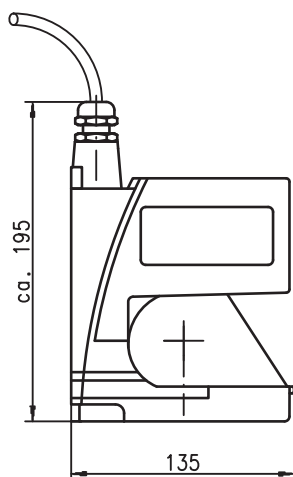
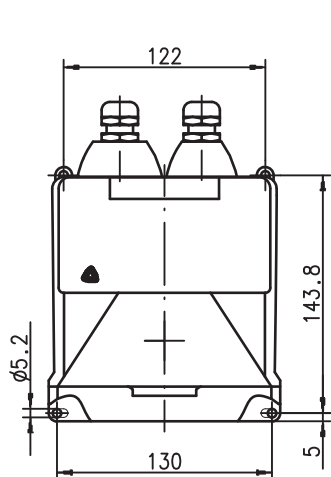
Object measurement



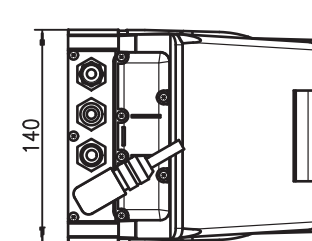
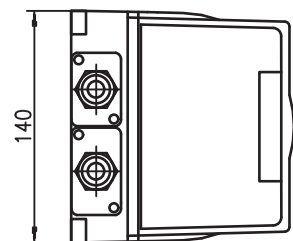
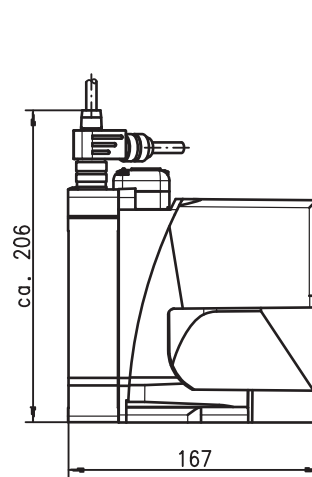
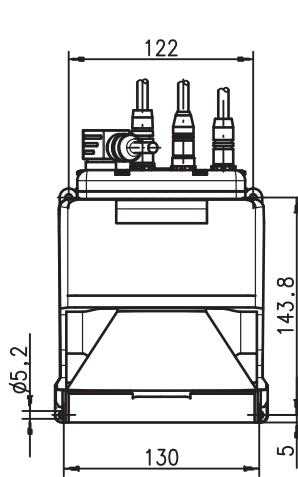
Position measurement

## Dimensioned drawing

**ROD 4 - 3...**














**ROD 4...plus**




Further details can be found in the respective data sheet.

We reserve the right to make changes • ROD4\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

## ROD 4 / ROD 4 plus





Surface distance sensors	Measurement range	Page
 Surface distance sensors ROD 4	0 ... 65m	284



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	+24VDC +20%/-30%
	Current consumption	Approx. 400mA
		Heating: approx. 2A
<b>Measurement data</b>	Detection range	190°
	Angular resolution	0.36°
	Measurement time	20ms/scan (ROD4-5xplus) 40ms/scan (ROD4plus)
<b>Mechanical data</b>	Housing	Aluminum/Plastic
	Optics cover	Plastic
	Weight	2000g
<b>Environmental data</b>	Ambient temperature (operation)	0°C ... +50°C
		Heating: -20°C ... +50°C
	VDE safety class	III
	Protection class	IP 65
	Standards applied	IEC 60947-5-2, UL 508
<b>Mounting systems for this series can be found from page 525 onwards</b>		

**Features**

- Area scanning distance sensor for object detection and object measurement
- Detection fields up to 50m
- 8 detection field pairs
- Config-Plug for device exchange without PC
- Fast Ethernet: ROD 4 plus
- Laser class 1

Optical Sensor ABC	
● Optical distance sensors	Page 565

[www.leuze.com/measuring\\_sensors/](http://www.leuze.com/measuring_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# OPTICAL SURFACE DISTANCE SENSORS

Part description Part No.:	Meas. range [m] <input type="checkbox"/>	Operating voltage	Light source	Output
<b>Optical surface distance sensors</b>				
<b>ROD 4 - 30</b> 50110238	<input type="text" value="0"/> <input type="text" value="65"/>	24VDC	Infrared laser class 1	Serial/RS 232/RS 422 4 x PNP
<b>ROD 4 - 36</b> 50110666	<input type="text" value="0"/> <input type="text" value="65"/>	24VDC	Infrared laser class 1	Serial/RS 232/RS 422 4 x PNP
<b>ROD 4 - 38</b> 50110667	<input type="text" value="0"/> <input type="text" value="25"/>	24VDC	Infrared laser class 1	Serial/RS 232/RS 422 4 x PNP














Configuration software RODsoft, RODplussoft - free download at [www.leuze.com](http://www.leuze.com).

We reserve the right to make changes • ROD4\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50108138	KB - ROD 4 - CP - 5000	Connection cable 5000mm, with configuration memory
b 50108139	KB - ROD 4 - CP - 10000	Connection cable 10000mm, with configuration memory
c 50038069	KB - ROD 4 PC - 3000	Configuration cable to PC, 3000mm
d 50038070	KB - ROD 4 PC - 10000	Configuration cable to PC, 10000mm
e 50038066	BT ROD 4	Mounting system for ROD 4...

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

# ROD 4

Optical distance sensors



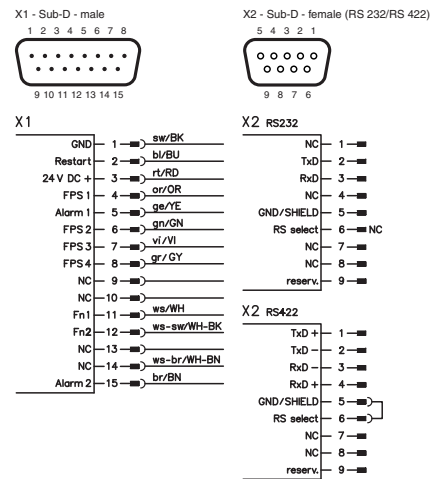
Connection	Option	Accessories
1 SUB-D, 15-pin 1 SUB-D, 9-pin	1, 2, 3, 6	a, b, c, d, e
1 SUB-D, 15-pin 1 SUB-D, 9-pin	1, 2, 3, 4, 6	a, b, c, d, e
1 SUB-D, 15-pin 1 SUB-D, 9-pin	1, 2, 3, 4, 5, 6	a, b, c, d, e



### Optical Sensor ABC

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 8 detection field pairs
- 2 Warning and alarm output
- 3 Restart-disable
- 4 Internal heating
- 5 Dust-insensitive version
- 6 UL approval (class 2 acc. to NEC)

## OPTICAL SURFACE DISTANCE SENSORS

Part description Part No.:	Meas. range [m] <input type="checkbox"/>	Operating voltage	Light source	Output
<b>Optical surface distance sensors</b>				
<b>ROD 4 plus</b> 50106481	<input type="text" value="0"/> <input type="text" value="65"/>	24VDC	Infrared laser class 1	Ethernet Serial/RS 232/RS 422 4 x PNP
<b>ROD 4 - 08 plus</b> 50106480	<input type="text" value="0"/> <input type="text" value="25"/>	24VDC	Infrared laser class 1	Ethernet Serial/RS 232/RS 422 4 x PNP
<b>ROD 4 - 50 plus</b> 50113226	<input type="text" value="0"/> <input type="text" value="65"/>	24VDC	Infrared laser class 1	Ethernet Serial/RS 232/RS 422 4 x PNP
<b>ROD 4 - 58 plus</b> 50113225	<input type="text" value="0"/> <input type="text" value="25"/>	24VDC	Infrared laser class 1	Ethernet Serial/RS 232/RS 422 4 x PNP














Configuration software RODsoft, RODplussoft - free download at [www.leuze.com](http://www.leuze.com).

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50106976	KB - 014S - 5000 - 14	Connection cable, single-sided M16 socket, 14-pin, angular, 5m
b 50109881	KB ET - 5000 - SA - RJ45	Ethernet cable, axial M12 connector - RJ 45 plug, 5m
c 50106881	KB - ROD 4plus - 5000	Configuration cable, M12 connector - 9 pin Sub-D socket, 5m
d 50104590	K-D - M12A - 8P - 5m - PUR	RS 232/422 connection cable, single-sided M12 socket, 8-pin, axial,
e 50038066	BT ROD 4	Mounting system for ROD 4...

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



**ROD 4 plus**  
Optical distance sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

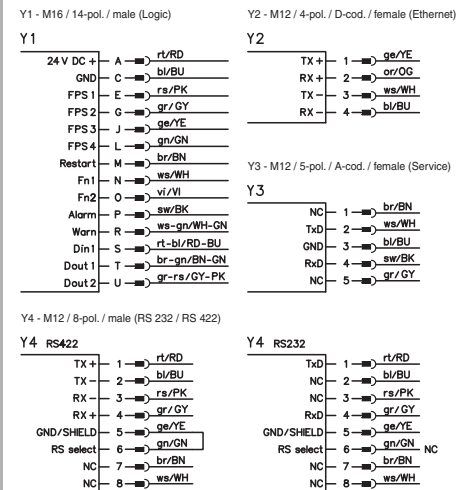
Connection	Option	Accessories
1 M16, 14-pin 3 M12, 4/5/8-pin	1, 2, 3, 4, 8	a, b, c, d, e
1 M16, 14-pin 3 M12, 4/5/8-pin	1, 2, 3, 4, 6, 7, 8	a, b, c, d, e
1 M16, 14-pin 3 M12, 4/5/8-pin	2, 3, 5, 8	a, b, c, d, e
1 M16, 14-pin 3 M12, 4/5/8-pin	2, 3, 5, 6, 7, 8	a, b, c, d, e



**Optical Sensor ABC**

- Optical distance sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



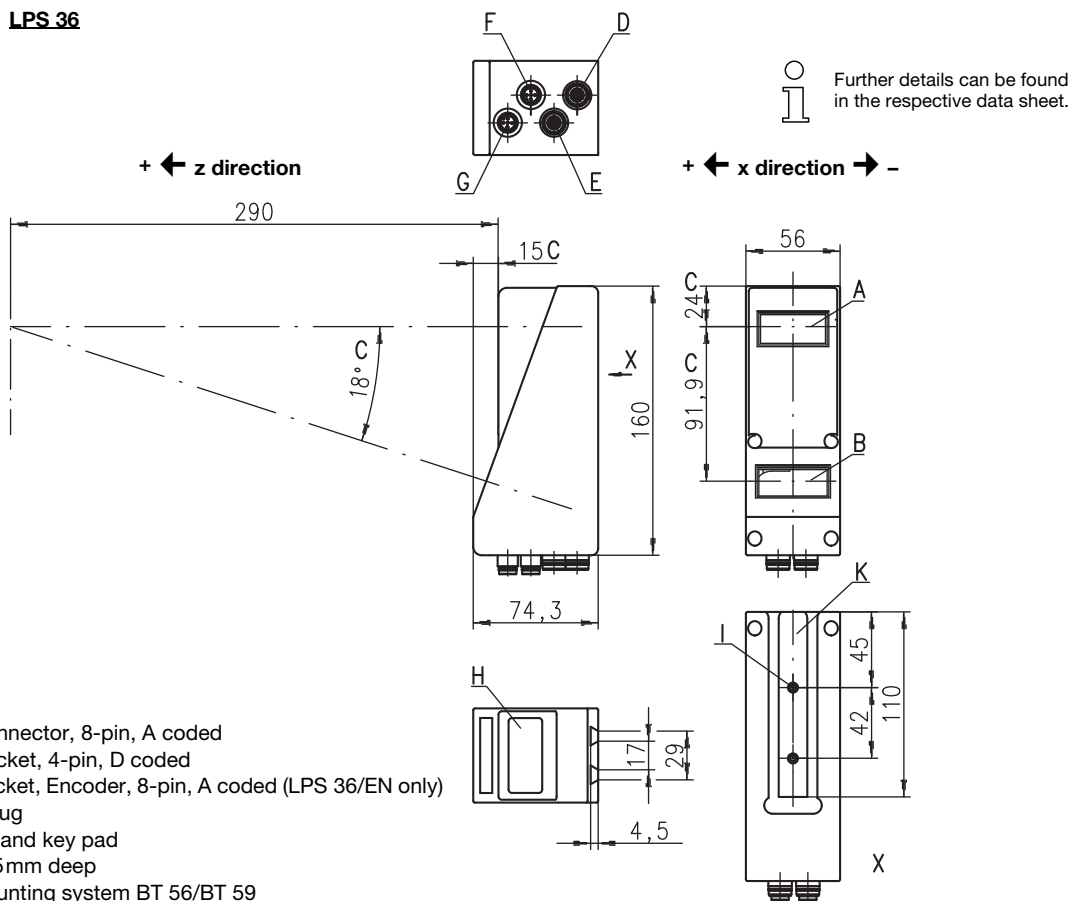
**Options**

- 7 storable and switchable detection fields
- Warning and alarm output
- Restart-disable
- Scanning rate 25Hz / measurement time 40ms/scan, for object detection and object measurement
- Scanning rate 50Hz / measurement time 20ms/scan, for object measurement
- Internal heating
- Dust-insensitive version
- UL approval (class 2 acc. to NEC)












# OVERVIEW OF LINE PROFILE SENSORS

## Dimensioned drawing

**LPS 36**



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<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

## LPS 36

Light section sensors	Measurement range	Page
 <b>Line Profile Sensors LPS 36</b>	200 ... 800mm	290



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 200$ mA
	Switching outputs	2x24V/100mA/push-pull
	Switching inputs	2x24V, Trigger+Enable
	Ethernet interface	UDP
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Ethernet
<b>Mechanical data</b>	Housing	Aluminum/Plastic
	Optics cover	Glass
	Weight	Approx. 620g
<b>Environmental data</b>	Ambient temperature (operation)	-30°C ... +50°C
	VDE safety class	III, PELV
	Protection class	IP 67
	Laser class	2M acc. to EN 60825-1
	Standards applied	IEC 60947-5-2, UL 508

### Features

- Line sensor for profile measurement
- Calibrated system
- Length of laser line: max. 600mm
- Measurement data transfer via Fast Ethernet (UDP)
- Measurement value display in mm on OLED display
- OLED display and key pad
- Laser class 2M



### Optical Sensor ABC

- Light section sensors Page 565

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

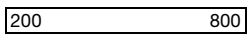

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## LIGHT SECTION SENSORS

Part description Part No.:	Meas. range [mm] <sup>1)</sup> <input type="checkbox"/>	Operating voltage	Light source	Output	Connection	Meas. time [ms]
<b>Line Profile Sensors</b>						
<b>LPS 36</b> 50111325		18 ... 30VDC	Red light Laser class 2M	Serial/RS 232, Ethernet 2 x push-pull	M12 connector	10
<b>LPS 36/EN</b> 50111324		18 ... 30VDC	Red light Laser class 2M	Serial/RS 232, Ethernet 2 x push-pull	M12 connector	10

1) Luminosity coefficient 6 ... 90 %, entire measurement range, at 20°C after 30 minutes warmup time, medium range U<sub>B</sub>.  
 2) in z direction, luminosity coefficient 90 %, same object, identical environmental conditions, measurement object ≥ 50x50mm<sup>2</sup>














Configuration software LPSsoft - free download at [www.leuze.com](http://www.leuze.com).

We reserve the right to make changes • LPS36\_EN.fm

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50109881	KB ET - 5000 - SA - RJ45	Ethernet cable, axial M12 connector - RJ 45 plug, 5m, for X2
b 50104590	K - D M12A - 8P - 5m - PUR	Connection cable 5000mm, axial M12 socket, 8-pin, for X1
c 50110180	KB M12/8 - 5000 - SA	Connection cable 5000mm, axial M12 connector, 8-pin, for X3
d 50027375	BT 56	Fixing component with dovetail for rod
e 50111224	BT 59	Fixing component with dovetail for ITEM profile

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

**LPS 36**  
Line Profile Sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Linearity	Repeatability	Resolution	Option	Accessories
$\leq \pm 1\% ^2)$	$\leq 0.5\% ^2)$	1 ... 1.5mm <sup>3)</sup> 1 ... 3mm <sup>4)</sup>	1, 2, 3, 5	a, b, c, d, e
$\leq \pm 1\% ^2)$	$\leq 0.5\% ^2)$	1 ... 1.5mm <sup>3)</sup> 1 ... 3mm <sup>4)</sup>	1, 2, 3, 4, 5	a, b, c, d, e

3) In x direction, minimum and maximum value depend on measurement distance  
4) In z direction, minimum and maximum value depend on measurement distance



**Optical Sensor ABC**

- Light section sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

X1			X2		
M12x1, 8-pole, male, A-cod.			M12x1, 4-pole, female, D-cod.		
PIN	Signal	Color	PIN	Signal	Color
1	+24 V DC	WH	1	Tx+	YE
2	In1	BR	2	Rx+	WH
3	GND	GN	3	Tx-	OR
4	Out1	YE	4	Rx-	BU
5	In2	GY			
6	Out2	PK			
7	RS 232 - Tx	BU			
8	RS 232 - Rx	RD			

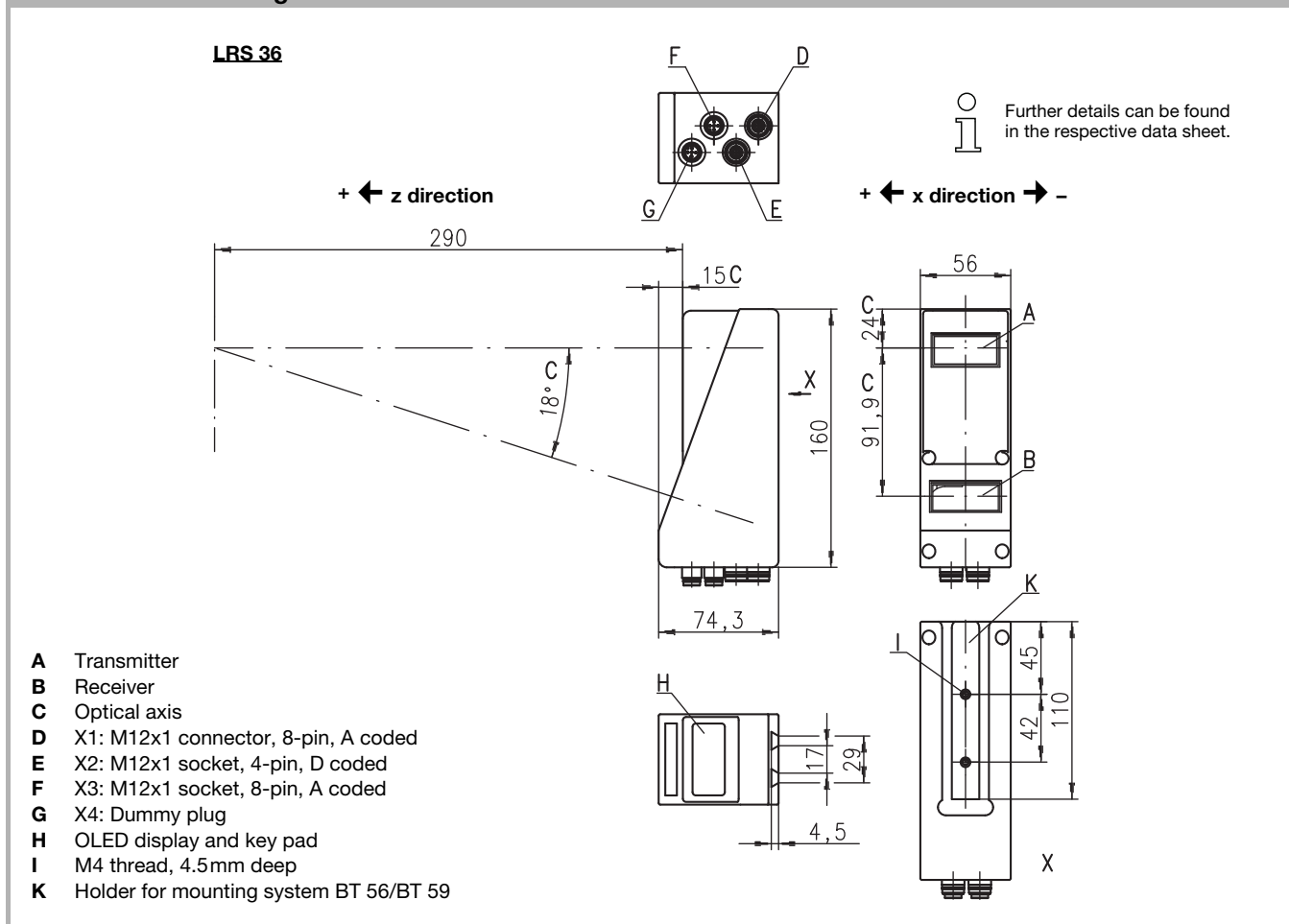
X3			X4		
M12x1, 8-pole, female, A-cod.			-		
PIN	Signal	Color	PIN	Signal	Color
1	Enc. +24 V DC	WH			
2	(GND)	BR			
3	GND	GN			
4	Enc. A+	YE			
5	Enc. A-	GY			
6	Enc. B+	PK			
7	Enc. B-	BU			
8	+5 V DC Out	RD			

**Options**












- 1 Configuration via OLED display and control buttons or via PC
- 2 Trigger and activation input
- 3 Cascading of up to 9 sensors
- 4 Connection for incremental transmitter (encoder)
- 5 UL approval (class 2 acc. to NEC)

# OVERVIEW OF LINE RANGE SENSORS


## Dimensioned drawing



We reserve the right to make changes • LRS36\_Overview\_EN.fm

										
<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292

## LRS 36

Light section sensors	Scanning range	Page
 <b>Line Range Sensors LRS 36</b>	200 ... 800mm	294



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 200$ mA
	Switching outputs	6x24V/100mA/push-pull
	Switching inputs	2x24V, Trigger/Enable, selection of the inspection
	Ethernet interface	UDP
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Ethernet
<b>Mechanical data</b>	Housing	Aluminum/Plastic
	Optics cover	Glass
	Weight	Approx. 620g
<b>Environmental data</b>	Ambient temperature (operation)	-30°C ... +50°C
	VDE safety class	III, PELV
	Protection class	IP 67
	Laser class	2M acc. to EN 60825-1
	Standards applied	IEC 60947-5-2, UL 508

### Features

- Line sensor for object detection
- Up to 16 detection fields with logical linking option
- Length of laser line: max. 600mm
- Up to 16 inspection tasks
- Laser class 2M



### Optical Sensor ABC

- Light section sensors Page 565

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## LIGHT SECTION SENSORS

Part description Part No.:	Scanning range [mm] <sup>1)</sup> <input type="checkbox"/>	Operating voltage	Light source	Output	Connection
<b>Line Range Sensors</b>					
<b>LRS 36/6</b> 50111330	200 — 800	18 ... 30VDC	Red light Laser class 2M	Serial/RS 232, Ethernet 6 x push-pull <sup>2)</sup>	M12 connector

1) Luminosity coefficient 6 ... 90%, entire detection range, at 20°C after 30minutes warmup time, medium range U<sub>B</sub>.

2) Number of detection fields: up to 16 with logical linking option; number of inspection tasks: up to 16, of which 8 can be activated via inputs



Configuration software LRSsoft - free download at [www.leuze.com](http://www.leuze.com).

We reserve the right to make changes • LRS36\_EN.fm

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50109881	KB ET - 5000 - SA - RJ45	Ethernet cable, axial M12 connector - RJ 45 plug, 5m, for X2
b 50104590	K - D M12A - 8P - 5m - PUR	Connection cable 5000mm, axial M12 socket, 8-pin, for X1
c 50110180	KB M12/8 - 5000 - SA	Connection cable 5000mm, axial M12 connector, 8-pin, for X3
d 50027375	BT 56	Fixing component with dovetail for rod
e 50111224	BT 59	Fixing component with dovetail for ITEM profile

<b>ODSL 8</b> Page 236	<b>ODSL 9</b> Page 240	<b>ODS 25</b> Page 246	<b>ODSL 30</b> Page 250	<b>ODS 96(B)</b> Page 254	<b>HRTU 418</b> Page 270	<b>VRTU 430</b> Page 274	<b>GS 754</b> Page 278	<b>ROD 4</b> Page 282	<b>LPS 36</b> Page 288	<b>LRS 36</b> Page 292



**LRS 36**  
Line Range Sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Response time [ms]	Minimum object size	Option	Accessories
10	2 ... 3 mm <sup>3)</sup> 2 ... 6 mm <sup>4)</sup>	1, 2, 3, 4, 5, 6	a, b, c, d, e

3) In x direction, minimum and maximum value depend on measurement distance  
4) In z direction, minimum and maximum value depend on measurement distance



**Optical Sensor ABC**

- Light section sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

X1			X2		
M12x1, 8-pole, male, A-cod.			M12x1, 4-pole, female, D-cod.		
PIN	Signal	Color	PIN	Signal	Color
1	+24 V DC	WH	1	Tx+	YE
2	In1	BR	2	Rx+	WH
3	GND	GN	3	Tx-	OR
4	Out1	YE	4	Rx-	BU
5	In2	GY			
6	Out2	PK			
7	RS 232 - Tx	BU			
8	RS 232 - Rx	RD			

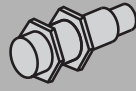






  

X3			X4		
M12x1, 8-pole, female, A-cod.			-		
PIN	Signal	Color			
1	Out6	WH			
2	Out5	BR			
3	GND	GN			
4	Out4	YE			
5	Out3	GY			
6	InSel3	PK			
7	InSel2	BU			
8	InSel1	RD			

**Options**

- 1 Configuration via OLED display and control buttons or via PC
- 2 Trigger and activation input
- 3 Cascading of up to 9 sensors
- 4 Up to 16 detection fields with logical linking option
- 5 Up to 16 inspection tasks, of which 8 can be activated via inputs
- 6 UL approval (class 2 acc. to NEC)

## SELECTION TABLE

Series	Dimensions in mm (WxHxD) in mm (ØxL)	Housing material		Typ. operating range/scanning range [mm]				
		Plastic	Metal	100	500	1000	6000	
 Series								
 <b>420</b>	20 x 42 x 15	●		10 — 1000				
 <b>8</b>	15 x 48 x 38		●	0 — 800				
 <b>18</b>	15 x 50 x 33		●	0 — 650				
 <b>412</b>	M12 x 70		●	10 — 400				
 <b>418</b>	M18 x 50 M18 x 70 M18 x 90		●	25 — 700				
 <b>430</b>	M30 x 131 48 x 150		●	60 — 6000				

We reserve the right to make changes • Auswahl\_Ultraschall\_Sensoren\_EN.fm

**ULTRASONIC SENSORS**   
Ultrasound

Operating principle	Operating voltage			Output		Input		Connection		Page				
	Ultrasound throughbeam sensor	Ultrasound retro-reflective sensor	Ultrasound scanners	10 ... 30VDC	12 ... 30VDC	20 ... 30VDC	PNP switching outputs	NPN switching outputs	Teach input		Synchronization input	M8 connector	M12 connector	
			●		●		●	●	●				306	Inductive Switches
	●	●	●			●	●	●		●		●	298	Forked Sensors
	●			●			●	●				●	302	Special Sensors
			●		●		●	●	●			●	312	Fiber Optic Sensors
			●			●	●		●			●	316	Light Curtains
			●			●	●		●			●	322	Protective Sensors

Standard Sensors

Measuring Sensors

**Ultrasound Sensors**

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

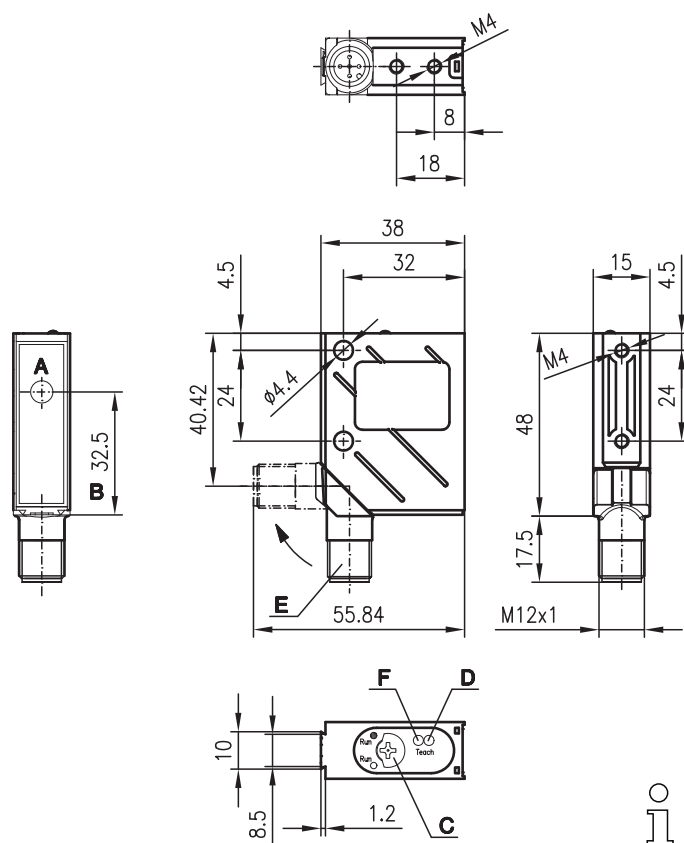
Light Curtains

Protective Sensors


Ex Sensors

# OVERVIEW OF SWITCHING ULTRASONIC SENSORS







## Dimensioned drawing






- A** Active surface
- B** Ultrasonic axis
- C** Operational control
- D** Green LED
- E** 90° turning connector
- F** Yellow LED

 Further details can be found in the respective data sheet.

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<b>8</b> Page 298	<b>18</b> Page 302	<b>420</b> Page 306	<b>412</b> Page 312	<b>418</b> Page 316	<b>430</b> Page 322

## 8 SERIES

Ultrasonic Sensors	Operating range	Page
 <b>Ultrasonic throughbeam sensor</b>	0 <input type="text" value="800"/> mm	300
 <b>Ultrasonic retro-reflective sensor</b>	0 <input type="text" value="400"/> mm	300
 <b>Ultrasonic scanner</b>	0 <input type="text" value="400"/> mm	300

### Other 8 Series products:

 Optical sensors	LSR(L) 8, PRK(L) 8, (V/H)RTR 8	60
 Optical distance sensors	LSU 8, RKU 8, HRTU 8	236
 Luminescence scanners	LRT 8	456

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	20 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready/Teach-in
	Yellow LED	Switching output/error
<b>Mechanical data</b>	Housing	Metal
	Weight	70g
<b>Environmental data</b>	Ambient temperature (operation/storage)	-25°C ... +70°C / -40°C ... +85°C
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2

Mounting systems for this series can be found from page 514 onwards



### Features

- Color and transmission independent detection of objects, even in wet and foggy environment
- Switching behavior largely independent of surface properties
- Teach function for adjustment
- M12 turning connector



### Optical Sensor ABC

- Ultrasonic sensors Page 565

# SWITCHING ULTRASONIC SENSORS

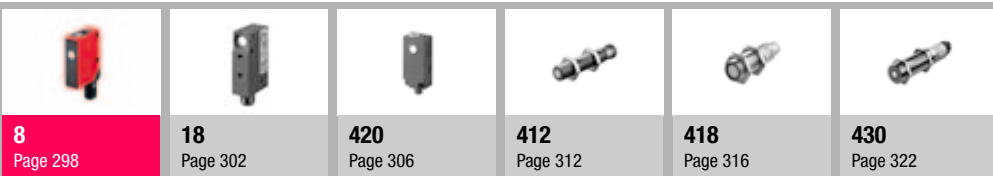
Part description Part No.:	Operating range [mm] <input type="checkbox"/> <sup>1)</sup>	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic throughbeam sensors</b>		▶ = Transmitter ◀ = Receiver				
▶ LSSU 8 - S12    50038914 ◀ LSEU 8 / 24 - S12    50038915	<input type="text" value="0"/> <input type="text" value="800"/>	20 ... 30VDC	300kHz	250Hz	1 PNP 1 NPN	Object detected
<b>Ultrasonic retro-reflective sensors</b>						
<b>RKU 8 / 24 - 400 - S12</b> 50038913	<input type="text" value="0"/> <input type="text" value="400"/>	20 ... 30VDC	300kHz	8Hz	1 PNP 1 NPN	Object detected/ not detected reversible
<b>Ultrasonic scanners with background suppression</b>						
<b>HRTU 8 / 24 - 400 - S12</b> 50038912	<input type="text" value="50"/> <input type="text" value="400"/>	20 ... 30VDC	300kHz	8Hz	1 PNP 1 NPN	Object detected/ not detected reversible

1) Over complete temperature range, measurement object ≥ 20x20mm<sup>2</sup>

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**Accessories / connection cables** More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC



**8 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

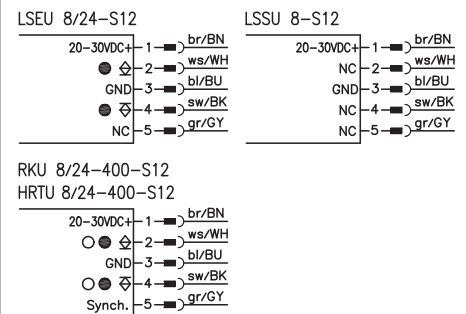
Connection	Repeatability	Option	Accessories
M12 connector		1, 4	a, b, c, d
M12 connector	± 1 mm	2, 3	e, f
M12 connector	± 1 mm	2, 3	e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

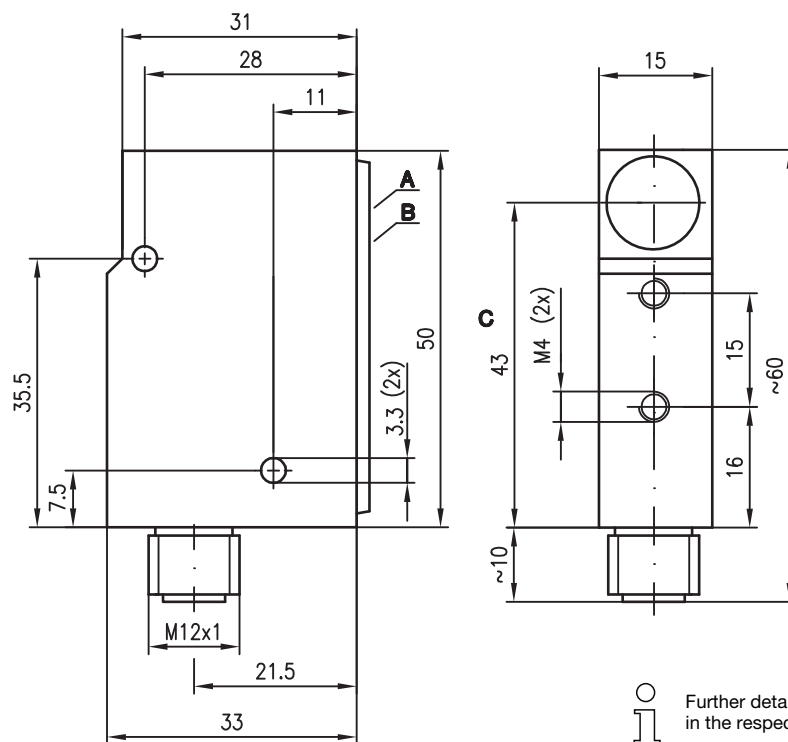



**Options**

- 1 Sensitivity adjustment via step switch
- 2 Teach-in via step switch
- 3 Synchronization input
- 4 UL approval

# OVERVIEW OF SWITCHING ULTRASONIC SENSORS

## Dimensioned drawing



 Further details can be found in the respective data sheet.

- A** Indicator diodes
- B** Sensitivity adjustment
- C** Center of ultrasonic transducer

We reserve the right to make changes • US\_18\_Overview\_EN.fm



**8**  
Page 298



**18**  
Page 302



**420**  
Page 306



**412**  
Page 312





**418**  
Page 316



**430**  
Page 322



## 18 SERIES

Ultrasonic Sensors	Operating range	Page
 <b>Ultrasonic throughbeam sensor</b>		304

### Other 18 Series products:

	Retro-reflective sensors	RK(R) 18, (I)PRK 18	72
	AS-interface sensors	IPRK 18	510



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
<b>Mechanical data</b>	Housing	Metal
	Weight	70g each
<b>Environmental data</b>	Ambient temperature (operation/storage)	0°C ... +70°C -40°C ... +85°C
	VDE safety class	III
	Protection class	IP 65
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 517 onwards

### Features

- Color and transmission independent detection of objects, even in humid and foggy environment
- Optimized for air transport systems
- Metal housing
- Insensitive to dust
- Detection of narrow gaps



### Optical Sensor ABC

- Ultrasonic sensors Page 565







## SWITCHING ULTRASONIC SENSORS

Part description Part No.:	Operating range [mm] <input type="checkbox"/> <sup>1)</sup>	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic throughbeam sensors</b>		▶ = Transmitter ◀ = Receiver				
<b>LSSU 18 - S12</b> 50103365 <b>LSEU 18 / 24 - S12</b> 50103364	<input type="text" value="0"/> <input type="text" value="650"/>	10 ... 30VDC	300kHz	100Hz	1 PNP 1 NPN	Object detected

1) Over complete temperature range, measurement object ≥ 20x20mm<sup>2</sup>

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC

					
<b>8</b> Page 298	<b>18</b> Page 302	<b>420</b> Page 306	<b>412</b> Page 312	<b>418</b> Page 316	<b>430</b> Page 322

**18 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

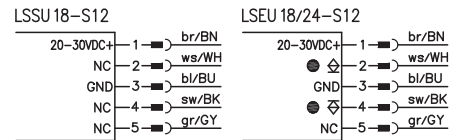
Connection	Repeatability	Option	Accessories
M12 connector		1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



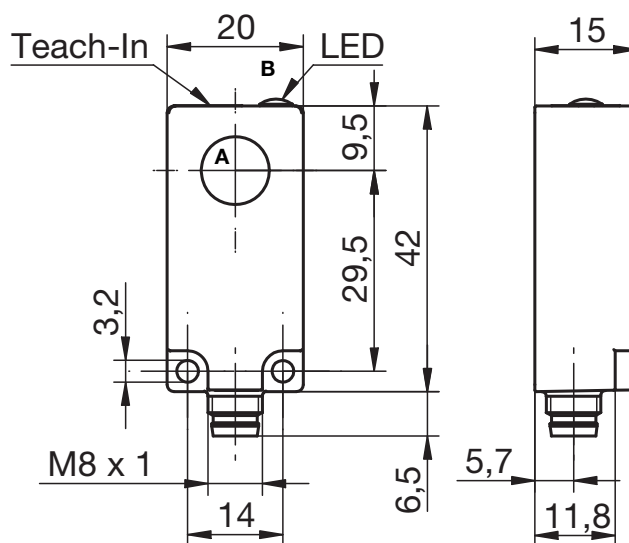
**Options**

- 1 Sensitivity adjustment via step switch
- 2 IP 65 metal housing
- 3 Bottle counting in the air conveyor
- 4 UL approval

[www.leuze.com/ultrasonics/](http://www.leuze.com/ultrasonics/)

## OVERVIEW OF SWITCHING ULTRASONIC SENSORS

### Dimensioned drawing



Further details can be found in the respective data sheet.

- A** Active surface
- B** Green indicator diode



**8**  
Page 298



**18**  
Page 302



**420**  
Page 306



**412**  
Page 312




**418**  
Page 316



**430**  
Page 322

# HRTU 420



Ultrasonic Sensors	Operating range	Page
 <b>Ultrasonic scanner HRTU 420</b>	10 1000 mm	308



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	12 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Output current	$\leq 200\text{mA}$
<b>Indicators</b>	Green LED	Switching/teach state
<b>Mechanical data</b>	Housing	Plastic (PE)
	Weight	Approx. 10g
<b>Environmental data</b>	Ambient temperature (operation/storage)	-10°C ... +60°C / -40°C ... +85°C
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508

**Features**

- Sensors in cubic plastic housing with protection class IP 67
- Measurement range up to 1000mm
- Various opening angles and sound cone geometries
- Switching behavior largely independent of surface properties
- Precise switching point adjustment through teach button or via a cable
- Protection against erroneous operation by self-locking teach button

Optical Sensor ABC	
● Ultrasonic sensors	Page 565

# SWITCHING ULTRASONIC SENSORS

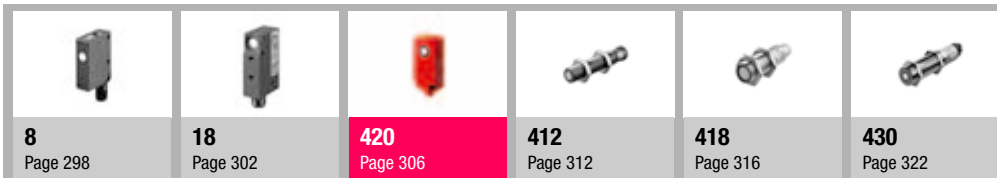
Part description Part No.:	Scanning range [mm]	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic scanners with background suppression</b>						
<b>HRTU 420 / 4NO.2 - S - S8</b> 50113992	10 200	12 ... 30VDC	380kHz	50Hz	1 PNP	NO (normally open)
<b>HRTU 420 / 4NC.2 - S - S8</b> 50113989	10 200	12 ... 30VDC	380kHz	50Hz	1 PNP	NC (normally closed)
<b>HRTU 420 / 2NO.2 - S - S8</b> 50113986	10 200	12 ... 30VDC	380kHz	50Hz	1 NPN	NO (normally open)
<b>HRTU 420 / 2NC.2 - S - S8</b> 50113983	10 200	12 ... 30VDC	380kHz	50Hz	1 NPN	NC (normally closed)
<b>HRTU 420 / 4NO.2 - S8</b> 50113991	40 400	12 ... 30VDC	290kHz	20Hz	1 PNP	NO (normally open)
<b>HRTU 420 / 4NC.2 - S8</b> 50113988	40 400	12 ... 30VDC	290kHz	20Hz	1 PNP	NC (normally closed)
<b>HRTU 420 / 2NO.2 - S8</b> 50113985	40 400	12 ... 30VDC	290kHz	20Hz	1 NPN	NO (normally open)
<b>HRTU 420 / 2NC.2 - S8</b> 50113982	40 400	12 ... 30VDC	290kHz	20Hz	1 NPN	NC (normally closed)

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104529	K - D M8W - 4P - 10m - PVC	Connection cable 10000mm, M8 angular, 4-pin, PVC
f 50104528	K - D M8A - 4P - 10m - PVC	Connection cable 10000mm, M8 axial, 4-pin, PVC

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**8**  
Page 298

**18**  
Page 302

**420**  
Page 306

**412**  
Page 312

**418**  
Page 316

**430**  
Page 322

**HRTU 420**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

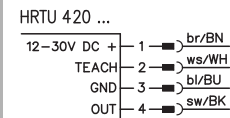
Connection	Repeatability	Option	Accessories
M8 connector	≤ 0.5mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 4	a, b, c, d, e, f
M8 connector	≤ 0.5mm	1, 2, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**







**Options**

- 1 Teach-in via teach input or teach button
- 2 Automatic locking of the teach button
- 3 Especially narrow sound cone
- 4 UL approval

[www.leuze.com/ultrasonics/](http://www.leuze.com/ultrasonics/)

## SWITCHING ULTRASONIC SENSORS

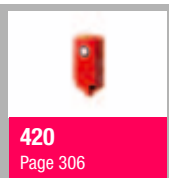
Part description Part No.:	Scanning range [mm]	Operating	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic scanners with background suppression</b>						
<b>HRTU 420 / 4NO.2 - L - S8</b> 50113990		12 ... 30VDC	240kHz	10Hz	1 PNP	NO (normally open)
<b>HRTU 420 / 4NC.2 - L - S8</b> 50113987		12 ... 30VDC	240kHz	10Hz	1 PNP	NC (normally closed)
<b>HRTU 420 / 2NO.2 - L - S8</b> 50113984		12 ... 30VDC	240kHz	10Hz	1 NPN	NO (normally open)
<b>HRTU 420 / 2NC.2 - L - S8</b> 50113981		12 ... 30VDC	240kHz	10Hz	1 NPN	NC (normally closed)

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104529	K - D M8W - 4P - 10m - PVC	Connection cable 10000mm, M8 angular, 4-pin, PVC
f 50104528	K - D M8A - 4P - 10m - PVC	Connection cable 10000mm, M8 axial, 4-pin, PVC





**420 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

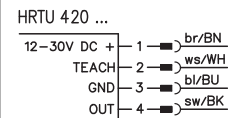
Connection	Repeatability	Option	Accessories
M8 connector	≤ 0.5 mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5 mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5 mm	1, 2, 3, 4	a, b, c, d, e, f
M8 connector	≤ 0.5 mm	1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

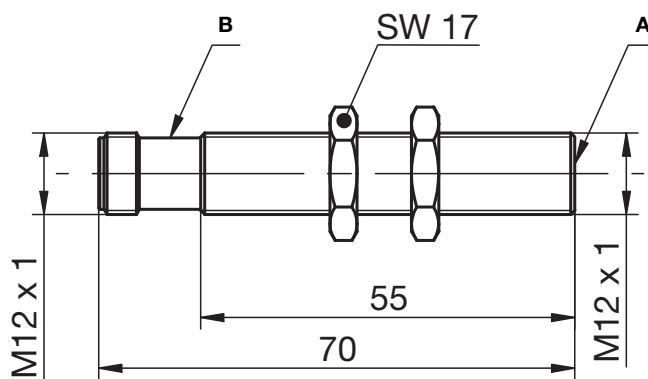


**Options**

- 1 Teach-in via teach input or teach button
- 2 Automatic locking of the teach button
- 3 Particularly wide sound cone
- 4 UL approval

## OVERVIEW OF SWITCHING ULTRASONIC SENSORS

### Dimensioned drawing



Further details can be found in the respective data sheet.

- A** Active surface
- B** Green indicator diode



**8**  
Page 298



**18**  
Page 302



**420**  
Page 306



**412**  
Page 312





**418**  
Page 316



**430**  
Page 322

# HRTU 412



Ultrasonic Sensors	Operating range	Page
 <b>Ultrasonic scanner HRTU 412</b>		314



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	12 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}$
	Output current	$\leq 200\text{mA}$
<b>Indicators</b>	Green LED	Switching/teach state
<b>Mechanical data</b>	Housing	Nickel-faced brass
	Weight	Approx. 30g
<b>Environmental data</b>	Ambient temperature (operation/storage)	-10°C ... +60°C / -40°C ... +85°C
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508

**Features**

- Sensors in M12 cylindrical housing
- Operating ranges up to 400mm
- Various opening angles and sound cone geometries
- Switching behavior largely independent of surface properties
- Precise switching point adjustment through teach-in via a cable

Optical Sensor ABC	
● Ultrasonic sensors	Page 565

# SWITCHING ULTRASONIC SENSORS

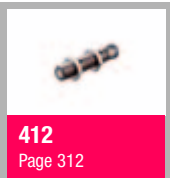
Part description Part No.:	Scanning range [mm]	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic scanners with background suppression</b>						
<b>HRTU 412 / 4NO.2 - S - S12</b> 50113993	10 200	12 ... 30VDC	380kHz	50Hz	1 PNP	NO (normally open)
<b>HRTU 412 / 4NC.2 - S - S12</b> 50113995	10 200	12 ... 30VDC	380kHz	50Hz	1 PNP	NC (normally closed)
<b>HRTU 412 / 2NO.2 - S - S12</b> 50113997	10 200	12 ... 30VDC	380kHz	50Hz	1 NPN	NO (normally open)
<b>HRTU 412 / 2NC.2 - S - S12</b> 50113999	10 200	12 ... 30VDC	380kHz	50Hz	1 NPN	NC (normally closed)
<b>HRTU 412 / 4NO.2 - S12</b> 50113994	40 400	12 ... 30VDC	290kHz	20Hz	1 PNP	NO (normally open)
<b>HRTU 412 / 4NC.2 - S12</b> 50113996	40 400	12 ... 30VDC	290kHz	20Hz	1 PNP	NC (normally closed)
<b>HRTU 412 / 2NO.2 - S12</b> 50113998	40 400	12 ... 30VDC	290kHz	20Hz	1 NPN	NO (normally open)
<b>HRTU 412 / 2NC.2 - S12</b> 50114000	40 400	12 ... 30VDC	290kHz	20Hz	1 NPN	NC (normally closed)

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## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**412 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

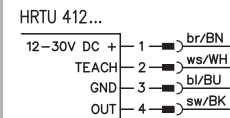
Connection	Repeatability	Option	Accessories
M12 connector	≤ 0.5mm	1, 2, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 2, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 2, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 2, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 3	a, b, c, d, e, f
M12 connector	≤ 0.5mm	1, 3	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

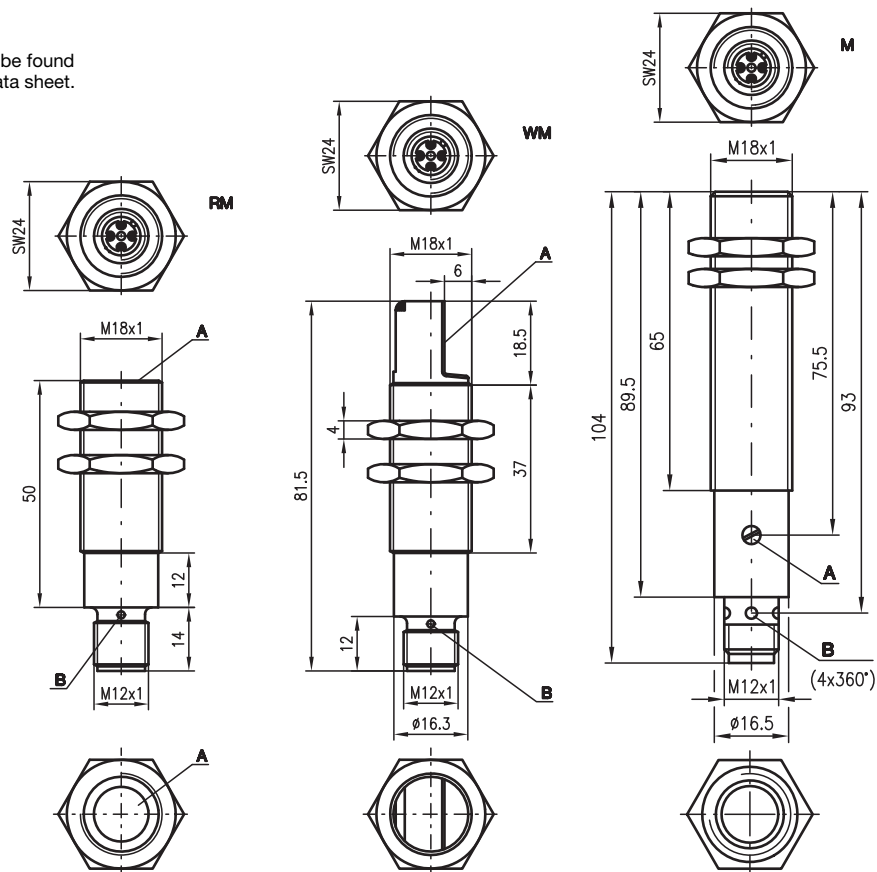
- 1 Teach-in via teach input
- 2 Especially narrow sound cone
- 3 UL approval

# OVERVIEW OF SWITCHING ULTRASONIC SENSORS

## Dimensioned drawing









Further details can be found in the respective data sheet.






- A** Active surface
- B** Indicator diode

We reserve the right to make changes • US\_418\_Overview\_EN.fm

					
<b>8</b> Page 298	<b>18</b> Page 302	<b>420</b> Page 306	<b>412</b> Page 312	<b>418</b> Page 316	<b>430</b> Page 322

# HRTU 418

Ultrasonic Sensors	Operating range	Page
 <b>Ultrasonic scanner HRTU 418</b>		318



Other 418 Series products:		
 Ultrasonic distance sensors	HRTU 418	270



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	20 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 60\text{mA}$
	Output current	$\leq 150\text{mA}$
<b>Indicators</b>	Yellow LED	Switching state/teach-in
<b>Mechanical data</b>	Housing	Nickel-faced brass
	Weight	50g
<b>Environmental data</b>	Ambient temperature (operation/storage)	-25°C ... +70°C / -40°C ... +85°C
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508

**Features**

- Color and transmission independent detection of objects
- Switching behavior largely independent of surface properties
- Distance teachable
- Small construction

Optical Sensor ABC	
● Ultrasonic sensors	Page 565

[www.leuze.com/ultrasonics/](http://www.leuze.com/ultrasonics/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# SWITCHING ULTRASONIC SENSORS

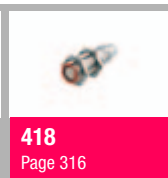
Part description Part No.:	Operating range <sup>1)</sup> [mm] <input type="checkbox"/>	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic scanners with background suppression, short construction</b>						
<b>HRTU 418 RM/P - 5020 - 200 - S12</b> 50038635	<input type="checkbox"/> 30 ... 200	20 ... 30VDC	400kHz	10Hz	1 PNP	Object detected
<b>HRTU 418 WM/P - 5020 - 200 - S12</b> 50038636	<input type="checkbox"/> 30 ... 200	20 ... 30VDC	400kHz	10Hz	1 PNP	Object detected
<b>HRTU 418 RM/P - 5220 - 400 - S12</b> 50109016	<input type="checkbox"/> 25 400	20 ... 30VDC	300kHz	10Hz	2 PNP	Object detected
<b>HRTU 418 RM/P - 3020 - 700 - S12</b> 50038639	<input type="checkbox"/> 100 700	20 ... 30VDC	200kHz	5Hz	1 PNP	Object detected
<b>HRTU 418 WM/P - 3020 - 700 - S12</b> 50038640	<input type="checkbox"/> 100 700	20 ... 30VDC	200kHz	5Hz	1 PNP	Object detected
<b>HRTU 418 RM/P - 5220 - 700 - S12</b> 50109018	<input type="checkbox"/> 50 700	20 ... 30VDC	200kHz	5Hz	2 PNP	Object detected

1) Over complete temperature range, measurement object  $\geq 20 \times 20 \text{mm}^2$

We reserve the right to make changes • US\_418\_2\_EN.fm

## Accessories / connection cables More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC





**418 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

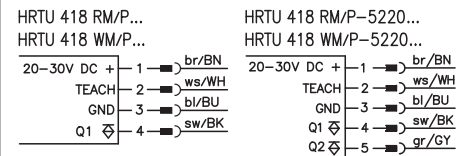
Connection	Repeatability	Option	Accessories
M12 connector	± 1 mm	1, 3	a, b, c, d
M12 connector	± 1 mm	1, 2, 3	a, b, c, d
M12 connector	± 1 mm	1, 3	e, f
M12 connector	± 1 mm	1, 3	a, b, c, d
M12 connector	± 1 mm	1, 2, 3	a, b, c, d
M12 connector	± 1 mm	1, 3	e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in via teach input
- 2 90° ultrasonic head (radial sound emission)
- 3 UL approval

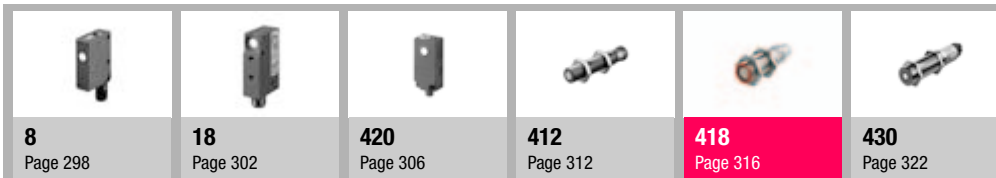
## SWITCHING ULTRASONIC SENSORS

Part description Part No.:	Operating range [mm]	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic scanners with background suppression, long construction</b>						
<b>HRTU 418 M/P - 5010 - 300 - S12</b> 50036257	<input type="text" value="50 ... 300"/> <sup>1)</sup>	20 ... 30VDC	400kHz	5Hz	1 PNP	Object detected
<b>HRTU 418 M/P - 3010 - 1000 - S12</b> 50036258	<input type="text" value="150 ... 1000"/> <sup>1)</sup>	20 ... 30VDC	200kHz	4Hz	1 PNP	Object detected

1) Over complete temperature range, measurement object  $\geq 10 \times 10 \text{mm}^2$

We reserve the right to make changes • US\_418\_3\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**418 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

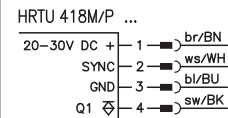
Connection	Repeatability	Option	Accessories
M12 connector	± 1 mm	1, 2, 3, 4	a, b, c, d, e, f
M12 connector	± 2 mm	1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



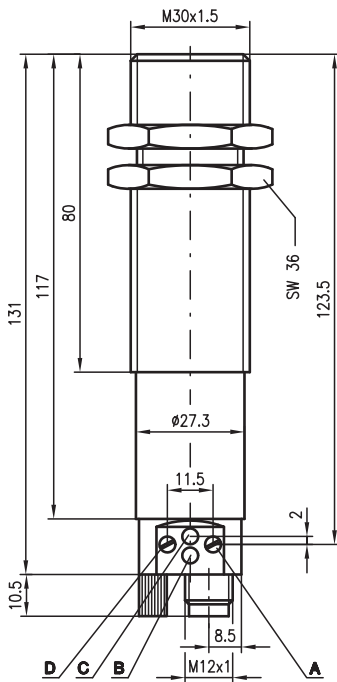
**Options**

- 1 Configurable via programming unit and software
- 2 Sensor synchronization via SYNC input
- 3 Configurable multiplex operation
- 4 UL approval

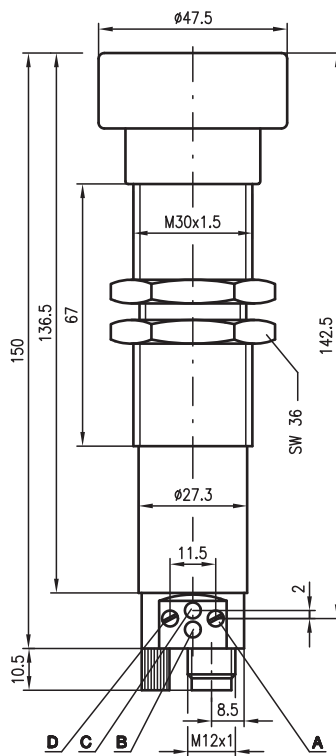
# OVERVIEW OF SWITCHING ULTRASONIC SENSORS

## Dimensioned drawing

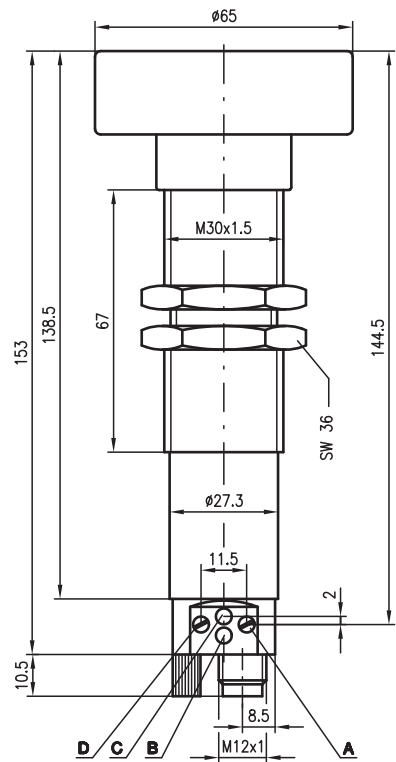
**VRTU 430...-300-S12**  
**VRTU 430...-1300-S12**




**VRTU 430...-3000-S12**









**VRTU 430...-6000-S12**




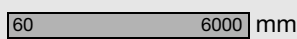
- A** Setting of cut-out point Q1
- B** Indicator diode Q2
- C** Indicator diode Q1
- D** Setting of cut-in point Q1/cut-out point Q2

 Further details can be found in the respective data sheet.

We reserve the right to make changes • US\_430\_Overview\_EN.fm

					
<b>8</b> Page 298	<b>18</b> Page 302	<b>420</b> Page 306	<b>412</b> Page 312	<b>418</b> Page 316	<b>430</b> Page 322

## VRTU 430

Ultrasonic Sensors	Operating range	Page
 <b>Ultrasonic scanner VRTU 430</b>	 60 6000 mm	324

### Other 430 Series products:

 Ultrasonic distance sensors	VRTU 430	274
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### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	20 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 50\text{mA}$
	Output current	$\leq 300\text{mA}$
<b>Indicators</b>	Yellow LED	Switching output
	Flashing yellow LED	Programming error
<b>Mechanical data</b>	Housing	Metal (CuZn)
	Weight	210g ... 380g
<b>Environmental data</b>	Ambient temperature (operation/storage)	-25°C ... +70°C / -40°C ... +85°C
	VDE safety class	III
	Protection class	IP 65
	Standards applied	IEC 60947-5-2

### Features

- Ideal for detection of levels of liquids, bulk materials, transparent media, ...
- Distance information largely independent of surface properties
- PC-configuration software for configuring sensor and switching output
- Up to 10 devices can be synchronized via the SYNC input
- Separate adjustment of start and end of switching range (Q1) via potentiometer and PC



### Optical Sensor ABC

- Ultrasonic distance sensors Page 565

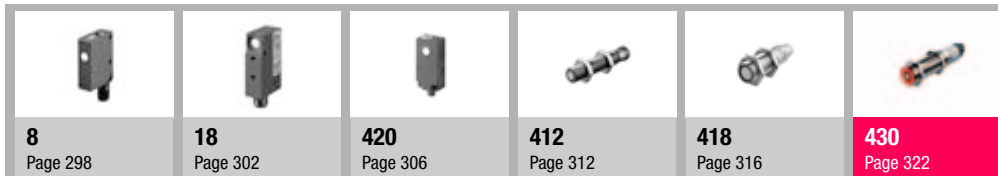
## SWITCHING ULTRASONIC SENSORS

Part description Part No.:	Operating range [mm] <input type="checkbox"/>	Operating voltage	Ultrasonic frequency	Switching frequency	Output	Switching
<b>Ultrasonic scanners</b>						
<b>VRTU 430 M/P - 5110 - 300 - S12</b> 50036261	<input type="checkbox"/> 60 ... 300 <sup>1)</sup>	20 ... 30VDC	400kHz	8Hz	2 PNP	Object detected
<b>VRTU 430 M/P - 3110 - 1300 - S12</b> 50036262	<input type="checkbox"/> 200 ... 1300 <sup>1)</sup>	20 ... 30VDC	200kHz	4Hz	2 PNP	Object detected
<b>VRTU 430 M/P - 2110 - 3000 - S12</b> 50036263	<input type="checkbox"/> 400 3000 <sup>2)</sup>	20 ... 30VDC	120kHz	2Hz	2 PNP	Object detected
<b>VRTU 430 M/P - 1110 - 6000 - S12</b> 50036264	<input type="checkbox"/> 600 6000 <sup>3)</sup>	20 ... 30VDC	80kHz	1Hz	2 PNP	Object detected

- 1) Over complete temperature range, measurement object  $\geq 10 \times 10 \text{mm}^2$   
 2) Over complete temperature range, measurement object  $\geq 50 \times 50 \text{mm}^2$   
 3) Over complete temperature range, measurement object  $\geq 100 \times 100 \text{mm}^2$

We reserve the right to make changes • US\_430\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC



**430 Series**  
Ultrasonic sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

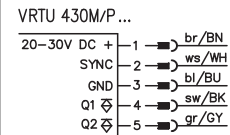
Connection	Repeatability	Option	Accessories
M12 connector	± 0.45mm	1, 2, 3, 4	a, b, c, d, e, f
M12 connector	± 2mm	1, 2, 3, 4	a, b, c, d, e, f
M12 connector	± 5mm	1, 2, 3, 4	a, b, c, d, e, f
M12 connector	± 9mm	1, 2, 3, 4	a, b, c, d, e, f



**Optical Sensor ABC**

- Ultrasonic sensors Page 565
- Connection types Page 568
- Outputs Page 568






**Electrical connection**



**Options**

- 1 Configurable via programming unit and software
- 2 Sensor synchronization via SYNC input
- 3 Configurable multiplex operation
- 4 UL approval

## SERIES SELECTION TABLE

Series	Dimensions in mm (HxWxL)	Typ. scan range limit $S_n$ in mm	Installation		Switching output / function				
			Embedded	Non-embedded	PNP	NPN	NO - normally open	NC - normally closed	
 Series									
 IS 255	5 x 5 x 25	1,5	•		•	•	•	○	
 IS 288	8 x 8 x 50	1,5	•		•	•	•	○	
		2,0	•		•	○	•	•	
		3,0	•		•	○	•	○	
 IS 240	40 x 12 x 26	4,0	•		•	•	•	•	
		8,0		•	•	•	•	•	
 IS 244	40 x 40 x 67 40 x 40 x 120	20,0	•		•	•	•	•	
		40,0		•	•	•	•	•	



# INDUCTIVE SWITCHES

Max. switching frequency	Operating voltage	Connection			Housing material		Protection class		Page
		M8 connector	M12 connector	Cable, 2 m, PVC	Chromium-plated brass	Plastic (PA)	IP 67	IP 69K	
3000Hz	10 ... 30VDC			●	●		●		338
5000Hz	10 ... 30VDC	●		●	●		●		342
3000Hz	10 ... 30VDC	●		●	●		●		
1000Hz	10 ... 30VDC	●		●	●		●		
1400Hz	10 ... 30VDC	●		●		●	●		330
1400Hz	10 ... 30VDC	●		●		●	●		
150Hz	10 ... 30VDC		●	●		●	●		334
150Hz	10 ... 30VDC		●	●		●	●		

○ = on request

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors








Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## SERIES SELECTION TABLE

Series	Dimensions in mm (Ø x L)	Typ. scan range limit S <sub>n</sub> in mm	Installation		Switching output / function			
			Embedded	Non-embedded	PNP	NPN	NO - normally open	NC - normally closed
 <b>IS 204</b>	Ø 4 x 25	1.5	●		●	○	●	○
 <b>IS 205</b>	M5 x 38	1.5	●		●	○	●	○
 <b>IS 206</b>	Ø 6.5 x 35	2.0	●		●	○	●	○
		3.0	●		●	○	●	○
 <b>IS 208</b>	M8 x 45	1.5	●		●	○	●	
		2.0	●		●	●	●	●
		2.5		●	●	○	●	
		4.0		●	●	○	●	○
 <b>IS 212</b>	M12 x 50	2.0	●		●	○	●	
		4.0	●		●	●	●	●
		4.0		●	●	○	●	
		6.0	●		●	○	●	
		6.0	●		●	●	●	○
		8.0		●	●	●	●	○
		10.0		●	●	○	●	
10.0		●	●	○	●	○		
 <b>IS 218</b>	M18 x 50	5.0	●		●	○	●	
		8.0	●		●	●	●	●
		8.0		●	●	○	●	
		10.0	●		●	○	●	
		12.0	●		●	●	●	○
		20.0		●	●	○	●	
20.0		●	●	○	●	○		
 <b>IS 230</b>	M30 x 60	10.0	●		●	○	●	
		15.0		●	●	○	●	
		20.0	●		●	○	●	
		22.0	●		●	●	●	●
		40.0		●	●	○	●	
		40.0		●	●	●	●	○

We reserve the right to make changes •

# INDUCTIVE SWITCHES

Max. switching frequency	Operating voltage	Connection			Housing material		Protection class		Page
		M8 connector	M12 connector	Cable, 2 m, PVC	Chromium-plated brass	Stainless steel	IP 67	IP 69K	
									346
3000Hz	10 ... 30VDC			●		●	●		
									350
3000Hz	10 ... 30VDC	●		●		●	●		
5000Hz	10 ... 30VDC	●		●		●	●		354
1000Hz	10 ... 30VDC			●		●	●		
5000Hz	10 ... 30VDC	●	●	●		●	●		358
5000Hz	10 ... 30VDC	●		●		●	●		
5000Hz	10 ... 30VDC	●	●	●		●	●		
3500Hz	10 ... 30VDC	●		●		●	●		
3000Hz	10 ... 30VDC		●	●	●	●	●		366
2000Hz	10 ... 30VDC		●	●	●	●	●		
2000Hz	10 ... 30VDC		●	●	●	●	●		
800Hz	10 ... 30VDC		●	●		●	●	●	
600Hz	10 ... 30VDC		●	●	●	●	●		
1500Hz	10 ... 30VDC		●	●	●	●	●		
400Hz	10 ... 30VDC		●	●		●	●	●	
400Hz	10 ... 30VDC		●	●	●	●	●		
2000Hz	10 ... 30VDC		●	●	●	●	●		376
1500Hz	10 ... 30VDC		●	●	●	●	●		
2000Hz	10 ... 30VDC		●	●	●	●	●		
200Hz	10 ... 30VDC		●	●		●	●	●	
500Hz	10 ... 30VDC		●	●	●	●	●		
200Hz	10 ... 30VDC		●	●		●	●	●	
200Hz	10 ... 30VDC		●	●	●	●	●		
1200Hz	10 ... 30VDC		●	●	●	●	●		386
700Hz	10 ... 30VDC		●	●	●	●	●		
100Hz	10 ... 30VDC		●	●		●	●	●	
200Hz	10 ... 30VDC		●	●	●	●	●		
100Hz	10 ... 30VDC		●	●		●	●	●	
90Hz	10 ... 30VDC		●	●	●	●	●		

1) Food+Beverage version

○ = on request

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

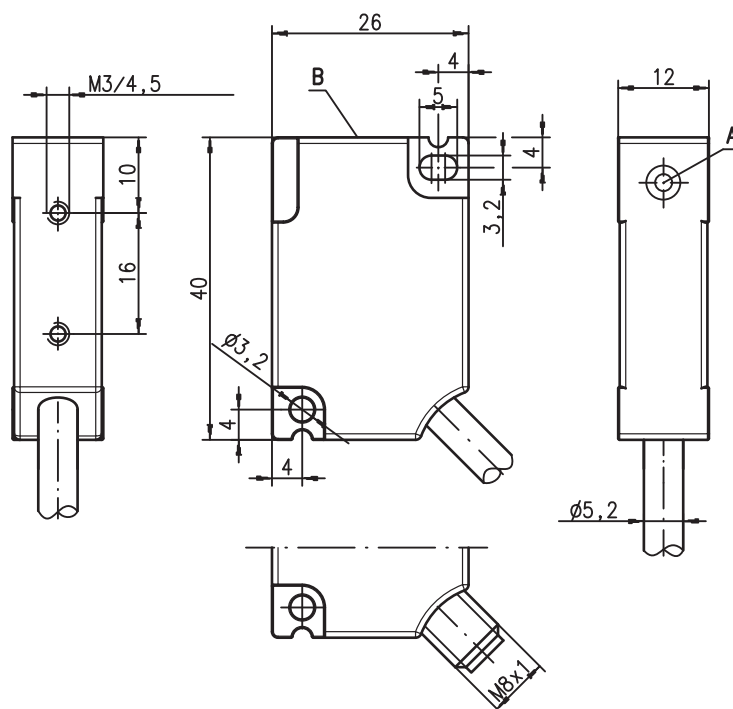
Light Curtains

Protective Sensors


Ex Sensors

# OVERVIEW










## Dimensioned drawing





- A** Active surface
- B** Yellow indicator diode

 Further details can be found in the respective data sheet.

We reserve the right to make changes • BR240\_Overview\_EN.fm

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

## IS 240 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 <span style="border: 1px solid black; padding: 0 2px;">4</span> mm	332
 <b>Non-embedded</b>	0 <span style="border: 1px solid black; padding: 0 2px;">8</span> mm	332



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$
	Output current $I_L$	$\leq 250\text{mA}$
	Residual current $I_r$	$\leq 10\mu\text{A}$
	Voltage drop $U_d$	$\leq 2.5\text{V}$
	Hysteresis H of $S_r$	$\leq 5\%$
	Repeatability	$\leq 10\%$
<b>Indicators</b>	Yellow LED	Switching state
<b>Mechanical data</b>	Standard target (Fe360)	12 x 12mm <sup>2</sup> (24 x 24mm <sup>2</sup> )
	Weight (connector/cable)	Approx. 18g/108g
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C
	Protective circuit	Polarity reversal protection, short circuit protection
	Standards applied	IEC 60947-5-2, UL 508
	Electromagnetic compatibility	IEC 61000-4-2 air 8kV IEC 61000-4-3 10V/m IEC 61000-4-4 2kV
<b>Mounting systems for this series can be found from page 523 onwards</b>		

### Features

- Slim construction 40 x 12mm
- Plastic housing
- Integrated short circuit and polarity reversal protection
- LED for switching state



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches 40 x 12, embedded installation</b>					
<b>IS 240 PP/44 - 4E0</b> 50114207		1400Hz	Embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>IS 240 PP/44 - 4E0 - S8.4</b> 50114208		1400Hz	Embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>IS 240 PP/22 - 4E0</b> 50114203		1400Hz	Embedded	2xNPN	NO / NC complementary (make-contact/break-contact)
<b>IS 240 PP/22 - 4E0 - S8.4</b> 50114204		1400Hz	Embedded	2xNPN	NO / NC complementary (make-contact/break-contact)
<b>Inductive switches 40 x 12, non-embedded installation</b>					
<b>IS 240 PP/44 - 8N0</b> 50114209		1400Hz	Non-embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>IS 240 PP/44 - 8N0 - S8.4</b> 50114210		1400Hz	Non-embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>IS 240 PP/22 - 8N0</b> 50114205		1400Hz	Non-embedded	2xNPN	NO / NC complementary (make-contact/break-contact)
<b>IS 240 PP/22 - 8N0 - S8.4</b> 50114206		1400Hz	Non-embedded	2xNPN	NO / NC complementary (make-contact/break-contact)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104583	D M8A - 4P - SK	Cable socket, M8 axial, 4-pin, user-configurable

We reserve the right to make changes • BR240\_1\_EN.fm

<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 240 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

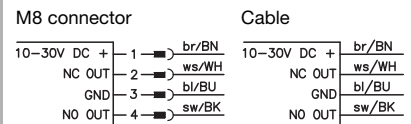
Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	PA / PA	IP 67	
M8 connector	PA / PA	IP 67	a, b, c, d, e
Cable, 2m, PVC	PA / PA	IP 67	
M8 connector	PA / PA	IP 67	a, b, c, d, e
Cable, 2m, PVC	PA / PA	IP 67	
M8 connector	PA / PA	IP 67	a, b, c, d, e
Cable, 2m, PVC	PA / PA	IP 67	
M8 connector	PA / PA	IP 67	a, b, c, d, e
Cable, 2m, PVC	PA / PA	IP 67	
M8 connector	PA / PA	IP 67	a, b, c, d, e



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

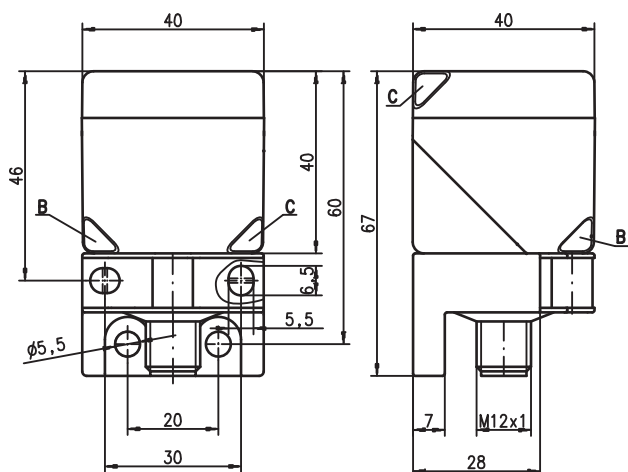


[www.leuze.com/inductiv/](http://www.leuze.com/inductiv/)

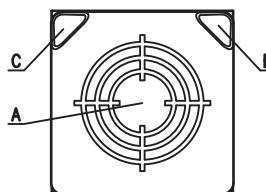
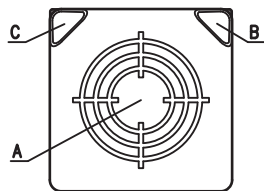
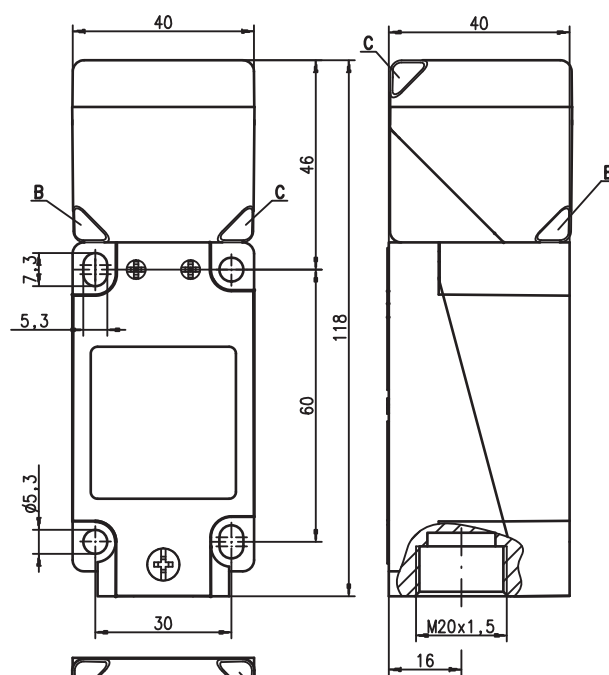
# OVERVIEW

## Dimensioned drawing


Types with M12 connector











Types with terminals



- A** Active surface
- B** Yellow indicator diode
- C** Green indicator diode





 Further details can be found in the respective data sheet.

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386



## IS 244 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	 mm	336
 <b>Non-embedded</b>	 mm	336



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$
	Output current $I_L$	$\leq 200\text{mA}$
	Residual current $I_r$	$\leq 500\mu\text{A}$
	Voltage drop $U_d$	$\leq 2.0\text{V}$
	Hysteresis H of $S_r$	$\leq 5\%$
	Repeatability	$\leq 10\%$
<b>Indicators</b>	2x green LED	Ready to operate
	2x yellow LED	Switching state
<b>Mechanical data</b>	Standard target (Fe360)	60 x 60mm <sup>2</sup> (120 x 120mm <sup>2</sup> )
	Weight (connector/cable)	Approx. 130g/225g
<b>Environmental data</b>	Ambient temperature	-25°C ... +85°C
	Protective circuit	Polarity reversal protection, short circuit protection
	Standards applied	IEC 60947-5-2, UL 508
	Electromagnetic compatibility	IEC 61000-4-2 air 8kV IEC 61000-4-3 10V/m IEC 61000-4-4 2kV
<b>Mounting systems for this series can be found from page 523 onwards</b>		

### Features

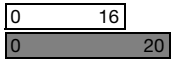
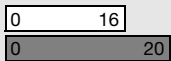
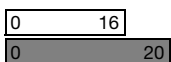
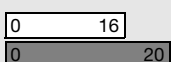
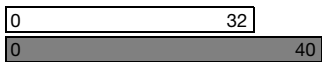
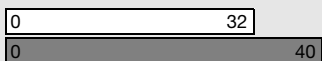
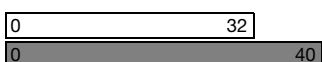

- **Classic construction 40 x 40mm**
- **Plastic housing**
- **Connection via M12 connector or terminals**
- **Integrated short circuit and polarity reversal protection**
- **LED for switching state**



### Inductive Switch

- **Functionality** P. 574
- **Outputs / Switching functions** P. 575
- **Mounting / Installation** P. 576
- **Characteristic values** P. 577

# INDUCTIVE SWITCHES












Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches 40 x 40, embedded installation</b>					
<b>IS 244 PP/44 - 20E - TB.4</b> 50114213		150Hz	Embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>ISS 244 PP/44 - 20E - S12</b> 50114217		150Hz	Embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>IS 244 PP/22 - 20E - TB.4</b> 50114211		150Hz	Embedded	2xNPN	NO / NC complementary (make-contact/break-contact)
<b>ISS 244 PP/22 - 20E - S12</b> 50114215		150Hz	Embedded	2xNPN	NO / NC complementary (make-contact/break-contact)
<b>Inductive switches 40 x 40, non-embedded installation</b>					
<b>IS 244 PP/44 - 40N - TB.4</b> 50114214		150Hz	Non-embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>ISS 244 PP/44 - 40N - S12</b> 50114218		150Hz	Non-embedded	2x PNP	NO / NC complementary (make-contact/break-contact)
<b>IS 244 PP/22 - 40N - TB.4</b> 50114212		150Hz	Non-embedded	2xNPN	NO / NC complementary (make-contact/break-contact)
<b>ISS 244 PP/22 - 40N - S12</b> 50114216		150Hz	Non-embedded	2xNPN	NO / NC complementary (make-contact/break-contact)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	IS 255 Page 338	IS 288 Page 342	IS 204 Page 346	IS 205 Page 350	IS 206 Page 354	IS 208 Page 358	IS 212 Page 366	IS 218 Page 376	IS 230 Page 386

**IS 244 SERIES**

Inductive switches



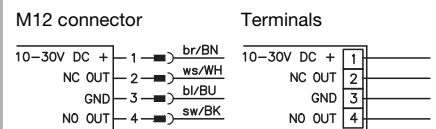
Connection	Material housing / active surface	Protection class	Accessories
Terminals	PA / PA	IP 67 IP 69K	
M12 connector	PA / PA	IP 67 IP 69K	a, b, c, d, e
Terminals	PA / PA	IP 67 IP 69K	
M12 connector	PA / PA	IP 67 IP 69K	a, b, c, d, e
Terminals	PA / PA	IP 67 IP 69K	
M12 connector	PA / PA	IP 67 IP 69K	a, b, c, d, e
Terminals	PA / PA	IP 67 IP 69K	
M12 connector	PA / PA	IP 67 IP 69K	a, b, c, d, e
Terminals	PA / PA	IP 67 IP 69K	
M12 connector	PA / PA	IP 67 IP 69K	a, b, c, d, e



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**



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Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

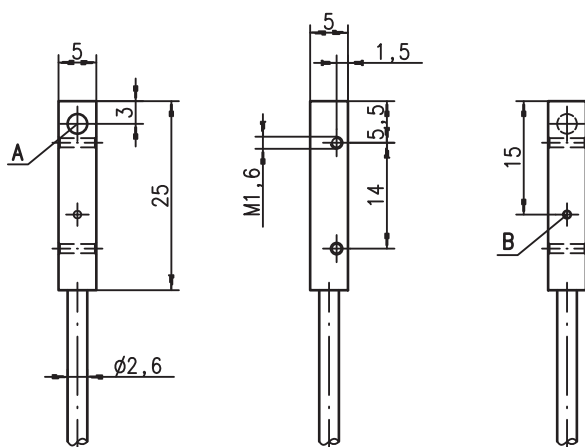
Light Curtains

Protective Sensors


Ex Sensors

# OVERVIEW








## Dimensioned drawing




- A** Active surface
- B** Yellow indicator diode

 Further details can be found in the respective data sheet.

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

## IS 255 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 1.5 mm	340



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	$\leq 10\%$	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 2\%$	
<b>Indicators</b>	Yellow LED	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	5 x 5 mm <sup>2</sup>	
	Weight	Approx. 34g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1 kV
		IEC 61000-4-2	Level 2
	IEC 61000-4-3	Level 3	
	IEC 61000-4-4	Level 3	

Mounting systems for this series can be found from page 523 onwards

### Features

- Slim and short 5 x 5mm cubical metal housing
- Chromium-plated brass housing
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains












Protective Sensors

Ex Sensors

## INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches 5 x 5, embedded installation</b>					
<b>IS 255 MP/4NO - 1E5</b> 50113209	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	3000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 255 MP/2NO - 1E5</b> 50113210	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	3000Hz	Embedded	1 x NPN	NO (normally open)

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 255 SERIES**

Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PUR	Brass, chromium-plated / PA66	IP 67	
Cable, 2m, PUR	Brass, chromium-plated / PA66	IP 67	



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

Cable

10-30V DC +	br/BN
GND	bl/BU
OUT	sw/BK

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

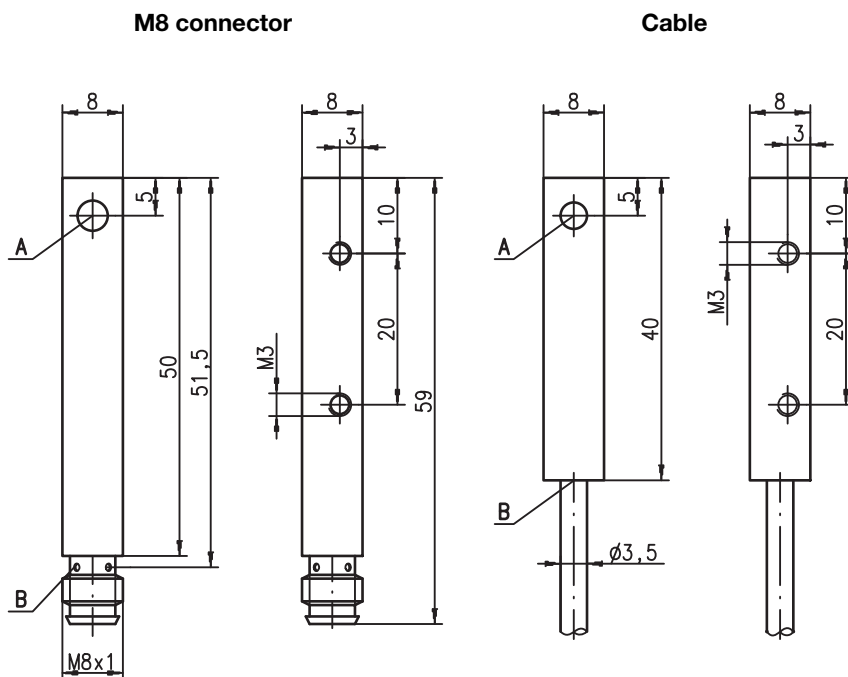
Protective Sensors

Ex Sensors


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# OVERVIEW









## Dimensioned drawing



- A** Active surface
- B** Yellow indicator diode


 Further details can be found in the respective data sheet.

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386



## IS 288 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 3 mm	344



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	$\leq 5\% / \leq 10\%$	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 2\% / 5\%$	
<b>Indicators</b>	Yellow LED	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	8 x 8 (9 x 9)mm <sup>2</sup>	
	Weight (connector/cable)	Approx. 15g/45g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1kV
		IEC 61000-4-2	Level 3
	IEC 61000-4-3	Level 3	
	IEC 61000-4-4	Level 3	

Mounting systems for this series can be found from page 523 onwards

### Features

- Slim and short 8 x 8mm cubical metal housing
- Nickel-plated brass housing
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors












Ex Sensors

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches 8 x 8, embedded installation</b>					
<b>IS 288 MP/4NO - 1E5 - S8.3</b> 50112886	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 288 MP/4NO - 1E5</b> 50112885	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 288 MP/2NO - 1E5</b> 50113208	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x NPN	NO (normally open)
<b>IS 288 MP/4NO - 2E0 - S8.3</b> 50112888	<input type="checkbox"/> 0 1.6 <input checked="" type="checkbox"/> 0 2	3000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 288 MP/4NO - 2E0</b> 50112887	<input type="checkbox"/> 0 1.6 <input checked="" type="checkbox"/> 0 2	3000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 288 MP/4NC - 2E0</b> 50113783	<input type="checkbox"/> 0 1.6 <input checked="" type="checkbox"/> 0 2	3000Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 288 MP/4NO - 3E0 - S8.3</b> 50112890	<input type="checkbox"/> 0 2.4 <input checked="" type="checkbox"/> 0 3	1000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 288 MP/4NO - 3E0</b> 50112889	<input type="checkbox"/> 0 2.4 <input checked="" type="checkbox"/> 0 3	1000Hz	Embedded	1 x PNP	NO (normally open)

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Accessories / connection cables		More accessories can be found from <b>page 523</b> onwards
Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50106692	K - D M8W - 3P - 5m - PUR	Connection cable 5000mm, M8 angular, 3-pin, PUR
d 50106691	K - D M8A - 3P - 5m - PUR	Connection cable 5000mm, M8 axial, 3-pin, PUR
e 50104582	D M8A - 3P - SK	Cable socket, M8 axial, 3-pin, user-configurable

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 288 SERIES**

Inductive switches



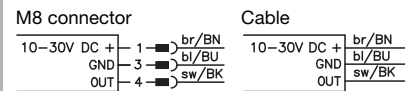
Connection	Material housing / active surface	Protection class	Accessories
M8 connector	Brass, nickel-plated / PBTP	IP 67	a, b, c, d, e
Cable, 2 m, PVC	Brass, nickel-plated / PBTP	IP 67	
Cable, 2 m, PVC	Brass, nickel-plated / PBTP	IP 67	
M8 connector	Brass, nickel-plated / PBTP	IP 67	a, b, c, d, e
Cable, 2 m, PVC	Brass, nickel-plated / PBTP	IP 67	
Cable, 2 m, PVC	Brass, nickel-plated / PBTP	IP 67	
M8 connector	Brass, nickel-plated / PBTP	IP 67	a, b, c, d, e
Cable, 2 m, PVC	Brass, nickel-plated / PBTP	IP 67	



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

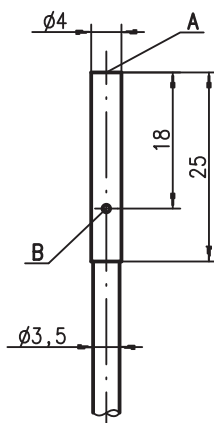
Light Curtains

Protective Sensors


Ex Sensors

# OVERVIEW












## Dimensioned drawing




- A** Active surface
- B** Yellow indicator diode

 Further details can be found in the respective data sheet.

We reserve the right to make changes • BR204\_Overview\_EN.fm

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

## IS 204 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 1.5 mm	348



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	$\leq 10\%$	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 2\%$	
<b>Indicators</b>	Yellow LED	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	4.5 x 4.5 mm <sup>2</sup>	
	Weight	Approx. 32g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2	
	Electromagnetic compatibility	IEC 60255-5	1kV
		IEC 61000-4-2	Level 2
	IEC 61000-4-3	Level 3	
	IEC 61000-4-4	Level 3	

Mounting systems for this series can be found from page 523 onwards

### Features

- Slim and short cylindrical metal housing  $\varnothing 4\text{mm}$
- Stainless steel housing
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors












Light Curtains

Protective Sensors

Ex Sensors

## INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches Ø 4, embedded installation</b>					
<b>IS 204 MP/4NO - 1E5</b> 50113478	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	3000Hz	Embedded	1 x PNP	NO (normally open)

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

# IS 204 SERIES

Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Stainless steel / PA66	IP 67	



### Inductive Switch

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

### Electrical connection

Cable

10-30V DC +	br/BN
GND	bl/BU
OUT	sw/BK

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

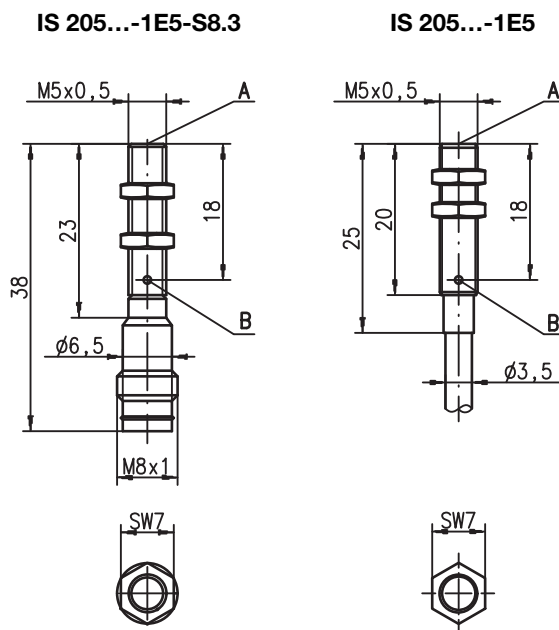
Protective Sensors

Ex Sensors


[www.leuze.com/inductiv/](http://www.leuze.com/inductiv/)

# OVERVIEW



## Dimensioned drawing



- A** Active surface
- B** Yellow indicator diode


 Further details can be found in the respective data sheet.

We reserve the right to make changes • BR205\_Overview\_EN.fm

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386



## IS 205 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 1.5 mm	352



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	$\leq 10\%$	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 2\%$	
<b>Indicators</b>	Yellow LED	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	5 x 5 mm <sup>2</sup>	
	Weight (connector/cable)	approx. 5g/approx. 35g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1 kV
		IEC 61000-4-2	Level 2
IEC 61000-4-3		Level 3	
IEC 61000-4-4	Level 3		

Mounting systems for this series can be found from page 523 onwards

### Features

- Slim and short cylindrical metal housing M5
- Stainless steel housing
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors






Ex Sensors

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M5, embedded installation</b>					
<b>IS 205 MM/4NO - 1E5</b> 50113213	<input type="checkbox"/> 0 1.2 <input type="checkbox"/> 0 1.5	3000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 205 MM/4NO - 1E5 - S8.3</b> 50113212	<input type="checkbox"/> 0 1.2 <input type="checkbox"/> 0 1.5	3000Hz	Embedded	1 x PNP	NO (normally open)

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Accessories / connection cables		More accessories can be found from <b>page 523</b> onwards
Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50106692	K - D M8W - 3P - 5m - PUR	Connection cable 5000mm, M8 angular, 3-pin, PUR
d 50106691	K - D M8A - 3P - 5m - PUR	Connection cable 5000mm, M8 axial, 3-pin, PUR
e 50104582	D M8A - 3P - SK	Cable socket, M8 axial, 3-pin, user-configurable

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

# IS 205 SERIES

Inductive switches



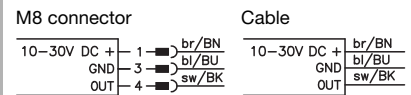
Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Stainless steel / PA66	IP 67	
M8 connector	Stainless steel / PA66	IP 67	a, b, c, d, e



### Inductive Switch

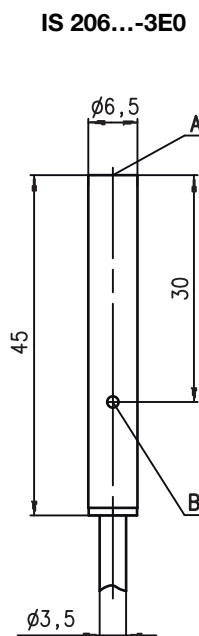
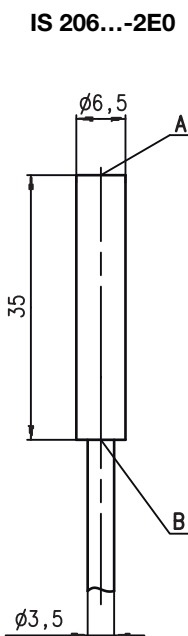
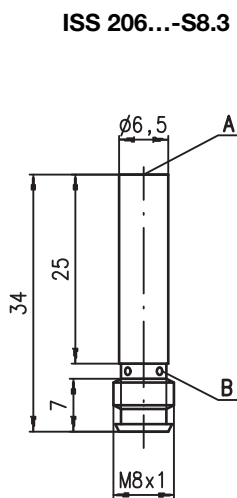
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

### Electrical connection




# OVERVIEW












## Dimensioned drawing




- A** Active surface
- B** Yellow indicator diode

 Further details can be found in the respective data sheet.

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

## IS 206 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 3 mm	356



Common technical data			
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	$\leq 10\%$	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 2\%/5\%$	
<b>Indicators</b>	Yellow LED (360° visible)	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	6.5 x 6.5 (9 x 9)mm <sup>2</sup>	
	Weight (connector/cable)	Approx. 4g/61g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1kV
		IEC 61000-4-2	Level 3
	IEC 61000-4-3	Level 3	
	IEC 61000-4-4	Level 3	
<b>Mounting systems for this series can be found from page 523 onwards</b>			

### Features

- Slim and short cylindrical metal housing  $\varnothing 6.5\text{mm}$
- Chromium-plated brass or stainless steel housing
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state visible from 360°



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors












# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches Ø 6.5, embedded installation</b>					
<b>IS 206 MP/4NO - 2E0</b> 50111437	<input type="checkbox"/> 0 1,6 <input checked="" type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 206 MP/4NO - 2E0 - S8.3 1)</b> 50111438	<input type="checkbox"/> 0 1,6 <input checked="" type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 206 MP/4NO - 3E0</b> 50109686	<input type="checkbox"/> 0 2,4 <input checked="" type="checkbox"/> 0 3	1000Hz	Embedded	1 x PNP	NO (normally open)

1) short construction

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Accessories / connection cables		More accessories can be found from <b>page 523</b> onwards
Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50106692	K - D M8W - 3P - 5m - PUR	Connection cable 5000mm, M8 angular, 3-pin, PUR
d 50106691	K - D M8A - 3P - 5m - PUR	Connection cable 5000mm, M8 axial, 3-pin, PUR
e 50104582	D M8A - 3P - SK	Cable socket, M8 axial, 3-pin, user-configurable

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 206 SERIES**

Inductive switches



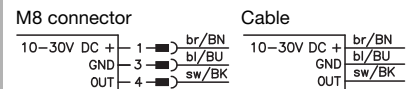
Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Stainless steel / PA12	IP 67	
M8 connector	Stainless steel / PA12	IP 67	a, b, c, d, e
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

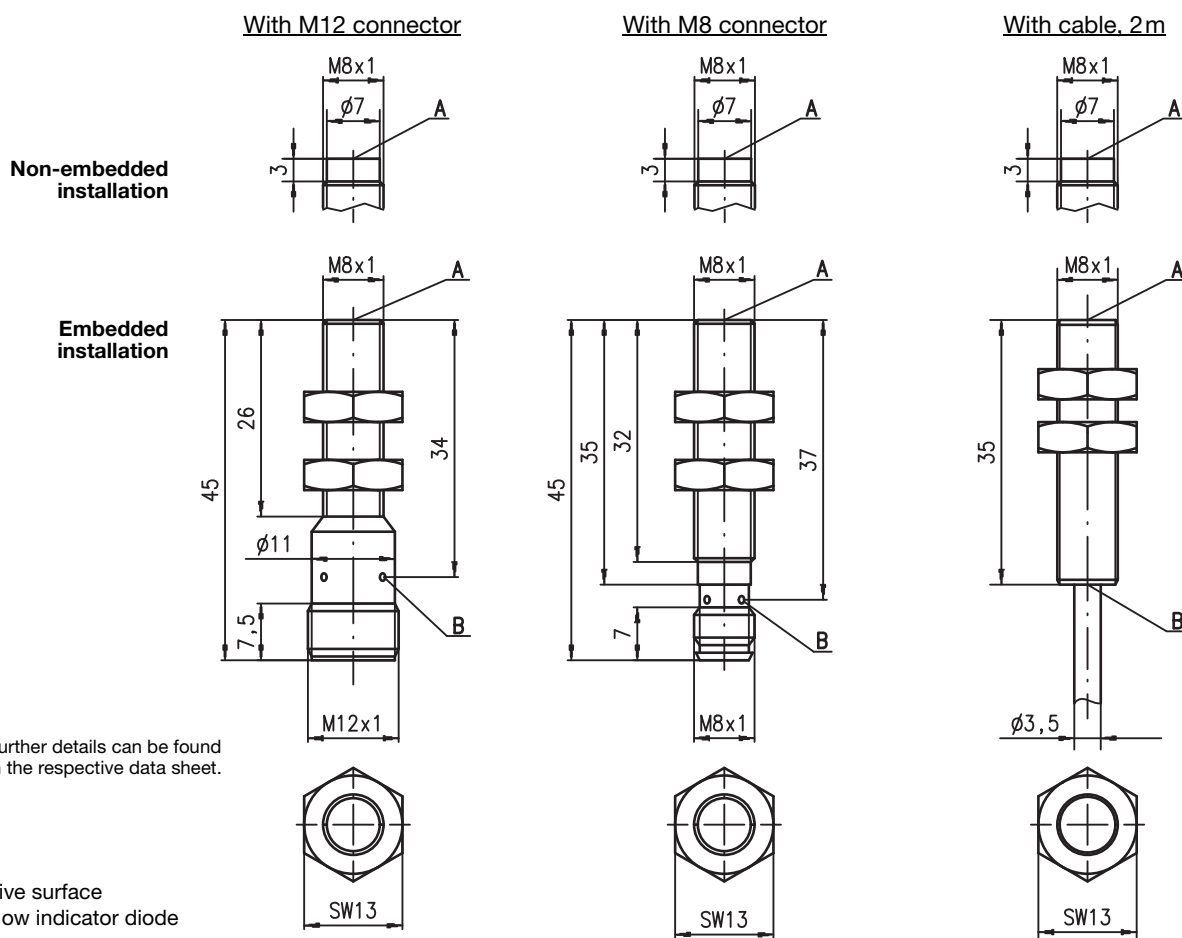
Light Curtains

Protective Sensors

Ex Sensors

# OVERVIEW

## Dimensioned drawing





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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386



## IS 208 SERIES

Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 2 mm	360
 <b>Non-embedded</b>	0 4 mm	364



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$
	Output current $I_L$	$\leq 200\text{mA}$
	Residual current $I_r$	$\leq 100\mu\text{A}$
	Voltage drop $U_d$	$\leq 2.0\text{V}$
	Hysteresis H of $S_r$	5 ... 20%
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)
	Repeatability	$\leq 5\%$
<b>Indicators</b>	Yellow LED (360° visible)	Switching state
<b>Mechanical data</b>	Standard target (Fe360)	8 x 8 (12 x 12)mm <sup>2</sup>
	Weight (connector/cable)	Approx. 12g/70g
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.
	Standards applied	IEC 60947-5-2, UL 508
	Electromagnetic compatibility	IEC 60255-5      1kV IEC 61000-4-2    Level 3 IEC 61000-4-3    Level 3 IEC 61000-4-4    Level 3
<b>Mounting systems for this series can be found from page 523 onwards</b>		

### Features

- Slim and short cylindrical metal housing M8 x 1
- Stainless steel housing
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state visible from 360°



### Inductive Switch

- |                                 |        |
|---------------------------------|--------|
| ● Functionality                 | P. 574 |
| ● Outputs / Switching functions | P. 575 |
| ● Mounting / Installation       | P. 576 |
| ● Characteristic values         | P. 577 |

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors












Ex Sensors

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M8, embedded installation</b>					
<b>IS 208 MM/4NO - 1E5</b> 50109639	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 1E5 - S8.3</b> 50109640	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 1E5 - S12</b> 50109641	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NC - 1E5</b> 50112444	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 208 MM/2NO - 1E5</b> 50109642	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1xNPN	NO (normally open)
<b>IS 208 MM/2NC - 1E5</b> 50113207	<input type="checkbox"/> 0 1.2 <input checked="" type="checkbox"/> 0 1.5	5000Hz	Embedded	1xNPN	NC (normally closed)

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Accessories / connection cables		More accessories can be found from page 523 onwards	
Part No.	Designation	Features	
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC	
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC	
c 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC	
d 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC	
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC	
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
g 50104582	D M8A - 3P - SK	Cable socket, M8 axial, 3-pin, user-configurable	

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 208 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

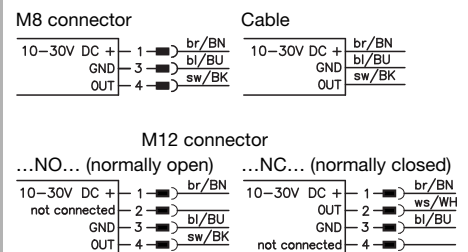
Connection	Material housing / active surface	Protection class	Accessories
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	
M8 connector	Stainless steel / PA12	IP 67	a, b, g
M12 connector	Stainless steel / PA12	IP 67	c, d, e, f
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**



**...NO...-S12 (normally open):**  
3-pin or 4-pin M12 connection cables can be used.












**...NC...-S12 (normally closed):**  
**only** 4-pin M12 connection cables can be used.

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M8, embedded installation</b>					
<b>IS 208 MM/4NO - 2EO</b> 50109652	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 2EO - S8.3</b> 50109653	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 2EO, 200 - S8.3</b> 50114051	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NC - 2EO</b> 50113211	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 208 MM/4NC - 2EO - S8.3</b> 50109654	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 208 MM/2NO - 2EO</b> 50109655	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x NPN	NO (normally open)
<b>IS 208 MM/2NO - 2EO - S8.3</b> 50109656	<input type="checkbox"/> 0 1,6 <input type="checkbox"/> 0 2	5000Hz	Embedded	1 x NPN	NO (normally open)

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Accessories / connection cables		More accessories can be found from <b>page 523</b> onwards
Part No.	Designation	Features
a 50104521	K - D M8W - 3P - 2m - PVC	Connection cable 2000mm, M8 angular, 3-pin, PVC
b 50104520	K - D M8A - 3P - 2m - PVC	Connection cable 2000mm, M8 axial, 3-pin, PVC
c 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
d 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
e 50104582	D M8A - 3P - SK	Cable socket, M8 axial, 3-pin, user-configurable

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 208 SERIES**

Inductive switches



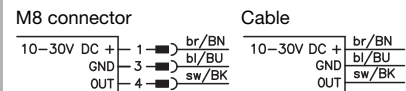
Connection	Material housing / active surface	Protection class	Accessories
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	
M8 connector	Stainless steel / PA12	IP 67	a, b, c, d, e
Cable, 0.2 m, with M8 connector	Stainless steel / PA12	IP 67	a, b, c, d, e
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	
M8 connector	Stainless steel / PA12	IP 67	a, b, c, d, e
Cable, 2 m, PVC	Stainless steel / PA12	IP 67	
M8 connector	Stainless steel / PA12	IP 67	a, b, c, d, e



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**



[www.leuze.com/inductiv/](http://www.leuze.com/inductiv/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors












Ex Sensors

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M8, non-embedded installation</b>					
<b>IS 208 MM/4NO - 2N5</b> 50109645	<input type="checkbox"/> 0 <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 2,5	5000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 2N5 - S8.3</b> 50109646	<input type="checkbox"/> 0 <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 2,5	5000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 2N5 - S12</b> 50109647	<input type="checkbox"/> 0 <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 2,5	5000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/2NO - 2N5</b> 50109649	<input type="checkbox"/> 0 <input type="checkbox"/> 2 <input type="checkbox"/> 0 <input type="checkbox"/> 2,5	5000Hz	Non-embedded	1xNPN	NO (normally open)
<b>IS 208 MM/4NO - 4NO</b> 50109658	<input type="checkbox"/> 0 <input type="checkbox"/> 3,2 <input type="checkbox"/> 0 <input type="checkbox"/> 4	3500Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/4NO - 4NO - S8.3</b> 50109659	<input type="checkbox"/> 0 <input type="checkbox"/> 3,2 <input type="checkbox"/> 0 <input type="checkbox"/> 4	3500Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 208 MM/2NO - 4NO</b> 50109661	<input type="checkbox"/> 0 <input type="checkbox"/> 3,2 <input type="checkbox"/> 0 <input type="checkbox"/> 4	3500Hz	Non-embedded	1xNPN	NO (normally open)
<b>IS 208 MM/2NO - 4NO - S8.3</b> 50109662	<input type="checkbox"/> 0 <input type="checkbox"/> 3,2 <input type="checkbox"/> 0 <input type="checkbox"/> 4	3500Hz	Non-embedded	1xNPN	NO (normally open)

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Accessories / connection cables		More accessories can be found from page 523 onwards
Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
d 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
g 50104582	D M8A - 3P - SK	Cable socket, M8 axial, 3-pin, user-configurable

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 208 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

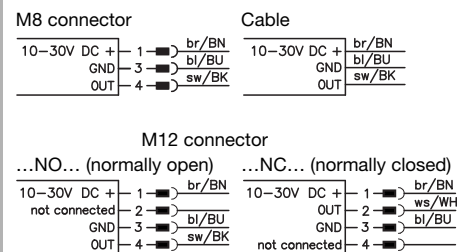
Connection	Material housing / active surface	Protection class	Accessories
Cable, 2 m, PVC	Stainless steel / PBTP	IP 67	
M8 connector	Stainless steel / PBTP	IP 67	a, b, g
M12 connector	Stainless steel / PBTP	IP 67	c, d, e, f
Cable, 2 m, PVC	Stainless steel / PBTP	IP 67	
Cable, 2 m, PVC	Stainless steel / PBTP	IP 67	
M8 connector	Stainless steel / PBTP	IP 67	a, b, g
Cable, 2 m, PVC	Stainless steel / PBTP	IP 67	
M8 connector	Stainless steel / PBTP	IP 67	a, b, g



**Inductive Switch**

- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

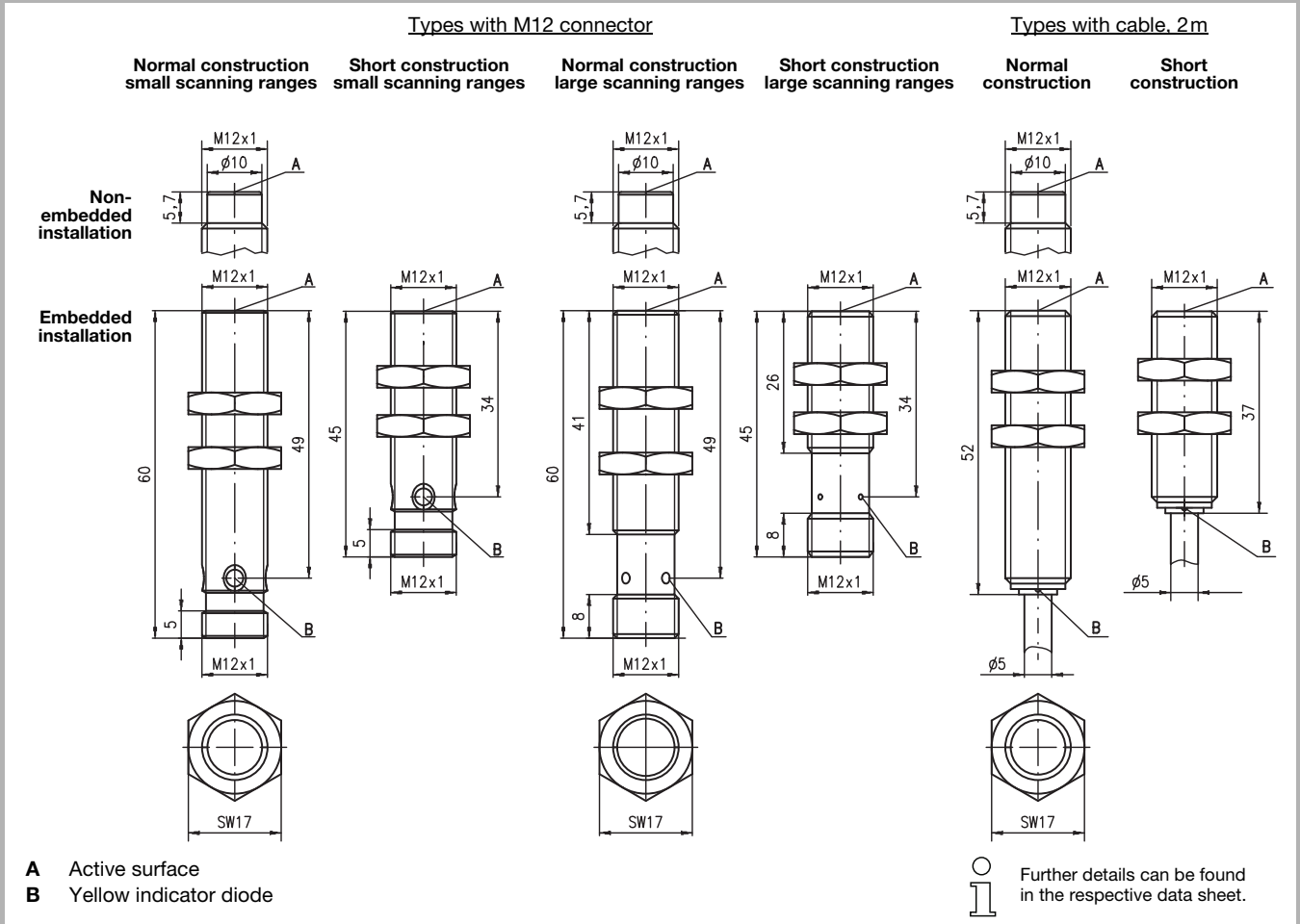


**...NO...-S12 (normally open):**  
3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**  
**only** 4-pin M12 connection cables can be used.

# OVERVIEW

## Dimensioned drawing





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IS 240 Page 330	IS 244 Page 334	IS 255 Page 338	IS 288 Page 342	IS 204 Page 346	IS 205 Page 350	IS 206 Page 354	IS 208 Page 358	IS 212 Page 366	IS 218 Page 376	IS 230 Page 386



## IS 212 SERIES



Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 6 mm	368
 <b>Non-embedded</b>	0 10 mm	374



Common technical data			
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	0 ... 15%	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 5\%$	
<b>Indicators</b>	Yellow LED (360° visible)	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	12x 12 (30x 30)mm <sup>2</sup>	
	Weight (connector/cable)	Approx. 30g/95g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C (+85°C)	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1 kV
		IEC 61000-4-2	Level 3
IEC 61000-4-3		Level 3	
IEC 61000-4-4	Level 3		
<b>Mounting systems for this series can be found from page 523 onwards</b>			

**Features**

- Slim and short cylindrical metal housing M12 x 1
- Chromium-plated brass housing
- Food+Beverage version in stainless steel AISI 316L (DIN 1.4404) up to +85°C
- Extra short construction available
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state visible from 360°

**Inductive Switch**

● Functionality	P. 574
● Outputs / Switching functions	P. 575
● Mounting / Installation	P. 576
● Characteristic values	P. 577

# INDUCTIVE SWITCHES

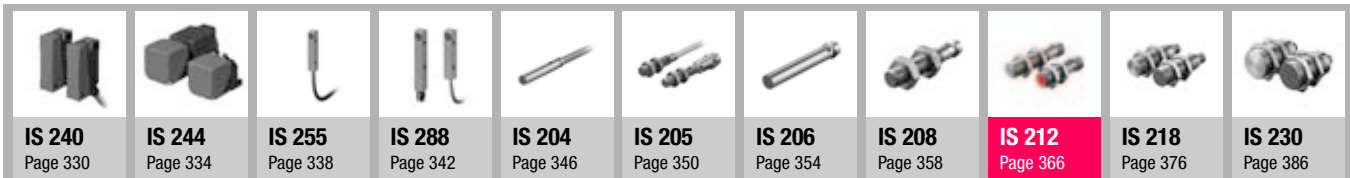
Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M12, embedded installation</b>					
<b>IS 212 MM/4NO - 2EO</b> 50109664		3000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NO - 2EO - S12</b> 50109665		3000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NC - 2EO - S12</b> 50111870		3000Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 212 MM/2NO - 2EO</b> 50109666		3000Hz	Embedded	1xNPN	NO (normally open)
<b>IS 212 MM/4NO - 4EO</b> 50109672		2000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NO - 4EO - S12</b> 50109673		2000Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 212 MM/4NO - 4EO <sup>1)</sup></b> 50109684		2000Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 212 MM/4NO - 4EO - S12 <sup>1)</sup></b> 50109685		2000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NC - 4EO - S12</b> 50109674		2000Hz	Embedded	1 x PNP	NC (normally closed)
<b>ISS 212 MM/4NC - 4EO - S12 <sup>1)</sup></b> 50109676		2000Hz	Embedded	1 x PNP	NC (normally closed)

**Accessories / connection cables**

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

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**IS 212 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Material housing / active surface	Protection class	Accessories
Cable, 2 m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, e, f
Cable, 2 m, PVC	Brass, chromium-plated / PBTP	IP 67	
Cable, 2 m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2 m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, e, f

1) Short construction

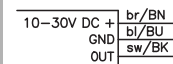


**Inductive Switch**

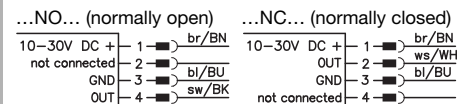
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

**Cable**



**M12 connector**



**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.

# INDUCTIVE SWITCHES












Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M12, embedded installation</b>					
<b>IS 212 MM/2NO - 4E0</b> 50109675	<input type="checkbox"/> 3,2 <input type="checkbox"/> 4	2000Hz	Embedded	1 x NPN	NO (normally open)
<b>ISS 212 MM/2NO - 4E0 - S12 <sup>1)</sup></b> 50109687	<input type="checkbox"/> 3,2 <input type="checkbox"/> 4	2000Hz	Embedded	1 x NPN	NO (normally open)
<b>IS 212 MM/2NC - 4E0 - S12</b> 50109677	<input type="checkbox"/> 3,2 <input type="checkbox"/> 4	2000Hz	Embedded	1 x NPN	NC (normally closed)
<b>IS 212 MM/4NO - 6E0</b> 50109678	<input type="checkbox"/> 4,8 <input type="checkbox"/> 6	800Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 212 MM/4NO - 6E0 - S12 <sup>1)</sup></b> 50109679	<input type="checkbox"/> 4,8 <input type="checkbox"/> 6	800Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/2NO - 6E0</b> 50109682	<input type="checkbox"/> 4,8 <input type="checkbox"/> 6	800Hz	Embedded	1 x NPN	NO (normally open)
<b>ISS 212 MM/2NO - 6E0 - S12 <sup>1)</sup></b> 50109688	<input type="checkbox"/> 4,8 <input type="checkbox"/> 6	800Hz	Embedded	1 x NPN	NO (normally open)
<b>IS 212 FM/4NO.5F - 6E0 - S12 <sup>2)</sup></b> 50109736	<input type="checkbox"/> 4,8 <input type="checkbox"/> 6	600Hz	Embedded	1 x PNP	NO (normally open)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.
g 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
h 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 212 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, g, h
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, g, h
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, g, h
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, g, h
M12 connector	Stainless steel AISI 316L (DIN 1.4404) / stainless steel AISI 316L (DIN 1.4404)	IP 67, IP 69K	e, f

- 1) Short construction
- 2) Food + Beverage version for the food and beverage industries

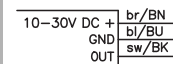


**Inductive Switch**

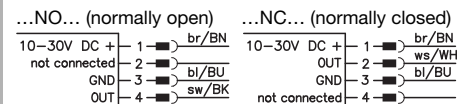
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

**Cable**



**M12 connector**



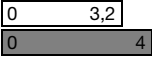
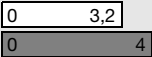
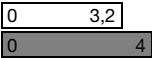
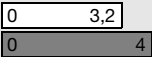
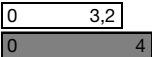
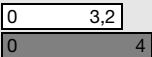


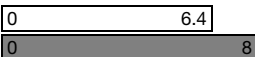
**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**












only 4-pin M12 connection cables can be used.

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M12, non-embedded installation</b>					
<b>IS 212 MM/4NO - 4NO</b> 50109668		2000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NO - 4NO - S12</b> 50109669		2000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>ISS 212 MM/4NO - 4NO - S12 <sup>1)</sup></b> 50111963		2000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NC - 4NO - S12</b> 50112914		2000Hz	Non-embedded	1 x PNP	NC (normally closed)
<b>IS 212 MM/2NO - 4NO</b> 50109670		2000Hz	Non-embedded	1xNPN	NO (normally open)
<b>ISS 212 MM/2NO - 4NO <sup>1)</sup></b> 50112209		2000Hz	Non-embedded	1xNPN	NO (normally open)
<b>IS 212 MM/4NO - 8NO</b> 50112807		1500Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NO - 8NO - S12</b> 50112808		1500Hz	Non-embedded	1xNPN	NO (normally open)
<b>IS 212 MM/2NO - 8NO</b> 50112806		1500Hz	Non-embedded	1xNPN	NO (normally open)

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Accessories / connection cables		More accessories can be found from <b>page 523</b> onwards
Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 212 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	

1) Short construction

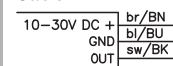


**Inductive Switch**

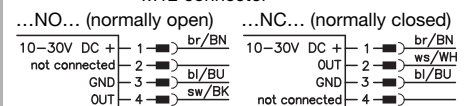
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

Cable



M12 connector



**...NO...-S12 (normally open):**





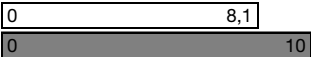
3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.



# INDUCTIVE SWITCHES












Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M12, non-embedded installation</b>					
<b>IS 212 MM/4NO - 10N</b> 50109689		400Hz	Non-embedded	1 x PNP	NO (normally open)
<b>ISS 212 MM/4NO - 10N - S12 <sup>1)</sup></b> 50109680		400Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 212 MM/4NC - 10N - S12</b> 50114052		400Hz	Non-embedded	1 x PNP	NC (normally closed)
<b>IS 212 MM/2NO - 10N</b> 50111952		400Hz	Non-embedded	1 x NPN	NO (normally open)
<b>IS 212 FM/4NO.5F - 10N - S12 <sup>2)</sup></b> 50109738		400Hz	Non-embedded	1 x PNP	NO (normally open)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.
g 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
h 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

We reserve the right to make changes • BR212\_4\_EN.fm

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386



**IS 212 SERIES**  
Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, g, h
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, g, h
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Stainless steel AISI 316L (DIN 1.4404) / stainless steel AISI 316L (DIN 1.4404)	IP 67, IP 69K	e, f

- 1) Short construction
- 2) Food + Beverage version for the food and beverage industries

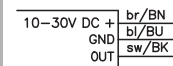


**Inductive Switch**

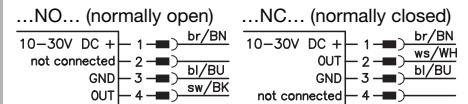
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

**Cable**



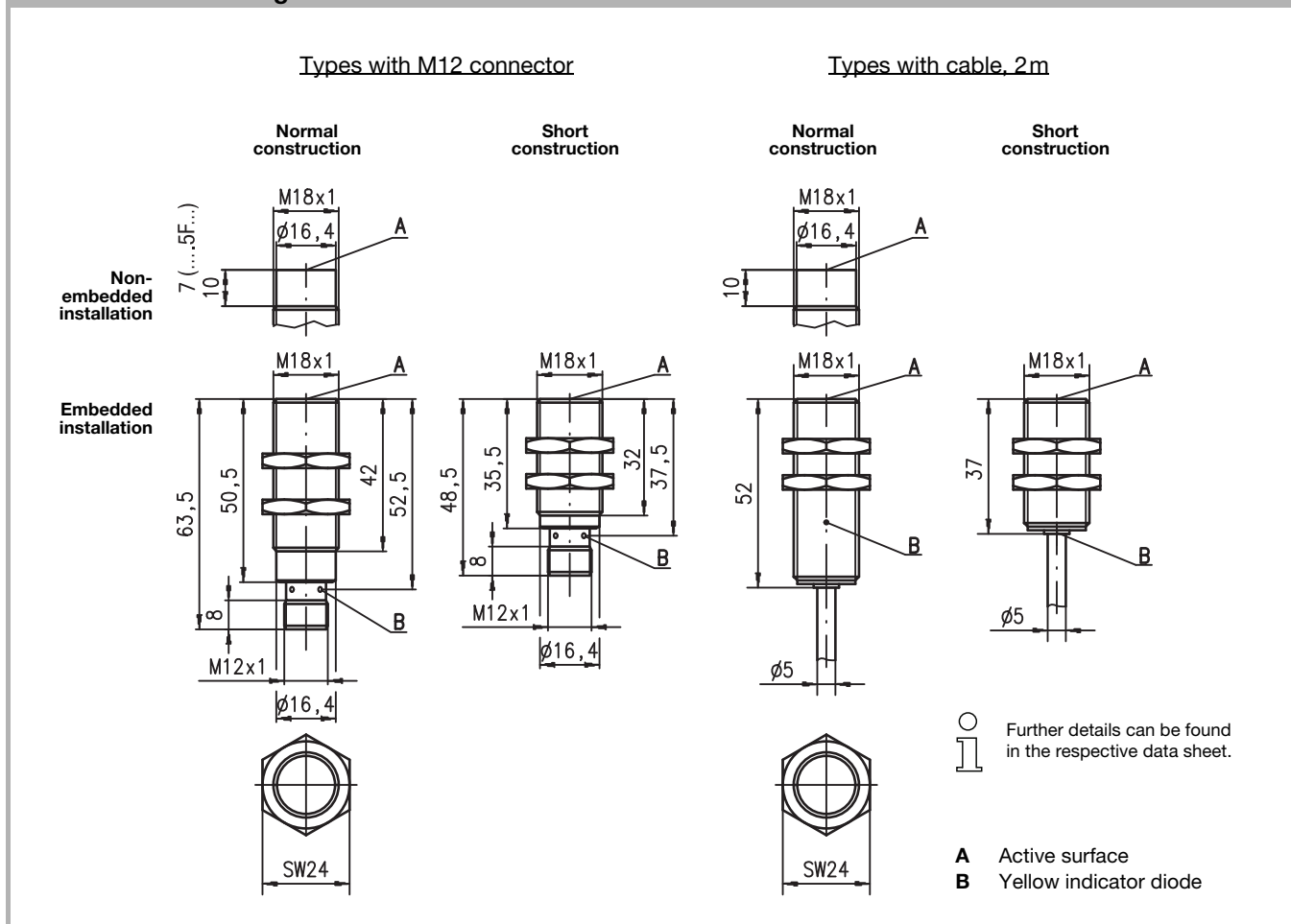
**M12 connector**



- ...NO...-S12 (normally open):**  
3-pin or 4-pin M12 connection cables can be used.
- ...NC...-S12 (normally closed):**  
only 4-pin M12 connection cables can be used.

# OVERVIEW



## Dimensioned drawing



We reserve the right to make changes • BR218\_Overview\_EN.fm

<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

## IS 218 SERIES



Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0 12 mm	378
 <b>Non-embedded</b>	0 20 mm	384



Common technical data			
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	0 ... 15%	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 5\%$	
<b>Indicators</b>	Yellow LED (360° visible)	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	18x 18 (60x 60)mm <sup>2</sup>	
	Weight (connector/cable)	Approx. 50g/165g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C (+85°C)	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1 kV
		IEC 61000-4-2	Level 3
	IEC 61000-4-3	Level 3	
	IEC 61000-4-4	Level 3	
<b>Mounting systems for this series can be found from page 523 onwards</b>			

**Features**

- Slim and short cylindrical metal housing M18 x 1
- Chromium-plated brass housing
- Food+Beverage version in stainless steel AISI 316L (DIN 1.4404) up to +85°C
- Extra short construction available
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state visible from 360°

**Inductive Switch**

● Functionality	P. 574
● Outputs / Switching functions	P. 575
● Mounting / Installation	P. 576
● Characteristic values	P. 577

# INDUCTIVE SWITCHES












Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M18, embedded installation</b>					
<b>IS 218 MM/4NO - 5E0</b> 50109692	<input type="checkbox"/> 0 4 <input type="checkbox"/> 0 5	2000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/4NO - 5E0 - S12</b> 50109693	<input type="checkbox"/> 0 4 <input type="checkbox"/> 0 5	2000Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 218 MM/4NO - 5E0 <sup>1)</sup></b> 50112915	<input type="checkbox"/> 0 4 <input type="checkbox"/> 0 5	2000Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 218 MM/4NO - 5E0 - S12 <sup>1)</sup></b> 50112293	<input type="checkbox"/> 0 4 <input type="checkbox"/> 0 5	2000Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/2NO - 5E0</b> 50109694	<input type="checkbox"/> 0 4 <input type="checkbox"/> 0 5	2000Hz	Embedded	1 x NPN	NO (normally open)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 218 SERIES**

Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	

1) Short construction

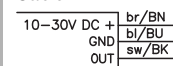


**Inductive Switch**

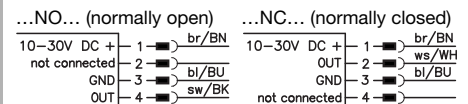
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

Cable



M12 connector



**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

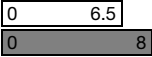
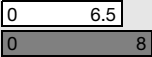
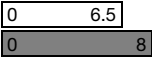
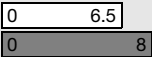
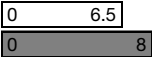
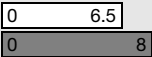
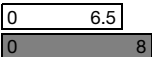
**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.



- Standard Sensors
- Measuring Sensors
- Ultrasonic Sensors
- Inductive Switches
- Forked Sensors
- Special Sensors
- Fiber Optic Sensors
- Light Curtains
- Protective Sensors
- Ex Sensors

# INDUCTIVE SWITCHES












Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M18, embedded installation</b>					
<b>IS 218 MM/4NO - 8EO</b> 50109700		1500Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/4NO - 8EO - S12</b> 50109701		1500Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 218 MM/4NO - 8EO - S12 1)</b> 50111743		1500Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/4NC - 8EO - S12</b> 50109702		1500Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 218 MM/2NO - 8EO</b> 50112104		1500Hz	Embedded	1 x NPN	NO (normally open)
<b>IS 218 MM/2NO - 8EO - S12</b> 50109704		1500Hz	Embedded	1 x NPN	NO (normally open)
<b>ISS 218 MM/2NO - 8EO - S12 1)</b> 50109703		1500Hz	Embedded	1 x NPN	NO (normally open)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

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<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 218 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d, e, f,
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d, e, f
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d, e, f

1) Short construction

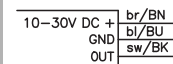


**Inductive Switch**

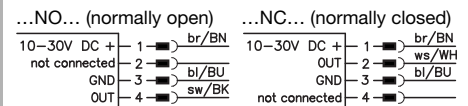
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

**Cable**



**M12 connector**



**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.

# INDUCTIVE SWITCHES












Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M18, embedded installation</b>					
<b>IS 218 MM/4NO - 12E</b> 50109706	<input type="checkbox"/> 9,7 <input checked="" type="checkbox"/> 12	500Hz	Embedded	1 x PNP	NO (normally open)
<b>ISS 218 MM/4NO - 12E - S12 <sup>1)</sup></b> 50109707	<input type="checkbox"/> 9,7 <input checked="" type="checkbox"/> 12	500Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/2NO - 12E</b> 50111954	<input type="checkbox"/> 9,7 <input checked="" type="checkbox"/> 12	500Hz	Embedded	1 x NPN	NO (normally open)
<b>ISS 218 MM/2NO - 12E - S12 <sup>1)</sup></b> 50109708	<input type="checkbox"/> 9,7 <input checked="" type="checkbox"/> 12	500Hz	Embedded	1 x NPN	NO (normally open)
<b>IS 218 FM/4NO.5F - 10E - S12 <sup>2)</sup></b> 50109732	<input type="checkbox"/> 8,1 <input checked="" type="checkbox"/> 10	300Hz	Embedded	1 x PNP	NO (normally open)

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
c 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
d 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable

We reserve the right to make changes • BR218\_3\_EN.fm

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386



**IS 218 SERIES**

Inductive switches



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
M12 connector	Stainless steel AISI 316L (DIN 1.4404) / stainless steel AISI 316L (DIN 1.4404)	IP 67, IP 69K	c, d

- 1) Short construction
- 2) Food + Beverage version for the food and beverage industries

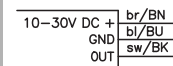


**Inductive Switch**

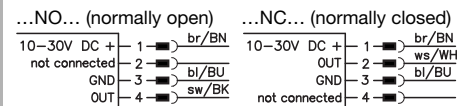
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

**Cable**



**M12 connector**

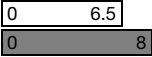
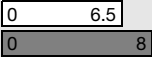
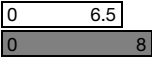






**...NO...-S12 (normally open):**  
3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**  
only 4-pin M12 connection cables can be used.














# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M18, non-embedded installation</b>					
<b>IS 218 MM/4NO - 8NO</b> 50109696		2000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/4NO - 8NO - S12</b> 50109697		2000Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/2NO - 8NO</b> 50109698		2000Hz	Non-embedded	1 x NPN	NO (normally open)
<b>IS 218 MM/4NO - 20N</b> 50109709		200Hz	Non-embedded	1 x PNP	NO (normally open)
<b>ISS 218 MM/4NO - 20N - S12 <sup>1)</sup></b> 50109710		200Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 218 MM/2NO - 20N</b> 50111953		200Hz	Non-embedded	1 x NPN	NO (normally open)
<b>IS 218 FM/4NO.5F - 20N - S12 <sup>2)</sup></b> 50109734		200Hz	Non-embedded	1 x PNP	NO (normally open)

1) Short construction  
2) Food + Beverage version for the food and beverage industries

We reserve the right to make changes • BR218\_4\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 523</b> onwards	
Part No.	Designation	Features	
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC	
b 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC	
c 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.	
d 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.	
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable	
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable	

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 218 SERIES**

Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Stainless steel AISI 316L (DIN 1.4404) / stainless steel AISI 316L (DIN 1.4404)	IP 67, IP 69K	c, d

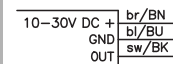


**Inductive Switch**

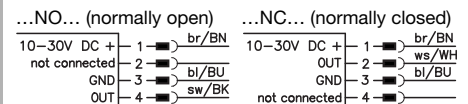
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

Cable



M12 connector



**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

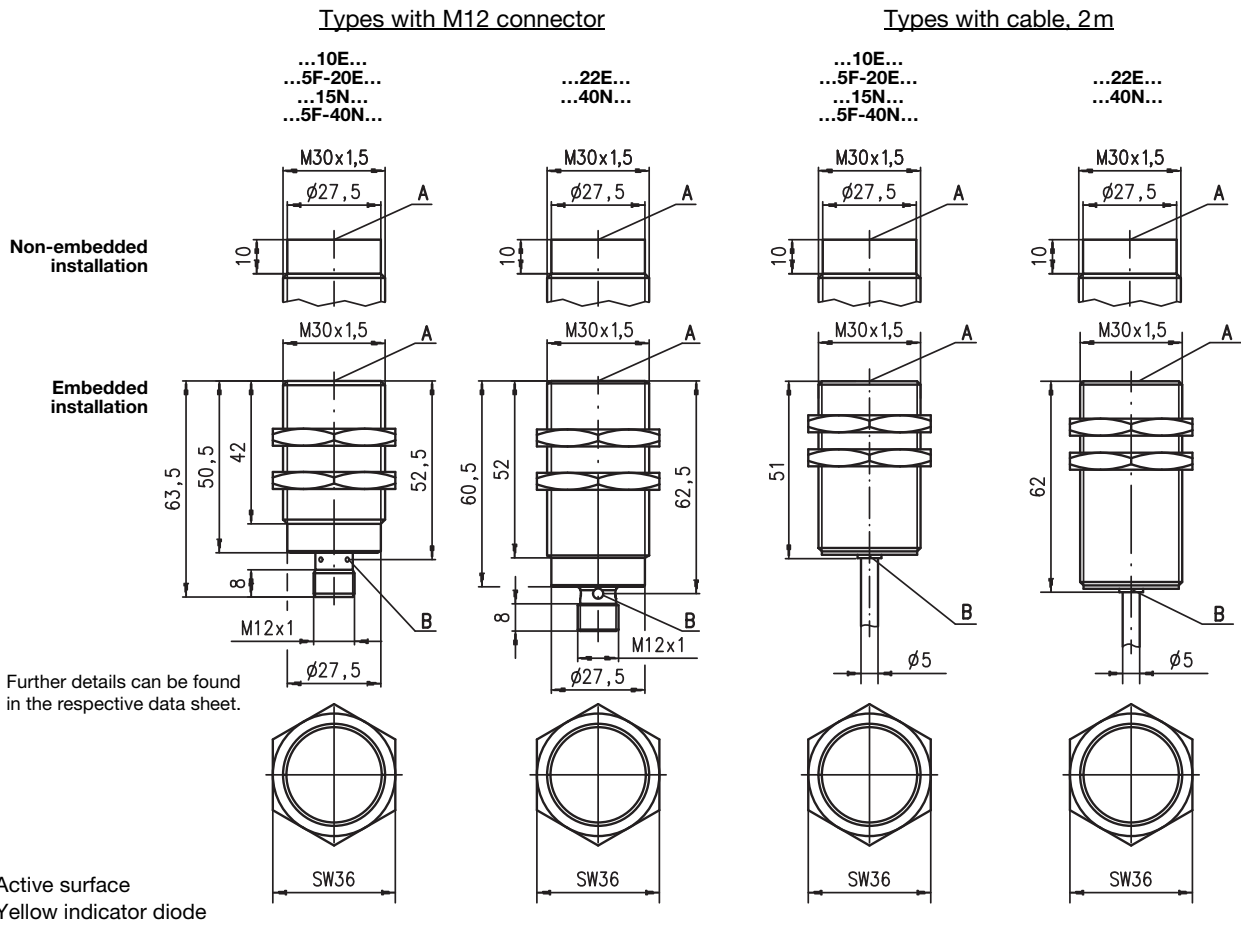
Light Curtains

Protective Sensors












Ex Sensors

**OVERVIEW**





**Dimensioned drawing**



We reserve the right to make changes • BR230\_Overview\_EN.fm

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

## IS 230 SERIES



Installation	Typ. scan range limit $S_n$	Page
 <b>Embedded</b>	0  22 mm	388
 <b>Non-embedded</b>	0  40 mm	390



Common technical data			
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC	
	Residual ripple $\sigma$	$\leq 20\%$ of $U_B$	
	Output current $I_L$	$\leq 200\text{mA}$	
	Residual current $I_r$	$\leq 100\mu\text{A}$	
	Voltage drop $U_d$	$\leq 2.0\text{V}$	
	Hysteresis H of $S_r$	0 ... 15%	
	Temperature drift of $s_r$	$\leq 10\%$ (entire temp. range)	
	Repeatability	$\leq 5\%$	
<b>Indicators</b>	Yellow LED (360° visible)	Switching state	
<b>Mechanical data</b>	Standard target (Fe360)	30x30 (120x120)mm <sup>2</sup>	
	Weight (connector/cable)	Approx. 155g/210g	
<b>Environmental data</b>	Ambient temperature	-25°C ... +70°C (+85°C)	
	Protective circuit	Polarity reversal protection, short circuit prot., inductive prot.	
	Standards applied	IEC 60947-5-2, UL 508	
	Electromagnetic compatibility	IEC 60255-5	1 kV
		IEC 61000-4-2	Level 3
IEC 61000-4-3		Level 3	
	IEC 61000-4-4	Level 3	
<b>Mounting systems for this series can be found from page 523 onwards</b>			

**Features**

- Slim and short cylindrical metal housing M30 x 1
- Chromium-plated brass housing
- Food+Beverage version in stainless steel AISI 316L (DIN 1.4404) up to +85°C
- Built-in short circuit protection, inductive protection, polarity reversal protection
- LED for switching state visible from 360°

**Inductive Switch**

● Functionality	P. 574
● Outputs / Switching functions	P. 575
● Mounting / Installation	P. 576
● Characteristic values	P. 577

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# INDUCTIVE SWITCHES

Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M30, embedded installation</b>					
<b>IS 230 MM/4NO - 10E</b> 50109712	<input type="text" value="0"/> <input type="text" value="8,1"/> <input type="text" value="0"/> <input type="text" value="10"/>	1200Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/4NO - 10E - S12</b> 50109713	<input type="text" value="0"/> <input type="text" value="8,1"/> <input type="text" value="0"/> <input type="text" value="10"/>	1200Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/4NC - 10E - S12</b> 50111871	<input type="text" value="0"/> <input type="text" value="8,1"/> <input type="text" value="0"/> <input type="text" value="10"/>	1200Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 230 MM/2NO - 10E</b> 50109714	<input type="text" value="0"/> <input type="text" value="8,1"/> <input type="text" value="0"/> <input type="text" value="10"/>	1200Hz	Embedded	1xNPN	NO (normally open)
<b>IS 230 MM/4NO - 22E</b> 50109720	<input type="text" value="0"/> <input type="text" value="17,8"/> <input type="text" value="0"/> <input type="text" value="22"/>	200Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/4NO - 22E - S12</b> 50109721	<input type="text" value="0"/> <input type="text" value="17,8"/> <input type="text" value="0"/> <input type="text" value="22"/>	200Hz	Embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/4NC - 22E - S12</b> 50109722	<input type="text" value="0"/> <input type="text" value="17,8"/> <input type="text" value="0"/> <input type="text" value="22"/>	200Hz	Embedded	1 x PNP	NC (normally closed)
<b>IS 230 MM/2NO - 22E</b> 50109723	<input type="text" value="0"/> <input type="text" value="17,8"/> <input type="text" value="0"/> <input type="text" value="22"/>	200Hz	Embedded	1xNPN	NO (normally open)
<b>IS 230 FM/4NO.5F - 20E - S12 <sup>1)</sup></b> 50111435	<input type="text" value="0"/> <input type="text" value="16,2"/> <input type="text" value="0"/> <input type="text" value="20"/>	100Hz	Embedded	1 x PNP	NO (normally open)












1) Food + Beverage version for the food and beverage industries

We reserve the right to make changes • BR230\_1\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
f 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.

										
<b>IS 240</b> Page 330	<b>IS 244</b> Page 334	<b>IS 255</b> Page 338	<b>IS 288</b> Page 342	<b>IS 204</b> Page 346	<b>IS 205</b> Page 350	<b>IS 206</b> Page 354	<b>IS 208</b> Page 358	<b>IS 212</b> Page 366	<b>IS 218</b> Page 376	<b>IS 230</b> Page 386

**IS 230 SERIES**

Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, c, d
M12 connector	Brass, chromium-plated / PBTP	IP 67	c, d
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Stainless steel AISI 316L (DIN 1.4404) / stainless steel AISI 316L (DIN 1.4404)	IP 67, IP 69K	e, f

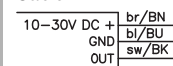


**Inductive Switch**

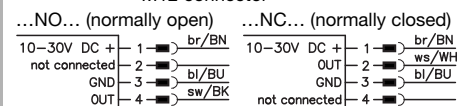
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

**Cable**



**M12 connector**



**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# INDUCTIVE SWITCHES

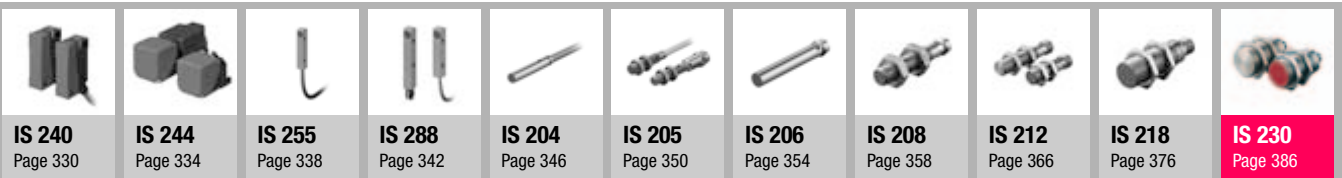
Part description Part No.:	Scanning range $S_a$ [mm] <input type="checkbox"/> Typ. scan range limit $S_n$ [mm] <input type="checkbox"/>	Switching frequency	Installation	Output	Switching
<b>Inductive switches M30, non-embedded installation</b>					
<b>IS 230 MM/4NO - 15N</b> 50109716		700Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/4NO - 15N - S12</b> 50109717		700Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/2NO - 15N</b> 50109718		700Hz	Non-embedded	1xNPN	NO (normally open)
<b>IS 230 MM/4NO - 40N</b> 50109726		100Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/4NO - 40N - S12</b> 50109727		100Hz	Non-embedded	1 x PNP	NO (normally open)
<b>IS 230 MM/2NO - 40N</b> 50109728		100Hz	Non-embedded	1xNPN	NO (normally open)
<b>IS 230 FM/4NO.5F - 40N - S12 <sup>1)</sup></b> 50111436		90Hz	Non-embedded	1 x PNP	NO (normally open)

1) Food + Beverage version for the food and beverage industries

We reserve the right to make changes • BR230\_2\_EN.fm

**Accessories / connection cables** More accessories can be found from **page 523** onwards

Part No.	Designation	Features
a 50104541	K - D M12W - 3P - 5m - PVC	Connection cable 5000mm, M12 angular, 3-pin, PVC
b 50104540	K - D M12A - 3P - 5m - PVC	Connection cable 5000mm, M12 axial, 3-pin, PVC
c 50104573	K - D M12W - 4P - 5m - FAB	Connection cable 5000mm, M12 angular, 4-pin, Food+Bev.
d 50104572	K - D M12A - 4P - 5m - FAB	Connection cable 5000mm, M12 axial, 4-pin, Food+Bev.
e 50031324	KD 095 - 4	Cable socket, M12 angular, 4-pin, user-configurable
f 50031323	KD 095 - 4A	Cable socket, M12 axial, 4-pin, user-configurable





**IS 230 SERIES**

Inductive switches



Connection	Material housing / active surface	Protection class	Accessories
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Brass, chromium-plated / PBTP	IP 67	a, b, e, f
Cable, 2m, PVC	Brass, chromium-plated / PBTP	IP 67	
M12 connector	Stainless steel AISI 316L (DIN 1.4404) / stainless steel AISI 316L (DIN 1.4404)	IP 67, IP 69K	c, d

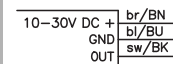


**Inductive Switch**

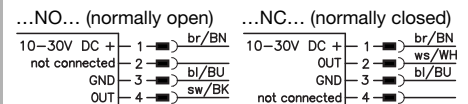
- Functionality P. 574
- Outputs / Switching functions P. 575
- Mounting / Installation P. 576
- Characteristic values P. 577

**Electrical connection**

Cable



M12 connector



**...NO...-S12 (normally open):**

3-pin or 4-pin M12 connection cables can be used.

**...NC...-S12 (normally closed):**

only 4-pin M12 connection cables can be used.



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

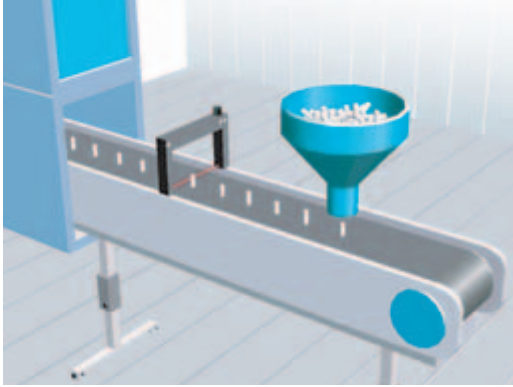
Protective Sensors

Ex Sensors

## SELECTION GUIDE

### Forked sensors for detecting small parts

#### Application



Detection of small parts in a feed system

#### Products and mouth widths [mm]



**GS 04** from **page 394** onwards  
Mouth widths: **20 / 30 / 50 / 80 / 120 / 220**



**GSL 04** from **page 394** onwards  
Mouth widths: **30 / 50 / 80**



**GS 21** from **page 394** onwards  
Mouth widths: **8**

# FORKED SENSORS

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors





## Forked sensors for detecting labels

### Application



Detection of paper, transparent or metallized labels

### Products and mouth widths [mm]

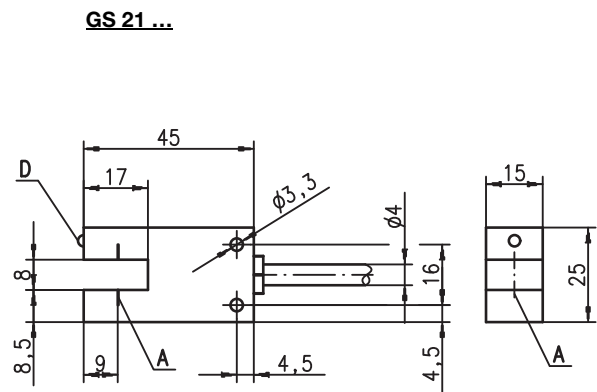
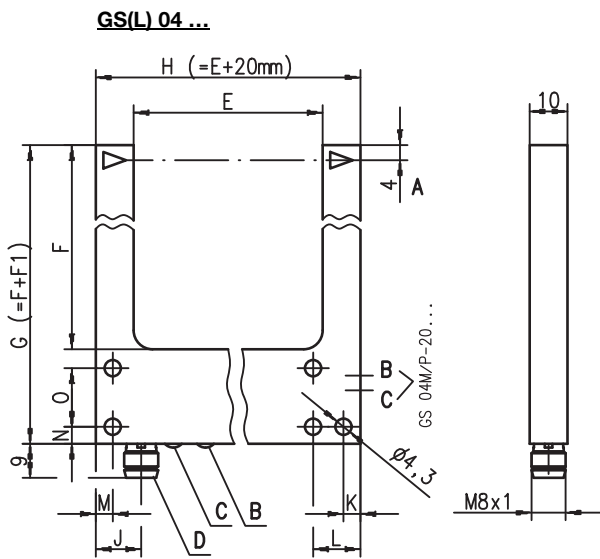
- 
**GS 61/(I)GS 63**  
 Mouth widths: 3 from **page 400** onwards
- 
**GK 14**  
 Mouth widths: 0.9 from **page 412** onwards
- 
**GSU 06**  
 Mouth widths: 2.5 from **page 416** onwards
- 
**GSU 14B**  
 Mouth widths: 4 from **page 416** onwards


## Using the sensors with different label materials

Sensors	Base material	Label material		
		PAPER	TRANSPARENT	METALLIZED
<b>Optical</b> forked sensors <b>GS 61, (I)GS 63</b>	PAPER	●		
	TRANSPARENT	●		
<b>Capacitive</b> forked sensors <b>GK 14</b>	PAPER	●	●	
	TRANSPARENT	●	●	
<b>Ultrasonic</b> forked sensors <b>GSU 06, GSU 14B</b>	PAPER	●	●	●
	TRANSPARENT	●	●	●

# OVERVIEW OF OPTICAL FORKED SENSORS

## Dimensioned drawing



 Further details can be found in the respective data sheet.




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

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




We reserve the right to make changes • GS\_04\_21\_Overview\_EN.fm

			
<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

## GS(L) 04 / GS 21

Optical forked sensors	Mouth widths	Page
 <b>Optical forked sensors GS 04</b>	20 / 30 / 50 / 80 / 120 / 220mm	396
 <b>Optical laser forked sensors GSL 04</b>	30 / 50 / 80 / 120mm	398
 <b>Optical forked sensors GS 21</b>	8mm	398

### Additional products - forked sensors:

 Optical forked sensors	GS 04	396
 Capacitive forked sensors	GK 14	412
 Ultrasonic forked sensors	GSU 06, GSU 14B	416

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	GS(L) 04: 10 ... 30VDC GS 21: 24VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA} / \leq 90\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Red LED	Switching output
<b>Mechanical data</b>	Housing GS(L) 04	Diecast zinc
	Housing GS 21	Aluminum, anodised
	Optics cover	Glass
	Weight	28g ... 220g
<b>Environmental data</b>	Ambient temperature (operation)	GS 04: $-10^\circ\text{C} \dots +60^\circ\text{C}$ GS 21: $-20^\circ\text{C} \dots +60^\circ\text{C}$
	VDE safety class	III
	Protection class	IP 67
	Standards applied	IEC 60947-5-2



### Features

- Sensitivity adjustment and light/dark switching on rear side of fork
- Visible red light and laser
- All common mouth widths



### Optical Sensor ABC

- Throughbeam sensors Page 563

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors</b>						
<b>GS 04 M/P - 20 - S8</b> 50110792	20	1500Hz	Red light	PNP	Light/dark reversible	0.33ms
<b>GS 04 M/P - 30 - S8</b> 50110782	30	1500Hz	Red light	PNP	Light/dark reversible	0.33ms
<b>GS 04 M/N - 30 - S8</b> 50110791	30	1500Hz	Red light	NPN	Light/dark reversible	0.33ms
<b>GS 04 M/P - 50 - S8</b> 50110783	50	1500Hz	Red light	PNP	Light/dark reversible	0.33ms
<b>GS 04 M/N - 50 - S8</b> 50110789	50	1500Hz	Red light	NPN	Light/dark reversible	0.33ms
<b>GS 04 M/P - 80 - S8</b> 50110784	80	1500Hz	Red light	PNP	Light/dark reversible	0.33ms
<b>GS 04 M/N - 80 - S8</b> 50110790	80	1500Hz	Red light	NPN	Light/dark reversible	0.33ms
<b>GS 04 M/P - 120 - S8</b> 50110785	120	1500Hz	Red light	PNP	Light/dark reversible	0.33ms
<b>GS 04 M/N - 120 - S8</b> 50110787	120	1500Hz	Red light	NPN	Light/dark reversible	0.33ms
<b>GS 04 M/P - 220 - S8</b> 50110786	220	1500Hz	Red light	PNP	Light/dark reversible	0.33ms
<b>GS 04 M/N - 220 - S8</b> 50110788	220	1500Hz	Red light	NPN	Light/dark reversible	0.33ms

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104521	K - D M8W - 3P - 2m - PVC	Connection cable 2000mm, M8 angular, 3-pin, PVC
b 50104520	K - D M8A - 3P - 2m - PVC	Connection cable 2000mm, M8 axial, 3-pin, PVC
c 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
d 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC

We reserve the right to make changes • GS\_04\_EN.fm

 <b>GS 04/21</b> Page 394	 <b>GS 61/63</b> Page 400	 <b>GK 14</b> Page 412	 <b>GSU 06/14B</b> Page 416
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**GS 04**  
Optical forked sensors



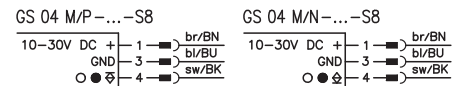
Repeatability	Connection	Option	Accessories
0.02mm	M8 connector	1, 2	a, b, c, d
0.02mm	M8 connector	1, 2	a, b, c, d
0.02mm	M8 connector	1, 2	a, b, c, d
0.04mm	M8 connector	1, 2	a, b, c, d
0.04mm	M8 connector	1, 2	a, b, c, d
0.06mm	M8 connector	1, 2	a, b, c, d
0.06mm	M8 connector	1, 2	a, b, c, d
0.08mm	M8 connector	1, 2	a, b, c, d
0.08mm	M8 connector	1, 2	a, b, c, d
0.08mm	M8 connector	1, 2	a, b, c, d
0.08mm	M8 connector	1, 2	a, b, c, d



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 UL approval (class 2 acc. to NEC)

[www.leuze.com/forked\\_sensors/](http://www.leuze.com/forked_sensors/)

## OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors</b>						
<b>GSL 04 M/P - 30 - S8</b> 50110793	30	5000Hz	Red light laser class 2	PNP	Light/dark reversible	0.1 ms
<b>GSL 04 M/P - 50 - S8</b> 50110794	50	5000Hz	Red light laser class 2	PNP	Light/dark reversible	0.1 ms
<b>GSL 04 M/P - 80 - S8</b> 50110795	80	5000Hz	Red light laser class 2	PNP	Light/dark reversible	0.1 ms
<b>GSL 04 M/P - 80.4 - S8</b> 50111362	80	5000Hz	Red light laser class 2	PNP	Light/dark reversible	0.1 ms
<b>GS 21 / 4 G, 5000</b> 50013967	8	1000Hz	Infrared light	PNP	Light	0.5 ms

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104521	K - D M8W - 3P - 2m - PVC	Connection cable 2000mm, M8 angular, 3-pin, PVC
b 50104520	K - D M8A - 3P - 2m - PVC	Connection cable 2000mm, M8 axial, 3-pin, PVC
c 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
d 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC





# GSL 04 / GS 21

Optical forked sensors



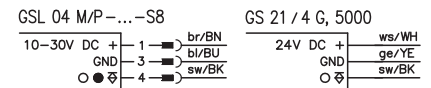
Repeatability	Connection	Option	Accessories
0.010mm	M8 connector	1	a, b, c, d
0.010mm	M8 connector	1	a, b, c, d
0.010mm	M8 connector	1	a, b, c, d
0.010mm	M8 connector	1, 2	a, b, c, d
	Cable, 5m		



### Optical Sensor ABC

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568
- Sensors w. laser transmitter Page 569

### Electrical connection



### Options

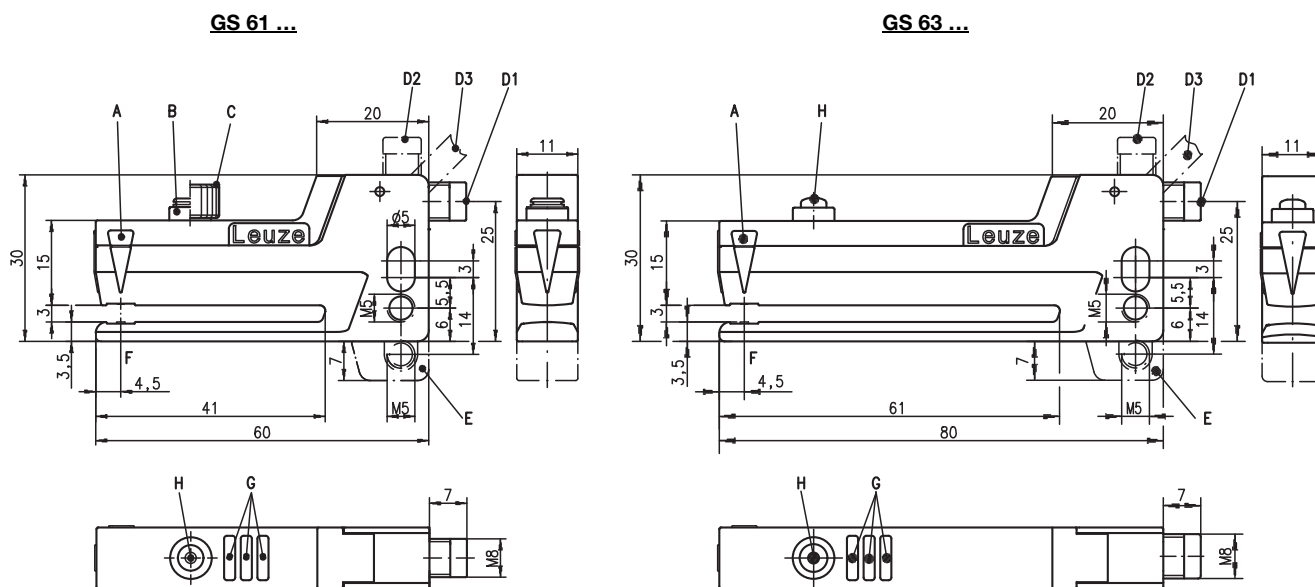
- 1 Sensitivity adjustment via potentiometer
- 2 Transparent objects

[www.leuze.com/forked\\_sensors/](http://www.leuze.com/forked_sensors/)

- Standard Sensors
- Measuring Sensors
- Ultrasonic Sensors
- Inductive Switches
- Forked Sensors
- Special Sensors
- Fiber Optic Sensors
- Light Curtains
- Protective Sensors
- Ex Sensors

# OVERVIEW OF OPTICAL FORKED SENSORS

## Dimensioned drawing





- A** Label center position
- B** Control element
- C** Knurled knob (removable)
- D** D1: horizontal connector, D2: vertical connector, D3: cable
- E** Mounting device BT-GS6X
- F** Optical axis
- G** Indicator diodes
- H** Teach button

**i** Further details can be found in the respective data sheet.





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<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

**GS 61 / (I)GS 63**

Optical forked sensors	Mouth width / mouth depth	Page
 <b>Optical forked sensors GS 61</b>	3mm / 40mm	402
 <b>Optical forked sensors (I)GS 63</b>	3mm / 60mm	408

**Additional products - forked sensors:**

 Optical forked sensors	GS 04, GSL 04, GS 21	394
 Capacitive forked sensors	GK 14	412
 Ultrasonic forked sensors	GSU 06, GSU 14B	416
 Measuring CCD forked sensors	GS 754	278



**Common technical data**

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 30\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching output
	LED red (optional)	teach / function error
<b>Mechanical data</b>	Housing	GS 61: plastic GS 63: metal/plastic
	Weight	20g ... 100g
<b>Environmental data</b>	Ambient temperature (operation)	-20°C ... +60°C
	VDE safety class	III
	Protection class	IP 65 <sup>1)</sup>
	Standards applied	IEC 60947-5-2, UL 508

1) With mounted connector

**Features**

- Precise detection of labels on base material
- Slim-line design for installation directly on the dispensing edge
- Smallest dimensions with excellent price / performance ratio
- High switching frequency of 10kHz
- Simple adjustment via multiturn potentiometer or teach-in button



**Optical Sensor ABC**

- Throughbeam sensors Page 563

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors with adjustment via multiturn potentiometer</b>						
<b>GS 61 / 6 - S8.3</b> 50110761	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6 - S8</b> 50110110	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6 - S8V</b> 50110112	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6</b> 50110769	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6, 200 - S12</b> 50112423	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6D - S8.3</b> 50110762	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D - S8</b> 50110111	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D - S8V</b> 50110113	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D</b> 50110770	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D, 200 - S12</b> 50112427	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC

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**GS 04/21**  
Page 394

**GS 61/63**  
Page 400

**GK 14**  
Page 412

**GSU 06/14B**  
Page 416

**GS 61**

Optical forked sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Repeatability <sup>1)</sup>	Connection	Option	Accessories
± 5 ... ± 40µm	M8 connector, 3-pin horizontal outlet	1, 4, 5	a, b
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	1, 4, 5	c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	1, 4, 5	c, d
± 5 ... ± 40µm	Cable, 2m	1, 4, 5	
± 5 ... ± 40µm	Cable, 0.2m, with M12 connector	1, 4, 5	e, f
± 5 ... ± 40µm	M8 connector, 3-pin horizontal outlet	1, 4, 5	a, b
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	1, 4, 5	c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	1, 4, 5	c, d
± 5 ... ± 40µm	Cable, 2m	1, 4, 5	
± 5 ... ± 40µm	Cable, 0.2m, with M12 connector	1, 4, 5	e, f

1) Linear, dependent on the conveyor speed, in range 25 ... 200m/min.

**Options**

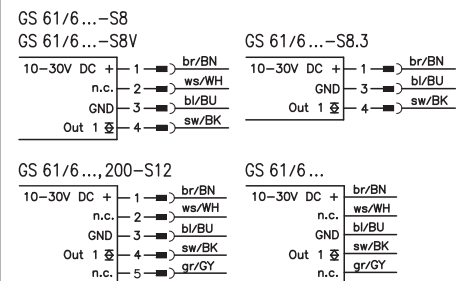
- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Sensitivity adjustment via teach button
- 3 Sensitivity adjustment via teach button and teach input
- 4 Removable operating head for potentiometer adjustment without tool
- 5 UL approval (class 2 acc. to NEC)



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



## OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors with adjustment via teach button/teach input</b>						
<b>GS 61 / 6.2 - S8.3</b> 50110765	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6.2 - S8</b> 50110108	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6.2 - S8V</b> 50110763	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6.2</b> 50110767	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6.2, 200 - S12</b> 50112422	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 61 / 6D.2 - S8.3</b> 50110766	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D.2 - S8</b> 50110109	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D.2 - S8V</b> 50110764	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D.2</b> 50110768	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6D.2, 200 - S12</b> 50112426	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
b 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC

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**GS 04/21**  
Page 394

**GS 61/63**  
Page 400

**GK 14**  
Page 412

**GSU 06/14B**  
Page 416

**GS 61**

Optical forked sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Repeatability <sup>1)</sup>	Connection	Option	Accessories
± 5 ... ± 40µm	M8 connector, 3-pin horizontal outlet	2, 4, 5	a, b
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	2, 4, 5	c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	2, 4, 5	c, d
± 5 ... ± 40µm	Cable, 2m outlet at 45°	2, 4, 5	
± 5 ... ± 40µm	Cable, 0.2m, outlet at 45°, with M12 connector	2, 4, 5	
± 5 ... ± 40µm	M8 connector, 3-pin horizontal outlet	2, 4, 5	a, b
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	2, 4, 5	c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	2, 4, 5	c, d
± 5 ... ± 40µm	Cable, 2m outlet at 45°	2, 4, 5	
± 5 ... ± 40µm	Cable, 0.2m, outlet at 45°, with M12 connector	2, 4, 5	

1) Linear, dependent on the conveyor speed, in range 25 ... 200m/min.

**Options**

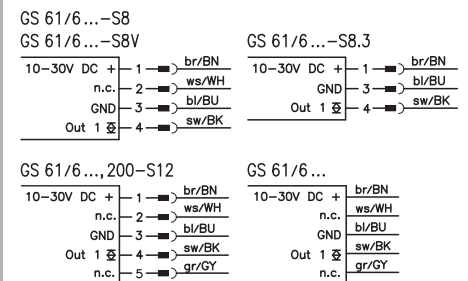
- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Sensitivity adjustment via teach button
- 3 Sensitivity adjustment via teach button and teach input
- 4 Removable operating head for potentiometer adjustment without tool
- 5 UL approval (class 2 acc. to NEC)



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



## OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors with adjustment via teach button/teach input</b>						
<b>GS 61 / 6.3</b> 50112424	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 61 / 6.3, 200 - S12</b> 50112425	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC



**GS 04/21**  
Page 394



**GS 61/63**  
Page 400



**GK 14**  
Page 412



**GSU 06/14B**  
Page 416



# GS 61

Optical forked sensors



Repeatability <sup>1)</sup>	Connection	Option	Accessories
± 5 ... ± 40 μm	Cable, 2m outlet at 45°	3, 5	
± 5 ... ± 40 μm	Cable, 0.2m, outlet at 45°, with M12 connector	3, 5	e, f

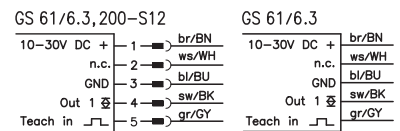
1) Linear, dependent on the conveyor speed, in range 25 ... 200m/min.



### Optical Sensor ABC

- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Sensitivity adjustment via teach button
- 3 Sensitivity adjustment via teach button and teach input
- 4 Removable operating head for potentiometer adjustment without tool
- 5 UL approval (class 2 acc. to NEC)

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# OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors with adjustment via teach button/teach input</b>						
<b>GS 63 / 6 - S8</b> 50112617	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05 ms
<b>GS 63 / 6 - S8V</b> 50112618	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05 ms
<b>GS 63 / 6</b> 50112615	3	10000Hz	Infrared light	2 x push-pull	PNP gap signal NPN label signal	typ. 0.05 ms
<b>GS 63 / 6, 200 - S12</b> 50112616	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05 ms
<b>GS 63 / 6D - S8</b> 50112620	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05 ms
<b>GS 63 / 6D</b> 50112619	3	10000Hz	Infrared light	2 x push-pull	PNP label signal NPN gap signal	typ. 0.05 ms
<b>GS 63 / 6D, 200 - S12</b> 50113790	3	10000Hz	Infrared light	2 x push-pull	PNP label signal NPN gap signal	typ. 0.05 ms

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC

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<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

**GS 63**

Optical forked sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Repeatability <sup>1)</sup>	Connection	Option	Accessories
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	1, 4, 5	a, b, c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	1, 4, 5	a, b, c, d
± 5 ... ± 40µm	Cable, 2m outlet at 45°	1, 4, 5	
± 5 ... ± 40µm	Cable, 0.2m, outlet at 45°, with M12 connector	1, 4, 5	a, b, c, d
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	1, 4, 5	a, b, c, d
± 5 ... ± 40µm	Cable, 2m outlet at 45°	1, 4, 5	
± 5 ... ± 40µm	Cable, 0.2m, outlet at 45°, with M12 connector	1, 4, 5	e, f

1) Linear, dependent on the conveyor speed, in range 25 ... 200m/min.

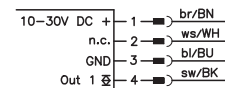


**Optical Sensor ABC**

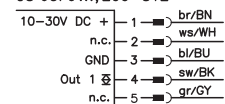
- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

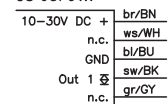
GS 63/6...-S8  
GS 63/6...-S8V



GS 63/6...,200-S12



GS 63/6...



**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Sensitivity adjustment via teach button
- 3 Sensitivity adjustment via teach button and teach input
- 4 Removable operating head for potentiometer adjustment without tool
- 5 UL approval (class 2 acc. to NEC)

# OPTICAL FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Light source	Output	Switching	Response time
<b>Optical forked sensors with adjustment via teach button/teach input</b>						
<b>GS 63 / 6.3 - S8</b> 50110104	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 63 / 6.3 - S8V</b> 50110106	3	10000Hz	Infrared light	1 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>IGS 63 / 6.3</b> 50110759	3	10000Hz	Infrared light	2 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>IGS 63 / 6.3, 200 - S12</b> 50112428	3	10000Hz	Infrared light	2 x push-pull	PNP gap signal NPN label signal	typ. 0.05ms
<b>GS 63 / 6D.3 - S8</b> 50110105	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>GS 63 / 6D.3 - S8V</b> 50110107	3	10000Hz	Infrared light	1 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>IGS 63 / 6D.3</b> 50110760	3	10000Hz	Infrared light	2 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms
<b>IGS 63 / 6D.3, 200 - S12</b> 50112429	3	10000Hz	Infrared light	2 x push-pull	PNP label signal NPN gap signal	typ. 0.05ms

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC

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<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

**(I)GS 63**

Optical forked sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Repeatability <sup>1)</sup>	Connection	Option	Accessories
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	3, 5	a, b, c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	3, 5	a, b, c, d
± 5 ... ± 40µm	Cable, 2m outlet at 45°	3, 4, 5	
± 5 ... ± 40µm	Cable, 2m outlet at 45°	3, 4, 5	e, f
± 5 ... ± 40µm	M8 connector, 4-pin horizontal outlet	3, 5	a, b, c, d
± 5 ... ± 40µm	M8 connector, 4-pin vertical outlet	3, 5	a, b, c, d
± 5 ... ± 40µm	Cable, 2m outlet at 45°	3, 4, 5	
± 5 ... ± 40µm	Cable, 2m outlet at 45°	3, 4, 5	e, f

1) Linear, dependent on the conveyor speed, in range 25 ... 200m/min.

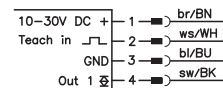


**Optical Sensor ABC**

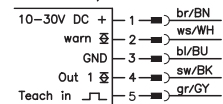
- Throughbeam sensors Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

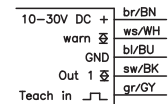
GS 63/6...-S8  
GS 63/6...-S8V



IGS 63/6...,200-S12



IGS 63/6...



**Options**

- 1 Sensitivity adjustment via multiturn potentiometer
- 2 Sensitivity adjustment via teach button
- 3 Sensitivity adjustment via teach button and teach input
- 4 Warning output
- 5 UL approval (class 2 acc. to NEC)

[www.leuze.com/forked\\_sensors/](http://www.leuze.com/forked_sensors/)

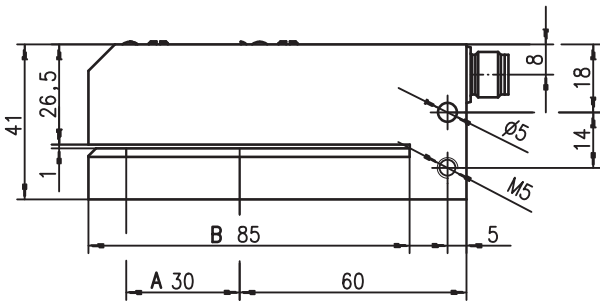
# OVERVIEW OF CAPACITIVE FORKED SENSORS



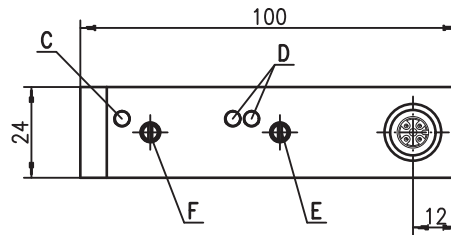
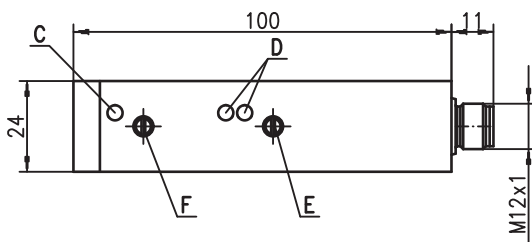
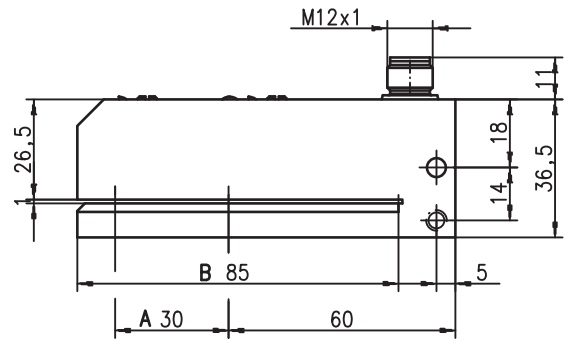
Detection of transparent labels

## Dimensioned drawing


**GK 14 / 24 L**



**GK 14 / 24 L.2**



- A** Sensor
- B** Mouth depth
- C** Switching output indicator diode
- D** Base adjustment indicator diode
- E** Base adjustment
- F** Sensitivity adjustment (clockwise rotation = increase in sensitivity)

 Further details can be found in the respective data sheet.




We reserve the right to make changes • GK\_14\_Overview\_EN.fm

			
<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

# GK 14

Capacitive forked sensors	Mouth widths	Page
 <b>Capacitive forked sensors GK 14</b>	0.9 ± 0.1 mm	414

**Additional products - forked sensors:**

 Optical forked sensors	GS 04, GSL 04, GS 21	394
 Optical forked sensors	GS 61, (I)GS 63	400
 Ultrasonic forked sensors	GSU 06, GSU 14B	416
 Measuring CCD forked sensors	GS 754	278



**Common technical data**

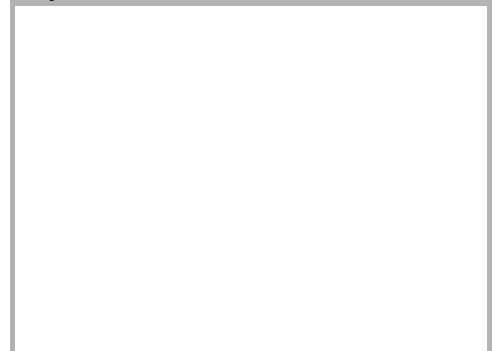
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	≤ 15% of $U_B$
	Open-circuit current	≤ 35mA
	Signal voltage high/low	≥ ( $U_B - 2V$ ) / ≤ 2V
<b>Indicators</b>	Yellow LED 1	Switching output
	Yellow LED 2	Base adjustment
<b>Mechanical data</b>	Housing	Aluminum, anodised
	Weight	175g
<b>Environmental data</b>	Ambient temperature (operation)	0°C ... +60°C
	VDE safety class	III
	Protection class	IP 65
	Standards applied	IEC 60947-5-2

**Features**

- Detection of paper and transparent labels
- Conveyor speeds up to 10m/s
- Attractive cost/performance ratio



**Optical Sensor ABC**



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## CAPACITIVE FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency	Sensor principle	Output	Switching	Response time
<b>Capacitive forked sensors</b>						
<b>GK 14 / 24 L</b> 50026371	0.9 ± 0.1	5000Hz	Capacitive	1 x NPN 1 x PNP	Light	0.1 ms
<b>GK 14 / 24 L.2</b> 50031714	0.9 ± 0.1	5000Hz	Capacitive	1 x NPN 1 x PNP	Light	0.1 ms

We reserve the right to make changes • GK\_14\_EN.fm

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104560	K - D M12W - 5P - 10m - PVC	Connection cable 10000mm, M12 angular, 5-pin, PVC
f 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC



**GS 04/21**  
Page 394

**GS 61/63**  
Page 400

**GK 14**  
Page 412

**GSU 06/14B**  
Page 416



# GK 14

Capacitive forked sensors



Repeatability	Connection	Option	Accessories
± 0.20mm	M12 connector	1, 2, 3	a, b, c, d, e, f
± 0.20mm	M12 connector <sup>1)</sup>	1, 2, 3	a, b, c, d, e, f

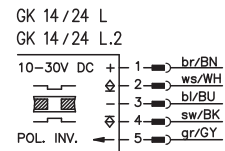
1) Plug outlet points upward



### Optical Sensor ABC

- Connection types Page 568
- Outputs Page 568

### Electrical connection

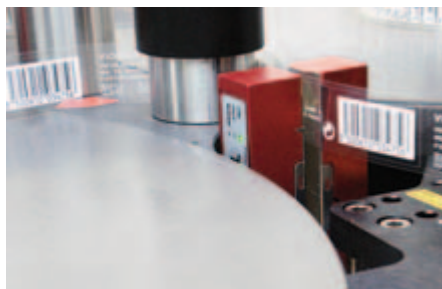


### Options

- 1 Sensitivity adjustment via potentiometer
- 2 Base adjustment via potentiometer
- 3 Inverting input for switching output signal

[www.leuze.com/forked\\_sensors/](http://www.leuze.com/forked_sensors/)

## OVERVIEW OF ULTRASONIC FORKED SENSORS



Detection of transparent labels

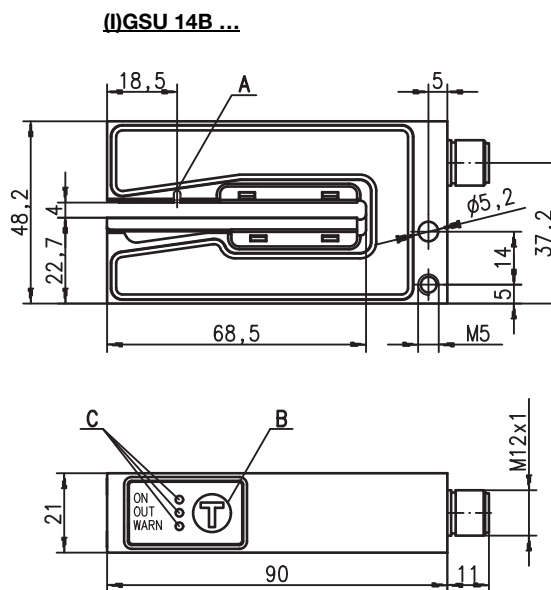
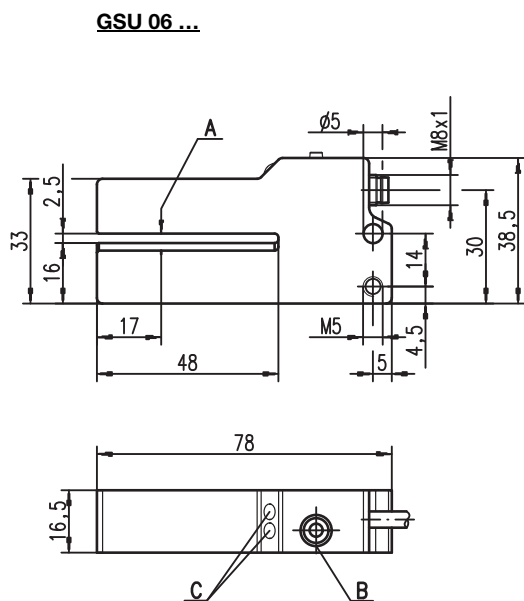


Detection of paper labels



Detection of metallized labels

### Dimensioned drawing





- A** Sensor marker (center of label tape)
- B** Teach-in button
- C** Indicator diodes

**i** Further details can be found in the respective data sheet.

We reserve the right to make changes • GSU\_06\_14\_Overview\_EN.fim

			
<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

## GSU 06 / (I)GSU 14B

Ultrasonic forked sensors	Mouth widths	Page
 <b>Ultrasonic forked sensors GSU 06</b>	2.5mm	418
 <b>Ultrasonic forked sensors (I)GSU 14B</b>	4mm	420

### Additional products - forked sensors:

 Optical forked sensors	GS 04, GSL 04, GS 21	394
 Optical forked sensors	GS 61, (I)GS 63	400
 Capacitive forked sensors	GK 14	412
 Measuring CCD forked sensors	GS 754	278

### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/12 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 40\text{mA}/\leq 70\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V})/\leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready/Teach-in
	Yellow LED	Switching point in the label gap
	Red LED	Teach/function error
<b>Mechanical data</b>	Housing	Aluminum, anodised
	Weight	60g / 160g
<b>Environmental data</b>	Ambient temperature (operation)	GSU 06: GSU 14B:
	VDE safety class	III
	Protection class	GSU 06: IP 62 GSU 14B: IP 65
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 525 onwards

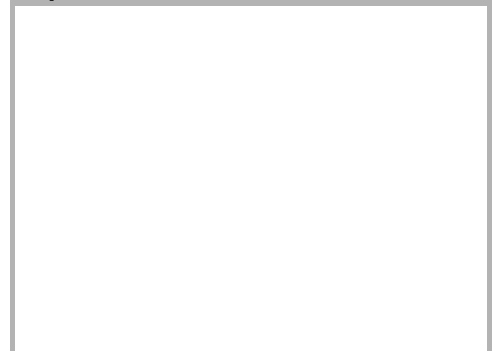


### Features

- Detection of paper, transparent and metallized labels
- Conveyor speeds up to 4m/s
- Simple adjustment via teach-in button or remote calibration



### Optical Sensor ABC



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# ULTRASONIC FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Switching frequency <sup>1)</sup>	Sensor principle	Output	Switching	Response time
<b>Ultrasonic forked sensors</b>						
<b>GSU 06 / 24 - 2 - S8</b> 50039638	2,5	2000 labels/min.	Ultrasonics	1 x NPN 1 x PNP	Light	0.15ms
<b>GSU 06 / 24 - 2</b> 50040191	2,5	2000 labels/min.	Ultrasonics	1 x NPN 1 x PNP	Light	0.15ms
<b>GSU 06 / 24D - 2 - S8</b> 50040190	2,5	2000 labels/min.	Ultrasonics	1 x NPN 1 x PNP	Dark	0.15ms
<b>GSU 06 / 24D - 2</b> 50040192	2,5	2000 labels/min.	Ultrasonics	1 x NPN 1 x PNP	Dark	0.15ms
<b>GSU 06 / 24D - 2, 200 - S12</b> 50108819	2,5	2000 labels/min.	Ultrasonics	1 x NPN 1 x PNP	Dark	0.15ms

- 1) Dependent on conveyor speed, label length and label gap  
 2) Material dependent  
 3) When using right-angle plugs, cable outlet must point upward!

We reserve the right to make changes • GSU\_06\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC	
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC	
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC	
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC	
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC	
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC	

			
<b>GS 04/21</b> Page 394	<b>GS 61/63</b> Page 400	<b>GK 14</b> Page 412	<b>GSU 06/14B</b> Page 416

# GSU 06

Ultrasonic forked sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Repeatability <sup>2)</sup>	Connection	Option	Accessories
±0.3mm	M8 connector	1, 4	a, b, c, d
±0.3mm	Cable, 2m	1, 2, 4	
±0.3mm	M8 connector	1, 4	a, b, c, d
±0.3mm	Cable, 2m	1, 2, 4	
±0.3mm	Cable, 0.2m, with M12 connector	1, 2, 4	e, f

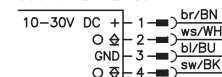


### Optical Sensor ABC

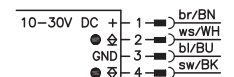
- Connection types Page 568
- Outputs Page 568

### Electrical connection

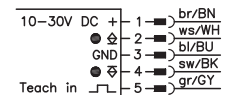
GSU 06/24-2-S8



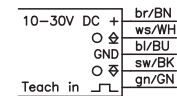
GSU 06/24 D-2-S8



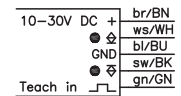
GSU 06/24 D-2, 200-S12



GSU 06/24-2



GSU 06/24 D-2



### Options

- 1 Teach-in via teach button
- 2 Teach-in via teach input
- 3 Forked sensor for tape-tear monitoring
- 4 UL approval

[www.leuze.com/forked\\_sensors/](http://www.leuze.com/forked_sensors/)

## ULTRASONIC FORKED SENSORS

Part description Part No.:	Mouth width [mm]	Conveyor speed [m/min.]	Sensor principle	Output	Switching	Response time
<b>Ultrasonic forked sensors</b>						
<b>IGSU 14B / 6.3 - S12</b> 50109276	4	≤ 240 <sup>1)</sup>	Ultrasonics	1 x Push-pull/DC	Light/dark antivalent	≤ 200 μs
<b>IGSU 14B / 6.31 - S12</b> 50111931	4	≤ 240 <sup>1)</sup>	Ultrasonics	1 x Push-pull/DC	Light/dark antivalent	≤ 200 μs
<b>IGSU 14B / 6D.3 - S12</b> 50109277	4	≤ 240 <sup>1)</sup>	Ultrasonics	1 x Push-pull/DC	Dark/light antivalent	≤ 200 μs
<b>GSU 14B / 66.3 - S12</b> 50109498	4	≤ 240 <sup>1)</sup>	Ultrasonics	2 x Push-pull/DC	Light/dark antivalent	≤ 200 μs
<b>GSU 14B / 66D.3 - S12</b> 50109499	4	≤ 240 <sup>1)</sup>	Ultrasonics	2 x Push-pull/DC	Dark/light antivalent	≤ 200 μs
<b>GSU 14B / 66D.31 - S12</b> 50111929	4	≤ 240 <sup>1)</sup>	Ultrasonics	2 x Push-pull/DC	Dark/light antivalent	≤ 200 μs

1) Label length ≥ 5 mm, label gap ≥ 2 mm

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104556	K - D M12W - 5P - 2m - PVC	Connection cable 2000mm, M12 angular, 5-pin, PVC
b 50104555	K - D M12A - 5P - 2m - PVC	Connection cable 2000mm, M12 axial, 5-pin, PVC
c 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
d 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
e 50104559	K - D M12A - 5P - 10m - PVC	Connection cable 10000mm, M12 axial, 5-pin, PVC
f 50109579	Extended carriage	Extended guide rail for GSU 14B, 260mm long

We reserve the right to make changes • GSU\_14B\_EN.fm



**GS 04/21**  
Page 394

**GS 61/63**  
Page 400

**GK 14**  
Page 412

**GSU 06/14B**  
Page 416

**(I)GSU 14B**  
Ultrasonic forked sensors



Repeatability <sup>1)</sup>	Connection	Option	Accessories
±0.2mm	M12 connector <sup>3)</sup>	1, 2, 3, 4, 5, 7	a, b, c, d, e, f
±0.2mm	M12 connector <sup>3)</sup>	1, 2, 3, 4, 5, 6, 7	a, b, c, d, e
±0.2mm	M12 connector	1, 2, 3, 4, 5, 7	a, b, c, d, e, f
±0.2mm	M12 connector	1, 2, 7	a, b, c, d, e, f
±0.2mm	M12 connector	1, 2, 7	a, b, c, d, e, f
±0.2mm	M12 connector	1, 2, 6, 7	a, b, c, d, e

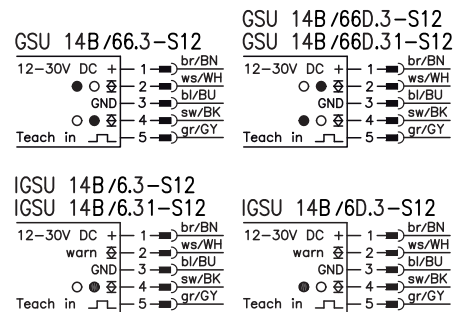
1) Depending on material, conveyor speed, label length and spacing between labels



**Optical Sensor ABC**

- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in via teach button
- 2 Teach-in via teach input
- 3 *easyTeach* function
- 4 ALC (auto level control) - online optimization of the switching threshold
- 5 Warning output
- 6 With extended carriage
- 7 UL approval (class 2 acc. to NEC)

[www.leuze.com/forked\\_sensors/](http://www.leuze.com/forked_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## SELECTION GUIDE

### Contrast scanners

#### Operating principle



Contrast scanners detect markings, even those with only slight contrast with respect to the background, at very high processing speeds. Automatic adaptation of the wavelength allows the slightest changes in grey value to be detected, independent of the color combination of the marking and background.

#### Products and typ. scanning ranges [mm]



**KRT... 3B**  
Scanning ranges: **14.5 / 60**

from **page 424** onwards



**KRT... 55**  
Scanning ranges: **14.5**

from **page 424** onwards



**KRT... 20B**  
Scanning ranges: **12 / 20 / 50**

from **page 424** onwards



**KRTM 20**  
Scanning ranges: **12 / 20 / 50**

from **page 424** onwards

#### Features

- Multicolor-, white-light- and laser contrast scanners available
- Detection of the slightest differences in contrast by means of highly dynamic transmitter regulation
- Various teach-in variants for optimum process integration
- Special functions can be enabled via a keyboard
- Temperature compensation ensures stable scanning over a long operating period

### Color sensors

#### Operating principle



Color sensors detect the color of an object by comparing with a taught-in reference color. They generate a switching signal when both colors match within a specified tolerance range.

#### Products and typ. scanning ranges [mm]



**CRT 20B**  
Scanning ranges: **12.5 / 60**

from **page 450** onwards



**CRT 442**  
Scanning ranges: **12.5**

from **page 450** onwards

#### Features

- Multicolor LED transmitter
- Color detection with incident light and transmitted light
- Detection of different colors via 1/4 digital outputs
- Up to four reference colors can be stored
- Programming via teach-in
- Analogue evaluation with transmitter switchover



**Luminescence scanners**

Operating principle



A luminescent material which is illuminated with blue light reflects light with a longer wavelength. This effect, combined with appropriate filtering, makes it possible to detect luminescent markings or materials, even on optically critical surfaces.

Products and typ. scanning ranges [mm]



**LRT 8**  
Scanning ranges: 0 ... 100

from **page 456** onwards



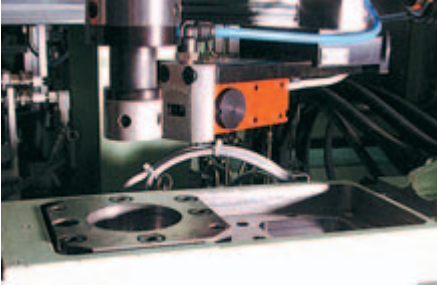
**LRT 440**  
Scanning ranges: 0 ... 150

from **page 456** onwards

Features

- UV LED transmitter
- Detection of visible and invisible luminescent material
- Luminescence scanners in various housings
- Filtering options
- PNP, NPN and analog outputs

# OVERVIEW OF CONTRAST SCANNERS



Slit and hole recognition

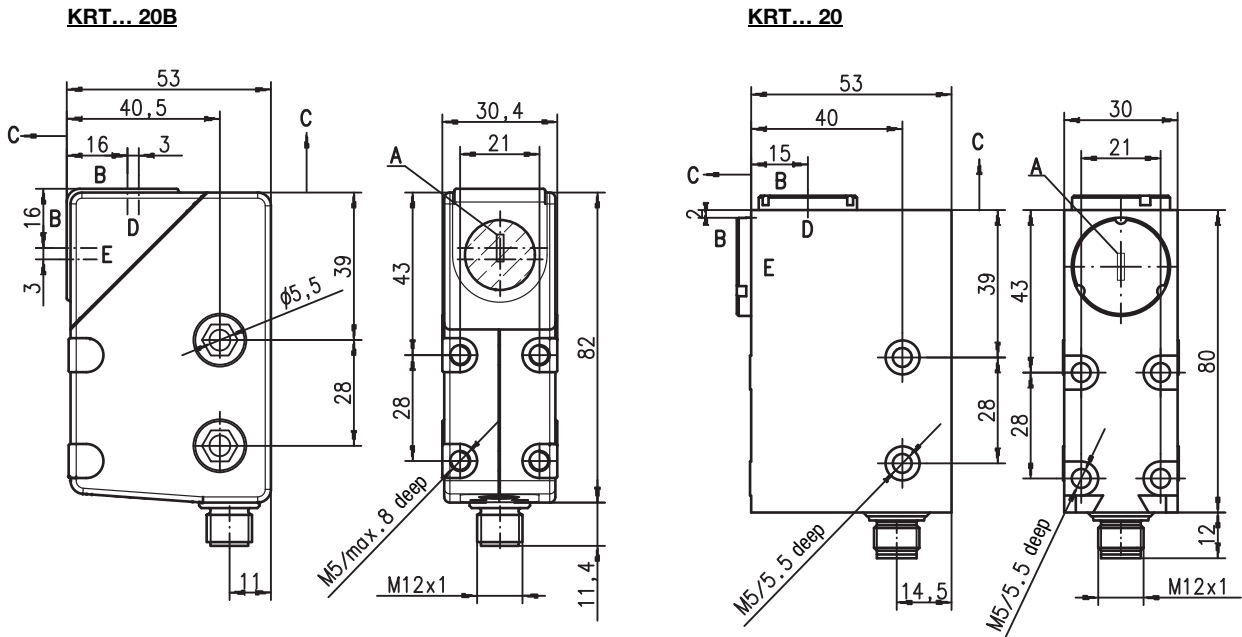


Mark detection



Dimensioned drawing KRT... 3B... see 3B Series standard sensors on page 32.  
 Dimensioned drawing KRT... 55... see 55 Series standard sensors on page 130.

## Dimensioned drawing






- A Vertical light spot orientation
- B Optical axis
- C Scanning range
- D Head
- E Front






Further details can be found in the respective data sheet.

We reserve the right to make changes • KRT\_Overview\_EN.fm

		
<b>KRT</b> Page 424	<b>CRT</b> Page 450	<b>LRT</b> Page 456

## KRT 3B / 55 / 20(B)

Contrast scanners	Scanning ranges	Page
 <b>Contrast scanner KRT... 3B</b>	14.5 / 60mm	426
 <b>Contrast scanner KRT... 55</b>	13mm	436
 <b>Contrast scanner KRT... 20(B)</b>	12 ... 50mm	442

### Additional products - special sensors:

 Color sensors	CRT 20B, CRT 442	450
 Luminescence scanners	LRT 8, LRT 440	456



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30/18 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA}/\leq 60\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V)/\leq 2V$
<b>Indicators</b>	Green LED	Ready, teach-in
	Yellow LED	Obj. detected, teach-in
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight (...3B/...55/...20)	10g/50g/300g
<b>Environmental data</b>	Ambient temperature (operation)	..3B: $-30^\circ\text{C} \dots +55^\circ\text{C}$
		Laser 3B: $-10^\circ\text{C} \dots +55^\circ\text{C}$
		..55/20B: $-30^\circ\text{C} \dots +55^\circ\text{C}$
	..20: $-25^\circ\text{C} \dots +60^\circ\text{C}$	
	VDE safety class	II, III for metal connector
	Protection class	IP 67, IP 69K
LED class	1 acc. to EN 60825-1	
Standards applied	IEC 60947-5-2, UL 508	

Mounting systems for this series can be found from page 526 onwards

### Features

- Multicolor, white light or laser light
- Variants with interchangeable objectives for scanning ranges of 12mm, 20mm and 50mm
- Models with memory for up to 128 different labels
- Analog and digital 10 $\mu\text{s}$  high-speed interface
- Automatic amplifier adaptation for shiny and dull cut marks
- IO-Link



### Optical Sensor ABC

- Contrast scanners Page 565

## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Multicolor contrast scanner</b>					
<b>KRTM 3B / 4.1121 - S8</b> 50110584	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 3B / 4.1121, 200 - S8</b> 50113785	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 3B / 4.1121, 200 - S12</b> 50110586	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 3B / 4.1221 - S8</b> 50110588	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 3B / 4.1221, 200 - S12</b> 50110590	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 3B / 4.2121 - S8</b> 50111768	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP

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### Accessories / connection cables

 More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC


**KRT**  
Page 424

**CRT**  
Page 450

**LRT**  
Page 456

**KRT 3B**  
Contrast scanners



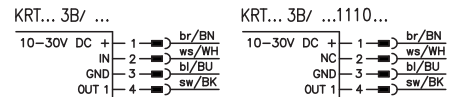
Connection	Option	Accessories
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 5, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 5, 6, 7, 8, 10	e, f
M8 connector	1, 5, 6, 7, 8, 9, 10	a, b, c, d



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Teach input
- Direct connection to AS-interface I/O coupling modules
- Static 1-point teach-in via teach button/line
- Static 2-point teach-in via teach button/line
- Dynamic 2-point teach-in via teach button/line
- Switching threshold adjustment with EasyTune via teach button
- Switchable pulse stretching
- Keyboard lockout
- Light spot orientation horizontal
- UL approval (class 2 acc. to NEC)

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## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Multicolor contrast scanner</b>					
<b>KRTM 3B / 2.1121 - S8</b> 50110585	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 3B / 2.1121, 200 - S12</b> 50110587	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 3B / 2.1221 - S8</b> 50110589	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 3B / 2.1221, 200 - S12</b> 50110591	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 3B / 6.1121 - S8</b> 50111312	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xPush-pull/DC
<b>KRTM 3B / 6.1221 - S8</b> 50111313	14.5 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xPush-pull/DC

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**KRT 3B**  
Contrast scanners



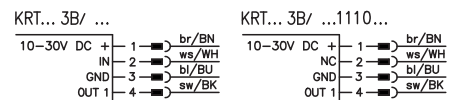
Connection	Option	Accessories
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 5, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 5, 6, 7, 8, 10	e, f
M8 connector	1, 4, 6, 7, 8, 9, 10	a, b, c, d
M8 connector	1, 5, 6, 7, 8, 9, 10	a, b, c, d



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Teach input
- Direct connection to AS-interface I/O coupling modules
- Static 1-point teach-in via teach button/line
- Static 2-point teach-in via teach button/line
- Dynamic 2-point teach-in via teach button/line
- Switching threshold adjustment with EasyTune via teach button
- Switchable pulse stretching
- Keyboard lockout
- IO-Link COM2
- UL approval (class 2 acc. to NEC)

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## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>White light contrast scanner</b>					
<b>KRTW 3B / 4.1110 - S8</b> 50110572	14.5 ± 2mm	10 ... 30VDC	6kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 3B / 4.1121 - S8</b> 50110576	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 3B / 4.1121, 200 - S12</b> 50110578	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 3B / 4.2121 - S8</b> 50111769	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 4.0 x 1.5mm <sup>2</sup>	1 x PNP
<b>KRTW 3B / 4.1321 - S8</b> 50110580	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 3B / 4.1321, 200 - S12</b> 50110582	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456



**KRT 3B**  
Contrast scanners



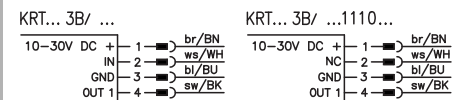
Connection	Option	Accessories
M8 connector	2, 4, 5, 10	a, b, c, d
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 4, 6, 7, 8, 9, 10	a, b, c, d
M8 connector	1, 3, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 3, 6, 7, 8, 10	e, f



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach input
- 2 Direct connection to AS-interface I/O coupling modules
- 3 Static 1-point teach-in via teach button/line
- 4 Static 2-point teach-in via teach button/line
- 5 Economy housing
- 6 Switching threshold adjustment with EasyTune via teach button
- 7 Switchable pulse stretching
- 8 Keyboard lockout
- 9 Light spot orientation horizontal
- 10 UL approval (class 2 acc. to NEC)

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## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>White light contrast scanner</b>					
<b>KRTW 3B / 2.1110 - S8</b> 50110573	14.5 ± 2mm	10 ... 30VDC	6kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xNPN
<b>KRTW 3B / 2.1121 - S8</b> 50110577	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xNPN
<b>KRTW 3B / 2.1121, 200 - S12</b> 50110579	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xNPN
<b>KRTW 3B / 2.1321 - S8</b> 50110581	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xNPN
<b>KRTW 3B / 2.1321, 200 - S12</b> 50110583	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xNPN
<b>KRTW 3B / 6.1121 - S8</b> 50111319	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xPush-pull/DC
<b>KRTW 3B / 6.1321 - S8</b> 50111320	14.5 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 xPush-pull/DC

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### Accessories / connection cables

 More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC


**KRT**  
Page 424

**CRT**  
Page 450

**LRT**  
Page 456

**KRT 3B**  
Contrast scanners



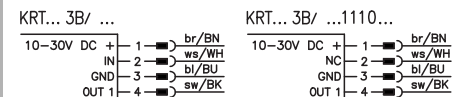
Connection	Option	Accessories
M8 connector	2, 4, 5, 10	a, b, c, d
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 3, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 3, 6, 7, 8, 10	e, f
M8 connector	1, 4, 6, 7, 8, 9, 10	a, b, c, d
M8 connector	1, 3, 6, 7, 8, 9, 10	a, b, c, d



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach input
- 2 Direct connection to AS-interface I/O coupling modules
- 3 Static 1-point teach-in via teach button/line
- 4 Static 2-point teach-in via teach button/line
- 5 Dynamic 2-point teach-in via teach button/line
- 6 Switching threshold adjustment with EasyTune via teach button
- 7 Switchable pulse stretching
- 8 Keyboard lockout
- 9 IO-Link COM2
- 10 UL approval (class 2 acc. to NEC)

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## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Laser contrast scanner</b>					
<b>KRTL 3B / 4.3111 - S8</b> 50110592	60 ± 20mm	10 ... 30VDC	4kHz	Red light laser class 1 0.5 x 1.0mm <sup>2</sup>	1 x PNP
<b>KRTL 3B / 4.3111, 200 - S12</b> 50110594	60 ± 20mm	10 ... 30VDC	4kHz	Red light laser class 1 0.5 x 1.0mm <sup>2</sup>	1 x PNP
<b>KRTL 3B / 2.3111 - S8</b> 50110593	60 ± 20mm	10 ... 30VDC	4kHz	Red light laser class 1 0.5 x 1.0mm <sup>2</sup>	1 x NPN
<b>KRTL 3B / 2.3111, 200 - S12</b> 50110595	60 ± 20mm	10 ... 30VDC	4kHz	Red light laser class 1 0.5 x 1.0mm <sup>2</sup>	1 x NPN
<b>KRTL 3B / 6.3111 - S8</b> 50111321	60 ± 20mm	10 ... 30VDC	4kHz	Red light laser class 1 0.5 x 1.0mm <sup>2</sup>	1 x Push-pull/DC

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**KRT 3B**  
Contrast scanners



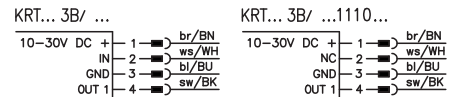
Connection	Option	Accessories
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 4, 6, 7, 8, 9, 10	a, b, c, d



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach input
- 2 Direct connection to AS-interface I/O coupling modules
- 3 Static 1-point teach-in via teach button/line
- 4 Static 2-point teach-in via teach button/line
- 5 Dynamic 2-point teach-in via teach button/line
- 6 Switching threshold adjustment with EasyTune via teach button
- 7 Switchable pulse stretching
- 8 Keyboard lockout
- 9 IO-Link COM2
- 10 UL approval (class 2 acc. to NEC)

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## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Multicolor contrast scanner</b>					
<b>KRTM 55 / 4.1121 - S8</b> 50111644	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 55 / 4.1121, 5000</b> 50114074	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 55 / 4.1121, 200 - S12</b> 50110611	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 55 / 4.1221 - S8</b> 50110613	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>KRTM 55 / 4.1221, 200 - S12</b> 50110615	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 x PNP

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**KRT 55**  
Contrast scanners



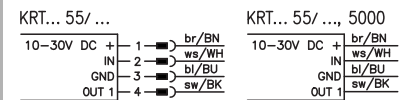
Connection	Option	Accessories
M8 connector	1, 4, 6, 7, 8, 9	a, b, c, d
Cable, 5 m	1, 4, 6, 7, 8, 9	
Cable, 0.2 m, with M12 connector	1, 4, 6, 7, 8, 9	e, f
M8 connector	1, 5, 6, 7, 8, 9	a, b, c, d
Cable, 0.2 m, with M12 connector	1, 5, 6, 7, 8, 9	e, f



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach input
- 2 IO-Link COM2
- 3 Static 1-point teach-in via teach button/line
- 4 Static 2-point teach-in via teach button/line
- 5 Dynamic 2-point teach-in via teach button/line
- 6 Switching threshold adjustment with EasyTune via teach button
- 7 Switchable pulse stretching
- 8 Keyboard lockout
- 9 UL approval (class 2 acc. to NEC)

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- Ex Sensors

## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Multicolor contrast scanner</b>					
<b>KRTM 55 / 2.1121 - S8</b> 50111610	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 55 / 2.1121, 200 - S12</b> 50110612	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 55 / 2.1221 - S8</b> 50110614	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 55 / 2.1221, 200 - S12</b> 50110616	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xNPN
<b>KRTM 55 / 6.1121 - S8</b> 50111643	13 ± 2mm	10 ... 30VDC	10kHz	RGB 1.5 x 6.5mm <sup>2</sup>	1 xPush-pull/DC

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC

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**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456



**KRT 55**  
Contrast scanners



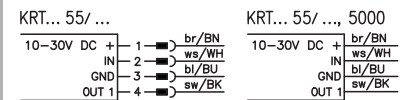
Connection	Option	Accessories
M8 connector	1, 4, 6, 7, 8, 9	a, b, c, d
Cable, 0.2m, with M12 connector	1, 4, 6, 7, 8, 9	e, f
M8 connector	1, 5, 6, 7, 8, 9	a, b, c, d
Cable, 0.2m, with M12 connector	1, 5, 6, 7, 8, 9	e, f
M8 connector	1, 2, 4, 6, 7, 8, 9	a, b, c, d



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach input
- 2 IO-Link COM2
- 3 Static 1-point teach-in via teach button/line
- 4 Static 2-point teach-in via teach button/line
- 5 Dynamic 2-point teach-in via teach button/line
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- Light Curtains
- Protective Sensors
- Ex Sensors

## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>White light contrast scanner</b>					
<b>KRTW 55 / 4.1121 - S8</b> 50111642	13 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 55 / 4.1121, 5000</b> 50114075	13 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 55 / 4.1121, 200 - S12</b> 50110602	13 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x PNP
<b>KRTW 55 / 2.1121 - S8</b> 50110601	13 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x NPN
<b>KRTW 55 / 2.1121, 200 - S12</b> 50110603	13 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x NPN
<b>KRTW 55 / 6.1121 - S8</b> 50111641	13 ± 2mm	10 ... 30VDC	10kHz	White light 1.5 x 4.0mm <sup>2</sup>	1 x Push-pull/DC

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC
e 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
f 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**KRT 55**  
Contrast scanners



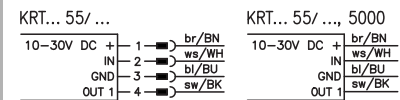
Connection	Option	Accessories
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 5 m	1, 4, 6, 7, 8, 10	
Cable, 0.2 m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 4, 6, 7, 8, 10	a, b, c, d
Cable, 0.2 m, with M12 connector	1, 4, 6, 7, 8, 10	e, f
M8 connector	1, 2, 4, 6, 7, 8, 10	a, b, c, d



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- Teach input
- IO-Link COM2
- Static 1-point teach-in via teach button/line
- Static 2-point teach-in via teach button/line
- Dynamic 2-point teach-in via teach button/line
- Switching threshold adjustment with EasyTune via teach button
- Switchable pulse stretching
- Keyboard lockout
- Light spot orientation horizontal
- UL approval (class 2 acc. to NEC)

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## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolor contrast scanners</b>					
<b>KRTM 20B/4.4110 - S12</b> 50112446	13.5 ± 3mm	10 ... 30VDC	6kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTM 20B/4.5110 - S12</b> 50112447	13.5 ± 3mm	10 ... 30VDC	6kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTM 20B/4.4121 - S12</b> 50111627	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTM 20B/4.4221 - S12</b> 50111633	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTM 20B/4.5121 - S12</b> 50111628	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTM 20B/4.5221 - S12</b> 50111634	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTM 20B/4.6121 - S12</b> 50111771	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 1.5 x 4mm <sup>2</sup>	PNP

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**KRT 20B**  
Contrast scanners



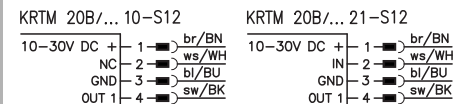
Connection	Option	Accessories
M12 connector	1, 4, 7	a, b, c, d, e, f
M12 connector	1, 5, 7	a, b, c, d, e, f
M12 connector	2, 4, 7	a, b, c, d, e, f
M12 connector	3, 4, 7	a, b, c, d, e, f
M12 connector	2, 5, 7	a, b, c, d, e, f
M12 connector	3, 5, 7	a, b, c, d, e, f
M12 connector	2, 4, 6, 7	a, b, c, d, e, f



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Static 2-point teach-in via teach button
- 2 Static 2-point teach-in via teach button/input
- 3 Dynamic 2-point teach-in via teach button/input
- 4 Light beam gate on face
- 5 Light beam gate on front
- 6 Light spot orientation horizontal
- 7 UL approval (class 2 acc. to NEC)

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Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolor contrast scanners</b>					
<b>KRTM 20B/2.4110 - S12</b> 50110600	13.5 ± 3mm	10 ... 30VDC	6kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTM 20B/2.5110 - S12</b> 50112445	13.5 ± 3mm	10 ... 30VDC	6kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTM 20B/2.4121 - S12</b> 50111629	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTM 20B/2.4221 - S12</b> 50111635	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTM 20B/2.5121 - S12</b> 50111630	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTM 20B/2.5221 - S12</b> 50111636	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTM 20B/6.4121 - S12</b> 50111625	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 1.5 x 4mm <sup>2</sup>	Push-pull/DC
<b>KRTM 20B/6.5121 - S12</b> 50111626	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	RGB light 1.5 x 4mm <sup>2</sup>	Push-pull/DC

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### Accessories / connection cables

 More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC


**KRT**  
Page 424

**CRT**  
Page 450

**LRT**  
Page 456

**KRT 20B**  
Contrast scanners



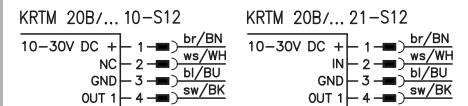
Connection	Option	Accessories
M12 connector	1, 4, 7	a, b, c, d, e, f
M12 connector	1, 5, 7	a, b, c, d, e, f
M12 connector	2, 4, 7	a, b, c, d, e, f
M12 connector	3, 4, 7	a, b, c, d, e, f
M12 connector	2, 5, 7	a, b, c, d, e, f
M12 connector	3, 5, 7	a, b, c, d, e, f
M12 connector	2, 4, 6, 7	a, b, c, d, e, f
M12 connector	2, 5, 6, 7	a, b, c, d, e, f



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Static 2-point teach-in via teach button
- 2 Static 2-point teach-in via teach button/input
- 3 Dynamic 2-point teach-in via teach button/input
- 4 Light beam gate on face
- 5 Light beam gate on front
- 6 IO-Link COM2
- 7 UL approval (class 2 acc. to NEC)

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Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## CONTRAST SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>White light contrast scanner RGB</b>					
<b>KRTW 20B/4.4121 - S12</b> 50111621	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	White light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTW 20B/4.5121 - S12</b> 50111622	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	White light 4.0 x 1.5mm <sup>2</sup>	PNP
<b>KRTW 20B/4.6121 - S12</b> 50111770	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	White light 1.5 x 4mm <sup>2</sup>	PNP
<b>KRTW 20B/2.4121 - S12</b> 50111623	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	White light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTW 20B/2.5121 - S12</b> 50111624	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	White light 4.0 x 1.5mm <sup>2</sup>	NPN
<b>KRTW 20B/6.4121 - S12</b> 50111619	13.5 ± 3mm	10 ... 30VDC	10kHz (internally)	White light 4.0 x 1.5mm <sup>2</sup>	Push-pull/DC

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456



**KRT 20B**  
Contrast scanners



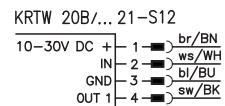
Connection	Option	Accessories	
M12 connector	1, 2, 6	a, b, c, d, e, f	
M12 connector	1, 3, 6	a, b, c, d, e, f	
M12 connector	1, 2, 4, 6	a, b, c, d, e, f	
M12 connector	1, 2, 6	a, b, c, d, e, f	
M12 connector	1, 3, 6	a, b, c, d, e, f	
M12 connector	1, 2, 5, 6	a, b, c, d, e, f	



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Static 2-point teach-in via teach button/input
- 2 Light beam gate on face
- 3 Light beam gate on front
- 4 Light spot orientation horizontal
- 5 IO-Link COM2
- 6 UL approval (class 2 acc. to NEC)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## CONTRAST SCANNERS

Part description Part No.:	Scanning range <sup>1)</sup>	Operating voltage	Switching frequency	Light source Light spot	Output
<b>RGB multicolor contrast scanners</b>					
<b>KRTM 20 M/P - 20 - 6320 - S12</b> 50113435	20 ± 2mm	12 ... 30VDC	25/50kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	PNP
<b>KRTM 20 M/P - 20 - 3320 - S12</b> 50114202	20 ± 2mm	12 ... 30VDC	25/50kHz (digital)	RGB light Ø 0.6mm	PNP
<b>KRTM 20 M/N - 20 - 6320 - S12</b> 50113436	20 ± 2mm	12 ... 30VDC	25/50kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	NPN
<b>KRTM 20 M/N - 20 - 3320 - S12</b> 50114201	20 ± 2mm	12 ... 30VDC	25/50kHz (digital)	RGB light Ø 0.6mm	NPN
<b>KRTM 20 M/V - 20 - 0004 - S12</b> 50041007	20 ± 2mm	12 ... 30VDC	16kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/V - 20 - 0001 - S12</b> 50035674	20 ± 2mm	12 ... 30VDC	16kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/C - 20 - 6526 - S12</b> 50113438	20 ± 2mm	12 ... 30VDC	25/50kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA PNP
<b>KRTM 20 M/C - 20 - 6626 - S12</b> 50113437	20 ± 2mm	12 ... 30VDC	25/50kHz (digital)	RGB light 4.0 x 1.2mm <sup>2</sup>	Analog/mA NPN

1) Other scanning ranges of 12 ± 1 mm or 50 ± 5 mm are possible by changing the objective.

We reserve the right to make changes • KRTM\_20\_1\_EN.fm

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 50034051	OB 12 - KRT 20	Objective for 12mm scanning range
d 50034050	OB 20 - KRT 20	Objective for 20mm scanning range
e 50034049	OB 50 - KRT 20	Objective for 50mm scanning range
f 50034118	WZ - OB - KRT 20	Tool for changing objectives



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**KRTM 20**  
Contrast scanners



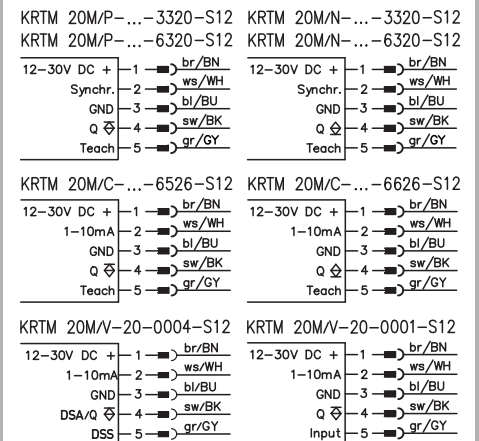
Connection	Option	Accessories
M12 connector	1, 2, 3, 6, 7, 8	a, b, c, d, e, f
M12 connector	1, 2, 3, 6, 7, 8	a, b, c, d, e, f
M12 connector	1, 2, 3, 6, 7, 8	a, b, c, d, e, f
M12 connector	1, 2, 3, 6, 7, 8	a, b, c, d, e, f
M12 connector	1, 4, 6, 7, 8	a, b, c, d, e, f
M12 connector	5, 8	a, b, c, d, e, f
M12 connector	1, 3, 6, 7, 8	a, b, c, d, e, f
M12 connector	1, 3, 6, 7, 8	a, b, c, d, e, f



**Optical Sensor ABC**

- Contrast scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

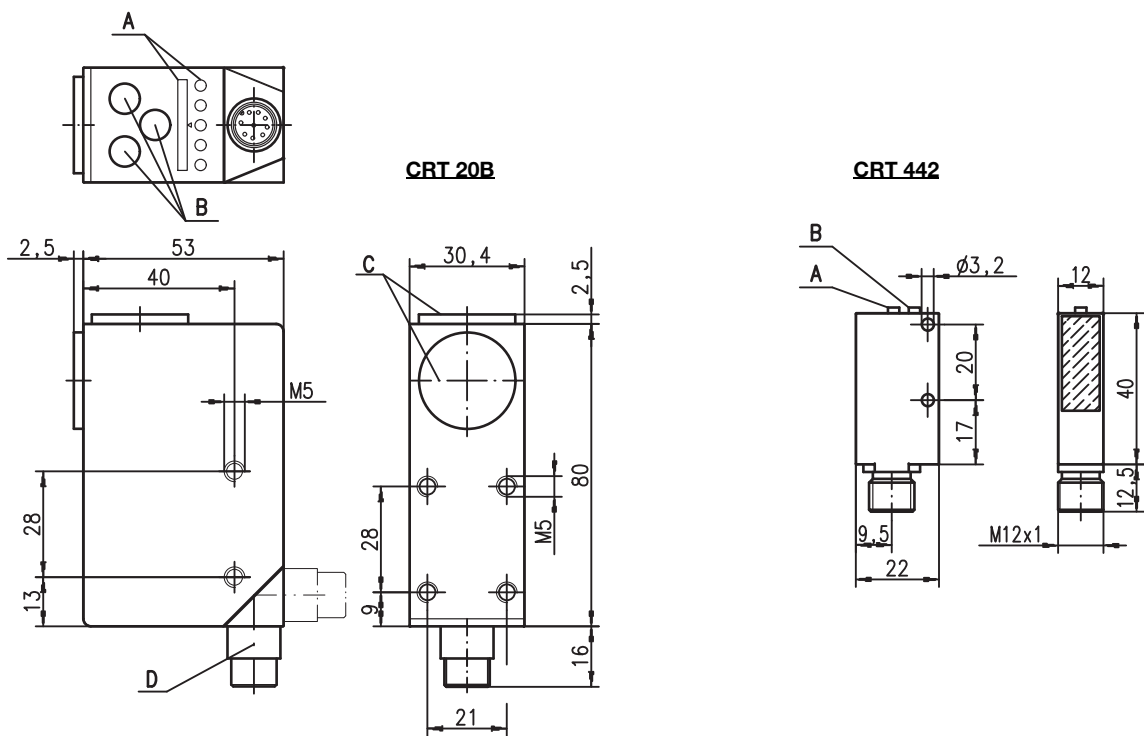
- 1 Static teach-in via teach button/line
- 2 Synchronous input
- 3 High resolution design: 70 gray levels for digital/ 400 gray levels for analog
- 4 Cut-marking system with memory for 128 data sets
- 5 Freely programmable via protocol interface (buttons disabled)
- 6 Switchable pulse stretching
- 7 Light/dark switching
- 8 UL approval

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- Standard Sensors
- Measuring Sensors
- Ultrasonic Sensors
- Inductive Switches
- Forked Sensors
- Special Sensors
- Fiber Optic Sensors
- Light Curtains
- Protective Sensors
- Ex Sensors

# OVERVIEW OF COLOR SENSORS

## Dimensioned drawing



- A** Display elements
- B** Control buttons
- C** Objective
- D** 90° turning connector



Further details can be found in the respective data sheet.

We reserve the right to make changes • CRT\_Overview\_EN.fm



**KRT**  
Page 424





**CRT**  
Page 450




**LRT**  
Page 456

## CRT 20B / 442

Color sensors	Scanning ranges	Page
 <b>Color sensors - digital output CRT 20B</b>	12.5 / 60mm	452
 <b>Color sensors - digital output CRT 442</b>	12.5mm	454

### Additional products - special sensors:

 Contrast scanners	KRT... 3B, KRTG 8, KRT... 20	424
 Luminescence scanners	LRT 8, LRT 440	456



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30 / 24VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 80\text{mA} / \leq 60\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Green LED	Ready to operate
	Yellow LED	Switching state/error
	Orange LED (CRT 448...)	Teach-in
<b>Mechanical data</b>	Housing	ABS / metal
	Optics cover	Glass
	Weight (...448/...20)	11 g/125g/300g
<b>Environmental data</b>	Ambient temperature (operation)	-10°C ... +55°C ...20: -25°C ... +55°C
	Protection class	IP 67
	LED class	1 acc. to EN 60825-1
	Standards applied	IEC 60947-5-2, UL 508

Mounting systems for this series can be found from page 526 onwards

### Features

- Scanning ranges of 12.5mm and 60mm
- Simple assignment of colors with teach function
- Reversible transmitter colors for sensitive measurement tasks
- High switching frequencies
- Up to 4 digital switching outputs



### Optical Sensor ABC

- Color sensors Page 565

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## COLOR SENSORS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Color sensors with digital output</b>					
<b>CRT 20B M/P - 60 - 001 - S12</b> 50109597	60mm	10 ... 30VDC	6kHz	RGB light 13.0 x 13.0mm <sup>2</sup>	1 x PNP
<b>CRT 20B M/P - 60 - 004 - S12</b> 50109601	60mm	10 ... 30VDC	3.5kHz	RGB light 13.0 x 13.0mm <sup>2</sup>	4x PNP
<b>CRT 20B M/N - 60 - 001 - S12</b> 50109595	60mm	10 ... 30VDC	6kHz	RGB light 13.0 x 13.0mm <sup>2</sup>	1xNPN
<b>CRT 20B M/N - 60 - 004 - S12</b> 50109599	60mm	10 ... 30VDC	3.5kHz	RGB light 13.0 x 13.0mm <sup>2</sup>	4xNPN
<b>CRT 20B M/P - 12 - 001 - S12</b> 50109596	12.5mm	10 ... 30VDC	6kHz	RGB light 4.0 x 2.0mm <sup>2</sup>	1 x PNP
<b>CRT 20B M/P - 12 - 004 - S12</b> 50109600	12.5mm	10 ... 30VDC	3.5kHz	RGB light 4.0 x 2.0mm <sup>2</sup>	4x PNP
<b>CRT 20B M/N - 12 - 001 - S12</b> 50109594	12.5mm	10 ... 30VDC	6kHz	RGB light 4.0 x 2.0mm <sup>2</sup>	1xNPN
<b>CRT 20B M/N - 12 - 004 - S12</b> 50109598	12.5mm	10 ... 30VDC	3.5kHz	RGB light 4.0 x 2.0mm <sup>2</sup>	4xNPN

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### Accessories / connection cables

 More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
b 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC
c 50104591	K - D M12A - 8P - 2m - PUR	Connection cable 2000mm, M12 axial, 8-pin, PUR
d 50104590	K - D M12A - 8P - 5m - PUR	Connection cable 5000mm, M12 axial, 8-pin, PUR


**KRT**  
Page 424

**CRT**  
Page 450

**LRT**  
Page 456

**CRT 20B**  
Color sensors



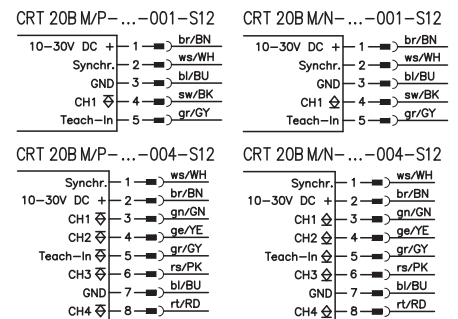
Connection	Option	Accessories
M12 connector	1, 3	a, b
M12 connector	2, 3	c, d
M12 connector	1, 3	a, b
M12 connector	2, 3	c, d
M12 connector	1, 3	a, b
M12 connector	2, 3	c, d
M12 connector	1, 3	a, b
M12 connector	2, 3	c, d



**Optical Sensor ABC**

- Color sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Color sensor with 1 channel, teach-in of reference color
- 2 Color sensor with 4 channels, teach-in of reference color
- 3 UL approval

[www.leuze.com/special\\_sensors/](http://www.leuze.com/special_sensors/)

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## COLOR SENSORS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source Light spot	Output
<b>Color sensors with digital output</b>					
<b>CRT 442 K/P - 12 - 001 - S12</b> 50109603	12.5 ± 2mm	24VDC ± 20%	1.5kHz	RGB light 1.5 x 6.5mm <sup>2</sup>	1 x PNP
<b>CRT 442 K/N - 12 - 001 - S12</b> 50109602	12.5 ± 2mm	24VDC ± 20%	1.5kHz	RGB light 1.5 x 6.5mm <sup>2</sup>	1xNPN

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104547	K - D M12W - 4P - 10m - PVC	Connection cable 10000mm, M12 angular, 4-pin, PVC
f 50104546	K - D M12A - 4P - 10m - PVC	Connection cable 10000mm, M12 axial, 4-pin, PVC

We reserve the right to make changes • CRT\_2\_EN.fm



**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456



**CRT 442**  
Color sensors



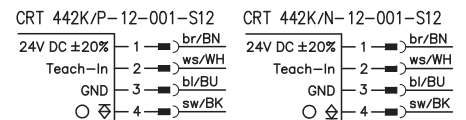
Connection	Option	Accessories
M12 connector	1, 2	a, b, c, d, e, f
M12 connector	1, 2	a, b, c, d, e, f



**Optical Sensor ABC**

- Color sensors Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Teach-in of reference color
- 2 UL approval

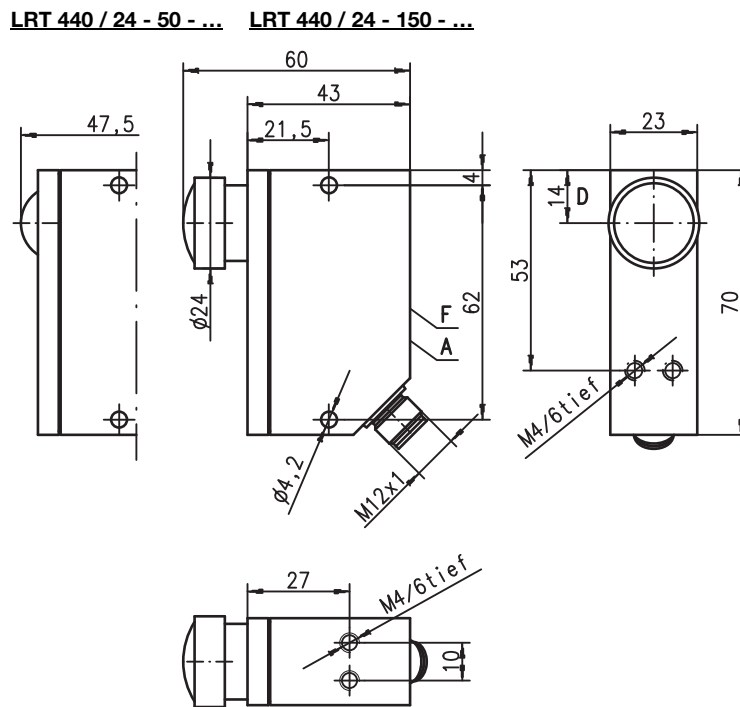
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# OVERVIEW OF LUMINESCENCE SCANNERS



Dimensioned drawing LRT 8... see 8 Series standard sensors on page 60.

## Dimensioned drawing



- A Indicator diode
- B Transmitter
- C Receiver
- D Optical axis
- E Sensitivity adjustment
- F Control button panel



Further details can be found in the respective data sheet.

We reserve the right to make changes • LRT\_Overview\_EN.fm



**KRT**  
Page 424





**CRT**  
Page 450



**LRT**  
Page 456

## LRT 8 / 440

Luminescence scanners	Scanning ranges	Page
 <b>Luminescence scanner LRT 8</b>	0 ... 50mm / 0 ... 100mm	458
 <b>Luminescence scanner LRT 440</b>	0 ... 150mm	458

### Additional products - special sensors:

 Contrast scanners	KRT... 3B, KRT... 55, KRT... 20	424
 Color sensors	CRTM 20, CRT 20B, CRT 442	450



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Open-circuit current	$\leq 35\text{mA} / \leq 40\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2\text{V}) / \leq 2\text{V}$
<b>Indicators</b>	Yellow LED	Obj. detected/Reflection
<b>Mechanical data</b>	Housing	Metal
	Optics cover	Glass
	Weight (...8/...440)	70g/250g
<b>Environmental data</b>	Ambient temperature (operation)	$-20^\circ\text{C} \dots +60^\circ\text{C}$
	Protection class	IP 67
	Standards applied	IEC 60947-5-2, UL 508 <sup>1)</sup>

1) LRT 8 only

Mounting systems for this series can be found from page 527 onwards

### Features

- Scanning ranges up to 150mm
- Among others, luminescence scanners in compact housings
- Filter possibility for distinguishing between different-colored luminescences
- Analog sensitivity adjustment via connector interface



### Optical Sensor ABC

- Luminescence scanners Page 565

Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

## LUMINESCENCE SCANNERS

Part description Part No.:	Scanning range	Operating voltage	Switching frequency	Light source	Output
<b>Luminescence scanners</b>					
<b>LRT 8 / 24.00 - 50 - S12</b> 50041839	0 ... 50mm	10 ... 30VDC	1500Hz	UV light, LED class 1M	1 x PNP 1 x NPN
<b>LRT 8 / 24.04 - 50 - S12</b> 50041840	0 ... 50mm	10 ... 30VDC	1500Hz	UV light, LED class 1M	1 x PNP 1 x NPN
<b>LRT 8 / 24.04 - 100 - S12</b> 50109343	0 ... 100mm	10 ... 30VDC	1500Hz	UV light, LED class 1M	1 x PNP 1 x NPN
<b>LRT 440 / 24 - 150 - 004 - S12</b> 50037909	0 ... 150mm	10 ... 30VDC	600Hz	UV light, laser class 3R	1 x PNP 1 x NPN
<b>LRT 440 / 24 - 50 - 104 - S12</b> 50037910	0 ... 50mm	10 ... 30VDC	600Hz	UV light, laser class 1	Analog/mA 1xPNP 1xNPN

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
f 50104557	K - D M12A - 5P - 5m - PVC	Connection cable 5000mm, M12 axial, 5-pin, PVC

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**KRT**  
Page 424



**CRT**  
Page 450



**LRT**  
Page 456

**LRT 8 / 440**  
Luminescence scanners



Connection	Option	Accessories
M12 connector	1, 3, 6, 7	e, f
M12 connector	1, 3, 4, 5, 6, 7	e, f
M12 connector	1, 3, 4, 5, 6, 7	e, f
M12 connector	2, 4, 5	a, b, c, d
M12 connector	2, 4, 5	e, f

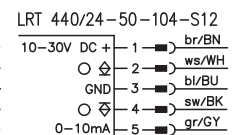
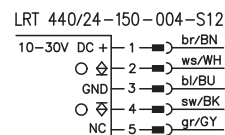
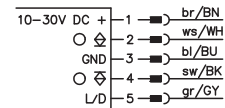


**Optical Sensor ABC**

- Luminescence scanners Page 565
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

LRT 8/24.00-50-S12  
LRT 8/24.04-50-S12  
LRT 8/24.04-100-S12



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Sensitivity adjustment in 256 levels via buttons
- 3 For detecting red luminescence
- 4 For detecting blue/colorless luminescence
- 5 For detecting yellow/yellow-green luminescence
- 6 Light/dark switching
- 7 UL approval

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Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

# OVERVIEW OF FIBER OPTIC AMPLIFIERS

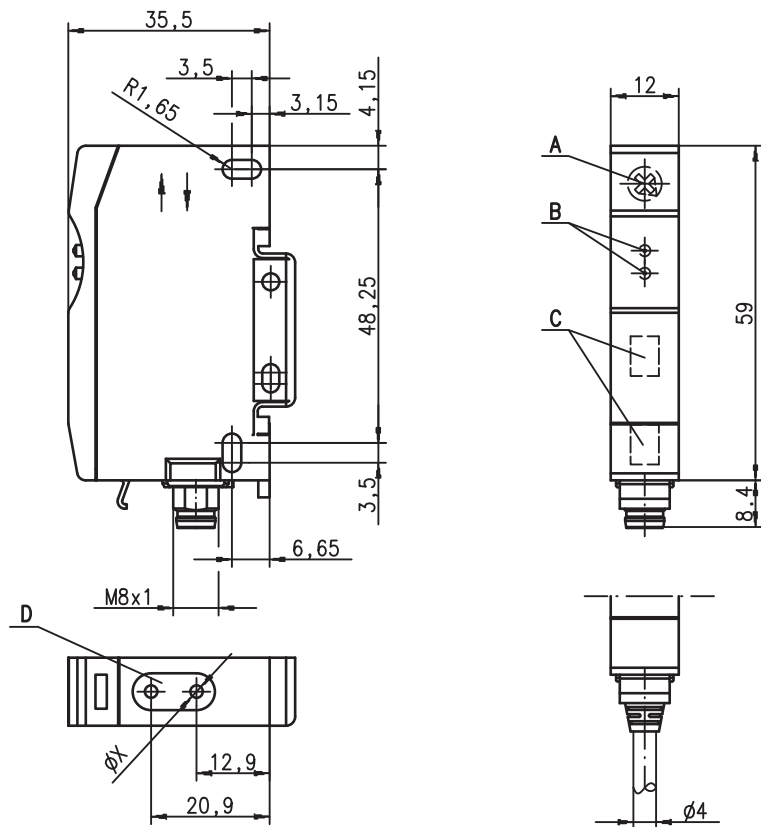
## Dimensioned drawing

	X
LVSR 325K/P-201	∅ 2.2
LVSR 325K/P-202-S8	∅ 2.2
LVSR 325K/N-201	∅ 2.2
LVSR 325K/N-202-S8	∅ 2.2
LVSR 325K/P-401	∅ 4
LVSR 325K/P-402-S8	∅ 4







Further details can be found in the respective data sheet.

- A** Fiber optics fixing screw
- B** Indicator diodes
- C** Sensitivity adjustment
- D** Fiber optics input



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<b>LVSR 325</b> Page 460	<b>LVSR 424</b> Page 464	<b>GF</b> Page 468	<b>KF</b> Page 474

## LVSR 325

Fiber optic amplifiers	Fiber optics	Page
 <b>Fiber optic amplifier LVSR 325</b>	Plastic / glass fiber	462


Additional products:		
 Fiber optic amplifier	LVSR 424	464
 Glass fiber optics	GF	468
 Plastic fiber optics	KF	474



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 25\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2V) / \leq 2V$
<b>Indicators</b>	Green LED	Ready/Teach-in
	Yellow LED	Switching output
	Red LED	Performance res./Teach-in
<b>Mechanical data</b>	Housing	Plastic
	Fiber optic connection	Screw connection
	Weight (without cable)	30g
<b>Environmental data</b>	Ambient temperature (operation)	$-20^\circ\text{C} \dots +70^\circ\text{C}$
	Protection class	IP 65

**Features**

- For plastic or glass fiber optics
- Teach-in for optimum sensitivity adjustment
- Activation or teach input
- Warning output



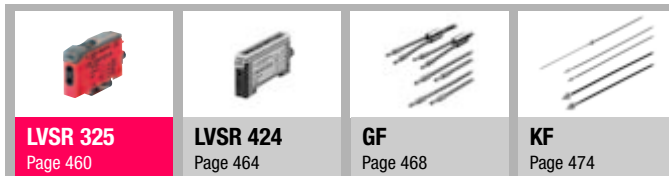
Optical Sensor ABC	
● Fiber optic sensors	Page 566

## FIBER OPTIC AMPLIFIERS

Part description Part No.:	Fiber optics	Light source	Output	Switching
<b>Fiber optic amplifiers for glass and plastic fiber optic cables</b>				
<b>LVSr 325 K / P - 402 - S8</b> 50081301	Glass fiber GF, Ø 4 mm	Red light	PNP	Light/dark configurable
<b>LVSr 325 K / P - 401</b> 50081300	Glass fiber GF, Ø 4 mm	Red light	PNP	Light/dark configurable
<b>LVSr 325 K / P - 202 - S8</b> 50081298	Plastic KF, Ø 2.2 mm	Red light	PNP	Light/dark configurable
<b>LVSr 325 K / P - 201</b> 50081297	Plastic KF, Ø 2.2 mm	Red light	PNP	Light/dark configurable
<b>LVSr 325 K / N - 202 - S8</b> 50033579	Plastic KF, Ø 2.2 mm	Red light	NPN	Light/dark configurable
<b>LVSr 325 K / N - 201</b> 50033581	Plastic KF, Ø 2.2 mm	Red light	NPN	Light/dark configurable

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Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards	
Part No.	Designation	Features	
a 50104525	K - D M8W - 4P - 2m - PVC	Connection cable 2000mm, M8 angular, 4-pin, PVC	
b 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC	
c 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC	
d 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC	
e 50104529	K - D M8W - 4P - 10m - PVC	Connection cable 10000mm, M8 angular, 4-pin, PVC	
f 50104528	K - D M8A - 4P - 10m - PVC	Connection cable 10000mm, M8 axial, 4-pin, PVC	





**LVSr 325**  
Fiber optic amplifiers

Connection	Option	Accessories
M8 connector	1	a, b, c, d, e, f
Cable, 2m	1	
M8 connector	1	a, b, c, d, e, f
Cable, 2m	1	
M8 connector	1	a, b, c, d, e, f
Cable, 2m	1	

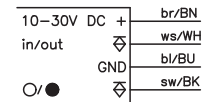


**Optical Sensor ABC**

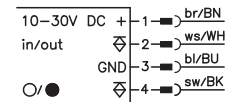
- Fiber optic sensors Page 566
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

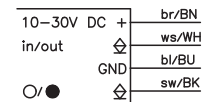
LVSr 325K/P-201  
LVSr 325K/P-401



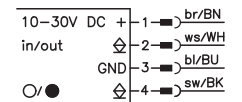
LVSr 325K/P-202-S8  
LVSr 325K/P-402-S8



LVSr 325K/N-201



LVSr 325K/N-202-S8



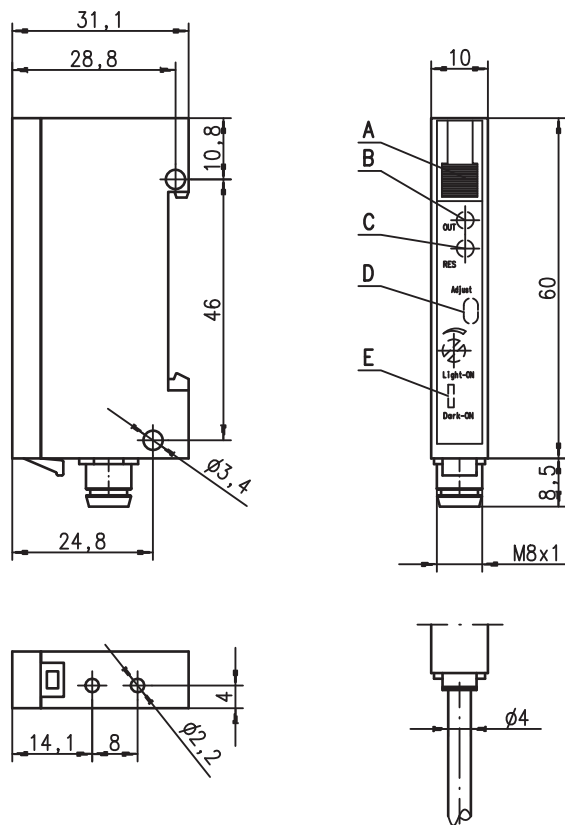
**Options**

- 1 Teach-in via buttons

# OVERVIEW OF FIBER OPTIC AMPLIFIERS

## Dimensioned drawing

**i** Further details can be found in the respective data sheet.



- A** Clamping lever for fiber optic
- B** Yellow indicator diode
- C** Green indicator diode
- D** Sensitivity adjustment
- E** Light/dark switching

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**LVS 325**  
Page 460



**LVS 424**  
Page 464



**GF**  
Page 468



**KF**  
Page 474

## LVSR 424

Fiber optic amplifiers	Fiber optics	Page
 <b>Fiber optic amplifier LVSR 424</b>	Plastic	466

### Additional products:

 Fiber optic amplifier	LVSR 325	460
 Glass fiber optics	GF	468
 Plastic fiber optics	KF	474



### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	10 ... 30VDC
	Residual ripple	$\leq 10\%$ of $U_B$
	Open-circuit current	$\leq 15\text{mA}$
	Signal voltage high/low	$\geq (U_B - 2,5\text{V}) / \leq 2,5\text{V}$
<b>Indicators</b>	Green LED	Performance reserve
	Yellow LEDs	Object detected
<b>Mechanical data</b>	Housing	Plastic (PBTP)
	Fiber optic connection	Clamp
	Weight (without cable)	18g
<b>Environmental data</b>	Ambient temperature (operation)	$-25^\circ\text{C} \dots +55^\circ\text{C}$
	Protection class	IP 64
	Standards applied	IEC 60947-5-2

### Features

- For plastic fiber optics
- 12-turn potentiometer for sensitivity adjustment
- Warning output
- 3-pin or 4-pin plug connection



### Optical Sensor ABC

- Fiber optic sensors Page 566

## FIBER OPTIC AMPLIFIERS

Part description Part No.:	Fiber optics	Light source	Output	Switching
<b>Fiber optic amplifiers for plastic fiber optics</b>				
<b>LVSr 424 / P - 203 - S8</b> 50102992	Plastic KF, Ø 2.2mm	Red light	PNP	Light/dark reversible
<b>LVSr 424 / P - 204 - S8</b> 50103475	Plastic KF, Ø 2.2mm	Red light	PNP	Light/dark reversible
<b>LVSr 424 / P - 204</b> 50103515	Plastic KF, Ø 2.2mm	Red light	PNP	Light/dark reversible
<b>LVSr 424 / N - 204 - S8</b> 50107069	Plastic KF, Ø 2.2mm	Red light	NPN	Light/dark reversible
<b>LVSr 424 / N - 204</b> 50103516	Plastic KF, Ø 2.2mm	Red light	NPN	Light/dark reversible

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104521	K - D M8W - 3P - 2m - PVC	Connection cable 2000mm, M8 angular, 3-pin, PVC
b 50104520	K - D M8A - 3P - 2m - PVC	Connection cable 2000mm, M8 axial, 3-pin, PVC
c 50104523	K - D M8W - 3P - 5m - PVC	Connection cable 5000mm, M8 angular, 3-pin, PVC
d 50104522	K - D M8A - 3P - 5m - PVC	Connection cable 5000mm, M8 axial, 3-pin, PVC
e 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
f 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC

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**LVSr 325**  
Page 460



**LVSr 424**  
Page 464



**GF**  
Page 468



**KF**  
Page 474

**LVSr 424**  
Fiber optic amplifiers

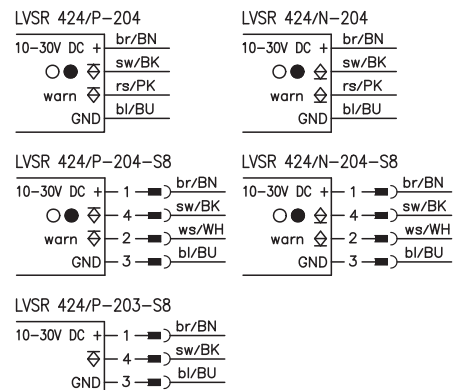
Connection	Option	Accessories
M8 connector, 3-pin	1	a, b, c, d
M8 connector, 4-pin	1, 2	e, f
Cable, 2m	1, 2	
M8 connector, 4-pin	1, 2	e, f
Cable, 2m	1, 2	



**Optical Sensor ABC**

- Fiber optic sensors Page 566
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via 12-turn potentiometer
- 2 Warning output

[www.leuze.com/fibre\\_optics/](http://www.leuze.com/fibre_optics/)

Standard Sensors  
Measuring Sensors  
Ultrasonic Sensors  
Inductive Switches  
Forked Sensors  
Special Sensors  
Fiber Optic Sensors  
Light Curtains  
Protective Sensors  
Ex Sensors

# GLASS FIBER OPTICS

Dimensioned drawing of light beam gate	Part description Part No.:	Operating range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: throughbeam sensor</b>				
	<b>GF 500 / 1 LS - MS</b> 50001030	250mm <sup>2)</sup>	500mm Brass	Ø 1.14mm
	<b>GF 1000 / 1 LS - MS</b> 50001032	250mm <sup>2)</sup>	1000mm Brass	Ø 1.14mm
	<b>GF 500 / 1 LS - VA</b> 50000042	250mm <sup>2)</sup>	500mm Stainless steel	Ø 1.14mm
	<b>GF 1000 / 1 LS - VA</b> 50000044	250mm <sup>2)</sup>	1000mm Stainless steel	Ø 1.14mm
	<b>GF 500 / 1 LS - SI</b> 50006779	250mm <sup>2)</sup>	500mm Silicone	Ø 1.3mm
	<b>GF 1000 / 1 LS - SI</b> 50000036	250mm <sup>2)</sup>	1000mm Silicone	Ø 1.3mm

1) Operation and storage temp.

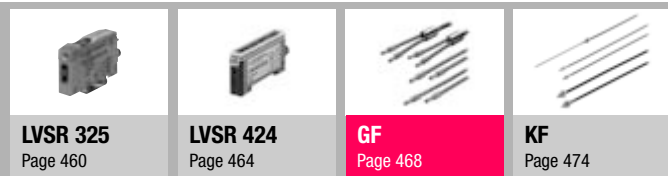
Brass: -30°C ... +200°C  
 Stainl. steel: -30°C ... +200°C (for short periods +300°C)  
 Silicone: -30°C ... +180°C (for short periods +200°C)

2) In combination with LVSR 325

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## Accessories

Part No.	Designation	Features
1 50014649	GF - L1	Lens for glass fiber optics
2 50009382	GF - U1	Deflectors for glass fiber optics



**LVSR 325**  
Page 460

**LVSR 424**  
Page 464

**GF**  
Page 468

**KF**  
Page 474

Dimensioned drawing of light beam gate	Part description Part No.:	Operating range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: throughbeam sensor</b>				
	<b>GF 500 / 4 LS - MS</b> 50001031	300mm <sup>2)</sup>	500mm Brass	Ø 2.28mm
	<b>GF 1000 / 4 LS - MS</b> 50001033	300mm <sup>2)</sup>	1000mm Brass	Ø 2.28mm
	<b>GF 1500 / 4 LS - MS</b> 50021192	300mm <sup>2)</sup>	1500mm Brass	Ø 2.28mm
	<b>GF 2000 / 4 LS - MS</b> 50000051	300mm <sup>2)</sup>	2000mm Brass	Ø 2.28mm
	<b>GF 3000 / 4 LS - MS</b> 50024604	300mm <sup>2)</sup>	3000mm Brass	Ø 2.28mm
	<b>GF 500 / 4 LS - VA</b> 50000043	300mm <sup>2)</sup>	500mm Stainless steel	Ø 2.28mm
	<b>GF 1000 / 4 LS - VA</b> 50000045	300mm <sup>2)</sup>	1000mm Stainless steel	Ø 2.28mm
	<b>GF 1500 / 4 LS - VA</b> 50018698	300mm <sup>2)</sup>	1500mm Stainless steel	Ø 2.28mm
	<b>GF 2000 / 4 LS - VA</b> 50009331	300mm <sup>2)</sup>	2000mm Stainless steel	Ø 2.28mm
	<b>GF 3000 / 4 LS - VA</b> 50039145	300mm <sup>2)</sup>	3000mm Stainless steel	Ø 2.28mm
<b>GF 5000 / 4 LS - VA</b> 50022139	300mm <sup>2)</sup>	5000mm Stainless steel	Ø 2.28mm	



Fiber optics available in lengths up to 6m.

## GLASS FIBER OPTICS

Dimensioned drawing of light beam gate	Part description Part No.:	Operating range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: throughbeam sensor</b>				
	<b>GF 500 / 4 LS - SI</b> 50000035	300mm <sup>2)</sup>	500mm Silicone	Ø 2.3mm
	<b>GF 1000 / 4 LS - SI</b> 50000037	300mm <sup>2)</sup>	1000mm Silicone	Ø 2.3mm
	<b>GF 2000 / 4 LS - SI</b> 50041611	300mm <sup>2)</sup>	2000mm Silicone	Ø 2.3mm
	<b>GF 3000 / 4 LS - SI</b> 50036128	300mm <sup>2)</sup>	3000mm Silicone	Ø 2.3mm

- 1) Operation and storage temp.      Brass: -30°C ... +200°C  
 Stainl. steel: -30°C ... +200°C (for short periods +300°C)  
 Silicone: -30°C ... +180°C (for short periods +200°C)
- 2) In combination with LVSR 325

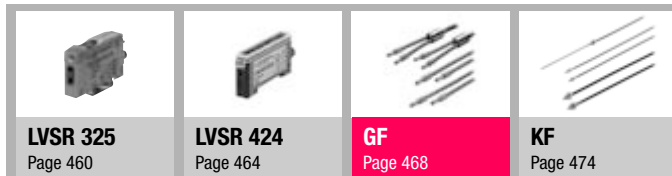


Fiber optics available in lengths up to 6m.

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### Accessories

Part No.	Designation	Features
1 50014649	GF - L1	Lens for glass fiber optics
2 50009382	GF - U1	Deflectors for glass fiber optics



**LVSR 325**  
Page 460

**LVSR 424**  
Page 464

**GF**  
Page 468

**KF**  
Page 474



Dimensioned drawing of light beam gate	Part description Part No.:	Scanning range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: diffuse reflection scanner</b>				
	<b>GF 500 / 1 RT - MS</b> 50001034	50mm <sup>2)</sup>	500mm Brass	Ø 1.8mm
	<b>GF 1000 / 1 RT - MS</b> 50001036	50mm <sup>2)</sup>	1000mm Brass	Ø 1.8mm
	<b>GF 1500 / 1 RT - MS</b> 50019341	50mm <sup>2)</sup>	1500mm Brass	Ø 1.8mm
	<b>GF 600 / 1 RT - MS - D5 - L10</b> 50105340	20mm <sup>2)</sup>	600mm Brass	Ø 1.0mm
	<b>GF 1000 / 1 RT - MS.1</b> 50011508	20mm <sup>2)</sup>	1000mm Brass	Ø 1.0mm
	<b>GF 500 / 1 RT - VA</b> 50000046	50mm <sup>2)</sup>	500mm Stainless steel	Ø 1.8mm
	<b>GF 1000 / 1 RT - VA</b> 50000048	50mm <sup>2)</sup>	1000mm Stainless steel	Ø 1.8mm
	<b>GF 500 / 1 RT - SI</b> 50000038	50mm <sup>2)</sup>	500mm Silicone	Ø 1.8mm
	<b>GF 1000 / 1 RT - SI</b> 50000040	50mm <sup>2)</sup>	1000mm Silicone	Ø 1.8mm
	<b>GF 600 / 1 RT - Si - W - 1.5</b> 50034368	20mm <sup>2)</sup>	600mm Silicone	Ø 1.0mm

## GLASS FIBER OPTICS

Dimensioned drawing of light beam gate	Part description Part No.:	Scanning range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: diffuse reflection scanner</b>				
	<b>GF 500 / 4 RT - MS</b> 50001035	80mm <sup>2)</sup>	500mm Brass	Ø 3.5mm
	<b>GF 1000 / 4 RT - MS</b> 50001037	80mm <sup>2)</sup>	1000mm Brass	Ø 3.5mm
	<b>GF 1500 / 4 RT - MS</b> 50023019	80mm <sup>2)</sup>	1500mm Brass	Ø 3.5mm
	<b>GF 2000 / 4 RT - MS</b> 50000053	80mm <sup>2)</sup>	2000mm Brass	Ø 3.5mm
	<b>GF 2500 / 4 RT - MS</b> 50039392	80mm <sup>2)</sup>	2500mm Brass	Ø 3.5mm
	<b>GF 3000 / 4 RT - MS</b> 50022551	80mm <sup>2)</sup>	3000mm Brass	Ø 3.5mm
	<b>GF 5000 / 4 RT - MS</b> 50105274	80mm <sup>2)</sup>	5000mm Brass	Ø 3.5mm
	<b>GF 6000 / 4 RT - MS</b> 50041477	80mm <sup>2)</sup>	6000mm Brass	Ø 3.5mm

1) Operation and storage temp.

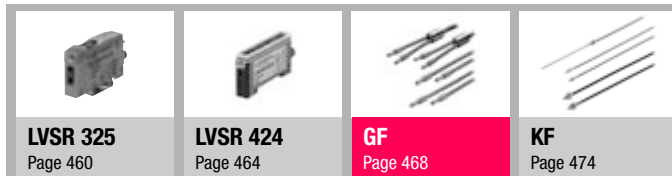
Brass: -30°C ... +200°C  
Stainl. steel: -30°C ... +200°C (for short periods +300°C)  
Silicone: -30°C ... +180°C (for short periods +200°C)

2) In combination with LVSR 325

We reserve the right to make changes • GF\_3\_EN.fm

### Accessories

Part No.	Designation	Features
1 50014649	GF - L1	Lens for glass fiber optics
2 50009382	GF - U1	Deflectors for glass fiber optics



**LVSR 325**  
Page 460

**LVSR 424**  
Page 464

**GF**  
Page 468

**KF**  
Page 474

Dimensioned drawing of light beam gate	Part description Part No.:	Scanning range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: diffuse reflection scanner</b>				
	<b>GF 500 / 4 RT - VA</b> 50000047	80mm <sup>2)</sup>	500mm Stainless steel	Ø 3.5mm
	<b>GF 1000 / 4 RT - VA</b> 50000049	80mm <sup>2)</sup>	1000mm Stainless steel	Ø 3.5mm
	<b>GF 1500 / 4 RT - VA</b> 50010567	80mm <sup>2)</sup>	1500mm Stainless steel	Ø 3.5mm
	<b>GF 2000 / 4 RT - VA</b> 50000054	80mm <sup>2)</sup>	2000mm Stainless steel	Ø 3.5mm
	<b>GF 2500 / 4 RT - VA</b> 50041741	80mm <sup>2)</sup>	2500mm Stainless steel	Ø 3.5mm
	<b>GF 3500 / 4 RT - VA</b> 50041742	80mm <sup>2)</sup>	3500mm Stainless steel	Ø 3.5mm
	<b>GF 500 / 4 RT - SI</b> 50000039	80mm <sup>2)</sup>	500mm Silicone	Ø 3.5mm
	<b>GF 1000 / 4 RT - SI</b> 50000041	80mm <sup>2)</sup>	1000mm Silicone	Ø 3.5mm
	<b>GF 2000 / 4 RT - SI</b> 50010820	80mm <sup>2)</sup>	2000mm Silicone	Ø 3.5mm
	<b>GF 3000 / 4 RT - SI</b> 50060384	80mm <sup>2)</sup>	3000mm Silicone	Ø 3.5mm



Fiber optics available in lengths up to 6m.

## PLASTIC FIBER OPTICS

Dimensioned drawing	Part description Part No.:	Operating range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: throughbeam sensor</b>				
	<b>KF 2000 / 2 LS.4 - 01</b> 50027775	200mm <sup>2)</sup> 300mm <sup>3)</sup>	2000mm PVC	Ø 1mm
	<b>KF 2000 / 2 LS.4 - 08</b> 50035309 <sup>4)</sup>	200mm <sup>2)</sup> 300mm <sup>3)</sup>	2000mm PVC	Ø 1mm

- 1) Operation and storage temp. PVC: -25°C ... +80°C  
 2) In combination with LVSR 325  
 3) In combination with LVSR 424  
 4) Delivery does not include cutting device  
 5) With bendable end piece, minimum bending radius 10mm

We reserve the right to make changes • KF\_1\_EN.fm

### Accessories

Part No.	Designation	Features
1 50034065	KF - L1	Attachment lens for greater operating ranges
2 50034064	KF - U1	90° deflector for plastic fiber optics

<p><b>LVSR 325</b> Page 460</p>	<p><b>LVSR 424</b> Page 464</p>	<p><b>GF</b> Page 468</p>	<p><b>KF</b> Page 474</p>
-------------------------------------	-------------------------------------	-------------------------------	-------------------------------

Dimensioned drawing	Part description Part No.:	Operating range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: throughbeam sensor</b>				
	<b>KF 2000 / 2 LS.4 - 02</b> 50027780	200mm <sup>2)</sup> 400mm <sup>3)</sup>	2000mm PVC	$\varnothing$ 1mm
	<b>KF 2000 / 2 LS.5 - 03</b> 50027781 <sup>5)</sup>	200mm <sup>2)</sup> 400mm <sup>3)</sup>	2000mm PVC	$\varnothing$ 1mm

# PLASTIC FIBER OPTICS

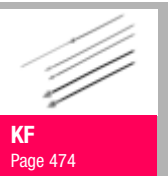
Dimensioned drawing	Part description Part No.:	Scanning range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: diffuse reflection scanner</b>				
	<b>KF 2000 / 1 RT.4 - 06</b> 50027784	15 mm <sup>2)</sup> 25 mm <sup>3)</sup>	2000 mm PVC	2 x Ø 0.5 mm
	<b>KF 2000 / 1 RT - M5 - Z8</b> 50104483	15 mm <sup>2)</sup> 25 mm <sup>3)</sup>	2000 mm PVC	2 x Ø 0.5 mm
	<b>KF 2000 / 2 RT.4 - 04</b> 50027782	65 mm <sup>2)</sup> 100 mm <sup>3)</sup>	2000 mm PVC	2 x Ø 0.85 mm

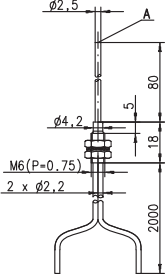
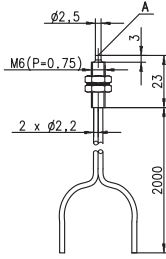
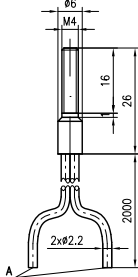
- 1) Operation and storage temp. PVC: -25°C ... +80°C  
 2) In combination with LVSR 325  
 3) In combination with LVSR 424  
 4) With bendable end piece, minimum bending radius 10mm

We reserve the right to make changes • KF\_2\_EN.fm

## Accessories

Part No.	Designation	Features
1 50034065	KF - L1	Attachment lens for greater operating ranges
2 50034064	KF - U1	90° deflector for plastic fiber optics

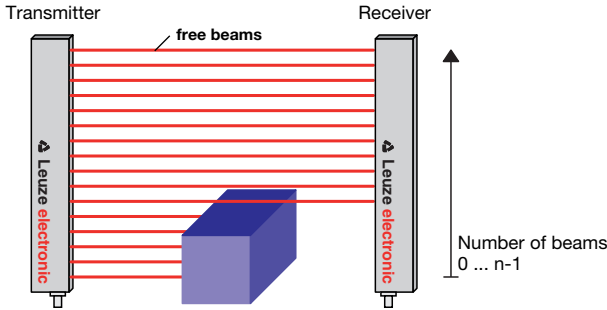


Dimensioned drawing	Part description Part No.:	Scanning range	Fiber length sheathing <sup>1)</sup>	Active light diameter (A)
<b>Function: diffuse reflection scanner</b>				
	<b>KF 2000 / 2 RT.5 - 07</b> 50027785 <sup>4)</sup>	65 mm <sup>2)</sup> 100 mm <sup>3)</sup>	2000 mm PVC	2 x Ø 0.85 mm
	<b>KF 2000 / 2 RT.4 - 05</b> 50027783	80 mm <sup>2)</sup> 120 mm <sup>3)</sup>	2000 mm PVC	2 x Ø 1.0 mm
	<b>KF 2000 / 2 RT - M4 - D6</b> 50105372	80 mm <sup>2)</sup> 120 mm <sup>3)</sup>	2000 mm PVC	2 x Ø 1.0 mm

## SELECTION GUIDE

### VARIO B switching light curtains

#### Measurement principle



The infrared light signal emitted by the transmitter diode is detected at the receiver. If one or more beams are interrupted by an object, this is signalled at the switching output. Triggering of the integrated system and soiling control is signalled via the warning output.

#### Products and measurement field lengths [mm]

**Op. range:** 0.7 ... 5m  
**Cycle time:** 1 ms / beam

**VARIO B beam spacing 5mm** from **page 480** onwards  
35 155

**VARIO B beam spacing 12.5mm** from **page 480** onwards  
88 388

**VARIO B beam spacing 25mm** from **page 480** onwards  
175 775

**VARIO B beam spacing 50mm** from **page 480** onwards  
350 1550

**VARIO B beam spacing 100mm** from **page 480** onwards  
700 3100

#### Features

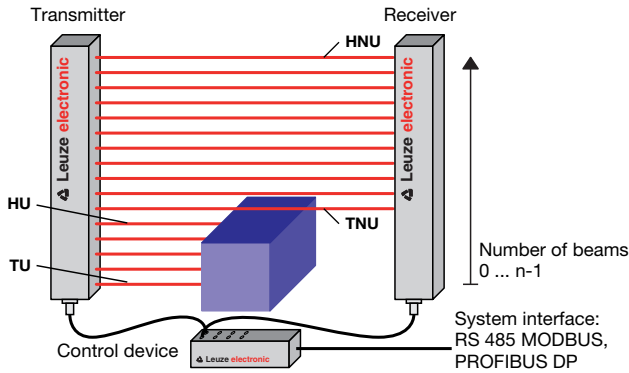
- Plug'n Play use through factory-set configuration and simple installation
- Can be specially configured to detect optically critical objects
- Integrated control device with signal and warning output
- Measurement field coverage up to 3.2m with an operating range of up to 5m



# LIGHT CURTAINS

## KONTURflex measuring light curtains

### Measurement principle



The state of the infrared light field between the transmitter and receiver light strips is analysed in the external control device for configurable functions. The corresponding information is passed on to the primary control via the system interface.

### Products and measurement field lengths [mm]

**Op. range:** 0 ... 4m  
**Cycle time:**  $(\sum \text{number of light beams in system} + 3) \times 50\mu\text{s}$



**KONTURflex beam spacing 5mm** from page 486 onwards  
 80 2560

**KONTURflex beam spacing 10mm** from page 486 onwards  
 160 3200

**KONTURflex beam spacing 20mm** from page 486 onwards  
 160 3200



**QUATTRO control device** from page 486 onwards

### Features

- Up to 4 light curtains with varying number of beams with a total of up to 512 beams per control device
- Configuration of the control device either directly or offline via PC configuration software with subsequent download
- Fast measurement value acquisition dependent on the number of system beams connected to the control device
- Integrated and configurable measurement functions (e.g. hole recognition, web centre recognition, blanking)

# OVERVIEW OF SWITCHING LIGHT CURTAINS



Projection control in materials handling



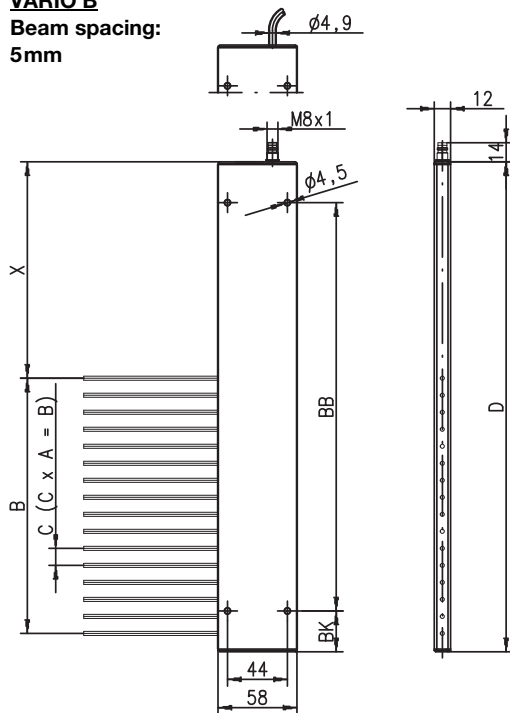
Process control in foil packaging



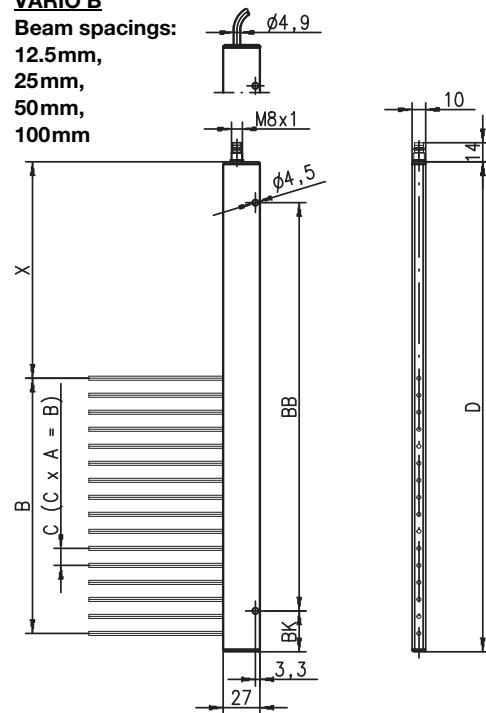
Access control in public transportation

## Dimensioned drawing

**VARIO B**  
Beam spacing:  
5mm



**VARIO B**  
Beam spacings:  
12.5mm,  
25mm,  
50mm,  
100mm



- A** Beam spacing
- B** Measurement field length
- C** Number of beams
- D** Profile length
- BB** Distance from bore hole to bore hole
- BK** Distance from bore hole to housing edge
- X** Distance from first beam to housing edge




Dimensions of optional measurement field lengths on request. Further details can be found in the respective data sheet.

We reserve the right to make changes • VARIO\_B\_Overview\_EN.fm

**VARIO B**  
Page 480

**KONTURflex**  
Page 486

## VARIO B

Light curtain	Beam spacing	Page
 <b>VARIO B switching light curtain</b>	5 ... 100mm	482


Additional products:		
 Measuring light curtain	KONTURflex	486



Common technical data		
<b>Electrical data</b>	Operating voltage $U_B$	24VDC
	Residual ripple	$\leq 15\%$ of $U_B$
	Output	2 x PNP or 2 x NPN, max. 200mA per output
	Cycle time (parallel mode)	1 ms / beam (min. 30ms)
<b>Optical data</b>	Max. no. of beams	64
	Operating range	0.7 ... 5m
	Wavelength	880nm (infrared light)
	Max. misalignment angle	$\pm 10^\circ$ between transmitter and receiver
<b>Mechanical data</b>	Housing	Aluminum, anodised
	Dimensions (W x H)	12 x 58mm and 10 x 27mm, resp.
	Connection	M8 connector or cable
<b>Environmental data</b>	Ambient temperature	-10°C ... +45°C
	Protection class	IP 54
<b>Mounting systems for this series can be found from page 528 onwards</b>		

**Features**

- **Beam spacing 5 / 12.5 / 25 / 50 / 100mm**
- **Operating range 5m**
- **Calibratability for optically critical objects**
- **Factory-set configuration**
- **Configuration software**



Optical Sensor ABC	
● Light curtain	Page 563

[www.leuze.com/light\\_curtains/](http://www.leuze.com/light_curtains/)

# SWITCHING LIGHT CURTAINS

Part description Part No.:	▶ = Transmitter ◀ = Receiver	A [mm]	B [mm]	C	D [mm]	BB [mm]	BK [mm]	X [mm]	Op. range [m]	Light source
▶VBT-5-35-S8 ◀IVBR/4-5-35-00-S8	50107869 50107869-00	5	35	8	120	108	6	67,5	0.7 ... 5	Infrared light 880nm
▶VBT-5-35-S8 ◀IVBR/2-5-35-00-S8	50107869 50107869-10	5	35	8	120	108	6	67,5	0.7 ... 5	Infrared light 880nm
▶VBT-12.5-88-S8 ◀IVBR/4-12.5-88-00-S8	50107888 50107888-00	12,5	88	8	260	200	30	158.5	0.7 ... 5	Infrared light 880nm
▶VBT-12.5-88-S8 ◀IVBR/2-12.5-88-00-S8	50107888 50107888-10	12,5	88	8	260	200	30	158.5	0.7 ... 5	Infrared light 880nm
▶VBT-25-175-S8 ◀IVBR/4-25-175-00-S8	50107911 50107911-00	25	175	8	360	300	30	165	0.7 ... 5	Infrared light 880nm
▶VBT-25-2175,4000 ◀IVBR/4-25-2175-00,4000	50107936 50107936-00	25	175	8	360	300	30	165	0.7 ... 5	Infrared light 880nm
▶VBT-25-175-S8 ◀IVBR/2-25-175-00-S8	50107911 50107911-10	25	175	8	360	300	30	165	0.7 ... 5	Infrared light 880nm
▶VBT-50-350-S8 ◀IVBR/4-50-350-00-S8	50107939 50107939-00	50	350	8	560	400	80	190	0.7 ... 5	Infrared light 880nm
▶VBT-50-350-S8 ◀IVBR/2-50-350-00-S8	50107939 50107939-10	50	350	8	560	400	80	190	0.7 ... 5	Infrared light 880nm
▶VBT-100-700-S8 ◀IVBR/4-100-700-00-S8	50107970 50107970-00	100	700	8	970	400	85	190	0.7 ... 5	Infrared light 880nm
▶VBT-100-700-S8 ◀IVBR/2-100-700-00-S8	50107970 50107970-10	100	700	8	970	400	85	190	0.7 ... 5	Infrared light 880nm

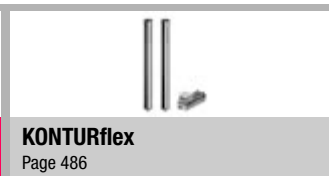
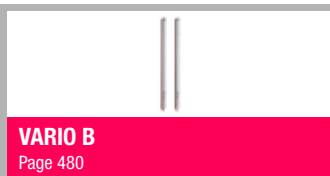
A Beam spacing      C Number of beams      BB Distance from bore hole to bore hole      X Distance from first beam to housing edge  
 B Meas. field length      D Profile length      BK Distance from bore hole to housing edge

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50107711	VB - Int - 232	Interface module for PC configuration via RS 232
b 50107925	UPG 50	Calibration adapter for VARIO B with M8 connector
c 50104524	K - D M8A - 4P - 2m - PVC	Connection cable 2000mm, M8 axial, 4-pin, PVC
d 50104527	K - D M8W - 4P - 5m - PVC	Connection cable 5000mm, M8 angular, 4-pin, PVC
e 50104526	K - D M8A - 4P - 5m - PVC	Connection cable 5000mm, M8 axial, 4-pin, PVC

We reserve the right to make changes • VARIO\_B\_1\_EN.fm



**VARIO B**  
Light curtain



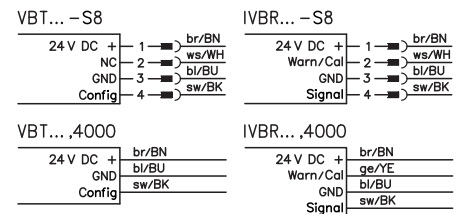
Output <sup>1)</sup> / Switching	Connection <sup>2)</sup>	Option	Accessories
PNP / light	M8 connector	1, 2, 3	a, b, c, d, e
NPN / light	M8 connector	1, 2, 3	a, b, c, d, e
PNP / light	M8 connector	1, 2, 3	a, b, c, d, e
NPN / light	M8 connector	1, 2, 3	a, b, c, d, e
PNP / light	M8 connector	1, 2, 3	a, b, c, d, e
PNP / light	Cable, 4m	1, 2, 3	a
NPN / light	M8 connector	1, 2, 3	a, b, c, d, e
PNP / light	M8 connector	1, 2, 3	a, b, c, d, e
NPN / light	M8 connector	1, 2, 3	a, b, c, d, e
PNP / light	M8 connector	1, 2, 3	a, b, c, d, e
NPN / light	M8 connector	1, 2, 3	a, b, c, d, e




**Optical Sensor ABC**

- Light curtain Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



1) The factory-set configuration can be changed at a later time using the VARIOsoft conf. software  
 2) Also available with line connection, line length 4 m

 Additional light curtains available with **measurement field lengths of up to 3150 mm and up to 64 beams**, see **table on page 484**.  
**VARIOsoft configuration software** available at no cost at [www.leuze.com](http://www.leuze.com).

**Options**

- 1 Combined warning output / calibration input (configurable)
- 2 Parallel beam mode / parallel and diagonal beam mode configurable
- 3 Light/dark switching configurable

- Standard Sensors
- Measuring Sensors
- Ultrasonic Sensors
- Inductive Switches
- Forked Sensors
- Special Sensors
- Fiber Optic Sensors
- Light Curtains
- Protective Sensors
- Ex Sensors

# SWITCHING LIGHT CURTAINS

## VARIO B transmitter

V B T - 1 2 . 5 - 6 8 8 - S 8

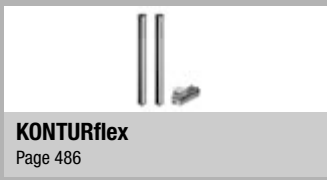
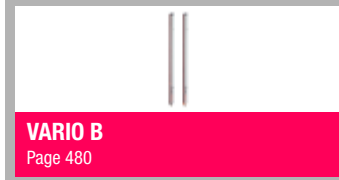
<b>Model</b>	
VBT	VARIO B transmitter
<b>Beam spacing A</b>	
5	5 mm
12.5	12.5 mm
25	25 mm
50	50 mm
100	100 mm
<b>Measurement field length B</b>	
XXXX	In mm, see adjacent table 'Measurement field length'
<b>Electrical connection</b>	
S8	M8 connector, 4-pin, axial

## VARIO B receiver

I V B R / 2 - 1 2 . 5 - 6 8 8 - 0 0 - S 8

<b>Model</b>	
IVBR	VARIO B receiver with warning output
<b>Output</b>	
2	NPN
4	PNP
<b>Beam spacing A</b>	
5	5 mm
12.5	12.5 mm
25	25 mm
50	50 mm
100	100 mm
<b>Measurement field length B</b>	
XXXX	In mm, see adjacent table 'Measurement field length'
<b>Measurement function</b>	
00	Parallel beam method, light switching
01	Parallel and diagonal beam method, light switching
02	Parallel beam method, dark switching
03	Parallel and diagonal beam method, dark switching
<b>Electrical connection</b>	
S8	M8 connector, 4-pin, axial

We reserve the right to make changes • VARIO\_B\_2\_EN.fm



**VARIO B**  
Light curtain



Beam spacing A [mm]	Measurement field length B [mm]										
	35	75	115	155	195	235	275	315			
5	35	75	115	155	195	235	275	315			
12.5	88	188	288	388	488	588	688	788			
25	175	375	575	775	975	1175	1375	1575	1775 <sup>1)</sup>	2175 <sup>1)</sup>	2375 <sup>1)</sup>
50	350	750	1150	1550	1950	2350	2750	3150			
100	700	1100	1500	1900	2300	2700	3100				

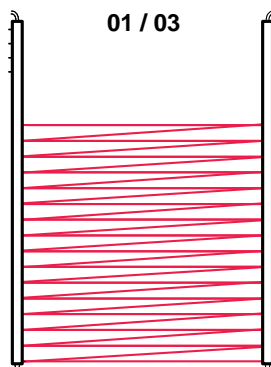
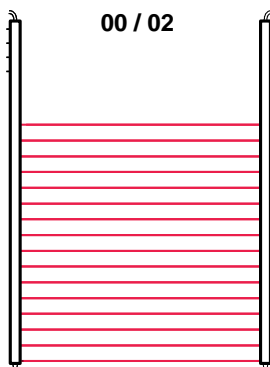


1) Only available with PNP switching output and with measurement function 00!



**Beam spacing A** and **measurement field length B** of a transmitter/receiver pair **must be the same!**

Measurement function	Light switching	Dark switching
	Parallel beam method	<b>00</b>
Parallel and diagonal beam method	<b>01</b>	<b>03</b>



# OVERVIEW OF MEASURING LIGHT CURTAINS



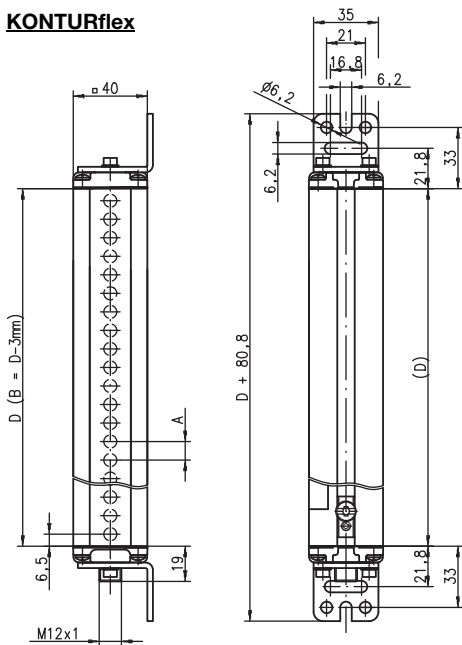
Powder-coating system



Painting system

## Dimensioned drawing

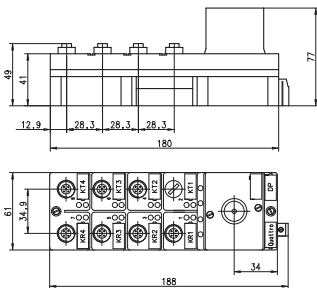
### KONTURflex



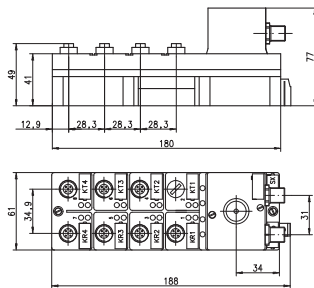
Dimensions of optional measurement field lengths on request. Further details can be found in the respective data sheet.

- A** Beam spacing
- B** Measurement field length
- D** Profile length

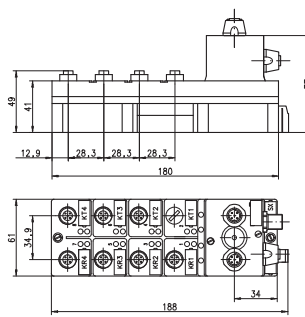
### QUATTRO - RSX QUATTRO - DP QUATTRO - CANopen



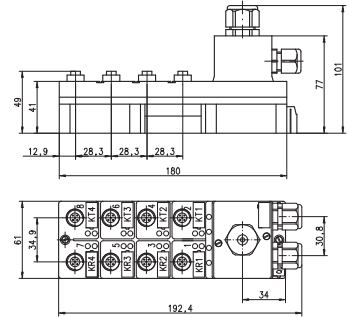
### QUATTRO - RSX / M12



### QUATTRO - DP / M12



### QUATTRO - DP / KV




We reserve the right to make changes • KONTURflex\_Overview\_EN.fm

**VARIO B**  
Page 480

**KONTURflex**  
Page 486



## KONTURflex

Light curtain	Beam spacing	Page
 <b>KONTURflex measuring light curtain</b>	5 ... 20mm	488

### Additional products:

 Switching light curtain	VARIO B	480
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### Common technical data

<b>Electrical data</b>	Operating voltage $U_B$	12VDC (light curtain) 24VDC (control device)
	Residual ripple	$\leq 20\%$ of $U_B$
	Cycle time	(Number of beams in system + 3) x 50 $\mu$ s
	Output	1 x PNP, configurable
	Connection	M12 cable, 5-pin, max. 20m between control device and light curtains
	System interface	RS 485 PROFIBUS DP CANopen
	Config. interface	RS 232
<b>Optical data</b>	Max. no. of beams	512 on 4 systems
	Wavelength	880nm (infrared light)
<b>Mechanical data</b>	Housing	Light curtain: aluminum Control device: plastic
	<b>Environmental data</b>	Ambient temperature
Protection class		IP 65
Standards applied		IEC 60947-5-2, UL 508
<b>Mounting systems for this series can be found from page 528 onwards</b>		

### Features

- Beam spacings 5 / 10 / 20mm
- Operating range 4m
- Up to 4 light curtains per QUATTRO control device
- Integrated and configurable functions
- Factory-set configuration
- PC configuration software



### Optical Sensor ABC

- Light curtain Page 563

## MEASURING LIGHT CURTAINS

Part description Part No.:	▶ = Transmitter ◀ = Receiver	Beam spacing A [mm]	Meas. field length B [mm]	No. of beams	Profile length D [mm]	Op. range [m]	Light source
<b>KONTURflex measuring light curtains</b>							
▶ KT 5-80 ◀ KR 5-80	671008 670008	5	80	16	83	0 ... 4	Infrared light 880nm
▶ KT 10-160 ◀ KR 10-160	673016 672016	10	160	16	163	0 ... 4	Infrared light 880nm
▶ KT 20-160 ◀ KR 20-160	675016 674016	20	160	8	163	0 ... 4	Infrared light 880nm

**For other measurement field lengths, see type key on page 490!**



A **QUATTRO control device is absolutely necessary** for operating the KONTURflex light curtains.  
See following double page!



**KONTURflexsoft configuration software** available at no cost at [www.leuze.com](http://www.leuze.com).  
Accessories / connection cables: additional cable lengths available!

Accessories / connection cables		More accessories can be found from page 514 onwards
Part No.	Designation	Features
a 678033	CB - M12 - 2500S - 5GF/GM	QUATTRO-KT/KR connection cable, length 2.5m, shielded
b 678035	CB - M12 - 5000S - 5GF/GM	QUATTRO-KT/KR connection cable, length 5m, shielded
c 678040	CB - M12 - 10000S - 5GF/GM	QUATTRO-KT/KR connection cable, length 10m, shielded
d 50104557	K - D M12A - 5P - 5m - PVC	QUATTRO-RSX/M12 RS 232 connection cable 5m, M12 axial
e 50104590	K - D M12A - 8P - 5m - PUR	QUATTRO-RSX/M12 RS 485/U <sub>B</sub> connection cable 5m, M12 axial
f 50111864	QUATTRO-DP Adapter M12	DP adapter from 5-pin built-in plug to M12 connector
g 678100	K - CB - SUBP - 3000	QUATTRO-PC diagnosis cable, 3m

**KONTURflex**  
Light curtain



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Cycle time <sup>1)</sup> [μs]	Output <sup>2)</sup>	Connection	Option	Accessories
950	QUATTRO control device	M12 connector	1	a, b, c
950	QUATTRO control device	M12 connector	1	a, b, c
550	QUATTRO control device	M12 connector	1	a, b, c

1) Cycle time = (total number of beams + 3) x 50μs

2) The factory-set config. can be changed at a later time using the KONTURflexsoft config. software



**Optical Sensor ABC**

- Light curtain Page 563
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

See Quattro control devices!

**Options**

- 1 UL approval (class 2 acc. to NEC)

[www.leuze.com/light\\_curtains/](http://www.leuze.com/light_curtains/)

## MEASURING LIGHT CURTAINS

**KONTURflex**

**K T 1 0 - 1 2 8 0 0 0**

**Model**

**KT** KONTURflex transmitter

**KR** KONTURflex receiver

**Beam spacing A**

**5** 5mm

**10** 10mm

**20** 20mm

**Measurement field length B**

**XXXX** In mm, see adjacent table 'Measurement field length'

**Optional**

**Ex** Ex version

We reserve the right to make changes • KONTURflex\_3\_EN.fm



**KONTURflex**  
Light curtain



Beam spacing A [mm]	Measurement field length B [mm]																									
	80	160	240	320	400	480	560	640	720	800	960	1120	1280	1440	1600	1760	1920	2080	2240	2400	2560	2720	2880	3040	3200	
5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					
10		•		•		•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•			•
20	•		•		•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•



**Beam spacing A and measurement field length B of a transmitter/receiver pair must be the same!**



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

**Light Curtains**

Protective Sensors

Ex Sensors

[www.leuze.com/light\\_curtains/](http://www.leuze.com/light_curtains/)

# MEASURING LIGHT CURTAINS

Part description Part No.:	Description
<b>QUATTRO control devices for KONTURflex measuring light curtains</b>	
<b>QUATTRO - RSX</b> 670001	Control device for up to 4 KONTURflex light curtains, system interface: <b>RS 232/RS 485</b> , connection via 5-pin built-in plug
<b>QUATTRO - RSX / M12</b> 670003	Control device for up to 4 KONTURflex light curtains, system interface: <b>RS 232/RS 485</b> , connection via 5-/8-pin M12 connector
<b>QUATTRO - DP</b> 670002	Control device for up to 4 KONTURflex light curtains, system interface: <b>RS 485/PROFIBUS DP</b> , connection via 5-pin built-in plug
<b>QUATTRO - DP / M12</b> 50111868	Control device for up to 4 KONTURflex light curtains, system interface: <b>RS 485/PROFIBUS DP</b> , connection via 5-pin M12 connector
<b>QUATTRO - DP / KV</b> 670005	Control device for up to 4 KONTURflex light curtains, system interface: <b>RS 485/PROFIBUS DP</b> , connection via 5-pin built-in plug with screwed cable gland
<b>QUATTRO - CANopen</b> 670004	Control device for up to 4 KONTURflex light curtains, system interface: <b>CANopen</b> , connection via 5-pin built-in plug



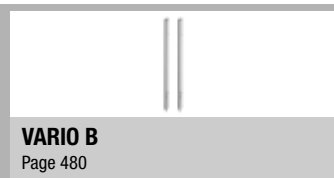
A **QUATTRO control device is absolutely necessary** for operating the KONTURflex light curtains.  
Please include with your order.



**KONTURflexsoft configuration software** available at no cost at [www.leuze.com](http://www.leuze.com).  
Accessories / connection cables: additional cable lengths available!

We reserve the right to make changes • KONTURflex\_2\_EN.fm

Accessories / connection cables		More accessories can be found from <b>page 514</b> onwards
Part No.	Designation	Features
a 678033	CB - M12 - 2500S - 5GF/GM	QUATTRO-KT/KR connection cable, length 2.5m, shielded
b 678035	CB - M12 - 5000S - 5GF/GM	QUATTRO-KT/KR connection cable, length 5m, shielded
c 678040	CB - M12 - 10000S - 5GF/GM	QUATTRO-KT/KR connection cable, length 10m, shielded
d 50104557	K - D M12A - 5P - 5m - PVC	QUATTRO-RSX/M12 RS 232 connection cable 5m, M12 axial
e 50104590	K - D M12A - 8P - 5m - PUR	QUATTRO-RSX/M12 RS 485/U <sub>B</sub> connection cable 5m, M12 axial
f 50111864	QUATTRO-DP Adapter M12	DP adapter from 5-pin built-in plug to M12 connector
g 678100	K - CB - SUBP - 3000	QUATTRO-PC diagnosis cable, 3m



# KONTURflex

Light curtain



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

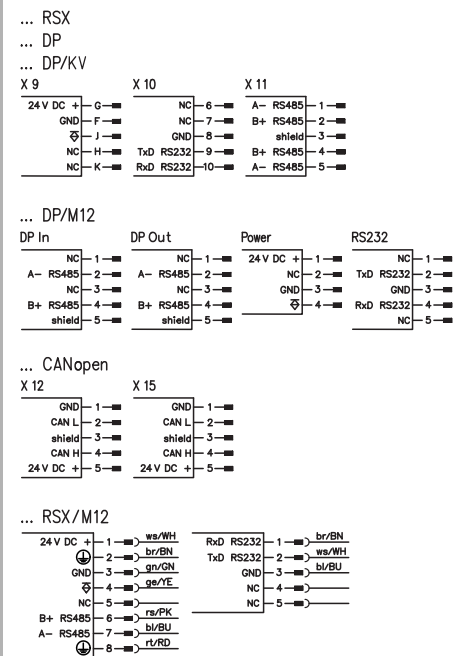
Output	Connections	Option	Accessories
1 x PNP, configurable	Built-in plug	1, 2, 3, 5, 6	a, b, c, g
1 x PNP, configurable	M12 connector	1, 2, 3, 5, 6	a, b, c, d, e, g
1 x PNP, configurable	Built-in plug	1, 2, 4, 5, 6	a, b, c, f, g
1 x PNP, configurable	M12 connector	1, 2, 4, 5, 6	a, b, c, d, g
1 x PNP, configurable	Built-in plug with screwed cable gland	1, 2, 4, 5, 6	a, b, c, g
1 x PNP, configurable	Built-in plug	1, 2, 4, 6	a, b, c, g



### Optical Sensor ABC

- Light curtain Page 563
- Connection types Page 568
- Outputs Page 568

### Electrical connection



### Options

- 1 Configuration with KONTURflexsoft PC software
- 2 Integrated functions such as web-center monitoring, hole recognition, etc.
- 3 Data transmission and configuration via MODBUS RTU protocol
- 4 Data transmission and configuration via PROFIBUS DP or CANopen
- 5 Integrated, connectable bus terminator
- 6 UL approval (class 2 acc. to NEC)

# SINGLE BEAM SAFETY DEVICES

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Operating voltage	Switching frequency	Light source	Output
<b>Protective throughbeam sensors (AOPD type 2)</b>			▶ = Transmitter ◀ = Receiver			
▶ SLSR 25B.8 - S8 ◀ SLSR 25B / 66 - S8	50108490 50108493	<input type="text" value="0"/> <input type="text" value="20"/> <input type="text" value="0"/> <input type="text" value="22"/>	10 ... 30VDC	100Hz	Red light	2x Push-pull/DC
▶ SLSR 25B.8 - S12 ◀ SLSR 25B / 66 - S12	50108489 50108492	<input type="text" value="0"/> <input type="text" value="20"/> <input type="text" value="0"/> <input type="text" value="22"/>	10 ... 30VDC	100Hz	Red light	2x Push-pull/DC
▶ SLSR 25B.8 ◀ SLSR 25B / 66	50108491 50108494	<input type="text" value="0"/> <input type="text" value="20"/> <input type="text" value="0"/> <input type="text" value="22"/>	10 ... 30VDC	100Hz	Red light	2x Push-pull/DC
▶ SLSR 25B.8, 200 - S12 ◀ SLSR 25B / 66, 200 - S12	50110151 50110152	<input type="text" value="0"/> <input type="text" value="20"/> <input type="text" value="0"/> <input type="text" value="22"/>	10 ... 30VDC	100Hz	Red light	2x Push-pull/DC
▶ SLSR 46B.8 - S12 ◀ SLSR 46B / 66 - S12	50108538 50108540	<input type="text" value="0"/> <input type="text" value="40"/> <input type="text" value="0"/> <input type="text" value="44"/>	10 ... 30VDC	100Hz	Red light	2x Push-pull/DC
▶ SLSR 46B.8 ◀ SLSR 46B / 66	50108539 50108541	<input type="text" value="0"/> <input type="text" value="40"/> <input type="text" value="0"/> <input type="text" value="44"/>	10 ... 30VDC	100Hz	Red light	2x Push-pull/DC
▶ SLSR 95 / 2.8 SE - L ◀ SLSR 95 / 44 E - L	50080183 50080184	<input type="text" value="0"/> <input type="text" value="8"/> <input type="text" value="0"/> <input type="text" value="10"/>	10 ... 30VDC	200Hz	Red light	2x PNP

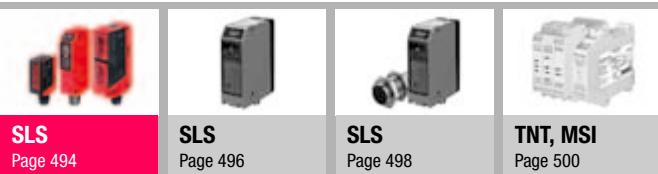


**Dimensioned drawings see standard sensors:**  
**SLS 25B...** on page 80, **SLS 46B...** on page 102, **SLSR 95...** on page 144.  
 Additional information and products can also be found in the **Safety at work** catalog from **Leuze electronic**.

We reserve the right to make changes • SLS\_1\_EN1.fm

## Accessories / connection cables More accessories can be found from page 514 onwards

Part No.	Designation	Features
a 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
b 50104558	K - D M12W - 5P - 5m - PVC	Connection cable 5000mm, M12 angular, 5-pin, PVC
c 50040739	ARH 46	Alignment aid for 46 Series sensors
d 50080502	ARH 96	Alignment aid for 96 Series sensors
e 50109545	SAT 5	Sensorscope, alignment control for all series
f 50000670	US 1	Deflection mirror
g 50017434	US 2	Deflection mirror on mounting plate, can be turned by 90°



**SLS**  
Page 494

**SLS**  
Page 496

**SLS**  
Page 498

**TNT, MSI**  
Page 500



# AOPD Type 2

Protective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

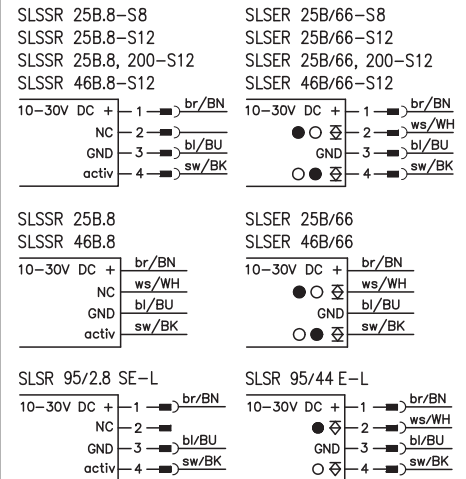
Switching	Connection	Minimum object size	Option	Accessories
Light/dark antivalent	M8 connector	Ø 14mm	1, 4	a, c, e, f, g
Light/dark antivalent	M12 connector	Ø 14mm	1, 4	c, e, f, g
Light/dark antivalent	Cable, 2m	Ø 14mm	1, 4	a, c, e, f, g
Light/dark antivalent	Cable, 0.2m, with M12 connector	Ø 14mm	1, 4	c, e, f, g
Light/dark antivalent	M12 connector	Ø 22mm	1, 2, 4	a, c, e, f, g
Light/dark antivalent	Cable, 2m	Ø 22mm	1, 2, 4	c, e, f, g
Light/dark antivalent	M12 connector	Ø 13mm	1, 3	a, e, f, g



### Optical Sensor ABC

- Protective sensors Page 566
- Connection types Page 568
- Outputs Page 568

### Electrical connection



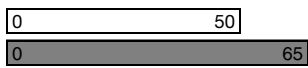
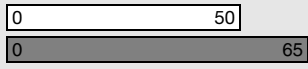
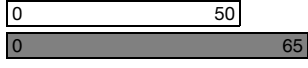
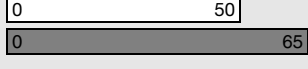
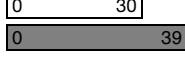
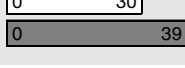
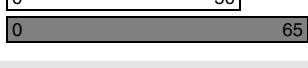

The protective throughbeam photoelectric sensor is a contactless active protective device only in connection with a safety-relevant control system, in which the cyclical testing of transmitter and receiver is carried out according to EN 61496-1, up to category 2, and PL d according to EN ISO 13849-1.

The safety sensor must only be used after it has been selected in accordance with the respectively applicable instructions and relevant standards, rules and regulations regarding labor protection and occupational safety, and after it has been installed on the machine, connected, commissioned, and checked by a competent person.

### Options

- 1 Transmitter with activation input for testing and interlinking
- 2 Highly visible LED display assists with alignment
- 3 UL approval
- 4 UL approval (class 2 acc. to NEC)

# SINGLE BEAM SAFETY DEVICES

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Operating voltage	Switching frequency	Light source	Output
<b>Protective throughbeam sensors (AOPD type 2)</b>			▶ = Transmitter ◀ = Receiver			
▶ SLSS 96 M - 1080 - T2 - 45 ◀ SLSE 96 M/P - 1070 - T2 - 41	50025215 50025193		10 ... 30VDC	500Hz	Infrared light	PNP
▶ SLSS 96 M - 1090 - T2 - 45 ◀ SLSE 96 M/P - 1071 - T2 - 41	50080478 50080479		10 ... 30VDC	500Hz	Infrared light	PNP
▶ SLSS 96 M - 1080 - T2 - 24 ◀ SLSE 96 M/P - 1070 - T2 - 21	50025213 50025192		10 ... 30VDC	500Hz	Infrared light	PNP
▶ SLSS 96 M - 1090 - T2 - 24 ◀ SLSE 96 M/P - 1071 - T2 - 21	50029454 50029455		10 ... 30VDC	500Hz	Infrared light	PNP
▶ SLSS 96 M - 1210 - T2 - 45 ◀ SLSE 96 M/P - 1200 - T2 - 41	50031249 50031250		10 ... 30VDC	500Hz	Red light	PNP
▶ SLSS 96 M/P - 1210 - T2 - 24 ◀ SLSE 96 M/P - 1200 - T2 - 21	50025209 50031562		10 ... 30VDC	500Hz	Red light	PNP
▶ SLSS 96 K 1080 - T2 - 45 ◀ SLSE 96 K/P 1070 - T2 - 41	50031559 50031561		10 ... 30VDC	500Hz	Infrared light	PNP
▶ SLSS 96 K 1080 - T2 - 24 ◀ SLSE 96 K/P 1070 - T2 - 21	50081292 50081293		10 ... 30VDC	500Hz	Infrared light	PNP



**Dimensioned drawings** see **standard sensors: SLS 96...** on **page 152**.  
Additional information and products can also be found in the **Safety at work** catalog from **Leuze electronic**.

We reserve the right to make changes • SLS\_2\_EN.fm

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
b 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
c 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
d 50080502	ARH 96	Alignment aid for 96 Series sensors
e 50109545	SAT 5	Sensorscope, alignment control for all series
f 50000670	US 1	Deflection mirror
g 50017434	US 2	Deflection mirror on mounting plate, can be turned by 90°



**AOPD Type 2**  
Protective sensors



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

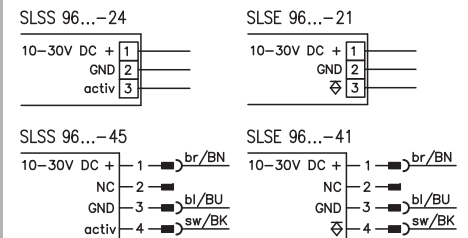
Switching	Connection	Minimum object size	Option	Accessories
Light	M12 connector	Ø 28mm	1, 3	a, b, c, d, e, f, g
Light	M12 connector	Ø 28mm	1, 2, 3	a, b, c, d, e, f, g
Light	Terminals	Ø 28mm	1, 3	d, e, f, g
Light	Terminals	Ø 28mm	1, 2, 3	d, e, f, g
Light	M12 connector	Ø 28mm	1, 3	a, b, c, d, e, f, g
Light	Terminals	Ø 28mm	1, 3	d, e, f, g
Light	M12 connector	Ø 28mm	1, 3	a, b, c, d, e, f, g
Light	Terminals	Ø 28mm	1, 3	d, e, f, g



**Optical Sensor ABC**

- Protective sensors Page 566
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



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, up to category 2, and PL d according to EN ISO 13849-1.

The safety sensor must only be used after it has been selected in accordance with the respectively applicable instructions and relevant standards, rules and regulations regarding labor protection and occupational safety, and after it has been installed on the machine, connected, commissioned, and checked by a competent person.

**Options**

- 1 Transmitter with activation input for testing and interlinking
- 2 Low-temperature version with optics heating
- 3 UL approval

# SINGLE BEAM SAFETY DEVICES

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Operating voltage	Switching frequency	Light source	Output
<b>Protective throughbeam sensors (AOPD type 2)</b>			▶ = Transmitter ◀ = Receiver			
▶ SLSS 96 K - 1210 - T2 - 45 ◀ SLSE 96 K/P - 1200 - T2 - 41	50028011 50028012	<input type="checkbox"/> 0 30 <input checked="" type="checkbox"/> 0 39	10 ... 30VDC	500Hz	Red light	PNP
▶ SLSS 96 K - 1210 - T2 - 45 ◀ SLSE 96 K/P - 1207 - T2 - 41	50028011 50041109	<input type="checkbox"/> 0 30 <input checked="" type="checkbox"/> 0 39	10 ... 30VDC	500Hz	Red light	PNP
▶ SLSS 96 K - 1210 - T2 - 24 ◀ SLSE 96 K/P - 1200 - T2 - 21	50028009 50028010	<input type="checkbox"/> 0 30 <input checked="" type="checkbox"/> 0 39	10 ... 30VDC	500Hz	Red light	PNP
▶ SLSS 96 K - 1210 - T2 - 24 ◀ SLSE 96 K/P - 1207 - T2 - 21	50028009 50035078	<input type="checkbox"/> 0 30 <input checked="" type="checkbox"/> 0 39	10 ... 30VDC	500Hz	Red light	PNP
▶ SLSS 318 M - S12 ◀ SLSE 318 M/P - S12	50082199 50082200	<input type="checkbox"/> 0 10 <input checked="" type="checkbox"/> 0 12	10 ... 30VDC	1000Hz	Red light	2x PNP
▶ SLSS 318 K - S12 ◀ SLSE 318 K/P - S12	50083116 50083117	<input type="checkbox"/> 0 10 <input checked="" type="checkbox"/> 0 12	10 ... 30VDC	1000Hz	Red light	2x PNP
▶ SLSS 318 K ◀ SLSE 318 K/P	50083132 50083133	<input type="checkbox"/> 0 10 <input checked="" type="checkbox"/> 0 12	10 ... 30VDC	1000Hz	Red light	2x PNP



Dimensioned drawings see standard sensors: SLS 96... on page 152, SLS 318... on page 188.  
Additional information and products can be found in the **Safety at work** catalog from **Leuze electronic**.

## Accessories / connection cables

More accessories can be found from page 514 onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50080502	ARH 96	Alignment aid for 96 Series sensors
f 50109545	SAT 5	Sensorscope, alignment control for all series
g 50000670	US 1	Deflection mirror
h 50017434	US 2	Deflection mirror on mounting plate, can be turned by 90°

We reserve the right to make changes • SLS\_3\_EN.fm



**SLS**  
Page 494

**SLS**  
Page 496

**SLS**  
Page 498

**TNT, MSI**  
Page 500

# AOPD Type 2

Protective sensors



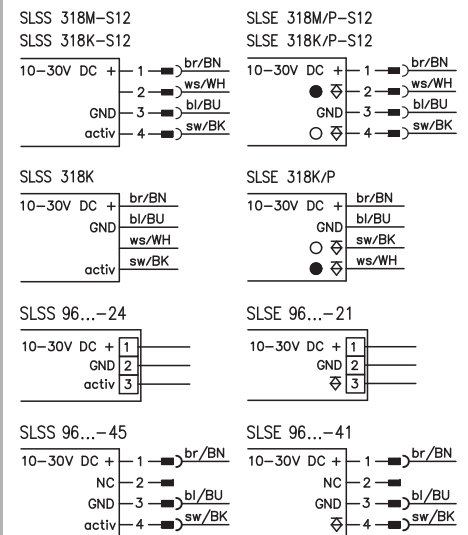
Switching	Connection	Minimum object size	Option	Accessories
Light	M12 connector	Ø 28mm	1, 3	a, b, c, d, e, f, g, h
Light	M12 connector	Ø 28mm	1, 2, 3	a, b, c, d, e, f, g, h
Light	Terminals	Ø 28mm	1, 3	e, f, g, h
Light	Terminals	Ø 28mm	1, 2, 3	e, f, g, h
Light/dark antivalent	M12 connector	Ø 13mm	1, 4	a, b, c, d, f, g, h
Light/dark antivalent	M12 connector	Ø 13mm	1, 4	a, b, c, d, f, g, h
Light/dark antivalent	Cable, 2m	Ø 13mm	1, 4	f, g, h



### Optical Sensor ABC

- Protective sensors Page 566
- Connection types Page 568
- Outputs Page 568

### Electrical connection



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, up to category 2, and PL d according to EN ISO 13849-1.

The safety sensor must only be used after it has been selected in accordance with the respectively applicable instructions and relevant standards, rules and regulations regarding labor protection and occupational safety, and after it has been installed on the machine, connected, commissioned, and checked by a competent person.

### Options

- 1 Transmitter with activation input for testing and interlinking
- 2 Filter for multi-axis operation
- 3 UL approval
- 4 UL approval (class 2 acc. to NEC)

Standard Sensors  
Measuring Sensors  
Ultrasonic Sensors  
Inductive Switches  
Forked Sensors  
Special Sensors  
Fiber Optic Sensors  
Light Curtains  
Protective Sensors  
Ex Sensors

## SAFETY RELAYS

Part description Part No.:	Feature	Option	
<b>Safety relays (type 2)</b>			
<b>MSI - TR1</b> 549988	Periodic testing of type 2 sensors	1, 2, 3, 4	
<b>MSI - TR2</b> 549990	Periodic testing of type 2 sensors with filter time 130 ms	1, 2, 3, 4	
<b>MSI - TS</b> 549989	Periodic testing of type 2 sensors with STOP1 function	1, 2, 3, 5	
<b>Configurable safety relays (type 4)</b>			
<b>MSI - m / R</b> 549904	Muting function, 2 relay outputs	1, 2, 6, 7	
<b>MSI - mE / R</b> 549980	Muting function, 2 relay outputs, UL/CSA, extended temperature range to 60°C	1, 2, 6, 7	
<b>MSI - mx / Rx</b> 549905	Muting function, extended functions, 3 relay outputs	1, 2, 6, 7	
<b>MSI - mxE / Rx</b> 549982	Muting function, extended functions, 3 relay outputs, UL/CSA, extended temperature range to 60°C	1, 2, 6, 7	



**Dimensioned drawings and electrical connection at [www.leuze.com](http://www.leuze.com) .**

Additional information and products can be found in the **Safety at work** catalog from **Leuze electronic**.



**SLS**  
Page 494



**SLS**  
Page 496



**SLS**  
Page 498



**TNT, MSI**  
Page 500

**MSI**  
Safety relays



**Optical Sensor ABC**

- Protective sensors Page 566
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Observe the operating instructions!**  
Download from [www.leuze.com](http://www.leuze.com)

**Options**

- 1 Start/restart interlock selectable
- 2 Contactor monitoring (EDM) selectable
- 3 "Error" message output
- 4 "Safety on" message output
- 5 "STOP1" message output
- 6 Muting function
- 7 PC diagnostics interface

Standard  
Sensors

Measuring  
Sensors

Ultrasonic  
Sensors

Inductive  
Switches

Forked  
Sensors

Special  
Sensors

Fiber Optic  
Sensors

Light  
Curtains

Protective  
Sensors

Ex  
Sensors

## SENSORS FOR POTENTIALLY EXPLOSIVE AREAS

Part description Part No.:	Device category	Operating range [m]	<input type="checkbox"/> Operating voltage	Light source	Output
<b>Throughbeam sensors</b>		▶ = Transmitter ◀ = Receiver			
▶ LS 92 / 3 SE - L Ex 50080722 ◀ LS 92 / 3 E - L Ex 50080721	2G, 2D intrinsically safe ia IIC	<input type="checkbox"/> 0 12	5.5 ... 13VDC	Infrared light	NAMUR
<b>Retro-reflective sensors with polarization filter</b>					
PRK 92 / 3 L Ex 50080723	2G, 2D intrinsically safe ia IIC	<input type="checkbox"/> 0.2 ... 5	5.5 ... 13VDC	Red light	NAMUR
<b>Diffuse reflection scanners with background suppression</b>					
FRK 92 / 3 - 300 L Ex 50080724	2G, 2D intrinsically safe ia IIC	<input type="checkbox"/> 0.03 ... 0.3	5.5 ... 13VDC	Infrared light	NAMUR
<b>Isolated switching amplifier</b>					
VS 403/N 50040825	2G, intrinsically safe NAMUR input ia IIC		18 ... 31.2VDC		NPN
VS 403/R 50040826	2G, intrinsically safe NAMUR input ia IIC		18 ... 31.2VDC		Relay
VS 403/R-AC 50040824	2G, intrinsically safe NAMUR input ia IIC		120 ... 230VAC		Relay



Dimensioned drawing 92 Series at [www.leuze.com](http://www.leuze.com).

### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50037784	BK7 KB - 092 - 5000 - 4 Ex	Connection cable 5000mm for intrinsically safe circuits, blue, M12 angular, 4-pin
b 50037783	BK7 KB - 092 - 5000 - 4A Ex	Connection cable 5000mm for intrinsically safe circuits, blue, M12 axial, 4-pin





**Ex Sensors**

Zone 1, Zone 21



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

Switching	Connection	Option	Accessories
Light	M12 connector	1, 2	a, b
Light	M12 connector	1, 2	a, b
Light	M12 connector	1, 2	a, b
Light/dark reversible	Terminals	3, 4	
Light/dark reversible	Terminals	3, 4	
Light/dark reversible	Terminals	3, 4	

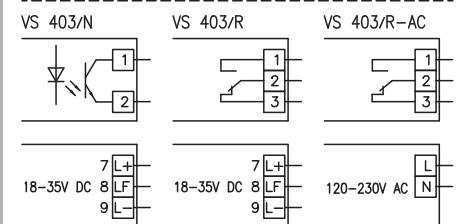
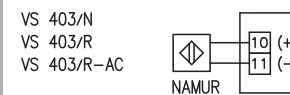
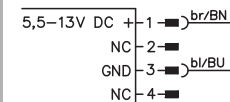


**Optical Sensor ABC**

- Sensors for potentially explosive areas Page 573
- Connection types Page 568
- Outputs Page 568

**Electrical connection**

LS 92/3 SE-L Ex  
 LS 92/3 E-L Ex  
 PRK 92/3 L Ex  
 FRK 92/3-300 L Ex



**Options**

- 1 Operation in combination with isolated switching amplifier VS 403
- 2 Light/dark switching at isolated switching amplifier
- 3 Line fault detection
- 4 Warning output for line fault/auxiliary power failure

## SENSORS FOR POTENTIALLY EXPLOSIVE AREAS

Part description Part No.:	Device category	Operating range [m] <input type="checkbox"/>	Operating voltage	Light source	Output	
<b>Throughbeam sensors acc. to EN 60079-15:2005 and EN 61241-1:2004</b>			▶ = Transmitter ◀ = Receiver			
▶ LSS 96M - 1079 - 23 - Ex n ◀ LSE 96M/P - 3019 - 21 Ex n	50111015 50111016	3G, 3D Protection types nA and tD A22	<input type="text" value="0"/> <input type="text" value="120"/>	10 ... 30VDC	Infrared light	1 x PNP
▶ LSSR 46B, 200 - S12 S - Ex n ◀ LSER 46B/66, 200 - S12 S - Ex n	50111519 50111520	3G, 3D Protection types nA and tD A22	<input type="text" value="0"/> <input type="text" value="50"/>	10 ... 30VDC	Red light	2xPush-pull/DC



**Dimensioned drawings at [www.leuze.com](http://www.leuze.com).**

The sensors of the 3B, 25B and 55 series can, with the exception of models HRTR...-L... and HRTR...-XL..., be used in potentially explosive areas in combination with an Ex protective housing. Additional information is available on request.

We reserve the right to make changes • Ex\_3\_EN.fm

Accessories / connection cables		More accessories can be found from page 514 onwards
Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50109217	K - V M12 - Ex	Mechanical connector lock



**Ex Sensors**

Zone 2, Zone 22



Standard Sensors

Measuring Sensors

Ultrasonic Sensors

Inductive Switches

Forked Sensors

Special Sensors

Fiber Optic Sensors

Light Curtains

Protective Sensors

Ex Sensors

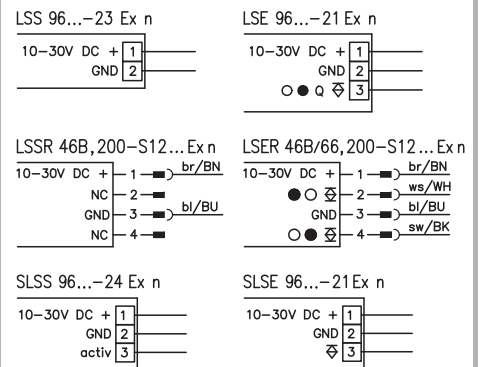
Switching	Connection	Option	Accessories
Light/dark reversible	Terminals		
Light/dark antivalent	Cable 0.2m, with M12 connector	7	a, b, c, d, e



**Optical Sensor ABC**

- Sensors for potentially explosive areas Page 573
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Adjustment of the switching points via teach buttons
- 3 Autocollimation principle
- 4 Low-temperature version with optics heating
- 5 Shining surfaces
- 6 Transparent media
- 7 Standard housing: ...-S12 **S**...; with flange for wall mounting: ...-S12 **W**...

# SENSORS FOR POTENTIALLY EXPLOSIVE AREAS

Part description Part No.:	Device category	Operating range [m] <input type="checkbox"/>	Operating voltage	Light source	Output
<b>Retro-reflective photoelectric sensors with polarization filter acc. to EN 60079-15:2005 and EN 61241-1:2004</b>					
<b>PRK 46B / 66, 200 - S12 S - Ex n</b> 50108591	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.05 ... 15	10 ... 30VDC	Red light	2x Push-pull/DC
<b>PRK 46B / 66, 200 - S12 W - Ex n</b> 50108592	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.05 ... 15	10 ... 30VDC	Red light	2x Push-pull/DC
<b>PRK 46B / 66.01, 200 - S12 S - Ex n</b> 50108593	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.05 ... 15	10 ... 30VDC	Red light	2x Push-pull/DC
<b>PRK 46B / 66.01, 200 - S12 W - Ex n</b> 50108594	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.05 ... 15	10 ... 30VDC	Red light	2x Push-pull/DC
<b>IPRK 46B / 4, 200 - S12 S - Ex n</b> 50108945	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.05 ... 15	10 ... 30VDC	Red light	1 x PNP
<b>IPRK 46B / 4, 200 - S12 W - Ex n</b> 50108946	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.05 ... 15	10 ... 30VDC	Red light	1 x PNP
<b>PRK 96 M / P - 3369 - 21 Ex n</b> 50111088	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0.3 ... 15	10 ... 30VDC	Red light	1 x PNP
<b>PRK 96 M / P - 2838 - 28 Ex n</b> 50109523	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 0 ... 7	10 ... 30VDC	Red light	2 x PNP



**Dimensioned drawings at [www.leuze.com](http://www.leuze.com).**

The **sensors of the 3B, 25B and 55 series** can, with the exception of models HRTR...-L... and HRTR...-XL..., be used in **potentially explosive areas in combination with an Ex protective housing**.  
Additional information is available on request.

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104543	K - D M12W - 4P - 2m - PVC	Connection cable 2000mm, M12 angular, 4-pin, PVC
b 50104542	K - D M12A - 4P - 2m - PVC	Connection cable 2000mm, M12 axial, 4-pin, PVC
c 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
d 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
e 50109217	K - V M12 - Ex	Mechanical connector lock



**Zone 1**  
Page 502



**Zone 2**  
Page 504



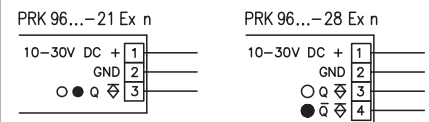
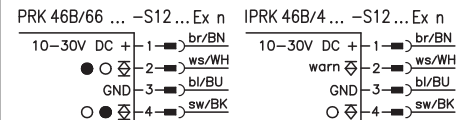
Switching	Connection	Option	Accessories
Light/dark antivalent	Cable 0.2m, with M12 connector	7	a, b, c, d, e
Light/dark antivalent	Cable 0.2m, with M12 connector	7	a, b, c, d, e
Light/dark antivalent	Cable 0.2m, with M12 connector	1, 7	a, b, c, d, e
Light/dark antivalent	Cable 0.2m, with M12 connector	1, 7	a, b, c, d, e
Light	Cable 0.2m, with M12 connector	4, 7	a, b, c, d, e
Light	Cable 0.2m, with M12 connector	4, 7	a, b, c, d, e
Light/dark reversible	Terminals	1	
Light/dark antivalent	Terminals	1, 3, 6	



**Optical Sensor ABC**

- Sensors for potentially explosive areas Page 573
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Adjustment of the switching points via teach buttons
- 3 Autocollimation principle
- 4 Warning output
- 5 Shining surfaces
- 6 Transparent media
- 7 Standard housing: ...-S12 **S**...; with flange for wall mounting: ...-S12 **W**...

# SENSORS FOR POTENTIALLY EXPLOSIVE AREAS

Part description Part No.:	Device category	Operating range [mm] <input type="checkbox"/>	Operating voltage	Light source	Output
<b>Diffuse reflection light scanners with background suppression acc. to EN 60079-15:2005 and EN 61241-1:2004</b>					
<b>HRTR 46B / 66, 200 - S12 S - Ex n</b> 50108589	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 20 800	10 ... 30VDC	Red light	2xPush-pull/DC
<b>HRTR 46B / 66, 200 - S12 W - Ex n</b> 50108590	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 20 800	10 ... 30VDC	Red light	2xPush-pull/DC
<b>HRT 46B / 66, 200 - S12 S - Ex n</b> 50108587	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 10 1200	10 ... 30VDC	Infrared light	2xPush-pull/DC
<b>HRT 46B / 66, 200 - S12 W - Ex n</b> 50108588	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 10 1200	10 ... 30VDC	Infrared light	2xPush-pull/DC
<b>IHRT 46B / 4, 200 - S12 S - Ex n</b> 50108943	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 10 1200	10 ... 30VDC	Infrared light	1 x PNP
<b>IHRT 46B / 4, 200 - S12 W - Ex n</b> 50108944	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 10 1200	10 ... 30VDC	Infrared light	1 x PNP
<b>HRT 96 M / P - 1639 - 800 - 21 Ex n</b> 50111087	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 100 800	10 ... 30VDC	Red light	1 x PNP
<b>HRT 96 M / P - 1649 - 800 - 21 Ex n</b> 50111089	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 100 800	10 ... 30VDC	Red light	1 x PNP
<b>HRT 96 M / P - 3360 - 2500 - 21 Ex n</b> 50108464	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 80 2200	10 ... 30VDC	Red light	Analog/V 2xpush-pull/DC
<b>HRT 96 M / P - 3370 - 5000 - 21.1 Ex n</b> 50112358	3G, 3D Protection types nA and tD A22	<input type="checkbox"/> 100 5000	10 ... 30VDC	Red light laser class 2	3xPush-pull/DC



**Dimensioned drawings at [www.leuze.com](http://www.leuze.com).**

The **sensors of the 3B, 25B and 55 series** can, with the exception of models HRTR...-L... and HRTR...-XL..., be used in **potentially explosive areas in combination with an Ex protective housing**.

Additional information is available on request.

## Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50104545	K - D M12W - 4P - 5m - PVC	Connection cable 5000mm, M12 angular, 4-pin, PVC
b 50104544	K - D M12A - 4P - 5m - PVC	Connection cable 5000mm, M12 axial, 4-pin, PVC
c 50109217	K - V M12 - Ex	Mechanical connector lock



**Zone 1**  
Page 502



**Zone 2**  
Page 504



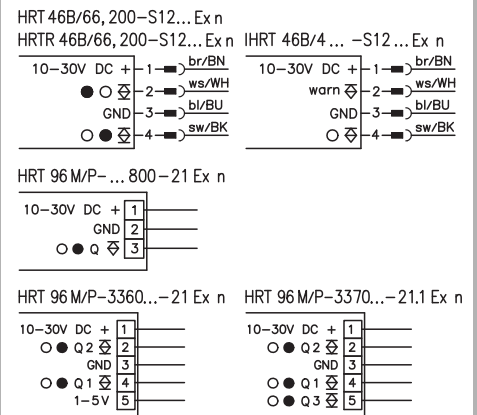
Switching	Connection	Option	Accessories
Light/dark antivalent	Cable 0.2m, with M12 connector	1, 4, 7	a, b, c
Light/dark antivalent	Cable 0.2m, with M12 connector	1, 4, 7	a, b, c
Light/dark antivalent	Cable 0.2m, with M12 connector	1, 4, 7	a, b, c
Light/dark antivalent	Cable 0.2m, with M12 connector	1, 4, 7	a, b, c
Light	Cable 0.2m, with M12 connector	1, 3, 4, 7	a, b, c
Light	Cable 0.2m, with M12 connector	1, 3, 4, 7	a, b, c
Light/dark reversible	Terminals	1	
Light/dark reversible	Terminals	1, 6	
Light/dark antivalent	Terminals	2, 5	
Light/dark reversible	Terminals	1, 5	



**Optical Sensor ABC**

- Sensors for potentially explosive areas Page 573
- Connection types Page 568
- Outputs Page 568

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Adjustment of the switching points via teach buttons
- 3 Warning output
- 4 Light/dark, as well as inclined/sloped surfaces
- 5 Shining surfaces
- 6 Switching delay
- 7 Standard housing: ...-S12 **S**...; with flange for wall mounting: ...-S12 **W**...

## AS-INTERFACE SENSORS

Part description Part No.:	Operating range [m] Typ. op. range limit [m]	<input type="checkbox"/> <input type="checkbox"/>	Operating voltage (acc. to AS-i spec.)	Light source	Output
<b>Throughbeam sensors</b>					
▶ = Transmitter ◀ = Receiver					
▶LSSR 8 / A.8 - S12 ◀ILSR 8 / A - S12	50038787 50038788	<input type="text" value="0"/> <input type="text" value="12"/> <input type="text" value="0"/> <input type="text" value="20"/>	26.5 ... 31.6V	Red light	AS-interface
▶LSS 96 M - 180W - 44 ◀LSE 96 M/ A - 182W - 44	50082040 50082039	<input type="text" value="0"/> <input type="text" value="30"/> <input type="text" value="0"/> <input type="text" value="39"/>	26.5 ... 31.6V	Red light	AS-interface
<b>Retro-reflective sensors with polarization filter</b>					
IPRK 8 / A - S12 50038789	<input type="text" value="0.1"/> <input type="text" value="6.4"/> <input type="text" value="0.1"/> <input type="text" value="8"/>		26.5 ... 31.6V	Red light	AS-interface
IPRK 18 / A L.4 50030077	<input type="text" value="0"/> <input type="text" value="2.4"/> <input type="text" value="0"/> <input type="text" value="3"/>		26.5 ... 31.6V	Red light	AS-interface
IPRK 18 / A.1 L.4 50034119	<input type="text" value="0"/> <input type="text" value="2.4"/> <input type="text" value="0"/> <input type="text" value="3"/>		26.5 ... 31.6V	Red light	AS-interface
IPRK 18 / A - L.46 50040278	<input type="text" value="0"/> <input type="text" value="2.4"/> <input type="text" value="0"/> <input type="text" value="3"/>		26.5 ... 31.6V	Red light	AS-interface



**Dimensioned drawings see standard sensors:**  
ILSR 8..., IPRK 8... on page 60, IPRK 18... on page 72, LS 96... on page 152.

We reserve the right to make changes • AS-i\_1\_EN.fm

### Accessories / connection cables

More accessories can be found from page 514 onwards

Part No.	Designation	Features
a 50024748	KB - 095 - 1000 - 3AW	Connection cable 1000mm, M12 axial/angular
b 50024749	KB - 095 - 2000 - 3AW	Connection cable 2000mm, M12 axial/angular
c 50081151	KB - 095 - 5000 - 3AW	Connection cable 5000mm, M12 axial/angular
d 50024750	AKB 01	Yellow AS-i ribbon cable
e 50080027	AKB 02	Black AS-i ribbon cable
f 50024346	AM 06	AS-i bus terminal for profile cable



**AS-i**  
Page 510



**Sensors**  
with AS-interface



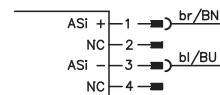
Connection	Option	Accessories	
M12 connector	4, 5, 6, 10, 11	a, b, c, d, e, f	
M12 connector	5, 6, 9, 11	a, b, c, d, e, f	
M12 connector	5, 6, 10, 11	a, b, c, d, e, f	
M12 connector	1, 3, 4, 5, 6, 9, 11	a, b, c, d, e, f	
M12 connector	1, 3, 4, 5, 6, 7, 9, 11	a, b, c, d, e, f	
M12 connector	2, 3, 5, 6, 7, 8, 10, 11	a, b, c, d, e, f	



**Optical Sensor ABC**

- Throughbeam sensors Page 563
- Retro-reflective sensors with polarization filter Page 563
- AS-interface sensors Page 567

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Teach-in via rotary switch
- 3 Transparent media
- 4 Activation input (via AS-i)
- 5 Switching output with configurable light/dark switching (via AS-i)
- 6 Warning output (via AS-i)
- 7 Pulse stretching
- 8 Contamination compensation (tracking function)
- 9 AS-interface slave address range: 1 ... 31
- 10 AS-interface slave address range: 1 ... 62
- 11 UL approval

## AS-INTERFACE SENSORS

Part description Part No.:	Operating range Typ. op. range limit	<input type="checkbox"/> <input type="checkbox"/>	Operating voltage (acc. to AS-i spec.)	Light source	Output
<b>Retro-reflective sensors with polarization filter</b>					
<b>PRK 95 / A L.4</b> 50027095	<input type="text" value="0.18"/> m <input type="text" value="0.3"/> m		26.5 ... 31.6V	Red light	AS-interface
<b>PRK 96 M / A - 3410 - 44</b> 50082067	<input type="text" value="0.3"/> m <input type="text" value="0.1"/> m	<input type="text" value="15"/> m <input type="text" value="18"/> m	26.5 ... 31.6V	Red light	AS-interface
<b>Energetic diffuse reflection scanners</b>					
<b>IRTR 8 / A - 800 - S12</b> 50038790	<input type="text" value="10"/> mm <input type="text" value="5"/> mm	<input type="text" value="600"/> mm <input type="text" value="800"/> mm	26.5 ... 31.6V	Red light	AS-interface
<b>Diffuse reflection scanners with background suppression</b>					
<b>HRT 96 M / A - 1670 - 800 - 44</b> 50080048	<input type="text" value="100"/> mm <input type="text" value="100"/> mm	<input type="text" value="800"/> mm <input type="text" value="1200"/> mm	26.5 ... 31.6V	Red light	AS-interface
<b>HRT 96 M / A - 1660 - 1200 - 44</b> 50025112	<input type="text" value="100"/> mm <input type="text" value="100"/> mm	<input type="text" value="1200"/> mm <input type="text" value="1800"/> mm	26.5 ... 31.6V	Infrared light	AS-interface



**Dimensioned drawings see standard sensors:**  
**IRTR 8...** on page 60, **PRK 95...** on page 144, **PRK 96...** and **HRT 96...** on page 152.

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### Accessories / connection cables

More accessories can be found from **page 514** onwards

Part No.	Designation	Features
a 50024748	KB - 095 - 1000 - 3AW	Connection cable 1000mm, M12 axial/angular
b 50024749	KB - 095 - 2000 - 3AW	Connection cable 2000mm, M12 axial/angular
c 50081151	KB - 095 - 5000 - 3AW	Connection cable 5000mm, M12 axial/angular
d 50024750	AKB 01	Yellow AS-i ribbon cable
e 50080027	AKB 02	Black AS-i ribbon cable
f 50024346	AM 06	AS-i bus terminal for profile cable



**AS-i**  
Page 510

**Sensors**  
with AS-interface



Connection	Option	Accessories	
M12 connector	1, 3, 4, 5, 6, 9, 11	a, b, c, d, e, f	
M12 connector	1, 4, 5, 6, 9, 11	a, b, c, d, e, f	
M12 connector	1, 5, 6, 10, 11	a, b, c, d, e, f	
M12 connector	1, 4, 5, 9, 11	a, b, c, d, e, f	
M12 connector	1, 4, 5, 9, 11	a, b, c, d, e, f	



Accessories

Services

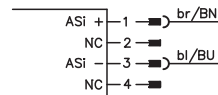
Optical Sensor  
ABC

**Optical Sensor ABC**

- Diffuse reflection scanners with background suppression Page 564
- AS-interface sensors Page 567

Inductive Switch  
ABC

**Electrical connection**



**Options**

- 1 Sensitivity adjustment via potentiometer
- 2 Teach-in via rotary switch
- 3 Transparent media
- 4 Activation input (via AS-i)
- 5 Switching output with configurable light/dark switching (via AS-i)
- 6 Warning output (via AS-i)
- 7 Pulse stretching
- 8 Contamination compensation (tracking function)
- 9 AS-interface slave address range: 1 ... 31
- 10 AS-interface slave address range: 1 ... 62
- 11 UL approval

**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>2 Series</b>		
	<p><b>BT 002M.5</b> 50112206</p>	<p>Mounting bracket</p>
<b>3B Series</b>		
	<p><b>BT 3</b> 50060511</p> <p><b>BT 3.1</b> 50105585</p> <p><b>BT 3.5</b> 50111830</p> <p><b>BT 3B</b> 50105546</p>	<p>Mounting bracket</p> <p>Retaining clip + 2 oval-head screws M3 x 16</p> <p>Retaining clip + 2 oval-head screws M3 x 16, stainless steel model</p> <p>Mounting bracket + retaining clip + 2 oval-head screws M3 x 16</p>
	<p><b>BT 3.2</b> 50103844</p>	<p>Adapter plate for alternate mounting of 3B Series sensors on 25.4 mm hole spacing</p>
<b>Other 3B Series accessories</b>		
	<p><b>SAT 5</b> 50109545</p>	<p>Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors</p>

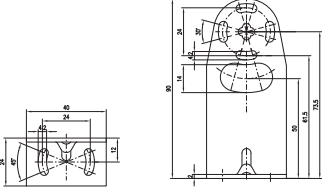
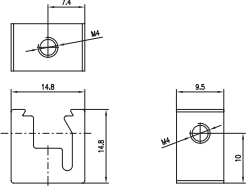
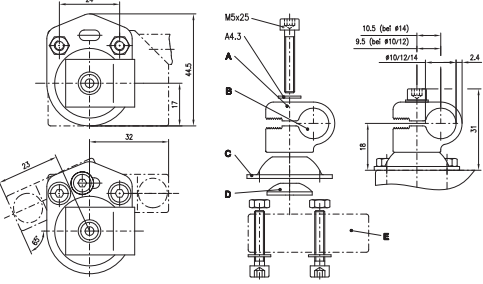
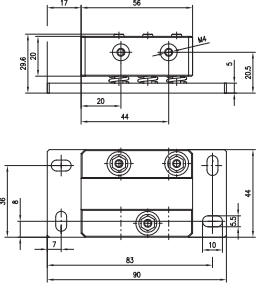

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**Mounting systems**  
Page 514

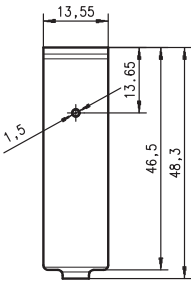
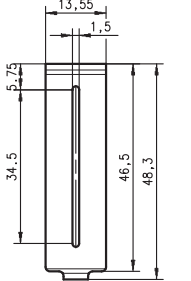
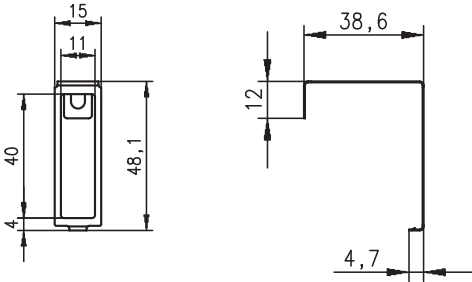
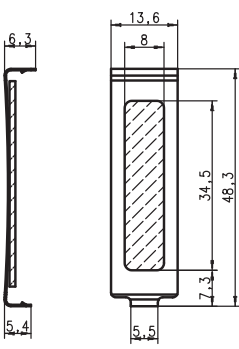
**Connection technology**  
Page 530

**Reflectors**  
Page 542

**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>8 Series</b>		
	<b>BT 8</b> 50036195	Mounting bracket
	<b>BT 8 - 0</b> 50036196	Mounting block for dovetail
	<b>BT 8 - D10</b> 50035017	Through-hole mount for rod D = 10mm or cheek
	<b>BT 8 - D12</b> 50035018	Through-hole mount for rod D = 12mm or cheek
	<b>BT 8 - D14</b> 50035019	Through-hole mount for rod D = 14mm or cheek
<b>Other 8 Series accessories</b>		
	<b>BT 8 - ARH</b> 50035030	Mounting/alignment system for laser sensors
	<b>SAT 5</b> 50109545	Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors

## ACCESSORIES / MOUNTING SYSTEMS / OTHER

Dimensioned drawing	Part description Part No.:	Feature
<b>Other 8 Series accessories</b>		
	<b>BL 8</b> 50040279	Pin diaphragm
	<b>BL 8.1</b> 50040280	Slit diaphragm
	<b>BS 8</b> 50041067	Control guard
	<b>SG 8</b> 50113307	Protective glass, consisting of a metal frame with glass included, snap-in mounting


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**Mounting systems**  
Page 516



**Connection technology**  
Page 530



**Reflectors**  
Page 542


**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>18 Series</b>		
	<p><b>BT 95</b> 50020833</p>	<p>Mounting bracket</p>
<p>A View turned by 45°</p>	<p><b>US 18</b> 50080987</p>	<p>90° deflection mirror</p>
<b>25(B) SERIES</b>		
	<p><b>BT 25</b> 50040269</p>	<p>Mounting bracket</p>
	<p><b>UMS 25 - D10</b> 50105451</p> <p><b>UMS 25 - D12</b> 50040270</p> <p><b>UMS 25.1 - D14</b> 50107016</p>	<p>Through-hole mount for rod D = 10mm or cheek</p> <p>Through-hole mount for rod D = 12mm or cheek</p> <p>Through-hole mount for rod D = 14mm or cheek</p>
	<p><b>SAT 5</b> 50109545</p>	<p>Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors</p>

# ACCESSORIES / MOUNTING SYSTEMS / OTHER

Dimensioned drawing	Part description Part No.:	Feature
<b>46B Series</b>		
	<b>BT 46</b> 50105315	Mounting bracket
	<b>BT 46.1</b> 50030556	Mounting system for rod D = 12 mm, steel/ aluminum
	<b>BT 46.1.5</b> 50082104	Mounting system for rod D = 12 mm, stainless steel
	<b>BT 46.2</b> 50033785	Mounting system for rod D = 14 mm, steel/ aluminum
<b>Other 46B Series accessories</b>		
	<b>ARH 46</b> 50040739	Alignment aid
	<b>SAT 5</b> 50109545	Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors


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**Mounting systems**  
Page 518



**Connection technology**  
Page 530



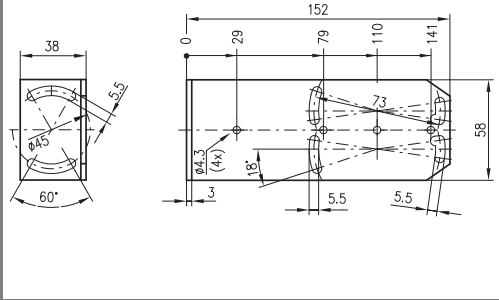
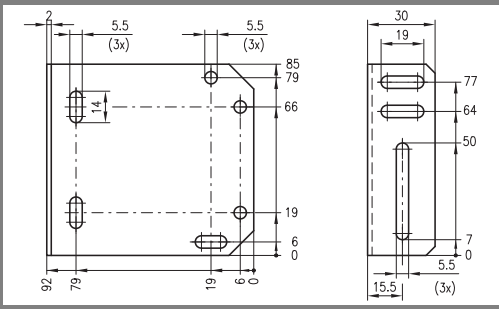
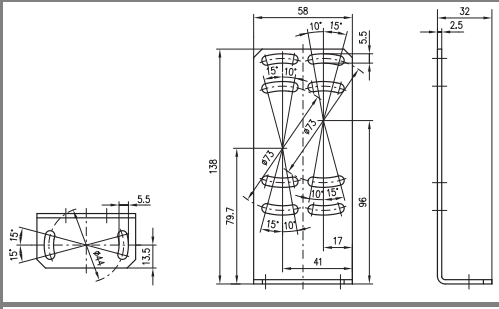
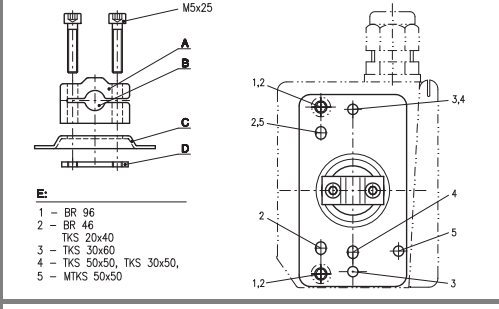
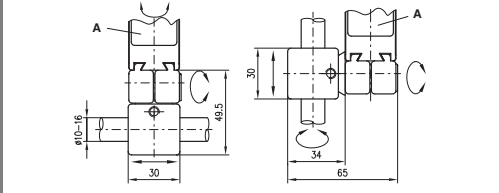
**Reflectors**  
Page 542



**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>95 Series</b>		
	<p><b>BT 95</b> 50020833</p>	<p>Mounting bracket</p>
	<p><b>UMS 96 - 95</b> 50080334</p>	<p>Mounting system</p>
<b>Other 95 Series accessories</b>		
	<p><b>SAT 5</b> 50109545</p>	<p>Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors</p>

# ACCESSORIES / MOUNTING SYSTEMS / OTHER

Dimensioned drawing	Part description Part No.:	Feature
<b>96 Series</b>		
	<b>BT 96</b> 50025570	Mounting bracket
	<b>BT 96.1</b> 50080614	Mounting device
	<b>BT 96.4</b> 50032319	Mounting bracket
 <p><b>E:</b></p> <ul style="list-style-type: none"> <li>1 - BR 96</li> <li>2 - BR 46</li> <li>3 - TKS 20x40</li> <li>4 - TKS 30x60</li> <li>5 - TKS 50x50, TKS 30x50,</li> <li>5 - MTKS 50x50</li> </ul>	<b>BT 450.1 - 96</b> 50082084  <b>BT 450.3 - 96</b> 50104897	Through-hole mount for rod D = 10 mm  Through-hole mount for rod D = 12 mm
	<b>UMS 96</b> 50026204	Universal mounting system


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**Mounting systems**  
Page 520

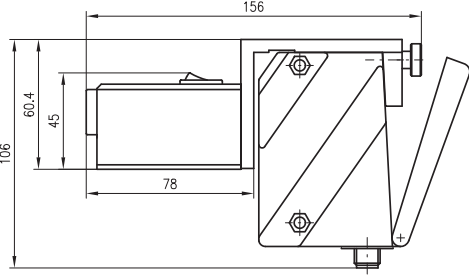

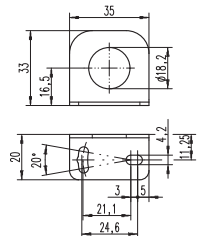
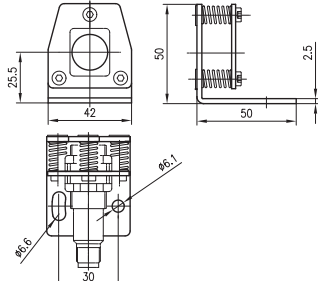


**Connection technology**  
Page 530



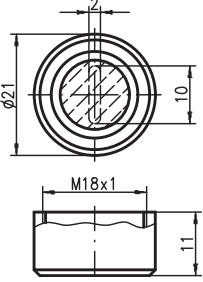
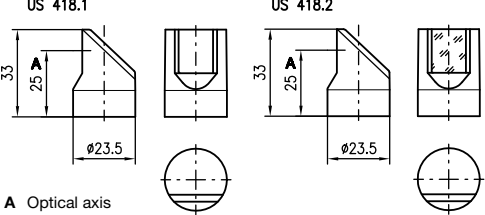

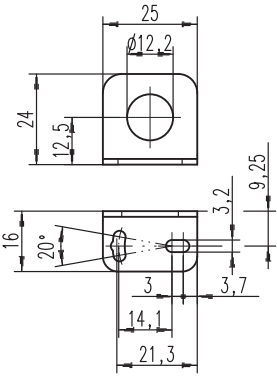
**Reflectors**  
Page 542

**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>Other 96 Series accessories</b>		
	<p><b>ARH 96</b> 50080502</p>	<p>Laser alignment aid</p>
	<p><b>SAT 5</b> 50109545</p>	<p>Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors</p>
<b>318 Series and 618 Series</b>		
	<p><b>BT D18M.5</b> 50113548</p>	<p>Mounting bracket for M18 cylindrical devices</p>
	<p><b>BT 318 - ARH</b> 50083189</p>	<p>Mounting/alignment system for laser sensors</p>

[www.leuze.com/accessories/](http://www.leuze.com/accessories/)

## ACCESSORIES / MOUNTING SYSTEMS / OTHER

Dimensioned drawing	Part description Part No.:	Feature
<b>Other 318 Series accessories</b>		
	<p><b>BL 318.1</b> 50082008</p>	<p>Slit diaphragm for 318 Series</p>
 <p>A Optical axis</p>	<p><b>US 418.1</b> 50080130</p> <p><b>US 418.2</b> 50080131</p>	<p>90° deflector attachment (open version) for diffuse reflection scanners</p> <p>90° deflector attachment (closed version)</p>
	<p><b>SAT 5</b> 50109545</p>	<p>Sensorscope - mechanical-optical alignment aid, suitable for throughbeam- and safety-throughbeam photoelectric sensors</p>
<b>412 Series</b>		
	<p><b>BT D12M.5</b> 50113549</p>	<p>Mounting bracket for M12 cylindrical devices</p>


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**Mounting systems**  
Page 522



**Connection technology**  
Page 530



**Reflectors**  
Page 542

**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>Mounting clamps for inductive switches</b>		
	<p><b>MC 006K</b> 50111496</p>	<p>Mounting clamp for inductive switches Ø 6.5mm, without limit stop, ØA = 6.5mm</p>
	<p><b>MC 008K</b> 50111497</p>	<p>Mounting clamp for inductive switches M8 x 1, without limit stop, ØA = 8mm</p>
	<p><b>MC 008K - LS</b> 50111498</p>	<p>Mounting clamp for inductive switches M8 x 1, with limit stop, ØA = 8mm</p>
	<p><b>MC 012K</b> 50111499</p>	<p>Mounting clamp for inductive switches M12 x 1, without limit stop, ØA = 12mm, B = 9.75mm, C = 9mm, D = 18mm</p>
	<p><b>MC 012K - LS</b> 50111500</p>	<p>Mounting clamp for inductive switches M12 x 1, with limit stop, ØA = 12mm, B = 9.75mm, C = 9mm, D = 18mm</p>
	<p><b>MC 018K</b> 50111501</p>	<p>Mounting clamp for inductive switches M18 x 1, without limit stop, ØA = 18mm, B = 12.85mm, C = 12mm, D = 24mm</p>
	<p><b>MC 018K - LS</b> 50111502</p>	<p>Mounting clamp for inductive switches M18 x 1, with limit stop, ØA = 18mm, B = 12.85mm, C = 12mm, D = 24mm</p>
	<p><b>MC 030K</b> 50111503</p>	<p>Mounting clamp for inductive switches M30 x 1.5, without limit stop</p>
	<p><b>MC 030K - LS</b> 50111504</p>	<p>Mounting clamp for inductive switches M30 x 1.5, with limit stop</p>

## ACCESSORIES / MOUNTING SYSTEMS / OTHER

Dimensioned drawing	Part description Part No.:	Feature
<b>Mounting brackets for inductive switches</b>		
	<p><b>BT D08M.5</b> 50113550</p>	<p>Mounting bracket for M8 inductive switches</p>
	<p><b>BT D12M.5</b> 50113549</p>	<p>Mounting bracket for M12 inductive switches</p>
	<p><b>BT D18M.5</b> 50113548</p>	<p>Mounting bracket for M18 inductive switches</p>
	<p><b>BT D30M.5</b> 50113510</p>	<p>Mounting bracket for M30 inductive switches</p>

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**Mounting systems**  
Page 524

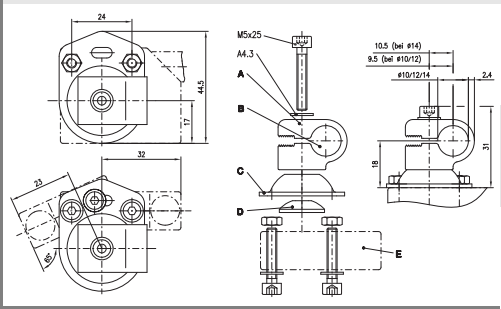
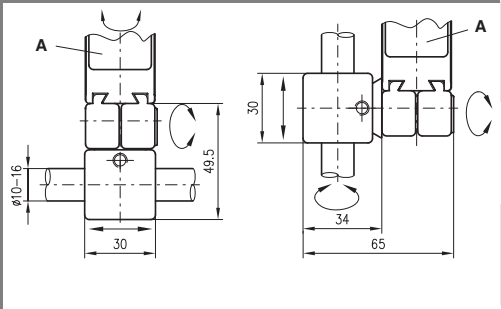
**Connection technology**  
Page 530

**Reflectors**  
Page 542

**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>ROD 4</b>		
	<p><b>ROD 4 - MS</b> 50038066</p>	<p>Mounting system / mounting plate</p>
<b>Other accessories for optical forked sensors (I)GS 61 / 63</b>		
	<p><b>BT - GS6X.L</b> 50112215</p>	<p>Mounting device for forked sensors (I)GS 61 / 63</p>
<b>Other accessories for ultrasonic forked sensors GSU 14B</b>		
<p><b>FS 14BM.5</b> 50114055</p>		<p>Replacement rail for standard design GSU 14B</p>
<p><b>FS 14BML.5</b> 50114056</p>		<p>Extended guide rail for GSU 14B, 260mm long</p>

## ACCESSORIES / MOUNTING SYSTEMS / OTHER

Dimensioned drawing	Part description Part No.:	Feature
<b>Contrast scanners</b>		
	<b>BT 8 - D10</b> <sup>1)</sup> 50035017	Through-hole mount for rod D = 10 mm or cheek
	<b>BT 8 - D12</b> <sup>1)</sup> 50035018	Through-hole mount for rod D = 12 mm or cheek
	<b>BT 8 - D14</b> <sup>1)</sup> 50035019	Through-hole mount for rod D = 14 mm or cheek
	<b>UMS 96</b> 50026204	Universal mounting system
<p>1) Additional mounting systems can be found under mounting systems for 8 series on page 514</p>		
<b>Other accessories for contrast scanners KRTG 20, KRTM 20 and color scanner CRTM 20</b>		
	<b>OB 12 - KRT 20</b> 50034051	Optics 12mm
	<b>OB 20 - KRT 20</b> 50034050	Optics 20mm
	<b>OB 50 - KRT 20</b> 50034049	Optics 50mm
	<b>WZ - OB - KRT 20</b> 50034118	Tool for changing objectives


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**Mounting systems**  
Page 526



**Connection technology**  
Page 530



**Reflectors**  
Page 542



**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

Dimensioned drawing	Part description Part No.:	Feature
<b>Luminescence scanners LRT 8 and LRT 440</b>		
	<p><b>BT 8 - D10</b> <sup>1)</sup> 50035017</p>	Through-hole mount for rod D = 10mm or cheek
	<p><b>BT 8 - D12</b> <sup>1)</sup> 50035018</p>	Through-hole mount for rod D = 12mm or cheek
	<p><b>BT 8 - D14</b> <sup>1)</sup> 50035019</p>	Through-hole mount for rod D = 14mm or cheek
	<p><b>BT 46.1</b> 50030556</p>	Mounting system for LRT 440, Mounting system for rod D = 12mm, steel/aluminum
	<p><b>BT 46.2</b> 50033785</p>	Mounting system for LRT 440, Mounting system for rod D = 14mm, steel/aluminum

1) Additional mounting systems can be found under mounting systems for 8 Series on page 514



**Mounting systems for optical distance sensors, ultrasonic sensors, fiber optic amplifiers, protective sensors and AS-interface sensors can be found with the mounting accessories for the respective standard sensors.**



**ACCESSORIES / MOUNTING SYSTEMS / OTHER**

AS-interface  
Sensors

Accessories

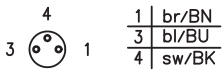
Services

Optical Sensor  
ABC

Inductive Switch  
ABC

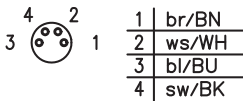
## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M8 connector, 3-pin socket, open cable end</b>		
	<b>K - D M8A - 3P - 2m - PVC</b> 50104520	Connection cable 2000mm, M8 axial, 3-pin, PVC
	<b>K - D M8W - 3P - 2m - PVC</b> 50104521	Connection cable 2000mm, M8 angular, 3-pin, PVC
	<b>K - D M8A - 3P - 5m - PVC</b> 50104522	Connection cable 5000mm, M8 axial, 3-pin, PVC
	<b>K - D M8W - 3P - 5m - PVC</b> 50104523	Connection cable 5000mm, M8 angular, 3-pin, PVC
	<b>K - D M8A - 3P - 10m - PVC</b> 50110556	Connection cable 10000mm, M8 axial, 3-pin, PVC
	<b>K - D M8W - 3P - 10m - PVC</b> 50110559	Connection cable 10000mm, M8 angular, 3-pin, PVC
	<b>K - D M8A - 3P - 2m - PUR</b> 50110555	Connection cable 2000mm, M8 axial, 3-pin, PUR
	<b>K - D M8W - 3P - 2m - PUR</b> 50110557	Connection cable 2000mm, M8 angular, 3-pin, PUR
	<b>K - D M8A - 3P - 5m - PUR</b> 50106691	Connection cable 5000mm, M8 axial, 3-pin, PUR
	<b>K - D M8W - 3P - 5m - PUR</b> 50106692	Connection cable 5000mm, M8 angular, 3-pin, PUR
	<b>K - D M8A - 3P - 10m - PUR</b> 50106693	Connection cable 10000mm, M8 axial, 3-pin, PUR
	<b>K - D M8W - 3P - 10m - PUR</b> 50110558	Connection cable 10000mm, M8 angular, 3-pin, PUR



## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M8 connector, 4-pin socket, open cable end</b>		
	<b>K - D M8A - 4P - 2m - PVC</b> 50104524	Connection cable 2000mm, M8 axial, 4-pin, PVC
	<b>K - D M8W - 4P - 2m - PVC</b> 50104525	Connection cable 2000mm, M8 angular, 4-pin, PVC
	<b>K - D M8A - 4P - 5m - PVC</b> 50104526	Connection cable 5000mm, M8 axial, 4-pin, PVC
	<b>K - D M8W - 4P - 5m - PVC</b> 50104527	Connection cable 5000mm, M8 angular, 4-pin, PVC
	<b>K - D M8A - 4P - 10m - PVC</b> 50104528	Connection cable 10000mm, M8 axial, 4-pin, PVC
	<b>K - D M8W - 4P - 10m - PVC</b> 50104529	Connection cable 10000mm, M8 angular, 4-pin, PVC
	<b>K - D M8A - 4P - 2m - PUR</b> 50104530	Connection cable 2000mm, M8 axial, 4-pin, PUR
	<b>K - D M8W - 4P - 2m - PUR</b> 50104531	Connection cable 2000mm, M8 angular, 4-pin, PUR
	<b>K - D M8A - 4P - 5m - PUR</b> 50104532	Connection cable 5000mm, M8 axial, 4-pin, PUR
	<b>K - D M8W - 4P - 5m - PUR</b> 50104761	Connection cable 5000mm, M8 angular, 4-pin, PUR
	<b>K - D M8A - 4P - 10m - PUR</b> 50104533	Connection cable 10000mm, M8 axial, 4-pin, PUR
	<b>K - D M8W - 4P - 10m - PUR</b> 50104534	Connection cable 10000mm, M8 angular, 4-pin, PUR



## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M8 connector, 4-pin socket, open cable end, with integrated LEDs</b>		
	<b>K - D M8W - 4P - 2m - DP - PUR</b> 50104535	Connection cable 2000mm, M8 angular, 4-pin, PUR, 2 integrated LEDs (PNP)
	<b>K - D M8W - 4P - 5m - DP - PUR</b> 50104536	Connection cable 5000mm, M8 angular, 4-pin, PUR, 2 integrated LEDs (PNP)
<b>Connection cables with M8 connector, 4-pin socket, open cable end, for the food and beverage industries</b>		
	<b>K - D M8A - 4P - 2m - FAB</b> 50106152	Connection cable 2000mm, M8 axial, 4-pin, PVC, Food & Beverage version
	<b>K - D M8W - 4P - 2m - FAB</b> 50106154	Connection cable 2000mm, M8 angular, 4-pin, PVC, Food & Beverage version
	<b>K - D M8A - 4P - 5m - FAB</b> 50106153	Connection cable 5000mm, M8 axial, 4-pin, PVC, Food & Beverage version
	<b>K - D M8W - 4P - 5m - FAB</b> 50106155	Connection cable 5000mm, M8 angular, 4-pin, PVC, Food & Beverage version
	<b>K - D M8A - 4P - 10m - FAB</b> 50110274	Connection cable 10000mm, M8 axial, 4-pin, PVC, Food & Beverage version
	<b>K - D M8W - 4P - 10m - FAB</b> 50110273	Connection cable 10000mm, M8 angular, 4-pin, PVC, Food & Beverage version


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**Mounting systems**  
Page 514

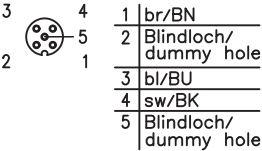


**Connection technology**  
Page 532




**Reflectors**  
Page 542

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M12 connector, 3-pin socket, open cable end</b>		
	<b>K - D M12A - 3P - 2m - PVC</b> 50104538	Connection cable 2000 mm, M12 axial, 3-pin, PVC
	<b>K - D M12W - 3P - 2m - PVC</b> 50104539	Connection cable 2000 mm, M12 angular, 3-pin, PVC
	<b>K - D M12A - 3P - 5m - PVC</b> 50104540	Connection cable 5000 mm, M12 axial, 3-pin, PVC
	<b>K - D M12W - 3P - 5m - PVC</b> 50104541	Connection cable 5000 mm, M12 angular, 3-pin, PVC

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature										
<b>Connection cables with M12 connector, 4-pin socket, open cable end</b>												
	<b>K - D M12A - 4P - 2m - PVC</b> 50104542	Connection cable 2000mm, M12 axial, 4-pin, PVC										
	<b>K - D M12W - 4P - 2m - PVC</b> 50104543	Connection cable 2000mm, M12 angular, 4-pin, PVC										
	<b>K - D M12A - 4P - 5m - PVC</b> 50104544	Connection cable 5000mm, M12 axial, 4-pin, PVC										
	<b>K - D M12W - 4P - 5m - PVC</b> 50104545	Connection cable 5000mm, M12 angular, 4-pin, PVC										
 <p>3 4 2 5 1</p> <table border="1"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>2</td><td>ws/WH</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> <tr><td>5</td><td>Blindloch/ dummy hole</td></tr> </table>	1	br/BN	2	ws/WH	3	bl/BU	4	sw/BK	5	Blindloch/ dummy hole	<b>K - D M12A - 4P - 10m - PVC</b> 50104546	Connection cable 10000mm, M12 axial, 4-pin, PVC
1	br/BN											
2	ws/WH											
3	bl/BU											
4	sw/BK											
5	Blindloch/ dummy hole											
	<b>K - D M12W - 4P - 10m - PVC</b> 50104547	Connection cable 10000mm, M12 angular, 4-pin, PVC										
	<b>K - D M12A - 4P - 20m - PVC</b> 50104753	Connection cable 20000mm, M12 axial, 4-pin, PVC										
	<b>K - D M12W - 4P - 20m - PVC</b> 50113473	Connection cable 20000mm, M12 angular, 4-pin, PVC										



**Mounting systems**  
Page 514



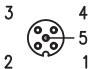
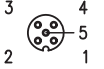
**Connection technology**  
Page 534



**Reflectors**  
Page 542



## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M12 connector, 4-pin socket, open cable end</b>		
 <p>3 4 2 5 1</p> <p>1   br/BN 2   ws/WH 3   bl/BU 4   sw/BK 5   Blindloch/ dummy hole</p>	<b>K - D M12A - 4P - 2m - PUR</b> 50104561	Connection cable 2000mm, M12 axial, 4-pin, PUR
	<b>K - D M12W - 4P - 2m - PUR</b> 50104562	Connection cable 2000mm, M12 angular, 4-pin, PUR
	<b>K - D M12A - 4P - 5m - PUR</b> 50104563	Connection cable 5000mm, M12 axial, 4-pin, PUR
	<b>K - D M12W - 4P - 5m - PUR</b> 50104564	Connection cable 5000mm, M12 angular, 4-pin, PUR
	<b>K - D M12A - 4P - 10m - PUR</b> 50104565	Connection cable 10000mm, M12 axial, 4-pin, PUR
	<b>K - D M12W - 4P - 10m - PUR</b> 50104566	Connection cable 10000mm, M12 angular, 4-pin, PUR
<b>Connection cables for intrinsically safe circuits with M12 connector, 4-pin socket, open cable end</b>		
 <p>3 4 2 5 1</p> <p>1   br/BN 2   ws/WH 3   bl/BU 4   sw/BK 5   Blindloch/ dummy hole</p>	<b>BK7 KB - 092 - 5000 - 4A Ex</b> 50037783	Connection cable 5000mm for intrinsically safe circuits, blue, M12 axial, 4-pin
	<b>BK7 KB - 092 - 5000 - 4 Ex</b> 50037784	Connection cable 5000mm for intrinsically safe circuits, blue, M12 angular, 4-pin

# ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M12 connector, 4-pin socket, open cable end, with integrated LEDs</b>		
	<b>K - D M12A - 4P - 2m - DP - PUR</b> 50104548	Connection cable 2000 mm, M12 axial, 4-pin, PUR, 2 integrated LEDs (PNP)
	<b>K - D M12W - 4P - 2m - DP - PUR</b> 50104549	Connection cable 2000 mm, M12 angular, 4-pin, PUR, 2 integrated LEDs (PNP)
	<b>K - D M12A - 4P - 5m - DP - PUR</b> 50104550	Connection cable 5000 mm, M12 axial, 4-pin, PUR, 2 integrated LEDs (PNP)
	<b>K - D M12W - 4P - 5m - DP - PUR</b> 50104551	Connection cable 5000 mm, M12 angular, 4-pin, PUR, 2 integrated LEDs (PNP)
	<b>K - D M12A - 4P - 10m - DP - PUR</b> 50104552	Connection cable 10000 mm, M12 axial, 4-pin, PUR, 2 integrated LEDs (PNP)
	<b>K - D M12W - 4P - 10m - DP - PUR</b> 50104553	Connection cable 10000 mm, M12 angular, 4-pin, PUR, 2 integrated LEDs (PNP)
<b>Connection cables with M12 connector, 4-pin socket, open cable end, for the food and beverage industries</b>		
	<b>K - D M12A - 4P - 2m - FAB</b> 50104570	Connection cable 2000 mm, M12 axial, 4-pin, PVC, Food & Beverage version
	<b>K - D M12W - 4P - 2m - FAB</b> 50104571	Connection cable 2000 mm, M12 angular, 4-pin, PVC, Food & Beverage version
	<b>K - D M12A - 4P - 5m - FAB</b> 50104572	Connection cable 5000 mm, M12 axial, 4-pin, PVC, Food & Beverage version
	<b>K - D M12W - 4P - 5m - FAB</b> 50104573	Connection cable 5000 mm, M12 angular, 4-pin, PVC, Food & Beverage version
	<b>K - D M12A - 4P - 10m - FAB</b> 50112960	Connection cable 10000 mm, M12 axial, 4-pin, PVC, Food & Beverage version
	<b>K - D M12W - 4P - 10m - FAB</b> 50112961	Connection cable 10000 mm, M12 angular, 4-pin, PVC, Food & Beverage version


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**Mounting systems**  
Page 514




**Connection technology**  
Page 536



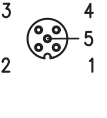
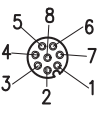
**Reflectors**  
Page 542

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables with M12 connector, 5-pin socket, open cable end</b>		
	<b>K - D M12A - 5P - 2m - PVC</b> 50104555	Connection cable 2000mm, M12 axial, 5-pin, PVC
	<b>K - D M12W - 5P - 2m - PVC</b> 50104556	Connection cable 2000mm, M12 angular, 5-pin, PVC
	<b>K - D M12A - 5P - 5m - PVC</b> 50104557	Connection cable 5000mm, M12 axial, 5-pin, PVC
	<b>K - D M12W - 5P - 5m - PVC</b> 50104558	Connection cable 5000mm, M12 angular, 5-pin, PVC
	<b>K - D M12A - 5P - 10m - PVC</b> 50104559	Connection cable 10000mm, M12 axial, 5-pin, PVC
	<b>K - D M12W - 5P - 10m - PVC</b> 50104560	Connection cable 10000mm, M12 angular, 5-pin, PVC
	<b>K - D M12A - 5P - 2m - PUR</b> 50104567	Connection cable 2000mm, M12 axial, 5-pin, PUR
	<b>K - D M12W - 5P - 2m - PUR</b> 50104568	Connection cable 2000mm, M12 angular, 5-pin, PUR
	<b>K - D M12A - 5P - 5m - PUR</b> 50104569	Connection cable 5000mm, M12 axial, 5-pin, PUR
	<b>K - D M12W - 5P - 5m - PUR</b> 50104762	Connection cable 5000mm, M12 angular, 5-pin, PUR

1	br/BN
2	ws/WH
3	bl/BU
4	sw/BK
5	gr/GY

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature																
<b>Connection cables with M12 connector, 5-pin socket, open cable end, for the food and beverage industries</b>																		
 <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>2</td><td>ws/WH</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> <tr><td>5</td><td>gr/GY</td></tr> </table>	1	br/BN	2	ws/WH	3	bl/BU	4	sw/BK	5	gr/GY	<b>K - D M12A - 5P - 2m - FAB</b> 50104574	Connection cable 2000mm, M12 axial, 5-pin, PVC, Food & Beverage version						
	1	br/BN																
	2	ws/WH																
	3	bl/BU																
4	sw/BK																	
5	gr/GY																	
<b>K - D M12W - 5P - 2m - FAB</b> 50104575	Connection cable 2000mm, M12 angular, 5-pin, PVC, Food & Beverage version																	
<b>K - D M12A - 5P - 5m - FAB</b> 50104576	Connection cable 5000mm, M12 axial, 5-pin, PVC, Food & Beverage version																	
<b>K - D M12W - 5P - 5m - FAB</b> 50104577	Connection cable 5000mm, M12 angular, 5-pin, PVC, Food & Beverage version																	
<b>Connection cables with M12 connector, 8-pin socket, open cable end</b>																		
 <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>1</td><td>ws/WH</td></tr> <tr><td>2</td><td>br/BN</td></tr> <tr><td>3</td><td>gn/GN</td></tr> <tr><td>4</td><td>ge/YE</td></tr> <tr><td>5</td><td>gr/GY</td></tr> <tr><td>6</td><td>rs/PK</td></tr> <tr><td>7</td><td>bl/BU</td></tr> <tr><td>8</td><td>rt/RD</td></tr> </table>	1	ws/WH	2	br/BN	3	gn/GN	4	ge/YE	5	gr/GY	6	rs/PK	7	bl/BU	8	rt/RD	<b>K - D M12A - 8P - 2m - PUR</b> 50104591	Connection cable 2000mm, M12 axial, 8-pin, shielded, PUR
	1	ws/WH																
	2	br/BN																
3	gn/GN																	
4	ge/YE																	
5	gr/GY																	
6	rs/PK																	
7	bl/BU																	
8	rt/RD																	
<b>K - D M12A - 8P - 5m - PUR</b> 50104590	Connection cable 5000mm, M12 axial, 8-pin, shielded, PUR																	
<b>K - D M12A - 8P - 10m - PUR</b> 50106882	Connection cable 10000mm, M12 axial, 8-pin, shielded, PUR																	
<b>Adapter cables with M8/M12 connector, 4-pin</b>																		
	<b>K - DS M8A - M12A - 4P - 0.3m - PVC</b> 50107276	Adapter line 300mm, axial M8 socket, axial M12 connector, 4-pin, PVC. Simple connection of sensors with M8 connectors to M12 connection technology possible.																
<b>Extension cables with M12 connector, 4-pin</b>																		
	<b>K - DS M12A - M12A - 4P - 10m - PVC</b> 50113265	10m extension cable, M12 axial socket, M12 axial connector, 4-pin, PVC																


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**Mounting systems**  
Page 514



**Connection technology**  
Page 538



**Reflectors**  
Page 542

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cables ROD4 and ROD4plus</b>		
	<b>KB - ROD4PC - 3000</b> 50038069	Connection cable between ROD 4 and PC 3000 mm
	<b>KB - ROD4PC - 10000</b> 50038070	Connection cable between ROD 4 and PC 10000 mm
	<b>KB - ROD4 - CP - 5000</b> 50108138	Connection cable 5000 mm for ROD 4-3x, with configuration memory (Config-Plug)
	<b>KB - ROD4 - CP - 10000</b> 50108139	Connection cable 10000 mm for ROD 4-3x, with configuration memory (Config-Plug)
	<b>KB - ROD4 plus - 5000</b> 50106881	Connection cable for ROD 4 plus 5000 mm
	<b>KB - ROD4 plus - 10000</b> 50106906	Connection cable for ROD 4 plus 10000 mm
	<b>KB - ET - 2000 - SA - RJ45</b> 50109880	Ethernet connection cable for ROD 4 plus 2000 mm, M12 axial D-coded to RJ45
	<b>KB - ET - 5000 - SA - RJ45</b> 50109881	Ethernet connection cable for ROD 4 plus 5000 mm, M12 axial D-coded to RJ45
	<b>KB - ET - 10000 - SA - RJ45</b> 50109882	Ethernet connection cable for ROD 4 plus 10000 mm, M12 axial D-coded to RJ45

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature
<b>Connection cable for KONTURflex light curtains</b>		
	<b>CB - M12 - 1000S - 5GF/GM</b> 678031	QUATTRO-KT/KR connection cable, length 1 m, shielded
	<b>CB - M12 - 2500S - 5GF/GM</b> 678033	QUATTRO-KT/KR connection cable, length 2.5 m, shielded
	<b>CB - M12 - 5000S - 5GF/GM</b> 678035	QUATTRO-KT/KR connection cable, length 5 m, shielded
	<b>CB - M12 - 10000S - 5GF/GM</b> 678040	QUATTRO-KT/KR connection cable, length 10 m, shielded
	<b>CB - M12 - 15000S - 5GF/GM</b> 678045	QUATTRO-KT/KR connection cable, length 15 m, shielded
	<b>CB - M12 - 20000S - 5GF/GM</b> 678032	QUATTRO-KT/KR connection cable, length 20 m, shielded



**Mounting systems**  
Page 514










**Connection technology**  
Page 540



**Reflectors**  
Page 542

## ACCESSORIES / CONNECTION TECHNOLOGY

Contact assignment	Part description Part No.:	Feature										
<b>Connectors, user-configurable</b>												
	<table border="1"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> </table>	1	br/BN	3	bl/BU	4	sw/BK	<b>D M8A - 3P - SK</b> 50104582 Cable socket, M8 axial, 3-pin, insulation displacement connections, user-configurable				
1	br/BN											
3	bl/BU											
4	sw/BK											
	<table border="1"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>2</td><td>ws/WH</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> </table>	1	br/BN	2	ws/WH	3	bl/BU	4	sw/BK	<b>D M8A - 4P - SK</b> 50104583 Cable socket, M8 axial, 4-pin, insulation displacement connections, user-configurable		
1	br/BN											
2	ws/WH											
3	bl/BU											
4	sw/BK											
	<table border="1"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>2</td><td>ws/WH</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> </table>	1	br/BN	2	ws/WH	3	bl/BU	4	sw/BK	<b>KD 095 - 4</b> 50031324 Cable socket, M12 angular, 4-pin, user-configurable		
1	br/BN											
2	ws/WH											
3	bl/BU											
4	sw/BK											
	<table border="1"> <tr><td>5</td><td>Blindloch/ dummy hole</td></tr> </table>	5	Blindloch/ dummy hole	<b>KD 095 - 4A</b> 50031323 Cable socket, M12 axial, 4-pin, user-configurable								
5	Blindloch/ dummy hole											
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1	br/BN											
2	ws/WH											
3	bl/BU											
4	sw/BK											
	<table border="1"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>2</td><td>ws/WH</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> <tr><td>5</td><td>gr/GY</td></tr> </table>	1	br/BN	2	ws/WH	3	bl/BU	4	sw/BK	5	gr/GY	<b>KD 095 - 5</b> 50020502 Cable socket, M12 angular, 5-pin, user-configurable
1	br/BN											
2	ws/WH											
3	bl/BU											
4	sw/BK											
5	gr/GY											
	<table border="1"> <tr><td>1</td><td>br/BN</td></tr> <tr><td>2</td><td>ws/WH</td></tr> <tr><td>3</td><td>bl/BU</td></tr> <tr><td>4</td><td>sw/BK</td></tr> <tr><td>5</td><td>gr/GY</td></tr> </table>	1	br/BN	2	ws/WH	3	bl/BU	4	sw/BK	5	gr/GY	<b>KD 095 - 5A</b> 50020501 Cable socket, M12 axial, 5-pin, user-configurable
1	br/BN											
2	ws/WH											
3	bl/BU											
4	sw/BK											
5	gr/GY											
	<b>KD 095 - 5A - PG9</b> 50081461 Cable socket, M12 axial, 5-pin, user-configurable, with PG9 screwed cable gland											
	<b>KD - ROD4 - X1 - Set</b> 50038072 Connector X1 for ROD 4, 15-pin											
	<b>KD - ROD4 - X2 - Set</b> 50038073 Connector X2 for ROD 4, 9-pin											
	<b>D - ET1</b> 50108991 RJ45 plug for user-configuration											

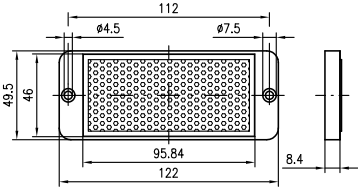
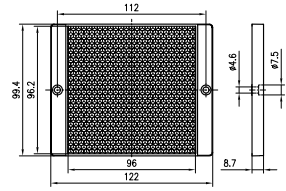
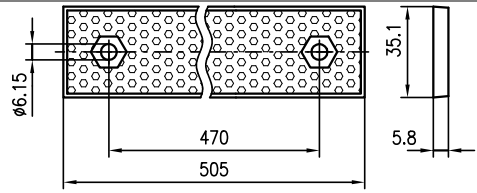
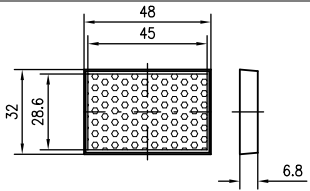
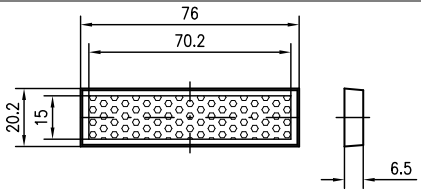
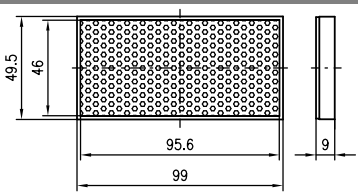
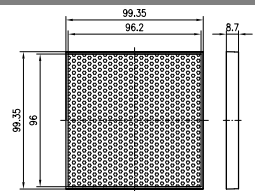
## ACCESSORIES / REFLECTORS

Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors, rectangular</b>		
	<b>TKS 10 x 32</b> 50110282	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 20 x 40</b> 50081283	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 30 x 50</b> 50023525	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 30 x 60</b> 50030433	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 40 x 60</b> 50040820	Screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 50 x 50</b> 50022814	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 50 x 50.1</b> 50105153	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C

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Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors, rectangular</b>		
	<b>TKS 50 x 100</b> 50022815	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 100 x 100</b> 50022816	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 30 x 500</b> 50027097	Screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 30 x 50</b> 50003189	Adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 20 x 75</b> 50003188	Adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 50 x 100</b> 50003191	Adhesive, screw type with BT 910M  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 100 x 100</b> 50003192	Adhesive, screw type with BT 910M  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C

# ACCESSORIES / REFLECTORS

Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors, rectangular</b>		
	<p><b>TK 40 x 180</b> 50003190</p>	<p>Adhesive, screw type</p> <p>Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C</p>
<b>Plastic reflectors, rectangular, self-adhesive</b>		
	<p><b>TKA 30 x 46</b> 50108216</p>	<p>Self-adhesive</p> <p>Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C</p>
	<p><b>TKA 30 x 60</b> 50108215</p>	<p>Self-adhesive</p> <p>Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C</p>
<b>Plastic reflectors, rectangular, for use in the pharmaceutical industry</b>		
	<p><b>TKS 20 x 40.P</b> 50106960</p>	<p>Screw type, resistant to cleaning with alcohol and hydrogen peroxide</p> <p>Protection class IP 67 Temperature range -40°C ... +60°C</p>
	<p><b>TKS 40 x 60.P</b> 50106957</p>	<p>Screw type, resistant to cleaning with alcohol and hydrogen peroxide</p> <p>Protection class IP 67 Temperature range -40°C ... +60°C</p>

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**Mounting systems**  
Page 514

**Connection technology**  
Page 530

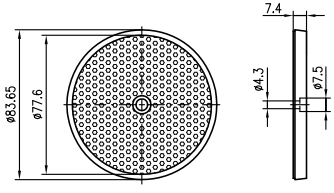
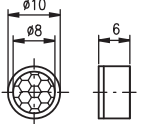
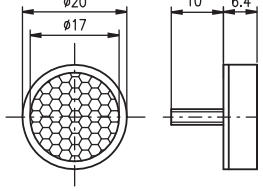
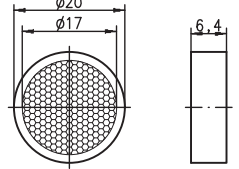
**Reflectors**  
Page 542

**ACCESSORIES / REFLECTORS**

Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors, round</b>		
	<b>TK 20.1</b> <sup>1)</sup> 50041471	Adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 25.1</b> <sup>1)</sup> 50041355	Adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TKS 25</b> <sup>1)</sup> 50027696	Screw type, threaded bolt  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 35.1</b> <sup>1)</sup> 50101867	Adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 45.1</b> <sup>1)</sup> 50105990	Adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 60</b> <sup>1)</sup> 50003186	Adhesive, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C

1) Dimensional tolerance for all specified dimensions: ± 0.2mm

## ACCESSORIES / REFLECTORS

Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors</b>		
	<b>TK 82.2</b> 50024127	Screw type, flat surface, (dimensional tolerance for all specified dimensions: ± 0.2 mm)  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>TK 82.AF</b> 50111375	Screw type, flat surface, with anti-fogging coating (dimensional tolerance for all specified dimensions: ± 0.2 mm)  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
<b>Plastic reflectors, round, for use in the pharmaceutical industry</b>		
	<b>TK 10.P</b> 50106959	Adhesive, resistant to cleaning with alcohol and hydrogen peroxide  Protection class IP 67 Temperature range -40°C ... +60°C
	<b>TKS 20.P</b> 50106958	Screw type, resistant to cleaning with alcohol and hydrogen peroxide  Protection class IP 67 Temperature range -40°C ... +60°C
<b>Plastic reflectors with micro triple structure, round</b>		
	<b>MTK 20</b> 50109828	Micro triple, adhesive  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C

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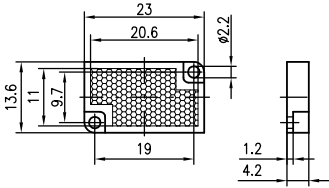
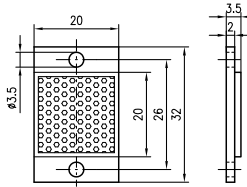
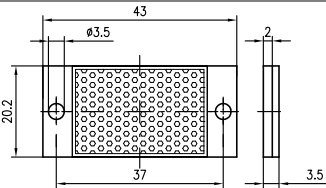
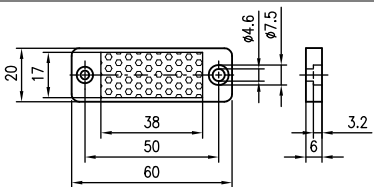
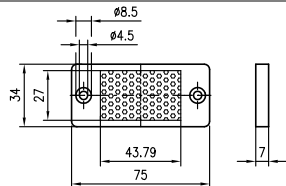
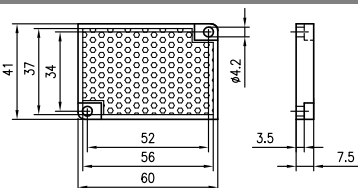
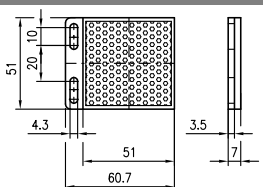
**Mounting systems**  
Page 514



**Connection technology**  
Page 530



**Reflectors**  
Page 542

Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors with micro triple structure, rectangular</b>		
	<b>MTKS 14 x 23</b> 50106209	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>MTKS 20 x 20</b> 50040895	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>MTKS 20 x 30</b> 50040894	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>MTKS 20 x 40.1</b> 50104130	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>MTKS 30 x 50.1</b> 50104132	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>MTKS 40 x 60.1</b> 50104131	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C
	<b>MTKS 50 x 50</b> 50036188	Micro triple, screw type  Plastic PMMA 8N, protection class IP 67 Temperature range -40°C ... +70°C

# ACCESSORIES / REFLECTORS

Dimensioned drawing	Part description Part No.:	Feature
<b>Plastic reflectors with micro triple structure, rectangular</b>		
	<p><b>REF 6 - S - 20 x 40</b> 50114185</p>	<p>Reflector with maximum homogeneity based on reflective tape no. 6</p> <p>Screw type, protection class IP 67 Temperature range -40°C ... +70°C</p>
<b>Plastic reflectors with micro triple structure, for use in the pharmaceutical industry</b>		
	<p><b>MTKS 14 x 23.P</b> 50106961</p>	<p>Micro triple, screw type resistant to cleaning with alcohol and hydrogen peroxide</p> <p>Protection class IP 67 Temperature range -40°C ... +60°C</p>
<b>Heatable plastic reflectors</b>		
	<p><b>HTK 82</b> 50000068</p> <p><b>HTK 82 - 24V</b> 50000071</p>	<p>Screw type, 230VAC, cable length 2m, Cable cross-section 2x0.75 mm<sup>2</sup></p> <p>Power consumption 3.4W Temperature range -40°C ... +70°C</p> <p>Screw type, 24VAC/DC, cable length 2m, cable cross-section 2x0.75 mm<sup>2</sup></p> <p>Power consumption 2.8W Temperature range -40°C ... +70°C</p>
<b>High-temperature reflector</b>		
	<p><b>TKS 50 x 50.1.HT</b> 50113309</p>	<p>High-temperature reflector, plastic, protection class IP 40, temperature range -40°C ... +120°C</p> <p>IP 69K</p>

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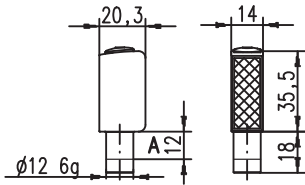


**Dimensioned drawing**

**Part description**  
Part No.:

**Feature**

**Special reflector for use in food + beverage sector**

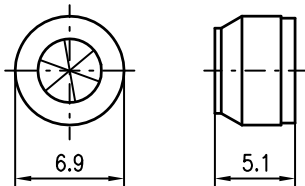


**TK BR 53**  
50112142

Special reflector in the housing of the 53 series,  
A = permissible clamping range

Protection class IP 67, IP 69K  
Temperature range -30°C ... +70°C

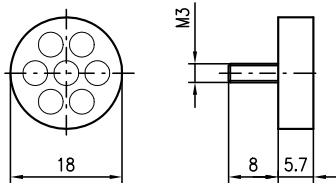
**Glass reflectors, round**



**TG 6**  
50003176

Adhesive, pressable

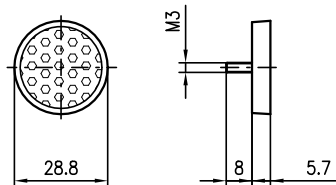
Temperature range -20°C ... +120°C



**TG 15**  
50003177

Threaded bolt

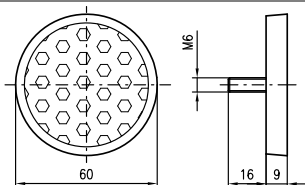
Temperature range -20°C ... +120°C



**TG 29**  
50009374

Threaded bolt

Temperature range -20°C ... +120°C

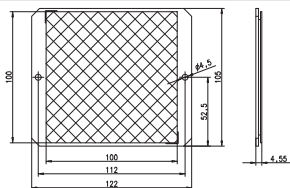


**TG 60**  
50003179

Threaded bolt

Temperature range -20°C ... +120°C

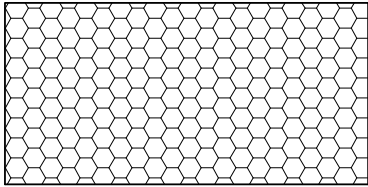
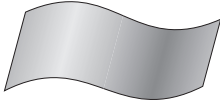
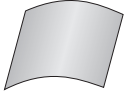
**Cooperative Targets for Optical Laser Distance Sensors ODSL 30**



**CTS 100 x 100**  
50104599

Screw type, diffuse target reflection approx. 90%, ceramics  
on galvanized sheet steel, for ODSL 30 measurement  
modes with object luminosity coefficient of 50% ... 90%

## ACCESSORIES / REFLECTORS

Dimensioned drawing	Part description Part No.:	Feature
<b>Reflective tape no. 4, self-adhesive, direction-independent adhesive mounting</b>		
	<b>Refl. tape No. 4 / 20 x 20 mm</b> 50107057	For polarized retro-reflective sensors, temperature range -40°C ... +80°C
	<b>Refl. tape No. 4 / 25 x 1000 mm</b> 50102604	For polarized retro-reflective sensors, temperature range -40°C ... +80°C
	<b>Refl. tape No. 4 / 50 x 50 mm</b> 50108300	For polarized retro-reflective sensors, temperature range -40°C ... +80°C
	<b>Refl. tape No. 4 / 50 x 1000 mm</b> 50038060	For polarized retro-reflective sensors, temperature range -40°C ... +80°C
	<b>Refl. tape No. 4 / 100 x 100 mm</b> 50106119	For polarized retro-reflective sensors, temperature range -40°C ... +80°C
	<b>Refl. tape No. 4 / 920 x 749 mm</b> 50038117	For polarized retro-reflective sensors, temperature range -40°C ... +80°C
	<b>Refl. tape No. 4 / 25mm roll</b> 50041876	For polarized retro-reflective sensors, width 25 mm, length 22.8 m, temperature range -40°C ... +80°C
	<b>REF 4 - A - 50 x 45700</b> 50111772	For polarized retro-reflective sensors, width 50 mm, length 45.7 m, temperature range -40°C ... +80°C
<b>Refl. tape No. 4 / 100mm roll</b> 50104657	For polarized retro-reflective sensors, width 100 mm, length 45.7 m, temperature range -40°C ... +80°C	
<b>Reflective tape no. 6, self-adhesive, maximum return-beam power and homogeneity, adhesive mounting is <u>not</u> direction-independent (side edge of sensor must be aligned parallel to foil edge)</b>		
	<b>Refl. tape No. 6 / 25 x 25 mm</b> 50110191	For polarized retro-reflective sensors, PMMA, temperature range -40°C ... +70°C
	<b>Refl. tape No. 6 / 50 x 50 mm</b> 50110192	For polarized retro-reflective sensors, PMMA, temperature range -40°C ... +70°C
<b>High-gain reflective tape no. 7, self-adhesive, direction-independent adhesive mounting, for ODKL 96B distance sensors</b>		
	<b>REF 7 - A - 100 x 100</b> 50111527	For distance sensors ODKL 96B, width 100 mm, length 100 mm temperature range -40°C ... +70°C

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**Mounting systems**  
Page 514



**Connection technology**  
Page 530



**Reflectors**  
Page 542



Dimensioned drawing	Part description Part No.:	Feature
<b>Mounting systems for reflectors</b>		
	<p><b>UMS 96 - 82</b> 50027191</p>	<p>Rod mount with reflector TK 82 for rod D = 10mm ... 16mm</p>
	<p><b>BT 46.1</b> 50030556</p> <p><b>BT 46.1.5</b> 50082104</p> <p><b>BT 46.2</b> 50033785</p>	<p>Mounting system for 46 series, LRT 440 and reflectors TKS 20x40, MTKS 20x40.1, TK 60, dia. = 12 mm, Material: steel/aluminum</p> <p>Mounting system for 46 series, LRT 440 and reflectors TKS 20x40, MTKS 20x40.1, TK 60, dia. = 12 mm, Material: stainless steel</p> <p>Mounting system for 46 series, LRT 440 and reflectors TKS 20x40, MTKS 20x40.1, TK 60, dia. = 14 mm, Material: steel/aluminum</p> <p>Through-hole mounts for rods D = 12 mm or D = 14 mm, clamp-mounting on cheeks/sheet metal</p>
	<p><b>BT 46</b> 50105315</p>	<p>Mounting bracket for 46 series and reflectors MTKS 20x20, (M)TKS 30x50, TKS 30x60, (M)TKS 40x60, (M)TKS 50x50, TK 82.2</p>
	<p><b>BT 450.1-96</b> 50082084</p> <p><b>BT 450.3-96</b> 50104897</p>	<p>Mounting system for reflectors TKS 20x40, TKS 30x50, TKS 30x60, TKS 50x50, MTKS 50x50 Mounting on rod D = 10 mm</p> <p>Mounting system for reflectors TKS 20x40, TKS 30x50, TKS 30x60, TKS 50x50, MTKS 50x50 Mounting on rod D = 12 mm</p>
	<p><b>UMS 25.2 - D12</b> 50110639</p> <p><b>UMS 25.2 - D14</b> 50108129</p>	<p>Through-hole mount for rod D = 12 mm or cheek, with self-adhesive reflector TKA 30x46</p> <p>Through-hole mount for rod D = 14 mm or cheek, with self-adhesive reflector TKA 30x46</p>

[www.leuze.com/accessories/](http://www.leuze.com/accessories/)

## REFLECTOR SELECTION

## 2 SERIES

Retro-reflective sensor		Operating range [m]						
with reflector		Typ. op. range limit [m]						
Type		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TKS 40 x 60	MTKS 20 x 40.1	TKS 20 x 40	MTKS 20 x 30	Tape 4 50 x 50
PRK 2 / 42 ...		0.07 ... 3.5 0.07 ... 4.0		0.07 ... 2.5 0.07 ... 2.9		0.02 ... 1.3 0.02 ... 1.5		0.12 ... 0.9 0.12 ... 1.1

## REFLECTOR SELECTION

## 3B SERIES

Retro-reflective sensor		Operating range [m]						
with reflector		Typ. op. range limit [m]						
Type		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TKS 40 x 60	MTKS 20 x 40.1	TKS 20 x 40	MTKS 20 x 30	Tape 4 50 x 50
RKR 3B / 6.42 ...		0.0 ... 1.5 0.0 ... 1.8	0.0 ... 1.0 0.0 ... 1.2	0.0 ... 1.0 0.0 ... 1.2		0.0 ... 0.5 0.0 ... 0.6		
PRK 3B / 6.7 ... PRK 3B / 66 ...		0.02 ... 5.0 0.02 ... 6.0		0.02 ... 3.0 0.02 ... 3.6		0.02 ... 1.5 0.02 ... 2.0		0.1 ... 1.2 0.1 ... 1.6
PRK 3B / 6.22 ...		0.0 ... 4.0 0.0 ... 5.0		0.0 ... 3.0 0.0 ... 3.6		0.0 ... 1.3 0.0 ... 1.5		0.0 ... 0.7 0.0 ... 1.0
PRKL 3B / 6.22 ...			0.0 ... 2.0 0.0 ... 3.0		0.0 ... 1.0 0.0 ... 1.5		0.0 ... 1.6 0.0 ... 2.2	

## REFLECTOR SELECTION

## 8 SERIES

Retro-reflective sensor		Operating range [m]				
with reflector		Typ. op. range limit [m]				
Type		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
PRK 8 / 44 ... PRK 8 / 66 ...		0.10 ... 6.4 0.05 ... 8.0	0.12 ... 4.8 0.12 ... 6.0	0.10 ... 2.8 0.10 ... 3.5	0.13 ... 2.4 0.13 ... 3.0	0.15 ... 2.8 0.15 ... 3.5
PRK 8 / 66.11 - S12		0.0 ... 5.0 0.0 ... 7.0	0.0 ... 3.5 0.0 ... 4.5	0.0 ... 2.0 0.0 ... 2.4	0.0 ... 1.5 0.0 ... 2.0	0.0 ... 1.0 0.0 ... 1.3
PRK 8 / 66.41 - S12 PRK 8 / 66.42 - S12		0.0 ... 2.0 0.0 ... 2.4	0.0 ... 1.5 0.0 ... 1.8	0.0 ... 0.6 0.0 ... 0.8	0.0 ... 0.6 0.0 ... 0.8	0.0 ... 0.3 0.0 ... 0.5

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## REFLECTOR SELECTION

## 18 SERIES

Retro-reflective sensor	with reflector	Operating range [m]				
		Typ. op. range limit [m]				
Type		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
RK(R) 18 / 4 DL ... PRK 18 / 4 DL.4 PRK 18 / 2 DL.4		0.0 ... 2.4 0.0 ... 3.0	0.0 ... 2.0 0.0 ... 2.5	0.0 ... 0.8 0.0 ... 1.0	0.0 ... 0.8 0.0 ... 1.0	0.0 ... 0.4 0.0 ... 0.6
RKR 18 / 4 ... PRK 18 / 4 ...		0.0 ... 4.0 0.0 ... 5.0	0.0 ... 3.5 0.0 ... 4.5	0.0 ... 2.0 0.0 ... 2.5	0.0 ... 1.5 0.0 ... 2.0	0.0 ... 0.8 0.0 ... 1.1
PRK 18 / 24 DL ... IPRK 18 / 4 DL ...		0.0 ... 3.0 0.0 ... 4.0	0.0 ... 2.4 0.0 ... 3.0	0.0 ... 1.6 0.0 ... 2.0	0.0 ... 1.4 0.0 ... 1.8	0.0 ... 0.6 0.0 ... 0.8

## REFLECTOR SELECTION

## 25 SERIES

Retro-reflective sensor	with reflector	Operating range [m]					
		Typ. op. range limit [m]					
Type		TK 100 x 100 TKS 100 x 100	TK 82.2	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
PRK 25 / 66.2 ...		0.0 ... 4.5 0.0 ... 5.0	0.0 ... 2.5 0.0 ... 3.0	0.0 ... 3.0 0.0 ... 3.5	0.0 ... 1.7 0.0 ... 2.0	0.0 ... 1.5 0.0 ... 1.7	0.0 ... 0.7 0.0 ... 0.9
PRK 25 / 66.41 ...		0.0 ... 1.7 0.0 ... 2.0		0.0 ... 1.2 0.0 ... 1.4	0.0 ... 0.9 0.0 ... 1.1	0.0 ... 0.7 0.0 ... 0.8	0.0 ... 0.2 0.0 ... 0.25

## REFLECTOR SELECTION

## 25B SERIES

Retro-reflective sensor	with reflector	Operating range [m]					
		Typ. op. range limit [m]					
Type		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TKS 40 x 60	TKS 20 x 40	MTKS 20 x 20	Tape 4 50 x 50
(I)PRK 25B / 4 ... PRK 25B / 66 ...		0.05 ... 8.0 0.05 ... 10.0		0.05 ... 4.0 0.05 ... 5.0	0.05 ... 2.5 0.05 ... 3.0		0.05 ... 3.0 0.05 ... 3.5
PRK 25B / ....3 ...		0.05 ... 6.0 0.02 ... 8.0		0.05 ... 3.0 0.02 ... 4.0	0.05 ... 2.0 0.02 ... 3.0		0.15 ... 2.0 0.15 ... 2.1
PRKL 25B / ...		0.3 ... 12.0 0.3 ... 15.0	0.05 ... 12.0 0.05 ... 15.0			0.05 ... 6.0 0.05 ... 7.0	0.1 ... 1.7 0.1 ... 1.9

## REFLECTOR SELECTION

## 46B SERIES

Retro-reflective sensor Type	with reflector	Operating range [m] Typ. op. range limit [m]					Tape 4 50 x 50
		TK 100 x 100 TKS 100 x 100	TKS 50 x 50	TKS 40 x 60	TKS 30 x 50	TKS 20 x 40	
IPRK 46B / 4 - S12 PRK 46B / 44 - S12 PRK 46B / 6, 200 - S12 PRK 46B / 66 - S12 PRK 46B / 66.01 - S12 PRK 46B / 66, 200 - S12 PRK 46B / 7D - S12		0.05 ... 15.0 0.05 ... 18.0	0.05 ... 10.0 0.05 ... 12.0	0.05 ... 8.0 0.05 ... 10.0	0.05 ... 5.0 0.05 ... 6.0	0.05 ... 3.0 0.05 ... 5.0	0.2 ... 2.0 0.2 ... 3.0
PRK 46B / 4.82 - S12 PRK 46B / 4D.2 - S12 IPRK 46B / 4.2 - S12 PRK 46B / 44.2 - S12 PRK 46B / 6.2 - S12 PRK 46B / 66.2 - S12 PRK 46B / 66.2, 200 - S12		0.1 ... 8.0 0.1 ... 10.0	0.1 ... 5.0 0.1 ... 6.0	0.1 ... 4.0 0.1 ... 5.0	0.1 ... 2.5 0.1 ... 3.0	0.1 ... 2.0 0.1 ... 3.0	0.3 ... 1.0 0.3 ... 1.5

## REFLECTOR SELECTION

## 53 SERIES

Retro-reflective sensor Type	with reflector	Operating range [m] Typ. op. range limit [m]					
		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TKS 40 x 60	MTKS 20 x 40.1	TKS 20 x 40	Tape 4 50 x 50
RKR 53 / 6.42 ...		0.0 ... 1.5 0.0 ... 1.8	0.0 ... 1.0 0.0 ... 1.2	0.0 ... 1.0 0.0 ... 1.2		0.0 ... 0.5 0.0 ... 0.6	
PRK 53 / 6.22 ...		0.0 ... 4.0 0.0 ... 5.0		0.0 ... 2.6 0.0 ... 3.2		0.0 ... 1.3 0.0 ... 1.5	0.0 ... 0.7 0.0 ... 1.0
PRKL 53 / 6.22 ...			0.0 ... 2.0 0.0 ... 3.0		0.0 ... 1.0 0.0 ... 1.5		

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**Mounting systems**  
Page 514

**Connection technology**  
Page 530

**Reflectors**  
Page 542

## REFLECTOR SELECTION

## 55 SERIES

Retro-reflective sensor Type	with reflector	Operating range [m] Typ. op. range limit [m]					
		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TKS 40 x 60	MTKS 20 x 40.1	TKS 20 x 40	Tape 4 50 x 50
RKR 55 / 6.42 ...		0.0 ... 1.5 0.0 ... 1.8	0.0 ... 1.0 0.0 ... 1.2	0.0 ... 1.0 0.0 ... 1.2		0.0 ... 0.5 0.0 ... 0.6	
PRK 55 / 66 ...		0.02 ... 5.0 0.02 ... 6.0		0.02 ... 3.0 0.02 ... 3.6		0.02 ... 1.5 0.02 ... 2.0	0.1 ... 1.2 0.1 ... 1.6
PRK 55 / 6.22 ...		0.0 ... 4.0 0.0 ... 5.0		0.0 ... 2.6 0.0 ... 3.2		0.0 ... 1.3 0.0 ... 1.5	0.0 ... 0.7 0.0 ... 1.0
PRKL 55 / 6.22 ...			0.0 ... 2.0 0.0 ... 3.0		0.0 ... 1.0 0.0 ... 1.5		

## REFLECTOR SELECTION

## 95 SERIES

Retro-reflective sensor Type	with reflector	Operating range [m] Typ. op. range limit [m]					
		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100	Tape 4 10 x 10
PRK 95 / 44 L IPRK 95 / 44 L.5		0.2 ... 6.0 0.2 ... 9.0	0.2 ... 4.2 0.2 ... 7.1	0.2 ... 2.5 0.2 ... 4.1	0.2 ... 1.9 0.2 ... 3.2	0.2 ... 2.4 0.2 ... 4.0	
IPRK 95 / 4.8 L.2 IPRK 95 / 44 L.2 ...		0.0 ... 4.2 0.0 ... 6.0	0.0 ... 3.2 0.0 ... 5.4	0.0 ... 1.8 0.0 ... 3.0	0.0 ... 1.7 0.0 ... 2.9	0.0 ... 1.2 0.0 ... 1.7	
PRK 95 / 22 L.4 PRK 95 / 44 L.4		0.0 ... 1.8 0.0 ... 3.0	0.0 ... 1.8 0.0 ... 3.0	0.0 ... 1.1 0.0 ... 1.8	0.0 ... 1.0 0.0 ... 1.7	0.0 ... 0.4 0.0 ... 0.7	
IPRK 95 / 44 L.3		0.0 ... 2.2 0.0 ... 3.7	0.0 ... 1.7 0.0 ... 2.9	0.0 ... 1.0 0.0 ... 1.7	0.0 ... 0.8 0.0 ... 1.6	0.0 ... 0.6 0.0 ... 1.0	0.0 ... 0.3 0.0 ... 0.3



Additional reflectors and the dimensioned drawings for the reflectors can be found from page 542 onwards.

# REFLECTOR SELECTION

# 96 SERIES / DC

Retro-reflective sensor  Type	with reflector	Operating range [m] Typ. op. range limit [m]					
		TK 100 x 100 TKS 100 x 100	TK 82	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
RK 96 M/P - 1440 - 21		0.3 ... 15.0 0.1 ... 18.0	0.3 ... 11.0 0.1 ... 12.0	0.3 ... 11.0 0.1 ... 12.0	0.3 ... 6.0 0.1 ... 7.1	0.3 ... 5.0 0.1 ... 6.0	0.3 ... 6.0 0.1 ... 8.0
PRK 96 M/P - 3380 - 41 PRK 96 M/P - 3360 - 21 PRK 96 M/N - 3366 - 27		0.3 ... 15.0 0.1 ... 18.0	0.3 ... 11.0 0.1 ... 11.5	0.3 ... 11.0 0.1 ... 12.0	0.3 ... 6.0 0.1 ... 7.5	0.3 ... 5.0 0.1 ... 6.0	0.3 ... 6.0 0.1 ... 7.5
PRK 96 M/P - 1361 - 47 PRK 96 M/P - 1362 - 47 PRK 96 M/P - 1370 - 22 PRK 96 M/P - 1370 - 42 PRK 96 M/P - 1400 - 22 PRK 96 M/P - 1400 - 42 PRK 96 K/P - 1360 - 41 PRK 96 K/P - 1360.1 - 41 PRK 96 K/P - 1365 - 45 PRK 96 K/P - 1380 - 41 PRK 96 K/P - 1360 - 21 PRK 96 K/P - 1361 - 29 PRK 96 K/P - 1363 - 29 PRK 96 K/N - 1380 - 46		0.3 ... 8.0 0.1 ... 10.0	0.3 ... 6.0 0.1 ... 7.5	0.3 ... 7.0 0.1 ... 8.5	0.3 ... 4.5 0.1 ... 5.0	0.3 ... 3.0 0.1 ... 4.0	0.3 ... 4.0 0.1 ... 5.5
PRK 96 M/P - 1838 - 21 PRK 96 M/P - 1838 - 41 PRK 96 M/P - 2838 - 28		0.0 ... 7.0 0.0 ... 8.5	0.0 ... 5.0 0.0 ... 6.0	0.0 ... 6.0 0.0 ... 7.5	0.0 ... 4.0 0.0 ... 5.0	0.0 ... 3.5 0.0 ... 4.0	0.0 ... 3.0 0.0 ... 3.5
PRK 96 K/P - 3368 - 41		0.3 ... 26.0 0.1 ... 28.0	0.3 ... 19.0 0.1 ... 21.0	0.3 ... 18.0 0.1 ... 19.0	0.3 ... 10.0 0.1 ... 12.0	0.3 ... 6.0 0.1 ... 8.0	0.3 ... 6.5 0.1 ... 7.0
PRK 96 M/P - 1830 - 21 PRK 96 M/P - 1830 - 41		0.0 ... 1.5 0.0 ... 1.85		TK(S) 50 x 50: 0.0 ... 1.5 0.0 ... 1.85	0.0 ... 1.5 0.0 ... 1.85		

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**Mounting systems**  
Page 514



**Connection technology**  
Page 530



**Reflectors**  
Page 542

# REFLECTOR SELECTION

# 96 SERIES / AC-DC

Retro-reflective sensor  Type	with reflector	Operating range [m] Typ. op. range limit [m]					
		TK 100 x 100 TKS 100 x 100	TK 82	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
RK 96 K/R - 1560 - 25		0.3 ... 15.0 0.1 ... 18.0	0.3 ... 11.0 0.1 ... 12.0	0.3 ... 11.0 0.1 ... 12.0	0.3 ... 6.0 0.1 ... 7.1	0.3 ... 5.0 0.1 ... 6.0	0.3 ... 6.0 0.1 ... 8.0
PRK 96 M/R - 3420 - 25 PRK 96 M/R - 3430 - 25		0.3 ... 15.0 0.1 ... 18.0	0.3 ... 11.0 0.1 ... 11.5	0.3 ... 11.0 0.1 ... 12.0	0.3 ... 6.0 0.1 ... 7.5	0.3 ... 5.0 0.1 ... 6.0	0.3 ... 6.0 0.1 ... 7.5
PRK 96 M/R - 1858 - 25		0.0 ... 7.0 0.0 ... 8.5	0.0 ... 5.0 0.0 ... 6.0	0.0 ... 6.0 0.0 ... 7.5	0.0 ... 4.0 0.0 ... 5.0	0.0 ... 3.5 0.0 ... 4.0	0.0 ... 3.0 0.0 ... 3.5
PRK 96 M/R - 1850 - 25		0.0 ... 1.5 0.0 ... 1.85		TK(S) 50 x 50: 0.0 ... 1.5 0.0 ... 1.85	0.0 ... 1.5 0.0 ... 1.85		
PRK 96 K/R - 3428 - 25		0.3 ... 20.0 0.1 ... 24.0	0.3 ... 15.0 0.1 ... 17.0	0.3 ... 15.0 0.1 ... 16.0	0.3 ... 10.0 0.1 ... 12.0	0.3 ... 8.0 0.1 ... 9.0	0.3 ... 10.0 0.1 ... 12.0
PRK 96 K/R - 1420 - 25 PRK 96 K/R - 1430 - 25		0.3 ... 8.0 0.1 ... 10.0	0.3 ... 6.0 0.1 ... 7.5	0.3 ... 7.0 0.1 ... 8.5	0.3 ... 4.5 0.1 ... 5.0	0.3 ... 3.0 0.1 ... 4.0	0.3 ... 4.0 0.1 ... 5.5



Additional reflectors and the dimensioned drawings for the reflectors can be found from page 542 onwards.

## REFLECTOR SELECTION

## 318 SERIES

Retro-reflective sensor  Type	with reflector	Operating range [m] Typ. op. range limit [m]				
		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
RK 318 M/... - S12 RK 318 M/... RK 318 K/... - S12 RK 318 K/...		0.03 ... 4.6 0.03 ... 6.0	0.02 ... 4.0 0.02 ... 5.4	0.03 ... 2.2 0.03 ... 3.2	0.06 ... 1.9 0.06 ... 2.9	0.15 ... 2.5 0.15 ... 3.5
RK 318 WM/... - S12 RK 318 WM/... RK 318 WK/... - S12 RK 318 WK/...		0.05 ... 3.7 0.05 ... 4.8	0.05 ... 3.2 0.05 ... 4.3	0.05 ... 1.8 0.05 ... 2.6	0.24 ... 1.5 0.24 ... 2.3	0.36 ... 2.0 0.36 ... 2.8
PRK 318 M/... - S12 PRK 318 M/... PRK 318 K/... - S12 PRK 318 K/...		0.03 ... 4.6 0.03 ... 6.0	0.02 ... 3.2 0.02 ... 4.6	0.03 ... 2.2 0.03 ... 3.2	0.06 ... 1.9 0.06 ... 2.9	0.24 ... 2.0 0.24 ... 3.1

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## REFLECTOR SELECTION

## 412 SERIES

Retro-reflective sensor	with reflector	Operating range [m]				
		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
Type		Typ. op. range limit [m]				
PRK 412 M/P - S12		0.15 ... 1.3	0.15 ... 0.8	0.15 ... 0.6	0.15 ... 0.5	0.15 ... 0.5
PRK 412 M/P		0.05 ... 1.6	0.05 ... 1.1	0.05 ... 0.8	0.05 ... 0.6	0.05 ... 0.6

## REFLECTOR SELECTION

## 618 SERIES

Retro-reflective sensor	with reflector	Operating range [m]				
		TK 100 x 100 TKS 100 x 100	MTKS 50 x 50	TK 30 x 50 TKS 30 x 50	TKS 20 x 40	Tape 4 100 x 100
Type		Typ. op. range limit [m]				
PRK 618 / 4 - S12		0.0 ... 5.0	0.0 ... 2.3	0.03 ... 2.1	0.0 ... 1.7	0.05 ... 2.0
		0.0 ... 7.0	0.0 ... 3.3	0.03 ... 3.0	0.0 ... 2.4	0.05 ... 2.8



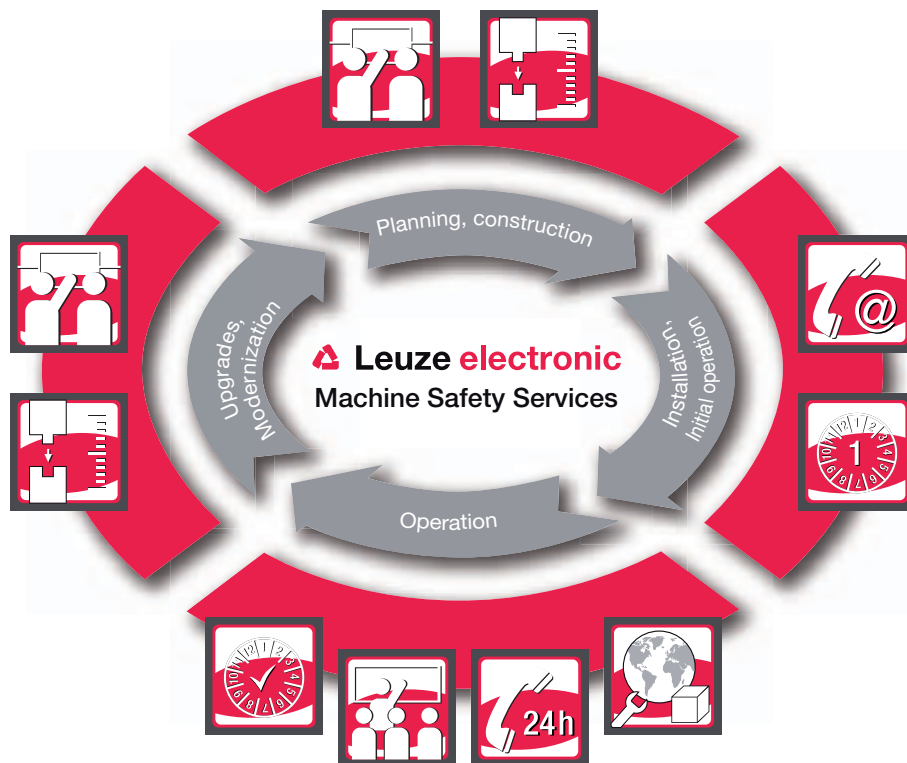
Additional reflectors and the dimensioned drawings for the reflectors can be found from page 542 onwards.

## SERVICES

Overview

### Our services – Your benefits, at a glance

Whether it's planning, engineering, commissioning or repair, the use of complex industrial automation technology requires a keen intellectual grasp and well-established expertise.



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**Services**  
Page 560

Part description Part No.	Feature
<b>Services on-site in Germany and abroad</b>	
<b>LOS daily rate</b> S50000100	includes up to 10 hours, plus expenses/travel costs
<b>LOS labor per hour</b> S50000101	
<b>LOS travel time per hour</b> S50000102	
<b>LOS price per km for travel by car</b> S50000103	plus toll charges, vignettes, etc.
<b>LOS flight costs</b> S50000104	invoicing according to expenditure
<b>LOS accommodation expenses</b> S50000105	invoicing according to expenditure



Service calls on Saturdays, Sundays and holidays will incur a surcharge of a factor of 1.5.

Service work, such as fault analysis, fault rectification, installation and fine adjustment, test installations etc. are invoiced on a time and material cost basis.

Software adjustments, creation of customer-specific software, log adjustments etc. are calculated according to time and effort. Prices on request.

[www.leuze.com/service/](http://www.leuze.com/service/)

# Optical Sensor ABC



## Introduction

The optical sensor ABC shall assist you in selecting the right sensor.

You will find here explanations on the different optical sensor types, the additional functions and a lot of information for the practitioner.

## Optical sensor types

The wide variety of photoelectric sensors with their varying function characteristics solves almost every "detection problem". The following explanations shall assist you in making the right selection for the corresponding application.

The following symbols are used for easy selection of the different optical sensors.

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	Throughbeam sensors Protective throughbeam sensors Forked sensors	LS... SLS... GS...
	Retro-reflective sensors Retro-reflective sensors with polarisation filter	RK... PRK...
	Diffuse reflection scanners energetic	RK... RT...
	Diffuse reflection scanners with background suppression	FRK... HRT... RTF...
	with fading	
	Light curtains	VT..., VR... KT..., KR...
	Optical distance sensors	ODS...
	Ultrasonic distance sensors	HRTU... VRTU...
	Contrast scanners	KRT...
	Color sensors	CRT...
	Luminescence scanners	LRT...
	Fiber optic control devices Glass fiber optics Plastic fiber optics	LVS ... GF... KF...

## OPERATING PRINCIPLES

AS-interface  
Sensors

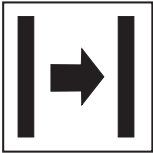
Accessories

Services

Optical Sensor  
ABC

Inductive Switch  
ABC

### Throughbeam sensors



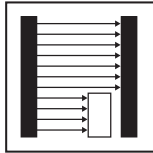
Throughbeam sensors consist of transmitter and receiver, which are contained in separate housings. The beam of the transmitter travels the whole light path only once, therefore, long operating ranges are possible when using throughbeam sensors. If choosing the correct device, throughbeam sensors are especially suited for applications under difficult conditions, e.g. if heavy contamination occurs or out in the open.

The installation is more extensive than with retro-reflective sensors as both the transmitter and the receiver must be electrically wired.

Forked sensors also belong to the group of throughbeam sensors.

Because both transmitter and receiver are integrated in the "fork", an alignment of the optical axis is not necessary.

### Light curtains

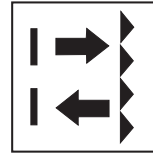


Light curtains also function according to the principle of the throughbeam photoelectric sensors. In this case, the transmitter and receiver consist of multiple elements which are positioned in a specific beam-spacing grid and which are secured in aluminium profiles. These elements are cyclically controlled one after another and analysed.

The switching light curtains are typically used if the objects to be detected have various dimensions or shapes or the point of incidence in the horizontal plane cannot be predicted.

Measuring light curtains are another variant. These facilitate a cyclical analysis with beam precision, and can thus be used to detect 2- or 3-dimensional contours.

### Retro-reflective sensors

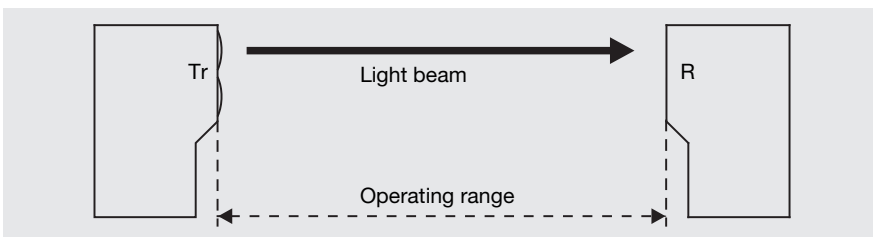


With retro-reflective sensors, the transmitter and receiver are combined in one housing. The beam of the transmitter meets the reflector and is redirected to the receiver of the sensor. The electrical wiring is therefore only required on one end of the light path.

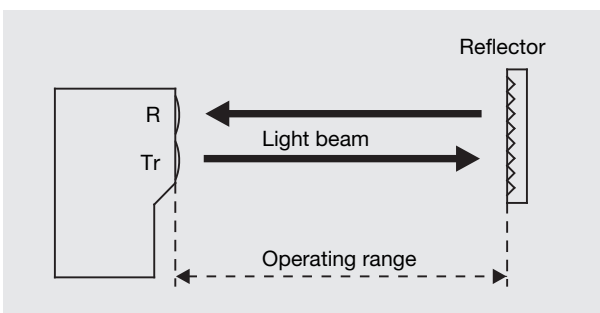
### Retro-reflective sensors with polarisation filter

Highly reflective objects, such as mirror-like metal parts could cause switching errors if using standard sensors. If retro-reflective sensors work with polarised light, those problems are avoided.

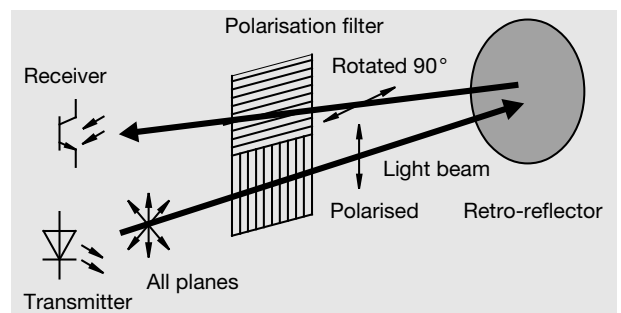
The polarised light of the transmitter meets the reflector, which "rotates" the plane of polarisation by 90°. The receiver recognises only this light from the reflector. The receiver is not tricked by "false" light reflected directly by the object because its plane of polarisation was not changed.



With throughbeam sensors, the beam of the transmitter travels the whole light path only once.



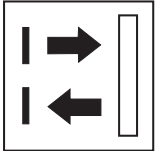
Retro-reflective sensor: transmitter and receiver are located in one housing. The reflector returns the transmitted light to the receiver.



Retro-reflective sensor with polarised optics, the receiver only recognises the light rotated 90° by the reflector.

## OPERATING PRINCIPLES

### Energetic diffuse reflection scanners



With diffuse reflection scanners, as well as with retro-reflective sensors, transmitter and receiver are located in one housing.

The transmitter's beam however, is returned by the surface to be scanned itself. The scanning range of such a sensor is depending on its performance abilities and the reflection properties of the scanned surface.

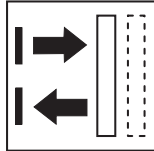
An energetic diffuse reflection scanner can detect a bright, reflective surface over a greater distance than it can detect a dark, poorly reflective one.

When choosing a device, the user should be aware of the fact that the scanning range as mentioned in the data sheet refers to the maximum possible working range based on white paper.

Diffuse reflection scanners are used primarily where neither a receiver nor a transmitter can be mounted.

Another application area for diffuse reflection scanners is the detection of objects with different reflective properties, e.g. dark print-marks on light background.

### Diffuse reflection light scanners with fading



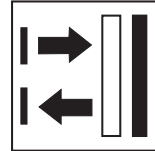
For diffuse reflection light scanners with fading, background suppression is achieved through the use of a mechanical diaphragm in front of the receiving element. Aside from this, the functionality corresponds to that of the energetic diffuse reflection light scanner.

The scanner is set to the respective scanning plane electronically. The distance between the object to be detected and the background which is to be suppressed must be large enough to ensure reliable object detection. The background should not change with respect to distance and diffuse reflection.

The black/white behaviour is somewhere between that of the energetic diffuse reflection light scanner and that of the light scanner with background suppression.

The preferred areas of use for the diffuse reflection light scanner with fading are in storage/materials handling applications for the detection of storage and transport containers on conveyor belts and in packaging technology applications.

### Diffuse reflection scanners with background suppression



The construction of diffuse reflection scanners with background suppression uses multiple receiver elements and thus takes into account the relation between transmitter and receiver elements.

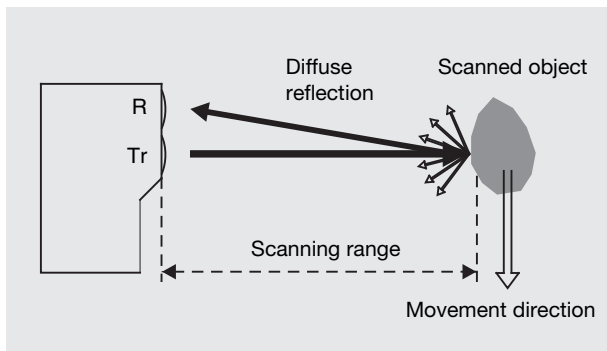
The geometric relation created makes these sensors less susceptible to varying object and background colors.

The scanner is set to the respective scanning plane electronically or mechanically and then recognises only objects in front of this scanning plane.

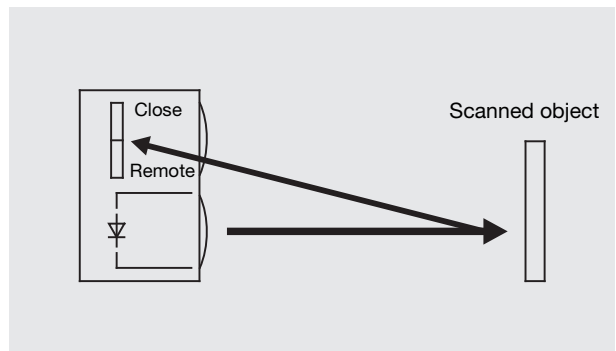
Even the smallest objects < 1 mm can be reliably detected through the use of laser transmitter diodes.

When using diffuse reflection scanners with background suppression, the mounting position has to be taken into consideration. Moving and shining objects in the background can cause interference. This interference can be minimised by mounting the sensors in an inclined position.

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*Energetic diffuse reflection scanner: the transmitted light is directly reflected from the surface.*



*Diffuse reflection scanners with background suppression*

## MEASURING SENSORS / SPECIAL SENSORS

### Optical distance sensors



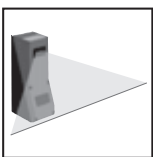
These sensors function with red, infrared or laser light.

Through the use of various receiving elements, such as CCD lines or a PSD element, the performance of the sensor can be adapted to the application or the given requirements.

With these devices, various measurement techniques are used for distance determination. These include, among others: triangulation, phase measurement and the pulse propagation time technique. The accuracy of the measurement result is almost completely independent of differences in object color. All systems can be adapted to a given application using configuration software.

The switching signals or distances are made available via digital, analog or serial outputs of the machine controller. Connection to a fieldbus system is also possible.

### Light section sensors



Light section sensors work according to the triangulation principle. Using transmission optics a laser beam is expanded to a line and aimed at a measurement object. The light remitted by the object is monitored by a position sensitive planar detector (CMOS camera).

Depending on the distance of the measurement object the laser line is projected to a different position on the planar detector. By means of this position the distance of the measurement object can be calculated.

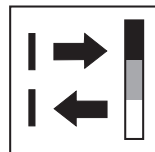
The sensor outputs 2D measurement values. It is possible to produce 3D profile data by including the movement of the measurement object.

### Ultrasonic distance sensors



With these sensors, acoustic waves are transmitted and are reflected by the objects which are to be detected. The propagation time of the acoustic waves reflected back to the sensor is measured and the distance to the object calculated. This physical principle is particularly well suited for the detection of fluid-, powder-, and transparent media. The switching signals and distance information are available via digital or analog outputs. Application-specific parameters can be set directly on the sensor using programming software.

### Contrast scanners

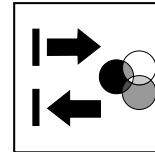


Contrast scanners are high-resolution, energetic diffuse reflection scanners which differentiate between objects and/or object colors by grey values. This means that the brightness and shininess of the object or object color strongly affect the measurement result. Contrast scanners have focusing optics and a special light-spot geometry. In order to detect slight variations in grey value, the distance to the object must not change. The resolution decreases with increasing scanning range.

If different object colors are illuminated with the same transmitter color, these may return the same grey value. In this case, positive differentiation is not possible. To avoid this, various, automatically switching transmitter colors are used.

With these characteristics, it is possible to, for example, detect any markings on any background.

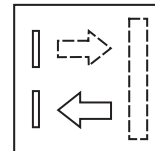
### Color sensors



Color sensors are diffuse reflection scanners which break down object colors into their different spectral components using a special combination of transmitter light. The different spectral composition of the received light is analysed by the sensor and compared with values stored previously in the sensor. If all spectral components match, the color is considered detected.

This process can be used for opaque as well as transparent objects. For shiny objects, the sensor must be oriented at an angle of 10 ... 15° to the object.

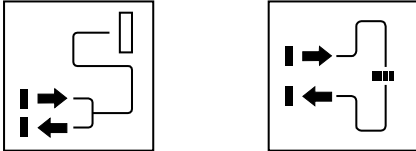
### Luminescence scanners



Luminescence scanners are energetic diffuse reflection scanners which illuminate luminescing materials by means of their special UV transmission light. The resulting visible light is detected by the luminescence sensor. Some of these luminescent materials are invisible and are available in a variety of solid and fluid forms. These can be used to make markings which are invisible under normal lighting conditions.

## OPTIONS

### Fiber optic control devices



A speciality of modern optical electronics are fiber optic sensors. The complete functionality of the photoelectric sensor is located in one controlling device.

This determines the electrical key data of the system. The special thing about fiber optic control devices is that the light of the transmitter element is transported to the place to be scanned and back to the receiver element (both in the control unit) through the fiber optics.

The transporting effect of the light is based on a total reflection. This happens always when light comes in contact with a medium having a lower optical density than the medium in which it is travelling. In a cylindrical fiber, the light undergoes total reflection as it is reflected back and forth. As a result, the light can follow the bends of the curved fiber optics.

Fiber optics made of glass as well as plastic are available, functioning on the throughbeam and scanning principle. Depending on the application requirements and the environmental conditions at the place of application, a selection from the extensive range of products should be made.

### Mini sensors

The mini sensors are well suited for installation locations with limited space. These are commonly known as "conventional", photoelectric sensors without amplifiers in miniature format. Their small construction and the extremely small bending radius of the connection cables facilitate installation even in places which are difficult to access.

Through the possibility to choose from a number of amplifiers of different sizes and functions, adaptation to any kind of application is especially easy.

### Optical sensors with additional functionality

Today, optical sensors can do much more than just detect objects. The advances in electronics and microelectronics have also left their footprints in photoelectric sensor technology. As a result the sensors have become "intelligent" and offer numerous useful options. These functions simplify sensor use and have created entirely new application possibilities.

### Protective sensors



A contactless active protective device (AOPD) is designed for machines with possible risk of injury. It offers protection by telling the machine to move into a safe operating state before a person can get into a dangerous situation.

To choose the right protective device, the following has to be observed:

- the possible state of injury
- the duration of time spent by a person in the hazardous area
- the possibility to prevent dangers

Depending on the safety requirements, two different categories are possible:

- Contactless active protective device with testing function: Category 2.
- On these systems, the functional safety is checked through cyclically reoccurring, external testing pulses.

- Contactless active protective device with self-monitoring: Category 4
- On these systems, the functional safety is permanently checked through self-monitoring.

It is the responsibility of the machine manufacturer and/or user to determine with which standard the respective application is to be measured.

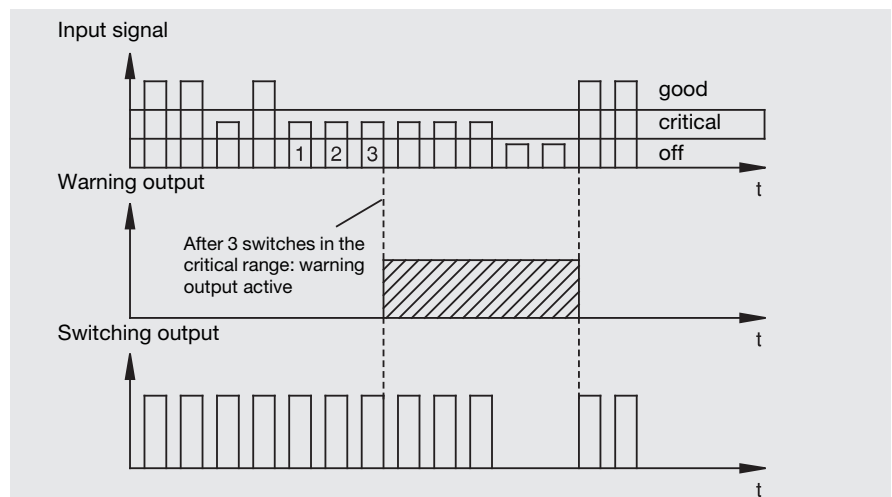
### Automatic contamination control: autoControl

Though optical sensors function reliably, they are not immune to damage, misalignment or contamination of their optics.

Monitoring circuits protect against such "accidents" by warning the user in good time. Such a warning signal has many advantages in practical life. It indicates interference before an error can occur. Therefore, precise maintenance work is possible; unnecessary procedures are avoided. It is possible to differentiate between two operating principles: time dependent and counting.

With time-dependent monitoring, an integrated monitoring circuit measures the time the signal spends in the critical brightness range and triggers the warning signal as required.

This time-dependent method, however, is only suitable for static applications. Dynamic processes can cause "false" error messages. For this purpose, a testing circuit, which works on a counting basis is better suited.



Counting operating principle (autoControl)



The patented autoControl testing circuit monitors the input pulse and detects possible impairment by counting the reduced incoming signals. If the incoming light signal is at a reduced level for three consecutive switching cycles, this critical function status is evaluated as a negative trend and the warning signal output is activated.

At this point in time, the switching function of the optical sensor is not yet impaired. Therefore, targeted maintenance measures can be taken before a complete system failure occurs. If the signal is within limits again, the warning output is reset automatically. During short-term interference, this means if the light reception is reduced less than three times, the warning output is not activated.

**AS-interface**



The AS-interface is an optimised bus system for the lowest field level of the automation technology

Aim of the AS-interface is the cost saving connection of binary sensors and actuators to a primary controller. Voltage supply and data exchange pass through the same (unshielded) two-wire connection. Bus-compatible sensors with integrated AS-i chip can be connected directly to the bus; connection of common sensors is possible through so-called coupling modules.

The tree structure of the AS-i bus system as well as the technical key features enable a considerable reduction of expenditures during wiring and installation. The AS-interface is therefore a future-oriented alternative to standard parallel wiring.

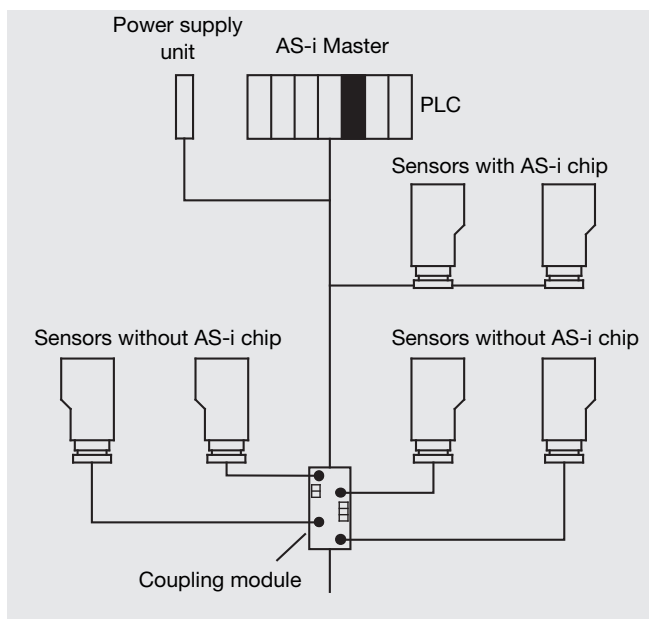
**Housing**

Photoelectric sensors are located in either a robust plastic or metal housing. Especially under rough operating conditions, the use of metal-type devices which offer special protection against mechanical and chemical influences is recommended.

**IP protection classes**

In order to make the protection of housings against foreign objects and water comparable, the protection classes have been defined in DIN 40050. The first digit refers to the protection against foreign objects, the second to water protection.

Almost every sensor is dustproof and protected against immersion.



AS-interface: bus coupling

+49 (0) 7021 573 0

1 <sup>st</sup> digit	Contact protection and foreign object protection	2 <sup>nd</sup> digit	Water protection
0	No special protection	0	No special protection
1	Against large foreign objects, dia. >50mm	1	Against vertically falling water drops
2	Against medium foreign objects, dia. >12mm	2	Against angled falling water drops (up to 15° from vertical)
3	Against small foreign objects, dia. > 2.5mm	3	Against sprayed water (up to 60° from the vertical)
4	Against corn-formed foreign objects, dia. > 1mm	4	Against splashed water from all directions
5	Dust protected; dust deposits permitted but not in quantities which interfere with the function of the device	5	Against water jets from a nozzle from all directions
6	Dust proof	6	Against flooding
		7	Against dipping
		8	Against submerging
		9K	For high-pressure / steam-jet cleaning

IP Protection classes acc. to IEC 529 and/or DIN 40050

## EQUIPMENT

### Optics

The light outlet surface of a photoelectric sensor is, depending on the model, made of plastic or glass. Covers or optics made of hard glass fulfil the highest requirements. They are resistant against detergents, chemicals and scratching.

To increase the effectiveness of the optics and to reduce the effects of possible contamination, glass as well as plastic optics have the largest possible surface area.

### Diaphragms

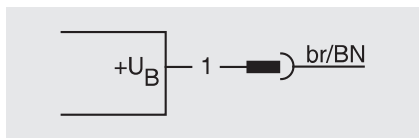
In order to detect small objects over great distances, appropriate pin or slit diaphragms, which are fitted on the transmitter and receiver, are offered for some throughbeam sensors.

As a result e.g. drilling bits can be safely detected even at a distance of several meters. The size of the diaphragm is dependent on the size of the object and the required range.

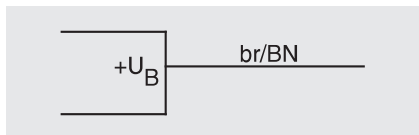
### Connection types

There are three common types of connection for optical electronic sensors: plug, cable or terminals.

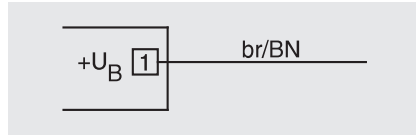
The three different possibilities can be easily identified in the connection illustrations of the individual devices.



Devices with this connection diagram are connectable via plugs. Ready-made connection cables with fitting connectors are available for almost every sensor.



These devices have a cable connection, usually with a 2m cable. Special cable lengths are available upon request.



Devices with this connection diagram are equipped with screw terminals. Cables are fed through screw fittings.

### Switching delay

Photoelectric sensors or amplifiers with integrated switching delay work with slow operation and/or slow release. Slow operation is used if short events need to be suppressed. Slow release prolongs the duration of the output signals which is often necessary for control purposes.

### Outputs

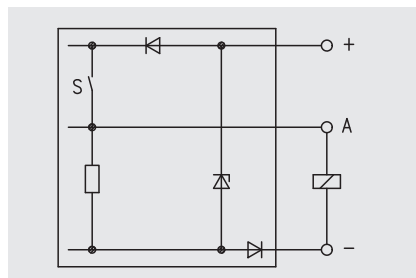
Optical electronic sensors are most commonly offered with relay or transistor output. Relay outputs with change-over contacts are the most universal, however, they also have their disadvantages: relays require a large amount of space, their time delays cannot be accepted in every application, and, due to their moving parts, their operating life is limited.

The user can choose between NPN, PNP and push-pull type transistor outputs. It is therefore optimally compatible with the respective control system to be connected.

### PNP transistor outputs

The PNP transistor output is a high-impedance switching output with open collector. It switches positive potential to the connected load.

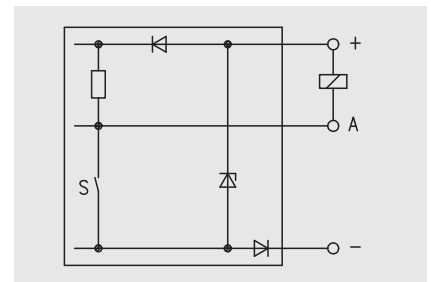
Indicated in connection drawing by:



### NPN transistor outputs

The NPN transistor output is a high-impedance switching output with open collector. It switches GND to the connected load.

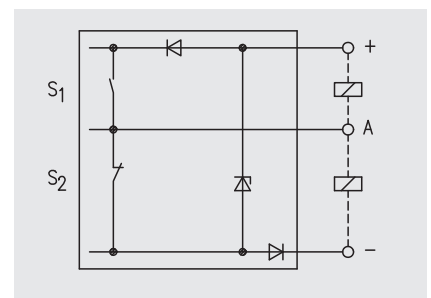
Indicated in connection drawing by:



### Push-pull transistor output

This type of transistor output has a low impedance and is immune to interference (push-pull technology). The outputs can be used in connection with both, PNP and NPN control systems. Symmetric response behaviour is a further advantage. Push-pull outputs must not be connected in parallel.

Indicated in connection drawing by:



### Short-circuit protection

Transistor outputs are usually short-circuit proof. This is achieved by monitoring the output current and, should it exceed a certain level, cutting off the supply to the transistor.

The information on the maximum current given on the data sheet have to be observed despite the short-circuit protection.

## Sensors with laser transmitter



(LASER = **L**ight **A**mplification by **S**timu-  
**E**mission of **R**adiation)

Laser diodes as sensor light source enable the realisation of higher operating and scanning ranges with small beam geometries.

Red light laser diodes offer the advantage of fast function control and alignment. The beam output is expressed by the laser class. On sensors of the laser class 1 or 2, no additional protective measures are specified.

## Laser safety classes

Laser-specific regulations are included in the European Standard EN 60825-1 - Safety of Laser Devices (corresponds to IEC 60825-1).

The products are divided into danger classes according to the intensity of the laser radiation.

### Class 1:

The accessible laser radiation is not dangerous - integrated safety by means of constructive measures such as laser power monitoring.

### Class 1M:

Same as class 1, however the use of optical instruments may pose a threat.

### Class 2:

Due to low transmitting power, the accessible laser radiation is usually not dangerous. Natural reflex reaction (eyelid closure) is usually adequate eye protection. Avoid prolonged, direct eye exposure to the beam, however.

### Class 2M:

Same as class 2, however the use of optical instruments may pose a threat.

### Class 3R:

Looking directly into the laser beam with optical aides, such as a telescope or magnifying glass, may be dangerous.

### Class 3B:

Looking directly into the beam is dangerous

### Class 4:

High laser power - even diffuse reflection may be dangerous, e.g. for skin and eyes.

## Laser security

For the use of laser products of Leuze electronic, the standard IEC 60825-1 applies: Do not stare into the beam - not even with optical instruments.

In connection with visible beams, eye-protection is usually guaranteed through the eye lid closing reflex. The standard prescribes that the laser beam path should be closed at the end of its purpose-oriented way, where this is practically and responsibly possible. Do not point the laser at people (head level).

## Application of laser optical sensors

All laser sensors work with small light spots. Through this, a corresponding object resolution and exact positioning is achieved.

In order to use these advantages, throughbeam and retro-reflective sensors are equipped with a mechanical focus adjustment (collimator). Through this, the light spot can be optimally adjusted to the application over the complete working distance.

## CDRH

Laser products which are imported into the USA are to be specified by the manufacturer to the CDRH (**C**enter for **D**evelopments and **R**adiological **H**ealth), a branch of the FDA. Verification of conformity with the applicable US rules for laser products (21 CFR 1040.10 and, if applicable, 1040.11 including the applicable laser notices, issued by the CDRH) is to be documented and an appropriate certification attached to the products.

Products with the CDRH certification in the catalog or to which the certification label has been attached fulfil the specified rules.

## APPLICATION

### Parallel and serial connection

A direct logical linking is possible on optical sensors with PNP or NPN transistor outputs. Through internal protective circuits, up to ten sensors with equal output potential (PNP or NPN) can be connected to a parallel circuit. This can be useful for, among other things, collective messages (e.g. from warning outputs).

An activation input is needed in order to connect several sensors in series.

That means that, for example, the PNP output of the first device has to be connected to a "positively" activated input of the second device etc.

Both parallel and serial connection can be performed directly on the devices with PNP or NPN transistor outputs. This reduces wiring requirements and PLC capacity in the form of inputs and outputs.

Parallel connection of optical sensors with push-pull transistor output is not permitted.

### Alignment of optical sensors

The optimal alignment is absolutely required for fault-free function characteristics.

With throughbeam sensors, the transmitted beam should meet the receiver's optics as centrally as possible. For this purpose, the light beam is to be corner-cut from all four directions, e.g. with a piece of cardboard.

When optimally aligned, the receiver switches with symmetric shadowing. In connection to large ranges, a laser alignment device simplifies the adjustment. For some devices, special alignment and mounting parts with three-point adjustment are available.

There are two possibilities for adjusting a retro-reflective sensor: the user can cover all four sides of the reflector with an object until the sensor output switches. The forward switching points are symmetric if the alignment is optimal. The second possibility involves covering the outer area of the reflector with non-reflective material, then aligning the sensor (the material is removed upon conclusion of the procedure). When mounting the reflector, it is essential to observe that it is fixed at right angles towards the light axis. However, variations of up to 15° are unproblematic.

Sensors with red light LED or red light lasers offer simple function control and in addition to that fast and simple alignment.

### Operating range

Describes the range which should not be exceeded during practical use of the sensor.

If the sensor is used within its operating range, there is still adequate performance reserve present to compensate for e.g. light soiling or misalignment.

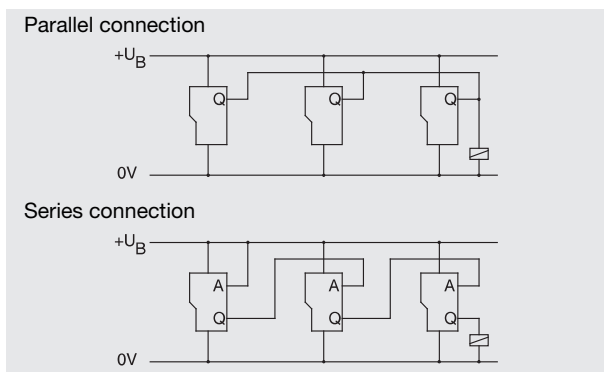
### Operating range limit

Describes the maximum possible range of the sensor. If the sensor is used at this operating range limit, the sensor functions without performance reserve. This is also referred to as "performance reserve = 1". No additional protection is present, e.g. for soiling. With regards to functional safety, a sensor should never be used at the operating range limit.

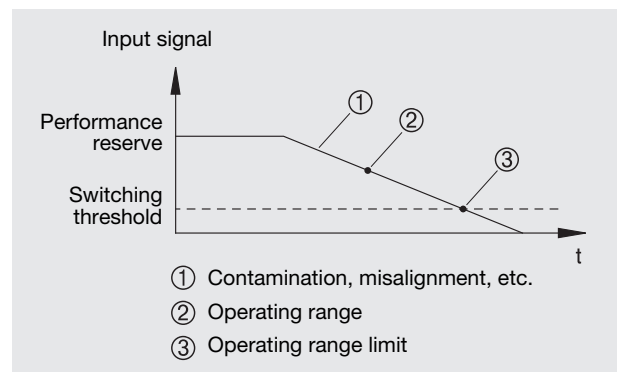
### Performance reserve

Receivers of optical sensors require a minimum amount of light to be able to switch (switching threshold). All light over and above this minimum amount is designated as "performance reserve". A distinction must be made between the internal performance reserve and the performance reserve selected by the user. The internal performance reserve provides the user with additional security that the information given on the data-sheet is not the limit of what is actually possible. If, in individual cases, heavy contamination can be expected, the user should provide additional performance reserve by selecting the sensor with the next higher operating range.

We reserve the right to make changes • Opto\_ABC\_EN.fm

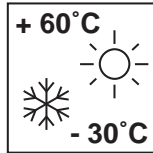
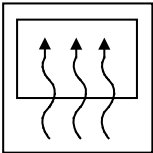


Parallel and serial connection



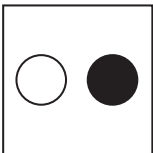
Performance reserve: the light intensity during normal operation is clearly above the minimum value required by the receiver to trigger.

**Optics heating and low-temperature versions**



Optical sensors are designed for a broad temperature range. Extreme conditions, e.g. intense cooling plants, permanent outdoor installation or on gates and sluices with frequent high/ low temperature transitions, require special low-temperature versions with optics heating.

**Light and dark switching**



With light switching optical sensors, the transistor is switched through if the light path is free and disabled if the light path is interrupted.

With dark switching sensors it is the other way around. Many photoelectric sensor types offer the choice between light and dark switching variants.

Optical sensors with changeover relay are usable in both operating modes. The user chooses through the respective connection.

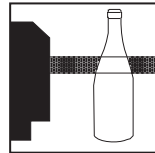
**Static - Dynamic**

The optical sensor output directly follows the light reception during static operation. During dynamic operation however, the optical sensor reacts to the change of brightness. A signal of a certain length is deducted from the change of light to dark.

Dynamic optical sensors are suitable for applications which would otherwise deliver impulses too short for evaluation. A typical application would be the monitoring of thin thread on spinning machines.

The torn thread passes through the light path only once.

**User guidance**



For detection of highly-transparent objects, special retro-reflective sensors have to be used. Adjustment of these sensors is normally very time-consuming and varies from sensor to sensor.

With user guidance, adjustment happens without an object. Through this, a fast and always reproducible adjustment is achieved. For PET, clear and colored glass, separate operating points are set within the sensor.

**Tracking: Automatic contamination compensation**



Sensors for the detection of transparent objects such as foils and glass surfaces are very sensitive to soiling due to their detection characteristics. The tracking function compensates for this gradual soiling. The sensor determines the current reception level and compares this with the initial reference value. In this way, the regulator compensates not only for the soiling, but also for the elevated signal level which occurs after cleaning without the need for new system calibration. It is no longer necessary to stop the machine. In addition, this tracking function makes possible automatic sensor commissioning. Commissioning calibration in the form of a teach-in is no longer necessary. The maintenance intervals are extended considerably.

**A<sup>2</sup>LS: active suppression of extraneous light**

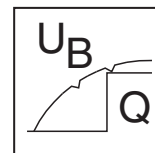


A<sup>2</sup>LS is the acronym for **Active Ambient Light Suppression**, the active suppression of extraneous light. And it functions as follows:

An optical sensor transmits and receives light at a specific signal frequency and phase. If the sensor detects ambient light which is similar in frequency and/or phase of its own sensor signal, the optical sensor actively and automatically changes its signal or the phase. A high degree of permanent detection reliability is achieved in this way.

As a result, not even the pulsed light from energy-saving lamps or other optical sensors has a negative effect on the A<sup>2</sup>LS optical sensors.

**Delay before start-up**



During connection of the operating voltage to a sensor, different electronic standardising procedures are performed internally. The device is not working during this period. Also during this phase, a short, undefinable output pulse can be generated. The delay before start-up suppresses sensor operation until all device-internal preparations have been concluded. This process takes approximately 50 to 200ms.

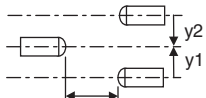
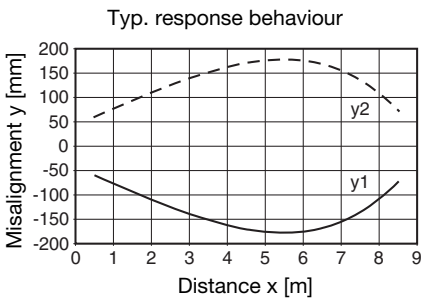
# DIAGRAM TYPES

## Typical response behaviour

### Throughbeam sensors:

The diagram illustrates the possible offset of the optical axis from the transmitter and receiver as a function of their distance.

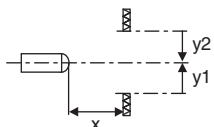
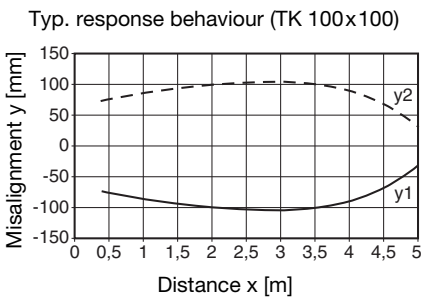
Detection by the transmitter and receiver takes place within the two curves.



### Retro-reflective sensors:

The diagram illustrates the possible offset of the optical axis of the sensor and the boundary of the reference reflector TK 100x100 as a function of the distance.

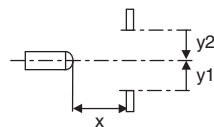
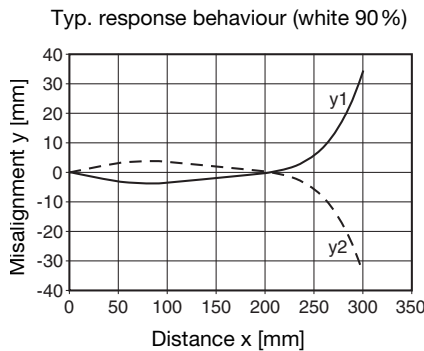
The sensor is detected by the reflector within the two curves.



### Energetic diffuse reflection scanners and diffuse reflection scanners with background suppression:

The diagram illustrates the possible offset of the optical axis of the sensor and the boundary of the measured object (90% white) as a function of distance.

With larger distances, the edge of the measured object must cover the optical axis in order to be detected.



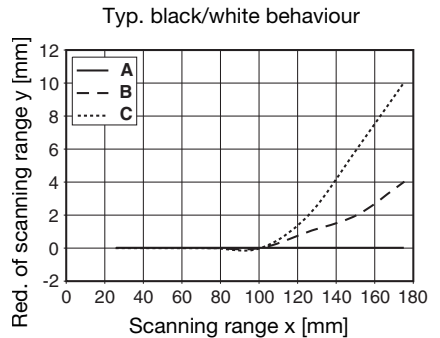
## Typical black/white behaviour

### Diffuse reflection scanner with background suppression:

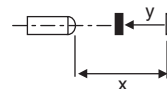
The diagram illustrates the reduction of the scanning range of different-colored measured objects relative to a white measured object as a function of distance.

In the diagram, the scanning range reduction from black (6% diffuse reflection) and grey (18% diffuse reflection) relative to white (90% diffuse reflection) is plotted.

In this example, a scanning range reduction of 8mm relative to black is read for a scanning range setting on the sensor of 160mm. Thus, the sensor has a scanning range of 152mm on black.



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



## STANDARDS AND CERTIFICATION

### Optical sensors for the potentially explosive area



In order to use optical sensors in potentially explosive atmospheres, it is necessary to take constructive measures to avoid the explosion of an inflammable mixture even if an error occurs. The principle of such a measure is marked by the protection method (examples: pressurisation or intrinsic safety).

The protection method intrinsic safety is available for all sensor operating principles. They are examined and equipped with the respective certificate of conformity.

### Intrinsically safe optical sensors

An intrinsically safe circuit must never, neither in normal function nor in abnormal conditions, release sufficient ignition energy which can through

- sparks (opening, closing, short circuit, ground contact)

or

- extreme heating of the operating material and conductors

cause an ignition of the surrounding explosive atmosphere.

Switching amplifiers take over the function of dividing the explosive area and the safe area. The connection to the sensor is done via the NAMUR-interface acc. to EN 60947-5-6 (IEC 60947-5-6). The different switching amplifier types differ with respect to operating voltage and output. Via DIP switches the output signal can be inverted (light/dark switching) and wire-break or short-circuit monitoring can be activated.

### CE labelling



An important goal of the European Union (EU) is free trade and the standardisation of applicable regulations within EU member countries. To achieve this aim, the European parliament has enacted certain guidelines.

2006/42/EC Machinery directive

2004/108/EC EMC directive

2006/95/EC Low voltage directive

94/9/EG ATEX Product directive

If a product falls under one of these directives, it must only be placed on the market if it meets the requirements of the respective directive. The product also has to be marked with the CE label. The CE certification certifies conformity with the applicable guideline(s).

All listed products are equipped with the CE certification.

### Standards

For optical sensors, there are independent, harmonised product standards on both national and international levels. These product standards ensure adherence to the corresponding basic and specific standards.

Among other topics, optical sensor functions, construction requirements, pin assignments, temperature ranges, protection classes, electromagnetic compatibility as well as vibration and shock load are described in these standards.

The applicable international standard is the IEC 60947-5-2, for Europe EN 60947-5-2 (in Germany: DIN EN 60947-5-2).

### C-UL-US certification



Products with this certification meet the requirements specified by UL (Underwriters Laboratory Inc.) for both the USA as well as Canada. The adherence to the specifications is checked during periodical audits by the UL officials or their representatives. The product standard which is used is UL 508.

### CDRH

Laser products which are imported into the USA are to be specified by the manufacturer to the CDRH (Center for Devices and Radiological Health), a branch of the FDA. Verification of conformity with the applicable US rules for laser products (21 CFR 1040.10 and, if applicable, 1040.11 including the applicable laser notices, issued by the CDRH) is to be documented and an appropriate certification attached to the products.

Products with the CDRH certification in the catalog or to which the certification label has been attached fulfil the specified rules.

## INDUCTIVE SWITCH ABC

### Introduction

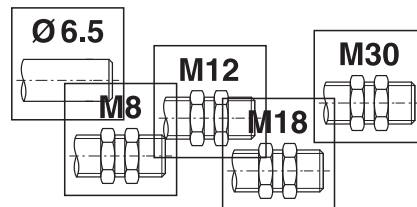
The inductive switch ABC shall assist you in selecting the right switch.



You will find here explanations on the different inductive switch types, the additional functions and a lot of information for the practitioner.

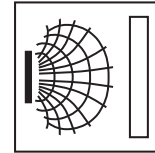
### Inductive switch types

The wide variety of constructions with their varying scanning ranges solves almost every "detection problem".



The following explanations shall assist you in making the right selection for the corresponding application.

### Functionality

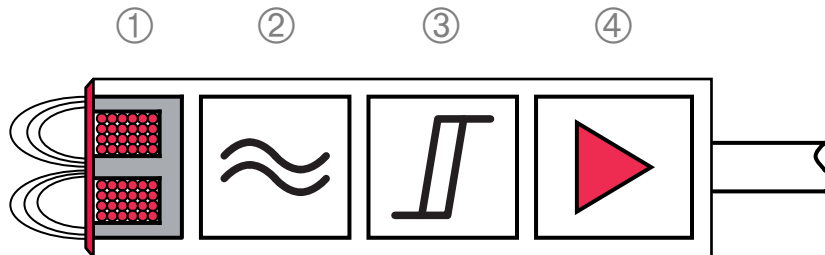


The function of inductive switches is based on the interaction of metallic conductors with the electromagnetic field of the switch.

Eddy currents are induced in the metallic damping material, and these extract energy from the sensor's alternating field. If the amplitude of the internal oscillation falls below the factory-set switching threshold, the signal at the switch output changes.

### Function groups of a switch

- ① Coil and ferrite core define the geometry and hence the operating range of the electromagnetic field.
- ② The oscillator defines the oscillating frequency and supplies the coil with energy.



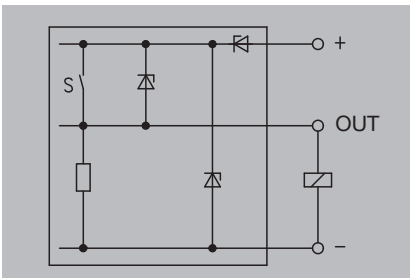
- ③ The trigger circuit detects the changes in the oscillating circuit.
- ④ The driver stage amplifies the trigger signal for evaluation by a control.



**Outputs**

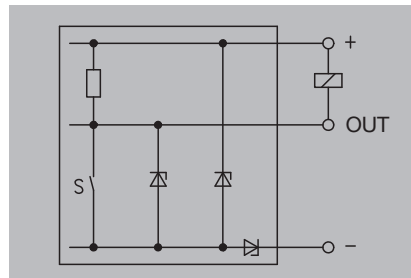
**PNP transistor outputs**

The PNP transistor output is a high-impedance switching output with open collector. It switches positive potential to the connected load.



**NPN transistor outputs**

The NPN transistor output is a high-impedance switching output with open collector. It switches GND to the connected load.



**Short-circuit protection**

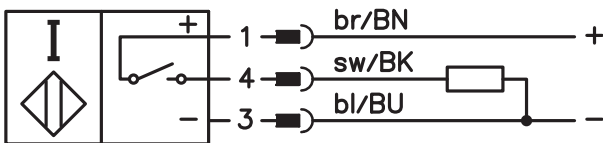
Transistor outputs are usually short-circuit proof. This is achieved by monitoring the output current and, should it exceed a certain level, cutting off the supply to the transistor.

The information on the maximum current given on the data sheet have to be observed despite the short-circuit protection.

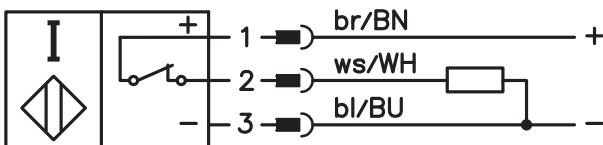
**Switching functions**

**PNP (+) switching**

**NO (Normally Open – make-contact)**

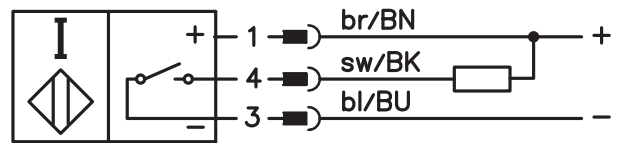


**NC (Normally Closed – break-contact)**

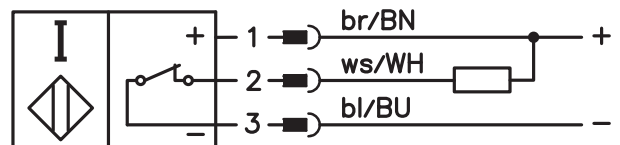


**NPN (-) switching**

**NO (Normally Open – make-contact)**



**NC (Normally Closed – break-contact)**



# MOUNTING / INSTALLATION

## Metal installation

The inductive switches can be classified as "embedded installation possible" and "embedded installation not possible".

Switches for which embedded installation is possible may be recognized from their metal sleeve, which does not fully stretch to the active surface, but falls a few millimeters short depending on the switch's diameter.

Switches that are not for embedded installation permit a larger operating distance to be achieved.

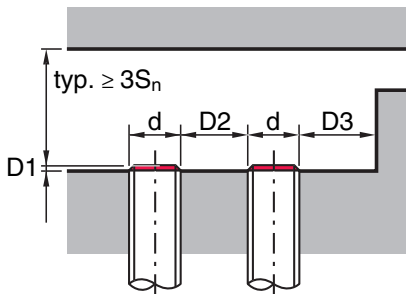


**Notice:**

The individual installation specifications may be found in the data sheet of the respective switch.

## Embedded installation in metal

For inductive switches capable of embedded installation, the active surface can be installed flush with the surrounding metal surface.



For switches with increased operating distance  $S_n$  (typically the scanning range limit), the active surface must protrude by the distance  $D1$ .

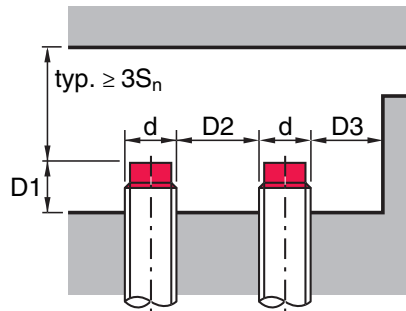
If switches for embedded installation are mounted side by side, a distance of more than  $D2$  must be kept.

The distance to the adjacent metal walls must be at least  $D3$ .

The distance of the switch's active surface to the opposite metal surfaces must be  $3 \times S_n$ .

## Non-embedded installation in metal

Inductive switches for non-embedded installation can be recognized by the protruding caps. This area must not be installed inside metal. This lets these switches achieve a larger operating distance  $S_n$ .



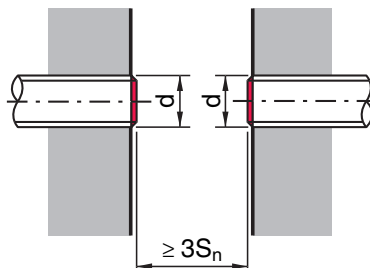
The distance from the switch's active surface to the surrounding metal surface must be  $D1$ .

If switches for non-embedded installation are mounted side by side, a distance of more than  $D2$  must be kept. The distance to the adjacent metal walls must be at least  $D3$ .

The distance of the switch's active surface to the opposite metal surfaces must be  $3 \times S_n$ .

## Installation of 2 switches opposite to each other

If two inductive switches are mounted opposite each other, the minimum distance between the active surfaces must be  $3 \times S_n$ .



## Tightening torque

If the holding nut is tightened too much, the cylindrical switches may be mechanically damaged. In order to avoid this, the indicated maximum admissible tightening torques must not be exceeded:

Installation size	max. tightening torque
M8 x 1	4Nm
M12 x 1	10Nm
M18 x 1	30Nm
M30 x 1.5	60Nm



**Notice:**

For precise individual values please refer to the data sheet of the respective switch.

## IP protection class

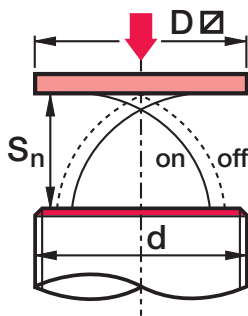
In order to make the protection of housings against foreign objects and water comparable, the protection classes have been defined in EN 60529/IEC 60529.

The first digit refers to the protection against foreign objects, the second to water protection.

Leuze inductive switches meet at least protection class IP 67. The models featuring stainless steel housings were specifically developed against intrusion of humidity during high-pressure cleaning and pass the tests of protection class IP 69K according to DIN 40050 Part 9.

**Typical response behaviour**

The specified values for the operating distance  $S$  relate to the damping of the inductive switch using a standard measuring plate in axial direction. If the measuring plate is laterally offset or the switch is approached radially, the actual operating distance  $S_r$  shifts.



As an example, the diagram above shows the response behaviour of an inductive switch: the operating distance in relation to axial and radial offset.



**Notice:**

The type-specific response curves may be found in the data sheet of the respective switch.

**Active surface**

The active surface is the area from which the electromagnetic field of the switch emanates. It is used as reference point for the specified operating distance.

The area is determined by the coil core geometry and roughly matches the surface of the core cap.

**Standard measuring plate**

The standard measuring plate is used to determine the inductive characteristics such as operating distance, repeatability, or temperature drift according to IEC 60947-5-2.

The plate is a square of 1 mm thickness and made of steel (Fe360). The side length  $a$  of the square is the diameter of the inscribed circle of the active surface, or three times the rated operating distance  $S_n$  if this is the larger value.

**Operating distances**

The operating distance  $S$  defines the distance from a standard measuring plate to the inductive switch at which the signal at the switch's switching output changes.

**Typ. Scanning range limit (rated operating distance  $S_n$ )**

The rated operating distance  $S_n$  is a parameter for the specification of operating distances. It considers neither manufacturing tolerances nor changes due to external influences such as voltage and temperature.

The actual operating distance  $S_r$  of an inductive switch is measured under defined installation conditions, at rated operating voltage and an ambient temperature of  $23^\circ\text{C} \pm 5^\circ\text{C}$  ( $0.9 \times S_n \leq S_r \leq 1.1 \times S_n$ ).

The usable operating distance  $S_u$  is measured over the complete ambient temperature range (typically:  $-25^\circ\text{C} \dots 70^\circ\text{C}$ ) at a supply voltage of 85% ... 110% of the rated value ( $0.81 \times S_n \leq S_u \leq 1.21 \times S_n$ ).

**Scanning range (assured operating distance  $S_a$ )**

The assured operating distance  $S_a$  describes the scanning range that ensures a safe operation of the switch across the specified temperature and voltage range.

For inductive switches, the assured operating distance  $S_a$  is between 0% ... 81% of the rated operating distance  $S_n$ .

**Reduction factors**

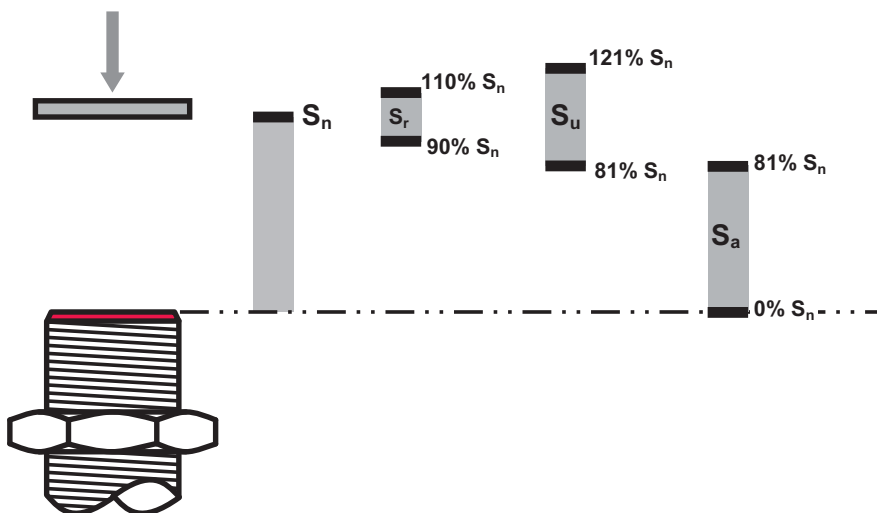
The reduction factor is a value that changes depending on the material. It describes the change of the operating distance  $S$  if the damping material differs from Fe360:  $S_r = \text{factor} \times S_n$

Material	Factor
Steel (FE360)	1.0
Copper	0.18 ... 0.50
Aluminium	0.25 ... 0.50
Brass	0.33 ... 0.60
Stainless steel	0.63 ... 0.90



**Notice:**

For precise individual values please refer to the data sheet of the respective switch.



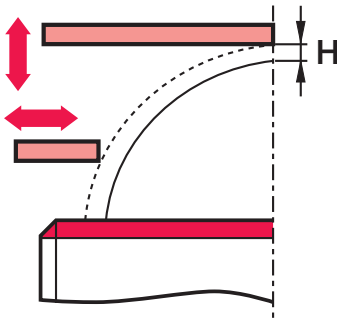
# CHARACTERISTICS

## Delay before start-up

The delay before start-up is the maximum delay between switching the operating voltage on and the switch reaching readiness for operation.

## Hysteresis H

The hysteresis H is the range between switch-on and cut-out point (switch reversal) of an inductive switch.



It is determined at the rated operating voltage and an ambient temperature of 23°C ± 5°C.

At the most, the hysteresis is 20% of the actual operating distance S<sub>r</sub>.

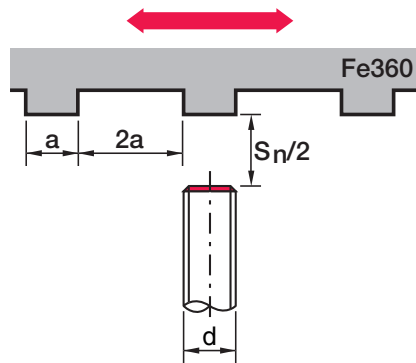
## Repeatability

The repeatability of the actual operating distance S<sub>r</sub> is measured over eight hours at an ambient temperature of 23°C ± 5°C, a relative humidity of 90%, and the rated operating voltage.

The difference between two arbitrary measurement values must not exceed 10% of the actual operating distance S<sub>r</sub>.

## Switching frequency

The switching frequency indicates the maximum possible number of switching sequences per second at a constant pulse-pause ratio (1:2) and half the rated operating distance S<sub>r</sub>.



## Ambient temperature

The ambient temperature range specified (typically -25°C ... +70°C) must not be exceeded, as the switches may be damaged in this case. The functionality outside these limits is also not defined.

## Temperature drift

The temperature drift is the deviation of the actual operating distance S<sub>r</sub> within the temperature range of -25°C ... +70°C. According to IEC 60947-5-2, the difference is at most 10% compared to the rated value.

## Voltage drop U<sub>d</sub>

In the switched-on state, a current-dependent voltage drop is present across the output transistor.

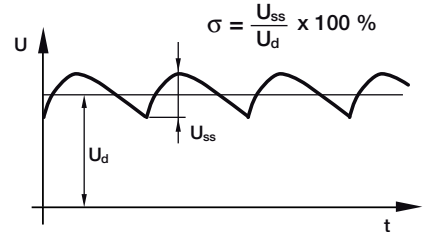
The actual output voltage is the applied operating voltage less the voltage drop.

## Operating voltage U<sub>B</sub>

The operating voltage is the voltage at which the switch operates safely. The operating voltage is 10 ... 30VDC.

## Residual ripple σ

The residual ripple is the AC voltage superimposed onto the DC voltage.



If the residual ripple is too high, the switching behavior of the switch may be undefined.

The maximum allowable operating voltage U<sub>B</sub> must not be exceeded, even during the peaks of U<sub>ss</sub>.

## Open-circuit current I<sub>0</sub>

The open-circuit current is the current consumption of the inductive sensor for operating LED, amplifier etc. in the locked state.

## Output current I<sub>L</sub>

The devices are designed for a maximum output current I<sub>L</sub>. If this current is exceeded, even for brief periods, the overload protection activates.

## Residual current I<sub>r</sub>

If the output is switched off, the residual current flows through the output transistor and therefore through the load connected.

## Electromagnetic compatibility – EMC

The EMC robustness of the products listed meets the high requirements of the IEC 60947-5-2. They are subjected to the following tests:

- IEC 60255-5      1 kV
- IEC 61000-4-2    Level 3 (ESD)
- IEC 61000-4-3    Level 3 (RFI)
- IEC 61000-4-4    Level 3 (Burst)

## STANDARDS AND CERTIFICATION

### IEC 60947-5-2



There is a harmonized product standard for inductive switches.

It provides a reference to the respective basic standards and basic engineering standards and describes, among others, the inductive switch functions, pin assignments, temperature ranges, protection classes, electromagnetic compatibility, and the stress from swinging and shock.

The applicable international standard is the IEC 60947-5-2, for Europe EN 60947-5-2 (in Germany: DIN EN 60947-5-2).

### CE labelling



An important goal of the European Union (EU) is free trade and the standardisation of applicable regulations within EU member countries. To achieve this aim, the European parliament has enacted certain guidelines.

2006/42/EC Machinery directive

2004/108/EC EMC directive

2006/95/EC Low voltage directive

94/9/EC ATEX Product directive

If a product falls under one of these directives, it must only be placed on the market if it meets the requirements of the respective directive. The product also has to be marked with the CE label. The CE certification certifies conformity with the applicable guideline(s).

All listed products are equipped with the CE certification.

### C-UL-US certification



Products with this certification meet the requirements specified by UL (Underwriters Laboratory Inc.) for both the USA as well as Canada. The adherence to the specifications is checked during periodical audits by the UL officials or their representatives. The product standard which is used is UL 508.

## PART INDEX

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
<b>A</b>			
ARH 46 .....	518	BT 3.1 .....	514
ARH 96 .....	521	BT 3.2 .....	514
<b>B</b>			
BK7 KB - 092 - 5000 - 4 Ex .....	535	BT 3.5 .....	514
BK7 KB - 092 - 5000 - 4A Ex .....	535	BT 8.....	515
BL 318.1 .....	522	<b>C</b>	
BL 8.....	516	CB - M12 - 10000S - 5GF/GM .....	540
BL 8.1 .....	516	CB - M12 - 1000S - 5GF/GM .....	540
BS 8 .....	516	CB - M12 - 15000S - 5GF/GM .....	540
BT - GS6X.L.....	525	CB - M12 - 20000S - 5GF/GM .....	540
BT - Kflex long vers.....	528	CB - M12 - 2500S - 5GF/GM .....	540
BT - Kflex Standard .....	528	CB - M12 - 5000S - 5GF/GM .....	540
BT - NC .....	528	CRT 20B M/N - 12 - 001 - S12.....	452
BT - S .....	528	CRT 20B M/N - 12 - 004 - S12.....	452
BT - SSD .....	528	CRT 20B M/N - 60 - 001 - S12.....	452
BT 002M.5.....	514	CRT 20B M/N - 60 - 004 - S12.....	452
BT 25.....	517	CRT 20B M/P - 12 - 001 - S12.....	452
BT 318 - ARH.....	521	CRT 20B M/P - 12 - 004 - S12.....	452
BT 3B .....	514	CRT 20B M/P - 60 - 001 - S12.....	452
BT 450.1 - 96 .....	520	CRT 20B M/P - 60 - 004 - S12.....	452
BT 450.1-96 .....	551	CRT 442 K/N - 12 - 001 - S12 .....	454
BT 450.3 - 96 .....	520	CRT 442 K/P - 12 - 001 - S12 .....	454
BT 450.3-96 .....	551	CTS 100 x 100 .....	549
BT 46.....	518, 551	<b>D</b>	
BT 46.1 .....	518, 527, 551	D - ET1.....	541
BT 46.1.5.....	518, 551	D M8A - 3P - SK.....	541
BT 46.2 .....	518, 527, 551	D M8A - 4P - SK.....	541
BT 8 - 0.....	515	<b>F</b>	
BT 8 - ARH.....	515	FRK 92 / 3 - 300 L Ex.....	502
BT 8 - D10.....	515, 526, 527	FRK 95 / 22 - 150 L .....	150
BT 8 - D12.....	515, 526, 527	FRK 95 / 44 - 150 L .....	150
BT 8 - D14.....	515, 526, 527	FRK 95 / 44 - 350 L .....	150
BT 95.....	517, 519	FRKR 95 / 44 - 150 L .....	150
BT 96.....	520	FRKR 95 / 44 - 350 L .....	150
BT 96.1 .....	520	FS 14BM.5.....	525
BT 96.4 .....	520	FS 14BML.5.....	525
BT D08M.5 .....	524	<b>G</b>	
BT D12M.5 .....	522, 524	GF 1000 / 1 LS - MS .....	468
BT D18M.5 .....	521, 524	GF 1000 / 1 LS - SI.....	468
BT D30M.5 .....	524	GF 1000 / 1 LS - VA .....	468
BT 3.....	514		

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
GF 1000 / 1 RT - MS	471	GF 600 / 1 RT - MS - D5 - L10	471
GF 1000 / 1 RT - MS.1	471	GF 600 / 1 RT - Si - W - 1.5	471
GF 1000 / 1 RT - SI	471	GF 6000 / 4 RT - MS	472
GF 1000 / 1 RT - VA	471	GK 14 / 24 L	414
GF 1000 / 4 LS - MS	469	GK 14 / 24 L.2	414
GF 1000 / 4 LS - SI	470	GS 04 M/N - 120 - S8	396
GF 1000 / 4 LS - VA	469	GS 04 M/N - 220 - S8	396
GF 1000 / 4 RT - MS	472	GS 04 M/N - 30 - S8	396
GF 1000 / 4 RT - SI	473	GS 04 M/N - 50 - S8	396
GF 1000 / 4 RT - VA	473	GS 04 M/N - 80 - S8	396
GF 1500 / 1 RT - MS	471	GS 04 M/P - 120 - S8	396
GF 1500 / 4 LS - MS	469	GS 04 M/P - 20 - S8	396
GF 1500 / 4 LS - VA	469	GS 04 M/P - 220 - S8	396
GF 1500 / 4 RT - MS	472	GS 04 M/P - 30 - S8	396
GF 1500 / 4 RT - VA	473	GS 04 M/P - 50 - S8	396
GF 2000 / 4 LS - MS	469	GS 04 M/P - 80 - S8	396
GF 2000 / 4 LS - SI	470	GS 21 / 4 G, 5000	398
GF 2000 / 4 LS - VA	469	GS 61 / 6	402
GF 2000 / 4 RT - MS	472	GS 61 / 6 - S8	402
GF 2000 / 4 RT - SI	473	GS 61 / 6 - S8.3	402
GF 2000 / 4 RT - VA	473	GS 61 / 6 - S8V	402
GF 2500 / 4 RT - MS	472	GS 61 / 6, 200 - S12	402
GF 2500 / 4 RT / VA	473	GS 61 / 6.2	404
GF 3000 / 4 LS - MS	469	GS 61 / 6.2 - S8	404
GF 3000 / 4 LS - SI	470	GS 61 / 6.2 - S8.3	404
GF 3000 / 4 LS - VA	469	GS 61 / 6.2 - S8V	404
GF 3000 / 4 RT - MS	472	GS 61 / 6.2, 200 - S12	404
GF 3000 / 4 RT - SI	473	GS 61 / 6.3	406
GF 3500 / 4 RT / VA	473	GS 61 / 6.3, 200 - S12	406
GF 500 / 1 LS - MS	468	GS 61 / 6D	402
GF 500 / 1 LS - SI	468	GS 61 / 6D - S8	402
GF 500 / 1 LS - VA	468	GS 61 / 6D - S8.3	402
GF 500 / 1 RT - MS	471	GS 61 / 6D - S8V	402
GF 500 / 1 RT - SI	471	GS 61 / 6D, 200 - S12	402
GF 500 / 1 RT - VA	471	GS 61 / 6D.2	404
GF 500 / 4 LS - MS	469	GS 61 / 6D.2 - S8	404
GF 500 / 4 LS - SI	470	GS 61 / 6D.2 - S8.3	404
GF 500 / 4 LS - VA	469	GS 61 / 6D.2 - S8V	404
GF 500 / 4 RT - MS	472	GS 61 / 6D.2, 200 - S12	404
GF 500 / 4 RT - SI	473	GS 63 / 6	408
GF 500 / 4 RT - VA	473	GS 63 / 6 - S8	408
GF 5000 / 4 LS - VA	469	GS 63 / 6 - S8V	408
GF 5000 / 4 RT - MS	472	GS 63 / 6, 200 - S12	408

## PART INDEX

Part	Page	Part	Page
GS 63 / 6.3 - S8.....	410	HRT 46B / 66, 200 - S12 .....	114
GS 63 / 6.3 - S8V.....	410	HRT 46B / 66, 200 - S12 S - Ex n.....	508
GS 63 / 6D.....	408	HRT 46B / 66, 200 - S12 W - Ex n .....	508
GS 63 / 6D - S8.....	408	HRT 46B / 66.1 - S12.....	116
GS 63 / 6D, 200 - S12.....	408	HRT 46B / 7 - S12 .....	114
GS 63 / 6D.3 - S8 .....	410	HRT 8 / 66.6 - 350 - S12 .....	68
GS 63 / 6D.3 - S8V .....	410	HRT 96 K/P - 1600 - 1200 - 21 .....	176
GS 754 M/D - 100/42 - 104 - S12 .....	280	HRT 96 K/P - 1600 - 1200 - 41 .....	176
GS 754 M/D - 29/42 - 104 - S12 .....	280	HRT 96 K/P - 1600 - 1800 - 41 .....	174
GS 754 M/D - 29/42 - 204 - S12 .....	280	HRT 96 K/P - 1600.1 - 1200 - 41.....	176
GS 754 M/V - 100/42 - 504 - S12 .....	280	HRT 96 K/P - 1607 - 1200 - 49 .....	176
GS 754 M/V - 100/42 - 604 - S12 .....	280	HRT 96 K/P - 1630 - 800 - 21 .....	174
GS 754 M/V - 29/42 - 504 - S12 .....	280	HRT 96 K/P - 1630 - 800 - 41 .....	174
GS 754 M/V - 29/42 - 604 - S12 .....	280	HRT 96 K/P - 1631 - 800 - 47 .....	174
GSL 04 M/P - 30 - S8 .....	398	HRT 96 K/P - 1640 - 800 - 41 .....	174
GSL 04 M/P - 50 - S8 .....	398	HRT 96 K/R - 1680 - 1200 - 25 .....	186
GSL 04 M/P - 80 - S8 .....	398	HRT 96 K/R - 1690 - 1200 - 25 .....	186
GSL 04 M/P - 80.4 - S8.....	398	HRT 96 M / A - 1660 - 1200 - 44.....	512
GSU 06 / 24 - 2 .....	418	HRT 96 M / A - 1670 - 800 - 44.....	512
GSU 06 / 24 - 2 - S8 .....	418	HRT 96 M / P - 1639 - 800 - 21 Ex n .....	508
GSU 06 / 24D - 2.....	418	HRT 96 M / P - 1649 - 800 - 21 Ex n .....	508
GSU 06 / 24D - 2 - S8 .....	418	HRT 96 M / P - 3360 - 2500 - 21 Ex n .....	508
GSU 06 / 24D - 2, 200 - S12 .....	418	HRT 96 M / P - 3370 - 5000 - 21.1 Ex n.....	508
GSU 14B / 66.3 - S12 .....	420	HRT 96 M/N - 1606 - 1200 - 27.....	168
GSU 14B / 66D.3 - S12 .....	420	HRT 96 M/P - 1600 - 2000 - 42.....	166
GSU 14B / 66D.31 - S12 .....	420	HRT 96 M/P - 1610 - 1200 - 21.....	168
		HRT 96 M/P - 1610 - 1200 - 41.....	168
<b>H</b>		HRT 96 M/P - 1620 - 1200 - 21.....	168
HRT 25 / 6.03 - 300 - S12.....	100	HRT 96 M/P - 1620 - 1200 - 41.....	168
HRT 25 / 66 - 300 .....	100	HRT 96 M/P - 1620 - 1800 - 41.....	166
HRT 25 / 66 - 300 - S12 .....	100	HRT 96 M/P - 1630 - 800 - 41.....	166
HRT 25 / 66 - 300, 150 - S12 .....	100	HRT 96 M/P - 1636 - 800 - 41.....	166
HRT 25 / 66 - 300, 300 - S12 .....	100	HRT 96 M/P - 1640 - 800 - 21.....	166
HRT 25 / 66 - 300, 5000 .....	100	HRT 96 M/P - 1640 - 800 - 41.....	166
HRT 25 / 66.03 - 300 - S8.....	100	HRT 96 M/P - 3360 - 2500 - 426.....	170
HRT 3B / 44.....	58	HRT 96 M/P - 3360 - 5000 - 426.....	170
HRT 46B / 4 - S12 .....	112	HRT 96 M/P - 336W.21 - 5000 - 426.....	170
HRT 46B / 4.1 - S12.....	116	HRT 96 M/P - 3604 - 2000 - 42.....	166
HRT 46B / 44 - S12.....	112	HRT 96 M/R - 1680 - 1200 - 25.....	186
HRT 46B / 4D - S12.....	112	HRT 96 M/R - 1690 - 1200 - 25.....	186
HRT 46B / 4D, 200 - S12.....	112	HRTL 46B / 6.8 - S12.....	116
HRT 46B / 66.....	114	HRTL 46B / 66 - S12 .....	116
HRT 46B / 66 - S12.....	114	HRTL 46B / 66, 200 - S12 .....	116



## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
HRTL 46B / 66.1 - S12.....	116	HRTR 318 K/66 - 120 - S12.....	214
HRTL 8 / 24 - 150.....	70	HRTR 318 M/66 - 120.....	214
HRTL 8 / 24 - 150 - S12.....	70	HRTR 318 M/66 - 120 - S12.....	214
HRTL 8 / 24 - 350.....	70	HRTR 3B / 2.7.....	50
HRTL 8 / 24 - 350 - S12.....	70	HRTR 3B / 22.....	50
HRTL 8 / 66 - 150 - S12.....	70	HRTR 3B / 22 - S8.....	50
HRTL 8 / 66 - 350 - S12.....	70	HRTR 3B / 4 - XL - S8.....	56
HRTL 8 / 66 - 350, 5000.....	70	HRTR 3B / 4, 200 - S8.3.....	50
HRTL 96B M/6.49.02S - S12.....	172	HRTR 3B / 44.....	50
HRTL 96B M/6.9S - S12.....	172	HRTR 3B / 44 - L - S8.....	54
HRTL 96B M/66.01S - S12.....	172	HRTR 3B / 44 - L, 200 - S8.....	54
HRTL 96B M/66.9.03S - S12.....	172	HRTR 3B / 44 - S8.....	50
HRTL 96B M/666.01S - S12.....	172	HRTR 3B / 44 - XL - S8.....	56
HRTL 96B M/C66.01S - S12.....	172	HRTR 3B / 44 - XL, 200 - S12.....	56
HRTL 96B M/V66.01S - S12.....	172	HRTR 3B / 44, 200 - S12.....	50
HRTR 2 / 42 - 15F.....	30	HRTR 3B / 44, 5000.....	50
HRTR 2 / 42 - 15F, 150 - S12.....	30	HRTR 3B / 6 - S - S8.3.....	54
HRTR 2 / 42 - 15F, 150 - S8.....	30	HRTR 3B / 6 - S, 200 - S8.3.....	54
HRTR 2 / 42 - 30F.....	28	HRTR 3B / 6 - S8.3.....	52
HRTR 2 / 42 - 30F, 150 - S12.....	28	HRTR 3B / 6 - XL - S8.3.....	56
HRTR 2 / 42 - 30F, 150 - S8.....	28	HRTR 3B / 6.7.....	50
HRTR 2 / 42 - 50F.....	26	HRTR 3B / 6.7 - S8.....	50
HRTR 2 / 42 - 50F, 150 - S12.....	26	HRTR 3B / 66.....	52
HRTR 2 / 42 - 50F, 150 - S8.....	26	HRTR 3B / 66 - S.....	54
HRTR 2 / 42D - 15F.....	30	HRTR 3B / 66 - S - S8.....	54
HRTR 2 / 42D - 15F, 150 - S12.....	30	HRTR 3B / 66 - S, 200 - S12.....	54
HRTR 2 / 42D - 15F, 150 - S8.....	30	HRTR 3B / 66 - S, 200 - S8.....	54
HRTR 2 / 42D - 30F.....	28	HRTR 3B / 66 - S, 5000.....	54
HRTR 2 / 42D - 30F, 150 - S12.....	28	HRTR 3B / 66 - S8.....	52
HRTR 2 / 42D - 30F, 150 - S8.....	28	HRTR 3B / 66 - XL.....	56
HRTR 2 / 42D - 50F.....	26	HRTR 3B / 66 - XL - S8.....	56
HRTR 2 / 42D - 50F, 150 - S12.....	26	HRTR 3B / 66 - XL, 200 - S12.....	56
HRTR 2 / 42D - 50F, 150 - S8.....	26	HRTR 3B / 66 - XL, 200 - S8.....	56
HRTR 25 / 44 - 300 - S12.....	98	HRTR 3B / 66, 200 - S12.....	52
HRTR 25 / 4D - 300, 200 - S8.1.....	98	HRTR 3B / 66, 200 - S8.....	52
HRTR 25 / 4D - 300, 300 - S12.....	98	HRTR 3B / 6D - XL - S8.3.....	56
HRTR 25 / 66 - 300.....	98	HRTR 3B / 6D.7.....	52
HRTR 25 / 66 - 300 - S12.....	98	HRTR 46B / 4 - S12.....	110
HRTR 25 / 66 - 300 - S8.....	98	HRTR 46B / 4D - S12.....	110
HRTR 25 / 66 - 300, 100 - S8.....	98	HRTR 46B / 4D, 200 - S12.....	110
HRTR 25 / 66 - 300, 300 - S12.....	98	HRTR 46B / 66 - S - S12.....	110
HRTR 25 / 66 - 300, 500 - S12.....	98	HRTR 46B / 66 - S12.....	110
HRTR 318 K/66 - 120.....	214	HRTR 46B / 66, 200 - S12.....	110

## PART INDEX

Part	Page	Part	Page
HRTR 46B / 66, 200 - S12 S - Ex n	508	HRTU 418 RM/P - 5020 - 200 - S12	318
HRTR 46B / 66, 200 - S12 W - Ex n	508	HRTU 418 RM/P - 5220 - 400 - S12	318
HRTR 53 / 6 - S - S8.3	128	HRTU 418 RM/P - 5220 - 700 - S12	318
HRTR 53 / 6 - S8.3	128	HRTU 418 WM/P - 3020 - 700 - S12	318
HRTR 53 / 6 - XL - S8.3	128	HRTU 418 WM/P - 5020 - 200 - S12	318
HRTR 53 / 66 - S - S8	128	HRTU 420 / 2NC.2 - L - S8	310
HRTR 53 / 66 - S, 200 - S8	128	HRTU 420 / 2NC.2 - S - S8	308
HRTR 53 / 66 - S8	128	HRTU 420 / 2NC.2 - S8	308
HRTR 53 / 66 - XL - S8	128	HRTU 420 / 2NO.2 - L - S8	310
HRTR 53 / 66 - XL, 200 - S8	128	HRTU 420 / 2NO.2 - S - S8	308
HRTR 53 / 66, 200 - S8	128	HRTU 420 / 2NO.2 - S8	308
HRTR 55 / 66 - S, 5000	140	HRTU 420 / 4NC.2 - L - S8	310
HRTR 55 / 66 - XL, 5000	142	HRTU 420 / 4NC.2 - S - S8	308
HRTR 55 / 66, 5000	140	HRTU 420 / 4NC.2 - S8	308
HRTR 8 / 44 - 350	68	HRTU 420 / 4NO.2 - L - S8	310
HRTR 8 / 44 - 350 - S12	68	HRTU 420 / 4NO.2 - S - S8	308
HRTR 8 / 66 - 350	68	HRTU 420 / 4NO.2 - S8	308
HRTR 8 / 66 - 350 - S12	68	HRTU 8 / 24 - 400 - S12	300
HRTR 8 / 66 - 350, 5000	68	HTK 82	548
HRTR 55 / 6 - S - S8.3	140	HTK 82 - 24V	548
HRTR 55 / 6 - S8.3	140		
HRTR 55 / 6 - XL - S8.3	142	<b>I</b>	
HRTR 55 / 66 - S - S8	140	IGS 63 / 6.3	410
HRTR 55 / 66 - S, 200 - S12	140	IGS 63 / 6.3, 200 - S12	410
HRTR 55 / 66 - S8	140	IGS 63 / 6D.3	410
HRTR 55 / 66 - XL - S8	142	IGS 63 / 6D.3, 200 - S12	410
HRTR 55 / 66 - XL, 200 - S12	142	IGSU 14B / 6.3 - S12	420
HRTR 55 / 66, 200 - S12	140	IGSU 14B / 6.31 - S12	420
HRTU 412 / 2NC.2 - S - S12	314	IGSU 14B / 6D.3 - S12	420
HRTU 412 / 2NC.2 - S12	314	IHRT 46B / 4 - S12	112
HRTU 412 / 2NO.2 - S - S12	314	IHRT 46B / 4, 200 - S12	112
HRTU 412 / 2NO.2 - S12	314	IHRT 46B / 4, 200 - S12 S - Ex n	508
HRTU 412 / 4NC.2 - S - S12	314	IHRT 46B / 4, 200 - S12 W - Ex n	508
HRTU 412 / 4NC.2 - S12	314	IHRT 46B / 4D - S12	112
HRTU 412 / 4NO.2 - S - S12	314	IHRT 46B / 4D, 200 - S12	112
HRTU 412 / 4NO.2 - S12	314	IHRT 8 / 4 - 100 - S12	68
HRTU 418 M/P - 3010 - 1000 - S12	320	IHRT 8 / 4 - 200 - S12	68
HRTU 418 M/P - 5010 - 300 - S12	320	ILS 95 / 44 E - L.1	146
HRTU 418 M/V - 3010 - 1000 - S12	272	ILSER 25B / 4 - S12	82
HRTU 418 M/V - 3310 - 1000 - S12	272	ILSER 3B/4 - S8	34
HRTU 418 M/V - 5010 - 300 - S12	272	ILSER 3B/4, 200 - S8	34
HRTU 418 M/V - 5310 - 300 - S12	272	ILSER 46B/4 - S12	104
HRTU 418 RM/P - 3020 - 700 - S12	318	ILSER 8 / A - S12	510

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
ILSR 95 / 44 E - L.1	146	IS 208 MM/4NO - 2E0 - S8.3	362
IPRK 18 / 4 DL.41	76	IS 208 MM/4NO - 2E0, 200 - S8.3	362
IPRK 18 / A - L.46	510	IS 208 MM/4NO - 2N5	364
IPRK 18 / A L.4.	510	IS 208 MM/4NO - 2N5 - S12	364
IPRK 18 / A.1 L.4	510	IS 208 MM/4NO - 2N5 - S8.3	364
IPRK 18 / V L.03.	78	IS 208 MM/4NO - 4NO	364
IPRK 25B / 4 - S12.	84	IS 208 MM/4NO - 4NO - S8.3	364
IPRK 25B / 4, 200 - S12.	84	IS 212 FM/4NO.5F - 10N - S12	374
IPRK 25B / 4.3 - S12	86	IS 212 FM/4NO.5F - 6E0 - S12	370
IPRK 25B / 4.3, 200 - S12	86	IS 212 MM/2NC - 4E0 - S12	370
IPRK 46B / 4 - S12.	106	IS 212 MM/2NO - 10N	374
IPRK 46B / 4, 200 - S12 S - Ex n	506	IS 212 MM/2NO - 2E0	368
IPRK 46B / 4, 200 - S12 W - Ex n	506	IS 212 MM/2NO - 4E0	370
IPRK 46B / 4.2 - S12	108	IS 212 MM/2NO - 4NO	372
IPRK 46B / 4D.2 - S12	108	IS 212 MM/2NO - 6E0	370
IPRK 8 / A - S12.	510	IS 212 MM/2NO - 8NO	372
IPRK 95 / 4.8 L.2	148	IS 212 MM/4NC - 10N - S12	374
IPRK 95 / 44 L.2.	148	IS 212 MM/4NC - 2E0 - S12	368
IPRK 95 / 44 L.21.	148	IS 212 MM/4NC - 4E0 - S12	368
IPRK 95 / 44 L.3.	148	IS 212 MM/4NC - 4NO - S12	372
IPRK 95 / 44 L.5.	148	IS 212 MM/4NO - 10N	374
IRK 95 / 44 - 250 L	150	IS 212 MM/4NO - 2E0	368
IRKR 95 / 44 - 250 L	150	IS 212 MM/4NO - 2E0 - S12	368
IRTR 8 / A - 800 - S12	512	IS 212 MM/4NO - 4E0	368
IS 204 MP/4NO - 1E5.	348	IS 212 MM/4NO - 4E0 - S12	368
IS 205 MM/4NO - 1E5	352	IS 212 MM/4NO - 4NO	372
IS 205 MM/4NO - 1E5 - S8.3	352	IS 212 MM/4NO - 4NO - S12	372
IS 206 MP/4NO - 2E0.	356	IS 212 MM/4NO - 6E0	370
IS 206 MP/4NO - 3E0.	356	IS 212 MM/4NO - 8NO	372
IS 208 MM/2NC - 1E5	360	IS 212 MM/4NO - 8NO - S12	372
IS 208 MM/2NO - 1E5	360	IS 218 FM/4NO.5F - 10E - S12	382
IS 208 MM/2NO - 2E0	362	IS 218 FM/4NO.5F - 20N - S12	384
IS 208 MM/2NO - 2E0 - S8.3	362	IS 218 MM/2NO - 12E	382
IS 208 MM/2NO - 2N5	364	IS 218 MM/2NO - 20N	384
IS 208 MM/2NO - 4NO	364	IS 218 MM/2NO - 5E0	378
IS 208 MM/2NO - 4NO - S8.3	364	IS 218 MM/2NO - 8E0	380
IS 208 MM/4NC - 1E5	360	IS 218 MM/2NO - 8E0 - S12	380
IS 208 MM/4NC - 2E0	362	IS 218 MM/2NO - 8NO	384
IS 208 MM/4NC - 2E0 - S8.3	362	IS 218 MM/4NC - 8E0 - S12	380
IS 208 MM/4NO - 1E5	360	IS 218 MM/4NO - 12E	382
IS 208 MM/4NO - 1E5 - S12	360	IS 218 MM/4NO - 20N	384
IS 208 MM/4NO - 1E5 - S8.3	360	IS 218 MM/4NO - 5E0	378
IS 208 MM/4NO - 2E0	362	IS 218 MM/4NO - 5E0 - S12	378

## PART INDEX

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
IS 218 MM/4NO - 8E0 .....	380	ISS 212 MM/2NO - 4E0 - S12.....	370
IS 218 MM/4NO - 8E0 - S12 .....	380	ISS 212 MM/2NO - 4N0 .....	372
IS 218 MM/4NO - 8N0 .....	384	ISS 212 MM/2NO - 6E0 - S12.....	370
IS 218 MM/4NO - 8N0 - S12 .....	384	ISS 212 MM/4NC - 4E0 - S12.....	368
IS 230 FM/4NO.5F - 20E - S12 .....	388	ISS 212 MM/4NO - 10N - S12 .....	374
IS 230 FM/4NO.5F - 40N - S12 .....	390	ISS 212 MM/4NO - 4E0 .....	368
IS 230 MM/2NO - 10E .....	388	ISS 212 MM/4NO - 4E0 - S12.....	368
IS 230 MM/2NO - 15N .....	390	ISS 212 MM/4NO - 4N0 - S12 .....	372
IS 230 MM/2NO - 22E .....	388	ISS 212 MM/4NO - 6E0 - S12.....	370
IS 230 MM/2NO - 40N .....	390	ISS 218 MM/2NO - 12E - S12.....	382
IS 230 MM/4NC - 10E - S12 .....	388	ISS 218 MM/2NO - 8E0 - S12.....	380
IS 230 MM/4NC - 22E - S12 .....	388	ISS 218 MM/4NO - 12E - S12.....	382
IS 230 MM/4NO - 10E .....	388	ISS 218 MM/4NO - 20N - S12 .....	384
IS 230 MM/4NO - 10E - S12 .....	388	ISS 218 MM/4NO - 5E0 .....	378
IS 230 MM/4NO - 15N .....	390	ISS 218 MM/4NO - 5E0 - S12.....	378
IS 230 MM/4NO - 15N - S12 .....	390	ISS 218 MM/4NO - 8E0 - S12.....	380
IS 230 MM/4NO - 22E .....	388	ISS 244 PP/22 - 20E - S12.....	336
IS 230 MM/4NO - 22E - S12 .....	388	ISS 244 PP/22 - 40N - S12.....	336
IS 230 MM/4NO - 40N .....	390	ISS 244 PP/44 - 20E - S12.....	336
IS 230 MM/4NO - 40N - S12 .....	390	ISS 244 PP/44 - 40N - S12.....	336
IS 240 PP/22 - 4E0 .....	332	IVBR/2-100-700-00-S8 .....	482
IS 240 PP/22 - 4E0 - S8.4 .....	332	IVBR/2-12.5-88-00-S8 .....	482
IS 240 PP/22 - 8N0 .....	332	IVBR/2-25-175-00-S8 .....	482
IS 240 PP/22 - 8N0 - S8.4 .....	332	IVBR/2-50-350-00-S8 .....	482
IS 240 PP/44 - 4E0 .....	332	IVBR/2-5-35-00-S8 .....	482
IS 240 PP/44 - 4E0 - S8.4 .....	332	IVBR/4-100-700-00-S8 .....	482
IS 240 PP/44 - 8N0 .....	332	IVBR/4-12.5-88-00-S8 .....	482
IS 240 PP/44 - 8N0 - S8.4 .....	332	IVBR/4-25-175-00-S8 .....	482
IS 244 PP/22 - 20E - TB.4 .....	336	IVBR/4-25-2175-00,4000 .....	482
IS 244 PP/22 - 40N - TB.4 .....	336	IVBR/4-50-350-00-S8 .....	482
IS 244 PP/44 - 20E - TB.4 .....	336	IVBR/4-5-35-00-S8 .....	482
IS 244 PP/44 - 40N - TB.4 .....	336		
IS 255 MP/2NO - 1E5 .....	340	<b>K</b>	
IS 255 MP/4NO - 1E5 .....	340	K - D M12A - 3P - 2m - PVC .....	533
IS 288 MP/2NO - 1E5 .....	344	K - D M12A - 4P - 10m - DP - PUR.....	536
IS 288 MP/4NC - 2E0 .....	344	K - D M12A - 4P - 10m - FAB .....	536
IS 288 MP/4NO - 1E5 .....	344	K - D M12A - 4P - 10m - PUR .....	535
IS 288 MP/4NO - 1E5 - S8.3 .....	344	K - D M12A - 4P - 20m - PVC .....	534
IS 288 MP/4NO - 2E0 .....	344	K - D M12A - 4P - 2m - DP - PUR .....	536
IS 288 MP/4NO - 2E0 - S8.3 .....	344	K - D M12A - 4P - 2m - FAB .....	536
IS 288 MP/4NO - 3E0 .....	344	K - D M12A - 4P - 2m - PUR .....	535
IS 288 MP/4NO - 3E0 - S8.3 .....	344	K - D M12A - 4P - 5m - DP - PUR .....	536
ISS 206 MP/4NO - 2E0 - S8.3 .....	356	K - D M12A - 4P - 5m - FAB .....	536

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
K - D M12A - 4P - 5m - PUR	535	K - D M8W - 4P - 5m - DP - PUR	532
K - D M12A - 5P - 2m - FAB	538	K - D M8W - 4P - 5m - FAB	532
K - D M12A - 5P - 2m - PUR	537	K - D M8W - 4P - 5m - PUR	531
K - D M12A - 5P - 5m - FAB	538	K - DS M12A - M12A - 4P - 10m - PVC	538
K - D M12A - 5P - 5m - PUR	537	K - DS M8A - M12A - 4P - 0.3m - PVC	538
K - D M12A - 8P - 10m - PUR	538	K - D M12A - 3P - 5m - PVC	533
K - D M12A - 8P - 2m - PUR	538	K - D M12A - 4P - 10m - PVC	534
K - D M12A - 8P - 5m - PUR	538	K - D M12A - 4P - 2m - PVC	534
K - D M12W - 3P - 2m - PVC	533	K - D M12A - 4P - 5m - PVC	534
K - D M12W - 4P - 10m - DP - PUR	536	K - D M12A - 5P - 10m - PVC	537
K - D M12W - 4P - 10m - FAB	536	K - D M12A - 5P - 2m - PVC	537
K - D M12W - 4P - 10m - PUR	535	K - D M12A - 5P - 5m - PVC	537
K - D M12W - 4P - 20m - PVC	534	K - D M12W - 3P - 5m - PVC	533
K - D M12W - 4P - 2m - DP - PUR	536	K - D M12W - 4P - 10m - PVC	534
K - D M12W - 4P - 2m - FAB	536	K - D M12W - 4P - 2m - PVC	534
K - D M12W - 4P - 2m - PUR	535	K - D M12W - 4P - 5m - PVC	534
K - D M12W - 4P - 5m - DP - PUR	536	K - D M12W - 5P - 10m - PVC	537
K - D M12W - 4P - 5m - FAB	536	K - D M12W - 5P - 2m - PVC	537
K - D M12W - 4P - 5m - PUR	535	K - D M12W - 5P - 5m - PVC	537
K - D M12W - 5P - 2m - FAB	538	K - D M8A - 3P - 2m - PVC	530
K - D M12W - 5P - 2m - PUR	537	K - D M8A - 3P - 5m - PVC	530
K - D M12W - 5P - 5m - FAB	538	K - D M8A - 4P - 10m - PVC	531
K - D M12W - 5P - 5m - PUR	537	K - D M8A - 4P - 2m - PVC	531
K - D M8A - 3P - 10m - PUR	530	K - D M8A - 4P - 5m - PVC	531
K - D M8A - 3P - 10m - PVC	530	K - D M8W - 3P - 2m - PVC	530
K - D M8A - 3P - 2m - PUR	530	K - D M8W - 3P - 5m - PVC	530
K - D M8A - 3P - 5m - PUR	530	K - D M8W - 4P - 2m - PVC	531
K - D M8A - 4P - 10m - FAB	532	K - D M8W - 4P - 5m - PVC	531
K - D M8A - 4P - 10m - PUR	531	KB - ET - 10000 - SA - RJ45	539
K - D M8A - 4P - 2m - FAB	532	KB - ET - 2000 - SA - RJ45	539
K - D M8A - 4P - 2m - PUR	531	KB - ET - 5000 - SA - RJ45	539
K - D M8A - 4P - 5m - FAB	532	KB - ROD4 - CP - 10000	539
K - D M8A - 4P - 5m - PUR	531	KB - ROD4 - CP - 5000	539
K - D M8W - 3P - 10m - PUR	530	KB - ROD4 plus - 10000	539
K - D M8W - 3P - 10m - PVC	530	KB - ROD4 plus - 5000	539
K - D M8W - 3P - 2m - PUR	530	KB - ROD4PC - 10000	539
K - D M8W - 3P - 5m - PUR	530	KB - ROD4PC - 3000	539
K - D M8W - 4P - 10m - FAB	532	KD - ROD4 - X1 - Set	541
K - D M8W - 4P - 10m - PUR	531	KD - ROD4 - X2 - Set	541
K - D M8W - 4P - 10m - PVC	531	KD 095 - 4	541
K - D M8W - 4P - 2m - DP - PUR	532	KD 095 - 4A	541
K - D M8W - 4P - 2m - FAB	532	KD 095 - 5	541
K - D M8W - 4P - 2m - PUR	531	KD 095 - 5A	541

## PART INDEX

Part	Page	Part	Page
KD 095 - 5A - PG9.....	541	KRTM 20B/4.5121 - S12 .....	442
KF 2000 / 1 RT - M5 - Z8.....	476	KRTM 20B/4.5221 - S12 .....	442
KF 2000 / 1 RT.4 - 06 .....	476	KRTM 20B/4.6121 - S12 .....	442
KF 2000 / 2 LS.4 - 01 .....	474	KRTM 20B/6.4121 - S12 .....	444
KF 2000 / 2 LS.4 - 02 .....	475	KRTM 20B/6.5121 - S12 .....	444
KF 2000 / 2 LS.4 - 08 .....	474	KRTM 3B / 2.1121 - S8 .....	428
KF 2000 / 2 LS.5 - 03 .....	475	KRTM 3B / 2.1121, 200 - S12 .....	428
KF 2000 / 2 RT - M4 - D6 .....	477	KRTM 3B / 2.1221 - S8 .....	428
KF 2000 / 2 RT.4 - 04 .....	476	KRTM 3B / 2.1221, 200 - S12 .....	428
KF 2000 / 2 RT.4 - 05 .....	477	KRTM 3B / 4.1121 - S8 .....	426
KF 2000 / 2 RT.5 - 07 .....	477	KRTM 3B / 4.1121, 200 - S12 .....	426
KONTURflex-1280 diaphragm profile .....	528	KRTM 3B / 4.1121, 200 - S8 .....	426
KONTURflex-1600 diaphragm profile .....	528	KRTM 3B / 4.1221 - S8 .....	426
KONTURflex-1920 diaphragm profile .....	528	KRTM 3B / 4.1221, 200 - S12 .....	426
KONTURflex-2560 diaphragm profile .....	528	KRTM 3B / 4.2121 - S8 .....	426
KONTURflex-480 diaphragm profile .....	528	KRTM 3B / 6.1121 - S8 .....	428
KONTURflex-640 diaphragm profile .....	528	KRTM 3B / 6.1221 - S8 .....	428
KR 10-160.....	488	KRTM 55 / 2.1121 - S8 .....	438
KR 20-160.....	488	KRTM 55 / 2.1121, 200 - S12 .....	438
KR 5-80.....	488	KRTM 55 / 2.1221 - S8 .....	438
KRTL 3B / 2.3111 - S8.....	434	KRTM 55 / 2.1221, 200 - S12 .....	438
KRTL 3B / 2.3111, 200 - S12.....	434	KRTM 55 / 4.1121 - S8 .....	436
KRTL 3B / 4.3111 - S8.....	434	KRTM 55 / 4.1121, 200 - S12 .....	436
KRTL 3B / 4.3111, 200 - S12.....	434	KRTM 55 / 4.1121, 5000 .....	436
KRTL 3B / 6.3111 - S8.....	434	KRTM 55 / 4.1221 - S8 .....	436
KRTM 20 M/C - 20 - 6526 - S12 .....	448	KRTM 55 / 4.1221, 200 - S12 .....	436
KRTM 20 M/C - 20 - 6626 - S12 .....	448	KRTM 55 / 6.1121 - S8 .....	438
KRTM 20 M/N - 20 - 3320 - S12 .....	448	KRTW 20B/2.4121 - S12 .....	446
KRTM 20 M/N - 20 - 6320 - S12 .....	448	KRTW 20B/2.5121 - S12 .....	446
KRTM 20 M/P - 20 - 3320 - S12 .....	448	KRTW 20B/4.4121 - S12 .....	446
KRTM 20 M/P - 20 - 6320 - S12 .....	448	KRTW 20B/4.5121 - S12 .....	446
KRTM 20 M/V - 20 - 0001 - S12 .....	448	KRTW 20B/4.6121 - S12 .....	446
KRTM 20 M/V - 20 - 0004 - S12 .....	448	KRTW 20B/6.4121 - S12 .....	446
KRTM 20B/2.4110 - S12 .....	444	KRTW 3B / 2.1110 - S8 .....	432
KRTM 20B/2.4121 - S12 .....	444	KRTW 3B / 2.1121 - S8 .....	432
KRTM 20B/2.4221 - S12 .....	444	KRTW 3B / 2.1121, 200 - S12 .....	432
KRTM 20B/2.5110 - S12 .....	444	KRTW 3B / 2.1321 - S8 .....	432
KRTM 20B/2.5121 - S12 .....	444	KRTW 3B / 2.1321, 200 - S12 .....	432
KRTM 20B/2.5221 - S12 .....	444	KRTW 3B / 4.1110 - S8 .....	430
KRTM 20B/4.4110 - S12 .....	442	KRTW 3B / 4.1121 - S8 .....	430
KRTM 20B/4.4121 - S12 .....	442	KRTW 3B / 4.1121, 200 - S12 .....	430
KRTM 20B/4.4221 - S12 .....	442	KRTW 3B / 4.1321 - S8 .....	430
KRTM 20B/4.5110 - S12 .....	442	KRTW 3B / 4.1321, 200 - S12 .....	430

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
KRTW 3B / 4.2121 - S8 .....	430	LSE 318 WM/P .....	190
KRTW 55 / 2.1121 - S8 .....	440	LSE 318 WM/P - S12 .....	190
KRTW 55 / 2.1121, 200 - S12 .....	440	LSE 96 K/P - 1010 - 41 .....	156
KRTW 55 / 4.1121 - S8 .....	440	LSE 96 K/P - 1015 - 45 .....	156
KRTW 55 / 4.1121, 200 - S12 .....	440	LSE 96 K/P - 1030 - 21 .....	156
KRTW 55 / 4.1121, 5000 .....	440	LSE 96 K/P - 1030 - 41 .....	156
KRTW 55 / 6.1121 - S8 .....	440	LSE 96 K/P - 1039.1 - 41 .....	156
KRTW 3B / 6.1121 - S8 .....	432	LSE 96 K/P - 1140 - 21 .....	156
KRTW 3B / 6.1321 - S8 .....	432	LSE 96 K/R - 1310 - 25 .....	180
KS 095 - 4A .....	541	LSE 96 K/R - 1320 - 25 .....	180
KT 10-160 .....	488	LSE 96 M/ A - 182W - 44 .....	510
KT 20-160 .....	488	LSE 96 M/N - 1010 - 27 .....	154
KT 5-80 .....	488	LSE 96 M/P - 1040 - 42 .....	154
		LSE 96 M/P - 1130 - 22 .....	154
<b>L</b>		LSE 96 M/P - 1170 - 22 .....	154
LOS accommodation expenses .....	561	LSE 96 M/P - 1170 - 42 .....	156
LOS daily rate .....	561	LSE 96 M/P - 1816 - 41 .....	154
LOS flight costs .....	561	LSE 96 M/P - 181W - 41 .....	154
LOS labor per hour .....	561	LSE 96 M/P - 3010 - 21 .....	154
LOS price per km for travel by car .....	561	LSE 96 M/P - 3010 - 41 .....	154
LOS travel time per hour .....	561	LSE 96 M/P - 3012 - 21 .....	154
LPS 36 .....	290	LSE 96 M/P - 3012 - 41 .....	154
LPS 36/EN .....	290	LSE 96 M/P 3012 - 21 .....	156
LRS 36/6 .....	294	LSE 96 M/R - 1310 - 25 .....	180
LRT 440 / 24 - 150 - 004 - S12 .....	458	LSE 96 M/R - 176W - 25 .....	180
LRT 440 / 24 - 50 - 104 - S12 .....	458	LSE 96 M/R - 3310 - 25 .....	180
LRT 8 / 24.00 - 50 - S12 .....	458	LSE 96M/P - 3019 - 21 Ex n. ....	504
LRT 8 / 24.04 - 100 - S12 .....	458	LSEL 318 M/P .....	192
LRT 8 / 24.04 - 50 - S12 .....	458	LSEL 318 M/P - B5 .....	192
LS 412 M/P .....	218	LSEL 318 M/P - B5 - S12 .....	192
LS 92 / 3 E - L Ex .....	502	LSEL 318 M/P - S12 .....	192
LS 92 / 3 SE - L Ex .....	502	LSE 2/42 .....	22
LS 95 / 2.8 SE - L.1 .....	146	LSE 2/42, 150 - S12 .....	22
LSE 318 K/N .....	194	LSE 2/42, 150 - S8 .....	22
LSE 318 K/N - S12 .....	194	LSE 2/42D .....	22
LSE 318 K/P .....	194	LSE 2/42D, 150 - S12 .....	22
LSE 318 K/P - S12 .....	194	LSE 2/42D, 150 - S8 .....	22
LSE 318 M/N .....	190	LSE 25B / 4, 200 - S8.1 .....	82
LSE 318 M/P .....	190	LSE 25B / 66 .....	82
LSE 318 M/P - S12 .....	190	LSE 25B / 66 - S12 .....	82
LSE 318 WK/N - S12 .....	194	LSE 25B / 66 - S8 .....	82
LSE 318 WK/P - S12 .....	194	LSE 25B / 66.1 - S12 .....	82
LSE 318 WM/N .....	190	LSE 25B/4, 200 - S12 .....	82

## PART INDEX

Part	Page	Part	Page
LSER 3B/44.1, 5000	34	LSS 96 M - 1090 - 24	154
LSER 3B/66	34	LSS 96 M - 1090 - 43	154
LSER 3B/66 - S8	34	LSS 96 M - 1093 - 24	156
LSER 3B/66, 200 - S12	34	LSS 96 M - 1200 - 23	154
LSER 3B/66, 5000	34	LSS 96 M - 1206 - 43	154, 156
LSER 3B/66.1 - S8	34	LSS 96 M - 120W - 43	154
LSER 46B/66	104	LSS 96 M - 1350 - 26	180
LSER 46B/66 - S - S12	104	LSS 96 M - 175W - 26	180
LSER 46B/66 - S12	104	LSS 96 M - 180W - 44	510
LSER 46B/66, 200 - S12	104	LSS 96M - 1079 - 23 - Ex n	504
LSER 46B/66, 200 - S12 S - Ex n	504	LSSL 318 M	192
LSER 46B/66.1 - S12	104	LSSL 318 M - S12	192
LSER 53/66 - S8	120	LSSR 2	22
LSER 55/66 - S8	132	LSSR 2, 150 - S12	22
LSER 55/66, 200 - S12	132	LSSR 2, 150 - S8	22
LSER 55/66, 5000	132	LSSR 25B - S12	82
LSER 8 / 44	62	LSSR 25B, 200 - S12	82
LSER 8 / 44 - S12	62	LSSR 25B, 200 - S8.1	82
LSER 8 / 66	62	LSSR 25B.8	82
LSER 8 / 66 - S12	62	LSSR 25B.8 - S12	82
LSERL 8 / 24.01	62	LSSR 25B.8 - S8	82
LSERL 8 / 24.01 - S12	62	LSSR 3B - S8	34
LSEU 18 / 24 - S12	304	LSSR 3B, 200 - S12	34
LSEU 8 / 24 - S12	300	LSSR 3B.8	34
LSR 95 / 2.8 SE - L.1	146	LSSR 3B.8 - S8	34
LSS 318 K	194	LSSR 3B.8, 200 - S12	34
LSS 318 K - 70	194	LSSR 3B.8, 200 - S8	34
LSS 318 K - 70 - S12	194	LSSR 3B.8, 5000	34
LSS 318 K - S12	194	LSSR 46B	104
LSS 318 M	190	LSSR 46B - S - S12	104
LSS 318 M - 70	190	LSSR 46B - S12	104
LSS 318 M - 70 - S12	190	LSSR 46B, 200 - S12	104
LSS 318 M - S12	190	LSSR 46B, 200 - S12 S - Ex n	504
LSS 318 WK - S12	194	LSSR 46B.8 - S12	104
LSS 318 WM	190	LSSR 53.8 - S8	120
LSS 318 WM - S12	190	LSSR 55.8 - S8	132
LSS 96 K - 1070 - 23	156	LSSR 55.8, 200 - S12	132
LSS 96 K - 1070 - 43	156	LSSR 55.8, 5000	132
LSS 96 K - 1079 - 43	156	LSSR 8	62
LSS 96 K - 1213 - 24	156	LSSR 8 - S12	62
LSS 96 K - 1350 - 26	180	LSSR 8 / A.8 - S12	510
LSS 96 M - 1070 - 23	154	LSSRL 8.9	62
LSS 96 M - 1070 - 43	154	LSSRL 8.9 - S12	62



## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
LSSU 18 - S12.....	304	ODKL 96B M/D26 - S12.....	268
LSSU 8 - S12.....	300	ODKL 96B M/D36 - S12.....	268
LVSR 325 K / N - 201.....	462	ODKL 96B M/V6 - S12.....	268
LVSR 325 K / N - 202 - S8.....	462	ODS 25 / V - 200 - S12.....	248
LVSR 325 K / P - 201.....	462	ODS 96B M/66 - 600 - S12.....	258
LVSR 325 K / P - 202 - S8.....	462	ODS 96B M/C6 - 600 - S12.....	258
LVSR 325 K / P - 401.....	462	ODS 96B M/C66.01 - 1400 - S12.....	258
LVSR 325 K / P - 402 - S8.....	462	ODS 96B M/D26 - 600 - S12.....	258
LVSR 424 / N - 204.....	466	ODS 96B M/D36 - 600 - S12.....	258
LVSR 424 / N - 204 - S8.....	466	ODS 96B M/V6 - 1400 - S12.....	258
LVSR 424 / P - 203 - S8.....	466	ODS 96B M/V6 - 600 - S12.....	258
LVSR 424 / P - 204.....	466	ODSIL 96B M/C6 - S12.....	266
LVSR 424 / P - 204 - S8.....	466	ODSIL 96B M/V6 - S12.....	266
<b>M</b>		ODSL 30 / 24 - 30M - S12.....	252
MC 006K.....	523	ODSL 30 / D 232 - 30M - S12.....	252
MC 008K.....	523	ODSL 30 / D 485 - 30M - S12.....	252
MC 008K - LS.....	523	ODSL 30 / V - 30M - S12.....	252
MC 012K.....	523	ODSL 8 / 66 - 500 - S12.....	238
MC 012K - LS.....	523	ODSL 8 / C66 - 200 - S12.....	238
MC 018K.....	523	ODSL 8 / C66 - 45 - S12.....	238
MC 018K - LS.....	523	ODSL 8 / C66 - 500 - S12.....	238
MC 030K.....	523	ODSL 8 / V66 - 200 - S12.....	238
MC 030K - LS.....	523	ODSL 8 / V66 - 45 - S12.....	238
MSI - m / R.....	500	ODSL 8 / V66 - 500 - S12.....	238
MSI - mE / R.....	500	ODSL 9 / 66 - 100 - S12.....	242
MSI - mx / Rx.....	500	ODSL 9 / 66 - 450 - S12.....	244
MSI - mxE / Rx.....	500	ODSL 9 / C6 - 100 - S12.....	242
MTK 20.....	546	ODSL 9 / C6 - 450 - S12.....	244
MTKS 14 x 23.....	547	ODSL 9 / C66 - 100 - S12.....	242
MTKS 14 x 23.P.....	548	ODSL 9 / C66 - 450 - S12.....	244
MTKS 20 x 20.....	547	ODSL 9 / D26 - 100 - S12.....	242
MTKS 20 x 30.....	547	ODSL 9 / D26 - 450 - S12.....	244
MTKS 20 x 40.1.....	547	ODSL 9 / D36 - 100 - S12.....	242
MTKS 30 x 50.1.....	547	ODSL 9 / D36 - 450 - S12.....	244
MTKS 40 x 60.1.....	547	ODSL 9 / V6 - 100 - S12.....	242
MTKS 50 x 50.....	547	ODSL 9 / V6 - 450 - S12.....	244
<b>O</b>		ODSL 9 / V66 - 100 - S12.....	242
OB 12 - KRT 20.....	526	ODSL 9 / V66 - 450 - S12.....	244
OB 20 - KRT 20.....	526	ODSL 96 K/66 - 2300 - S12.....	264
OB 50 - KRT 20.....	526	ODSL 96 K/V66 - 2300 - S12.....	264
ODKL 96B M/C6 - S12.....	268	ODSL 96B M/66 - 2000 - S12.....	262
		ODSL 96B M/C6 - 1200 - XL - S12.....	260
		ODSL 96B M/C6 - 2000 - S12.....	262

## PART INDEX

Part	Page	Part	Page
ODSL 96B M/C6 - S12	266	PRK 25B / 4.38 - S12	86
ODSL 96B M/C6.S - 800 - S12	260	PRK 25B / 4.8 - S12	84
ODSL 96B M/C66 - S12	266	PRK 25B / 44 - S12	84
ODSL 96B M/D26 - 2000 - S12	262	PRK 25B / 4D.3 - S12	86
ODSL 96B M/D26 - S12	266	PRK 25B / 4D.3 - S8	86
ODSL 96B M/D26.S - 800 - S12	260	PRK 25B / 4D.3, 200 - S12	86
ODSL 96B M/D36 - 2000 - S12	262	PRK 25B / 66	84
ODSL 96B M/D36 - S12	266	PRK 25B / 66 - S12	84
ODSL 96B M/D36.S - 800 - S12	260	PRK 25B / 66 - S8	84
ODSL 96B M/V6 - 1200 - XL - S12	260	PRK 25B / 66, 100 - S8	84
ODSL 96B M/V6 - 2000 - S12	262	PRK 25B / 66, 200 - S12	84
ODSL 96B M/V6 - S12	266	PRK 25B / 66.1 - S12	84
ODSL 96B M/V6.S - 800 - S12	260	PRK 25B / 66.3	88
ODSLR 96B M/C6 - 2000 - S12	262	PRK 25B / 66.3 - S12	88
ODSLR 96B M/V6 - 2000 - S12	262	PRK 25B / 66.3 - S8	88
ODSR 96B M/C6 - 600 - S12	256	PRK 25B / 66.3, 200 - S12	88
ODSR 96B M/V6 - 600 - S12	256	PRK 25B / 66.3, 200 - S8	88
		PRK 25B / 66.30, 200 - S12	88
		PRK 25B / 66.31	88
		PRK 25B / 66.31 - S12	88
		PRK 25B / 66.31 - S8	88
		PRK 318 K/N	202
		PRK 318 K/N - S12	202
		PRK 318 K/P	202
		PRK 318 K/P - S12	202
		PRK 318 M/4D - S12	200
		PRK 318 M/N	200
		PRK 318 M/N - S12	200
		PRK 318 M/P	200
		PRK 318 M/P - S12	200
		PRK 3B / 4D.22, 200 - S8	40
		PRK 3B / 6 - S8.3	38
		PRK 3B / 6.2 - S8.3	40
		PRK 3B / 6.2, 200 - S8.3	40
		PRK 3B / 6.22	40
		PRK 3B / 6.22 - S8	40
		PRK 3B / 6.22, 200 - S12	40
		PRK 3B / 6.22, 200 - S8	40
		PRK 3B / 6.7	38
		PRK 3B / 6.7 - S8	38
		PRK 3B / 66	38
		PRK 3B / 66 - S8	38
		PRK 3B / 66, 200 - S12	38

### P

PRK 18 / 2 DL.4	78
PRK 18 / 24 DL.42	76
PRK 18 / 24 DL.46	76
PRK 18 / 4 DL.4	78
PRK 18 / 4 L	76
PRK 18 / 4 L.4	78
PRK 18 / 4, 6000	76
PRK 2 / 42	24
PRK 2 / 42, 150 - S12	24
PRK 2 / 42, 150 - S8	24
PRK 2 / 42D	24
PRK 2 / 42D, 150 - S12	24
PRK 2 / 42D, 150 - S8	24
PRK 25 / 66.2	90
PRK 25 / 66.2 - S12	90
PRK 25 / 66.2 - S8	90
PRK 25 / 66.2, 150 - S12	90
PRK 25 / 66.41	90
PRK 25 / 66.41 - S12	90
PRK 25 / 66.41 - S8	90
PRK 25 / 66.41, 150 - S12	90
PRK 25B / 4, 200 - S8.1	84
PRK 25B / 4.3, 200 - S12	86
PRK 25B / 4.3, 200 - S8.1	86

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
PRK 3B / 66, 200 - S8	38	PRK 8 / 44	64
PRK 3B / 66.1 - S8	38	PRK 8 / 44 - S12	64
PRK 3B / 6D.22 - S8	40	PRK 8 / 66	64
PRK 3B / 6D.46	40	PRK 8 / 66 - S12	64
PRK 3B / 6D.7 - S8	38	PRK 8 / 66.11 - S12	64
PRK 412 M/P	220	PRK 8 / 66.41 - S12	64
PRK 412 M/P - S12	220	PRK 8 / 66.42 - S12	64
PRK 46B / 4.82 - S12	108	PRK 92 / 3 L Ex	502
PRK 46B / 44 - S12	106	PRK 95 / 4 L.2	148
PRK 46B / 44.2 - S12	108	PRK 95 / 44 L	148
PRK 46B / 4D.2 - S12	108	PRK 95 / 44 L.4	148
PRK 46B / 6.2 - S12	108	PRK 95 / A L.4	512
PRK 46B / 66	106	PRK 96 K/N - 1380 - 46	162
PRK 46B / 66 - S12	106	PRK 96 K/P - 1360 - 21	162
PRK 46B / 66, 200 - S12	106	PRK 96 K/P - 1360 - 41	162
PRK 46B / 66, 200 - S12 S - Ex n	506	PRK 96 K/P - 1360.1 - 41	162
PRK 46B / 66, 200 - S12 W - Ex n	506	PRK 96 K/P - 1361 - 29	162
PRK 46B / 66.01 - S12	106	PRK 96 K/P - 1363 - 29	162
PRK 46B / 66.01, 200 - S12 S - Ex n	506	PRK 96 K/P - 1380 - 41	162
PRK 46B / 66.01, 200 - S12 W - Ex n	506	PRK 96 K/P - 3368 - 41	162
PRK 46B / 66.2 - S12	108	PRK 96 K/R - 1420 - 25	184
PRK 46B / 66.2, 200 - S12	108	PRK 96 K/R - 1420.1 - 25	184
PRK 46B / 66D - S12	106	PRK 96 K/R - 1430 - 25	184
PRK 46B / 7D - S12	106	PRK 96 K/R - 3428.1 - 25	184
PRK 53 / 6.22 - S8	124	PRK 96 M / A - 3410 - 44	512
PRK 53 / 6.22 - S8.3	124	PRK 96 M / P - 2838 - 28 Ex n	506
PRK 53 / 6.22, 200 - S8	124	PRK 96 M / P - 3369 - 21 Ex n	506
PRK 53 / 6.42 - S8	124	PRK 96 M/N - 3366 - 27	158
PRK 53 / 6D.42 - S8	124	PRK 96 M/P - 1361 - 47	158
PRK 55 / 6 - S8.3	134	PRK 96 M/P - 1361.1 - 47	158
PRK 55 / 6.22 - S8	136	PRK 96 M/P - 1362 - 47	158
PRK 55 / 6.22 - S8.3	136	PRK 96 M/P - 1370 - 22	160
PRK 55 / 6.22, 200 - S12	136	PRK 96 M/P - 1370 - 42	158
PRK 55 / 6.22, 5000	136	PRK 96 M/P - 1375 - 22	158
PRK 55 / 6.42 - S8	136	PRK 96 M/P - 1400 - 22	160
PRK 55 / 6.42, 200 - S12	136	PRK 96 M/P - 1400 - 42	160
PRK 55 / 6.42, 5000	136	PRK 96 M/P - 1830 - 21	160
PRK 55 / 66 - S8	134	PRK 96 M/P - 1830 - 41	160
PRK 55 / 66, 200 - S12	134	PRK 96 M/P - 1832 - 41	160
PRK 55 / 66, 5000	134	PRK 96 M/P - 1838 - 21	160
PRK 55 / 6D.42 - S8	136	PRK 96 M/P - 1838 - 41	160
PRK 55 / 6D.42, 200 - S12	136	PRK 96 M/P - 2838 - 28	160
PRK 618 / 4 - S12	226	PRK 96 M/P - 3360 - 21	158

## PART INDEX

Part	Page	Part	Page
PRK 96 M/P - 3380 - 41 .....	158	Reflective tape No. 4 / 100 x 100mm .....	550
PRK 96 M/R - 1850 - 25 .....	182	Reflective tape No. 4 / 20 x 20mm .....	550
PRK 96 M/R - 1858 - 25 .....	182	Reflective tape No. 4 / 25 x 1000 mm .....	550
PRK 96 M/R - 3420 - 25 .....	182	Reflective tape No. 4 / 50 x 1000mm .....	550
PRK 96 M/R - 3430 - 25 .....	182	Reflective tape No. 4 / 50 x 50mm .....	550
PRK 96 K/R - 3428 - 25 .....	184	Reflective tape No. 4 100mm roll .....	550
PRKL 25B / 4.1, 200 - S12 .....	92	Reflective tape No. 4 25mm roll .....	550
PRKL 25B / 4D.1 - S12 .....	92	Reflective tape No. 4 920 x 749mm .....	550
PRKL 25B / 6.81 - S12 .....	92	Reflective tape No. 6 / 25 x 25mm .....	550
PRKL 25B / 66.1 .....	92	Reflective tape No. 6 / 50 x 50mm .....	550
PRKL 25B / 66.1 - S12 .....	92	RK 18 / 4 DL.45 .....	74
PRKL 25B / 66.1 - S8 .....	92	RK 318 K/N .....	198
PRKL 318 M/P .....	200	RK 318 K/N - S12 .....	198
PRKL 318 M/P - S12 .....	200	RK 318 K/P .....	198
PRKL 3B / 6.2 - S8.3 .....	44	RK 318 K/P - S12 .....	198
PRKL 3B / 6.22 .....	44	RK 318 M/N .....	196
PRKL 3B / 6.22 - S8 .....	44	RK 318 M/N - S12 .....	196
PRKL 3B / 6.22, 200 - S12 .....	44	RK 318 M/P .....	196
PRKL 3B / 6.22, 200 - S8 .....	44	RK 318 M/P - S12 .....	196
PRKL 3B / 6D.22 - S8 .....	44	RK 318 WK/N .....	198
PRKL 53 / 6.22 - S8 .....	126	RK 318 WK/N - S12 .....	198
PRKL 53 / 6.22 - S8.3 .....	126	RK 318 WK/P .....	198
PRKL 53 / 6.22, 200 - S8 .....	126	RK 318 WK/P - S12 .....	198
PRKL 53 / 6.2P - S8.3 .....	126	RK 3B / 66.1 .....	36
PRKL 55 / 6.22 - S8 .....	138	RK 96 K/R - 1560 - 25 .....	182
PRKL 55 / 6.22 - S8.3 .....	138	RK 96 M/P - 1440 - 21 .....	158
PRKL 55 / 6.22, 200 - S12 .....	138	RKR 18 / 4 DL8.45 .....	74
PRKL 55 / 6.22, 5000 .....	138	RKR 18 / 4 DL8.45.1 .....	74
PRKL 8 / 24.91 .....	64	RKR 18 / 4 L .....	74
PRKL 8 / 24.91 - S12 .....	64	RKR 18 / 4, 6000 .....	74
<b>Q</b>		RKR 3B / 22D.01 .....	36
QUATTRO - CANopen .....	492	RKR 3B / 22D.01, 200 - S8 .....	36
QUATTRO - DP .....	492	RKR 3B / 44D.01 .....	36
QUATTRO - DP / KV .....	492	RKR 3B / 6.42 .....	36
QUATTRO - DP / M12 .....	492	RKR 3B / 6.42 - S8 .....	36
QUATTRO - RSX .....	492	RKR 3B / 6.42, 200 - S12 .....	36
QUATTRO - RSX / M12 .....	492	RKR 3B / 6.42, 200 - S8 .....	36
<b>R</b>		RKR 3B / 66.11 .....	36
REF 4 - A - 50 x 45700 .....	550	RKR 3B / 6D.42 .....	36
REF 6 - S - 20 x 40 .....	548	RKR 53 / 6.42 - S8 .....	122
REF 7 - A - 100 x 100 .....	550	RKR 53 / 6.42 - S8.3 .....	122
		RKR 53 / 6.42, 200 - S8 .....	122
		RKR 55 / 6.42 - S8 .....	134

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
RKR 55 / 6.42 - S8.3	134	RT 318 WK/P - 400	210
RKR 55 / 6.42, 200 - S12	134	RT 318 WK/P - 400 - S12	210
RKR 55 / 6.42, 5000	134	RT 318 WM/P - 100 - S12	206
RKR 95 / 44 - 600 L	150	RT 318 WM/P - 400 - S12	204
RKU 8 / 24 - 400 - S12	300	RT 412 M/P - 200	222
ROD 4 - 08 plus	286	RT 412 M/P - 200 - S12	222
ROD 4 - 30	284	RT 618 / 4 - 200 - S12	228
ROD 4 - 36	284	RT 96 K/N - 1444 - 800 - 46	164
ROD 4 - 38	284	RT 96 K/P - 1444 - 800 - 21	164
ROD 4 - 50 plus	286	RT 96 K/P - 1444 - 800 - 41	164
ROD 4 - 58 plus	286	RT 96 M/P - 1474 - 800 - 42	164
ROD 4 - MS	525	RT 96 M/R - 1574 - 800 - 25	186
ROD 4 plus	286	RT 318 K/N - 100.11	212
RT 318 K/N - 200	212	RTFR 25B / 66	96
RT 318 K/N - 200 - S12	212	RTFR 25B / 66 - S12	96
RT 318 K/N - 400	210	RTFR 25B / 66 - S8	96
RT 318 K/N - 400 - S12	210	RTFR 25B / 66, 200 - S12	96
RT 318 K/N - 550 - S12	210	RTFR 3B / 2.7	48
RT 318 K/P - 100 - S12.11	212	RTFR 3B / 6 - S8.3	48
RT 318 K/P - 100.11	212	RTFR 3B / 6.7	48
RT 318 K/P - 200	212	RTFR 3B / 6.7 - S8	48
RT 318 K/P - 200 - S12	212	RTFR 3B / 66	48
RT 318 K/P - 400	210	RTFR 3B / 66 - S8	48
RT 318 K/P - 400 - S12	210	RTFR 3B / 66, 200 - S8	48
RT 318 K/P - 550	210	RTFR 3B / 6D - S8.3	48
RT 318 K/P - 550 - S12	210	RTFR 3B / 6D.7 - S8	48
RT 318 M/N - 100 - S12.11	206	RTL 318 M/P - 300 - S12	208
RT 318 M/N - 100.11	206	RTR 25 / 66.1 - 200, 150 - S12	94
RT 318 M/N - 200	206	RTR 25B / 66 - S12	94
RT 318 M/N - 200 - S12	206	RTR 3B / 2.7	46
RT 318 M/N - 400	204	RTR 3B / 2.7 - S8	46
RT 318 M/N - 400 - S12	204	RTR 3B / 6.7	46
RT 318 M/P - 100 - S12.11	206	RTR 3B / 6.7 - S8	46
RT 318 M/P - 100.11	206	RTR 3B / 66	46
RT 318 M/P - 200	206	RTR 3B / 66 - S8	46
RT 318 M/P - 200 - S12	206	RTR 46B / 66	110
RT 318 M/P - 400	204	RTR 46B / 66 - S12	110
RT 318 M/P - 400 - S12	204	RTR 46B / 66, 200 - S12	110
RT 318 M/P - 550	204	RTR 8 / 44 - 800	66
RT 318 M/P - 550 - S12	204	RTR 8 / 44 - 800 - S12	66
RT 318 WK/N - 100 - S12	212	RTR 8 / 66 - 800	66
RT 318 WK/P - 100	212	RTR 8 / 66 - 800 - S12	66
RT 318 WK/P - 100 - S12	212		

## PART INDEX

Part	Page	Part	Page
<b>S</b>			
SAT 5.....	514, 515, 517, 518, 519, 521, 522	SLSSR 46B.8 .....	494
SG 8 .....	516	SLSSR 46B.8 - S12 .....	494
SLSE 318 K/P.....	498	<b>T</b>	
SLSE 318 K/P - S12.....	498	TG 15.....	549
SLSE 318 M/P - S12 .....	498	TG 29.....	549
SLSE 96 K/P - 1200 - T2 - 21 .....	498	TG 6.....	549
SLSE 96 K/P - 1200 - T2 - 41 .....	498	TG 60.....	549
SLSE 96 K/P - 1207 - T2 - 21 .....	498	TK 10.P .....	546
SLSE 96 K/P - 1207 - T2 - 41 .....	498	TK 100 x 100 .....	543
SLSE 96 K/P 1070 - T2 - 21.....	496	TK 20 x 75 .....	543
SLSE 96 K/P 1070 - T2 - 41.....	496	TK 25.1 .....	545
SLSE 96 M/P - 1070 - T2 - 21 .....	496	TK 30 x 50 .....	543
SLSE 96 M/P - 1070 - T2 - 41 .....	496	TK 35.1 .....	545
SLSE 96 M/P - 1071 - T2 - 21 .....	496	TK 40 x 180 .....	544
SLSE 96 M/P - 1071 - T2 - 41 .....	496	TK 45.1 .....	545
SLSE 96 M/P - 1200 - T2 - 21 .....	496	TK 50 x 100 .....	543
SLSE 96 M/P - 1200 - T2 - 41 .....	496	TK 60.....	545
SLSER 25B / 66.....	494	TK 82.2 .....	546
SLSER 25B / 66 - S12 .....	494	TK 82.AF .....	546
SLSER 25B / 66 - S8 .....	494	TK BR 53 .....	549
SLSER 25B / 66, 200 - S12 .....	494	TK 20.1 .....	545
SLSER 46B / 66.....	494	TKA 30 x 46 .....	544
SLSER 46B / 66 - S12 .....	494	TKA 30 x 60 .....	544
SLSR 95 / 2.8 SE - L .....	494	TKS 10 x 32 .....	542
SLSR 95 / 44 E - L.....	494	TKS 100 x 100 .....	543
SLSS 318 K .....	498	TKS 20 x 40 .....	542
SLSS 318 K - S12 .....	498	TKS 20 x 40.P .....	544
SLSS 318 M - S12.....	498	TKS 20.P .....	546
SLSS 96 K - 1210 - T2 - 24.....	498	TKS 25.....	545
SLSS 96 K - 1210 - T2 - 45.....	498	TKS 30 x 50 .....	542
SLSS 96 K 1080 - T2 - 24 .....	496	TKS 30 x 500 .....	543
SLSS 96 K 1080 - T2 - 45 .....	496	TKS 30 x 60 .....	542
SLSS 96 M - 1080 - T2 - 24 .....	496	TKS 40 x 60 .....	542
SLSS 96 M - 1080 - T2 - 45 .....	496	TKS 40 x 60.P .....	544
SLSS 96 M - 1090 - T2 - 24 .....	496	TKS 50 x 100 .....	543
SLSS 96 M - 1090 - T2 - 45 .....	496	TKS 50 x 50 .....	542
SLSS 96 M - 1210 - T2 - 45 .....	496	TKS 50 x 50.1 .....	542
SLSS 96 M/P - 1210 - T2 - 24.....	496	TKS 50 x 50.1.HT .....	548
SLSSR 25B.8.....	494	<b>U</b>	
SLSSR 25B.8 - S12 .....	494	UMS 25 - D10 .....	517
SLSSR 25B.8 - S8 .....	494	UMS 25 - D12 .....	517
SLSSR 25B.8, 200 - S12 .....	494		

## TYPE DESIGNATION

<b>Part</b>	<b>Page</b>	<b>Part</b>	<b>Page</b>
UMS 25.1 - D14.....	517		
UMS 25.2 - D12.....	551		
UMS 25.2 - D14.....	551		
UMS 96 .....	520, 526		
UMS 96 - 82 .....	551		
UMS 96 - 95 .....	519		
US 18.....	517		
US 418.1 .....	522		
US 418.2 .....	522		
 <b>V</b>			
VBT-100-700-S8.....	482		
VBT-12.5-88-S8 .....	482		
VBT-25-175-S8.....	482		
VBT-25-2175,4000 .....	482		
VBT-50-350-S8.....	482		
VBT-5-35-S8.....	482		
VRTR 8 / 44 - 250 - S12 .....	66		
VRTR 8 / 66 - 250 .....	66		
VRTR 8 / 66 - 250 - S12 .....	66		
VRTU 430 M/P - 1110 - 6000 - S12.....	324		
VRTU 430 M/P - 2110 - 3000 - S12.....	324		
VRTU 430 M/P - 3110 - 1300 - S12.....	324		
VRTU 430 M/P - 5110 - 300 - S12.....	324		
VRTU 430 M/V - 1710 - 6000 - S12.....	276		
VRTU 430 M/V - 2510 - 3000 - S12.....	276		
VRTU 430 M/V - 2710 - 3000 - S12.....	276		
VRTU 430 M/V - 3510 - 1300 - S12.....	276		
VRTU 430 M/V - 3710 - 1300 - S12.....	276		
VRTU 430 M/V - 5510 - 300 - S12.....	276		
VRTU 430 M/V - 5710 - 300 - S12.....	276		
VS 403/N.....	502		
VS 403/R.....	502		
VS 403/R-AC .....	502		
 <b>W</b>			
WZ - OB - KRT 20 .....	526		

## PART INDEX

Order No.	Page	Order No.	Page	Order No.	Page
345899	528	50003192	543	50025192	496
345907	528	50006779	468	50025193	496
345909	528	50009331	469	50025195	154
345914	528	50009374	549	50025197	156
345915	528	50010567	473	50025201	154
345916	528	50010820	473	50025205	154
345919	528	50011508	471	50025209	496
345925	528	50013967	398	50025213	496
425720	528	50018698	469	50025215	496
50000035	470	50019341	471	50025217	154
50000036	468	50019925	150	50025223	154
50000037	470	50020501	541	50025225	154
50000038	471	50020502	541	50025228	154
50000039	473	50020833	517, 519	50025253	180
50000040	471	50021192	469	50025254	156
50000041	473	50022139	469	50025255	156
50000042	468	50022551	472	50025256	180
50000043	469	50022680	148	50025257	180
50000044	468	50022681	148	50025258	156
50000045	469	50022794	150	50025259	156
50000046	471	50022814	542	50025570	520
50000047	473	50022815	543	50025609	148
50000048	471	50022816	543	50025610	150
50000049	473	50023019	472	50025611	150
50000051	469	50023525	542	50025612	150
50000053	472	50024127	546	50026204	520, 526
50000054	473	50024604	469	50026371	414
50000068	548	50025112	512	50026835	146
50000071	548	50025114	168	50026836	146
50001030	468	50025116	168	50027095	512
50001031	469	50025118	168	50027097	543
50001032	468	50025124	166	50027191	551
50001033	469	50025126	166	50027696	545
50001034	471	50025131	186	50027775	474
50001035	472	50025132	186	50027780	475
50001036	471	50025133	176	50027781	475
50001037	472	50025135	176	50027782	476
50003176	549	50025163	162	50027783	477
50003177	549	50025165	162	50027784	476
50003179	549	50025166	162	50027785	477
50003186	545	50025167	184	50027993	148
50003188	543	50025168	184	50028009	498
50003189	543	50025178	160	50028010	498
50003190	544	50025182	160	50028011	498
50003191	543	50025186	158	50028012	498



## PART NUMBER

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50028975	160	50034509	146	50036364	64
50029454	496	50034510	146	50036365	64
50029455	496	50034511	148	50036366	66
50029880	160	50034512	148	50036367	66
50029881	182	50034513	150	50036368	66
50030077	510	50034514	150	50036369	66
50030257	148	50034515	150	50036370	70
50030269	156	50035017	515, 526, 527	50036371	70
50030433	542	50035018	515, 526, 527	50036372	66
50030556	518, 527, 551	50035019	515, 526, 527	50036374	66
50030648	158	50035030	515	50036375	66
50031249	496	50035078	498	50036569	62
50031250	496	50035309	474	50036570	62
50031295	154	50035351	184	50037083	62
50031323	541	50035674	448	50037084	62
50031324	541	50036128	470	50037133	64
50031549	160	50036188	547	50037134	64
50031559	496	50036195	515	50037135	64
50031561	496	50036196	515	50037783	535
50031562	496	50036257	320	50037784	535
50031574	154	50036258	320	50037909	458
50031575	154	50036259	272	50037910	458
50031651	180	50036260	272	50038060	550
50031714	414	50036261	324	50038066	525
50032003	180	50036262	324	50038069	539
50032004	180	50036263	324	50038070	539
50032127	166	50036264	324	50038072	541
50032128	154	50036266	276	50038073	541
50032129	154, 156	50036267	276	50038117	550
50032319	520	50036268	276	50038449	228
50032798	76	50036269	276	50038450	226
50033244	76	50036350	68	50038471	174
50033328	154, 156	50036351	68	50038482	70
50033552	76	50036352	68	50038483	70
50033554	76	50036353	68	50038635	318
50033579	462	50036354	62	50038636	318
50033581	462	50036355	62	50038639	318
50033785	518, 527, 551	50036356	62	50038640	318
50034049	526	50036357	62	50038787	510
50034050	526	50036358	62	50038788	510
50034051	526	50036359	62	50038789	510
50034118	526	50036360	64	50038790	512
50034119	510	50036361	64	50038912	300
50034128	154	50036362	64	50038913	300
50034368	471	50036363	64	50038914	300

## PART INDEX

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50038915	300	50041448	74	50080721	502
50039145	469	50041471	545	50080722	502
50039392	472	50041477	472	50080723	502
50039447	252	50041595	164	50080724	502
50039470	170	50041597	164	50080760	160
50039546	98	50041598	186	50080987	517
50039547	98	50041611	470	50081153	78
50039548	98	50041741	473	50081177	164
50039638	418	50041742	473	50081178	164
50039650	68	50041839	458	50081254	76
50040155	541	50041840	458	50081283	542
50040190	418	50041876	550	50081292	496
50040191	418	50060384	473	50081293	496
50040192	418	50060511	514	50081297	462
50040269	517	50060857	166	50081298	462
50040270	517	50060858	166	50081300	462
50040278	510	50061102	168	50081301	462
50040279	516	50061111	182	50081325	162
50040280	516	50061452	158	50081335	194
50040358	168	50080047	166	50081336	194
50040465	100	50080048	512	50081337	194
50040466	100	50080075	186	50081338	194
50040616	272	50080076	186	50081339	190
50040618	272	50080080	180	50081340	190
50040720	252	50080081	180	50081341	190
50040739	518	50080130	522	50081342	190
50040771	276	50080131	522	50081343	198
50040772	276	50080153	78	50081344	198
50040820	542	50080183	494	50081345	196
50040824	502	50080184	494	50081346	196
50040825	502	50080242	174	50081347	202
50040826	502	50080327	174	50081348	202
50040894	547	50080334	519	50081349	200
50040895	547	50080469	160	50081350	200
50041007	448	50080470	182	50081351	210
50041042	162	50080476	162	50081352	210
50041067	516	50080477	158	50081353	204
50041109	498	50080478	496	50081354	204
50041203	252	50080479	496	50081355	212
50041204	252	50080483	156	50081356	212
50041355	545	50080484	182	50081357	206
50041394	90	50080502	521	50081358	206
50041395	90	50080614	520	50081364	74
50041396	90	50080656	162	50081407	220
50041446	74	50080657	156	50081408	220

## PART NUMBER

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50081409	222	50082196	204	50102604	550
50081410	222	50082197	210	50102613	148
50081432	218	50082198	204	50102704	70
50081461	541	50082199	498	50102705	70
50081464	174	50082200	498	50102730	74
50082008	522	50082296	154	50102731	74
50082039	510	50083102	206	50102824	248
50082040	510	50083111	194	50102839	94
50082050	206	50083112	204	50102981	280
50082060	160	50083113	210	50102992	466
50082065	158	50083116	498	50103004	156
50082066	182	50083117	498	50103070	106
50082067	512	50083132	498	50103071	106
50082084	520, 551	50083133	498	50103072	108
50082092	158	50083139	212	50103073	108
50082104	518, 551	50083140	200	50103074	106
50082140	194	50083151	202	50103076	108
50082142	198	50083162	198	50103080	106
50082143	196	50083163	212	50103082	106
50082145	200	50083171	192	50103084	108
50082146	210	50083172	192	50103090	176
50082147	204	50083175	192	50103206	280
50082148	212	50083176	192	50103216	162
50082152	190	50083179	192	50103217	176
50082153	194	50083180	192	50103290	154
50082154	190	50083183	200	50103291	154
50082156	190	50083184	200	50103360	68
50082157	194	50083188	208	50103361	68
50082158	190	50083189	521	50103364	304
50082159	198	50083194	210	50103365	304
50082161	198	50083232	194	50103475	466
50082167	212	50083234	196	50103487	280
50082169	212	50083244	212	50103488	280
50082170	206	50083246	190	50103515	466
50082171	210	50083249	206	50103516	466
50082173	210	50101457	90	50103709	70
50082174	204	50101867	545	50103844	514
50082175	210	50101879	238	50104130	547
50082176	194	50101880	238	50104131	547
50082177	190	50101881	264	50104132	547
50082185	198	50101882	264	50104202	90
50082186	198	50101977	90	50104223	84
50082187	202	50101978	90	50104224	84
50082188	190	50102286	170	50104225	84
50082195	194	50102379	158	50104226	84

## PART INDEX

Order No.	Page	Order No.	Page	Order No.	Page
50104227	84	50104539	533	50104694	38
50104228	84	50104540	533	50104695	38
50104229	84	50104541	533	50104696	38
50104230	84	50104542	534	50104697	38
50104231	92	50104543	534	50104698	38
50104232	92	50104544	534	50104699	40
50104233	92	50104545	534	50104700	40
50104234	92	50104546	534	50104701	40
50104235	92	50104547	534	50104702	36
50104236	88	50104548	536	50104703	36
50104237	88	50104549	536	50104704	36
50104238	88	50104550	536	50104705	44
50104239	88	50104551	536	50104706	44
50104240	88	50104552	536	50104707	44
50104241	86	50104553	536	50104753	534
50104242	86	50104555	537	50104761	531
50104243	88	50104556	537	50104762	537
50104244	88	50104557	537	50104825	170
50104245	88	50104558	537	50104897	520, 551
50104246	86	50104559	537	50105106	108
50104247	86	50104560	537	50105153	542
50104279	158	50104561	535	50105156	108
50104280	280	50104562	535	50105210	98
50104281	280	50104563	535	50105274	472
50104283	280	50104564	535	50105315	518, 551
50104415	78	50104565	535	50105340	471
50104483	476	50104566	535	50105372	477
50104520	530	50104567	537	50105451	517
50104521	530	50104568	537	50105546	514
50104522	530	50104569	537	50105585	514
50104523	530	50104570	536	50105587	184
50104524	531	50104571	536	50105622	160
50104525	531	50104572	536	50105667	174
50104526	531	50104573	536	50105739	84
50104527	531	50104574	538	50105761	238
50104528	531	50104575	538	50105762	40
50104529	531	50104576	538	50105763	36
50104530	531	50104577	538	50105764	44
50104531	531	50104582	541	50105789	124
50104532	531	50104583	541	50105790	122
50104533	531	50104590	538	50105791	126
50104534	531	50104591	538	50105792	136
50104535	532	50104599	549	50105793	136
50104536	532	50104657	550	50105794	134
50104538	533	50104693	38	50105795	134

## PART NUMBER

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50105796	138	50106597	262	50107238	50
50105797	138	50106598	262	50107239	50
50105803	98	50106599	262	50107240	50
50105804	134	50106691	530	50107241	50
50105805	134	50106692	530	50107242	54
50105986	106	50106693	530	50107243	54
50105987	108	50106720	258	50107244	54
50105990	545	50106721	258	50107245	54
50106078	38	50106722	258	50107246	56
50106085	214	50106723	258	50107247	56
50106086	214	50106724	258	50107248	56
50106089	214	50106727	258	50107249	56
50106090	214	50106728	260	50107250	56
50106119	550	50106729	260	50107251	56
50106152	532	50106730	256	50107276	538
50106153	532	50106731	256	50107298	52
50106154	532	50106732	262	50107299	56
50106155	532	50106733	262	50107368	100
50106203	88	50106736	260	50107484	140
50106209	547	50106737	260	50107491	140
50106418	40	50106852	36	50107492	140
50106475	44	50106865	38	50107493	140
50106480	286	50106871	156	50107494	140
50106481	286	50106881	539	50107495	140
50106511	36	50106882	538	50107496	142
50106512	36	50106906	539	50107497	142
50106546	112	50106957	544	50107498	142
50106547	114	50106958	546	50107499	128
50106548	114	50106959	546	50107500	128
50106549	112	50106960	544	50107501	128
50106550	112	50106961	548	50107503	128
50106551	112	50106974	78	50107504	128
50106552	112	50107016	517	50107505	128
50106553	112	50107057	550	50107507	128
50106554	112	50107068	106	50107508	128
50106555	110	50107069	466	50107509	128
50106556	110	50107096	276	50107599	136
50106557	110	50107216	184	50107600	134
50106558	110	50107228	52	50107601	134
50106559	110	50107229	52	50107602	138
50106560	116	50107230	52	50107603	124
50106561	116	50107232	50	50107604	124
50106562	114	50107233	50	50107605	126
50106593	262	50107235	50	50107606	126
50106594	262	50107236	50	50107607	122

## PART INDEX

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50107608	122	50108477	82	50108533	104
50107869	482	50108478	82	50108534	104
50107869-00	482	50108479	82	50108535	104
50107869-10	482	50108480	82	50108536	104
50107888	482	50108483	82	50108538	494
50107888-00	482	50108484	82	50108539	494
50107888-10	482	50108485	82	50108540	494
50107911	482	50108486	82	50108541	494
50107911-00	482	50108487	82	50108549	86
50107911-10	482	50108489	494	50108587	508
50107914	36	50108490	494	50108588	508
50107918	50	50108491	494	50108589	508
50107922	52	50108492	494	50108590	508
50107936	482	50108493	494	50108591	506
50107936-00	482	50108494	494	50108592	506
50107939	482	50108495	48	50108593	506
50107939-00	482	50108496	48	50108594	506
50107939-10	482	50108497	48	50108611	206
50107970	482	50108498	48	50108612	212
50107970-00	482	50108499	48	50108613	190
50107970-10	482	50108500	48	50108715	132
50108026	40	50108501	48	50108717	132
50108049	90	50108502	48	50108721	132
50108111	86	50108504	48	50108723	132
50108129	551	50108505	46	50108736	120
50108138	539	50108506	46	50108742	120
50108139	539	50108508	34	50108812	156
50108215	544	50108509	34	50108813	156
50108216	544	50108510	34	50108819	418
50108224	68	50108511	34	50108889	172
50108239	100	50108512	34	50108943	508
50108240	100	50108514	34	50108944	508
50108300	550	50108515	34	50108945	506
50108361	238	50108516	34	50108946	506
50108362	238	50108517	34	50108991	541
50108363	238	50108518	34	50109016	318
50108364	238	50108519	34	50109018	318
50108407	54	50108522	110	50109023	36
50108408	52	50108523	110	50109051	54
50108464	508	50108524	110	50109061	46
50108472	96	50108526	104	50109062	98
50108473	96	50108527	104	50109065	46
50108474	96	50108528	104	50109208	158
50108475	96	50108529	104	50109250	46
50108476	94	50108532	104	50109251	46

## PART NUMBER

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50109276	420	50109649	364	50109708	382
50109277	420	50109652	362	50109709	384
50109290	266	50109653	362	50109710	384
50109291	266	50109654	362	50109712	388
50109292	266	50109655	362	50109713	388
50109293	266	50109656	362	50109714	388
50109295	266	50109658	364	50109716	390
50109297	268	50109659	364	50109717	390
50109298	268	50109661	364	50109718	390
50109299	268	50109662	364	50109720	388
50109300	268	50109664	368	50109721	388
50109302	266	50109665	368	50109722	388
50109303	266	50109666	368	50109723	388
50109343	458	50109668	372	50109726	390
50109385	40	50109669	372	50109727	390
50109432	84	50109670	372	50109728	390
50109470	206	50109672	368	50109732	382
50109471	206	50109673	368	50109734	384
50109473	212	50109674	368	50109736	370
50109484	44	50109675	370	50109738	374
50109485	56	50109676	368	50109753	50
50109498	420	50109677	370	50109828	546
50109499	420	50109678	370	50109880	539
50109523	506	50109679	370	50109881	539
50109545	514, 515, 517, 518, 519, 521, 522	50109680	374	50109882	539
50109551	112	50109682	370	50110102	98
50109581	38	50109684	368	50110104	410
50109594	452	50109685	368	50110105	410
50109595	452	50109686	356	50110106	410
50109596	452	50109687	370	50110107	410
50109597	452	50109688	370	50110108	404
50109598	452	50109689	374	50110109	404
50109599	452	50109692	378	50110110	402
50109600	452	50109693	378	50110111	402
50109601	452	50109694	378	50110112	402
50109602	454	50109696	384	50110113	402
50109603	454	50109697	384	50110151	494
50109639	360	50109698	384	50110152	494
50109640	360	50109700	380	50110191	550
50109641	360	50109701	380	50110192	550
50109642	360	50109702	380	50110208	100
50109645	364	50109703	380	50110209	100
50109646	364	50109704	380	50110231	258
50109647	364	50109706	382	50110238	284
		50109707	382	50110273	532

## PART INDEX

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50110274	532	50110761	402	50111088	506
50110282	542	50110762	402	50111089	508
50110555	530	50110763	404	50111157	244
50110556	530	50110764	404	50111158	244
50110557	530	50110765	404	50111159	244
50110558	530	50110766	404	50111160	244
50110559	530	50110767	404	50111161	244
50110572	430	50110768	404	50111162	244
50110573	432	50110769	402	50111163	244
50110576	430	50110770	402	50111167	242
50110577	432	50110775	40	50111168	242
50110578	430	50110782	396	50111169	242
50110579	432	50110783	396	50111170	242
50110580	430	50110784	396	50111171	242
50110581	432	50110785	396	50111172	242
50110582	430	50110786	396	50111173	242
50110583	432	50110787	396	50111208	172
50110584	426	50110788	396	50111312	428
50110585	428	50110789	396	50111313	428
50110586	426	50110790	396	50111319	432
50110587	428	50110791	396	50111320	432
50110588	426	50110792	396	50111321	434
50110589	428	50110793	398	50111324	290
50110590	426	50110794	398	50111325	290
50110591	428	50110795	398	50111330	294
50110592	434	50110806	116	50111362	398
50110593	434	50110809	54	50111375	546
50110594	434	50110872	82	50111435	388
50110595	434	50110873	82	50111436	390
50110600	444	50110874	86	50111437	356
50110601	440	50110876	98	50111438	356
50110602	440	50110921	92	50111440	34
50110603	440	50110922	82	50111441	34
50110611	436	50110923	82	50111442	34
50110612	438	50110924	86	50111443	54
50110613	436	50110925	98	50111444	56
50110614	438	50110929	104	50111496	523
50110615	436	50110930	104	50111497	523
50110616	438	50110932	200	50111498	523
50110639	551	50110952	172	50111499	523
50110659	58	50110990	172	50111500	523
50110666	284	50111015	504	50111501	523
50110667	284	50111016	504	50111502	523
50110759	410	50111035	260	50111503	523
50110760	410	50111087	508	50111504	523



**PART NUMBER**

<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>	<b>Order No.</b>	<b>Page</b>
50111519	504	50111968	140	50112423	402
50111520	504	50111969	132	50112424	406
50111527	550	50111970	132	50112425	406
50111610	438	50112065	260	50112426	404
50111618	116	50112104	380	50112427	402
50111619	446	50112109	30	50112428	410
50111621	446	50112110	30	50112429	410
50111622	446	50112111	30	50112444	360
50111623	446	50112112	30	50112445	444
50111624	446	50112113	30	50112446	442
50111625	444	50112114	30	50112447	442
50111626	444	50112115	28	50112475	124
50111627	442	50112116	28	50112476	124
50111628	442	50112117	28	50112477	136
50111629	444	50112118	28	50112478	136
50111630	444	50112119	28	50112615	408
50111633	442	50112120	28	50112616	408
50111634	442	50112121	26	50112617	408
50111635	444	50112122	26	50112618	408
50111636	444	50112123	26	50112619	408
50111640	116	50112124	26	50112620	408
50111641	440	50112125	26	50112803	172
50111642	440	50112126	26	50112804	172
50111643	438	50112127	22	50112805	114
50111644	436	50112128	22	50112806	372
50111655	108	50112129	22	50112807	372
50111732	34	50112130	22	50112808	372
50111743	380	50112131	22	50112862	172
50111768	426	50112132	22	50112885	344
50111769	430	50112133	22	50112886	344
50111770	446	50112134	22	50112887	344
50111771	442	50112135	22	50112888	344
50111772	550	50112136	24	50112889	344
50111830	514	50112137	24	50112890	344
50111868	492	50112138	24	50112914	372
50111870	368	50112139	24	50112915	378
50111871	388	50112140	24	50112960	536
50111929	420	50112141	24	50112961	536
50111931	420	50112142	549	50112991	136
50111952	374	50112206	514	50112992	136
50111953	384	50112209	372	50113009	106
50111954	382	50112215	525	50113207	360
50111963	372	50112293	378	50113208	344
50111966	134	50112358	508	50113209	340
50111967	136	50112422	404	50113210	340

## PART INDEX

Order No.	Page	Order No.	Page	Order No.	Page
50113211	362	50113999	314	671008	488
50113212	352	50114000	314	672016	488
50113213	352	50114051	362	673016	488
50113225	286	50114052	374	674016	488
50113226	286	50114055	525	675016	488
50113265	538	50114056	525	678031	540
50113267	36	50114070	142	678032	540
50113307	516	50114071	136	678033	540
50113308	116	50114072	138	678035	540
50113309	548	50114073	134	678040	540
50113317	54	50114074	436	678045	540
50113432	110	50114075	440	S50000100	561
50113435	448	50114099	40	S50000101	561
50113436	448	50114179	126	S50000102	561
50113437	448	50114185	548	S50000103	561
50113438	448	50114201	448	S50000104	561
50113473	534	50114202	448	S50000105	561
50113478	348	50114203	332		
50113510	524	50114204	332		
50113548	521, 524	50114205	332		
50113549	522, 524	50114206	332		
50113550	524	50114207	332		
50113771	84	50114208	332		
50113783	344	50114209	332		
50113785	426	50114210	332		
50113790	408	50114211	336		
50113909	166	50114212	336		
50113981	310	50114213	336		
50113982	308	50114214	336		
50113983	308	50114215	336		
50113984	310	50114216	336		
50113985	308	50114217	336		
50113986	308	50114218	336		
50113987	310	549904	500		
50113988	308	549905	500		
50113989	308	549980	500		
50113990	310	549982	500		
50113991	308	560120	528		
50113992	308	560300	528		
50113993	314	670001	492		
50113994	314	670002	492		
50113995	314	670003	492		
50113996	314	670004	492		
50113997	314	670005	492		
50113998	314	670008	488		

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