

Through-beam sensors are unsurpassed in their accuracy, ability to discriminate small parts and fine detail, as well as their operating reliability. The only disadvantages are in installation and setup. The goal of eliminating these objections has led to the concept of the slot sensor.

A full range of slot sensors with a variety of slot openings and dimensions ensures that virtually any sensing task can be handled while still using standard product.

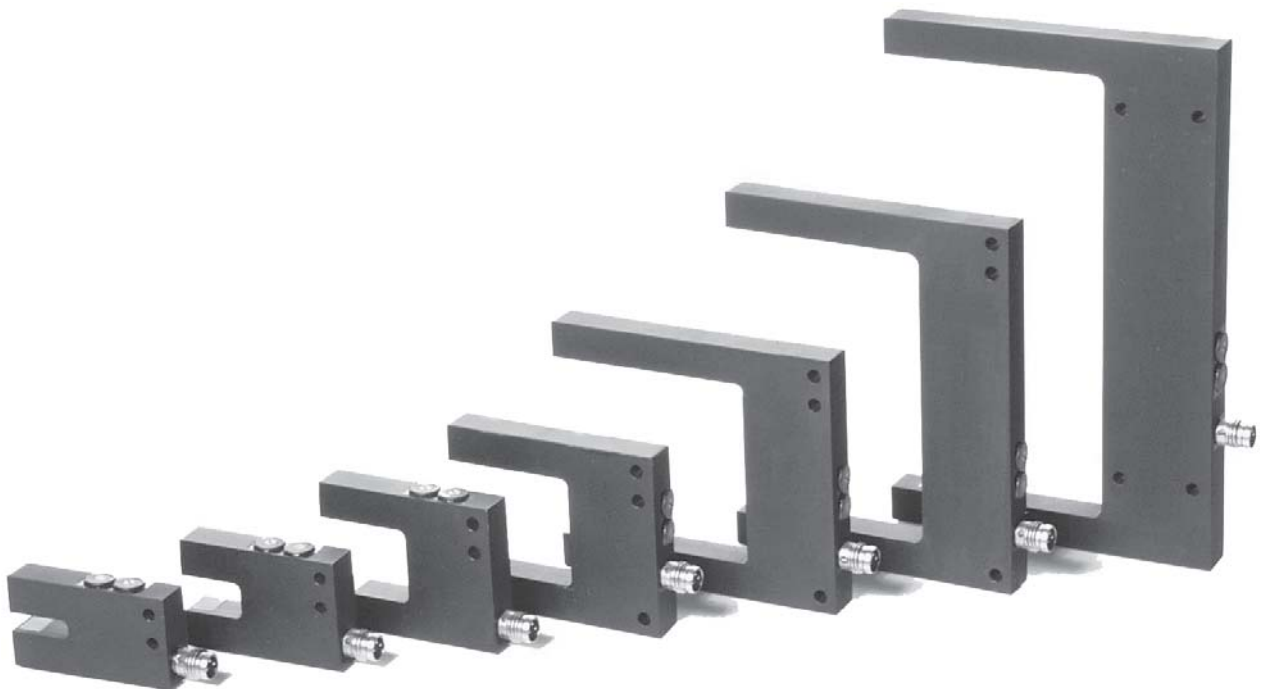
Laser slot sensors are the logical extension of this proven concept. They are unbeatable when it comes to accuracy, detail discrimination and operating reliability. Balluff laser slot sensors are ideal for precise positioning as well as reliable detection of fast-moving processes and small parts. This opens a vast range of applications in robotics and automation.


Features

- Integrated processing electronics
- Easy to use and adjust
- Only one cable connection needed
- Tough metal housing
- Glass optical surface
- High switching frequency
- Adjustable sensitivity
- High resolution
- NO/NC toggle switch
- LED indicator 360° visible
- Choose from red or laser light
- Identical housing dimensions for both light versions
- Slot arm 10x10 mm, even for large slot openings
- Side-by-side allowed
- Laser Class 1

Applications

- Parts sensing on conveyor and feed belts
- Label sensing on transparent backing material
- Dimension checking
- Counting parts in assembly lines
- Tool break monitoring
- Position monitoring
- Feed control on automatic assembly equipment
- Checking for completeness (e.g. connector pins)
- Level monitoring of containers
- Handling and assembly



Type	Slot opening	Resolution	Light type				Output		Output function		Switching frequency	U _B	Connection	Page
			Red light	Laser light	Infrared	Red and green light	PNP-Transistor	NPN-Transistor	Light-on	Dark-on				
 Slot Sensors														
BGL 5A-001-S49	5 mm	0.3 mm	■				■		■	■	3 kHz	■	■	2.2.84
BGL 5A-002-S49	5 mm	0.3 mm	■					■	■	■	3 kHz	■	■	2.2.84
BGL 10A-001-S49	10 mm	0.3 mm	■				■		■	■	3 kHz	■	■	2.2.84
BGL 10A-002-S49	10 mm	0.3 mm	■					■	■	■	3 kHz	■	■	2.2.84
BGL 20A-001-S49	20 mm	0.3 mm	■				■		■	■	1.5 kHz	■	■	2.2.85
BGL 20A-002-S49	20 mm	0.3 mm	■					■	■	■	1.5 kHz	■	■	2.2.85
BGL 30A-001-S49	30 mm	0.3 mm	■				■		■	■	1.5 kHz	■	■	2.2.85
BGL 30A-002-S49	30 mm	0.3 mm	■					■	■	■	1.5 kHz	■	■	2.2.85
BGL 30A-003-S49	30 mm	50 µm		■			■		■	■	5 kHz	■	■	2.2.88
BGL 30A-004-S49	30 mm	50 µm		■				■	■	■	5 kHz	■	■	2.2.88
BGL 50A-001-S49	50 mm	0.4 mm	■				■		■	■	1.5 kHz	■	■	2.2.85
BGL 50A-002-S49	50 mm	0.4 mm	■					■	■	■	1.5 kHz	■	■	2.2.85
BGL 50A-003-S49	50 mm	80 µm		■			■		■	■	5 kHz	■	■	2.2.89
BGL 50A-004-S49	50 mm	80 µm		■				■	■	■	5 kHz	■	■	2.2.89
BGL 80A-001-S49	80 mm	0.4 mm	■				■		■	■	1.5 kHz	■	■	2.2.86
BGL 80A-002-S49	80 mm	0.4 mm	■					■	■	■	1.5 kHz	■	■	2.2.86
BGL 80A-003-S49	80 mm	0.1 mm		■			■		■	■	5 kHz	■	■	2.2.89
BGL 80A-004-S49	80 mm	0.1 mm		■				■	■	■	5 kHz	■	■	2.2.89
BGL 120A-001-S49	120 mm	0.5 mm	■				■		■	■	1.5 kHz	■	■	2.2.87
BGL 120A-002-S49	120 mm	0.5 mm	■					■	■	■	1.5 kHz	■	■	2.2.87
BGL 120A-003-S49	120 mm	0.15 mm		■			■		■	■	5 kHz	■	■	2.2.89
BGL 120A-004-S49	120 mm	0.15 mm		■				■	■	■	5 kHz	■	■	2.2.89
BGL 180A-001-S49	180 mm	0.6 mm	■				■		■	■	1.5 kHz	■	■	2.2.87
BGL 180A-002-S49	180 mm	0.6 mm	■					■	■	■	1.5 kHz	■	■	2.2.87
BGL 220A-001-S49	220 mm	0.6 mm	■				■		■	■	1.5 kHz	■	■	2.2.87
BGL 220A-002-S49	220 mm	0.6 mm	■					■	■	■	1.5 kHz	■	■	2.2.87
BGL 21-AV	2 mm	0.25 mm			■		■	■	■	■	7.5 kHz	■	■	2.2.91
BGL 21-AS	2 mm	0.25 mm			■		■	■	■	■	15 kHz	■	■	2.2.91
BGL 21-AR	2 mm	0.5 mm			■		■	■	■	■	7.5 kHz	■	■	2.2.91
BGL 21-AH	2 mm	0.5 mm				■	■	■	■	■	7.5 kHz	■	■	2.2.91

2.2

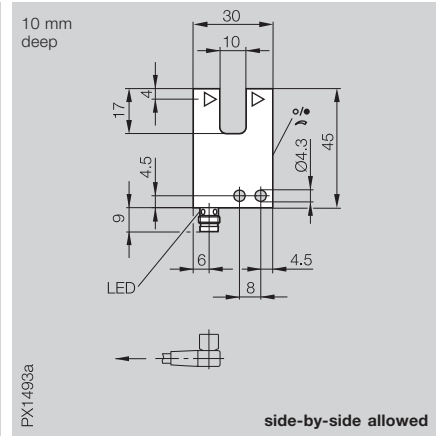
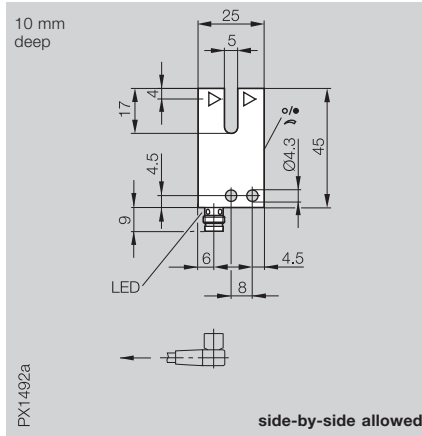
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Photoelectric sensors accessories page 2.3.2 ...

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Connectors ... page 5.2 ...

Series	BGL	BGL
Slot opening	5 mm	10 mm
Slot depth	17 mm	17 mm



Slot sensor

PNP	BGL 5A-001-S49	BGL 10A-001-S49
NPN	BGL 5A-002-S49	BGL 10A-002-S49

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	< 35 mA	< 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	200 mA	200 mA
Voltage drop U_d at I_0	≤ 3 V (PNP)/≤ 2.5 V (NPN)	≤ 3 V (PNP)/≤ 2.5 V (NPN)
Settings	Potentiometer 270°	Potentiometer 270°

Optical data

Emitter, light type	LED, red light	LED, red light
Wavelength	640 nm	640 nm
Resolution (smallest discernible part)	0.3 mm	0.3 mm
Repeat accuracy	20 µm	20 µm
Switching hysteresis	≤ 0.1 mm	≤ 0.1 mm

Time data

Response time	0.2 ms	0.2 ms
Switching frequency f	3 kHz	3 kHz

Indicators

Output function indicator	LED yellow	LED yellow
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Mechanical data

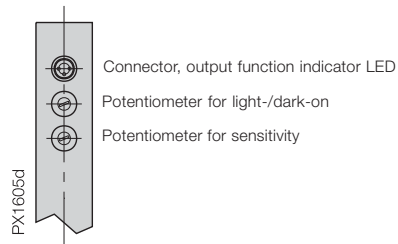
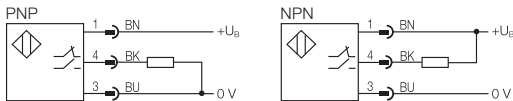
Dimensions	25×45×10 mm	30×45×10 mm
Connection	M8 connector, 3-pin	M8 connector, 3-pin
Housing material	GD-Zn	GD-Zn
Optical surface	Glass	Glass
Weight	20 g	23 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C
Ambient light rejection per	EN 60947-5-2	EN 60947-5-2



Wiring diagrams



Slot Sensors

Photoelectric Sensors

BGL Slot Sensors

BGL 20 mm 24 mm	BGL 30 mm 34 mm	BGL 50 mm 54 mm
<p>10 mm deep</p> <p>PX1494a</p> <p>side-by-side allowed</p>	<p>10 mm deep</p> <p>PX1495b</p> <p>side-by-side allowed</p>	<p>10 mm deep</p> <p>PX1496c</p> <p>side-by-side allowed</p>
BGL 20A-001-S49 BGL 20A-002-S49	BGL 30A-001-S49 BGL 30A-002-S49	BGL 50A-001-S49 BGL 50A-002-S49
10...30 V DC 10 % < 35 mA PNP- or NPN-Transistor Light-/dark-on (selectable) 200 mA ≤ 3 V (PNP)/≤ 2.5 V (NPN) Potentiometer 270°	10...30 V DC 10 % < 35 mA PNP- or NPN-Transistor Light-/dark-on (selectable) 200 mA ≤ 3 V (PNP)/≤ 2.5 V (NPN) Potentiometer 270°	10...30 V DC 10 % ≤ 35 mA PNP- or NPN-Transistor Light-/dark-on (selectable) 200 mA ≤ 3 V (PNP), ≤ 2.5 V (NPN) Potentiometer 270°
LED, red light 640 nm 0.3 mm 20 µm ≤ 0.1 mm	LED, red light 640 nm 0.3 mm 20 µm ≤ 0.1 mm	LED, red light 640 nm 0.4 mm 40 µm ≤ 0.15 mm
0.33 ms 1.5 kHz	0.33 ms 1.5 kHz	0.33 ms 1.5 kHz
LED yellow	LED yellow	LED yellow
40×49×10 mm M8 connector, 3-pin GD-Zn Glass 28 g	50×59×10 mm M8 connector, 3-pin GD-Zn Glass 36 g	70×79×10 mm M8 connector, 3-pin GD-Zn Glass 107 g
IP 67 yes yes -10...+60 °C EN 60947-5-2	IP 67 yes yes -10...+60 °C EN 60947-5-2	IP 67 yes yes -10...+60 °C EN 60947-5-2

2.2

2.3

Photoelectric sensors accessories page 2.3.2 ...

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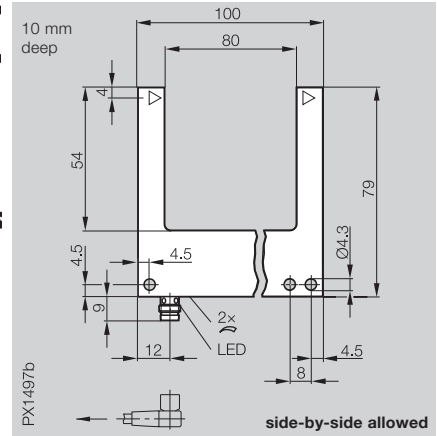
Connectors ... page 5.2 ...

Recommended accessories
please order separately

Connector
Straight BKS-_ 48
Right-angle BKS-_ 49



Series	BGL
Slot opening	80 mm
Slot depth	54 mm



Slot sensor

PNP	BGL 80A-001-S49
NPN	BGL 80A-002-S49

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 35 mA
Switching output	PNP- or NPN-Transistor
Output current	Light-/dark-on (selectable)
Switching type	200 mA
Voltage drop U_d at I_e	≤ 3 V (PNP), ≤ 2.5 V (NPN)
Settings	Potentiometer 270°

Optical data

Emitter, light type	LED, red light
Wavelength	640 nm
Resolution (smallest discernible part)	0.4 mm
Repeat accuracy	60 μ m
Switching hysteresis	≤ 0.2 mm

Time data

Response time	0.33 ms
Switching frequency f	1.5 kHz

Indicators

Output function indicator	LED yellow
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Mechanical data

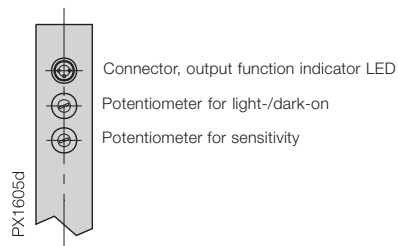
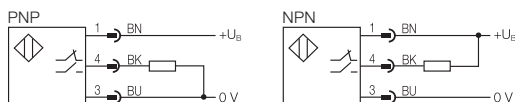
Dimensions	100x79x10 mm
Connection	M8 connector, 3-pin
Housing material	GD-Zn
Optical surface	Glass
Weight	140 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-10...+60 °C
Ambient light rejection per	EN 60947-5-2



Wiring diagrams



Slot Sensors

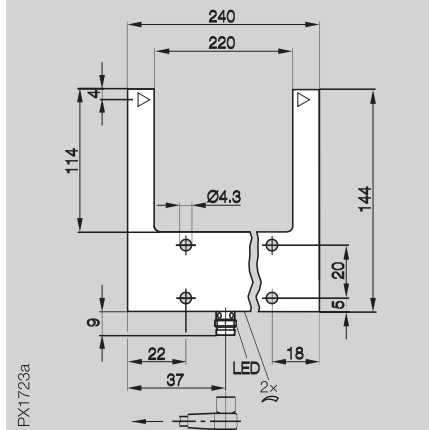
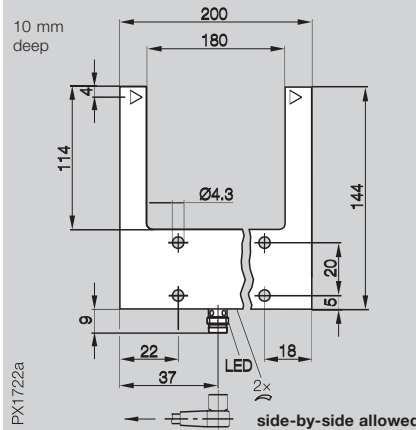
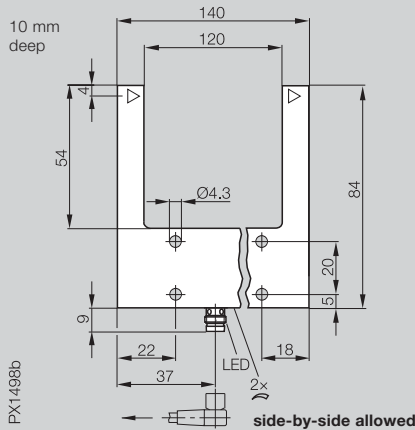
Photoelectric Sensors

BGL Slot Sensors

BGL
120 mm
54 mm

BGL
180 mm
114 mm

BGL
220 mm
114 mm



BGL 120A-001-S49
BGL 120A-002-S49

BGL 180A-001-S49
BGL 180A-002-S49

BGL 220A-001-S49
BGL 220A-002-S49

10...30 V DC
10 %
≤ 35 mA
PNP- or NPN-Transistor
Light-/dark-on (selectable)
200 mA
≤ 3 V (PNP), ≤ 2.5 V (NPN)
Potentiometer 270°

10...30 V DC
10 %
≤ 35 mA
PNP- or NPN-Transistor
Light-/dark-on (selectable)
200 mA
≤ 3 V (PNP), ≤ 2.5 V (NPN)
Potentiometer 270°

10...30 V DC
10 %
≤ 35 mA
PNP- or NPN-Transistor
Light-/dark-on (selectable)
200 mA
≤ 3 V (PNP), ≤ 2.5 V (NPN)
Potentiometer 270°

LED, red light
640 nm
0.5 mm
80 μm
≤ 0.2 mm

LED, red light
640 nm
0.6 mm
80 μm
≤ 0.2 mm

LED, red light
640 nm
0.6 mm
80 μm
≤ 0.2 mm

0.33 ms
1.5 kHz

0.33 ms
1.5 kHz

0.33 ms
1.5 kHz

LED yellow

LED yellow

LED yellow

140×84×10 mm
M8 connector, 3-pin
GD-Zn
Glass
118 g

200×144×10 mm
M8 connector, 3-pin
GD-Zn
Glass
190 g

240×144×10 mm
M8 connector, 3-pin
GD-Zn
Glass
220 g

IP 67
yes
yes
-10...+60 °C
EN 60947-5-2

IP 67
yes
yes
-10...+60 °C
EN 60947-5-2

IP 67
yes
yes
-10...+60 °C
EN 60947-5-2

2.2

2.3

Photoelectric sensors accessories page 2.3.2 ...

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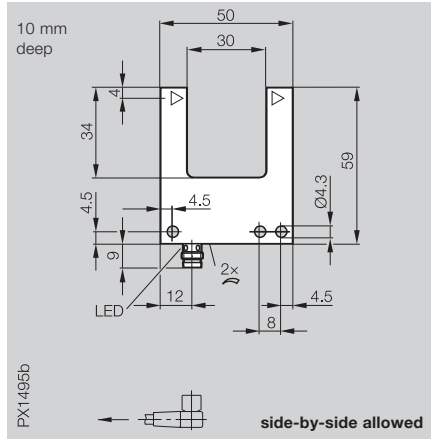
Connectors ... page 5.2 ...

Recommended accessories
please order separately

Connector
Straight BKS- 48
Right-angle BKS- 49



Series	BGL
Slot opening	30 mm
Slot depth	34 mm



Slot sensor

PNP	BGL 30A-003-S49
NPN	BGL 30A-004-S49

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 20 mA
Switching output	PNP- or NPN-Transistor
Output current	200 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_e	≤ 3 V (PNP), ≤ 2.5 V (NPN)
Settings	Potentiometer 270°

Optical data

Emitter, light type	Laser, red light
Wavelength	650 nm
Laser class	1
Resolution (smallest discernible part)	50 μ m
Repeat accuracy	10 μ m
Switching hysteresis	≤ 20 μ m

Time data

Response time	0.16 ms
Switching frequency f	5 kHz

Indicators

Output function indicator	LED yellow
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Mechanical data

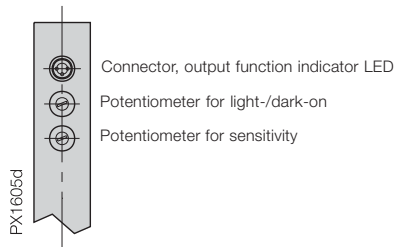
Dimensions	50x59x10 mm
Connection	M8 connector, 3-pin
Housing material	GD-Zn
Optical surface	Glass
Weight	66 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-10...+60 °C
Ambient light rejection	5 kLux



Wiring diagrams



Laser Through-Beam Slot Sensors



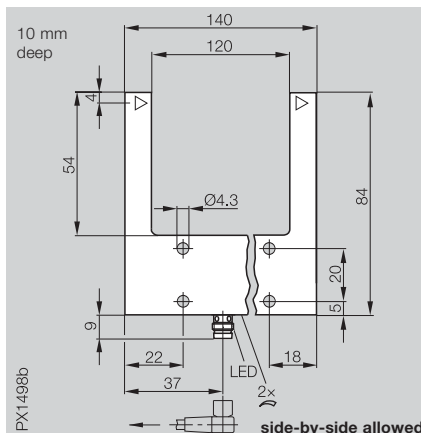
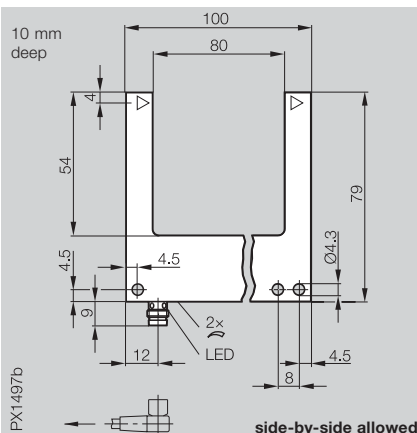
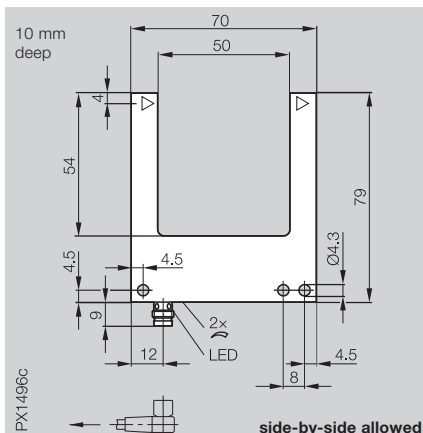
Photoelectric Sensors

BGL Laser Slot Sensors

BGL
50 mm
54 mm

BGL
80 mm
54 mm

BGL
120 mm
54 mm



BGL 50A-003-S49
BGL 50A-004-S49

BGL 80A-003-S49
BGL 80A-004-S49

BGL 120A-003-S49
BGL 120A-004-S49

10...30 V DC
10 %
≤ 20 mA
PNP- or NPN-Transistor
200 mA
Light-/dark-on (selectable)
≤ 3 V (PNP), ≤ 2.5 V (NPN)
Potentiometer 270°

10...30 V DC
10 %
≤ 20 mA
PNP- or NPN-Transistor
200 mA
Light-/dark-on (selectable)
≤ 3 V (PNP), ≤ 2.5 V (NPN)
Potentiometer 270°

10...30 V DC
10 %
≤ 20 mA
PNP- or NPN-Transistor
200 mA
Light-/dark-on (selectable)
≤ 3 V (PNP), ≤ 2.5 V (NPN)
Potentiometer 270°

Laser, red light
650 nm
1
80 μm
10 μm
≤ 25 μm

Laser, red light
650 nm
1
0.1 mm
10 μm
≤ 30 μm

Laser, red light
650 nm
1
0.15 mm
15 μm
≤ 50 μm

0.16 ms
5 kHz

0.16 ms
5 kHz

0.16 ms
5 kHz

LED yellow

LED yellow

LED yellow

70×79×10 mm
M8 connector, 3-pin
GD-Zn
Glass
110 g

100×79×10 mm
M8 connector, 3-pin
GD-Zn
Glass
135 g

140×84×10 mm
M8 connector, 3-pin
GD-Zn
Glass
210 g

IP 67
yes
yes
-10...+60 °C
5 kLux

IP 67
yes
yes
-10...+60 °C
5 kLux

IP 67
yes
yes
-10...+60 °C
5 kLux

2.2

2.3

Photoelectric sensors accessories page 2.3.2 ...

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Connectors ... page 5.2 ...

Recommended accessories
please order separately

Connector
Straight BKS- 48
Right-angle BKS- 49



The **BGL 21 slot sensor** is a photoelectric sensor using a microcontroller for the setup process and function monitoring. All the user needs to do is press a button to access all the data needed for the sensor setting.

Both the top and bottom side of the sensor have an adjustment aid printed for indicating the position in which the object must be located.

The internal microcontroller monitors all settings to ensure optimum switching frequency, repeat accuracy and rejection of optical interference and ambient light.

The **BGL 21-AH** has red and green emitter diodes which are advantageous for detecting colored markings. Which color of emitter light is more appropriate for the particular task is automatically determined during setup.

Models **BGL 21-AR** and **BGL 21-AS** with infrared emitter enable detection of labels or holes on endless material.

The **BGL 21-AV** with low hysteresis detects even transparent films or see-through labels on transparent backing material.

Features

- Fast, fully automatic sensor calibration
- Control panel has just one button and two LED's
- Very short response time and high repeat accuracy
- High rejection of mutual optical interference and ambient light
- NPN/PNP output on separate pins with overload protection
- M8 connector block can be rotated 90°
- Metal housing

Applications

- Detecting markings on backing material
- Label detection
- Monitoring web tracking
- Belt break monitoring
- Hole checking in thin materials (< 2 mm)



Series	
Slot opening	
Slot depth	



Slot sensor

PNP/NPN	
Object property*	

Electrical data

Supply voltage U_B	
Ripple	
No-load supply current I_0 max.	
Switching output	
Switching type	
Output current	
Voltage drop U_d at I_e	
Settings	

Optical data

Emitter, light type	
Wavelength	
Resolution (smallest discernible part)	

Time data

Response time	
Switching frequency f	

Indicators

Output function indicator	
Function ready/error indicator	

Mechanical data

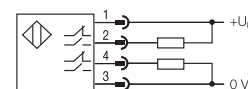
Dimensions	
Connection	
Housing material	
Optical surface	
Weight	

Ambient data

Degree of protection per IEC 60529	
Polarity reversal protected	
Short circuit protected	
Ambient temperature range T_a	
Ambient light rejection	



Wiring diagram



Slot Sensor for Label Detection

Photoelectric Sensors

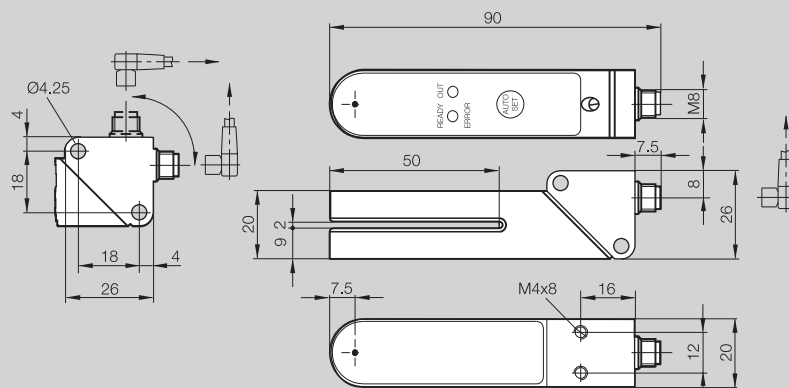
BGL 21
Slot Sensors

BGL
2 mm
50 mm

BGL
2 mm
50 mm

BGL
2 mm
50 mm

BGL
2 mm
50 mm



PXI124

BGL 21-AH	BGL 21-AV	BGL 21-AS	BGL 21-AR
Colored and transparent on colored or neutral substrate	Transparent or see-through on transparent substrate	Opaque on see-through or transparent substrate	Opaque on see-through or transparent substrate
10...30 V DC 2 V ≤ 55 mA	10...30 V DC 2 V ≤ 55 mA	10...30 V DC 2 V ≤ 55 mA	10...30 V DC 2 V ≤ 55 mA
PNP and NPN Transistor Light-/dark-on (selectable) 100 mA ≤ 1.2 V Teach-in	PNP and NPN Transistor Light-/dark-on (selectable) 100 mA ≤ 1.2 V Teach-in	PNP and NPN Transistor Light-/dark-on (selectable) 100 mA ≤ 1.2 V Teach-in	PNP and NPN Transistor Light-/dark-on (selectable) 100 mA ≤ 1.2 V Teach-in
LED, red light/green light 635 nm/535 nm 0.5 mm	LED, infrared 880 nm 0.25 mm	LED, infrared 880 nm 0.25 mm	LED, infrared 880 nm 0.5 mm
133 μs 7.5 kHz	133 μs 7.5 kHz	66 μs 15 kHz	133 μs 7.5 kHz
LED yellow LED red/green	LED yellow LED red/green	LED yellow LED red/green	LED yellow LED red/green
90×26×20 mm M8 connector, 4-pin Anodized Al Glass 100 g	90×26×20 mm M8 connector, 4-pin Anodized Al Glass 100 g	90×26×20 mm M8 connector, 4-pin Anodized Al Glass 100 g	90×26×20 mm M8 connector, 4-pin Anodized Al Glass 100 g
IP 65 yes yes 0...+55 °C 3 kLux (artificial light)/ 10 kLux (sunlight)	IP 65 yes yes 0...+55 °C 3 kLux (artificial light)/ 10 kLux (sunlight)	IP 65 yes yes 0...+55 °C 3 kLux (artificial light)/ 10 kLux (sunlight)	IP 65 yes yes 0...+55 °C 3 kLux (artificial light)/ 10 kLux (sunlight)

*Object transparent	Impinging light fully penetrates the object
Object transparent	Impinging light penetrates the object partially or is reflected
Object opaque	Impinging light does not penetrate the object

Recommended accessories
please order separately

Connector
Straight BKS-S 74
Right-angle BKS-S 75



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2.3

Photoelectric sensors accessories page 2.3.2 ...

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Connectors ... page 5.2 ...