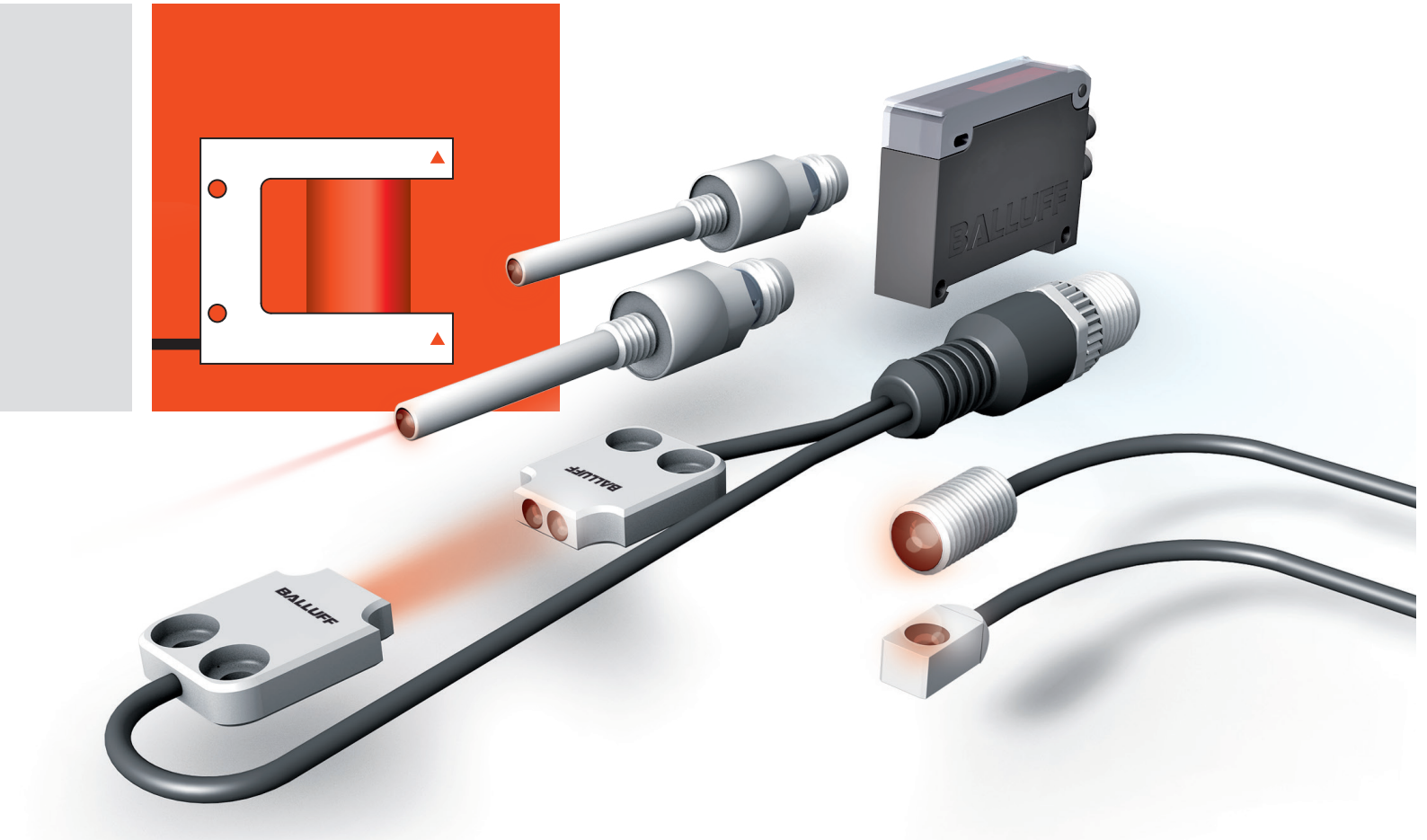
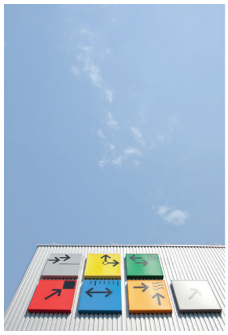
BALLUFF

sensors worldwide

Object Detection

Photoelectric Sensors with Outstanding Precision





As the leading sensor specialist and system provider with more than 90 years of company tradition, Balluff GmbH has been a recognized partner in factory automation for decades. The global player has a strong presence with 61 sales branches and representative offices as well as nine production sites on all continents. The corporate headquarters in Neuhausen a.d.F. is located near Stuttgart.

Balluff masters the entire technological variety with various operating principles, including high-quality sensors and systems for position measurement and identification, as well as sensors for detecting objects and measuring fluids. The full-range assortment includes optimal network and connection technology and a comprehensive line of accessory products.

We offer innovative, first-class products tested in our own accredited laboratory, and maintain certified quality management in accordance with DIN EN 9001:2008. Our technology speaks for itself in international applications since it also meets regional standards.

Balluff stands for application-specific customer solutions, comprehensive services, individual consultation and prompt service. Our staff of more than 2,750 employees is committed to providing outstanding service worldwide.

Benefit from comprehensive sensor expertise from a single source. Achieve solutions suited to your requirements.

CERTIFICATE

DQS GmbH

Balluff GmbH

ISO 9001 : 2008

Photoelectric Sensors with Outstanding Precision

Modular components for maximum possible flexibility

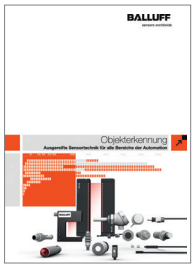
Flexible modular system thanks to manufacturer expertise
Our photoelectric sensors feature unmatched performance and precision. No wonder, as we are proven photoelectric specialists. We have the entire technological bandwidth of development and production of photoelectric sensors. We have expertise in each individual sensor component, allowing you to benefit from our advanced knowledge of sensor applications. Take advantage of our modular design principle, which provides the ideal solution for your requirements. For example, with modular size systems for optical window and through-beam fork sensors. Individually selected light wavelengths. Or compact sensors with high-performance miniature optics.

Optimized for the smallest installation space
From the beginning, fitting a large amount of optical performance into the smallest possible space was our most important goal for sensor production.
However, the photoelectric components available on the market were not big or powerful enough to meet our requirements.

Therefore, we developed our own manufacturing technology, had it patented and put the requirements in place for micro-optical components with unmatched technical characteristics: LED, photodiode, phototransistor and laser diode units.

Their micro-optics feature long range and excellent resolution values. Integrated metal housings provide the needed durability. Highly flexible electrical cables transmit the sensor signals to separate amplifiers with convenient indicators and operating elements that are installed where installation space is not critical.

This results in a wide variety of minimally sized standard products with a wide variety of unique selling points. Consequently we are able to implement even customer-specific solutions with greater speed, cost-effectiveness and reliability.



For additional photoelectric sensors, refer to our complete catalog:
Object Detection.
Sophisticated sensor technology for all areas of automation

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Photoelectric Sensors

MICROmote® sensors
BOH – Balluff Optical Head

MICROmote® sensors are miniaturized photoelectric sensors with separate electronic processor unit. Their highly flexible, purely electric sensor cable makes them a genuine technical alternative to conventional fiber optics—with many added advantages for users.

The photoelectric sensor heads have exceptionally small dimensions, excellent technical characteristic values and outstanding flexibility for customer-specific solutions. This makes them ideal for combining optimally with a wide variety of electronic functions, while maintaining convenient operation and maximum visibility.

MICROmote® sensors are particularly well suited to installation in moving machine parts and robot grippers.

micro SPOT®

microSPOT® is a manufacturing technology developed to implement exceptional optical precision in extremely small housings. Therefore, the strength of the microSPOT® photoelectric sensors is reliable detection of tiny objects in extremely tight spaces—without interference from reflections from the surrounding area.

Through our patented method of production, the optics of each sensor are matched to the respective application during production—without complicated simulations or non-recurring costs for tools. In spite of its tiny dimensions, this helps in achieving excellent optical precision in LEDs, photodiodes and phototransistors. With technical characteristic values, which are far superior to conventional photoelectric components.

The minimum size opens a width spectrum of outstanding miniature photoelectric sensors with a wide variety of unique selling points.

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Diffuse sensors BOH for separate amplifiers BAE
Cylinder designs

Type	**Diffuse sensor**	**Diffuse sensor**	**Diffuse sensor**
Dimension	**Ø 2×8 mm**	**Ø 2×8 mm**	**M3×0.5×8 mm**
Sensing distance	**12 mm**	**12 mm**	**12 mm**
Order code	**BOH0003**	**BOH0002**	**BOH0009**
Part number	BOH DR-G02-001-01-S49F	BOH DI-G02-001-01-S49F	BOH DR-M03-001-01-S49F
Light type	Red light	Infrared	Red light
Wavelength	660 Nm	880 Nm	660 Nm
Light spot diameter			
Degree of protection as per IEC 60529	IP 65	IP 65	IP 65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Stainless steel	Stainless steel
Fastener	Adhesive or clamp fastening	Adhesive or clamp fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Reference object: white, 90% reflection, 100×100 mm

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02
Function diagrams
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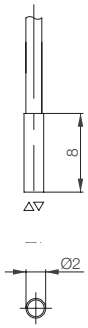
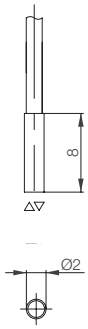
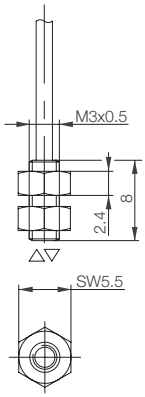
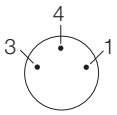






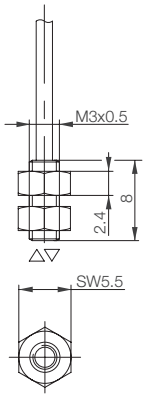
Connection configuration
M8 connector, 3-pin

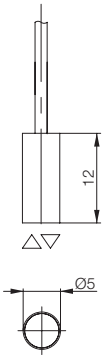
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

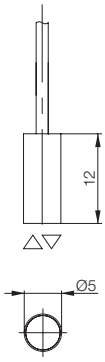


Diffuse sensors BOH for separate amplifiers BAE
Cylinder designs

	Diffuse sensor	**Diffuse sensor**	**Diffuse sensor**
	M3×0.5×8 mm	**Ø 5×12 mm**	**Ø 5×12 mm**
	12 mm	**60 mm**	**60 mm**
	BOH0004	**BOH0006**	**BOH0005**
	BOH DI-M03-001-01-S49F	BOH DK-G05-002-01-S49F	BOH DR-G05-002-01-S49F
	Infrared	Red light microSPOT	Red light
	880 Nm	645 Nm	660 Nm
		5 mm (at 50 mm)	14 mm (at 50 mm)
	IP 65	IP 65	IP 65
	–10...+55 °C	–10...+55 °C	–10...+55 °C
	Stainless steel	Stainless steel	Stainless steel
	Screw fastening	Adhesive or clamp fastening	Adhesive or clamp fastening
	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin







Diffuse sensors BOH for separate amplifiers BAE
Cylinder designs

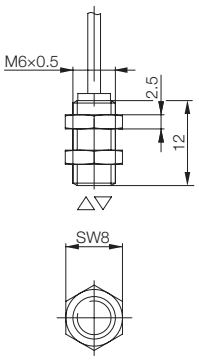
micro SPOT®

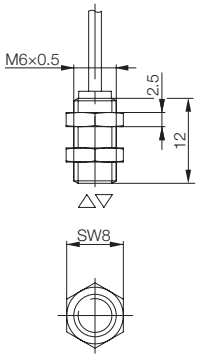
Type	**Diffuse sensor**	**Diffuse sensor**		
Dimension	**M6×0.5×12 mm**	**M6×0.5×12 mm**		
Sensing distance	**60 mm**	**60 mm**		
Rated switching distance S_n				
Order code	**BOH0008**	**BOH0007**		
Part number	BOH DK-M06-002-01-S49F	BOH DR-M06-002-01-S49F		
Light type	Red light microSPOT	Red light		
Wavelength	645 Nm	660 Nm		
Light spot diameter	5 mm (at 50 mm)	14 mm (at 50 mm)		
Degree of protection as per IEC 60529	IP 65	IP 65		
Ambient temperature T_a	–10...+55 °C	–10...+55 °C		
Housing material	Nickel-plated brass	Nickel-plated brass		
Fastener	Screw fastening	Screw fastening		
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin		

Reference object: white, 90% reflection, 100×100 mm

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

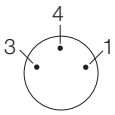
Function diagrams beginning on page 49





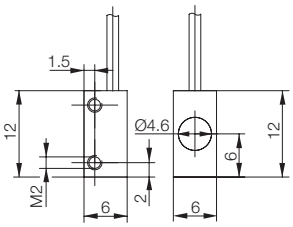
Connection configuration
M8 connector, 3-pin

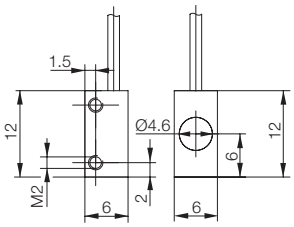
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

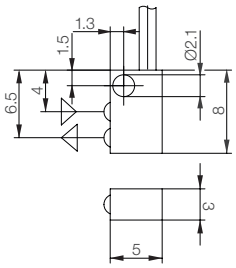


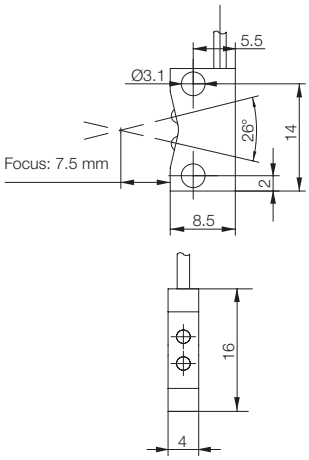
Diffuse sensors BOH for separate amplifiers BAE
Block designs

Diffuse sensor	**Diffuse sensor**	**Diffuse sensor**	**Fixed-focus diffuse sensor**
6×6×12 mm	**6×6×12 mm**	**3×8×5 mm**	**16×4×8.5 mm**
60 mm	**60 mm**	**70 mm**	
			7.5 mm
BOH000M	**BOH000L**	**BOH002K**	**BOH002L**
BOH DK-Q06-001-01-S49F	BOH DR-Q06-001-01-S49F	BOH DK-R002-006-01-S49F	BOH FK-Z001-001-01-S49F
Red light microSPOT	Red light	Red light microSPOT	Red light microSPOT
645 Nm	660 Nm	645 Nm	645 Nm
4 mm (at 50 mm)	11 mm (at 50 mm)	5 mm (at 50 mm)	
IP 65	IP 65	IP 65	IP 65
–10...+55 °C	–10...+55 °C	–10...+55 °C	–10...+55 °C
Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
Screw fastening	Screw fastening	Screw fastening	Screw fastening
1 m PUR cable with	1 m PUR cable with	1 m PUR cable with	1 m PUR cable with
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin









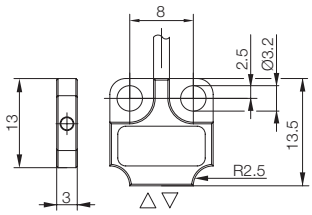
Diffuse sensors BOH for separate amplifiers BAE
Block designs

Type	**Diffuse sensor**	**Diffuse sensor**
Dimension	**13.5×13×3 mm**	**13.5×13×3 mm**
Sensing distance	**60 mm**	**60 mm**
Order code	**BOH0027**	**BOH0028**
Part number	BOH DK-R018-001-01-S49F	BOH DK-R018-002-01-S49F
Light type	Red light microSPOT	Red light microSPOT
Wavelength	645 Nm	645 Nm
Light spot diameter	5 mm (at 50 mm)	5 mm (at 50 mm)
Degree of protection as per IEC 60529	IP 67	IP 67
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Naturally anodized aluminum	Naturally anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

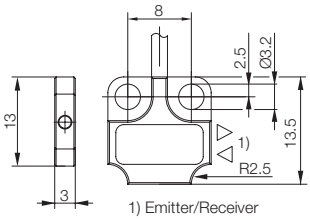
Reference object: white, 90% reflection, 100×100 mm

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

Function diagrams beginning on page 48



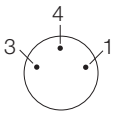
Emitter/Receiver



1) Emitter/Receiver

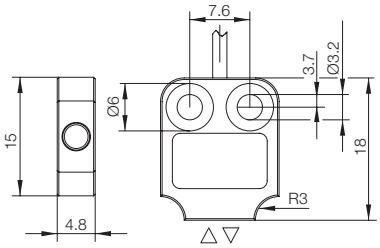
Connection configuration
M8 connector, 3-pin

3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

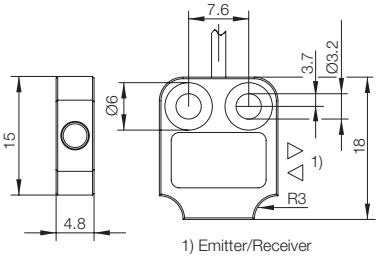


Diffuse sensors BOH for separate amplifiers BAE
Block designs

Diffuse sensor	**Diffuse sensor**	
18×15×4.8 mm	**18×15×4.8 mm**	
100 mm	**100 mm**	
BOH0029	**BOH002A**	
BOH DK-R027-003-01-S49F	BOH DK-R027-004-01-S49F	
Red light microSPOT	Red light microSPOT	
645 Nm	645 Nm	
8 mm (at 100 mm)	8 mm (at 100 mm)	
IP 67	IP 67	
–10...+55 °C	–10...+55 °C	
Naturally anodized aluminum	Naturally anodized aluminum	
Screw fastening	Screw fastening	
1 m PUR cable with	1 m PUR cable with	
M8 connector, 3-pin	M8 connector, 3-pin	

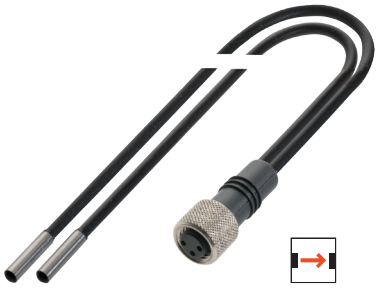


Emitter/Receiver



1) Emitter/Receiver

Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

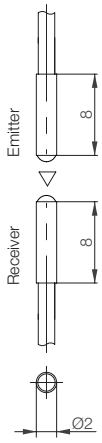


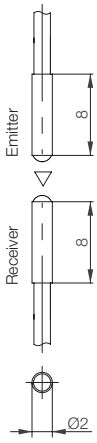
Type	**Through-beam sensor**	**Through-beam sensor**
Dimension	**Ø 2×8 mm**	**Ø 2×8 mm**
Range	**300 mm**	**500 mm**
Order code	**BOH000A**	**BOH000C**
Part number	BOH TR-G02-001-01-S49F	BOH TK-G02-001-01-S49F
Light type	Red light	Red light microSPOT
Wavelength	660 Nm	645 Nm
Light spot diameter		10 mm (at 100 mm)
Resolution (smallest detectable part)	0.2 mm	0.2 mm
Degree of protection as per IEC 60529	IP 65	IP 65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Stainless steel
Fastening	Adhesive or clamp fastening	Adhesive or clamp fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

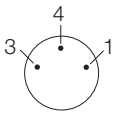
Function diagrams
on page 53



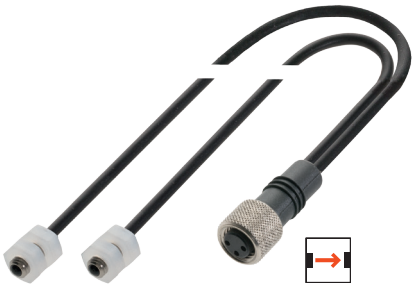


Connection configuration
M8 connector, 3-pin

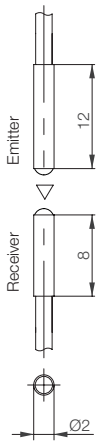
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

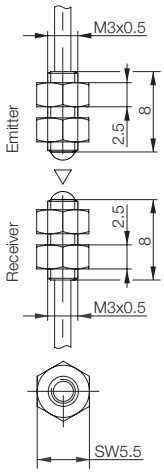


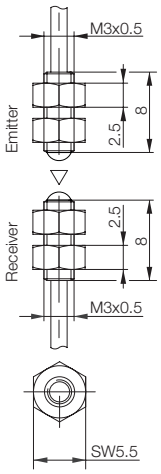
Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs



	Through-beam sensor **Emitter Ø 2x12 mm** **Receiver Ø 2x8 mm**	**Through-beam sensor** **M3×0.5×8 mm**	**Through-beam sensor** **M3×0.5×8 mm**
	200 mm	**300 mm**	**500 mm**
	BOH001K	**BOH000T**	**BOH000U**
	BOH TZ-G02-001-01-S49F-SA2	BOH TR-M03-001-01-S49F	BOH TK-M03-001-01-S49F
	Red light	Red light	Red light microSPOT
	660 Nm	660 Nm	645 Nm
	0.4 mm (at 10 mm)		10 mm (at 100 mm)
	0.1 mm	0.2 mm	0.2 mm
	IP 65	IP 65	IP 65
	–10...+55 °C	–10...+55 °C	–10...+55 °C
	Stainless steel	Stainless steel	Stainless steel
	Adhesive or clamp fastening	Screw fastening	Screw fastening
	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin







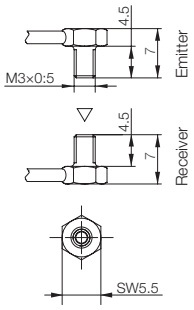
Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

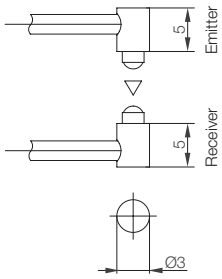
Model	**Through-beam sensor**	**Through-beam sensor**
Dimension	**M3×0.5×7 mm**	**Ø 3×5 mm**
Range	**500 mm**	**500 mm**
Order code	**BOH000E**	**BOH000Z**
Part number	BOH TK-M03-005-01-S49F	BOH TK-G03-004-01-S49F
Light type	Red light microSPOT	Red light microSPOT
Wavelength	645 Nm	645 Nm
Light spot diameter	10 mm (at 100 mm)	10 mm (at 100 mm)
Resolution (smallest detectable part)	0.2 mm	0.2 mm
Degree of protection as per IEC 60529	IP 65	IP 65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Stainless steel
Fastening	Screw fastening	Adhesive or clamp fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

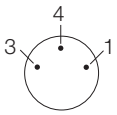
Function diagrams
beginning on page 54



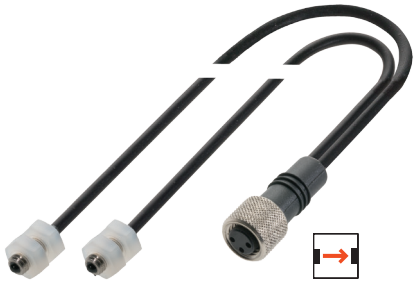


Connection configuration
M8 connector, 3-pin

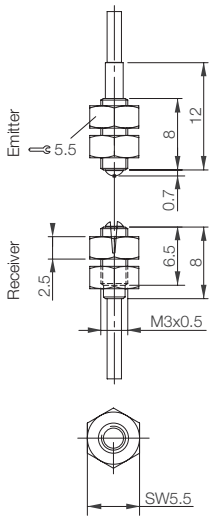
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

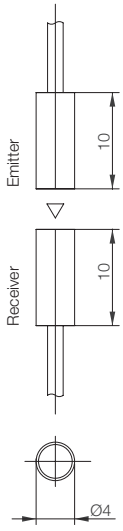


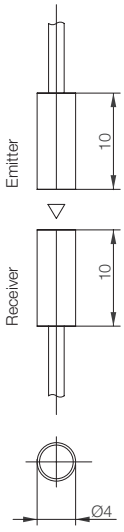
Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs



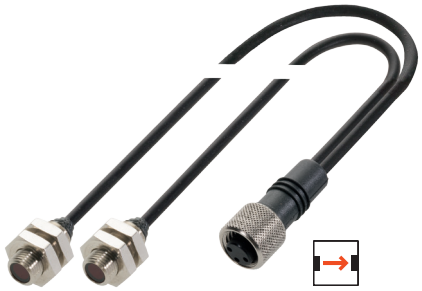
	Through-beam sensor Ermitter M3×0.5×12 mm, Receiver M3×0.5×8 mm	**Through-beam sensor Ø 4×10 mm**	**Through-beam sensor Ø 4×10 mm**
	200 mm	**1000 mm**	**2000 mm**
	BOH001L	**BOH000W**	**BOH0014**
	BOH TZ-M03-001-01-S49F-SA2	BOH TR-G04-003-01-S49F	BOH TK-G04-003-01-S49F
	Red light	Red light	Red light microSPOT
	660 Nm	660 Nm	645 Nm
	0.4 mm (at 10 mm)		8 mm (at 100 mm)
	0.1 mm	0.3 mm	0.4 mm
	IP 65	IP 65	IP 65
	–10...+55 °C	–10...+55 °C	–10°C... +55°C
	Stainless steel	Stainless steel	Stainless steel
	Screw fastening	Adhesive or clamp fastening	Adhesive or clamp fastening
	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin







Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

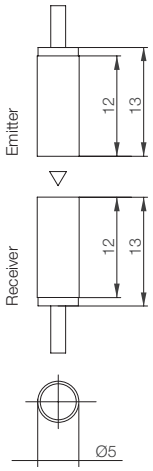


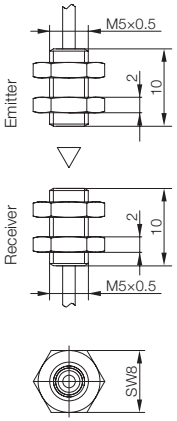
Model	**Through-beam sensor**	**Through-beam sensor**	
Dimension	**Ø 5×12 mm**	**M5×0.5×10 mm**	
Range	**4000 mm**	**1000 mm**	
Order code	**BOH0010**	**BOH000Y**	
Part number	BOH TR-G05-005-02-S49F	BOH TR-M05-003-01-S49F	
Light type	Red light	Red light	
Wavelength	660 Nm	660 Nm	
Light spot diameter			
Resolution (smallest detectable part)	0.4 mm	0.3 mm	
Degree of protection as per IEC 60529	IP 65	IP 65	
Ambient temperature T_a	–10...+55 °C	–10...+55 °C	
Housing material	Stainless steel	Nickel-plated brass	
Fastening	Adhesive or clamp fastening	Screw fastening	
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	

Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

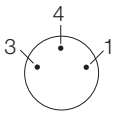
Function diagrams
beginning on page 57





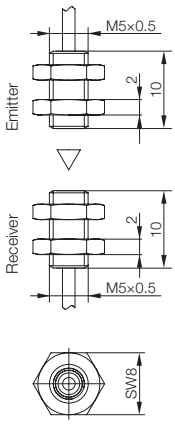
Connection configuration
M8 connector, 3-pin

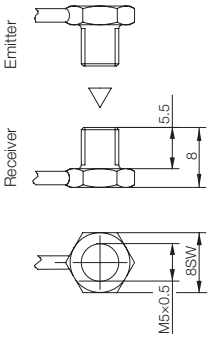
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



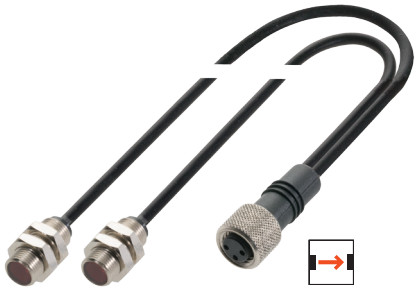
Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

Through-beam sensor	**Through-beam sensor**	
M5×0.5×10 mm	**M5×0.5×8 mm**	
2000 mm	**2000 mm**	
BOH0013	**BOH000F**	
BOH TK-M05-003-01-S49F	BOH TK-M05-006-01-S49F	
Red light microSPOT	Red light microSPOT	
645 Nm	645 Nm	
8 mm (at 100 mm)	8 mm (at 100 mm)	
0.4 mm	0.4 mm	
IP 65	IP 65	
–10...+55 °C	–10...+55 °C	
Nickel-plated brass	Stainless steel	
Screw fastening	Screw fastening	
1 m PUR cable with	1 m PUR cable with	
M8 connector, 3-pin	M8 connector, 3-pin	





Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

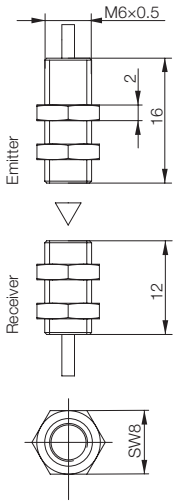


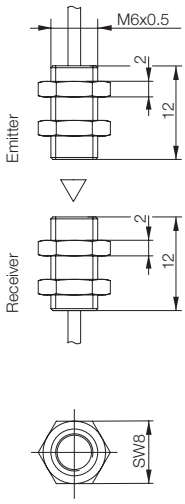
Model	**Through-beam sensor**	**Through-beam sensor**
Dimension	**M6×0.5×16 mm**	**M6×0.5×12 mm**
Range	**4000 mm**	**4000 mm**
Order code	**BOH000H**	**BOH000K**
Part number	BOH TL-M06-007-02-S49F	BOH TR-M06-002-02-S49F
Light type	Laser red light, class 1	Red light
Wavelength	650 Nm	660 Nm
Light spot diameter		
Resolution (smallest detectable part)	< 0.05 mm	0.4 mm
Degree of protection as per IEC 60529	IP 65	IP 65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Nickel-plated brass
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

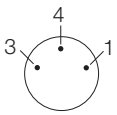
Function diagrams
beginning on page 58





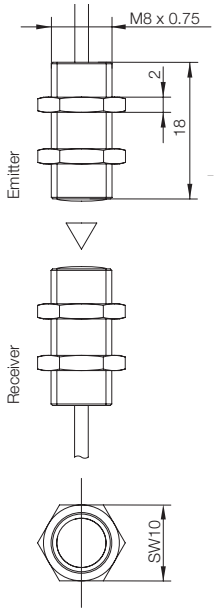
Connection configuration
M8 connector, 3-pin

3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

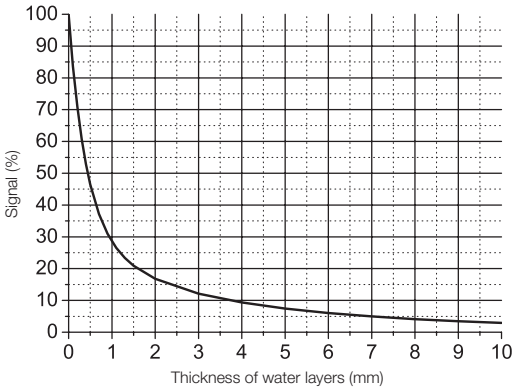
Through-beam sensor		
M8×0.75×18 mm		
4000 mm		
BOH0012		
BOH TK-M08-004-02-S49F		
Red light microSPOT		
645 Nm		
18 mm (at 1000 mm)		
0.2 mm		
IP 65		
–10...+55 °C		
Nickel-plated brass		
Screw fastening		
1 m PUR cable with M8 connector, 3-pin		



Through-beam sensors BOH for water detection for separate amplifiers BAE

Detection of water
MICROmote® photoelectric sensors for water detection use a specific wavelength at which water absorbs more light. This significantly simplifies the detection of liquids with high water content using optical sensors. The container does not have any effect.

The combination of an extra-compact design and powerful micro-optics allows for reliable use in hoses and capillary tubes where other physical effects are stretched to their natural limits.



Type	
Dimension	
Range	
Order code	
Part number	
Light type	
Wavelength	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Housing material	
Fastening	
Connection	

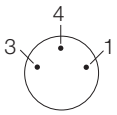
Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

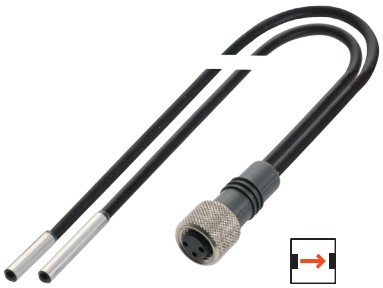
Function diagrams
on pages 53, 60

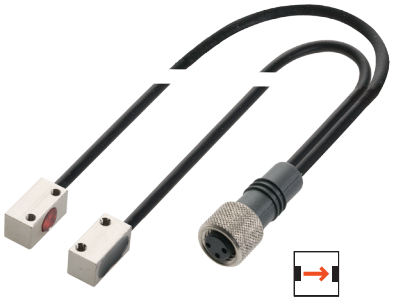
Connection configuration
M8 connector, 3-pin

3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

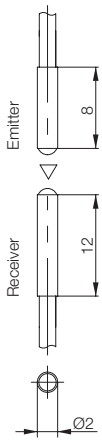


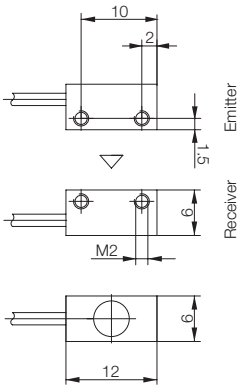
Through-beam sensors BOH for water detection for separate amplifiers BAE



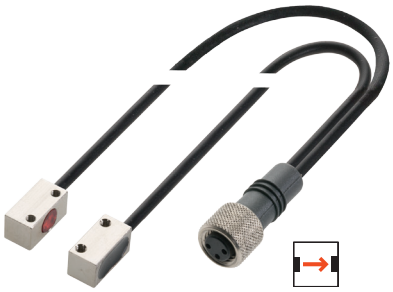


Through-beam sensor **Detection of water** **Emitter Ø 2×8 mm** **Receiver Ø 2×12 mm**	**Through-beam sensor** **Detection of water** **6×6×12 mm**
250 mm	**500 mm**
BOH000J	**BOH000R**
BOH TJ-G02-001-01-S49F	BOH TJ-Q06-001-01-S49F
Infrared	Infrared
1480 Nm	**1480 Nm**
IP 67	IP 67
–10...+55 °C	–10...+55 °C
Stainless steel	Nickel-plated brass
Adhesive or clamp fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin





Through-beam sensors BOH for separate amplifiers BAE
Block designs

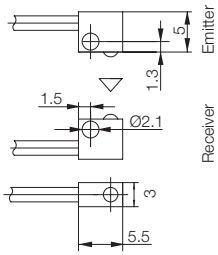


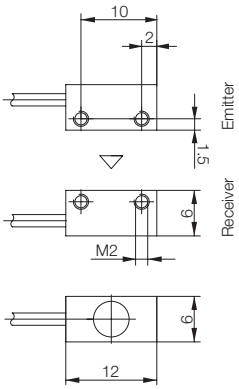
Model	**Through-beam sensor**	**Through-beam sensor**
Dimension	**3×6×5.5 mm**	**6×6×12 mm**
Range	**500 mm**	**1000 mm**
Order code	**BOH001Z**	**BOH000N**
Part number	BOH TK-R003-007-01-S49F	BOH TR-Q06-001-01-S49F
Light type	Red light microSPOT	Red light
Wavelength	645 Nm	660 Nm
Light spot diameter	10 mm (at 100 mm)	
Resolution (smallest detectable part)	0.2 mm	0.3 mm
Degree of protection as per IEC 60529	IP 65	IP 65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Nickel-plated brass	Nickel-plated brass
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

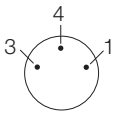
Function diagrams
beginning on page 50



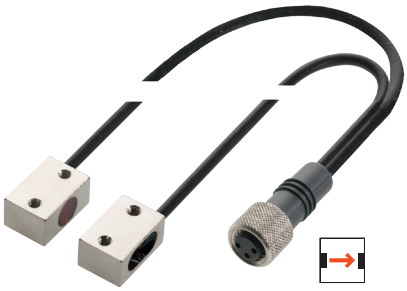


Connection configuration
M8 connector, 3-pin

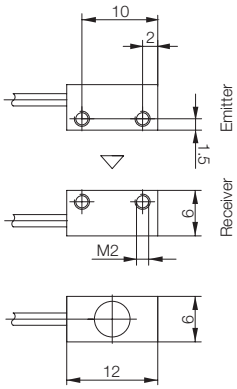
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

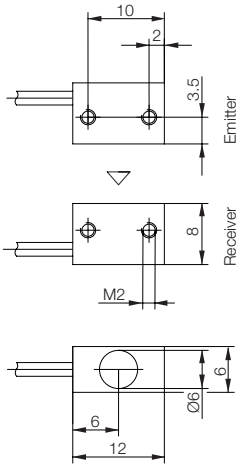


Through-beam sensors BOH for separate amplifiers BAE
Block designs

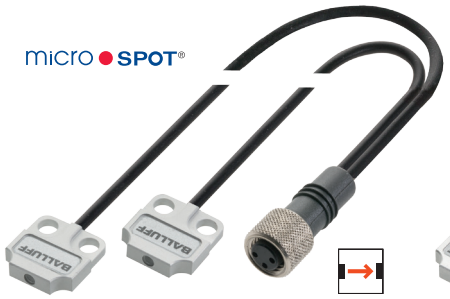


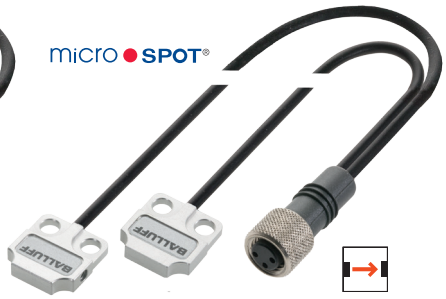
Through-beam sensor	**Through-beam sensor**	
6×6×12 mm	**6×8×12 mm**	
2000 mm	**4000 mm**	
BOH000P	**BOH0020**	
BOH TK-Q06-001-01-S49F	BOH TR-R010-008-02-S49F	
Red light microSPOT	Red light	
645 Nm	660 Nm	
8 mm (at 100 mm)		
0.4 mm	0.4 mm	
IP 65	IP 65	
–10°C... +55°C	–10...+55 °C	
Nickel-plated brass	Nickel-plated brass	
Screw fastening	Screw fastening	
1 m PUR cable with	1 m PUR cable with	
M8 connector, 3-pin	M8 connector, 3-pin	





Through-beam sensors BOH for separate amplifiers BAE
Block designs



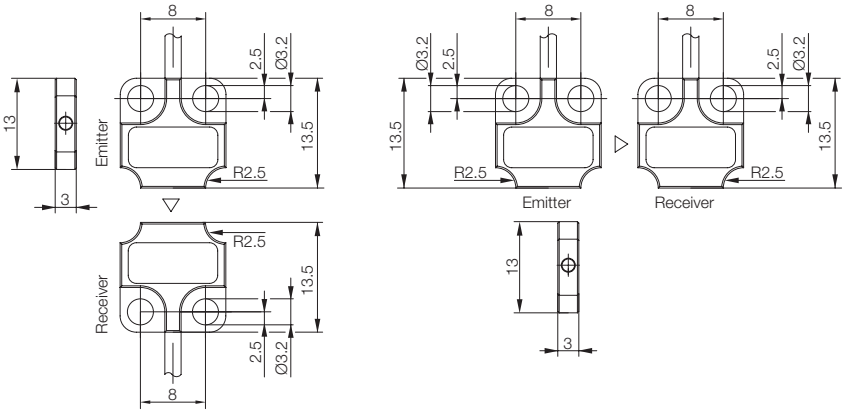


Type	**Through-beam sensor**	**Through-beam sensor**
Dimension	**13.5×13×3 mm**	**13.5×13×3 mm**
Range	**500 mm**	**500 mm**
Order code	**BOH002C**	**BOH002E**
Part number	BOH TK-R018-001-01-S49F	BOH TK-R018-002-01-S49F
Light type	Red light microSPOT	Red light microSPOT
Wavelength	645 Nm	645 Nm
Light spot diameter	10 mm (at 100 mm)	10 mm (at 100 mm)
Resolution (smallest detectable part)	0.2 mm	0.2 mm
Degree of protection as per IEC 60529	IP 67	IP 67
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Naturally anodized aluminum	Naturally anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

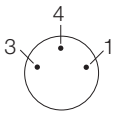
Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

Function diagrams
beginning on page 59

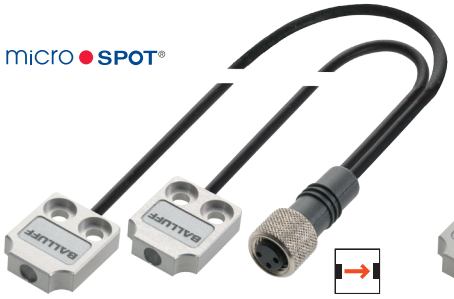


Connection configuration
M8 connector, 3-pin

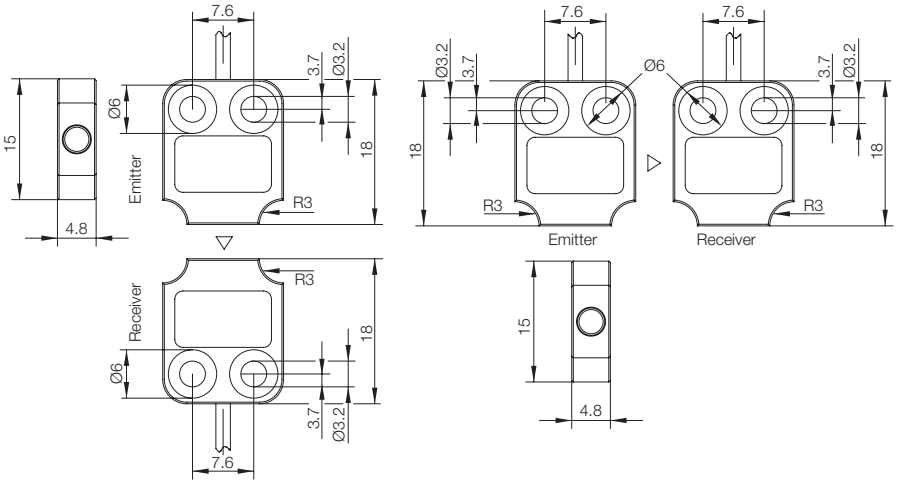
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



Through-beam sensors BOH for separate amplifiers BAE
Block designs



Through-beam sensor	**Through-beam sensor**	
18×15×4.8 mm	**18×15×4.8 mm**	
2000 mm	**2000 mm**	
BOH002F	**BOH002H**	
BOH TK-R027-003-01-S49F	BOH TK-R027-004-01-S49F	
Red light microSPOT	Red light microSPOT	
645 nm	645 Nm	
8 mm (at 100 mm)	8 mm (at 100 mm)	
0.4 mm	0.4 mm	
IP 67	IP 67	
–10...+55 °C	–10...+55 °C	
Naturally anodized aluminum	Naturally anodized aluminum	
Screw fastening	Screw fastening	
1 m PUR cable with	1 m PUR cable with	
M8 connector, 3-pin	M8 connector, 3-pin	



The vacuum-compatible MICROmote® photoelectric sensors are the only classic photoelectric sensors that are suitable for direct use in a high or ultra-high vacuum.
Versions for direct use in the chamber wall with an integrated sealing function and versions meant for complete installation in the chamber are available. These versions have electric signals that are guided to outside electronics via conventional vacuum grommets. The degassing properties of these sensors is optimized by selecting appropriate materials. The minimum size saves valuable chamber space.

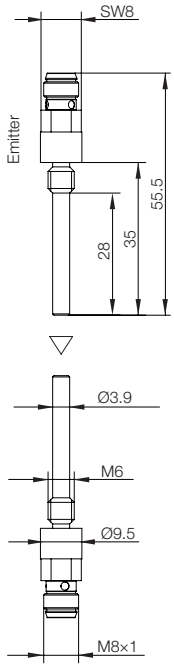
Here you will find a representative selection of possible versions. The modular design enables extraordinarily fast implementation of customer-specific solutions.

Type	**Through-beam sensor**	
Dimension	**M6×55.5 mm**	
Fork opening		
Range	**300 mm**	
Sensing distance		
Order code	**BOH009U**	
Part number	BOH TR-M06V-009-S49/S75-SA3	
Light type	Red light	
Wavelength	650 Nm	
Resolution (smallest discernible part)	0.2 mm	
Degree of protection as per IEC 60529	IP 65	
Ambient temperature T_a	–10...+55 °C	
Housing material	Stainless steel	
Fastening	Screw-in thread	
Connection	M8 connector, 4-pin, **emitter** M8 connector, 3-pin, **receiver**	

Reference object: white, 90% reflection, 100×100 mm

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

Function diagrams beginning on pages 48, 52, 53



Included in the scope of delivery: Emitter and receiver. Please order adapter cable separately (see table below).

Suitable connectors for BOH009U
(please order separately)

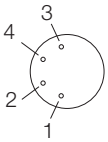
Size	Design	Cable material	Color	Length	Order code
M8	gerade	PUR	schwarz	1 m	**BCC0FTM**
M8	gerade	PUR	schwarz	2 m	**BCC0FTN**

Suitable connectors for BOH009R
(please order separately)

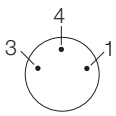
Size	Design	Cable material	Color	Length	Order code
M8	gerade	PUR	schwarz	1 m	**BCC0FTH**
M8	gerade	PUR	schwarz	2 m	**BCC0FTJ**
M8	gerade	PUR	schwarz	5 m	**BCC0FTP**

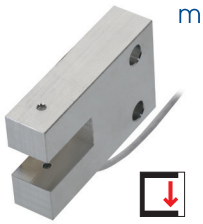
Connection configuration
M8 connector, 4-pin, **emitter**

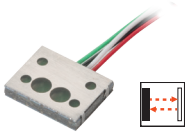
1		Not assigned
2		Not assigned
3	(Red)	LED +
4	(white)	LED



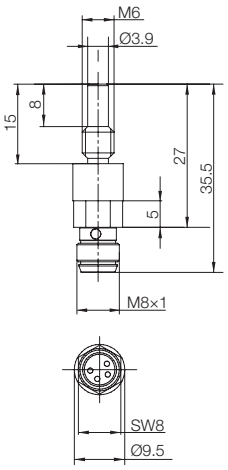
Connection configuration
M8 connector, 3-pin, **receiver**
3 + Receiver (green)
4 GND/Shield (white, black)
1 Not assigned



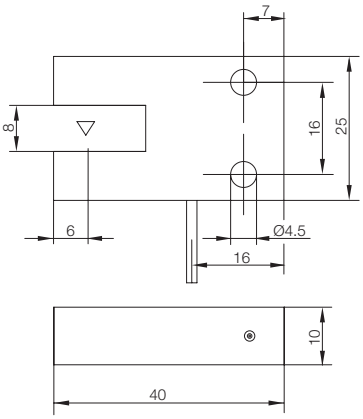


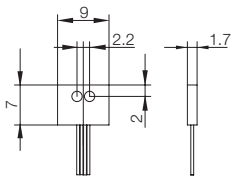


Diffuse sensor	**Fork sensor**	**Diffuse sensor**
M6×35.5 mm	**40×25×10 mm**	**9×7×1.7 mm**
	8 mm	
12 mm		**10 mm**
BOH009R	**BOH001J**	**BOH0021**
BOH DI-M06V-008-S75-SA3	BOH TK-F08V-004-TF-01	BOH DI-R006V-009-TL-01
Infrared	Red light microSPOT	Infrared
880 Nm	645 Nm	880 Nm
	Ø 1.5 mm	
IP 67	IP 67	IP 67
–10...+55 °C	–10...+55 °C	–10...+55 °C
Stainless steel	Aluminum	Stainless steel
Screw-in thread	Screw fastening	Adhesive or clamp fastening
M8 connector, 4-pin	1 m cable PFA encapsulated, 4×AWG36	1 m stranded PFA encapsulated, 4×AWG36



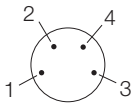
Please order adapter cable separately (see table on page 26).





Connection configuration
M8 connector, 4-pin

1 + Receiver (green)
2 – Receiver (black)
3 – Emitter (white)
4 + Emitter (red)



Connection configuration

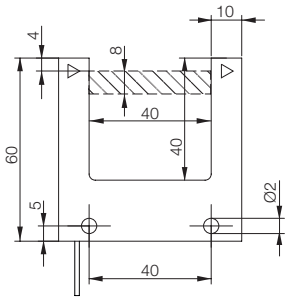
Emitter:	Red:	LED +
	White:	LED
Receiver:	green:	FT +
	Black:	FT –

Connection configuration

Emitter:	Red:	LED +
	White:	LED
Receiver:	Green:	FT +
	Black:	FT –

Light band fork sensors BOH for separate amplifiers BAE

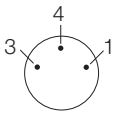
Type	**Light band fork sensor**	
Light band width	**8 mm**	
Fork opening	**40 mm**	
Order code	**BOH001M**	
Part number	BOH AR-F40-001-01-S49F	
Light type	LED, red light	
Wavelength	645 Nm	
Edge resolution	0.05 mm	
Resolution (smallest discernible part)	0.5 mm	
Reproducibility	< 0.03 mm	
Linearity	Range 0...8 mm: 8% Range 1...7 mm: 2% Range 2...6 mm: 1%	
Degree of protection as per IEC 60529	IP 65	
Ambient temperature T_a	–10...+55 °C	
Housing material	Anodized aluminum	
Connection	1 m PUR cable with M8 connector, 3-pin	



Connection configuration

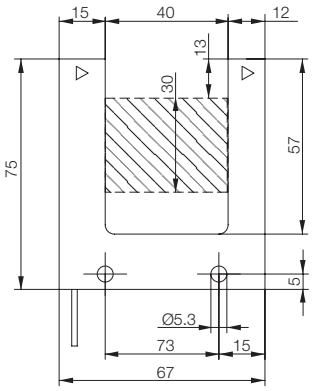
M8 connector, 3-pin

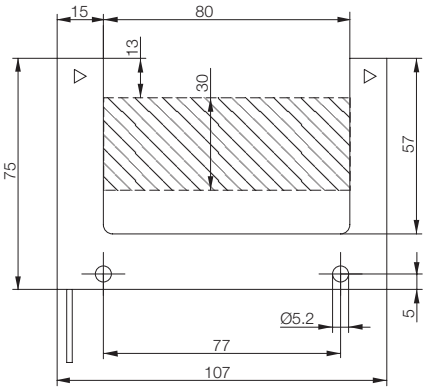
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



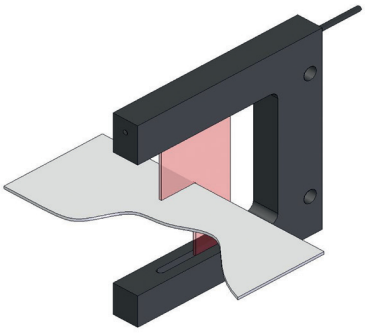
Light band fork sensors BOH for separate amplifiers BAE

Light band fork sensor	**Light band fork sensor**
30 mm	**30 mm**
40 mm	**80 mm**
BOH001N	**BOH001P**
BOH AR-F40-002-01-S49F	BOH AR-F80-003-01-S49F
LED, red light	LED, red light
645 Nm	645 Nm
0.1 mm	0.15 mm
0.5 mm	0.5 mm
0.05 mm	0.05 mm
Range 0...30 mm: 10%	Range 0...30 mm: 10%
Range 3...27 mm: 5%	Range 3...27 mm: 5%
Range 6...24 mm: 3.2%	Range 6...24 mm: 3.4%
IP 65	IP 65
–10...+55 °C	–10...+55 °C
Anodized aluminum	Anodized aluminum
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

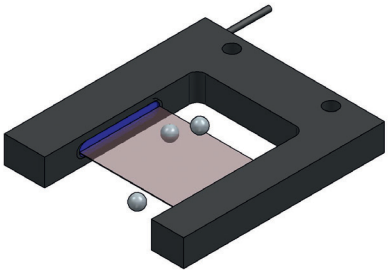




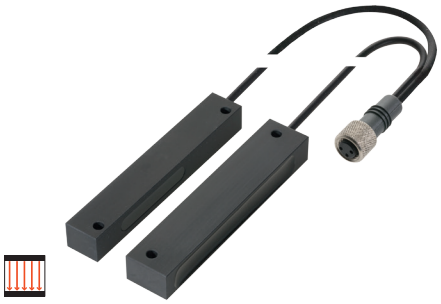
Recommended amplifier for edge control:
BAE00NH, BAE SA-OH-038-UA-DV02
or **BAE00N4,** BAE SA-OH-038-IC-DV02



Recommended amplifier for counting window:
BAE00NJ, BAE SA-OH-040-PP-DV02

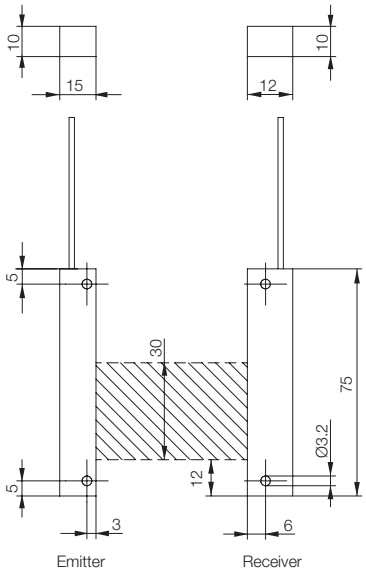


Light band sensors BOH for separate amplifiers BAE



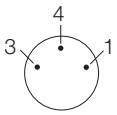
Type	**Light band sensor**	
Light band width	**30 mm**	
Working distance	**40...200 mm**	
Order code	**BOH0024**	
Part number	BOH AR-R113-010-01-S49F	
Light type	LED, red light	
Wavelength	645 Nm	
Edge resolution	0.1 mm	
Resolution (smallest discernible part)	0.5 mm	
Reproducibility	0.05 mm	
Degree of protection as per IEC 60529	IP 65	
Ambient temperature T_a	–10...+55 °C	
Housing material	Anodized aluminum	
Connection	1 m PUR cable with M8 connector, 3-pin	

Included in the scope of delivery:
Emitter and receiver



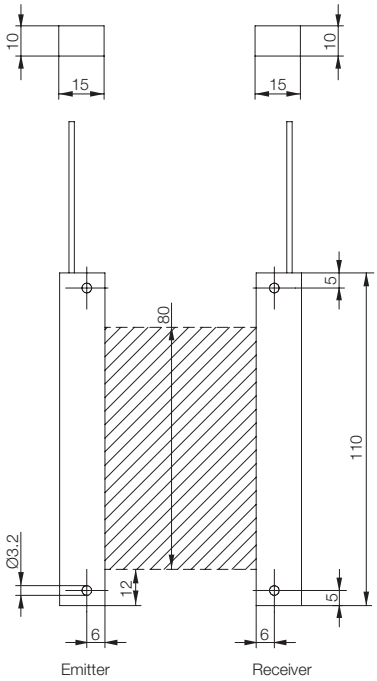
Connection configuration
M8 connector, 3-pin

3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

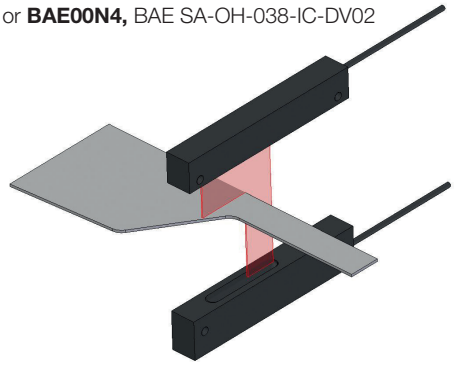


Light band sensors BOH for separate amplifiers BAE

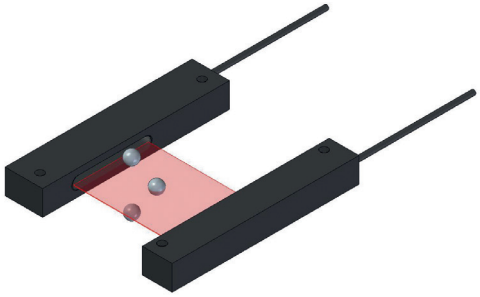
Light band sensor	
80 mm	
50...500 mm	
BOH002M	
BOH AI-R165-011-01-S49F	
LED, infrared	
950 Nm	
0.15 mm	
1.5 mm	
0.05 mm	
IP 65	
–10...+55 °C	
Anodized aluminum	
1 m PUR cable with M8 connector, 3-pin	



Recommended amplifier for edge control:
BAE00NH, BAE SA-OH-038-UA-DV02
or **BAE00N4,** BAE SA-OH-038-IC-DV02



Recommended amplifier for counting window:
BAE00NJ, BAE SA-OH-040-PP-DV02

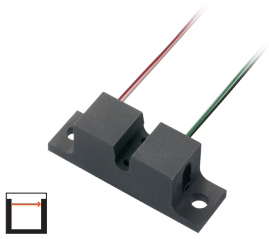


Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles

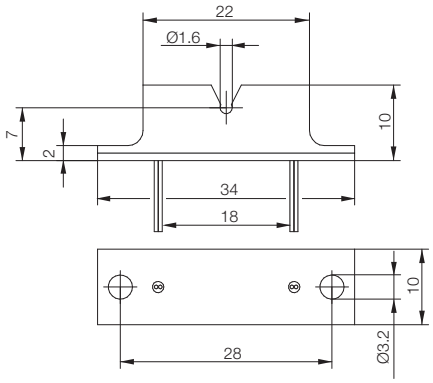
Detection of liquids/bubbles
Precision hose sensors for detecting liquids/bubbles use the differing light refraction in the air or liquid column within the hose. Therefore they are very reliable even for clear liquids.

Built-in micro-optics detect the air-to-liquid transitions with high accuracy. The high reproducibility of the signal jump makes the hose sensors very good for precisely determining volume.

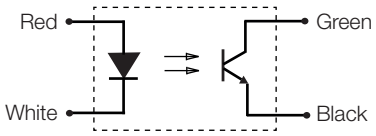
The optical properties and thickness of the hose can affect the magnitude of the resulting signal swings.



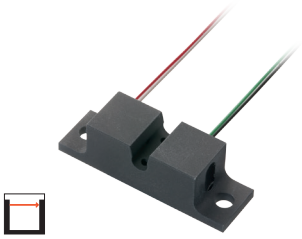
Type	**Precision hose sensor**	
Hose diameter	**1.6 mm (1/16")**	
Use	**Detection of liquids/bubbles**	
Order code	**BOH001T**	
Part number	BOH TR-T16-001-TL-00,1	
Light type	Red light	
Wavelength	665 Nm	
Functional principle	Light refraction	
Degree of protection as per IEC 60529	IP 54	
Ambient temperature T_a	–10...+60 °C	
Housing material	Black anodized aluminum	
Fastening	Screw fastening	
Connection	**100 mm stranded wire PFA encapsulated, 4×AWG32**	

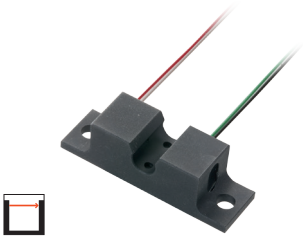


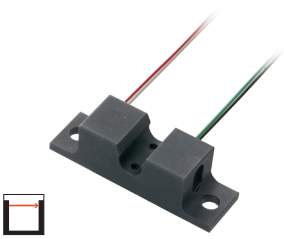
Connection configuration for all Stranded wire variants



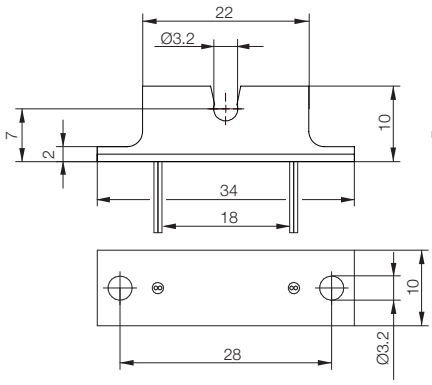
Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles

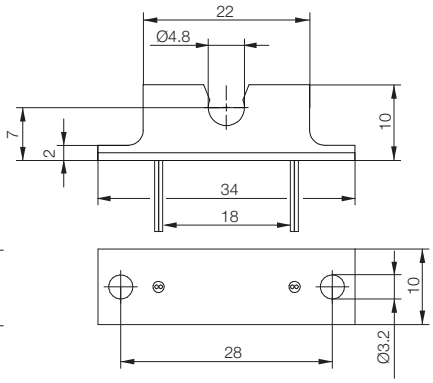


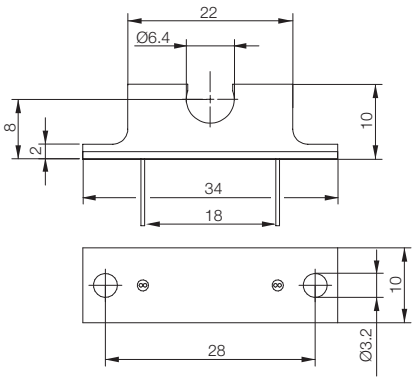




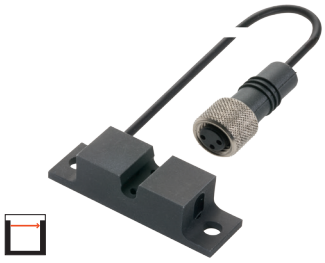
Precision hose sensor	**Precision hose sensor**	**Precision hose sensor**
3.2 mm (1/8")	**4.8 mm (3/16")**	**6.4 mm (1/4")**
Detection of liquids/bubbles	**Detection of liquids/bubbles**	**Detection of liquids/bubbles**
BOH001C	**BOH001E**	**BOH001F**
BOH TR-T32-001-TL-00,1	BOH TR-T48-001-TL-00,1	BOH TR-T64-001-TL-00,1
Red light	Red light	Red light
665 Nm	665 Nm	665 Nm
Light refraction	Light refraction	Light refraction
IP 54	IP 54	IP 54
–10...+60 °C	–10...+60 °C	–10...+60 °C
Black anodized aluminum	Black anodized aluminum	Black anodized aluminum
Screw fastening	Screw fastening	Screw fastening
100 mm stranded wire PFA encapsulated, 4×AWG32	**100 mm stranded wire PFA encapsulated, 4×AWG32**	**100 mm stranded wire PFA encapsulated, 4×AWG32**





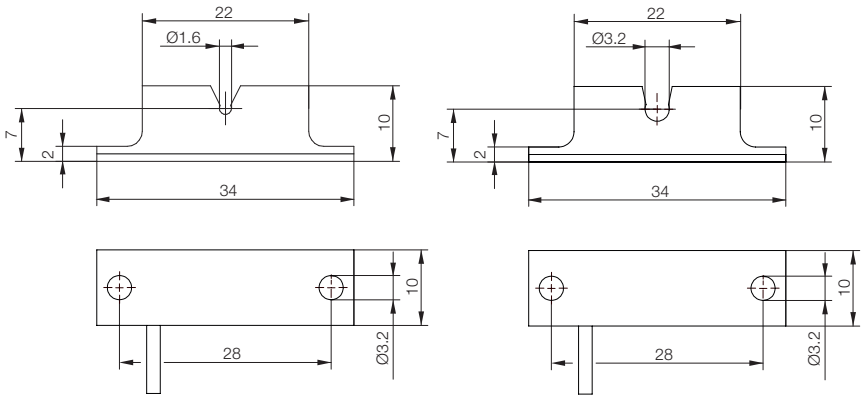


Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles



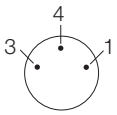
Type	**Precision hose sensor**	**Precision hose sensor**
Hose diameter	**1.6 mm (1/16")**	**3.2 mm (1/8")**
Use	**Detection of liquids/bubbles**	**Detection of liquids/bubbles**
Order code	**BOH001R**	**BOH001Y**
Part number	BOH TR-T16-001-01-S49F	BOH TR-T32-001-01-S49F
Light type	Red light	Red light
Wavelength	665 Nm	665 Nm
Functional principle	Light refraction	Light refraction
Degree of protection as per IEC 60529	IP 54	IP 54
Ambient temperature T_a	–10...+60 °C	–10...+60 °C
Housing material	Black anodized aluminum	Black anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	**1 m PUR cable with M8 connector, 3-pin**	**1 m PUR cable with M8 connector, 3-pin**

Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02



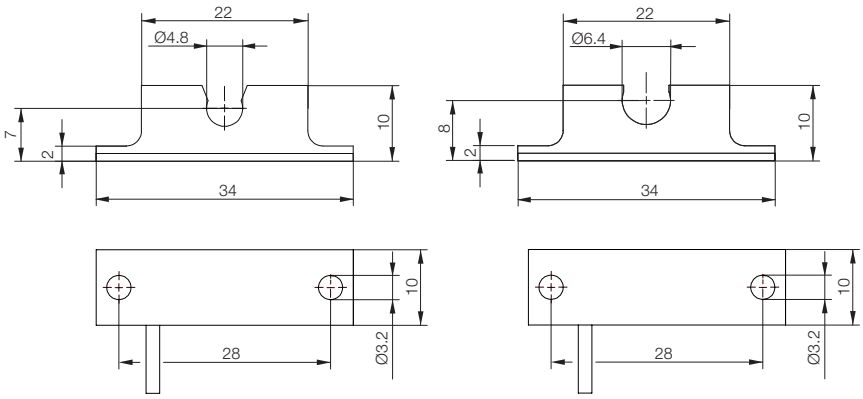
Connection configuration
M8 connector, 3-pin

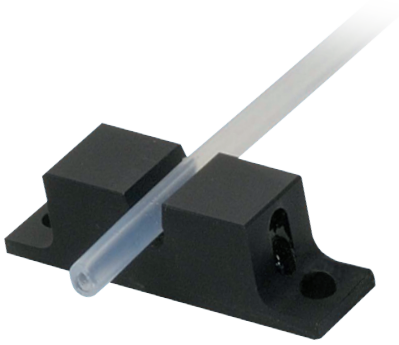
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles

Precision hose sensor	**Precision hose sensor**	
4.8 mm (3/16")	**6.4 mm (1/4")**	
Detection of liquids/bubbles	**Detection of liquids/bubbles**	
BOH0019	**BOH001A**	
BOH TR-T48-001-01-S49F	BOH TR-T64-001-01-S49F	
Red light	Red light	
665 Nm	665 Nm	
Light refraction	Light refraction	
IP 54	IP 54	
–10...+60 °C	–10...+60 °C	
Black anodized aluminum	Black anodized aluminum	
Screw fastening	Screw fastening	
1 m PUR cable with M8 connector, 3-pin	**1 m PUR cable with M8 connector, 3-pin**	



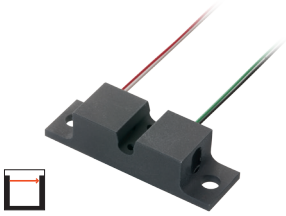


Precision hose sensors BOH for separate amplifiers BAE
Detection of water/bubbles and aqueous liquids

Detection of water and aqueous liquids
Precision hose sensors for detecting water and aqueous liquids use the light attenuation in the liquid column within the hose. They use a special wavelength so that the water absorbs the light. This makes them perfect for applications involving water and aqueous liquids.

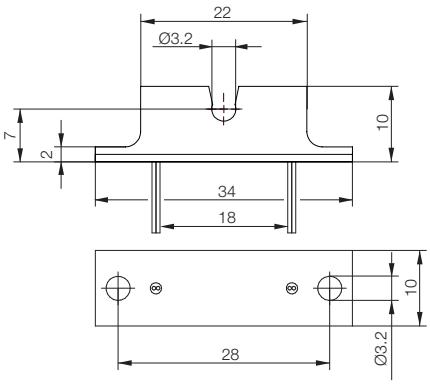
Built-in micro-optics detect the air-to-liquid transitions with high accuracy. The high reproducibility of the signal jump makes the hose sensors very good for precisely determining volume. Together with the microprocessor-controlled MICROmote® amplifiers having a digital signal display and switching or analog output, they form a complete measurement system with diverse application possibilities in laboratory, analysis and medical technology.

The optical properties and thickness of the hose can affect the magnitude of the resulting signal swings.

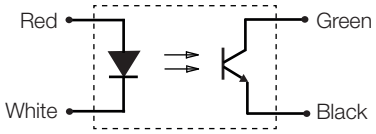


Type	**Precision hose sensor**	
Hose diameter	**3.2 mm (1/8")**	
Use	**Detection of water/bubbles and aqueous liquids**	
Order code	**BOH001W**	
Part number	BOH TJ-T32-001-TL-00,1	
Light type	Infrared	
Wavelength	1480 Nm	
Functional principle	Absorption	
Degree of protection as per IEC 60529	IP 54	
Ambient temperature T_a	–10...+60 °C	
Housing material	Black anodized aluminum	
Fastening	Screw fastening	
Connection	**100 mm stranded wire PFA encapsulated, 4×AWG32**	

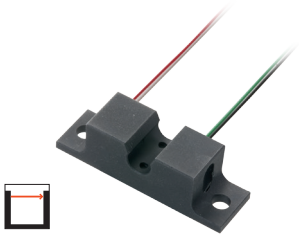
Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

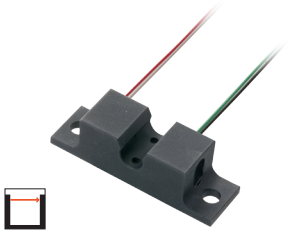


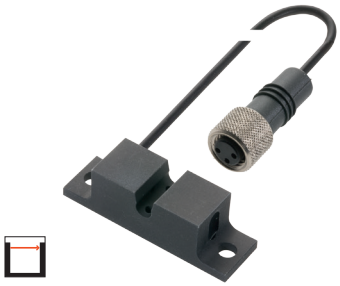
Connection configuration for all Stranded wire variants



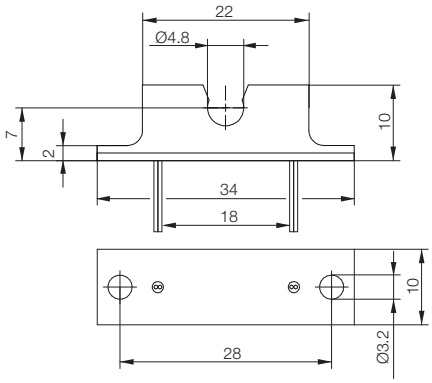
Precision hose sensors BOH for separate amplifiers BAE
Detection of water/bubbles and aqueous liquids

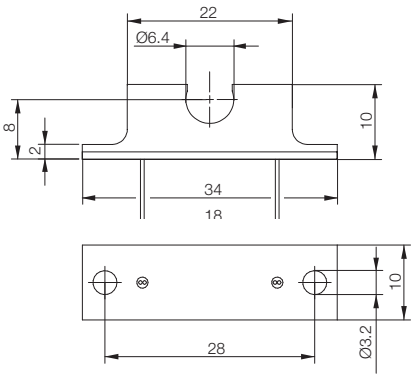


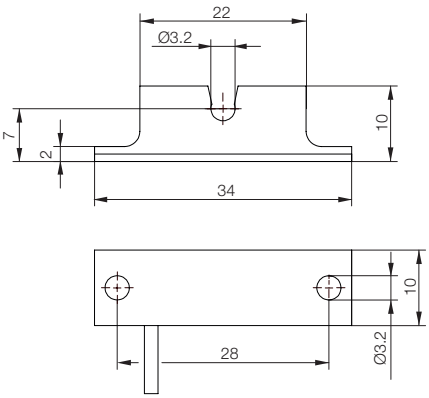




Precision hose sensor	**Precision hose sensor**	**Precision hose sensor**
4.8 mm (3/16")	**6.4 mm (1/4")**	**3.2 mm (1/8")**
Detection of water/bubbles and aqueous liquids	**Detection of water/bubbles and aqueous liquids**	**Detection of water/bubbles and aqueous liquids**
BOH0017	**BOH0018**	**BOH001U**
BOH TJ-T48-001-TL-00,1	BOH TJ-T64-001-TL-00,1	BOH TJ-T32-001-01-S49F
Infrared	Infrared	Infrared
1480 Nm	1480 Nm	1480 Nm
Absorption	Absorption	Absorption
IP 54	IP 54	IP 54
–10...+60 °C	–10...+60 °C	–10...+60 °C
Black anodized aluminum	Black anodized aluminum	Black anodized aluminum
Screw fastening	Screw fastening	Screw fastening
100 mm stranded wire PFA encapsulated, 4×AWG32	**100 mm stranded wire PFA encapsulated, 4×AWG32**	**1 m PUR cable with M8 connector, 3-pin**

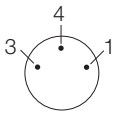




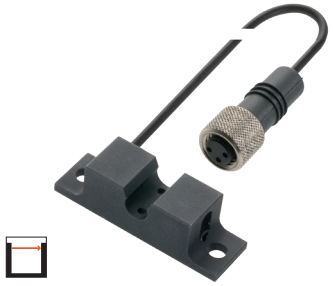


Connection configuration
M8 connector, 3-pin

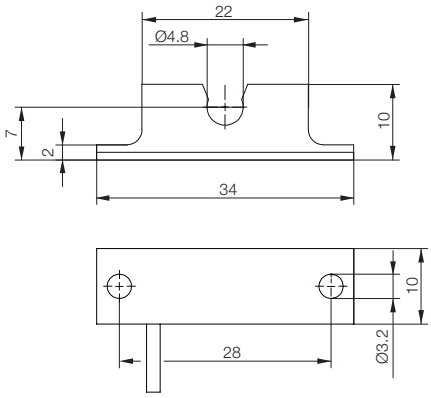
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

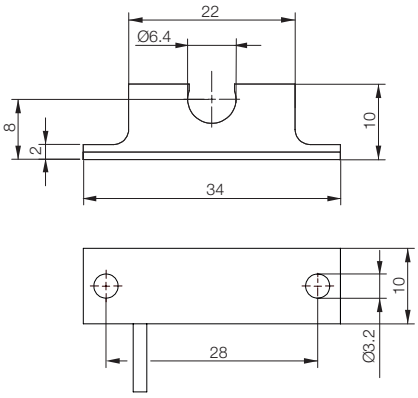


Precision hose sensors BOH for separate amplifiers BAE
Detection of water and aqueous liquids



Type	**Precision hose sensor**	**Precision hose sensor**
Hose diameter	**4.8 mm (3/16")**	**6.4 mm (1/4")**
Use	**Detection of water/bubbles and aqueous liquids**	**Detection of water/bubbles and aqueous liquids**
Order code	**BOH0015**	**BOH0016**
Part number	BOH TJ-T48-001-01-S49F	BOH TJ-T64-001-01-S49F
Light type	Infrared	Infrared
Wavelength	1480 Nm	1480 Nm
Functional principle	Absorption	Absorption
Degree of protection as per IEC 60529	IP 54	IP 54
Ambient temperature T_a	–10...+60 °C	–10...+60 °C
Housing material	Black anodized aluminum	Black anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	**1 m PUR cable with M8 connector, 3-pin**	**1 m PUR cable with M8 connector, 3-pin**

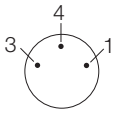


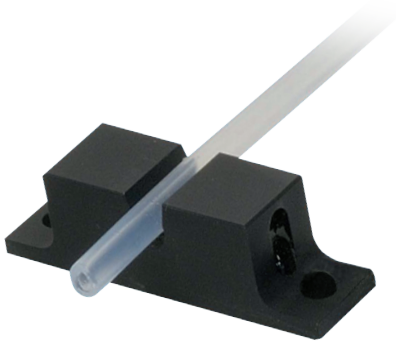


Connection configuration

M8 connector, 3-pin

3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)





Precision hose sensors BOH for separate amplifiers BAE
Detection of microbubbles

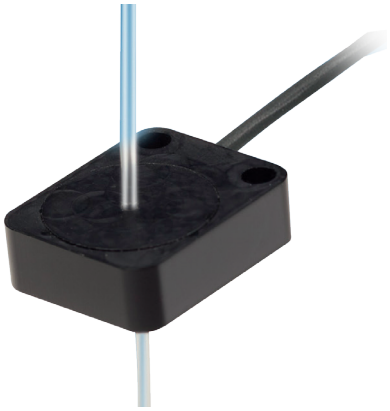
Detection of microbubbles
This series of precision hose sensors is designed to freely detect floating microbubbles in transparent liquids. Microbubbles refer to little gas bubbles with dimensions smaller than the inside diameter of the hose.

Uniform lighting is achieved in the liquid column by using a concentrated arrangement of multiple light beams with very uniform intensity distribution. Gas bubbles that move through this field induce a signal jump in the built-in photoelectric receiver elements.

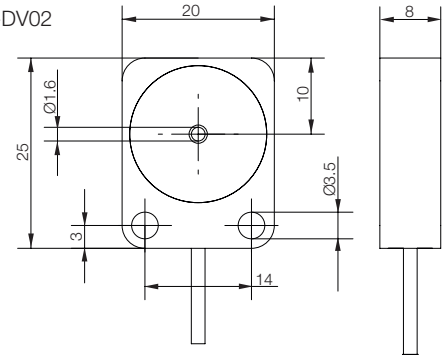
Together with the microprocessor-controlled MICROmote® amplifiers of the BAE series with digital signal display and switching or analog output, these hose sensors form a complete detection system with diverse application possibilities for laboratory, analysis and medical technology.

The optical properties and thickness of the hose can affect the magnitude of the resulting signal swings.

Type	**Precision hose sensor**
Hose diameter	**1.6 mm (1/16")**
Use	**Detection of microbubbles**
Order code	**BOH001H**
Part number	BOH ZR-T16-002-S49F-SA1
Light type	Red light
Wavelength	665 Nm
Functional principle	Light refraction
Degree of protection as per IEC 60529	IP 54
Ambient temperature T_a	–10...+60 °C
Housing material	PEEK black
Fastening	Screw fastening
Connection	**1 m PUR cable with M8 connector, 3-pin**

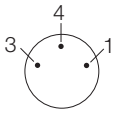


Recommended amplifier:
BAE00NJ
BAE SA-OH-040-PP-DV02



Connection configuration
M8 connector, 3-pin

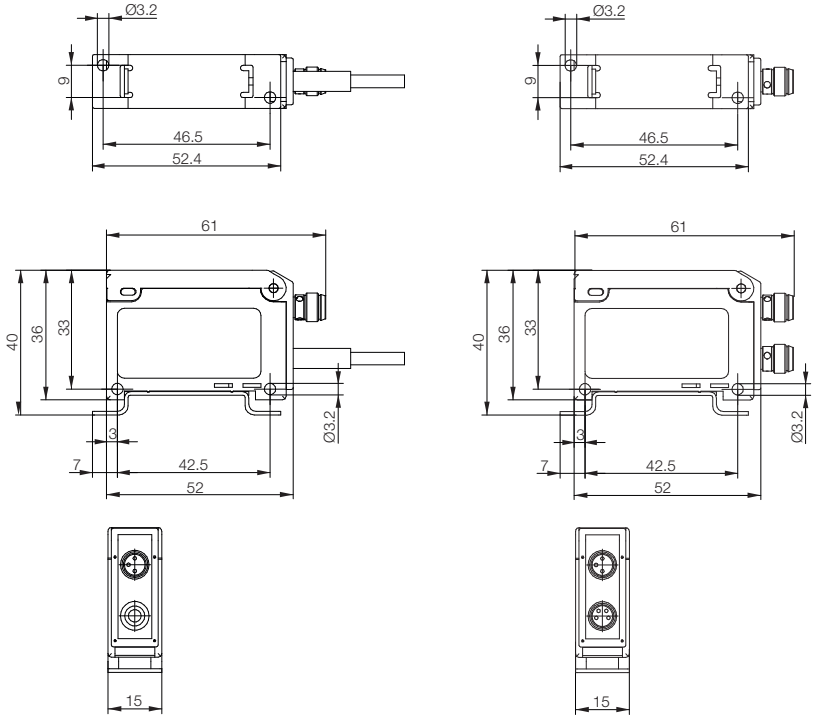
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



Sensor amplifiers BAE with display Premium

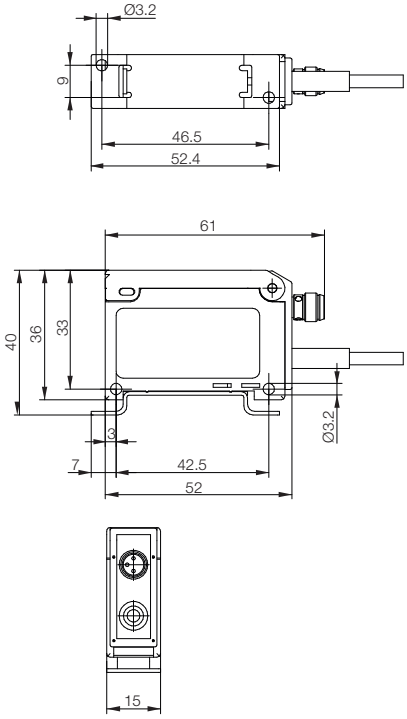
Type		**Premium switching amplifier**	**Premium switching amplifier**	
PNP	**Order code**	**BAE00NE**	**BAE00NF**	
NC/NO	Part number	BAE SA-OH-035-PP-DV02	BAE SA-OH-035-PP-S75G	
NPN	**Order code**	**BAE00PR**	**BAE00PT**	
NC/NO	Part number	BAE SA-OH-035-NP-DV02	BAE SA-OH-035-NP-S75G	
Analog	**Order code**			
0...10 V	Part number			
Supply voltage U_S		10 to 30 V DC	10 to 30 V DC	
Output current		200 mA	200 mA	
Max. response time		1 ms	1 ms	
Polarity reversal protected/ Short-circuit protected		Yes/Yes	Yes/Yes	
Power indicator		Green LED	Green LED	
Function indicator		Yellow LED / 3-digit display	Yellow LED / 3-digit display	
Function principle		Clocked	Clocked	
Pulse stretching (Off delay)		0...250 ms selectable	0...250 ms selectable	
Limit frequency		500 Hz	500 Hz	
Intrinsic current consumption		45 mA	45 mA	
Degree of protection as per IEC 60529		IP 54	IP 54	
Ambient temperature T_a		–10...+55 °C	–10...+55 °C	
Material	Housing	ABS	ABS	
Supply connection		**2 m PVC cable, 5×0.14 mm²**	**M8 connector, 4-pin**	

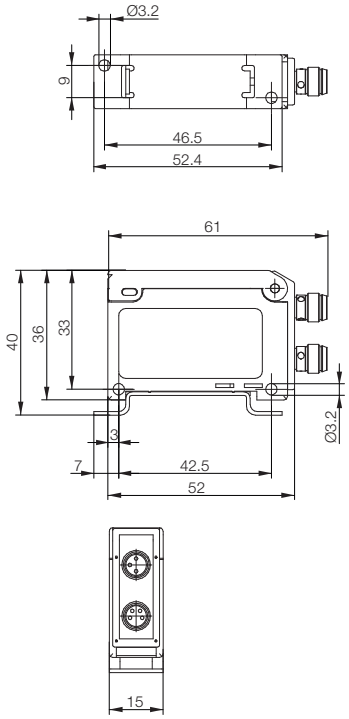
Wiring diagrams
On page 46

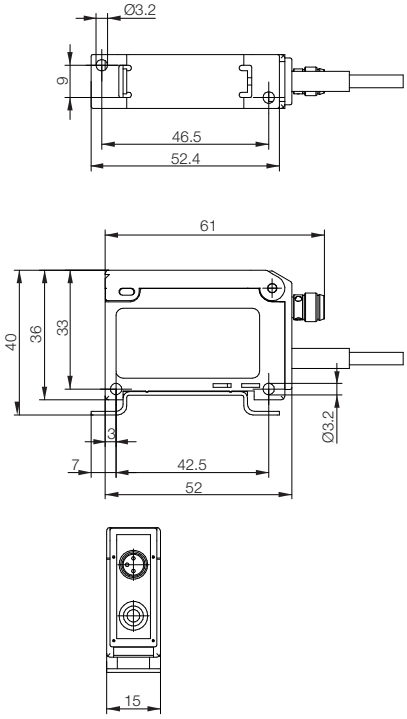


Sensor amplifiers BAE with display Premium

	Premium switching amplifier	**Premium switching amplifier**	**Premium analog amplifier**
	BAE00NL	**BAE00NK**	
	BAE SA-OH-039-PP-DV02	BAE SA-OH-039-PP-S75G	
	BAE00U8		
	BAE SA-OH-039-NP-DV02-SA22		
			BAE00NH
			BAE SA-OH-038-UA-DV02
	10 to 30 V DC	10 to 30 V DC	15...30 VDC
	200 mA	200 mA	
	1 ms	1 ms	0.5 ms
	Yes/Yes	Yes/Yes	Yes/Yes
	Green LED	Green LED	Green LED
	Yellow LED / 3-digit display	Yellow LED / 3-digit display	Yellow LED / 3-digit display
	Clocked, self-synchronized	**Clocked, self-synchronized**	Clocked
	0...250 ms selectable	0...250 ms selectable	
	500 Hz	500 Hz	1 kHz
	45 mA	45 mA	45 mA
	IP 54	IP 54	IP 54
	–10...+55 °C	–10...+55 °C	–10...+55 °C
	ABS	ABS	ABS
	2 m PVC cable, 5×0.14 mm²	**M8 connector, 4-pin**	**2 m PVC cable, 5×0.14 mm²**



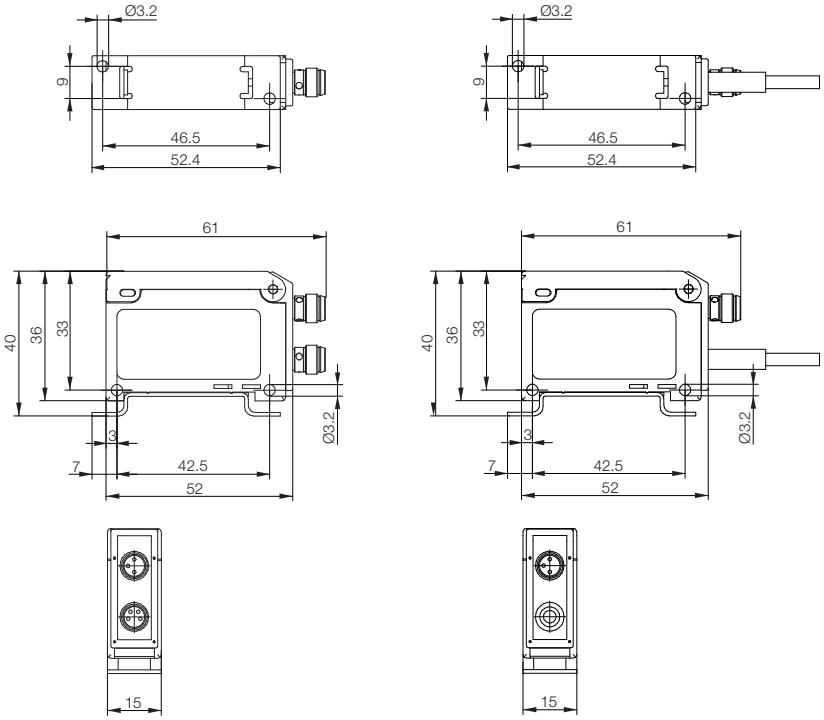




Sensor amplifiers BAE with display
Premium

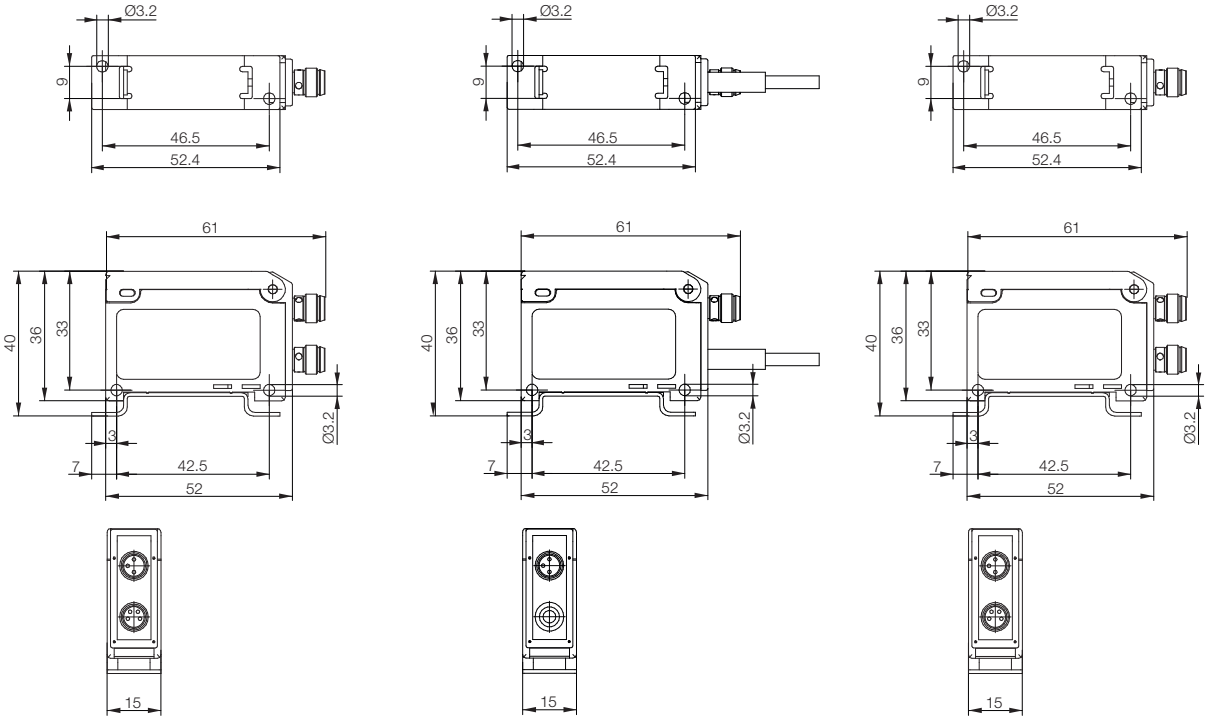
Type		Premium analog amplifier	Premium analog amplifier	
PNP	**Order code**			
NC/NO	Part number			
Analog	**Order code**	**BAE00N6**		
0...10 V	Part number	BAE SA-OH-038-UA-S75G		
Analog	**Order code**		**BAE00N4**	
4...20 mA	Part number		BAE SA-OH-038-IC-DV02	
Supply voltage U_S		15...30 VDC	15...30 VDC	
Output current				
Max. response time		0.5 ms	0.5 ms	
Polarity reversal protected/ Short-circuit protected		Yes/Yes	Yes/Yes	
Power indicator		Green LED	Green LED	
Function indicator		Yellow LED / 3-digit display	Yellow LED / 3-digit display	
Function principle		Clocked	Clocked	
Pulse stretching (Off delay)				
Limit frequency		1 kHz	1 kHz	
Intrinsic current consumption		45 mA	45 mA	
Degree of protection as per IEC 60529		IP 54	IP 54	
Ambient temperature T_a		–10...+55 °C	–10...+55 °C	
Housing material		ABS	ABS	
Supply connection		**M8 connector, 4-pin**	**2 m PVC cable, 5×0.14 mm²**	

Wiring diagrams
On page 46



Sensor amplifiers BAE with display Premium

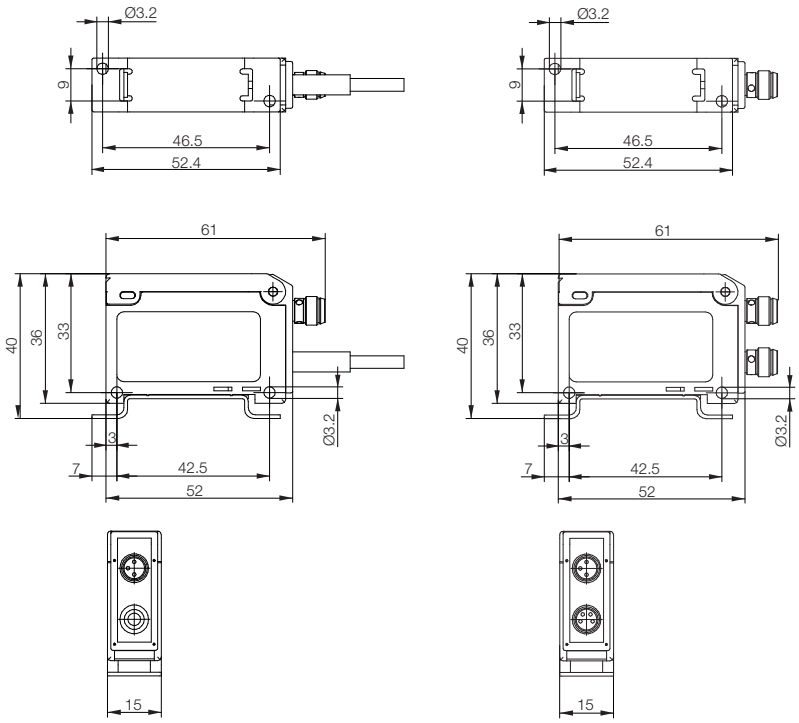
	Premium analog amplifier	Premium dynamic amplifier	Premium dynamic amplifier
		BAE00NJ	**BAE00N7**
		BAE SA-OH-040-PP-DV02	BAE SA-OH-040-PP-S75G
	BAE00N5		
	BAE SA-OH-038-IC-S75G		
	15...30 VDC	10 to 30 V DC	10 to 30 V DC
		200 mA	200 mA
	0.5 ms	1 ms	1 ms
	Yes/Yes	Yes/Yes	Yes/Yes
	Green LED	Green LED	Green LED
	Yellow LED / 3-digit display	Yellow LED / 3-digit display	Yellow LED / 3-digit display
	Clocked	**Clocked, dynamic**	**Clocked, dynamic**
		0...250 ms	0...250 ms
	1 kHz	2 kHz (scan rate)	2 kHz (scan rate)
	45 mA	45 mA	45 mA
	IP 54	IP 54	IP 54
	–10...+55 °C	–10...+55 °C	–10...+55 °C
	ABS	ABS	ABS
	M8 connector, 4-pin	**2 m PVC cable, 5×0.14 mm²**	**M8 connector, 4-pin**



Sensor amplifiers BAE
Advanced

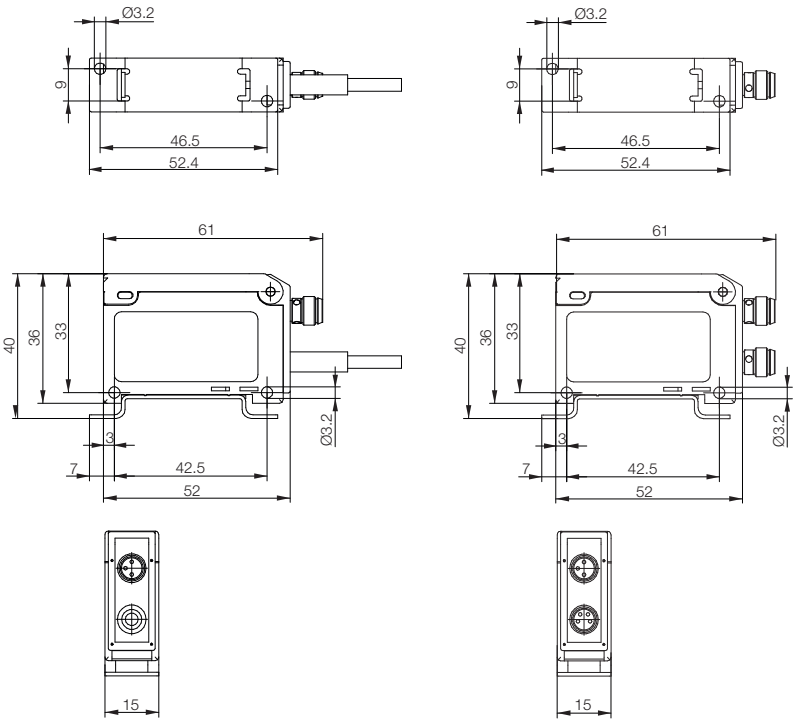
Type		**Advanced switching amplifier**	**Advanced switching amplifier**	
PNP	**Order code**	**BAE00N8**	**BAE00N9**	
NC/NO	Part number	BAE SA-OH-032-PP-DV02	BAE SA-OH-032-PP-S75G	
NPN	**Order code**	**BAE00PC**	**BAE00PE**	
NC/NO	Part number	BAE SA-OH-032-NP-DV02	BAE SA-OH-032-NP-S75G	
PNP/NPN	**Order code**			
NC/NO	Part number			
Supply voltage U_S		10 to 30 V DC	10 to 30 V DC	
Output current		100 mA	100 mA	
Max. response time		1.1 ms	1.1 ms	
Polarity reversal protected/ Short-circuit protected		Yes/Yes	Yes/Yes	
Power indicator		Green LED	Green LED	
Function indicator		Yellow LED	Yellow LED	
Function principle		Clocked	Clocked	
Pulse stretching (Off delay)		0/50 ms (selectable)	0/50 ms (selectable)	
Limit frequency		500 Hz	500 Hz	
Intrinsic current consumption		40 mA	40 mA	
Degree of protection as per IEC 60529		IP 54	IP 54	
Ambient temperature T_a		–10...+55 °C	–10...+55 °C	
Housing material		ABS	ABS	
Supply connection		**2 m PVC cable, 3×0.14 mm²**	**M8 connector, 4-pin**	

Wiring diagrams
On page 46



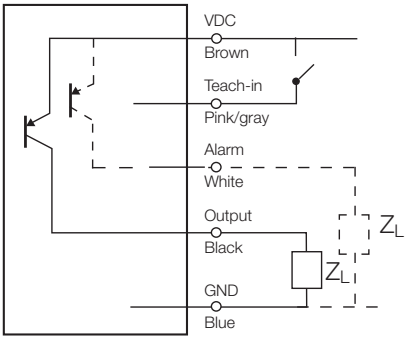
Sensor amplifiers BAE
Basic

	Basic switching amplifier	**Basic switching amplifier**
	BAE00NA	**BAE00NC**
	BAE SA-OH-029-YP-DV02	BAE SA-OH-029-YP-S75G
	15...30 VDC	15...30 VDC
	100 mA	100 mA
	1.1 ms	1.1 ms
	Yes/Yes	Yes/Yes
	Green LED	Green LED
	Yellow LED	Yellow LED
	Clocked	Clocked
	0/50 ms (selectable)	0/50 ms (selectable)
	500 Hz	500 Hz
	45 mA	45 mA
	IP 54	IP 54
	–10...+55 °C	–10...+55 °C
	ABS	ABS
	2 m PVC cable, 4×0.14 mm²	**M8 connector, 4-pin**



Switching amplifiers BAE for sensor heads BOH
Wiring diagrams

Switching amplifier and premium dynamic amplifier (PNP)



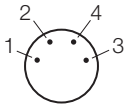
NPN on request.

2 m PVC cable, 5×0.14 mm²

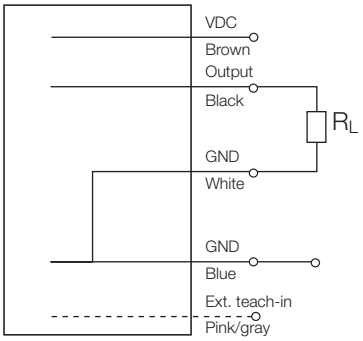
Brown	+ VDC
White	Alarm output
Blue	– GND
Black	Signal output
Pink	Teach input

M8 connector, 4-pin

1 (brown)	+ VDC
2 (white)	Alarm output
3 (blue)	– GND
4 (black)	Signal output



Premium analog amplifier with current output



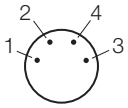
NPN on request.

2 m PVC cable, 5×0.14 mm²

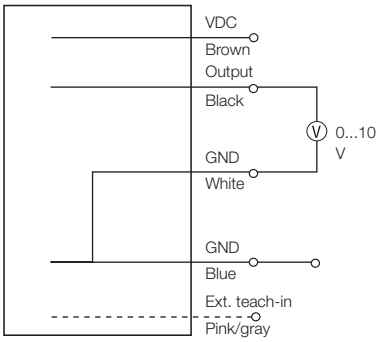
Brown	+ VDC
White	Analog GND
Blue	– GND
Black	Analog +
Pink	External teach

M8 connector, 4-pin

1 (brown)	+ VDC
2 (white)	Analog GND
3 (blue)	– GND
4 (black)	Analog +



Premium analog amplifier with voltage output



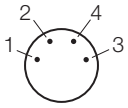
NPN on request.

2 m PVC cable, 5×0.14 mm²

Brown	+ VDC
White	Analog GND
Blue	– GND
Black	Analog +
Pink	External teach

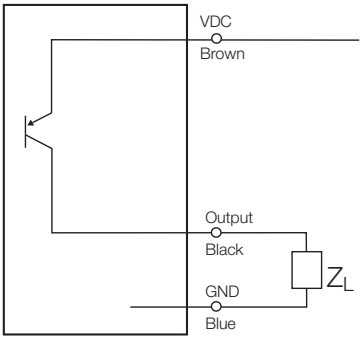
M8 connector, 4-pin

1 (brown)	+ VDC
2 (white)	Analog GND
3 (blue)	– GND
4 (black)	Analog +



Switching amplifiers BAE for sensor heads BOH
Wiring diagrams

Advanced switching amplifier



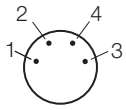
NPN on request.

2 m PVC cable, 3×0.14 mm²

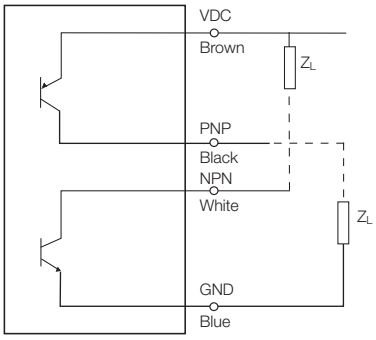
Brown	+ VDC
Blue	– GND
Black	Signal output

M8 connector, 4-pin

1 (brown)	+ VDC
2 (white)	Not assigned
3 (blue)	– GND
4 (black)	Signal output



Basic switching amplifier

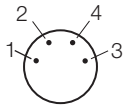


2 m PVC cable, 4×0.14 mm²

Brown	+ VDC
White	NPN signal output
Blue	– GND
Black	PNP signal output

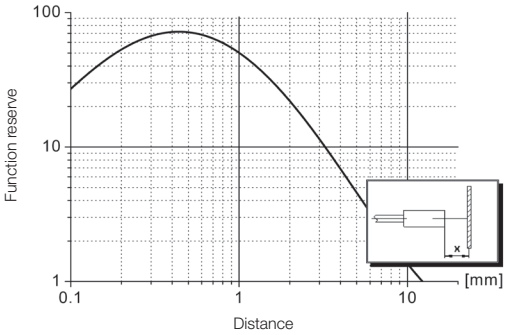
M8 connector, 4-pin

1 (brown)	+ VDC
2 (white)	NPN signal output
3 (blue)	– GND
4 (black)	PNP signal output

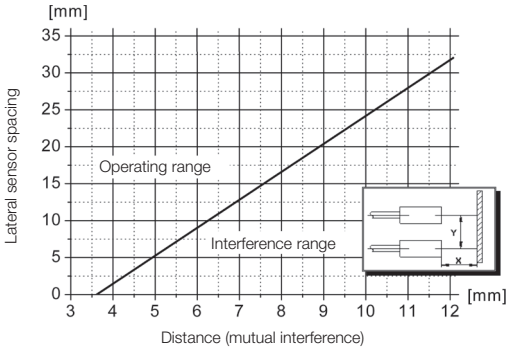


Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

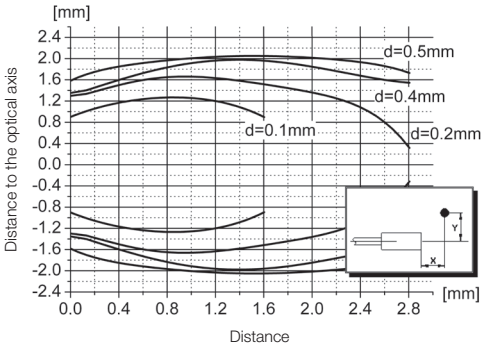
BOH0002, BOH DI-G02-001-01-S49F
BOH0004, BOH DI-M03-001-01-S49F
BOH0022, BOH DI-M06V-008-S49-SA3



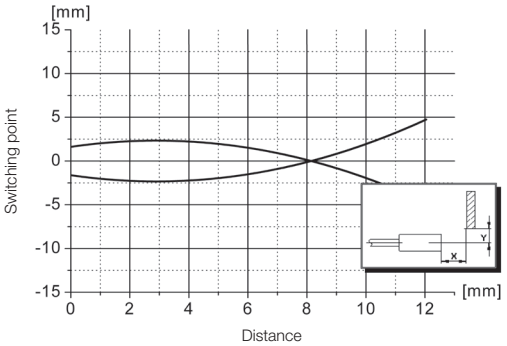
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

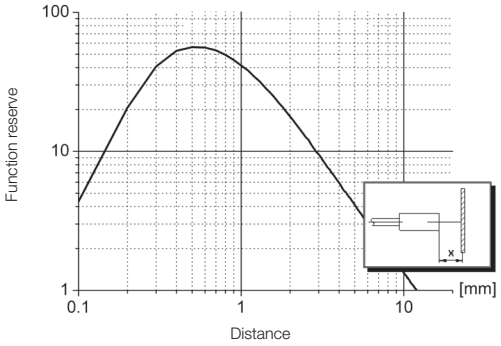


Resolution depending on distance

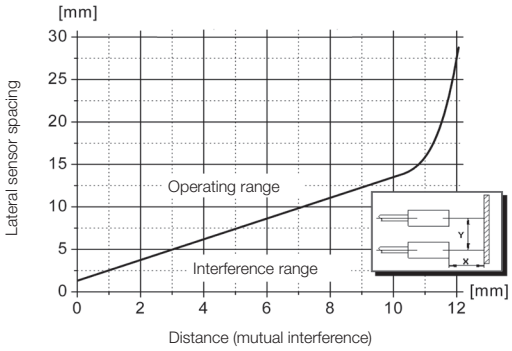


Detection range depending on distance

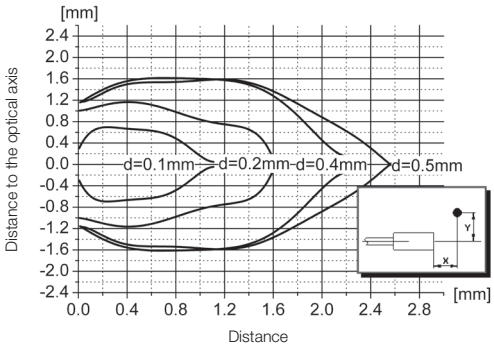
BOH0003, BOH DR-G02-001-01-S49F
BOH0009, BOH DR-M03-001-01-S49F



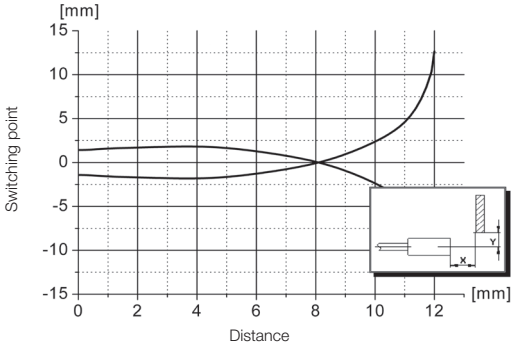
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



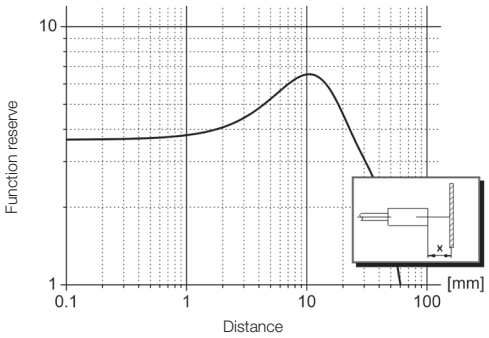
Resolution depending on distance



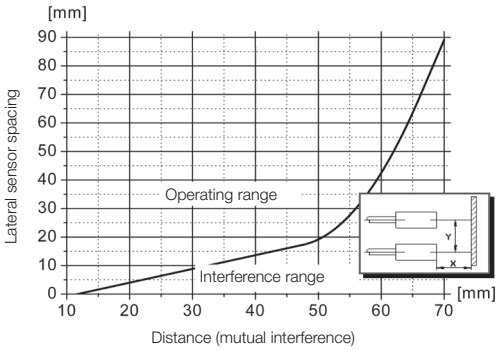
Detection range depending on distance

Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

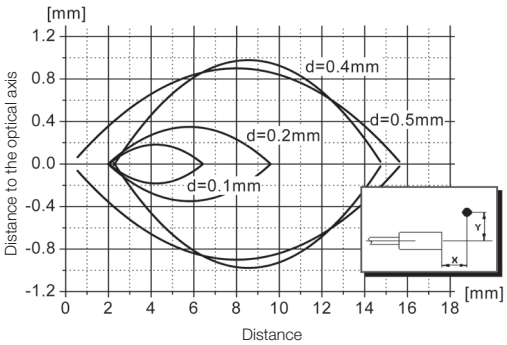
BOH0005, BOH DR-G05-002-01-S49F
BOH0007, BOH DR-M06-002-01-S49F
BOH000L, BOH DR-Q06-001-01-S49F



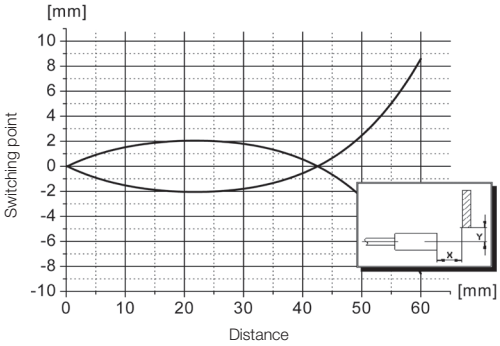
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

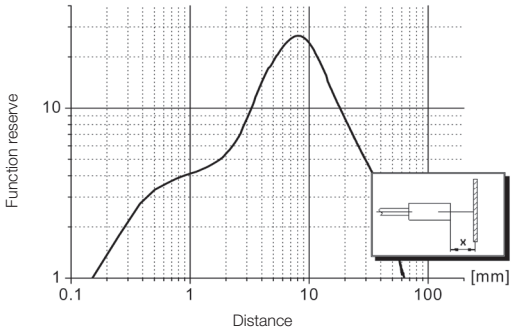


Resolution depending on distance

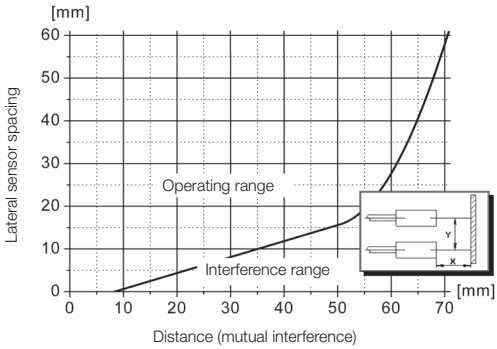


Detection range depending on distance

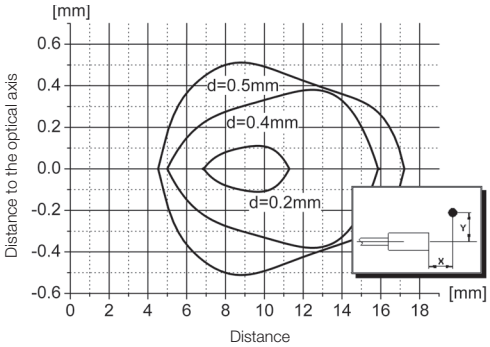
BOH0006, BOH DK-G05-002-01-S49F
BOH0008, BOH DK-M06-002-01-S49F
BOH000M, BOH DK-Q06-001-01-S49F



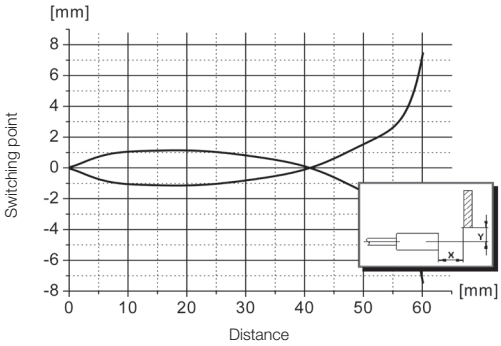
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



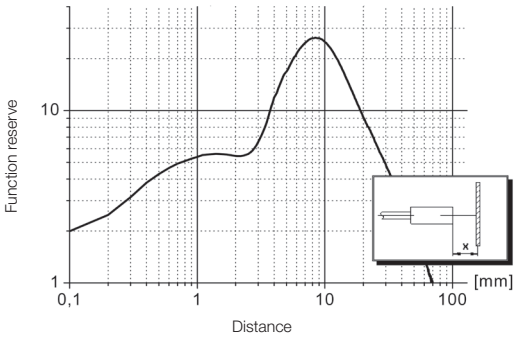
Resolution depending on distance



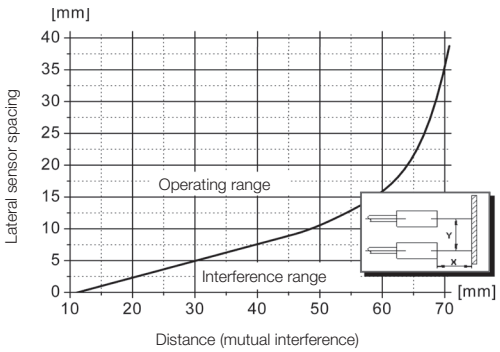
Detection range depending on distance

Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

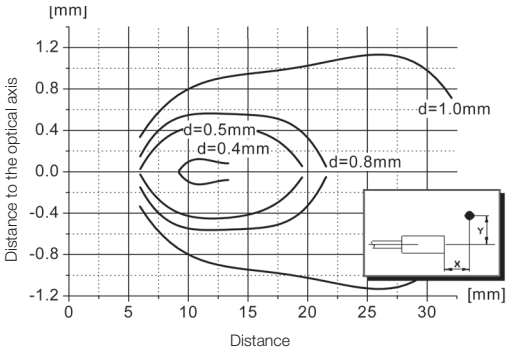
BOH002K, BOH DK-R002-006-01-S49F



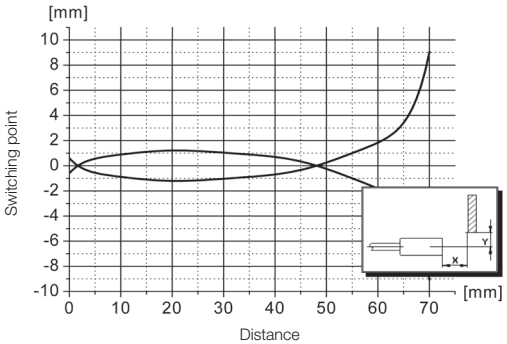
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

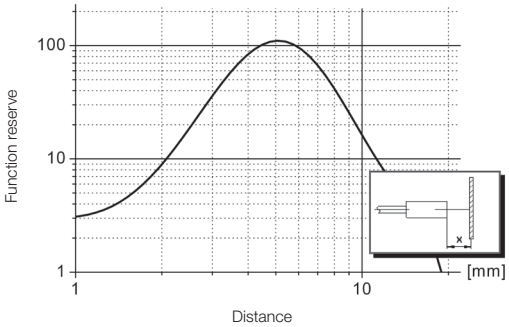


Resolution depending on distance

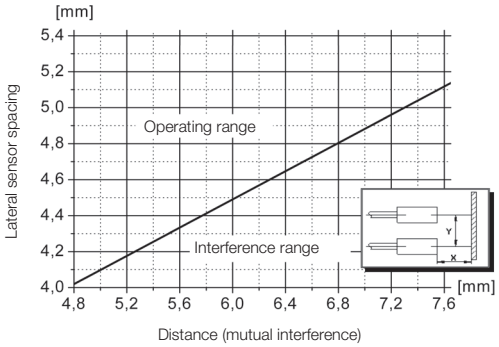


Detection range depending on distance

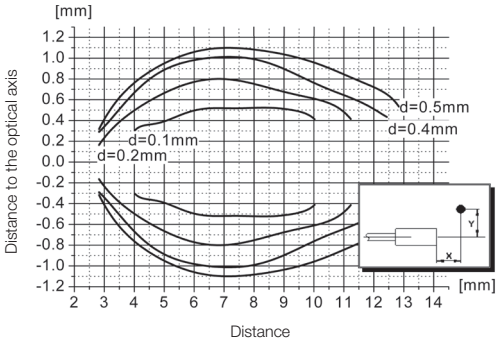
BOH002L, BOH FK-Z001-001-01-S49F



Function reserve depending on distance

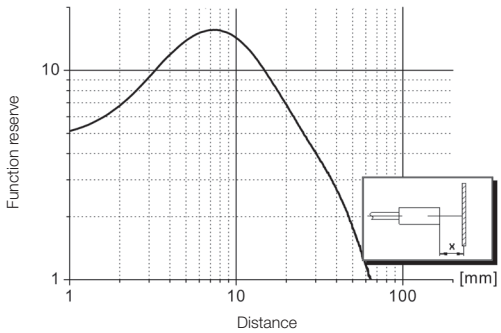


Minimum distance between two sensors for avoiding mutual interference

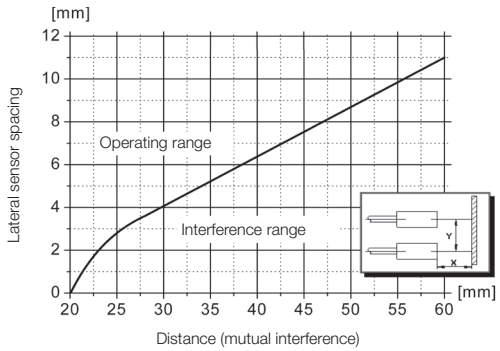


Resolution depending on distance

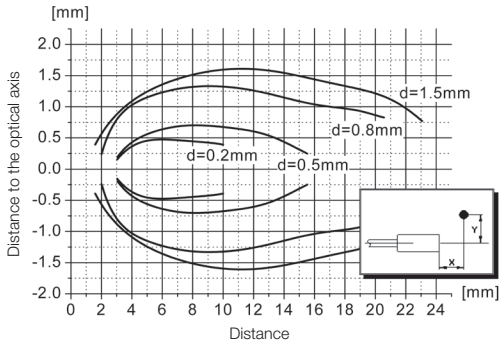
BOH0027, BOH DK-R018-001-01-S49F
BOH0028, BOH DK-R018-002-01-S49F



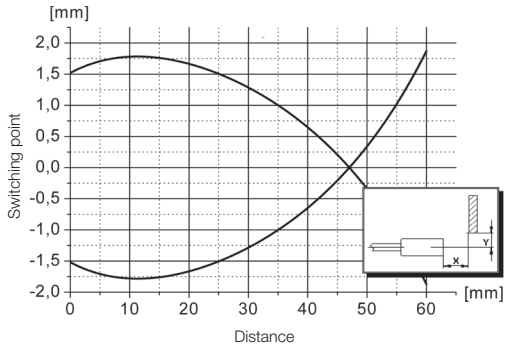
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

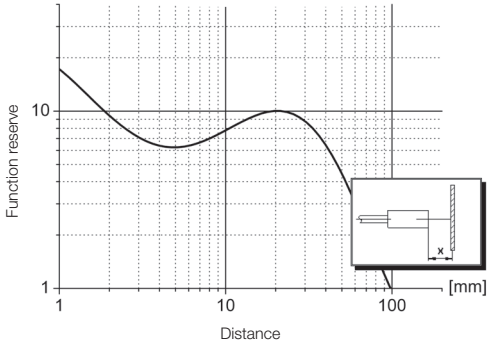


Resolution depending on distance

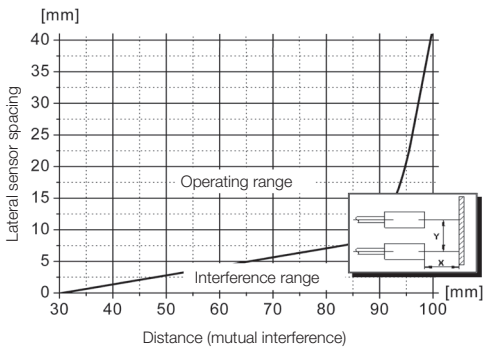


Detection range depending on distance

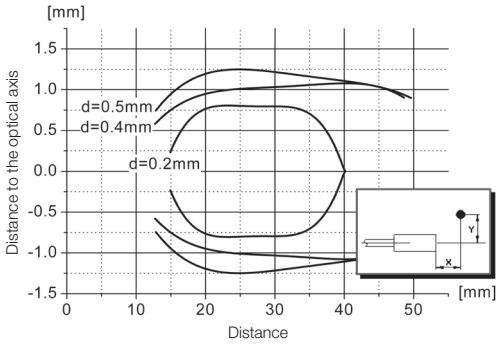
BOH0029, BOH DK-R027-003-01-S49F
BOH002A, BOH DK-R027-004-01-S49F



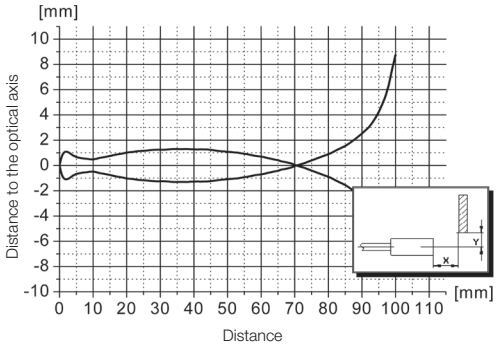
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



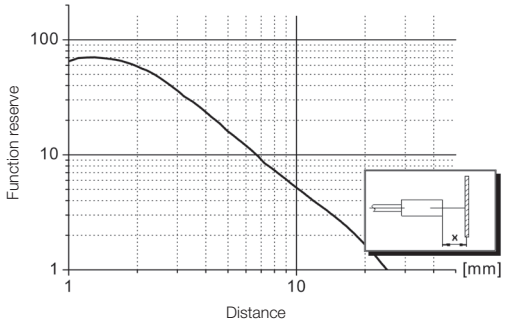
Resolution depending on distance



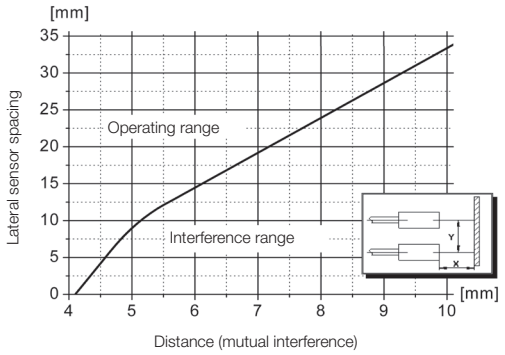
Detection range depending on distance

Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

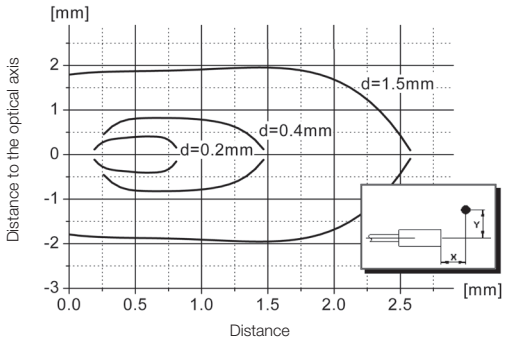
BOH0021, BOH DI-R006V-009-TL-01



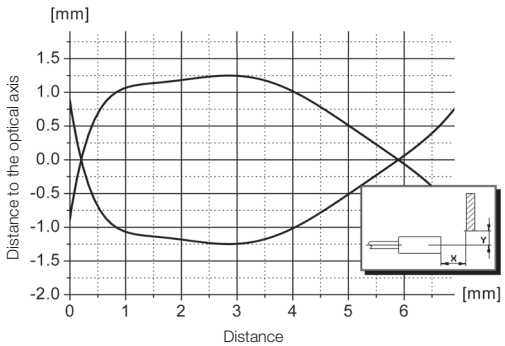
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

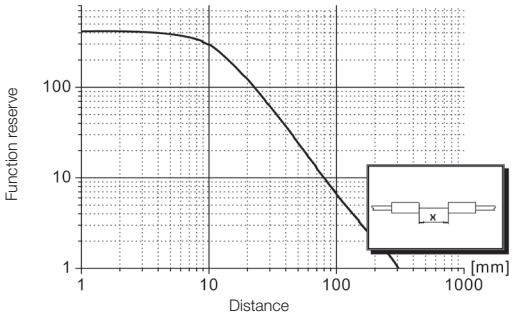


Resolution depending on distance

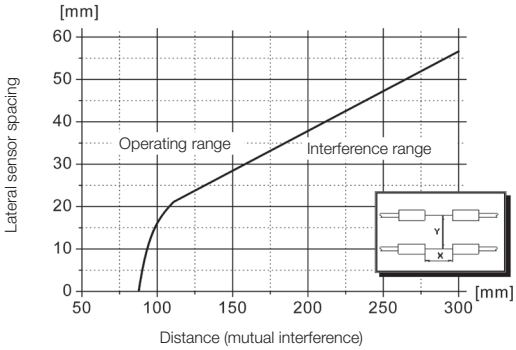


Detection range depending on distance

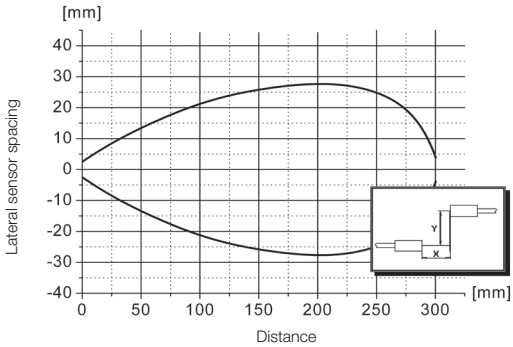
BOH000A, BOH TR-G02-001-01-S49F
BOH0023, BOH TR-M06V-009-S49-SA3



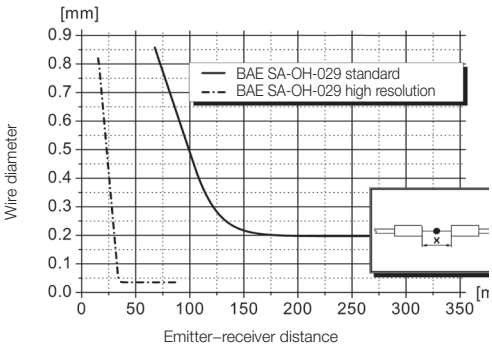
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

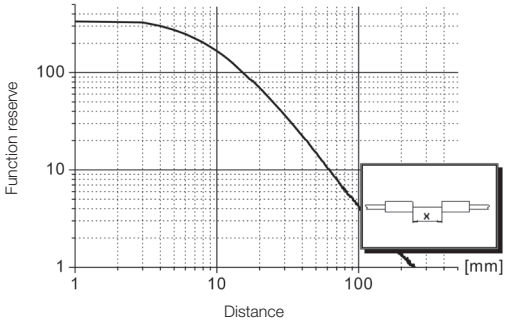


Lateral offset depending on distance

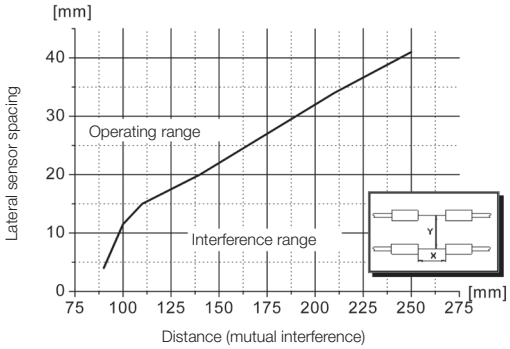


Resolution depending on distance

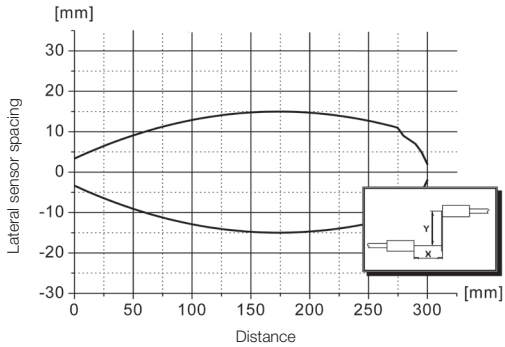
BOH000J, BOH TJ-G02-001-01-S49F



Function reserve depending on distance



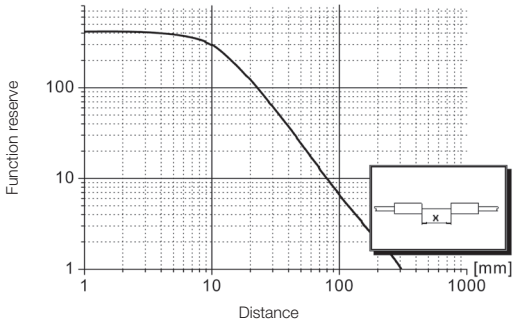
Minimum distance between two sensors for avoiding mutual interference



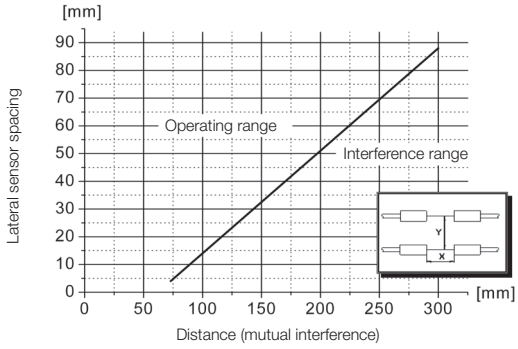
Lateral offset depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

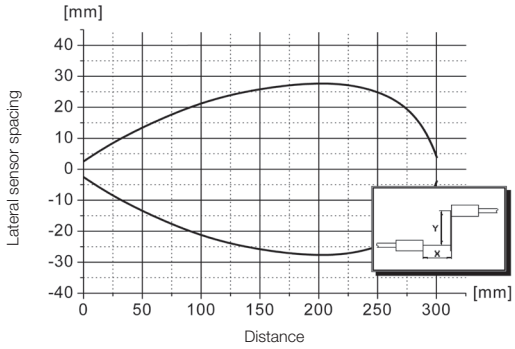
BOH000T, BOH TR-M03-001-01-S49F



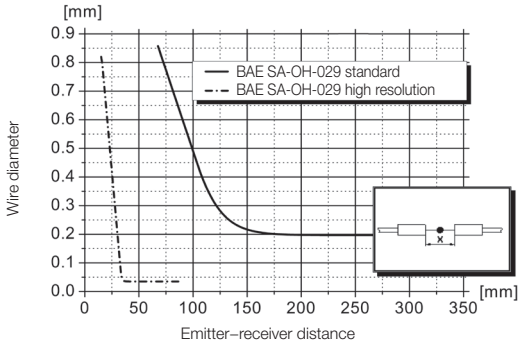
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

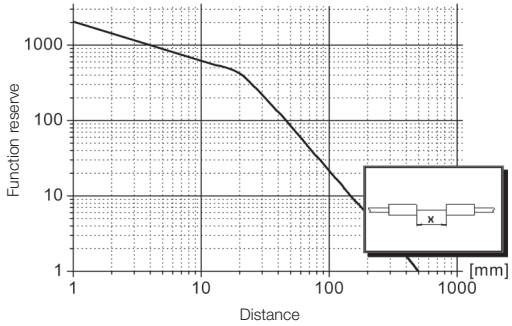


Lateral offset depending on distance

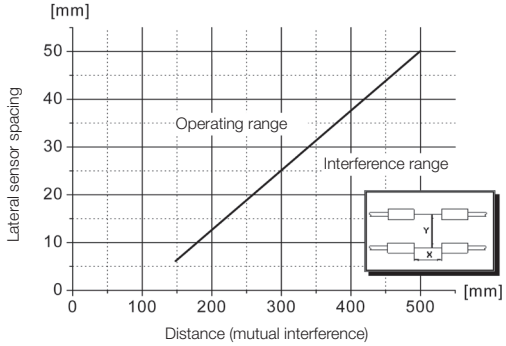


Resolution depending on distance

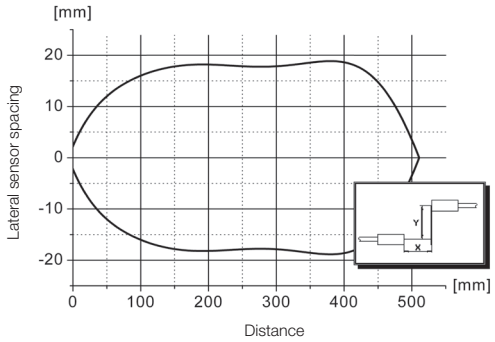
BOH000U, BOH TK-M03-001-01-S49F
BOH000E, BOH TK-M03-005-01-S49F
BOH000C, BOH TK-G02-001-01-S49F
BOH000E, BOH TK-G03-004-01-S49F



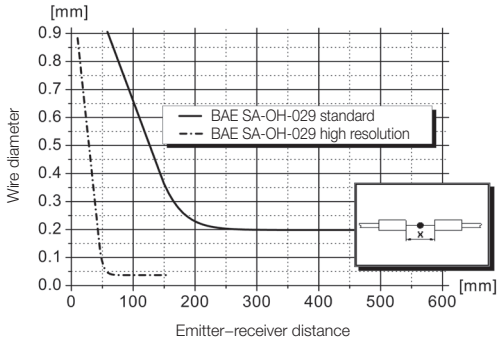
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



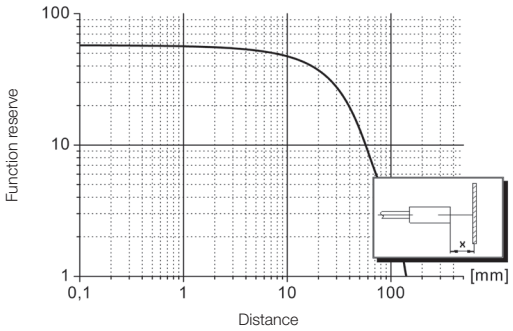
Lateral offset depending on distance



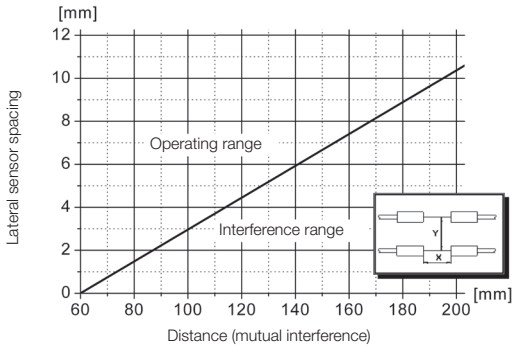
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

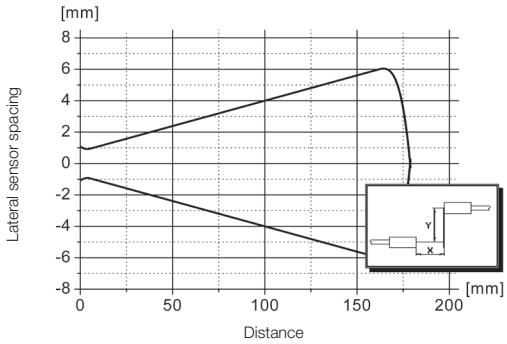
BOH001L, BOH TZ-M03-001-01-S49F-SA2
BOH001K, BOH TZ-G02-001-01-S49F-SA2



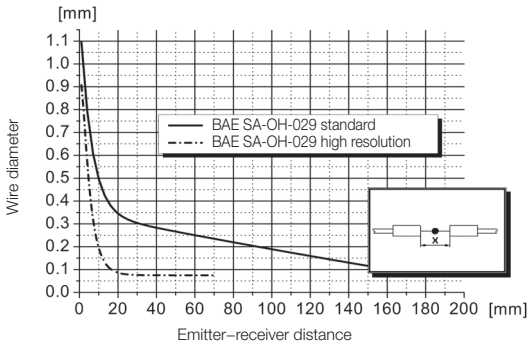
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

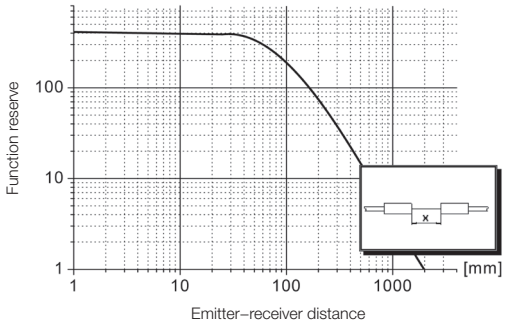


Lateral offset depending on distance

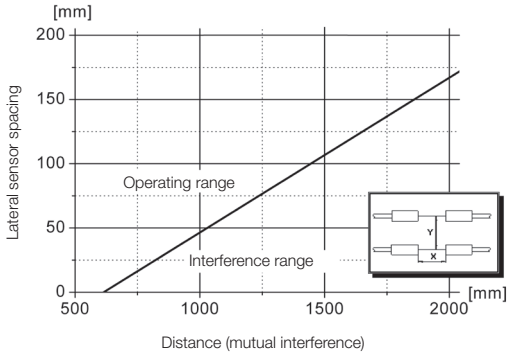


Resolution depending on distance

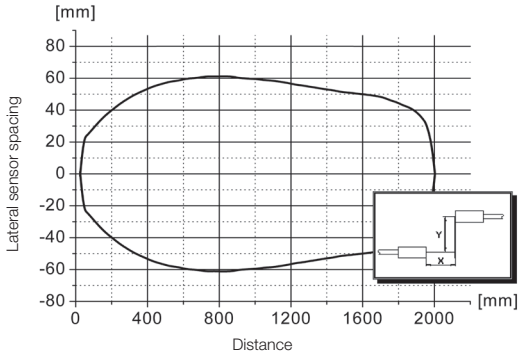
BOH002F, BOH TK-R027-003-01-S49F
BOH002H, BOH TK-R027-004-01-S49F



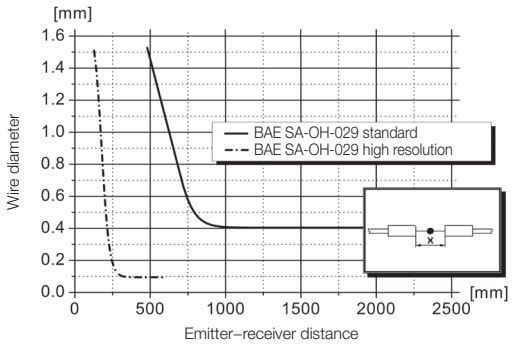
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



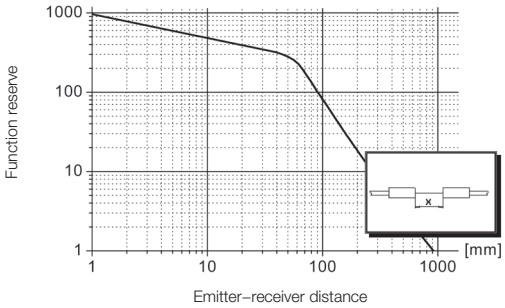
Lateral offset depending on distance



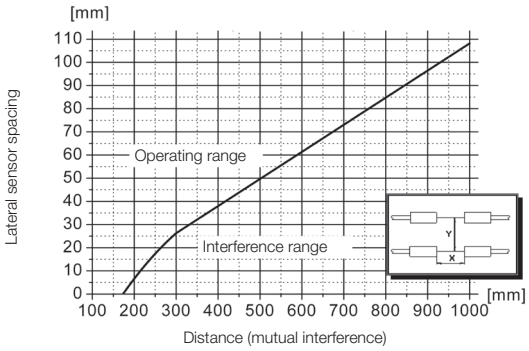
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

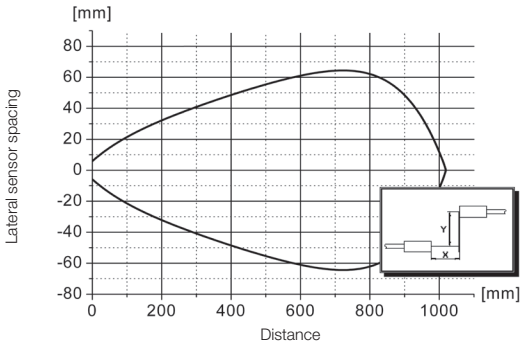
BOH000W, BOH TR-G04-003-01-S49F



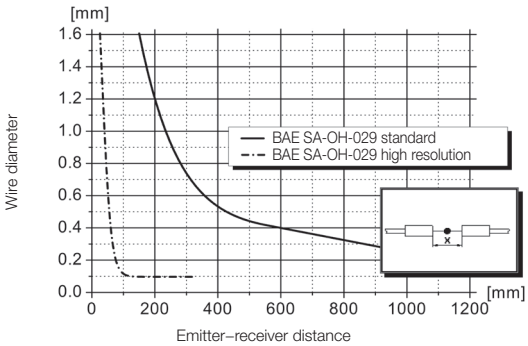
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

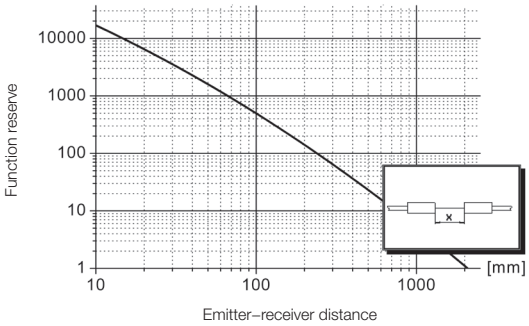


Lateral offset depending on distance

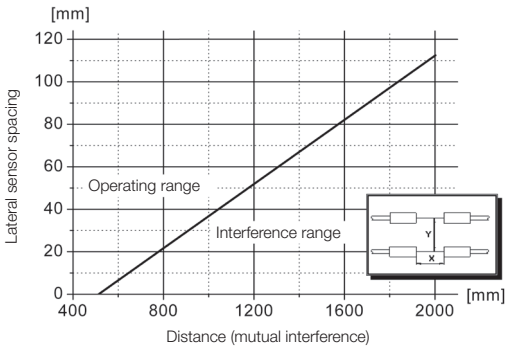


Resolution depending on distance

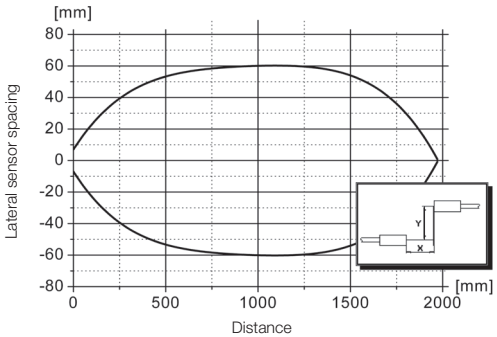
BOH0014, BOH TK-G04-003-01-S49F
BOH000P, BOH TK-Q06-001-01-S49F



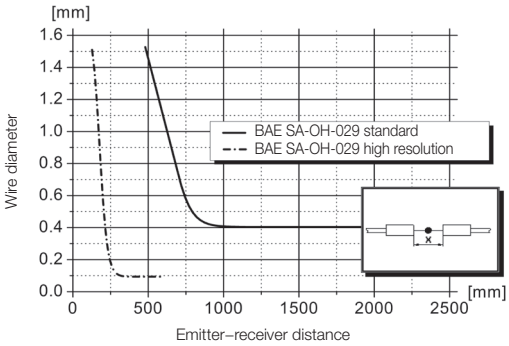
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

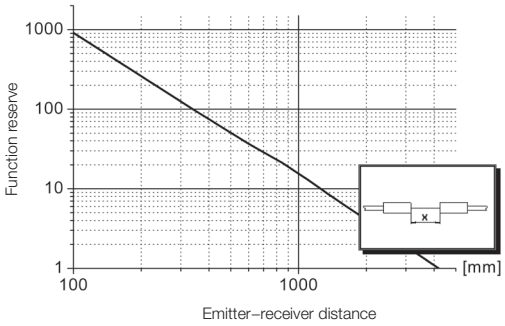


Lateral offset depending on distance

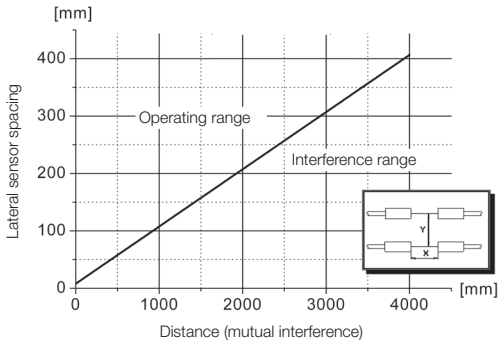


Resolution depending on distance

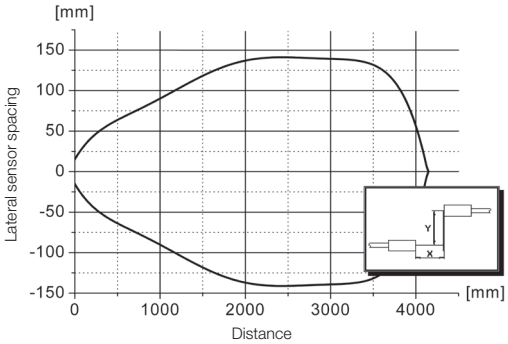
BOH0010, BOH TR-G05-005-02-S49F



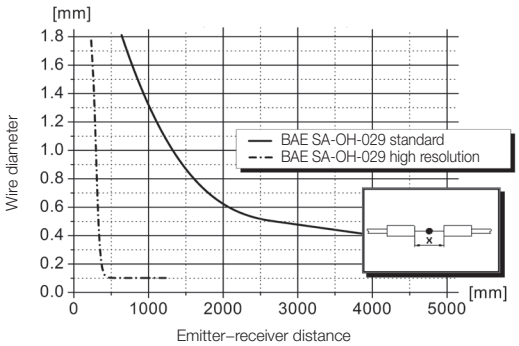
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

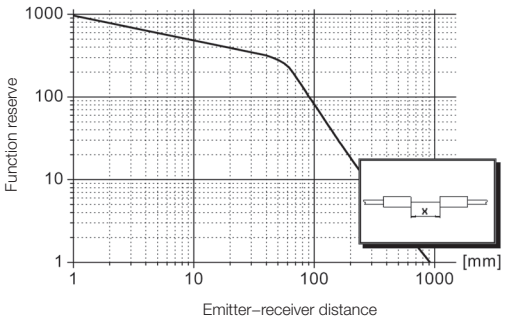


Lateral offset depending on distance

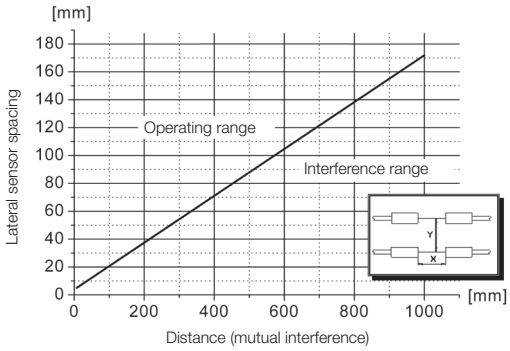


Resolution depending on distance

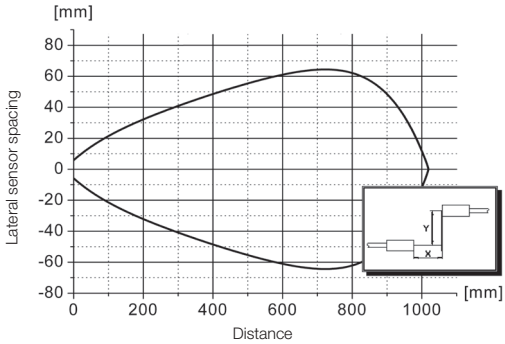
BOH000Y, BOH TR-M05-003-01-S49F
BOH000N, BOH TR-Q06-001-01-S49F



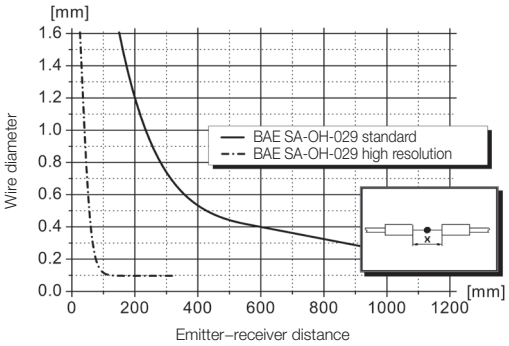
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



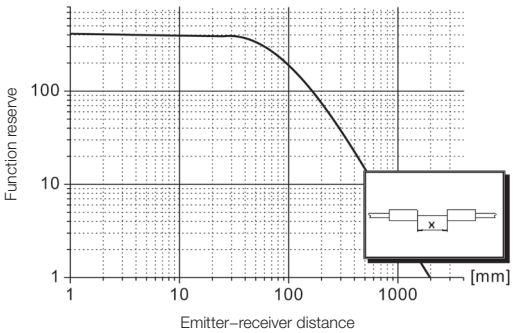
Lateral offset depending on distance



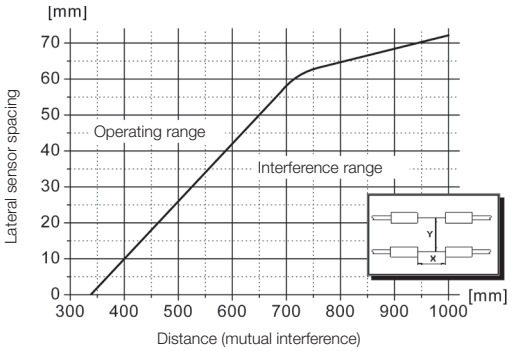
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

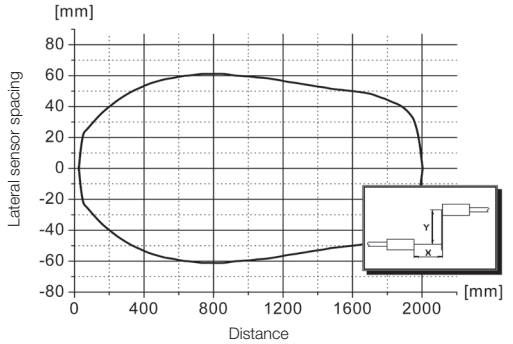
BOH0013, BOH TK-M05-003-01-S49F
BOH000F, BOH TK-M05-006-01-S49F



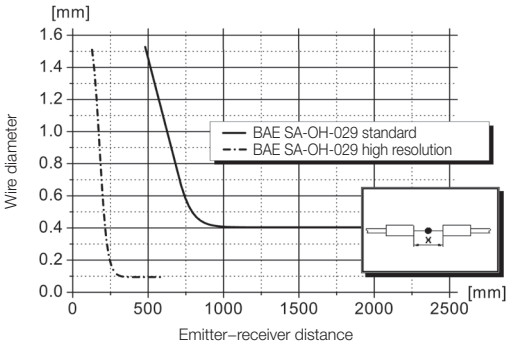
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

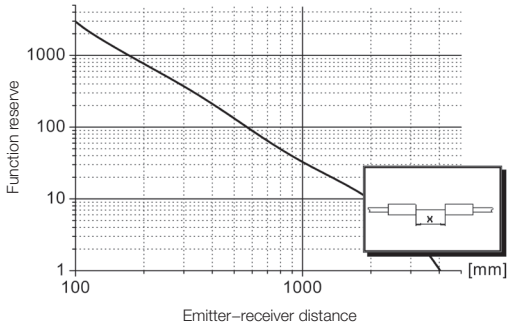


Lateral offset depending on distance

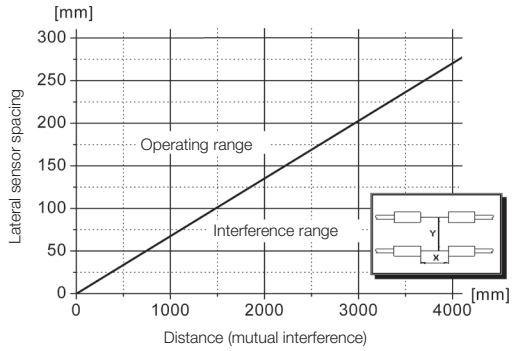


Resolution depending on distance

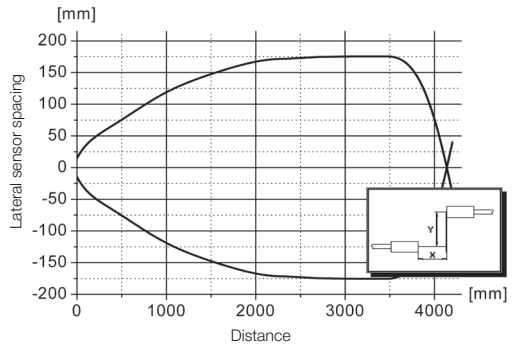
BOH000K, BOH TR-M06-002-02-S49F
BOH0020, BOH TR-R010-008-01-S49F



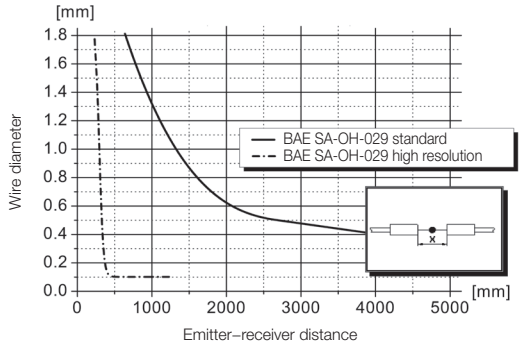
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



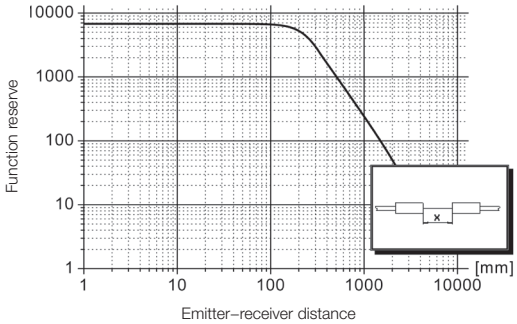
Lateral offset depending on distance



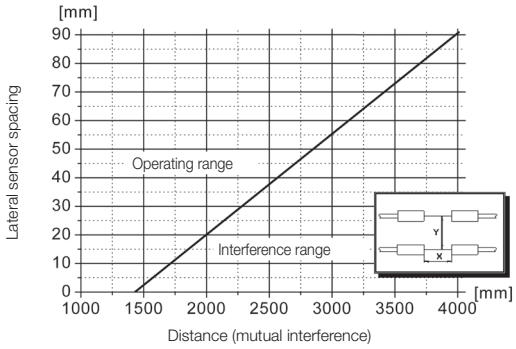
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

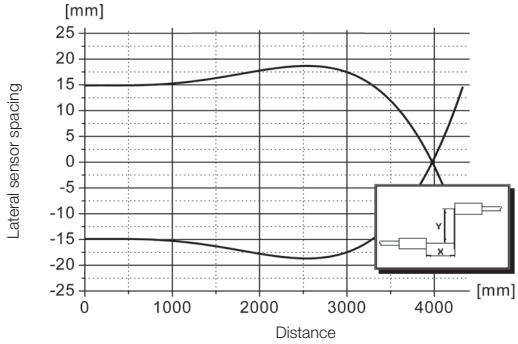
BOH0012, BOH TK-M08-004-02-S49F



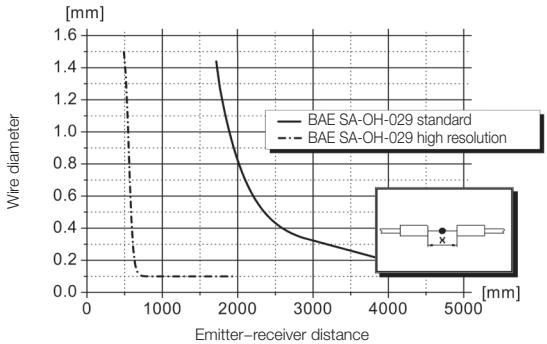
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

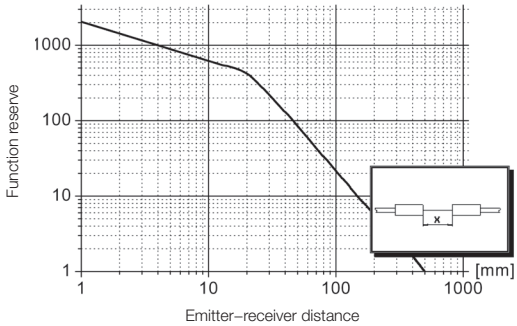


Lateral offset depending on distance

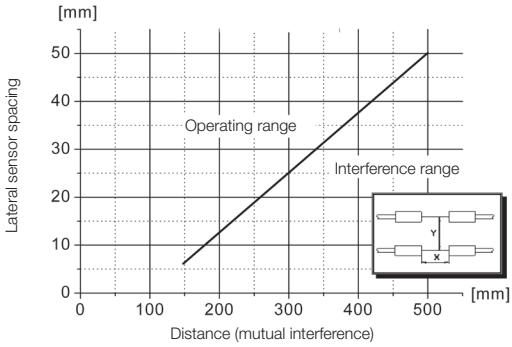


Resolution depending on distance

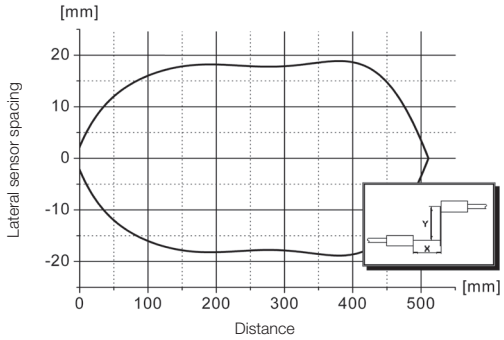
BOH001Z, BOH TK-R003-007-01-S49F
BOH002C, BOH TK-R018-001-01-S49F
BOH002E, BOH TK-R018-002-01-S49F



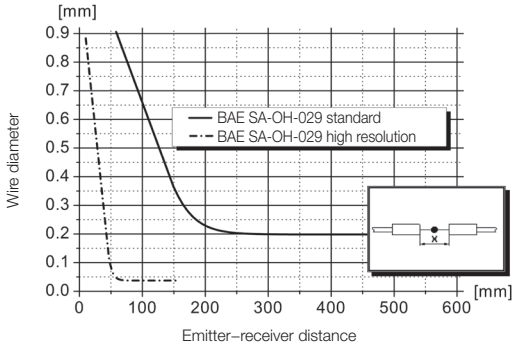
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



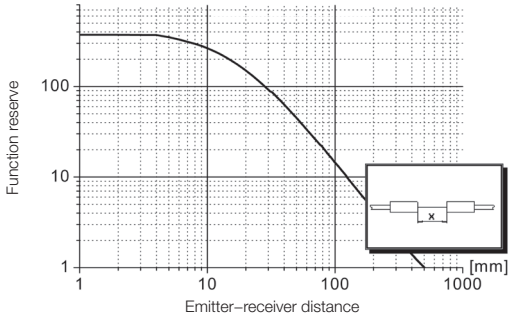
Lateral offset depending on distance



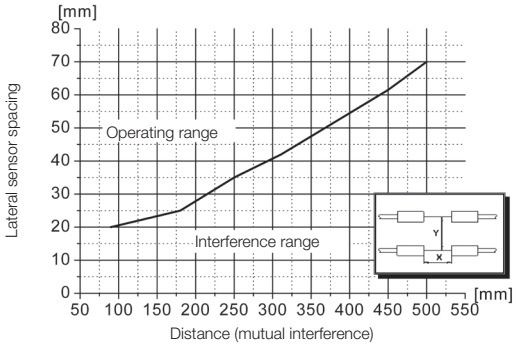
Resolution depending on distance

Through-beam sensors and light band fork sensors BOH for separate amplifiers BAE, function diagrams

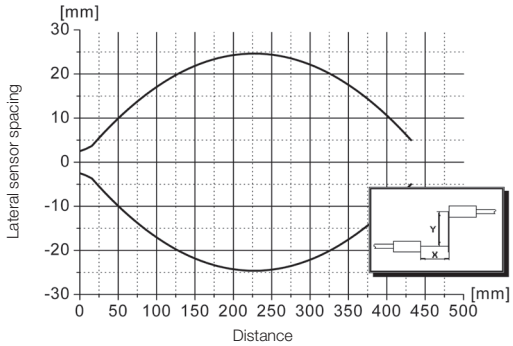
BOH000R, BOH TJ-Q06-001-01-S49F



Function reserve depending on distance

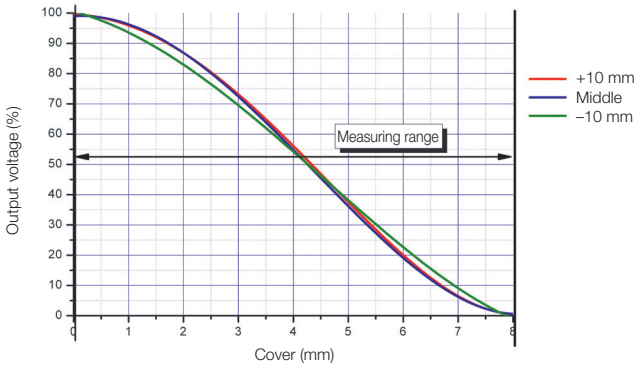


Minimum distance between two sensors for avoiding mutual interference



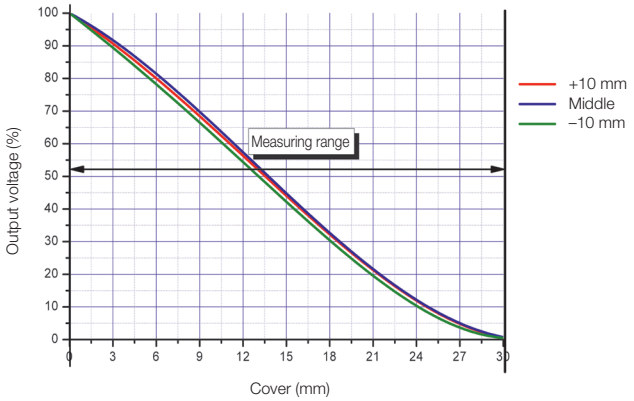
Lateral offset depending on distance

BOH001M, BOH AR-F40-001-01-S49F



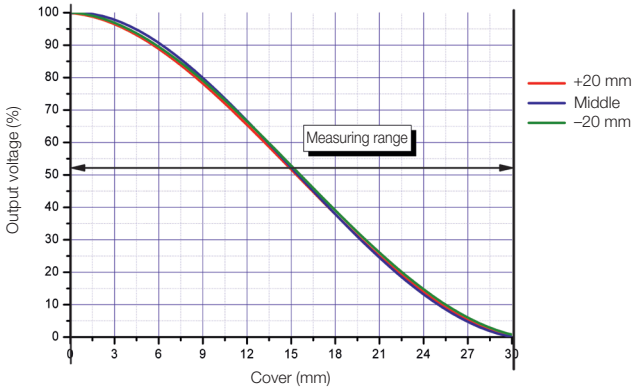
Output voltage dependent on the cover

BOH001N, BOH AR-F40-002-01-S49F



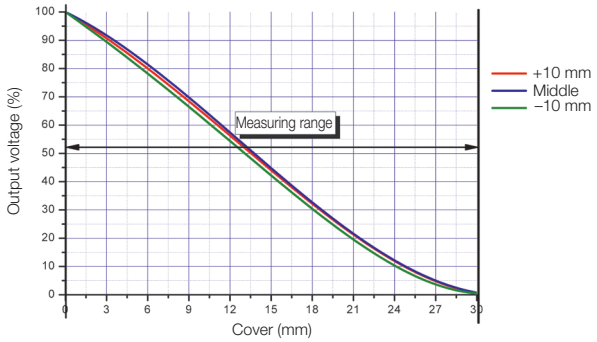
Output voltage dependent on the cover

BOH001P, BOH AR-F80-003-01-S49F

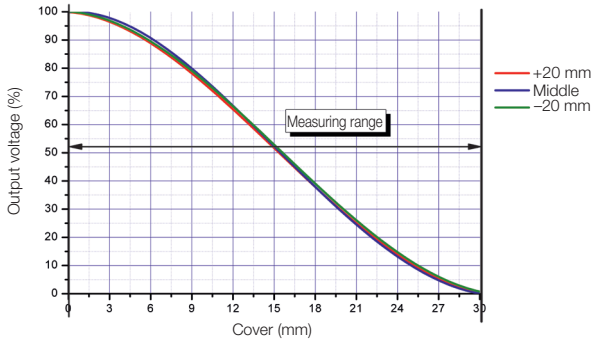


Output voltage dependent on the cover

BOH0024, BOH AR-R113-010-01-S49F

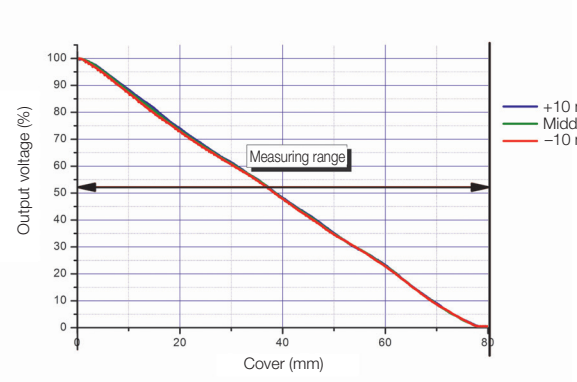


Emitter–receiver distance: 40 mm
Output voltage dependent on the cover

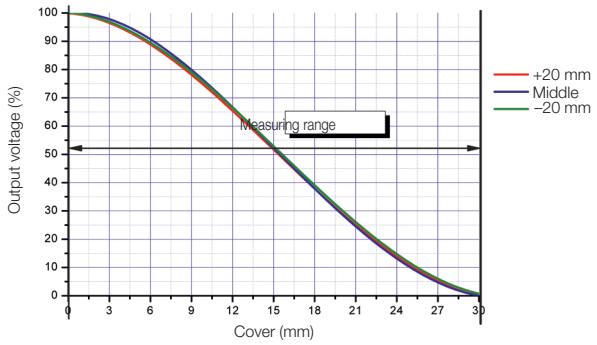


Emitter–receiver distance: 80 mm
Output voltage dependent on the cover

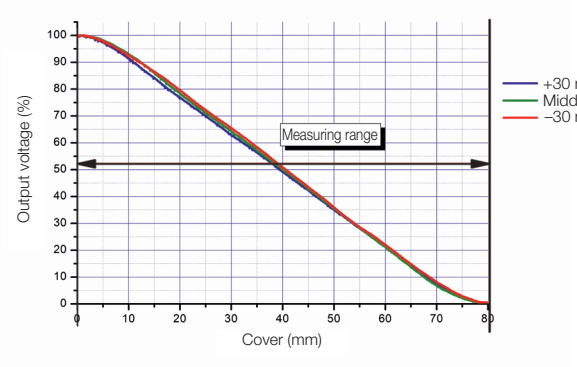
BOH002M, BOH AI-R165-011-01-S49F



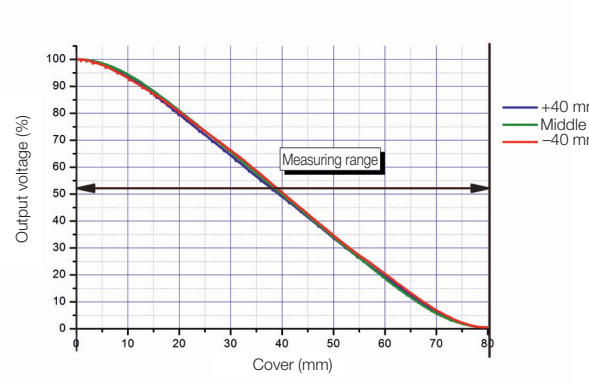
Emitter–receiver distance: 50 mm
Output voltage dependent on the cover



Emitter–receiver distance: 80 mm
Output voltage dependent on the cover



Emitter–receiver distance: 120 mm
Output voltage dependent on the cover



Emitter–receiver distance: 180 mm
Output voltage dependent on the cover

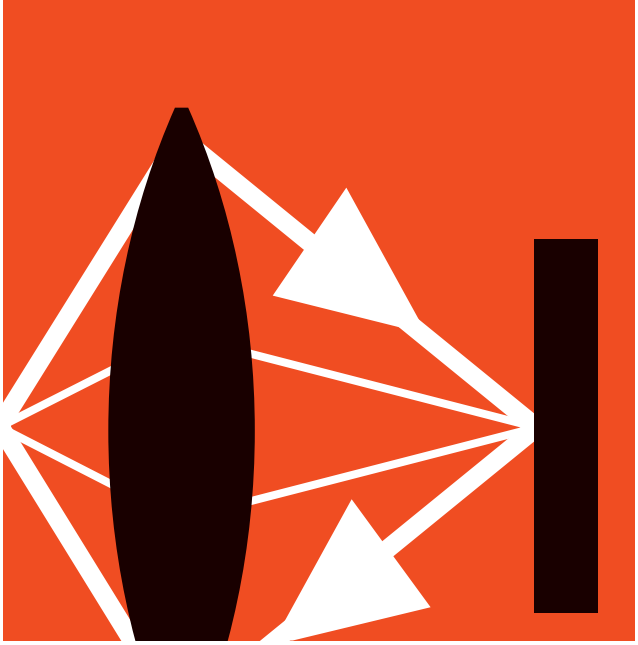
The depicted signal characteristics result if the sensor is used with an analog amplifier. More information can be found in the amplifier data sheets.

In combination with an analog amplifier, the sensor returns a linear output signal analogous to the cover of the measuring range (for example, with voltage or current output).

This makes the sensor ideally suited for high-resolution web edge control systems.

In combination with a dynamic amplifier, the sensor detects quick processes (such as numbers and identification of objects) within the entire measuring range.

Photoelectric Sensors
MICROmote Sensors
Diffuse Sensors
Through-beam Sensors
High-vacuum Sensors
Light Band Fork Sensors
Light Band Sensors
Precision Hose Sensors
Sensor Amplifiers
Function Diagrams
Laser Light Band Sensors
Compact Sensors
Optical Window, Fork and Angle Sensors



Photoelectric Sensors

High-resolution laser light band BLA

If there is a need to identify different objects during the manufacturing process, packing, or quality control, the new BLA high-resolution light beam is ideal. This light beam identifies, compares or sorts objects based on minimal size or height differences.

The intuitive nature of the device makes it easy to use. It consists of a powerful red-light laser and a receiver and operates completely independently - without any other accessories such as a controller, PC or special software.

The range extends up to 2 m. The continuous, highly visible light band has an excellent resolution of 0.01 mm.

Application
The multi-functional device provides numerous measuring modes such as object diameter, object position, gap width, gap position, edge position, etc. In addition, the user can use keys to teach-in up to six different objects and blank out disruptive objects in the measuring field (blanking). Parallel use of the different measuring modes is also possible: e.g. checking the diameter of the object at the same time as determining the position of the object.

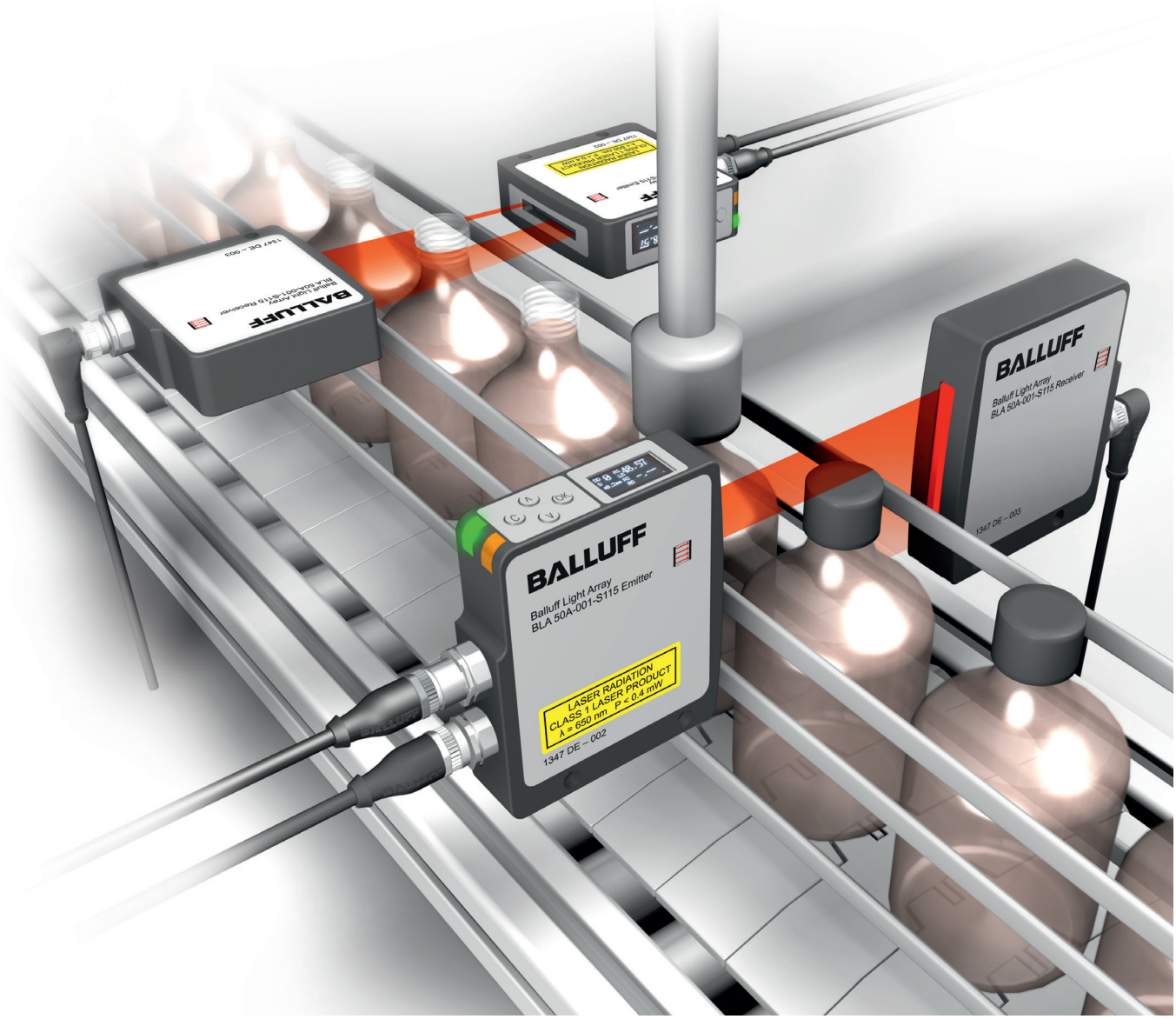
The light array can also count objects and compare this number with a target value. You can decide in which form to represent the result on the digital outputs.

The BLA is very versatile, even in particularly harsh conditions, thanks to its robust metal housing

- High-precision position monitoring and detection
- Quick and easy sorting of parts according to size and/or diameter
- Quality assurance and monitoring, e.g. of heights of objects, gap sizes, etc.
- Precise detection of web edges, even with semitransparent materials

Contents

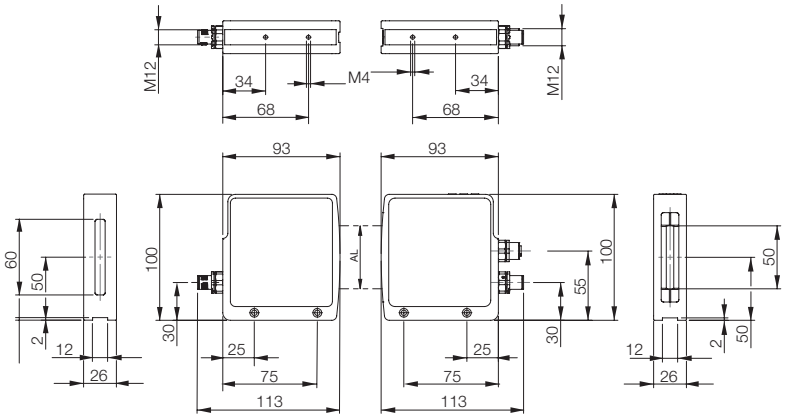
High-resolution light band BLA 64



Laser Light Band Sensor

High-resolution light band BLA

Type		**Light band BLA**
Light band width		**50 mm**
	Order code	**BLA0001**
	Part number	BLA 50A-001-S115
Usable light band width		48.6 mm
Max. emitter-receiver distance		2000 mm
Best resolution		0.01 mm
Smallest object		0.3 mm
Supply voltage U_S		15...30 VDC
No-load supply current I_0 max.		< 100 mA
Output current		Max. 100 mA per switching output
Analog outputs		2× current (4...20 mA) or voltage (0...10 V) can be disconnected
Digital outputs		3× PNP
Output function		Differentiation or counting of objects up to 6 (binary coded)
Output current		Max. 100 mA per switching output
Polarity reversal/short-circuit protected		Yes/Yes
Settings		Via a multifunction display and 4 teach buttons
Emitter, light type		Laser 650 nm
Laser class		1
Power indicator		Green
Object display		Yellow
Scanning period		Typically 5 ms (2 ms…100 ms, automatically configured)
Degree of protection		IP 65
Ambient temperature T_a		+5…+55 °C
Material	Housing	Anodized aluminum
	Optical surface	Glass



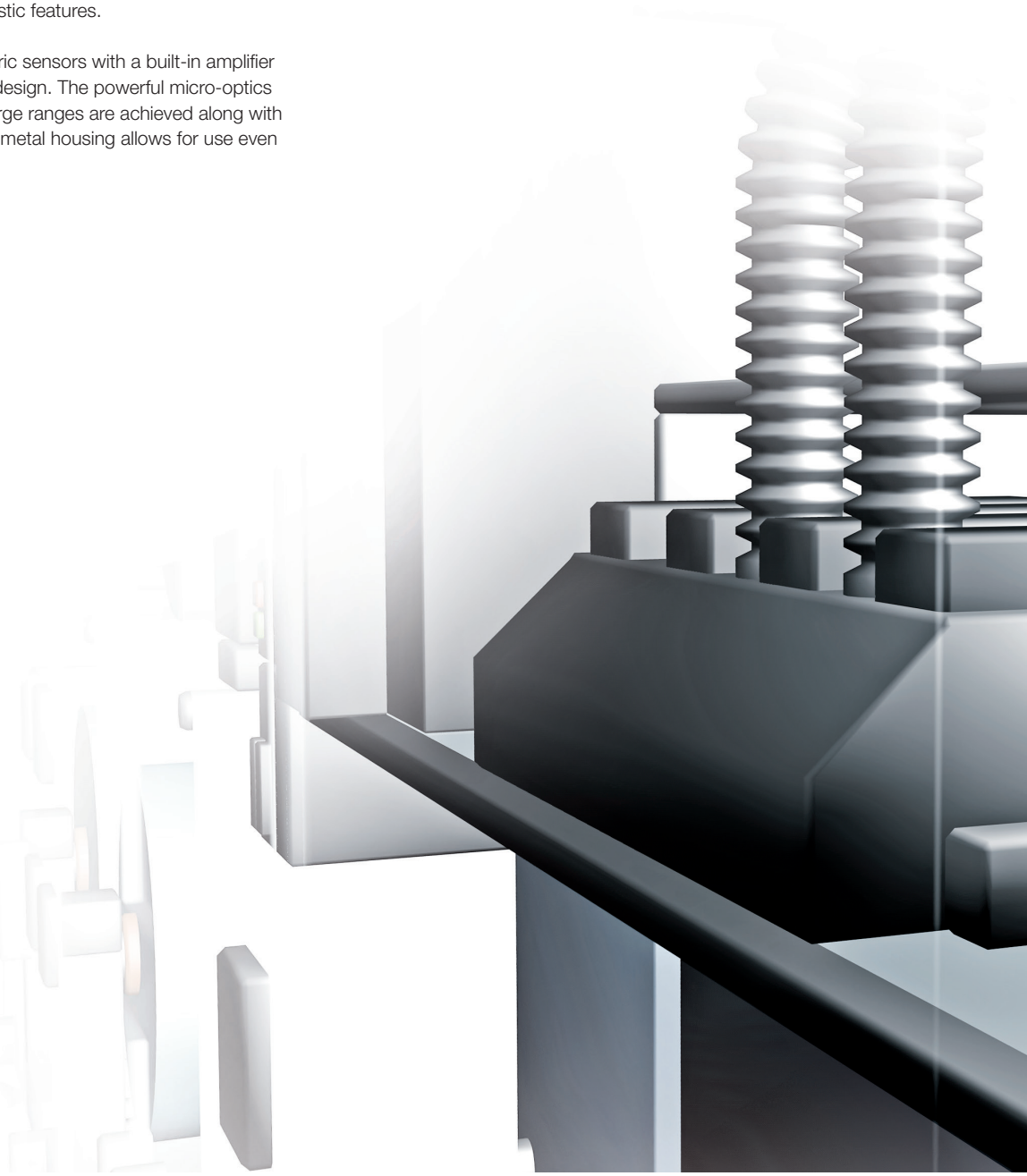
BALLUFF
Balluff Light Array
BLA 50A-001-S115 Emitter
LASER RADIATION
CLASS 1 LASER PRODUCT
λ = 650 nm P < 0.4 mW
1347 DE – 002
OK
BALLUFF
Balluff Light Array
BLA 50A-001-S115 Receiver
1347 DE – 003

Photoelectric Sensors

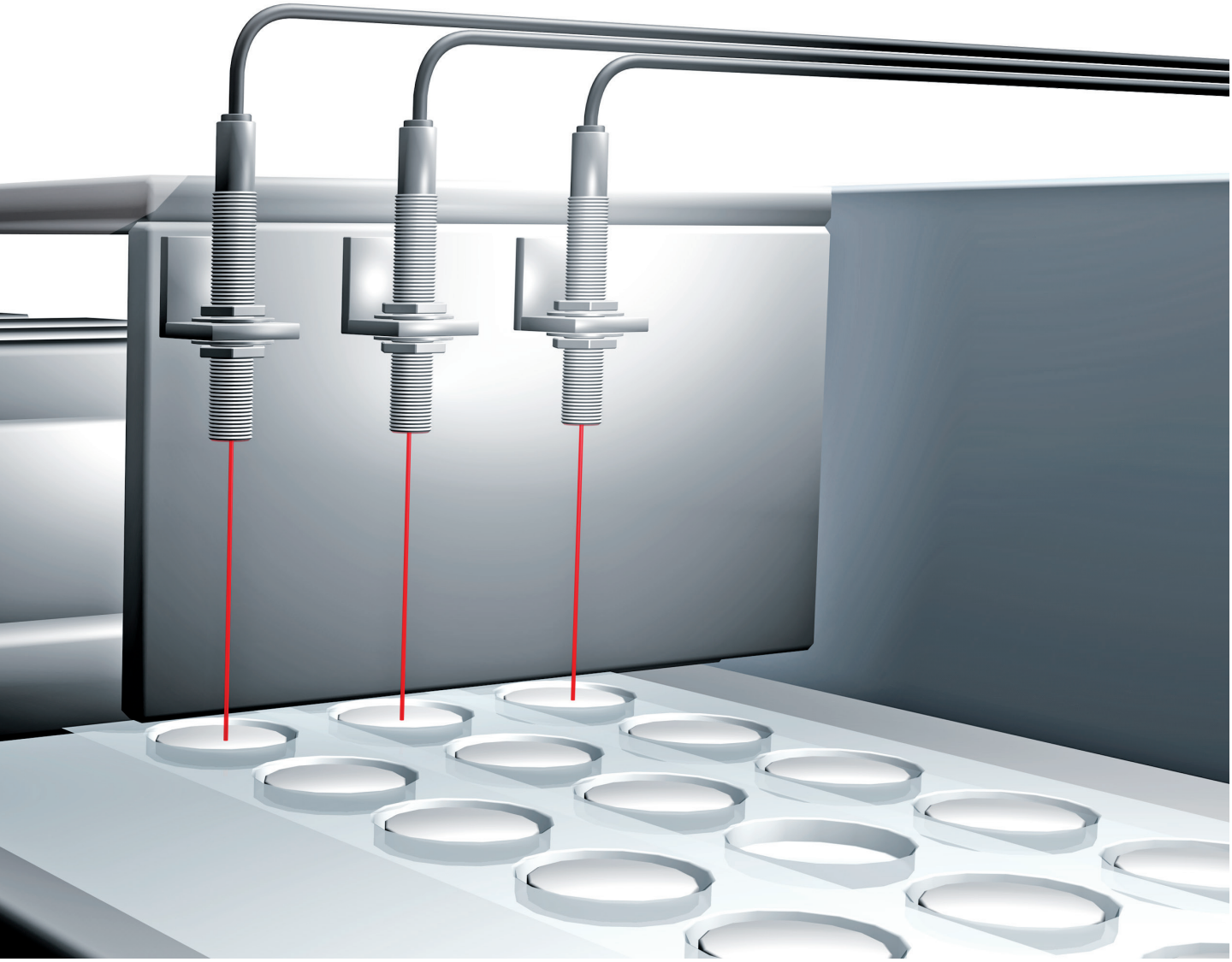
Compact sensors

The compact photoelectric sensors connect small dimensions with compact switching electronics. Powerful miniature optics and a metal housing are its characteristic features.

Compact stands for photoelectric sensors with a built-in amplifier and an exceptionally compact design. The powerful micro-optics ensure a perfect light beam. Large ranges are achieved along with excellent object resolution. The metal housing allows for use even under harsh conditions.

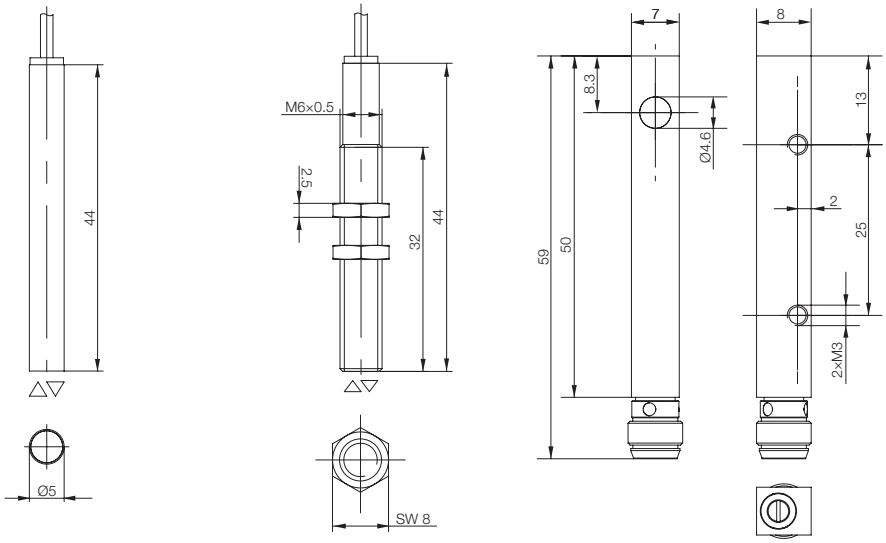


Diffuse Sensors 68



Type	**Diffuse sensor**	**Diffuse sensor**	**Diffuse sensor**
Dimension	**Ø 5×44 mm**	**M6×0.5×44 mm**	**7×8×59 mm**
Detection range	**50 mm**	**50 mm**	**50 mm**
Order code	**BOS01UZ**	**BOS01W0**	**BOS01W1**
Part number	BOS G05E-PS-RD10-PU-02	BOS M06M-PS-RD10-PU-02	BOS R040M-PS-RD10-S49
Supply voltage	10 to 30 V DC	10 to 30 V DC	10 to 30 V DC
Output current	PNP 100 mA	PNP 100 mA	PNP 100 mA
Intrinsic current consumption	30 mA	30 mA	30 mA
Polarity reversal protected/ Short-circuit protected	Yes/Yes	Yes/Yes	Yes/Yes
Light type	Red light	Red light	Red light
Wavelength	660 Nm	660 Nm	660 Nm
Light spot diameter	14 mm (at 50 mm)	14 mm (at 50 mm)	14 mm (at 50 mm)
Function indicator	Red LED	Red LED	Red LED
Ambient temperature T_a	–10°C... +55 °C	–10°C... +55 °C	–10°C... +55 °C
Function principle	Clocked	Clocked	Clocked
Limit frequency	500 Hz	500 Hz	500 Hz
Degree of protection as per IEC 60529	IP 65	IP 65	IP 65
Housing material	Stainless steel	Nickel-plated brass	Nickel-plated brass
Fastening	Adhesive or clamp fastening	Screw fastening	Screw fastening
Connection	2 m PUR cable, 3×0.1 mm²	2 m PUR cable, 3×0.1 mm²	M8 connector, 3-pin

Reference object: white, 90% reflection, 100×100 mm

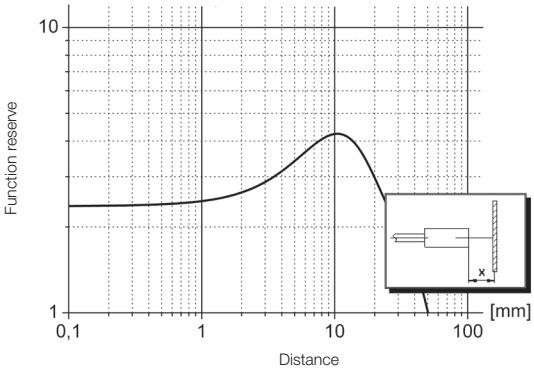


Suitable connection cable
(please order separately)

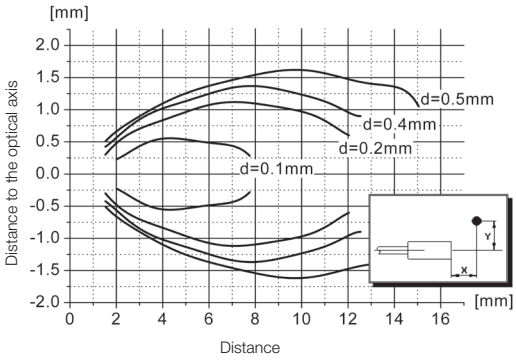
Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

Connection cable without LED are suitable for PNP and NPN sensors.

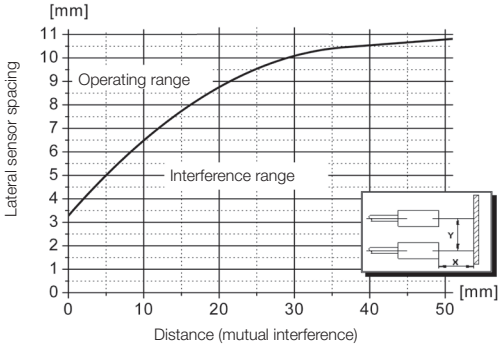
BOS01UZ, BOS G05E-PS-RD10-PU-02
BOS01W0, BOS M06M-PS-RD10-PU-02
BOS01W1, BOS R040M-PS-RD10-S49



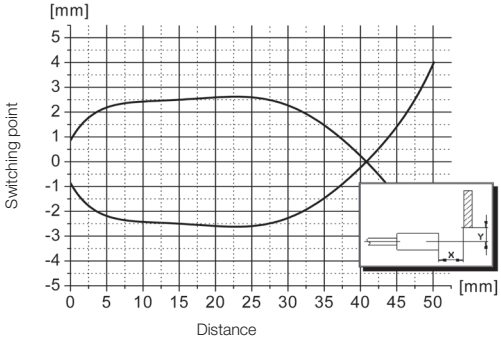
Function reserve depending on distance



Resolution depending on distance

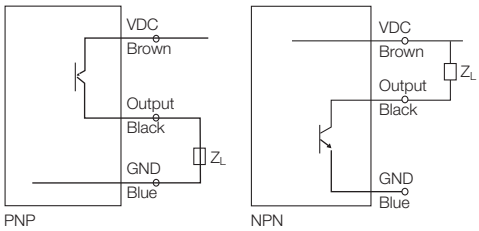


Minimum distance between two sensors for avoiding mutual interference



Detection range depending on distance

Wiring diagrams



2 m PUR cable, 3×0.1 mm²

Brown	+ VDC
Blue	– GND
Black	Signal output

Photoelectric Sensors

Optical window, fork and angle sensors

Fork sensors include all types of transmitted light sensors that have their electronics and optics mounted and precisely adjusted in a U-shaped metal housing. These range from the universal single-beam photoelectric sensor with red light, infrared or laser, all the way to photoelectric label sensors. The extraordinary thing is that, in addition to precision designs, you get modular size increments ideally matched to your applications. Even special dimensions and materials are possible.

As a further development of the fork sensor, the angle sensor has almost identical technical data. Its special design makes it extremely valuable for diverse and demanding applications. This is because the beam geometry enables objects to be approached and detected from almost any direction. Angle sensors are perfect with regard to accuracy and detection of small parts and details.

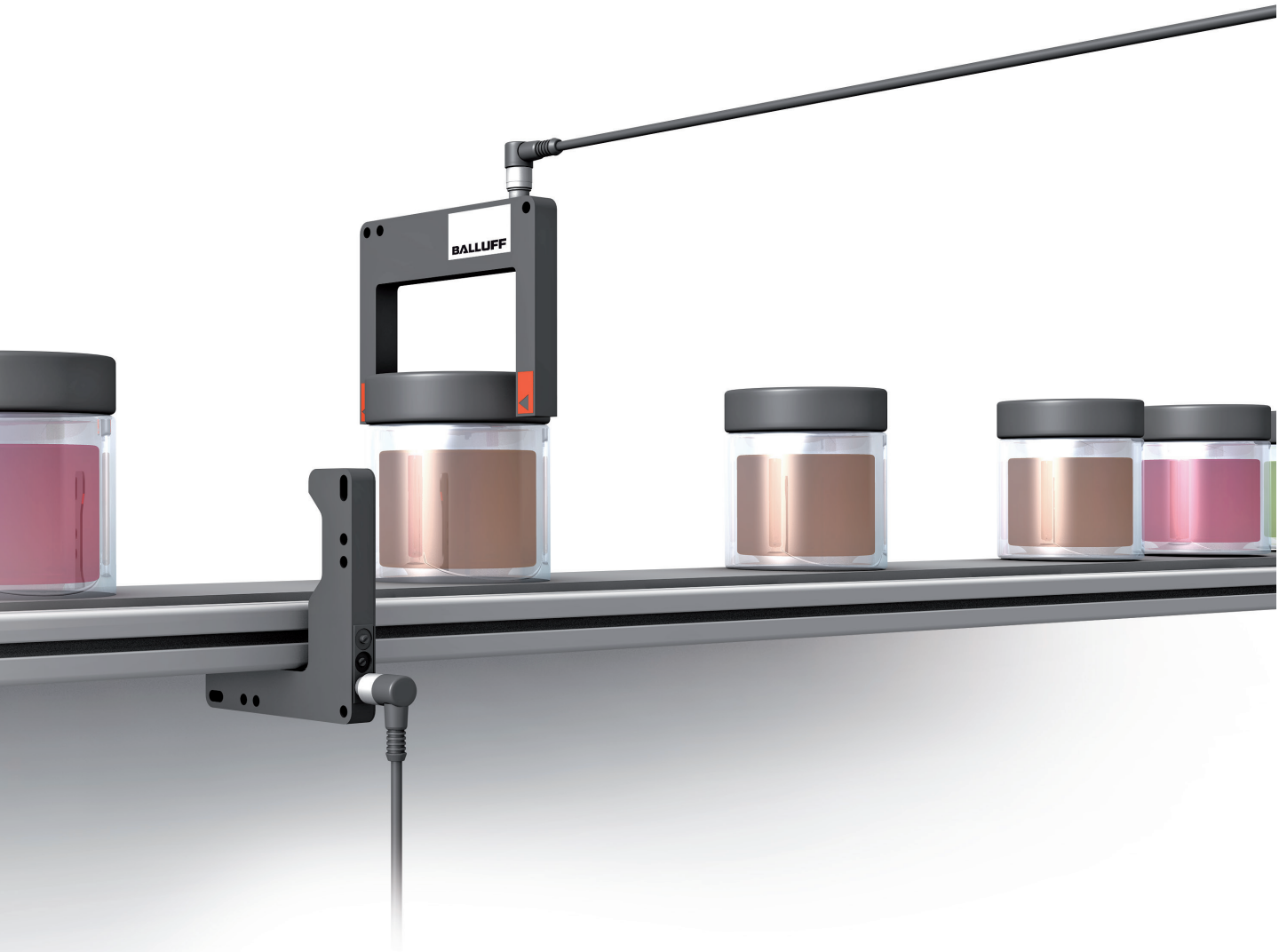
Optical window sensors are densely packed through-beam sensors in a metal housing. They are ideal for highly accurate scanning and counting of fast, randomly falling or flying objects. In addition, they can provide dynamic or static analysis.
Designs: Our optical window sensors are available in fixed sizes or can be variably assembled from a modular construction set.

Optical Window, Fork and Angle Sensors
Contents

Optical Window Sensors BOW
Dynamic 72
Static 82

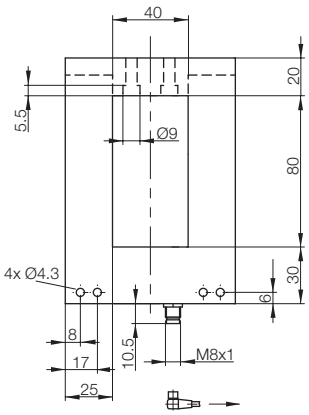
Fork Sensors BGL
Analogs BGL 88
BGL with IO-Link 90
Red light 92
Pin point 96
Laser 104
Fluid detection 106
Label detection 108

Angle sensors BWL
Red light 110
Pin point 112
Infrared 114
Laser 116



Dynamic optical window sensors BOW

Type		**BOW**	
Active area		**40×80 mm**	
PNP NO/NC	**Order code**	**BOW001A**	
	Part number	BOW A-0408-PS-C-S49	
Supply voltage U_S		10...30 V DC	
No-load supply current I_0 max.		≤ 40 mA	
Output current		200 mA	
Switching type		Dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	
Settings		2× Potentiometer, 270°	
Emitter, light type		LED, infrared	
Wavelength		880 Nm	
Resolution (smallest discernible part)		1.0 mm	
Power-on indicator		Green LED	
Output function indicator		Red LED	
Turn-on delay		0.4 ms	
Signal duration for pulse stretching		5...300 ms adjustable	
Switching frequency		3...100 Hz	
Function principle		Dynamic	
Degree of protection as per IEC 60529		IP 67	
Ambient temperature T_a		–10...+55 °C	
Ambient light limit according to		EN 60947-5-2	
Material	Housing	Anodized aluminum	
	Optical surface	PMMA	
Connection		M8 connector, 3-pin	



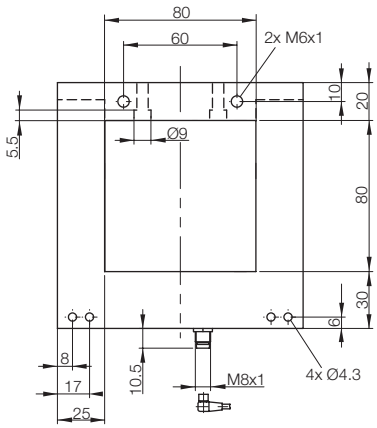
Suitable connection cable
(please order separately)

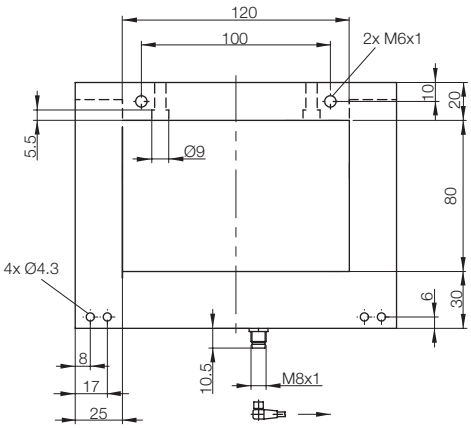
Size	Design	Cable material	Color	Length	Order code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

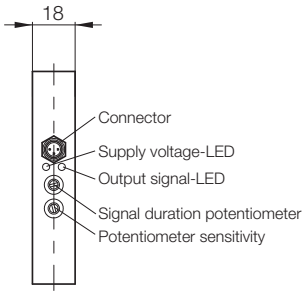
Connection cable without LED are suitable for PNP and NPN sensors.

More electric accessories: A large selection of connectors and cables in a wide range of cable materials, colors and lengths can be found in our **Industrial Networking and Connectivity catalog.**

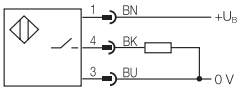
BOW	**BOW**
80×80 mm	**120×80 mm**
BOW001J	**BOW0012**
BOW A-0808-PS-C-S49	BOW A-1208-PS-C-S49
10...30 V DC	10...30 V DC
≤ 45 mA	≤ 60 mA
200 mA	200 mA
Dark switching	Dark switching
Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared
880 Nm	880 Nm
1.0 mm	1.2 mm
Green LED	Green LED
Red LED	Red LED
0.4 ms	0.4 ms
5...300 ms adjustable	5...300 ms adjustable
3...100 Hz	3...100 Hz
Dynamic	Dynamic
IP 67	IP 67
–10...+55 °C	–10...+55 °C
EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum
PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin







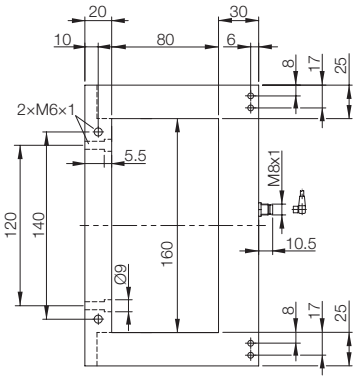
Wiring diagram

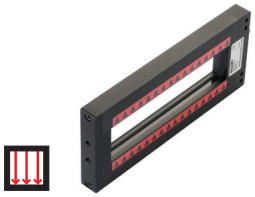


Note when using for ambient light:
The receiver is located on the connector side.

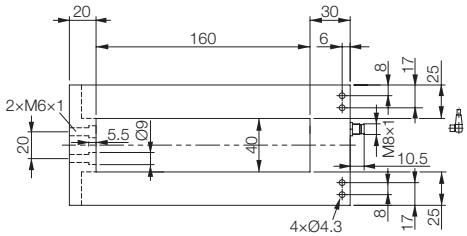
Dynamic optical window sensors BOW

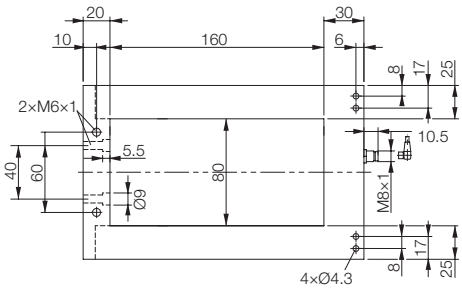
Type		**BOW**
Active area		**160×80 mm**
NPN NO/NC	**Order code**	**BOW0026**
	Part number	BOW A-1608-NS-C-S49
Supply voltage U_S		10...30 V DC
No-load supply current I_0 max.		≤ 75 mA
Output current		200 mA
Switching type		Dark switching
Polarity reversal/short-circuit protected		Yes/Yes
Settings		2× Potentiometer, 270°
Emitter, light type		LED, infrared
Wavelength		880 Nm
Resolution (smallest discernible part)		1.5 mm
Power-on indicator		Green LED
Output function indicator		Red LED
Turn-on delay		0.4 ms
Signal duration for pulse stretching		5...300 ms adjustable
Switching frequency		3...100 Hz
Function principle		Dynamic
Degree of protection as per IEC 60529		IP 67
Ambient temperature T_a		–10...+55 °C
Ambient light limit according to		EN 60947-5-2
Material	Housing	Anodized aluminum
	Optical surface	PMMA
Connection		M8 connector, 3-pin

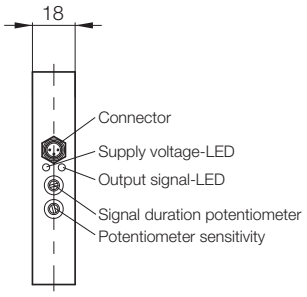




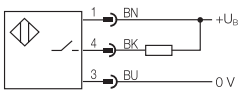
BOW	**BOW**
40×160 mm	**80×160 mm**
BOW0027	**BOW0028**
BOW A-0416-NS-C-S49	BOW A-0816-NS-C-S49
10...30 V DC	10...30 V DC
≤ 65 mA	≤ 75 mA
200 mA	200 mA
Dark switching	Dark switching
Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared
880 Nm	880 Nm
1.0 mm	1.0 mm
Green LED	Green LED
Red LED	Red LED
0.4 ms	0.4 ms
5...300 ms adjustable	5...300 ms adjustable
3...100 Hz	3...100 Hz
Dynamic	Dynamic
IP 67	IP 67
–10...+55 °C	–10...+55 °C
EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum
PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin







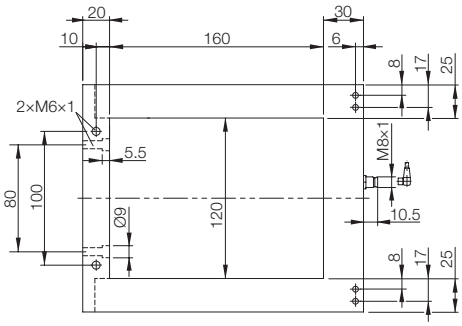
Wiring diagram



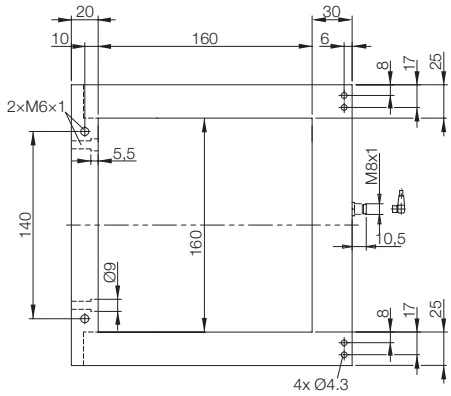
Note when using for ambient light:
The receiver is located on the connector side.

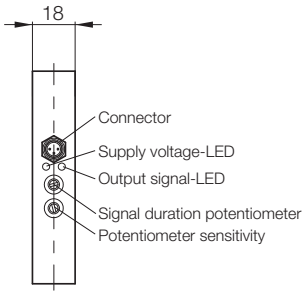
Dynamic optical window sensors BOW

Type		**BOW**	
Active area		**120×160 mm**	
NPN NO/NC	**Order code**	**BOW0029**	
	Part number	BOW A-1216-NS-C-S49	
Supply voltage U_S		10...30 V DC	
No-load supply current I_0 max.		≤ 90 mA	
Output current		200 mA	
Switching type		Dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	
Settings		2× Potentiometer, 270°	
Emitter, light type		LED, infrared	
Wavelength		880 Nm	
Resolution (smallest discernible part)		1.2 mm	
Power-on indicator		Green LED	
Output function indicator		Red LED	
Turn-on delay		0.4 ms	
Signal duration for pulse stretching		5...300 ms adjustable	
Switching frequency		3...100 Hz	
Function principle		Dynamic	
Degree of protection as per IEC 60529		IP 67	
Ambient temperature T_a		–10...+55 °C	
Ambient light limit according to		EN 60947-5-2	
Material	Housing	Anodized aluminum	
	Optical surface	PMMA	
Connection		M8 connector, 3-pin	



BOW	
160×160 mm	
BOW002A	
BOW A-1616-NS-C-S49	
10...30 V DC	
≤ 100 mA	
200 mA	
Dark switching	
Yes/Yes	
2× Potentiometer, 270°	
LED, infrared	
880 Nm	
1.5 mm	
Green LED	
Red LED	
0.4 ms	
5...300 ms adjustable	
3...100 Hz	
Dynamic	
IP 67	
–10...+55 °C	
EN 60947-5-2	
Anodized aluminum	
PMMA	
M8 connector, 3-pin	

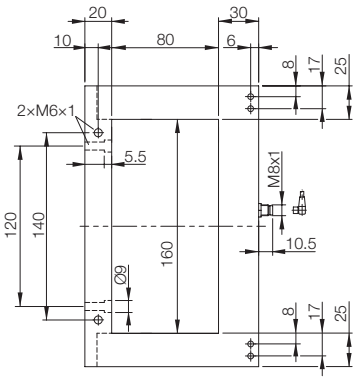


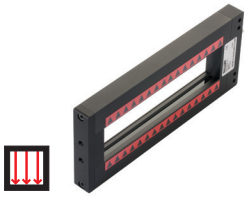


Note when using for ambient light:
The receiver is located on the connector side.

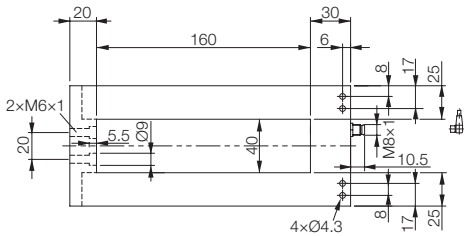
Dynamic optical window sensors BOW

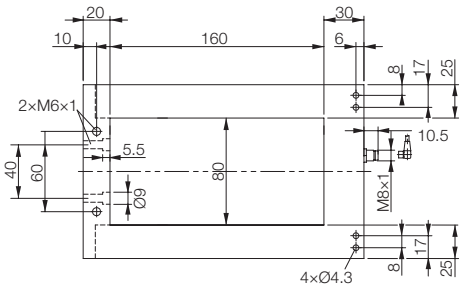
Type		**BOW**	
Active area		**160×80 mm**	
PNP NO/NC	**Order code**	**BOW002C**	
	Part number	BOW A-1608-PS-C-S49	
Supply voltage U_S		10...30 V DC	
No-load supply current I_0 max.		≤ 75 mA	
Output current		200 mA	
Switching type		Dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	
Settings		2× Potentiometer, 270°	
Emitter, light type		LED, infrared	
Wavelength		880 Nm	
Resolution (smallest discernible part)		1.5 mm	
Power-on indicator		Green LED	
Output function indicator		Red LED	
Turn-on delay		0.4 ms	
Signal duration for pulse stretching		5...300 ms adjustable	
Switching frequency		3...100 Hz	
Function principle		Dynamic	
Degree of protection as per IEC 60529		IP 67	
Ambient temperature T_a		–10...+55 °C	
Ambient light limit according to		EN 60947-5-2	
Material	Housing	Anodized aluminum	
	Optical surface	PMMA	
Connection		M8 connector, 3-pin	

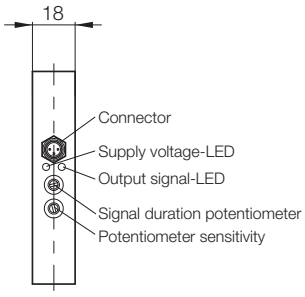




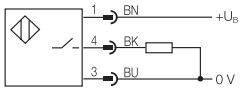
BOW	**BOW**
40×160 mm	**80×160 mm**
BOW002E	**BOW002F**
BOW A-0416-PS-C-S49	BOW A-0816-PS-C-S49
10...30 V DC	10...30 V DC
≤ 65 mA	≤ 75 mA
200 mA	200 mA
Dark switching	Dark switching
Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared
880 Nm	880 Nm
1.5 mm	1.5 mm
Green LED	Green LED
Red LED	Red LED
0.4 ms	0.4 ms
5...300 ms adjustable	5...300 ms adjustable
3...100 Hz	3...100 Hz
Dynamic	Dynamic
IP 67	IP 67
–10...+55 °C	–10...+55 °C
EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum
PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin







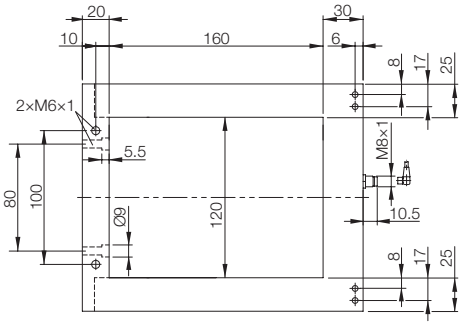
Wiring diagram



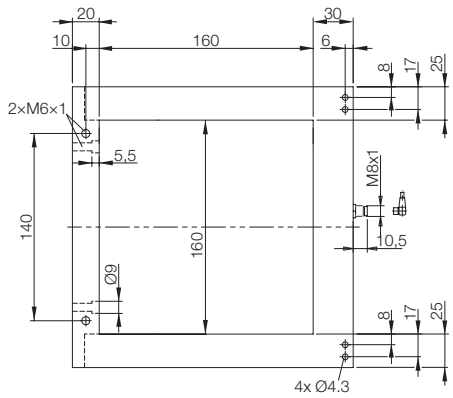
Note when using for ambient light:
The receiver is located on the connector side.

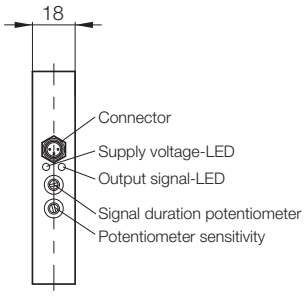
Dynamic optical window sensors BOW

Type		**BOW**	
Active area		**120×160 mm**	
PNP NO/NC	**Order code**	**BOW002H**	
	Part number	BOW A-1216-PS-C-S49	
Supply voltage U_S		10...30 V DC	
No-load supply current I_0 max.		≤ 90 mA	
Output current		200 mA	
Switching type		Dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	
Settings		2× Potentiometer, 270°	
Emitter, light type		LED, infrared	
Wavelength		880 Nm	
Resolution (smallest discernible part)		1.2 mm	
Power-on indicator		Green LED	
Output function indicator		Red LED	
Turn-on delay		0.4 ms	
Signal duration for pulse stretching		5...300 ms adjustable	
Switching frequency		3...100 Hz	
Function principle		Dynamic	
Degree of protection as per IEC 60529		IP 67	
Ambient temperature T_a		–10...+55 °C	
Ambient light limit according to		EN 60947-5-2	
Material	Housing	Anodized aluminum	
	Optical surface	PMMA	
Connection		M8 connector, 3-pin	

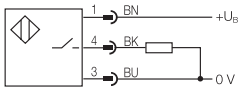


BOW	
160×160 mm	
BOW002J	
BOW A-1616-PS-C-S49	
10...30 V DC	
≤ 100 mA	
200 mA	
Dark switching	
Yes/Yes	
2× Potentiometer, 270°	
LED, infrared	
880 Nm	
1.5 mm	
Green LED	
Red LED	
0.4 ms	
5...300 ms adjustable	
3...100 Hz	
Dynamic	
IP 67	
–10...+55 °C	
EN 60947-5-2	
Anodized aluminum	
PMMA	
M8 connector, 3-pin	





Wiring diagram

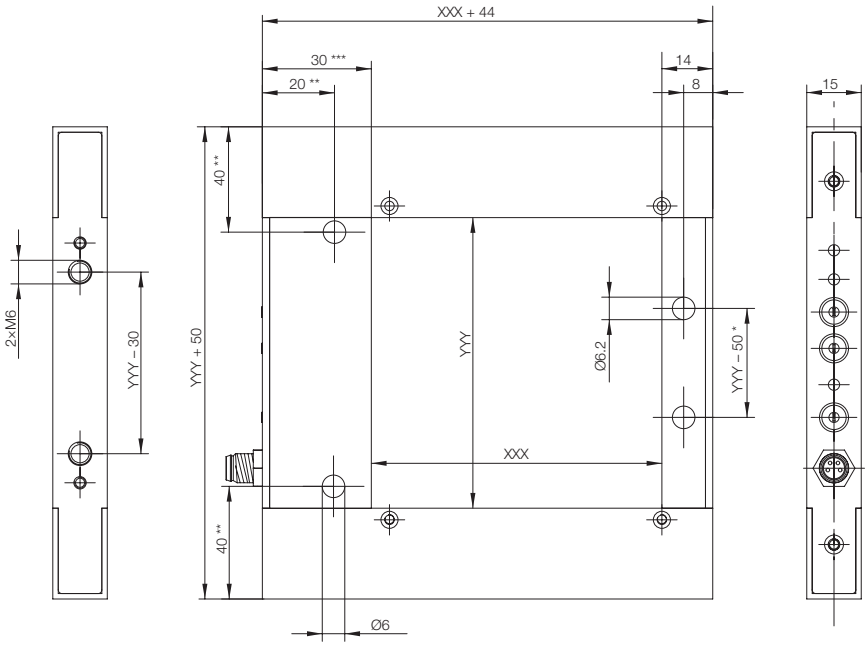


Note when using for ambient light:
The receiver is located on the connector side.

Static optical window sensors BOW (Modular)

Type		**BOW**	**BOW**
Active area (XXX × YYY)		**40×40 mm**	**40×80 mm**
Switching delay		**0.25 ms**	**0.25 ms**
Counting frequency		**2000 Hz**	**2000 Hz**
PNP/ NC/	**Order code**	**BOW002U**	**BOW002W**
NPN NO	Part number	BOW B-0404-DU-C-S75	BOW B-0804-DU-C-S75
Resolution	High (H)	2 mm	2 mm
Switch setting:	Medium (M)	4 mm	4 mm
	Low (L)	8 mm	8 mm
Supply voltage U_S		15...30 VDC	15...30 VDC
Intrinsic current consumption		< 400 mA	< 400 mA
Output		PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected
Function principle		Static	Static
Switching type		Dark switching, NO/NC selection	Dark switching, NO/NC selection
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Light type		Infrared, clocked	Infrared, clocked
Function indicator	Operation	Green LED	Green LED
	Output signal	Yellow LED	Yellow LED
	Alarm	Red LED	Red LED
Pulse stretching (only dyn. function)		50 ms, selectable	50 ms, selectable
Degree of protection as per IEC 60529		IP 65	IP 65
Ambient temperature T_a		–10...+55 °C	–10...+55 °C
Material	Housing	Anodized aluminum	Anodized aluminum
	Filter material	PMMA	PMMA
Connection		M8 connector, 4-pin	M8 connector, 4-pin

Connection and operating elements on page 87

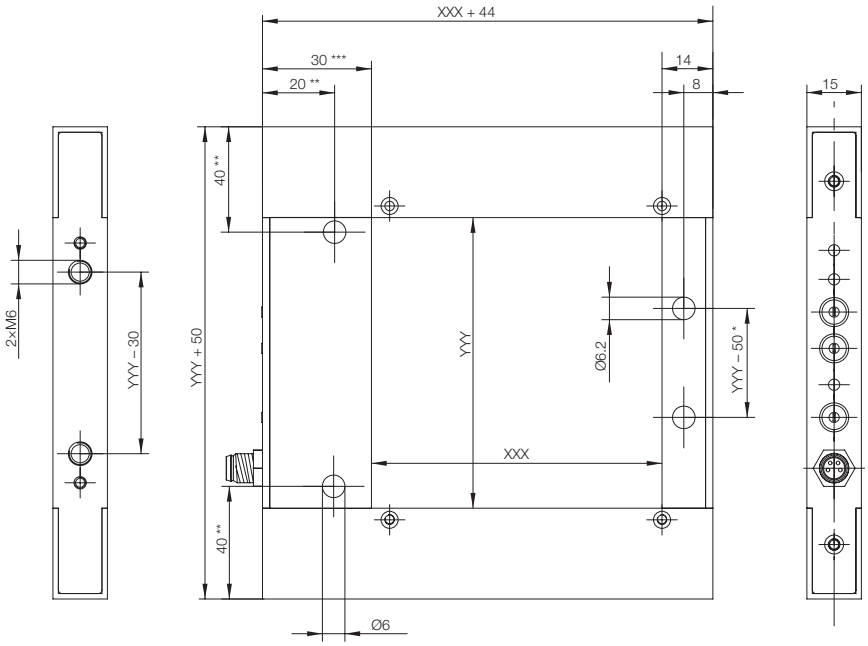


XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* Mounting holes for YYY < 080 not present
** Mounting holes for YYY < 120 not present
*** 40 mm for YYY = 040

Static optical window sensors BOW BOW (Modular)

BOW	**BOW**	**BOW**
80×80 mm	**80×120 mm**	**120×80 mm**
0.5 ms	**0.5 ms**	**0.75 ms**
1000 Hz	**1000 Hz**	**667 Hz**
BOW002Y	**BOW002Z**	**BOW0030**
BOW B-0808-DU-C-S75	BOW B-1208-DU-C-S75	BOW B-0812-DU-C-S75
2 mm	2 mm	2 mm
4 mm	4 mm	4 mm
8 mm	8 mm	8 mm
15...30 VDC	15...30 VDC	15...30 VDC
< 400 mA	< 400 mA	< 400 mA
PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected
Static	Static	Static
Dark switching, NO/NC selection	Dark switching, NO/NC selection	Dark switching, NO/NC selection
Yes/Yes	Yes/Yes	Yes/Yes
Infrared, clocked	Infrared, clocked	Infrared, clocked
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
Red LED	Red LED	Red LED
50 ms, selectable	50 ms, selectable	50 ms, selectable
IP 65	IP 65	IP 65
–10...+55 °C	–10...+55 °C	–10...+55°C
Anodized aluminum	Anodized aluminum	Aluminum, black anodized
PMMA	PMMA	PMMA
M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin



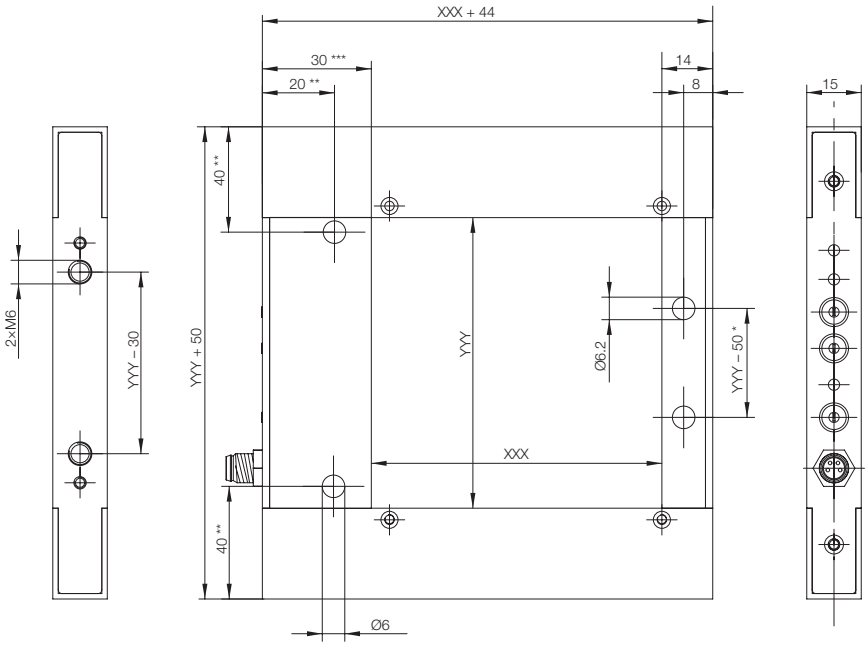
XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* Mounting holes for YYY < 080 not present
** Mounting holes for YYY < 120 not present
*** 40 mm for YYY = 040

Static optical window sensors BOW (Modular)

Type		**BOW**	**BOW**
Active area (XXX × YYY)		**120×120 mm**	**120×160 mm**
Switching delay		**0.75 ms**	**0.75 ms**
Counting frequency		**667 Hz**	**667 Hz**
PNP/ NC/	**Order code**	**BOW0031**	**BOW0032**
NPN NO	Part number	BOW B-1212-DU-C-S75	BOW B-1612-DU-C-S75
Resolution	High (H)	2 mm	2 mm
Switch setting:	Medium (M)	4 mm	4 mm
	Low (L)	8 mm	8 mm
Supply voltage U_S		15...30 VDC	15...30 VDC
Intrinsic current consumption		< 400 mA	< 400 mA
Output		PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected
Function principle		Static	Static
Switching type		Dark switching, NO/NC selection	Dark switching, NO/NC selection
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Light type		Infrared, clocked	Infrared, clocked
Function indicator	Operation	Green LED	Green LED
	Output signal	Yellow LED	Yellow LED
	Alarm	Red LED	Red LED
Pulse stretching (only dyn. function)		50 ms, selectable	50 ms, selectable
Degree of protection as per IEC 60529		IP 65	IP 65
Ambient temperature T_a		–10...+55 °C	–10...+55 °C
Material	Housing	Anodized aluminum	Anodized aluminum
	Filter material	PMMA	PMMA
Connection		M8 connector, 4-pin	M8 connector, 4-pin

Connection and operating elements on page 87

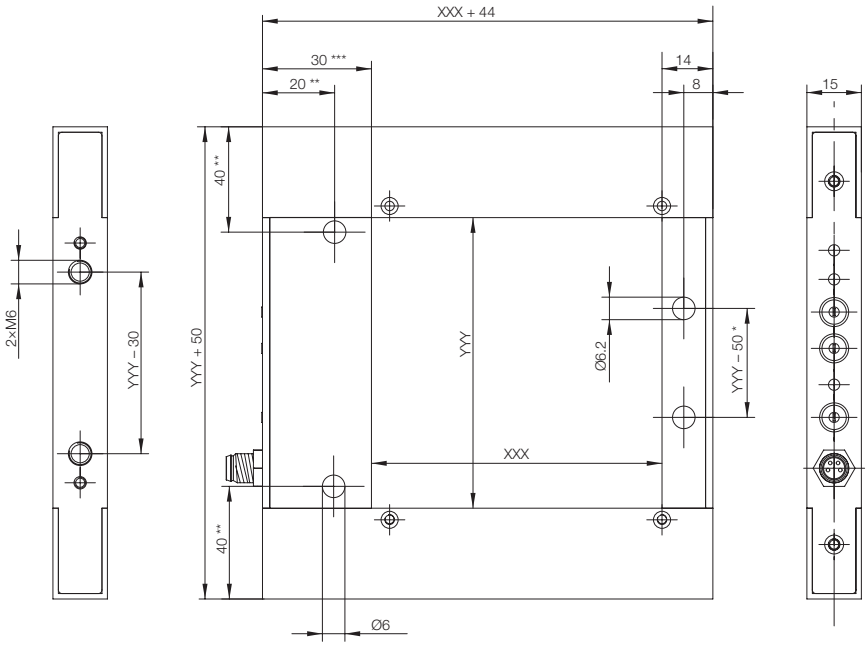


XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* Mounting holes for YYY < 080 not present
** Mounting holes for YYY < 120 not present
*** 40 mm for YYY = 040

Static optical window sensors BOW (Modular)

BOW	**BOW**	**BOW**
160×120 mm	**160×160 mm**	**160×200 mm**
1.0 ms	**1.0 ms**	**1.0 ms**
500 Hz	**500 Hz**	**500 Hz**
BOW0033	**BOW0034**	**BOW0035**
BOW B-1216-DU-C-S75	BOW B-1616-DU-C-S75	BOW B-2016-DU-C-S75
2 mm	2 mm	2 mm
4 mm	4 mm	4 mm
8 mm	8 mm	8 mm
15...30 VDC	15...30 VDC	15...30 VDC
< 400 mA	< 400 mA	< 400 mA
PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected
Static	Static	Static
Dark switching, NO/NC selection	Dark switching, NO/NC selection	Dark switching, NO/NC selection
Yes/Yes	Yes/Yes	Yes/Yes
Infrared, clocked	Infrared, clocked	Infrared, clocked
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
Red LED	Red LED	Red LED
50 ms, selectable	50 ms, selectable	50 ms, selectable
IP 65	IP 65	IP 65
–10...+55 °C	–10...+55 °C	–10...+55°C
Anodized aluminum	Anodized aluminum	Aluminum, black anodized
PMMA	PMMA	PMMA
M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin

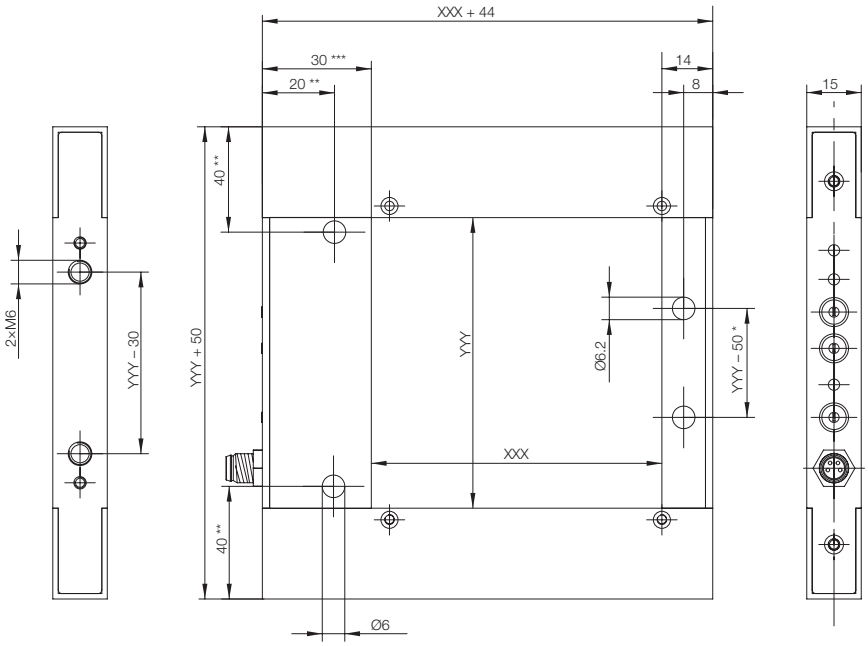


XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* Mounting holes for YYY < 080 not present
** Mounting holes for YYY < 120 not present
*** 40 mm for YYY = 040

Static optical window sensors BOW (Modular)

Type		**BOW**	**BOW**
Active area (XXX × YYY)		**200×160 mm**	**200×200 mm**
Switching delay		**1.25 ms**	**1.25 ms**
Counting frequency		**400 Hz**	**400 Hz**
PNP/ NC/	**Order code**	**BOW0036**	**BOW0037**
NPN NO	Part number	BOW B-1620-DU-C-S75	BOW B-2020-DU-C-S75
Resolution	High (H)	2 mm	2 mm
Switch setting:	Medium (M)	4 mm	4 mm
	Low (L)	8 mm	8 mm
Supply voltage U_S		15...30 VDC	15...30 VDC
Intrinsic current consumption		< 400 mA	< 400 mA
Output		PNP and NPN simultaneously, 200 mA, short-circuit protected	PNP and NPN simultaneously, 200 mA, short-circuit protected
Function principle		Static	Static
Switching type		Dark switching, NO/NC selection	Dark switching, NO/NC selection
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Light type		Infrared, clocked	Infrared, clocked
Function indicator	Operation	Green LED	Green LED
	Output signal	Yellow LED	Yellow LED
	Alarm	Red LED	Red LED
Pulse stretching (only dyn. function)		50 ms, selectable	50 ms, selectable
Degree of protection as per IEC 60529		IP 65	IP 65
Ambient temperature T_a		–10...+55 °C	–10...+55 °C
Material	Housing	Anodized aluminum	Anodized aluminum
	Filter material	PMMA	PMMA
Connection		M8 connector, 4-pin	M8 connector, 4-pin

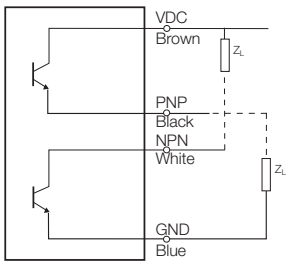


XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* Mounting holes for YYY < 080 not present
** Mounting holes for YYY < 120 not present
*** 40 mm for YYY = 040

Static optical window sensors BOW (Modular)
Connection, operating elements

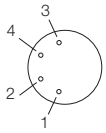
Wiring diagrams



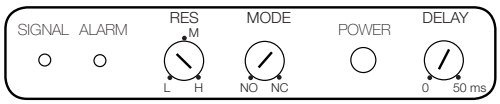
PNP/NPN

Connection configuration

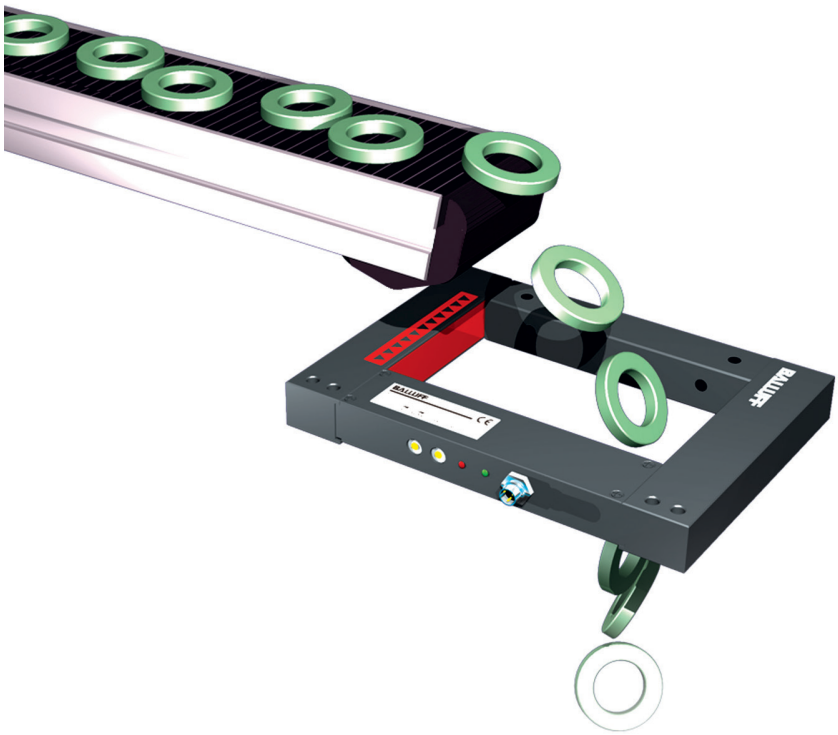
1 (brown)	VDC
2 (white)	signal output NPN
3 (blue)	GND
4 (black)	signal output PNP



Operating elements



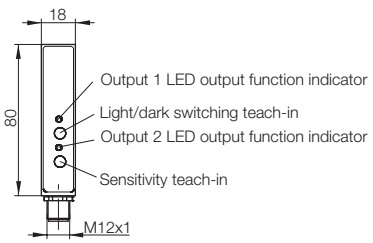
■ Power indicator	(Power)	Green LED
■ Function indicator	(Signal)	Yellow LED
■ Warning indicator	(Alarm)	Red LED
■ Object resolution	(Res)	Low (L), Medium (M), High (H)
■ Switching function	(Mode)	Normally Open (NO), Normally Closed (NC)
■ Pulse stretching	(Delay)	Off (0), 50 ms

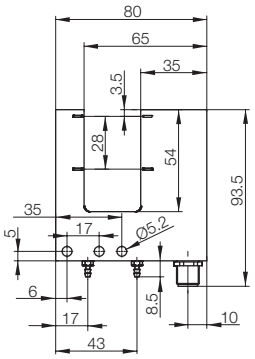


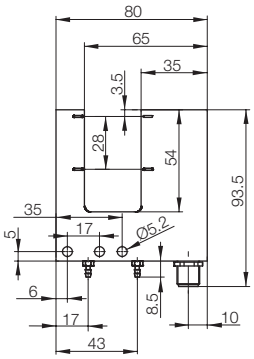
Analog fork sensors BGL

Series			**BGL analog**	**BGL analog**
Fork opening			**30 mm**	**30 mm**
Fork depth			**54 mm**	**54 mm**
PNP 2 switching outputs	NO/NC	**Order code**	**BGL002Z**	
		Part number	BGL 30C-001-S4	
PNP 1 analog and 1 switching/ error output	NO/NC	**Order code**		**BGL0031**
		Part number		BGL 30C-003-S4
PNP 2 switching outputs with DSC	NO/NC	**Order code**	**BGL0036**	
		Part number	BGL 30C-009-S4	
Supply voltage U_S			18...30 V DC	18...30 V DC
No-load supply current I_0 max.			≤ 20 mA	≤ 20 mA
Output current			100 mA	100 mA
Analog output				4...20 mA
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Teach-in	Teach-in
Emitter, light type			Red light	Red light
Wavelength			633 Nm	633 Nm
Resolution (smallest discernible part)			≤ 80 µm	≤ 80 µm
Repeat accuracy			0.15 mm	0.15 mm
Switching hysteresis			< 0.4 mm	< 0.4 mm
Output function indicator			2× yellow LED	2× yellow LED
Response time			< 1 ms	< 1 ms
Switching frequency			500 Hz	500 Hz
Measurement field length			28 mm	28 mm
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T_a			–5...+55°C	–5...+55°C
Ambient light limit according to			EN 60947-5-2	EN 60947-5-2
Material		Housing	Anodized aluminum	Anodized aluminum
		Optical surface	PMMA	PMMA
Connection			M12 connector, 4-pin	M12 connector, 4-pin

For wiring diagrams and suitable connectors, see page 91.

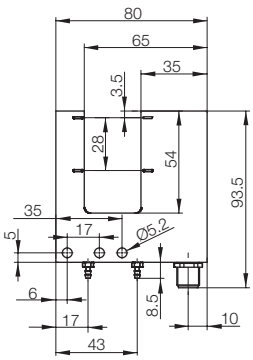


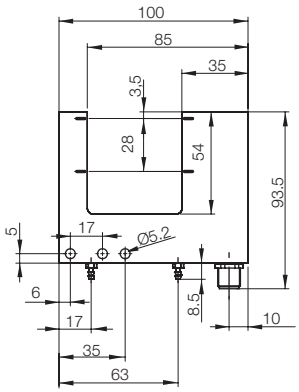


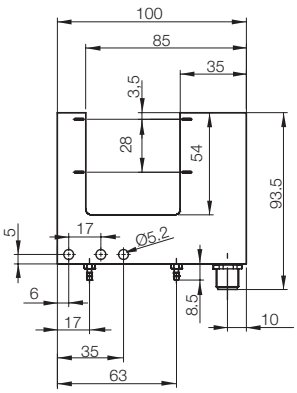


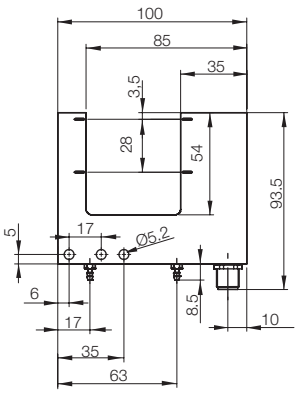
Analog fork sensors BGL

BGL analog	**BGL analog**	**BGL analog**	**BGL analog**
30 mm	**50 mm**	**50 mm**	**50 mm**
54 mm	**54 mm**	**54 mm**	**54 mm**
	BGL0037		
	BGL 50C-001-S4		
BGL0033		**BGL0039**	**BGL003C**
BGL 30C-005-S4		BGL 50C-003-S4	BGL 50C-005-S4
	BGL003H		
	BGL 50C-009-S4		
18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
100 mA	100 mA	100 mA	100 mA
0...10 V DC		4...20 mA	0...10 V DC
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Teach-in	Teach-in	Teach-in	Teach-in
Red light	Red light	Red light	Red light
633 Nm	633 Nm	633 Nm	633 Nm
≤ 80 µm	≤ 80 µm	≤ 80 µm	≤ 80 µm
0.15 mm	0.15 mm	0.15 mm	0.15 mm
< 0.4 mm	< 0.4 mm	< 0.4 mm	< 0.4 mm
2× yellow LED	2× yellow LED	2× yellow LED	2× yellow LED
< 1 ms	< 1 ms	< 1 ms	< 1 ms
500 Hz	500 Hz	500 Hz	500 Hz
28 mm	28 mm	28 mm	28 mm
IP 67	IP 67	IP 67	IP 67
–5...+55°C	–5...+55°C	–5...+55°C	–5...+55°C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin









Optical Window, Fork and Angle Sensors

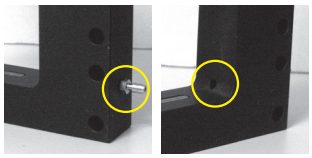
Fork sensors BGL with IO-Link

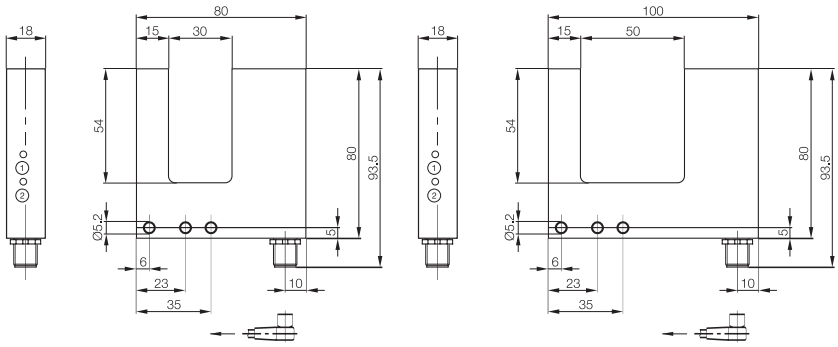
Series		**BGL analog, Series C Premium**	**BGL analog, Series C Premium**
Fork opening		**30 mm**	**50 mm**
Fork depth		**54 mm**	**54 mm**
PNP With IO-Link	**Order code**	**BGL0035**	**BGL003F**
	Part number	BGL 30C-007-S4	BGL 50C-007-S4
Supply voltage U_S		18...30 V DC	18...30 V DC
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA
Output current		Max. 100 mA per output	Max. 100 mA per output
Analog output		4...20 mA	4...20 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Response time		≤ 1 ms	≤ 1 ms
Settings		2× teach button	2× teach button
Emitter, light type		Red light	Red light
Wavelength		633 Nm	633 Nm
Resolution		0.1 mm	0.1 mm
Repeat accuracy		0.15 mm	0.15 mm
Switching hysteresis		< 0.4 mm	< 0.4 mm
Hysteresis		±0.8%	±0.8%
Output function indicator		2× yellow LED	2× yellow LED
Response time		2 ms	2 ms
Switching frequency		500 Hz	500 Hz
Measurement field length		28 mm	28 mm
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–5...+55 °C	–5...+55 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Anodized aluminum	Anodized aluminum
	Optical surface	PMMA	PMMA
Connection		M12 connector, 4-pin, A-coded	M12 connector, 4-pin, A-coded

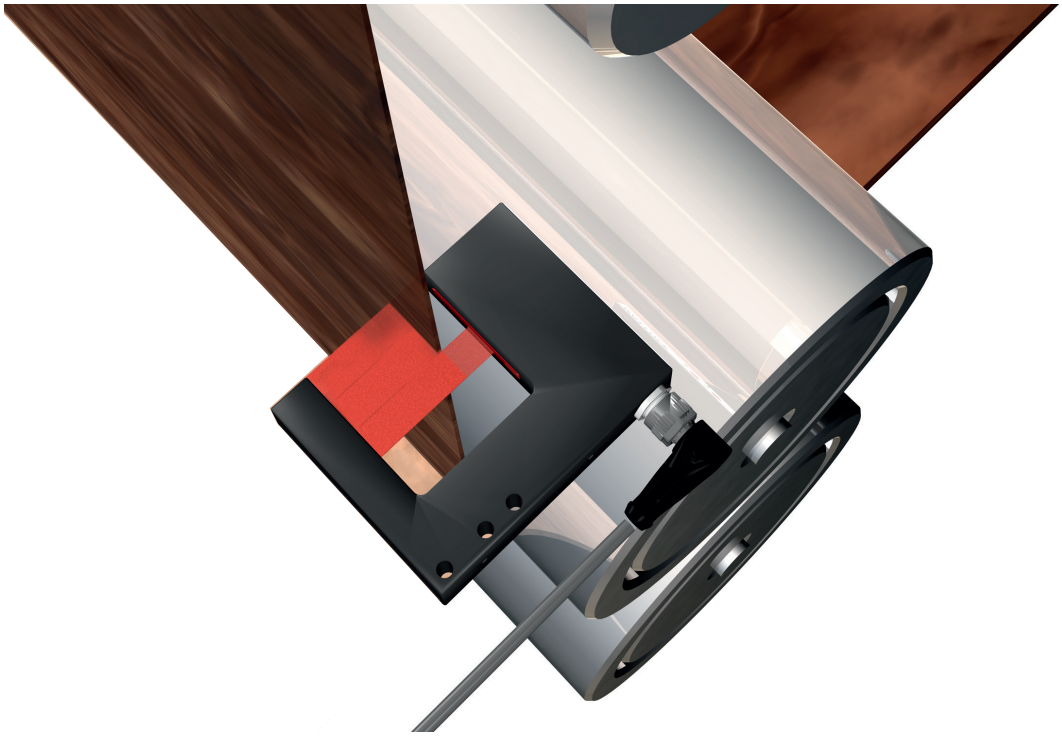
IO-Link

Mode	COM 2	COM 2
Transfer rate	38.4 kbaud	38.4 kbaud
IO-Link process data length	2 input bytes	2 input bytes
Value range	000 H...03FF H	000 H...03FF H
Diagnostics	Contamination	Contamination
Parameters	Switching points/switching range, button disable, NO/NC switch, analog value characteristics	Switching points/switching range, button disable, NO/NC switch, analog value characteristics

Integrated air rinsing nozzles for the emitter and receiver optics, so that no dust can accumulate. Connection via standard pneumatic system.

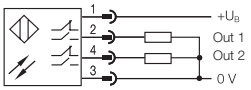




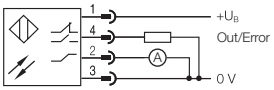


Wiring diagrams

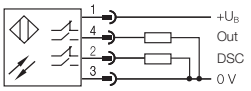
BGL... 001-S4



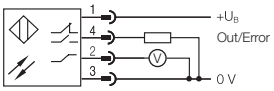
BGL... 003-S4



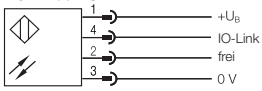
BGL... 009-S4



BGL... 005-S4



BGL... 007-S4



Suitable connection cable
(please order separately)

Size	Design	Cable material	Color	Length	Order code
M12, 4-pin	Straight	PUR	Black	2 m	**BCC032F**
M12, 4-pin	Straight	PVC	Gray	2 m	**BCC0367**
M12, 4-pin	Angled	PUR	Black	2 m	**BCC032Y**
M12, 4-pin	Angled	PVC	Gray	2 m	**BCC036N**

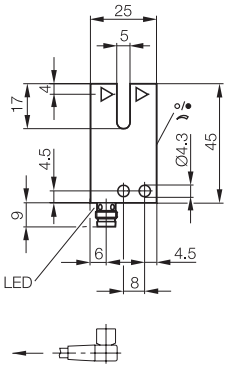
Connection cable without LED are suitable for PNP and NPN sensors.

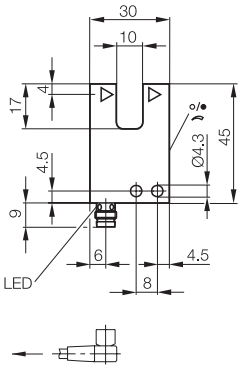
More electric accessories: A large selection of connectors and cables in a wide range of cable materials, colors and lengths can be found in our **Industrial Networking and Connectivity catalog.**

Red light fork sensors BGL

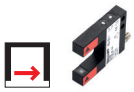
Series		**BGL**	**BGL**
Fork opening		**5 mm**	**10 mm**
Fork depth		**17 mm**	**17 mm**
PNP NO/NC	**Order code**	**BGL001W**	**BGL0001**
	Part number	BGL 5A-001-S49	BGL 10A-001-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
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
Output function indicator		Yellow LED	Yellow LED
Response time		0.166 ms	0.166 ms
Switching frequency		3 kHz	3 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

Connector orientation

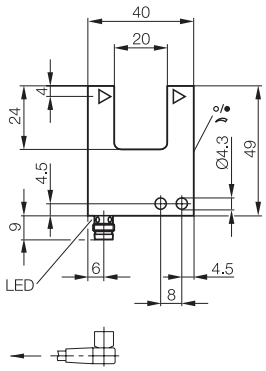


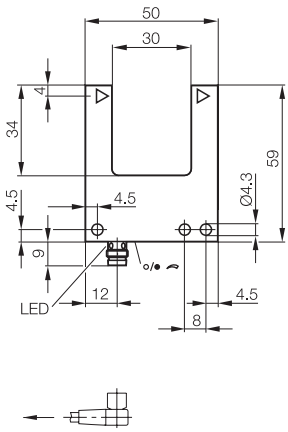


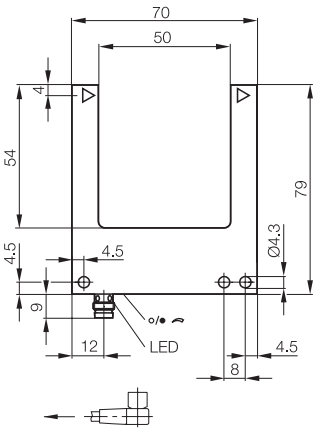
Red light fork sensors BGL

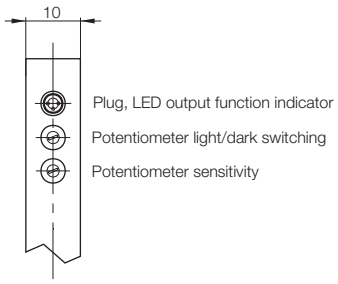


BGL	**BGL**	**BGL**
20 mm	**30 mm**	**50 mm**
24 mm	**34 mm**	**54 mm**
BGL000R	**BGL0016**	**BGL001J**
BGL 20A-001-S49	BGL 30A-001-S49	BGL 50A-001-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
LED, red light	LED, red light	LED, red light
640 Nm	640 Nm	640 Nm
0.3 mm	0.3 mm	0.4 mm
20 µm	20 µm	40 µm
≤ 0.1 mm	≤ 0.1 mm	≤ 0.15 mm
Yellow LED	Yellow LED	Yellow LED
0.33 ms	0.33 ms	0.33 ms
1.5 kHz	1.5 kHz	1.5 kHz
IP 67	IP 67	IP 67
–10...+60 °C	–10...+60 °C	–10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



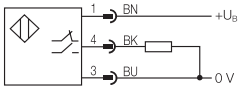






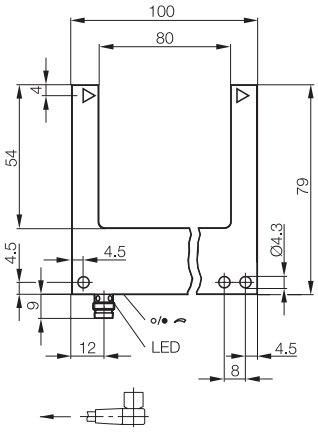
Wiring diagram

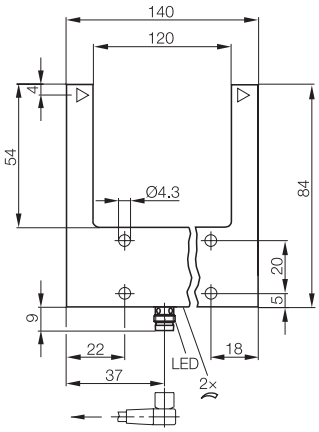
PNP



Red light fork sensors BGL

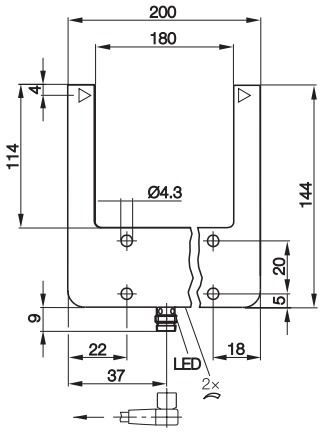
Series		**BGL**	**BGL**
Fork opening		**80 mm**	**120 mm**
Fork depth		**54 mm**	**54 mm**
PNP NO/NC	**Order code**	**BGL0023**	**BGL0007**
	Part number	BGL 80A-001-S49	BGL 120A-001-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		LED, red light	LED, red light
Wavelength		640 Nm	640 Nm
Resolution (smallest discernible part)		0.4 mm	0.5 mm
Repeat accuracy		60 µm	80 µm
Switching hysteresis		≤ 0.2 mm	≤ 0.2 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.33 ms	0.33 ms
Switching frequency		1.5 kHz	1.5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

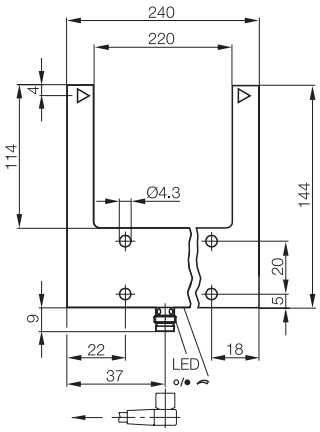


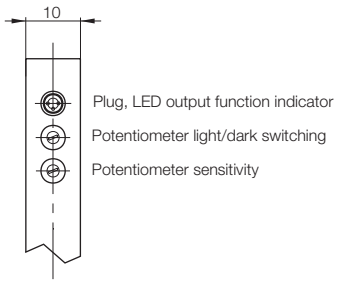


Red light fork sensors BGL

	BGL	**BGL**
	180 mm	**220 mm**
	114 mm	**114 mm**
	BGL000J	**BGL0010**
	BGL 180A-001-S49	BGL 220A-001-S49
	10...30 V DC	10...30 V DC
	≤ 35 mA	≤ 35 mA
	200 mA	200 mA
	Light/dark switching (selectable)	Light/dark switching (selectable)
	Yes/Yes	Yes/Yes
	Potentiometer, 270°	Potentiometer, 270°
	LED, red light	LED, red light
	640 Nm	640 Nm
	0.6 mm	0.6 mm
	80 µm	80 µm
	≤ 0.2 mm	≤ 0.2 mm
	Yellow LED	Yellow LED
	0.33 ms	0.33 ms
	1.5 kHz	1.5 kHz
	IP 67	IP 67
	–10...+60 °C	–10...+60 °C
	EN 60947-5-2	EN 60947-5-2
	Cast zinc, painted	Cast zinc, painted
	Glass	Glass
	M8 connector, 3-pin	M8 connector, 3-pin

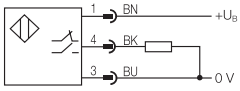




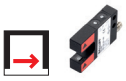


Wiring diagram

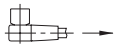
PNP

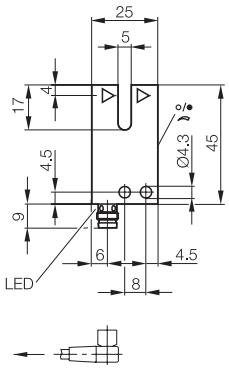


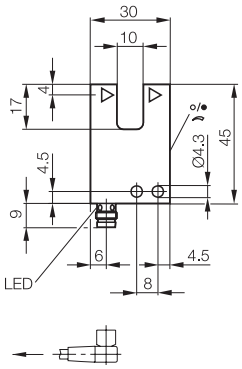
Pin Point fork sensors BGL



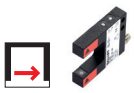
Series		**BGL**	**BGL**
Fork opening		**5 mm**	**10 mm**
Fork depth		**17 mm**	**17 mm**
PNP NO/NC	**Order code**	**BGL001Z**	**BGL0003**
	Part number	BGL 5A-005-S49	BGL 10A-005-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Red light, pin point	Red light, pin point
Wavelength		640 Nm	640 Nm
Resolution (smallest discernible part)		0.2 mm	0.2 mm
Repeat accuracy		20 µm	20 µm
Switching hysteresis		≤ 70 µm	≤ 70 µm
Output function indicator		Yellow LED	Yellow LED
Response time		0.1 ms	0.1 ms
Switching frequency		5 kHz	5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin


Connector orientation

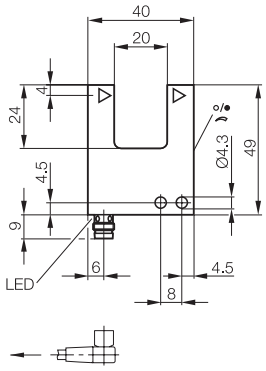


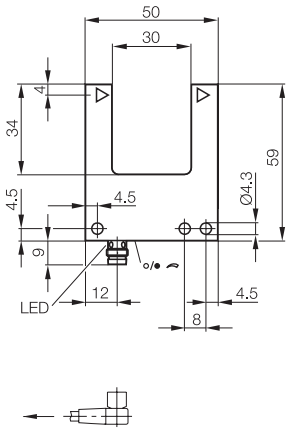


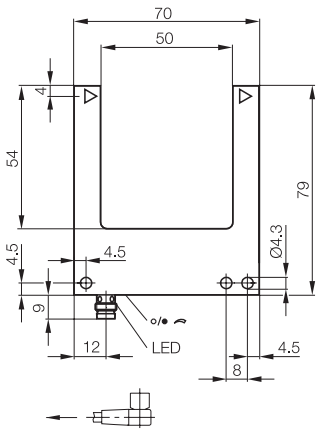
Pin Point fork sensors BGL

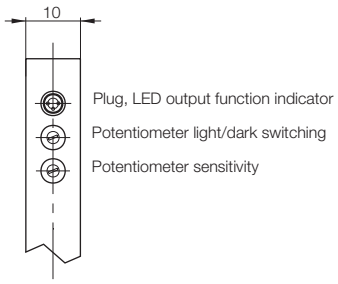


BGL	**BGL**	**BGL**
20 mm	**30 mm**	**50 mm**
24 mm	**34 mm**	**54 mm**
BGL000U	**BGL001C**	**BGL001P**
BGL 20A-005-S49	BGL 30A-005-S49	BGL 50A-005-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Red light, pin point	Red light, pin point	Red light, pin point
640 Nm	640 Nm	640 Nm
0.2 mm	0.2 mm	0.3 mm
20 µm	20 µm	30 µm
≤ 70 µm	≤ 70 µm	≤ 0.1 mm
Yellow LED	Yellow LED	Yellow LED
0.1 ms	0.1 ms	0.1 ms
5 kHz	5 kHz	5 kHz
IP 67	IP 67	IP 67
–10...+60 °C	–10...+60 °C	–10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



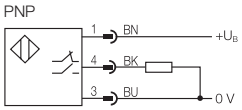






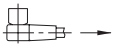
Wiring diagram

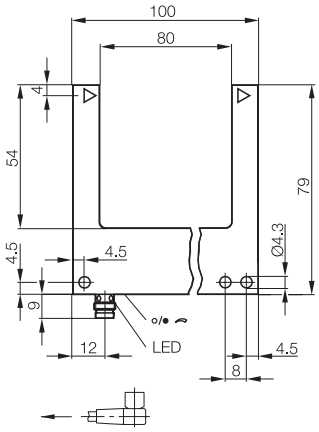
PNP

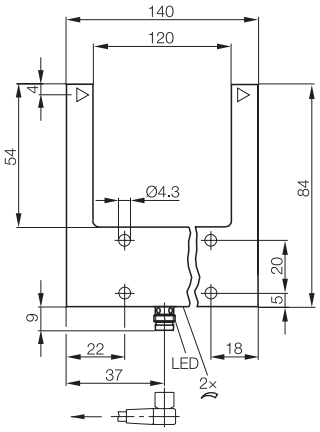


Pin Point fork sensors BGL

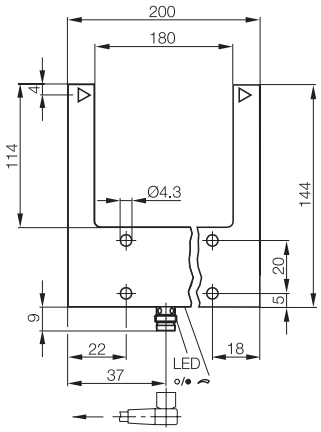
Series		**BGL**	**BGL**
Fork opening		**80 mm**	**120 mm**
Fork depth		**54 mm**	**54 mm**
PNP NO/NC	**Order code**	**BGL0027**	**BGL000C**
	Part number	BGL 80A-005-S49	BGL 120A-005-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Red light, pin point	Red light, pin point
Wavelength		640 Nm	640 Nm
Resolution (smallest discernible part)		0.4 mm	0.5 mm
Repeat accuracy		40 µm	50 µm
Switching hysteresis		≤ 0.15 mm	≤ 0.15 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.1 ms	0.1 ms
Switching frequency		5 kHz	5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

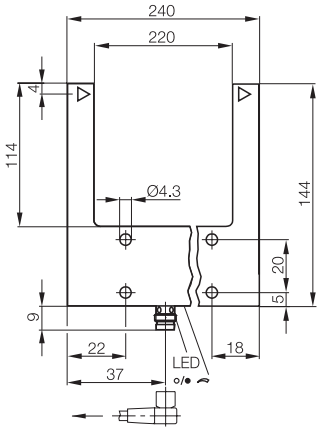


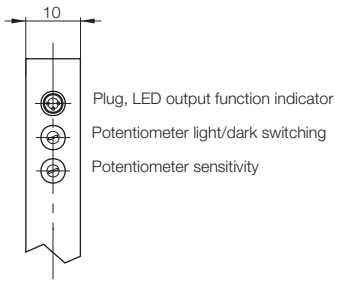




	BGL	**BGL**
	180 mm	**220 mm**
	114 mm	**114 mm**
	BGL000L	**BGL0012**
	BGL 180A-005-S49	BGL 220A-005-S49
	10...30 V DC	10...30 V DC
	≤ 35 mA	≤ 35 mA
	200 mA	200 mA
	Light/dark switching (selectable)	Light/dark switching (selectable)
	Yes/Yes	Yes/Yes
	Potentiometer, 270°	Potentiometer, 270°
	Red light, pin point	Red light, pin point
	640 Nm	640 Nm
	0.6 mm	0.6 mm
	60 µm	60 µm
	≤ 0.2 mm	≤ 0.2 mm
	Yellow LED	Yellow LED
	0.1 ms	0.1 ms
	5 kHz	5 kHz
	IP 67	IP 67
	–10...+60 °C	–10...+60 °C
	EN 60947-5-2	EN 60947-5-2
	Cast zinc, painted	Cast zinc, painted
	Glass	Glass
	M8 connector, 3-pin	M8 connector, 3-pin

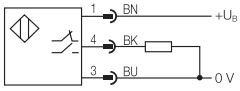






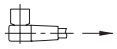
Wiring diagram

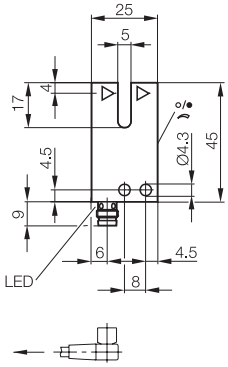
PNP

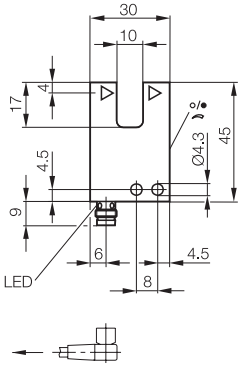


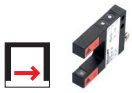
Infrared fork sensors BGL

Series		**BGL**	**BGL**
Fork opening		**5 mm**	**10 mm**
Fork depth		**17 mm**	**17 mm**
PNP NO/NC	**Order code**	**BGL0021**	**BGL0005**
	Part number	BGL 5A-007-S49	BGL 10A-007-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Infrared	Infrared
Wavelength		880 Nm	880 Nm
Resolution (smallest discernible part)		0.8 mm	0.8 mm
Repeat accuracy		0.1 mm	0.1 mm
Switching hysteresis		≤ 0.3 mm	≤ 0.3 mm
Power-on indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Response time		0.166 ms	0.166 ms
Switching frequency		3 kHz	3 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

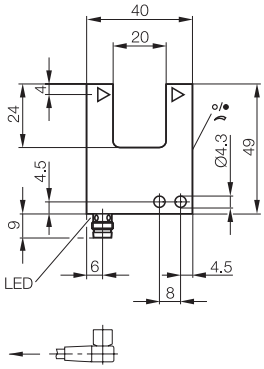

Connector orientation

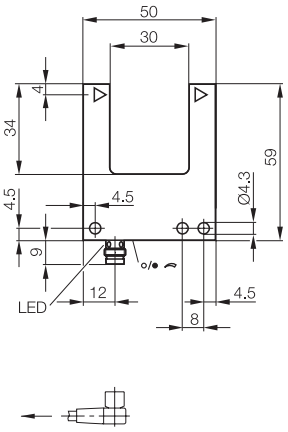


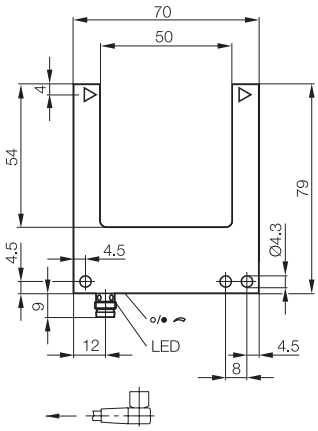


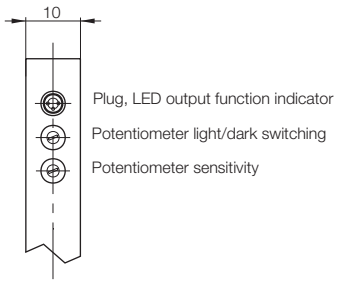


BGL	**BGL**	**BGL**
20 mm	**30 mm**	**50 mm**
24 mm	**34 mm**	**54 mm**
BGL000Y	**BGL001F**	**BGL001T**
BGL 20A-007-S49	BGL 30A-007-S49	BGL 50A-007-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Infrared	Infrared	Infrared
880 Nm	880 Nm	880 Nm
0.8 mm	0.8 mm	1 mm
0.1 mm	0.1 mm	0.12 mm
≤ 0.3 mm	≤ 0.3 mm	≤ 0.3 mm
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
0.25 ms	0.25 ms	0.25 ms
2 kHz	2 kHz	2 kHz
IP 67	IP 67	IP 67
–10...+60 °C	–10...+60 °C	–10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin

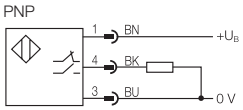






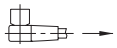


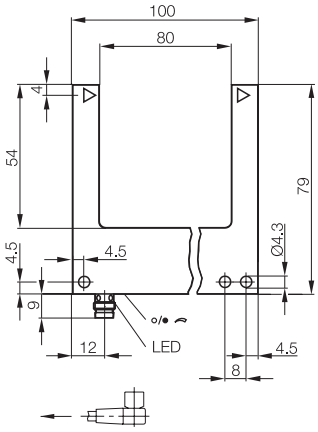
Wiring diagram

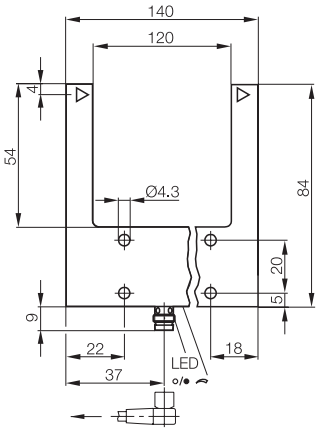


Infrared fork sensors BGL

Series		**BGL**	**BGL**
Fork opening		**80 mm**	**120 mm**
Fork depth		**54 mm**	**54 mm**
PNP NO/NC	**Order code**	**BGL0029**	**BGL000F**
	Part number	BGL 80A-007-S49	BGL 120A-007-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Infrared	Infrared
Wavelength		880 Nm	880 Nm
Resolution (smallest discernible part)		1.2 mm	1.5 mm
Repeat accuracy		0.15 mm	0.2 mm
Switching hysteresis		≤ 0.4 mm	≤ 0.5 mm
Power-on indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Response time		0.25 ms	0.5 ms
Switching frequency		2 kHz	1 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

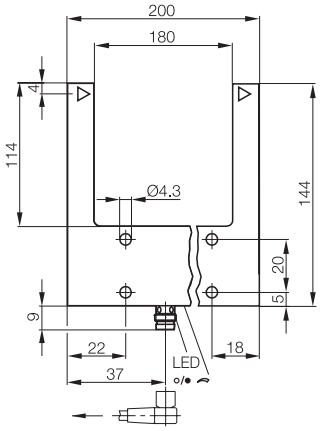

Connector orientation

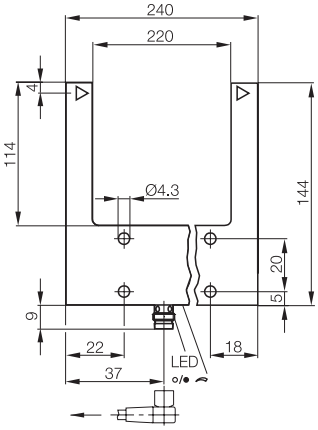


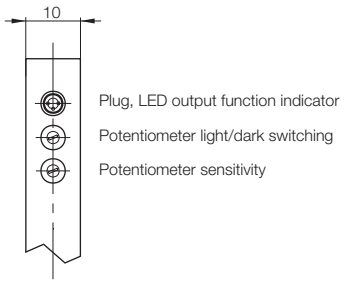


Infrared fork sensors BGL

	BGL	**BGL**
	180 mm	**220 mm**
	114 mm	**114 mm**
	BGL000N	**BGL0014**
	BGL 180A-007-S49	BGL 220A-007-S49
	10...30 V DC	10...30 V DC
	≤ 35 mA	≤ 35 mA
	200 mA	200 mA
	Light/dark switching (selectable)	Light/dark switching (selectable)
	Yes/Yes	Yes/Yes
	Potentiometer, 270°	Potentiometer, 270°
	Infrared	Infrared
	880 Nm	880 Nm
	1.5 mm	1.5 mm
	0.2 mm	0.2 mm
	≤ 0.5 mm	≤ 0.5 mm
	Green LED	Green LED
	Yellow LED	Yellow LED
	0.25 ms	0.25 ms
	2 kHz	2 kHz
	IP 67	IP 67
	–10...+60 °C	–10...+60 °C
	EN 60947-5-2	EN 60947-5-2
	Cast zinc, painted	Cast zinc, painted
	Glass	Glass
	M8 connector, 3-pin	M8 connector, 3-pin

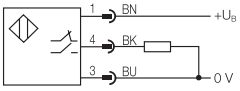




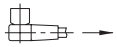


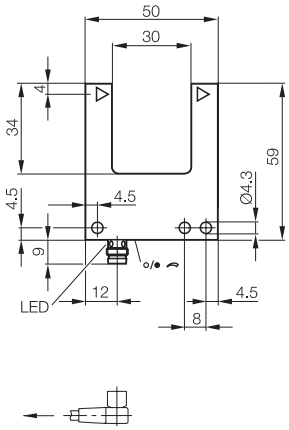
Wiring diagram

PNP

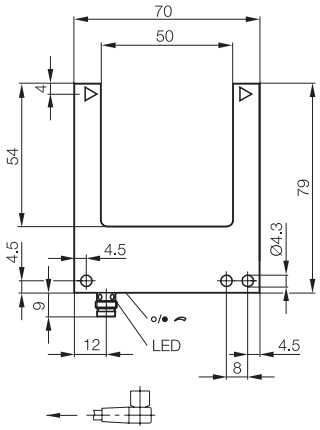


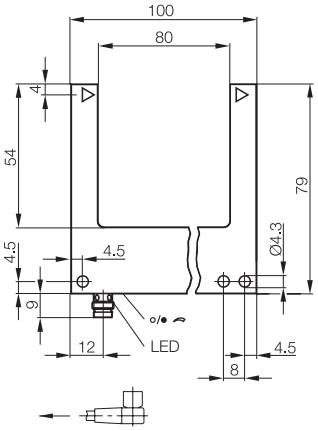
Series			**BGL**
Fork opening			**30 mm**
Fork depth			**34 mm**
PNP	NO/NC	**Order code**	**BGL0019**
		Part number	BGL 30A-003-S49
Supply voltage U_S			10...30 V DC
No-load supply current I_0 max.			≤ 20 mA
Output current			200 mA
Switching type			Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes
Settings			Potentiometer, 270°
Emitter, light type			Laser, red light
Wavelength			650 Nm
Laser class			1
Resolution (smallest discernible part)			50 µm
Repeat accuracy			10 µm
Switching hysteresis			20 µm
Output function indicator			Yellow LED
Response time			0.1 ms
Switching frequency			5 kHz
Degree of protection as per IEC 60529			IP 67
Ambient temperature T_a			–10...+60 °C
Ambient light limit according to			EN 60947-5-2
Material		Housing	Cast zinc, painted
		Optical surface	Glass
Connection			M8 connector, 3-pin

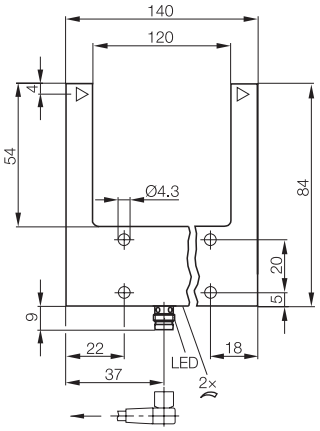

Connector orientation

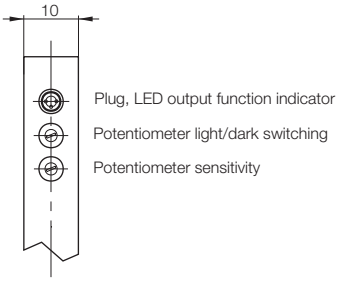


BGL	**BGL**	**BGL**
50 mm	**80 mm**	**120 mm**
54 mm	**54 mm**	**54 mm**
BGL001M	**BGL0025**	**BGL0009**
BGL 50A-003-S49	BGL 80A-003-S49	BGL 120A-003-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Laser, red light	Laser, red light	Laser, red light
650 Nm	650 Nm	650 Nm
1	1	1
80 µm	0.1 mm	0.15 mm
10 µm	10 µm	5 µm
25 µm	30 µm	50 µm
Yellow LED	Yellow LED	Yellow LED
0.1 ms	0.1 ms	0.1 ms
5 kHz	5 kHz	5 kHz
IP 67	IP 67	IP 67
–10...+60 °C	–10...+60 °C	–10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



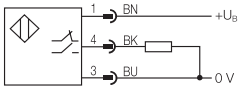






Wiring diagram

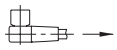
PNP



Fork sensors BGL for fluid detection

Fluid detection
The photoelectric sensors with fork openings of 30 mm and 80 mm are ideal for the level detection of clear, colored or cloudy liquids with a water proportion > 15% through transparent container walls. This through-beam fork sensor can be used, for example, to detect aqueous liquids in small, transparent hoses with a diameter ≤ 6 mm.

Series			
Fork opening			
Fork depth			
PNP	NO/	**Order code**	
Fluid detection	NC	Part number	
Supply voltage U_S			
No-load supply current I_0 max.			
Output current			
Switching type			
Polarity reversal/short-circuit protected			
Settings			
Special features			
Emitter, light type			
Wavelength			
Resolution (smallest discernible part)			
Repeat accuracy			
Switching hysteresis			
Power-on indicator			
Output function indicator			
Response time			
Switching frequency			
Degree of protection as per IEC 60529			
Ambient temperature T_a			
Ambient light limit according to			
Material		Housing	
		Optical surface	
Connection			


Connector orientation

Suitable connection cable
(please order separately)

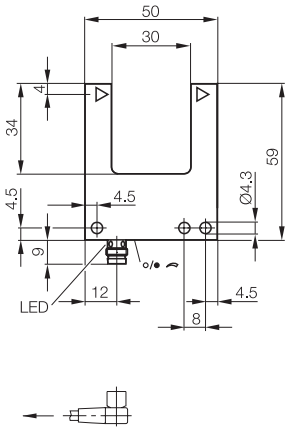
Size	Design	Cable material	Color	Length	Order code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

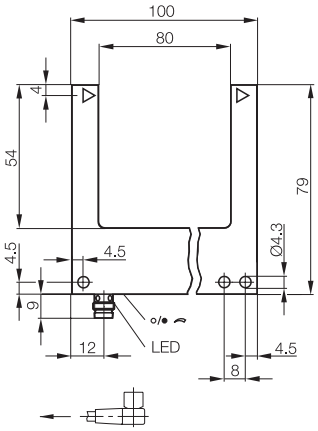
Connection cable without LED are suitable for PNP and NPN sensors.

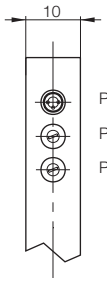
More electric accessories: A large selection of connectors and cables in a wide range of cable materials, colors and lengths can be found in our **Industrial Networking and Connectivity catalog.**

Mechanical accessories: You can find a large selection of mounting components of all types, such as clamping holders, mounting brackets and the Balluff mounting system BMS, in our **Accessory Product Line catalog**.

BGL for fluid detection	**BGL for fluid detection**
30 mm	**80 mm**
34 mm	**54 mm**
BGL003J	**BGL003L**
BGL 30A-011-S49	BGL 80A-011-S49
10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA
200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°
Detects liquids	Detects liquids
with 15% or more water	with 15% or more water
Infrared	Infrared
1480 Nm	1480 Nm
0.6 mm	0.8 mm
0.1 mm	0.1 mm
≤ 0.2 mm	≤ 0.2 mm
Green LED	Green LED
Yellow LED	Yellow LED
0.25 ms	0.25 ms
2 kHz	2 kHz
IP 67	IP 67
–10...+60 °C	–10...+60 °C
EN 60947-5-2	EN 60947-5-2
Cast zinc, painted	Cast zinc, painted
Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin







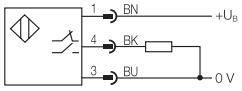
Plug, LED output function indicator

Potentiometer light/dark switching

Potentiometer sensitivity

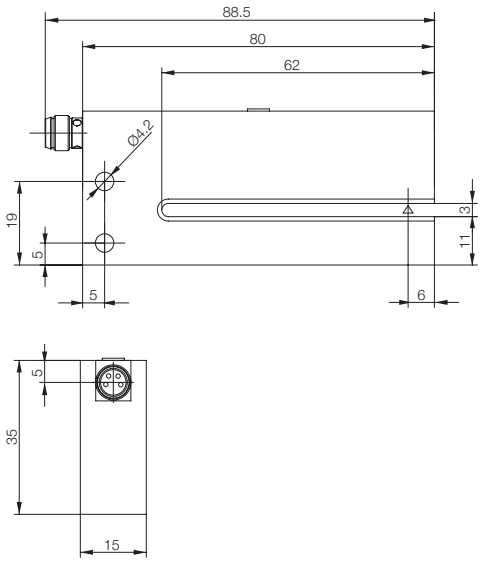
Wiring diagram

PNP



Fork sensors BGL for label detection

Series			**BGL for label detection**	**BGL for label detection**
Fork opening			**3 mm**	**3 mm**
Fork depth			**62 mm**	**62 mm**
PNP/NPN	NO/	**Order code**	**BGL003Y**	**BGL003Z**
Push/Pull	NC	Part number	BGL 3D-002-S75	BGL 3D-001-S75
Supply voltage U_S			10...30 V DC	10...30 V DC
No-load supply current I_0 max.			≤ 40 mA	≤ 40 mA
Output current			200 mA	200 mA
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Emitter, light type			Infrared	Infrared
Wavelength			880 Nm	880 Nm
Resolution (smallest discernible part)			**0.5 mm**	**1 mm**
Repeat accuracy			50 µs	50 µs
Switching hysteresis			< 0.4 mm	< 0.4 mm
Power-on indicator			Green LED	Green LED
Function principle			Unclocked	Unclocked
Switching frequency			10 kHz	10 kHz
Sensitivity setting			**Teach via button/ ext. input**	**Multiple potentiometer**
Degree of protection as per IEC 60529			IP 65	IP 65
Ambient temperature T_a			–10...+60 °C	–10...+60 °C
Permissible ambient light			3000 lux	3000 lux
Material		Housing	Anodized aluminum	Anodized aluminum
Connection			M8 connector, 4-pin	M8 connector, 4-pin



Setting

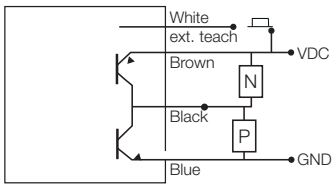
BGL003Y, BGL 3D-002-S75

1. Insert labels, press button briefly (or external: min. 50 ms)	Red LED begins to flash, regardless of whether or not the button is still pressed. Teach process begins.
2. Transport label carrier web through the sensor, at least 3 labels	Teach process continues
3. Briefly press button, (or external: min. 50 ms)	Teach process is ended
4. If there is no object detection,	The red LED flashes quickly
5. After object detection	Green LED illuminates without label

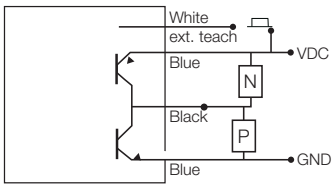
BGL003Z, BGL 3D-001-S75

1. Insert label carrier
2. Turn potentiometer to the left, until red LED lights up
3. Turn potentiometer to the right, until green LED illuminates
4. Turn potentiometer another 1 to 3 revolutions turn to the right
5. After object detection:
   - Red LED illuminates with label
   - Green LED illuminates without label

Wiring diagrams



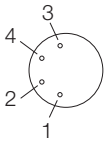
PNP: light switching
NPN: dark switching



PNP: dark switching
NPN: light switching

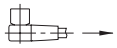
Connection configuration

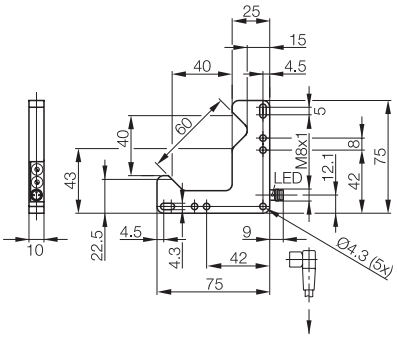
1	(brown	VDC (GND)
2	(white)	ext. teach
3	(blue)	GND (VDC)
4	(black)	Signal output

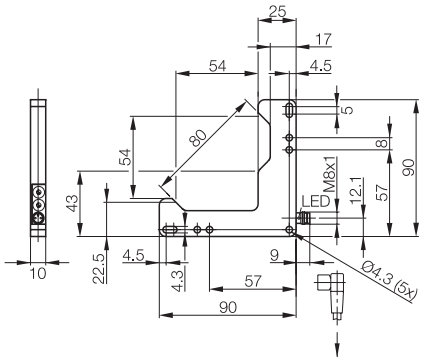


Red light angle sensors BWL

Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54**
PNP NO/NC	**Order code**	**BWL000F**	**BWL000R**
	Part number	BWL 4040D-R011-S49	BWL 5454D-R011-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		LED, red light	LED, red light
Wavelength		640 Nm	640 Nm
Resolution (smallest discernible part)		0.4 mm	0.4 mm
Repeat accuracy		40 µm	60 µm
Switching hysteresis		≤ 0.15 mm	≤ 0.2 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.33 ms	0.33 ms
Switching frequency		1.5 kHz	1.5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

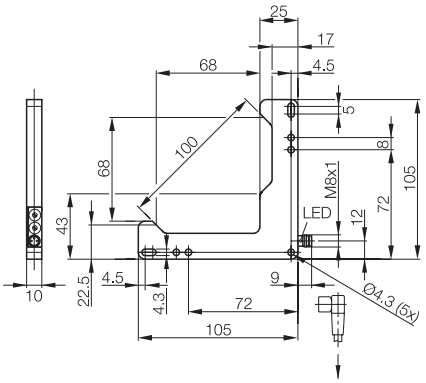


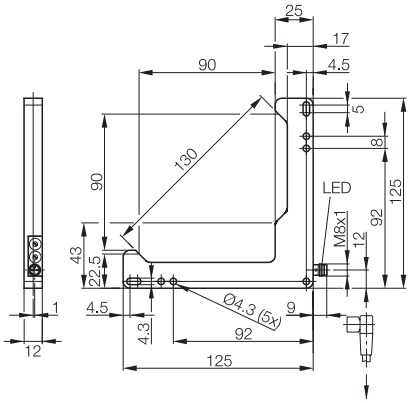


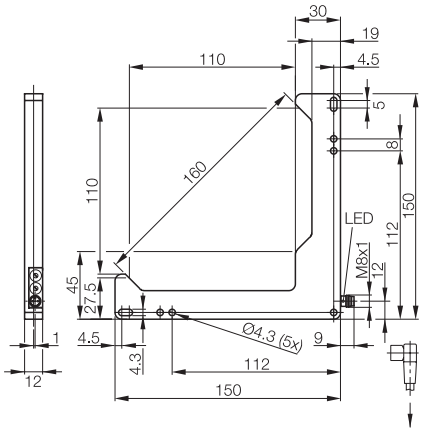


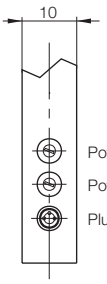
Red light angle sensors BWL

	BWL	BWL	BWL
	68/68 mm	**90/90 mm**	**110/110 mm**
	BWL0012	**BWL0019**	**BWL0005**
	BWL 6868D-R011-S49	BWL 9090D-R011-S49	BWL 110110D-R011-S49
	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 35 mA	≤ 35 mA	≤ 35 mA
	200 mA	200 mA	200 mA
	Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
	Yes/Yes	Yes/Yes	Yes/Yes
	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
	LED, red light	LED, red light	LED, red light
	640 Nm	640 Nm	640 Nm
	0.5 mm	0.6 mm	0.6 mm
	80 µm	80 µm	80 µm
	≤ 0.2 mm	≤ 0.2 mm	≤ 0.2 mm
	Yellow LED	Yellow LED	Yellow LED
	0.33 ms	0.33 ms	0.33 ms
	1.5 kHz	1.5 kHz	1.5 kHz
	IP 67	IP 67	IP 67
	–10...+60 °C	–10...+60 °C	–10...+60 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
	Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
	Glass	Glass	Glass
	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin







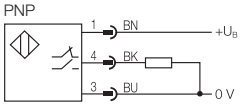


Potentiometer, sensitivity

Potentiometer light/dark switching

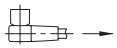
Plug, LED output function indicator

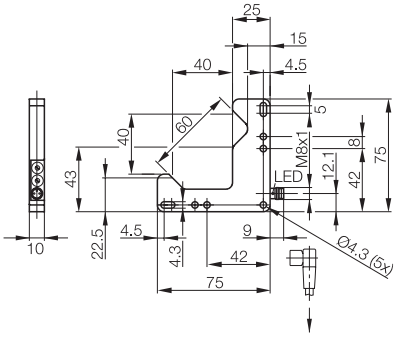
Wiring diagram

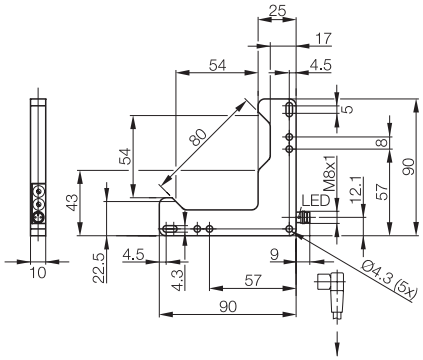


Pin Point angle sensors BWL

Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54**
PNP NO/NC	**Order code**	**BWL000J**	**BWL000U**
	Part number	BWL 4040D-R013-S49	BWL 5454D-R013-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Red light, pin point	Red light, pin point
Wavelength		640 Nm	640 Nm
Resolution (smallest discernible part)		0.3 mm	0.4 mm
Repeat accuracy		30 µm	40 µm
Switching hysteresis		≤ 0.1 mm	≤ 0.15 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.1 ms	0.1 ms
Switching frequency		5 kHz	5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

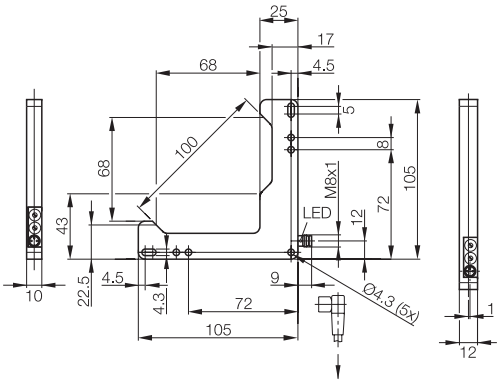


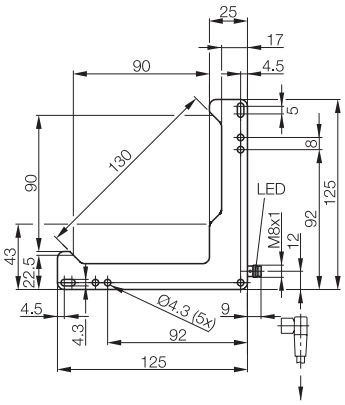


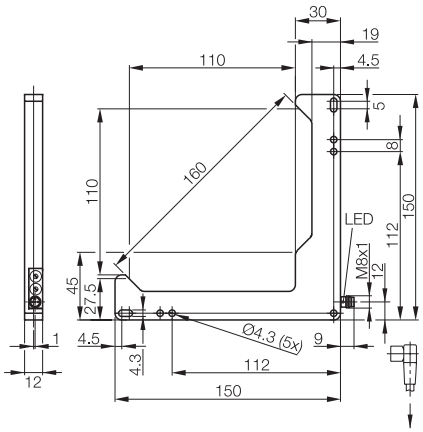


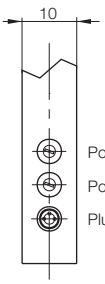
Pin Point angle sensors BWL

	BWL	BWL	BWL
	68/68 mm	**90/90 mm**	**110/110 mm**
	BWL001N	**BWL001C**	**BWL0007**
	BWL 6868D-R013-S49	BWL 9090D-R013-S49	BWL 110110D-R013-S49
	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 35 mA	≤ 35 mA	≤ 35 mA
	200 mA	200 mA	200 mA
	Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
	Yes/Yes	Yes/Yes	Yes/Yes
	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
	Red light, pin point	Red light, pin point	Red light, pin point
	640 Nm	640 Nm	640 Nm
	0.4 mm	0.5 mm	0.6 mm
	40 µm	50 µm	60 µm
	≤ 0.15 mm	≤ 0.15 mm	≤ 0.2 mm
	Yellow LED	Yellow LED	Yellow LED
	0.1 ms	0.1 ms	0.1 ms
	5 kHz	5 kHz	5 kHz
	IP 67	IP 67	IP 67
	–10...+60 °C	–10...+60 °C	–10...+60 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
	Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
	Glass	Glass	Glass
	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin







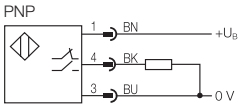


Potentiometer, sensitivity

Potentiometer light/dark switching

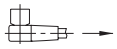
Plug, LED output function indicator

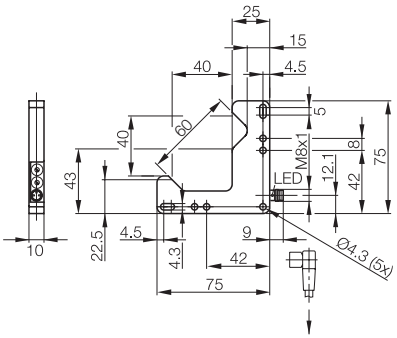
Wiring diagram

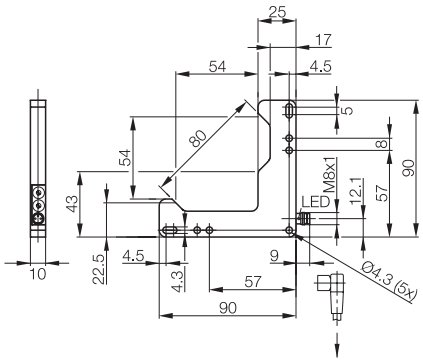


Infrared angle sensors BWL

Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54 mm**
PNP NO/NC	**Order code**	**BWL0009**	**BWL000L**
	Part number	BWL 4040D-I011-S49	BWL 5454D-I011-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Infrared	Infrared
Wavelength		880 Nm	880 Nm
Resolution (smallest discernible part)		1 mm	1.2 mm
Repeat accuracy		0.12 mm	0.15 mm
Switching hysteresis		≤ 0.3 mm	≤ 0.4 mm
Operating function indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Response time		0.25 ms	0.25 ms
Switching frequency		2 kHz	2 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

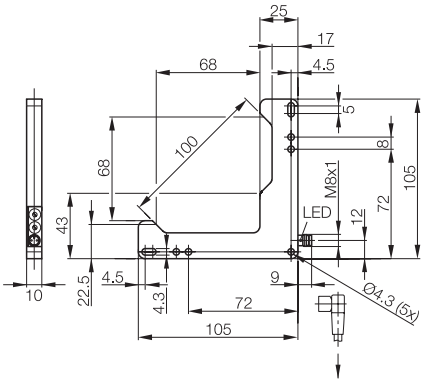


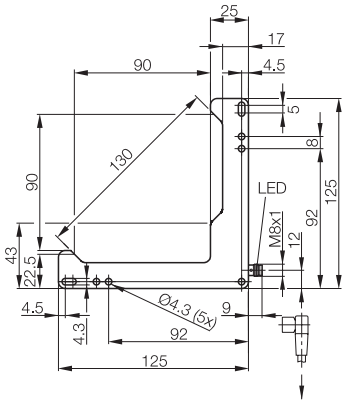


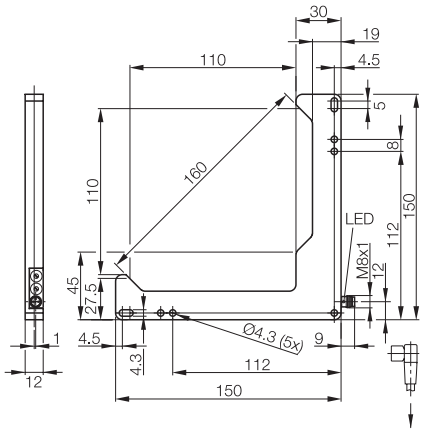


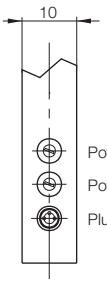
Infrared angle sensors BWL

BWL	**BWL**	**BWL**
68/68 mm	**90/90 mm**	**110/110 mm**
BWL000Y	**BWL0015**	**BWL0001**
BWL 6868D-I011-S49	BWL 9090D-I011-S49	BWL 110110D-I011-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Infrared	Infrared	Infrared
880 Nm	880 Nm	880 Nm
1.5 mm	1.5 mm	1.5 mm
0.2 mm	0.2 mm	0.2 mm
≤ 0.5 mm	≤ 0.5 mm	≤ 0.5 mm
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
0.25 ms	0.5 ms	0.25 ms
2 kHz	1 kHz	2 kHz
IP 67	IP 67	IP 67
–10...+60 °C	–10...+60 °C	–10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin







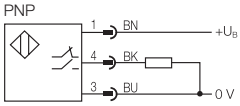


Potentiometer, sensitivity

Potentiometer light/dark switching

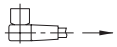
Plug, LED output function indicator

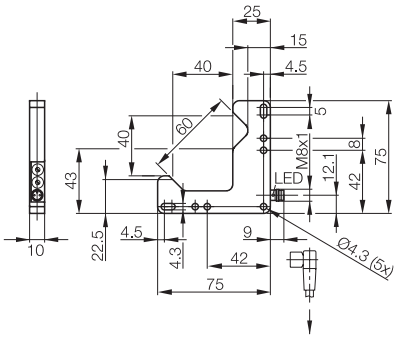
Wiring diagram

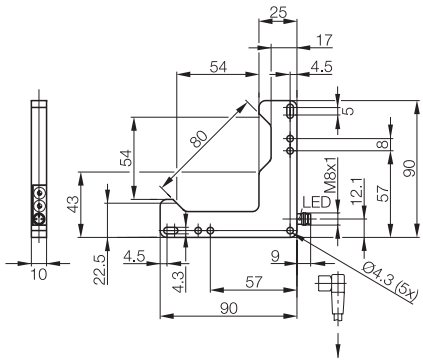


Laser angle sensors BWL

Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54 mm**
PNP NO/NC	**Order code**	**BWL000C**	**BWL000N**
	Part number	BWL 4040D-L011-S49	BWL 5454D-L011-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Laser, red light	Laser, red light
Wavelength		640 Nm	640 Nm
Laser class		1	1
Resolution (smallest discernible part)		80 µm	100 µm
Repeat accuracy		≤ 10 µm	10 µm
Switching hysteresis		≤ 25 µm	≤ 35 µm
Output function indicator		Yellow LED	Yellow LED
Response time		0.1 ms	0.1 ms
Switching frequency		5 kHz	5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Cast zinc, painted	Cast zinc, painted
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin


Connector orientation





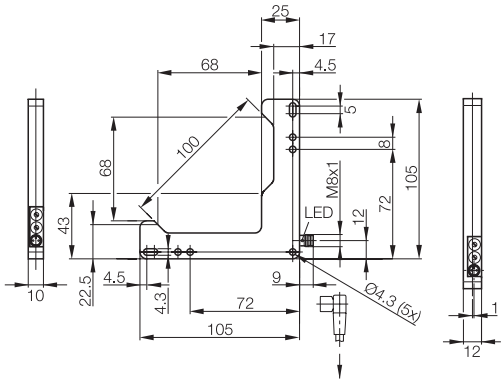
Suitable connection cable
(please order separately)

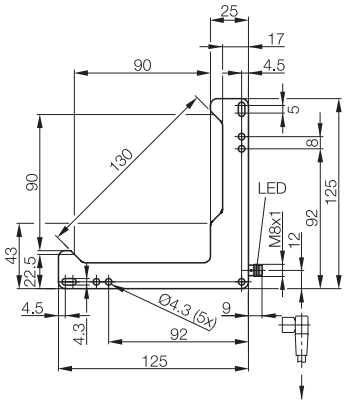
Size	Design	Cable material	Color	Length	Order code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

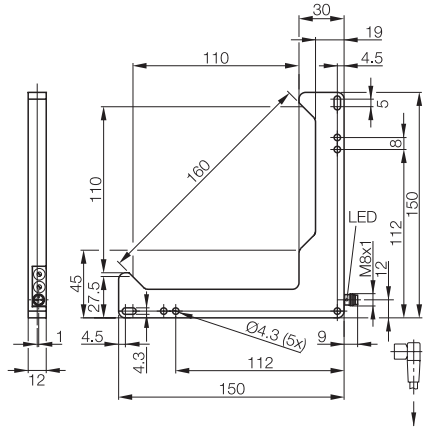
Connection cable without LED are suitable for PNP and NPN sensors.

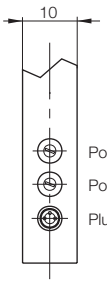
More electric accessories: A large selection of connectors and cables in a wide range of cable materials, colors and lengths can be found in our **Industrial Networking and Connectivity catalog.**

	BWL	BWL	BWL
	68/68 mm	**90/90 mm**	**110/110 mm**
	BWL0010	**BWL0017**	**BWL0003**
	BWL 6868D-L011-S49	BWL 9090D-L011-S49	BWL 110110D-L011-S49
	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 20 mA	≤ 20 mA	≤ 20 mA
	200 mA	200 mA	200 mA
	Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
	Yes/Yes	Yes/Yes	Yes/Yes
	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
	Laser, red light	Laser, red light	Laser, red light
	640 Nm	640 Nm	640 Nm
	1	1	1
	120 µm	150 µm	0.2 mm
	≤ 15 µm	≤ 15 µm	≤ 20 µm
	≤ 40 µm	≤ 50 µm	≤ 70 µm
	Yellow LED	Yellow LED	Yellow LED
	0.1 ms	0.1 ms	0.1 ms
	5 kHz	5 kHz	5 kHz
	IP 67	IP 67	IP 67
	–10...+60 °C	–10...+60 °C	–10...+60 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
	Cast zinc, painted	Cast zinc, painted	Cast zinc, painted
	Glass	Glass	Glass
	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin







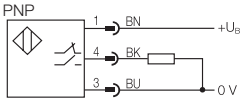


Potentiometer, sensitivity

Potentiometer light/dark switching

Plug, LED output function indicator

Wiring diagram



Sorted by part number

Part number	Order code	Page
BAE		
BAE SA-OH-029-YP-DV02	**BAE00NA**	45
BAE SA-OH-029-YP-S75G	**BAE00NC**	45
BAE SA-OH-032-NP-DV02	**BAE00PC**	44
BAE SA-OH-032-NP-S75G	**BAE00PE**	44
BAE SA-OH-032-PP-DV02	**BAE00N8**	44
BAE SA-OH-032-PP-S75G	**BAE00N9**	44
BAE SA-OH-035-NP-DV02	**BAE00PR**	40
BAE SA-OH-035-NP-S75G	**BAE00PT**	40
BAE SA-OH-035-PP-DV02	**BAE00NE**	40
BAE SA-OH-035-PP-S75G	**BAE00NF**	40
BAE SA-OH-038-IC-DV02	**BAE00N4**	42
BAE SA-OH-038-IC-S75G	**BAE00N5**	43
BAE SA-OH-038-UA-DV02	**BAE00NH**	41
BAE SA-OH-038-UA-S75G	**BAE00N6**	42
BAE SA-OH-039-NP-DV02-SA22	**BAE00U8**	41
BAE SA-OH-039-PP-DV02	**BAE00NL**	41
BAE SA-OH-039-PP-S75G	**BAE00NK**	41
BAE SA-OH-040-PP-DV02	**BAE00NJ**	43
BAE SA-OH-040-PP-S75G	**BAE00N7**	43
BGL		
BGL 10A-001-S49	**BGL0001**	92
BGL 10A-005-S49	**BGL0003**	96
BGL 10A-007-S49	**BGL0005**	100
BGL 120A-001-S49	**BGL0007**	94
BGL 120A-003-S49	**BGL0009**	105
BGL 120A-005-S49	**BGL000C**	98
BGL 120A-007-S49	**BGL000F**	102
BGL 180A-001-S49	**BGL000J**	95
BGL 180A-005-S49	**BGL000L**	99
BGL 180A-007-S49	**BGL000N**	103
BGL 20A-001-S49	**BGL000R**	93
BGL 20A-005-S49	**BGL000U**	97
BGL 20A-007-S49	**BGL000Y**	101
BGL 220A-001-S49	**BGL0010**	95
BGL 220A-005-S49	**BGL0012**	99
BGL 220A-007-S49	**BGL0014**	103
BGL 30A-001-S49	**BGL0016**	93
BGL 30A-003-S49	**BGL0019**	104
BGL 30A-005-S49	**BGL001C**	97
BGL 30A-007-S49	**BGL001F**	101
BGL 30A-011-S49	**BGL003J**	107
BGL 30C-001-S4	**BGL002Z**	88
BGL 30C-003-S4	**BGL0031**	88
BGL 30C-005-S4	**BGL0033**	89
BGL 30C-007-S4	**BGL0035**	90
BGL 30C-009-S4	**BGL0036**	88
BGL 3D-001-S75	**BGL003Z**	108
BGL 3D-002-S75	**BGL003Y**	108
BGL 50A-001-S49	**BGL001J**	93
BGL 50A-003-S49	**BGL001M**	105
BGL 50A-005-S49	**BGL001P**	97
BGL 50A-007-S49	**BGL001T**	101
BGL 50C-001-S4	**BGL0037**	89
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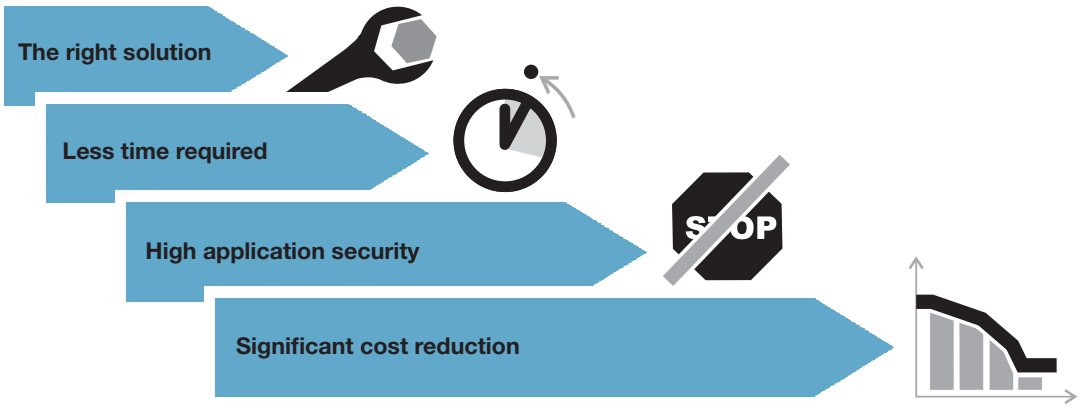

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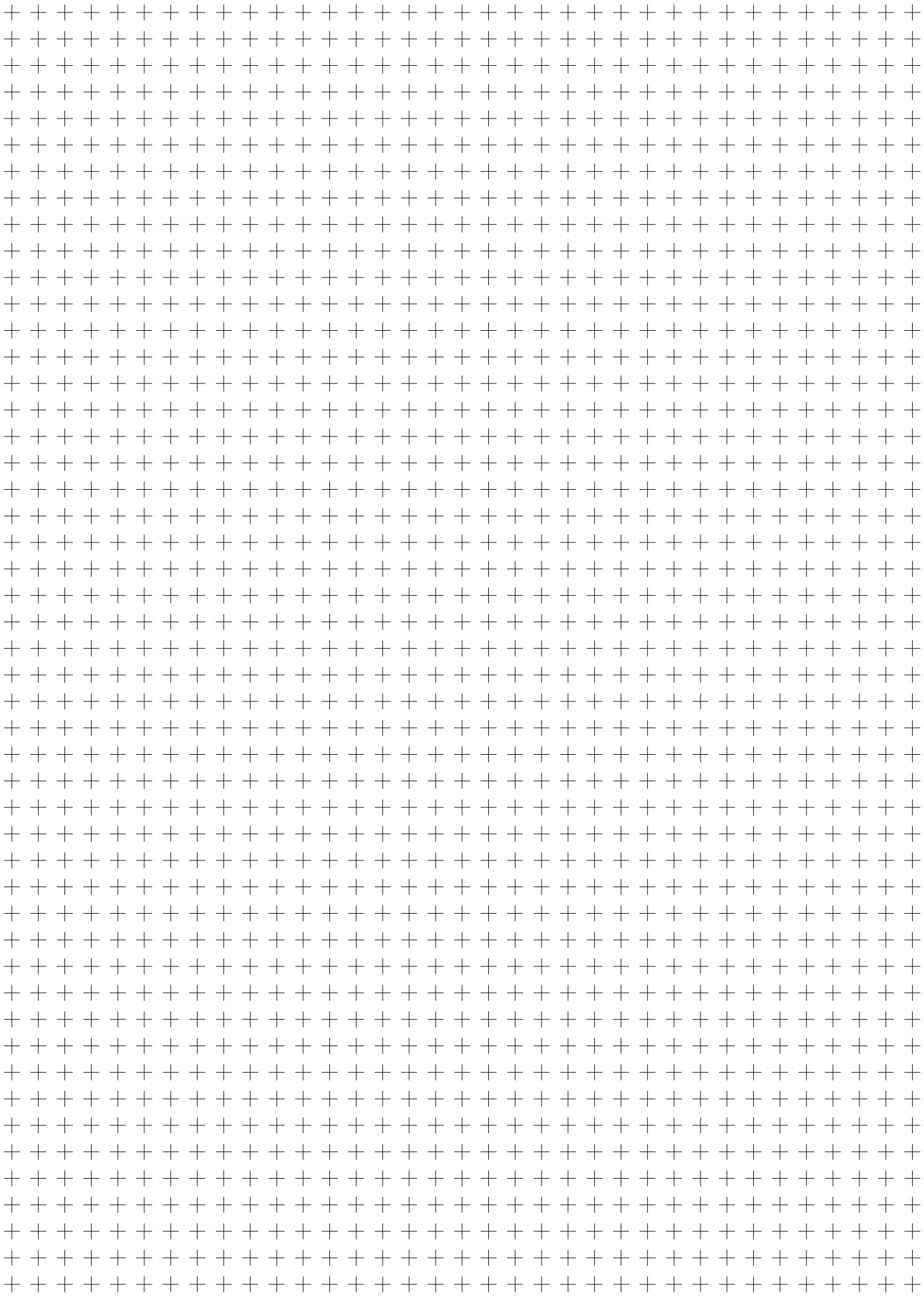

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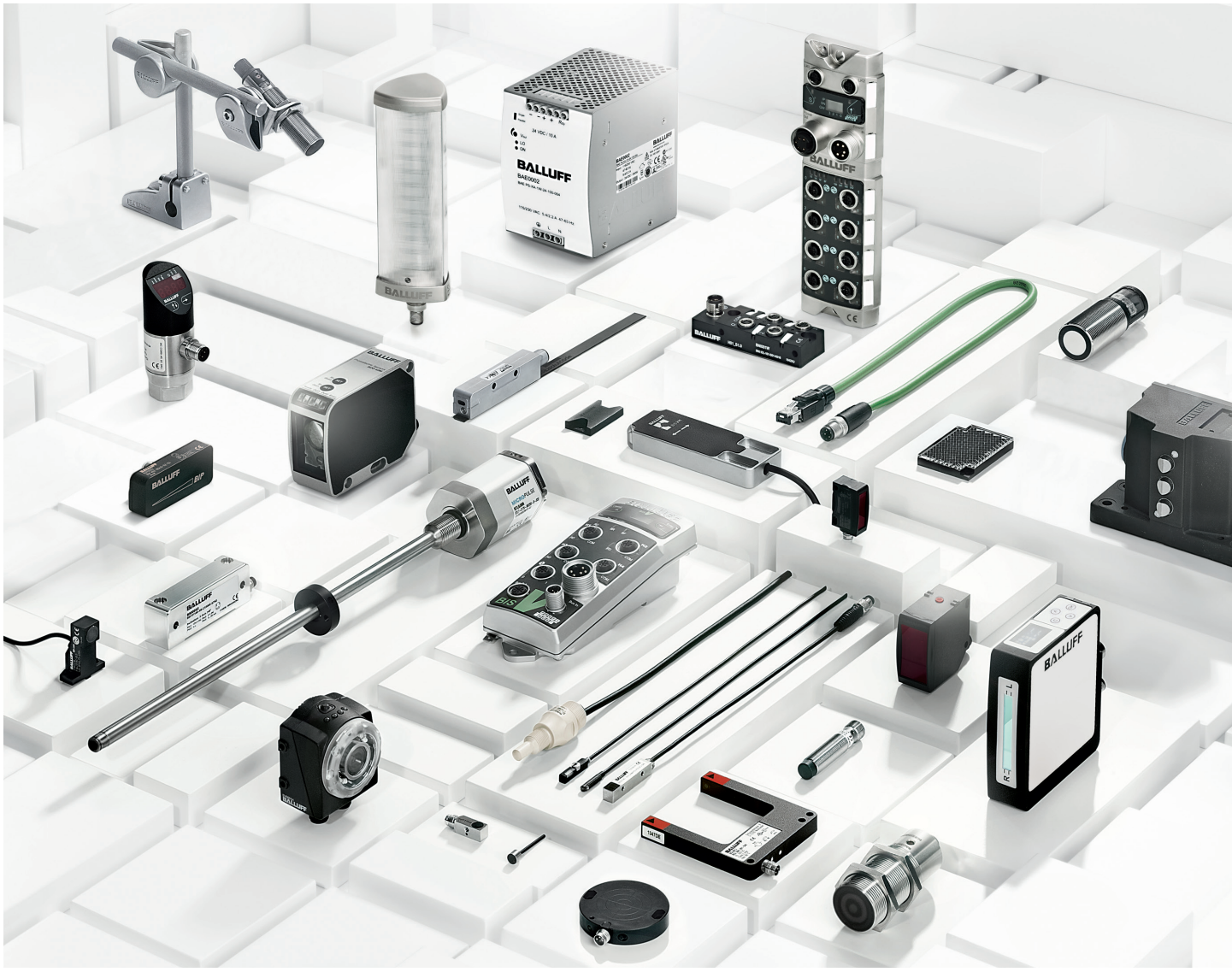

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Doc. No. 916597/Mat. No. 240808 EN
F15; Subject to modification. Replaces F14.