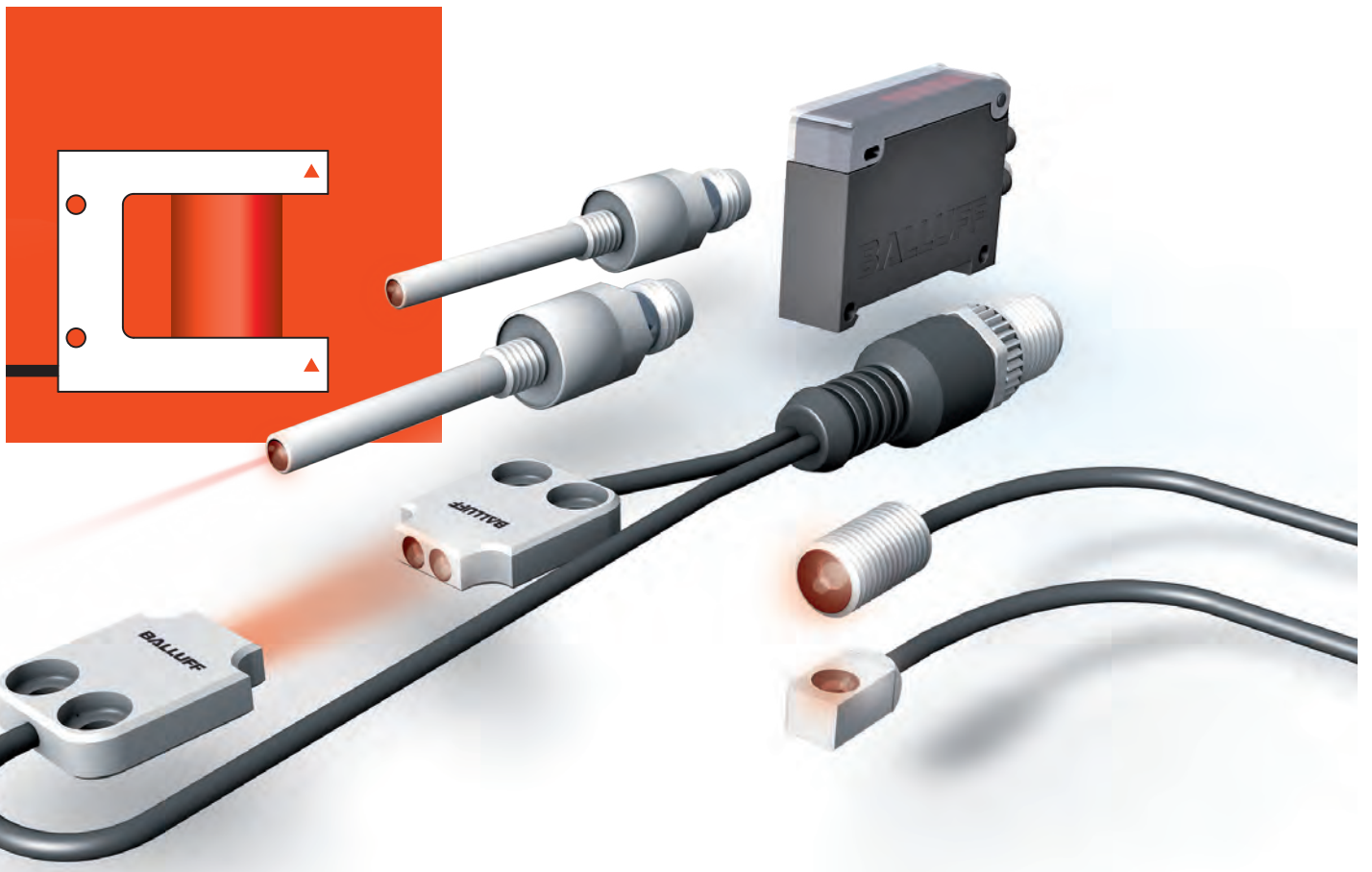
BALLUFF

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 56 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 2,600 employees is committed to providing outstanding service worldwide.

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

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

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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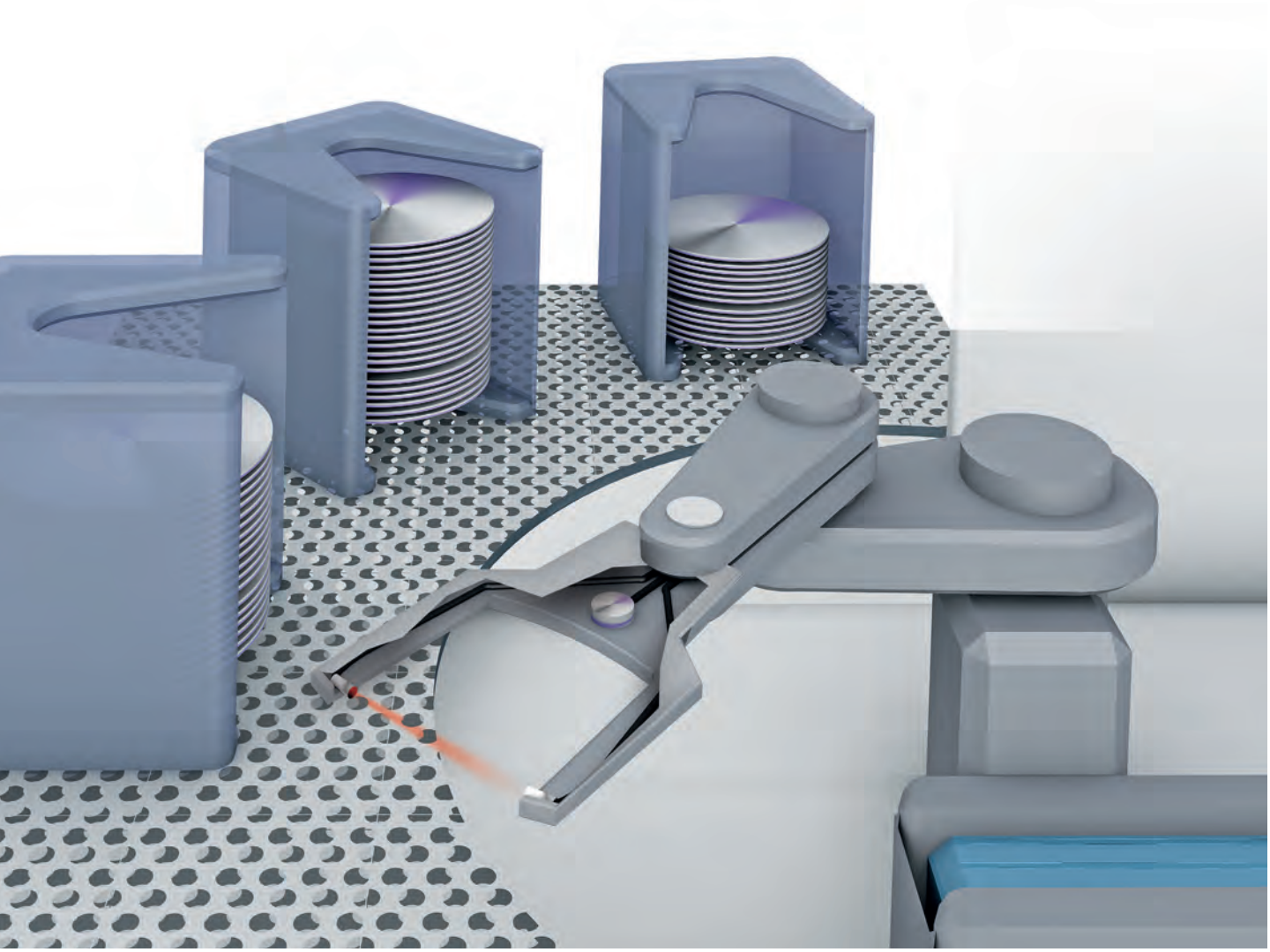


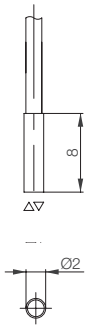
Diffuse sensors BOH for separate amplifiers BAE
Cylinder designs

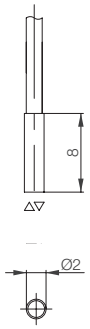


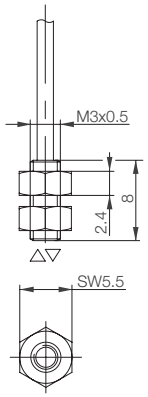
Type	Diffuse sensor	Diffuse sensor	Diffuse sensor
Dimension	**Ø 2×8 mm**	**Ø 2×8 mm**	**M3×0.5×8 mm**
Sensing distance	**12 mm**	**12 mm**	**12 mm**
Order code	**BOH0003**	**BOH0002**	**BOH0009**
Part number	BOH DR-G02-001-01-S49F	BOH DI-G02-001-01-S49F	BOH DR-M03-001-01-S49F
Light type	Red light	Infrared	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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	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
on page 48

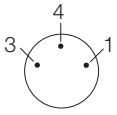




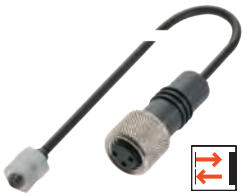


Connection configuration
M8 connector, 3-pin

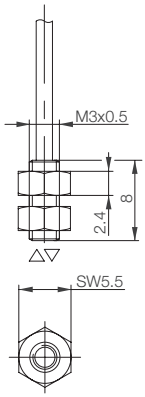
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

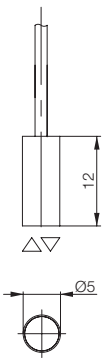


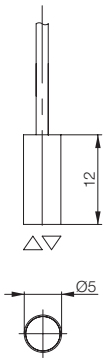
Diffuse sensors BOH for separate amplifiers BAE
Cylinder designs



	Diffuse sensor M3×0.5×8 mm 12 mm	Diffuse sensor Ø 5×12 mm 60 mm	Diffuse sensor Ø 5×12 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
	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin







Diffuse sensors BOH for separate amplifiers BAE
Cylinder designs

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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin		

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

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

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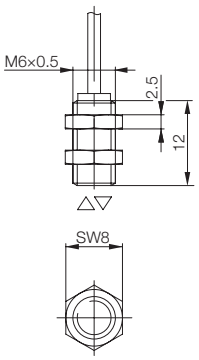
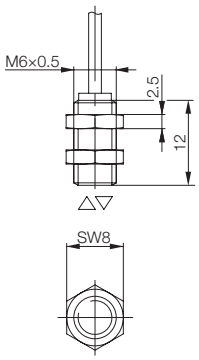
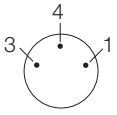


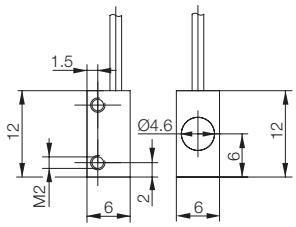


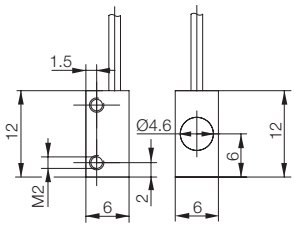
Connection configuration
M8 connector, 3-pin

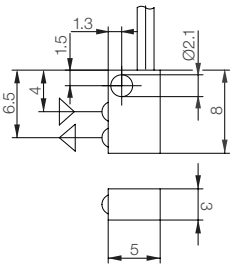
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

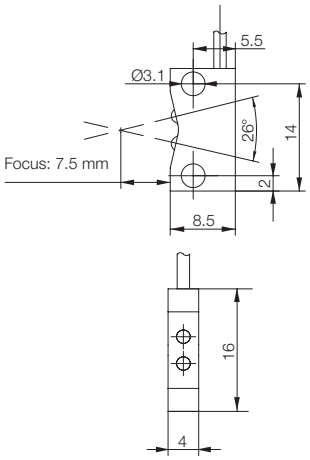


	Diffuse sensor **6×6×12 mm** **60 mm**	**Diffuse sensor** **6×6×12 mm** **60 mm**	**Diffuse sensor** **3×8×5 mm** **70 mm**	**Fixed-focus diffuse sensor** **16×4×8.5 mm** **7.5 mm**
	BOH000M	**BOH000L**	**BOH002K**	**BOH002L**
	BOH DK-Q06-001-01-S49F	BOH DR-Q06-001-01-S49F	BOH DK-R002-006-01-S49F	BOH 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
	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	PUR cable with 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	PUR cable with M8 connector, 3-pin	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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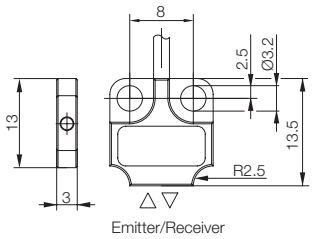
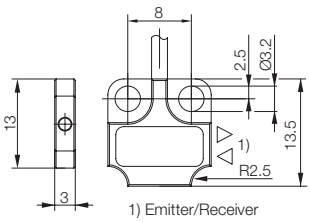


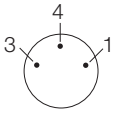
Emitter/Receiver



1) Emitter/Receiver

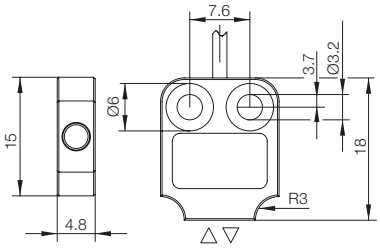
Connection configuration
M8 connector, 3-pin

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

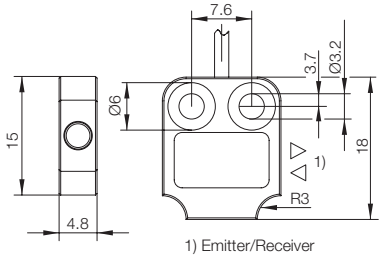


Diffuse sensors BOH for separate amplifiers BAE
Block designs

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
PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin

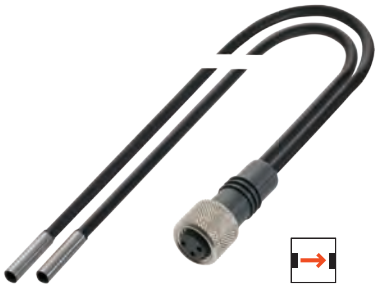


Emitter/Receiver



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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	

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

Included in the scope of delivery: Emitter and receiver

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

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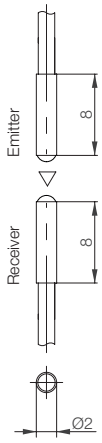
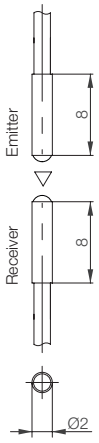
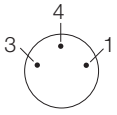


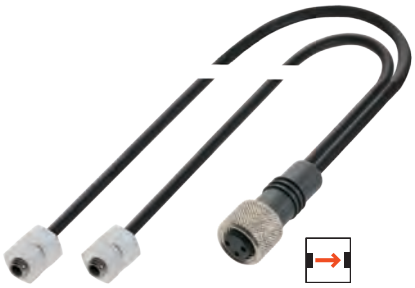


Connection configuration
M8 connector, 3-pin

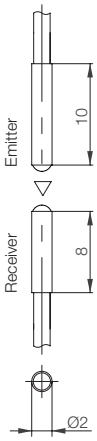
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

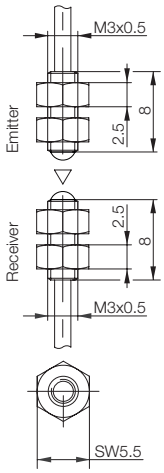


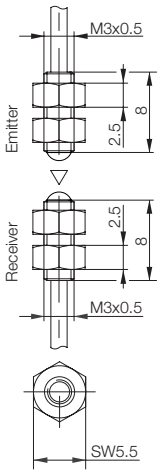
Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs



	Through-beam sensor Emitter Ø 2x10 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
	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin







Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

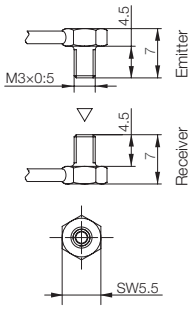
Model	**Through-beam sensor**	**Through-beam sensor**
Dimension	**M3×0.5×7 mm**	**Ø 3×5 mm**
Range	**500 mm**	**500 mm**
Order code	**BOH000E**	**BOH000Z**
Part number	BOH TK-M03-005-01-S49F	BOH TK-G03-004-01-S49F
Light type	Red light microSPOT	Red light microSPOT
Wavelength	645 Nm	645 Nm
Light spot 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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin

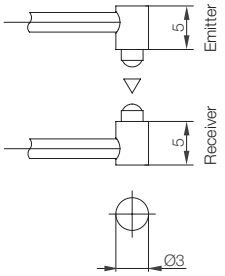
Reference object: white,
90% reflection, 100×100 mm

Included in the scope of delivery:
Emitter and receiver

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

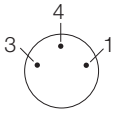
Function diagrams
beginning on page 54



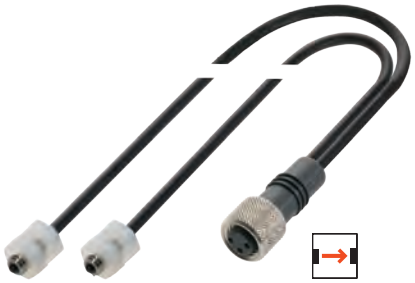


Connection configuration
M8 connector, 3-pin

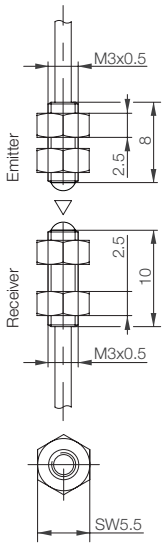
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

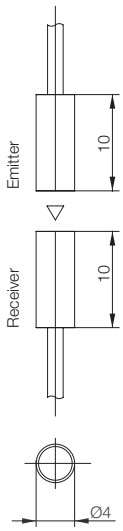


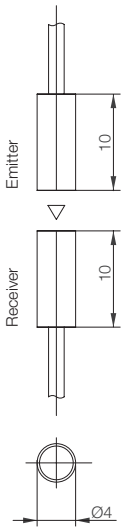
Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs



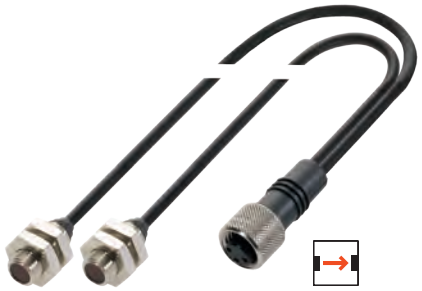
	Through-beam sensor M3×0.5×10 mm M3×0.5×8 mm	Through-beam sensor Ø 4×10 mm	Through-beam sensor Ø 4×10 mm
	200 mm	1000 mm	2000 mm
	BOH001L	**BOH000W**	**BOH0014**
	BOH TZ-M03-001-01-S49F-SA2	BOH TR-G04-003-01-S49F	BOH TK-G04-003-01-S49F
	Red light	Red light	Red light microSPOT
	660 Nm	660 Nm	645 Nm
	0.4 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
	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin







Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs



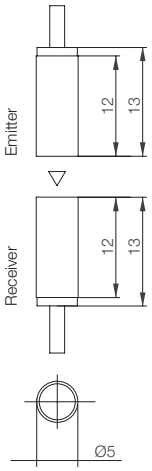
Model	Through-beam sensor	Through-beam sensor
Dimension	**Ø 5×12 mm**	**M5×0.5×10 mm**
Range	**4000 mm**	**1000 mm**
Order code	**BOH0010**	**BOH000Y**
Part number	BOH TR-G05-005-02-S49F	BOH TR-M05-003-01-S49F
Light type	Red light	Red light
Wavelength	660 Nm	660 Nm
Light spot diameter		
Resolution (smallest 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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin

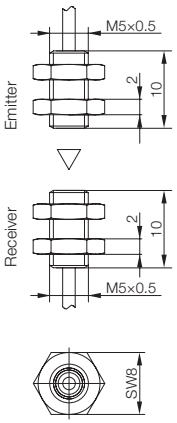
Reference object: white,
90% reflection, 100×100 mm

Included in the scope of delivery:
Emitter and receiver

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

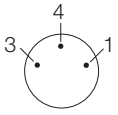
Function diagrams
beginning on page 57





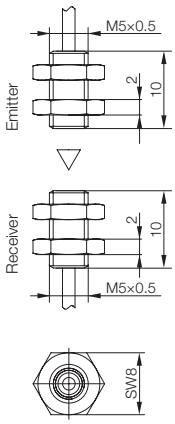
Connection configuration
M8 connector, 3-pin

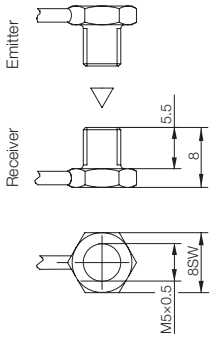
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



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	
	PUR cable with	PUR cable with	
	M8 connector, 3-pin	M8 connector, 3-pin	





Through-beam sensors BOH for separate amplifiers BAE
Cylinder designs

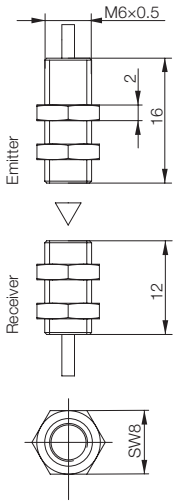
Model	Through-beam sensor	Through-beam sensor
Dimension	**M6×0.5×16 mm**	**M6×0.5×12 mm**
Range	**4000 mm**	**4000 mm**
Order code	**BOH000H**	**BOH000K**
Part number	BOH TL-M06-007-02-S49F	BOH TR-M06-002-02-S49F
Light type	Laser red light, class 1	Red light
Wavelength	650 Nm	660 Nm
Light spot diameter		
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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin

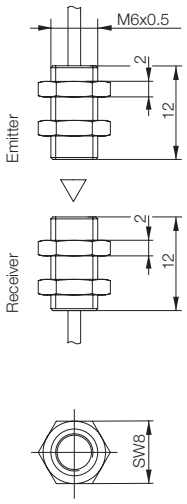
Reference object: white, 90% reflection, 100×100 mm

Included in the scope of delivery: Emitter and receiver

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

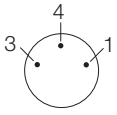
Function diagrams beginning on page 58





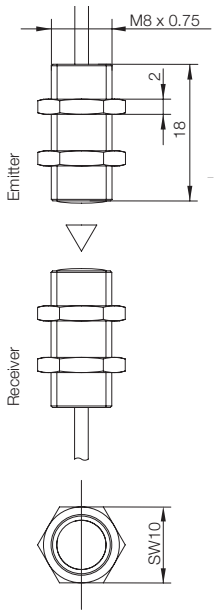
Connection configuration
M8 connector, 3-pin

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		
	PUR cable with M8 connector, 3-pin		

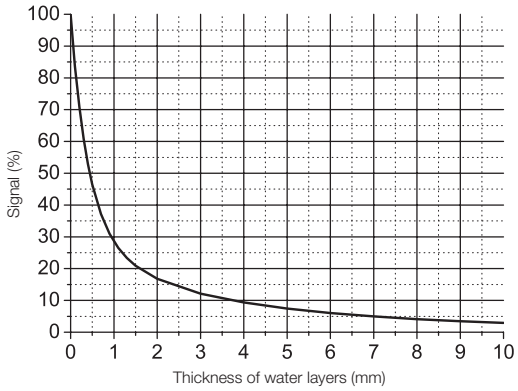


Through-beam sensors BOH for water detection for separate amplifiers BAE

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

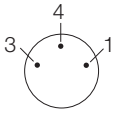
Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

Function diagrams
on pages 53, 60

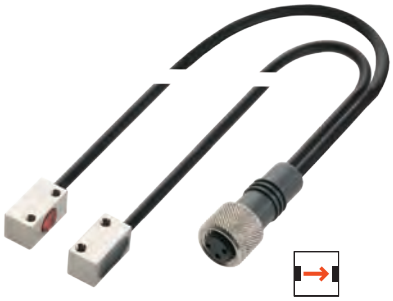
Connection configuration

M8 connector, 3-pin

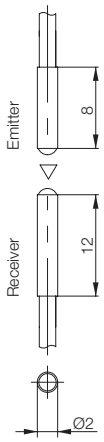
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)

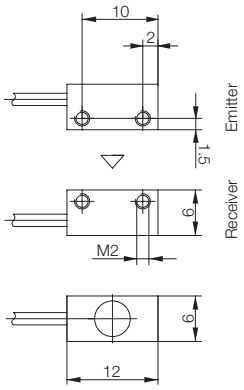


Through-beam sensors BOH for water detection for separate amplifiers BAE

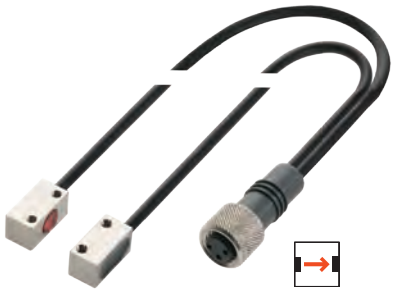


	Through-beam sensor **Detection of water** **Emitter Ø 2×8 mm** **Receiver Ø 2×12 mm**	**Through-beam sensor** **Detection of water** **6×6×12 mm**
	250 mm	**500 mm**
	BOH000J	**BOH000R**
	BOH TJ-G02-001-01-S49F	BOH TJ-Q06-001-01-S49F
	Infrared	Infrared
	1480 Nm	**1480 Nm**
	IP 67	IP 67
	–10...+55 °C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





Through-beam sensors BOH for separate amplifiers BAE
Block designs



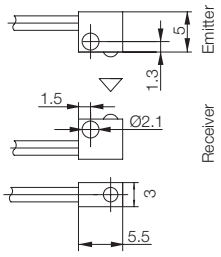
Model	Through-beam sensor	Through-beam sensor	
Dimension	**3×6×5.5 mm**	**6×6×12 mm**	
Range	**500 mm**	**1000 mm**	
Order code	**BOH001Z**	**BOH000N**	
Part number	BOH TK-R003-007-01-S49F	BOH TR-Q06-001-01-S49F	
Light type	Red light microSPOT	Red light	
Wavelength	645 Nm	660 Nm	
Light spot diameter	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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin	

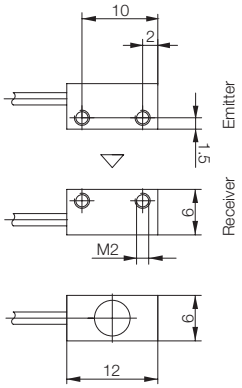
Reference object: white,
90% reflection, 100×100 mm

Included in the scope of delivery:
Emitter and receiver

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

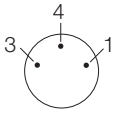
Function diagrams
beginning on page 50



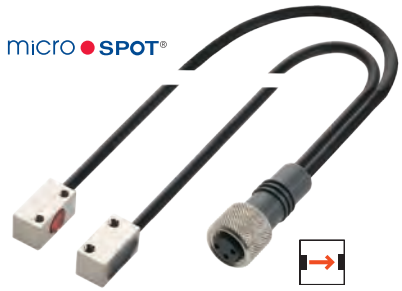


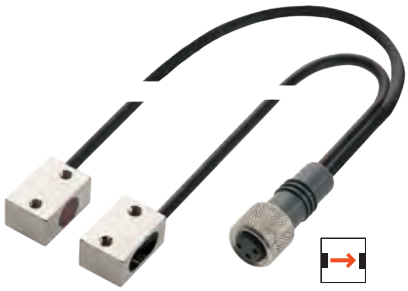
Connection configuration
M8 connector, 3-pin

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

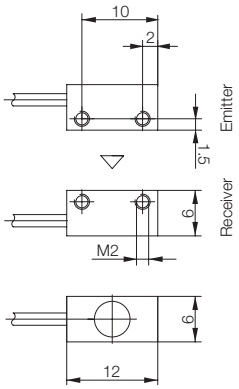


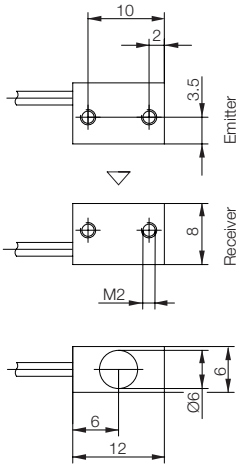
Through-beam sensors BOH for separate amplifiers BAE
Block designs



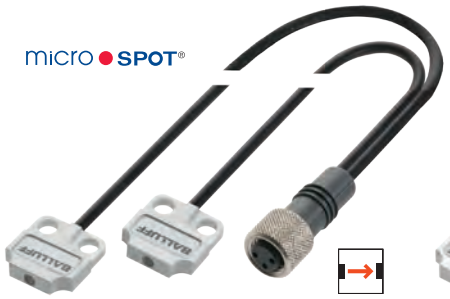


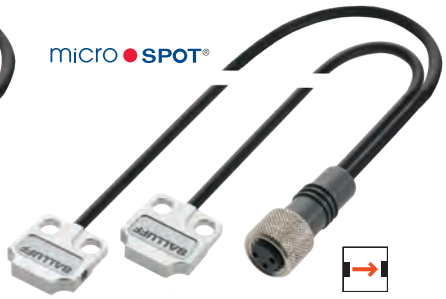
	Through-beam sensor	Through-beam sensor	
	6×6×12 mm	**6×8×12 mm**	
	2000 mm	**4000 mm**	
	BOH000P	**BOH0020**	
	BOH TK-Q06-001-01-S49F	BOH TR-R010-008-02-S49F	
	Red light microSPOT	Red light	
	645 Nm	660 Nm	
	8 mm (at 100 mm)		
	0.4 mm	0.4 mm	
	IP 65	IP 65	
	–10°C... +55°C	–10...+55 °C	
	Nickel-plated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





Through-beam sensors BOH for separate amplifiers BAE
Block designs





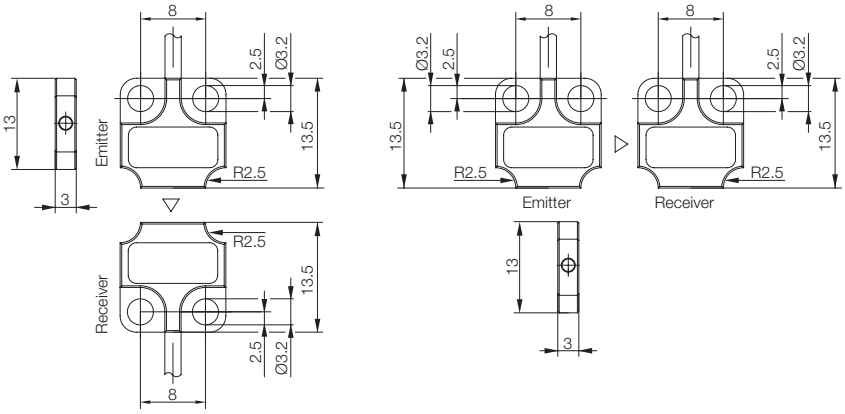
Type	**Through-beam sensor**	**Through-beam sensor**
Dimension	**13.5×13×3 mm**	**13.5×13×3 mm**
Range	**500 mm**	**500 mm**
Order code	**BOH002C**	**BOH002E**
Part number	BOH TK-R018-001-01-S49F	BOH TK-R018-002-01-S49F
Light type	Red light microSPOT	Red light microSPOT
Wavelength	645 Nm	645 Nm
Light 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	PUR cable with M8 connector, 3-pin	PUR cable with M8 connector, 3-pin

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

Included in the scope of delivery:
Emitter and receiver

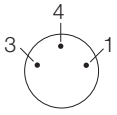
Recommended amplifier:
BAE00NE
BAE-SA-OH-035-PP-DV02

Function diagrams
beginning on page 59

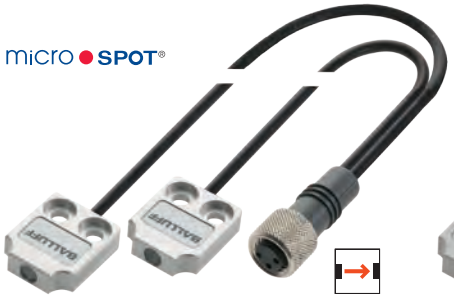


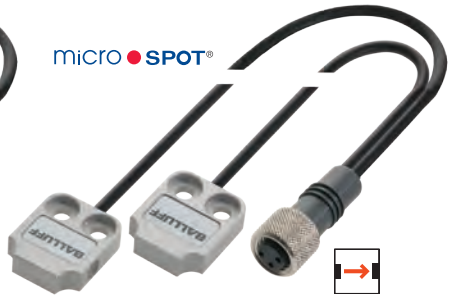
Connection configuration
M8 connector, 3-pin

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

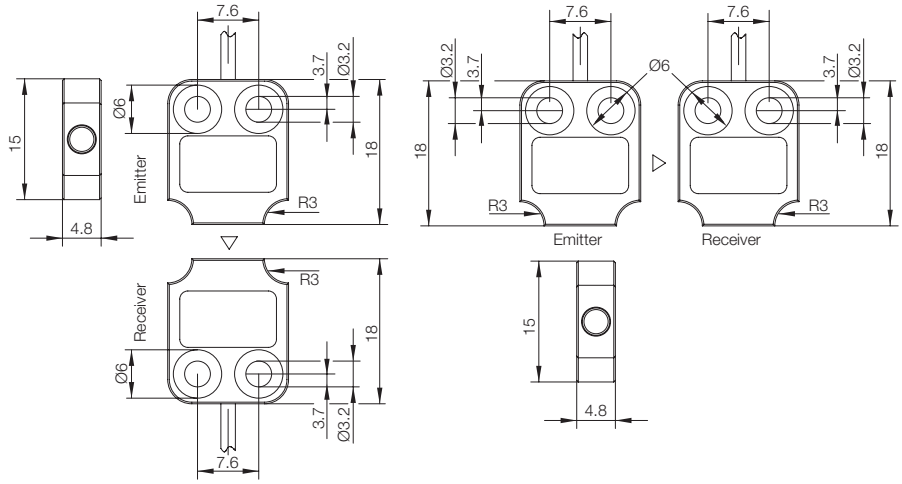


Through-beam sensors BOH for separate amplifiers BAE
Block designs





	Through-beam sensor 18×15×4.8 mm 2000 mm BOH002F	Through-beam sensor 18×15×4.8 mm 2000 mm 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
	PUR cable with M8 connector, 3-pin	PUR cable with 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.

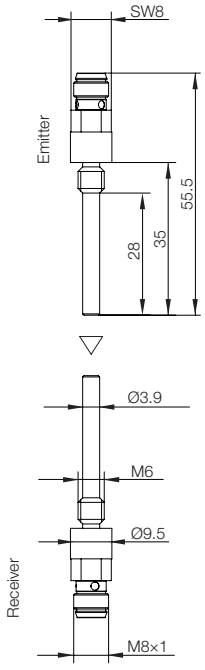
Here you will find a representative selection of possible versions. The modular design enables extraordinarily fast implementation of customer-specific solutions.

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

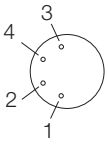


Included in the scope of delivery:
Emitter and receiver

Connection configuration

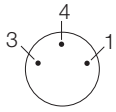
M8 connector, 4-pin, **emitter**

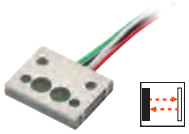
1		Not assigned
2		Not assigned
3	(Red)	LED +
4	(white)	LED



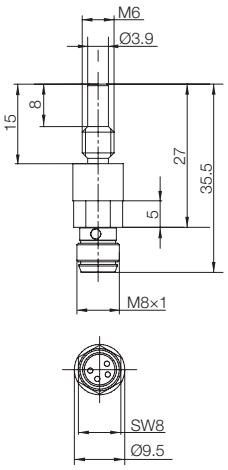
M8 connector, 3-pin, **receiver**

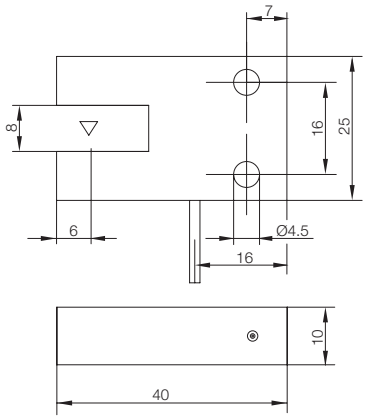
1	(green)	FT –
3		Not assigned
4	(black)	FT +

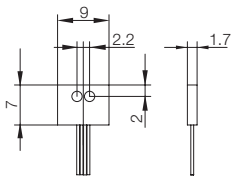




	Diffuse sensor M6×35.5 mm 12 mm	Fork sensor 40×25×10 mm 8 mm	Diffuse sensor 9×7×1.7 mm 10 mm
	BOH009R	**BOH001J**	**BOH0021**
	BOH DI-M06V-008-S75-SA3	BOH TK-F08V-004-TF-01	BOH DI-R006V-009-TL-01
	Infrared	Red light microSPOT	Infrared
	880 Nm	645 Nm	880 Nm
		Ø 1.5 mm	
	IP 67	IP 67	IP 67
	–10...+55 °C	–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 cable PFA encapsulated, 4×AWG36

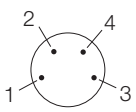






Connection configuration
M8 connector, 4-pin

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



Connection configuration

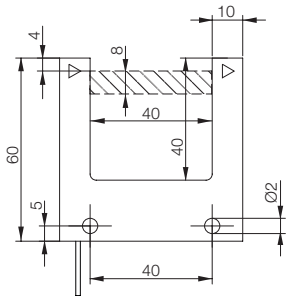
Emitter:	Red:	LED +
	White:	LED
Receiver:	green:	FT +
	Black:	FT –

Connection configuration

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

Light band fork sensors BOH for separate amplifiers BAE

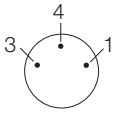
Type	**Light band fork sensor**
Light band width	**8 mm**
Fork opening	**40 mm**
Order code	**BOH001M**
Part number	BOH AR-F40-001-01-S49F
Light type	LED, red light
Wavelength	645 Nm
Edge resolution	0.05 mm
Resolution (smallest discernible part)	0.5 mm
Reproducibility	< 0.03 mm
Linearity	Range 0...8 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

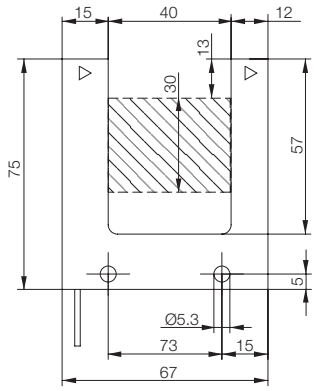
M8 connector, 3-pin

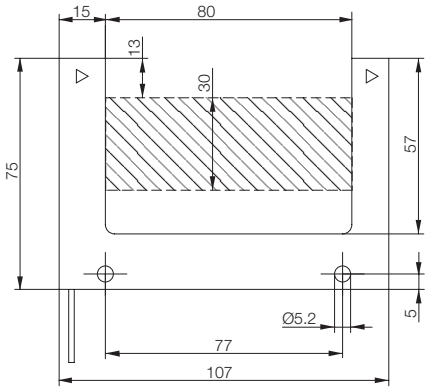
3 + Receiver (green)
4 GND/Shield (white, black)
1 + Emitter (red)



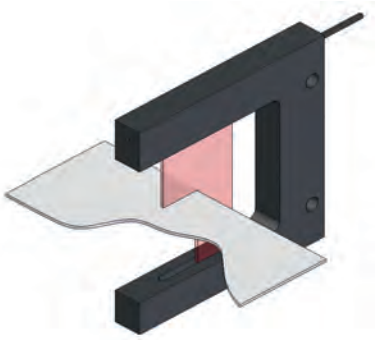
Light band fork sensors BOH for separate amplifiers BAE

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

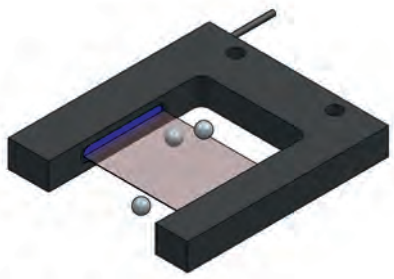




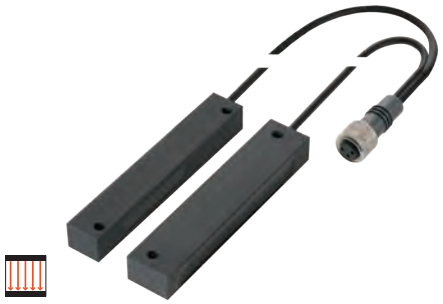
Recommended amplifier for edge control:
BAE00NH, BAE SA-OH-038-UA-DV02
or **BAE00N4,** BAE SA-OH-038-IC-DV02



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

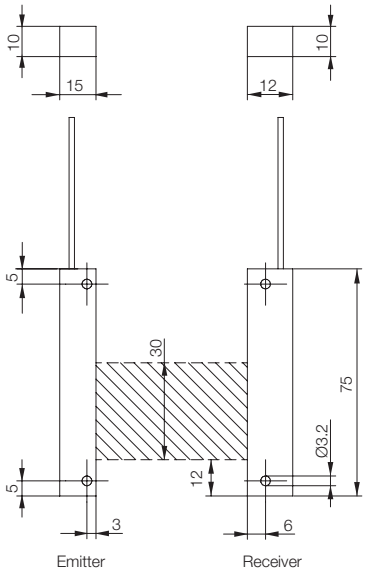


Light band sensors BOH for separate amplifiers BAE



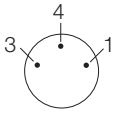
Type	**Light band sensor**
Light band width	**30 mm**
Working distance	**40...200 mm**
Order code	**BOH0024**
Part number	BOH AR-R113-010-01-S49F
Light type	LED, red light
Wavelength	645 Nm
Edge resolution	0.1 mm
Resolution (smallest discernible part)	0.5 mm
Reproducibility	0.05 mm
Degree of protection 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



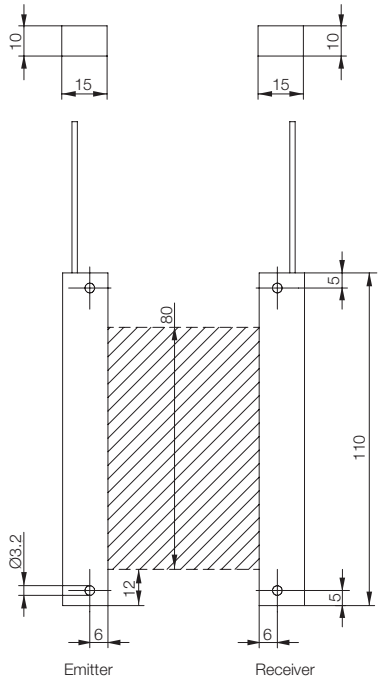
Connection configuration
M8 connector, 3-pin

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

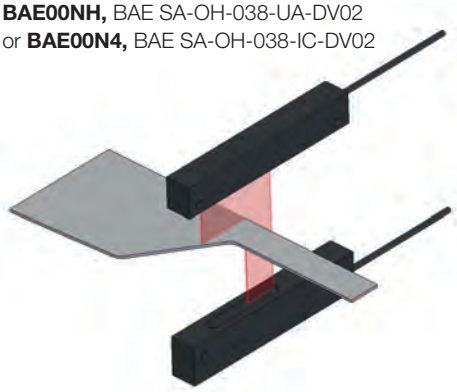


Light band sensors BOH for separate amplifiers BAE

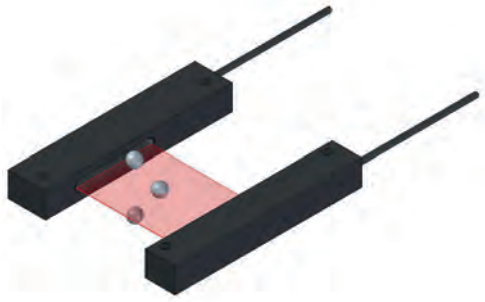
Light band sensor	
80 mm	
50...500 mm	
BOH002M	
BOH AI-R165-011-01-S49F	
LED, infrared	
950 Nm	
0.15 mm	
1.5 mm	
0.05 mm	
IP 65	
–10...+55 °C	
Anodized aluminum	
1 m PUR cable with M8 connector, 3-pin	



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

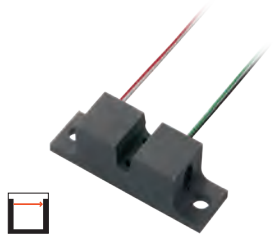


Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles

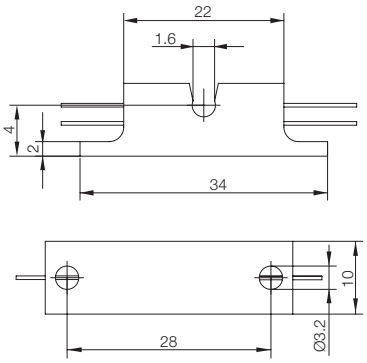
Detection of liquids/bubbles
Precision hose sensors for detecting liquids/bubbles use the differing light refraction in the air or liquid column within the hose. Therefore they are very reliable even for clear liquids.

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.

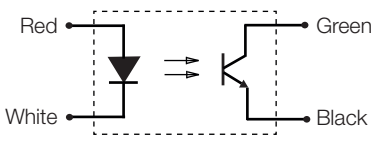
The optical properties and thickness of the hose can affect the magnitude of the resulting signal swings.



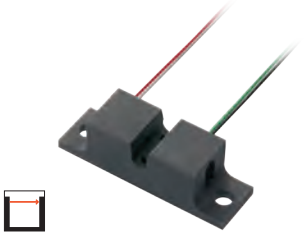
Type	**Precision hose sensor**
Hose diameter	**1.6 mm (1/16")**
Use	**Detection of liquids/bubbles**
Order code	**BOH001T**
Part number	BOH TR-T16-001-TL-00,1
Light type	Red light
Wavelength	665 Nm
Functional principle	Light refraction
Degree of protection as per IEC 60529	IP 54
Ambient temperature T_a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

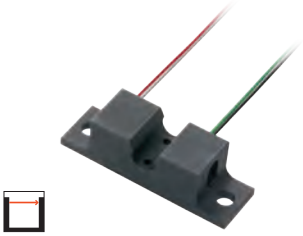


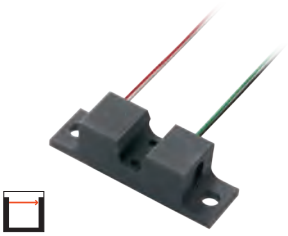
Connection configuration for all Stranded wire variants



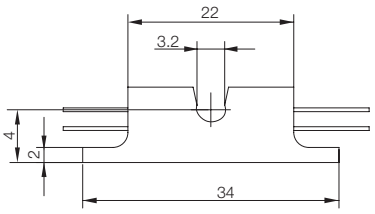
Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles

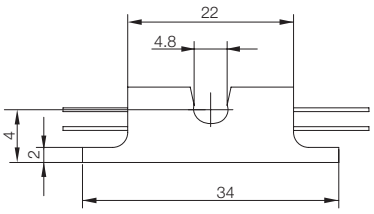


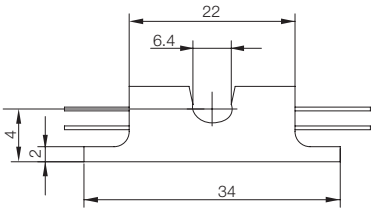


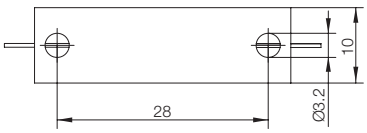


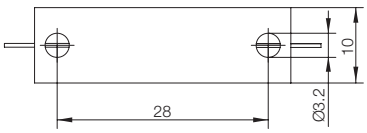
	Precision hose sensor **3.2 mm (1/8")** **Detection of liquids/bubbles**	**Precision hose sensor** **4.8 mm (3/16")** **Detection of liquids/bubbles**	**Precision hose sensor** **6.4 mm (1/4")** **Detection of liquids/bubbles**
	BOH001C	**BOH001E**	**BOH001F**
	BOH TR-T32-001-TL-00,1	BOH TR-T48-001-TL-00,1	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 PFTE encapsulated, 4×AWG32	**100 mm stranded wire PFTE encapsulated, 4×AWG32**	**100 mm stranded wire PFTE encapsulated, 4×AWG32**

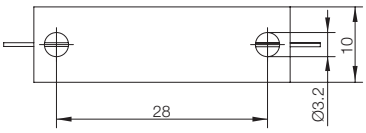






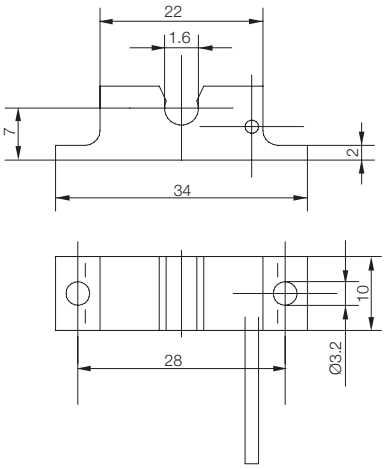


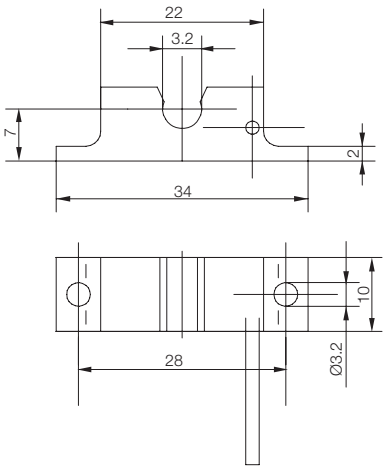




Precision hose sensors BOH for separate amplifiers BAE
Detection of liquids/bubbles

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	**PUR cable with M8 connector, 3-pin**	**PUR cable with M8 connector, 3-pin**

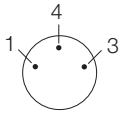




Connection configuration

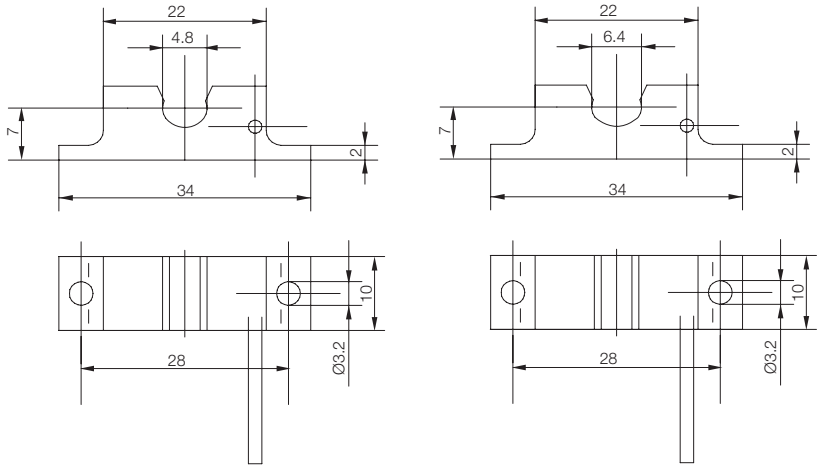
M8 connector, 3-pin

1	(red)	LED +
4	(white/black)	LED– /FT–
3	(green)	FT +



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	
	PUR cable with M8 connector, 3-pin	**PUR cable with M8 connector, 3-pin**	



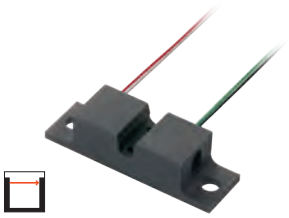
Precision hose sensors BOH for separate amplifiers BAE
Detection of water/bubbles and aqueous liquids

Detection of water and aqueous liquids

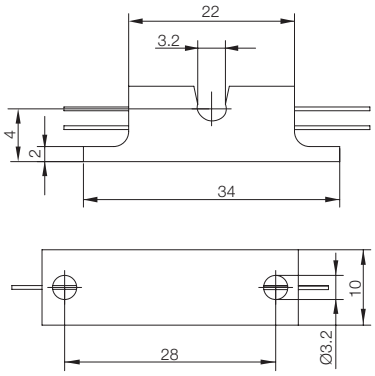
Precision hose sensors for detecting water and aqueous liquids use the light attenuation in the liquid column within the hose. They use a special wavelength so that the water absorbs the light. This makes them perfect for applications involving water and aqueous liquids.

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.

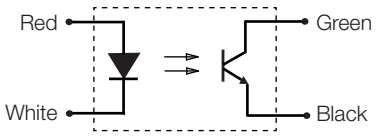
The optical properties and thickness of the hose can affect the magnitude of the resulting signal swings.



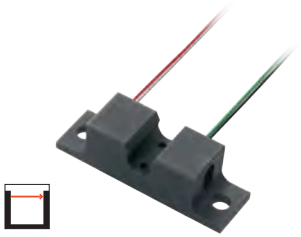
Type	**Precision hose sensor**	
Hose diameter	**3.2 mm (1/8")**	
Use	**Detection of water/bubbles and aqueous liquids**	
Order code	**BOH001W**	
Part number	BOH TJ-T32-001-TL-00,1	
Light type	Infrared	
Wavelength	1480 Nm	
Functional principle	Absorption	
Degree of protection as per IEC 60529	IP 54	
Ambient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

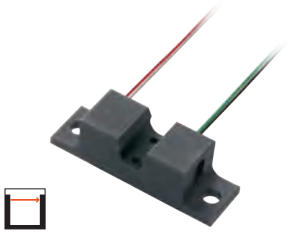


Connection configuration for all Stranded wire variants

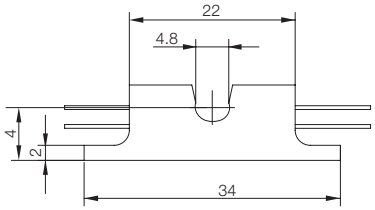


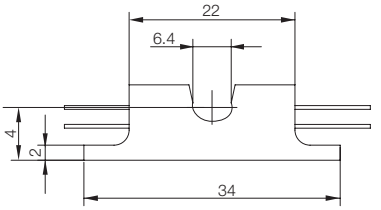
Precision hose sensors BOH for separate amplifiers BAE
Detection of water/bubbles and aqueous liquids

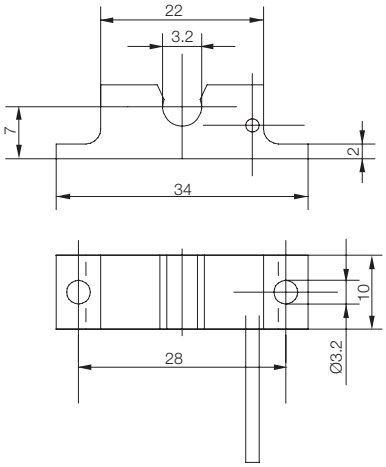




Precision hose sensor **4.8 mm (3/16")** **Detection of water/bubbles and aqueous liquids**	**Precision hose sensor** **6.4 mm (1/4")** **Detection of water/bubbles and aqueous liquids**	**Precision hose sensor** **3.2 mm (1/8")** **Detection of water/bubbles and aqueous liquids**
BOH0017	**BOH0018**	**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 PFTE encapsulated, 4×AWG32	**100 mm stranded wire PFTE encapsulated, 4×AWG32**	**PUR cable with M8 connector, 3-pin**

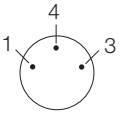






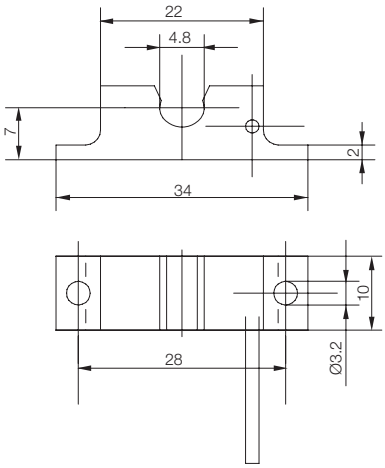
Connection configuration
M8 connector, 3-pin

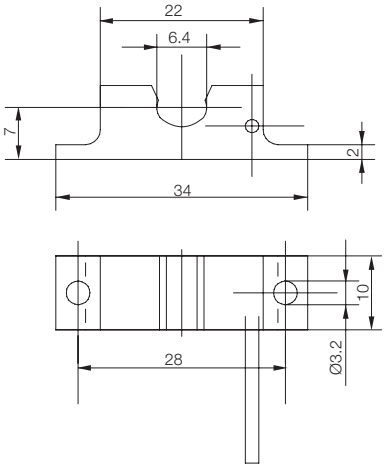
1	(red)	LED +
4	(white/black)	LED– /FT–
3	(green)	FT +



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

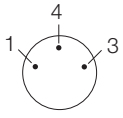
Type	**Precision hose sensor**	**Precision hose sensor**
Hose diameter	**4.8 mm (3/16")**	**6.4 mm (1/4")**
Use	**Detection of water/bubbles and aqueous liquids**	**Detection of water/bubbles and aqueous liquids**
Order code	**BOH0015**	**BOH0016**
Part number	BOH TJ-T48-001-01-S49F	BOH TJ-T64-001-01-S49F
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	**PUR cable with M8 connector, 3-pin**	**PUR cable with M8 connector, 3-pin**





Connection configuration
M8 connector, 3-pin

1	(red)	LED +
4	(white/black)	LED– /FT–
3	(green)	FT +



Precision hose sensors BOH for separate amplifiers BAE
Detection of microbubbles

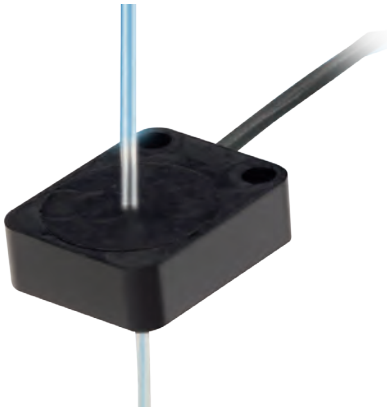
Detection of microbubbles
This series of precision hose sensors is designed to freely detect floating microbubbles in transparent liquids. Microbubbles refer to little gas bubbles with dimensions smaller than the inside diameter of the hose.

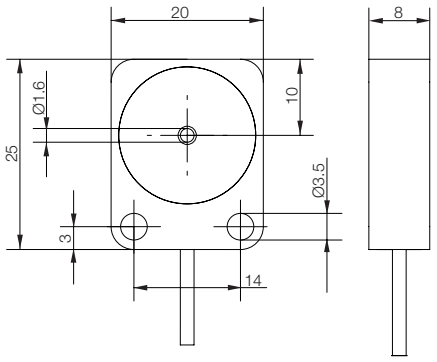
Uniform lighting is achieved in the liquid column by using a concentrated arrangement of multiple light beams with very uniform intensity distribution. Gas bubbles that move through this field induce a signal jump in the built-in photoelectric receiver elements.

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.

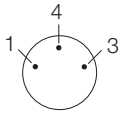
Type	**Precision hose sensor**
Hose diameter	**1.6 mm (1/16")**
Use	**Detection of microbubbles**
Order code	**BOH001H**
Part number	BOH ZR-T16-002-S49F-SA1
Light type	Red light
Wavelength	665 Nm
Functional principle	Light refraction
Degree of protection as per IEC 60529	IP 54
Ambient temperature T_a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





Connection configuration
M8 connector, 3-pin

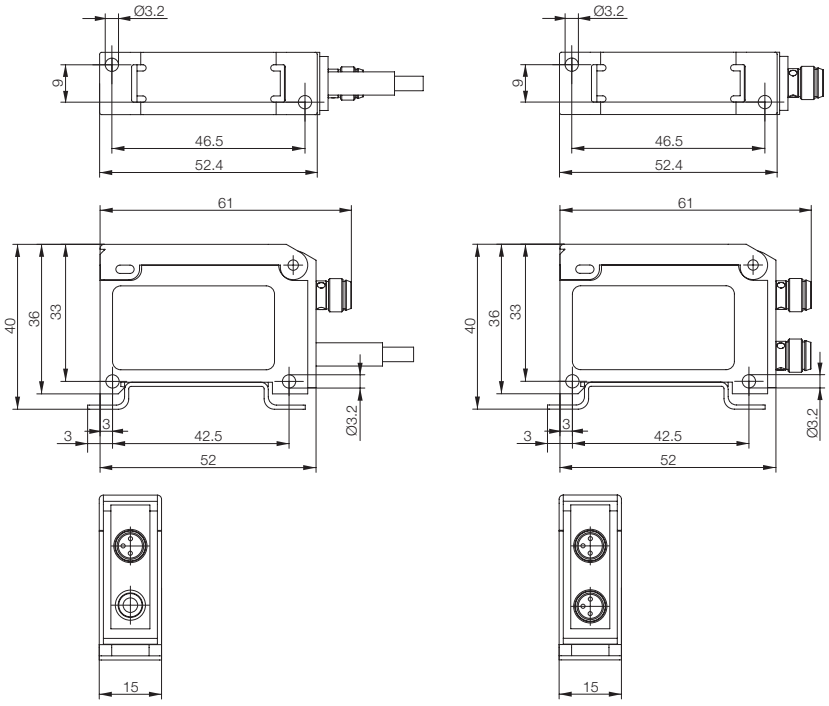
1	(red)	LED +
4	(white/black)	LED – /FT –
3	(green)	FT +



Sensor amplifiers BAE with display
Premium

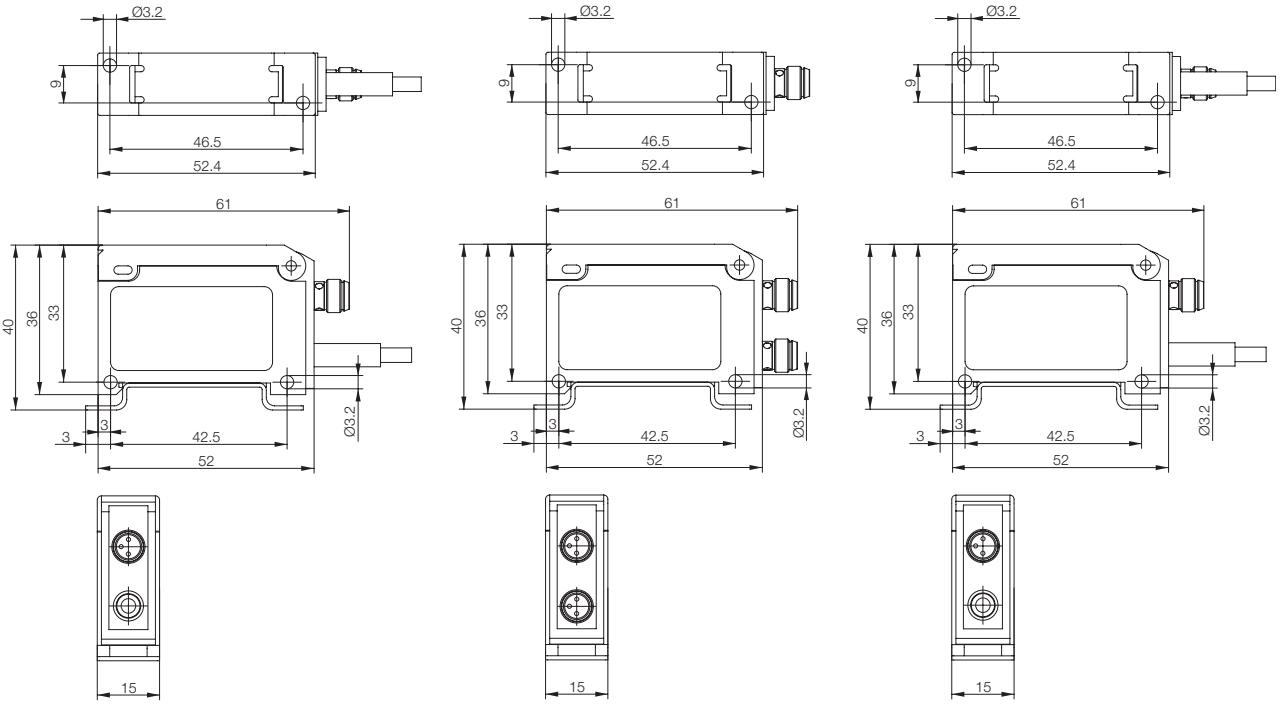
Type	Premium switching amplifier	Premium switching amplifier
Order code	**BAE00NE**	**BAE00NF**
Part number	BAE SA-OH-035-PP-DV02	BAE SA-OH-035-PP-S75G
Supply voltage U_S	10 to 30 V DC	10 to 30 V DC
Output current	200 mA	200 mA
Max. response time	1 ms	167 µs
Polarity reversal protected/ Short-circuit 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
Output	**PNP**	**PNP**
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

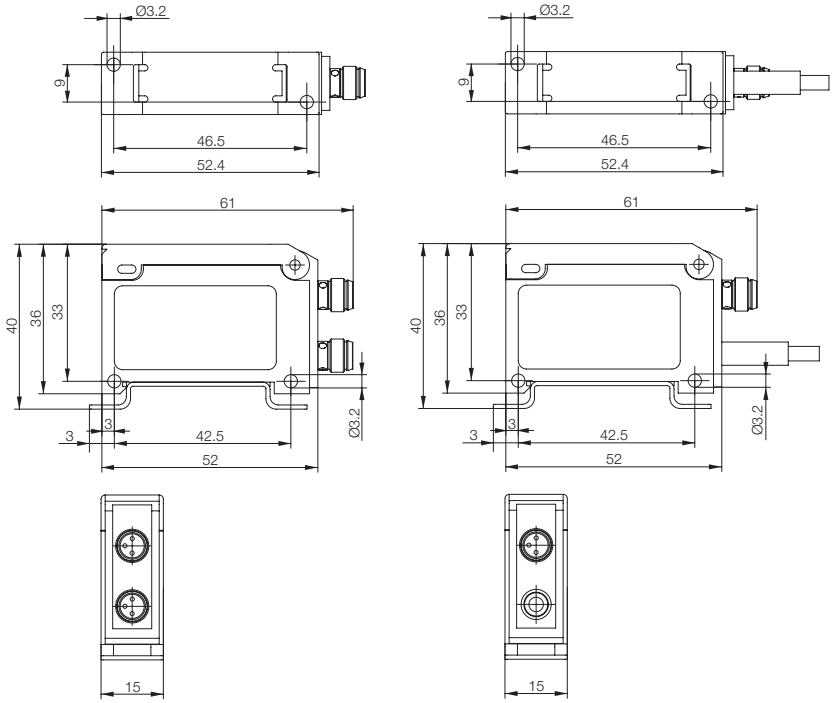
	Premium switching amplifier	Premium switching amplifier	Premium analog amplifier
	BAE00NL	**BAE00NK**	**BAE00NH**
	BAE SA-OH-039-PP-DV02	BAE SA-OH-039-PP-S75G	BAE SA-OH-038-UA-DV02
	10 to 30 V DC	10 to 30 V DC	15...30 VDC
	200 mA	200 mA	200 mA
	1 ms	1 ms	0.5 ms
	Yes/Yes	Yes/Yes	Yes/Yes
	Green LED	Green 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	
	PNP	**PNP**	**0...10 V (analog)**
	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

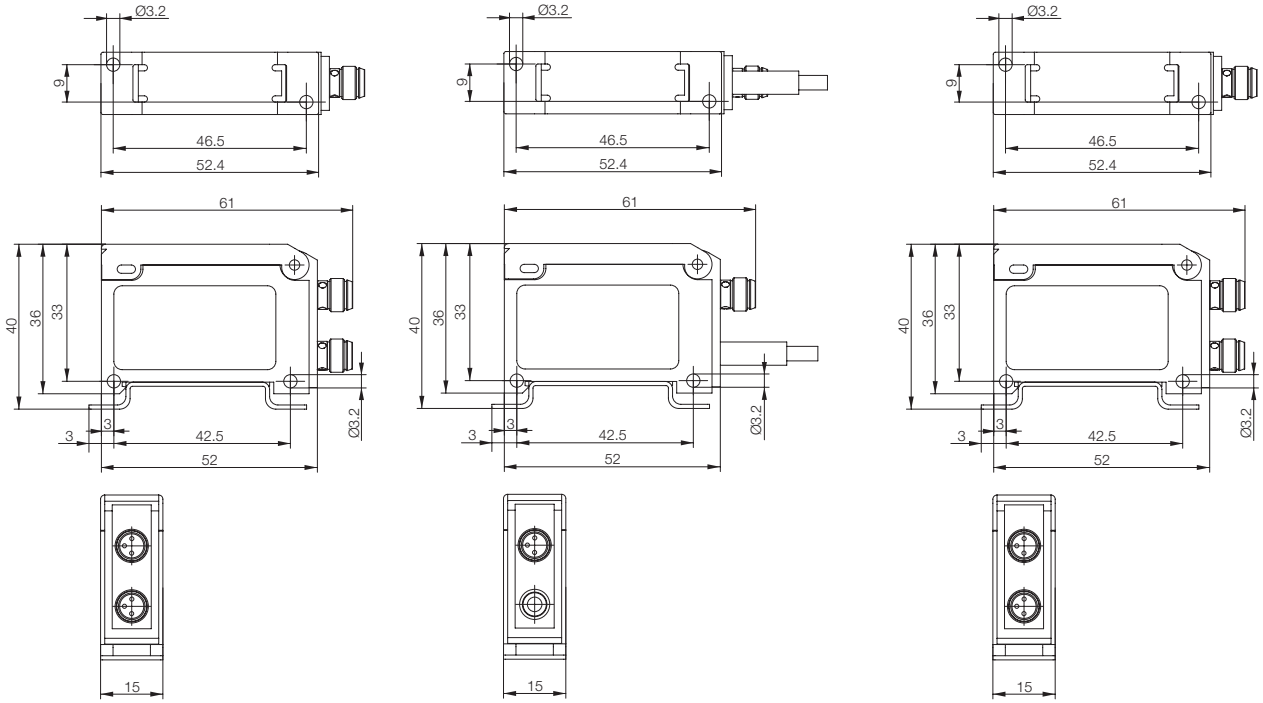
Type	Premium analog amplifier	Premium analog amplifier	
Order code	**BAE00N6**	**BAE00N4**	
Part number	BAE SA-OH-038-UA-S75G	BAE SA-OH-038-IC-DV02	
Supply voltage U_S	15...30 VDC	15...30 VDC	
Output current	200 mA	200 mA	
Max. response time	0.5 ms	0.5 ms	
Polarity reversal protected/ Short-circuit protected	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)			
Output	**0...10 V (analog)**	**4...20 mA (analog)**	
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

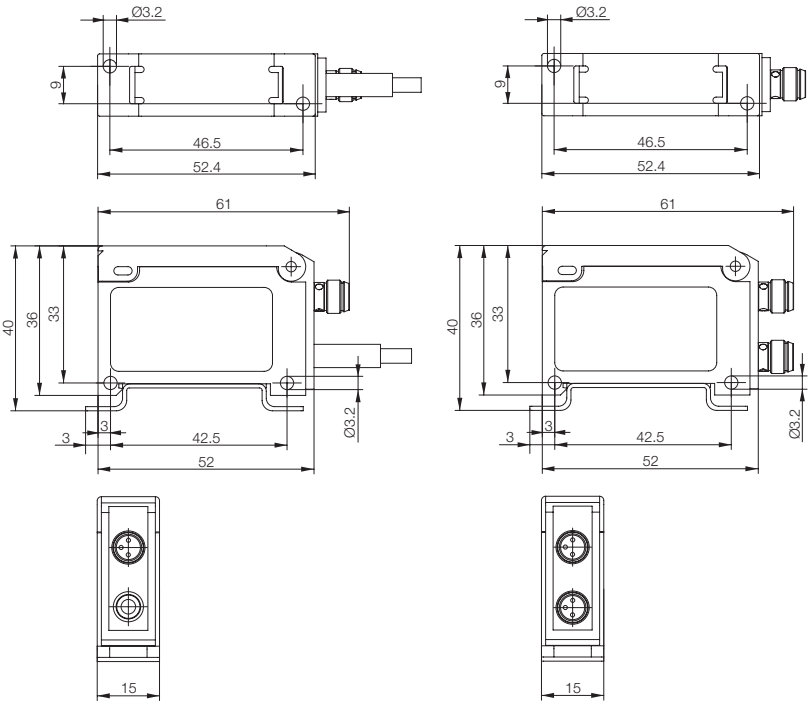
	Premium analog amplifier	Premium dynamic amplifier	Premium dynamic amplifier
	BAE00N5	**BAE00NJ**	**BAE00N7**
	BAE SA-OH-038-IC-S75G	BAE SA-OH-040-PP-DV02	BAE SA-OH-040-PP-S75G
	15...30 VDC	10 to 30 V DC	10 to 30 V DC
	200 mA	200 mA	200 mA
	0.5 ms	1 ms	1 ms
	Yes/Yes	Yes/Yes	Yes/Yes
	Green LED	Green LED	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
	4...20 mA (analog)	**PNP**	**PNP**
	1 kHz	2 kHz (scan rate)	3 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
	M8 connector, 4-pin	**2 m PVC cable, 5×0.14 mm²**	**M8 connector, 4-pin**



Sensor amplifiers BAE
Advanced

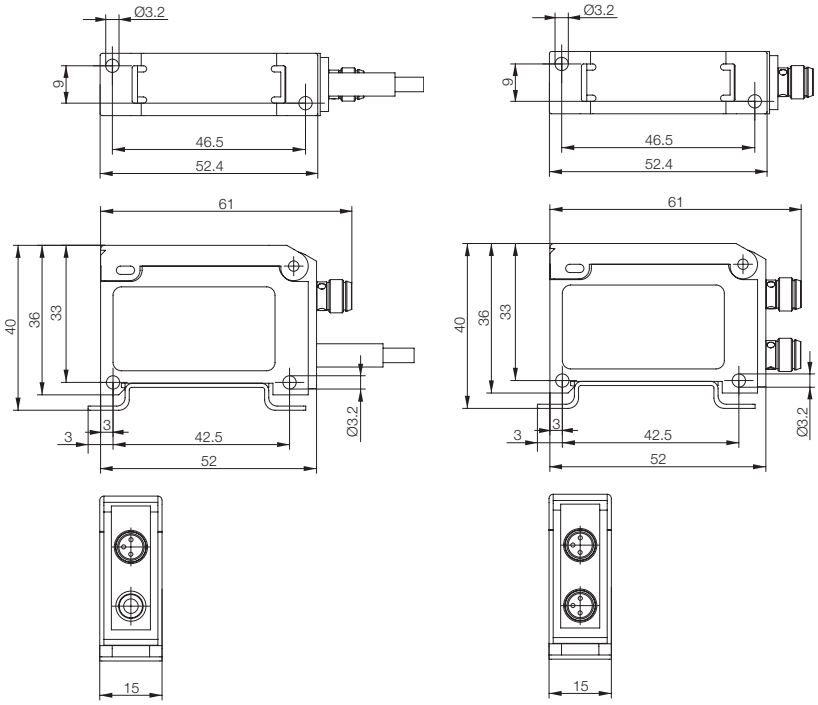
Type	Advanced switching amplifier	Advanced switching amplifier	
Order code	**BAE00N8**	**BAE00N9**	
Part number	BAE SA-OH-032-PP-DV02	BAE SA-OH-032-PP-S75G	
Supply voltage U_S	10 to 30 V DC	10 to 30 V DC	
Output current	100 mA	100 mA	
Max. response time	1.1 ms	1.1 ms	
Polarity reversal protected/ Short-circuit 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)	
Output	**PNP**	**PNP**	
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



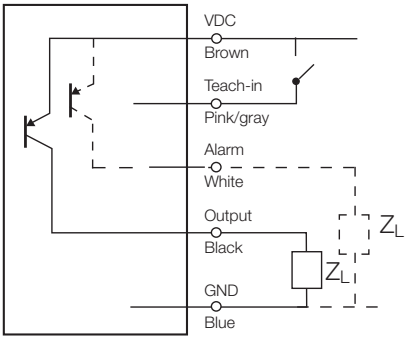
Sensor amplifiers BAE
Basic

	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)	
	PNP/NPN	**PNP/NPN**	
	500 Hz	500 Hz	
	40 mA	40 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

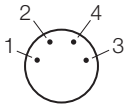


2 m PVC cable, 5×0.14 mm²

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

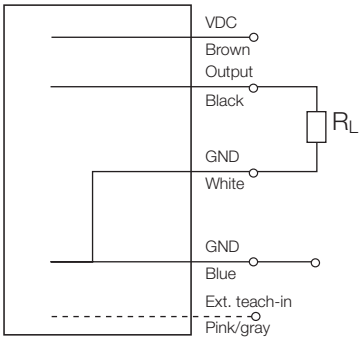
M8 connector, 4-pin

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



NPN on request.

Premium analog amplifier with current output

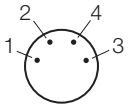


2 m PVC cable, 5×0.14 mm²

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

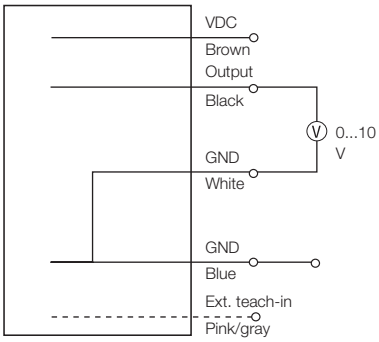
M8 connector, 4-pin

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



NPN on request.

Premium analog amplifier with voltage output

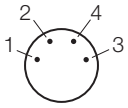


2 m PVC cable, 5×0.14 mm²

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

M8 connector, 4-pin

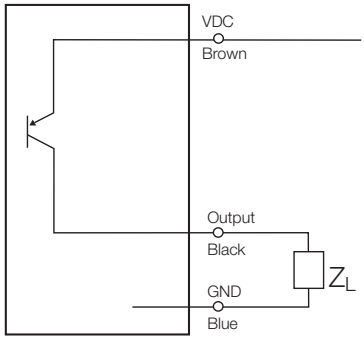
1 (brown)	+ VDC
2 (white)	Analog GND
3 (blue)	– GND
4 (black)	Analog +



NPN on request.

Switching amplifiers BAE for sensor heads BOH
Wiring diagrams

Advanced switching amplifier



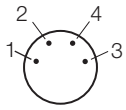
NPN on request.

2 m PVC cable, 3×0.14 mm²

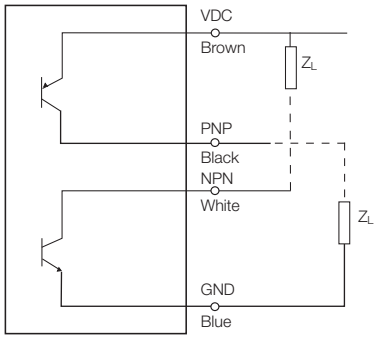
Brown	+ VDC
Blue	– GND
Black	Signal output

M8 connector, 4-pin

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



Basic switching amplifier

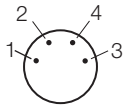


2 m PVC cable, 4×0.14 mm²

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

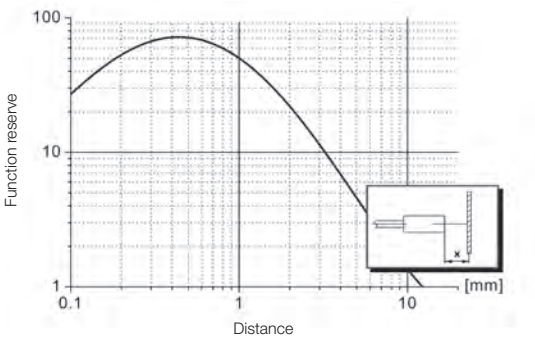
M8 connector, 4-pin

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

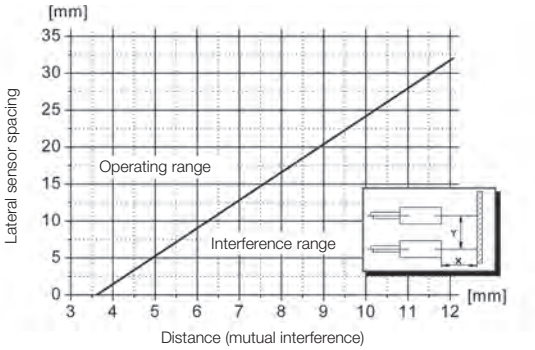


Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

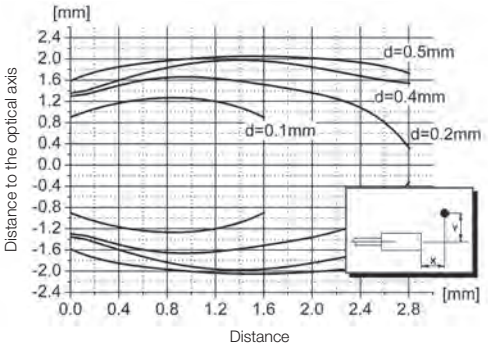
BOH0002, BOH DI-G02-001-01-S49F
BOH0004, BOH DI-M03-001-01-S49F
BOH0022, BOH DI-M06V-008-S49-SA3



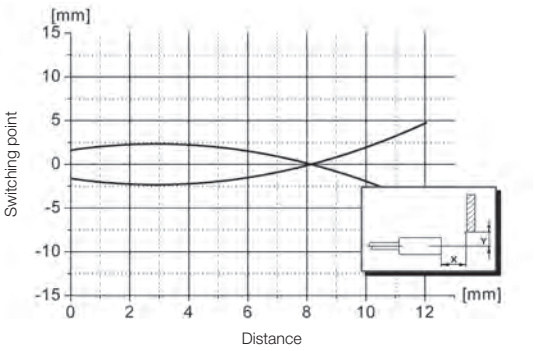
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

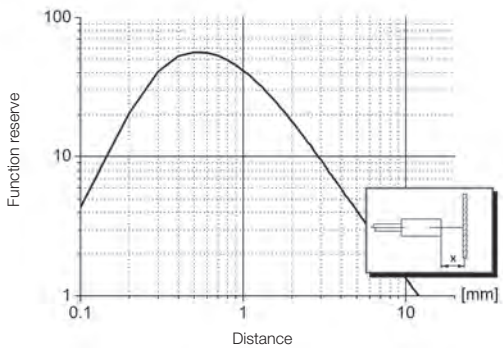


Resolution depending on distance

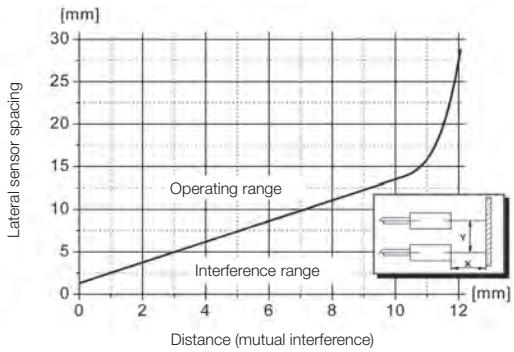


Detection range depending on distance

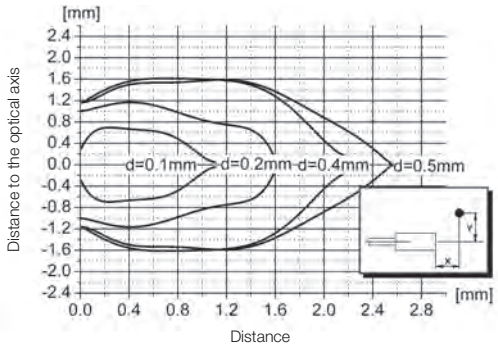
BOH0003, BOH DR-G02-001-01-S49F
BOH0009, BOH DR-M03-001-01-S49F



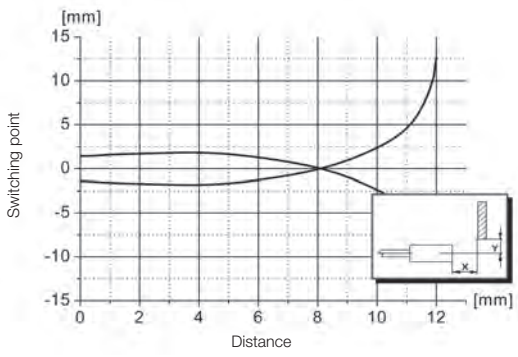
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



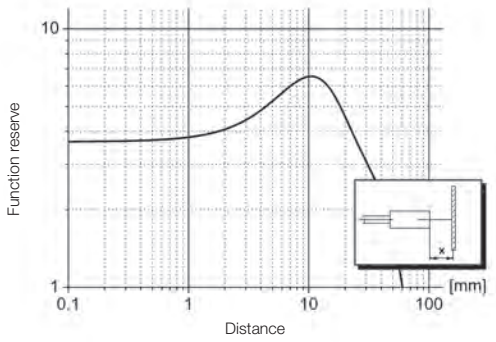
Resolution depending on distance



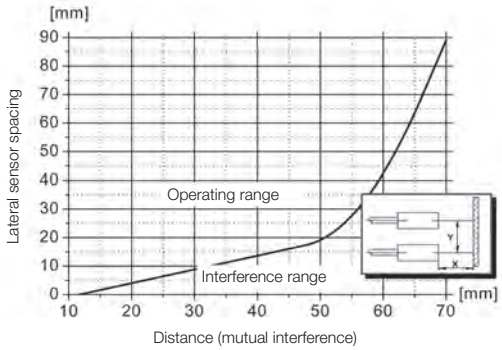
Detection range depending on distance

Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

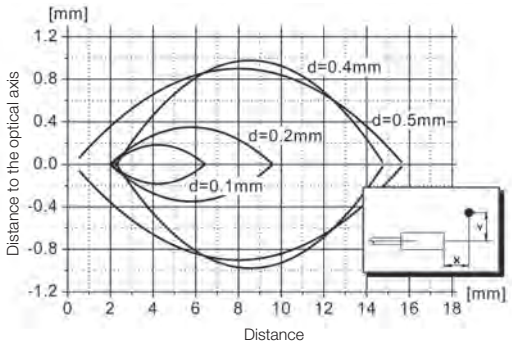
BOH0005, BOH DR-G05-002-01-S49F
BOH0007, BOH DR-M06-002-01-S49F
BOH000L, BOH DR-Q06-001-01-S49F



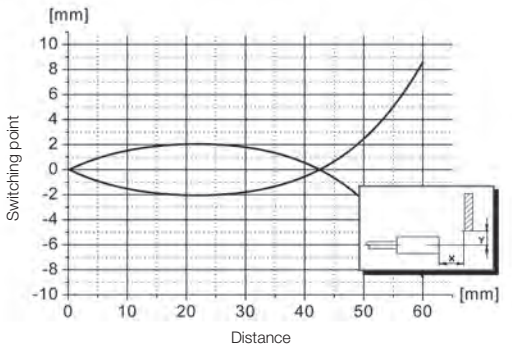
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

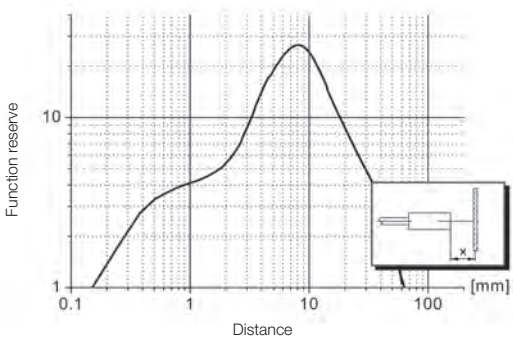


Resolution depending on distance

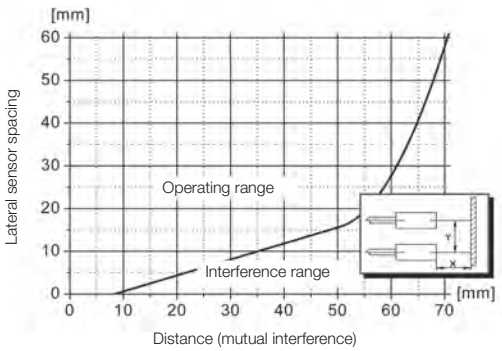


Detection range depending on distance

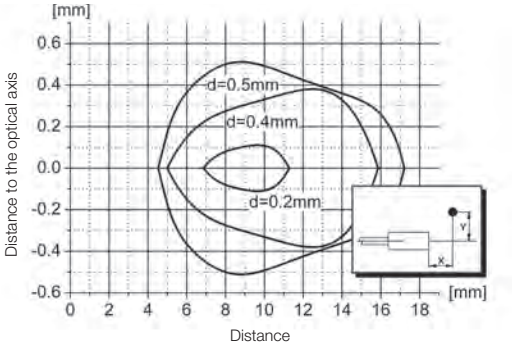
BOH0006, BOH DK-G05-002-01-S49F
BOH0008, BOH DK-M06-002-01-S49F
BOH000M, BOH DK-Q06-001-01-S49F



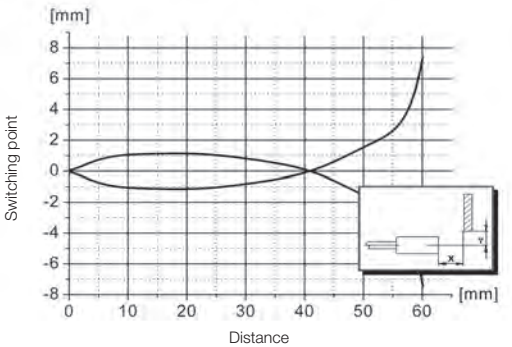
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



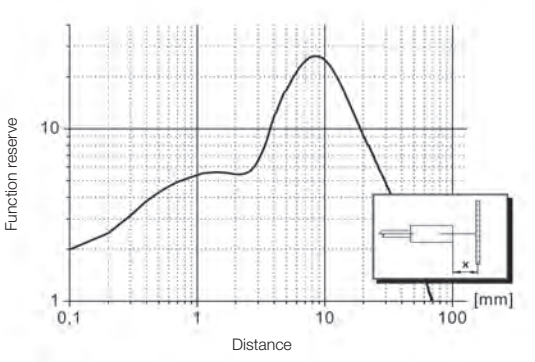
Resolution depending on distance



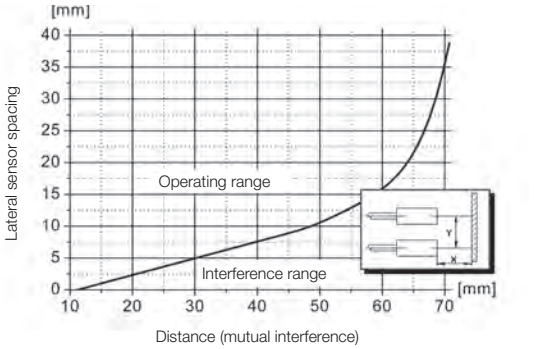
Detection range depending on distance

Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

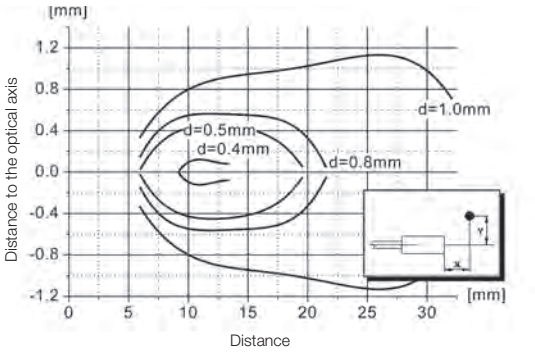
BOH002K, BOH DK-R002-006-01-S49F



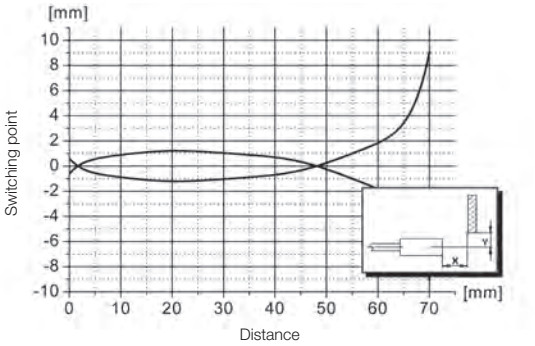
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

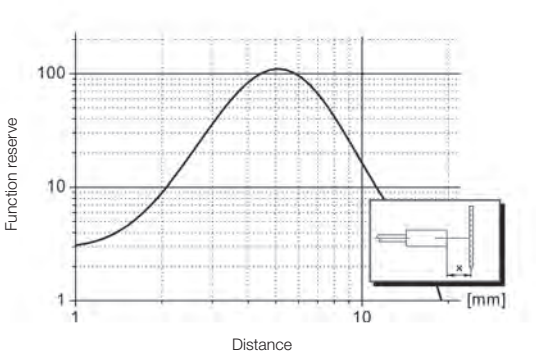


Resolution depending on distance

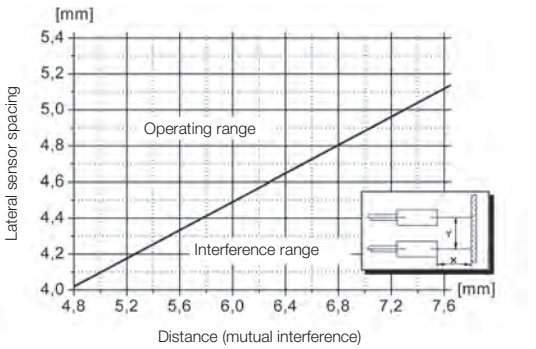


Detection range depending on distance

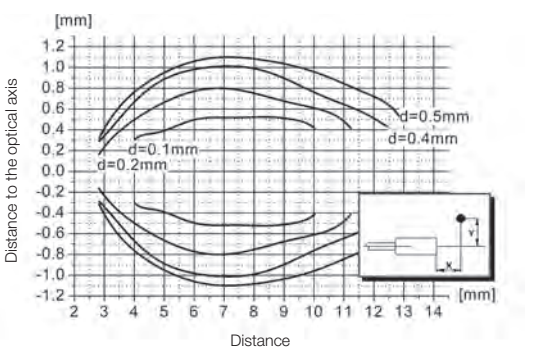
BOH002L, BOH FK-Z001-001-01-S49F



Function reserve depending on distance

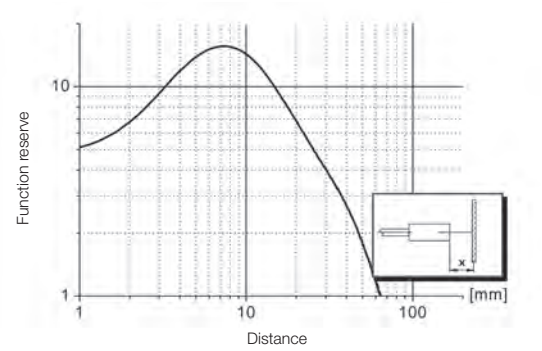


Minimum distance between two sensors for avoiding mutual interference

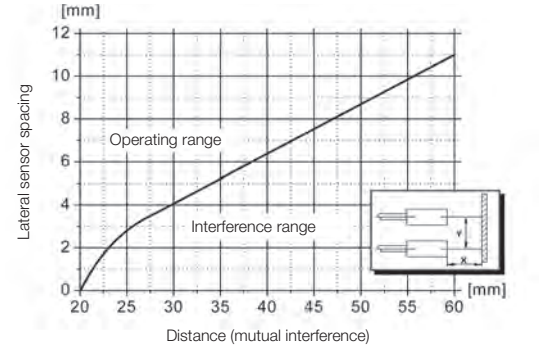


Resolution depending on distance

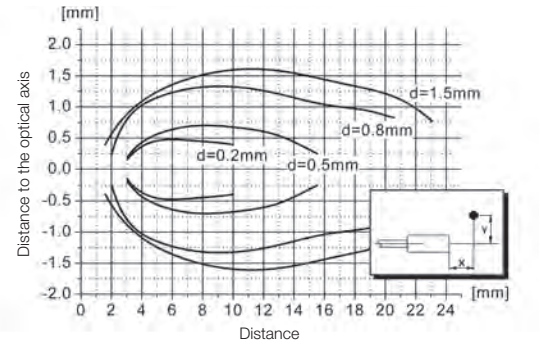
BOH0027, BOH DK-R018-001-01-S49F
BOH0028, BOH DK-R018-002-01-S49F



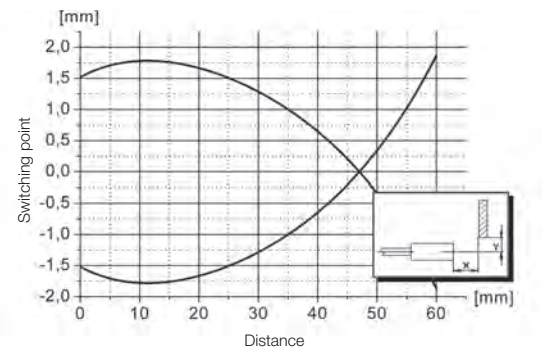
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

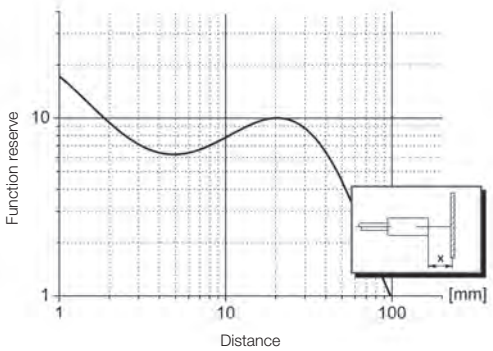


Resolution depending on distance

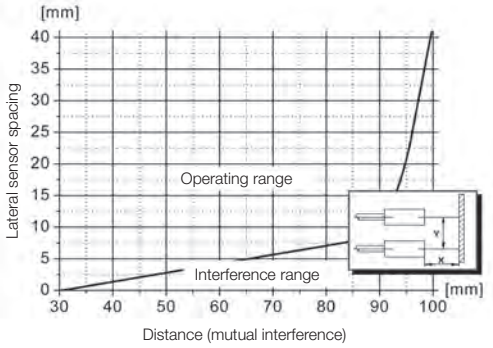


Detection range depending on distance

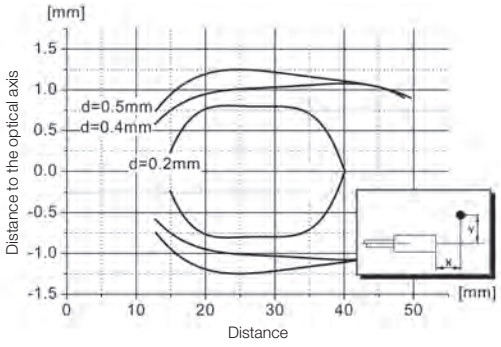
BOH0029, BOH DK-R027-003-01-S49F
BOH002A, BOH DK-R027-004-01-S49F



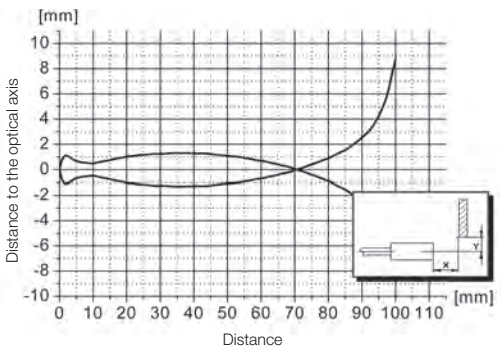
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



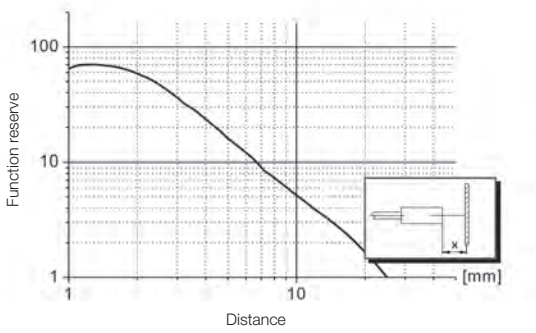
Resolution depending on distance



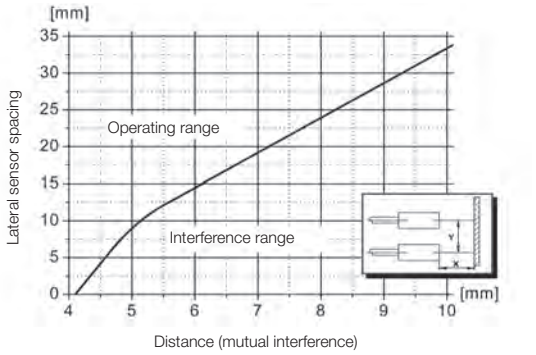
Detection range depending on distance

Diffuse sensors BOH for separate amplifiers BAE
Function diagrams

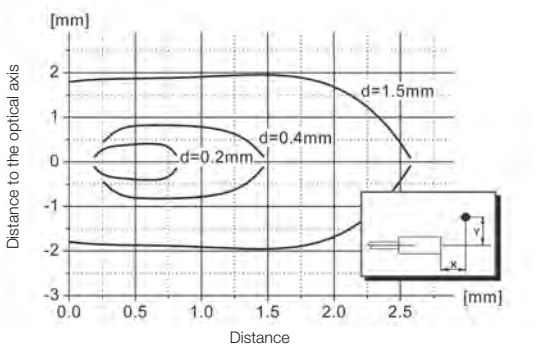
BOH0021, BOH DI-R006V-009-TL-01



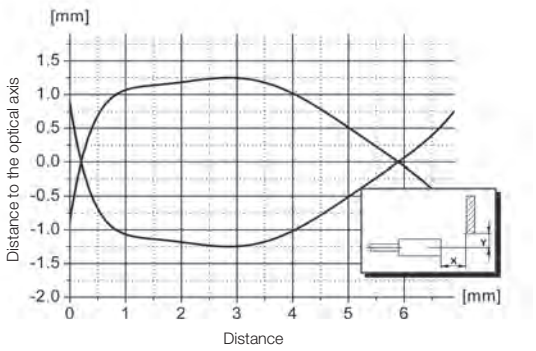
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

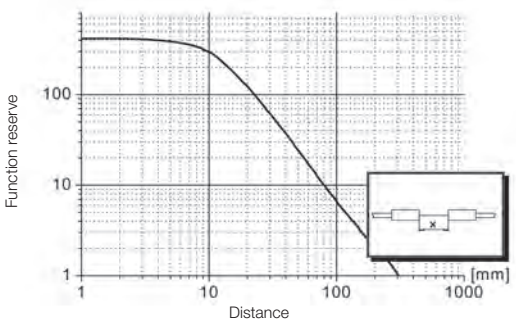


Resolution depending on distance

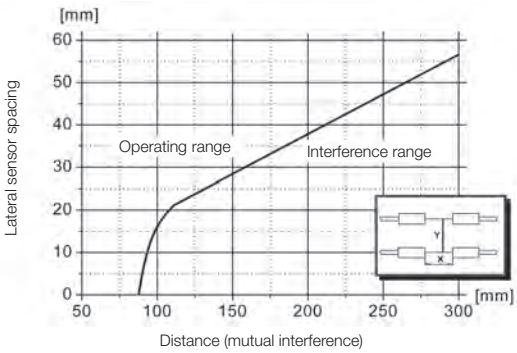


Detection range depending on distance

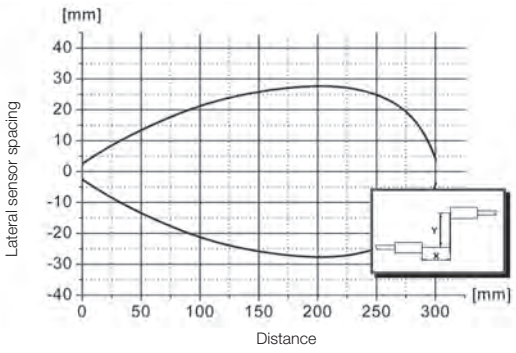
BOH000A, BOH TR-G02-001-01-S49F
BOH0023, BOH TR-M06V-009-S49-SA3



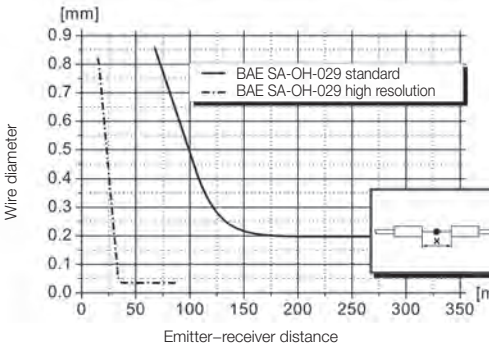
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

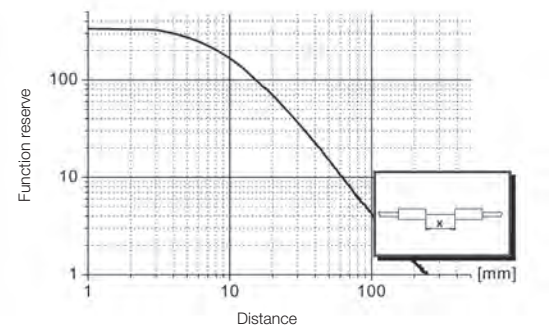


Lateral offset depending on distance

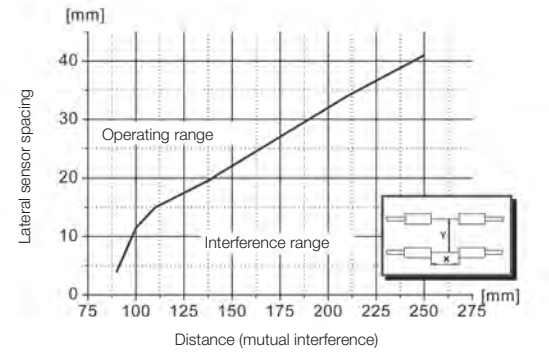


Resolution depending on distance

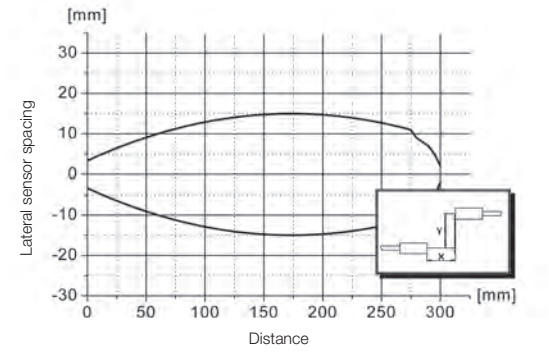
BOH000J, BOH TJ-G02-001-01-S49F



Function reserve depending on distance



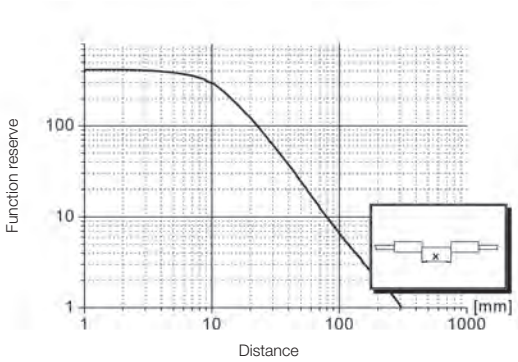
Minimum distance between two sensors for avoiding mutual interference



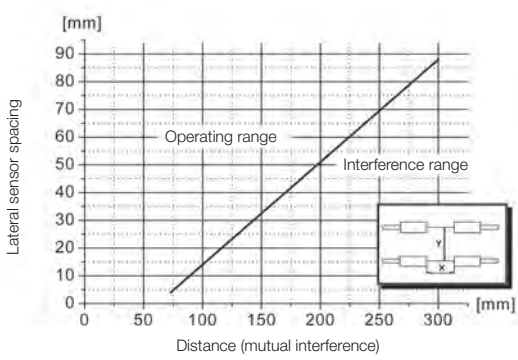
Lateral offset depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

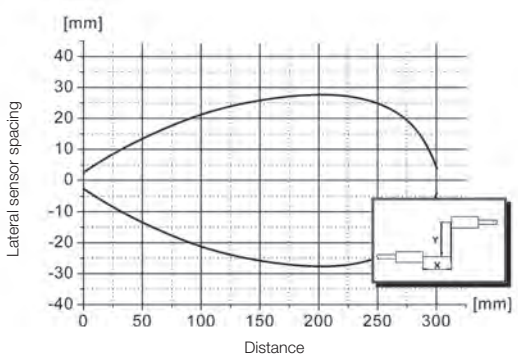
BOH000T, BOH TR-M03-001-01-S49F



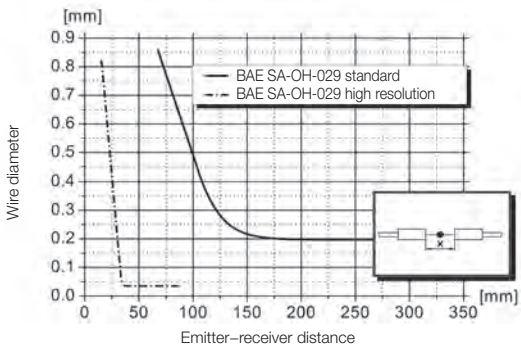
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

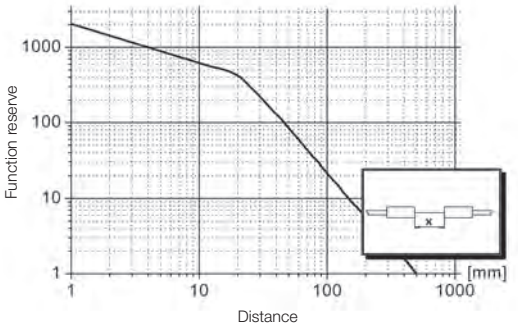


Lateral offset depending on distance

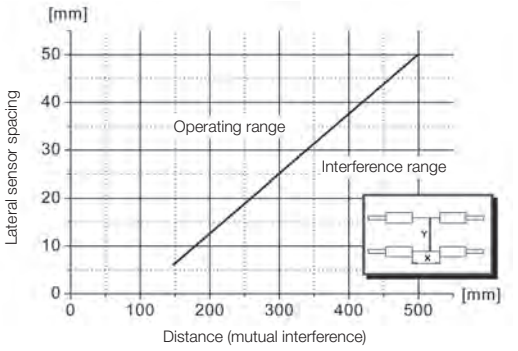


Resolution depending on distance

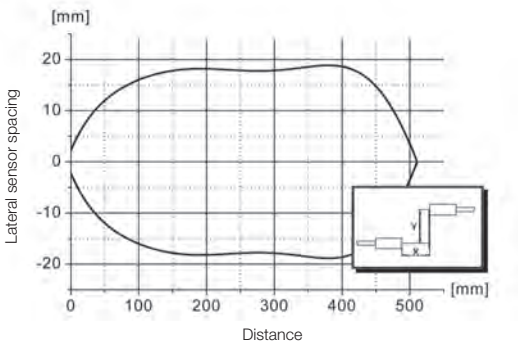
BOH000U, BOH TK-M03-001-01-S49F
BOH000E, BOH TK-M03-005-01-S49F
BOH000C, BOH TK-G02-001-01-S49F
BOH000E, BOH TK-G03-004-01-S49F



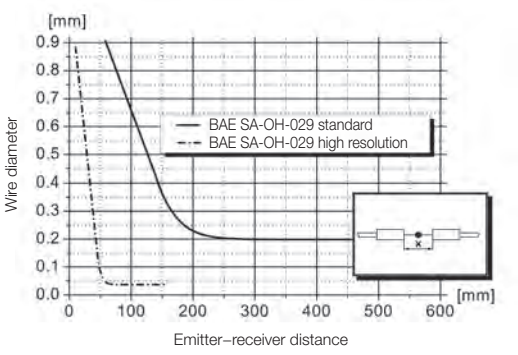
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



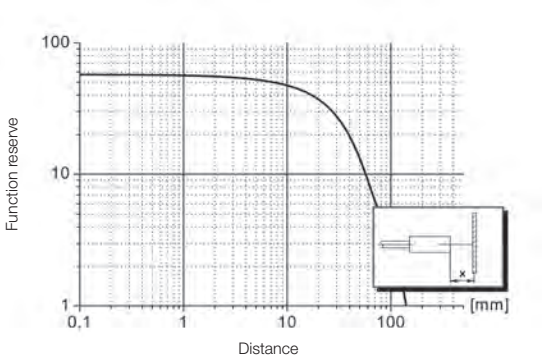
Lateral offset depending on distance



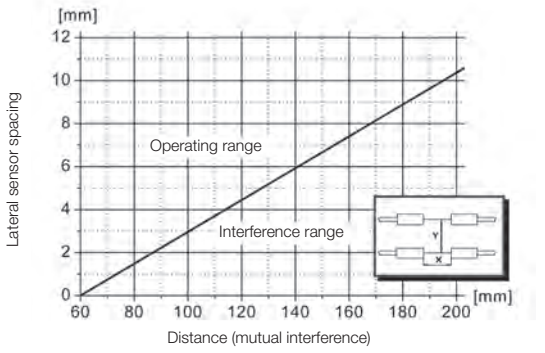
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

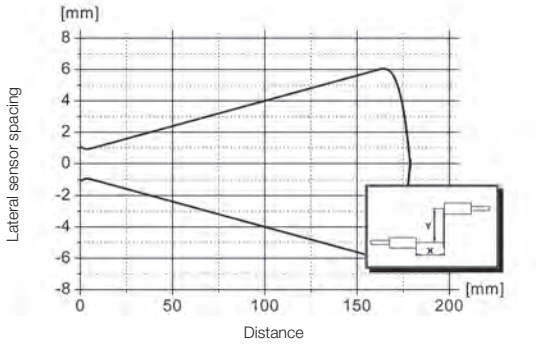
BOH001L, BOH TZ-M03-001-01-S49F-SA2
BOH001K, BOH TZ-G02-001-01-S49F-SA2



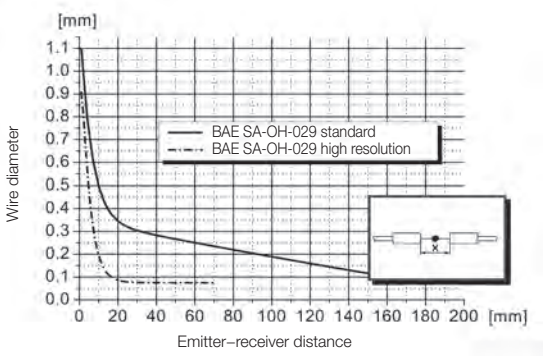
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

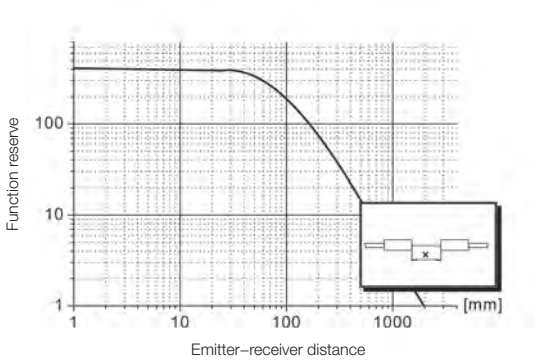


Lateral offset depending on distance

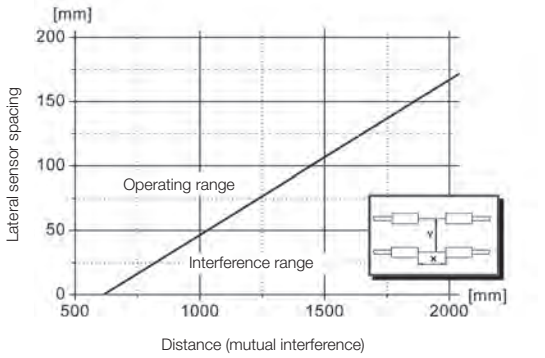


Resolution depending on distance

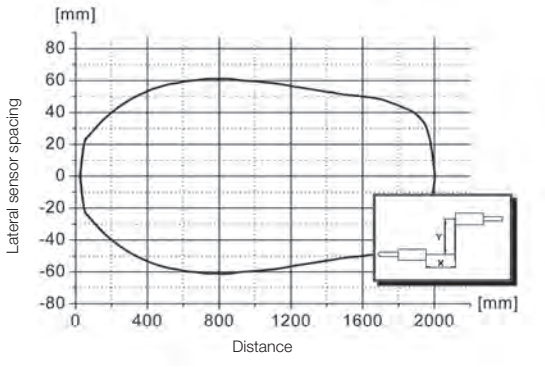
BOH002F, BOH TK-R027-003-01-S49F
BOH002H, BOH TK-R027-004-01-S49F



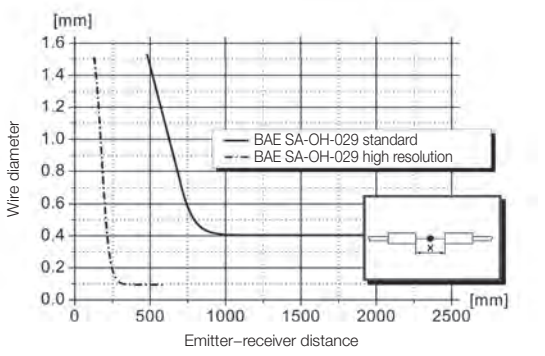
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



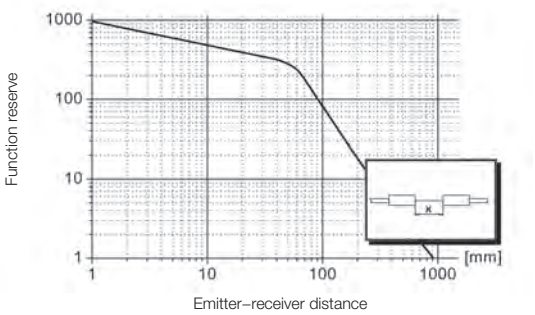
Lateral offset depending on distance



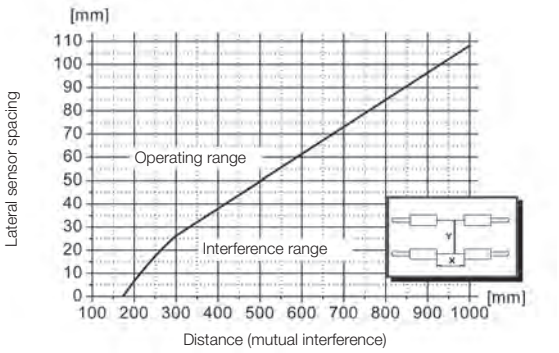
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

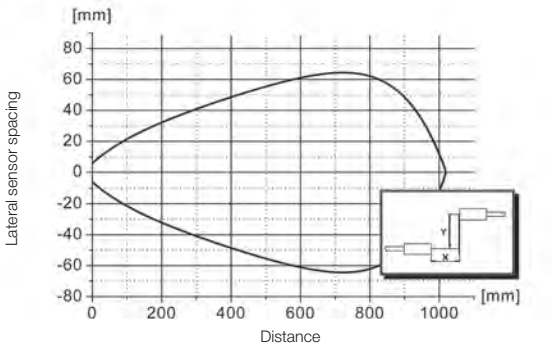
BOH000W, BOH TR-G04-003-01-S49F



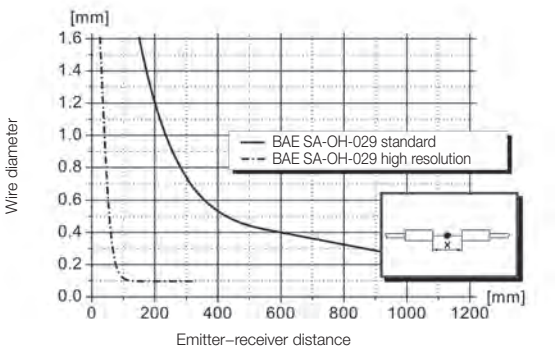
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

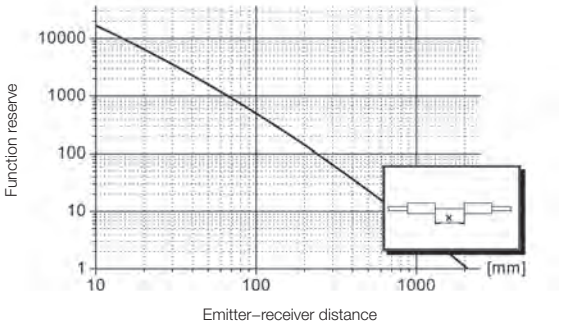


Lateral offset depending on distance

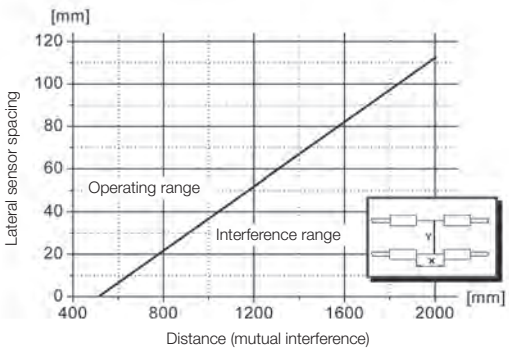


Resolution depending on distance

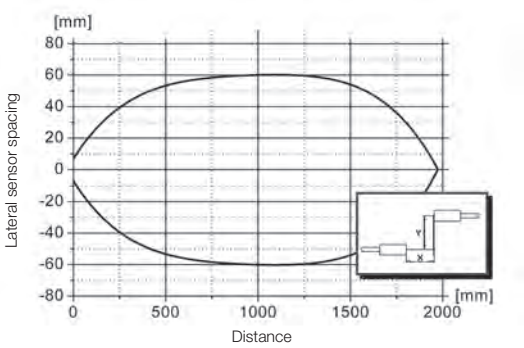
BOH0014, BOH TK-G04-003-01-S49F
BOH000P, BOH TK-Q06-001-01-S49F



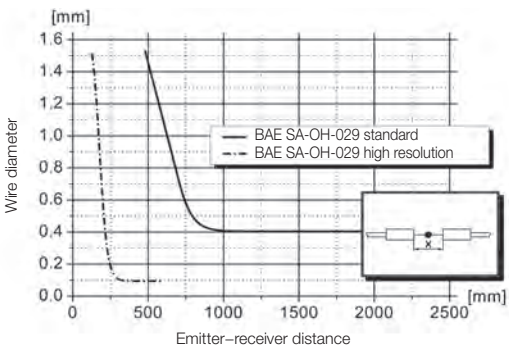
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



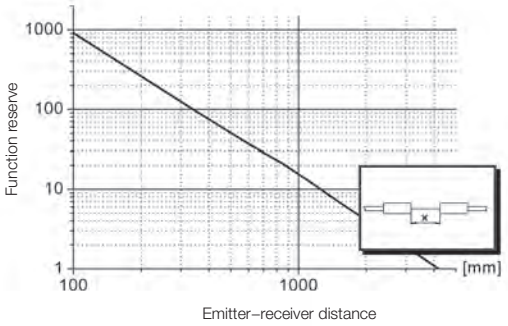
Lateral offset depending on distance



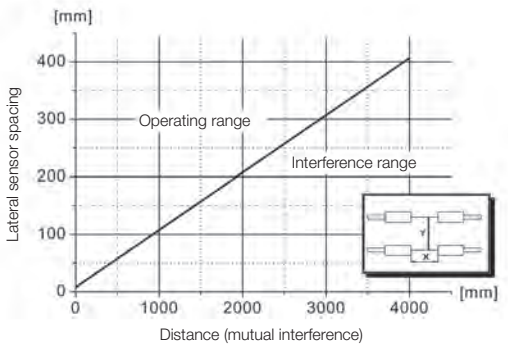
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

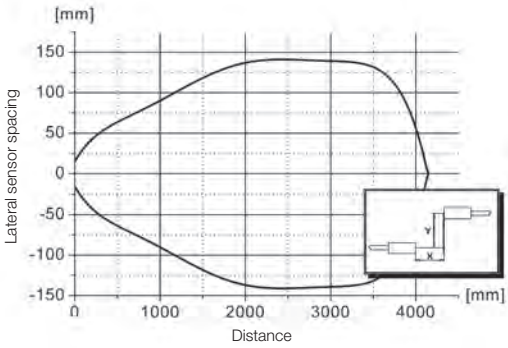
BOH0010, BOH TR-G05-005-02-S49F



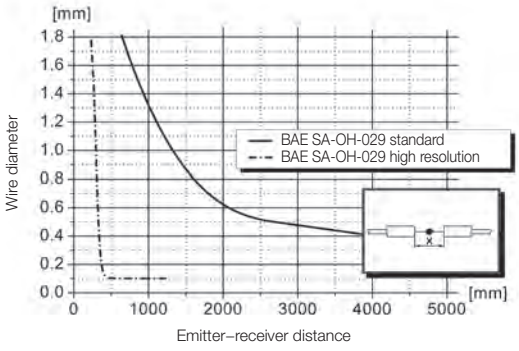
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

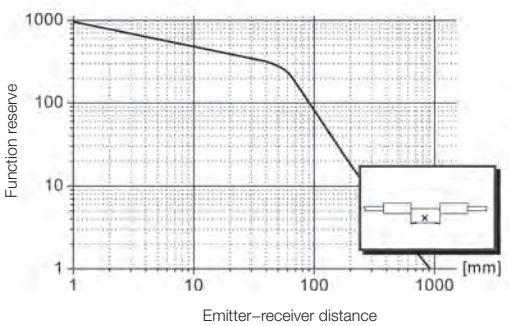


Lateral offset depending on distance

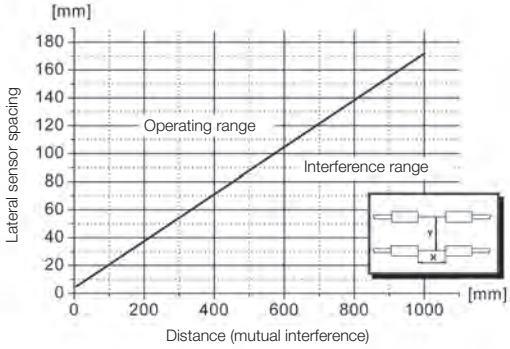


Resolution depending on distance

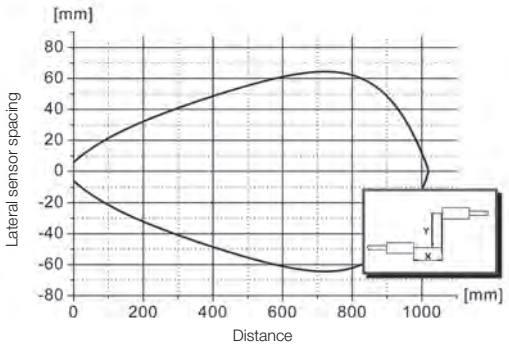
BOH000Y, BOH TR-M05-003-01-S49F
BOH000N, BOH TR-Q06-001-01-S49F



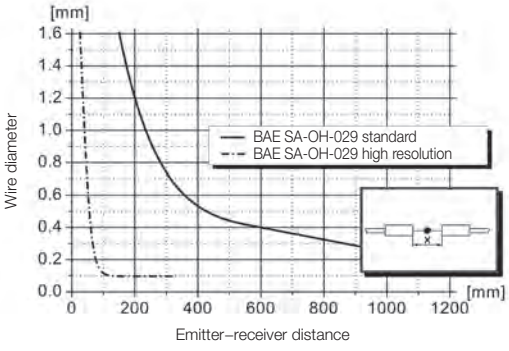
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



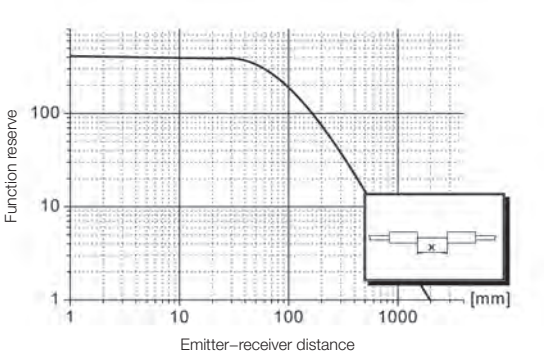
Lateral offset depending on distance



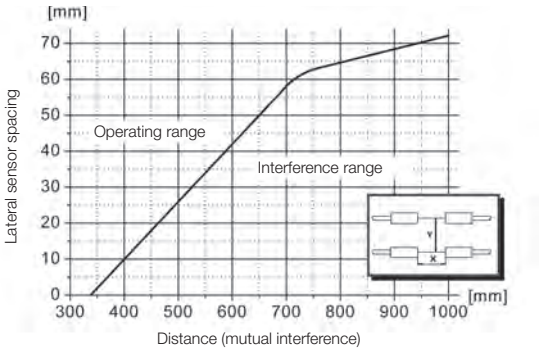
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

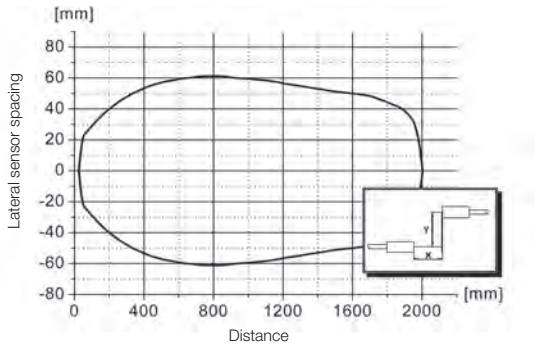
BOH0013, BOH TK-M05-003-01-S49F
BOH000F, BOH TK-M05-006-01-S49F



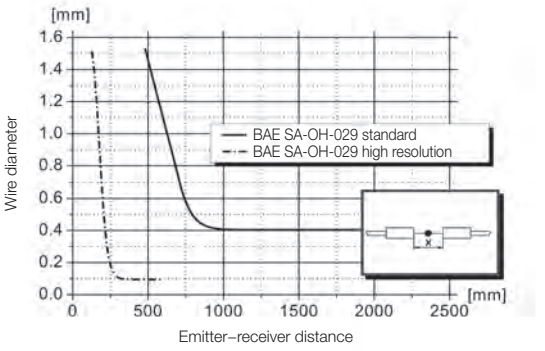
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

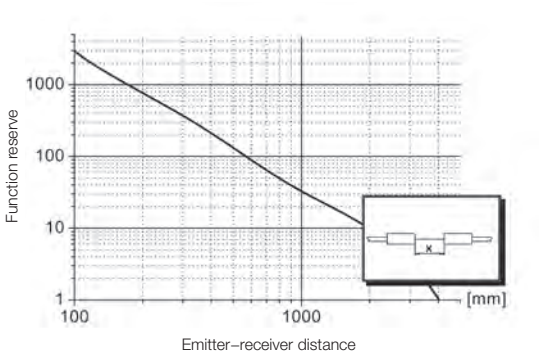


Lateral offset depending on distance

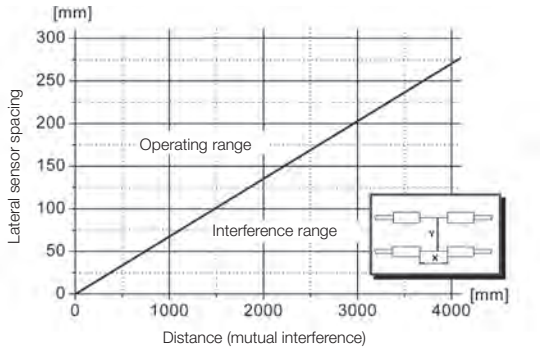


Resolution depending on distance

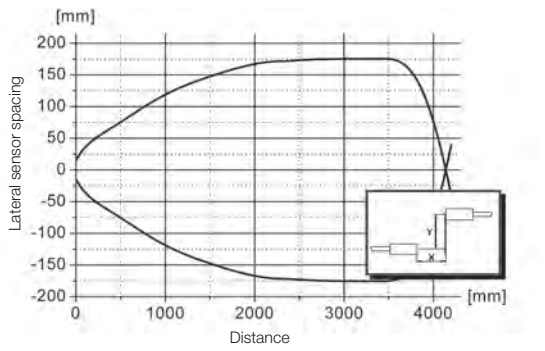
BOH000K, BOH TR-M06-002-02-S49F
BOH0020, BOH TR-R010-008-01-S49F



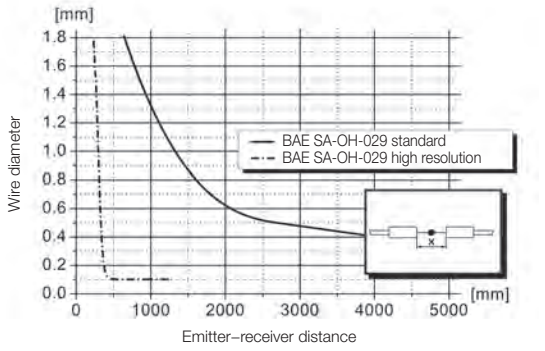
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



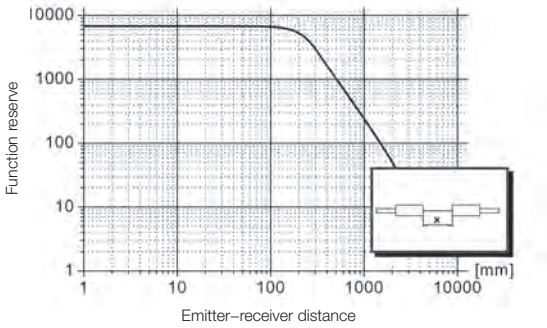
Lateral offset depending on distance



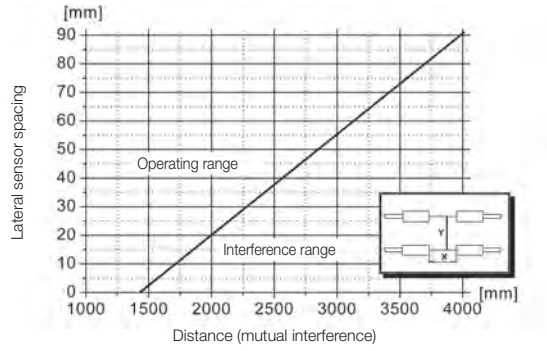
Resolution depending on distance

Through-beam sensors BOH for separate amplifiers BAE
Function diagrams

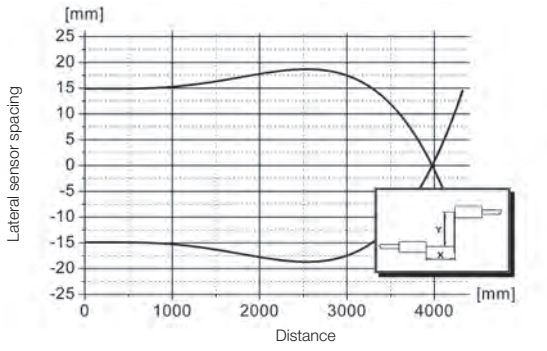
BOH0012, BOH TK-M08-004-02-S49F



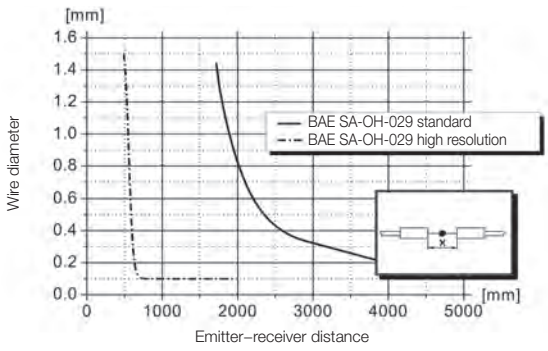
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference

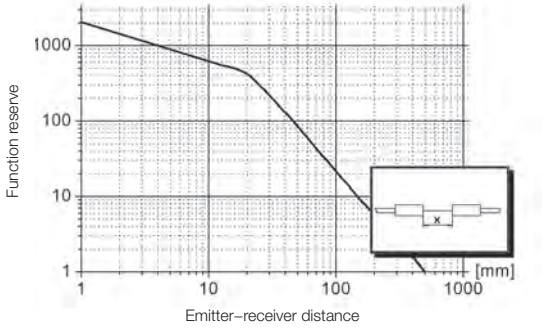


Lateral offset depending on distance

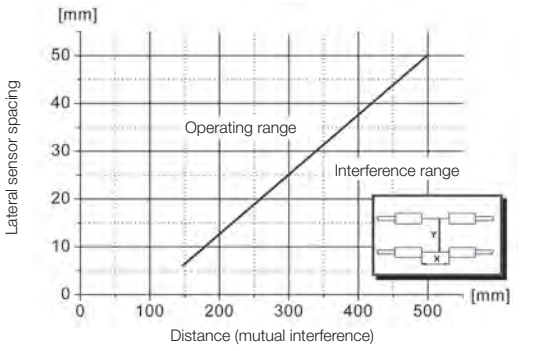


Resolution depending on distance

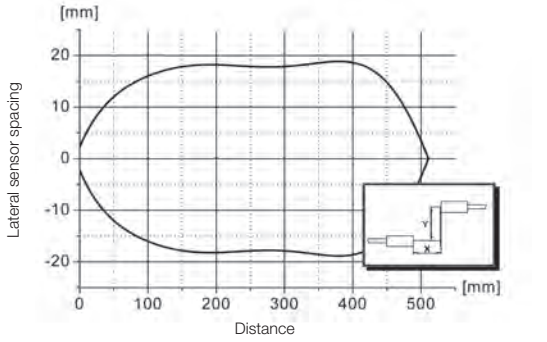
BOH001Z, BOH TK-R003-007-01-S49F
BOH002C, BOH TK-R018-001-01-S49F
BOH002E, BOH TK-R018-002-01-S49F



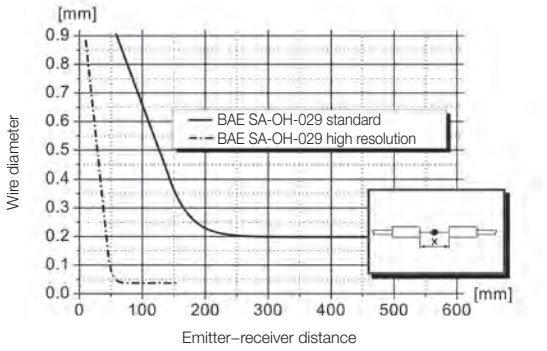
Function reserve depending on distance



Minimum distance between two sensors for avoiding mutual interference



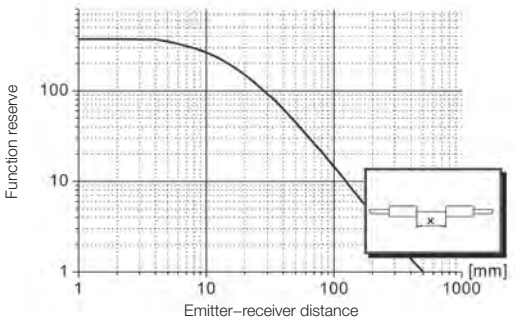
Lateral offset depending on distance



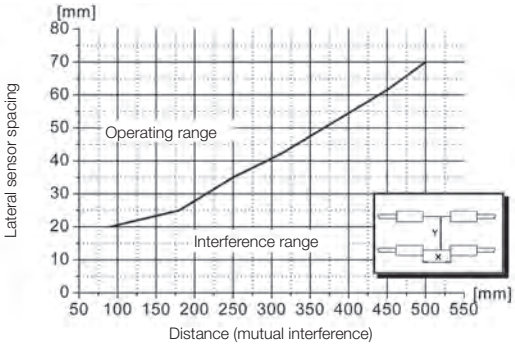
Resolution depending on distance

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

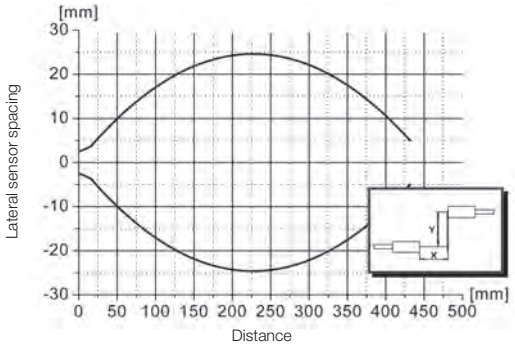
BOH000R, BOH TJ-Q06-001-01-S49F



Function reserve depending on distance

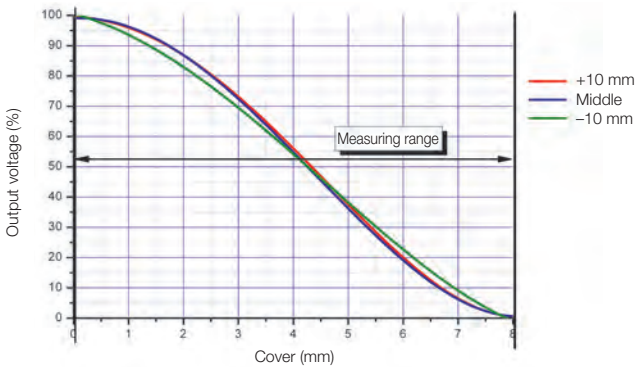


Minimum distance between two sensors for avoiding mutual interference



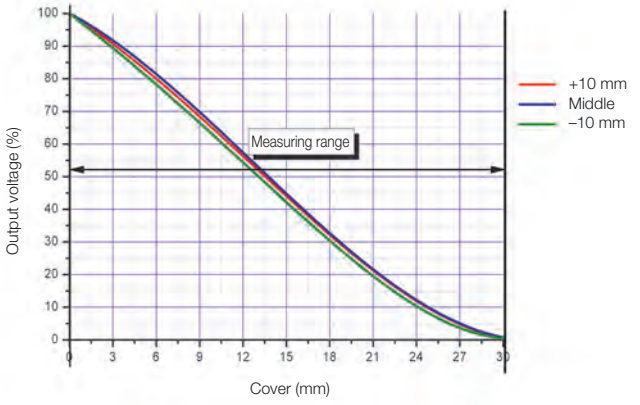
Lateral offset depending on distance

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



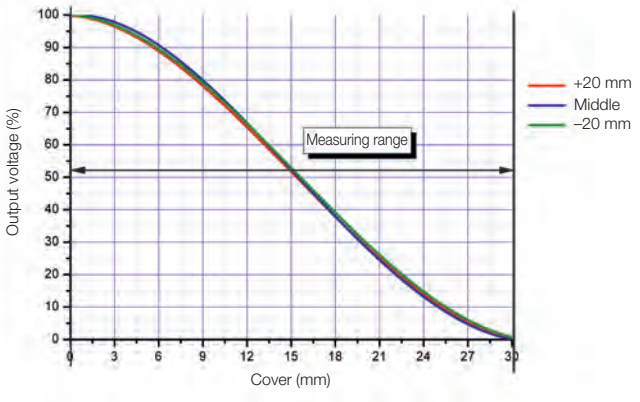
Output voltage dependent on the cover

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



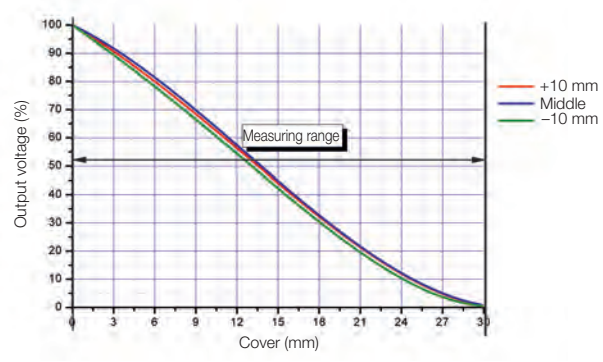
Output voltage dependent on the cover

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

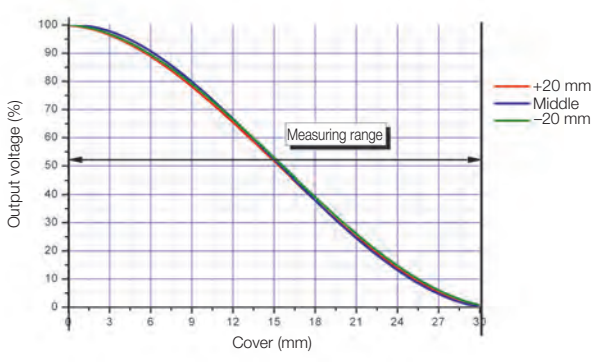


Output voltage dependent on the cover

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

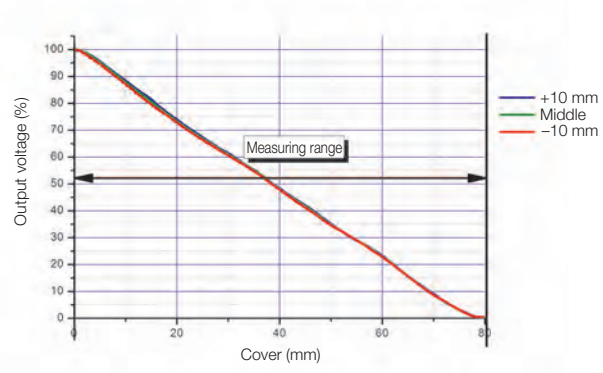


Emitter–receiver distance: 40 mm
Output voltage dependent on the cover

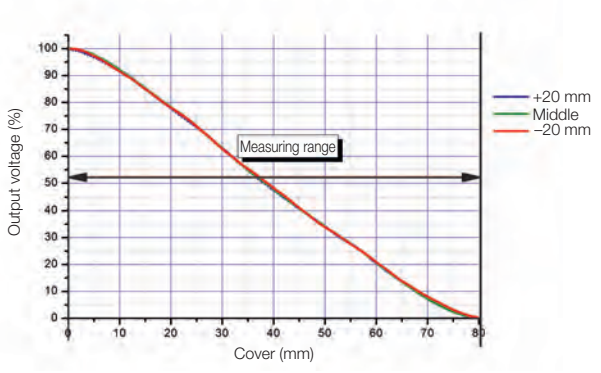


Emitter–receiver distance: 80 mm
Output voltage dependent on the cover

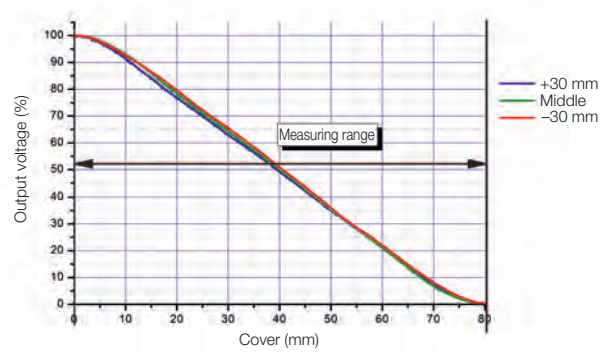
BOH002M, BOH AI-R165-011-01-S49F



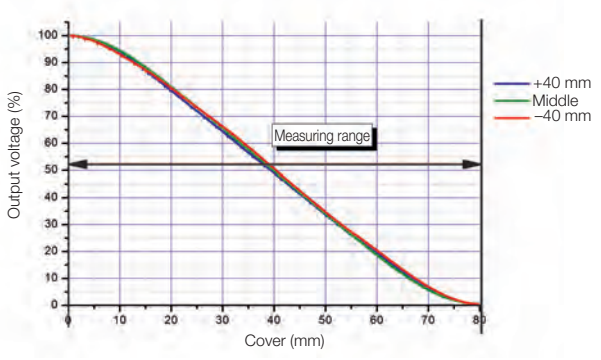
Emitter–receiver distance: 50 mm
Output voltage dependent on the cover



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



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



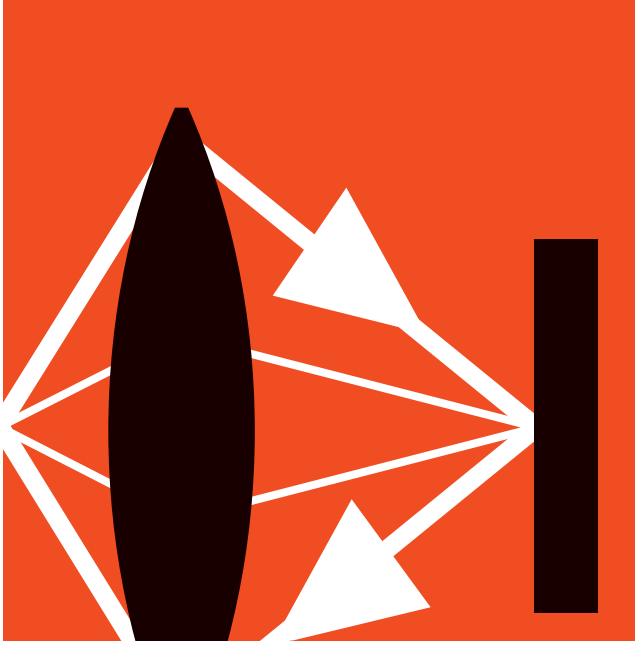
Emitter–receiver distance: 180 mm
Output voltage dependent on the cover

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

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.

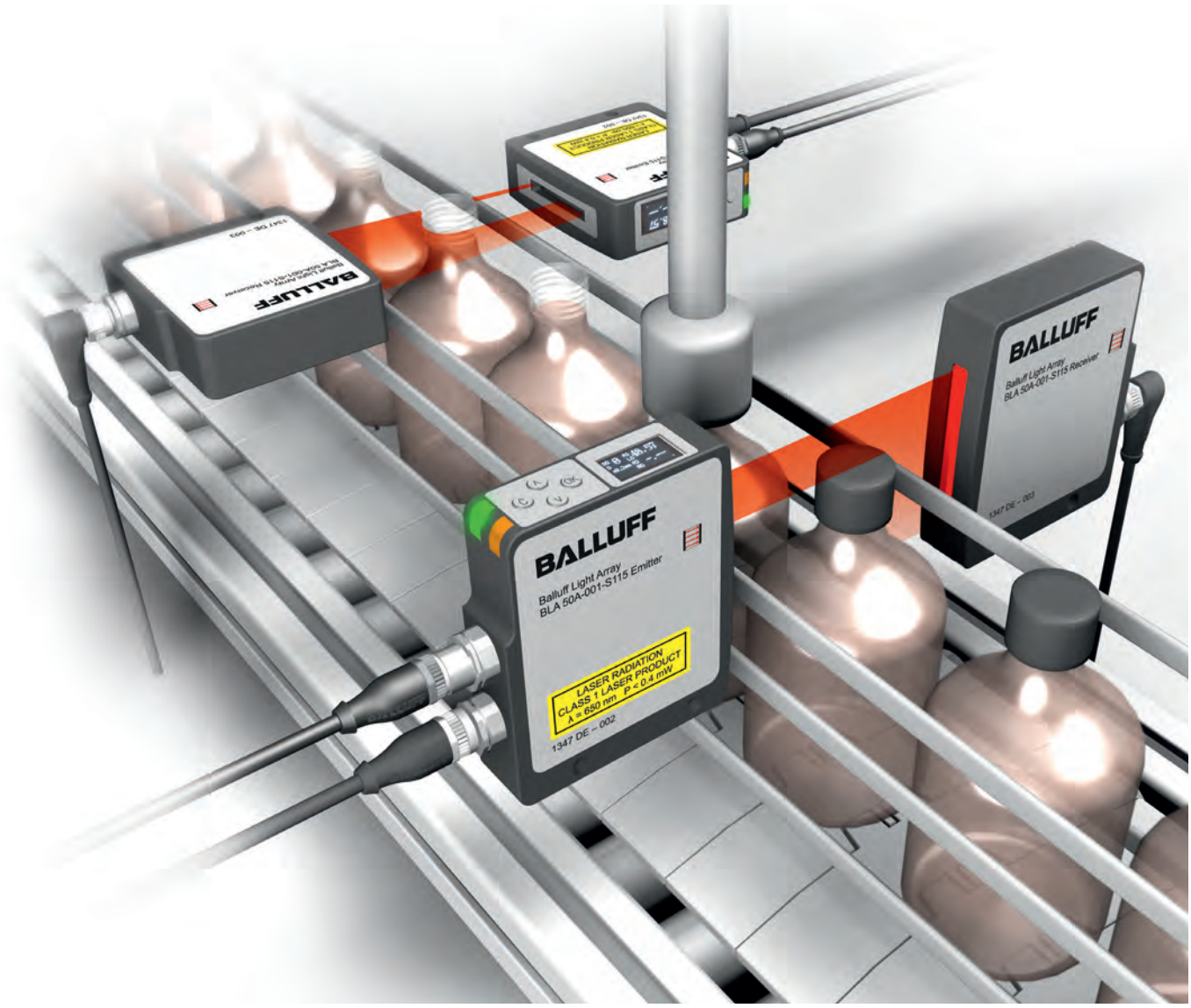
The range extends up to 2 m. The continuous, highly visible light band has an excellent resolution of 0.01 mm.

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

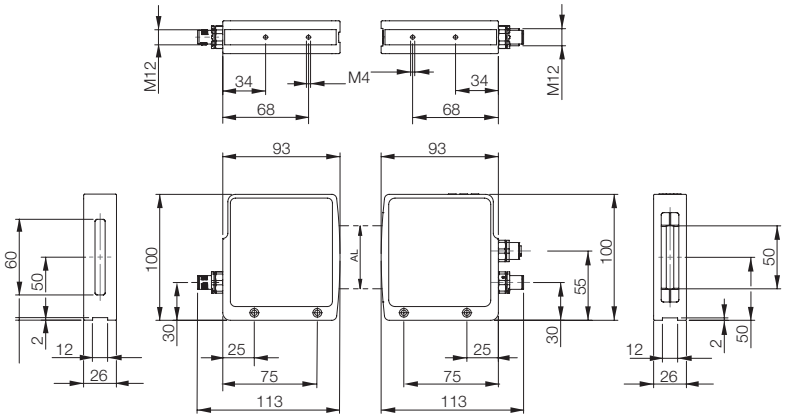
- High-precision position monitoring and detection
- Quick and easy sorting of parts according to size and/or diameter
- Quality assurance and monitoring, e.g. of heights of objects, gap sizes, etc.
- Precise detection of web edges, even with semitransparent materials

Contents



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		Difference of up to 6 objects (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



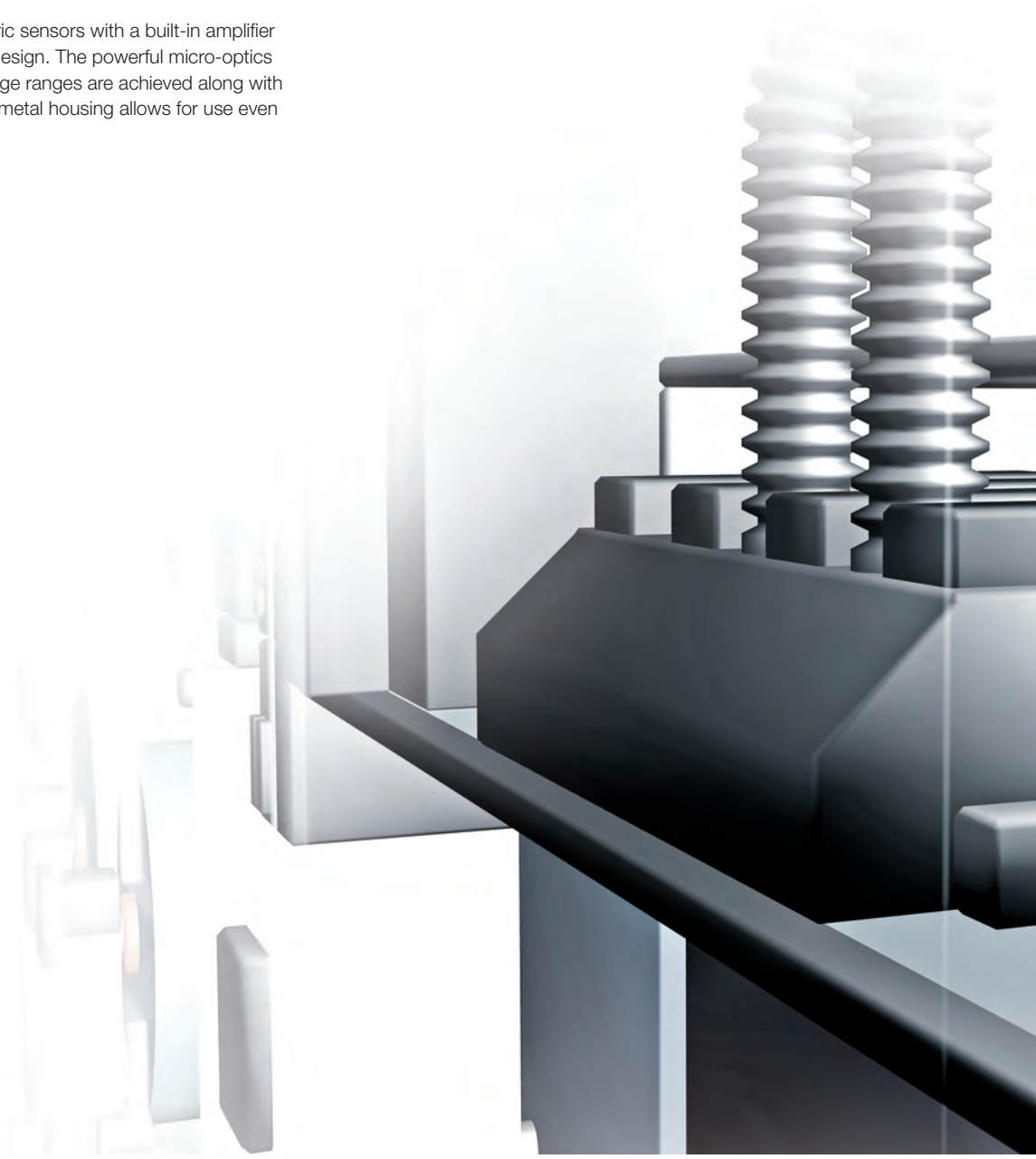

BALLUFF
Balluff Light Array
BLA 50A-001-S115 Emitter
LASER RADIATION
CLASS 1 LASER PRODUCT
λ = 650 nm P < 0.4 mW
1347 DE – 002
BALLUFF
Balluff Light Array
BLA 50A-001-S115 Receiver
1347 DE – 003

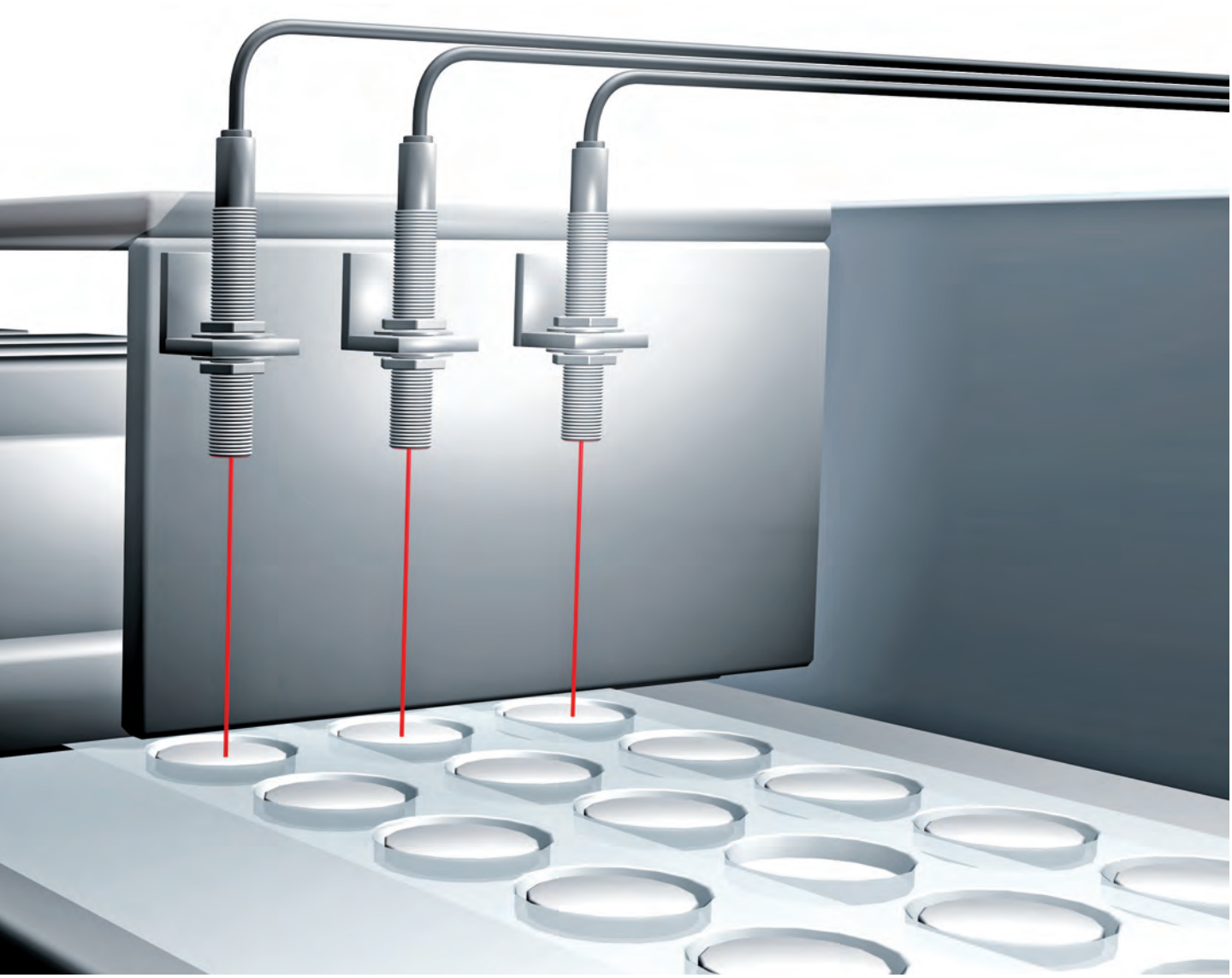
Photoelectric Sensors

Compact sensors

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

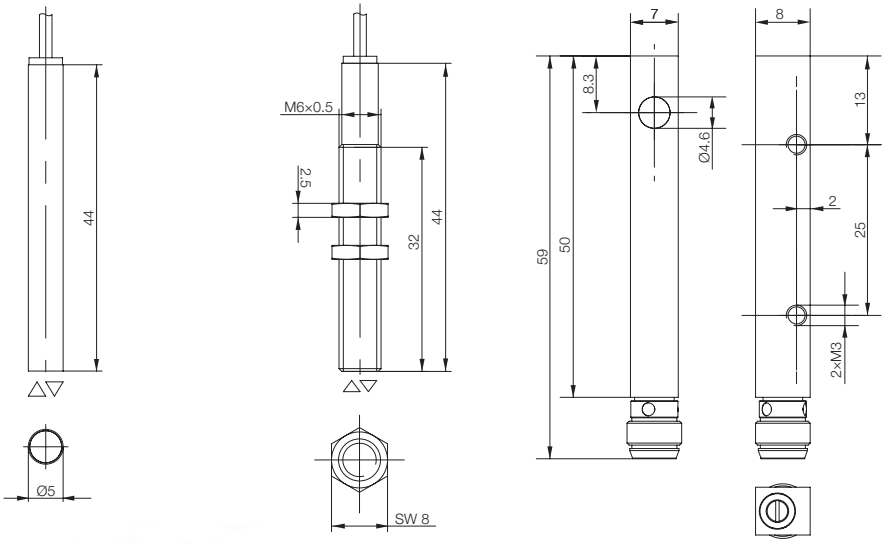
Compact stands for photoelectric sensors with a built-in amplifier and an exceptionally compact design. The powerful micro-optics ensure a perfect light beam. Large ranges are achieved along with excellent object resolution. The metal housing allows for use even under harsh conditions.





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

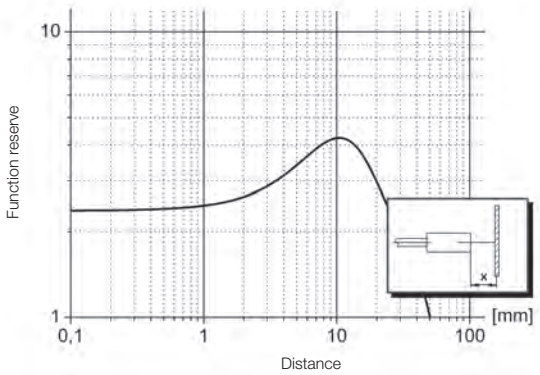


Suitable connectors
(please order separately)

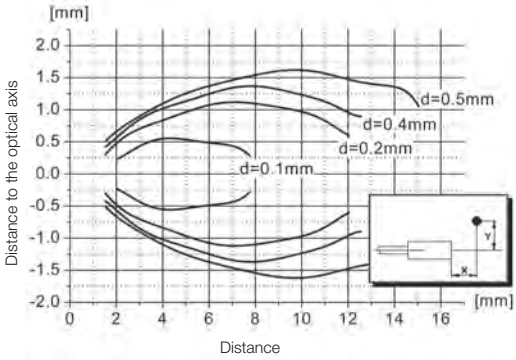
Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

Connectors without LED are suitable for PNP and NPN sensors.

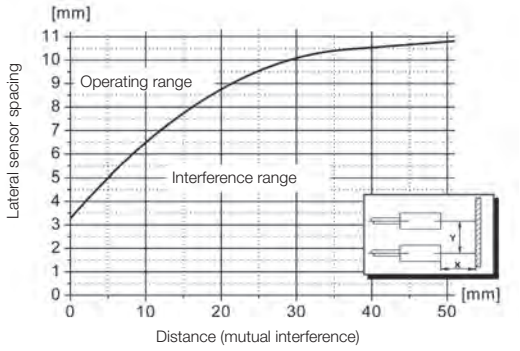
BOS01UZ, BOS G05E-PS-RD10-PU-02
BOS01W0, BOS M06M-PS-RD10-PU-02
BOS01W1, BOS R040M-PS-RD10-S49



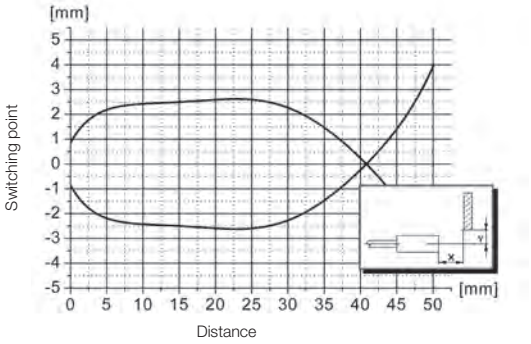
Function reserve depending on distance



Resolution depending on distance

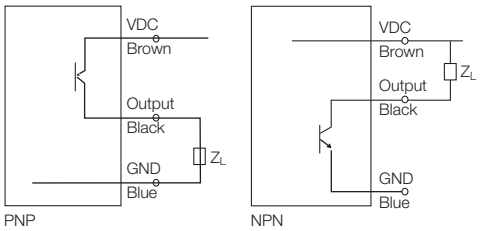


Minimum distance between two sensors for avoiding mutual interference



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.

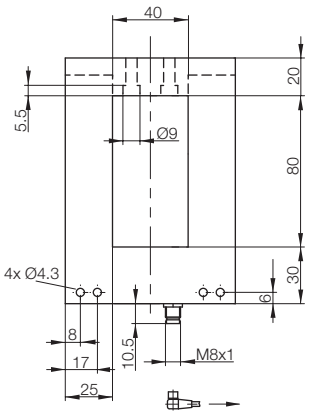
As a further development of the fork sensor, the angle sensor has almost identical technical data. Its special design makes it extremely valuable for diverse and demanding applications. This is because the beam geometry enables objects to be approached and detected from almost any direction. Angle sensors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

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



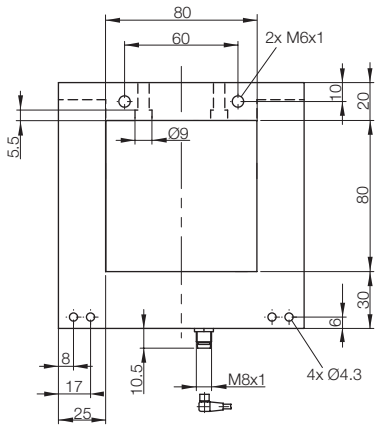
Suitable connectors
(please order separately)

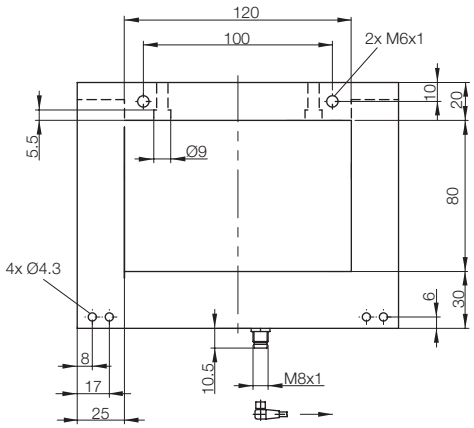
Size	Design	Cable material	Color	Length	Order code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

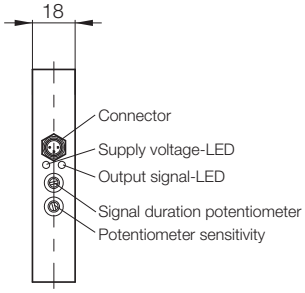
Connectors without LED are suitable for PNP and NPN sensors.

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.**

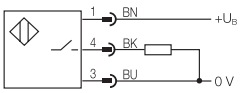
BOW	BOW
80×80 mm	**120×80 mm**
BOW001J	**BOW0012**
BOW A-0808-PS-C-S49	BOW A-1208-PS-C-S49
10...30 V DC	10...30 V DC
≤ 45 mA	≤ 60 mA
200 mA	200 mA
Dark switching	Dark switching
Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared
880 Nm	880 Nm
1.0 mm	1.2 mm
Green 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







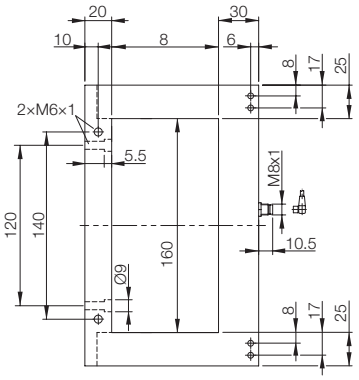
Wiring diagram



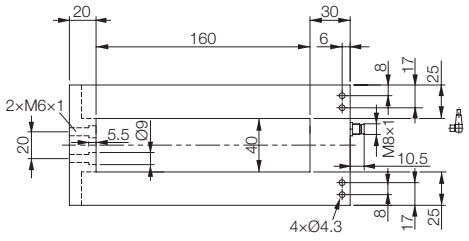
Note when using for ambient light:
The receiver is located on the connector side.

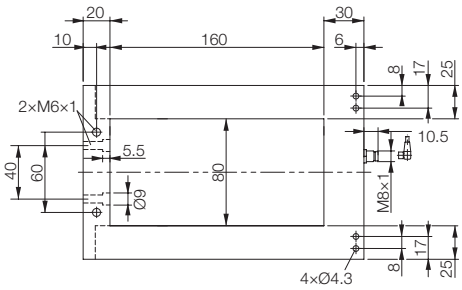
Dynamic optical window sensors BOW

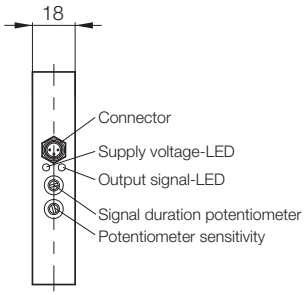
Type		**BOW**
Active area		**160×80 mm**
NPN NO/NC	**Order code**	**BOW0026**
	Part number	BOW A-1608-NS-C-S49
Supply voltage U_S		10...30 V DC
No-load supply current I_0 max.		≤ 75 mA
Output current		200 mA
Switching type		Dark switching
Polarity reversal/short-circuit protected		Yes/Yes
Settings		2× 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



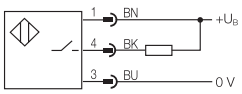
BOW	BOW
40×160 mm	**80×160 mm**
BOW0027	**BOW0028**
BOW A-0416-NS-C-S49	BOW A-0816-NS-C-S49
10...30 V DC	10...30 V DC
≤ 65 mA	≤ 75 mA
200 mA	200 mA
Dark switching	Dark switching
Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared
880 Nm	880 Nm
1.0 mm	1.0 mm
Green 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







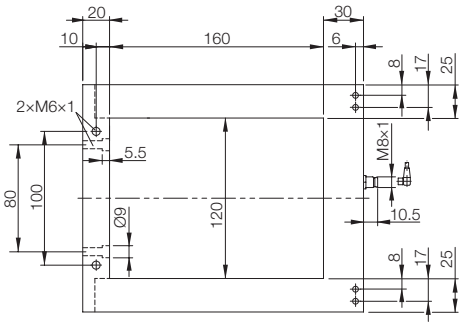
Wiring diagram



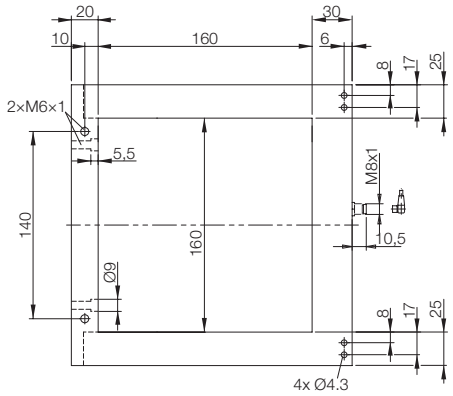
Note when using for ambient light:
The receiver is located on the connector side.

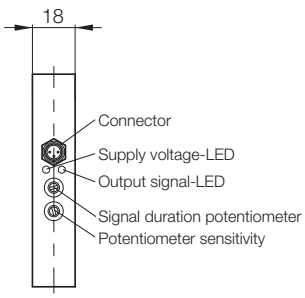
Dynamic optical window sensors BOW

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	

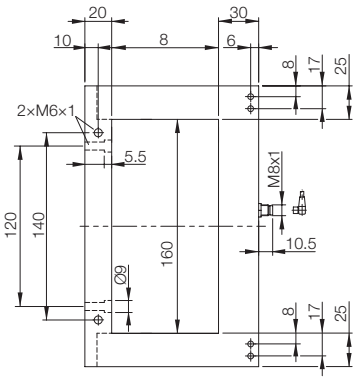




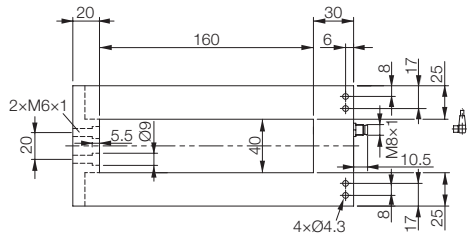
Note when using for ambient light:
The receiver is located on the connector side.

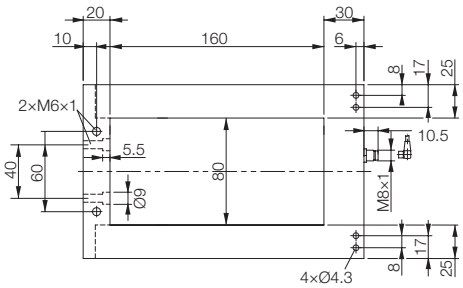
Dynamic optical window sensors BOW

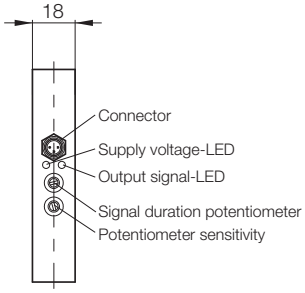
Type		**BOW**
Active area		**160×80 mm**
PNP NO/NC	**Order code**	**BOW002C**
	Part number	BOW A-1608-PS-C-S49
Supply voltage U_S		10...30 V DC
No-load supply current I_0 max.		≤ 75 mA
Output current		200 mA
Switching type		Dark switching
Polarity reversal/short-circuit protected		Yes/Yes
Settings		2× 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



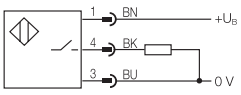
BOW	BOW
40×160 mm	**80×160 mm**
BOW002E	**BOW002F**
BOW A-0416-PS-C-S49	BOW A-0816-PS-C-S49
10...30 V DC	10...30 V DC
≤ 65 mA	≤ 75 mA
200 mA	200 mA
Dark switching	Dark switching
Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared
880 Nm	880 Nm
1.5 mm	1.5 mm
Green 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







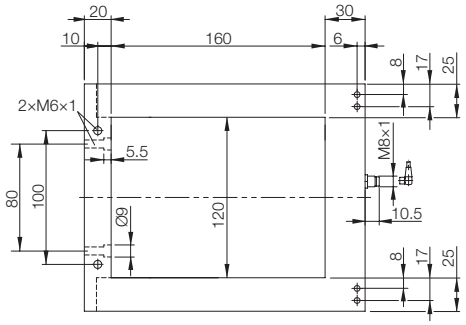
Wiring diagram



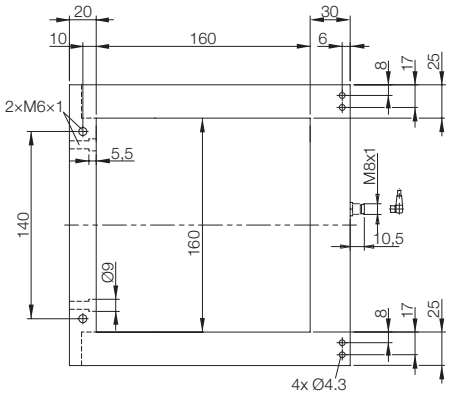
Note when using for ambient light:
The receiver is located on the connector side.

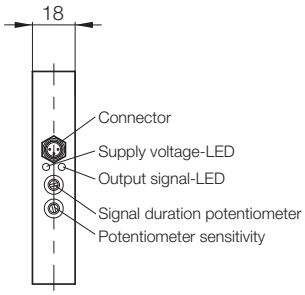
Dynamic optical window sensors BOW

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	

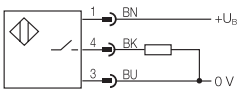


BOW	
160×160 mm	
BOW002J	
BOW A-1616-PS-C-S49	
10...30 V DC	
≤ 100 mA	
200 mA	
Dark switching	
Yes/Yes	
2× Potentiometer, 270°	
LED, infrared	
880 Nm	
1.5 mm	
Green LED	
Red LED	
0.4 ms	
5...300 ms adjustable	
3...100 Hz	
Dynamic	
IP 67	
–10...+55 °C	
EN 60947-5-2	
Anodized aluminum	
PMMA	
M8 connector,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





Wiring diagram

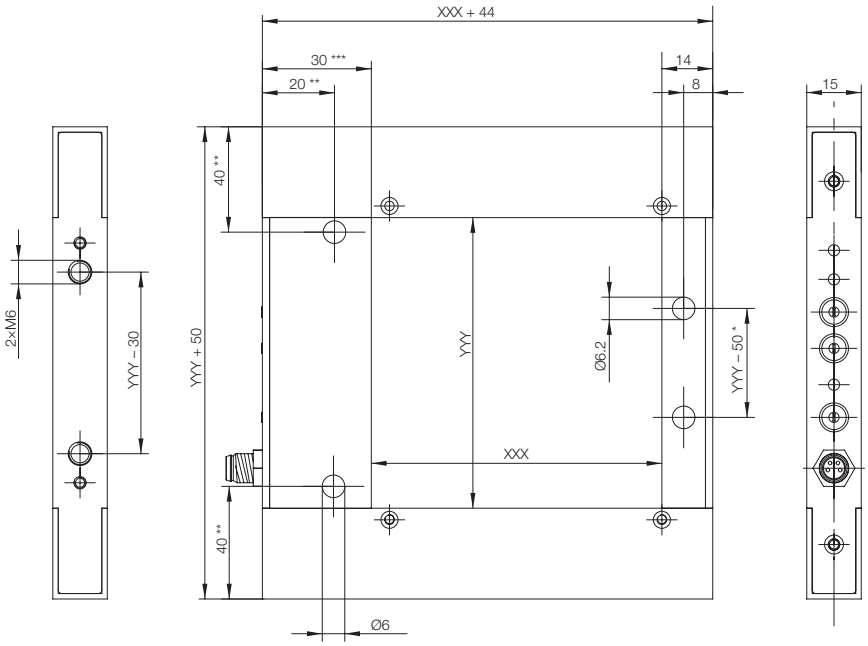


Note when using for ambient light:
The receiver is located on the connector side.

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

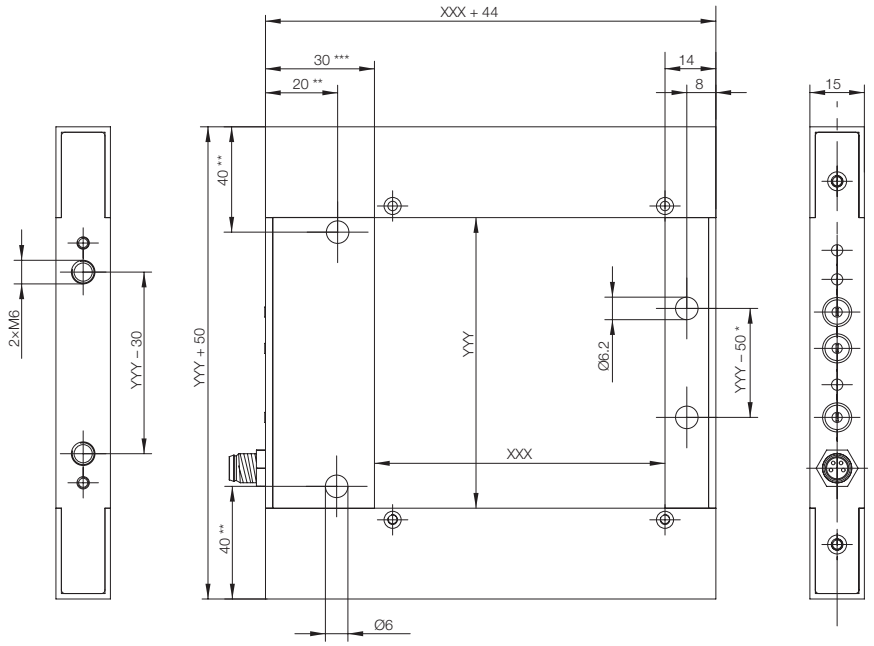
Connection and operating elements on page 87



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

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



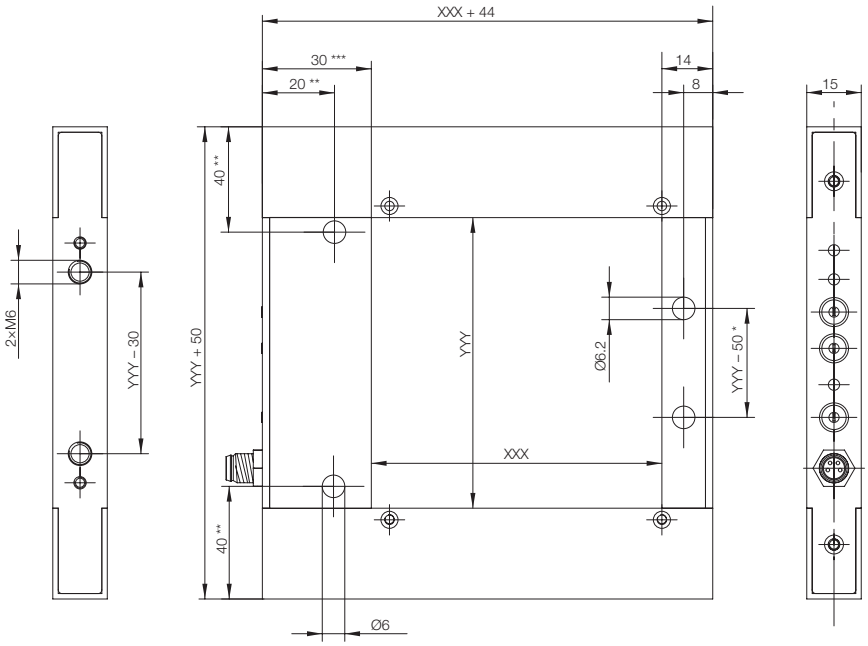
XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* 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

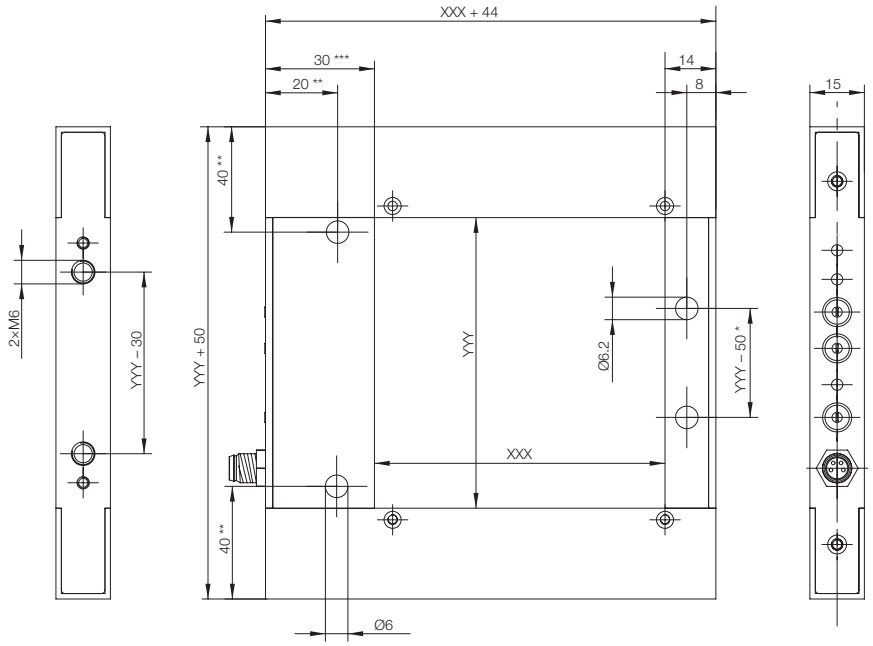


XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

* 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



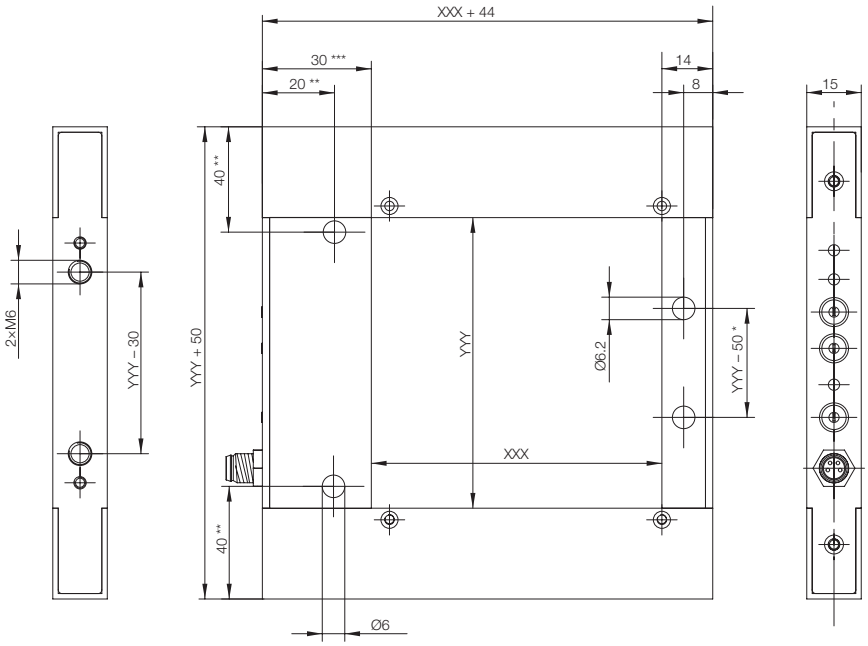
XXX = Length of active bracket (carries emitter or receiver) = integer multiple of 40 mm
YYY = Length of passive bracket (emitter/receiver distance) = integer multiple of 40 mm

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

Optical Window, Fork and Angle Sensors

Static optical window sensors BOW (Modular)

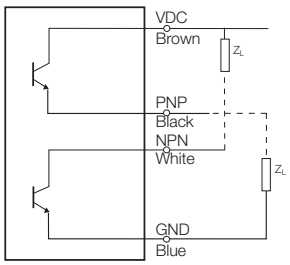
Type		**BOW**	**BOW**
Active area (XXX × YYY)		**200×160 mm**	**200×200 mm**
Switching delay		**1.25 ms**	**1.25 ms**
Counting frequency		**400 Hz**	**400 Hz**
PNP/ NC/	**Order code**	**BOW0036**	**BOW0037**
NPN NO	Part number	BOW B-1620-DU-C-S75	BOW B-2020-DU-C-S75
Resolution	High (H)	2 mm	2 mm
Switch 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

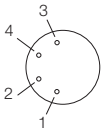
Wiring diagrams



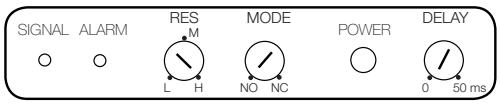
PNP/NPN

Connection configuration

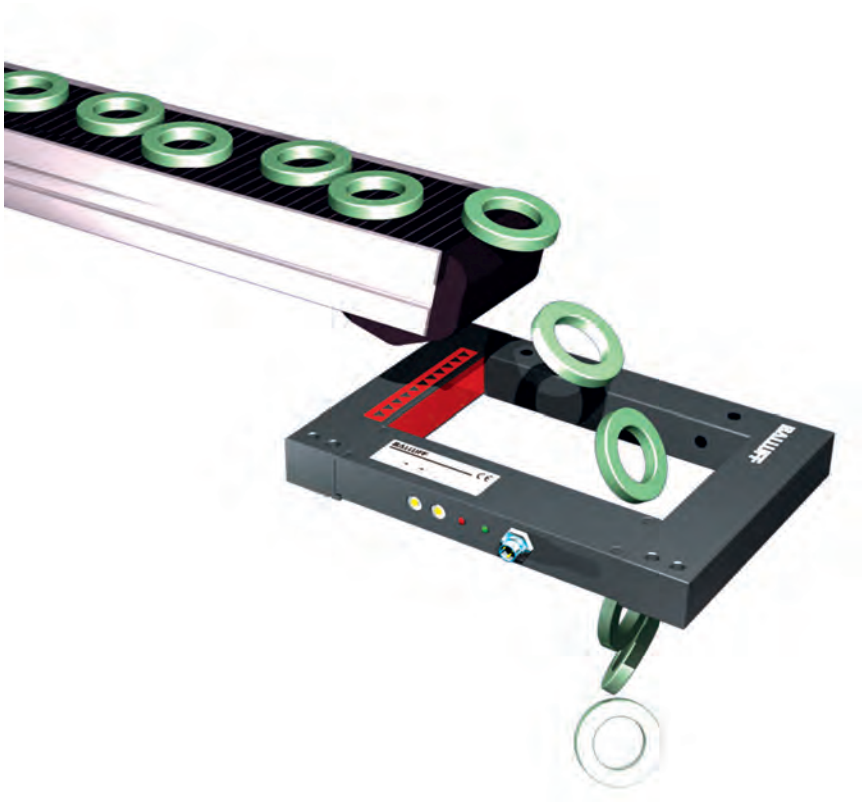
1 (brown)	VDC
2 (white)	signal output NPN
3 (blue)	GND
4 (black)	signal output PNP



Operating elements



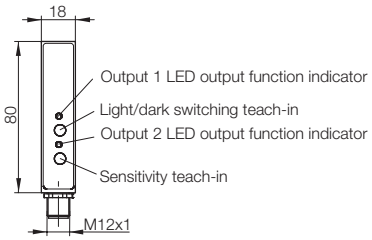
■ Power indicator	(Power)	Green LED
■ Function indicator	(Signal)	Yellow LED
■ Warning indicator	(Alarm)	Red LED
■ Object resolution	(Res)	Low (L), Medium (M), High (H)
■ Switching function	(Mode)	Normally Open (NO), Normally Closed (NC)
■ Pulse stretching	(Delay)	Off (0), 50 ms

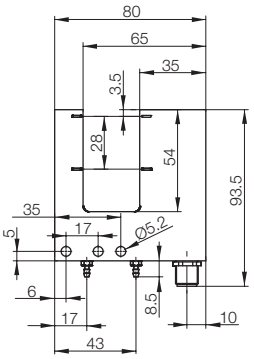


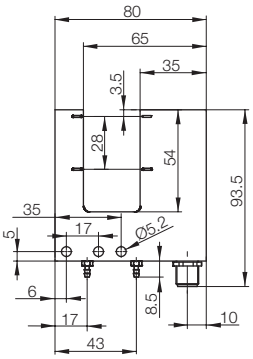
Analog fork sensors BGL

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.

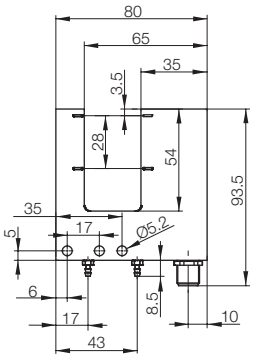


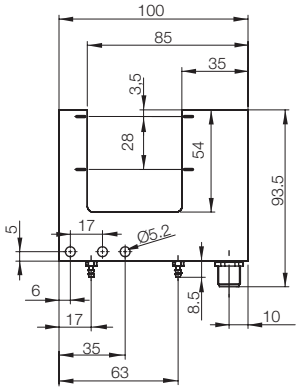


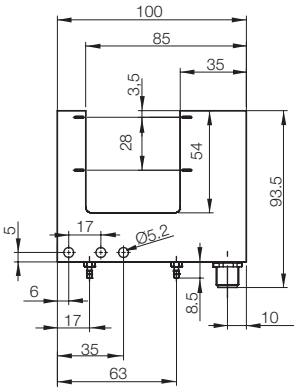


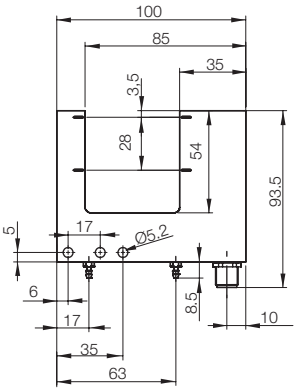



BGL analog **30 mm** **54 mm**	**BGL analog** **50 mm** **54 mm**	**BGL analog** **50 mm** **54 mm**	**BGL analog** **50 mm** **54 mm**
	BGL0037		
	BGL 50C-001-S4		
BGL0033		**BGL0039**	**BGL003C**
BGL 30C-005-S4		BGL 50C-003-S4	BGL 50C-005-S4
	BGL003H		
	BGL 50C-009-S4		
18...30 V DC	18...30 V DC	18...30 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









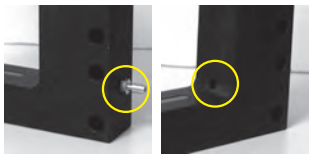
Fork sensors BGL with IO-Link

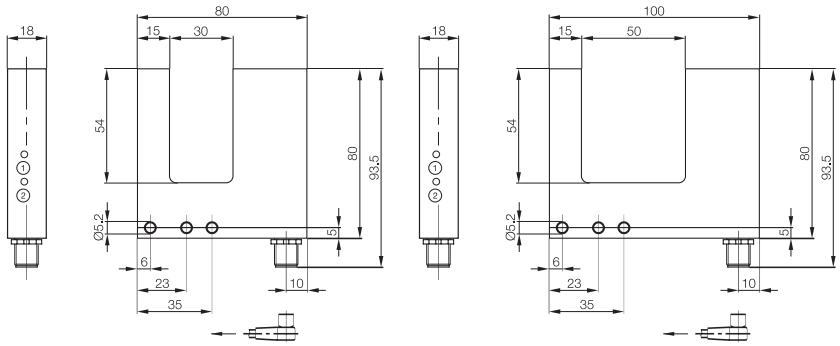
Series			**BGL analog, Series C Premium**	**BGL analog, Series C Premium**
Fork opening			**30 mm**	**50 mm**
Fork depth			**54 mm**	**54 mm**
PNP	With IO-Link	**Order code**	**BGL0035**	**BGL003F**
		Part number	BGL 30C-007-S4	BGL 50C-007-S4
Supply voltage U_S			18...30 V DC	18...30 V DC
No-load supply 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

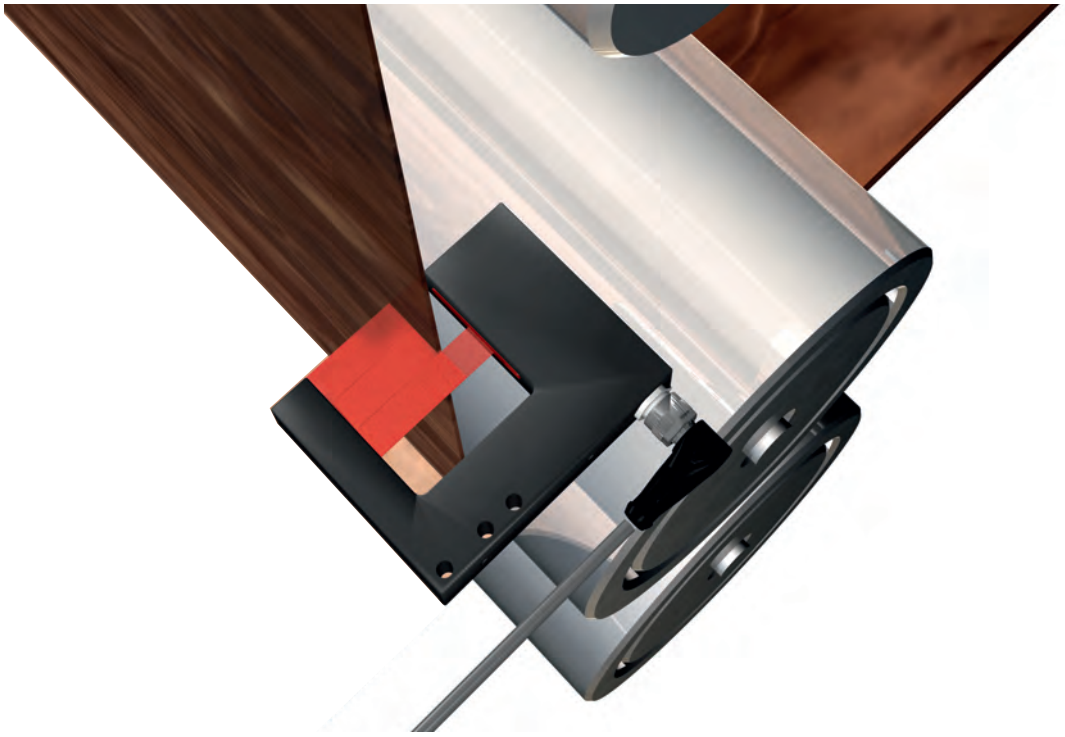
IO-Link

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.

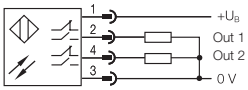




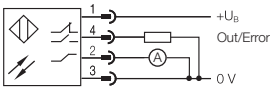


Wiring diagrams

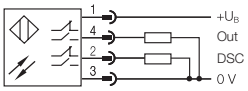
BGL... 001-S4



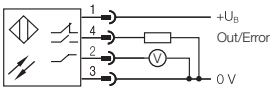
BGL... 003-S4



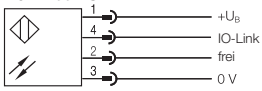
BGL... 009-S4



BGL... 005-S4



BGL... 007-S4



Suitable connectors
(please order separately)

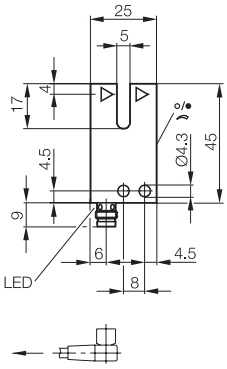
Size	Design	Cable material	Color	Length	Order code
M12, 4-pin	Straight	PUR	Black	2 m	**BCC032F**
M12, 4-pin	Straight	PVC	Gray	2 m	**BCC0367**
M12, 4-pin	Angled	PUR	Black	2 m	**BCC032Y**
M12, 4-pin	Angled	PVC	Gray	2 m	**BCC036N**

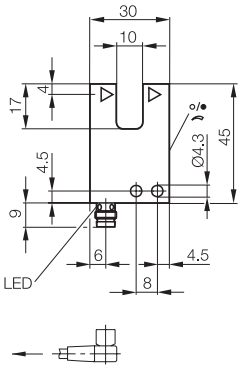
Connectors without LED are suitable for PNP and NPN sensors.

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

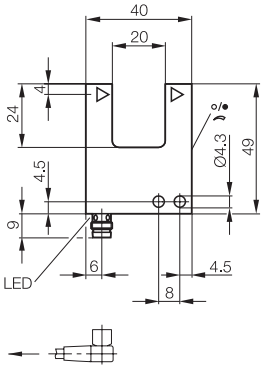
Series		**BGL**	**BGL**
Fork opening		**5 mm**	**10 mm**
Fork depth		**17 mm**	**17 mm**
PNP NO/NC	**Order code**	**BGL001W**	**BGL0001**
	Part number	BGL 5A-001-S49	BGL 10A-001-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 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

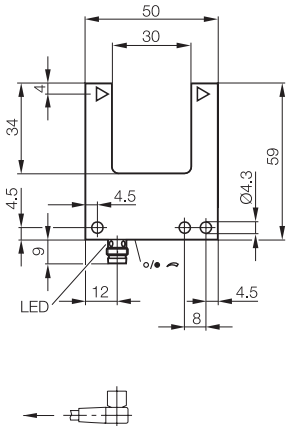


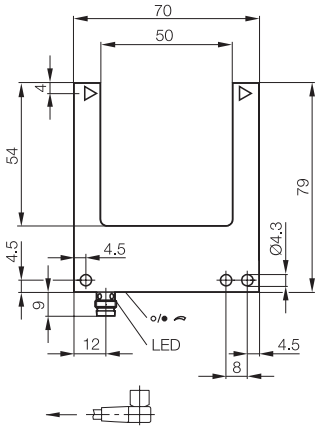


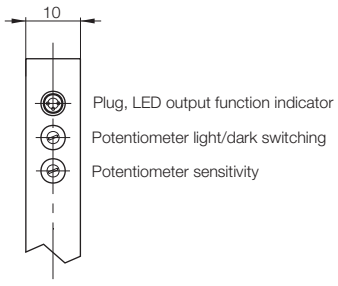
Red light fork sensors BGL

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



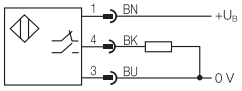






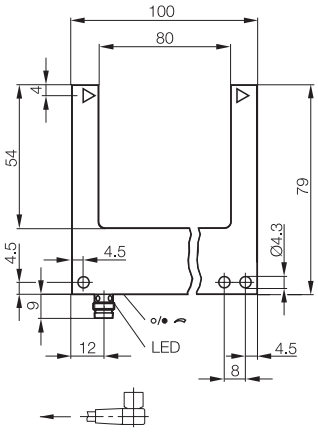
Wiring diagram

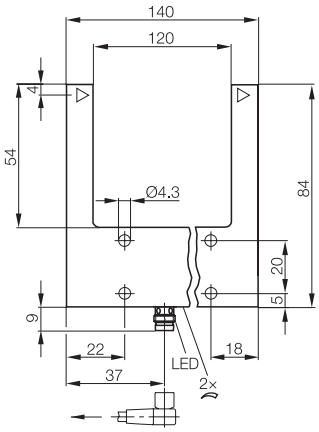
PNP



Red light fork sensors BGL

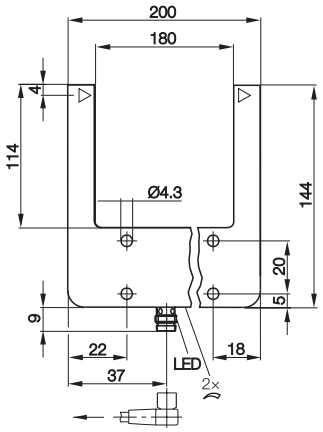
Series		**BGL**	**BGL**
Fork opening		**80 mm**	**120 mm**
Fork depth		**54 mm**	**54 mm**
PNP NO/NC	**Order code**	**BGL0023**	**BGL0007**
	Part number	BGL 80A-001-S49	BGL 120A-001-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 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

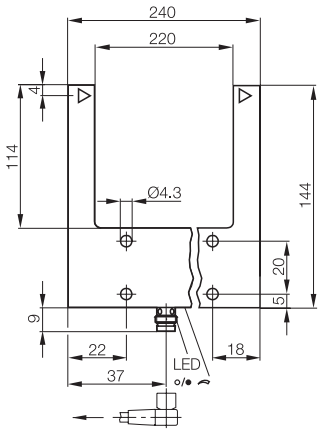


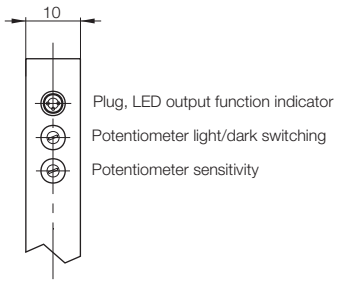


Red light fork sensors BGL

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

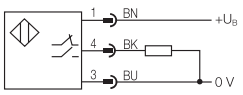






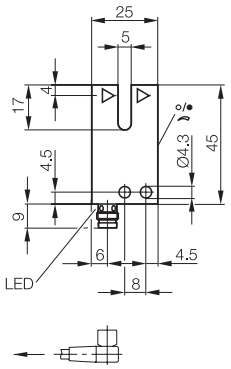
Wiring diagram

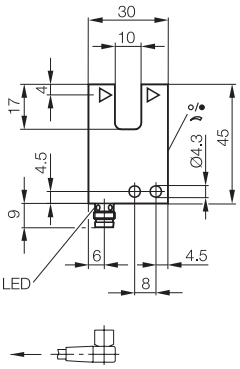
PNP



Pin Point fork sensors BGL

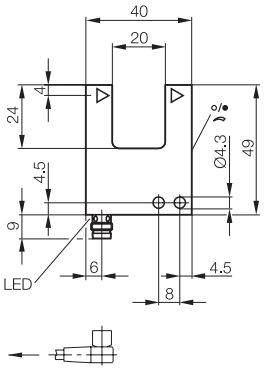
Series		**BGL**	**BGL**
Fork opening		**5 mm**	**10 mm**
Fork depth		**17 mm**	**17 mm**
PNP NO/NC	**Order code**	**BGL001Z**	**BGL0003**
	Part number	BGL 5A-005-S49	BGL 10A-005-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 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

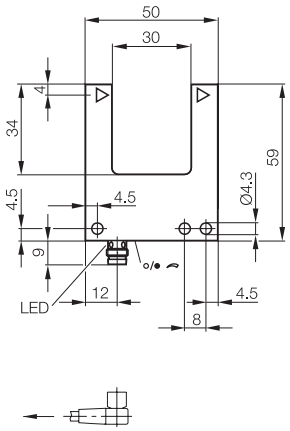


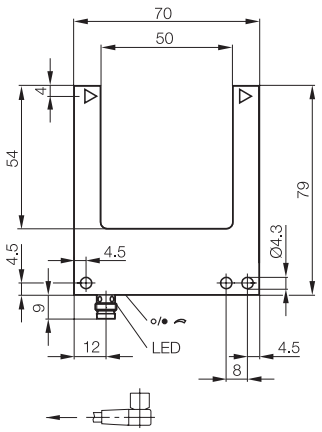


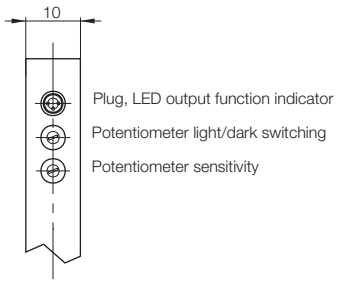


BGL	**BGL**	**BGL**
20 mm	**30 mm**	**50 mm**
24 mm	**34 mm**	**54 mm**
BGL000U	**BGL001C**	**BGL001P**
BGL 20A-005-S49	BGL 30A-005-S49	BGL 50A-005-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	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

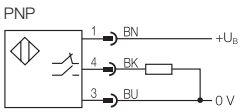






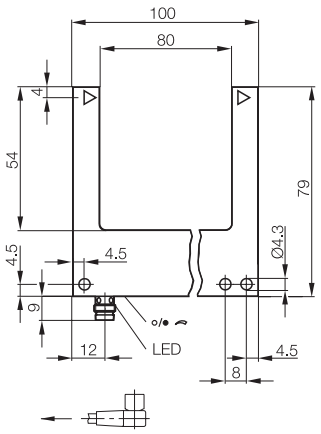


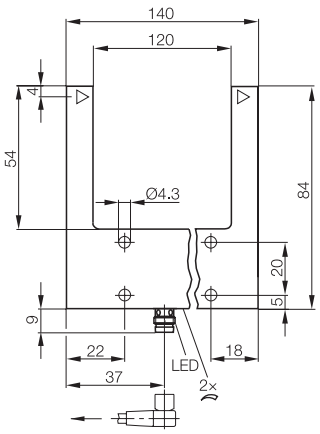
Wiring diagram



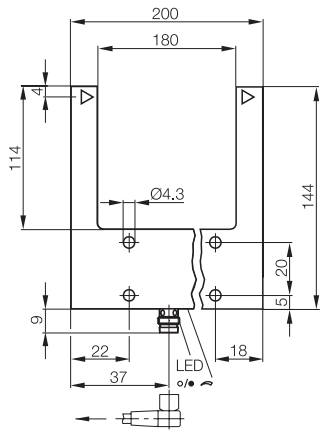
Pin Point fork sensors BGL

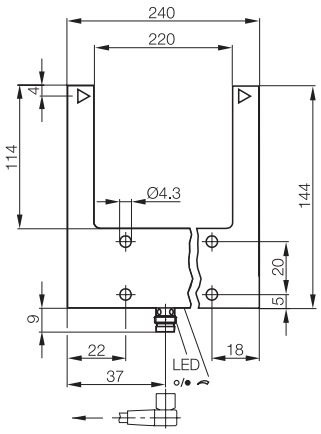
Series		**BGL**	**BGL**	
Fork opening		**80 mm**	**120 mm**	
Fork depth		**54 mm**	**54 mm**	
PNP NO/NC	**Order code**	**BGL0027**	**BGL000C**	
	Part number	BGL 80A-005-S49	BGL 120A-005-S49	
Supply voltage U_S		10...30 V DC	10...30 V DC	
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA	
Output current		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	

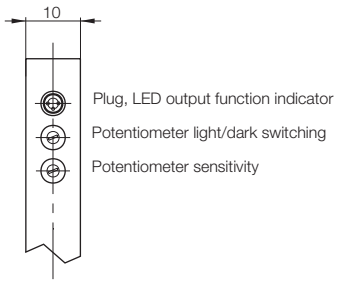




BGL	BGL
180 mm	**220 mm**
114 mm	**114 mm**
BGL000L	**BGL0012**
BGL 180A-005-S49	BGL 220A-005-S49
10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA
200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°
Red light, pin point	Red 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

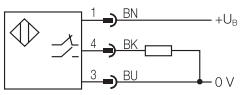






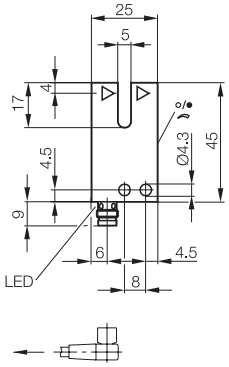
Wiring diagram

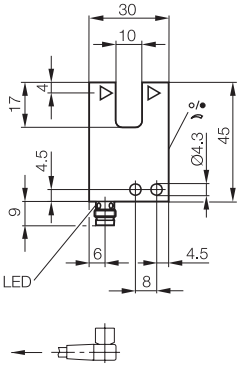
PNP



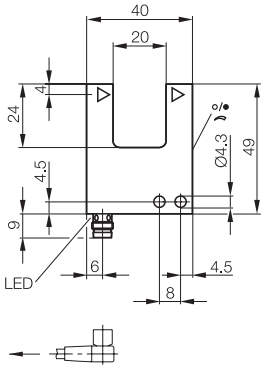
Infrared fork sensors BGL

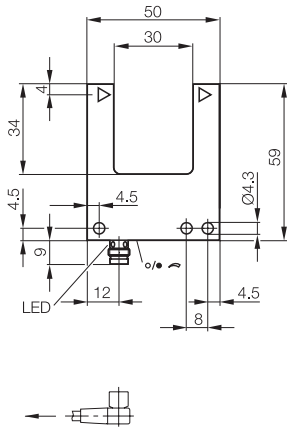
Series		**BGL**	**BGL**
Fork opening		**5 mm**	**10 mm**
Fork depth		**17 mm**	**17 mm**
PNP NO/NC	**Order code**	**BGL0021**	**BGL0005**
	Part number	BGL 5A-007-S49	BGL 10A-007-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 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

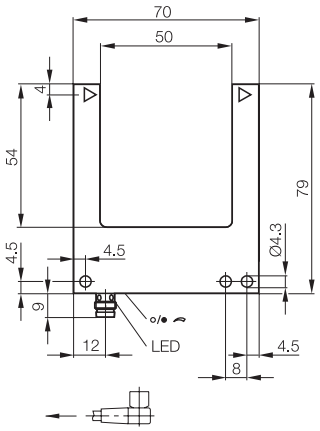


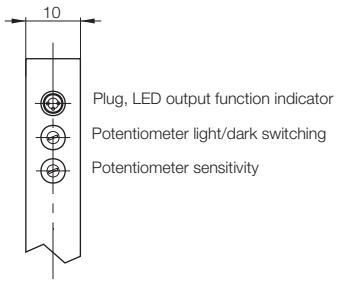


BGL	BGL	BGL
20 mm	**30 mm**	**50 mm**
24 mm	**34 mm**	**54 mm**
BGL000Y	**BGL001F**	**BGL001T**
BGL 20A-007-S49	BGL 30A-007-S49	BGL 50A-007-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark 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

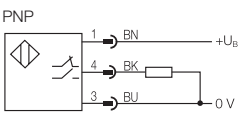






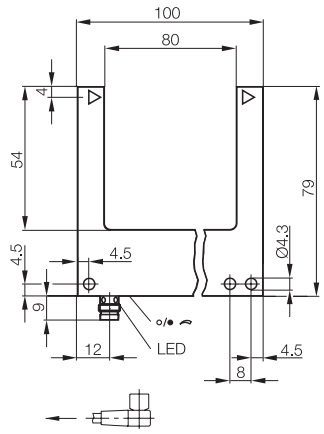


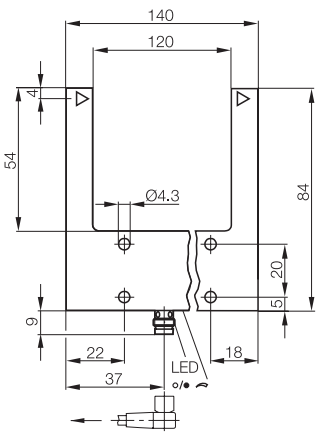
Wiring diagram



Infrared fork sensors BGL

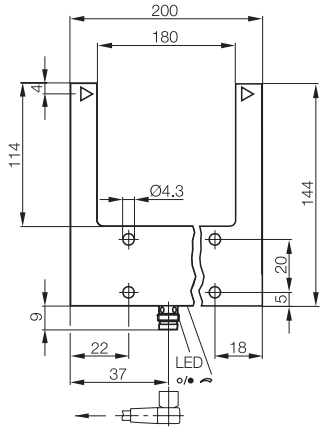
Series		**BGL**	**BGL**
Fork opening		**80 mm**	**120 mm**
Fork depth		**54 mm**	**54 mm**
PNP NO/NC	**Order code**	**BGL0029**	**BGL000F**
	Part number	BGL 80A-007-S49	BGL 120A-007-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 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

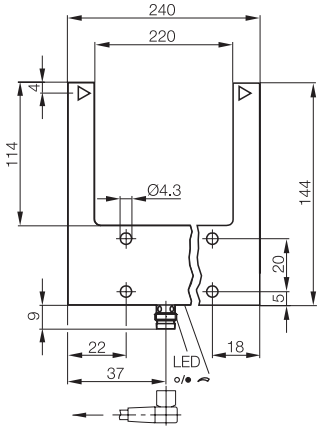


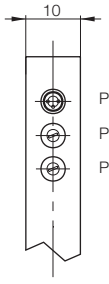


Infrared fork sensors BGL

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







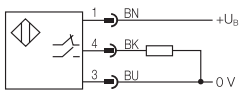
Plug, LED output function indicator

Potentiometer light/dark switching

Potentiometer sensitivity

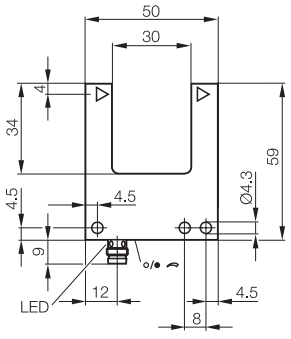
Wiring diagram

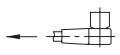
PNP



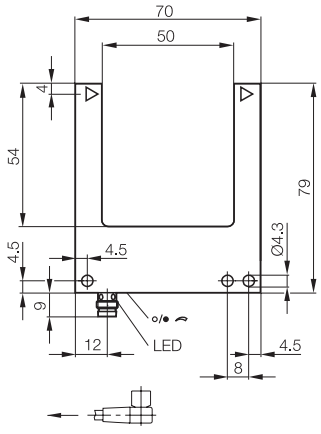
Laser fork sensors BGL

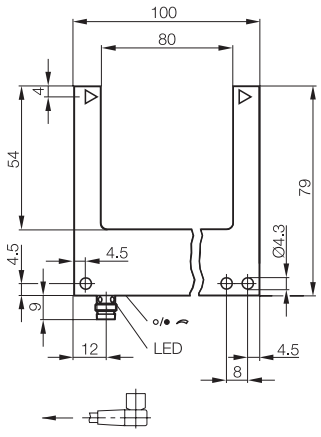
Series			**BGL**
Fork opening			**30 mm**
Fork depth			**34 mm**
PNP	NO/NC	**Order code**	**BGL0019**
		Part number	BGL 30A-003-S49
Supply voltage U_S			10...30 V DC
No-load supply current I_0 max.			≤ 20 mA
Output current			200 mA
Switching type			Light/dark switching (selectable)
Polarity reversal/short-circuit 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

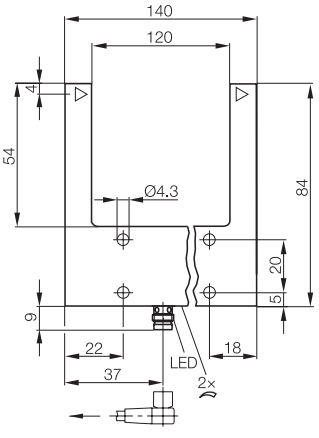


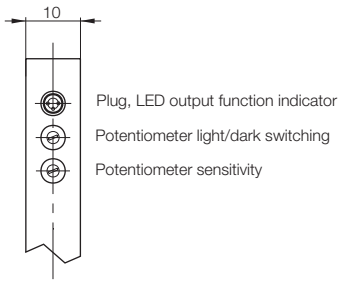


BGL	BGL	BGL
50 mm	**80 mm**	**120 mm**
54 mm	**54 mm**	**54 mm**
BGL001M	**BGL0025**	**BGL0009**
BGL 50A-003-S49	BGL 80A-003-S49	BGL 120A-003-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark 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



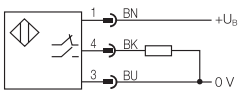






Wiring diagram

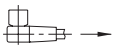
PNP



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 connectors
(please order separately)

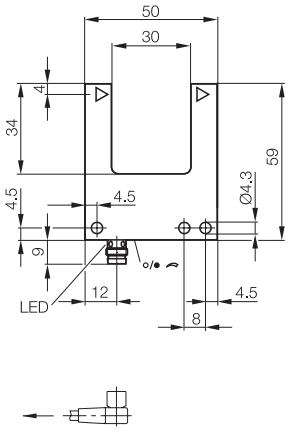
Size	Design	Cable material	Color	Length	Order code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

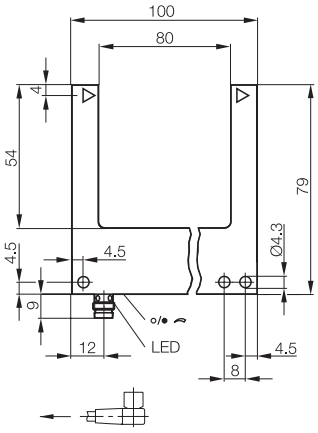
Connectors without LED are suitable for PNP and NPN sensors.

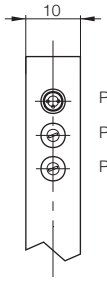
More electric accessories: A large selection of connectors and cables in a wide range of cable materials, colors and lengths can be found in our **Industrial Networking and Connectivity catalog.**

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







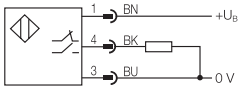
Plug, LED output function indicator

Potentiometer light/dark switching

Potentiometer sensitivity

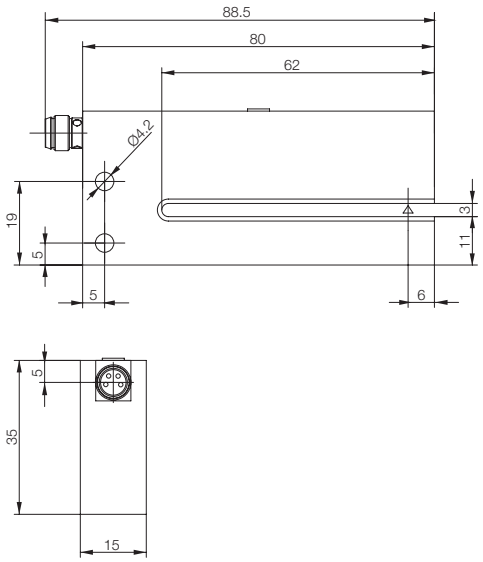
Wiring diagram

PNP



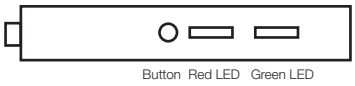
Fork sensors BGL for label detection

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			**Multiple potentiometer**	**Teach via button/ ext. input**
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



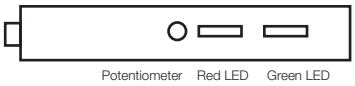
Setting

BGL003Y, BGL 3D-002-S75



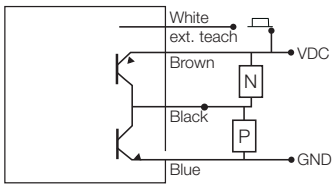
1. Insert labels, press button briefly (or external: min. 50 ms)	Red LED begins to flash, regardless of whether or not the button is still pressed. Teach process begins.
2. Transport label carrier web through the sensor, at least 3 labels	Teach process continues
3. Briefly press button, (or external: 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

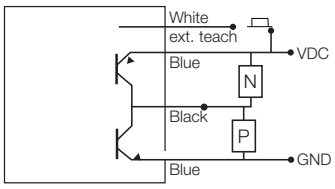


1. Insert label carrier
2. Turn potentiometer to the left, until red LED lights up
3. Turn potentiometer to the right, until green LED illuminates
4. Turn potentiometer another 1 to 3 revolutions turn to the right
5. After object detection:
   - Red LED illuminates with label
   - Green LED illuminates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

Wiring diagrams



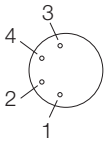
PNP: light switching
NPN: dark switching



PNP: dark switching
NPN: light switching

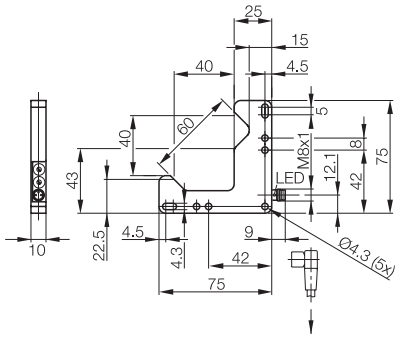
Connection configuration

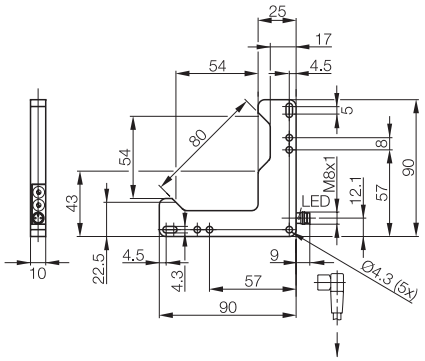
1	(brown	VDC (GND)
2	(white)	ext. teach
3	(blue)	GND (VDC)
4	(black)	Signal output



Red light angle sensors BWL

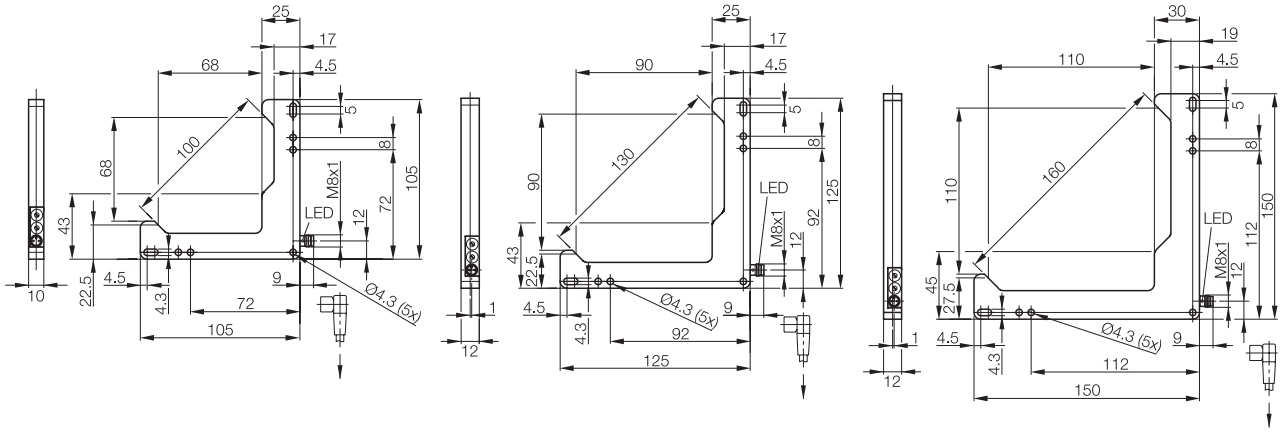
Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54**
PNP NO/NC	**Order code**	**BWL000F**	**BWL000R**
	Part number	BWL 4040D-R011-S49	BWL 5454D-R011-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		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

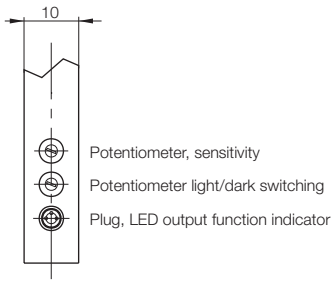




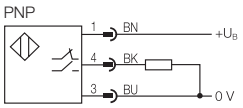
Red light angle sensors BWL

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



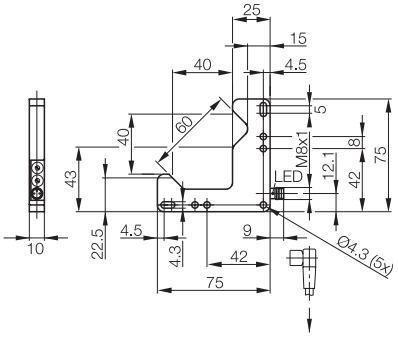


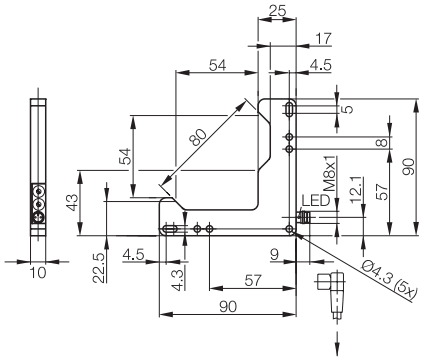
Wiring diagram



Pin Point angle sensors BWL

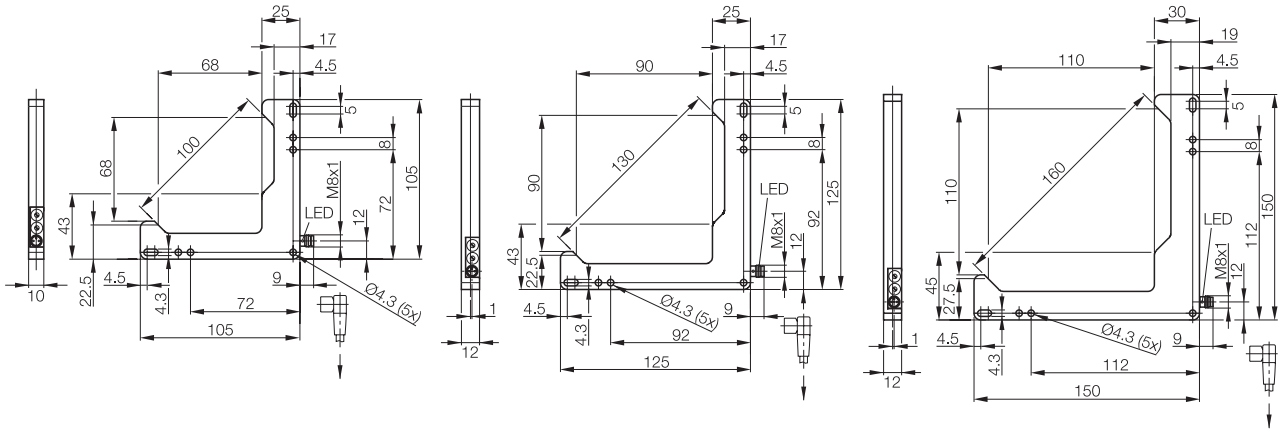
Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54**
PNP NO/NC	**Order code**	**BWL000J**	**BWL000U**
	Part number	BWL 4040D-R013-S49	BWL 5454D-R013-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		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

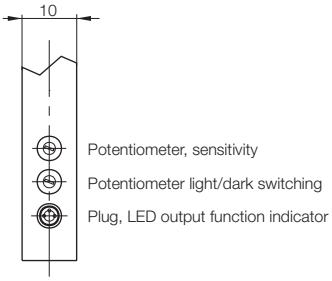




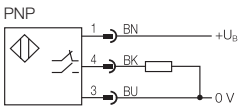
Pin Point angle sensors BWL

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



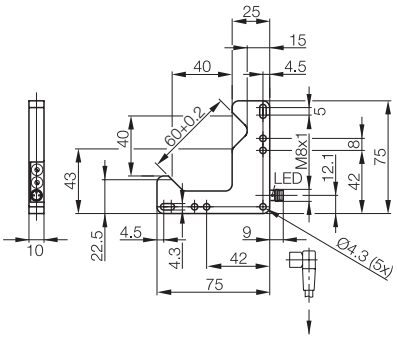


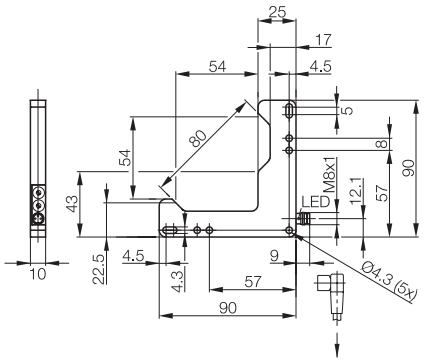
Wiring diagram



Infrared angle sensors BWL

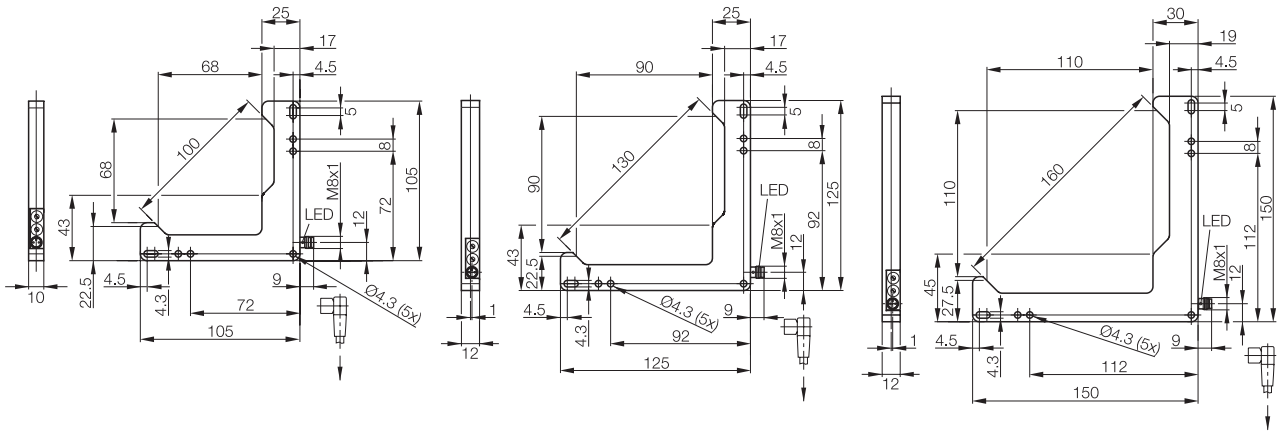
Series		**BWL**	**BWL**
Optical axis		**40/40 mm**	**54/54 mm**
PNP NO/NC	**Order code**	**BWL0009**	**BWL000L**
	Part number	BWL 4040D-I011-S49	BWL 5454D-I011-S49
Supply voltage U_S		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		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

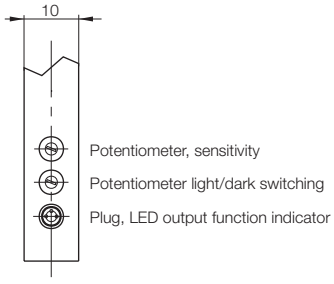




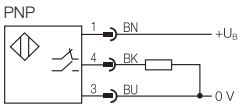
Infrared angle sensors BWL

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



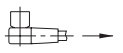


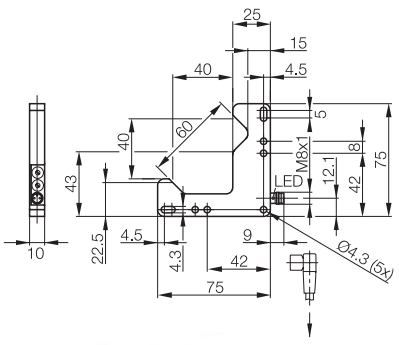
Wiring diagram

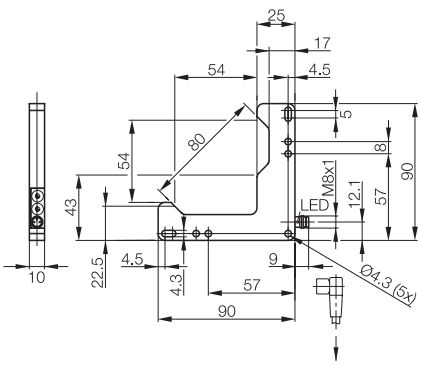


Laser angle sensors BWL

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







Suitable connectors
(please order separately)

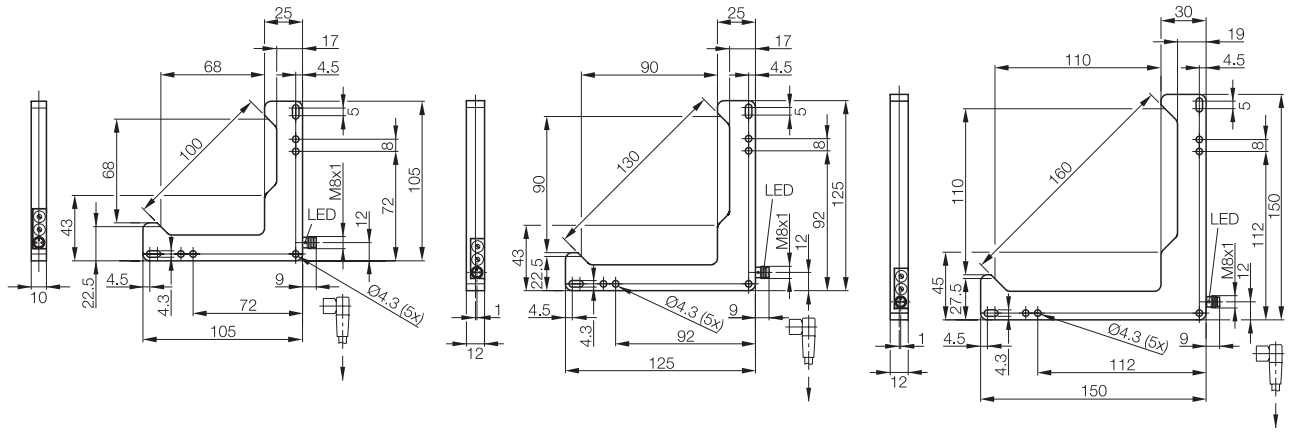
Size	Design	Cable material	Color	Length	Order code
M8, 3-pin	Straight	PUR	Black	2 m	**BCC02M8**
M8, 3-pin	Straight	PVC	Gray	2 m	**BCC02NU**
M8, 3-pin	Angled	PUR	Black	2 m	**BCC02ML**
M8, 3-pin	Angled	PVC	Gray	2 m	**BCC02P5**

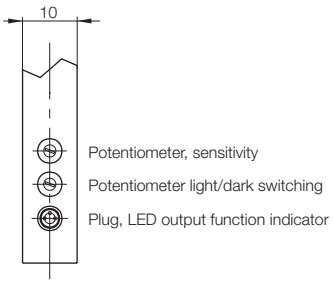
Connectors without LED are suitable for PNP and NPN sensors.

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.**

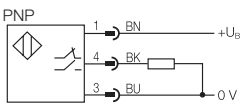


BWL	BWL	BWL
68/68 mm	**90/90 mm**	**110/110 mm**
BWL0010	**BWL0017**	**BWL0003**
BWL 6868D-L011-S49	BWL 9090D-L011-S49	BWL 110110D-L011-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark 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





Wiring diagram



AZ

Sorted by part number

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BAE		
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BGL 120A-001-S49	**BGL0007**	94
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BGL 30A-007-S49	**BGL001F**	101
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BGL 50C-005-S4	**BGL003C**	89
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BOH DR-M06-002-01-S49F	**BOH0007**	8
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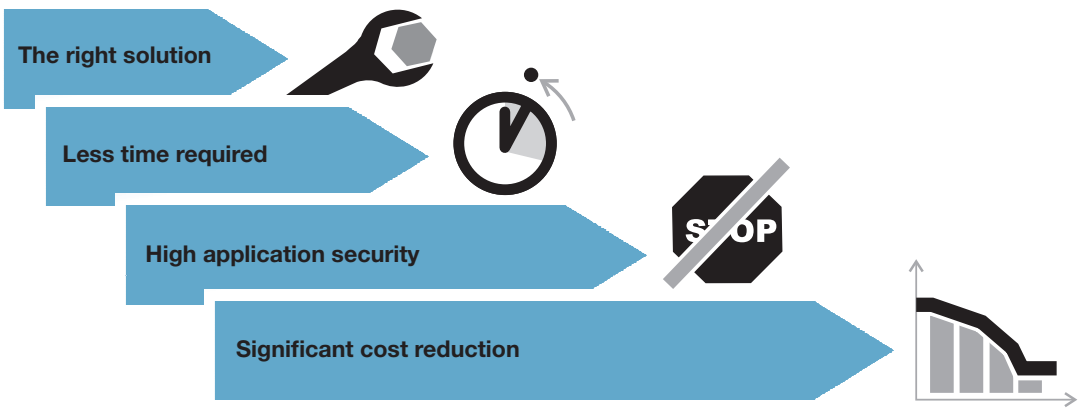


Worldwide Sales

Headquarters

Germany
Balluff GmbH
Schurwaldstrasse 9
73765 Neuhausen a.d.F.
Phone +49 7158 173-0
Fax +49 7158 5010
balluff@balluff.de

Subsidiaries and Representatives

Argentina
Balluff Argentina S.R.L.
Echeverría 1050, 1st UF 2
1604 Florida Oeste,
Buenos Aires
Phone +54 11 4730-4544
Fax +54 11 4730-3908

Australia
Balluff Pty. Ltd.
Unit 25, 18 Malvern Street
Bayswater VIC 3153
Phone 1300 225 833
Fax 1300 653 894
sales@balluff.com.au

Austria
Balluff GmbH
Industriestraße B16
2345 Brunn am Gebirge
Phone +43 2236 32521-0
Fax +43 2236 32521-46
sensor@balluff.at

Bahrain
Represented through
Multiline Technical Co.,
United Arab Emirates

Belarus
Automaticacentre OOO
Nezavisimosti Av. 185,
Block 19, Office 3
220125 Minsk
Phone +375 17 2838940
Fax +375 17 2181798
info@automatica.by

Belgium
Balluff bvba
Researchpark Haasrode 1820
Interleuvenlaan 62,
3001 Leuven
Phone +32 16 397800
Fax +32 16 397809
info.be@balluff.be

Brazil
Balluff Controles
Elétricos Ltda.
Rua Francisco Foga, 25
Distrito Industrial
CEP 13280.000
Vinhedo – Sao Paulo
Phone +55 19 38769999
Fax +55 19 38769990
balluff@balluff.com.br

Bulgaria
Belopitov AG
41, Nedelcho Bonchev St.
1528 Sofia
Phone +359 2 9609875
Fax +359 2 9609896
bps@bps.bg

Canada
Balluff Canada Inc.
2840 Argentia Road, Unit 2
Mississauga, Ontario L5N 8G4
Phone +1 905 816-1494
Toll-free 1-8 00-927-9654
Fax +1 905 816-1411
balluff.canada@balluff.ca

Chile
Microtec S/A
Salar Ascotan, Parque Enea Pud 1281
Santiago
Phone + 56 2 25954661
soledadrozas@micro.cl

China
Balluff (Shanghai) Trading Co., Ltd.
8F, Building A, Yunding International
Commercial Plaza,
No. 800 Chengshan Rd,
Pudong, Shanghai, 200125
Phone +86 21 5089 9970
Fax +86 21 5089 9975
info@balluff.com.cn

Colombia
Micro Pneumatic S.A.
Calle 19, No. 70-63
Zona Industrial, Bogotá
Phone +57 1 4050016
hescobar@micro.com.co

Croatia
HSTEC d.d.
Zagrebacka 100
23000 Zadar
Phone +385 23 205-405
Fax +385 23 205-406
info@hstec.hr

Czech Republic
Balluff CZ, s.r.o
Pelušková 1400
198 00 Praha 9 – Kyje
Phone +420 281 000 666
Fax +420 281 940066
obchod@balluff.cz

Denmark
Balluff ApS
Åbogade 15
8200 Århus N
Phone +45 70 234929
Fax +45 70 234930
info.dk@balluff.dk

Ecuador
CAMEI S.A.
Vasco de Contreras
N35-254 y Mañosca
Quito
Phone +593 2 224 2288
Fax +593 2 245 6510
camei@uio.satnet.net

Egypt
EGEC
24 St., 302 Taksym El Kodah-smouha,
First Floor, Department 1
Alexandria
Phone +20 3 4299771
Fax +20 3 4261773
info@egecgroup.com

Finland
Murri Oy
Koukkukatu 1
15700 Lahti
Phone +358 3 8824000
Fax +358 3 8824040
myynti@murri.fi

France
Balluff SAS
5 rue des Vieilles Vignes
Bâtiment A
CS 90406 Croissy Beaubourg
77435 Marne la Vallée Cedex 02
Phone +33 1 64111990
Fax +33 1 64111991
info.fr@balluff.fr

Greece
S. NAZOS S.A.
10 KLM Thessalonikis-Kilkis
P.O. Box 57008
Thessaloniki
Phone +30 2310 462120
Fax +30 2310 474079
parasxos@nazos.gr

Hong Kong
Sensortech Company
No. 43, 18th Street
Hong Lok Yuen,
Tai Po, NT
Phone +852 26510188
Fax +852 26510388
sensortech@netvigator.com

Hungary
Balluff Elektronika Kft.
Pápai út. 55.
8200 Veszprém
Phone +36 88 421808
Fax +36 88 423439
saleshu@balluff.hu

Iceland
Smith & Norland
Nóatúni 4
105 Reykjavík
Phone +354 520 3000
Fax +354 520 3011
olaf@sminor.is

India
Balluff India
405 Raikar Chambers
Deonar Village Road,
Govandi, Mumbai 400088
Phone +91 22 25568097
Fax +91 22 25560871
balluff@balluff.co.in

Indonesia
Represented through
Balluff Asia Pte. Ltd.,
Singapore

Ireland
Balluff Ireland Ltd.
Block B, The Crescent Building
Northwood, Santry
Dublin 9
Phone +353 1 8934188
Fax +44 161 2824701
sales.ie@balluff.com

Israel
Ancitech Ltd.
19, Hamashbir St.
Industrial Zone Holon
58853 Holon
Phone +972 3 5568351
Fax +972 3 5569278
tuvia@ancitech.com

Italy
Balluff Automation S.R.L.
Via Morandi 4
10095 Grugliasco, Torino
Phone +39 11 3150711
Fax +39 11 3170140
info.italy@balluff.it

Japan
Balluff Co., Ltd.
Aqua Hakusan Bldg. 9F
1-13-7 Hakusan, Bunkyo-ku,
Tokyo 113-0001
Phone +81 3 3830-0520
Fax +81 3 3830-0519
info.jp@balluff.jp

Kazakhstan
elcos electric control systems
2A, Molodezhniy Str. 3D
Block O., Offices 318-319
050061 Almaty
Phone +7 727 3340536
Fax +7 727 3340539
info@elcos.kz

Kuwait
Represented through
Multiline Technical Co.,
United Arab Emirates

Latvia and Estonia
SIA Interautomatika
Brīvības g. 410
1024 Rīga
Phone +371 67522010
Fax +371 67522007
info@interautomatika.lv

Lithuania
UAB Interautomatika
Kęstučio 47
08127 Vilnius
Phone +370 5 2607810
Fax +370 5 2411464
andrius@interautomatika.lt

Malaysia
Represented through
Balluff Asia Pte. Ltd.,
Singapore

Mexico
Balluff de México S.A. de C.V.
Anillo Vial II Fray Junípero Serra No. 4416
Colonia La Vista Residencial, CP 76232
Delegación Epigmenio González
Queretaro, Qro.
Phone +52 442 2124882
Fax +52 442 2140536
balluff.mexico@balluff.com

Morocco
TAK
Ilot 24B, Lot 24A-2
Tanger Free Zone
9000 Tanger
Phone +212 06 61464946
Fax +212 05 39393269
o.zerhouani@tak.ma

Netherlands
Balluff B.V.
Europalaan 6a
5232 BC 's-Hertogenbosch
Phone +31 73 6579702
Fax +31 73 6579786
info.nl@balluff.nl

New Zealand
Balluff Ltd.
105 Morrin Road
Panmure, Auckland
Phone +63 9 250 1460
Fax +63 9 250 1462
sales@balluff.co.nz

Norway
Primatec as
Lillesandsveien 44
4877 Grimstad
Phone +47 37 258700
Fax +47 37 258710
post@primatec.no

Oman
Represented through
Multiline Technical Co.,
United Arab Emirates

Philippines
Represented through
Balluff Asia Pte. Ltd.,
Singapore

Poland
Balluff Sp. z o.o.
Ul. Muchoborska 16
54-424 Wrocław
Phone +48 71 3384929
Fax +48 71 3384930
balluff@balluff.pl

Portugal
LA2P Lda.
Rua Teofilo Braga, 156 A
Escrit. F – Edificio S. Domingos
Cabeco Do Mouro
2785-122 S. Domingos De Rana
Phone +351 21 4447070
Fax +351 21 4447075
la2p@la2p.pt

Qatar
Represented through
Multiline Technical Co.,
United Arab Emirates

Romania
Balluff Automation SRL
Strada Industriilor Nr. 56.,
Bloc 1, Etaj 1
032901 Bucuresti Sector 3
Phone +40 374 926252
Fax +40 374 097 423
office@balluff.com.ro

Russia
Balluff OOO
M. Kaluzhskaja Street 15
Building 17, Office 500
119071 Moscow
Phone +7 495 78071-94
Fax +7 495 78071-97
balluff@balluff.ru

Saudi Arabia
Represented through
Multiline Technical Co.,
United Arab Emirates

Serbia
ENEL d.o.o.
Ul. Vasilja Pavlovica 10
14000 Valjevo
Phone +381 14 291161
Fax +381 14 244641
enelvaljevo@gmail.com

Singapore
Balluff Asia Pte. Ltd.
18 Sin Ming Lane
#06-41 Midview City,
Singapore 573960
Phone +65 62524384
Fax +65 62529060
balluff@balluff.com.sg

Slovakia
Balluff Slovakia s.r.o.
Blagoevova 9
85104 Bratislava
Phone +421 2 67200062
Fax +421 2 67200060
info@balluff.sk

Slowenia
Senzorji SB d.o.o.,
Proizvodnja,
trgovina in storitve d.o.o.
Livadna ulica 1
2204 Miklavž na Dravskem polju
Phone +386 2 6290300
Fax +386 2 6290302
senzorji.sb@siol.net

South Africa
PAL Distributers CC
291A Pine Avenue, Ferndale
Randburg, Gauteng
Phone +27 11 7814381
Fax +27 11 7818166
pal@polka.co.za

South Korea
Mahani Electric Co. Ltd.
792-7 Yeoksam-Dong
Gangnam-Gu, Seoul
Post code: 135-080
Phone +82 2 21943300
Fax +82 2 21943397
yskim@hanmec.co.kr

Spain
Balluff S.L. (Sociedad Unipersonal)
Edificio Forum SCV
Planta 5°, Oficina 4°
Carretera Sant Cugat a Rubi
Km01, 40-50
08190 Sant Cugat del Vallés
Barcelona
Phone +34 93 5441313
Fax +34 93 5441312
info.es@balluff.es

Sweden
Balluff AB
Gamlestadsvägen 2, B19
41502 Göteborg
Phone +46 31 3408630
Fax +46 31 3409431
info.se@balluff.se

Switzerland
Balluff Sensortechnik AG
Riedstrasse 6
8953 Dietikon
Phone +41 43 3223240
Fax +41 43 3223241
sensortechnik@balluff.ch

Taiwan
Canaan Electric Corp.
6F-5, No. 63 Sec. 2
Chang An East Road
10455 Taipei
Phone +886 22 5082331
Fax +886 22 5084744
sales@canaan-elec.com.tw

Thailand
Compomax Co. Ltd.
16 Soi Ekamai 4,
Sukhumvit 63 Rd.
Prakanongnua, Vadhana,
Bangkok 10110
Phone +66 2 7269595
Fax +66 2 7269800
info@compomax.co.th

Turkey
Balluff Sensor Otomasyon
Sanayi Ve Ticaret Ltd. Sti.
Perpa Ticaret Is Merkezi
A Blok, Kat 1-2-3
No: 0013-0014
34381 Okmeydani/Istanbul
Phone +90 212 3200411
Fax +90 212 3200416
balluff@balluff.com.tr

Ukraine
Micronlogistik Ltd.
Ul. Promyischlennaya Street 37
65031 Odessa
Phone +380 48 7781278
Fax +380 48 2358760
info@balluff-ua.com

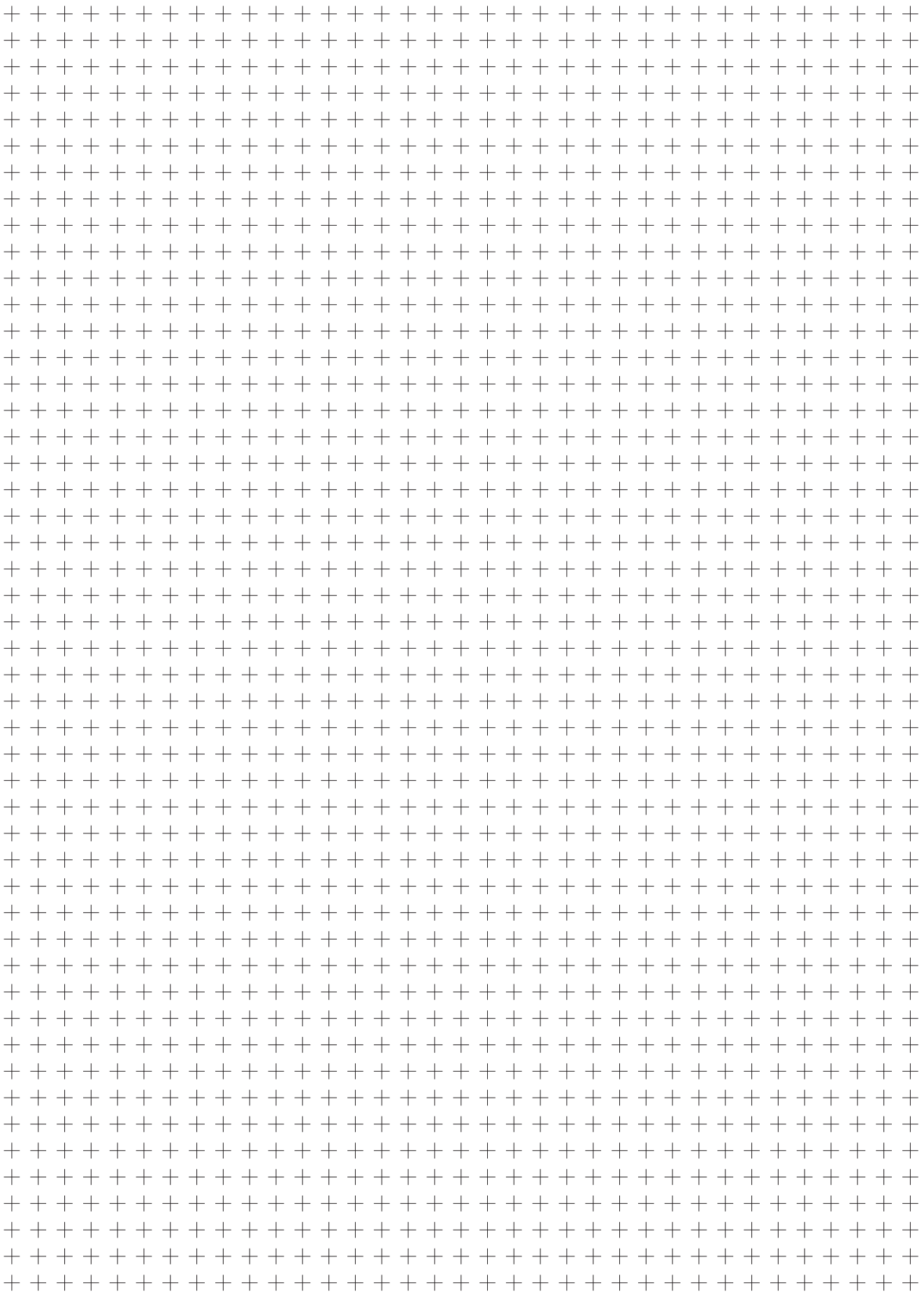
United Arab Emirates
Multiline Technical Co.
TCA, behind ADCB Bank
46530 Abu Dhabi
Phone +971 2 6430733
Fax +971 2 6430778
asif@multilinetech.com

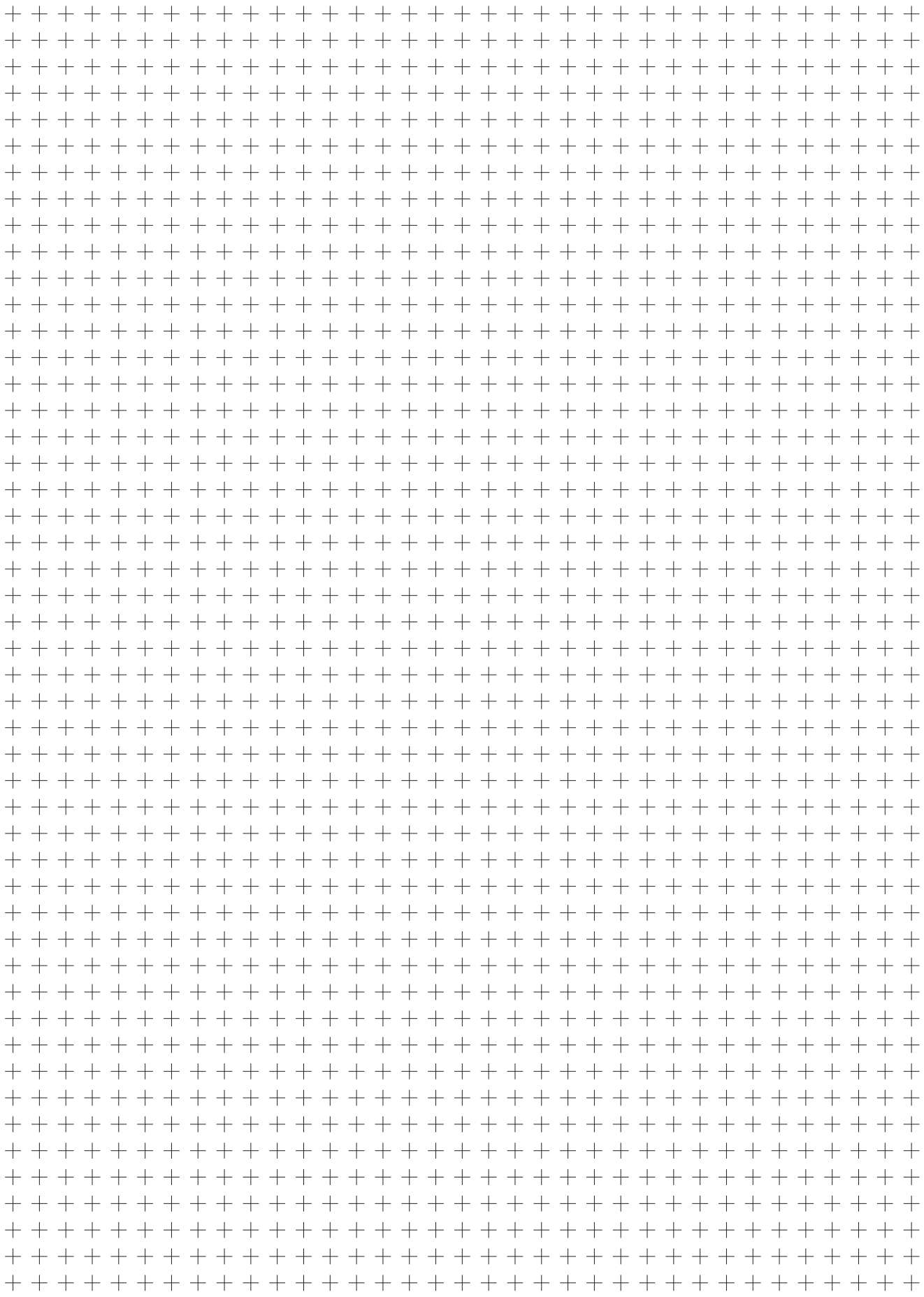
United Kingdom
Balluff Ltd.
20 Cheshire Business Park
Cheshire Avenue
Lostock Gralam
Northwich, CW9 7UA
Phone +44 161 282-4700
Fax +44 161 282-4701
sales@balluff.co.uk

USA
Balluff Inc.
8125 Holton Drive
Florence, KY 41042-0937
Phone +1 859 727-2200,
Toll-free 1-800-543-8390
Fax +1 859 727-4823
balluff@balluff.com

Venezuela
Micro Tecnologia Neumatica, C.A.
Av. Henry Ford C.C.
Boulevard Industrial Local AC-2
Valencia Carabobo
Phone +58 241 8641534
Fax +58 241 8641732
iraida.marrero@micro.com.ve

Vietnam
Anh Nghi Son Service Trading Co., Ltd.
D3 KDC Mieu Noi Dinh Tien Hoang St.,
W3, Binh Thanh Dist.,
Ho Chi Minh City
Phone +84 8 35170401
Fax +84 8 35170403
ans.vina@gmail.com





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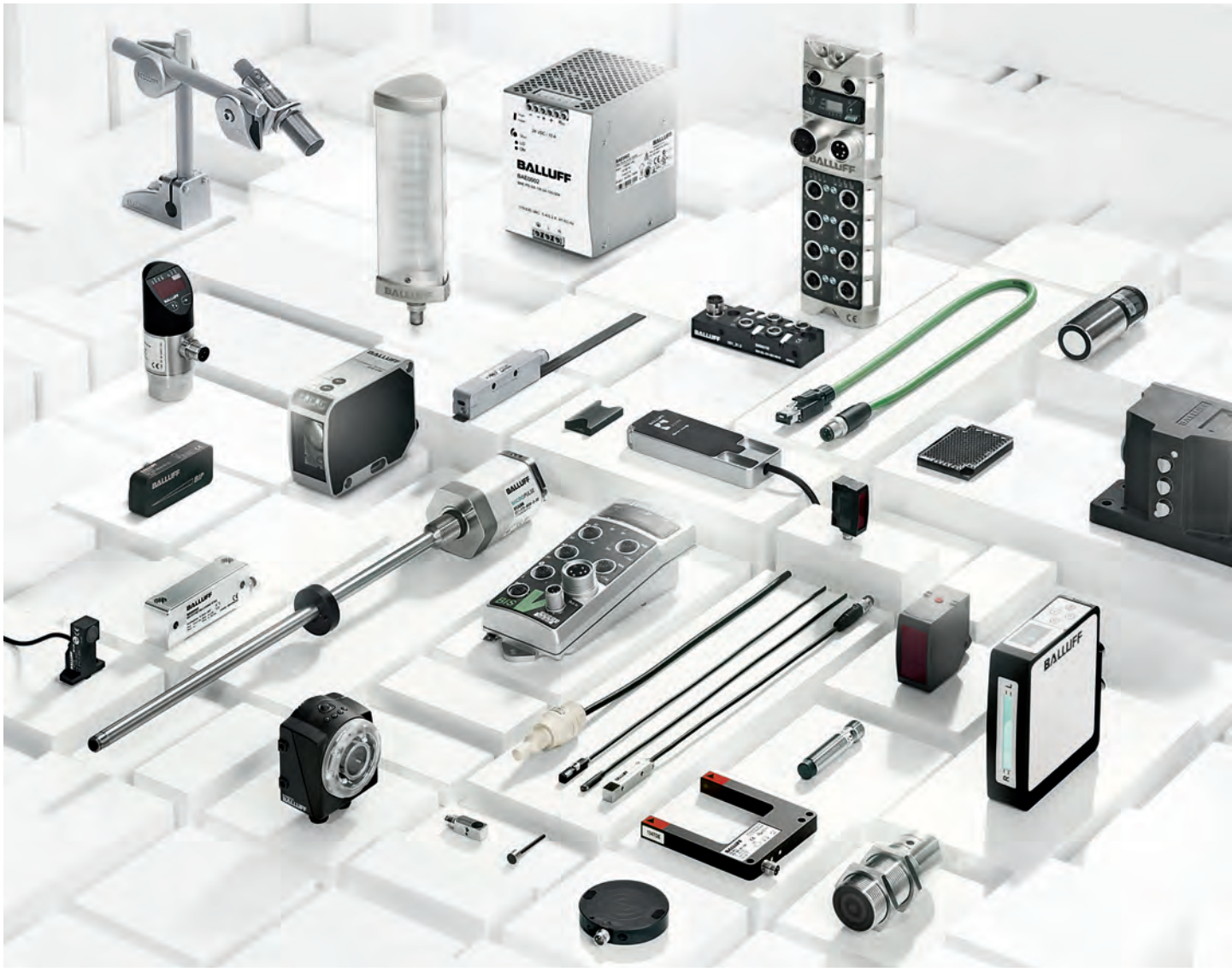

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Phone +49 7158 173-0
www.balluff.com

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Accessories

Headquarters
Balluff GmbH
Schurwaldstrasse 9
73765 Neuhausen a.d.F.
Germany
Phone +49 7158 173-0
Fax +49 7158 5010
balluff@balluff.de

www.balluff.com

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