BALLUFF

sensors worldwide

Object Detection

Supplementary volume

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

Balluff offers a wide array of products with varied operating principles taking advantage of the broad spectrum of technology available, 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 accessories.

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 3000 employees is committed to providing outstanding service worldwide.

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

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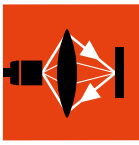
Photoelectric Sensors 4



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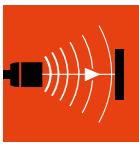

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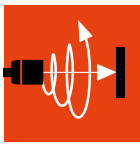

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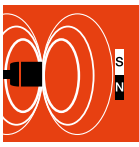

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Photoelectric Sensors

Matched to your requirements

Our broad portfolio of standard sensors provides the ideal solution for every application, whether using through-beam, retroreflective or diffuse light sensors. You can freely choose your light type. This stems from the fact that, regardless of type, the sensors operate with easily visible red light, invisible infrared light or incredibly precise laser light. All of the sensors are robust and reliable – even under harsh ambient conditions or in complex applications.

Photoelectric Sensors
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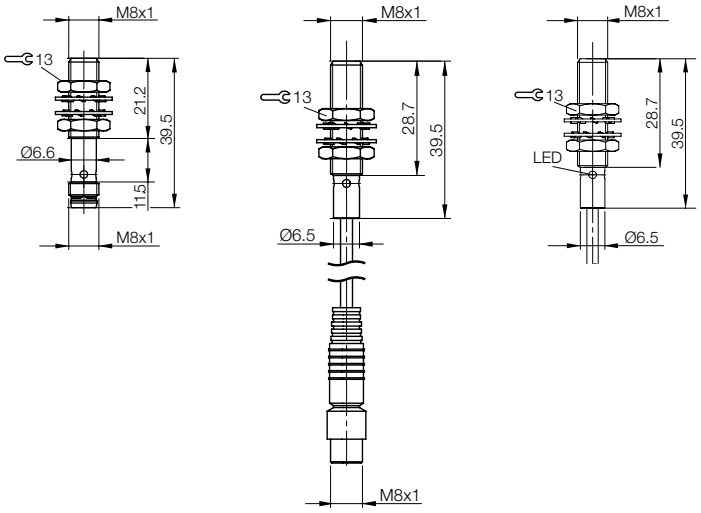
Fixed range
The BOS 08E family, tried and proven over a long time, now has a new member. For the first time, background suppression is available in this very compact design. Thanks to innovative LED technology, this sensor offers a very sharp and homogeneous red light spot that enables reliable and precises detection of even the smallest parts.

Benefits
- Precise, almost color-independent object detection up to 20 mm
- Easy alignment thanks to bright, sharply contoured light spot
- Fixed range for fast startup

Drill break monitoring

Type		**Diffuse sensor with background suppression**	**Diffuse sensor with background suppression**	**Diffuse sensor with background suppression**
Detection range		20 mm fixed	20 mm fixed	20 mm fixed
PNP, NO		**BOS01H6**	**BOS01H2**	**BOS01H9**
NPN, NO		**BOS01H7**	**BOS01H3**	
Light type		Red light, PinPoint LED	Red light, PinPoint LED	Red light, PinPoint LED
Supply voltage U_S		10...30 V DC	10...30 V DC	10...30 V DC
Switching frequency		500 Hz	500 Hz	500 Hz
Degree of protection per IEC 60529		IP67	IP67	IP67
Ambient temperature T_a		–5...+55 °C	–5...+55 °C	–5...+55 °C
Material	Housing	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
	Optical surface	PMMA	PMMA	PMMA
Connection		M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 3 × 0.14 mm²

Other variants on our website or on request



Small design for small spaces
The BOS 08E photoelectric sensors are an entirely new advance in their class. They feature simple handling with fixed sensing and detection ranges. Thanks to the highly visible red light spot they can be installed quickly and are simple to align. This makes them flexible and especially economical.

The highly compact stainless steel housing means they can handle demanding applications in harsh environments while taking up little space.

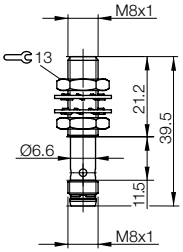
Benefits
- Compact design enables use in the smallest of spaces
- Rugged stainless steel housing, IP67
- Bright, homogeneous light spot for simple alignment
- Long ranges and precise object detection
- Available in all function principles

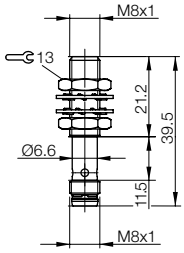
Type	
Detection range	
PNP, NO	
PNP, NC	
NPN, NO	
Emitter	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Switching state indicator	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

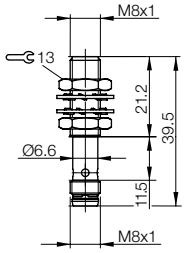
Other variants on our website or on request

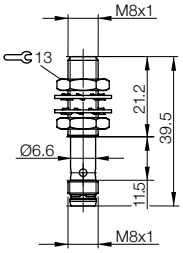
Detecting loaded pallets in an assembly line for hard drives

Diffuse sensor	**Retroreflective sensor**	**Through-beam sensor**	**Through-beam sensor**
1...60 mm	**0...1 m**	**0...2.2 m**	**0...2.2 m**
BOS01NN	**BOS01RK**		**BOS020F**
BOS01R9	**BOS01RM**		**BOS020A**
BOS01RE	**BOS01RR**		**BOS0207**
		BOS01Z5	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	
645 nm	645 nm	645 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED
500 Hz	500 Hz		500 Hz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	10000 Lux	5000 Lux	5000 Lux
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PMMA	PMMA	PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin







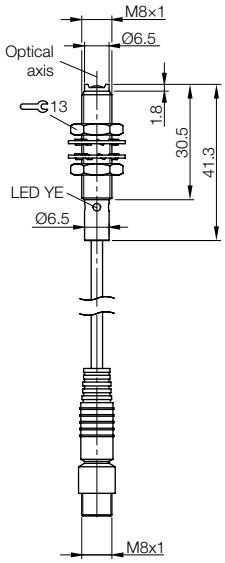


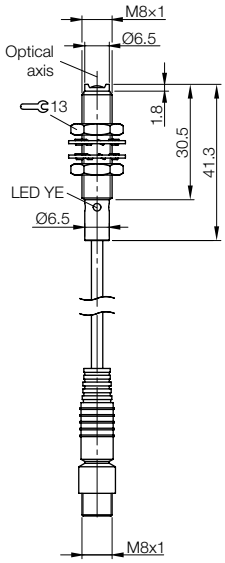
Cable versions with connector
The BOS 08E photoelectric sensors in the stainless steel housing are available as connector and cable versions with our without plug-in connection.

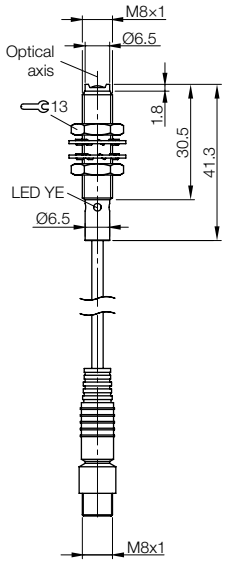
Type	
Detection range	
PNP, NO	
PNP, NC	
NPN, NO	
Emitter	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Switching state indicator	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

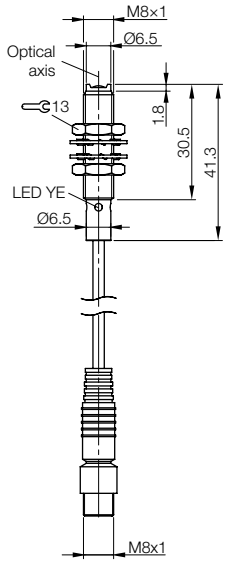
Other variants on our website or on request

Diffuse sensor	Retroreflective sensor	Through-beam sensor	Through-beam sensor
1...60 mm	**0...1 m**	**0...2.2 m**	**0...2.2 m**
BOS01R8	**BOS01RL**		**BOS020C**
BOS01RA	**BOS01RN**		**BOS0208**
BOS01RF	**BOS01RT**		**BOS0205**
		BOS01Z7	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	
645 nm	645 nm	645 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED
500 Hz	500 Hz		500 Hz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	10000 Lux	5000 Lux	5000 Lux
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PMMA	PMMA	PMMA	PMMA
0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin





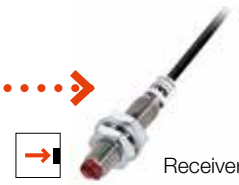




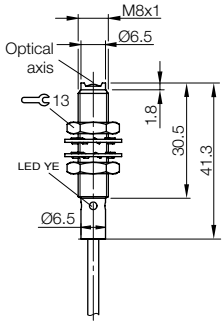
Cable versions without connector
The BOS 08E photoelectric sensors in the stainless steel housing are available as connector and cable versions with our without plug-in connection.

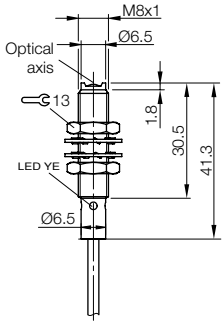
Type		
Detection range		
PNP, NO		
Emitter		
Supply voltage U_S		
Output current		
No-load supply current I_0 max.		
Polarity reversal protected/short-circuit protected		
Emitter, light type		
Wavelength		
Switching state indicator		
Switching frequency f		
Degree of protection per IEC 60529		
Ambient temperature T_a		
Permissible ambient light		
Material	Housing	
	Optical surface	
Connection		

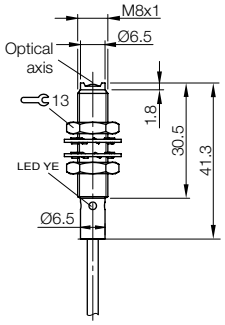
Other variants on our website or on request

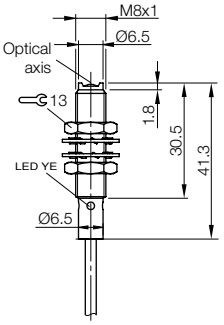


Diffuse sensor	Retroreflective sensor	Through-beam sensor	Through-beam sensor
1...60 mm	**0...1 m**	**0...2.2 m**	**0...2.2 m**
BOS01RC	**BOS01RP**		**BOS020E**
		BOS01Z6	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	
645 nm	645 nm	645 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED
500 Hz	500 Hz		500 Hz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	10000 Lux	5000 Lux	5000 Lux
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PMMA	PMMA	PMMA	PMMA
2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 2 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²





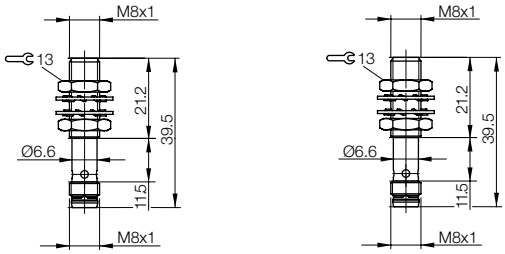




Laser class 1

Type		**Through-beam sensor**	**Through-beam sensor**
Detection range		**3 m**	**3 m**
PNP, NO			**BOS01U3**
Emitter		**BOS01U8**	
Emitter, light type		Laser, red light	Laser, red light
Laser class		1	1
Smallest detectable part		Up to 0.3 mm	Up to 0.3 mm
Degree of protection per IEC 60529		IP67	IP67
Ambient temperature T_a		–5...+55 °C	–5...+55 °C
Material	Housing	Stainless steel	Stainless steel
	Optical surface	PMMA	PMMA
Connection		M8 connector, 3-pin	M8 connector, 3-pin

Other variants on our website or on request

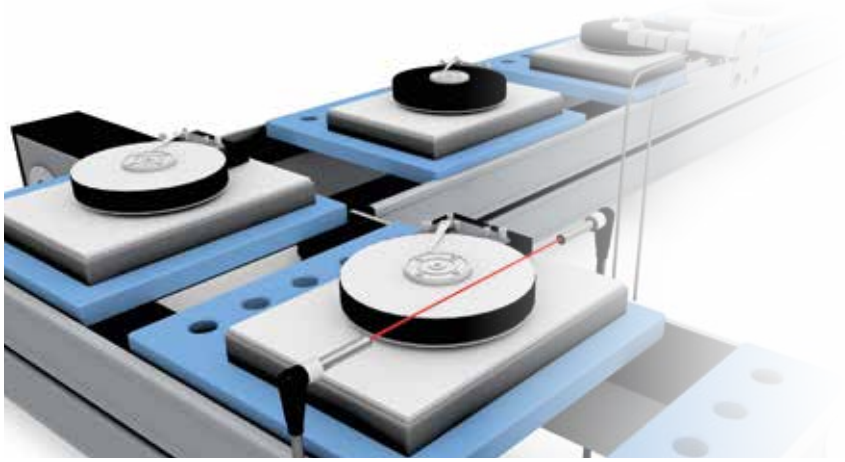


Excellent performance

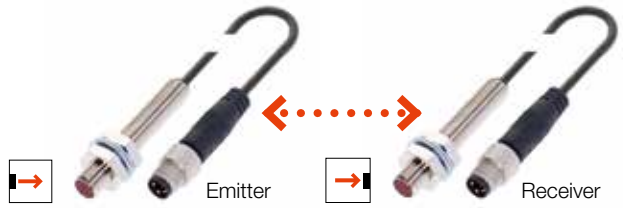
The Balluff laser through-beam sensor BOS 08E is an innovative, compact product with a high performance level. Nothing else produces comparable results under similar conditions. Its excellently focused light beam is able to detect even the smallest of parts, grooves or holes with absolute reliability. Thus the laser through-beam sensor very accurately monitors stack heights, for example. Their highly compact design means multiple sensors can be installed in rows in narrow spaces.

Benefits

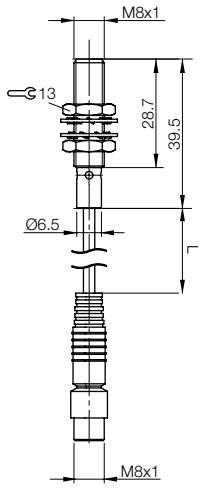
- Compact design for installation and use in the smallest of spaces
- Rugged stainless steel housing
- Tubular design – easy assembly
- Reliable detection of small parts Up to 0.3 mm
- Laser class 1 – safe for the eyes

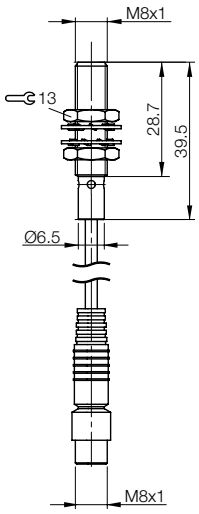


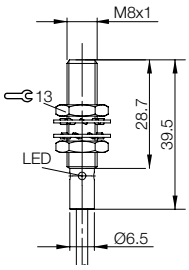
Precise height control of hard drives in an assembly line

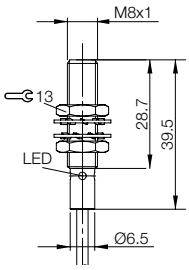


Through-beam sensor	Through-beam sensor	Through-beam sensor	Through-beam sensor
3 m	3 m	3 m	3 m
	BOS01U1		BOS01UH
BOS01U7		BOS01UL	
Laser, red light	Laser, red light	Laser, red light	Laser, red light
1	1	1	1
Up to 0.3 mm	Up to 0.3 mm	Up to 0.3 mm	Up to 0.3 mm
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PMMA	PMMA	PMMA	PMMA
0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²









Precise light spot
Reliably detecting the finest structures on objects is something that most photoelectric sensors are barely able to handle. In particular, dark objects in front of a bright background make this task difficult.

But that is not the case for the new photoelectric sensors BOS 12M with preset background suppression. Their extremely precise spot of light covers only about 1.5 mm. As a result, the sensors are capable – just like a laser – of detecting very small and fine details.

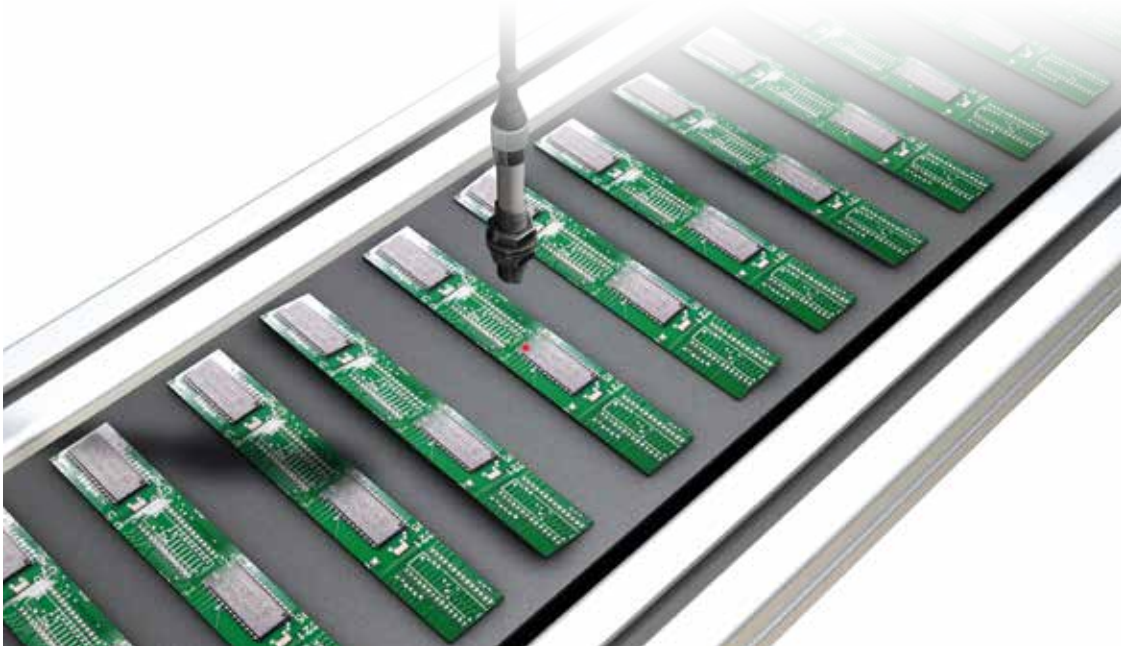
Another plus is the additional stability output. The sensor detects and indicates any misalignment right away. This increases the reliability and productivity of your machines.

Benefits
- Small spot of light like a laser – extremely precise
- Detects the finest structures of objects
- Interference-free even with extreme levels of ambient light
- Compact housing – easy to install

Type	
Detection range	
PNP, complementary	
PNP, NO contact, stability output	
NPN, complementary	
Emitter, light type	
Light spot diameter	
Gray value shift	90 %/18 %
	90 %/5 %
Smallest detectable part	
Switching frequency f	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

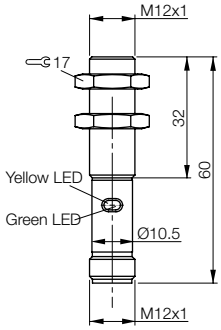
Reference object: white, 90% reflection, 100×100 mm
Reference reflector: BOS R-1

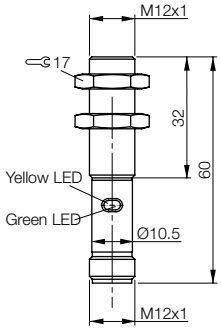
Other variants on our website or on request

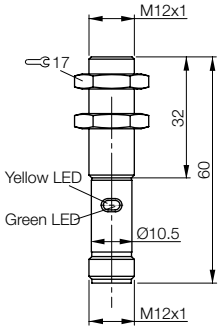


Quality inspection in automated circuit board assembly

Diffuse sensor with background suppression	**Diffuse sensor with background suppression**	**Diffuse sensor with background suppression**
1...25 mm	**1...25 mm**	**1...25 mm**
BOS01UM		
	BOS01UN	
		BOS01UP
Red light, PinPoint	Red light, PinPoint	Red light, PinPoint
~1.5 mm	~1.5 mm	~1.5 mm
< 1%	< 1%	< 1%
< 5 %	< 5 %	< 5 %
Wire Ø 0.05 mm	Wire Ø 0.05 mm	Wire Ø 0.05 mm
1 kHz	1 kHz	1 kHz
–5...+60 °C	–5...+60 °C	–5...+60 °C
Max. 50000 Lux	Max. 50000 Lux	Max. 50000 Lux
Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin







Your first choice for Standard applications

Easy operation, fast installation, affordable price – the highlights of our photoelectric BOS 12M Global sensors. These easy to install sensors in a fully potted metal housing are optimized for common applications.

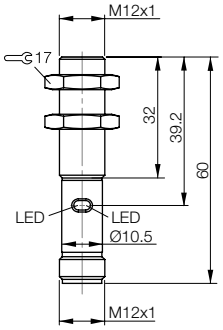
Benefits

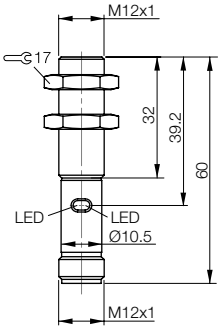
- Solid and reliable
- Ideal for standard applications
- Diffuse with red and infrared light
- Attractive price – available from stock

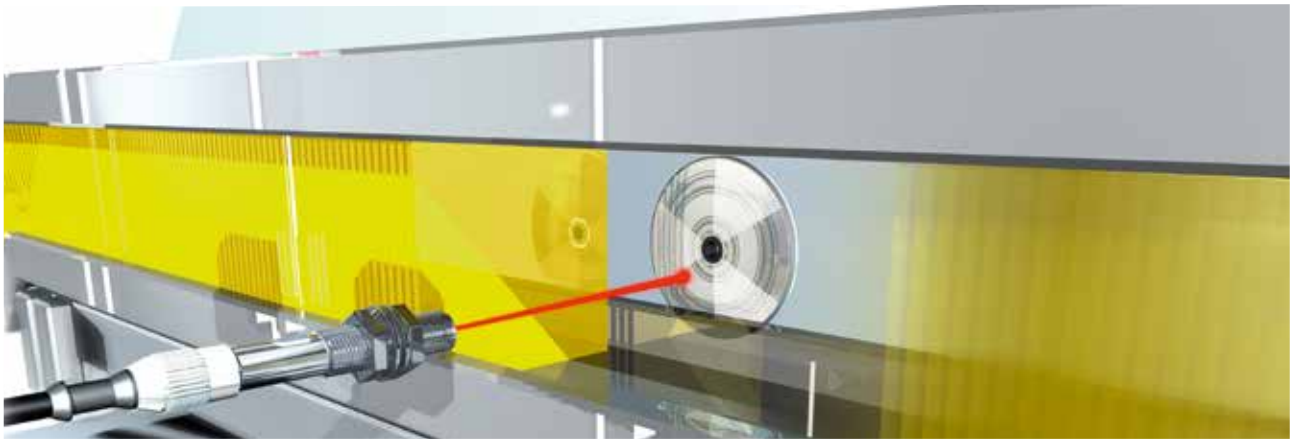
Type		Diffuse sensor	Diffuse sensor
Detection range		**1...100 mm**	**1...200 mm**
PNP, NO		**BOS01TN**	**BOS01TU**
Emitter			
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		20 mA	20 mA
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Settings		fixed	fixed
Emitter, light type		LED, red light	LED, red light
Switching frequency f		1 kHz	1 kHz
Degree of protection per IEC 60529		IP67	IP67
Ambient temperature T_a		–5…+55 °C	–5…+55 °C
Material	Housing	Nickel-plated brass	Nickel-plated brass
	Optical surface	PMMA	PMMA
Connection		M12 connector, 4-pin	M12 connector, 4-pin

Reference object:
white, 90% reflection, 200 × 200 mm
Reference reflector: BOS R-1

Other variants on our website or on request

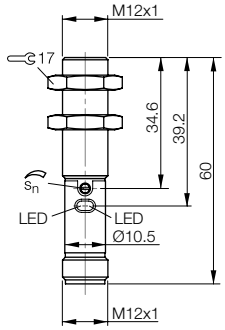


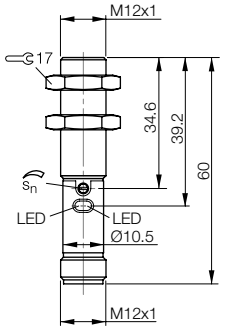


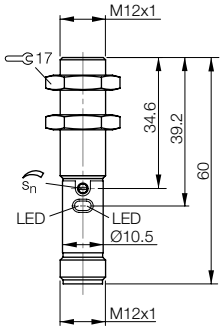


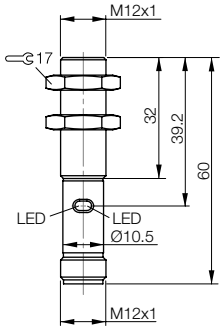
Assembly and handling technology

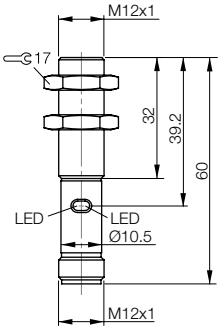
Diffuse sensor	Diffuse sensor	Retroreflective sensor with polarization	Through-beam sensor	Through-beam sensor
1...250 mm	**1...400 mm**	**0...3 m**	**0...8 m**	**0...8 m**
BOS01TP	**BOS01Y2**	**BOS01TT**		**BOS01TY**
			BOS01TW	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA	100 mA
20 mA	20 mA	20 mA	20 mA	20 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	without	Potentiometer, 270°
LED, red light	LED, infrared	LED, red light	LED, red light	LED, red light
1 kHz	1 kHz	1 kHz	1 kHz	1 kHz
IP67	IP67	IP67	IP67	IP67
–5…+55 °C	–5…+55 °C	–5…+55 °C	–5…+55 °C	–5…+55 °C
Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
PMMA	PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin











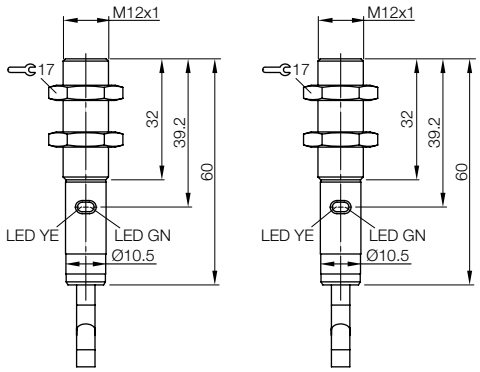
Wide product range
The wide range of high-performance diffuse, retroreflective and through-beam sensors offers versatility. The diffuse models are available with red light or invisible infrared light. This makes them suitable for virtually any application. Thanks to the extremely short housing of just 60 mm length, even tight mounting spaces are no problem.

Benefits
- Flexible application
- Fully potted metal housing
- Where space is at a premium

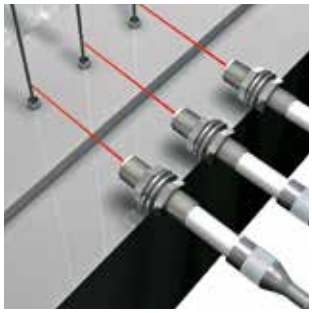
Type		Diffuse sensor	Diffuse sensor
Detection range		**1...100 mm**	**1...200 mm**
PNP, NO		**BOS01Y0**	**BOS01Y3**
Emitter			
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		20 mA	20 mA
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Settings		fixed	fixed
Emitter, light type		LED, red light	LED, red light
Switching frequency f		1 kHz	1 kHz
Degree of protection per IEC 60529		IP67	IP67
Ambient temperature T_a		–5…+55 °C	–5…+55 °C
Material	Housing	Nickel-plated brass	Nickel-plated brass
	Optical surface	PMMA	PMMA
Connection		2 m PVC cable, 4 × 0.34 mm²	2 m PVC cable, 4 × 0.34 mm²

Reference object:
white, 90% reflection, 200 × 200 mm
Reference reflector: BOS R-1

Other variants on our website or on request



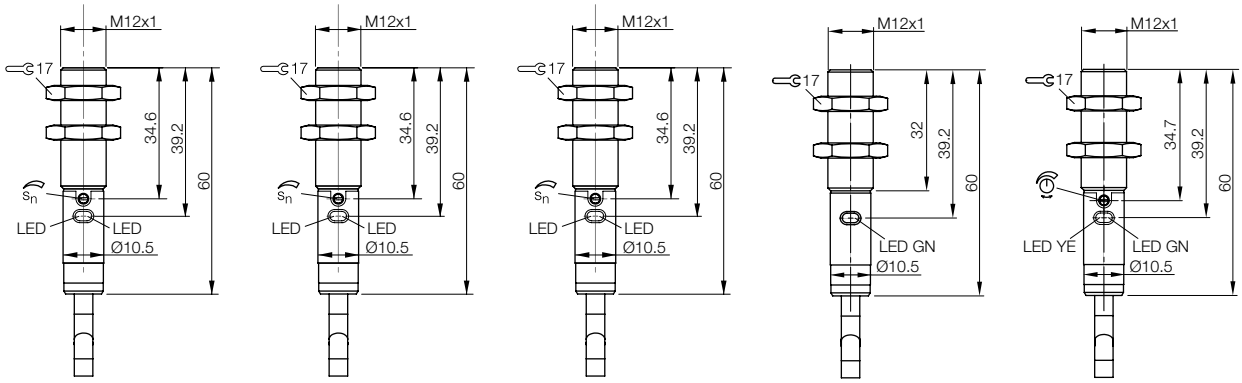
Automotive industry


Automation

Packaging industry

Machine tool building

Diffuse sensor	Diffuse sensor	Retroreflective sensor with polarization	Through-beam sensor	Through-beam sensor
1...250 mm	**1...400 mm**	**0...3 m**	**0...8 m**	**0...8 m**
BOS01TR	**BOS01ZH**	**BOS01WR**		**BOS01WW**
			BOS01WT	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA	100 mA
20 mA	20 mA	20 mA	20 mA	20 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°		Potentiometer, 270°
LED, red light	LED, red light	LED, red light	LED, red light	LED, red light
1 kHz	1 kHz	1 kHz	1 kHz	1 kHz
IP67	IP67	IP67	IP67	IP67
–5…+55 °C	–5…+55 °C	–5…+55 °C	–5…+55 °C	–5…+55 °C
Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
PMMA	PMMA	PMMA	PMMA	PMMA
2 m PVC cable, 4 × 0.34 mm²	2 m PVC cable, 4 × 0.34 mm²	2 m PVC cable, 4 × 0.34 mm²	2 m PVC cable, 4 × 0.34 mm²	2 m PVC cable, 4 × 0.34 mm²



Across every level of the system architecture
The standard BOS 18M sensor can now communicate across all levels of the system architecture. Because this highly successful photoelectric series is now available with IO-Link interface.

Startup and maintenance are significantly simplified. The sensor offers numerous diagnostic and monitoring functions. For example the function of the emitter diode is continually monitored. And the controller notified immediately if there is a failure. This reliably prevents equipment damage from incorrectly detected objects.

The numerous parameter setting possibilities open up new areas of application.

Benefits
- Convenient setting and parameterization
- Sensor parameters are saved in the controller
- Continuous monitoring of the sensor function
- For optimal maintenance and startup

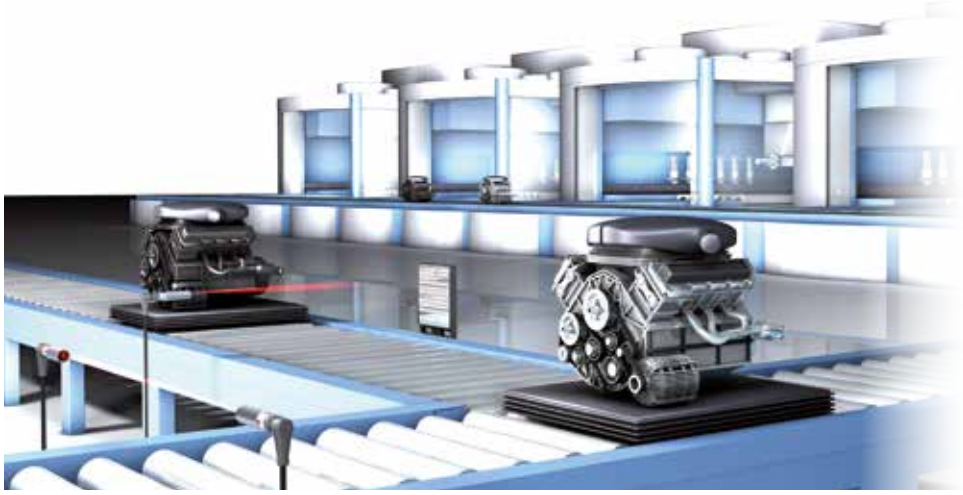
CE cULus LISTED IO-Link

Type	
Detection range	
PNP, IO-Link	
Emitter	
Supply voltage U_S	
Output current max.	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Settings	
Emitter, light type	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Material	Housing
	Optical surface
Connection	

IO-Link version 1.1
Mode
Transfer rate
Functions

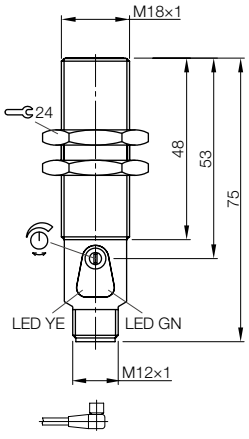
Reference object: white, 90% reflection, 200 × 200 mm
Reference reflector: BOS R-1

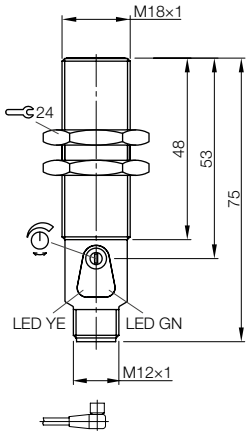
Other variants on our website or on request

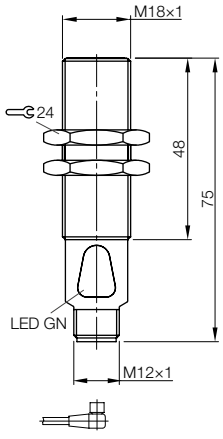


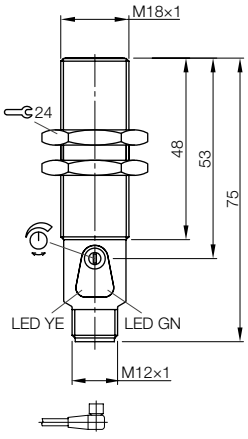
Presence checking in motor production

Diffuse sensor	Retroreflective sensor with polarization	Through-beam sensor	Through-beam sensor
1...500 mm	**0...5 m**	**0...20 m**	**0...20 m**
BOS01UA	**BOS01UE**		**BOS01UC**
		BOS01UF	
18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
100 mA	100 mA	100 mA	100 mA
40 mA	40 mA	40 mA	40 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Teach key	Teach key		Teach key
LED, red light	LED, red light	LED, red light	
500 Hz	500 Hz		400 Hz
IP67	IP67	IP67	IP67
–5…+55 °C	–5…+55 °C	–5…+55 °C	–5…+55 °C
Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
Glass	Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
COM 2	COM 2	COM 2	COM 2
38.4 kBit/s	38.4 kBit/s	38.4 kBit/s	38.4 kBit/s
Configuration of switching modes, teach-in, diagnostic info (monitoring of emitter diode), additional functions in accordance with the Smart Sensor profile			









Long range – up to 60 m

The new BOS 18M Laser series features long ranges yet outstanding precision. Laser Class 1 means no protection measures are needed. The sensors are available in all function principles: as diffuse, retro-reflective or through-beam. The fine light beam is highly visible even over long distances and is simple to align. The rugged metal housing enables use in harsh industrial environments.

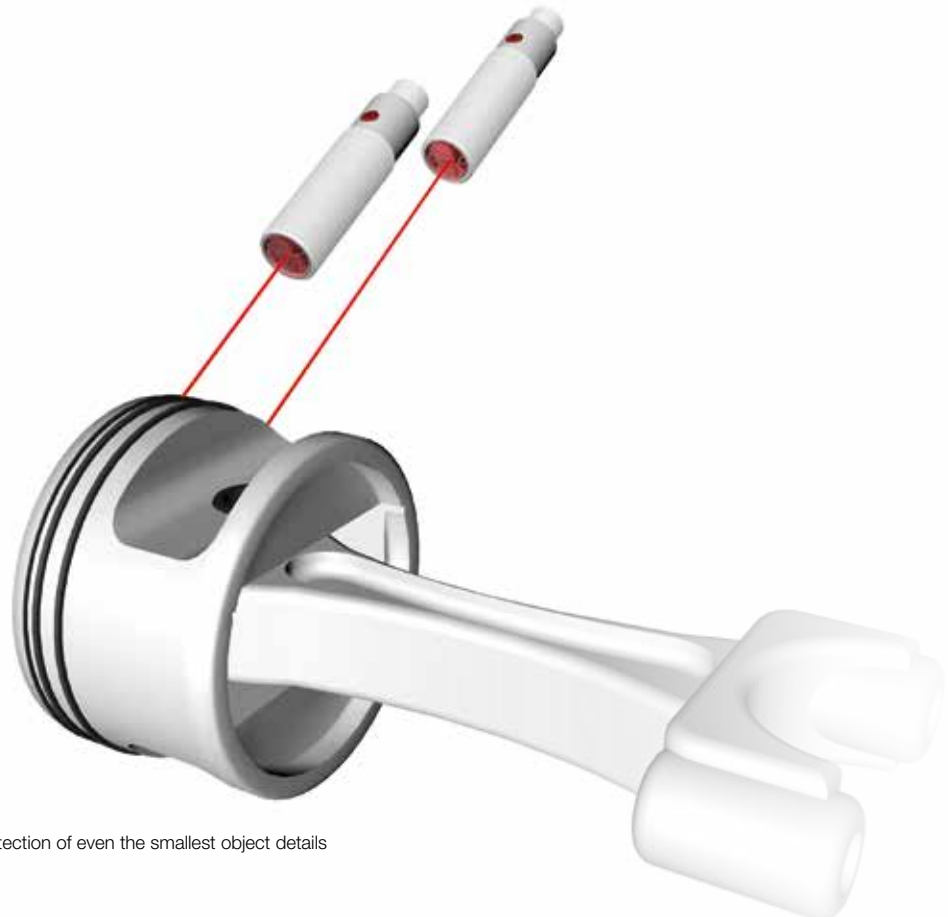
Benefits

- Highly visible laser spot, Laser Class 1
- Rugged M18 metal housing
- Precise switching response over the entire range
- Ideal for detecting small objects and high-precision position sensing
- Simple and fast setting with potentiometer

Laser class 1

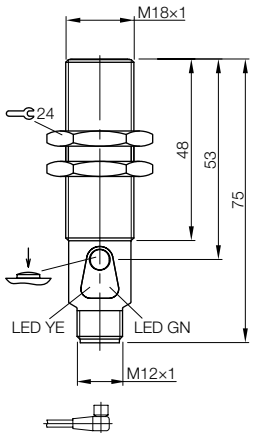
Type		
Detection range		
PNP, NO/NC		
Emitter		
Supply voltage U_S		
Output current		
No-load supply current I_0 max.		
Switching type		
Polarity reversal protected/short-circuit protected		
Settings		
Emitter, light type		
Wavelength		
Laser class		
Switching frequency f		
Degree of protection per IEC 60529		
Ambient temperature T_a		
Permissible ambient light		
Material	Housing	
	Optical surface	
Connection		

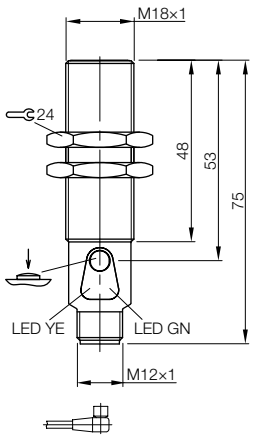
Other variants on our website or on request

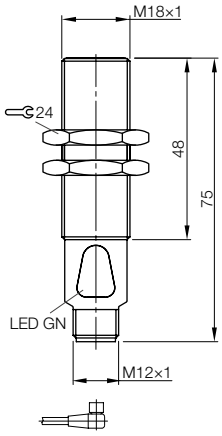


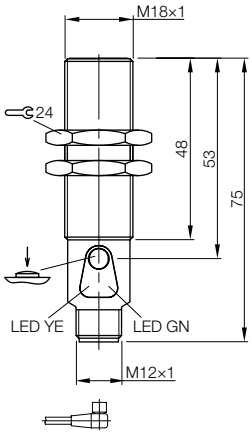
Highly precise detection of even the smallest object details

Diffuse sensor	**Retroreflective sensor with polarization**	**Through-beam sensor**	**Through-beam sensor**
1...250 mm	**0...16 m**	**0...60 m**	**0...60 m**
BOS01NF	**BOS01NE**		**BOS01NJ**
		BOS01NH	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA
Light/dark switching	Light/dark switching		Light/dark switching
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Potentiometer, 270°	Potentiometer, 270°		Potentiometer, 270°
Red laser	Red laser	Red laser	Red laser
655 nm	655 nm	655 nm	655 nm
1	1	1	1
1 kHz	1 kHz		1 kHz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	10000 Lux		10000 Lux
Coated brass	Coated brass	Coated brass	Coated brass
Glass	Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin





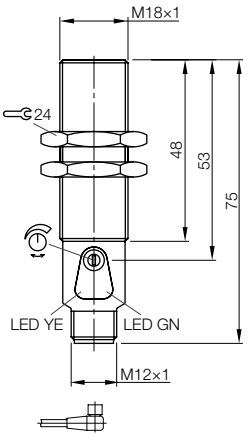


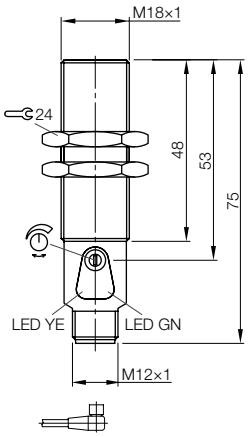


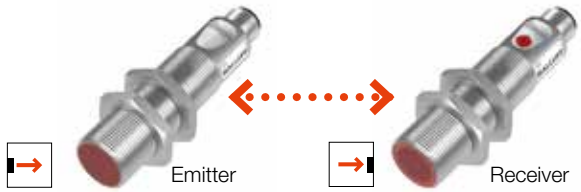
Laser class 1

Type		Diffuse sensor	Retroreflective sensor
Detection range		**1...250 mm**	**0...16 m**
PNP, NO		**BOS01R2**	**BOS01R4**
Emitter			
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 15 mA	≤ 15 mA
Switching type		Light switching	Dark switching
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Red laser	Red laser
Wavelength		655 nm	655 nm
Laser class		1	1
Switching frequency f		1 kHz	1 kHz
Degree of protection per IEC 60529		IP67	IP67
Ambient temperature T_a		–5...+55 °C	–5...+55 °C
Permissible ambient light		10000 Lux	10000 Lux
Material	Housing	Coated brass	Coated brass
	Optical surface	Glass	Glass
Connection		M12 connector, 4-pin	M12 connector, 4-pin

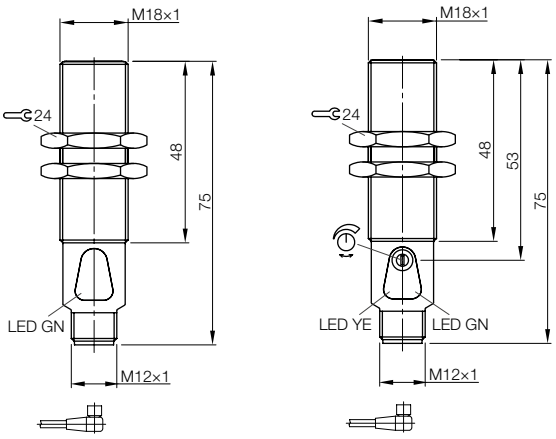
Other variants on our website or on request







Through-beam sensor	Through-beam sensor
0...60 m	**0...60 m**
	BOS01PZ
BOS01R1	
10...30 V DC	10...30 V DC
100 mA	100 mA
≤ 15 mA	≤ 15 mA
	Dark switching
Yes/yes	Yes/yes
	Potentiometer, 270°
Red laser	Red laser
655 nm	655 nm
1	1
	1 kHz
IP67	IP67
–5...+55 °C	–5...+55 °C
	10000 Lux
Coated brass	Coated brass
Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin



Ø 18 Stainless Steel Smooth Body

Rugged with maximum performance
The BOS 18E photoelectric sensors are made of corrosion-resistant stainless steel. This makes them especially rugged and resistant to many cleaning agents and other chemicals. A special housing nose and optics construction provides optimum sealing and rigidity.

The optical element is available in glass or plastic. The new BOS 18E series can thus be used for applications wherever other sensors reach their limits. Preferred areas of application are the foods and pharmaceutical industries, automotive and off-shore applications.

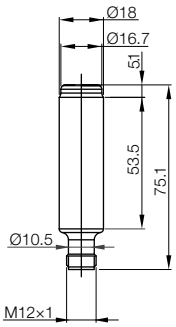
Benefits
- Housing made of 1.4404 stainless steel
- Outstanding sealing quality: IP69K, IP68
- Available threaded or with smooth sleeve
- Hygiene-compliant – washdown design
- Available in all function principles

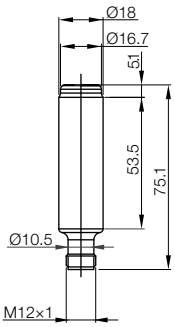
Type		
Detection range		
PNP, NO/NC		
Emitter		
Emitter with test input		
Supply voltage U_S		
Output current		
No-load supply current I_0 max.		
Switching type		
Polarity reversal protected/short-circuit protected		
Emitter, light type		
Wavelength		
Switching frequency f		
Degree of protection per IEC 60529		
Ambient temperature T_a		
Permissible ambient light		
Material	Housing	
	Optical surface	
Connection		

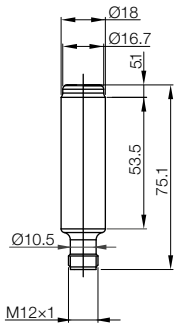
Other variants on our website or on request

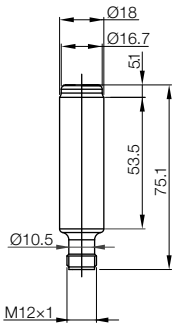
BOS 18E – Part of an impressive portfolio for harsh applications

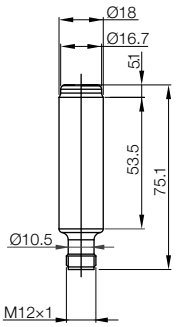
Diffuse sensor	Diffuse sensor	Retroreflective sensor with polarization	Through-beam sensor	Through-beam sensor
1…250 mm	**1…500 mm**	**0…5 m**	**0…20 m**	**0…20 m**
BOS01KJ	**BOS01KH**	**BOS01KK**		**BOS01KR**
			BOS01KU	
			BOS023P	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA	100 mA
≤ 24 mA	≤ 24 mA	≤ 24 mA	≤ 24 mA	≤ 24 mA
Light/dark switching	Light/dark switching	Light/dark switching		Light/dark switching
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm	640 nm	640 nm
400 Hz	400 Hz	400 Hz		400 Hz
IP68/IP69K	IP68/IP69K	IP68/IP69K	IP68/IP69K	IP68/IP69K
–25…+70 °C	–25…+70 °C	–25…+70 °C	–25…+70 °C	–25…+70 °C
10000 Lux	10000 Lux	10000 Lux		10000 Lux
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
Glass	Glass	Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin









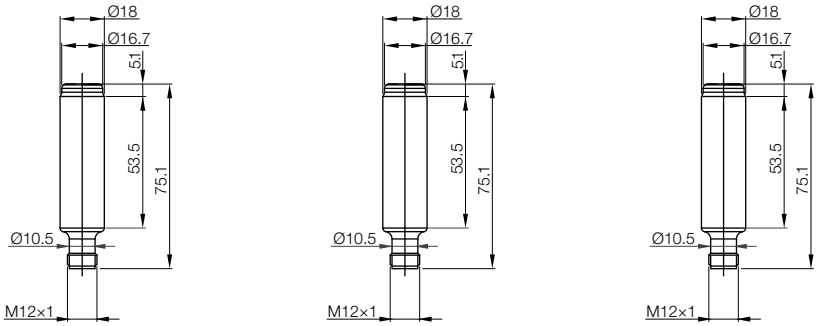


Ø 18 Stainless Steel Smooth Body

Type	
Detection range	
PNP, NO/NC	
Emitter	
Emitter with test input	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Switching type	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

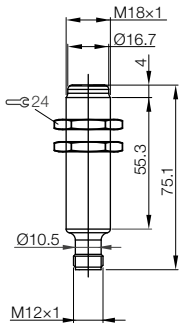
Other variants on our website or on request

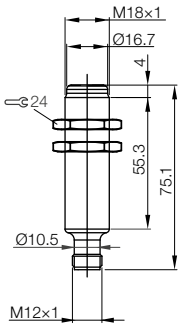
Diffuse sensor	Through-beam sensor	Through-beam sensor
1…700 mm	**0…50 m**	**0…50 m**
BOS023M		**BOS023N**
	BOS023K	
	BOS023L	
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 24 mA	≤ 24 mA	≤ 24 mA
Light/dark switching		Light/dark switching
Yes/yes	Yes/yes	Yes/yes
LED, infrared	LED, infrared	LED, infrared
850 nm	850 nm	850 nm
400 Hz		400 Hz
IP68/IP69K	IP68/IP69K	IP68/IP69K
–25…+70 °C	–25…+70 °C	–25…+70 °C
10000 Lux		10000 Lux
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



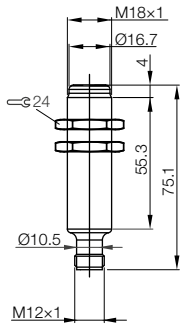
Type		**Diffuse sensor**	**Diffuse sensor**
Detection range		**1...250 mm**	**1…500 mm**
PNP, NO/NC		**BOS01KF**	**BOS01KE**
Emitter			
Sensor with test input			
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 24 mA	≤ 24 mA
Switching type		Light/dark switching	Light/dark switching
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Emitter, light type		LED, red light	LED, red light
Wavelength		640 nm	640 nm
Switching frequency f		400 Hz	400 Hz
Degree of protection per IEC 60529		IP68/IP69K	IP68/IP69K
Ambient temperature T_a		–25…+70 °C	–25…+70 °C
Permissible ambient light		10000 Lux	10000 Lux
Material	Housing	1.4404 stainless steel	1.4404 stainless steel
	Optical surface	Glass	Glass
Connection		M12 connector, 4-pin	M12 connector, 4-pin

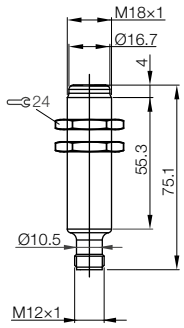
Other variants on our website or on request

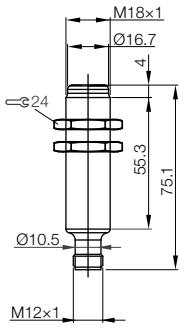




Retroreflective sensor with polarization	**Through-beam sensor**	**Through-beam sensor**
0…5 m	**0…20 m**	**0…20 m**
BOS01KL		**BOS01KM**
	BOS01KT	
	BOS0235	
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 24 mA	≤ 24 mA	≤ 24 mA
Light/dark switching		Light/dark switching
Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm
400 Hz		400 Hz
IP68/IP69K	IP68/IP69K	IP68/IP69K
–25…+70 °C	–25…+70 °C	–25…+70 °C
10000 Lux		10000 Lux
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin





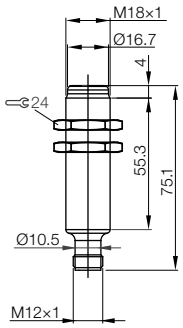


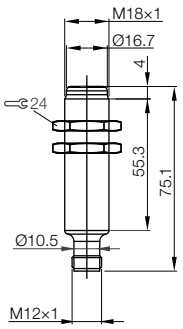
M18 Stainless Steel Thread

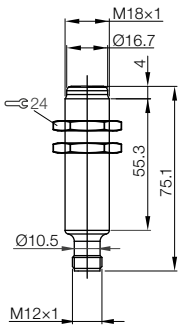
Type		
Detection range		
PNP, NO/NC		
Emitter		
Sensor with test input		
Supply voltage U_S		
Output current		
No-load supply current I_0 max.		
Switching type		
Polarity reversal protected/short-circuit protected		
Emitter, light type		
Wavelength		
Switching frequency f		
Degree of protection per IEC 60529		
Ambient temperature T_a		
Permissible ambient light		
Material	Housing	
	Optical surface	
Connection		

Other variants on our website or on request

Diffuse sensor	**Through-beam sensor**	**Through-beam sensor**
1…700 mm	**0…50 m**	**0…50 m**
BOS0239		**BOS023A**
	BOS0236	
	BOS0237	
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 24 mA	≤ 24 mA	≤ 24 mA
Light/dark switching		Light/dark switching
Yes/yes	Yes/yes	Yes/yes
Infrared	Infrared	Infrared
850 nm	850 nm	850 nm
400 Hz		400 Hz
IP68/IP69K	IP68/IP69K	IP68/IP69K
–25…+70 °C	–25…+70 °C	–25…+70 °C
10000 Lux		10000 Lux
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

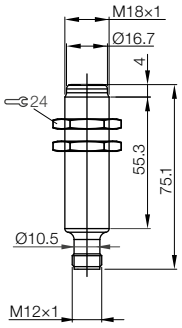


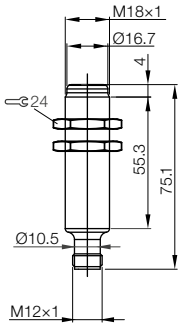




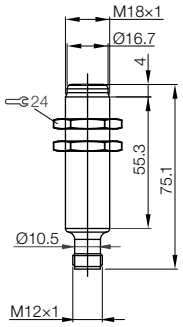
Type		**Diffuse sensor**	**Diffuse sensor**
Detection range		**1...250 mm**	**1…500 mm**
PNP, NO/NC		**BOS023T**	**BOS023R**
Emitter			
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 24 mA	≤ 24 mA
Switching type		Light/dark switching	Light/dark switching
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Emitter, light type		LED, red light	LED, red light
Wavelength		640 nm	640 nm
Switching frequency f		400 Hz	400 Hz
Degree of protection per IEC 60529		IP68/IP69K	IP68/IP69K
Ambient temperature T_a		–25…+70 °C	–25…+70 °C
Permissible ambient light		10000 Lux	10000 Lux
Material	Housing	1.4404 stainless steel	1.4404 stainless steel
	Optical surface	PMMA	PMMA
Connection		M12 connector, 4-pin	M12 connector, 4-pin

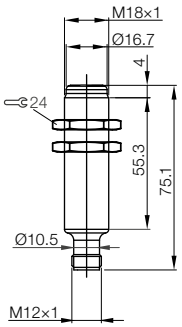
Other variants on our website or on request

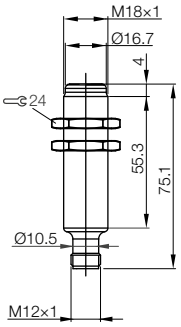




Retroreflective sensor with polarization	**Through-beam sensor**	**Through-beam sensor**
0…5 m	**0…20 m**	**0…20 m**
BOS023Y		**BOS023W**
	BOS023U	
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 24 mA	≤ 24 mA	≤ 24 mA
Light/dark switching		Light/dark switching
Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm
400 Hz		400 Hz
IP68/IP69K	IP68/IP69K	IP68/IP69K
–25…+70 °C	–25…+70 °C	–25…+70 °C
10000 Lux		10000 Lux
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin





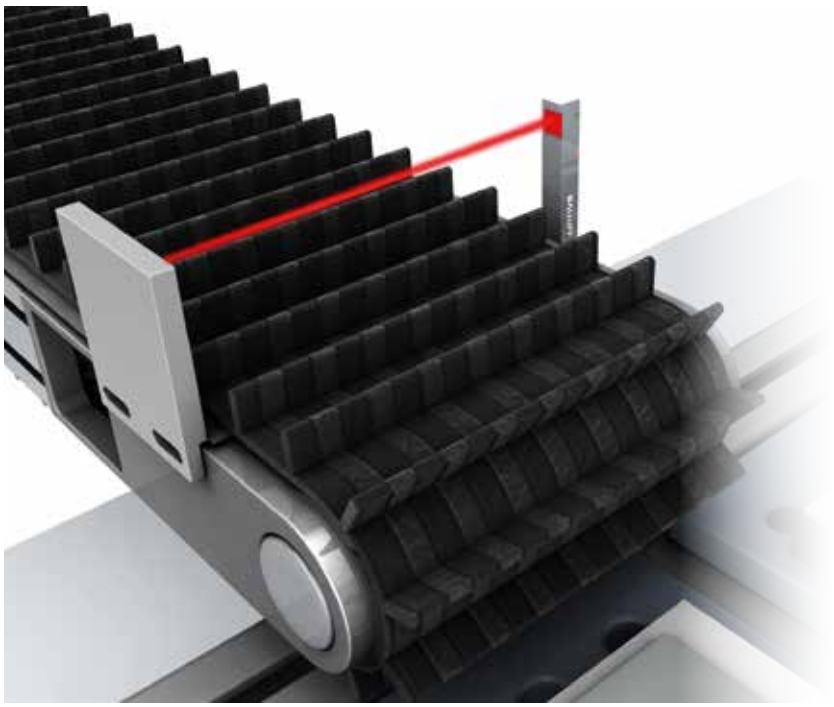


Compact and high-performance
The proven BOS Q08M series in the compact, block-design housing is now beginning its third generation. It stands out with excellent performance, a powerful red light and precise switching response. The unique periscope design allows for installation in previously inaccessible locations. This makes it the ideal solution for virtually any application.

Benefits
- Compact design enables use in the smallest of spaces
- Rugged stainless steel housing, IP67
- Bright, homogeneous light spot for simple alignment
- Long ranges and precise object detection
- Available in all function principles

Type	
Detection range	
PNP, NO	
PNP, NC	
NPN, NO	
Emitter	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Switching state indicator	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

Other variants on our website or on request

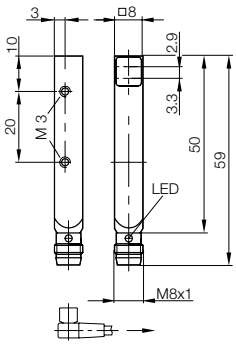


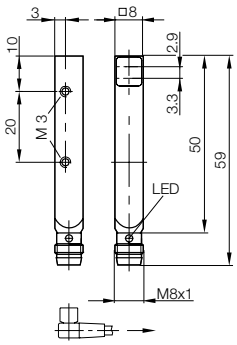
Precise clear space control on a conveyor belt

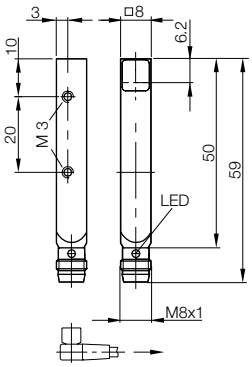
Emitter

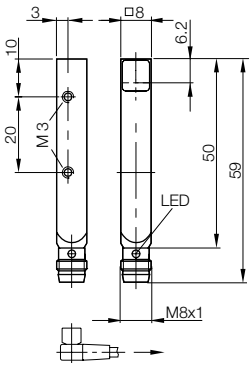
Receiver

Diffuse sensor	Retroreflective sensor	Through-beam sensor	Through-beam sensor
1...60 mm	**0...1 m**	**0...2.2 m**	**0...2.2 m**
BOS01RJ	**BOS01T8**		**BOS01Y4**
BOS01T0	**BOS01TA**		**BOS01Y7**
BOS01T3	**BOS01TF**		**BOS01YA**
		BOS01YK	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	
645 nm	645 nm	645 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED
500 Hz	500 Hz		500 Hz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	5000 Lux		10000 Lux
Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc
PMMA	PMMA	PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin







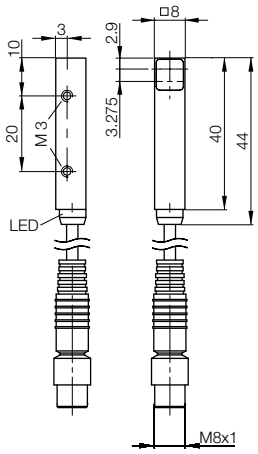


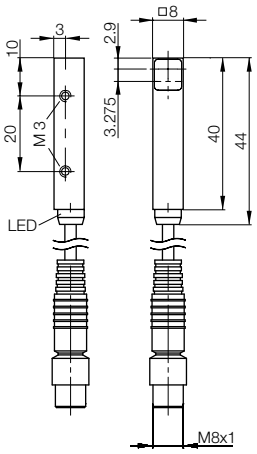
Cable versions with connector
The BOS Q08M photoelectric sensors are available as cable or connector versions with or without plug-in connection.

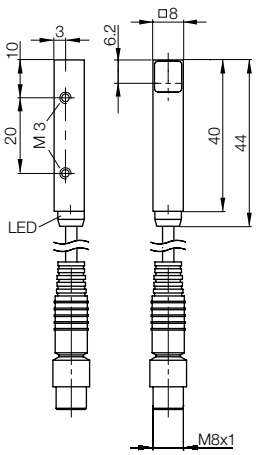
Type	
Detection range	
PNP, NO	
PNP, NC	
NPN, NO	
Emitter	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Switching state indicator	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

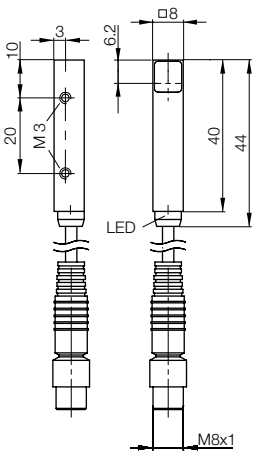
Other variants on our website or on request

Diffuse sensor	Retroreflective sensor	Through-beam sensor	Through-beam sensor
1...60 mm	**0...1 m**	**0...2.2 m**	**0...2.2 m**
BOS01RZ	**BOS01T9**		**BOS01Y6**
BOS01T1	**BOS01TC**		**BOS01Y9**
BOS01T4	**BOS01TH**		**BOS01YE**
		BOS01YM	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	
645 nm	645 nm	645 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED
500 Hz	500 Hz		500 Hz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	5000 Lux		10000 Lux
Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc
PMMA	PMMA	PMMA	PMMA
0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin







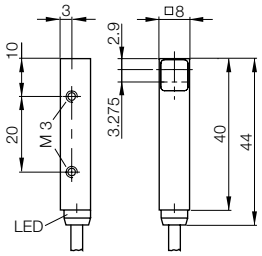


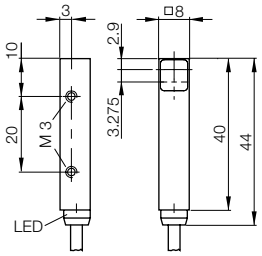
Cable versions with connector
The BOS Q08M photoelectric sensors are available as cable or connector versions with or without plug-in connection.

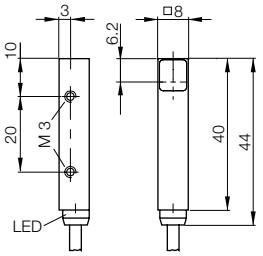
Type	
Detection range	
PNP, NO	
Emitter	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Switching state indicator	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

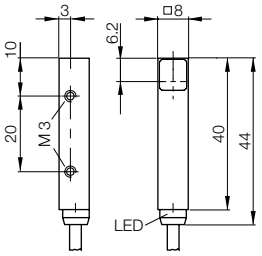
Other variants on our website or on request

Diffuse sensor	Retroreflective sensor	Through-beam sensor	Through-beam sensor
1...60 mm	**0...1 m**	**0...2.2 m**	**0...2.2 m**
BOS01T2	**BOS01TE**		**BOS01Y5**
		BOS01YL	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, red light	LED, red light	
645 nm	645 nm	645 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED
500 Hz	500 Hz		500 Hz
IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
10000 Lux	5000 Lux		10000 Lux
Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc
PMMA	PMMA	PMMA	PMMA
2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 2 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²









Accurately detect even the smallest parts
The new laser diffuse sensor follows the motto of the BOS Q08M family: small size – big performance. Its excellent, fine light beam also detects the smallest objects and contours with absolute reliability and can be aligned with high precision, even amidst tightly packed parts. Therefore the laser diffuse sensor is ideally suited for small spaces.

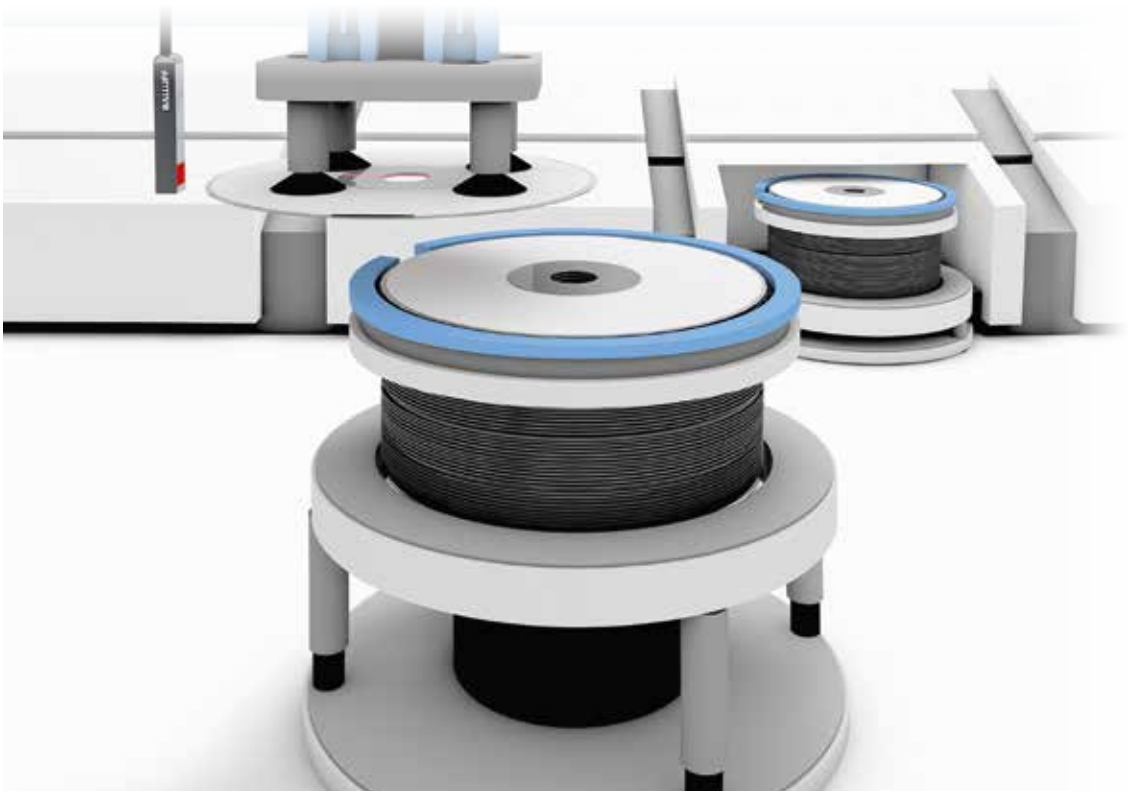
Benefits
- Compact design for installation and use in the smallest of spaces
- Rugged metal housing with threaded holes
- Reliable detection of small parts Up to 0.3 mm
- Uses a patented mounting concept for Bosch profiles that allows quick, precise positioning
- Laser class 1 – safe for the eyes

Laser class 1

Type	
Detection range	
PNP, NO	
PNP, NC	
Emitter, light type	
Laser class	
Smallest detectable part	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Material	Housing
	Optical surface
Connection	

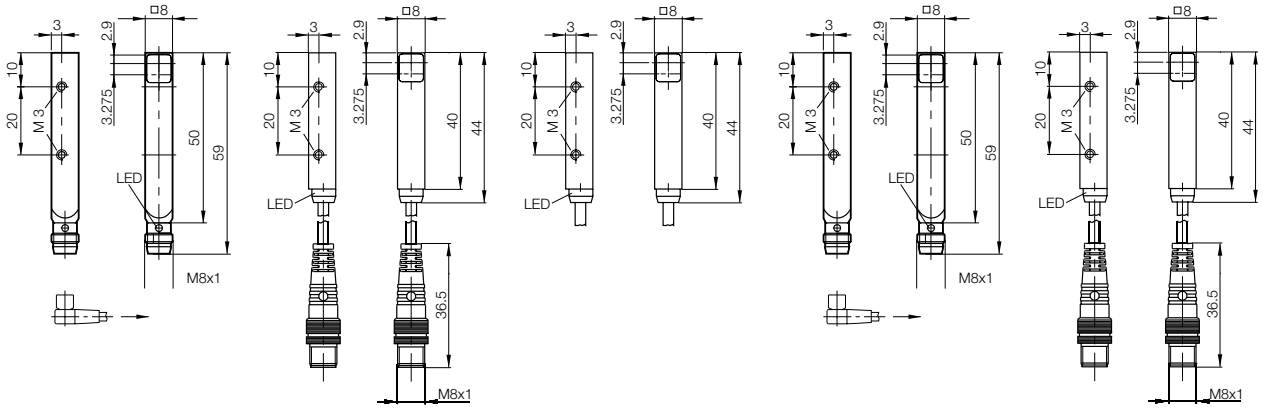
Other variants on our website or on request

Laser retroreflective and laser through-beam sensors can be found in the main catalog.



Presence verification of CDs in a vacuum gripper

Diffuse sensor	**Diffuse sensor**	**Diffuse sensor**	**Diffuse sensor**	**Diffuse sensor**
1...60 mm	**1...60 mm**	**1...60 mm**	**1...60 mm**	**1...60 mm**
BOS01WC	**BOS01WH**	**BOS01WL**		
			BOS01WE	**BOS01WJ**
Laser, red light	Laser, red light	Laser, red light	Laser, red light	Laser, red light
1	1	1	1	1
Up to 0.3 mm	Up to 0.3 mm	Up to 0.3 mm	Up to 0.3 mm	Up to 0.3 mm
IP67	IP67	IP67	IP67	IP67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
Nickel-plated die-cast zinc	Nickel-plated die-cast zinc	Nickel-plated die-cast zinc	Nickel-plated die-cast zinc	Nickel-plated die-cast zinc
PMMA	PMMA	PMMA	PMMA	PMMA
M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 3 × 0.14 mm²	M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin



For harsh environments
The new BOS R01E series sensors are ideal for harsh environments. With a full stainless steel housing they resist aggressive media such as all common cleaning agents. This makes these sensors ideal for many applications and industries – especially the foods industry and metalworking.

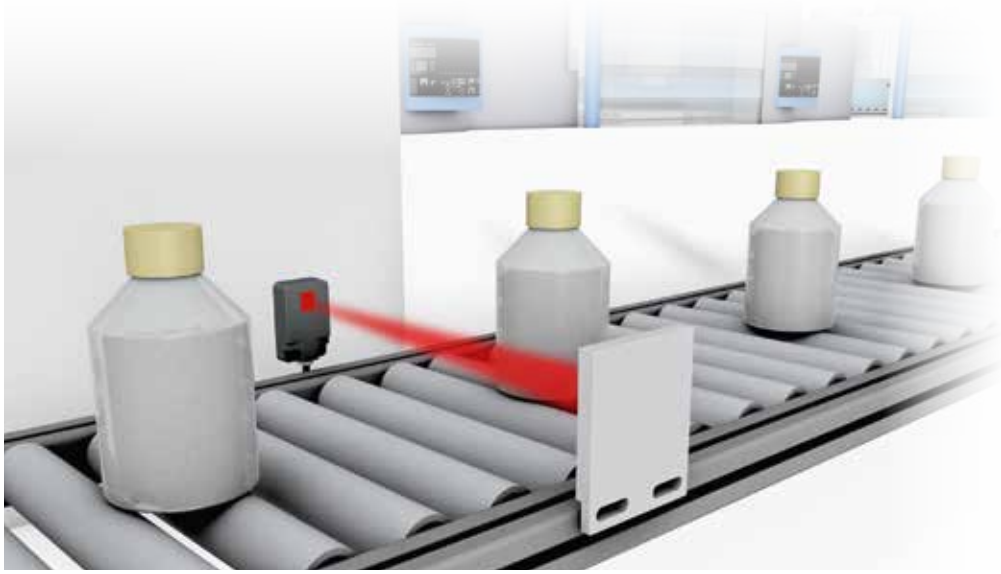
Their compact size means the BOS R01E series sensors also fit in tight spaces. Their installation is quick and easy.

Benefits
- Full stainless steel – ideal in harsh environments
- Bright, homogeneous light spot – quick and easy alignment
- Strong red light – precision for long ranges
- Complete family – all optical sensor types available

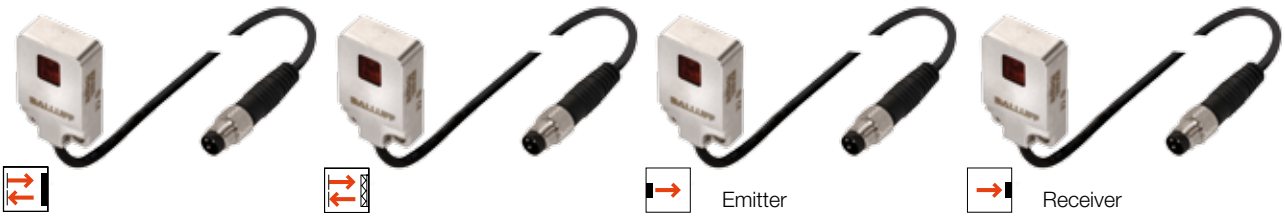
Type		
Detection range		
PNP, NO		
PNP, NC		
Emitter		
Supply voltage U_S		
Output current max.		
No-load supply current I_0 max.		
Polarity reversal protected/short-circuit protected		
Settings		
Emitter, light type		
Switching frequency f		
Degree of protection per IEC 60529/DIN 40050		
Ambient temperature T_a		
Material	Housing	
	Optical surface	
Connection		

Reference object: white, 90 % reflection, 200 × 200 mm
Reference reflector: BOS R-9

Other variants on our website or on request



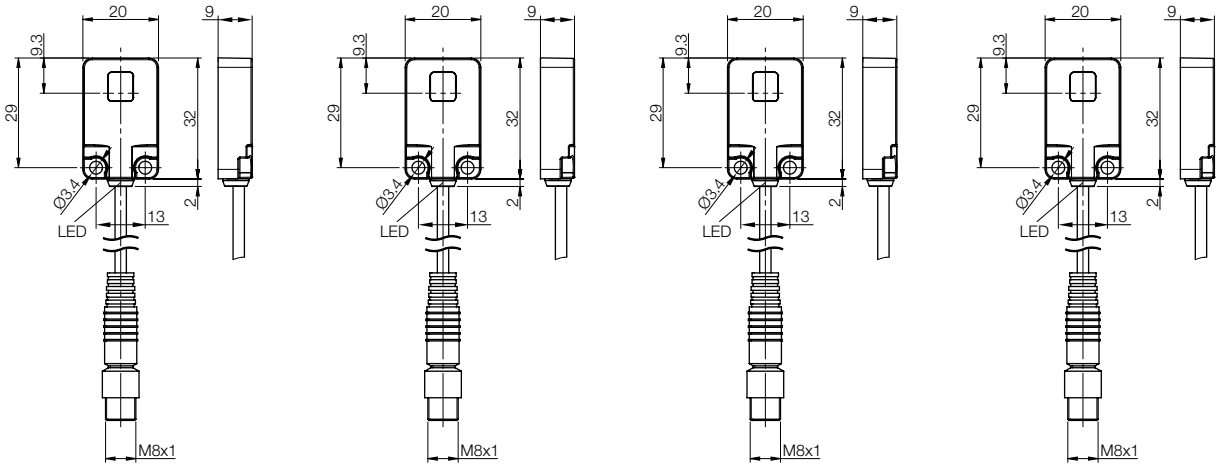
The stainless steel housing enables presence verification in the foods industry.

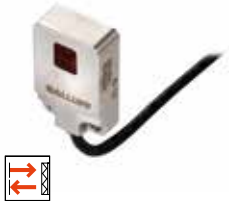


Emitter

Receiver

Diffuse sensor	Retroreflective sensor with polarization	Through-beam sensor	Through-beam sensor
1...100 mm	**25...1000 mm**	**0...2200 mm**	**0...2200 mm**
BOS021J	**BOS021L**		**BOS021N**
BOS021Y	**BOS0222**		**BOS0226**
		BOS021R	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		100 mA
10 mA	10 mA	10 mA	10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
fixed	fixed	fixed	fixed
LED, red light	LED, red light	LED, red light	
500 Hz	500 Hz		500 Hz
IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K
–5…+55 °C	–5…+55 °C	–5…+55 °C	–5…+55 °C
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
PA	PA	PA	PA
0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin

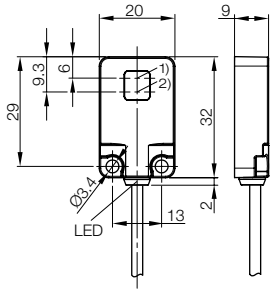


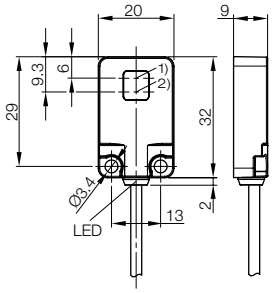


Type		Diffuse sensor	Retroreflective sensor with polarization
Detection range		**1...100 mm**	**25...1000 mm**
PNP, NO		**BOS021K**	**BOS021M**
PNP, NC		**BOS021Z**	**BOS0223**
Emitter			
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current max.		100 mA	100 mA
No-load supply current I_0 max.		10 mA	10 mA
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Settings		fixed	fixed
Emitter, light type		LED, red light	LED, red light
Switching frequency f		500 Hz	500 Hz
Degree of protection per IEC 60529/DIN 40050		IP67/IP69K	IP67/IP69K
Ambient temperature T_a		–5…+55 °C	–5…+55 °C
Material	Housing	1.4404 stainless steel	1.4404 stainless steel
	Optical surface	PA	PA
Connection		2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²

Reference object: white, 90 % reflection, 200 × 200 mm
Reference reflector: BOS R-9

Other variants on our website or on request

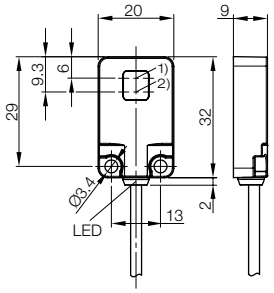


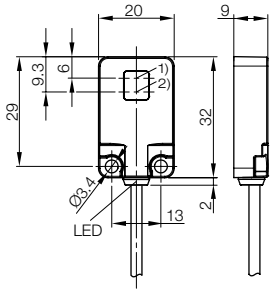


Emitter

Receiver

Through-beam sensor	Through-beam sensor
0...2200 mm	**0...2200 mm**
	BOS021P
	BOS0227
BOS021T	
10...30 V DC	10...30 V DC
	100 mA
10 mA	10 mA
Yes/yes	Yes/yes
fixed	fixed
LED, red light	
	500 Hz
IP67/IP69K	IP67/IP69K
–5…+55 °C	–5…+55 °C
1.4404 stainless steel	1.4404 stainless steel
PA	PA
2 m PUR cable, 3 × 0.14 mm²	2 m PUR cable, 3 × 0.14 mm²





Reliably detect dark and reflective objects
Photoelectric mini-sensors BOS R020K are ideal for reliable detection of dark and reflective objects. Their long range provides great function reserve.

The impact-resistant housing in IP67 with potted metal sleeves and the rugged PMMA disc makes them suitable for harsh environments in factory automation. They are also at home in the automobile, semiconductor or packaging industries.

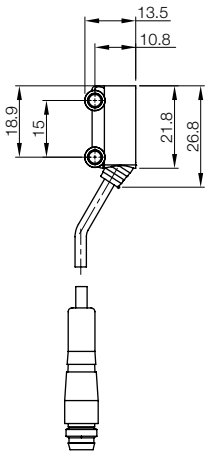
The diffuse models are available with fixed or adjustable background suppression with retro-reflective and through-beam models available as well. Learn here about the cable versions with M8 connectors.

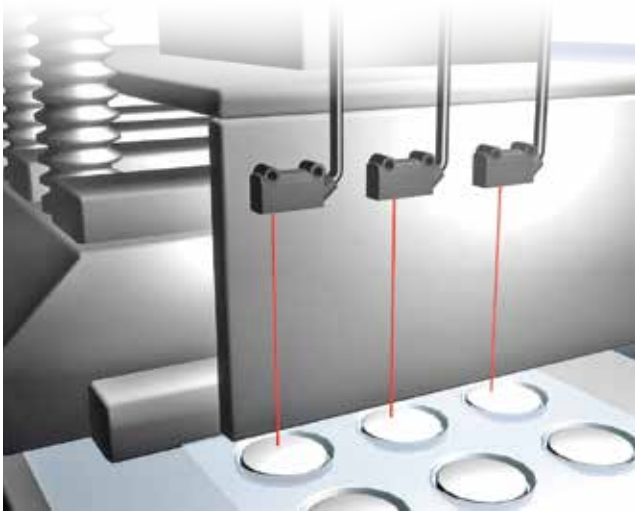
Benefits
- Impact-resistant, rugged IP67 housing
- background suppression simply and precisely adjustable with 3-turn potentiometer
- cULus certified

Type		**Diffuse sensor with fixed background suppression**
Detection range		**1...15 mm**
PNP, NO	3-pin	**BOS021C**
PNP, NC	3-pin	**BOS021F**
PNP, NO	4-pin	**BOS021E**
Supply voltage U_S		10...30 V DC
Output current		50 mA
No-load supply current I_0 max.		20 mA
Polarity reversal protected/short-circuit protected		Yes/yes
Settings		Fixed
Emitter, light type		LED, red light
Wavelength		640 nm
Light spot diameter		2 mm at a distance of 8 mm
Switching frequency f		800 Hz
Degree of protection per IEC 60529		IP67
Ambient temperature T_a		–20…+50 °C
Material	Housing	ABS
	Optical surface	PMMA
Connection		0.2 m PVC cable with M8 connector

Reference object:
white, 90 % reflection, 200 × 200 mm
Reference reflector: BOS R-9

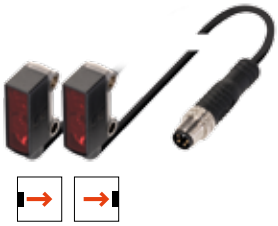
Other variants on our website
or on request



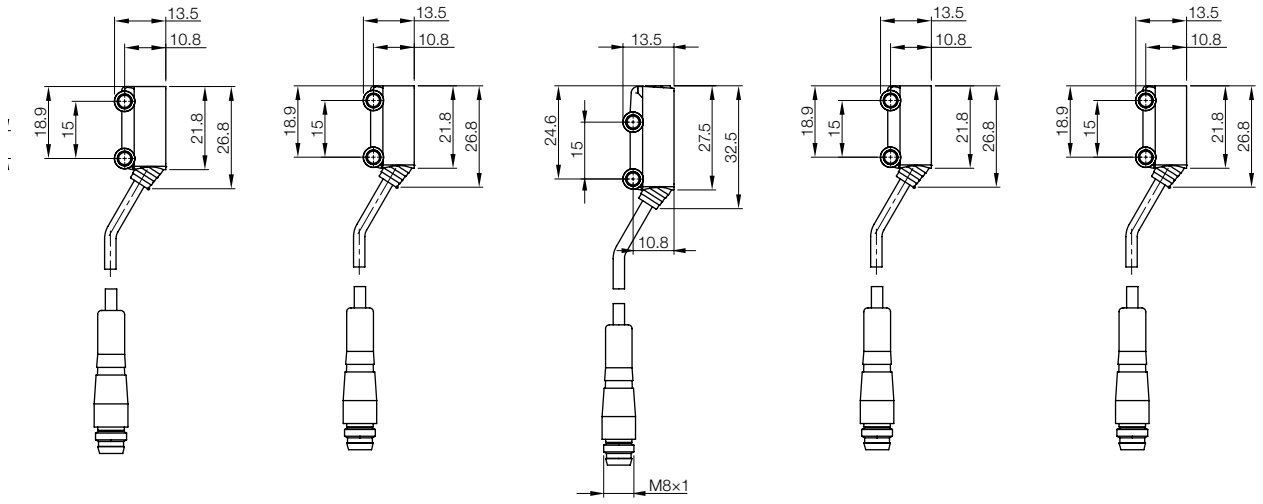


Pill detection in a blister

Super long range adjustable!



Diffuse sensor with fixed background suppression	Diffuse sensor with fixed background suppression	Diffuse sensor with adjustable background suppression	Retroreflective sensor with polarization	Through-beam sensor emitter and receiver
1...30 mm	**3...60 mm**	**1...150 mm**	**0.025...3 m**	**0...2 m**
BOS020M	**BOS0217**		**BOS020T**	**BOS0214**
			BOS020Z	**BOS0248**
BOS020N	**BOS0218**	**BOS0234**	**BOS020U**	**BOS0212**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
50 mA	50 mA	50 mA	50 mA	50 mA
20 mA	20 mA	20 mA	20 mA	20 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Fixed	Fixed	3-turn potentiometer	Fixed	Fixed
LED, red light	LED, red light	LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm	640 nm	640 nm
3 mm at a distance of 15 mm	4.5 mm at a distance of 40 mm	4.4 mm at a distance of 80 mm	11 mm at a distance of 250 mm	23 mm at a distance of 500 mm
800 Hz	800 Hz	800 Hz	800 Hz	800 Hz
IP67	IP67	IP67	IP67	IP67
–20…+50 °C	–20…+50 °C	–20…+50 °C	–20…+50 °C	–20…+50 °C
ABS	ABS	ABS	ABS	ABS
PMMA	PMMA	PMMA	PMMA	PMMA
0.2 m PVC cable with M8 connector	0.2 m PVC cable with M8 connector	0.2 m PVC cable with M8 connector	0.2 m PVC cable with M8 connector	0.2 m PVC cable with M8 connector



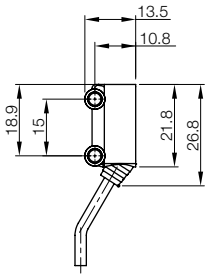
Detect objects made of virtually any material
The cable versions of the photoelectric mini-sensors BOS R020K offer all the basic advantages of this rugged mini-sensor series. They reliably detect dark and reflective objects over long distances. Their rugged design and simple startup makes them ideal for a variety of applications. The switching distance of the diffuse model with variable background suppression can be precisely and simply set using a 3-turn potentiometer.

Benefits
- Long range – great function reserve
- Cable outlet 45° toward back with anti-kink protection
- Various versions for a variety of demands – with cULus certificate

Type		**Diffuse sensor with fixed background suppression**
Detection range		**1...15 mm**
PNP, NO		**BOS021A**
PNP, NC		
Supply voltage U_S		10...30 V DC
Output current		50 mA
No-load supply current I_0 max.		20 mA
Polarity reversal protected/short-circuit protected		Yes/yes
Settings		Fixed
Emitter, light type		LED, red light
Wavelength		640 nm
Light spot diameter		2 mm at a distance of 8 mm
Switching frequency f		800 Hz
Degree of protection per IEC 60529		IP67
Ambient temperature T_a		–20…+50 °C
Material	Housing	ABS
	Optical surface	PMMA
Connection		2 m PVC cable, 3 × 0.09 mm²

Reference object:
white, 90 % reflection, 200 × 200 mm
Reference reflector: BOS R-9

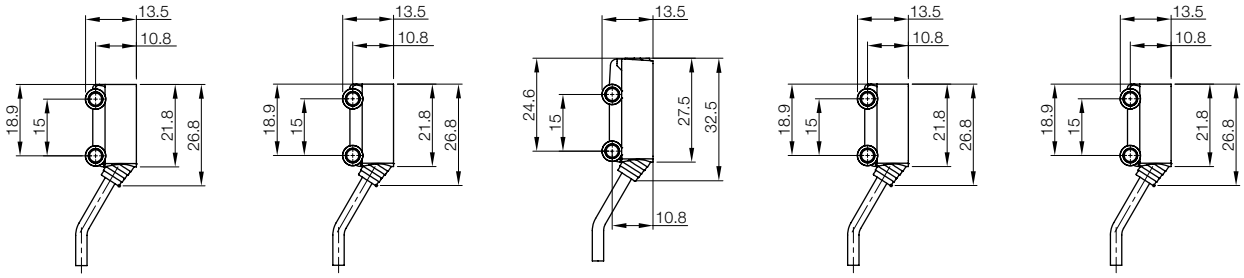
Other variants on our website
or on request



Reliable detection even of weakly reflecting or shiny objects such as solar cells

Super long range adjustable!

Diffuse sensor with fixed background suppression	Diffuse sensor with fixed background suppression	Diffuse sensor with adjustable background suppression	Retroreflective sensor with polarization	Through-beam sensor emitter and receiver
1...30 mm	**3...60 mm**	**1...150 mm**	**0.025...3 m**	**0...2 m**
BOS020K	**BOS0216**	**BOS022C**	**BOS020R**	**BOS0211**
BOS020H			**BOS020Y**	**BOS0213**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
50 mA	50 mA	50 mA	50 mA	50 mA
20 mA	20 mA	20 mA	20 mA	20 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Fixed	Fixed	3-turn potentiometer	Fixed	Fixed
LED, red light	LED, red light	LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm	640 nm	640 nm
3 mm at a distance of 15 mm	4.5 mm at a distance of 40 mm	4.4 mm at a distance of 80 mm	11 mm at a distance of 250 mm	23 mm at a distance of 500 mm
800 Hz	800 Hz	800 Hz	800 Hz	800 Hz
IP67	IP67	IP67	IP67	IP67
–20…+50 °C	–20…+50 °C	–20…+50 °C	–20…+50 °C	–20…+50 °C
ABS	ABS	ABS	ABS	ABS
PMMA	PMMA	PMMA	PMMA	PMMA
2 m PVC cable, 3 × 0.09 mm²	2 m PVC cable, 3 × 0.09 mm²	2 m PVC cable, 3 × 0.09 mm²	2 m PVC cable, 3 × 0.09 mm²	2 m PVC cable, 3 × 0.09 mm²

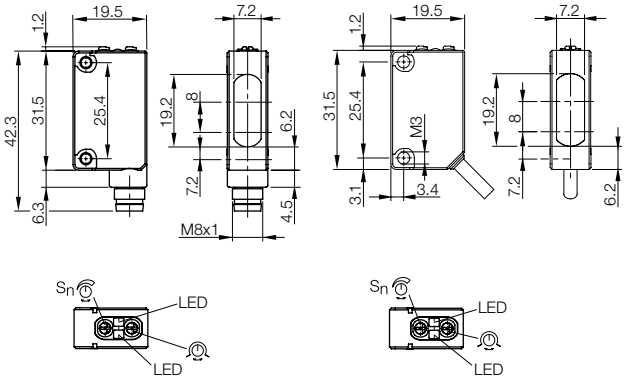


Type		Diffuse sensor with background suppression	Diffuse sensor with background suppression
Detection range		**20...300 mm**	**20...300 mm**
PNP, NO/NC		**BOS01JK**	**BOS01JZ**
NPN, NO/NC		**BOS01K0**	**BOS01JY**
Supply voltage U_S		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		35 mA	35 mA
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Settings		Potentiometer, 6-turn	Potentiometer, 6-turn
Emitter, light type		Laser class 1, red light	Laser class 1, red light
Switching frequency f		2 kHz	2 kHz
Degree of protection per IEC 60529		IP67	IP67
Ambient temperature T_a		–10...+55 °C	–10...+55 °C
Material	Housing	PC/PBT	PC/PBT
	Optical surface	PMMA	PMMA
Connection		M8 connector, 4-pin	2 m PVC cable, 3 × 0.2 mm²

Preferred variants (available immediately)

Reference object: white, 90 % reflection, 200 × 200 mm,
Reference reflector: BOS R-22

Other variants on our website or on request



Small, compact and competitive
The optical sensors from the BOS 5K product line now include a mini laser sensor: used as a diffuse sensor with background suppression, retroreflective sensor or through-beam sensor. The compact housing makes it ideal for tight installation conditions.

Long sensing distance with high function reserve
The high-performance, cost-effective sensor in laser class 1 does not require any protective measures. Its fine laser beam is clearly visible over long distances, easy to align and enables long sensing distances that provide a greater function reserve.

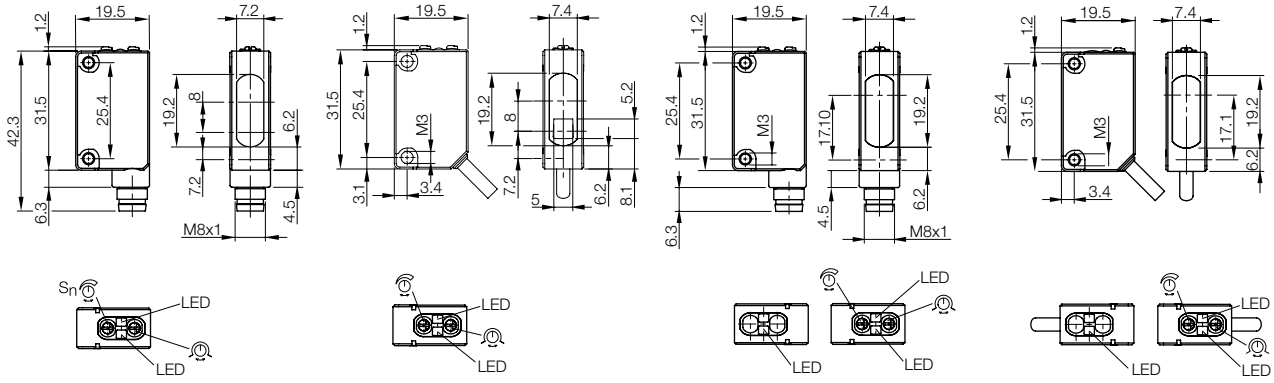
The main application area is to detect small parts in fast processes.

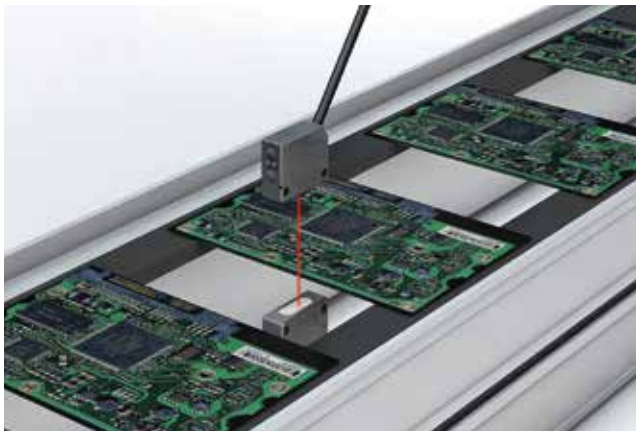
Significant benefits at a glance
- Detecting small objects or object characteristics
- Reliable detection of objects over large distances
- Large sensing distance in a small design
- For tight spaces
- Wherever a visible light beam is required

Retroreflective sensor	Retroreflective sensor	Through-beam sensor	Through-beam sensor
0...10 m	**0...10 m**	**0...30 m**	**0...30 m**
BOS01JW	**BOS01JT**	**BOS01JP**	**BOS01JM**
BOS01JU	**BOS01JR**	**BOS01JN**	**BOS01JL**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
35 mA	35 mA	35 mA	35 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Laser class 1, red light	Laser class 1, red light	Laser class 1, red light	Laser class 1, red light
2 kHz	2 kHz	2 kHz	2 kHz
IP67	IP67	IP67	IP67
–10...+55 °C	–10...+55 °C	–10...+55 °C	–10...+55 °C
PC/PBT	PC/PBT	PC/PBT	PC/PBT
PMMA	PMMA	PMMA	PMMA
M8 connector, 4-pin	2 m PVC cable, 3 × 0.2 mm²	M8 connector, 4-pin	2 m PVC cable, 3 × 0.2 mm²

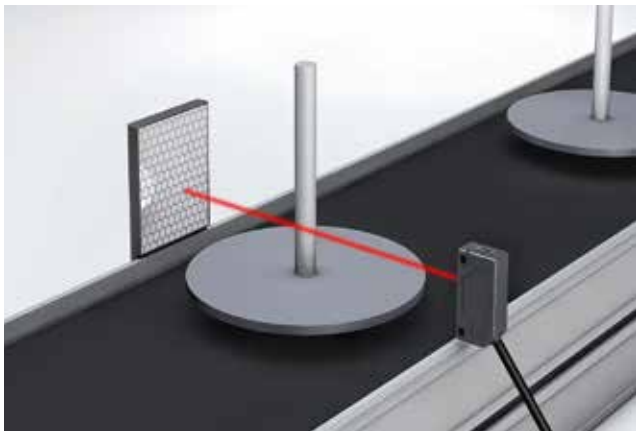
Delivery scope:
Emitter + receiver

Delivery scope:
Emitter + receiver





Reliable presence verification of circuit boards

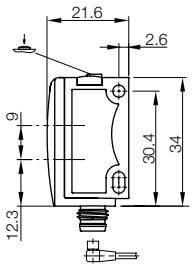


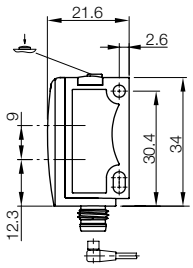
The fine laser beam ensure precise positioning

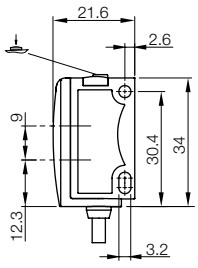
Type		Diffuse sensor with background suppression	Diffuse sensor with background suppression	Diffuse sensor with background suppression
Detection range		**1...200 mm**	**1...200 mm**	**1...200 mm**
PNP, NO/NC		**BOS01KY**	**BOS01KW**	**BOS01L0**
Supply voltage U_S		10...30 V DC	10...30 V DC	10...30 V DC
Output current		100 mA	100 mA	100 mA
No-load supply current I_0 max.		≤ 30 mA	≤ 30 mA	≤ 30 mA
Switching type		Light/dark	Light/dark	Light/dark
Polarity reversal protected/ short-circuit protected		Yes/yes	Yes/yes	Yes/yes
Settings		Teach-in	Teach-in	Teach-in
Emitter, light type		LED, red light	LED, red light	LED, red light
Light spot diameter		Approx. 5 × 5 mm at 50 mm	Approx. 5 × 5 mm at 50 mm	Approx. 5 × 5 mm at 50 mm
Power-on indicator		Green LED	Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Response time		0.5 ms	0.5 ms	0.5 ms
Switching frequency f		1 kHz	1 kHz	1 kHz
Degree of protection per IEC 60529/DIN 40050		IP67/IP69K	IP67/IP69K	IP67/IP69K
Ambient temperature T_a		–20...+60 °C	–20...+60 °C	–20...+60 °C
Permissible ambient light		5000 Lux	5000 Lux	5000 Lux
Material	Housing	ABS	ABS	ABS
	Optical surface	PMMA	PMMA	PMMA
Connection		M8 connector, 4-pin	M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²

Reference object:
white, 90 % reflection,
200 × 200 mm.

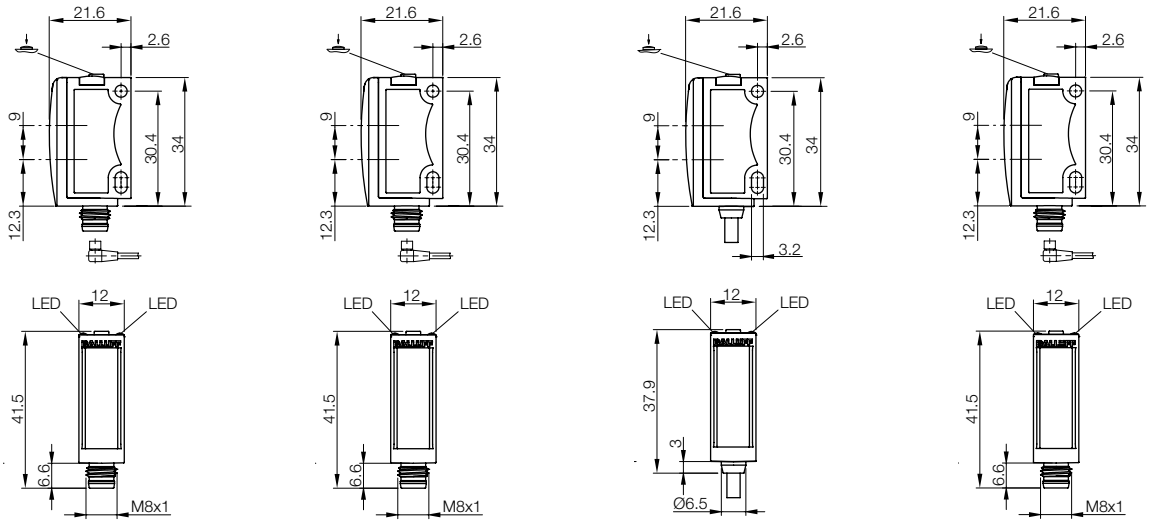
Other variants on our website or on request







Diffuse sensor with background suppression	Diffuse sensor with background suppression	Diffuse sensor with background suppression	Diffuse sensor (energetic)
3...400 mm	**3...400 mm**	**3...400 mm**	**0...800 mm**
BOS01L3	**BOS01L2**	**BOS01L5**	**BOS01LK**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA
Light/dark	Light/dark	Light/dark	Light/dark
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Teach-in	Teach-in	Teach-in	Teach-in
LED, red light	LED, red light	LED, red light	LED, red light
Approx. 8 × 8 mm at 60 mm	Approx. 8 × 8 mm at 60 mm	Approx. 8 × 8 mm at 60 mm	20 × 20 mm at 180 mm
Green LED	Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED	Yellow LED
0.5 ms	0.5 ms	0.5 ms	0.5 ms
1 kHz	1 kHz	1 kHz	1 kHz
IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K
–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
5000 Lux	5000 Lux	5000 Lux	5000 Lux
ABS	ABS	ABS	ABS
PMMA	PMMA	PMMA	PMMA
M8 connector, 4-pin	M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²	M8 connector, 3-pin



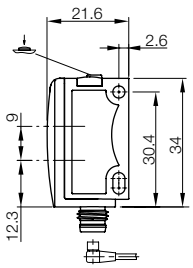
For transparency detection

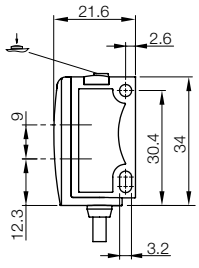
Type	Diffuse sensor (energetic)	Diffuse sensor (energetic)	Retroreflective sensor with autocollimation
Detection range	**0...800 mm**	**0...800 mm**	**0...2 m**
PNP, NO/NC	**BOS01LL**	**BOS01LN**	**BOS01L7**
Supply voltage U_S	10...30 V DC	10...30 V DC	10...30 V DC
Output current	100 mA	100 mA	100 mA
No-load supply current I_0 max.	≤ 30 mA	≤ 30 mA	≤ 30 mA
Switching type	Light/dark	Light/dark	Light/dark
Polarity reversal protected/ short-circuit protected	Yes/yes	Yes/yes	Yes/yes
Settings	Teach-in	Teach-in	Teach-in
Emitter, light type	LED, red light	LED, red light	LED, red light
Light spot diameter	20 × 20 mm at 180 mm	20 × 20 mm at 180 mm	Approx. 50 × 50 mm at 2 m
Power-on indicator	Green LED	Green LED	Green LED
Output function indicator	Yellow LED	Yellow LED	Yellow LED
Response time	0.5 ms	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz	1 kHz
Degree of protection per IEC 60529/DIN 40050	IP67/IP69K	IP67/IP69K	IP67/IP69K
Ambient temperature T_a	–20...+60 °C	–20...+60 °C	–20...+60 °C
Permissible ambient light	5000 Lux	5000 Lux	5000 Lux
Material Housing	ABS	ABS	ABS
Optical surface	PMMA	PMMA	PMMA
Connection	M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²	M8 connector, 3-pin

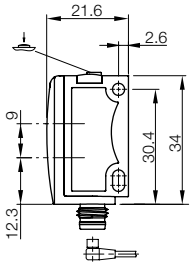
Reference object:
white, 90 % reflection,
200 × 200 mm.

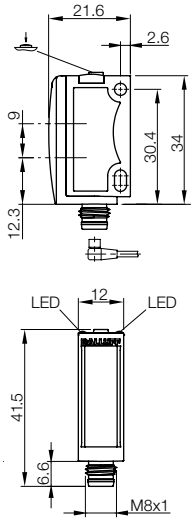
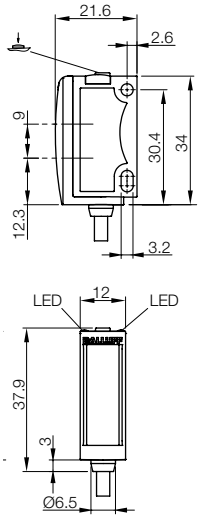
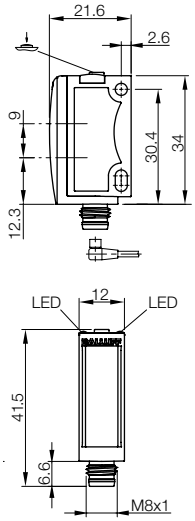
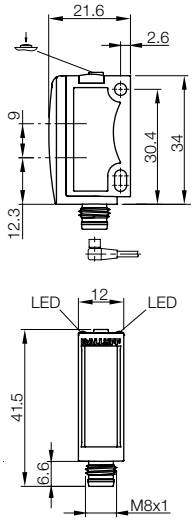
Other variants on our website or on request

Reference reflector:
BOS R-22







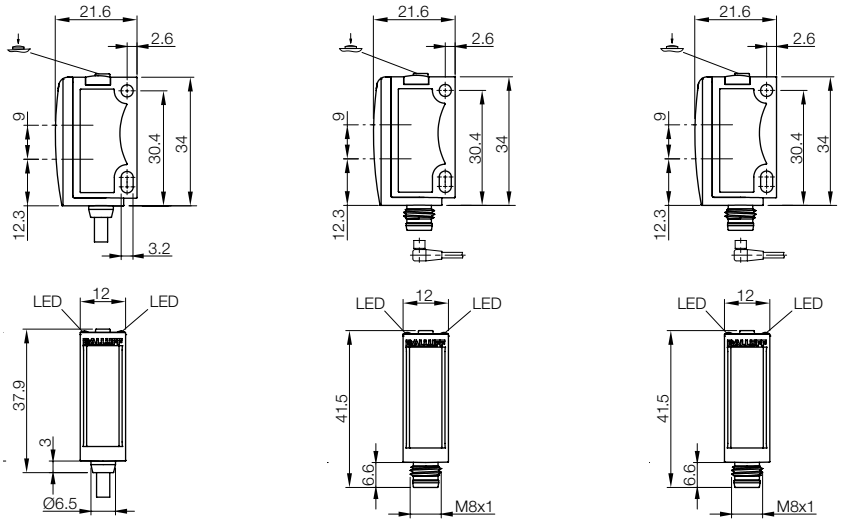
For transparency detection	For transparency detection		
Retroreflective sensor with autocollimation	**Retroreflective sensor**	**Retroreflective sensor**	**Retroreflective sensor**
0...2 m	**0...2 m**	**0...6 m**	**0...6 m**
BOS01L8	**BOS01LA**	**BOS01MH**	**BOS01MJ**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA
Light/dark	Light/dark	Light/dark	Light/dark
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Teach-in	Teach-in	Teach-in	Teach-in
LED, red light	LED, red light	LED, red light	LED, red light
Approx. 5 × 5 mm at 50 mm	Approx. 50 × 50 mm at 2 m	600 × 600 mm at 7 m	500 × 500 mm at 6 m
Green LED	Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED	Yellow LED
0.5 ms	0.5 ms	0.5 ms	0.5 ms
1 kHz	1 kHz	1 kHz	1 kHz
IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K
–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
5000 Lux	5000 Lux	5000 Lux	5000 Lux
ABS	ABS	ABS	ABS
PMMA	PMMA	PMMA	PMMA
M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²	M8 connector, 3-pin	M8 connector, 4-pin
Reference reflector: BOS R-22	Reference reflector: BOS R-22	Reference reflector: BOS R-1	Reference reflector: BOS R-1
			

Type		Retroreflective sensor	Through-beam sensor	Through-beam sensor
Detection range		**0...6 m**	**0...13 m**	**0...13 m**
PNP, NO/NC		**BOS01ML**		
PNP	Receiver		**BOS01M8**	**BOS01M9**
	Emitter		**BOS01MF**	**BOS01LR**
Supply voltage U_S		10...30 V DC	10...30 V DC	10...30 V DC
Output current		100 mA	100 mA	100 mA
No-load supply current I_0 max.		≤ 30 mA	≤ 30 mA	≤ 30 mA
Switching type		Light/dark	Light/dark	Light/dark
Polarity reversal protected/ short-circuit protected		Yes/yes	Yes/yes	Yes/yes
Settings		Teach-in	Teach-in	Teach-in
Emitter, light type		LED, red light	LED, red light	LED, red light
Laser class				
Light spot diameter		600 × 600 mm at 7 m	1.2 × 1.2 mm at 15 m	1 × 1 mm at 13 m
Power-on indicator		Green LED	Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Response time		0.5 ms	0.5 ms	0.5 ms
Switching frequency f		1 kHz	1 kHz	1 kHz
Degree of protection per IEC 60529/DIN 40050		IP67/IP69K	IP67/IP69K	IP67/IP69K
Ambient temperature T_a		–20...+60 °C	–20...+60 °C	–20...+60 °C
Permissible ambient light		5000 Lux	5000 Lux	5000 Lux
Material	Housing	ABS	ABS	ABS
	Optical surface	PMMA	PMMA	PMMA
Connection		2 m PVC cable, 4 × 0.14 mm²	M8 connector, 3-pin	M8 connector, 4-pin

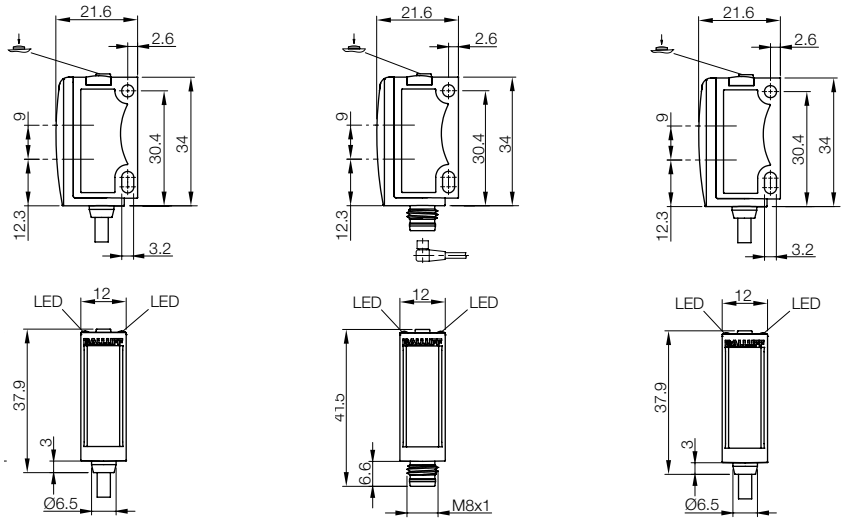
Reference object: white, 90 % reflection, 200 × 200 mm.

Reference reflector: BOS R-1

Other variants on our website or on request



Through-beam sensor	Diffuse sensor with background suppression	Diffuse sensor with background suppression
0...13 m	**4...120 mm**	**4...120 mm**
	BOS01LE	**BOS01LH**
BOS01MC		
BOS01LT		
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA
Light/dark	Light/dark	Light/dark
Yes/yes	Yes/yes	Yes/yes
Teach-in	Teach-in	Teach-in
LED, red light	Laser, red light	Laser, red light
	1	1
1.2 × 1.2 mm at 15 m	1.2 × 1.2 mm at 120 mm	1.2 × 1.2 mm at 120 mm
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
0.5 ms	0.5 ms	0.5 ms
1 kHz	1 kHz	1 kHz
IP67/IP69K	IP67/IP69K	IP67/IP69K
–20...+60 °C	–20...+60 °C	–20...+60 °C
5000 Lux	5000 Lux	5000 Lux
ABS	ABS	ABS
PMMA	PMMA	PMMA
2 m PVC cable, 4 × 0.14 mm²	M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²



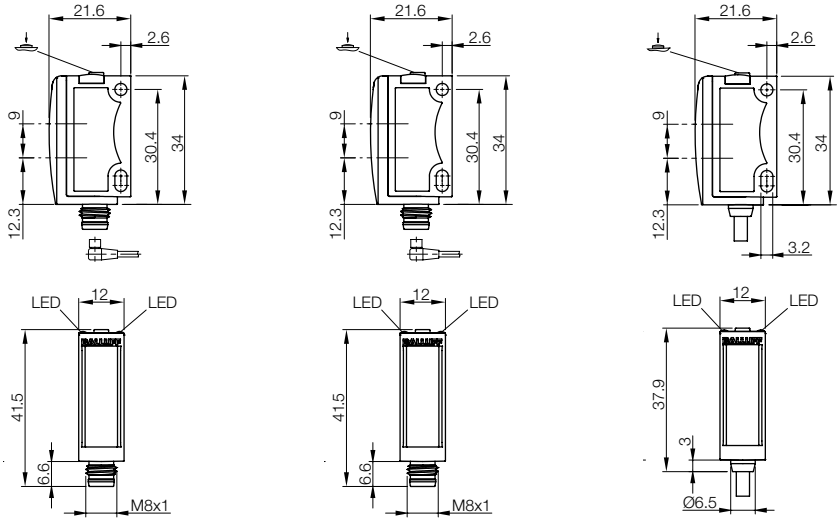
Laserklasse 1

Type		Retroreflective sensor with autocollimation	Retroreflective sensor with autocollimation	Retroreflective sensor with autocollimation
Detection range		**0...4 m**	**0...4 m**	**0...4 m**
PNP, NO/NC		**BOS01MN**	**BOS01M4**	**BOS01M6**
PNP	Receiver			
	Emitter			
Supply voltage U_S		10...30 V DC	10...30 V DC	10...30 V DC
Output current		100 mA	100 mA	100 mA
No-load supply current I_0 max.		≤ 30 mA	≤ 30 mA	≤ 30 mA
Switching type		Light/dark	Light/dark	Light/dark
Polarity reversal protected/ short-circuit protected		Yes/yes	Yes/yes	Yes/yes
Settings		Teach-in	Teach-in	Teach-in
Emitter, light type		Laser, red light	Laser, red light	Laser, red light
Laser class		1	1	1
Light spot diameter		Ø 2 mm at 2.5 m	2 × 4 mm at 2 m	Ø 1 mm at focal point
Power-on indicator		Green LED	Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Response time		0.5 ms	0.5 ms	0.5 ms
Switching frequency f		1 kHz	1 kHz	1 kHz
Degree of protection per IEC 60529/DIN 40050		IP67/IP69K	IP67/IP69K	IP67/IP69K
Ambient temperature T_a		–20...+60 °C	–20...+60 °C	–20...+60 °C
Permissible ambient light		5000 Lux	5000 Lux	5000 Lux
Material	Housing	ABS	ABS	ABS
	Optical surface	PMMA	PMMA	PMMA
Connection		M8 connector, 3-pin	M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²

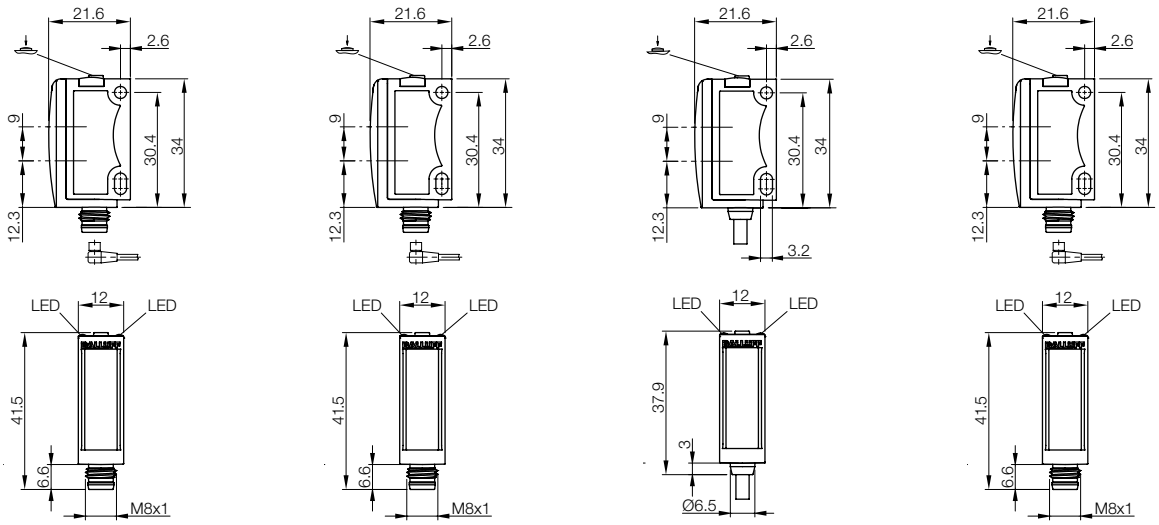
Reference object: white, 90 % reflection, 200 × 200 mm.

Reference reflector: BOS R-22

Other variants on our website or on request



Through-beam sensor	Through-beam sensor	Through-beam sensor	Contrast sensor
0...18 m	**0...18 m**	**0...18 m**	**1...250 mm**
			BKT0010
BOS01LU	**BOS01LW**	**BOS01LZ**	
BOS01M1	**BOS01M2**	**BOS01M3**	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 25 mA
Light/dark	Light/dark	Light/dark	Light/dark switching (selectable)
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Teach-in	Teach-in	Teach-in	Teach-in
Laser, red light	Laser, red light	LED, red light	Laser, red light
1	1	1	1
14 × 14 mm at 20 m	13 × 13 mm at 18 m	14 × 14 mm at 20 m	0.7 × 0.7 mm at 250 mm
Green LED	Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED	Yellow LED
0.5 ms	0.5 ms	0.5 ms	0.5 ms
1 kHz	1 kHz	1 kHz	1 kHz
IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K
–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
5000 Lux	5000 Lux	5000 Lux	5000 Lux
ABS	ABS	ABS	Impact-resistant ABS
PMMA	PMMA	PMMA	PMMA
M8 connector, 3-pin	M8 connector, 4-pin	2 m PVC cable, 4 × 0.14 mm²	M8 connector, 4-pin



BOS 23K
IO-Link

Designed for industry
The product characteristics of our BOS 23K photoelectric sensors have proven themselves many times over in actual practice. They feature long range, high switching accuracy and a sensor design tailored to industry. With IO-Link these sensors can be configured even more simply. The sensor process data includes switching signals and the actual remission values. After a sensor is replaced, all the settings can be easily sent from the master to the new sensor. This saves time and increases equipment availability.

Benefits
- Simple parameterizing via IO-Link
- Decentralized data storage in the master
- Unambiguous sensor identification
- Simplified installation

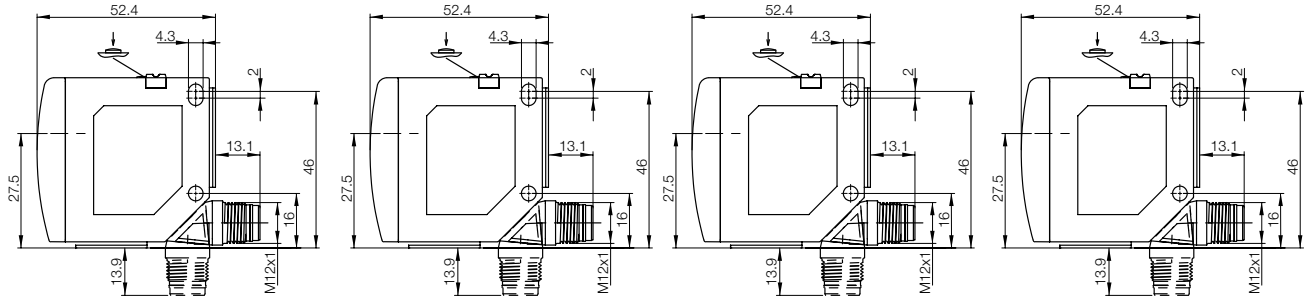
CE ECOLAB IO-Link

Type	
Detection range	
PNP, NO/NC selectable	
PNP, receiver	
PNP, emitter	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Settings	
Emitter, light type	
Wavelength	
Power-on indicator	
Output function indicator	
Stability indicator	
Switching frequency f	
Degree of protection per IEC 60529/DIN 40050	
Ambient temperature T_a	
Material	Housing
	Optical surface
Connection	

Reference object: white, 90 % reflection, 200 × 200 mm
Recommended reflector: BAM00UK

Other variants on our website or on request

Diffuse sensor (energetic)	Diffuse sensor with background suppression	Retroreflective sensor	Through-beam sensor
5...2000 mm	**3...1200 mm**	**0.3...12 m**	**0...20 m**
BOS0171	**BOS017A**	**BOS016T**	
			BOS016J
			BOS01UT
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Teach-in button/IO-Link	Potentiometer/IO-Link	Teach-in button/IO-Link	Teach-in button/IO-Link
LED, red light	LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm	640 nm
Green LED	Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED	Yellow LED
Flashing yellow LED	Flashing yellow LED	Flashing yellow LED	Flashing yellow LED
600 Hz	600 Hz	600 Hz	500 Hz
IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K
–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
PC-ABS	PC-ABS	PC-ABS	PC-ABS
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



Ideal for detecting small parts
The BOS 23K laser retroreflective sensor is a high-performance product for demanding applications. The autocollimation offers a small, round beam profile, since emitter and receiver operate with a shared lens. Without a dead zone, it enables excellent detection of small parts.

Benefits
- 20 m range on standard laser reflector
- Reliable detection of objects as small as just 1 mm over a distance of 10 m
- Laser class 1 requires no additional protective measures
- Only one optical axis through autocollimation

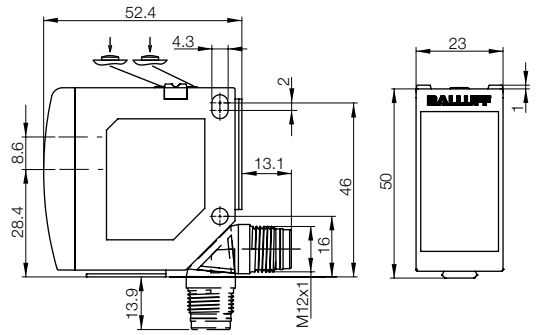
Laser class 1

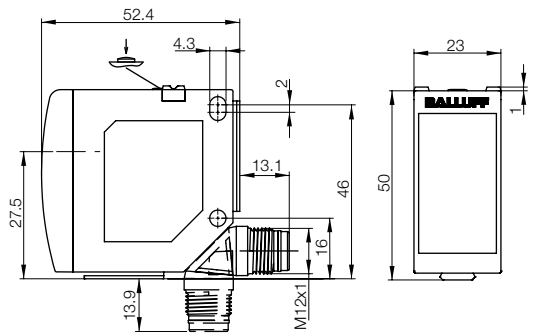
Type	
Detection range	
2 × PNP, complementary	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Switching type	
Polarity reversal protected/short-circuit protected	
Settings	
Emitter, light type	
Wavelength	
Laser class	
Power-on indicator	
Output function indicator	
Stability indicator	
Response time	
Switching frequency f	
Degree of protection per IEC 60529/DIN 40050	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

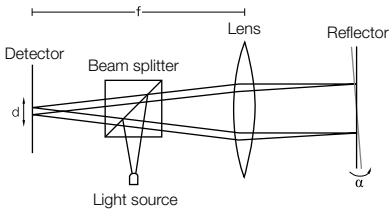
Reference reflector: BOS R-22

Simple, reliable detection of transparent objects

Diffuse sensor with background suppression	Retroreflective sensor with autocollimation
0...5 m	**0.1...20 m**
BOS01UW	**BOS01NC**
18...30 V DC	10...30 V DC
100 mA	100 mA
≤ 30 mA	≤ 30 mA
Light/dark	Light/dark
Yes/yes	Yes/yes
Teach-in button/control input	Teach-in button/control input
Laser, red light	Laser, red light
655 nm	655 nm
1	1
Green LED	Green LED
Yellow LED	Yellow LED
	Flashing yellow LED
1 ms	0.2 ms
500 Hz	2.5 kHz
IP67/IP69K	IP67/IP69K
–40...+60 °C	–20...+60 °C
EN 60947-5-2	EN 60947-5-2
PC-ABS	PC-ABS
PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin

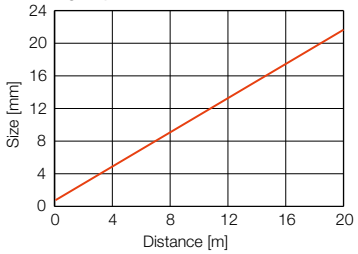






Internal structure

Light spot size



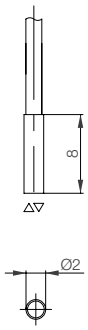
Photoelectric Sensors with Special Properties

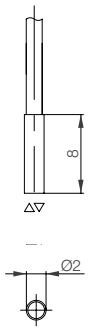
Micromote® sensors BOH, cylinder design, diffuse for separate amplifiers

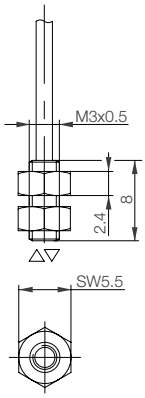
Type	Diffuse sensor	Diffuse sensor	Diffuse sensor
Dimension	**Ø 2 × 8 mm**	**Ø 2 × 8 mm**	**M3 × 0.5 × 8 mm**
Detection range	**12 mm**	**12 mm**	**12 mm**
	BOH0003	**BOH0002**	**BOH0009**
Light type	Red light	Infrared	Red light
Wavelength	660 nm	880 nm	660 nm
Light spot diameter			
Degree of protection per IEC 60529	IP65	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Stainless steel	Stainless steel
Fastening	Adhesive or clamp fastening	Adhesive or clamp fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

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

Recommended amplifier:
BAE00NE

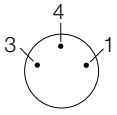




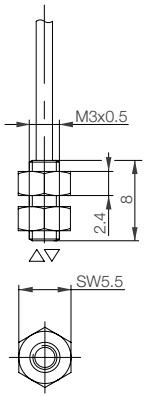


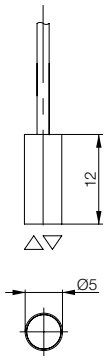
Connection configuration
M8 connector, 3-pin

3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



Diffuse sensor	Diffuse sensor	Diffuse sensor
M3 × 0.5 × 8 mm	**Ø 5 × 12 mm**	**Ø 5 × 12 mm**
12 mm	**60 mm**	**60 mm**
BOH0004	**BOH0006**	**BOH0005**
Infrared	Red light Microspot	Red light
880 nm	645 nm	660 nm
	5 mm (at 50 mm)	14 mm (at 50 mm)
IP65	IP65	IP65
–10...+55 °C	–10...+55 °C	–10...+55 °C
Stainless steel	Stainless steel	Stainless steel
Screw fastening	Adhesive or clamp fastening	Adhesive or clamp fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin





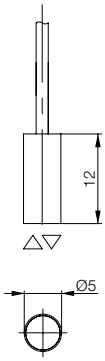
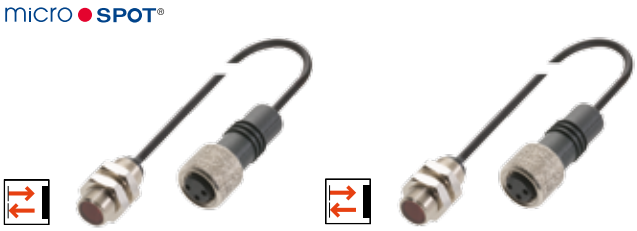


Photo-electric Sensors
Photo-electric standard sensors
Photoelectric Sensors with Special Properties
Micromote® Sensors
Stainless Steel Fork Through-beam Sensors
Light-band Sensor
True Color Sensor
Fiber optic amplifier
Accessories for Photoelectric Sensors

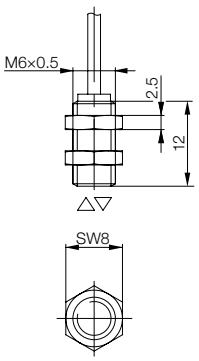
Micromote® sensors BOH, cylinder design, diffuse for separate amplifiers

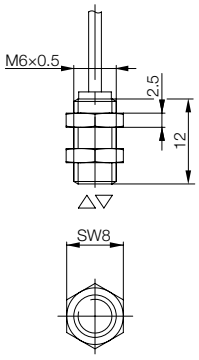


Type	Diffuse sensor	Diffuse sensor
Dimension	**M6 × 0.5 × 12 mm**	**M6 × 0.5 × 12 mm**
Detection range	**60 mm**	**60 mm**
	BOH0008	**BOH0007**
Light type	Red light Microspot	Red light
Wavelength	645 nm	660 nm
Light spot diameter	5 mm (at 50 mm)	14 mm (at 50 mm)
Degree of protection per IEC 60529	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Nickel-plated brass	Nickel-plated brass
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

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

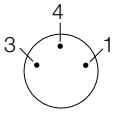
Recommended amplifier:
BAE00NE





Connection configuration
M8 connector, 3-pin

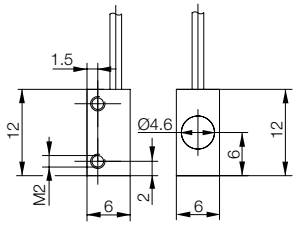
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

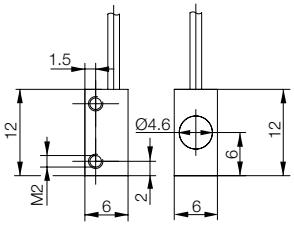


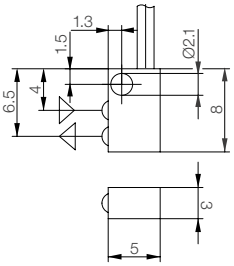
Photoelectric Sensors with Special Properties

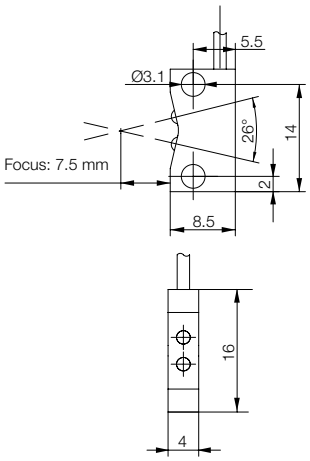
Micromote® sensors BOH, block design, diffuse for separate amplifiers

Diffuse sensor	Diffuse sensor	Diffuse sensor	Fixed-focus diffuse sensor
6 × 6 × 12 mm	**6 × 6 × 12 mm**	**3 × 8 × 5 mm**	**16 × 4 × 8.5 mm**
60 mm	**60 mm**	**70 mm**	**7.5 mm**
BOH000M	**BOH000L**	**BOH002K**	**BOH002L**
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)	
IP65	IP65	IP65	IP65
–10...+55 °C	–10...+55 °C	–10...+55 °C	–10...+55 °C
Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
Screw fastening	Screw fastening	Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin









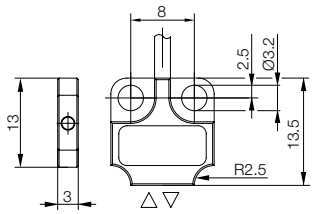
Photoelectric Sensors with Special Properties

Micromote® sensors BOH, block design, diffuse for separate amplifiers

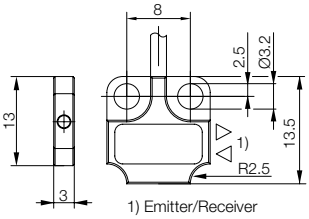
Type	**Diffuse sensor**	**Diffuse sensor**
Dimension	**13.5 × 13 × 3 mm**	**13.5 × 13 × 3 mm**
Detection range	**60 mm**	**60 mm**
	BOH0027	**BOH0028**
Light type	Red light Microspot	Red light Microspot
Wavelength	645 nm	645 nm
Light spot diameter	5 mm (at 50 mm)	5 mm (at 50 mm)
Degree of protection per IEC 60529	IP67	IP67
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Anodized aluminum	Anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

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

Recommended amplifier:
BAE00NE



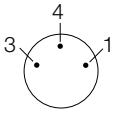
Emitter/Receiver



1) Emitter/Receiver

Connection configuration
M8 connector, 3-pin

3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



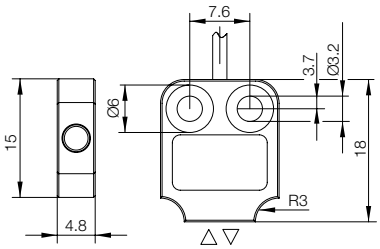
Photoelectric Sensors with Special Properties

Micromote® sensors BOH, block design, diffuse for separate amplifiers

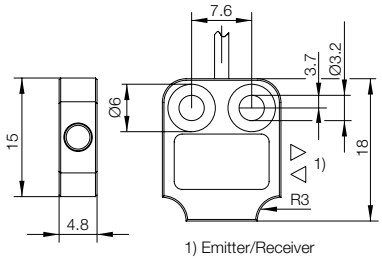
micro SPOT®

micro SPOT®

Diffuse sensor	Diffuse sensor
18 × 15 × 4.8 mm	**18 × 15 × 4.8 mm**
100 mm	**100 mm**
BOH0029	**BOH002A**
Red light Microspot	Red light Microspot
645 nm	645 nm
8 mm (at 100 mm)	8 mm (at 100 mm)
IP67	IP67
–10...+55 °C	–10...+55 °C
Anodized aluminum	Anodized aluminum
Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin



Emitter/Receiver



1) Emitter/Receiver

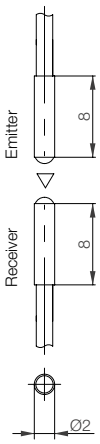
Photoelectric Sensors with Special Properties

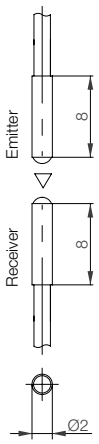
Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

Type	**Through-beam sensor**	**Through-beam sensor**
Dimension	**Ø 2 × 8 mm**	**Ø 2 × 8 mm**
Detection range	**300 mm**	**500 mm**
	BOH000A	**BOH000C**
Light type	Red light	Red light Microspot
Wavelength	660 nm	645 nm
Light spot diameter		10 mm (at 100 mm)
Resolution (smallest discernible part)	0.2 mm	0.2 mm
Degree of protection per IEC 60529	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Stainless steel
Fastening	Adhesive or clamp fastening	Adhesive or clamp fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

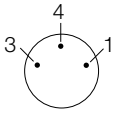
Recommended amplifier:
BAE00NE





Connection configuration
M8 connector, 3-pin

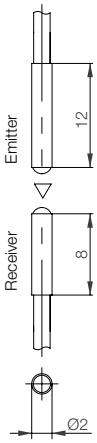
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

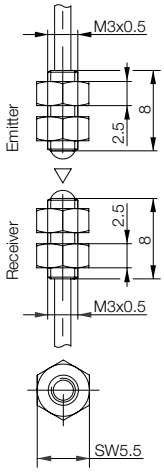


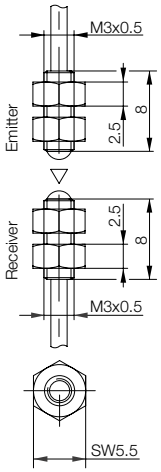
Photoelectric Sensors with Special Properties

Micromote® sensors BOH, cylinder designs, through-beams for separate amplifiers

Through-beam sensor	Through-beam sensor	Through-beam sensor
Emitter Ø 2 × 12 mm	**M3 × 0.5 × 8 mm**	**M3 × 0.5 × 8 mm**
Receiver Ø 2 × 8 mm		
200 mm	**300 mm**	**500 mm**
BOH001K	**BOH000T**	**BOH000U**
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
IP65	IP65	IP65
–10...+55 °C	–10...+55 °C	–10...+55 °C
Stainless steel	Stainless steel	Stainless steel
Adhesive or clamp fastening	Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin







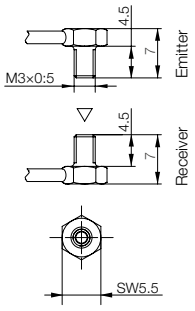
Photoelectric Sensors with Special Properties

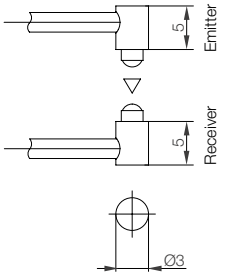
Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

Series	**Through-beam sensor**	**Through-beam sensor**
Dimension	**M3 × 0.5 × 7 mm**	**Ø 3 × 5 mm**
Detection range	**500 mm**	**500 mm**
	BOH000E	**BOH000Z**
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 discernible part)	0.2 mm	0.2 mm
Degree of protection per IEC 60529	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Stainless steel
Fastening	Screw fastening	Adhesive or clamp fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

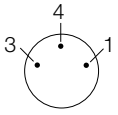
Recommended amplifier:
BAE00NE





Connection configuration
M8 connector, 3-pin

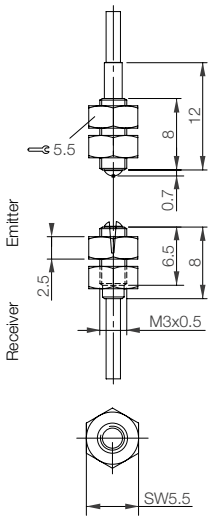
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

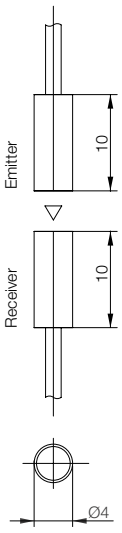


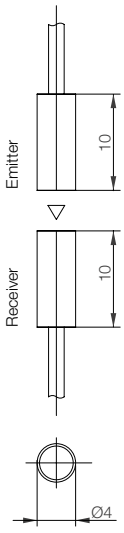
Photoelectric Sensors with Special Properties

Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

Through-beam sensor	Through-beam sensor	Through-beam sensor
Emitter M3 × 0.5 × 12 mm	**Ø 4 × 10 mm**	**Ø 4 × 10 mm**
Receiver M3 × 0.5 × 8 mm		
200 mm	**1000 mm**	**2000 mm**
BOH001L	**BOH000W**	**BOH0014**
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
IP65	IP65	IP65
–10...+55 °C	–10...+55 °C	–10...+55 °C
Stainless steel	Stainless steel	Stainless steel
Screw fastening	Adhesive or clamp fastening	Adhesive or clamp fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin







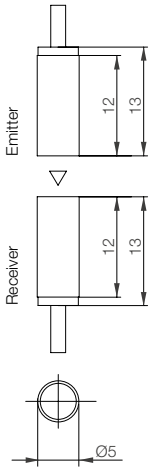
Photoelectric Sensors with Special Properties

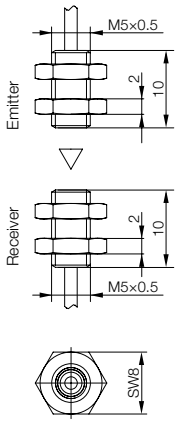
Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

Series	Through-beam sensor	Through-beam sensor
Dimension	**Ø 5 × 12 mm**	**M5 × 0.5 × 10 mm**
Detection range	**4000 mm**	**1000 mm**
	BOH0010	**BOH000Y**
Light type	Red light	Red light
Wavelength	660 nm	660 nm
Light spot diameter		
Resolution (smallest discernible part)	0.4 mm	0.3 mm
Degree of protection per IEC 60529	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Nickel-plated brass
Fastening	Adhesive or clamp fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

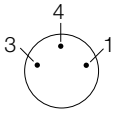
Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE





Connection configuration
M8 connector, 3-pin

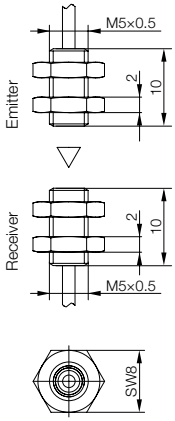


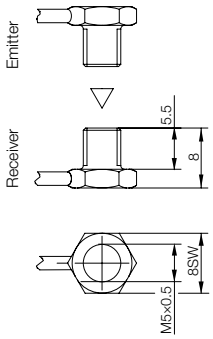
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

Photoelectric Sensors with Special Properties

Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

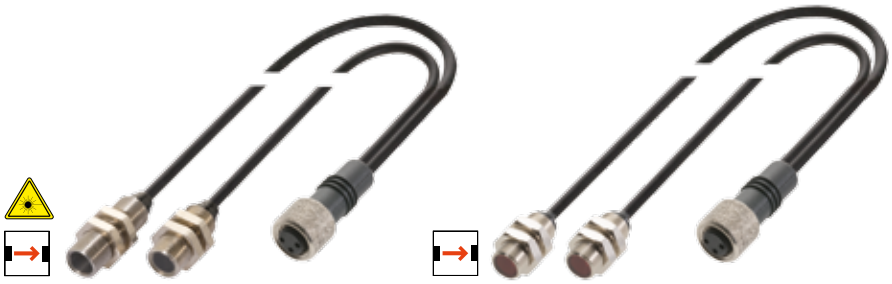
Through-beam sensor	Through-beam sensor
M5 × 0.5 × 10 mm	**M5 × 0.5 × 8 mm**
2000 mm	**2000 mm**
BOH0013	**BOH000F**
Red light Microspot	Red light Microspot
645 nm	645 nm
8 mm (at 100 mm)	8 mm (at 100 mm)
0.4 mm	0.4 mm
IP65	IP65
–10...+55 °C	–10...+55 °C
Nickel-plated brass	Stainless steel
Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin





Photoelectric Sensors with Special Properties

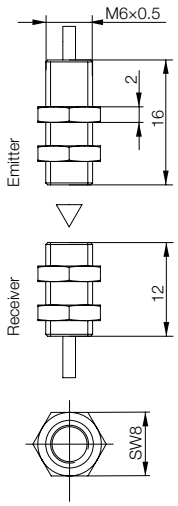
Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

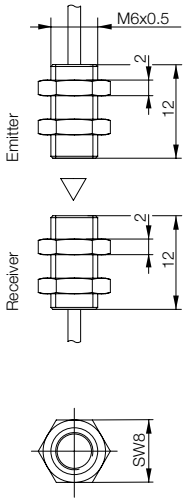


Series	**Through-beam sensor**	**Through-beam sensor**
Dimension	**M6 × 0.5 × 16 mm**	**M6 × 0.5 × 12 mm**
Detection range	**4000 mm**	**4000 mm**
	BOH000H	**BOH000K**
Light type	Laser red light, class 1	Red light
Wavelength	650 nm	660 nm
Light spot diameter		
Resolution (smallest discernible part)	< 0.05 mm	0.4 mm
Degree of protection per IEC 60529	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Stainless steel	Nickel-plated brass
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

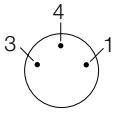
Recommended amplifier:
BAE00NE





Connection configuration
M8 connector, 3-pin

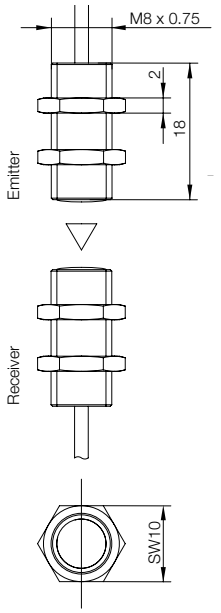
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



Photoelectric Sensors with Special Properties

Micromote® sensors BOH, cylinder designs, through-beam for separate amplifiers

Through-beam sensor
M8 × 0.75 × 18 mm
4000 mm
BOH0012
Red light Microspot
645 nm
18 mm (at 1000 mm)
0.2 mm
IP65
–10...+55 °C
Nickel-plated brass
Screw fastening
1 m PUR cable with M8 connector, 3-pin



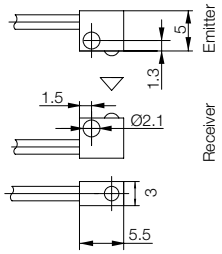
Photoelectric Sensors with Special Properties

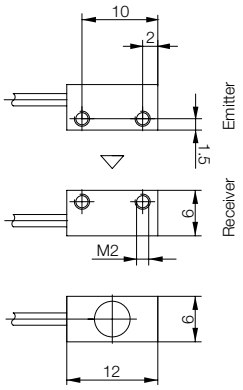
Micromote® sensors BOH, block designs, through-beam for separate amplifiers

Series	Through-beam sensor	Through-beam sensor
Dimension	**3 × 6 × 5.5 mm**	**6 × 6 × 12 mm**
Detection range	**500 mm**	**1000 mm**
	BOH001Z	**BOH000N**
Light type	Red light Microspot	Red light
Wavelength	645 nm	660 nm
Light spot diameter	10 mm (at 100 mm)	
Resolution (smallest discernible part)	0.2 mm	0.3 mm
Degree of protection per IEC 60529	IP65	IP65
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Nickel-plated brass	Nickel-plated brass
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

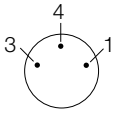
Recommended amplifier:
BAE00NE





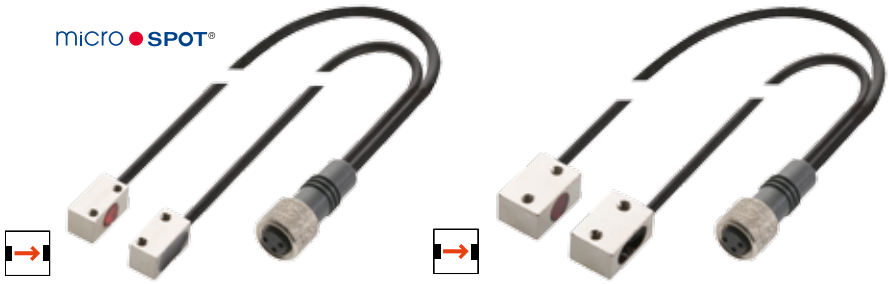
Connection configuration
M8 connector, 3-pin

3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

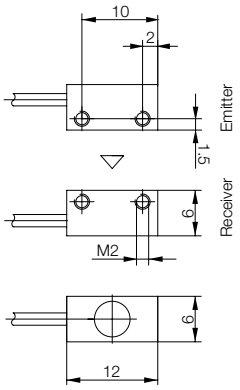


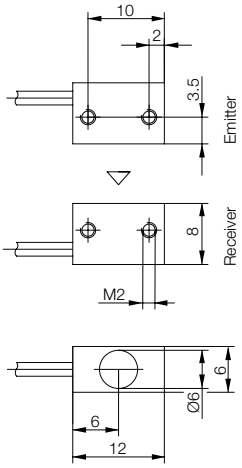
Photoelectric Sensors with Special Properties

Micromote® sensors BOH, block designs, through-beam for separate amplifiers



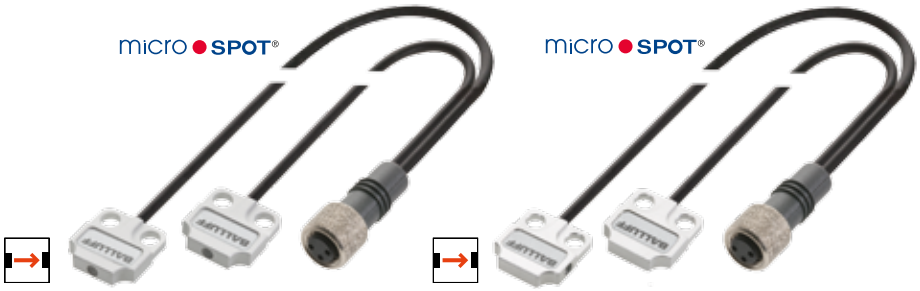
Through-beam sensor	Through-beam sensor
6 × 6 × 12 mm	**6 × 8 × 12 mm**
2000 mm	**4000 mm**
BOH000P	**BOH0020**
Red light Microspot	Red light
645 nm	660 nm
8 mm (at 100 mm)	
0.4 mm	0.4 mm
IP65	IP65
–10...+55 °C	–10...+55 °C
Nickel-plated brass	Nickel-plated brass
Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin





Photoelectric Sensors with Special Properties

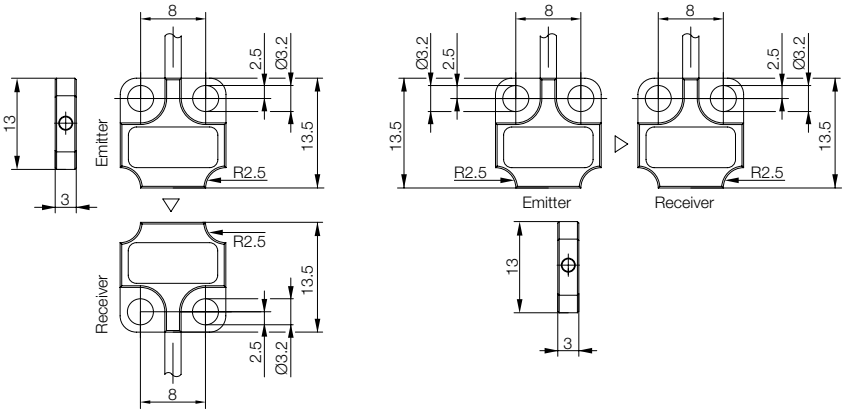
Micromote® sensors BOH, block designs, through-beam for separate amplifiers



Type	**Through-beam sensor**	**Through-beam sensor**
Dimension	**13.5 × 13 × 3 mm**	**13.5 × 13 × 3 mm**
Detection range	**500 mm**	**500 mm**
	BOH002C	**BOH002E**
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 discernible part)	0.2 mm	0.2 mm
Degree of protection per IEC 60529	IP67	IP67
Ambient temperature T_a	–10...+55 °C	–10...+55 °C
Housing material	Anodized aluminum	Anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Included in the scope of delivery:
Emitter and receiver

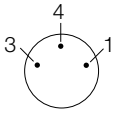
Recommended amplifier:
BAE00NE



Connection configuration

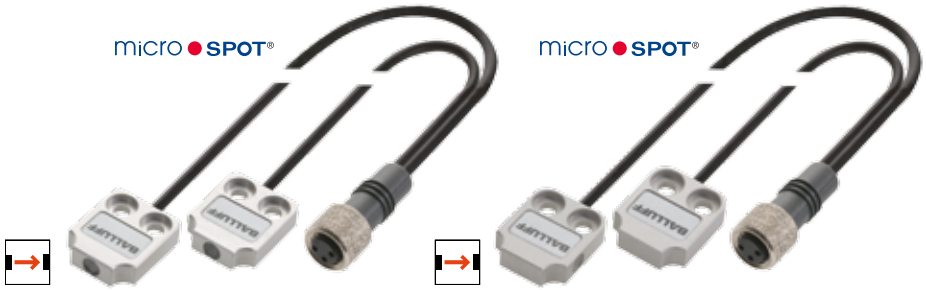
M8 connector, 3-pin

3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

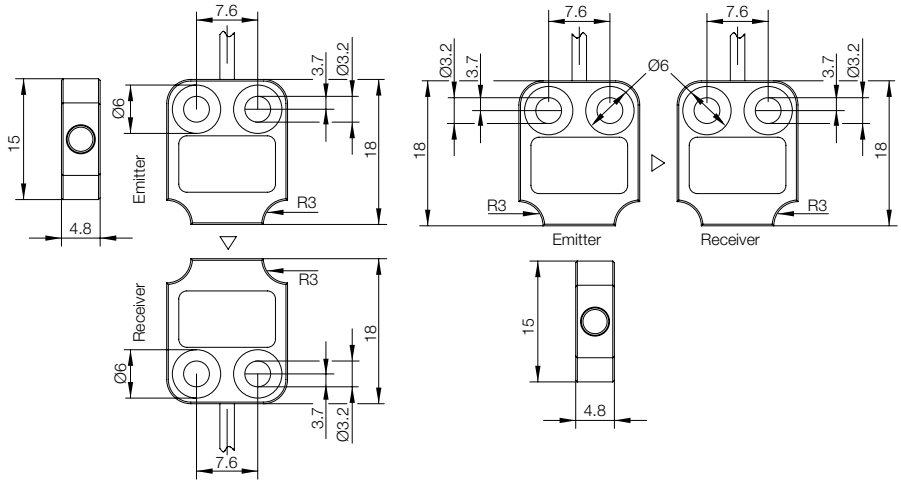


Photoelectric Sensors with Special Properties

Micromote® sensors BOH, block designs, through-beam for separate amplifiers



Through-beam sensor	Through-beam sensor
18 × 15 × 4,8 mm	**18 × 15 × 4,8 mm**
2000 mm	**2000 mm**
BOH002F	**BOH002H**
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
IP67	IP67
–10...+55 °C	–10...+55 °C
Anodized aluminum	Anodized aluminum
Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin



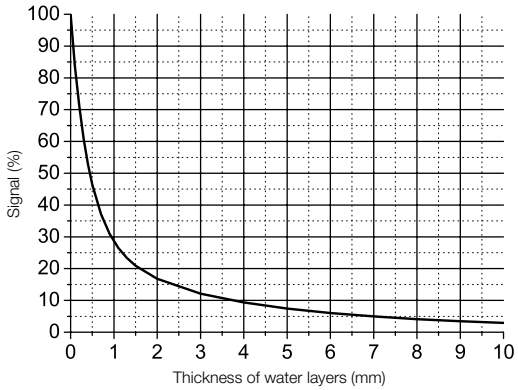
Photoelectric Sensors with Special Properties

Micromote® sensors BOH for water detection, through-beam for separate amplifiers

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	
Detection range	
Light type	
Wavelength	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Housing material	
Fastening	
Connection	

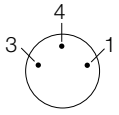
Included in the scope of delivery:
Emitter and receiver

Recommended amplifier:
BAE00NE

Connection configuration

M8 connector, 3-pin

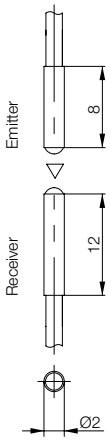
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

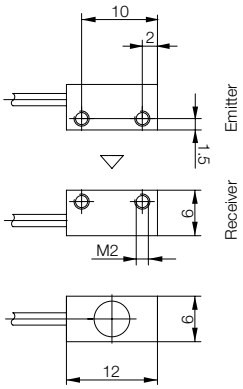


Photoelectric Sensors with Special Properties

Micromote® sensors BOH for water detection, through-beam for separate amplifiers

Through-beam sensor for water detection	Through-beam sensor for water detection
Emitter Ø 2 × 8 mm Receiver Ø 2 × 12 mm	**6 × 6 × 12 mm**
250 mm	**500 mm**
BOH000J	**BOH000R**
Infrared	Infrared
1480 nm	**1480 nm**
IP67	IP67
–10...+55 °C	–10...+55 °C
Stainless steel	Nickel-plated brass
Adhesive or clamp fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin





Photoelectric Sensors with Special Properties

Micromote® sensors BOH for separate amplifiers, high-vacuum sensors

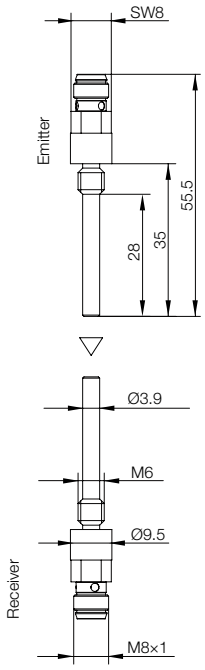
The vacuum-compatible
Micromote® photoelectric sensors are the only classic photoelectric sensors that are suitable for direct use in a high or ultra-high vacuum.
Versions for direct use in the chamber wall with an integrated sealing function and versions meant for complete installation in the chamber 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	
Detection range	**300 mm**
	BOH009U
Light type	Red light
Wavelength	650 nm
Resolution (smallest discernible part)	0.2 mm
Degree of protection per IEC 60529	IP65
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



Included in scope of delivery: Emitter and receiver. Please order adapter cable separately.

Suitable adapter cable for BOH009U
(please order separately)

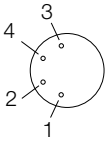
Size	Design	Cable material	Color	Length	
M8	straight	PUR	Black	1 m	**BCC0FTM**
M8	straight	PUR	Black	2 m	**BCC0FTN**

Suitable adapter cable for BOH009R
(please order separately)

Size	Design	Cable material	Color	Length	
M8	straight	PUR	Black	1 m	**BCC0FTH**
M8	straight	PUR	Black	2 m	**BCC0FTJ**
M8	straight	PUR	Black	5 m	**BCC0FTP**

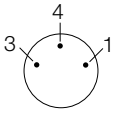
Connection configuration
M8 connector, 4-pin, **emitter**

1		not assigned
2		not assigned
3	(red)	LED +
4	(white)	LED



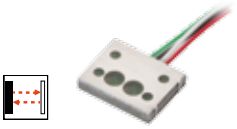
Connection configuration
M8 connector, 3-pin, **receiver**

3	+ receiver (green)
4	GND/shield (white, black)
1	not assigned

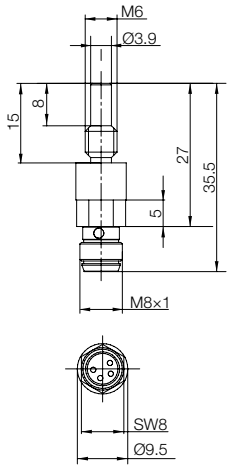


Photoelectric Sensors with Special Properties

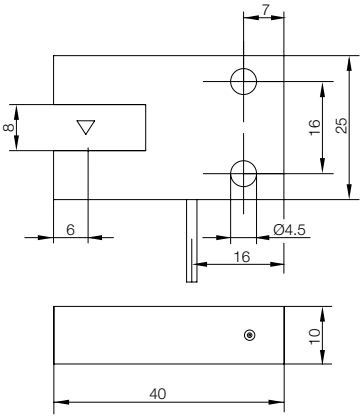
Micromote® sensors BOH for separate amplifiers, high-vacuum sensors

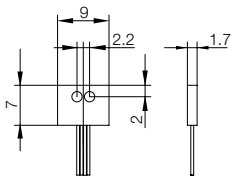


Diffuse sensor	Fork sensor	Diffuse sensor
M6 × 35.5 mm	**40 × 25 × 10 mm**	**9 × 7 × 1.7 mm**
	8 mm	
12 mm		**10 mm**
BOH009R	**BOH001J**	**BOH0021**
Infrared	Red light Microspot	Infrared
880 nm	645 nm	880 nm
	Ø 1.5 mm	
IP67	IP67	IP67
–10...+55 °C	–10...+55 °C	–10...+55 °C
Stainless steel	Aluminum	Stainless steel
Screw-in thread	Screw fastening	Adhesive or clamp fastening
M8 connector, 4-pin	1 m cable PFA encapsulated, 4 × AWG32	1 m leads PFA encapsulated, 4 × AWG32

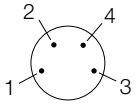


Please order adapter cable separately.





Connection configuration
M8 connector, 4-pin
1 + receiver (green)
2 – receiver (black)
3 – emitter (white)
4 + emitter (red)



Connection configuration

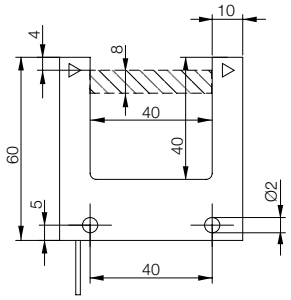
Emitter:	red:	LED +
	white:	LED
Receiver:	green:	FT +
	black:	FT –

Connection configuration

Emitter:	red:	LED +
	white:	LED
Receiver:	green:	FT +
	black:	FT –

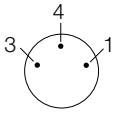
Micromote® sensors BOH for separate amplifiers, light-band fork sensors

Type	**Light-band fork sensor**
Lighting strip width	**8 mm**
Fork opening	**40 mm**
	BOH001M
Light type	LED, red light
Wavelength	645 nm
Edge resolution	0.05 mm
Resolution (smallest discernible part)	0.5 mm
Repeatability	< 0.03 mm
Linearity	Range 0...8 mm: 8 % Range 1...7 mm: 2 % Range 2...6 mm: 1 %
Degree of protection per IEC 60529	IP65
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

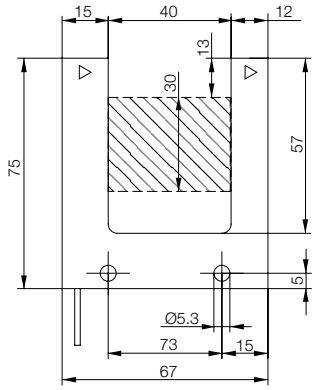
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)

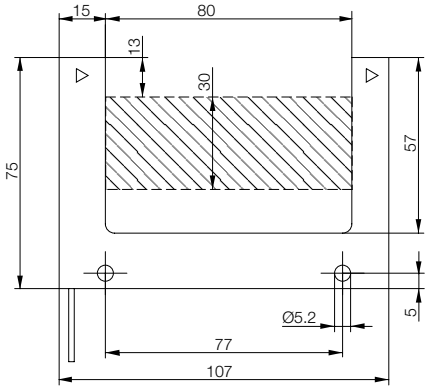


Photoelectric Sensors with Special Properties

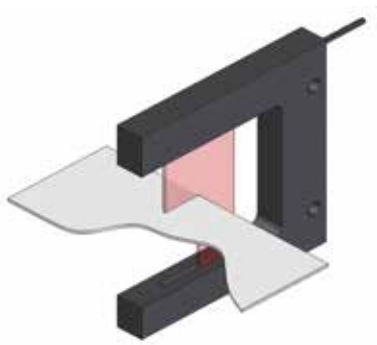
Micromote® sensors BOH for separate amplifiers, light-band fork sensors

Light-band fork sensor	Light-band fork sensor
30 mm	**30 mm**
40 mm	**80 mm**
BOH001N	**BOH001P**
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 3...27 mm: 5 % Range 6...24 mm: 3.2 %	Range 0...30 mm: 10 % Range 3...27 mm: 5 % Range 6...24 mm: 3.4 %
IP65	IP65
–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

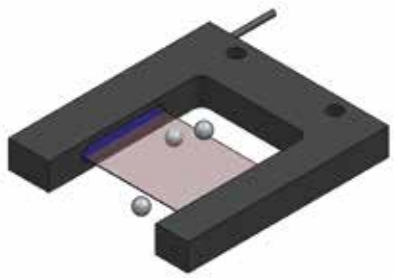




Recommended amplifier for edge control:
BAE00NH or **BAE00N4**



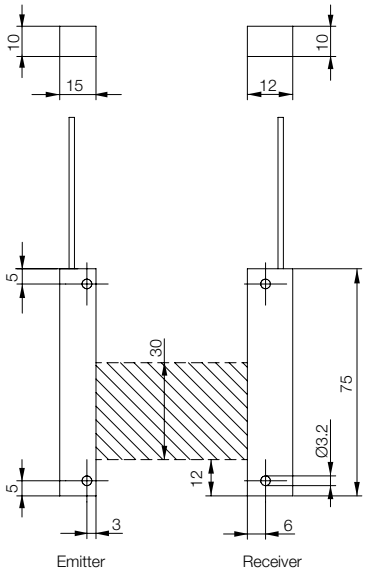
Recommended amplifier for counting window:
BAE00NJ



Micromote® sensors BOH for separate amplifiers, light-band fork sensors

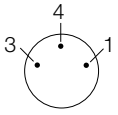
Type	**Light-band Sensor**
Lighting strip width	**30 mm**
Working distance	**40...200 mm**
	BOH0024
Light type	LED, red light
Wavelength	645 nm
Edge resolution	0.1 mm
Resolution (smallest discernible part)	0.5 mm
Repeatability	0.05 mm
Degree of protection per IEC 60529	IP65
Ambient temperature T_a	–10...+55 °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

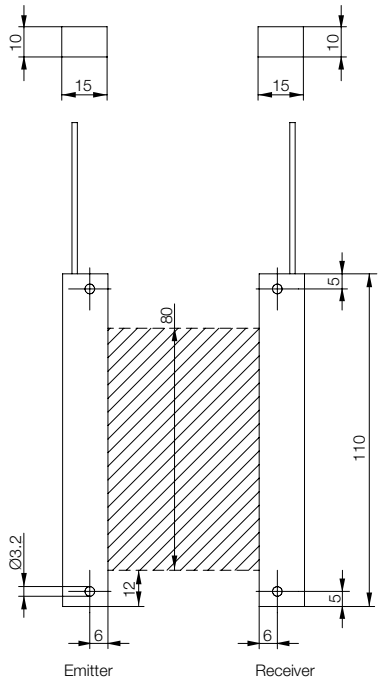
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



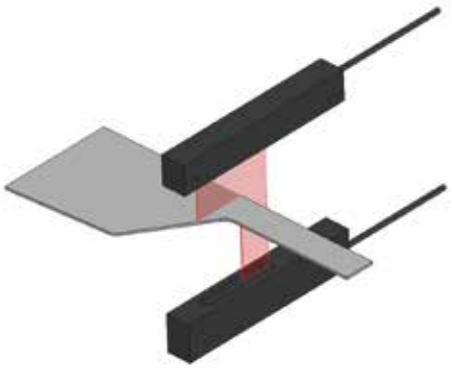
Photoelectric Sensors with Special Properties

Micromote® sensors BOH for separate amplifiers, light-band fork sensors

Light-band Sensor
80 mm
50...500 mm
BOH002M
LED, infrared
950 nm
0.15 mm
1.5 mm
0.05 mm
IP65
–10...+55 °C
Anodized aluminum
1 m PUR cable with M8 connector, 3-pin



Recommended amplifier for edge control:
BAE00NH or **BAE00N4**



Recommended amplifier for counting window:
BAE00NJ

Photoelectric Sensors with Special Properties

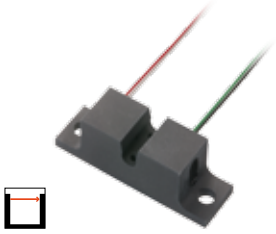
Micromote® sensors BOH for separate amplifiers, hose sensors for liquids and bubbles

Detection of liquids/bubbles

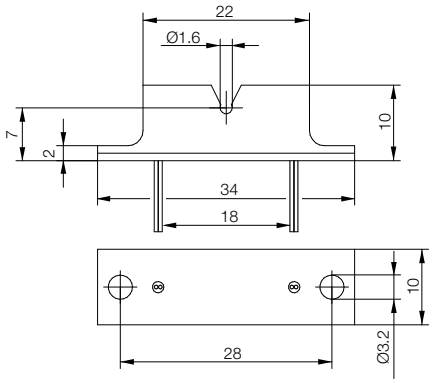
Precision hose sensors for detecting liquids/bubbles use the differing light refraction in the air or liquid column within the hose. Therefore they are very reliable even for clear liquids.

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

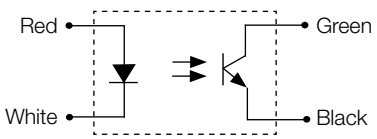
The optical properties and thickness of the hose can affect the magnitude of the resulting signal swings.



Type	**Precision hose sensor**
Hose diameter	**1.6 mm (1/16")**
Use	**Detection of liquids/bubbles**
	BOH001T
Light type	Red light
Wavelength	665 nm
Functional principle	Light refraction
Degree of protection per IEC 60529	IP54
Ambient temperature T_a	–10...+60 °C
Housing material	Anodized aluminum
Fastening	Screw fastening
Connection	100 mm stranded wire PFA encapsulated, 4 × AWG32

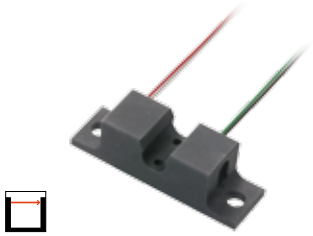


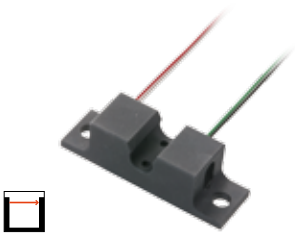
Connection configuration for all stranded wire variants



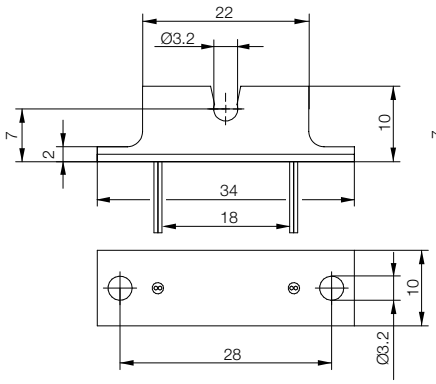
Photoelectric Sensors with Special Properties

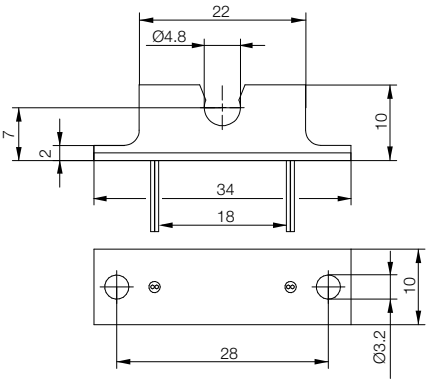
Micromote® sensors BOH for separate amplifiers, hose sensors for liquids and bubbles

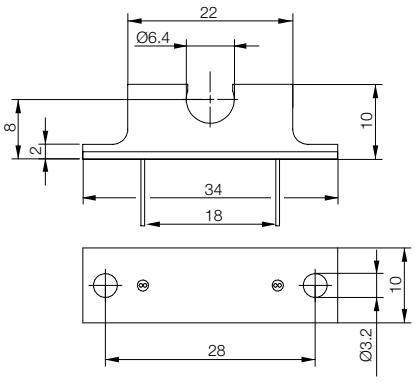




Precision hose sensor	Precision hose sensor	Precision hose sensor
3.2 mm (1/8")	**4.8 mm (3/16")**	**6.4 mm (1/4")**
Detection of liquids/bubbles	**Detection of liquids/bubbles**	**Detection of liquids/bubbles**
BOH001C	**BOH001E**	**BOH001F**
Red light	Red light	Red light
665 nm	665 nm	665 nm
Light refraction	Light refraction	Light refraction
IP54	IP54	IP54
–10...+60 °C	–10...+60 °C	–10...+60 °C
Anodized aluminum	Anodized aluminum	Anodized aluminum
Screw fastening	Screw fastening	Screw fastening
100 mm stranded wire PFA encapsulated, 4 × AWG32	100 mm stranded wire PFA encapsulated, 4 × AWG32	100 mm stranded wire PFA encapsulated, 4 × AWG32



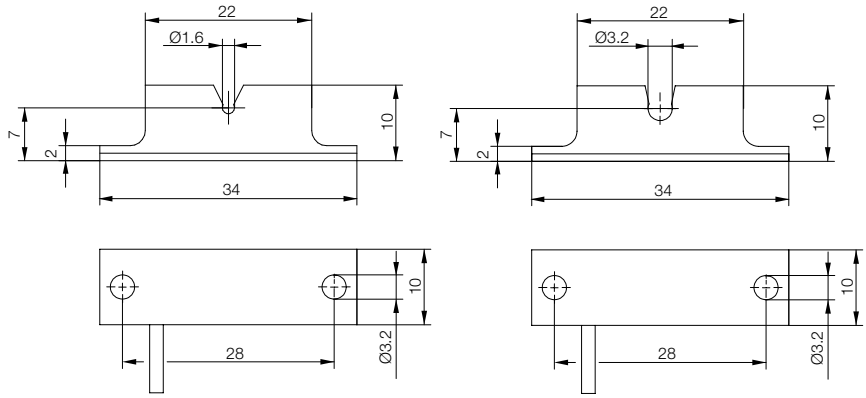




Micromote® sensors BOH for separate amplifiers, hose sensors for liquids and bubbles

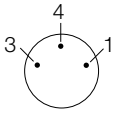
Type	**Precision hose sensor**	**Precision hose sensor**
Hose diameter	**1.6 mm (1/16")**	**3.2 mm (1/8")**
Use	**Detection of liquids/bubbles**	**Detection of liquids/bubbles**
	BOH001R	**BOH001Y**
Light type	Red light	Red light
Wavelength	665 nm	665 nm
Functional principle	Light refraction	Light refraction
Degree of protection per IEC 60529	IP54	IP54
Ambient temperature T_a	–10...+60 °C	–10...+60 °C
Housing material	Anodized aluminum	Anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Recommended amplifier:
BAE00NE



Connection configuration
M8 connector, 3-pin

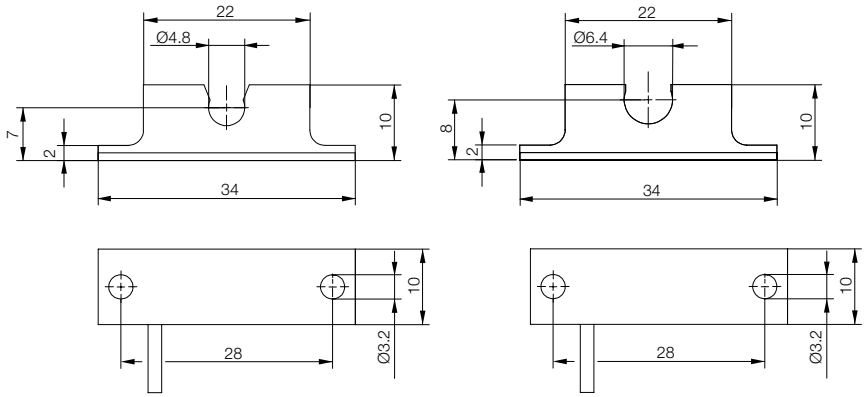
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



Photoelectric Sensors with Special Properties

Micromote® sensors BOH for separate amplifiers, hose sensors for liquids and 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**
Red light	Red light
665 nm	665 nm
Light refraction	Light refraction
IP54	IP54
–10...+60 °C	–10...+60 °C
Anodized aluminum	Anodized aluminum
Screw fastening	Screw fastening
1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin



Photoelectric Sensors with Special Properties

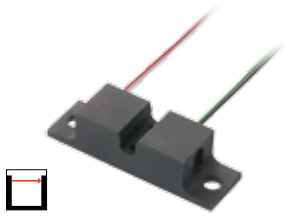
Micromote® sensors BOH for separate amplifiers, hose sensors for water and aqueous solutions

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.

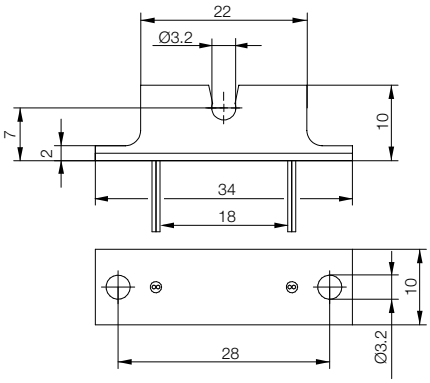
Built-in micro-optics detect the air-to-liquid transitions with high accuracy. The high Repeatability of the signal jump makes the hose sensors very good for precisely determining volume. Together with the microprocessor-controlled Micromote® amplifiers having a digital signal display and switching or 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.

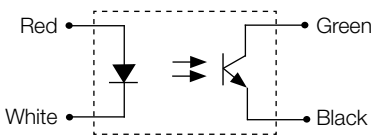


Type	**Precision hose sensor**
Hose diameter	**3.2 mm (1/8")**
Use	**Detection of water/bubbles and aqueous liquids**
	BOH001W
Light type	Infrared
Wavelength	1480 nm
Functional principle	Absorption
Degree of protection per IEC 60529	IP54
Ambient temperature T_a	–10...+60 °C
Housing material	Anodized aluminum
Fastening	Screw fastening
Connection	100 mm stranded wire PFA encapsulated, 4 × AWG32

Recommended amplifier:
BAE00NE

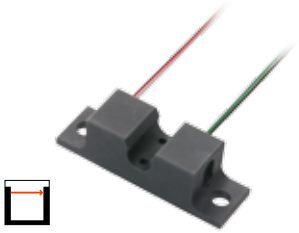


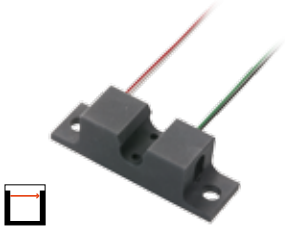
Connection configuration for all Stranded wire variants



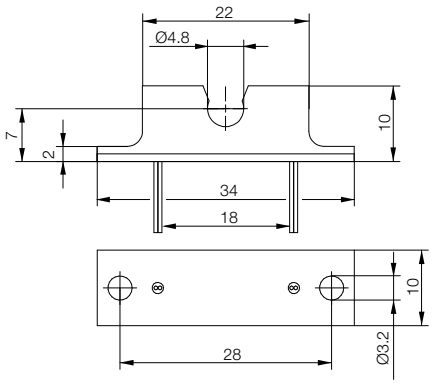
Photoelectric Sensors with Special Properties

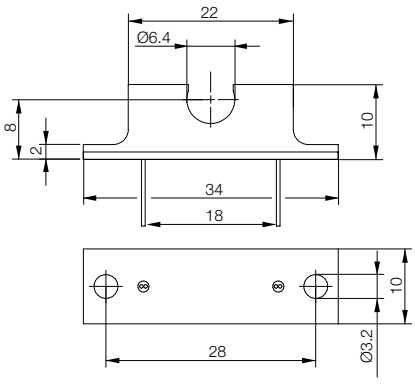
Micromote® sensors BOH for separate amplifiers, hose sensors for water and aqueous solutions

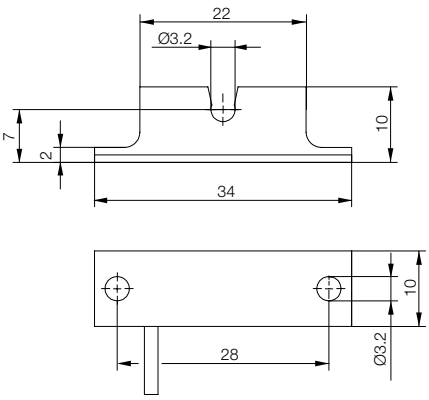




Precision hose sensor	Precision hose sensor	Precision hose sensor
4.8 mm (3/16")	6.4 mm (1/4")	3.2 mm (1/8")
Detection of water/bubbles and aqueous liquids	Detection of water/bubbles and aqueous liquids	Detection of water/bubbles and aqueous liquids
BOH0017	BOH0018	BOH001U
Infrared	Infrared	Infrared
1480 nm	1480 nm	1480 nm
Absorption	Absorption	Absorption
IP54	IP54	IP54
–10...+60 °C	–10...+60 °C	–10...+60 °C
Anodized aluminum	Anodized aluminum	Anodized aluminum
Screw fastening	Screw fastening	Screw fastening
100 mm stranded wire PFA encapsulated, 4 × AWG32	100 mm stranded wire PFA encapsulated, 4 × AWG32	1 m PUR cable with M8 connector, 3-pin



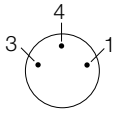




Connection configuration

M8 connector, 3-pin

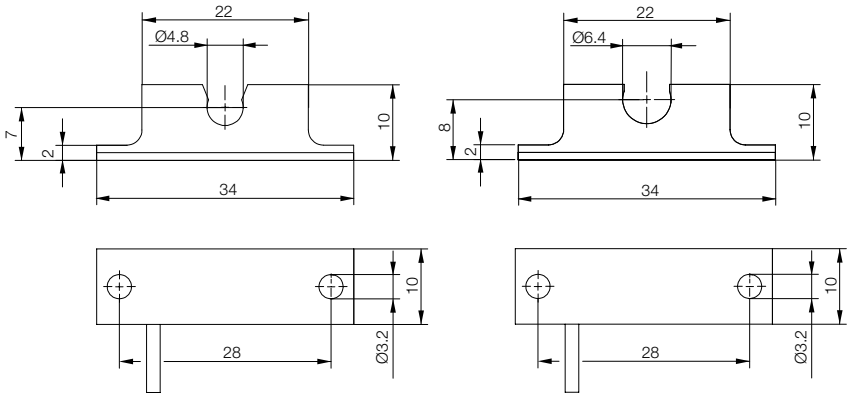
3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



Micromote® sensors BOH for separate amplifiers, hose sensors for water and aqueous solutions

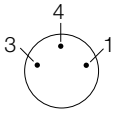
Type	Precision hose sensor	Precision hose sensor
Hose diameter	4.8 mm (3/16")	6.4 mm (1/4")
Use	Detection of water/bubbles and aqueous liquids	Detection of water/bubbles and aqueous liquids
	BOH0015	BOH0016
Light type	Infrared	Infrared
Wavelength	1480 nm	1480 nm
Functional principle	Absorption	Absorption
Degree of protection per IEC 60529	IP54	IP54
Ambient temperature T_a	–10...+60 °C	–10...+60 °C
Housing material	Anodized aluminum	Anodized aluminum
Fastening	Screw fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin

Recommended amplifier:
BAE00NJ



Connection configuration
M8 connector, 3-pin

3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



Photoelectric Sensors with Special Properties

Micromote® sensors for BOH separate amplifiers, hose sensors for detecting microbubbles

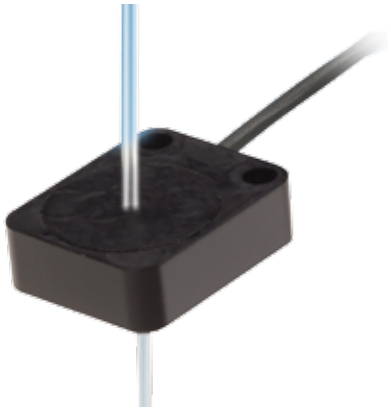
Detection of microbubbles

This series of precision hose sensors is designed to detect freely 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.

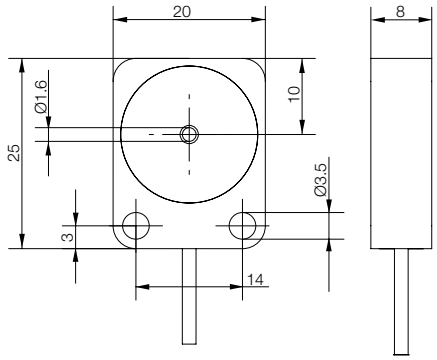
Together with the microprocessor-controlled Micromote® amplifiers series BAE with digital signal indicator and switching or analog output, these hose sensors form a complete detection system with diverse application possibilities for laboratory, analysis and medical technology.

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**
	BOH001H
Light type	Red light
Wavelength	665 nm
Functional principle	Light refraction
Degree of protection per IEC 60529	IP54
Ambient temperature T_a	–10...+60 °C
Housing material	PEEK
Fastening	Screw fastening
Connection	1 m PUR cable with M8 connector, 3-pin

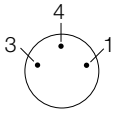
Recommended amplifier:
BAE00NJ



Connection configuration

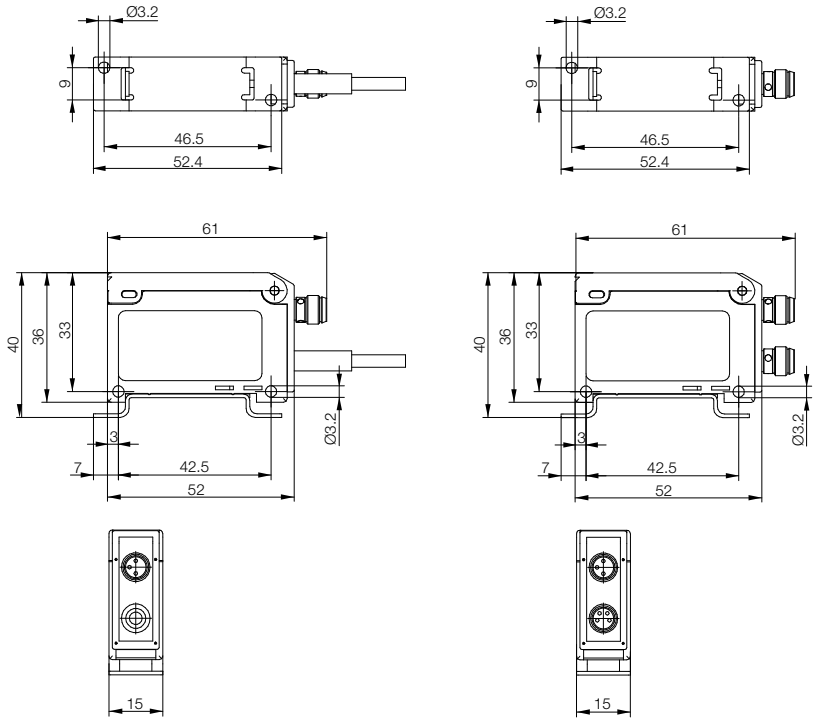
M8 connector, 3-pin

3 + receiver (green)
4 GND/shield (white, black)
1 + emitter (red)



Micromote® sensor amplifiers BAE with display
Premium

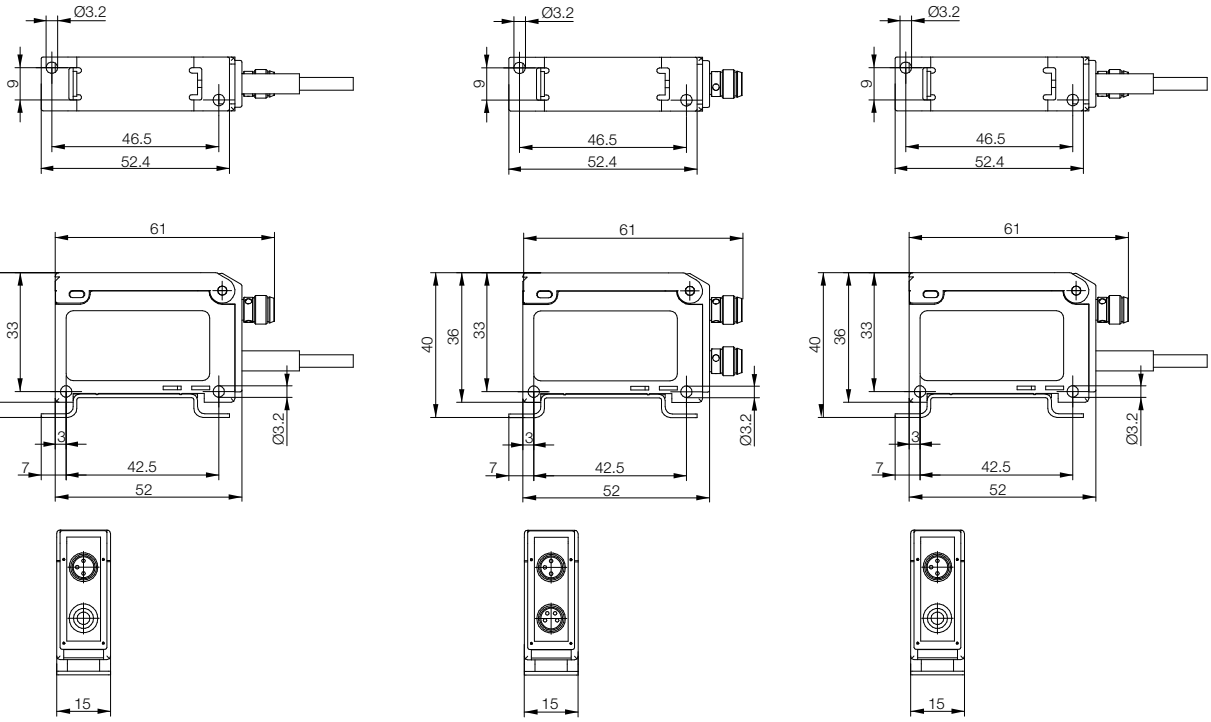
Type	Premium switching amplifier	Premium switching amplifier
PNP, NO/NC	**BAE00NE**	**BAE00NF**
NPN, NO/NC	**BAE00PR**	**BAE00PT**
Analog 0...10 V		
Supply voltage U_S	10...30 VDC	10...30 VDC
Output current	200 mA	200 mA
Max. response time	1 ms	1 ms
Polarity reversal protected/short-circuit protected	Yes/yes	Yes/yes
Power indicator	Green LED	Green LED
Function indicator	Yellow LED/3-digit display	Yellow LED/3-digit display
Function principle	Clocked	Clocked
Pulse stretching (off delay)	0...250 ms selectable	0...250 ms selectable
Cutoff frequency	500 Hz	500 Hz
Intrinsic current consumption	45 mA	45 mA
Degree of protection per IEC 60529	IP54	IP54
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



Photoelectric Sensors with Special Properties

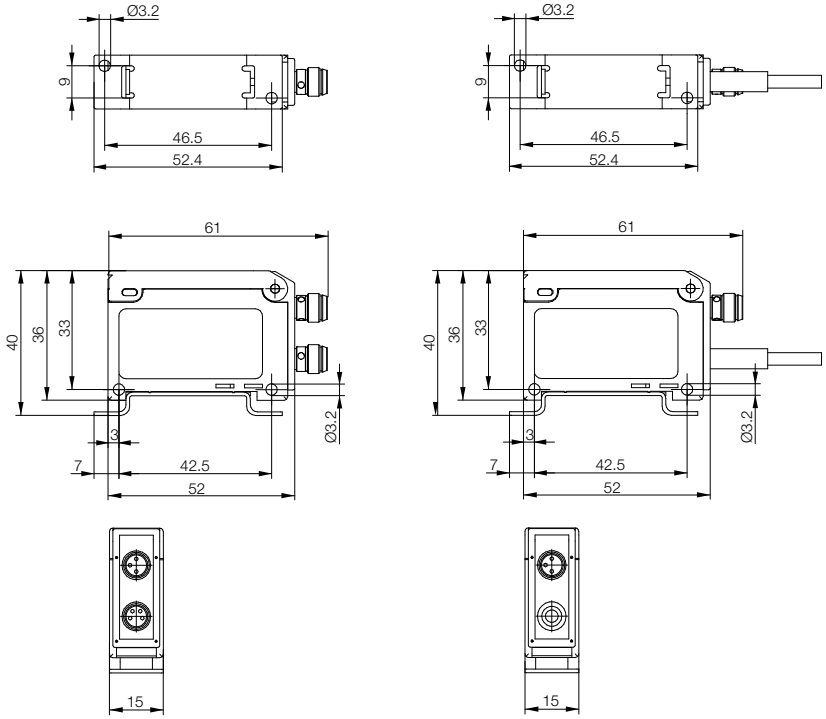
Micromote® sensor amplifiers BAE with display Premium

Premium switching amplifier	Premium switching amplifier	Premium analog amplifier
BAE00NL	**BAE00NK**	
BAE00U8		
		BAE00NH
10...30 VDC	10...30 VDC	15...30 VDC
200 mA	200 mA	
1 ms	1 ms	0.5 ms
Yes/yes	Yes/yes	Yes/yes
Green LED	Green LED	Green LED
Yellow LED/3-digit display	Yellow LED/3-digit display	Yellow LED/3-digit display
Clocked, self-synchronized	**Clocked, self-synchronized**	Clocked
0...250 ms selectable	0...250 ms selectable	
500 Hz	500 Hz	1 kHz
45 mA	45 mA	45 mA
IP54	IP54	IP54
–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



Micromote® sensor amplifiers BAE with display
Premium

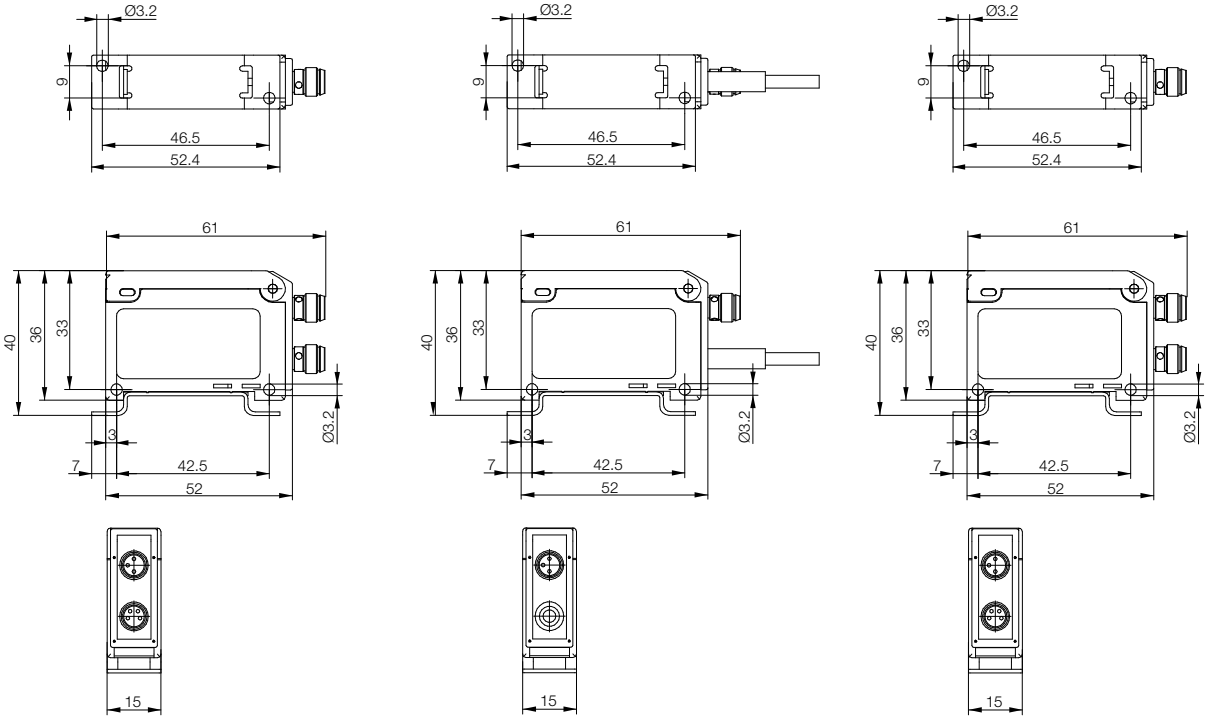
Type	Premium analog amplifier	Premium analog amplifier
PNP, NO/NC		
Analog 0...10 V	**BAE00N6**	
Analog 4...20 mA		**BAE00N4**
Supply voltage U_S	15...30 VDC	15...30 VDC
Output current		
Max. response time	0.5 ms	0.5 ms
Polarity reversal protected/short-circuit protected	Yes/yes	Yes/yes
Power indicator	Green LED	Green LED
Function indicator	Yellow LED/3-digit display	Yellow LED/3-digit display
Function principle	Clocked	Clocked
Pulse stretching (off delay)		
Cutoff frequency	1 kHz	1 kHz
Intrinsic current consumption	45 mA	45 mA
Degree of protection per IEC 60529	IP54	IP54
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



Photoelectric Sensors with Special Properties

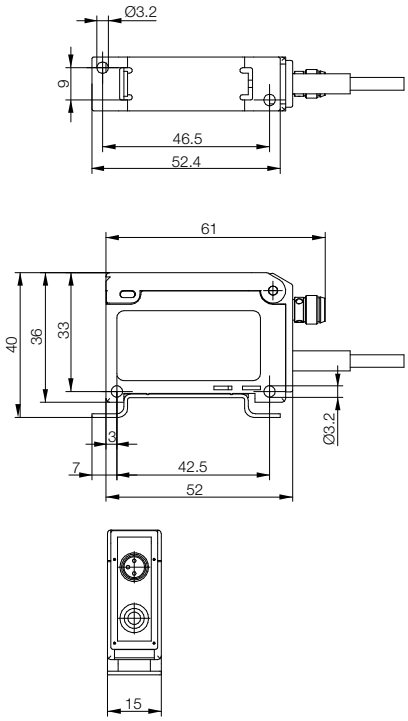
Micromote® sensor amplifiers BAE with display Premium

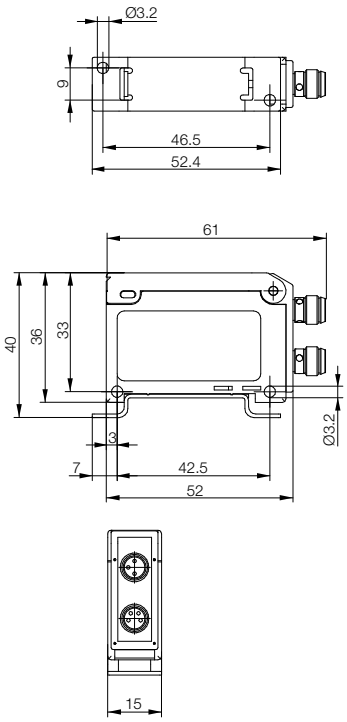
Premium analog amplifier	Premium dynamic amplifier	Premium dynamic amplifier
	BAE00NJ	BAE00N7
BAE00N5		
15...30 VDC	10...30 VDC	10...30 VDC
	200 mA	200 mA
0.5 ms	1 ms	1 ms
Yes/yes	Yes/yes	Yes/yes
Green LED	Green LED	Green LED
Yellow LED/3-digit display	Yellow LED/3-digit display	Yellow LED/3-digit display
Clocked	Clocked, dynamic	Clocked, dynamic
	0...250 ms	0...250 ms
1 kHz	2 kHz (scan rate)	2 kHz (scan rate)
45 mA	45 mA	45 mA
IP54	IP54	IP54
–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



Micromote® sensor amplifier BAE Advanced

Type	Advanced switching amplifier	Advanced switching amplifier
PNP, NO/NC	**BAE00N8**	**BAE00N9**
NPN, NO/NC	**BAE00PC**	**BAE00PE**
PNP/NPN, NO/NC		
Supply voltage U_S	10...30 VDC	10...30 VDC
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)
Cutoff frequency	500 Hz	500 Hz
Intrinsic current consumption	40 mA	40 mA
Degree of protection per IEC 60529	IP54	IP54
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

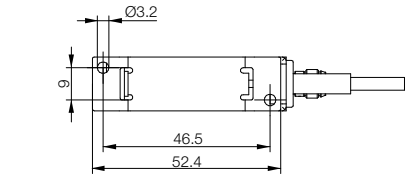


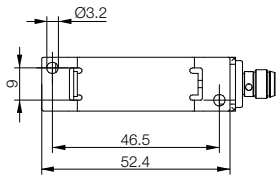


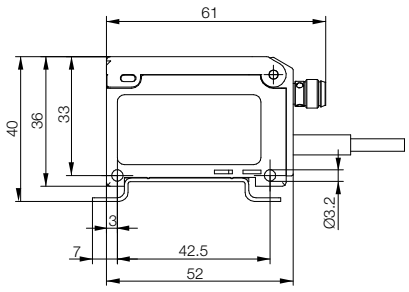
Photoelectric Sensors with Special Properties

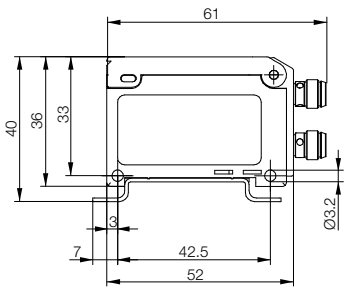
Micromote® sensor amplifier BAE Basic

Basic switching amplifier	Basic switching amplifier
BAE00NA	**BAE00NC**
15...30 VDC	15...30 VDC
100 mA	100 mA
1.1 ms	1.1 ms
Yes/yes	Yes/yes
Green LED	Green LED
Yellow LED	Yellow LED
Clocked	Clocked
0/50 ms (selectable)	0/50 ms (selectable)
500 Hz	500 Hz
45 mA	45 mA
IP54	IP54
–10...+55 °C	–10...+55 °C
ABS	ABS
2 m PVC cable, 4 × 0.14 mm²	M8 connector, 4-pin









Stainless Steel Trough-beam Fork Sensors

Tough performers

The new BGL series fork sensors are ideal for challenging environments. Aggressive media such as cleaning agents or coolant/lubricants have no effect on them. Their stainless steel housing provides full protection. That makes these sensors ideal for many applications in various sectors – especially the foods industry and for metalworking processes.

Benefits

- Fully enclosed stainless steel housing with high protection rating
- With visible red light or strong infrared light
- Compact housing – easy to install
- Washdown design for ease of cleaning

CE ECOLAB

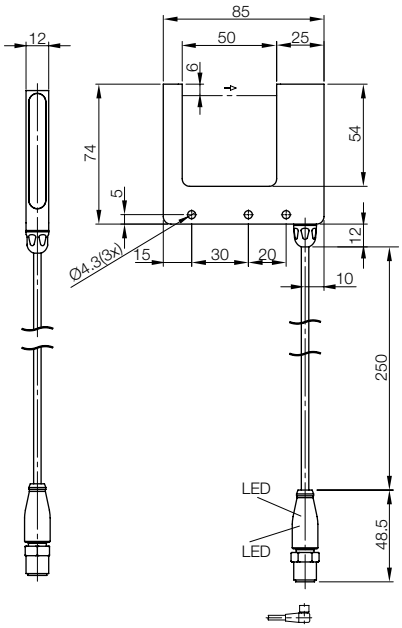
Type	
Fork opening	
Fork depth	
2 × PNP, NO/NC	
Supply voltage U_S	
Output current	
No-load supply current I_0 max.	
Switching type	
Polarity reversal protected/short-circuit protected	
Emitter, light type	
Wavelength	
Power-on indicator	
Switching state indicator	
Switching frequency f	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

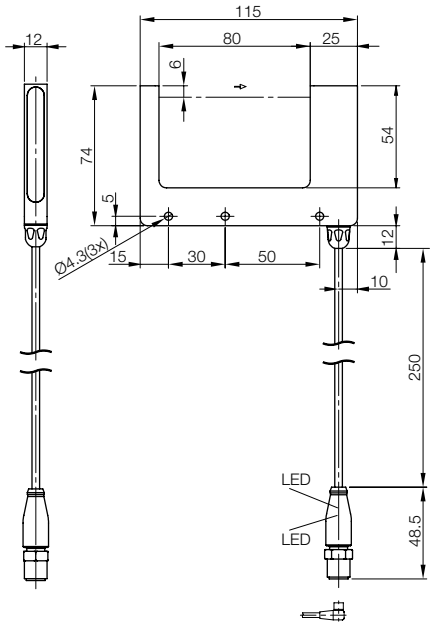
Other variants on our website or on request

Filling jam containers

Stainless steel through-beam fork sensors BGL

Stainless steel fork sensor	Stainless steel fork sensor	Stainless steel fork sensor	Stainless steel fork sensor
50 mm	**50 mm**	**80 mm**	**80 mm**
54 mm	**54 mm**	**54 mm**	**54 mm**
BGL004L	**BGL004M**	**BGL004N**	**BGL004P**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
200 mA	200 mA	200 mA	200 mA
35 mA	35 mA	35 mA	35 mA
Light/dark switching	Light/dark switching	Light/dark switching	Light/dark switching
Yes/yes	Yes/yes	Yes/yes	Yes/yes
LED, red light	LED, infrared	LED, red light	LED, infrared
660 nm	850 nm	660 nm	850 nm
Green LED in connector	Green LED in connector	Green LED in connector	Green LED in connector
Yellow LED in connector	Yellow LED in connector	Yellow LED in connector	Yellow LED in connector
3 kHz	2 kHz	3 kHz	2 kHz
IP67/IP69K	IP67/IP69K	IP67/IP69K	IP67/IP69K
–10...+60 °C	–10...+60 °C	–10...+60 °C	–10...+60 °C
5000 Lux	5000 Lux	5000 Lux	5000 Lux
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
PMMA	PMMA	PMMA	PMMA
0.25 m PUR cable with M12 connector, 4-pin	0.25 m PUR cable with M12 connector, 4-pin	0.25 m PUR cable with M12 connector, 4-pin	0.25 m PUR cable with M12 connector, 4-pin





Intuitive operation
If various objects have to be identified in production, when packaging or in quality control, the new high-resolution Light band BLA is ideal. Because it identifies, compares or sorts objects based on minimum size or height differences. The intuitively operated device can be put into operation easily. It consists of a high-performance red-light laser and a receiver and operates entirely on its own. It does not need any other accessories such as a controller, a computer or special software. The range encompasses up to 2 m. The consistent and well visible lighting strip provides 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. To do so, the user can teach in up to six different objects using buttons and hide unwanted objects in the measuring field (blanking).

New Functions
In addition, the number of objects located in the light strip at the same time can be detected. This enables fully automated inspection of power strips, a task that until now required highly complex vision systems.

**Can be used in a versatile manner –
even in particularly harsh environments**
- Highly accurate position monitoring and detection
- Easy and fast sorting of parts according to size/diameter
- Quality assurance and monitoring,
  e.g. of object heights, gap dimensions, etc.
- Detect object number and monitor objects
- Easy to align using the new mounting bracket
  (available as an accessory)

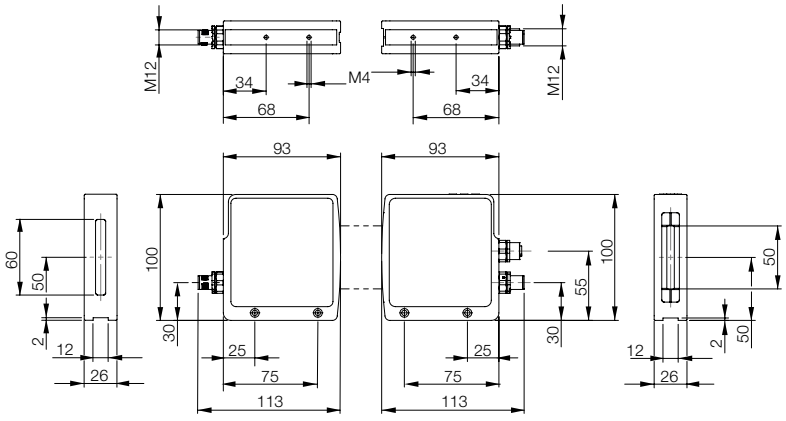
Monitoring wire thickness, position and thickness in a wire winding machine.

Photoelectric Sensors with Special Properties

Light band BLA

CE

Type		**Light band BLA**
Lighting strip width		**50 mm**
		BLA0001
Usable lighting strip 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 V DC
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 2 × voltage 0...10 V (individually selectable)
Digital outputs		3 × PNP
Output function		Differentiation of up to 6 objects (binary coded), as well as output of the object number and number "OK" or "NOK"
Polarity reversal protected/short-circuit protected		Yes/yes
Settings		Using multifunction display and four teach buttons
Emitter, light type		Laser 650 nm
Laser class		1
Supply voltage/output function indicator		Green LED/yellow LED
Scanning period		Typ. 5 ms
Degree of protection per IEC 60529		IP65
Ambient temperature T_a		+5...+55 °C
Material	Housing	Anodized aluminum
	Optical surface	Glass



For distinguishing the finest color nuances

Compared to traditional RGB sensors, the BFS 33M true color sensor is in a league of its own. Thanks to its high resolution, it not only detects colors but can also reliably distinguish between nuances. The true color sensor thus detects for instance minimal color deviations in injection molded parts. And it can also tell if a metal enters production polished or unpolished. Faded colors or poor print quality are detected in an instant and separated. It thus opens up completely new dimensions in quality control. The integrated IO-Link interface enables simple, bi-directional communication with the controller.

Benefits

- Detection of and distinguishing between a random number of colors
- Distinguishes between the slightest color shade differences
- Large sensing distance up to 400 mm
- Simple parameterizing via IO-Link
- Robust metal housing

Industries

- Automotive industry
- Plastics processing
- Packaging industry
- Handling and assembly
- Printing industry
- Wood processing

Plastic parts having slight color deviations can be reliably detected and quickly separated out.

Photoelectric Sensors with Special Properties

True color sensors BFS 33M

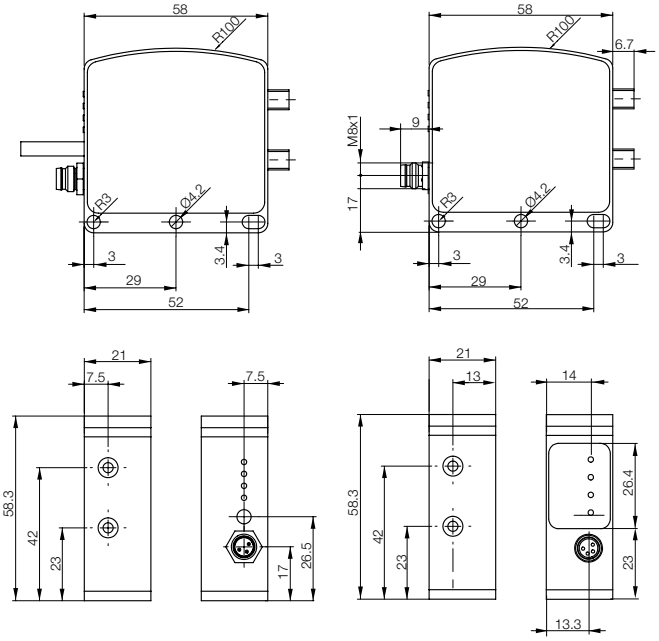
256 colors

IO-Link

Type	BFS 33M	BFS 33M
Interface	RS232	IO-Link
Working range	Fiber-dependent (up to 400 mm)	Fiber-dependent (up to 400 mm)
	BFS000L	BFS000M
Supply voltage U_S	21.6...26.4 V DC	21.6...26.4 V DC
No-load supply current I_0 max.	≤ 40 mA	≤ 60 mA
Emitter, light type	Pulsed white light	Pulsed white light
Light spot geometry/diameter	Fiber-dependent	Fiber-dependent
Range/color resolution tolerance	Adjustable	Adjustable
Supply voltage/output function indicator	Green LED/3 yellow LEDs	Green LED/yellow LED
Dimensions	58 × 58.3 × 21 mm	58 × 58.3 × 21 mm
Connection	M8 connector, 4-pin	M8 connector, 4-pin
Housing material	Coated aluminum	Coated aluminum
Optical surface	Fiber-dependent	Fiber-dependent
Weight	150 g	150 g
Degree of protection per IEC 60529	IP54	IP54
Polarity reversal protected/short-circuit protected	Yes/yes	Yes/yes
Ambient temperature T_a	+10...+55 °C	+10...+55 °C
Ambient light limit according to	EN 60947-5-2	EN 60947-5-2

IO-Link	Version 1.1
Mode	COM 3
Transfer rate	230.4 kBit/s
Cycle time	9,2 ms
IO-Link process data length	2 bytes
Parameters	256 colors, operating mode, tolerance, calibration

Recommended fiber optics:
BFO00C9



Fiber optic amplifier for Glass Fiber Optics

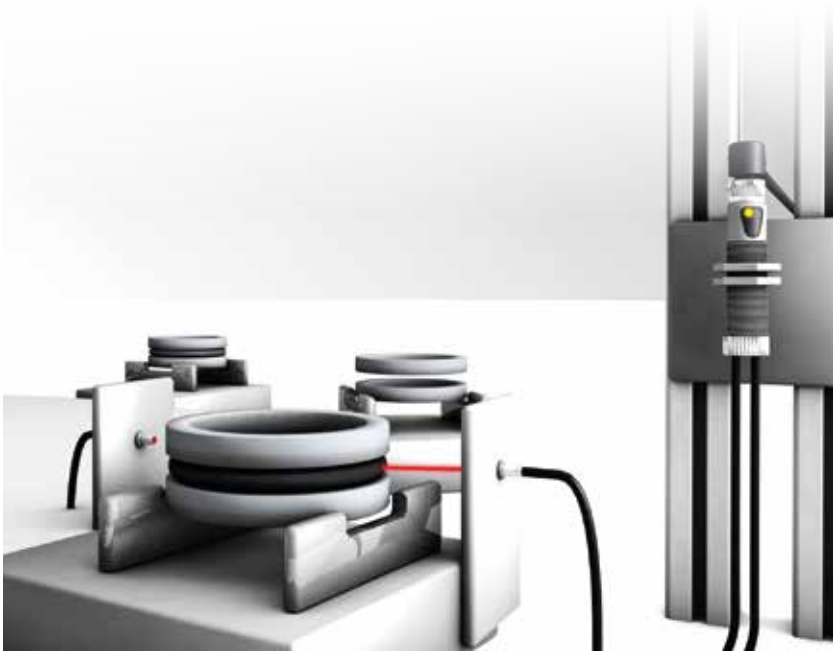
Strong light for the fiber optics
Fiber optics are the ideal choice when installation space is tight. And when you add extreme ambient conditions, glass fibers are the right choice. But their performance depends on the optical fiber base unit.

The new BFB 18M base units have a lot to offer when it comes to performance. Two light types – visible red light and powerful infrared light – provide a broad range of applications. And the Highspeed versions with a switching frequency of 3 kHz keep up in fast-moving applications.

Benefits
- Rugged M18 metal housing
- With visible red light or strong infrared light
- Also available as high-speed version for fast-moving applications
- Simple and fast setting with potentiometer

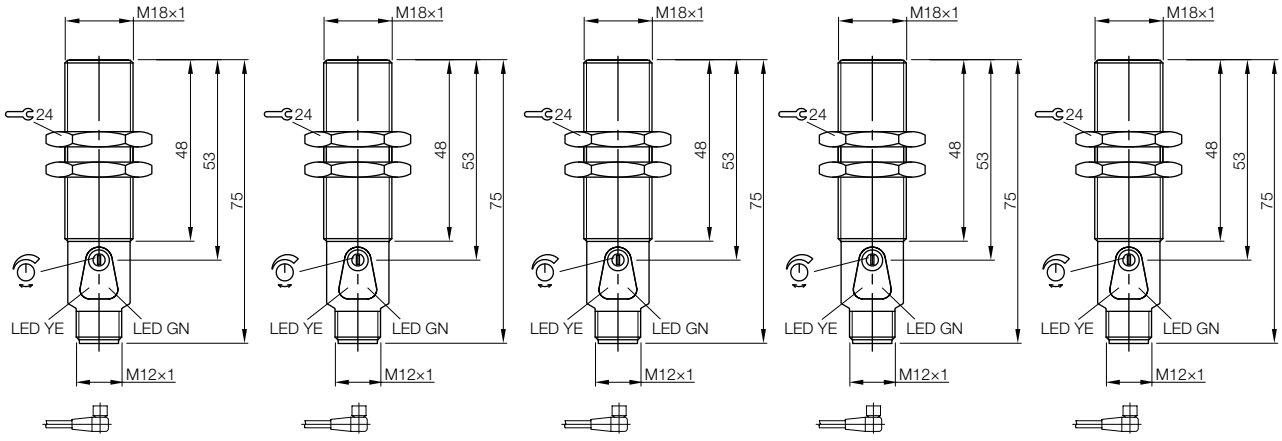
Type		
Detection range		
2 × PNP, NO/NC		
Supply voltage U_S		
Output current		
No-load supply current I_0 max.		
Switching type		
Polarity reversal protected/short-circuit protected		
Settings		
Emitter, light type		
Wavelength		
Power-on indicator		
Switching state indicator		
Switching frequency f		
Degree of protection per IEC 60529		
Ambient temperature T_a		
Permissible ambient light		
Material	Housing	
	Optical surface	
Connection		

Other variants on our website or on request



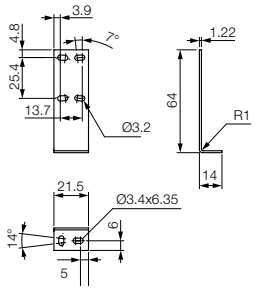
Precise seal detection

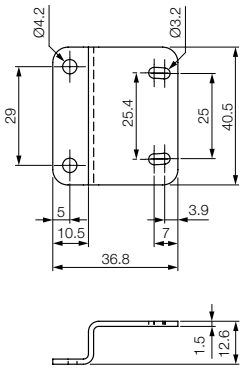
Fiber optic amplifier for glass optics	Fiber optic amplifier for glass optics	Fiber optic amplifier for glass optics	Fiber optic amplifier for glass optics
Depends on fiber optics	Depends on fiber optics	Depends on fiber optics	Depends on fiber optics
BFB0009	**BFB000A**	**BFB000C**	**BFB000E**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
30 mA	30 mA	30 mA	30 mA
Light/dark switching	Light/dark switching	Light/dark switching	Light/dark switching
Yes/yes	Yes/yes	Yes/yes	Yes/yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
LED, red light	LED, red light	LED, infrared	LED, infrared
626 nm	626 nm	850 nm	850 nm
Green LED	Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED	Yellow LED
1 kHz	3 kHz	1 kHz	3 kHz
IP67	IP67	IP67	IP67
–5…+55 °C (at +65 °C and U_S 10 V)	–5…+55 °C (at +65 °C and U_S 10 V)	–5…+55 °C (at +65 °C and U_S 10 V)	–5…+55 °C (at +65 °C and U_S 10 V)
10000 Lux	10000 Lux	10000 Lux	10000 Lux
Coated brass	Coated brass	Coated brass	Coated brass
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

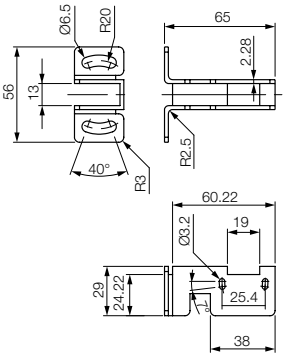


Mounting brackets

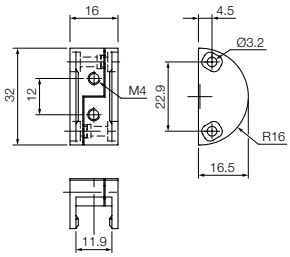
Description	Mounting brackets	Mounting brackets	Mounting brackets
Use	For BOS 5K	For BOS 5K	For BOS 5K
	BAM00UC	**BAM00UE**	**BAM00UF**
Material	Stainless steel	Galvanized steel	Galvanized steel

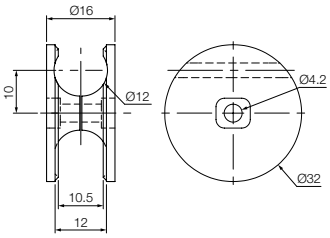






Description	Mounting brackets	Mounting brackets
Use	For BOS 6K	For series 6K for M12 rods
	BAM022A	**BAM022C**
Material	Anodized aluminum	Anodized aluminum



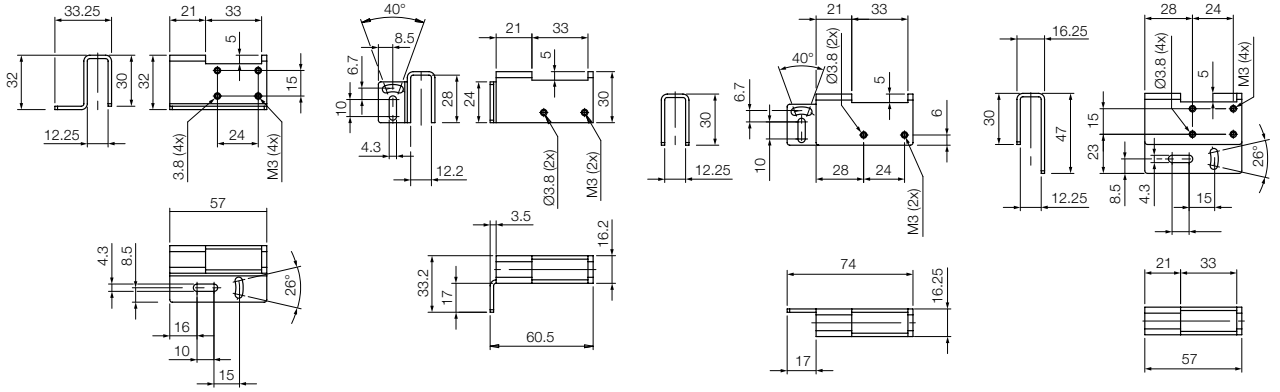


Mounting brackets
For BOS 6K
BAM0225
Stainless steel

Mounting brackets
For BOS 6K
BAM0226
Stainless steel

Mounting brackets
For BOS 6K
BAM0227
Stainless steel

Mounting brackets
For BOS 6K
BAM0228
Stainless steel

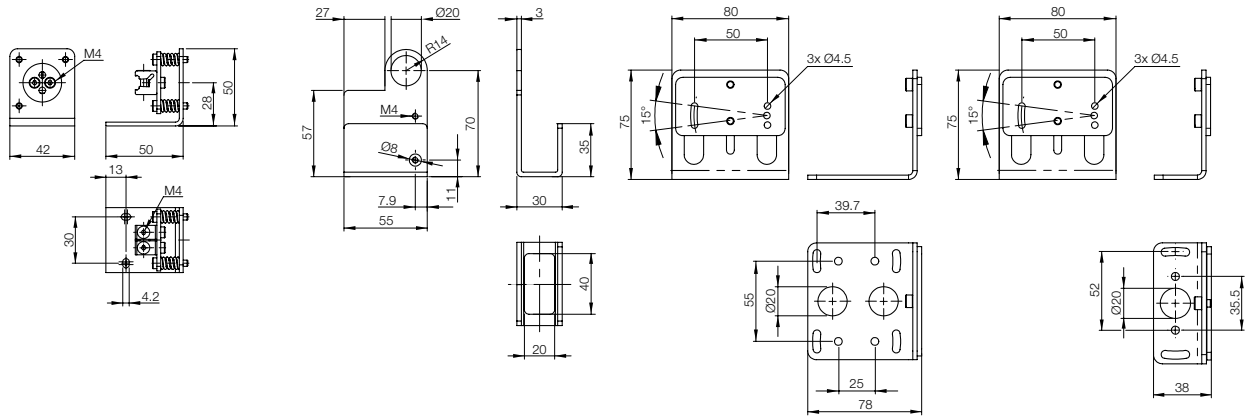


Mounting brackets
For BOS 23K
BAM027E
Stainless steel

Mounting brackets
For BOS 23K
BAM01AW
Stainless steel

Mounting brackets
For BLA
BAM02HE
Stainless steel

Mounting brackets
For BLA
BAM02HF
Stainless steel



Ultrasonic Sensors

Switching and analog variants
BUS ultrasonic sensors differ form one another in their output signal. Each series is available as a switching or analog version, whereby all analog versions are available with voltage or current output (0…10 V or 4…20 mA). The BUS M30 series includes variants with two switching outputs, one switching and one analog output or two switching outputs and one analog output so that one sensor can adopt the function of a second sensor.

Ultrasonic Sensors
Contents

Tubular designs

Chemical resistant	BUS M30E2	122

Up to 6 bar

Ultrasonic sensors BUS M30E2 provide contact-free level measurement at normal pressure and in tanks and containers with positive pressure up to 6 bar. The combination of switching and analog outputs enables level measurement and overflow protection.
A PTFE membrane protects the sensor from aggressive liquids.

The pressure-tight installation in a tank uses a 1" threaded flange. Special software filters enable use in tanks that are filled from above or have an agitator.

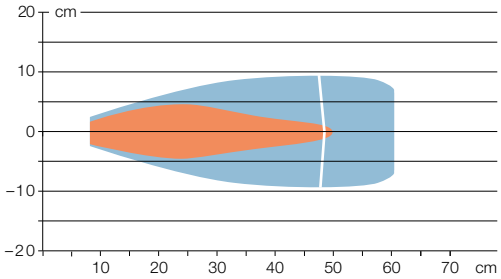
Benefits

- Contact-free measurement of 30 mm to 1.3 m operating scanning width/5 m limiting scanning range
- PTFE membrane for protection against aggressive media
- Pressure-resistant to 6 bar
- Process connection G1"
- Stainless steel housing for use in the food industry

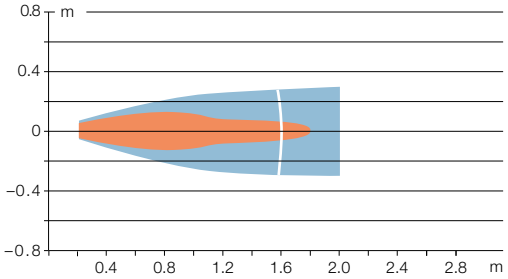
Other features

- Switching output and analog output in one sensor or version with 2 PNP switching outputs
- Easy setting of the sensor using digital display
- Degree of protection IP67

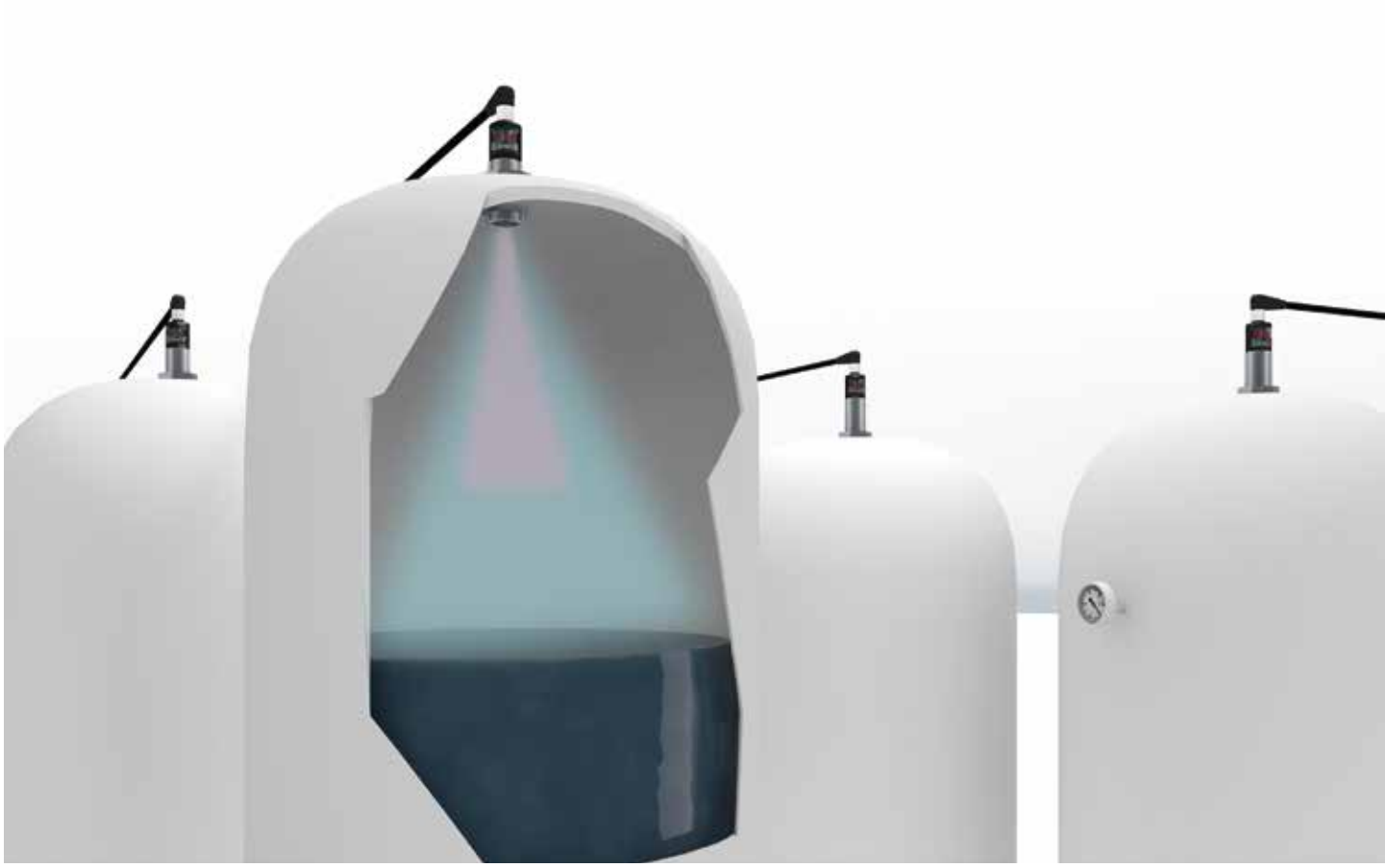
Sound cone No. 5



Sound cone No. 8



- Round rod 10 mm/27 mm
- Plate 500 × 500 mm
- Scanning range

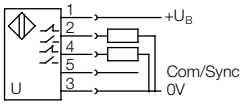


Level measurement and overflow protection all in one - the combination of switching and analog makes both possible.

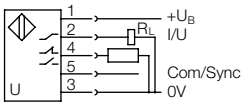
Size	**M30 × 1**	**M30 × 1**
Operating scanning range	**85…350 mm**	**200…1300 mm**
Overpressure	**Up to 6 bar**	**Up to 6 bar**
BUS M30E2 switching output		
Resolution		0.18 mm
2 × PNP, NO/NC		**BUS005U**
BUS M30E2 switching and analog output		
Resolution (dependent on set window)	0.18...0.45 mm	0.18...1.5 mm
0…10 V/4…20 mA and PNP, NO/NC	**BUS005Y**	**BUS005W**

Blind zone		0...85 mm	0...200 mm
Limiting scanning range		1500 mm	5000 mm
Sound cone		See page 102, No. 5	See page 102, No. 8
Repeat accuracy		±0,15 %	±0,15 %
Accuracy		±1 % (temperature drift internally compensated)	±1 % (temperature drift internally compensated)
Supply voltage		9...30 V DC	9...30 V DC
Output current		200 mA	200 mA
No-load supply current I_0 max.		≤ 80 mA	≤ 80 mA
Polarity reversal protected/short-circuit protected		Yes/yes	Yes/yes
Settings		Teach-in	Teach-in
Response delay		84 ms	160 ms
Switching frequency f		320 Hz	180 Hz
Process connection		G1"	G1"
Degree of protection per IEC 60529		IP67	IP67
Operating temperature		–25...+70 °C	–25...+70 °C
Material	Housing	1.4571 stainless steel	1.4571 stainless steel
	Plastic parts	PBT, TPU	PBT, TPU
	Sensing surface	PTFE	PTFE
Connection		M12 connector, 5-pin	M12 connector, 5-pin

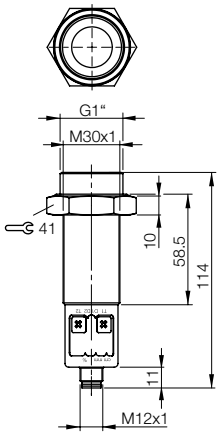
Wiring diagrams

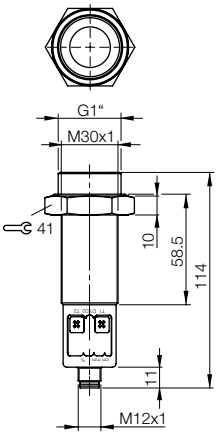


BUS005U



BUS005Y and BUS005W





Suitable connectors		
Size/design	**Length/cable material**	
M12, 5-pin/straight	5 m/PUR	**BCC098C**
M12, 5-pin/angled	5 m/PUR	**BCC08FC**

You can find additional electrical accessories in our catalog Industrial Networking and Connectivity

Recommended accessories	
Description	
Clamping holder	**BAM00HN**
Clamping holder with ball joint	**BAM00TN**
Mounting brackets	**BAM00HH**

You can find additional mechanical accessories in our catalog Accessories Line

Inductive Sensors

Rugged sensors for object detection in metal areas
Balluff offers solutions for practically any application in the field of automation. These high-quality sensors are designed and manufactured according to worldwide standards and the latest technology.

Inductive Sensors
Contents

DC 3-/4-wire Inductive Standard Sensors

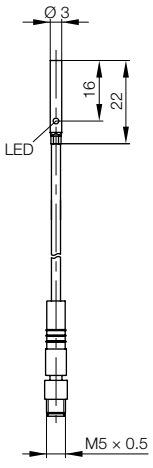
Cylinder designs	Ø 3 mm	126
	Ø 4 mm	127
	M4 × 0.5	128
	M5 × 0.5	129

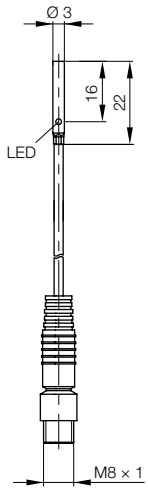
Inductive Sensors with Special Properties

PTFE sensors	M12 × 1	129
	M18 × 1	129
Steelface sensors	M12 × 1	131
NAMUR sensors	Ø 4 mm	132
	M5 × 0.5	132
	8 × 16 × 4 mm	132
Block designs 5 V DC	10 × 30 × 6 mm R03	137
	8 × 16 × 4.7 mm R04	137
IO-Link version	M12 × 1	139

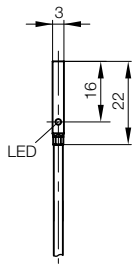
Series		**Ø 3 mm**	**Ø 3 mm**
Installation type		Flush	Flush
Rated switching distance s_n		**1 mm**	**1 mm**
Assured switching distance s_a		0...0.8 mm	0...0.8 mm
Switching distance marking		■■	■■
PNP, NO		**BES040F**	**BES0409**
PNP, NC			**BES040A**
NPN, NO			**BES040C**
NPN, NC			**BES040E**
Supply voltage U_S		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2 V	2 V
Rated insulation voltage U_i		75 V DC	75 V DC
Rated operating current I_e		100 mA	100 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/yes/yes	Yes/yes/yes
Ambient temperature T_a		–25...+70 °C	–25...+70 °C
Switching frequency f max.		3,5 kHz	3,5 kHz
Output function indicator		Yellow LED	Yellow LED
Degree of protection per IEC 60529		IP67	IP67
Approvals		CE, cULus	CE, cULus
Special properties		**Short design**	**Short design**
Material	Housing	Stainless steel	Stainless steel
	Sensing surface	PBT	PBT
Connection		0.3 m PUR cable with M5 connector, 4-pin	0.3 m PUR cable with M8 connector, 4-pin

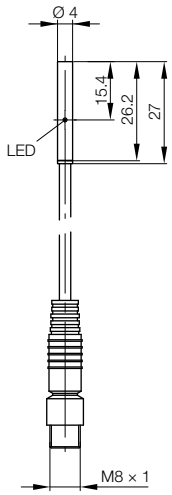
Additional cable lengths on request

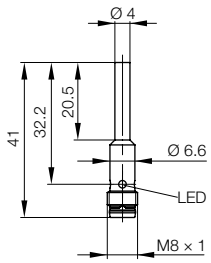


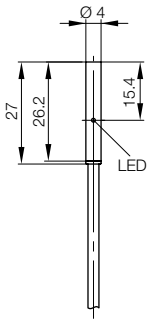


Ø 3 mm	**Ø 4 mm**	**Ø 4 mm**	**Ø 4 mm**
Flush	Flush	Flush	Flush
1 mm	**0.8 mm**	**0.8 mm**	**0.8 mm**
0...0.8 mm	0...0.65 mm	0...0.65 mm	0...0.65 mm
■■	■■	■■	■■
BES03Z6	**BES00J3**	**BES00J5**	**BES00HW**
BES03Z7	**BES00K3**	**BES00K4**	**BES00K1**
BES03ZF	**BES00JT**	**BES00JU**	**BES00JP**
BES03ZH		**BES00KF**	**BES00KC**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2 V	2 V	2 V	2 V
75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA
Yes/yes/yes	Yes/yes/yes	Yes/yes/yes	Yes/yes/yes
–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
3,5 kHz	5 kHz	5 kHz	5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP67	IP67	IP67	IP67
CE, cULus	CE, cULus	CE, cULus	CE, cULus
Short design	**High switching frequency**	**High switching frequency**	**High switching frequency**
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT
2 m PUR cable, 3 × 0.1 mm²	0.3 m PUR cable with M8 connector, 4-pin	M8 connector, 4-pin	2 m PUR cable, 3 × 0.1 mm²







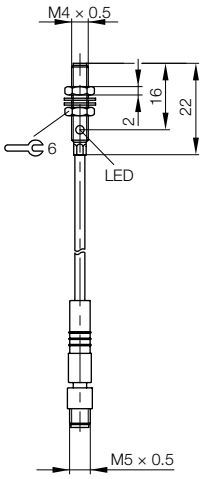


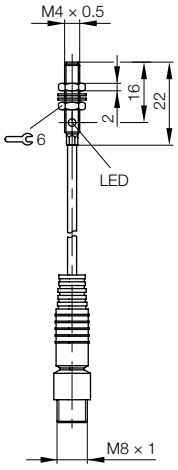
DC 3-/4-wire Inductive Standard Sensors

Cylinder designs, M4 × 0.5

Series		**M4 ×0.5**	**M4 ×0.5**
Installation type		Flush	Flush
Rated switching distance s_n		**1 mm**	**1 mm**
Assured switching distance s_a		0...0.8 mm	0...0.8 mm
Switching distance marking		■■	■■
PNP, NO		**BES040Y**	**BES040R**
PNP, NC			**BES040T**
NPN, NO			**BES040U**
NPN, NC			**BES040W**
Supply voltage U_S		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2 V	2 V
Rated insulation voltage U_i		75 V DC	75 V DC
Rated operating current I_e		100 mA	100 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/yes/yes	Yes/yes/yes
Ambient temperature T_a		–25...+70 °C	–25...+70 °C
Switching frequency f max.		3,5 kHz	3,5 kHz
Output function indicator		Yellow LED	Yellow LED
Degree of protection per IEC 60529		IP67	IP67
Approvals		CE, cULus	CE, cULus
Special properties		**Short design**	**Short design**
Material	Housing	Stainless steel	Stainless steel
	Sensing surface	PBT	PBT
Connection		0.3 m PUR cable with M5 connector, 4-pin	0.3 m PUR cable with M8 connector, 4-pin

Additional cable lengths on request

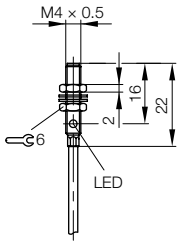


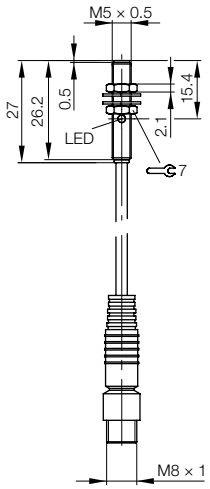


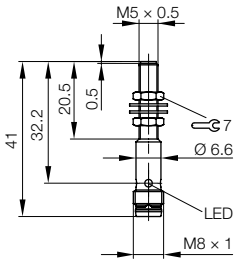
DC 3-/4-wire Inductive Standard Sensors

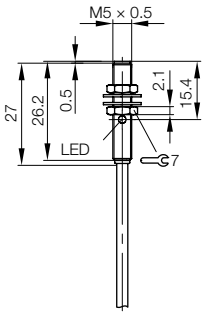
Cylinder designs, M4 × 0.5, M5 × 0.5

M4 ×0.5	**M5 ×0.5**	**M5 ×0.5**	**M5 ×0.5**
Flush	Flush	Flush	Flush
1 mm	**0.8 mm**	**0.8 mm**	**0.8 mm**
0...0.8 mm	0...0.65 mm	0...0.65 mm	0...0.65 mm
■■	■■	■■	■■
BES03Z8	**BES00H1**	**BES00H2**	**BES00FT**
BES03Z9		**BES00L1**	**BES00HJ**
BES03ZJ		**BES00HL**	**BES00KZ**
BES03ZK		**BES00L8**	**BES00L6**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2 V	2 V	2 V	2 V
75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA
Yes/yes/yes	Yes/yes/yes	Yes/yes/yes	Yes/yes/yes
–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
3,5 kHz	5 kHz	5 kHz	5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP67	IP67	IP67	IP67
CE, cULus	CE, cULus	CE, cULus	CE, cULus
Short design	**High switching frequency**	**High switching frequency**	**High switching frequency**
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT
2 m PUR cable, 3 × 0.1 mm²	0.3 m PUR cable with M8 connector, 4-pin	M8 connector, 4-pin	2 m PUR cable, 3 × 0.1 mm²





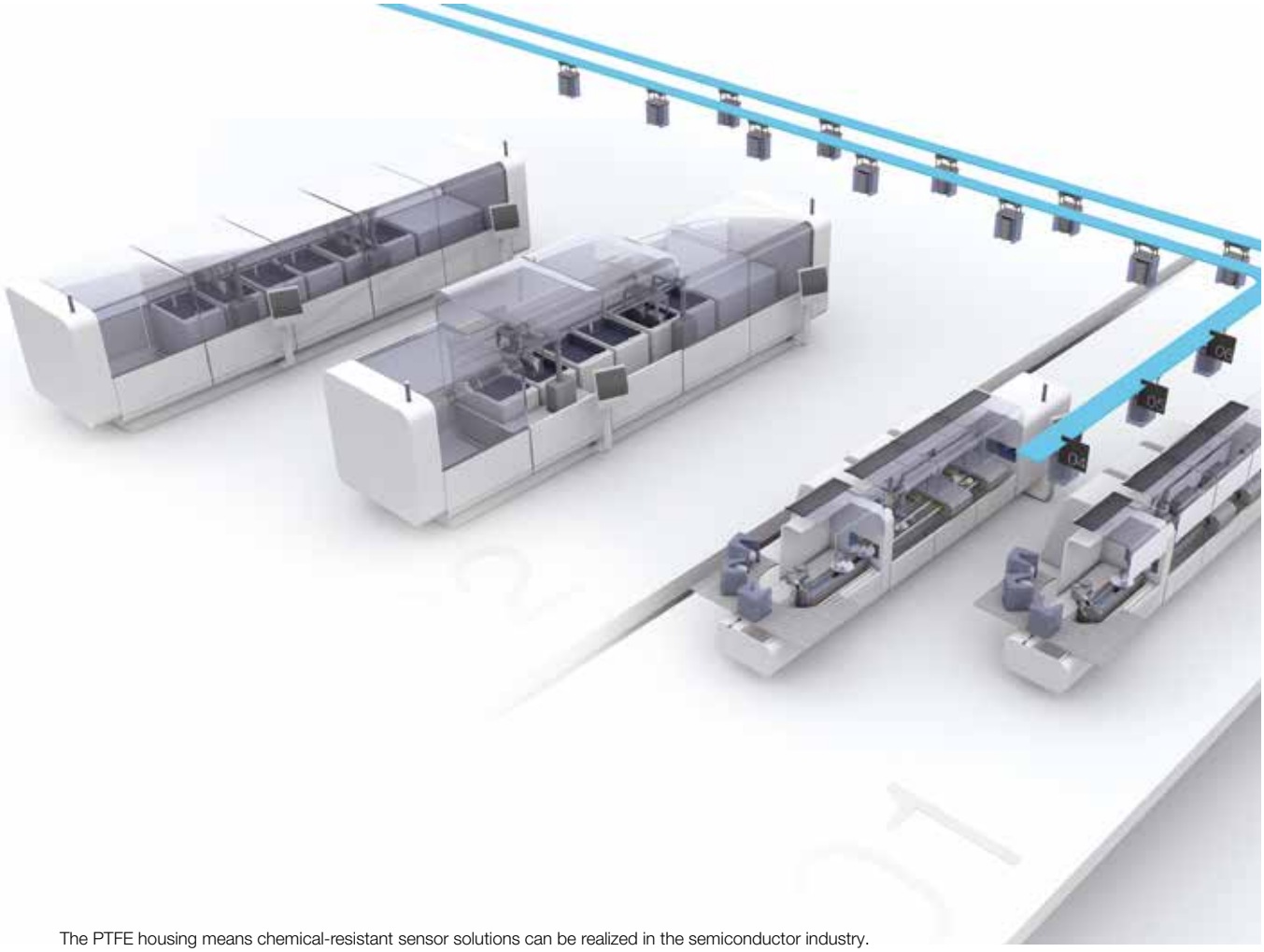




Inductive Sensors with Special Properties
PTFE sensors for aggressive environments

Ideally suited for aggressive environments
Inductive sensors made from PTFE are ideal for extreme conditions. Because they resist nearly all chemicals. Full PTFE sensors are being used to great effect in many applications in the chemical industry, for electroplating and even for acid filling. In addition, they can be used in a metal-free environment, particularly in the semiconductor industry. Their application in a situation such as this could involve monitoring valve positions, thereby increasing system safety and availability. They also complete their tasks in wet areas and under clean room conditions. Any chance of metal contamination is prevented.

Benefits
- Non-metal PTFE housing
- PTFE connection cable
- Encapsulated, easily visible function indicator
- Large switching distance for reliable detection

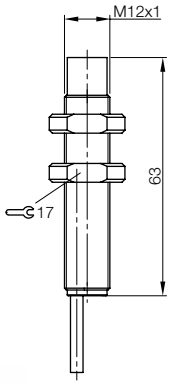


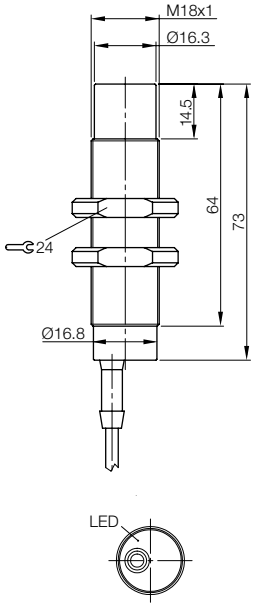
The PTFE housing means chemical-resistant sensor solutions can be realized in the semiconductor industry.

PTFE sensors for aggressive environments, M12 × 1, M18 × 1

		M12 ×1	M18 × 1
Size		**M12 ×1**	**M18 × 1**
Installation type		Not flush	Not flush
Rated switching distance s_n		**8 mm**	**16 mm**
Assured switching distance s_a		0...6.1 mm	0...13 mm
Switching distance marking		■■	■■
PNP, NO		**BES04PT**	**BES04FU**
NPN, NO		**BES04PR**	**BES049C**
Supply voltage U_S		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		2.5 V	1.5 V
Rated operating current I_e		200 mA	200 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/yes/yes	Yes/yes/yes
Ambient temperature T_a		–25...70 °C	–25...70 °C
Switching frequency f max.		1 kHz	600 Hz
Approvals		CE, cULus	CE, cULus
Degree of protection per IEC 60529		IP67	IP67
Material	Housing	PTFE	PTFE
	Sensing surface	PTFE	PTFE
Connection		5 m PTFE cable, 3 × 0.14 mm²	5 m PTFE cable, 3 × 0.14 mm²

Additional switching outputs, cable lengths and form factors are available on request





The display for the switching state is encapsulated in the housing while still remaining easily visible.

Extremely rugged and reliable
The special rugged design of the Steelface sensors opens up new possibilities for use in automation technology. This is true in especially harsh environments and applications too extreme for standard sensors.

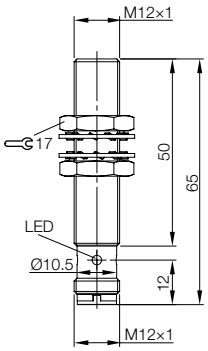
Benefits
- More functional reliability thanks to robust steel housing
- Increased reliability during use, even in direct contact with the object
- Housing and sensor labeling optimized for the requirements of the automotive industry
- Best suited for applications with variable detection objects (steel, Al, CuZn and Cu)
- Steelface sensors M12 with Factor 1

Application
- Welding equipment
- Lightweight construction
- Automotive industry
- Conveyor technology
- Handling
- Assembly
- Machine tool building

Rugged Steelface sensors detect objects in harsh surroundings.

Steelface sensors made of stainless steel, Factor 1, M12 × 1

Size		**M12 × 1**
Installation type		Flush
Rated switching distance s_n		**4 mm**
PNP, NO		**BES04Z5**
Supply voltage U_S		10...30 V DC
Rated operating current I_e		200 mA
Polarity reversal protected/short-circuit protected		Yes/yes
Ambient temperature		–25...+70 °C
Switching frequency f		80 Hz
Degree of protection per IEC 60529		IP67
Approvals		CE, cULus
Special properties		**Weld-immune, factor 1**
Material	Housing	Stainless steel
	Sensing surface	Stainless steel
Connection		M12 connector



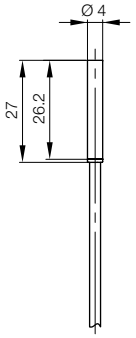
Factor 1 sensors ensure parts quality even when materials often change.

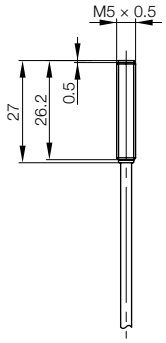
Inductive Sensors with Special Properties

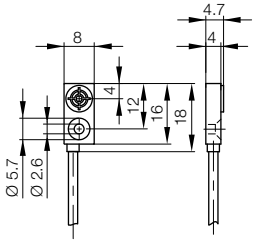
Standard NAMUR sensors, Ø 4 mm, M5 × 0.5, 8 × 16 × 4 mm R04

Size		**Ø 4 mm**	**M5 × 0.5**	**8 × 16 × 4 mm**
Installation type		Flush	Flush	Flush
Rated switching distance s_n		**0.8 mm**	**0.8 mm**	**1.5 mm**
Assured switching distance s_a		0.64 mm	0.64 mm	1.2 mm
NAMUR		**BES050N**	**BES050P**	**BES03M5**
Rated operational voltage U_e		8.2 V DC	8.2 V DC	8.2 V DC
Supply voltage U_S		7.7...9 V DC	7.7...9 V DC	7.7...9 V DC
Rated insulation voltage Ui		75 V DC	75 V DC	75 V DC
Current consumption	damped max.	≤ 1 mA	≤ 1 mA	≤ 1 mA
	undamped min.	≥ 3.75 mA	≥ 3.75 mA	≥ 3.75 mA
Rated series resistance R_V		1 kΩ	1 kΩ	1 kΩ
Polarity reversal protected		Yes, up to 9 V	Yes, up to 9 V	Yes, up to 9 V
Ambient temperature T_a		–25...+70 °C	–25...+70 °C	–25...+70 °C
Switching frequency f		2.8 kHz	2.8 kHz	8 kHz
Degree of protection per IEC 60529		IP67	IP67	IP67
Special properties		**Low power loss**	**Low power loss**	**Low power loss**
Material	Housing	1.4305 stainless steel	1.4104 stainless steel	PA 6 (fiberglass reinforced)
	Sensing surface	PBT	PBT	PA 6 (fiberglass reinforced)
Connection		2 m PUR cable, 2 × 0.14 mm²	2 m PUR cable, 2 × 0.14 mm²	2 m PUR cable, 2 × 0.1 mm²

Please order NAMUR isolating amplifiers separately using **order code FHW004P**.



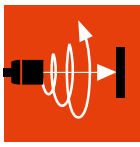




The use of NAMUR sensors and isolating amplifiers enables non-contact detecting of conditions in sensitive areas. Process stability is supported by the fact that the sensors are inside and the isolating amplifier outside the work area.

Benefits

- Low power loss
- Stable processes



Optimized for mobile equipment
Inductive sensors with a supply voltage of 5 V DC are optimized for use in mobile equipment. They can be installed directly in a TTL environment.

Benefits
- Simple mounting and reliable grip from M3 screw
- Pigtail and cable variants
- PNP NO/NC, NPN NO/NC
- Suitable for battery-powered applications
- Reduced power loss
- Direct compatibility in 5 V TTL environment

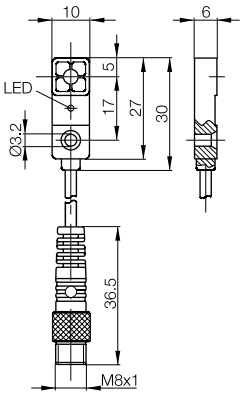
Size		
Installation type		
Rated switching distance s_n		
Assured switching distance s_a		
PNP, NO		
PNP, NC		
NPN, NO		
NPN, NC		
Supply voltage U_S		
Voltage drop U_d at I_e max.		
Rated insulation voltage U_i		
Rated operating current I_e		
Polarity reversal protected/transposition protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Degree of protection per IEC 60529		
Approvals		
Material	Housing	
	Sensing surface	
Connection		

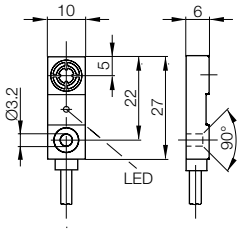
Additional cable lengths on request

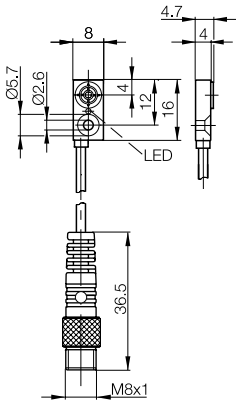
Inductive sensors with special properties

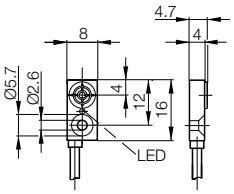
Block designs, 5 V DC,
10 × 30 × 6 mm R03, 8 × 16 × 4.7 mm R04

10 × 30 × 6 mm R03	**10 × 30 × 6 mm** R03	**8 × 16 × 4.7 mm** R04	**8 × 16 × 4.7 mm** R04
Flush	Flush	Flush	Flush
3 mm	**3 mm**	**1.5 mm**	**1.5 mm**
0...2.4mm	0...2.4 mm	0...1.2 mm	0...1.2 mm
BES052P	**BES052N**	**BES054J**	**BES054K**
BES052T	**BES052R**	**BES054F**	**BES054H**
BES052W	**BES052U**	**BES054C**	**BES054E**
BES052Z	**BES052Y**	**BES0549**	**BES054A**
5...30 V DC	5...30 V DC	5...30 V DC	5...30 V DC
1.1 V	1.1 V	1.1 V	1.1 V
75 V DC	75 V DC	75 V DC	75 V DC
50 mA	50 mA	50 mA	50 mA
Yes/yes/yes	Yes/yes/yes	Yes/yes/yes	Yes/yes/yes
–25...+70 °C	–25...+70 °C	–25...70 °C	–25...70 °C
3 kHz	3 kHz	2,5 kHz	2,5 kHz
IP67	IP67	IP67	IP67
CE, cULus	CE, cULus	CE, cULus	CE, cULus
PA 6	PA 6	PA 6	PA 6
PA 6	PA 6	PA 6	PA 6
0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 3 × 0.1 mm²	0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 3 × 0.1 mm²









Configurable switching distance

The new inductive sensors BES with adjustable switching distance provide IO-Link convenience. For example, during configuration via IO-Link, the sensor checks whether the correct distance from the detecting object is being maintained. This avoids damage to objects positioned close by. An additional check is carried out to ensure that the permitted working range is being maintained. This ensures that the sensor is programmed to move within the safe working range exclusively, reliably preventing damage to the sensor or machine. This introduces the sensor to completely new areas of application. For example, rotary indexing tables can be optimally controlled or, in linear motions, sensors can be tailored perfectly to targets that approach the detection range from the side.

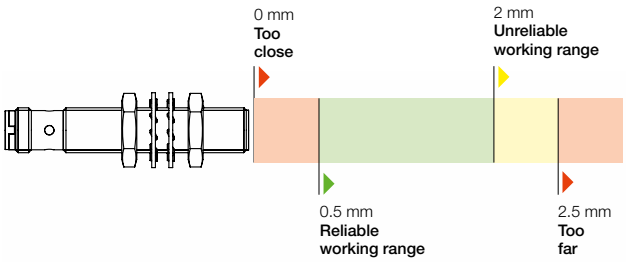
After successful IO-Link configuration, the sensor can be set to the SIO mode and then work like a standard sensor. The teachable inductive sensor BES is available in M12 × 1. Its switching distance is 0.5…2 mm.

Benefits

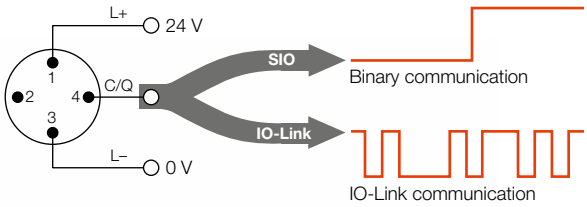
- Series production of machines with fixed installation specificationsand subsequent IO-Link configuration
- Remote monitoring using IO-Link distance value
- Controlling the installation by monitoring the setting range
- Reducing sensor and machine damage
- Cost-effective 3-wire standard wiring

Applications

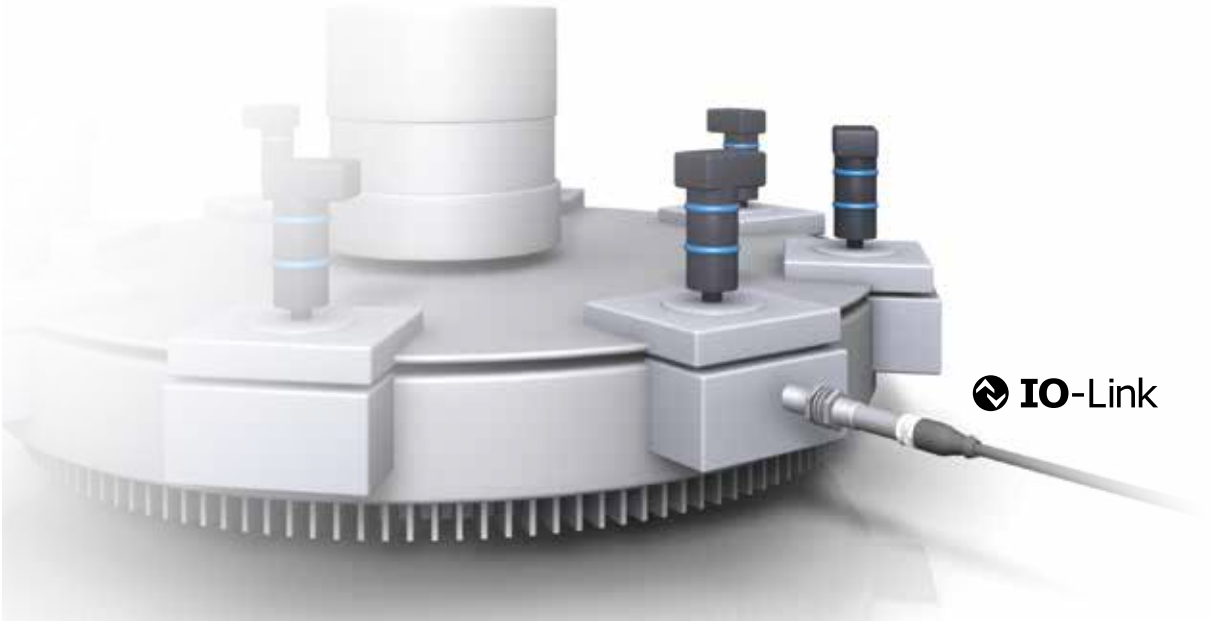
- Controlling rotary indexing tables
- Detecting end positions of levers
- Soft-stopping linear movements
- Monitoring interlocks
- Controlling grippers



Representation of the working ranges

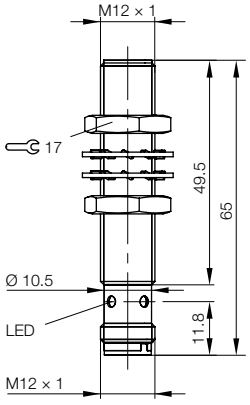


IO-Link is defined as an "add-on" to the standard sensor/actuator interface.



Inductive sensors monitor correct positioning on a rotary indexing table.

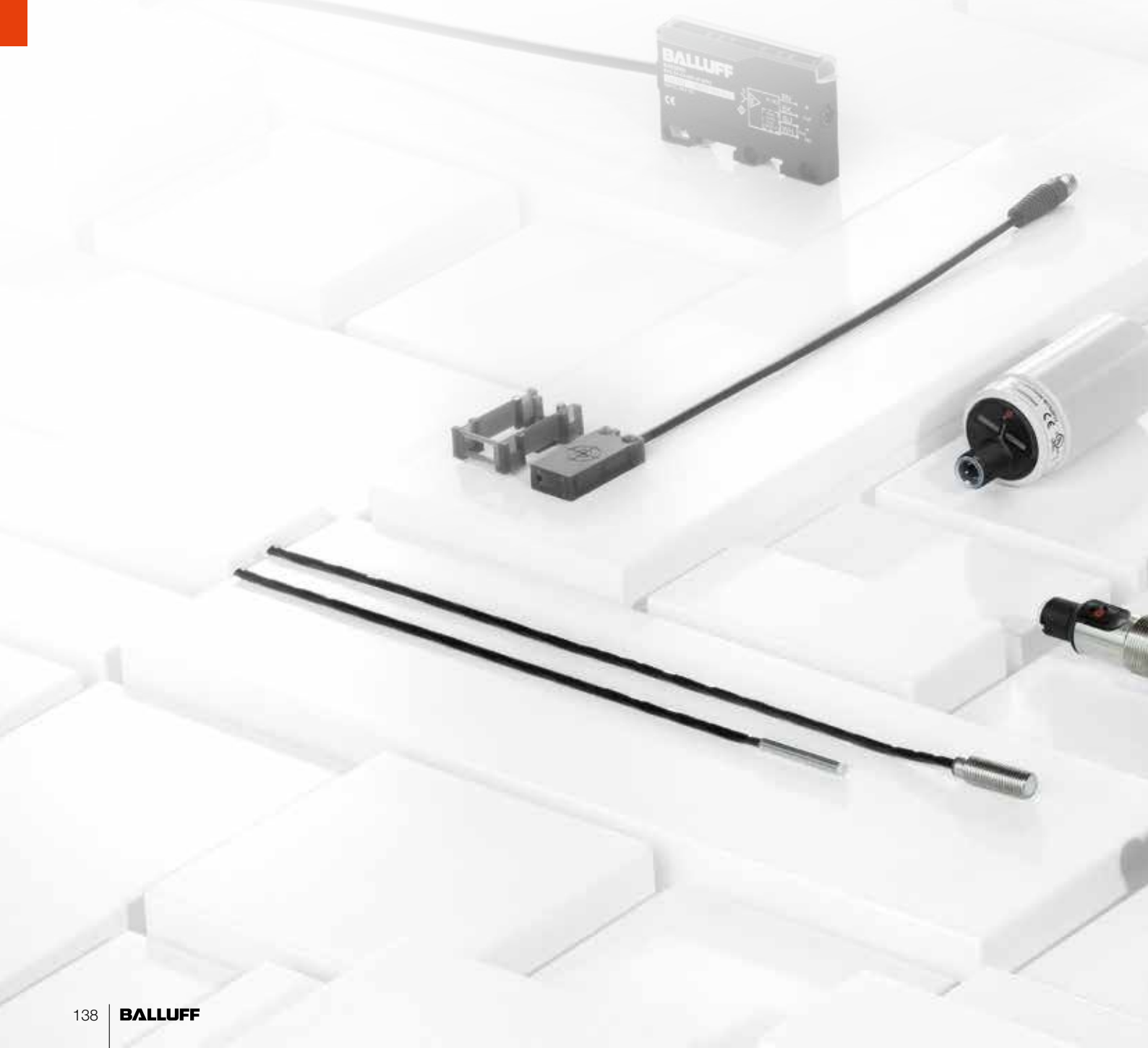
Size		**M12 ×1**
Installation type		Flush
Rated switching distance s_n		**0.5...2 mm, programmable**
PNP, NO		**BES04FK**
Supply voltage U_S		10...30 V DC
Rated operating current I_e		100 mA
Polarity reversal protected/short-circuit protected		Yes/yes
Ambient temperature T_a		–25...+85 °C
Switching frequency f		1 kHz
Approvals		CE, cULus
Degree of protection per IEC 60529		IP68
Material	Housing	Coated brass
	Sensing surface	LCP
Connection		M12 connector, 3-pin



Capacitive Sensors

Reliably detect objects and levels

Capacitive sensors detect objects and fill levels of all liquids, granular materials and powders, including non-conductive materials, directly or through a container wall.



Capacitive Sensors
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Accessories for Capacitive Sensors
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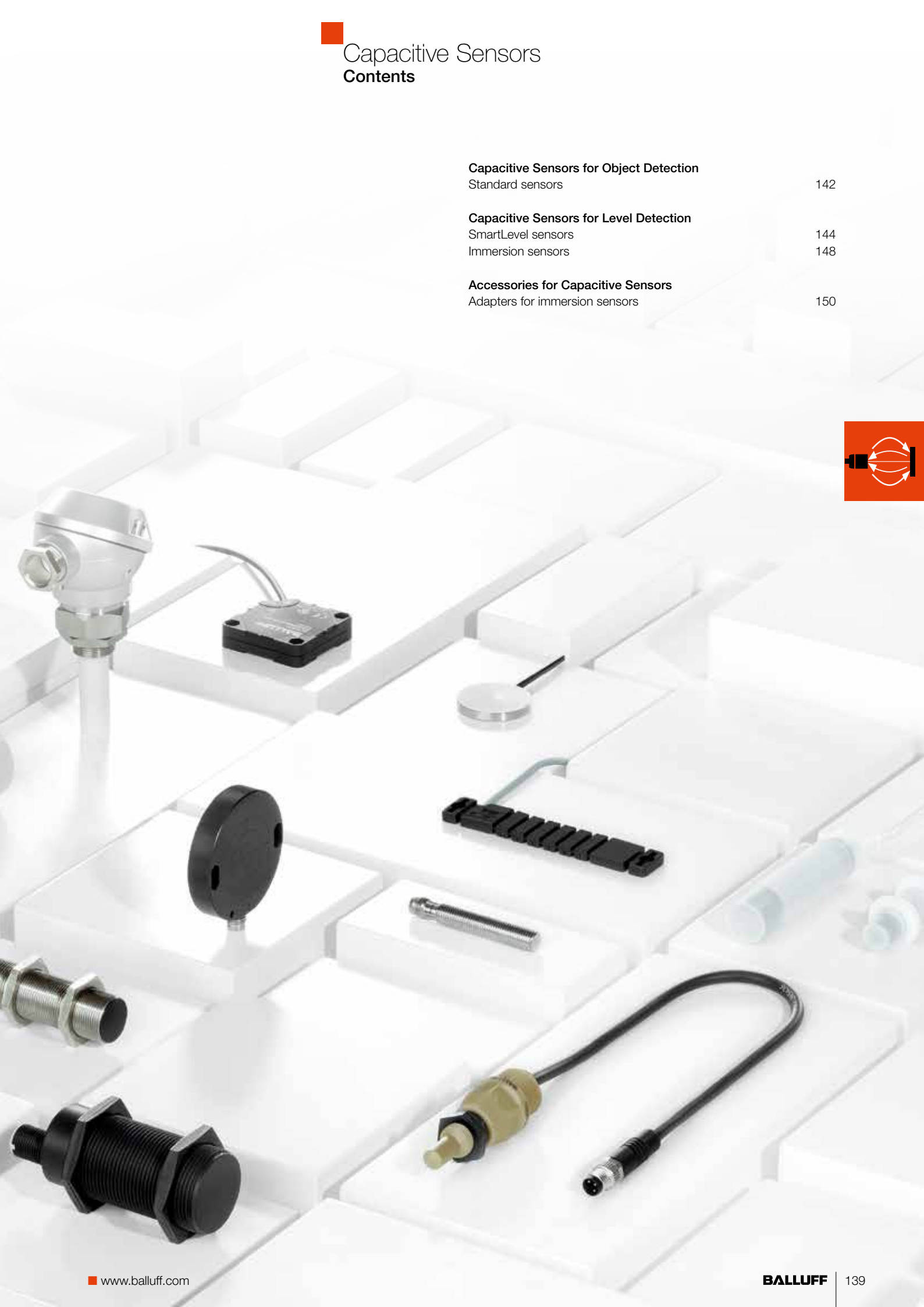


Capacitive Sensors for Object Detection

Standard sensors, block designs, DC 3-wire, 16 × 34 × 8 mm Microbox

Compact

The highly compact housing of the capacitive Microbox sensors is absolutely compatible with their predecessor. The standard version is installed flush and features a switching distance of 8 mm. The variants for object detection are

- Teachable using the wire connection
- Available as IO-Link versions
- Easy to install on tubes with cable ties

Applications

- Detect objects at a distance of up to 8 mm
- Replaces tubular M18 sensors in spite of its compact size
- Detect non-conductive media in plastic or glass containers (wall thickness up to 4 mm)
- As leak detector: sense even the smallest amounts of liquid

Size	
Installation type	
Rated switching distance s_n	
PNP, NO	
PNP, NC	
NPN, NO	
NPN, NC	
PNP/NPN and NO/NC can be coded	
Supply voltage U_S	
Output current max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Switching frequency f	
Power-on indicator	
Output function indicator	
Degree of protection per IEC 60529	
Material	Housing
	Sensing surface
Connection	

Preferred variants (available immediately)

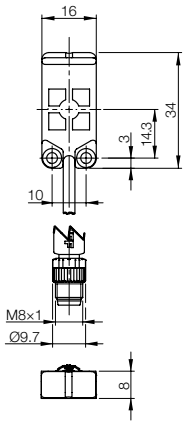
Other variants on our website or on request

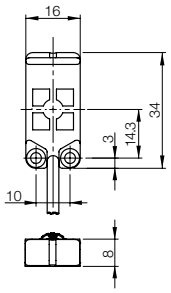
Universal holder for installing as leak detector in troughs or sensor for object detection. Holder included in the scope of delivery. For replacements please use **order code BAM02P2** .

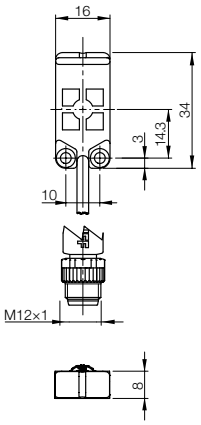
The BCS Global sensors are simple to install using cable ties.

Standard sensors, block designs, DC 3-wire, 16 × 34 × 8 mm Microbox

16 × 34 × 8 mm Microbox	**16 × 34 × 8 mm** Microbox	**16 × 34 × 8 mm** Microbox
Flush	Flush	Flush
1...8 mm teachable	**1...8 mm teachable**	**1...8 mm teachable**
BCS012T	**BCS012A**	
BCS012U	**BCS012C**	
BCS012W	**BCS012E**	
BCS012Y	**BCS012F**	
		BCS012N
10…30 V DC	10…30 V DC	18…30 V DC
50 mA	50 mA	50 mA
Yes/yes/yes	Yes/yes/yes	Yes/yes/yes
–25…+70 °C	–25…+70 °C	–25…+70 °C
50 Hz	50 Hz	50 Hz
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
IP67	IP67	IP67
PP	PP	PP
PP	PP	PP
0.3 m PUR cable with M8 connector, 4-pin	2 m PUR cable, 4 × 0.14 mm²	0.3 m PUR cable with M12 connector, 4-pin







Appropriate clamps for Microbox sensors
(please order separately)

Size	**22 × 35 × 10 mm**
	BAM02P1
Ambient temperature T_a	–25...+85 °C
Material	PP
Weight	1 g

Compact – with foam suppression and build-up compensation
The highly compact housing of the capacitive Microbox sensors is absolutely compatible with their predecessor. SmartLevel 50 versions feature improved foam suppression and build-up compensation. They are

- Teachable using the wire connection
- Available as IO-Link versions
- Easy to install on tubes with cable ties

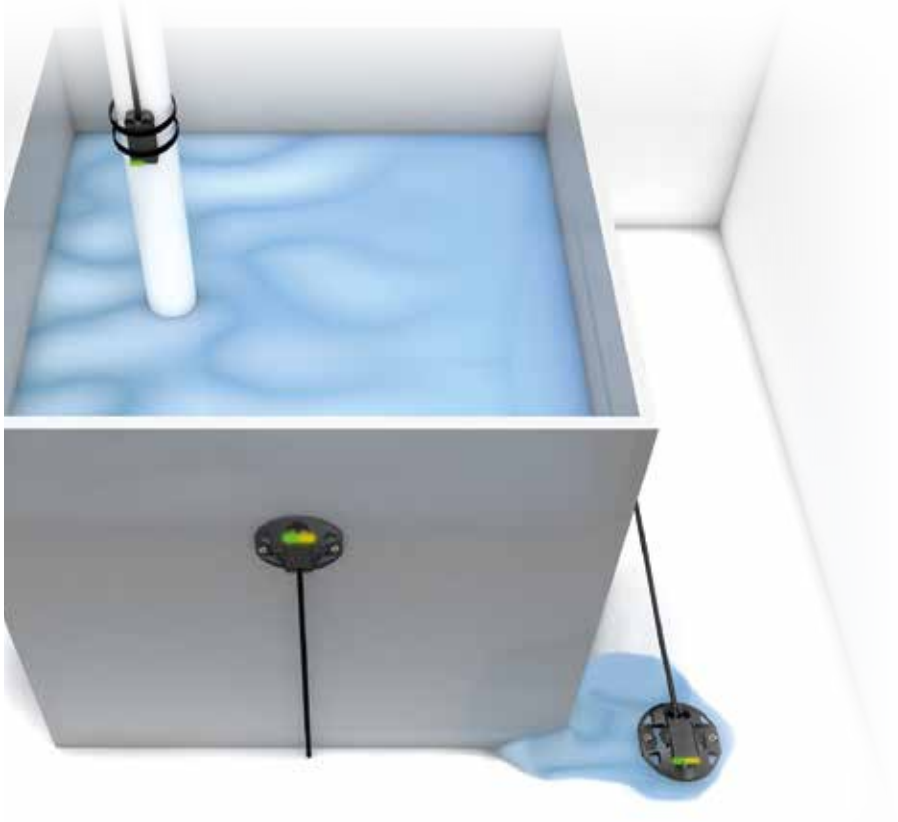
Applications

- Detect conductive media in plastic tubes or glass pipes
- Detect conductive media through the container wall with a thickness of up to 10 mm
- Sense highly conductive media up to 50 mS/cm, such as acids and bases
- Medical technology: detect body fluids (e.g. blood, even when foam has formed)
- Semiconductor industry: detect process fluids without direct media contact

Size	
Installation type	
Rated switching distance s_n	
PNP, NO	
PNP, NC	
NPN, NO	
NPN, NC	
PNP/NPN and NO/NC can be coded	
Supply voltage U_S	
Output current max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Switching frequency f	
Power-on indicator	
Output function indicator	
Degree of protection per IEC 60529	
Material	Housing
	Sensing surface
Connection	

Other variants on our website or on request

Universal holder for mounting on containers.
Holder included in the scope of delivery.
For replacements please use **order code BAM02P2** .



Capacitive SmartLevel sensors permit a broad range of applications.

Capacitive Sensors for Level Detection

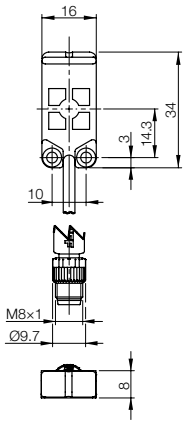
SmartLevel, block design, DC 3-wire, 16 × 34 × 8 mm Microbox

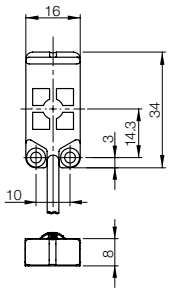
SMART*LEVEL* 50

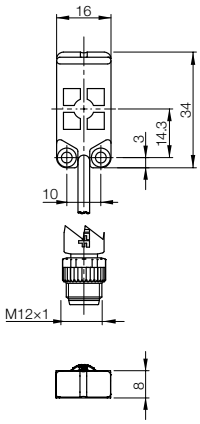
SMART*LEVEL* 50

IO-Link
SMART*LEVEL* 50

16 × 34 × 8 mm Microbox	**16 × 34 × 8 mm** Microbox	**16 × 34 × 8 mm** Microbox
Flush	Flush	Flush
Level teachable	**Level teachable**	**Level teachable**
BCS012Z	**BCS012H**	
BCS0130	**BCS012J**	
BCS0131	**BCS012K**	
BCS0132	**BCS012L**	
		BCS012P
10…30 V DC	10…30 V DC	18…30 V DC
50 mA	50 mA	50 mA
Yes/yes/yes	Yes/yes/yes	Yes/yes/yes
–25…+70 °C	–25…+70 °C	–25…+70 °C
10 Hz	10 Hz	10 Hz
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
IP67	IP67	IP67
PP	PP	PP
PP	PP	PP
0.3 m PUR cable with M8 connector, 4-pin	2 m PUR cable, 4 × 0.14 mm²	0.3 m PUR cable with M12 connector, 4-pin







Appropriate clamps for Microbox sensors
(please order separately)

Size	**22 × 35 × 10 mm**
	BAM02P1
Ambient temperature T_a	–25...+85 °C
Material	PP
Weight	1 g

Capacitive Sensors for Level Detection

SmartLevel, block design, DC 3-wire, 40 × 40 × 10 mm

For highly conductive media now in SmartLevel 50 technology
Capacitive sensors in the proven, compact Uniflat housing feature high-performance SmartLevel 50 technology for detecting highly conductive liquids in plastic vessels. Residue and foam as well as wall thicknesses of up to 10 mm are reliably ignored. This significantly increases the number and types of media that can be detected. These sensors can be used for example with acids and bases, milk and yogurt, foaming media or metal powders.

The universal final stage offers PNP and NPN as well as NO and NC. Connection options include 2 m cable or cable with M8 connector.

Benefits

- Usable with highly conducting media
- For acids and bases
- Compensate for foam and build-up
- For wall thicknesses up to 10 mm

Simple to install with cable connectors. The capacitive Uniflat housing is easy to use, reliably detecting highly conductive media.

Capacitive Sensors for Level Detection

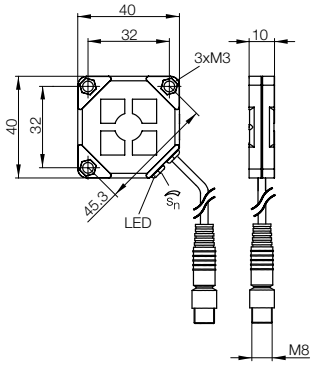
SmartLevel, block design, DC 3-wire, 40 × 40 × 10 mm

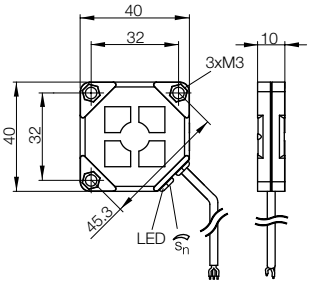
SMARTLEVEL 50

SMARTLEVEL 50

Size		**40 × 40 × 10 mm** Uniflat	**40 × 40 × 10 mm** Uniflat
Installation type		Flush	Flush
Rated switching distance s_n		**Media-dependent**	**Media-dependent**
PNP, NO		**BCS0134**	
PNP, NC		**BCS0135**	
PNP/NPN and NO/NC can be coded			**BCS0133**
Supply voltage U_S		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC
Output current max.		100 mA	100 mA
No-load supply current I_0 max.		≤ 11 mA	≤ 11 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/yes/yes	Yes/yes/yes
Ambient temperature T_a		–5...+85 °C	–5...+85 °C
Switching frequency f		10 Hz	10 Hz
Output function indicator		Green LED	Green LED
Power-on indicator		Yellow LED	Yellow LED
Degree of protection per IEC 60529		IP67	IP67
Material	Housing	PBT	PBT
	Sensing surface	PBT	PBT
	Cover	PBT	PBT
Connection		0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 3 × 0.14 mm²

Other variants on our website or on request





Capacitive Sensors for Level Detection

SmartLevel, immersion sensors, DC 3-wire, M12 × 1, G½"

Flexible use: in plastic or metal

BCS capacitive immersion sensors detect levels of plastic granulates or highly conductive media with absolute reliability. Their excellent foam and build-up compensation makes them highly flexible. They can be installed in plastic or metal tanks.

Benefits

- High-quality 1.4404 stainless and PEEK housings
- Wire connection for remote teach-in
- EHEDG conformal with special approved adapters
- Media temperature up to 105 °C
- Autoclave compatible (1 h)
- IO-Link versions available
- Pressure rated to 10 bar and IP69K at the M12 connector

Applications

- Detect plastic granulates up to 105 °C
- Sense adhering foods such as yogurt, milk, beverages etc.
- Detect highly conductive acids and bases up to a value of 100 mS/cm

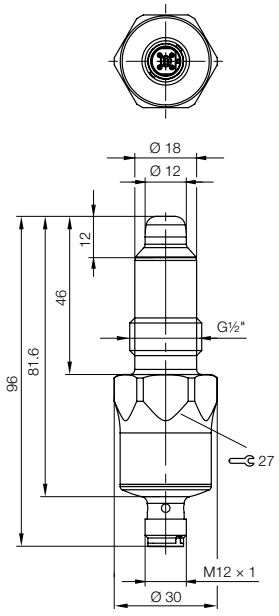
Size	
Installation type	
Rated switching distance s_n	
PNP, NO	
PNP, NC	
NPN, NO	
NPN, NC	
IO-Link, PNP/NPN and NO/NC can be coded	
Supply voltage U_S	
Voltage drop U_d at I_e	
Rated insulation voltage U_i	
Output current max.	
No-load supply current I_0 max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a/media temperature	
Switching frequency f	
Output function indicator	
Degree of protection per IEC 60529	
Special properties	
Material	Housing
	Sensing surface
	O-ring
Connection	

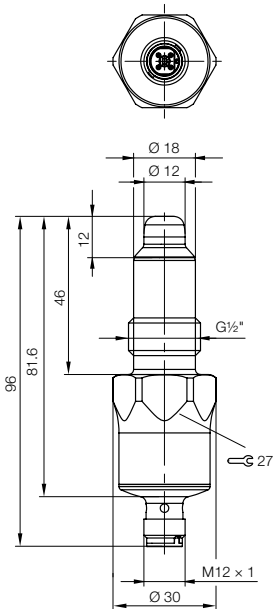
EHEDG conformal only when used with a corresponding sensor

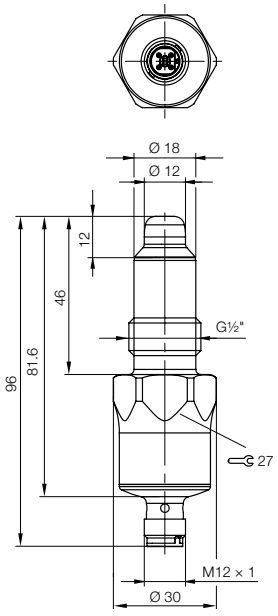
The BCS capacitive immersion sensor reliably detects the level of a milk tank.

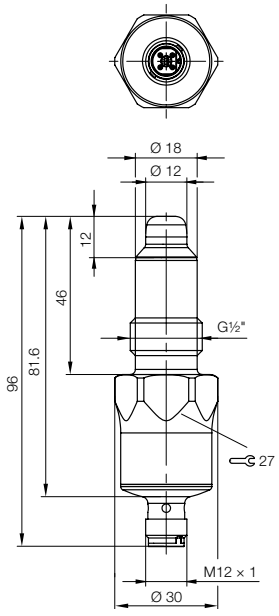
SmartLevel, immersion sensors, DC 3-wire, M12 × 1, G½"

G½"	**G½"**	**G½"**	**G½"**
Not flush	Not flush	Not flush	Not flush
Level teachable	**Level teachable**	**Level teachable**	**Level teachable**
BCS011F		**BCS011M**	
BCS011H		**BCS011N**	
BCS011J		**BCS011P**	
BCS011K		**BCS011R**	
	BCS011E		**BCS011L**
12...30 V DC	18...30 V DC	12...30 V DC	18...30 V DC
≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
75 V DC	75 V DC	75 V DC	75 V DC
50 mA	50 mA	50 mA	50 mA
15 mA	15 mA	15 mA	15 mA
Yes/yes/yes	Yes/yes/yes	Yes/yes/yes	Yes/yes/yes
–40...+85 °C/105 °C	–40...+85 °C/105 °C	–10...+85 °C/105 °C	–10...+85 °C/105 °C
5 Hz	5 Hz	5 Hz	5 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP68 10 bar/IP69K	IP68 10 bar/IP69K	IP68 10 bar/IP69K	IP68 10 bar/IP69K
Autoclave compatible	**Autoclave compatible**	**Autoclave compatible**	**Autoclave compatible**
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
PEEK	PEEK	PEEK	PEEK
EPDM	EPDM	**FKM, oil-resistant**	**FKM, oil-resistant**
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin





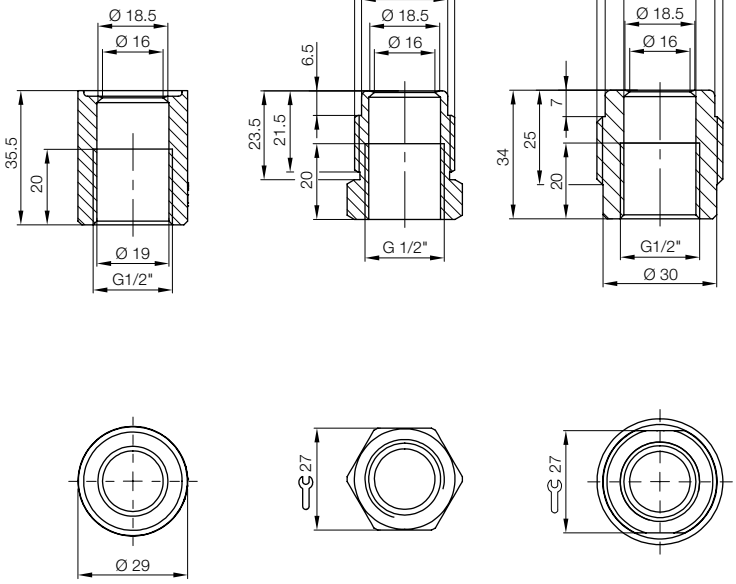




Adapters for immersion sensors

Description		Adapter	Adapter	Adapter
Version		G½" ➔ Ø 29 mm	G½" ➔ G¾"	G½" ➔ G1"
Use		for hygienic processes with BCS capacitive immersion sensor	for hygienic processes with BCS capacitive immersion sensor	for hygienic processes with BCS capacitive immersion sensor
Can be welded		**BAM0294**		
Thread-in			**BAM0292**	**BAM0293**
Dairy coupling per DIN 11851				
Tri-Clamp				
Weight		105 g	70 g	120 g
Approvals		EHEDG conformal	EHEDG conformal	EHEDG conformal
Material	Housing	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
Connection	Sensor	G½"	G½"	G½"
	Process	Ø 18.5 mm	G¾"	G1"

EHEDG conformal only when used with a corresponding sensor

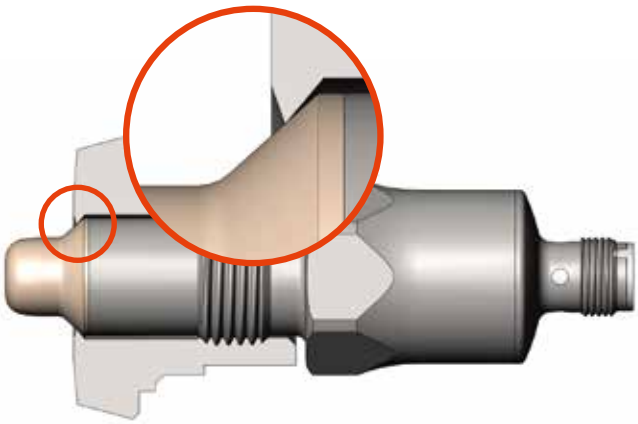


Optimal installation

The capacitive immersion sensors are to be installed in combination with the EHEDG conformal adapters shown here. They are approved for level detection in the European foods industry.

Benefits

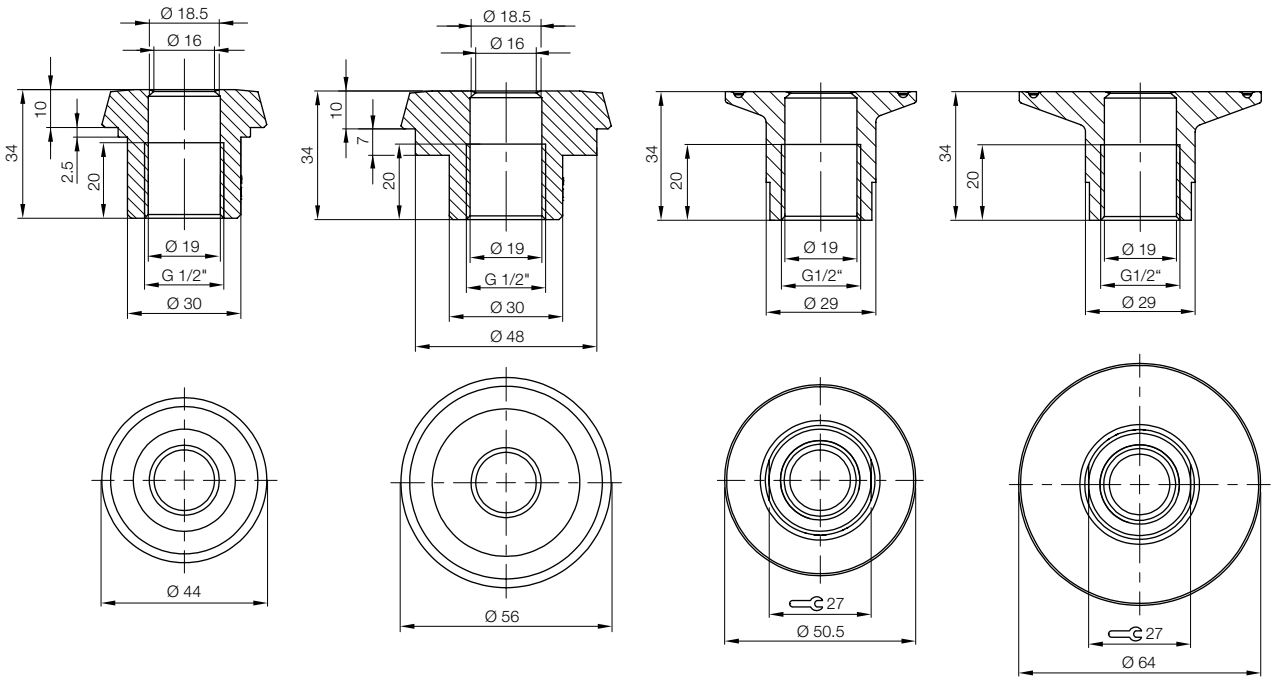
- Housing stainless steel 1.4404
- EHEDG approved when used with Balluff BCS immersion sensor
- Other special versions upon request



Stainless steel adapter for hygienic installation of the Balluff BCS immersion sensor.

Adapters for immersion sensors

Adapter	Adapter	Adapter	Adapter
G½" ➔ DN25	G½" ➔ DN40	G½" ➔ Tri-Clamp Ø 50.5 mm	G½" ➔ Tri-Clamp Ø 64 mm
for hygienic processes with BCS capacitive immersion sensor	for hygienic processes with BCS capacitive immersion sensor	for hygienic processes with BCS capacitive immersion sensor	for hygienic processes with BCS capacitive immersion sensor
BAM0295	**BAM0296**		
		BAM02NT	**BAM02NU**
170 g	230 g	142 g	205 g
EHEDG conformal	EHEDG conformal	EHEDG conformal	EHEDG conformal
1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel	1.4404 stainless steel
G½"	G½"	G½"	G½"
DN25	DN40	Tri-Clamp Ø 50.5 mm	Tri-Clamp Ø 64 mm



Magnetic sensors

Reliable, wear-free position detection on all pneumatic cylinders
Magnetic cylinder sensors are used chiefly on cylinders and grippers for monitoring the piston position. The sensor detects the field of the magnet embedded in the piston through the actuator wall. Thanks to the non-contact position sensing principle, our magnetic cylinder sensors work reliably and without wear.

Magnetic Cylinder Sensors
Contents

Magnetic Cylinder Sensors
BMF 203 with multiple switchpoints 154

C-Slot (size 10 slot)

Teachable
For cylinders, grippers and process valves, a teachable magnetic sensor with two switchpoints replaces two standard sensors. For longer cylinders the additional switchpoint can be used for example for reducing the air pressure before the end point. IO-Link makes it possible to implement eight switchpoints as well as individual setting of the hysteresis.

The traverse distance is 60 mm. Ideally the sensor is in the middle of the travel path – in other words as close as possible to the switchpoints. The teachable magnetic sensor for C-slots offers 10 mm more travel distance than other sensors.

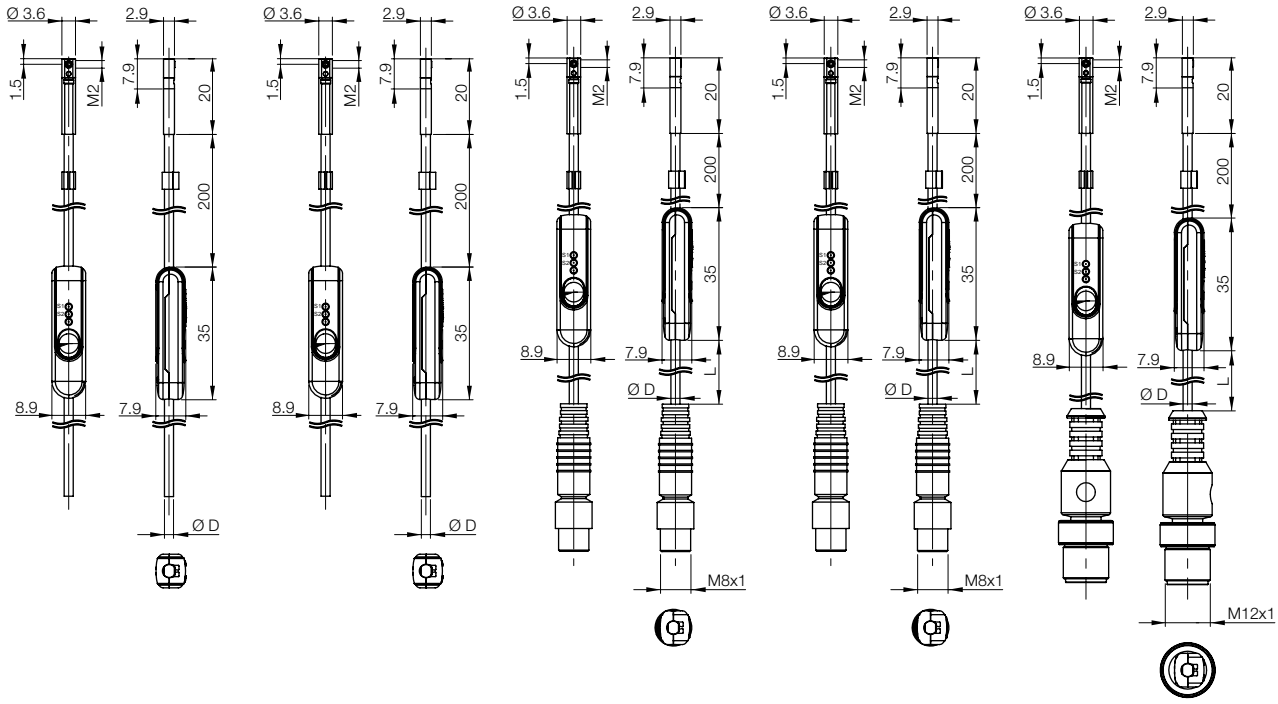
Benefits
- 10 mm more travel distance than other magnetic sensors
- Sensor head length 20 mm, with remote electronics
- PNP/NPN NO/NC; PNP, NO, with IO-Link
- Cable with M12 or M18 connector as well as versions with 2 m cable
- Temperature range –25...+80 °C

Series	
Measuring range	
Programmable switchpoints	
PNP, NO	
NPN, NO	
PNP, NC	
NPN, NC	
PNP, NO, with IO-Link	
Supply voltage U_S	
Voltage drop U_d	
Rated insulation voltage U_i	
Rated operating current I_e	
No-load supply current I_0 max.	
Polarity reversal protected/short-circuit protected	
Repeatability max.	
Temperature drift of switch-on point of $I H_n I$ typ.	
Hysteresis typ.	
On/off delay	
Ambient temperature T_a	
Degree of protection per IEC 60529	
Material	Housing
Connection	

Assembly
Slot

BMF 203 magnetic sensor on a centric gripper.

BMF 203	BMF 203	BMF 203	BMF 203	BMF 203
–30...+30 mm	**–30...+30 mm**	**–30...+30 mm**	**–30...+30 mm**	**–30...+30 mm**
2	**8**	**2**	**8**	**8**
BMF00JF		**BMF00JH**		
BMF00K2		**BMF00K3**		
BMF00K4		**BMF00K5**		
BMF00K0		**BMF00K1**		
	BMF00K8		**BMF00K9**	**BMF00JJ**
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
1.5 V	1.5 V	1.5 V	1.5 V	1.5 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA	100 mA
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
0.2 mm	0.2 mm	0.2 mm	0.2 mm	0.2 mm
1 mm	1 mm	1 mm	1 mm	1 mm
0.9...4 mm	Adjustable	0.9...4 mm	Adjustable	Adjustable
≤ 25 ms	≤ 25 ms	≤ 25 ms	≤ 25 ms	≤ 25 ms
–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
IP67	IP67	IP67	IP67	IP67
PA 12	PA 12	PA 12	PA 12	PA 12
2 m PUR cable, 4 × 0.07 mm²	2 m PUR cable, 4 × 0.07 mm²	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin
Can be installed from above	Can be installed from above	Can be installed from above	Can be installed from above	Can be installed from above
C-slot (size 10 slot)	C-slot (size 10 slot)	C-slot (size 10 slot)	C-slot (size 10 slot)	C-slot (size 10 slot)



Mechanical Sensors

For positioning and end-of-travel shutoff
Mechanical sensors are used for positioning and end-of-travel switching on machine tools and presses, in flexible machining centers, robots, assembly and conveying fixtures, as well as in machine and equipment building. These rugged classics of automation have proven themselves over decades.

Mechanical Multiple and Single Position Switches
Contents

Mechanical Multiple and Single Position Switches
Ultra-high-temperature resistant up to +180 °C 158

Mechanical Multiple and Single Position Switches

Ultra-high temperature resistant for extreme applications up to +180 °C, series 46, 40, 99

Stays cool, even when things get hot

The ultra-high temperature resistant multiple and single position switches can be used for temperatures up to 180 °C, require little space and feature a robust die casting housing. They are the perfect solution for harsh environments in die construction, plastic and steel industry.

CE

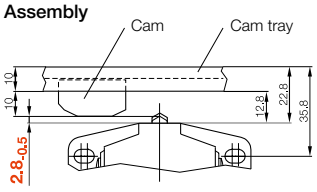
Type	
Series	
Plunger spacing	
Plunger style	
Material	Plunger
	Housing
Connection type	
Ambient temperature	Deg. Celsius
	Deg. Fahrenheit
Degree of protection per IEC 60529	

Switch element BSE 79

Connection	
Contact material	
Switching principle	
Contact system	
Connection	
Approval	
Plunger tip/switching point to reference surface	
to reference surface	
Maximum plunger travel	
Switching actuating force on plunger	

Additional types on request

Assembly

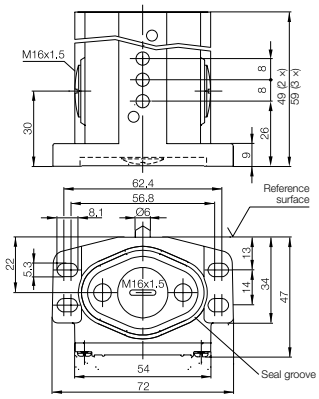


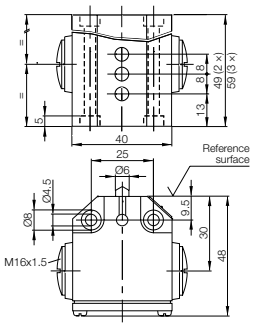
Notice!
To ensure switching function, the dimension $2.8_{-0.5}$ is especially critical.

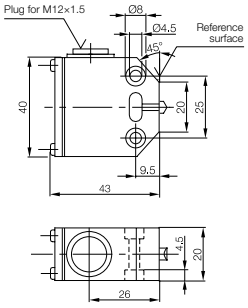
Mechanical Multiple and Single Position Switches

Ultra-high temperature resistant for extreme applications up to +180 °C, series 46, 40, 99

Multiple position switch	Multiple position switch	Single position switch
BNS 819-...-46-15	**BNS 819-...-40-15**	**BNS 819-99-...-15**
8 mm	8 mm	
Chisel (**D**), Ball (**K**), Roller (**R**)	Chisel (**D**), Ball (**K**), Roller (**R**)	Chisel (**D**), Ball (**K**), Roller (**R**)
Stainless steel, contact surfaces induction-hardened	Stainless steel, contact surfaces induction-hardened	Stainless steel, contact surfaces induction-hardened
Cast aluminum, corrosion-resistant, anodized finish	Cast aluminum, corrosion-resistant, anodized finish	Cast aluminum, corrosion-resistant, anodized finish
M16 × 1.5 for bulkhead	M16 × 1.5 for bulkhead	M12 × 1.5 for bulkhead
–5...+150 °C (–5...+180 °C 10 h/day)	**–5...+150 °C** (–5...+180 °C 10 h/day)	**–5...+150 °C** (–5...+180 °C 10 h/day)
+23...302 °F (+23...356 °F 10 h/day)	**+23...302 °F** (+23...356 °F 10 h/day)	**+23...302 °F** (+23...356 °F 10 h/day)
IP67	IP67	IP67







NO NC C	NO NC C	NO NC C
Gold	Gold	Gold
Snap switch	Snap switch	Snap switch
Single-pin changeover	Single-pin changeover	Single-pin changeover
Solder connection	Solder connection	Solder connection
UL, CE, CSA, CCC, ENEC	UL, CE, CSA, CCC, ENEC	UL, CE, CSA, CCC, ENEC
4 mm	4 mm	4 mm
3.5 mm	3.5 mm	3.5 mm
3.5 mm	3.5 mm	3.5 mm
Min. 8 N	Min. 8 N	Min. 8 N

Ordering example:
BNS 819-B03-D08-46-15

BNS 819-B_ _-_ 08-46-15

No. of plungers		Plunger style	
02	2 ×	**D**	Chisel
03	3 ×	**K**	Ball
		R	Roller

BNS 819-B03-D08-40-15

BNS 819-B_ _-_ 08-40-15

No. of plungers		Plunger style	
02	2 ×	**D**	Chisel
03	3 ×	**K**	Ball
		R	Roller

BNS 819-99-D-15

BNS 819-99-_ -15

Plunger style	
D	Chisel
K	Ball
R	Roller

Accessories

Suitable accessories are the optimum peripherals for sensors
We provide reliable products for time-saving and cost-effective integration into your automation system and for reliable operation. We have put together a selection for you from our comprehensive product line.

Contents

Accessories
Power supplies 162
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IP20 power supplies with Heartbeat® function and IO-Link

For reliable, efficient power
The industrial requirements for a power supply are as diverse and varied as the applications themselves. When what is needed is a reliable and efficient power supply, the new IP20 devices with Heartbeat® function and IO-Link are ideal. They provide feedback indicating the internal condition and the current status of your system.

Everything at a glance: **Stresslevel** indicates excessive temperature in the power supply and thereby in the control cabinet as well. **Loadlevel** indicates the current load on the output. If load increases, this can indicate a problem in the system, such as when a motor needs too much force to move a corroded ball bearing.
Lifetime reflects the service life of the power supply, making sure that you have an eye on the situation at all times. Unexpected failures and production stops are a thing of the past.

For the first time, you can easily transmit this information to the controller via IO-Link and have it processed there. This guarantees continuous diagnostics at a central location.

An expansion with the optional **IO-Link adapter** saves additional energy and money. IO-Link can be sued to place the power supply in stand-by as soon as this part of the system is not needed.

These power supply units save an enormous amount of energy due to their high efficiency. This provided the opportunity of reducing power loss (heat) to a minimum, making it possible to reduce the size of the housing for the power supply units. As an example, the 20 A version is 50 % narrower than a conventional power supply. This saves space in the control cabinet.

CE HEARTBEAT®

Output current
Output wattage
Output voltage
Input voltage
Efficiency
Degree of protection per IEC 60529

IO-Link adapter
BAE00TF

IO-Link

Information about the Heartbeat® power supply via IO-Link
- Process data, e.g. output voltage, output current
- Heartbeat® parameters
- Alarm messages, e.g. overload, over-temperature
- Diagnostics messages, e.g. for input voltage, current stress level, operating hours

IO-Link can also be used to turn off the output voltage. A concrete example of energy savings.

Loadlevel (load factor)

- Short term, reversible

Loadlevel indicates the present load factor of the device. The display indicates the load with no delay.

Stress level

- Medium term, reversible

Stresslevel indicates the thermal load. Changing the load has an effect on device wear.

Lifetime (service life)

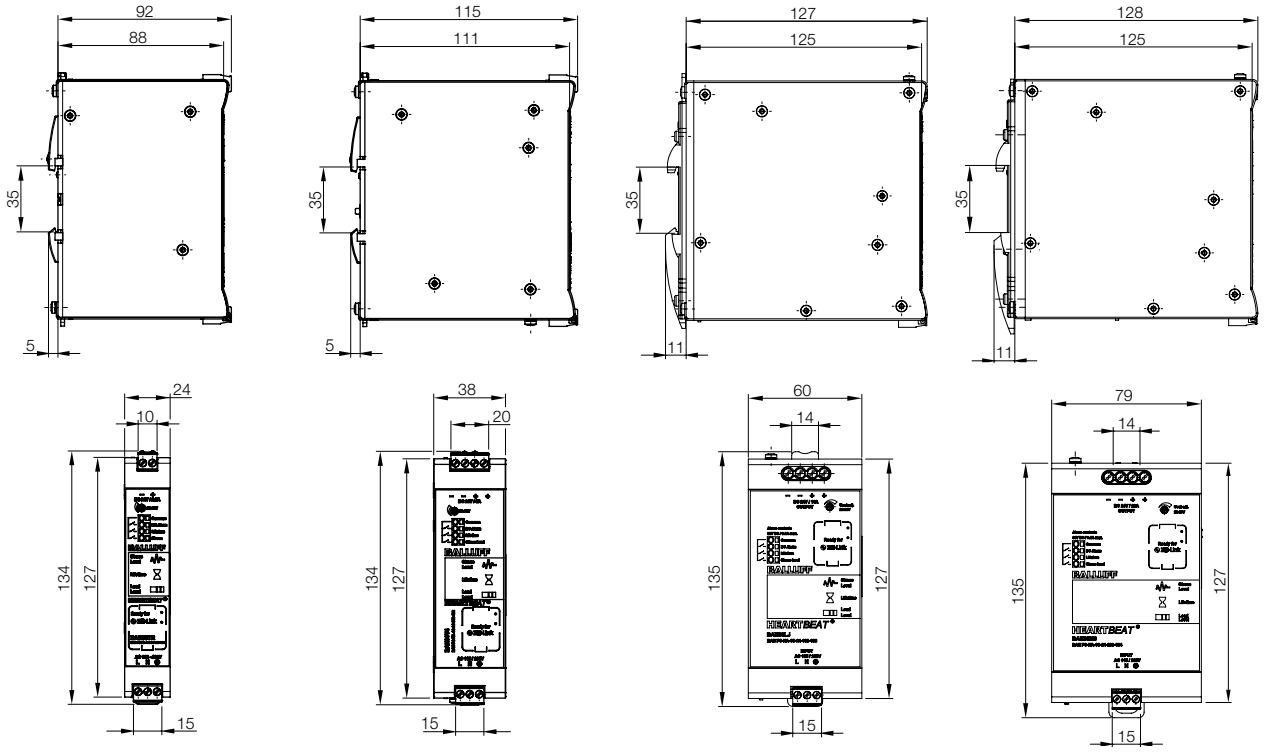
- Long-term, irreversible

Lifetime shows the remaining service life of the device, based on the total of all loads.

All indicators show the status of the device and are multi-colored: green yellow red

IP20 power supplies with Heartbeat® function and IO-Link

2.5 A	5 A	10 A	20 A
60 W	120 W	240 W	480 W
24 V DC (SELV, PELV)	24 V DC (SELV, PELV)	24 V DC (SELV, PELV)	24 V DC (SELV, PELV)
115…230 V AC	115 V/230 V AC (automatic setting)	115 V/230 V AC (automatic setting)	115 V/230 V AC (automatic setting)
BAE00TR	**BAE00T4**	**BAE00LJ**	**BAE00M3**
High efficiency, typically 88 %	High efficiency, typically 92 %	High efficiency, typically 93.5 %	High efficiency, typically 93.5 %
IP20	IP20	IP20	IP20



The complete line from Balluff includes power supplies for all applications in IP20 and IP67 for challenging environments. Many more mounting accessories can be found at **www.balluff.de/power-supply-units** or in our "Accessories Line" catalog.

Continuous monitoring of the wear factors
In industrial automation, the focus continues to shift more towards decentralized installation without control cabinets. Balluff power supplies with IP67 protection are perfect for this. They can be used in the field directly and under harsh conditions.

Special sensors in the device continuously monitor wear factors such as temperature, overload, interference and other basic conditions.

In addition to the visualized interface, the devices provide the option of transmitting parameters using IO-Link for the first time. This means the power supply can be installed in hard to access locations and be conveniently monitored from the control center.

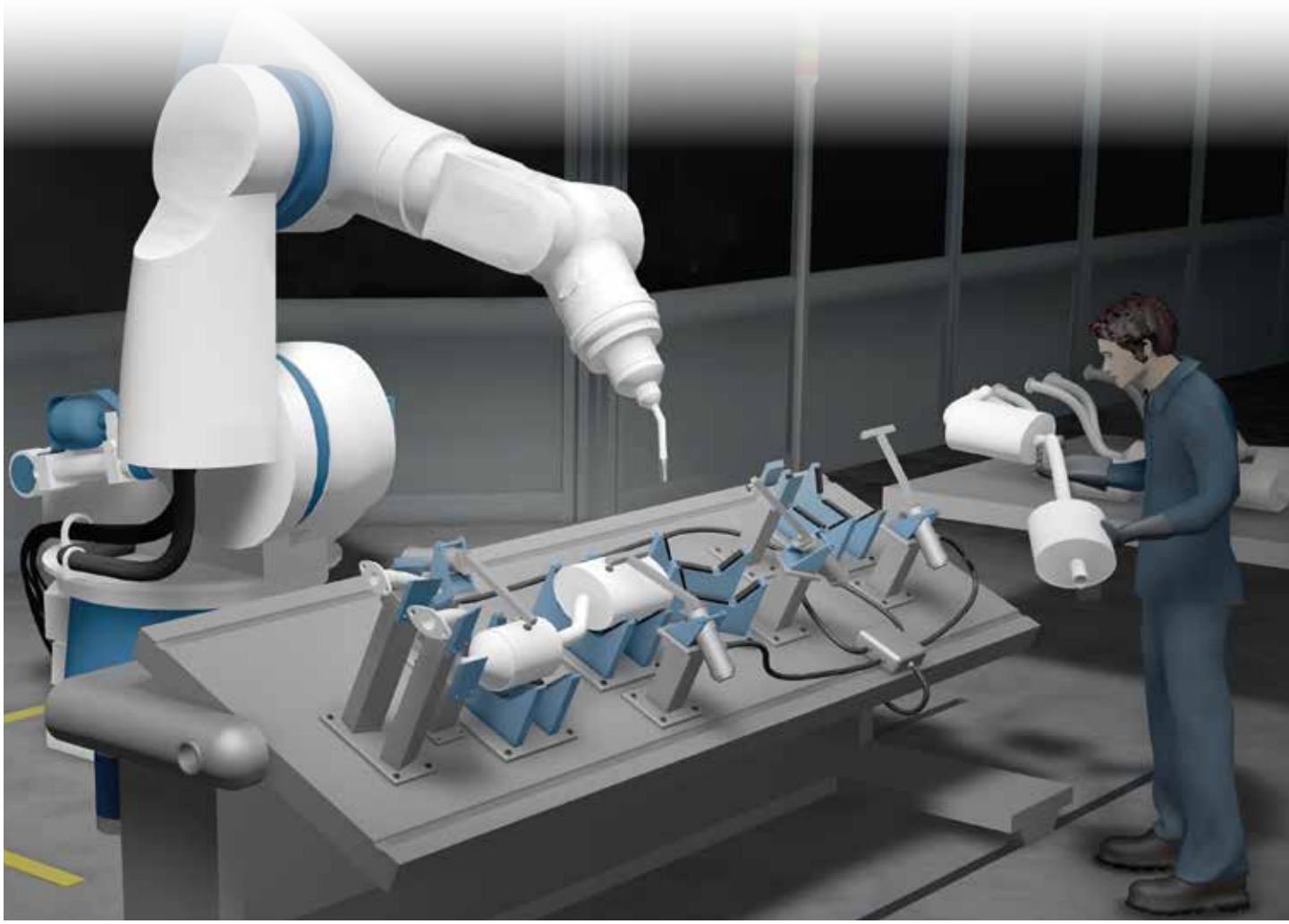
Information about the Heartbeat® IP67 power supply via IO-Link
- Process data, e.g. output voltage, output current
- Heartbeat® parameters
- Alarm messages, e.g. overload, over-temperature
- Diagnostics messages, e.g. for input voltage, current stress level, operating hours

The IO-Link connection is made through the proven M12 connector.

CE IO-Link
HEARTBEAT®

Output current
Output wattage
Output voltage
Input voltage
Efficiency
Degree of protection per IEC 60529

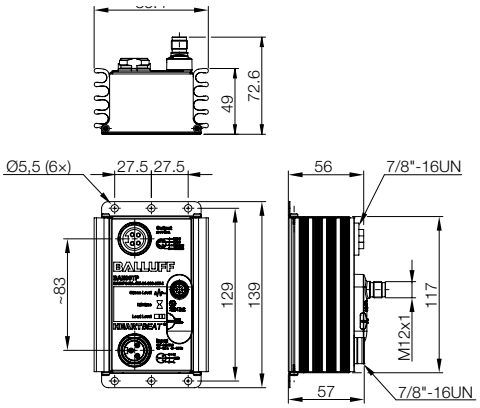
This compilation is an excerpt from the complete portfolio

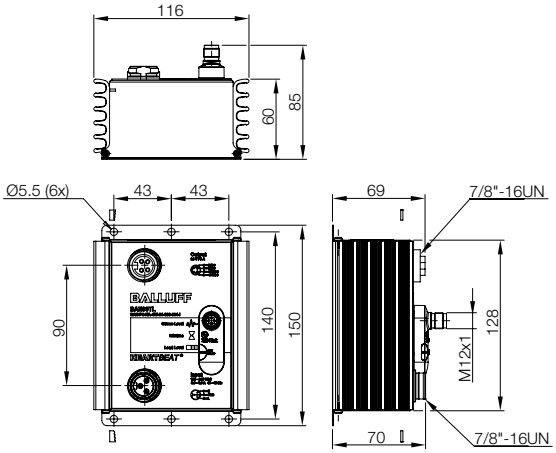


IP67 power supplies are installed directly where the action is. They can be monitored locally via the Heartbeat®LEDs and conveniently from the control panel through IO-Link.

IP67 power supplies with IO-Link

3.8 A	8 A
91.2 W	192 W
24 V DC (SELV)	24 V DC (SELV)
100...240 V AC	100...240 V AC
BAE00TP	**BAE00TL**
High efficiency, typically 91 %	High efficiency, typically 91 %
IP67	IP67



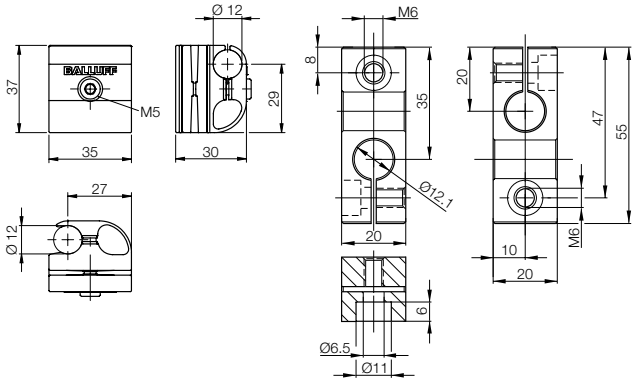


Guarantees reliable sensor grip
The BMS universal mounting system provides a new design, ideal for easily securing sensors in almost any application. This allows complicated positioning tasks to be completed quickly and flexibly without a special tool or much effort. The versatile accessories cover almost any solid angle.

Robust and can be used universally
The fastening technology is designed for use in difficult industrial environments. The mechanically reliable components – base holder, joint piece and sensor holder – are made of rugged die-cast zinc.

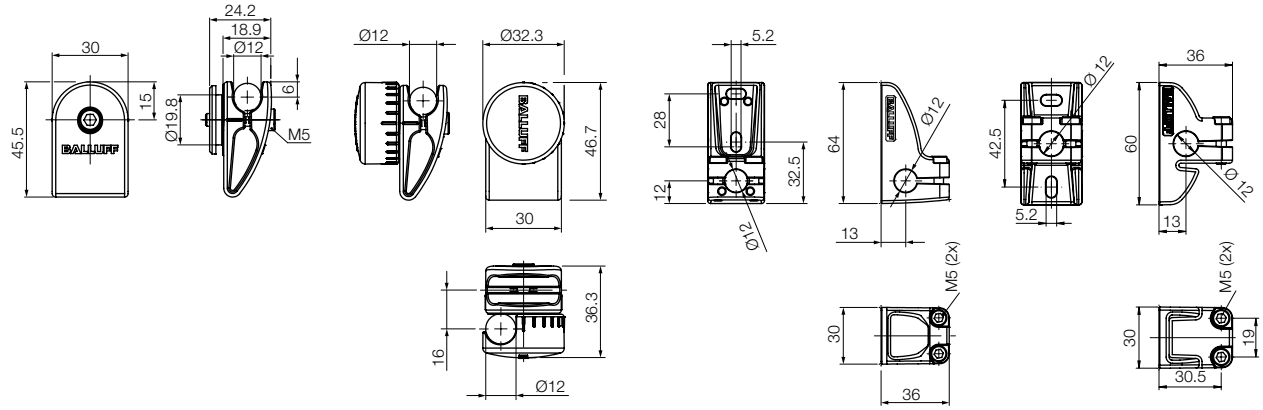
Ease of handling
The basic holder fits on all manufacturer-specific assembly profiles and fully covers the groove. Extensively flattened on one side, this is also the first version of the holder suitable for mounting directly on a wall. The fastening screws are accessible from one side. Both the joint piece and sensor holder can be positioned on the rod without risk of slipping by using a snap mechanism. For mounting, one screw suffices for each. A scale assists with setting the joint angle.

Description	**Cross-connector**	**Cross-connector**
Version	For 2 mounting rods Ø 12 mm	For 2 mounting rods Ø 12 mm
Use	Connection element for 2 mounting rods Ø 12 mm	Connection element for 2 mounting rods Ø 12 mm
	BAM027F	**BAM002Z**
Material	Coated die-cast zinc	Anodized aluminum



reddot award 2014
winner

Sensor holder	Joint	Base holder	Base holder
For 1 mounting rod Ø 12 mm	For 2 mounting rods Ø 12 mm	For 1 mounting rod Ø 12 mm (vertical or horizontal)	For 1 mounting rod Ø 12 mm (vertical or horizontal)
For securing all sensor, reflector and antenna holders	Adjustable connecting piece for Ø 12 mm mounting rods	For mounting on base plates or profiles	For mounting on base plates or profiles
BAM024T	**BAM024R**	**BAM024P**	**BAM0275**
Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc	Coated die-cast zinc



Also available as a taller version under order code **BAM02JT**

Many more products can be found in our "Accessories Line" catalog or online at:
www.balluff.com

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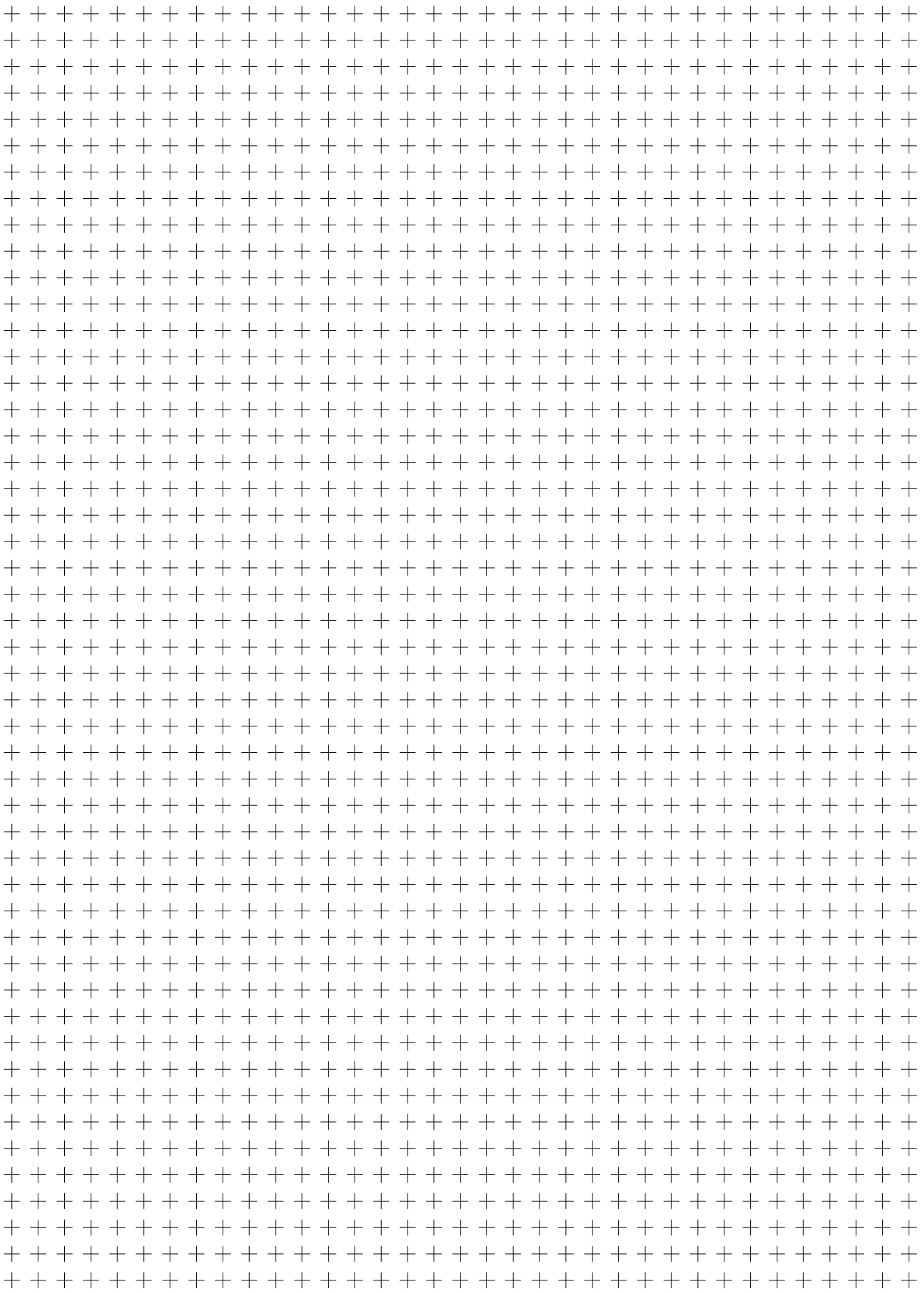

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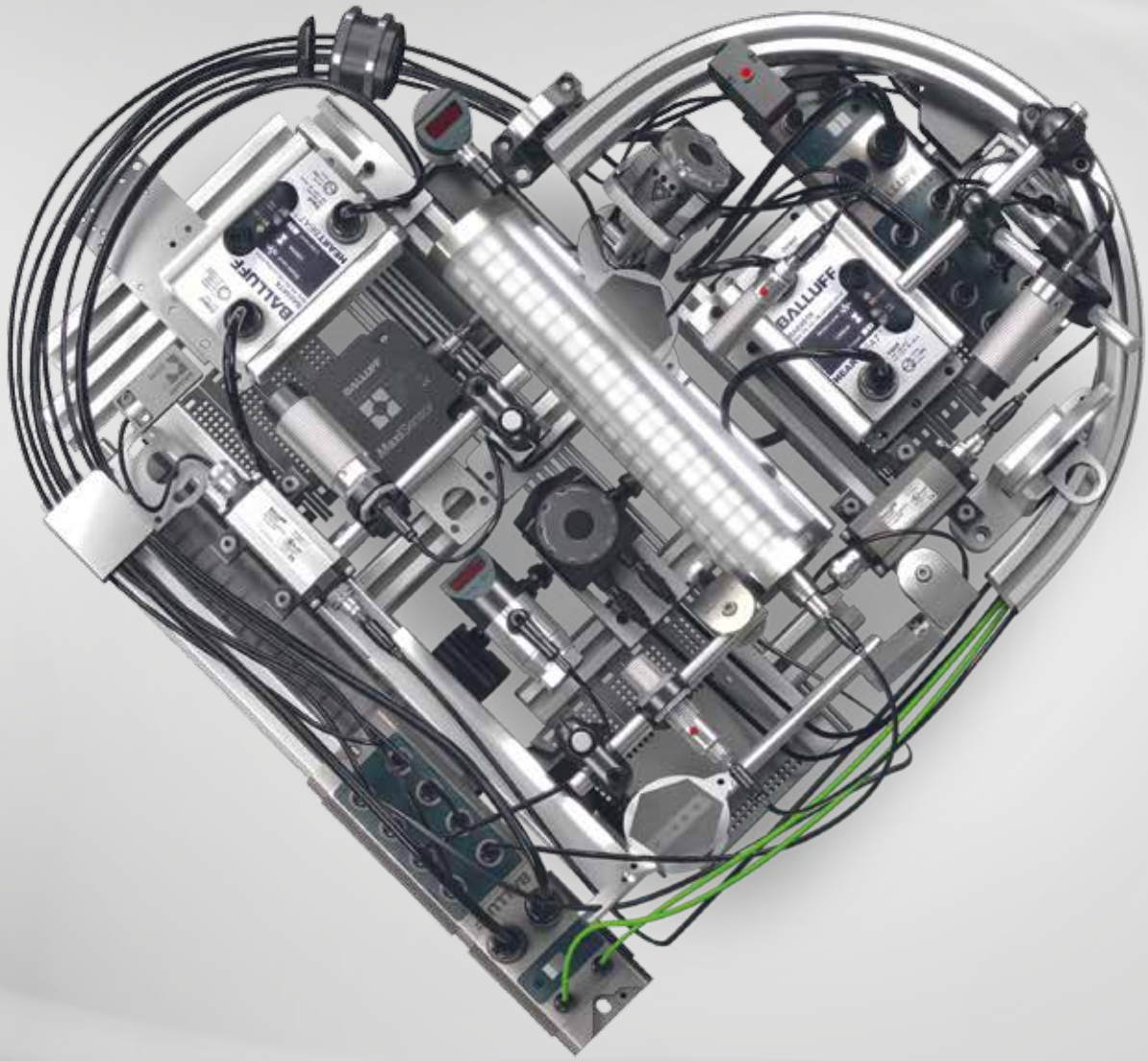

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