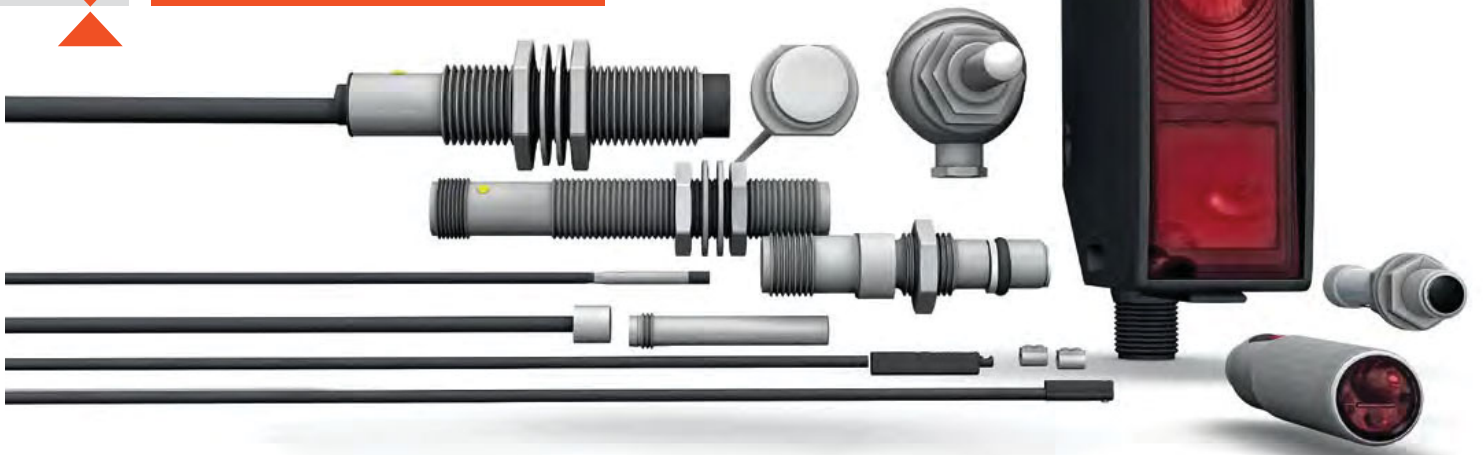
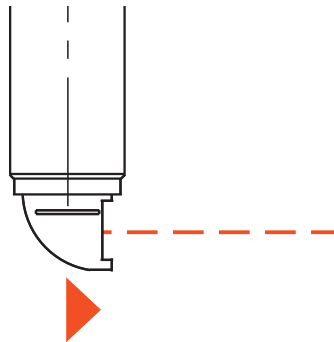
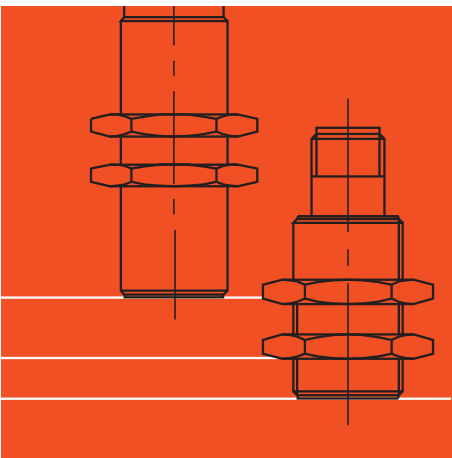


Object Detection

Innovative sensor technology for all areas of automation





With over 50 years of sensor experience, Balluff is a leading global sensor specialist with its own line of connectivity products for every area of factory automation. Balluff is based in Germany and has a tight international network of 54 representatives and subsidiaries.

Balluff stands for comprehensive systems from a single source, continuous innovation, state-of-the-art technology, highest quality, and greatest reliability. That's not all: Balluff also stands for exceptional customer orientation, customized solutions, fast worldwide service, and outstanding application assistance.

High-quality, innovative products tested in our own accredited laboratory and a quality management system certified according to DIN ISO 9001 (EN 2008) form a secure foundation for optimized added value for our customers.

Whether electronic and mechanical sensors, rotary and linear transducers, identification systems or optimized connection technology for high-performance automation, Balluff masters not only the entire technological variety with all of the different operating principles, but also provides technology that fulfills regional quality standards and is suitable for use worldwide. Wherever you are in the world, Balluff technology is never far away. You won't have to look far for your nearest Balluff expert.

Balluff products increase performance, quality and productivity around the world every day. They satisfy prerequisites for meeting demands for greater performance and cost reductions on the global market. Including in the most demanding areas. No matter how stringent your requirements may be, Balluff delivers state-of-the-art solutions.

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



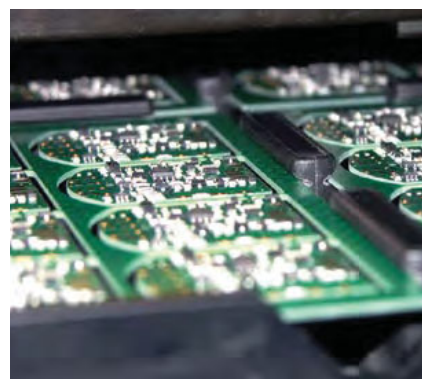
Object Detection

Innovative sensor technology for all areas of automation

Photoelectric sensors	14
Inductive sensors	466
Capacitive sensors	768
Magnetic cylinder sensors	850
Industrial networking and connectivity – A selection You will find many additional products in our total product line catalog, "Industrial Networking and Connectivity"	912
Basic information and definitions	952
Index	1010



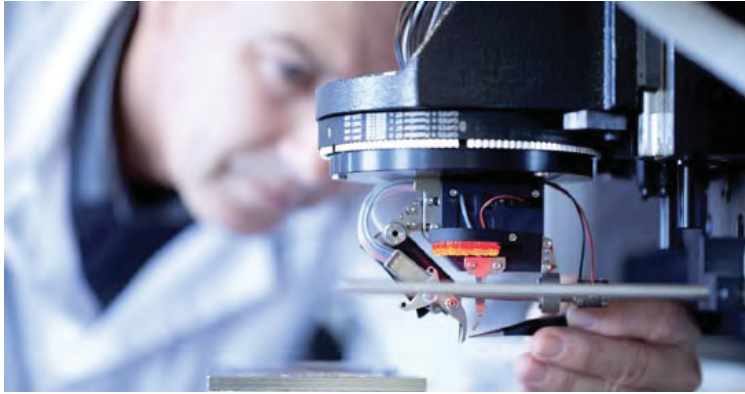
Automobile, factory automation, metal processing,
energy, hydraulics and pneumatics,
filling and packaging, handling and automation,
plastics processing and many more.





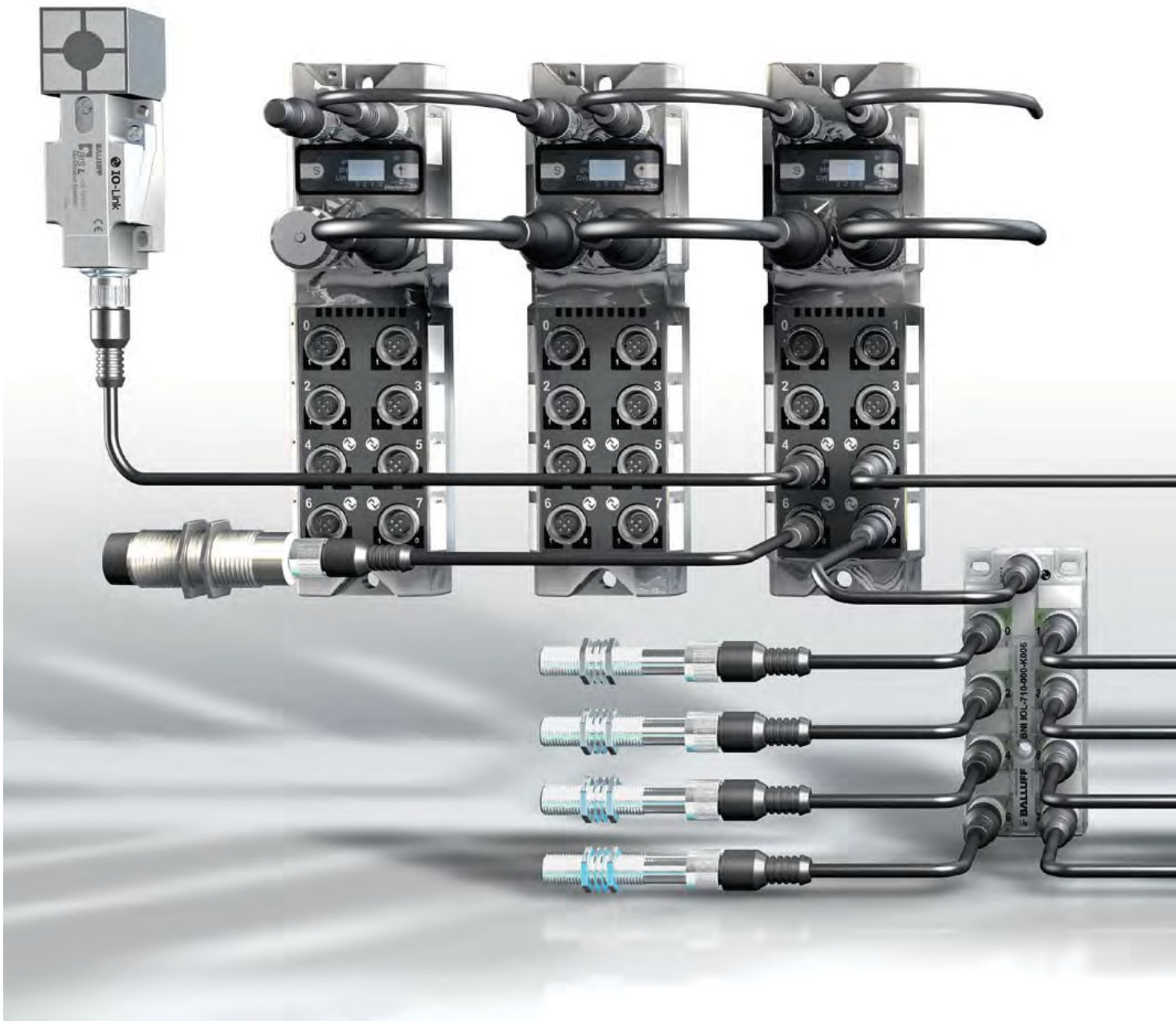
Object Detection

Innovative sensor technology for all areas of automation



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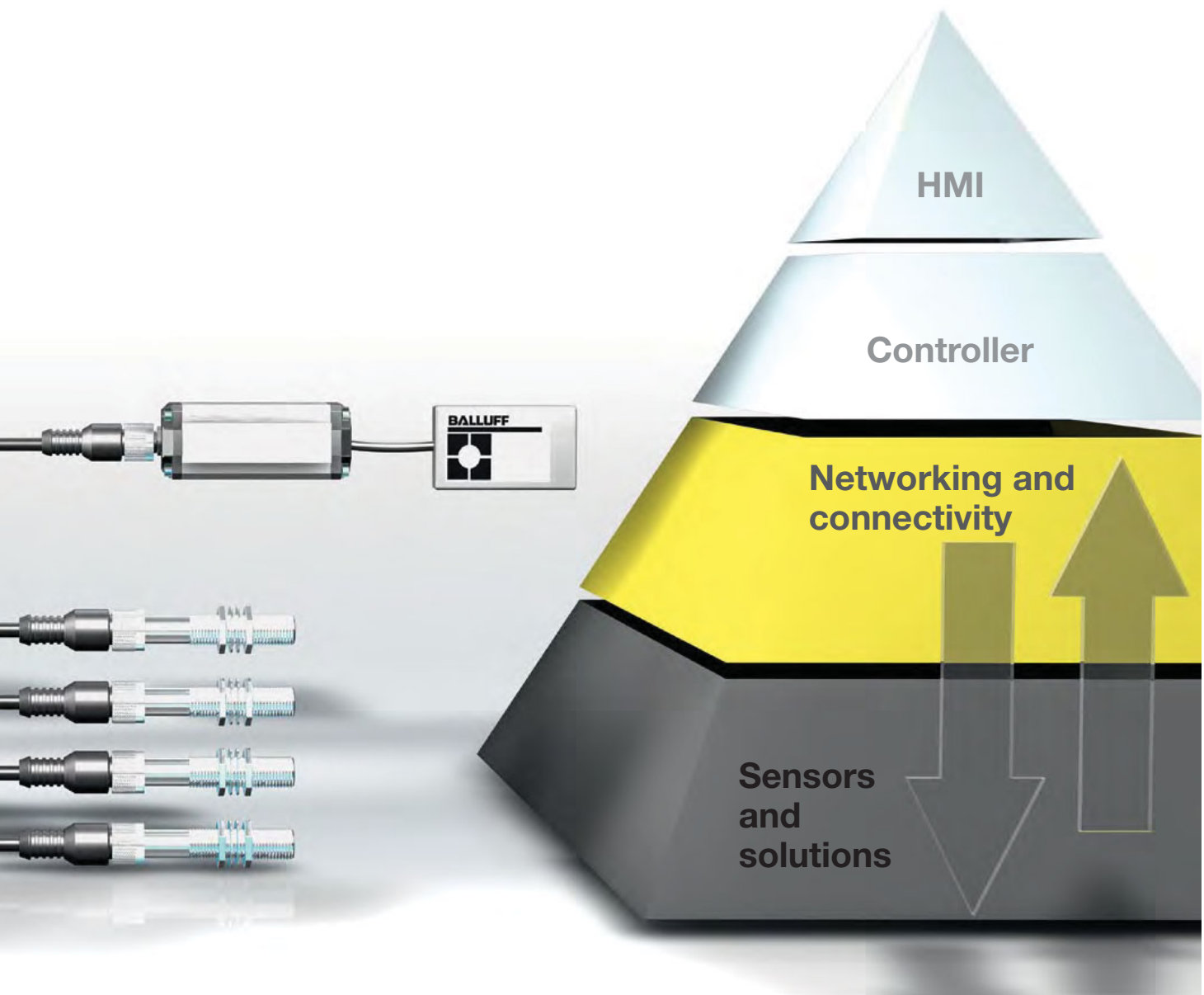






Industrial Identification Industrial Networking and Connectivity

Industrial RFID systems BIS, Vision Sensors BVS, connectors and connection cables BCC, valve connectors BCC, passive splitter boxes BPI, active splitter boxes BNI, IO-Link, inductive couplers BIC, bus systems (Profibus, Profinet, CC-Link, Devicenet, Ethernet, IO-Link), wireless systems BWT, power supplies BAE, electrical equipment BAE



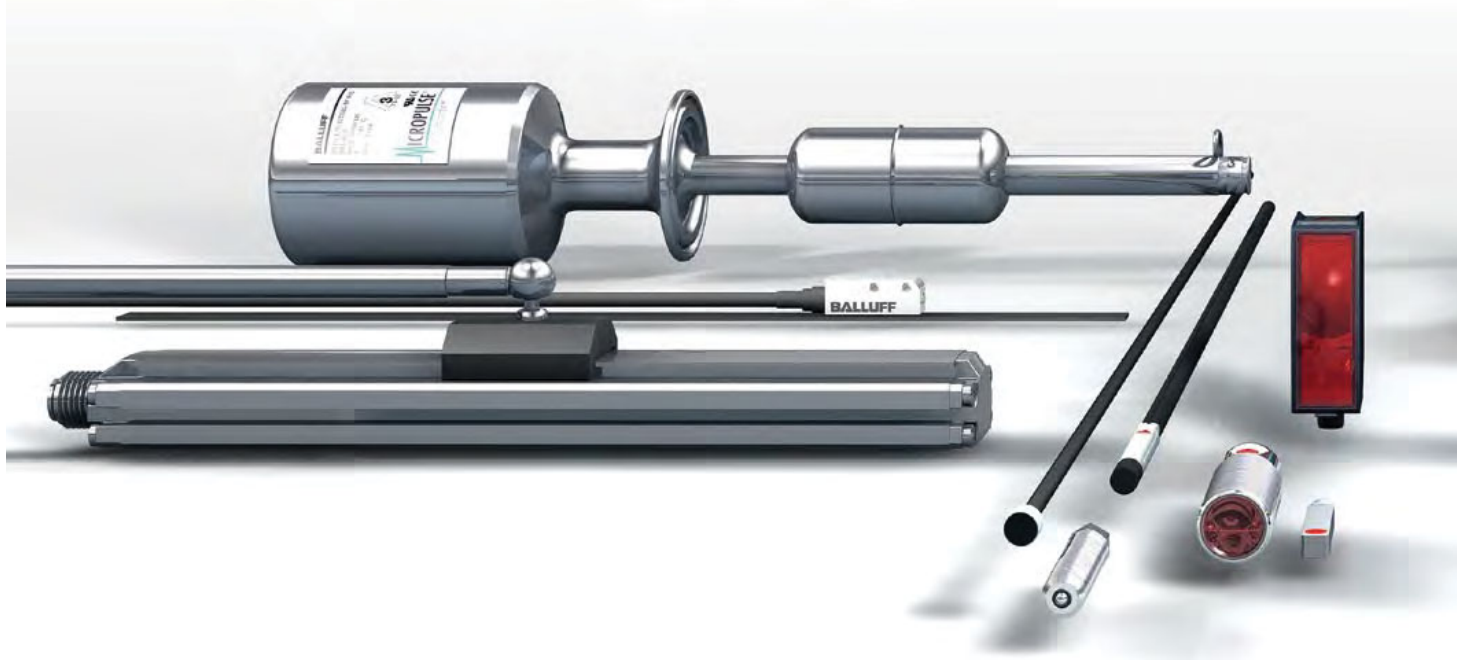
i





Object Detection Sensors Linear Position Sensing Fluid Sensors Mechanical Accessories

Inductive sensors BES, magnetic field cylinder sensors BMF, photoelectric sensors BOS, capacitive sensors BCS for object detection, ultrasonic sensors BUS for object detection, fiber optic devices BFB, through-beam fork sensors BGL, optical window sensors BOW, light grids BLG, contrast sensors BKT, luminescence sensors BLT, color sensors BFS, mechanical and inductive single and multiple position switches BNS, micropulse transducers BTL, magnetic linear encoder system BML, incremental encoders BDG, absolute encoders BRG, inductive displacement system BIW, inductive distance sensors BAW, magnetoinductive distance sensors BIL, capacitive distance sensors BCW, photoelectric distance sensors BOD, ultrasonic sensors BUS for analog distance measurement, pressure sensors BSP, capacitive sensors BCS for level detection, brackets and mountings, mounting system BMS

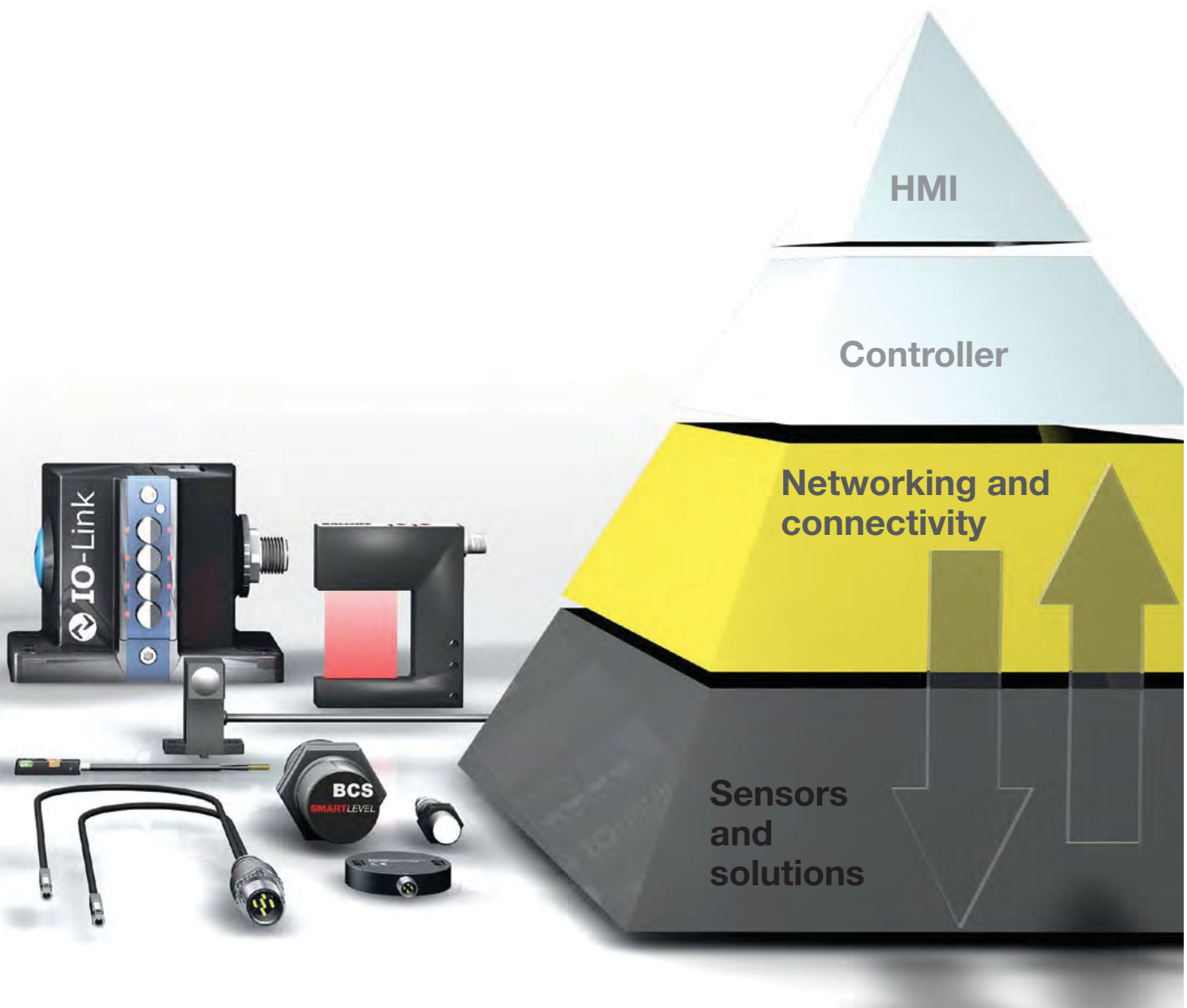




Sensors and Solutions

Rugged control components from network to sensor

i



http://www.balluff.com

BALLUFF

sensors worldwide

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mini.s – powerful, compact mini
Outstanding freedom of design for more applications

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- CAD drawings in 2D or 3D
- Catalogs
- Brochures
- Manuals
- Software descriptions
- User's guides
- FAQs
- Worldwide addresses

■ Product overview



■ 2D and 3D product data



■ News and events



■ Company information



■ Service and support



■ We are happy to help



i



Comprehensive sensor expertise from a single source



Photoelectric
sensors



Photoelectric sensors check presence, size, color, distance and thickness. They are excellent specialists with different focuses:

- Part recognition and counting
- Stack height monitoring
- Detection through glass
- Small parts alignment
- Brand recognition
- Fill level detection and much more

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Inductive
sensors



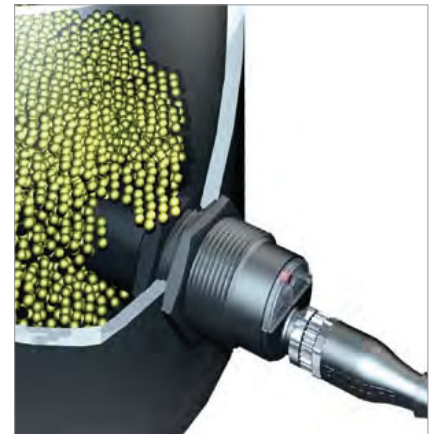
Inductive sensors are used to control, position and check processes in automation technology. The robust sensors detect objects in the metal range.

- Non-contact, wear-free, contamination-resistant, short-circuit protected
- Available in designs from Ø 3 mm to 80x80 mm square dimensions

Page 466



Capacitive
sensors



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

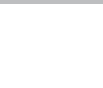
- Non-contact, wear-free, non-reactive, bounce-free output signal
- Simple sensor replacement, container seal is unnecessary

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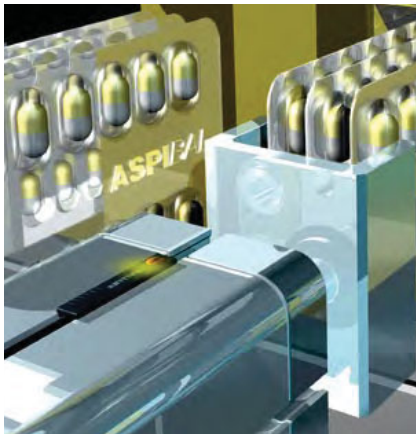
Object Detection

Innovative sensor technology for all areas of automation

i



Magnetic cylinder sensors



The primary application for magnetic cylinder sensors is detecting piston positions on pneumatic and hydraulic cylinders.

- Can be used universally
- Very precise, reliable switching behavior
- Long service life due to lack of contact and wear
- Vibration-resistant
- Space-saving mounting thanks to small sizes



Industrial networking and connectivity



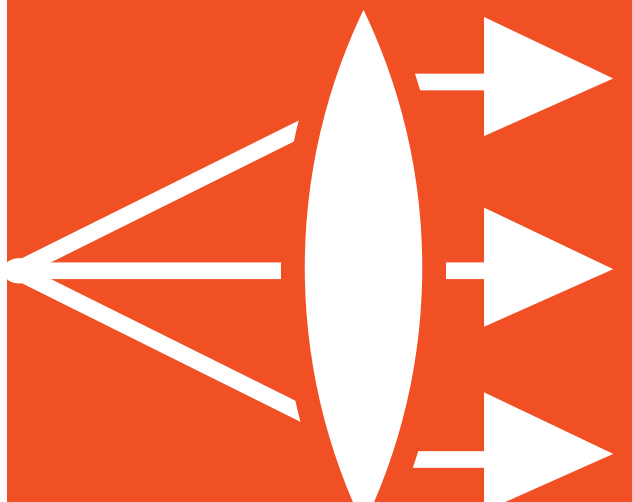
Complete product line for quickly and easily connecting sensors and systems to all networks. Usable anywhere in the world. For powerful performance

- All bus systems – shock and vibration-resistant. IP 67 guaranteed!
- Inductive coupler for contactless transmission of data and energy
- Passive distributor for the best integration
- Comprehensive portfolio of plug connectors and connection lines for all areas of automation
- The entire connection design is also available in IO-Link versions

⚠ WARNING

- Read, understand, and follow warnings and manual. Failure to do so could result in serious injury or death.
- NEVER USE AS A SENSING DEVICE FOR PERSONNEL PROTECTION
- Does NOT include self-checking redundancy circuitry required for use in personnel safety applications
- Does NOT meet OSHA and ANSI standards for point-of-operation devices

Balluff, Inc. · www.balluff.com · 1-800-543-8390



Photoelectric Sensors

Photoelectric sensors for object detection

Photoelectric sensors check presence, size, color, distance and thickness.

They are excellent specialists with completely different focuses:

- Part recognition and counting
- Stack height monitoring
- Detection through glass
- Small parts alignment
- Brand recognition
- Fill level detection and much more.

The wide Balluff portfolio offers every light type, whether red light, infrared or laser technology. In different ranges. With and without background suppression.

Various designs – also in mini version – ensure a wide variety of possible applications. Our photoelectric sensors are optimized for robotics, automation, installation and handling.



Photoelectric Sensors

Contents

Photoelectric sensors

Performance spectrum
Product overview

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Photoelectric standard sensors

Cylinder designs
Block designs

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Photoelectric special sensors

Optical fiber basic devices BFB/BOS
Fiber optics BFO
Contrast sensors BKT
Luminescence sensors BLT
Color sensors BFS
Fork sensors BGL_A
Analog fork sensors BGL_C
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Dynamic optical windows BOW
Light grids BLG

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Photoelectric distance sensors for analog distance measurement

Block designs

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Special accessories for photoelectric sensors

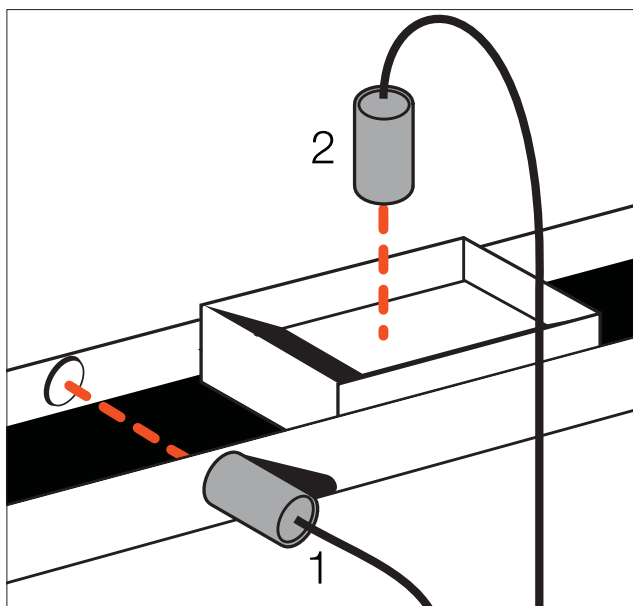
Reflectors
Fasteners
Optical accessories
Fiber optic accessories

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Basic
information
and definitions
can be found
on page 952.



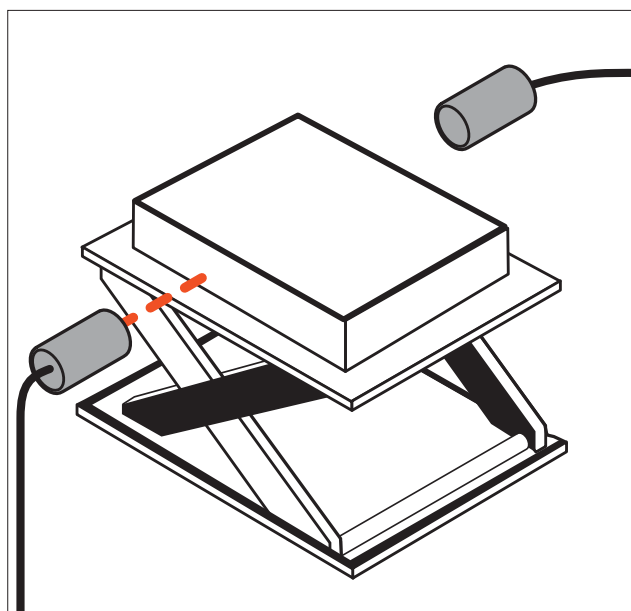
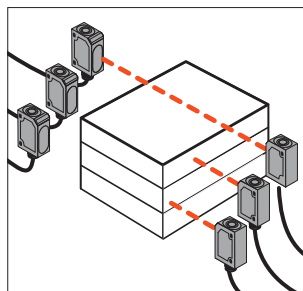


Querying the size and content of containers

The retroreflective sensor (1) indicates the presence of the box. The pulse duration can be used to count or measure box lengths. The diffuse sensor (2) with background suppression checks the contents of the box. Its range is adjustable.

Checking stack height

Through-beam sensors that consist of a emitter and receiver can be installed one on top of the other. Each through-beam sensor then scans a specific stack height. The accuracy of the scan is within a few millimeters, if apertures are used.



Tracking a hoist

The through-beams are assigned so that the uppermost metal plate interrupts the light beam. The beam path is open when the metal plate is removed for processing. The through-beams provide a switching signal, and the hoist is automatically reset to the height of a metal plate.



Photoelectric sensors

Performance spectrum

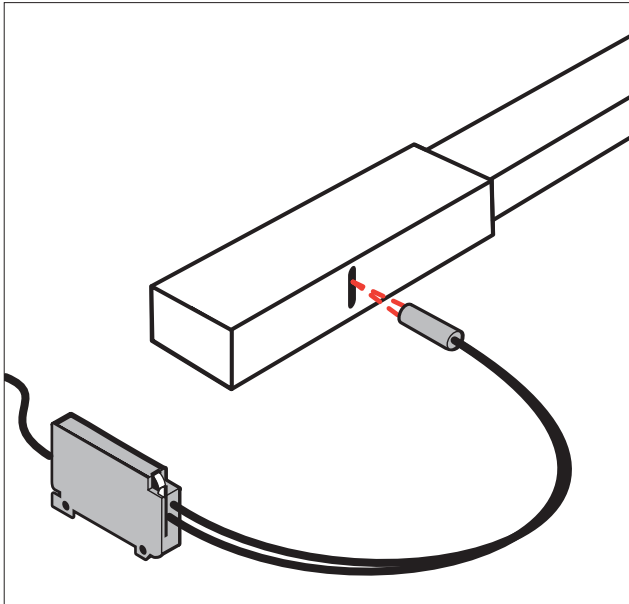
Product overview

Photoelectric standard sensors

Photoelectric special sensors

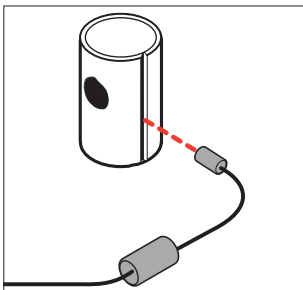
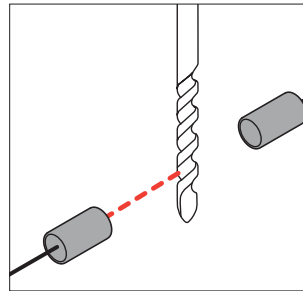
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



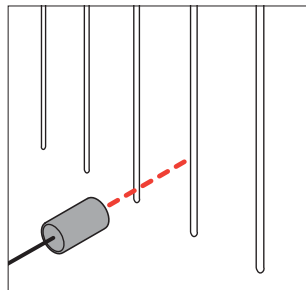
Scanning a read mark

In order to recognize a reading mark, a base device and plastic fiber optics are used. This way a mark – such as a bright line – can be scanned on a dark background, as occur on belts, hoses or containers.



Detecting a groove

To sense a groove on a bearing pillow, a diffuse sensor is adjusted using a fiber optic cable so that the bearing pillow is reliably detected. The groove interrupts the beam (no reflection). And the switch changes its output condition.

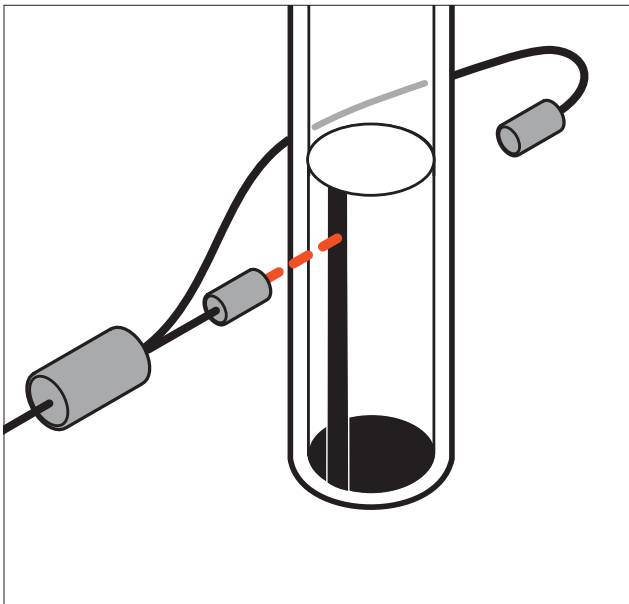


Detecting small parts

With an optical adapter such as the BOS 18-PK-1, small parts can be measured and the background simultaneously suppressed. In this way, with a sensing distance of up to 13 mm, for example, fibers with a diameter of 0.05 mm can be queried, where the color plays a subordinate role. Diffuse sensors with background suppression enable larger ranges.

Checking drill breakage

Using a through-beam sensor with double-slotted apertures, a drill breakage check can be carried out from 2 m away. Drills larger than approx. 2 mm diameter can be checked this way. If even smaller drills (down to 1 mm Ø) have to be checked, then a laser through-beam sensor can be used.

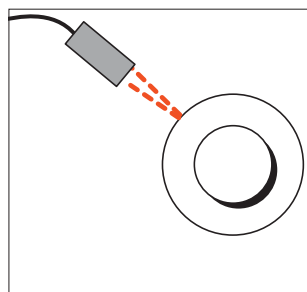


Querying fill level in transparent containers

During the fill level query in a transparent container (cylinder), a diffuse sensor with fiber optics is used as a through-beam sensor. If no liquid is at the sensor height, the light beam is not broken, so that it hits the receiver. If enough fluid is available, the light beam is deflected away from the receiver. The switch changes its output condition.

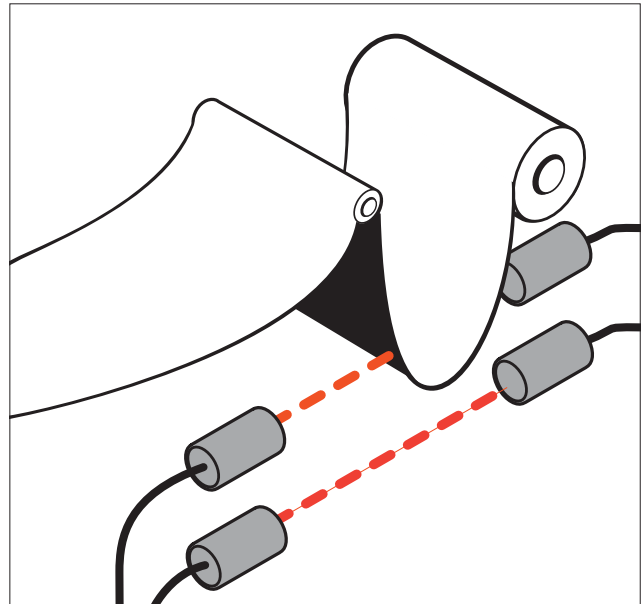
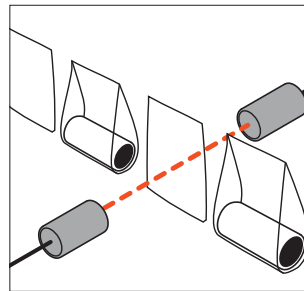
Recognizing different diameters

In order to be able to recognize different shaft diameters, a diffuse sensor with background suppression (HGA) is used in such a manner that it switches with large diameters. Small diameters, on the other hand, are suppressed as "background" so that the sensor does not switch.



Querying packaging contents

A through-beam sensor is used in order to query the content of a package (e.g., bandages). To do so, the emitter and receiver are arranged so that the light beam goes through the packaging. If the packaging is empty, the light is sufficient to light up the receiver. If it is filled, the packaging contents interrupt the emitter's light beam. And the sensor switches.



Checking sag

Two through-beam sensors can be used to control the positioning of a roller conveyor. In addition, the through-beams are arranged above each other so that at optimum slack, the lower light beam is clear and the upper beam interrupted. If both light beams are clear, more roll tension is needed. If both are interrupted, there is too much material (slack) present.



Photoelectric
sensors
**Performance
spectrum**
Product
overview

Photoelectric
standard
sensors

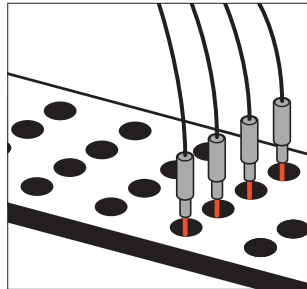
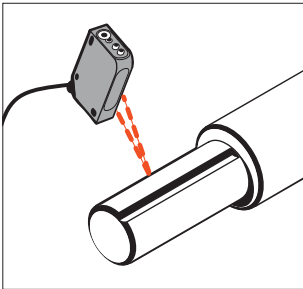
Photoelectric
special
sensors

Photoelectric
distance
sensors
for analog
distance
measurement

Special
accessories for
photoelectric
sensors

Positioning parts

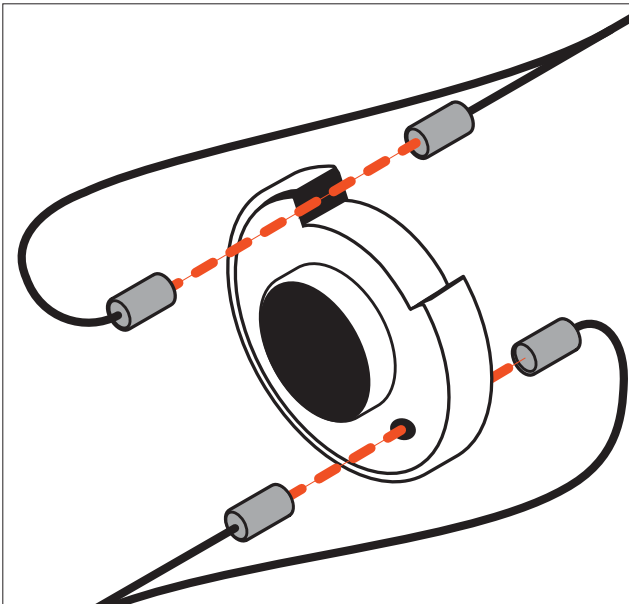
In order to correctly position pivoted parts, its groove can be scanned. A laser diffuse sensor with background suppression is calibrated so that it recognizes the surface of the pivoted part. If the light beam strikes the slot, the light is reflected back to the sensor at a different angle. The switch recognizes this as a background signal and ignores it, i. e. changes its switching state.



Checking fill level: Granular material in small packages

Multiple sensors simultaneously check the content of a whole series of small packages on a conveyor belt.

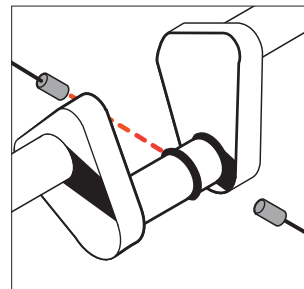
In addition, the user can shorten the plastic fiber optics to the desired length. Its standard length is 2 m.



Checking the quality of workpieces

Multiple sensors with fiber optic attachments simultaneously check different features of a workpiece.

Only if all drill holes, screws, dimensional accuracies, surface qualities etc. are present may the workpiece be processed further. Later failures and downtime are thus avoided.

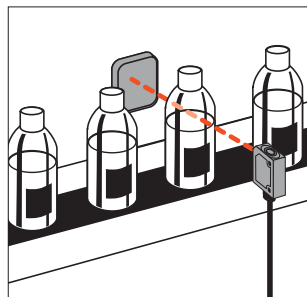
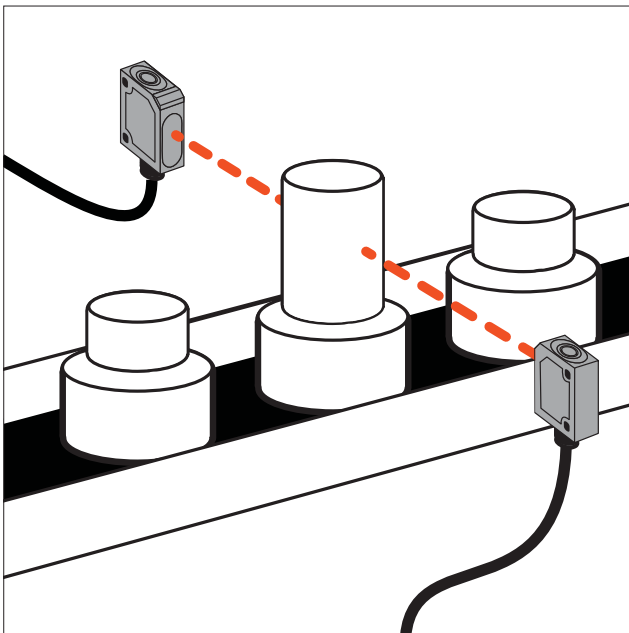


Detecting the bead of a camshaft

To detect whether a bead is present, a diffuse sensor with fiber optics is used. This fiber optic is arranged on a level parallel to the camshaft. If a bead is present on the camshaft, the light beam is interrupted. With no bead, the beam path is free.

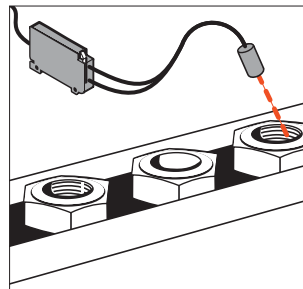
Sorting parts

In order to be able to sort parts of various heights, a through-beam sensor is used. To do so, a teach-in process is used so that taller parts interrupt the light beam and can be sorted out. The quick and secure teach-in enables quick adaptation to changed conditions.



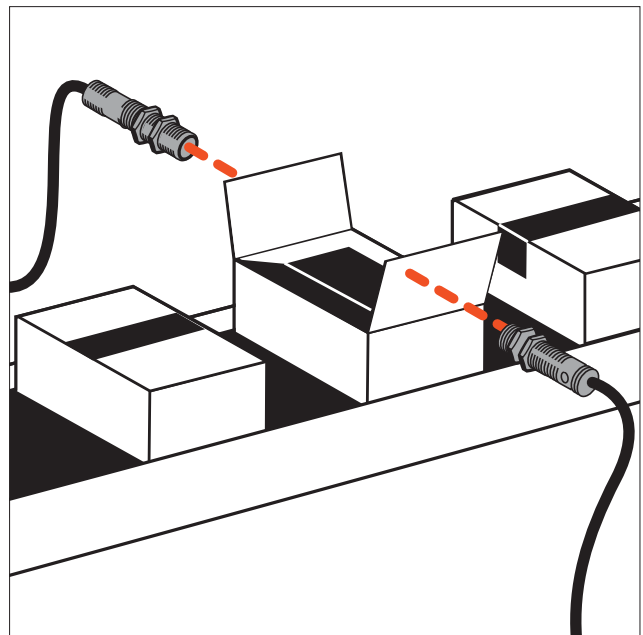
Counting transparent bottles

Transparent objects absorb only a little light. In order to measure them accurately, retroreflective sensors with small hysteresis are best suited. Through their teach-in-buttons, the sensors can additionally be set very easily, and their configuration can be changed even when the process is running. Unnecessary downtimes are thus prevented easily.



Checking threads

Prior to assembling nuts, a check needs to be made to determine whether a thread is present or not. If the thread is present, they will reflect the light back to the fiber optics and the sensor will operate. If the thread is missing, there will be a total reflection on the blank wall of the drill hole, and as a result, no light will be reflected to the fiber optics. The sensor does not switch.



Checking packaging

In order to check whether a packaging is correctly closed, a through-beam sensor is configured so that the light beam runs just above the packaging. If it is not correctly closed, the obstructing lid interrupts the light beam, and the through-beam sensor signals it.



Photoelectric sensors

Performance spectrum

Product overview

Photoelectric standard sensors

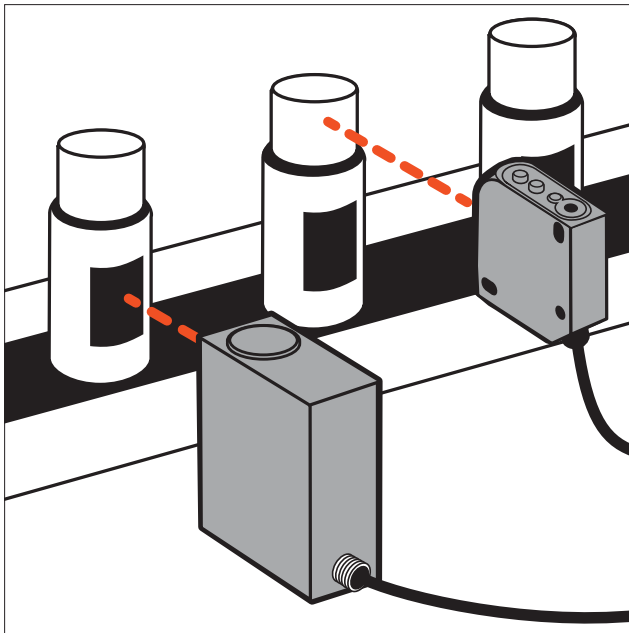
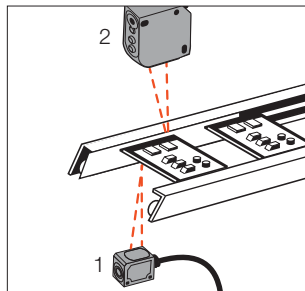
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Positioning and checking equipment

To bring the circuit board to a particular inspection position, a focused diffuse sensor (1) is used. The board crosses the light beam of the sensor exactly in its focus. This enables maximum precision. Through the small spot of light of the laser diffuse sensor (2) and its background suppression, it can be checked whether even small components are present on the board.

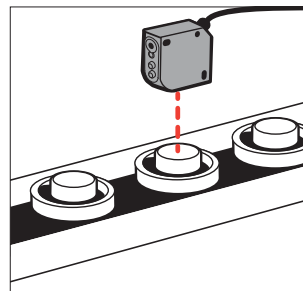
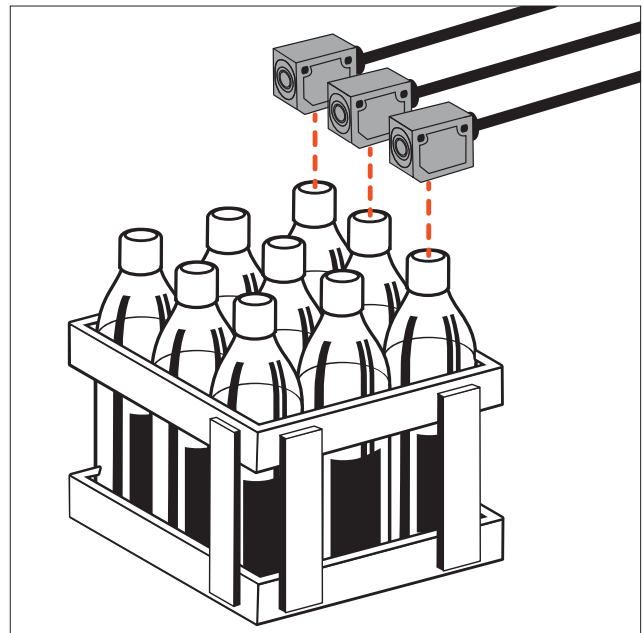


Final inspection of labels and caps

For the final inspection of dish detergent bottles, a check must be made to determine whether the label and cap are attached. A contrast sensor is used for the label inspection. This distinguishes between the relative reflectivity of the label and the bottle. The cap is detected using a diffuse sensor with background suppression. The advantage of the background suppression is that if the cap is missing, the screw closure can be faded out.

Checking completeness

In order to be able to check an assembly process in detail, diffuse sensors with background suppression (HGA) are used. These sense small objects with high precision and are not misled by different colors. If details need to be measured even more accurately, we recommend laser sensors with background suppression.



Inspecting closing caps

Depending on installation circumstances and the required switching distance, a wide variety of diffuse sensors with background suppression can be employed. In this way, you can choose excellent specialists from the tightest installation conditions, the maximum resolution or high ranges. Contact us.

Photoelectric Sensors

Product overview

Global
mini.s



Global



Global



Type

BOS 08M

BOS 12M

**BOS 12M
laser**

BOS 18M

**BOS 18M
red light**

Housing material

Metal

Metal

Metal

Metal

Metal

Range/sensing distance

Through-beam sensor
emitter/receiver

0...1.1 m

0...5 m

0...3 m, 0...30
m

0...20 m,
0...25 m

0...20 m

Retroreflective sensor

Retroreflective sensor
with polarizing filter

25...550 mm

0...1.5 m

Retroreflective sensor
with glass detection

Diffuse sensor

0...55 mm

0...100 mm,
0...200 mm,
0...400 mm

1...400 mm,
1...600 mm

1...300 mm,
1...600 mm

Diffuse sensor
with background suppression

0...24 mm,
10...60 mm

30...150 mm,
30...300 mm

Diffuse sensor with
foreground suppression

Technical data

Supply voltage

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

Output
function

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

Connection

Connectors/
cables

Connectors/
cables

Connectors/
cables

Connectors

Connectors

Ambient temperature

-10...+60 °C

-5...+55 °C,
-15...+55 °C,
-20...+60 °C

-10...+50 °C

-5...+55 °C

-5...+55 °C

Degree of protection as per IEC 60529

IP 67

IP 67

IP 67

IP 67

IP 67

Light

Red light

Infrared light/
red light

Laser

Infrared light/
red light

Red light

Special features

Page number

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Photoelectric Sensors

Product overview



BOS 18M
red light
Teach-in

Metal



BOS 18M
red light
angle head

Metal



BOS 18M
infrared

Metal



BOS 18M
laser

Metal



BOS 18M
laser with
angle head

Metal



BOS 18E

Stainless steel



BOS 18KF

Plastic



BOS 18KF
laser

Plastic



Photoelectric
sensors
Performance
spectrum
**Product
overview**

Photoelectric
standard
sensors

Photoelectric
special
sensors

Photoelectric
distance
sensors
for analog
distance
measurement

Special
accessories for
photoelectric
sensors

	0...20 m	0...16 m	0...50 m	0...50 m, 0...60 m	0...50 m	16 m	0...20 m	0...60 m
	5 m	2 m	10 m	0.1...16 m	0.1...9 m	4 m	0.1...4.5 m	
			7 m			2 m	0.1...5 m	0.1...16 m
							0.1...1.7 m	
	1...500 mm	0...400 mm	1...800 mm	0...350 mm	0...250 mm	0...100 mm, 0...200 mm, 0...400 mm	0...100 mm, 0...400 mm, 0...700 mm	0...350 mm
		10...120 mm, 40...120 mm		30...150 mm		0...40 mm	50...100 mm, 100 mm 40...100 mm	
	10...30 V DC	10...30 V DC, 10...36 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	PNP NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC
	Connectors	Connectors	Connectors	Connectors/ cables	Connectors/ cables	Connectors	Connectors/ cables	Connectors/ cables
	-5...+55 °C	-15...+55 °C, -25...+55 °C	-5...+55 °C	-5...+55 °C, -10...+55 °C, -15...+55 °C	-5...+55 °C	-5...+75 °C, -20...+75 °C	-25...+55 °C	-10...+50 °C
	IP 67	IP 67	IP 67	IP 65/IP 67	IP 67	IP 69K/IP 68	IP 67	IP 67
	Red light	Red light	Infrared light	Laser	Laser	Infrared light/ red light	Infrared light/ red light	Laser
	with DSC							
	72	74	78	82	86	98	106	114

Photoelectric Sensors

Product overview



Type

**BOS 18KW
with
angle head**

**BOS 18KW
laser with
angle head**

BOS 30M

BOS Q08M

**BOS Q08M
laser**

BOS 2K

Housing material

Plastic

Plastic

Metal

Metal

Metal

Plastic

Range/sensing distance

Through-beam sensor
transmitter/receiver

0...15 m

0...50 m

0...2.2 m

0...3 m

0...1.2 m

Retroreflective sensor
with polarizing filter

0.1...3 m

0.1...9 m

25...550 mm

45...800 m

Retroreflective sensor
with glass detection

0.1...1.7 m

Retroreflective sensor
with autocollimation

Diffuse sensor

0...80 mm,
0...400 mm

0...250 mm

0...2 m

0...55 mm

1...55 mm

Diffuse sensor
with background suppression

50...100 mm

5...50 mm

1...15 mm,
1...30 mm

Diffuse sensor with
foreground and background
suppression

Technical data

Supply voltage

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

Output function

PNP
NO/NC

PNP
NO/NC

PNP/NPN

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

Connection

Connectors/
cables

Connectors/
cables

Connectors

Connectors/
cables

Connectors/
cables

Connectors/
cables

Ambient temperature

-25...+55 °C

-10...+50 °C

-20...+60 °C

-10...+60 °C

0...+50 °C

-20...+50 °C

Degree of protection as per IEC 60529

IP 67

IP 67

IP 65

IP 67

IP 67

IP 67

Light

Infrared light/
red light

Laser

Infrared light

Red light

Laser

Red light

Special features

Page number

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146

150

Photoelectric Sensors

Product overview

Global



BOS 5K



BOS 6K



BOS 6K laser

Global



BOS 11K



BOS 21M



**BOS 21M
laser**



BOS 23K



**BOS 23K
laser**



Photoelectric
sensors
Performance
spectrum
**Product
overview**

Photoelectric
standard
sensors

Photoelectric
special
sensors

Photoelectric
distance
sensors
for analog
distance
measurement

Special
accessories for
photoelectric
sensors

Plastic

Plastic

Plastic

Plastic

Metal

Metal

Plastic

Plastic

0...10 m

0...6.5 m

0.05...3 m

0...20 m

0...20 m

0...60 m

0...25 m

0...30 m

0.1...4 m

0.05...3 m

0...3.5 m,
0...4 m

0.1...8 m

0.1...20 m

0...14 m

0...14 m

0...500 mm,
50...700 mm
0...500 mm

0...4 m

0...2 m

0...4 m

1...900 mm,
50...200 m

20...300 mm

10...450 mm

0.01...1 m,
0.05...2 m

0...600 mm

0...2 m

0...1.2 m

25...100 mm

20...60 mm,
30...110 mm

10...50

70...200 mm

50...100 mm

70...800 mm

120...600 mm,
150...800 mm

70...200 mm

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC,
12...30 V DC

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

PNP/NPN
NO/NC

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

Connectors/
cables

Connectors/
cables

Connectors/
cables

Connectors/
cables

Connectors

Connectors

Connectors

Connectors

-25...+55 °C

-20...+60 °C

-20...+60 °C

-20...+55 °C

-10...+50 °C,
-25...+55 °C

-10...+50 °C

-20...+60 °C

-20...+60 °C

IP 67

IP 67

IP 67

IP 67

IP 67

IP 67

IP 67/IP 69K

IP 67/IP 69K

Infrared light/
red light

Red light

Laser/red light

Infrared light/
red light

Infrared light/
red light

Laser

Red light

Laser

Teach-in

Teach-in

160

170

176

184

194

200

208

210

Photoelectric Sensors

Product overview



Type

BOS 26K

**BOS 26K
laser**

BOS 50K

**BOS 63M
laser**

BOS 64K

Housing material

Plastic

Plastic

Plastic

Metal

Plastic

Range/sensing distance

Through-beam sensor
transmitter/receiver

0...60 m

0...50 m

Retroreflective sensor
with polarizing filter

0.1...18 m

0...10 m

Retroreflective sensor
with autocollimation

0...5.5 m

0...6 m,
0...7 m,
0...20 m

Diffuse sensor

1...2000 mm
1...3500 mm

0.05...2 m

Diffuse sensor
with background suppression

30...300 mm,
150...600 mm

30...150 mm,
40...60 mm,
50...300 mm

200...2000 mm

0.2...6 m

0.2...2 m

Technical data

Supply voltage

10...30 V DC

10...30 V DC

10...30 V DC

15...30 V DC

24...60 V DC
24...240 V AC

Output function

PNP
NO/NC

PNP
NO/NC

PNP
NO/NC

2× PNP

Relay

Connection

Connectors

Connectors

Connectors

Connectors

Wiring chamber

Ambient temperature

-20...+60 °C

-15...+45 °C,
-20...+45 °C

-5...+55 °C,
-10...+60 °C,

-10...+60 °C

-25...+50 °C

Degree of protection as per IEC 60529

IP 67

IP 67

IP 67

IP 67

IP 67

Light

Infrared light/
red light

Laser

Red light

Laser

Infrared light/
red light

Special features

Time function

Page number

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228

236

240

Photoelectric Sensors

Product overview



BFB 75K



BOS 73K



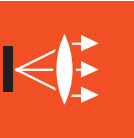
BOS 6K



BOS 18KF



BOS18M



Photoelectric sensors
Performance spectrum
Product overview

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

	Plastic	Plastic	Plastic	Plastic	Metal			
	Depending on fiber used	Depending on fiber used	Depending on fiber used	Depending on fiber used	Depending on fiber used			
	Depending on fiber used	Depending on fiber used	Depending on fiber used	Depending on fiber used	Depending on fiber used			
	10...30 V DC	11...26 V DC	10...30 V DC	10...30 V DC	10...30 V DC			
	PNP NPN NO/NC	PNP NO/NC	PNP NPN NO/NC	PNP NPN NO/NC	PNP NPN NO/NC			
	Connectors/cables	Connectors/cables	Connectors	Connectors	Connectors			
	-20...+60 °C	-25...+55 °C	-20...+60 °C	-25...+55 °C	-5...+60 °C			
	IP 64	IP 54	IP 67	IP 67	IP 67			
	Red light	Red light	Red light	Red light	Infrared light			
	Teach-in	Teach-in	Teach-in	Potentiometer	Potentiometer			
	249	253	255	257	258			

Photoelectric Sensors

Product overview



Type

BOS 16 K

BOS 72 K

BMOA

BFO
Fiber optics

BMOA
Wired
fiber optics

BKT 6K
laser

Housing material

Plastic

Plastic

Plastic

Glass, plastic

Metal

Plastic

Range/sensing distance

Through-beam

Depending on
fiber used

Depending on
fiber used

Depending on
fiber used

Depending on
fiber used

Diffuse sensor
with background suppression

Depending on
fiber used

Luminescence sensor

40...150 mm

Technical data

Supply voltage

11...26 V DC
22...250 V AC/V DC

10...24 V DC

10...30 V DC

10...30 V DC

Output function
PNP/NPN
NO/NC
2-wire

PNP/NPN
NO/NC

PNP/NPN
NO/NC

PNP/NPN
NO/NC

PNP/NPN
NO/NC

Connection

Connectors/
cables

Connectors/
cables

Analog
Connectors/
cables

Connectors/
cables

Ambient temperature

-20...+70 °C

-10...+55 °C

-10...+55 °C

-20...+85 °C,
-0...+170 °C

-10...+55 °C

-20...+60 °C

Degree of protection as per IEC 60529
Light

IP 67
Infrared light

IP 67
Red light

IP 65
Infrared light/
red light

-45...+275 °C
Various

IP 67
Infrared light

IP 67
Laser

Special features

with display

Custom
lengths
possible

Focused light
beam

Page number

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269

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274

314

325

Photoelectric Sensors

Product overview



Photoelectric sensors
Performance spectrum
Product overview

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



BKT 18KF

BKT 21M

BKT 67M

BKT M

BLT 18KF

BLT 21M

Plastic

Metal

Metal

Plastic

Plastic

Metal

	10 mm±2 mm	19 mm±2 mm	9 mm±3 mm (18 mm) ±4 mm		8...20 mm	0...40 mm		
	10...30 V DC	10...30 V DC,	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC		
	PNP NO/NC	PNP/NPN NO/NC	PNP/NPN/ Analog NO/NC	PNP/NPN NO/NC	PNP NO/NC	PNP NO/NC		
	Connectors/ cables	Connectors	Connectors	Wiring chamber	Connectors/ cables	Connectors		
	-25...+55 °C	-25...+55 °C	-10...+55 °C	-10...+55 °C	-25...+55 °C	-10...+55 °C		
	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67		
	White light	White light	Red, green and blue light	Red and green light	UV	UV		
			Interchange- able optics	Teach-in				
	327	329	331	333	339	341		

Photoelectric Sensors

Product overview



Type

BFS 26K

**BFS 33M
true color**

**BGL
red light**

**BGL
pin point**

**BGL
infrared**

Housing material

Plastic

Metal

Metal

Metal

Metal

Range/sensing distance

Angle sensor

Color sensors

Fork sensor

12...32 mm,
15...30 mm,
18...22 mm,

up to 400 mm

5, 10, 20, 30, 50,
80, 120, 180, 220
mm

5, 10, 20, 30, 50,
80, 120, 180, 220
mm

5, 10, 20, 30, 50,
80, 120, 180, 220
mm

Technical data

Supply voltage

Output function

Connection

Ambient temperature

Degree of protection as per IEC 60529

Light

Special features

Page number

12...28 V DC

3 × PNP
NO

Connectors

−10...+55 °C

IP 67

White light

various
Light spot
sizes

345

24 V DC ±10%

3 × push-pull
NO/RS 232

Cables

+10...+55 °C

IP 54

White light

True color sensor

347

10...30 V DC

PNP
NO/NC

Connectors

−10...+60 °C

IP 67

Red light

350

10...30 V DC

PNP
NO/NC

Connectors

−10...+60 °C

IP 67

Red light,
pin point

354

10...30 V DC

PNP
NO/NC

Connectors

−10...+60 °C

IP 67

Infrared

Fluid
detection

358

Photoelectric Sensors

Product overview



**BGL
laser**

Metal



BGL 21

Metal



**BGL_C
analog**

Metal



**BWL
red light**

Metal



**BWL
pin point**

Metal



**BWL
infrared**

Metal



**BWL
laser**

Metal



Photoelectric
sensors
Performance
spectrum
**Product
overview**

				40, 54, 68, 90, 110 mm	40, 54, 68, 90, 110 mm	40, 54, 68, 90, 110 mm	40, 54, 68, 90, 110 mm
	30, 50, 80, 120 mm	2 mm	30 mm, 50 mm				
	10...30 V DC	10...30 V DC	18...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	PNP NO/NC	PNP/NPN NO/NC	PNP/analog NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC	PNP NO/NC
	Connectors	Connectors	Connectors	Connectors	Connectors	Connectors	Connectors
	-10...+60 °C	-20...+60 °C	-5...+55 °C	-10...+60 °C	-10...+60 °C	-10...+60 °C	-10...+60 °C
	IP 67	IP 65	IP 65	IP 67	IP 67	IP 67	IP 67
	Laser	Infrared/ red, green light	Red light	Red light	Red light, Pin point	Infrared light	Laser
	Transparent detection	for label sensing		stackable	stackable	stackable	stackable
	362	367	370	374	376	378	380

Photoelectric
standard
sensors

Photoelectric
special
sensors

Photoelectric
distance
sensors
for analog
distance
measurement

Special
accessories for
photoelectric
sensors

Photoelectric Sensors

Product overview



Type

BWL

BOW

BLG

BOD 6K

**BOD 21M
laser**

**BOD 26K
laser**

Housing material

Metal

Metal

Metal

Plastic

Metal

Plastic

Range/sensing distance

Angled light sensor

22×22 mm,
43×43 mm,
42×62 mm

20...80 mm

25...45 mm,
20...200 mm,
20...500 mm

45...85 mm,
30...100 mm,
80...300 mm

Dynamic optical window

40×80 mm,
80×80 mm,
120×80 mm

20...80 mm

30...100 mm,
80...300 mm

Light grid

0.15...2.1 m

Technical data

Supply voltage

10...30 V DC

10...30 V DC

24 V DC,

15...30 V DC

18...30 V DC

18...28 V DC,
18...30 V DC

Output function

PNP
NO

PNP
NO

PNP/analog
NO

analog
PNP NO/NC

analog
PNP NO/NC

analog
PNP NO/NC

Connection

Connectors

Connectors

Connectors/cables

Connectors

Connectors/cables

Ambient temperature

-10...+60 °C

-10...+55 °C

0...+55 °C

-20...+60 °C

-10...+50 °C

0...+45 °C,
-10...+60 °C

Degree of protection as per IEC 60529

IP 67

IP 65

IP 65

IP 67

IP 67

IP 67

Light

Infrared light

Infrared light

Infrared light

Red light

Laser

Laser

Special features

Dynamic
measuring
procedures

various
measurement
field heights

Teach-in

Page number

382

386

393

399

400

403

Photoelectric Sensors

Product overview



**BOD 63M
laser**

Metal



BOD 66M

Metal



**BOD 66M
laser**

Metal

	200...2000 mm, 200...6000 mm	100...600 mm	200...2000 mm					
	200...2000 mm, 200...6000 mm	100...600 mm	200...2000 mm					
	15...30 V DC	18...30 V DC	18...30 V DC					
	analog	analog	analog					
	PNP NO	PNP NO	PNP NO					
	Connectors	Connectors	Connectors					
	-10...+60 °C	-20...+50 °C	-20...+50 °C					
	IP 67	IP 65	IP 65					
	Laser	Red light	Laser					
	411	415	417					



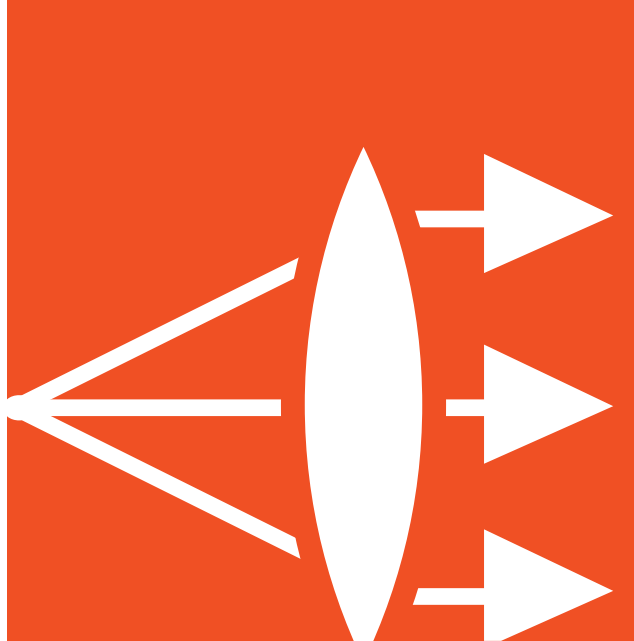
Photoelectric sensors
Performance spectrum
Product overview

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Photoelectric Sensors

Photoelectric standard sensors for object detection

Our broad portfolio of standard sensors provides the ideal solution for every application, whether using through-beam, retroreflective or diffuse sensors. The sensors operate with 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 Standard Sensors

Contents

Cylinder designs

BOS 08M	36
BOS 12M	42
BOS 18M	52
BOS 18E	97
BOS 18KF	104
BOS 18KW	122
BOS 30M	136

Block designs

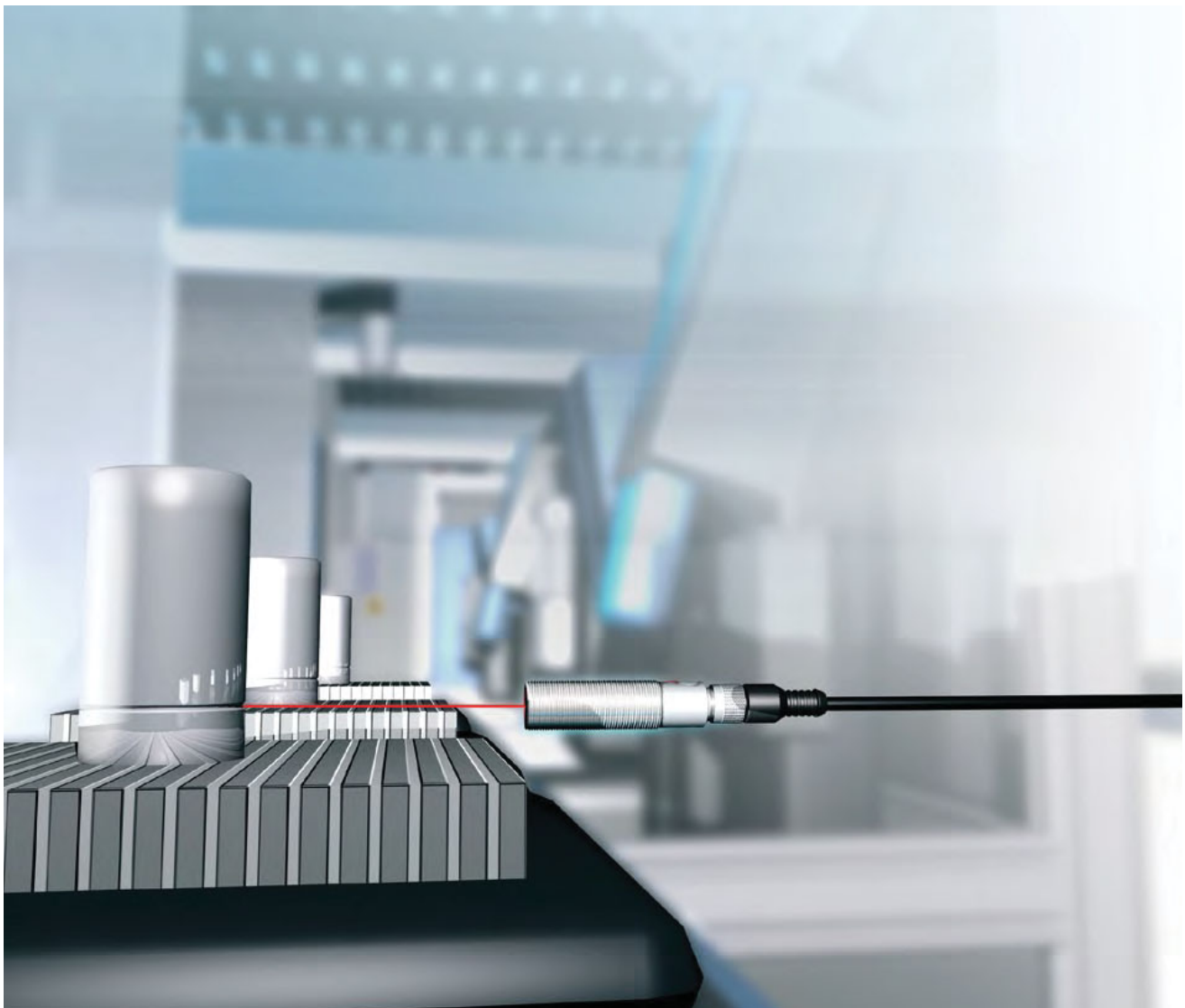
BOS Q08M	140
BOS 2K	148
BOS 5K	158
BOS 6K	168
BOS 11K	182
BOS 21M	192
BOS 23K	206
BOS 26K	216
BOS 50K	226
BOS 63M	234
BOS 64K	238



Small size – big performance

Diffuse, retroreflective and through-beam sensors are available in a cylindrical M8 housing. The sensors stand out with ease of installation and fixed sensing distances and ranges. They are small, robust, flexible and affordable.

Small photoelectric sensors open up possibilities in highly dynamic applications such as robot arms. This is precisely where components that have very low weight and small dimensions while retaining high switching precision are in demand.



Photoelectric Standard Sensors

BOS 08M – Product overview

Type		Sensing distance/ Range	Material Housing	Light type	Output		Switching type		Switching frequency	U _s	Connection		Special features	Page
			Nickel-plated CuZn	Red light	PNP	NPN	Light switching	Dark switching		10...30 V DC	M8 plug, 3-pin	Cable	Polarizing filter	
 Diffuse sensor														
BOS0006	BOS 08M-PS-RD11-S49	0...55 mm	■	■	■		■		400 Hz	■	■			38
BOS0002	BOS 08M-NS-RD11-S49	0...55 mm	■	■		■	■		400 Hz	■	■			38
BOS0004	BOS 08M-PO-RD11-S49	0...55 mm	■	■	■			■	400 Hz	■	■			38
BOS0001	BOS 08M-NO-RD11-S49	0...55 mm	■	■		■		■	400 Hz	■	■			38
BOS0005	BOS 08M-PS-RD11-02	0...55 mm	■	■	■		■		400 Hz	■		■		38
BOS014N	BOS 08M-NS-RD11-02	0...55 mm	■	■		■	■		400 Hz	■		■		38
BOS0003	BOS 08M-PO-RD11-02	0...55 mm	■	■	■			■	400 Hz	■		■		38
BOS014M	BOS 08M-NO-RD11-02	0...55 mm	■	■		■		■	400 Hz	■		■		38
 Retroreflective sensor														
BOS00RC	BOS 08M-PS-PR11-S49	25...550 mm	■	■	■			■	400 Hz	■	■		■	38
BOS00R7	BOS 08M-NS-PR11-S49	25...550 mm	■	■		■		■	400 Hz	■	■			38
BOS00R9	BOS 08M-PO-PR11-S49	25...550 mm	■	■	■		■		400 Hz	■	■		■	38
BOS00R6	BOS 08M-NO-PR11-S49	25...550 mm	■	■		■	■		400 Hz	■	■			38
BOS00RA	BOS 08M-PS-PR11-02	25...550 mm	■	■	■			■	400 Hz	■		■	■	39
BOS014Z	BOS 08M-NS-PR11-02	25...550 mm	■	■		■		■	400 Hz	■		■		39
BOS00R8	BOS 08M-PO-PR11-02	25...550 mm	■	■	■		■		400 Hz	■		■	■	39
BOS014Y	BOS 08M-NO-PR11-02	25...550 mm	■	■		■	■		400 Hz	■		■		39
 Through-beam sensor Receiver														
BOS00W9	BOS 08M-PS-RE11-S49	0...1.1 m	■	■	■			■	400 Hz	■	■			39
BOS0154	BOS 08M-NS-RE11-S49	0...1.1 m	■	■		■		■	400 Hz	■	■			39
BOS0153	BOS 08M-PO-RE11-S49	0...1.1 m	■	■	■		■		400 Hz	■	■			39
BOS0152	BOS 08M-NO-RE11-S49	0...1.1 m	■	■		■	■		400 Hz	■	■			39
BOS018F	BOS 08M-PS-RE11-02	0...1.1 m	■	■	■			■	400 Hz	■		■		39
BOS018C	BOS 08M-NS-RE11-02	0...1.1 m	■	■		■		■	400 Hz	■		■		39
BOS018E	BOS 08M-PO-RE11-02	0...1.1 m	■	■	■		■		400 Hz	■		■		39
BOS018A	BOS 08M-NO-RE11-02	0...1.1 m	■	■		■	■		400 Hz	■		■		39
 Through-beam sensor Emitter														
BOS0151	BOS 08M-X-RS11-S49	0...1.1 m	■	■						■	■			39
BOS018H	BOS 08M-X-RS11-02	0...1.1 m	■	■						■		■		39



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric Standard Sensors
BOS 08M
 Sensing distance 55 mm, range 550 mm

M8 Metal
mini.s
Global

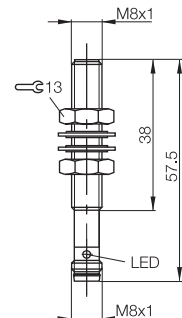
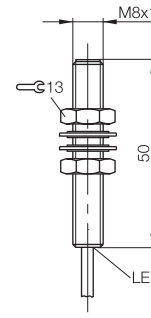
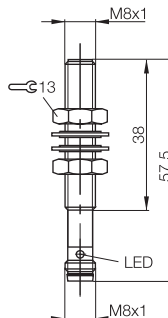


Type		Diffuse sensor	Diffuse sensor	Retroreflective sensor	
Detection range		0...55 mm	0...55 mm	25...550 mm	
PNP NO	Part number	BOS 08M-PS-RD11-S49 ②	BOS 08M-PS-RD11-02 ①		
NPN NO	Part number	BOS 08M-NS-RD11-S49 ⑥	BOS 08M-NS-RD11-02 ⑤		
PNP NC	Part number	BOS 08M-PO-RD11-S49 ④	BOS 08M-PO-RD11-02 ③		
NPN NC	Part number	BOS 08M-NO-RD11-S49 ⑧	BOS 08M-NO-RD11-02 ⑦		
PNP NO	Polarizing filter	Part number		BOS 08M-PS-PR11-S49 ②	
NPN NO		Part number		BOS 08M-NS-PR11-S49 ⑥	
PNP NC	Polarizing filter	Part number		BOS 08M-PO-PR11-S49 ④	
NPN NC		Part number		BOS 08M-NO-PR11-S49 ⑧	
PNP NO	Receiver	Part number			
NPN NO		Part number			
PNP NC	Receiver	Part number			
NPN NC		Part number			
	Emitter	Part number			
		Part number			
Supply voltage U_B		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.		20 mA	20 mA	20 mA	
Switching type		Light or dark switching	Light or dark switching	Light or dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes	Yes/Yes	
Settings		Fixed	Fixed	Fixed	
Emitter, light type		LED, red light	LED, red light	LED, red light	
Wavelength		640 nm	640 nm	640 nm	
Received light indicator		Yellow LED	Yellow LED	Yellow LED	
Response time		1.25 ms	1.25 ms	1.25 ms	
Switching frequency f		400 Hz	400 Hz	400 Hz	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Ambient temperature T_a		-10...+60 °C	-10...+60 °C	-10...+60 °C	
Permissible ambient light per		EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
Material	Housing	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
	Optical surface	PMMA	PMMA	PMMA	
Connection		M8 connector, 3-pin	2 m PUR cable, 3×26 AWG	M8 connector, 3-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card. Retroreflective sensor values referenced to BOS-R9 reflector.

Wiring diagrams on page 40.

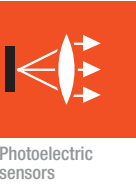
Ordering codes see page 37.



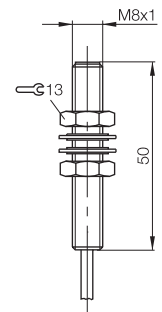
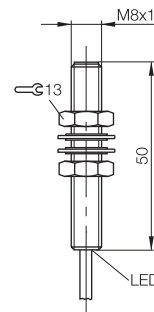
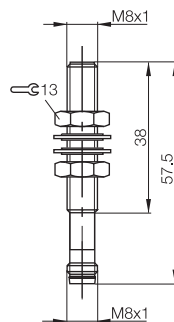
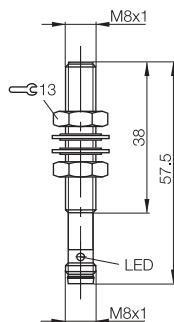
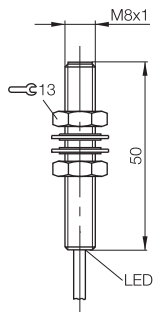
Photoelectric Standard Sensors

BOS 08M

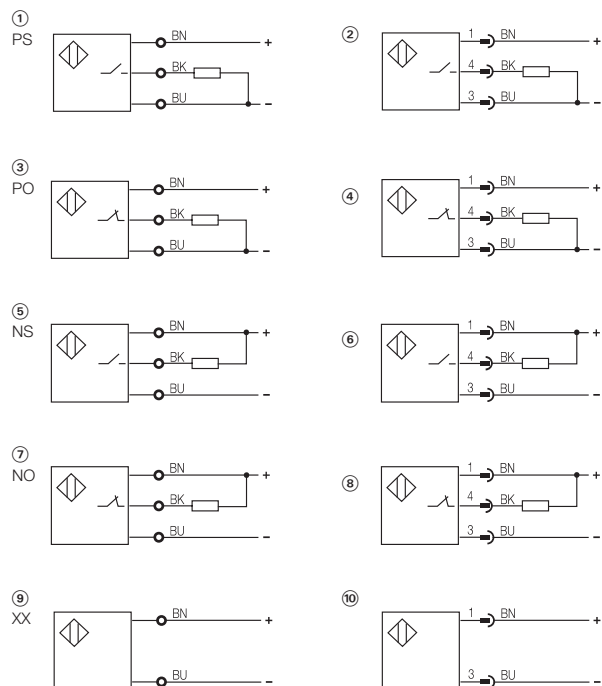
Range 550 mm, 1.1 m



	Retroreflective sensor 25...550 mm	Through-beam sensor 0...1.1 m	Through-beam sensor 0...1.1 m	Through-beam sensor 0...1.1 m	Through-beam sensor 0...1.1 m	
						Photoelectric standard sensors
						Cylinder designs
						Block designs
	BOS 08M-PS-PR11-02 ①					Photoelectric special sensors
	BOS 08M-NS-PR11-02 ⑤					
	BOS 08M-PO-PR11-02 ③					
	BOS 08M-NO-PR11-02 ⑦					
		BOS 08M-PS-RE11-S49 ②		BOS 08M-PS-RE11-02 ①		Photoelectric distance sensors for analog distance measurement
		BOS 08M-NS-RE11-S49 ⑥		BOS 08M-NS-RE11-02 ⑥		
		BOS 08M-PO-RE11-S49 ④		BOS 08M-PO-RE11-02 ③		
		BOS 08M-NO-RE11-S49 ⑧		BOS 08M-NO-RE11-02 ⑦		
			BOS 08M-X-RS11-S49 ⑩		BOS 08M-X-RS11-02 ⑨	Special accessories for photoelectric sensors
	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		
	20 mA	8 mA	≤ 15 mA	8 mA	≤ 15 mA	
	Light or dark switching	Light or dark switching		Light or dark switching		
	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	
	Fixed	Fixed	Fixed	Fixed	Fixed	
	LED, red light		LED, red light		LED, red light	
	640 nm		640 nm		640 nm	
	Yellow LED	Yellow LED		Yellow LED		
	1.25 ms	1.25 ms		1.25 ms		
	400 Hz	400 Hz		400 Hz		
	IP 67	IP 67	IP 67	IP 67	IP 67	
	-10...+60 °C	-10...+60 °C	-10...+60 °C	-10...+60 °C	-10...+60 °C	
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
	PMMA	PMMA	PMMA	PMMA	PMMA	
	2 m PUR cable, 3×26 AWG	M8 connector, 3-pin	M8 connector, 3-pin	2 m PUR cable, 3×26 AWG	2 m PUR cable, 3×26 AWG	



Wiring diagrams



Display elements

Yellow LED: received light indicator

The LED can show 3 different statuses:

- LED off: no object detected
- LED constantly lit: object detected
- LED flashing: contamination indicator/signal not stable



Photoelectric Standard Sensors

BOS 08M

Connection, accessories



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Recommended accessories

(please order separately)

Description	Ordering code
Reflector	BAM00WL



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Simplification with potential

Our **BOS 12M** series are in a fully potted metal housing with IP 67 degree of protection have been optimized for typical applications.

Their installation also draws attention with its simplicity. This is because BOS 12M sensors are fastened in place simply by drilling holes. This provides the following benefits:

- Simplifies the design of machines and systems.
- Adapts sensor principles more quickly.
- Allows accessories to be used in multiple ways, thereby reducing stock levels as well.

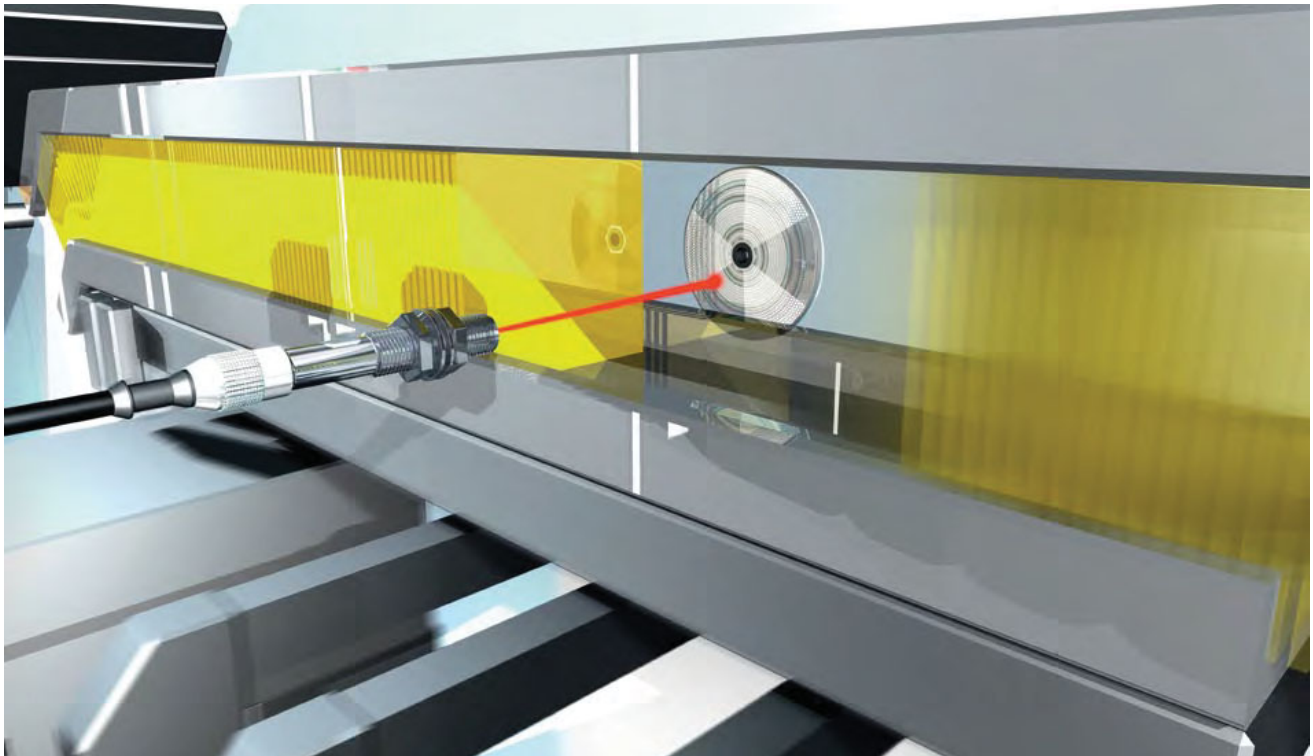
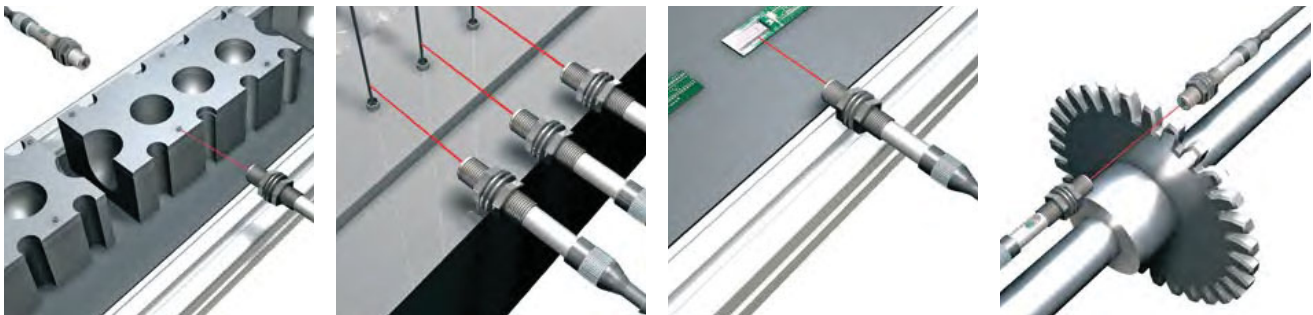
For long ranges or for detecting small parts, laser through-beam sensors are available in two different designs.

Features

- Supply voltage 10...30 V DC, protected from polarity reversal
- Output function indicator for the output
- IP 67 degree of protection
- Standard (M12x1) metal housing
- Red and infrared light versions
- Fixed and adjustable sensitivity
- PNP or NPN, light or dark switching
- Cable and connector versions (M12 connector)

Applications

- General automation tasks
- Assembly and handling technology
- Machine tool building
- Packaging industry
- Robots
- Machine tool building



Photoelectric Standard Sensors

BOS 12M Global – Product overview

Type		Sensing distance/range	Light type			Output		Switching type		Switching frequency	U _s	Connection		Special features			Page
			Red light	Infrared	Laser Class	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 plug, 4-pin	Cable, 3 m	Adjustable	Polarizing filter	Teach-in	
 Diffuse sensor with background suppression																	
BOS007R	BOS 12M-PS-1N1I-S4-C	0...24 mm	■			■		■		1 kHz	■	■					44
BOS007T	BOS 12M-PU-1HA-S4-C	10...60 mm	■			■		■	■	1 kHz	■	■		■		■	44
 Diffuse sensor																	
BOS0012	BOS 12M-PS-1YA-S4-C	1...100 mm	■			■		■		200 Hz	■	■					44
BOS000H	BOS 12M-NS-1YA-S4-C	1...100 mm	■				■	■		200 Hz	■	■					44
BOS000P	BOS 12M-PO-1YA-S4-C	1...100 mm	■			■			■	200 Hz	■	■					44
BOS0042	BOS 12M-NO-1YA-S4-C	1...100 mm	■				■		■	200 Hz	■	■					44
BOS0010	BOS 12M-PS-1YA-BO-C-03	1...100 mm	■			■		■		200 Hz	■		■				45
BOS000F	BOS 12M-NS-1YA-BO-C-03	1...100 mm	■				■	■		200 Hz	■		■				45
BOS000N	BOS 12M-PO-1YA-BO-C-03	1...100 mm	■			■			■	200 Hz	■		■				45
BOS0008	BOS 12M-NO-1YA-BO-C-03	1...100 mm	■				■		■	200 Hz	■		■				45
BOS000W	BOS 12M-PS-1PB-S4-C	1...200 mm		■		■		■		200 Hz	■	■		■			45
BOS000U	BOS 12M-PS-1PB-BO-C-03	1...200 mm		■		■		■		200 Hz	■		■	■			45
BOS0043	BOS 12M-PS-1YB-S4-C	1...200 mm	■			■		■		200 Hz	■	■					45
BOS000K	BOS 12M-NS-1YB-S4-C	1...200 mm	■				■	■		200 Hz	■	■					45
BOS000T	BOS 12M-PO-1YB-S4-C	1...200 mm	■			■			■	200 Hz	■	■					45
BOS000A	BOS 12M-NO-1YB-S4-C	1...200 mm	■				■		■	200 Hz	■	■					45
BOS0013	BOS 12M-PS-1YB-BO-C-03	1...200 mm	■			■		■		200 Hz	■		■				45
BOS000J	BOS 12M-NS-1YB-BO-C-03	1...200 mm	■				■	■		200 Hz	■		■				45
BOS000R	BOS 12M-PO-1YB-BO-C-03	1...200 mm	■			■			■	200 Hz	■		■				45
BOS0009	BOS 12M-NO-1YB-BO-C-03	1...200 mm	■				■		■	200 Hz	■		■				45
BOS0045	BOS 12M-PS-1PD-S4-C	1...400 mm		■		■		■		200 Hz	■	■		■			46
BOS000E	BOS 12M-NS-1PD-S4-C	1...400 mm		■			■	■		200 Hz	■	■		■			46
BOS0044	BOS 12M-PO-1PD-S4-C	1...400 mm		■		■			■	200 Hz	■	■		■			46
BOS0007	BOS 12M-NO-1PD-S4-C	1...400 mm		■			■		■	200 Hz	■	■		■			46
BOS000Y	BOS 12M-PS-1PD-BO-C-03	1...400 mm		■		■		■		200 Hz	■		■	■			46
BOS000C	BOS 12M-NS-1PD-BO-C-03	1...400 mm		■			■	■		200 Hz	■		■	■			46
BOS000L	BOS 12M-PO-1PD-BO-C-03	1...400 mm		■		■			■	200 Hz	■		■	■			46
 Retroreflective sensor																	
BOS00RE	BOS 12M-PS-1QA-S4-C	0...1.5 m	■			■			■	200 Hz	■	■		■	■		46
BOS00RF	BOS 12M-NS-1QA-S4-C	0...1.5 m	■				■		■	200 Hz	■	■		■	■		46
BOS00RJ	BOS 12M-PO-1QA-S4-C	0...1.5 m	■			■		■		200 Hz	■	■		■	■		46
BOS00RK	BOS 12M-PS-1QA-BO-C-03	0...1.5 m	■			■			■	200 Hz	■		■	■	■		47
BOS00RH	BOS 12M-PO-1QA-BO-C-03	0...1.5 m	■			■		■		200 Hz	■		■	■	■		47
 Through-beam sensor Receiver																	
BOS00UE	BLE 12M-PA-1PD-S4-C	0...5 m	■			■		■	■	500 Hz	■	■		■			47
BOS00UA	BLE 12M-NA-1PD-S4-C	0...5 m	■				■	■	■	500 Hz	■	■		■			47
BOS00UC	BLE 12M-PA-1PD-BO-C-03	0...5 m	■			■		■	■	500 Hz	■		■	■			47
 Through-beam sensor Emitter																	
BOS00W2	BLS 12M-XX-1RD-S4-L	0...5 m	■								■	■					47
BOS00UW	BLS 12M-XX-1RD-BO-L-03	0...5 m	■								■		■				47
 Laser through-beam sensor Receiver 																	
BOS00WF	BOS 12M-PA-LE10-S4	0...3 m			1	■		■	■	1 kHz	■	■		■			51
BOS00WC	BOS 12M-NA-LE10-S4	0...3 m			1		■	■	■	1 kHz	■	■		■			51
BOS00WE	BOS 12M-PA-LE10-03	0...3 m			1	■		■	■	1 kHz	■		■	■			51
BOS00WA	BOS 12M-NA-LE10-03	0...3 m			1		■	■	■	1 kHz	■		■	■			51
 Laser through-beam sensor Emitter 																	
BOS00WH	BOS 12M-X-LS11-S4	0...3 m			1						■	■					51
BOS00WJ	BOS 12M-X-LS12-S4	0...30 m															51
BOS00WL	BOS 12M-X-LS11-S4	0...3 m			1						■	■					51
BOS00WN	BOS 12M-X-LS12-S4	0...30 m															51
BOS00WK	BOS 12M-X-LS11-03	0...3 m			1						■		■				51
BOS00WM	BOS 12M-X-LS12-03	0...30 m			1						■		■				51



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

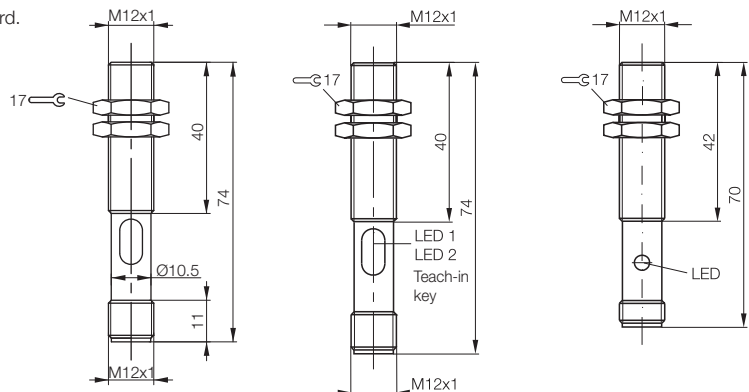


Type	Diffuse sensor with background suppression		Diffuse sensor with background suppression	Diffuse sensor
Detection range	0...24 mm		10...60 mm	1...100 mm
PNP NO Background suppression	Part number	BOS 12M-PS-1N1I-S4-C ②		
PNP NO/NC Background suppression, Teach-in	Part number		BOS 12M-PU-1HA-S4-C ⑪	
PNP NO	Part number			BOS 12M-PS-1YA-S4-C ②
NPN NO	Part number			BOS 12M-NS-1YA-S4-C ⑧
PNP NC	Part number			BOS 12M-PO-1YA-S4-C ④
NPN NC	Part number			BOS 12M-NO-1YA-S4-C ⑩
Supply voltage U_B	10...30 V DC		10...30 V DC	10...30 V DC
Output current	100 mA		100 mA	≤ 200 mA
No-load supply current I_0 max.	≤ 25 mA		≤ 25 mA	≤ 20 mA
Switching type	Light switching		Light/dark switching (selectable)	Light or dark switching
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	Yes/Yes
Settings	Fixed		Teach-in	Fixed
Emitter, light type	LED, red light		LED, red light	LED, red light
Wavelength	660 nm		660 nm	660 nm
Light spot diameter	5x5 mm		5x5 mm at 50 mm	
Distance hysteresis	≤ 5%		≤ 5%	
Gray value shift (90%/18%)	≤ 5%		≤ 6%	
Output function indicator	Yellow LED		Yellow LED	Yellow LED
Stability indicator	Green LED		Green LED	
Response time	0.5 ms		0.5 ms	2.5 ms
Switching frequency f	1 kHz		1 kHz	200 Hz
Degree of protection as per IEC 60529	IP 67		IP 67	IP 67
Ambient temperature T_a	-20...+60 °C		-20...+60 °C	-5...+55 °C
Permissible ambient light	5 klx		5 klx	5 klx
Material	Housing	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn
	Optical surface	PMMA	PMMA	PMMA
Connection	M12 connector, 4-pin		M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 49.

Ordering codes on page 43.



Photoelectric Standard Sensors

BOS 12M Global

Sensing distance 100, 200 mm



Photoelectric standard sensors

Cylinder designs

Block designs

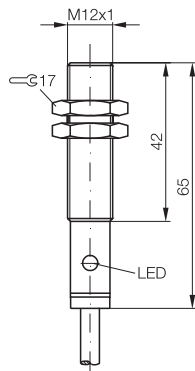
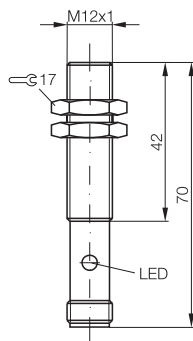
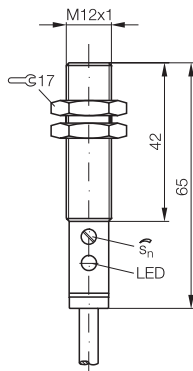
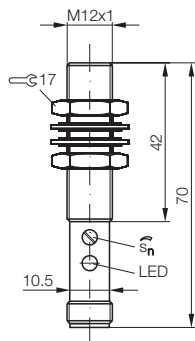
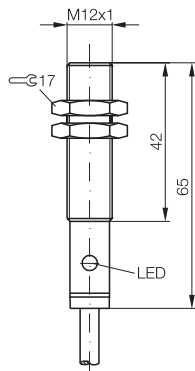
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor 1...100 mm	Diffuse sensor 1...200 mm	Diffuse sensor 1...200 mm	Diffuse sensor 1...200 mm	Diffuse sensor 1...200 mm
BOS 12M-PS-1YA-BO-C-03 ①	BOS 12M-PS-1PB-S4-C ②	BOS 12M-PS-1PB-BO-C-03 ①	BOS 12M-PS-1YB-S4-C ①	BOS 12M-PS-1YB-BO-C-03 ①
BOS 12M-NS-1YA-BO-C-03 ⑦			BOS 12M-NS-1YB-S4-C ⑦	BOS 12M-NS-1YB-BO-C-03 ⑦
BOS 12M-PO-1YA-BO-C-03 ③			BOS 12M-PO-1YB-S4-C ④	BOS 12M-PO-1YB-BO-C-03 ③
BOS 12M-NO-1YA-BO-C-03 ②			BOS 12M-NO-1YB-S4-C ③	BOS 12M-NO-1YB-BO-C-03 ②
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
Light or dark switching	Light switching	Light switching	Light or dark switching	Light or dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Fixed	Potentiometer, 270°	Potentiometer, 270°	Fixed	Fixed
LED, red light 660 nm	LED, infrared light 880 nm	LED, infrared light 880 nm	LED, red light 660 nm	LED, red light 660 nm
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
2.5 ms	2.5 ms	2.5 ms	2.5 ms	2.5 ms
200 Hz	200 Hz	200 Hz	200 Hz	200 Hz
IP 67	IP 67	IP 67	IP 67	IP 67
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C
5 klx	5 klx	5 klx	5 klx	5 klx
Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn
PMMA	PMMA	PMMA	PMMA	PMMA
3 m PVC cable, 22 AWG	M12 connector, 4-pin	3 m PVC cable, 22 AWG	M12 connector, 4-pin	3 m PVC cable, 22 AWG



Photoelectric Standard Sensors
BOS 12M Global
 Sensing distance 400 mm, range 1.5 m

M12 Metal
Global



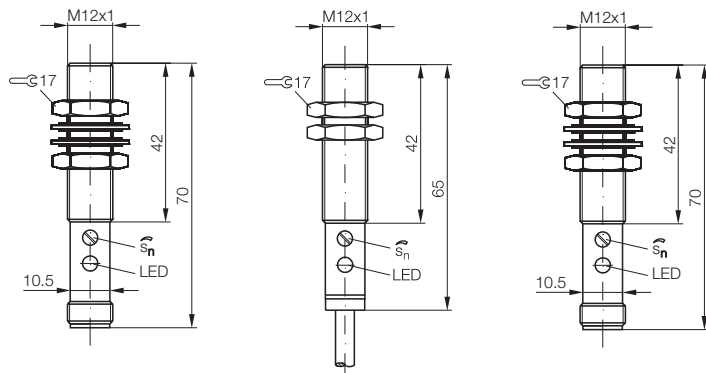
Type		Diffuse sensor	Diffuse sensor	Retroreflective sensor	
Detection range		1...400 mm	1...400 mm	0...1.5 m	
PNP NO	Part number	BOS 12M-PS-1PD-S4-C ②	BOS 12M-PS-1PD-BO-C-03 ①		
NPN NO	Part number	BOS 12M-NS-1PD-S4-C ⑧	BOS 12M-NS-1PD-BO-C-03 ⑦		
PNP NC	Part number	BOS 12M-PO-1PD-S4-C ④	BOS 12M-PO-1PD-BO-C-03 ③		
NPN NC	Part number	BOS 12M-NO-1PD-S4-C ⑩			
PNP NO	Polarizing filter	Part number		BOS 12M-PS-1QA-S4-C ②	
NPN NO	Polarizing filter	Part number		BOS 12M-NS-1QA-S4-C ⑧	
PNP NC	Polarizing filter	Part number		BOS 12M-PO-1QA-S4-C ④	
PNP complementary	Receiver	Part number			
NPN complementary	Receiver	Part number			
	Emitter	Part number			
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Output current		≤ 200 mA	≤ 200 mA	≤ 200 mA	
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA	≤ 20 mA	
Switching type		Light or dark switching	Light or dark switching	Light or dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes	Yes/Yes	
Settings		Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	
Emitter, light type		LED, infrared light	LED, infrared light	LED, red light	
Wavelength		880 nm	880 nm	660 nm	
Power-on indicator					
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Response time		2.5 ms	2.5 ms	2.5 ms	
Switching frequency f		200 Hz	200 Hz	200 Hz	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Ambient temperature T_a		-5...+55 °C	-5...+55 °C	-5...+55 °C	
Permissible ambient light		5 klx	5 klx	5 klx	
Material	Housing	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
	Optical surface	PMMA	PMMA	PMMA	
Connection		M12 connector, 4-pin	3 m PVC cable, 22 AWG	M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 49.

Ordering codes on page 43.



Photoelectric Standard Sensors

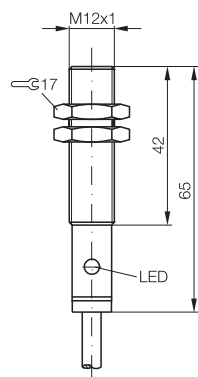
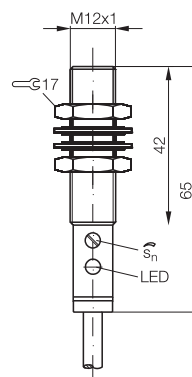
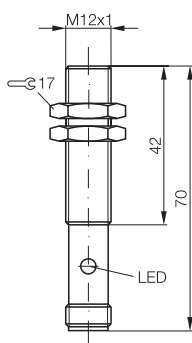
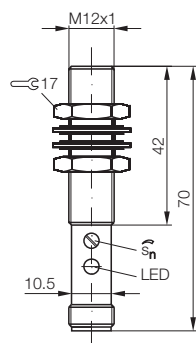
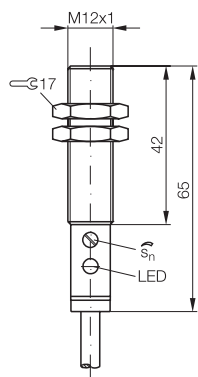
BOS 12M Global

Range 5 m

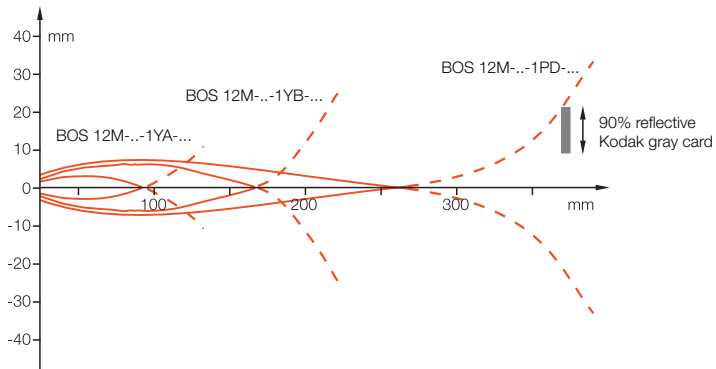


Photoelectric sensors

	Retroreflective sensor 0...1.5 m	Through-beam sensor 0...5 m	Through-beam sensor 0...5 m	Through-beam sensor 0...5 m	Through-beam sensor 0...5 m	
						Photoelectric standard sensors
						Cylinder designs
						Block designs
	BOS 12M-PS-1QA-BO-C-03 ①					Photoelectric special sensors
	BOS 12M-PO-1QA-BO-C-03 ③					Photoelectric distance sensors for analog distance measurement
		BLE 12M-PA-1PD-S4-C ⑥		BLE 12M-PA-1PD-BO-C-03 ⑥		
		BLE 12M-NA-1PD-S4-C ⑩				
			BLS 12M-XX-1RD-S4-L ⑩		BLS 12M-XX-1RD-BO-L-03 ⑩	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	Special accessories for photoelectric sensors
	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	
	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	
	Light or dark switching	Light and dark switching	Yes/Yes	Light and dark switching	Yes/Yes	
	Yes/Yes	Yes/Yes		Yes/Yes		
	Potentiometer, 270°	Potentiometer, 270°		Potentiometer, 270°		
	LED, red light	LED, red light	LED, red light	LED, red light	LED, red light	
	660 nm	660 nm	660 nm	660 nm	660 nm	
			Green LED		Green LED	
	Yellow LED	Yellow LED		Yellow LED		
	2.5 ms	1 ms		1 ms		
	200 Hz	500 Hz		500 Hz		
	IP 67	IP 67	IP 67	IP 67	IP 67	
	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	
	5 klx	5 klx	5 klx	5 klx	5 klx	
	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
	PMMA	PMMA	PMMA	PMMA	PMMA	
	3 m PVC cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin	3 m PVC cable, 22 AWG	3 m PVC cable, 22 AWG	

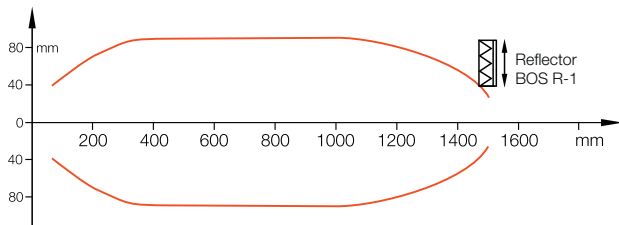


Diffuse sensor BOS 12M-...-1YA/1YB/1PD-...



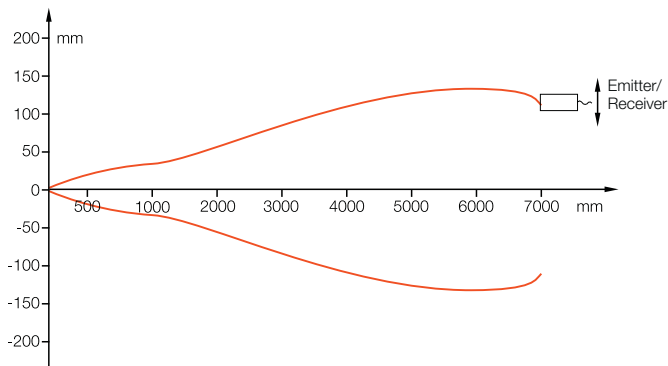
Sensing distance measured with side approach of Kodak gray card.

Retroreflective sensor BOS 12M-...-1QA-...



Range measured with side approach of reflector.

Through-beam sensor BLE/BLS 12M-...



The maximum offset between the emitter and receiver is measured for the through-beam sensor.

Photoelectric Standard Sensors

BOS 12M Global

Accessories, Connection

Photoelectric sensors

Photoelectric standard sensors

Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

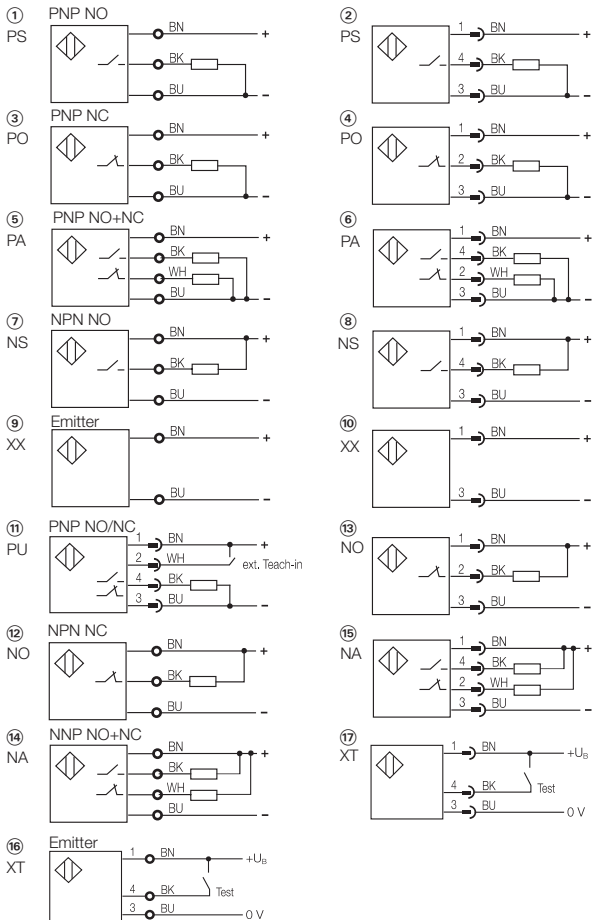
Orientation aid

The additional function indicator on the receiver of the through-beam sensor enables fast and simple alignment between the emitter and receiver.

First attach the receiver and then the emitter. As soon as the emitter is located within the active range of the receiver, the function indicator on the front of the sensor goes out. This indicates an optical connection between the emitter and receiver. It is also easily visible when the sensor is flush mounted.



Wiring diagrams



Recommended accessories (please order separately)

Description	Ordering code
① Reflector	BAM00WL
② Reflector	BAM00UK
③ Diagonal mirror	BAM00R0
④ Air shield	BAM00PY
⑤ Slit aperture	BAM00PW
⑥ Mounting cuff	BAM01KM
⑦ Cover nut	BAM01Y6



You can find additional accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connectors (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Standard Sensors

BOS 12M Connection

M12 Metal Laser

The basis of the laser through-beam sensor BOS 12M is its two different emitters. Emitter version **LS11** is for small parts detection and offers a resolution of 50 µm at the focal point of 500 mm.

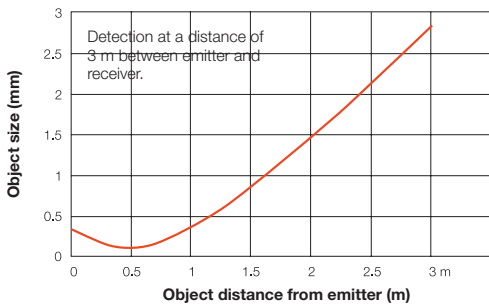
The **LS12** version is not focused and is used for long ranges up to 30 m. The receivers can be PNP or NPN, and any emitter can be combined with any receiver.

All sensors are Laser Class 1 and are available as a connector or with a cable.

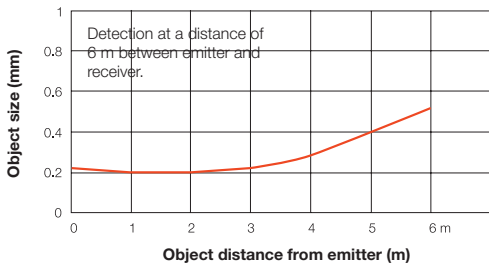


Small parts detection

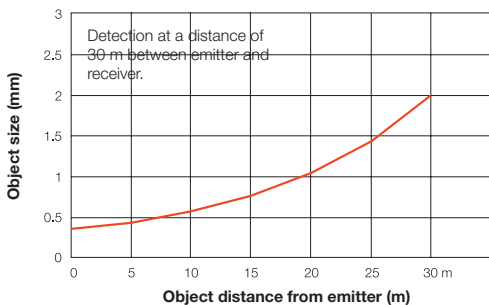
BOS 12M-XT-LS11-..



BOS 12M-XT-LS12-..



BOS 12M-XT-LS12-..



Recommended accessories (please order separately)

Description	Ordering code
Mounting cuff	BAM00R2



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Type	
Detection range	
PNP	NO/NC
Receiver	Part number
Emitter	Part number
50 µm high resolution	Part number
Emitter	Part number
Long range 30 m	Part number
Supply voltage U_B	
Output current	
No-load supply current I_0 max.	
Switching type	
Polarity reversal/short-circuit protected	
Settings	
Help function	
Emitter, light type	
Wavelength	
Laser class	
Output function indicator	
Response time	
Switching frequency f	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Permissible ambient light per	
Material	Housing
	Optical surface
Connection	

Wiring diagrams on page 49.

Ordering codes on page 43.

Suitable connectors (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.



Photoelectric Standard Sensors

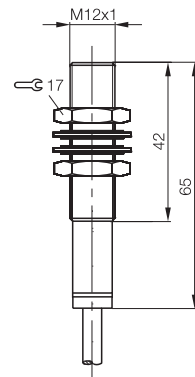
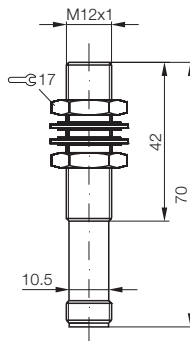
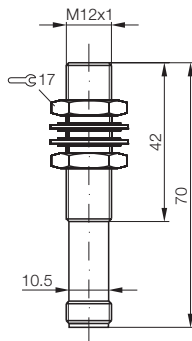
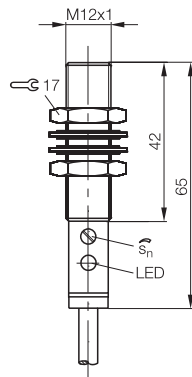
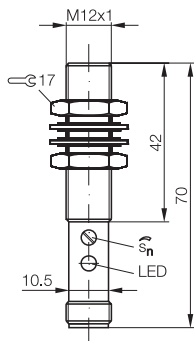
BOS 12M

Range 3 m, 30 m



Laser through-beam sensor 0...3 m	Laser through-beam sensor 0...3 m	Laser through-beam sensor 0...3 m/0...30 m	Laser through-beam sensor 0...3 m/0...30 m	Laser through-beam sensor 0...3 m/0...30 m
BOS 12M-PA-LE10-S4 ⑥	BOS 12M-PA-LE10-03 ⑤			
BOS 12M-NA-LE10-S4 ⑩	BOS 12M-NA-LE10-03 ⑭			
		BOS 12M-X-LS11-S4 ⑩	BOS 12M-X-LS11-S4 ⑰	BOS 12M-X-LS11-03 ⑱
		BOS 12M-X-LS12-S4 ⑩	BOS 12M-X-LS12-S4 ⑰	BOS 12M-X-LS12-03 ⑱
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 200 mA	≤ 200 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
≤ 15 mA	≤ 15 mA			
Light/dark switching (complementary)	Light/dark switching (complementary)			
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°			
		Laser, red light 655 nm 1	Test input Laser, red light 655 nm 1	Test input Laser, red light 655 nm 1
Yellow LED	Yellow LED			
0.5 ms	0.5 ms			
1 kHz	1 kHz			
IP 67	IP 67	IP 67	IP 67	IP 67
-10...+50 °C	-10...+50 °C	-10...+50 °C	-10...+50 °C	-10...+50 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn
PMMA	PMMA	Glass	Glass	Glass
M12 connector, 4-pin	3 m PVC cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin	3 m PVC cable, 22 AWG

Photoelectric standard sensors
Cylinder designs
Block designs
Photoelectric special sensors
Photoelectric distance sensors for analog distance measurement
Special accessories for photoelectric sensors



BOS 18M GlobalProx – sound and cost-effective



We often come across systems in which a sensor adjustment is not required, not possible or is undesirable. Our BOS-18M diffuse sensors and light barriers from the Global family are the correct choice for these applications. All of these sensors have a fixed setting. This shortens the time required for system commissioning and protects against tampering. Equipped with a sound basic range of functions, these sensors also have the best possible price/performance ratio.

- Sound performance and reliable object detection
- Ideal for standard applications, e.g. in automation
- Cost-effective alternative for all types of light
- Plug and play: All sensors with fixed setting
- Universal fastening thanks to wide range of assembly accessories

Red light sensors M18 – for the highest precision

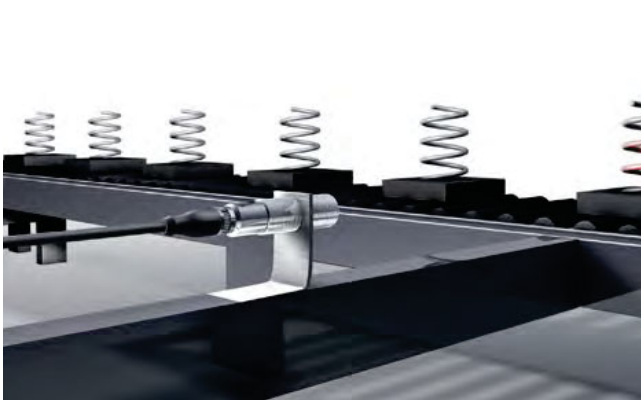


Precise switching behavior – excellent repeat accuracy

Cutting-edge LED technology and the latest Fresnel lenses are combined in this unit to form an innovative and powerful photoelectric sensor. What this means in practice: Improved repeat accuracy and precise switching behavior even at large distances.

- Long range
- Rugged M18 metal housing
- State-of-the-art LED technology with sharply contoured light spot

BOS 18M background suppression – expertise with all kinds of light



Balluff M18 laser diffuse sensors with background suppression are a genuine highlight. They are available with different light types, allowing you to simply select according to your requirements. The perfectly focused light beam is able to detect the smallest of parts, grooves or holes with maximum precision and reliability. The large light spot of the red light variant with 300 mm is ideal for detecting objects with notches, holes or openings, because breakthroughs and free areas are simply bridged.

The 150 mm red light version is ideal for distinguishing between foreground and background with high precision at extremely short distances.

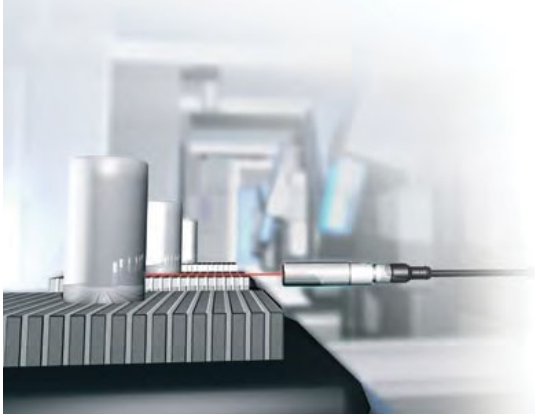
- Exact, almost color-independent object detection
- The correct light type for every application – laser or red light
- Precise setting with 10-turn potentiometer
- Robust M18 metal housing with same design for all types
- Universal fastening and alignment thanks to wide range of assembly accessories



Photoelectric Standard Sensors

BOS 18M

BOS 18M Teach-in



For users who prefer the teach-in procedure for sensor setting, Balluff now offers its successful red light series BOS 18M, with long ranges, precise switching behavior and very high levels of repeat accuracy. The top sensor in its class is quickly set at the push of a button. Further advantage: The BOS 18M Teach-in reports "difficulties" immediately by means of our patented "Dynamic Sensor Control" diagnostic system, which is available as an option. The DSC allows you to react immediately to contamination or malfunctions. Even users without DSC can make use of the contamination detection as the sensors are also optionally available with a separate alarm output.

- Continuous sensor monitoring of contamination and malfunctions
- Switchable output
- Simple teach-in procedure
- Standardized BOS-18M design for fast sensor change



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs
Block designs

Photoelectric special sensors

BOS 18M infrared – invisible power



The successful BOS-18M series now also includes invisible infrared light. This type of light demonstrates its advantages particularly in heavily contaminated production environments: Objects are reliably detected unimpeded by dust or dirt. With its range of over 100 meters, the high-power version of the through-beam sensor impresses particularly in this area. The standardized design of all BOS 18Ms permits a simple change between the different types of light – without assembly change.

- Reliable object detection even in a contaminated environment
- Invisible light – does not irritate personnel
- Simple and fast setting with potentiometer
- Through-beam sensor with test input for function check
- Wide range of assembly accessories

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

BOS 18M Laser



The **BOS 18M(R) Laser** series is characterized by long ranges and absolute precision in small parts detection. These sensors are Laser Class 1 and are available with axial or radial light exit. Newly added is a diffuse version with background suppression (Laser Class 2) and a sensing distance of 150 mm.

- Long ranges (50 m)
- High switching frequency (1.5 kHz)
- Straight- and right-angle versions
- Drill break monitoring
- Precise parts positioning
- Fast counting of objects
- High precision

The **BOS 18MR** product family has a built-in angled mirror made of scratch-resistant glass which is attached to the housing. Since the optical head does not protrude over the side, installation from the front is no problem.

- Standard M18×1 housing made of metal (nickel plated brass)
- All sensors use visible red light
- IP 67 degree of protection
- Supply voltage 10...30 V DC, polarity reversal protected
- Output short circuit protected
- Roller conveyors
- Conveying lines
- Packaging industry

Type		Sensing distance/ range	Light exit		Light type			Output		Switching type		Switching frequency	U _s	Connection		Special features						Page
			Straight	Right-angle	Red light	Infrared	Laser	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 plug, 4-pin	Cable	Polarizing filter	Teach-in	Error output	Fixed	Laser Class 1	Test input	
 Diffuse sensor with background suppression																						
BOS010J	BOS 18MR-PS-1HA-E5-C-S4	10...120 mm										500 Hz									74	
BOS0081	BOS 18MR-PA-1HA-S4-C	40...120 mm										600 Hz									74	
BOS01J4	BOS 18M-PA-RH23-S4	30...150 mm										500 Hz									64	
BOS01J3	BOS 18M-NA-RH23-S4	30...150 mm										500 Hz									64	
BOS01J2	BOS 18M-PSV-RH23-S4	30...150 mm										500 Hz									64	
BOS002H	BOS 18M-PS-LH22-S4	30...150 mm										500 Hz									82	
BOS002K	BOS 18M-PSV-LH22-S4	30...150 mm										500 Hz									82	
BOS001L	BOS 18M-NSV-LH22-S4	30...150 mm										500 Hz									82	
BOS001Z	BOS 18M-POV-LH22-S4	30...150 mm										500 Hz									82	
BOS001H	BOS 18M-NOV-LH22-S4	30...150 mm										500 Hz									82	
BOS01C5	BOS 18M-PA-LH23-S4	30...150 mm										500 Hz									83	
BOS01C4	BOS 18M-PSV-LH23-S4	30...150 mm										500 Hz									83	
BOS014W	BOS 18M-PA-RH22-S4	30...300 mm										500 Hz									65	
BOS019T	BOS 18M-NA-RH22-S4	30...300 mm										500 Hz									65	
BOS019P	BOS 18M-PS-RH22-S4	30...300 mm										500 Hz									65	
BOS019N	BOS 18M-PSV-RH22-S4	30...300 mm										500 Hz									65	
BOS019U	BOS 18M-NSV-RH22-S4	30...300 mm										500 Hz									65	
BOS019R	BOS 18M-POV-RH22-S4	30...300 mm										500 Hz									65	
BOS019W	BOS 18M-NOV-RH22-S4	30...300 mm										500 Hz									65	
 Diffuse sensor																						
BOS0141	BOS 18MR-PA-LD10-02	250 mm										1.5 kHz									86	
BOS013T	BOS 18MR-NA-LD10-02	250 mm										1.5 kHz									86	
BOS0142	BOS 18MR-PA-LD10-S4	250 mm										1.5 kHz									86	
BOS013U	BOS 18MR-NA-LD10-S4	250 mm										1.5 kHz									86	
BOS01CA	BOS 18M-PA-RD21-S4	300 mm										400 Hz									66	
BOS01EC	BOS 18M-NA-RD21-S4	300 mm										400 Hz									66	
BOS01E7	BOS 18M-PS-RD21-S4	300 mm										400 Hz									66	
BOS01E9	BOS 18M-NS-RD21-S4	300 mm										400 Hz									66	
BOS01E8	BOS 18M-PO-RD21-S4	300 mm										400 Hz									67	
BOS01EA	BOS 18M-NO-RD21-S4	300 mm										400 Hz									67	
BOS013H	BOS 18M-PA-LD10-S4	350 mm										1.5 kHz									83	
BOS0138	BOS 18M-NA-LD10-S4	350 mm																			83	
BOS013F	BOS 18M-PA-LD10-02	350 mm										1.5 kHz									83	
BOS0137	BOS 18M-NA-LD10-02	350 mm																			83	
BOS01FA	BOS 18M-PS-RD23-S4	400 mm										400 Hz									58	
BOS01FC	BOS 18M-PO-RD23-S4	400 mm										400 Hz									58	
BOS01HL	BOS 18M-PS-ID23-S4	600 mm										400 Hz									58	
BOS01J8	BOS 18M-PUV-RD30-S4	500 mm										1 kHz									72	
BOS01CU	BOS 18M-PUD-RD30-S4	500 mm										200 Hz									72	
BOS01CF	BOS 18M-PA-RD20-S4	600 mm										400 Hz									67	
BOS01E6	BOS 18M-NA-RD20-S4	600 mm										400 Hz									67	
BOS01C1	BOS 18M-PS-RD20-S4	600 mm										400 Hz									67	
BOS01E4	BOS 18M-NS-RD20-S4	600 mm										400 Hz									67	
BOS01E3	BOS 18M-PO-RD20-S4	600 mm										400 Hz									67	
BOS01E5	BOS 18M-NO-RD20-S4	600 mm										400 Hz									67	
BOS01J1	BOS 18M-PS-ID24-S4	80 mm										200 Hz									78	
BOS01EY	BOS 18M-PA-ID20-S4	800 mm										400 Hz									78	
BOS01EZ	BOS 18M-NA-ID20-S4	800 mm										400 Hz									78	

Photoelectric Standard Sensors

BOS 18M

Product overview

Type			Sensing distance/ range	Light exit		Light type			Output		Switching type		Switching frequency	U _s	Connection		Special features					Page	 Photoelectric sensors		
				Straight	Right-angle	Red light	Infrared	Laser	PNP	NPN	Light switching	Dark switching		10...30V DC	M12 plug, 4-pin	Cable	Polarizing filter	Teach-in	Error output	Fixed	Test input			 Photoelectric standard sensors	
 Retroreflective sensor																									 Cylinder designs
BOS010L	BOS 18MR-PS-1QB-E5-C-S4	2 m											1 kHz									75	 Photoelectric special sensors		
BOS01F8	BOS 18M-PS-PR23-S4	4 m											400 Hz								59	 Photoelectric distance sensors for analog distance measurement			
BOS01F9	BOS 18M-PO-PR23-S4	4 m											400 Hz								59			 Special accessories for photoelectric sensors	
BOS01J9	BOS 18M-PUV-PR30-S4	5 m											1 kHz								73				 Photoelectric distance sensors for analog distance measurement
BOS01CT	BOS 18M-PUD-PR30-S4	5 m											200 Hz								73		 Special accessories for photoelectric sensors		
BOS01HK	BOS 18M-PS-IR23-S4	6 m											400 Hz								59	 Photoelectric distance sensors for analog distance measurement			
BOS01CE	BOS 18M-PA-PR20-S4	7 m											400 Hz								68			 Special accessories for photoelectric sensors	
BOS01E2	BOS 18M-NA-PR20-S4	7 m											400 Hz								68				 Special accessories for photoelectric sensors
BOS01FJ	BOS 18M-PA-PR20-S4S	7 m											400 Hz								68		 Special accessories for photoelectric sensors		
BOS01C3	BOS 18M-PS-PR20-S4	7 m											400 Hz								69	 Special accessories for photoelectric sensors			
BOS01E0	BOS 18M-NS-PR20-S4	7 m											400 Hz								69			 Special accessories for photoelectric sensors	
BOS01CZ	BOS 18M-PO-PR20-S4	7 m											400 Hz								69				 Special accessories for photoelectric sensors
BOS01E1	BOS 18M-NO-PR20-S4	7 m											400 Hz								69		 Special accessories for photoelectric sensors		
BOS01EM	BOS 18M-PO-PR20-S4S	7 m											400 Hz								69	 Special accessories for photoelectric sensors			
BOS01EN	BOS 18M-NO-PR20-S4S	7 m											400 Hz								69			 Special accessories for photoelectric sensors	
BOS01HR	BOS 18M-PA-IR21-S4	7 m											400 Hz								78				 Special accessories for photoelectric sensors
BOS01HW	BOS 18M-NA-IR21-S4	7 m											400 Hz								78		 Special accessories for photoelectric sensors		
BOS0145	BOS 18MR-PA-LR10-02	9 m											1.5 kHz								87	 Special accessories for photoelectric sensors			
BOS0132	BOS 18MR-NA-LR10-02	9 m											1.5 kHz								87			 Special accessories for photoelectric sensors	
BOS0146	BOS 18MR-PA-LR10-S4	9 m											1.5 kHz								87				 Special accessories for photoelectric sensors
BOS0140	BOS 18MR-NA-LR10-S4	9 m											1.5 kHz								87		 Special accessories for photoelectric sensors		
BOS01F0	BOS 18M-PA-IR20-S4	10 m											400 Hz								79	 Special accessories for photoelectric sensors			
BOS01F2	BOS 18M-NA-IR20-S4	10 m											400 Hz								79			 Special accessories for photoelectric sensors	
BOS01F1	BOS 18M-PS-IR20-S4	10 m											400 Hz								79				 Special accessories for photoelectric sensors
BOS013M	BOS 18M-PA-LR10-S4	16 m											1.5 kHz								84		 Special accessories for photoelectric sensors		
BOS013E	BOS 18M-NA-LR10-S4	16 m											1.5 kHz								84	 Special accessories for photoelectric sensors			
BOS013L	BOS 18M-PA-LR10-02	16 m											1.5 kHz								84			 Special accessories for photoelectric sensors	
BOS013C	BOS 18M-NA-LR10-02	16 m											1.5 kHz								84				 Special accessories for photoelectric sensors
 Through-beam sensor Receiver																									
BOS010E	BLE 18MR-PA-1PP-E5-C-S4	0...16 m											1 kHz								75	 Special accessories for photoelectric sensors			
BOS01CC	BOS 18M-PA-RE20-S4	0...20 m											400 Hz								70		 Special accessories for photoelectric sensors		
BOS01EK	BOS 18M-NA-RE20-S4	0...20 m											400 Hz								70			 Special accessories for photoelectric sensors	
BOS01FK	BOS 18M-PA-RE20-S4S	0...20 m											400 Hz								70				 Special accessories for photoelectric sensors
BOS01C2	BOS 18M-PS-RE20-S4	0...20 m											400 Hz								71	 Special accessories for photoelectric sensors			
BOS01EH	BOS 18M-NS-RE20-S4	0...20 m											400 Hz								71		 Special accessories for photoelectric sensors		
BOS01EE	BOS 18M-PO-RE20-S4	0...20 m											400 Hz								71			 Special accessories for photoelectric sensors	
BOS01EJ	BOS 18M-NO-RE20-S4	0...20 m											400 Hz								71				 Special accessories for photoelectric sensors
BOS01EF	BOS 18M-PO-RE20-S4S	0...20 m											400 Hz								71	 Special accessories for photoelectric sensors			
BOS01EL	BOS 18M-NO-RE20-S4S	0...20 m											400 Hz								71		 Special accessories for photoelectric sensors		
BOS01FF	BOS 18M-PO-RE23-S4	0...20 m											400 Hz								60			 Special accessories for photoelectric sensors	
BOS01FE	BOS 18M-PS-RE23-S4	0...20 m											400 Hz								60				 Special accessories for photoelectric sensors
BOS01J7	BOS 18M-PUV-RE30-S4	0...20 m											1 kHz								73	 Special accessories for photoelectric sensors			
BOS01CW	BOS 18M-PUD-RE30-S4	0...20 m											200 Hz								73		 Special accessories for photoelectric sensors		
BOS01HP	BOS 18M-PS-IE23-S4	0...50 m											400 Hz								61			 Special accessories for photoelectric sensors	
BOS01F3	BOS 18M-PA-IE20-S4	0...50 m											400 Hz								79				 Special accessories for photoelectric sensors
BOS01F4	BOS 18M-NA-IE20-S4	0...50 m											400 Hz								79	 Special accessories for photoelectric sensors			
BOS0074	BLE 18M-BA-1LT-S4-C	0...50 m											6 kHz								93		 Special accessories for photoelectric sensors		
BOS0076	BLE 18MR-BA-1LT-S4-C	0...50 m											6 kHz								93			 Special accessories for photoelectric sensors	
																									 Special accessories for photoelectric sensors
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Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

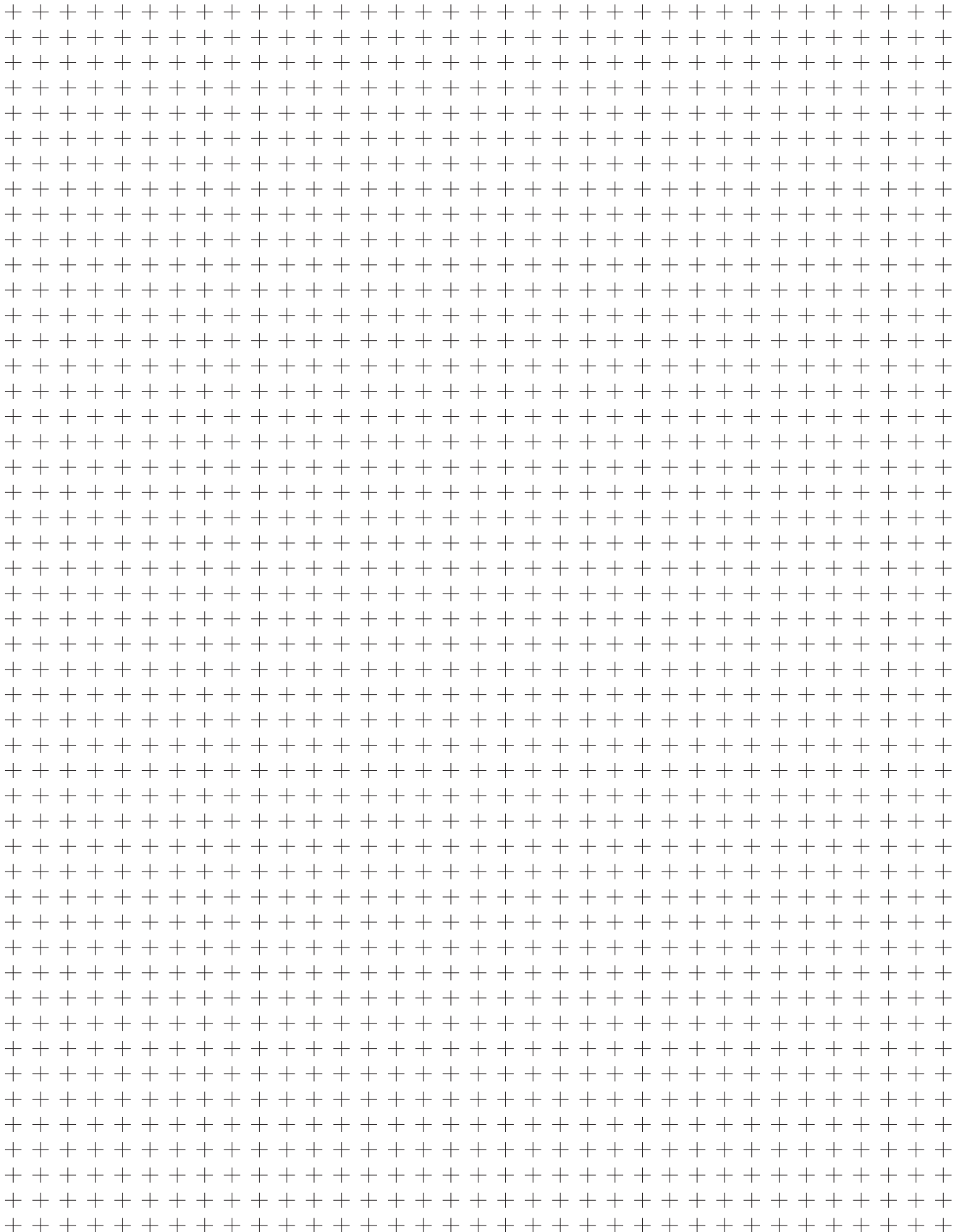
Type		Sensing distance/ range	Light exit		Light type			Output		Switching type		Switching frequency	U _S	Connection		Special features					Page
			Straight	Right-angle	Red light	Infrared	Laser	PNP	NPN	Light switching	Dark switching			M12 plug, 4-pin	Cable	Polarizing filter	Teach-in	Error output	Fixed	Test input	
 Through-beam sensor Receiver																					
BOS0143	BOS 18MR-PA-LE10-02	0...50 m		■			■	■		■	■	1.5 kHz	■								88
BOS013W	BOS 18MR-NA-LE10-02	0...50 m		■					■	■	■	1.5 kHz	■		■						88
BOS0144	BOS 18MR-PA-LE10-S4	0...50 m		■			■	■		■	■	1.5 kHz	■	■							88
BOS013Y	BOS 18MR-NA-LE10-S4	0...50 m		■			■	■		■	■	1.5 kHz	■	■							88
BOS013K	BOS 18M-PA-LE10-S4	0...60 m	■				■	■		■	■	1.5 kHz	■	■							85
BOS013A	BOS 18M-NA-LE10-S4	0...60 m	■				■		■	■		1.5 kHz	■	■							85
BOS013J	BOS 18M-PA-LE10-02	0...60 m	■				■	■		■	■	1.5 kHz	■		■						85
BOS0139	BOS 18M-NA-LE10-02	0...60 m	■				■		■	■		1.5 kHz	■		■						85
 Through-beam sensor Emitter																					
BOS010F	BLS 18MR-XX-1P-E5-L-S4	0...16 m		■	■								■	■							75
BOS01C0	BOS 18M-X-RS20-S4	0...20 m	■		■								■	■							71
BOS01EP	BOS 18M-XT-RS20-S4	0...20 m	■		■								■	■					■		71
BOS01FH	BOS 18M-X-RS23-S4	0...20 m	■		■								■	■							60
BOS01CY	BOS 18M-X-RS30-S4	0...20 m	■		■								■	■							73
BOS01HM	BOS 18M-X-IS23-S4	0...50 m	■			■							■	■							61
BOS01F5	BOS 18M-X-IS20-S4	0...50 m	■			■							■	■							79
BOS01HN	BOS 18M-XT-IS20-S4	0...50 m	■			■							■	■					■		79
BOS01HT	BOS 18M-X-IS24-S4	0...100 m	■			■							■	■							79
BOS01HU	BOS 18M-XT-IS24-S4	0...100 m	■			■							■	■					■		79
BOS00AW	BLS 18M-XX-1LT-S4-C	0...50 m	■				■						■	■							93
BOS00AU	BLS 18MR-XX-1LT-S4-C	0...50 m		■			■						■	■							93
BOS0147	BOS 18MR-XT-LS10-02	0...50 m		■			■						■		■					■	89
BOS0148	BOS 18MR-XT-LS10-S4	0...50 m		■			■						■	■						■	89
BOS013R	BOS 18M-XT-LS10-S4	0...60 m	■				■						■	■						■	85
BOS013P	BOS 18M-XT-LS10-02	0...60 m	■				■						■		■					■	85



Photoelectric Standard Sensors

BOS 18M

Product overview



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric Standard Sensors
BOS 18M Global
Sensing distance 400 mm, 600 mm

M18 Metal
Global

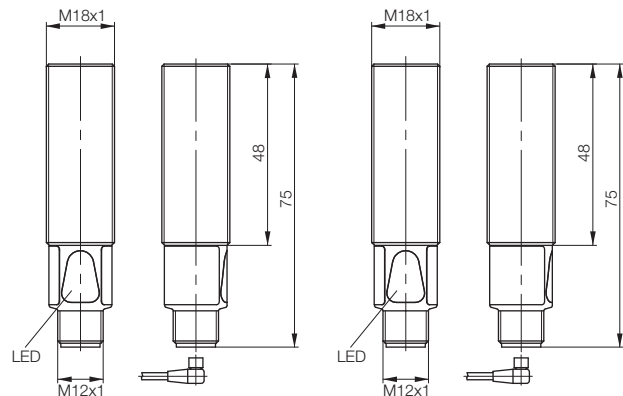


Type		Diffuse sensor 1...400 mm	Diffuse sensor 1...600 mm
Detection range			
PNP NO	Part number	BOS 18M-PS-RD23-S4 ①	BOS 18M-PS-ID23-S4 ①
NPN NO	Part number		
PNP NC	Part number	BOS 18M-PO-RD23-S4 ②	
NPN NC	Part number		
PNP NO	Polarizing filter	Part number	
NPN NO		Part number	
PNP NC	Polarizing filter	Part number	
NPN NC		Part number	
Supply voltage U_B		10...30 V DC	10...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 30 mA	≤ 30 mA
Switching type		Light or dark switching	Light switching
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Fixed	Fixed
Emitter, light type		LED, red light	LED, infrared
Wavelength		620...670 nm	850 nm
Received light indicator		Yellow LED	Yellow LED
Response time		1.25 ms	1.25 ms
Switching frequency f		400 Hz	400 Hz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-5...+55 °C	-5...+55 °C
Permissible ambient light		10 klx	5 klx
Material	Housing	Nickel-plated brass	Nickel-plated brass
	Optical surface	Glass	Glass
Connection		M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

wiring diagrams on page 95.

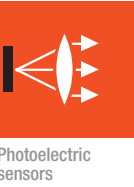
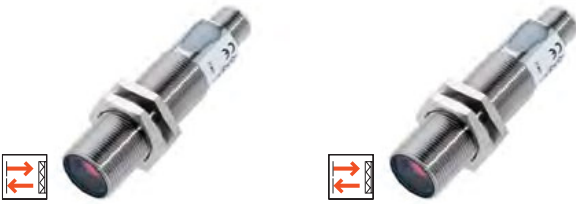
Ordering codes on pages 54-56.



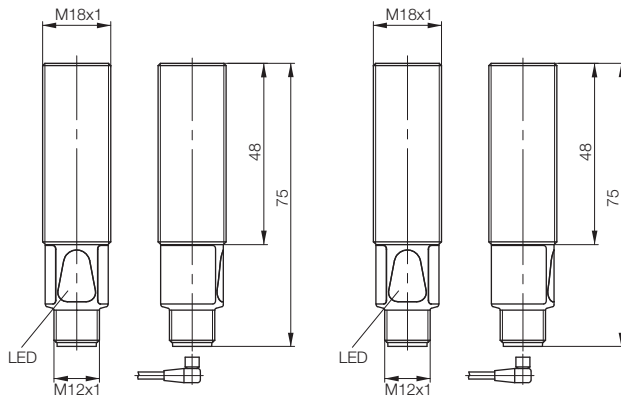
Photoelectric Standard Sensors

BOS 18M Global

Range 4 m, 6 m



	Retroreflective sensor 4 m	Retroreflective sensor 6 m		
		BOS 18M-PS-IR23-S4 ①		Photoelectric standard sensors
				Cylinder designs
				Block designs
	BOS 18M-PS-PR23-S4 ①			Photoelectric special sensors
	BOS 18M-PO-PR23-S4 ②			
	10...30 V DC	10...30 V DC		Photoelectric distance sensors for analog distance measurement
	100 mA	100 mA		
	≤ 30 mA	≤ 30 mA		
	Light or dark switching	Dark switching		
	Yes/Yes	Yes/Yes		Special accessories for photoelectric sensors
	Fixed	Fixed		
	LED, red light	LED, infrared		
	620...670 nm	850 nm		
	Yellow LED	Yellow LED		
	1.25 ms	1.25 ms		
	400 Hz	400 Hz		
	IP 67	IP 67		
	-5...+55 °C	-5...+55 °C		
	10 klx	5 klx		
	Nickel-plated brass	Nickel-plated brass		
	Glass	Glass		
	M12 connector, 4-pin	M12 connector, 4-pin		

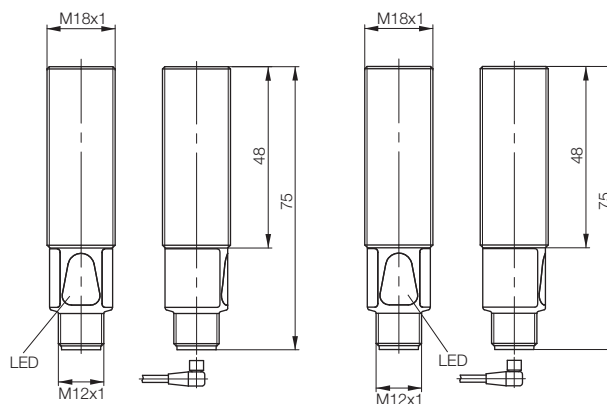




Type	Through-beam sensor		Through-beam sensor	
Detection range	0...20 m		0...20 m	
PNP NO Receiver	Part number	BOS 18M-PS-RE23-S4	②	
NPN NO	Part number			
PNP NC Receiver	Part number	BOS 18M-PO-RE23-S4	①	
NPN NC	Part number			
Emitter	Part number		BOS 18M-X-RS23-S4	⑥
	Part number			
Supply voltage U_B	10...30 V DC		10...30 V DC	
Output current	100 mA			
No-load supply current I_0 max.	≤ 20 mA		≤ 30 mA	
Switching type	Light or dark switching			
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Fixed		Fixed	
Emitter, light type	LED, red light		LED, red light	
Wavelength	620...670 nm		620...670 nm	
Received light indicator	Yellow LED			
Power-on indicator			Green LED	
Response time	1.25 ms			
Switching frequency f	400 Hz			
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	$-5...+55$ °C		$-5...+55$ °C	
Permissible ambient light	10 klx		10 klx	
Material	Housing	Nickel-plated brass	Nickel-plated brass	
	Optical surface	Glass	Glass	
Connection	M12 connector, 4-pin		M12 connector, 4-pin	

Wiring diagrams on page 95.

Ordering codes on pages 54-56.





Photoelectric Standard Sensors

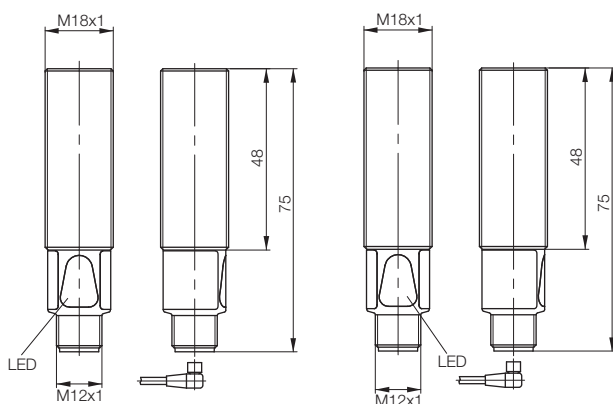
BOS 18M Global

Range 50 m

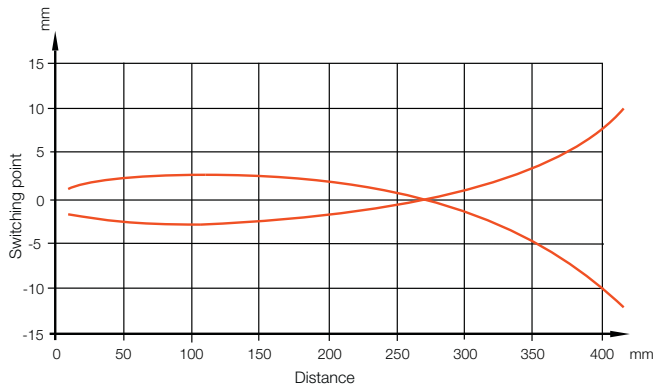


Photoelectric sensors

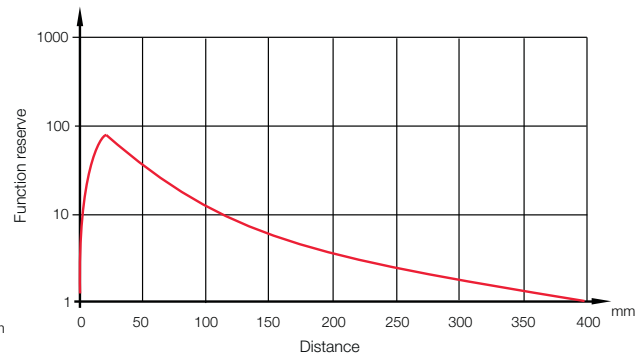
	Through-beam sensor 0...50 m	Through-beam sensor 0...50 m		
	BOS 18M-PS-IE23-S4 ②			Photoelectric standard sensors
				Cylinder designs
				Block designs
		BOS 18M-X-IS23-S4 ⑥		Photoelectric special sensors
	10...30 V DC	10...30 V DC		Photoelectric distance sensors for analog distance measurement
	100 mA			
	≤ 20 mA	≤ 30 mA		
	Dark switching			
	Yes/Yes	Yes/Yes		
	Fixed	Fixed		
	LED, infrared	LED, infrared		
	850 nm	850 nm		
	Yellow LED	Green LED		Special accessories for photoelectric sensors
	1.25 ms			
	400 Hz			
	IP 67	IP 67		
	-5...+55 °C	-5...+55 °C		
	5 klx			
	Nickel-plated brass	Nickel-plated brass		
	Glass	Glass		
	M12 connector, 4-pin	M12 connector, 4-pin		



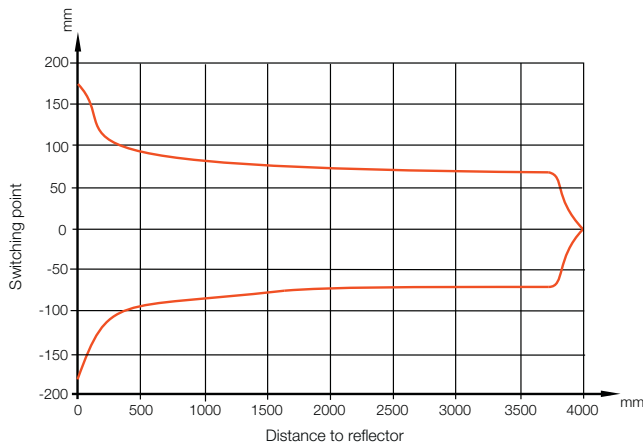
Diffuse sensor BOS 18M...RD23
 Response curve



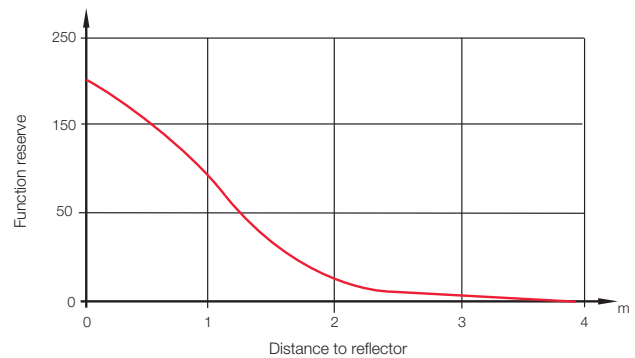
Diffuse sensor BOS 18M...RD23
 Distance function reserve



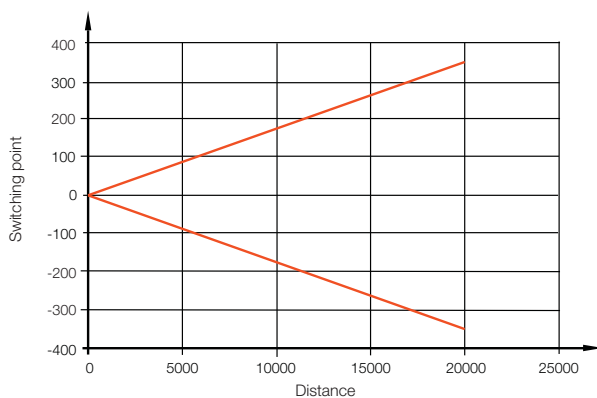
Retroreflective sensor BOS 18M...PR23
 Response curve



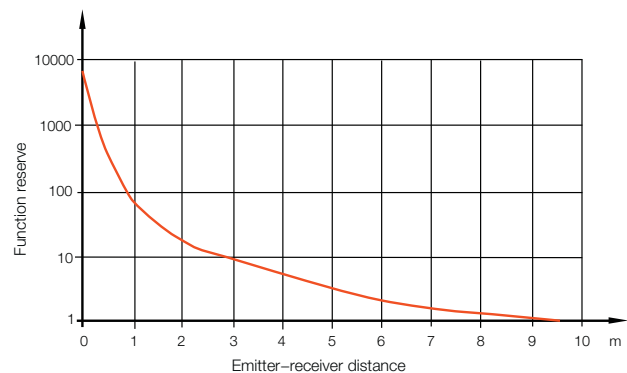
Retroreflective sensor BOS 18M...PR23
 Distance function reserve



Through-beam sensor BOS 18M...RE/RS23
 Response curve based on distance



Through-beam sensor BOS 18M...RE/RS23
 Emitter distance function reserve





Photoelectric Standard Sensors

BOS 18M Global

Accessories



Photoelectric sensors

Photoelectric standard sensors

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Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Recommended accessories

(please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Mounting bracket	BAM00RY
③ Reflector	BAM00UK



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC0CAU
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC0CAT

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Standard Sensors
BOS 18M red light
Sensing distance 150 mm

M18 Metal Red light

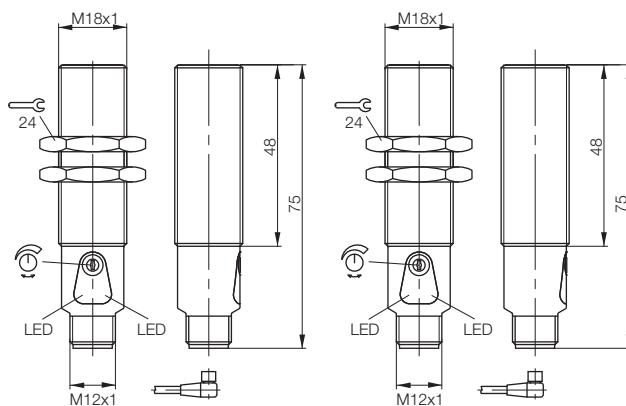


Type			Diffuse sensor with background suppression		Diffuse sensor with background suppression	
Detection range			30...150 mm		30...150 mm	
PNP	NO/NC		Part number	BOS 18M-PA-RH23-S4 ③		
NPN	NO/NC		Part number	BOS 18M-NA-RH23-S4 ④		
PNP	NO		Part number			
NPN	NO		Part number			
PNP	NO	Error output	Part number		BOS 18M-PSV-RH23-S4 ⑤	
NPN	NO	Error output	Part number			
PNP	NC	Error output	Part number			
NPN	NC	Error output	Part number			
Supply voltage U _B			10...30 V DC		10...30 V DC	
Output current			100 mA		100 mA	
No-load supply current I ₀ max.			≤ 40 mA		≤ 40 mA	
Switching type			Light and dark switching		Light switching	
Polarity reversal/short-circuit protected			Yes/Yes		Yes/Yes	
Settings			10-turn potentiometer		10-turn potentiometer	
Emitter, light type			LED, red light		LED, red light	
Wavelength			620...670 nm		620...670 nm	
Response time			1ms		1ms	
Switching frequency f			500 Hz		500 Hz	
Degree of protection as per IEC 60529			IP 67		IP 67	
Ambient temperature T _a			–5...+55 °C		–5...+55 °C	
Permissible ambient light			10 klx		10 klx	
Material	Housing		Nickel-plated CuZn		Nickel-plated CuZn	
	Optical surface		Glass		Glass	
Connection			M12 connector, 4-pin		M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.



Photoelectric Standard Sensors

BOS 18M red light

Sensing distance 300 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

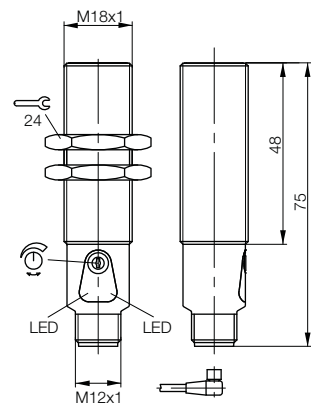
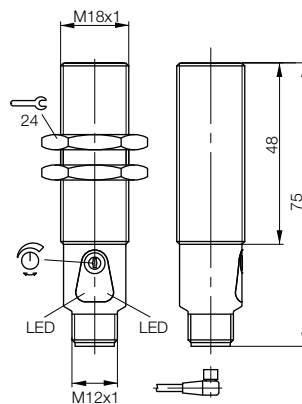
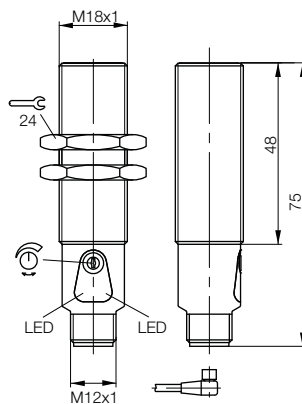
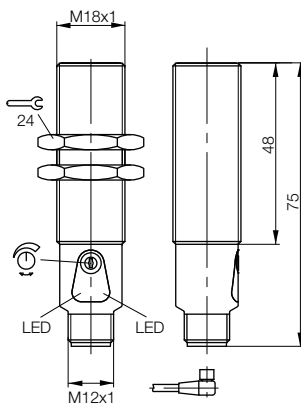
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor with background suppression 30...300 mm	Diffuse sensor with background suppression 30...300 mm	Diffuse sensor with background suppression 30...300 mm	Diffuse sensor with background suppression 30...300 mm
BOS 18M-PA-RH22-S4 ③			
BOS 18M-NA-RH22-S4 ④			
	BOS 18M-PS-RH22-S4 ②		
		BOS 18M-PSV-RH22-S4 ⑧	
		BOS 18M-NSV-RH22-S4 ⑰	
			BOS 18M-POV-RH22-S4 ⑨
			BOS 18M-NOV-RH22-S4 ⑯
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 50 mA	≤ 50 mA	≤ 50 mA	≤ 50 mA
Light and dark switching	Light switching	Light switching	Dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
10-turn potentiometer	10-turn potentiometer	10-turn potentiometer	10-turn potentiometer
LED, red light	LED, red light	LED, red light	LED, red light
620...670 nm	620...670 nm	620...670 nm	620...670 nm
1ms	1ms	1ms	1ms
500 Hz	500 Hz	500 Hz	500 Hz
IP 67	IP 67	IP 67	IP 67
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C
10 klx	10 klx	10 klx	10 klx
Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn
Glass	Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



Photoelectric Standard Sensors
BOS 18M red light
Sensing distance 300 mm

M18 Metal Red Light

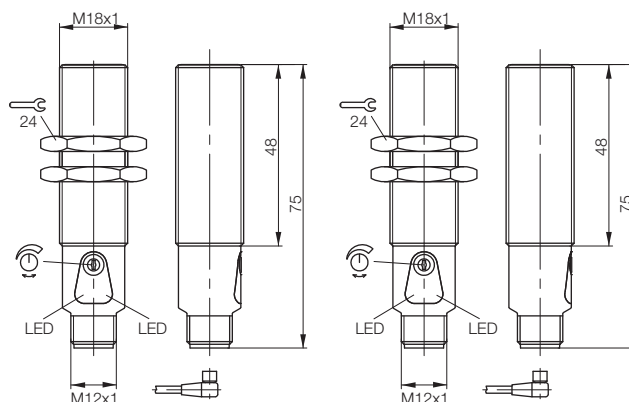


Type			Diffuse sensor	Diffuse sensor
Detection range			1...300 mm	1...300 mm
PNP	NO/NC	Part number	BOS 18M-PA-RD21-S4 ③	
NPN	NO/NC	Part number	BOS 18M-NA-RD21-S4 ④	
PNP	NO	Part number		BOS 18M-PS-RD21-S4 ①
NPN	NO	Part number		BOS 18M-NS-RD21-S4 ⑧
PNP	NC	Part number		
NPN	NC	Part number		
Supply voltage U_B			10...30 V DC	10...30 V DC
Output current			100 mA	100 mA
No-load supply current I_0 max.			≤ 50 mA	≤ 50 mA
Switching type			Light and dark switching	Light switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Potentiometer, 270°	Potentiometer, 270°
Emitter, light type			LED, red light	LED, red light
Wavelength			620...670 nm	620...670 nm
Response time			1.25 ms	1.25 ms
Switching frequency f			400 Hz	400 Hz
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T_a			-5...+55 °C	-5...+55 °C
Permissible ambient light			10 klx	10 klx
Material	Housing		Nickel-plated CuZn	Nickel-plated CuZn
	Optical surface		Glass	Glass
Connection			M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.
200x200 mm²

Wiring diagrams on page 95.

Ordering codes on pages 54-56.



Photoelectric Standard Sensors

BOS 18M red light

Sensing distance 300 mm, 600 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

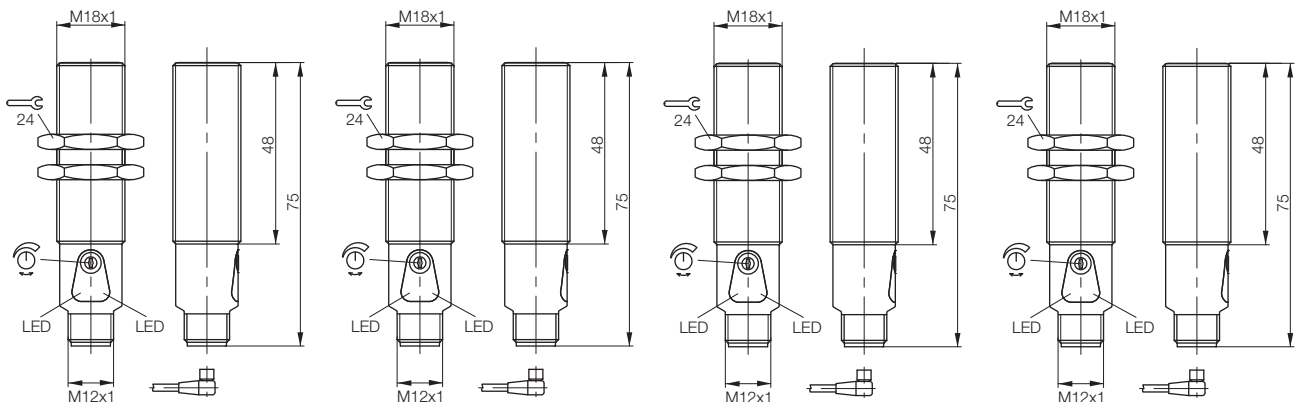
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor 1...300 mm	Diffuse sensor 1...600 mm	Diffuse sensor 1...600 mm	Diffuse sensor 1...600 mm
	BOS 18M-PA-RD20-S4 ③		
	BOS 18M-NA-RD20-S4 ④		
		BOS 18M-PS-RD20-S4 ①	
		BOS 18M-NS-RD20-S4 ⑱	
BOS 18M-PO-RD21-S4 ②			BOS 18M-PO-RD20-S4 ②
BOS 18M-NO-RD21-S4 ⑳			BOS 18M-NO-RD20-S4 ⑳
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA	100 mA
≤ 50 mA	≤ 50 mA	≤ 50 mA	≤ 50 mA
Dark switching	Light and dark switching	Light switching	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, red light	LED, red light
620...670 nm	620...670 nm	620...670 nm	620...670 nm
1.25 ms	1.25 ms	1.25 ms	1.25 ms
400 Hz	400 Hz	400 Hz	400 Hz
IP 67	IP 67	IP 67	IP 67
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C
10 klx	10 klx	10 klx	10 klx
Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn
Glass	Glass	Glass	Glass
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



Photoelectric Standard Sensors
BOS 18M red light
Range 7 m

M18 Metal Red Light

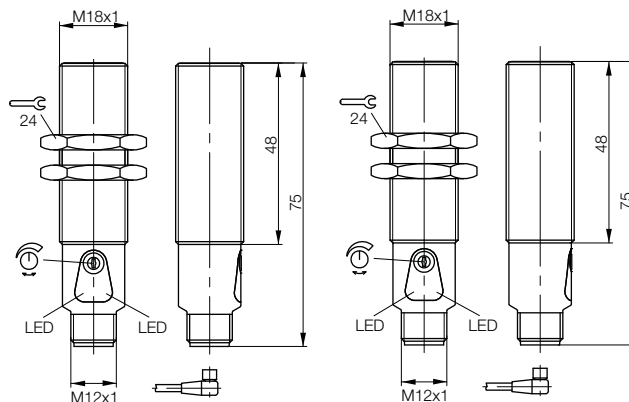


Type				Retroreflective sensor		Retroreflective sensor	
Detection range				7 m		7 m	
PNP	NO/NC		Part number	BOS 18M-PA-PR20-S4	③		
NPN	NO/NC		Part number	BOS 18M-NA-PR20-S4	④		
PNP	NO/NC		Part number			BOS 18M-PA-PR20-S4S	⑫
NPN	NO/NC		Part number				
PNP	NO		Part number				
NPN	NO		Part number				
PNP	NC		Part number				
NPN	NC		Part number				
PNP	NC	Special output	Part number				
NPN	NC	Special output	Part number				
Supply voltage U_B				10...30 V DC		10...30 V DC	
Output current				100 mA		100 mA	
No-load supply current I_0 max.				≤ 50 mA		≤ 50 mA	
Switching type				Light and dark switching		Light and dark switching	
Polarity reversal/short-circuit protected				Yes/Yes		Yes/Yes	
Settings				Potentiometer, 270°		Potentiometer, 270°	
Emitter, light type				LED, red light		LED, red light	
Wavelength				620...670 nm		620...670 nm	
Response time				1.25 ms		1.25 ms	
Switching frequency f				400 Hz		400 Hz	
Degree of protection as per IEC 60529				IP 67		IP 67	
Ambient temperature T_a				-5...+55 °C		-5...+55 °C	
Permissible ambient light				10 klx		10 klx	
Material		Housing		Nickel-plated CuZn		Nickel-plated CuZn	
		Optical surface		Glass		Glass	
Connection				M12 connector, 4-pin		M12 connector, 4-pin	

Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 95.

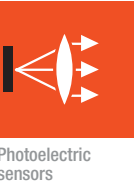
Ordering codes on pages 54-56.



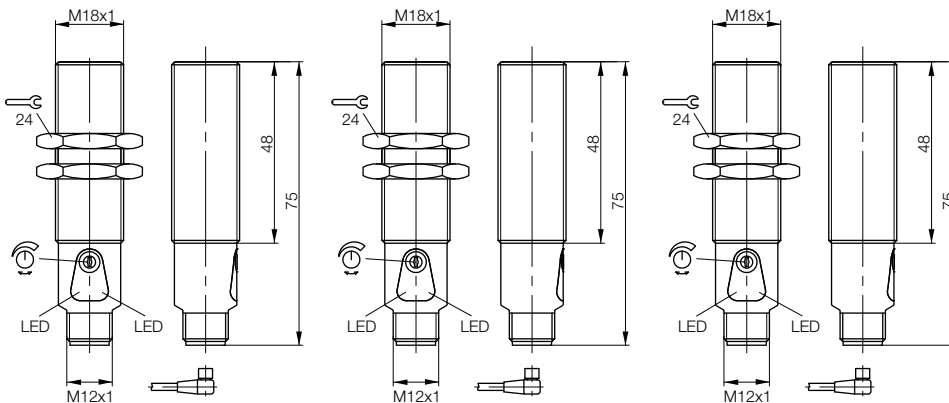
Photoelectric Standard Sensors

BOS 18M red light

Range 7 m



	Retroreflective sensor 7 m	Retroreflective sensor 7 m	Retroreflective sensor 7 m	
				Photoelectric standard sensors
				Cylinder designs
				Block designs
	BOS 18M-PS-PR20-S4 ①			
	BOS 18M-NS-PR20-S4 ⑱			Photoelectric special sensors
		BOS 18M-PO-PR20-S4 ②		
		BOS 18M-NO-PR20-S4 ⑳		
			BOS 18M-PO-PR20-S4S ⑬	Photoelectric distance sensors for analog distance measurement
			BOS 18M-NO-PR20-S4S ㉑	
	10...30 V DC	10...30 V DC	10...30 V DC	
	100 mA	100 mA	100 mA	
	≤ 50 mA	≤ 50 mA	≤ 50 mA	
	Dark switching	Light switching	Light switching	Special accessories for photoelectric sensors
	Yes/Yes	Yes/Yes	Yes/Yes	
	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	
	LED, red light	LED, red light	LED, red light	
	620...670 nm	620...670 nm	620...670 nm	
	1.25 ms	1.25 ms	1.25 ms	
	400 Hz	400 Hz	400 Hz	
	IP 67	IP 67	IP 67	
	-5...+55 °C	-5...+55 °C	-5...+55 °C	
	10 klx	10 klx	10 klx	
	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
	Glass	Glass	Glass	
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	



Photoelectric Standard Sensors
BOS 18M red light
Range 20 m

M18 Metal Red Light



Receiver

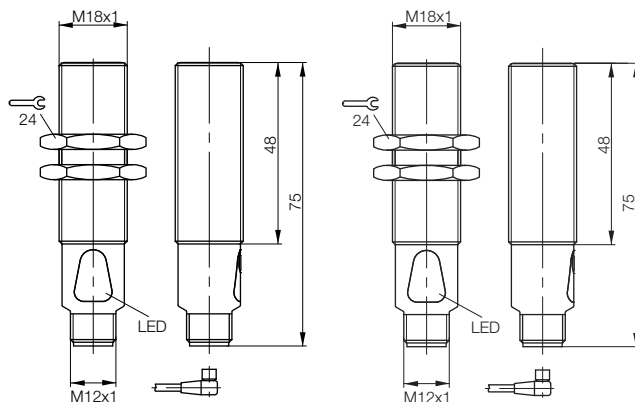


Receiver

Type				Through-beam sensor	Through-beam sensor
Detection range				0...20 m	0...20 m
PNP	NO/NC	Receiver	Part number	BOS 18M-PA-RE20-S4 ③	BOS 18M-PA-RE20-S4S ⑫
NPN	NO/NC		Part number	BOS 18M-NA-RE20-S4 ④	
PNP	NO	Receiver	Part number		
NPN	NO		Part number		
PNP	NC	Receiver	Part number		
NPN	NC		Part number		
		Emitter	Part number		
			Part number		
		Emitter Test input	Part number		
			Part number		
Supply voltage U_B				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
Switching type				Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected				Yes/Yes	Yes/Yes
Settings					
Emitter, light type				LED, red light	LED, red light
Wavelength				620...670 nm	620...670 nm
Response time				1.25 ms	1.25 ms
Switching frequency f				400 Hz	400 Hz
Degree of protection as per IEC 60529				IP 67	IP 67
Ambient temperature T_a				-5...+55 °C	-5...+55 °C
Permissible ambient light				10 klx	10 klx
Material		Housing		Nickel-plated CuZn	Nickel-plated CuZn
		Optical surface		Glass	Glass
Connection				M12 connector, 4-pin	M12 connector, 4-pin

Wiring diagrams on page 95.

Ordering codes on pages 54-56.



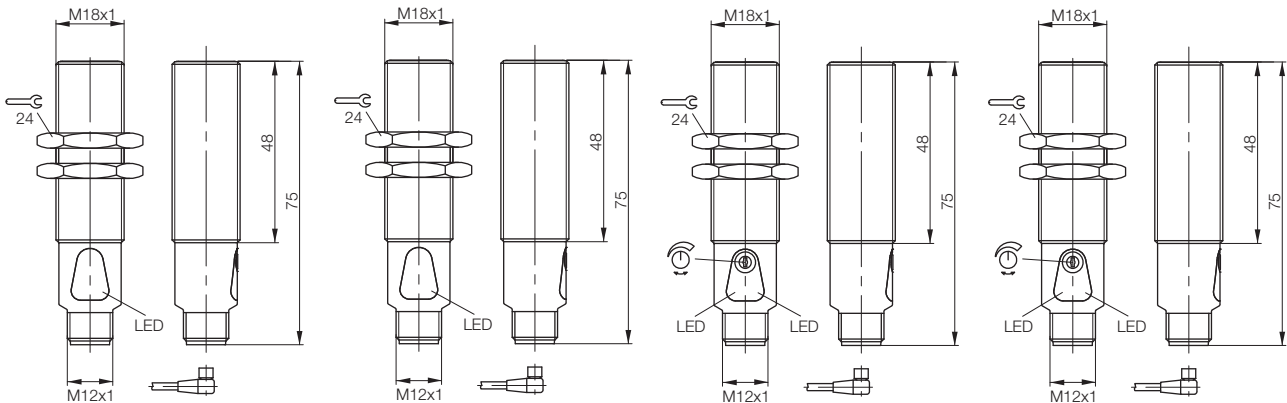
Photoelectric Standard Sensors

BOS 18M red light

Range 20 m



Through-beam sensor 0...20 m	Through-beam sensor 0...20 m	Through-beam sensor 0...20 m	Through-beam sensor 0...20 m	
BOS 18M-PS-RE20-S4 ^②				Photoelectric standard sensors
BOS 18M-NS-RE20-S4 ^⑱				Cylinder designs
BOS 18M-PO-RE20-S4 ^②	BOS 18M-PO-RE20-S4S ^⑬			Block designs
BOS 18M-NO-RE20-S4 ^⑳	BOS 18M-NO-RE20-S4S ^㉑			Photoelectric special sensors
		BOS 18M-X-RS20-S4 ^⑫		
			BOS 18M-XT-RS20-S4 ^⑦	Photoelectric distance sensors for analog distance measurement
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	Special accessories for photoelectric sensors
100 mA	100 mA			
≤ 35 mA	≤ 35 mA	≤ 50 mA	≤ 50 mA	
Light or dark switching	Light switching	Yes/Yes	Yes/Yes	
Yes/Yes	Yes/Yes	Potentiometer, 270°	Potentiometer, 270°	
LED, red light	LED, red light	LED, red light	LED, red light	
620...670 nm	620...670 nm	620...670 nm	620...670 nm	
1.25 ms	1.25 ms			
400 Hz	400 Hz			
IP 67	IP 67	IP 67	IP 67	
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	
10 klx	10 klx	10 klx	10 klx	
Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
Glass	Glass	Glass	Glass	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	



Photoelectric Standard Sensors
BOS 18M red light
Sensing distance 500 mm, range 5 m

M18 Metal Red Light Teach-in

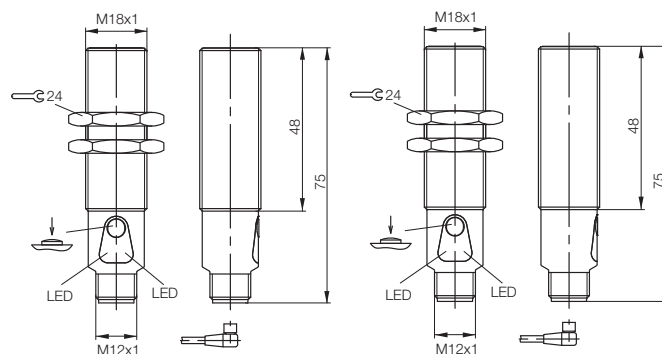


Type				Diffuse sensor	Diffuse sensor
Detection range				1...500 mm	1...500 mm
PNP NO/NC	Error output	Part number	BOS 18M-PUV-RD30-S4 ¹⁴		
NPN NO/NC					
PNP NO/NC		Part number			BOS 18M-PUD-RD30-S4 ¹⁵
NPN NO/NC					
PNP NO/NC	Polarizing filter,	Part number			
NPN NO/NC	Error output	Part number			
PNP NO/NC	Polarizing filter	Part number			
NPN NO/NC		Part number			
Emitter		Part number			
		Part number			
Supply voltage U_B				10...30 V DC	10...30 V DC
Output current				100 mA	100 mA
No-load supply current I_0 max.				≤ 40 mA	≤ 40 mA
Switching type				Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected				Yes/Yes	Yes/Yes
Settings				Teach-in	Teach-in
Emitter, light type				LED, red light	LED, red light
Wavelength				626 nm	626 nm
Response time				0.5 ms	2.5 ms
Switching frequency f				1 kHz	200 Hz
Degree of protection as per IEC 60529				IP 67	IP 67
Ambient temperature T_a				-5...+55 °C	-5...+55 °C
Permissible ambient light				10 klx	10 klx
Material	Housing		Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
	Optical surface		Glass	Glass	Glass
Connection				M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.



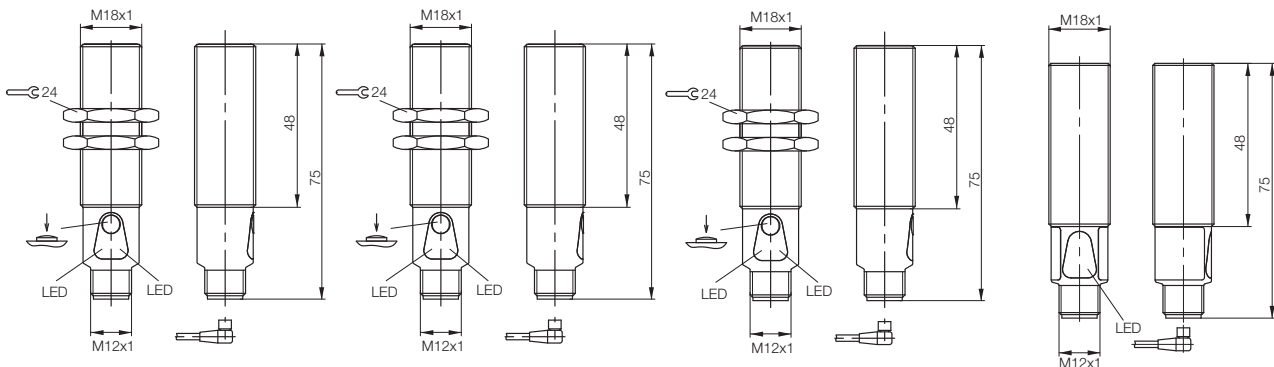
Photoelectric Standard Sensors

BOS 18M red light

Range 5 m, 20 m



	Retroreflective sensor 5 m	Retroreflective sensor 5 m	Through-beam sensor 0...20 m	Through-beam sensor 0...20 m	
			BOS 18M-PUV-RE30-S4 ⁽¹⁴⁾		Photoelectric standard sensors
			BOS 18M-PUD-RE30-S4 ⁽¹⁵⁾		Cylinder designs
					Block designs
	BOS 18M-PUV-PR30-S4 ⁽¹⁴⁾				
		BOS 18M-PUD-PR30-S4 ⁽¹⁵⁾			Photoelectric special sensors
				BOS 18M-X-RS30-S4 ⁽⁶⁾	Photoelectric distance sensors for analog distance measurement
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
	100 mA	100 mA	100 mA	100 mA	
	≤ 40 mA	≤ 40 mA	≤ 25 mA	≤ 25 mA	
	Light and dark switching	Light and dark switching	Light and dark switching	Light and dark switching	
	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Special accessories for photoelectric sensors
	Teach-in	Teach-in	Teach-in	Teach-in	
	LED, red light	LED, red light	LED, red light	LED, red light	
	626 nm	626 nm	626 nm	626 nm	
	0.5 ms	2.5 ms	0.5 ms		
	1 kHz	200 Hz	1 kHz / 200 Hz		
	IP 67	IP 67	IP 67	IP 67	
	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	
	10 klx	10 klx	10 klx		
	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	



Photoelectric Standard Sensors
BOS 18M red light
Sensing distance 120 mm

M18 Metal with Angle Head

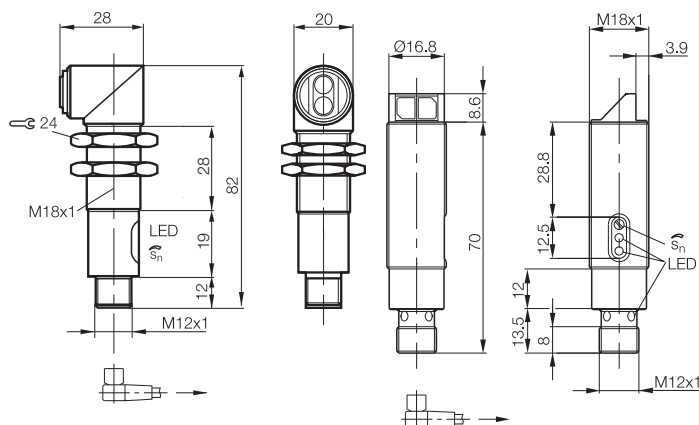


Type			Diffuse sensor with background suppression	Diffuse sensor with background suppression
Detection range			40...120 mm	10...120 mm
PNP	NO/NC	Part number	BOS 18MR-PA-1HA-S4-C ③	
NPN	NO/NC	Part number		
PNP	NO	Part number		BOS 18MR-PS-1HA-E5-C-S4 ①
NPN	NO	Part number		
PNP	NO/NC	Receiver	Part number	
NPN	NO/NC	Receiver	Part number	
	Emitter	Part number		
	Emitter	Part number		
Supply voltage U_B			10...30 V DC	10...36 V DC
Output current			200 mA	200 mA
No-load supply current I_0 max.			≤ 30 mA	≤ 20 mA
Switching type			Light and dark switching	Light switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			18-turn potentiometer	Potentiometer, 270°
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Response time			0.8 ms	≤ 1 ms
Switching frequency f			600 Hz	500 Hz
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T_a			-15...+55 °C	-25...+55 °C
Permissible ambient light			2 klx	10 klx
Material	Housing		Nickel-plated CuZn	Nickel-plated CuZn
	Optical surface		Glass	Glass
Connection			M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.



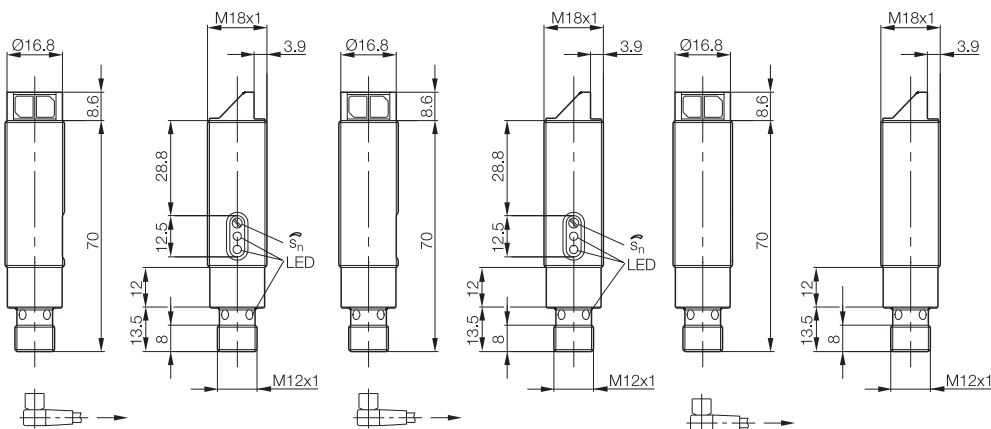
Photoelectric Standard Sensors

BOS 18M red light

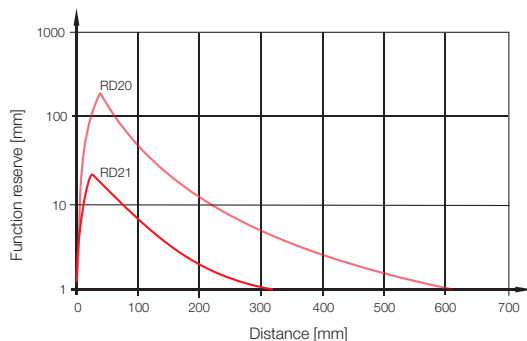
Sensing distance 2 m, 16 m



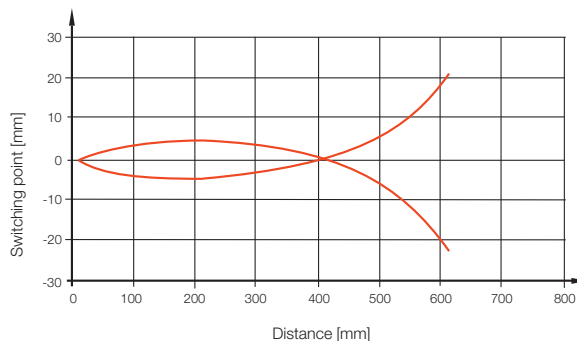
	Retroreflective sensor 2 m	Through-beam sensor 0...16 m	Through-beam sensor 0...16 m	
				Photoelectric standard sensors
				Cylinder designs
	BOS 18MR-PS-1QB-E5-C-S4 ①			Block designs
		BLE 18MR-PA-1PP-E5-C-S4 ③		
			BLS 18MR-XX-1P-E5-L-S4 ⑥	Photoelectric special sensors
	10...36 V DC	10...36 V DC	10...36 V DC	Photoelectric distance sensors for analog distance measurement
	200 mA	200 mA		
	≤ 20 mA	≤ 20 mA	≤ 20 mA	
	Dark switching	Light and dark switching		
	Yes/Yes	Yes/Yes		
	Potentiometer, 270°	Potentiometer, 270°		Special accessories for photoelectric sensors
	LED, red light	LED, red light	LED, red light	
	660 nm	660 nm	660 nm	
	≤ 0.5 ms	≤ 0.5 ms		
	1 kHz	1 kHz		
	IP 67	IP 67	IP 67	
	-25...+55 °C	-25...+55 °C	-25...+55 °C	
	10 klx	10 klx	10 klx	
	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	
	Glass	Glass	Glass	
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	



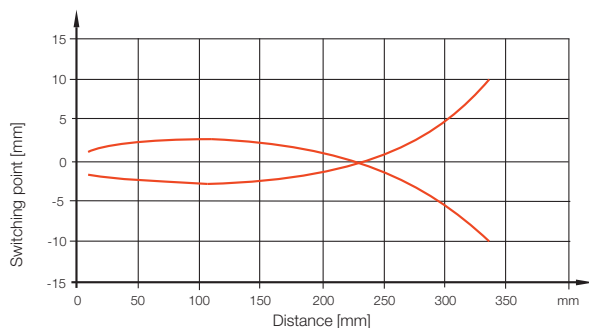
Diffuse sensor BOS 18M...RD
 Distance function reserve



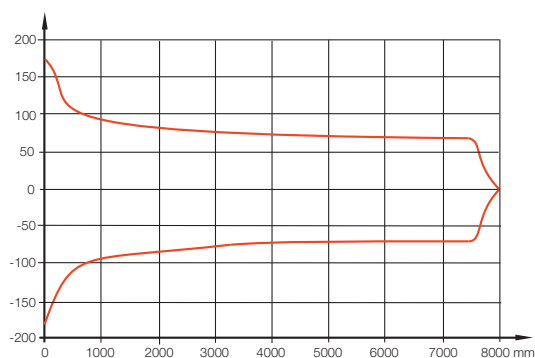
Diffuse sensor BOS 18M...RD20
 Response curve



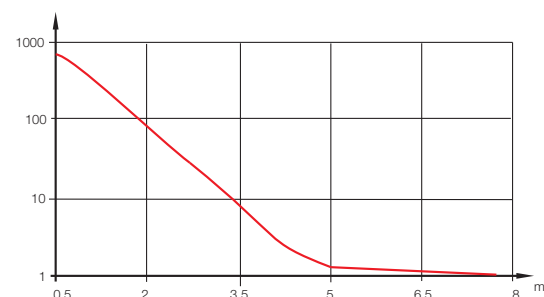
Diffuse sensor BOS 18M...RD21..
 Response curve



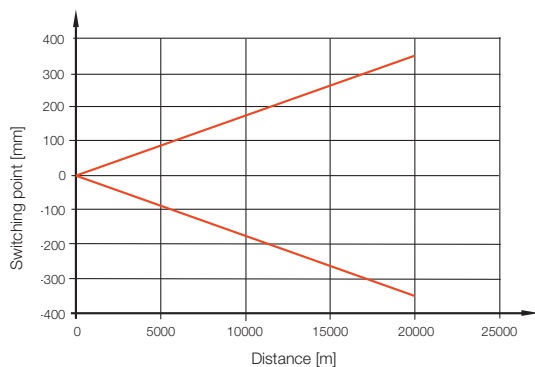
Retroreflective sensor BOS 18M...PR20...
 Response curve



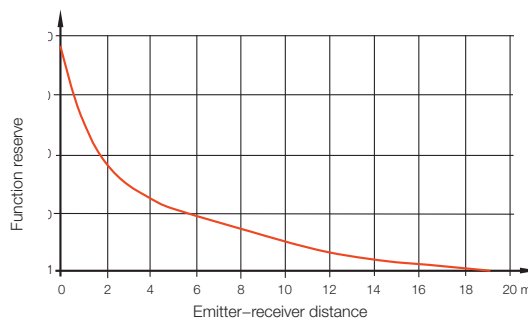
Retroreflective sensor BOS 18M...PR20...
 Distance function reserve



Through-beam sensor BOS 18M...RE/RS20
 Response curve depending on distance



Through-beam sensor BOS 18M...RE/RS20
 Distance function reserve





Photoelectric Standard Sensors

BOS 18M red light

Connection, accessories



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Recommended accessories

(please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Mounting bracket	BAM00RY
③ Reflector	BAM00UK



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Standard Sensors
BOS 18M infrared
Sensing distance 800 mm, Range 7 m

M18 Metal Infrared

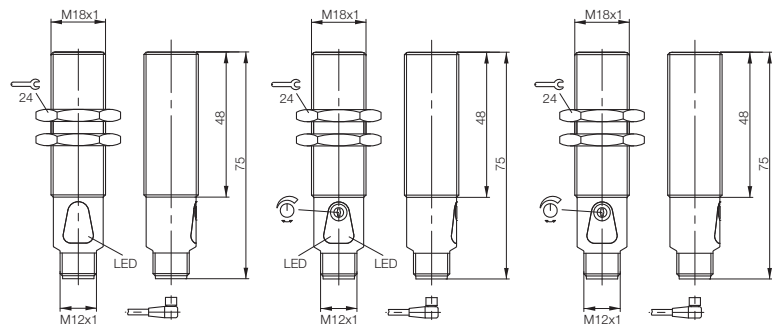


Type			Diffuse sensor	Diffuse sensor	Retroreflective sensor
Detection range			80 mm Glass detection	1...800 mm	7 m Polarizing filter
PNP	NO/NC	Part number		BOS 18M-PA-ID20-S4 ③	BOS 18M-PA-IR21-S4 ③
NPN	NO/NC	Part number		BOS 18M-NA-ID20-S4 ④	BOS 18M-NA-IR21-S4 ④
PNP	NO	Part number	BOS 18M-PS-ID24-S4 ①		
NPN	NO	Part number			
PNP	NO/NC Receiver	Part number			
NPN	NO/NC	Part number			
	Emitter	Part number			
	Emitter	Part number			
	Emitter Test input	Part number			
	Emitter Test input	Part number			
Supply voltage U_B			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 switching	Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes	Yes/Yes
Settings			None	Potentiometer, 270°	Potentiometer, 270°
Emitter, light type			LED, infrared	LED, infrared	LED, infrared
Wavelength			850 nm	850 nm	850 nm
Response time			2.5 ms	1.25 ms	1.25 ms
Switching frequency f			200 Hz	400 Hz	400 Hz
Degree of protection as per IEC 60529			IP 67	IP 67	IP 67
Ambient temperature T_a			-5...+55 °C	-5...+55 °C	-5...+55 °C
Permissible ambient light			30 klx	5 klx	5 klx
Material	Housing		Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
	Optical surface		Glass	Glass	Glass
Connection			M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.
200x200 mm² retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.



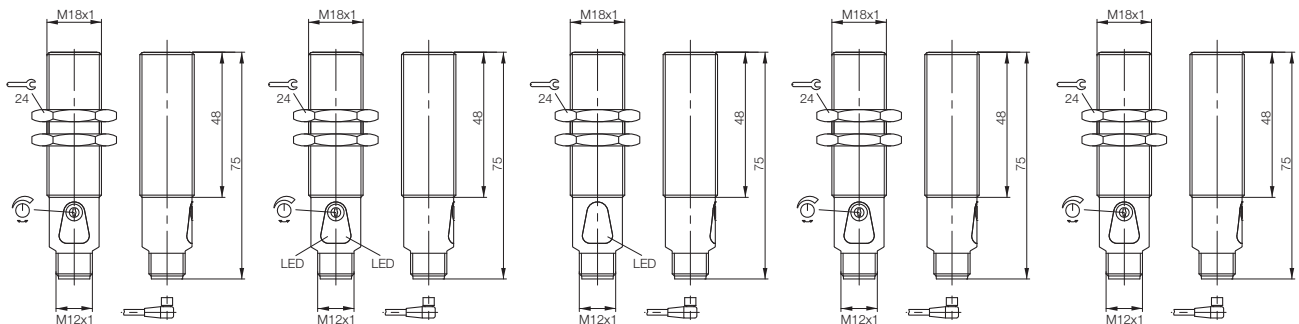
Photoelectric Standard Sensors

BOS 18M infrared

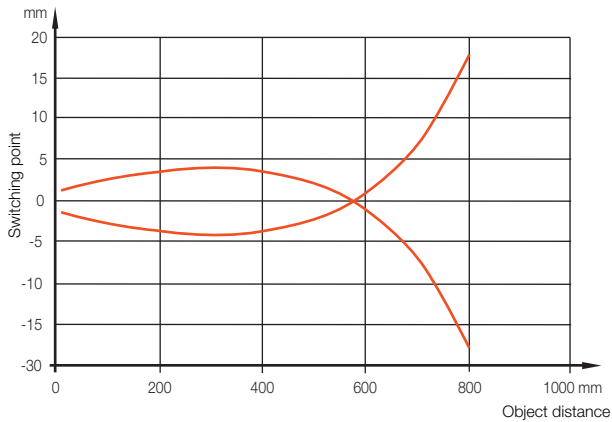
Range 10 m, 50 m



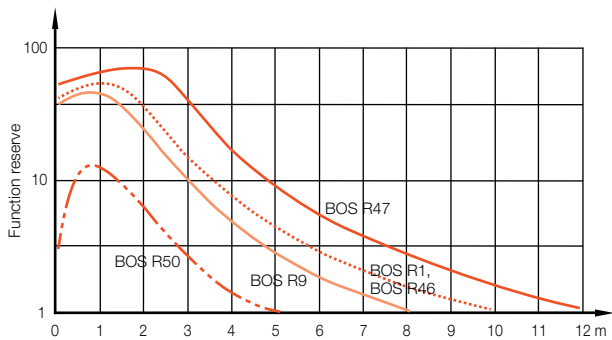
	Retroreflective sensor 10 m	Retroreflective sensor 10 m	Through-beam sensor 0...50 m	Through-beam sensor 0...50 m	Through-beam sensor 0...100 mm	
	BOS 18M-PA-IR20-S4 ③					Photoelectric standard sensors
	BOS 18M-NA-IR20-S4 ④					Cylinder designs
		BOS 18M-PS-IR20-S4 ①				Block designs
			BOS 18M-PA-IE20-S4 ③			Photoelectric special sensors
			BOS 18M-NA-IE20-S4 ④			
				BOS 18M-X-IS20-S4 ⑥	BOS 18M-X-IS24-S4 ⑥	Photoelectric distance sensors for analog distance measurement
				BOS 18M-XT-IS20-S4 ⑦	BOS 18M-XT-IS24-S4 ⑦	Special accessories for photoelectric sensors
	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			
	≤ 30 mA	≤ 30 mA	≤ 20 mA	≤ 30 mA	≤ 30 mA	
	Light and dark switching	Dark switching	Light and dark switching	Yes/Yes	Yes/Yes	
	Yes/Yes	Yes/Yes	Yes/Yes	Potentiometer, 270°	Potentiometer, 270°	
	Potentiometer, 270°	Potentiometer, 270°		LED, infrared	LED, infrared	
	LED, infrared	LED, infrared	LED, infrared			
	850 nm	850 nm	850 nm			
	1.25 ms	1.25 ms	1.25 ms			
	400 Hz	400 Hz	400 Hz			
	IP 67	IP 67	IP 67	IP 67	IP 67	
	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	
	5 klx	5 klx	5 klx	5 klx	5 klx	
	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	
	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	



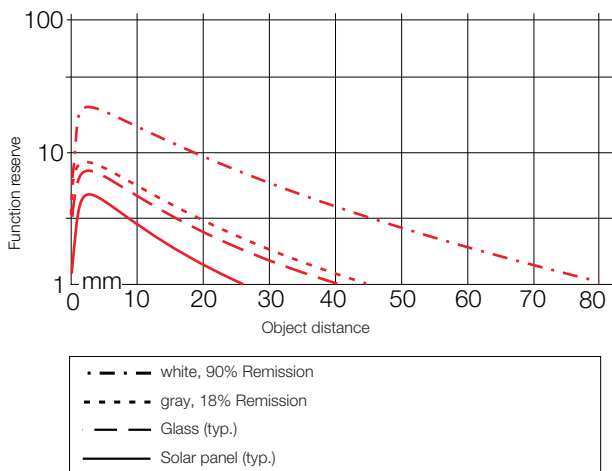
Diffuse sensor BOS 18M...ID20-S4 response curve



Retroreflective sensor BOS 18M...IR20/IR21-S4



Diffuse sensor BOS 18M...ID24-S4



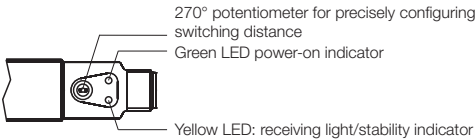


Photoelectric Standard Sensors

BOS 18M infrared

Accessories

Indicators and operating elements



Green LED power-on indicator

LED lit: supply voltage is applied.

Yellow LED receiving light/stability indicator

LED lit: light at receiver.

LED flashes at function reserve < 1.5. Unreliable range.

Potentiometer

Used for precisely configuring the switching point



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Recommended accessories

(please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Mounting bracket	BAM00RY
③ Reflector	BAM00UK



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Standard Sensors
BOS 18M Laser
Sensing distance 150 mm

M18 Metal Laser

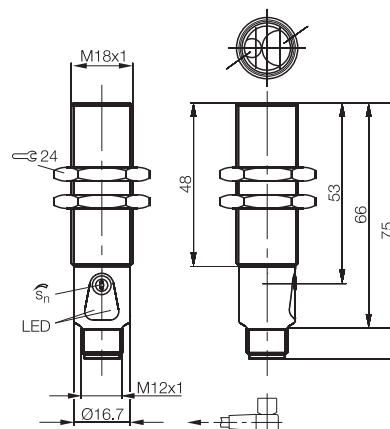


Type			Diffuse sensor with background suppression	Diffuse sensor with background suppression	
Detection range			30...150 mm	30...150 mm	
PNP	NO		Part number	BOS 18M-PS-LH22-S4 ①	
NPN	NO		Part number		
PNP	NO	Error output	Part number	BOS 18M-PSV-LH22-S4 ⑧	
NPN	NO	Error output	Part number	BOS 18M-NSV-LH22-S4 ⑰	
PNP	NC	Error output	Part number		BOS 18M-POV-LH22-S4 ⑨
NPN	NC	Error output	Part number		BOS 18M-NOV-LH22-S4 ⑯
PNP	NO/NC		Part number		
NPN	NO/NC		Part number		
Supply voltage U _B			10...30 V DC	10...30 V DC	
Output current			100 mA	100 mA	
No-load supply current I ₀ max.			≤ 30 mA	≤ 30 mA	
Switching type			Light switching	Dark switching	
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes	
Settings			10-turn potentiometer	10-turn potentiometer	
Emitter, light type			Laser, red light	Laser, red light	
Wavelength			670 nm	670 nm	
Laser class			2	2	
Response time			1 ms	1 ms	
Switching frequency f			500 Hz	500 Hz	
Degree of protection as per IEC 60529			IP 67	IP 67	
Ambient temperature T _a			−5...+55 °C	−5...+55 °C	
Permissible ambient light			10 klx	10 klx	
Material	Housing		Nickel-plated CuZn	Nickel-plated CuZn	
	Optical surface		PMMA	PMMA	
Connection			M12 connector, 4-pin	M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.





Photoelectric Standard Sensors

BOS 18M Laser

Sensing distance 150 mm, 350 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

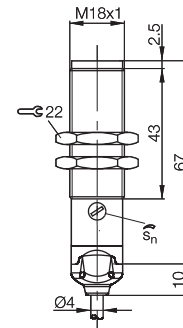
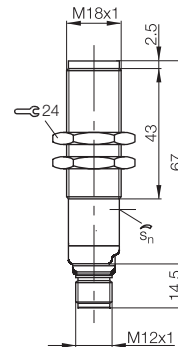
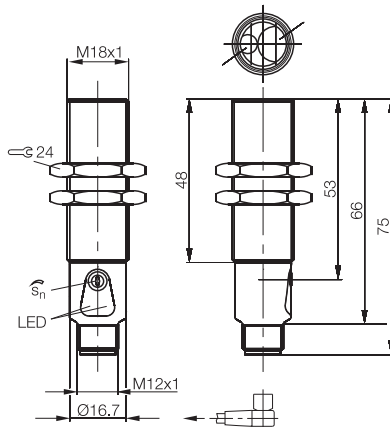
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Diffuse sensor with background suppression 30...150 mm	Diffuse sensor with background suppression 30...150 mm	Diffuse sensor 0...350 mm	Diffuse sensor 0...350 mm
	BOS 18M-PSV-LH23-S4 ⑧		
BOS 18M-PA-LH23-S4 ③		BOS 18M-PA-LD10-S4 ③	BOS 18M-PA-LD10-02 ②②
		BOS 18M-NA-LD10-S4 ④	BOS 18M-NA-LD10-02 ②③
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	≤ 35 mA	≤ 35 mA
Light and dark switching	Light switching	Light and dark switching	Light and dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
10-turn potentiometer	10-turn potentiometer	Potentiometer, 270°	Potentiometer, 270°
Laser, red light	Laser, red light	Laser, red light	Laser, red light
650 nm	650 nm	650 nm	650 nm
1	1	1	1
1 ms	1 ms	333 μs	333 μs
500 Hz	500 Hz	1.5 kHz	1.5 kHz
IP 67	IP 67	IP 67	IP 67
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C
10 klx	10 klx	5 klx	5 klx
Nickel-plated CuZn	Nickel-plated CuZn	Chrome-plated CuZn	Chrome-plated CuZn
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	2 m PVC cable, 26 AWG



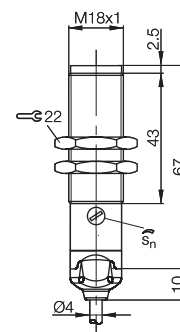
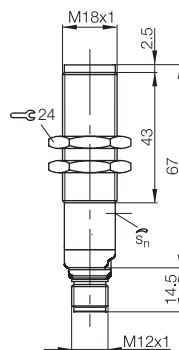


Type			Retroreflective sensor with polarizing filter 0.1...16 m		Retroreflective sensor with polarizing filter 0.1...16 m	
Detection range						
PNP	NO/NC	Part number	BOS 18M-PA-LR10-S4	③	BOS 18M-PA-LR10-02	②②
NPN	NO/NC	Part number	BOS 18M-NA-LR10-S4	④	BOS 18M-NA-LR10-02	②③
Emitter						
			Part number			
			Part number			
Supply voltage U_B			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	
Switching type			Light and dark switching		Light and dark switching	
Polarity reversal/short-circuit protected			Yes/Yes		Yes/Yes	
Settings			Potentiometer, 270°		Potentiometer, 270°	
Emitter, light type			Laser, red light		Laser, red light	
Wavelength			650 nm		650 nm	
Laser class			1		1	
Response time			333 µs		333 µs	
Switching frequency f			1.5 kHz		1.5 kHz	
Degree of protection as per IEC 60529			IP 67		IP 67	
Ambient temperature T_a			-10...+55 °C		-10...+55 °C	
Permissible ambient light			5 klx		5 klx	
Material			Chrome-plated CuZn		Chrome-plated CuZn	
			PMMA		PMMA	
Connection			M12 connector, 4-pin		2 m PVC cable, 26 AWG	

Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.

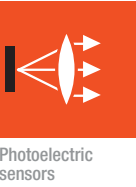




Photoelectric Standard Sensors

BOS 18M Laser

Range 60 m



Photoelectric sensors

Photoelectric standard sensors
Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Receiver



Receiver

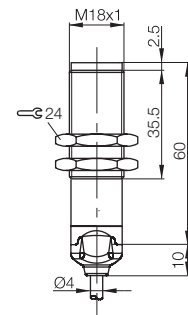
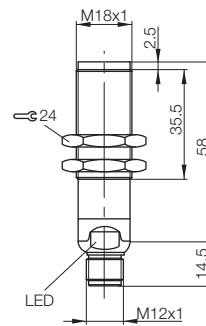
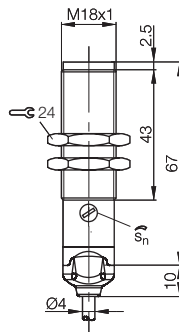
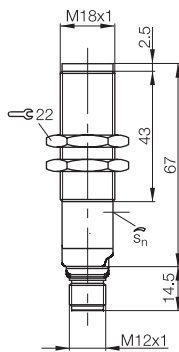


Emitter



Emitter

Through-beam sensor	Through-beam sensor	Through-beam sensor	Through-beam sensor
0...60 m	0...60 m	0...60 m	0...60 m
BOS 18M-PA-LE10-S4 ③	BOS 18M-PA-LE10-02 ②②		
BOS 18M-NA-LE10-S4 ④	BOS 18M-NA-LE10-02 ②③		
		BOS 18M-XT-LS10-S4 ⑦	BOS 18M-XT-LS10-02 ②④
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA		
≤ 35 mA	≤ 35 mA	≤ 30 mA	≤ 30 mA
Light and dark switching	Light and dark switching		
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°		
Laser, red light	Laser, red light	Laser, red light	Laser, red light
650 nm	650 nm	650 nm	650 nm
1	1	1	1
333 μs	333 μs		
1.5 kHz	1.5 kHz		
IP 67	IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C
5 klx	5 klx	5 klx	5 klx
Chrome-plated CuZn	Chrome-plated CuZn	Chrome-plated CuZn	Chrome-plated CuZn
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	2 m PVC cable, 26 AWG	M12 connector, 4-pin	2 m PVC cable, 26 AWG



M18 Metal Laser with Angle Head

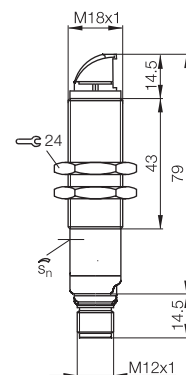
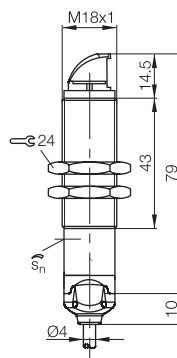


Type			Diffuse sensor		Diffuse sensor		
Detection range			0...250 mm		0...250 mm		
PNP	NO/NC	Part number	BOS 18MR-PA-LD10-02	②	BOS 18MR-PA-LD10-S4	③	
NPN	NO/NC	Part number	BOS 18MR-NA-LD10-02	③	BOS 18MR-NA-LD10-S4	④	
Supply voltage U _B			10...30 V DC		10...30 V DC		
Output current			100 mA		100 mA		
No-load supply current I ₀ max.			≤ 35 mA		≤ 35 mA		
Switching type			Light and dark switching		Light and dark switching		
Polarity reversal/short-circuit protected			Yes/Yes		Yes/Yes		
Settings			Potentiometer, 270°		Potentiometer, 270°		
Emitter, light type			Laser, red light		Laser, red light		
Wavelength			650 nm		650 nm		
Laser class			1		1		
Response time			333 μs		333 μs		
Switching frequency f			1.5 kHz		1.5 kHz		
Degree of protection as per IEC 60529			IP 67		IP 67		
Ambient temperature T _a			−10...+55 °C		−10...+55 °C		
Permissible ambient light			5 klx		5 klx		
Material	Housing		Chrome-plated CuZn		Chrome-plated CuZn		
	Optical surface		PMMA		PMMA		
Connection			2 m PVC cable, 26 AWG		M12 connector, 4-pin		

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 95.

Ordering codes on pages 54-56.





Photoelectric Standard Sensors

BOS 18M Laser

Range 9 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Retroreflective sensor with polarizing filter

0.1...9 m

BOS 18MR-PA-LR10-02 ②

BOS 18MR-NA-LR10-02 ③

10...30 V DC

100 mA

≤ 35 mA

Light and dark switching

Yes/Yes

Potentiometer, 270°

Laser, red light

650 nm

1

333 μs

1.5 kHz

IP 67

-10...+55 °C

5 klx

Chrome-plated CuZn

PMMA

2 m PVC cable,

26 AWG

Retroreflective sensor with polarizing filter

0.1...9 m

BOS 18MR-PA-LR10-S4 ③

BOS 18MR-NA-LR10-S4 ④

10...30 V DC

100 mA

≤ 35 mA

Light and dark switching

Yes/Yes

Potentiometer, 270°

Laser, red light

650 nm

1

333 μs

1.5 kHz

IP 67

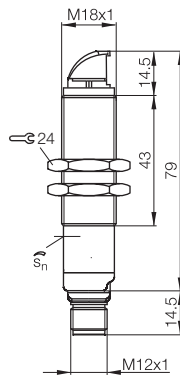
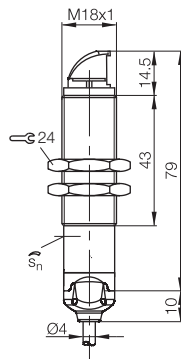
-10...+55 °C

5 klx

Chrome-plated CuZn

PMMA

M12 connector, 4-pin



Photoelectric Standard Sensors
BOS 18M Laser
Range 50 m

M18 Metal Laser with Angle Head



Receiver

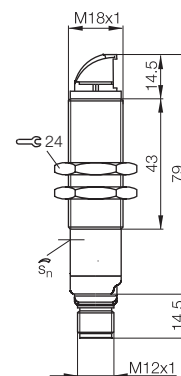
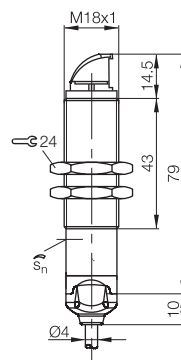


Receiver

Type	Through-beam sensor		Through-beam sensor	
Detection range	0...50 m		0...50 m	
PNP NO/NC Receiver	Part number	BOS 18MR-PA-LE10-02 ②	Part number	BOS 18MR-PA-LE10-S4 ③
NPN NO/NC	Part number	BOS 18MR-NA-LE10-02 ③	Part number	BOS 18MR-NA-LE10-S4 ④
Emitter	Part number		Part number	
Supply voltage U_B	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	
Switching type	Light and dark switching		Light and dark switching	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Potentiometer, 270°		Potentiometer, 270°	
Emitter, light type	Laser, red light		Laser, red light	
Wavelength	650 nm		650 nm	
Laser class	1		1	
Response time	333 μ s		333 μ s	
Switching frequency f	1.5 kHz		1.5 kHz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	-10...+55 °C		-10...+55 °C	
Permissible ambient light	5 klx		5 klx	
Material	Housing	Chrome-plated CuZn	Housing	Chrome-plated CuZn
	Optical surface	PMMA	Optical surface	PMMA
Connection	2 m PVC cable, 26 AWG		M12 connector, 4-pin	

Wiring diagrams on page 95.

Ordering codes on pages 54-56.





Photoelectric Standard Sensors

BOS 18M Laser

Range 50 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Emitter



Emitter

Through-beam sensor
0...50 m

Through-beam sensor
0...50 m

BOS 18MR-XT-LS10-02 ②④

BOS 18MR-XT-LS10-S4 ⑦

10...30 V DC

10...30 V DC

≤ 30 mA

≤ 30 mA

Yes/Yes

Yes/Yes

Laser, red light
650 nm
1

Laser, red light
650 nm
1

IP 67

IP 67

−10...+55 °C

−10...+55 °C

5 klx

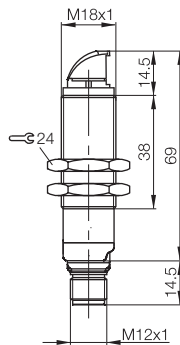
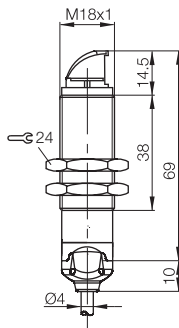
5 klx

Chrome-plated CuZn
PMMA

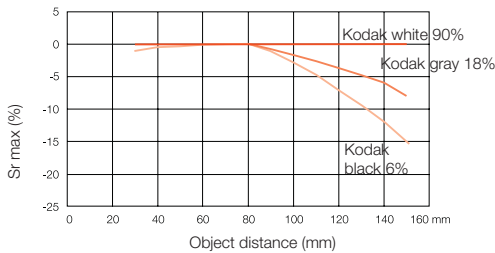
Chrome-plated CuZn
PMMA

2 m PVC cable,
26 AWG

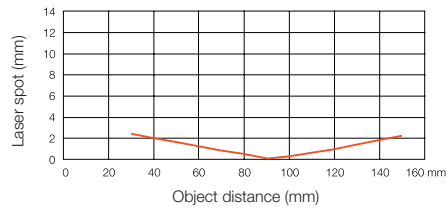
M12 connector, 4-pin



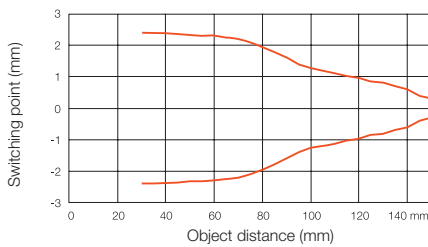
Diffuse sensor with background suppression BOS 18M-...LH
 Gray value shift



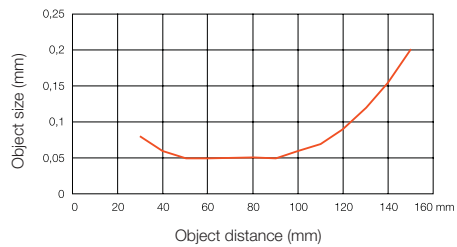
Diffuse sensor with background suppression BOS 18M-...LH
 Light spot diameter at distance



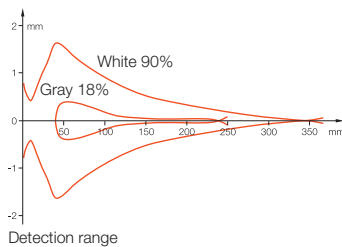
Diffuse sensor with background suppression BOS 18M-...LH
 Turn-on point for lateral approach



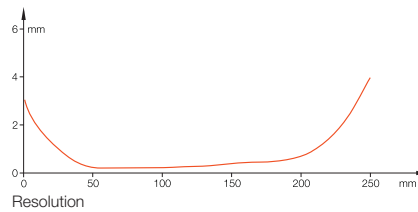
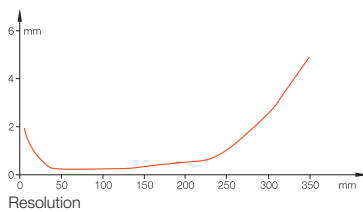
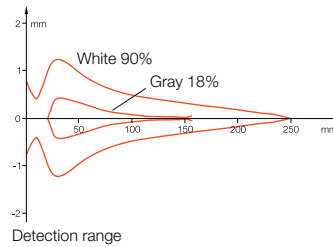
Diffuse sensor with background suppression BOS 18M-...LH
 Smallest detectable part



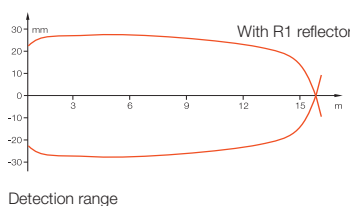
Diffuse sensor BOS 18M-...LD10-...



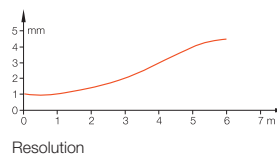
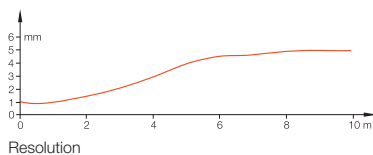
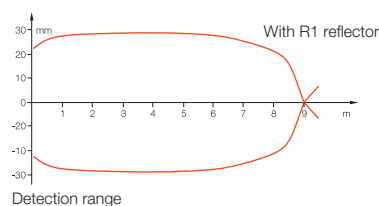
Diffuse sensor BOS 18MR-...LD10-...



Retroreflective sensor BOS 18M-...LR10-...



Retroreflective sensor BOS 18MR-...LR10-...

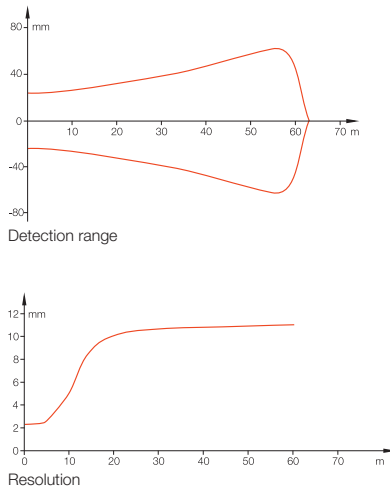


Photoelectric Standard Sensors

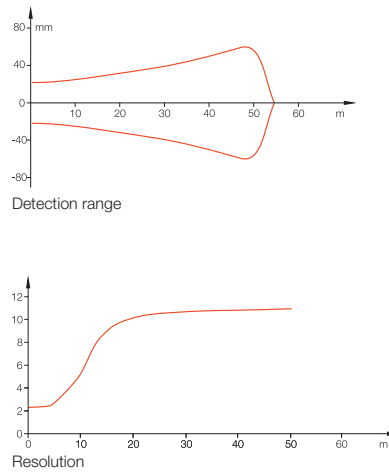
BOS 18M Laser

Function diagrams, connection, accessories

Through-beam sensor BOS 18M...-LE/LS10...



Through-beam sensor BOS 18MR...-LE/LS10...



Photoelectric sensors

Photoelectric standard sensors

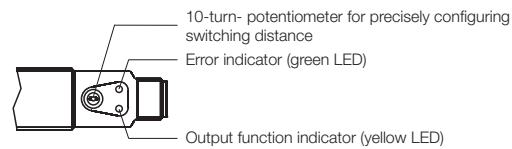
Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Indicators and operating elements



Green LED

The green LED turns on when the sensor is working in an unreliable range. The green LED flashes when there is a short circuit on the output.

Yellow LED

Output function indicator: The yellow LED comes on when the output is active.

Error output

The error output is active when the sensor is working in an unreliable range.

Potentiometer

Used for precisely configuring the switching point and background suppression.

Recommended accessories (please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Mounting bracket	BAM00RY
③ Reflector	BAM00UK



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connectors (please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF



Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

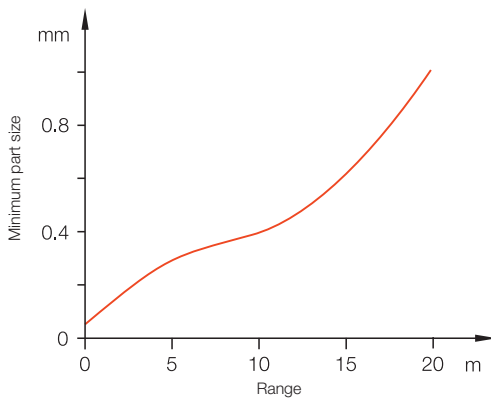
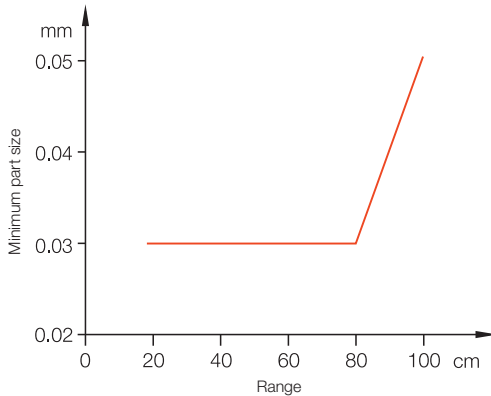
Photoelectric Standard Sensors

BOS 18M

Laser through-beam sensor

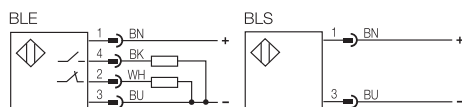
Accuracy diagram

Smallest detectable part size as a function of range.



Beam spot perpendicular to transport direction of the object.

Wiring diagrams



Recommended accessories

(please order separately)

Description	Ordering code
Mounting cuff	BAM00R2



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

M18 Metal Laser Through-beam Sensor



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

Ordering codes on pages 54-56.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.



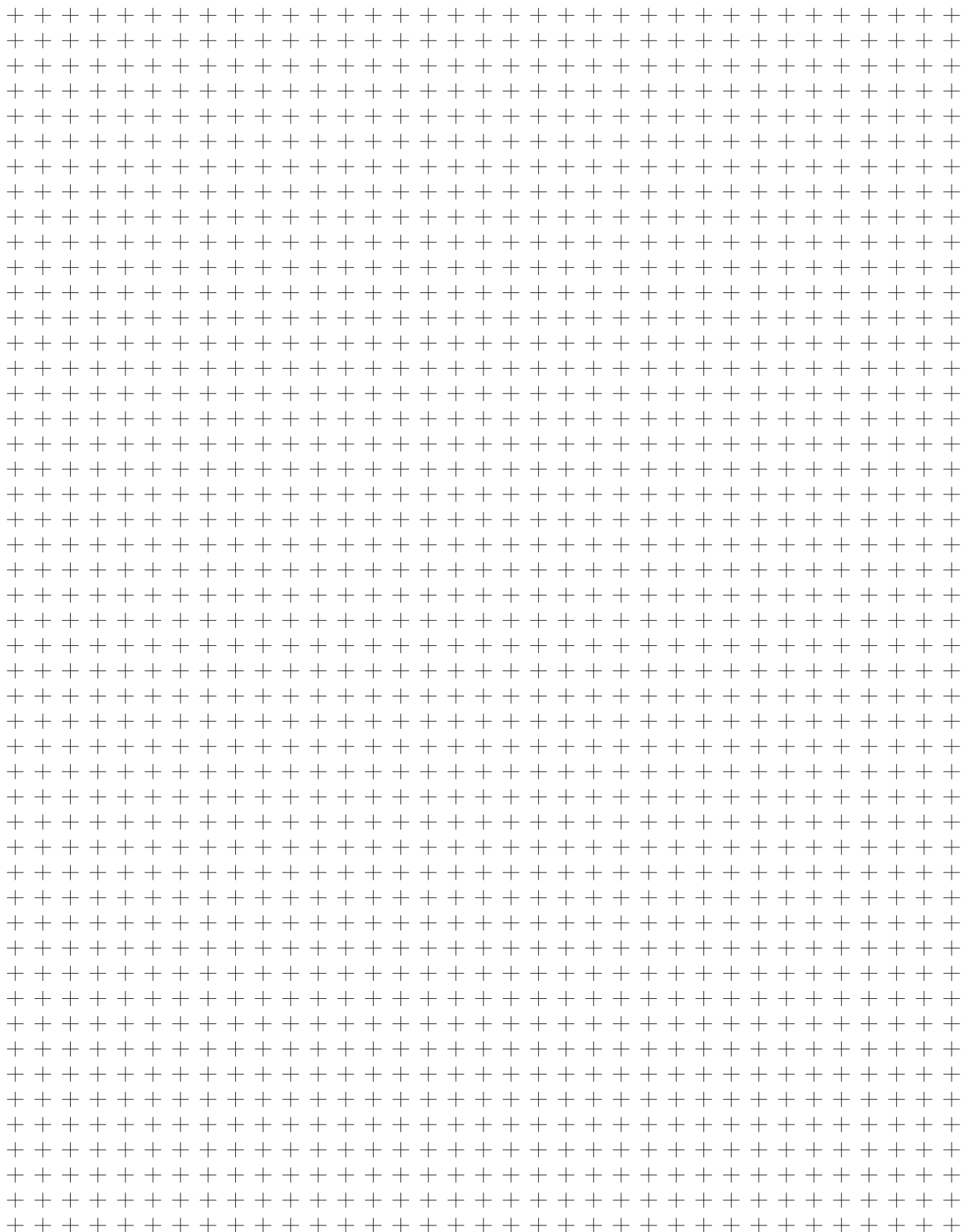
Technical drawing of a 1/2" NPT female plug. The drawing shows two views: a side view and a front view. Dimensions are provided in millimeters (mm). The side view shows a total length of 85 mm, with a 27 mm section for the plug body and a 58 mm section for the nut. The front view shows a total width of 20 mm, with a 9 mm section for the plug body and a 11 mm section for the nut. The nut has a thread of M18x1 and a maximum height of 5 mm. The plug body has a 24 mm diameter section and a 28.7 mm section. The drawing also includes a detail view of the plug body and a section line A-A.





Photoelectric Standard Sensors

BOS 18M

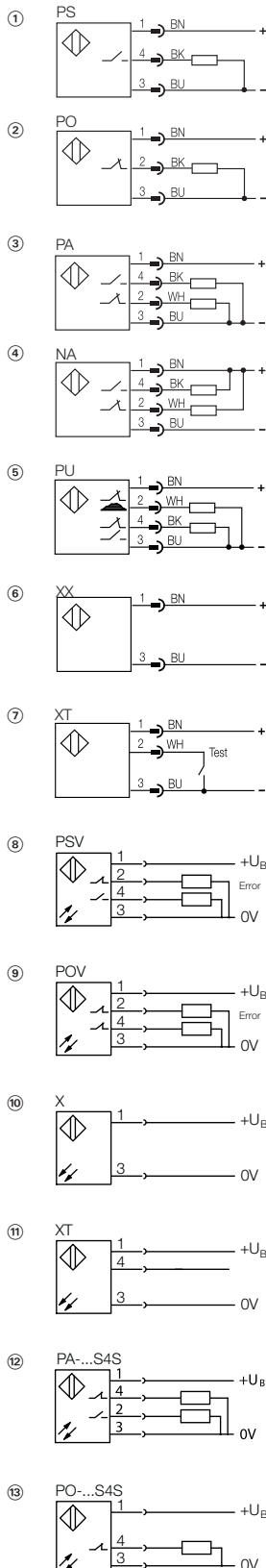


Photoelectric Standard Sensors

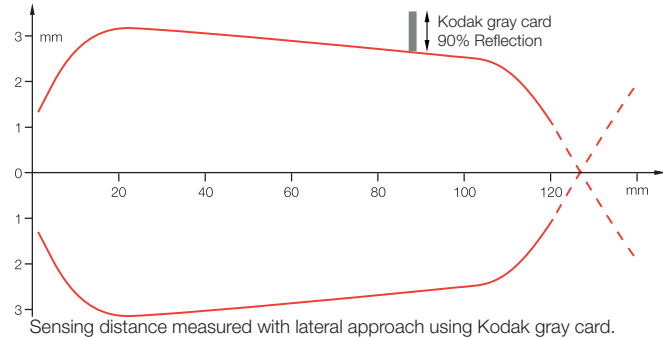
Wiring diagrams

BOS 18M metal technical data

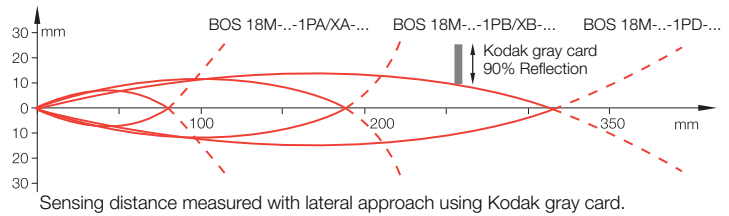
Wiring diagrams



A. Diffuse with background suppression



B. Diffuse



Photoelectric sensors

Photoelectric standard sensors

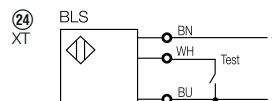
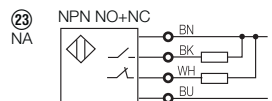
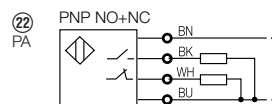
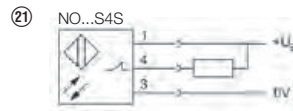
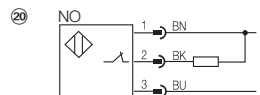
Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Photoelectric sensors from the **Proxinox** series are made of corrosion-resistant **stainless steel 1.4571** and therefore do not wear down. Their optical surface is made of 2 mm thick glass (also available in plastic for the food industry), making it stable and shockproof. The nightmare of lost name-plates is also over, because the photoelectric sensors are laser engraved.

The housing design is identical for all the sensors in the **BOS 18E** series. A special housing nose and optics construction provides optimum sealing and rigidity. In addition to the usual IP 68 protection, steam cleaning is also permitted.

In addition to retroreflective and through-beam sensors with a fine-tunable range, the **BOS 18E** series offers diffuse sensors whose sensing distances of 100 mm, 200 mm to 400 mm have been fine-tuned. These diffuse sensors are manufactured with tight tolerances. This makes them ideal for rapid and simple assembly. Easily visible red light (for 100 and 200 mm) also makes them easy to align. The through-beam model operates using infrared light. The high-energy beam can penetrate ordinary paper. The through-beam sensor is ideal for harsh environments, for example in the food processing and machine tools industry, where a sensor with a large function reserve is needed.

Features

- Supply voltage 10...30 V DC, polarity reversal protected
- Output short circuit protected
- Tough stainless steel housing without holes and with stainless steel nuts
- IP 68 degree of protection (BWN Pr. 27), can also withstand steam cleaning
- Optical surface of tough 2 mm Borofloat glass or scratch-resistant PMMA, secured in place by crimping.

Applications

- Bottling equipment
- Food industry
- Packaging industry
- Laundry and dry-cleaning equipment
- Machine tools
- Heavy industry
- Wherever other sensors don't measure up



Photoelectric Standard Sensors

BOS 18E

Product overview

Type		Sensing distance/ range	Light type		Output	Switching type		Switching frequency	U _s	Connection		Special features		Page		
			Red light	Infrared	PNP transistor	Light switching	Dark switching		10...30 V DC	M12 plug, 4-pin	Cable	Polarizing filter				
Ordering code																
Part number																
 Diffuse sensor with background suppression															Photoelectric sensors	
BOS0016	BOS 18E-PS-1N2M-S4-D	0...40 mm	■		■	■		100 Hz	■	■				98	Photoelectric standard sensors	
 Diffuse sensor															Cylinder designs	
BOS0047	BOS 18E-PS-1YA-E5-D-S4	0...100 mm	■		■	■		100 Hz	■	■				98	Block designs	
BOS0015	BOS 18E-PO-1YA-E5-D-S4	0...100 mm	■		■		■	100 Hz	■	■				98	Photoelectric special sensors	
BOS0017	BOS 18E-PS-1XA-SA1-S4	0...100 mm		■	■	■		100 Hz	■	■				99	Photoelectric distance sensors for analog distance measurement	
BOS001A	BOS 18E-PS-1YB-E5-D-S4	0...200 mm	■		■	■		100 Hz	■	■				99		
BOS0018	BOS 18E-PS-1XB-SA1-S4	0...200 mm		■	■	■		100 Hz	■	■				99		
BOS001C	BOS 18E-PS-1YD-E5-D-S4	0...400 mm	■		■	■		100 Hz	■	■				99	Special accessories for photoelectric sensors	
BOS0019	BOS 18E-PS-1XD-SA1-S4	0...400 mm		■	■	■		100 Hz	■	■				100		
 Retroreflective sensor																
BOS00RN	BOS 18E-PS-1UB-E5-D-S4	2 m	■		■		■	100 Hz	■	■		■		100		
BOS00RL	BOS 18E-PO-1UB-E5-D-S4	2 m	■		■	■		100 Hz	■	■		■		100		
BOS00RP	BOS 18E-PS-1UB-SA1-S4	2 m	■		■		■	100 Hz	■	■		■		101		
BOS0046	BOS 18E-PS-1WD-E5-D-S4	4 m	■		■		■	100 Hz	■	■				101		
 Through-beam sensor Receiver																
BOS00UJ	BLE 18E-PS-1P-E5-D-S4	16 m		■	■		■	100 Hz	■	■				101		
BOS00UF	BLE 18E-PO-1P-E5-D-S4	16 m		■	■	■		100 Hz	■	■				101		
BOS00UH	BLE 18E-PO-1P-E5-D-S4S	16 m		■	■	■		100 Hz	■	■				101		
BOS00UK	BLE 18E-PS-1P-SA1-S4	16 m		■	■		■	100 Hz	■	■				101		
 Through-beam sensor Emitter																
BOS00UY	BLS 18E-XX-1P-E5-X-S4	16 m		■					■	■				101		
BOS00UZ	BLS 18E-XX-1P-SA1-S4	16 m		■					■	■				101		

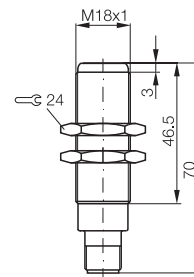
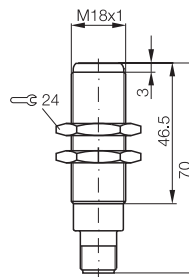


Type			Diffuse sensor with background suppression	Diffuse sensor
Detection range			0...40 mm	0...100 mm
PNP	NO	Part number	BOS 18E-PS-1N2M-S4-D ①	BOS 18E-PS-1YA-E5-D-S4 ①
		Part number		
PNP	NC	Part number		BOS 18E-PO-1YA-E5-D-S4 ②
		Part number		
Supply voltage U _B			10...30 V DC	10...30 V DC
Output current			200 mA	200 mA
No-load supply current I ₀ max.			≤ 20 mA	≤ 20 mA
Switching type			Light switching	Light or dark switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Fixed	Fixed
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Response time			5 ms	5 ms
Switching frequency f			100 Hz	100 Hz
Degree of protection as per IEC 60529			IP 69K and IP 68	IP 69K and IP 68
Ambient temperature T _a			−5...+75 °C	−20...+75 °C
Permissible ambient light			2 klx	2 klx
Material	Housing		316Ti Stainless steel	316Ti Stainless steel
	Optical surface		Glass	Glass
Connection			M12 connector, 4-pin	M12 connector, 4-pin

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 103.

Ordering codes on page 97.



Photoelectric Standard Sensors

BOS 18E

Sensing distance 100, 200, 400 mm,



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

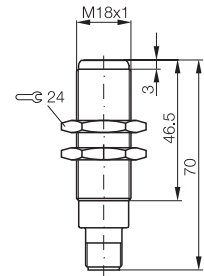
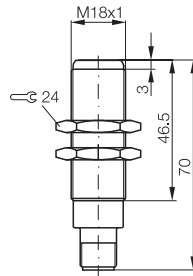
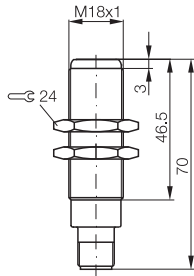
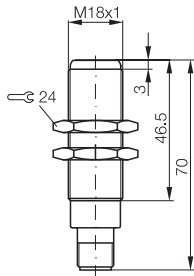
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



	Diffuse sensor 0...100 mm	Diffuse sensor 0...200 mm	Diffuse sensor 0...200 mm	Diffuse sensor 0...400 mm	
	BOS 18E-PS-1XA-SA1-S4 ①	BOS 18E-PS-1YB-E5-D-S4 ①	BOS 18E-PS-1XB-SA1-S4 ①	BOS 18E-PS-1YD-E5-D-S4 ①	
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
	200 mA	200 mA	200 mA	200 mA	
	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	
	Light switching	Light switching	Light switching	Light switching	
	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	
	Fixed	Fixed	Fixed	Fixed	
	LED, infrared	LED, red light	LED, infrared	LED, red light	
	880 nm	660 nm	880 nm	660 nm	
	5 ms	5 ms	5 ms	5 ms	
	100 Hz	100 Hz	100 Hz	100 Hz	
	IP 69K and IP 68	IP 69K and IP 68	IP 69K and IP 68	IP 69K and IP 68	
	-5...+75 °C	-20...+75 °C	-5...+75 °C	-20...+75 °C	
	2 klx	2 klx	2 klx	2 klx	
	316Ti Stainless steel	316Ti Stainless steel	316Ti Stainless steel	316Ti Stainless steel	
	PMMA scratch-resistant	Glass	PMMA scratch-resistant	Glass	
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	



Photoelectric Standard Sensors

BOS 18E

Sensing distance 400 mm, 2 m

M18E Stainless Steel

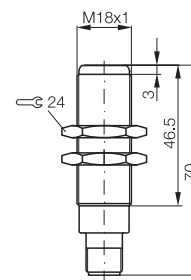
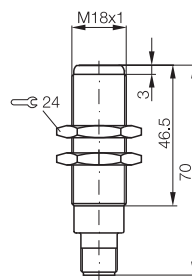


Type		Diffuse sensor		Retroreflective sensor	
Detection range		0...400 mm		2 m with polarizing filter	
PNP NO		Part number	BOS 18E-PS-1XD-SA1-S4 ①	BOS 18E-PS-1UB-E5-D-S4 ①	
		Part number			
PNP NC		Part number		BOS 18E-PO-1UB-E5-D-S4 ②	
		Part number			
PNP NO	Receiver	Part number			
		Part number			
PNP NC	Receiver	Part number			
		Part number			
PNP NC	Receiver	Part number			
		Part number			
Output special assignment	Emitter	Part number			
		Part number			
Supply voltage U _B		10...30 V DC		10...30 V DC	
Output current		200 mA		200 mA	
No-load supply current I ₀ max.		≤ 20 mA		≤ 20 mA	
Switching type		Light switching		Light or dark switching	
Polarity reversal/short-circuit protected		Yes/Yes		Yes/Yes	
Settings		Fixed		Fixed	
Emitter, light type		LED, infrared		LED, red light	
Wavelength		880 nm		660 nm	
Response time		5 ms		5 ms	
Switching frequency f		100 Hz		100 Hz	
Degree of protection as per IEC 60529		IP 69K and IP 68 as per BWN Pr. 27		IP 69K and IP 68 as per BWN Pr. 27	
Ambient temperature T _a		−5...+75 °C		−20...+75 °C	
Permissible ambient light		2 klx		2 klx	
Material	Housing	316Ti Stainless steel		316Ti Stainless steel	
	Optical surface	PMMA scratch-resistant		Glass	
Connection		M12 connector, 4-pin		M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 103.

Ordering codes on page 97.



Photoelectric Standard Sensors

BOS 18E

Sensing distance 2, 4, 16 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

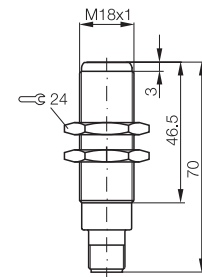
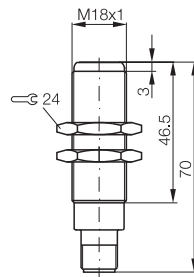
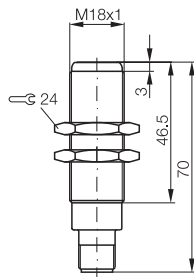
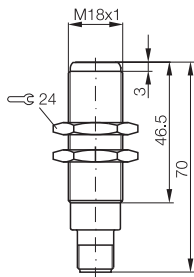
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

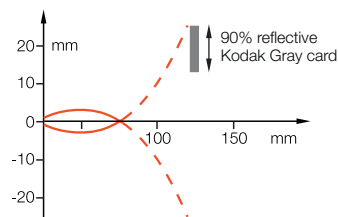
Special accessories for photoelectric sensors



	Retroreflective sensor 2 m with polarizing filter	Retroreflective sensor 4 m	Through-beam sensor 16 m	Through-beam sensor 16 m
	BOS 18E-PS-1UB-SA1-S4 ①	BOS 18E-PS-1WD-E5-D-S4 ①		
			BLE 18E-PS-1P-E5-D-S4 ①	BLE 18E-PS-1P-SA1-S4 ①
			BLE 18E-PO-1P-E5-D-S4 ②	
			BLE 18E-PO-1P-E5-D-S4S ④	
			BLS 18E-XX-1P-E5-X-S4 ③	BLS 18E-XX-1P-SA1-S4 ③
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	200 mA	200 mA	200 mA	200 mA
	≤ 20 mA	≤ 20 mA	≤ 15 mA (BLS ≤ 40 mA)	≤ 15 mA (BLS ≤ 35 mA)
	Dark switching	Dark switching	Light or dark switching	Dark switching
	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
	Fixed	Fixed	Fixed	Fixed
	LED, red light	LED, red light	LED, infrared	LED, infrared
	660 nm	660 nm	880 nm	880 nm
	5 ms	5 ms	5 ms	5 ms
	100 Hz	100 Hz	100 Hz	100 Hz
	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27
	-20...+75 °C	-20...+75 °C	-5...+75 °C	-5...+75 °C
	2 klx	2 klx	2 klx	2 klx
	316Ti Stainless steel	316Ti Stainless steel	316Ti Stainless steel	316Ti Stainless steel
	PMMA scratch-resistant	Glass	Glass	PMMA scratch-resistant
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

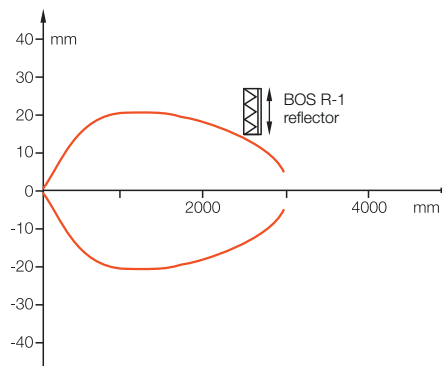


Diffuse sensor BOS 18E-...-1YA-...



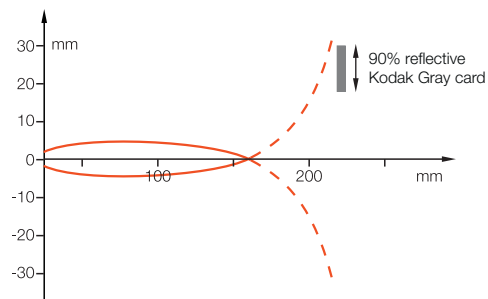
Sensing distance with side approach of Kodak gray card.

Retroreflective sensor BOS 18E-...-1UB-...



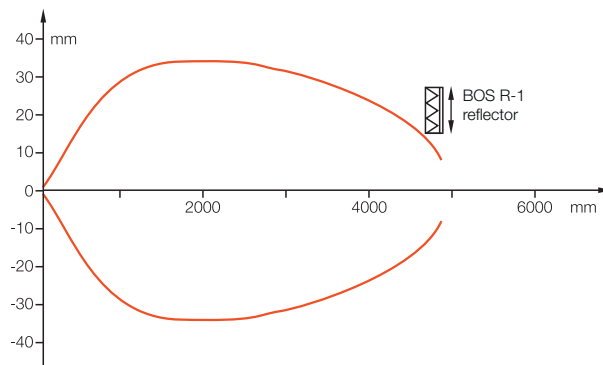
Range measured with side approach of reflector.

Diffuse sensor BOS 18E-...-1YB-...



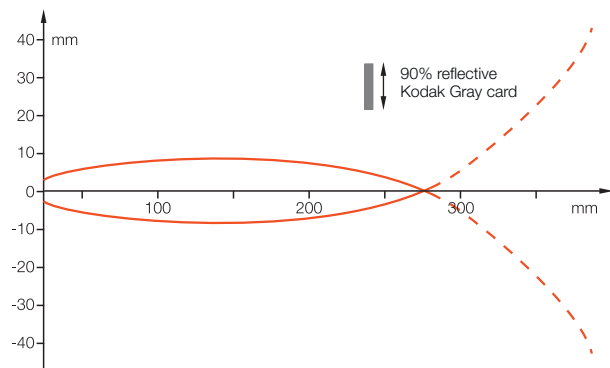
Sensing distance with side approach of Kodak gray card.

Retroreflective sensor BOS 18E-...-1WD-...



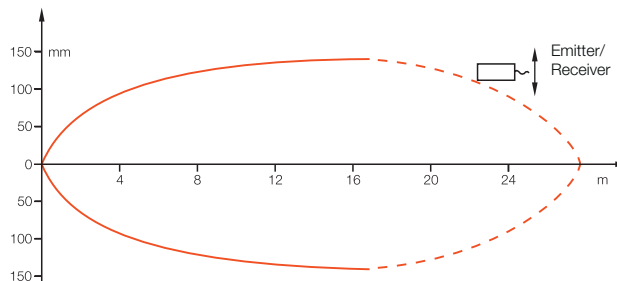
Range measured with side approach of reflector.

Diffuse sensor BOS 18E-...-1YD-...



Sensing distance with side approach of Kodak gray card.

Through-beam BLE/BLS 18E-...



For a through-beam sensor, the maximum possible offset between the emitter and receiver is measured.



Photoelectric Standard Sensors

BOS 18E

Connection, accessories



Photoelectric sensors

Photoelectric standard sensors

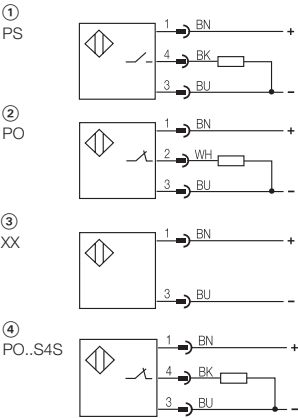
Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Wiring diagrams



Recommended accessories (please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Reflector	BAM00UK
③ Round aperture	BAM00R6
④ Air shield	BAM00R9



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connectors (please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC0AHZ
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC0AHJ



Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

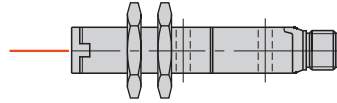
BOS 18KF – with expanded product line

BOS 18KF series sensors are available with red, infrared light or with a Class 1 laser.

They are configured using a potentiometer or via teach-in.

The plastic housing with flattened sides allows installation using the included M18-nuts or screws through the sensor housing.

The sensors are available as cable or M12 connector styles with PNP or NPN output.



Type		Sensing distance/ Range	Light type			Output		Switching type		Switching frequency	U _s	Connection		Special features			Page
			Red light	Infrared	Laser	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 plug, 4-pin	Cable	Polarizing filter	Teach-in	Glass detection	
 Diffuse sensor with background suppression																	
BOS00JM	BOS 18KF-PA-1HA-S4-C	50...100 mm								500 Hz							106
BOS00HR	BOS 18KF-NA-1HA-S4-C	50...100 mm								500 Hz							106
BOS00JL	BOS 18KF-PA-1HA-C-02	50...100 mm								500 Hz							106
BOS00HP	BOS 18KF-NA-1HA-C-02	50...100 mm								500 Hz							106
BOS00JW	BOS 18KF-PA-1N1R-S4-C	100 mm								1 kHz							107
BOS00JO	BOS 18KF-NA-1N1R-S4-C	100 mm								1 kHz							107
BOS00JU	BOS 18KF-PA-1N1R-C-02	100 mm								1 kHz							107
BOS00HZ	BOS 18KF-NA-1N1R-C-02	100 mm								1 kHz							107
 Diffuse sensor with foreground suppression																	
BOS00JK	BOS 18KF-PA-1GA-S4-C	40...100 mm								250 Hz							107

Photoelectric Standard Sensors

BOS 18KF Global

Product overview

Type		Sensing distance/ range	Light type			Output		Switching type		Switching frequency	U _S	Connection		Special features			Page	
			Red light	Infrared	Laser	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 plug, 4-pin	Cable	Polarizing filter	Teach-in	Glass detection		
 Diffuse sensor																		Photoelectric standard sensors
BOS00K9 BOS 18KF-PA-1XA-S4-C		0...100 mm		■		■		■	■	1 kHz	■	■					107	Cylinder designs
BOS00JF BOS 18KF-NA-1XA-S4-C		0...100 mm		■			■	■	■	1 kHz	■	■					107	
BOS00K8 BOS 18KF-PA-1XA-C-02		0...100 mm		■		■		■	■	1 kHz	■		■				108	Block designs
BOS00JE BOS 18KF-NA-1XA-C-02		0...100 mm		■			■	■	■	1 kHz	■		■				108	
BOS00JP BOS 18KF-PA-1LOC-S4-C		0...350 mm			■	■		■	■	1.5 kHz	■	■					114	Photoelectric special sensors
BOS00HU BOS 18KF-NA-1LOC-S4-C		0...350 mm			■		■	■	■	1.5 kHz	■	■					114	
BOS00JN BOS 18KF-PA-1LOC-C-02		0...350 mm			■	■		■	■	1.5 kHz	■		■				114	Photoelectric distance sensors for analog distance measurement
BOS00HT BOS 18KF-NA-1LOC-C-02		0...350 mm			■		■	■	■	1.5 kHz	■		■				114	
BOS00JZ BOS 18KF-PA-1PD-S4-C		0...400 mm		■		■		■	■	1 kHz	■	■					108	Special accessories for photoelectric sensors
BOS00J5 BOS 18KF-NA-1PD-S4-C		0...400 mm		■			■	■	■	1 kHz	■	■					108	
BOS00JY BOS 18KF-PA-1PD-C-02		0...400 mm		■		■		■	■	1 kHz	■		■				109	
BOS00J1 BOS 18KF-NA-1PD-C-02		0...400 mm		■			■	■	■	1 kHz	■		■				109	
BOS00K1 BOS 18KF-PA-1PE-S4-C		0...700 mm		■		■		■	■	1 kHz	■	■					109	
BOS00J5 BOS 18KF-NA-1PE-S4-C		0...700 mm		■			■	■	■	1 kHz	■	■					109	
BOS00K0 BOS 18KF-PA-1PE-C-02		0...700 mm		■		■		■	■	1 kHz	■		■				109	
BOS00J4 BOS 18KF-NA-1PE-C-02		0...700 mm		■			■	■	■	1 kHz	■		■				109	
 Retroreflective sensor																		
BOS00K7 BOS 18KF-PA-1TB-S4-C		0.1...1.7 m	■			■		■	■	1 kHz	■	■		■		■	110	
BOS00JC BOS 18KF-NA-1TB-S4-C		0.1...1.7 m	■				■	■	■	1 kHz	■	■		■		■	110	
BOS00K6 BOS 18KF-PA-1TB-C-02		0.1...1.7 m	■			■		■	■	1 kHz	■		■	■		■	110	
BOS00JA BOS 18KF-NA-1TB-C-02		0.1...1.7 m	■				■	■	■	1 kHz	■		■	■		■	110	
BOS00K3 BOS 18KF-PA-1QD-S4-C		0.1...4.5 m	■			■		■	■	1 kHz	■	■		■			111	
BOS00J7 BOS 18KF-NA-1QD-S4-C		0.1...4.5 m	■				■	■	■	1 kHz	■	■		■			111	
BOS00K2 BOS 18KF-PA-1QD-C-02		0.1...4.5 m	■			■		■	■	1 kHz	■		■	■			111	
BOS00J6 BOS 18KF-NA-1QD-C-02		0.1...4.5 m	■				■	■	■	1 kHz	■		■	■			111	
BOS00K5 BOS 18KF-PA-1RE-S4-C		0.1...5 m	■			■		■	■	1 kHz	■	■					111	
BOS00J9 BOS 18KF-NA-1RE-S4-C		0.1...5 m	■				■	■	■	1 kHz	■	■					111	
BOS00K4 BOS 18KF-PA-1RE-C-02		0.1...5 m	■			■		■	■	1 kHz	■		■				111	
BOS00J8 BOS 18KF-NA-1RE-C-02		0.1...5 m	■				■	■	■	1 kHz	■		■				111	
BOS00JT BOS 18KF-PA-1LQP-S4-C		0.1...16 m			■	■		■	■	1.5 kHz	■	■		■			115	
BOS00HY BOS 18KF-NA-1LQP-S4-C		0.1...16 m			■		■	■	■	1.5 kHz	■	■		■			115	
BOS00JR BOS 18KF-PA-1LQP-C-02		0.1...16 m			■	■		■	■	1.5 kHz	■		■	■			115	
BOS00HW BOS 18KF-NA-1LQP-C-02		0.1...16 m			■		■	■	■	1.5 kHz	■		■	■			115	
 Through-beam sensor Receiver																		
BOS00CK BLE 18KF-PA-1PP-S4-C		0...20 m		■		■		■	■	250 Hz	■	■					112	
BOS00CE BLE 18KF-NA-1PP-S4-C		0...20 m		■			■	■	■	250 Hz	■	■					112	
BOS00CJ BLE 18KF-PA-1PP-C-02		0...20 m		■		■		■	■	250 Hz	■		■				113	
BOS00CC BLE 18KF-NA-1PP-C-02		0...20 m		■			■	■	■	250 Hz	■		■				113	
BOS00CH BLE 18KF-PA-1LT-S4-C		0...60 m			■	■		■	■	1.5 kHz	■	■					116	
BOS00CA BLE 18KF-NA-1LT-S4-C		0...60 m			■		■	■	■	1.5 kHz	■	■					116	
BOS00CF BLE 18KF-PA-1LT-C-02		0...60 m			■	■		■	■	1.5 kHz	■		■				117	
BOS00C9 BLE 18KF-NA-1LT-C-02		0...60 m			■		■	■	■	1.5 kHz	■		■				117	
 Through-beam sensor Emitter																		
BOS00EP BLS 18KF-XX-1P-S4-L		0...20 m		■							■	■					112	
BOS00EN BLS 18KF-XX-1P-L-02		0...20 m		■							■		■				113	
BOS00EM BLS 18KF-XX-1LT-S4-L		0...60 m			■						■	■					116	
BOS00EL BLS 18KF-XX-1LT-L-02		0...60 m			■						■		■				117	

Photoelectric Standard Sensors
BOS 18KF Global
 Sensing distance 100 mm

M18
Plastic
Global

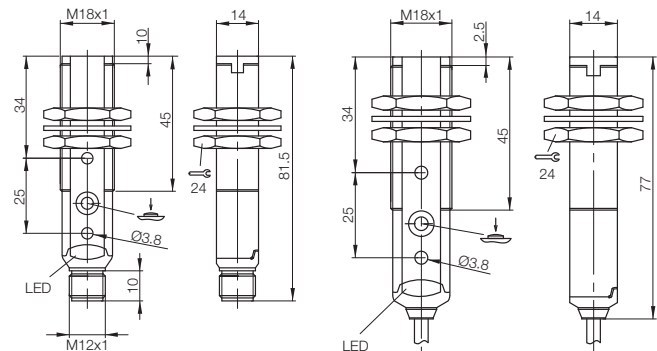


Type	Diffuse sensor with background suppression		Diffuse sensor with background suppression	
Detection range	50...100 mm		50...100 mm	
PNP NO/NC	Part number			
NPN NO/NC	Part number			
PNP NO/NC Teach-in	Part number	BOS 18KF-PA-1HA-S4-C ①	BOS 18KF-PA-1HA-C-02 ②	
NPN NO/NC Teach-in	Part number	BOS 18KF-NA-1HA-S4-C ③	BOS 18KF-NA-1HA-C-02 ④	
Supply voltage U_B	10...30 V DC		10...30 V DC	
Output current	100 mA		100 mA	
No-load supply current I_0 max.	≤ 30 mA		≤ 30 mA	
Switching type	Light and dark switching		Light and dark switching	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Teach-in		Teach-in	
Emitter, light type	LED, red light		LED, red light	
Wavelength	630 nm		630 nm	
Light spot diameter	approx. 8 mm at 100 mm		approx. 8 mm at 100 mm	
Output function indicator	Yellow LED		Yellow LED	
Stability indicator	Green/red LED		Green/red LED	
Response time	1 ms		1 ms	
Switching frequency f	500 Hz		500 Hz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	$-25...+55$ °C		$-25...+55$ °C	
Reference standard	EN 60947-5-2		EN 60947-5-2	
Material	Housing	PBT	PBT	
	Optical surface	PMMA	PMMA	
Connection	M12 connector, 4-pin		2 m PVC cable, 26 AWG	

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 121.

Ordering codes on pages 104-105.



Photoelectric Standard Sensors

BOS 18KF Global

Sensing distance 100 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

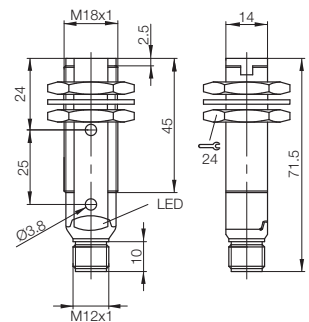
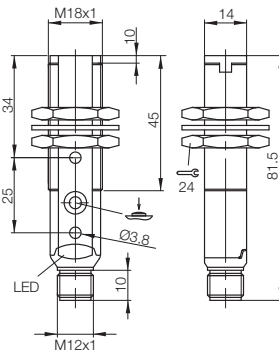
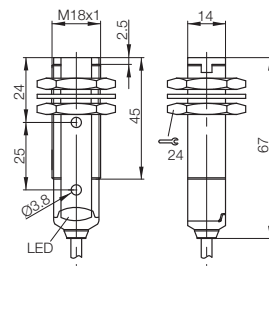
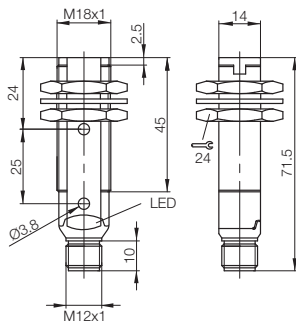
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor with background suppression 100 mm	Diffuse sensor with background suppression 100 mm	Diffuse sensor with foreground suppression 40...100 mm	Diffuse sensor 0...100 mm
BOS 18KF-PA-1N1R-S4-C ①	BOS 18KF-PA-1N1R-C-02 ②		BOS 18KF-PA-1XA-S4-C ②
BOS 18KF-NA-1N1R-S4-C ③	BOS 18KF-NA-1N1R-C-02 ④		BOS 18KF-NA-1XA-S4-C ④
		BOS 18KF-PA-1GA-S4-C ①	
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	≤ 30 mA	≤ 35 mA
Light and dark switching	Light and dark switching	Light and dark switching	Light and dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Fixed	Fixed	Teach-in	Fixed
LED, red light	LED, red light	LED, red light	LED, infrared
630 nm	630 nm	630 nm	880 nm
approx. 20 mm at 100 mm	approx. 20 mm at 100 mm	approx. 8 mm at 100 mm	approx. 80 mm at 100 mm
Yellow LED	Yellow LED	Yellow LED	Yellow LED
Green/red LED	Green/red LED	Green/red LED	
0.5 ms	0.5 ms	2 ms	0.5 ms
1 kHz	1 kHz	250 Hz	1 kHz
IP 67	IP 67	IP 67	IP 67
-25...+55 °C	-25...+55 °C	-25...+55 °C	-25...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
PBT	PBT	PBT	PBT
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	2 m PVC cable, 26 AWG	M12 connector, 4-pin	M12 connector, 4-pin



Photoelectric Standard Sensors

BOS 18KF Global

Sensing distance 100, 400 mm

M18
Plastic
Global

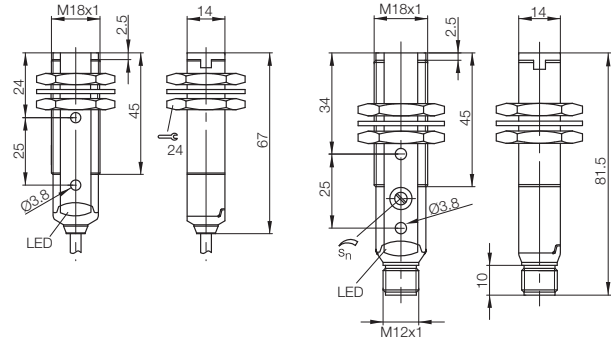


Type		Diffuse sensor		Diffuse sensor	
Detection range		0...100 mm		0...400 mm	
PNP	NO/NC	Part number	BOS 18KF-PA-1XA-C-02 ②	BOS 18KF-PA-1PD-S4-C ①	
NPN	NO/NC	Part number	BOS 18KF-NA-1XA-C-02 ④	BOS 18KF-NA-1PD-S4-C ③	
Supply voltage U_B		10...30 V DC		10...30 V DC	
Output current		100 mA		100 mA	
No-load supply current I_0 max.		≤ 35 mA		≤ 35 mA	
Switching type		Light/dark (complementary)		Light/dark (complementary)	
Polarity reversal/short-circuit protected		Yes/Yes		Yes/Yes	
Settings		Fixed		Potentiometer, 270°	
Emitter, light type		LED, infrared		LED, infrared	
Wavelength		880 nm		880 nm	
Light spot diameter		approx. 80 mm at 100 mm		approx. 100 mm at 300 mm	
Output function indicator		Yellow LED		Yellow LED	
Stability indicator				Green LED	
Response time		0.5 ms		0.5 ms	
Switching frequency f		1 kHz		1 kHz	
Degree of protection as per IEC 60529		IP 67		IP 67	
Ambient temperature T_a		-25...+55 °C		-25...+55 °C	
Reference standard		EN 60947-5-2		EN 60947-5-2	
Material	Housing	PBT		PBT	
	Optical surface	PMMA		PMMA	
Connection		2 m PVC cable, 26 AWG		M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 121.

Ordering codes on page 105.



Photoelectric Standard Sensors

BOS 18KF Global

Sensing distance 400, 700 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

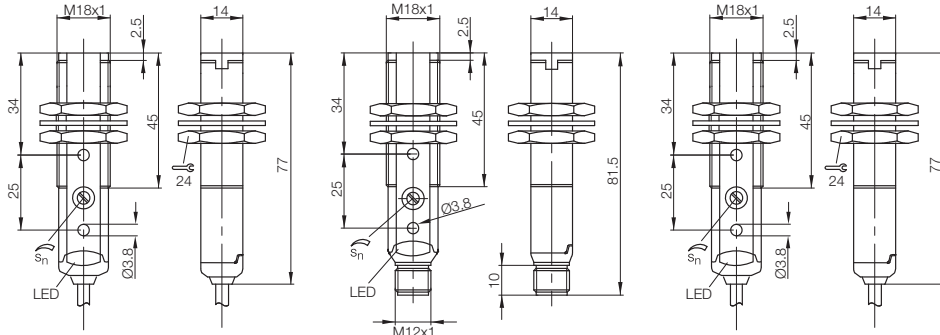
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



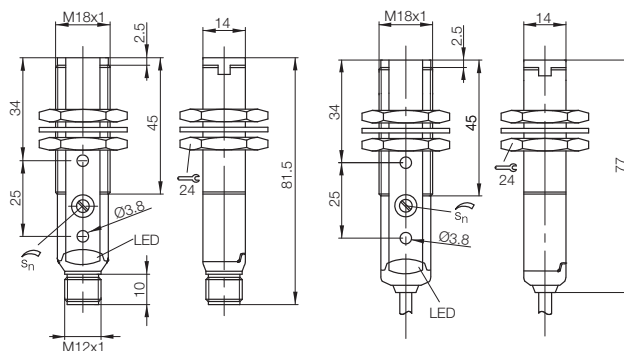
Diffuse sensor 0...400 mm	Diffuse sensor 0...700 mm	Diffuse sensor 0...700 mm	
BOS 18KF-PA-1PD-C-02 ②	BOS 18KF-PA-1PE-S4-C ①	BOS 18KF-PA-1PE-C-02 ②	
BOS 18KF-NA-1PD-C-02 ④	BOS 18KF-NA-1PE-S4-C ③	BOS 18KF-NA-1PE-C-02 ④	
10...30 V DC	10...30 V DC	10...30 V DC	
100 mA	100 mA	100 mA	
≤ 35 mA	≤ 35 mA	≤ 35 mA	
Light/dark (complementary)	Light/dark (complementary)	Light/dark (complementary)	
Yes/Yes	Yes/Yes	Yes/Yes	
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	
LED, infrared	LED, infrared	LED, infrared	
880 nm	880 nm	880 nm	
approx. 100 mm at 300 mm	approx. 200 mm at 600 mm	approx. 200 mm at 600 mm	
Yellow LED	Yellow LED	Yellow LED	
Green LED	Green LED	Green LED	
0.5 ms	0.5 ms	0.5 ms	
1 kHz	1 kHz	1 kHz	
IP 67	IP 67	IP 67	
-25...+55 °C	-25...+55 °C	-25...+55 °C	
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
PBT	PBT	PBT	
PMMA	PMMA	PMMA	
2 m PVC cable, 26 AWG	M12 connector, 4-pin	2 m PVC cable, 26 AWG	





Retroreflective sensor values referenced to R1 reflector.

Ordering codes on page 105.



Photoelectric Standard Sensors

BOS 18KF Global

Range 4.5 m, 5 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

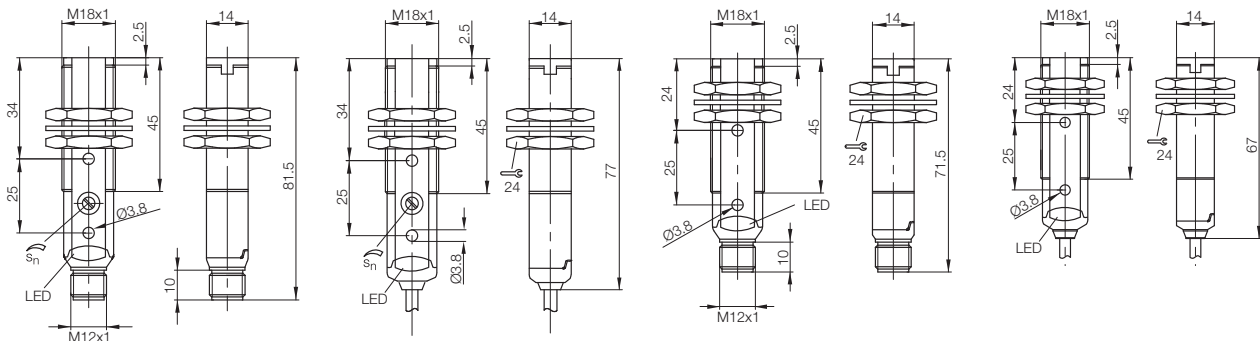
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Retroreflective sensor 0.1...4.5 m	Retroreflective sensor 0.1...4.5 m	Retroreflective sensor 0.1...5 m	Retroreflective sensor 0.1...5 m
BOS 18KF-PA-1QD-S4-C ①	BOS 18KF-PA-1QD-C-02 ②	BOS 18KF-PA-1RE-S4-C ①	BOS 18KF-PA-1RE-C-02 ②
BOS 18KF-NA-1QD-S4-C ③	BOS 18KF-NA-1QD-C-02 ④	BOS 18KF-NA-1RE-S4-C ③	BOS 18KF-NA-1RE-C-02 ④
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
Light/dark (complementary)	Light/dark (complementary)	Light/dark (complementary)	Light/dark (complementary)
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Fixed	Fixed
LED, red light	LED, red light	LED, infrared	LED, infrared
660 nm	660 nm	880 nm	880 nm
approx. 65 mm at 3 m	approx. 65 mm at 3 m	approx. 100 mm at 2 m	approx. 100 mm at 2 m
Yellow LED	Yellow LED	Yellow LED	Yellow LED
Green LED	Green LED	Green LED	Green LED
0.5 ms	0.5 ms	0.5 ms	0.5 ms
1 kHz	1 kHz	1 kHz	1 kHz
IP 67	IP 67	IP 67	IP 67
-25...+55°C	-25...+55°C	-25...+55°C	-25...+55°C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
PBT	PBT	PBT	PBT
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	2 m PVC cable, 26 AWG	M12 connector, 4-pin	2 m PVC cable, 26 AWG



Photoelectric Standard Sensors
BOS 18KF Global
 Range 20 m

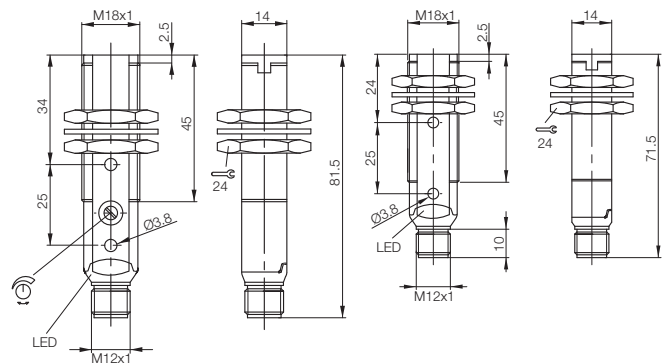
M18
Plastic
Global



Type				Through-beam sensor		Through-beam sensor	
Detection range				0...20 m		0...20 m	
PNP	NO/NC	Receiver	Part number	BLE 18KF-PA-1PP-S4-C	①		
NPN	NO/NC		Part number	BLE 18KF-NA-1PP-S4-C	③		
		Emitter	Part number			BLS 18KF-XX-1P-S4-L	⑤
			Part number				
Supply voltage U _B				10...30 V DC		10...30 V DC	
Output current				100 mA			
No-load supply current I ₀ max.				≤ 30 mA		≤ 35 mA	
Switching type				Light/dark (complementary)			
Polarity reversal/short-circuit protected				Yes/Yes		Yes/Yes	
Settings				Potentiometer, 270°			
Help functions						Test input	
Emitter, light type						LED, infrared	
Wavelength						880 nm	
Light spot diameter						approx. 500 mm at 15 m	
Power-on indicator				Green LED		Green LED	
Output function indicator				Yellow LED			
Response time				2 ms			
Switching frequency f				250 Hz			
Degree of protection as per IEC 60529				IP 67		IP 67	
Ambient temperature T _a				-25...+55°C		-25...+55°C	
Reference standard				EN 60947-5-2		EN 60947-5-2	
Material		Housing		PBT		PBT	
		Optical surface		PMMA		PMMA	
Connection				M12 connector, 4-pin		M12 connector, 4-pin	

Wiring diagrams on page 121.

Ordering codes on page 105.





Photoelectric Standard Sensors
BOS 18KF Laser Global
 Sensing distance 350 mm

M18
Plastic Laser
Global

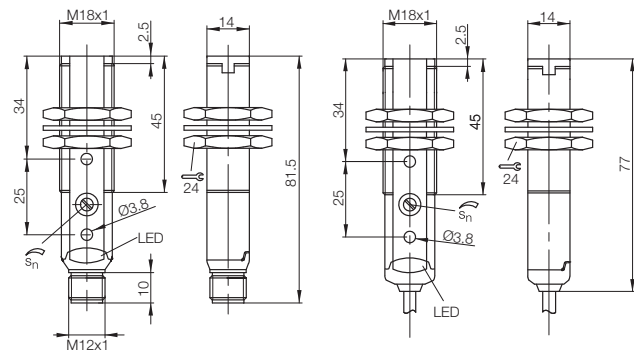


Type				Diffuse sensor	Diffuse sensor
Detection range				0...350 mm	0...350 mm
PNP	NO/NC		Part number	BOS 18KF-PA-1LOC-S4-C ①	BOS 18KF-PA-1LOC-C-02 ②
NPN	NO/NC		Part number	BOS 18KF-NA-1LOC-S4-C ③	BOS 18KF-NA-1LOC-C-02 ④
PNP	NO/NC	Polarizing	Part number		
NPN	NO/NC	filter	Part number		
Supply voltage U_B				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
Switching type				Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected				Yes/Yes	Yes/Yes
Settings				Potentiometer, 270°	Potentiometer, 270°
Emitter, light type				Laser, red light	Laser, red light
Wavelength				650 nm	650 nm
Laser class				1	1
Resolution				approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm	approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm
Power-on indicator				Green LED	Green LED
Output function indicator				Yellow LED	Yellow LED
Response time				333 μ s	333 μ s
Switching frequency f				1.5 kHz	1.5 kHz
Degree of protection as per IEC 60529				IP 67	IP 67
Ambient temperature T_a				-10...+50 °C	-10...+50 °C
Reference standard				EN 60947-5-2	EN 60947-5-2
Material		Housing	PBT		
		Optical surface	PMMA		
Connection				M12 connector, 4-pin	2 m PVC cable, 26 AWG

Diffuse sensor values referenced to 90% reflective Kodak gray card.
 Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 121.

Ordering codes on page 105.





Photoelectric Standard Sensors

BOS 18KF Laser Global

Range 16 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

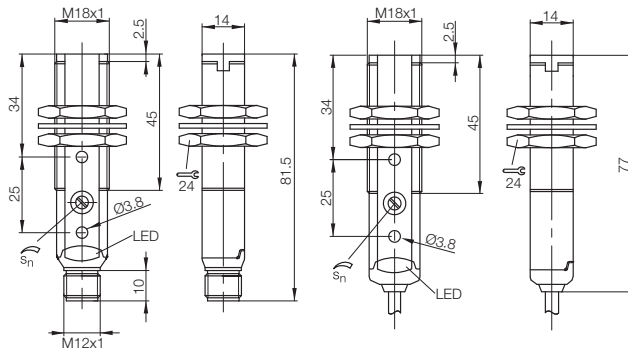
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Retroreflective sensor 0.1...16 m	Retroreflective sensor 0.1...16 m		
BOS 18KF-PA-1LQP-S4-C ①	BOS 18KF-PA-1LQP-C-02 ②		
BOS 18KF-NA-1LQP-S4-C ③	BOS 18KF-NA-1LQP-C-02 ④		
10...30 V DC	10...30 V DC		
100 mA	100 mA		
≤ 35 mA	≤ 35 mA		
Light and dark switching	Light and dark switching		
Yes/Yes	Yes/Yes		
Potentiometer, 270°	Potentiometer, 270°		
Laser, red light	Laser, red light		
650 nm	650 nm		
1	1		
approx. 0.9 mm at 1 m	approx. 0.9 mm at 1 m		
approx. 2 mm at 3 m	approx. 2 mm at 3 m		
Green LED	Green LED		
Yellow LED	Yellow LED		
333 µs	333 µs		
1.5 kHz	1.5 kHz		
IP 67	IP 67		
-10...+50 °C	-10...+50 °C		
EN 60947-5-2	EN 60947-5-2		
PBT	PBT		
PMMA	PMMA		
M12 connector, 4-pin	2 m PVC cable, 26 AWG		



Photoelectric Standard Sensors
BOS 18KF Laser Global
 Range 60 m

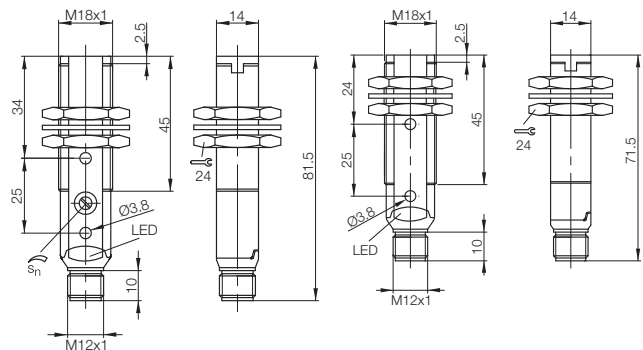
M18
Plastic Laser
Global



Type	Through-beam sensor		Through-beam sensor	
Detection range	0...60 m		0...60 m	
PNP NO/NC	Receiver	Part number	BLE 18KF-PA-1LT-S4-C ⑥	
NPN NO/NC		Part number	BLE 18KF-NA-1LT-S4-C ③	
	Emitter	Part number		BLS 18KF-XX-1LT-S4-L ⑨
		Part number		
Supply voltage U_B	10...30 V DC		10...30 V DC	
Output current	100 mA			
No-load supply current I_0 max.	≤ 30 mA		≤ 35 mA	
Switching type	Light and dark switching			
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Potentiometer, 270°			
Emitter, light type			Laser, red light	
Wavelength			650 nm	
Laser class			1	
Resolution			approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m	
			Green LED	
Power-on indicator	Green LED			
Output function indicator	Yellow LED			
Response time	333 μ s			
Switching frequency f	1.5 kHz			
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	-10...+50 °C		-10...+50 °C	
Reference standard	EN 60947-5-2		EN 60947-5-2	
Material	Housing	PBT	PBT	
	Optical surface	PMMA	PMMA	
Connection	M12 connector, 4-pin		M12 connector, 4-pin	

Wiring diagrams on page 121.

Ordering codes on page 105.





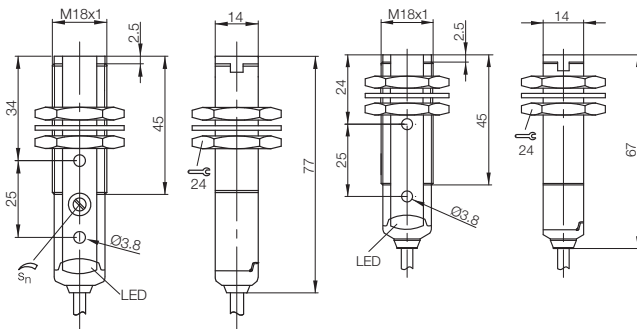
Photoelectric Standard Sensors

BOS 18KF Laser Global

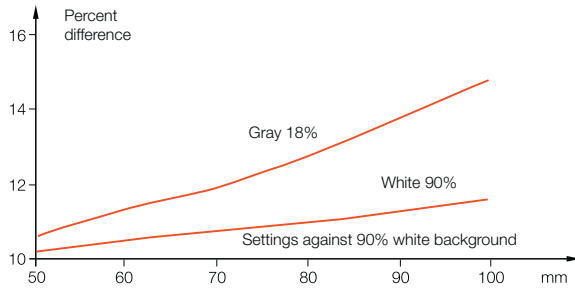
Range 60 m



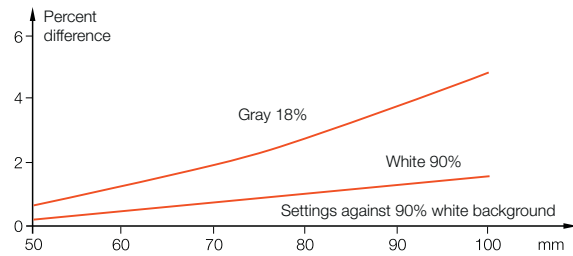
Through-beam sensor 0...60 m	Through-beam sensor 0...60 m			
BLE 18KF-PA-1LT-C-02 ②				Photoelectric standard sensors
BLE 18KF-NA-1LT-C-02 ④				Cylinder designs
	BLS 18KF-XX-1LT-L-02 ⑥			Block designs
10...30 V DC	10...30 V DC			Photoelectric special sensors
100 mA				
≤ 30 mA	≤ 35 mA			Photoelectric distance sensors for analog distance measurement
Light and dark switching				
Yes/Yes	Yes/Yes			
Potentiometer, 270°				
	Laser, red light			Special accessories for photoelectric sensors
	650 nm			
	1			
	approx. 2.5 mm at 5 m			
	approx. 5 mm at 10 m			
	approx. 10 mm at 20 m			
	Green LED			
Green LED				
Yellow LED				
333 µs				
1.5 kHz				
IP 67	IP 67			
-10...+50 °C	-10...+50 °C			
EN 60947-5-2	EN 60947-5-2			
PBT	PBT			
PMMA	PMMA			
2 m PVC cable, 26 AWG	2 m PVC cable, 26 AWG			



Diffuse sensor BOS 18KF-...-1HA-...

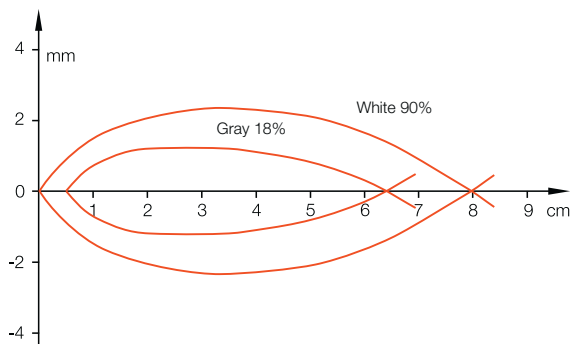


Tolerance with standard setting

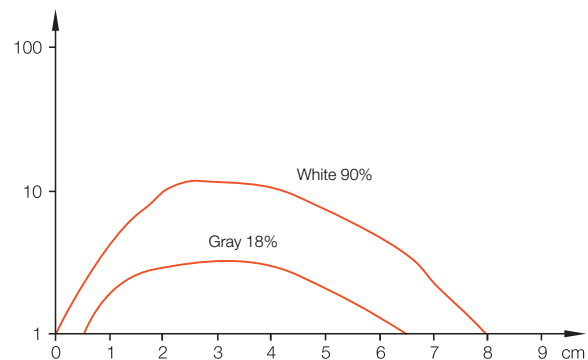


Tolerance with fine setting

Diffuse sensor BOS 18KF-...-1N1R-...

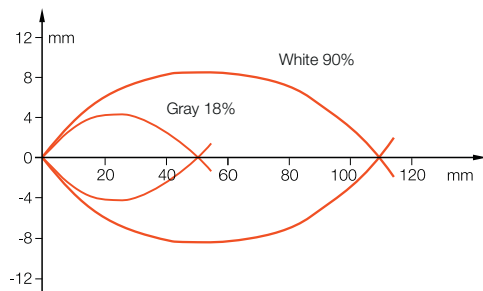


Detection range

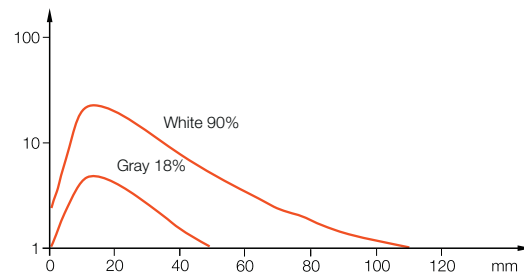


Function reserve

Diffuse sensor BOS 18KF-...-1XA-...

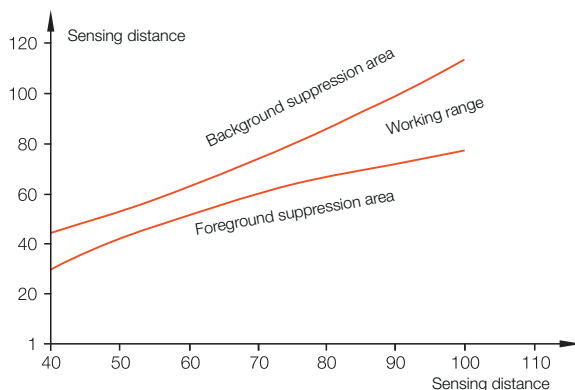


Detection range



Function reserve

Diffuse sensor BOS 18KF-...-1GA-...



Hysteresis with standard setting

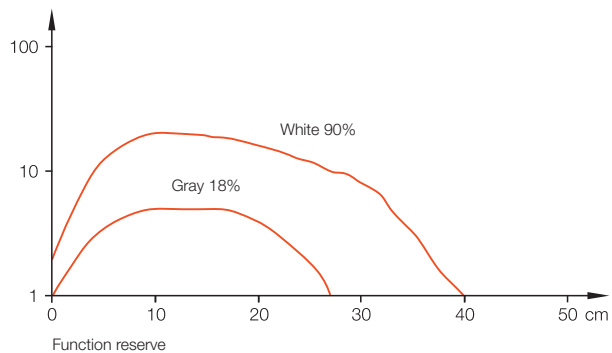
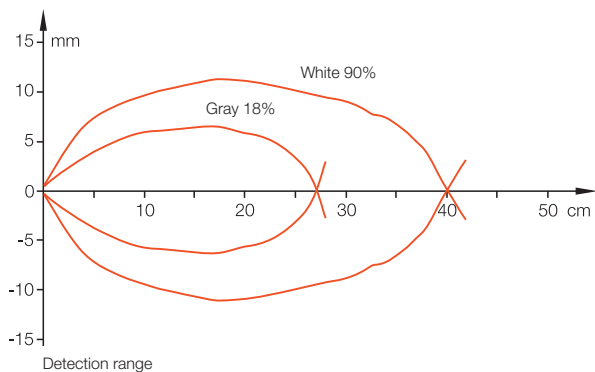


Photoelectric Standard Sensors

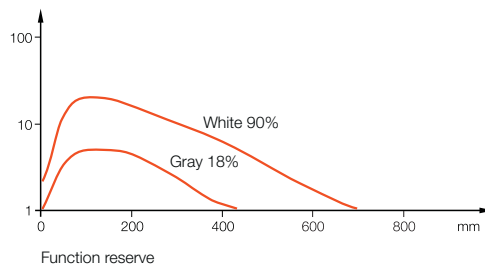
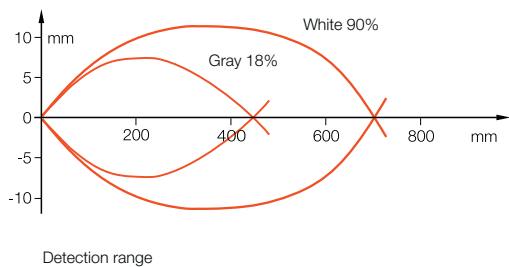
BOS 18KF Global

Function diagrams

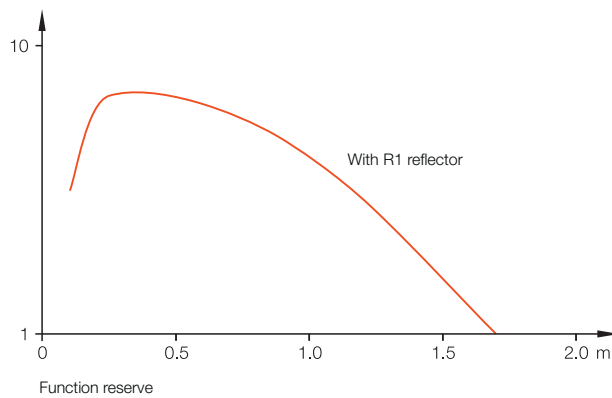
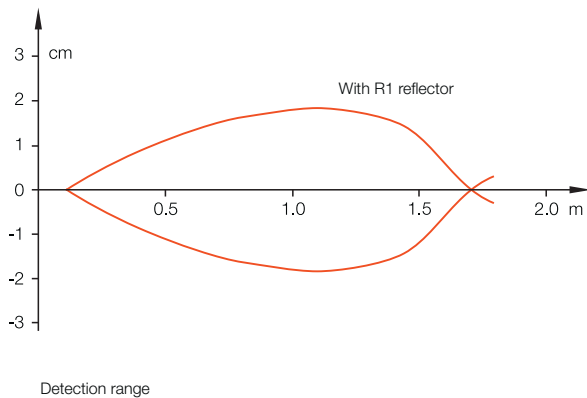
Diffuse sensor BOS 18KF...-1PD-...



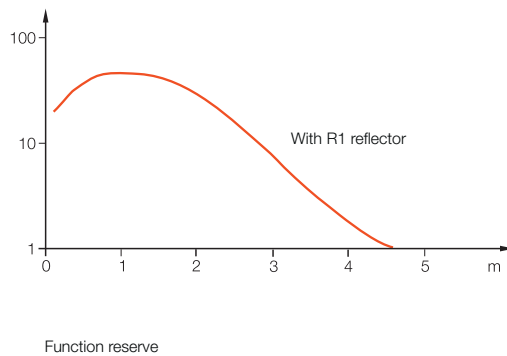
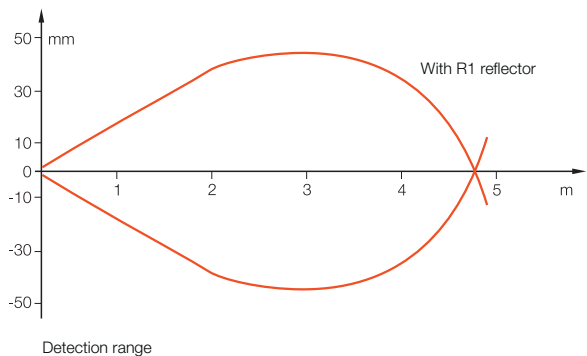
Diffuse sensor BOS 18KF...-1PE-...



Retroreflective sensor BOS 18KF...-1TB-...



Retroreflective sensor BOS 18KF...-1QD-...



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

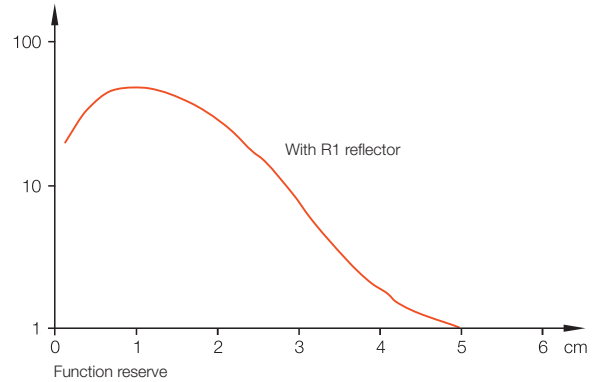
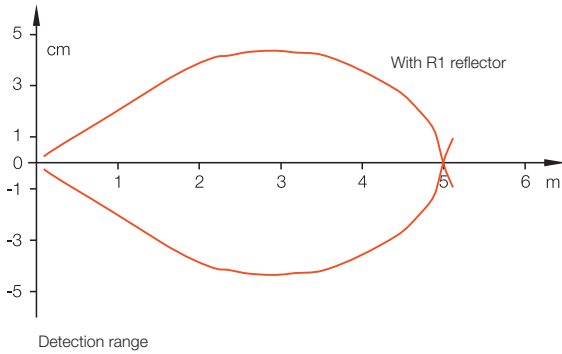
Block designs

Photoelectric special sensors

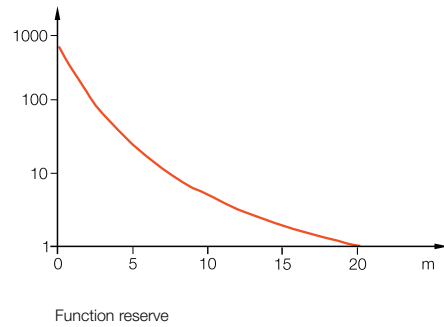
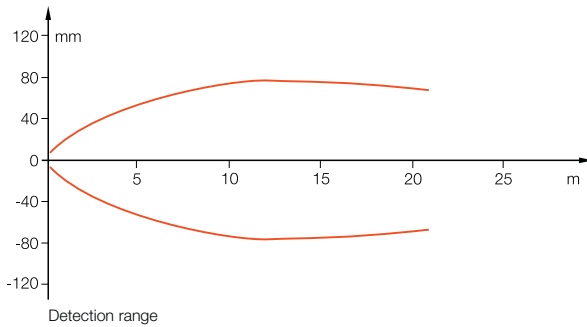
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

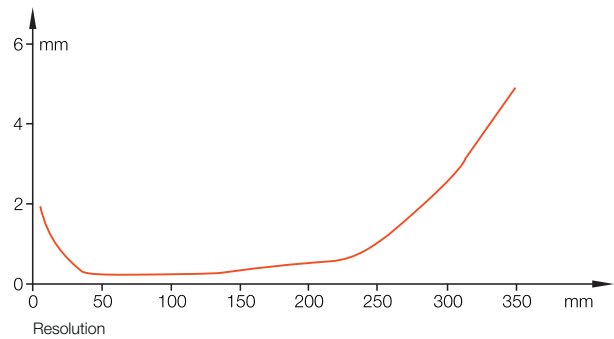
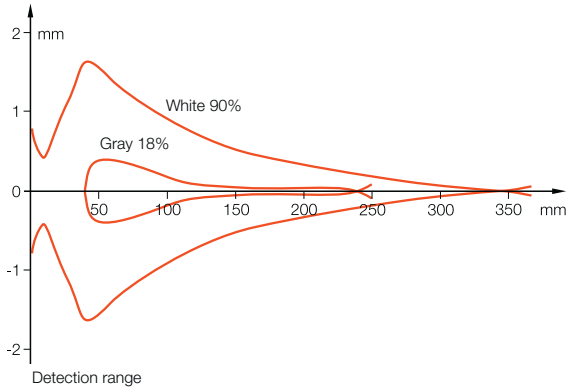
Retroreflective sensor BOS 18KF...-1RE-...



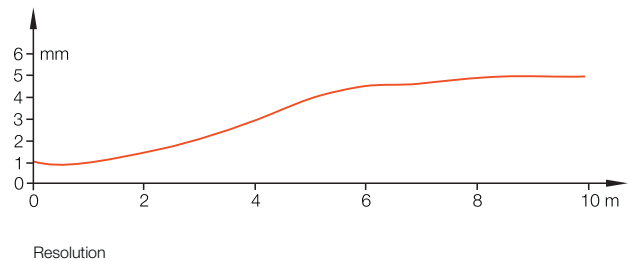
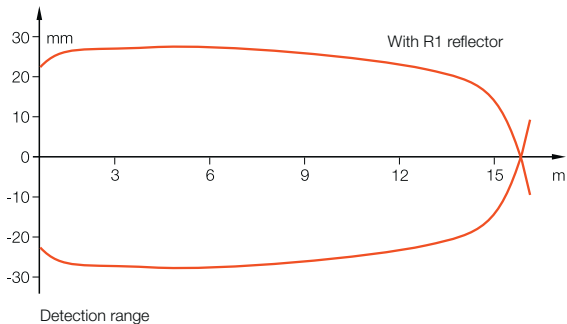
Through-beam sensor BLE/BLS 18KF...-1PP/1P-...



Diffuse sensor BOS 18KF...-1LOC-...



Retroreflective sensor BOS 18KF...-1LQP-...

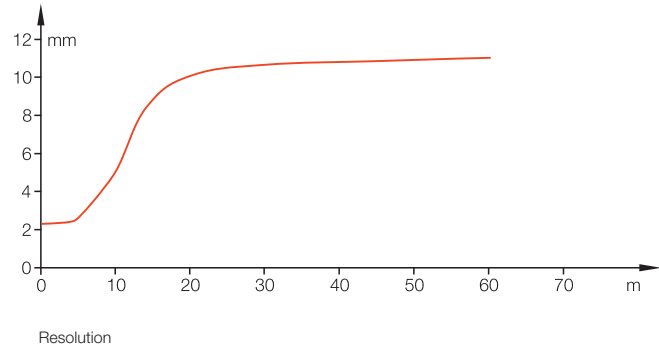
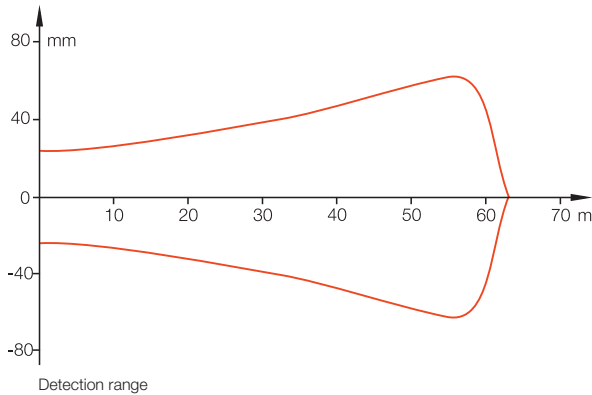


Photoelectric Standard Sensors

BOS 18KF Global

Function diagrams, connection, accessories

Through-beam sensor BLE/BLS 18KF-...-1LT...



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

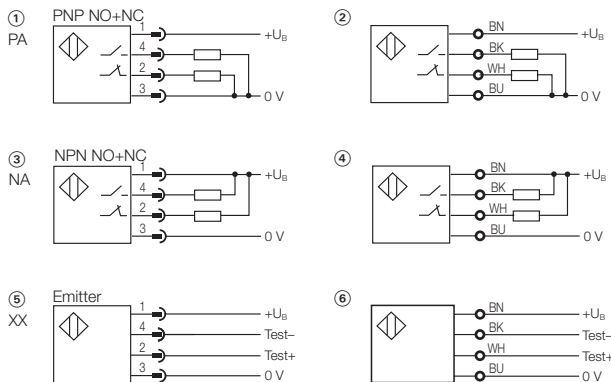
Block designs

Photoelectric special sensors

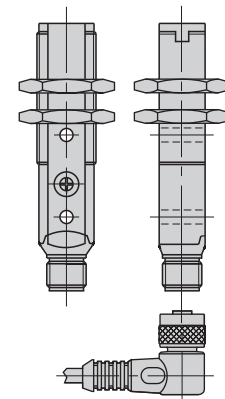
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Wiring diagrams



Connector orientation



BOS 18KF



Recommended accessories
(please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Mounting bracket	BAM00RY
③ Reflector	BAM00UK
④ Round aperture	BAM00R6
⑤ Cover nut	BAM00RL
⑥ Air shield	BAM00R9



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.



Suitable connectors
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

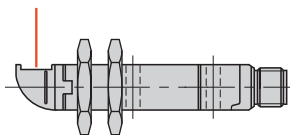
BOS 18KF – with expanded product line

BOS 18KF series sensors are available with red, infrared light or with a Class 1 laser.

They are configured using a potentiometer or via teach-in.

The plastic housing with flattened sides allows installation using the included M18-nuts or screws through the sensor housing.

The sensors are available as cable or M12 connector styles with PNP or NPN output.



Photoelectric Standard Sensors

BOS 18KW Global

Product overview

Type		Sensing distance/ range	Light type			Output		Switching type		Switching frequency	U _s	Connection		Special features		Page		
			Red light	Infrared	Laser	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 plug, 4-pin	Cable	Polarizing filter	Teach-in			
Ordering code Part number																		
 Diffuse sensor with background suppression																		
BOS00LH	BOS 18KW-PA-1HA-S4-C	50...100 mm								500 Hz						124	Photoelectric special sensors	
BOS00KY	BOS 18KW-NA-1HA-S4-C	50...100 mm								500 Hz						124		
BOS00LF	BOS 18KW-PA-1HA-C-02	50...100 mm								500 Hz						124		
 Diffuse sensor																	Photoelectric distance sensors for analog distance measurement	
BOS00M1	BOS 18KW-PA-1XA-S4-C	0...80 mm								1 kHz						125		
BOS00LE	BOS 18KW-NA-1XA-S4-C	0...80 mm								1 kHz						125		
BOS00M0	BOS 18KW-PA-1XA-C-02	0...80 mm								1 kHz						125		
BOS00LC	BOS 18KW-NA-1XA-C-02	0...80 mm								1 kHz						125		
BOS00LK	BOS 18KW-PA-1LOB-S4-C	0...250 mm								1.5 kHz						130		
BOS00LO	BOS 18KW-NA-1LOB-S4-C	0...250 mm								1.5 kHz						130		
BOS00LJ	BOS 18KW-PA-1LOB-C-02	0...250 mm								1.5 kHz						130		
BOS00KZ	BOS 18KW-NA-1LOB-C-02	0...250 mm								1.5 kHz						130		
BOS00LT	BOS 18KW-PA-1PD-S4-C	0...400 mm								1 kHz						125		
BOS00L6	BOS 18KW-NA-1PD-S4-C	0...400 mm								1 kHz						125		
BOS00LR	BOS 18KW-PA-1PD-C-02	0...400 mm								1 kHz						125		
BOS00L5	BOS 18KW-NA-1PD-C-02	0...400 mm								1 kHz						125		
 Retroreflective sensor																	Special accessories for photoelectric sensors	
BOS00LZ	BOS 18KW-PA-1TB-S4-C	0.1...1.7 m								1 kHz						126		
BOS00LA	BOS 18KW-NA-1TB-S4-C	0.1...1.7 m								1 kHz						126		
BOS00LY	BOS 18KW-PA-1TB-C-02	0.1...1.7 m								1 kHz						126		
BOS00L9	BOS 18KW-NA-1TB-C-02	0.1...1.7 m								1 kHz						126		
BOS00LW	BOS 18KW-PA-1QC-S4-C	0.1...3 m								1 kHz						127		
BOS00L8	BOS 18KW-NA-1QC-S4-C	0.1...3 m								1 kHz						127		
BOS00LU	BOS 18KW-PA-1QC-C-02	0.1...3 m								1 kHz						127		
BOS00L7	BOS 18KW-NA-1QC-C-02	0.1...3 m								1 kHz						127		
BOS00LM	BOS 18KW-PA-1LQH-S4-C	0.1...9 m								1.5 kHz						131		
BOS00L2	BOS 18KW-NA-1LQH-S4-C	0.1...9 m								1.5 kHz						131		
BOS00LL	BOS 18KW-PA-1LQH-C-02	0.1...9 m								1.5 kHz						131		
BOS00LI	BOS 18KW-NA-1LQH-C-02	0.1...9 m								1.5 kHz						131		
 Through-beam sensor Receiver																		
BOS00CW	BLE 18KW-PA-1PP-S4-C	0...15 m								250 Hz						128		
BOS00CP	BLE 18KW-NA-1PP-S4-C	0...15 m								250 Hz						128		
BOS00CU	BLE 18KW-PA-1PP-C-02	0...15 m								250 Hz						129		
BOS00CN	BLE 18KW-NA-1PP-C-02	0...15 m								250 Hz						129		
BOS00CT	BLE 18KW-PA-1LT-S4-C	0...50 m								1.5 kHz						133		
BOS00CM	BLE 18KW-NA-1LT-S4-C	0...50 m								1.5 kHz						133		
 Through-beam sensor Emitter																		
BOS00EW	BLS 18KW-XX-1P-S4-L	0...15 m														128		
BOS00EU	BLS 18KW-XX-1P-L-02	0...15 m														129		
BOS00ET	BLS 18KW-XX-1LT-S4-L	0...50 m														133		

Photoelectric Standard Sensors
BOS 18KW Global
 Sensing distance 100 mm

M18 Plastic with Angle Head

Global

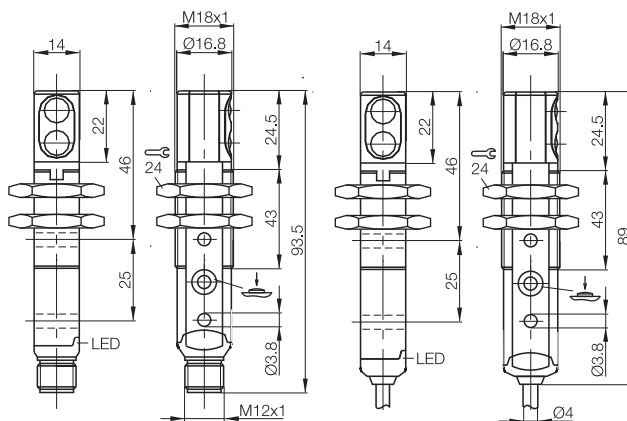


Type			Diffuse sensor with background suppression	Diffuse sensor with background suppression
Detection range			50...100 mm	50...100 mm
PNP	NO/NC	Part number		
NPN	NO/NC	Part number		
PNP	NO/NC	Teach-in	BOS 18KW-PA-1HA-S4-C ①	BOS 18KW-PA-1HA-C-02 ②
NPN	NO/NC	Teach-in	BOS 18KW-NA-1HA-S4-C ③	
Supply voltage U _B			10...30 V DC	10...30 V DC
Output current			100 mA	100 mA
No-load supply current I ₀ max.			≤ 30 mA	≤ 30 mA
Switching type			Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Teach-in	Teach-in
Emitter, light type			LED, red light	LED, red light
Wavelength			630 nm	630 nm
Light spot diameter			approx. 10 mm at 100 mm	approx. 10 mm at 100 mm
Output function indicator			Yellow LED	Yellow LED
Stability indicator			Green/red LED	Green/red LED
Response time			1 ms	1 ms
Switching frequency f			500 Hz	500 Hz
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T _a			–25...+55 °C	–25...+55 °C
Permissible ambient light			EN 60947-5-2	EN 60947-5-2
Material	Housing	Optical surface	PBT	PBT
			PMMA	PMMA
Connection			M12 connector, 4-pin	2 m PVC cable, 26 AWG

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 135.

Ordering codes on page 123.



Photoelectric Standard Sensors

BOS 18KW Global

Sensing distance 80, 400 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

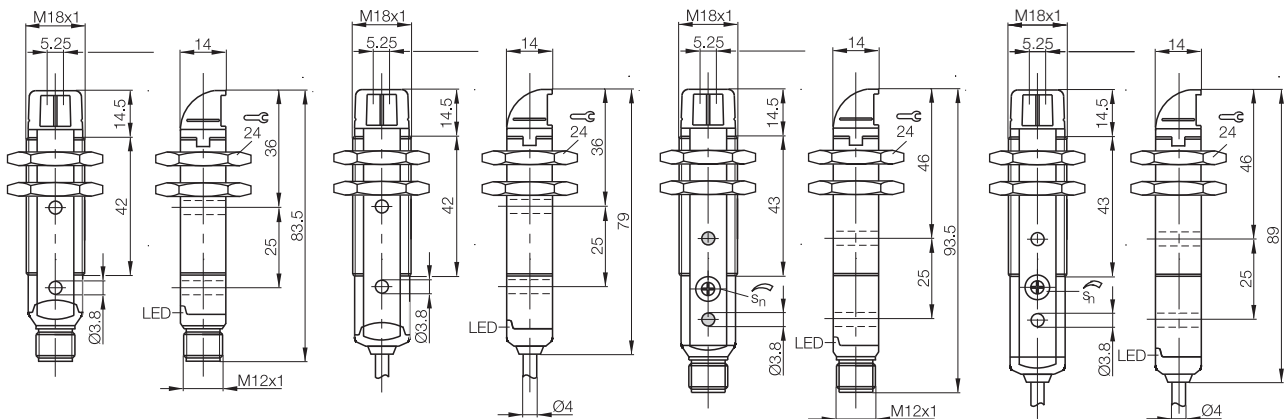
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor 0...80 mm	Diffuse sensor 0...80 mm	Diffuse sensor 0...400 mm	Diffuse sensor 0...400 mm
BOS 18KW-PA-1XA-S4-C ①	BOS 18KW-PA-1XA-C-02 ②	BOS 18KW-PA-1PD-S4-C ①	BOS 18KW-PA-1PD-C-02 ②
BOS 18KW-NA-1XA-S4-C ③	BOS 18KW-NA-1XA-C-02 ④	BOS 18KW-NA-1PD-S4-C ③	BOS 18KW-NA-1PD-C-02 ④
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
Light and dark switching	Light and dark switching	Light and dark switching	Light and dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Fixed	Fixed	Potentiometer, 270°	Potentiometer, 270°
LED, infrared	LED, infrared	LED, infrared	LED, infrared
880 nm	880 nm	880 nm	880 nm
approx. 55 mm at 100 mm	approx. 55 mm at 100 mm	approx. 35 mm at 400 mm	approx. 35 mm at 400 mm
Yellow LED	Yellow LED	Yellow LED	Yellow LED
0.5 ms	0.5 ms	Green LED	Green LED
1 kHz	1 kHz	0.5 ms	0.5 ms
IP 67	IP 67	1 kHz	1 kHz
-25...+55 °C	-25...+55 °C	IP 67	IP 67
EN 60947-5-2	EN 60947-5-2	-25...+55 °C	-25...+55 °C
PBT	PBT	EN 60947-5-2	EN 60947-5-2
PMMA	PMMA	PBT	PBT
M12 connector, 4-pin	2 m PVC cable, 26 AWG	PMMA	PMMA
		M12 connector, 4-pin	2 m PVC cable, 26 AWG



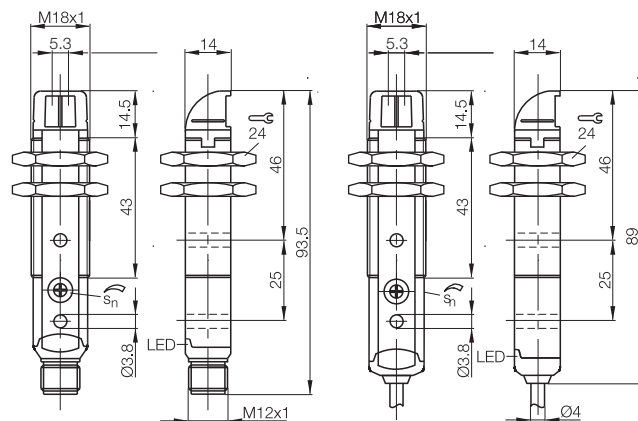


Type	Retroreflective sensor			Retroreflective sensor		
Detection range	0.1...1.7 m			0.1...1.7 m		
PNP NO/NC Polarizing filter,	Part number	BOS 18KW-PA-1TB-S4-C ①		BOS 18KW-PA-1TB-C-02 ②		
NPN NO/NC Transparency detection	Part number	BOS 18KW-NA-1TB-S4-C ③		BOS 18KW-NA-1TB-C-02 ④		
PNP NO/NC Polarizing filter	Part number					
NPN NO/NC	Part number					
PNP NO/NC Receiver	Part number					
NPN NO/NC	Part number					
Supply voltage U_B	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		
Switching type	Light and dark switching			Light and dark switching		
Polarity reversal/short-circuit protected	Yes/Yes			Yes/Yes		
Settings	Potentiometer, 270°			Potentiometer, 270°		
Emitter, light type	LED, red light			LED, red light		
Wavelength	660 nm			660 nm		
Light spot diameter	approx. 60 mm at 1 m			approx. 60 mm at 1 m		
Output function indicator	Yellow LED			Yellow LED		
Stability indicator	Green LED			Green LED		
Response time	0.5 ms			0.5 ms		
Switching frequency f	1 kHz			1 kHz		
Degree of protection as per IEC 60529	IP 67			IP 67		
Ambient temperature T_a	-25...+55°C			-25...+55°C		
Permissible ambient light	EN 60947-5-2			EN 60947-5-2		
Material	Housing	PBT		PBT		
	Optical surface	PMMA		PMMA		
Connection	M12 connector, 4-pin			2 m PVC cable, 26 AWG		

Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 135.

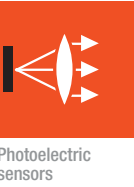
Ordering codes on page 123.



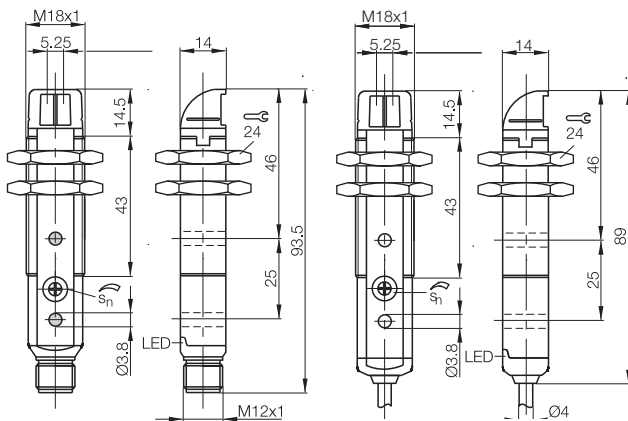
Photoelectric Standard Sensors

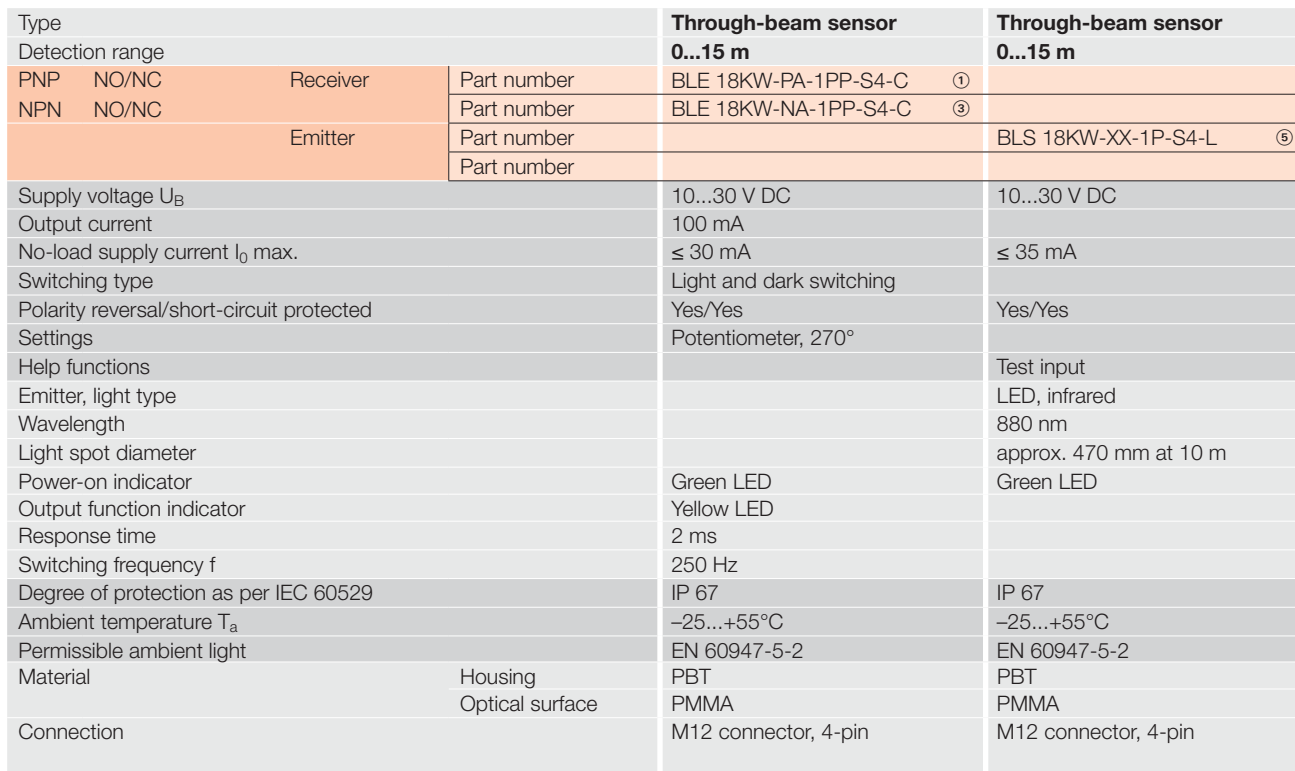
BOS 18KW Global

Range 3 m

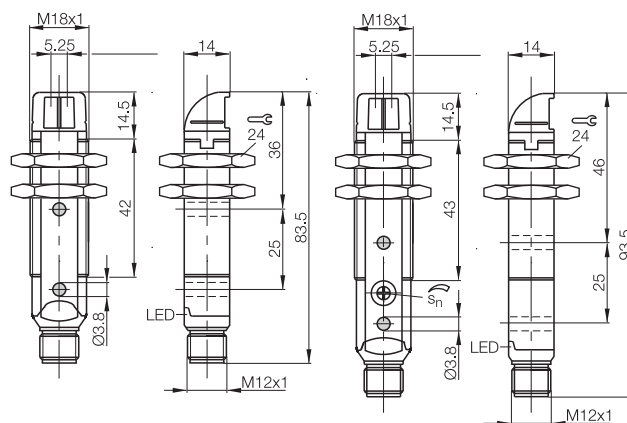


Retroreflective sensor 0.1...3 m	Retroreflective sensor 0.1...3 m			Photoelectric standard sensors
BOS 18KW-PA-1QC-S4-C ①	BOS 18KW-PA-1QC-C-02 ②			Cylinder designs
BOS 18KW-NA-1QC-S4-C ③	BOS 18KW-NA-1QC-C-02 ④			Block designs
10...30 V DC	10...30 V DC			Photoelectric special sensors
100 mA	100 mA			Photoelectric distance sensors for analog distance measurement
≤ 35 mA	≤ 35 mA			
Light and dark switching	Light and dark switching			
Yes/Yes	Yes/Yes			
Potentiometer, 270°	Potentiometer, 270°			
LED, red light	LED, red light			
660 nm	660 nm			
approx. 60 mm at 2 m	approx. 60 mm at 2 m			Special accessories for photoelectric sensors
Yellow LED	Yellow LED			
Green LED	Green LED			
0.5 ms	0.5 ms			
1 kHz	1 kHz			
IP 67	IP 67			
-25...+55°C	-25...+55°C			
EN 60947-5-2	EN 60947-5-2			
PBT	PBT			
PMMA	PMMA			
M12 connector, 4-pin	2 m PVC cable, 26 AWG			





Ordering codes on page 123.



Photoelectric Standard Sensors
BOS 18KW Laser Global
 Sensing distance 250 mm

M18 Plastic Laser with Angle Head

Global

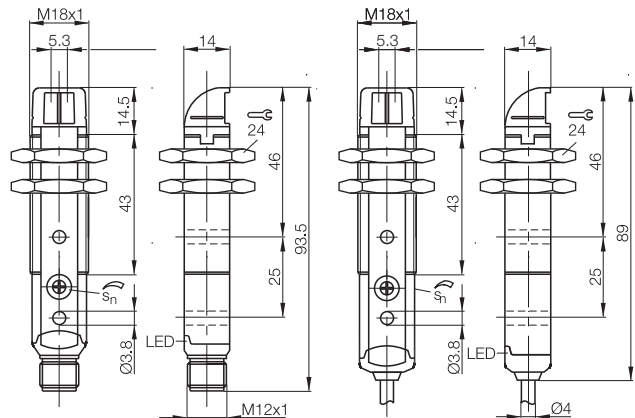


Type			Diffuse sensor	Diffuse sensor	
Detection range			0...250 mm	0...250 mm	
PNP	NO/NC	Polarizing filter	Part number	BOS 18KW-PA-1LOB-S4-C	BOS 18KW-PA-1LOB-C-02
NPN	NO/NC		Part number	BOS 18KW-NA-1LOB-S4-C	BOS 18KW-NA-1LOB-C-02
PNP	NO/NC		Part number		
NPN	NO/NC		Part number		
Supply voltage U _B			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	
Switching type			Light and dark switching	Light and dark switching	
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes	
Settings			Potentiometer, 270°	Potentiometer, 270°	
Emitter, light type			Laser, red light	Laser, red light	
Wavelength			650 nm	650 nm	
Laser class			1	1	
Resolution			approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm	approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm	
Power-on indicator			Green LED	Green LED	
Output function indicator			Yellow LED	Yellow LED	
Response time			333 μs	333 μs	
Switching frequency f			1 kHz	1 kHz	
Degree of protection as per IEC 60529			IP 67	IP 67	
Ambient temperature T _a			−10...+50 °C	−10...+50 °C	
Reference standard			EN 60947-5-2	EN 60947-5-2	
Material		Housing	PBT	PBT	
		Optical surface	PMMA	PMMA	
Connection			M12 connector, 4-pin	2 m PVC cable, 26 AWG	

Diffuse sensor values referenced to 90% reflective Kodak gray card.
 Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 135.

Ordering codes on page 123.





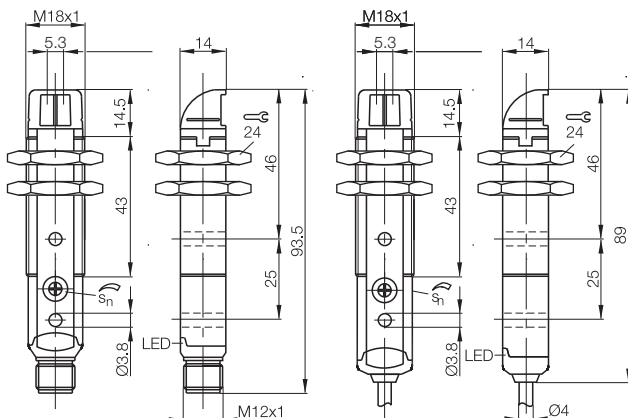
Photoelectric Standard Sensors

BOS 18KW Laser Global

Range 9 m



Retroreflective sensor 0.1...9 m	Retroreflective sensor 0.1...9 m			Photoelectric standard sensors
				Cylinder designs
				Block designs
BOS 18KW-PA-1LQH-S4-C	BOS 18KW-PA-1LQH-C-02			
BOS 18KW-NA-1LQH-S4-C	BOS 18KW-NA-1LQH-C-02			
10...30 V DC	10...30 V DC			Photoelectric special sensors
100 mA	100 mA			
≤ 35 mA	≤ 35 mA			
Light and dark switching	Light and dark switching			Photoelectric distance sensors for analog distance measurement
Yes/Yes	Yes/Yes			
Potentiometer, 270°	Potentiometer, 270°			
Laser, red light	Laser, red light			
650 nm	650 nm			
1	1			
approx. 0.9 mm at 1 m	approx. 0.9 mm at 1 m			Special accessories for photoelectric sensors
approx. 2 mm at 3 m	approx. 2 mm at 3 m			
Green LED	Green LED			
Yellow LED	Yellow LED			
333 µs	333 µs			
1.5 kHz	1.5 kHz			
IP 67	IP 67			
-10...+50 °C	-10...+50 °C			
EN 60947-5-2	EN 60947-5-2			
PBT	PBT			
PMMA	PMMA			
M12 connector, 4-pin	2 m PVC cable, 26 AWG			





Type			
Detection range			
PNP NO/NC	Emitter	Part number	
NPN NO/NC		Part number	
PNP NO/NC	Receiver	Part number	
NPN NO/NC		Part number	
Supply voltage U_B			
Output current			
No-load supply current I_0 max.			
Switching type			
Polarity reversal/short-circuit protected			
Settings			
Help function			
Emitter, light type			
Wavelength			
Laser class			
Resolution			
Power-on indicator			
Output function indicator			
Response time			
Switching frequency f			
Degree of protection as per IEC 60529			
Ambient temperature T_a			
Reference standard			
Material	Housing		
	Optical surface		
Connection			

Wiring diagrams on page 135.

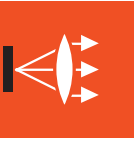
Ordering codes on page 123.



Photoelectric Standard Sensors

BOS 18KW Laser Global

Range 50 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

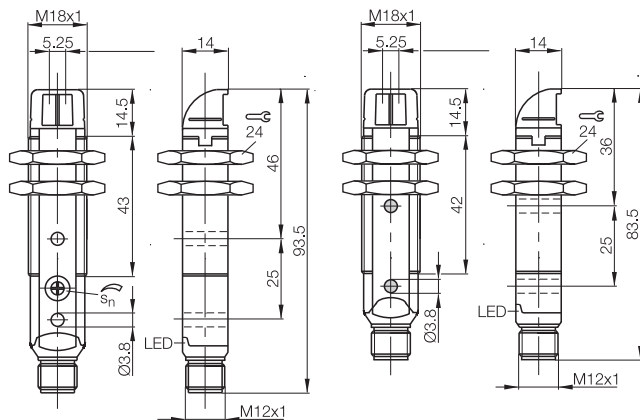
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

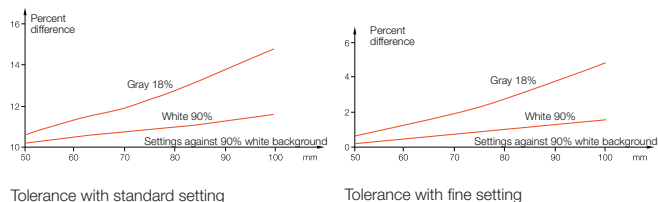
Special accessories for photoelectric sensors



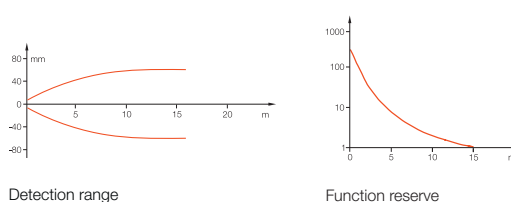
Through-beam sensor 0...50 m	Through-beam sensor 0...50 m		
	BLS 18KW-XX-1LT-S4-L		
BLE 18KW-PA-1LT-S4-C			
BLE 18KW-NA-1LT-S4-C			
10...30 V DC	10...30 V DC		
100 mA			
≤ 30 mA	≤ 35 mA		
Light and dark switching			
Yes/Yes	Yes/Yes		
Potentiometer, 270°			
	Test input		
	Laser, red light		
	650 nm		
	1		
	approx. 2.5 mm at 5 m		
	approx. 5 mm at 10 mm		
	approx. 10 mm at 20 mm		
Green LED	Green LED		
Yellow LED			
333 µs			
1.5 kHz			
IP 67	IP 67		
-10...+50 °C	-10...+50 °C		
EN 60947-5-2	EN 60947-5-2		
PBT	PBT		
PMMA	PMMA		
M12 connector, 4-pin	M12 connector, 4-pin		



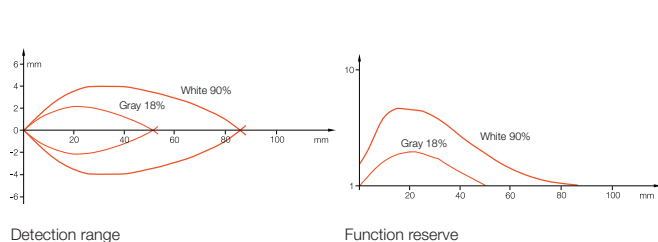
Diffuse BOS 18KW-...-1HA-...



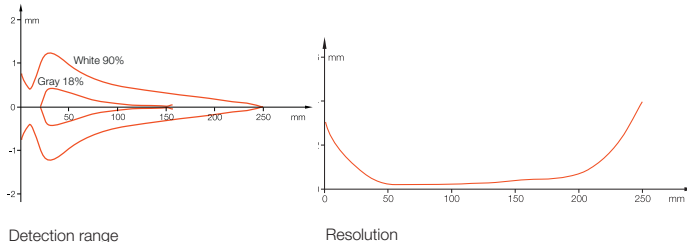
Through-beam BLE/BLS 18KW-...-1PP/1P-...



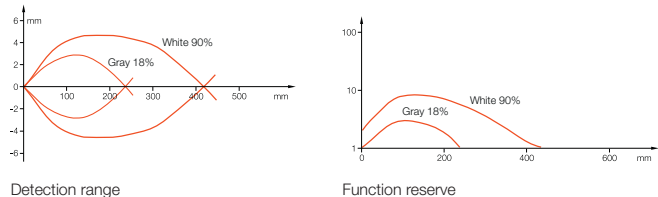
Diffuse sensor BOS 18KW-...-1XA-...



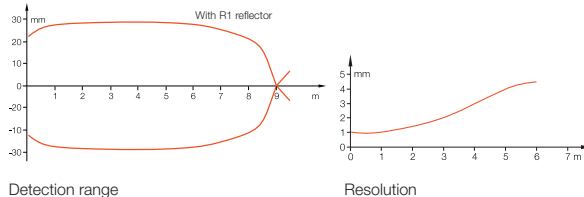
Diffuse sensor BOS 18KW-...-1LOB-...



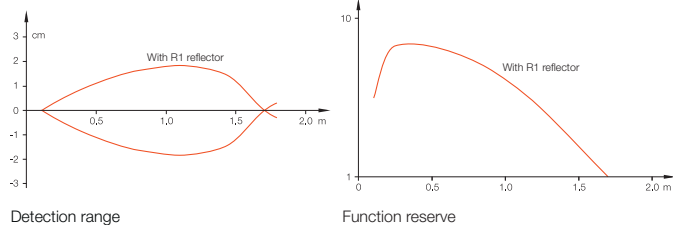
Diffuse sensor BOS 18KW-...-1PD-...



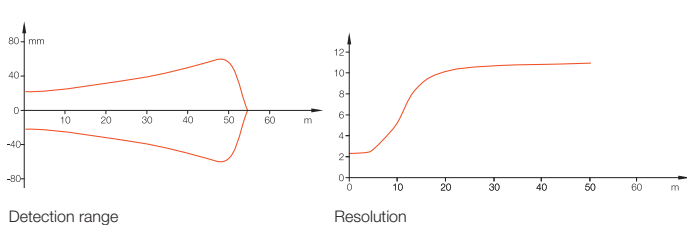
Retroreflective BOS 18KW-...-1LQH-...



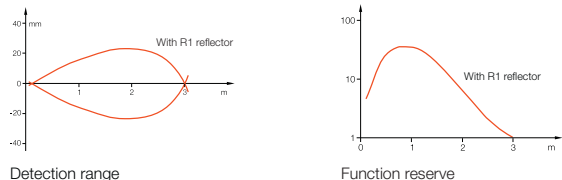
Retroreflective sensor BOS 18KW-...-1TB-...



Through-beam sensor BLE/BLS 18KW-...-1LT-...



Retroreflective sensor BOS 18KW-...-1QC-...





Photoelectric Standard Sensors

BOS 18KW Global

Connection, accessories



Photoelectric sensors

Photoelectric standard sensors

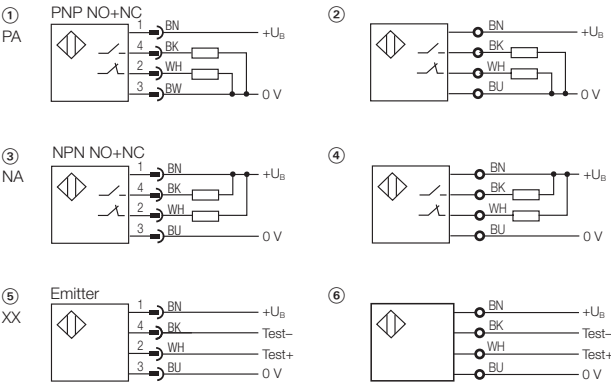
Cylinder designs
Block designs

Photoelectric special sensors

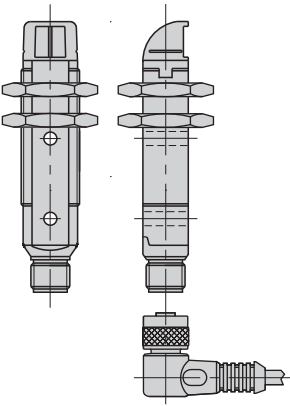
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Wiring diagrams



Connector orientation



Recommended accessories

(please order separately)

Description	Ordering code
① Mounting clamp	BAM00T3
② Mounting bracket	BAM00RY
③ Reflector	BAM00UK



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

The **BOS 30M** series combines the high optical performance of large block-shaped sensors with the installation-friendly characteristics of cylindrical sensors.

The long 2 m sensing distance provides great function reserve under less than favorable operating conditions. A tough glass disk protects the optics from debris such as hot swarf, and the 18-turn- potentiometer enables precise sensitivity configuration. In addition, the integrated contamination indicator provides warning of contamination or external influences in order to avoid impairing the optics.

The BOS 30M series provides a very high performance and robust design together with special glass optical fiber BFO 18V-... A design that is particularly well-suited to the automotive industry.

Features

- Long sensing distance
- Tough design (metal housing and glass protective shield)
- 18-turn- potentiometer
- NO-/NC- toggle
- Compatible with special glass optical fiber
- Automotive industry approved
- Contamination indicator

Applications

- Automotive industry
- Conveying and warehouse equipment
- Construction machinery
- Woodworking industry
- In harsh environments





Photoelectric Standard Sensors

BOS 30M

Product overview

Type

■ Ordering code

■ Part number



Diffuse sensor

Type	Sensing distance/ range	Light type		Output		Switching type		Switching frequency	U _s	Connection		Special features		Page
		Infrared		PNP transistor	NPN transistor	Light switching	Dark switching			M12 plug, 4-pin				
BOS0134	BOS 30M-GA-1PH-S4-C	0...2 m	■	■		■	■	100 Hz	■	■				139
BOS008T	BOS 30M-PU-1PH-SA3-C	0...2 m	■	■	■	■	■	100 Hz	■	■				139



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

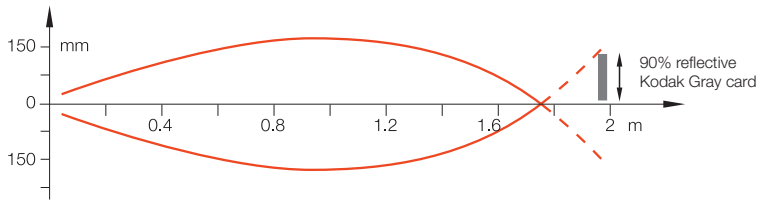
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

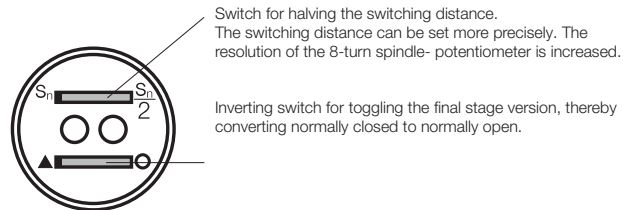
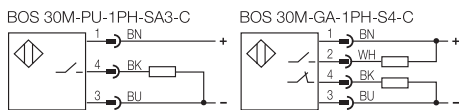
Special accessories for photoelectric sensors

Diffuse BOS 30M...-1PH-...



Sensing distance with side approach of Kodak gray card.

Wiring diagrams



Recommended accessories (please order separately)

Description	Ordering code
Mounting clamp	BAM00TN



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connectors (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Standard Sensors

BOS 30M

Sensing distance 2 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

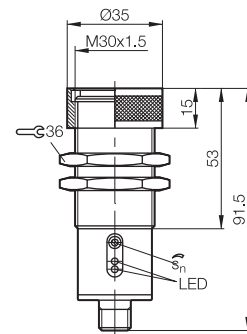
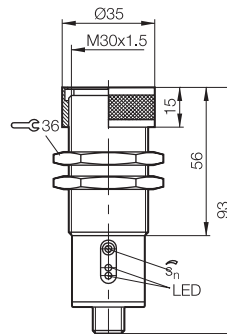
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type			Diffuse sensor	Diffuse sensor
Detection range			200...2000 mm	200...2000 mm
PNP	Daylight filter	Ordering code		BOS008T
		Part number		BOS 30M-PU-1PH-SA3-C
PNP/NPN	Daylight filter	Ordering code	BOS0134	
		Part number	BOS 30M-GA-1PH-S4-C	
Supply voltage U_B			10...30 V DC	10...30 V DC
Output current			200 mA	200 mA
No-load supply current I_0 max.			≤ 50 mA	≤ 40 mA
Switching type			Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Potentiometer, 18-turn	Potentiometer, 18-turn
Emitter, light type			LED, infrared	LED, infrared
Wavelength			880 nm	880 nm
Power-on indicator			Green LED	Green LED
Output function indicator			Yellow LED	Yellow LED
Stability indicator			Red LED	Red LED
Response time			33 ms	5 ms
Switching frequency f			15 Hz	100 Hz
Degree of protection as per IEC 60529			IP 65	IP 65
Ambient temperature T_a			-20...+60 °C	-20...+60 °C
Material	Housing		Nickel-plated CuZn	Nickel-plated CuZn
	Optical surface		Glass	Glass
Connection			M12 connector, 4-pin	M12 connector, 4-pin

Ordering codes on page 137.

Diffuse sensor values referenced to 90% reflective Kodak gray card, 400×400 mm.



Diffuse sensor, reflection and through-beam sensor are now also available in the block-shaped housing with 8 mm edge length. They provide the small sensors solutions in highly dynamic applications such as robot arms. That is precisely where components that have very low-weight and small dimensions while retaining high switching precision are in demand.

Reliably detect the smallest parts

Balluff through-beam sensors BOS Q08M are innovative, compact products that reach a high performance level. Nothing else produces comparable results under similar conditions. These sensors are therefore particularly recommended if there is little space available. A focused light beam is able to detect even the smallest of parts, grooves or holes reliably. In this way, they check things like heights very reliably. And in cramped systems, the high-performance, compact units are also characterized by the fact that their fine laser beam (PinPoint laser/red light) can be aligned very precisely in the middle of closely set parts to ensure reliable detection.

- Small design for small spaces
- Rugged metal housing
- Reliable detection of small parts up to 0.4 mm (PinPoint red light) or 0.28 mm (laser)
- Uses a patented mounting concept for Bosch profiles that allows quick, precise positioning



Type		Sensing distance/ Range	Light type			Output		Switching type		Switching frequency	U _s	Connection			Special features		Page
			Red light	Red light pin point	Laser	PNP	NPN	Light switching	Dark switching		10...30 V DC	M8 connector, 3-pin	Pigtail M8 plug, 3-pin	Cable, 2 m	Polarizing filter		
Diffuse sensor with background suppression																	
BOS0163	BOS Q08M-PS-KF20-00,2-S49	5...50 mm		■		■		■		400 Hz	■		■				142
BOS0169	BOS Q08M-NS-KF20-00,2-S49	5...50 mm		■			■	■		400 Hz	■		■				142
BOS0168	BOS Q08M-PO-KF20-00,2-S49	5...50 mm		■		■			■	400 Hz	■		■				142
BOS0162	BOS Q08M-NO-KF20-00,2-S49	5...50 mm		■			■		■	400 Hz	■		■				142
BOS0160	BOS Q08M-PS-KF20-S49	5...50 mm		■		■		■		400 Hz	■	■					142
BOS016C	BOS Q08M-NS-KF20-S49	5...50 mm		■			■	■		400 Hz	■	■					142
BOS0164	BOS Q08M-PO-KF20-S49	5...50 mm		■		■			■	400 Hz	■	■					142
BOS0167	BOS Q08M-NO-KF20-S49	5...50 mm		■			■		■	400 Hz	■	■					142
BOS0161	BOS Q08M-PS-KF20-02	5...50 mm		■		■		■		400 Hz	■				■		143
BOS016A	BOS Q08M-NS-KF20-02	5...50 mm		■			■	■		400 Hz	■				■		143
BOS0165	BOS Q08M-PO-KF20-02	5...50 mm		■		■			■	400 Hz	■				■		143
BOS0166	BOS Q08M-NO-KF20-02	5...50 mm		■			■		■	400 Hz	■				■		143
Diffuse sensor																	
BOS0041	BOS Q08M-PS-RD11-S49	0...55 mm	■			■		■		500 Hz	■	■					143
BOS003W	BOS Q08M-NS-RD11-S49	0...55 mm	■				■	■		500 Hz	■	■					143
BOS003Z	BOS Q08M-PO-RD11-S49	0...55 mm	■			■			■	500 Hz	■	■					143
BOS003T	BOS Q08M-NO-RD11-S49	0...55 mm	■				■		■	500 Hz	■	■					143
BOS0040	BOS Q08M-PS-RD11-02	0...55 mm	■			■		■		500 Hz	■				■		143
BOS003U	BOS Q08M-NS-RD11-02	0...55 mm	■				■	■		500 Hz	■				■		143
BOS003Y	BOS Q08M-PO-RD11-02	0...55 mm	■			■			■	500 Hz	■				■		143
BOS003R	BOS Q08M-NO-RD11-02	0...55 mm	■				■		■	500 Hz	■				■		143



Photoelectric Standard Sensors

BOS Q08M

Product overview



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Sensing distance/ Range	Light type			Output		Switching type		Switching frequency	U _s	Connection			Special features		Page
			Red light	Red light pin point	Laser	PNP	NPN	Light switching	Dark switching			10...30 V DC	M8 connector, 3-pin	Pigtail M8 plug, 3-pin	Cable, 2 m	Polarizing filter	
 Retroreflective sensor																	
BOS00U6	BOS Q08M-PS-PR11-S49	25...550 mm	■			■			■	500 Hz	■	■			■		144
BOS0150	BOS Q08M-NS-PR11-S49	25...550 mm	■				■		■	500 Hz	■	■			■		144
BOS00U4	BOS Q08M-PO-PR11-S49	25...550 mm	■			■		■		500 Hz	■	■			■		144
BOS00U1	BOS Q08M-NO-PR11-S49	25...550 mm	■				■	■		500 Hz	■	■			■		144
BOS00U5	BOS Q08M-PS-PR11-02	25...550 mm	■			■			■	500 Hz	■				■	■	144
BOS00U2	BOS Q08M-NS-PR11-02	25...550 mm	■				■		■	500 Hz	■				■	■	144
BOS00U3	BOS Q08M-PO-PR11-02	25...550 mm	■			■		■		500 Hz	■				■	■	144
BOS00U0	BOS Q08M-NO-PR11-02	25...550 mm	■				■	■		500 Hz	■				■	■	144
 Through-beam sensor																	
Receiver																	
BOS00YC	BOS Q08M-PS-KE20-00,2-S49	0...2.2 m		■		■			■	400 Hz	■			■			145
BOS00Y5	BOS Q08M-NS-KE20-00,2-S49	0...2.2 m		■			■		■	400 Hz	■			■			145
BOS00Y8	BOS Q08M-PO-KE20-00,2-S49	0...2.2 m		■		■		■		400 Hz	■			■			145
BOS00Y4	BOS Q08M-NO-KE20-00,2-S49	0...2.2 m		■			■	■		400 Hz	■			■			145
BOS00YF	BOS Q08M-PS-KE20-S49	0...2.2 m		■		■			■	400 Hz	■		■				145
BOS00Y7	BOS Q08M-NS-KE20-S49	0...2.2 m		■			■		■	400 Hz	■		■				145
BOS00YA	BOS Q08M-PO-KE20-S49	0...2.2 m		■		■		■		400 Hz	■		■				145
BOS00Y3	BOS Q08M-NO-KE20-S49	0...2.2 m		■			■	■		400 Hz	■		■				145
BOS00YE	BOS Q08M-PS-KE20-02	0...2.2 m		■		■			■	400 Hz	■				■		145
BOS00Y6	BOS Q08M-NS-KE20-02	0...2.2 m		■			■		■	400 Hz	■				■		145
BOS00Y9	BOS Q08M-PO-KE20-02	0...2.2 m		■		■		■		400 Hz	■				■		145
BOS00Y2	BOS Q08M-NO-KE20-02	0...2.2 m		■			■	■		400 Hz	■				■		145
BOS0197	BOS Q08M-PS-LE20-00,2-S49	0...3 m			■	■			■	400 Hz	■			■			146
BOS0191	BOS Q08M-NS-LE20-00,2-S49	0...3 m			■		■		■	400 Hz	■			■			146
BOS0194	BOS Q08M-PO-LE20-00,2-S49	0...3 m			■	■		■		400 Hz	■			■			146
BOS0184	BOS Q08M-NO-LE20-00,2-S49	0...3 m			■		■	■		400 Hz	■			■			146
BOS0199	BOS Q08M-PS-LE20-S49	0...3 m			■	■			■	400 Hz	■		■				146
BOS0193	BOS Q08M-NS-LE20-S49	0...3 m			■		■		■	400 Hz	■		■				146
BOS0196	BOS Q08M-PO-LE20-S49	0...3 m			■	■		■		400 Hz	■		■				146
BOS0190	BOS Q08M-NO-LE20-S49	0...3 m			■		■	■		400 Hz	■		■				146
BOS0198	BOS Q08M-PS-LE20-02	0...3 m			■	■			■	400 Hz	■				■		147
BOS0192	BOS Q08M-NS-LE20-02	0...3 m			■		■		■	400 Hz	■				■		147
BOS0195	BOS Q08M-PO-LE20-02	0...3 m			■	■		■		400 Hz	■				■		147
BOS0182	BOS Q08M-NO-LE20-02	0...3 m			■		■	■		400 Hz	■				■		147
 Through-beam sensor																	
Emitter																	
BOS00YH	BOS Q08M-X-KS20-00,2-S49	0...2.2 m		■							■			■			145
BOS00YK	BOS Q08M-X-KS20-S49	0...2.2 m		■							■		■				145
BOS00YJ	BOS Q08M-X-KS20-02	0...2.2 m		■							■				■		145
BOS019M	BOS Q08M-X-LS20-00,2-S49	0...3 m			■						■			■			146
BOS018K	BOS Q08M-X-LS20-S49	0...3 m			■						■		■				146
BOS018M	BOS Q08M-X-LS20-02	0...3 m			■						■				■		147

Photoelectric Standard Sensors

BOS Q08M

Sensing distance 50 mm

mini.s BOS Q08M

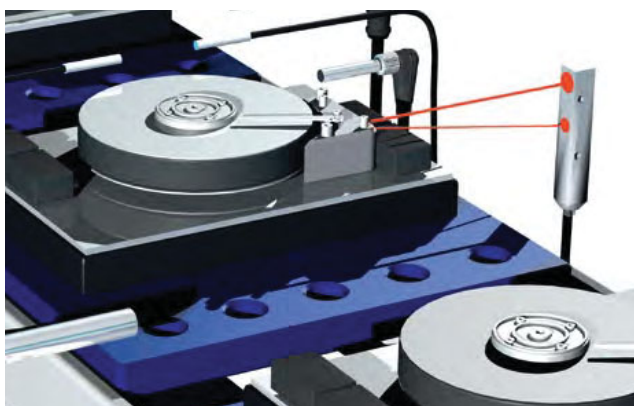
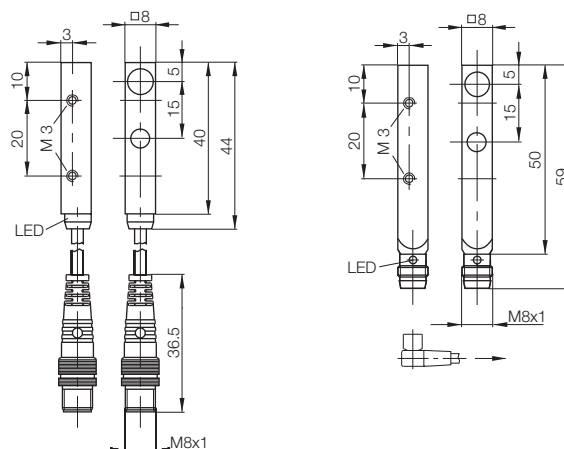


Type		Diffuse sensor with background suppression	Diffuse sensor with background suppression
Detection range		5...50 mm	5...50 mm
PNP NO	Part number	BOS Q08M-PS-KF20-00,2-S49 ②	BOS Q08M-PS-KF20-S49 ②
NPN NO	Part number	BOS Q08M-NS-KF20-00,2-S49 ⑥	BOS Q08M-NS-KF20-S49 ⑥
PNP NC	Part number	BOS Q08M-PO-KF20-00,2-S49 ④	BOS Q08M-PO-KF20-S49
NPN NC	Part number	BOS Q08M-NO-KF20-00,2-S49 ⑧	BOS Q08M-NO-KF20-S49 ⑧
Supply voltage U_B		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 or dark switching	Light or dark switching
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Fixed	Fixed
Emitter, light type		Pin point-LED, red light	Pin point-LED, red light
Wavelength		655 nm	655 nm
Received light indicator		Yellow LED	Yellow LED
Response time		1.25 ms	1.25 ms
Switching frequency f		400 Hz	400 Hz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Permissible ambient light per		EN 60947-5-2	EN 60947-5-2
Material	Housing	Nickel-plated GD-Zn	Nickel-plated GD-Zn
	Optical surface	PMMA, PC	PMMA, PC
Connection		Pigtail 20 cm, M8 plug, 3-pin	M8 connector, 3-pin

Diffuse values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 146.

Ordering codes on page 140.



Photoelectric Standard Sensors

BOS Q08M

Sensing distance 50 mm, 55 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

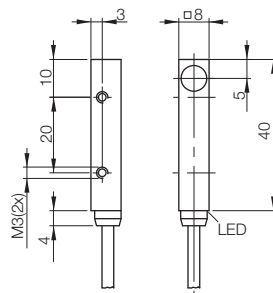
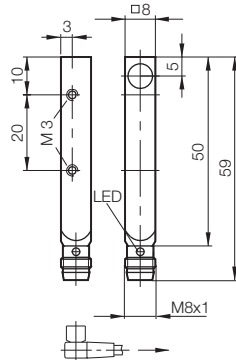
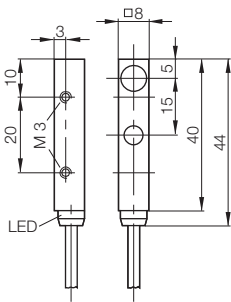
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor with background suppression 5...50 mm	Diffuse sensor 0...55 mm	Diffuse sensor 0...55 mm	
BOS Q08M-PS-KF20-02 ①	BOS Q08M-PS-RD11-S49 ②	BOS Q08M-PS-RD11-02 ①	
BOS Q08M-NS-KF20-02 ⑤	BOS Q08M-NS-RD11-S49 ⑥	BOS Q08M-NS-RD11-02 ⑤	
BOS Q08M-PO-KF20-02 ③	BOS Q08M-PO-RD11-S49 ④	BOS Q08M-PO-RD11-02 ③	
BOS Q08M-NO-KF20-02 ⑦	BOS Q08M-NO-RD11-S49 ⑧	BOS Q08M-NO-RD11-02 ⑦	
10...30 V DC	10...30 V DC	10...30 V DC	
100 mA	100 mA	100 mA	
≤ 15 mA	≤ 15 mA	≤ 15 mA	
Light or dark switching	Light or dark switching	Light or dark switching	
Yes/Yes	Yes/Yes	Yes/Yes	
Fixed	Fixed	Fixed	
Pin point-LED, red light	LED, red light	LED, red light	
655 nm	640 nm	640 nm	
Yellow LED	Yellow LED	Yellow LED	
1.25 ms	1.25 ms	1.25 ms	
400 Hz	400 Hz	400 Hz	
IP 67	IP 67	IP 67	
-10...+60 °C	-10...+60 °C	-10...+60 °C	
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn	
PMMA, PC	PMMA	PMMA	
2 m PUR cable, 26 AWG	M8 connector, 3-pin	2 m PUR cable, 26 AWG	



Photoelectric Standard Sensors

BOS Q08M

Range 550 mm

mini.s BOS Q08M

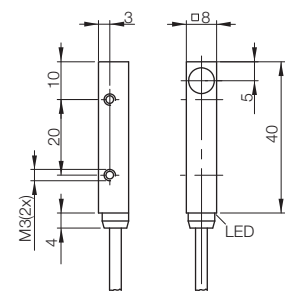
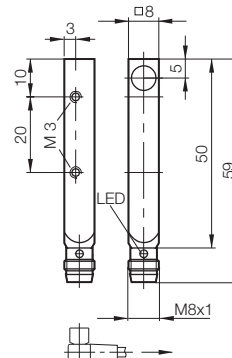


Type			Retroreflective sensor		Retroreflective sensor	
Detection range			25...550 mm		25...550 mm	
PNP NO	Polarizing filter	Part number	BOS Q08M-PS-PR11-S49	②	BOS Q08M-PS-PR11-02	①
NPN NO		Part number	BOS Q08M-NS-PR11-S49	⑥	BOS Q08M-NS-PR11-02	⑤
PNP NC	Polarizing filter	Part number	BOS Q08M-PO-PR11-S49	④	BOS Q08M-PO-PR11-02	③
NPN NC		Part number	BOS Q08M-NO-PR11-S49	⑧	BOS Q08M-NO-PR11-02	⑦
PNP NO	Receiver	Part number				
NPN NO		Part number				
PNP NC	Receiver	Part number				
NPN NC		Part number				
	Emitter	Part number				
		Part number				
Supply voltage U_B			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	
Switching type			Light or dark switching		Light or dark switching	
Polarity reversal/short-circuit protected			Yes/Yes		Yes/Yes	
Settings			Fixed		Fixed	
Emitter, light type			LED, red light		LED, red light	
Wavelength			640 nm		640 nm	
Smallest detectable part						
Received light indicator			Yellow LED		Yellow LED	
Response time			1.25 ms		1.25 ms	
Switching frequency f			400 Hz		400 Hz	
Degree of protection as per IEC 60529			IP 67		IP 67	
Ambient temperature T_a			-10...+60 °C		-10...+60 °C	
Permissible ambient light per			EN 60947-5-2		EN 60947-5-2	
Material	Housing		Nickel-plated GD-Zn		Nickel-plated GD-Zn	
	Optical surface		PMMA		PMMA	
Connection			M8 connector, 3-pin		2 m PUR cable, 26 AWG	

Retroreflective sensor values referenced to R9 reflector.

Wiring diagrams on page 146.

Ordering codes on page 141.



Photoelectric Standard Sensors

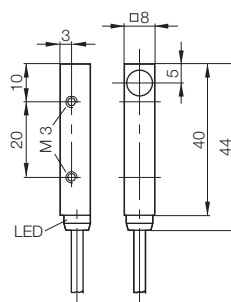
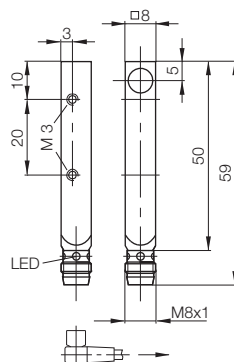
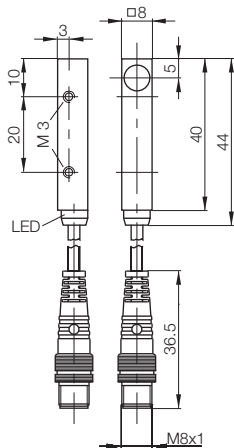
BOS Q08M Range 2.2 m



Photoelectric sensors



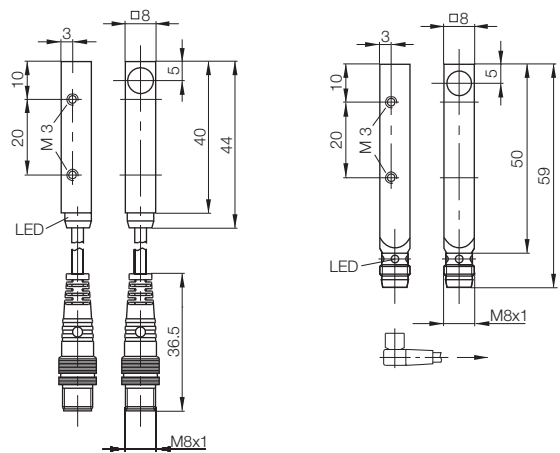
Through-beam sensor 0...2.2 m	Through-beam sensor 0...2.2 m	Through-beam sensor 0...2.2 m	
BOS Q08M-PS-KE20-00,2-S49 ②	BOS Q08M-PS-KE20-S49 ②	BOS Q08M-PS-KE20-02 ①	Photoelectric standard sensors
BOS Q08M-NS-KE20-00,2-S49 ⑥	BOS Q08M-NS-KE20-S49 ⑥	BOS Q08M-NS-KE20-02 ⑤	Cylinder designs
BOS Q08M-PO-KE20-00,2-S49 ④	BOS Q08M-PO-KE20-S49 ④	BOS Q08M-PO-KE20-02 ③	Block designs
BOS Q08M-NO-KE20-00,2-S49 ⑧	BOS Q08M-NO-KE20-S49 ⑧	BOS Q08M-NO-KE20-02 ⑦	Photoelectric special sensors
BOS Q08M-X-KS20-00,2-S49 ⑩	BOS Q08M-X-KS20-S49 ⑩	BOS Q08M-X-KS20-02 ⑨	Photoelectric distance sensors for analog distance measurement
10...30 V DC	10...30 V DC	10...30 V DC	Special accessories for photoelectric sensors
100 mA	100 mA	100 mA	
≤ 15 mA	≤ 15 mA	≤ 15 mA	
Light or dark switching	Light or dark switching	Light or dark switching	
Yes/Yes	Yes/Yes	Yes/Yes	
Fixed	Fixed	Fixed	
Pin point-LED, red light	Pin point-LED, red light	Pin point-LED, red light	
655 nm	655 nm	655 nm	
0.4 mm	0.4 mm	0.4 mm	
Yellow LED	Yellow LED	Yellow LED	
1.25 ms	1.25 ms	1.25 ms	
400 Hz	400 Hz	400 Hz	
IP 67	IP 67	IP 67	
-10...+60 °C	-10...+60 °C	-10...+60 °C	
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn	
PMMA	PMMA	PMMA	
Pigtail 20 cm, M8 plug, 3-pin	M8 connector, 3-pin	2 m PUR cable, 26 AWG	



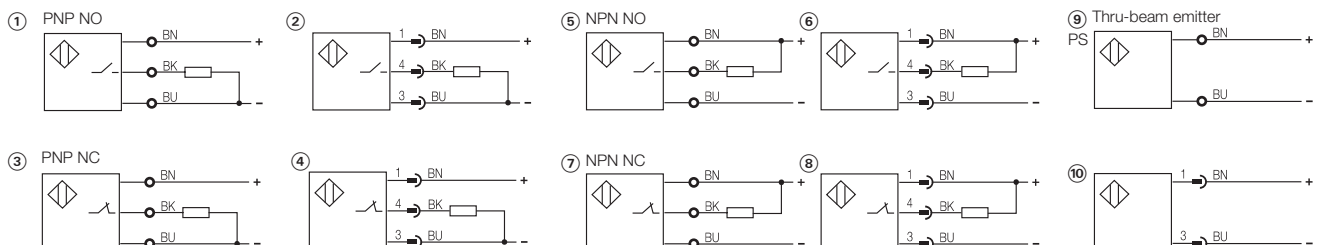


Type	Through-beam sensor		Through-beam sensor	
Detection range	0...3 m		0...3 m	
PNP NO	Receiver	Part number	BOS Q08M-PS-LE20-00,2-S49 ②	BOS Q08M-PS-LE20-S49 ②
NPN NO		Part number	BOS Q08M-NS-LE20-00,2-S49 ⑥	BOS Q08M-NS-LE20-S49 ⑥
PNP NC	Receiver	Part number	BOS Q08M-PO-LE20-00,2-S49 ④	BOS Q08M-PO-LE20-S49 ④
NPN NC		Part number	BOS Q08M-NO-LE20-00,2-S49 ⑧	BOS Q08M-NO-LE20-S49 ⑧
	Emitter	Part number	BOS Q08M-X-LS20-00,2-S49 ⑩	BOS Q08M-X-LS20-S49 ⑩
		Part number		
Supply voltage U_B	10...30 V DC		10...30 V DC	
Output current	100 mA (receiver)		100 mA (receiver)	
No-load supply current I_0 max.	≤ 15 mA		≤ 15 mA	
Switching type	Light or dark switching		Light or dark switching	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Fixed		Fixed	
Emitter, light type	Laser, red light		Laser, red light	
Wavelength	650 nm		650 nm	
Laser class	1		1	
Smallest detectable part	0.28 mm		0.28 mm	
Received light indicator	Yellow LED		Yellow LED	
Response time	1.25 ms		1.25 ms	
Switching frequency f	400 Hz		400 Hz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	0...+50 °C		0...+50 °C	
Permissible ambient light per	EN 60947-5-2		EN 60947-5-2	
Material	Housing	Nickel-plated GD-Zn	Housing	Nickel-plated GD-Zn
	Optical surface	PMMA	Optical surface	PMMA
Connection	Pigtail 20 cm, M8 plug, 3-pin		M8 connector, 3-pin	

Ordering codes on page 141.



Wiring diagrams





Photoelectric Standard Sensors

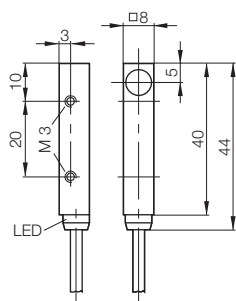
BOS Q08M Laser

Range 3 m



Photoelectric sensors

	Through-beam sensor					Photoelectric standard sensors
	0...3 m					
	BOS Q08M-PS-LE20-02	①				
	BOS Q08M-NS-LE20-02	⑤				
	BOS Q08M-PO-LE20-02	③				
	BOS Q08M-NO-LE20-02	⑦				
	BOS Q08M-X-LS20-02	⑨				Block designs
	10...30 V DC					Photoelectric special sensors
	100 mA (receiver)					
	≤ 15 mA					Photoelectric distance sensors for analog distance measurement
	Light or dark switching					
	Yes/Yes					
	Fixed					
	Laser, red light					Special accessories for photoelectric sensors
	650 nm					
	1					
	0.28 mm					
	Yellow LED					
	1.25 ms					
	400 Hz					
	IP 67					
	0...+50 °C					
	EN 60947-5-2					
	Nickel-plated GD-Zn					
	PMMA					
	2 m PUR cable, 26 AWG					



Clamp holder
For Bosch profile: **BES Q08-KH-3**



Recommended accessories

(please order separately)

Description	Ordering code
Reflector	BAM00WL



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.

Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

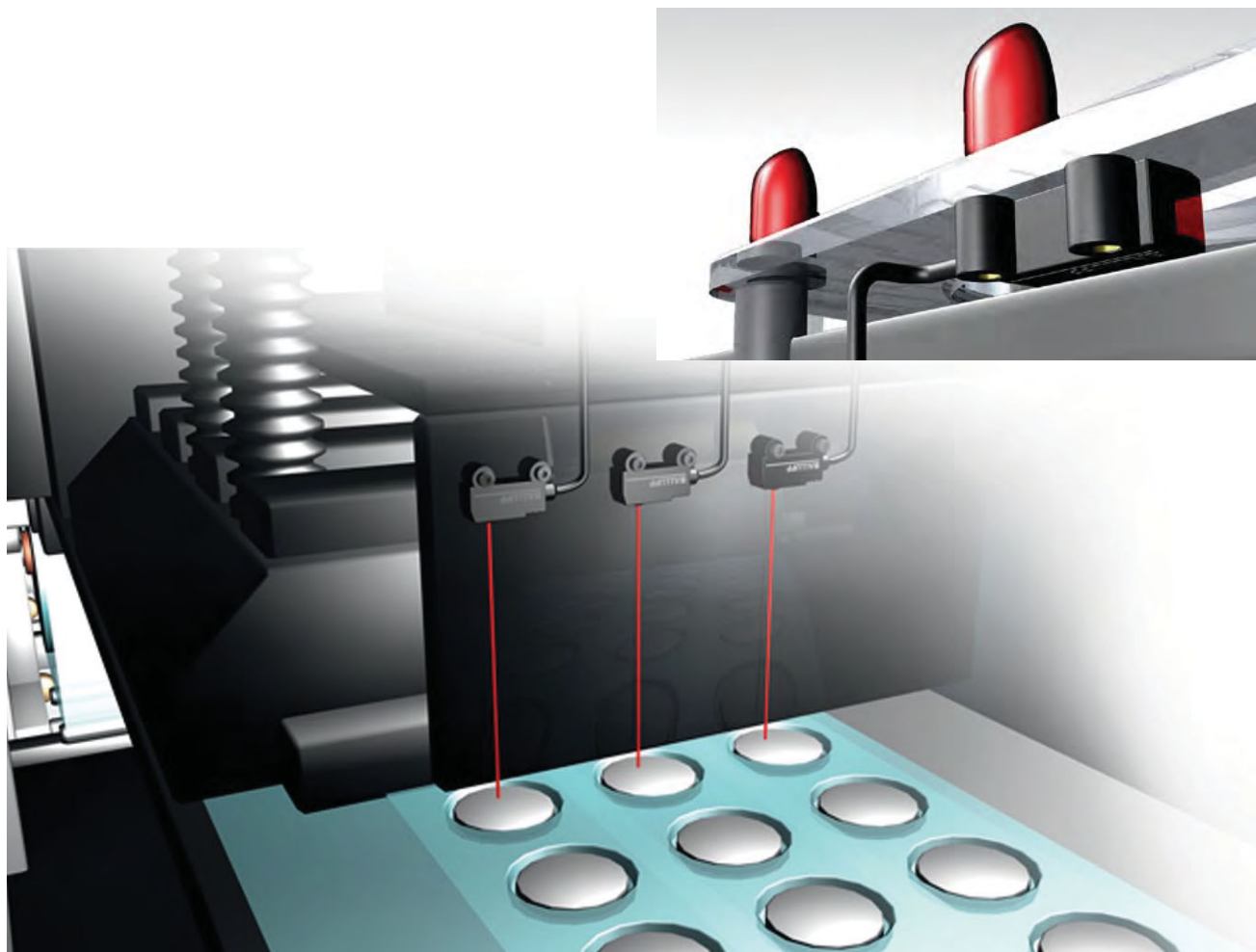
More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Requirements such as extremely tight mounting spaces under the most difficult of conditions are easily handled by the sub-mini **BOS 2K** series.

The electronic circuitry is housed in a plastic enclosure just 20.6×12.5×7.6 mm. Metal sleeves in the housing ensure secure and simple mounting.

The laser-like, visible light spot makes precise small-parts detection possible. Unmatched ranges up to 1.2 m and fast response times ensure compatibility with dynamic applications.

The BOS 2K series is a complete series with diffuse sensors, retroreflective sensors and through-beam sensor as well as diffuse sensors with background suppression. That means this series offers the complete functionality demanded of a modern sensor series.





Photoelectric Standard Sensors

BOS 2K

Product overview



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _S	Connection			Special features		Page
			Red light		PNP	NPN	Light switching	Dark switching		10...30 V DC	M8 connector, 3-pin	M8 connector, 4-pin	Cable	Polarizing filter		
 Diffuse sensor with background suppression																
BOS0104	BOS 2K-PS-RH10-00,2-S75	1...15 mm	■		■		■		800 Hz	■		■				150
BOS0103	BOS 2K-PS-RH10-00,2-S49	1...15 mm	■		■		■		800 Hz	■	■					150
BOS00ZN	BOS 2K-PO-RH10-00,2-S49	1...15 mm	■		■			■	800 Hz	■	■					150
BOS0105	BOS 2K-PS-RH10-02	1...15 mm	■		■		■		800 Hz	■			■			151
BOS00ZH	BOS 2K-NS-RH10-02	1...15 mm	■			■	■		800 Hz	■			■			151
BOS00ZA	BOS 2K-NO-RH10-02	1...15 mm	■			■		■	800 Hz	■			■			151
BOS0107	BOS 2K-PS-RH11-00,2-S75	1...30 mm	■		■		■		800 Hz	■		■				151
BOS0106	BOS 2K-PS-RH11-00,2-S49	1...30 mm	■		■		■		800 Hz	■	■					151
BOS0108	BOS 2K-PS-RH11-02	1...30 mm	■		■		■		800 Hz	■			■			151
BOS00ZJ	BOS 2K-NS-RH11-02	1...30 mm	■			■	■		800 Hz	■			■			151
BOS00ZP	BOS 2K-PO-RH11-02	1...30 mm	■		■			■	800 Hz	■			■			151
 Diffuse sensor																
BOS00ZY	BOS 2K-PS-RD10-00,2-S75	1...55 mm	■		■		■		800 Hz	■		■				152
BOS00ZW	BOS 2K-PS-RD10-00,2-S49	1...55 mm	■		■		■		800 Hz	■	■					152
BOS00ZZ	BOS 2K-PS-RD10-02	1...55 mm	■		■		■		800 Hz	■			■			153
BOS00ZE	BOS 2K-NS-RD10-02	1...55 mm	■			■	■		800 Hz	■			■			153
 Retroreflective sensor																
BOS00ZT	BOS 2K-PS-PR10-00,2-S75	45...800 mm	■		■			■	800 Hz	■		■		■		153
BOS00ZR	BOS 2K-PS-PR10-00,2-S49	45...800 mm	■		■			■	800 Hz	■	■			■		153
BOS00ZK	BOS 2K-PO-PR10-00,2-S49	45...800 mm	■		■		■		800 Hz	■	■			■		153
BOS00ZU	BOS 2K-PS-PR10-02	45...800 mm	■		■			■	800 Hz	■			■	■		153
BOS00ZC	BOS 2K-NS-PR10-02	45...800 mm	■			■		■	800 Hz	■			■	■		153
BOS00ZL	BOS 2K-PO-PR10-02	45...800 mm	■		■		■		800 Hz	■			■	■		153
BOS00Z9	BOS 2K-NO-PR10-02	45...800 mm	■			■	■		800 Hz	■			■	■		153
 Through-beam sensor Receiver																
BOS0101	BOS 2K-PS-RE10-00,2-S75	0...1.2 m	■		■			■	200 Hz	■		■				154
BOS0100	BOS 2K-PS-RE10-00,2-S49	0...1.2 m	■		■			■	200 Hz	■	■					154
BOS0102	BOS 2K-PS-RE10-02	0...1.2 m	■		■			■	200 Hz	■			■			155
BOS00ZF	BOS 2K-NS-RE10-02	0...1.2 m	■			■		■	200 Hz	■			■			155
BOS00ZM	BOS 2K-PO-RE10-02	0...1.2 m	■		■		■		200 Hz	■			■			155
 Through-beam sensor Emitter																
BOS010A	BOS 2K-X-RS10-00,2-S75	0...1.2 m	■							■		■				155
BOS0109	BOS 2K-X-RS10-00,2-S49	0...1.2 m	■							■	■					155
BOS010C	BOS 2K-X-RS10-02	0...1.2 m	■							■			■			155

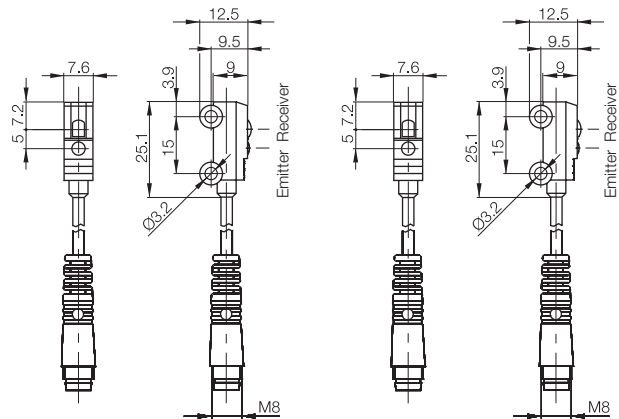


Type		Diffuse sensor with background suppression	Diffuse sensor with background suppression
Detection range		1...15 mm	1...15 mm
PNP NO	Part number	BOS 2K-PS-RH10-00,2-S75 ③	BOS 2K-PS-RH10-00,2-S49 ②
NPN NO	Part number		
PNP NC	Part number		BOS 2K-PO-RH10-00,2-S49 ④
NPN NC	Part number		
Supply voltage U_B		10...30 V DC	10...30 V DC
Output current		50 mA	50 mA
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA
Switching type		Light switching	Light or dark switching
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Fixed	Fixed
Emitter, light type		Pin point-LED, red light	Pin point-LED, red light
Wavelength		640 nm	640 nm
Light spot diameter		approx. 1.2 mm at 8 mm approx. 2.5 mm at 15 mm	approx. 1.2 mm at 8 mm approx. 2.5 mm at 15 mm
Output function indicator		Red LED	Red LED
Response time		0.6 ms	0.6 ms
Switching frequency f		800 Hz	800 Hz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-20...+50 °C	-20...+50 °C
Permissible ambient light per		EN 60947-5-2	EN 60947-5-2
Material	Housing	ABS	ABS
	Optical surface	PMMA	PMMA
Connection		Pigtail 20 cm, M8 plug, 4-pin	Pigtail 20 cm, M8 plug, 3-pin

Diffuse values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 157.

Ordering codes on page 149.



Photoelectric Standard Sensors

BOS 2K

Sensing distance 15 mm, 30 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

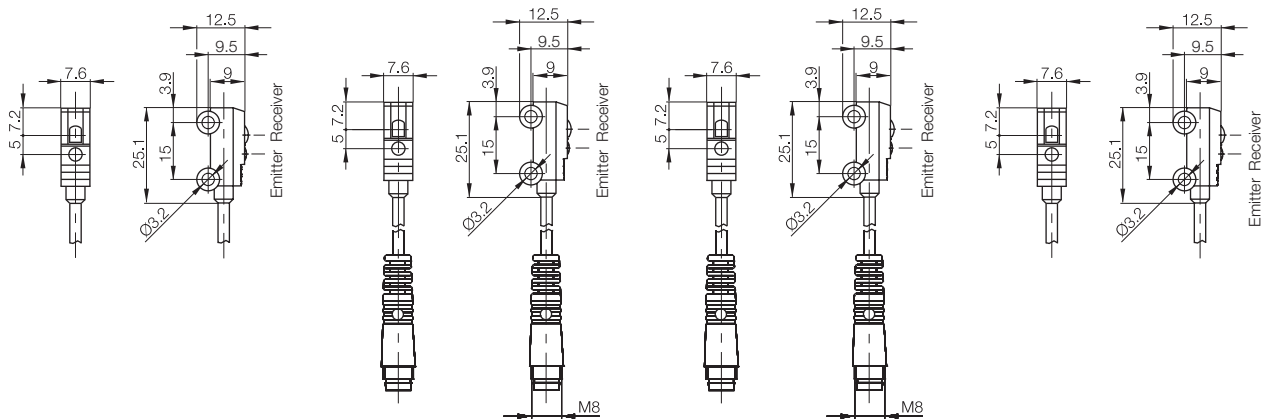
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor with background suppression	Diffuse sensor with background suppression	Diffuse sensor with background suppression	Diffuse sensor with background suppression
1...15 mm	1...30 mm	1...30 mm	1...30 mm
BOS 2K-PS-RH10-02 ①	BOS 2K-PS-RH11-00,2-S75 ③	BOS 2K-PS-RH11-00,2-S49 ②	BOS 2K-PS-RH11-02 ①
BOS 2K-NS-RH10-02 ⑤			BOS 2K-NS-RH11-02 ⑤
BOS 2K-NO-RH10-02 ⑥			BOS 2K-PO-RH11-02 ④
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
50 mA	50 mA	50 mA	50 mA
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
Light switching	Light switching	Light switching	Light or dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Fixed	Fixed	Fixed	Fixed
Pin point-LED, red light	Pin point-LED, red light	Pin point-LED, red light	Pin point-LED, red light
640 nm	640 nm	640 nm	640 nm
approx. 1.2 mm at 8 mm	approx. 1.0 mm at 15 mm	approx. 1.0 mm at 15 mm	approx. 1.0 mm at 15 mm
approx. 2.5 mm at 15 mm	approx. 4.5 mm at 30 mm	approx. 4.5 mm at 30 mm	approx. 4.5 mm at 30 mm
Red LED	Red LED	Red LED	Red LED
0.6 ms	0.6 ms	0.6 ms	0.6 ms
800 Hz	800 Hz	800 Hz	800 Hz
IP 67	IP 67	IP 67	IP 67
-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
ABS	ABS	ABS	ABS
PMMA	PMMA	PMMA	PMMA
2 m PVC cable, 28 AWG	Pigtail 20 cm, M8 plug, 4-pin	Pigtail 20 cm, M8 plug, 3-pin	2 m PVC cable, 28 AWG



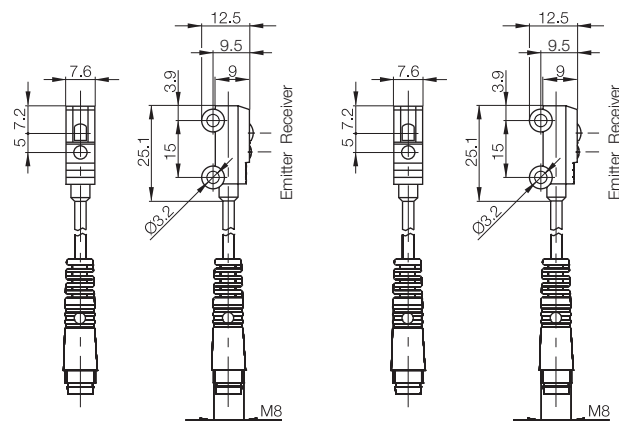


Type		Diffuse sensor		Diffuse sensor	
Detection range		1...55 mm		1...55 mm	
PNP NO	Part number	BOS 2K-PS-RD10-00,2-S75 ③		BOS 2K-PS-RD10-00,2-S49 ②	
NPN NO	Part number				
PNP NO	Polarizing filter	Part number			
NPN NO	Polarizing filter	Part number			
PNP NC	Polarizing filter	Part number			
NPN NC	Polarizing filter	Part number			
Supply voltage U_B		10...30 V DC		10...30 V DC	
Output current		50 mA		50 mA	
No-load supply current I_0 max.		≤ 20 mA		≤ 20 mA	
Switching type		Light switching		Light switching	
Polarity reversal/short-circuit protected		Yes/Yes		Yes/Yes	
Settings		Fixed		Fixed	
Emitter, light type		Pin point-LED, red light		Pin point-LED, red light	
Wavelength		660 nm		660 nm	
Light spot diameter		approx. 3.5 mm at 50 mm		approx. 3.5 mm at 50 mm	
Output function indicator		Red LED		Red LED	
Response time		0.6 ms		0.6 ms	
Switching frequency f		800 Hz		800 Hz	
Degree of protection as per IEC 60529		IP 67		IP 67	
Ambient temperature T_a		-20...+50 °C		-20...+50 °C	
Permissible ambient light per		EN 60947-5-2		EN 60947-5-2	
Material	Housing	ABS		ABS	
	Optical surface	PMMA		PMMA	
Connection		Pigtail 20 cm, M8 plug, 4-pin		Pigtail 20 cm, M8 plug, 3-pin	

Diffuse values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R9 reflector.

Wiring diagrams on page 157.

Ordering codes on page 149.



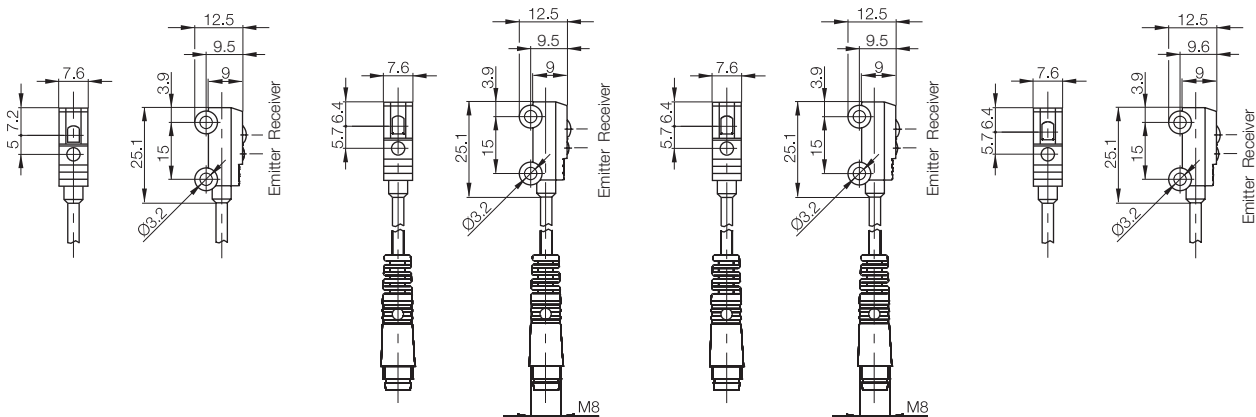
Sensing distance 55 mm, range 800 mm



Photoelectric sensors



	Diffuse sensor 1...55 mm	Retroreflective sensor 45...800 mm	Retroreflective sensor 45...800 mm	Retroreflective sensor 45...800 mm	Photoelectric standard sensors Cylinder designs Block designs
	BOS 2K-PS-RD10-02 ①				
	BOS 2K-NS-RD10-02 ⑤				
		BOS 2K-PS-PR10-00,2-S75 ③	BOS 2K-PS-PR10-00,2-S49 ②	BOS 2K-PS-PR10-02 ①	Block designs
				BOS 2K-NS-PR10-02 ⑤	
			BOS 2K-PO-PR10-00,2-S49 ④	BOS 2K-PO-PR10-02 ④	
				BOS 2K-NO-PR10-02 ⑥	Photoelectric special sensors
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
	50 mA	50 mA	50 mA	50 mA	
	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	Photoelectric distance sensors for analog distance measurement
	Light switching	Dark switching	Light or dark switching	Light or dark switching	
	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	
	Fixed	Fixed	Fixed	Fixed	
	Pin point-LED, red light	Pin point-LED, red light	Pin point-LED, red light	Pin point-LED, red light	Special accessories for photoelectric sensors
	660 nm	660 nm	660 nm	660 nm	
	approx. 3.5 mm at 50 mm	approx. 10 mm at 100 mm	approx. 10 mm at 100 mm	approx. 10 mm at 100 mm	
	Red LED	Red LED	Red LED	Red LED	
	0.6 ms	0.6 ms	0.6 ms	0.6 ms	
	800 Hz	800 Hz	800 Hz	800 Hz	
	IP 67	IP 67	IP 67	IP 67	
	-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C	
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
	ABS	ABS	ABS	ABS	
	PMMA	PMMA	PMMA	PMMA	
	2 m PVC cable, 28 AWG	Pigtail 20 cm, M8 plug, 4-pin	Pigtail 20 cm, M8 plug, 3-pin	2 m PVC cable, 28 AWG	

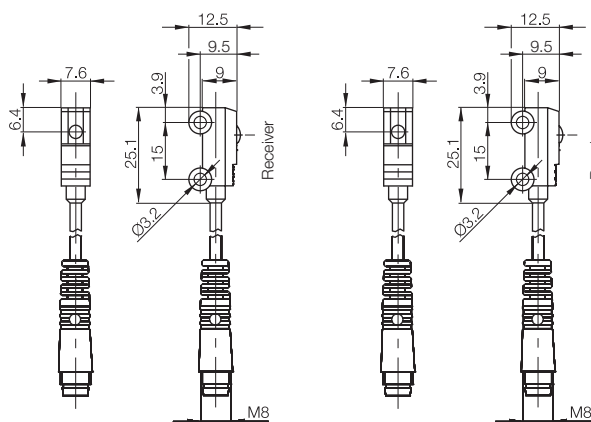




Type			Through-beam sensor	Through-beam sensor
Detection range			0...1.2 m	0...1.2 m
PNP NO	Receiver	Part number	BOS 2K-PS-RE10-00,2-S75 ③	BOS 2K-PS-RE10-00,2-S49 ①
NPN NO		Part number		
PNP NC	Receiver	Part number		
NPN NC		Part number		
	Emitter	Part number		
		Part number		
Supply voltage U_B			10...30 V DC	10...30 V DC
Output current			50 mA	50 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA
Switching type			Dark switching	Dark switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Fixed	Fixed
Emitter, light type				
Wavelength				
Output function indicator			Red LED	Red LED
Response time			2.5 ms	2.5 ms
Switching frequency f			200 Hz	200 Hz
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T_a			-20...+50 °C	-20...+50 °C
Permissible ambient light per			EN 60947-5-2	EN 60947-5-2
Material	Housing		ABS	ABS
	Optical surface		PMMA	PMMA
Connection			Pigtail 20 cm, M8 plug, 4-pin	Pigtail 20 cm, M8 plug, 3-pin

Wiring diagrams on page 157.

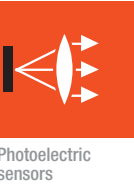
Ordering codes on page 149.



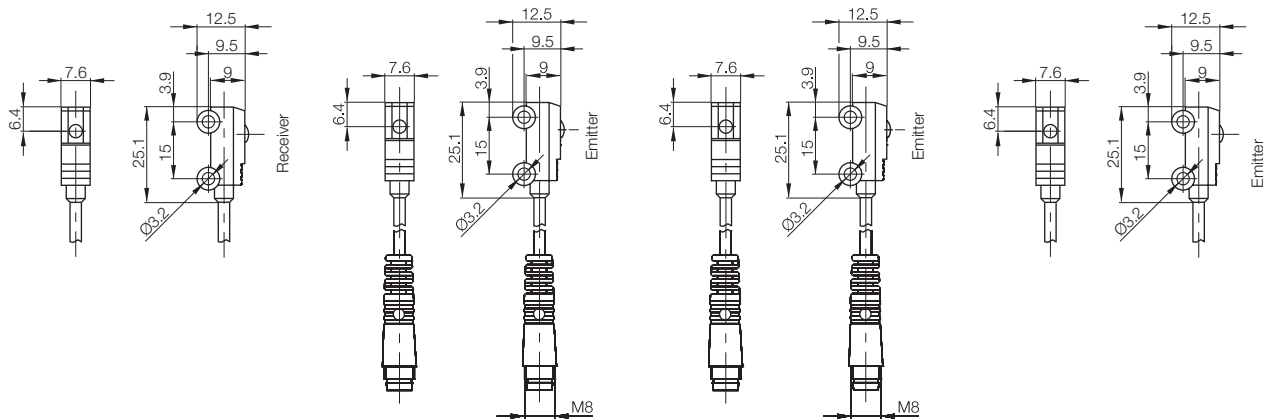
Photoelectric Standard Sensors

BOS 2K

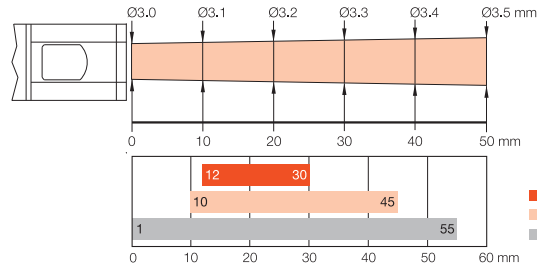
Range 1.2 m



Through-beam sensor 0...1.2 m	Through-beam sensor 0...1.2 m	Through-beam sensor 0...1.2 m	Through-beam sensor 0...1.2 m	Photoelectric standard sensors
BOS 2K-PS-RE10-02 ①				Cylinder designs
BOS 2K-NS-RE10-02 ⑥				Block designs
BOS 2K-PO-RE10-02 ⑦				
	BOS 2K-X-RS10-00,2-S75 ⑩	BOS 2K-X-RS10-00,2-S49 ⑨	BOS 2K-X-RS10-02 ⑧	Photoelectric special sensors
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
50 mA				
≤ 10 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	Photoelectric distance sensors for analog distance measurement
Light or dark switching				
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	
Fixed				
	Pin point-LED, red light 660 nm	Pin point-LED, red light 660 nm	Pin point-LED, red light 660 nm	Special accessories for photoelectric sensors
Red LED				
2.5 ms				
200 Hz				
IP 67	IP 67	IP 67	IP 67	
-20...+50 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C	
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
ABS	ABS	ABS	ABS	
PMMA	PMMA	PMMA	PMMA	
2 m PVC cable, 28 AWG	Pigtail 20 cm, M8 plug, 4-pin	Pigtail 20 cm, M8 plug, 3-pin	2 m PVC cable, 28 AWG	

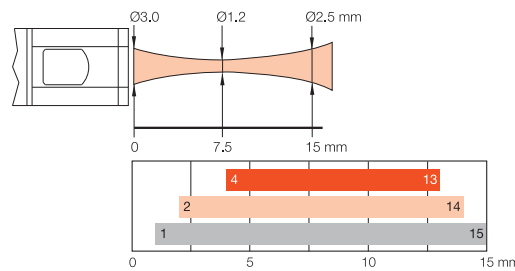


Light spot diameter
 Diffuse sensor, 50 mm



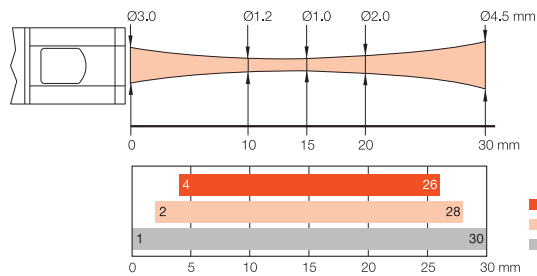
Diffuse sensor

Light spot diameter
 Diffuse sensor with background suppression, 15 mm



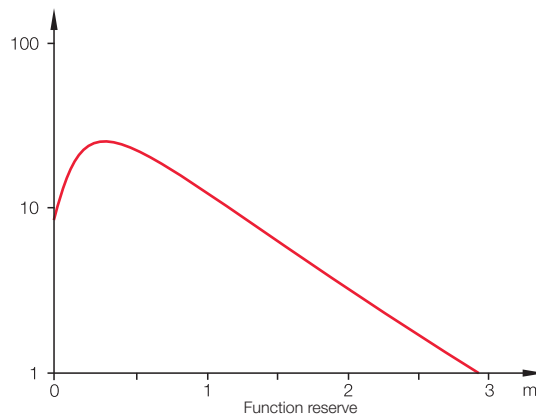
Diffuse sensor
 with background suppression
 15 mm

Light spot diameter
 Diffuse sensor with background suppression, 30 mm

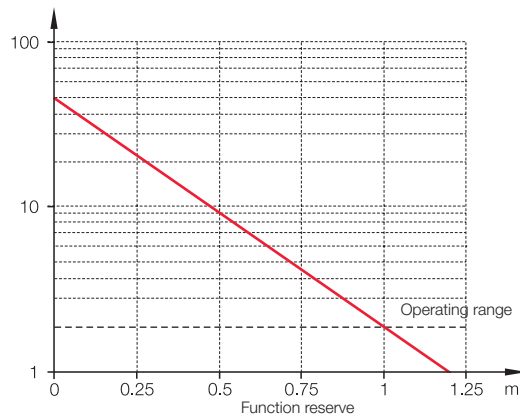


Diffuse sensor
 with background suppression
 30 mm

Retroreflective sensor



Through-beam sensor



Photoelectric Standard Sensors

BOS 2K

Connection, Accessories



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

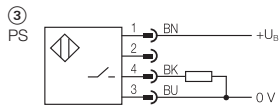
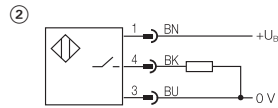
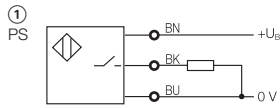
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

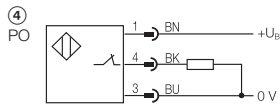
Wiring diagrams

Diffuse sensor

PNP light switching

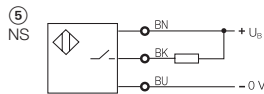


PNP dark switching

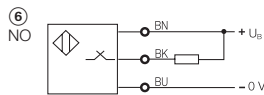


Diffuse & Background Suppression

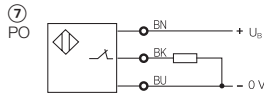
NPN light-on



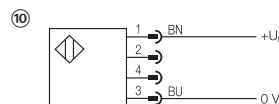
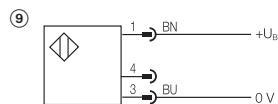
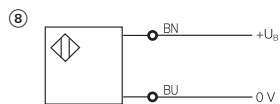
NPN dark-on



PNP dark-on



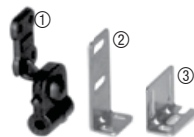
Through-beam emitter



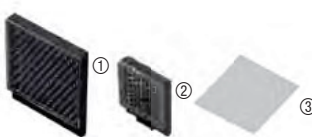
Recommended accessories

(please order separately)

Description	Ordering code
① Mounting bracket	BAM00T4
② Mounting bracket	BAM00T6
③ Mounting bracket	BAM00T5



Description	Ordering code
① Reflector	BAM00WL
② Reflector	BAM00W0
③ Reflective tape	BAM00W5



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connectors

(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC0532
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

The advantage of miniature sensors is clearly seen: small size – offers flexibility and construction freedom. Not only are they easier to install, many applications can be solved easily with a mini-sensor. Even the photoelectric BOS 5K series stands out due to its optical power and its compact design. This series includes various diffuse sensors with background suppression, energetic diffuse sensors, retroreflective models with polarizing filter and through-beam sensors. For electrical connection of the sensors, plugs with a cable or M8-plugs are available.

The new **BOS 5K** series features:

- a small, compact design
- Concentration on the most important basic functions
- Attractive price in the lower segment
- Wide-ranging accessories for increased functionality



Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _s	Connection			Special features		Page
			Red light	Infrared	PNP	NPN	Light switching	Dark switching		10...30V DC	M8 connector, 3-pin	M8 connector, 4-pin	Cable	Polarizing filter		
Ordering code																
Part number																
 Diffuse sensor with background suppression																
BOS012A	BOS 5K-PS-RH12-S75	40...200 mm	■		■		■		500 Hz	■		■				160
BOS011F	BOS 5K-NS-RH12-S75	40...200 mm	■			■	■		500 Hz	■		■				160
BOS011Z	BOS 5K-PO-RH12-S75	40...200 mm	■		■			■	500 Hz	■		■				160
BOS0112	BOS 5K-NO-RH12-S75	40...200 mm	■			■		■	500 Hz	■		■				160
BOS015U	BOS 5K-PS-RH12-S49	40...200 mm	■		■		■		500 Hz	■	■					160
BOS015Y	BOS 5K-NS-RH12-S49	40...200 mm	■			■	■		500 Hz	■	■					160
BOS015W	BOS 5K-PO-RH12-S49	40...200 mm	■		■			■	500 Hz	■	■					160
BOS015Z	BOS 5K-NO-RH12-S49	40...200 mm	■			■		■	500 Hz	■	■					160
BOS0129	BOS 5K-PS-RH12-02	40...200 mm	■		■		■		500 Hz	■			■			161
BOS011E	BOS 5K-NS-RH12-02	40...200 mm	■			■	■		500 Hz	■			■			161
BOS011Y	BOS 5K-PO-RH12-02	40...200 mm	■		■			■	500 Hz	■			■			161
BOS0111	BOS 5K-NO-RH12-02	40...200 mm	■			■		■	500 Hz	■			■			161
 Diffuse sensor																
BOS0124	BOS 5K-PS-ID10-S75	0...900 mm		■	■		■		500 Hz	■		■				161
BOS0117	BOS 5K-NS-ID10-S75	0...900 mm		■		■	■		500 Hz	■		■				161
BOS011L	BOS 5K-PO-ID10-S75	0...900 mm		■	■			■	500 Hz	■		■				161
BOS010R	BOS 5K-NO-ID10-S75	0...900 mm		■		■		■	500 Hz	■		■				161
BOS015J	BOS 5K-PS-ID10-S49	0...900 mm		■	■		■		500 Hz	■	■					161
BOS015L	BOS 5K-NS-ID10-S49	0...900 mm		■		■	■		500 Hz	■	■					161
BOS015K	BOS 5K-PO-ID10-S49	0...900 mm		■	■			■	500 Hz	■	■					161
BOS015M	BOS 5K-NO-ID10-S49	0...900 mm		■		■		■	500 Hz	■	■					161
BOS0123	BOS 5K-PS-ID10-02	0...900 mm		■	■		■		500 Hz	■			■			161
BOS0116	BOS 5K-NS-ID10-02	0...900 mm		■		■	■		500 Hz	■			■			161
BOS011K	BOS 5K-PO-ID10-02	0...900 mm		■	■			■	500 Hz	■			■			161
BOS010P	BOS 5K-NO-ID10-02	0...900 mm		■		■		■	500 Hz	■			■			161

Photoelectric Standard Sensors

BOS 5K Global

Product overview



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _s	Connection			Special features		Page
			Red light	Infrared	PNP	NPN	Light switching	Dark switching			M8 connector, 3-pin	M8 connector, 4-pin	Cable	Polarizing filter	Special output assignment	
	Diffuse small beam															
BOS0128	BOS 5K-PS-RD11-S75	50...200 mm	■		■		■		500 Hz	■		■				162
BOS011C	BOS 5K-NS-RD11-S75	50...200 mm	■			■	■		500 Hz	■		■				162
BOS011W	BOS 5K-PO-RD11-S75	50...200 mm	■		■			■	500 Hz	■		■				162
BOS0110	BOS 5K-NO-RD11-S75	50...200 mm	■			■		■	500 Hz	■		■				162
BOS015N	BOS 5K-PS-RD11-S49	50...200 mm	■		■		■		500 Hz	■	■					162
BOS015R	BOS 5K-NS-RD11-S49	50...200 mm	■			■	■		500 Hz	■	■					162
BOS015P	BOS 5K-PO-RD11-S49	50...200 mm	■		■			■	500 Hz	■	■					162
BOS015T	BOS 5K-NO-RD11-S49	50...200 mm	■			■		■	500 Hz	■	■					162
BOS0127	BOS 5K-PS-RD11-02	50...200 mm	■		■		■		500 Hz	■			■			163
BOS011A	BOS 5K-NS-RD11-02	50...200 mm	■			■	■		500 Hz	■			■			163
BOS011U	BOS 5K-PO-RD11-02	50...200 mm	■		■			■	500 Hz	■			■			163
BOS010Z	BOS 5K-NO-RD11-02	50...200 mm	■			■		■	500 Hz	■			■			163
	Retroreflective sensor															
BOS012E	BOS 5K-PS-RR10-S75	0.1...4 m	■		■			■	500 Hz	■		■		■		163
BOS011J	BOS 5K-NS-RR10-S75	0.1...4 m	■			■		■	500 Hz	■		■		■		163
BOS0121	BOS 5K-PO-RR10-S75	0.1...4 m	■		■		■		500 Hz	■		■		■		163
BOS0114	BOS 5K-NO-RR10-S75	0.1...4 m	■			■	■		500 Hz	■		■		■		163
BOS0122	BOS 5K-PO-RR10-S75-S	0.1...4 m	■		■		■		500 Hz	■		■		■	■	163
BOS0115	BOS 5K-NO-RR10-S75-S	0.1...4 m	■			■	■		500 Hz	■		■		■	■	163
BOS015E	BOS 5K-PS-RR10-S49	0.1...4 m	■		■			■	500 Hz	■	■			■		163
BOS015H	BOS 5K-NS-RR10-S49	0.1...4 m	■			■		■	500 Hz	■	■			■		163
BOS015C	BOS 5K-PO-RR10-S49	0.1...4 m	■		■		■		500 Hz	■	■			■		163
BOS015F	BOS 5K-NO-RR10-S49	0.1...4 m	■			■	■		500 Hz	■	■			■		163
BOS012C	BOS 5K-PS-RR10-02	0.1...4 m	■		■			■	500 Hz	■			■	■		163
BOS011H	BOS 5K-NS-RR10-02	0.1...4 m	■			■		■	500 Hz	■			■	■		163
BOS0120	BOS 5K-PO-RR10-02	0.1...4 m	■		■		■		500 Hz	■			■	■		163
BOS0113	BOS 5K-NO-RR10-02	0.1...4 m	■			■	■		500 Hz	■			■	■		163
	Through-beam sensor															
BOS0126	BOS 5K-PS-IX10-S75	0...10 m		■	■			■	500 Hz	■		■				164
BOS0119	BOS 5K-NS-IX10-S75	0...10 m		■		■		■	500 Hz	■		■				164
BOS011R	BOS 5K-PO-IX10-S75	0...10 m		■	■		■		500 Hz	■		■				164
BOS010W	BOS 5K-NO-IX10-S75	0...10 m		■		■	■		500 Hz	■		■				164
BOS011T	BOS 5K-PO-IX10-S75-S	0...10 m		■	■		■		500 Hz	■		■			■	164
BOS010Y	BOS 5K-NO-IX10-S75-S	0...10 m		■		■	■		500 Hz	■		■			■	164
BOS0158	BOS 5K-PS-IX10-S49	0...10 m		■	■			■	500 Hz	■	■					165
BOS015A	BOS 5K-NS-IX10-S49	0...10 m		■		■		■	500 Hz	■	■					165
BOS0157	BOS 5K-PO-IX10-S49	0...10 m		■	■		■		500 Hz	■	■					165
BOS0159	BOS 5K-NO-IX10-S49	0...10 m		■		■	■		500 Hz	■	■					165
BOS0125	BOS 5K-PS-IX10-02	0...10 m		■	■			■	500 Hz	■			■			165
BOS0118	BOS 5K-NS-IX10-02	0...10 m		■		■		■	500 Hz	■			■			165
BOS011N	BOS 5K-PO-IX10-02	0...10 m		■	■		■		500 Hz	■			■			165
BOS010U	BOS 5K-NO-IX10-02	0...10 m		■		■	■		500 Hz	■			■			165

Photoelectric Standard Sensors
BOS 5K Global
 Sensing distance 200 mm

BOS 5K
Global

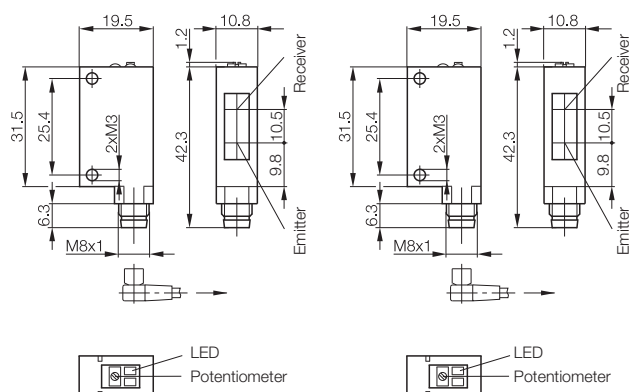


Type		Diffuse sensor with background suppression		Diffuse sensor with background suppression	
Detection range		40...200 mm		40...200 mm	
PNP	NO	Part number	BOS 5K-PS-RH12-S75 ②	BOS 5K-PS-RH12-S49 ①	
NPN	NO	Part number	BOS 5K-NS-RH12-S75 ⑨	BOS 5K-NS-RH12-S49 ⑧	
PNP	NC	Part number	BOS 5K-PO-RH12-S75 ⑤	BOS 5K-PO-RH12-S49 ④	
NPN	NC	Part number	BOS 5K-NO-RH12-S75 ⑫	BOS 5K-NO-RH12-S49 ⑪	
Supply voltage U_B		10...30 V DC		10...30 V DC	
Output current		100 mA		100 mA	
No-load supply current I_0 max.		≤ 30 mA		≤ 30 mA	
Switching type		Light or dark switching		Light or dark switching	
Polarity reversal/short-circuit protected		Yes/Yes		Yes/Yes	
Settings		Potentiometer, 6-turn		Potentiometer, 6-turn	
Emitter, light type		LED, red light		LED, red light	
Wavelength		660 nm		660 nm	
Output function indicator		Yellow LED		Yellow LED	
Stability indicator					
Response time		1 ms		1 ms	
Switching frequency f		500 Hz		500 Hz	
Degree of protection as per IEC 60529		IP 67		IP 67	
Ambient temperature T_a		-25...+55 °C		-25...+55 °C	
Permitted ambient light per		5 klx (artificial light)/10 klx (sunlight)		5 klx (artificial light)/10 klx (sunlight)	
Material	Housing	PC/PBT		PC/PBT	
	Optical surface	PC		PC	
Connection		M8 connector, 4-pin		M8 connector, 3-pin	

Diffuse values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 167.

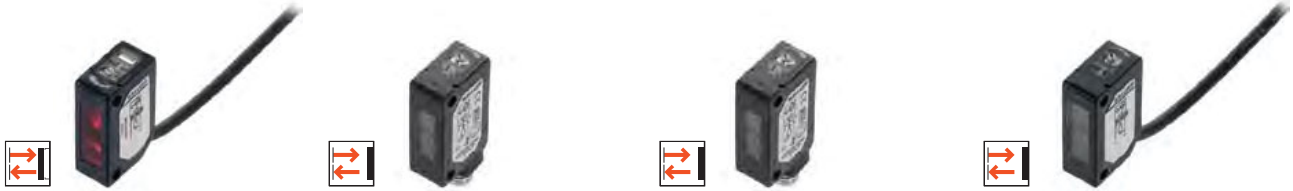
Ordering codes on page 158.



Photoelectric Standard Sensors

BOS 5K Global

Sensing distance 200 mm, 900 mm



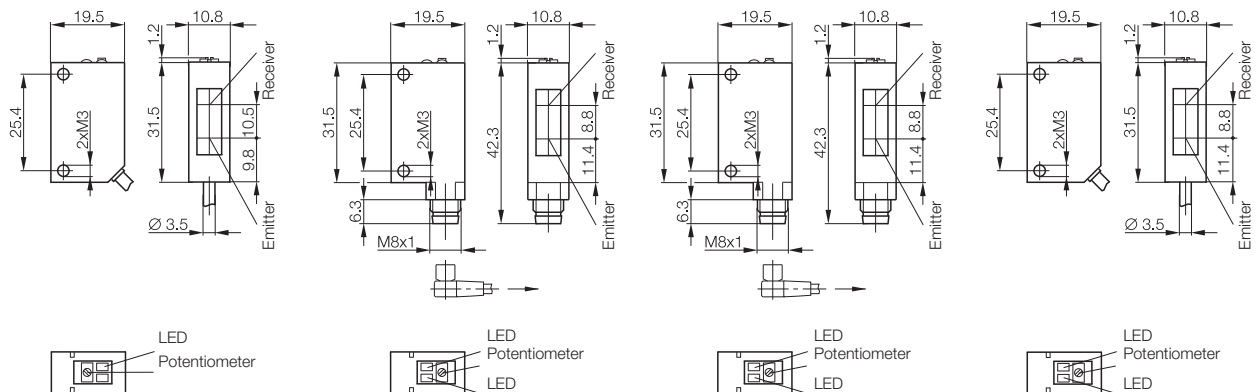
Diffuse sensor with background suppression 40...200 mm	Diffuse sensor 0...900 mm	Diffuse sensor 0...900 mm	Diffuse sensor 0...900 mm
BOS 5K-PS-RH12-02 ③	BOS 5K-PS-ID10-S75 ②	BOS 5K-PS-ID10-S49 ①	BOS 5K-PS-ID10-02 ③
BOS 5K-NS-RH12-02 ⑩	BOS 5K-NS-ID10-S75 ⑨	BOS 5K-NS-ID10-S49 ⑧	BOS 5K-NS-ID10-02 ⑩
BOS 5K-PO-RH12-02 ⑥	BOS 5K-PO-ID10-S75 ⑤	BOS 5K-PO-ID10-S49 ④	BOS 5K-PO-ID10-02 ⑥
BOS 5K-NO-RH12-02 ⑬	BOS 5K-NO-ID10-S75 ⑫	BOS 5K-NO-ID10-S49 ⑪	BOS 5K-NO-ID10-02 ⑬
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 or dark switching	Light or dark switching	Light or dark switching	Light or dark switching
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 6-turn	Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
LED, red light	LED, infrared	LED, infrared	LED, infrared
660 nm	880 nm	880 nm	880 nm
Yellow LED	Yellow LED	Yellow LED	Yellow LED
1 ms	1 ms	1 ms	1 ms
500 Hz	500 Hz	500 Hz	500 Hz
IP 67	IP 67	IP 67	IP 67
-25...+55 °C	-25...+55 °C	-25...+55 °C	-25...+55 °C
5 klx (artificial light)/10 klx (sunlight)	5 klx (artificial light)/10 klx (sunlight)	5 klx (artificial light)/10 klx (sunlight)	5 klx (artificial light)/10 klx (sunlight)
PC/PBT	PC/PBT	PC/PBT	PC/PBT
PC	PC	PC	PC
2 m PVC cable, 24 AWG	M8 connector, 4-pin	M8 connector, 3-pin	2 m PVC cable, 24 AWG

Photoelectric standard sensors
Cylinder designs
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



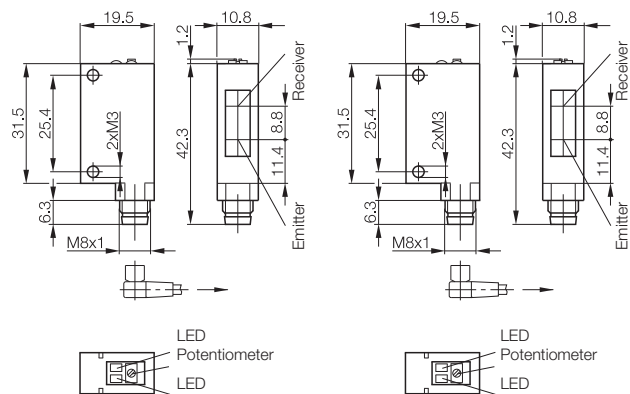


Type			Diffuse small beam		Diffuse small beam	
Detection range			50...200 mm		50...200 mm	
PNP	NO		Part number	BOS 5K-PS-RD11-S75 ②	BOS 5K-PS-RD11-S49 ①	
NPN	NO		Part number	BOS 5K-NS-RD11-S75 ⑨	BOS 5K-NS-RD11-S49 ⑧	
PNP	NC		Part number	BOS 5K-PO-RD11-S75 ⑤	BOS 5K-PO-RD11-S49 ④	
NPN	NC		Part number	BOS 5K-NO-RD11-S75 ⑫	BOS 5K-NO-RD11-S49 ⑪	
PNP	NC	Special assignment	Part number			
NPN	NC	Output	Part number			
Supply voltage U _B			10...30 V DC		10...30 V DC	
Output current			100 mA		100 mA	
No-load supply current I ₀ max.			≤ 30 mA		≤ 30 mA	
Switching type			Light or dark switching		Light or dark switching	
Polarity reversal/short-circuit protected			Yes/Yes		Yes/Yes	
Settings			Potentiometer, 270°		Potentiometer, 270°	
Emitter, light type			LED, red light		LED, red light	
Wavelength			660 nm		660 nm	
Output function indicator			Yellow LED		Yellow LED	
Stability indicator			Green LED		Green LED	
Response time			1 ms		1 ms	
Switching frequency f			500 Hz		500 Hz	
Degree of protection as per IEC 60529			IP 67		IP 67	
Ambient temperature T _a			-25...+55 °C		-25...+55 °C	
Permitted ambient light per			5 klx (artificial light)/10 klx (sunlight)		5 klx (artificial light)/10 klx (sunlight)	
Material		Housing	PC/PBT		PC/PBT	
		Optical surface	PC		PC	
Connection			M8 connector, 4-pin		M8 connector, 3-pin	

Diffuse values referenced to 90° reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 167.

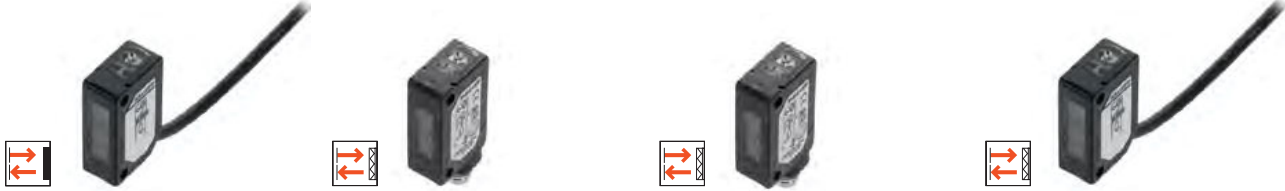
Ordering codes on page 159.



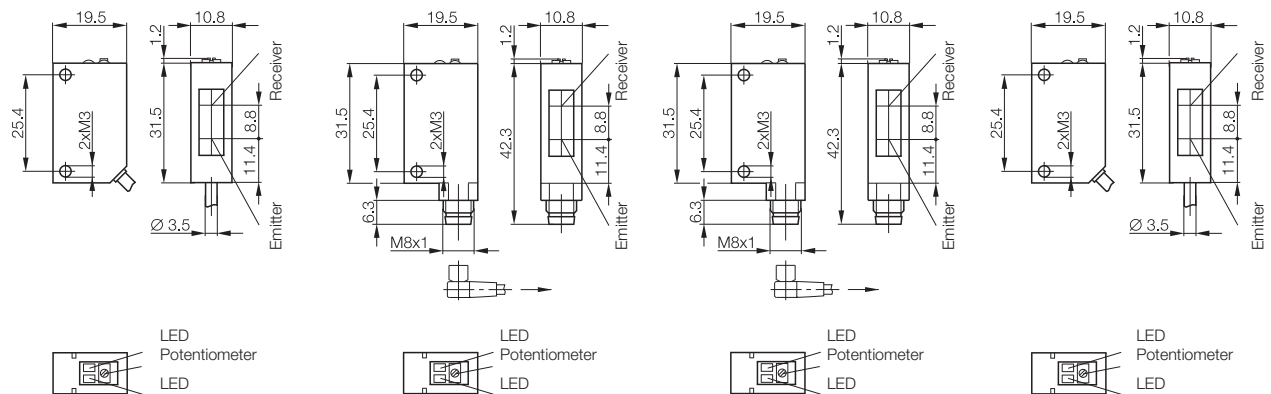
Photoelectric Standard Sensors

BOS 5K Global

Sensing distance 200 mm, range 4 m



Diffuse small beam 50...200 mm	Retroreflective sensor 0.1...4 m	Retroreflective sensor 0.1...4 m	Retroreflective sensor 0.1...4 m	Photoelectric standard sensors
BOS 5K-PS-RD11-02 ③	BOS 5K-PS-RR10-S75 ②	BOS 5K-PS-RR10-S49 ①	BOS 5K-PS-RR10-02 ③	Cylinder designs
BOS 5K-NS-RD11-02 ⑩	BOS 5K-NS-RR10-S75 ⑨	BOS 5K-NS-RR10-S49 ⑧	BOS 5K-NS-RR10-02 ⑩	Block designs
BOS 5K-PO-RD11-02 ⑥	BOS 5K-PO-RR10-S75 ⑤	BOS 5K-PO-RR10-S49 ④	BOS 5K-PO-RR10-02 ⑥	Photoelectric special sensors
BOS 5K-NO-RD11-02 ⑬	BOS 5K-NO-RR10-S75 ⑫	BOS 5K-NO-RR10-S49 ⑪	BOS 5K-NO-RR10-02 ⑬	Photoelectric distance sensors for analog distance measurement
	BOS 5K-PO-RR10-S75-S ⑦			Special accessories for photoelectric sensors
	BOS 5K-NO-RR10-S75-S ⑭			
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 or dark switching	Light or dark switching	Light or dark switching	Light or 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, red light	LED, red light	
660 nm	660 nm	660 nm	660 nm	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
Green LED	Green LED	Green LED	Green LED	
1 ms	1 ms	1 ms	1 ms	
500 Hz	500 Hz	500 Hz	500 Hz	
IP 67	IP 67	IP 67	IP 67	
-25...+55 °C	-25...+55 °C	-25...+55 °C	-25...+55 °C	
5 klx (artificial light)/10 klx (sunlight)	5 klx (artificial light)/10 klx (sunlight)	5 klx (artificial light)/10 klx (sunlight)	5 klx (artificial light)/10 klx (sunlight)	
PC/PBT	PC/PBT	PC/PBT	PC/PBT	
PC	PC	PC	PC	
2 m PVC cable, 24 AWG	M8 connector, 4-pin	M8 connector, 3-pin	2 m PVC cable, 24 AWG	

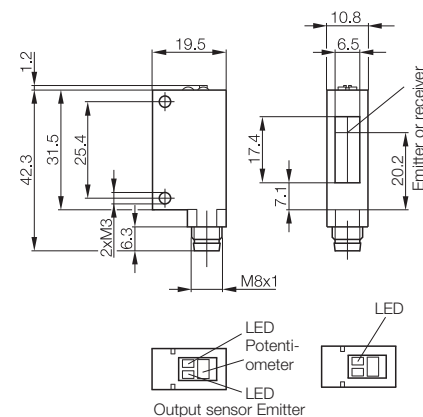




Type	Through-beam sensor		
Detection range	0...10 m		
PNP NO	Part number	BOS 5K-PS-IX10-S75	(2) (15)
NPN NO	Part number	BOS 5K-NS-IX10-S75	(9) (15)
PNP NC	Part number	BOS 5K-PO-IX10-S75	(5) (15)
NPN NC	Part number	BOS 5K-NO-IX10-S75	(12) (15)
PNP NC Special assignment	Part number	BOS 5K-PO-IX10-S75-S	(7) (15)
NPN NC Output	Part number	BOS 5K-NO-IX10-S75-S	(14) (15)
Supply voltage U_B	10...30 V DC		
Output current	100 mA		
No-load supply current I_0 max.	≤ 20 mA (receiver), ≤ 15 mA (emitter)		
Switching type	Light or dark switching		
Polarity reversal/short-circuit protected	Yes/Yes		
Settings	Potentiometer, 270°		
Emitter, light type	LED, infrared		
Wavelength	880 nm		
Power-on indicator	Green LED (emitter)		
Output function indicator	Yellow LED (receiver)		
Stability indicator	Green LED (receiver)		
Response time	1 ms		
Switching frequency f	500 Hz		
Degree of protection as per IEC 60529	IP 67		
Ambient temperature T_a	-25...+55 °C		
Permitted ambient light per	5 klx (artificial light)/10 klx (sunlight)		
Material	Housing	PC/PBT	
	Optical surface	PC	
Connection	M8 connector, 4-pin		

Wiring diagrams on page 167.

Ordering codes on page 159.



Photoelectric Standard Sensors

BOS 5K Global

Range 10 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Through-beam sensor 0...10 m

BOS 5K-PS-IX10-S49	① ⑮
BOS 5K-NS-IX10-S49	⑧ ⑮
BOS 5K-PO-IX10-S49	④ ⑮
BOS 5K-NO-IX10-S49	⑪ ⑮

Through-beam sensor 0...10 m

BOS 5K-PS-IX10-02	③ ⑮
BOS 5K-NS-IX10-02	⑩ ⑮
BOS 5K-PO-IX10-02	⑥ ⑮
BOS 5K-NO-IX10-02	⑬ ⑮

10...30 V DC

100 mA

≤ 20 mA (receiver),
≤ 15 mA (transmitter)

Light or dark switching

Yes/Yes

Potentiometer, 270°

LED, infrared

880 nm

Green LED (emitter)

Yellow LED (receiver)

Green LED (receiver)

1 ms

500 Hz

IP 67

-25...+55 °C

5 klx (artificial light)/10 klx (sunlight)

PC/PBT

PC

M8 connector, 3-pin

10...30 V DC

100 mA

≤ 20 mA (receiver),
≤ 15 mA (transmitter)

Light or dark switching

Yes/Yes

Potentiometer, 270°

LED, infrared

880 nm

Green LED (emitter)

Yellow LED (receiver)

Green LED (receiver)

1 ms

500 Hz

IP 67

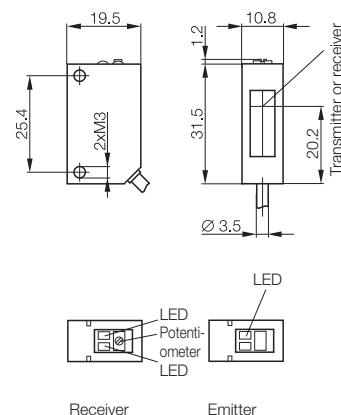
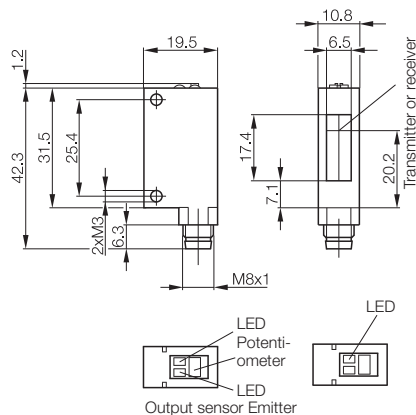
-25...+55 °C

5 klx (artificial light)/10 klx (sunlight)

PC/PBT

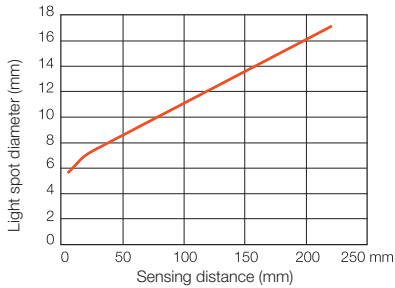
PC

2 m PVC cable, 24 AWG (emitter)

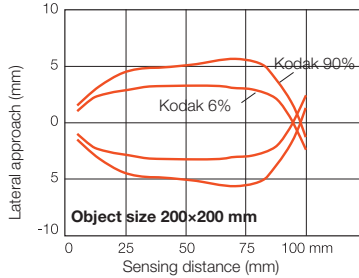


Diffuse sensor with background suppression BOS 5K-__-RH12-__

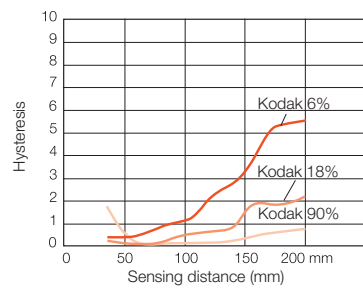
Light spot diameter



Characteristic response curve (background suppression 100 mm)

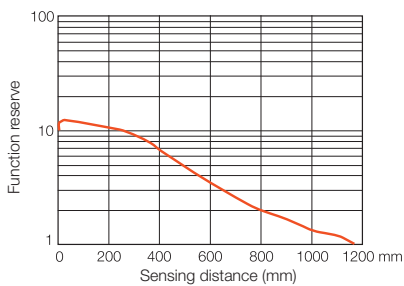


Sensing distance vs. hysteresis

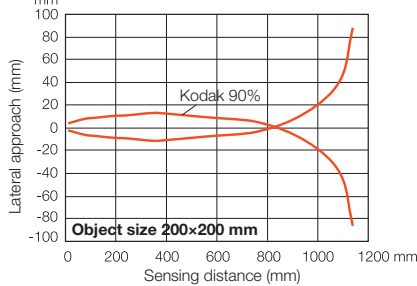


Diffuse BOS 5K-__-ID10-__

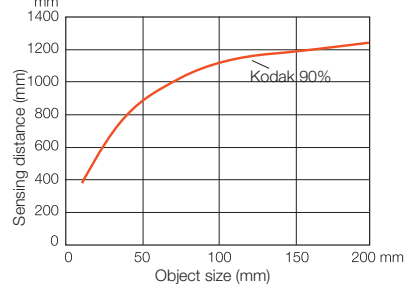
Receiving characteristics



Characteristic response curve

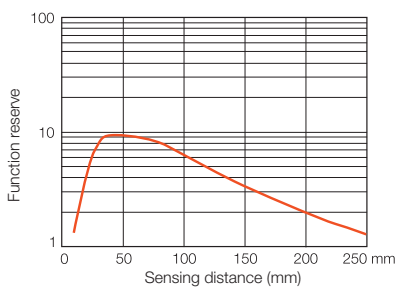


Object size vs. hysteresis

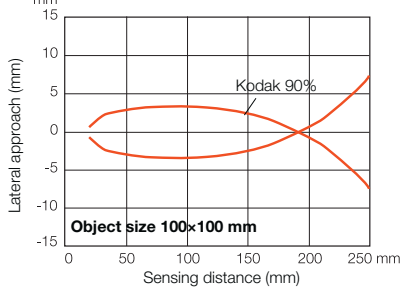


Diffuse sensor, small beam BOS 5K-__-RD11-__

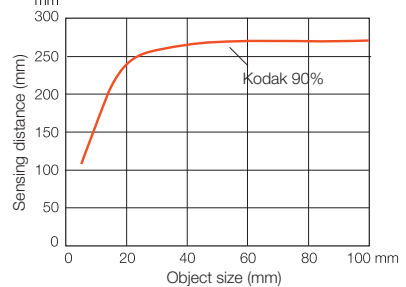
Receiving characteristics



Characteristic response curve

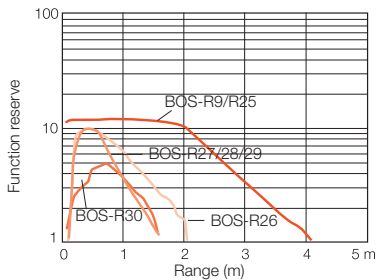


Object size vs. hysteresis

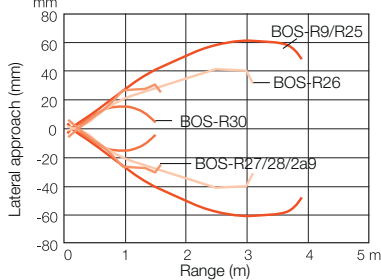


Retroreflective sensor BOS 5K-__-RR10-__

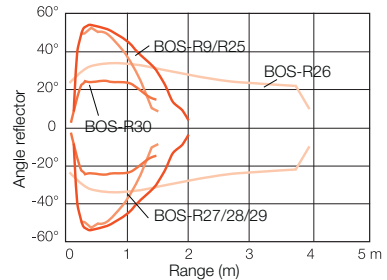
Receiving characteristics



Characteristic response curve

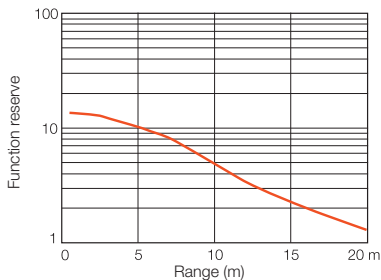


Angular offset

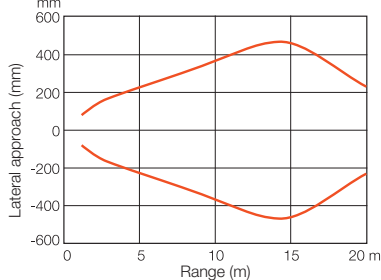


Through-beam sensor BOS 5K-__-IX10-__

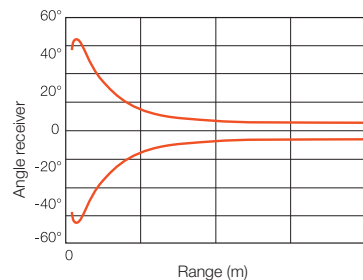
Receiving characteristics



Characteristic response curve



Angular offset

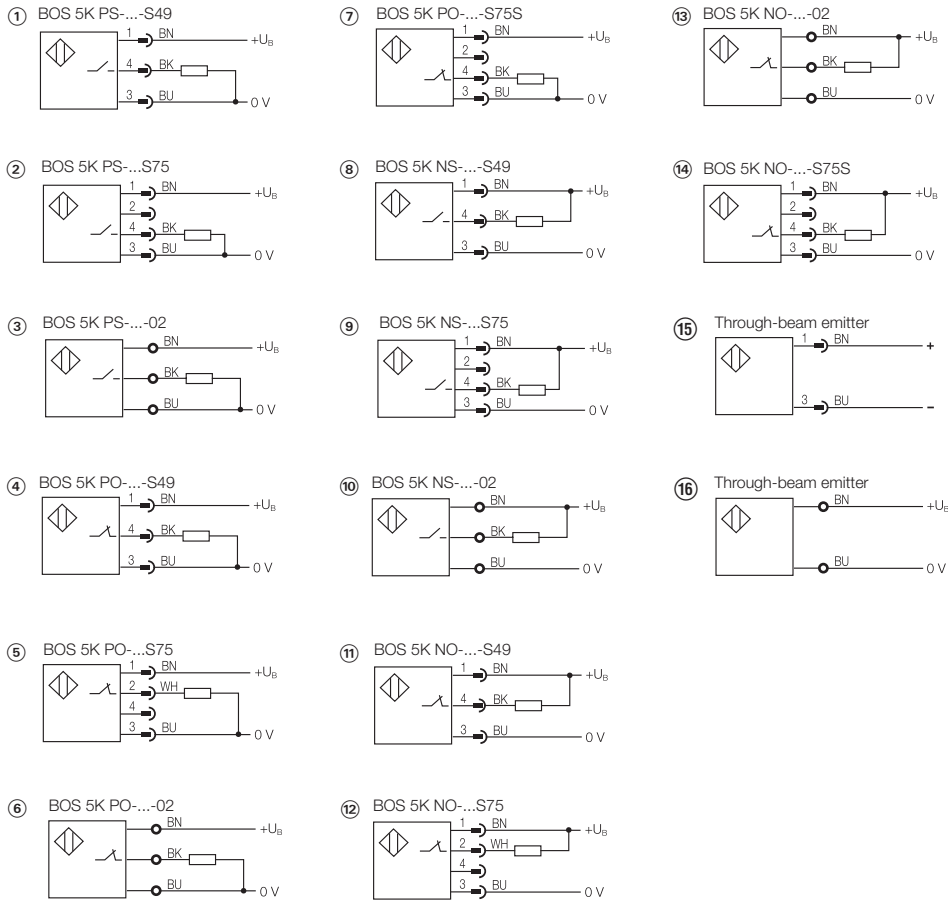


Photoelectric Standard Sensors

BOS 5K Global

Connection, accessories

Wiring diagrams



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

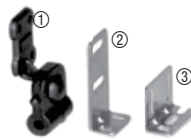
Special accessories for photoelectric sensors



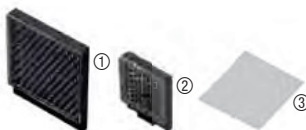
Recommended accessories

(please order separately)

Description	Ordering code
① Mounting bracket	BAM00T4
② Mounting bracket	BAM00T6
③ Mounting bracket	BAM00T5



Description	Ordering code
① Reflector	BAM00WL
② Reflector	BAM00W0
③ Reflective tape	BAM00W5



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC054Z
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Due to its high performance, the **BOS 6K** can be used almost anywhere. When space is at a premium, it is particularly advantageous. This is because its small size allows better integration of the sensors into the machine. Red light and background suppression make the sensor extremely user-friendly. Additionally, there are multiple varieties of lasers for an “absolute” detection of small parts, so that even objects smaller than 1 mm can be accurately measured. Calibration using the control lines means the sensor can be installed at virtually inaccessible locations. Dynamic teach-in in running operation means less attention needs to be paid to the sensors.

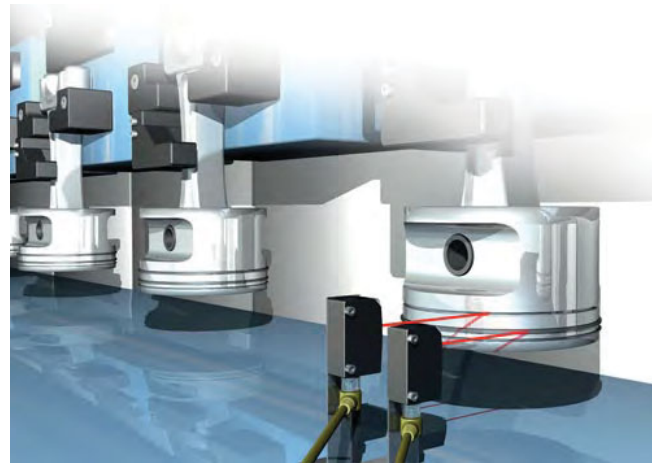


Features

- Teach-in-button and control line
- Dynamic teach-in possible (i. e., without stopping the machine)
- Multi-function display visible from any direction
- Disable buttons
- Versions with 3- or 4-pin M8-plug or with 2 m cable
- IP 67 protection
- Red light and laser versions

Applications

- Packaging machines
- Handling and assembly
- Specialty machines
- Printing and paper machinery



Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _s	Connection			Special features			Page
			Red light	Laser class	PNP	NPN	Light switching	Dark switching			M8 connector, 3-pin	M8 connector, 4-pin	Cable	Polarizing filter	Glass sensing	Autocollimation	
Diffuse sensor with background suppression																	
Ordering code	BOS009Y BOS 6K-PU-1HA-S75-C	25...100 mm							1 kHz							170	
Part number	BOS008Z BOS 6K-NU-1HA-S75-C	25...100 mm							1 kHz							170	
	BOS009U BOS 6K-PU-1HA-S49-C	25...100 mm							1 kHz							170	
	BOS009T BOS 6K-PU-1HA-C-02	25...100 mm							1 kHz							171	
	BOS008Y BOS 6K-NU-1HA-C-02	25...100 mm							1 kHz							171	
	BOS00A0 BOS 6K-PU-1LHA-S75-C	20...60 mm		1					1 kHz							176	
	BOS0091 BOS 6K-NU-1LHA-S75-C	20...60 mm		1					1 kHz							176	
	BOS009Z BOS 6K-PU-1LHA-C-02	20...60 mm		1					1 kHz							176	
	BOS0090 BOS 6K-NU-1LHA-C-02	20...60 mm		1					1 kHz							176	
	BOS00A2 BOS 6K-PU-1LHA-SA1-S75-C	30...110 mm		2					1 kHz							177	
	BOS0093 BOS 6K-NU-1LHA-SA1-S75-C	30...110 mm		2					1 kHz							177	
	BOS00A1 BOS 6K-PU-1LHA-SA1-C-02	30...110 mm		2					1 kHz							177	
	BOS0092 BOS 6K-NU-1LHA-SA1-C-02	30...110 mm		2					1 kHz							177	

Photoelectric Standard Sensors

BOS 6K

Product overview



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _s	Connection			Special features			Page
			Red light	Laser class	PNP	NPN	Light switching	Dark switching			M8 connector, 3-pin	M8 connector, 4-pin	Cable	Polarizing filter	Glass sensing	Autocollimation	
Ordering code Part number																	
Diffuse sensor																	
BOS00A9	BOS 6K-PU-10C-S75-C	20...300 mm	■		■		■	■	1 kHz	■		■				171	
BOS0099	BOS 6K-NU-10C-S75-C	20...300 mm	■			■	■	■	1 kHz	■		■				171	
BOS00A8	BOS 6K-PU-10C-S49-C	20...300 mm	■		■		■	■	1 kHz	■	■					171	
BOS00A7	BOS 6K-PU-10C-C-02	20...300 mm	■		■		■	■	1 kHz	■			■			171	
BOS0098	BOS 6K-NU-10C-C-02	20...300 mm	■			■	■	■	1 kHz	■			■			171	
Retroreflective sensor																	
BOS00AE	BOS 6K-PU-1QA-S75-C	50...700 mm	■		■		■	■	1 kHz	■		■		■	■	172	
BOS009C	BOS 6K-NU-1QA-S75-C	50...700 mm	■			■	■	■	1 kHz	■		■		■	■	172	
BOS00AC	BOS 6K-PU-1QA-S49-C	50...700 mm	■		■		■	■	1 kHz	■	■			■	■	172	
BOS00AA	BOS 6K-PU-1QA-C-02	50...700 mm	■		■		■	■	1 kHz	■			■	■	■	173	
BOS009A	BOS 6K-NU-1QA-C-02	50...700 mm	■			■	■	■	1 kHz	■			■	■	■	173	
BOS00A4	BOS 6K-PU-1LQA-S75-C	0.05...3 m		1	■		■	■	4 kHz	■		■		■		177	
BOS0095	BOS 6K-NU-1LQA-S75-C	0.05...3 m		1		■	■	■	4 kHz	■		■		■		177	
BOS00A3	BOS 6K-PU-1LQA-C-02	0.05...3 m		1	■		■	■	4 kHz	■			■	■		177	
BOS0094	BOS 6K-NU-1LQA-C-02	0.05...3 m		1		■	■	■	4 kHz	■			■	■		177	
BOS00AJ	BOS 6K-PU-1QC-S75-C	0.05...3 m	■		■		■	■	1 kHz	■		■		■		173	
BOS009F	BOS 6K-NU-1QC-S75-C	0.05...3 m	■			■	■	■	1 kHz	■		■		■		173	
BOS00AH	BOS 6K-PU-1QC-S49-C	0.05...3 m	■		■		■	■	1 kHz	■	■			■		173	
BOS00AF	BOS 6K-PU-1QC-C-02	0.05...3 m	■		■		■	■	1 kHz	■			■	■		173	
BOS009E	BOS 6K-NU-1QC-C-02	0.05...3 m	■			■	■	■	1 kHz	■			■	■		173	
Retroreflective sensor with autocollimation																	
BOS00AL	BOS 6K-PU-1TA-S75-C	0...500 mm	■		■		■	■	1 kHz	■		■		■	■	■	174
BOS009J	BOS 6K-NU-1TA-S75-C	0...500 mm	■			■	■	■	1 kHz	■		■		■	■	■	174
BOS00AK	BOS 6K-PU-1TA-C-02	0...500 mm	■		■		■	■	1 kHz	■			■	■	■	■	174
BOS009H	BOS 6K-NU-1TA-C-02	0...500 mm	■			■	■	■	1 kHz	■			■	■	■	■	174
BOS01CH	BOS 6K-PU-1LQD-S75-C	0...4 m		1	■		■	■	4 kHz	■		■		■		■	178
BOS01JC	BOS 6K-NU-1LQD-S75-C	0...4 m		1		■	■	■	4 kHz	■		■		■		■	178
BOS01HH	BOS 6K-PU-1LQD-S49-C	0...4 m		1	■		■	■	4 kHz	■	■			■		■	178
Through-beam sensor Receiver																	
BOS007J	BLE 6K-PU-1E-S75-C	0...6.5 m	■		■		■	■	500 Hz	■		■					175
BOS007A	BLE 6K-NU-1E-S75-C	0...6.5 m	■			■	■	■	500 Hz	■		■					175
BOS007H	BLE 6K-PU-1E-S49-C	0...6.5 m	■		■		■	■	500 Hz	■	■						175
BOS007F	BLE 6K-PU-1E-C-02	0...6.5 m	■		■		■	■	500 Hz	■			■				175
BOS0079	BLE 6K-NU-1E-C-02	0...6.5 m	■			■	■	■	500 Hz	■			■				175
Through-beam sensor Emitter																	
BOS007P	BLS 6K-XX-1E-S75	0...6.5 m	■							■		■					175
BOS007N	BLS 6K-XX-1E-S49	0...6.5 m	■							■	■						175
BOS007M	BLS 6K-XX-1E-02	0...6.5 m	■							■			■				175

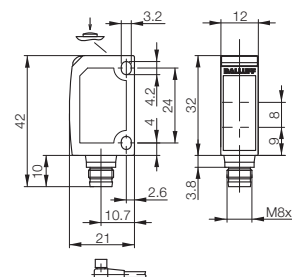
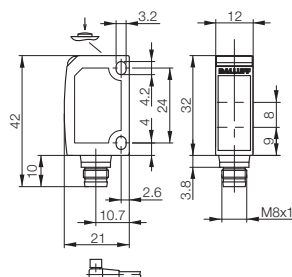


Type	Diffuse sensor with background suppression		Diffuse sensor with background suppression
Detection range	25...100 mm		25...100 mm
PNP NC/NO	Part number	BOS 6K-PU-1HA-S75-C ②	BOS 6K-PU-1HA-S49-C ③
NPN NC/NO	Part number	BOS 6K-NU-1HA-S75-C ⑤	
Supply voltage U_B	10...30 V DC		10...30 V DC
Output current	100 mA		100 mA
No-load supply current I_0 max.	≤ 35 mA		≤ 35 mA
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Emitter, light type	LED, red light		LED, red light
Wavelength	660 nm		660 nm
Light spot diameter	approx. 5x5 mm at 60 mm		approx. 5x5 mm at 60 mm
Gray value shift (90%/18%)	$\leq 10\%$		$\leq 10\%$
Distance hysteresis	$\leq 5\%$		$\leq 5\%$
Switching state indicator	Yellow LED		Yellow LED
Stability indicator	Green LED		Green LED
Response time	0.5 ms		0.5 ms
Switching frequency f	1 KHz		1 KHz
Degree of protection as per IEC 60529	IP 67		IP 67
Ambient temperature T_a	$-20...+60$ °C		$-20...+60$ °C
Permitted ambient light per	5 klx		5 klx
Material	Housing	Impact-resistant ABS	Impact-resistant ABS
	Optical surface	PMMA	PMMA
Connection	M8 connector, 4-pin		M8 connector, 3-pin

Diffuse values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 180.

Ordering codes on pages 168-169.



Sensing distance 100 mm, 300 mm

BALLUFF | 171

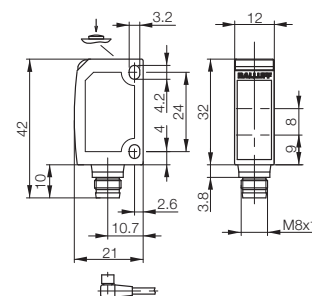
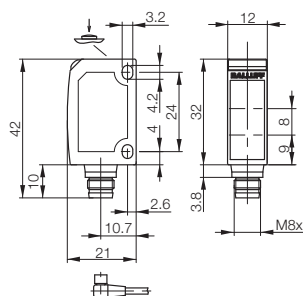


Type				Retroreflective sensor		Retroreflective sensor		
Detection range				50...700 mm		50...700 mm		
PNP	NO/NC	Polarizing filter,	Part number	BOS 6K-PU-1QA-S75-C	②	BOS 6K-PU-1QA-S49-C	③	
NPN	NO/NC	Glass sensing	Part number	BOS 6K-NU-1QA-S75-C	⑤			
PNP	NO/NC	Polarizing filter	Part number					
NPN	NO/NC		Part number					
Supply voltage U _B				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		
Switching type				Light/dark switching (selectable)		Light/dark switching (selectable)		
Polarity reversal/short-circuit protected				Yes/Yes		Yes/Yes		
Settings				Teach-in		Teach-in		
Emitter, light type				LED, red light		LED, red light		
Wavelength				660 nm		660 nm		
Light spot diameter				20×20 mm up to 500 mm		20×20 mm up to 500 mm		
Switching state indicator				Yellow LED		Yellow LED		
Stability indicator				Green LED		Green LED		
Response time				0.5 ms		0.5 ms		
Switching frequency f				1 KHz		1 KHz		
Degree of protection as per IEC 60529				IP 67		IP 67		
Ambient temperature T _a				–20...+60 °C		–20...+60 °C		
Permitted ambient light per				5 klx		5 klx		
Material		Housing		Impact-resistant ABS		Impact-resistant ABS		
		Optical surface		PMMA		PMMA		
Connection				M8 connector, 4-pin		M8 connector, 3-pin		

Retroreflective sensor values referenced to R9 reflector.

Wiring diagrams on page 180.

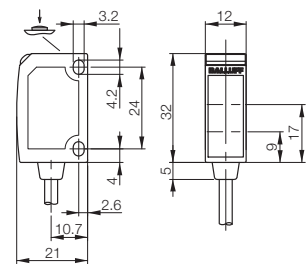
Ordering codes on pages 168-169.



Range 700 mm, 3 m



Special accessories for photoelectric sensors





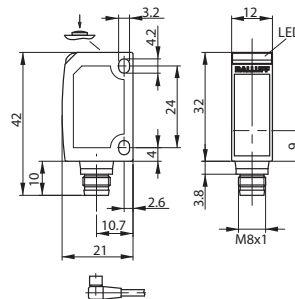
Type				Retroreflective sensor with autocollimation 0...500 mm	Retroreflective sensor with autocollimation 0...500 mm
Detection range				0...500 mm	0...500 mm
PNP NO/NC	Polarizing filter, glass	Part number		BOS 6K-PU-1TA-S75-C ②	BOS 6K-PU-1TA-C-02 ①
NPN NO/NC	detection, autocollimation	Part number		BOS 6K-NU-1TA-S75-C ⑤	BOS 6K-NU-1TA-C-02 ④
PNP NO/NC	Receiver	Part number			
NPN NO/NC		Part number			
	Emitter	Part number			
		Part number			
Supply voltage U_B				10...30 V DC	10...30 V DC
Output current				100 mA	100 mA
No-load supply current I_0 max.				≤ 25 mA	≤ 25 mA
Switching type				Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected				Yes/Yes	Yes/Yes
Settings				Teach-in	Teach-in
Emitter, light type				LED, red light	LED, red light
Wavelength				660 nm	660 nm
Light spot diameter				20×20 mm up to 500 mm	20×20 mm up to 500 mm
Switching state indicator				Yellow LED	Yellow LED
Stability indicator				Green LED	Green LED
Response time				0.5 ms	0.5 ms
Switching frequency f				1 KHz	1 KHz
Degree of protection as per IEC 60529				IP 67	IP 67
Ambient temperature T_a				-20...+60 °C	-20...+60 °C
Permitted ambient light per				5 klx	5 klx
Material	Housing			Impact-resistant ABS	Impact-resistant ABS
	Optical surface			PMMA	PMMA
Connection				M8 connector, 4-pin	2 m PVC cable, 26 AWG

Retroreflective sensor values referenced to R9/R22 reflector.

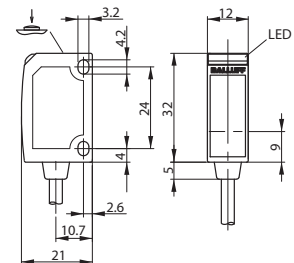
Wiring diagrams on page 180.

Ordering codes on pages 168-169.

Only usable with R22 reflector



Only usable with R22 reflector



Photoelectric Standard Sensors

BOS 6K

Range 6.5 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

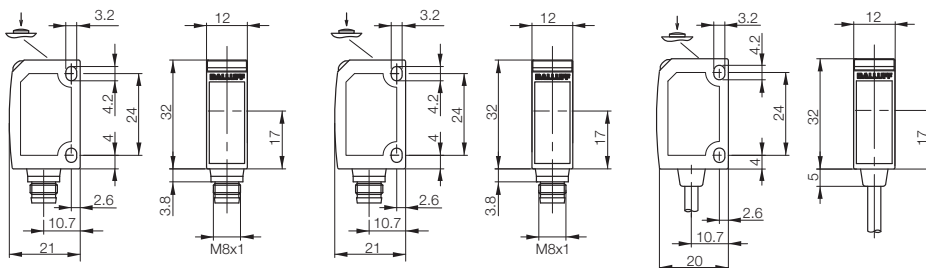
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Through-beam sensor	Through-beam sensor	Through-beam sensor	
0...6.5 m	0...6.5 m	0...6.5 m	
BLE 6K-PU-1E-S75-C ②	BLE 6K-PU-1E-S49-C ③	BLE 6K-PU-1E-C-02 ①	
BLE 6K-NU-1E-S75-C ⑤		BLE 6K-NU-1E-C-02 ④	
BLS 6K-XX-1E-S75 ⑧	BLS 6K-XX-1E-S49 ⑧	BLS 6K-XX-1E-02 ⑦	
10...30 V DC	10...30 V DC	10...30 V DC	
100 mA	100 mA	100 mA	
≤ 25 mA	≤ 25 mA	≤ 25 mA	
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)	
Yes/Yes	Yes/Yes	Yes/Yes	
Teach-in	Teach-in	Teach-in	
LED, red light	LED, red light	LED, red light	
660 nm	660 nm	660 nm	
Yellow LED	Yellow LED	Yellow LED	
Green LED	Green LED	Green LED	
1 ms	1 ms	1 ms	
500 Hz	500 Hz	500 Hz	
IP 67	IP 67	IP 67	
-20...+60 °C	-20...+60 °C	-20...+60 °C	
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS	
PMMA	PMMA	PMMA	
M8 connector, 4-pin	M8 connector, 3-pin	2 m PVC cable, 26 AWG	



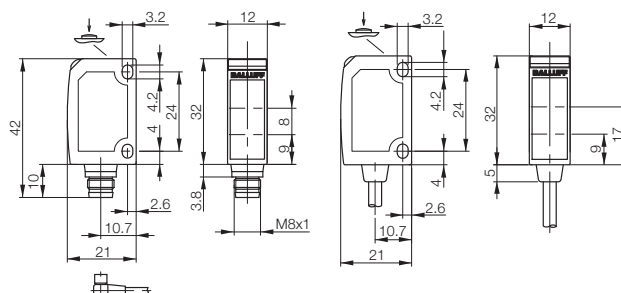


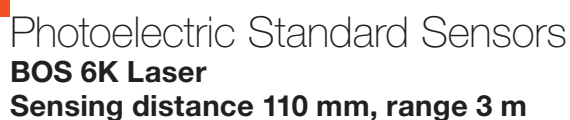
Type			Diffuse sensor with background suppression		Diffuse sensor with background suppression	
Detection range			20...60 mm		20...60 mm	
PNP	NO/NC	Polarizing filter	Part number	BOS 6K-PU-1LHA-S75-C ②	BOS 6K-PU-1LHA-C-02 ①	
NPN	NO/NC		Part number	BOS 6K-NU-1LHA-S75-C ⑤	BOS 6K-NU-1LHA-C-02 ④	
PNP	NO/NC		Part number			
NPN	NO/NC		Part number			
Supply voltage U _B			10...30 V DC		10...30 V DC	
Output current			100 mA		100 mA	
No-load supply current I ₀ max.			≤ 25 mA		≤ 25 mA	
Switching type			Light/dark switching (selectable)		Light/dark switching (selectable)	
Polarity reversal/short-circuit protected			Yes/Yes		Yes/Yes	
Settings			Teach-in		Teach-in	
Emitter, light type			Laser, red light		Laser, red light	
Wavelength			650 nm		650 nm	
Laser class			1		1	
Light spot diameter			0.5 mm in focus (35 mm)		0.5 mm in focus (35 mm)	
Distance hysteresis						
Gray value shift (90%/18%)			≤ 7%		≤ 7%	
Switching state indicator			Yellow LED		Yellow LED	
Stability indicator			Green LED		Green LED	
Response time			0.5 ms		0.5 ms	
Switching frequency f			1 KHz		1 KHz	
Degree of protection as per IEC 60529			IP 67		IP 67	
Ambient temperature T _a			-20...+60 °C		-20...+60 °C	
Permitted ambient light per			EN 60947-5-2		EN 60947-5-2	
Material	Housing		Impact-resistant ABS		Impact-resistant ABS	
	Optical surface		PMMA		PMMA	
Connection			M8 connector, 4-pin		2 m PVC cable, 26 AWG	

Diffuse sensor values referenced to 18% reflective Kodak gray card.
Retroreflective sensor values referenced to R22 reflector.

Wiring diagrams on page 180.

Ordering codes on pages 168-169.





Photoelectric standard sensors

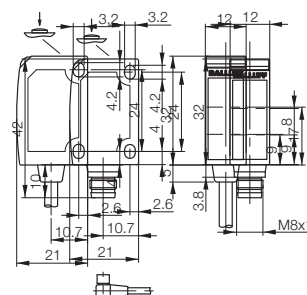
Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



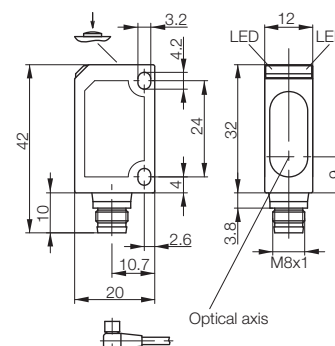
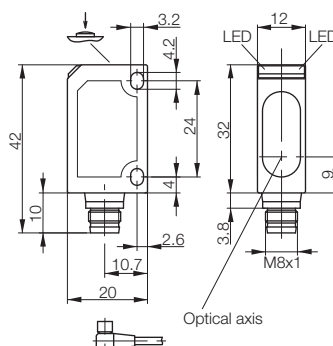


Type	Retroreflective sensor with autocollimation		Retroreflective sensor with autocollimation	
Detection range	0...4 m		0...4 m	
PNP NO/NC Polarizing	Part number	BOS 6K-PU-1LQD-S75-C ②	BOS 6K-PU-1LQD-S49-C ③	
NPN NO/NC filter	Part number	BOS 6K-NU-1LQD-S75-C ⑤		
Supply voltage U_B	10...30 V DC		10...30 V DC	
Output current	100 mA		100 mA	
No-load supply current I_0 max.	≤ 25 mA		≤ 25 mA	
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Teach-in		Teach-in	
Emitter, light type	Laser, red light		Laser, red light	
Wavelength	650 nm		650 nm	
Laser class	1		1	
Light spot diameter	2 mm at 2500 mm		2 mm at 2500 mm	
Switching state indicator	Yellow LED		Yellow LED	
Stability indicator	Green LED		Green LED	
Response time	0.125 ms		0.125 ms	
Switching frequency f	4KHz		4KHz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	-20...+60 °C		-20...+60 °C	
Permitted ambient light per	EN 60947-5-2		EN 60947-5-2	
Material	Housing	Impact-resistant ABS	Impact-resistant ABS	
	Optical surface	PMMA	PMMA	
Connection	M8 connector, 4-pin		M8 connector, 3-pin	

Retroreflective sensor values depend on the R22 reflector.

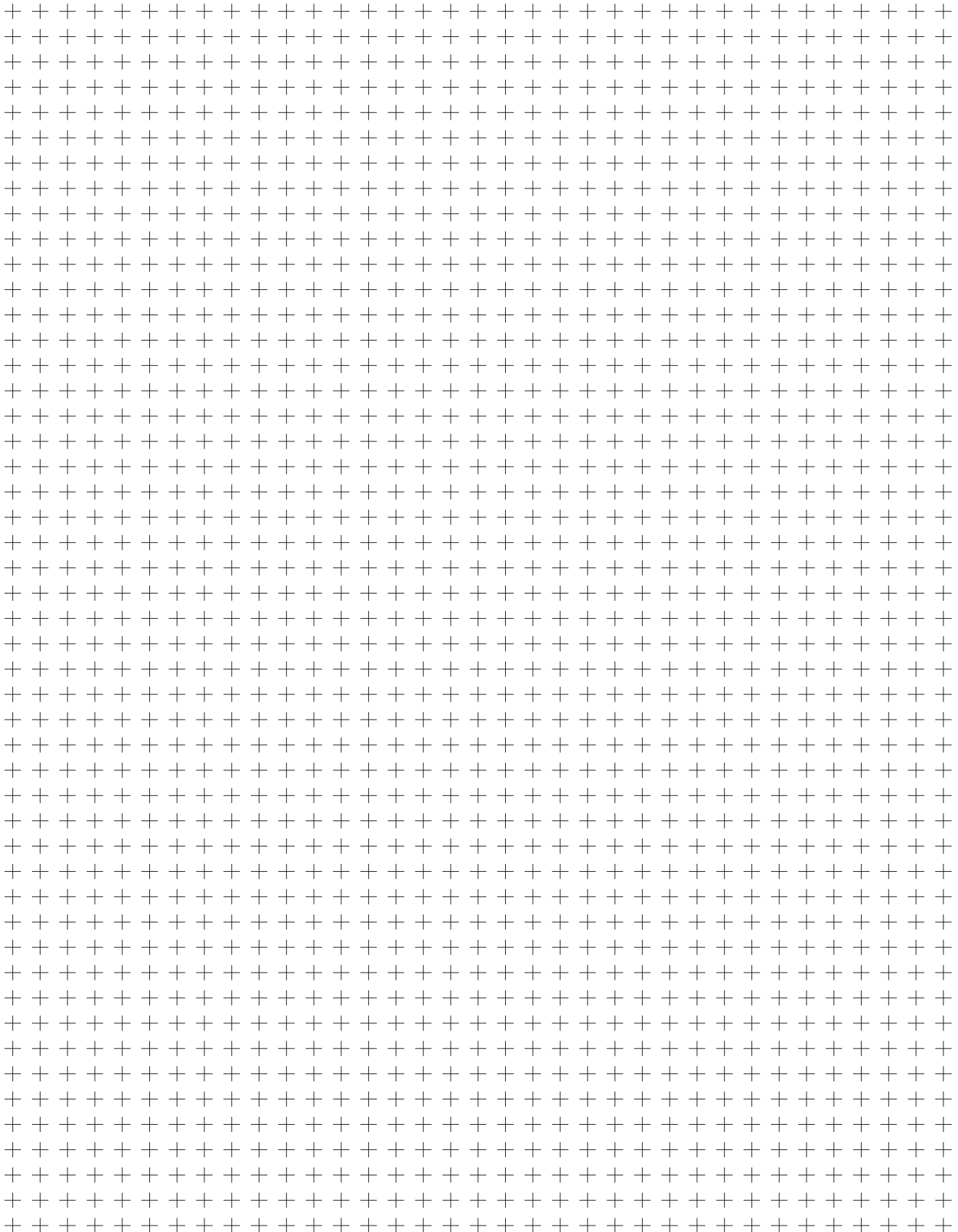
Wiring diagrams on page 180.

Ordering codes on pages 168-169.





Photoelectric Standard Sensors



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

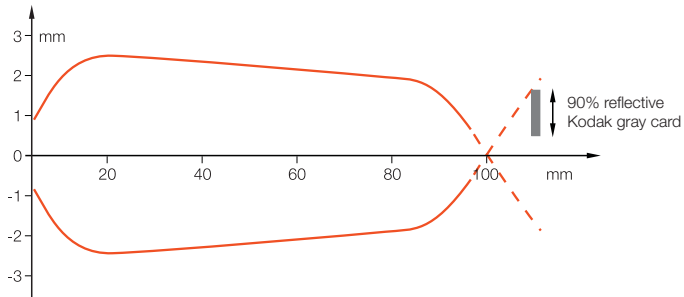
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

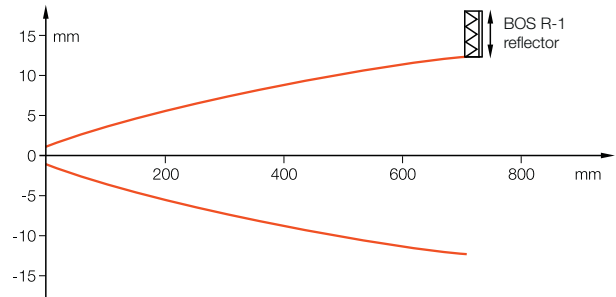
Special accessories for photoelectric sensors

Diffuse BOS 6K-...-1HA-...



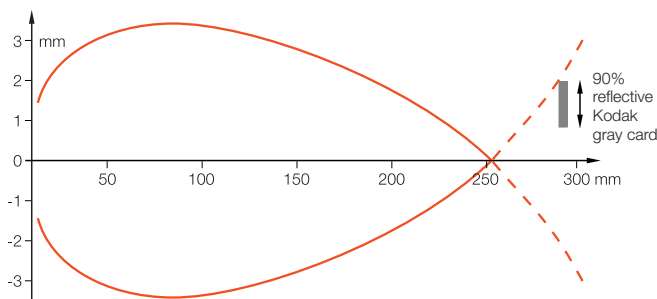
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 6K-...-1QA-...



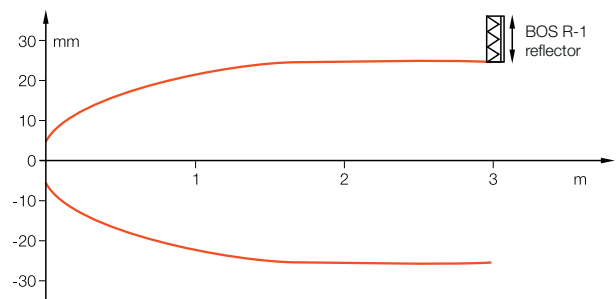
Range measured with side approach of reflector.

Diffuse BOS 6K-...-1OC-...



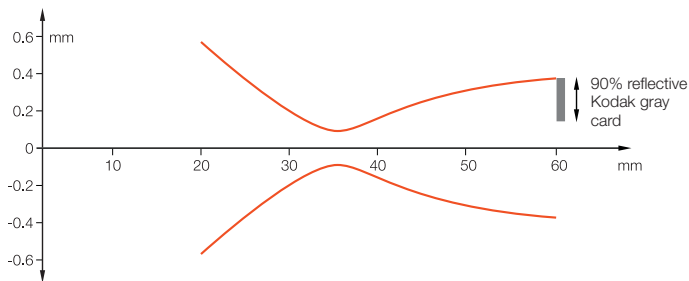
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 6K-...-1QC-...



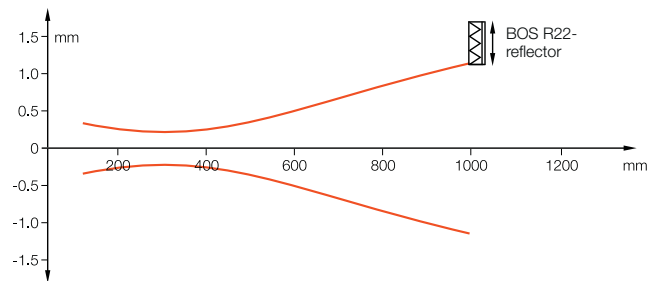
Range measured with side approach of reflector.

Diffuse BOS 6K-...-1LHA-...



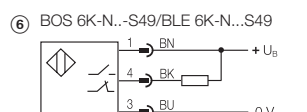
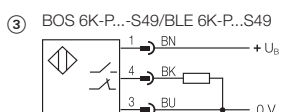
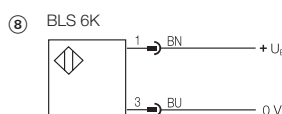
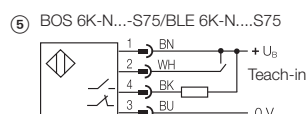
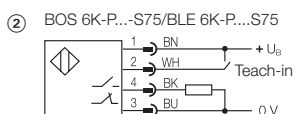
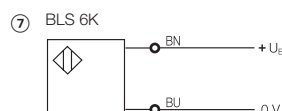
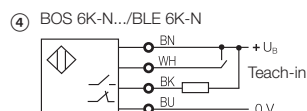
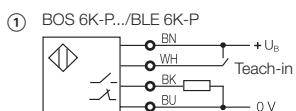
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 6K-...-1LQA-...



Range measured with side approach of reflector.

Wiring diagrams

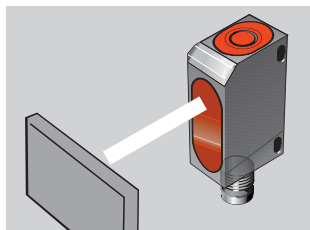


Photoelectric Standard Sensors

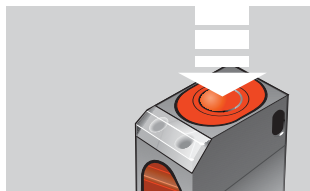
BOS 6K

Configuration notes, accessories

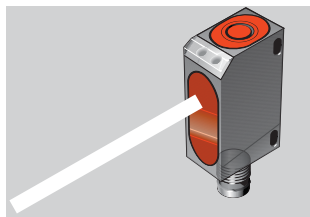
Diffuse sensor



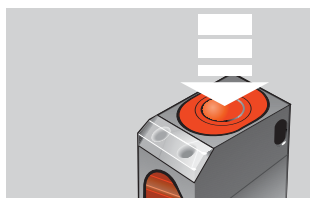
Direct sensor at object.



Press button for approx. 3 sec. until both LEDs blink at the same time.

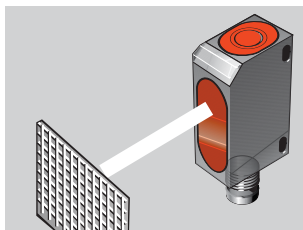


Remove object from beam path.

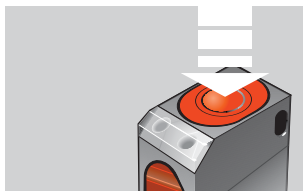


Hold down button for 1 sec. Green LED blinks briefly and then comes full on. The sensor is ready. If both LEDs blink at the same time, reconfigure your settings.

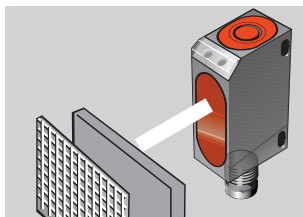
Retroreflective/through-beam



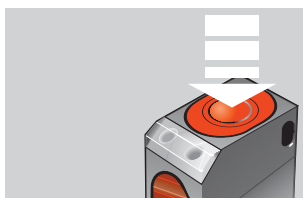
Direct sensor at reflector/receiver.



Press button for approx. 3 sec. until both LED's blink at the same time.



Bring objects into detection range.



Hold down button for 1 sec. Green LED blinks briefly and then stays on. The sensor is ready. If both LEDs blink at the same time, reconfigure your settings.



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Recommended accessories

(please order separately)

Description	Ordering code
① Reflector	BAM00UK
② Reflector	BAM00WL
③ Laser reflector	BAM00UY
④ Mounting bracket	BAM00UH



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

BOS 11K

The photoelectric sensor BOS 11K is available in the most popular form factor with the optimal size for the most frequent applications in packaging machines and handling and assembly systems.

Features

- Two mounting options
- Infrared and red light versions
- Pigtail with connector or cable out



Photoelectric Standard Sensors

BOS 11K

Product overview

Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _s	Connection		Special features		Page
			Red light	Infrared	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 Pigtail	Cable, 2 m	Polarizing filter	Test input	
 Diffuse sensor															
BOS014R	BOS 11K-PA-RH10-00,15-S4	10...50 mm	■		■		■	■	500 Hz	■	■				184
BOS014U	BOS 11K-NA-RH10-00,15-S4	10...50 mm	■			■	■	■	500 Hz	■	■				184
BOS014P	BOS 11K-PA-RH10-02	10...50 mm	■		■		■	■	500 Hz	■		■			185
BOS014T	BOS 11K-NA-RH10-02	10...50 mm	■			■	■	■	500 Hz	■		■			185
BOS019A	BOS 11K-PA-RH11-00,15-S4	10...100 mm	■		■		■	■	500 Hz	■	■				185
BOS019C	BOS 11K-NA-RH11-00,15-S4	10...100 mm	■			■	■	■	500 Hz	■	■				185
BOS019E	BOS 11K-PA-RH11-02	10...100 mm	■		■		■	■	500 Hz	■		■			185
BOS019F	BOS 11K-NA-RH11-02	10...100 mm	■			■	■	■	500 Hz	■		■			185
 Diffuse sensor															
BOS012P	BOS 11K-PA-ID10-00,15-S4	10...450 mm		■	■		■	■	500 Hz	■	■				186
BOS012F	BOS 11K-NA-ID10-00,15-S4	10...450 mm		■		■	■	■	500 Hz	■	■				186
BOS012R	BOS 11K-PA-ID10-02	10...450 mm		■	■		■	■	500 Hz	■		■			187
BOS012H	BOS 11K-NA-ID10-02	10...450 mm		■		■	■	■	500 Hz	■		■			187
 Retroreflective sensor															
BOS012W	BOS 11K-PA-PR10-00,15-S4	0...3.5 m	■		■		■	■	500 Hz	■	■		■		187
BOS012L	BOS 11K-NA-PR10-00,15-S4	0...3.5 m	■			■	■	■	500 Hz	■	■		■		187
BOS012Y	BOS 11K-PA-PR10-02	0...3.5 m	■		■		■	■	500 Hz	■		■	■		187
BOS012M	BOS 11K-NA-PR10-02	0...3.5 m	■			■	■	■	500 Hz	■		■	■		187
BOS012Z	BOS 11K-PA-RR10-02	0...4 m	■		■		■	■	500 Hz	■		■	■		188
BOS012N	BOS 11K-NA-RR10-02	0...4 m	■			■	■	■	500 Hz	■		■	■		188
 Through-beam sensor															
Receiver															
BOS012T	BOS 11K-PA-IE11-00,15-S4	0...20 m		■	■		■	■	150 Hz	■	■				189
BOS012J	BOS 11K-NA-IE11-00,15-S4	0...20 m		■		■	■	■	150 Hz	■	■				189
BOS012U	BOS 11K-PA-IE11-02	0...20 m		■	■		■	■	150 Hz	■		■			189
BOS012K	BOS 11K-NA-IE11-02	0...20 m		■		■	■	■	150 Hz	■		■			189
 Through-beam sensor															
Emitter															
BOS0130	BOS 11K-X-IS11-00,15-S4	0...20 m		■						■	■				189
BOS0131	BOS 11K-X-IS11-02	0...20 m		■						■		■			189



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric Standard Sensors

BOS 11K

Sensing distance 50 mm, 100 mm

BOS 11K
Global

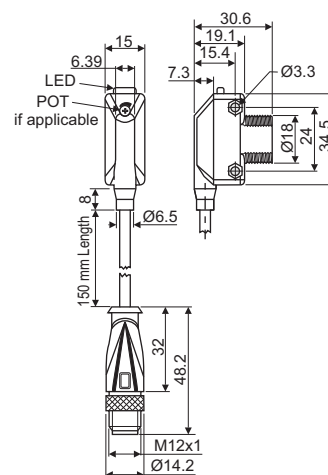


Type	Diffuse with fixed background suppression		
Detection range	10...50 mm		
PNP NO/NC	Part number	BOS 11K-PA-RH10-00,15-S4	①
NPN NO/NC	Part number	BOS 11K-NA-RH10-00,15-S4	③
Supply voltage U_B	10...30 V DC		
Output current	100 mA		
No-load supply current I_0 max.	25 mA		
Switching type	Light/dark switching (selectable)		
Light exit	Angle		
Polarity reversal/short-circuit protected	Yes/Yes		
Emitter, light type	LED, red light		
Wavelength	626 nm		
Output function indicator	Yellow LED		
Power indicator	Green LED		
Response time	1 ms		
Switching frequency f	500 Hz		
Degree of protection as per IEC 60529	IP 67		
Ambient temperature T_a	-20...+55 °C		
Permitted ambient light per	10 klx sunlight		
Material	Housing	ABS	
	Optical surface	PMMA	
Connection	Pigtail 150 mm M12 plug, 4 pin		

Diffuse values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 190.

Ordering codes on page 183.



Photoelectric Standard Sensors

BOS 11K

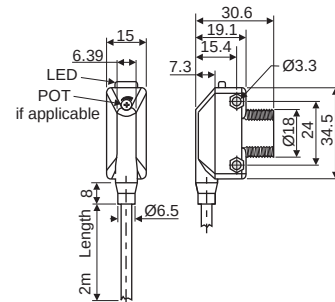
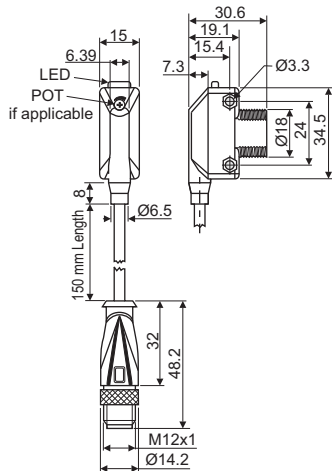
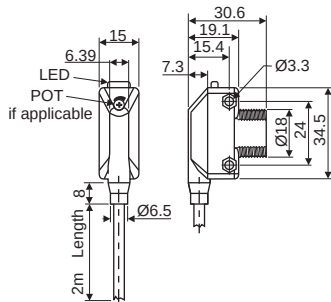
Sensing distance 50 mm, 100 mm



Photoelectric standard sensors
Cylinder designs
Block designs
Photoelectric special sensors
Photoelectric distance sensors for analog distance measurement
Special accessories for photoelectric sensors

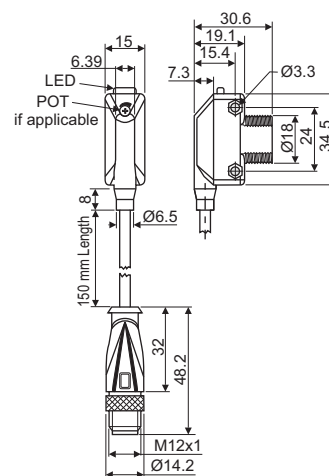


Diffuse with fixed background suppression 10...50 mm	Diffuse with fixed background suppression 10...100 mm	Diffuse with fixed background suppression 10...100 mm
BOS 11K-PA-RH10-02 ②	BOS 11K-PA-RH11-00,15-S4 ①	BOS 11K-PA-RH11-02 ②
BOS 11K-NA-RH10-02 ④	BOS 11K-NA-RH11-00,15-S4 ③	BOS 11K-NA-RH11-02 ④
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
25 mA	25 mA	25 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Angle	Angle	Angle
Yes/Yes	Yes/Yes	Yes/Yes
LED, red light	LED, red light	LED, red light
626 nm	626 nm	626 nm
Yellow LED	Yellow LED	Yellow LED
Green LED	Green LED	Green LED
1 ms	1 ms	1 ms
500 Hz	500 Hz	500 Hz
IP 67	IP 67	IP 67
-20...+55 °C	-20...+55 °C	-20...+55 °C
10 klx sunlight	10 klx sunlight	3 klx/10 klx sunlight
ABS	ABS	ABS
PMMA	PMMA	PMMA
2 m PVC cable, 28 AWG	Pigtail 150 mm M12 plug, 4 pin	2 m PVC cable, 28 AWG





Ordering codes on page 183.



Photoelectric Standard Sensors

BOS 11K

Range 450 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

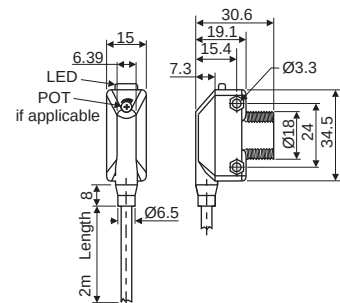
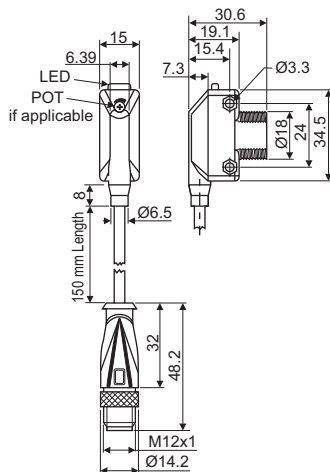
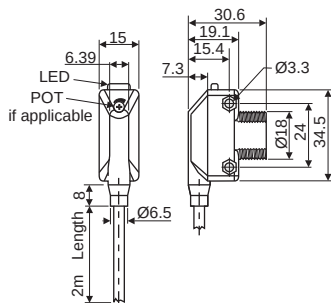
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor 10...450 mm	Diffuse sensor 0...3.5 m	Diffuse sensor 0...3.5 m
BOS 11K-PA-ID10-02 ②		
BOS 11K-NA-ID10-02 ④		
	BOS 11K-PA-PR10-00,15-S4 ⑤	BOS 11K-PA-PR10-02 ⑥
	BOS 11K-NA-PR10-00,15-S4 ⑦	BOS 11K-NA-PR10-02 ⑧
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
25 mA	25 mA	25 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Angle	Angle	Angle
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
LED, infrared	LED, red light	LED, red light
950 nm	626 nm	626 nm
Yellow LED	Yellow LED	Yellow LED
Green LED	Green LED	Green LED
1 ms	1 ms	1 ms
500 Hz	500 Hz	500 Hz
IP 67	IP 67	IP 67
-20...+55 °C	-20...+55 °C	-20...+55 °C
10 klx sunlight	10 klx sunlight	10 klx sunlight
ABS	ABS	ABS
PMMA	PMMA	PMMA
2 m PVC cable, 28 AWG	Pigtail 150 mm, M12 plug, 4 pin	2 m PVC cable, 28 AWG

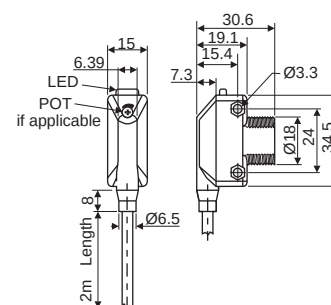




Type				Retroreflective sensor	
Detection range				4 m	
PNP	NO/NC	Polarizing filter	Part number	BOS 11K-PA-RR10-02	⑥
NPN	NO/NC		Part number	BOS 11K-NA-RR10-02	⑧
PNP	NO/NC	Receiver	Part number		
NPN	NO/NC		Part number		
		Emitter	Part number		
			Part number		
Supply voltage U_B				10...30 V DC	
Output current				100 mA	
No-load supply current I_0 max.				25 mA	
Switching type				Light/dark switching (selectable)	
Light exit				Angle	
Polarity reversal/short-circuit protected				Yes/Yes	
Settings				Potentiometer, 270°	
Emitter, light type				LED, red light	
Wavelength				626 nm	
Power-on indicator				Green LED	
Output function indicator				Yellow LED	
Response time				1 ms	
Switching frequency f				500 Hz	
Degree of protection as per IEC 60529				IP 67	
Ambient temperature T_a				-20...+55 °C	
Permitted ambient light per				10 klx sunlight	
Material		Housing		ABS	
		Optical surface		PMMA	
Connection				2 m PVC cable, 28 AWG	

Wiring diagrams on page 190.

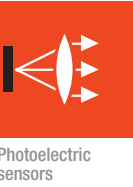
Ordering codes on page 183.



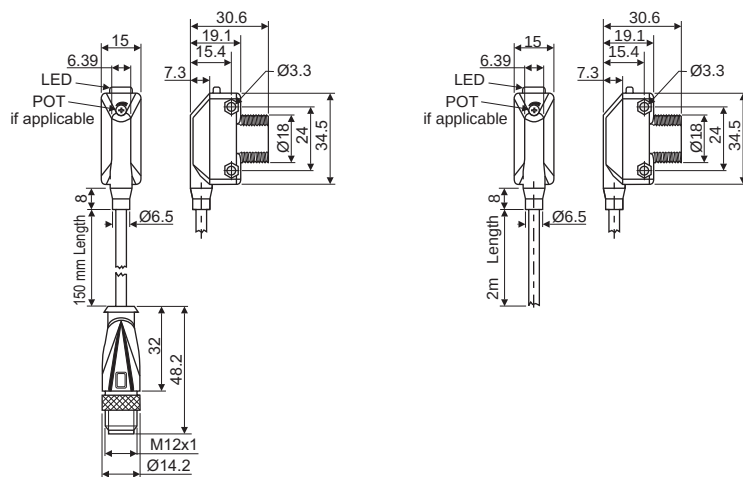
Photoelectric Standard Sensors

BOS 11K

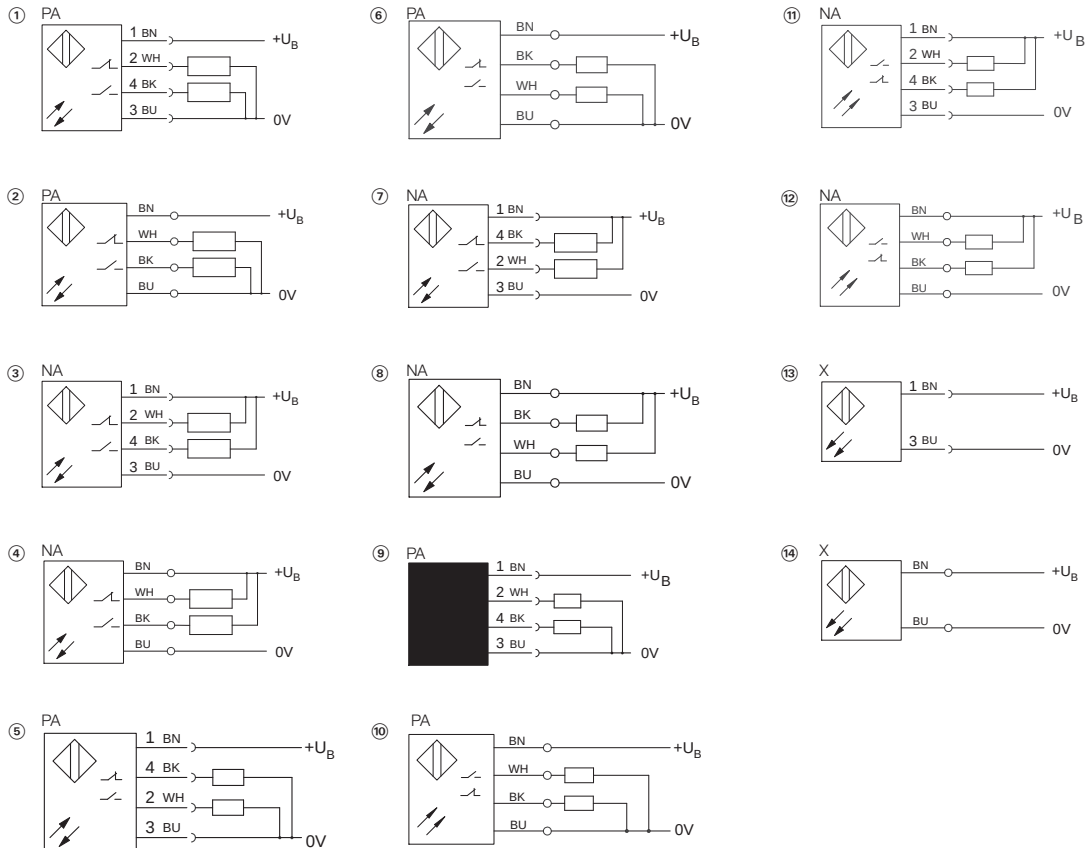
Range 20 m



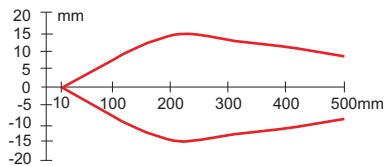
Retroreflective sensor 20 m		Retroreflective sensor 20 m		
BOS 11K-PA-IE11-00,15-S4		BOS 11K-PA-IE11-02		Photoelectric standard sensors
BOS 11K-NA-IE11-00,15-S4		BOS 11K-NA-IE11-02		Cylinder designs
BOS 11K-X-IS11-00,15-S4		BOS 11K-X-IS11-02		Block designs
10...30 V DC		10...30 V DC		Photoelectric special sensors
100 mA		100 mA		
25 mA		25 mA		Photoelectric distance sensors
Light/dark switching (selectable)		Light/dark switching (selectable)		for analog distance measurement
Angle		Angle		
Yes/Yes		Yes/Yes		
Potentiometer, 270°		Potentiometer, 270°		Special accessories for photoelectric sensors
LED, infrared		LED, infrared		
950 nm		950 nm		
Green LED		Green LED		
Yellow LED		Yellow LED		
3 ms		3 ms		
150 Hz		150 Hz		
IP 67		IP 67		
-20...+55 °C		-20...+55 °C		
10 klx sunlight		10 klx sunlight		
ABS		ABS		
PMMA		PMMA		
Pigtail 150 mm M12 plug 4 pin		2 m PVC cable, (2)/28 AWG (emitter)		



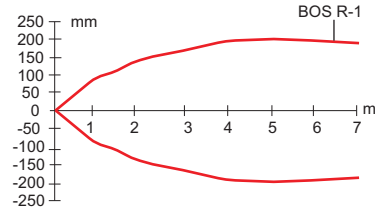
Wiring Diagrams



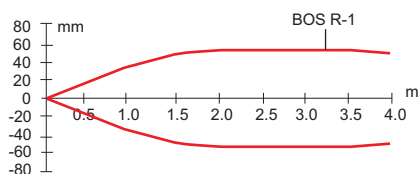
A Diffuse BOS 11K-...-ID10-...



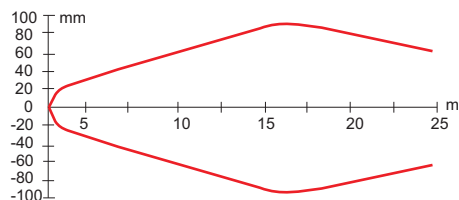
C Non-Polarized Retroreflective BOS 11K-...-RR10-...



B Polarized Retroreflective BOS 11K-...-PR10-...



D Thru-Beam BOS 11K-...-IE11-.../BOS 11K-X-IS11-...



Recommended Reflectors



BOS R1 - High Efficiency



BOS R26 - Standard
BOS R9 - High Efficiency



Photoelectric Standard Sensors

BOS 11K

Definitions, accessories



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

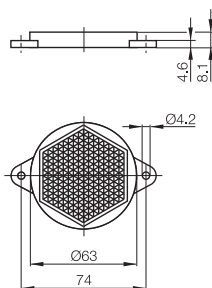
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflector BOS R-10
(delivered with retroreflective sensor)



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.



Suitable connectors
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

BOS 21M – the complete series in one compact, robust metal housing with comprehensive functionality. State-of-the-art sensor technology and innovative manufacturing technologies leave nothing to be desired for versatile applications in robotics and automation, packaging technology, installing, and handling technology, etc. Teach-in switches and potentiometers assure fast startup as well as simple and economical operation of the sensors. A wide range of accessories such as mounting brackets, stands, dovetail clamps, etc., enable adjustable mounting of the sensors in any position.



Photoelectric Standard Sensors

BOS 21M

Product overview

Type		Sensing distance/ range	Light type			Output		Switching type		Switching frequency	U _S	Connection		Special features					Page
			Red light	Infrared	Laser class	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 connector, 4-pin		Teach-in	Polarizing filter	Autocollimation	Glass detection	Output special assignment	
 Diffuse sensor with background suppression																			
BOS0034	BOS 21M-PUS-LH12-S4	50...100 mm			1					1 kHz									200
BOS0024	BOS 21M-NUS-LH12-S4	50...100 mm			1					1 kHz									200
Block designs																			
BOS0035	BOS 21M-PUS-RH12-S4	70...200 mm								1 kHz									194
BOS002Z	BOS 21M-NUS-RH12-S4	70...200 mm								1 kHz									194
BOS0036	BOS 21M-PUS-RV13-S4	70...200 mm								1 kHz									195
BOS0030	BOS 21M-NUS-RV13-S4	70...200 mm								1 kHz									195
 Diffuse sensor																			
BOS0033	BOS 21M-PA-RD10-S4	0.01...1 m								500 Hz									195
BOS002W	BOS 21M-NA-RD10-S4	0.01...1 m								500 Hz									195
Special accessories for photoelectric sensors																			
BOS0031	BOS 21M-PA-ID10-S4	0.05...2 m								500 Hz									195
BOS002T	BOS 21M-NA-ID10-S4	0.05...2 m								500 Hz									195
BOS0032	BOS 21M-PA-LD10-S4	0...600 mm			1					2 kHz									201
BOS002U	BOS 21M-NA-LD10-S4	0...600 mm			1					2 kHz									201
 Retroreflective sensor																			
BOS00TR	BOS 21M-PA-PR10-S4	0.1...8 m								1 kHz									196
BOS00TH	BOS 21M-NA-PR10-S4	0.1...8 m								1 kHz									196
BOS00TT	BOS 21M-PA-PR10-S4S	0.1...8 m								1 kHz									196
BOS00TL	BOS 21M-PA-LR10-S4	0.1...20 m			1					2 kHz									201
BOS00TE	BOS 21M-NA-LR10-S4	0.1...20 m			1					2 kHz									201
BOS00TM	BOS 21M-PA-LR10-S4S	0.1...20 m			1					2 kHz									201
BOS00TN	BOS 21M-PA-PK10-S4	0...4 m								1 kHz									197
BOS00TF	BOS 21M-NA-PK10-S4	0...4 m								1 kHz									197
BOS00TP	BOS 21M-PA-PK10-S4S	0...4 m								1 kHz									197
BOS00TU	BOS 21M-PA-PT10-S4	0...2 m								1 kHz									197
BOS00TJ	BOS 21M-NA-PT10-S4	0...2 m								1 kHz									197
BOS00TW	BOS 21M-PA-PT10-S4S	0...2 m								1 kHz									197
BOS00TY	BOS 21M-PA-PT14-S4	0...2 m								1 kHz									197
BOS00TK	BOS 21M-NA-PT14-S4	0...2 m								1 kHz									197
 Through-beam sensor Receiver																			
BOS00WT	BOS 21M-PA-IE10-S4	0...20 m								500 Hz									198
BOS00WP	BOS 21M-NA-IE10-S4	0...20 m								500 Hz									198
BOS00WU	BOS 21M-PA-IE10-S4S	0...20 m								500 Hz									198
BOS00WW	BOS 21M-PA-LE10-S4	0...60 m			1					1.5 kHz									201
BOS00WR	BOS 21M-NA-LE10-S4	0...60 m								1.5 kHz									201
BOS00WY	BOS 21M-PA-LE10-S4S	0...60 m			1					1.5 kHz									201
 Through-beam sensor Emitter																			
BOS00WZ	BOS 21M-XT-IS11-S4	0...20 m																	199
BOS00Y0	BOS 21M-XT-LS11-S4	0...60 m																	201

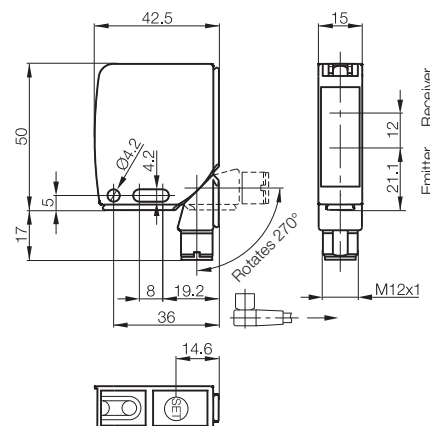


Type	Diffuse sensor with background suppression	
Detection range	70...200 mm	
PNP NO/NC	Part number	BOS 21M-PUS-RH12-S4 ②
NPN NO/NC	Part number	BOS 21M-NUS-RH12-S4 ④
PNP NO/NC	Part number	
NPN NO/NC	Part number	
Supply voltage U_B	10...30 V DC	
Output current	100 mA	
No-load supply current I_0 max.	≤ 50 mA	
Switching type	Light/dark (switchable)	
Polarity reversal/short-circuit protected	Yes/Yes	
Settings	Teach-in	
Emitter, light type	LED, red light	
Wavelength	670 nm	
Output function indicator	Yellow LED	
Stability indicator	Green/red LED	
Response time	0.5 ms	
Switching frequency f	1 kHz	
Degree of protection as per IEC 60529	IP 67	
Ambient temperature T_a	$-10...+50^\circ\text{C}$	
Permissible ambient light	10 klx	
Material	Housing	GD-Zn/Al
	Optical surface	PMMA
Connection	M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 205.

Ordering codes on page 193.



Photoelectric Standard Sensors

BOS 21M

Sensing distance 200 mm, 1 m, 2 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

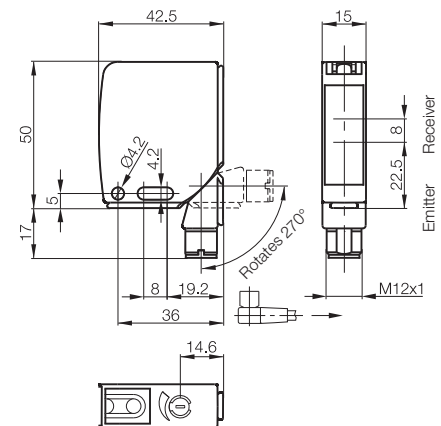
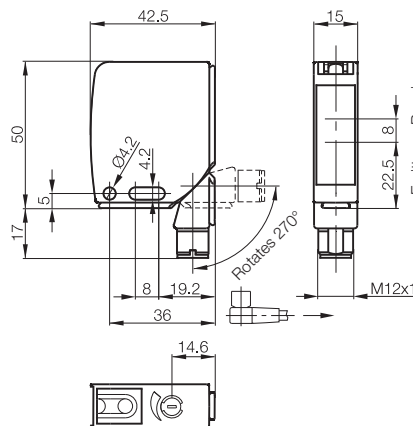
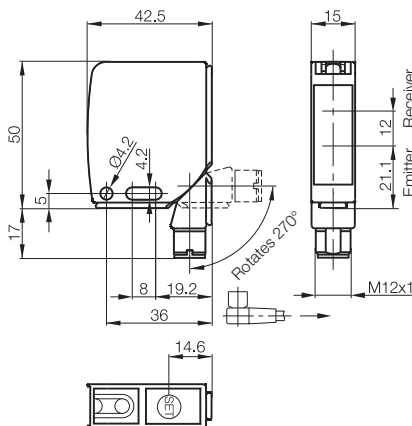
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor with foreground and background suppression 70...200 mm	Diffuse sensor 0.01...1 m	Diffuse sensor 0.05...2 m
BOS 21M-PUS-RV13-S4 ②		
BOS 21M-NUS-RV13-S4 ④		
	BOS 21M-PA-RD10-S4 ①	BOS 21M-PA-ID10-S4 ①
	BOS 21M-NA-RD10-S4 ③	BOS 21M-NA-ID10-S4 ③
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 50 mA	≤ 35 mA	≤ 35 mA
Light/dark (switchable)	Light/dark (complementary)	Light/dark (complementary)
Yes/Yes	Yes/Yes	Yes/Yes
Teach-in	Potentiometer, 270°	Potentiometer, 270°
LED, red light	LED, red light	LED, infrared
670 nm	650 nm	880 nm
Yellow LED	Yellow LED	Yellow LED
Green LED	Green LED	Green LED
0.5 ms	1 ms	1 ms
1 kHz	500 Hz	500 Hz
IP 67	IP 67	IP 67
-10...+50°C	-25...+55°C	-25...+55°C
10 klx	10 klx	10 klx
GD-Zn/Al	GD-Zn/Al	GD-Zn/Al
PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



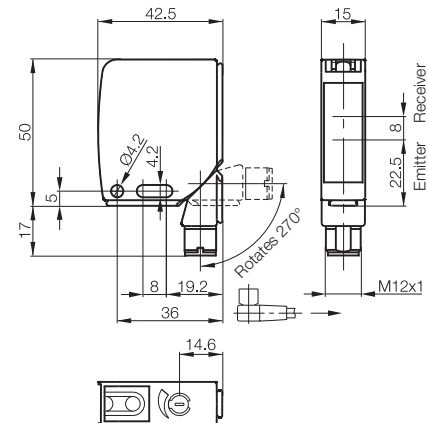


Type				Retroreflective sensor	
Detection range				0.1...8 m	
PNP NO/NC	Polarizing filter	Part number	BOS 21M-PA-PR10-S4	①	
NPN NO/NC		Part number	BOS 21M-NA-PR10-S4	③	
PNP NO/NC	Polarizing filter	Part number	BOS 21M-PA-PR10-S4S	⑤	
NPN NO/NC	Output special assignment	Part number			
PNP NO/NC	Polarizing filter, autocollimation	Part number			
NPN NO/NC		Part number			
PNP NO/NC	Polarizing filter, autocollimation	Part number			
	Output special assignment	Part number			
PNP NO/NC	Polarizing filter, glass detection, autocollimation	Part number			
NPN NO/NC		Part number			
PNP NO/NC	Polarizing filter, glass detection, autocollimation, output special assignment	Part number			
Supply voltage U_B				10...30 V DC	
Output current				100 mA	
No-load supply current I_0 max.				≤ 35 mA	
Switching type				Light/dark (complementary)	
Polarity reversal/short-circuit protected				Yes/Yes	
Settings				Potentiometer, 270°	
Emitter, light type				LED, red light	
Wavelength				650 nm	
Output function indicator				Yellow LED	
Stability indicator				Green LED	
Response time				0.5 ms	
Switching frequency f				1 kHz	
Degree of protection as per IEC 60529				IP 67	
Ambient temperature T_a				-25...+55°C	
Permissible ambient light				10 klx	
Material	Housing			GD-Zn/Al	
	Optical surface			PMMA	
Connection				M12 connector, 4-pin	

Retroreflective sensor values referenced to reflector R1.

Wiring diagrams on page 205.

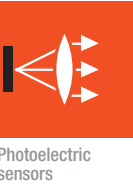
Ordering codes on page 193.



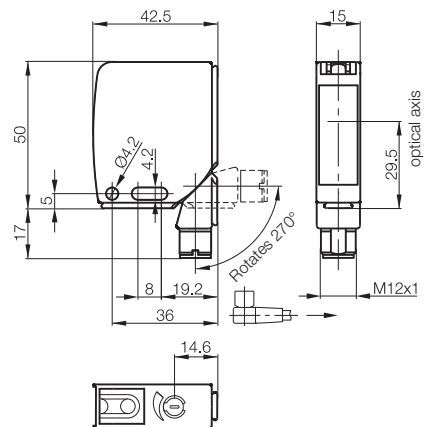
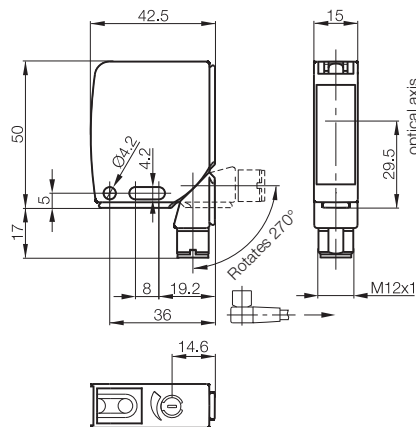
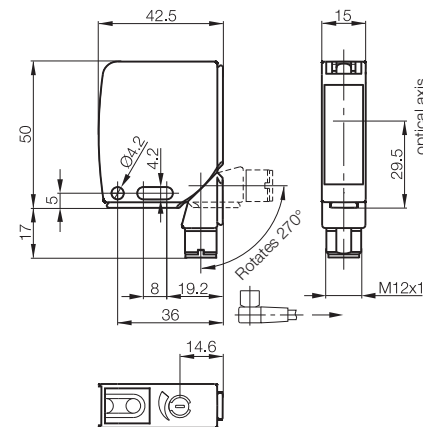
Photoelectric Standard Sensors

BOS 21M

Range 4 m, 2 m



Retroreflective sensor 0...4 m	Retroreflective sensor 0...2 m	Retroreflective sensor 0...2 m
BOS 21M-PA-PK10-S4 ①		
BOS 21M-NA-PK10-S4 ③		
BOS 21M-PA-PK10-S4S ⑤		
	BOS 21M-PA-PT10-S4 ①	BOS 21M-PA-PT14-S4 ①
	BOS 21M-NA-PT10-S4 ③	BOS 21M-NA-PT14-S4 ③
	BOS 21M-PA-PT10-S4S ⑤	
10...30 V DC	10...30 V DC	10...30 V DC
100 mA	100 mA	100 mA
≤ 35 mA	≤ 35 mA	≤ 35 mA
Light/dark (complementary)	Light/dark (complementary)	Light/dark (complementary)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
LED, red light	LED, red light	LED, red light
650 nm	650 nm	650 nm
Yellow LED	Yellow LED	Yellow LED
Green LED		
0.5 ms	0.5 ms	0.5 ms
1 kHz	1 kHz	1 kHz
IP 67	IP 67	IP 67
-25...+55°C	-25...+55°C	-25...+55°C
10 klx	10 klx	10 klx
GD-Zn/Al	GD-Zn/Al	GD-Zn/Al
Glass	Glass	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

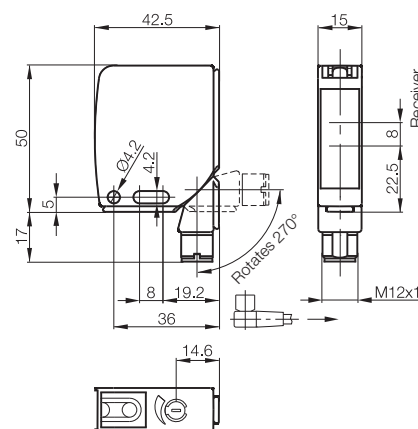




Type				Through-beam sensor	
Detection range				0...20 m	
PNP NO/NC Receiver	Part number	BOS 21M-PA-IE10-S4	①		
NPN NO/NC Receiver	Part number	BOS 21M-NA-IE10-S4	③		
PNP NO/NC Receiver	Part number	BOS 21M-PA-IE10-S4S	⑨		
Output special assignment	Part number				
Emitter	Part number				
Supply voltage U_B				10...30 V DC	
Output current				100 mA	
No-load supply current I_0 max.				≤ 35 mA	
Switching type				Light/dark (complementary)	
Polarity reversal/short-circuit protected				Yes/Yes	
Settings				Potentiometer, 270°	
Help functions					
Emitter, light type				LED, infrared	
Wavelength				880 nm	
Power-on indicator					
Output function indicator				Yellow LED (receiver)	
Stability indicator				Green LED (receiver)	
Response time				1 ms	
Switching frequency f				500 Hz	
Degree of protection as per IEC 60529				IP 67	
Ambient temperature T_a				-25...+55°C	
Permissible ambient light				10 klx	
Material	Housing	GD-Zn/Al			
	Optical surface	PMMA			
Connection				M12 connector, 4-pin	

Wiring diagrams on page 205.

Ordering codes on page 193.



Photoelectric Standard Sensors

BOS 21M

Range 20 m



Through-beam sensor 0...20 m

BOS 21M-XT-IS11-S4

⑥

10...30 V DC

≤ 35 mA

Yes/Yes

Test input

Green LED

IP 67

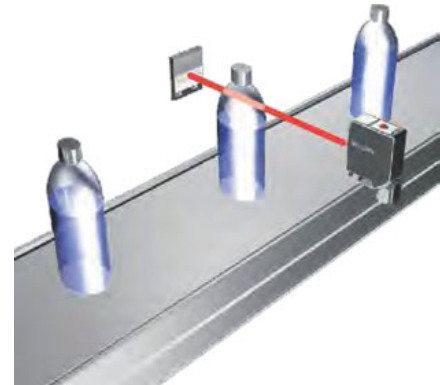
-25...+55°C

10 klx

GD-Zn/Al

PMMA

M12 connector, 4-pin



Photoelectric sensors

Photoelectric standard sensors

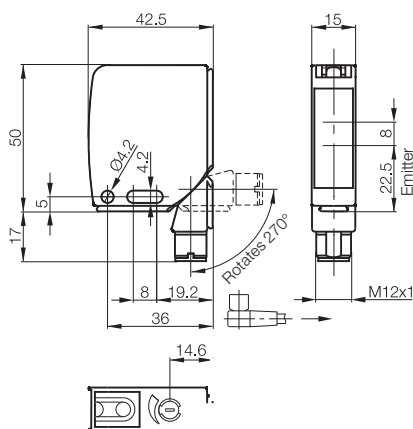
Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Photoelectric Standard Sensors
BOS 21M Laser
Sensing distance 100 mm

BOS 21M Laser

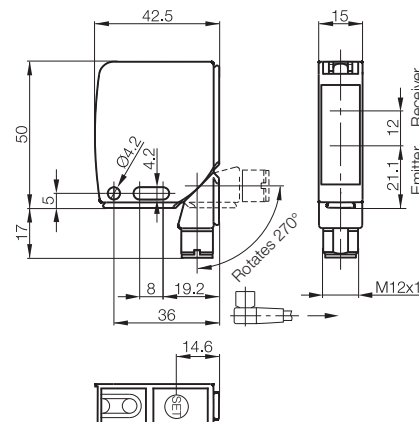


Type	Diffuse sensor with background suppression		
Detection range	50...100 mm		
PNP NO/NC	Part number	BOS 21M-PUS-LH12-S4	②
NPN NO/NC	Part number	BOS 21M-NUS-LH12-S4	④
PNP NO/NC Polarizing filter	Part number		
NPN NO/NC Polarizing filter	Part number		
PNP NO/NC Polarizing filter	Part number		
PNP NO/NC Output special assignment	Part number		
PNP NO/NC Receiver	Part number		
NPN NO/NC Receiver	Part number		
PNP NO/NC Receiver	Part number		
PNP NO/NC Output special assignment	Part number		
PNP NO/NC Emitter	Part number		
PNP NO/NC Emitter	Part number		
Supply voltage U_B	10...30 V DC		
Output current	100 mA		
No-load supply current I_0 max.	60 mA		
Switching type	Light/dark (switchable)		
Polarity reversal/short-circuit protected	Yes/Yes		
Settings	Teach-in		
Help functions			
Emitter, light type	Laser, red light		
Wavelength	650 nm		
Laser class	1		
Power-on indicator			
Output function indicator	Yellow LED		
Stability indicator	Green/red LED		
Response time	0.5 ms		
Switching frequency f	1 kHz		
Degree of protection as per IEC 60529	IP 67		
Ambient temperature T_a	-10...+50°C		
Permissible ambient light	5 klx		
Material	Housing	GD-Zn/Al	
	Optical surface	PMMA	
Connection	M12 connector, 4-pin		

Diffuse sensor values referenced to 90% reflective Kodak gray card.
 Retroreflective sensor values referenced to reflector R1.

Wiring diagrams on page 205.

Ordering codes on page 193.





Photoelectric Standard Sensors

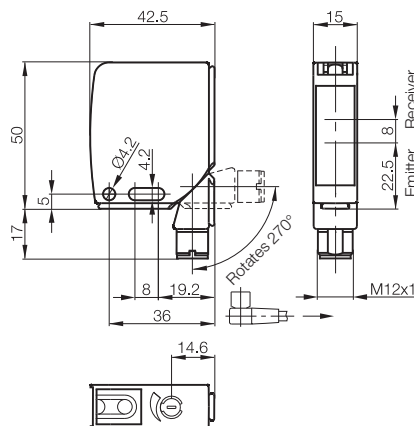
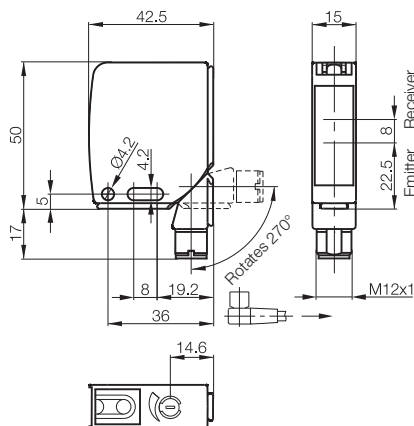
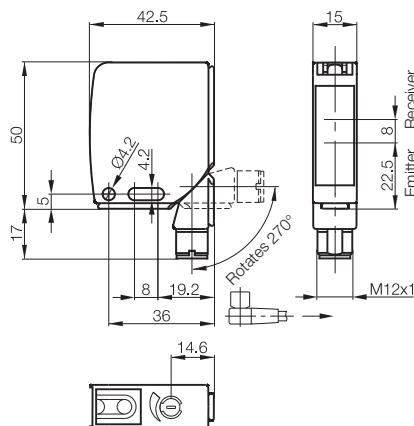
BOS 21M Laser

Sensing distance 600 mm, range 20 m, 60 m

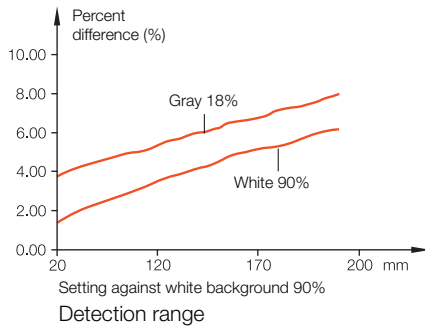


Photoelectric sensors

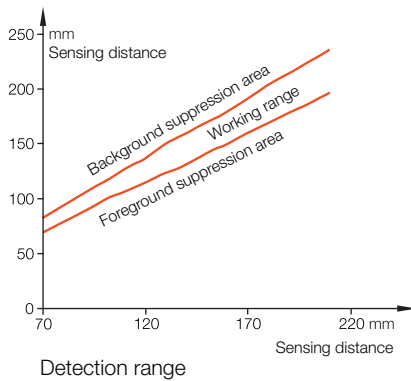
Diffuse sensor 0...600 mm	Retroreflective sensor 0.1...20 m	Through-beam sensor 0...60 m	
BOS 21M-PA-LD10-S4 ①			Photoelectric standard sensors
BOS 21M-NA-LD10-S4 ③			Cylinder designs
	BOS 21M-PA-LR10-S4 ①		Block designs
	BOS 21M-NA-LR10-S4 ③		
	BOS 21M-PA-LR10-S4S ⑤		
		BOS 21M-PA-LE10-S4 ①	Photoelectric special sensors
		BOS 21M-NA-LE10-S4 ③	
		BOS 21M-PA-LE10-S4S ⑤	Photoelectric distance sensors for analog distance measurement
		BOS 21M-XT-LS11-S4 ⑥	
10...30 V DC	10...30 V DC	10...30 V DC	Special accessories for photoelectric sensors
100 mA	100 mA	100 mA	
35 mA	35 mA	≤ 35 mA	
Light/dark (complementary)	Light/dark (complementary)	Light/dark (complementary)	
Yes/Yes	Yes/Yes	Yes/Yes	
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°	
		Test input (emitter)	
Laser, red light 650 nm	Laser, red light 650 nm	Laser, red light 650 nm	
1	1	1	
Green LED Yellow LED	Green LED Yellow LED	Green LED Yellow LED	
0.25 ms	0.25 ms	1 ms	
2 kHz	2 kHz	500 Hz	
IP 67	IP 67	IP 67	
-10...+50°C	-10...+50°C	-25...+55°C	
5 klx	5 klx	10 klx	
GD-Zn/Al	GD-Zn/Al	GD-Zn/Al	
PMMA	PMMA	PMMA	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	



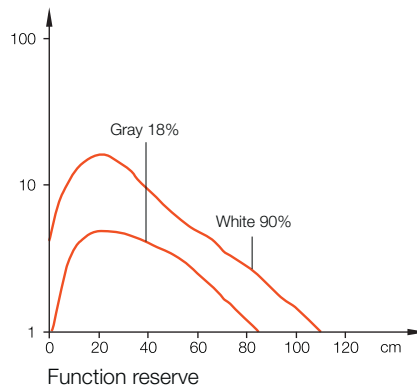
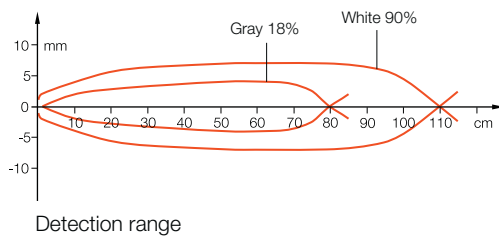
Diffuse sensor with background suppression
BOS 21M-.US-RH12



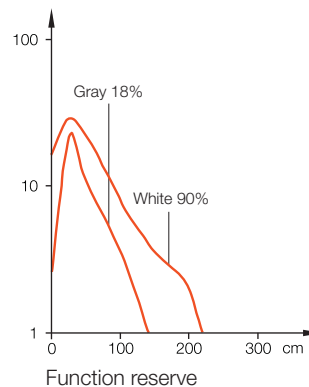
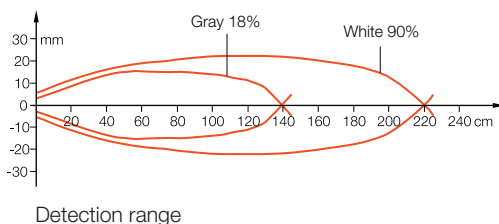
Diffuse sensor with fore- and background suppression
BOS 21M-.US-RV13



Diffuse sensor
BOS 21M-.A-RD10



Diffuse sensor, long range
BOS 21M-.A-ID10



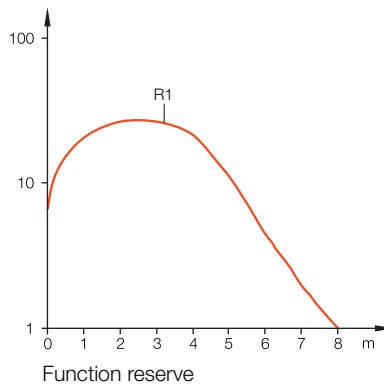


Photoelectric Standard Sensors

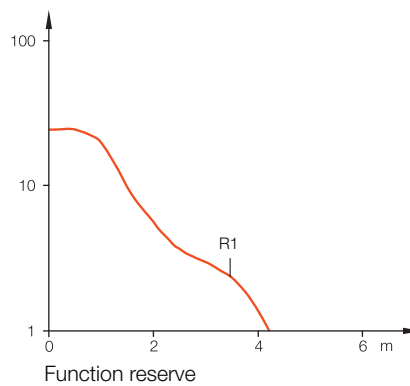
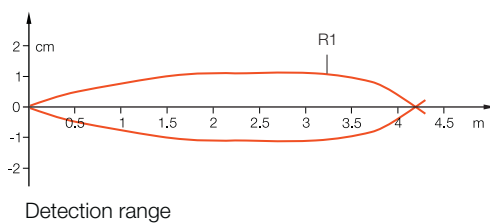
BOS 21M

Function diagrams

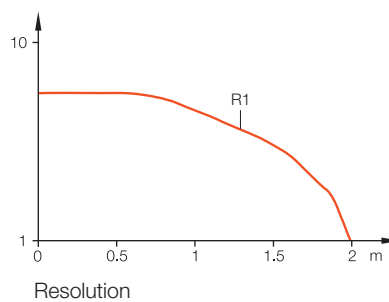
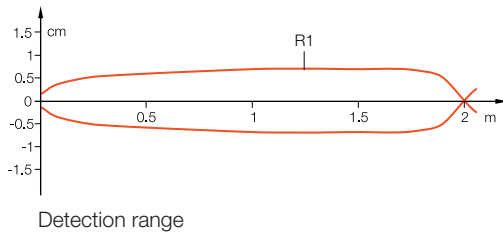
Retroreflective sensor with polarization
BOS 21M-A-PR10



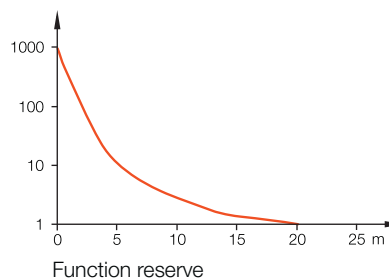
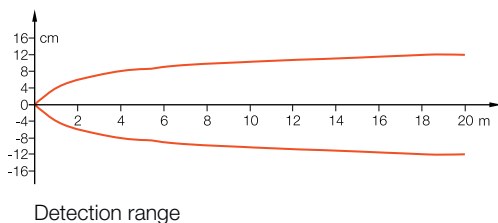
Retroreflective sensor with autocollimation
BOS 21M-A-PK10



Retroreflective sensor with glass detection
BOS 21M-A-PT-S4



Through-beam sensor
BOS 21M-A-IE10



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

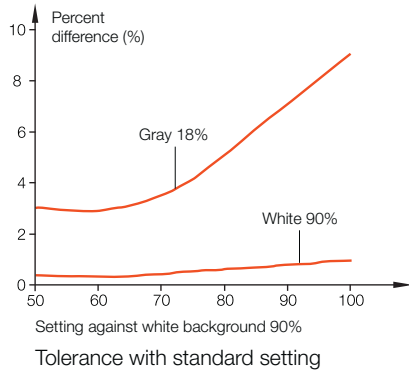
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

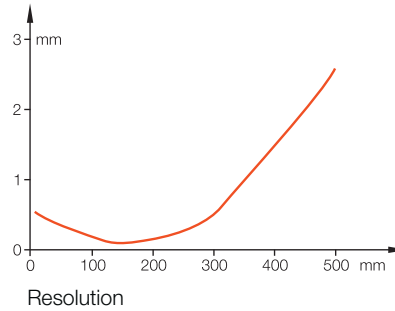
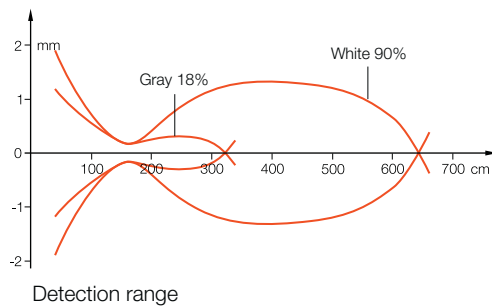
Laser diffuse sensor with background suppression

BOS 21M-US-LH12-



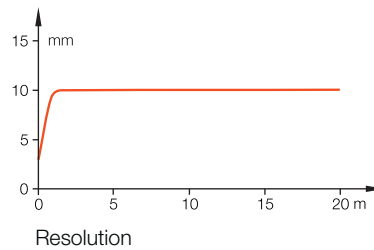
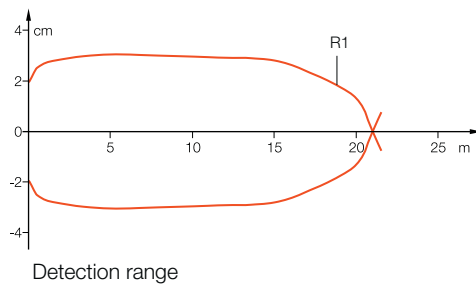
Laser diffuse sensor

BOS 21M-A-LD10-



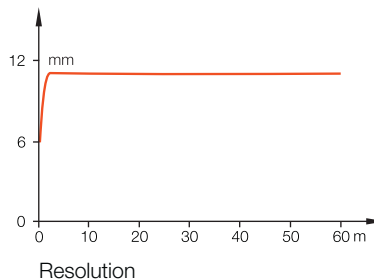
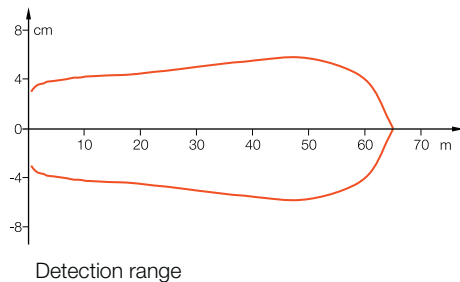
Laser retroreflective sensor with polarization

BOS 21M-A-LR10-



Laser through-beam sensor

BOS 21M-A-LE10-



Photoelectric Standard Sensors

BOS 21M

Connection, accessories



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

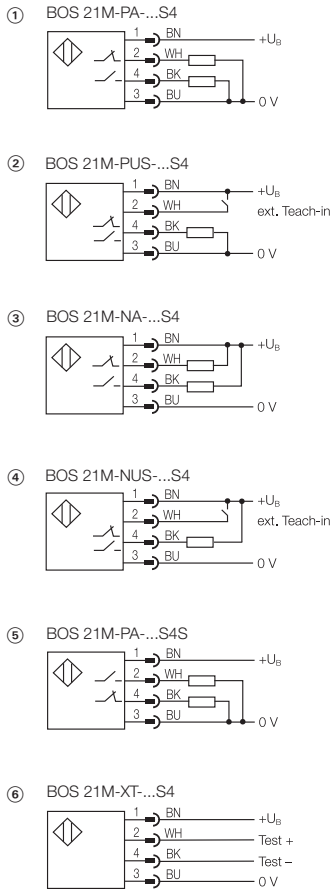
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Wiring diagrams



Recommended accessories

(please order separately)

Description	Ordering code
① Reflector	BAM00UK
② Reflector	BAM00WL
③ Clamp holder	BAM00TF
④ Clamping holder	BAM00TH
⑤ Adapter plate	BAM00T7
⑥ Mounting bracket	BAM00T9
⑦ Mounting bracket	BAM00TA



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

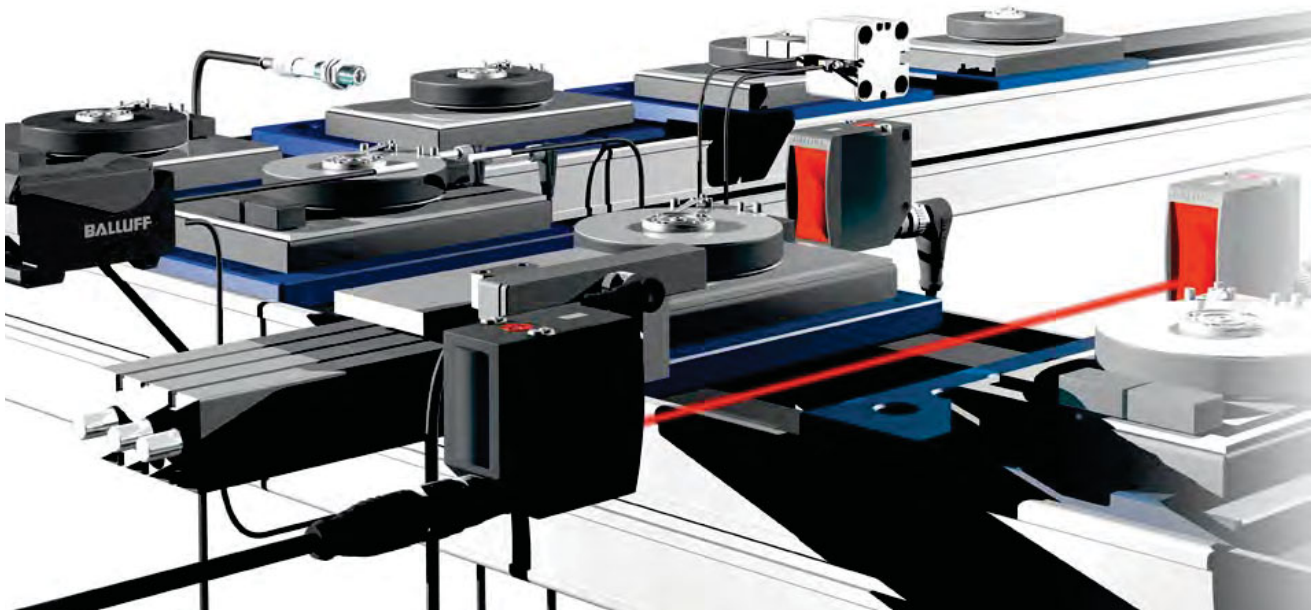
More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

The new photoelectric series **BOS 23K** stands for precise switching behavior with exact positioning tasks. Its high ranges and compact design provide for great freedom in designing the system.

The laser versions are ideal for detecting small parts.

Additional Features

- Highly visible red light/laser light for precision alignment
- LEDs visible from all sides
- Adjustable mounting options
- Outstanding price/performance ratio



Photoelectric Standard Sensors

BOS 23K



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type	Sensing distance/Range		Light type		Output		Switching type		Switching frequency	U _s	Connec- tion	Special features		Page
			Red light	Laser class	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 connector, 4-pin	Polarizing filter	Teach-in	
 Diffuse sensor with background suppression														
BOS01FL	BOS 23K-PA-RH10-S4	70...800 mm	■		■		■	■	600 Hz	■	■			208
BOS0178	BOS 23K-PU-RH10-S4	70...800 mm	■		■		■	■	600 Hz	■	■			208
BOS0179	BOS 23K-NU-RH10-S4	70...800 mm	■			■	■	■	600 Hz	■	■			208
BOS01FR	BOS 23K-PA-LH10-S4	120...600 mm		1	■		■	■	1 kHz	■	■			210
BOS017C	BOS 23K-PU-LH10-S4	120...600 mm		1	■		■	■	1 kHz	■	■			210
BOS017E	BOS 23K-NU-LH10-S4	120...600 mm		1		■	■	■	1 kHz	■	■			210
BOS01FT	BOS 23K-PA-LH20-S4	150...800 mm		2	■		■	■	1 kHz	■	■			210
BOS017H	BOS 23K-PU-LH20-S4	150...800 mm		2	■		■	■	1 kHz	■	■			210
BOS017J	BOS 23K-NU-LH20-S4	150...800 mm		2		■	■	■	1 kHz	■	■			210
 Diffuse sensor														
BOS01FM	BOS 23K-PA-RD10-S4	0...2 m	■		■		■	■	600 Hz	■	■		■	208
BOS016Z	BOS 23K-PU-RD10-S4	0...2 m	■		■		■	■	600 Hz	■	■		■	208
BOS0170	BOS 23K-NU-RD10-S4	0...2 m	■			■	■	■	600 Hz	■	■		■	208
BOS0175	BOS 23K-PU-LD20-S4	0...1.2 m		2	■		■	■	600 Hz	■	■		■	211
BOS0176	BOS 23K-NU-LD20-S4	0...1.2 m		2		■	■	■	600 Hz	■	■		■	211
 Retroreflective sensor														
BOS01FN	BOS 23K-PA-RR10-S4	0...14 m	■		■		■	■	600 Hz	■	■	■	■	209
BOS016P	BOS 23K-PU-RR10-S4	0...14 m	■		■		■	■	600 Hz	■	■	■	■	209
BOS016R	BOS 23K-NU-RR10-S4	0...14 m	■			■	■	■	600 Hz	■	■	■	■	209
BOS01HJ	BOS 23K-PA-LR10-S4	0...14 m		1	■		■	■	2 kHz	■	■	■	■	211
BOS016U	BOS 23K-PU-LR10-S4	0...14 m		1	■		■	■	2 kHz	■	■	■	■	211
BOS016W	BOS 23K-NU-LR10-S4	0...14 m		1		■	■	■	2 kHz	■	■	■	■	211
 Through-beam sensor Receiver														
BOS01FP	BOS 23K-PA-RE10-S4	0...25 m	■		■		■	■	500 Hz	■	■		■	209
BOS016F	BOS 23K-PU-RE10-S4	0...25 m	■		■		■	■	500 Hz	■	■		■	209
BOS016H	BOS 23K-NU-RE10-S4	0...25 m	■			■	■	■	500 Hz	■	■		■	209
BOS01FU	BOS 23K-PA-LE10-S4	0...30 m		1	■		■	■	3.5 kHz	■	■		■	211
BOS016L	BOS 23K-PU-LE10-S4	0...30 m		1	■		■	■	3.5 kHz	■	■		■	211
BOS016M	BOS 23K-NU-LE10-S4	0...30 m		1		■	■	■	3.5 kHz	■	■		■	211
 Through-beam sensor Emitter														
BOS016E	BOS 23K-XT-RS11-S4	0...25 m	■							■	■		■	209
BOS016K	BOS 23K-XT-LS11-S4	0...30 m		1						■	■		■	211

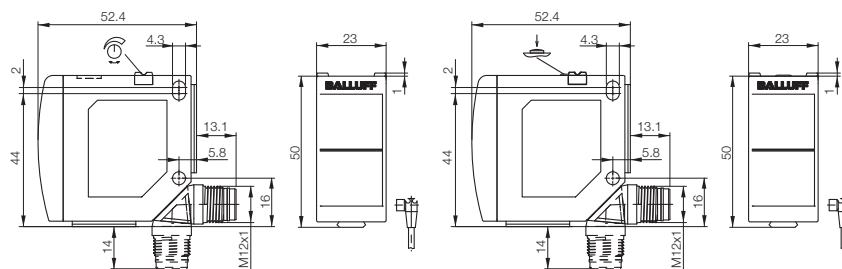


Type	Diffuse sensor with background suppression		Diffuse sensor	
Detection range	70...800 mm		0...2 m	
PNP Complementary	Part number	BOS 23K-PA-RH10-S4 ①	BOS 23K-PA-RD10-S4 ①	
PNP NO/NC	Part number	BOS 23K-PU-RH10-S4 ②	BOS 23K-PU-RD10-S4 ②	
NPN switchable	Part number	BOS 23K-NU-RH10-S4 ③	BOS 23K-NU-RD10-S4 ③	
PNP Complementary	Part number			
PNP NO/NC	Part number			
PNP switchable	Part number			
PNP Receiver	Part number			
PNP Receiver	Part number			
NPN	Part number			
Emitter	Part number			
Supply voltage U_B	10...30 V DC		10...30 V DC	
Output current	100 mA		100 mA	
No-load supply current I_0 max.	≤ 30 mA		≤ 30 mA	
Switching type	Light/dark		Light/dark	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	18-turn potentiometer		Teach-in / control input	
Emitter, light type	LED, red light		LED, red light	
Wavelength	640 nm		640 nm	
Power-on indicator	Green LED		Green LED	
Output function indicator	Yellow LED		Yellow LED	
Stability indicator	Flashing yellow LED		Flashing yellow LED	
Response time	0.833 ms		0.833 ms	
Switching frequency f	600 Hz		600 Hz	
Degree of protection as per IEC 60529	IP 67/IP 69K		IP 67/IP 69K	
Ambient temperature T_a	$-20...+60^\circ\text{C}$		$-20...+60^\circ\text{C}$	
Permissible ambient light	EN 60947-5-2		EN 60947-5-2	
Material	Housing	PC-ABS	PC-ABS	
	Optical surface	PMMA	PMMA	
Connection	M12 connector, 4-pin		M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card. Reflection light barrier values referenced to R1 reflector.

Wiring diagrams on page 215.

Ordering codes on page 207.



Photoelectric Standard Sensors

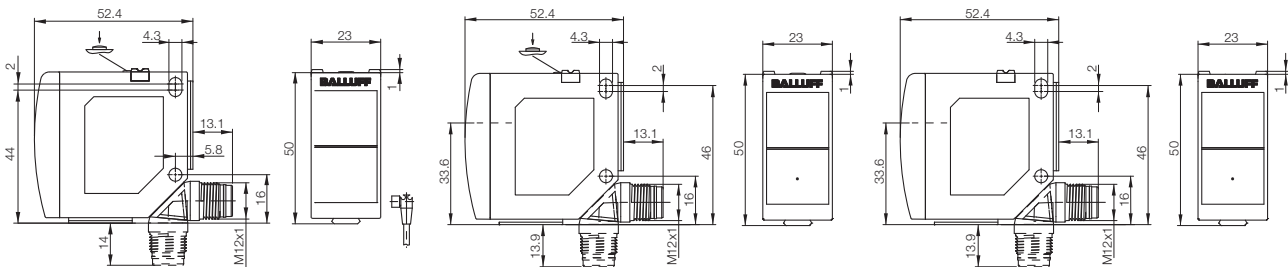
BOS 23K

Range 14 m, 25 m



Photoelectric sensors

	Retroreflective sensor 0...14 m	Through-beam sensor 0...25 m	Through-beam sensor 0...25 m	
				Photoelectric standard sensors
				Cylinder designs
				Block designs
	BOS 23K-PA-RR10-S4 ①			Photoelectric special sensors
	BOS 23K-PU-RR10-S4 ②			
	BOS 23K-NU-RR10-S4 ③			
		BOS 23K-PA-RE10-S4 ①		Photoelectric distance sensors for analog distance measurement
		BOS 23K-PU-RE10-S4 ②		
		BOS 23K-NU-RE10-S4 ③		
			BOS 23K-XT-RS11-S4 ④	Special accessories for photoelectric sensors
	10...30 V DC	10...30 V DC	10...30 V DC	
	100 mA	100 mA		
	≤ 30 mA	≤ 30 mA	≤ 30 mA	
	Light/dark	Light/dark		
	Yes/Yes	Yes/Yes		
	Teach-in / control input	Teach-in / control input		
	LED, red light	LED, red light		
	640 nm	640 nm		
	Green LED	Green LED		
	Yellow LED	Yellow LED		
	Flashing yellow LED	Flashing yellow LED		
	0.833 ms	1 ms		
	600 Hz	500 Hz		
	IP 67/IP 69K	IP 67/IP 69K	IP 67/IP 69K	
	-20...+60°C	-20...+60°C	-20...+60°C	
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	
	PC-ABS	PC-ABS	PC-ABS	
	PMMA	PMMA	PMMA	
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	



Photoelectric Standard Sensors

BOS 23K Laser

Sensing distance 600 mm, 800 mm

BOS 23K Laser

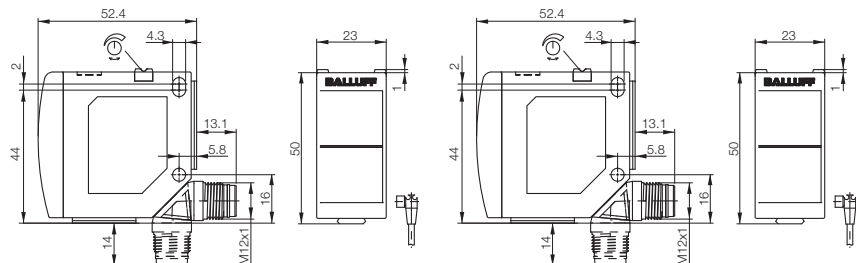


Type	Diffuse sensor with background suppression		Diffuse sensor with background suppression	
Detection range	120...600 mm		150...800 mm	
PNP Complementary	Part number	BOS 23K-PA-LH10-S4 ①	BOS 23K-PA-LH20-S4 ①	
	Part number			
PNP NO/NC	Part number	BOS 23K-PU-LH10-S4 ②	BOS 23K-PU-LH20-S4 ②	
NPN switchable	Part number	BOS 23K-NU-LH10-S4 ③	BOS 23K-NU-LH20-S4 ③	
PNP Complementary	Part number			
	Part number			
PNP NO/NC	Part number			
NPN switchable	Part number			
PNP NO/NC Receiver	Part number			
	Part number			
PNP NO/NC NPN Receiver	Part number			
	Part number			
Emitter	Part number			
	Part number			
Supply voltage U_B	12...30 V DC		12...30 V DC	
Output current	100 mA		100 mA	
No-load supply current I_0 max.	≤ 30 mA		≤ 30 mA	
Switching type	Light/dark		Light/dark	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	18-turn potentiometer		18-turn potentiometer	
Emitter, light type	Laser, red light		Laser, red light	
Wavelength	655 nm		655 nm	
Laser class	1		2	
Light spot diameter	2 mm at 600 mm		2.5x3.5 mm at 800 mm	
Power-on indicator	Green LED		Green LED	
Output function indicator	Yellow LED		Yellow LED	
Stability indicator	Flashing yellow LED		Flashing yellow LED	
Response time	0.5 ms		0.5 ms	
Switching frequency f	1 kHz		1 kHz	
Degree of protection as per IEC 60529	IP 67/IP 69K		IP 67/IP 69K	
Ambient temperature T_a	$-20...+60^\circ\text{C}$		$-20...+60^\circ\text{C}$	
Permissible ambient light	EN 60947-5-2		EN 60947-5-2	
Material	Housing	PC-ABS	PC-ABS	
	Optical surface	PMMA	PMMA	
Connection	M12 connector, 4-pin		M12 connector, 4-pin	

Diffuse sensor values referenced to 90% reflective Kodak gray card. Reflection light barrier values referenced to R1 reflector.

Wiring diagrams on page 215.

Ordering codes on page 207.





Photoelectric Standard Sensors

BOS 23K Laser

Sensing distance 1.2 m, range 14 m, 30 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

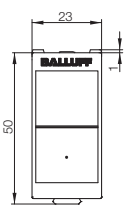
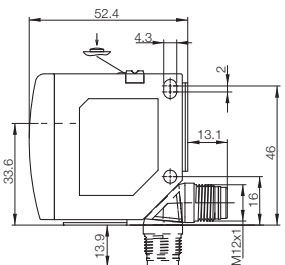
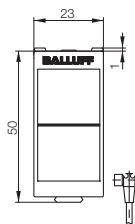
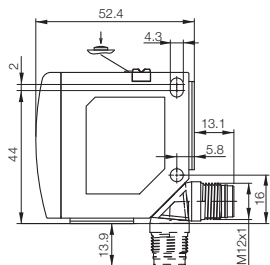
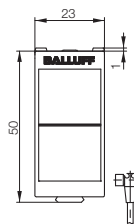
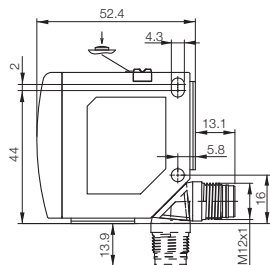
Block designs

Photoelectric special sensors

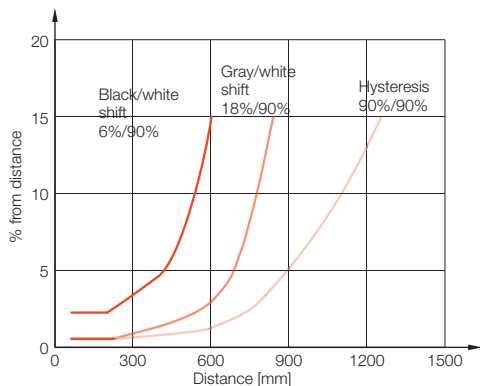
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

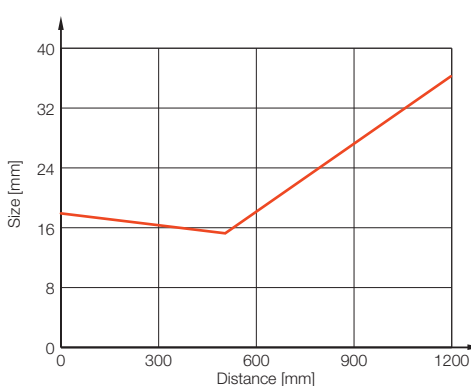
Diffuse sensor 0...1.2 m	Retroreflective sensor 0...14 m	Through-beam sensor 0...30 m
BOS 23K-PU-LD20-S4 ②		
BOS 23K-NU-LD20-S4 ③		
	BOS 23K-PA-LR10-S4 ①	
	BOS 23K-PU-LR10-S4 ②	
	BOS 23K-NU-LR10-S4 ③	
		BOS 23K-PA-LE10-S4 ①
		BOS 23K-PU-LE10-S4 ②
		BOS 23K-NU-LE10-S4 ③
		BOS 23K-XL-LS11-S4 ④
10...30 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 button / control input	Teach-in button / control input	Teach-in button / control input
Laser, red light	Laser, red light	Laser, red light
655 nm	655 nm	655 nm
2	1	1
1.2x2.2 m at 1200 mm		17 mm at 14 m
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
Flashing yellow LED	Flashing yellow LED	Flashing yellow LED
0.833 ms	0.25 ms	0.14 ms
600 Hz	2 kHz	3.5 kHz
IP 67/IP 69K	IP 67/IP 69K	IP 67/IP 69K
-20...+60°C	-20...+60°C	-20...+60°C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
PC-ABS	PC-ABS	PC-ABS
PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



Diffuse sensor with background suppression BOS 23K-...-RH10-...
Scanning features



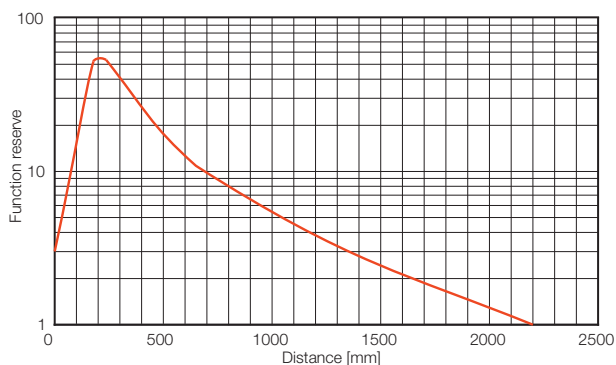
Diffuse sensor with background suppression BOS 23K-...-RH10-...
Light spot size



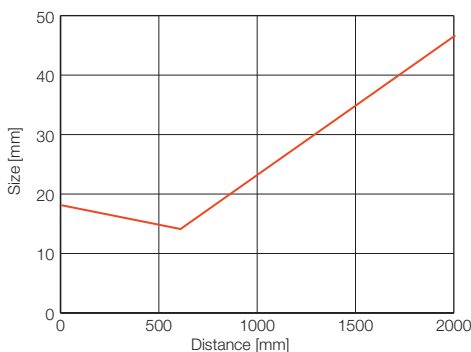
Detection range BOS 23K-...-RH10-...

Reference material	Detection range
White 90%	3...1200 mm
Gray 18%	5...800 mm
Black 6%	10...600 mm

Diffuse sensor BOS 23K-...-RD10-...
Function reserve



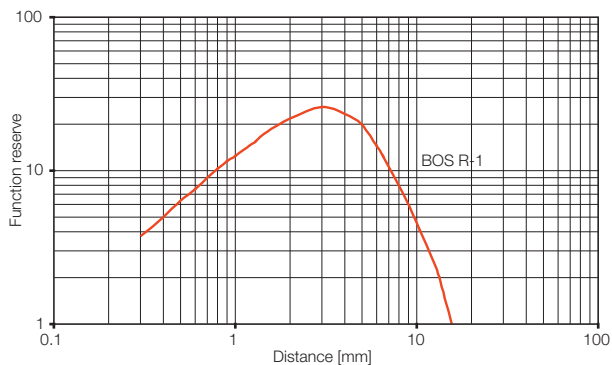
Diffuse sensor BOS 23K-...-RD10-...
Light spot size



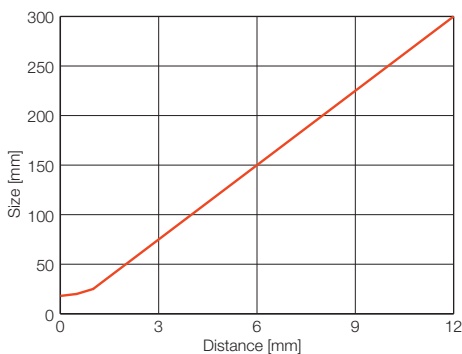
Detection range BOS 23K-...-RD10-...

Reference material	Detection range
White 90%	5...2000 mm
Gray 18%	10...1200 mm
Black 6%	90...600 mm

Retroreflective sensor BOS 23K-...-RR10-...
Function reserve



Retroreflective sensor BOS 23K-...-RR10-...
Light spot diameter



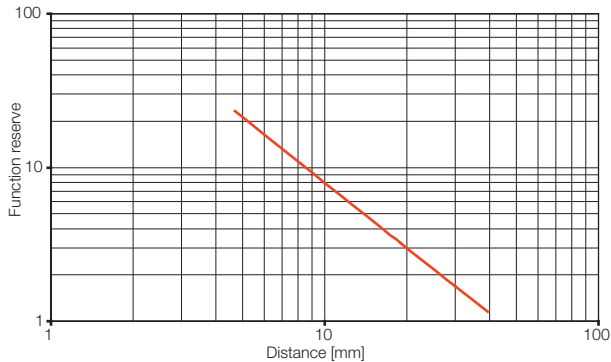


Photoelectric Standard Sensors

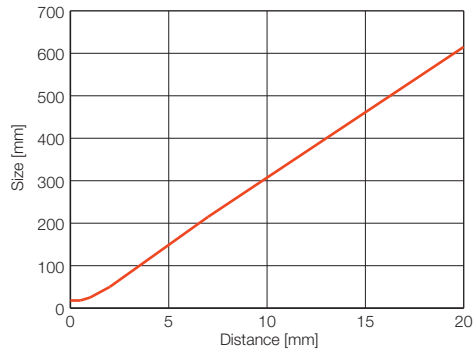
BOS 23K

Function diagrams

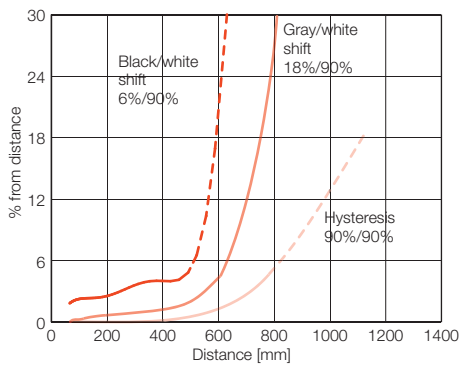
Through-beam sensor BOS 23K-...-RS../RE
Function reserve



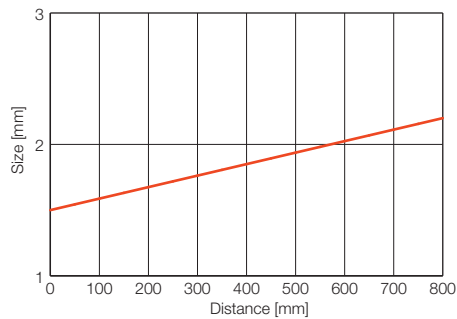
Through-beam sensor BOS 23K-...-RS../RE
Light spot size



Laser diffuse sensor with background suppression BOS 23K-...-LH10-...
scanning features



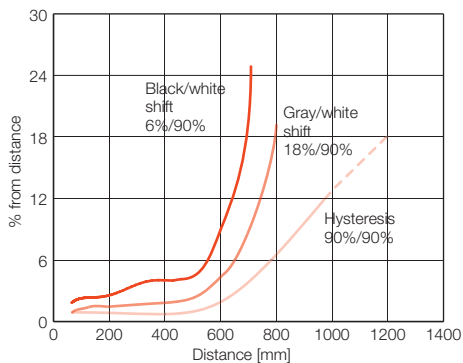
Laser diffuse sensor with background suppression BOS 23K-...-LH10-...
Light spot size



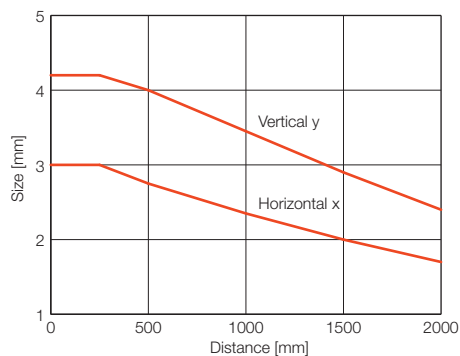
Detection range BOS 23K-...-LH10-...

Reference material	Detection range
White 90%	5...800 mm
Gray 18%	10...600 mm
Black 6%	30...500 mm

Laser diffuse sensor with background suppression BOS 23K-...-LH20-...
Scanning features



Laser diffuse sensor with background suppression BOS 23K-...-LH20-...
Light spot size



Detection range BOS 23K-...-LH20-...

Reference material	Detection range
White 90%	5...1000 mm
Gray 18%	10...800 mm
Black 6%	15...700 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

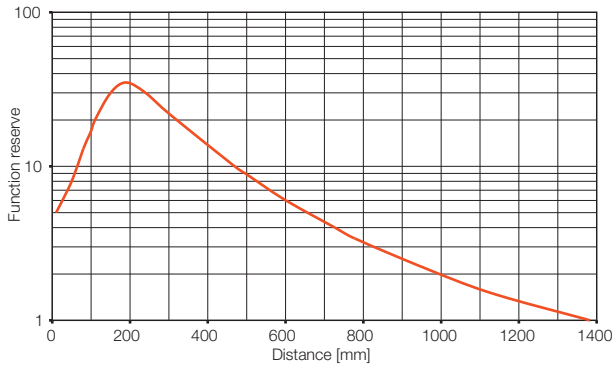
Block designs

Photoelectric special sensors

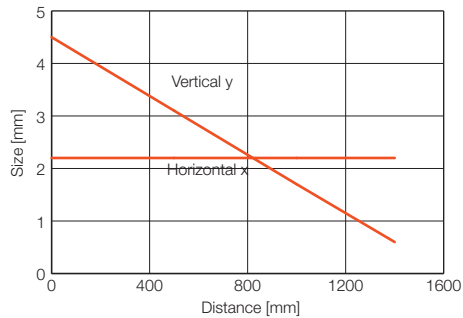
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Laser diffuse sensor BOS 23K-...-LD20-...
 Function reserve



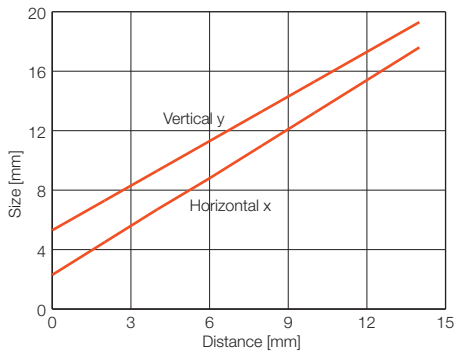
Laser diffuse sensor BOS 23K-...-LD20-...
 Light spot size



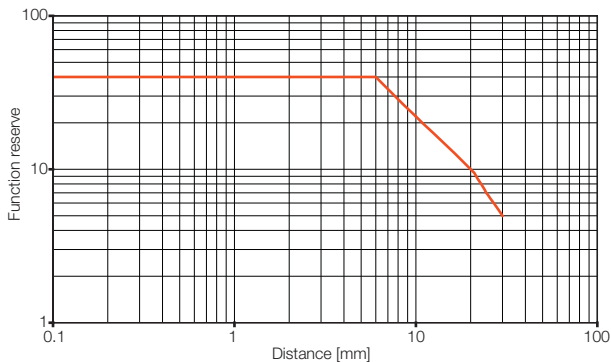
Detection range BOS 23K-...-LD20-...

Reference material	Detection range
White 90%	5...1200 mm
Gray 18%	10...700 mm
Black 6%	100...400 mm

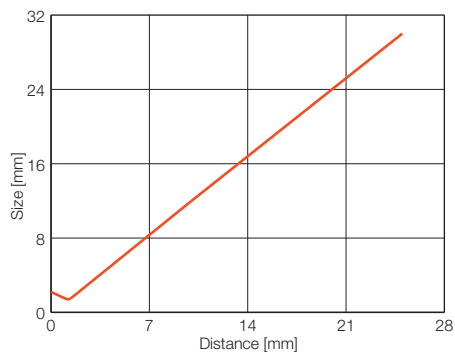
Laser retroreflective sensor BOS 23K-...-LR10-...
 Light spot size



Laser through-beam sensor BOS 23K-...-LE../LS-...
 Function reserve



Laser through-beam sensor BOS 23K-...-LE../LS-...
 Light spot size

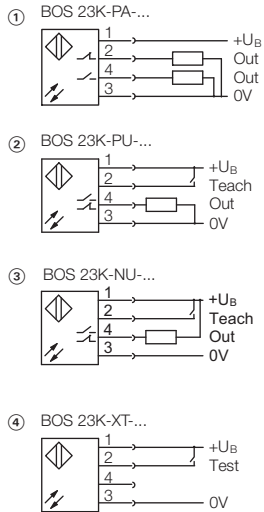


Photoelectric Standard Sensors

BOS 23K

Connection, accessories

Wiring diagrams



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Recommended accessories

(please order separately)

Description	Ordering code
① Reflector	BAM00UK
② Reflector	BAM00WL
③ Laser reflector	BAM00UY
④ Reflective tape	BAM01JM
⑤ Clamping holder	BAM00TF
⑥ Clamping holder	BAM00TH
⑦ Weld protection	BAM01L8
⑧ Mounting bracket	BAM01FK
⑨ Mounting bracket	BAM01FM



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

The BOS 26K series is ideally suited wherever greater demands are required in terms of precision, handling, high sensing distance or range, and detection of small parts.

The retroreflective sensors feature autocollimation, that is, the emitter and receiver beams coincide geometrically.

Advantage: Exact switching points for any desired side-approaching object in the entire beam path.

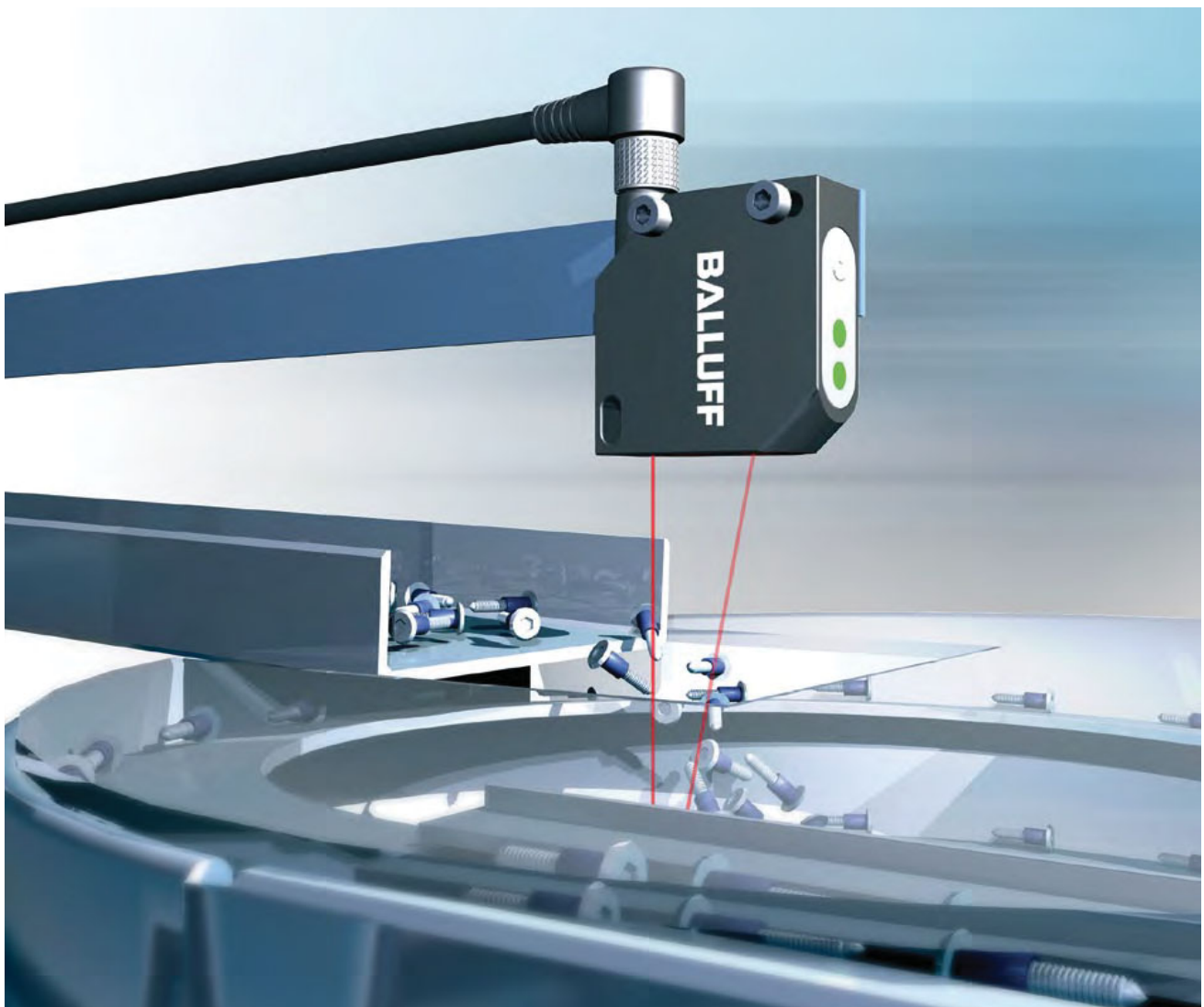
The diffuse sensor with background suppression **BOS 26K-...-1LHB**, with its focused light beam, can accurately detect very small objects in virtually any color between 30 and 150 mm. The focusing feature enables a spot size of just 0.1 mm at a distance of 80 mm.

Features

- Rotatable M12 connector
- Precise setting mechanism with two revolutions (720°)
- Clear digital display for the sensitivity setting
- Switching status and contamination indicator visible from any direction
- Complementary PNP output
- High switching frequency for laser version

Applications

- Precise detection of small parts
- Positioning tasks
- Detail checking
- Conveyor inspection (background suppression)
- Conveyor technology
- Automation technology
- Handling machines, robotics
- Machine tool building
- Specialty machines



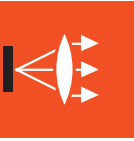


Photoelectric Standard Sensors

BOS 26K

Product overview

Type		Sensing distance/ Range	Light type			Output		Switching type		Switching frequency	U _s	Connection		Special features			Page
			Red light	Infrared	Laser class	PNP	NPN	Light switching	Dark switching		10...30 V DC	M12 connector, 4-pin		Polarizing filter	Autocollimation	Alarm output	
Ordering code Part number																	
Diffuse sensor with background suppression																	
BOS008C	BOS 26K-PA-1LHA-SA1-S4-C	40...60 mm			2					2.5 kHz							220
BOS0084	BOS 26K-NA-1LHA-SA1-S4-C	40...60 mm			2					2.5 kHz							220
BOS008E	BOS 26K-PA-1LHB-S4-C	30...150 mm			2					2.5 kHz							221
BOS0085	BOS 26K-NA-1LHB-S4-C	30...150 mm			2					2.5 kHz							221
BOS0089	BOS 26K-PA-1HC-S4-C	30...300 mm								1 kHz							218
BOS008P	BOS 26K-PS-1HC-S4-C	30...300 mm								1 kHz							218
BOS0082	BOS 26K-NA-1HC-S4-C	30...300 mm								1 kHz							218
BOS008F	BOS 26K-PA-1LHC-S4-C	50...300 mm			2					2.5 kHz							221
BOS008R	BOS 26K-PS-1LHC-S4-C	50...300 mm								2.5 kHz							221
BOS0086	BOS 26K-NA-1LHC-S4-C	50...300 mm			2					2.5 kHz							221
BOS008A	BOS 26K-PA-1IE-S4-C	150...600 mm								800 Hz							219
BOS0083	BOS 26K-NA-1IE-S4-C	150...600 mm								800 Hz							219
Retroreflective sensor																	
BOS008M	BOS 26K-PA-1QE-S4-C	0...5.5 mm								1 kHz							219
BOS0088	BOS 26K-NA-1QE-S4-C	0...5.5 mm								1 kHz							219
BOS008N	BOS 26K-PO-1QE-SA1-C	0...5.5 mm								1 kHz							219
BOS008L	BOS 26K-PA-1LQP-S4-C	0...20 m			1					2.5 kHz							222
BOS0087	BOS 26K-NA-1LQP-S4-C	0...20 m			1					2.5 kHz							222
BOS008J	BOS 26K-PA-1LQE-SA1-S4-C	0...7 mm			1					2.5 kHz							223
BOS008K	BOS 26K-PA-1LQE-SA2-S4-C	0...6 mm			1					2.5 kHz							223



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

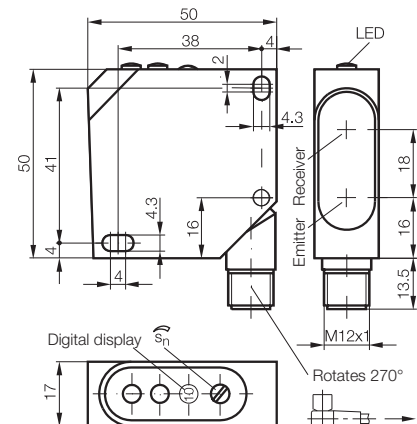


Type	Diffuse sensor with background suppression		
Detection range	30...300 mm		
PNP NO/NC	Part number	BOS 26K-PA-1HC-S4-C	①
NPN NO/NC	Part number	BOS 26K-NA-1HC-S4-C	④
PNP NO/NC Polarizing filter, autocollimation,	Part number		
NPN NO/NC	Part number		
PNP NO Polarizing filter, autocollimation, Alarm output	Part number	BOS 26K-PS-1HC-S4-C	③
Supply voltage U_B	10...30 V DC		
Output current	200 mA		
No-load supply current I_0 max.	≤ 35 mA		
Switching type	Light/dark (complementary)		
Polarity reversal/short-circuit protected	Yes/Yes		
Settings	2-turn potentiometer with indicator		
Help function			
Emitter, light type	LED, red light, pulsed		
Wavelength	660 nm		
Light spot diameter	approx. 8 mm at 200 mm		
Gray value shift (90%/18%)	8%		
Distance hysteresis	<5%		
Power-on indicator	Green LED		
Output function indicator	Yellow LED		
Stability indicator	Red LED		
Response time	0.5 ms		
Switching frequency f	1 kHz		
Degree of protection as per IEC 60529	IP 67		
Ambient temperature T_a	-20...+60°C		
Permissible ambient light	EN 60947-5-2		
Material	Housing	ABS, impact-resistant	
	Optical surface	PMMA	
Connection	M12 connector, 4-pin		

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 225.

Ordering codes on page 217.



Photoelectric Standard Sensors

BOS 26K

Sensing distance 600 mm, range 5.5 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

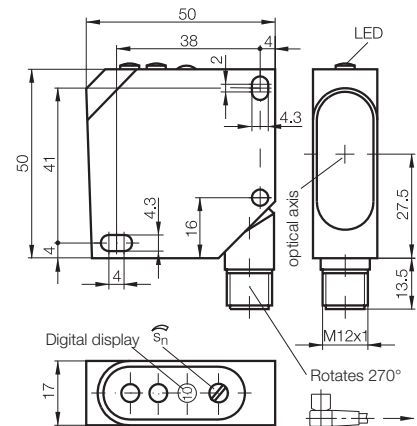
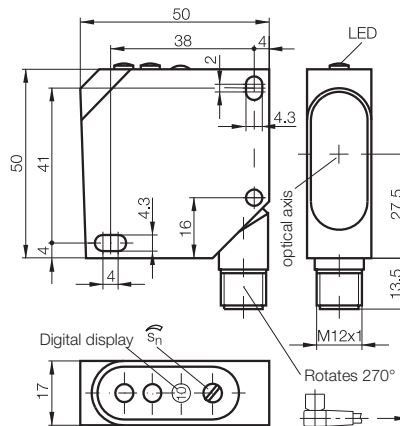
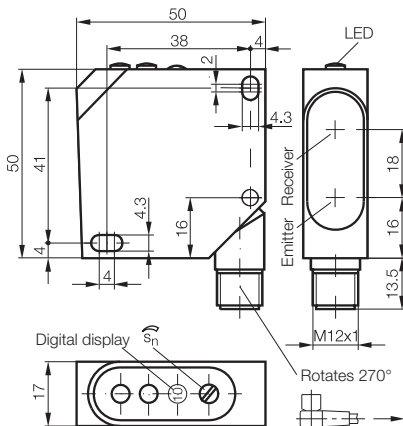
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor with background suppression 150...600 mm	Retroreflective sensor 0...5.5 m	Retroreflective sensor 0...5.5 m
BOS 26K-PA-1IE-S4-C ①		
BOS 26K-NA-1IE-S4-C ④		
	BOS 26K-PA-1QE-S4-C ①	
	BOS 26K-NA-1QE-S4-C ④	
		BOS 26K-PO-1QE-SA1-C ②
10...30 V DC	10...30 V DC	10...30 V DC
200 mA	200 mA	200 mA
≤ 70 mA	≤ 30 mA	≤ 30 mA
Light/dark (complementary)	Light/dark (complementary)	Light switching
Yes/Yes	Yes/Yes	Yes/Yes
2-turn potentiometer with indicator	2-turn potentiometer with indicator	2-turn potentiometer with indicator
		Contamination output
LED, infrared, pulsed	LED, red light, pulsed	LED, red light, pulsed
880 nm	660 nm	660 nm
approx. 20 mm at 400 mm	Ø 15 mm in 500 mm	Ø 15 mm in 500 mm
12%		
<5%		
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
Red LED	Red LED	Red LED
0.625 ms	0.5 ms	0.5 ms
800 Hz	1 kHz	1 kHz
IP 67	IP 67	IP 67
-20...+60°C	-20...+60°C	-20...+60°C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
ABS, impact-resistant	ABS, impact-resistant	ABS, impact-resistant
PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



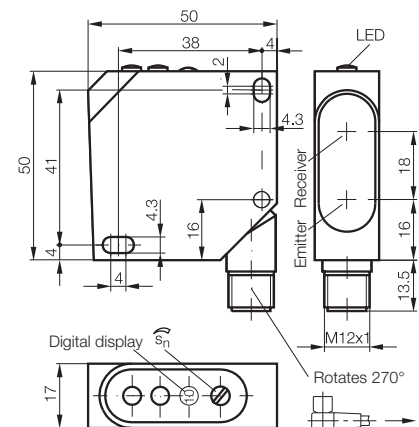


Type		Diffuse sensor with background suppression		
Detection range		40...60 mm		
PNP	NO/NC	Part number	BOS 26K-PA-1LHA-SA1-S4-C	①
NPN	NO/NC	Part number	BOS 26K-NA-1LHA-SA1-S4-C	④
PNP	NO	Part number		
Supply voltage U _B		10...30 V DC		
Output current		200 mA		
No-load supply current I ₀ max.		≤ 50 mA		
Switching type		Light/dark (complementary)		
Polarity reversal/short-circuit protected		Yes/Yes		
Settings		2-turn potentiometer with indicator		
Emitter, light type		Laser, red light		
Wavelength		670 nm		
Laser class		2		
Light spot diameter		see table		
Gray value shift (90%/18%)		1%		
Distance hysteresis		≤ 50 µm		
Power-on indicator		Green LED		
Output function indicator		Yellow LED		
Stability indicator		Red LED		
Response time		0.2 ms		
Switching frequency f		2.5 kHz		
Degree of protection as per IEC 60529		IP 67		
Ambient temperature T _a		−20...+45°C		
Permissible ambient light		EN 60947-5-2		
Material		Housing	ABS, impact-resistant	
		Optical surface	PMMA	
Connection		M12 connector, 4-pin		

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 225.

Ordering codes on page 217.



Light spot diameter [mm]

Sensing distance	40	45	50	55	60
Light spot $\varnothing$	0.25	0.7	1.1	1.5	1.8



Photoelectric Standard Sensors

BOS 26K Laser

Sensing distance 150 mm, 300 mm



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

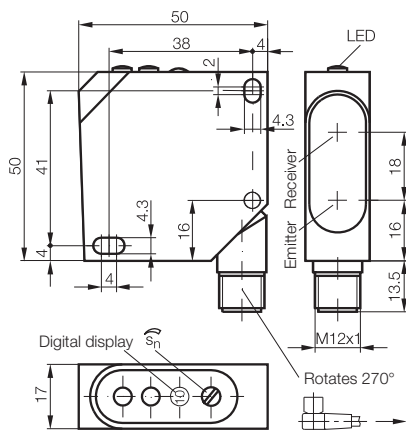
Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

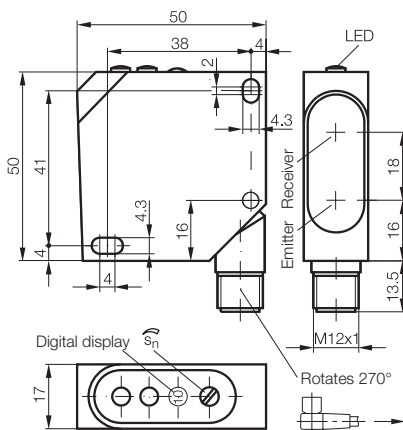
Special accessories for photoelectric sensors

Diffuse sensor with background suppression 30...150 mm	Diffuse sensor with background suppression 50...300 mm	
BOS 26K-PA-1LHB-S4-C ①	BOS 26K-PA-1LHC-S4-C ①	
BOS 26K-NA-1LHB-S4-C ④	BOS 26K-NA-1LHC-S4-C ④	
	BOS 26K-PS-1LHC-S4-C ③	
10...30 V DC	10...30 V DC	
200 mA	200 mA	
≤ 50 mA	≤ 50 mA	
Light/dark (complementary)	Light/dark (complementary)	
Yes/Yes	Yes/Yes	
2-turn potentiometer with indicator	2-turn potentiometer with indicator	
Laser, red light	Laser, red light	
670 nm	670 nm	
2	2	
see table	3×1 mm at 300 mm	
8%	5%	
5%	2%	
Green LED	Green LED	
Yellow LED	Yellow LED	
Red LED	Red LED	
0.2 ms	0.2 ms	
2.5 kHz	2.5 kHz	
IP 67	IP 67	
-15...+45°C	-20...+45°C	
5 klx	5 klx	
ABS, impact-resistant	ABS, impact-resistant	
PMMA	PMMA	
M12 connector, 4-pin	M12 connector, 4-pin	



Light spot diameter [mm]

Sensing distance	30	60	80	100	150
Light spot Ø	1.8	0.7	0.1	1.1	2.5



Light spot diameter [mm]

Sensing distance	50	100	200
Light spot Ø	5×1.8	4×1.5	3.8×1.2



For more information, visit us online!



Photoelectric Standard Sensors

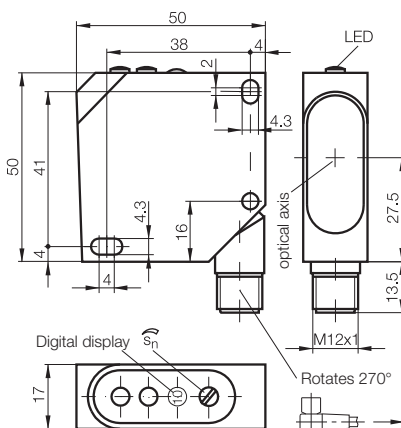
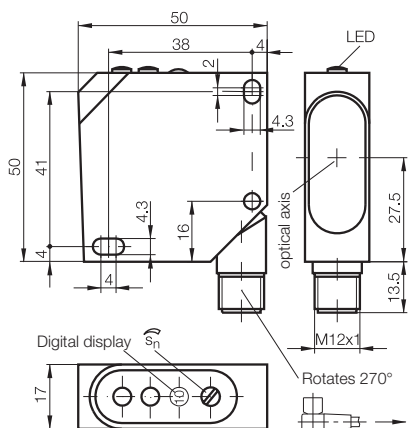
BOS 26K Laser

Range 7 m, 6 m

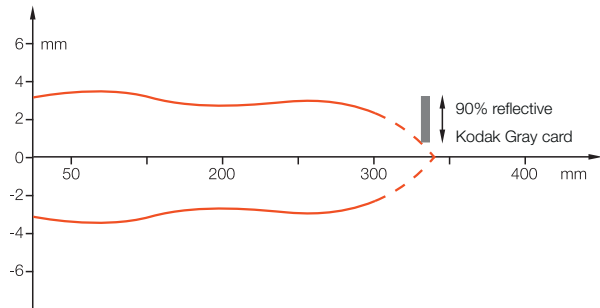


Photoelectric sensors

Retroreflective sensor 0...7 m		Retroreflective sensor 0...6 m		
BOS 26K-PA-1LQE-SA1-S4-C	①	BOS 26K-PA-1LQE-SA2-S4-C	①	Photoelectric standard sensors
10...30 V DC		10...30 V DC		Cylinder designs
200 mA		200 mA		Block designs
≤ 40 mA		≤ 40 mA		
Light/dark (complementary)		Light/dark (complementary)		Photoelectric special sensors
Yes/Yes		Yes/Yes		
2-turn potentiometer with indicator		2-turn potentiometer with indicator		
Laser, red light		Laser, red light		Photoelectric distance sensors for analog distance measurement
670 nm		670 nm		
1		1		
1.5 mm in 150 mm		1.5 mm in 150 mm		
Green LED		Green LED		
Yellow LED		Yellow LED		
Red LED		Red LED		Special accessories for photoelectric sensors
0.2 ms		0.2 ms		
2.5 kHz		2.5 kHz		
IP 67		IP 67		
-20...+45°C		-20...+45°C		
5 klx		5 klx		
ABS, impact-resistant		ABS, impact-resistant		
PMMA		PMMA		
M12 connector, 4-pin		M12 connector, 4-pin		

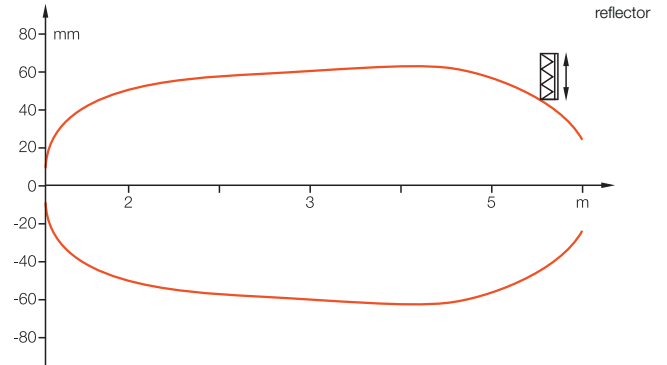


Diffuse sensor BOS 26K...-1HC-...



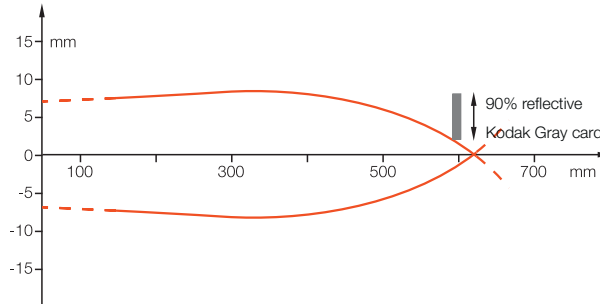
Sensing distance with side approach of Kodak gray card.

Retroreflective sensor BOS 26K...-1QE-...



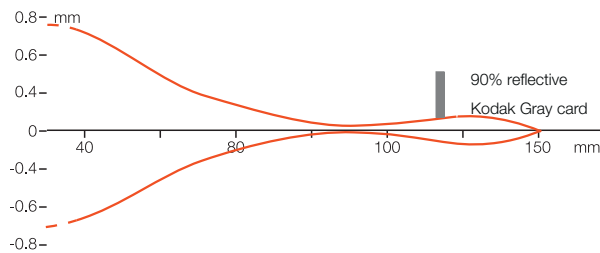
Range measured with side approach of reflector.

Diffuse sensor BOS 26K...-1IE-...



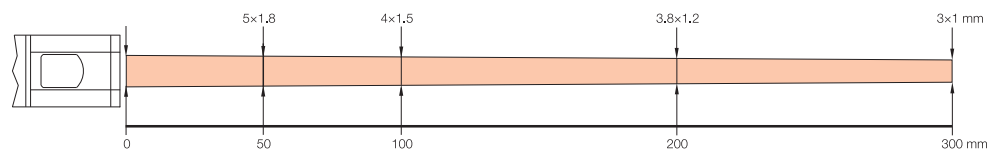
Sensing distance with side approach of Kodak gray card.

Diffuse sensor BOS 26K...-1LHB-...

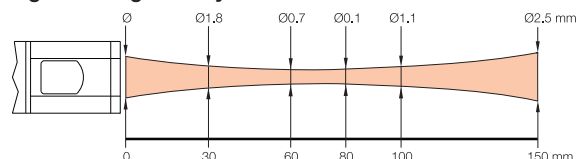


Sensing distance with side approach of Kodak gray card.

Light beam geometry BOS 26K...1LHC



Light beam geometry BOS 26K...1LHB



Photoelectric Standard Sensors

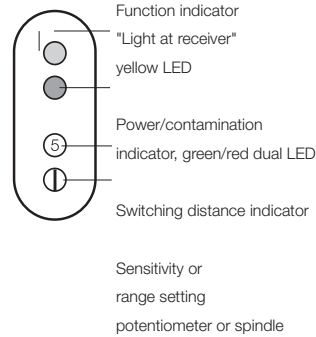
BOS 26K

Connection, accessories

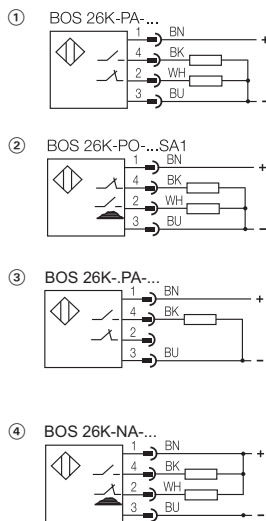
Contamination indicator

The BOS 26K has 2 LED indicators: yellow for the function indicator and green/red for the power and contamination indicator. Should the received light intensity drop below a certain level, this will be indicated by the red LED. This allows contamination or maladjustment to be detected early.

Indicators and operating elements



Wiring diagrams



Recommended accessories

(please order separately)

Description	Ordering code
① Reflector	BAM00UK
② Reflector	BAM00WL
③ Laser reflector	BAM00UY
④ Laser reflector	BAM00UM
⑤ Laser reflector	BAM00UN
⑥ Mounting bracket	BAM00TK
⑦ Adapter plate	BAM00T7



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.

Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

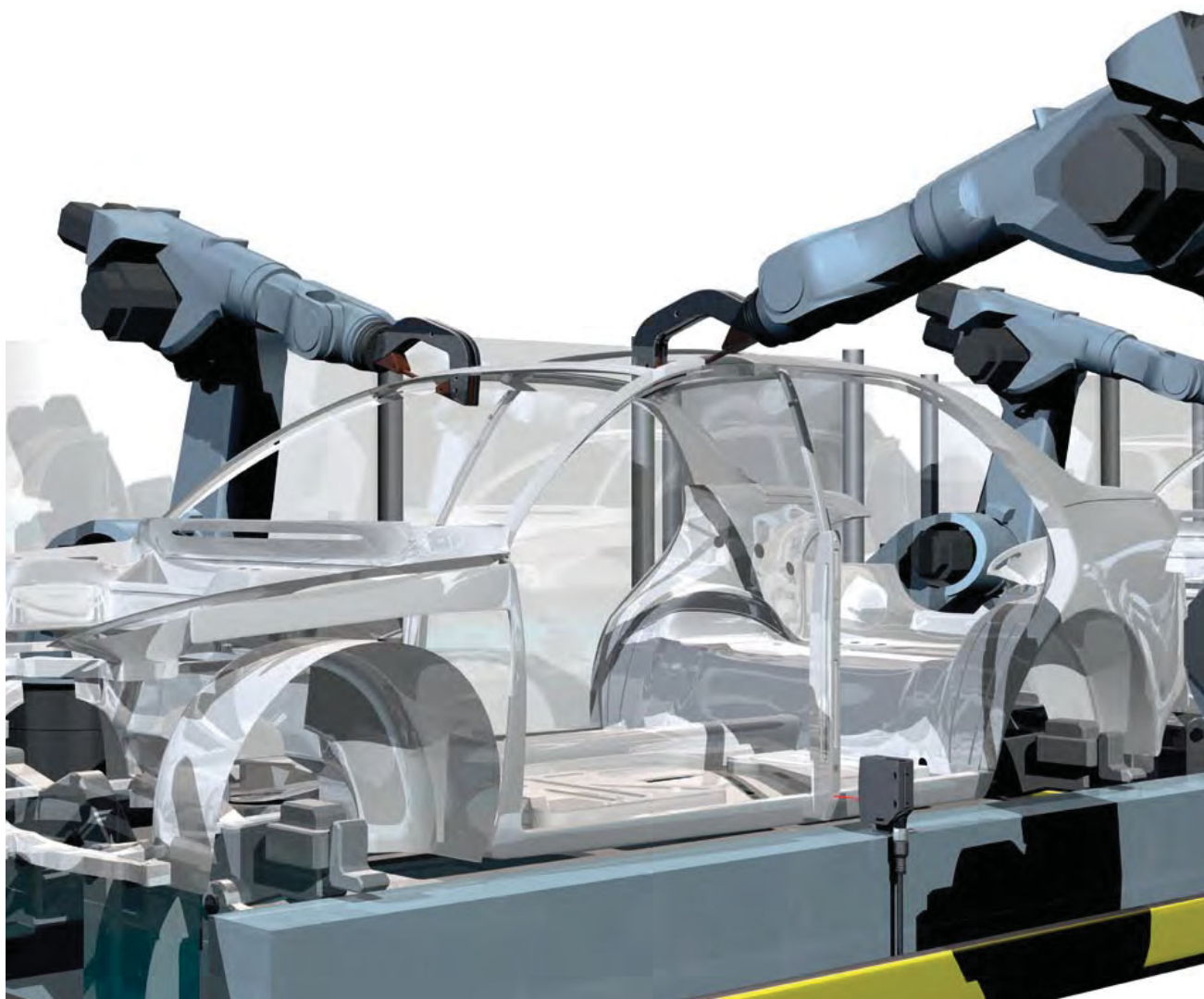
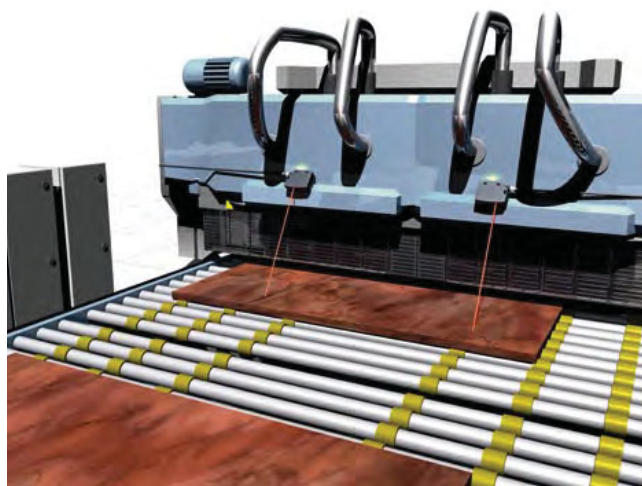
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

The new light barriers and diffuse sensors in the BOS 50K series combine top performance and compact dimensions. Thanks to their long range, these all-rounders are suitable for use in numerous sectors, ranging from the automotive industry to the woodworking industry. The background suppression is particularly impressive with an almost color-independent detection of objects – and that at maximum sensing distance.

The most important features at a glance

- Reliable object detection even at large distances
- Real background suppression for a sensing distance of up to 2 m even on dark objects
- Simple alignment due to bright, clearly visible beam spot
- Simple and fast setting with potentiometer
- Through-beam sensor with test input for function check
- Varied and time-saving assembly options



Photoelectric Standard Sensors

BOS 50K

Product overview

Type		Sensing distance/ Range	Light type	Output				Switching type		Switching frequency	U _S	Con- nection	Special features		Page
			Red light	PNP	NPN	10-Link	Contamination output	Light switching	Dark switching		10...30 V DC	M12 connector, 4-pin	Polarizing filter	Teach-in	
 Diffuse sensor with background suppression															
BOS018P	BOS 50K-PA-RH12-S4	200...2000 mm	■	■				■	■	500 Hz	■	■			228
BOS018R	BOS 50K-NA-RH12-S4	200...2000 mm	■		■			■	■	500 Hz	■	■			228
BOS018N	BOS 50K-PS-RH12-S4	200...2000 mm	■	■				■		500 Hz	■	■			228
BOS0156	BOS 50K-PSV-RH12-S4	200...2000 mm	■	■			■	■		500 Hz	■	■			228
BOS018T	BOS 50K-NSV-RH12-S4	200...2000 mm	■		■		■	■		500 Hz	■	■			228
BOS018U	BOS 50K-POV-RH12-S4	200...2000 mm	■	■			■		■	500 Hz	■	■			228
BOS018W	BOS 50K-NOV-RH12-S4	200...2000 mm	■		■		■		■	500 Hz	■	■			228
 Diffuse sensor															
BOS01CJ	BOS 50K-PA-RD10-S4	1...2000 mm	■	■				■	■	400 Hz	■	■			229
BOS01N7	BOS 50K-NA-RD10-S4	1...2000 mm	■		■			■	■	400 Hz	■	■			229
BOS01CP	BOS 50K-PS-RD10-S4	1...2000 mm	■	■				■		400 Hz	■	■			229
BOS01N9	BOS 50K-NS-RD10-S4	1...2000 mm	■		■			■		400 Hz	■	■			229
BOS01J0	BOS 50K-PO-RD10-S4	1...2000 mm	■	■					■	400 Hz	■	■			229
BOS01N8	BOS 50K-NO-RD10-S4	1...2000 mm	■		■				■	400 Hz	■	■			229
BOS01JA	BOS 50K-PU-RD11-S4	1...3500 mm	■	■				■	■	200 Hz	■	■		■	229
BOS01JH	BOS 50K-NU-RD11-S4	1...3500 mm	■		■			■	■	200 Hz	■	■		■	229
BOS01JJ	BOS 50K-PI-RD11-S4	1...3500 mm	■	■		■		■	■	200 Hz	■	■		■	229
 Retroreflective sensor															
BOS01CR	BOS 50K-PA-PR10-S4	0.1...18 m	■	■				■	■	400 Hz	■	■	■		230
BOS01N1	BOS 50K-NA-PR10-S4	0.1...18 m	■		■			■	■	400 Hz	■	■	■		230
BOS01CL	BOS 50K-PS-PR10-S4	0.1...18 m	■	■					■	400 Hz	■	■	■		230
BOS01N3	BOS 50K-NS-PR10-S4	0.1...18 m	■		■				■	400 Hz	■	■	■		230
BOS01HY	BOS 50K-PO-PR10-S4	0.1...18 m	■	■				■		400 Hz	■	■	■		230
BOS01N2	BOS 50K-NO-PR10-S4	0.1...18 m	■		■			■		400 Hz	■	■	■		230
 Through-beam sensor Receiver															
BOS01CK	BOS 50K-PA-RE10-S4	0...60 m	■	■				■	■	400 Hz	■	■			231
BOS01N4	BOS 50K-NA-RE10-S4	0...60 m	■		■			■	■	400 Hz	■	■			231
BOS01CM	BOS 50K-PS-RE10-S4	0...60 m	■	■					■	400 Hz	■	■			231
BOS01N6	BOS 50K-NS-RE10-S4	0...60 m	■		■				■	400 Hz	■	■			231
BOS01HZ	BOS 50K-PO-RE10-S4	0...60 m	■	■				■		400 Hz	■	■			231
BOS01N5	BOS 50K-NO-RE10-S4	0...60 m	■		■			■		400 Hz	■	■			231
 Through-beam sensor Emitter															
BOS01EU	BOS 50K-X-RS10-S4		■								■	■			231
BOS01CN	BOS 50K-XT-RS10-S4		■								■	■			231



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

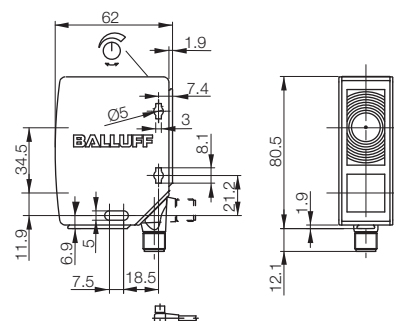


Type	Diffuse sensor with background suppression		
Detection range	200...2000 mm		
PNP Complementary	Part number	BOS 50K-PA-RH12-S4	④
NPN	Part number	BOS 50K-NA-RH12-S4	⑩
PNP NO/NC	Part number		
NPN Switchable	Part number		
PNP NO/NC	Part number		
Switchable IO-Link	Part number		
PNP NO	Part number	BOS 50K-PS-RH12-S4	①
NPN NO	Part number		
PNP NC	Part number		
NPN NC	Part number		
PNP NO with	Part number	BOS 50K-PSV-RH12-S4	②
NPN Error output	Part number	BOS 50K-NSV-RH12-S4	⑧
PNP NC with	Part number	BOS 50K-POV-RH12-S4	⑥
NPN Error output	Part number	BOS 50K-NOV-RH12-S4	⑪
Supply voltage U_B	10...30 V DC		
Output current	100 mA		
No-load supply current I_0 max.	≤ 50 mA		
Switching type	Light/dark switching		
Polarity reversal/short-circuit protected	Yes/Yes		
Settings	Potentiometer, 10-turn		
Emitter, light type	LED, red light		
Wavelength	630 nm		
Light spot diameter	75×75 mm at 1.5 m		
Gray value shift (90%/18%)	8%		
Power indicator	Green LED		
Received light indicator	Yellow LED		
Stability indicator			
Error indicator	Yellow LED (flashes)		
Response time	1 ms		
Switching frequency f	500 Hz		
Degree of protection as per IEC 60529	IP 67		
Ambient temperature T_a	-10...+60°C		
Permissible ambient light	10 klx		
Material	Housing	ABS/PC	
	Optical surface	Glass	
Connection	M12 connector, 4-pin		

Diffuse sensor values referenced to 90% reflective Kodak gray card.

Wiring diagrams on page 233.

Ordering codes on page 227.



Photoelectric Standard Sensors

BOS 50K

Sensing distance 2 m, 3.5 m



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

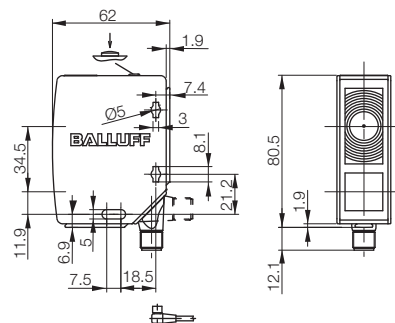
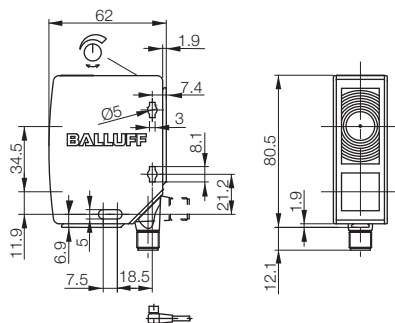
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Diffuse sensor 1...2000 mm		Diffuse sensor 1...3500 mm	
BOS 50K-PA-RD10-S4	④		
BOS 50K-NA-RD10-S4	⑩		
		BOS 50K-PU-RD11-S4	⑤
		BOS 50K-NU-RD11-S4	⑫
		BOS 50K-PI-RD11-S4	⑬
BOS 50K-PS-RD10-S4	①		
BOS 50K-NS-RD10-S4	⑦		
BOS 50K-PO-RD10-S4	③		
BOS 50K-NO-RD10-S4	⑨		
10...30 V DC		10...30 V DC	
100 mA		100 mA	
≤ 50 mA		≤ 50 mA	
Light/dark switching		Light/dark switching	
Yes/Yes		Yes/Yes	
Potentiometer, 270°		Teach-in	
LED, red light		LED, red light	
630 nm		630 nm	
50x50 mm at 2 m		80x80 mm at 3.5 m	
Green LED		Green LED	
Yellow LED		Yellow LED	
Yellow LED, flashes		Yellow LED, flashes	
1.25 ms		2.5 ms	
400 Hz		200 Hz	
IP 67		IP 67	
-5...+55°C		-5...+55°C	
5 klx		10 klx	
ABS/PC		ABS/PC	
Glass		Glass	
M12 connector, 4-pin		M12 connector, 4-pin	



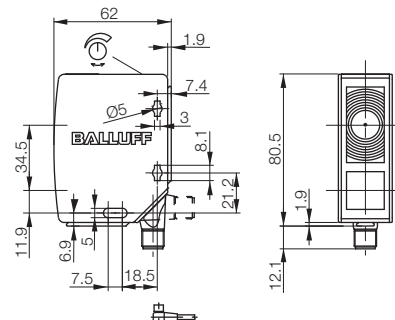


Type				Retroreflective sensor	
Detection range				0.1...18 m	
PNP	NO/NC	Polarizing filter	Part number	BOS 50K-PA-PR10-S4	④
NPN	NO/NC		Part number	BOS 50K-NA-PR10-S4	⑩
PNP	NO	Polarizing filter	Part number	BOS 50K-PS-PR10-S4	①
NPN	NO		Part number	BOS 50K-NS-PR10-S4	⑦
PNP	NC	Polarizing filter	Part number	BOS 50K-PO-PR10-S4	③
NPN	NC		Part number	BOS 50K-NO-PR10-S4	⑨
	Emitter	Test input	Part number		
	Emitter		Part number		
Supply voltage U _B				10...30 V DC	
Output current				100 mA	
No-load supply current I ₀ max.				≤ 50 mA	
Switching type				Light/dark	
Polarity reversal/short-circuit protected				Yes/Yes	
Settings				Potentiometer, 270°	
Emitter, light type				LED, red light	
Wavelength				630 nm	
Light spot diameter				200×200 mm at 10 m	
Power indicator				Green LED	
Received light indicator				Yellow LED	
Stability indicator				Yellow LED flashes	
Response time				1.25 ms	
Switching frequency f				400 Hz	
Degree of protection as per IEC 60529				IP 67	
Ambient temperature T _a				−5...+55°C	
Permissible ambient light				10 klx	
Material			Housing	ABS/PC	
			Optical surface	Glass	
Connection				M12 connector, 4-pin	

Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 233.

Ordering codes on page 227.



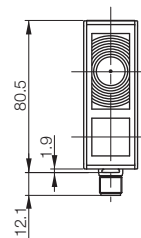
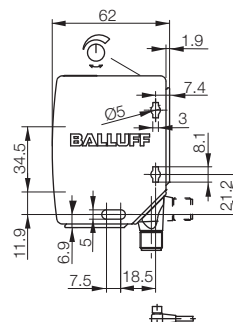
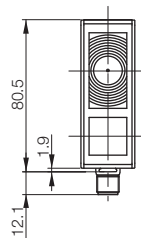
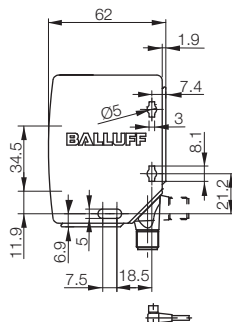
Photoelectric Standard Sensors

BOS 50K

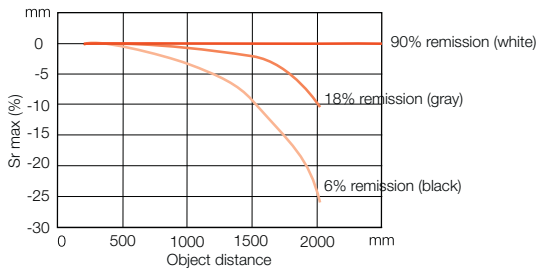
Range 60 m



Through-beam sensor 0...60 m		Through-beam sensor 0...60 m		Photoelectric standard sensors
BOS 50K-PA-RE10-S4	④			
BOS 50K-NA-RE10-S4	⑩			Cylinder designs
BOS 50K-PS-RE10-S4	①			
BOS 50K-NS-RE10-S4	⑦			Block designs
BOS 50K-PO-RE10-S4	③			
BOS 50K-NO-RE10-S4	⑨			Photoelectric special sensors
		BOS 50K-XT-RS10-S4	⑭	
		BOS 50K-X-RS10-S4	⑭	Photoelectric distance sensors for analog distance measurement
10...30 V DC		10...30 V DC		
100 mA		≤ 50 mA		Special accessories for photoelectric sensors
≤ 35 mA				
Light/dark		Yes/Yes		
Yes/Yes		Potentiometer, 270°		
Fixed		LED, red light		
		630 nm		
		180×180 mm at 10 m		
		Green LED		
Green LED				
Yellow LED				
1.25 ms				
400 Hz				
IP 67		IP 67		
-5...+55°C		-5...+55°C		
10 klx		10 klx		
ABS/PC		ABS/PC		
Glass		Glass		
M12 connector, 4-pin		M12 connector, 4-pin		

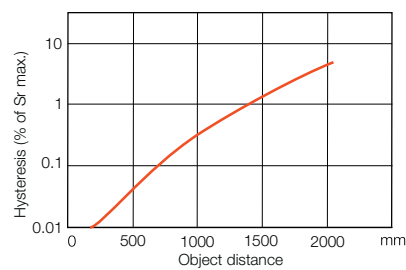


Diffuse sensor with background suppression BOS 50K-...-RH12-S4-...



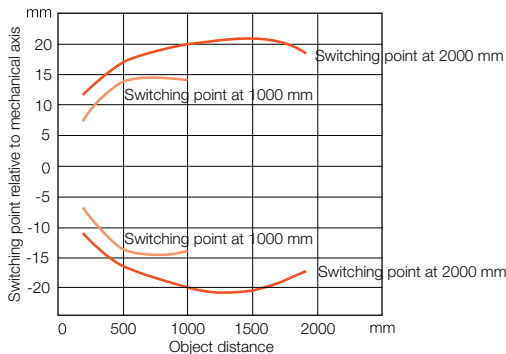
Switching distance deviation depending on object distance
With differing level of remission

Diffuse sensor BOS 50K-...-RH12-S4-...



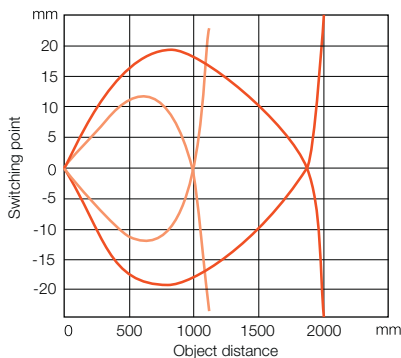
Switching hysteresis depending on object distance

Diffuse sensor with background suppression BOS 50K-...-RH12-S4-...



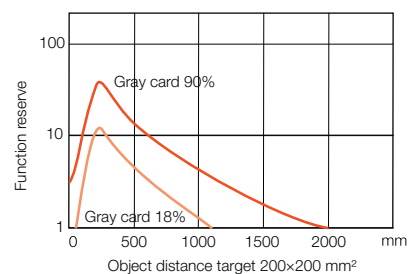
Response curve with switch-on point from left and right side

Diffuse sensor BOS 50K-...-RD10-S4



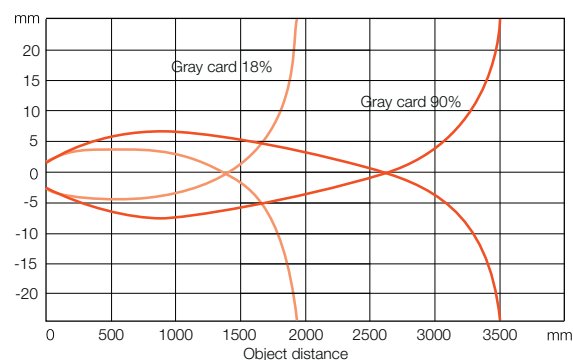
Response curve depending on distance

Diffuse sensor BOS 50K-...-RD10-S4



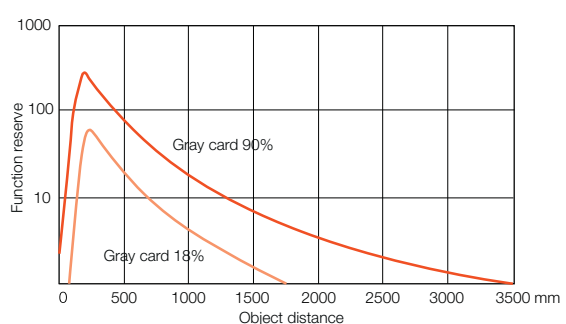
Function reserve depending on distance

Diffuse sensor BOS 50K-...-RD11-S4



Response curve depending on object distance

Diffuse sensor BOS 50K-...-RD11-S4



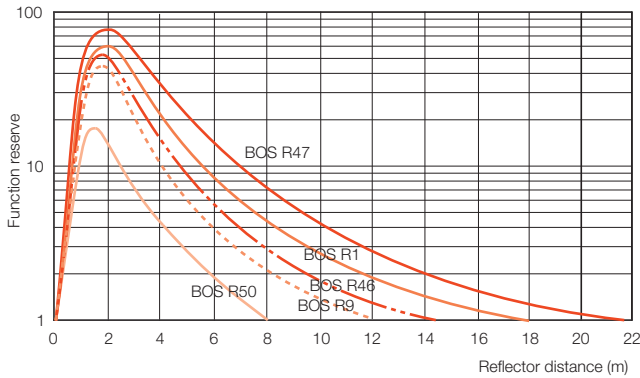
Function reserve depending on object distance

Photoelectric Standard Sensors

BOS 50K

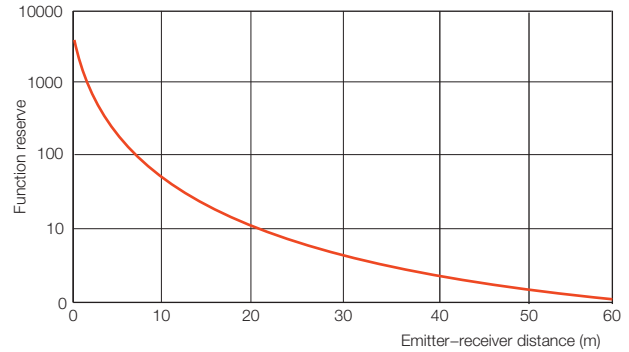
Function diagrams, connection, accessories

Retroreflective sensor BOS 50K-...-PR10-S4



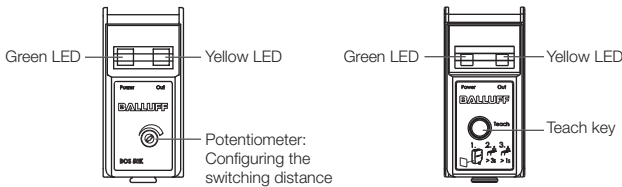
Function reserve depending on distance between sensor and reflector

Through-beam sensor BOS 50K-...-RE/RS10-S4

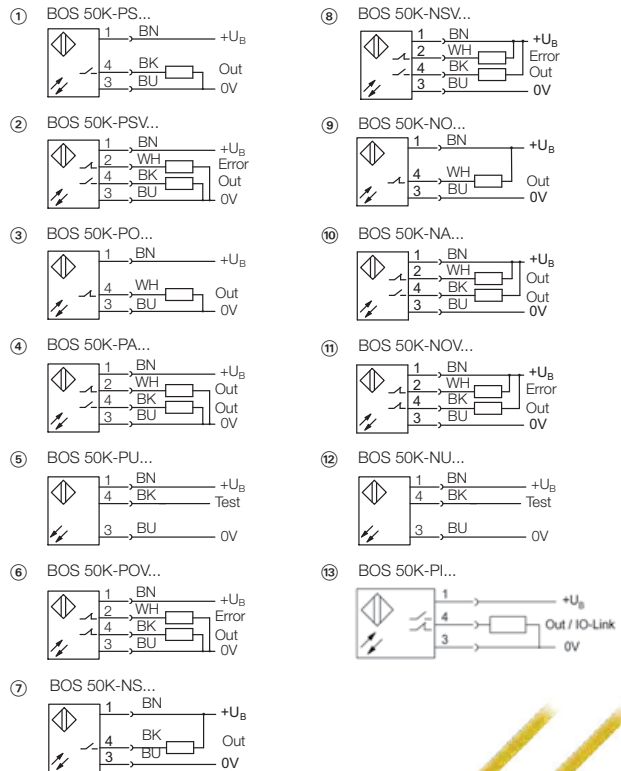


Function reserve depending on distance between emitter and receiver

Indicators and operating elements



Wiring diagrams



Recommended accessories (please order separately)

Description	Ordering code
① Reflector	BAM00UK
② Reflector	BAM00WL
③ Reflector	BAM01JN
④ Reflector	BAM01JP
⑤ Reflective tape	BAM01JM
⑥ Mounting bracket	BAM01E8
⑦ Weld protection	BAM01U6



Suitable connector (please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric sensors

Photoelectric standard sensors
Cylinder designs
Block designs

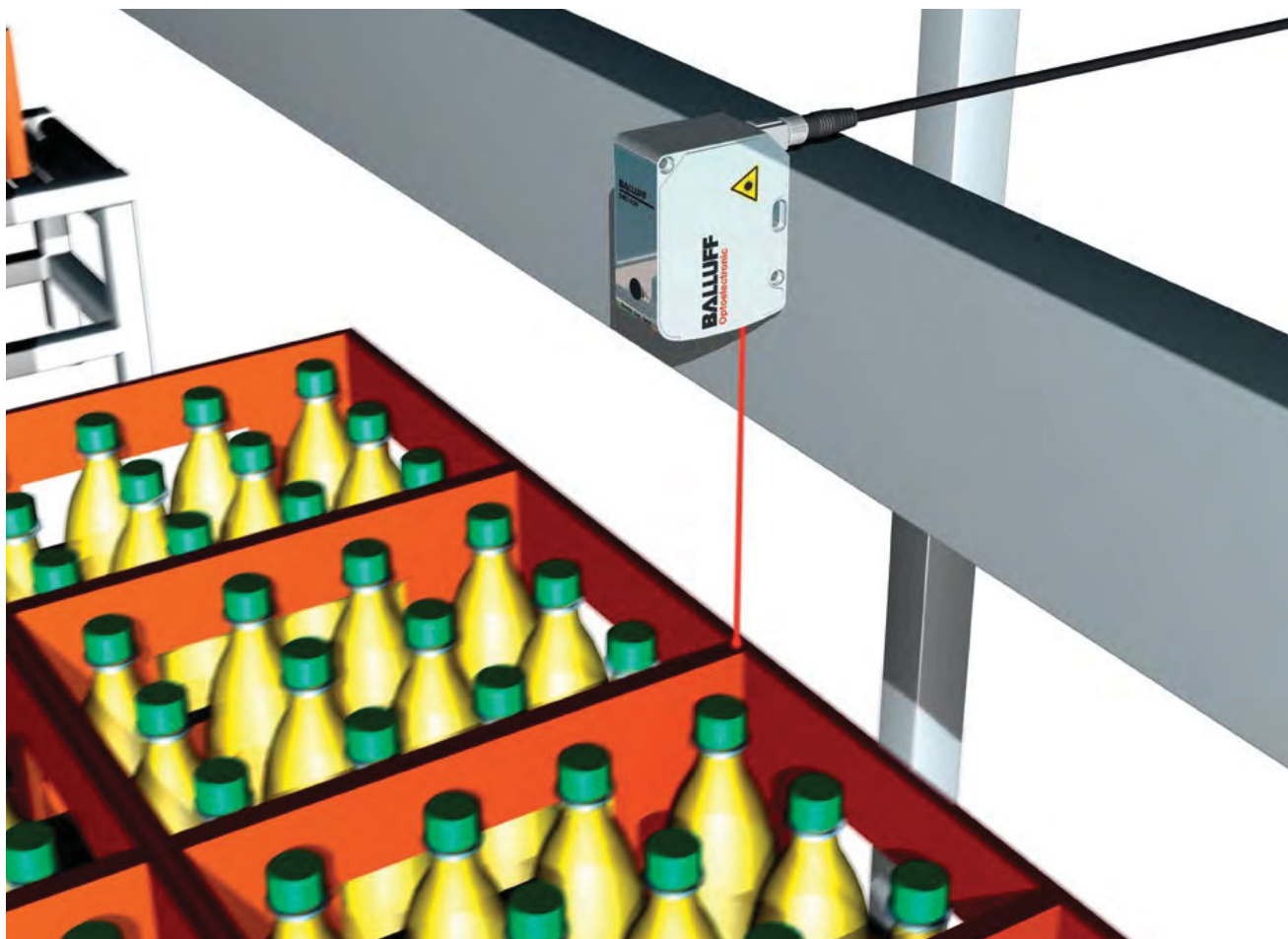
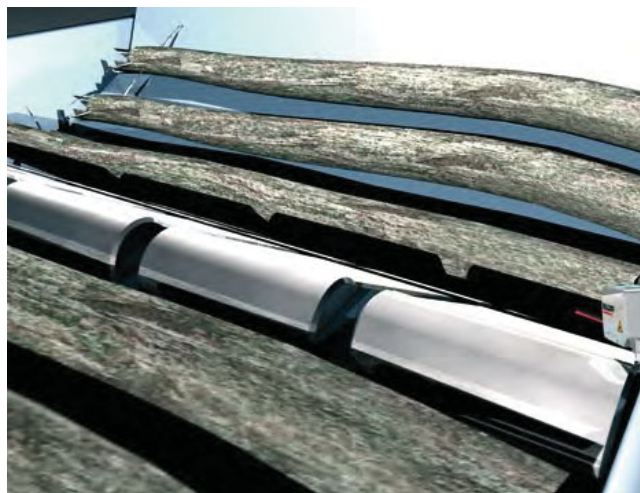
Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

The **BOS 63M** is a specialist among the diffuse sensors with regard to background suppression. The laser makes it ideally suited for detecting objects from far away when they are right in front of a background. The precise laser beam detects even small objects or object details from great distances.

With two solid 4-turn potentiometers, the two switching outputs can be configured independently and exactly. An integrated error indicator informs you about the current sensor status.



Photoelectric Standard Sensors

BOS 63M

Product overview

Type

■ Ordering code

■ Part number

Type		Sensing distance/ Range	Light type		Output		Switching type		Switching frequency	U _S	Con- nection	Special features		Page
			Laser		2 × PNP 2 × NPN		Light switching			15...30 V DC	M12 connector, 4-pin			
 Diffuse sensor with background suppression														
BOS019J	BOS 63M-PS-LH13-S4	0.2...6 m	■		■		■		250 Hz	■	■			236
BOS019H	BOS 63M-NS-LH13-S4	0.2...6 m	■			■	■		250 Hz	■	■			236



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric Standard Sensors

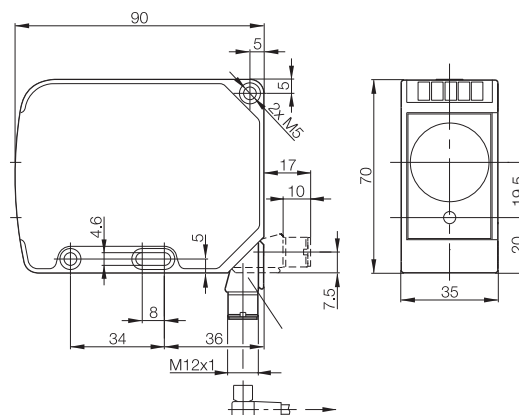
BOS 63M

Sensing distance 6 m

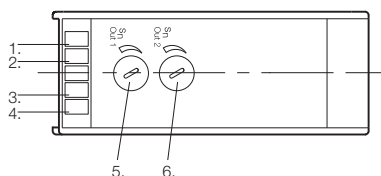


Type	Diffuse sensor with background suppression		
Detection range	0.2...6 m		
2× PNP	Part number	BOS 63M-PS-LH13-S4	①
2× NPN	Part number	BOS 63M-NS-LH13-S4	②
Supply voltage U _B	15...30 V DC		
Output current	200 mA		
No-load supply current I ₀ max.	75 mA		
Switching type	Light switching		
Polarity reversal/short-circuit protected	Yes/Yes		
Settings	Potentiometer, 4-turn (2x)		
Emitter, light type	Laser, red light		
Wavelength	660 nm		
Laser class	2		
Light spot size	10 mm		
Gray value shift	≤ 1.5%		
Switching hysteresis	≤ 15 mm		
Repeat accuracy	≤ ±4 mm		
Power-on indicator	Green LED		
Output function indicator	Yellow LED (2x)		
Error indicator	Red LED		
Response time	2 ms		
Switching frequency f	250 Hz		
Degree of protection as per IEC 60529	IP 67		
Ambient temperature T	−10...+60°C		
Permissible ambient light	10 klx		
Material	Housing	GD-AL	
	Optical surface	Glass	
Connection	M12 connector, 4-pin		

Diffuse sensor values referenced to 90% reflective Kodak gray card, 400×400 mm.

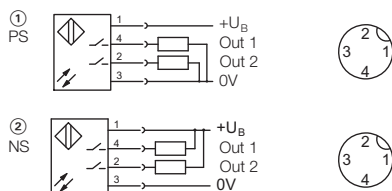


Indicators and operating elements

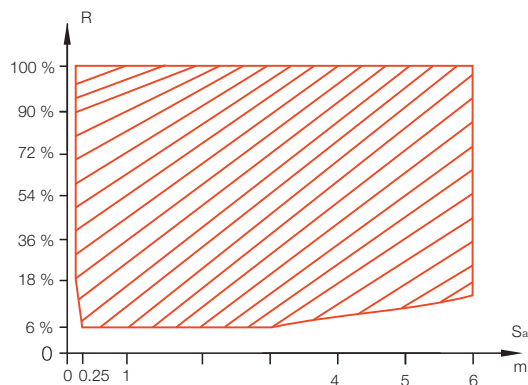


1. Power indicator (green)
2. Output function indicator Out 1 (yellow)
3. Output function indicator Out 2 (yellow)
4. Error indicator (red)
5. 4-turn potentiometer for switching distance 1
6. 4-turn potentiometer for switching distance 2

Wiring diagram



Working range as a function of object reflectivity



Photoelectric sensors

Photoelectric standard sensors

Cylinder designs

Block designs

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00P6



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 8-pin	Straight	PUR	Yellow	5 m	BCC0995
M12, 8-pin	Angled	PUR	Yellow	5 m	BCC0998

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.

High-performance sensors are particularly in demand for harsh applications. This is why our BOS 64K has a 3 A output at 264 V AC and a very long sensing distance and range. Additionally, it provides an adjustment aid and time functions.

The following variants with a robust plastic housing and large terminal compartment can be delivered:

- Diffuse sensor
- Diffuse sensor with background suppression
- Retroreflective sensor with polarizing filter
- Through-beam sensor

The sensors have a relay output.

The photoelectric sensors operate with alternating light in the visible red and infrared light range.

Features

- Universal voltage model 24...240 V AC with relay output
- Light/dark switching
- Time functions
- Wiring compartment with cable gland

Applications

- Conveyor technology
- Machine tool building
- Packaging technology
- Assembly and handling automation
- Gate controls
- Warehouse technology



Photoelectric Standard Sensors

BOS 64K (AC/DC)

Product overview

Type	Sensing distance/ Range	Light type		Out- put	Switching type		Switch- ing fre- quency	U _s		Connection		Features		Page	
		Red light	Infrared		Light switching	Dark switching		24...60 V DC	24...240 V AC	Wiring chamber		Polarizing filter			
 Diffuse sensor with background suppression															Photoelectric sensors Photoelectric standard sensors Cylinder designs Block designs
BOS01K1 BOS 64K-AA-IH12-TG	200...2000 mm		■	■	■	■	20 Hz	■	■	■				240	
 Diffuse sensor															Photoelectric special sensors
BOS01K2 BOS 64K-AA-ID10-TG	50...2000 mm		■	■	■	■	20 Hz	■	■	■				240	
 Retroreflective sensor															Photoelectric distance sensors for analog distance measurement
BOS01K3 BOS 64K-AA-PR10-TG	0...10 m	■		■	■	■	20 Hz	■	■	■		■		241	
 Through-beam sensor Receiver															Special accessories for photoelectric sensors
BOS01K4 BOS 64K-AA-IE10-TG	0...50 m		■	■	■	■	20 Hz	■	■	■				241	
 Through-beam sensor Emitter															
BOS01K5 BOS 64K-AA-IS10-TG	0...50 m		■					■	■	■				241	

Photoelectric Standard Sensors

BOS 64K (AC/DC)

Sensing distance 1.1 m, 2 m

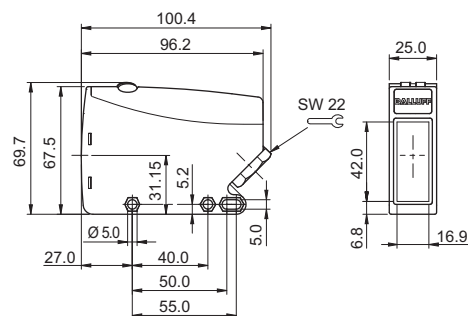


Type			Diffuse sensor with background suppression	Diffuse sensor	
Detection range			200...2000 mm		
Relay 3A, 250 V AC	Time function Infrared	Part number	BOS 64K-AA-IH12-TG	BOS 64K-AA-ID10-TG	
Relay 3A, 250 V AC	Time function Polarizing filter, red light	Part number			
Relay 3A, 250 V AC	Time function Receiver, Infrared	Part number			
Relay 3A, 250 V AC	Time function Emitter	Part number			
Supply voltage U_B			24...60 V DC, 24...240 V AC	24...60 V DC, 24...240 V AC	
Switching type			Light and dark (switchable)	Light and dark (switchable)	
Settings			Potentiometer, dip switch	Potentiometer, dip switch	
Power-on indicator			Yellow LED	Yellow LED	
Output function indicator			Green LED	Green LED	
Stability indicator			25 ms	25 ms	
Response time			20 Hz	20 Hz	
Switching frequency f			IP 67	IP 67	
Degree of protection as per IEC 60529			-25...+55°C	-25...+55°C	
Ambient temperature T_a			5 klx	5 klx	
Permissible ambient light			PBT	PBT	
Material			PC	PC	
Housing			Wiring chamber	Wiring chamber	
Optical surface			8...10 mm	8...10 mm	
Connection					
Cable diameter					

Diffuse sensor values referenced to 90% reflective Kodak gray card.
Retroreflective sensor values referenced to R1 reflector.

Wiring diagrams on page 242.

Ordering codes on page 239.



Photoelectric Standard Sensors

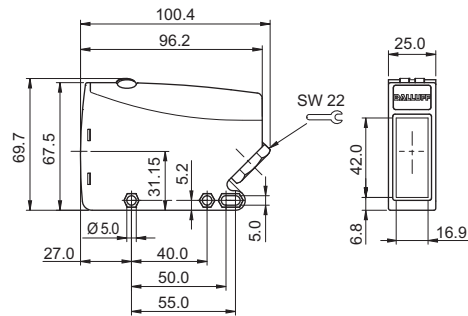
BOS 64K (AC/DC)

Range 8 m, 50 m



Photoelectric sensors

	Retroreflective sensor 0...10 m	Through-beam sensor 0...50 m	Through-beam sensor 0...50 m	
				Photoelectric standard sensors
	BOS 64K-AA-PR10-TG			Cylinder designs
		BOS 64K-AA-IE10-TG		Block designs
			BOS 64K-AA-IS10-TG	Photoelectric special sensors
	24...60 V DC, 24...240 V AC	24...60 V DC, 24...240 V AC	24...60 V DC, 24...240 V AC	
	Light and dark (switchable)	Light and dark (switchable)		
	Potentiometer, dip switch	Potentiometer, dip switch		
			Green LED	
	Yellow LED	Yellow LED		Photoelectric distance sensors for analog distance measurement
	Green LED	Green LED		
	25 ms	25 ms		
	20 Hz	20 Hz		
	IP 67	IP 67	IP 67	
	-25...+55°C	-25...+55°C	-25...+55°C	Special accessories for photoelectric sensors
	5 klx	5 klx		
	PBT	PBT	PBT	
	PC	PC	PC	
	Wiring chamber	Wiring chamber	Wiring chamber	
	8...10 mm	8...10 mm	8...10 mm	



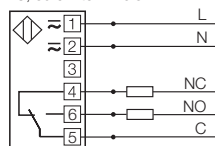
Photoelectric Standard Sensors

BOS 64K (AC/DC)

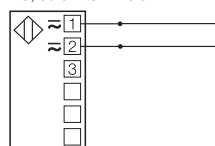
Function diagrams, connection

Wiring diagrams

BOS/BLE 65K-1-...
AC, screw terminals



BLS 65K-1-...
AC, screw terminals



Recommended accessories (please order separately)

Description	Ordering code
① Reflector	BAM00UK
② Mounting bracket	BAM0125



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters, and deflection heads**, in this catalog starting on page 420.



- Photoelectric standard sensors

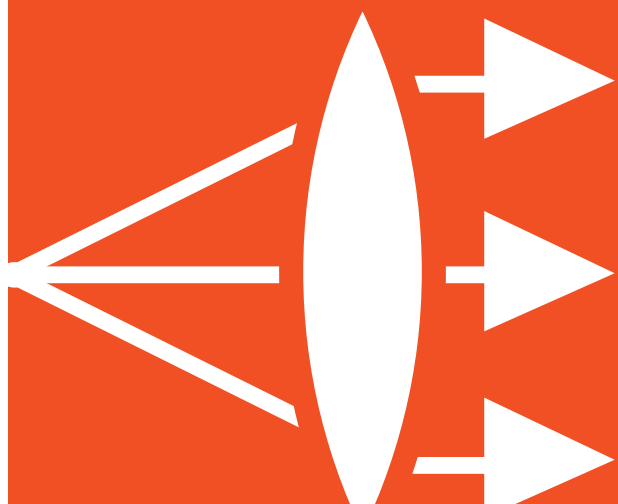
- Cylinder designs

Block designs

- Photoelectric special sensors

- Photoelectric distance sensors for analog distance measurement

- Special accessories for photoelectric sensors



Photoelectric Sensors

Photoelectric special sensors for object detection

Special applications need special sensors. Our special photoelectric sensors solve very special tasks with reliability and dependability. For instance, color sensors reliably detect even the slightest color differences. The first-class True Color Sensor is at home in quality control as well as sorting systems. Contrast sensors and luminescence sensors are perfectly suited for detection tasks, such as reading marks on packaging and sensing fill levels, determining contours, measuring thickness, etc.

Our broad selection of fork sensors with various widths and light types allow optimal adaptation to many detection tasks. Angle sensors or Dynamic optical windows are available as another alternative, in addition to light grids for packaging larger objects involving longer distances.

But even if it looks like there is no space for a photoelectric sensor, Balluff provides a solution: fiber optics in glass and plastic versions.





Photoelectric Special Sensors

Photoelectric special sensors

Optical fiber basic devices BFB/BOS	246
Fiber optics BFO	272
Contrast sensors BKT	322
Luminescence sensors BLT	336
Color sensors BFS	342
Fork sensors BGL_A	348
Analog fork sensors BGL_C	368
Angle sensors BWL	372
Dynamic optical windows BOW	384
Light grids BLG	390

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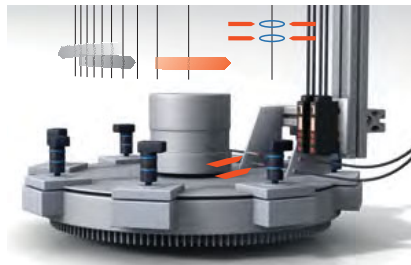
Fiber optics are needed whenever there is not enough space for a photoelectric sensor.

Plastic fiber optics are the right choice if the requirements for toughness, ambient temperature or chemical resistance are not very high. There is a wide selection of special base units available with different outputs and various functions for using them: from simple models with a potentiometer to high-end devices with a display. The base units generally operate using red light.

The base units for glass fiber optics find use in harsh environments thanks to their powerful infrared light. Temperatures of up to 250 °C and oil mist are not a problem thanks to the various models of glass fiber optics.

Applications

- Small parts detection
- Suitable for tight mounting conditions
- Inspecting parts features
- Counting
- Precise parts positioning
- Assembly and handling technology
- Robotics



Type		Light type		Output				Switching type		Switching frequency	U _s		Connection				Special features		Page
		Red light	Infrared light	PNP transistor	NPN transistor	Analog output	Alarm output	Light switching	Dark switching		10...30 V DC	11...26 V DC	M8 plug, 3-pin	M8 plug, 4-pin	M12 plug, 4-pin	Cable	Teach-in	Display	
Ordering code Part number Base units for plastic optical fibers																			
BFB0004	BFB 75K-001-P-S75	■		■				■	■	1.5 kHz	■			■			■		249
BFB0002	BFB 75K-001-N-S75	■			■			■	■	1.5 kHz	■			■			■		249
BFB0003	BFB 75K-001-P-02	■		■				■	■	1.5 kHz	■					■	■		249
BFB0001	BFB 75K-001-N-02	■			■			■	■	1.5 kHz	■					■	■		249
BFB0006	BFB 75K-002-P-S75	■		■				■	■	8 kHz	■			■			■	■	251
BFB0005	BFB 75K-002-N-S75	■			■			■	■	8 kHz	■			■			■	■	251
BFB0008	BFB 75K-003-P-02	■		■		■		■	■	8 kHz	■					■	■	■	251
BFB0007	BFB 75K-003-N-02	■			■	■		■	■	8 kHz	■					■	■	■	251
BOS003K	BOS 73K-PU-1FR-C-02	■		■			■	■	■	1 kHz		■		■			■	■	253
BOS003L	BOS 73K-PU-1FR-C-S75-00,1	■		■			■	■	■	1 kHz		■				■	■	■	253
BOS014L	BOS 73K-PU-1FR-C-S49-00,3	■		■				■	■	1 kHz		■	■				■	■	253
BOS009R	BOS 6K-PU-1FR-S75-C	■		■				■	■	1 kHz	■			■			■		255
BOS009P	BOS 6K-PU-1FR-C-02	■		■				■	■	1 kHz	■					■	■		255
BOS008W	BOS 6K-NU-1FR-S75-C	■			■			■	■	1 kHz	■			■			■		255
BOS008U	BOS 6K-NU-1FR-C-02	■			■			■	■	1 kHz	■					■	■		255
BOS00JJ	BOS 18KF-PA-1FR-S4-C	■		■				■	■	1 kHz	■				■				257
BOS00JH	BOS 18KF-PA-1FR-C-02	■		■				■	■	1 kHz	■					■			257
BOS00HL	BOS 18KF-NA-1FR-S4-C	■			■			■	■	1 kHz	■				■				257
BOS00HK	BOS 18KF-NA-1FR-C-02	■			■			■	■	1 kHz	■					■			257

Photoelectric Special Sensors

Optical fiber base units BFB/BOS

Product overview



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Light type	Output					Switching type	Switching frequency	U _s			Connection					Special features		Page	
			Red light	Infrared light	PNP transistor	NPN transistor	AC/DC 2 - wire			Analog output	Alarm output	Light switching	Dark switching		10...24 V DC	11...26 V DC	22...250 V ACV DC	M8 plug, 4-pin	M12 plug, 4-pin		M12 plug, 4-pin pigtail
  Base units for glass optical fibers																					
BOS0049	BOS 18M-PA-1PD-E5-C-S4		■	■					■	■	100 Hz	■			■						258
BOS0080	BOS 18M-PU-1PD-SA5-C		■	■					■	■	1 kHz	■			■						258
BOS001P	BOS 18M-PA-1PF-E5-C-S4		■	■					■	■	200 Hz	■			■						259
BOS007U	BOS 18M-GU-1PF-S4-Y		■	■	■				■	■	1 kHz	■			■						259
BOS0134	BOS 30M-GA-1PH-S4-C		■	■	■				■	■	100 Hz	■			■						259
BOS00P3	BOS 16K-UU-1FI-00.2-S4		■	■	■				■	■	500 Hz		■				■				261
BOS00PR	BOS 16K-VU-1FI-00.2-S4		■	■	■				■	■	1.6 kHz		■				■				261
BOS00P4	BOS 16K-UU-1FI-02		■	■	■				■	■	500 Hz		■						■		262
BOS00PT	BOS 16K-VU-1FI-02		■	■	■				■	■	1.6 kHz		■						■		262
BOS00NH	BOS 16K-AU-OF1-00.2-S21		■			■			■	■	60 Hz			■				■			263
BOS00NJ	BOS 16K-AU-OF1-02			■			■		■	■	60 Hz			■					■		263
BOS00P5	BOS 16K-UU-1FR-00.2-S4	■			■	■			■	■	500 Hz		■				■				264
BOS00PU	BOS 16K-VU-1FR-00.2-S4	■			■	■			■	■	1.6 kHz		■				■				264
BOS00P6	BOS 16K-UU-1FR-02	■			■	■			■	■	500 Hz		■						■		265
BOS00NK	BOS 16K-AU-OFR-00.2-S21	■							■	■	60 Hz			■					■		265
BOS00NL	BOS 16K-AU-OFR-02	■							■	■	60 Hz			■					■		266
BOS00Z0	BOS 72K-PU-RA10-S75	■			■				■	■	*	■			■					■	269
BOS00YZ	BOS 72K-NU-RA10-S75	■				■			■	■	*	■			■					■	269
BOS00YU	BOS 72K-PU-RA10-02	■			■				■	■	*	■							■	■	269
BOS00YT	BOS 72K-NU-RA10-02	■				■			■	■	*	■							■	■	269
BOS00YY	BOS 72K-PU-RA20-S75	■			■				■	■	*	■			■					■	269
BOS00YW	BOS 72K-NU-RA20-S75	■				■			■	■	*	■			■					■	269
BOS00YR	BOS 72K-PU-RA20-02	■			■				■	■	*	■							■	■	269
BOS00YP	BOS 72K-NU-RA20-02	■				■			■	■	*	■							■	■	269
  Base units for wire optical fibers											10...30VDC	15...30VDC									
BAE00AL	BMO A01-J-PU-C-S75	■	■	■					■	■	500 Hz	■			■					■	271
BAE00AK	BMO A01-J-PU-C-02	■	■	■					■	■	500 Hz	■							■	■	271
BAE00AJ	BMO A01-J-NU-C-02	■	■			■			■	■	500 Hz	■							■	■	271
BAE00AH	BMO A01-I-PU-C-02	■	■			■			■	■	500 Hz	■							■	■	271
BAE00AF	BMO A01-I-NU-C-02	■	■			■			■	■	500 Hz	■							■	■	271
BAE00AC	BMO A01-H-C1-C-02	■	■					■	■	■	500 Hz		■						■	■	271
BAE00AE	BMO A01-H-V1-C-02	■	■					■	■	■	500 Hz		■						■	■	271

* 1 kHz High Resolution
5 kHz Standard Resolution

Photoelectric Special Sensors

Optical fiber base units BFB 75K

Base Units for Plastic Optical Fibers

The BFB 75K-001...

is ideal for any kind of standard application. This affordable sensor is installed on DIN rails and makes a great entry-level model. Ease of setting using a teach-in procedure on the sensor or via an external teach line make the sensor especially user-friendly.

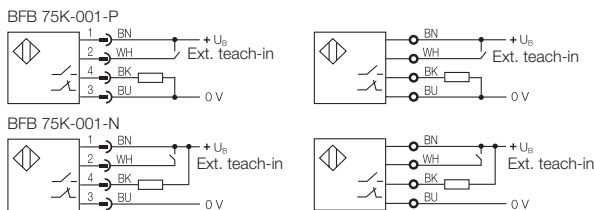
Features

- Red light
- Teach-in
- Connector and cable versions

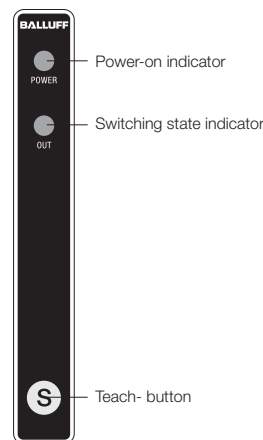
Mounting notes for fiber optics

The resistance of the sealing ring must be overcome when connecting the fiber optics to the base unit.

Wiring diagrams



Operating panel



Suitable connector
(please order separately)



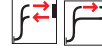
Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Optical fiber base units BFB 75K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

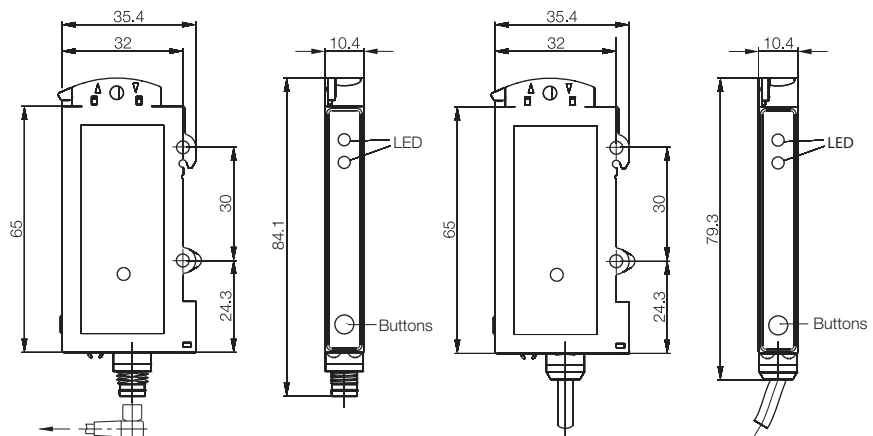
Series			BFB 75K	BFB 75K
Plastic fiber optic base unit			for plastic fiber optics with an outside diameter of 2.2 mm	for plastic fiber optics with an outside diameter of 2.2 mm
PNP	NC/NO	Part number	BFB 75K-001-P-S75	BFB 75K-001-P-02
NPN	NC/NO	Part number	BFB 75K-001-N-S75	BFB 75K-001-N-02
Supply voltage U_B			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
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Teach-in	Teach-in
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Light spot diameter			Depends on the fiber optics	Depends on the fiber optics
Power-on indicator			Green LED	Green LED
Switching state indicator			Yellow LED	Yellow LED
Switching frequency f			1.5 kHz	1.5 kHz
Degree of protection as per IEC 60529			IP 64	IP 64
Ambient temperature T_a			-20...+60 °C	-20...+60 °C
Permissible ambient light per			EN 60947-5-2	EN 60947-5-2
Material	Housing		ABS	ABS
	Optical surface		Depends on fiber optics	Depends on fiber optics
Connection			M8 connector, 4-pin	2 m PVC cable, 26 AWG



→ Connector orientation

Ordering codes on page 246.

Suitable fiber optics can be found starting on page 272.



Photoelectric Special Sensors

Optical fiber base units BFB 75K

The BFB 75K-002...

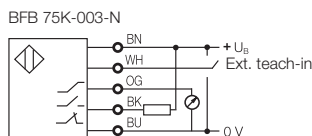
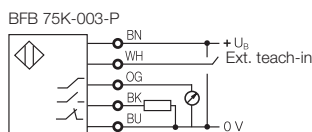
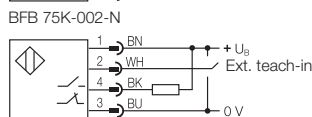
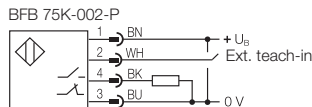
The high-end amplifier offers perfect performance with 12-bit resolution, a 4-digit display and a switching frequency up to 8 kHz. Various operating modes such as Fine or High Distance allow the sensor to be better adapted to the respective application. Several sensors can be installed next to each other. Up to four sensors installed adjacent to each other are synchronized to avoid mutual interference in an application. They are synchronized automatically after the supply voltage is turned on. Adjustable time functions, window programming and fine-tuning for the switching point expand its range of application options.

The BFB 75K-003... version provides an additional analog output. The output signal is in proportion to the remission or to the distance of the target object. All of the functions of the BFB 75K-02 variant are included.

Features

- Display
- 4 operating modes
- No mutual interference
- Variant with analog output

Wiring diagrams



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Base Units for Plastic Optical Fibers

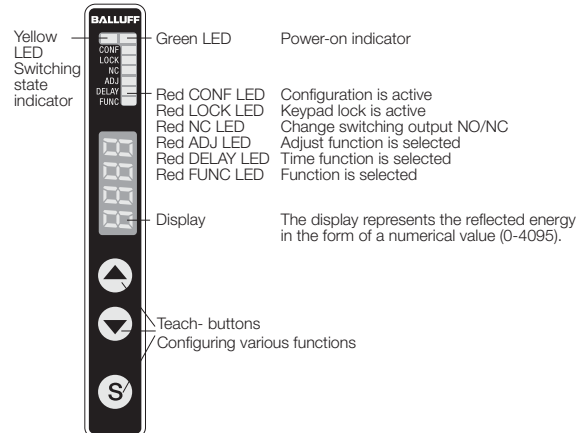
Mounting notes for fiber optics

The resistance of the sealing ring must be overcome when connecting the fiber optics to the base unit.

Operating mode	Standard	High resolution	High switching frequency	High Range
Sensing distance*	150 mm	70 mm	70 mm	300 mm
Switching frequency	1 kHz	125 Hz	8 kHz	125 Hz

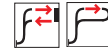
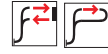
*Depending on fiber optics used

Operating panel



Photoelectric Special Sensors

Optical fiber base units BFB 75K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

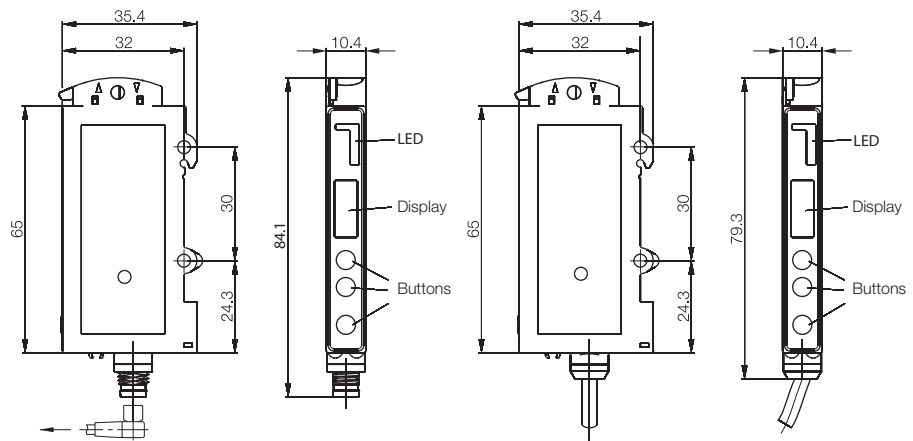
sensors for analog distance measurement

Special accessories for photoelectric sensors

Series			BFB 75K	BFB 75K
Plastic fiber optic base unit			for plastic fiber optics with an outside diameter of 2.2 mm	for plastic fiber optics with an outside diameter of 2.2 mm
PNP	NC/NO	Part number	BFB 75K-002-P-S75	BFB 75K-003-P-02
NPN	NC/NO	Part number	BFB 75K-002-N-S75	BFB 75K-003-N-02
Supply voltage U_B			10...30 V DC	10...30 V DC
Output current			100 mA	100 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 20 mA
Analog output				0...10 V (max. 2 mA)
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Teach-in	Teach-in
Emitter, light type			LED, red light	LED, red light
Wavelength			630 nm	630 nm
Light spot diameter			Depends on the fiber optics	Depends on the fiber optics
Power-on indicator			Green LED	Green LED
Switching state indicator			Yellow LED	Yellow LED
Status indicator			6x red LEDs	6x red LEDs
Display			4-digit	4-digit
Switching frequency f		Standard	1.5 kHz	1.5 kHz
		Fast Mode	8 kHz	8 kHz
Time function			Adjustable 1...2000 ms delay for switching on and/or off	Adjustable 1...2000 ms delay for switching on and/or off
Degree of protection as per IEC 60529			IP 64	IP 64
Ambient temperature T_a			-20...+60 °C	-20...+60 °C
Permissible ambient light per			EN 60947-5-2	EN 60947-5-2
Material		Housing	ABS	ABS
		Optical surface	Depends on fiber optics	Depends on fiber optics
Connection			M8 connector, 4-pin	2 m PVC cable, 26 AWG

Ordering codes on page 246.

Suitable fiber optics can be found starting on page 272.



The **BOS 73K** with display simplifies sensor set up and provides a precise overview of its settings.

The display shows sensitivity, signal strength as well as additional functions.

The switching point and hysteresis can be acquired automatically or set manually. The powerful red light emitter permits very long sensing distances and ranges.

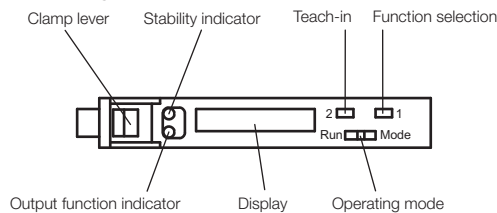
A switching and alarm output is also provided as an output and time functions can also be set.

Two transmission channels allow multiple sensors to be used without them interfering with each other.

Features

- LCD display with backlighting
- Settings via teach-in
- Powerful red light emitter for long ranges
- Contamination output
- All time functions can be set from 10...120 ms
- Two transmission channels

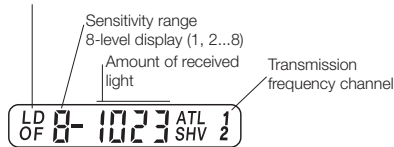
Operating panel



Display

Mode

- L: Light switching
- D: Dark switching
- O: On-delay
- F: Off-delay



Functions

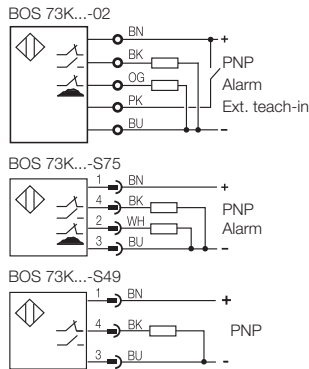
Sensor functions

- A: Automatic Detection
- T: Teach-in
- L: Lock

Additional functions

- S: Manual sensitivity setting/switch-on point
- H: Manual hysteresis setting (switch-off point)
- V: Signal strength fluctuation and absolute value display

Wiring diagrams



Series		
Plastic fiber optic base unit		
PNP	NC/NO	Part number
Supply voltage U_B		
Switching frequency f	Switching output	
No-load supply current I_0 max.	Alarm output	
Switching type		
Polarity reversal/short-circuit protected		
Settings		
Emitter, light type		
Wavelength		
Light spot diameter		
Output function indicator		
Stability indicator		
Display		
Response time		
Switching frequency f	Standard	
Time function		
Degree of protection as per IEC 60529		
Ambient temperature T_a		
Permissible ambient light		
Material	Housing	
	Optical surface	
Connection		

Mounting hardware included!
Ordering codes on page 246.



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Optical fiber base units BOS 73K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

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Photoelectric distance sensors for analog distance measurement

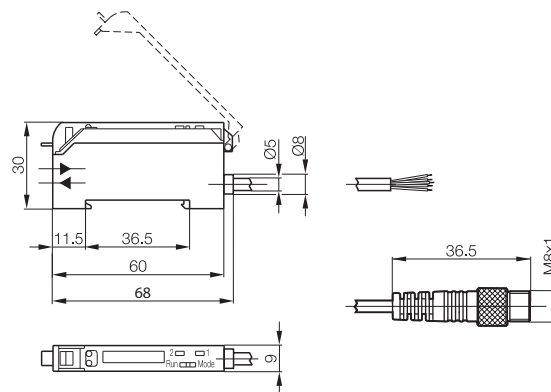
Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement



BOS 73K for plastic fiber optics with an outside diameter of 2.2 mm BOS 73K-PU-1FR-C-02	BOS 73K for plastic fiber optics with an outside diameter of 2.2 mm BOS 73K-PU-1FR-C-S75-00,1	BOS 73K for plastic fiber optics with an outside diameter of 2.2 mm BOS 73K-PU-1FR-C-S49-00,3
11...26 V DC	11...26 V DC	11...26 V DC
100 mA	100 mA	100 mA
50 mA	50 mA	50 mA
≤ 50 mA	≤ 50 mA	≤ 50 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Teach-in/Manually using buttons	Teach-in/Manually using buttons	Teach-in/Manually using buttons
LED, red light	LED, red light	LED, red light
660 nm	660 nm	660 nm
Depends on the fiber optics	Depends on the fiber optics	Depends on the fiber optics
Orange LED	Orange LED	Orange LED
Green LED	Green LED	Green LED
Backlit LCD	Backlit LCD	Backlit LCD
Channel 1: 0.5 ms	Channel 1: 0.5 ms	Channel 1: 0.5 ms
Channel 2: 0.6 ms	Channel 2: 0.6 ms	Channel 2: 0.6 ms
Channel 1: 1kHz	Channel 1: 1kHz	Channel 1: 1kHz
Channel 2: 833 kHz	Channel 2: 833 kHz	Channel 2: 833 kHz
On/off delay	On/off delay	On/off delay
10...120 ms selectable	10...120 ms selectable	10...120 ms selectable
IP 54	IP 54	IP 54
-25...+55 °C	-25...+55 °C	-25...+55 °C
Artificial light ≤ 10 klx, Sunlight ≤ 20 klx	Artificial light ≤ 10 klx, Sunlight ≤ 20 klx	Artificial light ≤ 10 klx, Sunlight ≤ 20 klx
ABS	ABS	ABS
Depends on fiber optics	Depends on fiber optics	Depends on fiber optics
2 m PVC cable, 24 AWG	Pigtail 10 cm, M8 connector, 4-pin	Pigtail 30 cm, M8 connector, 3-pin



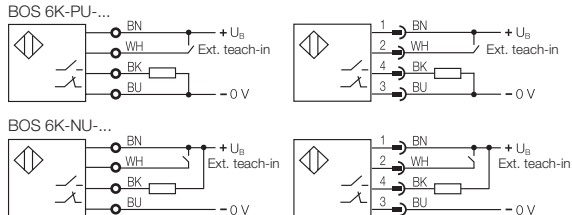
Suitable fiber optics can be found starting on page 272.

The **BOS 6K** series also offers a optical fiber base unit that is easy to teach in externally using a button or control line. Together with the BFO series of fiber optics, an enclosure rating of IP 67 is provided.

Features

- Teach-in
- Contamination indicator
- Control line for external teach-in
- Disable buttons

Wiring diagrams



Recommended accessories (please order separately)

Description	Ordering code
Mounting bracket	BAM00UH



Suitable connector (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Optical fiber base units BOS 6K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

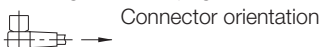
Photoelectric distance sensors

sensors for analog distance measurement

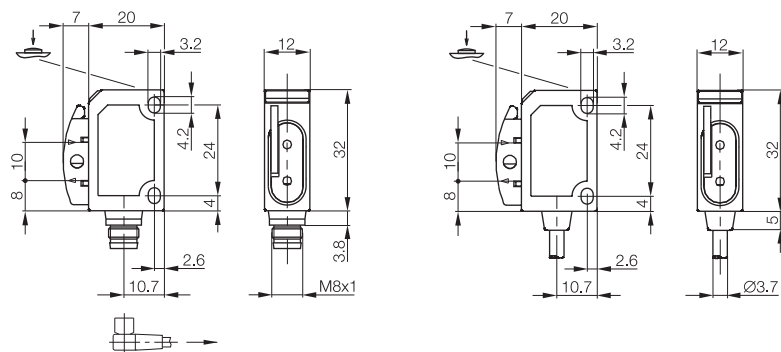
Special accessories for photoelectric sensors

Series			BOS 6K	BOS 6K
Plastic fiber optic base unit			for plastic fiber optics with an outside diameter of 2.2 mm	for plastic fiber optics with an outside diameter of 2.2 mm
PNP	NC/NO	Part number	BOS 6K-PU-1FR-S75-C	BOS 6K-PU-1FR-C-02
NPN	NC/NO	Part number	BOS 6K-NU-1FR-S75-C	BOS 6K-NU-1FR-C-02
Supply voltage U_B			10...30 V DC	10...30 V DC
Output current			100 mA	100 mA
No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Teach-in	Teach-in
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Light spot diameter			Depends on range/sensing distance	Depends on range/sensing distance
Output function indicator			Yellow LED	Yellow LED
Stability indicator			Green LED	Green LED
Response time			0.5 ms	0.5 ms
Switching frequency f			1 kHz	1 kHz
No. of wires × conductor cross-section				26 AWG
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T_a			-20...+60 °C	-20...+60 °C
Permissible ambient light			EN 60947-5-2	EN 60947-5-2
Material			ABS	ABS
Housing				
Optical surface			Depends on fiber optics	Depends on fiber optics
Connection			M8 connector, 4-pin	2 m PVC cable

Ordering codes on page 246.



Suitable fiber optics can be found starting on page 272.



Photoelectric Special Sensors

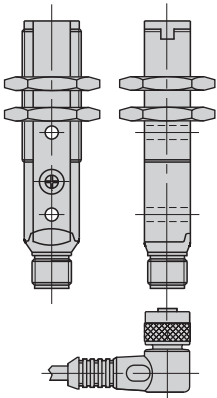
Optical fiber base units BOS 18KF

The optical fiber base unit **BOS 18KF** offers simple operation and installation.

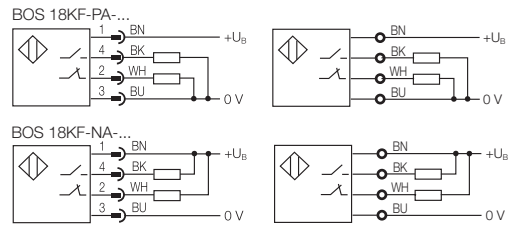
Features

- Sensitivity setting using 270°- potentiometer
- Cap nut for adapting optical fibers

Connector orientation



Wiring diagrams



Recommended accessories

(please order separately)



Description	Ordering code
① Mounting bracket	BAM00RY
② Mounting clamp	BAM00T3



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	2 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Optical fiber base units BOS 18KF



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

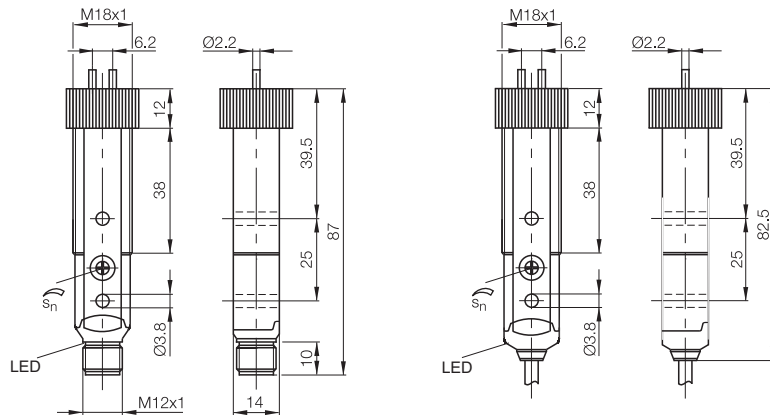
for analog distance measurement

Special accessories for photoelectric sensors

Series			BOS 18KF	BOS 18KF
Plastic fiber optic base unit			for plastic fiber optics	for plastic fiber optics
			with an outside diameter of 2.2 mm	with an outside diameter of 2.2 mm
PNP	NC/NO	Part number	BOS 18KF-PA-1FR-S4-C	BOS 18KF-PA-1FR-C-02
NPN	NC/NO	Part number	BOS 18KF-NA-1FR-S4-C	BOS 18KF-NA-1FR-C-02
Supply voltage UB			10...30 V DC	10...30 V DC
No-load supply current IO max.			≤ 35 mA	≤ 35 mA
Output current			100 mA	100 mA
Switching type			Light and dark switching	Light and dark switching
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Potentiometer, 270°	Potentiometer, 270°
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Light spot diameter			Depends on range/sensing distance	Depends on range/sensing distance
Output function indicator			Yellow LED	Yellow LED
Stability indicator			Green LED	Green LED
Response time			0.5 ms	0.5 ms
Switching frequency f			1 kHz	1 kHz
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature Ta			-25...+55 °C	-25...+55 °C
Permissible ambient light			EN 60947-5-2	EN 60947-5-2
Material	Housing		PBT	PBT
	Optical surface		Depends on fiber optics	Depends on fiber optics
Connection			M12 connector, 4-pin	2 m PVC cable, 26 AWG

Ordering codes on page 246.

Suitable fiber optics can be found starting on page 272.

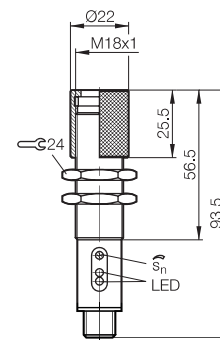
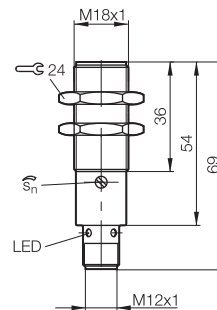




Type	Diffuse sensor, energetic		Diffuse sensor, energetic
Detection range	0...400 mm		0...400 mm
PNP NC/NO	Part number	BOS 18M-PA-1PD-E5-C-S4	BOS 18M-PU-1PD-SA5-C
PNP/NPN NC/NO	Part number		
Supply voltage U_B	10...30 V DC		10...30 V DC
Output current	200 mA		200 mA
No-load supply current I_0 max.	≤ 20 mA		≤ 25 mA
Switching type	Light/dark switching (complementary)		Light/dark switching (selectable)
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Potentiometer, 270°		18-turn potentiometer
Emitter, light type	LED, infrared		LED, infrared
Wavelength	880 nm		880 nm
Response time	5 ms		5 ms
Switching frequency f	100 Hz		1 kHz
Degree of protection as per IEC 60529	IP 67		IP 67
Ambient temperature T_a	-5...+55 °C		-20...+60 °C
Permissible ambient light	5 klx		2 klx
Material	Housing	Nickel-plated CuZn	Nickel-plated CuZn
	Optical surface	PMMA	Glass
Connection	M12 connector, 4-pin		M12 connector, 4-pin

Ordering codes on page 247.

Suitable fiber optics can be found
starting on page 291.



Recommended accessories (please order separately)

Description	Ordering code
Mounting clamp	BAM00T3



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

Suitable connector (please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF



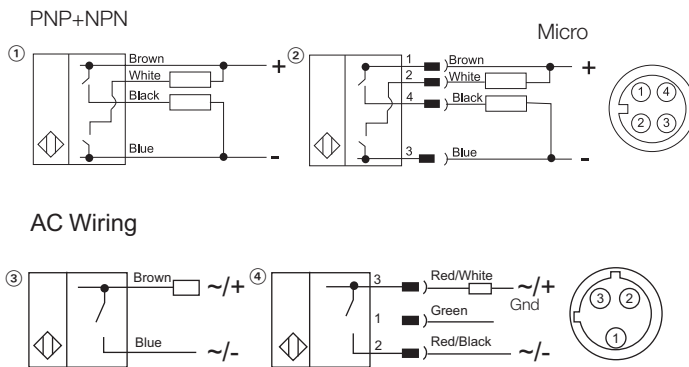
Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

The **BOS 16K** series also offers a optical fiber base unit that offers mounting versatility and easy set up.

Features

- Mounting as block style or 18 mm tubular
- Multiple indicators
- AC/DC and DC versions
- Potentiometer setup



Recommended accessories (please order separately)

Description	Ordering code
Mounting bracket	BAM00UH



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF
1/2" Dual Keyway	Straight	PVC	Yellow	12 ft	BCC020C
1/2" Dual Keyway	Angled	PVC	Yellow	15 ft	BCC0200

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Optical fiber base units BOS 16K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

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Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

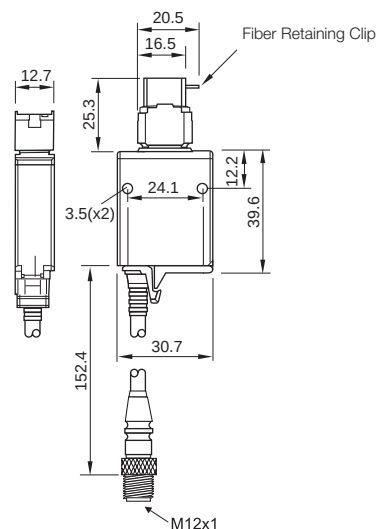
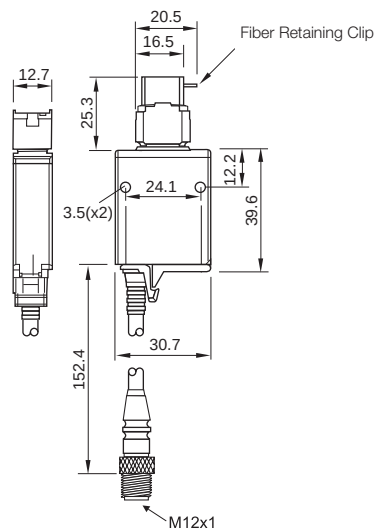
Photoelectric distance sensors for analog distance measurement

Series		BOS 16K	BOS 16K
Plastic fiber optic base unit		for glass fiber optics with an outside diameter of 4.8 mm	for glass fiber optics with an outside diameter of 4.8 mm
PNP/NPN	NO	Part number	Part number
		BOS 16K-UU-1FI-00.2-S4	BOS 16K-VU-1FI-00.2-S4
Supply voltage U_B		11...30 V DC	11...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer 5 turn	Potentiometer 5 turn
Emitter, light type		LED, infrared	LED, infrared
Wavelength		880 nm	880 nm
Light spot diameter		Depends on range/sensing distance	Depends on range/sensing distance
Power indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Stability indicator		Orange LED	Orange LED
Response time		1 ms	0.3 ms
Switching frequency f		500 Hz	1.6 kHz
No. of wires $\times$ conductor cross-section			
Degree of protection as per IEC 60529		IP 67; 1200 PSI washdown	IP 67; 1200 PSI washdown
Ambient temperature T_a		-20...+70 °C	-20...+70 °C
Material	Housing	PPE-PS	PPE-PS
	Optical surface	Depends on fiber optics	Depends on fiber optics
Connection		M12 connector, 4-pin, 6 inch pigtail	M12 connector, 4-pin, 6 inch pigtail

Ordering codes on page 247.



Suitable fiber optics can be found starting on page 298.





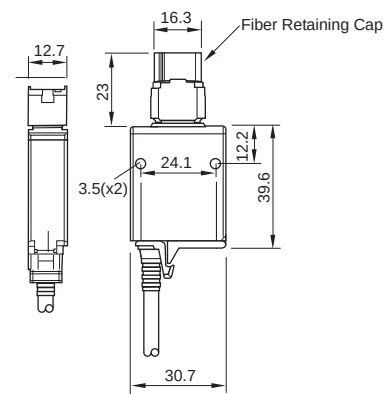
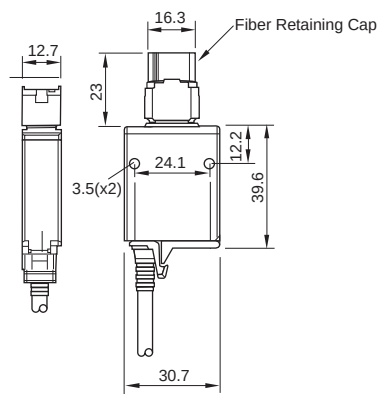
Series			BOS 16K	BOS 16K
Plastic fiber optic base unit			for glass fiber optics with an outside diameter of 4.8 mm	for glass fiber optics with an outside diameter of 4.8 mm
PNP	NO	Part number	BOS 16K-UU-1FI-02	BOS 16K-VU-1FI-02
Supply voltage U _B			11...30 V DC	11...30 V DC
Output current			100 mA	100 mA
No-load supply current I ₀ max.			≤ 35 mA	≤ 35 mA
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Potentiometer 5 turn	Potentiometer 5 turn
Emitter, light type			LED, infrared	LED, infrared
Wavelength			880 nm	880 nm
Light spot diameter			Depends on range/sensing distance	Depends on range/sensing distance
Power indicator			Green LED	Green LED
Output function indicator			Yellow LED	Yellow LED
Stability indicator			Orange LED	Orange LED
Response time			1 ms	0.3 ms
Switching frequency f			500 Hz	1.6 kHz
No. of wires × conductor cross-section			4x22 AWG	4x22 AWG
Degree of protection as per IEC 60529			IP 67; 1200 PSI washdown	IP 67; 1200 PSI washdown
Ambient temperature T _a			−20...+70 °C	−20...+70 °C
Material	Housing		PPE-PS	PPE-PS
	Optical surface		Depends on fiber optics	Depends on fiber optics
Connection			2 m PVC cable	2 m PVC cable

Ordering codes on page 247.



Connector orientation

Suitable fiber optics can be found
starting on page 298.



Photoelectric Special Sensors

Optical fiber base units BOS 16K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

for analog distance measurement

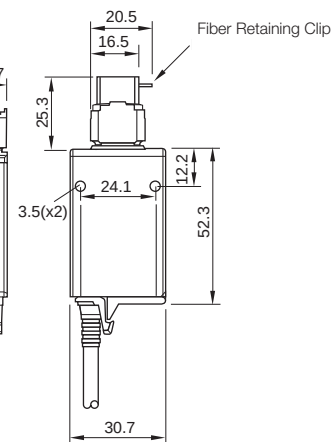
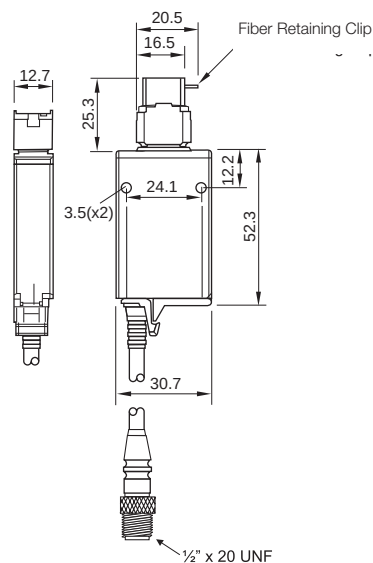
Special accessories for photoelectric sensors

Series		BOS 16K	BOS 16K
Plastic fiber optic base unit		for glass fiber optics with an outside diameter of 4.8 mm	for glass fiber optics with an outside diameter of 4.8 mm
2-wire	Part number	BOS 16K-AU-0F1-00.2-S21 ④	BOS 16K-AU-0F1-02 ③
Supply voltage U_B		22...250 V AC	22...250 V AC
Output current		100 mA	100 mA
Leakage		1.7 mA	1.7 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer 5 turn	Potentiometer 5 turn
Emitter, light type		LED, infrared	LED, infrared
Wavelength		880 nm	880 nm
Light spot diameter		Depends on range/sensing distance	Depends on range/sensing distance
Power indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Stability indicator		Orange LED	Orange LED
Response time		8.3 ms	8.3 ms
Switching frequency f		60 Hz	60 Hz
No. of wires × conductor cross-section			3x22 AWG
Degree of protection as per IEC 60529		IP 67; 1200 PSI washdown	IP 67; 1200 PSI washdown
Ambient temperature T_a		-20...+70 °C	-20...+70 °C
Material	Housing	PPE-PS	PPE-PS
	Optical surface	Depends on fiber optics	Depends on fiber optics
Connection		1/2 x 20 UNF connector 3-pin, 6 inch pigtail	2 meter cable

Ordering codes on page 247.



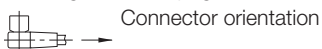
Connector orientation



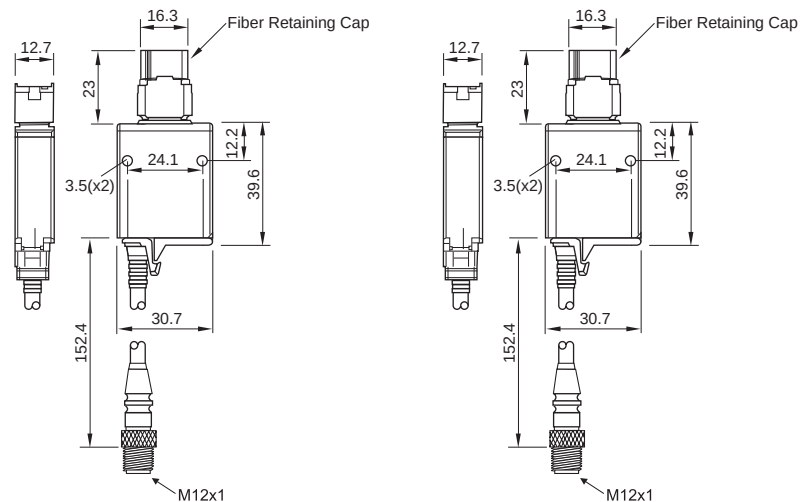


Series		BOS 16K	BOS 16K
Plastic fiber optic base unit		for glass fiber optics with an outside diameter of 4.8 mm	for glass fiber optics with an outside diameter of 4.8 mm
PNP/NPN	NO	Part number	②
		BOS 16K-UU-1FR-00.2-S4	BOS 16K-VU-1FR-00.2-S4
Supply voltage U_B		11...30 V DC	11...30 V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer 5 turn	Potentiometer 5 turn
Emitter, light type		LED, infrared	LED, infrared
Wavelength		880 nm	880 nm
Light spot diameter		Depends on range/sensing distance	Depends on range/sensing distance
Power indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Stability indicator		Orange LED	Orange LED
Response time		1 ms	0.3 ms
Switching frequency f		500 Hz	1.6 kHz
No. of wires $\times$ conductor cross-section		4x22 AWG	4x22 AWG
Degree of protection as per IEC 60529		IP 67; 1200 PSI washdown	IP 67; 1200 PSI washdown
Ambient temperature T_a		-20...+70 °C	-20...+70 °C
Material	Housing	PPE-PS	PPE-PS
	Optical surface	Depends on fiber optics	Depends on fiber optics
Connection		M12 connector, 4-pin, 6 inch pigtail	M12 connector, 4-pin, 6 inch pigtail

Ordering codes on page 247.

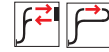


Suitable fiber optics can be found
starting on page 298.



Photoelectric Special Sensors

Optical fiber base units BOS 16K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

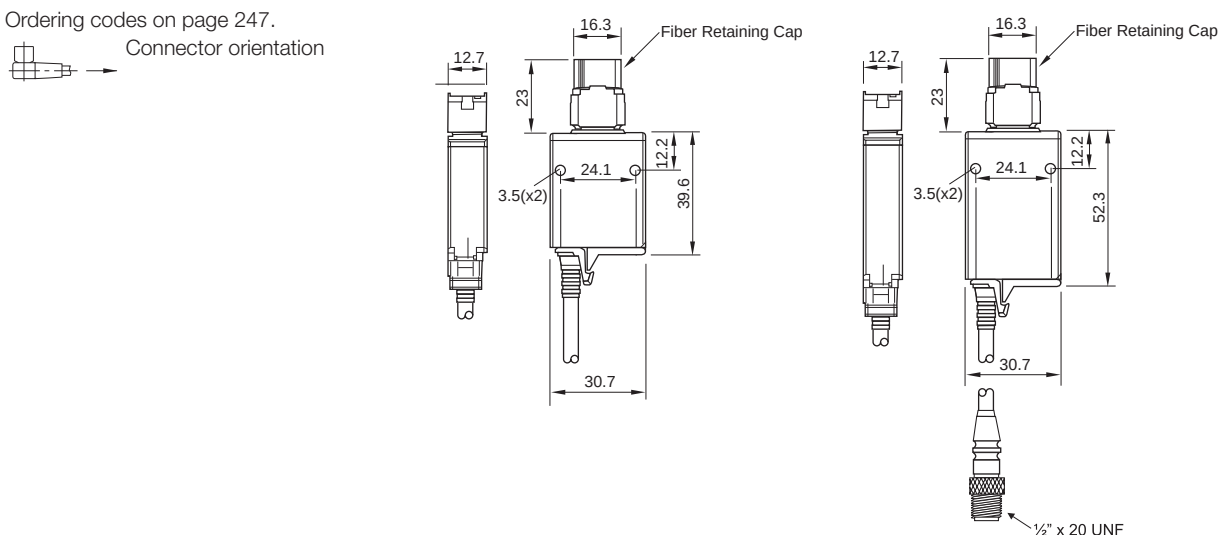
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Series		BOS 16K	BOS 16K
Plastic fiber optic base unit		for glass fiber optics with an outside diameter of 4.8 mm	for glass fiber optics with an outside diameter of 4.8 mm
PNP/NPN	NO	Part number	Part number
2-wire		BOS 16K-UU-1FR-02	BOS 16K-AU-0FR-00.2-S21
Supply voltage U_B		11...30 V DC	22...250 V AC/V DC
Output current		100 mA	100 mA
No-load supply current I_0 max.		≤ 35 mA	1.7 mA (Leakage)
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer 5 turn	Potentiometer 5 turn
Emitter, light type		LED, infrared	LED, infrared
Wavelength		880 nm	880 nm
Light spot diameter		Depends on range/sensing distance	Depends on range/sensing distance
Power indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Stability indicator		Orange LED	Orange LED
Response time		1 ms	8.3 ms
Switching frequency f		500 Hz	60 Hz
No. of wires $\times$ conductor cross-section		4 $\times$ 22 AWG	
Degree of protection as per IEC 60529		IP 67; 1200 PSI washdown	IP 67; 1200 PSI washdown
Ambient temperature T_a		-20...+70 °C	-20...+70 °C
Material	Housing	PPE-PS	PPE-PS
	Optical surface	Depends on fiber optics	Depends on fiber optics
Connection		2 m PVC cable	1/2 x 20 UNF connector, 3-pin (2 keys), 6 inch pigtail

Ordering codes on page 247.

Connector orientation





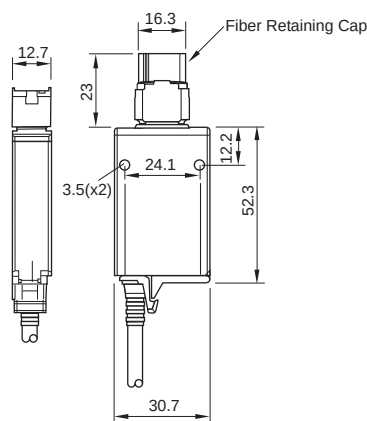
Series	BOS 16K	
Plastic fiber optic base unit	for glass fiber optics	
	with an outside diameter of 4.8 mm	
2-wire	Part number	BOS 16K-AU-0FR-02 ③
Supply voltage U_B	22...250 V AC/V DC	
Output current	100 mA	
Leakage	1.7 mA	
Switching type	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes	
Settings	Potentiometer 5 turn	
Emitter, light type	LED, infrared	
Wavelength	880 nm	
Light spot diameter	Depends on range/sensing distance	
Power indicator	Green LED	
Output function indicator	Yellow LED	
Stability indicator	Orange LED	
Response time	8.3 ms	
Switching frequency f	60 Hz	
No. of wires × conductor cross-section		
Degree of protection as per IEC 60529	IP 67; 1200 PSI washdown	
Ambient temperature T_a	-20...+70 °C	
Material	Housing	PPS-PE
	Optical surface	Depends on fiber optics
Connection	2 m PVC cable	

Ordering codes on page 247.



Connector orientation

**Suitable fiber optics can be found
starting on page 298.**





Photoelectric Special Sensors



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

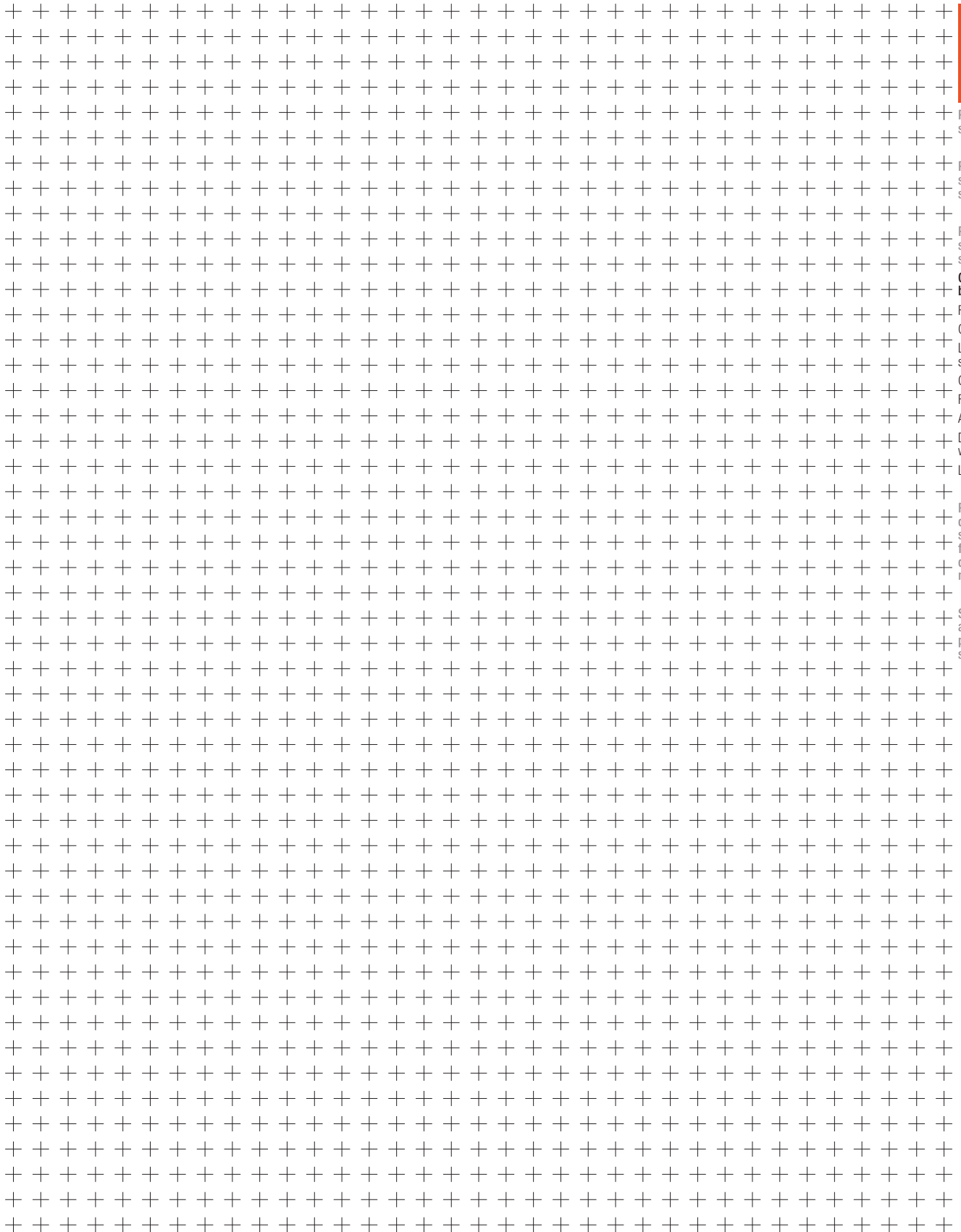
Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Photoelectric Special Sensors

Fiber Optic Amplifier BOS 72K

BOS 72K Advanced Fiber Optic Amplifier

The BOS 72K fiber optic amplifier uses the latest microprocessor-based technology to solve the most difficult applications. It is available in a standard style without display as well as a version with display. The standard version without display has a 10-bit processor that offers over 1000 points of resolution and a fast operational speed up to 1000Hz. The version with display offers a 12-bit processor with over 4000 points of resolution, plus the convenience of a 4-digit display. The 4-digit display gives a clear indication of the received signal or threshold value.

Set-up has never been easier with the patented EASYtouch™ pushbutton teach-in process offered on the display version. It features two modes of operation— standard mode for 1kHz operation and fast mode for 5kHz operation. Additionally, pushbuttons for + and – allow the user to tweak in the application.

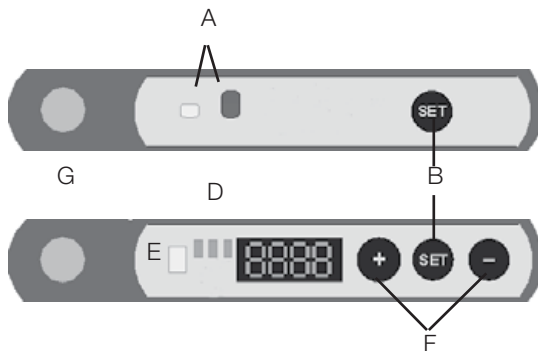
Features

- Accepts all 2.2 mm diameter fiber optic cables
- Patented EASYtouch™ pushbutton teach-in process
- Remote teach for fast change over
- Powerful economical standard version without display
- Display version with over 4000 points of resolution
- Din rail or panel mountable
- M8 connector or cable out

Applications

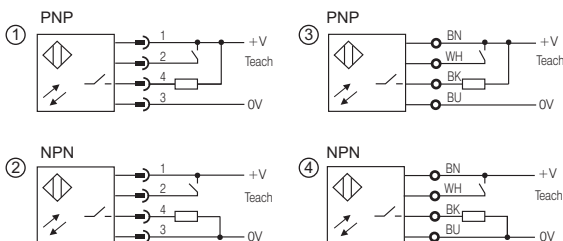
- Small object detection
- Limited mounting space restrictions
- Chemically aggressive environments
- High temperature environments

Adjustment Indications



- A OUTPUT status and READY/ERROR LED
- B Teach-in button
- C 4 digit display
- D STATUS signaling LED
- E OUTPUT signaling LED
- F '+' e '-' buttons (adjust/menu)
- G Fiber lock/unlock button

Wiring Diagrams



Photoelectric Special Sensors

Fiber Optic Amplifier BOS 72K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

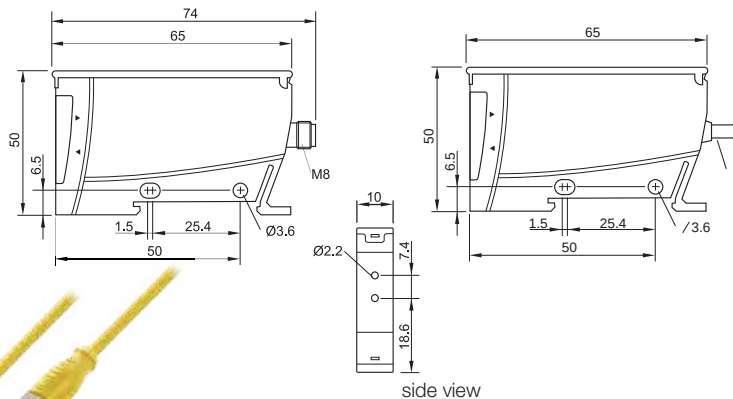
Special accessories for photoelectric sensors

Series		BOS 72K	BOS 72K
Fiber optic amplifier			
*High resolution with display			
PNP Light-on/Dark-on	Part number	BOS 72K-PU-RA20-S75	BOS 72K-PU-RA20-02
NPN Light-on/Dark-on	Part number	BOS 72K-NU-RA20-S75	BOS 72K-NU-RA20-02
Std. resolution without display			
PNP Light-on/Dark-on	Part number	BOS 72K-PU-RA10-S75	BOS 72K-PU-RA10-02
NPN Light-on/Dark-on	Part number	BOS 72K-NU-RA10-S75	BOS 72K-NU-RA10-02
Supply voltage U_B		10...24 V DC	10...24 V DC
Output current		100 mA	100 mA
Emitter, light type		Visible red 670 nm	Visible red 670 nm
Operating temperature range		-10...+55 °C	-10...+55 °C
On/Off delay (standard)		100us High resolution	500us Standard resolution
Operating frequency (max.)		1Khz High resolution	5Khz standard resolution
Sensitivity adjustment		EASY touch Teach-in	Remote Teach-in
Function indication		Yellow	Yellow
Contamination indication		2 bicolor Red/Green LED's (SET and ERROR)	2 bicolor Red/Green LED's (SET and ERROR)
Environmental protection		IP 67	IP 67
Housing material		ABS	ABS
Connection		M8 4-pin connector	2 m cable 4x26 AWG

Ordering codes on page 247.



Suitable fiber optics can be found starting on page 298.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Miniature remote amplifier sensors BMOA

BMOA Miniature Remote Amplifier Sensors

Need the precision of a laser photoelectric sensor, but have no room to mount something that big? Ultra miniature sensing heads down to 2 mm can fit into applications where most sensors won't. The BMOA component systems use an amplifier to power and control the signals from the sensing head, making it a unique alternative to typical fiber optic solutions. The BMOA component systems offer maximum flexibility with high flex cable versions for moving applications like robotic arms. The systems can detect targets as small as 0.05 mm. The BMOA amplifiers make set-up and operation easy, using a simple dynamic teach function, or a manual push-button adjustment mode. Available in economical discrete or advanced analog output versions to solve difficult applications.

Features

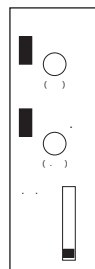
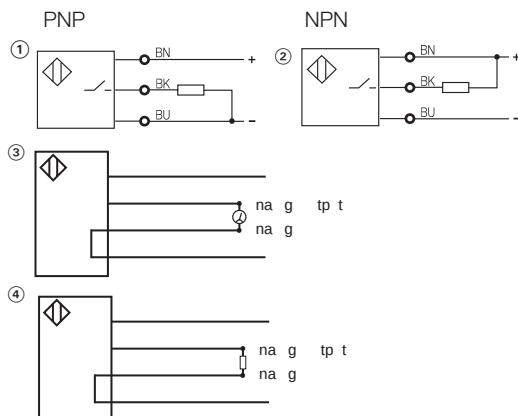
- Smallest sensing head in the industry
- Laser-like precision to detect targets as small as 0.05 mm
- High speed switching up to 5kHz
- 50 ms pulse stretching delay
- Simple pushbutton adjustment of dynamic teach function
- Stability and Output Function LED's
- Discrete output versions 0...10 V DC and 4...20 mA
- Din-rail or panel mountable

Applications

- Thread detection
- Small part profiling
- Robotic end-effectors
- Semiconductor component detection
- High performance alternative to fiber optics



Wiring Diagrams



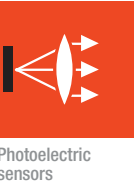
Sensitivity setting

AUT – the amplifier will determine the best setting for the application.

MAN – this allows you to fine-tune the settings or manually adjust the sensor for difficult applications.

Photoelectric Special Sensors

Miniature remote amplifier sensors BMOA



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

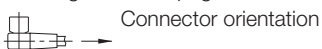
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

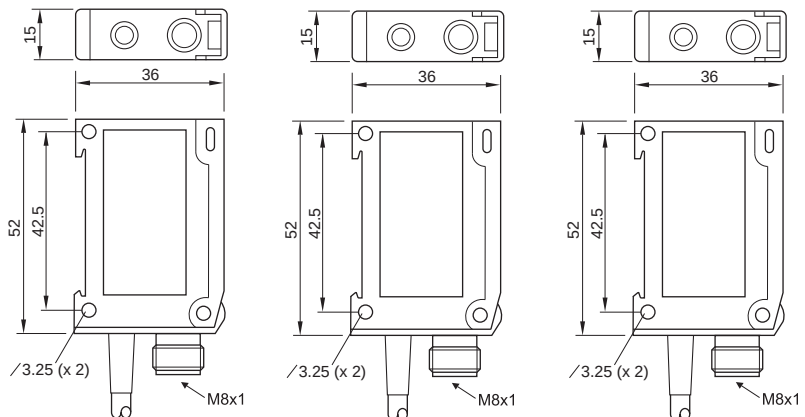
Series		BMOA	BMOA	BMOA
Amplifier		High speed	Standard	Advanced Analog Amplifier
Discrete output				
PNP NO	Part number	BMO A01-I-PU-C-02	BMO A01-J-PU-C-02	
NPN NO	Part number	BMO A01-I-NU-C-02	BMO A01-J-NU-C-02	
			BMO A01-J-PU-C-S75*	
Analog output				
0...10 V DC	Part number			BMO A01-H-V1-C-02
4...20 mA	Part number			BMO A01-H-C1-C-02
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Output current		100 mA	100 mA	
Analog Output type (voltage)				0...10 V (10 bit)
Analog Output type (current)				4...20 V (10 bit)
Analog Output load (voltage) min.				2k Ω
Analog Output load (current) max.				300 Ω <20 V DC or 600 Ω <20 V DC
Response time		100 μ s	1 ms	1 ms
Switching frequency		5 kHz	500 Hz	500 Hz
Pulsed/Non-pulsed light source		Non-pulsed	Pulsed	Pulsed
Output function		Light/Dark selectable	Light/Dark selectable	Light/Dark selectable
Operating temperature range		-10 °C to +55 °C	-10 °C to +55 °C	-10 °C to +55 °C
Degree of protection per IEC 60529		IP 65	IP 65	IP 65
Sensitivity/Range adjustment		Teach-in and Manual	Teach-in and Manual	Teach-in and Manual
Power/Stability indication		Green LED	Green LED	Green LED
Alarm indication				Red LED
Output LED		Yellow LED	Yellow LED	3 Yellow LED's
Housing material		ABS	ABS	ABS
Connection (to control system)		2 m PVC cable, 3x26 AWG	2 m PVC cable, 3x26 AWG	2 m PVC cable, 4x26 AWG
Recommended connector				

*M8, 4-pin connector

Ordering codes on page 247.



Suitable wired fiber optics can be found starting on page 313.



Fiber optics are generally available in a diffuse sensor or through-beam design.

The diffuse sensors have an integrated emitter and receiver fiber at the optical head; the through-beam sensors use two separate optical fibers.

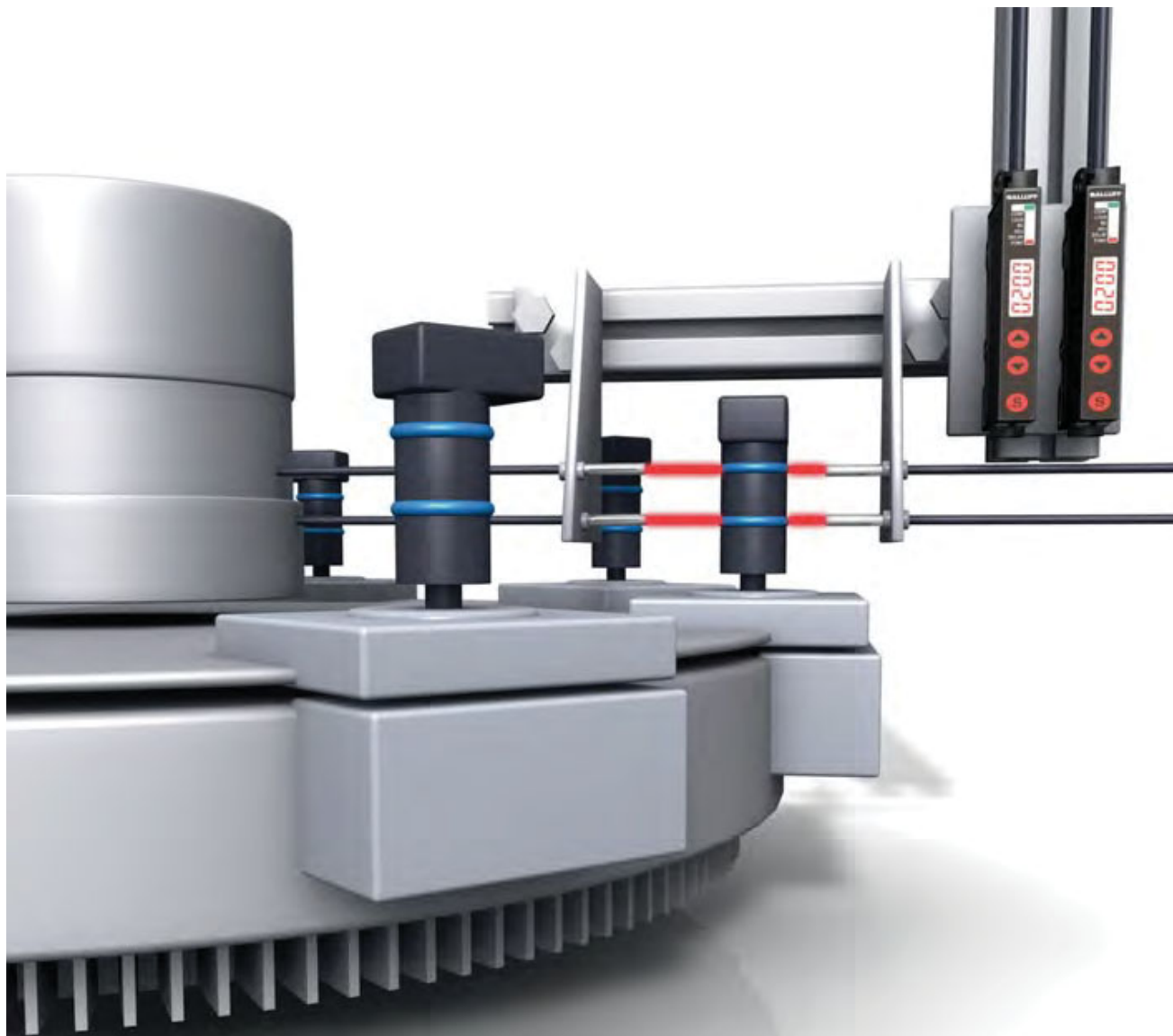
It is easy to see why optical fibers are so commonly used: The variety of end configurations, with straight or angled light exit, flexible optical head or coaxial fiber arrangement, the various fiber diameters and the ability to trim them to the desired length.

Another plus

For complete flexibility, there are also fiber optics for user assembly; the length of the duplex cable can be trimmed as needed and can be combined with various end fittings as desired.

Applications

- Small parts detection
- For tight mounting conditions
- Inspecting parts features
- Counting (e.g. counting drops)
- Precise parts positioning
- Handling and assembly technology
- Robotics



Photoelectric Special Sensors

Plastic fiber optics BFO

Product overview



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Length (meters)	Optical head	Light exit		Fiber arrangement		Core diameter				Features			Page
				Straight	90°			1.5 mm	1.0 mm	0.5 mm	0.25 mm	Bendable optical tip	Extended tempera- ture range	Highly flexible	
Ordering code Part number															
Through-beam fiber optics															
BF0005M	BFO D22-LA-KB-EAK-10-02	2	M4	■		■			■					274	
BF0005T	BFO D22-LAH-KB-EAK-10-02	2	M4	■		■			■				■	274	
BF0005W	BFO D22-LAT-KB-EAK-10-02	2	M4	■		■			■			■		274	
BF0005U	BFO D22-LAP-KB-EAK-15-02	2	M4	■		■		■						275	
BF00002	BFO D22-LA-TB-EAK-10-02	2	M4	■		■			■			■		275	
BF0005N	BFO D22-LA-NB-PZK-10-02	2	M4	■		■			■			■		275	
BF000AW	BFO D22-LAH-BK-EAK-10-02	2	M4		■	■			■				■	275	
BF0005R	BFO D22-LA-RB-EAK-10-02	2	M3	■		■			■					276	
BF0000C	BFO N22-LA-FB-EAK-05-01	1	M2	■		■				■				276	
BF000AY	BFO D22-LAT-YB-EAK-10-0,5	0.5	Ø3		■	■			■				■	276	
BF0005P	BFO D22-LA-QB-PAK-05-02	2	Ø3		■	■			■					277	
BF00056	BFO D13-LA-QB-EAK-05-02	2	Ø3		■	■				■				277	
BF00051	BFO D10-LA-CB-EAK-05-02	2	Ø2	■		■				■				277	
BF00057	BFO D13-LA-WB-EAK-05-02	2	Ø2		■	■			■					277	
BF000AP	BFO D22-LA-GD-EAK-52-02	2	10×10	■				■				■		278	
BF0005H	BFO D22-LA-AD-EAK-52-02	2	20×10	■				■				■		278	
BF0005K	BFO D22-LA-BD-EAK-52-02	2	15×15		■			■				■		278	
BF00067	BFO D25-LA-CD-EAK-110-02	2	19×25	■				■				■		279	
BF000C5	BFO D25-LA-ED-EAK-250-0,5	0.5	19×38		■			■				■		279	
BF00068	BFO D25-LA-ED-EAK-250-02	2	19×38		■			■				■		279	
BFB00C8	BFO D25 LA-HD-EAK-465-02	2	23×55		■			■				■		279	
BF00058	BFO D13-LG-05-EAK-30-02	2	15×41		■							■		280	
BF00059	BFO D13-LG-10-EAK-30-02	2	20×32		■							■		280	
BF0000E	BFO D22-LAH-ZB-EAK-10-02	2	5×4		■	■			■				■	280	
BF000C6	BFO D10-LAH-CK-EAK-05-02	2	11×6		■	■				■			■	281	
BF000C7	BFO D10-LAH-DK-EAK-05-02	2	13×7		■	■				■			■	281	
Diffuse sensor fiber optics															
BF00061	BFO D22-XA-LB-EAK-20-02	2	M6	■		■			■					282	
BF00063	BFO D22-XAH-LB-EAK-20-02	2	M6	■		■			■				■	282	
BF00065	BFO D22-XAT-LB-EAK-20-02	2	M6	■		■			■			■		282	
BF00064	BFO D22-XAP-LB-EAK-30-02	2	M6	■		■		■						283	
BF00066	BFO D22-XB-LB-EAK-15-02	2	M6	■			■		■					283	
BF00007	BFO D22-XBF-LB-EAK-15-02	2	M6	■			■		■				■	283	
BF00004	BFO D22-XA-SB-EAK-20-02	2	M6	■		■			■			■		283	
BF00005	BFO D22-XA-UB-EAK-20-02	2	M4	■		■			■					284	
BF00006	BFO D22-XB-UB-EAK-15-02	2	M4	■			■		■					284	
BF00055	BFO D10-XAH-KB-EAK-10-02	2	M4	■		■			■				■	284	
BF0005C	BFO D13-XB-KB-EAK-10-02	2	M4	■			■			■				285	
BF00053	BFO D10-XA-HB-EAK-10-02	2	M4	■		■				■		■		285	
BF00054	BFO D10-XA-RB-EAK-10-02	2	M3	■		■				■				285	
BF0005E	BFO D13-XB-RB-EAK-10-02	2	M3	■			■			■				285	
BF000C3	BFO D10-XA-VB-EAK-10-02	2	M3	■		■			■			■		285	
BF00052	BFO D10-XA-GB-EAK-10-02	2	M3	■		■				■		■		286	
BF0005A	BFO D13-XA-JB-EAK-20-02	2	Ø3	■		■			■					286	
BF00062	BFO D22-XA-MB-PAK-10-02	2	Ø3		■	■				■				286	
BF000AT	BFO D13-XB-AB-EAK-10-01	1	Ø2.5	■			■		■					287	
BF000AR	BFO D13-XV-AK-EAK-50-02	2	13×20		■				■					287	
BF0005Z	BFO D22-XA-CD-EAK-110-02	2	19×25	■				■			■			287	
BF00060	BFO D22-XA-ED-EAK-250-02	2	19×38		■			■			■			287	



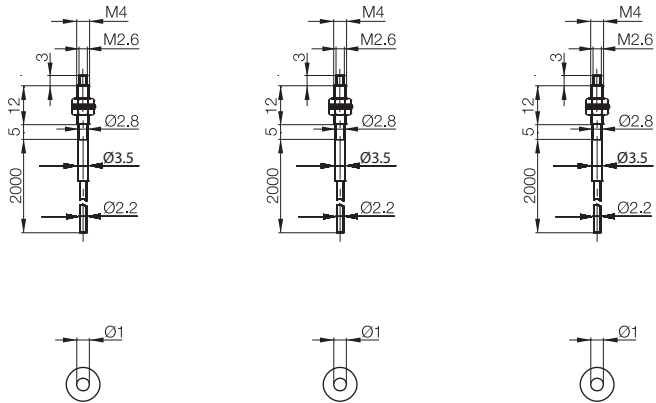
Optical head		M4 thread	M4 thread	M4 thread
Features		Standard	Highly flexible	Temperature rated
Straight light exit	Part number	BFO D22-LA-KB-EAK-10-02	BFO D22-LAH-KB-EAK-10-02	BFO D22-LAT-KB-EAK-10-02
90° light exit	Part number			
Sheathing Ø		2.2 mm	2.2 mm	2.2 mm
Core Ø		1 mm	1 mm	1 mm
Fiber length		2 m	2 m	2 m
Fiber bending radius		≥ 25 mm	≥ 2 mm	≥ 25 mm
Head bending radius				
Temperature range		-55...+70 °C	-40...+70 °C	-55...+105 °C
Range	with BFB 75K-001	500 mm	300 mm	600 mm
	with BFB 75K-002*	500 mm	300 mm	600 mm
	with BFB 73K	500 mm	300 mm	500 mm
	with BFB 6K	220 mm	200 mm	230 mm
	with BFB 18KF	120 mm	90 mm	120 mm

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 273.

Available lengths on page 273.



Photoelectric Special Sensors

Plastic fiber optics BFO

Through-beam



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

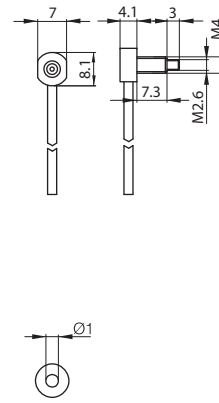
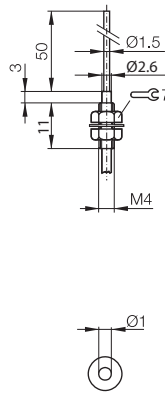
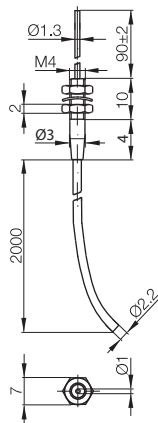
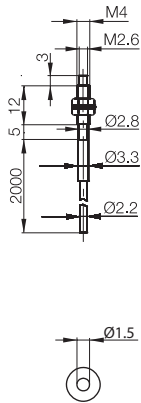
Light grids

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

	M4 thread Long range	M4 thread Bendable optical tip	M4 thread Bendable optical tip	M4 thread Highly flexible	
	BFO D22-LAP-KB-EAK-15-02	BFO D22-LA-TB-EAK-10-02	BFO D22-LA-NB-PZK-10-02	BFO D22-LAH-BK-EAK-10-02	
	2.2 mm	2.2 mm	2.2 mm	2.2 mm	
	1.5 mm	1 mm	1 mm	1 mm	
	2 m	2 m	2 m	2 m	
	≥ 40 mm	≥ 25 mm	≥ 25 mm	≥ 2 mm	
	–55...+70 °C	–30...+60 °C	–55...+70 °C	–40...+70 °C	
	800 mm	450 mm	500 mm	250 mm	
	800 mm	450 mm	500 mm	250 mm	
	800 mm	400 mm	500 mm	250 mm	
	500 mm	200 mm	250 mm	170 mm	
	250 mm	110 mm	120 mm	80 mm	





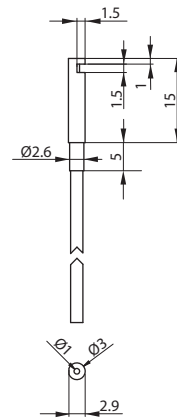
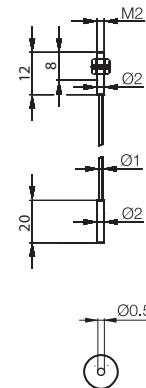
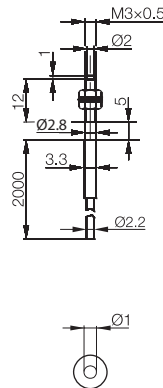
Optical head		M3 thread	M2 thread	Ø 3	
Features		Standard	Precision	Temperature rated	
Straight light exit	Part number	BFO D22-LA-RB-EAK-10-02	BFO N22-LA-FB-EAK-05-01		
90° light exit	Part number			BFO D22-LAT-YB-EAK-10-0,5	
Sheathing Ø		2.2 mm	1 mm	2.2 mm	
Core Ø		1 mm	0.5 mm	1 mm	
Fiber length		2 m	2 m	0.5 m	
Fiber bending radius		≥ 25 mm	≥ 10 mm	≥ 25 mm	
Head bending radius					
Temperature range		-55...+70 °C	-30...+60 °C	-55...+70 °C	
Range	with BFB 75K-001	500 mm	140 mm	600 mm	
	with BFB 75K-002*	500 mm	140 mm	600 mm	
	with BFB 73K	450 mm	130 mm	500 mm	
	with BFB 6K	220 mm	50 mm	230 mm	
	with BFB 18KF	100 mm	20 mm	120 mm	

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 273.

Available lengths on page 273.



Photoelectric Special Sensors

Plastic fiber optics BFO

Through-beam



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

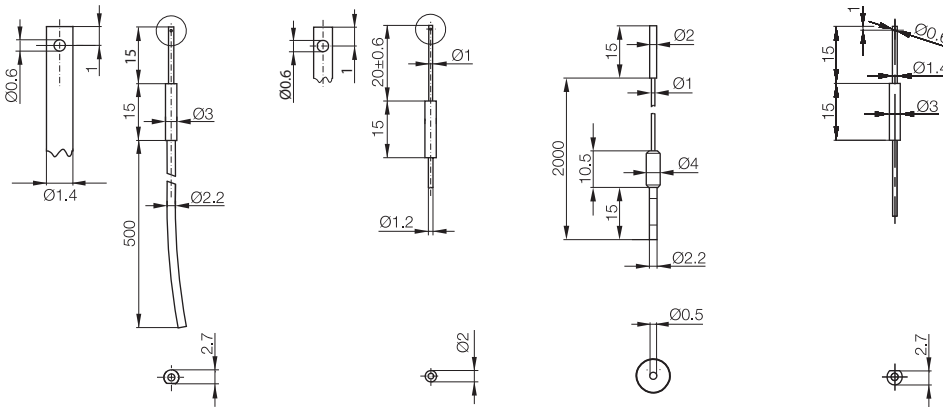
Dynamic optical windows

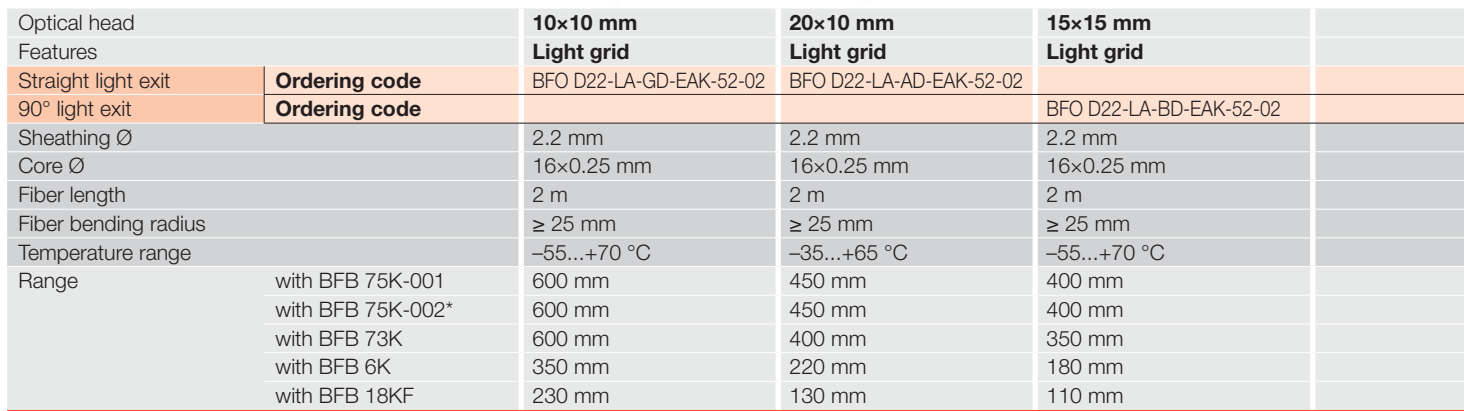
Light grids

Photoelectric distance sensors for analog distance measurement

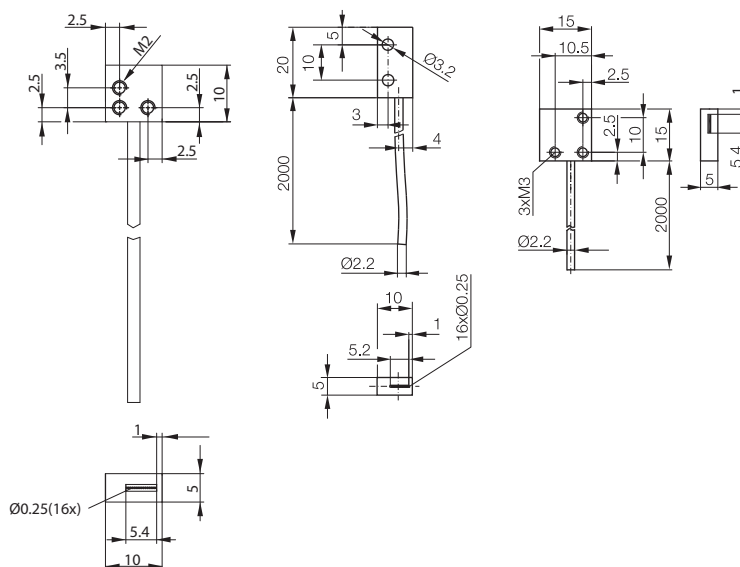
Special accessories for photoelectric sensors

	Ø 3	Ø 1 mm	Ø 2	Ø 1.4 mm	
	Light exit on side	Light exit on side	Precision	Standard	
	BFO D22-LA-QB-PAK-05-02	BFO D13-LA-QB-EAK-05-02	BFO D10-LA-CB-EAK-05-02	BFO D13-LA-WB-EAK-05-02	
	2.2 mm	1.3 mm	1 mm	1.3 mm	
	1 mm	0.5 mm	0.5 mm	1 mm	
	2 m	2 m	2 m	2 m	
	≥ 25 mm	≥ 15 mm	≤ 15 mm	≥ 25 mm	
	-40...+70 °C	-35...+65 °C	-55...+70 °C	-40...+70 °C	
	120 mm	110 mm	130 mm	75 mm	
	120 mm	110 mm	130 mm	75 mm	
	115 mm	105 mm	120 mm	70 mm	
	65 mm	-	-	-	
	35 mm	25 mm	-	20 mm	

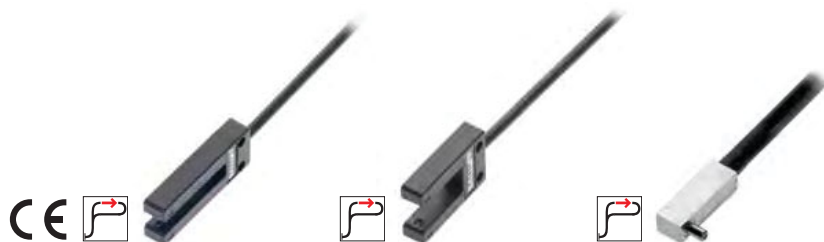




Available lengths on page 273.







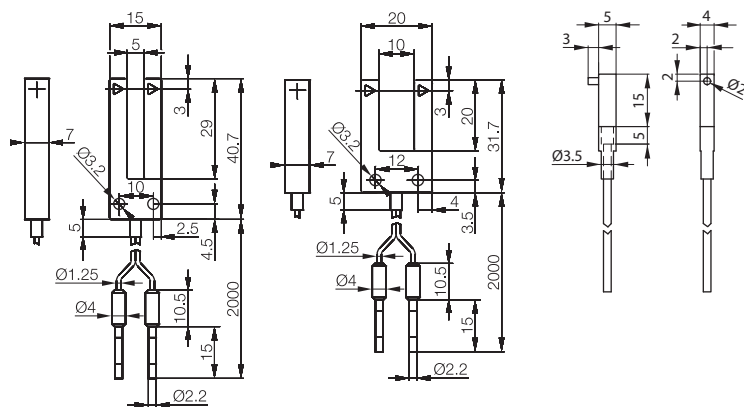
Optical head		15x41 mm	20x32 mm	5x4 mm	
Features		Fork	Fork	Highly flexible	
Straight light exit					
90° light exit	Part number	BFO D13-LG-05-EAK-30-02	BFO D13-LG-10-EAK-30-02	BFO D22-LAH-ZB-EAK-10-02	
Sheathing Ø		2x1.25 mm	2x1.25 mm	2.2 mm	
Core Ø		2x0.25 mm	2x0.25 mm	1 mm	
Fiber length		2 m	2 m	2 m	
Fiber bending radius		≥ 10 mm	≥ 10 mm	≥ 2 mm	
Temperature range		-55...+70 °C	-55...+70 °C	-55...+70 °C	
Range	with BFB 75K-001	5 mm	10 mm	300 mm	
	with BFB 75K-002*	5 mm	10 mm	300 mm	
	with BFB 73K	5 mm	10 mm	300 mm	
	with BFB 6K	5 mm	10 mm	200 mm	
	with BFB 18KF	5 mm	10 mm	90 mm	

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 273.

Available lengths on page 273.



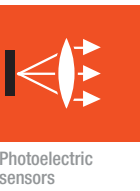
Photoelectric Special Sensors

Plastic fiber optics BFO

Through-beam



	11x6 mm	13x7 mm			
	Highly flexible	Highly flexible			
	BFO D10-LAH-CK-EAK-05-02	BFO D10-LAH-DK-EAK-05-02			
	1 mm	1 mm			
	0.5 mm	0.5 mm			
	2 m	2 m			
	≥ 1 mm	≥ 1 mm			
	-40...+70 °C	-40...+70 °C			
	55 mm	50 mm			
	55 mm	50 mm			
	45 mm	40 mm			
	-	-			
	20 mm	20 mm			



Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

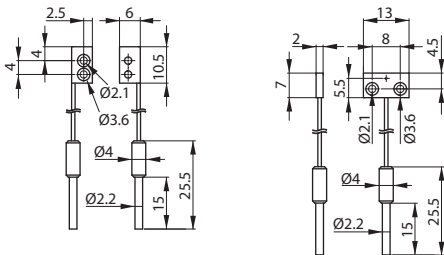
Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



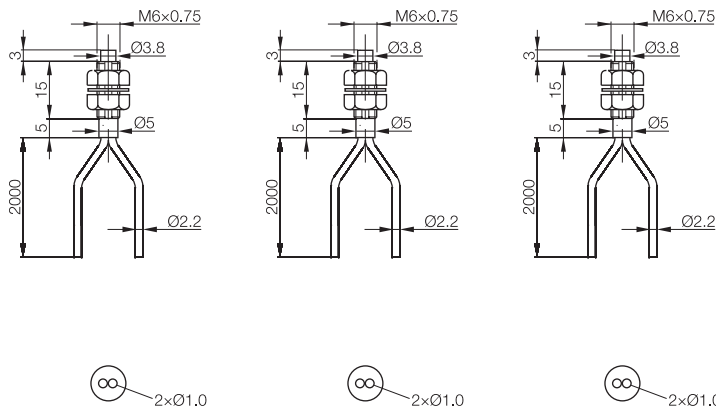


Optical head		M6 thread	M6 thread	M6 thread	
Features		Standard	Highly flexible	Temperature rated	
Straight light exit	Part number	BFO D22-XA-LB-EAK-20-02	BFO D22-XAH-LB-EAK-20-02	BFO D22-XAT-LB-EAK-20-02	
Sheathing Ø		2×2.2 mm	2×2.2 mm	2×2.2 mm	
Core Ø		2×1 mm	2×1 mm	2×1 mm	
Fiber bending radius		≥ 25 mm	≥ 2 mm	≥ 25 mm	
Head bending radius					
Temperature range		-55...+70 °C	-40...+70 °C	-55...+115 °C	
Range	with BFB 75K-001	150 mm	120 mm	130 mm	
	with BFB 75K-002*	150 mm	120 mm	130 mm	
	with BFB 73K	150 mm	120 mm	130 mm	
	with BFB 6K	100 mm	70 mm	90 mm	
	with BFB 18KF	50 mm	30 mm	50 mm	

*Max. range in standard mode

Ordering codes on page 273.

Available lengths on page 273.



Photoelectric Special Sensors

Plastic fiber optics BFO

Diffuse



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

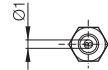
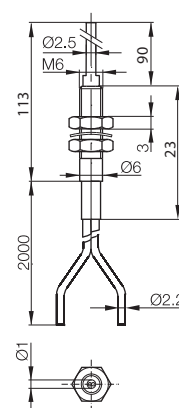
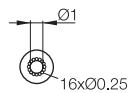
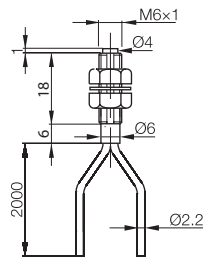
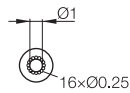
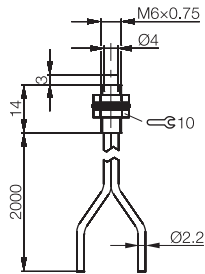
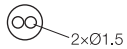
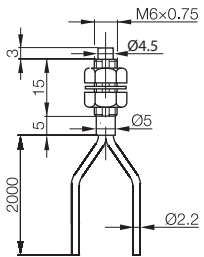
Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

M6 thread	M6 thread	M6 thread	M6 thread	
Long range	Coaxial	Coaxial, flexible	Bendable optical tip	
BFO D22-XAP-LB-EAK-30-02	BFO D22-XB-LB-EAK-15-02	BFO D22-XBF-LB-EAK-15-02	BFO D22-XA-SB-EAK-20-02	
2x2.2 mm	2x2.2 mm	2x2.2 mm	2x2.2 mm	
2x1.5 mm	1x1 mm/16x0.25 mm	1x1 mm/16x0.25 mm	2x1 mm	
≥ 40 mm	≥ 25 mm	≥ 5 mm	≥ 25 mm	
			≥ 15 mm	
-55...+70 °C	-55...+70 °C	-40...+60 °C	-35...+65 °C	
180 mm	120 mm	110 mm	130 mm	
180 mm	120 mm	110 mm	130 mm	
180 mm	120 mm	120 mm	130 mm	
130 mm	80 mm	70 mm	90 mm	
100 mm	50 mm	30 mm	40 mm	



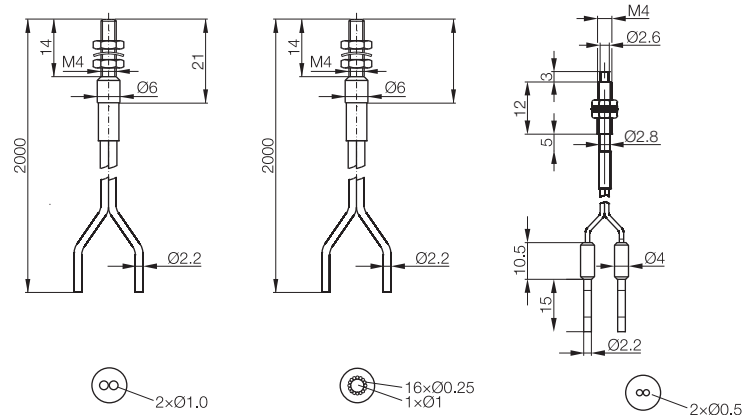


Optical head		M4 thread	M4 thread	M4 thread
Features		Standard	Coaxial	Highly flexible
Straight light exit	Part number	BFO D22-XA-UB-EAK-20-02	BFO D22-XB-UB-EAK-15-02	BFO D10-XAH-KB-EAK-10-02
Sheathing Ø		2×2.2 mm	2×2.2 mm	2×1 mm
Core Ø		2×1 mm	1×1 mm/16×0.25 mm	2×0.5 mm
Fiber bending radius		≥ 25 mm	≥ 25 mm	≥ 1 mm
Head bending radius				
Temperature range		–35...+65 °C	–40...+60 °C	–40...+70 °C
Range	with BFB 75K-001	120 mm	130 mm	40 mm
	with BFB 75K-002*	120 mm	130 mm	40 mm
	with BFB 73K	120 mm	130 mm	30 mm
	with BFB 6K	80 mm	90 mm	–
	with BFB 18KF	40 mm	50 mm	10 mm

*Max. range in standard mode

Ordering codes on page 273.

Available lengths on page 273.



Photoelectric Special Sensors

Plastic fiber optics BFO

Diffuse



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

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for analog distance measurement

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Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

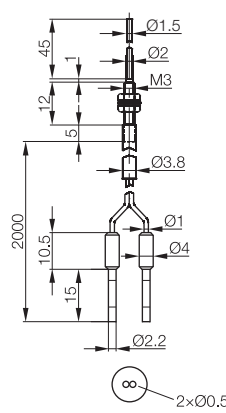
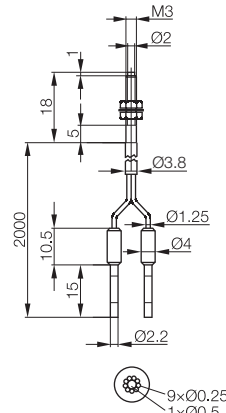
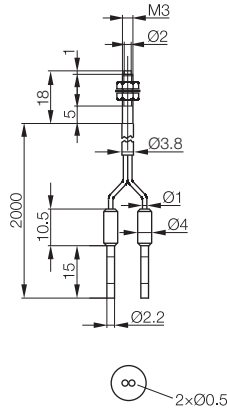
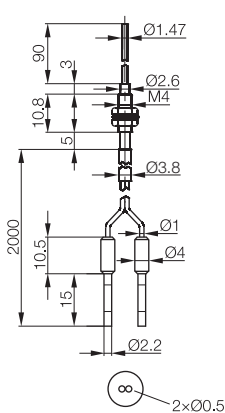
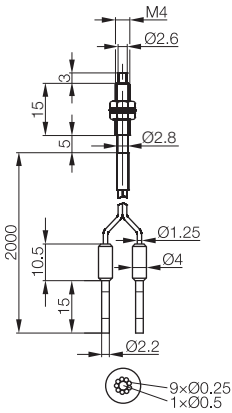
Special accessories for photoelectric sensors

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors

M4 thread	M4 thread	M3 thread	M3 thread	M3 thread
Coaxial	Bendable optical tip	Standard	Coaxial	Bendable optical tip
BFO D13-XB-KB-EAK-10-02	BFO D10-XA-HB-EAK-10-02	BFO D10-XA-RB-EAK-10-02	BFO D13-XB-RB-EAK-10-02	BFO D10-XA-VB-EAK-10-02
2×1.25 mm	2×1 mm	2×1 mm	2×1.25 mm	2×1 mm
1×0.5 mm/9×0.25 mm	2×0.5 mm	2×0.5 mm	1×0.5 mm/9×0.25 mm	2×0.5 mm
≥ 15 mm	≥ 15 mm	≥ 15 mm	≥ 15 mm	≥ 15 mm
	≥ 10 mm			≥ 10 mm
-55...+70 °C	-55...+70 °C	-55...+70 °C	-40...+60 °C	-55...+70 °C
60 mm	50 mm	50 mm	60 mm	50 mm
60 mm	50 mm	50 mm	60 mm	50 mm
60 mm	40 mm	40 mm	—	40 mm
—	—	—	—	—
20 mm	10 mm	10 mm	20 mm	10 mm



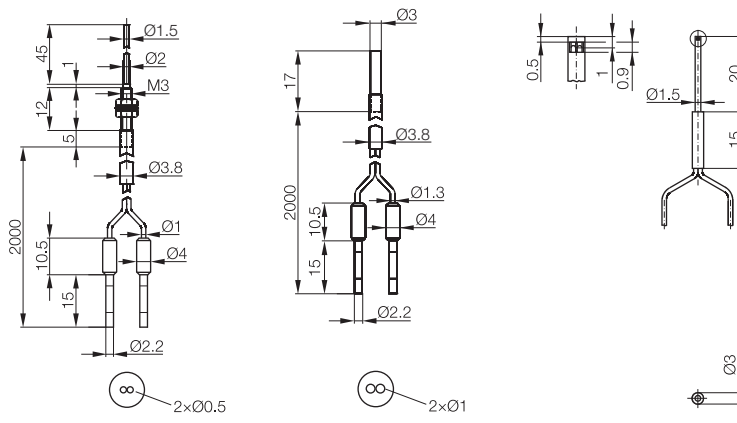


Optical head		M3 thread	Ø 3 mm	Ø 3 mm	
Features		Standard	Standard	Standard	
Straight light exit	Part number	BFO D10-XA-GB-EAK-10-02	BFO D13-XA-JB-EAK-20-02		
90° light exit	Part number			BFO D22-XA-MB-PAK-10-02	
Sheathing Ø		2×1 mm	2×1.3 mm	2×1 mm	
Core Ø		2×0.5 mm	2×1 mm	2×0.5 mm	
Fiber bending radius		≥ 15 mm	≥ 25 mm	≥ 25 mm	
Head bending radius		≥ 10 mm			
Temperature range		-55...+70 °C	-55...+70 °C	-40...+70 °C	
Range	with BFB 75K-001	50 mm	130 mm	35 mm	
	with BFB 75K-002*	50 mm	130 mm	35 mm	
	with BFB 73K	40 mm	130 mm	25 mm	
	with BFB 6K	–	–	–	
	with BFB 18KF	10 mm	50 mm	–	

*Max. range in standard mode

Ordering codes on page 273.

Available lengths on page 273.



Photoelectric Special Sensors

Plastic fiber optics BFO

For customized solutions

Plastic Fiber Optics

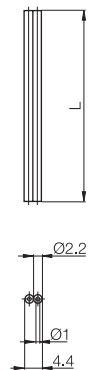
Customized solutions with plastic fiber optics for user assembly

Optical fibers can be user-cut to the desired length from a 20 m roll. This way you only use as much plastic optical fiber as you actually need. Considerable savings, especially if multiple sensors are used. For simple applications you may not need an end piece. A simple clamp will suffice. Or for convenience and flexibility, select from among the available end pieces. The plastic optical fiber is simply crimped into the end piece. Tedious gluing is eliminated. The end piece can be removed at any time.



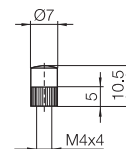
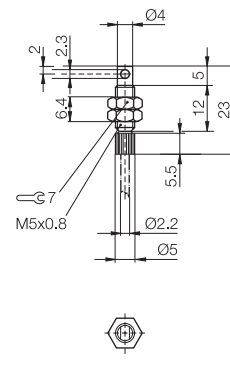
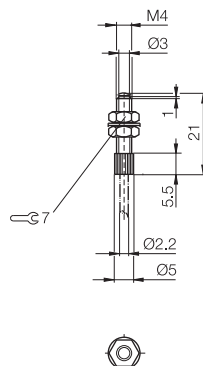
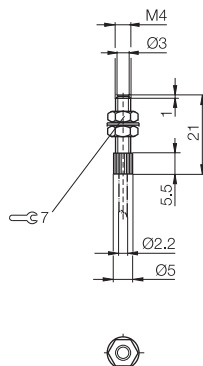
Size	2.2x4.4 mm duplex cable
Through-beam sensor range with L = 2 m	150 mm
Cable length	20 m
Ordering code	BFO005Y
Part number	BFO D22-LD-EAK-10-20
Sheathing Ø	2x1 mm
Core Ø	2.2 mm
Ambient temperature Ta	-40...+85 °C
Tension on optical fiber and connection parts at 20 °C	6 N

Cutting tool BFO CT is included.



Size	M4	M4	Ø 4 mm/M5	Ø 7 mm
Features	End piece without lens	End piece with lens	90° end piece	Adapter lens
Used with	BFO D22-LD-EAK-10-...	BFO D22-LD-EAK-10-...	BFO D22-LD-EAK-10-...	BFO D22-LA-BC-10
Range	150 mm	450 mm	150 mm	1500 mm
Ordering code	BFO005J	BFO005L	BFO005F	BAM 00NW
Part number	BFO D22-LA-BC-10	BFO D22-LA-CC-30	BFO D22-LA-AC-20	BFO 04-PK-1
Material	Plastic (fibers)	Glass	Glass	Glass
Optical surface	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Threaded tube	1 pc.	1 pc.	1 pc.	1 pc.
Packaging unit				

Range when used with 2 m plastic fiber cable.



Accessories for Photoelectric Sensors

Adapter lens, deflection head, focus lens, adapter, cutting tool



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

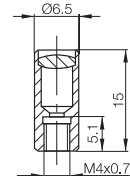
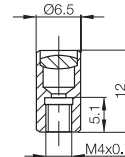
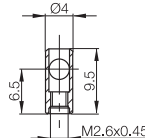
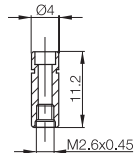
Special accessories for photoelectric sensors



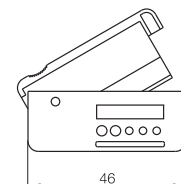
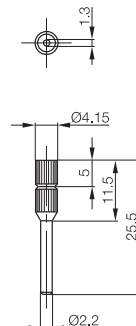
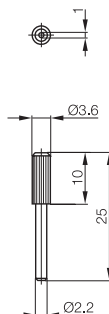
Adapter lens, deflection head, focus lens, adapter and cutting tool are assigned to accessories, which we mark in gray.



Description	Adapter lens	90° rotatable head	Focusing lens	Focusing lens
Use	For through-beam optical fibers M2.6x0.45	For through-beam optical fibers M2.6x0.45	For coaxial diffuse sensor optical fibers M4x0.7	For coaxial diffuse sensor optical fibers M4x0.7
Ordering code	BAM00NN	BAM00NP	BAM00NR	BAM00NT
Part number	BFO 02-PK-1	BFO 02-UK-1	BFO 04-FL-1	BFO 04-FL-2
Sensing distance/range distance with corresponding fiber optics	x10	x0.7	19 mm±2 mm	7 mm±2 mm
Packaging unit	2 pcs.	2 pcs.	1 pc.	1 pc.



Description	Adapter	Adapter	Cutting Tool
Use	For plastic fiber optics Ø 1 mm for connecting to fiber optic base units	For plastic fiber optics Ø 1.3 mm for connecting to fiber optic base units	For trimming plastic fiber optics Ø 1 mm or Ø 2.2 mm
Ordering code	BAM000J	BAM00P1	BAM000E
Part number	BFO D10-LA-DC-10	BFO D13-LA-EC-10	BFO CT
Packaging unit	2 pcs.	2 pcs.	1 pc.



The BFO 18 series of glass fiber optics are designed for series BOS 18M cylindrical sensors and are used wherever a high level of function reserve or chemical resistance is required. Likewise, temperatures over 200 °C pose no problem.

Various straight or right-angle versions are available with a polyurethane jacket, corrugated metal armor or silicon protective jacket.

UZG type

Polyurethane jacket
Strain relief
Glass optical fiber bundle

- Flexible
- Excellent chemical resistance
- Does not become brittle from oils and cooling emulsions
- Temperature resistance
-20...+85 °C

MZG type

Corrugated metal armor
Strain relief
Glass optical fiber bundle

- Resistant to high temperatures
-20...+170 °C (up to +250 °C
for a fixed installation)
- Flexible
- Crush-resistant
- Resistant to hot swarf

SMG type

Silicon protection jacket
Corrugated metal armor with
strain relief
Glass optical fiber bundle

- Extended temperature range
-40...+150 °C
- Highly flexible
- Crush-resistant



Photoelectric Special Sensors

Glass fiber optics BFO 18

Product overview

Type

Ordering code
Part number



Through-beam fiber optics

Type			Optical head		Optical bundle diameter				Page	 Photoelectric sensors	
		Lenght (meters)		Straight	90°	1.0 mm	1.5 mm	2.0 mm	3.0 mm		
Ordering code	Part number										
 Through-beam fiber optics											
BF0001Z	BFO 18A-LGG-MZG-10-0,5	0.5	Ø2	■		■				294	Photoelectric standard sensors
BF00020	BFO 18A-LGG-MZG-10-1	1	Ø2	■		■				294	
BF00023	BFO 18A-LGG-SMG-10-0,5	0.5	Ø2	■		■				294	
BF00024	BFO 18A-LGG-SMG-10-1	1	Ø2	■		■				294	
BF00022	BFO 18A-LGG-MZG-10-2	2	Ø2	■		■				294	Optical fiber base units
BF0001P	BFO 18A-LFF-MZG-10-0,5	0.5	Ø2		■	■				294	Fiber optics
BF0001R	BFO 18A-LFF-MZG-10-1	1	Ø2		■	■				294	
BF0001U	BFO 18A-LFF-SMG-10-0,5	0.5	Ø2		■	■				294	Contrast sensor
BF0001W	BFO 18A-LFF-SMG-10-1	1	Ø2		■	■				294	Luminescence sensor
BF0001Y	BFO 18A-LFF-SMG-10-3	3	Ø2		■	■				294	Color sensors
BF0000M	BFO 18A-LAA-UZG-20-0,5	0.5	M5	■				■		295	Fork sensors
BF0000N	BFO 18A-LAA-UZG-20-1	1	M5	■				■		295	Angle sensors
BF0000R	BFO 18A-LAA-UZG-20-2	2	M5	■				■		295	Dynamic optical windows
BF0000T	BFO 18A-LAA-UZG-20-3	3	M5	■				■		295	Light grids
BF0000F	BFO 18A-LAA-MZG-20-0,5	0.5	M5	■				■		295	
BF0000H	BFO 18A-LAA-MZG-20-1	1	M5	■				■		295	Photoelectric distance sensors for analog distance measurement
BF0000J	BFO 18A-LAA-MZG-20-1,5	1.5	M5	■				■		295	
BF0000L	BFO 18A-LAA-MZG-20-3	3	M5	■				■		295	
BF0000Z	BFO 18A-LCC-UZG-20-1	1	Ø6	■				■		295	Special accessories for photoelectric sensors
BF00010	BFO 18A-LCC-UZG-20-1,5	1.5	Ø6	■				■		295	
BF0000U	BFO 18A-LCC-SMG-20-0,5	0.5	Ø6	■				■		295	
BF0000W	BFO 18A-LCC-SMG-20-1	1	Ø6	■				■		295	
BF0001F	BFO 18A-LEE-UZG-20-0,5	0.5	Ø6		■			■		295	
BF0001H	BFO 18A-LEE-UZG-20-1	1	Ø6		■			■		295	
BF0001K	BFO 18A-LEE-UZG-20-2	2	Ø6		■			■		295	
BF00013	BFO 18A-LEE-MZG-20-0,5	0.5	Ø6		■			■		295	
BF00014	BFO 18A-LEE-MZG-20-1	1	Ø6		■			■		295	
BF00016	BFO 18A-LEE-MZG-20-2	2	Ø6		■			■		295	
BF00019	BFO 18A-LEE-SMG-20-0,5	0.5	Ø6		■			■		295	
BF0001C	BFO 18A-LEE-SMG-20-1,5	1.5	Ø6		■			■		295	
BF0003Y	BFO 18V-LCC-MZG-23-0,5	0.5	Ø6	■				■		295	
BF0003Z	BFO 18V-LCC-MZG-23-0,75	0.75	Ø6	■				■		295	
BF00040	BFO 18V-LCC-MZG-23-1,5	1.5	Ø6	■				■		295	
BF00041	BFO 18V-LCC-MZG-23-2,0	2	Ø6	■				■		295	
BF00042	BFO 18V-LCC-SMG-23-0,5	0.5	Ø6	■				■		295	
BF00043	BFO 18V-LCC-SMG-23-0,75	0.75	Ø6	■				■		295	
BF00044	BFO 18V-LCC-SMG-23-1,5	1.5	Ø6	■				■		295	
BF00045	BFO 18V-LCC-SMG-23-2	2	Ø6	■				■		295	
BF00046	BFO 18V-LCC-SMG-23-3	3	Ø6	■				■		295	
BF00047	BFO 18V-LDD-MZG-23-0,75	0.75	Ø6		■			■		295	
BF00048	BFO 18V-LDD-MZG-23-1,5	1.5	Ø6		■			■		295	
BF00049	BFO 18V-LDD-MZG-23-2,0	2	Ø6		■			■		295	
BF0004A	BFO 18V-LDD-MZG-23-3	3	Ø6		■			■		295	
BF000C0	BFO 18V-LDD-MZG-23-5	5	Ø6		■			■		295	
BF000C1	BFO 18V-LDD-MZG-23-8	8	Ø6		■			■		295	
BF000C2	BFO 18V-LDD-MZG-23-13	13	Ø6		■			■		295	
BF0004C	BFO 18V-LDD-SMG-23-0,5	0.5	Ø6		■			■		295	
BF0004E	BFO 18V-LDD-SMG-23-0,75	0.75	Ø6		■			■		295	
BF0004F	BFO 18V-LDD-SMG-23-1	1	Ø6		■			■		295	
BF0004H	BFO 18V-LDD-SMG-23-1,5	1.5	Ø6		■			■		295	
BF0004J	BFO 18V-LDD-SMG-23-2	2	Ø6		■			■		295	
BF0004K	BFO 18V-LDD-SMG-23-3	3	Ø6		■			■		295	

Photoelectric Special Sensors

Glass fiber optics BFO 18

Product overview

Type			Optical head			Optical bundle diameter				
		Length (meters)		Straight	90°	1.0 mm	1.5 mm	2.0 mm	3.0 mm	
Diffuse sensor fiber optics										
BF0003R	BFO 18A-XAG-MZG-15-0,5	0.5	Ø2	■			■			296
BF0003T	BFO 18A-XAG-MZG-15-1	1	Ø2	■			■			296
BF0003U	BFO 18A-XAG-MZG-15-1,5	1.5	Ø2	■			■			296
BF0003W	BFO 18A-XAG-MZG-15-2	2	Ø2	■			■			296
BF0003H	BFO 18A-XAF-MZG-15-0,5	0.5	Ø2		■		■			296
BF0003J	BFO 18A-XAF-MZG-15-1	1	Ø2		■		■			296
BF0003K	BFO 18A-XAF-MZG-15-1,5	1.5	Ø2		■		■			296
BF0003L	BFO 18A-XAF-MZG-15-2	2	Ø2		■		■			296
BF0003M	BFO 18A-XAF-SMG-15-0,5	0.5	Ø2		■		■			296
BF0003N	BFO 18A-XAF-SMG-15-1	1	Ø2		■		■			296
BF0003P	BFO 18A-XAF-SMG-15-3	3	Ø2		■		■			296
BF0002M	BFO 18A-XAA-UZG-30-0,5	0.5	M5	■					■	297
BF0002N	BFO 18A-XAA-UZG-30-1	1	M5	■					■	297
BF0002P	BFO 18A-XAA-UZG-30-1,5	1.5	M5	■					■	297
BF0002R	BFO 18A-XAA-UZG-30-2	2	M5	■					■	297
BF0002T	BFO 18A-XAA-UZG-30-3	3	M5	■					■	297
BF00026	BFO 18A-XAA-MZG-30-0,5	0.5	M5	■					■	297
BF00027	BFO 18A-XAA-MZG-30-1	1	M5	■					■	297
BF00028	BFO 18A-XAA-MZG-30-1,5	1.5	M5	■					■	297
BF0002A	BFO 18A-XAA-MZG-30-2	2	M5	■					■	297
BF0002C	BFO 18A-XAA-MZG-30-2,5	2.5	M5	■					■	297
BF0002E	BFO 18A-XAA-MZG-30-3	3	M5	■					■	297
BF00029	BFO 18A-XAA-MZG-30-12	12	M5	■					■	297
BF0002F	BFO 18A-XAA-SMG-30-0,5	0.5	M5	■					■	297
BF0002H	BFO 18A-XAA-SMG-30-1	1	M5	■					■	297
BF0002J	BFO 18A-XAA-SMG-30-1,5	1.5	M5	■					■	297
BF0002K	BFO 18A-XAA-SMG-30-2	2	M5	■					■	297
BF0002L	BFO 18A-XAA-SMG-30-3	3	M5	■					■	297
BF0002U	BFO 18A-XAC-SMG-30-0,5	0.5	Ø8	■					■	297
BF0002W	BFO 18A-XAC-SMG-30-1	1	Ø8	■					■	297
BF0002Y	BFO 18A-XAC-SMG-30-1,5	1.5	Ø8	■					■	297
BF0002Z	BFO 18A-XAC-SMG-30-2,5	2.5	Ø8	■					■	297
BF00030	BFO 18A-XAC-SMG-30-3	3	Ø8	■					■	297
BF0003C	BFO 18A-XAE-UZG-30-0,5	0.5	Ø8		■				■	297
BF0003E	BFO 18A-XAE-UZG-30-1	1	Ø8		■				■	297
BF0003F	BFO 18A-XAE-UZG-30-2,5	2.5	Ø8		■				■	297
BF00031	BFO 18A-XAE-MZG-30-0,5	0.5	Ø8		■				■	297
BF00032	BFO 18A-XAE-MZG-30-1	1	Ø8		■				■	297
BF00033	BFO 18A-XAE-MZG-30-1,5	1.5	Ø8		■				■	297
BF00034	BFO 18A-XAE-MZG-30-2	2	Ø8		■				■	297
BF00035	BFO 18A-XAE-MZG-30-2,5	2.5	Ø8		■				■	297
BF00036	BFO 18A-XAE-MZG-30-3	3	Ø8		■				■	297
BF00037	BFO 18A-XAE-SMG-30-0,5	0.5	Ø8		■				■	297
BF00038	BFO 18A-XAE-SMG-30-1	1	Ø8		■				■	297
BF00039	BFO 18A-XAE-SMG-30-2	2	Ø8		■				■	297
BF0003A	BFO 18A-XAE-SMG-30-3	3	Ø8		■				■	297
BF0004M	BFO 18V-XAC-MZG-30-0,5	0.5	Ø6	■					■	297
BF0004P	BFO 18V-XAC-SMG-30-0,5	0.5	Ø6	■					■	297
BF0004R	BFO 18V-XAC-SMG-30-1	1	Ø6	■					■	297
BF0004U	BFO 18V-XAD-MZG-30-0,5	0.5	Ø6		■				■	297
BF0004Y	BFO 18V-XAD-SMG-30-0,5	0.5	Ø6		■				■	297
BF0004Z	BFO 18V-XAD-SMG-30-1	1	Ø6		■				■	297



Photoelectric Special Sensors



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

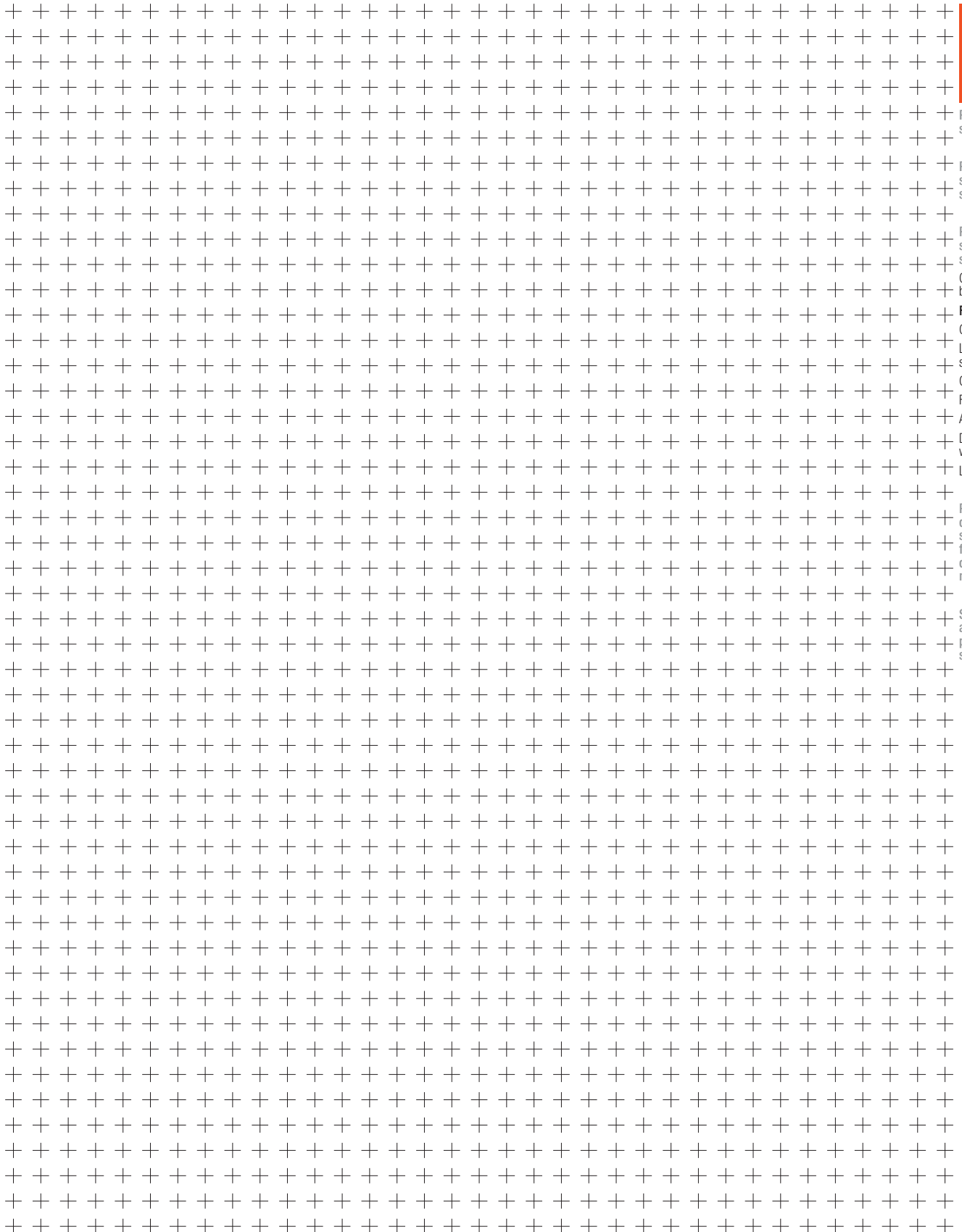
Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Photoelectric Special Sensors

Glass fiber optics BFO 18

Through-beam

Glass Fiber Optics



Through-beam sensor with	BOS 18M-...-PD-...	Range	100 mm	100 mm
	BOS 18M-...-1PF-...	Range	400 mm	400 mm
	BOS 30M-...	Range		
UZG type		Part number		
MZG type		Part number	BFO 18A-LGG-MZG-10-__	BFO 18A-LFF-MZG-10-__
SMG type		Part number	BFO 18A-LGG-SMG-10-__	BFO 18A-LFF-SMG-10-__
Glass optical fiber bundle diameter			1 mm	1 mm
Max. tension on optical fibers and connection parts			80 N	80 N
Min. bending radius			60 mm	60 mm
Can be used with	BOS 18M-PA-1PD...	Yes	Yes	Yes
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	Yes (remove adapter disk)	Yes (remove adapter disk)	Yes (remove adapter disk)
	BOS 18M-GU-1PF-...	Yes (remove adapter disk)	Yes (remove adapter disk)	Yes (remove adapter disk)
	BOS 18M-PA-1PF-...	Yes	Yes	Yes
	BOS 30M-... (use BFO 30-A1 adapter)	No	No	No

Ordering codes on page 291.

Additional lengths available (in 0.5 m increments)! Please submit an inquiry.

Please append the desired length L of the fiber optics cable to the ordering code.
Adjustments from 0.5 m to max. 2 m possible.

Example:

BFO 18...-30-**0,5** for **0.5 m** fiber length

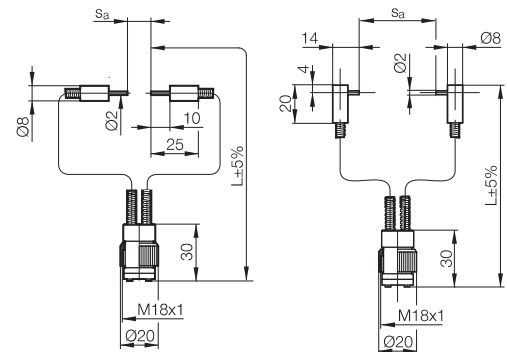
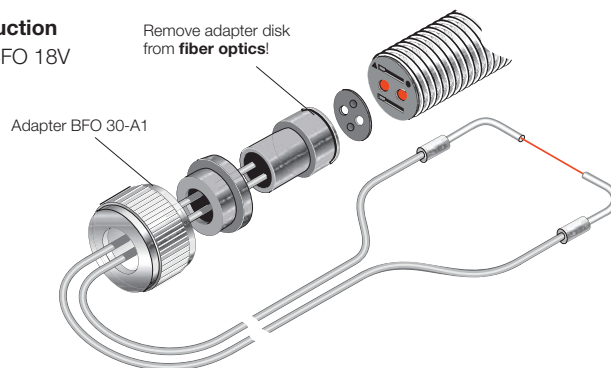
BFO 18...-30-**2** for **2 m** fiber length

Important!

With a fiber optic through-beam sensor, the base unit's normally open signal switches to a normally closed signal!

Mounting instruction

BOS 30M with BFO 18V



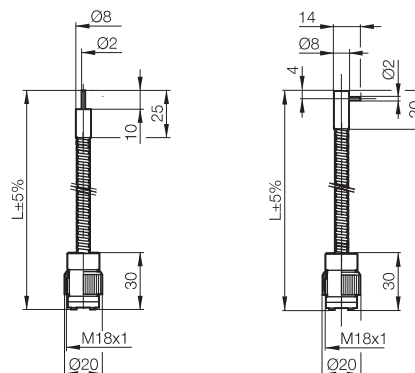
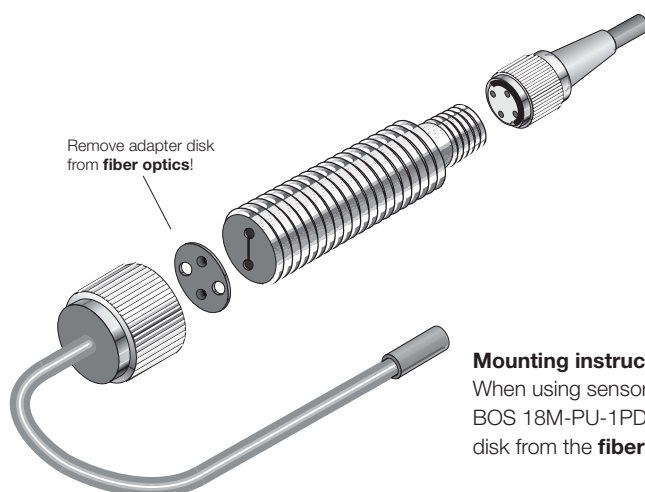


Diffuse sensor with	BOS 18M-...-PD-.../BOS 18M-...-1PF-... BOS 30M-...	10 mm/50 mm	10 mm/50 mm	
Retroreflective sensor with	BOS 18M-...-PD-.../BOS 18M-...-1PF-... BOS 30M-...	300 mm/1000 mm	300 mm/1000 mm	
UZG type	Part number			
MZG type	Part number	BFO 18A-XAG-MZG-15-__	BFO 18A-XAF-MZG-15-__	
SMG type	Part number		BFO 18A-XAF-SMG-15-__	
Glass optical fiber bundle diameter		1.5 mm	1.5 mm	
Max. tension on optical fibers and connection parts		80 N	80 N	
Min. bending radius		60 mm	60 mm	
Can be used with	BOS 18M-PA-1PD...	Yes	Yes	
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	Yes (remove adapter disk)	Yes (remove adapter disk)	
	BOS 18M-GU-1PF-...	Yes (remove adapter disk)	Yes (remove adapter disk)	
	BOS 18M-PA-1PF-...	Yes	Yes	
	BOS 30M-...	No	No	
Sensing distance with	BOS 18M-PA-1PD...	10 mm	10 mm	
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	10 mm	10 mm	
	BOS 18M-...-1PF-...	50 mm	50 mm	
	BOS 30M-...			
Range with	BOS 18M-PA-1PD...	300 mm	300 mm	
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	300 mm	300 mm	
	BOS 18M-...-1PF-...	1000 mm	1000 mm	
	BOS 30M-...			

Ordering codes on page 292.

Additional lengths available (in 0.5 m increments)!

Please submit an inquiry.



Mounting instruction

When using sensor BOS18M-GU-1PF-S4-Y or BOS 18M-PU-1PD-SA..., please remove the adapter disk from the **fiber optics**.

Photoelectric Special Sensors

Glass fiber optics BFO 18

Diffuse



	20 mm/100 mm	20 mm/100 mm	20 mm/100 mm	20 mm 200 mm 500 mm 2000 mm	20 mm 200 mm 500 mm 2000 mm
	500 mm/1000 mm	500 mm/1000 mm	500 mm/1000 mm		
	BFO 18A-XAA-UZG-30-__		BFO 18A-XAE-UZG-30-__		
	BFO 18A-XAA-MZG-30-__		BFO 18A-XAE-MZG-30-__	BFO 18V-XAC-MZG-30-__	BFO 18V-XAD-MZG-30-__
	BFO 18A-XAA-SMG-30-__	BFO 18A-XAC-SMG-30-__	BFO 18A-XAE-SMG-30-__	BFO 18V-XAC-SMG-30-__	BFO 18V-XAD-SMG-30-__
	3 mm	3 mm	3 mm	3 mm	3 mm
	80 N	80 N	80 N	80 N	80 N
	60 mm	60 mm	60 mm	60 mm	60 mm
	Yes	Yes	Yes	No	No
	Yes (remove adapter disk)	Yes (remove adapter disk)	Yes (remove adapter disk)	Yes (remove adapter disk)	Yes (remove adapter disk)
	Yes (remove adapter disk)	Yes (remove adapter disk)	Yes (remove adapter disk)	No	No
	Yes	Yes	Yes	No	No
	No	No	No	Yes (remove adapter disk)	Yes (remove adapter disk)
	20 mm	20 mm	20 mm	20 mm	20 mm
	20 mm	20 mm	20 mm	20 mm	20 mm
	100 mm	100 mm	100 mm		
				200 mm	200 mm
	500 mm	500 mm	500 mm	500 mm	500 mm
	500 mm	500 mm	500 mm		
	1000 mm	1000 mm	1000 mm		
				2000 mm	2000 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

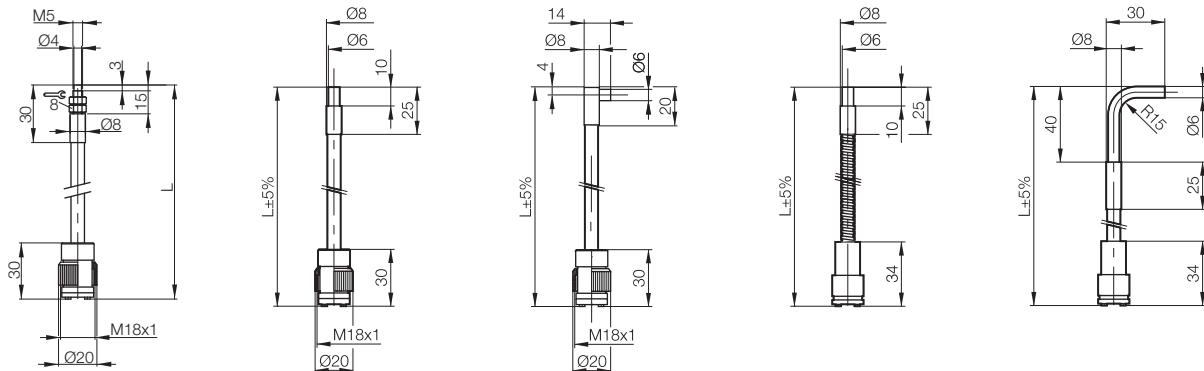
Dynamic optical windows

Light grids

Photoelectric distance sensors

for analog distance measurement

Special accessories for photoelectric sensors



Sensing distances referenced to a 90% reflective Kodak gray card.
Diffuse sensor with glass fiber optics as a retroreflective sensor:
Ranges are referenced to BOS R-1 reflector.

When being used as a retroreflective sensor, twice the switching distance must be used as the object dead zone.

Type

Ordering code

Part number

	Through-beam fiber optics											
BF000FH	BFO N22-LA-01B-PAG-16-0,9	0.9	Ø2.2	■			■			■		300
BF000EJ	BFO N22-LA-04B-MZG-16-0,9	0.9	5/16" -24 UNF	■			■				■	300
BF000FW	BFO N22-LA-04B-MZG-16-1,8	1.8	5/16" -24 UNF	■			■				■	300
BF000EM	BFO N22-LA-01B-MZG-16-0,9	0.9	Ø2.2	■			■				■	300
BF000EF	BFO N22-LA-03K-MZG-16-0,9	0.9	Ø2.1		■		■				■	301
BF000EK	BFO N22-LA-02K-MZG-16-0,9	0.9	5/16" -24 UNF		■		■				■	301
BF000EL	BFO N22-LA-02B-MZG-16-0,9	0.9	Ø6.3		■		■				■	301
BF000EN	BFO N22-LA-01K-MZG-16-0,9	0.9	Ø4.8		■		■				■	301
BF000FL	BFO N22-LA-02K-PAG-16-0,9	0.9	5/16" -24 UNF		■		■			■		301
BF000FK	BFO N22-LA-02B-PAG-16-0,9	0.9	Ø6.3		■		■			■		302
BF000FJ	BFO N22-LA-01D-PAG-95-0,9	0.9	19.1x25.4	■		■	■			■		302
BF000EU	BFO N48-LA-02B-PAG-24-0,9	0.9	Ø6.3		■			■		■		302
BF000EY	BFO N48-LA-04K-PAG-32-0,9	0.9	5/16" -24 UNF		■				■	■		303
BF000EZ	BFO N48-LA-03K-PAG-16-0,9	0.9	Ø2.1		■		■			■		303
BF000ET	BFO N48-LA-04B-PAG-32-0,9	0.9	5/16" -24 UNF	■					■	■		303
BF000FY	BFO N48-LA-04B-PAG-32-1,8	1.8	5/16" -24 UNF	■					■	■		303
BF000EW	BFO N48-LA-02D-PAG-95-0,9	0.9	19.1x25.4	■		■				■		303
BF000CN	BFO N48-LA-06B-MZG-32-0,9	0.9	Ø4.8	■					■		■	303
BF000CZ	BFO N48-LA-04B-MZG-32-0,9	0.9	5/16" -24 UNF	■					■		■	304
BF000FR	BFO N48-LA-04B-MZG-32-1,8	1.8	5/16" -24 UNF	■					■		■	304
BF000CP	BFO N48-LA-02B-MZG-24-0,9	0.9	Ø6.3		■			■			■	304
BF000CT	BFO N48-LA-03K-MZG-16-0,9	0.9	Ø2.1		■		■				■	304
BF000CU	BFO N48-LA-01K-MZG-32-0,9	0.9	Ø4.8		■				■		■	305
BF000CW	BFO N48-LA-04K-MZG-32-0,9	0.9	5/16" -24 UNF		■				■		■	305
BF000E1	BFO N48-LA-02K-MZG-32-0,9	0.9	5/16" -24 UNF		■				■		■	305
BF000E0	BFO N48-LA-02K-MZG-32-3	3	5/16" -24 UNF		■				■		■	305
BF000FT	BFO N48-LA-02D-MZG-95-1,8	1.8	19.1x25.4	■		■					■	305

Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M

Product overview

Type

Ordering code

Part number

Type		Length (meters)	Optical head						Jacket material		Page	
			Straight	90°	Light grid	1.6 mm	2.4 mm	3.2 mm	PVC	Stainless steel		
 Diffuse sensor fiber optics												
BF000EP	BFO N22-XC-02B-PAG-16-0,9	0.9	Ø6.3								306	Photoelectric standard sensors
BF000FA	BFO N22-XC-04B-MZG-16-0,9	0.9	5/16" -24 UNF								306	Photoelectric special sensors
BF000F9	BFO N22-XC-02K-MZG-16-0,9	0.9	5/16" -24 UNF								306	Optical fiber base units
BF000F5	BFO N22-XC-04K-MZG-16-0,9	0.9	5/16" -24 UNF								307	Fiber optics
BF000F8	BFO N22-XC-02B-MZG-16-0,9	0.9	Ø6.3								307	Contrast sensor
BF000F7	BFO N22-XC-06B-MZG-16-0,9	0.9	Ø4.8								307	Luminescence sensor
BF000CM	BFO N22-XC-05B-MAK-08-0,9	0.9	M5								307	Color sensors
BF000F6	BFO N22-XC-02B-MZG-95-0,9	0.9	19.1x25.4								307	Fork sensors
BF000FZ	BFO N48-XC-06B-PAG-32-1,8	1.8	Ø4.8								308	Angle sensors
BF000F4	BFO N48-XC-03K-PAG-16-0,9	0.9	Ø2.1								308	Dynamic optical windows
BF000F1	BFO N48-XC-02B-PAG-24-0,9	0.9	Ø6.3								308	Light grids
BF000F0	BFO N48-XC-02K-PAG-32-0,9	0.9	5/16" -24 UNF								309	Photoelectric distance sensors for analog distance measurement
BF000FF	BFO N48-XC-03D-PAG-381-0,9	0.9	50.8x38.1								309	Special accessories for photoelectric sensors
BF000EE	BFO N48-XC-06B-MZG-32-0,9	0.9	Ø4.8								309	
BF000E6	BFO N48-XC-01B-MZG-16-0,9	0.9	Ø2.1								309	
BF000EA	BFO N48-XC-02K-MZG-32-0,9	0.9	5/16" -24 UNF								309	
BF000H0	BFO N48-XC-02K-MZG-32-1,8	1.8	5/16" -24 UNF								309	
BF000E2	BFO N48-XC-03K-MZG-16-0,9	0.9	Ø2.1								310	
BF000E3	BFO N48-XC-01K-MZG-32-0,9	0.9	Ø4.8								310	
BF000E4	BFO N48-XC-04K-MZG-32-0,9	0.9	5/16" -24 UNF								310	
BF000E9	BFO N48-XC-04B-MZG-32-0,9	0.9	5/16" -24 UNF								311	
BF000FU	BFO N48-XC-04B-MZG-32-1,8	1.8	5/16" -24 UNF								311	
BF000EC	BFO N48-XC-02B-MZG-24-0,9	0.9	Ø6.3								311	
BF000E7	BFO N48-XC-02D-MZG-95-0,9	0.9	19.1x25.4								311	
BF000FE	BFO N48-XC-03D-MZG-381-0,9	0.9	50.8x38.1								311	



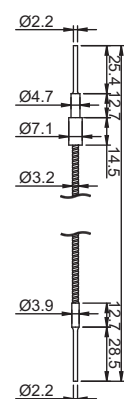
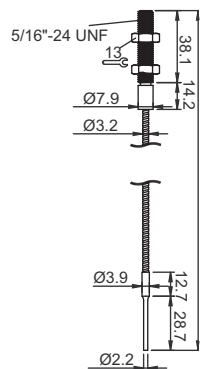
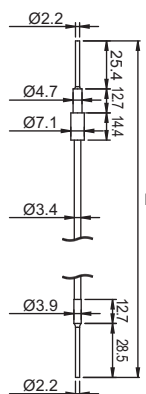
Optical head		Ø2.2	5/16" -24 UNF	Ø2.2	
Straight light exit	Part number	BFO N22-LA-01B-PAG-16-__	BFO N22-LA-04B-MZG-16-__	BFO N22-LA-01B-MZG-16-__	
90° light exit	Part number				
Sheathing Ø		3.4 mm	3.2 mm	3.2 mm	
Core Ø		1.6 mm	1.6 mm	1.6 mm	
Jacket material		PVC	Stainless steel	Stainless steel	
Fiber bending radius		12 mm	25 mm	25 mm	
Temperature range		-40...+105 °C	-5...+275 °C	-45...+275 °C	
Range	with BOS 72K	600 mm	600 mm	600 mm	
	with BOS 16K				

Packaging unit: 2

*Max. range in standard mode

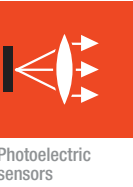
Ordering codes on page 298.

Available lengths on page 298.



Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M Through-beam



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

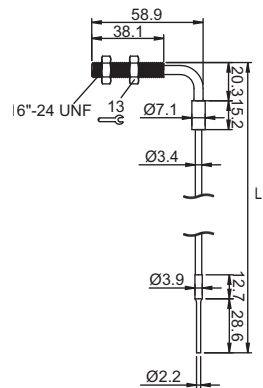
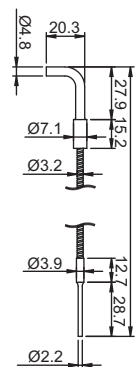
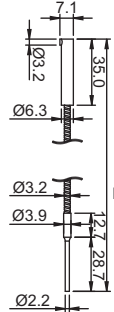
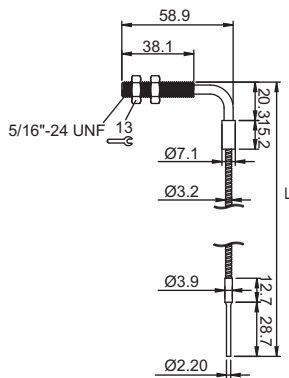
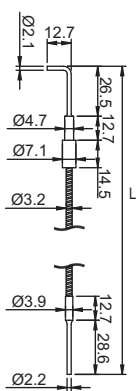
Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

	Ø2.1	5/16" -24 UNF	Ø6.3	Ø4.8	5/16" -24 UNF
	BFO N22-LA-03K-MZG-16-__	BFO N22-LA-02K-MZG-16-__	BFO N22-LA-02B-MZG-16-__	BFO N22-LA-01K-MZG-16-__	BFO N22-LA-02K-PAG-16-__
	3.2 mm	3.2 mm	3.2 mm	3.2 mm	3.4 mm
	1.6 mm	1.6 mm	1.6 mm	1.6 mm	1.6 mm
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	PVC
	25 mm	25 mm	25 mm	25 mm	12 mm
	-45...+275 °C	-45...+275 °C	-45...+275 °C	-45...+275 °C	-40...+105 °C
	375 mm	600 mm	600 mm	600 mm	600 mm





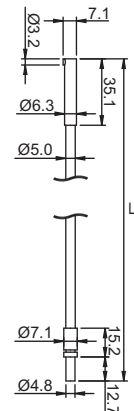
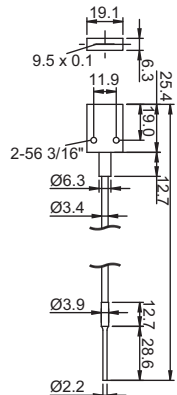
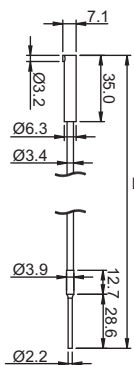
Optical head		Ø6.3	19.1x25.4	Ø6.3	
Straight light exit	Part number				
90° light exit	Part number	BFO N22-LA-02B-PAG-16-__	BFO N22-LA-01D-PAG-95-__	BFO N48-LA-02B-PAG-24-__	
Sheathing Ø		3.4 mm	3.4 mm	5 mm	
Core Ø		1.6 mm	1.6 mm	2.4 mm	
Jacket material		PVC	PVC	PVC	
Fiber bending radius		12 mm	12 mm	12 mm	
Temperature range		-40...+105 °C	-40...+105 °C	-40...+105 °C	
Range	with BOS 72K	600 mm	350 mm	350 mm	
	with BOS 16K				

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 298.

Available lengths on page 298.

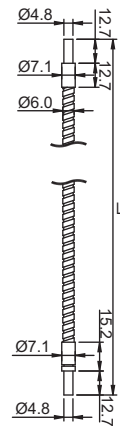
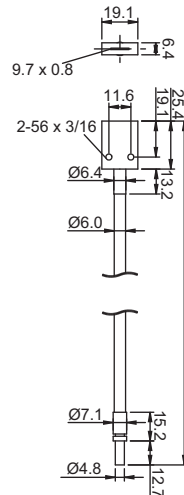
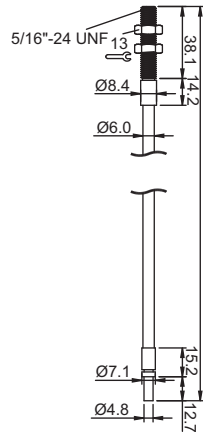
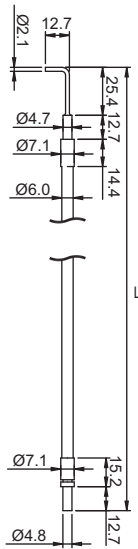
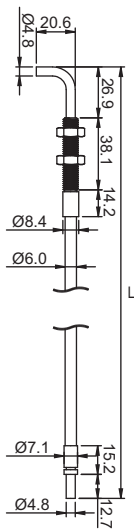


Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M Through-beam



	5/16" -24 UNF	Ø2.1	5/16" -24 UNF	19.1x25.4	Ø4.8
	BFO N48-LA-04K-PAG-32-__	BFO N48-LA-03K-PAG-16-__	BFO N48-LA-04B-PAG-32-__	BFO N48-LA-02D-PAG-95-__	BFO N48-LA-06B-MZG-32-__
	6 mm	6 mm	6 mm	6 mm	6 mm
	3.2 mm	1.6 mm	3.2 mm	3.2 mm	3.2 mm
	PVC	PVC	PVC	PVC	Stainless steel
	12 mm	12 mm	12 mm	12 mm	25 mm
	-45...+105 °C	-45...+105 °C	-45...+105 °C	-40...+105 °C	-45...+275 °C
	500 mm	140 mm	500 mm	100 mm	500 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

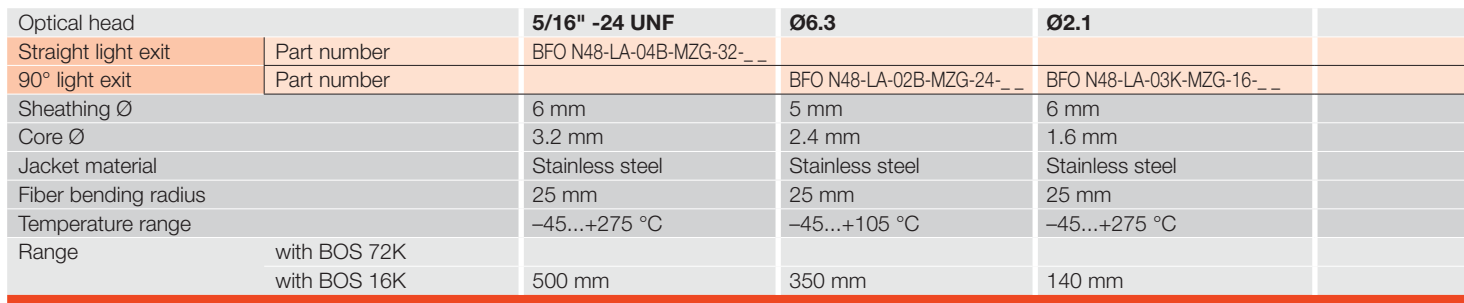
Angle sensors

Dynamic optical windows

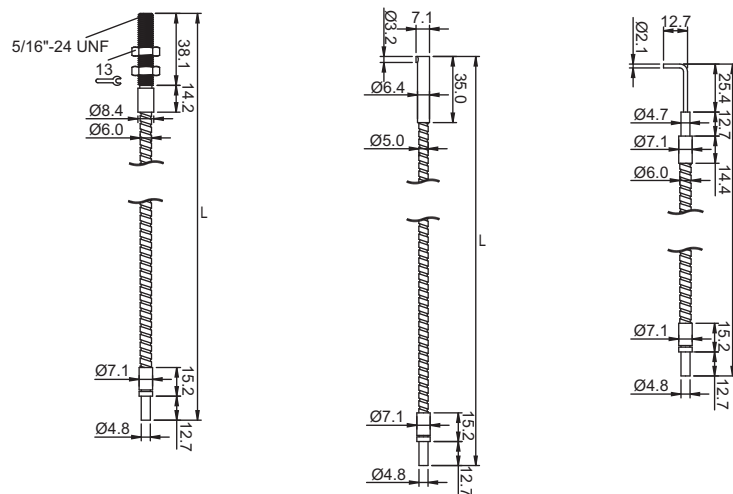
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Available lengths on page 298.



Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M Through-beam



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

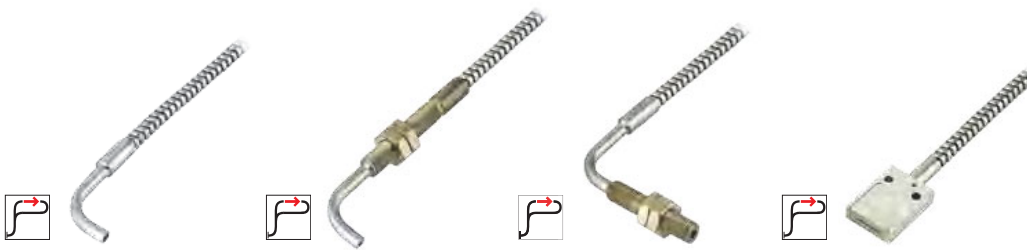
Angle sensors

Dynamic optical windows

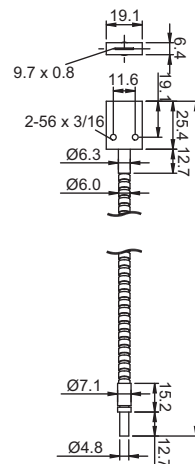
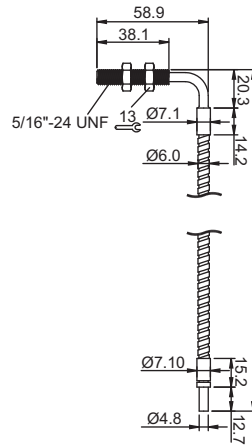
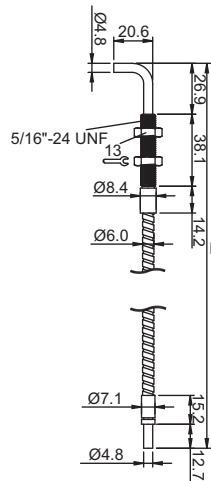
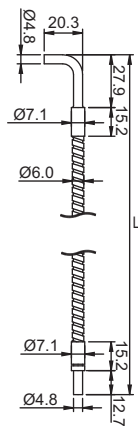
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Ø4.8	5/16" -24 UNF	5/16" -24 UNF	19.1x25.4
BFO N48-LA-01K-MZG-32-__	BFO N48-LA-04K-MZG-32-__	BFO N48-LA-02K-MZG-32-__	BFO N48-LA-02D-MZG-95-__
6 mm	6 mm	6 mm	6 mm
3.2 mm	3.2 mm	3.2 mm	3.2 mm
Stainless steel	Stainless steel	Stainless steel	Stainless steel
25 mm	25 mm	25 mm	25 mm
-45...+275 °C	-45...+275 °C	-45...+275 °C	-45...+275 °C
500 mm	500 mm	500 mm	100 mm





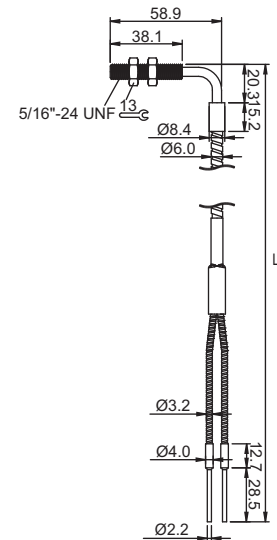
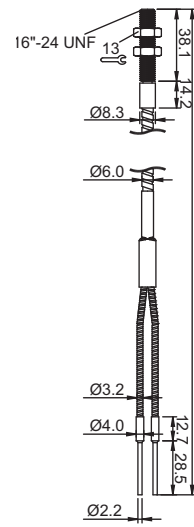
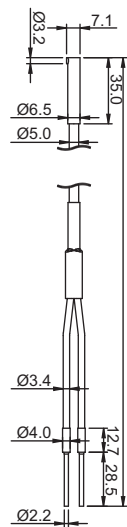
Optical head		Ø6.3	5/16" -24 UNF	5/16" -24 UNF	
Straight light exit	Part number		BFO N22-XC-04B-MZG-16-__		
90° light exit	Part number			BFO N22-XC-02K-MZG-16-__	
Sheathing Ø		5.0 mm	6 mm	6 mm	
Core Ø		1.6 mm	1.6 mm	1.6 mm	
Jacket material		PVC	Stainless steel	Stainless steel	
Fiber bending radius		12 mm	25 mm	25 mm	
Temperature range		-40...+105 °C	-45...+275 °C	-45...+275 °C	
Range	with BOS 72K	80 mm	140 mm	140 mm	
	with BOS 16K				

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 299.

Available lengths on page 299.



Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M

Diffuse



	5/16" -24 UNF	Ø6.3	Ø4.8	M3	19.1x25.4 mm
	BFO N22-XC-04K-MZG-16-__	BFO N22-XC-02B-MZG-16-__	BFO N22-XC-06B-MZG-16-__	BFO N22-XC-05B-MAK-08-__	BFO N22-XC-02B-MZG-95-__
	6 mm	5 mm	6 mm	6.0 mm	6.0 mm
	1.6 mm	1.6 mm	1.6 mm	1.6 mm	
	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
	25 mm	25 mm	25 mm	25 mm	25 mm
	-45...+275 °C	-45...+275 °C	-45...+275 °C	-45...+275 °C	-45...+275 °C
	140 mm	80 mm	140 mm	140 mm	140 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

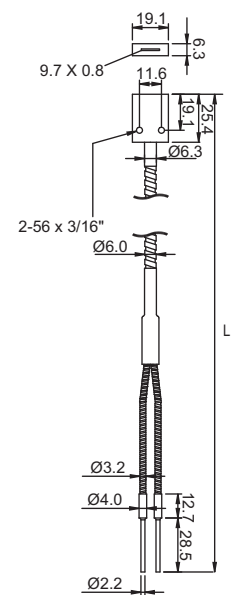
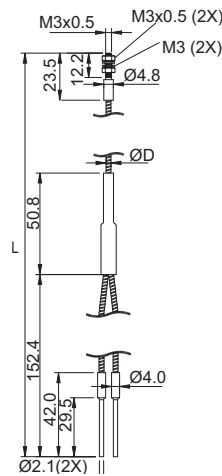
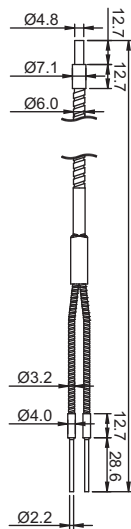
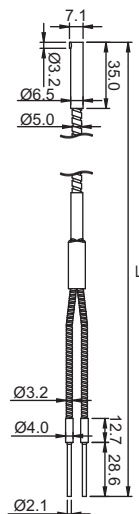
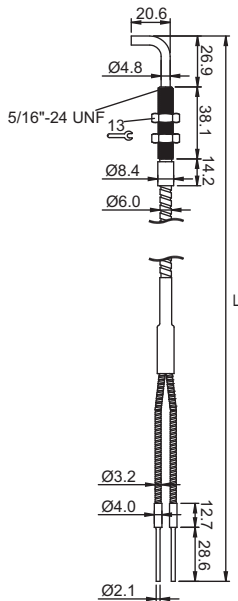
Angle sensors

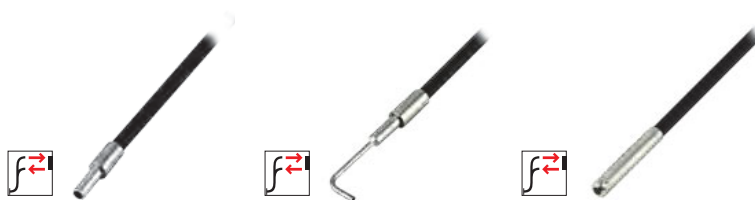
Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors





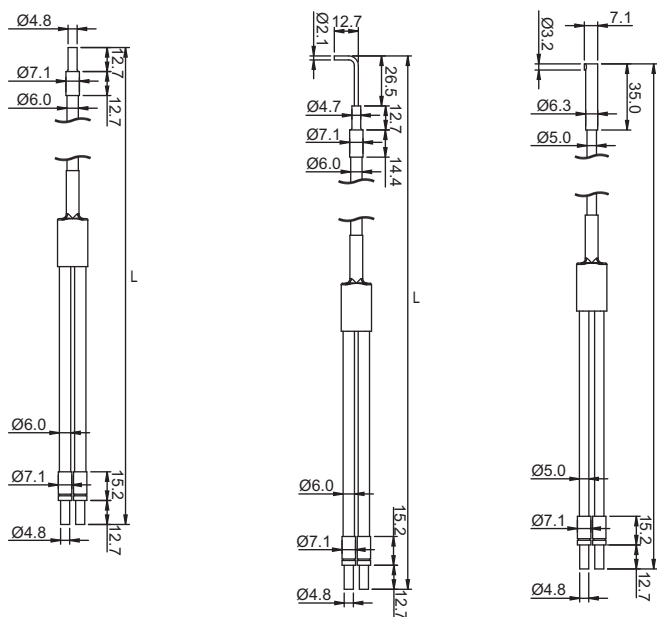
Optical head		Ø4.8	Ø2.1	Ø6.3	
Straight light exit	Part number	BFO N48-XC-06B-PAG-32-__			
90° light exit	Part number		BFO N48-XC-03K-PAG-16-__	BFO N48-XC-02B-PAG-24-__	
Sheathing Ø		6 mm	6 mm	5.0 mm	
Core Ø		3.2 mm	1.6 mm	2.4 mm	
Jacket material		PVC	PVC	PVC	
Fiber bending radius		12 mm	12 mm	12 mm	
Temperature range		-40...+105 °C	-45...+275 °C	-45...+275 °C	
Range	with BOS 72K				
	with BOS 16K	80 mm	10 mm	40 mm	

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 299.

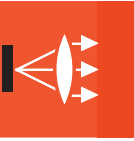
Available lengths on page 299.



Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M

Diffuse



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

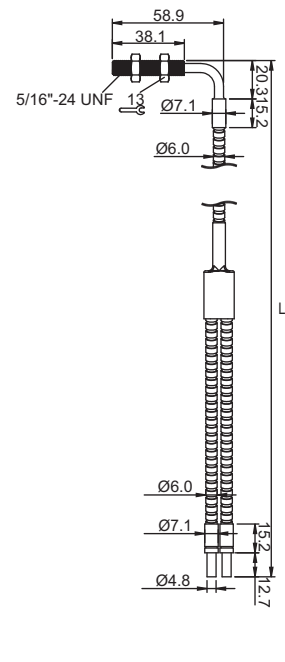
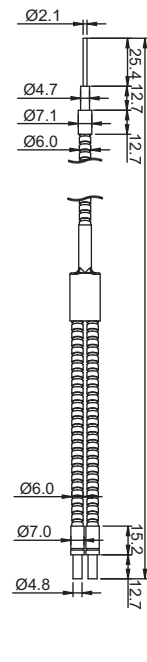
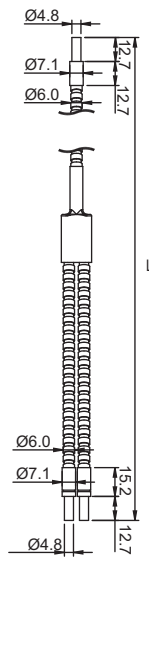
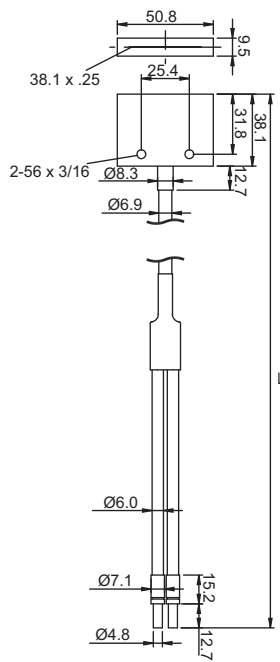
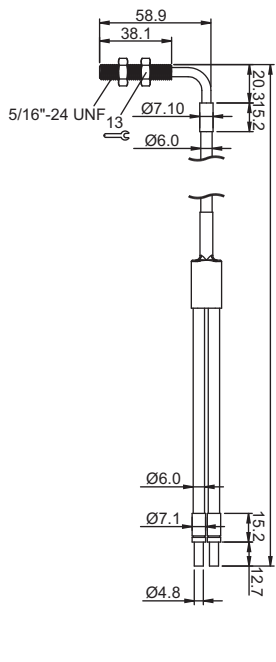
Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

	5/16" -24 UNF	50.8x38.1 mm	Ø4.8	Ø2.1	5/16" -24 UNF
	BFO N48-XC-02K-PAG-32-__	BFO N48-XC-03D-PAG-381-__	BFO N48-XC-06B-MZG-32-__	BFO N48-XC-01B-MZG-16-__	BFO N48-XC-02K-MZG-32-__
	6 mm	6.9 mm	6.0 mm	6 mm	6 mm
	3.2 mm		3.2 mm	1.6 mm	3.2 mm
	PVC	PVC	Stainless steel	Stainless steel	Stainless steel
	12 mm	12 mm	25 mm	25 mm	25 mm
	-40...+105 °C	-40...+105 °C	-45...+275 °C	-45...+275 °C	-45...+275 °C
	80 mm	50 mm	80 mm	50 mm	80 mm





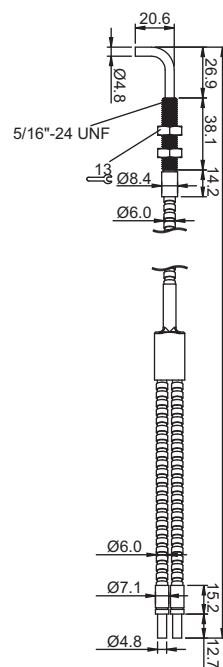
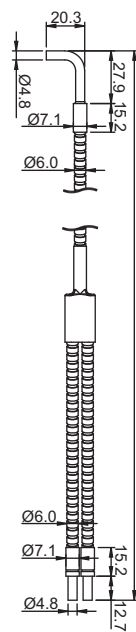
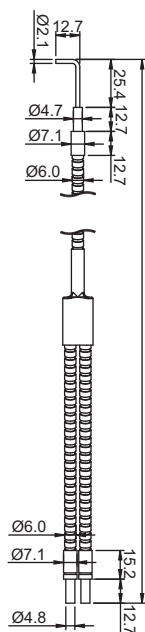
Optical head		Ø2.1	Ø4.8	5/16" -24 UNF	
Straight light exit	Part number				
90° light exit	Part number	BFO N48-XC-03K-MZG-16-__	BFO N48-XC-01K-MZG-32-__	BFO N48-XC-04K-MZG-32-__	
Sheathing Ø		6 mm	6 mm	6 mm	
Core Ø		1.6 mm	3.2 mm	3.2 mm	
Jacket material		Stainless steel	Stainless steel	Stainless steel	
Fiber bending radius		25 mm	25 mm	25 mm	
Temperature range		-45...+275 °C	-45...+275 °C	-45...+275 °C	
Range	with BOS 72K				
	with BOS 16K	10 mm	80 mm	80 mm	

Packaging unit: 2

*Max. range in standard mode

Ordering codes on page 299.

Available lengths on page 299.



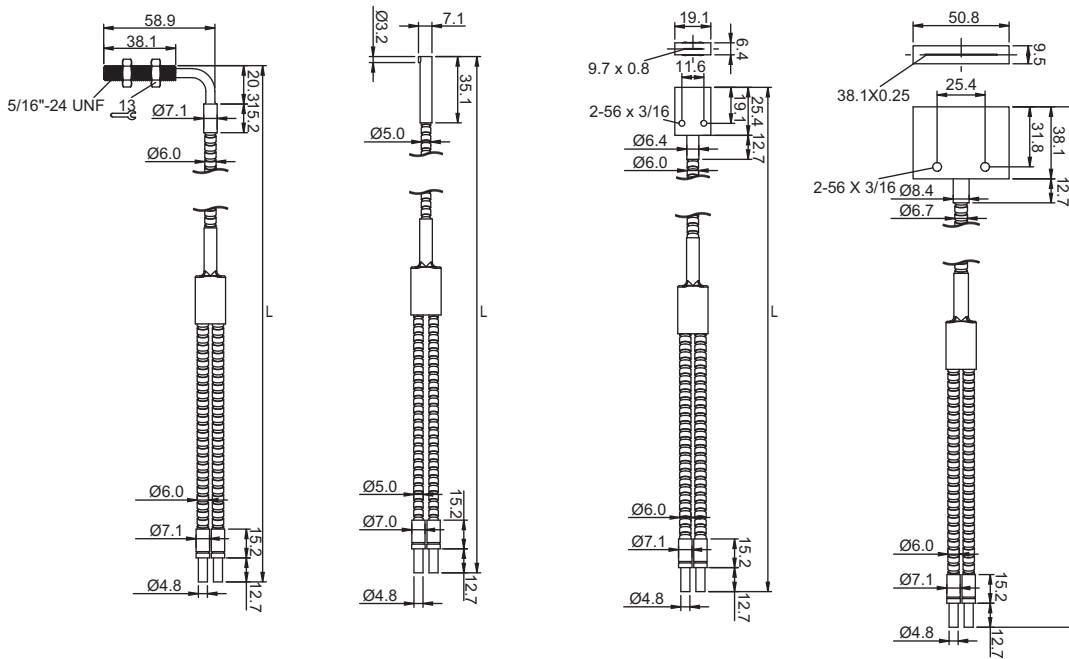
Photoelectric Special Sensors

Glass fiber optics for 16K, 72K, 30M

Diffuse



	5/16" -24 UNF	Ø6.3	19.1x25.4 mm	50.8x38.1 mm	
	BFO N48-XC-04B-MZG-32-__	BFO N48-XC-02B-MZG-24-__	BFO N48-XC-02D-MZG-95-__	BFO N48-XC-03D-MZG-381-__	
	6 mm	5 mm	6 mm	6.7 mm	
	3.2 mm	2.4 mm			
	Stainless steel	Stainless steel			
	25 mm	25 mm	25 mm	25 mm	
	-45...+275 °C	-45...+275 °C	-45...+275 °C	-45...+275 °C	
	80 mm	40 mm	60 mm	50 mm	



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

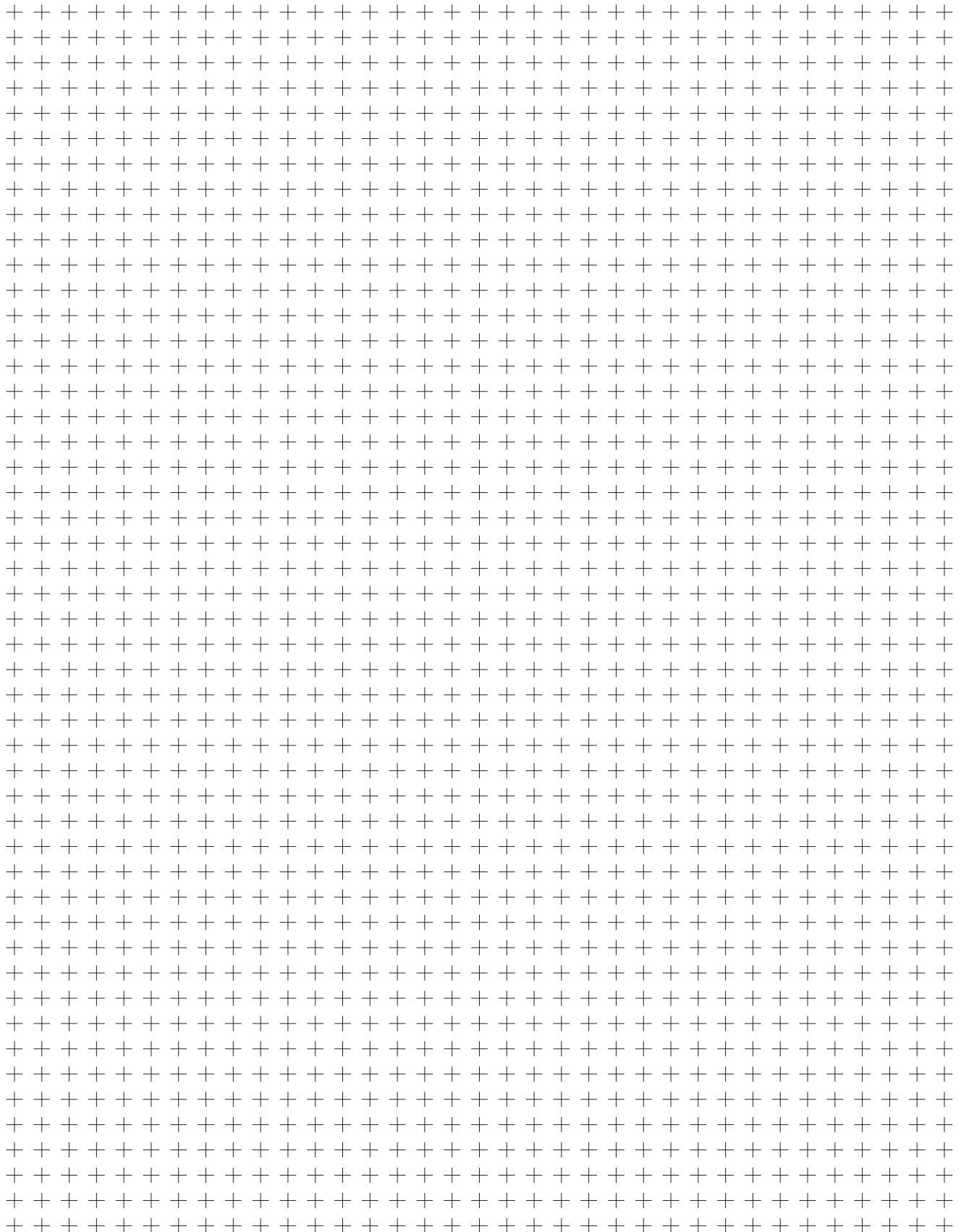
Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Photoelectric Special Sensors

Wire fiber optics for BMOA

Product overview

Type

Sensing Range

Optical head

Page



Photoelectric sensors

Photoelectric standard sensors

Ordering code
Part number

Through-beam fiber optics		BMO A01-J	BMO A01-I		Red light	Infrared	Cable length (meters)	PUR cable	PVC cable	
BOS005L	BMOA 02SM-B200-1	200 mm	80 mm	Ø2.0		■	1	■		314
BOS005M	BMOA 02SM-B200-F1	200 mm	80 mm	Ø2.0		■	1		■	314
BOS005N	BMOA 02SM-B200-R1	200 mm	80 mm	Ø2.0	■		1	■		314
BOS0064	BMOA 04SM-B800-1	800 mm	250 mm	Ø4.0		■	1	■		315
BOS0065	BMOA 04SM-B800-2	800 mm	250 mm	Ø4.0		■	2	■		315
BOS0066	BMOA 04SM-B800-R1	800 mm	250 mm	Ø4.0	■		1	■		315
BOS006C	BMOA 05TM-B800-1	800 mm	250 mm	M5 x 13		■	1	■		315
BOS006E	BMOA 05TM-B800-3	800 mm	250 mm	M5 x 13		■	3	■		315
BOS006F	BMOA 05TM-B800-R1	800 mm	250 mm	M5 x 13	■		1	■		315
BOS005Y	BMOA 03TM-B200-1	200 mm	80 mm	M3 x 8		■	1	■		315
BOS005U	BMOA 03TM-B200-02	200 mm	80 mm	M3 x 8		■	2	■		316
BOS005W	BMOA 03TM-B200-03	200 mm	80 mm	M3 x 8		■	3	■		316
BOS005Z	BMOA 03TM-B200-F1	200 mm	80 mm	M3 x 8		■	1		■	316
BOS0060	BMOA 03TM-B200-F3	200 mm	80 mm	M3 x 8		■	3		■	316
BOS0061	BMOA 03TM-B200-R1	200 mm	80 mm	M3 x 8	■		1	■		316
BOS006T	BMOA 66RM-B800-1	800 mm	250 mm	6 x 6 x12 mm		■	1	■		317
BOS006W	BMOA 66RM-B800-R1	800 mm	250 mm	6 x 6 x12 mm	■		1	■		317
Diffuse sensor fiber optics										
BOS005P	BMOA 02SM-X12-1	12 mm	3 mm	Ø2.0		■	1	■		318
BOS005R	BMOA 02SM-X12-5	12 mm	3 mm	Ø2.0		■	5	■		318
BOS005T	BMOA 02SM-X12-F1	12 mm	3 mm	Ø2.0		■	1		■	318
BOS0062	BMOA 03TM-X12-1	12 mm	3 mm	M3 x 8		■	1	■		318
BOS0063	BMOA 03TM-X12-F1	12 mm	3 mm	M3 x 8		■	1		■	319
BOS0069	BMOA 05SM-X63-1	63 mm	15 mm	Ø5.0		■	1	■		319
BOS006A	BMOA 05SM-X63-R1	63 mm	15 mm	Ø5.0	■		1	■		319
BOS006K	BMOA 06TM-X63-1	63 mm	15 mm	M6 x 13		■	1	■		319
BOS006L	BMOA 06TM-X63-3	63 mm	15 mm	M6 x 13		■	3	■		319
BOS006M	BMOA 06TM-X63-R1	63 mm	15 mm	M6 x 13	■		1	■		319
BOS0071	BMOA 66RM-X63-R1	63 mm	15 mm	6 x 6 x12 mm	■		1	■		321

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

for analog distance measurement

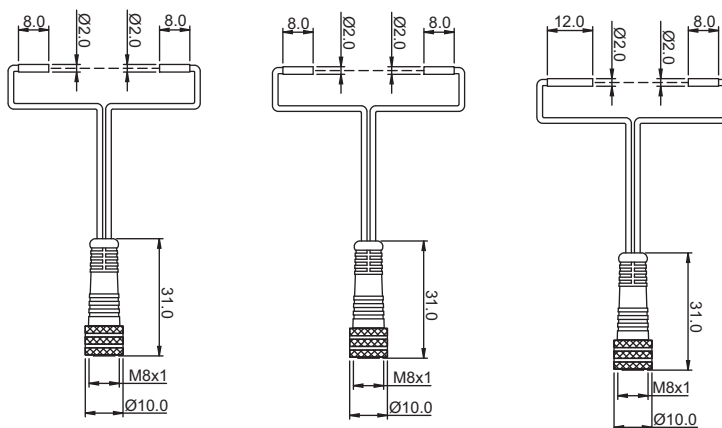
Special accessories for photoelectric sensors



Optical head		Ø2.2	Ø2.2	Ø2.2	
Straight light exit	Part number	BMOA 02SM-B200-1	BMOA 02SM-B200-F1	BMOA 02SM-B200-R1	
90° light exit	Part number				
Emitter light type		Infrared	Infrared	Red light	
Wave length		880 nm	880 nm	660 nm	
Housing material		Stainless steel	Stainless steel	Stainless steel	
Sensing face material		PMMA	PMMA	PMMA	
Degree of protection		IP 67	IP 67	IP 67	
Temperature range		-10...+55 °C	-10...+55 °C	-10...+55 °C	
Range	BMO A01-J	200 mm	200 mm	200 mm	
	BMO A01-I	80 mm	80 mm	80 mm	
Connection		1 m PUR with M8 connector	1 m PUR with M8 connector	1 m PUR with M8 connector	

Ordering codes on page 313.

Available lengths on page 313.



Photoelectric Special Sensors

Wire fiber optics for BMOA



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

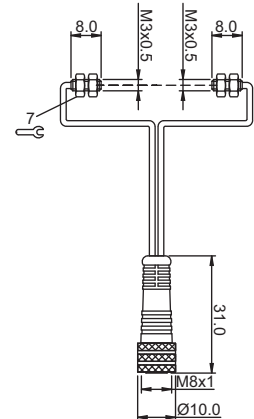
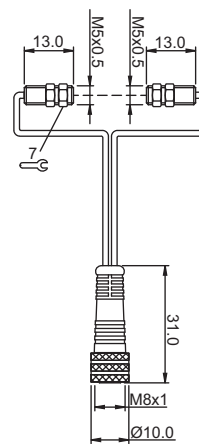
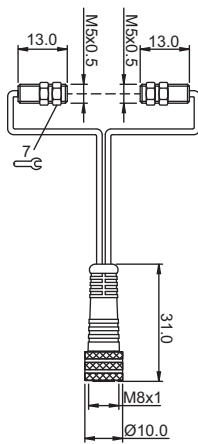
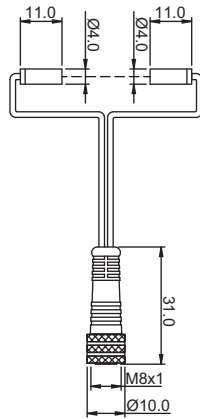
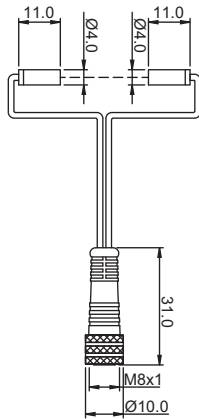
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



Ø4.0	Ø4.0	M5x13	M5x13	M3x8
BMOA 04SM-B800-__	BMOA 04SM-B800-R1	BMOA 05TM-B800-__	BMOA 05TM-B800-R1	BMOA 03TM-B200-__
Infrared	Red light	Infrared	Red light	Infrared
880 mm	660 mm	880 mm	660 mm	880mm
Stainless steel	Stainless steel	Nickel plated	Nickel plated	Nickel plated
PMMA	PMMA	PMMA	PMMA	PMMA
IP 67	IP 67	IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C
800 mm	800 mm	800 mm	800 mm	200 mm
250 mm	250 mm	250 mm	250 mm	80 mm
1 m PUR	1 m PUR	1 m PUR	1 m PUR	1 m PUR
with M8 connector	with M8 connector	with M8 connector	with M8 connector	with M8 connector

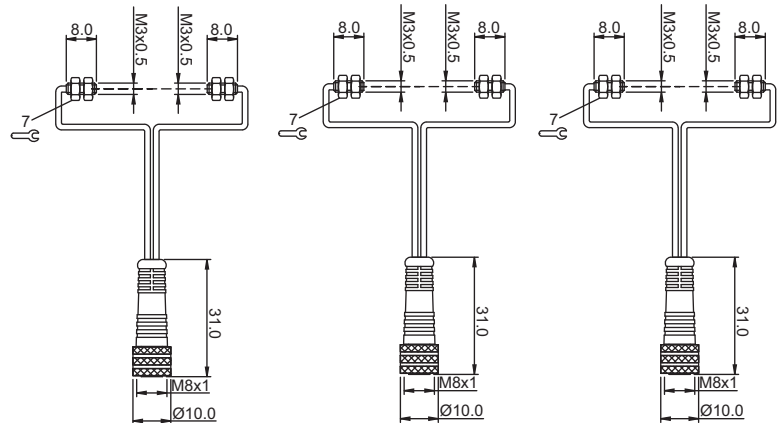




Optical head		M3x8	M3x8	M3x8	
Straight light exit	Part number	BMOA 03TM-B200-0_	BMOA 03TM-B200-F_	BMOA 03TM-B200-R1	
90° light exit	Part number				
Emitter light type		Infrared	Infrared	Red light	
Wave length		880 nm	880 nm	660 nm	
Housing material		Nickel plated	Nickel plated	Nickel plated	
Sensing face material		PMMA	PMMA	PMMA	
Degree of protection		IP 67	IP 67	IP 67	
Temperature range		-10...+55 °C	-10...+55 °C	-10...+55 °C	
Range	BMO A01-J	200 mm	200 mm	200 mm	
	BMO A01-I	80 mm	80 mm	80 mm	
Connection		2 m PUR with M8 connector	PVC with M8 connector	1 m PUR with M8 connector	

Ordering codes on page 313.

Available lengths on page 313.





Photoelectric Special Sensors

Wire fiber optics for BMOA



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

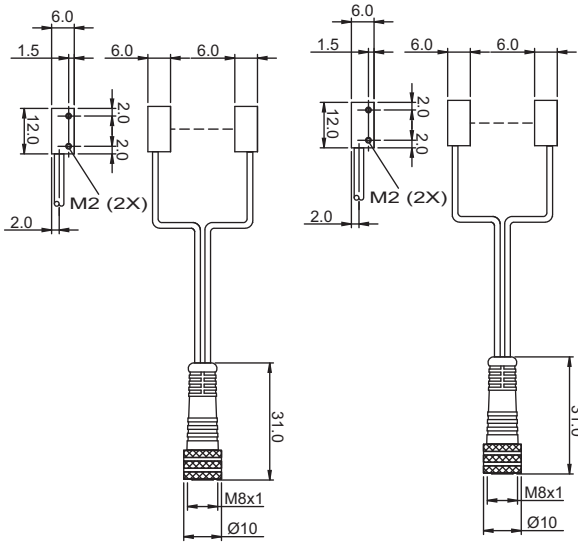
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



	6x6x12 mm	6x6x12 mm			
	BMOA 66RM-B800-1	BMOA 66RM-B800-R1			
	Infrared	Red light			
	880 mm	660 mm			
	Nickel plated	Nickel plated			
	PMMA	PMMA			
	IP 67	IP 67			
	-10...+55 °C	-10...+55 °C			
	800 mm	800 mm			
	250 mm	250 mm			
	1 m PUR	1 m PUR			
	with M8 connector	with M8 connector			

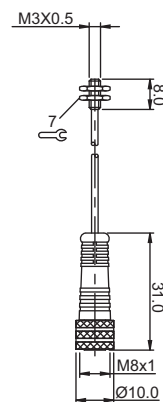
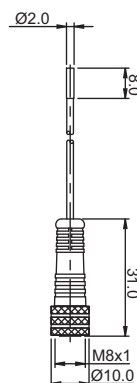
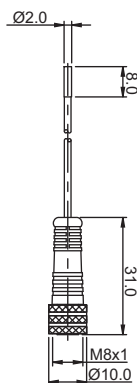




Optical head		Ø2.0	Ø2.0	M3x8	
Straight light exit	Part number	BMOA 02SM-X12-1_	BMOA 02SM-X12-F1	BMOA 03TM-X12-1	
90° light exit	Part number				
Emitter light type		Infrared	Infrared	Infrared	
Wave length		880 nm	880 nm	880 nm	
Housing material		Stainless steel	Stainless steel	Nickel plated	
Sensing face material		PMMA	PMMA	PMMA	
Degree of protection		IP 67	IP 67	IP 67	
Temperature range		-10...+55 °C	-10...+55 °C	-10...+55 °C	
Range	BMO A01-J	12 mm	12 mm	12 mm	
	BMO A01-I	3 mm	3 mm	3 mm	
Connection		PUR cable	1 m PVC	1 m PUR	
		with M8 connector	with M8 connector	with M8 connector	

Ordering codes on page 313.

Available lengths on page 313.



Photoelectric Special Sensors

Wire fiber optics for BMOA



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

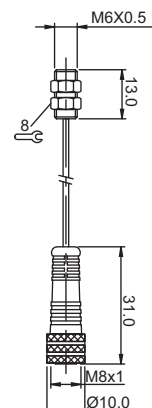
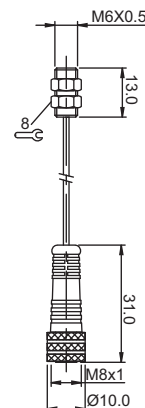
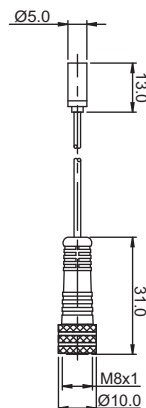
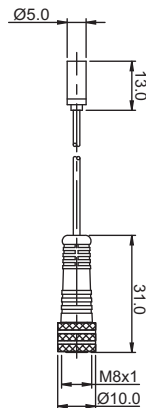
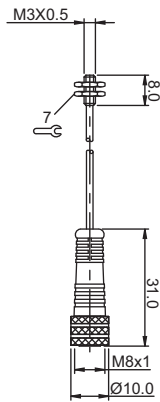
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



	M3x8	Ø5.0	Ø5.0	M6x13	M6x13
	BMOA 03TM-X12-F1	BMOA 05SM-X63-1	BMOA 05SM-X63-R1	BMOA 06TM-X63-__	BMOA 06TM-X63-R1
	Infrared	Infrared	Red light	Infrared	Red light
	880 nm	880 nm	660 nm	880 nm	660 nm
	Nickel plated brass	Stainless steel	Stainless steel	Nickel plated brass	Nickel plated brass
	PMMA	PMMA	PMMA	PMMA	PMMA
	IP 67	IP 67	IP 67	IP 67	IP 67
	-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C
	12 mm	63 mm	63 mm	63 mm	63 mm
	3 mm	15 mm	15 mm	15 mm	15 mm
	1 m PUR	1 m PUR	1 m PUR	1 m PUR	1 m PUR
	with M8 connector	with M8 connector	with M8 connector	with M8 connector	with M8 connector





Ordering codes on page 313.

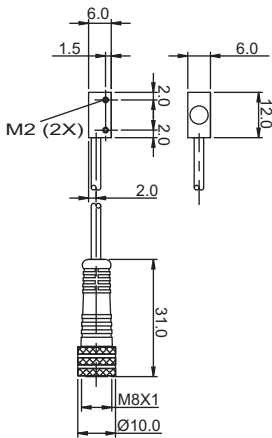


Photoelectric Special Sensors

Wire fiber optics for BMOA



	6x6x12 mm		
	BMOA 66RM-X63-R1		
	Red light		
	660 nm		
	Nickel plated brass		
	PMMA		
	-10...+55 °C		
	63 mm		
	15 mm		
	1 m PUR cable		
	with M8 connector		



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Special accessories for photoelectric sensors

Contrast sensors are high-resolution diffuse sensors that distinguish objects based on their gray values because of that color, brightness and reflectivity have a strong effect on the measuring result. The distance should be kept constant because gray values differ only slightly. The resolution of the sensor decreases with increasing sensing distance.

Multiple series with various light types and functions are available for the wide variety of uses for the sensors.

Applications

- Sensing markings on packaging material
- Synchronizing cutting or separating processes
- Checking for adhesive, ink and color
- Position checking of printing templates
- Sensing objects based on contrast



Photoelectric Special Sensors

Contrast sensors BKT

Product overview

Type		Sensing distance	Light type				Output			Switching type		Switching frequency	U _s	Connection				Features		Page	
			White light	Red, green and blue light	Red, green light	Laser light	PNP transistor	NPN transistor	Analog output	Light switching	Dark switching		10...30 V DC	M8 plug, 4-pin	M12 plug, 4-pin	M12 plug, 5-pin	Cable	for adapting fiber optics			
Ordering code	Part number																				
 Contrast sensors																					
BKT000A	BKT 6K-001-P-S75	40...150 mm				■	■			■	■	1 kHz	■	■						325	Photoelectric special sensors
BKT0008	BKT 6K-001-N-S75	40...150 mm				■		■		■	■	1 kHz	■	■						325	Optical fiber base units
BKT0009	BKT 6K-001-P-02	40...150 mm				■	■			■	■	1 kHz	■					■		325	Fiber optics
BKT0007	BKT 6K-001-N-02	40...150 mm				■		■		■	■	1 kHz	■					■		325	Contrast sensor
																					Luminescence sensor
BKT000H	BKT 18KF-001-P-S4	10 mm	■				■			■	■	5 kHz	■		■					327	Color sensors
BKT000F	BKT 18KF-001-P-02	10 mm	■				■			■	■	5 kHz	■					■		327	Fork sensors
																					Angle sensors
BKT000Y	BKT 21M-002-P-S4	19 mm	■				■			■	■	5 kHz	■		■					329	Dynamic optical windows
BKT000W	BKT 21M-002-N-S4	19 mm	■					■		■	■	5 kHz	■		■					329	Light grids
BKT0001	BKT 67M-001-U-S92	9 mm*		■			■	■	■	■	■	15 kHz	■			■				331	Photoelectric distance sensors
BKT0002	BKT 67M-002-U-S92	9 mm*		■			■	■	■	■	■	15 kHz	■			■				331	for analog distance measurement
BKT0003	BKT 67M-003-U-S92	9 mm*		■			■	■	■	■	■	25 kHz	■			■				331	
BKT0004	BKT 67M-004-U-S92	9 mm*		■			■	■	■	■	■	25 kHz	■			■				331	
BKT0005	BKT 67M-005-U-S92	9 mm*		■			■	■		■	■	30 kHz	■			■				331	
BKT0006	BKT 67M-006-U-S92	9 mm*		■			■	■		■	■	30 kHz	■			■				331	Special accessories for photoelectric sensors
BKT000N	BKT M-15C-U-S4	6...12 mm*	■				■	■	■	■	■	20 kHz	■							335	
BKT000R	BKT M-45-U-S4	0...3 mm	■				■	■	■	■	■	20 kHz	■					■		335	
BKT000U	BKT M-71-U-03	9 mm			■		■	■	■	■	■	20 kHz	■							333	
BKT000T	BKT M-52-U-03	**	■				■	■	■	■	■	20 kHz	■							333	

*Longer sensing distances using interchangeable optics

** Fiber optic dependant

Photoelectric Special Sensors

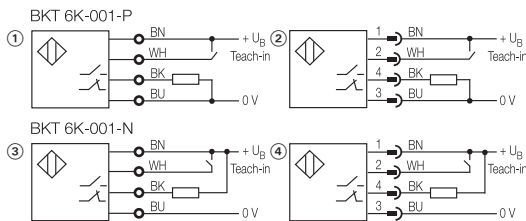
Laser contrast sensor BKT 6K

Laser Contrast Sensor

The laser contrast sensor **BKT 6K** is designed to reliably detect small areas of contrast variances. Even the narrowest lines can be detected reliably in the optimum working range of 70...100 mm. Larger areas are capable of being detected outside this range.

Programming the sensor is easy using a teach-in button or control line.

Wiring diagrams



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00UH



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	5 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC059R
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC059W

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Special Sensors

Laser contrast sensor BKT 6K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

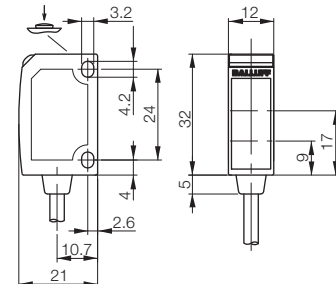
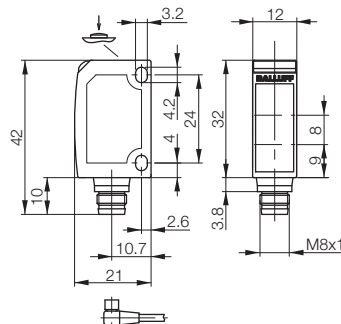
sensors for analog distance measurement

Special accessories for photoelectric sensors

Series			BKT 6K	BKT 6K
Working distance			40...150 mm*	40...150 mm*
PNP	NC/NO	Part number	BKT 6K-001-P-S75 ②	BKT 6K-001-P-02 ①
NPN	NC/NO	Part number	BKT 6K-001-N-S75 ③	BKT 6K-001-N-02 ④
Supply voltage U_B			10...30 V DC	10...30 V DC
No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA
Output current			100 mA	100 mA
Switching type			Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes
Settings			Teach-in	Teach-in
Emitter, light type			Laser, red light	Laser, red light
Wavelength			650 nm	650 nm
Laser class			2	2
Light spot diameter			0.7 mm at the focus (85 mm ± 15 mm)	0.7 mm at the focus (85 mm ± 15 mm)
Output function indicator			Yellow LED	Yellow LED
Stability indicator			Green LED	Green LED
Response time			0.5 ms	0.5 ms
Switching frequency			1 kHz	1 kHz
Degree of protection as per IEC 60529			IP 67	IP 67
Ambient temperature T_a			-20...+60 °C	-20...+60 °C
Permissible ambient light			EN 60947-5-2	EN 60947-5-2
Material	Housing		Impact-resistant ABS	Impact-resistant ABS
	Optical surface		PMMA	PMMA
Connection			M8 connector, 4-pin	2 m PVC cable, 26 AWG

*Optimum working range for small markings:
70...100 mm

Ordering codes on page 323.

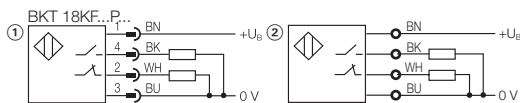


Photoelectric Special Sensors

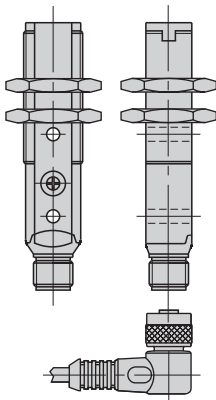
Contrast sensor BKT 18KF

The contrast sensor **BKT 18KF** operates with white light and can be configured simply at just the press of a button. It detects colored markings as well as gray levels on various surfaces. In the standard setting the sensor operates using dark switching. Precise configuration is available for slight contrast differences. The switching type can also be selected in this setting.

Wiring diagrams



Connector orientation



Recommended accessories

(please order separately)

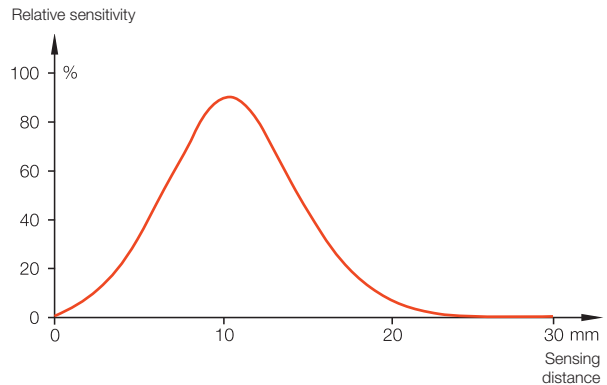
Description	Ordering code
① Mounting bracket	BAM00RY
② Mounting clamp	BAM00T3



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

White Light Contrast Sensor

Function diagram



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Contrast sensor BKT 18KF



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

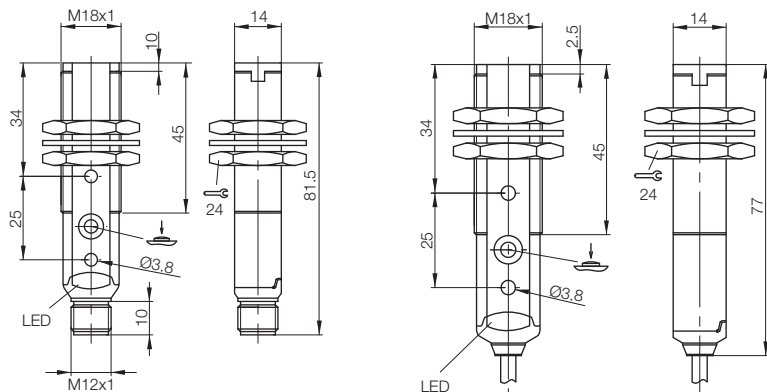
Photoelectric distance sensors

sensors for analog distance measurement

Special accessories for photoelectric sensors

Series	BKT		10 mm±2 mm	BKT	10 mm±2 mm
Working distance					
PNP	NC/NO	Part number	BKT 18KF-001-P-S4 ①	BKT 18KF-001-P-02 ②	
Supply voltage U_B			10...30 V DC	10...30 V DC	
No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA	
Output current			100 mA	100 mA	
Switching type			Light and dark switching	Light and dark switching	
Polarity reversal/short-circuit protected			Yes/Yes	Yes/Yes	
Settings			Teach-in	Teach-in	
Emitter, light type			LED, white light	LED, white light	
Wavelength			400...700 nm	400...700 nm	
Light spot diameter			ca. 4.5 mm 10 mm	ca. 4.5 mm 10 mm	
Output function indicator			Yellow LED	Yellow LED	
Power/error indicator			Green/red LED	Green/red LED	
Response time			100 µs	100 µs	
Switching frequency			5 kHz	5 kHz	
Degree of protection as per IEC 60529			IP 67	IP 67	
Ambient temperature T_a			-25...+55 °C	-25...+55 °C	
Permissible ambient light			EN 60947-5-2	EN 60947-5-2	
Material	Housing		PBT	PBT	
	Optical surface		PMMA	PMMA	
Connection			M12 connector, 4-pin	2 m PVC cable, 26 AWG	

Ordering codes on page 323.



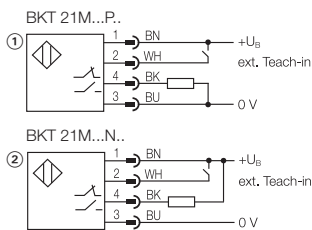
Photoelectric Special Sensors

Contrast sensors BKT 21M

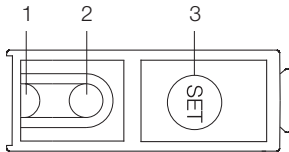
The **BKT 21M** contrast sensor uses white light and can be programmed at the push of a button. It detects colored markings as well as gray levels on various surfaces. In its standard setting the sensor is dark switching (markings with less light intensity are detected as the background).

Precise configuration is available for slight contrast differences. The switching type can also be selected in this setting.

Wiring diagrams



Indicators and operating elements



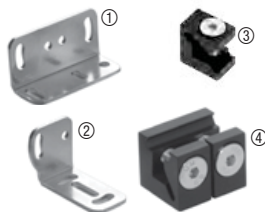
- 1 Output function indicator (yellow)
- 2 Power-/error indicator (green/red)
- 3 SET- button



Recommended accessories

(please order separately)

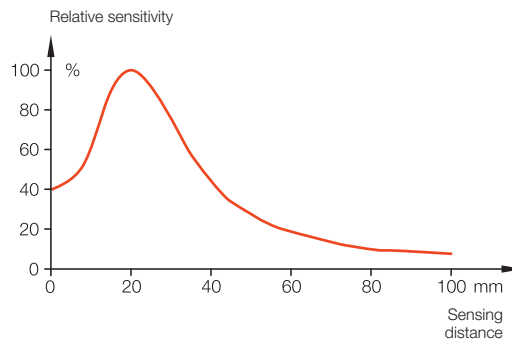
Description	Ordering code
① Mounting bracket	BAM00T9
② Mounting bracket	BAM00TA
③ Clamp holder	BAM00TF
④ Clamp holder	BAM00TH



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

White Light Contrast Sensor

Function diagram



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Contrast sensors BKT 21M



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

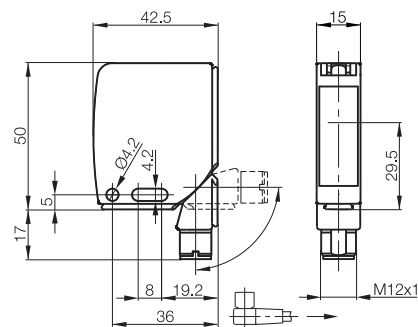
Light grids

Photoelectric distance sensors for analog distance measurement

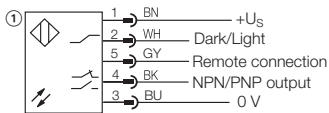
Special accessories for photoelectric sensors

Series			BKT
Working distance			19 mm±2 mm
PNP	NC/NO	Part number	BKT 21M-002-P-S4 ①
NPN	NC/NO	Part number	BKT 21M-002-N-S4 ②
Supply voltage U_B			10...30 V DC
No-load supply current I_0 max.			≤ 30 mA
Output current			100 mA
Switching type			Light/dark switching (adjustable in precise mode)
Polarity reversal/short-circuit protected			Yes/Yes
Settings			Teach-in
Emitter, light type			LED, white light
Wavelength			400...700 nm
Light spot diameter			ca. 3.5 mm 19 mm
Output function indicator			Yellow LED
Power/error indicator			Green/red LED
Response time			0.1 ms
Switching frequency			5 kHz
Time function			20 ms off-delay
Degree of protection as per IEC 60529			IP 67
Ambient temperature T_a			-25...+55 °C
Permissible ambient light			EN 60947-5-2
Material	Housing		GD-Zn/Al
	Optical surface		Glass
Connection			M12 connector, 4-pin

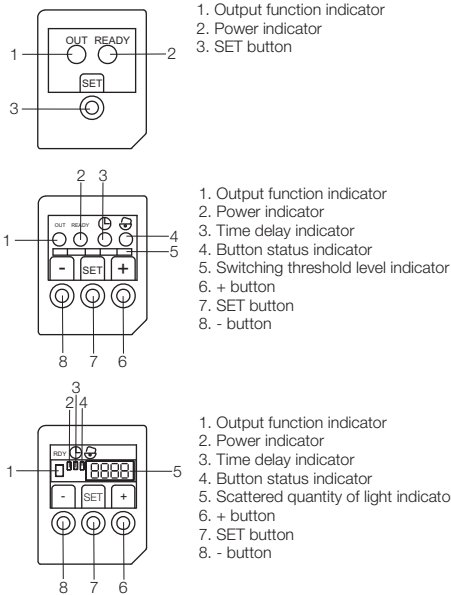
Ordering codes on page 323.



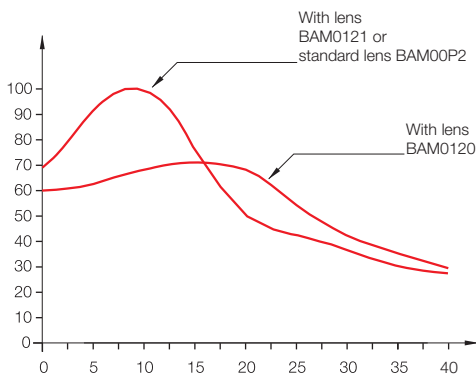
Wiring diagram



Indicators and operating elements



Relative responsiveness based on object distance



Recommended accessories

(please order separately)

Description	Focal length/focus	Ordering code
① Lens	18 mm	BAM0120
② Lens	9 mm	BAM0121
③ Lens	28 mm	BAM0122
④ Lens	50 mm	BAM00P3
⑤ Intermediate ring		BAM00P2



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.



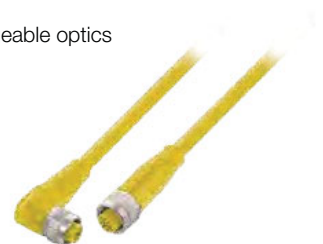
Series	
Working distance	
PNP and NPN transistor (selectable)	
Vertical light spot	Part number
PNP and NPN transistor (selectable)	
Horizontal light spot	Part number
Supply voltage U_B	
No-load supply current I_0 max.	
Output current	
Switching type	
Analog output	
Polarity reversal/short-circuit protected	
Settings	
Additional function	
Emitter, light type	
Wavelength	
Light spot diameter	
Output function indicator	
Power/error indicator	
Time function display	
Response time	
Switching frequency	
Time function	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

*Longer sensing distance using interchangeable optics

Ordering codes on page 323.

Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	Straight	PUR	Black	5 m	BCC098C
M12, 5-pin	Angled	PUR	Black	5 m	BCC08FC

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Contrast sensors BKT 67M



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

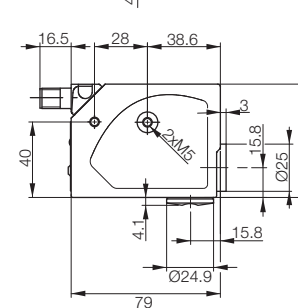
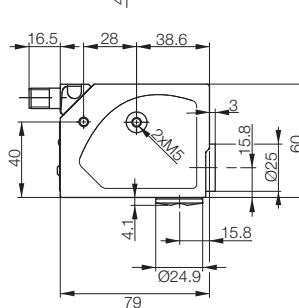
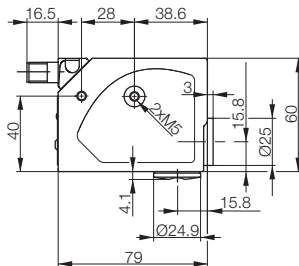
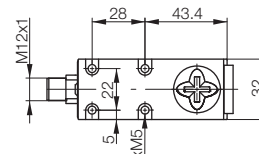
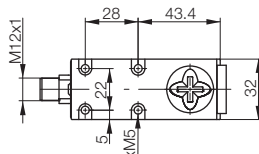
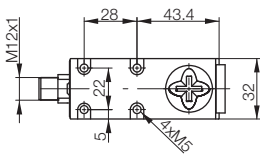
Light grids

Photoelectric distance sensors

sensors for analog distance measurement



BKT 9 mm* ± 3 mm	BKT 9 mm* ± 3 mm	BKT 9 mm* ± 3 mm
BKT 67M-001-U-S92 ①	BKT 67M-003-U-S92 ①	BKT 67M-005-U-S92 ①
BKT 67M-002-U-S92 ①	BKT 67M-004-U-S92 ①	BKT 67M-006-U-S92 ①
10...30 V DC	10...30 V DC	10...30 V DC
≤ 50 mA	≤ 85 mA	≤ 35 mA
100 mA	100 mA	100 mA
Light/Dark (automatic)	Light/Dark (automatic)	Light/Dark (automatic)
1...3 V	1...3 V	
Yes/Yes	Yes/Yes	Yes/Yes
Teach-in button	3 teach-in buttons	3 teach-in buttons
	Segment display	4-digit display
Red, green and blue light	Red, green and blue light	Red, green and blue light
630 nm/520 nm/465 nm	630 nm/520 nm/465 nm	630 nm/520 nm/465 nm
1.5x5 mm	1.5x5 mm	1.5x5 mm
Yellow LED	Yellow LED	Yellow LED
Green LED	Green LED	Green LED
	Orange LED	
33 μS	25 μS	17 μS
15 kHz	20 kHz	30 kHz
	20 ms (can be activated)	
IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Al	Al	Al
PMMA	PMMA	PMMA
M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin



Photoelectric Special Sensors

Contrast sensor BKT M

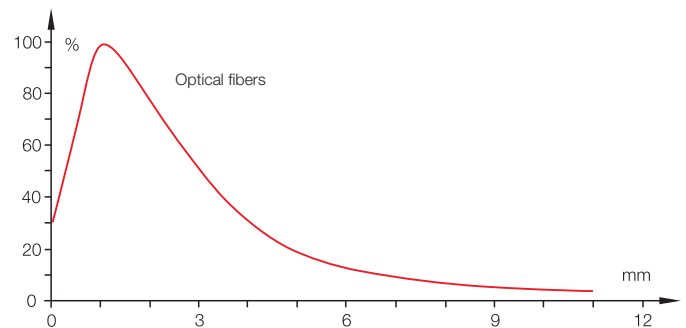
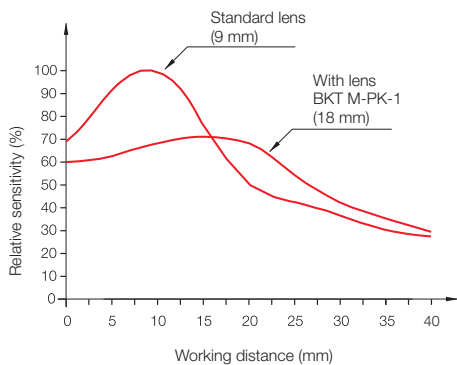
White Light Contrast Sensor

The **BKT M...** series of contrast sensors are also available with white light. Models with either a round light spot or an optical fiber connection are available.

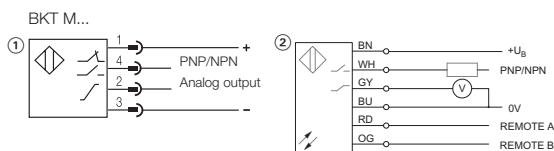
Features

- Round light spot
- White light
- Automatic setting of light/dark switching
- Time delay and key lock
- Interchangeable optics (straight and 90°)
- Analog output

Function diagrams



Wiring diagram



Recommended access
(please order separately)

Description	Ordering code
① Optical fibers	BFO0008
② Lens	BAM0120



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Contrast sensor BKT M



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

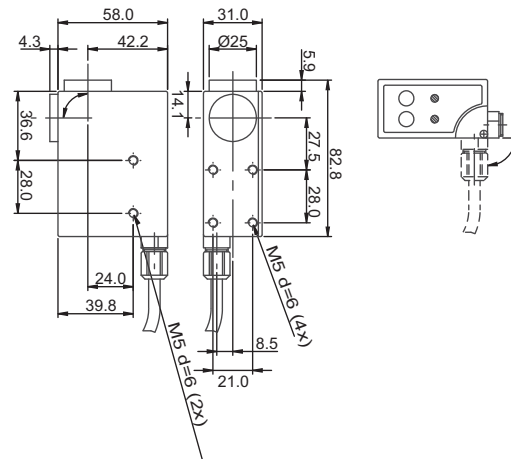
sensors for analog distance measurement

Special accessories for photoelectric sensors

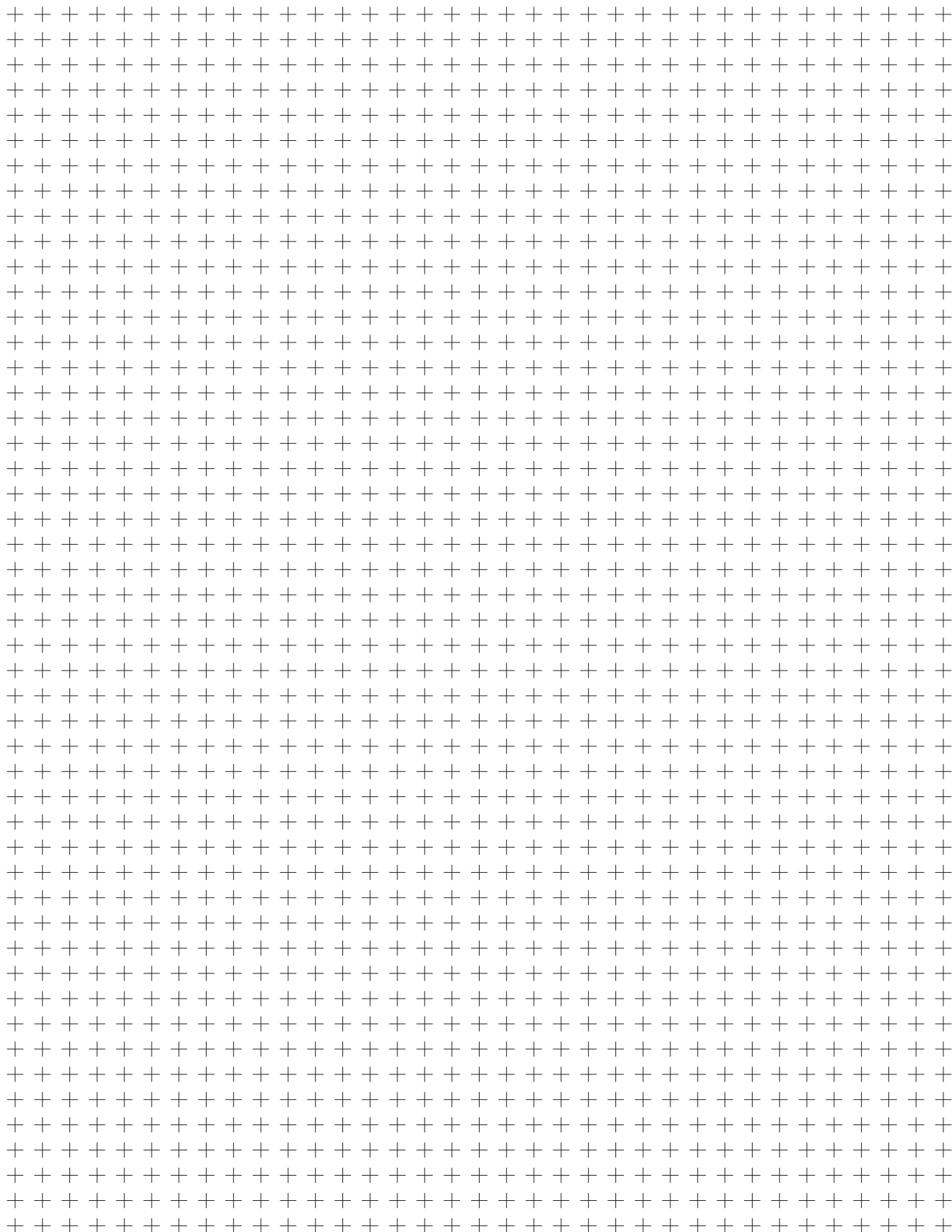
Series	BKT		BKT
Working distance	9 mm± 3 mm		
Working distance with lens PK-1	18 mm± 4 mm		
Working distance with optical fibers (diffuse)			0...3 mm
PNP/NPN NC/NO Round spot	Part number	BKT M-71-U-03 ②	
PNP/NPN NC/NO for optical fibers	Part number		BKT M-52-U-03 ②
Supply voltage U_B	10...30 V DC		10...30 V DC
No-load supply current I_0 max.	≤ 80 mA		≤ 80 mA
Output current	200 mA		200 mA
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)
Analog output	0...5.5 V DC*		0...5.5 V DC*
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Additional function	Disable buttons		Disable buttons
Emitter, light type	LED, green light/red light		LED, white light
Wavelength	526...630 nm		400...700 nm
Ready indicator	Green LED		Green LED
Output function indicator	Red LED		Red LED
Response time	25µs		25µs
Switching frequency	20 kHz		20 kHz
Time function	20 ms off-delay selectable		20 ms off-delay selectable
Degree of protection as per IEC 60529	IP 67		IP 67
Ambient temperature T_a	-10...+55 °C		-10...+55 °C
Permissible ambient light	EN 60947-5-2		EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection	6x22 AWG		6x22 AWG

2.5 V DC with 90% reflective Kodak gray card

Ordering codes on page 323.

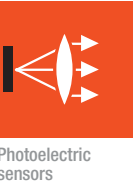


White Light Contrast Sensor



Photoelectric Special Sensors

Contrast sensor BKT M



Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

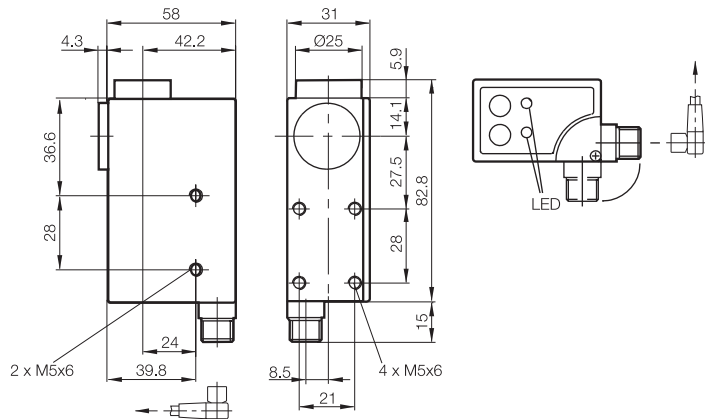
sensors for analog distance measurement

Special accessories for photoelectric sensors

Series	BKT		BKT
Working distance	9 mm± 3 mm		
Working distance with lens PK-1	18 mm± 4 mm		
Working distance with optical fibers (diffuse)			0...3 mm
PNP/NPN NC/NO Round spot	Part number	BKT M-15C-U-S4 ①	
PNP/NPN NC/NO for optical fibers	Part number		BKT M-45-U-S4 ①
Supply voltage U_B	10...30 V DC		10...30 V DC
No-load supply current I_0 max.	≤ 80 mA		≤ 80 mA
Output current	200 mA		200 mA
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)
Analog output	0...5.5 V DC*		0...5.5 V DC*
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Additional function	Disable buttons		Disable buttons
Emitter, light type	LED, green light/red light		LED, white light
Wavelength	526...630 nm		400...700 nm
Ready indicator	Green LED		Green LED
Output function indicator	Red LED		Red LED
Response time	25µs		25µs
Switching frequency	20 kHz		20 kHz
Time function	20 ms off-delay selectable		20 ms off-delay selectable
Degree of protection as per IEC 60529	IP 67		IP 67
Ambient temperature T_a	-10...+55 °C		-10...+55 °C
Permissible ambient light	EN 60947-5-2		EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection	M12 4-pin		M12 4-pin

2.5 V DC with 90% reflective Kodak gray card

Ordering codes on page 323.



Luminescence (UV) sensors can detect invisible marks that so not appear to the naked eye without a black light. They are used to detect grease, glue on boxes, and luminescent plastic safety seals on bottles.

Applications

- Logistics (marking, selecting)
- Assembly (guiding, monitoring, sorting)
- Packaging machines (to monitor cutting, folding)
- Ceramics industry (e.g. positioning parts)
- Wood industry (e.g. checking the glue bead)
- Pharmaceuticals (control tasks in the manufacturing process)
- Textiles (e.g. guiding cuts)
- Food industry



Photoelectric Special Sensors

Luminescence sensors BLT

Product overview

Type

■ Ordering code
■ Part number

Type		Sensing distance	Light type		Output			Switching type		Switching frequency	U _s		Connec- tion		Page	 Photoelectric sensors Photoelectric standard sensors Photoelectric special sensors Optical fiber base units Fiber optics Contrast sensor Luminescence sensor Color sensors Fork sensors Angle sensors Dynamic optical windows Light grids Photoelectric distance sensors for analog distance measurement Special accessories for photoelectric sensors
			UV light		PNP transistor	NPN transistor	Analog output	Light switching	Dark switching		10...24 V DC	10...30 V DC	M12 plug, 4-pin	Cable		
 Luminescence sensors																
BLT0004	BLT 18KF-001-P-S4	8...20 mm	■		■			■	■	1 kHz		■	■		339	
BLT0003	BLT 18KF-001-P-02	8...20 mm	■		■			■	■	1 kHz		■		■	339	
BLT0009	BLT 21M-001-P-S4	0...40 mm	■		■			■	■	2 kHz		■	■		341	Luminescence sensor
BLT0008	BLT 21M-001-N-S4	0...40 mm	■			■		■	■	2 kHz		■	■		341	

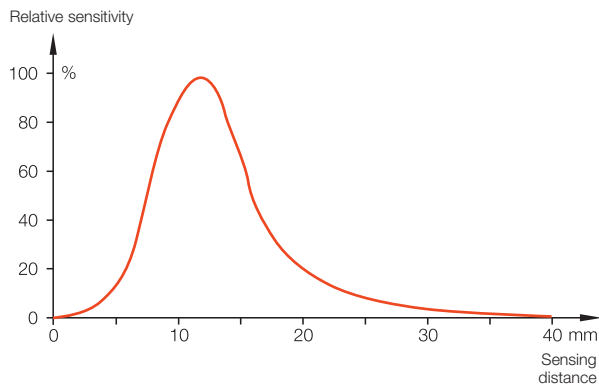
Photoelectric Special Sensors

Luminescence sensors BLT 18KF

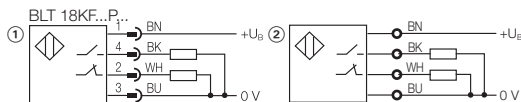
Luminescence Sensors

The luminescence sensor **BLT 18KF** detects any type of luminescent markings on any surface and automatically adjusts to ambient conditions. The sensor is calibrated with the simple push of a button. A precise setting is available for slightly luminescent markings. The switching type can be freely selected in this case.

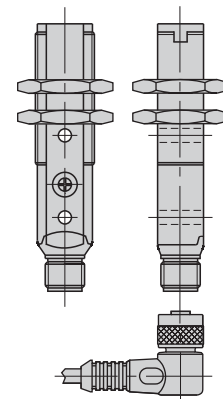
Function diagram



Wiring diagrams



Connector orientation



Recommended accessories (please order separately)

Description	Ordering code
① Mounting bracket	BAM00RY
② Mounting clamp	BAM00T3



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

Suitable connector (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Luminescence sensors BLT 18KF



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

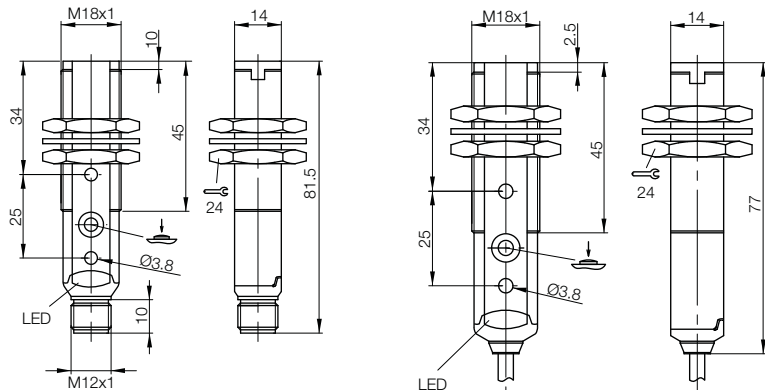
Photoelectric distance sensors

sensors for analog distance measurement

Special accessories for photoelectric sensors

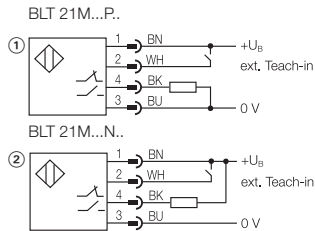
Series	BLT 8...20 mm		BLT 8...20 mm
Working range	8...20 mm		8...20 mm
PNP NC/NO	Part number	BLT 18KF-001-P-S4 ①	BLT 18KF-001-P-02 ②
Supply voltage U_B	10...30 V DC		10...30 V DC
No-load supply current I_0 max.	≤ 25 mA		≤ 25 mA
Output current	100 mA		100 mA
Switching type	Light and dark switching		Light and dark switching
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Emitter, light type	LED, UV		LED, UV
Wavelength	370 nm		370 nm
Light spot diameter	approx. 3 mm at 20 mm		approx. 3 mm at 20 mm
Output function indicator	Yellow LED		Yellow LED
Power/error indicator	Green/red LED		Green/red LED
Response time	0.5 ms		0.5 ms
Switching frequency	1 kHz		1 kHz
Degree of protection as per IEC 60529	IP 67		IP 67
Ambient temperature T_a	$-25...+55$ °C		$-25...+55$ °C
Permissible ambient light	EN 60947-5-2		EN 60947-5-2
Material	Housing	PBT	PBT
	Optical surface	PMMA	PMMA
Connection	M12 connector, 4-pin		2 m PVC cable, 26 AWG

Ordering codes on page 337.

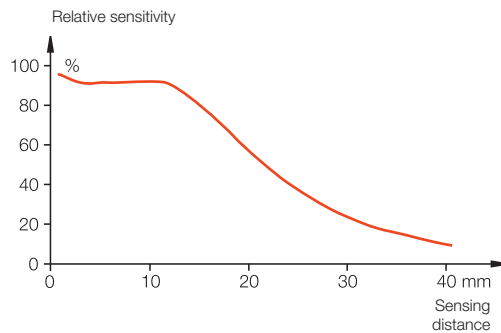


The luminescence sensor **BLT 21M** detects any type of luminescent markings on any surface and automatically adjusts to ambient conditions. The sensor is calibrated with the simple push of a button. A precise setting is available for slightly luminescent markings. The switching type can be freely selected in this case.

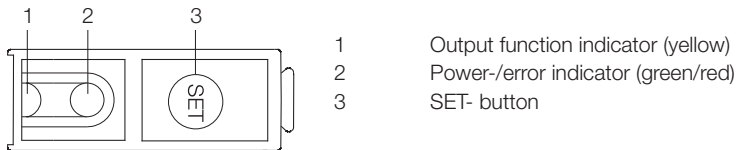
Wiring diagrams



Function diagram



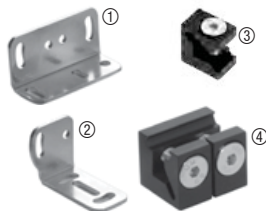
Indicators and operating elements



Recommended accessories

(please order separately)

Description	Ordering code
① Mounting bracket	BAM00T9
② Mounting bracket	BAM00TA
③ Clamp holder	BAM00TF
④ Clamp holder	BAM00TH



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.



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[illegible]

Applications

Color sensors open up a wide range of various applications, such as in the packaging industry, robotics, automation, quality assurance or in the process industry.

Versatile color sensors can be used to simplify and speed up automated processes, for detecting color nuance in rugs and textiles or for color markings on packaging or labels.

The **BFS 26K** and **BFS 27K** series of color sensors operate using pulsed white light, making them particularly insensitive to ambient light. The light reflected back from the object is received and processed by three different receivers (red, green, blue).

The various light spot geometry configurations of the respective sensors (round, rectangular or square) can reliably detect even the smallest color markings.

Numerous special functions such as color scanning, pulse expansion and blanking input provide additional application flexibility.

Features

- Microcontroller-based
- Pulsed white light
- Various light spot geometries
- 3 different colors can be identified at the same time
- 5-stage adjustable color tolerance



Photoelectric Special Sensors

Color sensors BFS

Product overview



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

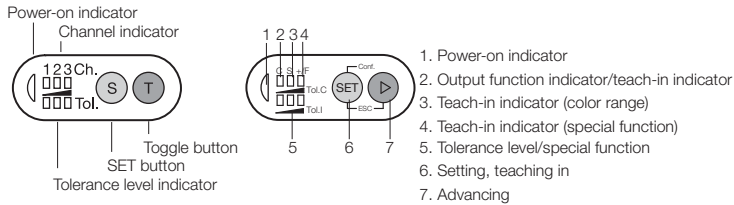
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type		Sensing distance/ Range	Light type	Output				Switching type	Switching frequency	U _s				Connection			Special features			Page	
			White light	3×PNP transistor	3×Push-pull	RS485 interface	RS 232 interface	Light switching	Dark switching		10...30 V DC	12...28 V DC	18...30 V DC	24 V	M12 plug, 8-pin	M12 plug, 5-pin	Cable	Color intensity measurement	Color scan	True color	
 Color sensors																					
BFS0001	BFS 26K-PS-L01-S115	12...32 mm								500 Hz											345
BFS0002	BFS 26K-PS-L02-S115-C	15...30 mm								500 Hz											345
BFS0003	BFS 26K-PS-L03-S115-C	18...22 mm								500 Hz											345
BFS000F	BFS 26K-GI-L04-S92	12...32 mm								500 Hz											345
BFS000L	BFS 33M-GSS-F01-PU-02	400 mm								1.5 kHz											347

Indicators and operating elements

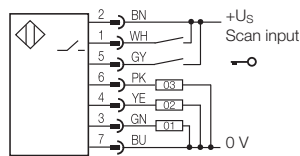


Wiring diagrams

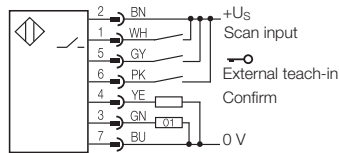
BFS 26K-PS...

Two modes are available.

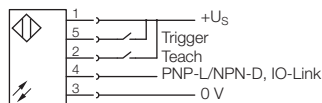
1. Normal mode "factory setting"



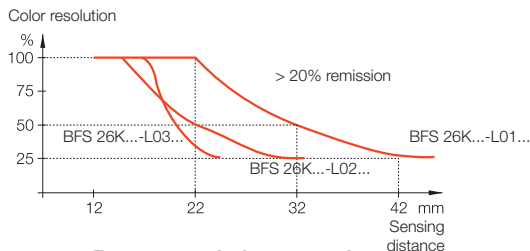
2. External Teach-in setting using "special functions"



BFS 26K-GI...



Color resolution/sensing distance diagram



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00TK



Series	
Working range	
Diffuse mode working range	
Retroreflective working range	
3x PNP	Ordering code
	Part number
1x Push-pull, IO-Link	Ordering code
	Part number
Supply voltage U_B	
No-load supply current I_0 max.	
Output current	
Switching type	
Polarity reversal/short-circuit protected	
Settings	
Emitter, light type	
Light spot geometry	
Light spot diameter	
Sensing distance tolerance	
Color resolution tolerance	
Ready indicator	
Output function indicator Ch. 1...Ch. 3	
Output function indicator Tol. 1...Tol. 5	
Ready delay	
Response time	
Switching frequency	
Time function	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

Ordering codes on page 343.

Suitable connector

(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 8-pin	Straight	PUR	Black	2 m	BCC06K1
M12, 8-pin	Angled	PUR	Black	2 m	BCC06K4
M12, 5-pin	Straight	PUR	Black	2 m	BCC08FE
M12, 5-pin	Angled	PUR	Black	2 m	BCC09H7

Connectors without LED are suitable for PNP and NPN sensors.
More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Color Sensors BFS 26K



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

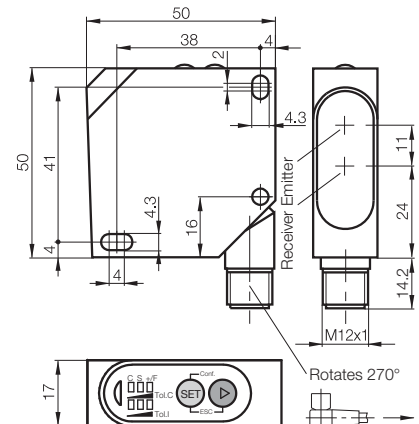
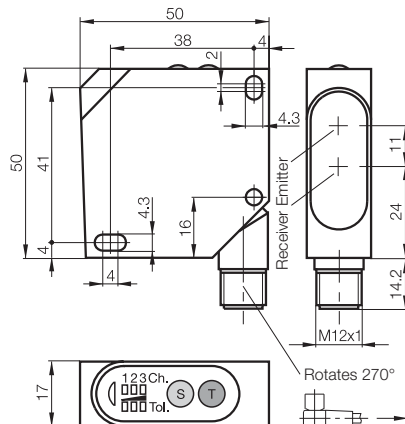
Light grids

Photoelectric distance sensors

sensors for analog distance measurement

Special accessories for photoelectric sensors

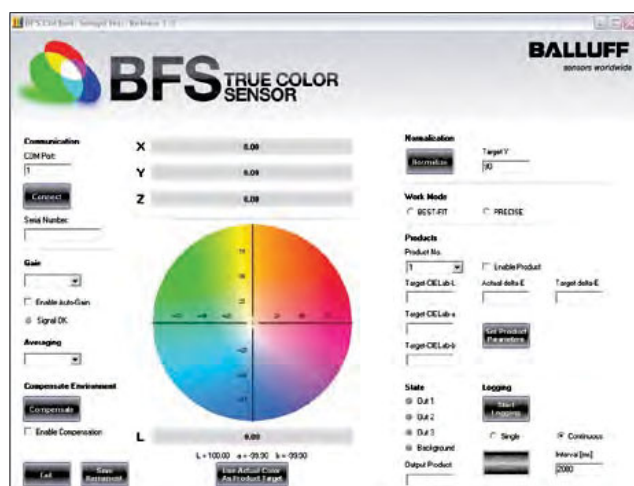
BFS 26K	BFS 26K	BFS 26K	BFS 26K
12...32 mm	15...30 mm	18...22 mm	12...32 mm
50...200 mm			
BFS0001	BFS0002	BFS0003	BFS000F
BFS 26K-PS-L01-S115	BFS 26K-PS-L02-S115-C	BFS 26K-PS-L03-S115-C	BFS 26K-GI-L04-S92
12...28 V DC	12...28 V DC	12...28 V DC	18...30 V DC
≤ 40 mA	≤ 40 mA	≤ 40 mA	≤ 40 mA
100 mA	100 mA	100 mA	100 mA
Light switching	Light switching	Light switching	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Teach-in	Teach-in	Teach-in	Teach-in
Pulsed white light	Pulsed white light	Pulsed white light	Pulsed white light
Round	Square	Rectangular	Round
Ø 4 mm at 22 mm sensing distance	2x2 mm at 22 mm sensing distance	5x1 mm at 22 mm sensing distance	Ø 4 mm at 22 mm sensing distance
±6 mm at Tol.3	±5 mm at Tol.3	±2 mm at Tol.3	±6 mm at Tol C3 and Tol I2
Adjustable in 5 levels	Adjustable in 5 levels	Adjustable in 5 levels	
Green LED	Green LED	Green LED	
3xYellow LED	3xYellow LED	3xYellow LED	
3xRed LED	3xRed LED	3xRed LED	
300 ms	300 ms	300 ms	300 ms
1 ms	1 ms	1 ms	
500 Hz	500 Hz	500 Hz	500 Hz (SIO mode)
50 ms release delay selectable	50 ms release delay selectable	50 ms release delay selectable	50 ms release delay selectable
IP 67	IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS
PMMA	PMMA	PMMA	PMMA
M12 connector, 8-pin	M12 connector, 8-pin	M12 connector, 8-pin	M12 connector, 5-pin



For distinguishing between the smallest of color nuances at the highest level

The True Color sensor BFS 33M is in a completely different league to conventional RGB sensors. 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 sensor uses three digital outputs and a serial interface to perform evaluations. The lab color space values are transmitted directly via this interface.



Features

- Detection of and distinguishing between a random number of colors
- Reliably distinguishes between the smallest of color nuances
- Large sensing distance up to 400 mm
- Simple configuration and visualization using software
- Robust metal housing

Industries

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

Recommended accessories (please order separately)

Description	Ordering code
① Optical fiber M4 (coaxial), 2 m long	BFO00C9
② Optics (short-range), 7 mm, screwed onto M4 optical fiber	BAM00NT
③ Optical fiber M6 (coaxial), 1 m long	BFO00FP
④ Optical fiber M6 (coaxial), 2 m long	BFO00C4
⑤ Optical fiber M6 (coaxial), 5 m long	BFO00FN
⑥ Optics (adjustable), 200 mm sensing distance, screwed onto M6 optical fiber	BAM01U2
⑦ Optics (long-range), 400 mm sensing distance, screwed onto M6 optical fiber	BAM01PA
⑧ Interface cable (shielded)	BCC00ARP
⑨ RS232/USB interface converter	BAE009A





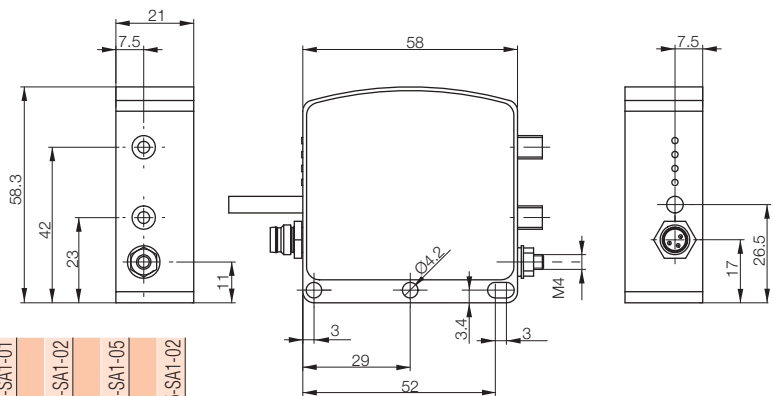
Photoelectric special sensors

Color sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Ordering codes on page 343.



Part number

■ www.balluff.com

Through-beam sensors are unsurpassed in their accuracy, their ability to distinguish small parts and fine detail and their operating reliability. However, they do take some time to install and configure. This does not apply to fork sensors, since the emitter and receiver are self-contained in one housing. Nevertheless, their accuracy, ability to distinguish small parts and fine detail and their operating reliability is outstanding. Laser fork sensors achieve the best results in these kinds of tasks. Balluff laser through-beam fork sensors are ideally used for precisely positioning and reliably detecting fast-moving processes and small parts. This opens a vast range of applications in robotics and automation.



Features

- Integrated unit
- Rugged metal housing
- Glass optical surface
- High resolution
- Available in red light, laser light, IR or pin point
- Identical housing dimensions for all light types
- 10×10 mm fork arm, even for large fork openings
- Stackable
- Laser Class 1

Applications

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

Type		Fork opening	Resolution	Light type					Output		Switching type		Switching frequency	U _s	Connection		Features		Page
				Red light	Red light, pin point	Laser light	Infrared	Red and green light	PNP	NPN	Light switching	Dark switching			M8 plug, 3-pin	M8 plug, 4-pin	Transparency detection	Fluid detection	
Fork sensors																			
BGL001W	BGL 5A-001-S49	5 mm	0.3 mm	■					■		■	■	3 kHz	■	■				350
BGL001Y	BGL 5A-002-S49	5 mm	0.3 mm	■						■	■	■	3 kHz	■	■				350
BGL001Z	BGL 5A-005-S49	5 mm	0.2 mm		■				■		■	■	5 kHz	■	■				354
BGL0020	BGL 5A-006-S49	5 mm	0.2 mm		■					■	■	■	5 kHz	■	■				354
BGL0021	BGL 5A-007-S49	5 mm	0.8 mm				■		■		■	■	3 kHz	■	■				358
BGL0022	BGL 5A-008-S49	5 mm	0.8 mm				■			■	■	■	3 kHz	■	■				358
BGL0001	BGL 10A-001-S49	10 mm	0.3 mm	■					■		■	■	3 kHz	■	■				350
BGL0002	BGL 10A-002-S49	10 mm	0.3 mm	■						■	■	■	3 kHz	■	■				350
BGL0003	BGL 10A-005-S49	10 mm	0.2 mm		■				■		■	■	5 kHz	■	■				354
BGL0004	BGL 10A-006-S49	10 mm	0.2 mm		■					■	■	■	5 kHz	■	■				354
BGL0005	BGL 10A-007-S49	10 mm	0.8 mm				■		■		■	■	3 kHz	■	■				358
BGL0006	BGL 10A-008-S49	10 mm	0.8 mm				■			■	■	■	3 kHz	■	■				358
BGL000R	BGL 20A-001-S49	20 mm	0.3 mm	■					■		■	■	1.5 kHz	■	■				351
BGL000T	BGL 20A-002-S49	20 mm	0.3 mm	■						■	■	■	1.5 kHz	■	■				351
BGL000U	BGL 20A-005-S49	20 mm	0.2 mm		■				■		■	■	5 kHz	■	■				355
BGL000W	BGL 20A-006-S49	20 mm	0.2 mm		■					■	■	■	5 kHz	■	■				355
BGL000Y	BGL 20A-007-S49	20 mm	0.8 mm				■		■		■	■	2 kHz	■	■				359
BGL000Z	BGL 20A-008-S49	20 mm	0.8 mm				■			■	■	■	2 kHz	■	■				359
BGL0016	BGL 30A-001-S49	30 mm	0.3 mm	■					■		■	■	1.5 kHz	■	■				351
BGL0018	BGL 30A-002-S49	30 mm	0.3 mm	■						■	■	■	1.5 kHz	■	■				351
BGL0019	BGL 30A-003-S49	30 mm	50 µm			■			■		■	■	5 kHz	■	■				362
BGL001A	BGL 30A-004-S49	30 mm	50 µm			■				■	■	■	5 kHz	■	■				362
BGL001C	BGL 30A-005-S49	30 mm	0.2 mm		■				■		■	■	5 kHz	■	■				355

Photoelectric Special Sensors

Fork sensors BGL

Product overview

Type		Fork opening	Resolution	Light type					Output		Switching type		Switching frequency	U _s	Connection		Features		Page	 Photoelectric sensors		
				Red light	Red light, pin point	Laser light	Infrared	Red and green light	PNP	NPN	Light switching	Dark switching			M8 plug, 3-pin	M8 plug, 4-pin	Transparency detection	Fluid detection				
 Fork sensors																						
BGL001E	BGL 30A-006-S49	30 mm	0.2 mm		■					■	■	■	5 kHz	■	■						355	Photoelectric standard sensors
BGL001F	BGL 30A-007-S49	30 mm	0.8 mm				■			■		■	2 kHz	■	■						359	
BGL001H	BGL 30A-008-S49	30 mm	0.8 mm				■			■	■	■	2 kHz	■	■					359		
BGL003J	BGL 30A-011-S49	30 mm	0.6 mm				■			■		■	2 kHz	■	■				■	364	Photoelectric special sensors	
BGL003K	BGL 30A-012-S49	30 mm	0.6 mm				■			■	■	■	2 kHz	■	■				■	364		
																					Optical fiber base units	
BGL001J	BGL 50A-001-S49	50 mm	0.4 mm	■						■		■	1.5 kHz	■	■					351	Fiber optics	
BGL001L	BGL 50A-002-S49	50 mm	0.4 mm	■							■	■	1.5 kHz	■	■					351	Contrast sensor	
BGL001M	BGL 50A-003-S49	50 mm	80 µm			■				■		■	5 kHz	■	■					363	Luminescence sensor	
BGL001N	BGL 50A-004-S49	50 mm	80 µm			■					■	■	5 kHz	■	■					363	Color sensors	
BGL001P	BGL 50A-005-S49	50 mm	0.3 mm		■					■		■	5 kHz	■	■					355	Fork sensors	
BGL001R	BGL 50A-006-S49	50 mm	0.3 mm		■					■	■	■	5 kHz	■	■					355		
BGL001T	BGL 50A-007-S49	50 mm	1.0 mm				■			■		■	2 kHz	■	■					359	Angle sensors	
BGL001U	BGL 50A-008-S49	50 mm	1.0 mm				■			■	■	■	2 kHz	■	■					359	Dynamic optical windows	
																					Light grids	
BGL0023	BGL 80A-001-S49	80 mm	0.4 mm	■						■		■	1.5 kHz	■	■					352	Photoelectric distance sensors for analog distance measurement	
BGL0024	BGL 80A-002-S49	80 mm	0.4 mm	■							■	■	1.5 kHz	■	■					352		
BGL0025	BGL 80A-003-S49	80 mm	0.1 mm			■				■		■	5 kHz	■	■					363		
BGL0026	BGL 80A-004-S49	80 mm	0.1 mm			■					■	■	5 kHz	■	■					363		
BGL0027	BGL 80A-005-S49	80 mm	0.4 mm		■					■		■	5 kHz	■	■					356		
BGL0028	BGL 80A-006-S49	80 mm	0.4 mm		■						■	■	5 kHz	■	■					356		
BGL0029	BGL 80A-007-S49	80 mm	1.2 mm				■			■		■	2 kHz	■	■					360	Special accessories for photoelectric sensors	
BGL002A	BGL 80A-008-S49	80 mm	1.2 mm				■				■	■	2 kHz	■	■					360		
BGL002T	BGL 80A-009-S49	80 mm	50 µm			■				■		■	5 kHz	■	■			■		365		
BGL002U	BGL 80A-010-S49	80 mm	50 µm			■					■	■	5 kHz	■	■			■		365		
BGL003L	BGL 80A-011-S49	80 mm	0.8 mm				■			■		■	2 kHz	■	■				■	365		
BGL003M	BGL 80A-012-S49	80 mm	0.8 mm			■					■	■	2 kHz	■	■		■		■	365		
BGL0007	BGL 120A-001-S49	120 mm	0.5 mm	■						■		■	1.5 kHz	■	■					352		
BGL0008	BGL 120A-002-S49	120 mm	0.5 mm	■							■	■	1.5 kHz	■	■					352		
BGL0009	BGL 120A-003-S49	120 mm	0.15 mm			■				■		■	5 kHz	■	■					363		
BGL000A	BGL 120A-004-S49	120 mm	0.15 mm			■					■	■	5 kHz	■	■					363		
BGL000C	BGL 120A-005-S49	120 mm	0.5 mm		■					■		■	5 kHz	■	■					356		
BGL000E	BGL 120A-006-S49	120 mm	0.5 mm		■						■	■	5 kHz	■	■					356		
BGL000F	BGL 120A-007-S49	120 mm	1.5 mm				■			■		■	1 kHz	■	■					360		
BGL000H	BGL 120A-008-S49	120 mm	1.5 mm				■				■	■	1 kHz	■	■					360		
BGL000J	BGL 180A-001-S49	180 mm	0.6 mm	■						■		■	1.5 kHz	■	■					353		
BGL000K	BGL 180A-002-S49	180 mm	0.6 mm	■							■	■	1.5 kHz	■	■					353		
BGL000L	BGL 180A-005-S49	180 mm	0.6 mm		■					■		■	5 kHz	■	■					357		
BGL000M	BGL 180A-006-S49	180 mm	0.6 mm		■						■	■	5 kHz	■	■					357		
BGL000N	BGL 180A-007-S49	180 mm	1.5 mm				■			■		■	2 kHz	■	■					361		
BGL000P	BGL 180A-008-S49	180 mm	1.5 mm				■				■	■	2 kHz	■	■					361		
BGL0010	BGL 220A-001-S49	220 mm	0.6 mm	■						■		■	1.5 kHz	■	■					353		
BGL0011	BGL 220A-002-S49	220 mm	0.6 mm	■							■	■	1.5 kHz	■	■					353		
BGL0012	BGL 220A-005-S49	220 mm	0.6 mm		■					■		■	5 kHz	■	■					357		
BGL0013	BGL 220A-006-S49	220 mm	0.6 mm		■						■	■	5 kHz	■	■					357		
BGL0014	BGL 220A-007-S49	220 mm	1.5 mm				■			■		■	2 kHz	■	■					361		
BGL0015	BGL 220A-008-S49	220 mm	1.5 mm				■				■	■	2 kHz	■	■					361		
BGL002L	BGL 21-IR	2 mm	0.25 mm				■			■		■	25 kHz	■			■			367		
BGL002M	BGL 21-RG	2 mm	0.25 mm					■		■		■	25 kHz	■			■			367		



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

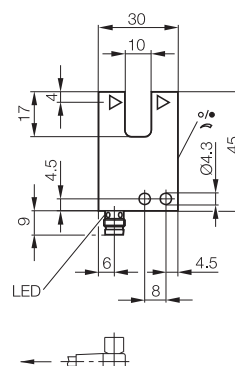
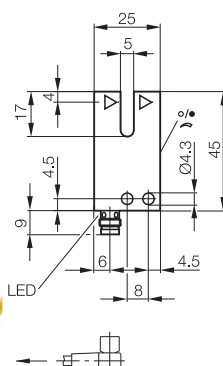
Special accessories for photoelectric sensors



Series		BGL	BGL	
Fork opening		5 mm	10 mm	
Fork depth		17 mm	17 mm	
PNP NO/NC	Part number	BGL 5A-001-S49	BGL 10A-001-S49	
NPN NO/NC	Part number	BGL 5A-002-S49	BGL 10A-002-S49	
Supply voltage U_B		10...30 V DC	10...30 V DC	
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA	
Output current		200 mA	200 mA	
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes	
Settings		Potentiometer, 270°	Potentiometer, 270°	
Emitter, light type		LED, red light	LED, red light	
Wavelength		640 nm	640 nm	
Resolution (smallest discernible part)		0.3 mm	0.3 mm	
Repeat accuracy		20 μ m	20 μ m	
Switching hysteresis		≤ 0.1 mm	≤ 0.1 mm	
Output function indicator		Yellow LED	Yellow LED	
Response time		0.166 ms	0.166 ms	
Switching frequency		3 kHz	3 kHz	
Degree of protection as per IEC 60529		IP 67	IP 67	
Ambient temperature T_a		-10...+60 °C	-10...+60 °C	
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2	
Material	Housing	GD-Zn	GD-Zn	
	Optical surface	Glass	Glass	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	



Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Fork sensors BGL

20A, 30A, 50A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

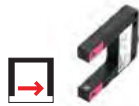
Photoelectric distance sensors

sensors for analog

distance measurement

Special accessories for

photoelectric sensors



BGL
20 mm
24 mm

BGL 20A-001-S49

BGL 20A-002-S49

10...30 V DC

≤ 35 mA

200 mA

Light/dark switching (selectable)

Yes/Yes

Potentiometer, 270°

LED, red light

640 nm

0.3 mm

20 μm

≤ 0.1 mm

Yellow LED

0.33 ms

1.5 kHz

IP 67

-10...+60 °C

EN 60947-5-2

GD-Zn

Glass

M8 connector, 3-pin

BGL
30 mm
34 mm

BGL 30A-001-S49

BGL 30A-002-S49

10...30 V DC

≤ 35 mA

200 mA

Light/dark switching (selectable)

Yes/Yes

Potentiometer, 270°

LED, red light

640 nm

0.3 mm

20 μm

≤ 0.1 mm

Yellow LED

0.33 ms

1.5 kHz

IP 67

-10...+60 °C

EN 60947-5-2

GD-Zn

Glass

M8 connector, 3-pin

BGL
50 mm
54 mm

BGL 50A-001-S49

BGL 50A-002-S49

10...30 V DC

≤ 35 mA

200 mA

Light/dark switching (selectable)

Yes/Yes

Potentiometer, 270°

LED, red light

640 nm

0.4 mm

40 μm

≤ 0.15 mm

Yellow LED

0.33 ms

1.5 kHz

IP 67

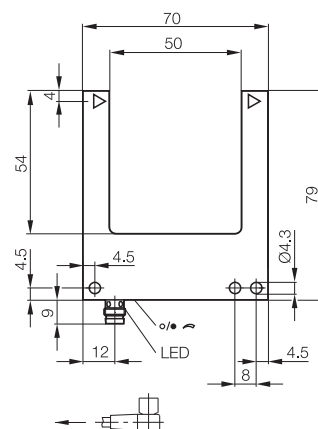
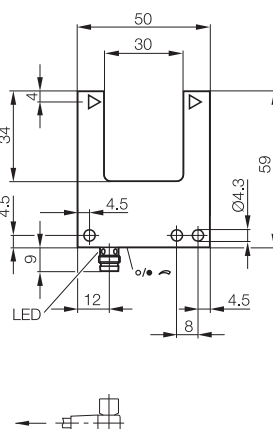
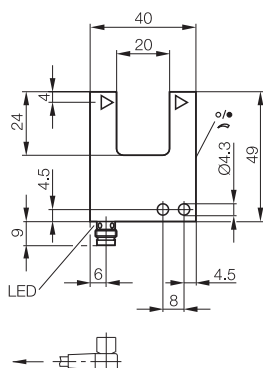
-10...+60 °C

EN 60947-5-2

GD-Zn

Glass

M8 connector, 3-pin



Wiring diagram

PNP



NPN



1 BW



4 BK



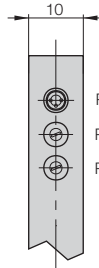
3 BU



+U_B



0 V



Plug, LED output function indicator

Potentiometer light/dark switching

Potentiometer, sensitivity

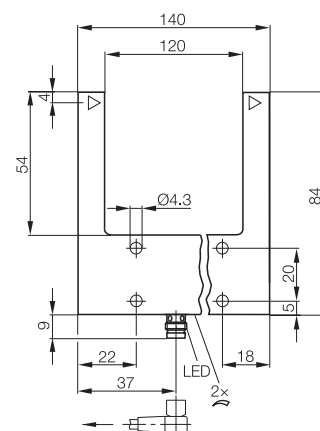
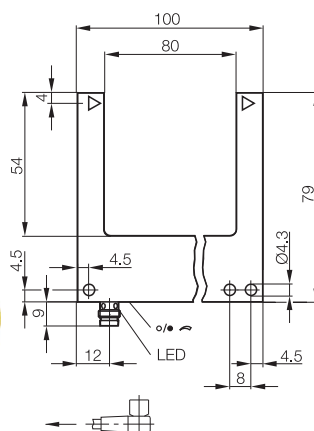


Series		BGL	BGL
Fork opening		80 mm	120 mm
Fork depth		54 mm	54 mm
PNP NO/NC	Part number	BGL 80A-001-S49	BGL 120A-001-S49
NPN NO/NC	Part number	BGL 80A-002-S49	BGL 120A-002-S49
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		LED, red light	LED, red light
Wavelength		640 nm	640 nm
Resolution (smallest discernible part)		0.4 mm	0.5 mm
Repeat accuracy		60 μ m	80 μ m
Switching hysteresis		≤ 0.2 mm	≤ 0.2 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.33 ms	0.33 ms
Switching frequency		1.5 kHz	1.5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin



Connector orientation

Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Fork sensors BGL

180A, 220A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

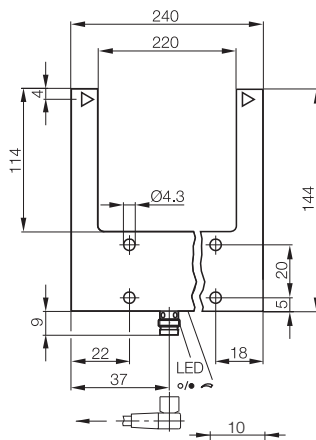
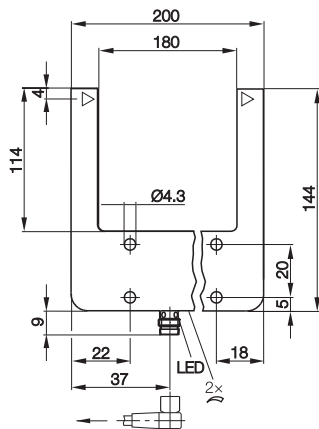
Dynamic optical windows

Light grids

Photoelectric distance sensors

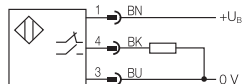
sensors for analog distance measurement

BGL 180 mm 114 mm	BGL 220 mm 114 mm	
BGL 180A-001-S49	BGL 220A-001-S49	
BGL 180A-002-S49	BGL 220A-002-S49	
10...30 V DC	10...30 V DC	
≤ 35 mA	≤ 35 mA	
200 mA	200 mA	
Light/dark switching (selectable)	Light/dark switching (selectable)	
Yes/Yes	Yes/Yes	
Potentiometer, 270°	Potentiometer, 270°	
LED, red light	LED, red light	
640 nm	640 nm	
0.6 mm	0.6 mm	
80 μm	80 μm	
≤ 0.2 mm	≤ 0.2 mm	
Yellow LED	Yellow LED	
0.33 ms	0.33 ms	
1.5 kHz	1.5 kHz	
IP 67	IP 67	
-10...+60 °C	-10...+60 °C	
EN 60947-5-2	EN 60947-5-2	
GD-Zn	GD-Zn	
Glass	Glass	
M8 connector, 3-pin	M8 connector, 3-pin	

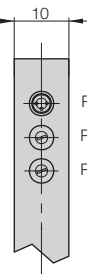
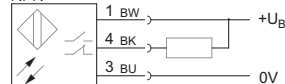


Wiring diagram

PNP



NPN



Plug, LED output function indicator

Potentiometer light/dark switching

Potentiometer, sensitivity

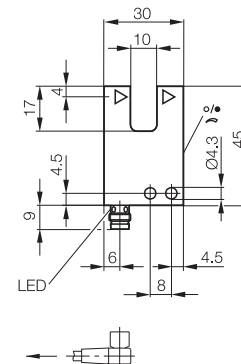
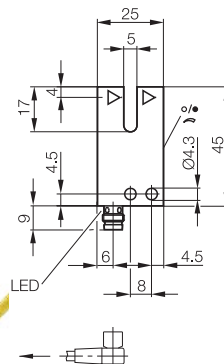


Series		BGL	BGL
Fork opening		5 mm	10 mm
Fork depth		17 mm	17 mm
PNP NO/NC	Part number	BGL 5A-005-S49	BGL 10A-005-S49
NPN NO/NC	Part number	BGL 5A-006-S49	BGL 10A-006-S49
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Red light, pin point	Red light, pin point
Wavelength		640 nm	640 nm
Resolution (smallest discernible part)		0.2 mm	0.2 mm
Repeat accuracy		20 µm	20 µm
Switching hysteresis		≤ 70 µm	≤ 70 µm
Output function indicator		Yellow LED	Yellow LED
Response time		0.1 ms	0.1 ms
Switching frequency		5 kHz	5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin



Connector orientation

Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Fork sensors BGL

20A, 30A, 50A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

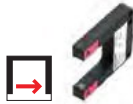
Angle sensors

Dynamic optical windows

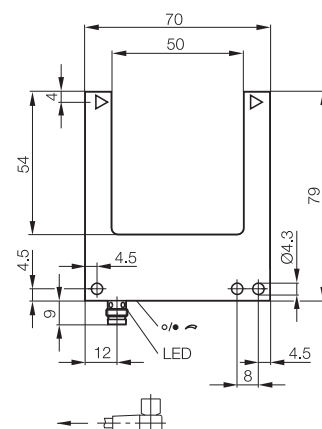
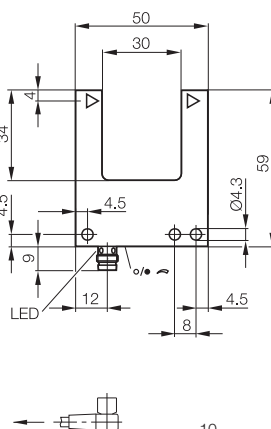
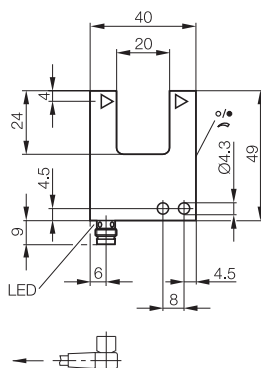
Light grids

Photoelectric distance sensors for analog distance measurement

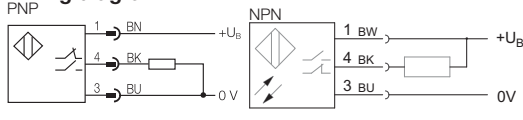
Special accessories for photoelectric sensors



BGL 20 mm 24 mm	BGL 30 mm 34 mm	BGL 50 mm 54 mm
BGL 20A-005-S49	BGL 30A-005-S49	BGL 50A-005-S49
BGL 20A-006-S49	BGL 30A-006-S49	BGL 50A-006-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Red light, pin point	Red light, pin point	Red light, pin point
640 nm	640 nm	640 nm
0.2 mm	0.2 mm	0.3 mm
20 µm	20 µm	30 µm
≤ 70 µm	≤ 70 µm	≤ 0.1 mm
Yellow LED	Yellow LED	Yellow LED
0.1 ms	0.1 ms	0.1 ms
5 kHz	5 kHz	5 kHz
IP 67	IP 67	IP 67
-10...+60 °C	-10...+60 °C	-10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
GD-Zn	GD-Zn	GD-Zn
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram



Plug, LED output function indicator

Potentiometer light/dark switching

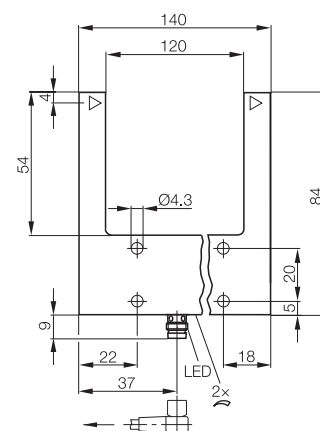
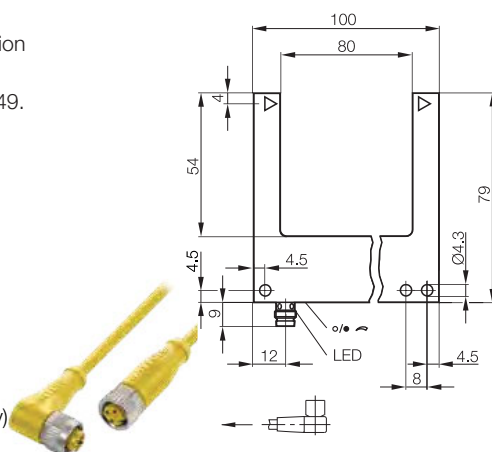
Potentiometer, sensitivity



Series	BGL		BGL	
Fork opening	80 mm		120 mm	
Fork depth	54 mm		54 mm	
PNP NO/NC	Part number	BGL 80A-005-S49	BGL 120A-005-S49	
NPN NO/NC	Part number	BGL 80A-006-S49	BGL 120A-006-S49	
Supply voltage U_B	10...30 V DC		10...30 V DC	
No-load supply current I_0 max.	≤ 35 mA		≤ 35 mA	
Output current	200 mA		200 mA	
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Potentiometer, 270°		Potentiometer, 270°	
Emitter, light type	Red light, pin point		Red light, pin point	
Wavelength	640 nm		640 nm	
Resolution (smallest discernible part)	0.4 mm		0.5 mm	
Repeat accuracy	40 μ m		50 μ m	
Switching hysteresis	≤ 0.15 mm		≤ 0.15 mm	
Output function indicator	Yellow LED		Yellow LED	
Response time	0.1 ms		0.1 ms	
Switching frequency	5 kHz		5 kHz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	-10...+60 °C		-10...+60 °C	
Ambient light limit according to	EN 60947-5-2		EN 60947-5-2	
Material	Housing	GD-Zn	GD-Zn	
	Optical surface	Glass	Glass	
Connection	M8 connector, 3-pin		M8 connector, 3-pin	



Ordering codes on pages 348-349.



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Fork sensors BGL

180A, 220A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

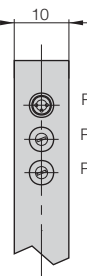
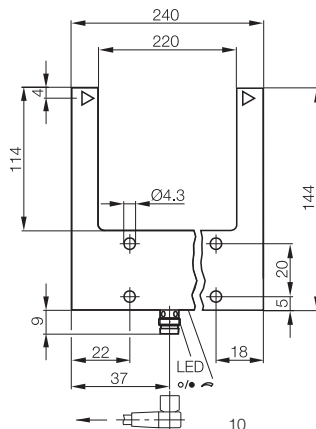
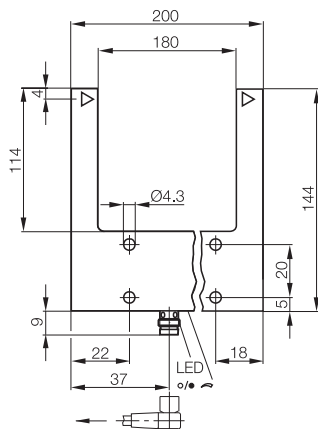
Fork sensors

Angle sensors

Dynamic optical windows

Light grids

BGL 180 mm 114 mm	BGL 220 mm 114 mm	
BGL 180A-005-S49	BGL 220A-005-S49	
BGL 180A-006-S49	BGL 220A-006-S49	
10...30 V DC	10...30 V DC	
≤ 35 mA	≤ 35 mA	
200 mA	200 mA	
Light/dark switching (selectable)	Light/dark switching (selectable)	
Yes/Yes	Yes/Yes	
Potentiometer, 270°	Potentiometer, 270°	
Red light, pin point	Red light, pin point	
640 nm	640 nm	
0.6 mm	0.6 mm	
60 μm	60 μm	
≤ 0.2 mm	≤ 0.2 mm	
Yellow LED	Yellow LED	
0.1 ms	0.1 ms	
5 kHz	5 kHz	
IP 67	IP 67	
-10...+60 °C	-10...+60 °C	
EN 60947-5-2	EN 60947-5-2	
GD-Zn	GD-Zn	
Glass	Glass	
M8 connector, 3-pin	M8 connector, 3-pin	



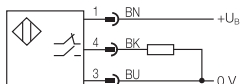
Plug, LED output function indicator

Potentiometer light/dark switching

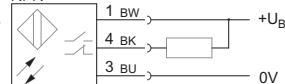
Potentiometer, sensitivity

Wiring diagram

PNP



NPN



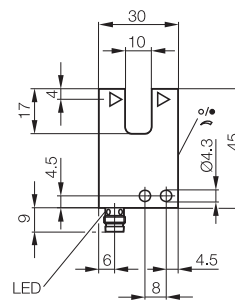
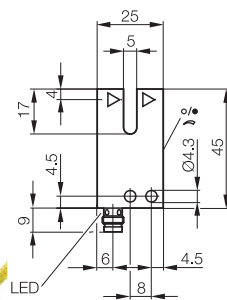


Series		BGL	BGL
Fork opening		5 mm	10 mm
Fork depth		17 mm	17 mm
PNP NO/NC	Part number	BGL 5A-007-S49	BGL 10A-007-S49
NPN NO/NC	Part number	BGL 5A-008-S49	BGL 10A-008-S49
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Infrared	Infrared
Wavelength		880 nm	880 nm
Resolution (smallest discernible part)		0.8 mm	0.8 mm
Repeat accuracy		0.1 mm	0.1 mm
Switching hysteresis		≤ 0.3 mm	≤ 0.3 mm
Power-on indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Response time		0.166 ms	0.166 ms
Switching frequency		3 kHz	3 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin

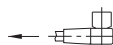


Connector orientation

Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

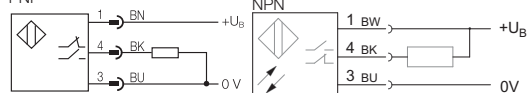
20A, 30A, 50A



SENSORS

Technical drawing showing the front view of a rectangular plate. The overall width is 70 mm and the overall height is 79 mm. A central rectangular cutout has a width of 50 mm and a height of 54 mm. The distance from the top edge of the plate to the top edge of the cutout is 4 mm. The distance from the bottom edge of the plate to the bottom edge of the cutout is 4.5 mm. The distance from the left edge of the plate to the left edge of the cutout is 4.5 mm. The distance from the right edge of the plate to the right edge of the cutout is 4.5 mm. There are two circular holes, each with a diameter of $\varnothing 4.3$ mm, located on the bottom edge of the plate. The distance between the centers of these two holes is 8 mm. The distance from the left edge of the plate to the center of the left hole is 12 mm. The distance from the right edge of the plate to the center of the right hole is 8 mm. A label "LED" points to a feature on the bottom edge of the plate.

PNP



Potentiometer, sensitivity



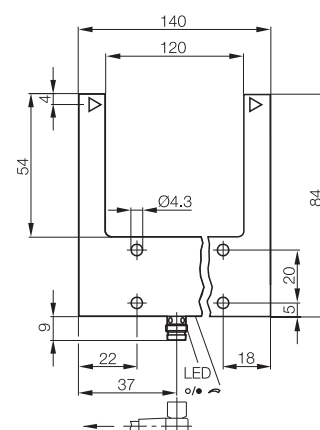
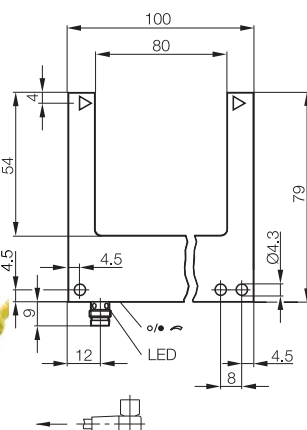
Series	BGL		BGL	
Fork opening	80 mm		120 mm	
Fork depth	54 mm		54 mm	
PNP NO/NC	Part number	BGL 80A-007-S49	BGL 120A-007-S49	
NPN NO/NC	Part number	BGL 80A-008-S49	BGL 120A-008-S49	
Supply voltage U_B	10...30 V DC		10...30 V DC	
No-load supply current I_0 max.	≤ 35 mA		≤ 35 mA	
Output current	200 mA		200 mA	
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Potentiometer, 270°		Potentiometer, 270°	
Emitter, light type	Infrared		Infrared	
Wavelength	880 nm		880 nm	
Resolution (smallest discernible part)	1.2 mm		1.5 mm	
Repeat accuracy	0.15 mm		0.2 mm	
Switching hysteresis	≤ 0.4 mm		≤ 0.5 mm	
Power-on indicator	Green LED		Green LED	
Output function indicator	Yellow LED		Yellow LED	
Response time	0.33 ms		0.5 ms	
Switching frequency	2 kHz		1 kHz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	-10...+60 °C		-10...+60 °C	
Ambient light limit according to	EN 60947-5-2		EN 60947-5-2	
Material	Housing	GD-Zn	GD-Zn	
	Optical surface	Glass	Glass	
Connection	M8 connector, 3-pin		M8 connector, 3-pin	



Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

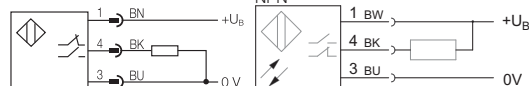
Connectors without LED are suitable for PNP and NPN sensors.

180A, 220A



- Plug, LED output function indicator
- Potentiometer light/dark switching
- Potentiometer, sensitivity

PNP





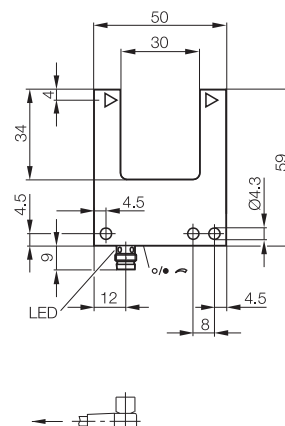
Series	BGL	
Fork opening	30 mm	
Fork depth	34 mm	
PNP	NO/NC	Part number BGL 30A-003-S49
NPN	NO/NC	Part number BGL 30A-004-S49
Supply voltage U_B	10...30 V DC	
No-load supply current I_0 max.	≤ 20 mA	
Output current	200 mA	
Switching type	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes	
Settings	Potentiometer, 270°	
Emitter, light type	Laser, red light	
Wavelength	650 nm	
Laser class	1	
Resolution (smallest discernible part)	50 μ m	
Repeat accuracy	10 μ m	
Switching hysteresis	20 μ m	
Output function indicator	Yellow LED	
Response time	0.1 ms	
Switching frequency	5 kHz	
Degree of protection as per IEC 60529	IP 67	
Ambient temperature T_a	-10...+60 °C	
Ambient light limit according to	EN 60947-5-2	
Material	Housing	GD-Zn
	Optical surface	Glass
Connection	M8 connector, 3-pin	



Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

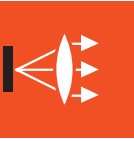
Connectors without LED are suitable for PNP and NPN sensors.



Photoelectric Special Sensors

Fork sensors BGL

80A, 120A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

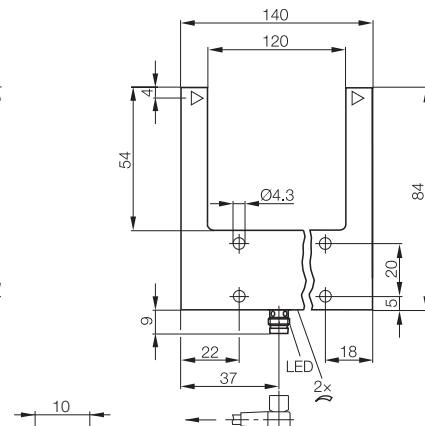
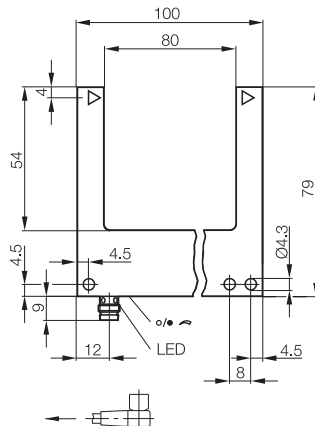
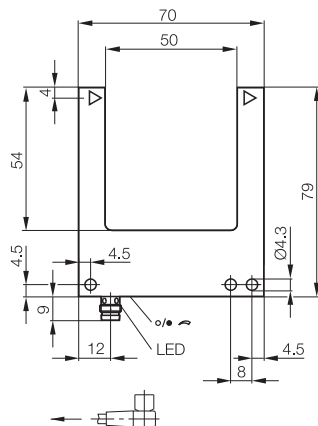
sensors for analog

distance measurement

Special accessories for

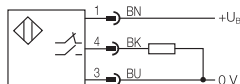
photoelectric sensors

BGL 50 mm 54 mm	BGL 80 mm 54 mm	BGL 120 mm 54 mm
BGL 50A-003-S49	BGL 80A-003-S49	BGL 120A-003-S49
BGL 50A-004-S49	BGL 80A-004-S49	BGL 120A-004-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Laser, red light	Laser, red light	Laser, red light
650 nm	650 nm	650 nm
1	1	1
80 µm	0.1 mm	0.15 mm
10 µm	10 µm	10 µm
25 µm	30 µm	50 µm
Yellow LED	Yellow LED	Yellow LED
0.1 ms	0.1 ms	0.1 ms
5 kHz	5 kHz	5 kHz
IP 67	IP 67	IP 67
-10...+60 °C	-10...+60 °C	-10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
GD-Zn	GD-Zn	GD-Zn
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin

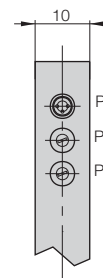
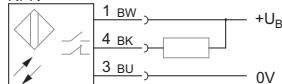


Wiring diagram

PNP



NPN



Plug, LED output function indicator

Potentiometer light/dark switching

Potentiometer, sensitivity



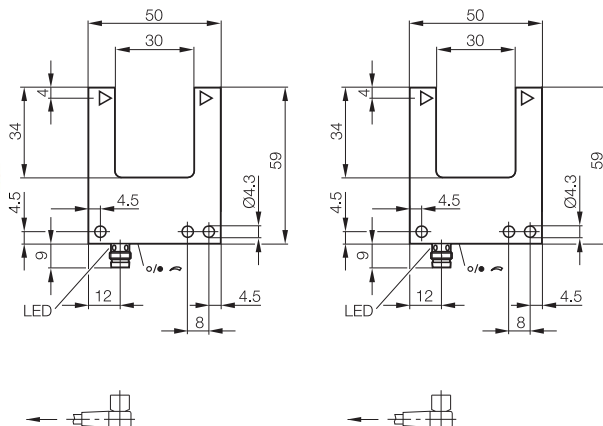
Series		BGL	BGL	
Fork opening		30 mm	30 mm	
Fork depth		34 mm	34 mm	
PNP NO/NC	Part number			
NPN NO/NC	Transparency detection	Part number		
PNP NO/NC	Part number	BGL 30A-011-S49		
NPN NO/NC	Fluid detection	Part number	BGL 30A-012-S49	
Supply voltage U_B		10...30 V DC	10...30 V DC	
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA	
Output current		200 mA	200 mA	
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes	
Settings		Potentiometer, 270°	Potentiometer, 270°	
Emitter, light type		Infrared	Infrared	
Wavelength		1480 nm	880 nm	
Resolution (smallest discernible part)		0.6 mm	0.8 mm	
Repeat accuracy		0.1 mm	0.1 mm	
Switching hysteresis		≤ 0.2 mm	≤ 0.3 mm	
Power-on indicator		Green LED	Green LED	
Output function indicator		Yellow LED	Yellow LED	
Response time		0.25 ms	2.5 ms	
Switching frequency		2 kHz	200 Hz	
Degree of protection as per IEC 60529		IP 67	IP 67	
Ambient temperature T_a		-10...+60 °C	-10...+60 °C	
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2	
Material	Housing	GD-Zn	GD-Zn	
	Optical surface	Glass	Glass	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	



Ordering codes on pages 348-349.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Fork sensors BGL

50A, 80A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

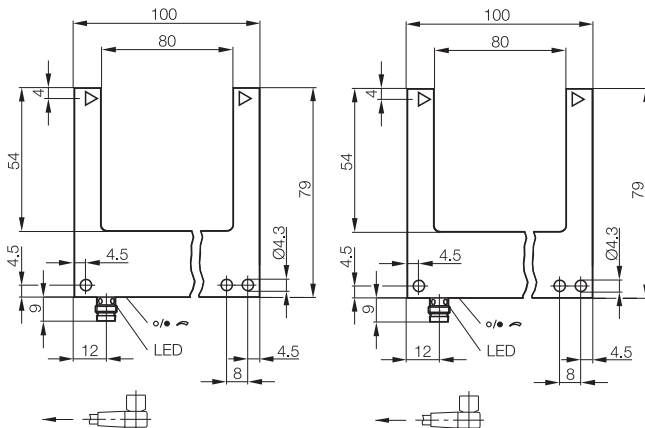
Light grids

Photoelectric distance sensors for analog distance measurement

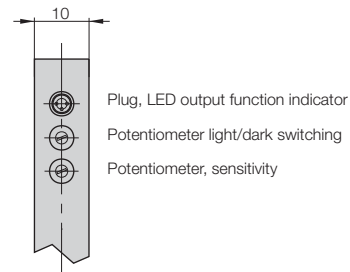
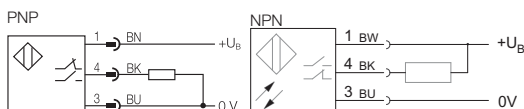
Special accessories for photoelectric sensors



BGL 80 mm 54 mm	BGL 80 mm 54 mm		
	BGL 80A-009-S49		
	BGL 80A-010-S49		
BGL 80A-011-S49			
BGL 80A-012-S49			
10...30 V DC	10...30 V DC		
≤ 35 mA	≤ 20 mA		
200 mA	200 mA		
Light/dark switching (selectable)	Light/dark switching (selectable)		
Yes/Yes	Yes/Yes		
Potentiometer, 270°	Potentiometer, 270°		
Infrared	Laser, red light		
1480 nm	650 nm		
0.8 mm	50 µm		
0.1 mm	10 µm		
≤ 0.2 mm	30 µm		
Green LED			
Yellow LED	Yellow LED		
0.25 ms	0.1 ms		
2 kHz	5 kHz		
IP 67	IP 67		
-10...+60 °C	-10...+60 °C		
EN 60947-5-2	EN 60947-5-2		
GD-Zn	GD-Zn		
Glass	Glass		
M8 connector, 3-pin	M8 connector, 3-pin		



Wiring diagram



The fork sensor BGL 21 is a photoelectric sensor using a microcontroller for the setup process and function monitoring. All the user needs to do is press a button to access all the data needed for configuring the sensor. An adjustment aid on the top and bottom of the sensor specifies the object position during configuration. The internal microcontroller monitors all settings to ensure optimum switching frequency, repeat accuracy and rejection of optical interference and ambient light.

The **BGL 21-RG** has a red and green emitter diode, which is ideal for detecting colored markings on transparent backing material. Which color of emitter light is more appropriate for the particular task is automatically determined during setup.

The **BGL 21-IR** model with an infrared emitter makes it possible to scan labels or holes on backing material.

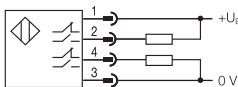
Features

- Fast, fully automatic sensor calibration
- User interface has just one button and two LEDs
- Very short response time and high repeat accuracy
- Very resistant to optical interference and ambient light
- NPN/PNP output on separate pins with overload protection
- M8 connector block can be rotated 90°
- Metal housing

Applications

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

Wiring diagram



Suitable connector

(please order separately)



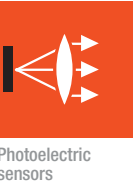
Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	2 m	BCC053Z
M8, 4-pin	Straight	PVC	Yellow	2 m	BCC0542
M8, 4-pin	Angled	PUR	Yellow	2 m	BCC050P
M8, 4-pin	Angled	PVC	Yellow	2 m	BCC050Y

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Fork sensors BGL 21



Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

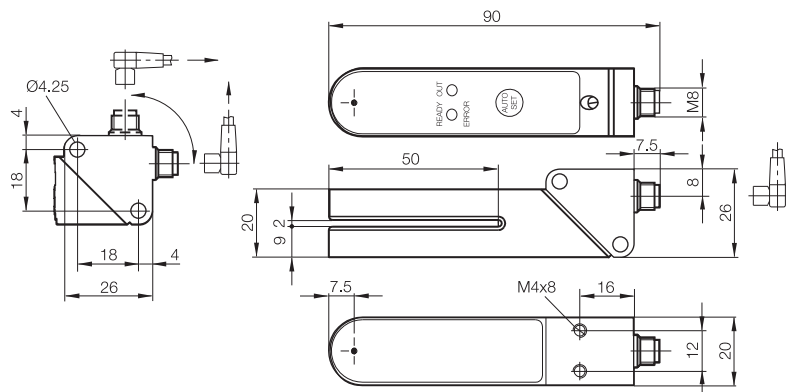
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Series	BGL		BGL
Fork opening	2 mm		2 mm
Fork depth	50 mm		50 mm
PNP/NPN	NC/NO	Part number	BGL 21-IR
Supply voltage U_B	10...30 V DC		10...30 V DC
No-load supply current I_0 max.	≤ 55 mA		≤ 55 mA
Output current	100 mA		100 mA
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Emitter, light type	Infrared		Red and green light
Wavelength	880 nm		636 nm/536 nm
Resolution (smallest discernible part)	1 mm		0.5 mm
Repeat accuracy	80 μ m		80 μ m
Switching hysteresis	≤ 0.2 mm		≤ 0.2 mm
Output function indicator	Yellow LED		Yellow LED
Power/error indicator	Green/red LED		Green/red LED
Response time	20 μ s		20 μ s
Switching frequency	25 kHz		25 kHz
Degree of protection as per IEC 60529	IP 65		IP 65
Ambient temperature T_a	-20...+60 °C		-20...+60 °C
Ambient light limit according to	EN 60947-5-2		EN 60947-5-2
Material	Housing	Anodized aluminum	Anodized aluminum
	Optical surface	Glass	Glass
Connection	M8 connector, 4-pin		M8 connector, 4-pin



Ordering codes on pages 348-349.



In-process correction

Thanks to their band of light, analog fork sensors not only detect objects with absolute reliability, they determine the positions of the objects with extreme precision as well. This makes readjustment in an ongoing process a snap. Process reliability and product quality increase significantly – and more efficiency is a welcome side effect.

Technical highlights

- Analog signal proportional to the skin depth of the object
- Constant value, even in the event of height variations
- High degree of soiling resistance and compensation
- Fieldbus connection with IO-Link
- Ideal for web edge control



Integral air rinsing nozzle to prevent dust from accumulating on the emitter and receiver optics. Simple connection via standard pneumatic system.



Photoelectric Special Sensors

Analog fork sensors BGL_C

Product overview



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

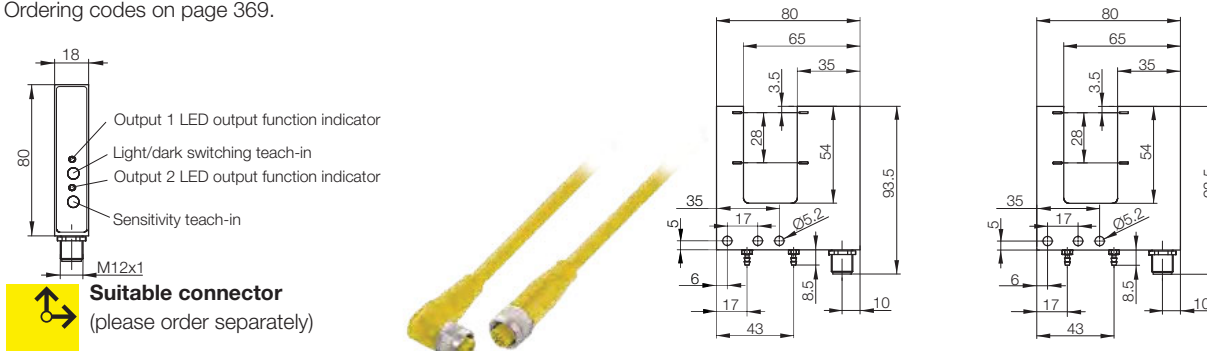
Special accessories for photoelectric sensors

Type		Fork opening	Resolution	Light type		Output						Switching type		Switching frequency	U _S	Connection	Page
				Red light		0-10 V	4-20 mA	1× PNP	1× NPN	2× PNP	2× NPN	Light switching	Dark switching		18 ...30V DC	M12 plug, 4-pin	
 Fork sensors																	
BGL002Z	BGL 30C-001-S4	30 mm	80 µm	■						■		■	■	500 Hz	■	■	370
BGL0030	BGL 30C-002-S4	30 mm	80 µm	■							■	■	■	500 Hz	■	■	370
BGL0031	BGL 30C-003-S4	30 mm	80 µm	■			■	■				■	■	500 Hz	■	■	370
BGL0032	BGL 30C-004-S4	30 mm	80 µm	■			■		■			■	■	500 Hz	■	■	370
BGL0033	BGL 30C-005-S4	30 mm	80 µm	■		■		■				■	■	500 Hz	■	■	371
BGL0034	BGL 30C-006-S4	30 mm	80 µm	■		■						■	■	500 Hz	■	■	371
BGL0037	BGL 50C-001-S4	50 mm	80 µm	■						■		■	■	500 Hz	■	■	371
BGL0038	BGL 50C-002-S4	50 mm	80 µm	■							■	■	■	500 Hz	■	■	371
BGL0039	BGL 50C-003-S4	50 mm	80 µm	■			■	■				■	■	500 Hz	■	■	371
BGL003A	BGL 50C-004-S4	50 mm	80 µm	■			■		■			■	■	500 Hz	■	■	371
BGL003C	BGL 50C-005-S4	50 mm	80 µm	■		■		■				■	■	500 Hz	■	■	371
BGL003E	BGL 50C-006-S4	50 mm	80 µm	■		■			■			■	■	500 Hz	■	■	371



Series				BGL	BGL	
Fork opening				30 mm	30 mm	
Fork depth				54 mm	54 mm	
PNP	2 switching outputs	NC/NO	Part number	BGL 30C-001-S4		
NPN			Part number	BGL 30C-002-S4		
PNP	1 analog and	NC/NO	Part number		BGL 30C-003-S4	
NPN	1 switching/error output		Part number		BGL 30C-004-S4	
Supply voltage U _B				18...30 V DC	18...30 V DC	
No-load supply current I ₀ max.				≤ 20 mA	≤ 20 mA	
Output current				100 mA	100 mA	
Analog output					4...20 mA	
Switching type				Light/dark switching (selectable)	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected				Yes/Yes	Yes/Yes	
Settings				Teach-in	Teach-in	
Emitter, light type				Red light	Red light	
Wavelength				633 nm	633 nm	
Resolution (smallest discernible part)				≤ 80 μm	≤ 80 μm	
Repeat accuracy				0.15 mm	0.15 mm	
Switching hysteresis				< 0.4 mm	< 0.4 mm	
Output function indicator				2× Yellow LEDs	2× Yellow LEDs	
Response time				2 ms	2 ms	
Switching frequency				500 Hz	500 Hz	
Measurement field length				28 mm	28 mm	
Degree of protection as per IEC 60529				IP 65	IP 65	
Ambient temperature T _a				−5...+55°C	−5...+55°C	
Ambient light limit according to				EN 60947-5-2	EN 60947-5-2	
Material		Housing	Anodized aluminum	Anodized aluminum		
		Optical surface	PMMA	PMMA		
Connection				M12 connector, 4-pin	M12 connector, 4-pin	

Ordering codes on page 369.



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Analog fork sensors BGL_C

30C, 50C



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

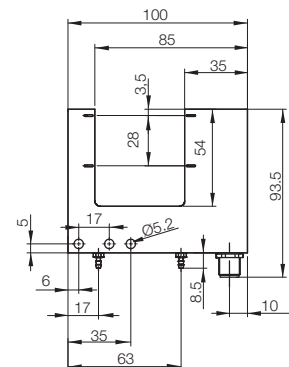
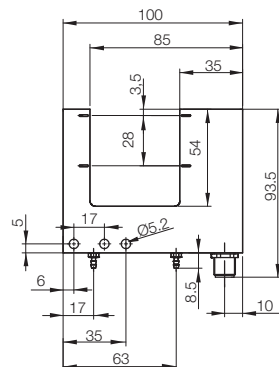
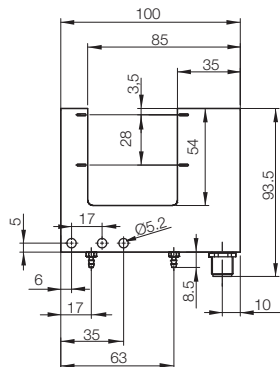
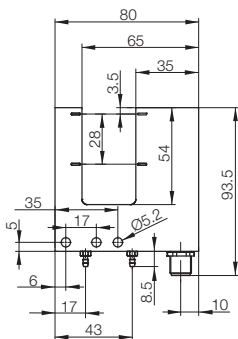
sensors for analog

distance measurement

Special accessories for

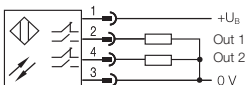
photoelectric sensors

BGL 30 mm 54 mm	BGL 50 mm 54 mm	BGL 50 mm 54 mm	BGL 50 mm 54 mm
	BGL 50C-001-S4		
	BGL 50C-002-S4		
BGL 30C-005-S4		BGL 50C-003-S4	BGL 50C-005-S4
BGL 30C-006-S4		BGL 50C-004-S4	BGL 50C-006-S4
18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
100 mA	100 mA	100 mA	100 mA
0...10 V DC		4...20 mA	0...10 V DC
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Teach-in	Teach-in	Teach-in	Teach-in
Red light	Red light	Red light	Red light
633 nm	633 nm	633 nm	633 nm
≤ 80 μm	≤ 80 μm	≤ 80 μm	≤ 80 μm
0.15 mm	0.15 mm	0.15 mm	0.15 mm
< 0.4 mm	< 0.4 mm	< 0.4 mm	< 0.4 mm
2× Yellow LEDs	2× Yellow LEDs	2× Yellow LEDs	2× Yellow LEDs
2 ms	2 ms	2 ms	2 ms
500 Hz	500 Hz	500 Hz	500 Hz
28 mm	28 mm	28 mm	28 mm
IP 65	IP 65	IP 65	IP 65
-5...+55°C	-5...+55°C	-5...+55°C	-5...+55°C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

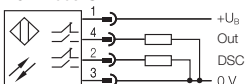


Wiring diagrams

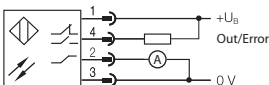
BGL... 002-S4



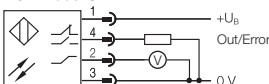
BGL... 009-S4



BGL... 004-S4



BGL... 006-S4



BWL standard angle sensors are needed whenever space is too tight for fork sensors. The design and beam geometry allow objects to be approached and scanned from almost any direction, while red light and laser variants ensure versatile use.

Applications

- Assembly and handling technology
- Robotic systems
- Position and location control

Benefits

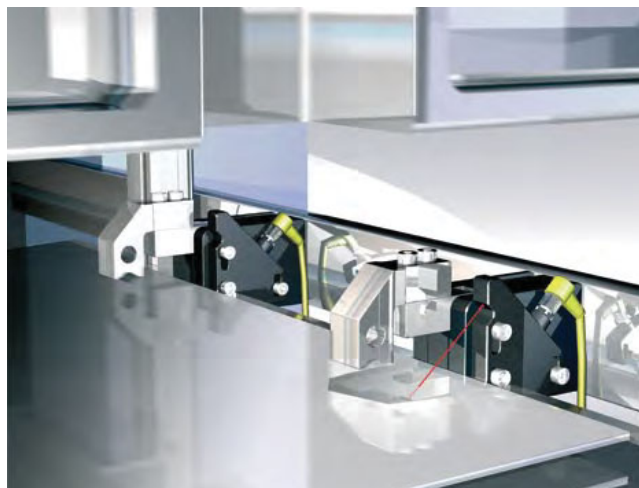
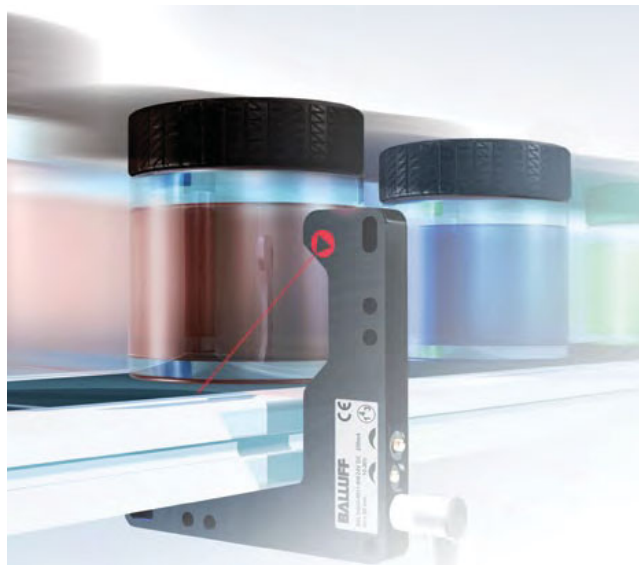
- High accuracy
- Visible light spot for easy alignment
- Can be installed even in tight mounting conditions

The Balluff angle sensor **BWL Robust** is a powerful photoelectric sensor designed for harsh industrial use. Its housing is tough and allows for variable mounting options. Objects are reliably detected, even under extremely difficult conditions.

A strong infrared emitter ensures a large function reserve and various designs allow for flexible use, allowing the creation of elegant solutions for a vast number of applications.

Applications

- Robotic systems
- Position and location control



Type

Ordering code

Part number



Angle sensors
Standard

Type		Optical axis	Resolu- tion	Light type				Output		Switching type		Switch- ing fre- quency	U _s 10...30 V DC	Conne- ction		Page
				Infrared	Red light	Red light, pin point	Laser	PNP	NPN	Light switching	Dark switching			M8 plug, 3-pin	M12 connector, 4-pin	
BWL000F	BWL 4040D-R011-S49	40/40 mm	0.4 mm		■			■		■	■	1.5 kHz	■	■		374
BWL000H	BWL 4040D-R012-S49	40/40 mm	0.4 mm		■				■	■	■	1.5 kHz	■	■		374
BWL000J	BWL 4040D-R013-S49	40/40 mm	0.3 mm			■		■		■	■	5 kHz	■	■		376
BWL000K	BWL 4040D-R014-S49	40/40 mm	0.3 mm			■			■	■	■	5 kHz	■	■		376
BWL0009	BWL 4040D-I011-S49	40/40 mm	1.0 mm	■				■		■	■	2 kHz	■	■		378
BWL000A	BWL 4040D-I012-S49	40/40 mm	1.0 mm	■						■	■	2 kHz	■	■		378
BWL000C	BWL 4040D-L011-S49	40/40 mm	80 µm				■	■		■	■	5 kHz	■	■		380
BWL000E	BWL 4040D-L012-S49	40/40 mm	80 µm				■		■	■	■	5 kHz	■	■		380

Photoelectric Special Sensors

Angle sensors BWL

Product overview



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Special accessories for photoelectric sensors

Special accessories for photoelectric sensors

Special accessories for photoelectric sensors

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Special accessories for photoelectric sensors

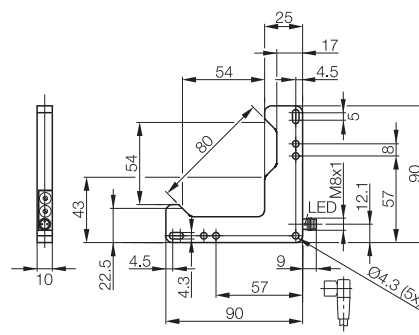
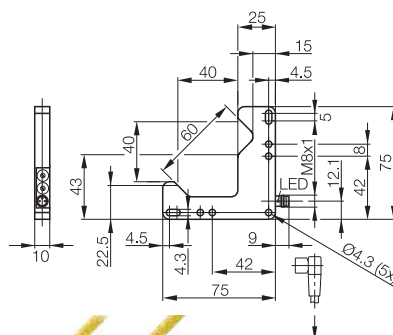
Type		Optical axis	Resolu- tion	Light type				Output		Switching type		Switch- ing fre- quency	U _S	Connec- tion		Page
				Infrared	Red light	Red light, pin point	Laser	PNP	NPN	Light switching	Dark switching			10...30 V DC	M8 plug, 3-pin	
Angle sensors Standard																
BWL000R	BWL 5454D-R011-S49	54/54 mm	0.4 mm		■			■		■	■	1.5 kHz	■	■		374
BWL000T	BWL 5454D-R012-S49	54/54 mm	0.4 mm		■				■	■	■	1.5 kHz	■	■		374
BWL000U	BWL 5454D-R013-S49	54/54 mm	0.4 mm			■		■		■	■	5 kHz	■	■		376
BWL000W	BWL 5454D-R014-S49	54/54 mm	0.4 mm			■			■	■	■	5 kHz	■	■		376
BWL000L	BWL 5454D-I011-S49	54/54 mm	1.2 mm	■				■		■	■	2 kHz	■	■		378
BWL000M	BWL 5454D-I012-S49	54/54 mm	1.2 mm	■					■	■	■	2 kHz	■	■		378
BWL000N	BWL 5454D-L011-S49	54/54 mm	100 µm				■	■		■	■	5 kHz	■	■		380
BWL000P	BWL 5454D-L012-S49	54/54 mm	100 µm				■		■	■	■	5 kHz	■	■		380
BWL0012	BWL 6868D-R011-S49	68/68 mm	0.5 mm		■			■		■	■	1.5 kHz	■	■		375
BWL0013	BWL 6868D-R012-S49	68/68 mm	0.5 mm		■				■	■	■	1.5 kHz	■	■		375
BWL001N	BWL 6868D-R013-S49	68/68 mm	0.4 mm			■		■		■	■	5 kHz	■	■		377
BWL0014	BWL 6868D-R014-S49	68/68 mm	0.4 mm			■			■	■	■	5 kHz	■	■		377
BWL000Y	BWL 6868D-I011-S49	68/68 mm	1.5 mm	■				■		■	■	2 kHz	■	■		379
BWL000Z	BWL 6868D-I012-S49	68/68 mm	1.5 mm	■					■	■	■	2 kHz	■	■		379
BWL0010	BWL 6868D-L011-S49	68/68 mm	120 µm				■	■		■	■	5 kHz	■	■		381
BWL0011	BWL 6868D-L012-S49	68/68 mm	120 µm				■		■	■	■	5 kHz	■	■		381
BWL0019	BWL 9090D-R011-S49	90/90 mm	0.6 mm		■			■		■	■	1.5 kHz	■	■		375
BWL001A	BWL 9090D-R012-S49	90/90 mm	0.6 mm		■				■	■	■	1.5 kHz	■	■		375
BWL001C	BWL 9090D-R013-S49	90/90 mm	0.5 mm			■		■		■	■	5 kHz	■	■		377
BWL001E	BWL 9090D-R014-S49	90/90 mm	0.5 mm			■			■	■	■	5 kHz	■	■		377
BWL0015	BWL 9090D-I011-S49	90/90 mm	1.5 mm	■				■		■	■	1 kHz	■	■		379
BWL0016	BWL 9090D-I012-S49	90/90 mm	1.5 mm	■					■	■	■	1 kHz	■	■		379
BWL0017	BWL 9090D-L011-S49	90/90 mm	150 µm				■	■		■	■	5 kHz	■	■		381
BWL0018	BWL 9090D-L012-S49	90/90 mm	150 µm				■		■	■	■	5 kHz	■	■		381
BWL0005	BWL 110110D-R011-S49	110/110 mm	0.6 mm		■			■		■	■	1.5 kHz	■	■		375
BWL0006	BWL 110110D-R012-S49	110/110 mm	0.6 mm		■				■	■	■	1.5 kHz	■	■		375
BWL0007	BWL 110110D-R013-S49	110/110 mm	0.6 mm			■		■		■	■	5 kHz	■	■		377
BWL0008	BWL 110110D-R014-S49	110/110 mm	0.6 mm			■			■	■	■	5 kHz	■	■		377
BWL0001	BWL 110110D-I011-S49	110/110 mm	1.5 mm	■				■		■	■	2 kHz	■	■		379
BWL0002	BWL 110110D-I012-S49	110/110 mm	1.5 mm	■					■	■	■	2 kHz	■	■		379
BWL0003	BWL 110110D-L011-S49	110/110 mm	0.2 mm				■	■		■	■	5 kHz	■	■		381
BWL0004	BWL 110110D-L012-S49	110/110 mm	0.2 mm				■		■	■	■	5 kHz	■	■		381
Angle sensors Robust																
BWL001F	BWL 2222B-001-S4	22/22 mm			■			■			■	1 kHz	■		■	382
BWL001H	BWL 2222C-001-S4	22/22 mm			■			■			■	1 kHz	■		■	382
BWL001J	BWL 4241A-001-S4	43/43 mm			■			■			■	1 kHz	■		■	383
BWL001K	BWL 4241A-001-S49	43/43 mm			■			■			■	1 kHz	■	■		383
BWL001L	BWL 4260A-001-S4	42/62 mm			■			■			■	1 kHz	■		■	383
BWL001M	BWL 4260A-001-S49	42/62 mm			■			■			■	1 kHz	■	■		383



Series		BWL	BWL
Optical axis		40/40 mm	54/54
PNP NO/NC	Part number	BWL 4040D-R011-S49	BWL 5454D-R011-S49
NPN NO/NC	Part number	BWL 4040D-R012-S49	BWL 5454D-R012-S49
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		LED, red light	LED, red light
Wavelength		640 nm	640 nm
Resolution (smallest discernible part)		0.4 mm	0.4 mm
Repeat accuracy		40 μ m	60 μ m
Switching hysteresis		≤ 0.15 mm	≤ 0.2 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.33 ms	0.33 ms
Switching frequency		1.5 kHz	1.5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin



Ordering codes on pages 372-373.



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Angle sensors BWL

68/68 mm, 90/90 mm, 110/110 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

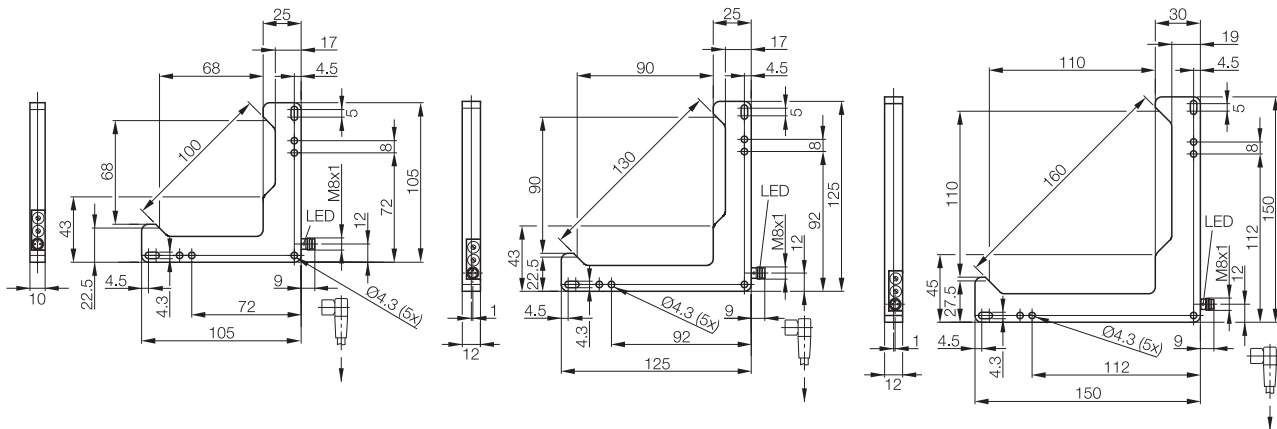
Light grids

Photoelectric distance sensors

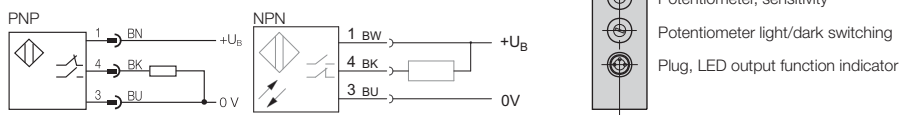
for analog distance measurement

Special accessories for photoelectric sensors

BWL 68/68 mm	BWL 90/90 mm	BWL 110/110 mm
BWL 6868D-R011-S49	BWL 9090D-R011-S49	BWL 110110D-R011-S49
BWL 6868D-R012-S49	BWL 9090D-R012-S49	BWL 110110D-R012-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
LED, red light	LED, red light	LED, red light
640 nm	640 nm	640 nm
0.5 mm	0.6 mm	0.6 mm
80 μm	80 μm	80 μm
≤ 0.2 mm	≤ 0.2 mm	≤ 0.2 mm
Yellow LED	Yellow LED	Yellow LED
0.33 ms	0.33 ms	0.33 ms
1.5 kHz	1.5 kHz	1.5 kHz
IP 67	IP 67	IP 67
-10...+60 °C	-10...+60 °C	-10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
GD-Zn	GD-Zn	GD-Zn
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram

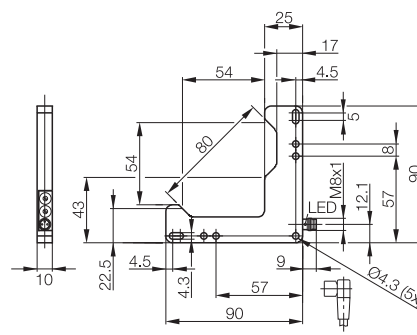
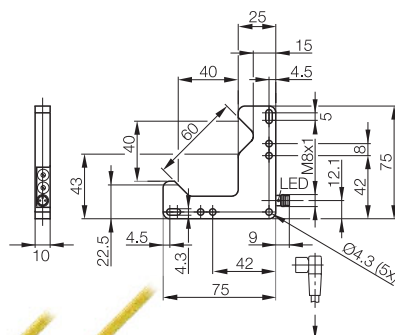




Series		BWL	BWL
Optical axis		40/40 mm	54/54
PNP NO/NC	Part number	BWL 4040D-R013-S49	BWL 5454D-R013-S49
NPN NO/NC	Part number	BWL 4040D-R014-S49	BWL 5454D-R014-S49
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Red light, pin point	Red light, pin point
Wavelength		640 nm	640 nm
Resolution (smallest discernible part)		0.3 mm	0.4 mm
Repeat accuracy		30 μ m	40 μ m
Switching hysteresis		≤ 0.1 mm	≤ 0.15 mm
Output function indicator		Yellow LED	Yellow LED
Response time		0.1 ms	0.1 ms
Switching frequency		5 kHz	5 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin



Ordering codes on pages 372-373.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Angle sensors BWL

68/68 mm, 90/90 mm, 110/110 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

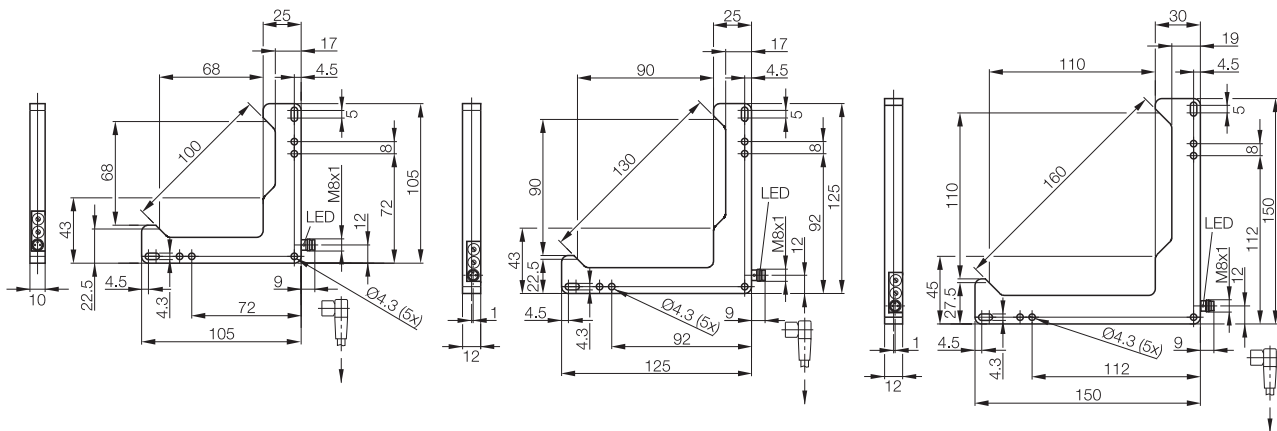
Light grids

Photoelectric distance sensors

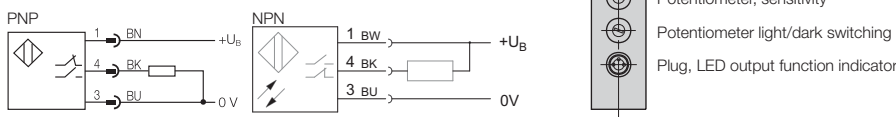
sensors for analog distance measurement

Special accessories for photoelectric sensors

BWL 68/68 mm	BWL 90/90 mm	BWL 110/110 mm
BWL 6868D-R013-S49	BWL 9090D-R013-S49	BWL 110110D-R013-S49
BWL 6868D-R014-S49	BWL 9090D-R014-S49	BWL 110110D-R014-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Red light, pin point	Red light, pin point	Red light, pin point
640 nm	640 nm	640 nm
0.4 mm	0.5 mm	0.6 mm
40 μm	50 μm	60 μm
≤ 0.15 mm	≤ 0.15 mm	≤ 0.2 mm
Yellow LED	Yellow LED	Yellow LED
0.1 ms	0.1 ms	0.1 ms
5 kHz	5 kHz	5 kHz
IP 67	IP 67	IP 67
-10...+60 °C	-10...+60 °C	-10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
GD-Zn	GD-Zn	GD-Zn
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram

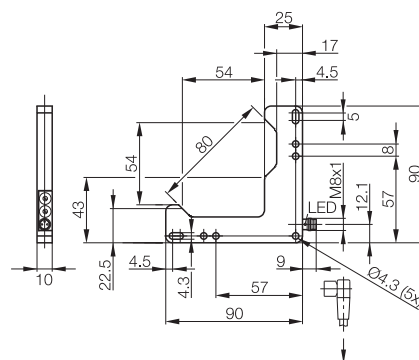
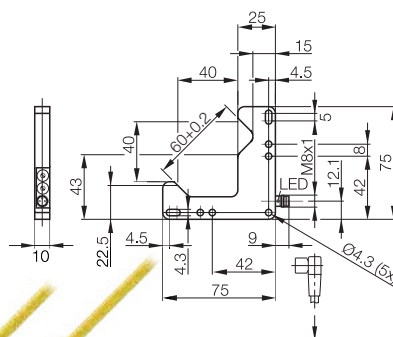




Series		BWL	BWL
Optical axis		40/40 mm	54/54
PNP NO/NC	Part number	BWL 4040D-I011-S49	BWL 5454D-I011-S49
NPN NO/NC	Part number	BWL 4040D-I012-S49	BWL 5454D-I012-S49
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		200 mA	200 mA
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Settings		Potentiometer, 270°	Potentiometer, 270°
Emitter, light type		Infrared	Infrared
Wavelength		880 nm	880 nm
Resolution (smallest discernible part)		1 mm	1.2 mm
Repeat accuracy		0.12 mm	0.15 mm
Switching hysteresis		≤ 0.3 mm	≤ 0.4 mm
Operating function indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Response time		0.25 ms	0.25 ms
Switching frequency		2 kHz	2 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	GD-Zn	GD-Zn
	Optical surface	Glass	Glass
Connection		M8 connector, 3-pin	M8 connector, 3-pin



Ordering codes on pages 372-373.



Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	5 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC0558

Connectors without LED are suitable for PNP and NPN sensors.

Photoelectric Special Sensors

Angle sensors BWL

68/68 mm, 90/90 mm, 110/110 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

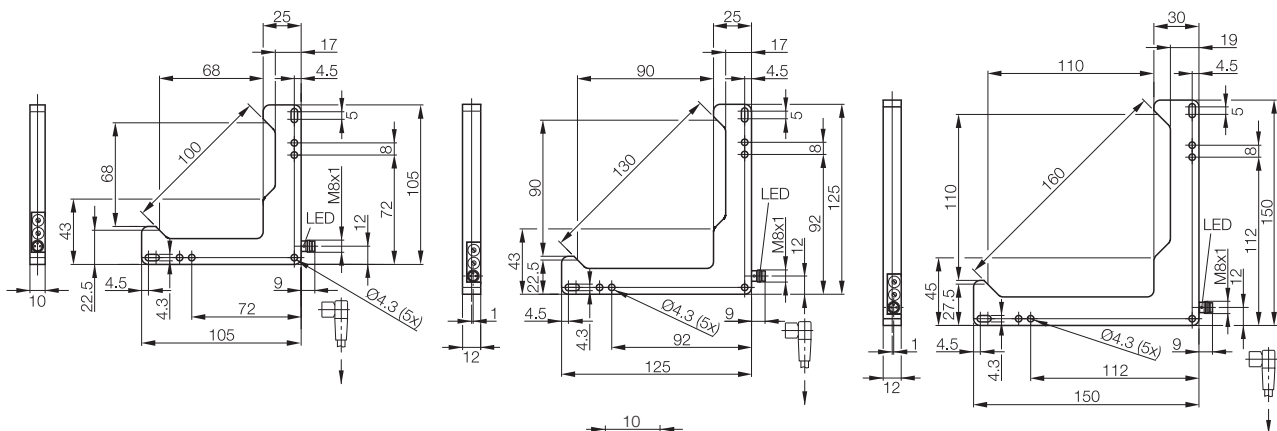
Dynamic optical windows

Light grids

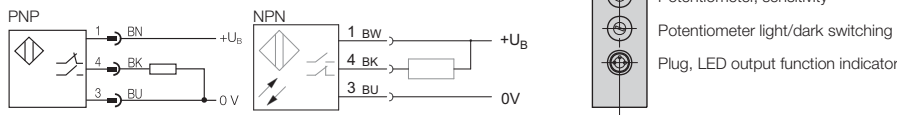
Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

BWL 68/68 mm	BWL 90/90 mm	BWL 110/110 mm
BWL 6868D-I011-S49	BWL 9090D-I011-S49	BWL 110110D-I011-S49
BWL 6868D-I012-S49	BWL 9090D-I012-S49	BWL 110110D-I012-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 35 mA	≤ 35 mA	≤ 35 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Infrared	Infrared	Infrared
880 nm	880 nm	880 nm
1.5 mm	1.5 mm	1.5 mm
0.2 mm	0.2 mm	0.2 mm
≤ 0.5 mm	≤ 0.5 mm	≤ 0.5 mm
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
0.25 ms	0.33 ms	0.25 ms
2 kHz	1 kHz	2 kHz
IP 67	IP 67	IP 67
-10...+60 °C	-10...+60 °C	-10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
GD-Zn	GD-Zn	GD-Zn
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram



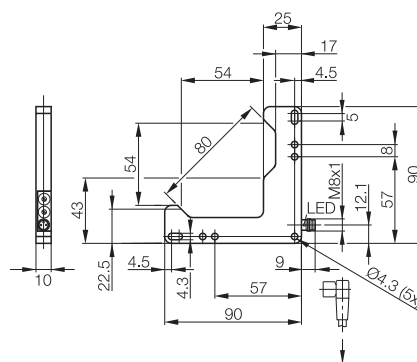
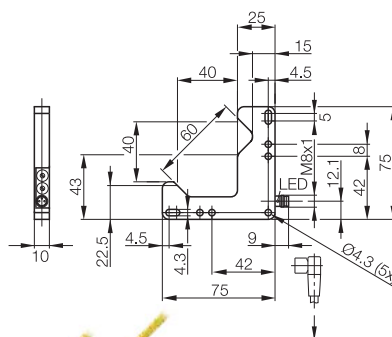


Series		BWL	BWL	
Optical axis		40/40 mm	54/54 mm	
PNP NO/NC	Part number	BWL 4040D-L011-S49	BWL 5454D-L011-S49	
NPN NO/NC	Part number	BWL 4040D-L012-S49	BWL 5454D-L012-S49	
Supply voltage U _B		10...30 V DC	10...30 V DC	
No-load supply current I ₀ max.		≤ 20 mA	≤ 20 mA	
Output current		200 mA	200 mA	
Switching type		Light/dark switching (selectable)	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes	
Settings		Potentiometer, 270°	Potentiometer, 270°	
Emitter, light type		Laser, red light	Laser	
Wavelength		640 nm	640 nm	
Laser class		1	1	
Resolution (smallest discernible part)		80 μm	100 μm	
Repeat accuracy		≤ 10 μm	10 μm	
Switching hysteresis		≤ 25 μm	≤ 35 μm	
Output function indicator		Yellow LED	Yellow LED	
Response time		0.1 ms	0.1 ms	
Switching frequency		5 kHz	5 kHz	
Degree of protection as per IEC 60529		IP 67	IP 67	
Ambient temperature T _a		−10...+60 °C	−10...+60 °C	
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2	
Material	Housing	GD-Zn	GD-Zn	
	Optical surface	Glass	Glass	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	



Connector orientation

Ordering codes on pages 372-373.



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC055C
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055S

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Special Sensors

Angle sensors BWL

68/68 mm, 90/90 mm, 110/110 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

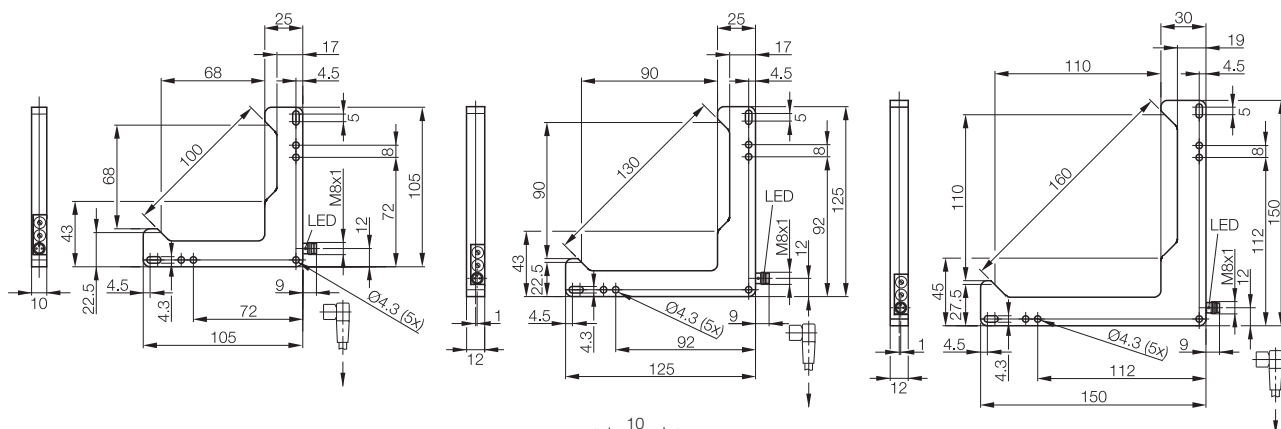
Light grids

Photoelectric distance sensors

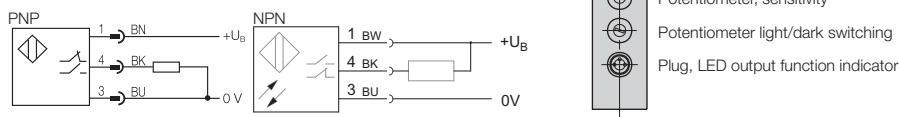
sensors for analog distance measurement

Special accessories for photoelectric sensors

BWL 68/68 mm	BWL 90/90 mm	BWL 110/110 mm
BWL 6868D-L011-S49	BWL 9090D-L011-S49	BWL 110110D-L011-S49
BWL 6868D-L012-S49	BWL 9090D-L012-S49	BWL 110110D-L012-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 20 mA	≤ 20 mA	≤ 20 mA
200 mA	200 mA	200 mA
Light/dark switching (selectable)	Light/dark switching (selectable)	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes
Potentiometer, 270°	Potentiometer, 270°	Potentiometer, 270°
Laser	Laser	Laser
640 nm	640 nm	640 nm
1	1	1
120 μm	150 μm	0.2 mm
≤ 15 μm	≤ 15 μm	≤ 20 μm
≤ 40 μm	≤ 50 μm	≤ 70 μm
Yellow LED	Yellow LED	Yellow LED
0.1 ms	0.1 ms	0.1 ms
5 kHz	5 kHz	5 kHz
IP 67	IP 67	IP 67
-10...+60 °C	-10...+60 °C	-10...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
GD-Zn	GD-Zn	GD-Zn
Glass	Glass	Glass
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram



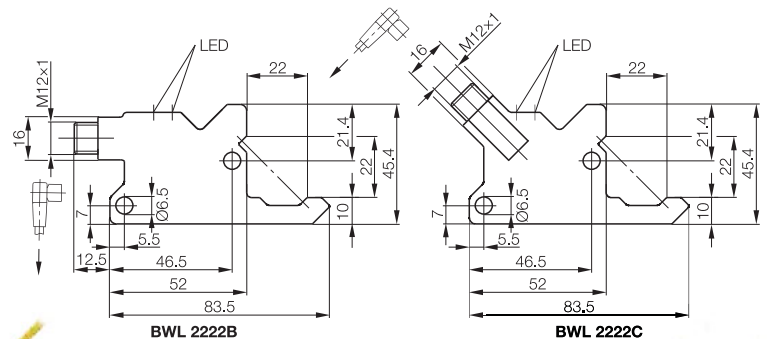


Series		BWL	BWL
Optical axis		22/22 mm	22/22 mm
PNP NO/NC	Part number	BWL 2222B-001-S4	BWL 2222C-001-S4
NPN NO/NC	Part number	BWL 2222B-002-S4	BWL 2222C-002-S4
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
Output current		≤ 200 mA	≤ 200 mA
Switching type		Dark switching	Dark switching
Polarity reversal/short-circuit protected		Yes/Yes	Yes/Yes
Emitter, light type		Infrared	Infrared
Wavelength		880 nm	880 nm
Power-on indicator		Green LED	Green LED
Output function indicator		Yellow LED	Yellow LED
Ready delay		100 ms	100 ms
Response time		≤ 0.5 ms	≤ 0.5 ms
Switching frequency		1 kHz	1 kHz
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature T_a		-10...+60 °C	-10...+60 °C
Ambient light limit according to		EN 60947-5-2	EN 60947-5-2
Material	Housing	Corrosion-resistant steel	Corrosion-resistant steel
	Optical surface	PMMA	PMMA
Connection		M12 connector, 4-pin	M12 connector, 4-pin



Connector orientation

Ordering codes on pages 372-373.



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Connectors without LED are suitable for PNP and NPN sensors.

43/43 mm, 42/62 mm



The ideal use for dynamic optical windows BOW is when objects do not just have to be scanned in some places, but throughout an entire area (window) instead. Thanks to their multitude of beams arranged in parallel, they can detect objects in a broad window. A constant, high resolution is ensured at each location in the window in the process.

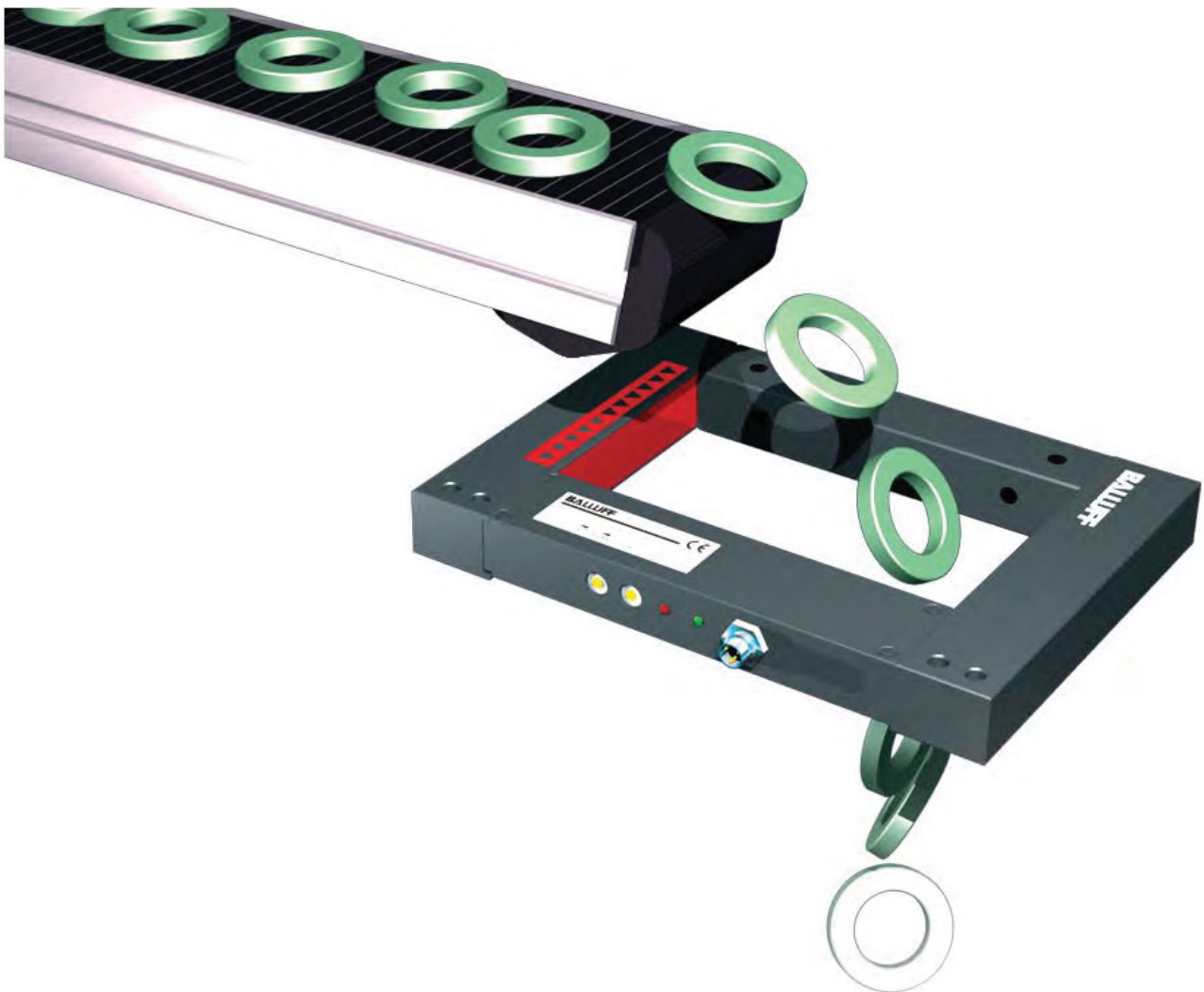
BOW sensors are dynamic, which means that parts are detected in the active area when they are moving.

Features

- Constant, high resolution
- Dynamic operation
- Only moving objects are detected, so feed trays and the like do not affect the measurement
- Detects small parts down to 1 mm
- Adjustable output signal length
- Adjustable sensitivity
- Three window sizes
- Standard M8 connector

Applications

- Compressed air feeding of small parts
- Thread break monitoring
- Eject monitoring
- Counting/separating parts



Photoelectric Special Sensors

Dynamic optical windows BOW

Product overview

Type

■ Ordering code
■ Part number

Dynamic optical windows		Active area	Resolution	Light type		Output		Switching type		Principle	U _s	Conne- tion	Page
				Infrared		PNP	NPN	Dark switching		Dynamic	10...30 V DC	M8 plug, 3-pin	
	Dynamic optical windows												
BOW001A	BOW A-0408-PS-C-S49	40×80 mm	1 mm	■		■		■		■	■	■	386
BOW001J	BOW A-0808-PS-C-S49	80×80 mm	1 mm	■		■		■		■	■	■	387
BOW0012	BOW A-1208-PS-C-S49	120×80 mm	1.2 mm	■		■		■		■	■	■	388
BOW0019	BOW A-0408-NS-C-S49	40×80 mm	1 mm	■			■	■		■	■	■	386
BOW002E	BOW A-0416-PS-C-S49	40×160 mm	1 mm	■		■		■		■	■	■	387
BOW0027	BOW A-0416-NS-C-S49	40×160 mm	1 mm	■			■	■		■	■	■	387
BOW001H	BOW A-0808-NS-C-S49	80×80 mm	1 mm	■			■	■		■	■	■	387
BOW002F	BOW A-0816-PS-C-S49	80×160 mm	1 mm	■		■		■		■	■	■	387
BOW0028	BOW A-0816-NS-C-S49	80×160 mm	1 mm	■			■	■		■	■	■	387
BOW001W	BOW A-1208-NS-C-S49	120×80 mm	1.2 mm	■			■	■		■	■	■	388
BOW002H	BOW A-1216-PS-C-S49	120×160 mm	1.2 mm	■		■		■		■	■	■	389
BOW0029	BOW A-1216-NS-C-S49	120×160 mm	1.2 mm	■			■	■		■	■	■	389
BOW002C	BOW A-1608-PS-C-S49	160×80 mm	1.5 mm	■		■		■		■	■	■	389
BOW0026	BOW A-1608-NS-C-S49	160×80 mm	1.5 mm	■			■	■		■	■	■	389
BOW002J	BOW A-1616-PS-C-S49	160×160 mm	1.5 mm	■		■		■		■	■	■	389
BOW002A	BOW A-1616-NS-C-S49	160×160 mm	1.5 mm	■			■	■		■	■	■	389



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

sensors for analog distance measurement

Special accessories for photoelectric sensors

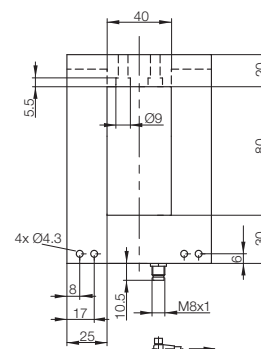
Photoelectric Special Sensors
Dynamic optical windows BOW
 40×80 mm, 40×160 mm

Dynamic Optical Window



Series	BOW	
Active area	40×80 mm	
PNP NC/NO	Part number	BOW A-0408-PS-C-S49
NPN NC/NO	Part number	BOW A-0408-NS-C-S49
Supply voltage U_B	10...30 V DC	
No-load supply current I_0 max.	≤ 40 mA	
Output current	200 mA	
Switching type	Dark switching	
Polarity reversal/short-circuit protected	Yes/Yes	
Settings	2× Potentiometer, 270°	
Emitter, light type	LED, infrared	
Wavelength	880 nm	
Resolution (smallest discernible part)	1.0 mm	
Power-on indicator	Green LED	
Output function indicator	Red LED	
Turn-on delay	0.2 ms	
Signal duration for pulse stretching	10...300 ms adjustable	
Switching frequency	3...100 Hz dyn.	
Degree of protection as per IEC 60529	IP 67	
Ambient temperature T_a	-10...+55 °C	
Ambient light limit according to	EN 60947-5-2	
Material	Housing	Anodized aluminum
	Optical surface	PMMA
Connection	M8 connector, 3-pin	

Ordering codes on page 385.



Suitable connector
 (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Special Sensors

Dynamic optical windows BOW

80×80 mm, 80X160 mm, 120×80 mm, 120x160 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors

sensors for analog

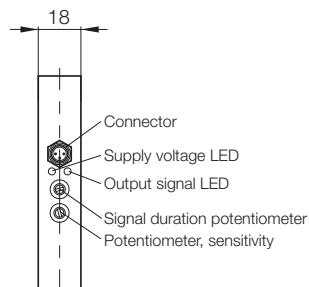
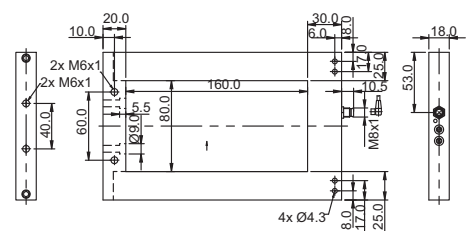
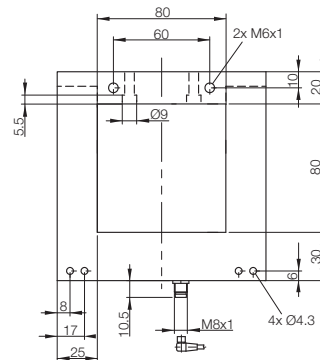
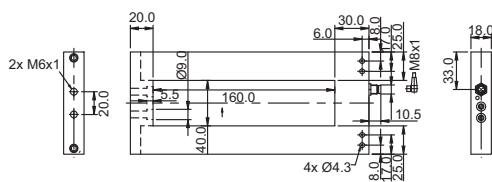
distance measurement

Special accessories for

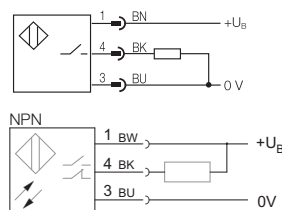
photoelectric sensors



BOW 40x160 mm	BOW 80x80 mm	BOW 80x160 mm
BOW A-0416-PS-C-S49	BOW A-0808-PS-C-S49	BOW A-0816-PS-C-S49
BOW A-0416-NS-C-S49	BOW A-0808-NS-C-S49	BOW A-0816-NS-C-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 65 mA	≤ 45 mA	≤ 75 mA
200 mA	200 mA	200 mA
Dark switching	Dark switching	Dark switching
Yes/Yes	Yes/Yes	Yes/Yes
2× Potentiometer, 270°	2× Potentiometer, 270°	2× Potentiometer, 270°
LED, infrared	LED, infrared	LED, infrared
880 nm	880 nm	880 nm
1.0 mm	1.0 mm	1.0 mm
Green LED	Green LED	Green LED
Red LED	Red LED	Red LED
0.2 ms	0.2 ms	0.2 ms
10...300 ms adjustable	10...300 ms adjustable	10...300 ms adjustable
3...100 Hz dyn.	3...100 Hz dyn.	3...100 Hz dyn.
IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum	Anodized aluminum
PMMA	PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram



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

Dynamic Optical Window



Series		BOW	
Active area		120x80 mm	
PNP NC/NO	Part number	BOW A-1208-PS-C-S49	
NPN NC/NO	Part number	BOW A-1208-NS-C-S49	
Supply voltage U _B		10...30 V DC	
No-load supply current I ₀ max.		≤ 60 mA	
Output current		200 mA	
Switching type		Dark switching	
Polarity reversal/short-circuit protected		Yes/Yes	
Settings		2× Potentiometer, 270°	
Emitter, light type		LED, infrared	
Wavelength		880 nm	
Resolution (smallest discernible part)		1.2 mm	
Power-on indicator		Green LED	
Output function indicator		Red LED	
Turn-on delay		0.2 ms	
Signal duration for pulse stretching		10...300 ms adjustable	
Switching frequency		3...100 Hz dyn	
Degree of protection as per IEC 60529		IP 67	
Ambient temperature T _a		−10...+55 °C	
Ambient light limit according to		EN 60947-5-2	
Material	Housing	Anodized aluminum	
	Optical surface	PMMA	
Connection		M8 connector, 3-pin	

Ordering codes on page 385.



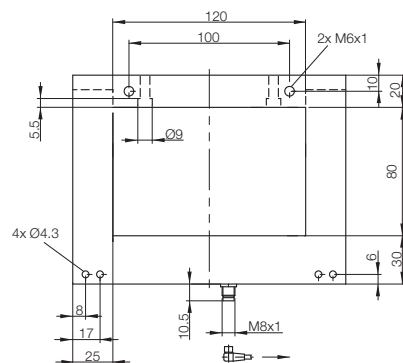
Suitable connector
(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 3-pin	Straight	PUR	Yellow	2 m	BCC050P
M8, 3-pin	Straight	PVC	Yellow	2 m	BCC050Y
M8, 3-pin	Angled	PUR	Yellow	2 m	BCC0558
M8, 3-pin	Angled	PVC	Yellow	2 m	BCC055C

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Special Sensors

Dynamic optical windows BOW

160x80 mm, 160x160 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

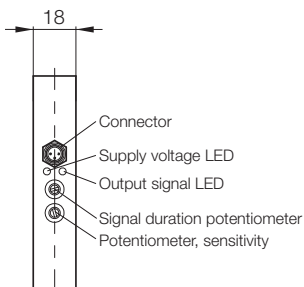
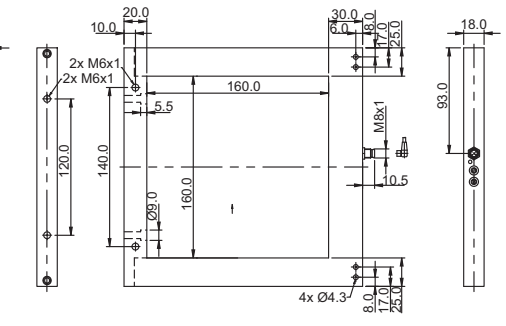
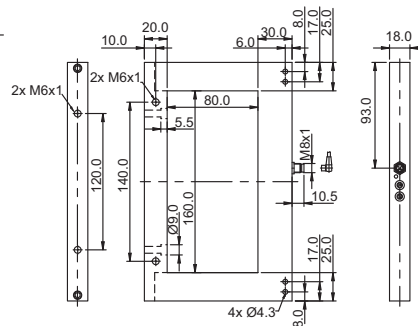
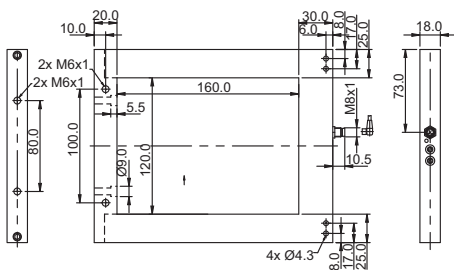
Photoelectric distance sensors

sensors for analog distance measurement

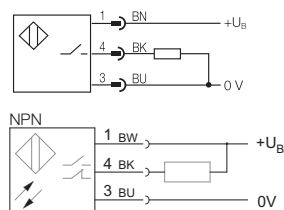
Special accessories for photoelectric sensors



BOW 120x160 mm	BOW 160x80 mm	BOW 160x160 mm
BOW A-1216-PS-C-S49	BOW A-1608-PS-C-S49	BOW A-1616-PS-C-S49
BOW A-1216-NS-C-S49	BOW A-1608-NS-C-S49	BOW A-1616-NS-C-S49
10...30 V DC	10...30 V DC	10...30 V DC
≤ 90 mA	≤ 75 mA	≤ 100 mA
200 mA	200 mA	200 mA
Dark switching	Dark switching	Dark switching
Yes/Yes	Yes/Yes	Yes/Yes
2x Potentiometer, 270°	2x Potentiometer, 270°	2x Potentiometer, 270°
LED, infrared	LED, infrared	LED, infrared
880 nm	880 nm	880 nm
1.2 mm	1.0 mm	1.0 mm
Green LED	Green LED	Green LED
Red LED	Red LED	Red LED
0.2 ms	0.2 ms	0.2 ms
10...300 ms adjustable	10...300 ms adjustable	10...300 ms adjustable
3...100 Hz dyn.	3...100 Hz dyn.	3...100 Hz dyn.
IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Anodized aluminum	Anodized aluminum	Anodized aluminum
PMMA	PMMA	PMMA
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin



Wiring diagram



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

Light grids BGL are normally used for reliably detecting wide and very large objects. BGL sensors are available in various measurement field heights of 100, 150 and 300 mm and allow both large and small ranges. Light grids with a measurement field height of 100 and 150 mm can be ordered with low or high resolution.

The light grid can be simply and quickly installed using the supplied mounting bracket. Setup and installation are user friendly and easy to accomplish.

The system features an analog voltage output for outputting the height or width of an object directly. An additional switching output indicates whether the object is within the monitored range.

Features

- Easy to connect
- Easy to install
- Ready for operation immediately
- No cumbersome configuration of parameters
- Ranges 150 mm...2.1 m
- Measurement field heights 100, 150, 300 mm
- Analog output

Applications

- Counting parts
- Height measurement and height checking
- Presence verification
- Slack and position checking
- Pallet checking
- Web monitoring
- Position and material monitoring



Photoelectric Special Sensors

Light grids BLG

Product overview



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Type

Ordering code

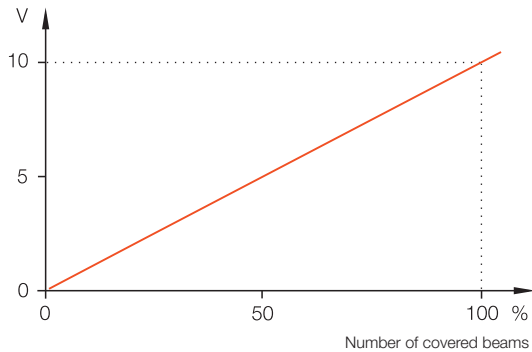
Part number



Light grids

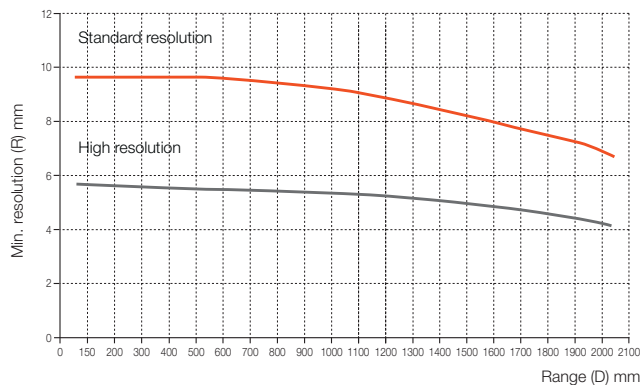
Type		Measuring field height	Range		Resolution		Light type		Output		Switching type		U _s	Conne- ction	Page
			0.15...2.1 m		5 mm	7 mm	Infrared		PNP transistor	Analog 0...10 V	Dark switching		24 V DC	M12 plug	
BLG0001	BLG 1-010-210-050-PV01-SX	100 mm	■		■		■		■	■	■		■	■	393
BLG0002	BLG 1-010-210-070-PV01-SX	100 mm	■			■	■		■	■	■		■	■	393
BLG0003	BLG 1-015-210-050-PV01-SX	150 mm	■		■		■		■	■	■		■	■	393
BLG0004	BLG 1-015-210-070-PV01-SX	150 mm	■			■	■		■	■	■		■	■	393
BLG0005	BLG 1-030-210-070-PV01-SX	300 mm	■			■	■		■	■	■		■	■	393

Analog output



Resolution diagram

Range 0.15...2.1 m

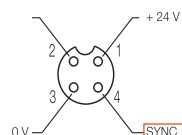
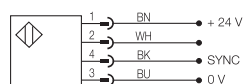


Series		
Measurement field height		
PNP	NO	Resolution 5 mm
NPN	NO	Resolution 7 mm
Supply voltage U_B		Part number
No-load supply current I_0 max.		Part number
		Emitter
		Receiver
Output current		
Switching type		
Short-circuit protected		
Analog output		
Settings		
Emitter, light type		
Wavelength		
Power-on indicator		Emitter/Receiver
Output function indicator		
Degree of protection as per IEC 60529		
Ambient temperature T_a		
Material		Housing
		Optical surface
Connection		Emitter
		Receiver

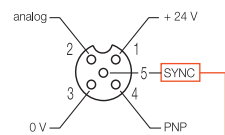
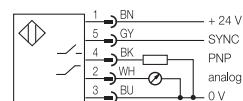
Ordering codes on page 391.

Wiring diagrams

Emitter



Receiver



Recommended accessories



Mounting bracket
(included)

You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 420.

Photoelectric Special Sensors

Light grids BLG

100 mm, 150 mm, 300 mm



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Optical fiber base units

Fiber optics

Contrast sensor

Luminescence sensor

Color sensors

Fork sensors

Angle sensors

Dynamic optical windows

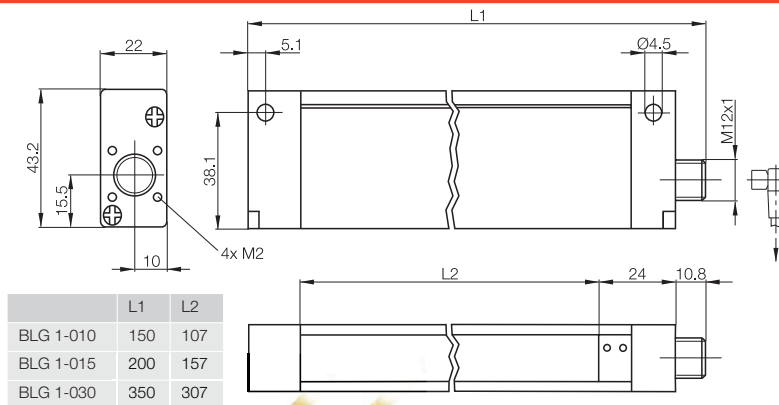
Light grids

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors



BLG 100 mm	BLG 150 mm	BLG 300 mm
BLG 1-010-210-050-PV01-SX	BLG 1-015-210-050-PV01-SX	BLG 1-030-210-070-PV01-SX
BLG 1-010-210-070-PV01-SX	BLG 1-015-210-070-PV01-SX	
24 V DC	24 V DC	24 V DC
≤ 150 mA	≤ 150 mA	≤ 150 mA
≤ 50 mA no load	≤ 50 mA no load	≤ 50 mA no load
100 mA	100 mA	100 mA
Dark switching	Dark switching	Dark switching
Yes	Yes	Yes
0...10 V	0...10 V	0...10 V
Fixed	Fixed	Fixed
LED, infrared	LED, infrared	LED, infrared
880 nm	880 nm	880 nm
Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED
IP 65	IP 65	IP 65
0...+55 °C	0...+55 °C	0...+55 °C
Black anodized aluminum	Black anodized aluminum	Black anodized aluminum
PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	Straight	PUR	Black	5 m	BCC098C
M12, 5-pin	Angled	PUR	Black	5 m	BCC08FC

Connectors without LED are suitable for PNP and NPN sensors.

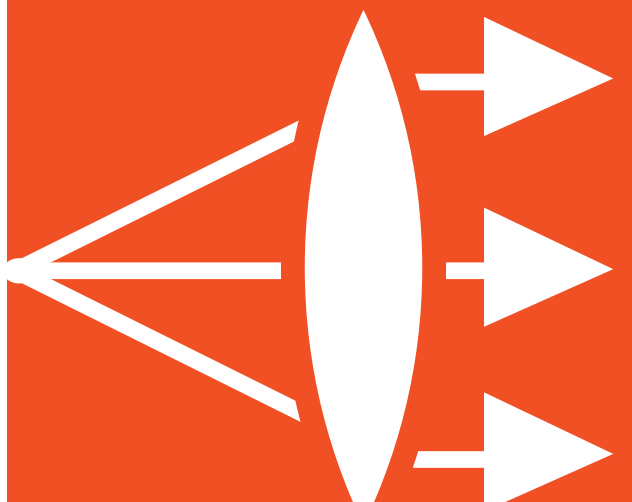
More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.



Suitable connector
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Yellow	5 m	BCC05FE
M12, 4-pin	Straight	PVC	Yellow	2 m	BCC05FF
M12, 4-pin	Angled	PUR	Yellow	2 m	BCC05TA
M12, 4-pin	Angled	PVC	Yellow	2 m	BCC05TF

Use the plug connector without an LED!



Photoelectric Sensors

Photoelectric distance sensors for analog distance measurement

Photoelectric distance sensors are used when distances to objects need to be measured or monitored or their precise position is to be determined. They support positioning tasks, material flow controls and level detections in the most diverse of applications – also across large distances.

Users have a wide range of output signals available. Depending on the type, these include analog current and voltage outputs or serial interfaces. However, variants with IO-Link are available for a simple and efficient connection to higher-level control systems.





Photoelectric Distance Sensors

Contents

Block designs

Product overview

BOD 6K

BOD 21M

BOD 26K

BOD 63M

BOD 66M

396

398

400

402

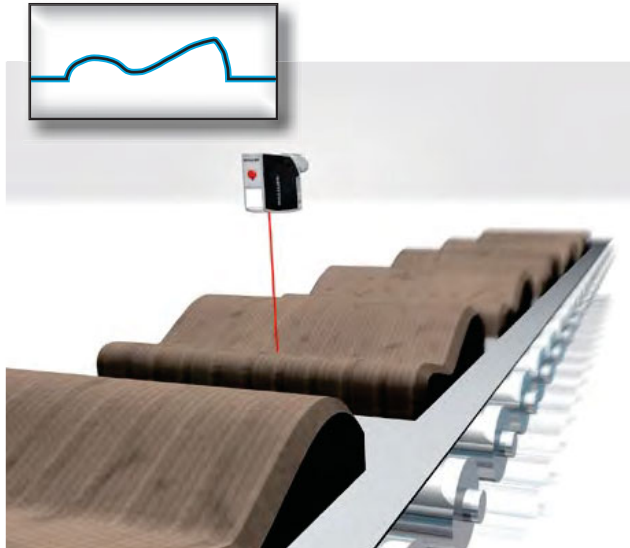
410

414



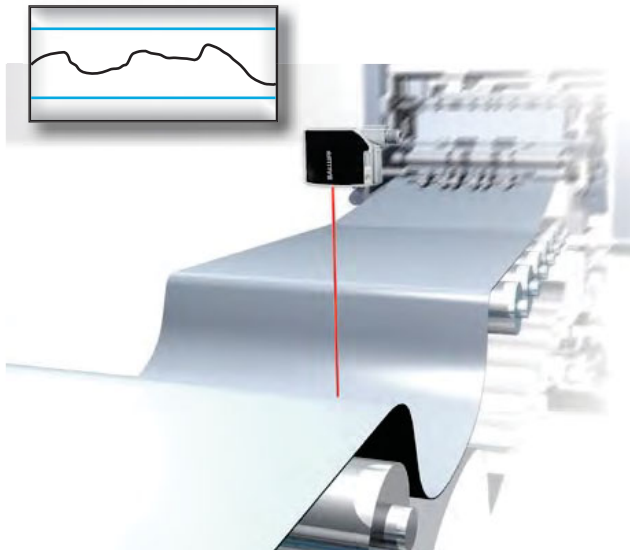
Optical distance sensors are used when distances of objects need to be measured or monitored with precise position determination. Distance measurement is based on either the triangulation principle or time of flight.

PSD elements or CCD arrays are used for the receiving elements, with the emitter consisting of a red light or laser light source. Analog current and voltage values, serial interfaces and digital outputs are available to the user.



Contour checking

Optical distance sensors continuously detect dimensions or contours on tongue and groove boards. Analog sensing detects individual defects and gradual deviations directly for permanent monitoring of the production process.

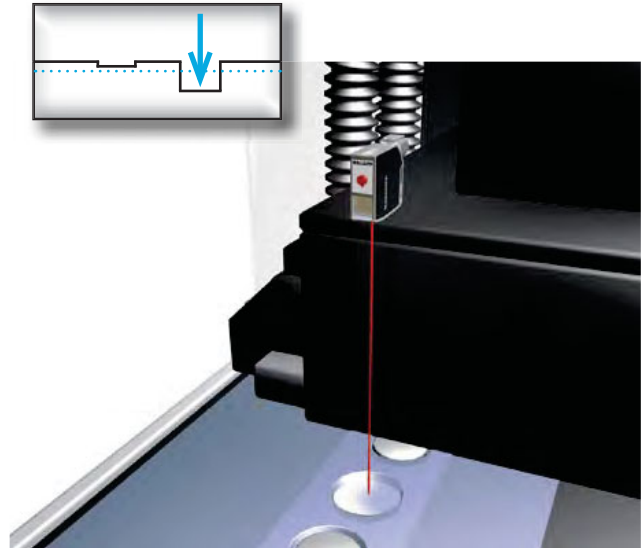


Sag monitoring

Film and web material has to be transported at a uniform speed in order to be processed with precision. Tension-free material transport succeeds using the BOD 21M, which dynamically detects the height of the sag section.

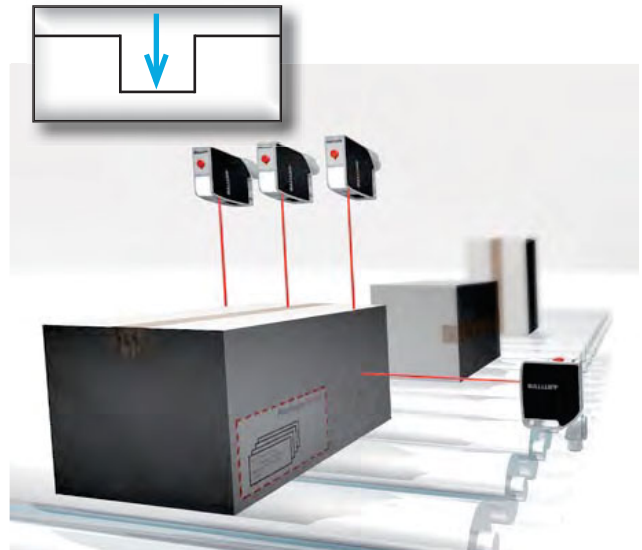
Applications

- Control tasks
- Sensing
- Object positioning
- Level detection



Blister packaging

Optical distance sensors monitor the packaging process, optimize product filling and increase system productivity. Before foil packaging is closed up, a BOD 21M checks the individual compartments and detects missing or extra items.



Adaptive feed

Multiple optical distance sensors measure components, assembled units and packages on a conveying line. BOD 21M sensors evaluate the outer dimension and contour so that these various parts can be transported to the next appropriate process steps. The rugged metal housing guarantees long service life of the installation.

Photoelectric Distance Sensors

Distance sensors BOD

Product overview

Type



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.

Ordering code

Part number



Distance sensor

BOD000H	BOD 6K-RA01-S75-C	20...80 mm	n.a.																	399
BOD000F	BOD 6K-RA01-C-02	20...80 mm	n.a.																	399
BOD000L	BOD 21M-LA01-S92	25...45 mm	30 µm																	400
BOD000P	BOD 21M-LB01-S92	25...45 mm	30 µm																	400
BOD000M	BOD 21M-LA02-S92	20...200 mm	100...200 µm																	401
BOD000R	BOD 21M-LB02-S92	20...200 mm	100...200 µm																	401
BOD000N	BOD 21M-LA04-S92	20...500 mm	100...500 µm																	401
BOD000T	BOD 21M-LB04-S92	20...500 mm	100...500 µm																	401
BOD0002	BOD 26K-LA01-S4-C	45...85 mm	80 µm																	403
BOD0001	BOD 26K-LA01-C-06	45...85 mm	80 µm																	403
BOD0004	BOD 26K-LA02-S4-C	45...85 mm	0.1% of Wh																	403
BOD0003	BOD 26K-LA02-C-06	45...85 mm	0.1% of Wh																	403
BOD0005	BOD 26K-LB04-S115-C	30...100 mm	0.1% of Wh																	405
BOD000C	BOD 26K-LBR04-S115-C	30...100 mm	0.1% of Wh																	405
BOD0006	BOD 26K-LB05-S115-C	80...300 mm	0.1% of Wh																	407
BOD000E	BOD 26K-LBR05-S115-C	80...300 mm	0.1% of Wh																	407
BOD0007	BOD 26K-LB06-S92-C	30...100 mm	0.1% of Wh																	409
BOD0008	BOD 26K-LB07-S92-C	80...300 mm	0.1% of Wh																	409
BOD000U	BOD 63M-LA02-S115	200...2000 mm	1 mm																	411
BOD0010	BOD 63M-LB02-S115	200...2000 mm	1 mm																	411
BOD0012	BOD 63M-LI06-S4	200...6000 mm	1 mm																	411
BOD000W	BOD 63M-LA04-S115	200...6000 mm	1 mm																	413
BOD0011	BOD 63M-LB04-S115	200...6000 mm	1 mm																	413
BOD0015	BOD 66M-RA01-S92-C	100...600 mm	0.5 mm																	415
BOD0016	BOD 66M-RB01-S92-C	100...600 mm	0.5 mm																	415
BOD0013	BOD 66M-LA04-S92-C	200...2000 mm	5 mm																	417
BOD0014	BOD 66M-LB04-S92-C	200...2000 mm	5 mm																	417



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Block designs

Special accessories for photoelectric sensors

Photoelectric Distance Sensors

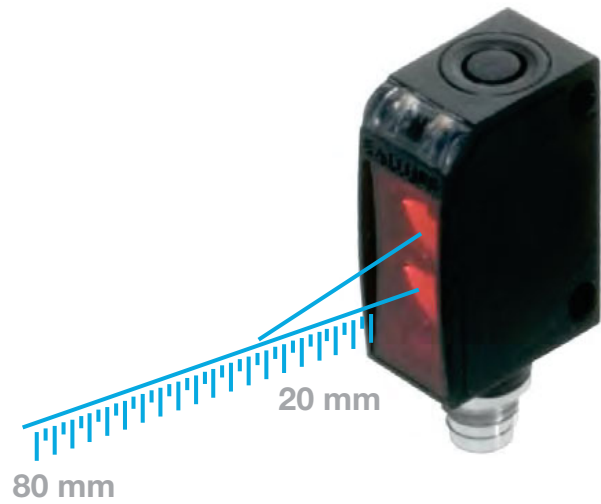
BOD 6K distance sensors

BOD 6K

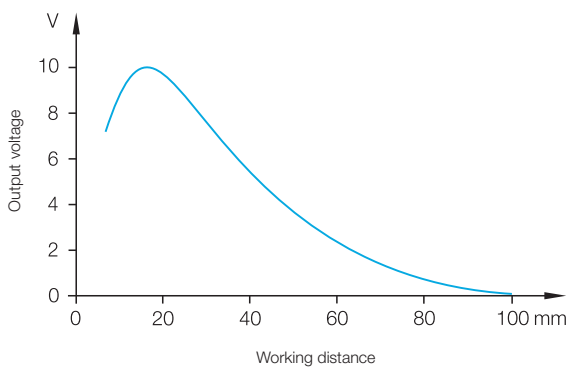
The **BOD 6K** provides a distance-proportional analog output signal with falling voltage over a fixed measuring range of 20 to 80 mm. With a switching output adjustable using teach-in, the sensor can also be used as a sensing device with background suppression.

Features

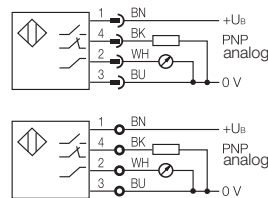
- Fixed measuring range between 20...80 mm
- Analog output 0...10 V
- Adjustable background suppression
- PNP, NO/NC switching output
- Teach-in
- Disable buttons
- Connector or cable version



Analog output BOD 6K-RA01



Wiring diagrams



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00UH



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Yellow	5 m	BCC02N5
M8, 4-pin	Angled	PUR	Yellow	5 m	BCC02NH

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Distance Sensors

BOD 6K distance sensors



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

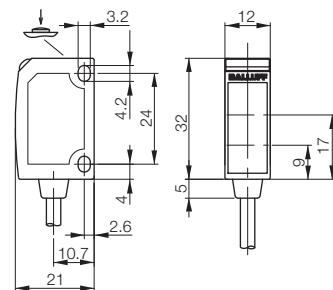
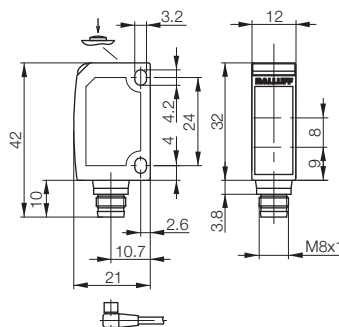
Block designs

Special accessories for photoelectric sensors

Series	BOD 6K	BOD 6K	
Working range	20...80 mm	20...80 mm	
Measuring range	60 mm	60 mm	
PNP NO/NC	Ordering code	Ordering code	
	Part number	Part number	
Supply voltage U_B	15...30 V DC	15...30 V DC	
Analog output	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)	
No-load supply current I_0 max.	≤ 30 mA at 24 V DC	≤ 30 mA at 24 V DC	
Output current	100 mA	100 mA	
Cutoff frequency	200 Hz	200 Hz	
Switching type	Light/dark switching (selectable)	Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes	Yes/Yes	
Settings	Teach-in	Teach-in	
Emitter, light type	LED, red light	LED, red light	
Wavelength	660 nm	660 nm	
Light spot diameter	5×5 mm at 60 mm	5×5 mm at 60 mm	
Power-on indicator	Green LED	Green LED	
Output function indicator	Yellow LED	Yellow LED	
Response time	0.5 ms	0.5 ms	
Switching frequency f	1 kHz	1 kHz	
Degree of protection as per IEC 60529	IP 67	IP 67	
Ambient temperature T_a	-20...+60 °C	-20...+60 °C	
Permissible ambient light	5 klx	5 klx	
Material	Housing: ABS	Housing: ABS	
	Optical surface: PMMA	Optical surface: PMMA	
Connection	M12 connector, 4-pin	2 m PVC cable, 26 AWG	

Measurement values referenced to 100×100 mm, 90% reflective Kodak gray card.

Connector orientation



BOD 21M Laser



Connector orientation

Description	Ordering code
① Mounting bracket	BAM00T9
② Mounting bracket	BAM00TA

① ②

photoelectric

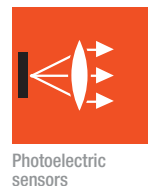
Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	Straight	PUR	Black	5 m	BCC08KP

[illegible]



Photoelectric Distance Sensors

BOD 21M laser distance sensors



BOD 21M 20...200 mm 180 mm BOD000M	BOD 21M 20...200 mm 180 mm BOD000R	BOD 21M 20...500 mm 480 mm BOD000N	BOD 21M 20...500 mm 480 mm BOD000T
BOD 21M-LA02-S92	BOD 21M-LB02-S92	BOD 21M-LA04-S92	BOD 21M-LB04-S92
18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
1...10 V (max. 3 mA)	4...20 mA	1...10 V (max. 3 mA)	4...20 mA
Teach-in (rotary switch)	Teach-in (rotary switch)	Teach-in (rotary switch)	Teach-in (rotary switch)
Light/dark switching	Light/dark switching	Light/dark switching	Light/dark switching
Laser, pulsed red light	Laser, pulsed red light	Laser, pulsed red light	Laser, pulsed red light
630 nm	630 nm	630 nm	630 nm
2	2	2	2
Ø1 mm at 200 mm	Ø1 mm at 200 mm	1×6 mm at 500 mm	1×6 mm at 500 mm
≤ 0.2 %/°K	≤ 0.2 %/°K	≤ 0.2 %/°K	≤ 0.2 %/°K
100...200 µm	100...200 µm	100...500 µm	100...500 µm
± 1 %	± 1 %	± 1% (to 200 mm) ± 3% (200...500 mm)	± 1% (to 200 mm) ± 3% (200 to 500 mm)
≤ 300 ms	≤ 300 ms	≤ 300 ms	≤ 300 ms
≤ 7 ms	≤ 7 ms	≤ 7 ms	≤ 7 ms
≤ 70 Hz	≤ 70 Hz	≤ 70 Hz	≤ 70 Hz
Green LED	Green LED	Green LED	Green LED
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67
Yes	Yes	Yes	Yes
5 klx	5 klx	5 klx	5 klx
-10...+50 °C	-10...+50 °C	-10...+50 °C	-10...+50 °C
Gd-Zn	Gd-Zn	Gd-Zn	Gd-Zn
Glass	Glass	Glass	Glass
M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin

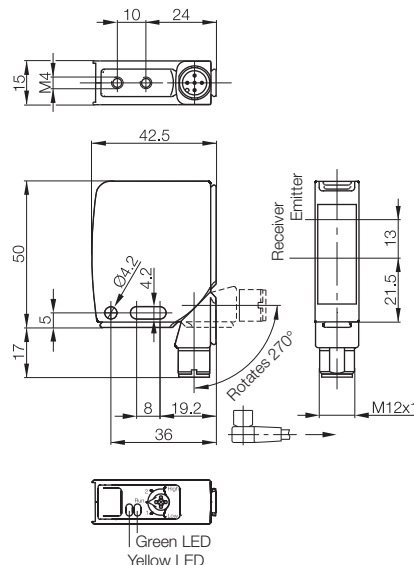
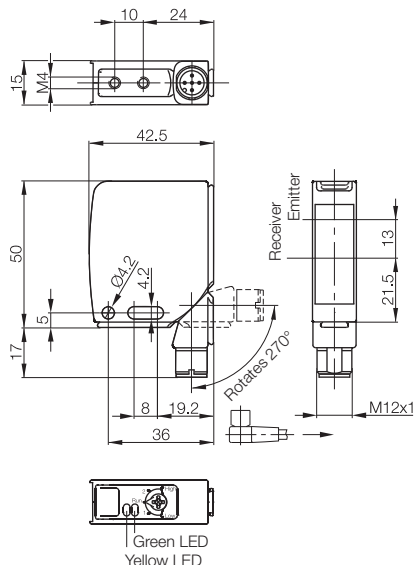
Photoelectric
standard
sensors

Photoelectric
special
sensors

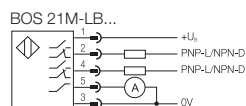
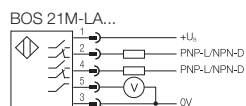
Photoelectric
distance
sensors
for analog
distance
measurement

Block
designs

Special
accessories for
photoelectric
sensors



Wiring diagrams



Photoelectric Distance Sensors

Distance sensors BOD 26K-LA Laser

BOD 26K-LA

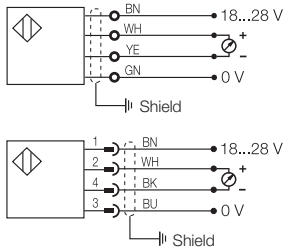
Laser

Features

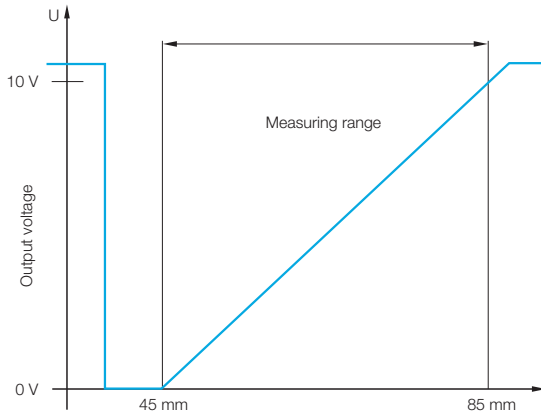
- Fixed measuring range between 45...85 mm
- Analog output 0 to 10 V
- 20 µm or 80 µm resolution
- Connector or cable version



Wiring diagrams



Analog output BOD 26K-LA0...



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00TK



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

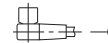


Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



Series	
Working range	
Measuring range	
Ordering code	
Part number	
Supply voltage U_B	
Analog output	
No-load supply current I_0 max.	
Output current	
Cutoff frequency	
Polarity reversal/short-circuit protected	
Settings	
Emitter, light type	
Wavelength	
Laser class	
Light spot diameter	
Temperature drift	
Resolution	
Linearity	
Power-on indicator	
Contamination indicator	
Cutoff frequency	
Rise time (from 10% to 90%)	
Fall-off time (from 90% to 10%)	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

Measured values referenced to Kodak gray card 90 % reflective.



Connector orientation



Suitable connector

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Black	5 m	BCC032L

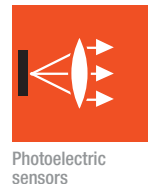
Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Distance Sensors

BOD 26K-LA laser distance sensors



BOD 26K 45...85 mm 40 mm BOD0002 BOD 26K-LA01-S4-C	BOD 26K 45...85 mm 40 mm BOD0004 BOD 26K-LA02-S4-C	BOD 26K 45...85 mm 40 mm BOD0001 BOD 26K-LA01-C-06	BOD 26K 45...85 mm 40 mm BOD0003 BOD 26K-LA02-C-06
18...28 V DC	18...28 V DC	18...28 V DC	18...28 V DC
0...10 V (max. 3 mA)	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)
≤ 35 mA	≤ 35 mA	≤ 35 mA	≤ 35 mA
100 mA	100 mA	100 mA	100 mA
200 Hz	200 Hz	200 Hz	200 Hz
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Fixed	Fixed	Fixed	Fixed
Laser, red light	Laser, red light	Laser, red light	Laser, red light
670 nm	670 nm	670 nm	670 nm
2	2	2	2
≤ 0.8 mm at 65 mm	≤ 0.8 mm at 65 mm	5×5 mm at 60 mm	5×5 mm at 60 mm
18 μm/°C	18 μm/°C	18 μm/°C	18 μm/°C
80 μm	20 μm	80 μm	20 μm
≤ 1 %	≤ 1 %	≤ 1 %	≤ 1 %
Green LED	Green LED	Green LED	Green LED
Red LED	Red LED	Red LED	Red LED
400 Hz	400 Hz	40 Hz	40 Hz
3 ms	3 ms	30 ms	30 ms
2 ms	2 ms	20 ms	20 ms
IP 67	IP 67	IP 67	IP 67
0...+45 °C	0...+45 °C	0...+45 °C	0...+45 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS
PMMA	PMMA	PMMA	PMMA
M12 connector, 4-pin	M12 connector, 4-pin	6 m PVC cable, 24 AWG	6 m PVC cable, 24 AWG

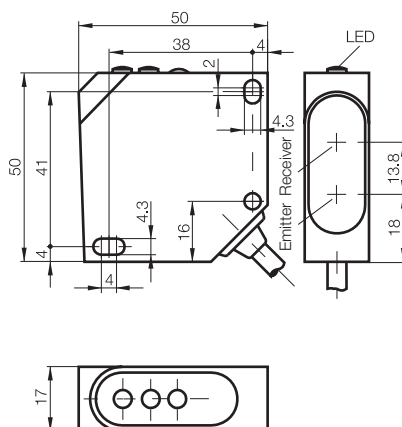
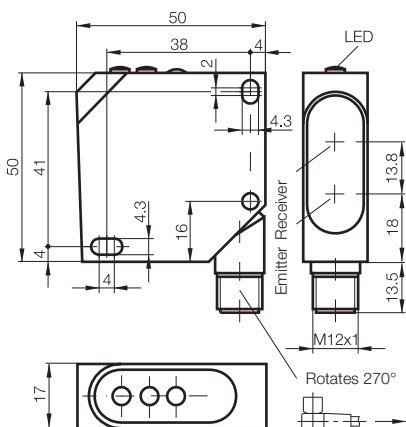
Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Block designs

Special accessories for photoelectric sensors



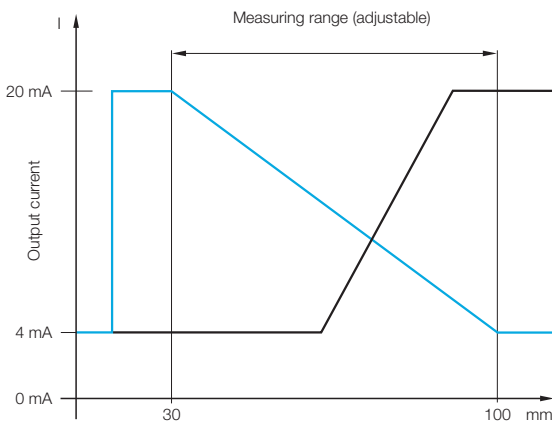
Photoelectric Distance Sensors

Distance sensors BOD 26K-LB Laser

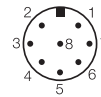
Features

- Adjustable measuring range between 30...100 mm
- Analog output 4...20 mA adjustable: Rising or falling
- Optional with RS485-interface (for master-slave-mode) and for visualization using a computer (additional software required)
- 2 switching outputs with adjustable switching points
- Teach-in
- Adjustable averaging
- Numerous additional functions

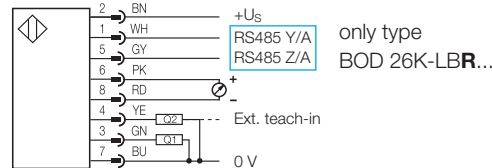
Analog output BOD 26K-LB(R)04...



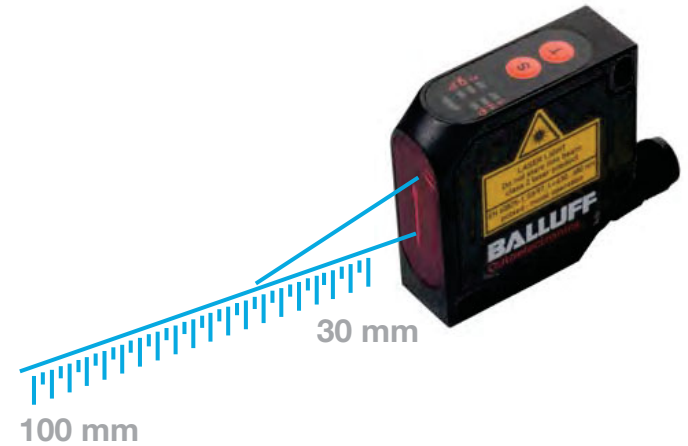
Connector diagram



Wiring diagram



BOD 26K-LB Laser



Recommended accessories (please order separately)

Description	Ordering code
Mounting bracket	BAM00TK



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

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

Suitable connector (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 8-pin	straight	PVC	Gray	5 m	BCC0995
M12, 8-pin	angled	PVC	Gray	5 m	BCC0998

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Distance Sensors

BOD 26K-LB laser distance sensors



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



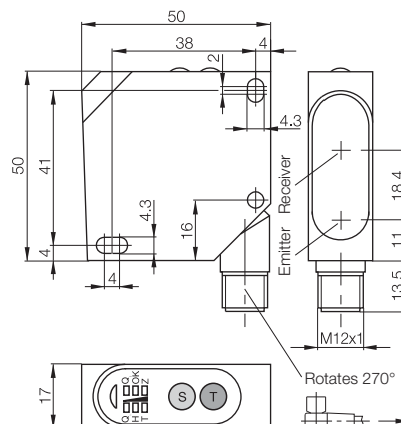
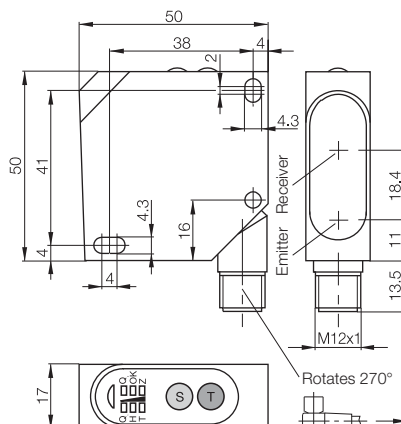
Photoelectric sensors

Series	BOD 26K	BOD 26K	Photoelectric standard sensors
Working range	30...100 mm	30...100 mm	
Measuring range	adjustable max. 70 mm	adjustable max. 70 mm	
2× PNP NO/NC	Ordering code	BOD0005	Photoelectric special sensors
	Part number	BOD 26K-LB04-S115-C	
Supply voltage U_B	18...30 V DC	18...30 V DC	Photoelectric distance sensors for analog distance measurement
Analog output	4...20 mA	4...20 mA	
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA	
Output current	100 mA	100 mA	Block designs
Switching type	Light/dark switching	Light/dark switching	
Interface		RS485	
Polarity reversal/short-circuit protected	Yes/Yes	Yes/Yes	Special accessories for photoelectric sensors
Settings	Teach-in	Teach-in	
Additional function		Master-slave mode	
Emitter, light type	Laser, red light	Laser, red light	
Wavelength	650 nm	650 nm	
Laser class	2	2	
Light spot diameter	3.25 mm at 100 mm	3.25 mm at 100 mm	
Resolution	≤ 70 μm	≤ 70 μm	
Linearity	≤ 175 μm	≤ 175 μm	
Power-on indicator	Green LED	Green LED	
Output function indicator	Yellow LED	Yellow LED	
Switching frequency	1 kHz	1 kHz	
Time function	50 ms pulse extension	50 ms pulse extension	
Degree of protection as per IEC 60529	IP 67	IP 67	
Ambient temperature T_a	-10...+60 °C	-10...+60 °C	
Permissible ambient light	EN 60947-5-2	EN 60947-5-2	
Material	Housing: Impact-resistant ABS	Housing: Impact-resistant ABS	
	Optical surface: PMMA	Optical surface: PMMA	
Connection	M12 connector, 8-pin	M12 connector, 8-pin	

Measured values referenced to Kodak gray card 90% reflective.



Connector orientation



For more information, visit us online!



Photoelectric Distance Sensors

BOD 26K-LB laser distance sensors



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



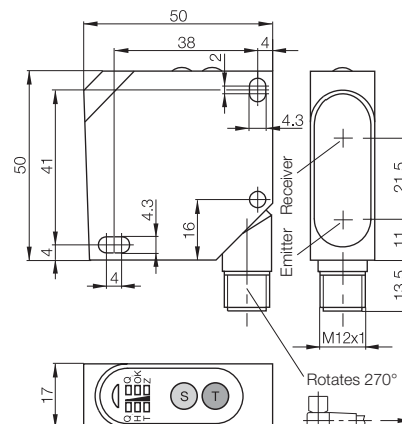
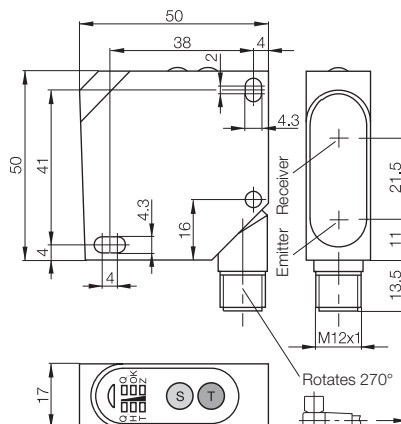
Photoelectric sensors

Series	BOD 26K	BOD 26K	Photoelectric standard sensors
Working range	80...300 mm	80...300 mm	
Measuring range	adjustable max. 220 mm	adjustable max. 220 mm	
2x PNP NO/NC	Ordering code	BOD0006	Photoelectric special sensors
	Part number	BOD 26K-LB05-S115-C	
Supply voltage U_B	18...30 V DC	18...30 V DC	Photoelectric distance sensors for analog distance measurement
Analog output	4...20 mA	4...20 mA	
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA	
Output current	100 mA	100 mA	Block designs
Switching type	Light/dark switching	Light/dark switching	
Interface		RS485	
Polarity reversal/short-circuit protected	Yes/Yes	Yes/Yes	Special accessories for photoelectric sensors
Settings	Teach-in	Teach-in	
Additional function		Master-slave mode	
Emitter, light type	Laser, red light	Laser, red light	
Wavelength	650 nm	650 nm	
Laser class	2	2	
Light spot diameter	4.5 mm at 300 mm	4.5 mm at 300 mm	
Resolution	≤ 220 μm	≤ 220 μm	
Linearity	≤ 550 μm	≤ 550 μm	
Power-on indicator	Green LED	Green LED	
Output function indicator	Yellow LED	Yellow LED	
Switching frequency	1 kHz	1 kHz	
Time function	50 ms pulse extension	50 ms pulse extension	
Degree of protection as per IEC 60529	IP 67	IP 67	
Ambient temperature T_a	-10...+60 °C	-10...+60 °C	
Permissible ambient light	EN 60947-5-2	EN 60947-5-2	
Material	Impact-resistant ABS	Impact-resistant ABS	
	PMMA	PMMA	
Connection	M12 connector, 8-pin	M12 connector, 5-pin	

Measured values referenced to Kodak gray card 90% reflective.



Connector orientation



Photoelectric Distance Sensors

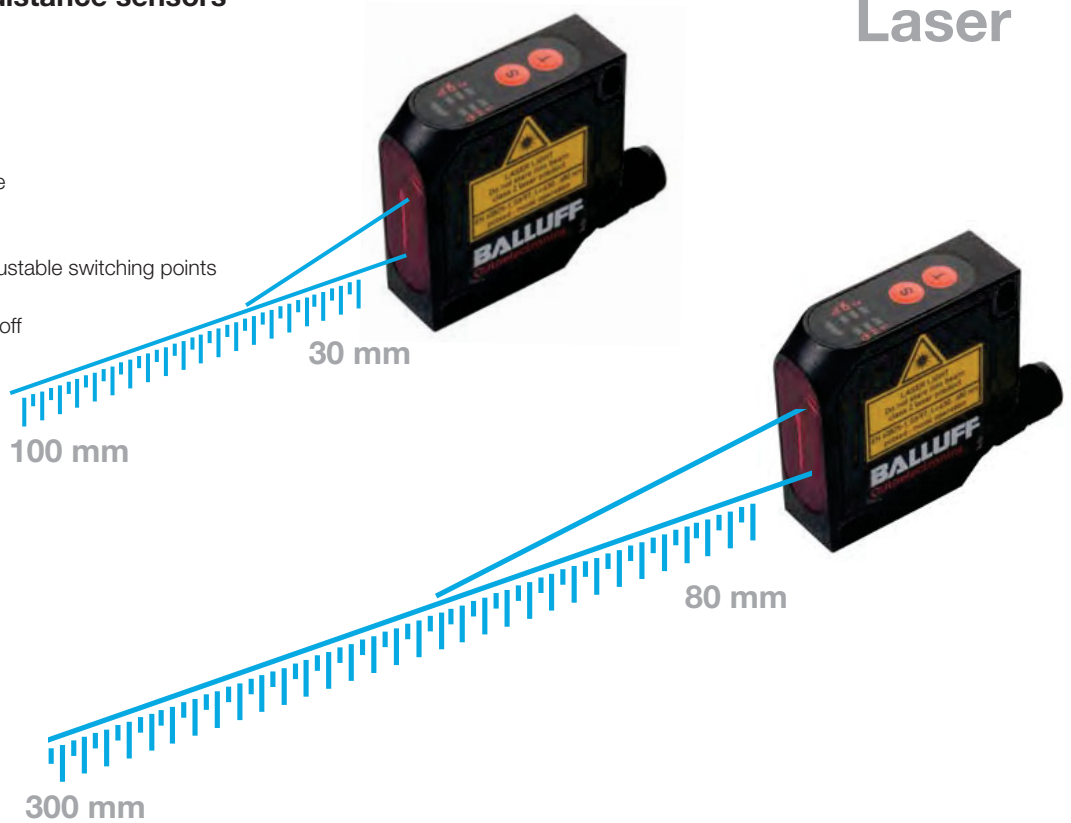
BOD 26K-LB laser distance sensors

BOD 26K-LB

Laser

Features

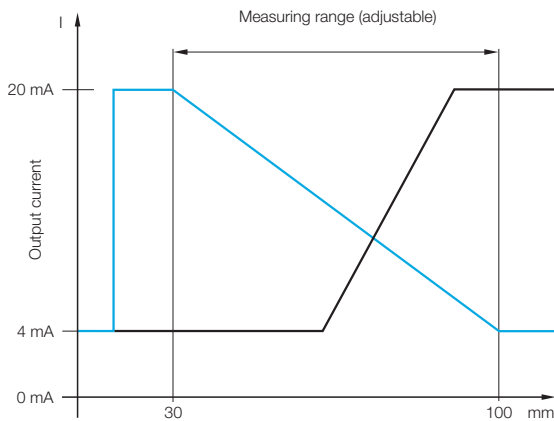
- Adjustable measuring range
- Analog output 4...20 mA
Adjustable: Rising or falling
- 1 switching output with adjustable switching points
- Teach-in
- Laser beam can be turned off



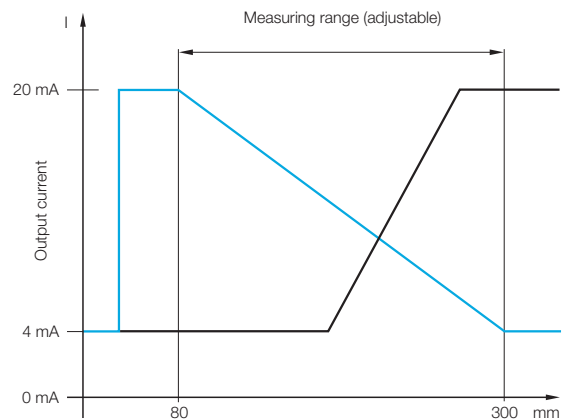
Connector diagram



Analog output BOD 26K-LB06...



Analog output BOD 26K-LB07...



Recommended accessories (please order separately)

Description	Ordering code
Mounting bracket	BAM00TK



Suitable connector (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	straight	PUR	black	5 m	BCC098C
M12, 5-pin	angled	PUR	black	5 m	BCC08FC

You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Distance Sensors

BOD 26K-LB laser distance sensors



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



Photoelectric sensors

Series	BOD 26K		BOD 26K
Working range	30...100 mm		80...300 mm
Measuring range	adjustable max. 70 mm		adjustable max. 220 mm
PNP NO/NC	Ordering code		BOD0007
	Part number		BOD 26K-LB06-S92-C
Supply voltage U_B	18...30 V DC		18...30 V DC
Analog output	4...20 mA		4...20 mA
No-load supply current I_0 max.	≤ 40 mA		≤ 40 mA
Output current	100 mA		100 mA
Switching type	Light/dark switching		Light/dark switching
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Emitter, light type	Laser, red light		Laser, red light
Wavelength	650 nm		650 nm
Laser class	2		2
Light spot diameter	3.25 mm at 100 mm		4.5 mm at 300 mm
Resolution	$\leq 70 \mu\text{m}$		$\leq 220 \mu\text{m}$
Linearity	$\leq 175 \mu\text{m}$		$\leq 550 \mu\text{m}$
Power-on indicator	Green LED		Green LED
Output function indicator	Yellow LED		Yellow LED
Switching frequency	1 kHz		1 kHz
Time function	50 ms pulse extension		50 ms pulse extension
Degree of protection as per IEC 60529	IP 67		IP 67
Ambient temperature T_a	$-10...+60^\circ\text{C}$		$-10...+60^\circ\text{C}$
Permissible ambient light	EN 60947-5-2		EN 60947-5-2
Material	Housing	Impact-resistant ABS	Impact-resistant ABS
	Optical surface	PMMA	PMMA
Connection	M12 connector, 5-pin		M12 connector, 5-pin

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

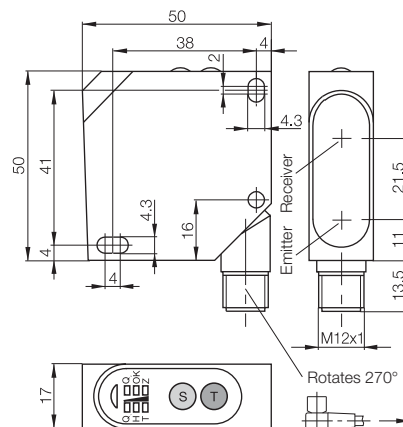
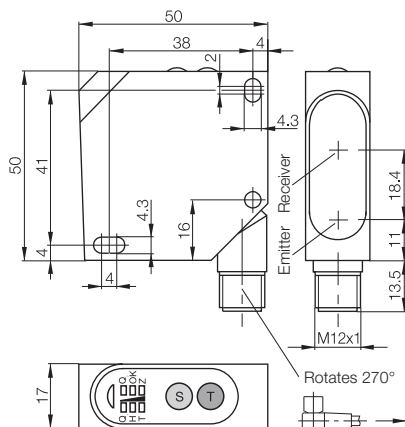
Block designs

Special accessories for photoelectric sensors

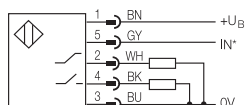
Measured values referenced to Kodak gray card 90% reflective.



Connector orientation



Wiring diagram



*Laser shut-off (+UB)
Key disable (0 V)

Photoelectric Distance Sensors

Distance sensors BOD 63M Laser

BOD 63M

Laser

The **BOD 63M** in a robust metal housing has a working range of 200...2000/6000 mm. It has adjustable background suppression and an analog output with 0...10 V or 4...20 mA. Time of flight measurement enables longer ranges than using triangulation or energetic light scanners. The switching outputs are set using a multi-turn-potentiometer. This innovative sensor technology is used in applications where traditional methods meet either technological or economical limits. Such applications include detecting small objects at large distances and operating in difficult conditions, such as if sensing must be performed "outside" of processes with high temperatures or in robotic cells.

Features

- Small laser spot for detecting small objects over large distances
- Virtually independent of the reflective properties of the target object within a specific sensing distance
- Background suppression across the entire working range
- Analog, switching and alarm output
- Laser beam can be turned off

Applications

- Exact detection tasks over long distances (e.g. due to design limitations or heat at the target location)
- Detecting objects with changing colors, shiny surfaces or unfavorable angles to the light beam
- Flexible solutions for position detection, level measurement and monitoring, distance and height measurement, quality assurance applications



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00P6



Suitable connector

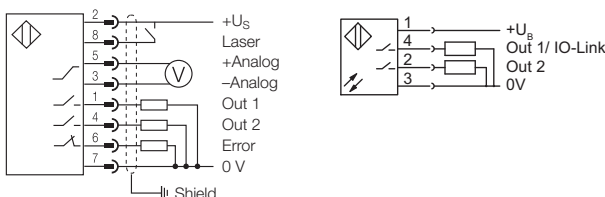
(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 8-pin	Straight	PVC	Gray	5 m	BCC0995
M12, 8-pin	Angled	PVC	Gray	5 m	BCC0998

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Wiring diagram



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



Series	
Working range	
Measuring range	
2x PNP NO	Ordering code
	Part number
Supply voltage U_B	
Analog output	
No-load supply current I_0 max.	
Switching type	
Polarity reversal/short-circuit protected	
Settings	
Emitter, light type	
Wavelength	
Laser class	
Light spot diameter	
Resolution	
Gray value shift	
Repeat accuracy per BWN	
Temperature drift	
Linearity	
Switching hysteresis	
Power-on indicator	
Switching output	
Stability indicator	
Ready delay	
Response time	
Switching frequency	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

IO-Link

Mode	
Transfer rate	
Value range	
Diagnostics	
Parameters	

Measured values referenced to Kodak gray card 90% reflective.

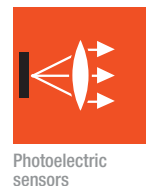


Connector orientation



Photoelectric Distance Sensors

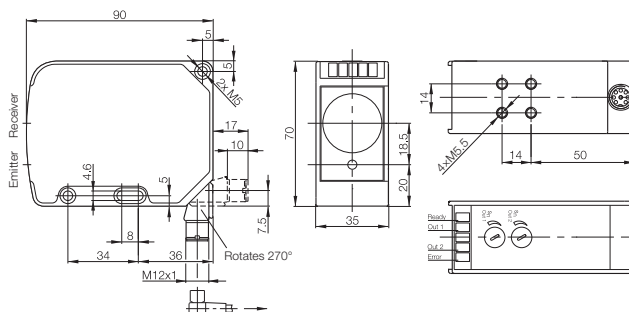
BOD 63M laser distance sensors



Photoelectric sensors

BOD 63M	BOD 63M	BOD 63M	
200...6000 mm	200...2000 mm	200...2000 mm	Photoelectric standard sensors
5800 mm	1800 mm	1800 mm	
BOD0012	BOD000U	BOD0010	Photoelectric special sensors
BOD 63M-LI06-S4	BOD 63M-LA02-S115	BOD 63M-LB02-S115	
18...30 V DC	15...30 V DC	15...30 V DC	Photoelectric distance sensors for analog distance measurement
≤ 90 mA	0...10 V	4...20 mA	
Light switching	≤ 75 mA	≤ 75 mA	
Yes/Yes	Light switching	Light switching	
Teach-in	Yes/Yes	Yes/Yes	
Laser, red light	Potentiometer, 4 revolutions	Potentiometer, 4 revolutions	Block designs
660 nm	Laser, red light	Laser, red light	
2	660 nm	660 nm	
5 mm at 3 m	2 per EN 60825	2 per EN 60825	Special accessories for photoelectric sensors
10 mm at 6 m	10 mm	10 mm	
≤ 2 mm	≤ 1 mm	≤ 1 mm	
≤ 1.5%	≤ 2 %	≤ 2 %	
≤ ±4 mm	≤ ±3 mm	≤ ±3 mm	
≤ 2 mm/°C	≤ 0.6 mm/°C	≤ 0.6 mm/°C	
≤ ±1%	≤ ±2%	≤ ±2 %	
≤ 15 mm	≤ 10 mm	≤ 10 mm	
Green LED	Green LED	Green LED	
Yellow LED	2× yellow LED	2× yellow LED	
Red LED	Red LED	Red LED	
≤ 20 ms	≤ 20 ms	≤ 20 ms	
≥ 150 Hz	≤ 2 ms	≤ 2 ms	
IP 65	≥ 250 Hz	≥ 250 Hz	
-10...+60 °C	IP 67	IP 67	
≤ 10 klx	-10...+60 °C	-10...+60 °C	
Anodized aluminum	≤ 10 klx	≤ 10 klx	
Glass	Anodized aluminum	Anodized aluminum	
M12 connector, 4-pin	Glass	Glass	
	M12 connector, 8-pin	M12 connector, 8-pin	

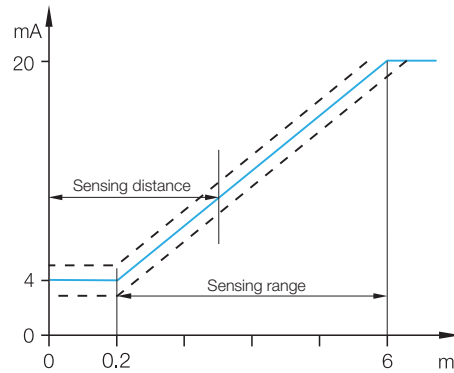
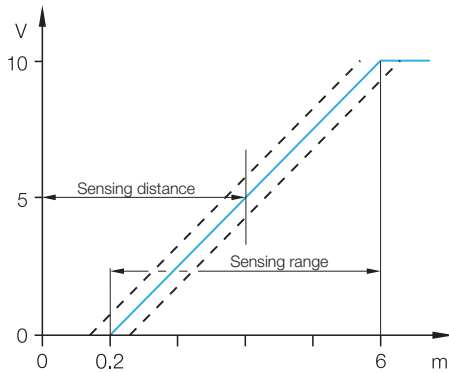
COM 2
38.4 kbaud
00C8 H...1770 H
Stability indicator
Switching points, laser on/off, button disable



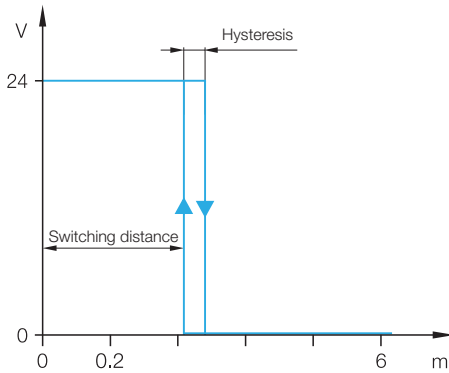
Laser class

The emitter corresponds to a class 2 laser according to EN 60825-1:2001-11. Thus no additional protective measures are required for operation. Install the device so that the laser warning label is easily visible.

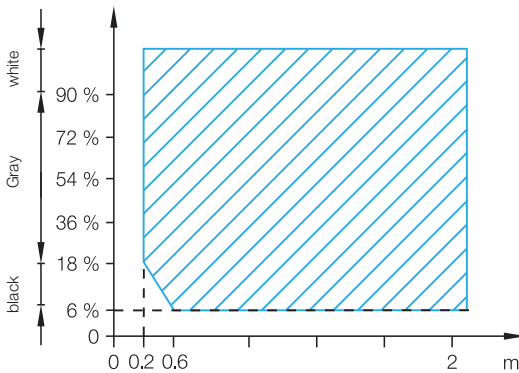
Analog output



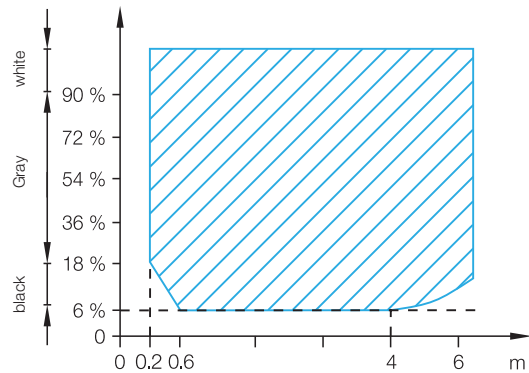
Switching output



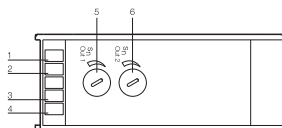
Measuring range BOD 63M-LA/LB02... depending on object reflection



Measuring range BOD 63M-LA/LB04... depending on object reflection



Indicators and operating elements

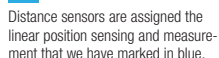


- 1 Supply voltage (green)
- 2 Switching output Out 1 (yellow)
- 3 Switching output Out 2 (yellow)
- 4 Stability indicator (red)
- 5 Potentiometer Out 1, 4 revolutions
- 6 Potentiometer Out 2, 4 revolutions

Connector diagram



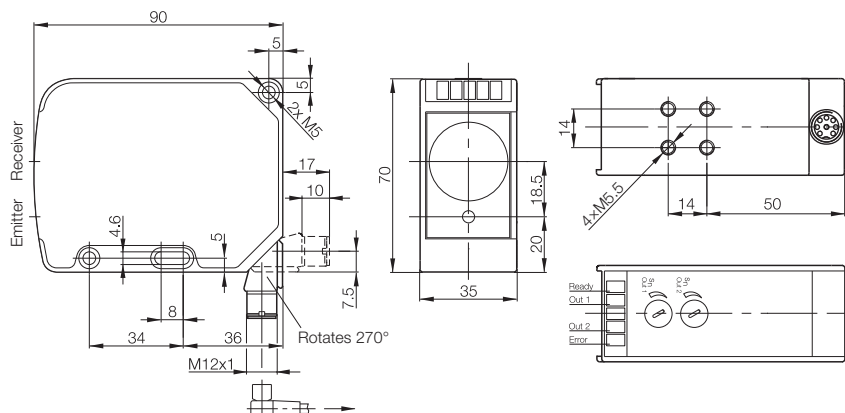
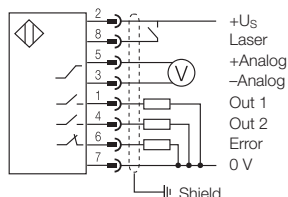
Pin-assignment	Cable color	
1	white	Out 1
2	brown	+U _S
3	Green	-Analog output
4	Yellow	Out 2
5	Gray	+Analog output
6	pink	Stability indicator
7	Blue	0 V
8	Red	Laser shut-off
Knurled nut	Braided shield	Shield



Measured values referenced to Kodak
gray card 90% reflective.



Wiring diagram



Distance measurements with high resolution are achieved using triangulation and modern CCD technology.

The **BOD 66M-R_01** with analog voltage or current output and an additional switching output can measure or monitor distance and, at the same time, operate as a light scanner with background suppression for object detection.

The BOD 66M-R_01 uses red light over a measuring range of 100...600 mm at a resolution of 0.5 mm.

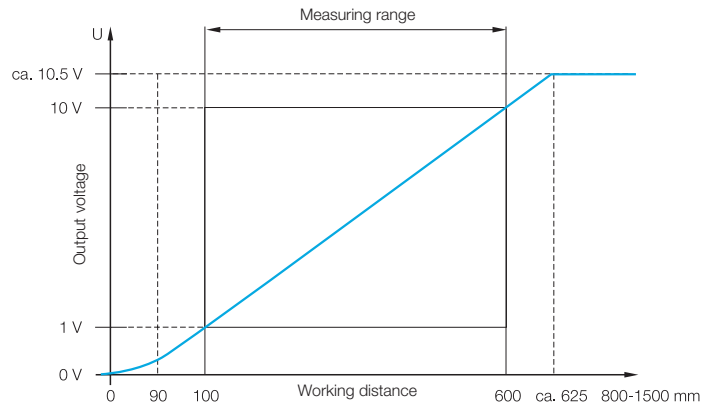
Features

- Extremely color and ambient light insensitive
- Working range 100...600 mm
- Resolution 0.5 mm
- Analog output with voltage (1...10 V) or current (4...20 mA)
- PNP switching output teachable
- Rugged metal housing
- Scratch-resistant glass optics

Applications

- Level monitoring
- Positioning tasks
- Winding diameter detection
- Profile measurement
- Sag control

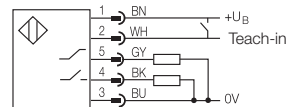
Analog output BOD 66M-R...



Connector diagram



Wiring diagram



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00P9



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420..

Suitable connectors

(please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	Straight	PUR	Black	5 m	BCC098C
M12, 5-pin	Angled	PUR	Black	5 m	BCC08FC



Connectors without LED are suitable for PNP and NPN sensors.

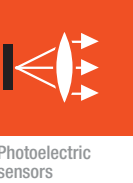
More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.

Photoelectric Distance Sensors

BOD 66M-R distance sensors



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



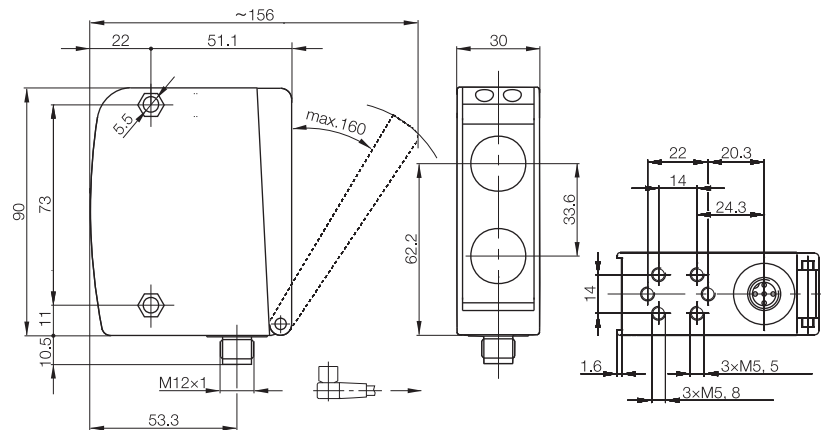
Series	BOD 66M		BOD 66M
Working range	100...600 mm		100...600 mm
Measuring range	500 mm		500 mm
PNP NO	Ordering code	BOD0015	BOD0016
	Part number	BOD 66M-RA01-S92-C	BOD 66M-RB01-S92-C
Supply voltage U_B	18...30 V DC		18...30 V DC
Analog output	0...10 V		4...20 mA
No-load supply current I_0 max.	≤ 150 mA		≤ 150 mA
Output current	250 mA		250 mA
Switching type	Light switching		Light switching
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Emitter, light type	LED, red light		LED, red light
Wavelength	660 nm		660 nm
Light spot diameter	approx. 10 mm		approx. 10 mm
Resolution	≤ 0.5 mm		≤ 0.5 mm
Gray value shift (90 %/6 %)	≤ 1 %		≤ 1 %
Repeat accuracy per BWN	± 0.5 %		± 0.5 %
Temperature drift	0.2 mm/°C		0.2 mm/°C
Absolute measuring accuracy**	± 2 % (at the measuring distance)		± 2 % (at the measuring distance)
Power-on indicator	Green LED		Green LED
Output function indicator	Yellow LED		Yellow LED
On/off delay	≤ 100 ms		≤ 100 ms
Ready delay	≤ 300 ms		≤ 300 ms
Switching frequency	20...100 Hz*		20...100 Hz*
Degree of protection as per IEC 60529	IP 65		IP 65
Ambient temperature T_a	$-20...+50$ °C		$-20...+50$ °C
Permissible ambient light	≤ 5 klx		≤ 5 klx
Material	Housing	Anodized aluminum	Anodized aluminum
	Optical surface	Glass	Glass
Connection	M12 connector, 5-pin		M12 connector, 5-pin

*depending on object reflectivity

**Target $\leq 50 \times 50$ mm²



Connector orientation



Photoelectric Distance Sensors

Distance sensors BOD 66M-L Laser

BOD 66M-L

Laser

The **BOD 66M-L_04** features an analog as well as an additional switching output. It measures the object position across a range from 200...2000 mm. In addition, it allows the switching output (background suppression) to be configured in the same area using teach-in. Forward-looking laser- and CCD-technology ensure accuracy and reliability.

Features

- Laser class 2
- Small light spot over the entire range
- Extremely color and ambient light insensitive due to CCD line receiver
- Analog current or voltage output over 200...2000 mm
- PNP switching output, teachable
- Rugged metal housing
- Scratch-resistant glass optics

Applications

- Background suppression up to 2 m
- Analog measuring at up to 2 m target distance
- Positioning tasks

Laser class

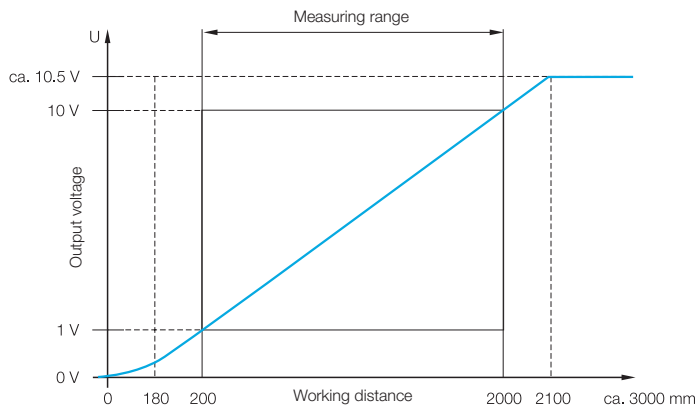
(see page 895)

The emitter corresponds to a class 2 laser according to EN 60825-1:2001-11. Thus no additional protective measures are required for operation.

Install the device so that the laser warning label is easily visible.



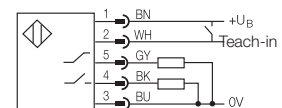
Analog output BOD 66M-L...



Connector diagram



Wiring diagram



Recommended accessories

(please order separately)

Description	Ordering code
Mounting bracket	BAM00P9



You can find special accessories for photoelectric sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog on page 420.

Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	straight	PUR	Black	5 m	BCC098C
M12, 5-pin	angled	PUR	Black	5 m	BCC08FC

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors, and lengths in our **Industrial Networking and Connectivity catalog**.



Photoelectric Distance Sensors

Distance sensors BOD 66M-L Laser



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



Photoelectric sensors

Series	BOD 66M		BOD 66M
Working range	200...2000 mm		200...2000 mm
Measuring range	1800 mm		1800 mm
PNP NO	Ordering code	BOD0013	BOD0014
	Part number	BOD 66M-LA04-S92-C	BOD 66M-LB04-S92-C
Supply voltage U_B	18...30 V DC		18...30 V DC
Analog output	1...10 V		4...20 mA
No-load supply current I_0 max.	≤ 150 mA		≤ 150 mA
Output current	250 mA		250 mA
Switching type	Light switching		Light switching
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes
Settings	Teach-in		Teach-in
Emitter, light type	Laser, red light		Laser, red light
Wavelength	660 nm		660 nm
Laser class	2		2
Light spot diameter	3× 12 mm ² at 2 m		3× 12 mm ² at 2 m
Resolution	≤ 5 mm		≤ 5 mm
Gray value shift (90 %/6 %)	≤ 1 %		≤ 1 %
Repeat accuracy	± 0.5 %		± 0.5 %
Temperature drift	0.6 mm/°C		0.6 mm/°C
Absolute measuring accuracy**	± 2 % (at the measuring distance)		± 2 % (at the measuring distance)
Power-on indicator	Green LED		Green LED
Output function indicator	Yellow LED		Yellow LED
On/off delay	≤ 100 ms		≤ 100 ms
Ready delay	≤ 300 ms		≤ 300 ms
Switching frequency	10...100 Hz*		10...100 Hz*
Degree of protection as per IEC 60529	IP 65		IP 65
Ambient temperature T_a	-20...+50 °C		-20...+50 °C
Permissible ambient light	≤ 5 klx		≤ 5 klx
Material	Housing	Anodized aluminum	Anodized aluminum
	Optical surface	Glass	Glass
Connection	M12 connector, 5-pin		M12 connector, 5-pin

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Block designs

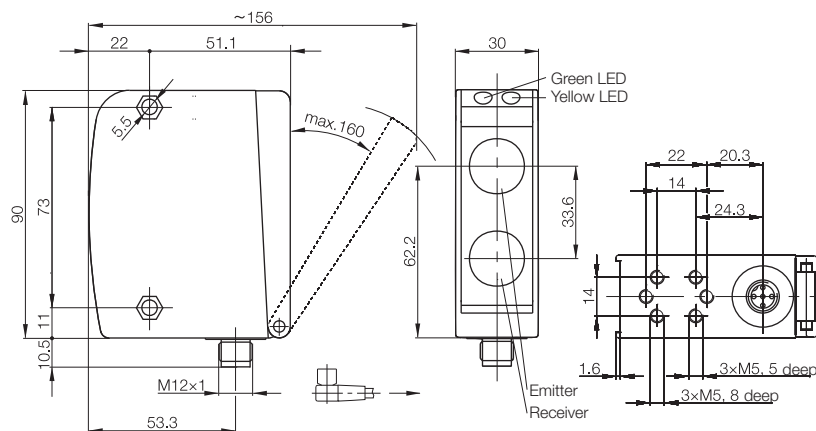
Special accessories for photoelectric sensors

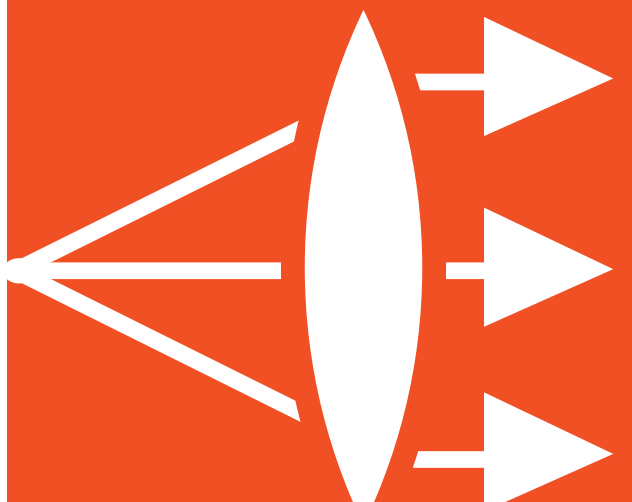
*depending on object reflectivity

**Target $\leq 50 \times 50$ mm²



Connector orientation





Photoelectric Sensors

Special accessories for photoelectric sensors

Complete optical accessories – from mounting brackets, reflectors, lenses and holding systems etc. for standard applications and applications under more difficult ambient conditions.





Special Accessories for Photoelectric Sensors

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Fasteners

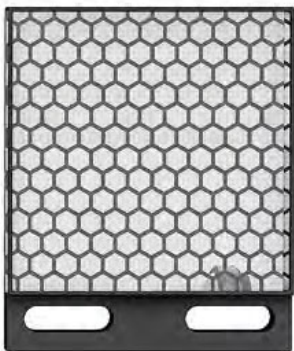
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Special Accessories for Photoelectric Sensors

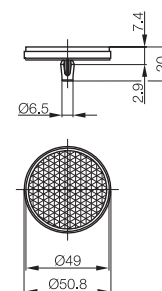
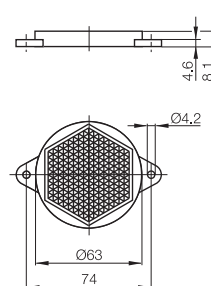
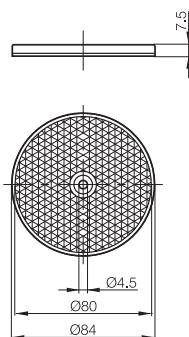
Round reflectors



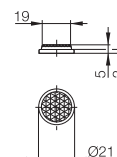
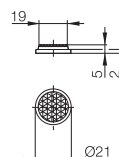
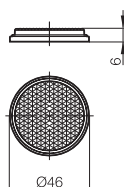
Reflectors are assigned to the accessories that we mark in gray.



Size	Reflector Ø 84 mm	Reflector Ø 62 mm	Reflector Ø 51 mm
Fasteners	M4 screw	Two M4 screws	Rivet with mounting tabs
Ordering code	BAM00UK	BAM0126	BAM00UP
Part number	BOS R-1	BOS R-10	BOS R-14
Material	PMMA/ABS	PMMA/ABS	PC
Cube size	4 mm	4 mm	4 mm
Mounting accessories	BOS 21-AD-1		
Special features			More chemical resistant
Temperature range	-20...+60 °C	-20...+60 °C	0...+100 °C
Reflectivity rating	100%	60%	60%

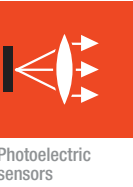


Size	Reflector Ø 46 mm	Reflector Ø 21 mm	Reflector Ø 21 mm
Fasteners	Glue	Glue	Glue
Ordering code	BAM00UW	BAM00W4	BAM00UR
Part number	BOS R-2	BOS R-3	BOS R-15
Material	PMMA/ABS	PMMA/ABS	PC
Cube size	2.5 mm	2 mm	2 mm
Special features			More chemical resistant
Temperature range	-20...+60 °C	-20...+60 °C	-20...+99 °C
Reflectivity rating	60%	25%	25%



Special Accessories for Photoelectric Sensors

Block-shaped reflectors



Size	Reflector 100x100 mm	Reflector 100x100 mm	Reflector 84x84 mm	Reflector 51x72 mm	Reflector 60x40 mm
Fasteners	Two M3 screws	Two M3 screws	Two M3 screws	Two M4 screws	Two M3 screws
Ordering code	BAM01CN	BAM01JN	BAM00UL	BAM00UZ	BAM01JP
Part number	BOS R-37	BOS R-47	BOS R-11	BOS R-25	BOS R-46
Material	PC	PMMA/ABS	PMMA/ABS	PMMA	PMMA/ABS
Cube size	4 mm	4 mm	4 mm	4 mm	4 mm
Temperature range	-20...+100 °C	-20...+60 °C	-20...+60 °C	0...+50 °C	-20...+60 °C
Reflectivity rating			125%		

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

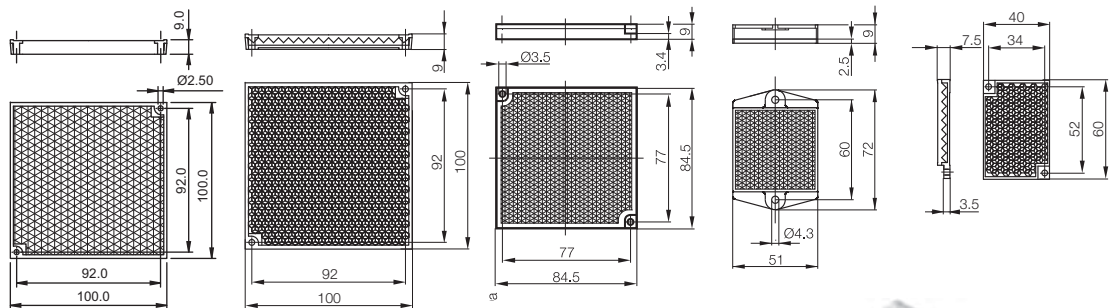
Special accessories for photoelectric sensors

Reflectors

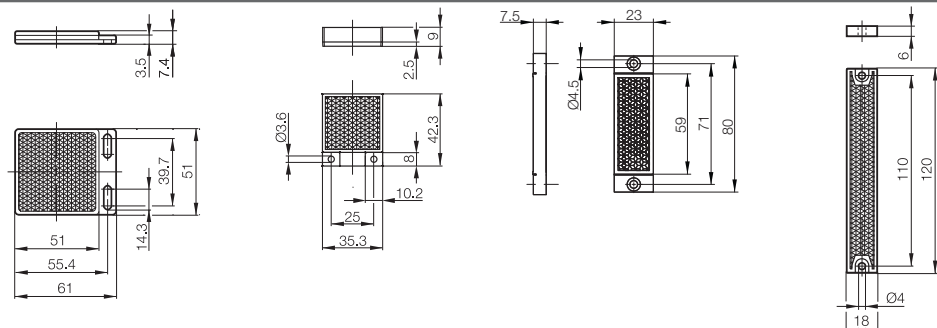
Fasteners

Sensor accessories

Accessories for fiber optics



Size	Reflector 51x61 mm	Reflector 35x42 mm	Reflector 23x80 mm	Reflector 18x120 mm
Fasteners	Two M4 screws	Two M3 screws	Two M4 screws	Two M4 screws
Ordering code	BAM00WL	BAM00W0	BAM01LA	BAM00WA
Part number	BOS R-9	BOS R-26	BOS R-48	BOS R-5
Material	PMMA/ABS	PMMA	PMMA/ABS	PMMA/ABS
Cube size	4 mm	4 mm	4 mm	4 mm
Mounting accessories		BOS 5-HW-5		
Temperature range	-20...+60 °C	0...+50 °C	-20...+60 °C	-20...+60 °C
Reflectivity rating	100%			40%



Special Accessories for Photoelectric Sensors

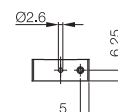
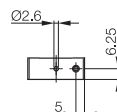
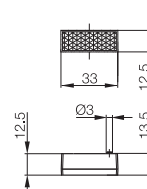
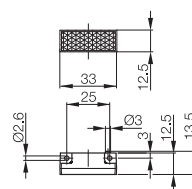
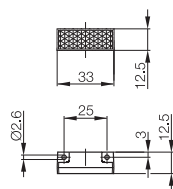
Block-shaped reflectors



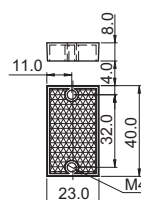
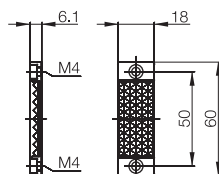
Reflectors are assigned to the accessories that we mark in gray.



Size	Reflector 33×12 mm	Reflector 33×12 mm	Reflector 33×12 mm
Fasteners	Side screws	Rear and side screws	Rear screws
Ordering code	BAM00W3	BAM00W1	BAM00W2
Part number	BOS R-29	BOS R-27	BOS R-28
Material	PMMA	PMMA	PMMA
Cube size	2.3 mm	2.3 mm	2.3 mm
Mounting accessories	BOS 5-HW-1/2	BOS 5-HW-1/2	
Temperature range	0...+50 °C	0...+50 °C	0...+50 °C
Reflectivity rating			

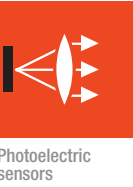


Size	Reflector 18×60 mm	Reflector 23×40 mm	
Fasteners	Two M4 screws	Two M4 screws	
Ordering code	BAM00W7	BAM01T3	
Part number	BOS R-33	BOS R-52	
Material	PMMA/ABS	PMMA/ABS	
Cube size	4 mm	0.9 mm	
Mounting accessories			
Temperature range	-20...+60 °C	-20...+60 °C	
Reflectivity rating			



Special Accessories for Photoelectric Sensors

Reflectors for special applications



Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

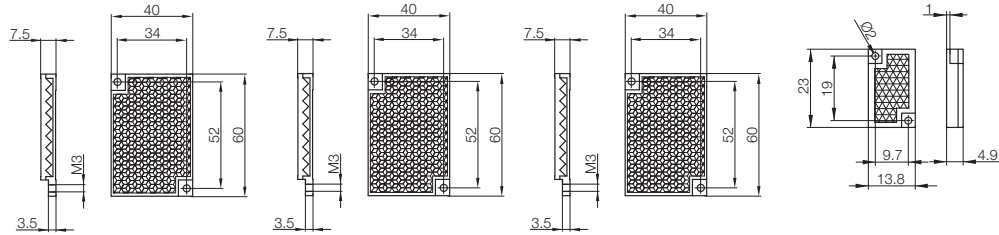
Reflectors

Fasteners

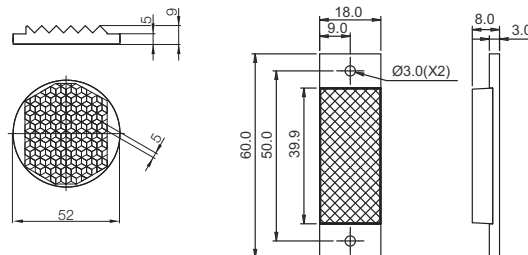
Sensor accessories

Accessories for fiber optics

Size	Reflector 60×40 mm	Reflector 60×40 mm	Reflector 60×40 mm	Reflector 14×23 mm
Fasteners	Two M3 screws	Two M3 screws	Two M3 screws	Two M1.5 screws
Ordering code	BAM00W8	BAM01CM	BAM01HE	BAM01NH
Part number	BOS R-34	BOS R-36	BOS R-44	BOS R-49
Material	Hot thermoplastic	PMMA/ABS	Solidchem	Hot thermoplastic
Cube size	4 mm	4 mm	4 mm	0.9 mm
Special features	Heat-resistant	Anti-fogging	Chemical-resistant	Heat-resistant; For laser applications
Temperature range	-20...+150°C	-20...+60 °C	-20...+140°C	-20...+110°C
Reflectivity rating				



Size	Reflector Ø 52 mm	Reflector 10x62 mm		
Fasteners	Clamps			
Ordering code	BAM01H6	BAM01KU		
Part number	BOS R-31	BOS R-51		
Material	Borosilicate	PMMA/ABS		
Cube size	4 mm	3 mm		
Special features	Glass reflector			
Temperature range	-20...+500°C	-20...+60°C		
Reflectivity rating				



Special Accessories for Photoelectric Sensors

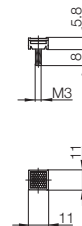
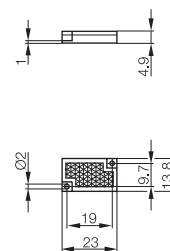
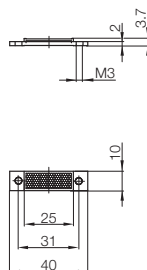
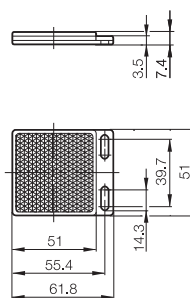
Reflectors for laser retroreflective sensors



Reflectors are assigned to the accessories that we mark in gray.



Size	Reflector 51×62 mm	Reflector 40×10 mm	Reflector 14×23 mm	Reflector 11×11 mm	
Fasteners	Two M4 screws	Two M3 screws	Two M1.5 screws	M3 screw	
Ordering code	BAM00UY	BAM01H9	BAM00UM	BAM01H8	
Part number	BOS R-22	BOS R-41	BOS R-12	BOS R-39	
Material	PMMA/ABS	PMMA/ABS	PMMA/ABS	PMMA/ABS	
Cube size	1.2 mm	1.2 mm	0.9 mm	0.9 mm	
Mounting accessories	BOS 5-HW-6				
Special features			For laser retroreflective sensors		
Temperature range	-20...+60 °C		-20...+60 °C	-20...+60 °C	
Reflectivity rating	100%(Laser) 40%(Non-laser)		100%(Laser) 30%(Non-laser)		

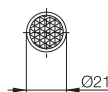
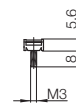
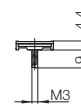
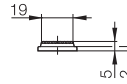
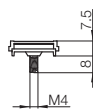
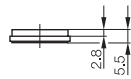


Special Accessories for Photoelectric Sensors

Reflectors for laser retroreflective sensors



Reflector Ø 25 mm	Reflector Ø 25 mm	Reflector Ø 21 mm	Reflector Ø 19 mm	Reflector Ø 10 mm
Glue	M4 screw	Glue	M3 screw	M3 screw
BAM00UN	BAM01HC	BAM00UT	BAM01HA	BAM01H7
BOS R-13	BOS R-43	BOS R-16	BOS R-42	BOS R-38
PMMA/ABS	PMMA/ABS	PMMA/ABS	PMMA/ABS	PMMA/ABS
1.2 mm	1.2 mm	1.2 mm	0.9 mm	0.9 mm
		For laser retroreflective sensors		
-20...+60 °C	-20...+60 °C	-20...+60 °C	-20...+60 °C	-20...+60 °C
100%(Laser) 40%(Non-laser)		100%(Laser) 40%(Non-laser)		



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

Special Accessories for Photoelectric Sensors

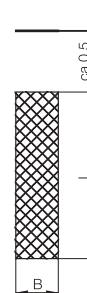
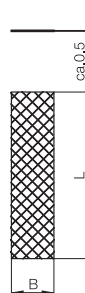
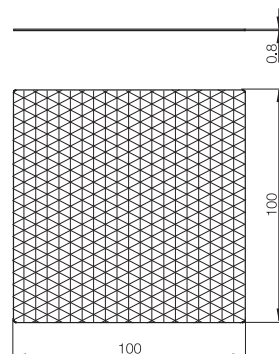
Reflective foils



Reflectors are assigned to the accessories that we mark in gray.



Size	Reflective tape (standard)	Reflective tape (standard)	Reflective tape (standard) (not for polarized light)	
Fasteners	Self-adhesive	Self-adhesive	Self-adhesive	
100 × 100 mm	Ordering code BAM01JM Part number BOS R-50			
50 mm × 25 cm	Ordering code Part number		BAM00WC BOS R-6-0,25	
50 mm × 45 m	Ordering code Part number		BAM00WE BOS R-6-45	
50 mm × 25 cm	Ordering code Part number	BAM00WF BOS R-7-0,25		
50 mm × 1 m	Ordering code Part number	BAM019L BOS R-7-1	BAM019J BOS R-6-1	
50 mm × 22 m	Ordering code Part number	BAM00WH BOS R-7-22		
50 mm × 100 m	Ordering code Part number	BAM019K BOS R-7-0,1	BAM019H BOS R-6-0,1	
25 mm × 25 cm	Ordering code Part number	BAM00WJ BOS R-8-0,25		
25 mm × 1 m	Ordering code Part number			
25 mm × 22 m	Ordering code Part number	BAM00WK BOS R-8-22		
25 mm × 100 mm	Ordering code Part number	BAM019M BOS R-8-0,1		
Material	PMMA	PMMA	PMMA	
Special features			Not for polarized light	
Temperature range	-20...+60 °C	-20...+60 °C	-20...+60 °C	
Reflectivity rating		40%	40%	





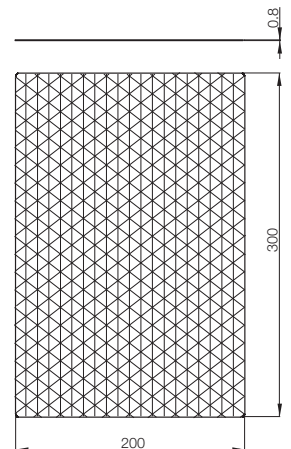
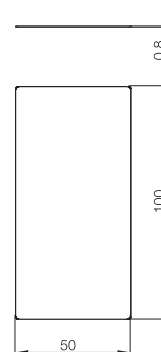
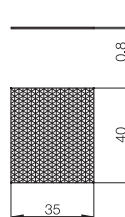
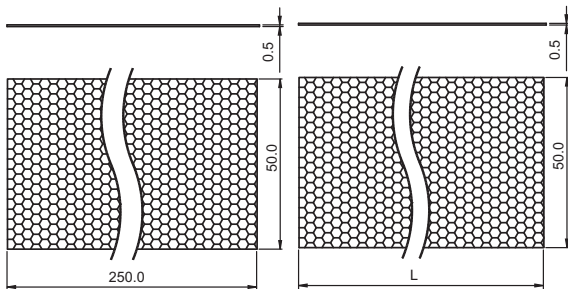
Special Accessories for Photoelectric Sensors

Reflective foils

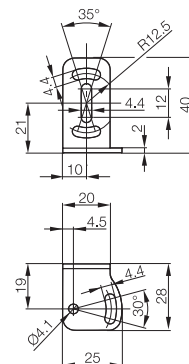
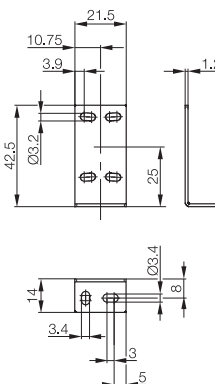
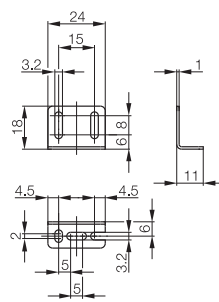
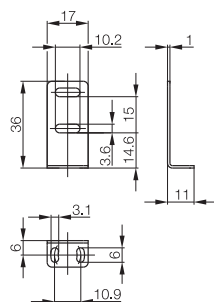


Photoelectric sensors

	Reflex foil	Reflex foil	Reflective tape 40×35 mm	Reflective tape 100×50 mm	Reflective tape 300×200 mm	
	Self-adhesive	Self-adhesive	Self-adhesive	Self-adhesive	Self-adhesive	Photoelectric standard sensors
		BAM00W9	BAM00W5	BAM01CF	BAM01HF	Photoelectric special sensors
		BOS R-35	BOS R-30 (standard)	BOS R-40	BOS R-45	
	BAM019T					Photoelectric distance sensors for analog distance measurement
	BOS R-17-0,25					
	BAM019P					Special accessories for photoelectric sensors
	BOS R-171					
	BAM00UU					
	BOS R-17-22					
	BAM019R					Reflectors
	BOS R-17-0,1					Fasteners
						Sensor accessories
						Accessories for fiber optics
	BAM019N					
	BOS R-8-1					
	Foil	Foil	PMMA	PMMA	PMMA	
	Micro glass balls	Micro glass balls		Special for laser sensors	Standard and laser	
	non polarized	non polarized			sensors for large surfaces	
	-20...+60 °C	-20...+60 °C	-20...+60 °C	-20...+60 °C	-20...+60 °C	
	50%	40%				



Reflectors are assigned to the accessories that we mark in gray.



Special Accessories for Photoelectric Sensors

Mounting bracket



Mounting bracket

For BOS 5K

BAM00U6

BOS 5-HW-2



Mounting bracket

For BOS 5K

BAM00U7

BOS 5-HW-3

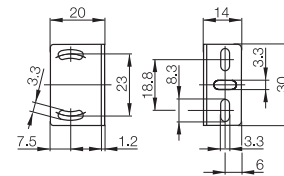
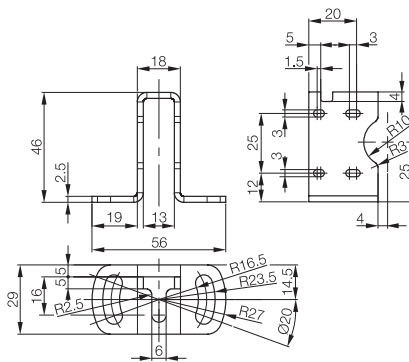
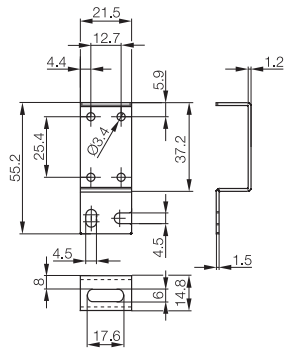


Mounting bracket

For BOS 6K and BOS 21M

BAM00UH

BOS 6-HW-1



Mounting bracket

For BOS 21K

BAM00TC

BOS 21-HW-3



Mounting bracket

For BOS 21K

BAM00TE

BOS 21-HW-4

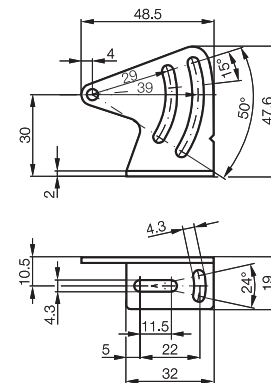
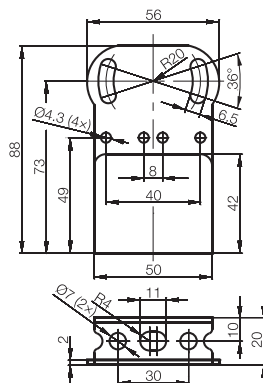
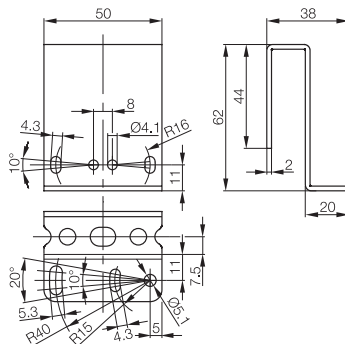


Mounting bracket

For BOS 25K, BOS 26K, BOS 21M

BAM00TK

BOS 26-HW-1



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

Special Accessories for Photoelectric Sensors

Mounting brackets



Reflectors are assigned to the accessories that we mark in gray.

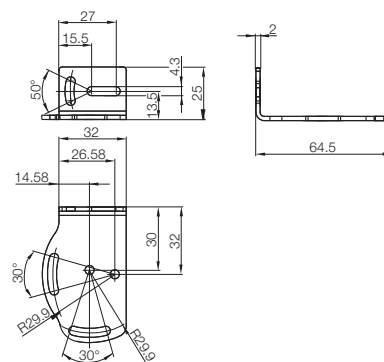
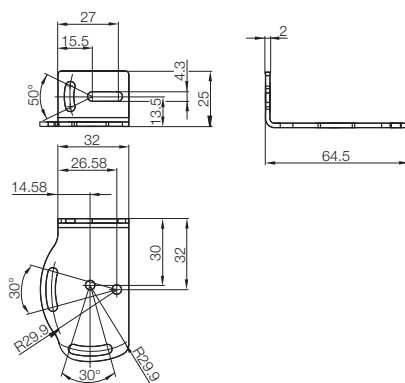


Stainless Steel



Stainless Steel

Description	Mounting bracket	Mounting bracket
Use	For BOS 23K	For BOS 23K
Ordering code	BAM01FK	BAM01FM
Part number	BAM MB-X0-006-B05-4	BAM MB-X0-007-B05-4
Material	Stainless steel	Stainless steel



Special Accessories for Photoelectric Sensors

Mounting bracket



Stainless
Steel



Photoelectric
sensors

Photoelectric
standard
sensors

Photoelectric
special
sensors

Photoelectric
distance
sensors
for analog
distance
measurement

Special
accessories for
photoelectric
sensors

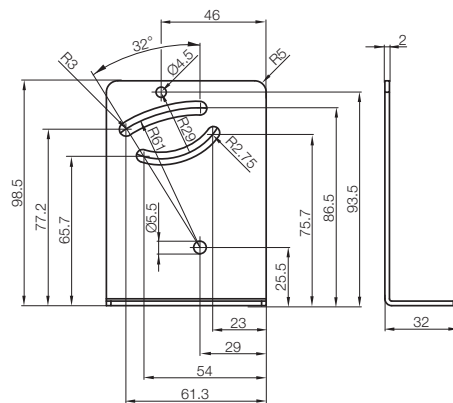
Reflectors

Fasteners

Sensor
accessories

Accessories for
fiber optics

Description	Mounting bracket	
Use	For BOS 50K/23K	
Ordering code	BAM01E8	
Part number	BAM MB-X0-005-B04-4	
Material	Stainless steel	



Special Accessories for Photoelectric Sensors

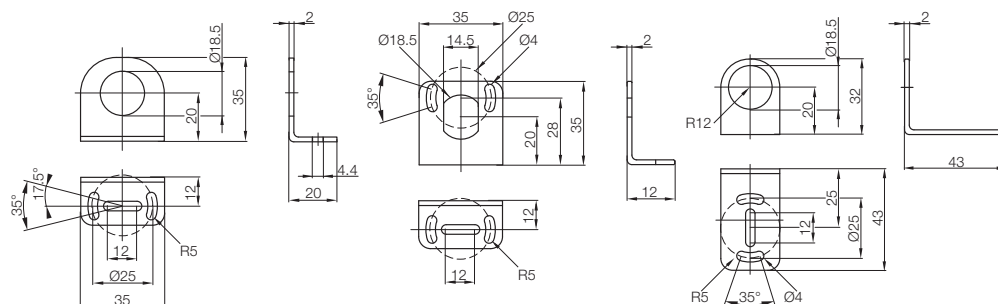
Mounting brackets



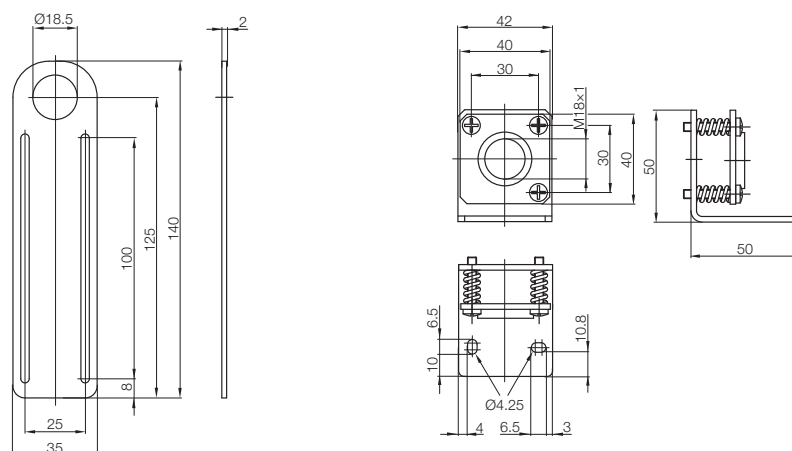
Reflectors are assigned to the accessories that we mark in gray.



Description	Mounting bracket	Mounting bracket	Mounting bracket
Use	For BOS 18	For BOS 18F/BOS 18KW	For BOS 18
Ordering code	BAM00RY	BAM00RZ	BAM00T0
Part number	BOS 18,0-HW-1	BOS 18,0-HW-2	BOS 18,0-HW-3



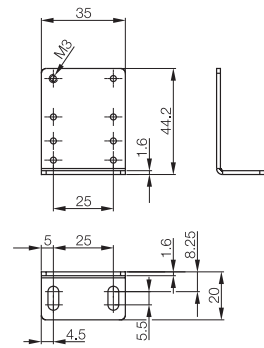
Description	Mounting bracket	Mounting bracket
Use	For BOS 18	For BOS 18 laser sensors
Ordering code	BAM00T1	BAM00T2
Part number	BOS 18,0-HW-4	BOS 18,0-HW-6





Photoelectric standard sensors

Photoelectric special sensors



Photoelectric distance sensors for analog distance measurement

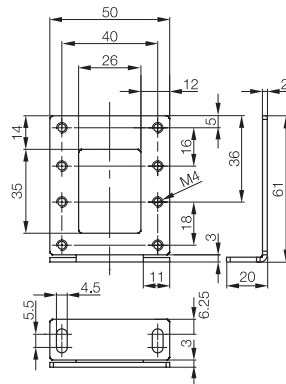
Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics



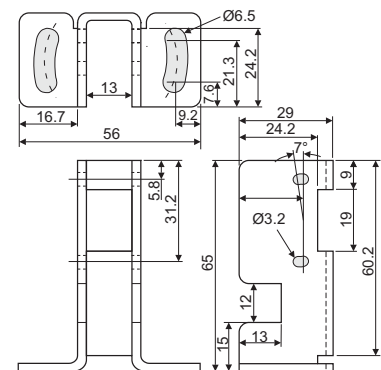
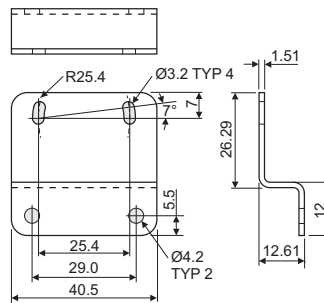
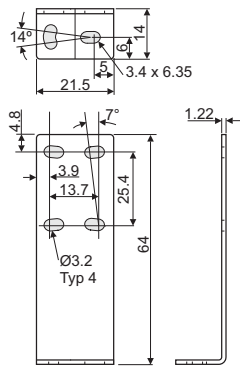
Special Accessories for Photoelectric Sensors

Mounting brackets

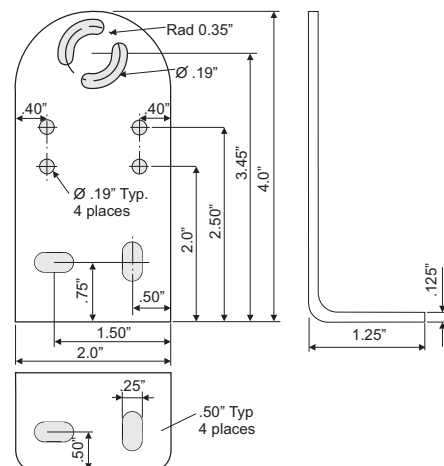
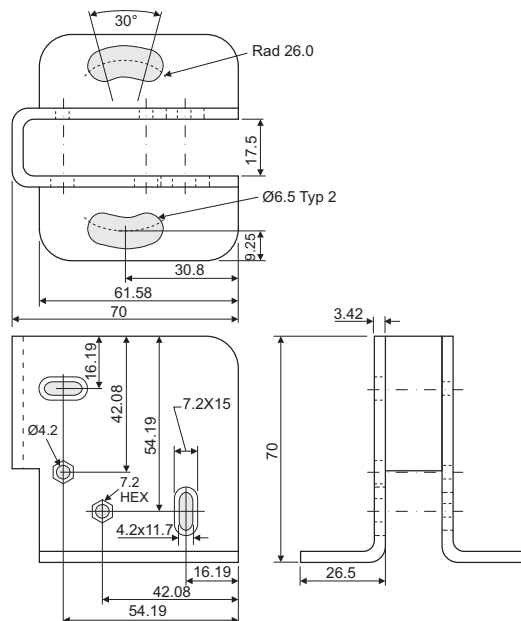


Deflection heads and angled mirrors are assigned to the accessories that we mark in gray.

Description	Dual axis adjustable	Dual axis adjustable	Dual axis adjustable
Use	Small block	Small block	Small block
Ordering code	BAM00UC	BAM00UE	BAM00UF
Part number	BOS 5-HW-7	BOS 5-HW-8	BOS 5-HW-9
Suitable product	BOS 5K	BOS 5K	BOS 5K
Material	Stainless steel	Zinc-plated steel	Zinc-plated steel



Description	Protective mount	Dual axis adjustable
Use	Mid-size block	Mid-size block
Ordering code	BAM0155	
Part number	BOS 26-HW-7	BTL 31M-HW-1
Suitable product	BOS 26K	BLT 31M
Material	Painted steel	Anodized Aluminum





Special Accessories for Photoelectric Sensors

Mounting brackets



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

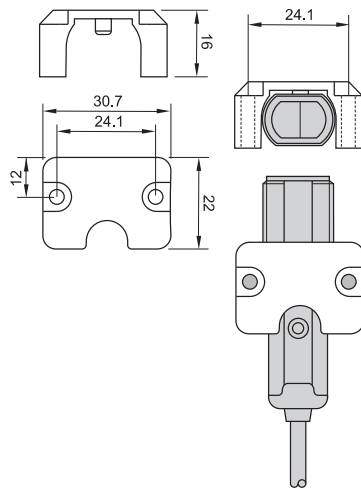
Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

Description	Adapter bracket
Use	Mounting adapter
Ordering code	
Part number	BOS 18.0-BS-3
Suitable product	BOS 18KF, BOS 18KW
Material	Durethan

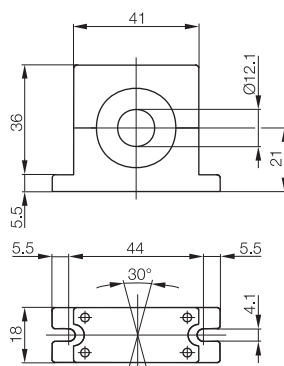


Special Accessories for Photoelectric Sensors

Mounting brackets

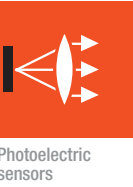


Description	Swivel adjustable mounting bracket
Use	12 mm Tubular
Part number	BOS 12.0-BS-1
Suitable product	12 mm tubular
Material	ABS



Special Accessories for Photoelectric Sensors

Mounting brackets for tubular sensors



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

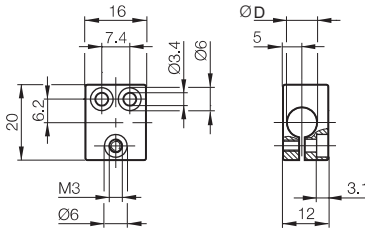
Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

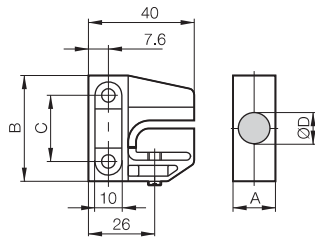
Accessories for fiber optics



Clamp for tubular sensors $\varnothing$ 8 mm or M8

	$\varnothing$ D
BES 08-KB-1	8

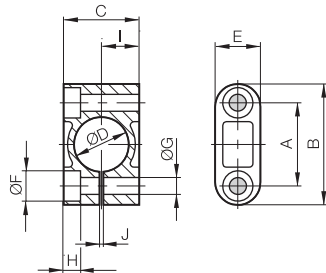
Material: PA6



Clamp for tubular sensors M12 and M18 (stackable)

	A	B	C	$\varnothing$ D
BES 12-KB-2	16	40	25	12
BES 18-KB-2	22	45	30	18

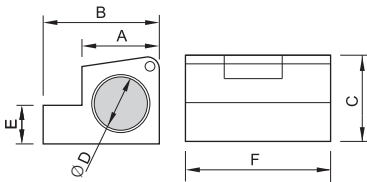
Material: PA6



Clamping cuff

	A	B	C	$\varnothing$ D	E	F	G	H	I	J
BES 08.0-BS-1	17	27	16	7.9	12	8	4.5	4.5	8	1
BES 12.0-BS-1	22	32	20	11.9	12	8	4.5	4.5	10	1
BES 18.0-BS-1	26	36	26	17.9	12	8	4.5	4.5	13	1

Material: PA6



Snap clamp with positive stop

	A	B	C	$\varnothing$ D	E	F
BES 08.0-KB-5-F	12	20	15	8	7	22
BES 12.0-KB-5-F	16	24	18	12	8	30
BES 18.0-KB-5-F	21	29	24	18	14	30

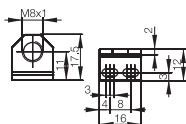
Material: Plastic PC

Note: All units are in mm



Special Accessories for Photoelectric Sensors

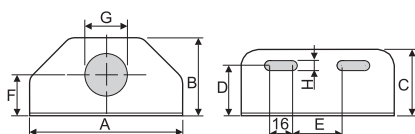
Mounting brackets for tubular sensors



SuperShorties™ "L" mounting bracket

BES 08-HW-4 12x17.5x16 mm

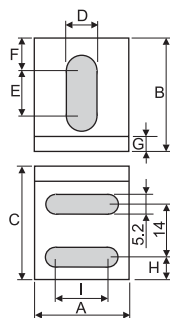
Material: Stainless steel



Universal "L" mounting bracket

	A	B	C	D	E	F	G	H
BES 516-MB-08	76	34	29	17	31	19	8	6
BES 516-MB-12	76	34	29	17	31	19	12	6
BES 516-MB-18	76	34	29	17	31	19	18	6

Material: Carbon steel



Slotted angle bracket (screws and washers included)

	A	B	C	D	E	F	G	H	I
BES 08-HW-1	25	30	30	8.1	12	7	4	6	14
BES 12-HW-1	25	30	30	12.1	9	8.5	4	6	14

Material: Aluminum

Note: All units are in mm

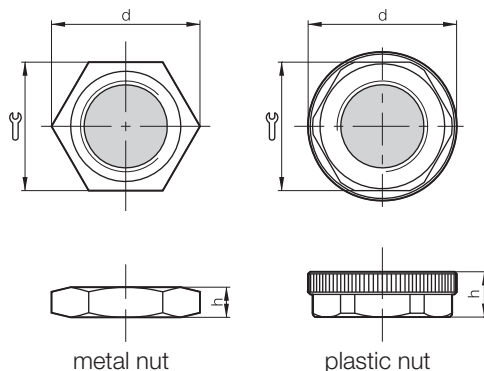




Special Accessories for Photoelectric Sensors

Mounting nuts

Description	Mounting Nuts
-------------	---------------



Ordering Code	Ordering code = Part no.					
Material	Metal nuts	Part no.	Material	d	wrench	h
	M8×1	500557	steel galvanized	15	13	4
	M12×1	500462	Ms nickel plated	20	17	4
	M18×1	500152	Ms nickel plated	28	24	4
	Stainless steel nuts					
	M12×1	636981	1.4305 (303)	20	17	4
	M18×1	636982	1.4301 (304)	28	24	4
	Plastic nuts					
	M12×1	507936	PA 6.6	19.7	17	6
	M18×1	606841	PA 6.6	28	24	8

Spring type lockwasher for M5 sensors: part no. 710256
 Toothed lockwasher for M8 sensors: part no. 500558
 Toothed lockwasher for M12 sensors: part no. 500552
 Toothed lockwasher for M18 sensors: part no. 117684
 Toothed lockwasher for M30 sensors: part no. 117685



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

Fasteners

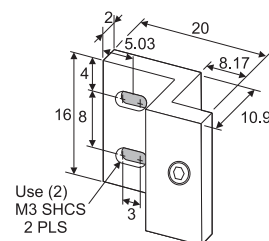
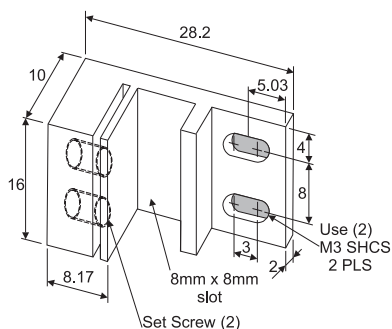
Sensor accessories

Accessories for fiber optics

Special Accessories for Photoelectric Sensors

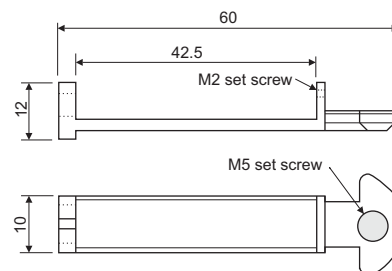
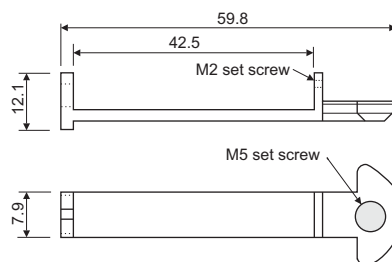
Mounting brackets for 8x8 block sensors

Description	Compression Block Mount for 8mm x 8mm Sensors	Set Screw Block Mount for 8mm x 8mm Sensors
-------------	---	---



Ordering Code	BES Q08-KH-1	BES Q08-HW-4
Material	Anodized Aluminum	Anodized Aluminum

Description	8mm Channel Extruded Rail Mount for 8mm x 8mm Cable-out Sensors	10mm Channel Extruded Rail Mount for 8mm x 8mm Cable-out Sensors
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Ordering Code	BES Q08-KH-2	BES Q08-KH-3
Material	Plated Copper Alloy	Plated Copper Alloy





Special Accessories for Photoelectric Sensors

BMS mounting systems

With the complete Balluff accessories line, you are well equipped for optimal integration of your sensors into your automation process. This is because reliable products make assembly easier than you ever thought possible. Only at Balluff will you find the eccentric clamp which requires no tools and attaches the sensor with just a click. Sensor integration has never been so easy. Ease of handling comes standard with all our products. The accessory line is designed specifically for our sensors, and positions sensors quickly and precisely. It saves time, lowers your costs and increases the machine availability.

Balluff accessories in use

- For adapting sensors to a specific application
- For simplifying work during installation and alignment
- For protecting the sensors
- As an interface to the controller

Mounting system BMS

Designed for industrial automation

Sensors must be positioned inside plants, machines or conveyor systems, usually during the setup process. Modular elements from the Balluff mounting system provide valuable assistance here. The flexible Balluff mounting system can be mounted on base plates and all standard profiles. Almost every corner of the working area can be covered using the versatile range of accessories.



Special Accessories for Photoelectric Sensors

BMS mounting systems



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

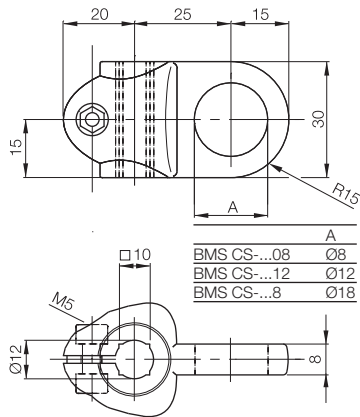
Fasteners

Sensor accessories

Accessories for fiber optics

Sensor Holder

for 1 rod $\varnothing$ 12 mm or 10x10 mm
for cylindrical sensors

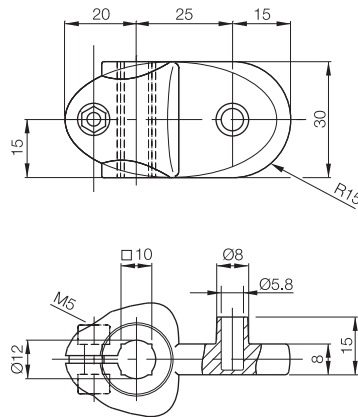


BMS CS-P-D12-AD08-00 for M8 sensors
BMS CS-P-D12-AD12-00 for M12 sensors
BMS CS-P-D12-AD18-00 for M18 sensors

POM plastic

Reflector Holder

for 1 rod $\varnothing$ 12 mm or 10x10 mm
for all reflectors with $\varnothing$ 20 mm (glue) and
BOS R-14 $\varnothing$ 51 mm (pluggable)

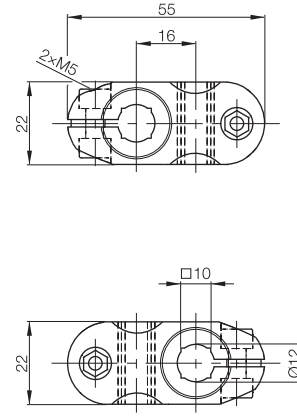


BMS CR-P-D12-AU-00

POM plastic

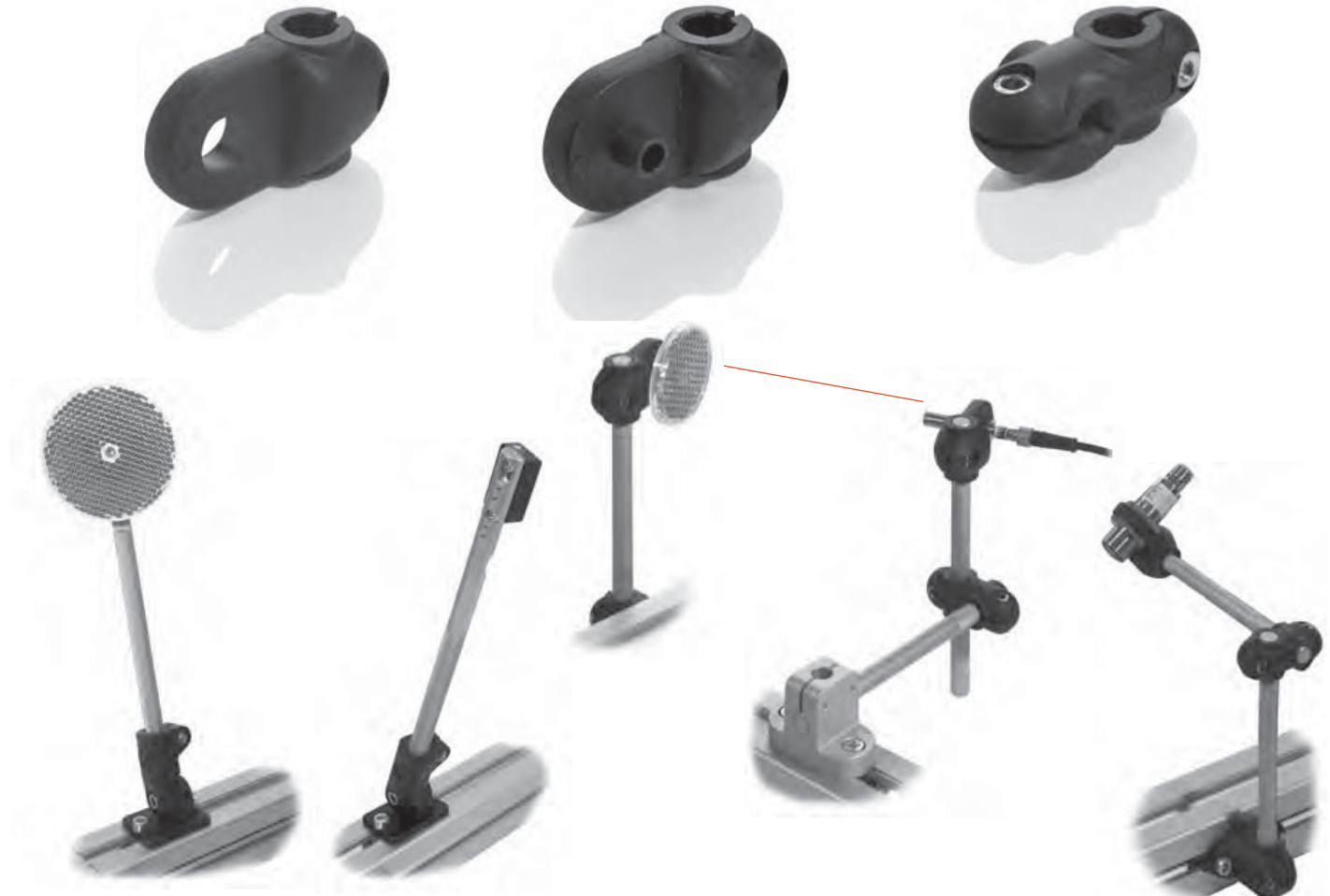
Cross-Connector

for 2 rods $\varnothing$ 12 mm or 10x10 mm
connecting element for 2 rods
 $\varnothing$ 12 mm or 10x10 mm

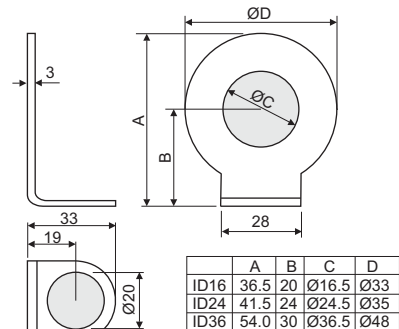


BMS CC-P-D12-A-00

POM plastic



Sensor Mount for clamping cylinder for use with prox mounts

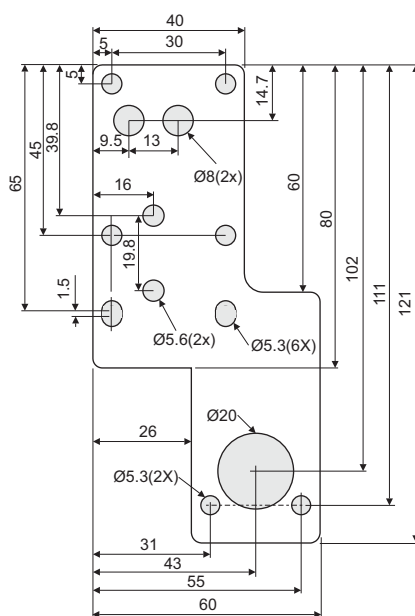


BMS CS-M-D12-ID16-01
BMS CS-M-D12-ID24-01
BMS CS-M-D12-ID36-01

V4A



Mounting Bracket
for clamping cylinder
for UniCompact sensors



BMS-M-D12-IQ40-03

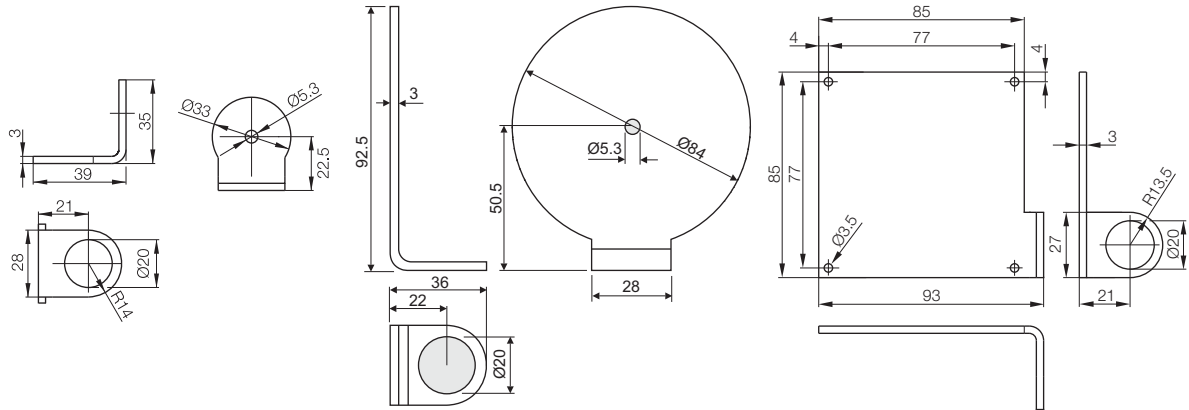
V4A



Special Accessories for Photoelectric Sensors

BMS mounting systems

Description	Reflector Mount	Reflector Mount	Reflector Mount
Type	for BOS R1 + R2 + R3	for BOS R1 + R2 + R3	for BOS R11
Application	for clamping cylinders	for clamping cylinders	for clamping cylinders



Ordering Code	BMS CR-M-D12-IU-02	BMS CR-M-D12-IU-05	BMS CR-M-D12-IS-03
Material	V4A	V4A	V4A



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

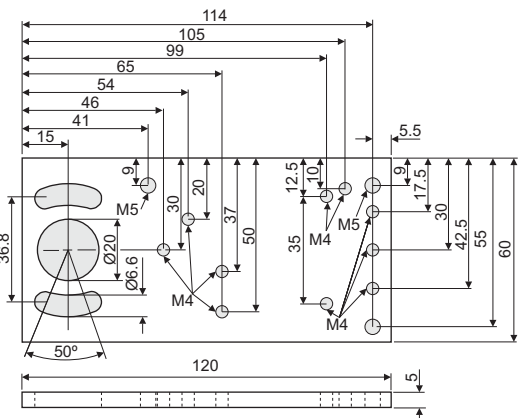
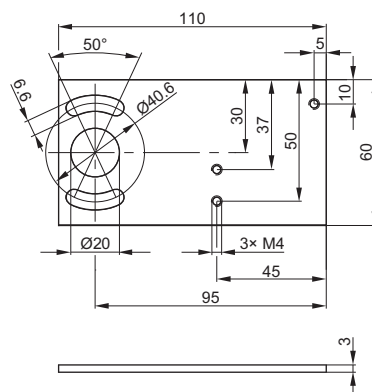
Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

Description	Sensor Adapter Plate	Sensor Adapter Plate
Type	for BOS 21/25/26	for BOS 21/25/26
Application	for base holder with 40 mm hole spacing or clamping cylinders	for base holder with 40 mm hole spacing or clamping cylinders



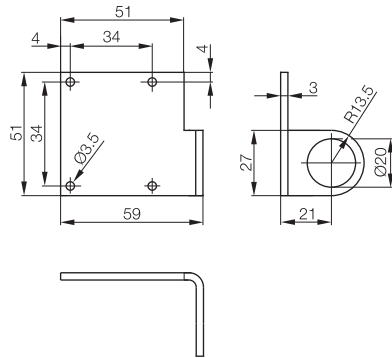
Ordering Code	BMS CS-M-D12-BX01-01	BMS CS-M-D12-BX05-02
Material	Al anodized	Al anodized

Special Accessories for Photoelectric Sensors

BMS mounting systems

Reflector mount

for BOS R9
for clamping cylinders

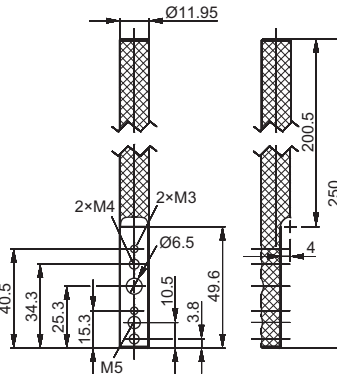


BMS CR-M-D12-IS-04

V4A

Mounting Rod

for reflectors R1, R9, R14, R22, R26
for base holder Ø 12 mm

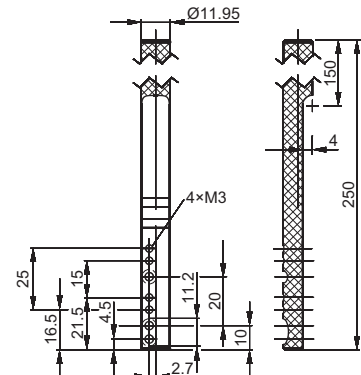


BMS BS-M-D12-0250-01

Al anodized

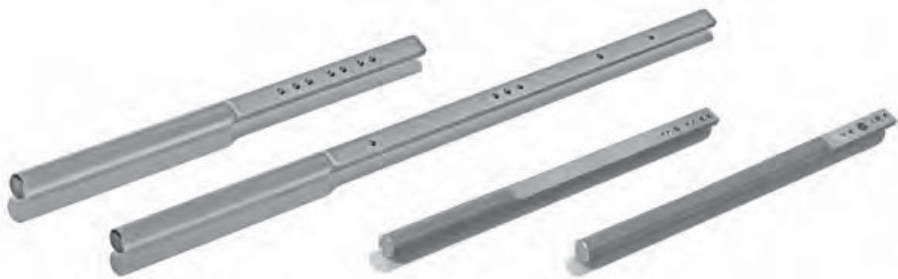
Mounting Rod

for BOS 2K, BOS 5K, BOS 6K, BES/BOS Q08
for base holder Ø 12 mm



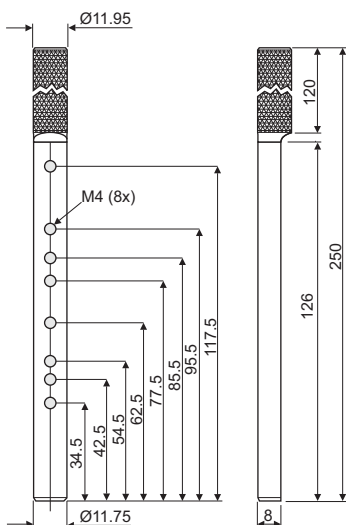
BMS BS-M-D12-0250-02

Al anodized



Mounting Rod

for BGL 5A...80A
for base holder Ø 12mm

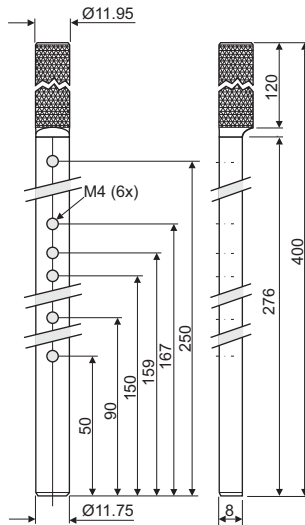


BMS BS-M-D12-0250-03

Al anodized

Mounting Rod

for BGL 80A...220A
for base holder Ø 12mm



BMS BS-M-D12-0400-04

Al anodized

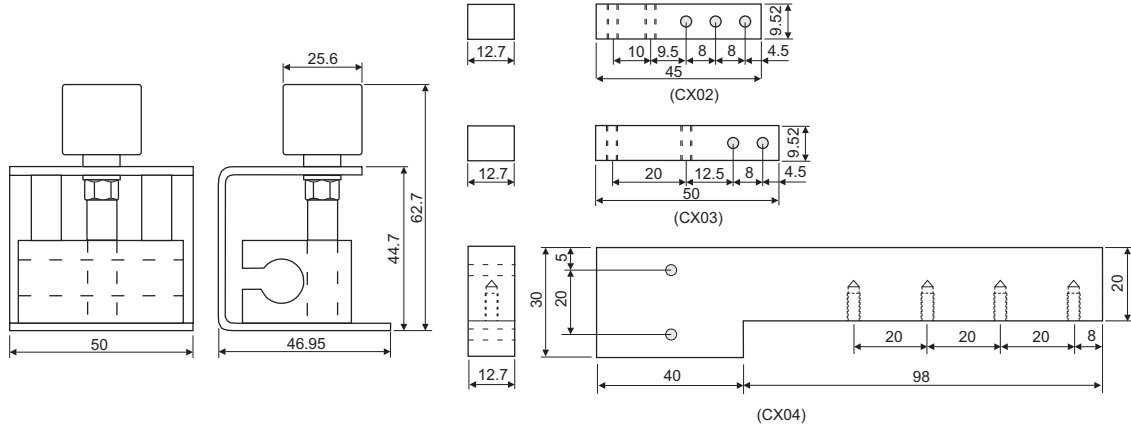


Mounting rods Ø 12 mm, anodized Al
BMS RS-M-D12-**0150**-00 = 150 mm
BMS RS-M-D12-**0250**-00 = 250 mm
BMS RS-M-D12-**1000**-00 = 1000 mm

Special Accessories for Photoelectric Sensors

BMS mounting systems

Description	Sensor adjustment tool	Adapter bracket
Type	for BGL	for BGL
Application	for fine positioning	for fine positioning



Ordering Code		
All BGLs	BMS CS-M-D12-CZ	
BGL 5 - 20 mm		BMS CS-M-D12-CX02-01
BGL 30 - 80 mm		BMS CS-M-D12-CX03-01
BGL 120 - 220 mm		BMS CS-M-D12-CX04-01

Kits Available:

BMS CS-M-D12-CX02-01-Z = BMS CS-M-D12-CZ and BMS CS-M-D12-CX02-01

BMS CS-M-D12-CX03-01-Z = BMS CS-M-D12-CZ and BMS CS-M-D12-CX03-01

BMS CS-M-D12-CX04-01-Z = BMS CS-M-D12-CZ and BMS CS-M-D12-CX04-01



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

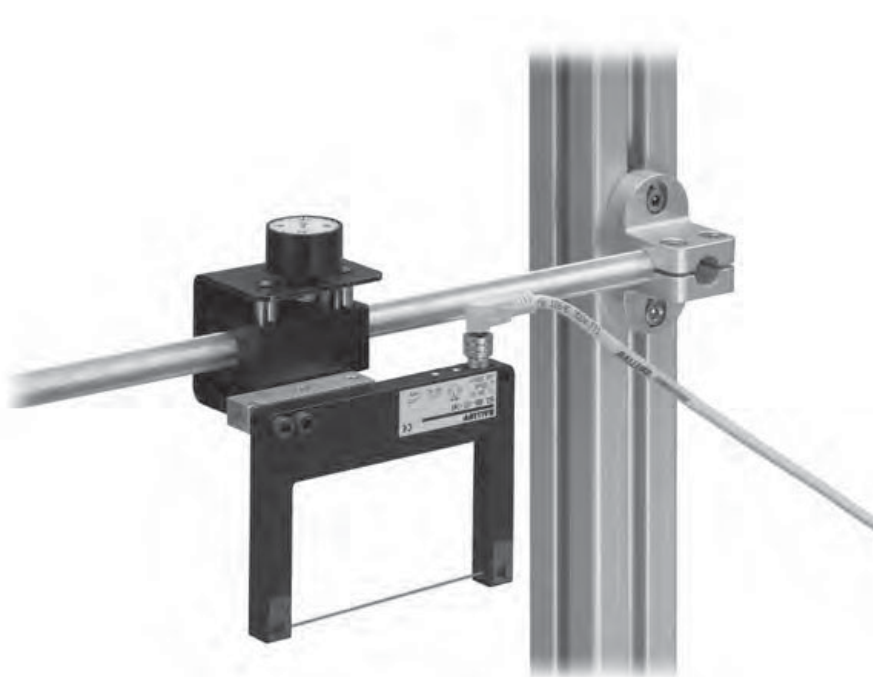


Mounting rods Ø 12 mm, anodized Al

BMS RS-M-D12-**0150**-00 = 150 mm

BMS RS-M-D12-**0250**-00 = 250 mm

BMS RS-M-D12-**1000**-00 = 1000 mm



Special Accessories for Photoelectric Sensors

BMS mounting systems

NEW! BMS Mounting Kits



Kit Number

	BMS CS-M-D12-IZ	BMS CS-M-D12-ID08-01	BMS CS-M-D12-ID12-01	BMS CS-M-D12-ID16-01	BMS CS-M-D12-ID18-01	BMS CS-M-D12-ID24-01	BMS CS-M-D12-ID30-01	BMS CS-M-D12-ID36-01	BMS CS-M-IQ40-02	M10 x 40mm bolt and M10 nut	M10 x 55mm bolt and M10 nut	M10 x 70mm bolt and M10 nut
BMS KIT-MTG-01-D08/40	■	■								■		
BMS KIT-MTG-01-D12/40	■		■							■		
BMS KIT-MTG-01-D16/40	■			■						■		
BMS KIT-MTG-01-D18/40	■				■					■		
BMS KIT-MTG-01-D24/40	■					■				■		
BMS KIT-MTG-01-D30/40	■						■			■		
BMS KIT-MTG-01-D36/40	■							■		■		
BMS KIT-MTG-01-D08/55	■	■									■	
BMS KIT-MTG-01-D12/55	■		■								■	
BMS KIT-MTG-01-D16/55	■			■							■	
BMS KIT-MTG-01-D18/55	■				■						■	
BMS KIT-MTG-01-D24/55	■					■					■	
BMS KIT-MTG-01-D30/55	■						■				■	
BMS KIT-MTG-01-D36/55	■							■			■	
BMS KIT-MTG-01-D08/70	■	■										■
BMS KIT-MTG-01-D12/70	■		■									■
BMS KIT-MTG-01-D16/70	■			■								■
BMS KIT-MTG-01-D18/70	■				■							■
BMS KIT-MTG-01-D24/70	■					■						■
BMS KIT-MTG-01-D30/70	■						■					■
BMS KIT-MTG-01-D36/70	■							■				■
BMS KIT-MTG-01-Q40/40	■								■	■		
BMS KIT-MTG-01-Q40/55	■								■		■	
BMS KIT-MTG-01-Q40/70	■								■			■

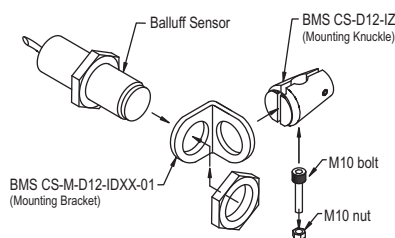
These kits provide you the convenience of all the parts you need in a single box.

Kit Components

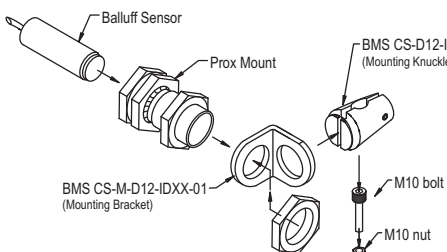
Description

BMS CS-M-D12-IZ	Joint, Rotary Mounting type
BMS CS-M-D12-ID08-01	Bracket, for standard M8 sensors
BMS CS-M-D12-ID12-01	Bracket, for M8 sensor prox mounts or standard M12 sensors
BMS CS-M-D12-ID16-01	Bracket, for M12 sensor prox mounts
BMS CS-M-D12-ID18-01	Bracket, for standard M18 sensors
BMS CS-M-D12-ID24-01	Bracket, for M18 sensor prox mounts
BMS CS-M-D12-ID30-01	Bracket, for standard M30 sensors
BMS CS-M-D12-ID36-01	Bracket, for M30 sensor prox mounts
BMS CS-M-IQ40-02	Bracket, 40x40mm Cube Sensor Mount
M10 x 40mm bolt and M10 nut	M10 x 40mm bolt with M10 x 1.5 nut, black oxide
M10 x 55mm bolt and M10 nut	M10 x 55mm bolt with M10 x 1.5 nut, black oxide
M10 x 70mm bolt and M10 nut	M10 x 70mm bolt with M10 x 1.5 nut, black oxide

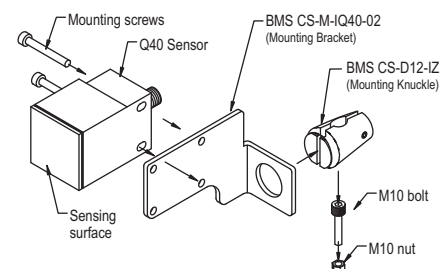
Tubular Sensors Only



Tubular Sensors with Prox Mount



Unicompact Sensor

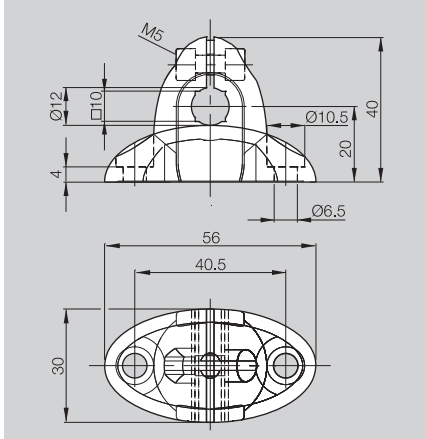
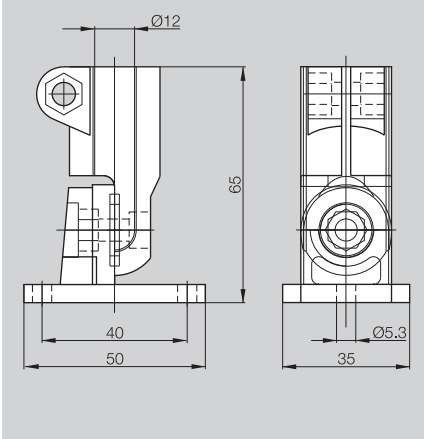


Special Accessories for Photoelectric Sensors

BMS mounting systems

BMS Mounting Systems

Balluff offers high-quality mounting accessories for optimally positioning the sensors in systems and machines. The mounting system can be attached to base plates or on all common extrusion rails. The kit design means that virtually any required solid angle can be accommodated. Additional accessories such as reflector holders and adapter plates, usable for tubular and block-style sensors, complete the accessories kit.

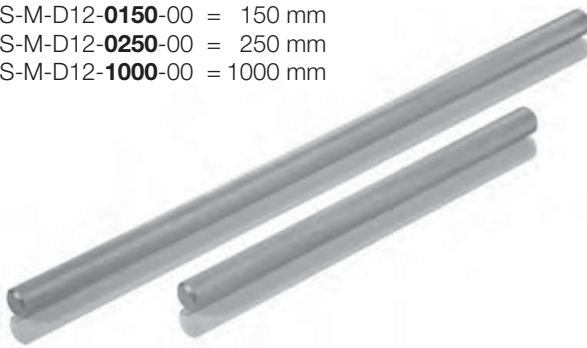
Description	Base Holder	Articulated Base Holder
Type	for 1 rod $\varnothing$ 12 mm or 10x10 mm	for 1 rod $\varnothing$ 12 mm
Application	for mounting on base plates or rails	for mounting on base plates or rails
		
Ordering Code	BMS CU-P-D12-A040-00	BMS CUJ-P-D12-R040-00
Material	POM plastic	POM plastic

Note: Stainless steel screws included.

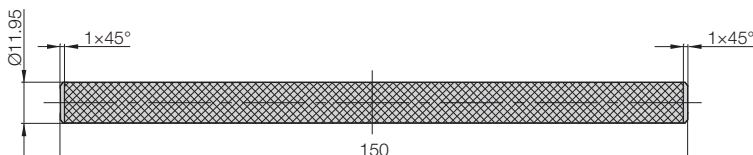


Mounting rods $\varnothing$ 12 mm, anodized Al

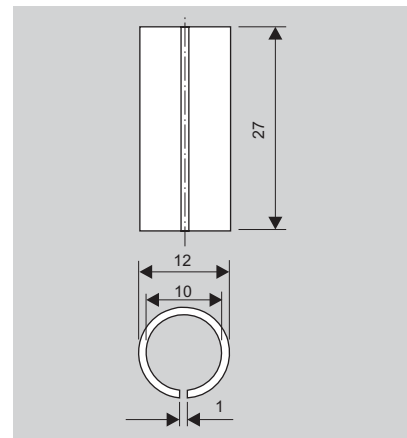
BMS RS-M-D12-**0150**-00 = 150 mm
 BMS RS-M-D12-**0250**-00 = 250 mm
 BMS RS-M-D12-**1000**-00 = 1000 mm



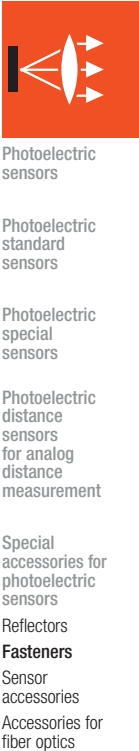
The mounting rods are knurled over the full length. This prevents slipping and position shifting.



Description	Rod Adapter
Type	for 1 rod $\varnothing$ 10 mm
Application	converts a $\varnothing$ 10 mm rod to a $\varnothing$ 12 mm rod



Ordering Code	BMS AD-P-001-12/10
Material	POM plastic



Special Accessories for Photoelectric Sensors

Holding system

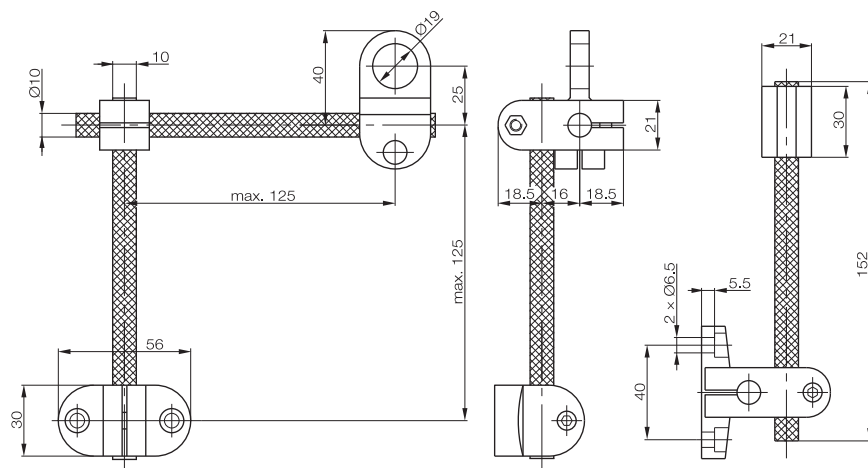


Mounting rods are knurled all the way around.
This prevents any position change.



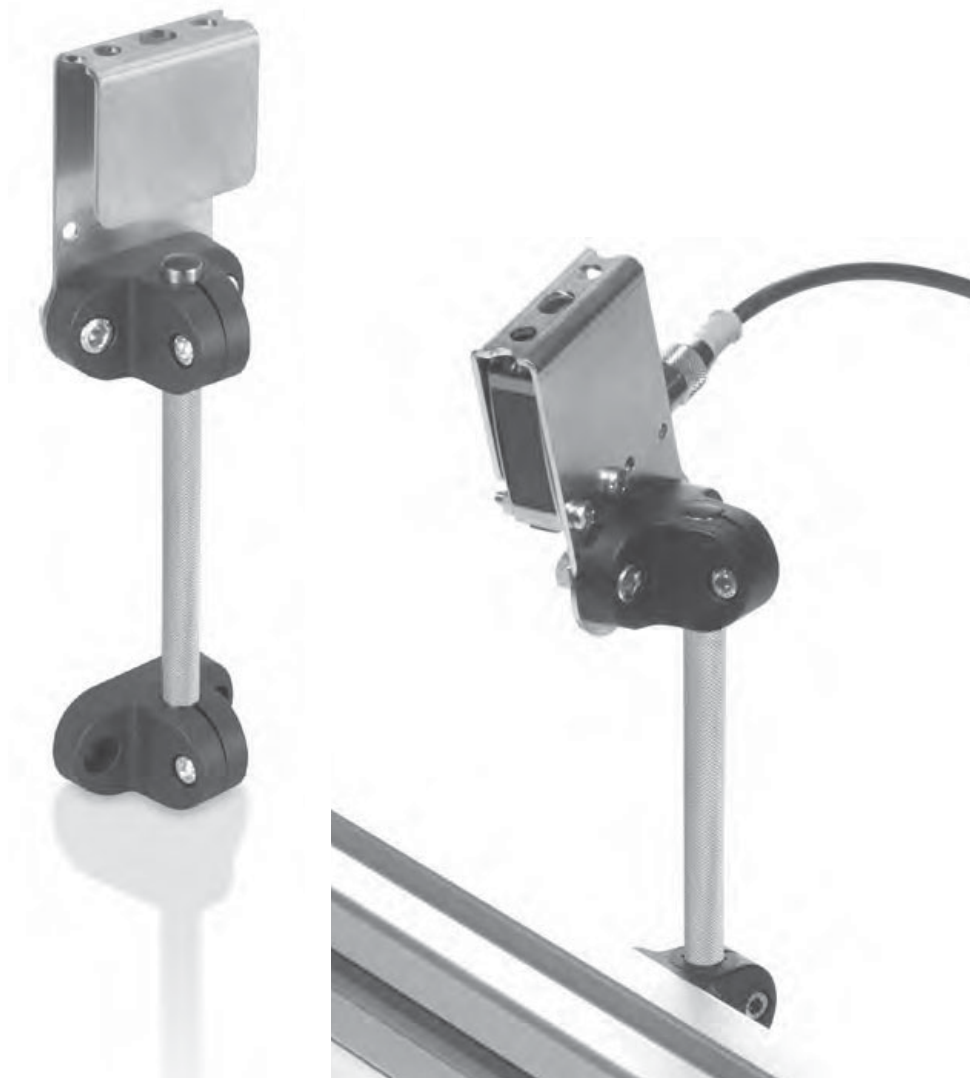
Holding systems are assigned to the accessories that we mark in gray.

Description	Holding system
Use	For flexible mounting; for all cylindrical sensors with M18 outside thread and 8×8 sensors. May be combined with other Balluff accessories.
Ordering code	BAM00R8
Part number	BOS 18-HS-1



Special Accessories for Photoelectric Sensors

Holding system



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

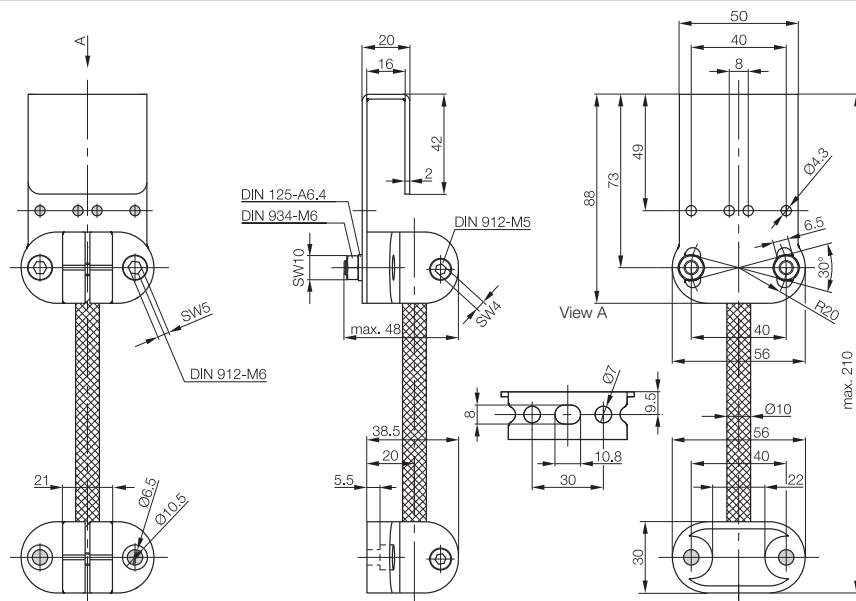
Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

Description	Holding system
Use	For sensors in series BOS 21M. May be combined with other Balluff accessories.
Ordering code	BAM00T8
Part number	BOS 21-HS-1

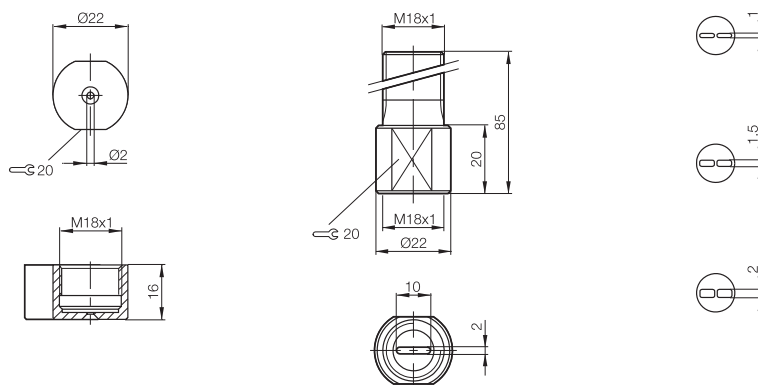


Special Accessories for Photoelectric Sensors

Apertures



Description	Round aperture			Double slit aperture			Slit aperture		
Use	For BLE/BLS 18			For BLE/BLS 18			For BLE/BLS 12M		
Ordering code	BAM00R6			BAM00R7			BAM00PW		
Part number	BOS 18-BL-1			BOS 18-BL-2			BOS 12-BL-1		
	Aper- ture on emitter	Aper- ture on receiver	Range	Aper- ture on emitter	Aper- ture on receiver	Range	Slit width	Range	Object size
	○		8 mm	⏏	⏏	3 mm	1 mm	0.5 mm	> 1 mm
		○	8 mm	⏏	⏏	2 mm	1.5 mm	1 mm	> 1.5 mm
	○	○	2 mm	⏏	⏏	2 mm	2 mm	2 mm	> 2 mm



The round and slit apertures restrict the beam diameter. This allows you to detect small parts over a large range. The emitter and receiver must be exactly aligned with each other.

Advantages:

- Small parts detection, i.e. 1 mm drill, aperture on emitter only
- Through-beams may be mounted close to one another
- Highly reflective parts directly next to the light path do not interfere.

Special Accessories for Photoelectric Sensors

Apertures



Reflectors are assigned to the accessories that we mark in gray.



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

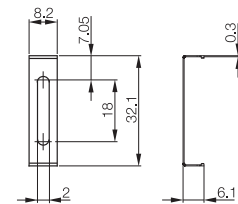
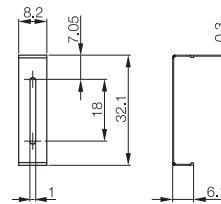
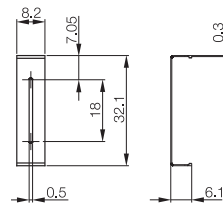
Fasteners

Sensor accessories

Accessories for fiber optics

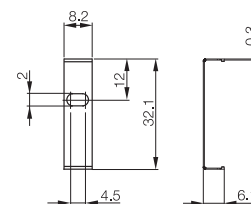
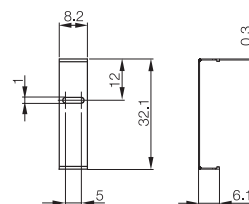
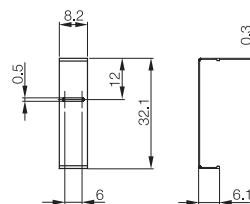
Description	Vertical slit aperture	Vertical slit aperture	Vertical slit aperture
Use	For BOS 5K through-beam sensors	For BOS 5K through-beam sensors	For BOS 5K through-beam sensors
Ordering code	BAM00TU	BAM00TW	BAM00TY
Part number	BOS 5-BL-1	BOS 5-BL-2	BOS 5-BL-3
Aperture size	0.5 mm, vertical	1 mm, vertical	2 mm, vertical
Range*	1.0 (2.5 m)	1.5 (3.5 m)	3.5 (6 m)
Min. object*	0.5 (7 mm)	1.0 (7 mm)	2.0 (7 mm)
Packaging unit	2 pcs.	2 pcs.	2 pcs.

*Values in brackets apply to slit apertures on one side



Description	Horizontal slit aperture	Horizontal slit aperture	Horizontal slit aperture
Use	For BOS 5K through-beam sensors	For BOS 5K through-beam sensors	For BOS 5K through-beam sensors
Ordering code	BAM00TZ	BAM00U0	BAM00U1
Part number	BOS 5-BL-4	BOS 5-BL-5	BOS 5-BL-6
Aperture size	0.5 mm horizontal	1 mm horizontal	2 mm horizontal
Range*	0.7 (2 m)	1.5 (3 m)	3.0 (5.5 m)
Min. object*	0.4 (7 mm)	0.7 (7 mm)	1.5 (7 mm)
Packaging unit	2 pcs.	2 pcs.	2 pcs.

*Values in brackets apply to slit apertures on one side



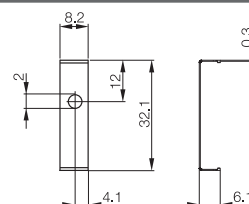
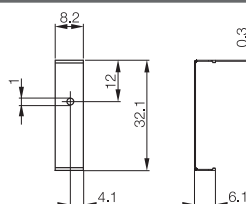
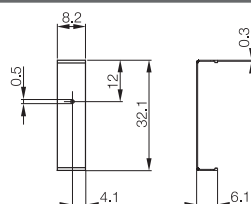
Special Accessories for Photoelectric Sensors

Apertures, weld protection



Description	Round aperture	Round aperture	Round aperture
Use	For BOS 5K through-beam sensors	For BOS 5K through-beam sensors	For BOS 5K through-beam sensors
Ordering code	BAM00U2	BAM00U3	BAM00U4
Part number	BOS 5-BL-7	BOS 5-BL-8	BOS 5-BL-9
Aperture size	0.5 mm Ø	1 mm Ø	2 mm Ø
Range*	0.08 (0.8 m)	0.3 (1.5 m)	1.2 (2.5 m)
Min. object*	0.3 (5 mm)	0.6 (5 mm)	1.5 (7 mm)
Packaging unit	2 pcs.	2 pcs.	2 pcs.

*Values in brackets apply to slit apertures on one side





Special Accessories for Photoelectric Sensors

Apertures, weld protection



Sensor not included in the standard scope of delivery!



Sensor not included in the standard scope of delivery!



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

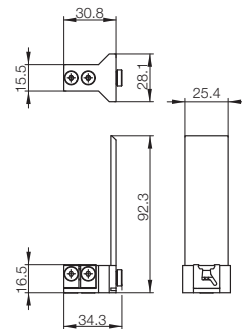
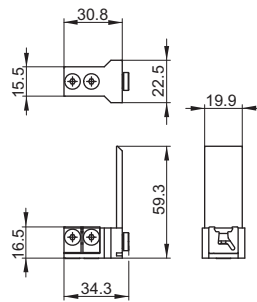
Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

Description	Weld protection	Weld protection	
Use	For BOS 23K	For BOS 50K	
Ordering code	BAM01L8	BAM01U6	
Part number	BAM PC-XO-006-23K-1	BAM PC-XO-006-50K-1	

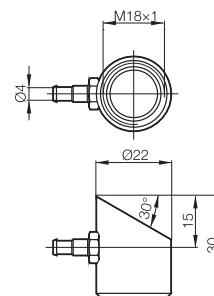
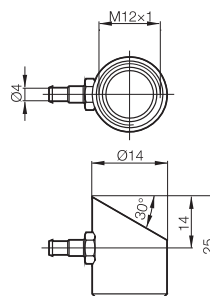
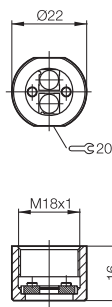
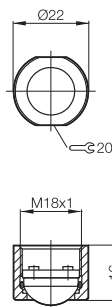


Special Accessories for Photoelectric Sensors

Planoconvex lens, polarizing filter, air tube



Description	Planoconvex lens	Polarizing filter	Air shield	Air shield	
Use	For all BOS 18 diffuse sensors for background suppression and small parts detection	Only for BOS 18M-...-1RD...	For BOS 12 and tube with 4 mm inner diameter	For BOS 18 and tube with 4 mm inner diameter	
Focal length/focus					
Ordering code	BAM00RF	BAM00RE	BAM00PY	BAM00R9	
Part number	BOS 18-PK-1	BOS 18-PF-1	BOS 12-LT-1	BOS 18-LT-1	
Material	Housing: PA6 Planoconvex lens: glass	Housing: PA6 Polarization filter: IR polarization			



Benefits

- Sensing distance adjustable 0...40 mm
- Low switching point shift, e.g. for different colors or surface properties
- Background suppression facilitates detection of objects on reflective background
- Small parts detection down to 0.05 mm through focusing planoconvex lens with a working range of approx. 0...13 mm

Polarizing filters are used for reliably sensing highly reflective objects. They prevent faulty switching.

Reflecting or shiny parts will then not cause faulty switching. The polarizing filters guarantee that only the light reflected back by the reflector is detected. They reduce the sensing range by 50%.

The air tube with a compressed air source prevents premature contamination of the optics.

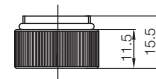
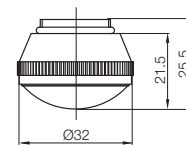
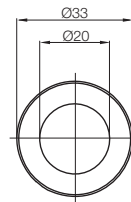
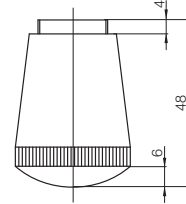
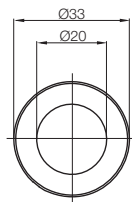
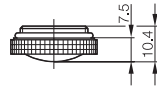
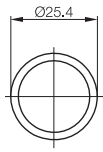
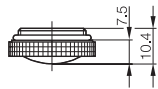
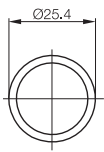
The air tube with a compressed air source prevents premature contamination of the optics.

Special Accessories for Photoelectric Sensors

Lenses, intermediate ring



Lens	Lens	Lens	Lens	Intermediate ring
For BKT 67 for increasing the sensing distance (light spot 2×7 mm)	For BKT 67 standard lenses (light spot 1.5×4 mm)	For BKT 67 for increasing the sensing distance (light spot 2×8 mm)	For BKT 67 for increasing the sensing distance (light spot 2.5×11 mm)	Intermediate ring with lens for increased resolution for BKT 67 in combination with M-PK-2. It is screwed in between the sensor and the 9 mm lens.
18 mm	9 mm	28 mm	50 mm	
BAM0120	BAM0121	BAM0122	BAM00P3	BAM00P2
BKT M-PK-1	BKT M-PK-2	BKT M-PK-3	BKT M-PK-5	BKT M-PK-4
Lens: glass Version: aluminum	Lens: glass Version: aluminum	Lens: glass Version: aluminum	Lens: glass Version: aluminum	Lens: glass Version: aluminum



Photoelectric
sensors

Photoelectric
standard
sensors

Photoelectric
special
sensors

Photoelectric
distance
sensors
for analog
distance
measurement

Special
accessories for
photoelectric
sensors

Reflectors

Fasteners

**Sensor
accessories**

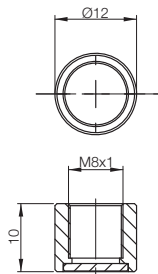
Accessories for
fiber optics

Special Accessories for Photoelectric Sensors

Neutral density filters



Description	Cover nut	Cover nut	
Use	For BOS 08	For BOS 12	
Transmission			
Ordering code	BAM01Y5	BAM01Y6	
Part number	BAM PC-X0-005-08M-4	BOS PC-X0-005-12M-4	



The protective end cap (cap nut) is made with tempered glass and can be used with all M12 photoelectric sensors. The protective glass is used to protect the optics from mechanical or thermal damage, such as weld splatter.

Special Accessories for Photoelectric Sensors

Protective nuts



Cover nut

For BOS 18

BAM00RL

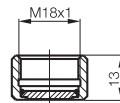
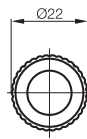
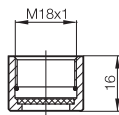
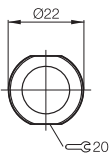
BOS 18-SM-1

Cover nut

For BOS 18 with flat front surface

BAM01NC

BAM PC-XO-005-18M-4



The protective end cap is made with tempered glass and can be used with all M18 photoelectric sensors. The protective glass is used to protect the optics from mechanical or thermal damage, such as weld splatter.

The protective cap can be used in combination with all BOS 18M and BOS 18K sensors. It protects the sensor optics from external effects, such as welding splatter. For increased protection, the BOS 18-SM-2 is made of metal, providing even better protection for the sensor optics. The heat-protecting glass closes off flush with the front surface of the cover nut. This prevents dust deposits from forming, which can impact the range. A ring between the sensor and protective glass makes sure the system is sealed.



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

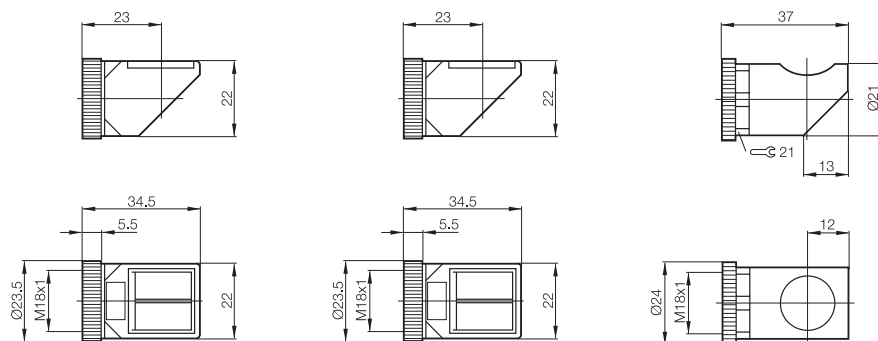
Accessories for fiber optics

Special Accessories for Photoelectric Sensors

Deflection heads



Description	90° deflection head	90° deflection head	90° deflection head
Use	For diffuse, retroreflective and through-beam sensors BOS 18 (except laser)	For diffuse, retroreflective and through-beam sensors BOS 18 (except laser)	For diffuse, retroreflective and through-beam sensors BOS 18
Ordering code	BAM00RP	BAM00RT	BAM00RR
Part number	BOS 18-UK-1	BOS 18-UK-2	BOS 18-UK-10

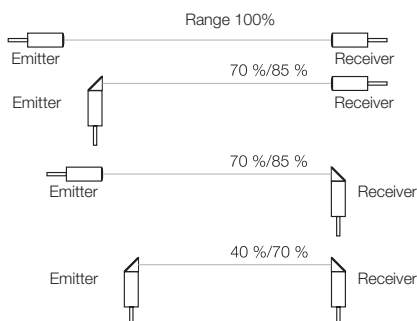


	BOS 18-UK-1	BOS 18-UK-2	BOS 18-UK-10
Diffuse sensor			
BOS 18...-XA-...100 mm	RF = 45 %		RF = 50 %
BOS 18...-XB-...200 mm	RF = 25 %		RF = 50 %
BOS 18...-PB-...200 mm	RF = 25 %		RF = 50 %
BOS 18...-XD-...400 mm		RF = 25 %	RF = 30 %
BOS 18...-PD-...400 mm		RF = 25 %	RF = 30 %
Retroreflective sensor			
BOS 18...-RB-...2 m		RF = 20 %	RF = 20 %
BOS 18...-RD-...4 m		RF = 20 %	RF = 20 %
Through-beam sensor			
BLE 18...-P-...16 m		RF = 15 %	RF = 30 %
BLS 18...-XX-...16 m		RF = 15 %	RF = 30 %

Deflection heads, suitable combinations

All BOS 18 photoelectric sensors can be equipped with a 90° deflection head.

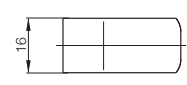
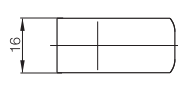
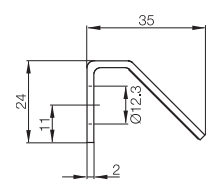
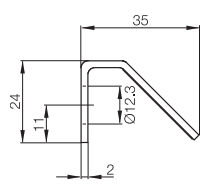
The table shows the appropriate deflection head for each switch type and indicates the corresponding reduction factor (RF) to apply to the range. With a through-beam sensor, the emitter and the receiver can be equipped with a 90° deflection head. Each deflection head reduces the range by approx. 15% ... 50%.



Special Accessories for Photoelectric Sensors
Angled mirrors



	Angled mirror For diffuse and through-beam sensors BOS 12	Angled mirror For laser through-beam sensors BOS 12		
	BAM00R0 BOS 12-WS-1	BAM00R1 BOS 12-WS-2		



When using the angled mirror, the sensing range is reduced by 30% for the M12 diffuse and M12 through-beam sensors. Not suitable for retroreflective sensors.

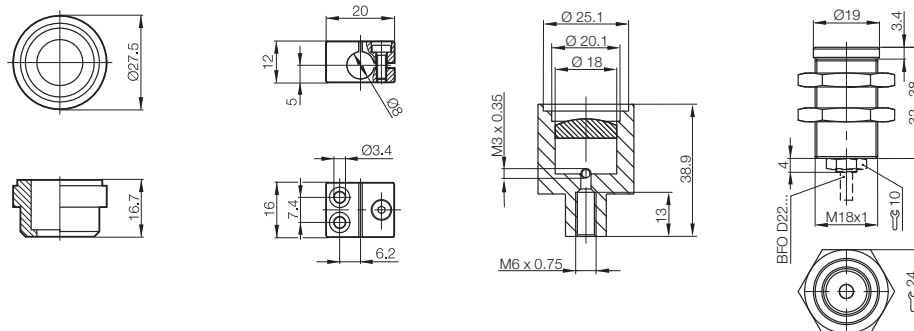
-
- Photoelectric sensors
- Photoelectric standard sensors
- Photoelectric special sensors
- Photoelectric distance sensors for analog distance measurement
- Special accessories for photoelectric sensors
- Reflectors
- Fasteners
- Sensor accessories**
- Accessories for fiber optics

Special Accessories for Photoelectric Sensors

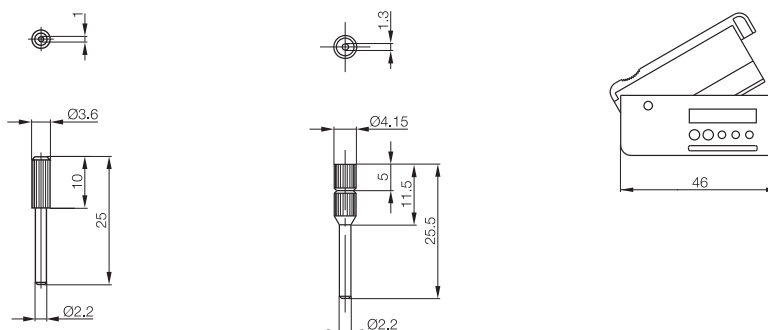
Adapter, holder, cutting tool, optics



Description	Adapter	Holder	Lens (Long Range)	Optics (adjustable)
Use	For BFO 18V glass fiber optics for connecting to BOS 30M	For glass fiber optics and sensors with a M8 corresponding diameter	screwed to fiber optics BFO00C4, 400 mm true-color sensor	screwed to fiber optics BFO00C4, 200 mm true-color sensor
Ordering code	BAM00NM	BAM00P0	BAM01PA	BAM01U2
Part number	BFO 30-A1	BFO 08,0-KB-1	BAM LS-FO-001-M6-L	BAM LS-FO-002-F
Packaging unit	1 pc.	1 pc.	1 pc.	1 pc.

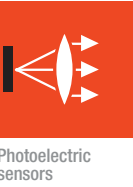


Description	Adapter	Adapter	Cutting tool
Use	For plastic fiber optics Ø 1 mm for connecting to fiber optic base units	For plastic fiber optics Ø 1.3 mm for connecting to fiber optic base units	For trimming plastic fiber optics Ø 1 mm or Ø 2.2 mm
Ordering code	BAM0003	BAM00P1	BAM000E
Part number	BFO D10-LA-DC-10	BFO D13-LA-EC-10	BFO CT
Packaging unit	2 pcs.	2 pcs.	1 pc.



Special Accessories for Photoelectric Sensors

Adapter lens, deflection head, focus lens, metal helical tube, optical fiber



Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

Special accessories for photoelectric sensors

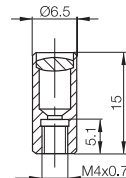
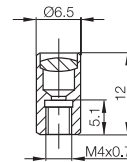
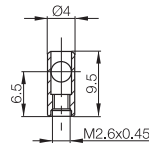
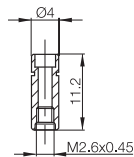
Reflectors

Fasteners

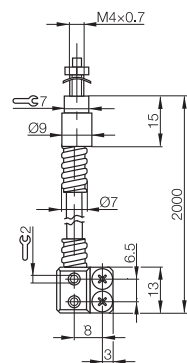
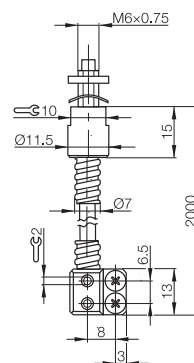
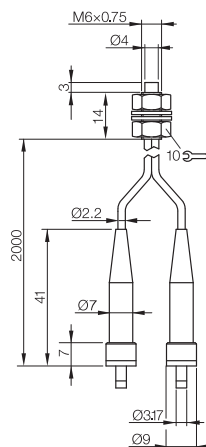
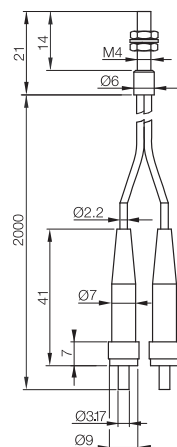
Sensor accessories

Accessories for fiber optics

Description	Adapter lens	90° deflection head	Focus lens	Focus lens
Use	For through-beam optical fibers M2.6x0.45	For through-beam optical fibers M2.6x0.45	For coaxial diffuse sensor optical fibers M4x0.7	For coaxial diffuse sensor optical fibers M4x0.7
Ordering code	BAM00NN	BAM00NP	BAM00NR	BAM00NT
Part number	BFO 02-PK-1	BFO 02-UK-1	BFO 04-FL-1	BFO 04-FL-2
Sensing distance/range with corresponding fiber optics	×10	×0.7	19 mm±2 mm	7 mm±2 mm
Packaging unit	2 pcs.	2 pcs.	1 pc.	1 pc.



Description	Optical fiber M4 with SMA connector	Optical fiber M6 with SMA connector	Metal corrugated tube (stainless steel)	Metal corrugated tube (stainless steel)
Use	For BFS000L True color sensor	For BFS000L True color sensor	For fiber optics M6x0.75	For fiber optics M4x0.7
Ordering code	BFO00C9	BFO00C4	BAM00NY	BAM00NU
Part number	BFO D22-XB-UB-EAK-15-SA1-02	BFO D22-XB-LB-EAK-15-SA1-02	BFO 06-FS-1	BFO 04-FS-1
Sensing distance/range with corresponding fiber optics	80 mm	80 mm		
Packaging unit	1 pc.	1 pc.	1 pc.	1 pc.

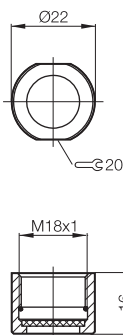


Special Accessories for Photoelectric Sensors

Lenses

Neutral Filter

for BOS 18M



BOS 18-NF-^{*}

Protective Lens Cap

for BOS 12M



BOS 12-SM-1

Protective Lens Cap

for BOS 18M



BOS 18-SM-2

^{*} 1 = 50 % Transmission, 2 = 75 % Transmission

Neutral filters reduce the amount of light transmitted (or received) by a photoelectric sensor.

The lens material is made of a specialized glass that works effectively with all wavelengths of light. Typical applications include sensor testing, where a specific excess gain level is required or specialized configurations, where an emitter needs to be dampened to reduce the amount of light as to not "burn-thru" an object.

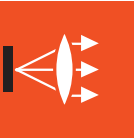
Protective cap with plastic lens suitable for all BOS 12M sensors. Adds a layer of protection from mechanical damage as well as heat.

Protective cap with glass lens suitable for all BOS 18M sensors. Adds a layer of protection from mechanical damage as well as heat.





Special Accessories for Photoelectric Sensors



Photoelectric sensors

Photoelectric standard sensors

Photoelectric special sensors

Photoelectric distance sensors for analog distance measurement

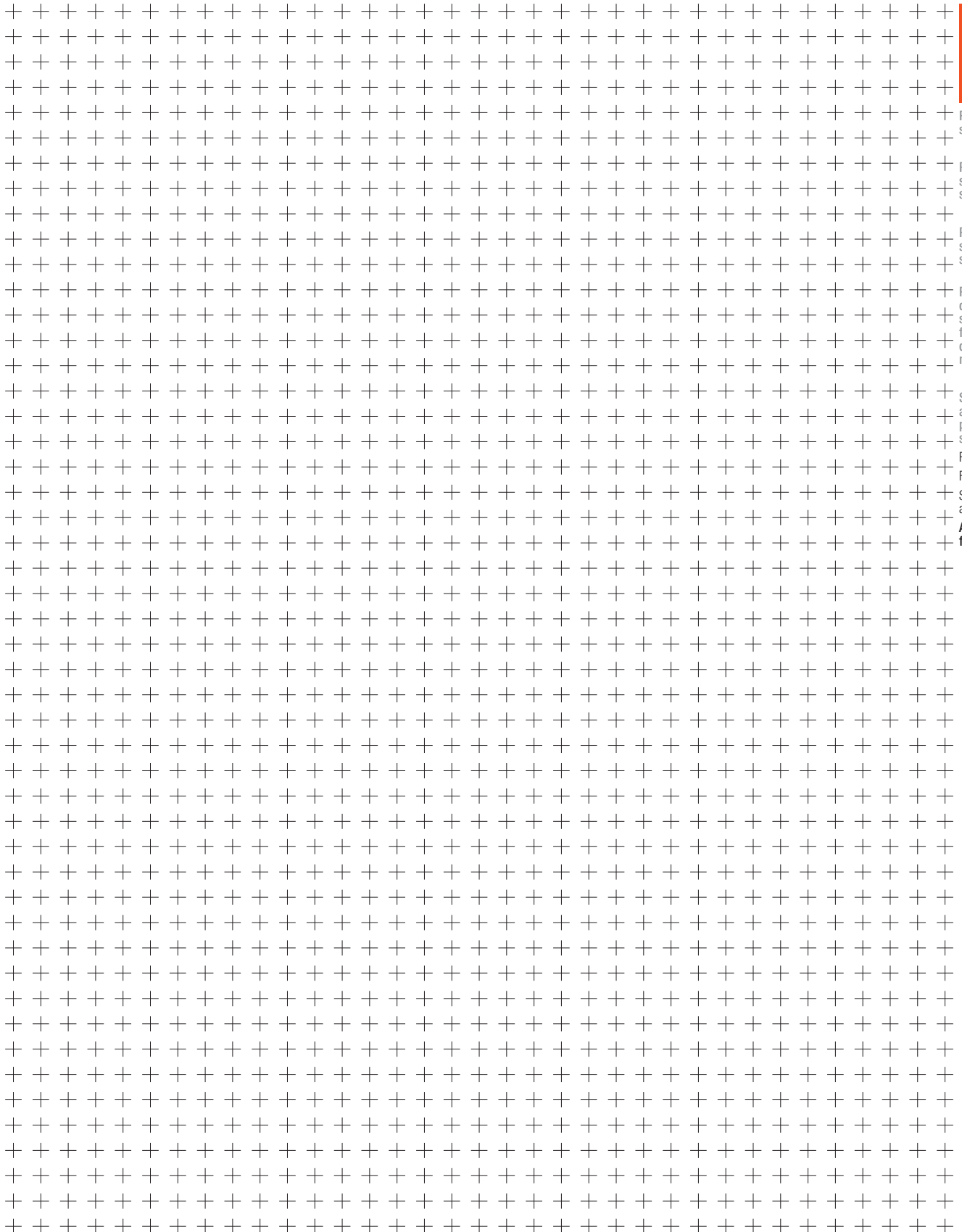
Special accessories for photoelectric sensors

Reflectors

Fasteners

Sensor accessories

Accessories for fiber optics

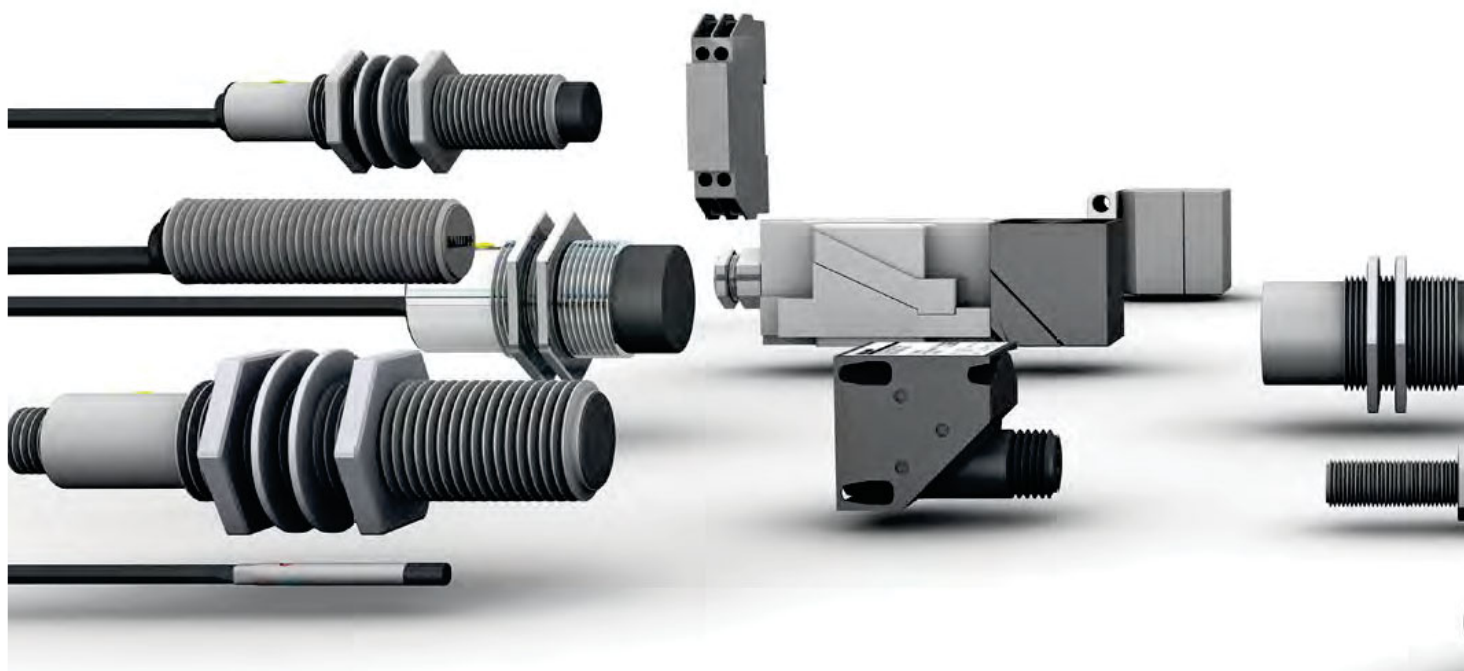




Inductive Sensors

Inductive sensors for object detection

Automation is almost inconceivable without inductive sensors. Wherever processes are automated, non-contact position detection, freedom from wear, and reliability are in demand. Whether in machine building, automation technology, electronics manufacturing or the plastics industry, in textile machines, wood processing or in the automobile industry – Balluff sensors monitor, control and automate processes and states. Providing the highest quality and optimized for any application. From standard to extended switching distance, from temperature and high pressure rated to "Factor 1" from mini to maxi: You too can take advantage of Balluff's versatility in your applications. And profit from the reliability and quality of proven products from your full-line provider.



Inductive sensors

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Product overview	470

DC 3-wire inductive global sensors

Tubular housings	476
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DC 3-/4-wire inductive sensors

Tubular housings	493
Block housings	552

DC 2-wire inductive sensors

Tubular housings	595
Block housings	606

AC/DC 2-wire inductive sensors

Tubular housings	615
Block housings	623

AC 2-wire inductive sensors

Tubular housings	634
Block housings	639

Inductive sensors with special properties

High-pressure sensors	643
Strokemaster® sensors	660
Steelface sensors	664
High temperature sensors	670
Harsh environment sensors	674
Factor 1 sensors	684
Weld field immune sensors	696
Large designs	704
Ring sensors	710
Tube sensors	714

Inductive Sensors for analog distance measurement

Tubular housings	720
Block housings	731

Accessories for inductive sensors

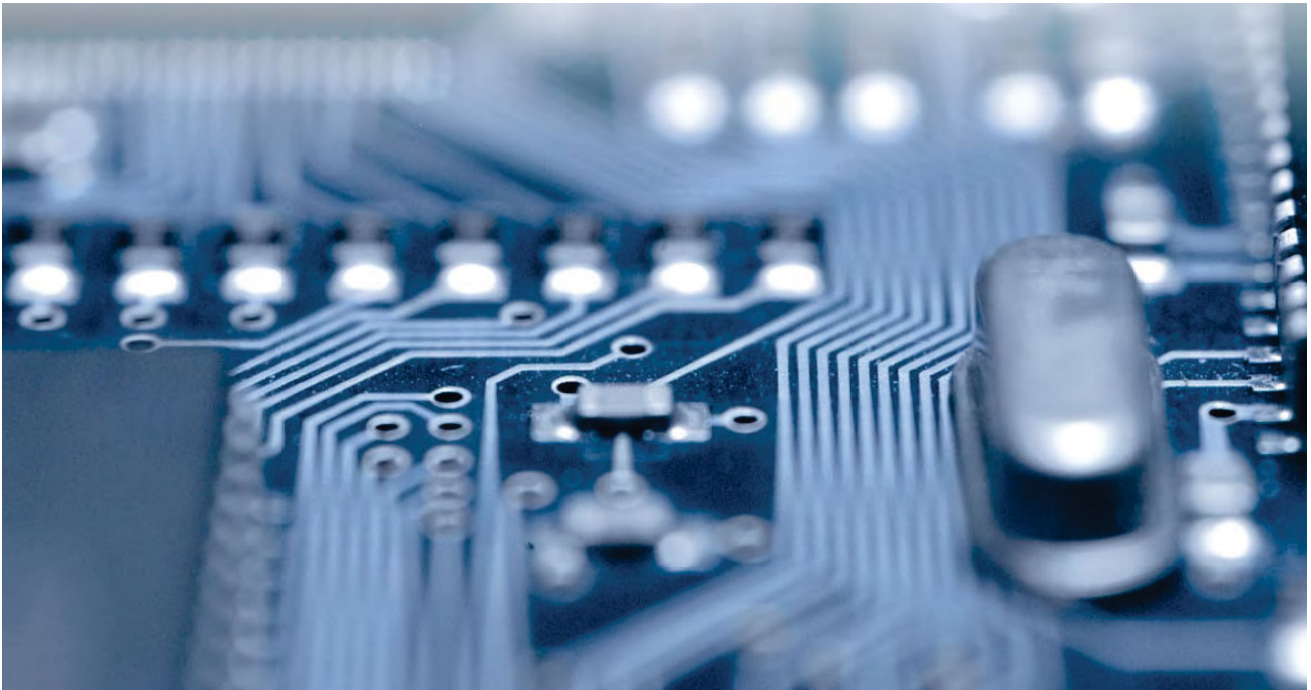
Pulse stretching	736
Sensor tester, testing and setting device	741
Analog switching devices	743
Assembly aids for Uni and Unicomact sensors	744
Protective coverings for Unicomact sensors	747
Protective nuts	748
Positive stop	750
Tube switch	752
Banking screw actuators	754
Cushioned Prox mounts	756
Mounting clamps for tubular sensors	758
Mounting brackets for tubular sensors	760
Prox mounts for tubular sensors	761
Bunker Blocks®	762
Weld Repel™	763
Mounting brackets for 8x8 block sensors & seal nuts	764
Mounting brackets for block sensors	766
Sensor protection devices	767



Basic information and definitions can be found on **page 952**.

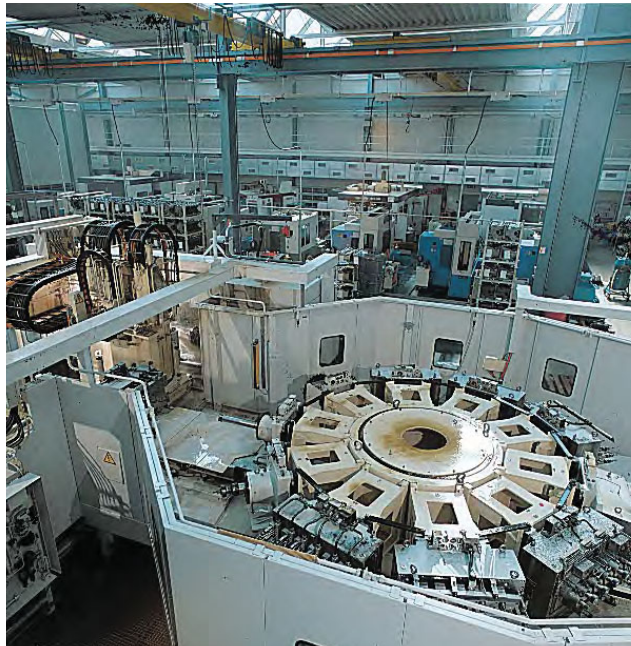


DC 3-/4-Wire	F1
DC 2-Wire	PTFE Coated Weld Immune
AC/ DC 2-Wire	500_{bar} High Pressure
	120°C High Temperature
IP68 BWN Pr27 BWN Pr20	Stainless Steel



Inductive Sensors

Introduction



Inductive
Sensors

Introduction

Product
overview

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories

Inductive Sensors

Product overview



Housing size	Ø 3 mm, Ø 4 mm, M4×0.5	M5×0.5 Ø 6.5	M8×1, Ø 8 mm	M12×1	M16×1	M18×1	
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Inductive sensors

DC 3-wire Global			page 476	page 481		page 484	
DC 3-/4-wire	page 492	page 498 page 503	page 512	page 530		page 538	
DC 2-wire			page 595	page 597		page 600	
AC/DC 2-wire				page 615		page 617	
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Inductive Sensors with Special Properties

High pressure sensors		page 643 page 651 page 590	page 651	page 643 page 645 page 653	page 648	page 650 page 659	
Steelface sensors			page 665	page 666		page 667	
High temperature sensors		page 670	page 670	page 670		page 671 page 673 page 676	
Sensors for harsh environments				page 674			
Factor 1 sensors			page 685	page 686		page 689	
Weld field immune sensors				page 697		page 699	
Large housing							
Tube sensors							
Ring sensors							

Inductive distance sensors for analog distance measurement

Tubular-style housings			page 721	page 722		page 725	
Block housings							
Ring sensors							

Inductive Sensors

Product overview



	M30×1.5	5×5 mm	8×8 mm	8×16 mm R04	10×30 mm R03	16.5×30 mm	20×32 mm R01	99×17.6 mm
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Inductive Sensors

Introduction

Product overview

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

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	page 603						page 606	
	page 620							
	page 637							

	page 669						page 669	
	page 671 page 673 page 677							
	page 692							
	page 701						page 702	

	page 728				page 731			
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Inductive Sensors

Product overview



Housing size	25x50 mm	26x26 mm	26x40 mm	42x48 mm	74x60.5 mm	40x40 mm	
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Inductive sensors

DC 3-wire Global							
DC 3-/4-wire	page 571		page 572	page 574	page 575	page 577	
DC 2-wire		page 607				page 608	
AC/DC 2-wire			page 623			page 625	
AC 2-wire							

Inductive Sensors with Special Properties

High pressure sensors							
Steelface sensors							
High temperature sensors	page 671						
Sensors for harsh environments							
Factor 1 sensors						page 693	
Weld field immune sensors						page 703	
Large housing							
Tube sensors							
Ring sensors							

Inductive distance sensors for analog distance measurement

Tubular-style housings							
Block housings							



Inductive Sensors

Introduction

Product overview

Global
DC 3-wire

DC 3-/4-wire

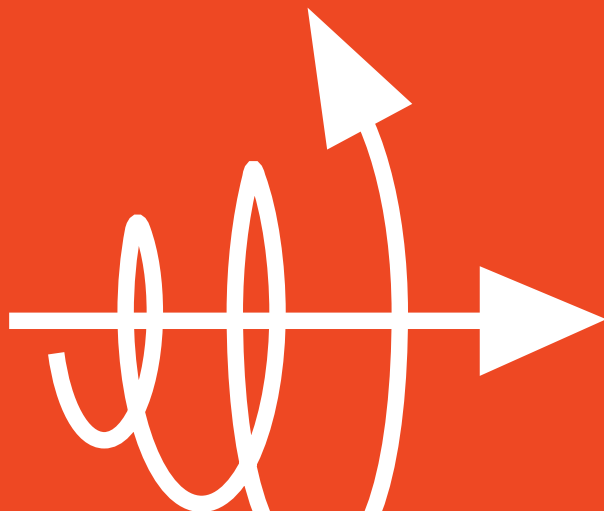
DC 2-wire

AC/DC 2-wireAC 2-wire

Special properties

Analog distance measurement

Accessories



Inductive Sensors

DC 3-wire inductive Global Sensors

DC 3-wire inductive global sensors: Global sensors are the most economical sensors from the Balluff group. These standardized sensors are readily available and are ideal for general-purpose applications



Tubular design

M8×1

476

M12×1

481

M18×1

484

M30×1.5

487



Global



DC 3-wire Inductive Global Sensors

Tubular housing, M8×1

Global: Performance and value in inductive proximity sensors

Balluff Global sensors are proven performers that are globally standardized with an optimum price point ratio.

- Short and mid-size designs M8 to M30×1.5
- Shielded and unshielded designs
- Cable and connector versions
- Standard and extended switching distance

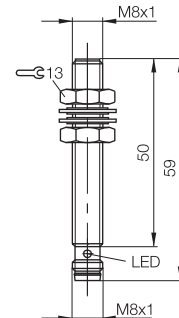
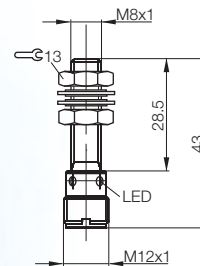
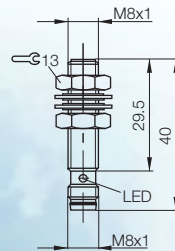


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES00CJ	BES00CH	BES003C	
	Part number	BES M08EE-PSC15B-S49G-003	BES M08EE-PSC15B-S04G-003	BES M08MI-PSC15B-S49G	
PNP, NC	Ordering code	BES00CC	BES00CA	BES03P6	
	Part number	BES M08EE-POC15B-S49G-003	BES M08EE-POC15B-S04G-003	BES M08MI-POC15B-S49G	
NPN, NO	Ordering code	BES00C7	BES00C6	BES002K	
	Part number	BES M08EE-NSC15B-S49G-003	BES M08EE-NSC15B-S04G-003	BES M08MI-NSC15B-S49G	
NPN, NC	Ordering code	BES00C3	BES00C2	BES03PK	
	Part number	BES M08EE-NOC15B-S49G-003	BES M08EE-NOC15B-S04G-003	BES M08MI-NOC15B-S49G	
Supply voltage U_B		10...30 V DC	10...30 V DC	12...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	75 V DC	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...70 °C	-25...70 °C	-25...70 °C	
Switching frequency f max.		1 kHz	1 kHz	1 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Stainless steel	Stainless steel	Brass-coated	
	Sensing surface	PBT	PBT	PA 12	
Connection		M8 connector, 3-pin	M12 connector, 4-pin	M8 connector, 3-pin	
Suggested mating cable		BCC M313-0000-10-001-VX43T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013	BCC M313-0000-10-001-VX43T2-020-C013	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Global

DC 3-wire Inductive Global Sensors

Tubular housing, M8x1



Inductive sensors

Global DC 3-wire

Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

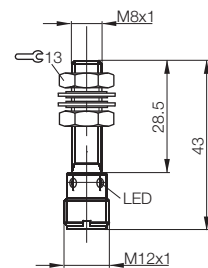
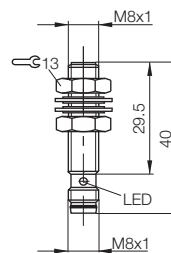
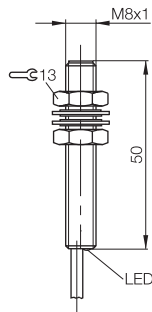
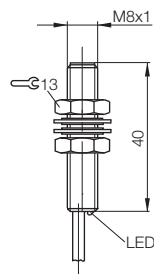
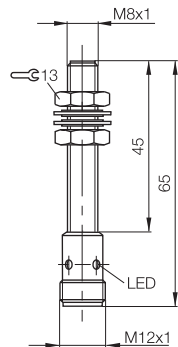
AC 2-wire

Special properties

Analog distance measurement

Accessories

M8 x 1	M8 x 1	M8 x 1	M8 x 1	M8 x 1
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	2 mm	2 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.6 mm	0...1.6 mm
1X	1X	1X	2X	2X
BES0027	BES00CU	BES0037	BES00CK	BES00FC
BES M08MH1-PSC15B-S04G	BES M08EF-PSC15B-BP02-003	BES M08MI-PSC15B-BV02	BES M08EE-PSC20B-S49G-003	BES M08EE-PSC20B-S04G-003
BES0026	BES00CR	BES0030	BES00CF	BES00CE
BES M08MH1-POC15B-S04G	BES M08EF-POC15B-BP02-003	BES M08MI-POC15B-BV02	BES M08EE-POC20B-S49G-003	BES M08EE-POC20B-S04G-003
BES0024	BES00CN	BES002F	BES00C9	BES00C8
BES M08MH1-NSC15B-S04G	BES M08EF-NSC15B-BP02-003	BES M08MI-NSC15B-BV02	BES M08EE-NSC20B-S49G-003	BES M08EE-NSC20B-S04G-003
BES0023	BES00CL	BES003PJ	BES00C5	BES00C4
BES M08MH1-NOC15B-S04G	BES M08EF-NOC15B-BP02-003	BES M08MI-NOC15B-BV02	BES M08EE-NOC20B-S49G-003	BES M08EE-NOC20B-S04G-003
12...30 V DC	10...30 V DC	12...30 V DC	10...30 V DC	10...30 V DC
2 V	2.5 V	2 V	2.5 V	2.5 V
75 V DC	250 V AC (□)	75 V DC	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C
1 kHz	1 kHz	1 kHz	700 Hz	700 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Stainless steel	Brass-coated	Stainless steel	Stainless steel
PA 12	PBT	PA 12	PBT	PBT
M12 connector, 4-pin	2 m PUR cable, 26 AWG	2 m PVC cable, 26 AWG	M8 connector, 3-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-VX44T2-020-C013			BCC M313-0000-10-001-VX43T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013



DC 3-wire Inductive Global Sensors

Tubular housing, M8x1

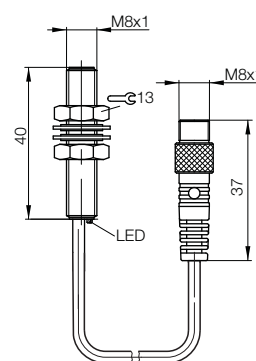
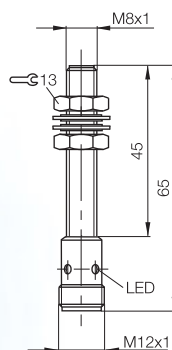
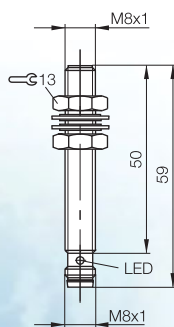


Housing size		M8 x 1	M8 x 1	M8 x 1	
Installation type (observe instructions in Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES003P	BES0028		
	Part number	BES M08MI-PSC20B-S49G	BES M08MH1-PSC20B-S04G		
PNP, NC	Ordering code	BES0033	BES03T5		
	Part number	BES M08MI-POC20B-S49G	BES M08MH1-POC20B-S04G		
NPN, NO	Ordering code	BES002U	BES0025	BES045P	
	Part number	BES M08MI-NSC20B-S49G	BES M08MH1-NSC20B-S04G	BES M08EF-NSC20B-BP00,3-GS49	
NPN, NC	Ordering code	BES03TJ	BES03T6		
	Part number	BES M08MI-NOC20B-S49G	BES M08MH1-NOC20B-S04G		
Supply voltage U_B		12...30 V DC	12...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	250 V AC (□)	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...70 °C	-25...70 °C	-25...70 °C	
Switching frequency f max.		700 Hz	700 Hz	700 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	Stainless steel	
	Sensing surface	PA 12	PA 12	PBT	
Connection		M8 connector, 3-pin	M12 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BCC M313-0000-10-001-VX43T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013	BCC M313-0000-10-001-VX43T2-020-C013	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Global

DC 3-wire Inductive Global Sensors

Tubular housing, M8x1



M8 x 1	M8 x 1	M8 x 1	M8 x 1	M8 x 1
Flush	Flush	Flush	Non-flush	Non-flush
2 mm	2 mm	2 mm	4 mm	4 mm
0...1.6 mm	0...1.6 mm	0...1.6 mm	0...3.2 mm	0...3.2 mm
2X	2X	2X	2X	2X
BES003E	BES00CW	BES003K	BES000M	BES001J
BES M08MI-PSC20B-BP00,2-GS04	BES M08EF-PSC20B-BP02-003	BES M08MI-PSC20B-BV02	BES M08EB-PSC40F-S49G	BES M08EH-PSC40F-S49G
	BES00CT	BES03TH	BES000L	BES001F
	BES M08EF-POC20B-BP02-003	BES M08MI-POC20B-BV02	BES M08EB-POC40F-S49G	BES M08EH-POC40F-S49G
	BES00CP	BES002P	BES000K	BES001C
	BES M08EF-NSC20B-BP02-003	BES M08MI-NSC20B-BV02	BES M08EB-NSC40F-S49G	BES M08EH-NSC40F-S49G
	BES00CM	BES03TF	BES000J	BES0019
	BES M08EF-NOC20B-BP02-003	BES M08MI-NOC20B-BV02	BES M08EB-NOC40F-S49G	BES M08EH-NOC40F-S49G
12...30 V DC	10...30 V DC	12...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
75 V DC	250 V AC (□)	75 V DC	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C
700 Hz	700 Hz	700 Hz	1.5 kHz	1.5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Stainless steel	Brass-coated	Stainless steel	Stainless steel
PA 12	PBT	PA 12	PBT	PBT
0.2 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 26 AWG	2 m PVC cable, 26 AWG	M8 connector, 3-pin	M8 connector, 3-pin
BCC M415-0000-1A-003-VX44T2-020-C013			BCC M313-0000-10-001-VX43T2-020-C013	BCC M313-0000-10-001-VX43T2-020-C013



Inductive sensors

Global DC 3-wire

Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

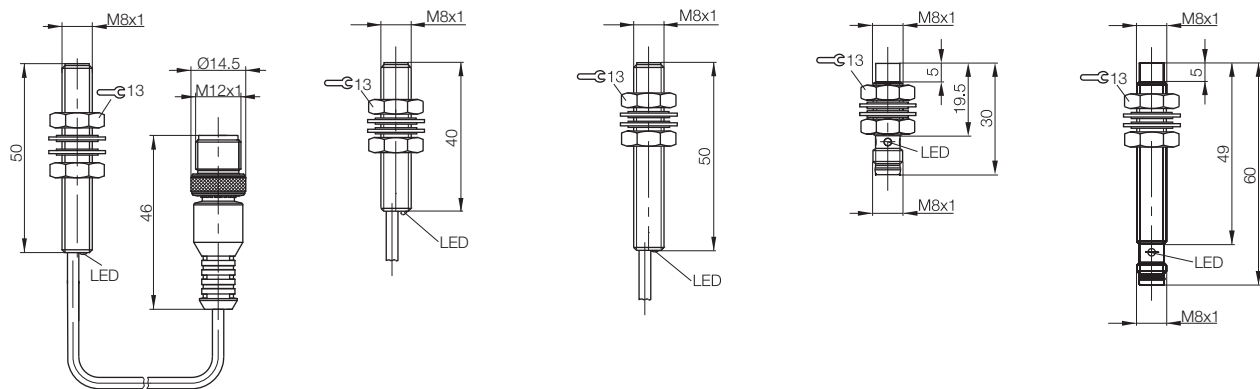
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-wire Inductive Global Sensors

Tubular housing, M8×1

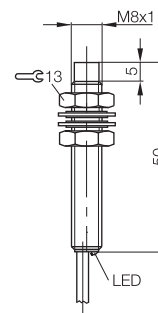
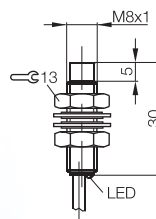
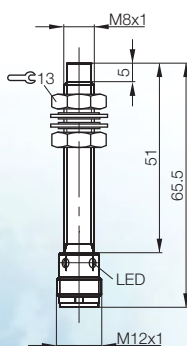


Housing size	M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in Basic Information chapter)	Non-flush	Non-flush	Non-flush	
Rated switching distance s_n	4 mm	4 mm	4 mm	
Assured switching distance s_a	0...3.2 mm	0...3.2 mm	0...3.2 mm	
Sensing distance	2X	2X	2X	
PNP, NO	Ordering code	BES001H	BES000Z	BES0017
	Part number	BES M08EH-PSC40F-S04G	BES M08ED-PSC40F-BV02	BES M08EG-PSC40F-BV02
PNP, NC	Ordering code	BES001E	BES000W	BES0015
	Part number	BES M08EH-POC40F-S04G	BES M08ED-POC40F-BV02	BES M08EG-POC40F-BV02
NPN, NO	Ordering code	BES001A	BES000T	BES0013
	Part number	BES M08EH-NSC40F-S04G	BES M08ED-NSC40F-BV02	BES M08EG-NSC40F-BV02
NPN, NC	Ordering code	BES0018	BES000P	BES0011
	Part number	BES M08EH-NOC40F-S04G	BES M08ED-NOC40F-BV02	BES M08EG-NOC40F-BV02
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	250 V AC (II)	250 V AC (II)	
Rated operating current I_e	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...70 °C	-25...70 °C	-25...70 °C	
Switching frequency f max.	1.5 kHz	1.5 kHz	1.5 kHz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Stainless steel	Stainless steel	Stainless steel
	Sensing surface	PBT	PA 12	PBT
Connection	M12 connector, 4-pin	2 m PVC cable, 26 AWG	2 m PVC cable, 26 AWG	
Suggested mating cable	BCC IM415-0000-1A-003-VX44T2-020-C013			

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-wire Inductive Global Sensors

Tubular housing, M12×1



M12×1	M12×1	M12×1	M12×1	M12×1	M12×1
Flush	Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	2 mm	2 mm	2 mm	4 mm
0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...3.2 mm
1X	1X	1X	1X	1X	2X
BES00EE	BES0060	BES00E4	BES005U	BES00EF	
BES M12ME-PSC20B-S04G-003	BES M12MI-PSC20B-S04G	BES M12MD-PSC20B-BP02-003	BES M12MI-PSC20B-BV02	BES M12ME-PSC40B-S04G-003	
BES00EA	BES005F	BES00E2	BES00FP	BES00EC	
BES M12ME-POC20B-S04G-003	BES M12MI-POC20B-S04G	BES M12MD-POC20B-BP02-003	BES M12MI-POC20B-BV02	BES M12ME-POC40B-S04G-003	
BES00E8	BES0054	BES00E0	BES00FL	BES00E9	
BES M12ME-NSC20B-S04G-003	BES M12MI-NSC20B-S04G	BES M12MD-NSC20B-BP02-003	BES M12MI-NSC20B-BV02	BES M12ME-NSC40B-S04G-003	
BES00E6	BES004Y	BES00CY	BES03PR	BES00E7	
BES M12ME-NOC20B-S04G-003	BES M12MI-NOC20B-S04G	BES M12MD-NOC20B-BP02-003	BES M12MI-NOC20B-BV02	BES M12ME-NOC40B-S04G-003	
10...30 V DC	12...30 V DC	10...30 V DC	12...30 V DC	10...30 V DC	
2 V	2.5 V	2 V	2.5 V	2.5 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
200 mA	200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	
1.2 kHz	1.2 kHz	1.2 kHz	1.2 kHz	300 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PBT	PA 12	PBT	PA 12	LCP	
M12 connector, 4-pin	M12 connector, 4-pin	2 m PUR cable, 22 AWG	2 m PVC cable, 22 AWG	M12 connector, 4-pin	
BCC M415-0000-1A-003-VX44T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013			BCC M415-0000-1A-003-VX44T2-020-C013	



Inductive sensors

Global DC 3-wire

Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

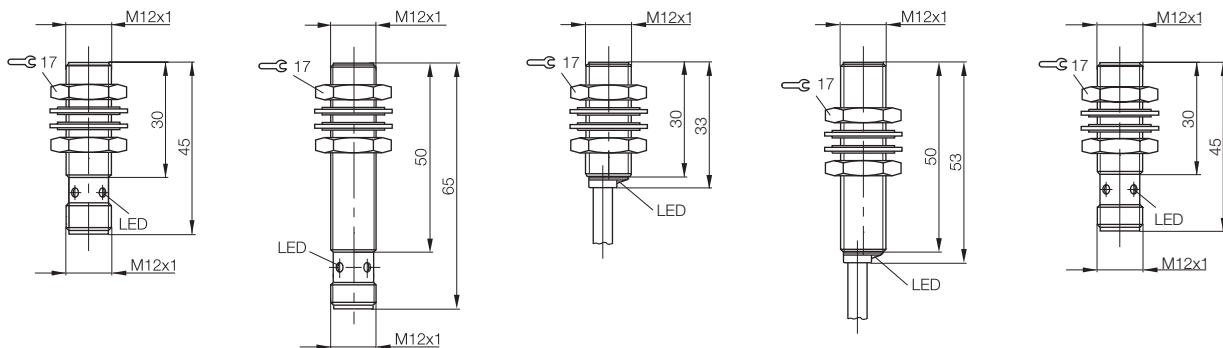
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-wire Inductive Global Sensors

Tubular housing, M12x1

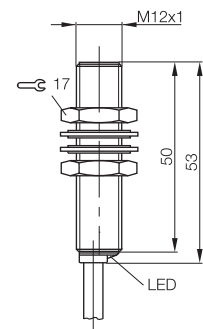
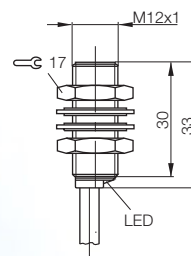
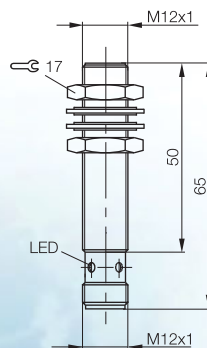


Housing size	M12x1	M12x1	M12x1	
Installation type (observe instructions in Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	4 mm	4 mm	4 mm	
Assured switching distance s_a	0...3.2 mm	0...3.2 mm	0...3.2 mm	
Sensing distance	2X	2X	2X	
PNP, NO	Ordering code	BES0068	BES00E5	BES0064
	Part number	BES M12MI-PSC40B-S04G	BES M12MD-PSC40B-BP02-003	BES M12MI-PSC40B-BV02
PNP, NC	Ordering code	BES005N	BES00E3	BES005L
	Part number	BES M12MI-POC40B-S04G	BES M12MD-POC40B-BP02-003	BES M12MI-POC40B-BV02
NPN, NO	Ordering code	BES0059	BES00E1	BES00FM
	Part number	BES M12MI-NSC40B-S04G	BES M12MD-NSC40B-BP02-003	BES M12MI-NSC40B-BV02
NPN, NC	Ordering code	BES004Z	BES00CZ	BES03PT
	Part number	BES M12MI-NOC40B-S04G	BES M12MD-NOC40B-BP02-003	BES M12MI-NOC40B-BV02
Supply voltage U_B	12...30 V DC	10...30 V DC	12...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...70 °C	-25...70 °C	-25...70 °C	
Switching frequency f max.	500 Hz	300 Hz	500 Hz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	Brass-coated
	Sensing surface	PA 12	LCP	PA 12
Connection	M12 connector, 4-pin	2 m PUR cable, 22 AWG	2 m PVC cable, 22 AWG	
Suggested mating cable	BCC IM415-0000-1A-003-VX44T2-020-C013			

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-wire Inductive Global Sensors

Tubular housing, M12x1



M12x1	M12x1	M12x1		
Non-flush	Non-flush	Non-flush		
8 mm	8 mm	8 mm		
0...6.4 mm	0...6.4 mm	0...6.4 mm		
2X	2X	2X		
BES01PY	BES004N	BES004M		
BES M12MD-PSC80F-S04G	BES M12MG-PSC80F-S04G	BES M12MG-PSC80F-BV02		
BES01PU	BES004K	BES004J		
BES M12MD-POC80F-S04G	BES M12MG-POC80F-S04G	BES M12MG-POC80F-BV02		
BES01PT	BES004F	BES004E		
BES M12MD-NSC80F-S04G	BES M12MG-NSC80F-S04G	BES M12MG-NSC80F-BV02		
BES01PR	BES004A	BES0049		
BES M12MD-NOC80F-S04G	BES M12MG-NOC80F-S04G	BES M12MG-NOC80F-BV02		
10...30 V DC	10...30 V DC	10...30 V DC		
2.5 V	2.5 V	2.5 V		
250 V AC (□)	250 V AC (□)	250 V AC (□)		
200 mA	200 mA	200 mA		
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes		
-25...70 °C	-25...70 °C	-25...70 °C		
800 Hz	800 Hz	800 Hz		
Yellow LED	Yellow LED	Yellow LED		
IP 68 per BWN Pr. 20	IP 67	IP 67		
CE, cULus	CE, cULus	CE, cULus		
Brass-coated	Brass-coated	Brass-coated		
PBT	PBT	PBT		
M12 connector, 4-pin	M12 connector, 4-pin	2 m PVC cable, 22 AWG		
BOC M415-0000-1A-003-VX44T2-020-C013	BOC M415-0000-1A-003-VX44T2-020-C013			



Inductive sensors

Global DC 3-wire

Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

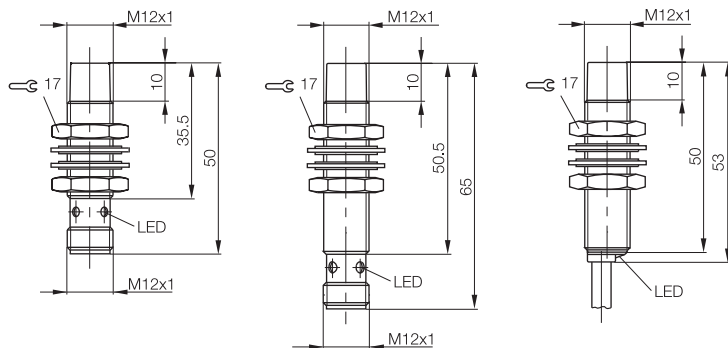
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-wire Inductive Global Sensors

Tubular housing, M18x1

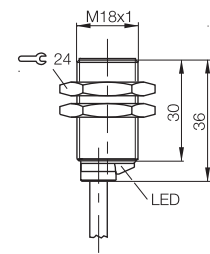
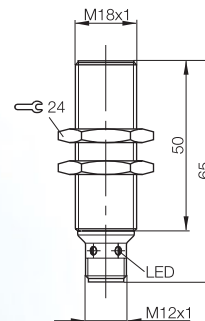
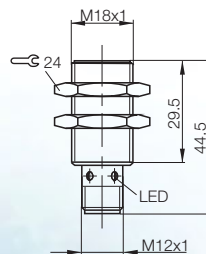


Housing size		M18x1	M18x1	M18x1	
Installation type (observe instructions in Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		5 mm	5 mm	5 mm	
Assured switching distance s_a		0...4 mm	0...4 mm	0...4 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES00EY	BES0086	BES00EN	
	Part number	BES M18ME-PSC50B-S04G-003	BES M18MI-PSC50B-S04G	BES M18MD-PSC50B-BP02-003	
PNP, NC	Ordering code	BES00EU	BES043J	BES00EL	
	Part number	BES M18ME-POC50B-S04G-003	BES M18MI-POC50B-S04G	BES M18MD-POC50B-BP02-003	
NPN, NO	Ordering code	BES00ER		BES00EJ	
	Part number	BES M18ME-NSC50B-S04G-003		BES M18MD-NSC50B-BP02-003	
NPN, NC	Ordering code	BES03T7		BES03T8	
	Part number	BES M18ME-NOC50B-S04G-003		BES M18MD-NOC50B-BP02-003	
Supply voltage U_B		10...30 V DC	12...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2 V	2.5 V	2 V	
Rated insulation voltage U_i (protection class)		75 V DC	250 V AC (□)	75 V DC	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...70 °C	-25...70 °C	-25...70 °C	
Switching frequency f max.		700 Hz	700 Hz	700 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 68 per BWN Pr. 20	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PA 12	PA 12	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	2 m PUR cable, 22 AWG	
Suggested mating cable		BCC M415-0000-1A-003-VX44T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Global

DC 3-wire Inductive Global Sensors

Tubular housing, M18×1



M18×1	M18×1	M18×1	M18×1	M18×1	M18×1
Flush	Flush	Flush	Flush	Flush	Flush
5 mm	8 mm	8 mm	8 mm	8 mm	8 mm
0...4 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm
1X	2X	2X	2X	2X	2X
BES0082	BES00EZ	BES008L	BES00EP	BES008E	
BES M18MI-PSC50B-BV02	BES M18ME-PSC80B-S04G-003	BES M18MI-PSC80B-S04G	BES M18MD-PSC80B-BP02-003	BES M18MI-PSC80B-BV02	
BES007R	BES00EW	BES03RP	BES00EM	BES03PY	
BES M18MI-POC50B-BV02	BES M18ME-POC80B-S04G-003	BES M18MI-POC80B-S04G	BES M18MD-POC80B-BP02-003	BES M18MI-POC80B-BV02	
BES007A	BES00ET	BES007L	BES00EK	BES00FE	
BES M18MI-NSC50B-BV02	BES M18ME-NSC80B-S04G-003	BES M18MI-NSC80B-S04G	BES M18MD-NSC80B-BP02-003	BES M18MI-NSC80B-BV02	
BES03RR	BES03RN	BES0077	BES00EH	BES03T4	
BES M18MI-NOC50B-BV02	BES M18ME-NOC80B-S04G-003	BES M18MI-NOC80B-S04G	BES M18MD-NOC80B-BP02-003	BES M18MI-NOC80B-BV02	
12...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	12...30 V DC	
2.5 V	3.5 V	2.5 V	3.5 V	2.5 V	
250 V AC (□)	75 V DC	250 V AC (□)	75 V DC	250 V AC (□)	
200 mA	130 mA	200 mA	130 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	
700 Hz	150 Hz	1 kHz	150 Hz	150 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PA 12	PBT	PBT	PBT	PA 12	
2 m PVC cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin	2 m PUR cable, 22 AWG	2 m PVC cable, 22 AWG	
	BOC M415-0000-1A-003-VX44T2-020-C013	BOC M415-0000-1A-003-VX44T2-020-C013			



Inductive sensors

Global DC 3-wire

Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

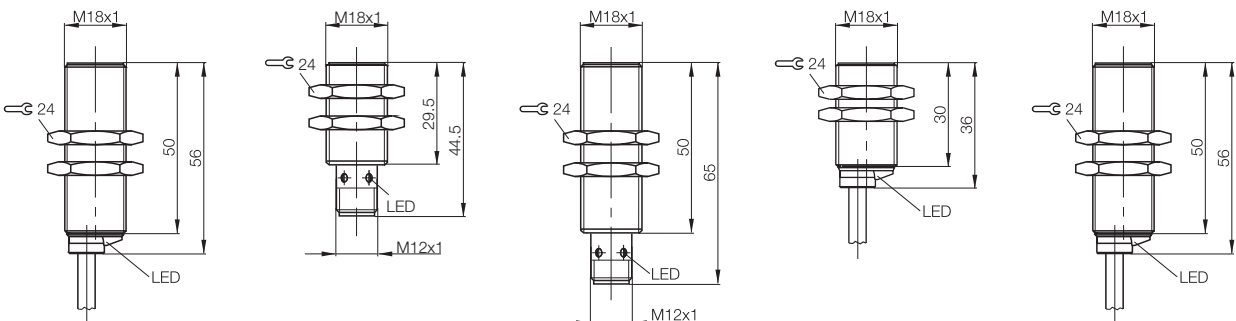
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-wire Inductive Global Sensors

Tubular housing, M18x1

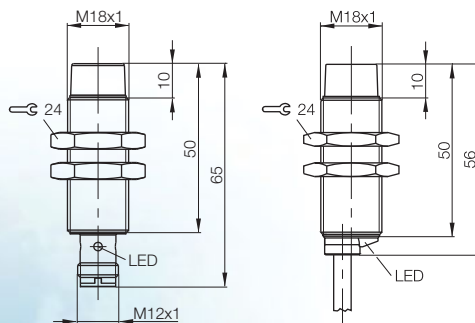


Housing size		M18x1	M18x1	
Installation type (observe instructions in Basic Information chapter)		Non-flush	Non-flush	
Rated switching distance s_n		16 mm	16 mm	
Assured switching distance s_a		0...13 mm	0...13 mm	
Sensing distance		2X	2X	
PNP, NO	Ordering code	BES03RM	BES006Z	
	Part number	BES M18MG-PSC16F-S04G	BES M18MG-PSC16F-BV02	
PNP, NC	Ordering code	BES03RL	BES006U	
	Part number	BES M18MG-POC16F-S04G	BES M18MG-POC16F-BV02	
NPN, NO	Ordering code		BES006P	
	Part number		BES M18MG-NSC16F-BV02	
NPN, NC	Ordering code		BES006L	
	Part number		BES M18MG-NOC16F-BV02	
Supply voltage U_B		10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC (□)	250 V AC (□)	
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.		800 Hz	800 Hz	
Output function indicator		Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	
	Sensing surface	PBT	PBT	
Connection		M12 connector, 4-pin	2 m PVC cable, 22 AWG	
Suggested mating cable		BCC M415-0000-1A-003-VX44T2-020-C013		

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



Global

DC 3-wire Inductive Global Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
Flush	Flush	Flush	Flush	Flush
10 mm	10 mm	10 mm	10 mm	10 mm
0...8 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm
1X	1X	1X	1X	1X
BES00F8	BES00A4	BES00A3	BES00F3	BES00A0
BES M30ME-PSC10B-S04G-003	BES M30MI-PSC10B-S04K	BES M30MI-PSC10B-S04G	BES M30MD-PSC10B-BP02-003	BES M30MI-PSC10B-BV02
BES00F6	BES009P	BES043H	BES03TC	BES009M
BES M30ME-POC10B-S04G-003	BES M30MI-POC10B-S04K	BES M30MI-POC10B-S04G	BES M30MD-POC10B-BP02-003	BES M30MI-POC10B-BV02
BES00F5	BES009H		BES00F0	BES009C
BES M30ME-NSC10B-S04G-003	BES M30MI-NSC10B-S04K		BES M30MD-NSC10B-BP02-003	BES M30MI-NSC10B-BV02
BES03TA	BES0097		BES03TE	BES0096
BES M30ME-NOC10B-S04G-003	BES M30MI-NOC10B-S04K		BES M30MD-NOC10B-BP02-003	BES M30MI-NOC10B-BV02
10...30 V DC	12...30 V DC	12...30 V DC	10...30 V DC	12...30 V DC
3.5 V	2.5 V	2.5 V	3.5 V	2.5 V
75 V DC	250 V AC (□)	75 V DC	75 V DC	250 V AC (□)
130 mA	200 mA	200 mA	130 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C
150 Hz	400 Hz	400 Hz	150 Hz	400 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 68 per BWN Pr. 20	IP 67	IP67	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated
PA 12	PA 12	PA 12	PA 12	PA 12
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	2 m PUR cable, 22 AWG	2 m PVC cable, 22 AWG
BCC M415-0000-1A-003-VX44T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013		



Inductive sensors

Global DC 3-wire

Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

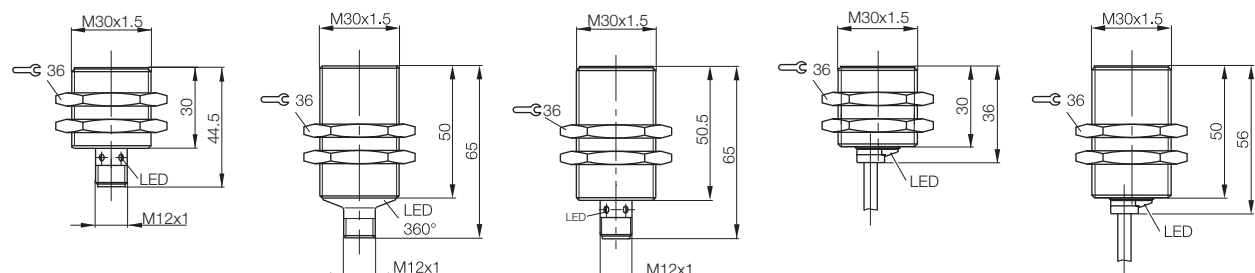
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-wire Inductive Global Sensors

Tubular housing, M30×1.5

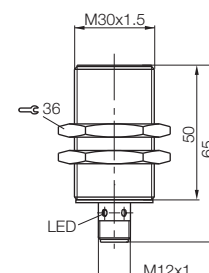
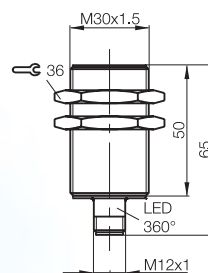
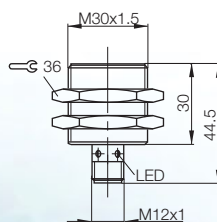


Housing size		M30×1.5	M30×1.5	M30×1.5	
Installation type (observe instructions in Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		15 mm	15 mm	15 mm	
Assured switching distance s_a		0...12 mm	0...12.2 mm	0...12.2 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES00F9	BES00AH	BES00AF	
	Part number	BES M30ME-PSC15B-S04G-003	BES M30MI-PSC15B-S04K	BES M30MI-PSC15B-S04G	
PNP, NC	Ordering code	BES00F7	BES009U	BES03RK	
	Part number	BES M30ME-POC15B-S04G-003	BES M30MI-POC15B-S04K	BES M30MI-POC15B-S04G	
NPN, NO	Ordering code		BES009J		
	Part number		BES M30MI-NSC15B-S04K		
NPN, NC	Ordering code		BES0098		
	Part number		BES M30MI-NOC15B-S04K		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		3.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 DC	250 V AC (□)	250 V AC (□)	
Rated operating current I_e		130 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...70 °C	-25...70 °C	-25...70 °C	
Switching frequency f max.		75 Hz	100 Hz	100 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PA 12	PA 12	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cables		BCC M415-0000-1A-003-VX44T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013	BCC M415-0000-1A-003-VX44T2-020-C013	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-wire Inductive Global Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush
15 mm	15 mm	30 mm	30 mm	30 mm	30 mm
0...12 mm	0...12.2 mm	0...24 mm	0...24 mm	0...24 mm	0...24 mm
2X	2X	2X	2X	2X	2X
BES00F4	BES00AA	BES00AZ	BES03RE	BES00AY	
BES M30MD-PSC15B-BP02-003	BES M30MI-PSC15B-BV02	BES M30MM-PSC30F-S04K	BES M30MM-PSC30F-S04G	BES M30MM-PSC30F-BV02	
BES00F2	BES009T	BES00AU	BES03RC	BES00AT	
BES M30MD-POC15B-BP02-003	BES M30MI-POC15B-BV02	BES M30MM-POC30F-S04K	BES M30MM-POC30F-S04G	BES M30MM-POC30F-BV02	
BES00F1	BES03RH	BES00AP		BES00AN	
BES M30MD-NSC15B-BP02-003	BES M30MI-NSC15B-BV02	BES M30MM-NSC30F-S04K		BES M30MM-NSC30F-BV02	
	BES03RJ	BES00AL		BES00AK	
	BES M30MI-NOC15B-BV02	BES M30MM-NOC30F-S04K		BES M30MM-NOC30F-BV02	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
3.5 V	2.5 V	2.5 V	2.5 V	2.5 V	
75 V DC	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
130 mA	200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	
75 Hz	100 Hz	300 Hz	300 Hz	300 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PBT	PBT	PBT	
2 m PUR cable, 22 AWG	2 m PVC cable, 22 AWG	M12 connector, 4-pin BCC M415-0000-1A-003-VX4T2-020-C013	M12 connector, 4-pin BCC M415-0000-1A-003-VX4T2-020-C013	2 m PVC cable, 22 AWG	



Inductive sensors

Global DC 3-wire
Tubular housings

Block housings

DC 3-/4-wire

DC 2-wire

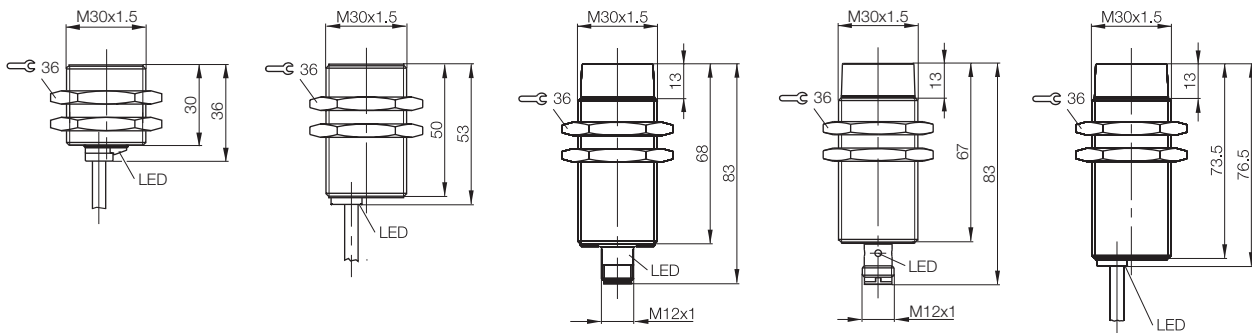
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories





Inductive Sensors

DC 3-/4-wire inductive tubular sensors

Balluff's largest and most popular sensor family DC 3 and 4 wire sensors

are used extensively around the world. Available from Ø 3 mm to 80×80 mm for practically every application in automation. These high-quality sensors are designed and manufactured according to worldwide standards and the latest technology. Our 100 % final inspection of all products guarantees that only carefully tested sensors leave our plants. Balluff DC 3 and 4 wire sensors are available with PNP, NPN, and complementary outputs and come with Balluff's lifetime warranty.



Tubular housings

Ø 3 mm	493
Ø 4 mm	494
M4x0.5	497
M5x0.5	498
Ø 6.5 mm	502
Ø 8 mm	512
M8x1	513
M12x1	530
M18x1	538
M30x1.5	547

Block designs

5x5 mm	552
8x8 mm	556
8x16x4 mm (R04)	562
10x30x6 mm (R03)	566
30x20x10 mm	567
16x30x10 mm	568
20x32x8 mm (R01)	569
20x50x10 mm	571
26x40x12 mm (R05)	572
42x48x22 mm	574
74x60.5x28 mm	575
40x40 mm (Unicompact)	577
40x40 mm (Unisensor)	581
80x80 mm (Maxisensor)	588



DC 3-/4-wire Inductive Tubular Sensors

Inductive mini-sensors

High-performance and compact

Inductive mini-sensors are ideal for position sensing in rough environments, and stand out due to an optimum price/performance ratio. They are easy to install and can be fully integrated even in narrow assemblies such as linear units, valves and actuators. As a result, position sensing is now possible where there was never space for a sensor before. Application tooling can be made even smaller. The low weight of the mini-sensors allows applications with extremely fast acceleration, so that pick-and-place is easy to manage.



Housing size		
Installation type (observe instructions in the Basic Information chapter)		
Rated switching distance s_n		
Assured switching distance s_a		
Sensing distance		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_o max.		
Rated insulation voltage U_i		
Rated operating current I_o		
Polarity reversal protected/transposition protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Output function indicator		
Degree of protection as per IEC 60529		
Approvals		
Special properties		
Material	Housing	
	Sensing surface	
Connection		
Suggested mating cable		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

SuperShorties and slim designs

Inductive mini sensors are available with especially small diameter: with 3 mm, 4 mm and 5 mm. They are also available as compact short housings, with lengths of just 6 mm — offering the shortest inductive sensors on the market.

- The most compact on the market: can be fully integrated
- Unmatched in thinness and, as SuperShorty, unmatched in their short length
- Low weight (0.7 g) for extreme accelerations



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 3 mm



Ø 3 mm	Ø 3 mm	Ø 3 mm	Ø 3 mm	Ø 3 mm
Flush	Flush	Flush	Flush	Non-flush
1 mm	1 mm	1 mm	1 mm	3 mm
0...0.8 mm	0...0.8 mm	0...0.8 mm	0...0.8 mm	0...2.3 mm
2X	2X	2X	2X	2X
BES0468	BES00M5	BES00M3		BES00MH
BES 516-3044-G-E4-C-S26-00,3	BES 516-3044-G-E4-C-S49-00,3	BES 516-3044-G-E4-C-PU-02		BES 516-3048-G-E4-C-S26-00,3
	BES0415	BES00M7		
	BES G03ED-POC10B-EP00,3-GS49	BES 516-3045-G-E4-C-PU-02		
			BES00M9	
			BES 516-3046-G-E4-L-PU-02	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	21.6...26.4 V DC
2.5 V	2.5 V	2.5 V	1.5 V	2.5 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA	50 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/No	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	0...+70 °C	0...+70 °C
2 kHz	2 kHz	2 kHz	5 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE	CE, cULus
Slim design	Slim design	Slim design	Slim design	Slim design
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
POM	POM	POM	POM	PET-C
0.3 m PUR cable with M5 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 26 AWG	2 m PUR cable, 26 AWG	0.3 m PUR cable with M5 connector, 4-pin
BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020			BKS-B 25-3-PU-03



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

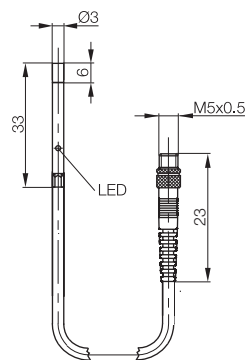
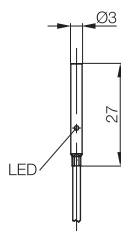
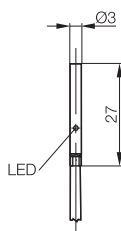
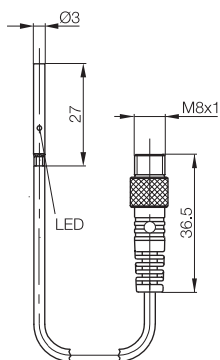
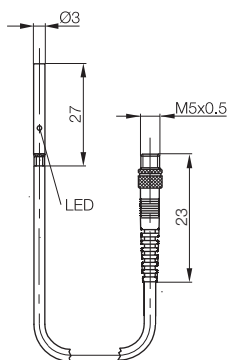
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housings, Ø 3 mm, Ø 4 mm

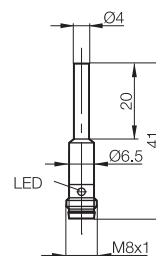
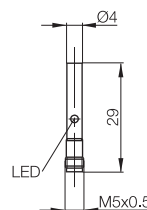
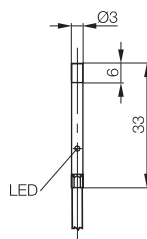


Housing size		Ø 3 mm	Ø 4 mm	Ø 4 mm	
Installation type (observe instructions in the Basic Information chapter)		Non-flush	Flush	Flush	
Rated switching distance s_n		3 mm	0.8 mm	0.8 mm	
Assured switching distance s_a		0...2.3 mm	0...0.65 mm	0...0.65 mm	
Sensing distance		3X	1X	1X	
PNP, NO	Ordering code	BES00ME	BES0122	BES00J5	
	Part number	BES 516-3048-G-E4-C-PU-02	BES G04EC-PSC08B-S26G	BES 516-3007-E5-C-S49	
PNP, NC	Ordering code	BES00MJ	BES0120	BES00K4	
	Part number	BES 516-3049-G-E4-C-PU-02	BES G04EC-POC08B-S26G	BES 516-3017-E5-C-S49	
NPN, NO	Ordering code		BES011Y		
	Part number		BES G04EC-NSC08B-S26G		
NPN, NC	Ordering code		BES011W	BES00KF	
	Part number		BES G04EC-NOC08B-S26G	BES 516-3018-E5-C-S49	
Supply voltage U_B		21.6...26.4 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	3 V	3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		50 mA	100 mA	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		0...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.		3 kHz	3 kHz	3 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Slim design, large switching distance	Slim design	Slim design	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PET-C	PBT	PBT	
Connection		2 m PUR cable, 26 AWG	M5 connector, 4-pin	M8 connector, 3-pin	
Suggested mating cable			BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 4 mm



Ø 4 mm	Ø 4 mm	Ø 4 mm	Ø 4 mm	Ø 4 mm
Flush	Flush	Flush	Flush	Flush
0.8 mm	0.8 mm	0.8 mm	1.5 mm	1.5 mm
0...0.65 mm	0...0.65 mm	0...0.65 mm	0...1.2 mm	0...1.2 mm
1X	1X	1X	2X	2X
BES00J3	BES00J0	BES00HW	BES012F	BES00JN
BES 516-3007-E4-C-S49-00,3	BES 516-3007-E4-C-S4-00,3	BES 516-3007-E4-C-PU-02	BES G04ED-PSC15B-S26G	BES 516-3007-G-E5-C-S49
BES00K3		BES00K1	BES012A	BES00KA
BES 516-3017-E4-C-S49-00,3		BES 516-3017-E4-C-PU-02	BES G04ED-POC15B-S26G	BES 516-3017-G-E5-C-S49
		BES00JP	BES0126	BES00K0
		BES 516-3008-E4-C-PU-02	BES G04ED-NSC15B-S26G	BES 516-3008-G-E5-C-S49
		BES00KC	BES0123	BES00KK
		BES 516-3018-E4-C-PU-02	BES G04ED-NOC15B-S26G	BES 516-3018-G-E5-C-S49
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3 V	3 V	3 V	3 V	3 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
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Slim design	Slim design	Slim design	Slim design	Slim design
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 26 AWG	M5 connector, 4-pin	M8 connector, 3-pin
BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

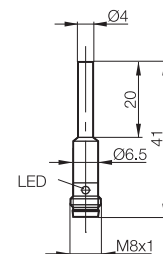
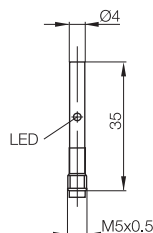
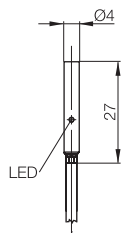
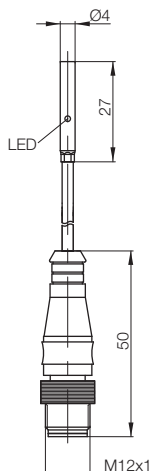
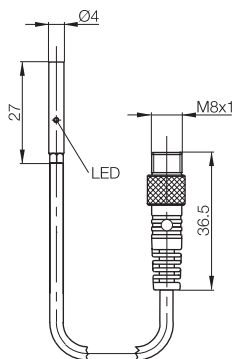
AC/DC 2-wire

AC 2-wire

Analog distance measurement

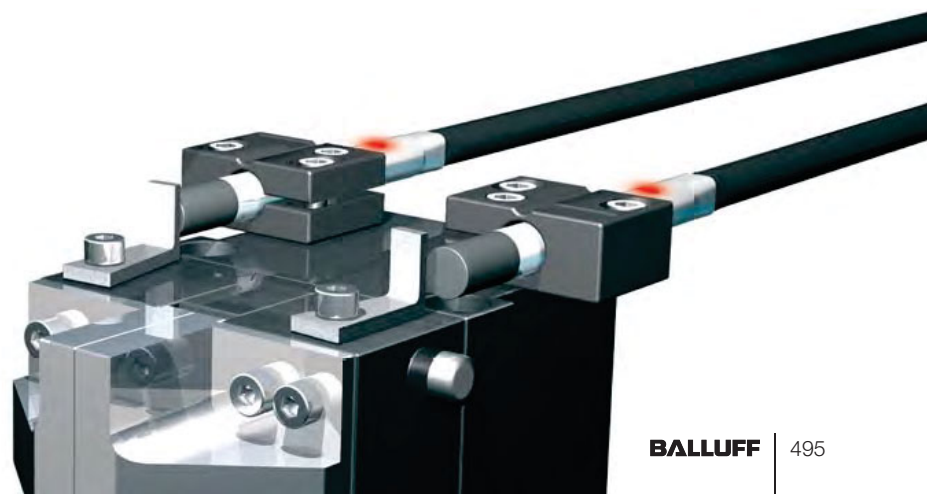
Special properties

Special accessories



mini.s Mini design

Ø 3 mm inductive sensors: Large switching distance with the smallest installation space.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 4 mm

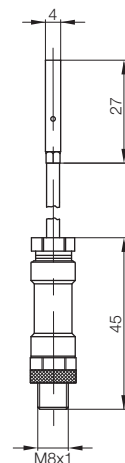
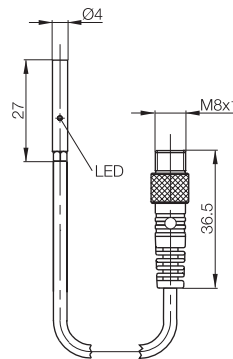
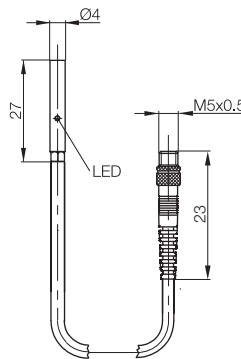


Housing size		Ø 4 mm	Ø 4 mm	Ø 4 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES00J8	BES00JJ		
	Part number	BES 516-3007-G-E4-C-S26-00,2	BES 516-3007-G-E4-C-S49-00,3		
PNP, NC	Ordering code		BES00K9		
	Part number		BES 516-3017-G-E4-C-S49-00,3		
NPN, NO	Ordering code			BES0156	
	Part number			BES 516-3008-G-E4-C-S49-PU-00,3	
NPN, NC	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		3 V	3 V	3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		100 mA	100 mA	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	1.8 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Slim design	Slim design	Slim design	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		0.2 m PUR cable with M5 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housings, Ø 4 mm, M4×0.5



Ø 4 mm	Ø 4 mm	Ø 4 mm	Ø 4 mm	M4×0.5
Flush	Flush	Non-flush	Non-flush	Flush
1.5 mm	1.5 mm	5 mm	5 mm	0.6 mm
0...1.2 mm	0...1.2 mm	0...4 mm	0...4 mm	0...0.42 mm
2X	2X	3X	3X	1X
BES00JA	BES00J6	BES012K	BES012H	BES01P0
BES 516-3007-G-E4-C-S4-00,3	BES 516-3007-G-E4-C-PU-02	BES G04ED-PSC50F-S26G	BES G04ED-PSC50F-EP02	BES M04EC-PSD06B-BP02
	BES00K5	BES012E	BES0127	
	BES 516-3017-G-E4-C-PU-02	BES G04ED-POC50F-S26G	BES G04ED-NSC50F-EP02	
	BES00JW	BES0129		
	BES 516-3008-G-E4-C-PU-02	BES G04ED-NSC50F-S26G		
	BES00KH	BES0125		
	BES 516-3018-G-E4-C-PU-02	BES G04ED-NOC50F-S26G		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3 V	3 V	2.5 V	2.5 V	2.5 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
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	No
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Slim design	Slim design	Slim design, large switching distance	Slim design, large switching distance	Slim design
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PET-C	PET-C	POM
0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 26 AWG	M5 connector, 4-pin	2 m PUR cable, 26 AWG	2 m PUR cable, 26 AWG
BCC M415-0000-1A-003-EX44T2-020		BKS-B 25-3-PU-03		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

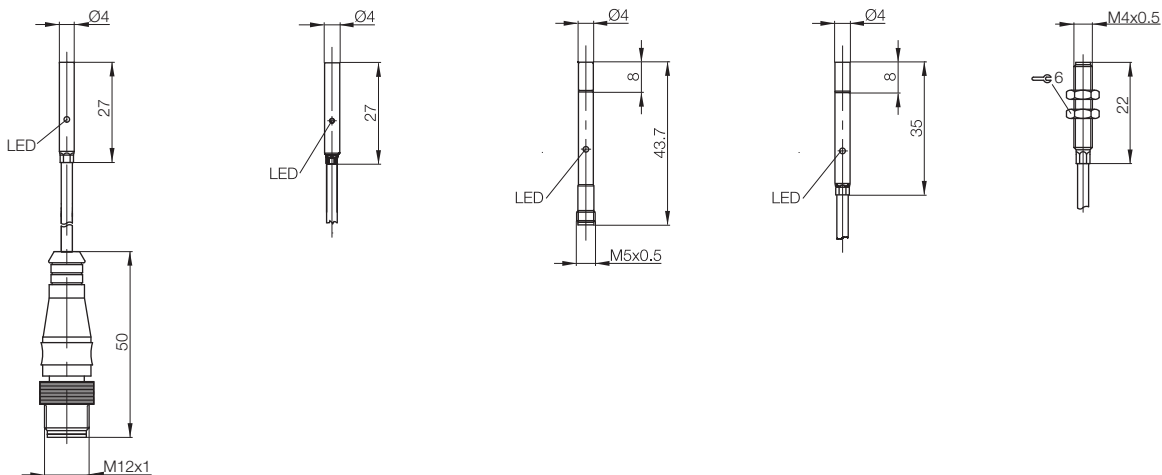
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M5×0.5

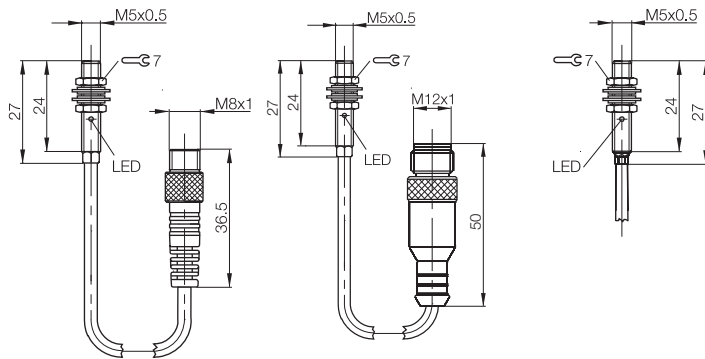


Housing size		M5×0.5	M5×0.5	M5×0.5	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES00HC	BES00H7	BES00H3	
	Part number	BES 516-3005-G-E4-C-S49-00,3	BES 516-3005-G-E4-C-S4-00,3	BES 516-3005-G-E4-C-PU-02	
PNP, NC	Ordering code	BES00L4		BES00L2	
	Part number	BES 516-3022-G-E4-C-S49-00,3		BES 516-3022-G-E4-C-PU-02	
NPN, NO	Ordering code			BES00HM	
	Part number			BES 516-3006-G-E4-C-PU-02	
NPN, NC	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		3 V	3 V	3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		100 mA	100 mA	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	3 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Slim design	Slim design	Slim design	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 26 AWG	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M5×0.5



M5×0.5 Non-flush 5 mm 0...4 mm 3X BES013H BES M05ED-PSC50F-S26G	M5×0.5 Non-flush 5 mm 0...4 mm 3X BES013C BES M05ED-PSC50F-EP00,3-GS04	M5×0.5 Non-flush 5 mm 0...4 mm 3X BES013E BES M05ED-PSC50F-EP02		
BES0139 BES M05ED-POC50F-S26G				
BES0136 BES M05ED-NSC50F-S26G		BES0134 BES M05ED-NSC50F-EP02		
BES0132 BES M05ED-NOC50F-S26G				
10...30 V DC 2.5 V 75 V DC 100 mA Yes/Yes/Yes -25...+70°C 3 kHz Yellow LED IP 67 CE, cULus Slim design, large switching distance Stainless steel PET-C M5 connector, 4-pin BKS-B 25-3-PU-03	10...30 V DC 2.5 V 75 V DC 100 mA No/Yes/Yes -25...+70°C 3 kHz Yellow LED IP 67 CE, cULus Slim design, large switching distance Stainless steel PET-C 0.3 m PUR cable with M12 connector, 4-pin BCC M415-0000-1A-003-EX44T2-020	10...30 V DC 2.5 V 75 V DC 100 mA Yes/Yes/Yes -25...+70°C 3 kHz Yellow LED IP 67 CE, cULus Slim design, large switching distance Stainless steel PET-C 2 m PUR cable, 26 AWG		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

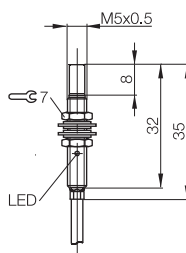
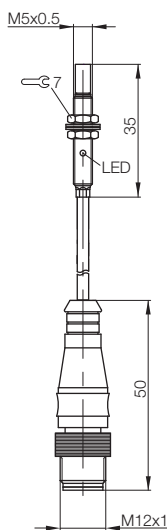
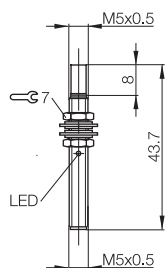
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M5×0.5

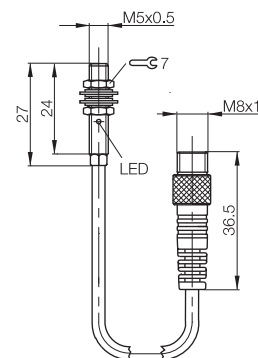
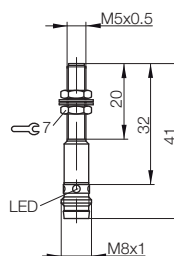
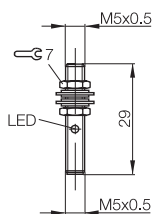


Housing size		M5×0.5	M5×0.5	M5×0.5	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		0.8 mm	0.8 mm	0.8 mm	
Assured switching distance s_a		0...0.65 mm	0...0.65 mm	0...0.65 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES012Z	BES00H2	BES00H1	
	Part number	BES M05EC-PSC08B-S26G	BES 516-3005-E5-C-S49	BES 516-3005-E4-C-S49-00,3	
PNP, NC	Ordering code	BES012Y	BES00L1		
	Part number	BES M05EC-POC08B-S26G	BES 516-3022-E5-C-S49		
NPN, NO	Ordering code	BES012W	BES00HL		
	Part number	BES M05EC-NSC08B-S26G	BES 516-3006-E5-C-S49		
NPN, NC	Ordering code	BES012U	BES00L8		
	Part number	BES M05EC-NOC08B-S26G	BES 516-3023-E5-C-S49		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		3 V	3 V	3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		100 mA	100 mA	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	3 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Slim design	Slim design	Slim design	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		M5 connector, 4-pin	M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M5x0.5



M5x0.5	M5x0.5	M5x0.5	M5x0.5	M5x0.5
Flush	Flush	Flush	Flush	Flush
0.8 mm	0.8 mm	1.5 mm	1.5 mm	1.5 mm
0...0.65 mm	0...0.65 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
1X	1X	2X	2X	2X
BES00FW	BES00FT	BES013A	BES00HF	BES00H5
BES 516-3005-E4-C-S4-00,3	BES 516-3005-E4-C-PU-02	BES M05ED-PSC15B-S26G	BES 516-3005-G-E5-C-S49	BES 516-3005-G-E4-C-S26-00,3
	BES00KZ	BES0137		
	BES 516-3022-E4-C-PU-02	BES M05ED-POC15B-S26G		
	BES00HJ	BES0133		
	BES 516-3006-E4-C-PU-02	BES M05ED-NSC15B-S26G		
	BES00L6	BES0130		
	BES 516-3023-E4-C-PU-02	BES M05ED-NOC15B-S26G		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3 V	3 V	3 V	3 V	3 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
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Slim design	Slim design	Slim design	Slim design	Slim design
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 26 AWG	M5 connector, 4-pin	M8 connector, 3-pin	0.3 m PUR cable with M5 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BKS-B 25-3-PU-03



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

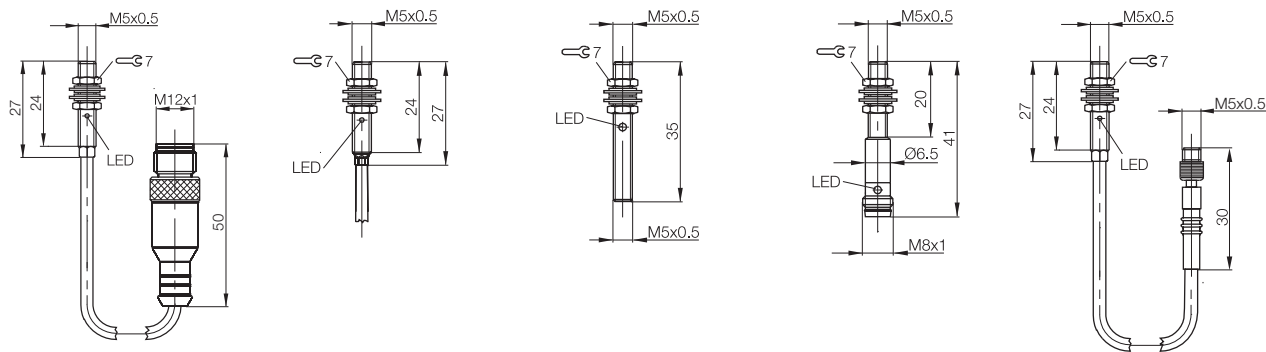
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors
Tubular housing, Ø 6.5 mm



Housing size		
Installation type (observe instructions in Basic Information chapter)		
Rated switching distance s_n		
Assured switching distance s_a		
Sensing distance		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_o max.		
Rated insulation voltage U_i (protection class)		
Rated operating current I_o		
Polarity reversal protected/transposition protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Output function indicator		
Degree of protection as per IEC 60529		
Approvals		
Material	Housing	
	Sensing surface	
Connection		
Suggested mating cable		

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**

DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Flush	Flush	Non-flush	Non-flush	Non-flush
2 mm	2 mm	4 mm	4 mm	4 mm
0...1.6 mm	0...1.6 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
2X	2X	2X	2X	2X
BES03R9	BES03P4	BES0005	BES03P5	BES000F
BES G06EE-PSC20B-S49G-003	BES G06EH-PSC20B-S49G	BES G06EB-PSC40F-S49G	BES G06EH-PSC40F-S49G	BES G06ED-PSC40F-BV02
BES03RY	BES03RT	BES0004	BES03T1	BES000C
BES G06EE-POC20B-S49G-003	BES G06EH-POC20B-S49G	BES G06EB-POC40F-S49G	BES G06EH-POC40F-S49G	BES G06ED-POC40F-BV02
BES03RZ		BES0003	BES03T2	BES0009
BES G06EE-NSC20B-S49G-003		BES G06EB-NSC40F-S49G	BES G06EH-NSC40F-S49G	BES G06ED-NSC40F-BV02
BES03T0		BES0002	BES03T3	BES0007
BES G06EE-NOC20B-S49G-003		BES G06EB-NOC40F-S49G	BES G06EH-NOC40F-S49G	BES G06ED-NOC40F-BV02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
75 V DC	75 V DC	75 V DC	75 V DC	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C	-25...70 °C
700 Hz	1.5 kHz	1.5 kHz	1.5 kHz	1.5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PA 12	PBT	PBT
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	2 m PVC cable, 26 AWG
BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

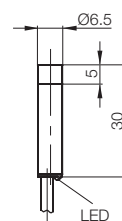
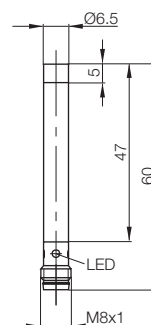
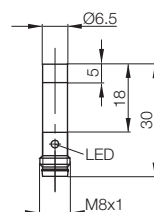
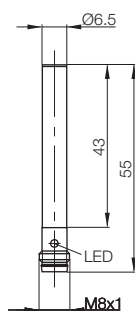
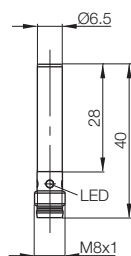
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



SUPERSHORTY™

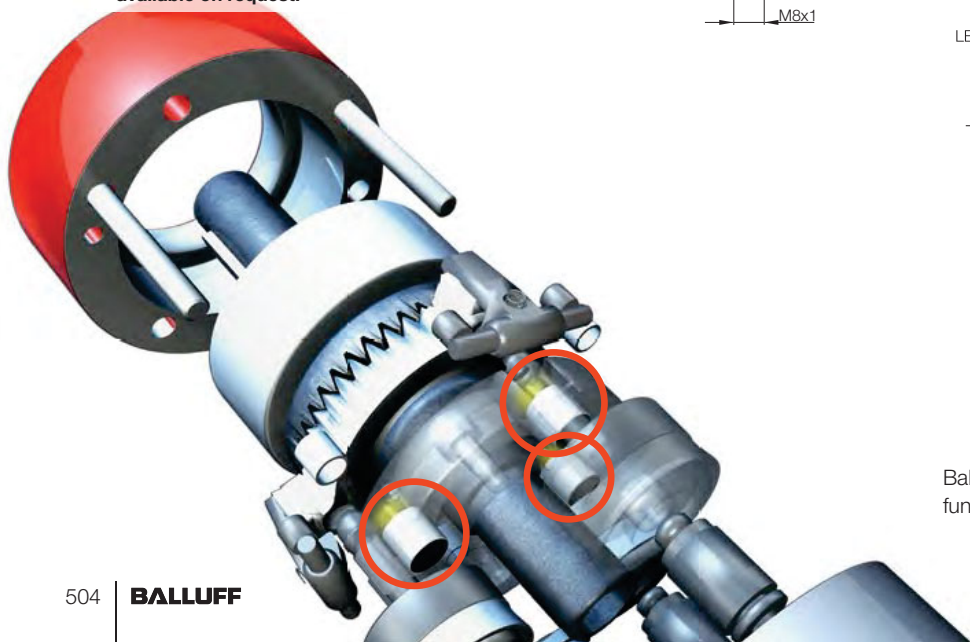
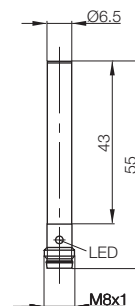
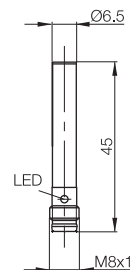
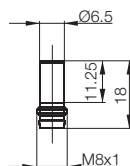


Housing size		Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm
Sensing distance		1X	1X	1X
PNP, NO	Ordering code	BES025N	BES00ZC	BES01KJ
	Part number	BES G06EA-PSD15B-S49G	BES 516-371-E5-C-S49	BES 516-371-S49-C
PNP, NC	Ordering code	BES025J		
	Part number	BES G06EA-POD15B-S49G		
NPN, NO	Ordering code	BES025F		
	Part number	BES G06EA-NSD15B-S49G		
NPN, NC	Ordering code	BES025A		
	Part number	BES G06EA-NOD15B-S49G		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC
Rated operating current I_o		150 mA	200 mA	200 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C
Switching frequency f max.		3 kHz	3 kHz	3 kHz
Output function indicator		No	Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approvals		CE, cULus	CE, cULus	CE, cULus
Special properties		Short design		
Material	Housing	Stainless steel	Stainless steel	Stainless steel
	Sensing surface	PBT	PBT	PBT
Connection		M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Balluff's SuperShorty sensors monitor the function of a pneumatic stepping motor.

DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



SUPERSHORTY™	SUPERSHORTY™	SUPERSHORTY™	SUPERSHORTY™	SUPERSHORTY™
Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
1X	1X	1X	1X	1X
BES0253	BES0254	BES00ZA	BES00Z8	BES0256
BES G06E60-PSC15B-EP00,3-GS26	BES G06E60-PSC15B-EP00,3-GS49	BES 516-371-E4-C-S49-00,3	BES 516-371-E4-C-S4-00,3	BES G06E60-PSC15B-EP02
				BES0251
				BES G06E60-POC15B-EP02
	BES024Y			BES024Z
	BES G06E60-NSC15B-EP00,3-GS49			BES G06E60-NSC15B-EP02
				BES024W
				BES G06E60-NOC15B-EP02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
75 V DC	75 V DC	250 V AC (□)	250 V AC (□)	75 V DC
150 mA	150 mA	200 mA	200 mA	150 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Short design	Short design			Short design
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
0.3 m PUR cable with M5 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 28 AWG
BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

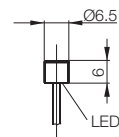
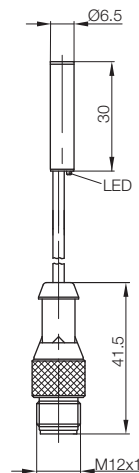
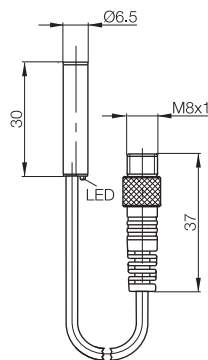
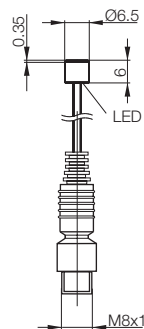
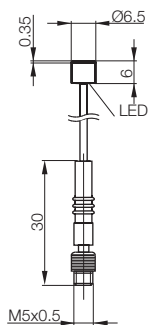
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm

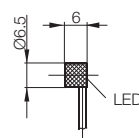
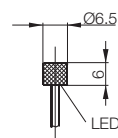
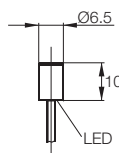


Housing size		Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm
Sensing distance		1X	1X	1X
PNP, NO	Ordering code	BES025M	BES026F	BES0269
	Part number	BES G06EA-PSC15B-EP02	BES K06K60-PSC15B-EP02	BES K06K40-PSC15B-FP02
PNP, NC	Ordering code	BES025H	BES026E	BES0262
	Part number	BES G06EA-POC15B-EP02	BES K06K60-POC15B-EP02	BES K06K40-POC15B-FP02
NPN, NO	Ordering code	BES025E	BES026C	BES0261
	Part number	BES G06EA-NSC15B-EP02	BES K06K60-NSC15B-EP02	BES K06K40-NSC15B-FP02
NPN, NC	Ordering code	BES0259	BES026A	BES0260
	Part number	BES G06EA-NOC15B-EP02	BES K06K60-NOC15B-EP02	BES K06K40-NOC15B-FP02
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC
Rated operating current I_o		150 mA	150 mA	150 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C
Switching frequency f max.		3 kHz	3 kHz	3 kHz
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 65	IP 65
Approvals		CE, cULus	CE, cULus	CE, cULus
Special properties		Short design	Short design	Short design
Material	Housing	Stainless steel	PBT	PBT
	Sensing surface	PBT	PBT	PBT
Connection		2 m PUR cable, 28 AWG	2 m PUR cable, 28 AWG	2 m PUR cable, 28 AWG
Suggested mating cable				

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

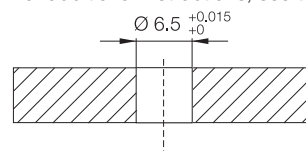


Features

- Simple installation with glue-in sensor
- Flexible use with optional radial cable outlet

Installation recommended for Ø 6.5 mm smooth sensor

Prepare and clean drill hole and sensor according to the specifications of the glue used. Coat hole and sensor with adhesive and position sensor in hole. Allow to cure. For additional instructions, see the data sheet.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



SUPERSHORTY™

Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	2 mm	2 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.6 mm	0...1.6 mm
1X	1X	1X	2X	2X
BES00Z2	BES00Z5	BES01K7		BES037K
BES 516-371-E4-C-02	BES 516-371-E4-C-PU-02	BES 516-371-EO-C-02		BES 516-371-SA15-C-S49
			BES025K	
			BES G06EA-POD20B-S49G	
BES00ZW	BES0100	BES01L1		
BES 516-372-E4-C-02	BES 516-372-E4-C-PU-02	BES 516-372-EO-C-02		
			BES025C	
			BES G06EA-NOD20B-S49G	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC	75 V DC
200 mA	200 mA	200 mA	150 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	1.5 kHz
Yellow LED	Yellow LED	Yellow LED	No	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
			Short design	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG	2 m PVC cable, 26 AWG	M8 connector, 3-pin	M8 connector, 3-pin
			BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

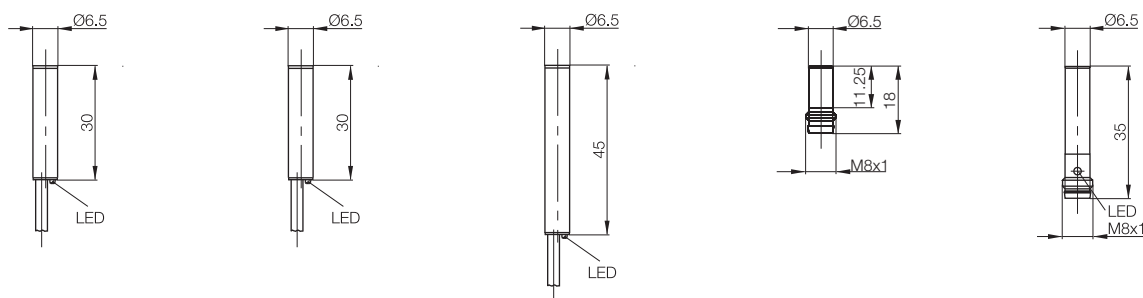
AC/DC 2-wire

AC 2-wire

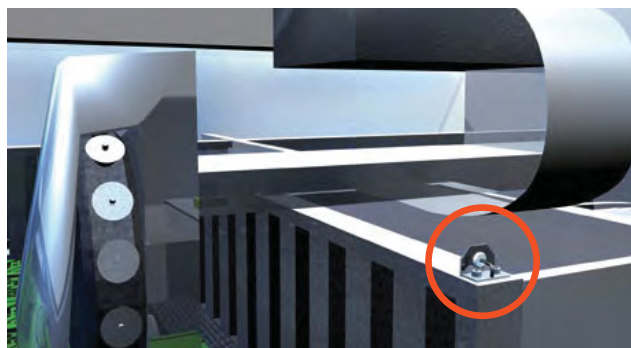
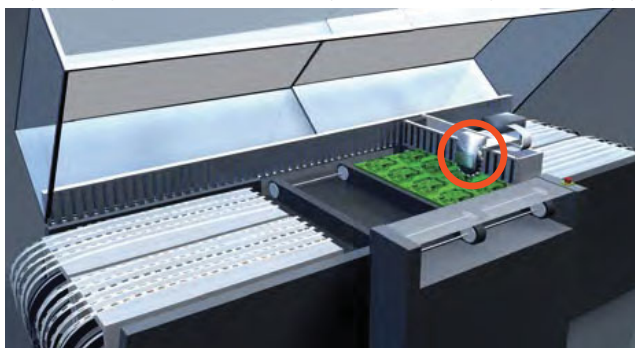
Analog distance measurement

Special properties

Special accessories



SuperShorty sensors in electronics production: SMT placement equipment



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



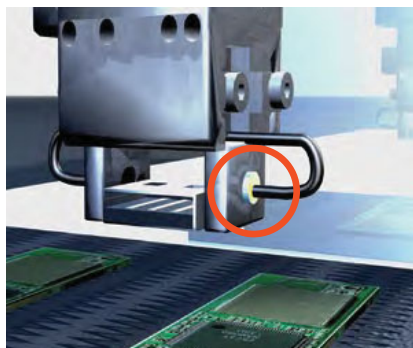
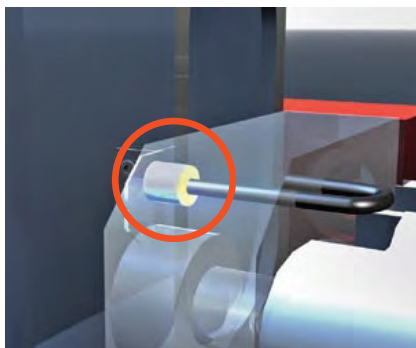
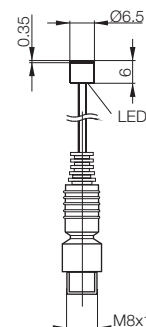
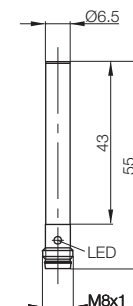
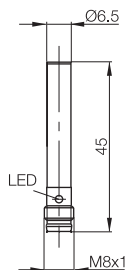
SUPERSHORTY™

Housing size		Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES00ZU	BES01KH	BES0257	
	Part number	BES 516-371-G-E5-C-S49	BES 516-371-G-S49-C	BES G06E60-PSC20B-EP00,3-GS49	
PNP, NC	Ordering code	BES00KY			
	Part number	BES 516-3021-G-E5-C-S49			
NPN, NO	Ordering code	BES0107	BES03RU		
	Part number	BES 516-372-G-E5-C-S49	BES G06EH-NSC20B-S49G		
NPN, NC	Ordering code		BES03RW		
	Part number		BES G06EH-NOC20B-S49G		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		200 mA	200 mA	150 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		1.5 kHz	1.5 kHz	3 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties				Short design	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	2 mm	2 mm	2 mm
0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm
2X	2X	2X	2X	2X
BES00ZR	BES00ZN	BES0258	BES03ZA	BES01KW
BES 516-371-G-E4-C-S49-00,3	BES 516-371-G-E4-C-S4-00,2	BES G06E60-PSC20B-EP02	BES G06K40-PSC20B-FP02	BES 516-371-SA13-PU-02
BES03F8	BES00KU			
BES 516-3021-G-E4-C-S49-00,3	BES 516-3021-G-E4-C-S4-00,2			
BES0106		BES0250		
BES 516-372-G-E4-C-S49-00,3		BES G06E60-NSC20B-EP02		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	75 V DC	75 V DC	75 V DC
200 mA	200 mA	150 mA	150 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
1.5 kHz	1.5 kHz	3 kHz	1.5 kHz	2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	No
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 65	IP 65
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE
		Short design	Short design	
Stainless steel	Stainless steel	Stainless steel	PBT	Stainless steel
PBT	PBT	PBT	PBT	PBT
0.3 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 28 AWG	2 m PUR cable, 28 AWG	2 m PUR cable, 26 AWG
BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020			



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

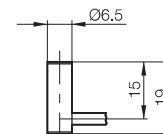
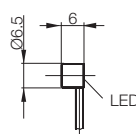
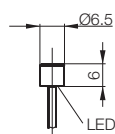
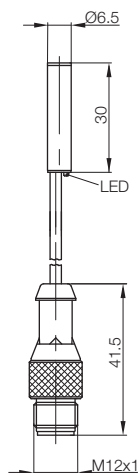
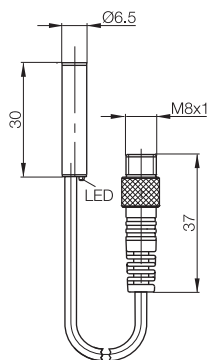
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories

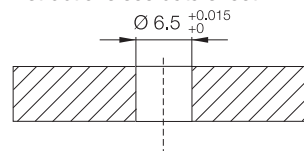


Features

- Simple installation with glue-in sensor
- Flexible use with optional radial cable outlet

Installation recommended for Ø 6.5 mm smooth sensor

Drill hole and sensor according to the specifications of the glue used. Coat hole and sensor with adhesive and position sensor in hole. Allow to cure. For additional instructions see data sheet.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm

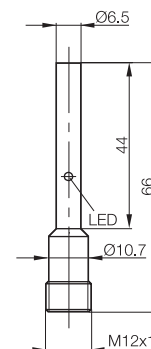
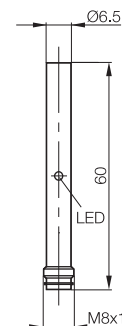
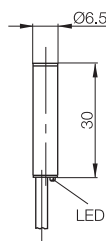


Housing size		Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Quasi-flush	Quasi-flush	
Rated switching distance s_n		2 mm	3 mm	3 mm	
Assured switching distance s_a		0...1.6 mm	0...2.4 mm	0...2.4 mm	
Sensing distance		2X	3X	3X	
PNP, NO	Ordering code	BES00ZF	BES02UY	BES02UR	
	Part number	BES 516-371-G-E4-C-02	BES G06MI-PSC30B-S49G	BES G06MH1-PSC30B-S04G	
PNP, NC	Ordering code	BES00KP	BES02UW		
	Part number	BES 516-3021-G-E4-C-02	BES G06MI-POC30B-S49G		
NPN, NO	Ordering code	BES0102	BES02UU	BES02UP	
	Part number	BES 516-372-G-E4-C-02	BES G06MI-NSC30B-S49G	BES G06MH1-NSC30B-S04G	
NPN, NC	Ordering code		BES02UT		
	Part number		BES G06MI-NOC30B-S49G		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2 V	2 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	75 V DC	75 V DC	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		1.5 kHz	1 kHz	1 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 67	
Approvals		CE, cULus	CE	CE	
Special properties			Large switching distance	Large switching distance	
Material	Housing	Stainless steel	Brass-coated	Brass-coated	
	Sensing surface	PBT	PBT	PBT	
Connection		2 m PVC cable, 26 AWG	M8 connector, 3-pin	M12 connector, 4-pin	
Suggested mating cable			BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 6.5 mm



Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm		
Quasi-flush	Non-flush	Non-flush		
4 mm	2.5 mm	4 mm		
0...2.9 mm	0...2 mm	0...3.2 mm		
4X	1X	2X		
BES01NT	BES00TZ	BES01NP		
BES G06MI-PSC40B-S49G	BES 516-349-E4-C-02	BES G06EF-PSC40F-S49G		
BES01NR	BES00U6			
BES G06MI-NSC40B-S49G	BES 516-350-E4-C-02			
10...30 V DC	10...30 V DC	10...30 V DC		
2.8 V	2.5 V	2.5 V		
75 V DC	250 V AC (□)	75 V DC		
200 mA	200 mA	200 mA		
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes		
0...+60 °C	-25...+70°C	-25...+70°C		
700 Hz	2 kHz	1.5 kHz		
Yellow LED	Yellow LED	Yellow LED		
IP 65	IP 68 per BWN Pr. 20	IP 67		
CE, cULus	CE, cULus	CE, cULus		
Large switching distance				
Brass-coated	Stainless steel	Stainless steel		
PBT	PBT	PBT		
M8 connector, 3-pin	2 m PVC cable, 26 AWG	M8 connector, 3-pin		
BCC M313-0000-10-001-EX43T2-020		BCC M313-0000-10-001-EX43T2-020		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

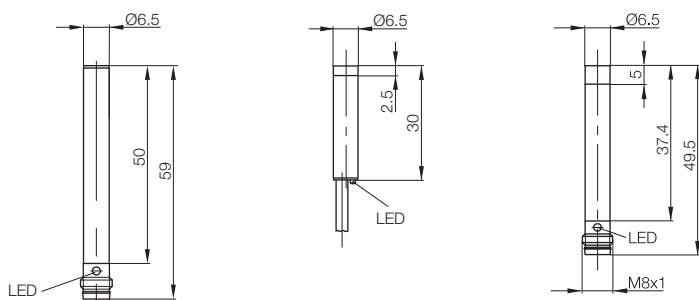
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, Ø 8 mm

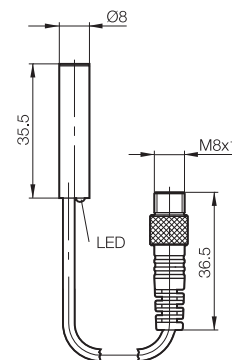
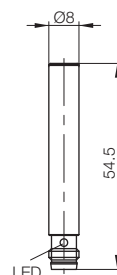
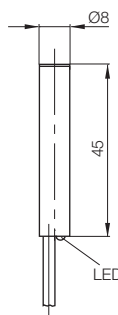


Housing size		Ø 8 mm	Ø 8 mm	Ø 8 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.2 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		1X	2X	2X	
PNP, NO	Ordering code	BES01NY	BES0379		
	Part number	BES G08EG-PSC15B-BV02	BES 516-369-G-SA2-S49-C		
PNP, NC	Ordering code		BES0349	BES0348	
	Part number		BES 516-3013-G-SA2-S49-C	BES 516-3013-G-SA2-S49-00,5	
NPN, NO	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	3.5 V	3.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	75 V DC	75 V DC	
Rated operating current I_e		200 mA	130 mA	130 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	800 Hz	800 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE	
Special properties					
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PA 12	PA 12	
Connection		2 m PVC cable, 26 AWG	M8 connector, 3-pin	0.5 m PUR cable with M8 connector, 3-pin	
Suggested mating cable			BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housings, Ø 8 mm, M8x1



Ø 8 mm	Ø 8 mm	M8 x 1	M8 x 1	M8 x 1
Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	0.5 mm	1 mm	1 mm
0...1.6 mm	0...1.6 mm	0...0.36 mm	0...0.8 mm	0...0.8 mm
2X	2X	1X	1X	1X
BES0388	BES012N	BES03P0		BES02HP
BES G08EC-PSC20B-EP01-GS04-516	BES G08EE-PSC20B-BV02	BES M08EA-PSC05B-EP02		BES 516-324-SA8-02
			BES0367	
			BES 516-343-SA13-E5-C-S49	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	1.5 V
75 V DC	250 V AC (□)	75 V DC	75 V DC	75 V DC
200 mA	200 mA	150 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/No/No
-25...+70°C	-25...+70°C	-25...85 °C	-25...+70°C	-25...+100 °C
2 kHz	1.5 kHz	2 kHz	3.5 kHz	2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	No
IP 67	IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67
CE	CE, cULus	CE, cULus	CE, cULus	CE
		Short design		
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Ceramic	PBT	PBT	PBT	PBT
1 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 26 AWG	2 m PUR cable, 28 AWG	M8 connector, 3-pin	2 m PVC cable, 26 AWG
BCC M415-0000-1A-003-EX44T2-020			BCC M313-0000-10-001-EX43T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

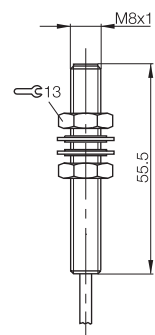
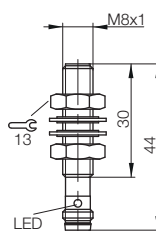
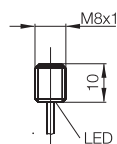
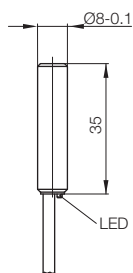
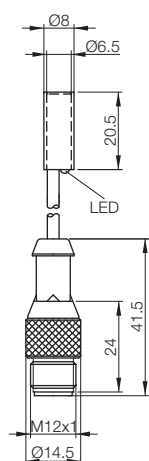
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



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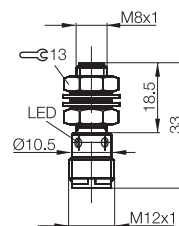
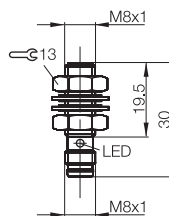
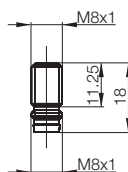


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES0277	BES013N	BES013M	
	Part number	BES M08EA-PSD15B-S49G	BES M08EC-PSC15B-S49G	BES M08EC-PSC15B-S04G	
PNP, NC	Ordering code	BES0270	BES013K		
	Part number	BES M08EA-POD15B-S49G	BES M08EC-POC15B-S49G		
NPN, NO	Ordering code	BES026W	BES013J		
	Part number	BES M08EA-NSD15B-S49G	BES M08EC-NSC15B-S49G		
NPN, NC	Ordering code	BES026R			
	Part number	BES M08EA-NOD15B-S49G			
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	250 V AC (□)	250 V AC (□)	
Rated operating current I_o		150 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	3 kHz	
Output function indicator		No	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Short design			
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



M8 × 1	M8 × 1	M8 × 1	M8 × 1	M8 × 1
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
1X	1X	1X	1X	1X
BES0147	BES0146	BES01P7	BES01AW	BES01PF
BES M08EE-PSC15B-S49G	BES M08EE-PSC15B-S04G	BES M08EG-PSC15B-S49G	BES 516-324-S49-C	BES M08EH-PSC15B-S04G
BES0143	BES0142		BES01LR	BES01PE
BES M08EE-POC15B-S49G	BES M08EE-POC15B-S04G		BES 516-377-S49-C	BES M08EH-POC15B-S04G
BES013Z	BES013Y		BES01F5	BES01PC
BES M08EE-NSC15B-S49G	BES M08EE-NSC15B-S04G		BES 516-343-S49-C	BES M08EH-NSC15B-S04G
BES013T	BES013R		BES01LZ	BES01PA
BES M08EE-NOC15B-S49G	BES M08EE-NOC15B-S04G		BES 516-378-S49-C	BES M08EH-NOC15B-S04G
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
M8 connector, 3-pin	M12 connector, 4-pin	M8 connector, 3-pin	M8 connector, 3-pin	M12 connector, 4-pin
BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

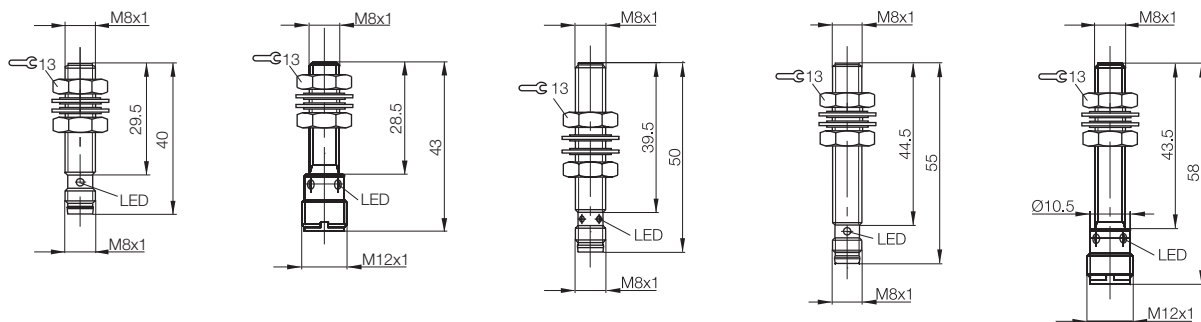
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



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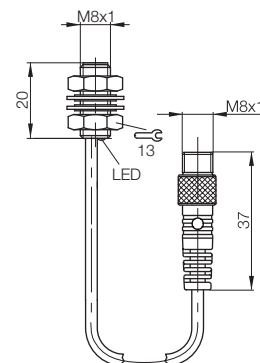
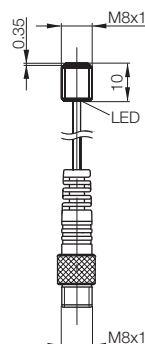
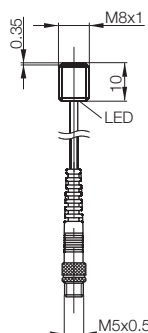


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES0272	BES0273	BES034Y	
	Part number	BES M08EA-PSC15B-EP00,3-GS26	BES M08EA-PSC15B-EP00,3-GS49	BES 516-324-SA44-C-S49-00,3	
PNP, NC	Ordering code				
	Part number				
NPN, NO	Ordering code		BES026T		
	Part number		BES M08EA-NSC15B-EP00,3-GS49		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC	
Rated operating current I_e		150 mA	150 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	4 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE	
Special properties		Short design	Short design		
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		0.3 m PUR cable with M5 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



M8 × 1	M8 × 1	M8 × 1	M8 × 1	M8 × 1
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
1X	1X	1X	1X	1X
BES00NK	BES00N9	BES00MU	BES00MT	BES01AL
BES 516-324-E4-C-S49-00,3	BES 516-324-E4-C-S49-00,3	BES 516-324-E3-C-S49-00,3	BES 516-324-E3-C-S49-00,3	BES 516-324-EO-C-S49-00,3
			BES010N	BES01LN
			BES 516-377-E3-C-S49-00,3	BES 516-377-EO-C-S49-00,3
				BES01F4
				BES 516-343-EO-C-S49-00,3
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin
BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

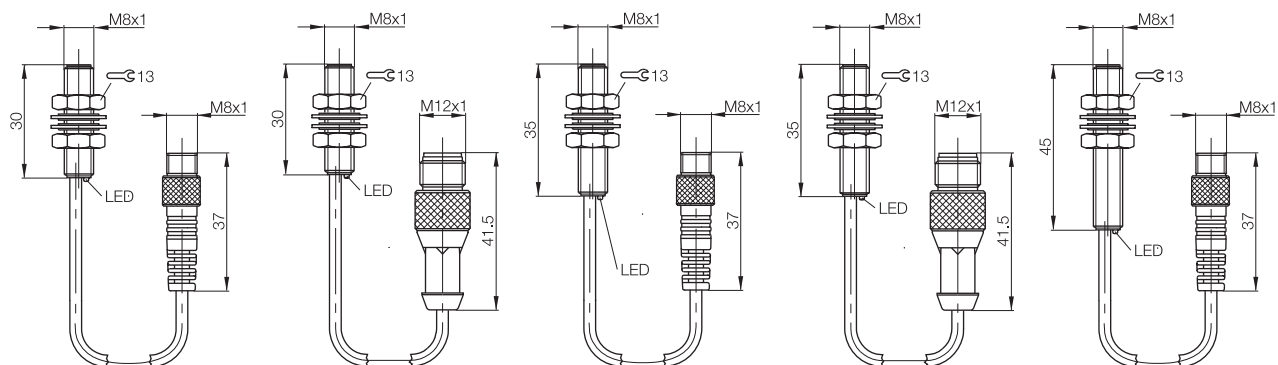
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



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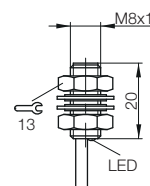
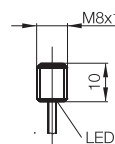
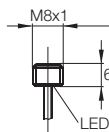


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES026M	BES0275	BES034P	
	Part number	BES M08E60-PSC15B-EP02	BES M08EA-PSC15B-EP02	BES 516-324-SA44-C-02	
PNP, NC	Ordering code	BES026K	BES026Y		
	Part number	BES M08E60-POC15B-EP02	BES M08EA-POC15B-EP02		
NPN, NO	Ordering code	BES026J	BES026U		
	Part number	BES M08E60-NSC15B-EP02	BES M08EA-NSC15B-EP02		
NPN, NC	Ordering code	BES026H	BES026N		
	Part number	BES M08E60-NOC15B-EP02	BES M08EA-NOC15B-EP02		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		150 mA	150 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	4 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE	
Special properties		Short design	Short design		
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		2 m PUR cable, 28 AWG	2 m PUR cable, 28 AWG	2 m PVC cable, 26 AWG	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8x1



M8 x 1	M8 x 1	M8 x 1	M8 x 1	M8 x 1
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
1X	1X	1X	1X	1X
BES00MY		BES014K	BES01A7	BES01AC
BES 516-324-E4-C-02		BES M08EF-PSC15B-BP02	BES 516-324-EO-C-02	BES 516-324-EO-C-PU-02
BES010T	BES010K	BES014H	BES01LC	BES01LH
BES 516-377-E4-C-02	BES 516-377-E3-C-PU-02	BES M08EF-POC15B-BP02	BES 516-377-EO-C-02	BES 516-377-EO-C-PU-02
BES00TL		BES03J6	BES01EY	BES01F1
BES 516-343-E4-C-02		BES M08EF-NSC15B-BP02	BES 516-343-EO-C-02	BES 516-343-EO-C-PU-02
		BES014C	BES01LT	
		BES M08EF-NOC15B-BP02	BES 516-378-EO-C-02	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	PBT	PBT	PBT	PBT
2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG	2 m PUR cable, 26 AWG	2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular
 housings

Block
 housings

DC 2-wire

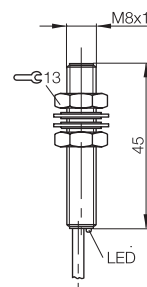
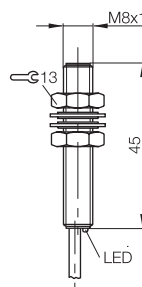
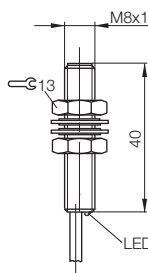
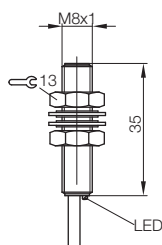
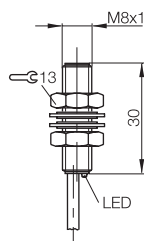
AC/DC 2-wire

AC 2-wire

Analog
distance
measurement

Special
properties

Special
accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



SUPERSHORTY™

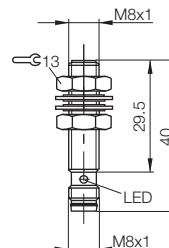
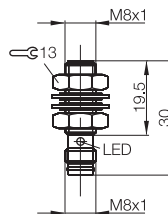
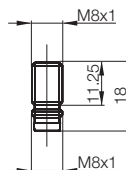


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES0278	BES013P	BES014A	
	Part number	BES M08EA-PSD20B-S49G	BES M08EC-PSC20B-S49G	BES M08EE-PSC20B-S49G	
PNP, NC	Ordering code		BES013L	BES0145	
	Part number		BES M08EC-POC20B-S49G	BES M08EE-POC20B-S49G	
NPN, NO	Ordering code	BES01P1		BES0141	
	Part number	BES M08EA-NSD20B-S49G		BES M08EE-NSC20B-S49G	
NPN, NC	Ordering code			BES013W	
	Part number			BES M08EE-NOC20B-S49G	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	250 V AC (□)	250 V AC (□)	
Rated operating current I_o		150 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	1.5 kHz	1.5 kHz	
Output function indicator		No	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Short design			
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



M8 × 1	M8 × 1	M8 × 1	M8 × 1	M8 × 1
Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	2 mm	2 mm	2 mm
0...1.6 mm	0...1.4 mm	0...1.6 mm	0...1.4 mm	0...1.6 mm
2X	2X	2X	2X	2X
BES0148	BES0149	BES00P7	BES02P0	BES01AU
BES M08EE-PSC20B-S04G	BES M08EE-PSC20B-S04G-101	BES 516-324-G-E5-C-S49	BES 516-324-SA96-G-E5-C-S49	BES 516-324-G-S49-C
BES0144		BES0113		BES01LP
BES M08EE-POC20B-S04G		BES 516-377-G-E5-C-S49		BES 516-377-G-S49-C
BES0140		BES00TY	BES02P1	
BES M08EE-NSC20B-S04G		BES 516-343-G-E5-C-S49	BES 516-343-SA96-G-E5-C-S49	
BES013U		BES0118		
BES M08EE-NOC20B-S04G		BES 516-378-G-E5-C-S49		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
1.5 kHz	1.5 kHz	1.5 kHz	1.5 kHz	1.5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	With ceramic coating	PBT	with ceramic coating	PBT
M12 connector, 4-pin	M12 connector, 4-pin	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

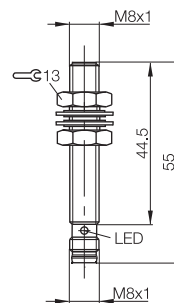
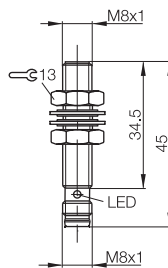
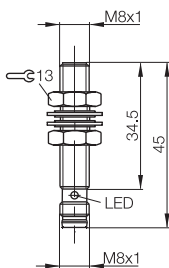
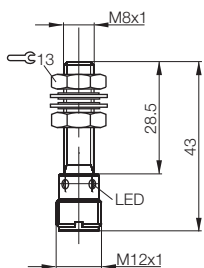
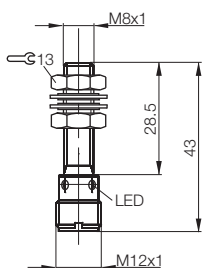
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



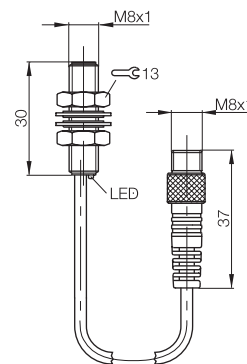
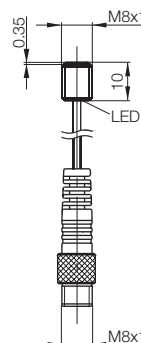
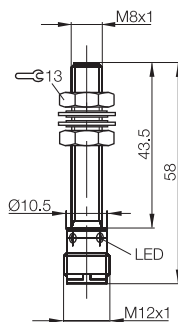
SUPERSHORTY™

Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES01PH	BES0276	BES00P4	
	Part number	BES M08EH-PSC20B-S04G	BES M08EA-PSC20B-EP00,3-GS49	BES 516-324-G-E4-C-S49-00,3	
PNP, NC	Ordering code			BES0112	
	Part number			BES 516-377-G-E4-C-S49-00,3	
NPN, NC	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	75 V DC	250 V AC (II)	
Rated operating current I_o		200 mA	150 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		1.5 kHz	3 kHz	1.5 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties			Short design		
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		M12 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



SUPERSHORTY™

M8 × 1	M8 × 1	M8 × 1	M8 × 1	M8 × 1
Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	2 mm	2 mm	2 mm
0...1.6 mm	0...1.4 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm
2X	2X	2X	2X	2X
BES00P2	BES02P5	BES03TU	BES01AT	
BES 516-324-G-E4-C-S4-00,3	BES 516-324-SA96-G-E4-C-S4-00,3	BES M08EF-PSC20B-BP00,3-GS49	BES 516-324-G-EO-C-S49-01	
				BES026Z
				BES M08EA-POC20B-EP02
				BES026P
				BES M08EA-NOC20B-EP02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC
200 mA	200 mA	200 mA	200 mA	150 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
1.5 kHz	1.5 kHz	1.5 kHz	1.5 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
				Short design
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PBT	with ceramic coating	PBT	PBT	PBT
0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M8 connector, 3-pin	1 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 28 AWG
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

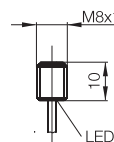
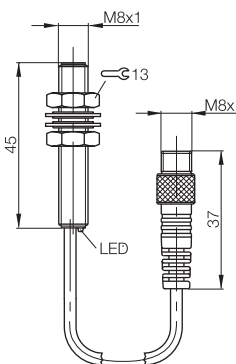
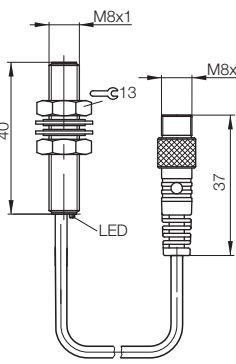
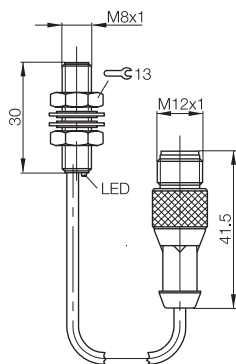
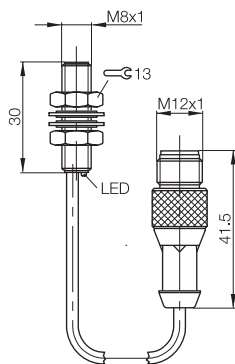
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1

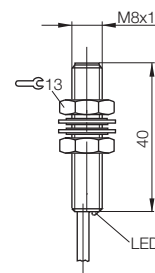
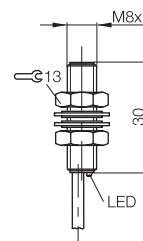
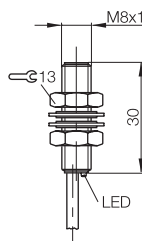


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES00NR	BES00NY	BES014L	
	Part number	BES 516-324-G-E4-C-02	BES 516-324-G-E4-C-PU-02	BES M08EF-PSC20B-BP02	
PNP, NC	Ordering code	BES010Y	BES010Z	BES014J	
	Part number	BES 516-377-G-E4-C-02	BES 516-377-G-E4-C-PU-02	BES M08EF-POC20B-BP02	
NPN, NO	Ordering code	BES00TT		BES014F	
	Part number	BES 516-343-G-E4-C-02		BES M08EF-NSC20B-BP02	
NPN, NC	Ordering code	BES0116		BES014E	
	Part number	BES 516-378-G-E4-C-02		BES M08EF-NOC20B-BP02	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		1.5 kHz	1.5 kHz	1.5 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties					
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG	2 m PUR cable, 26 AWG	
Suggested mating cable					

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8x1



M8 x 1	M8 x 1	M8 x 1	M8 x 1	M8 x 1	M8 x 1
Flush	Flush	Flush	Quasi-flush	Quasi-flush	Quasi-flush
2 mm	2 mm	2.5 mm	3 mm	3 mm	3 mm
0...1.6 mm	0...1.6 mm	0...2 mm	0...2.4 mm	0...2.4 mm	0...2.4 mm
2X	2X	2X	3X	3X	3X
BES01AM	BES01AN	BES0427	BES02WA	BES02W9	
BES 516-324-G-EO-C-02	BES 516-324-G-EO-C-PU-02	BES M08EE-PSC25B-S49G	BES M08MH1-PSC30B-S49G	BES M08MH1-PSC30B-S04G	
		BES0423			
		BES M08EE-POC25B-S49G			
			BES02W8	BES02W7	
			BES M08MH1-NSC30B-S49G	BES M08MH1-NSC30B-S04G	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2 V	2 V	2 V
250 V AC (□)	250 V AC (□)	250 V AC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	100 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	0...+60 °C	-25...+70°C	-25...+70°C	-25...+70°C
1.5 kHz	1.5 kHz	1 kHz	1 kHz	1 kHz	1 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE	CE	CE
			Large switching distance	Large switching distance	
Stainless steel	Stainless steel	Stainless steel	Brass-coated	Brass-coated	
PBT	PBT	PBT	PBT	PBT	
2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG	M8 connector, 3-pin	M8 connector, 3-pin	M12 connector, 4-pin	
		BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

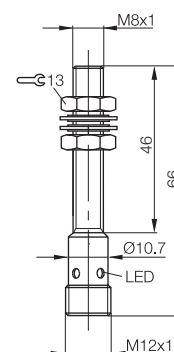
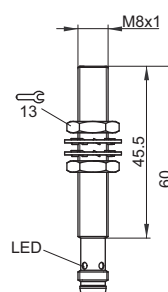
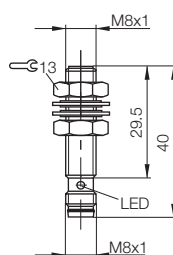
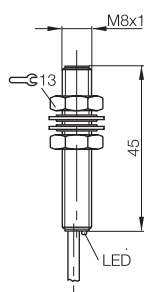
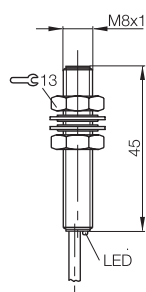
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1

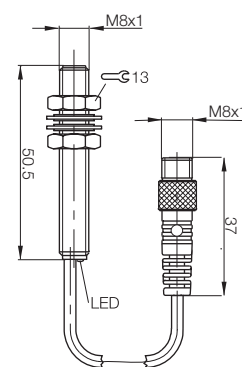
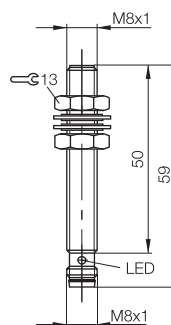
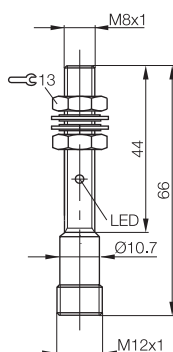


Housing size	M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)	Quasi-flush	Quasi-flush	Quasi-flush	
Rated switching distance s_n	3 mm	4 mm	4 mm	
Assured switching distance s_a	0...2.2 mm	0...2.9 mm	0...2.9 mm	
Sensing distance	3X	4X	4X	
PNP, NO	Ordering code	BES02PW	BES01ZW	BES003R
	Part number	BES M08MH1-PSC30B-S04G-101	BES M08MI-PSC40B-S49G	BES M08MI-PSC40B-BP00,3-GS49
PNP, NC	Ordering code			
	Part number			
NPN, NO	Ordering code	BES01ZT		
	Part number	BES M08MI-NSC40B-S49G		
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2 V	2.8 V	2.8 V	
Rated insulation voltage U_i (protection class)	75 V DC	75 V DC	75 V DC	
Rated operating current I_e	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	0...+60 °C	0...+60 °C	
Switching frequency f max.	1 kHz	800 Hz	800 Hz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE	CE, cULus	CE, cULus	
Special properties	Large switching distance	Large switching distance	Large switching distance	
Material	Housing	Brass-coated	Brass-coated	
	Sensing surface	with ceramic coating	PBT	
Connection	M12 connector, 4-pin	M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



M8 × 1 Quasi-flush 4 mm 0...2.9 mm 4X BES01ZU BES M08MI-PSC40B-BP00,2-GS04	M8 × 1 Non-flush 2.5 mm 0...2 mm 1X BES01P3 BES M08ED-PSC25F-S04G	M8 × 1 Non-flush 2.5 mm 0...2 mm 1X BES01M6 BES 516-383-S49-C	M8 × 1 Non-flush 2.5 mm 0...2 mm 1X BES01P8 BES M08EG-PSC25F-S04G BES01P6 BES M08EG-POC25F-S04G	M8 × 1 Non-flush 2.5 mm 0...2 mm 1X BES01ZR BES M08MI-NSC40B-BP00,2-GS04 BES01P2 BES M08ED-NSC25F-S04G BES01P5 BES M08EG-NSC25F-S04G BES011U BES 516-384-E4-C-S49-00.2
10...30 V DC 2.8 V 75 V DC 200 mA Yes/Yes/Yes 0...+60 °C 800 Hz Yellow LED IP 67 CE, cULus Large switching distance Brass-coated PBT 0.2 m PUR cable with M12 connector, 4-pin BCC M415-0000-1A-003-EX44T2-020	10...30 V DC 2.5 V 250 V AC (□) 200 mA Yes/Yes/Yes -25...+70 °C 2 kHz Yellow LED IP 68 per BWN Pr. 20 CE, cULus	10...30 V DC 2.5 V 250 V AC (□) 200 mA Yes/Yes/Yes -25...+70 °C 2 kHz Yellow LED IP 68 per BWN Pr. 20 CE, cULus	10...30 V DC 2.5 V 250 V AC (□) 200 mA Yes/Yes/Yes -25...+70 °C 2 kHz Yellow LED IP 68 per BWN Pr. 20 CE, cULus	10...30 V DC 2.5 V 250 V AC (□) 200 mA Yes/Yes/Yes -25...+70 °C 2 kHz Yellow LED IP 67 CE, cULus
Stainless steel PBT	Stainless steel PBT	Stainless steel PBT	Stainless steel PBT	Stainless steel PBT
M12 connector, 4-pin BCC M415-0000-1A-003-EX44T2-020	M12 connector, 4-pin BCC M415-0000-1A-003-EX44T2-020	M8 connector, 3-pin BCC M313-0000-10-001-EX43T2-020	M12 connector, 4-pin BCC M415-0000-1A-003-EX44T2-020	0.2 m PVC cable with M8 connector, 3-pin BCC M313-0000-10-001-EX43T2-020



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire
Tubular
housings

Block
housings

DC 2-wire

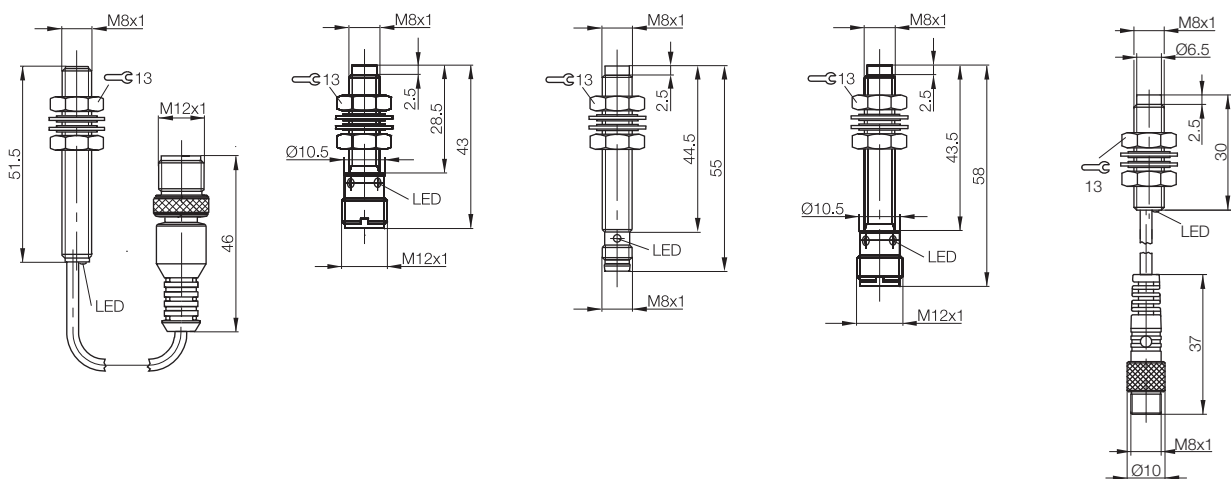
AC/DC 2-wire

AC 2-wire

Analog
distance
measurement

Special
properties

Special
accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1

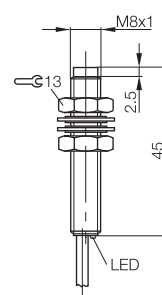
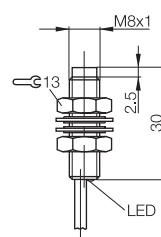
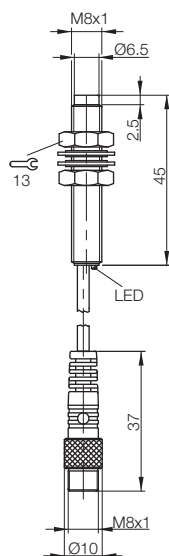


Housing size		M8 × 1	M8 × 1	M8 × 1	
Installation type (observe instructions in the Basic Information chapter)		Non-flush	Non-flush	Non-flush	
Rated switching distance s_n		2.5 mm	2.5 mm	2.5 mm	
Assured switching distance s_a		0...2 mm	0...2 mm	0...2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code		BES011A	BES01M0	
	Part number		BES 516-383-E4-C-02	BES 516-383-EO-C-02	
PNP, NC	Ordering code				
	Part number				
NPN, NO	Ordering code	BES01MA	BES011M	BES01M7	
	Part number	BES 516-384-EO-C-S49-00.2	BES 516-384-E4-C-02	BES 516-384-EO-C-02	
NPN, NC	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		2 kHz	2 kHz	2 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties					
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		0.2 m PVC cable with M8 connector, 3-pin	2 m PVC cable, 26 AWG	2 m PVC cable, 26 AWG	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020			

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M8×1



M8 × 1	M8 × 1	M8 × 1	M8 × 1	
Non-flush	Non-flush	Non-flush	Non-flush	
4 mm	4 mm	6 mm	6 mm	
0...3.2 mm	0...3.2 mm	0...4.8 mm	0...4.8 mm	
2X	2X	3X	3X	
BES014M	BES01P9	BES02W4	BES02W3	
BES M08EF-PSC40F-S49G	BES M08EG1-PSC40F-S04G	BES M08MG1-PSC60F-S49G	BES M08MG1-PSC60F-S04G	
		BES02W2		
		BES M08MG1-POC60F-S49G		
			BES02W0	
			BES M08MG1-NSC60F-S04G	
		BES02UZ		
		BES M08MG1-NOC60F-S49G		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	2.5 V	2 V	2 V	
250 V AC (□)	250 V AC (□)	75 V DC	75 V DC	
200 mA	200 mA	200 mA	200 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	
1.5 kHz	5 kHz	500 Hz	500 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67	
CE, cULus	CE, cULus	CE	CE	
		Large switching distance	Large switching distance	
Stainless steel	Stainless steel	Brass-coated	Brass-coated	
PBT	PBT	PBT	PBT	
M8 connector, 3-pin	M12 connector, 4-pin	M8 connector, 3-pin	M12 connector, 4-pin	
BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

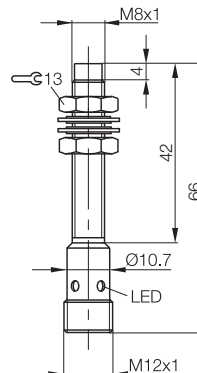
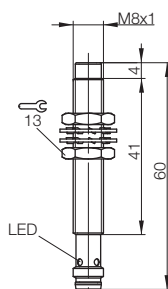
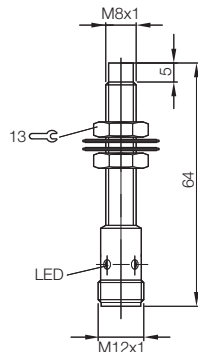
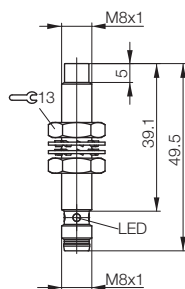
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12×1

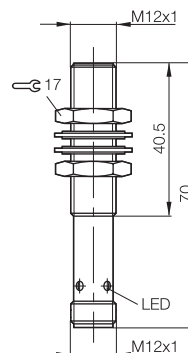
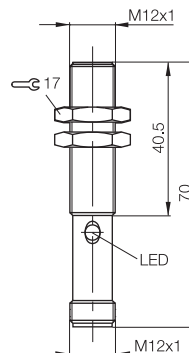
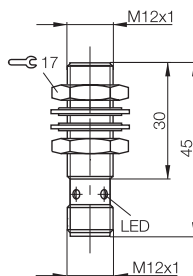


Housing size		M12×1	M12×1	M12×1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES00PK	BES02EL	BES01C8	
	Part number	BES 516-325-E5-C-S4	BES 515-325-S4-C	BES 516-325-S4-C	
PNP, NC	Ordering code	BES00YT	BES01K6		
	Part number	BES 516-370-E5-C-S4	BES 516-370-S4-C		
PNP, complementary	Ordering code			BES0161	
	Part number			BES 516-113-S4-C	
NPN, NO	Ordering code	BES00T5	BES01EN		
	Part number	BES 516-329-E5-C-S4	BES 516-329-S4-C		
NPN, NC	Ordering code	BES010A	BES01LA		
	Part number	BES 516-375-E5-C-S4	BES 516-375-S4-C		
NPN, complementary	Ordering code			BES016E	
	Part number			BES 516-118-S4-C	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2 V	1.5 V	1.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-40...+85 °C	
Switching frequency f max.		5 kHz	3 kHz	2.5 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Stainless steel	Stainless steel	
	Sensing surface	PBT	PA 12	PA 12	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12x1



M12x1	M12x1	M12x1	M12x1	M12x1
Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	2 mm	4 mm	4 mm
0...1.6 mm	0...1.6 mm	0...1.6 mm	0...3.2 mm	0...3.2 mm
1X	1X	1X	2X	2X
BES00PH	BES00P8	BES01AZ	BES00PY	BES014W
BES 516-325-E4-C-S4-00,5	BES 516-325-E4-C-02	BES 516-325-BO-C-02	BES 516-325-G-E5-C-S4	BES M12EE-PSC40B-S04G
	BES00YL	BES01K2	BES00Z0	BES014U
	BES 516-370-E4-C-02	BES 516-370-BO-C-02	BES 516-370-G-E5-C-S4	BES M12EE-POC40B-S04G
	BES00T0	BES01EF	BES00TC	
	BES 516-329-E4-C-02	BES 516-329-BO-C-02	BES 516-329-G-E5-C-S4	
	BES0108	BES01L7	BES010H	
	BES 516-375-E4-C-02	BES 516-375-BO-C-02	BES 516-375-G-E5-C-S4	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2 V	2 V	1.5 V	2.5 V	2 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-40...+85 °C	-25...+70°C	-25...+85 °C
5 kHz	5 kHz	3 kHz	2.5 kHz	2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Brass-coated	Stainless steel	Brass-coated	Stainless steel
PBT	PBT	PA 12	LCP	LCP
0.5 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020			BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

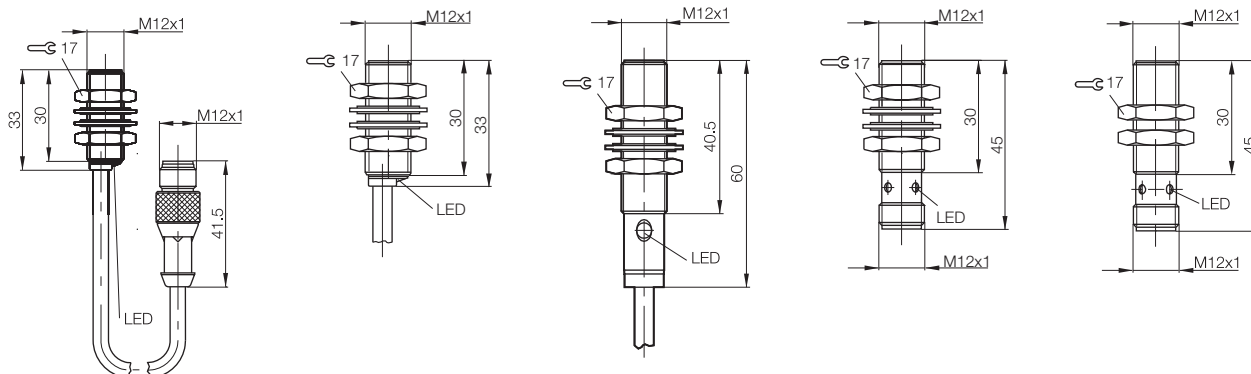
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12x1

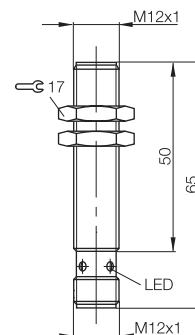
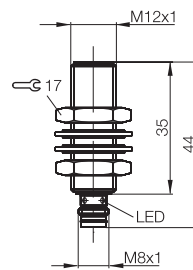
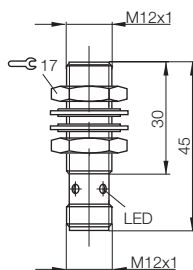


Housing size	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	4 mm	4 mm	4 mm	
Assured switching distance s_a	0...3 mm	0...3.2 mm	0...3.2 mm	
Sensing distance	2X	2X	2X	
PNP, NO	Ordering code	BES00PZ	BES02FU	
	Part number	BES 516-325-G-E5-C-S49	BES M12EI-PSC40B-S04G	
PNP, NC	Ordering code	BES00Z1	BES02FT	
	Part number	BES 516-370-G-E5-C-S49	BES M12EI-POC40B-S04G	
NPN, NO	Ordering code	BES03UP	BES00TE	
	Part number	BES 516-329-SA96-G-E5-C-S4	BES 516-329-G-E5-C-S49	BES M12EI-NSC40B-S04G
NPN, NC	Ordering code	BES010J		
	Part number	BES 516-375-G-E5-C-S49		
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	75 V DC	250 V AC (□)	
Rated operating current I_o	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70°C	-25...+70°C	-25...+85 °C	
Switching frequency f max.	2.5 kHz	2.5 kHz	1 kHz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Special properties				
Material	Housing	Brass-coated	Brass-coated	Stainless steel
	Sensing surface	with ceramic coating	LCP	LCP
Connection		M12 connector, 4-pin	M8 connector, 3-pin	M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12x1



SUPERSHORTY™

M12x1	M12x1	M12x1	M12x1	M12x1	M12x1
Flush	Flush	Flush	Flush	Flush	Flush
4 mm	4 mm	4 mm	4 mm	4 mm	4 mm
0...3.2 mm	0...3.2 mm	0...3 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
2X	2X	2X	2X	2X	2X
BES038C	BES01C7	BES035R	BES0464	BES00PW	
BES M12EI-PSC40B-S04G-009	BES 516-325-G-S4-C	BES 516-325-SA96-G-S4-C	BES M12EA-PSC40B-EP00,3-GS04	BES 516-325-G-E4-C-S4-00,5	
			BES0465		
			BES M12EA-POC40B-EP00,3-GS04		
			BES0467	BES03EK	
			BES M12EA-NSC40B-EP00,3-GS04	BES 516-329-G-E4-C-S4-PU-00.5	
			BES0466		
			BES M12EA-NOC40B-EP00,3-GS04		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	1.7 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	100 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-40...+85 °C	-25...+70°C	-25...+70°C	-40...+85 °C	-25...+70°C	-25...+70°C
2 kHz	1 kHz	1 kHz	1 kHz	2.5 kHz	2.5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
			Short design		
Stainless steel	Brass-coated	Brass-coated	Stainless steel	Brass-coated	Brass-coated
LCP	LCP	with ceramic coating	LCP	LCP	LCP
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	0.5 m PUR cable with M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

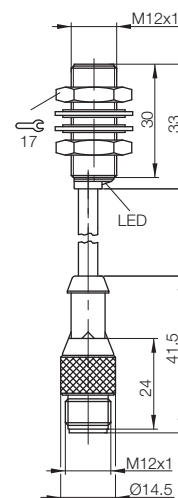
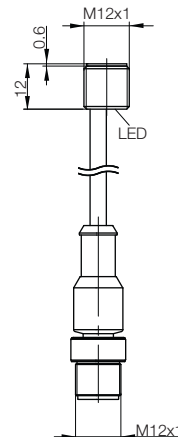
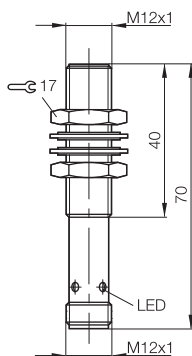
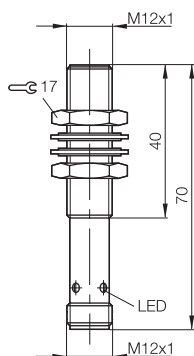
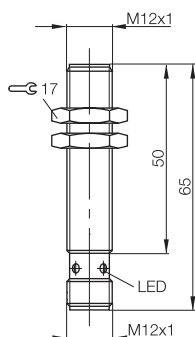
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12x1

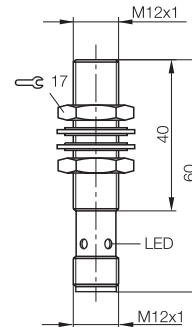
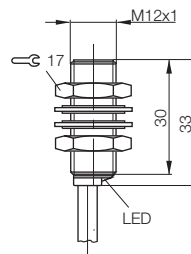
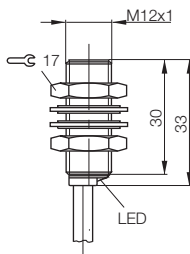


Housing size		M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Quasi-flush	
Rated switching distance s_n		4 mm	4 mm	6 mm	
Assured switching distance s_a		0...3.2 mm	0...3.2 mm	0...4.8 mm	
Sensing distance		2X	2X	3X	
PNP, NO	Ordering code	BES00PL	BES00PP	BES02WZ	
	Part number	BES 516-325-G-E4-C-02	BES 516-325-G-E4-C-PU-02	BES M12MG1-PSC60B-S04G	
PNP, NC	Ordering code	BES00YU	BES00YW	BES02WY	
	Part number	BES 516-370-G-E4-C-02	BES 516-370-G-E4-C-PU-02	BES M12MG1-POC60B-S04G	
PNP, complementary	Ordering code				
	Part number				
NPN, NO	Ordering code	BES00T6	BES00T9	BES02WW	
	Part number	BES 516-329-G-E4-C-02	BES 516-329-G-E4-C-PU-02	BES M12MG1-NSC60B-S04G	
NPN, NC	Ordering code	BES010C	BES010E	BES02WU	
	Part number	BES 516-375-G-E4-C-02	BES 516-375-G-E4-C-PU-02	BES M12MG1-NOC60B-S04G	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	2 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	75 V DC	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		2.5 kHz	2.5 kHz	800 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	
Approvals		CE, cULus	CE, cULus	CE	
Special properties				Large switching distance	
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	LCP	LCP	PBT	
Connection		2 m PVC cable, 22 AWG	2 m PUR cable, 22 AWG	M12 connector, 4-pin	
Suggested mating cable				BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12x1



M12x1	M12x1	M12x1	M12x1	M12x1
Quasi-flush	Non-flush	Non-flush	Non-flush	Non-flush
8 mm	4 mm	4 mm	4 mm	4 mm
0...5.8 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
4X	1X	1X	1X	1X
BES01ZN	BES00UY		BES02FC	BES01H6
BES M12MI-PSH80B-S04G	BES 516-356-E5-C-S4		BES 515-356-S4-C	BES 516-356-S4-C
	BES00KM		BES018Y	
	BES 516-3019-E5-C-S4		BES 516-3019-S4-C	
				BES0178
				BES 516-131-S4-C
BES01ZY		BES030Z	BES01HE	
BES M12MI-NSH80B-S04G		BES 516-357-E5-Y-S4	BES 516-357-S4-C	
			BES019E	
			BES 516-3030-S4-C	
10...55 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2 V	3.5 V	1.5 V	1.5 V
250 V AC (□)	250 V AC (□)	75 V DC	250 AC (□)	250 V AC (□)
200 mA	200 mA	130 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
0...+60 °C	-25...+70°C	-25...+70°C	-40...+85 °C	-40...+85 °C
300 Hz	2 kHz	400 Hz	1.5 kHz	1.5 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Large switching distance				
Brass-coated	Brass-coated	Brass-coated	Stainless steel	Stainless steel
LCP	PBT	PA 12	PA 12	PA 12
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

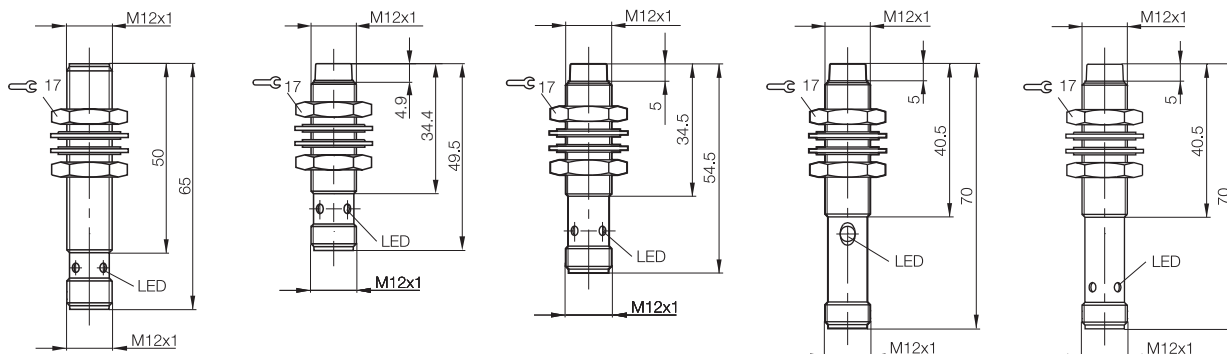
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12×1

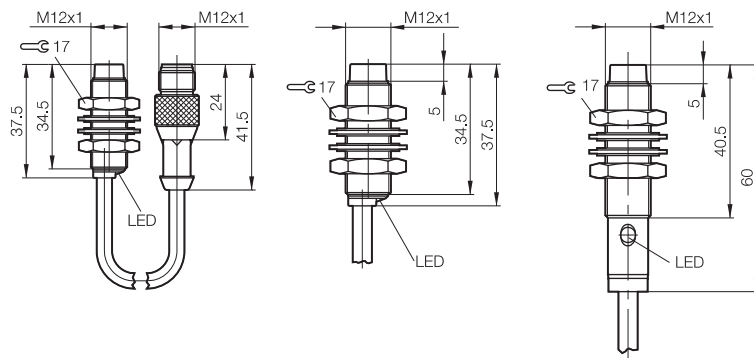


Housing size		M12×1	M12×1	M12×1	
Installation type (observe instructions in the Basic Information chapter)		Non-flush	Non-flush	Non-flush	
Rated switching distance s_n		4 mm	4 mm	4 mm	
Assured switching distance s_a		0...3.2 mm	0...3.2 mm	0...3.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES00UT	BES00UL	BES01H1	
	Part number	BES 516-356-E4-C-S4-00,3	BES 516-356-E4-C-02	BES 516-356-BO-C-02	
PNP, NC	Ordering code			BES018P	
	Part number			BES 516-3019-BO-C-02	
NPN, NO	Ordering code		BES00W0	BES01H7	
	Part number		BES 516-357-E4-C-02	BES 516-357-BO-C-02	
NPN, NC	Ordering code		BES00M0	BES019A	
	Part number		BES 516-3030-E4-C-02	BES 516-3030-BO-C-02	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2 V	2 V	1.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-40...+85 °C	
Switching frequency f max.		2 kHz	2 kHz	1.2 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties					
Material	Housing	Brass-coated	Brass-coated	Stainless steel	
	Sensing surface	PBT	PBT	PA 12	
Connection		0.3 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020			

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M12x1



SUPERSHORTY™

M12x1	M12x1	M12x1	M12x1	M12x1	
Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	
6 mm	8 mm	10 mm	10 mm	10 mm	
0...4.8 mm	0...6.4 mm	0...8 mm	0...8 mm	0...8 mm	
2X	2X	3X	3X	3X	
BES047L	BES01PN	BES02WK	BES02WR	BES02WR	
BES M12EA-PSC60F-EP00,3-GS04	BES M12EG-PSC80F-S04G	BES M12MC1-PSC10F-S04G	BES M12MF1-PSC10F-S04G	BES M12MF1-PSC10F-S04G	
BES047M			BES02WP	BES02WP	
BES M12EA-POC60F-EP00,3-GS04			BES M12MF1-POC10F-S04G	BES M12MF1-POC10F-S04G	
BES047P		BES02WJ	BES02WN	BES02WN	
BES M12EA-NSC60F-EP00,3-GS04		BES M12MC1-NSC10F-S04G	BES M12MF1-NSC10F-S04G	BES M12MF1-NSC10F-S04G	
BES047N					
BES M12EA-NOC60F-EP00,3-GS04					
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	2.5 V	2 V	2 V	2 V	
75 V DC	250 V AC (□)	75 V DC	75 V DC	75 V DC	
100 mA	200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-40...+85 °C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	
1 kHz	1.5 kHz	400 Hz	400 Hz	400 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE	CE	CE	
Short design		Large switching distance	Large switching distance	Large switching distance	
Stainless steel	Stainless steel	Brass-coated	Brass-coated	Brass-coated	
LCP	PBT	PBT	PBT	PBT	
0.3 m PUR cable with M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

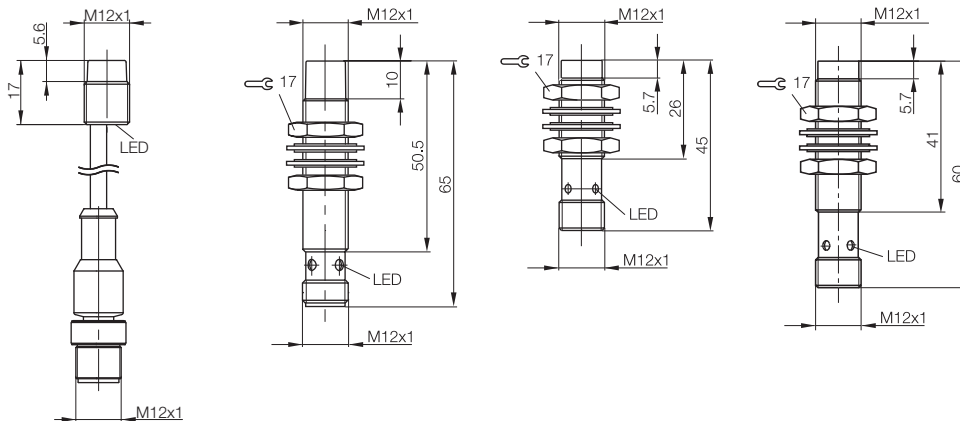
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18×1

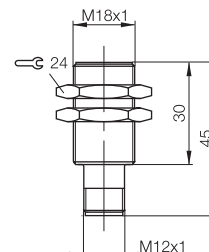
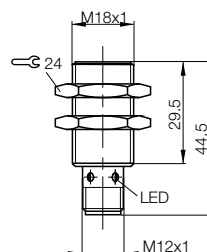
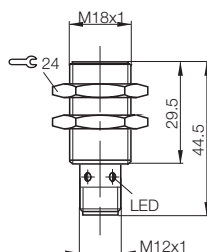


Housing size		M18×1	M18×1	M18×1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		5 mm	5 mm	5 mm	
Assured switching distance s_a		0...4 mm	0...4 mm	0...4 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES00R6		BES02ET	
	Part number	BES 516-326-E5-C-S4		BES 515-326-E5-T-S4	
PNP, NC	Ordering code		BES00YC		
	Part number		BES 516-367-E5-Y-S4		
PNP, complementary	Ordering code				
	Part number				
NPN, NO	Ordering code		BES00UC		
	Part number		BES 516-355-E5-Y-S4		
NPN, NC	Ordering code				
	Part number				
NPN, complementary	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2 V	3.5 V	3.5 V	
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC	
Rated operating current I_e		200 mA	130 mA	130 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-40...+105 °C*	
Switching frequency f max.		1 kHz	500 Hz	500 Hz	
Output function indicator		Yellow LED	Yellow LED	No	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 69K, IP 68 as per BWN Pr. 27	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties				Resistant to high pressure cleaners	
Material	Housing	Brass-coated	Brass-coated	Stainless steel	
	Sensing surface	PBT	PA 12	PA 12	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

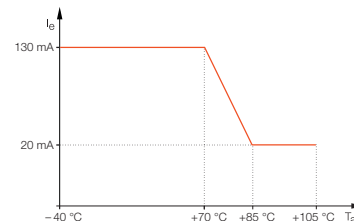
See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



*max. load current over temperature



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1



M18x1	M18x1	M18x1	M18x1	M18x1
Flush	Flush	Flush	Flush	Flush
5 mm	5 mm	5 mm	5 mm	5 mm
0...4 mm	0...4 mm	0...4 mm	0...4 mm	0...4 mm
1X	1X	1X	1X	1X
BES01CW	BES01CZ	BES02EU	BES00R5	BES00R0
BES 516-326-S4-C	BES 516-326-S4-H	BES 515-326-S4-C	BES 516-326-E4-C-S4-00,2	BES 516-326-E4-C-02
BES01JW				
BES 516-367-S4-C				
BES015N				
BES 516-105-S4-C				
BES01H0				
BES 516-355-S4-C				
BES01JU				
BES 516-366-S4-C				
BES015U				
BES 516-111-S4-C				
10...30 V DC	10...55 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	1.5 V	1.5 V	2 V	2 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-40...+85 °C	-25...+70°C	-25...+70°C
900 Hz	900 Hz	900 Hz	1 kHz	1 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67
CE, cULus	CE	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Brass-coated	Stainless steel	Brass-coated	Brass-coated
PA 12	PA 12	PA 12	PA 12	PBT
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	0.2 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 22 AWG
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

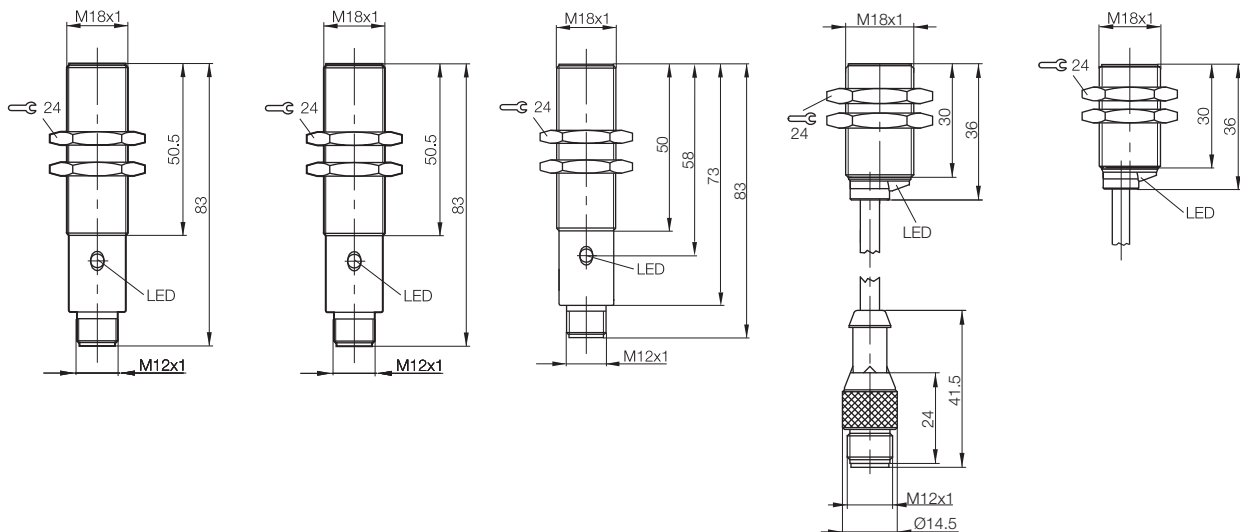
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1

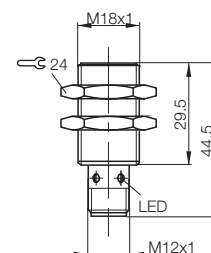
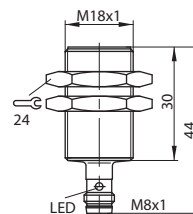
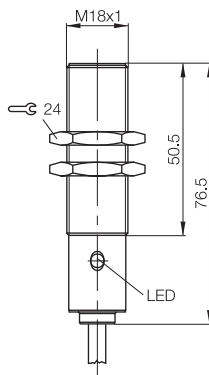


Housing size		M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		5 mm	8 mm	8 mm	
Assured switching distance s_a		0...4 mm	0...6.4 mm	0...6.4 mm	
Sensing distance		1X	2X	2X	
PNP, NO	Ordering code	BES01CE	BES030R	BES00RC	
	Part number	BES 516-326-BO-C-02	BES 516-326-G-E5-Y-S49	BES 516-326-G-E5-C-S4	
PNP, NC	Ordering code		BES00YK	BES00YJ	
	Part number		BES 516-367-G-E5-Y-S49	BES 516-367-G-E5-Y-S4	
PNP, complementary	Ordering code				
	Part number				
NPN, NO	Ordering code	BES01JP	BES00UK	BES00UJ	
	Part number	BES 516-366-BO-C-02	BES 516-355-G-E5-Y-S49	BES 516-355-G-E5-Y-S4	
NPN, NC	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	3.5 V	3.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	75 V DC	75 V DC	
Rated operating current I_e		200 mA	130 mA	130 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		500 Hz	200 Hz	200 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PBT	PBT	
Connection		2 m PVC cable, 22 AWG	M8 connector, 3-pin	M12 connector, 4-pin	
Suggested mating cable			BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1



M18x1	M18x1	M18x1	M18x1	M18x1	M18x1
Flush	Flush	Flush	Flush	Flush	Flush
8 mm	8 mm	8 mm	8 mm	8 mm	8 mm
0...6.3 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm
2X	2X	2X	2X	2X	2X
BES02P3	BES02H0	BES01CT	BES01CU	BES00RA	
BES 516-326-SA96-G-E5-Y-S4	BES M18EI-PSC80B-S04G	BES 516-326-G-S4-C	BES 516-326-G-S4-H	BES 516-326-G-E4-C-S4-00,3	
	BES02FZ				
	BES M18EI-POC80B-S04G				
			BES015M		
			BES 516-105-G-S4-H		
BES02P4	BES02FY				
BES 516-355-SA96-G-E5-Y-S4	BES M18EI-NSC80B-S04G				
	BES02FW				
	BES M18EI-NOC80B-S04G				
10...30 V DC	10...30 V DC	10...30 V DC	10...55 V DC	10...30 V DC	
3.5 V	2.5 V	2.5 V	2.5 V	2.5 V	
75 V DC	250 V AC (□)	75 V DC (□)	75 V DC	75 V DC	
130 mA	200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70 °C	-40...+85 °C	0...70 °C	0...+70 °C	-25...+70 °C	
200 Hz	700 Hz	80 Hz	80 Hz	500 Hz	
Yellow LED	Yellow LED	Yes	Yellow LED	Yellow LED	
IP 67	IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE	CE, cULus	
Brass-coated	Stainless steel	Brass-coated	Brass-coated	Brass-coated	
with ceramic coating	PBT	PBT	PBT	PBT	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

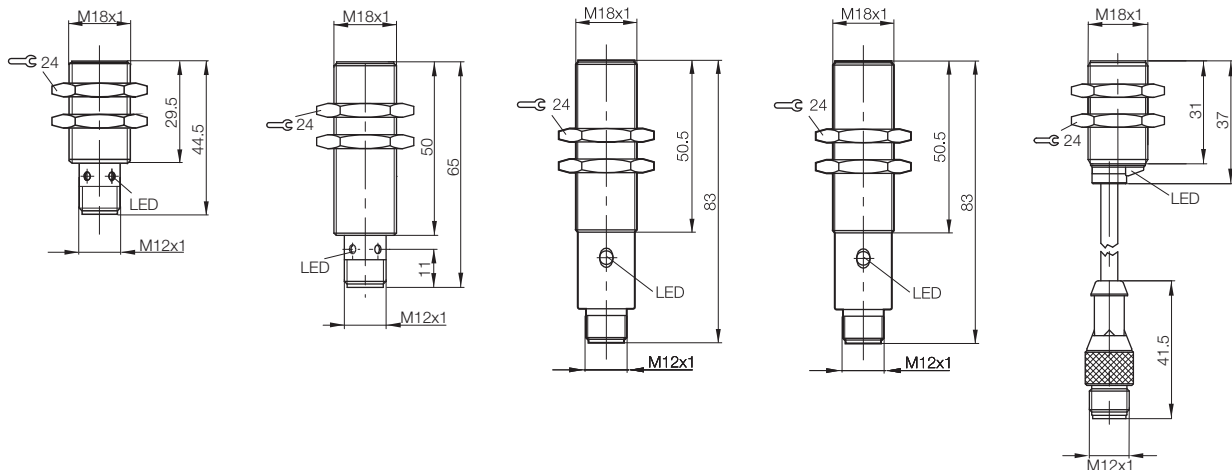
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1

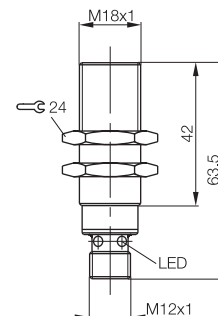
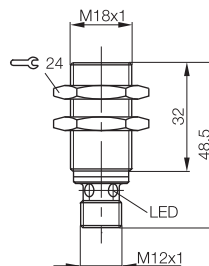
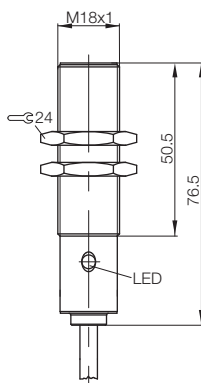


Housing size		M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Quasi-flush	Quasi-flush	
Rated switching distance s_n		8 mm	12 mm	12 mm	
Assured switching distance s_a		0...6.4 mm	0...9.6 mm	0...9.6 mm	
Sensing distance		2X	3X	3X	
PNP, NO	Ordering code	BES01CN	BES02Y5	BES02Y9	
	Part number	BES 516-326-G-BO-C-PU-02	BES M18MD1-PSC12B-S04G	BES M18MG1-PSC12B-S04G	
PNP, NC	Ordering code				
	Part number				
NPN, NO	Ordering code		BES02Y4	BES02Y8	
	Part number		BES M18MD1-NSC12B-S04G	BES M18MG1-NSC12B-S04G	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2 V	2 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	75 V DC	75 V DC	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		0...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.		80 Hz	500 Hz	500 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE	CE	
Special properties			Large switching distance	Large switching distance	
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PBT	PBT	
Connection		2 m PUR cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable			BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1



M18x1	M18x1	M18x1	M18x1	M18x1
Non-flush	Non-flush	Non-flush	Non-flush	Non-flush
8 mm	8 mm	8 mm	8 mm	8 mm
0...6.5 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm
1X	1X	1X	1X	1X
BES00WM	BES02FK	BES02FM	BES03AW	BES01HY
BES 516-360-E5-Y-S4	BES 515-360-E5-T-S4	BES 515-360-SA12-S4-T	BES 516-360-S4-L	BES 516-360-S4-C
BES00LL				BES0193
BES 516-3026-E5-Y-S4				BES 516-3026-S4-C
BES00WT				
BES 516-361-E5-Y-S4				
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3.5 V	3.5 V	3.5 V	2.5 V	1.5 V
75 V DC	75 DC	75 V DC	250 V AC (□)	250 V AC (□)
130 mA	130 mA	130 mA	400 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/No/No	Yes/Yes/Yes
-25...+70°C	-40...+105 °C*	-40...+85 °C (momentarily 105 °C)	-40...+85 °C	-25...+70°C
200 Hz	200 Hz	200 Hz	200 Hz	600 Hz
Yellow LED	No	No	Yellow LED	Yellow LED
IP 67	IP 69K, IP 68 as per BWN Pr. 27	IP 69K, IP 68 as per BWN Pr. 27	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
	Resistant to high pressure cleaners	Resistant to high pressure cleaners		
Brass-coated	Stainless steel	Stainless steel	Brass-coated	Brass-coated
PA 12	PA 12	PA 12	PA 12	PA 12
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular
housings

Block
housings

DC 2-wire

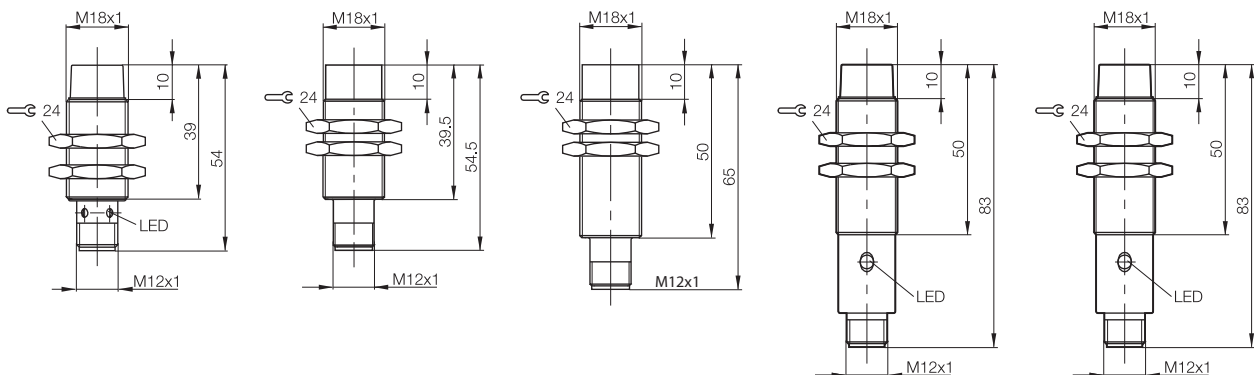
AC/DC 2-wire

AC 2-wire

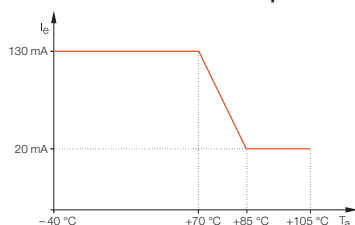
Analog
distance
measurement

Special
properties

Special
accessories



*max. load current over temperature



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1

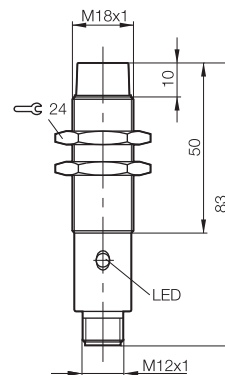
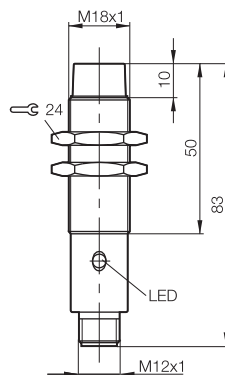
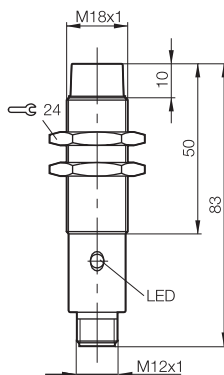


Housing size	M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	Non-flush	Non-flush	
Rated switching distance s_n	8 mm	8 mm	8 mm	
Assured switching distance s_a	0...6.5 mm	0...6.5 mm	0...6.5 mm	
Sensing distance	1X	1X	1X	
PNP, NO	Ordering code		BES02FL	
	Part number		BES 515-360-S4-C	
PNP, NC	Ordering code			
	Part number			
PNP, complementary	Ordering code	BES016Y		
	Part number	BES 516-123-S4-C		
NPN, NO	Ordering code		BES01J5	
	Part number		BES 516-361-S4-C	
NPN, NC	Ordering code		BES019H	
	Part number		BES 516-3031-S4-C	
NPN, complementary	Ordering code		BES0171	
	Part number		BES 516-124-S4-C	
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V	2.5 V	1.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_e	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-40...+85 °C	-25...+70 °C	-40...+85 °C	
Switching frequency f max.	200 Hz	200 Hz	600 Hz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material				
Housing	Brass-coated	Brass-coated	Stainless steel	
Sensing surface	PA 12	PA 12	PA 12	
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18x1



M18x1	M18x1	M18x1	M18x1	
Non-flush	Non-flush	Non-flush	Non-flush	
8 mm	8 mm	8 mm	8 mm	
0...6.5 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm	
1X	1X	1X	1X	
	BES00WH			
	BES 516-360-E4-Y-02			
	BES00LH		BES018Z	
	BES 516-3026-E4-Y-02		BES 516-3026-BO-C-02	
BES02E1				
BES 515-123-S4-C				
	BES00WN	BES01HZ		
	BES 516-361-E4-Y-02	BES 516-361-BO-C-02		
		BES019F		
		BES 516-3031-BO-C-02		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	3.5 V	2.5 V	1.5 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
200 mA	130 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-40...+85 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
200 Hz	200 Hz	200 Hz	600 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Stainless steel	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PA 12	
M12 connector, 4-pin	2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG	
BCC M415-0000-1A-003-EX44T2-020				



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

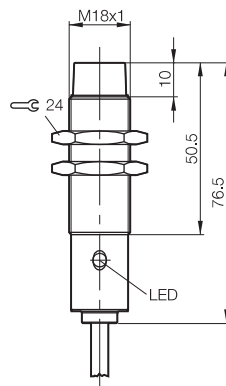
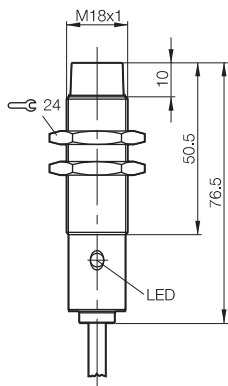
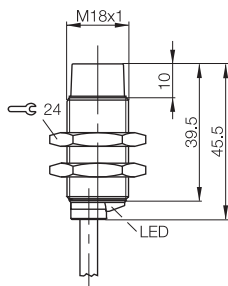
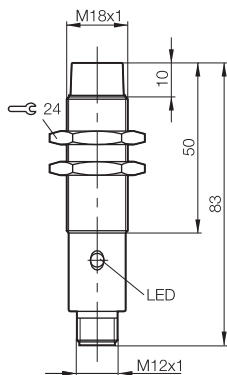
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M18×1

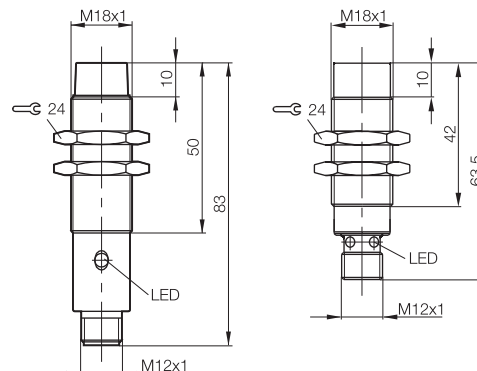


Housing size	M18×1	M18×1	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	Non-flush	
Rated switching distance s_n	16 mm	20 mm	
Assured switching distance s_a	0...13 mm	0...16 mm	
Sensing distance	2X	3X	
PNP, NO	Ordering code	BES016W	BES02Y7
	Part number	BES 516-123-G-S4-H	BES M18ME1-PSC20F-S04G
PNP, NC	Ordering code	BES01HW	
	Part number	BES 516-360-G-S4-H	
PNP, complementary	Ordering code		
	Part number		
NPN, NO	Ordering code		BES02Y6
	Part number		BES M18ME1-NSC20F-S04G
NPN, complementary	Ordering code		
	Part number		
Supply voltage U_B	10...55 V DC	10...30 V DC	
Voltage drop U_d at I_a max.	2.5 V	2 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	75 V DC	
Rated operating current I_a	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.	80 Hz	200 Hz	
Output function indicator	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 67	
Approvals	CE	CE	
Special properties		Large switching distance	
Material	Housing	Brass-coated	Brass-coated
	Sensing surface	PA 12	PBT
Connection		M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Monitor rotary speed

Two inductive sensors are used to protect rotary applications from overspeed. Attached to a perforated disk, they determine rotary speed and direction.

- Extremely reliable (EMC, shock)
- For extreme conditions (temperature fluctuations)
- Long service life

DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
Flush	Flush	Flush	Flush	Flush
10 mm	10 mm	10 mm	10 mm	10 mm
0...8 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm	0...8.1 mm
1X	1X	1X	1X	1X
BES00RP	BES01EE	BES02F1		BES00RF
BES 516-327-E5-Y-S4	BES 516-327-S4-C	BES 515-327-S4-C		BES 516-327-E4-Y-02
BES00LM	BES0195			
BES 516-3028-E5-Y-S4	BES 516-3028-S4-C			
	BES0167		BES02E0	
	BES 516-114-S4-C		BES 515-114-S4-C	
BES00W9	BES01HL			BES00W5
BES 516-359-E5-Y-S4	BES 516-359-S4-C			BES 516-359-E4-Y-02
	BES016J			
	BES 516-120-S4-C			
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3.5 V	2.5 V	2.5 V	2.5 V	3.5 V
75 V DC	250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC
130 mA	200 mA	200 mA	200 mA	130 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-40...+85 °C	-25...+70°C
200 Hz	300 Hz	300 Hz	300 Hz	200 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Brass-coated	Stainless steel	Stainless steel	Brass-coated
PA 12	PA 12	PA 12	PA 12	PA 12
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	2 m PVC cable, 22 AWG
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire Tubular housings

Block housings

DC 2-wire

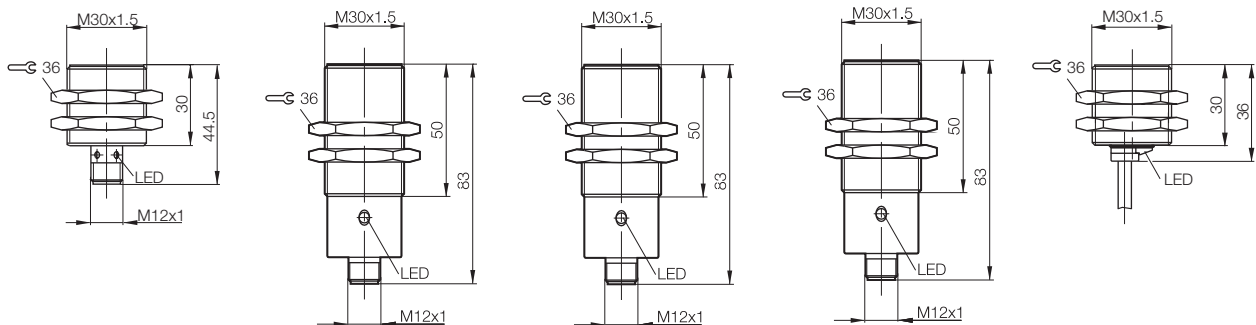
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M30×1.5

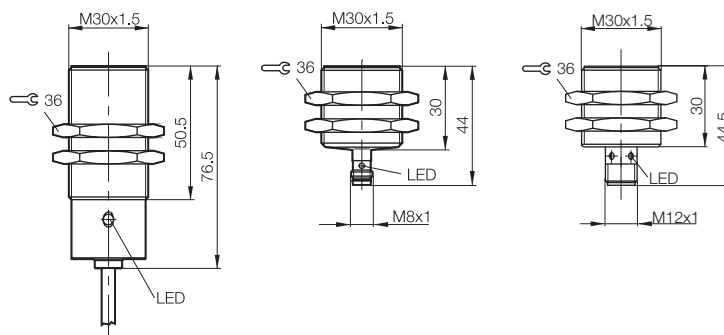


Housing size		M30×1.5	M30×1.5	M30×1.5	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		10 mm	15 mm	15 mm	
Assured switching distance s_a		0...8.1 mm	0...12 mm	0...12 mm	
Sensing distance		1X	2X	2X	
PNP, NO	Ordering code	BES01E3	BES00RY	BES00RW	
	Part number	BES 516-327-BO-C-02	BES 516-327-G-E5-Y-S49	BES 516-327-G-E5-Y-S4	
PNP, NC	Ordering code			BES00LU	
	Part number			BES 516-3028-G-E5-Y-S4	
PNP, complementary	Ordering code				
	Part number				
NPN, NO	Ordering code	BES01HF	BES00WE		
	Part number	BES 516-359-BO-C-02	BES 516-359-G-E5-Y-S49		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	3.5 V	3.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	75 V DC	75 V DC	
Rated operating current I_o		200 mA	130 mA	130 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		300 Hz	100 Hz	100 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties					
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PA 12	PA 12	
Connection		2 m PVC cable, 22 AWG	M8 connector, 3-pin	M12 connector, 4-pin	
Suggested mating cable			BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
Flush	Flush	Flush	Quasi-flush	Non-flush	
15 mm	15 mm	15 mm	22 mm	15 mm	
0...12 mm	0...12 mm	0...12 mm	0...17.6 mm	0...12.2 mm	
2X	2X	2X	3X	1X	
BES01EA	BES01EC	BES00RR	BES02YM	BES00Y0	
BES 516-327-G-S4-C	BES 516-327-G-S4-H	BES 516-327-G-E4-Y-02	BES M30MI1-PSC22B-S04G	BES 516-362-E5-Y-S4	
		BES00LN	BES02YL	BES00LZ	
		BES 516-3028-G-E4-Y-02	BES M30MI1-POC22B-S04G	BES 516-3029-E5-Y-S4	
	BES0166			BES00Y4	
	BES 516-114-G-S4-H			BES 516-363-E5-Y-S4	
		BES00WA	BES02YK		
		BES 516-359-G-E4-Y-02	BES M30MI1-NSC22B-S04G		
10...30 V DC	10...55 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	2.5 V	3.5 V	2 V	3.5 V	
250 V AC (□)	250 V AC (□)	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	130 mA	200 mA	130 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	
100 Hz	150 Hz	100 Hz	200 Hz	100 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 67	IP 67	
CE, cULus	CE	CE, cULus	CE	CE, cULus	
			Large switching distance		
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PBT	PA 12	
M12 connector, 4-pin	M12 connector, 4-pin	2 m PVC cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

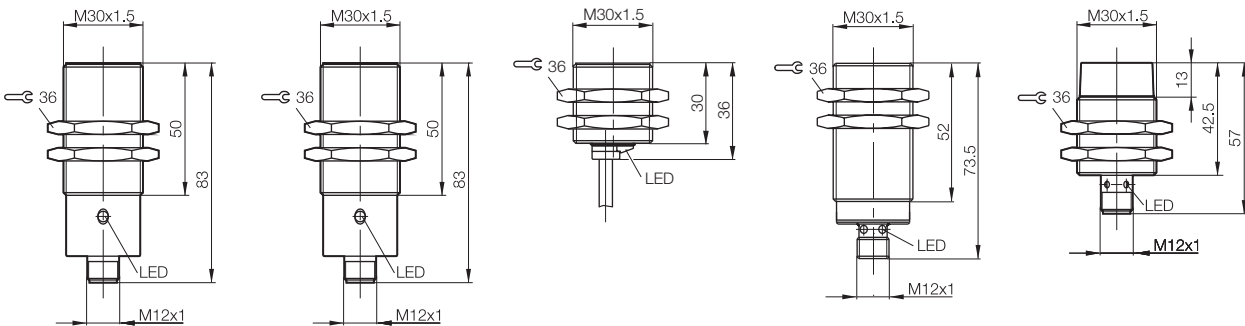
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M30×1.5

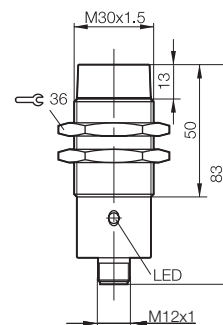
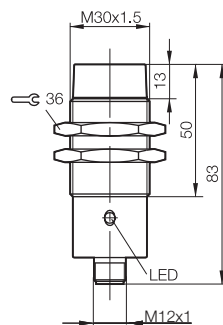
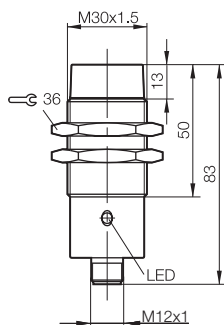


Housing size		M30×1.5	M30×1.5	M30×1.5	
Installation type (observe instructions in the Basic Information chapter)		Non-flush	Non-flush	Non-flush	
Rated switching distance s_n		15 mm	15 mm	15 mm	
Assured switching distance s_a		0...12.2 mm	0...12.2 mm	0...12.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES01JE	BES03AL	BES01JF	
	Part number	BES 516-362-S4-C	BES M30ML-PSC15F-S04G-002	BES 516-362-S4-H	
PNP, NC	Ordering code	BES0198			
	Part number	BES 516-3029-S4-C			
PNP, complementary	Ordering code	BES0173			
	Part number	BES 516-125-S4-C			
NPN, NO	Ordering code	BES01JN	BES03AT		
	Part number	BES 516-363-S4-C	BES M30ML-NSC15F-S04G-002		
NPN, NC	Ordering code	BES019N			
	Part number	BES 516-3033-S4-C			
Supply voltage U_B		10...30 V DC	10...30 V DC	10...55 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	1.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		100 Hz	75 Hz	400 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 67	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE	CE	
Special properties					
Material	Housing	Brass-coated	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PA 12	PA 12	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Tubular Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
Non-flush	Non-flush	Non-flush	Non-flush	Non-flush
15 mm	15 mm	15 mm	30 mm	40 mm
0...12.2 mm	0...12.2 mm	0...12.2 mm	0...24.00 mm	0...32 mm
1X	1X	1X	2X	3X
BES02FN	BES00WU	BES01J6	BES01JC	BES02YJ
BES 515-362-S4-C	BES 516-362-E4-Y-02	BES 516-362-BO-C-02	BES 516-362-G-S4-H	BES M30MG1-PSC40F-S04G
	BES00LW			
	BES 516-3029-E4-Y-02			
		BES01JJ		
		BES 516-363-BO-C-02		
	BES00Y1	BES019L		BES02YH
	BES 516-363-E4-Y-02	BES 516-3033-BO-C-02		BES M30MG1-NSC40F-S04G
10...30 V DC	10...30 V DC	10...30 V DC	10...55 V DC	10...30 V DC
2.5 V	3.5 V	2.5 V	2.5 V	2 V
250 V AC (□)	75 V DC	250 V AC (□)	250 V AC	75 V DC
200 mA	130 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
100 Hz	100 Hz	100 Hz	70 Hz	100 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 54
CE, cULus	CE, cULus	CE, cULus	CE	CE
				Large switching distance
Stainless steel	Brass-coated	Brass-coated	Brass-coated	Brass-coated
PA 12	PA 12	PA 12	PA 12	PBT
M12 connector, 4-pin	2 m cable PVC, 22 AWG	2 m cable PVC, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020			BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

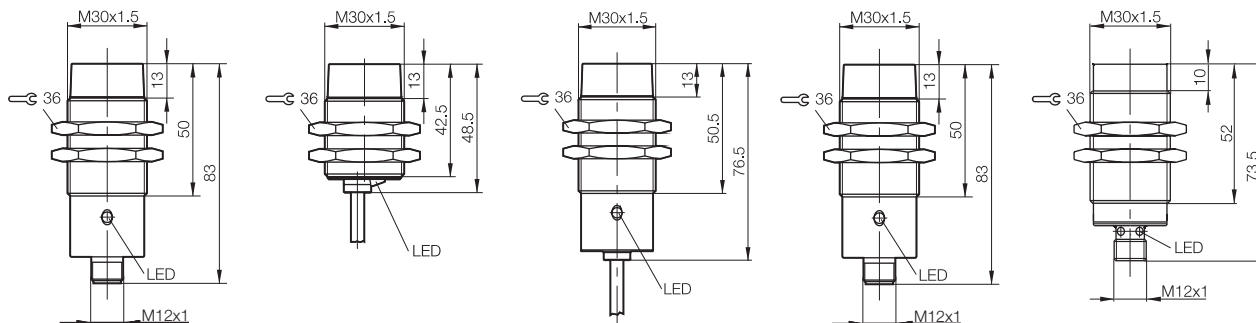
AC/DC 2-wire

AC 2-wire

Analog distance measurement

Special properties

Special accessories

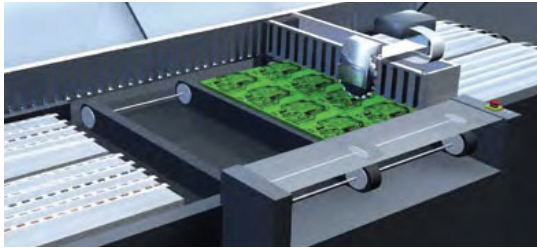


DC 3-/4-wire Inductive Block Sensors

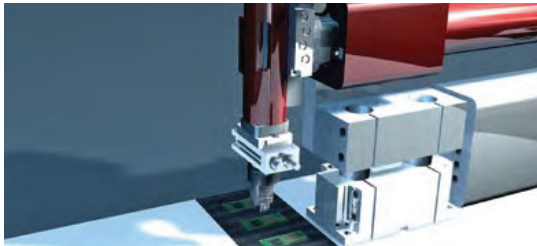
Block housing, 5x5 mm

Five good reasons for using inductive 5x5 sensors

- Rugged, compact metal housing
- Switching variants (can be installed flush): 0.8 mm for high-precision applications, new 1.5 mm for extended range applications
- Connections: Supply (+), Ground (-), Output. Easy to integrate into standard and special controllers.
- Interface variants: PNP or NPN, normally open or normally closed
- Narrow installation design



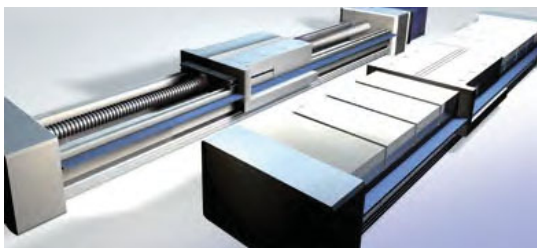
Electronics manufacturing: Applications require miniature sensors. Balluff offers mini.s in the highest degree of precision.



Robotics automation: The trend towards miniaturization continues. Balluff is leading the way.



Punching/reshaping technology: Automated assemblies are getting smaller and smaller. Balluff sensors adapt to this.



Linear technology: Position detection mini sensor designs achieve precise position with maximum performance.

Housing size	
Installation type (observe instructions in the Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
PNP, NO	Ordering code
	Part number
PNP, NC	Ordering code
	Part number
NPN, NO	Ordering code
	Part number
NPN, NC	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d at I_o max.	
Rated insulation voltage U_i	
Rated operating current I_o	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Output function indicator	
Degree of protection as per IEC 60529	
Approvals	
Special properties	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors

Block housing, 5×5 mm



5×5 mm	5×5 mm	5×5 mm	5×5 mm	5×5 mm
Flush	Flush	Flush	Flush	Flush
0.8 mm	0.8 mm	0.8 mm	0.8 mm	0.8 mm
0...0.65 mm	0...0.65 mm	0...0.65 mm	0...0.65 mm	0...0.65 mm
1X	1X	1X	1X	1X
BES01RM	BES01ZF	BES019W	BES019T	BES019P
BES Q05AC-PSC08B-S26G	BES 516-3040-I02-C-S49	BES 516-3040-I02-C-S49-00,3	BES 516-3040-I02-C-S4-00,3	BES 516-3040-I02-C-PU-02
BES01RH	BES01ZH			BES01A1
BES Q05AC-POC08B-S26G	BES 516-3042-I02-C-S49			BES 516-3042-I02-C-PU-02
BES01RA	BES01A0			BES019Y
BES Q05AC-NSC08B-S26G	BES 516-3041-I02-C-S49			BES 516-3041-I02-C-PU-02
BES01R6	BES01A5			BES01A3
BES Q05AC-NOC08B-S26G	BES 516-3043-I02-C-S49			BES 516-3043-I02-C-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 V
75 V DC	75 DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA	100 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Slim design	Slim design	Slim design	Slim design	Slim design
Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum
PBT	PBT	PBT	PBT	PBT
M5 connector, 3-pin	M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 26 AWG
BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

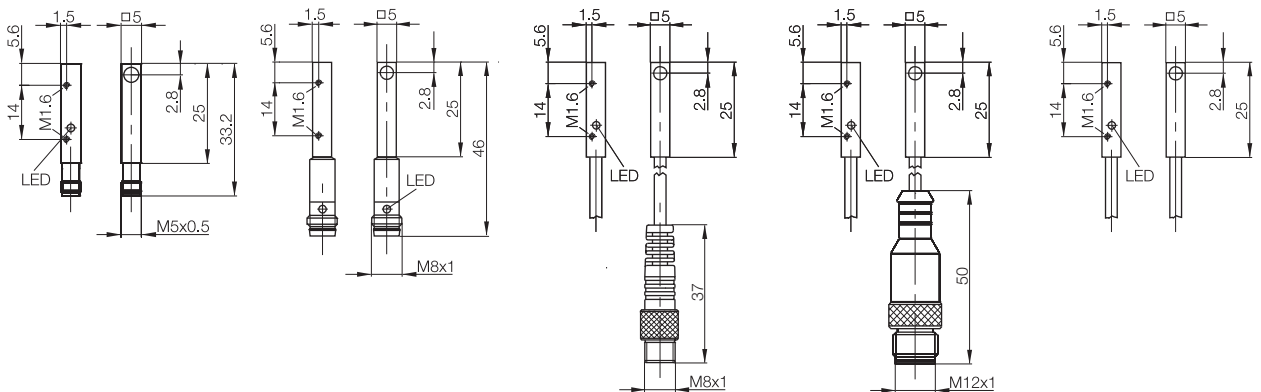
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housing, 5x5 mm

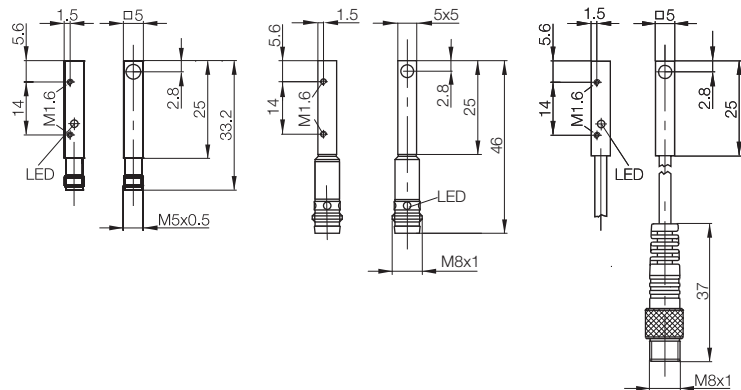


Housing size		5x5 mm	5x5 mm	5x5 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES01RP	BES01RR	BES03UW	
	Part number	BES Q05AC-PSC15B-S26G	BES Q05AC-PSC15B-S49G	BES Q05AC-PSC15B-EP00,3-GS49	
PNP, NC	Ordering code	BES01RK	BES01RL		
	Part number	BES Q05AC-POC15B-S26G	BES Q05AC-POC15B-S49G		
NPN, normally open	Ordering code	BES01RE	BES01RF		
	Part number	BES Q05AC-NSC15B-S26G	BES Q05AC-NSC15B-S49G		
NPN, NC	Ordering code	BES01R8	BES01R9		
	Part number	BES Q05AC-NOC15B-S26G	BES Q05AC-NOC15B-S49G		
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.5 V	3 V	3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		100 mA	100 mA	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		2 kHz	2 kHz	2 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Slim design	Slim design	Slim design	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PBT	PBT	PBT	
Connection		M5 connector, 3-pin	M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors

Block housing, 5×5 mm



5×5 mm				
Flush				
1.5 mm				
0...1.2 mm				
2X				
BES01RN				
BES Q05AC-PSC15B-EP02				
BES01RJ				
BES Q05AC-POC15B-EP02				
BES01RC				
BES Q05AC-NSC15B-EP02				
BES01R7				
BES Q05AC-NOC15B-EP02				
10...30 V DC				
3 V				
75 V DC				
100 mA				
Yes/Yes/Yes				
-25...+70°C				
2 kHz				
Yellow LED				
IP 67				
CE, cULus				
Slim design				
Stainless steel				
PBT				
2 m PUR cable, 26 AWG				



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular
 housings

Block
 housings

DC 2-wire

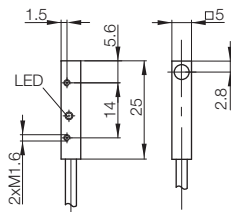
AC/DC 2-wire

AC 2-wire

Special
 properties

Analog
 distance
 measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housing, 8×8 mm



SUPER SHORTY™

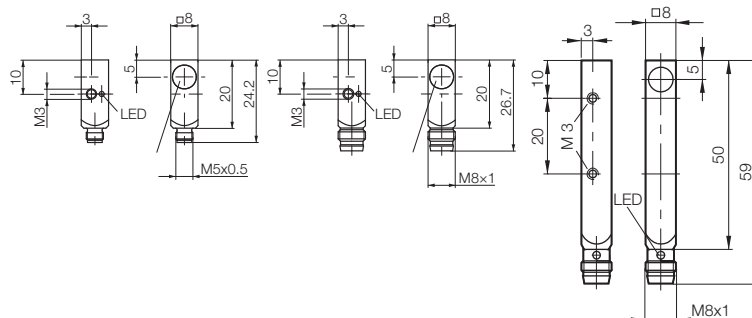
SUPER SHORTY™

Housing size		8×8 mm	8×8 mm	8×8 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES03U1	BES03Y6	BES0180	
	Part number	BES Q08MEC-PSC15B-S26G	BES Q08MEC-PSC15B-S49G	BES 516-300-S166-S49	
PNP, NC	Ordering code	BES03YE	BES03U0	BES0187	
	Part number	BES Q08MEC-POC15B-S26G	BES Q08MEC-POC15B-S49G	BES 516-300-S180-S49	
NPN, NO	Ordering code	BES03Y7	BES03U8	BES0184	
	Part number	BES Q08MEC-NSC15B-S26G	BES Q08MEC-NSC15B-S49G	BES 516-300-S170-S49	
NPN, NC	Ordering code	BES03U9	BES03YC	BES018H	
	Part number	BES Q08MEC-NOC15B-S26G	BES Q08MEC-NOC15B-S49G	BES 516-300-S264-S49	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.8 V	2.8 V	2.5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	5 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties		Short design	Short design		
Material	Housing	Brass-coated	Brass-coated	Cast zinc	
	Sensing surface	PBT	PBT	PBT	
Connection		M5 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	
Suggested mating cable		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors



SUPERSHORTY™



SUPERSHORTY™

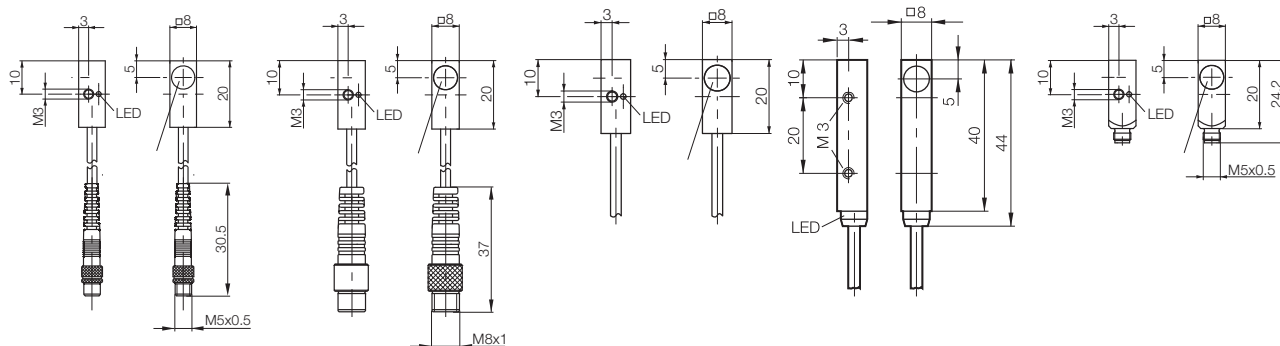


SUPERSHORTY™



SUPERSHORTY™

	8x8 mm	8x8 mm	8x8 mm	8x8 mm	8x8 mm
	Flush	Flush	Flush	Flush	Flush
	1.5 mm	1.5 mm	1.5 mm	1.5 mm	2 mm
	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.6 mm
	1X	1X	1X	1X	2X
	BES041J	BES041C	BES03TZ	BES017R	BES03U4
	BES Q08MEC-PSC15B-EP00,3-GS26	BES Q08MEC-PSC15B-EP00,3-GS49	BES Q08MEC-PSC15B-EP02	BES 516-300-S166-02	BES Q08MEC-PSC20B-S26G
	BES041K	BES041E	BES03Y5		BES03YH
	BES Q08MEC-POC15B-EP00,3-GS26	BES Q08MEC-POC15B-EP00,3-GS49	BES Q08MEC-POC15B-EP02		BES Q08MEC-POC20B-S26G
	BES041L	BES041F	BES03YA		BES03Y9
	BES Q08MEC-NSC15B-EP00,3-GS26	BES Q08MEC-NSC15B-EP00,3-GS49	BES Q08MEC-NSC15B-EP02		BES Q08MEC-NSC20B-S26G
	BES041M	BES041H	BES03U7		BES03UE
	BES Q08MEC-NOC15B-EP00,3-GS26	BES Q08MEC-NOC15B-EP00,3-GS49	BES Q08MEC-NOC15B-EP02		BES Q08MEC-NOC20B-S26G
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	2.8 V	2.8 V	2.8 V	2.5 V	2.8 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
	3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
	IP 67	IP 67	IP 67	IP 67	IP 67
	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
	Short design	Short design	Short design		Short design
	Brass-coated	Brass-coated	Brass-coated	Cast zinc	Brass-coated
	PBT	PBT	PBT	PBT	PBT
	0.3 m PUR cable with M5 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 26 AWG	2 m PVC cable, 26 AWG	M5 connector, 3-pin
	BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020			BKS-B 25-3-PU-03



DC 3-/4-wire Inductive Block Sensors

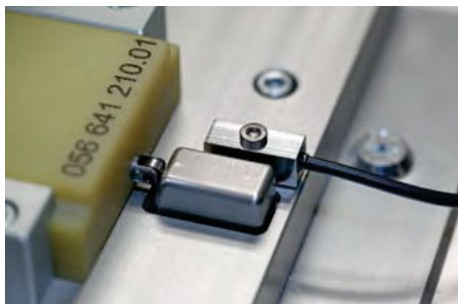
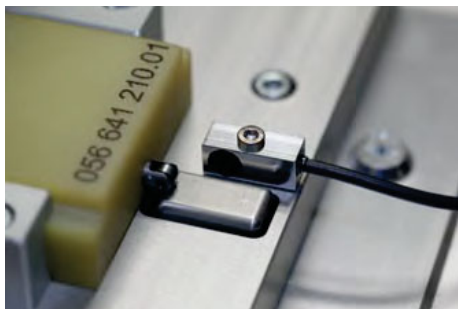
Block housing, 8×8 mm

Supershorty inductive sensors

- Thanks to the miniture housing size, position sensing is now also possible when minimum space is required
- Assemblies can be shrunk even futher, since the sensors require less space
- Ideal price/performance ratio
- Robust due to high-quality metal housing

Common application examples

- Linear units
- Machine position
- Part presence
- Robotics and automation
- Vibrating conveyor
- Error proofing



Housing size	
Installation type (observe instructions in the Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
PNP, NO	Ordering code
	Part number
PNP, NC	Ordering code
	Part number
NPN, normally open	Ordering code
	Part number
NPN, NC	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d at I_o max.	
Rated insulation voltage U_i	
Rated operating current I_o	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Output function indicator	
Degree of protection as per IEC 60529	
Approvals	
Special properties	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

DC 3-/4-wire Inductive Block Sensors

Block housing, 8x8 mm



8x8 mm	8x8 mm	8x8 mm	8x8 mm	8x8 mm
Flush	Flush	Flush	Flush	Flush
2 mm	2 mm	2 mm	2 mm	2 mm
0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm	0...1.6 mm
2X	2X	2X	2X	2X
BES03Y8	BES01U2	BES01UW	BES041U	BES041N
BES Q08MEC-PSC20B-S49G	BES Q08ZC-PSC20B-S49G	BES Q08ZE-PSC20B-S49G	BES Q08MEC-PSC20B-EP00,3-GS26	BES Q08MEC-PSC20B-EP00,3-GS49
BES03U3	BES01TF	BES01UK	BES041W	BES041P
BES Q08MEC-POC20B-S49G	BES Q08ZC-POC20B-S49G	BES Q08ZE-POC20B-S49G	BES Q08MEC-POC20B-EP00,3-GS26	BES Q08MEC-POC20B-EP00,3-GS49
BES03UC	BES01T3	BES01UC	BES041Y	BES041R
BES Q08MEC-NSC20B-S49G	BES Q08ZC-NSC20B-S49G	BES Q08ZE-NSC20B-S49G	BES Q08MEC-NSC20B-EP00,3-GS26	BES Q08MEC-NSC20B-EP00,3-GS49
BES03YJ	BES01RW	BES01U6	BES041Z	BES041T
BES Q08MEC-NOC20B-S49G	BES Q08ZC-NOC20B-S49G	BES Q08ZE-NOC20B-S49G	BES Q08MEC-NOC20B-EP00,3-GS26	BES Q08MEC-NOC20B-EP00,3-GS49
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.8 V	2.5 V	2.5 V	2.8 V	2.8 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
3 kHz	3 kHz	3 kHz	3 kHz	3 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Short design			Short design	Short design
Brass-coated	Cast zinc	Cast zinc	Brass-coated	Brass-coated
PBT	PBT	PBT	PBT	PBT
M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	0.3 m PUR cable with M5 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin
BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

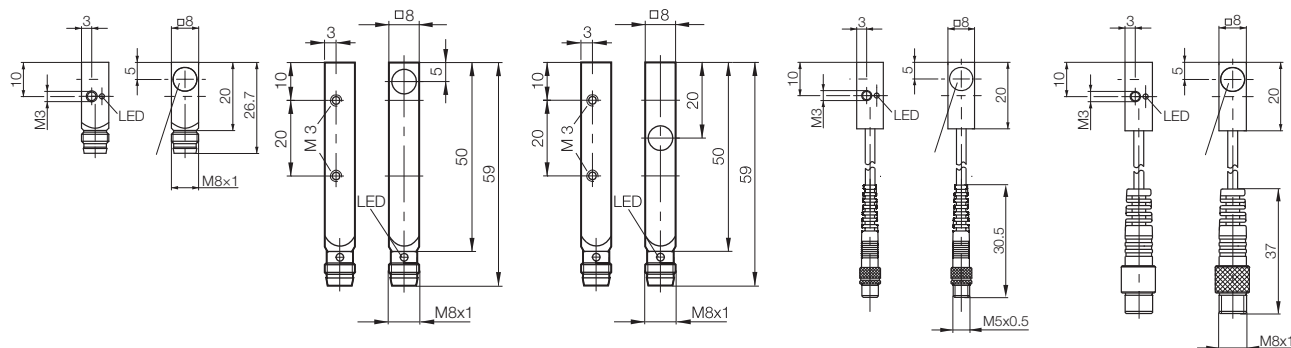
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housing, 8×8 mm



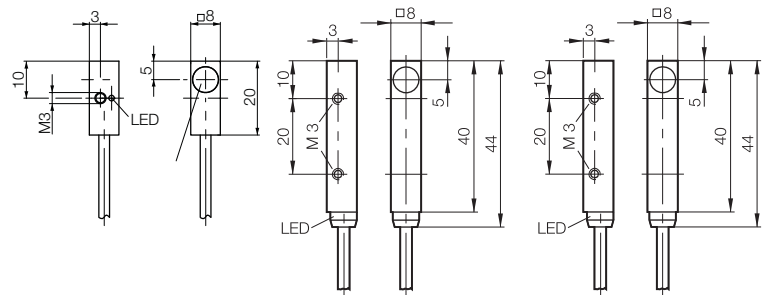
SUPERSHORTY™

Housing size		8×8 mm	8×8 mm	8×8 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	2 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...1.6 mm	
Sensing distance		2X	2X	2X	
PNP, NO	Ordering code	BES03U2	BES01TZ	BES01TN	
	Part number	BES Q08MEC-PSC20B-EP02	BES Q08ZC-PSC20B-BV02	BES Q08ZC-PSC20B-BP02	
PNP, NC	Ordering code	BES03YK	BES01TA	BES01T7	
	Part number	BES Q08MEC-POC20B-EP02	BES Q08ZC-POC20B-BV02	BES Q08ZC-POC20B-BP02	
NPN, NO	Ordering code		BES01T2	BES01RZ	
	Part number		BES Q08ZC-NSC20B-BV02	BES Q08ZC-NSC20B-BP02	
NPN, NC	Ordering code	BES03UA	BES01RU	BES01TL	
	Part number	BES Q08MEC-NOC20B-EP02	BES Q08ZC-NOC20B-BV02	BES Q08ZC-NOC20B-BP02	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		2.8 V	2.5 V	2.5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		3 kHz	3 kHz	3 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Special properties					
Material	Housing	Brass-coated	Cast zinc	Cast zinc	
	Sensing surface	PBT	PBT	PBT	
Connection		2 m PUR cable, 26 AWG	2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG	
Suggested mating cable					

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors



	8x8 mm	8x8 mm	8x8 mm	8x8 mm	8x8 mm
	Flush	Flush	Flush	Flush	Quasi-flush
	2 mm	2 mm	2.5 mm	2.5 mm	3 mm
	0...1.6 mm	0...1.6 mm	0...2 mm	0...2 mm	0...2.4 mm
	2X	2X	2X	2X	3X
	BES01UR	BES01UM	BES01U3	BES01UY	BES01U4
	BES Q08ZE-PSC20B-BV02	BES Q08ZE-PSC20B-BP02	BES Q08ZC-PSC25B-S49G	BES Q08ZE-PSC25B-S49G	BES Q08ZC-PSC30B-S49G
	BES01UH	BES01UE			
	BES Q08ZE-POC20B-BV02	BES Q08ZE-POC20B-BP02			
	BES01UA	BES01U7			
	BES Q08ZE-NSC20B-BV02	BES Q08ZE-NSC20B-BP02			
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	2.5 V	2.5 V	2.5 V	2.5 V	2 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
	-25...+70°C	-25...+70°C	0...+70 °C	0...+70 °C	-25...+70°C
	3 kHz	3 kHz	2 kHz	2 kHz	1 kHz
	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
	IP 67	IP 67	IP 67	IP 67	IP 67
	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE
					Long range
	Cast zinc	Cast zinc	Cast zinc	Cast zinc	Brass-coated
	PBT	PBT	PBT	PBT	PBT
	2 m PVC cable, 26 AWG	2 m PUR cable, 26 AWG	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
			BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

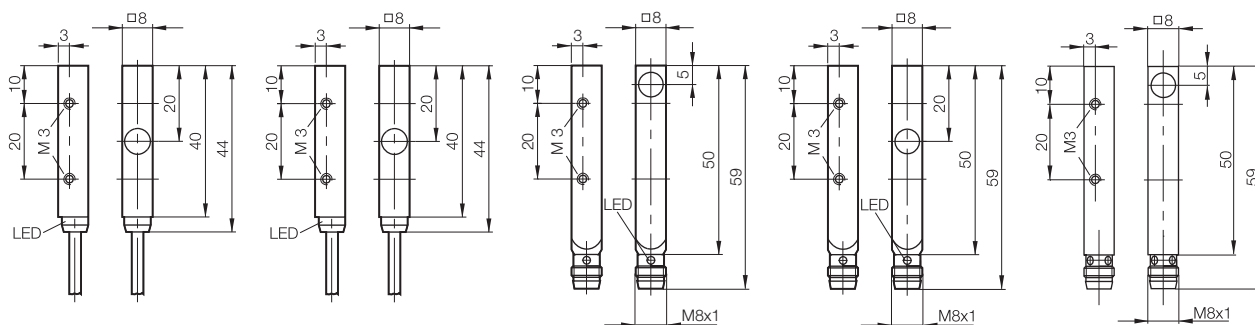
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housings, 8×16×4 mm R04

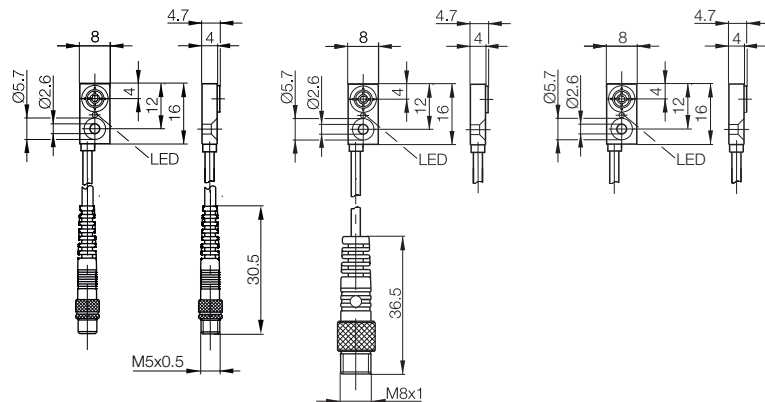


Housing size		8×16×4.7 mm R04	8×16×4.7 mm	8×16×4.7 mm R04	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Sensing distance		1X	1X	1X	
PNP, NO	Ordering code	BES01YC	BES01YE	BES01YJ	
	Part number	BES R04KC-PSC15B-EP00,2-GS26	BES R04KC-PSC15B-EP00,3-GS49	BES R04KC-PSC15B-EV02	
PNP, NC	Ordering code	BES01Y7	BES01Y8	BES03J1	
	Part number	BES R04KC-POC15B-EP00,2-GS26	BES R04KC-POC15B-EP00,3-GS49	BES R04KC-POC15B-EV02	
NPN, normally open	Ordering code			BES01Y3	
	Part number			BES R04KC-NSC15B-EV02	
NPN, NC	Ordering code	BES01WY		BES01WZ	
	Part number	BES R04KC-NOC15B-EP00,2-GS26		BES R04KC-NOC15B-EV02	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		1.5 V	1.5 V	1.8 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		100 mA	100 mA	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C	
Switching frequency f max.		600 Hz	600 Hz	2.5 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	PA 6	PA 6	PA 6	
	Sensing surface	PA 6/GF 30	PA 6/GF 30	PA 6/GF 30	
Connection		0.2 m PUR cable with M5 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	2 m PVC cable, 28 AWG	
Suggested mating cable		BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.





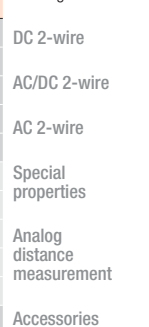
Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings



DC 3-/4-wire Inductive Block Sensors

Block housings, 8×16×4 mm R04

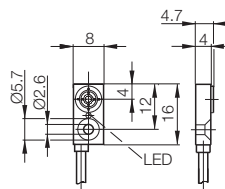


Housing size	8×16×4 mm R04	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	
Rated switching distance s_n	2.5 mm	
Assured switching distance s_a	0...2 mm	
Sensing distance	2X	
PNP, NO	Ordering code	BES01YT
	Part number	BES R04KC-PSC25F-EV02
PNP, NC	Ordering code	
	Part number	
NPN, normally open	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B	10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V	
Rated insulation voltage U_i	75 V DC	
Rated operating current I_e	100 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70°C	
Switching frequency f max.	150 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE, cULus	
Material	Housing	PA 6
	Sensing surface	PA 6/GF 30
Connection	2 m PVC cable, 28 AWG	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Block Sensors

Block housings, 8×16×4 mm R04



8×16×4 mm R04	
Non-flush	
2.5 mm	
0...2.2 mm	
2X	
BES01YN	
BES R04KC-PSC25F-EP02	
BES03R8	
BES R04KC-NSC25F-EP02	
10...30 V DC	
2.5 V	
75 V DC	
100 mA	
Yes/Yes/Yes	
-25...+70°C	
3 kHz	
Yellow LED	
IP 67	
CE, cULus	
PA 6	
PA 6/GF 30	
2 m PUR cable,	
26 AWG	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular
housings

Block
housings

DC 2-wire

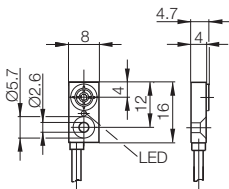
AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housings, 10×30×6 mm R03

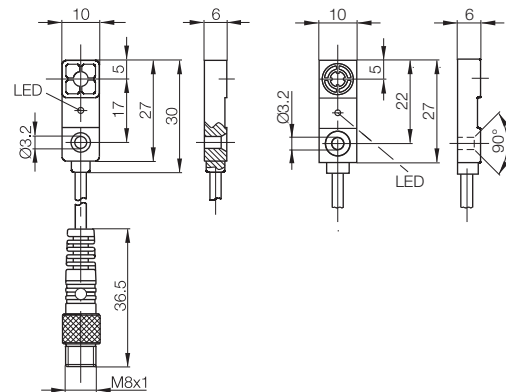


Housing size		10×30×6 mm R03	10×30×6 mm R03	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	
Rated switching distance s_n		3 mm	3 mm	
Assured switching distance s_a		0...2.4 mm	0...2.4 mm	
Sensing distance		1X	1X	
PNP, NO	Ordering code	BES01WP	BES01WR	
	Part number	BES R03KC-PSC30B-BP00,3-GS49	BES R03KC-PSC30B-EP02	
NPN, normally open	Ordering code	BES045C		
	Part number	BES R03KC-NSC30B-BP00,3-GS49		
Supply voltage U_B		10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		1.8 V	2.5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	
Rated operating current I_o		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 kHz	3 kHz	
Output function indicator		Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	
Material	Housing	PA 6	PA 6	
	Sensing surface	PA 6	PA 6	
Connection		0.3 m PUR cable with M8 connector, 3-pin	2 m cable TPU, 26 AWG	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors

Block housings, 10×30×6 mm R03, 30×20×10 mm



10×30×6 mm R03	10×30×6 mm R03	30×20×10 mm		
Non-flush	Non-flush	Flush		
3 mm	3 mm	2 mm		
0...2.4 mm	0...2.4 mm	0...1.6 mm		
1X	1X	1X		
BES02ZN	BES0397	BES033J		
BES R03KC-PSC30F-BV00.2-GS49	BES R03KC-PSC30F-BV00.3-GS04	BES 516-300-S279		
		BES033H		
		BES 516-300-S255		
10...30 V DC	10...30 V DC	10...30 V DC		
1.5 V	1.5 V	0.5 V		
75 V DC	75 V DC	75 V DC		
100 mA	100 mA	50 mA		
No/No/Yes	No/No/Yes	Yes/No/No		
-25...+70°C	-25...+70°C	-25...+70°C		
500 Hz	500 Hz	1.5 kHz		
Yellow LED	Yellow LED	Yes/No		
IP 67	IP 67	IP 65		
PA 6	PA 6	Anodized GD-Al		
PA 6	PA 6	PBT		
0.2 m PVC cable with M8 connector, 3-pin	0.3 m PVC cable with M12 connector, 3-pin	5 m PVC cable, 26 AWG		
BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020			



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular
housings

Block
housings

DC 2-wire

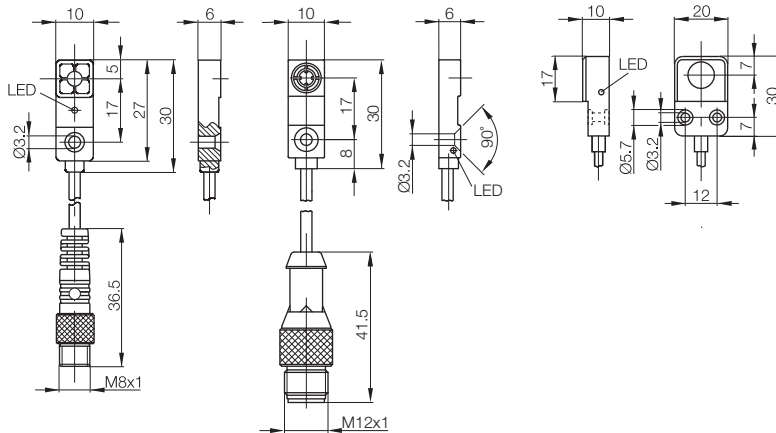
AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housings, 16×30×10 mm

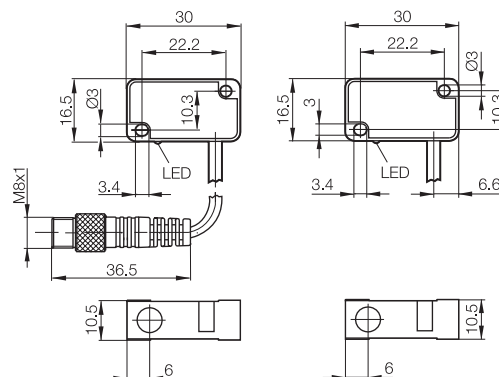


Housing size		16×30×10 mm	16×30×10 mm		
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush		
Rated switching distance s_n		2 mm	2 mm		
Assured switching distance s_a		0...1.6 mm	0...1.6 mm		
Sensing distance		1X	1X		
PNP, NO	Ordering code	BES01NA	BES01N4		
	Part number	BES 517-398-NO-C-S49-00,2	BES 517-398-NO-C-02		
PNP, NC	Ordering code	BES01MT	BES01ML		
	Part number	BES 517-351-NO-C-S49-00,2	BES 517-351-NO-C-02		
NPN, NO	Ordering code	BES01NM	BES01NF		
	Part number	BES 517-399-NO-C-S49-00,2	BES 517-399-NO-C-02		
NPN, NC	Ordering code		BES01MY		
	Part number		BES 517-352-NO-C-02		
NPN, complementary	Ordering code				
	Part number				
Supply voltage U_B		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		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.		2.5 kHz	2.5 kHz		
Output function indicator		Yellow LED	Yellow LED		
Degree of protection as per IEC 60529		IP 65	IP 65		
Approvals		CE	CE		
Material	Housing	PBT	PBT		
	Sensing surface	PBT	PBT		
Connection		0.2 m PUR cable with M8 connector, 3-pin	2 m PVC cable, 26 AWG		
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020			

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



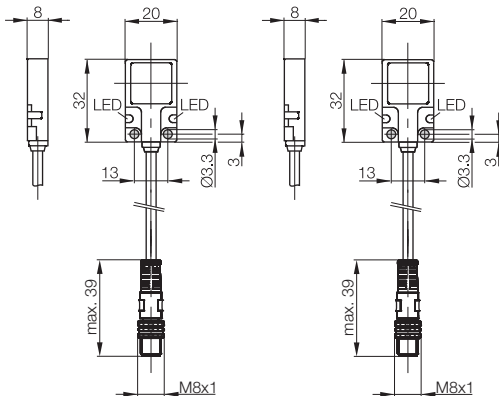
DC 3-/4-wire Inductive Block Sensors

Block housings, 20×32×8 mm R01



	20×32×8 mm R01	20×32×8 mm R01			
	Flush	Flush			
	7 mm	7 mm			
	0...5.6 mm	0...5.6 mm			
	1X	1X			
	BES01WF	BES01WE			
	BES R01ZC-PSC70B-BP00.3-GS49	BES R01ZC-PSC70B-BP00.2-GS49			
		BES01W1			
		BES R01ZC-NSC70B-BP00.2-GS49			
	10...30 V DC	10...30 V DC			
	2.5 V	2.5 V			
	75 V DC	75 V DC			
	200 mA	200 mA			
	Yes/Yes/Yes	Yes/Yes/Yes			
	-25...+70°C	-25...+70°C			
	150 Hz	150 Hz			
	Yellow LED	Yellow LED			
	IP 67	IP 67			
	CE, cULus	CE, cULus			
	Cast zinc	Cast zinc			
	PA 12	PA 12			
	0.3 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin			
	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020			

	Inductive sensors
	Global DC 3-wire
	DC 3-/4-wire
	Tubular housings
	Block housings
	DC 2-wire
	AC/DC 2-wire
	AC 2-wire
	Special properties
	Analog distance measurement
	Accessories



Note: R01 Steelface sensors are located on page 669.

DC 3-/4-wire Inductive Block Sensors

Block housings, 20×32×8 mm R01



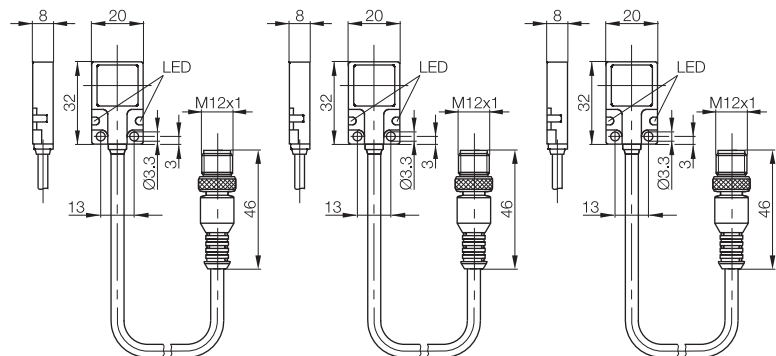
Housing size		20×32×8 mm R01	20×32×8 mm R01	20×32×8 mm R01
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		7 mm	7 mm	7 mm
Assured switching distance s_a		0...5.6 mm	0...5.6 mm	0...5.6 mm
Sensing distance		1X	1X	1X
PNP, NO	Ordering code	BES02PT		
	Part number	BES R01ZC-PSC70B-BP00.2-GS04-101		
PNP, complementary	Ordering code		BES01W2	BES0314
	Part number		BES R01ZC-PAC70B-BP00.2-GS04	BES R01ZC-PAC70B-BP00.2-GS04-107
NPN, complementary	Ordering code		BES01UZ	
	Part number		BES R01ZC-NAC70B-BP00.2-GS04	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2.5 V	2.5 V	2.5 V
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC	75 V DC
Rated operating current I_e		200 mA	200 mA	200 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+70°C	-25...+70°C	-25...+70°C
Switching frequency f max.		150 Hz	150 Hz	150 Hz
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approvals		CE, cULus	CE, cULus	CE, cULus
Material	Housing	Cast zinc	Cast zinc	Cast zinc
	Sensing surface	With ceramic coating	PA 12	With ceramic coating
Connection		0.2 m PUR cable with M12 connector, 4-pin	0.2 m PVC cable with M12 connector, 4-pin	0.2 m PUR cable with M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

Note: R01 Steelface sensors are located on page 669.



DC 3-/4-wire Inductive Block Sensors

Block housings 20x50x10mm



20x50x10 mm	20x50x10 mm	20x50x10 mm	20x50x10 mm
Flush	Flush	Flush	Flush
5 mm	5 mm	5 mm	5 mm
0...4.1 mm	0...4.1 mm	0...4.1 mm	0...4.1 mm
1X	1X	1X	1X
BES01FR	BES01FT	BES01FN	BES01FH
BES 516-347-M0-C-S49	BES 516-347-M0-C-S49-00,2	BES 516-347-M0-C-S4-00,2	BES 516-347-M0-C-02
		BES0153	BES0179
		BES 516-133-M0-C-S4-00,2	BES 516-133-M0-C-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V
75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 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
500 Hz	500 Hz	500 Hz	500 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus
Cast aluminum	Cast aluminum	Cast aluminum	Cast aluminum
PBT	PBT	PBT	PBT
M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin	0.2 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 22 AWG
BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

Tubular
housings

Block
housings

DC 2-wire

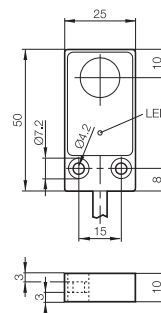
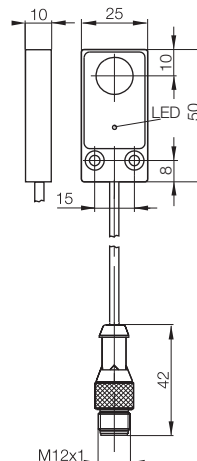
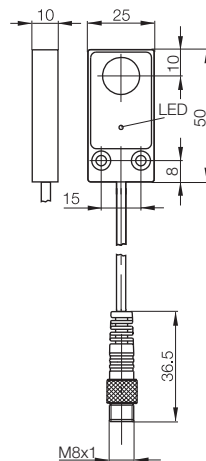
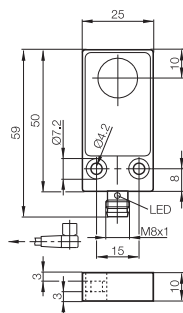
AC/DC 2-wire

AC 2-wire

Special
properties

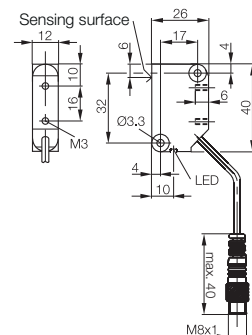
Analog
distance
measurement

Accessories





Technical drawing of the sensor head showing front and side views with dimensions. The front view (left) shows a circular sensor head with a diameter of 12 mm, a central hole of 6 mm, and a mounting hole of 10 mm. The side view (right) shows the sensor head with a diameter of 26 mm, a central hole of 17 mm, and a mounting hole of 4 mm. The sensor head is mounted on a base with a diameter of 32 mm and a height of 4 mm. The base has a central hole of 10 mm and a mounting hole of 6 mm. The sensor head is labeled "Sensing surface" and "LED". The mounting hole is labeled "M3" and "M8x1".



DC 3-/4-wire Inductive Block Sensors

Block housings, 26×40×12 mm R05



26×40×12 mm R05	26×40×12 mm R05	26×40×12 mm R05	26×40×12 mm R05
Flush	Flush	Flush	Flush
2 mm	4 mm	4 mm	4 mm
0...1.6 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
1X	1X	1X	1X
BES01Z4	BES01ZE	BES01Z8	BES01ZA
BES R05KB-PSC20B-EP02	BES R05KB-PSC40B-S49A	BES R05KB-PSC40B-EP00,3-GS04	BES R05KB-PSC40B-EV02
	BES01Z2		
	BES R05KB-POC40B-S49A		
	BES01Z1		
	BES R05KB-NSC40B-S49A		
			BES01YW
			BES R05KB-NOC40B-EV02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	75 V DC	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 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
400 Hz	400 Hz	400 Hz	400 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus
PA 12	PA 12	PA 12	PA 12
PA 12	PA 12	PA 12	PA 12
2 m PUR cable, 22 AWG	M8 connector, 3-pin BCC M313-0000-10-001-EX43T2-020	0.3 m PUR cable with M12 connector, 4-pin BCC M415-0000-1A-003-EX44T2-020	2 m PVC cable, 22 AWG



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

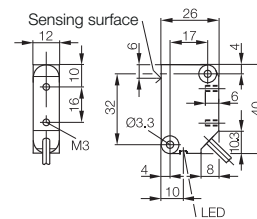
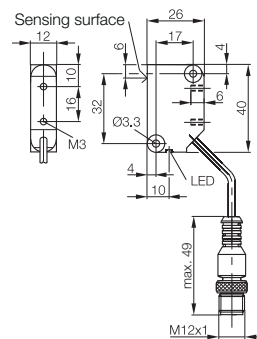
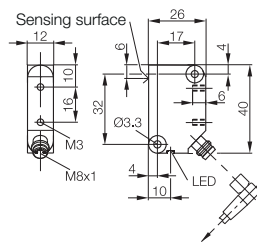
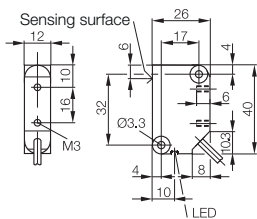
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housings, 42×48×22 mm

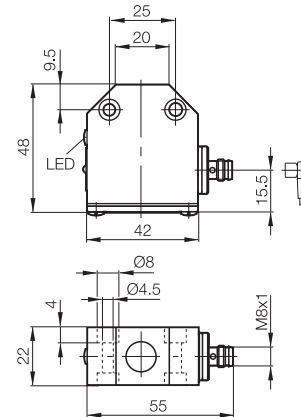
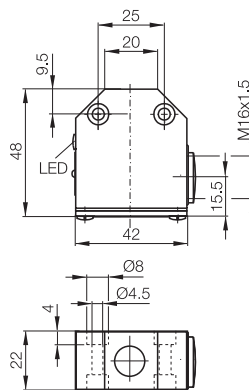


Housing size		42×48×22 mm	42×48×22 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	
Rated switching distance s_n		5 mm	5 mm	
Assured switching distance s_a		0...4.1 mm	0...4.1 mm	
Sensing distance		1X	1X	
PNP, NO	Ordering code	BES01FC	BES01FF	
	Part number	BES 516-346-H2-Y	BES 516-346-H2-Y-S49	
PNP, NC	Ordering code	BES01EU		
	Part number	BES 516-341-H2-Y		
PNP, complementary	Ordering code			
	Part number			
NPN, NO	Ordering code	BES01ZK		
	Part number	BES 516-344-H2-Y		
NPN, NC	Ordering code	BES01ET		
	Part number	BES 516-340-H2-Y		
Supply voltage U_B		10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		3.5 V	3.5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	
Rated operating current I_e		130 mA	130 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.		500 Hz	500 Hz	
Output function indicator		Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	
Approvals		CE	CE	
Material	Housing	Cast aluminum	Cast aluminum	
	Sensing surface	PA 12	PA 12	
Connection		Screw terminals up to 13 AWG	M8 connector, 3-pin	
Suggested mating cable			BCC M313-0000-10-001-EX43T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Block Sensors

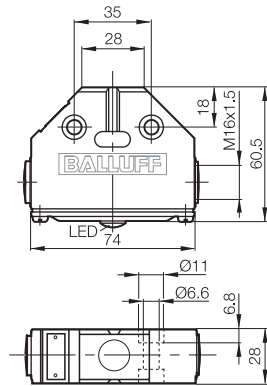
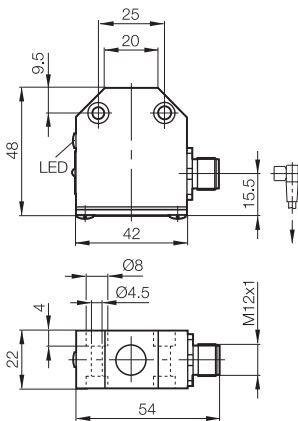
Block housings, 42×48×22 mm, 74×60.5×28 mm



42×48×22 mm	74×60.5×28 mm		
Flush	Flush		
5 mm	7 mm		
0...4.1 mm	0...5.7 mm		
1X	1X		
BES01FE			
BES 516-346-H2-Y-S4			
BES01EW			
BES 516-341-H2-Y-S4			
	BES017M		
	BES 516-161-H3-L		
10...30 V DC	10...30 V DC		
3.5 V	1.5 V		
75 V DC	75 V DC		
130 mA	400 mA		
Yes/Yes/Yes	Yes/No/No		
-25...+70°C	-25...+70°C		
500 Hz	300 Hz		
Yellow LED	Yellow LED		
IP 67	IP 67		
CE	CE		
Cast aluminum	Cast aluminum		
PA 12	PA 12		
M12 connector, 4-pin	Screw terminals up to 13 AWG		
BCC M415-0000-1A-003-EX44T2-020			



- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- Tubular housings
- Block housings
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties
- Analog distance measurement
- Accessories



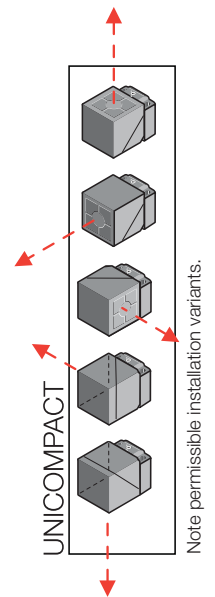
DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unicomact

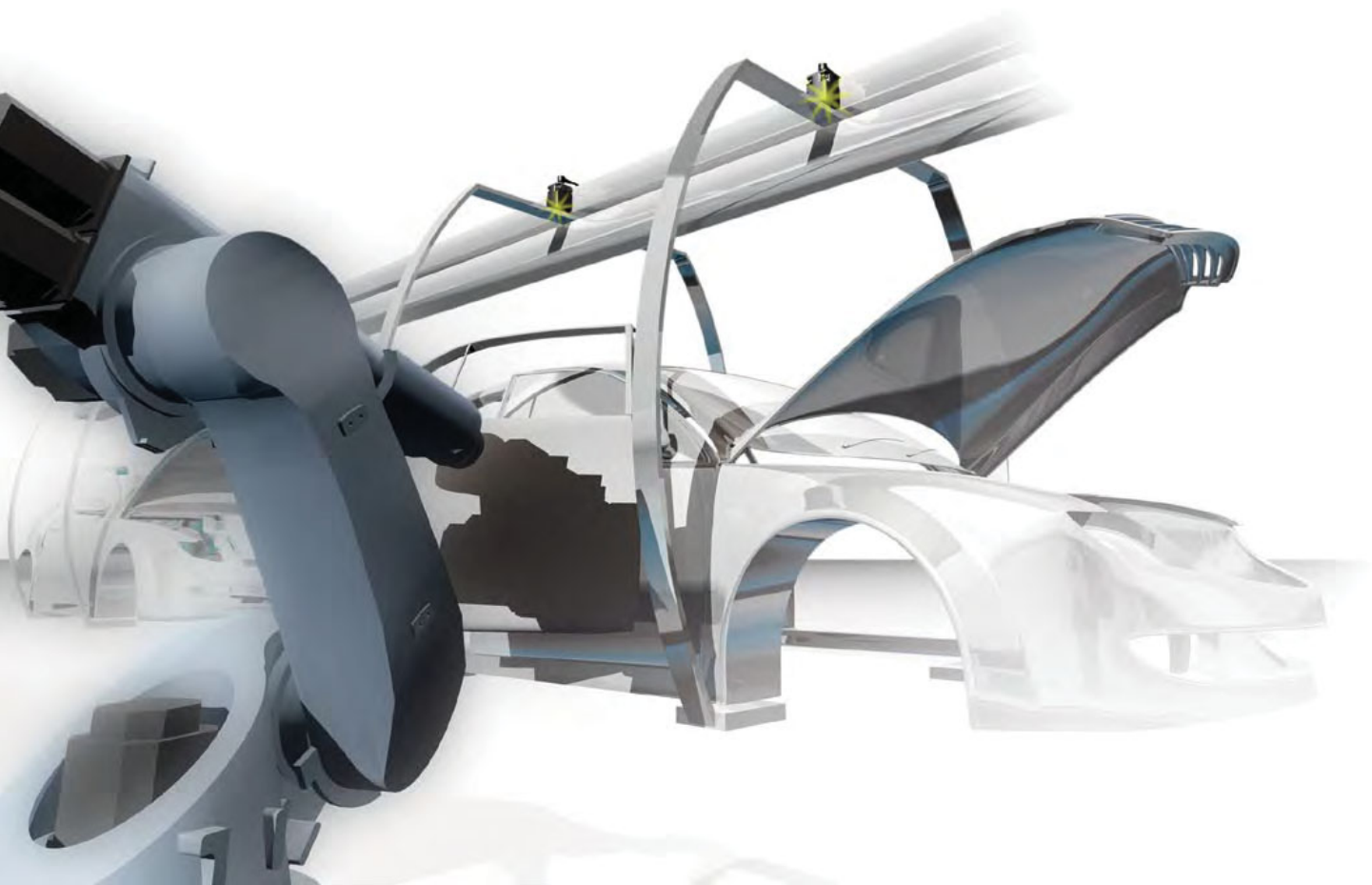
Unicomact Block Sensors

Balluff's 40 x 40 compact block sensor is a flexible sensor for versatile applications found in industrial automation processes.

The sensing surface and connection can be rotated to accommodate application position.



Compact sensor designs with large switching distances are required in material handling technology.



DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unicompat



Housing size	40×40 mm Unicompat	
Installation type (observe instructions in the Basic Information chapter)	Flush	
Rated switching distance s_n	20 mm	
Assured switching distance s_a	0...16 mm	
Sensing distance	1X	
PNP, NO	Ordering code	BES021W
	Part number	BES Q40KFU-PSC20B-S04G
PNP, complementary	Ordering code	BES0217
	Part number	BES Q40KFU-PAC20B-S04G
Supply voltage U_B	10...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_o	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70°C	
Switching frequency f max.	50 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE, cULus	
Material	Housing	PBT
	Sensing surface	PBT
Possible installation variations	Fig. 1...8	
Connection	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

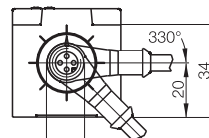
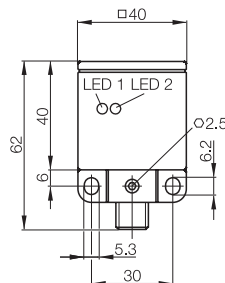
Analog distance measurement

Accessories

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Row mounting

Flush 80 mm

Ø 120 mm non-flush

Permissible installation options

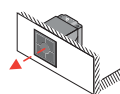
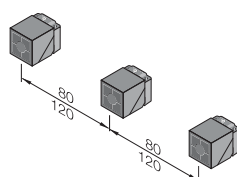


Fig. 1

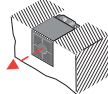


Fig. 2

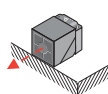


Fig. 3

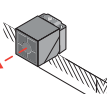


Fig. 4

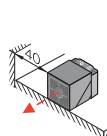


Fig. 5

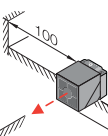


Fig. 6

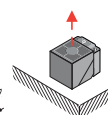


Fig. 7

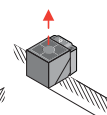


Fig. 8

DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unicompat

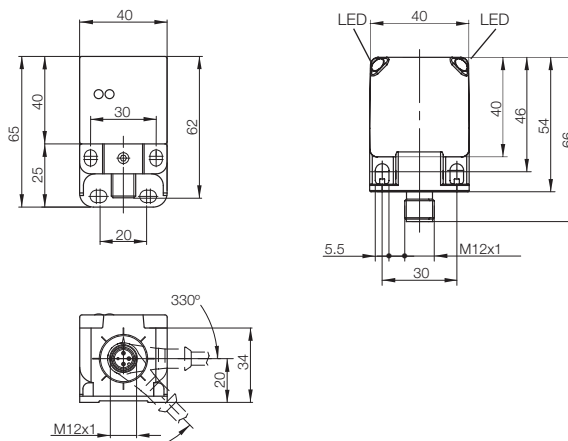


Housing size	40×40 mm Unicompat		40×40 mm Unicompat	
Installation type (observe instructions in the Basic Information chapter)	Flush		Flush	
Rated switching distance s_n	20 mm		20 mm	
Assured switching distance s_a	0...16 mm		0...16.2 mm	
Sensing distance	1X		1X	
PNP, NO	Ordering code		BES0306	
	Part number		BES Q40KFU-PSC20B-S04G-012	
PNP, complementary	Ordering code	BES03PN		
	Part number	BES Q40KHU-PAC20B-S04G		
NPN, complementary	Ordering code			
	Part number			
Supply voltage U_B	10...30 V DC		10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V		2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)		250 V AC (II)	
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.	50 Hz		100 Hz	
Output function indicator	Yellow LED		Yellow LED	
Degree of protection as per IEC 60529	IP 67		IP 67	
Approvals	CE, cULus		CE, cULus	
Material	Housing	PBT/Cast zinc	PA	
	Sensing surface	PBT	PA	
Possible installation variations	Fig. 1...8		Fig. 1...8	
Connection	M12 connector, 4-pin		M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



Housing optimized for material handling technology

- Highly visible corner LEDs
- Sensor head can be mounted in five positions
- Connector outlet set to position within a 270° range

DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unicompat



40×40 mm Unicompat	40×40 mm Unicompat	40×40 mm Unicompat	40×40 mm Unicompat
Non-flush	Non-flush	Non-flush	Non-flush
25 mm	25 mm	30 mm	40 mm
0...20 mm	0...20 mm	0...24 mm	0...32.4 mm
1X	1X	1X	2X
		BES021Z	BES0308
		BES Q40KFU-PSC30F-S04G	BES Q40KFU-PSC40F-S04G-012
	BES0210	BES021E	
	BES Q40KEU-PAH25F-S04G	BES Q40KFU-PAC30F-S04G	
BES022J			
BES Q40KFU-NAC25F-S04G			
10...30 V DC	10...55 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 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
50 Hz	50 Hz	50 Hz	60 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67
CE, cULus	CE	CE, cULus	CE, cULus
PBT	PBT/Cast zinc	PBT	PA
PBT	PBT	PBT	PA
Fig. 3...8	Fig. 3...8	Fig. 3...8	Fig. 3...8
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

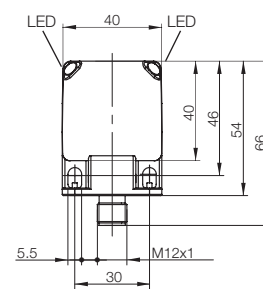
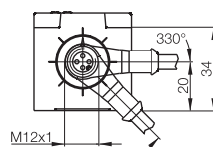
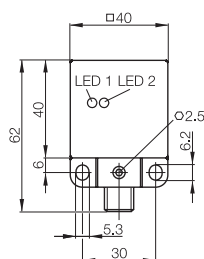
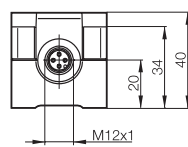
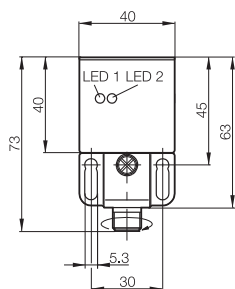
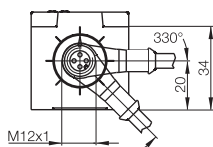
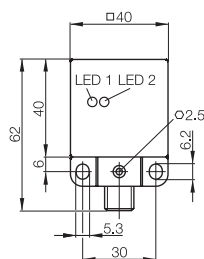
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

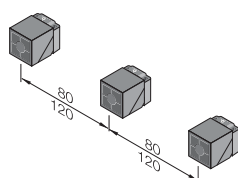
Accessories



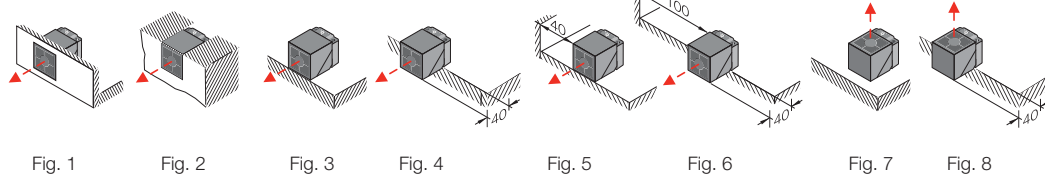
Row mounting

Flush 80 mm

Ø 120 mm non-flush



Permissible installation options

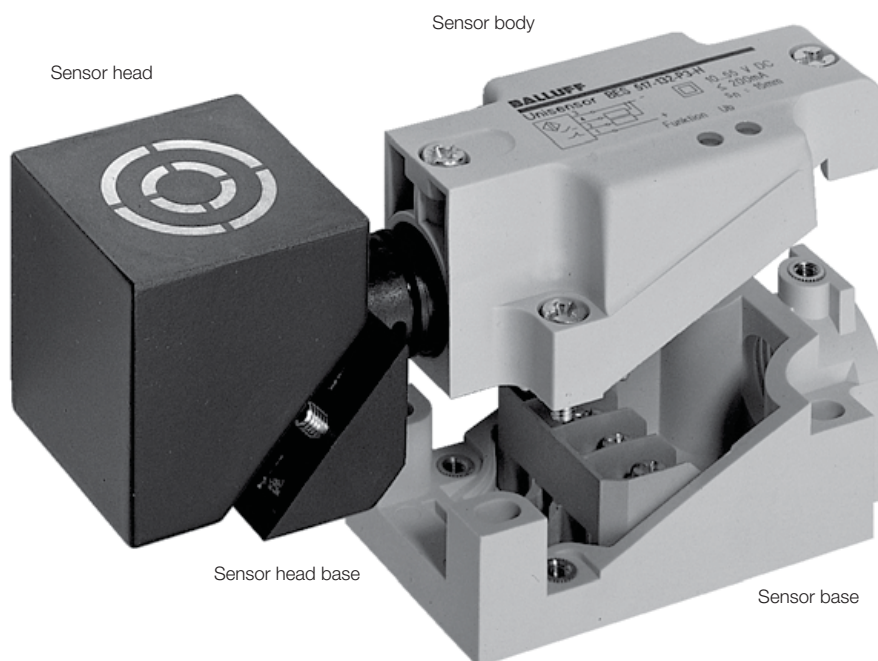
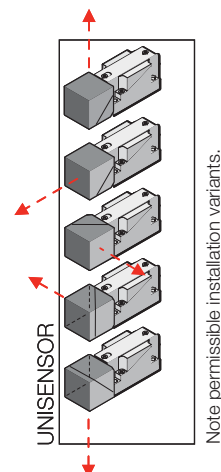


DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor

The Unisensor – multiple uses

- The Unisensor is made up of three modular components: sensor head including sensor head base, sensor body and sensor base.
- Easily removable pin contacts join sensor head and sensor body, e.g. easy interchange of the modules without wiring.
- Sensor base with wiring terminals, self-lifting pressure plates and ample wiring room.
- Sensor head rotatable in five different positions for multiple application installations (see installation drawings).
- PBT plastic housing.
- Mounting dimensions and values are based on DIN EN 60947-5-2
- LED for supply voltage and output function indicator



DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

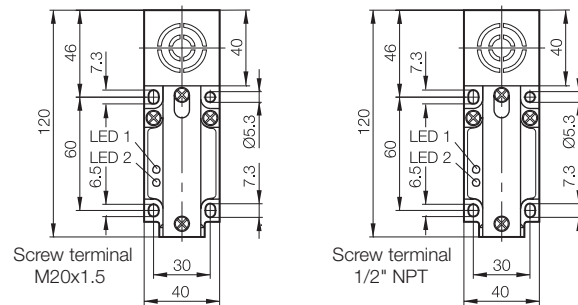
Accessories

Housing size		40×40×120 mm Unisensor	40×40×120 mm Unisensor
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush
Rated switching distance s_n		15 mm	15 mm
Assured switching distance s_a		0...12 mm	0...12 mm
Sensing distance		1X	1X
PNP, complementary	Ordering code	BES0201	BES023F
	Part number	BES 517-132-M3-H	BES 517-132-U3-H
Supply voltage U_B		10...55 V DC	10...55 V DC
Voltage drop U_d at I_e max.		2.5 V	2.5 V
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC
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.		100 Hz	100 Hz
Output function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE	CE
Material	Housing	PBT	PBT
	Sensing surface	PBT	PBT
Possible installation variations		Fig. 1...5	Fig. 1...5
Connection		Screw terminal, M20x1.5	Screw terminal, 1/2" NPT

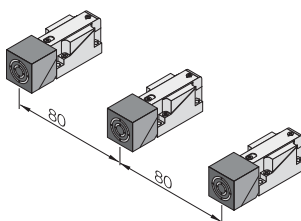
See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Row mounting



Installation variations

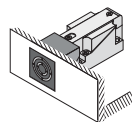


Fig. 1

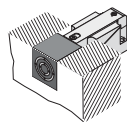


Fig. 2

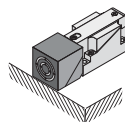


Fig. 3

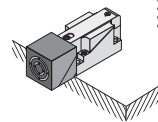


Fig. 4

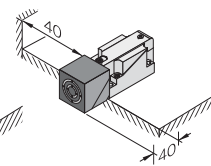


Fig. 5

DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor

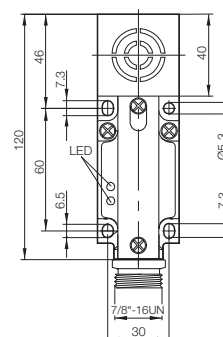
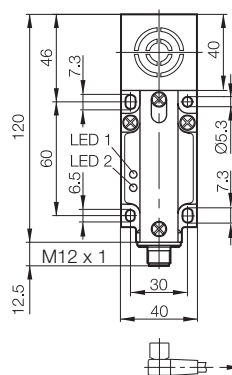


Housing size	40×40×120 mm Unisensor		40×40×120 mm Unisensor	
Installation type (observe instructions in the Basic Information chapter)	Flush		Flush	
Rated switching distance s_n	15 mm		15 mm	
Assured switching distance s_a	0...12 mm		0...12 mm	
Sensing distance	1X		1X	
PNP, complementary	Ordering code	BES0202	BES023J	
	Part number	BES 517-132-M3-H-S4	BES 517-132-U3-H-S5	
NPN, complementary	Ordering code	BES020H		
	Part number	BES 517-134-M3-H-S4		
Supply voltage U_B	10...55 V DC		10...55 V DC	
Voltage drop U_d at I_e max.	2.5 V		2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)		250 V AC	
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.	100 Hz		100 Hz	
Output function indicator	Yellow LED		Yellow LED	
Degree of protection as per IEC 60529	IP 67		IP 67	
Approvals	CE, cULus		CE	
Material	Housing	PBT	PBT	
	Sensing surface	PBT	PBT	
Possible installation variations	Fig. 1...5		Fig. 1...5	
Connection	M12 connector, 4-pin		7/8" 16UN plug connector, 5-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020		BCC A314-0000-10-003-EX44W6-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor



40×40×120 mm Unisensor	40×40×120 mm Unisensor	40×40×120 mm Unisensor	
Flush	Flush	Flush	
20 mm	20 mm	20 mm	
0...16 mm	0...16 mm	0...16 mm	
1X	1X	1X	
BES023L	BES020A		
BES 517-132-U6-H	BES 517-132-M6-H-S4		
	BES020N	BES020P	
	BES 517-134-M6-H-S4	BES 517-134-M6-H-S5	
10...55 V DC	10...55 V DC	10...55 V DC	
2.5 V	2.5 V	2.5 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	
200 mA	200 mA	200 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	
Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	
CE	CE	CE	
PBT/aluminum	PBT	PBT	
PBT	PBT	PBT	
Fig. 1...5	Fig. 1...5	Fig. 1...5	
Screw terminal, 1/2" NPT	M12 connector, 4-pin	7/8" 16UN plug connector, 5-pin	
	BCC M415-0000-1A-003-EX44T2-020	BCC A314-0000-10-003-EX44W6-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

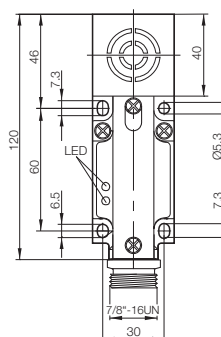
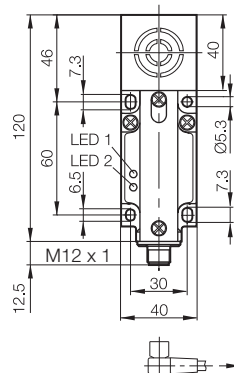
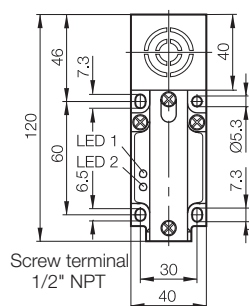
AC/DC 2-wire

AC 2-wire

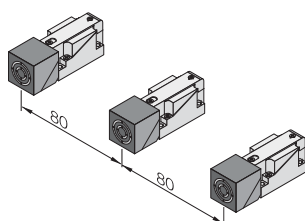
Special properties

Analog distance measurement

Accessories



Row mounting



Installation variations

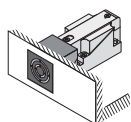


Fig. 1

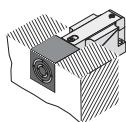


Fig. 2

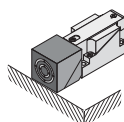


Fig. 3

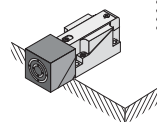


Fig. 4

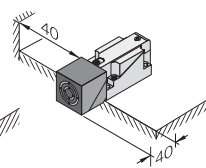


Fig. 5

DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor

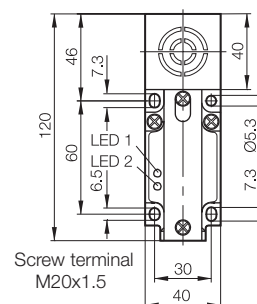


Housing size	40×40×120 mm Unisensor	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	
Rated switching distance s_n	20 mm	
Assured switching distance s_a	0...16 mm	
Sensing distance	1X	
PNP, NO	Ordering code	
	Part number	
PNP, complementary	Ordering code	BES0204
	Part number	BES 517-132-M4-H
NPN, complementary	Ordering code	BES020J
	Part number	BES 517-134-M4-H
Supply voltage U_B	10...55 V DC	
Voltage drop U_d at I_e max.	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_e	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70°C	
Switching frequency f max.	100 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE	
Material	Housing	PBT
	Sensing surface	PBT
Possible installation variations	Fig. 3...5	
Connection	Screw terminal, M20x1.5	
Suggested mating cable		

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Block Sensors Block housing, 40×40 mm Unisensor



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

AC/DC 2-wire

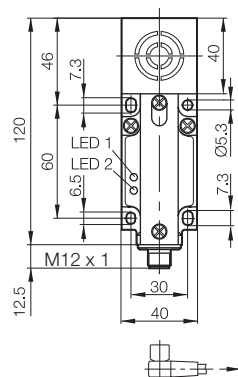
AC 2-wire

Special properties

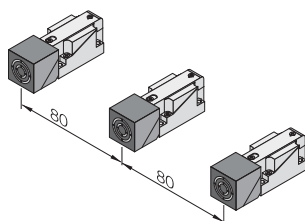
Analog distance measurement

Accessories

40×40×120 mm Unisensor	
Non-flush	
20 mm	
0...16 mm	
1X	
BES0205	
BES 517-132-M4-H-S4	
10...55 V DC	
2.5 V	
250 V AC (□)	
200 mA	
Yes/Yes/Yes	
-25...+70°C	
100 Hz	
Yellow LED	
IP 67	
CE	
PBT	
PBT	
Fig. 3...5	
M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	



Row mounting



Installation variations

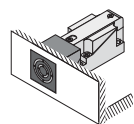


Fig. 1

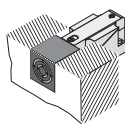


Fig. 2

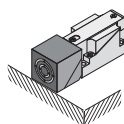


Fig. 3

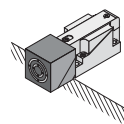


Fig. 4

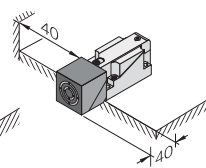


Fig. 5

DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor

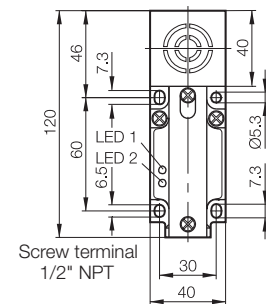
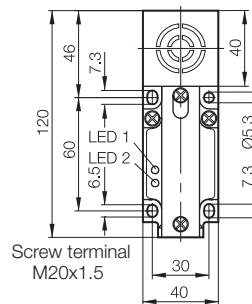


Housing size	40×40×120 mm Unisensor		40×40×120 mm Unisensor	
Installation type (observe instructions in the Basic Information chapter)	Non-flush		Non-flush	
Rated switching distance s_n	30 mm		30 mm	
Assured switching distance s_a	0...24 mm		0...24 mm	
Sensing distance	1X		1X	
PNP, NO	Ordering code	BES0206		
	Part number	BES 517-132-M5-H		
PNP, complementary	Ordering code			
	Part number			
NPN, complementary	Ordering code	BES020K	BES023N	
	Part number	BES 517-134-M5-H	BES 517-134-U5-H	
Supply voltage U_B	10...55 V DC		10...55 V DC	
Voltage drop U_d at I_e max.	2.5 V		2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)		250 V AC (II)	
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.	60 Hz		60 Hz	
Output function indicator	Yellow LED		Yellow LED	
Degree of protection as per IEC 60529	IP 67		IP 67	
Approvals	CE		CE	
Material	Housing	PBT	PBT/aluminum	
	Sensing surface	PBT	PBT	
Possible installation variations	Fig. 3...5		Fig. 3...5	
Connection	Screw terminal, M20x1.5		Screw terminal, 1/2" NPT	
Suggested mating cable				

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 3-/4-wire Inductive Block Sensors

Block housing, 40×40 mm Unisensor



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

AC/DC 2-wire

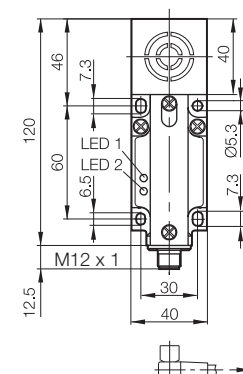
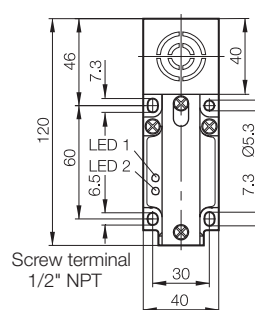
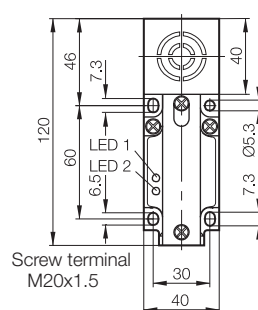
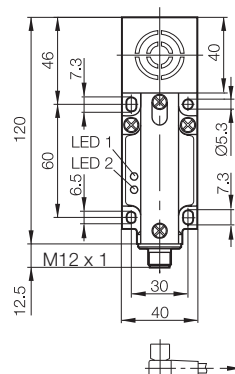
AC 2-wire

Special properties

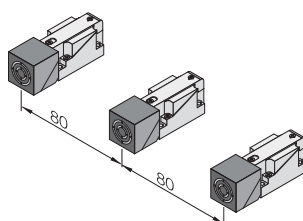
Analog distance measurement

Accessories

40×40×120 mm Unisensor	40×40×120 mm Unisensor	40×40×120 mm Unisensor	40×40×120 mm Unisensor
Non-flush	Non-flush	Non-flush	Non-flush
30 mm	40 mm	40 mm	40 mm
0...24 mm	0...32 mm	0...32 mm	0...32 mm
1X	1X	1X	1X
BES0207	BES020C	BES023M	BES020E
BES 517-132-M5-H-S4	BES 517-132-M7-H	BES 517-132-U7-H	BES 517-132-M7-H-S4
10...55 V DC	10...55 V DC	10...55 V DC	10...55 V DC
2.5 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 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
60 Hz	50 Hz	50 Hz	50 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67
CE	CE	CE	CE
PBT	PBT	PBT/aluminum	PBT
PBT	PBT	PBT	PBT
Fig. 3...5	Fig. 3...5	Fig. 3...5	Fig. 3...5
M12 connector, 4-pin	Screw terminal, M20x1.5	Screw terminal, 1/2" NPT	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020			BCC M415-0000-1A-003-EX44T2-020



Row mounting



Installation variations

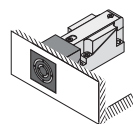


Fig. 1

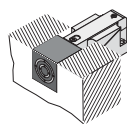


Fig. 2

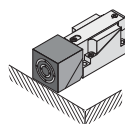


Fig. 3

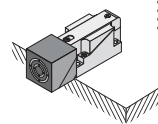


Fig. 4

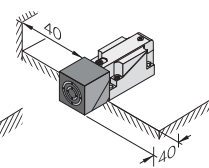


Fig. 5

DC 3-/4-wire Inductive Block Sensors

Block housing, 80×80 mm Maxisensor

Flush mount

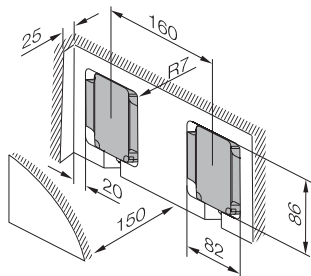


Fig. 1

Non-flush mount

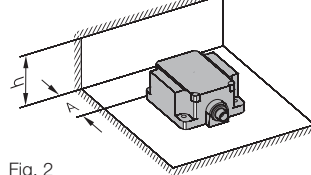


Fig. 2

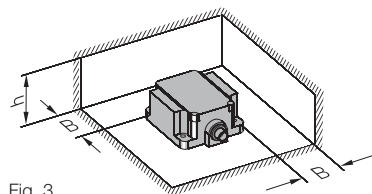


Fig. 3

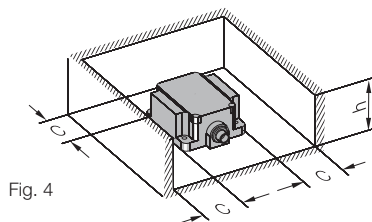


Fig. 4

Minimum distances with steel

h	A	B	C
40 mm	70 mm	80 mm	90 mm
70 mm	80 mm	90 mm	100 mm

Minimum distances with aluminum

h	A	B	C
40 mm	0 mm	10 mm	10 mm
70 mm	10 mm	20 mm	20 mm

The change of the real switching distance s_r is $\leq 10\%$ with these installation dimensions.

Mounting in steel

Mounting in non-ferrous metals

Mounting in steel/non-ferrous metals

Mounting on steel/non-ferrous metals

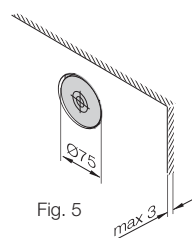


Fig. 5

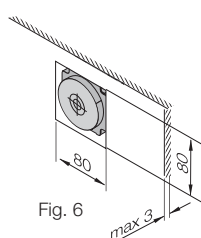


Fig. 6

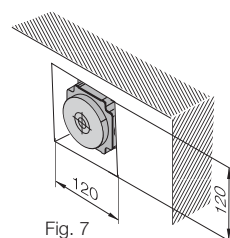


Fig. 7

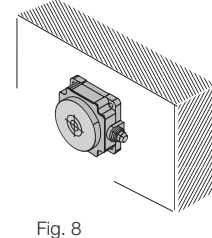


Fig. 8

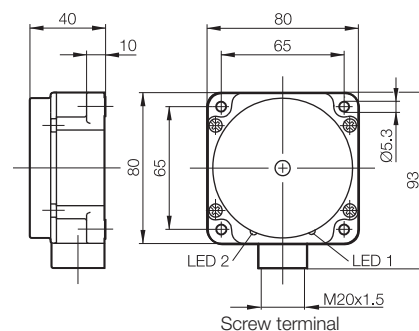


Housing size	80×80×40 mm Maxisensor	
Installation type (observe instructions in the Basic Information chapter)	Flush	
Rated switching distance s_n	40 mm	
Assured switching distance s_a	0...32 mm	
Sensing distance	1X	
PNP, NO	Ordering code	
	Part number	
PNP, complementary	Ordering code	BES023P
	Part number	BES 517-139-M4-H
NPN, complementary	Ordering code	
	Part number	
Supply voltage U_B	10...55 V DC	
Voltage drop U_d at I_B max.	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_B	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-15...+70 °C	
Switching frequency f max.	50 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE	
Material	Housing	PBT
	Sensing surface	PBT
Possible installation variations	Fig. 5...8	
Connection	Screw terminal, M20x1.5	
Suggested mating cable		

See technical section (page 963) for installation notes on 2X, 3X, and 4X long range sensors.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors

Block housing, 80×80 mm Maxisensor



80×80×40 mm Maxisensor	80×84×40 mm Maxisensor	80×80×40 mm Maxisensor
Flush	Flush	Flush
40 mm	40 mm	40 mm
0...32 mm	0...32 mm	0...32 mm
1X	1X	1X
	BES0227	
	BES Q80KA-PSH40B-S04Q	
	BES0225	
	BES Q80KA-PAH40B-S04Q	
BES020R		BES020T
BES 517-140-M4-H		BES 517-140-M4-H-S4
10...55 V DC	10...55 V DC	10...55 V DC
2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 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
Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67
CE	CE	CE
PBT	PBT	PBT
PBT	PBT	PBT
Fig. 5...8	Fig. 1	Fig. 5...8
Screw terminal, M20x1.5	M12 connector, 4-pin	M12 connector, 4-pin
	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

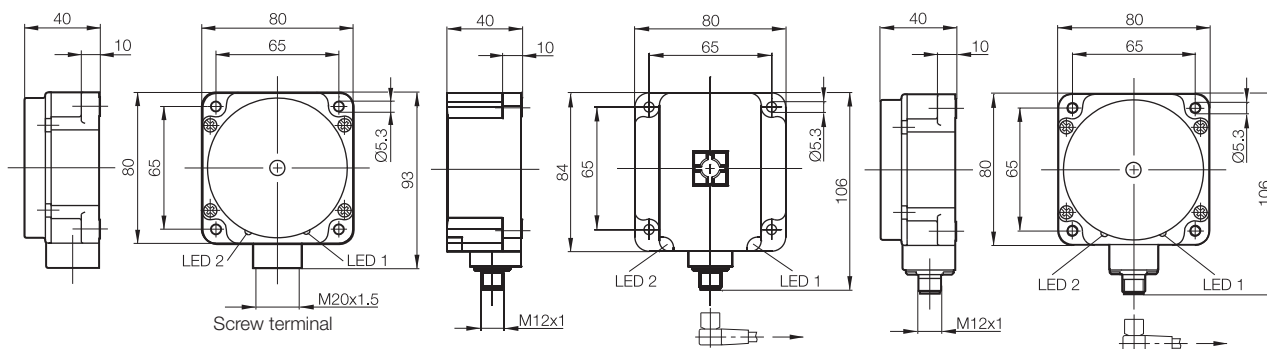
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 3-/4-wire Inductive Block Sensors

Block housing, 80×80 mm Maxisensor

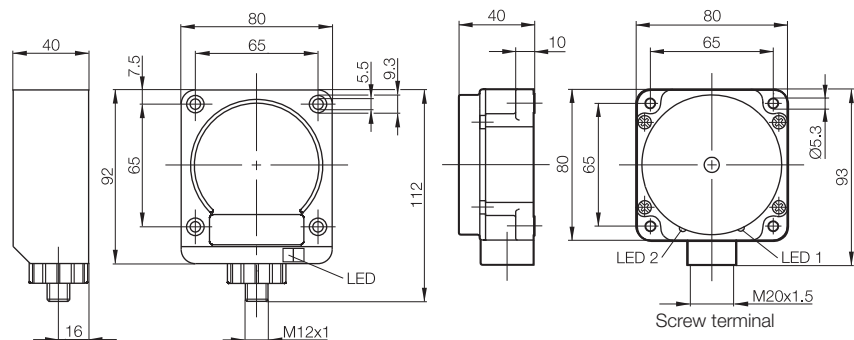


Housing size	80×92×40 mm Maxisensor		80×80×40 mm Maxisensor	
Installation type (observe instructions in the Basic Information chapter)	Flush		Non-flush	
Rated switching distance s_n	50 mm		50 mm	
Assured switching distance s_a	0...40.5 mm		0...40 mm	
Sensing distance	1X		1X	
PNP, NO	Ordering code			
	Part number			
PNP, complementary	Ordering code	BES030C	BES023R	
	Part number	BES Q80KA-PAC50B-S04Q-U	BES 517-139-M5-H	
NPN, complementary	Ordering code		BES020U	
	Part number		BES 517-140-M5-H	
Supply voltage U_B	10...36 V DC		10...55 V DC	
Voltage drop U_d at I_e max.	2.5 V		2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)		250 V AC (□)	
Rated operating current I_e	250 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.	70 Hz		100 Hz	
Output function indicator	Yellow LED		Yellow LED	
Degree of protection as per IEC 60529	IP 67		IP 67	
Approvals	CE, cULus		CE	
Material	Housing	PPE	PBT	
	Sensing surface	PPE	PBT	
Possible installation variations			Fig. 7, 8 (see page 588)	
Connection	M12 connector, 4-pin		Screw terminal, M20x1.5	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020			

See technical section (page 963) for installation notes on 2X, 3X, and 4X long range sensors.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 3-/4-wire Inductive Block Sensors

Block housing, 80×80 mm Maxisensor



80×80×40 mm Maxisensor	80×80×40 mm Maxisensor	80×84×40 mm Maxisensor
Non-flush	Non-flush	Non-flush
50 mm	50 mm	50 mm
0...40 mm	0...40 mm	0...40 mm
1X	1X	1X
	BES023W	BES0228
	BES 517-139-U5-H-S4	BES Q80KA-PSH50F-S04Q
		BES0226
		BES Q80KA-PAH50F-S04Q
BES020W		
BES 517-140-M5-H-S4		
10...55 V DC	10...55 V DC	10...55 V DC
2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...70 °C	-25...70 °C	-25...+70°C
100 Hz	100 Hz	50 Hz
Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67
CE	CE, cULus	CE
PBT	PBT	PBT
PBT	PBT	PBT
Fig. 7, 8 (see page 588)	Fig. 7, 8 (see page 588)	Fig. 2...4 (see page 588)
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

Tubular housings

Block housings

DC 2-wire

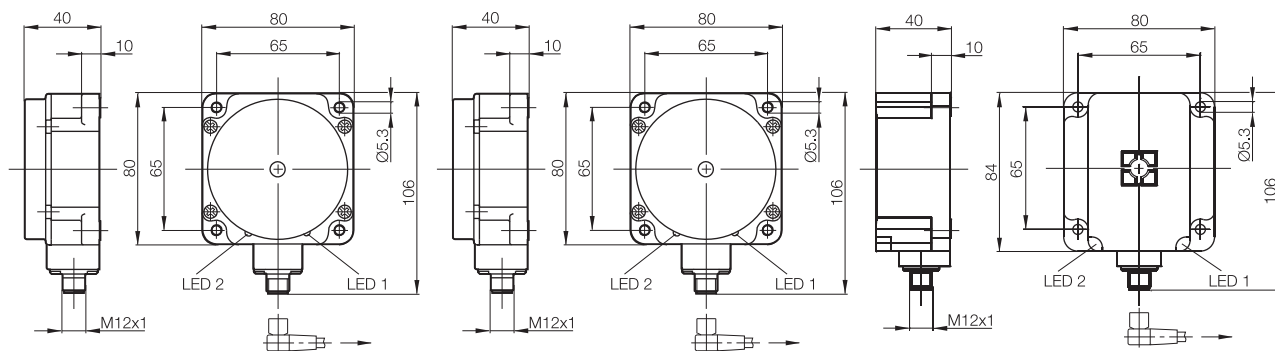
AC/DC 2-wire

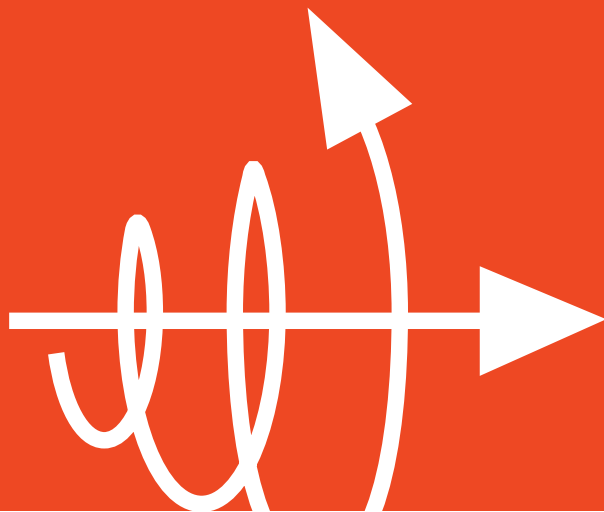
AC 2-wire

Special properties

Analog distance measurement

Accessories





Inductive Sensors

DC 2-wire inductive sensors

This extensive line of DC 2-wire sensors are offered in tubular and block housings to meet a wide variety of applications.



Tubular housing

M8×1

M12×1

M18×1

M30×1.5

595

597

600

603

Block housing

20×32×8 mm (R01)

26×26×26 mm (Z03)

40×66×40 mm (Unicompact)

40×121×40 mm (Unisensor)

80×92×40 mm (maxi-sensor)

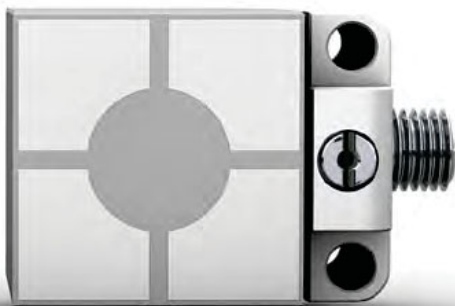
606

607

608

609

610



DC 2-wire Inductive Sensors

DC-2-wire Tubular Sensors

Popular in many "New Domestic" automotive plants and automotive tier suppliers, Balluff's 2-wire DC tubular sensors are offered in Polarized and Non-Polarized configurations, flush and non-flush mounting, in standard and extended sensing ranges. Some models are also available with PTFE-coated housings to help repel welding spatter.



Housing size	
Installation type (observe instructions in Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
Polarized, NO	Ordering code
	Part number
Polarized, NC	Ordering code
	Part number
Non-polarized, NO	Ordering code
	Part number
Non-polarized, NC	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d at I_o max.	
Rated insulation voltage U_i	
Rated operating current I_o	
Minimum operating current I_m	
Residual current I_r max.	
Permissible load capacitance max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Output function indicator	
Degree of protection as per IEC 60529	
Approvals	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	

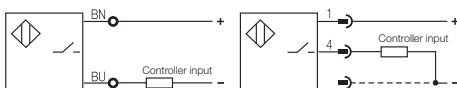
See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

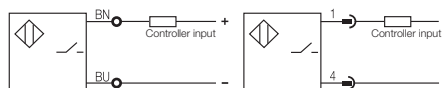
Additional cable lengths and PUR cable jacket material available on request.

Recommendation for connection wiring for polarized sensors on 3-wire controllers

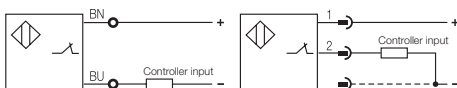
PNP, NO



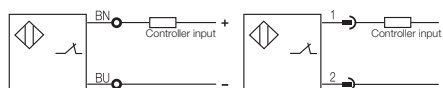
NPN, NO



PNP, NC



NPN, NC



DC 2-wire Inductive Sensors

Tubular housings, M8×1



M8×1	M8×1	M8×1	M8×1	
Flush	Flush	Flush	Flush	
2 mm	2 mm	1.5 mm	2 mm	
0 to 1.6 mm	0 to 1.4 mm	0 to 1.2 mm	0 to 1.6 mm	
2X	2X	1X	2X	
BES0022	BES00C0		BES001Z	
BES M08ME1-GSC20B-S04G	BES M08ME1-GSC20B-S04G-101		BES M08MG-GSC20B-BP00,3-GS04	
BES024N			BES03H8	
BES M08ME1-GOC20B-S04G			BES M08MG-GOC20B-BP00,3-GS04	
BES001Y				
BES M08ME1-USC20B-S04G				
BES024P		BES031N		
BES M08ME1-UOC20B-S04G		BES 516-527-S4-H		
10...36 V DC	10...30 V DC	10...55 V DC	10...36 V DC	
5 V	5 V	5 V	5 V	
75 V DC	75 V DC	75 V DC	75 V DC	
100 mA	100 mA	130 mA	100 mA	
5 mA	5 mA	5 mA	5 mA	
600 µA	600 µA	500 µA	600 µA	
1 µF	1 µF	1 µF	1 µF	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
1.5 kHz	1.5 kHz	3 kHz	1.5 kHz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Stainless steel	Brass-coated	
PBT	With ceramic coating	PBT	PBT	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular housings

Block housings

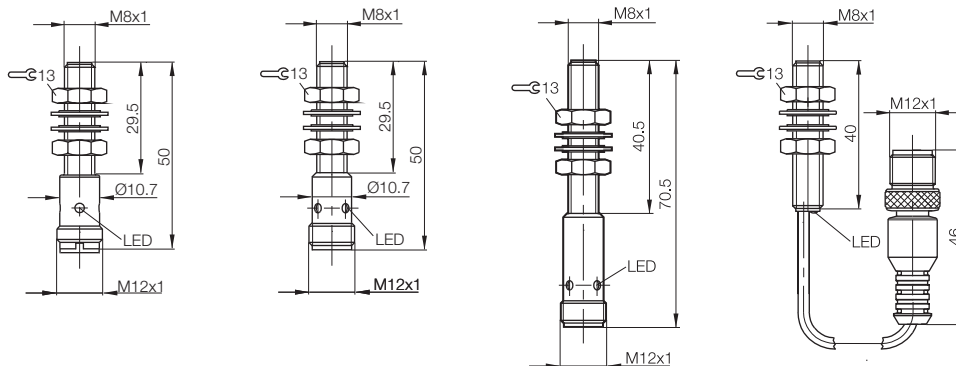
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 2-wire Inductive Sensors

Tubular housings, M8×1

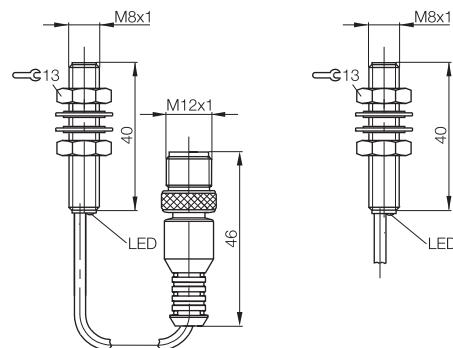


Housing size		M8×1	M8×1	
Installation type (observe instructions in Basic Information chapter)		Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	
Assured switching distance s_a		0 to 1.4 mm	0 to 1.6 mm	
Sensing distance		2X	2X	
Polarized, NO	Ordering code	BES0324	BES001L	
	Part number	BES M08MG-GSC20B-BP00,3-GS04-101	BES M08MG-GSC20B-BV02	
Polarized, NC	Ordering code		BES024R	
	Part number		BES M08MG-GOC20B-BV02	
Non-polarized, NO	Ordering code		BES001T	
	Part number		BES M08MG-USC20B-BV02	
Non-polarized, NC	Ordering code		BES024T	
	Part number		BES M08MG-UOC20B-BV02	
Supply voltage U_B		10...30 V DC	10...36 V DC	
Voltage drop U_d at I_o max.		5 V	5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	
Rated operating current I_o		100 mA	100 mA	
Minimum operating current I_m		5 mA	5 mA	
Residual current I_r max.		600 μ A	600 μ A	
Permissible load capacitance max.		1 μ F	1 μ F	
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.		1.5 kHz	1.5 kHz	
Output function indicator		Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	
Approvals		CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated	
	Sensing surface	With ceramic coating	PBT	
Connection		0.3 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 26 AWG	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020		

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 2-wire Inductive Sensors

Tubular housings, M8×1, M12×1



Global



Global



M12×1	M12×1	M12×1		
Flush	Flush	Flush		
3 mm	3 mm	3 mm		
0 to 2.4 mm	0 to 2.2 mm	0 to 2.4 mm		
2X	2X	2X		
BES003Z	BES00C1			
BES M12MF-GSC30B-S04G	BES M12MF-GSC30B-S04G-101			
BES024J				
BES M12MF-GOC30B-S04G				
		BES0041		
		BES M12MF-USC30B-S04G		
		BES024K		
		BES M12MF-UOC30B-S04G		
10...36 V DC	10...30 V DC	10...36 V DC		
4 V	5 V	5 V		
75 V DC	75 V DC	75 V DC		
100 mA	100 mA	100 mA		
5 mA	5 mA	5 mA		
600 µA	600 µA	600 µA		
1 µF	1 µF	1 µF		
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes		
-25...+70 °C	-25...+70 °C	-25...+70 °C		
1.3 kHz	1.5 kHz	1.3 kHz		
Yellow LED	Yellow LED	Yellow LED		
IP 67	IP 67	IP 67		
CE, cULus	CE, cULus	CE, cULus		
Brass-coated	Brass-coated	Brass-coated		
PA 12	With ceramic coating	PA 12		
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin		
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular housings

Block housings

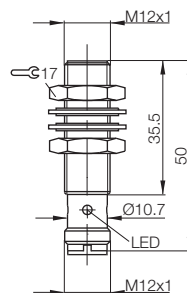
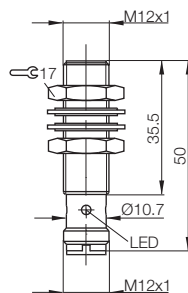
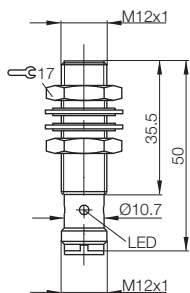
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 2-wire Inductive Sensors

Tubular housing, M12×1

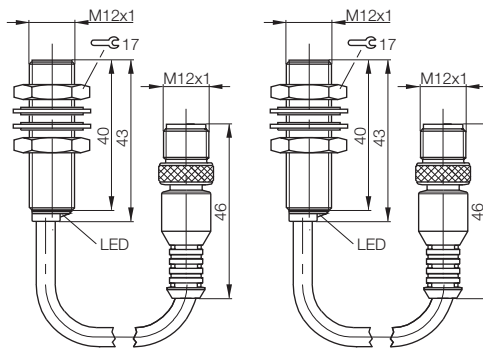


Housing size	M12×1	M12×1		
Installation type (observe instructions in Basic Information chapter)	Flush	Flush		
Rated switching distance s_n	3 mm	3 mm		
Assured switching distance s_a	0...2.4 mm	0...2.2 mm		
Sensing distance	2X	2X		
Polarized, NO	Ordering code	BES0042	BES0326	
	Part number	BES M12MG-GSC30B-BP00,3-GS04	BES M12MG-GSC30B-BP00,3-GS04-101	
Polarized, NC	Ordering code	BES03HK		
	Part number	BES M12MG-GOC30B-BP00,3-GS04		
Non-polarized, NO	Ordering code			
	Part number			
Non-polarized, NC	Ordering code			
	Part number			
Supply voltage U_B	10...36 V DC	10...30 V DC		
Voltage drop U_d at I_o max.	4 V	4 V		
Rated insulation voltage U_i (protection class)	75 V DC	75 V DC		
Rated operating current I_o	100 mA	100 mA		
Minimum operating current I_m	5 mA	5 mA		
Residual current I_r max.	600 μ A	600 μ A		
Permissible load capacitance max.	1 μ F	1 μ F		
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.	1.3 kHz	1.3 kHz		
Output function indicator	Yellow LED	Yellow LED		
Degree of protection as per IEC 60529	IP 67	IP 67		
Approvals	CE, cULus	CE, cULus		
Material	Housing	Brass-coated	Brass-coated	
	Sensing surface	PA 12	With ceramic coating	
Connection	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin		
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020		

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 2-wire Inductive Sensors

Tubular housing, M12×1



M12×1	M12×1	M12×1		
Flush	Flush	Flush		
3 mm	3 mm	3 mm		
0...2.4 mm	0...2.4 mm	0...2.4 mm		
2X	2X	2X		
BES0045				
BES M12MG-GSC30B-BV02				
BES024L				
BES M12MG-GOC30B-BV02				
		BES004U		
		BES M12MG-USC30B-BV03		
	BES024M			
	BES M12MG-UOC30B-BV02			
10...36 V DC	10...36 V DC	10...55 V DC		
4 V	5 V	5 V		
75 V DC	75 V DC	75 V DC		
100 mA	100 mA	100 mA		
5 mA	5 mA	5 mA		
600 µA	600 µA	600 µA		
1 µF	1 µF	1 µF		
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes		
-25...+70 °C	-25...+70 °C	-25...+70 °C		
1.3 kHz	1.3 kHz	1.3 kHz		
Yellow LED	Yellow LED	Yellow LED		
IP 67	IP 67	IP 67		
CE, cULus	CE, cULus	CE		
Brass-coated	Brass-coated	Brass-coated		
PA 12	PA 12	PA 12		
2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG		



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular
 housings

Block
 housings

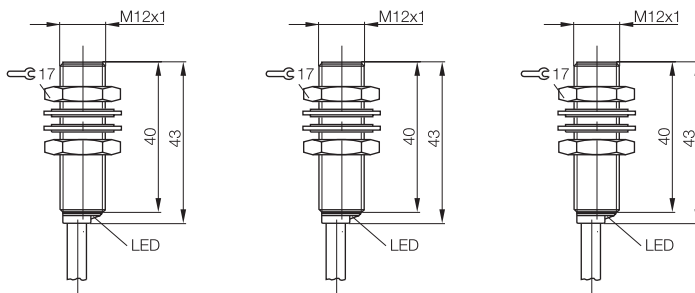
AC/DC
2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories



DC 2-wire Inductive Sensors

Tubular housing, M18x1



Global



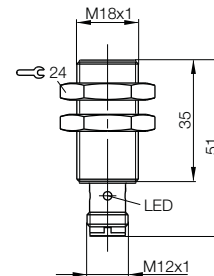
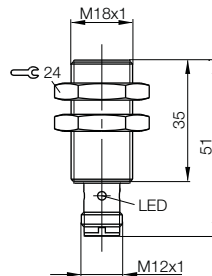
Global

Housing size	M18x1	M18x1		
Installation type (observe instructions in Basic Information chapter)	Flush	Flush		
Rated switching distance s_n	7 mm	7 mm		
Assured switching distance s_a	0...5.6 mm	0...5.6 mm		
Sensing distance	2X	2X		
Polarized, NO	Ordering code	BES0328		
	Part number	BES M18MF-GSC70B-S04G		
Polarized, NC	Ordering code	BES02NL		
	Part number	BES M18MF-GOC70B-S04G		
Non-polarized, NO	Ordering code	BES02NR		
	Part number	BES M18MF-USC70B-S04G		
Non-polarized, NC	Ordering code	BES02NN		
	Part number	BES M18MF-UOC70B-S04G		
Supply voltage U_B	10...36 V DC	10...36 V DC		
Voltage drop U_d at I_o max.	4 V	5 V		
Rated insulation voltage U_i	75 V DC	75 V DC		
Rated operating current I_o	100 mA	100 mA		
Minimum operating current I_m	5 mA	5 mA		
Residual current I_r max.	600 μ A	600 μ A		
Permissible load capacitance max.	1 μ F	1 μ F		
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.	600 Hz	600 Hz		
Output function indicator	Yellow LED	Yellow LED		
Degree of protection as per IEC 60529	IP 67	IP 67		
Approvals	CE, cULus	CE, cULus		
Material	Housing	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PA 12	
Connection	M12 connector, 4-pin	M12 connector, 4-pin		
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020		

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 2-wire Inductive Sensors

Tubular housing, M18×1



M18×1	M18×1	M18×1		
Flush	Flush	Flush		
7 mm	7 mm	7 mm		
0...5.6 mm	0...5.5 mm	0...5.6 mm		
2X	2X	2X		
BES006C	BES0329	BES00FA		
BES M18MG-GSC70B-BP00,3-GS04	BES M18MG-GSC70B-BP00,3-GS04-101	BES M18MG-GSC70B-BV02		
BES039L		BES02NT		
BES M18MG-GOC70B-BP00,3-GS04		BES M18MG-GOC70B-BV02		
10...36 V DC	10...30 V DC	10...36 V DC		
4 V	4 V	4 V		
75 V DC	75 V DC	75 V DC		
100 mA	100 mA	100 mA		
5 mA	5 mA	5 mA		
600 µA	600 µA	600 µA		
1 µF	1 µF	1 µF		
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes		
-25...+70 °C	-25...+70 °C	-25...+70 °C		
600 Hz	600 Hz	600 Hz		
Yellow LED	Yellow LED	Yellow LED		
IP 67	IP 67	IP 67		
CE, cULus	CE, cULus	CE, cULus		
Brass-coated	Brass-coated	Brass-coated		
PA 12	With ceramic coating	PA 12		
0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 22 AWG		
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020			



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular housings

Block housings

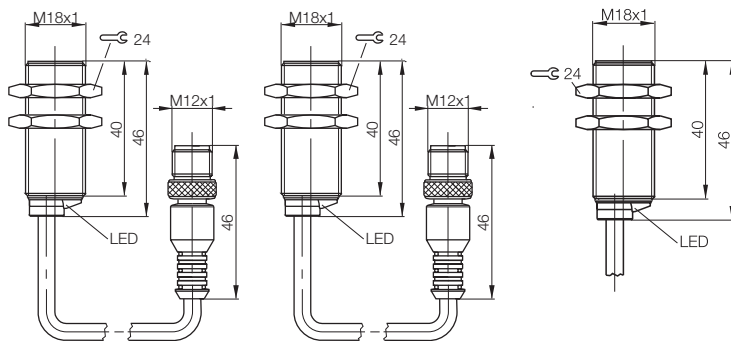
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 2-wire Inductive Sensors

Tubular housing, M18×1

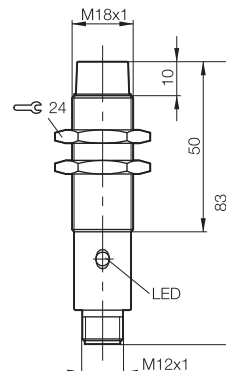
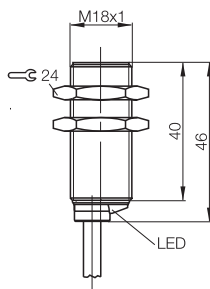


Housing size	M18×1	M18×1		
Installation type (observe instructions in Basic Information chapter)	Flush	Non-flush		
Rated switching distance s_n	7 mm	8 mm		
Assured switching distance s_a	0...5.6 mm	0...6.5 mm		
Sensing distance	2X	1X		
Polarized, NO	Ordering code			
	Part number			
Polarized, NC	Ordering code			
	Part number			
Non-polarized, NO	Ordering code	BES0073		
	Part number	BES M18MG-USC70B-BV02		
Non-polarized, NC	Ordering code	BES02NU	BES0322	
	Part number	BES M18MG-UOC70B-BV02	BES 516-547-S4-H	
Supply voltage U_B	10...36 V DC	10...55 V DC		
Voltage drop U_d at I_o max.	5 V	5 V		
Rated insulation voltage U_i (protection class)	75 V DC	250 V AC (□)		
Rated operating current I_o	100 mA	200 mA		
Minimum operating current I_m	5 mA	5 mA		
Residual current I_r max.	600 μ A	500 μ A		
Permissible load capacitance max.	1 μ F	1 μ F		
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.	600 Hz	200 Hz		
Output function indicator	Yellow LED	Yellow LED		
Degree of protection as per IEC 60529	IP 67	IP 68 per BWN Pr. 20		
Approvals	CE, cULus	CE, cULus		
Material	Housing	Brass-coated	Brass-coated	
	Sensing surface	PA 12	PA 12	
Connection	2 m PVC cable, 22 AWG	M12 connector, 4-pin		
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020		

See technical section (page 963-966)
for installation instructions.

For standard DC 2-wire connection information see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



DC 2-wire Inductive Sensors

Tubular housing, M30×1.5



Global

Global

Global

M30×1.5	M30×1.5	M30×1.5	M30×1.5	
Flush	Flush	Flush	Flush	
10 mm	15 mm	15 mm	15 mm	
0...8 mm	0...12 mm	0...12 mm	0...12 mm	
1X	2X	2X	2X	
	BES027L		BES008W	
	BES M30MF-GSC15B-S04G		BES M30MF-GSC15B-S04K	
	BES027C		BES027J	
	BES M30MF-GOC15B-S04G		BES M30MF-GOC15B-S04K	
		BES027E		
		BES M30MF-USC15B-S04G		
		BES027F		
		BES M30MF-UOC15B-S04G		
BES031T				
BES 516-541-S4-H				
10...55 V DC	10...36 V DC	10...36 V DC	10...36 V DC	
5 V	4 V	5 V	4 V	
250 V AC (□)	75 V DC	75 V DC	75 V DC	
200 mA	100 mA	100 mA	100 mA	
5 mA	5 mA	5 mA	5 mA	
500 µA	600 µA	600 µA	600 µA	
1 µF	1 µF	1 µF	1 µF	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
150 Hz	400 Hz	400 Hz	400 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 68 per BWN Pr. 20	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PA 12	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular housings

Block housings

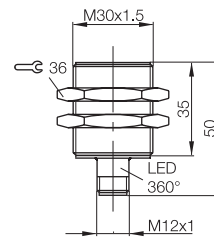
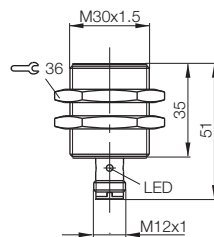
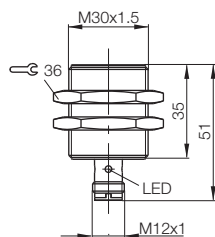
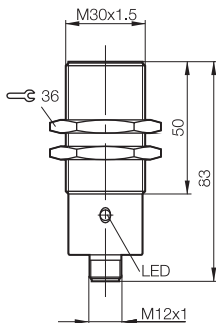
AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories



DC 2-wire Inductive Sensors

Tubular housing, M30×1.5

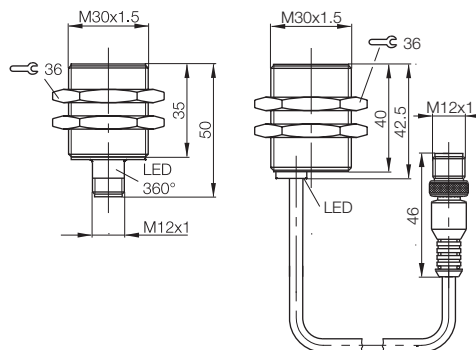


Housing size		M30×1.5	M30×1.5		
Installation type (observe instructions in Basic Information chapter)		Flush	Flush		
Rated switching distance s_n		15 mm	15 mm		
Assured switching distance s_a		0...12 mm	0...12 mm		
Sensing distance		2X	2X		
Polarized, NO	Ordering code		BES032A		
	Part number		BES M30MF-GSC15B-BP00,3-GS04-101		
Polarized, NC	Ordering code				
	Part number				
Non-polarized, NO	Ordering code	BES0094			
	Part number	BES M30MF-USC15B-S04K			
Non-polarized, NC	Ordering code	BES027H			
	Part number	BES M30MF-UOC15B-S04K			
Supply voltage U_B		10...36 V DC	10...36 V DC		
Voltage drop U_d at I_o max.		5 V	4 V		
Rated insulation voltage U_i (protection class)		75 V DC	75 V DC		
Rated operating current I_o		100 mA	100 mA		
Minimum operating current I_m		5 mA	5 mA		
Residual current I_r max.		600 μ A	600 μ A		
Permissible load capacitance max.		1 μ F	1 μ F		
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.		400 Hz	400 Hz		
Output function indicator		Yellow LED	Yellow LED		
Degree of protection as per IEC 60529		IP 67	IP 67		
Approvals		CE, cULus	CE, cULus		
Material	Housing	Brass-coated	Brass-coated		
	Sensing surface	PA 12	With ceramic coating		
Connection		M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin		
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020		

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 2-wire Inductive Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5	M30×1.5	M30×1.5	
Flush	Flush	Flush	Non-flush	
15 mm	15 mm	15 mm	15 mm	
0...12 mm	0...12 mm	0...12 mm	0...12 mm	
2X	2X	2X	1X	
BES008Y	BES008R			
BES M30MF-GSC15B-BP00,3-GS04	BES M30MF-GSC15B-BV02			
BES03H4	BES0279			
BES M30MF-GOC15B-BP00,3-GS04	BES M30MF-GOC15B-BV02			
		BES0091		
		BES M30MF-USC15B-BV02		
		BES027A	BES0323	
		BES M30MF-UOC15B-BV02	BES 516-549-S4-H	
10...36 V DC	10...36 V DC	10...36 V DC	10...55 V DC	
4 V	4 V	5 V	5 V	
75 V DC	75 V DC	75 V DC	250 V AC (□)	
100 mA	100 mA	100 mA	200 mA	
5 mA	5 mA	5 mA	5 mA	
600 µA	600 µA	600 µA	500 µA	
1 µF	1 µF	1 µF	1 µF	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
400 Hz	400 Hz	400 Hz	100 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PA 12	
0.3 m PUR cable with M12 connector, 4-pin	2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020			BCC M415-0000-1A-003-EX44T2-020	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular
 housings

Block
 housings

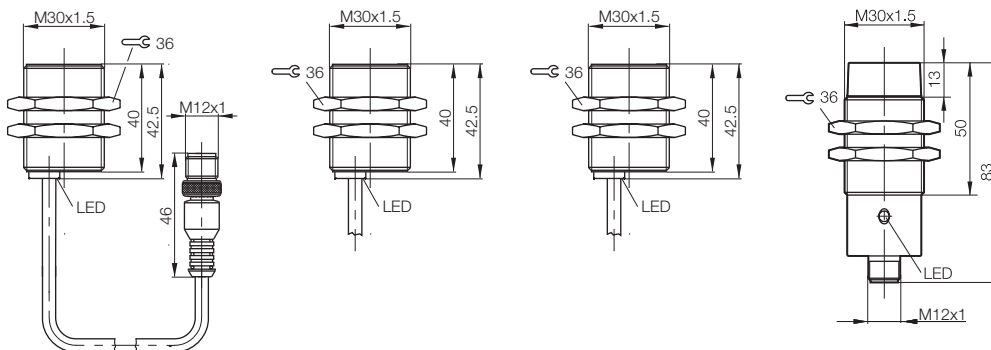
AC/DC
2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories



DC 2-wire Inductive Sensors

Block housings, 20×32×8 mm

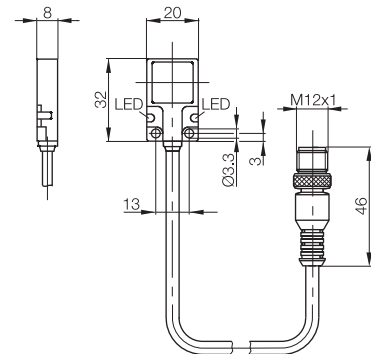
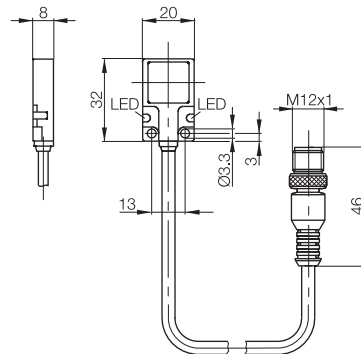


Housing size		20×32×8 mm R01	20×32×8 mm R01
Installation type (observe instructions in Basic Information chapter)		Flush	Flush
Rated switching distance s_n		5 mm	5 mm
Assured switching distance s_a		0...4 mm	0...3.9 mm
Sensing distance		1X	1X
Non-polarized, NO	Ordering code	BES032C	BES03TM
	Part number	BES R01ZC-USC50B-BP00.2-GS04	BES R01ZC-USC50B-BP00.2-GS04-101
Supply voltage U_B		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		5 V	5 V
Rated insulation voltage U_i		75 V DC	75 V DC
Rated operating current I_e		100 mA	100 mA
Minimum operating current I_m		5 mA	5 mA
Residual current I_r max.		600 μ A	600 μ A
Permissible load capacitance max.		1 μ F	1 μ F
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.		300 Hz	300 Hz
Output function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE, cULus	CE
Material	Housing	Cast zinc	Cast zinc
	Sensing surface	PA 12	With ceramic coating
Connection		0.2 m PUR cable with M12 connector, 4-pin	0.2 m PUR cable with M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

Additional cable lengths and PUR cable jacket material available on request.



DC 2-wire Inductive Sensors

Block housings, 26×26×26 mm



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular housings

Block housings

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Housing size		26×26×26 mm Z03	26×26×26 mm Z03
Installation type (observe instructions in Basic Information chapter)		Flush	Flush
Rated switching distance s_n		10 mm	10 mm
Assured switching distance s_a		0...8.1 mm	0...8.1 mm
Sensing distance		1X	1X
Polarized, NO	Ordering code	BES030H	BES030E
	Part number	BES Z03K-GSS10B-S04U-006	BES Z03K-GSS10B-EP00,15-GS04-006
Supply voltage U_B		10...36 V DC	10...36 V DC
Voltage drop U_d at I_e max.		4.6 V	4.6 V
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)
Rated operating current I_e		100 mA	100 mA
Minimum operating current I_m		2 mA	2 mA
Residual current I_r max.		600 μ A	600 μ A
Permissible load capacitance max.		0.1 μ F	0.1 μ F
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.		250 Hz	250 Hz
Output function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE	CE
Material	Housing	PA	PA
	Sensing surface	PA	PA
Connection		M12 connector, 4-pin	0.15 m PUR cable with M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

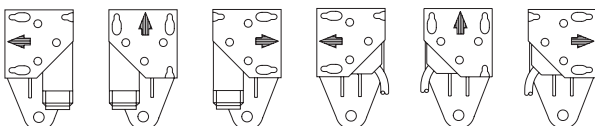
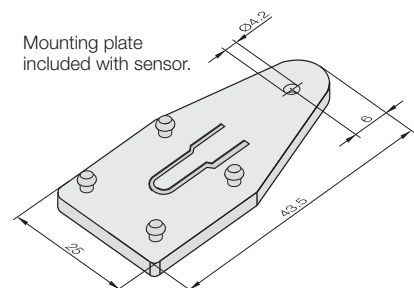
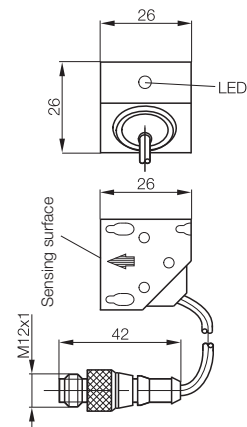
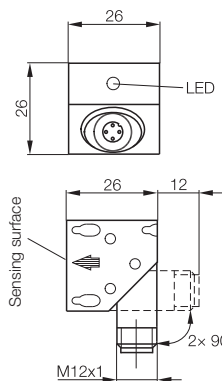
Additional cable lengths and PUR cable jacket material available on request.

Small, compact block sensor with increased switching distance for quick installation

The connector mount can be rotated and the sensing face can be oriented in three directions.

Simple replacement with no loss of position thanks to the fixed mounting plate:

- Cost savings
- No special tools necessary
- Easy to install



DC 2-wire Inductive Sensors

Block housings, 40×66×40 mm

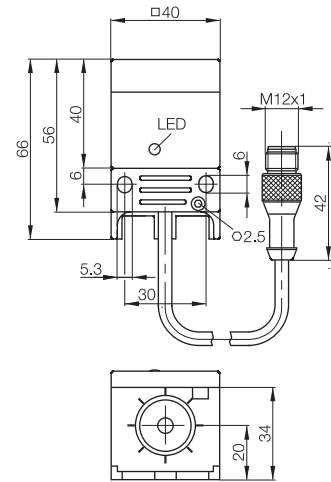
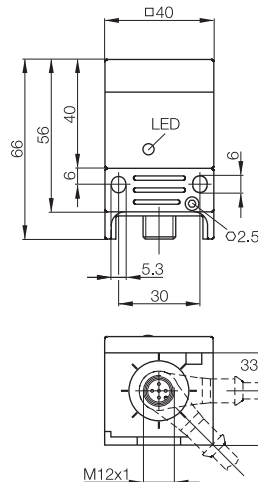


Housing size		40×66×40 mm	40×66×40 mm
Installation type (observe instructions in Basic Information chapter)		Flush	Flush
Rated switching distance s_n		15 mm	15 mm
Assured switching distance s_a		0...12 mm	0...12 mm
Sensing distance		1X	1X
Polarized, NO	Ordering code	BES0303	BES0302
	Part number	BES Q40KFU-GSH15B-S04G	BES Q40KFU-GSH15B-EP00,8-GS04
Polarized, NC	Ordering code		BES0301
	Part number		BES Q40KFU-GOH15B-EP00,8-GS04
Supply voltage U_B		10...55 V DC	10...55 V DC
Voltage drop U_d at I_o max.		4.6 V	4.6 V
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)
Rated operating current I_o		100 mA	100 mA
Minimum operating current I_m		2 mA	5 mA
Residual current I_r max.		800 μ A	800 μ A
Permissible load capacitance max.		1 μ F	1 μ F
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.		150 Hz	150 Hz
Output function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE	CE
Material	Housing	PPE, PPS	PPE, PPS
	Sensing surface	PPE	PPE
Connection		M12 connector, 4-pin	0.8 m PUR cable with M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For standard DC 2-wire connection information see page 958.

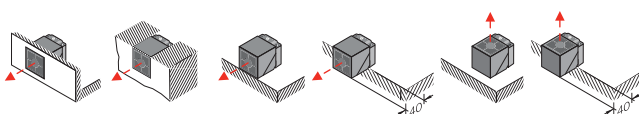
Additional cable lengths and PUR cable jacket material available on request.



40 x 66 x 40

The flexible sensor for mechanical engineering and equipment manufacturing. The detection direction can be adjusted in 5 directions. Long switching distance in compact package.

Permissible installation variations for 40 x 66 x 40 mm block housing



DC 2-wire Inductive Sensors

Block housings, 40×121×40 mm Unisensor



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

Tubular
housings

Block
housings

AC/DC
2-wire

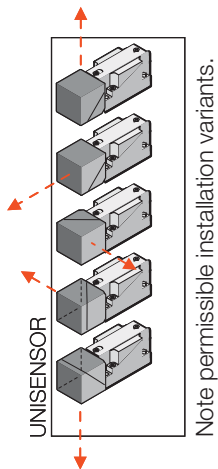
AC 2-wire

Special
properties

Analog
distance
measurement

Accessories

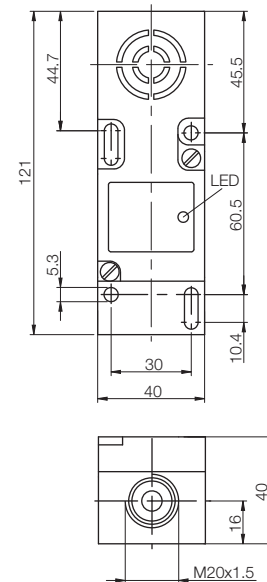
Housing size	40×121×40 mm Unisensor	
Installation type (observe instructions in Basic Information chapter)	Non-flush	
Rated switching distance s_n	20 mm	
Assured switching distance s_a	0...16 mm	
Sensing distance	1X	
Polarized, complementary	Ordering code	BES0309
	Part number	BES Q40KU-GPH20F-KM21
Supply voltage U_B	10...55 V DC	
Voltage drop U_d at I_e max.	4.6 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_e	400 mA	
Minimum operating current I_m	4 mA	
Residual current I_r max.	1 mA	
Permissible load capacitance max.	1 μ F	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-25...+80 °C	
Switching frequency f max.	300 Hz	
Output function indicator	Red LED	
Degree of protection as per IEC 60529	IP 65	
Approvals	CE	
Material	Housing	PPE
	Sensing surface	PPE
Connection	Screw terminal M20x1.5	



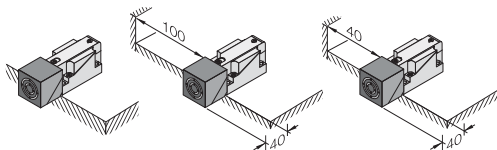
See technical section (page 963-966)
for installation instructions.

For standard DC 2-wire connection information see page 958.

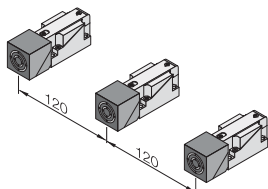
**Additional cable lengths and PUR cable jacket material
available on request.**



Mounting options



Row mounting



DC 2-wire Inductive Sensors

Block housings, 80×92×40 mm



Housing size	80×92×40 mm Maxisensor	
Installation type (observe instructions in Basic Information chapter)	Flush	
Rated switching distance s_n	50 mm	
Assured switching distance s_a	0...40 mm	
Sensing distance	1X	
Polarized, NO	Ordering code	BES030A
	Part number	BES Q80KA-GSH50B-S04Q
Supply voltage U_B	10...55 V DC	
Voltage drop U_d at I_e max.	4.6 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_e	400 mA	
Minimum operating current I_m	4 mA	
Residual current I_r max.	600 μ A	
Permissible load capacitance max.	1 μ F	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	
Switching frequency f max.	90 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE	
Material	Housing	PPE
	Sensing surface	PPE
Connection	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	

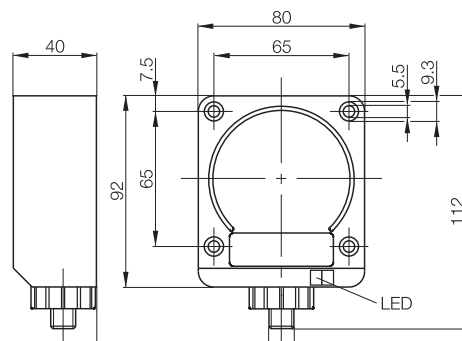
See technical section (page 963-966)
for installation instructions.

For standard DC 2-wire connection information see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**

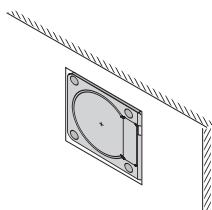
Maxisensor

Long switching distance with low installation height in the detection
direction. Ideal for equipment manufacturing and conveyor technology.

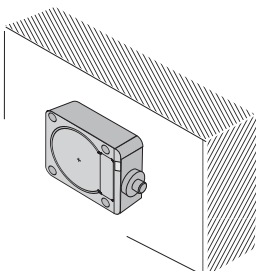


Permissible Maxisensor installation options

Installation in steel or
non-ferrous metals



Installation on steel or
non-ferrous metals



The switching distance is reduced by
max. 5.5 mm when not installed flush.



- Global DC 3-wire

- DC 3-/4-wire

DC 2-wire

- Tubular housings

- Block housings

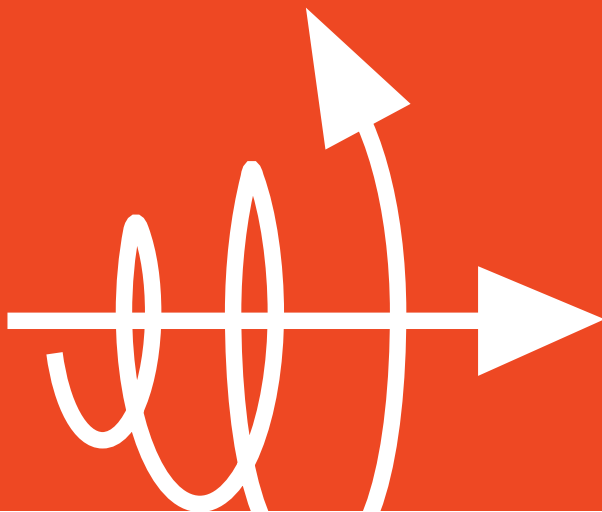
- AC/DC 2-wire

- AC 2-wire

- Special properties

- Analog distance measurement

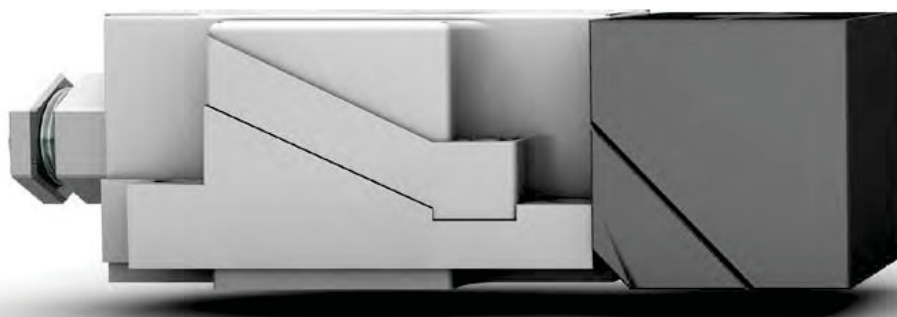
Accessories



Inductive Sensors

AC/DC 2-wire inductive sensors

Balluff offers something for practically any application in automation with this comprehensive product line of sensors from M12 to 80x80mm. These high-quality sensors are designed and manufactured according to worldwide standards and the latest technology. We inspect absolutely every one of our products, providing you the peace of mind that you are receiving the highest quality sensors.



Tubular housings

M12×1	615
M18×1	617
M30×1.5	620

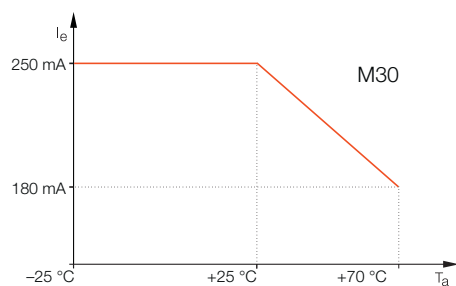
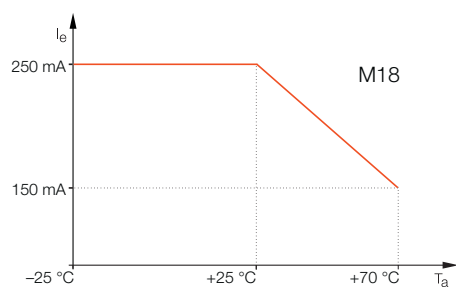
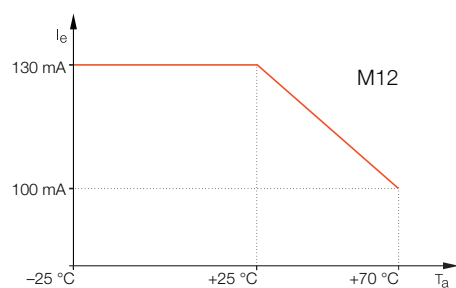
Block housings

26×40×12 mm (R05)	623
40×73×40 mm (Unicompact)	624
40×120×40 mm (Unisensor)	626
80×80×40 mm (Maxisensor)	630





Current reduction as a function of ambient temperature range



Housing size	
Installation type (observe instructions in the Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
NO	Ordering code
	Part number
NC	Ordering code
	Part number
Rated operating voltage U_e	
Supply voltage U_B	
Voltage drop U_d at I_e max.	
Rated insulation voltage U_i	
Rated operating current I_e	
Minimum operating current I_m	
Residual current I_r max.	
Short-term current carrying capacity I_c /time T	
Short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Utilization category	
Output function indicator	
Degree of protection as per IEC 60529	
Approvals	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

AC/DC 2-wire Inductive Sensors

Tubular housing, M12x1



M12x1	M12x1	M12x1		
Flush	Flush	Non-flush		
2 mm	2 mm	4 mm		
0...1.6 mm	0...1.6 mm	0...3.2 mm		
1X	1X	1X		
BES02E3	BES027Y	BES02E4		
BES 515-207-S21-E	BES 516-207-S5-E	BES 515-209-S21-E		
	BES0284			
	BES 516-208-S5-E			
110 V AC	110 V AC	110 V AC		
20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC		
11 V	11 V	11 V		
250 V AC	250 V AC	250 V AC		
130 mA	130 mA	130 mA		
5 mA	5 mA	5 mA		
1.7 mA	1.7 mA	1.7 mA		
0.7 A/20 ms	0.7 A/20 ms	0.7 A/20 ms		
Yes	Yes	Yes		
-25...+70 °C	-25...+70 °C	-25...+70 °C		
1 kHz	1 kHz	600 Hz		
AC 140/DC 13	AC 140/DC 13	AC 140/DC 13		
Yellow LED	Yellow LED	Yellow LED		
IP 67	IP 67	IP 67		
CE, cULus	CE, cULus	CE, cULus		
Stainless steel	Stainless steel	Stainless steel		
PA 12	PA 12	PA 12		
1/2" 20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin	1/2"-20UNF-2A plug connector, 3-pin		
C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020	C21 AE3-00-TY-060F		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housing

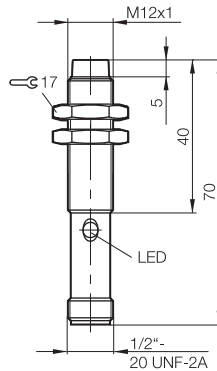
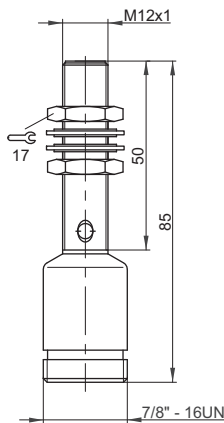
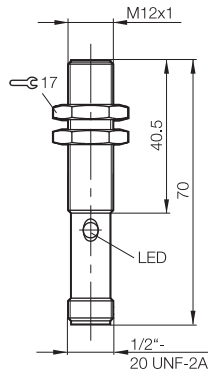
Block housings

AC 2-wire

Special properties

Analog distance measurement

Accessories



AC/DC 2-wire Inductive Sensors

Tubular housings, M12×1, M18×1

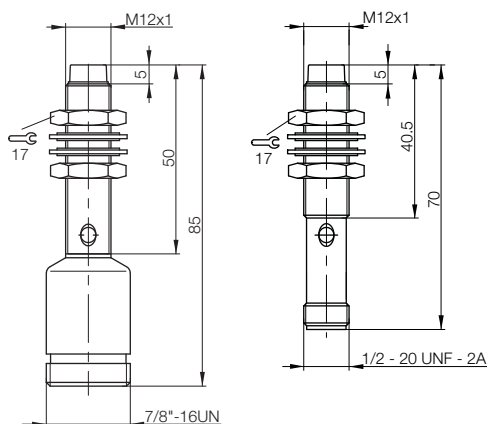


Housing size	M12×1	M12×1		
Installation type (observe instructions in the Basic Information chapter)	Non-flush	Non-flush		
Rated switching distance s_n	4 mm	8 mm		
Assured switching distance s_a	0...3.2 mm	0...6.4 mm		
Sensing distance	1X	2X		
NO	Ordering code	BES028E	BES0289	
	Part number	BES 516-209-S5-E	BES 516-209-G-S21-E	
NC	Ordering code			
	Part number			
Rated operating voltage U_o	110 V AC	110 V AC		
Supply voltage U_B	20...250 V AC/DC	20...250 V AC/DC		
Voltage drop U_d at I_o max.	11 V	11 V		
Rated insulation voltage U_i	250 V AC	250 V AC		
Rated operating current I_o	130 mA	130 mA		
Minimum operating current I_m	5 mA	5 mA		
Residual current I_r max.	1.7 mA	1.7 mA		
Short-term current carrying capacity I_c /time T	0.7 A/20 ms	0.7 A/20 ms		
Short-circuit protected	Yes	Yes		
Ambient temperature T_a	-25...+70 °C	-25...+70 °C		
Switching frequency f max.	600 Hz	600 Hz		
Utilization category	AC 140/DC 13	AC 140/DC 13		
Output function indicator	Yellow LED	Yellow LED		
Degree of protection as per IEC 60529	IP 67	IP 67		
Approvals	CE, cULus	CE, cULus		
Material	Housing	Stainless steel	Stainless steel	
	Sensing surface	PA 12	PA 12	
Connection	7/8" 16UN plug connector, 3-pin	1/2"-20UNF-2A plug connector, 3-pin		
Suggested mating cable	BCC A313-0000-10-071-VX43W6-020	C21 AE3-00-TY-060F		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC/DC 2-wire Inductive Sensors

Tubular housing, M18×1



M18×1	M18×1	M18×1	M18×1	
Flush	Flush	Flush	Flush	
5 mm	5 mm	5 mm	8 mm	
0...4 mm	0...4 mm	0...4 mm	0...6.4 mm	
1X	1X	1X	2X	
BES028P	BES02E5	BES028T	BES02ZE	
BES 516-211-E5-E-S21	BES 515-211-E5-E-S21	BES 516-211-E5-E-S5	BES M18MN-USU80B-S21G	
BES028Z		BES0291		
BES 516-212-E5-E-S21		BES 516-212-E5-E-S5		
110 V AC	110 V AC	110 V AC	110 V AC	
20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC	20...300 V AC/DC	
11 V	11 V	11 V	8 V	
250 V AC	250 V AC	250 V AC	250 V AC	
250 mA	250 mA	250 mA	200 mA	
5 mA	5 mA	5 mA	4 mA	
1.7 mA	1.7 mA	1.7 mA	0.8 mA	
1.5 A/20 ms	1.5 A/20 ms	1.5 A/20 ms	1.5 A/20 ms	
Yes	Yes	Yes	Yes	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
400 Hz	400 Hz	400 Hz	30 Hz	
AC 140/DC 13	AC 140/DC 13	AC 140/DC 13	AC 140/DC 13	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Stainless steel	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PBT	
1/2"-20UNF-2A plug connector, 3-pin	1/2"-20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin	1/2"-20UNF-2A plug connector, 3-pin	
C21 AE3-00-TY-060F	C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020	C21 AE3-00-TY-060F	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

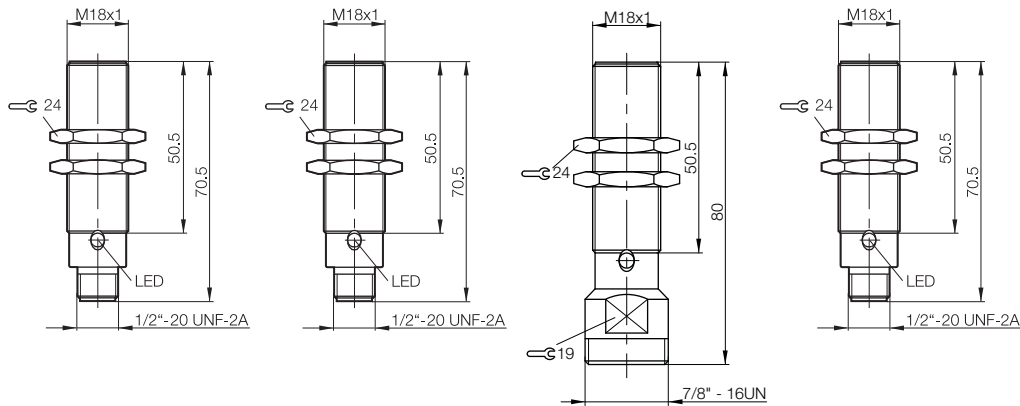
Block housings

AC 2-wire

Special properties

Analog distance measurement

Accessories



AC/DC 2-wire Inductive Sensors

Tubular housing, M18x1

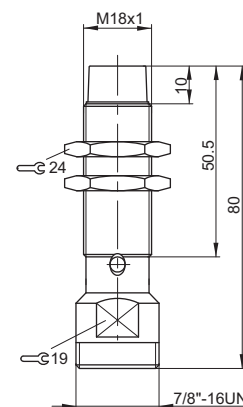
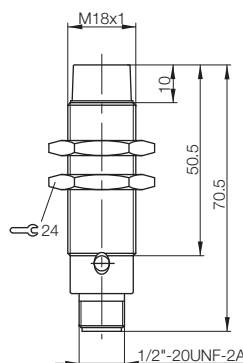
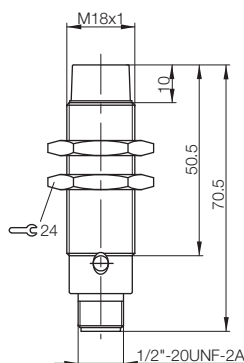


Housing size	M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	Non-flush	Non-flush	
Rated switching distance s_n	8 mm	8 mm	8 mm	
Assured switching distance s_a	0...6.4 mm	0...6.4 mm	0...6.4 mm	
Sensing distance	1X	1X	1X	
NO	Ordering code	BES0296	BES02E7	BES0298
	Part number	BES 516-213-E5-E-S21	BES 515-213-E5-E-S21	BES 516-213-E5-E-S5
NC	Ordering code	BES029H		
	Part number	BES 516-214-E5-E-S21		
Rated operating voltage U_o	110 V AC	110 V AC	110 V AC	
Supply voltage U_B	20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC	
Voltage drop U_d at I_o max.	11 V	11 V	11 V	
Rated insulation voltage U_i	250 V AC	250 V AC	250 V AC	
Rated operating current I_o	250 mA	250 mA	250 mA	
Minimum operating current I_m	5 mA	5 mA	5 mA	
Residual current I_r max.	1.7 mA	1.7 mA	1.7 mA	
Short-term current carrying capacity I_c /time T	1.5 A/20 ms	1.5 A/20 ms	1.5 A/20 ms	
Short-circuit protected	Yes	Yes	Yes	
Ambient temperature T_a	-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	250 Hz	250 Hz	250 Hz	
Utilization category	AC 140/DC 13	AC 140/DC 13	AC 140/DC 13	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Stainless steel	Brass-coated
	Sensing surface	PA 12	PA 12	PA 12
Connection	1/2"-20UNF-2A plug connector, 3-pin	1/2"-20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin	
Suggested mating cable	C21 AE3-00-TY-060F	C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC/DC 2-wire Inductive Sensors Tubular housings, M18×1



M18×1				
Non-flush				
16 mm				
0...13 mm				
2X				
BES029A				
BES 516-213-G-E5-E-S21				
110 V AC				
20...250 V AC/DC				
11 V				
250 V AC				
250 mA				
5 mA				
1.7 mA				
1.5 A/1 ms				
Yes				
-25...+70 °C				
250 Hz				
AC 140/DC 13				
Yellow LED				
IP 67				
CE, cULus				
Brass-coated				
PA 12				
1/2"-20UNF-2A plug connector, 3-pin				
C21 AE3-00-TY-060F				



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

**AC/DC
2-wire**

Tubular
housings

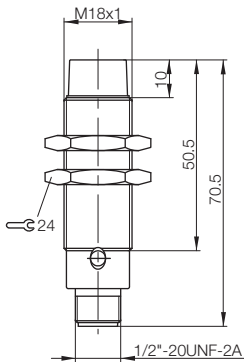
Block
housings

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories



AC/DC 2-wire Inductive Sensors

Tubular housing, M30×1.5

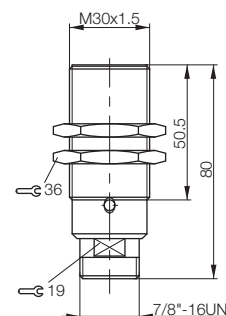
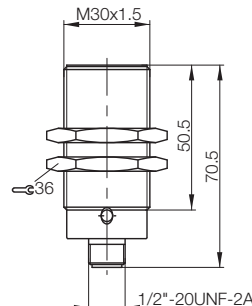
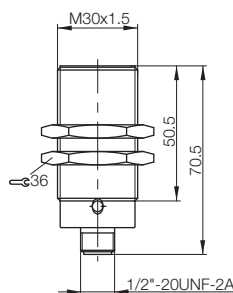


Housing size	M30×1.5	M30×1.5	M30×1.5	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	10 mm	10 mm	10 mm	
Assured switching distance s_a	0...8.1 mm	0...8.1 mm	0...8.1 mm	
Sensing distance	1X	1X	1X	
NO	Ordering code	BES029T	BES02E9	BES029W
	Part number	BES 516-215-E5-E-S21	BES 515-215-E5-E-S21	BES 516-215-E5-E-S5
NC	Ordering code	BES02A2		BES02A4
	Part number	BES 516-216-E5-E-S21		BES 516-216-E5-E-S5
Rated operating voltage U_o	110 V AC	110 V AC	110 V AC	
Supply voltage U_B	20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC	
Voltage drop U_d at I_o max.	11 V	11 V	11 V	
Rated insulation voltage U_i	250 V AC	250 V AC	250 V AC	
Rated operating current I_o	250 mA	250 mA	250 mA	
Minimum operating current I_m	5 mA	5 mA	5 mA	
Residual current I_r max.	1.7 mA	1.7 mA	1.7 mA	
Short-term current carrying capacity I_c /time T	3 A/20 ms	3 A/20 ms	3 A/20 ms	
Short-circuit protected	Yes	Yes	Yes	
Ambient temperature T_a	-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	150 Hz	150 Hz	150 Hz	
Utilization category	AC 140/DC 13	AC 140/DC 13	AC 140/DC 13	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Stainless steel	Brass-coated
	Sensing surface	PA 12	PA 12	PA 12
Connection	1/2"-20UNF-2A plug connector, 3-pin	1/2"-20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin	
Suggested mating cable	C21 AE3-00-TY-060F	C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC/DC 2-wire Inductive Sensors

Tubular housing, M30×1.5



M30×1.5	M30×1.5			
Non-flush	Non-flush			
15 mm	15 mm			
0...12.1 mm	0...12.1 mm			
1X	1X			
BES02AA	BES02AE			
BES 516-217-E5-E-S21	BES 516-217-E5-E-S5			
BES02AK	BES02AM			
BES 516-218-E5-E-S21	BES 516-218-E5-E-S5			
110 V AC	110 V AC			
20...250 V AC/DC	20...250 V AC/DC			
11 V	11 V			
250 V AC	250 V AC			
250 mA	250 mA			
5 mA	5 mA			
1.7 mA	1.7 mA			
3 A/20 ms	3 A/20 ms			
Yes	Yes			
-25...+70 °C	-25...+70 °C			
100 Hz	100 Hz			
AC 140/DC 13	AC 140/DC 13			
Yellow LED	Yellow LED			
IP 67	IP 67			
CE, cULus	CE, cULus			
Brass-coated	Brass-coated			
PA 12	PA 12			
1/2"-20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin			
C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020			



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

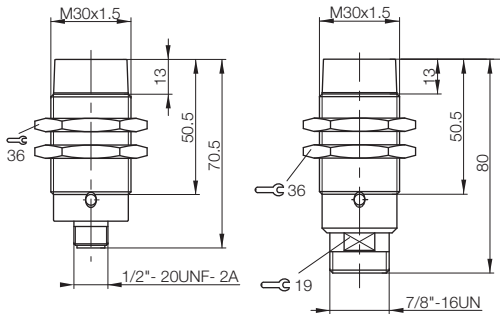
Block housings

AC 2-wire

Special properties

Analog distance measurement

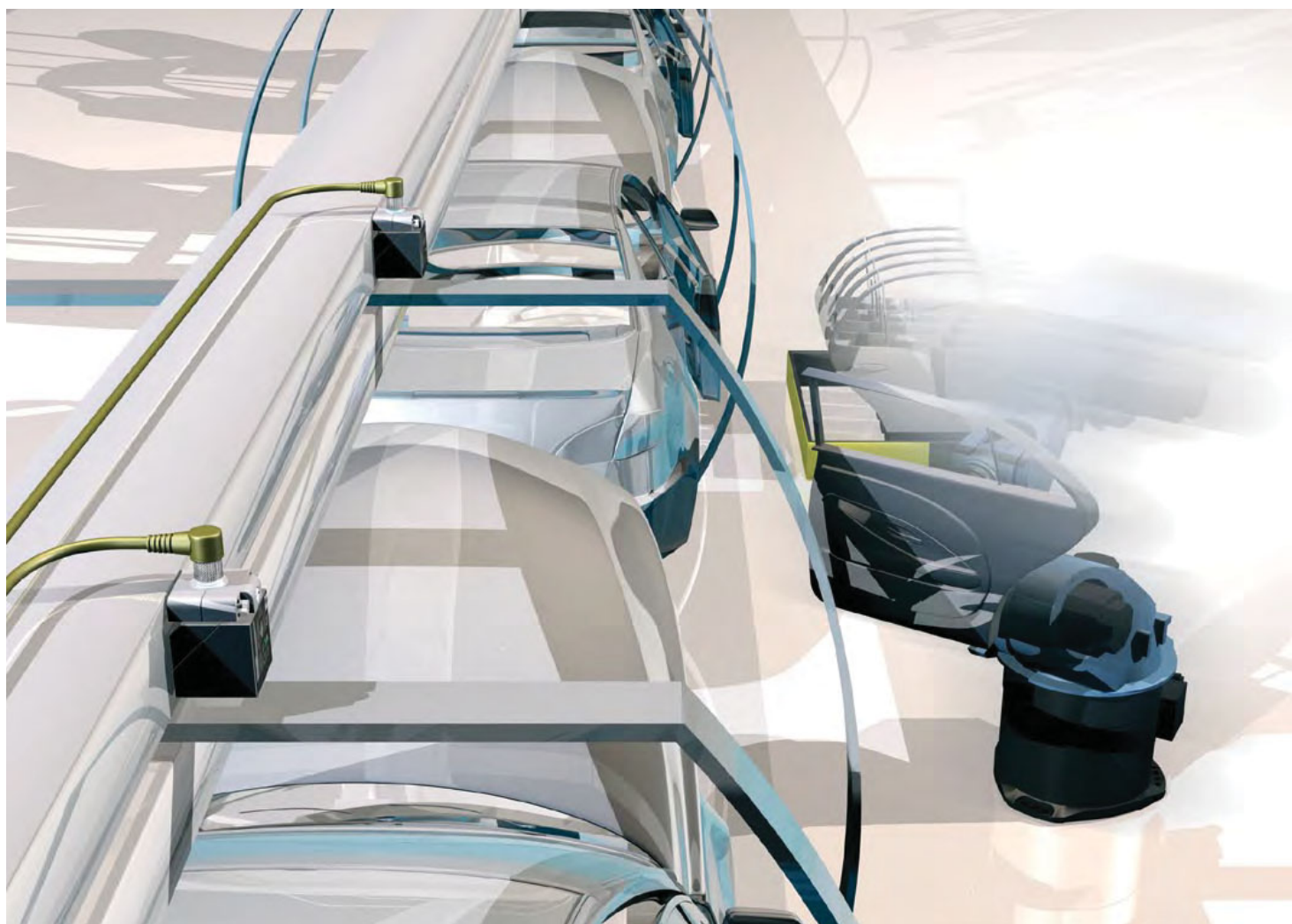
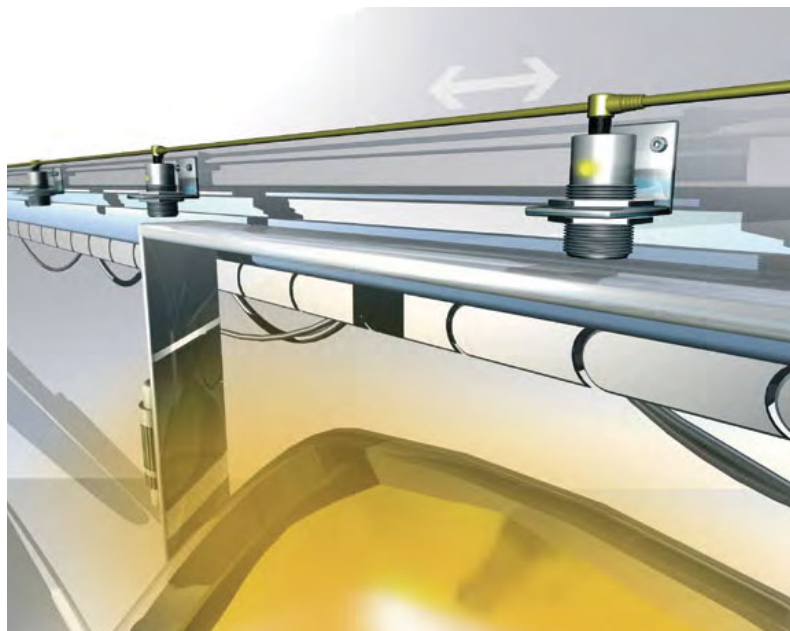
Accessories



AC/DC 2-wire Inductive Sensors Sensors in use

Position detection with Balluff inductive sensors: In foundry work, exact position detection is absolutely essential for pouring metal with exact precision. Balluff inductive sensors can be integrated into the existing feed system and detect the stationary ladle position right before pouring.

Assembly procedures require precise position of materials. Balluff inductive sensors also identify metals over long distances and in harsh environments.



AC/DC 2-wire Inductive Sensors

Block housings, 26×40×12 mm



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

Block housings

AC 2-wire

Special properties

Analog distance measurement

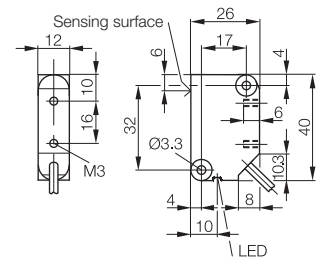
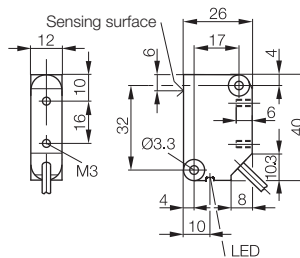
Accessories

Housing size		26×40×12 mm R05	26×40×12 mm R05
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush
Rated switching distance s_n		2 mm	4 mm
Assured switching distance s_a		0...1.6 mm	0...3.2 mm
Sensing distance		1X	2X
NO	Ordering code	BES02CT	BES02CY
	Part number	BES R05KB-USU20B-EV02	BES R05KB-USU40B-EV02
Rated operating voltage U_o		110 V AC	110 V AC
Supply voltage U_B		20...250 V AC/DC	20...250 V AC/DC
Voltage drop U_d at I_o max.		12 V	12 V
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)
Rated operating current I_o		130 mA	130 mA
Minimum operating current I_m		5 mA	5 mA
Residual current I_r max.		1.7 mA	1.7 mA
Short-term current carrying capacity I_c /time T		0.7 A/20 ms	0.7 A/20 ms
Short-circuit protected		Yes	Yes
Ambient temperature T_a		-25...+70 °C	-25...+70 °C
Switching frequency f max.		400 Hz	400 Hz
Utilization category		AC 140/DC 13	AC 140/DC 13
Output function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE	CE
Material	Housing	PA 12	PA 12
	Sensing surface	PA 12	PA 12
Connection		2 m PVC cable, 22 AWG	2 m PVC cable, 22 AWG

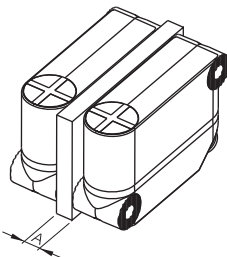
See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



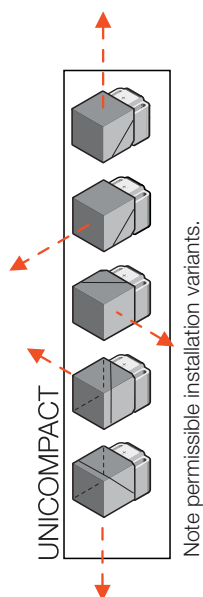
Row mounting



- With plastics or no material present in the space:
Distance A = at least 5 mm
- With metal in the space:
Distance A = at least 4 mm

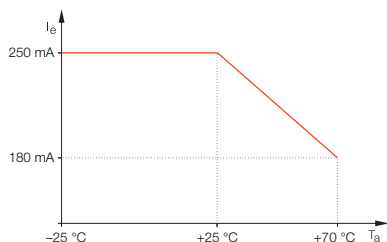
AC/DC 2-wire Inductive Sensors

Block housings, 40×73×40 mm



Housing size		
Installation type (observe instructions in Basic Information chapter)		
Rated switching distance s_n		
Assured switching distance s_a		
Sensing distance		
NO	Ordering code	
	Part number	
NC	Ordering code	
	Part number	
Rated operating voltage U_e		
Supply voltage U_B		
Voltage drop U_d at I_e max.		
Rated insulation voltage U_i		
Rated operating current I_e		
Minimum operating current I_m		
Residual current I_r max.		
Short-term current carrying capacity I_c /time T		
Short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Utilization category		
Output function indicator		
Degree of protection as per IEC 60529		
Approvals		
Material	Housing	
	Sensing surface	
Possible installation variations		
Connection		
Suggested mating cable		

Current reduction as a function of ambient temperature range



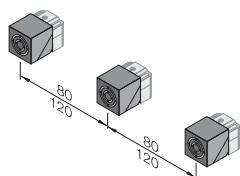
See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

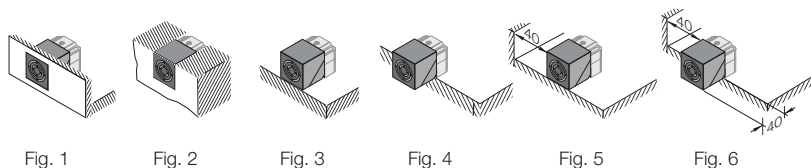
Additional cable lengths and PUR cable jacket material available on request.

Row mounting

Flush 80 mm, Non-flush 120 mm



Mounting options



AC/DC 2-wire Inductive Sensors

Block housings, 40×73×40 mm



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

Block housings

AC 2-wire

Special properties

Analog distance measurement

Accessories

40×73×40 mm Unicomact

Flush

15 mm

0...12 mm

1X

BES022A

BES Q40KEU-USU15B-S21G

BES0211

BES Q40KEU-UOU15B-S21G

110 V AC

20...250 V AC/DC

11 V

250 V AC

250 mA

5 mA

1.7 mA

2 A/20 ms

Yes

-25...+70 °C

100 Hz

AC 140/DC 13

Yellow LED

IP 67

CE

PBT/Cast zinc

PBT

Fig. 1...6

1/2" 20UNF-2A plug connector, 3-pin

C21 AE3-00-TY-060F

40×73×40 mm Unicomact

Non-flush

25 mm

0...20.2 mm

1X

BES022F

BES Q40KEU-USU25F-S21G

BES0213

BES Q40KEU-UOU25F-S21G

110 V AC

20...250 V AC/DC

11 V

250 V AC

250 mA

5 mA

1.7 mA

2 A/20 ms

Yes

-25...+70 °C

100 Hz

AC 140/DC 13

Yellow LED

IP 67

CE

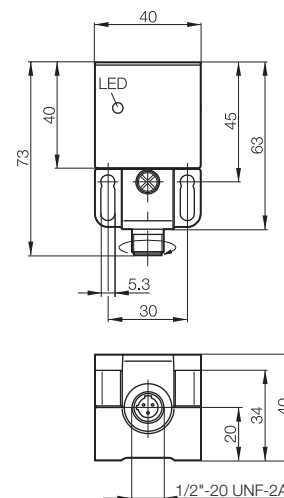
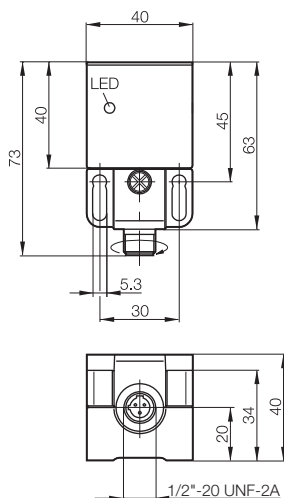
PBT/Cast zinc

PBT

Fig. 3...6

1/2" 20UNF-2A plug connector, 3-pin

C21 AE3-00-TY-060F

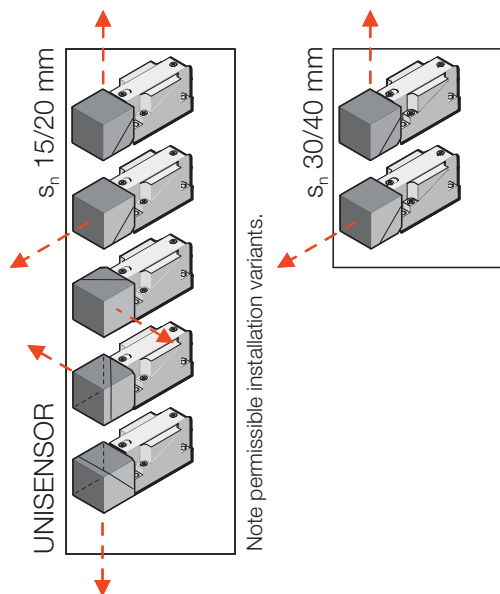


AC/DC 2-wire Inductive Sensors

Block housings, 40×120×40 mm

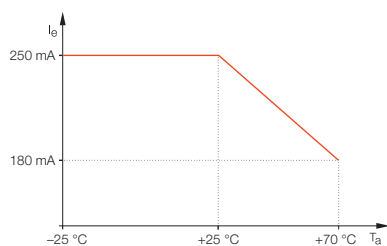
Programmable Unisensor

Unisensors can be switched between a normally open function- and a normally closed function. A wire jumper is used to change the setting.



Housing size	
Installation type (observe instructions in Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
NO/NC	Ordering code
programmable	Part number
Rated operating voltage U_e	
Supply voltage U_B	
Voltage drop U_d at I_e max.	
Rated insulation voltage U_i (protection class)	
Rated operating current I_e	
Minimum operating current I_m	
Residual current I_r max.	
Short-term current carrying capacity I_c /time T	
Short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Utilization category	
Output function indicator	
Degree of protection as per IEC 60529	
Approvals	
Material	Housing
	Sensing surface
Possible installation variations	
Connection	
Suggested mating cable	

Current reduction as a function of ambient temperature range



See technical section (page 963-966) for installation instructions.

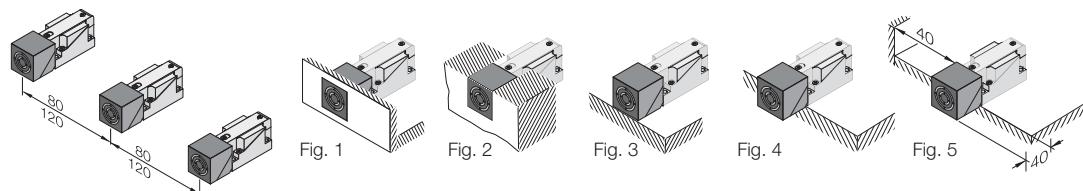
For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

Row mounting

Flush 80 mm,
Non-flush 120 mm

Mounting options



AC/DC 2-wire Inductive Sensors

Block housings, 40×120×40 mm



40×120×40 mm Unisensor	40×120×40 mm Unisensor	40×120×40 mm Unisensor
Flush	Flush	Flush
15 mm	15 mm	15 mm
0...12 mm	0...12 mm	0...12 mm
1X	1X	1X
BES020Y	BES0242	BES0243
BES 517-223-M3-E	BES 517-223-U3-E-S21	BES 517-223-U3-E-S5
110 V AC	110 V AC	110 V AC
20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC
10.5 V	10.5 V	10.5 V
250 V AC (□)	250 V AC	250 V AC
250 mA	250 mA	250 mA
5 mA	5 mA	5 mA
1.7 mA	1.7 mA	1.7 mA
1 A/20 ms	1 A/20 ms	1 A/20 ms
Yes	Yes	Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C
100 Hz	100 Hz	100 Hz
AC 140/DC 13	AC 140/DC 13	AC 140/DC 13
Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus
PBT/aluminum	PBT/aluminum	PBT/aluminum
PBT	PBT	PBT
Fig. 1...5	Fig. 1...5	Fig. 1...5
Screw terminal M20x1.5	1/2" 20UNF-2A plug connector, 3-pin C21 AE3-00-TY-060F	7/8" 16UN plug connector, 3-pin BCC A313-0000-10-071-VX43W6-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

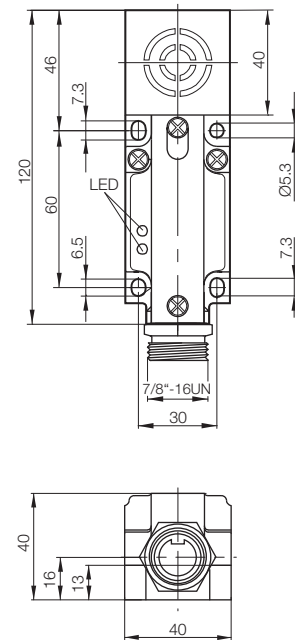
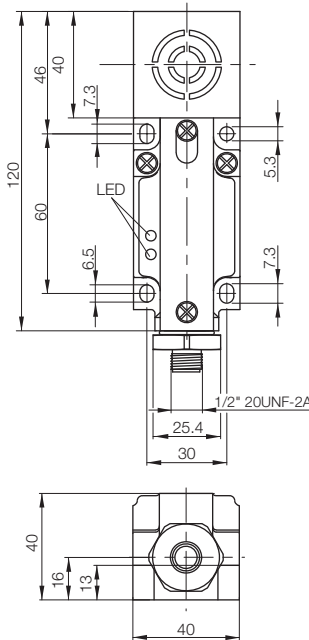
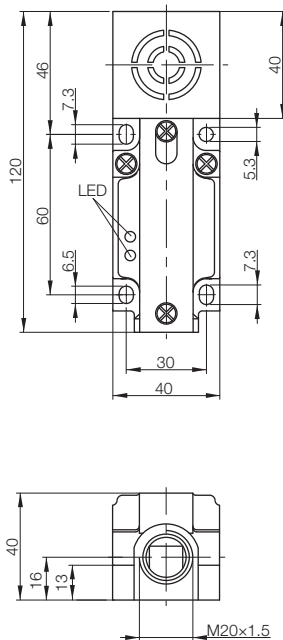
Block housings

AC 2-wire

Special properties

Analog distance measurement

Accessories



AC/DC 2-wire Inductive Sensors

Block housings, 40×120×40 mm

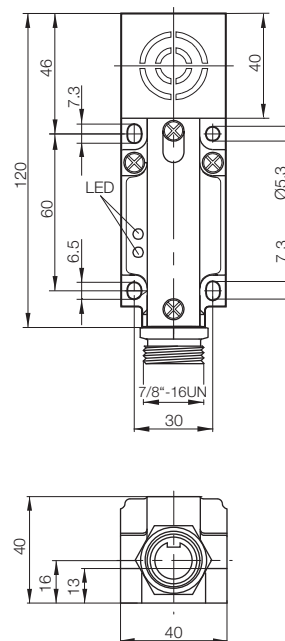
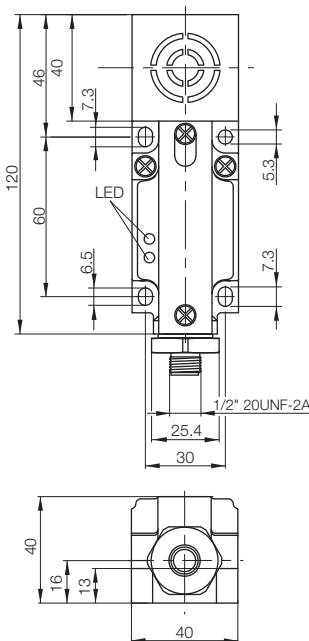


Housing size		40×120×40 mm Unisensor	40×120×40 mm Unisensor
Installation type (observe instructions in Basic Information chapter)		Non-flush	Non-flush
Rated switching distance s_n		20 mm	20 mm
Assured switching distance s_a		0...16 mm	0...16 mm
Sensing distance		1X	1X
NO/NC	Ordering code	BES0245	BES0246
programmable	Part number	BES 517-223-U4-E-S21	BES 517-223-U4-E-S5
Rated operating voltage U_e		110 V AC	110 V AC
Supply voltage U_B		20...250 V AC/DC	20...250 V AC/DC
Voltage drop U_d at I_e max.		10.5 V	10.5 V
Rated insulation voltage U_i		250 V AC	250 V AC
Rated operating current I_e		250 mA	250 mA
Minimum operating current I_m		5 mA	5 mA
Residual current I_r max.		1.7 mA	1.7 mA
Short-term current carrying capacity I_c /time T		1 A/20 ms	1 A/20 ms
Short-circuit protected		Yes	Yes
Ambient temperature T_a		-25...+70 °C	-25...+70 °C
Switching frequency f max.		100 Hz	100 Hz
Utilization category		AC 140/DC 13	AC 140/DC 13
Output function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE, cULus	CE, cULus
Material	Housing	PBT/aluminum	PBT/aluminum
	Sensing surface	PBT	PBT
Possible installation variations		Fig. 4 and 5 (see page 626)	Fig. 4 and 5 (see page 626)
Connection		1/2" 20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin
Suggested mating cable		C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC/DC 2-wire Inductive Sensors

Block housings, 40×120×40 mm



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

Block housings

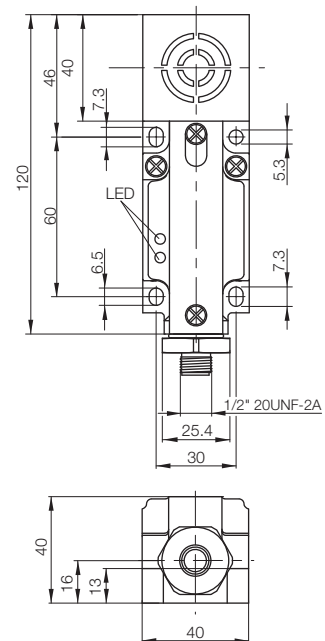
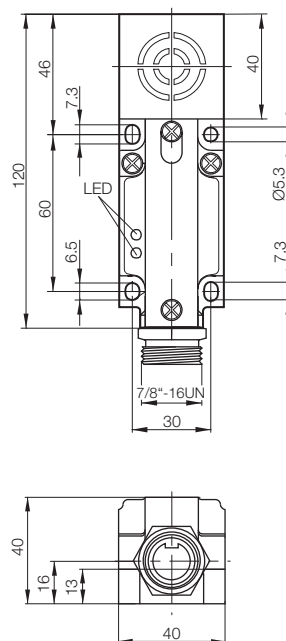
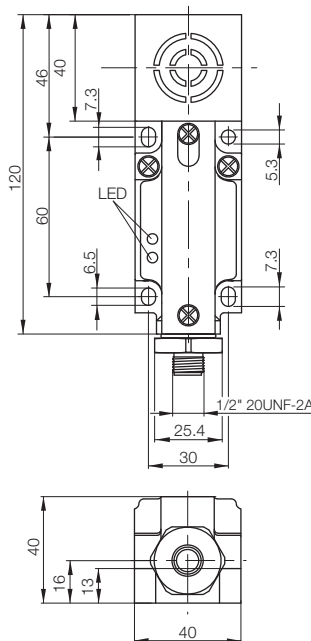
AC 2-wire

Special properties

Analog distance measurement

Accessories

40×120×40 mm Unisensor	40×120×40 mm Unisensor	40×120×40 mm Unisensor
Non-flush	Non-flush	Non-flush
30 mm	30 mm	40 mm
0...24 mm	0...24 mm	0...32 mm
1X	1X	1X
BES0248	BES0249	BES024C
BES 517-223-U5-E-S21	BES 517-223-U5-E-S5	BES 517-223-U7-EL-S21
110 V AC	110 V AC	110 V AC
20...250 V AC/DC	20...250 V AC/DC	20...250 V
10.5 V	10.5 V	12.5 V
250 V AC	250 V AC	250 V AC
250 mA	250 mA	250 mA
5 mA	5 mA	5 mA
1.7 mA	1.7 mA	1.7 mA
1 A/20 ms	1 A/20 ms	1 A/20 ms
Yes	Yes	Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C
100 Hz	100 Hz	100 Hz
AC 140/DC 13	AC 140/DC 13	AC 140/DC 13
Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus
PBT/aluminum	PBT/aluminum	PBT/aluminum
PBT	PBT	PBT
Fig. 4 and 5 (see page 626)	Fig. 4 and 5 (see page 626)	Fig. 4 and 5 (see page 626)
1/2" 20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin	1/2" 20UNF-2A plug connector, 3-pin
C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020	C21 AE3-00-TY-060F



AC/DC 2-wire Inductive Sensors

Block housings, 80×80×40 mm



Precise pallet positioning using inductive sensors with long switching distance

Take advantage of the ability to position with precision and ensure a consistent production process.

Rugged Maxisensors can be sunk into a plant floor to provide stopping points for vehicle assembly pallets.

Housing size	
Installation type (observe instructions in Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
NO/NC	Ordering code
programmable	Part number
Rated operating voltage U_o	
Supply voltage U_B	
Voltage drop U_d at I_o max.	
Rated insulation voltage U_i (protection class)	
Rated operating current I_o	
Minimum operating current I_m	
Residual current I_r max.	
Short-term current carrying capacity I_c /time T	
Short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Utilization category	
Output function indicator	
Degree of protection as per IEC 60529	
Approvals	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

Mounting in non-ferrous metals

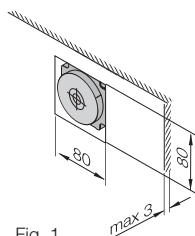


Fig. 1

Mounting in steel/non-ferrous metals

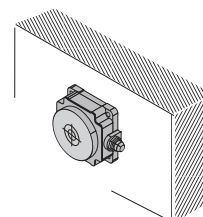


Fig. 2

AC/DC 2-wire Inductive Sensors

Block housings, 80×80×40 mm



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

Tubular housings

Block housings

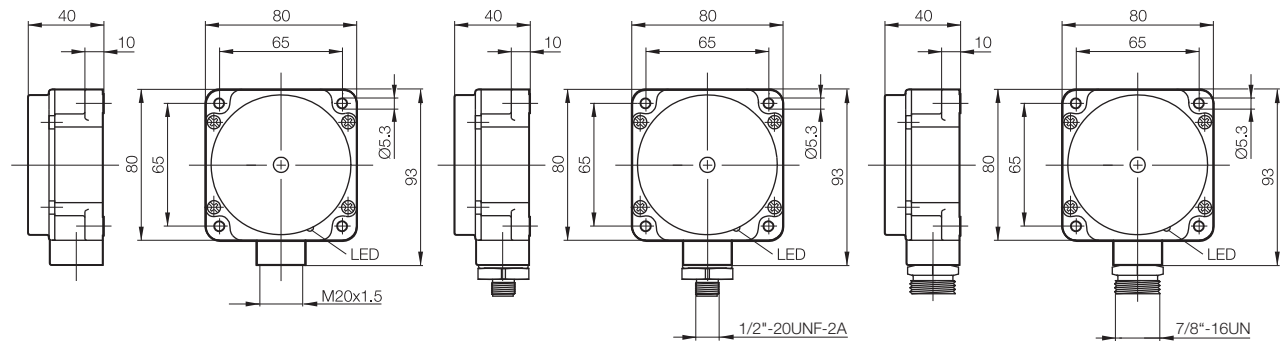
AC 2-wire

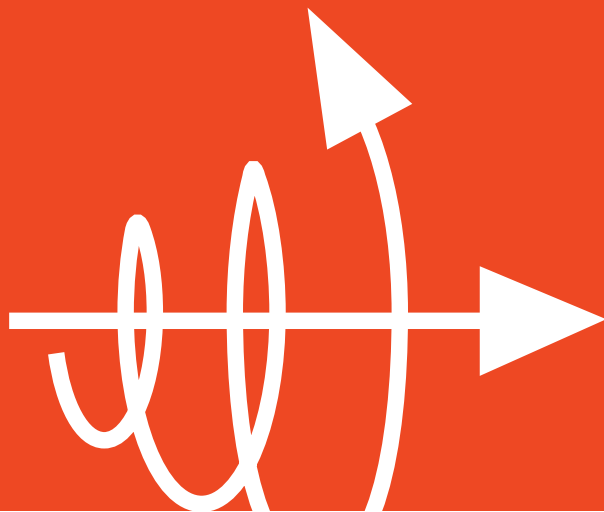
Special properties

Analog distance measurement

Accessories

80×80×40 mm Maxisensor	80×80×40 mm Maxisensor	80×80×40 mm Maxisensor
Non-flush	Non-flush	Non-flush
50 mm	50 mm	50 mm
0...40.5 mm	0...40.5 mm	0...40.5 mm
1X	1X	1X
BES024F	BES023C	BES01ZJ
BES 517-224-M5-E	BES 517-224-M5-E-S21	BES 517-224-U5-E-S5
110 V AC	110 V AC	110 V AC
20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC
11 V	11 V	11 V
250 V AC (□)	250 V AC (□)	250 V AC (□)
250 mA	250 mA	250 mA
5 mA	5 mA	5 mA
≤ 1.7 mA	1700 µA	1700 µA
1 A/20 ms	1 A/20 ms	1 A/20 ms
Yes	Yes	Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C
10 Hz	10 Hz	10 Hz
AC 140/DC 13	AC 140/DC 13	AC 140/DC 13
Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus
PBT	PBT	PBT
PBT	PBT	PBT
Screw terminal M20x1.5	1/2" 20UNF-2A plug connector, 3-pin C21 AE3-00-TY-060F	7/8" 16UN plug connector, 3-pin BCC A313-0000-10-071-VX43W6-020





Inductive Sensors

AC 2-wire inductive sensors

Balluff AC 2-wire sensor technology:

Balluff offers AC-sensors in the M12, M18, M30, and block housings to meet a wide variety of applications.



Tubular housings

M12×1

634

M18×1

636

M30×1.5

637

Block housings

80×80×40 mm (Maxisensor)

639



AC 2-wire Inductive Sensors

Tubular housings, M12×1

AC-sensors are optimized for controllers with alternating current inputs.
When maintaining the rated operating current, the sensors can directly control fuses and relays.

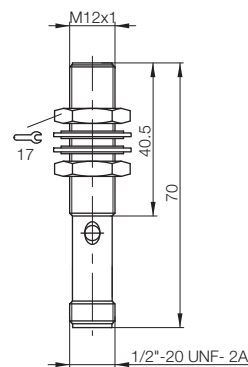


Housing size	M12×1	
Installation type (observe instructions in Basic Information chapter)	Flush	
Rated switching distance s_n	2 mm	
Assured operating distance s_a	0...1.6 mm	
Sensing distance	1X	
NO	Ordering code	BES02CA
	Part number	BES 516-449-S21-L
Supply voltage U_B	20...250 V AC	
Voltage drop U_d at I_e max.	4 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_e	500 mA	
Polarity reversal/short-circuit protected	Yes/No	
Ambient temperature range T_a	-25...+70 °C	
Switching frequency f max.	25 Hz	
Utilization category	AC 140	
Function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE, cULus	
Material	Housing	Brass-coated
	Sensing surface	PA 12
Connection	1/2" 20UNF-2A plug connector, 3-pin	
Suggested mating cable	C21 AE3-00-TY-060F	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC 2-wire Inductive Sensors

Tubular housings, M12×1



M12×1	M12×1	M12×1	M12×1	
Flush	Flush	Not flush	Not flush	
2 mm	2 mm	4 mm	4 mm	
0...1.6 mm	0...1.6 mm	0...3.2 mm	0...3.2 mm	
1X	1X	1X	1X	
BES02FP	BES02C8	BES02CF	BES02CC	
BES 515-449-SA7-S21	BES 516-449-BO-L-02	BES 516-461-S21-L	BES 516-461-BO-L-02	
35...250 V AC	20...250 V AC	20...250 V AC	20...250 V AC	
8.5 V	4 V	4 V	4 V	
250 V AC	250 V AC (□)	250 V AC (□)	250 V AC (□)	
150 mA	500 mA	500 mA	500 mA	
Yes/No	Yes/No	Yes/No	Yes/No	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
10 Hz	25 Hz	25 Hz	25 Hz	
AC 140	AC 140	AC 140	AC 140	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Stainless steel	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PA 12	
1/2" 20UNF-2A plug connector, 3-pin	2 m PVC cable, 22 AWG	1/2" 20UNF-2A plug connector, 3-pin	2 m PVC cable, 22 AWG	
C21 AE3-00-TY-060F		C21 AE3-00-TY-060F		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Tubular housings

Block housings

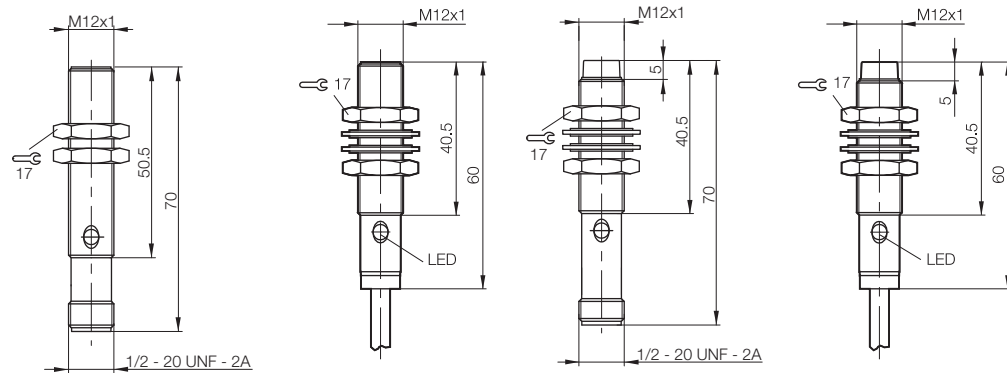
Special properties

Special properties

Special properties

Analog distance measurement

Accessories



AC 2-wire Inductive Sensors

Tubular housings, M18x1

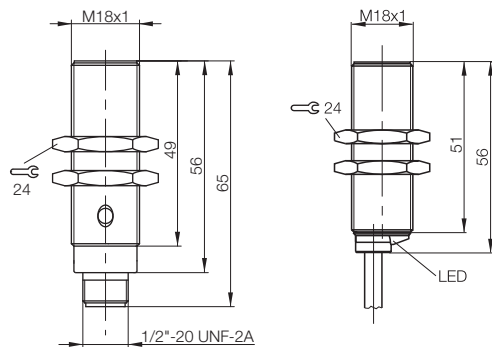


Housing size	M18x1	M18x1	
Installation type (observe instructions in Basic Information chapter)	Flush	Flush	
Rated switching distance s_n	5 mm	5 mm	
Assured switching distance s_a	0...4 mm	0...4 mm	
Sensing distance	1X	1X	
NO	Ordering code	BES02AY	BES02AU
	Part number	BES 516-420-E5-L-S21	BES 516-420-E4-L-02
Rated operating voltage U_o	110 V	110 V	
Supply voltage U_B	20...250 V AC	20...250 V AC	
Voltage drop U_d at I_o max.	4 V	4 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o	500 mA	500 mA	
Polarity reversal/short-circuit protected	Yes/No	Yes/No	
Ambient temperature range T_a	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	25 Hz	25 Hz	
Utilization category	AC 140	AC 140	
Function indicator	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	Brass-coated
	Sensing surface	PA 12	PA 12
Connection	1/2" 20UNF-2A plug connector, 3-pin	2 m PVC cable, 22 AWG	
Suggested mating cable	C21 AE3-00-TY-060F		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC 2-wire Inductive Sensors

Tubular housings, M18×1, M30×1.5



M18×1	M18×1	M30×1.5	M30×1.5	
Not flush	Not flush	Flush	Flush	
8 mm	8 mm	10 mm	10 mm	
0...6.4 mm	0...6.4 mm	0...8 mm	0...10 mm	
1X	1X	1X	1X	
BES02C7	BES02C5	BES02AT	BES02AP	
BES 516-437-E5-L-S21	BES 516-437-E4-L-02	BES 516-418-E5-L-S21	BES 516-418-E4-L-02	
110 V	110 V	110 V	110 V	
20...250 V AC	20...250 V AC	20...250 V AC	20...250 V AC	
4 V	4 V	4 V	4 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
500 mA	500 mA	500 mA	500 mA	
Yes/No	Yes/No	Yes/No	Yes/No	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
25 Hz	25 Hz	25 Hz	10 Hz	
AC 140	AC 140	AC 140	AC 140	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass-coated	Brass-coated	Brass-coated	Brass-coated	
PA 12	PA 12	PA 12	PA 12	
1/2" 20UNF-2A plug connector, 3-pin	2 m PVC cable, 22 AWG	1/2" 20UNF-2A plug connector, 3-pin	2 m PVC cable, 22 AWG	
C21 AE3-00-TY-060F		C21 AE3-00-TY-060F		



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

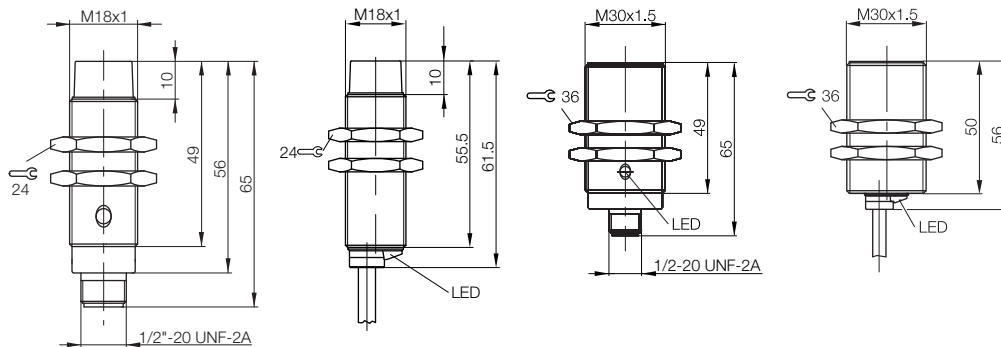
Tubular housings

Block housings

Special properties

Analog distance measurement

Accessories



AC 2-wire Inductive Sensors

Tubular housings, M30×1.5

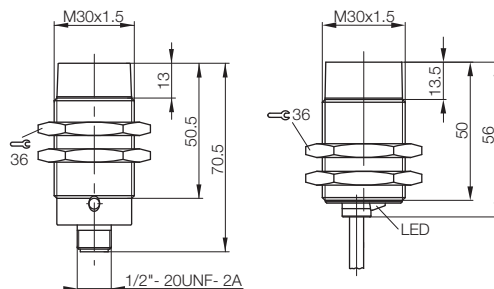


Housing size	M30×1.5	M30×1.5	
Installation type (observe instructions in Basic Information chapter)	Not flush	Not flush	
Rated switching distance s_n	15 mm	15 mm	
Assured switching distance s_a	0...12 mm	0...12 mm	
Sensing distance	1X	1X	
NO	Ordering code	BES02C3	BES02C1
	Part number	BES 516-432-E5-L-S21	BES 516-432-E4-L-02
Supply voltage U_B	20...250 V AC	20...250 V AC	
Voltage drop U_d at I_e max.	4 V	4 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	
Rated operating current I_e	500 mA	500 mA	
Polarity reversal/short-circuit protected	Yes/No	Yes/No	
Ambient temperature range T_a	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	10 Hz	10 Hz	
Utilization category	AC 140	AC 140	
Function indicator	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	
Material	Housing	Brass-coated	
	Sensing surface	PA 12	
Connection	1/2" 20UNF-2A plug connector, 3-pin	2 m PVC cable, 26 AWG	
Suggested mating cable	C21 AE3-00-TY-060F		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



AC 2-wire Inductive Sensors

Block housings, 80×80×40 mm



Housing size		80×80×40 mm Maxisensor	80×80×40 mm Maxisensor
Installation type (observe instructions in Basic Information chapter)		Not flush	Not flush
Rated switching distance s_n		50 mm	50 mm
Assured switching distance s_a		0...40 mm	0...40 mm
Sensing distance		1X	1X
NO/NC; programmable	Ordering code	BES022T	BES022U
	Part number	BES 517-460-U5-L-D-S21	BES 517-460-U5-L-D-S5
Supply voltage U_B		20...250 V AC	20...250 V AC
Voltage drop U_d at I_e max.		7 V	7 V
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)
Rated operating current I_e		500 mA	500 mA
Polarity reversal/short-circuit protected		Yes/No	Yes/No
Ambient temperature range T_a		-25...+70 °C	-25...+70 °C
Switching frequency f max.		10 Hz	10 Hz
Utilization category		AC 140	AC 140
Function indicator		Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Approvals		CE, cULus	CE, cULus
Material	Housing	PBT	PBT
	Sensing surface	PBT	PBT
Connection		1/2" 20UNF-2A plug connector, 3-pin	7/8" 16UN plug connector, 3-pin
Suggested mating cable		C21 AE3-00-TY-060F	BCC A313-0000-10-071-VX43W6-020



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Tubular
housings

Block
housings

Special
properties

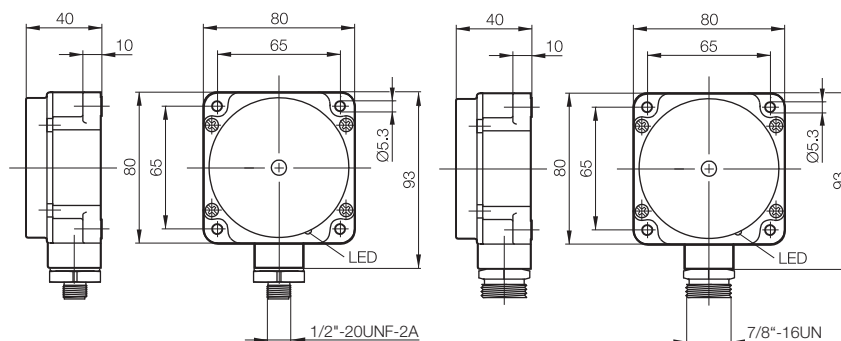
Analog
distance
measurement

Accessories

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket
material available on request.**



Maxisensor can be programmed

Maxisensors can be set to have
a normally open- or normally
closed function using a switch.

Mounting in non-ferrous metals

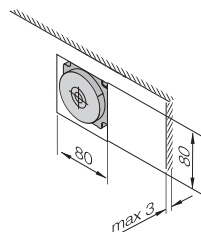


Fig. 1

Mounting in steel/non-ferrous metals

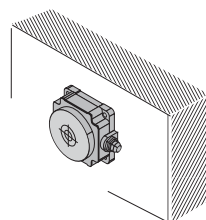
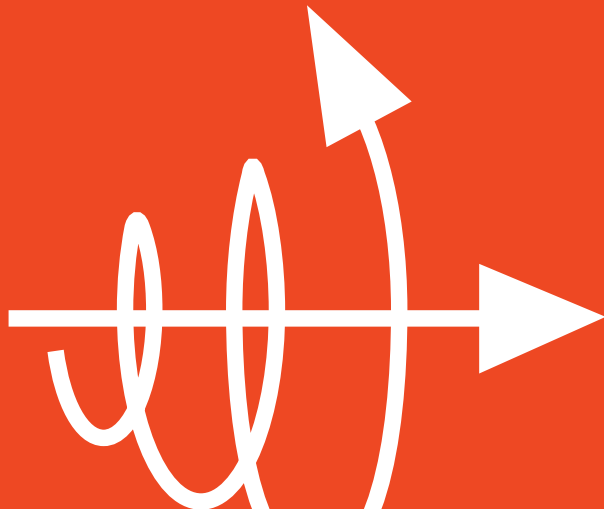


Fig. 2

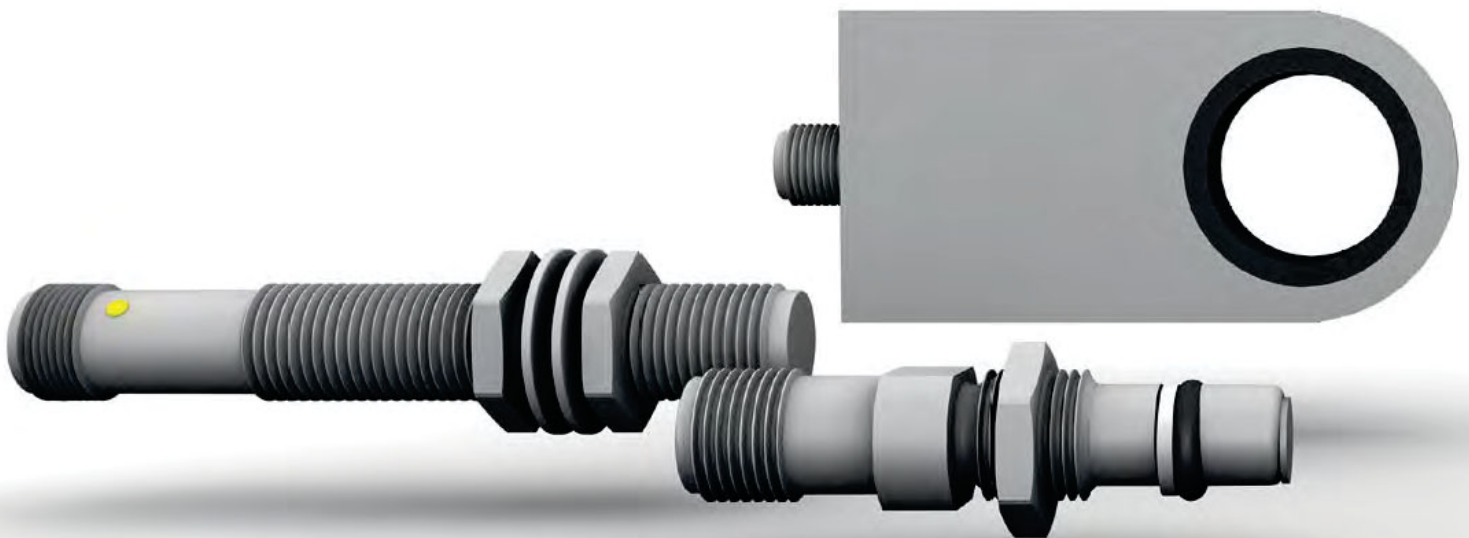


Inductive Sensors

Inductive sensors with special properties

Balluff's inductive sensors provide solutions for applications:
With increased requirements such as high pressure or Factor 1,
under rough conditions, in harsh environment applications.

The product line also includes special versions such as tube or ring
sensors for discharge and infeed and counting small parts and large
designs with large switching distance.





Inductive Sensors with Special Properties

Contents

High-pressure sensors	642
Strokemaster® sensors	660
Steelface sensors	664
High temperature sensors	670
Harsh environment sensors	674
Factor 1 sensors	684
Weld field immune sensors	696
Large designs	704
Ring sensors	710
Tube sensors	714



In the wide range of hydraulic applications, high pressure proximity switches are exposed to many aggressive media and hostile environments.

Balluff offers a world-class line of pressure inductive cylinder sensors to service high pressure applications. Designed to withstand severe duty, Balluff high pressure sensors deliver reliable switching performance under demanding industrial conditions.

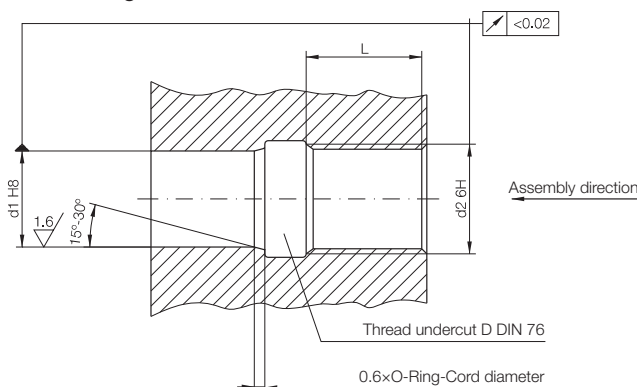
Corrosion-resistant housing materials, high-strength ceramic sensing faces, and special sealing techniques allow dependable service up to 500 bar according to the sensor type.

All Balluff high pressure sensors are rated for continuous operation in ambient temperatures up to 80° C, with some versions also high-temperature rated up to 120° C.



Housing size		
Installation type (observe instructions in the Basic Information chapter)		
Rated switching distance s_n		
Assured switching distance s_a		
Pressure range		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_e max.		
Rated insulation voltage U_i		
Rated operating current I_e		
Output resistance R_a		
Polarity reversal protected/transposition protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Output function indicator		
Degree of protection as per IEC 60529		
Approvals		
Material	Housing	
	Sensing surface	
Sealing ring material/size/replacement part number		
Supporting ring material/size/replacement part number		
Connection		
Suggested mating cable		

Installation instruction for high pressure rated sensors with O-ring



For example, for BES 516-300-S270-S4-D:

d1: Ø of the positioning hole for the switch head $\text{Ø } 10^{H8} = \text{Ø } 10^{+0.022}$

d2: Nominal thread diameter M12×1 6H

L: Recommended screw-in depth $L \geq 0.8 \times d_2 = 0.8 \times 12 = 9.6$

For wiring diagram see page 958.

Additional cable lengths on request.

Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

M5x0.5, M12x1



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

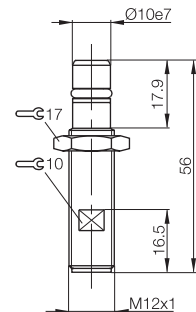
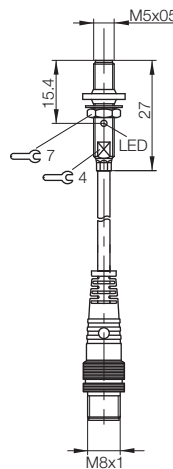
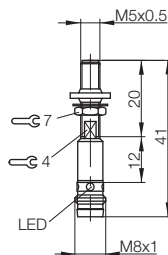
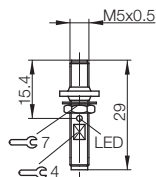
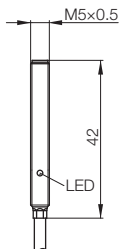
Ring sensors

Tube sensors

Analog distance measurement

Accessories

M5x0.5	M5x0.5	M5x0.5	M5x0.5	M12x1
Flush	Flush	Flush	Flush	Flush
0.8 mm	0.8 mm	0.8 mm	0.8 mm	1.5 mm
0...0.65 mm	0...0.65 mm	0...0.65 mm	0...0.65 mm	0...1.2 mm
Oil pressure resistant up to 10 bar	Oil pressure resistant up to 20 bar	Oil pressure resistant up to 20 bar	Oil pressure resistant up to 20 bar	Oil pressure resistant up to 50 bar
BES03H6	BES03JN	BES03LT	BES03K8	BHS003A
BES M05EG-PSC08B-BP02	BES M05EC-PSC08B-S26G-R01	BES M05EC-PSC08B-S49G-R01	BES M05ED-PSC08B-BP00,3-GS49-R01	BES 516-300-S291-S4-D
	BES03JP		BES03K9	
	BES M05EC-POC08B-S26G-R01		BES M05ED-POC08B-BP00,3-GS49-R01	
	BES03JP		BES03KA	
	BES M05EC-NSC08B-S26G-R01		BES M05ED-NSC08B-BP00,3-GS49-R01	
	BES03JT		BES03KC	
	BES M05EC-NOC08B-S26G-R01		BES M05ED-NOC08B-BP00,3-GS49-R01	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3 V	3 V	3 V	3 V	2 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA	200 mA
Open collector	Open collector	Open collector	Open collector	150 kΩ
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+80 °C
3 kHz	3 kHz	3 kHz	3 kHz	2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	no
IP 67	IP 67	IP 67	IP 67	IP 68 per BWN Pr. 20
CE	CE	CE	CE	CE
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Ceramic	PBT	PBT	PBT	EP
	PA/10.4x3.5/178173	PA/10.4x3.5/178173	PA/10.4x3.5/178173	N70B200V/5.3x2.4 NBR/631753
	M5 connector, 4-pin	M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	PTFE/5.3x2.4/705918
2 m PUR cable, 26 AWG	BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	M12 connector, 3-pin
				BCC M415-0000-1A-003-EX44T2-020





Housing size		
Installation type (observe instructions in the Basic Information chapter)		
Rated switching distance s_n		
Assured switching distance s_a		
Pressure range		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_o max.		
Rated insulation voltage U_i		
Rated operating current I_o		
Output resistance R_a		
Polarity reversal protected/transposition protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Degree of protection as per IEC 60529		
Approvals		
Material	Housing	
	Sensing surface	
Sealing ring material/size/replacement part number		
Supporting ring material/size/replacement part number		
Connection		
Suggested mating cable		

For wiring diagram see page 958.

Additional cable lengths on request.

Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

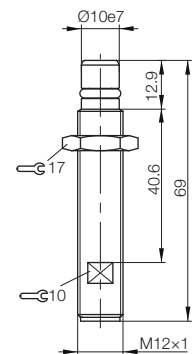
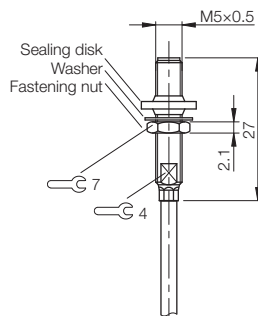
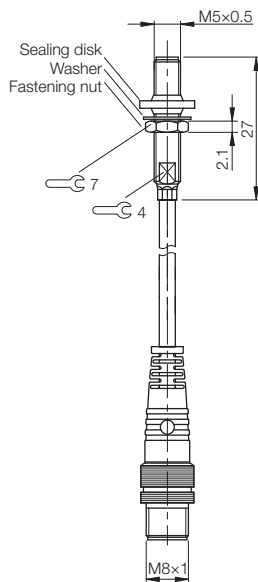
M5×0.5, M12×1



- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties**
- High-pressure sensors
- Strokemaster sensors
- Steelface sensors
- High temperature sensors
- Harsh environment sensors
- Factor 1 sensors
- Weld field immune sensors
- Large designs
- Ring sensors
- Tube sensors
- Analog distance measurement
- Accessories



M5×0.5	M5×0.5	M12×1
Flush	Flush	Flush
0.8 mm	0.8 mm	1.5 mm
0...0.65 mm	0...0.65 mm	0...1.2 mm
Oil pressure resistant up to 100 bar	Oil pressure resistant up to 100 bar	Oil pressure resistant up to 100 bar
BES03LC	BES03L7	BHS0035
BES M05ED-PSD08B-BP00,3-GS49-R03	BES M05ED-PSD08B-BP02-R03	BES 516-300-S270-S4-D
BES03LE	BES03L8	
BES M05ED-POD08B-BP00,3-GS49-R03	BES M05ED-POD08B-BP02-R03	
BES03LF	BES03L9	
BES M05ED-NSD08B-BP00,3-GS49-R03	BES M05ED-NSD08B-BP02-R03	
BES03LH	BES03LA	
BES M05ED-NOD08B-BP00,3-GS49-R03	BES M05ED-NOD08B-BP02-R03	
10...30 V DC	10...30 V DC	10...30 V DC
3 V	3 V	2.5 V
75 V DC	75 V DC	75 V DC
100 mA	100 mA	200 mA
Open collector	Open collector	150 kΩ
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+80 °C
3 kHz	3 kHz	2 kHz
IP 67	IP 67	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE
Stainless steel	Stainless steel	Stainless steel
Ceramic	Ceramic	EP
N70B200V/5.3×2.4/178173	N70B200V/5.3×2.4/178173	N70B200V/5.3×2.4/631753
0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable, 26 AWG	PTFE/5.3×2.4
BCC M313-0000-10-001-EX43T2-020		M12 connector, 3-pin
		BCC M415-0000-1A-003-EX44T2-020



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

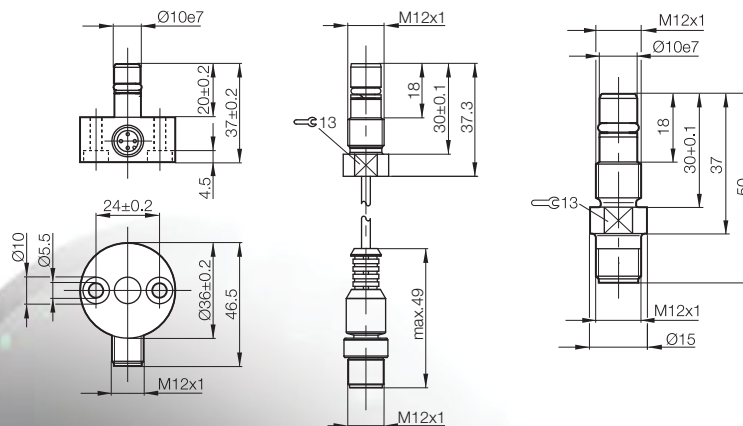
Ø 10 mm, M12x1

up to 350 bar



Housing size	Ø 10e7	M12x1	M12x1
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush
Rated switching distance s_n	1.5 mm	1.5 mm	1.5 mm
Assured switching distance s_a	0...1.2 mm	0...1.2 mm	0...1.2 mm
Pressure range	Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar
PNP, NO	BHS0030	BHS007E	BHS004T
Ordering code			
Part number	BES 516-300-S260-S4-D	BES 516-300-S205-D-S4-00,3	BES 516-300-S324-S4-D
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.	2 V	2 V	2 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Rated operating current I_e	200 mA	200 mA	200 mA
Output resistance R_a	150 kΩ	150 kΩ	150 kΩ
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-25...+80 °C	-25...+80 °C	-25...+80 °C
Switching frequency f max.	2 kHz	2 kHz	1 kHz
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Approvals	CE	CE	CE
Material			
Housing	Stainless steel	Stainless steel	Stainless steel
Sensing surface	EP	EP	EP
Sealing ring material/size/replacement part number	FPM 70/5.85x2.4/636594	N70B200V/5.3x2.4/631753	FPM 70/5.85x2.4/636594
Supporting ring material/size/replacement part number	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918
Connection	M12 connector, 3-pin	0.3 m PUR cable with M12 connector, 3-pin	M12 connector, 4-pin
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

For wiring diagram see page 958.



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

M12x1



M12x1	M12x1			
Flush	Flush			
1.5 mm	1.5 mm			
0...1.2 mm	0...1.2 mm			
Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar			
BHS004P	BHS004R			
BES 516-300-S322-S4-D	BES 516-300-S323-S4-D			
10...30 V DC	10...30 V DC			
2 V	2 V			
75 V DC	75 V DC			
200 mA	200 mA			
150 kΩ	150 kΩ			
Yes/Yes/Yes	Yes/Yes/Yes			
-25...+80 °C	-25...+80 °C			
1 kHz	1 kHz			
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20			
CE	CE			
Stainless steel	Stainless steel			
EP	EP			
FPM 70/5.85x2.4/636594	FPM 70/5.85x2.4/636594			
PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918			
M12 connector, 4-pin	M12 connector, 4-pin			
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020			



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

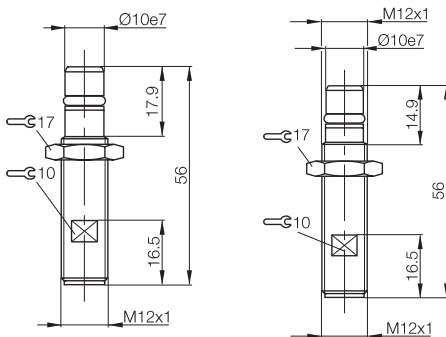
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

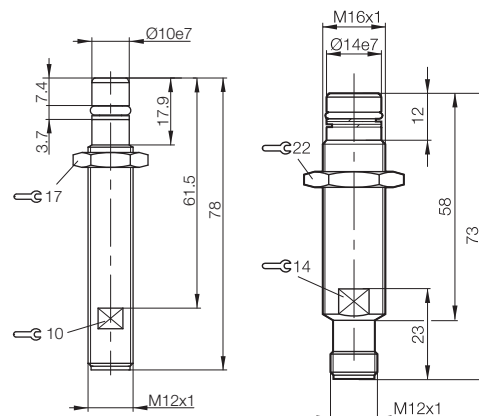
M12×1, M16×1

up to 350 bar



Housing size	M12×1	M16×1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	
Rated switching distance s_n	1.5 mm	1.5 mm	
Assured switching distance s_a	0...1.2 mm	0...1.2 mm	
Pressure range	Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar	
PNP, NO	Ordering code	BHS004N	BHS001T
	Part number	BES 516-300-S321-S4-D	BES 516-300-S149-S4-D
PNP, NC	Ordering code		
	Part number		
Supply voltage U_B	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	1.5 V	1.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	
Rated operating current I_e	200 mA	200 mA	
Output resistance R_a	33 k Ω	33 k Ω	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+80 °C	-25...+80 °C	
Switching frequency f max.	1 kHz	1 kHz	
Degree of protection as per IEC 60529	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals	CE	CE	
Material	Housing	Stainless steel	Stainless steel
	Sensing surface	EP	EP
Sealing ring material/size/replacement part number	FPM 70/5.85×2.4/636594	NBR 60-80/11.0×1.5/709137	
Supporting ring material/size/replacement part number	PTFE/5.3×2.4/705918	PTFE/14×11.6×1.5/709136	
Connection	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

For wiring diagram see page 958.



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

M16x1



M16x1	M16x1	M16x1	M16x1	
Flush	Flush	Flush	Flush	
1.5 mm	1.5 mm	1.5 mm	2.5 mm	
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...2 mm	
Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar	Oil pressure resistant up to 350 bar	
BHS001E		BHS001C		
BES 516-300-S129-S4-D		BES 516-300-S128-S4-D		
	BHS001Y		BHS004U	
	BES 516-300-S156-S4-D		BES 516-300-S328-S4-D	
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	
75 V DC	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	200 mA	200 mA	
33 kΩ	33 kΩ	33 kΩ	33 kΩ	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+80 °C	-25...+80 °C	-25...+80 °C	-10...+80 °C	
1 kHz	1 kHz	1 kHz	500 Hz	
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
CE	CE	CE	CE	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	
EP	EP	EP	EP	
NBR 60-80/11.0x1.5/709137	NBR 60-80/11.0x1.5/709137	NBR 60-80/11.0x1.5/709137	NBR 60-80/11.0x1.5/709137	
PTFE/14x11.1x0.7/505953	PTFE/14x11.6x1.5/709136	PTFE/14x11.1x0.7/505953	PTFE/14x11.1x0.7/505953	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

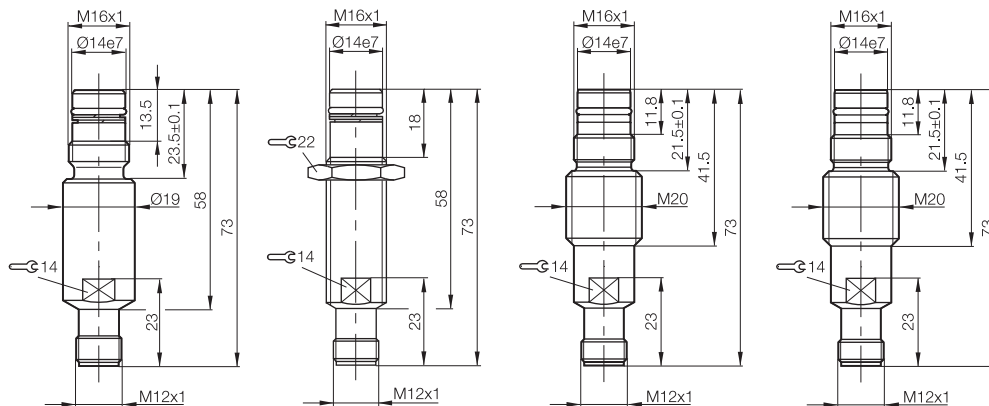
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

M18x1, M22x1.5, M5x0.5

350 bar
up to 500 bar

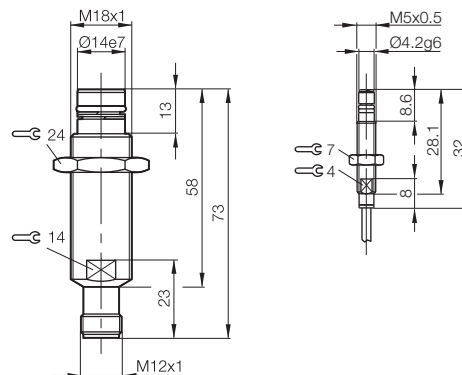
CE



Housing size		M18x1	M5x0.5
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush
Rated switching distance s_n		1.5 mm	1 mm
Assured switching distance s_a		0...1.2 mm	0...0.8 mm
Pressure range		Oil pressure resistant up to 350 bar	Oil pressure resistant up to 500 bar
PNP, NO	Ordering code	BHS001N	BHS006U
	Part number	BES 516-300-S144-S4-D	BHS G409N-PSD10-EP02
PNP, NC	Ordering code		BHS006W
	Part number		BHS G409N-POD10-EP02
NPN, NO	Ordering code		BHS006Y
	Part number		BHS G409N-NSD10-EP02
Supply voltage U_B		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		1.5 V	2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC
Rated operating current I_e		200 mA	100 mA
Output resistance R_a		33 k Ω	Open collector
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/No/Yes
Ambient temperature T_a		-25...+80 °C	-25...+80 °C
Switching frequency f max.		1 kHz	3 kHz
Output function indicator			
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
Approvals		CE	CE
Material	Housing	Stainless steel	Stainless steel
	Sensing surface	EP	ZrO ₂
Sealing ring material/size/replacement part number		NBR 60-80/11.0x1.5/709137	NBR 70/2.35x1/154783
Supporting ring material/size/replacement part number		PTFE/14x11.1x0.7/505953	PTFE/4.2x0.65x1/154782
Connection		M12 connector, 4-pin	2 m PUR cable, 26 AWG
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	

For wiring diagram see page 958.

Additional cable lengths on request.



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

M5x0.5, M8x1



M5x0.5	M5x0.5	M5x0.5	M8 x 1	M8 x 1
Flush	Flush	Flush	Flush	Flush
1 mm	1 mm	1 mm	1.5 mm	1.5 mm
0...0.8 mm	0...0.8 mm	0...0.8 mm	0...1.2 mm	0...1.2 mm
Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar
BHS007J	BHS006N	BHS005H	BHS0054	BHS0050
BHS G409N-PSD10-EP00,3-GS49	BHS G403N-PSD10-S26	BHS G408N-PSC10-S49	BHS A404N-PSC15-S49	BHS A402N-PSC15-S49
	BHS006P	BHS005F	BHS0053	BHS004Z
	BHS G403N-POD10-S26	BHS G408N-POC10-S49	BHS A404N-POC15-S49	BHS A402N-POC15-S49
	BHS006R	BHS005E	BHS0052	BHS004Y
	BHS G403N-NSD10-S26	BHS G408N-NSC10-S49	BHS A404N-NSC15-S49	BHS A402N-NSC15-S49
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V	2.5 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
Open collector	Open collector	Open collector	Open collector	Open collector
Yes/No/Yes	Yes/No/Yes	Yes/No/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+80 °C	-25...+80 °C	-25...+80 °C	0...+80 °C	-25...+80 °C
3 kHz	3 kHz	3 kHz	4 kHz	4 kHz
		Yellow LED	Yellow LED	Yellow LED
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE	CE	CE	CE	CE
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
ZrO ₂	ZrO ₂	ZrO ₂	ZrO ₂	ZrO ₂
NBR 70/2.35x1/154783	NBR 70/2.35x1/154783	NBR 70/2.35x1/154783	NBR 70/4x1.5/154149	NBR 70/4x1.5/154149
PTFE/4.2x0.65x1/154782	PTFE/4.2x0.65x1/154782	PTFE/4.2x0.65x1/154782	PTFE/5.3x2.4/154150	PTFE/5.3x2.4/154150
0.3 m PUR cable with M8 connector, 3-pin	M5 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
BCC M313-0000-10-001-EX43T2-020	BKS-B 25-3-PU-03	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020	BCC M313-0000-10-001-EX43T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

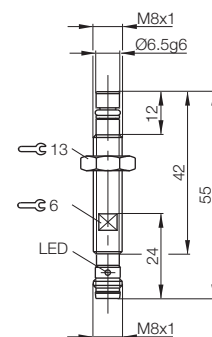
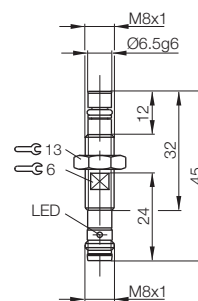
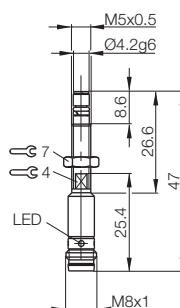
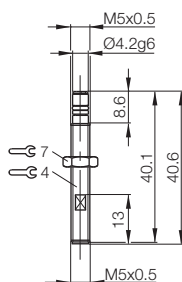
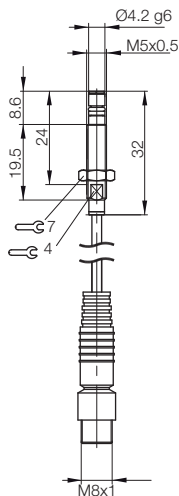
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



Inductive Sensors with Special Properties

High-pressure inductive cylinder sensors

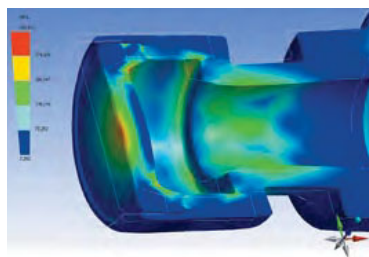
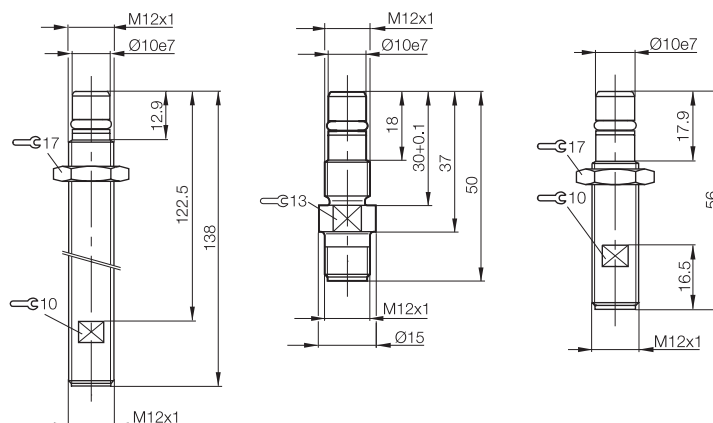
M12x1

up to 500 bar

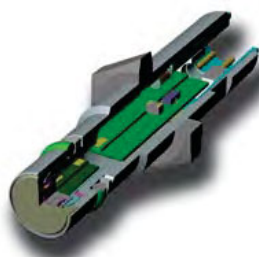


Housing size		M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm	
Pressure range		Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	
PNP, NO	Ordering code	BHS0023	BHS0032		
	Part number	BES 516-300-S164-S4-D	BES 516-300-S262-S4-D		
PNP, NC	Ordering code			BHS004F	
	Part number			BES 516-300-S305-S4-D	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		1.5 V	2 V	2 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_e		200 mA	200 mA	200 mA	
Output resistance R_a		33 k Ω	150 k Ω	150 k Ω	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+80 °C	-25...+90 °C	-25...+80 °C	
Switching frequency f max.		1 kHz	2 kHz	2 kHz	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE	CE	CE	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	EP	EP	EP	
Sealing ring material/size/replacement part number		N70B200V/5.3x2.4/631753	N70B200V/5.3x2.4/631753	N70B200V/5.3x2.4/631753	
Supporting ring material/size/replacement part number		PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

For wiring diagram see page 958.



Simulation of sensor end cap and housing under high-pressure stress.



Inductive Sensors with Special Properties

High-pressure sensors

M12x1



M12x1	M12x1	M12x1	M12x1	M12x1
Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm
Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar
BHS0033	BHS002Y	BHS005Y	BHS0063	BHS0061
BES 516-300-S265-S4-D	BES 516-300-S249-S4-D	BHS B249V-PSD15-S04	BHS B400V-PSD15-S04	BHS B265V-PSD15-S04
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2 V	2 V	2.5 V	2.5 V	2.5 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
150 kΩ	150 kΩ	33 kΩ	33 kΩ	33 kΩ
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+80 °C	-25...+80 °C	-25...+120 °C*	-25...+120 °C*	-25...+120 °C*
2 kHz	2 kHz	400 Hz	400 Hz	400 Hz
IP 68 per BWN Pr. 20 CE	IP 68 per BWN Pr. 20 CE	IP 68 per BWN Pr. 20 CE	IP 68 per BWN Pr. 20 CE	IP 68 per BWN Pr. 20 CE
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
EP	EP	Ceramic	Ceramic	Ceramic
N70B200V/5.3x2.4/631753	N70B200V/5.3x2.4 NBR/631753	FPM 80/6.75x1.78/149621	FPM 80/6.75x1.78/149621	FPM 80/6.75x1.78/123170
PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	PTFE/10x7.0x1.8/150229	PTFE/10x7.0x1.8/150229	PTFE/10x7.0x1.8/150229
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

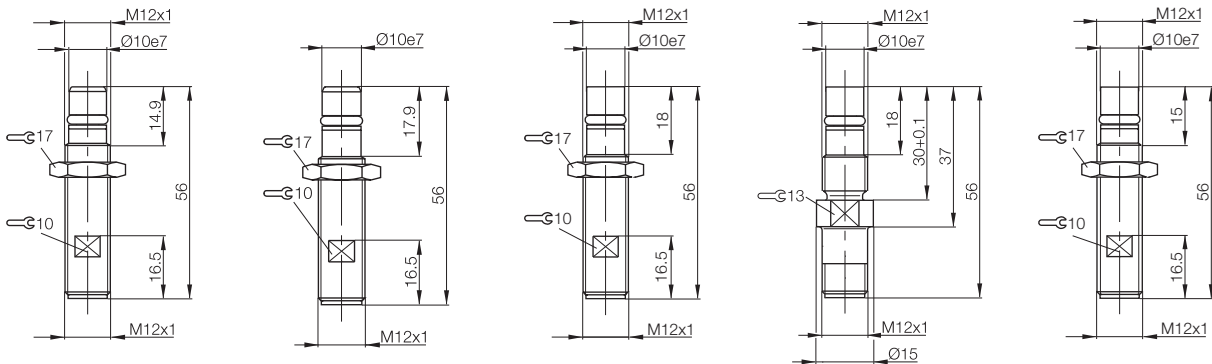
Large designs

Ring sensors

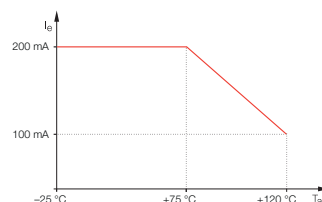
Tube sensors

Analog distance measurement

Accessories



***Current reduction as a function of ambient temperature range**



Inductive Sensors with Special Properties

High-pressure sensors

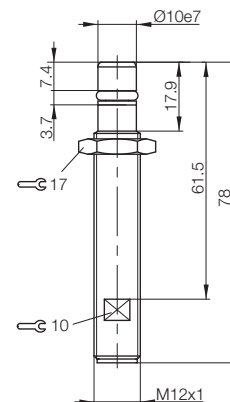
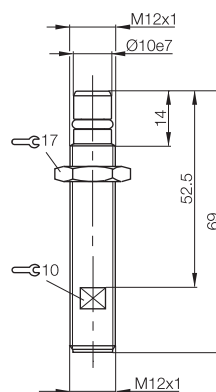
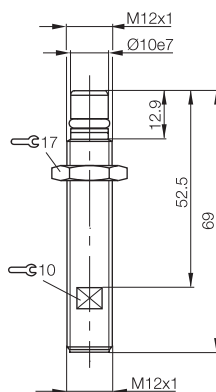
M12x1

up to 500 bar



Housing size	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	1.5 mm	1.5 mm	1.5 mm	
Assured switching distance s_a	0...1.2 mm	0...1.2 mm	0...1.2 mm	
Pressure range	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	
PNP, NO	Ordering code	BHS0021	BHS001L	
	Part number	BES 516-300-S162-S4-D	BES 516-300-S135-S4-D	
PNP, complementary	Ordering code			
	Part number			
NPN, NO	Ordering code	BHS0037		
	Part number	BES 516-300-S281-S4-D		
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2 V	1.5 V	1.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Rated operating current I_e	200 mA	200 mA	200 mA	
Output resistance R_a	150 k Ω	33 k Ω	33 k Ω	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+80 °C	-25...+80 °C	-25...+80 °C	
Switching frequency f max.	2 kHz	1 kHz	1 kHz	
Degree of protection as per IEC 60529	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	
Approvals	CE	CE	CE	
Material	Housing	Stainless steel	Stainless steel	
	Sensing surface	EP	EP	
Sealing ring material/size/replacement part number	N70B200V/5.3x2.4/631753	N70B200V/5.3x2.4/631753	FPM 70/5.85x2.4/636594	
Supporting ring material/size/replacement part number	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

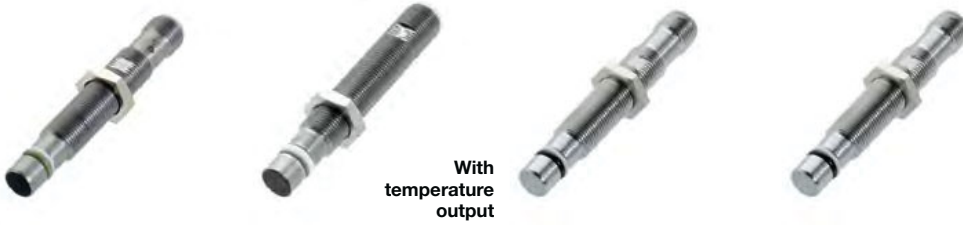
For wiring diagram see page 958.



Inductive Sensors with Special Properties

High-pressure sensors

M12x1



M12x1	M12x1	M12x1	M12x1	
Flush	Flush	Flush	Flush	
1.5 mm	1.5 mm	1.5 mm	1.5 mm	
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...1.2 mm	
Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	
BHS005R	BHS005T		BHS0049	
BHS B135V-PSD15-S04	BHS B135V-PSD15-S04-T01		BES 516-300-S298-S4-D	
		BHS0002		
		BES 516-100-S46-S4-D		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	2.5 V	1.5 V	1.5 V	
75 V DC	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	200 mA	200 mA	
33 kΩ	33 kΩ	33 kΩ	33 kΩ	
Yes/Yes/Yes	Yes/No/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+120 °C*	-25...+120 °C*	-25...+80 °C	-25...+80 °C	
400 Hz	400 Hz	1 kHz	1 kHz	
IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	
CE	CE	CE	CE	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	
Ceramic	Ceramic	EP	EP	
FPM 80/6.75x1.78/149621	FPM 80/6.75x1.78/123170	FPM 70/5.85x2.4/636594	FPM 70/5.85x2.4/636594	
PTFE/10x7.0x1.8/150229	PTFE/10x7.0x1.8/150229	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

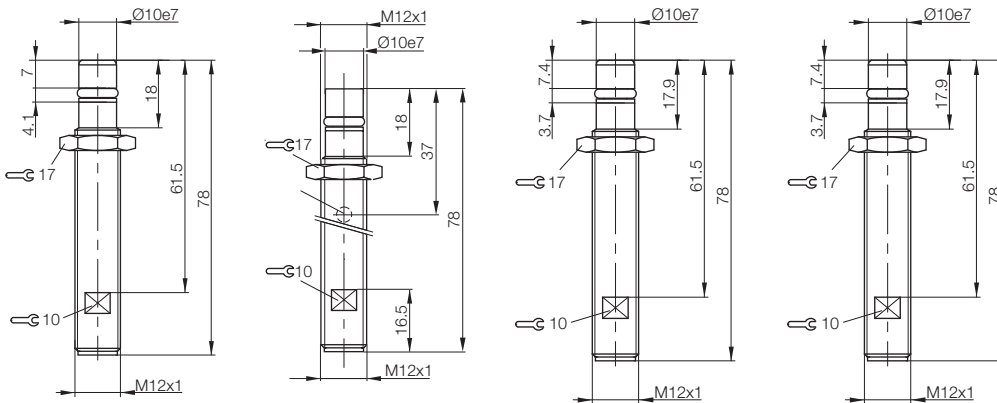
Large designs

Ring sensors

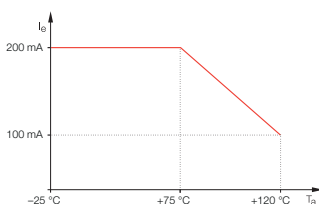
Tube sensors

Analog distance measurement

Accessories



***Current reduction as a function of ambient temperature range**



Inductive Sensors with Special Properties

High-pressure sensors

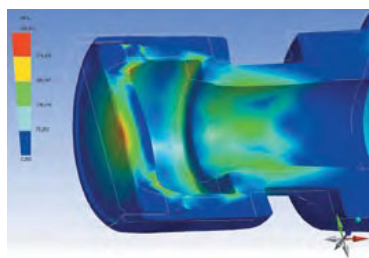
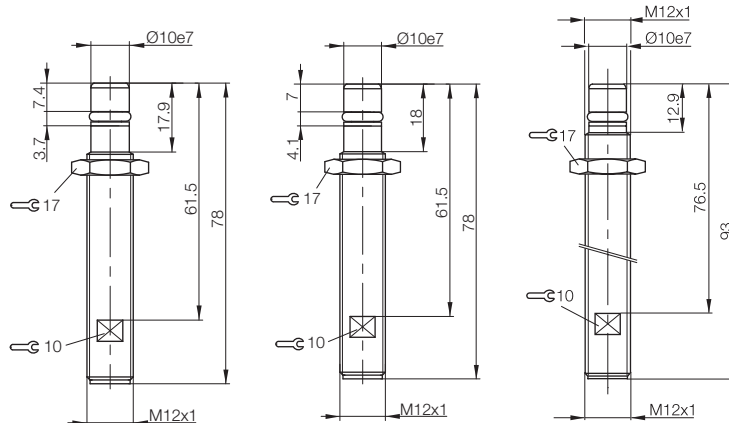
M12x1

up to 500 bar

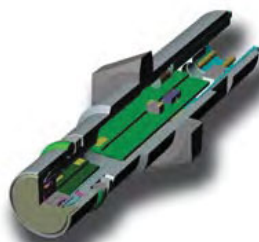


Housing size		M12x1	M12x1	M12x1
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		1.5 mm	1.5 mm	1.5 mm
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.2 mm
Pressure range		Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar
PNP, NO	Ordering code	BHS007H		BHS0022
	Part number	BES 516-300-S135-E1-S4-D		BES 516-300-S163-S4-D
PNP, complementary	Ordering code		BHS0076	
	Part number		BHS B135V-PAD15-S04-007	
NPN, NO	Ordering code			
	Part number			
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		3 V	2.5 V	1.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC
Rated operating current I_e		200 mA	200 mA	200 mA
Output resistance R_a		33 k Ω	33 k Ω	33 k Ω
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+80 °C	-25...+85 °C	-25...+80 °C
Switching frequency f max.		1 kHz	1.5 kHz	1 kHz
Degree of protection as per IEC 60529		IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20
Approvals		CE	CE	CE
Material	Housing	Stainless steel	Stainless steel	Stainless steel
	Sensing surface	EP	Ceramic	EP
Sealing ring material/size/replacement part number		FPM 70/5.85x2.4/636594	FPM 80/6.75x1.78/149621	N70B200V/5.3x2.4/631753
Supporting ring material/size/replacement part number		PTFE/5.3x2.4/705918	PTFE/10x7.0x1.8/150229	PTFE/5.3x2.4/705918
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

For wiring diagram see page 958.



Simulation of sensor end cap and housing under high-pressure stress.



Inductive Sensors with Special Properties

High-pressure sensors

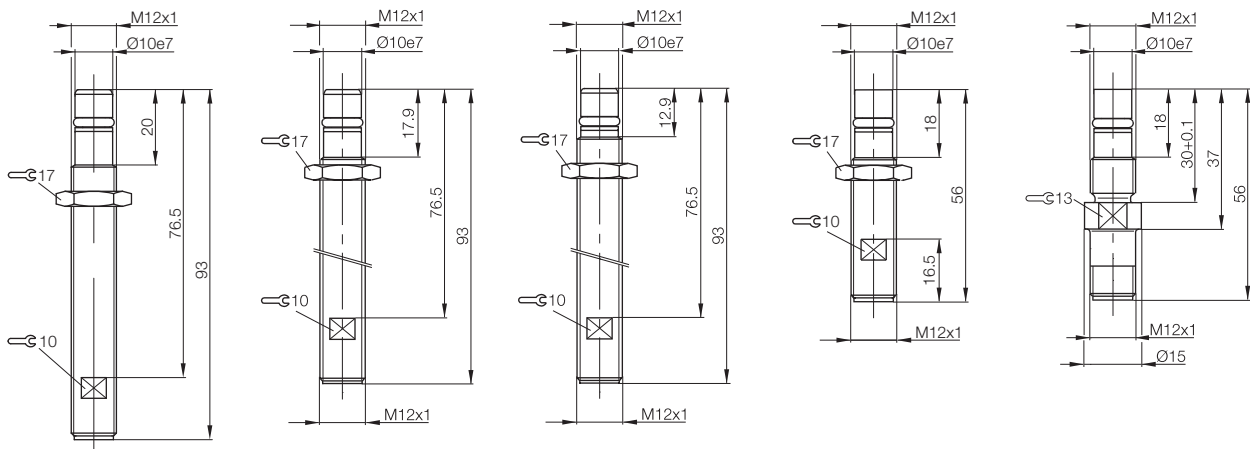
M12x1



M12x1	M12x1	M12x1	M12x1	M12x1	M12x1
Flush	Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	1.5 mm	2.5 mm	1.5 mm	
0...1.2 mm	0...1.2 mm	0...1.2 mm	0...2 mm	0...2 mm	
Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	
BES03PP	BHS004C		BHS0060	BHS0065	
BES 516-300-S335-S4-D	BES 516-300-S300-S4-D		BHS B249V-PSD25-S04-003	BHS B400V-PSD25-S04-003	
		BHS002U			
		BES 516-300-S242-S4-D			
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	2.5 V	2.5 V	
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	200 mA	200 mA	200 mA	
33 kΩ	33 kΩ	33 kΩ	33 kΩ	33 kΩ	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+80 °C	-25...+80 °C	-25...+80 °C	-25...+90 °C	-25...+90 °C	
1 kHz	1 kHz	1 kHz	400 Hz	400 Hz	
IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	
CE	CE	CE	CE	CE	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	
EP	EP	EP	Ceramic	Ceramic	
N70B200V/5.3x2.4/631753	N70B200V/5.3x2.4/631753	N70B200V/5.3x2.4/631753	FPM 80/6.75x1.78/149621	FPM 80/6.75x1.78/149621	
PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	PTFE/5.3x2.4/705918	PTFE/10x7.0x1.8/150229	PTFE/10x7.0x1.8/150229	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties**
- High-pressure sensors
- Strokemaster sensors
- Steelface sensors
- High temperature sensors
- Harsh environment sensors
- Factor 1 sensors
- Weld field immune sensors
- Large designs
- Ring sensors
- Tube sensors
- Analog distance measurement
- Accessories



Inductive Sensors with Special Properties

High-pressure sensors

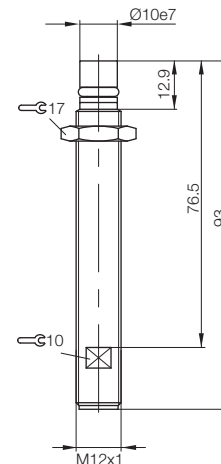
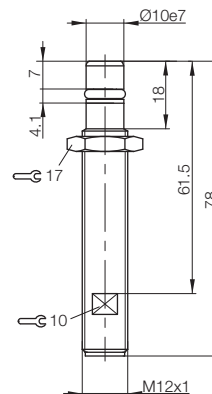
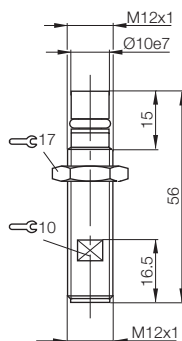
M12x1

up to 500 bar



Housing size	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	2.5 mm	2.5 mm	2.5 mm	
Assured switching distance s_a	0...2 mm	0...2 mm	0...2 mm	
Pressure range	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	
PNP, NO	Ordering code	Ordering code	Ordering code	
	Part number	Part number	Part number	
	BHS0062	BHS005U	BHS005W	
	BHS B265V-PSD25-S04-003	BHS B135V-PSD25-S04-003	BHS B163V-PSD25-S04-003	
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Rated operating current I_e	200 mA	200 mA	200 mA	
Output resistance R_a	33 k Ω	33 k Ω	33 k Ω	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+90 °C	-25...+90 °C	-25...+90 °C	
Switching frequency f max.	400 Hz	400 Hz	400 Hz	
Degree of protection as per IEC 60529	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	
Approvals	CE	CE	CE	
Material	Housing	Housing	Housing	
	Sensing surface	Sensing surface	Sensing surface	
	Stainless steel	Stainless steel	Stainless steel	
	Ceramic	Ceramic	Ceramic	
Sealing ring material/size/replacement part number	FPM 80/6.75x1.78/149621	FPM 80/6.75x1.78/149621	FPM 80/6.75x1.78/149621	
Supporting ring material/size/replacement part number	PTFE/10x7.0x1.8/150229	PTFE/10x7.0x1.8/150229	PTFE/10x7.0x1.8/150229	
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

For wiring diagram see page 958.



Inductive Sensors with Special Properties

High pressure sensors

M18x1



M18x1	M18x1	M18x1	M18x1	
Flush	Flush	Flush	Flush	
1.5 mm	1.5 mm	3 mm	3 mm	
0...1.2 mm	0...1.2 mm	0...2.1 mm	0...2.1 mm	
Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	Oil pressure resistant up to 500 bar	
BHS004A	BHS004J	BHS0071	BHS0026	
BES 516-300-S299-S4-D	BES 516-300-S308-S4-D	BES 516-300-S334-S4	BES 516-300-S190-S4	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2 V	2 V	3.5 V	3.5 V	
75 V DC	75 V DC	75 V DC	75 V DC	
200 mA	200 mA	130 mA	130 mA	
150 kΩ	150 kΩ	2 kΩ	2 kΩ	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+80 °C	-25...+80 °C	-25...+80 °C	-25...+80 °C	
2 kHz	2 kHz	400 Hz	400 Hz	
IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	IP 68 according to BWN PR. 20	
CE	CE	CE	CE	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	
EP	EP	PEEK	PEEK	
NBR 60-80/12.42x1.78/642828	NBR 60-80/12.42x1.78/642828	NBR 85/15.7x20.9x1.5/179002	NBR 90/13.0x1.5/619531	
PTFE/15x12.2x0.7/642827	PTFE/15x12.2x0.7/642827		PTFE/16x13.8x0.5/635431	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

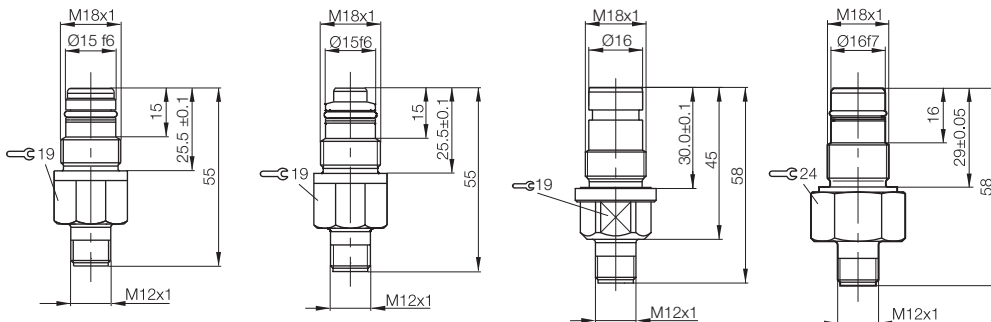
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



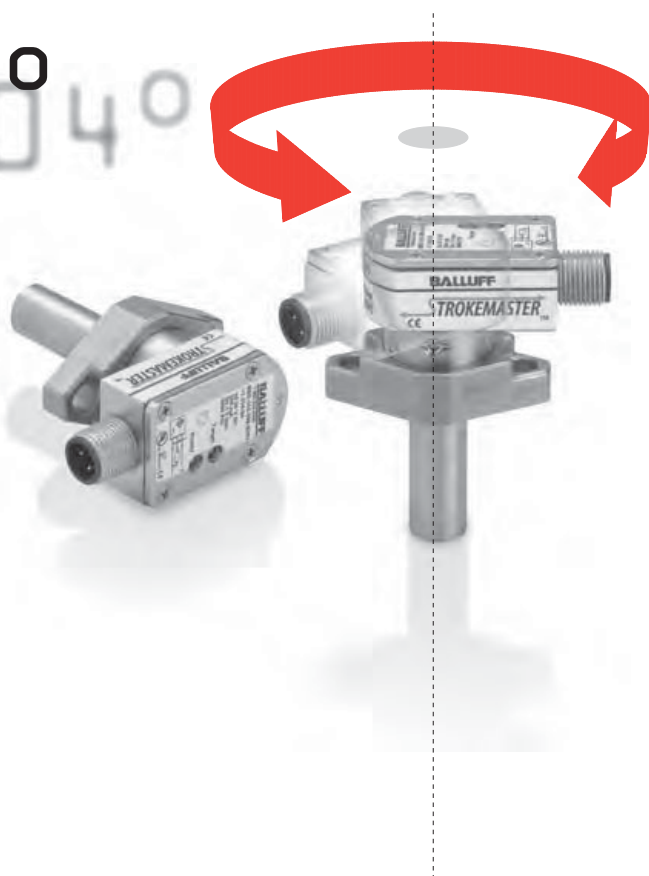
Strokemaster® Inductive Cylinder Sensors

Balluff's Strokemaster® cylinder-position sensors provide precision end-of-stroke sensing for hydraulic cylinders. The sensor body allows 304° of rotation to eliminate the hassle of post-installation cable management, which in some competitive designs requires unbolting the flange and breaking the hydraulic seal.

A high-pressure, inductive proximity sensor, the Strokemaster provides a 2mm (0.08") sensing range to detect the "spud" of hydraulic/pneumatic cylinders and indicate fully retracted or extended position. It mounts with two socket-head cap screws and seals with a Viton O-ring. Withstanding cylinder pressures up to 3000 PSI (207 bar), the embeddable design keeps most of the switch protected within the cylinder, with only a 0.62" (16 mm) high housing exposed outside.

Strokemaster sensors are available in 3-wire DC and 2-wire AC/DC versions, both with mini or micro connectors. Switching frequency is 50 Hz for the AC/DC versions. All units are weld-field immune, short-circuit, and reverse-polarity protected. They fit popular cylinder designs with standard available probe lengths of 0.912" - 4.560" (23.165mm - 115.8mm). Custom probe lengths can be achieved by using factory spacer kits. Probes are made of stainless steel with a high-strength ceramic face. Both DC and AC/DC sensors have all-metal housings. The Strokemaster sensor is CE-certified, and its housing is sealed to IP67 requirements.

304°



Inductive Sensors with Special Properties

Strokemaster DC sensors



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

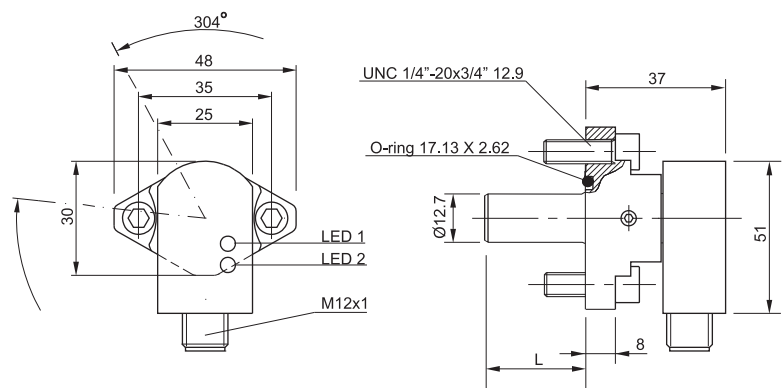
Tube sensors

Analog distance measurement

Accessories

Housing size		
Installation type (observe instructions in the Basic Information chapter)		Flush
Rated switching distance s_n		2 mm
Assured switching distance s_a		0...1.6 mm
PNP, NO	Ordering code	
	Part number	BES 516-300-S 295/0.912"...4.560"-S4
Rated operational voltage U_o		24 V DC
Supply voltage U_B		10...30 V DC
Voltage drop U_d at I_o max.		≤ 2.5 V
Rated insulation voltage U_i		75 V DC
Rated operating current I_o		200 mA
No-load supply current I_o damped/undamped		≤ 18 mA/ ≤ 10 mA
Off-state current I_r		≤ 80 μ A
Protected against polarity reversal		Yes
Short circuit/overload protected		Yes/Yes
Load capacitance		≤ 1.0 μ F
Repeat accuracy R		≤ 5 %
High pressure rated up to		207 bar (3000 PSI)
Ambient temperature T_a		-25...+70 °C
Operating frequency f		10 Hz
Utilization categories		DC 13
Function/Operating voltage indication		Yes/Yes
Degree of protection as per IEC 60529		IP 67
Approvals		cULus
Material	Housing	stainless steel/aluminum
	Sensing surface	ceramic
Connection		M12 connector 4-pin BCC M415-0000-IA-003-EX44T2-020

For wiring diagram see page 958.



Inductive Sensors with Special Properties

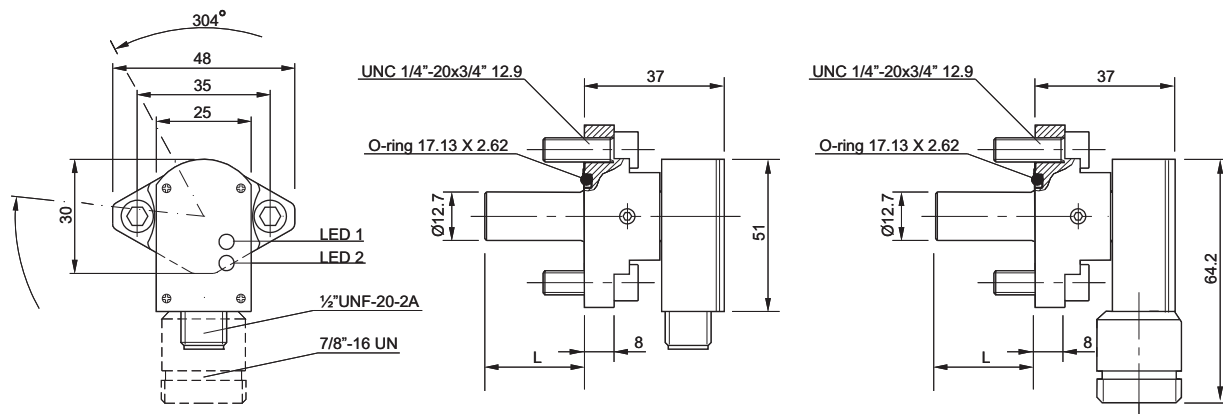
Strokemaster AC/DC sensors

STROKEMASTER



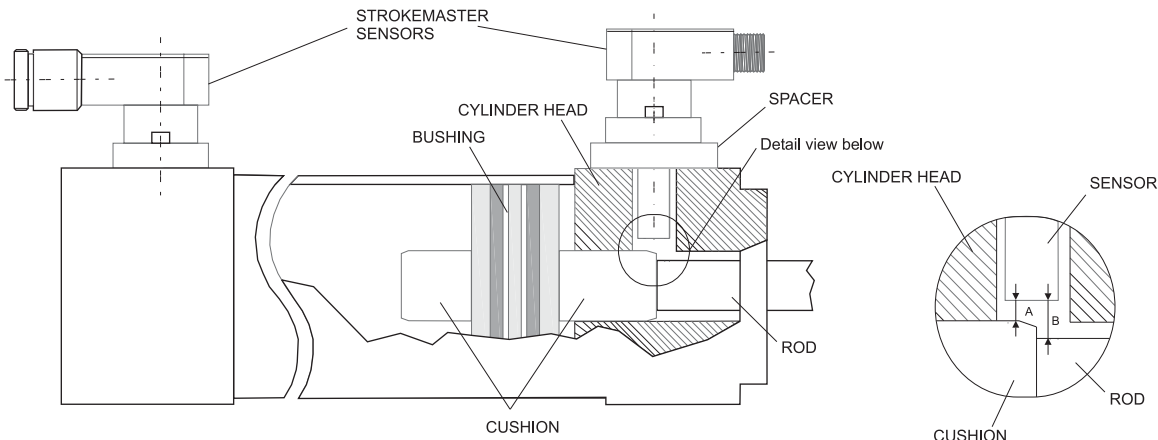
Housing size		
Installation type	Flush	Flush
Rated switching distance s_n	2 mm	2 mm
Assured switching distance s_a	0...1.6 mm	0...1.6 mm
PNP, NO	Ordering code	
	Part number	BES 516-200-S 2/0.912"...4.560"-S 21
Rated operational voltage U_o	110 V AC	BES 516-200-S 2/0.912"...4.560"-S5
Supply voltage U_B	20...250 V AC/V DC	110 V AC
Voltage drop U_d at I_o	≤ 6 V	20...250 V AC/V DC
Rated insulation voltage U_i	250 V AC	≤ 6 V
Rated operating current I_o	500 mA	250 V AC
Minimum operational current I_m	5 mA	500 mA
Off-state current I_r	≤ 1.7 mA at 110 V AC	5 mA
Inrush current I_k (t = 20 ms)	3 A max./1Hz	≤ 1.7 mA at 110 V AC
Protected against polarity reversal	Yes	3 A max./1Hz
Short circuit protected	Yes	Yes
Repeat accuracy R	≤ 5 %	Yes
High pressure rated up to	207 bar (3000 PSI)	≤ 5 %
Ambient temperature T_a	-25...+70 °C	207 bar (3000 PSI)
Operating frequency f	≤ 50 Hz	-25...+70 °C
Utilization categories	AC 140/DC 13	≤ 50 Hz
Function/Operating voltage indication	Yes/Yes	AC 140/DC 13
Degree of protection as per IEC 60529	IP 67	Yes/Yes
Approvals	cULus	IP 67
Material	Housing	cULus
	Sensing surface	stainless steel/aluminum
Connection		ceramic
		1/2" 20 UNF-2A plug connector, 3-pin
		C21-AE3-00-TY-060F
		7/8" 16 UN plug connector, 5-pin
		BCC A314-0000-IO-003-EX44W6-020

For wiring diagram see page 958.



Inductive Sensors with Special Properties

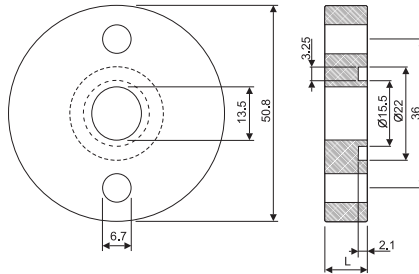
Strokemaster installation and spacers



Note: Spacer may be required to elevate cylinder sensor to position sensing face in optimal position. Balluff recommends the following guidelines when mounting our Strokemaster® sensors:

Strokemaster® Spacers

- A - Recommended to allow for mechanical wear (0.025" to 0.047")
- B - This dimension must be large enough to allow the sensor to turn off when the rod is present (0.110" to 0.118")



Below is a table to help you pick out a spacer for custom lengths needed with Strokemaster® sensors:

		Z/Spacers (inches)												
		0.180	0.188	0.225	0.307	0.372	0.375	0.500	0.562	0.600	0.684	0.712	0.810	0.937
Probe length (inches)	0.912	0.732	0.724	0.687	0.605	0.540	0.537	0.412	0.350	0.312	0.228	0.200	0.102	—
	1.025	0.845	0.837	0.800	0.718	0.653	0.650	0.525	0.463	0.425	0.341	0.313	0.215	0.088
	1.25	1.07	1.062	1.025	0.943	0.878	0.875	0.750	0.688	0.650	0.566	0.538	0.440	0.313
	1.35	1.17	1.162	1.125	1.043	0.978	0.975	0.850	0.788	0.750	0.666	0.638	0.540	0.413
	1.5	1.32	1.312	1.275	1.193	1.128	1.125	1.000	0.938	0.900	0.816	0.788	0.690	0.563
	1.75	1.57	1.562	1.525	1.443	1.378	1.375	1.250	1.188	1.150	1.066	1.038	0.940	0.813
	1.875	1.695	1.687	1.650	1.568	1.503	1.500	1.375	1.313	1.275	1.191	1.163	1.065	0.938
	2.062	1.882	1.874	1.837	1.755	1.690	1.687	1.562	1.500	1.462	1.378	1.350	1.252	1.125
	2.375	2.195	2.187	2.150	2.068	2.003	2.000	1.875	1.813	1.775	1.691	1.663	1.565	1.438
	2.775	2.595	2.587	2.550	2.468	2.403	2.400	2.275	2.213	2.175	2.091	2.063	1.965	1.838
	2.875	2.695	2.687	2.650	2.568	2.503	2.500	2.375	2.313	2.275	2.191	2.163	2.065	1.938
	3.775	3.595	3.587	3.550	3.468	3.403	3.400	3.275	3.213	3.175	3.091	3.063	2.965	2.838
	4.56	4.38	4.372	4.335	4.253	4.188	4.185	4.060	3.998	3.960	3.876	3.848	3.750	3.623

Example: Need probe length of 1.125" combine sensor BES-516-200-S2-1.35-S21 with a 0.225" spacer.
(1.35" tube length - 0.225" spacer = 1.125" adjusted length)

Note: A difference of 0.005" will still have to be carefully considered when sizing a spacer and sensor to the cylinder.

- Spacer kits include a spacer, "O" ring, and appropriate mounting screws.
- Other spacer kits may be available: consult factory.

To order a spacer kit:

Use part number BESA-516-200-KIT-* (X.XXX) *measured in inches

(For both DC and AC/DC devices - there is no difference in flange dimensions)

Today's inductive proximity sensors provide position/part confirmation and error proofing functions on a variety of machines and assembly lines. When impact damages or destroys these vital feedback devices it can shut down your entire production process. This leads to higher sensor costs, higher maintenance costs, loss of production and lower profitability...bad news for any manufacturer. Balluff's SteelFace inductive sensors are affordable, rugged sensors that are designed for impact-prone areas. Their stainless steel faces handle impacts and abuse multiple times longer than plastic faced sensors. They also provide up to twice the sensing range of standard flush mount sensors. This feature allows the sensors to be mounted farther away from their targets, reducing the chance of impact and impact-related failures.

The extremely high-quality coating has a PTFE and ceramic base. It prevents the deposition of weld splatter, thereby increasing the pot life of sensors.



Application areas

- Welding equipment
- Lightweight construction
- Automotive industry
- Conveyor technology
- Handling
- Assembly
- Special machine construction



Inductive Sensors with Special Properties

Steelface sensors

M8x1



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories

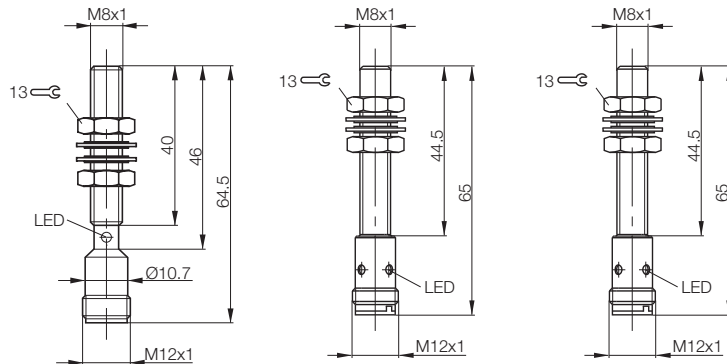
Housing size		M8 x 1	M8 x 1	M8 x 1
Installation type (pay attention to the note in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		1.5 mm	2 mm	2 mm
Assured switching distance s_a		0...1.2 mm	0...1.6 mm	0...1.6 mm
Sensing distance		1X	2X	2X
PNP, NO	Ordering code	BES02YZ	BES02N5	BES02N6
	Part number	BES M08EG1-PSC15S-S04G-S	BES M08EH1-PSC20B-S04G-S	BES M08EH1-PSC20B-S04G-S01
NPN, NO	Ordering code	BES02YY	BES02N3	BES02N4
	Part number	BES M08EG1-NSC15S-S04G-S	BES M08EH1-NSC20B-S04G-S	BES M08EH1-NSC20B-S04G-S01
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2 V	2.5 V	2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC
Rated operating current I_e		100 mA	200 mA	200 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/No/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+70 °C
Switching frequency f max.		20 Hz	750 Hz	750 Hz
Function indicator		Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approvals		CE	CE	CE
Special properties		Selective ferrous	Pressure rated to 80 bar	Pressure rated to 80 bar, weld spatter-resistant
Material	Housing	Stainless steel 303	Stainless steel 316 L	Stainless steel, PTFE coated
	Sensing surface	Stainless steel 303	Stainless steel 316 L	Stainless steel, PTFE coated
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

When using metal mounts, a reduction in the switching distance is to be expected. You should check whether the clamping holder can be used in the application.





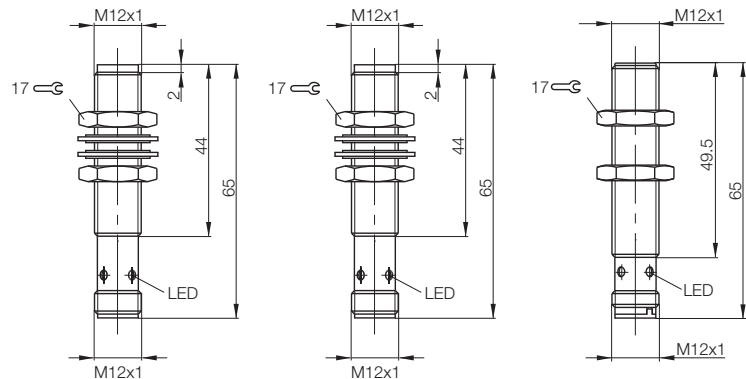
Housing size	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	2 mm	2 mm	4 mm	
Assured switching distance s_a	0...1.6 mm	0...1.6 mm	0...3.2 mm	
Sensing distance marking	1X	1X	2X	
PNP, NO	Ordering code	BES02Z2	BES02Z3	BES02NA
	Part number	BES M12EG1-PSC20N-S04G-S	BES M12EG1-PSC20S-S04G-S	BES M12EI-PSC40B-S04G-S
PNP, NC	Ordering code		BES02Z1	
	Part number		BES M12EG1-POC20S-S04G-S	
NPN, NO	Ordering code		BES02Z0	BES02N8
	Part number		BES M12EG1-NSC20S-S04G-S	BES M12EI-NSC40B-S04G-S
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2 V	2 V	2.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Rated operating current I_e	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/No/Yes	Yes/No/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	50 Hz	50 Hz	500 Hz	
Function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67/1200 psi washdown	IP 67/1200 psi washdown	IP 67	
Approvals	CE	CE	CE	
Special properties	Selective non-ferrous	Selective ferrous	Pressure rated to 60 bar (870 psi)	
Material	Housing	Stainless steel 303	Stainless steel 303	Stainless steel 316 L
	Sensing surface	Stainless steel 303	Stainless steel 303	Stainless steel 316 L
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

When using metal mounts, a reduction in the switching distance is to be expected. You should check whether the clamping holder can be used in the application.



Inductive Sensors with Special Properties

Steelface sensors

M12×1, M18×1



M12×1	M12×1	M12×1	M18×1	M18×1
Flush	Non-flush	Quasi-flush	Flush	Flush
4 mm	10 mm	6 mm	5 mm	5 mm
0...3.2 mm	0...8.1 mm	0...4.9 mm	0...4.1 mm	0...4.1 mm
2X	3X	3X	1X	1X
BES02NC	BES02WE	BES02WH	BES02Z8	BES02Z9
BES M12EI-PSC40B-S04G-S01	BES M12EF1-PSC10F-S04G-S	BES M12EG1-PSC60Z-S04G-S11	BES M18EG1-PSC50N-S04G-S	BES M18EG1-PSC50S-S04G-S
				BES02Z7
				BES M18EG1-POC50S-S04G-S
BES02N9	BES02WC	BES02WF		BES02Z6
BES M12EI-NSC40B-S04G-S01	BES M12EF1-NSC10F-S04G-S	BES M12EG1-NSC60Z-S04G-S11		BES M18EG1-NSC50S-S04G-S
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2 V	2 V	2 V	2 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	100 mA	100 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/No/Yes	Yes/No/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
500 Hz	350 Hz	400 Hz	15 Hz	15 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67/1200 psi washdown	IP 67/1200 psi washdown
CE	CE	CE	CE	CE
Pressure rated to 60 bar, weld spatter-resistant	Pressure rated to 80 bar (1,160 psi)	Pressure rated to 80 bar (1,160 psi)	Selective non-ferrous	Selective ferrous
Stainless steel, 316 L PTFE coated	Stainless steel 303	Stainless steel 303	Stainless steel 303	Stainless steel 303
Stainless steel, 316 L PTFE coated	Stainless steel 303	Stainless steel 303	Stainless steel 303	Stainless steel 303
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

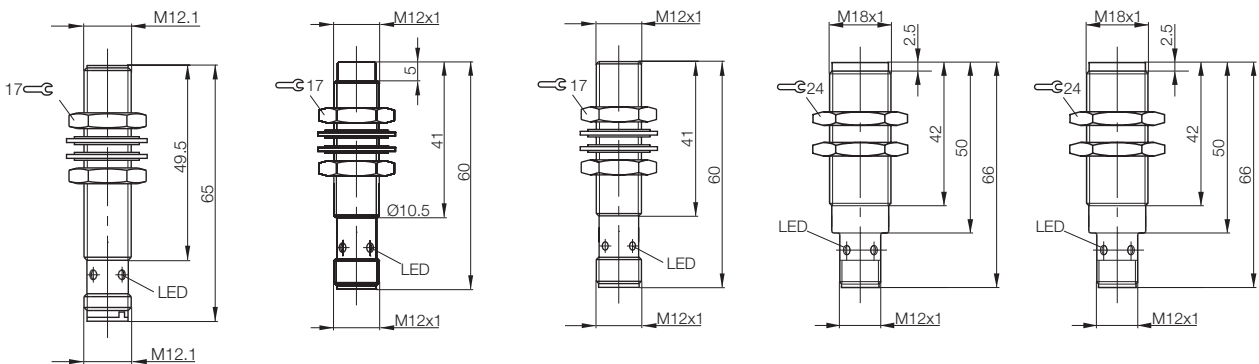
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories





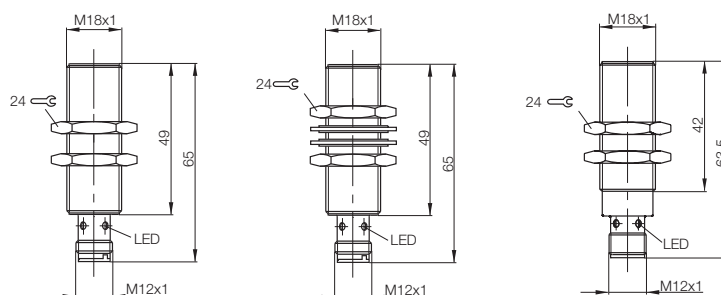
Housing size	M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	7.2 mm	7.2 mm	10 mm	
Assured switching distance s_a	0...5.2 mm	0...5.2 mm	0...8.1 mm	
Sensing distance	2X	2X	2X	
PNP, NO	Ordering code	BES02NJ	BES02NK	BES02Y3
	Part number	BES M18EI-PSC72B-S04G-S	BES M18EI-PSC72B-S04G-S01	BES M18EG1-PSC10Z-S04G-S11
NPN, NO	Ordering code	BES02NF	BES02NH	BES02Y2
	Part number	BES M18EI-NSC72B-S04G-S	BES M18EI-NSC72B-S04G-S01	BES M18EG1-NSC10Z-S04G-S11
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	2.5 V	2 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Rated operating current I_o	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	250 Hz	250 Hz	200 Hz	
Function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE	CE	CE	
Special properties	Pressure rated to 40 bar (580 psi)	Pressure rated to 40 bar, weld spatter-resistant (580 psi)	Pressure rated to 60 bar (870 psi)	
Material	Housing	Stainless steel 316 L	Stainless steel, 316 L PTFE coated	Stainless steel 303
	Sensing surface	Stainless steel 316 L	Stainless steel, 316 L PTFE coated	Stainless steel 303
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

When using metal mounts, a reduction in the switching distance is to be expected. You should check whether the clamping holder can be used in the application.



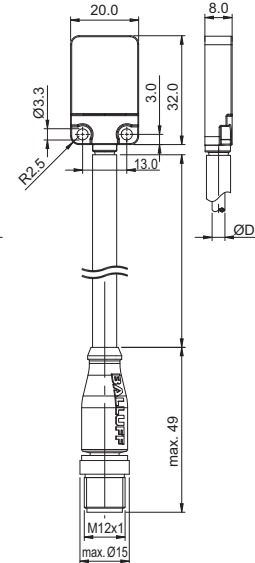
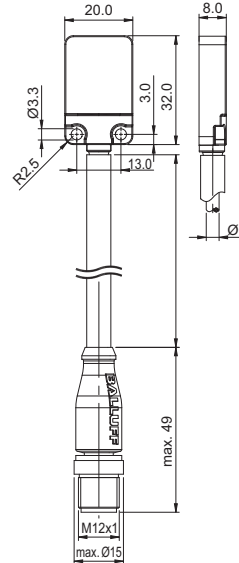
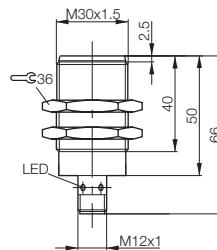
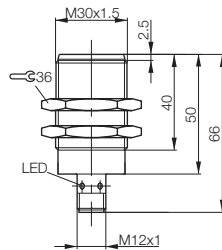
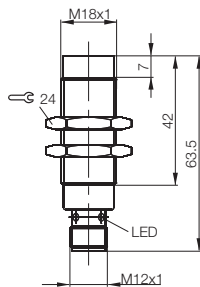
Inductive Sensors with Special Properties

Steelface sensors

M18x1, M30x1.5, Flat Pack



M18x1	M30x1.5	M30x1.5	20x32x8 mm	20x32x8 mm
Non-flush	Flush	Flush	Flush	Flush
20 mm	8 mm	8 mm	5 mm	5 mm
0...16.2 mm	0...6.5 mm	0...6.5 mm		
2X	1X	1X		
BES02Y1	BES02ZH	BES02ZJ	BES04AH	BES049Y
BES M18EF1-PSC20F-S04G-S	BES M30EG1-PSC80N-S04G-S	BES M30EG1-PSC80S-S04G-S	BES R01EC-PSC50A-BP00,3-GS04-W50	BES R01EC-PSC50A-BP00,3-GS04-W51
		BES02ZF		
		BES M30EG1-NSC80S-S04G-S		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2 V	2 V	2 V		
75 V DC	75 V DC	75 V DC		
200 mA	100 mA	100 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/No/Yes	Yes/No/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C	0...+50 °C	0...+50 °C
200 Hz	15 Hz	15 Hz	20 Hz	20 Hz
Yellow LED	Yellow LED	Yellow LED		
IP 67	IP 67	IP 67	IP 65	IP 65
CE	CE	CE	CE, cULus	CE, cULus
Pressure rated to 60 bar (870 psi)	Selective non-ferrous	Selective ferrous		
Stainless steel 303	Stainless steel 303	Stainless steel 303	Stainless steel 303	Stainless steel 303
Stainless steel 303	Stainless steel 303	Stainless steel 303	Stainless steel 303	Stainless steel with W51 ceramic coating
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	0.3 m PUR cable, M12 connector, 3-pin LED	0.3 m PUR cable, M12 connector, 3-pin LED
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories

Inductive Sensors with Special Properties

High temperature sensors

M5×0.5, M8×1, M12×1

High temperature sensors

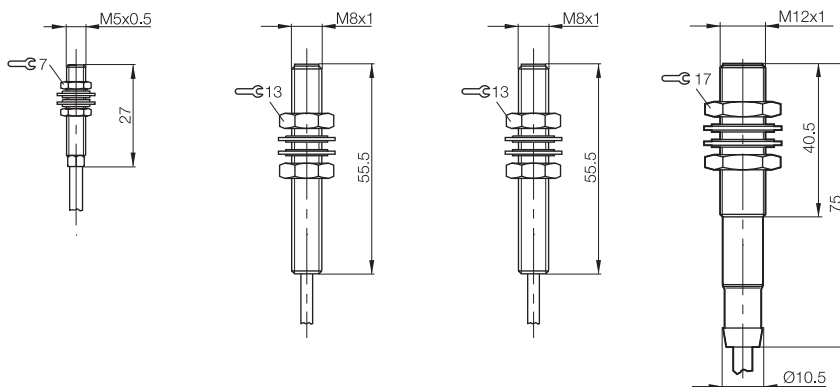


Housing size		M5×0.5	M8 × 1	M8 × 1	M12×1
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	Flush
Rated switching distance s_n		0.5 mm	1 mm	2 mm	2 mm
Assured switching distance s_a		0...0.4 mm	0...0.8 mm	0...1.6 mm	0...1.6 mm
Sensing distance		1X	1X	2X	1X
PNP, NO	Ordering code	BES02J2	BES02HP	BES02HK	BES02HU
	Part number	BES M05ED-PSD05B-ES02-T01	BES 516-324-SA8-02	BES 516-324-SA26-02	BES 516-325-SA19-03
NPN, NO	Ordering code				BES0361
	Part number				BES 516-329-SA14-A0-X-03
NPN, complementary	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		1 V	1.5 V	1.5 V	PNP 1.8 V, NPN 1.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	75 V DC
Rated operating current I_e		≤ 150 mA (fig. 1)	≤ 200 mA (fig. 2)	≤ 200 mA (fig. 3)	≤ 200 mA (fig. 3)
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/No/No	Yes/No/No	Yes/No/No
Ambient temperature T_a		-25...+120 °C	-25...+100 °C	-25...+120 °C	-25...+120 °C
Switching frequency f max.		1 kHz	2 kHz	1.5 kHz	1 kHz
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67, IP 60 cable outlet	IP 68 according to BWN Pr. 20, IP 60 cable outlet
Approvals		CE	CE	CE	CE
Material	Housing	Stainless steel	Stainless steel	Stainless steel	Brass-coated
	Sensing surface	PA 6	PBT	PBT	PEEK
Connection		2 m silicon cable, 26 AWG	2 m PVC cable, 26 AWG	2 m Teflon cable, 26 AWG	3 m silicon cable, 20 AWG
Suggested mating cable					
Pressure rated to					3 bar

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

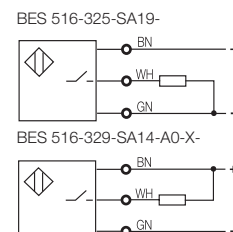


Temperature rated sensors to +120 °C

More and more industrial processes are running at higher temperatures. This increases the demands on the sensors. Balluff high temperature sensors are ideal for your high temperature application.

Applications

- Steel production
- Motor function monitoring
- Glass manufacturing



Inductive Sensors with Special Properties

High temperature sensors

M18×1, M30×1.5, 25×50×10 mm



M18×1	M18×1	M30×1.5	M30×1.5	25×50×10 mm
Flush	Flush	Flush	Non-flush	Flush
5 mm	5 mm	10 mm	15 mm	5 mm
0...4.1 mm	0...4.1 mm	0...8.1 mm	0...12.2 mm	0...4.1 mm
1X	1X	1X	1X	1X
BES02H6	BES02H5	BES02H7	BES02HE	BES02J0
BES 516-105-SA5	BES 516-105-SA2-05	BES 516-114-SA1-05	BES 516-125-SA1-05	BES 516-347-SA2-03
		BES02HC		
		BES 516-120-SA2		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	24 V DC ±10 %
1.5 V	1.5 V	1.5 V	1.5 V	2.5 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
≤ 400 mA (fig. 4)	≤ 400 mA (fig. 4)	≤ 400 mA (fig. 4)	≤ 400 mA (fig. 4)	≤ 25 mA
Yes/No/No	Yes/No/No	Yes/No/No	Yes/No/No	Yes/Yes/Yes
-25...+120 °C	-25...+120 °C	-25...+120 °C	-25...+120 °C	-25...+100 °C
500 Hz	500 Hz	300 Hz	100 Hz	500 Hz
IP 67	IP 67, IP 60 cable outlet	IP 67, IP 60 cable outlet	IP 67, IP 60 cable outlet	IP 67, IP 60 cable outlet
CE	CE	CE	CE	CE
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Cast aluminum
PBT	PBT	PBT	PA 12	PBT
M12 plug connector, 4-pin	5 m silicon cable, 19 AWG	Silicon cable, 19 AWG	5 m silicon cable, 19 AWG	3 m silicon cable, 19 AWG
BCC M415-0000-1A-003-EX44T2-020				



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

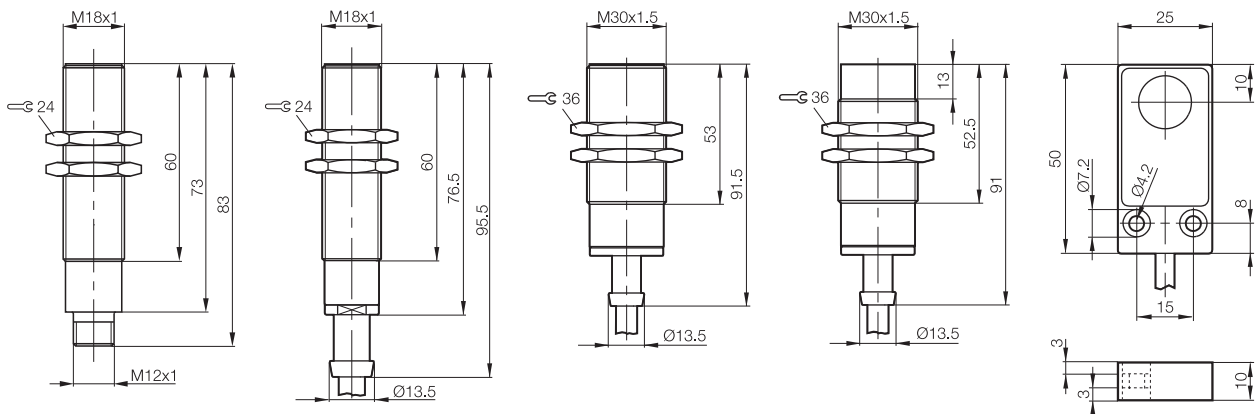
Large designs

Ring sensors

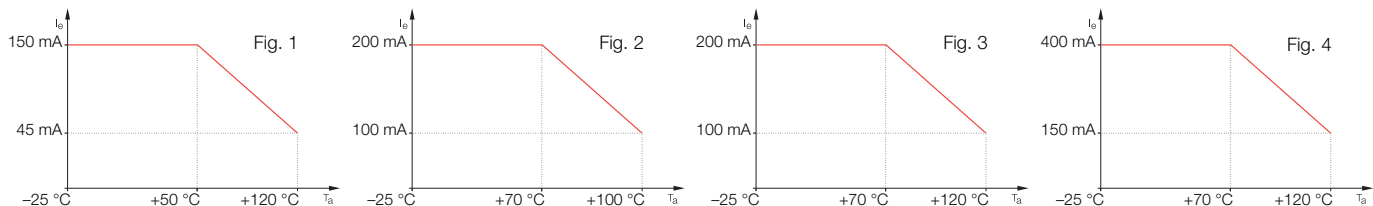
Tube sensors

Analog distance measurement

Accessories



Current reduction as a function of ambient temperature range



Inductive Sensors with Special Properties

High temperature sensors

High temperature sensors

Balluff's ultra-high temperature inductive sensors can be used in temperature ranges up to +160 °C. These sensors are ideally suited to harsh environments in the steel industry, in plastic injection molding machines and in forging and foundry processes.

- Optimization of system availability
- Reduction in maintenance costs
- Increase in process quality

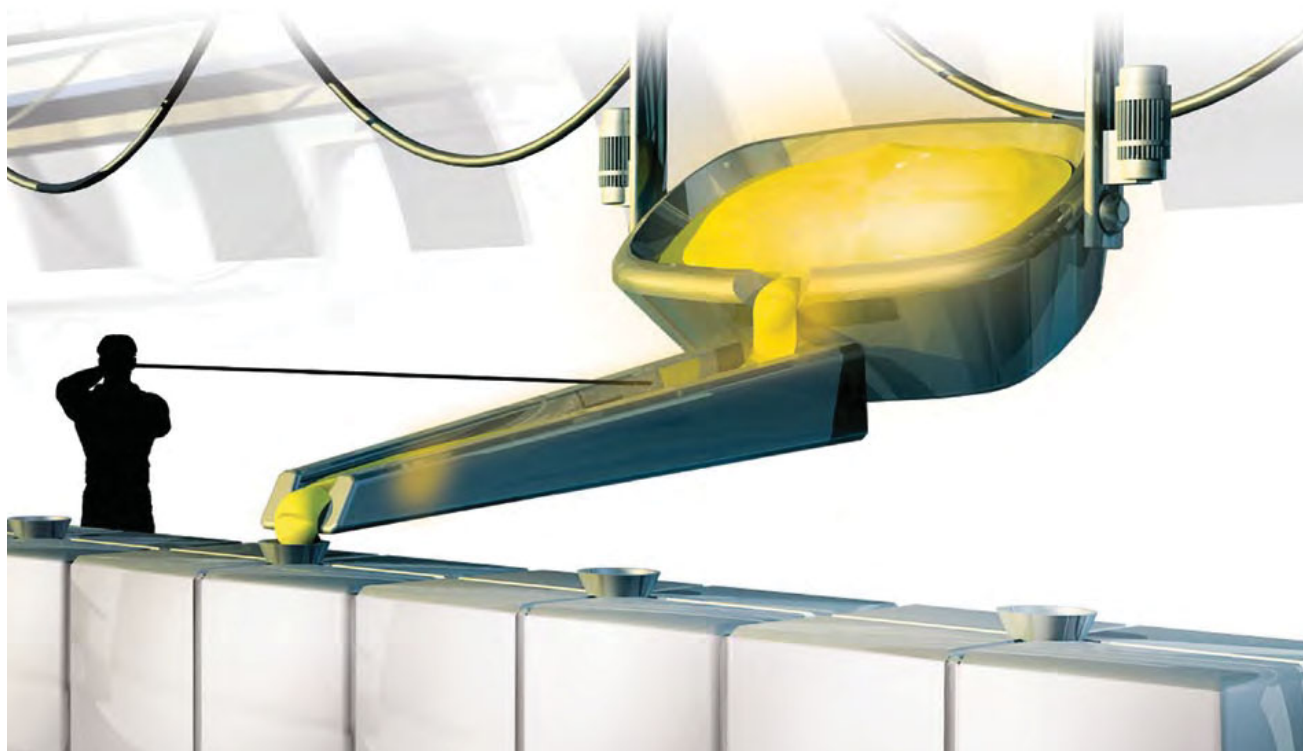


Housing size		
Installation type (observe instructions in the Basic Information chapter)		
Rated switching distance s_n		
Assured switching distance s_a		
Sensing distance		
PNP, NO	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_e max.		
Rated insulation voltage U_i		
Rated operating current I_e		
Polarity reversal protected/transposition protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f max.		
Degree of protection as per IEC 60529		
Approvals		
Material	Housing	
	Sensing surface	
Connection		

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Inductive Sensors with Special Properties

High temperature sensors

M18x1, M30x1.5



160 °C
High
temperature
range



160 °C
High
temperature
range



160 °C
High
temperature
range



160 °C
High
temperature
range

M18x1	M18x1	M30x1.5	M30x1.5
Flush	Non-flush	Flush	Non-flush
5 mm	8 mm	10 mm	15 mm
0...4 mm	0...6.4 mm	0...8 mm	0...12 mm
1X	1X	1X	1X
BES043T	BES043U	BES043W	BES043Y
BES 515-326-SA49-D-TF-02	BES 515-360-SA13-D-TF-02	BES 515-327-SA22-D-TF-02	BES 515-362-SA4-D-TF-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V
75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA
Yes/No/No	Yes/No/No	Yes/No/No	Yes/No/No
-25...+160 °C	-25...+160 °C	-25...+160 °C	-25...+160 °C
200 Hz	200 Hz	200 Hz	200 Hz
IP 69K	IP 69K	IP 69K	IP 69K
CE	CE	CE	CE
Stainless steel	Stainless steel	Stainless steel	Stainless steel
PEEK	PEEK	PEEK	PEEK
2 m cable FEP, 22 AWG	2 m cable FEP, 22 AWG	2 m cable FEP, 22 AWG	2 m cable FEP, 22 AWG



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

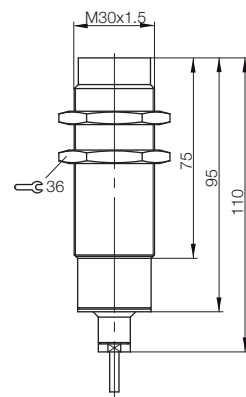
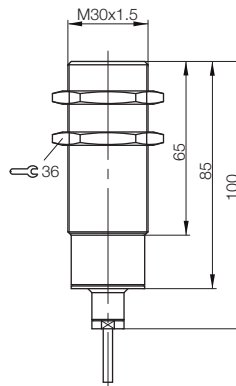
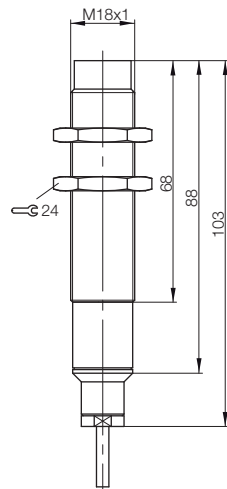
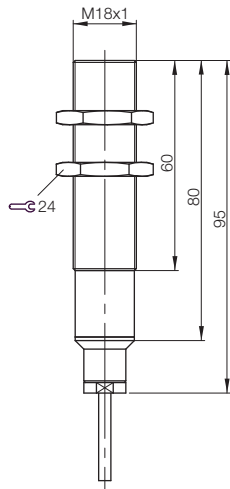
Large
designs

Ring sensors

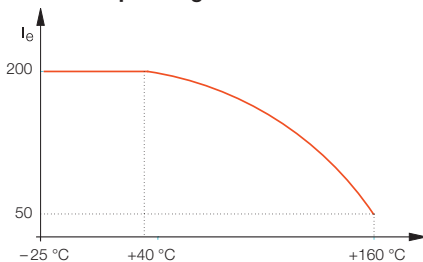
Tube sensors

Analog
distance
measurement

Accessories



Rated operating current





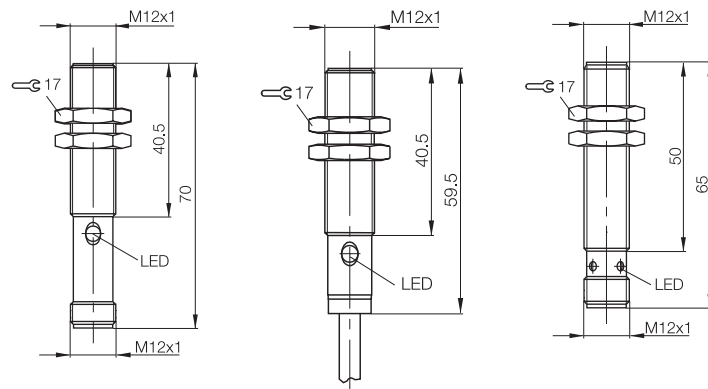
Increased temperature range

Housing size		M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		2 mm	2 mm	4 mm	
Assured switching distance s_a		0...1.6 mm	0...1.6 mm	0...3.2 mm	
Sensing distance		1X	1X	2X	
PNP, NO	Ordering code	BES02EL	BES02EH	BES02FU	
	Part number	BES 515-325-S4-C	BES 515-325-BO-C-PU-03	BES M12EI-PSC40B-S04G	
PNP, NC	Ordering code			BES02FT	
	Part number			BES M12EI-POC40B-S04G	
NPN, NO	Ordering code			BES02FR	
	Part number			BES M12EI-NSC40B-S04G	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		1.5 V	1.5 V	1.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	250 V AC (II)	250 V AC (II)	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+85 °C	
Switching frequency f max.		≤ 3 kHz	≤ 3 kHz	≤ 1 kHz	
Function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PA 12	PA 12	LCP	
Connection		M12 connector, 4 pin	3 m PUR cable, 22 AWG	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Built tough – stainless steel housing stops aggressive media in its tracks. Inductive sensors are also used more and more in aggressive environments: in machine tools, in the chemical industry, in packaging machines- and the food industry. PROXINOX® sensors are ideal for applications where aggressive cleaning agents, in connection with high-pressure cleaning devices are used.

Inductive Sensors with Special Properties

Harsh environment sensors

M12x1 standard



M12x1	M12x1	M12x1	M12x1	M12x1	M12x1
Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush
4 mm	4 mm	4 mm	4 mm	4 mm	4 mm
0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm	0...3.2 mm
2X	2X	1X	1X	1X	1X
BES038C	BES014W	BES02FC	BES02F3	BES02F7	
BES M12EI-PSC40B-S04G-009	BES M12EE-PSC40B-S04G	BES 515-356-S4-C	BES 515-356-BO-C-03	BES 515-356-E4-C-03	
	BES014U				
	BES M12EE-POC40B-S04G				
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2 V	1.5 V	1.5 V	2 V	2 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-40...+85 °C	-25...+85 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
≤ 2 kHz	≤ 2 kHz	≤ 1.5 kHz	≤ 1.5 kHz	≤ 2 kHz	≤ 2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
LCP	LCP	PA 12	PA 12	PBT	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	3 m PVC cable, 22 AWG	3 m PVC cable, 22 AWG	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020			



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

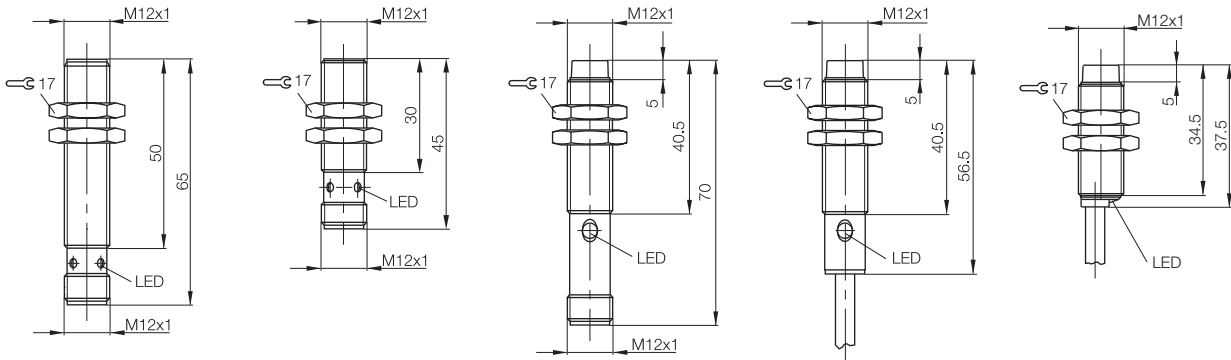
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories





Increased
temperature
range

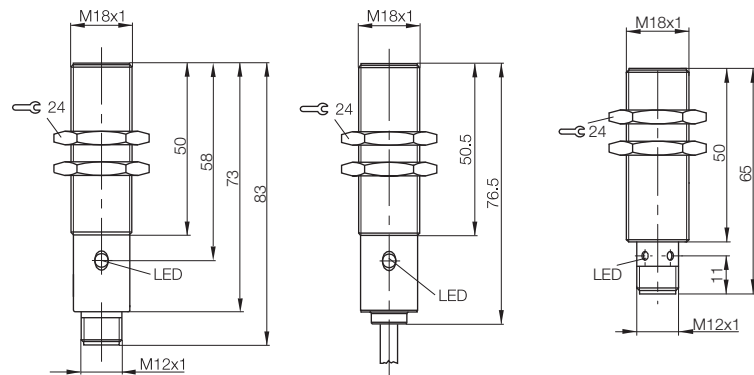


Housing size		M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush	
Rated switching distance s_n		5 mm	5 mm	8 mm	
Assured switching distance s_a		0...4.1 mm	0...4.1 mm	0...6.5 mm	
Sensing distance		1X	1X	2X	
PNP, NO	Ordering code	BES02EU	BES02EN	BES02H0	
	Part number	BES 515-326-S4-C	BES 515-326-BO-C-PU-03	BES M18EI-PSC80B-S04G	
PNP, NC	Ordering code			BES02FZ	
	Part number			BES M18EI-POC80B-S04G	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.		1.5 V	1.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-40...+85 °C	-25...+70 °C	-40...+85 °C	
Switching frequency f max.		900 Hz	900 Hz	≤ 700 Hz	
Function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
Approvals		CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PA 12	PA 12	PBT	
Connection		M12 connector, 4-pin	3 m PUR cable, 22 AWG	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



Inductive Sensors with Special Properties

Harsh environment sensors

M18×1, M30×1.5



Increased
temperature
range



M18×1	M18×1	M30×1.5	M30×1.5	
Non-flush	Non-flush	Flush	Non-flush	
8 mm	8 mm	10 mm	15 mm	
0...6.5 mm	0...6.5 mm	0...8.1 mm	0...12.2 mm	
1X	1X	1X	1X	
BES02FL	BES02FH	BES02F1	BES02FN	
BES 515-360-S4-C	BES 515-360-BO-C-PU-03	BES 515-327-S4-C	BES 515-362-S4-C	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
1.5 V	1.5 V	2.5 V	2.5 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-40...+85 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
≤ 600 Hz	≤ 600 Hz	≤ 300 Hz	≤ 100 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	IP 68 per BWN Pr. 20	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	
PA 12	PA 12	PA 12	PA 12	
M12 connector, 4-pin	3 m PUR cable, 22 AWG	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

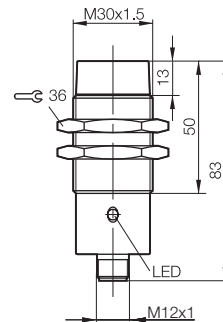
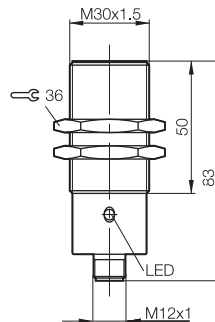
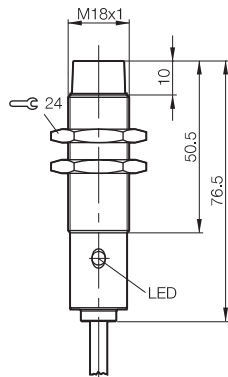
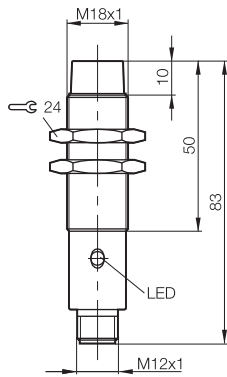
Large
designs

Ring sensors

Tube sensors

Analog
distance
measurement

Accessories



PROXINOX® sensors – withstand the harshest cleaning processes

In the food- and beverage industry, the chemical industry, and even conveying operations, inductive sensors are routinely cleaned with more and more aggressive methods. Whether acids, bases, steam, foaming cleaners or high-pressure cleaners – PROXINOX®-stainless steel sensors fulfill stringent requirements.

Features

- No function indicator directly on the sensor: The drill hole for the LED is a potential source of danger during cleaning processes and a possible means of entry for bacteria. The function display is completely wrapped in the transparent plastic of the connector.
- Housing made of stainless steel (material 1.4571): This material is common in the food and beverage- industry. The cable plug has to be adapted to different cleaning and- disinfection agents.
- Gold-coated contacts: The difficult installation relationships require gold-coated contacts, so that plug corrosion is prevented.
- Lasered or etched part number: Cleaning- and disinfection processes dissolve type plates. Lasered or etched part numbers are there to stay.
- Additional O-ring-seals for extreme requirements: temperature shocks – triggered by cleaning and disinfection – cause strong, different residual stress on steel housings and casting resin.

Steam jet tested



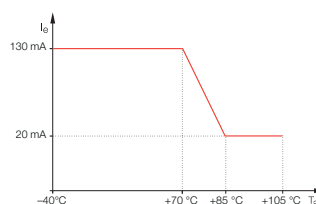
Housing size	
Installation type (observe instructions in the Basic Information chapter)	
Rated switching distance s_n	
Assured switching distance s_a	
Sensing distance	
PNP, NO	Ordering code
	Part number
Supply voltage U_R	
Voltage drop U_d at I_e max.	
Rated insulation voltage U_i (protection class)	
Rated operating current I_e	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Ambient temperature T_a at load current ≤ 20 mA	
Ambient temperature range T_a short-time 30 min	
Switching frequency f max.	
Degree of protection as per IEC 60529	
Approvals	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	

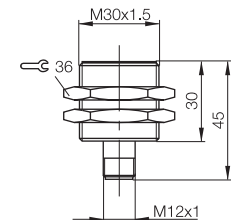
See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

Current reduction as a function of ambient temperature range





Inductive Sensors with Special Properties

Harsh environment sensors

PROXINOX®

In the food industry, medical and pharmaceutical technology, and special requirements are placed on sensors: FDA conformity and testing according to the Ecolab standard.

The sensors fulfill the highest requirements:

- Extended temperature range
- Safe to clean according to Ecolab
- FDA conformity
- Resistant to high-pressure cleaners

Steam jet tested



IP 69K

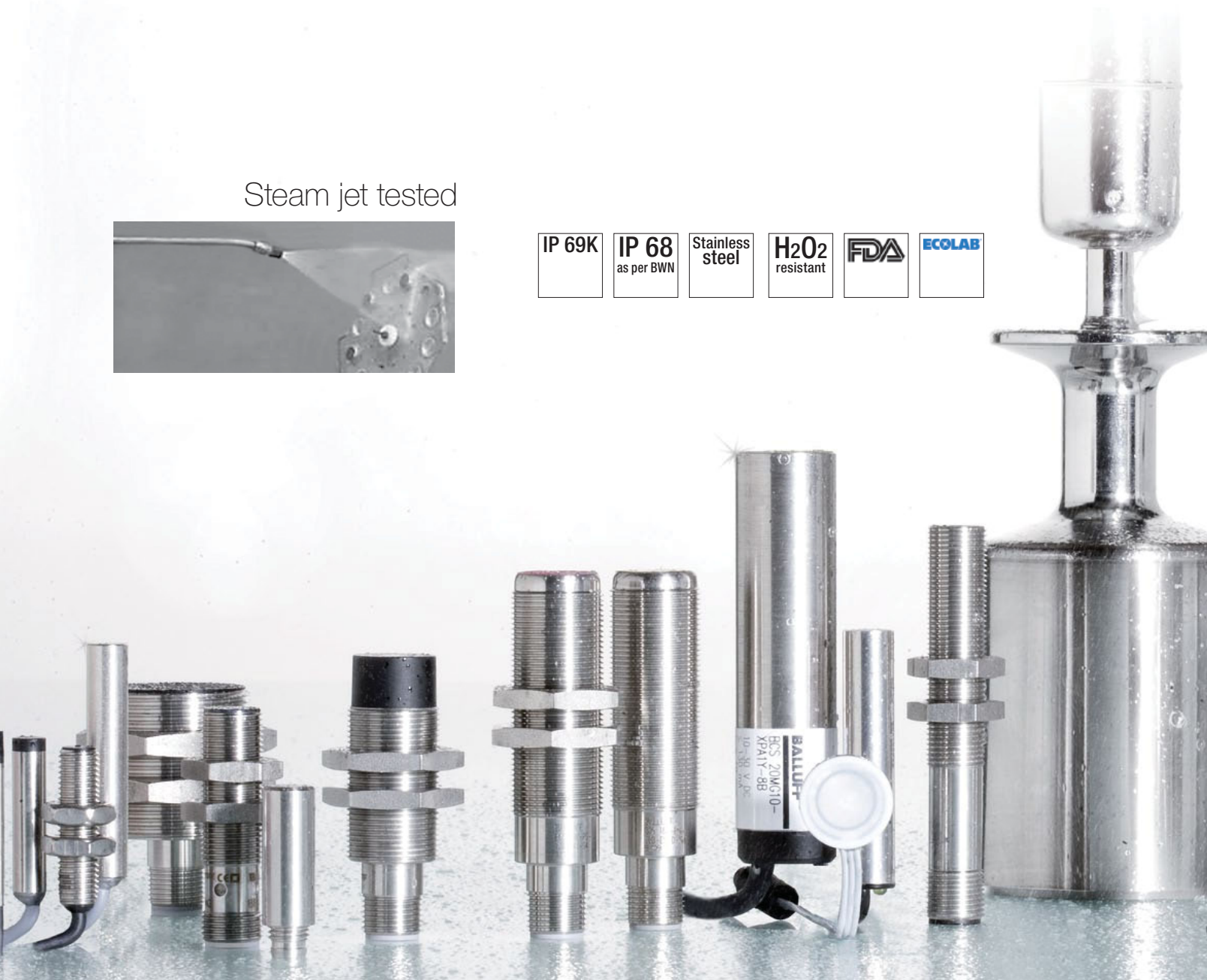
IP 68
as per BWN

Stainless
steel

H₂O₂
resistant

FDA

ECOLAB



Inductive Sensors with Special Properties

Harsh environment sensors

Ø 12 mm, M12x1



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analog distance measurement

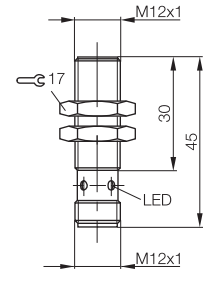
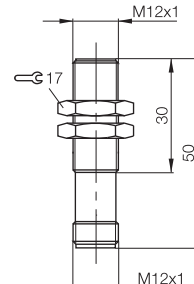
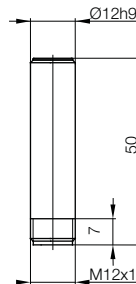
Accessories

Housing size	Ø 12 mm	M12x1	M12x1
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush
Rated switching distance s_n	2 mm	2 mm	4 mm
Assured switching distance s_a	0...1.6 mm	0...1.6 mm	0...3.2 mm
Sensing distance	1X	1X	1X
PNP, NO	Ordering code Part number	BES0430 BES G12EE1-PSY20B-S04G-L02	BES0444 BES M12EE1-PSY20B-S04G-L01
PNP, NC	Ordering code Part number	BES0433 BES M12EE-PSC40B-S04G-L01	BES0432 BES M12EE-POC40B-S04G-L01
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.	3.5 V	3.5 V	2 V
Rated insulation voltage U_i (protection class)	75 V DC	75 V DC	250 V AC (II)
Rated operating current I_e	130 mA*	130 mA*	200 mA
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-40...+105 °C	-40...+105 °C	-25...+85 °C
Switching frequency f max.	800 Hz	800 Hz	2000 Hz
Degree of protection as per IEC 60529	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 20
Approvals	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant
Material	Housing Sensing surface	Stainless steel 1.4571 PEEK	Stainless steel 1.4571 PEEK
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

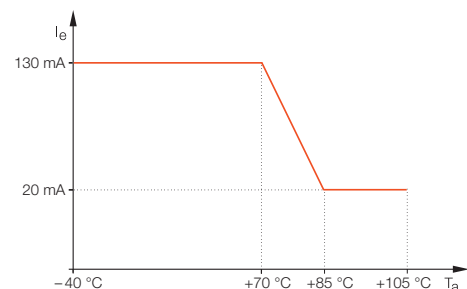
See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



*Current decrease curve



Inductive Sensors with Special Properties

Harsh environment sensors

Ø 12 mm, M12x1

PROXINOX®



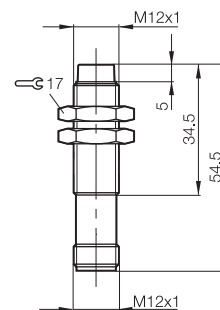
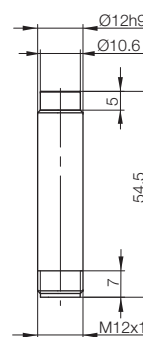
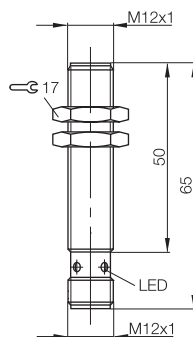
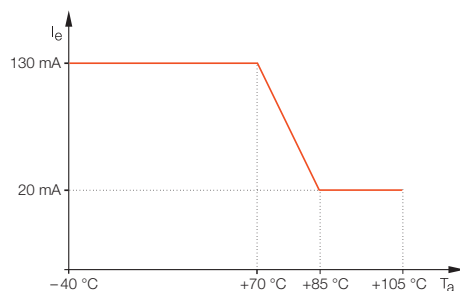
Housing size	M12x1	Ø 12 mm	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Non-flush	Non-flush	
Rated switching distance s_n	4 mm	4 mm	4 mm	
Assured switching distance s_a	0...3.2 mm	0...3.2 mm	0...3.2 mm	
Sensing distance	1X	1X	1X	
PNP, NO	Ordering code Part number	BES0435 BES M12EI-PSC40B-S04G-L01	BES0431 BES G12EE1-PSY40F-S04G-L02	BES0443 BES G12EE1-PSY40F-S04G-L01
PNP, NC	Ordering code Part number	BES0434 BES M12EI-POC40B-S04G-L01		
NPN, NO	Ordering code Part number	BES0436 BES M12EI-NSC40B-S04G-L01		
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V	3.5 V	3.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	75 V DC	75 V DC	
Rated operating current I_e	200 mA	130 mA*	130 mA*	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+85 °C	-40...+105 °C	-40...+105 °C	
Switching frequency f max.	1000 Hz	400 Hz	400 Hz	
Degree of protection as per IEC 60529	IP 69K and IP 68 as per BWN Pr. 20	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	
Approvals	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	
Material	Housing Sensing surface	Stainless steel 1.4404 LCP	Stainless steel 1.4571 PEEK	Stainless steel 1.4571 PEEK
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

*Current decrease curve



IP 69K

IP 68
as per BWN

Stainless steel

H₂O₂ resistant



Inductive Sensors with Special Properties

Harsh environment sensors

Ø 18 mm, M18x1



Ø 18 mm	M18x1	M18x1	Ø 18 mm	M18 mm
Flush	Flush	Flush	Non-flush	Non-flush
5 mm	5 mm	8 mm	8 mm	8 mm
0...4 mm	0...4 mm	0...6.4 mm	0...6.4 mm	0...6.4 mm
1X	1X	1X	1X	1X
BES0439	BES0441	BES0437	BES043A	BES0442
BES G18EE1-PSY50B-S04G-L02	BES M18EE1-PSY50B-S04G-L01	BES M18EI-PSC80B-S04G-L01	BES G18EE1-PSY80F-S04G-L02	BES M18EE1-PSY80F-S04G-L01
		BES0438		
		BES M18EI-POC80B-S04G-L01		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
3.5 V	3.5 V	2.5 V	3.5 V	3.5 V
75 V DC	75 V DC	250 V AC (□)	75 V DC	75 V DC
130 mA*	130 mA*	200 mA	130 mA*	130 mA*
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-40...+105 °C	-40...+105 °C	-40...+85 °C	-40...+105 °C	-40...+105 °C
500 Hz	500 Hz	700 Hz	200 Hz	200 Hz
IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 20	IP 69K and IP 68 as per BWN Pr. 27	IP 69K and IP 68 as per BWN Pr. 27
CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant
Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4571
PEEK	PEEK	PEEK	PEEK	PEEK
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

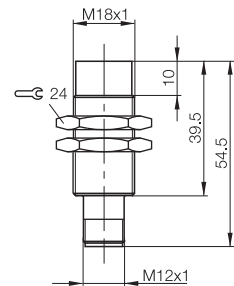
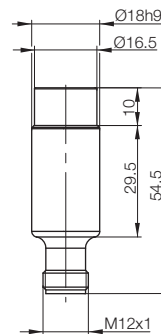
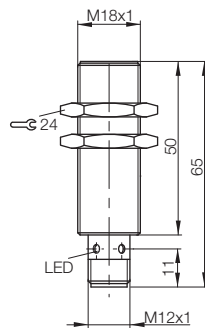
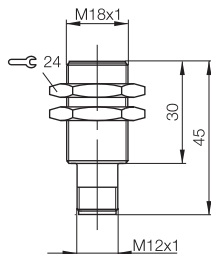
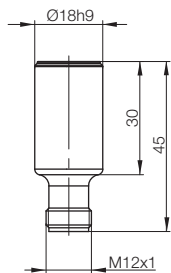
Large
designs

Ring sensors

Tube sensors

Analog
distance
measurement

Accessories





Inductive Sensors with Special Properties

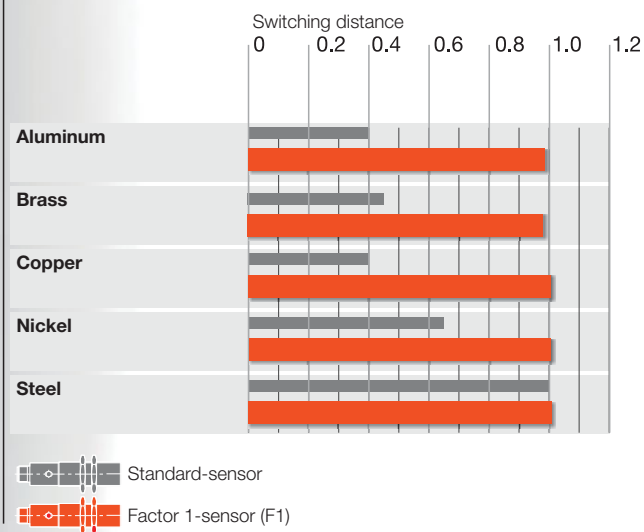
Factor 1

Factor 1 sensors identify objects, such as those made of steel, aluminum or brass, with identical switching distances (without reduction factor). These properties provide advantages in applications in which the material of the objects to be detected can vary, or non-ferrous metal can be detected with a high switching distance.

Moreover, all Factor 1-sensors are magnetic field immune. Their function is not impaired by strong electromagnetic fields (commonly found in welding applications). Factor 1-sensors are not influenced in their switching behavior by welding currents up to 25 kA (at a distance from the current conductor of approx. 5 cm).



Comparison of sensor types/switching distances





Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analog distance measurement

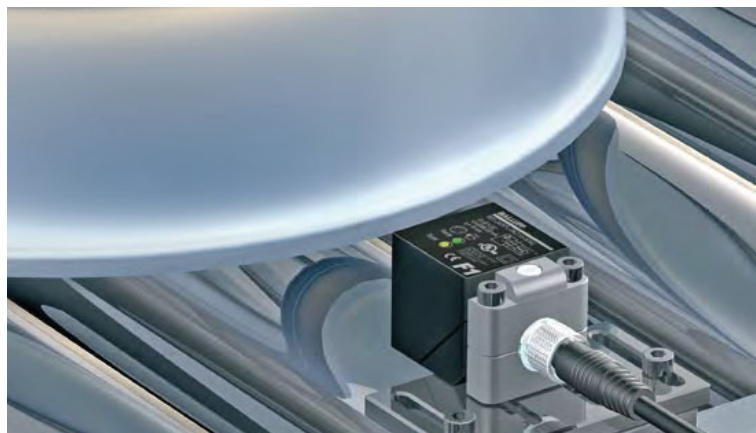
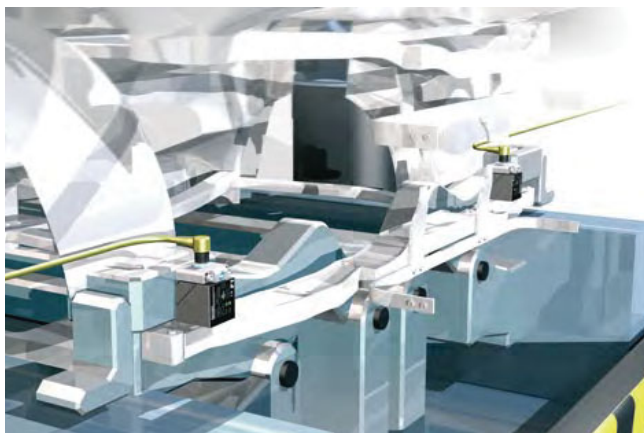
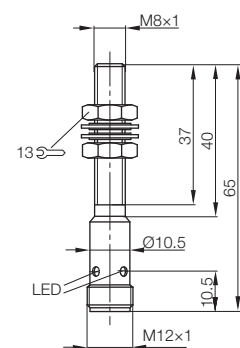
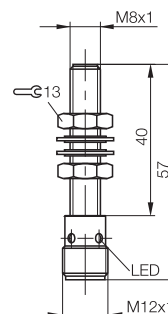
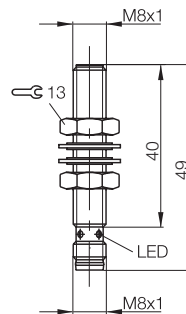
Accessories

Housing size		M8 x 1	M8 x 1	M8 x 1
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		1.5 mm	1.5 mm	2 mm
Assured switching distance s_a		0...1.2 mm	0...1.2 mm	0...1.6 mm
Sensing distance		1X	1X	1X
PNP, NO	Ordering code	BES02YR	BES02YT	BES03YP
	Part number	BES M08EG-PSC15A-S49G-W	BES M08EG1-PSC15A-S04G-W	BES M08MG1-PSC20A-S04G-W
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2.5 V	2.5 V	3 V
Rated insulation voltage U_i (protection class)		75 V DC	250 V AC (□)	75 V DC
Rated operating current I_e		150 mA	150 mA	100 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+70 °C
Switching frequency f max.		2 kHz	2 kHz	1 kHz
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approvals		CE	CE	CE
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
Material	Housing	Stainless steel, PTFE coated	Stainless steel, PTFE coated	Brass PTFE coated
	Sensing surface	PBT, PTFE coated	PBT, PTFE coated	LCP, PTFE coated
Connection		M8 connector, 3-pin	M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Inductive Sensors with Special Properties

Factor 1

M12x1

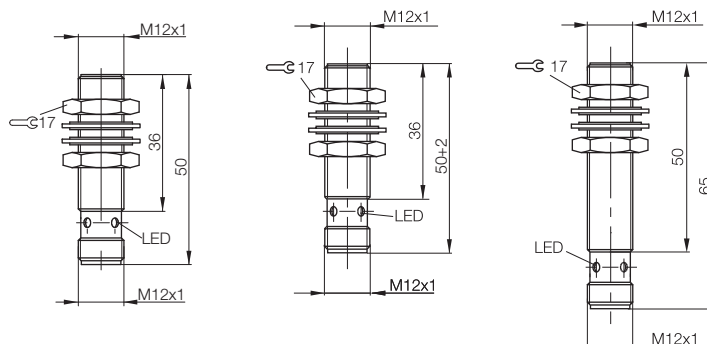


Housing size	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Rated switching distance s_n	3 mm	3 mm	3 mm	
Assured switching distance s_a	0...2.4 mm	0...2.4 mm	0...2.4 mm	
Sensing distance	2X	2X	2X	
PNP, NO	Ordering code	BES01PZ	BES02JZ	BES02K3
	Part number	BES M12MF-PSC30A-S04G	BES M12MF1-PSC30A-S04G-W	BES M12ML-PSC30A-S04G-W
NPN, NO	Ordering code			
	Part number			
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_o	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	2 kHz	2 kHz	2 kHz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE	CE	CE	
Special properties	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	Brass, coated	Brass, PTFE coated	Brass, PTFE coated
	Sensing surface	LCP, PTFE coated	LCP, PTFE coated	LCP, PTFE coated
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**





M12x1	M12x1	M12x1	M12x1	M12x1
Flush	Flush	Non-flush	Non-flush	Non-flush
3 mm	4 mm	8 mm	8 mm	8 mm
0...2.2 mm	0...3.2 mm	0...6.5 mm	0...6.5 mm	0...6.5 mm
2X	1X	2X	2X	2X
BES02K4	BES0452	BES01PW	BES02JW	
BES M12ML-PSC30A-S04G-W01	BES M12MG-PSC40A-S04G-W12	BES M12MD-PSC80E-S04G	BES M12MD1-PSC80E-S04G-W	
				BES02YU
				BES M12MD1-NSC80E-S04G
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	3 V	2.5 V	2.5 V	2.5 V
250 V AC (□)	60 V DC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
2 kHz	2 kHz	2 kHz	2 kHz	2 kHz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE	CE	CE	CE	CE
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
Brass, PTFE coated	Brass, PTFE coated	Brass, coated	Brass, PTFE coated	Brass, coated
Ceramic coating	PPS	LCP, PTFE coated	LCP, PTFE coated	PA 12
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

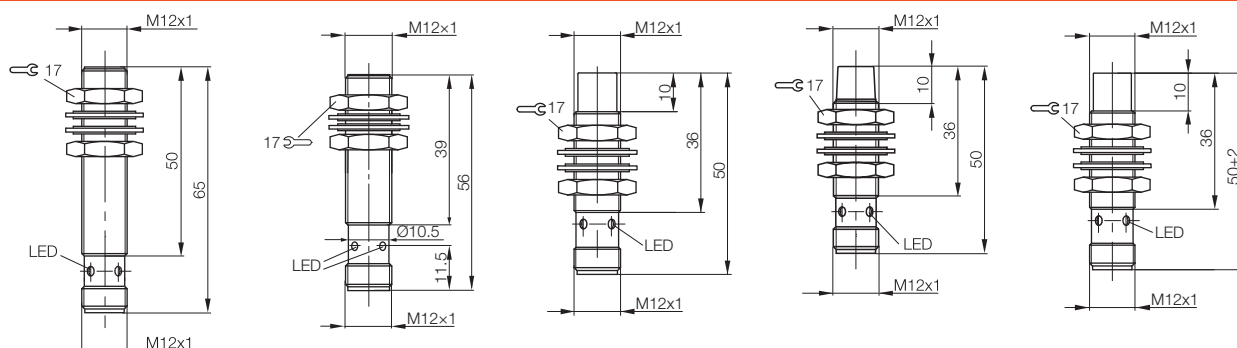
Large
designs

Ring sensors

Tube sensors

Analog
distance
measurement

Accessories



Inductive Sensors with Special Properties

Factor 1

M12x1, M18x1

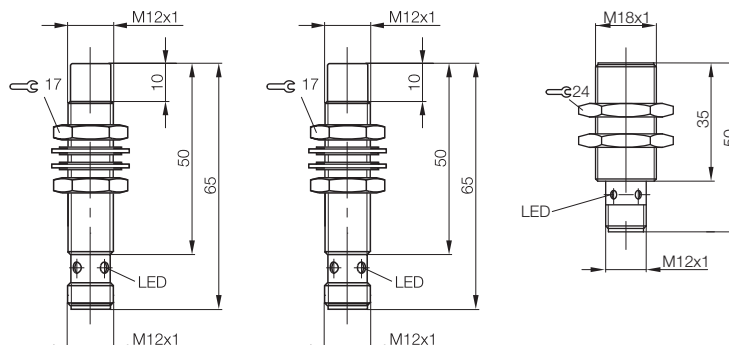


		M12x1	M12x1	M18x1	
Housing size		M12x1	M12x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)		Non-flush	Non-flush	Flush	
Rated switching distance s_n		8 mm	8 mm	5 mm	
Assured switching distance s_a		0...6.5 mm	0...6.3 mm	0...4 mm	
Sensing distance		2X	2X	1X	
PNP, NO	Ordering code	BES02K5	BES02K6	BES01R3	
	Part number	BES M12ML-PSC80E-S04G-W	BES M12ML-PSC80E-S04G-W01	BES M18MF-PSC50A-S04G	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.		2 kHz	2 kHz	2.5 kHz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE	CE	CE	
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	Brass, PTFE coated	Brass, PTFE coated	Brass, coated	
	Sensing surface	LCP, PTFE coated	Ceramic coating	LCP, PTFE coated	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.





Inductive Sensors with Special Properties

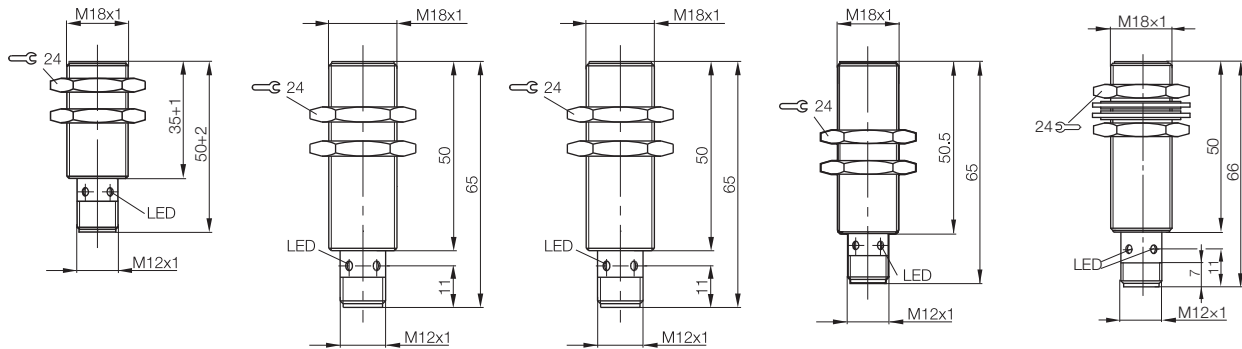
Factor 1 M18x1



M18x1	M18x1	M18x1	M18x1	M18x1
Flush	Flush	Flush	Flush	Flush
5 mm	5 mm	5 mm	5 mm	8 mm
0...4 mm	0...4 mm	0...3.9 mm	0...4 mm	0...6.4 mm
1X	1X	1X	1X	2X
BES02K9	BES02KJ	BES02KK	BES01R1	BES03YT
BES M18MF1-PSC50A-S04G-W	BES M18ML-PSC50A-S04G-W	BES M18ML-PSC50A-S04G-W01	BES M18EL-PSH50A-S04G	BES M18MG-PSC80A-S04G-W
10...30 V DC	10...30 V DC	10...30 V DC	10...55 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2 V	3 V
250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	60 V DC (□)
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
2.5 kHz	2.5 kHz	2.5 kHz	600 Hz	350 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 67	IP 67	IP 67	IP 67	IP 67
CE	CE	CE	CE	CE
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Stainless steel	Brass, PTFE coated
LCP, PTFE coated	LCP, PTFE coated	Ceramic coating	LCP	PPS
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties**
- High-pressure sensors
- Strokemaster sensors
- Steelface sensors
- High temperature sensors
- Harsh environment sensors
- Factor 1 sensors
- Weld field immune sensors
- Large designs
- Ring sensors
- Tube sensors
- Analog distance measurement
- Accessories



Inductive Sensors with Special Properties

Factor 1

M18x1

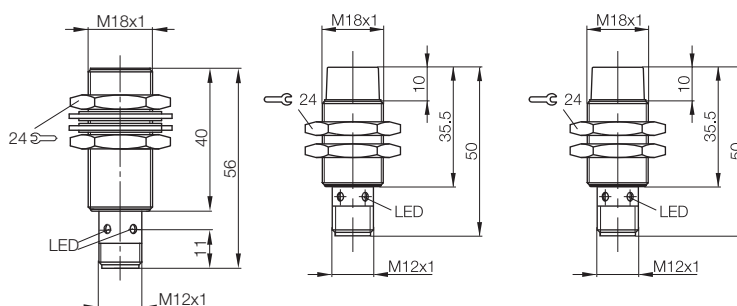


Housing size	M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Non-flush	Non-flush	
Rated switching distance s_n	8 mm	12 mm	12 mm	
Assured switching distance s_a	0...6.4 mm	0...9.7 mm	0...9.7 mm	
Sensing distance	2X	2X	2X	
PNP, NO	Ordering code	BES03YU	BES01R2	BES02K7
	Part number	BES M18MI-PSC80A-S04G-W	BES M18MD-PSC12E-S04G	BES M18MD-PSC12E-S04G-W
PNP, NC	Ordering code			
	Part number			
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.	3 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)	60 V DC (□)	250 V AC (□)	250 V AC (□)	
Rated operating current I_e	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.	600 Hz	2.5 kHz	2.5 kHz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE	CE	CE	
Special properties	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	Brass, PTFE coated	Brass, coated	Brass, PTFE coated
	Sensing surface	PPS	LCP, PTFE coated	LCP, PTFE coated
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**





Inductive Sensors with Special Properties

Factor 1 M18x1



M18x1	M18x1	M18x1	M18x1	
Non-flush	Non-flush	Non-flush	Quasi-flush	
12 mm	12 mm	12 mm	12 mm	
0...9.7 mm	0...9.5 mm	0...10.8 mm	0...9.7 mm	
2X	2X	2X	2X	
BES02KF	BES02KH		BES03YW	
BES M18ML-PSC12E-S04G-W	BES M18ML-PSC12E-S04G-W01		BES M18MG-PSC12A-S04G-W	
		BES01R0		
		BES M18EL-POC12E-S04G		
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	2.5 V	2 V	3 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	60 V DC (□)	
200 mA	200 mA	200 mA	200 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	
2.5 kHz	2.5 kHz	300 Hz	600 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	
CE	CE	CE	CE	
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Brass, PTFE coated	Brass, PTFE coated	Stainless steel	Brass, PTFE coated	
LCP, PTFE coated	Ceramic coating	LCP	PPS	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

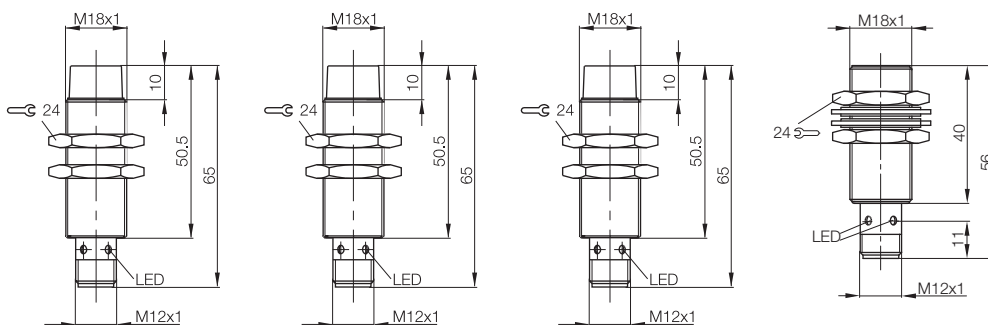
Large
designs

Ring sensors

Tube sensors

Analog
distance
measurement

Accessories



Inductive Sensors with Special Properties

Factor 1

M30x1.5

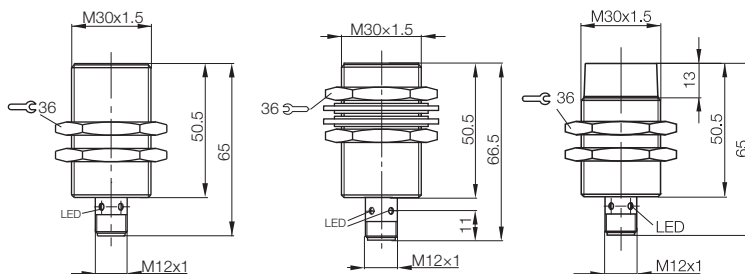


Housing size		M30x1.5	M30x1.5	M30x1.5	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Non-flush	
Rated switching distance s_n		10 mm	15 mm	20 mm	
Assured switching distance s_a		0...8.1 mm	0...12.1 mm	0...16 mm	
Sensing distance		1X	2X	2X	
PNP, NO	Ordering code	BES02KM	BES0454	BES02KP	
	Part number	BES M30ML-PSC10A-S04G-W	BES M30MI-PSC15A-S04G-W12	BES M30ML-PSC20E-S04G-W	
PNP, complementary	Ordering code				
	Part number				
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	3 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (□)	60 V DC (□)	250 V AC (□)	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+70 °C	
Switching frequency f max.		600 Hz	250 Hz	1 kHz	
Output function/power-on indicator		Yellow LED/No	Yellow LED/No	Yellow LED/No	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE	CE	CE	
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	
	Sensing surface	LCP, PTFE coated	LCP, PTFE coated	LCP, PTFE coated	
Possible installation variations					
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**

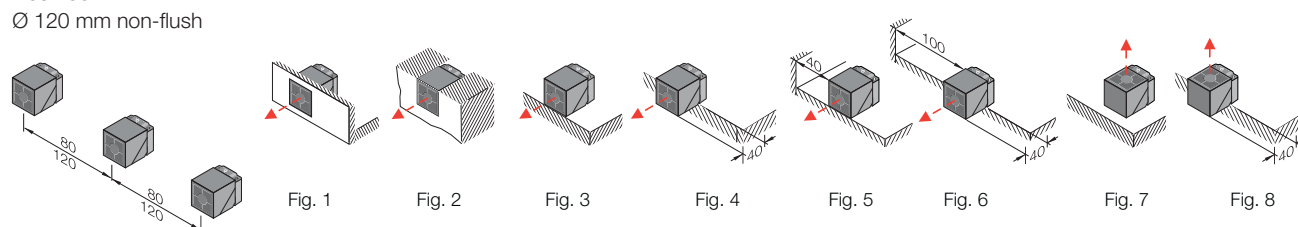


Row mounting

Flush 80 mm

Ø 120 mm non-flush

Permissible installation options





Inductive Sensors with Special Properties

Factor 1

M30×1.5, 40×40 mm Unicomact



M30×1.5	40×40 mm	40×40 mm
Non-flush	Flush	Flush
20 mm	15 mm	15 mm
0...16 mm	0...11.9 mm	0...11.9 mm
2X	1X	1X
BES03MZ	BES021P	BES021T
BES M30ML-PSC20E-S04G-W01	BES Q40KFU-PSC15A-S04G	BES Q40KFU-PSC15A-S04G-W01
	BES022K	BES0214
	BES Q40KFU-PAC15A-S04G	BES Q40KFU-PAC15A-S04G-W01
10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C
1 kHz	400 Hz	400 Hz
Yellow LED/No	Green LED/Yellow LED	Green LED/Yellow LED
IP 67	IP 67	IP 67
CE	CE	CE
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
Brass, PTFE coated	PBT	PBT, ceramic coating
Ceramic coating	PBT	PBT, ceramic coating
	Fig. 1...8	Fig. 1...8
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

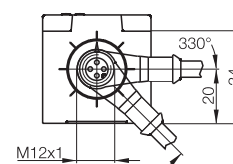
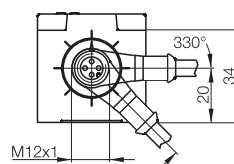
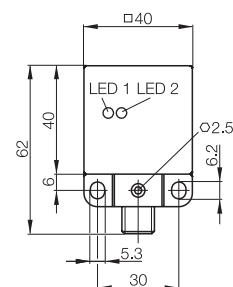
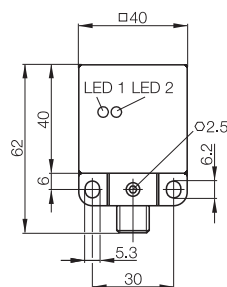
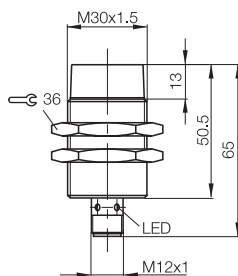
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



Inductive Sensors with Special Properties

Factor 1

40x40 mm Unicomact

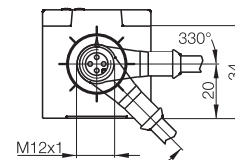
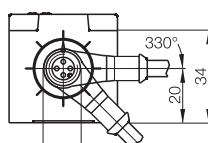
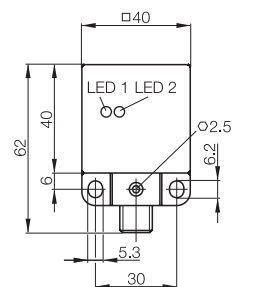
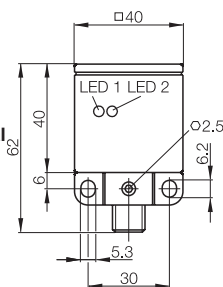


Housing size		40x40 mm	40x40 mm	
Installation type (observe instructions in the Basic Information chapter)		Flush	Non-flush	
Rated switching distance s_n		20 mm	25 mm	
Assured switching distance s_a		0...16 mm	0...20.2 mm	
Sensing distance		2X	1X	
PNP, NO	Ordering code	BES021U		
	Part number	BES Q40KFU-PSC20A-S04G		
PNP, complementary	Ordering code	BES0216	BES021A	
	Part number	BES Q40KFU-PAC20A-S04G	BES Q40KFU-PAC25E-S04G	
Supply voltage U_B		10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	250 V AC (II)	
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.		400 Hz	250 Hz	
Output function/power-on indicator		Green LED/Yellow LED	Green LED/Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	
Approvals		CE	CE	
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	PBT	PBT	
	Sensing surface	PBT	PBT	
Possible installation variations		Fig. 1...8	Fig. 3...8	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.

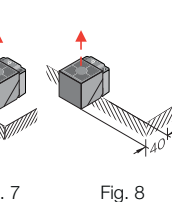
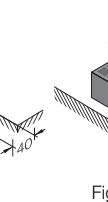
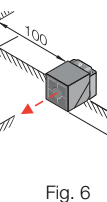
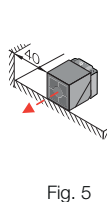
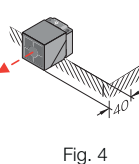
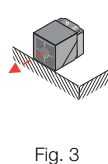
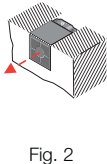
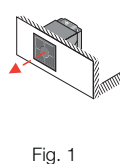
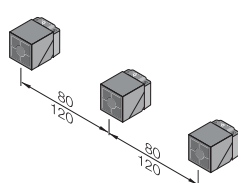


Row mounting

Flush 80 mm

Ø 120 mm non-flush

Permissible installation options





Inductive Sensors with Special Properties

Factor 1

40x40 mm Unicomact



40x40 mm	40x40 mm	40x40 mm
Non-flush	Non-flush	Non-flush
35 mm	35 mm	40 mm
0...28.4 mm	0...28.1 mm	0...32.4 mm
1X	1X	2X
BES0220	BES0221	BES0223
BES Q40KFU-PSC35E-S04G	BES Q40KFU-PSC35E-S04G-W01	BES Q40KFU-PSC40E-S04G
BES021H	BES021K	
BES Q40KFU-PAC35E-S04G	BES Q40KFU-PAC35E-S04G-W01	
10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V
250 V AC (□)	250 V AC (□)	250 V AC (□)
200 mA	200 mA	200 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-10...+70 °C	-10...+70 °C	-10...+70 °C
250 Hz	250 Hz	100 Hz
Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED
IP 67	IP 67	IP 67
CE	CE	CE
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
PBT	PBT, ceramic coating	PBT
PBT	PBT, ceramic coating	PBT
Fig. 3...8	Fig. 4...8	Fig. 4...8
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

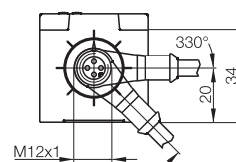
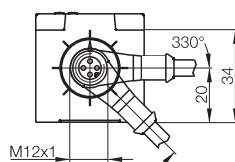
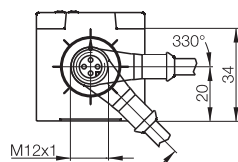
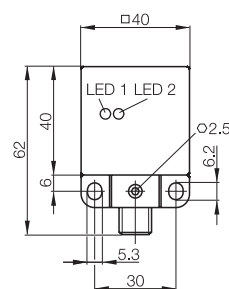
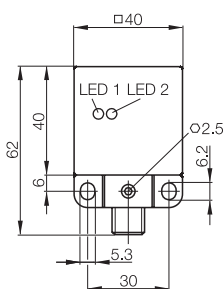
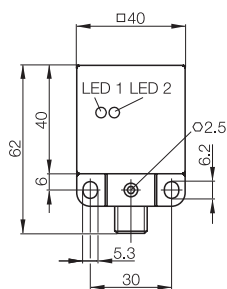
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



Inductive Sensors with Special Properties

Weld field immune sensors/Factor 1

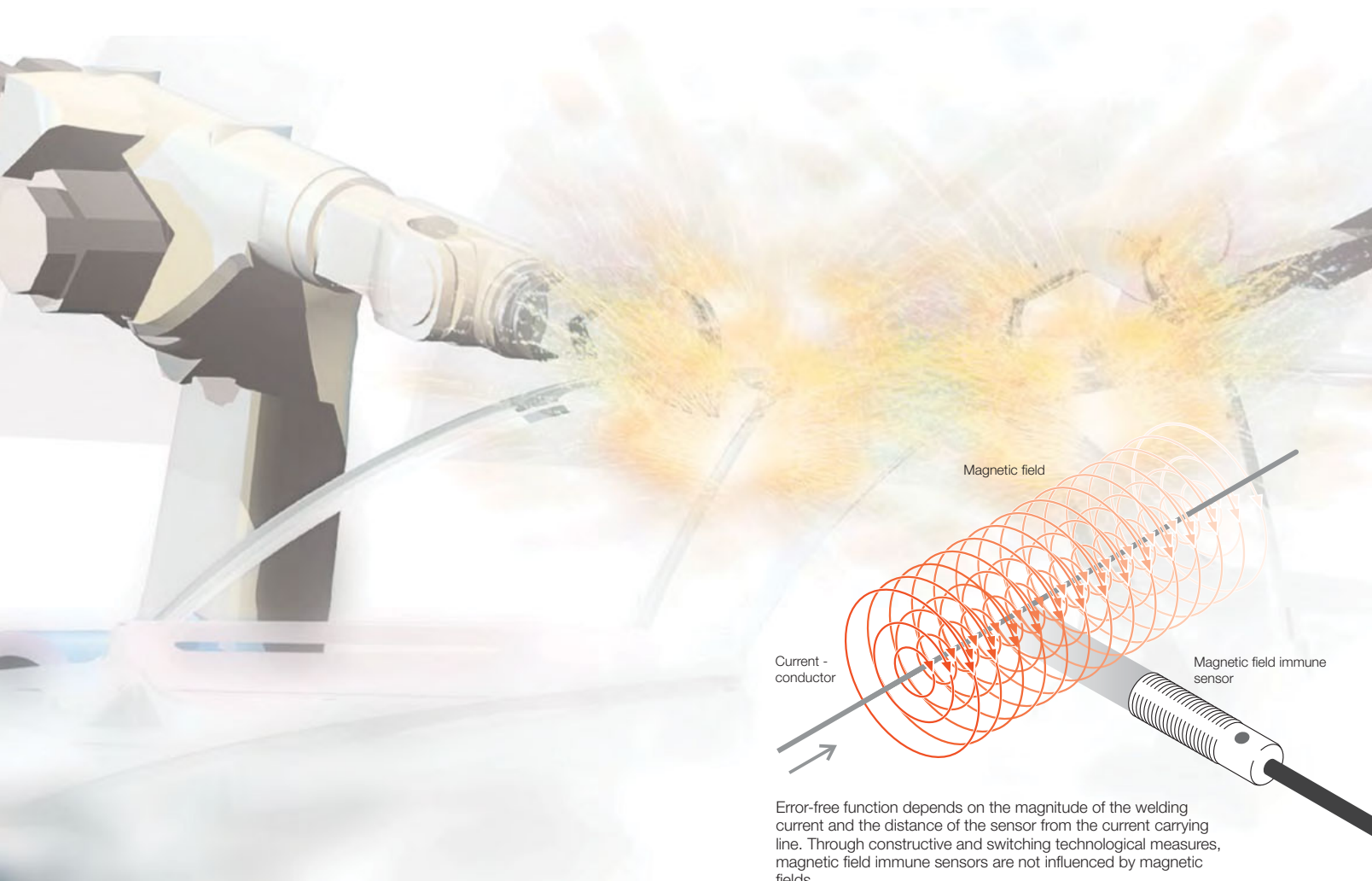
Weld field immune/Factor 1

Weld-immune sensors – for rough industrial applications

Magnetic field immune: Insensitive to magnetic fields which are created from electrical weld currents up to 25 kA (at a distance to the current conductor of approx. 5 cm).

Weld spatter-resistant: Resistant to weld slag which is created during welding processes.

Factor 1: Identical switching distance with metals such as steel, stainless steel, aluminum or brass.



Error-free function depends on the magnitude of the welding current and the distance of the sensor from the current carrying line. Through constructive and switching technological measures, magnetic field immune sensors are not influenced by magnetic fields.

Inductive Sensors with Special Properties

Weld field immune sensors

M12x1



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analog distance measurement

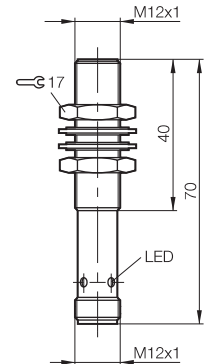
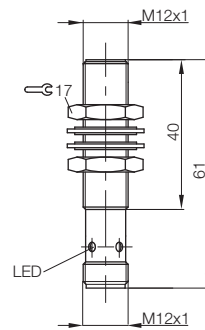
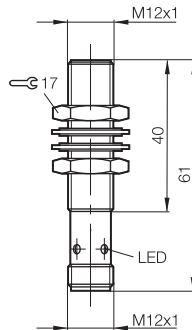
Accessories

Housing size		M12x1	M12x1	M12x1
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Flush
Rated switching distance s_n		2 mm	2 mm	2 mm
Assured switching distance s_a		1.6 mm	1.6 mm	1.6 mm
Sensing distance		1X	1X	1X
PNP, NO	Ordering code	BES02J6	BES02J5	BES02J7
	Part number	BES 516-325-S4-W	BES 516-325-S4-CW	BES 516-325-S4-WR
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2.5 V	2.5 V	2.5 V
Rated insulation voltage U_i (protection class)		250 V AC (II)	250 V AC (II)	75 V DC
Rated operating current I_e		200 mA	200 mA	200 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+70 °C
Switching frequency f max.		1 kHz	1 kHz	1 kHz
Output function indicator		Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approvals		CE	CE	CE
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
Material	Housing	Brass, PTFE coated	Stainless steel, PTFE coated	Stainless steel
	Sensing surface	LCP, PTFE coated	PTFE	Ceramic
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



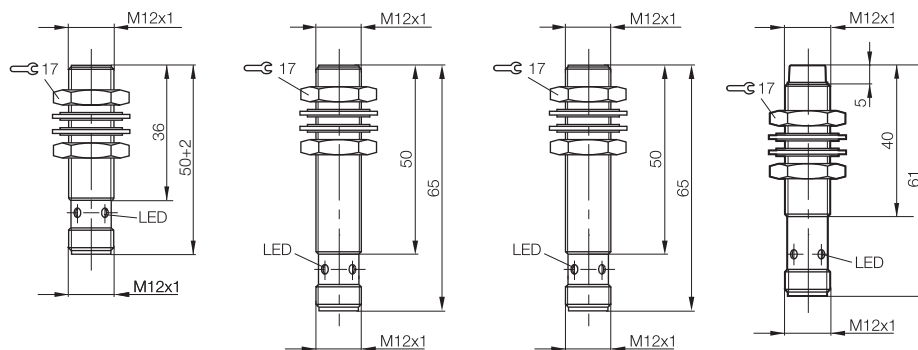


Housing size	M12x1	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	Non-flush	
Rated switching distance s_n	3 mm	3 mm	3 mm	4 mm	
Assured switching distance s_a	2.2 mm	2.4 mm	2.2 mm	3.2 mm	
Sensing distance	2X	2X	2X	1X	
PNP, NO	Ordering code	BES02K0	BES02K1	BES02K2	BES02JN
	Part number	BES M12MF1-PSC30A-S04G-W01	BES M12MI-PSC30B-S04G-W	BES M12MI-PSC30B-S04G-W01	BES 516-356-S4-W
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	2.5 V	2.5 V	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	250 V AC (II)	250 V AC (II)	250 V AC (II)	
Rated operating current I_o	200 mA	200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	-5...+60 °C	-5...+60 °C	-25...+70 °C	
Switching frequency f max.	2 kHz	300 Hz	300 Hz	1 kHz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	IP 67	
Approvals	CE	CE	CE	CE	
Special properties	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Stainless steel, PTFE coated
	Sensing surface	Ceramic coating	LCP, PTFE coated	Ceramic coating	PTFE
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



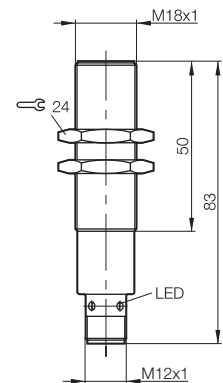
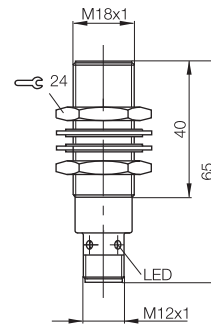
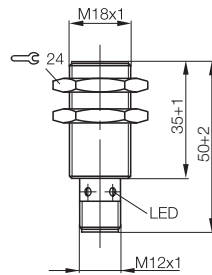
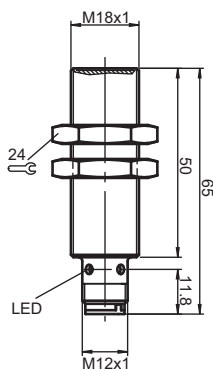
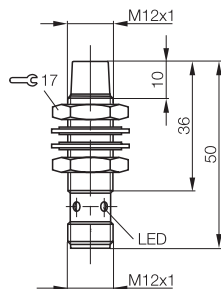
Inductive Sensors with Special Properties

Weld field immune sensors

M12x1, M18x1



M12x1	M18x1	M18x1	M18x1	M18x1	M18x1
Non-flush	Flush	Flush	Flush	Flush	Flush
8 mm	4 mm	5 mm	5 mm	5 mm	5 mm
6.3 mm	3.2 mm	3.9 mm	4 mm	4 mm	4 mm
2X	1X	1X	1X	1X	1X
BES02JY	BES03MY	BES02KA	BES02JA	BES02JC	
BES M12MD1-PSC80E-S04G-W01	BES M18MI-PSC40B-S04G-W03	BES M18MF1-PSC50A-S04G-W01	BES 516-326-S4-W	BES 516-326-S4-WR	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	2.5 V	2.5 V	1.5 V	2.5 V	
250 V AC (□)	75 V DC (□)	250 V AC (□)	250 V AC (□)	75 V DC	
200 mA	200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	
2 kHz	50 Hz	2.5 kHz	500 Hz	100 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	IP 67	
CE	CE	CE	CE	CE	
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	
Ceramic coating	Ceramic coating	Ceramic coating	PTFE	Ceramic	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

Large
designs

Ring sensors

Tube sensors

Analog
distance
measurement

Accessories

Inductive Sensors with Special Properties

Weld field immune sensors/Factor 1 M18x1

Weld field immune/Factor 1

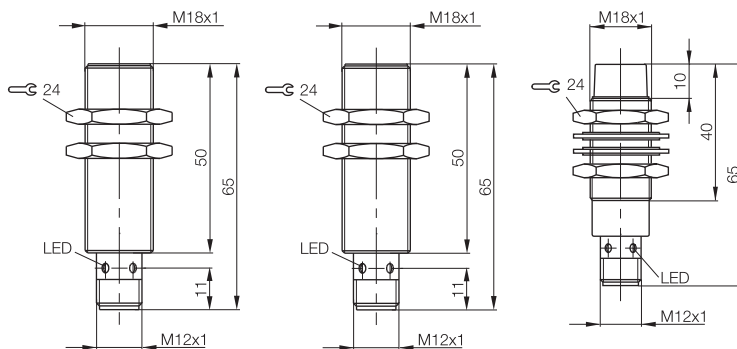


Housing size		M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)		Flush	Flush	Non-flush	
Rated switching distance s_n		7 mm	7 mm	8 mm	
Assured switching distance s_a		5.6 mm	5.5 mm	6.4 mm	
Sensing distance		2X	2X	1X	
PNP, NO	Ordering code	BES02KC	BES02KE	BES02JR	
	Part number	BES M18MI-PSC70B-S04G-W	BES M18MI-PSC70B-S04G-W01	BES 516-360-S4-W	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e max.		2.5 V	2.5 V	1.5 V	
Rated insulation voltage U_i (protection class)		250 V AC (II)	250 V AC (II)	75 V DC	
Rated operating current I_e		200 mA	200 mA	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-5...+60 °C	-5...+60 °C	-25...+70 °C	
Switching frequency f max.		50 Hz	50 Hz	200 Hz	
Output function indicator		Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approvals		CE	CE	CE	
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Material	Housing	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	
	Sensing surface	LCP, PTFE coated	Ceramic coating	PTFE	
Connection		M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



Inductive Sensors with Special Properties

Weld field immune sensors/Factor 1

M18x1, M30x1.5



M18x1	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5
Non-flush	Flush	Flush	Flush	Flush	Flush
12 mm	10 mm	10 mm	10 mm	10 mm	13 mm
9.5 mm	8.1 mm	7.9 mm	8.1 mm	8.1 mm	10.5 mm
2X	1X	1X	1X	1X	1X
BES02K8	BES02JJ	BES02KN	BES02JK	BES02KL	
BES M18MD-PSC12E-S04G-W01	BES 516-327-S4-W	BES M30ML-PSC10A-S04G-W01	BES 516-327-S4-WR	BES M30MI-PSC13B-S04G-W	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
2.5 V	1.5 V	2.5 V	2.5 V	2.5 V	
250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC	250 V AC (□)	
200 mA	200 mA	200 mA	200 mA	200 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-5...+60 °C	
2.5 Hz	100 Hz	600 Hz	50 Hz	30 Hz	
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED	
IP 67	IP 67	IP 67	IP 67	IP 67	
CE	CE	CE	CE	CE	
Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	
Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	
Ceramic coating	PTFE	Ceramic coating	Ceramic	LCP, PTFE coated	
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

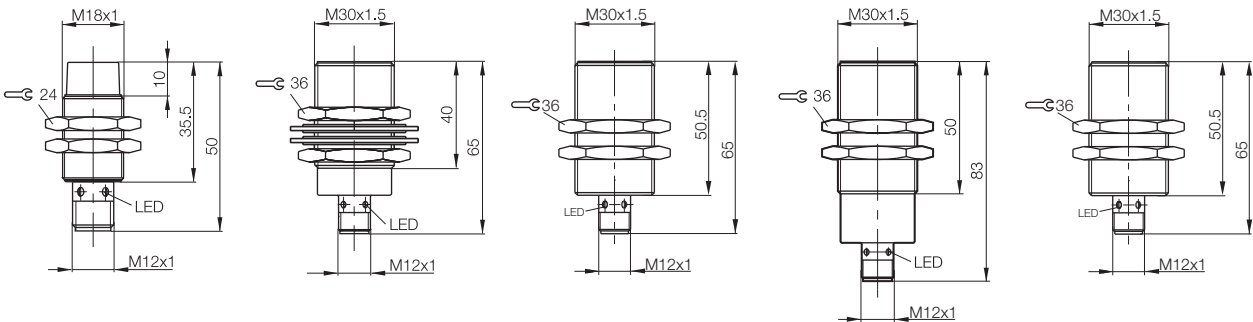
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



Inductive Sensors with Special Properties

Weld field immune sensors/Factor 1

M30×1.5, 32×20×8 mm R01

Weld field immune/Factor 1

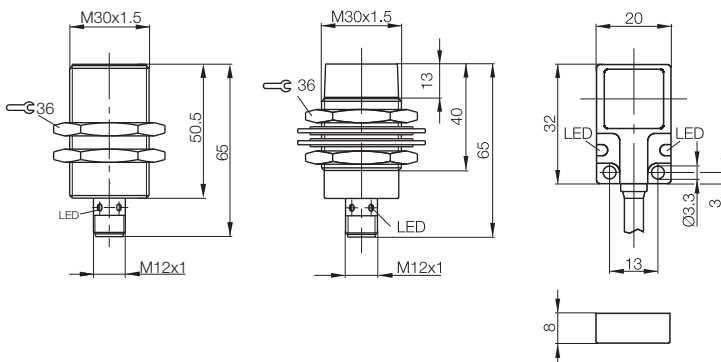


Housing size		M30×1.5	M30×1.5	32×20×8 mm R01
Installation type (observe instructions in the Basic Information chapter)		Flush	Non-flush	Flush
Rated switching distance s_n		13 mm	15 mm	5 mm
Assured switching distance s_a		10.3 mm	12.2 mm	4 mm
Sensing distance		1X	1X	1X
PNP, NO	Ordering code	BES03F1	BES02JU	BES02KW
	Part number	BES M30MI-PSC13B-S04G-W01	BES 516-362-S4-W	BES R01ZC-PSC50B-BX05-W01
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e max.		2.5 V	1.5 V	2.5 V
Rated insulation voltage U_i (protection class)		250 V AC (□)	250 V AC (□)	75 V DC
Rated operating current I_e		200 mA	200 mA	200 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-5...+60 °C	-25...+70 °C	-25...+70 °C
Switching frequency f max.		30 Hz	100 Hz	100 Hz
Output function/power-on indicator		Yellow LED/No	Yellow LED/No	Green LED/Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approvals		CE	CE	CE
Special properties		Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields	Interference-proof against magnetic AC and DC fields
Material	Housing	Brass, PTFE coated	Brass, PTFE coated	Cast zinc
	Sensing surface	Ceramic coating	PTFE	Ceramic coating
Connection		M12 connector, 4-pin	M12 connector, 4-pin	5 m PUR cable cross-linked, 24 AWG
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966) for installation instructions.

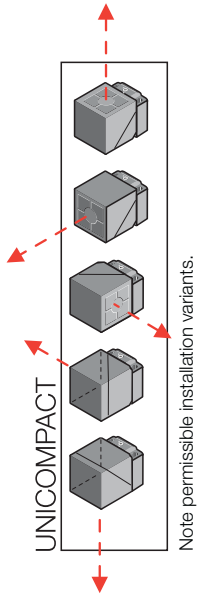
For wiring diagram see page 958.

Additional cable lengths and PUR cable jacket material available on request.



Inductive Sensors with Special Properties

Weld field immune sensors/Factor 1 40x40 mm Unicomact

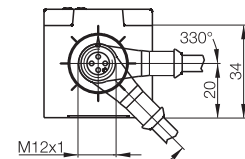
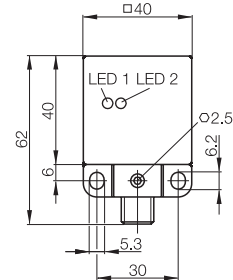


Housing size	40×40×62 mm	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	
Rated switching distance s_n	40 mm	
Assured switching distance s_a	32.4 mm	
Sensing distance	2X	
PNP, complementary	Ordering code	BES02JR
	Part number	BES Q40KFU-PAC40E-S04G
Supply voltage U_B	10...30 V DC	
Voltage drop U_d at I_e max.	2.5 V	
Rated insulation voltage U_i (protection class)	250 V AC (II)	
Rated operating current I_e	200 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-10...+70 °C	
Switching frequency f max.	100 Hz	
Output function/power-on indicator	Green LED/Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE	
Special properties	Interference-proof against magnetic AC and DC fields	
Material	Housing	PBT
	Sensing surface	PBT
Possible installation variations	Fig. 3...8	
Connection	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket material
available on request.**



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

**Special
properties**

High-pressure
sensors

Strokemaster
sensors

Steelface
sensors

High
temperature
sensors

Harsh
environment
sensors

Factor 1
sensors

Weld field
immune
sensors

Large
designs

Ring sensors

Tube sensors

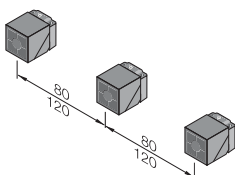
Analog
distance
measurement

Accessories

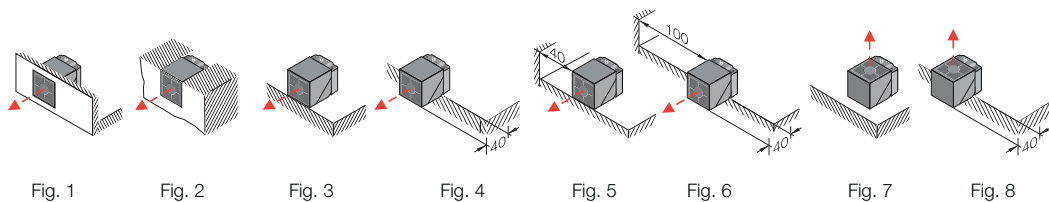
Row mounting

Flush 80 mm

Ø 120 mm non-flush



Permissible installation options



Inductive Sensors with Special Properties

Large housing

Extended switching distance

Large Housing Sensors

Certain inductive sensor applications call for exceptionally long sensing ranges. With their large-diameter sensing coils, Balluff's large housing inductive sensors meet these requirements. Available in round housing diameters from 80 mm to 163 mm and in rectangular housing dimensions of 100x35x35 mm or 200x35x35 mm, with sensing distances up to 100 mm in some models. A choice of AC or DC versions suit a wide range of control interface needs.

- AC Long Range Pancake Style
- DC Long Range Pancake Style
- Bar Style



Inductive Sensors with Special Properties

AC long range pancake style



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analogue distance measurement

Accessories

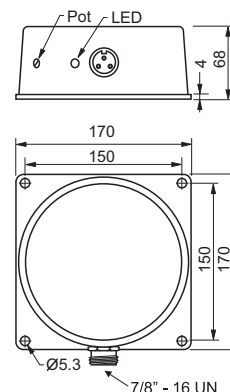
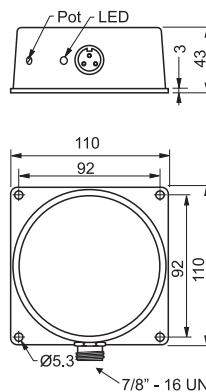
Housing size	Ø 100 mm	Ø 163 mm
Mounting	non-flush	non-flush
Rated operating distance S_n	35-105 mm	50-120 mm
AC Normally-open	Ordering code BES02T0	BES02T5
	Part number BES IKN-S5-070-W-4-S	BES IKO-S5-100-W-4-S
AC Normally-closed	Ordering code BES02T0	BES02T4
	Part number BES IKN-S5-070-W-4-O	BES IKO-S5-100-W-4-O
Nominal sensing distance S_n	70mm	100mm
Adjustable range	35...105mm	50...120 mm
Supply voltage	15-350 Vdc, 20-260 Vac	85-140 Vac
Supply frequency	45-65 Hz	45-65 Hz
Target	Steel, 1 mm thick	Steel, 1 mm thick
Switching hysteresis	$\leq 15\%$ of S_n	$\leq 15\%$ of S_n
Repeatability	$\leq 5\%$ of S_n	$\leq 5\%$ of S_n
Ambient temperature range	-25° C...+70° C	-25° C...+70° C
Temperature drift	$\leq 5\%$ of S_n	$\leq 10\%$ of S_n
Function display	LED	LED
Current consumption minimum	5 mA	5 mA
Current consumption maximum	300 mA	500 mA
Short-time load current maximum	1 A/100 msec	1 A/100 msec
Short circuit protection	yes	yes
Leakage current	≤ 1.5 ma @ 110 Vac	≤ 1.5 ma @ 110 Vac
Voltage drop V_d	≤ 10 V at 5 mA load	≤ 10 V at 5 mA load
Overload protection	yes	yes
Housing material	Makrolon Polyester	Makrolon Polyester
Mounting type	Surface mounting - 4 mounting holes	Surface mounting - 4 mounting holes
Protection class per DIN 40050	IP 67, NEMA 4, 4X, 6, 12, 13	IP 67, NEMA 4, 4X, 6, 12, 13
Recommended connector	BCC A313-0000-10-071-VX43W6-050	BCC A313-0000-10-071-VX43W6-050

For wiring diagram see page 958.

These sensors are specifically designed for use in heavy industrial environments such as:

- Automotive Manufacturing
- Steel Mills
- Assembly and Fabrication Lines
- Pipe and Rod Mills
- Conveyors

Additional models may be available. Refer to company website for details

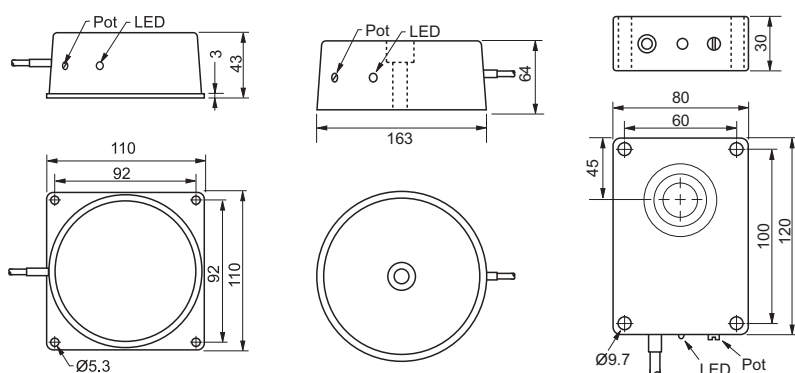




Housing size	Ø 100 mm	Ø 163 mm	120 x 80 x 30
Mounting	non-flush	non-flush	non-flush
Rated operating distance S_n	70 mm	100 mm	50 mm
PNP Normally-open	Ordering code BES02RW	BES02T2	BES02T8
	Part number BES IKN-K-070-P-1-S	BES IKO-K-100-P-1-S	BES IKRD-K-050-P-1-S
PNP Normally-closed	Ordering code		BES02T7
	Part number		BES IKRD-K-050-P-1-O
NPN Normally-open	Ordering code	BES02T1	BES02T6
	Part number	BES IKO-K-100-N-1-S	BES IKRD-K-050-N-1-S
Rated operational voltage U_e	24 Vdc	24 Vdc	24 Vdc
Supply voltage U_B	10...30 Vdc	10...30 Vdc	10...30 Vdc
Voltage drop U_d at I_e	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i	75 Vdc	75 Vdc	75 Vdc
Load current capacity	≤ 400 mA	≤ 500 mA	≤ 200 mA
Current consumption (closed/open)	≤ 25 mA / ≤ 12 mA	≤ 25 mA / ≤ 12 mA	≤ 25 mA / ≤ 12 mA
Protected against polarity reversal	yes	yes	yes
Short circuit protected	yes	yes	yes
Load capacitance	≤ 1 µF	≤ 1 µF	≤ 1 µF
	≤ 5%	≤ 5%	≤ 5%
Repeat accuracy R	-25°...+70°C	-25°...+70°C	-25°...+70°C
Ambient temperature range T_a	80 Hz	100 Hz	100 Hz
Operating frequency f	yes	yes	yes
Function indication	IP 67*	IP 67*	IP 67*
Degree of protection per IEC 60529	plastic PBT	plastic	plastic
Housing material	plastic PBT	plastic	plastic
Material of sensing face	cable	cable	cable
Connection	3 x 22 AWG	3 x 22 AWG	3 x 22 AWG

* Meets IP67 when potentiometer cover screw is properly installed.

For wiring diagram see page 958.



Inductive Sensors with Special Properties

3-wire DC, 2-wire AC

Long range bar style



Housing size		100 x 35 x 35	100 x 35 x 35	150 x 35 x 35	150 x 35 x 35
Mounting		non-flush	non-flush	non-flush	non-flush
Rated operating distance S _n		5...45 mm adjustable	30 mm factory set	5...45 mm adjustable	12 mm factory set
PNP	Ordering code	BES02TC	BES02TE	BES02TH	BES02TK
Normally-open	Part number	BES IKU-011-P-1-S-S4-SA1	BES IKU-011.23-G-S4-SA2	BES IKU-015-23-G-S4	BES IKU-015.23-G-S4-SA1
Rated operational voltage		24 Vdc	24 Vdc	24 Vdc	24 Vdc
Supply voltage		10...30Vdc	10...30Vdc	10...30Vdc	10...30 Vdc
Voltage drop at output		≤ 2.0 V	≤ 2.0 V	≤ 2.0 V	≤ 2.0 V
Load current capacity		≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA
Reverse polarity protection		yes	yes	yes	yes
Short circuit protected		yes	yes	yes	yes
Ambient temperature range		-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
Operating frequency (max.)		50 Hz	50 Hz	50 Hz	50 Hz
Function indication		yes	yes	yes	yes
Degree of protection per IEC 60529		IP 65	IP 65	IP 65	IP 65
Housing material		plastic	plastic	plastic	plastic
Sensing face material		plastic	plastic	plastic	plastic
Connection		connector	connector	connector	connector
Recommended connector		BCC M415-0000-1A-003-VX44T2-050		BCC M415-0000-1A-003-VX44T2-050	

Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

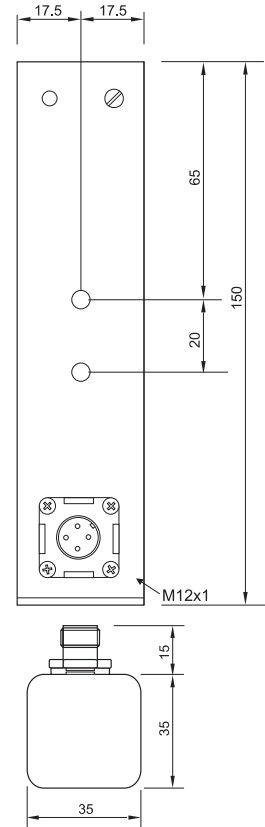
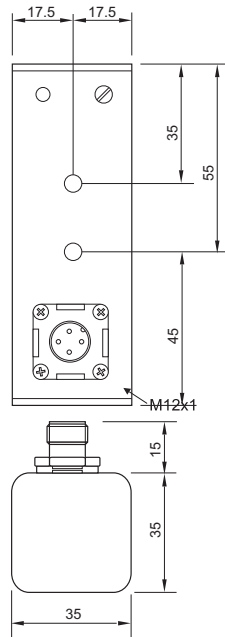
Ring sensors

Tube sensors

Analog distance measurement

Accessories

For wiring diagram see page 958.



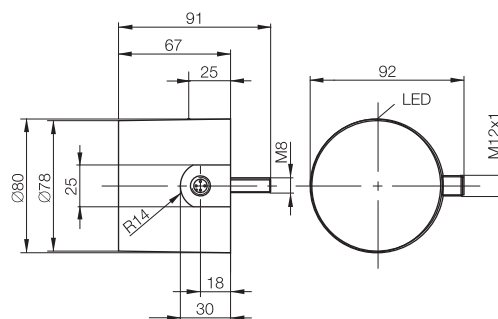


Housing size		Ø 80×67 mm	
Installation type (observe instructions in the Basic Information chapter)		Non-flush	
Rated switching distance s_n		50 mm	
Assured switching distance s_a		0...40.5 mm	
Sensing distance		1X	
PNP, NO	Ordering code	BES02RN	
	Part number	BES IKJ-S-050-P-2-S-S4-C	
PNP, complementary	Ordering code		
	Part number		
Supply voltage U_B		10...55 V DC	
Voltage drop U_d at I_e max.		2 V	
Rated insulation voltage U_i		75 V DC	
Rated operating current I_e		200 mA	
Output resistance R_a		Open collector	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	
Ambient temperature T_a		-25...+70 °C	
Switching frequency f max.		100 Hz	
Output function/power-on indicator		Red LED/No	
Degree of protection as per IEC 60529		IP 67	
Approvals		CE	
Material	Housing	PBT	
	Sensing surface	PBT	
Connection		M12 connector, 4-pin	
Suggested mating cable		BCC M415-0000-1A-003-EX44T2-020	

See technical section (page 963-966)
for installation instructions.

For wiring diagram see page 958.

**Additional cable lengths and PUR cable jacket
material available on request.**



Inductive Sensors with Special Properties

Large designs



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

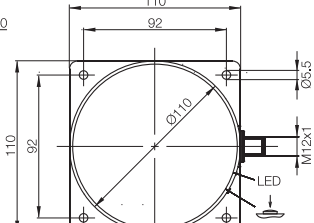
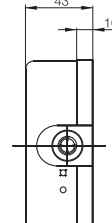
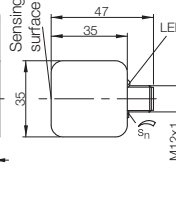
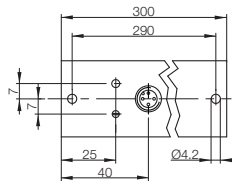
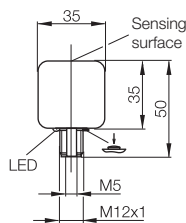
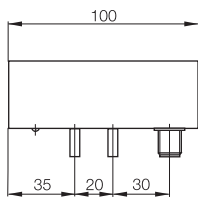
Ring sensors

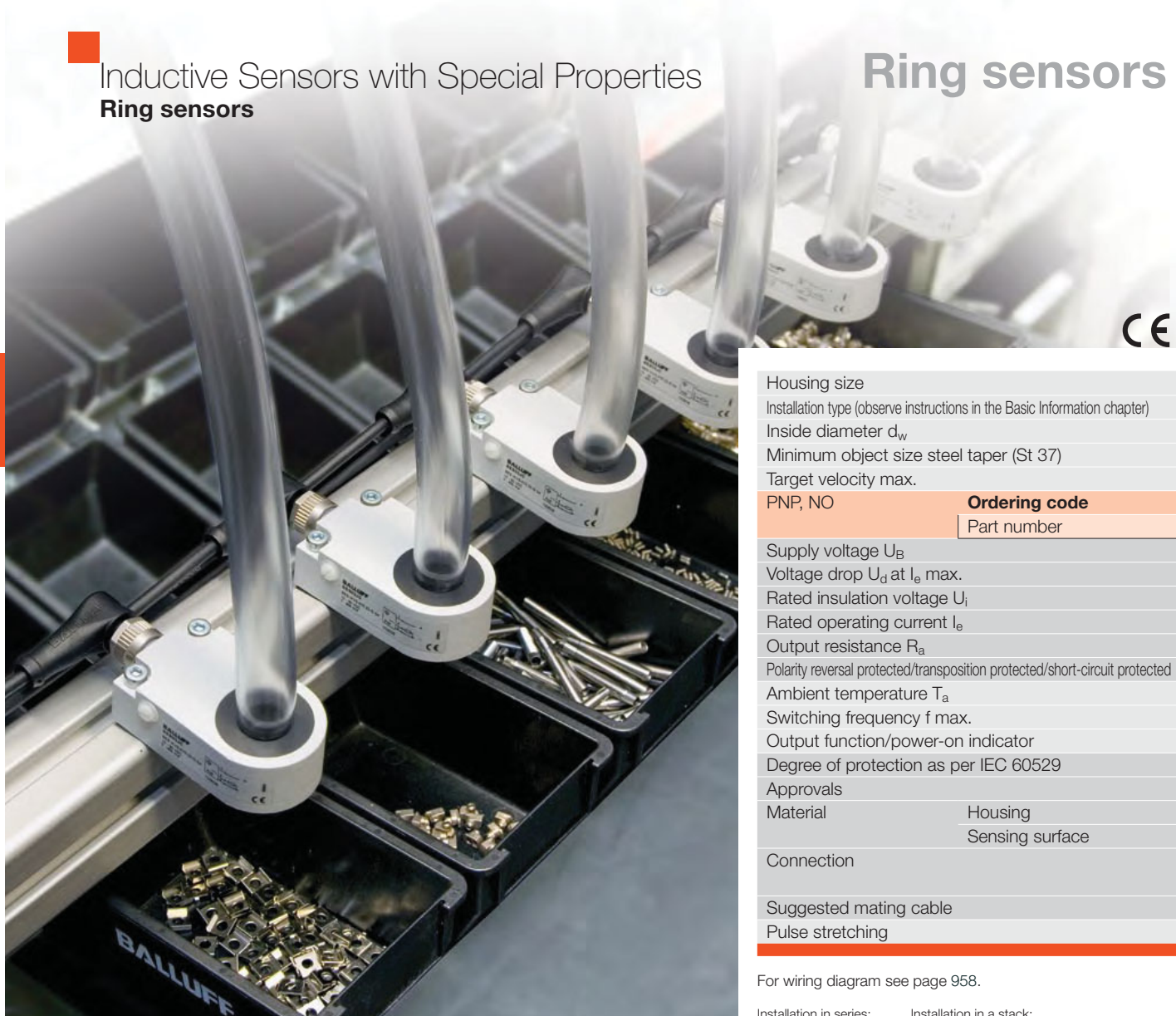
Tube sensors

Analog distance measurement

Accessories

35×35×100 mm	35×35×300 mm	110×110×43 mm
Non-flush	Non-flush	Non-flush
30 mm (adjustable with teach-in key)	30 mm (adjustable)	70 mm (adjustable with teach-in key)
0...24.3 mm	0...24.3 mm	0...56.7 mm
1X	1X	1X
BES02TF	BES02TN	BES02RU
BES IKU-011T.28-G-S4	BES IKU-031.28-S4	BES IKN-070T.38-G-S4
10...30 V DC	10...30 V DC	10...55 V DC
2 V	2 V	2 V
75 V DC	75 V DC	75 V DC
400 mA	200 mA	200 mA
Open collector	Open collector	Open collector
Yes/Yes/Yes	Yes/Yes/No	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	0...+70 °C
50 Hz	50 Hz	50 Hz
Red LED/No	Red LED/No	Red LED/Green LED (1 LED with color change)
IP 65	IP 65	IP 67
CE	CE	CE
PVC	PVC	PBT
PVC	PVC	PBT
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020



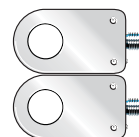


CE

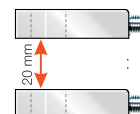
Housing size	
Installation type (observe instructions in the Basic Information chapter)	
Inside diameter d_w	
Minimum object size steel taper (St 37)	
Target velocity max.	
PNP, NO	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d at I_e max.	
Rated insulation voltage U_i	
Rated operating current I_e	
Output resistance R_a	
Polarity reversal protected/transposition protected/short-circuit protected	
Ambient temperature T_a	
Switching frequency f max.	
Output function/power-on indicator	
Degree of protection as per IEC 60529	
Approvals	
Material	Housing
	Sensing surface
Connection	
Suggested mating cable	
Pulse stretching	

For wiring diagram see page 958.

Installation in series:



Installation in a stack:



- Easy installation (since they can be mounted side-by-side and universally installed and can be stacked with a spacing of > 20 mm)
- Very reliable (due to inductive sensor principle)
- Optimal for detecting small parts (with integrated pulse extension, permanently set)

Applications

- Detection of nails, screws, welded studs, rivets, etc.
- Eject monitoring
- Part counting
- Checking for wire breaks
- Nail machines for creating pallets
- Feed check in assembly technology
- Blockage warning in feed hoses

Inductive Sensors with Special Properties

Ring sensors, 35×60×20 mm, 115×80×30 mm



35×60×20 mm	35×60×20 mm	35×60×20 mm	115×80×30 mm
Non-flush	Non-flush	Non-flush	Non-flush
Ø 10.1 mm	Ø 15.1 mm	Ø 25.1 mm	Ø 45 mm
Ø 2 mm	Ø 3 mm	Ø 4 mm	Ø 9 mm
60 m/s	60 m/s	60 m/s	20 m/s
BES03JA	BES03JC	BES03JH	BES02TJ
BES IKVS-010.23-G-S4	BES IKVS-015.23-G-S4	BES IKVS-025.23-G-S4	BES IKV-045.23-G-Z-S4
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
400 mA	400 mA	400 mA	200 mA
Open collector	Open collector	Open collector	Open collector
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
16 Hz	16 Hz	16 Hz	16 Hz
Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED
IP 65	IP 65	IP 65	IP 65
CE	CE	CE	CE
PBT	PBT	PBT	PBT
PVC	PVC	PVC	PBT
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020
60 ms	60 ms	60 ms	Can be set between 2.5...250 ms



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

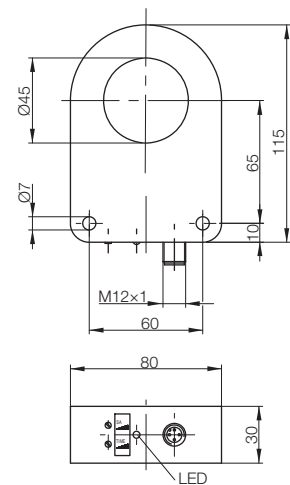
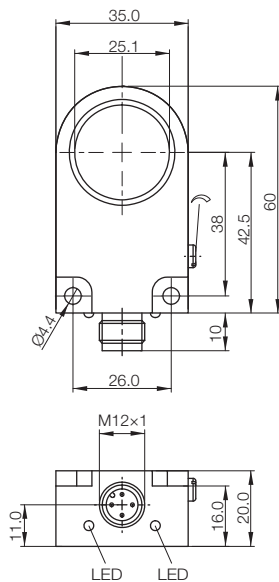
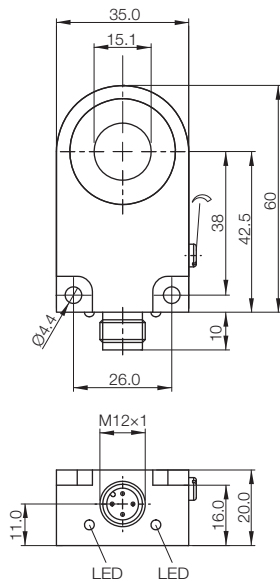
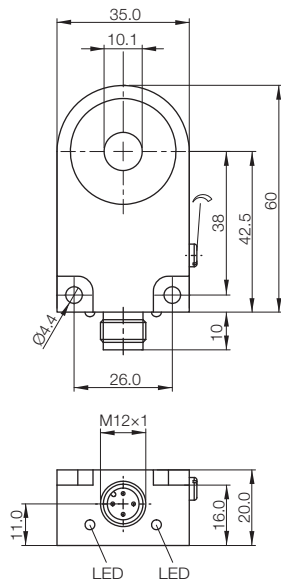
Large designs

Ring sensors

Tube sensors

Analog distance measurement

Accessories



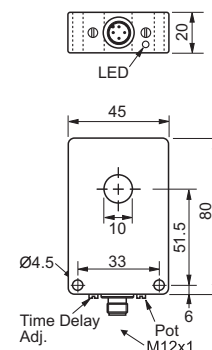
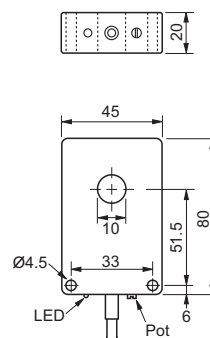


Housing size	80 x 45 mm		80 x 45 mm	
Mounting	flush**		flush	
Rated operating distance S_n	Ø 10 mm		Ø 10 mm	
PNP Normally-open	Ordering code	BES02U1		
	Part number	BES IKV-K-010-PS-1-Y		
PNP Normally-closed	Ordering code	BES02U0		
	Part number	BES IKV-K-010-PO-1-Y		
NPN Normally-open	Ordering code		BES02U8	
	Part number		BES IKV-S4-010-NS-1-Y-TD	
NPN Normally-closed	Ordering code			
	Part number			
Rated operational voltage U_o	24 Vdc		24 Vdc	
Supply voltage U_B	10...30 Vdc		10...30 Vdc	
Voltage drop U_d at I_o	≤ 3.5 Vdc		≤ 2.0 Vdc	
Load current capacity	≤ 200 mA		≤ 200 mA	
Current consumption (closed/open)	≤ 12 mA		≤ 12 mA	
Protected against polarity reversal	yes		yes	
Short circuit protected	yes		yes	
Repeat accuracy R	≤ 5%		≤ 5%	
Ambient temperature range T_a	-25... +70°C		-25... +70°C	
Operating frequency f	≤ 1000 Hz		4-400 Hz	
Function indication	yes		yes	
Degree of protection per IEC 60529	IP 65		IP 65	
Housing material	plastic		plastic	
Material of sensing face	plastic		plastic	
Connection	3 x 20 AWG		M12 connector, 4-pin	
No. of wires x gauge				
Recommended connector			BCC M415-0000-1A-003-EX44T2-020	

For wiring diagram see page 958.

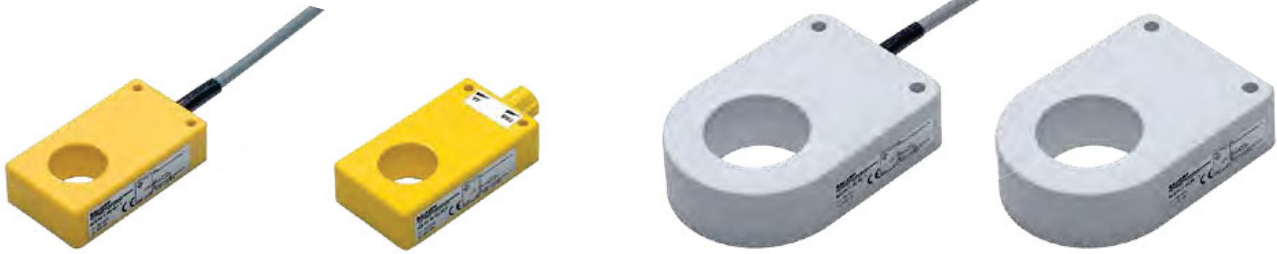
Standard cable length = 2 m PVC
Other cable lengths and jacket materials may be available. Additional models may also exist. Refer to company website for details.

** Flush mounting is possible when adjusted for minimum sensing distance.



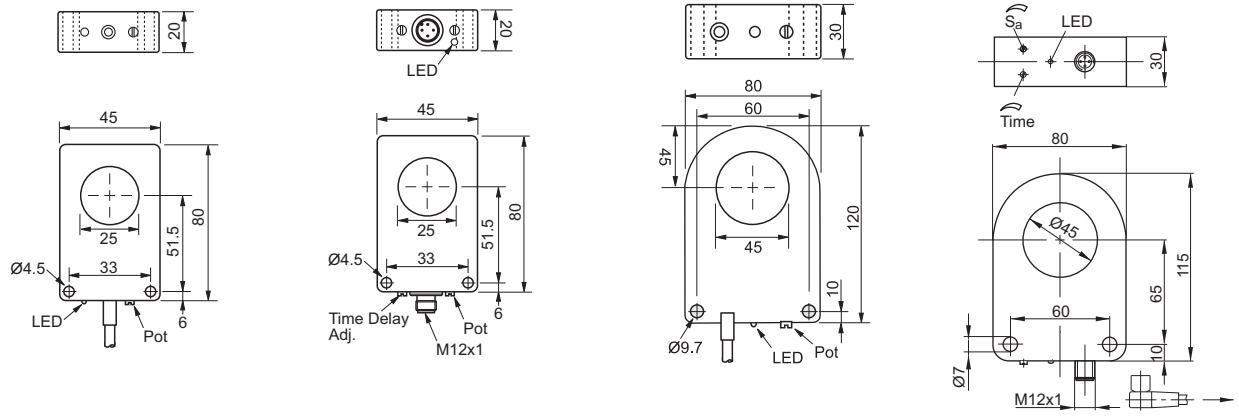
Inductive Sensors with Special Properties

DC 3/4-wire ring sensors, 35×60×20 mm, 115×80×30 mm



- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties
- High-pressure sensors
- Strokemaster sensors
- Steelface sensors
- High temperature sensors
- Harsh environment sensors
- Factor 1 sensors
- Weld field immune sensors
- Large designs
- Ring sensors
- Tube sensors
- Analog distance measurement
- Accessories

80 x 45 mm	80 x 45 mm	120 x 80 mm	115 x 80 mm
non-flush	non-flush	non-flush	non-flush
Ø 25 mm	Ø 25 mm	Ø 45 mm	Ø 45 mm
BES02UY	BES02TW	BES02U7	BES02TY
BES IKV-K-025-PS-1-Y	BES IKV-025.23-G-Z-S4	BES IKV-K-045-PS-1-Y	BES IKV-045.23-G-Z-S4
BES02U3		BES02U6	
BES IKV-K-025-PO-1-Y		BES IKV-K-045-PO-1-Y	
	BES02UE	BES02U5	
	BES IKV-S4-025-NS-1-Y-TD	BES IKV-K-045-NS-1-Y	
BES02U2			
BES IKV-K-025-NS-1-Y			
24 Vdc	24 Vdc	24 Vdc	24 Vdc
10...30 Vdc	10...30 Vdc	10...30 Vdc	18...30 Vdc
≤ 3.5 Vdc	≤ 2.0 Vdc	≤ 3.5 Vdc	≤ 20 Vdc
≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 200 mA
≤ 12 mA	≤ 12 mA	≤ 12 mA	≤ 12 mA
yes	yes	yes	yes
yes	yes	yes	yes
≤ 5%	≤ 5%	≤ 5%	≤ 5%
-25... +70°C	-25... +70°C	-25... +70°C	-25... +70°C
≤ 1000 Hz	4-400 Hz	≤ 100 Hz	yes
yes	yes	yes	IP 65
IP 65	IP 65	IP 65	plastic
plastic	plastic	plastic	plastic
plastic	plastic	plastic	M12 connector, 4-pin
3 x 20 AWG	M12 connector, 4-pin	3 x 20 AWG	
	BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020



Inductive Sensors with Special Properties

Tube sensors, 17×78.5×11.9 mm

Tube sensors

Inductive tube sensors BES extend our line of ring sensors. Optimized for tube infeeds in automated assembly, they detect small parts easily and reliably.

- Simple attachment to the infeed tube
- Pulse extension of 150 ms results in a reliable detection of fast-moving parts.
- Object speed max. 20 m/s



Inductive Sensors with Special Properties

Tube sensors, 17×78.5×11.9 mm



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

High-pressure sensors

Strokemaster sensors

Steelface sensors

High temperature sensors

Harsh environment sensors

Factor 1 sensors

Weld field immune sensors

Large designs

Ring sensors

Tube sensors

Analog distance measurement

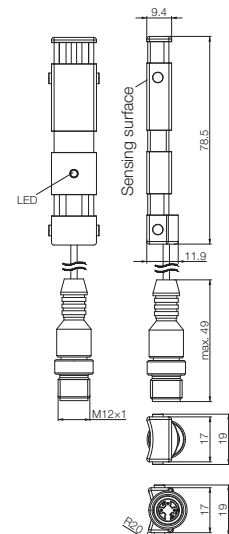
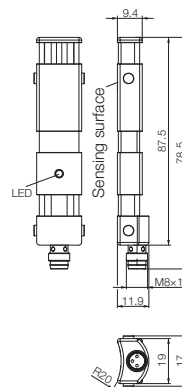
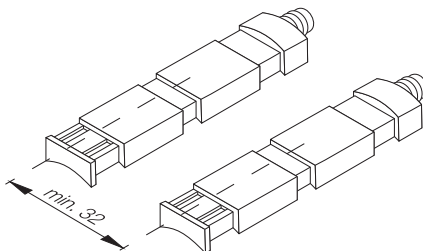
Accessories

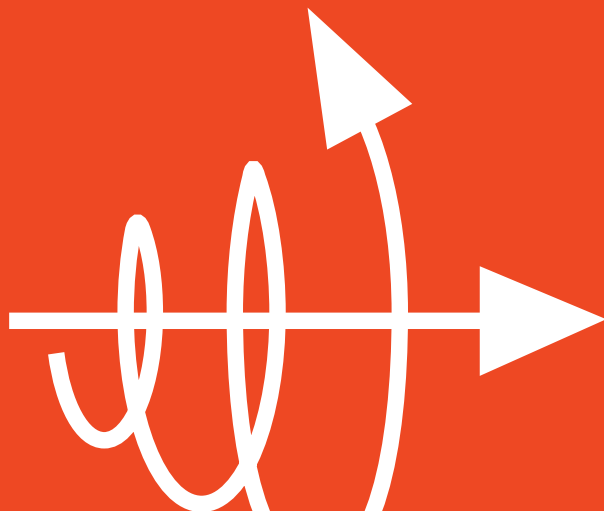
Housing size	17×78.5×11.9 mm	
Installation type (observe instructions in the Basic Information chapter)	Non-flush	
Minimum object size	Screw M3×5	
Rated switching distance s_n	16 mm	
Assured switching distance s_a	12.8 mm	
Sensing distance	1X	
PNP, NO	Ordering code	BES0428
	Part number	BES Z06K-PSC16F-S49G
		BES0429
		BES Z06K-PSC16F-BP00,1-GS04
Supply voltage U_B	10...30 V DC	
Voltage drop U_d at I_o max.	2.5 V	
Rated insulation voltage U_i	75 V DC	
Rated operating current I_o	200 mA	
Output resistance R_a	Open collector	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-25...+70 °C	
Switching frequency f max.	10 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE	
Material	Housing	PA 6.6
	Sensing surface	UN 3082
Connection	M8 connector, 3-pin	
Suggested mating cable	BCC M313-0000-10-001-EX43T2-020	
Pulse stretching	150 ms	
	BCC M415-0000-1A-003-EX44T2-020	

For wiring diagram see page 958.

Rated switching distance s_n relative to steel plate FE360 (18×18×1 mm)

Centerline spacing for side-by-side mounting





Inductive Sensors

Inductive sensors for analog distance measurement

Balluff inductive distance sensors BAW provide an absolute voltage- or current signal that changes proportionally to the distance of a metallic target. Objects of varying shape and size made of ferrous or non-ferrous materials damp the sensor to different degrees. This provides a simple way of detecting positions, distances and material differences.





Inductive Sensors for Analog Distance Measurement

Contents

Tubular-style housings

Ø 6.5	720
M8×1	720
M12×1	721
M18×1	725
M30×1.5	728
PG36	729
M12x1 high-pressure resistant	730

Block designs

10×30×6 mm (R03)	731
20×30×8 mm (R06)	732
14×38.5×17 (Z05)	733
80×80×40 mm	734



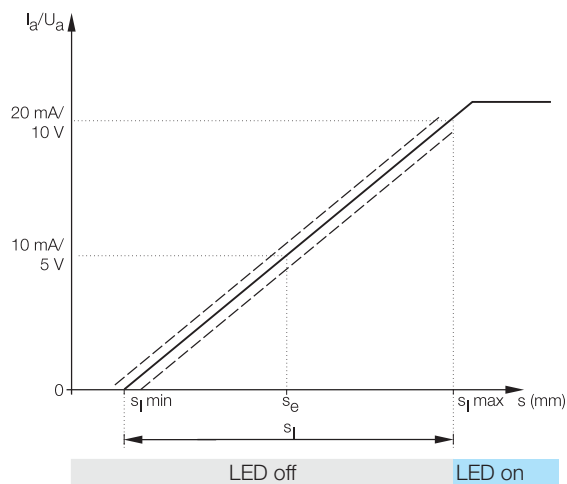
Inductive Sensors for Analog Distance Measurement

Features, approach curve, processing programmable switch points

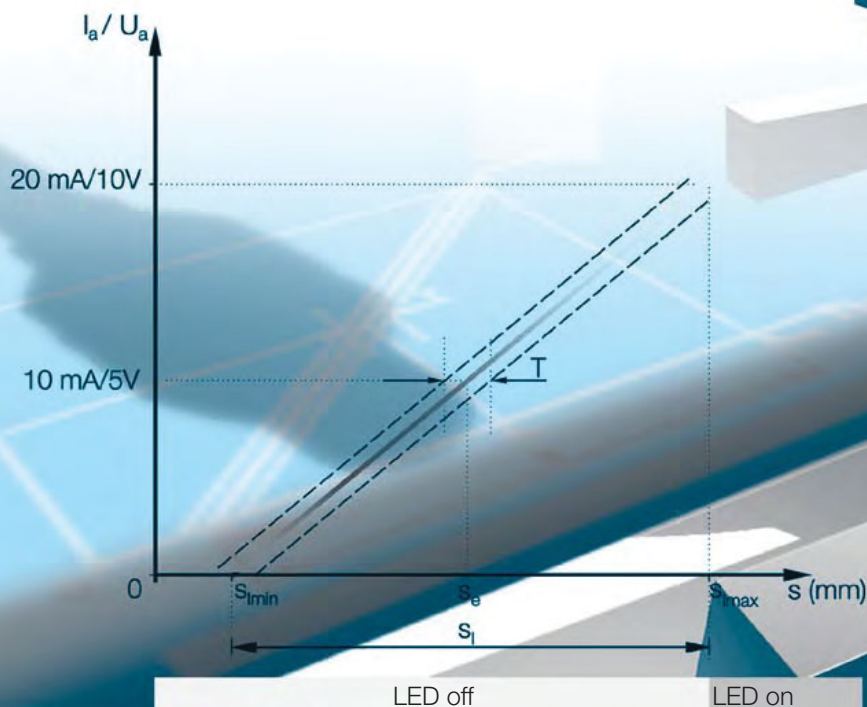
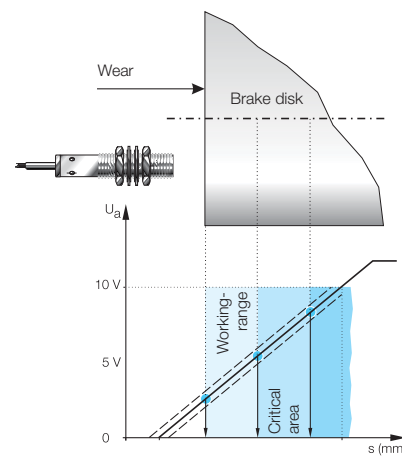
Features

- Distance-proportional analog output signal
- Contactless, absolute measuring principle
- Wide variety of designs: cylindrical and cubical
- Measuring ranges from 0.5...50 mm
- High repeat accuracy
- Optimal linearity
- Low temperature drift
- LED for setup aid
- Compact, sealed, rugged and reliable

Output characteristics



Evaluating programmed switching points (brake disk example)



Inductive Sensors for Analog Distance Measurement

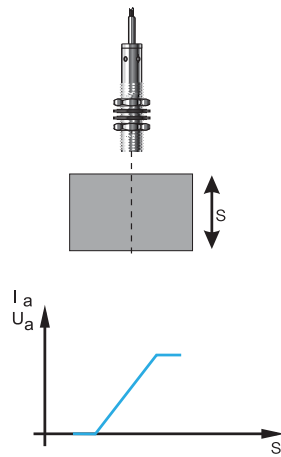
Sensors in Use

Applications

Some of the numerous applications in measuring and controlling include:

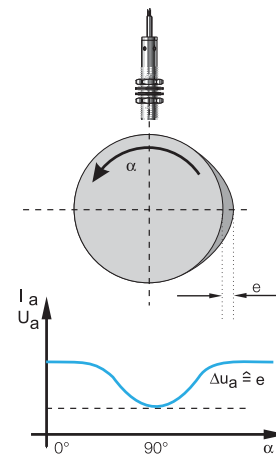
- Distance measurement
- Thickness measurement
- Run-off measurement
- Belt/band width measurement
- Detection of surface waves
- Counting
- Positioning
- Position monitoring
- Selection of parts of various sizes and materials

Axial approach



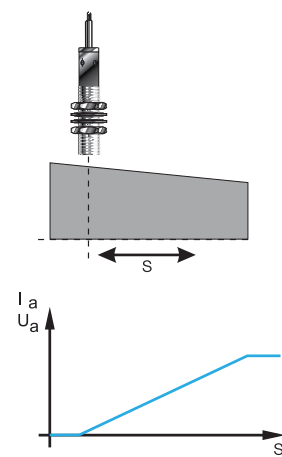
Distance changes in the sensor axis result in output signals proportional to distance.

Sensing a rotating object



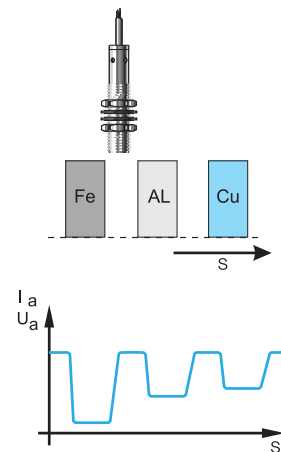
Eccentrics, cams or unbalanced motion result in a periodic change in the output signal.

Lateral approach



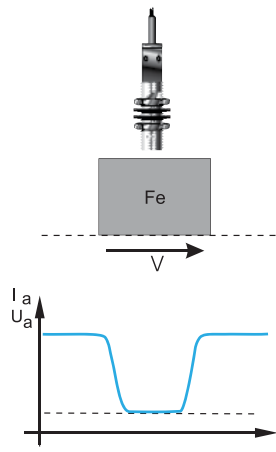
Detecting longer distances by sensing an inclined plane.

Sensing various materials



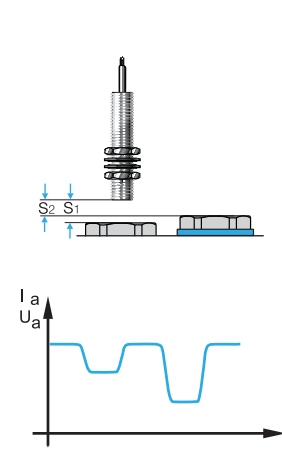
When the distance is kept constant, the output signal changes only when the object material is different.

Distance measurements at high object travel speeds



Even at high traverse speeds distances can be precisely measured.

Detecting installed seal rings

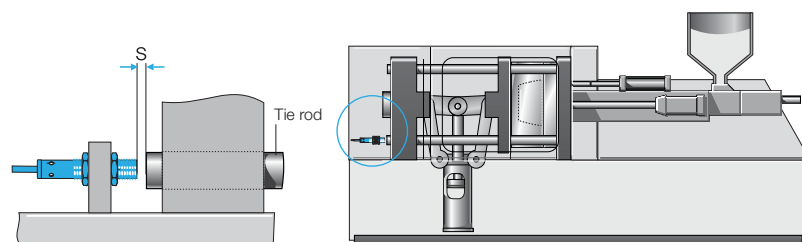


The seal ring effectively reduces the distance between the nut/screw and the sensor, thereby changing the output signal.

Resolution Application Notes:

- BAW sensors are a pure analog device with theoretically infinite resolution.
- Application resolution depends on ambient electrical noise level.
- Typical industrial application noise level is 10-15mV.
- If application level noise proves troublesome, a connectorized model and shielded cordset are recommended.

Tie rod length change on an injection molding machine



In injection molding machines, the clamping force of the tool is built up through a toggle joint and a hydraulic cylinder. The extension of the machine tie rods is thereby directly proportional to the clamping force, and can be easily determined using an inductive distance sensor.



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Tubular housings

Block designs

Accessories

Inductive Sensors for Analog Distance Measurement

Tubular housings, Ø 6.5 mm, M8x1



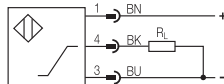
Temperature output

Series	Ø 6.5 mm	Ø 6.5 mm	M8 x 1
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush
Output signal	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V
Linear range s_L	0.5...2 mm	0.5...2 mm	0.5...1.5 mm
Ordering code	BAW000L	BAW000J	BAW000N
Part name	BAW G06EF-UAC20B-S49G	BAW G06EE-UAF20B-EP03-K	BAW M08EI-UAD15B-BP00,2-GS04
Supply voltage U_B	15...30 V DC	21.6...26.4 V DC	15...30 V DC
Rated insulation voltage U_i (protection class)	75 V DC	75 V DC	250 V AC (II)
Effective distance s_e	1.25 mm	1.25 mm	1 mm
Load resistance $R_{L \min}$	2 kΩ	5 kΩ	2 kΩ
Load resistance $R_{L \max}$			
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	No/No/No	Yes/Yes/Yes
Adjustment display (LED)	Yes	No	No
Ambient temperature T_a	+10...+60°C*	+10...+60°C*	-10...+70 °C
Repeat accuracy R_{BWN}	±40.0 μm	±10.0 μm	±8.0 μm
Non-linearity max.	±45 μm	±45 μm	±30 μm
Limit frequency (-3 dB)	1 kHz	1 kHz	1 kHz
Response time	0.5 ms	1 ms	0.5 ms
Temperature coefficient, typically in range from +10...+50 °C	-0.6 μm/K	-1 μm/K	-1 μm/K
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67
Approvals	CE, cULus	CE	CE, cULus
Material	Housing: Stainless steel Sensing surface: PBT	Stainless steel PBT	Stainless steel PBT
Connection	M8 connector, 3-pin	3 m PUR cable, 26 AWG	0.2 m PUR cable with M12 connector, 3-pin
Suggested mating cable	Unshielded: BCC M313-0000-10-001-EX43T2-020 Shielded: BCC M313-0000-10-036-VS8334-020		BCC M415-0000-1A-003-EX44T2-020 BCC M415-0000-1A-014-VS8434-020

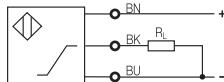
* The function is assured over a range of -10...+70 °C

Wiring diagrams

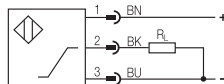
Connector, voltage output



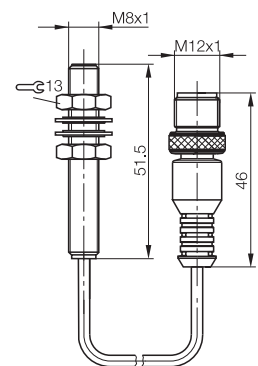
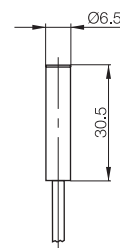
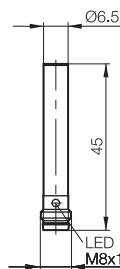
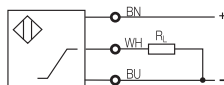
Cable, voltage output



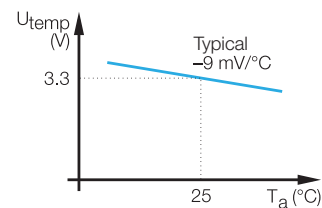
Connector, current output



Cable, current output



Temperature output



The temperature output (not short-circuit protected) provides a signal representing a precisely measured temperature change.

Inductive Sensors for Analog Distance Measurement Tubular housings, M8×1, M12×1



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

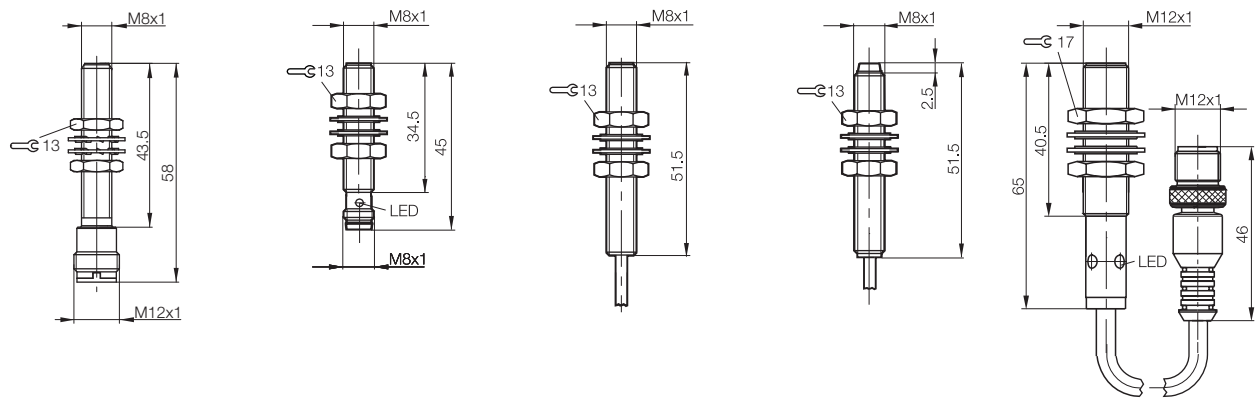
Tubular housings

Block designs

Accessories



M8 × 1	M8 × 1	M8 × 1	M8 × 1	M12×1
Flush	Flush	Flush	Not flush	Flush
Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	Current, 4...20 mA
0.5...1.5 mm	0.5...1.5 mm	0.5...1.5 mm	0.5...2.5 mm	0.5...2 mm
BAW003R	BAW000M	BAW000T	BAW000W	BAW001F
BAW M08EH-UAD15B-S04G	BAW M08EF-UAC15B-S49G	BAW M08EI-UAD15B-BP03	BAW M08EI-UAD25F-BP03	BAW M12MG2-ICC20B-BP00,2-GS04
15...30 V DC	15...30 V DC	15...30 V DC	15...30 V DC	10...30 V DC
250 V AC	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)
1 mm	1 mm	1 mm	1.5 mm	1.25 mm
2 kΩ	2 kΩ	2 kΩ	2 kΩ	
				500 Ω
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
No	Yes	No	No	Yes
-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+60 °C*	-10...+70 °C
±40.0 μm	±40.0 μm	±8.0 μm	±10.0 μm	±5.0 μm
±30 μm	±30 μm	±30 μm	±60 μm	±45 μm
1 kHz	1 kHz	1 kHz	1 kHz	500 Hz
0.5 ms	0.5 ms	0.5 ms	1 ms	0.5 ms
0 μm/K	0 μm/K	-1 μm/K	-1.5 μm/K	-0.5 μm/K
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Brass, coated
PBT	PBT	PBT	PBT	PBT
M12 connector, 3-pin	M8 connector, 3-pin	3 m PUR cable, 26 AWG	3 m PUR cable, 26 AWG	0.2 m PUR cable with M12 connector, 3-pin
BCC M415-0000-1A-003-EX44T2-020	BCC M313-0000-10-001-EX43T2-020			BCC M415-0000-1A-003-EX44T2-020
BCC M415-0000-1A-014-VS8434-020	BCC M313-0000-10-036-VS8334-020			BCC M415-0000-1A-014-VS8434-020



Inductive Sensors for Analog Distance Measurement

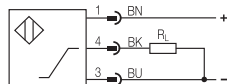
Tubular housings, M12x1



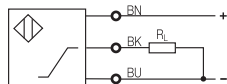
Series	M12x1	M12x1	M12x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Output signal	Current, 4...20 mA	Voltage, 0...10 V	Voltage, 0...10 V	
Linear range s_L	0.5...2 mm	0.5...2 mm	0.5...2 mm	
Ordering code	BAW001H	BAW001J	BAW001P	
Part name	BAW M12MG2-ICC20B-BP03	BAW M12MG2-UAC20B-BP00,2-GS04	BAW M12MI-UAC20B-S04G	
Supply voltage U_B	10...30 V DC	15...30 V DC	15...30 V DC	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
Effective distance s_e	1.25 mm	1.25 mm	1.3 mm	
Load resistance $R_{L \min}$		2 kΩ	2 kΩ	
Load resistance $R_{L \max}$	500 Ω			
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Adjustment display (LED)	Yes	Yes	Yes	
Ambient temperature T_a	-10...+70 °C	-10...+70 °C	-10...+70 °C	
Repeat accuracy R_{BWN}	±6.0 μm	±8.0 μm	±8.0 μm	
Non-linearity max.	±45 μm	±45 μm	±45 μm	
Limit frequency (-3 dB)	500 Hz	500 Hz	500 Hz	
Response time	0.5 ms	0.5 ms	0.5 ms	
Temperature coefficient, typically in range from +10...+50 °C	-0.5 μm/K	-1 μm/K	-0.5 μm/K	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing Sensing surface	Brass, coated PBT	Brass, coated PBT	Brass, coated PBT
Connection	3 m PUR cable, 22 AWG	0.2 m PUR cable with M12 connector, 3-pin	M12 connector, 3-pin	
Suggested mating cable	Unshielded	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	
	Shielded	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	

Wiring diagrams

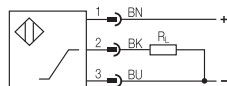
Connector, voltage output



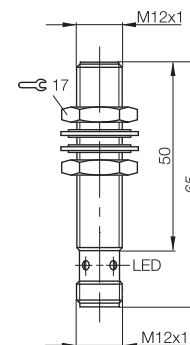
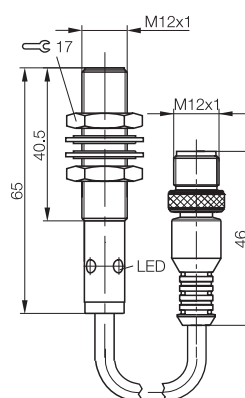
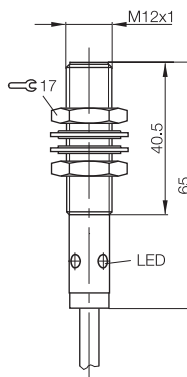
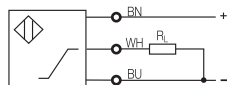
Cable, voltage output



Connector, current output



Cable, current output

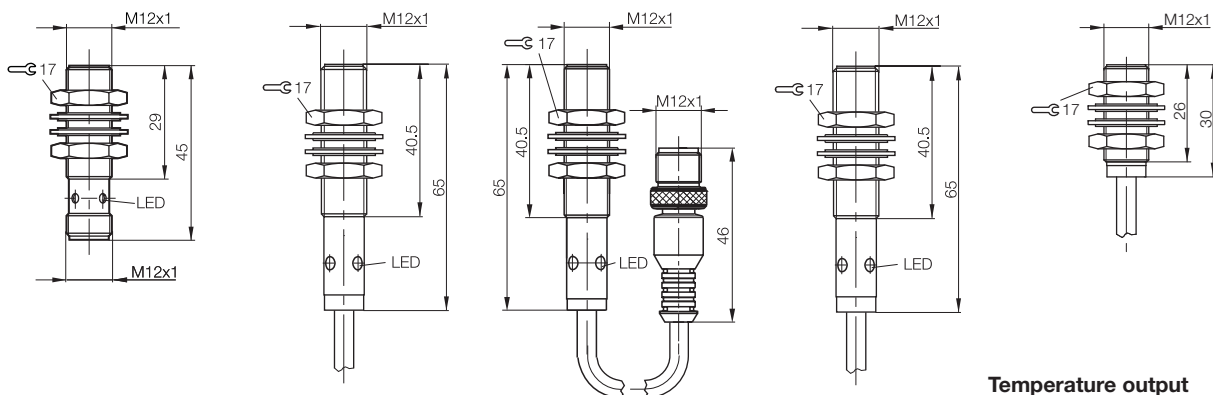


Inductive Sensors for Analog Distance Measurement Tubular housings, M12x1

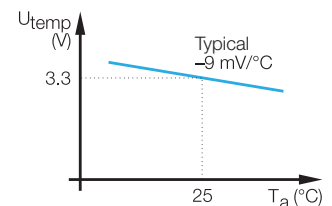


	M12x1	M12x1	M12x1	M12x1	M12x1
	Flush	Flush	Flush	Flush	Quasi-flush
	Voltage, 0...10 V	Voltage, 0...10 V	Current, 0...20 mA	Current, 0...20 mA	Voltage, 0...10 V
	0.5...2 mm	0.5...2 mm	0.5...2 mm	0.5...2 mm	1...5 mm
	BAW0010	BAW001L	BAW0019	BAW001C	BAW0011
	BAW M12ME-UAC20B-S04G	BAW M12MG2-UAC20B-BP03	BAW M12MG2-IAC20B-BP00,2-GS04	BAW M12MG2-IAC20B-BP03	BAW M12ME-UAD50B-BP01
	15...30 V DC	15...30 V DC	10...30 V DC	10...30 V DC	15...30 V DC
	250 V AC (□)	250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC
	1.25 mm	1.25 mm	1.25 mm	1.25 mm	3 mm
	2 kΩ	2 kΩ			2 kΩ
			500 Ω	500 Ω	
	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
	Yes	Yes	Yes	Yes	No
	-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C	0...+60 °C
	±20.0 μm	±8.0 μm	±5.0 μm	±5.0 μm	±10.0 μm
	±45 μm	±45 μm	±45 μm	±45 μm	±160 μm
	500 Hz	500 Hz	500 Hz	500 Hz	1 kHz
	0.5 ms	0.5 ms	0.5 ms	0.5 ms	2 ms
	0 μm/K	-1 μm/K	-1 μm/K	-1 μm/K	-1.5 μm/K
	IP 67	IP 67	IP 67	IP 67	IP 67
	CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
	Brass, coated	Brass, coated	Brass, coated	Brass, coated	Brass, coated
	PBT	PBT	PBT	PBT	PA 12
	M12 connector, 3-pin	3 m PUR cable, 22 AWG	0.2 m PUR cable with M12 connector, 3-pin	3 m PUR cable, 22 AWG	1 m PUR cable, 24 AWG
	BCC M415-0000-1A-003-EX44T2-020		BCC M415-0000-1A-003-EX44T2-020		
	BCC M415-0000-1A-014-VS8434-020		BCC M415-0000-1A-014-VS8434-020		

- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties
- Analog distance measurement
- Tubular housings
- Block designs
- Accessories



Temperature output



The temperature output (not short-circuit protected) provides a signal representing a precisely measured temperature change.

Inductive Sensors for Analog Distance Measurement

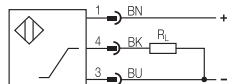
Tubular housings, M12x1



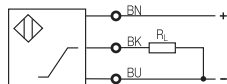
Series	M12x1	M12x1	M12x1	
Installation type (pay attention to the note in the Basic Information chapter)	Not flush	Not flush	Not flush	
Output signal	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	
Linear range s_L	1...4 mm	1...4 mm	1...4 mm	
Ordering code	BAW0014	BAW000Z	BAW0017	
Part name	BAW M12MF2-UAC40F-BP00,2-GS04	BAW M12MD-UAC40F-S04G	BAW M12MF2-UAC40F-BP03	
Supply voltage U_B	15...30 V DC	15...30 V DC	15...30 V DC	
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	250 V AC (□)	
Effective distance s_e	2.5 mm	2.5 mm	2.5 mm	
Load resistance $R_{L \min}$	2 kΩ	2 kΩ	2 kΩ	
Load resistance $R_{L \max}$				
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Adjustment display (LED)	Yes	Yes	Yes	
Ambient temperature T_a	-10...+70 °C	-10...+70 °C	-10...+70 °C	
Repeat accuracy R_{BWN}	±10.0 μm	±10.0 μm	±10.0 μm	
Non-linearity max.	±90 μm	±90 μm	±90 μm	
Limit frequency (-3 dB)	500 Hz	500 Hz	500 Hz	
Response time	1 ms	1 ms	1 ms	
Temperature coefficient, typically in range from +10...+50 °C	0 μm/K	-2 μm/K	0 μm/K	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing Sensing surface	Brass, coated PBT	Brass, coated PBT	
Connection	0.2 m PUR cable with M12 connector, 3-pin	M12 connector, 3-pin	3 m PUR cable, 22 AWG	
Suggested mating cable	Unshielded Shielded	BCC M415-0000-1A-003-EX44T2-020 BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-003-EX44T2-020 BCC M415-0000-1A-014-VS8434-020	

Wiring diagrams

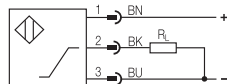
Connector, voltage output



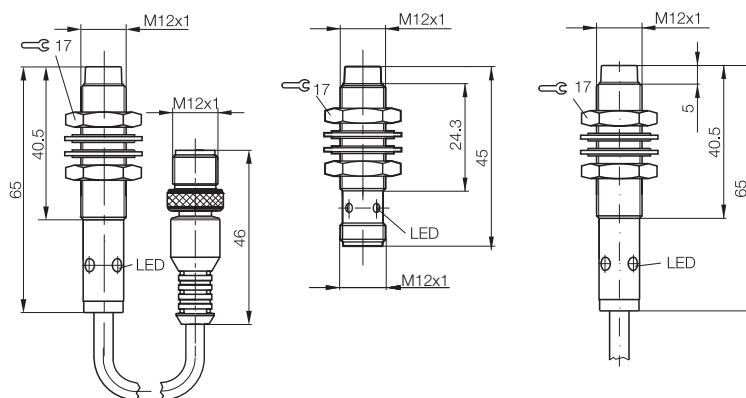
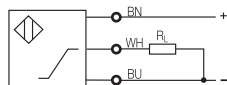
Cable, voltage output



Connector, current output



Cable, current output



Inductive Sensors for Analog Distance Measurement

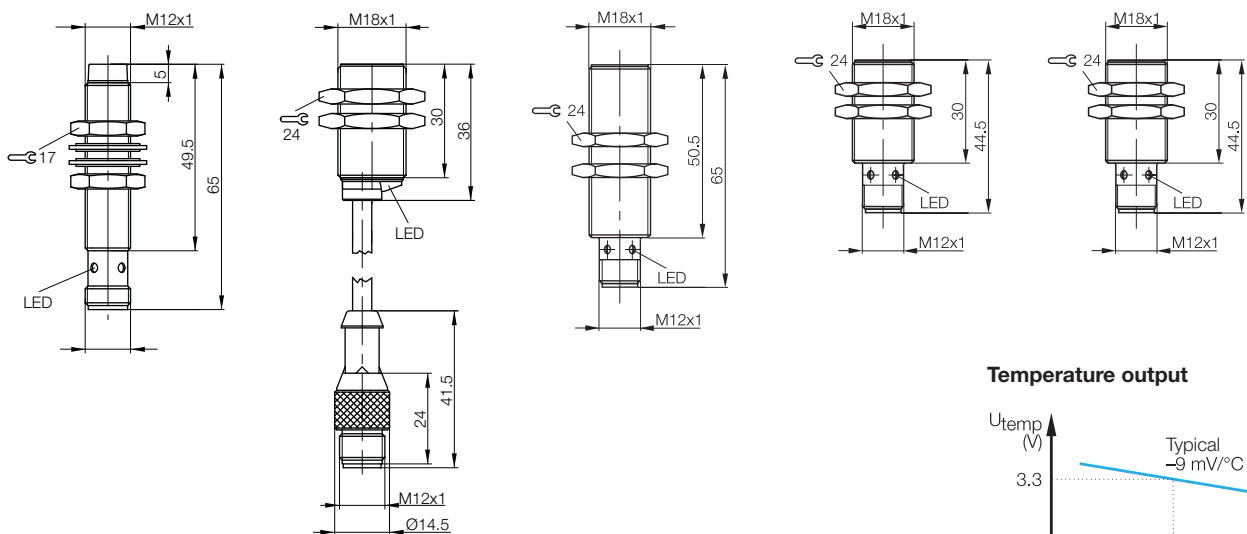
Tubular housings, M12×1, M18×1



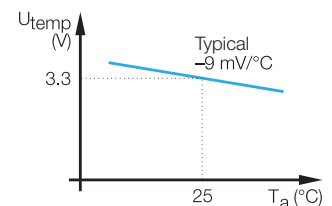
Temperature output

M12×1	M18×1	M18×1	M18×1	M18×1	M18×1
Not flush	Flush	Flush	Flush	Flush	Flush
Current, 4...20 mA	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V
1...4 mm	1...5 mm	1...5 mm	1...5 mm	1...5 mm	1...5 mm
BAW003N	BAW001Z	BAW002K	BAW0026	BAW0025	
BAW M12MH1-ICC40F-S04G	BAW M18ME-UAC50B-BP00,2-GS04	BAW M18MI-UAC50B-S04G	BAW M18ME-UAE50B-S04G-K	BAW M18ME-UAC50B-S04G	
10...30 V DC	15...30 V DC	15...30 V DC	21.6...26.4 V DC	15...30 V DC	
250 V AC (□)	75 V DC	250 V AC (□)	75 V DC	75 V DC	
2.5 mm		3 mm	3 mm	3 mm	
	2 kΩ	2 kΩ	2 kΩ	2 kΩ	
500 ohms					
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Yes	Yes	Yes	Yes	Yes	
-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C	
±120 μm	±8.0 μm	±8.0 μm	±8.0 μm	±8.0 μm	
500 Hz	±120 μm	±120 μm	±120 μm	±120 μm	
0.5 ms	500 Hz	500 Hz	500 Hz	500 Hz	
	1 ms	1 ms	1 ms	1 ms	
	-1 μm/K	-2 μm/K	-1 μm/K	-2 μm/K	
IP 67	IP 67	IP 67	IP 67	IP 67	
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus	
Brass, coated	Brass, coated	Brass, coated	Brass, coated	Brass, coated	
PBT	PBT	PBT	PBT	PBT	
M12 connector, 3-pin	0.2 m PUR cable with M12 connector, 3-pin	M12 connector, 3-pin	M12 connector, 4-pin	M12 connector, 3-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	
BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	

- Inductive sensors
- Global DC 3-wire
- DC 3-/4-wire
- DC 2-wire
- AC/DC 2-wire
- AC 2-wire
- Special properties
- Analog distance measurement
- Tubular housings
- Block designs
- Accessories



Temperature output



The temperature output (not short-circuit protected) provides a signal representing a precisely measured temperature change.

Inductive Sensors for Analog Distance Measurement

Tubular housings, M18x1



With teach-in,
3 switching points



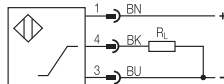
With Teach-in



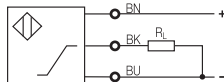
Series	M18x1	M18x1	M18x1	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	Flush	
Output signal	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	
Linear range s_L	1...5 mm	1...5 mm	1...5 mm	
Ordering code	BAW002M	BAW002U	BAW0022	
Part name	BAW M18MI2-UAC50B-BP05-002	BAW M18MM-UAZ50B-BP05-505	BAW M18ME-UAC50B-BP03	
Supply voltage U_B	15...30 V DC	21.6...26.4 V DC	15...30 V DC	
Rated insulation voltage U_i (protection class)	250 V AC (II)	250 V AC (II)	75 V DC	
Effective distance s_e	3 mm	3 mm	3 mm	
Load resistance $R_{L \min}$	2 k Ω	2 k Ω	2 k Ω	
Load resistance $R_{L \max}$				
Polarity reversal protected/transposition protected/short-circuit protected	Yes/No/Yes	Yes/No/Yes	Yes/Yes/Yes	
Adjustment display (LED)	Yes	No	Yes	
Ambient temperature T_a	-10...+70 °C	-10...+70 °C	-10...+70 °C	
Repeat accuracy R_{BWN}	$\pm 8.0 \mu\text{m}$	$\pm 8.0 \mu\text{m}$	$\pm 8.0 \mu\text{m}$	
Non-linearity max.	$\pm 120 \mu\text{m}$	$\pm 120 \mu\text{m}$	$\pm 120 \mu\text{m}$	
Limit frequency (-3 dB)	500 Hz	500 Hz	500 Hz	
Response time	1 ms	1 ms	1 ms	
Temperature coefficient, typically in range from +10...+50 °C	-1.5 $\mu\text{m}/\text{K}$	0 $\mu\text{m}/\text{K}$	-1 $\mu\text{m}/\text{K}$	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material	Housing	Brass, coated	Brass, coated	
	Sensing surface	PBT	PBT	
Connection	5 m PUR cable, 24 AWG	5 m PUR cable, 24 AWG	5 m PUR cable, 22 AWG	
Suggested mating cable	Unshielded			
	Shielded			

Wiring diagrams

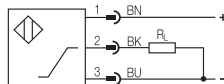
Connector, voltage output



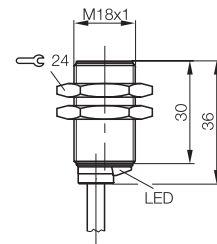
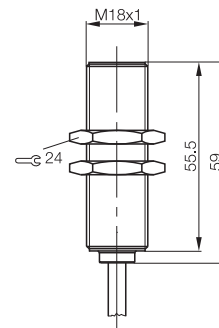
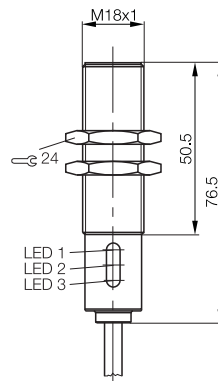
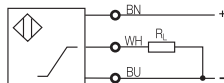
Cable, voltage output



Connector, current output



Cable, current output



Inductive Sensors for Analog Distance Measurement Tubular housings, M18x1



IO-Link

M18x1	M18x1	M18x1	M18x1	M18x1
Flush	Flush	Flush	Flush	Flush
IO-Link, falling with rising proximity	Current, 0...20 mA	Current, 4...20 mA	Current, 4...20 mA	Current, 4...20 mA
1...5 mm	1...5 mm	1...5 mm	1...5 mm	1...5 mm
BAW002F	BAW002H	BAW002J	BAW001U	BAW001T
BAW M18MI-BLC50B-S04G	BAW M18MI-IAC50B-S04G	BAW M18MI-ICC50B-S04G	BAW M18ME-ICC50B-S04G	BAW M18ME-ICC50B-BP03
18...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	15...30 V DC
250 V AC (□)	250 V AC (□)	250 V AC (□)	75 V DC	75 V DC
3 mm	3 mm	3 mm	3 mm	3 mm
	500 Ω	500 Ω	500 Ω	500 Ω
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Yes	Yes	Yes	Yes	Yes
-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C
±10.0 μm	±8.0 μm	±8.0 μm	±8.0 μm	±8.0 μm
±120 μm	±120 μm	±120 μm	±120 μm	±120 μm
500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
2 ms	1 ms	1 ms	1 ms	1 ms
-2 μm/K	-1 μm/K	-5 μm/K	-3 μm/K	-3 μm/K
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass, coated	Brass, coated	Brass, coated	Brass, coated	Brass, coated
PBT	PBT	PBT	PBT	PBT
M12 connector, 3-pin	M12 connector, 3-pin	M12 connector, 3-pin	M12 connector, 3-pin	3 m PVC cable, 22 AWG
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	
BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

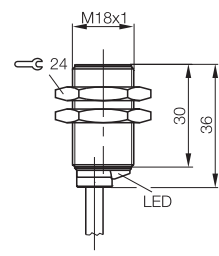
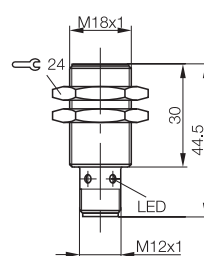
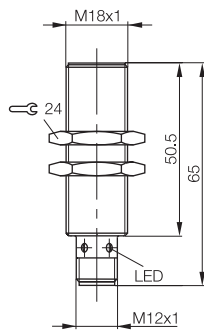
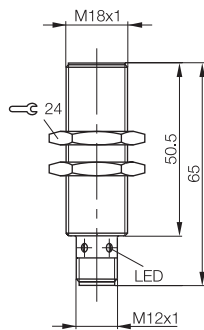
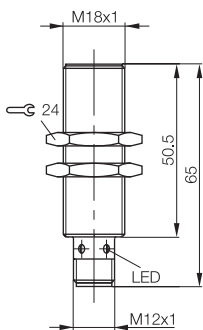
Special properties

Analog distance measurement

Tubular housings

Block designs

Accessories



Inductive Sensors for Analog Distance Measurement

Tubular housings, M18×1, M30×1.5



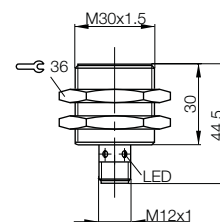
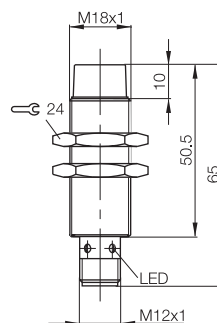
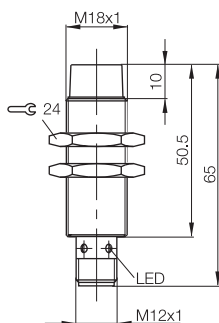
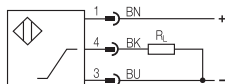
Temperature output

Series	M18×1	M18×1	M30×1.5	
Installation type (observe instructions in the Basic Information chapter)	Not flush	Not flush	Flush	
Output signal	Voltage, 0...10 V	Voltage, 0...10 V	Voltage, 0...10 V	
Linear range s_L	2...8 mm	4...16 mm	2...10 mm	
Ordering code	BAW002C	BAW0029	BAW002W	
Part name	BAW M18MG-UAC80F-S04G	BAW M18MG-UAC16F-S04G-K	BAW M30ME-UAC10B-S04G	
Supply voltage U_B	15...30 V DC	15...30 V DC	15...30 V DC	
Rated insulation voltage U_i (protection class)	250 V AC (II)	250 V AC (II)	250 V AC (II)	
Effective distance s_e	5 mm	10 mm	6 mm	
Load resistance $R_{L, min.}$	2 kΩ	2 kΩ	2 kΩ	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Adjustment display (LED)	Yes	Yes	Yes	
Ambient temperature T_a	-10...+70 °C	+10...+60°C*	-10...+70 °C	
Repeat accuracy R_{BWN}	±12.0 μm	±200.0 μm	±10.0 μm	
Non-linearity max.	±180 μm	±360 μm	±240 μm	
Limit frequency (-3 dB)	500 Hz	500 Hz	500 Hz	
Response time	1.5 ms	3 ms	1.5 ms	
Temperature coefficient, typically in range from +10...+50 °C	-3 μm/K	8 μm/K	1.5 μm/K	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67 per BWN Pr. 14	
Approvals	CE, cULus	CE, cULus	CE, cULus	
Material				
Housing	Brass, coated	Brass, coated	Brass, coated	
Sensing surface	PBT	PBT	PBT	
Connection	M12 connector, 3-pin	M12 connector, 3-pin	M12 connector, 3-pin	
Suggested mating cable				
Unshielded	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	
Shielded	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	

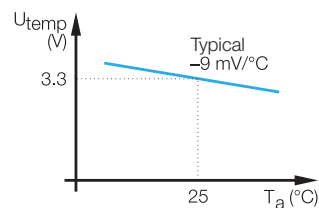
* The function is guaranteed over a range of -10...+70 °C

Wiring diagram

Connector, voltage output



Temperature output



The temperature output (not short-circuit protected) provides a signal representing a precisely measured temperature change.

Inductive Sensors for Analog Distance Measurement Tubular housings, M30×1.5, PG36



M30×1.5	PG36	
Not flush	Flush	
Voltage, 0...10 V	Voltage, 0...10 V	
3...15 mm	0...20 mm	
BAW002Y	BAW003M	
BAW M30ME-UAC15F-S04G	BAW MKZ-471.19-S4	
15...30 V DC	20...30 V DC	
250 V AC (□)	75 V DC	
9 mm	10 mm	
2 kΩ	10 kΩ	
Yes/Yes/Yes	Yes/Yes/Yes	
Yes	Yes	
-10...+70 °C	-10...+70 °C	
±12.0 μm	±5.0 μm	
±360 μm	±600 μm	
350 Hz	20 Hz	
3 ms		
1.5 μm/K	-1 μm/K	
IP 67	IP 67	
CE, cULus	CE	
Brass, coated	Brass, coated	
PBT	PBT	
M12 connector, 3-pin	M12 connector, 3-pin	
BCC M415-0000-1A-003-EX44T2-020	BCC M415-0000-1A-003-EX44T2-020	
BCC M415-0000-1A-014-VS8434-020	BCC M415-0000-1A-014-VS8434-020	



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

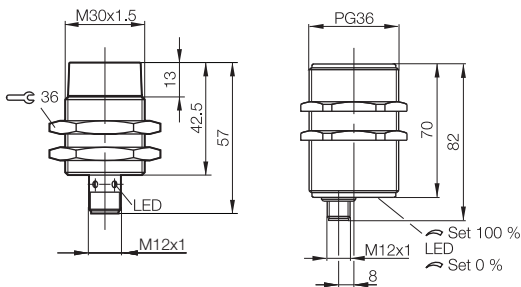
Special
properties

**Analog
distance
measurement**

Tubular
housings

Block designs

Accessories



Inductive Sensors for Analog Distance Measurement

Tubular housings, high-pressure resistant M12×1

- Analog for control of valves or soft stop
- Measurements of valves and cylinders possible
- Ceramic on medium side – robust
- Oil pressure up to 500 bar

Application areas

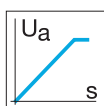
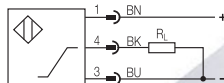
- Control of valves
- Parked position of cranes
- Final position of installation supports
- Service measurements of valves
- Position monitoring in mobile hydraulic systems
- Control of agricultural technology



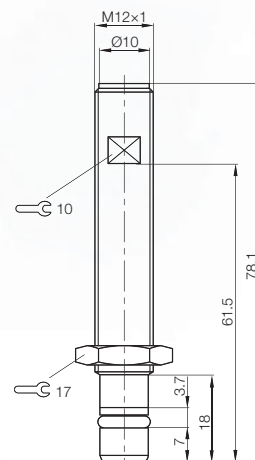
Series	M12×1	
Installation (observe instructions in the Basic Information chapter)	Flush	
Output signal	Voltage, 0...10 V	
Linear range s_l	0.5...2 mm	
Ordering code	BAW0040	
Part name	BAW Z08EO-UAD20B-S04G-H11	
Supply voltage U_B	15...30 V DC	
Rated insulation voltage U_i (protection class)	75 V DC	
Effective distance s_e	1.25 mm	
Load resistance $R_{L \min}$	2 kΩ	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Adjustment display (LED)	No	
Ambient temperature T_a	-25...+85 °C	
Repeat accuracy R_{BWN}	±8.0 μm	
Non-linearity max.	±45 μm	
Limit frequency (-3 dB)	1 kHz	
Response time	1 ms	
Temperature coefficient, typically in range from +10...+50 °C	-1 μm/K	
Degree of protection as per IEC 60529	IP 68	
Approvals	CE, cULus	
Material	Housing	Stainless steel
	Sensing surface	Ceramic
Connection	M12 connector, 3-pin	
Suggested mating cable	Unshielded	BCC M415-0000-1A-003-EX44T2-020
	Shielded	BCC M415-0000-1A-014-VS8434-020

Wiring diagram

Connector, voltage output



500 bar



Inductive Sensors for Analog Distance Measurement Block design, 10×30×6 mm



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Tubular
 housings

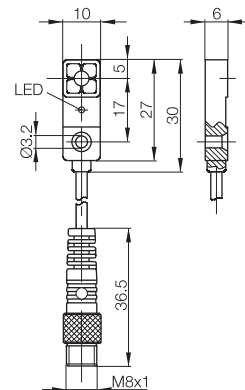
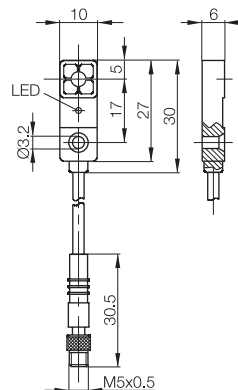
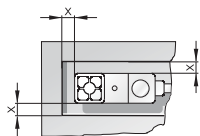
Block designs

Accessories

Series	10×30×6 mm R03	10×30×6 mm R03
Installation (observe instructions in the Basic Information chapter)	Flush	Flush
Output signal	Voltage, 0...10 V	Voltage, 0...10 V
Linear range s_l	1...4 mm	1...4 mm
Ordering code	BAW0030	BAW0031
Part name	BAW R03KC-UAE40B-BP00,3-GS26	BAW R03KC-UAE40B-BP00,3-GS49
Supply voltage U_B	21.6...26.4 V DC	21.6...26.4 V DC
Rated insulation voltage U_i (protection class)	75 V DC	75 V DC
Effective distance s_e	2.5 mm	
Load resistance $R_{L \min}$	5 k Ω	5 k Ω
Polarity reversal protected/transposition protected/short-circuit protected	No/No/No	No/No/No
Adjustment display (LED)	Yes	Yes
Ambient temperature T_a	0...+70 °C	0...+70 °C
Repeat accuracy R_{BWN}	$\pm 35.0 \mu\text{m}$	$\pm 35.0 \mu\text{m}$
Non-linearity max.	$\pm 150 \mu\text{m}$	$\pm 150 \mu\text{m}$
Limit frequency (–3 dB)	1 kHz	1 kHz
Response time	0.5 ms	0.5 ms
Temperature coefficient, typically in range from +10...+50 °C	4.7 $\mu\text{m/K}$	4.7 $\mu\text{m/K}$
Degree of protection as per IEC 60529	IP 67	IP 67
Approvals	CE, cULus	CE, cULus
Material		
Housing	No/No/No	PA6-FG30
Sensing surface	PA6-FG30	PA6-FG30
Connection	0.3 m PUR cable with M5 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin
Suggested mating cable		
Unshielded	BKS-B-25-3-PU-03	BCC M313-0000-10-001-EX43T2-020
Shielded		BCC M313-0000-10-036-VS8334-020

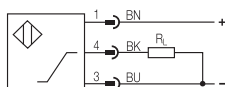
Installation note for BAW R03...

Material	Installation dimensions x
Steel	0 mm
Brass	5 mm
Aluminum	5 mm
Stainless steel	5 mm



Wiring diagram

Connector, voltage output



Inductive Sensors for Analog Distance Measurement

Block designs, 10×30×6 mm, 20×30×8 mm

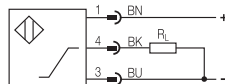


Series	10×30×6 mm R03	20×30×8 mm R06	
Installation type (observe instructions in the Basic Information chapter)	Flush	Flush	
Output signal	Voltage, 0...10 V	Voltage, 0...10 V	
Linear range s_L	1...4 mm	0.5...2 mm	
Ordering code	BAW0032	BAW0034	
Part name	BAW R03KC-UAE40B-BP03	BAW R06AC-UAF20B-S49G	
Supply voltage U_B	21.6...26.4 V DC	21.6...26.4 V DC	
Rated insulation voltage U_i (protection class)	75 V DC	75 V DC	
Effective distance s_e	2.5 mm	1.3 mm	
Load resistance $R_{L \min}$	5 k Ω	5 k Ω	
Polarity reversal protected/transposition protected/short-circuit protected	No/No/No	No/No/No	
Adjustment display (LED)	Yes	No	
Ambient temperature T_a	0...+70 °C	-10...+70 °C	
Repeat accuracy R_{BWN}	±35.0 μ m	±12.0 μ m	
Non-linearity max.	±150 μ m	±45 μ m	
Limit frequency (-3 dB)	1 kHz	1 kHz	
Response time	0.5 ms	0.5 ms	
Temperature coefficient, typically in range from +10...+50 °C	5 μ m/K	0.5 μ m/K	
Degree of protection as per IEC 60529	IP 67	IP 67	
Approvals	CE, cULus	CE	
Material			
Housing	PA6-FG30	Anodized aluminum	
Sensing surface	PA6-FG30	PBT	
Connection	3 m PUR cable, 26 AWG	M8 connector, 3-pin	
Suggested mating cable		BCC M313-0000-10-001-EX43T2-020	
		BCC M313-0000-10-036-VS8334-020	

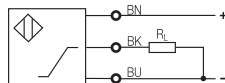
* The function is guaranteed over a range of -10...+70 °C

Wiring diagrams

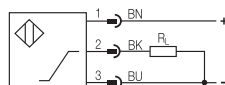
Connector, voltage output



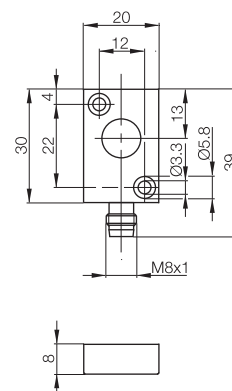
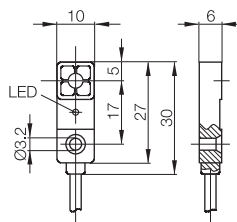
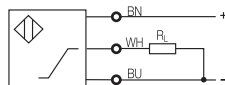
Cable, voltage output



Connector, current output

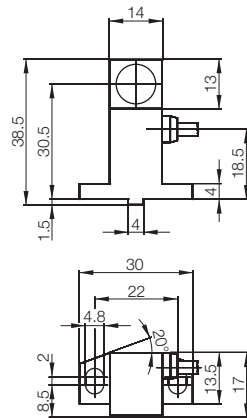


Cable, current output





Accessories



A graph showing the relationship between temperature T_a (in $^{\circ}\text{C}$) and temperature U_{temp} (in V). The y-axis is labeled U_{temp} (V) and has a tick mark at 3.3. The x-axis is labeled T_a ($^{\circ}\text{C}$) and has a tick mark at 25. A blue line with a negative slope is plotted, labeled "Typical $-9 \text{ mV}/^{\circ}\text{C}$ ". Dotted lines connect the point (25, 3.3) on the line to the axes.

Technical drawing of the M12x1 connector showing two views with dimensions in mm:

- Top View:**
 - Overall width: 14
 - Overall height: 38.5
 - Distance from top edge to center of mounting hole: 30.5
 - Radius of mounting hole: 13
 - Distance from center of mounting hole to bottom edge: 4
 - Distance from center of mounting hole to side edge: 4
- Side View:**
 - Overall width: 30
 - Distance from front face to center of mounting hole: 22
 - Distance from center of mounting hole to rear face: 4.8
 - Distance from center of mounting hole to bottom edge: 2
 - Angle of rear face: 18°
 - Overall height of connector body: 49
 - Thread specification: M12x1

Inductive Sensors for Analog Distance Measurement

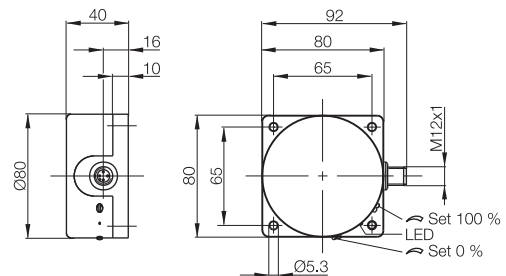
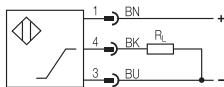
Block designs, 80×80×40 mm



Series	80×80×40 mm Maxisensor	
Installation type (observe instructions in the Basic Information chapter)	Not flush	
Output signal	Voltage, 0...10 V	
Linear range s_l	0...50 mm	
Ordering code	BAW003K	
Part name	BAW MKK-050.19-S4	
Supply voltage U_B	20...30 V DC	
Rated insulation voltage U_i	75 V DC	
Effective distance s_e	25 mm	
Load resistance $R_{L \min}$	10 k Ω	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Adjustment display (LED)	No	
Ambient temperature T_a	-10...+70 °C	
Repeat accuracy R_{BWN}	$\pm 12.0 \mu\text{m}$	
Non-linearity max.	$\pm 1500 \mu\text{m}$	
Limit frequency (-3 dB)	15 Hz	
Temperature coefficient, typically in range from +10...+50 °C	15 $\mu\text{m/K}$	
Degree of protection as per IEC 60529	IP 67	
Approvals	CE	
Material	Housing	PBT
	Sensing surface	PBT
Connection	M12 connector, 3-pin	
Suggested mating cable	Unshielded	BCC M415-0000-1A-003-EX44T2-020
	Shielded	BCC M415-0000-1A-014-VS8434-020

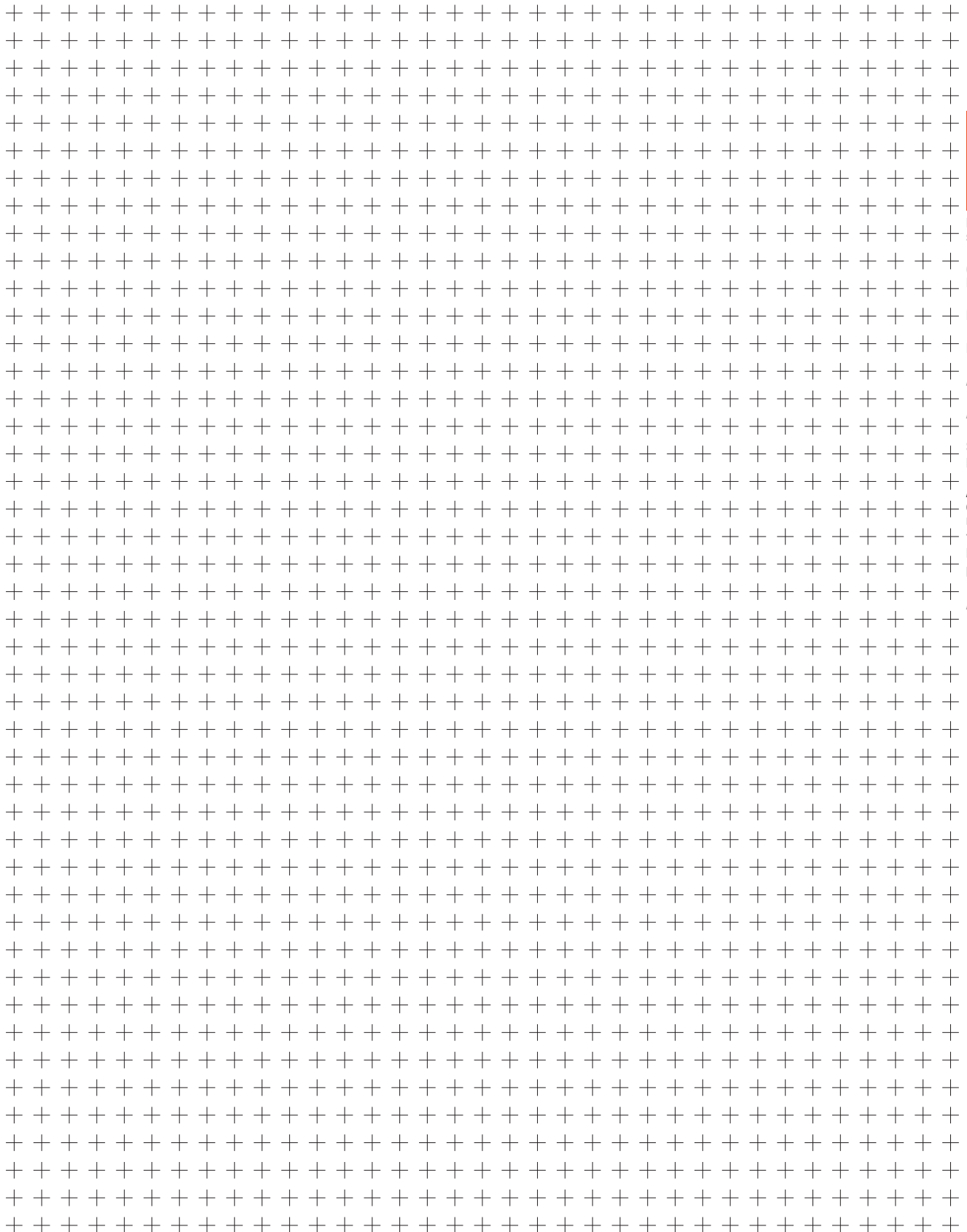
Wiring diagram

Connector, voltage output

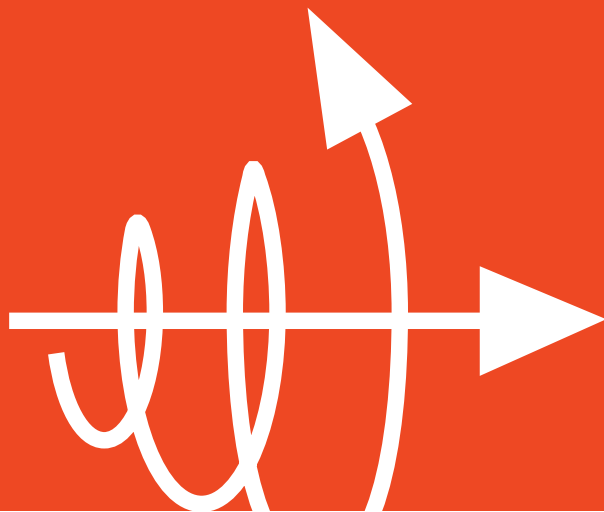




Inductive Sensors for Analog Distance Measurement



Inductive sensors
Global DC 3-wire
DC 3-/4-wire
DC 2-wire
AC/DC 2-wire
AC 2-wire
Special properties
Analog distance measurement
Tubular housings
Block designs
Accessories



Inductive Sensors

Accessories for inductive sensors

We offer special accessories for our inductive sensors. With products optimally suited to each other. Alongside switching devices, there are also assembly aids and protective equipment for the most varied inductive sensors.





Accessories for Inductive Sensors

Contents

Accessories for inductive sensors

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10

The solution is the Balluff pulse extender **BES 516-IV 2**. For controlling this device, the rising or falling edge of the sensor output signal is sufficient to generate a pulse that your controller can recognize. The length is adjustable from 2 ms to 1 sec. Small and space-saving, the device can be snapped onto a rail in accordance with EN 50022-35.



Accessories for Inductive Sensors

Pulse stretching



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories

**Pulse
Extension**

Sensor tester,
testing and
setting device

Analog
switching
device

Assembly aids
for Uni and
Unicomact
sensors

Protective
covering for
Unicomact
sensors

Protective nuts

Positive stop

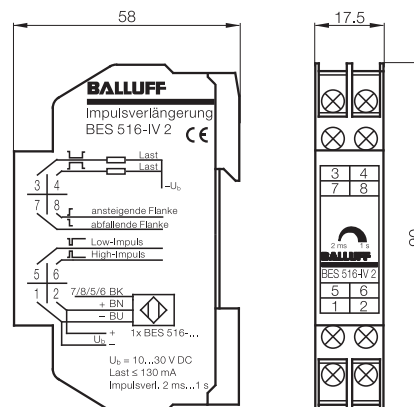
Tube switch

Banking screw

Cushioned
mounts

Clamping
holder overview

Description	Pulse stretching	
Use	Ensures secure output signals from inductive, capacitive or optoelectronic sensors to the controller	
Ordering code	BAE0073	
Part number	BES 516-IV 2	
Output (display by LEDs)	Positive-switching (PNP), complementary	
Adjustable pulse stretching	2 ms...1 s	
Set value	200 ms (+50 ms)	
Input 7/8	Referenced to the respective edge of the input signal	
Input 5/6	Referenced to the pulse end of the input signal	
Repeatability	< 10 %	
Input	1 PNP or 1 NPN - NO or NC	
Min. input pulse length	1.5 ms	
Supply voltage U_S	10...30 V DC (input voltage = output voltage)	
Residual ripple	≤ 15 %	
No-load current	Approx. 20 mA	
Output current	≤ 130 mA	
Permissible load capacity	$\leq 0.5 \mu\text{F}/24 \text{ V}$	
Ambient temperature T_a	0...60 °C	
Housing attachment	DIN rail EN 50022-35	
Max. conductor cross-section	2x2.5 mm ²	
Polarity reversal protected	Yes	
Short-circuit protected	Yes	
Degree of protection as per IEC 60529	Housing IP 40/terminals IP 20	
Output	3	Low-pulse, extended
	4	High-pulse, extended
Input	7	Falling edge
	8	Rising edge
	5	Low pulse
	6	High pulse
	1	- U_S
	2	+ U_S
Falling edge	Output signal is triggered by rising edge	
Rising edge	Output signal is triggered by rising edge	
Low pulse	PNP-NC/NPN-NO short damped	
	PNP-NO/NPN-NC short undamped	
High pulse	PNP-NC/NPN-NO short damped	
	PNP-NO/NPN-NC short undamped	



Accessories for Inductive Sensors

Sensor tester, testing and setting device

Testers BES 576-3

Balluff sensor testers are flat, handy, and visually appealing. The testing device is a simple manual testing device for PNP/NPN, normally open and normally closed sensors.

Benefits

- Integrated steel measuring plate for testing sensors
- Automatic shut-off after 30 s of non-use
- Power provided by a 9V battery
- Visual and acoustic signal

Testing and setting device BES 516-4

With this programming device, the following testing and setting functions can be carried out on the sensors:

- Programming the switching distance of analog sensors.
- Sensors with teachable switching points can also be programmed.
- Testing 3-wire sensors.
- Testing 2-wire sensors.



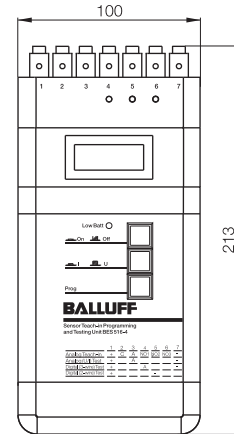
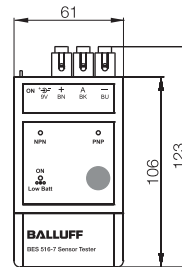
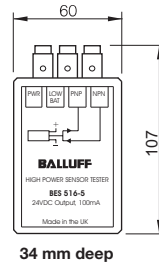
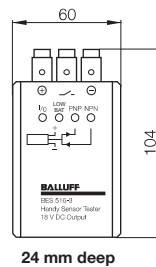
Accessories for Inductive Sensors

Sensor tester, testing and setting device



Description	Sensor tester	High Sensor tester	Sensor tester	Testing and setting device
Use	For DC PNP/NPN 3-wire sensors	For DC PNP/NPN 3-wire sensors	For DC PNP/NPN 3-wire sensors	For DC PNP/NPN 2/3-wire sensors and analog sensors
Ordering code	BAE000M	BAE002A	BAE002C	BAE0029
Part number	BES 516-3	BES 516-5	BES 516-7	BES 516-4
Output voltage	18 V DC	20-24 V DC	18 V DC	18 V DC
LED indicators	1 operating indicator	1 operating indicator	1 operating indicator	3 function indicators, 1 operating indicator
Battery type	2× 9 V battery	6 - 1.5 VAA (not included)	1× 9 V battery	2× 9 V batteries
Sensor connection	3 spring-loaded terminals	3 spring-loaded terminals	3 spring-loaded terminals	7 spring-loaded terminals
Degree of protection as per IEC 60529	IP 21	IP 21	IP 40	IP 40
Housing material	Plastic	Plastic	Plastic	Plastic

Acoustic and visual signal,
built-in steel measuring plate



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories

Pulse
Extension

**Sensor tester,
testing and
setting device**

Analog
switching
device

Assembly aids
for Uni and
Unicomact
sensors

Protective
covering for
Unicomact
sensors

Protective nuts

Positive stop

Tube switch

Banking screw

Cushioned
mounts

Clamping
holder overview

Accessories for Inductive Sensors

Analog switching device for onsite assembly for inductive distance sensors BAW

Analog switching device for onsite assembly

This switching device allows you to easily program sensors which have an analog output signal, such as the BOD family, with three switching thresholds, onsite.

In this, the sensor connected to the switching device is brought into the desired switching distance from the object. Then connecting the control line to the (+) side of the supply voltage enables a "Teach-in" mode; in other words, the set distance is assigned to the signal level present and these values are stored in the evaluation device. This procedure is supported with LEDs. During operation, these LEDs are available as switching state indicators.

For sensors with a temperature output, the analog temperature signal is made available in unchanged form on the device output.

Connection example

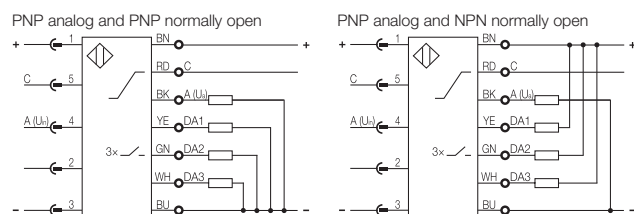
Analog sensors

e.g. BOD...

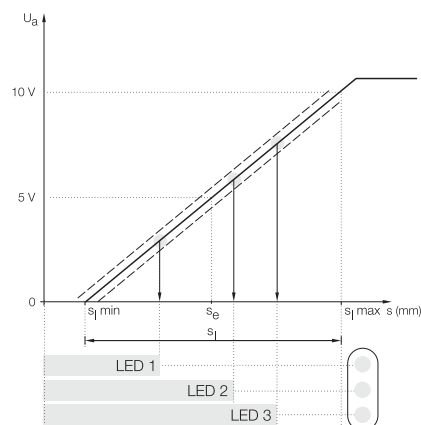
Analog switching amplifier

BES 516-615-PS-1-PU-05

Wiring diagrams



Approach curve



Accessories for Inductive Sensors

Analog switching device for onsite assembly for inductive distance sensors BAW



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse

Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

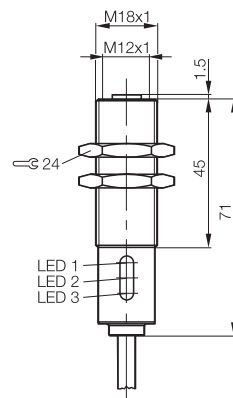
Tube switch

Banking screw

Cushioned mounts

Clamping holder overview

Size	M18×1	
Use	For analog sensors	
PNP analog and PNP NO	Ordering code	BAE0070
	Part number	BES 516-615-PS-1-PU-05
PNP analog and NPN NO	Ordering code	BAE006Z
	Part number	BES 516-615-NS-1-PU-05
Rated operating voltage U_e	15...30 V DC	
Supply voltage U_S	15...30 V DC	
Residual ripple	≤ 15 % of U_e	
Rated insulation voltage U_i	75 V DC	
Rated operating current I_e per output	100 mA	
No-load supply current I_0 max.	≤ 20 mA	
Residual current I_r	≤ 10 μA	
Polarity reversal protected	Only against ±-reversal	
Short-circuit protected	Yes	
Ambient temperature T_a	-10...+70 °C	
Switching frequency f	2 kHz	
Utilization category	DC 13	
Function indicator for each output	Yes	
Analog input		
Input voltage U_{in}	0...10 V (implemented to output A)	
Input impedance	4.2 kΩ	
Switching outputs		
Freely programmable switching outputs	3	
Hysteresis H	500 mV	
Temperature drift	≤ 2 % of U_{in} max.	
Degree of protection as per IEC 60529	IP 67	
Housing material	CuZn coated	
Connection	Input	M12 connector, 5-pin
	Output	5 m PUR cable, 7×0.25 mm²



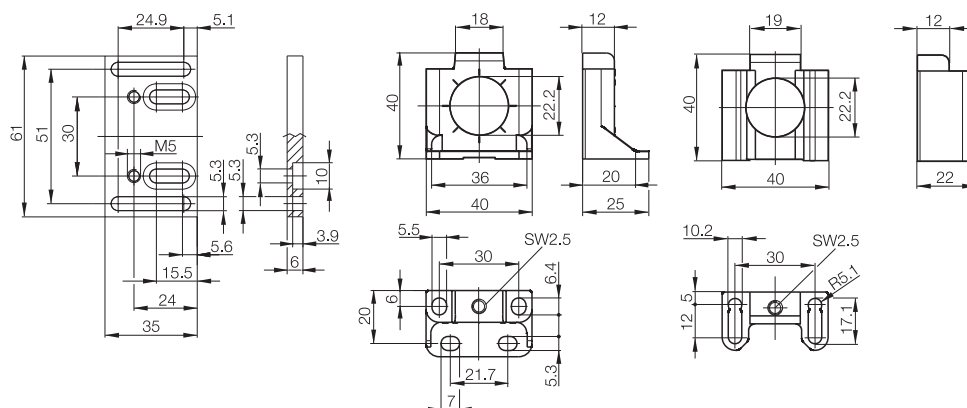
Accessories for Inductive Sensors

Assembly aids for Unicomcompact sensors

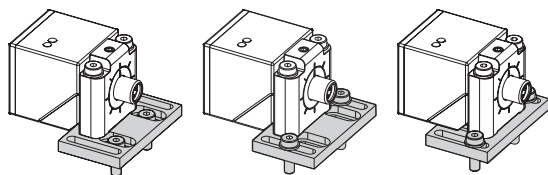


Description	Unicomcompact mounting bracket	Unicomcompact mounting base	Unicomcompact mounting base
Use	for BES Q40KFU-... Unicomcompact sensors (40x40 mm)	for BES Q40KFU-... Unicomcompact sensors (40x40 mm)	for BES Q40KFU-... Unicomcompact sensors (40x40 mm)
Ordering code	BAM00JW	BAM00JY	BAM00JZ
Part number	BES Q40-HW-1	BES Q40-HW-2	BES Q40-HW-3
Material	Anodized aluminum	Anodized aluminum	Anodized aluminum

Please note permissible installation options!



3 different mounting options



Accessories for Inductive Sensors

Assembly aids for Unicomcompact sensors

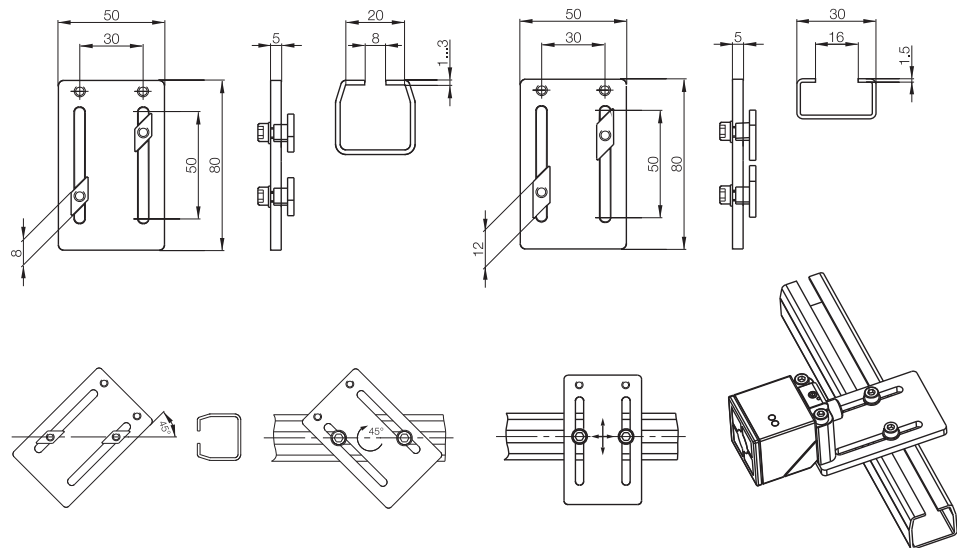


Description	Unicomcompact holding system	Unicomcompact holding system
Use	Unicomcompact sensors for fastening to profile rails (groove width: 8 mm)	Unicomcompact sensors for fastening to profile rails (groove width: 16 mm)
Ordering code	BAM00JU	BAM00JT
Part number	BES HS-01-P1-C8/Q40	BES HS-01-P1-C16/Q40
Material	Al anodized, CuZn	Al anodized, CuZn

This holding system is used to attach Unicomcompact sensors to extruded rails.

The mounting set consists of:

- 1 mounting plate
- 2 tenon blocks
- 2 M5×10 cheese head screws DIN 912 galvanized
- 2 washers Ø 5.3 DIN 533
- 2 M5×40 cheese head screws ISO 4762



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse

Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomcompact sensors

Protective covering for Unicomcompact sensors

Protective nuts

Positive stop

Tube switch

Banking screw

Cushioned mounts

Clamping holder overview

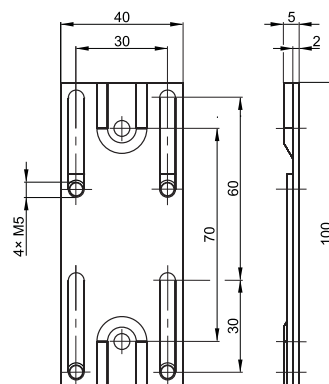


Accessories for Inductive Sensors

Assembly aid for Uni sensors and Unicomact sensors



Description	Mounting plate - Unisensor and Unicomact
Use	For Unisensor and Unicomact sensors (40x40 mm)
Ordering code	
Part number	Montageplatte B 4 - 2057
Material	Anodized aluminum



Unisensors can be adjusted up to 30 mm on this mounting plate while wired.

Loosening the sensor mounting screws (M5x25; included in set) allows the Unisensor to be easily repositioned to the desired location. Then simply tighten the screws.

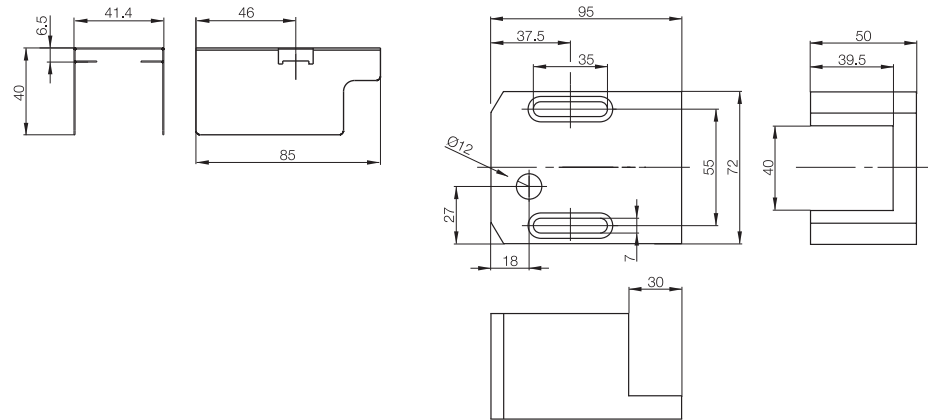


Accessories for Inductive Sensors

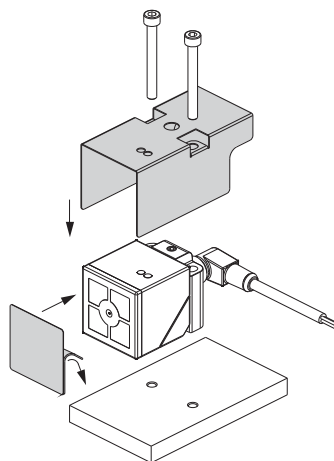
Protective coverings for Unicomcompact sensors



Description	Protective cover - Unicompart	Protective cap - Unicompart
Use	For BES Q40KFU-... magnetic field resistant Unicompart sensors (40×40 mm)	for BES Q40KFU-... Unicompart sensors (40×40 mm)
Ordering code	BAM00K0	BAM00K1
Part number	BES Q40-SH-1	BES Q40-SH-2
Material	Anodized aluminum	PA 6



The weld protection consists of a protective cover and a self-adhering PTFE film for protecting the active surface. If the sensor head is replaced, the welding protection must not be removed.



Protective cover
for use with BES 940
Material: **Coated Brass**



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse

Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicompart sensors

Protective covering for Unicompart sensors

Protective nuts

Positive stop

Tube switch

Banking screw

Cushioned mounts

Clamping

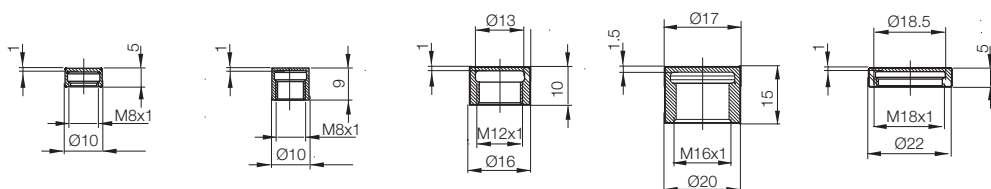
holder overview

Accessories for Inductive Sensors

Protective nuts



Description	Cover nut	Cover nut	Cover nut	Cover nut	Cover nut	
Use	For M8 sensors	For M8 sensors	For M12 sensors	For M16 sensors	For M18 sensors	
Ordering code	BAM009Z	BAM00A0	BAM00C2	BAM00EP	BAM00EZ	
Part number	BES 08-SM-1	BES 08-SM-1F	BES 12-SM-2	BES 16-SM-2	BES 18-SM-1	
Reduction of the rated switching distance	1 mm	1 mm	1 mm	1.5 mm	1 mm	
Material	PTFE	PTFE	POM	PTFE	PTFE	



Increase the life of a sensor with PTFE, Deirin or ceramic screw on cap.

- Increase life of the sensor by protecting sensor face
- Withstands high temperatures
- Used in welding applications
- Easy installation

Material	POM	PTFE
Ambient temperature T_a	-20...+90 °C	-20...+100 °C

Please note!

The rated switching distance of sensors is reduced to the wall thickness of the nut when the protective nut is installed.

Accessories for Inductive Sensors

Protective nuts



Cover nut	Cover nut	Cover nut	Cover nut	Cover nut
For M18 sensors	For M18 sensors	For M30 sensors	For M30 sensors	For M36 sensors
BAM00F0	BAM00H8	BAM00HJ	BAM00HK	BAM00JL
BES 18-SM-2	BES 22-SM-2	BES 30-SM-1	BES 30-SM-2	BES 36-SM-2
1 mm	2 mm	1 mm	2 mm	2 mm
POM	PTFE	POM	POM	POM



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse

Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

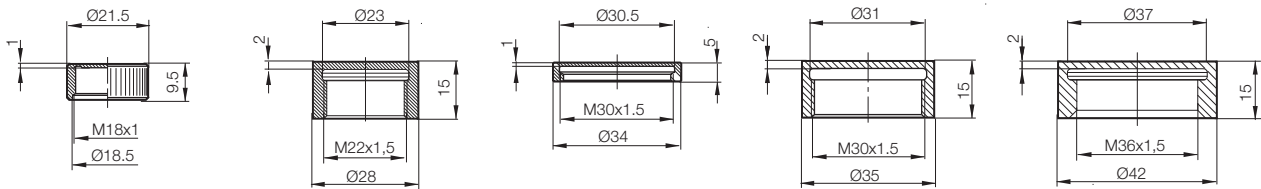
Positive stop

Tube switch

Banking screw

Cushioned mounts

Clamping holder overview



Description	Cover nut	Cover nut	Cover nut		
Use	For M18 sensors	For M18 sensors			
Order code					
Part number	BES 12-CERAMIC-CAP-1	BES 18-CERAMIC-CAP-1	BES 30-CERAMIC-CAP-1		
Reduction of the rated switching distance	2 mm	2 mm	2 mm		
Material	Ceramic	Ceramic	Ceramic		

Accessories for Inductive Sensors

Positive stop

Positive stops for sensors with diameters of 4 mm or 8 mm

A positive stop that is combined with the corresponding mounting cuff can be added to inductive sensors with housing $\varnothing$ 4 mm or $\varnothing$ 8 mm. The desired switching point between the proximity switch and the trigger pin can be set wherever needed.

Prox Actuator

To avoid sensor damage, Balluff's prox actuators isolate inductive proximity sensors from mechanical contact with targets. They consist of a mounting clamp and a detent holder and are used with either a 4mm or 8mm smooth bore sensor.

When a target contacts the plunger, the rod moves the detent into the sensing range of the switch, thus activating its output. When the target is removed, the plunger springs back into place and the detent is moved out of the sensing range.

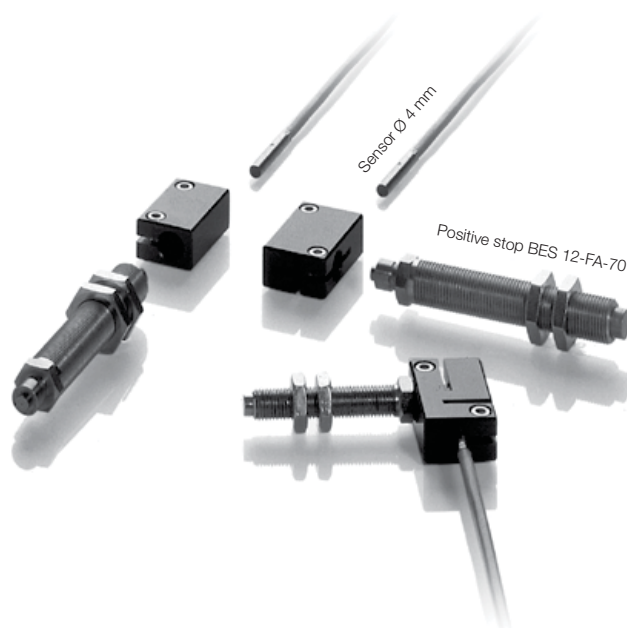
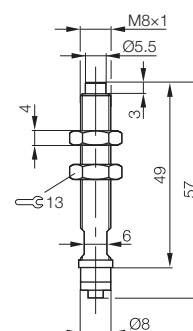
Each prox actuator consists of a threaded barrel, a plunger and rod with spring return and a detent, which is detected by the sensor. The sensor is inserted into one end of the mounting clamp and the detent holder is inserted into the other end. Mounting clamps are available in four configurations:

- Straight and right angle for use with 4mm sensors
- Straight and right angle for 8mm sensors
- Detent holders come in three configurations:
 - M12 x 1, 70mm long
 - M08 x 1, 49mm long
 - M08 x 1, 89mm long

All have a 8mm smooth bore end for insertion into the clamp. Any holder can be used with any clamp. Once the sensor and holder are installed, two allen screws are tightened to hold them in place.



Description	Positive stop	
Use	For inductive sensors for mechanical protection	
Ordering code	BAM009L	
Part number	BES 08-FA-49	
Ordering code		
Part number		
Temperature resistance	-25...+100 °C	
Spring force	3 N	
Impact force $F_{max.}$ (N)	100	
Spring deflection	2 mm	
Permissible torque	15 Nm	
Material	Stainless steel	

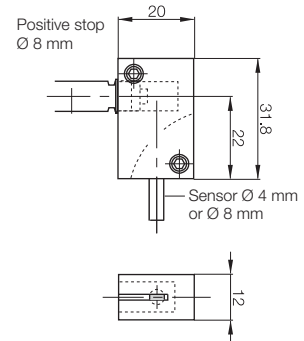
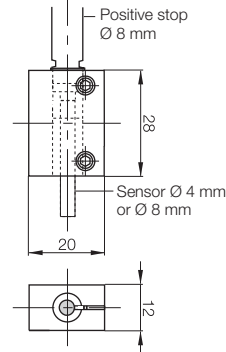
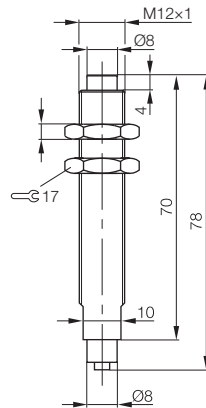
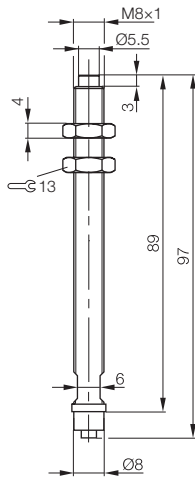


Accessories for Inductive Sensors

Positive stop, mounting cuff for positive stop



	Positive stop	Positive stop	Mounting cuff - straight for positive stop	Mounting cuff - angled for positive stop
	For inductive sensors for mechanical protection	For inductive sensors for mechanical protection	For sensors with Ø 4 mm or Ø 8 mm	For sensors with Ø 4 mm or Ø 8 mm
	BAM009M	BAM00AZ	BAM009N	BAM009P
	BES 08-FA-89	BES 12-FA-70	BES 08-FA-BS-4.0-G	BES 08-FA-BS-4.0-W
			BAM009R	BAM009T
			BES 08-FA-BS-8.0-G	BES 08-FA-BS-8.0-W
	-25...+100 °C	-25...+100 °C	-25...+100 °C	-25...+100 °C
	3 N	4 N		
	100	100		
	2 mm	32 mm		
	15 Nm	25 Nm	15 Nm	15 Nm
	Stainless steel	Stainless steel	Anodized Al	Anodized Al



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

Tube switch

Banking screw

Cushioned mounts

Clamping holder overview

Accessories for Inductive Sensors

Tube switch

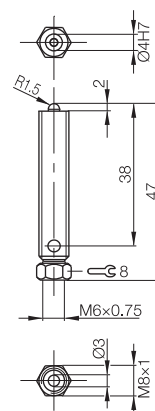
- Mechanical actuation – non-contact switching
- Protects the sensor from mechanical damage
- Plug and safe

Rapid application – high reliability

The set includes a pre-assembled tube switch, which means you only need to set up the sensor. The tube switch also combines the advantages offered by mechanical and inductive switches. Manufactured from stainless steel, it is extremely robust and very reliable, even under difficult conditions.



Description	Tube switch	
Use	For sensors dia. 4 mm for mechanical protection	
Ordering code	BAM01C0	
Part number	BAM FS-XE-002-D4-4	
Spring force F (N)	3	
Impact force F _{max.} (N)	400	
Switching operations min. (with F _{max.})	500000	
Housing material	Stainless steel	



Accessories for Inductive Sensors

Tube switch



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

Tube switch

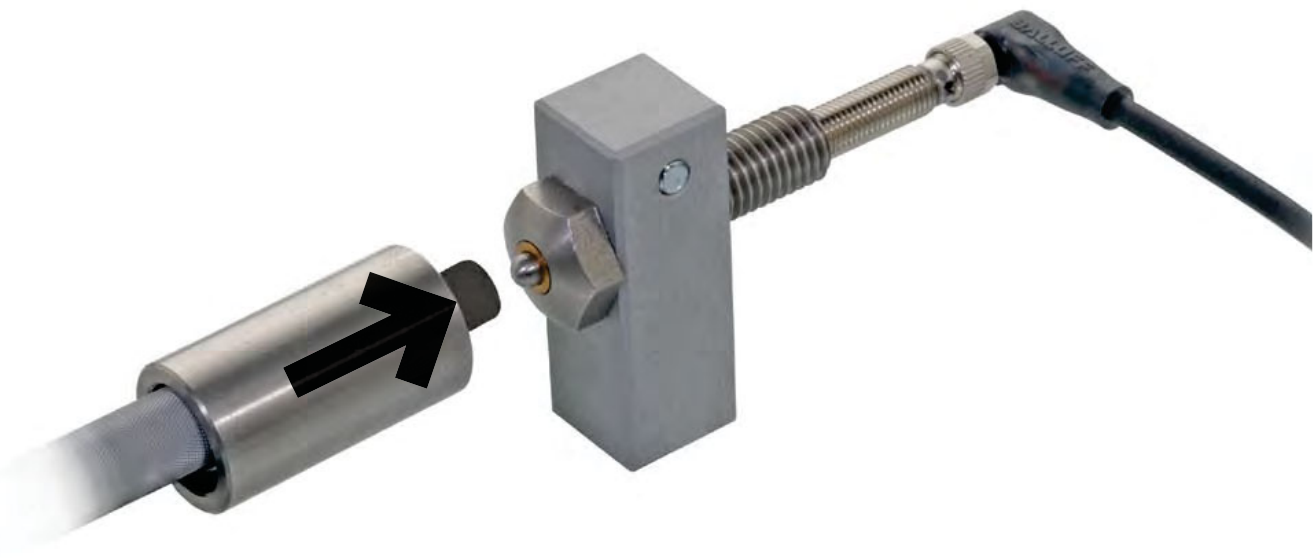
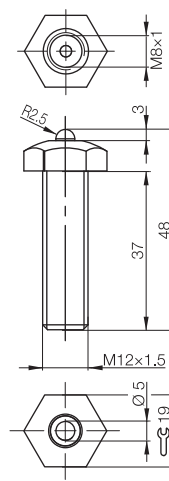
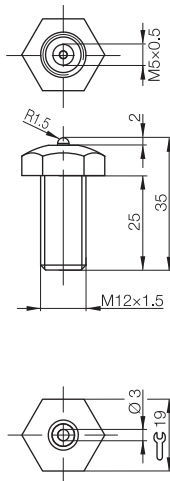
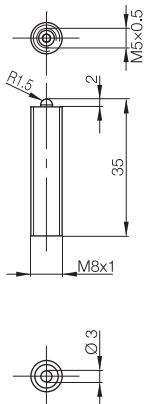
Banking screw

Cushioned mounts

Clamping holder overview



Tube switch	Tube switch	Tube switch	
For M5 sensors for mechanical protection	For M5 sensors for mechanical protection	For M8 sensors for mechanical protection	
BAM01AZ	BAM019Y	BAM019W	
BAM FS-XE-001-M5-4	BAM FS-XE-003-M5-4	BAM FS-XE-004-M8-4	
3	3	4	
400	400	400	
500000	500000	500000	
Stainless steel	Stainless steel	Stainless steel	



Accessories for Inductive Sensors

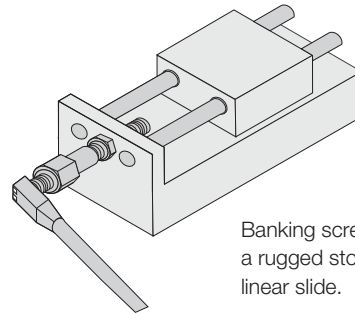
Banking screw actuators

Features:

Banking screw actuators are heat treated alloy steel that will accept any standard (1x) M8, M12 or M18 shielded sensor. Not intended for use with extended range models.

Benefits:

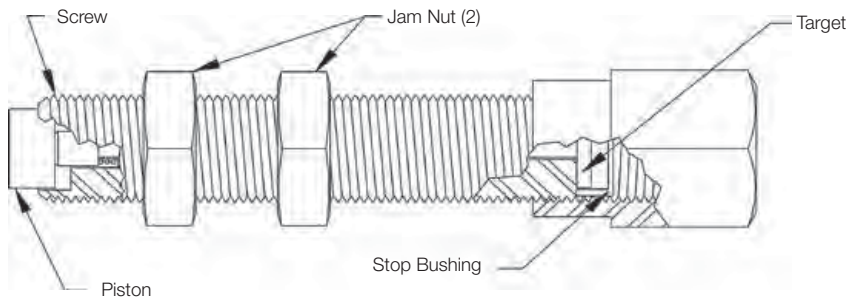
- Solid state output with no mechanical contact with sensor.
- Isolates sensor from impact.
- Allows for positive mechanical contact to plunge without physical contact to sensor.



Banking screw used as a rugged stop for a linear slide.

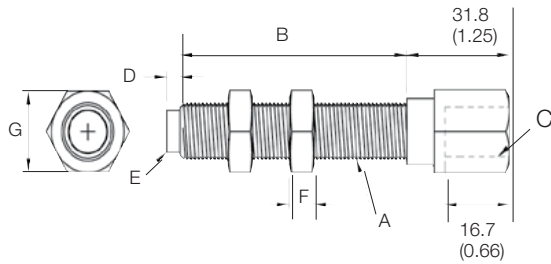
Construction & Operation

Both the screw and piston are heat-treated to withstand heavy use. A connecting rod ties the spring-loaded piston to the target, which triggers the sensor when the piston is displaced. The sensor is isolated from impact and separated from the target with a plastic bushing.



Accessories for Inductive Sensors

Banking screw actuators



Inductive
sensors

Global
DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special
properties

Analog
distance
measurement

Accessories

Pulse
Extension

Sensor tester,
testing and
setting device

Analog
switching
device

Assembly aids
for Uni and
Unicomact
sensors

Protective
covering for
Unicomact
sensors

Protective nuts

Positive stop

Tube switch

**Banking
screw**

Cushioned
mounts

Clamping
holder overview

Ordering Code	A	B	C	D	E	G
BESA 08-25-08-BANKING-SCREW	M8 X 1	25 mm	M8 X 1	3.16 mm	5.84 mm	11.0 mm
BESA 08-50-08-BANKING-SCREW	M8 X 1	50 mm	M8 X 1	3.16 mm	5.84 mm	11.0 mm
BESA 12-25-12-BANKING-SCREW	M12 X 1	25 mm	M12 X 1	4.32 mm	9.40 mm	15.7 mm
BESA 12-50-12-BANKING-SCREW	M12 X 1	50 mm	M12 X 1	4.32 mm	9.40 mm	15.7 mm
BESA 12-75-12-BANKING-SCREW	M12 X 1	75 mm	M12 X 1	4.32 mm	9.40 mm	15.7 mm
BESA 12-100-12-BANKING-SCREW	M12 X 1	100 mm	M12 X 1	4.32 mm	9.40 mm	15.7 mm
BESA 18-50-18-BANKING-SCREW	M18 X 1	50 mm	M18 X 1	4.32 mm	14.2 mm	22.1 mm
BESA 18-75-18-BANKING-SCREW	M18 X 1	75 mm	M18 X 1	4.32 mm	14.2 mm	22.1 mm
BESA 18-100-18-BANKING-SCREW	M18 X 1	100 mm	M18 X 1	4.32 mm	14.2 mm	22.1 mm

Features:

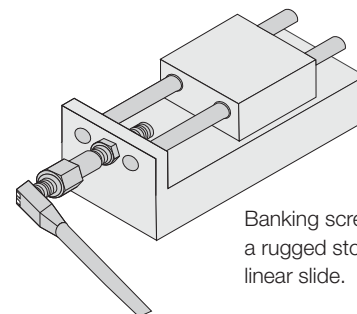
Banking screw actuators are heat treated alloy steel that will accept any standard (1x) M8, M12 or M18 shielded sensor. Not intended for use with extended range models.

Benefits:

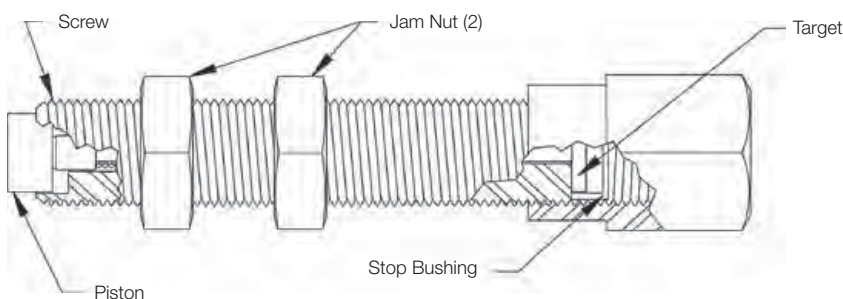
- Solid state output with no mechanical contact with sensor.
- Isolates sensor from impact.
- Allows for positive mechanical contact to plunge without physical contact to sensor.

Construction & Operation

Both the screw and piston are heat-treated to withstand heavy use. A connecting rod ties the spring-loaded piston to the target, which triggers the sensor when the piston is displaced. The sensor is isolated from impact and separated from the target with a plastic bushing.



Banking screw used as a rugged stop for a linear slide.



Accessories for Inductive Sensors

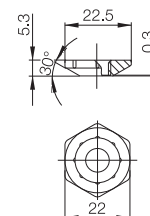
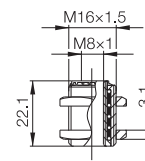
Cushioned Prox mounts

Protects sensor face from welding spatter and abrasives

- Minimal sensing distance affect (0.3-0.5 mm)
- Held in place with epoxy*
- Extends life of sensor
- Provides physical and thermal protection to sensor face



Description	Contact protector	
Use	For M8 sensors for mechanical protection	
Ordering code	BAM015U	
Part number	BESA-08-CM	
WAF	22	
Ambient temperature	-45...+85 °C	
Material	Anodized Al, POM	

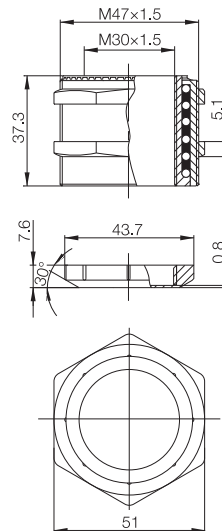
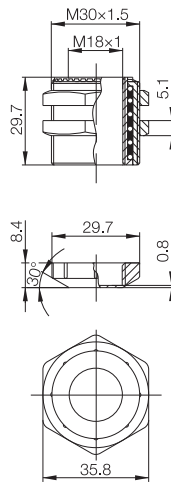
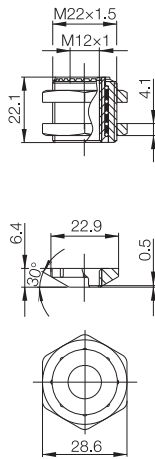


Accessories for Inductive Sensors

Cushioned Prox mounts



Contact protector	Contact protector	Contact protector	
For M12 sensors for mechanical protection	For M18 sensors for mechanical protection	For M30 sensors for mechanical protection	
BAM015W	BAM015Y	BAM015Z	
BESA-12-CM	BESA-18-CM	BESA-30-CM	
29	35	51	
-45...+85 °C	-45...+85 °C	-45...+85 °C	
Anodized Al, POM	Anodized Al, POM	Anodized Al, POM	



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

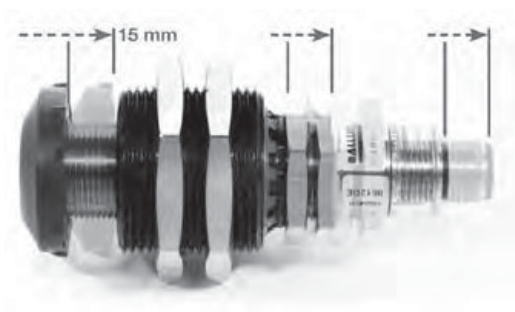
Positive stop

Tube switch

Banking screw

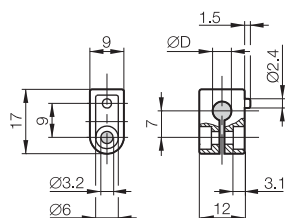
Cushioned mounts

Clamping holder overview



Accessories for Inductive Sensors

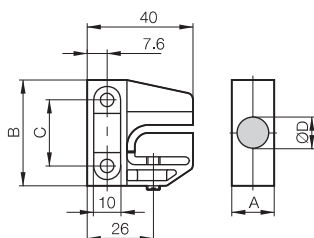
Mounting clamps for tubular sensors



Clamp for tubular sensors Ø 4 mm and 5 mm

	ØD
BES 04-KB-1	4
BES 05-KB-1	5
BES 06.5-KB-1	6.5

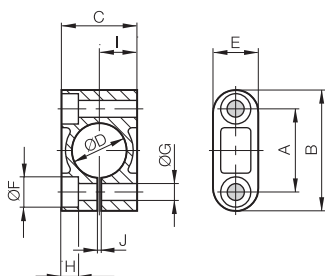
Material: PA6



Clamp for tubular sensors M12 and M18 (stackable)

	A	B	C	ØD
BES 12,0-KB-2	16	40	25	12
BES 18,0-KB-2	22	45	30	18

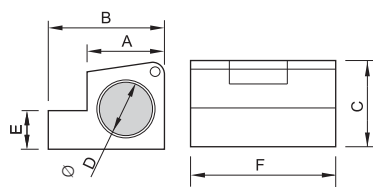
Material: PA6



Clamping cuff

	A	B	C	ØD	E	F	G	H	I	J
BES 06.5-BS-1	17	27	16	6.4	12	8	4.5	4.5	8	1
BES 08.0-BS-1	17	27	16	7.9	12	8	4.5	4.5	8	1
BES 12.0-BS-1	22	32	20	11.9	12	8	4.5	4.5	10	1
BES 14.5-BS-1	22	32	20	14.5	12	8	4.5	4.5	10	1
BES 16.0-BS-1	26	36	26	16	12	8	4.5	4.5	13	1
BES 18.0-BS-1	26	36	26	17.9	12	8	4.5	4.5	13	1
BES 20.0-BS-1	32	45	30	20	15	10	5.5	5.5	15	2
BES 22.0-BS-1	32	45	30	21.9	15	10	5.5	5.5	15	2
BES 30.0-BS-1	42	55	38	30	18	10	5.5	5.5	19	1.5
BES 36.0-BS-1	48	61	44	35.9	18	10	5.5	5.5	22	1.5

Material: PA6



Snap clamp with positive stop

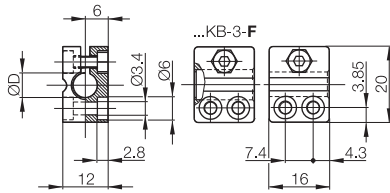
	A	B	C	ØD	E	F
BES 08.0-KB-5-F	12	20	15	8	7	22
BES 12.0-KB-5-F	16	24	18	12	8	30
BES 18.0-KB-5-F	21	29	24	18	14	30
BES 30.0-KR-5-F	33	41	34.5	30	24	35

Material: Plastic PC



Accessories for Inductive Sensors

Mounting clamps for tubular sensors



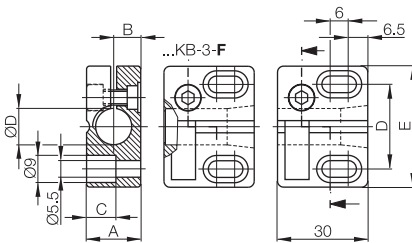
Clamp without positive stop for sensors Ø 3 mm to M8

	Ø D
BES 03.0-KB-3	3
BES 04.0-KB-3	4
BES 05.0-KB-3	5
BES 06.5-KB-3	6.5
BES 08.0-KB-3	8

Clamp with positive stop for sensors Ø 3 mm to M8

BES 08.0-KB-3-F	8
-----------------	---

Material: PA6



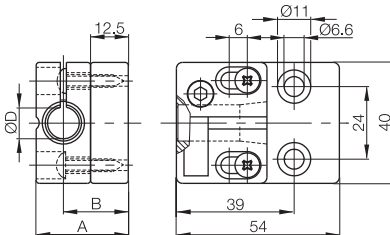
Clamp without positive stop for sensors M12 or M18 non-flush

	Ø D	A	B	C	D	E
BES 12.0-KB-3	12	18	9	9.7	28	40
BES 18.0-KB-3	18	24	12	13.5	28	40

Clamp with positive stop for sensors M12, M18 or M30 flush

BES 12.0-KB-3-F	12	18	9	9.7	28	40
BES 18.0-KB-3-F	18	24	12	13.5	28	40
BES 30.0-KB-3-F	30	36	18	19.5	42	54

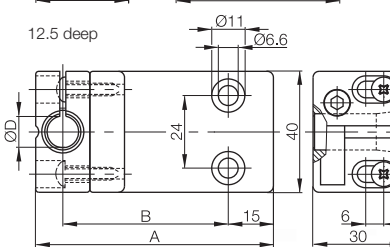
Material: PA6



Clamp with positive stop for vertical insertion of sensors for M12 or M18 flush, with mounting plate

	Ø D	A	B
BES 12.0-KB-3-F-SA 1	12	30.5	21.5
BES 18.0-KB-3-F-SA 1	18	36.5	24.5

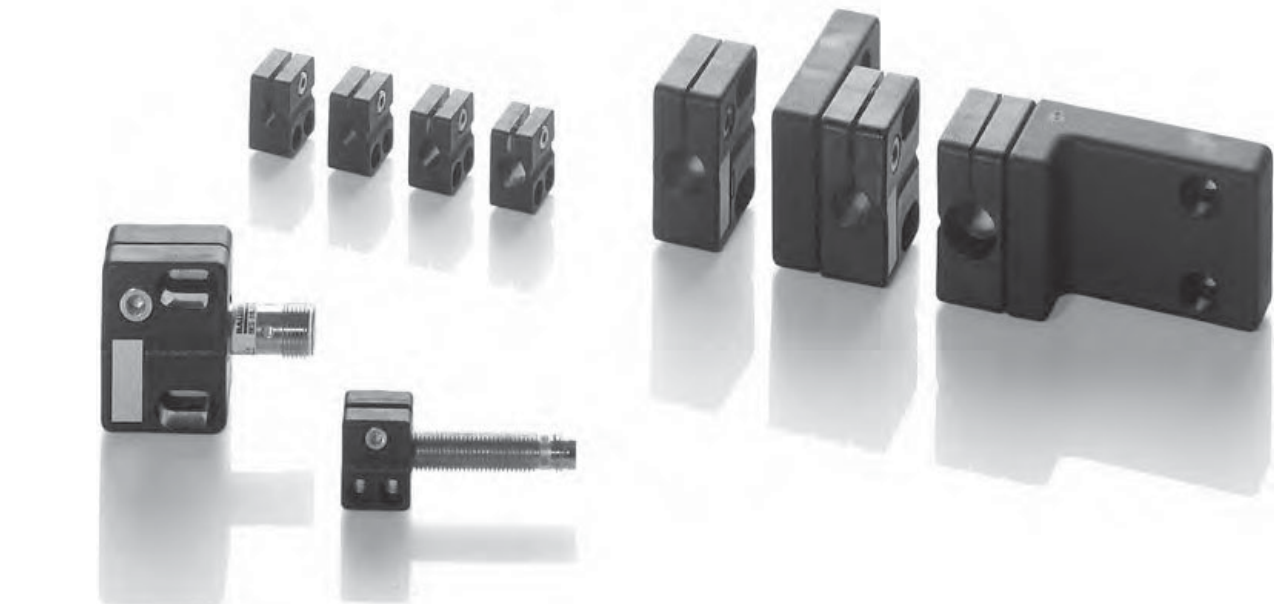
Material: PA6



Clamp with positive stop for horizontal insertion of sensors for M12 or M18 flush, with mounting plate

	Ø D	A	B
BES 12.0-KB-3-F-SA 2	12	79	55
BES 18.0-KB-3-F-SA 2	18	85	58

Material: PA6



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

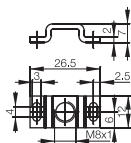
Tube switch

Banking screw

Cushioned mounts

Clamping holder

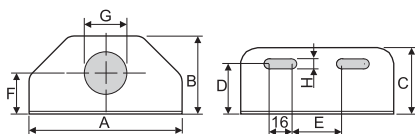
overview



Material: Stainless steel

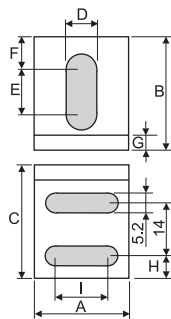


Material: Stainless steel



	A	B	C	D	E	F	G	H
BES 516-MB-08	76	34	29	17	31	19	8	6
BES 516-MB-12	76	34	29	17	31	19	12	6
BES 516-MB-18	76	34	29	17	31	19	18	6
BES 516-MB-30	108	55	45	25	51	29	30	7

Material: Carbon steel

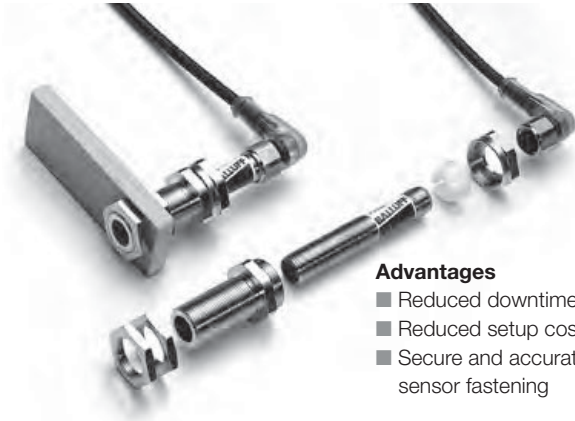


	A	B	C	D	E	F	G	H	I
BES 08-HW-1	25	30	30	8.1	12	7	4	6	14
BES 12-HW-1	25	30	30	12.1	9	8.5	4	6	14
BES 16-HW-1	30	40	40	16.1	12	12	5	10	18
BES 18-HW-1	30	40	40	18.1	11	12	5	10	18
BES 24-HW-1	35	50	40	24.1	13	16	5	10	23
BES 30-HW-1	40	60	40	30.1	18	19	5	10	30
BES 36-HW-1	50	60	40	36.1	13	21	5	10	40

Material: Aluminum

Accessories for Inductive Sensors

Prox mounts for tubular sensors



Balluff provides a range of mounting solutions to decrease the need to adjust sensors for correct sensing range to reduce downtime and setup costs when sensors are replaced.

Initial Sensor Installation

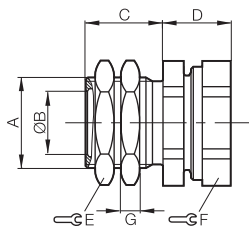
Sensor is assembled into the Prox Mount tube and locked into place with a plastic compression ring and metal nut. The Prox Mount and sensor assembly is then mounted and adjusted as with any tubular sensor, but the Prox Mount will remain in place on future sensor replacement tasks.

Advantages

- Reduced downtime
- Reduced setup costs
- Secure and accurate sensor fastening

Quick Sensor Replacement

Simply loosen the metal nut, allowing the sensor to be quickly removed. Install the new sensor into the Prox Mount mounting tube and lock into place with the compression ring and nut. A positive stop designed into the Prox Mount tube ensures effortless repeatable sensor positioning.



Prox Mounts with positive stop for sensors with thread length 30 mm

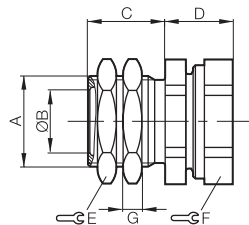
	A	Ø B	C	D max.	E	F	G
BES 05.0-KH-2S*	M5x0.5	5	13	11	13	13	4
BES 08.0-KH-2S*	M12x1 [‡]	8	17.5	14.5	17	17	4
BES 12.0-KH-2S*	M16x1	12	19.5	14.5	22	22	4
BES 12.0-KH-2S-M18	M18x1 [‡]	12	19.5	14.5	22	22	4
BES 18.0-KH-2S*	M24x1.5	18	20.5	15.5	30	30	5
BES 30.0-KH-2S*	M36x1.5	30	20.5	15.5	41	41	6

Material: CuZn, nickel plated

* Also available for welding environments (PTFE coated). Add /W to ordering code.

Ordering example: BES 12.0-KH-2S/W or BES 12.0-KH-2S/W-M18

[‡] Allows smaller diameter sensor to replace larger when installed in this prox mount.



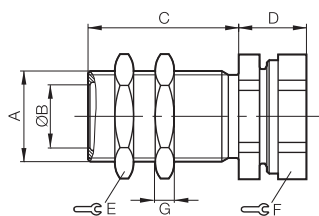
Prox Mounts with positive stop for sensors with thread length 30 mm

	A	Ø B	C	D max.	E	F	G
BES 08.0-KH-11S/W	M12x1 [‡]	8	17.5	15.5	17	17	4
BES 12.0-KH-11S/W	M16x1	12	21	15.5	22	22	4
BES 18.0-KH-11S/W	M24x1.5	18	21.5	15.5	30	30	5

Material: Steel, black PTFE coated

[‡] Allows smaller diameter sensor to replace larger when installed in this prox mount.

Note: Used with 2X Steelface sensors.



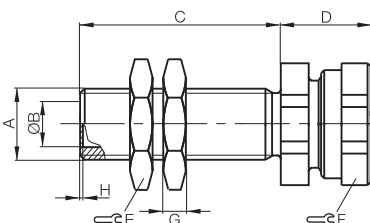
Prox Mounts with positive stop for sensors with thread length 40 mm or longer

	A	Ø B	C	D max.	E	F	G
BES 08.0-KH-2L*	M12x1	8	34	14.5	17	17	4
BES 12.0-KH-2L*	M16x1	12	30	14.5	22	22	4
BES 18.0-KH-2L*	M24x1.5	18	40	18	30	30	5
BES 30.0-KH-2L*	M36x1.5	30	40	18	41	41	6

Material: CuZn, nickel plated

* Also available for welding environments (PTFE coated). Add /W to end of ordering code.

Ordering example: BES 12.0-KH-2L/W



Prox Mounts with enclosed end for sensors in sealed installation

	A	Ø B	C	D max.	E	F	G	H
BES 08.0-KH-3L	M12x1	8	34	14.5	17	17	4	0.5
BES 12.0-KH-3L	M16x1	12	30	14.5	22	22	4	1
BES 18.0-KH-3L	M24x1.5	18	40	19.5	30	30	5	1

Material: PBT fiberglass reinforced



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse

Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

Tube switch

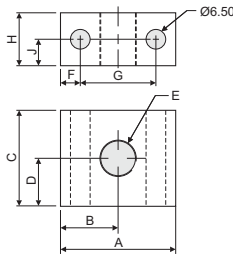
Banking screw

Cushioned mounts

Clamping holder overview

Accessories for Inductive Sensors

Bunker Blocks®

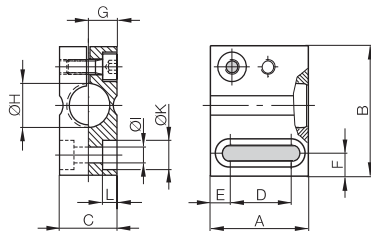


Bunker Block®

Bunker Block®	Prox Mount Required	A	B	C	D	E	F	G	H	J
BES 12.0-KB-9L	BES 08.0-KH-2L/W	38.1	19.05	31.75	15.88	M12	6.55	25	34	17
BES 16.0-KB-9L	BES 12.0-KH-2L/W	38.1	19.05	31.75	15.88	M16	6.55	25	30	15
BES 24.0-KB-9L	BES 18.0-KH-2L/W	50.8	25.4	38.1	19.05	M24	7.9	35	40	20
BES 36.0-KB-9L	BES 30.0-KH-2L/W	63.5	31.75	50.8	25.4	M36	7.75	48	40	20
BES 12.0-KB-9S	BES 08.0-KH-2S/W	38.1	19.05	31.75	15.88	M12	6.55	25	17.5	8.75
BES 16.0-KB-9S	BES 12.0-KH-2S/W	38.1	19.05	31.75	15.88	M16	6.55	25	19.5	9.75
BES 24.0-KB-9S	BES 18.0-KH-2S/W	50.8	25.4	38.1	19.05	M24	7.9	35	20.5	10.25
BES 36.0-KB-9S	BES 30.0-KH-2S/W	63.5	31.75	50.8	25.4	M36	7.75	48	20.5	10.25

Material: Aluminum

Sensor clamp with positive stop



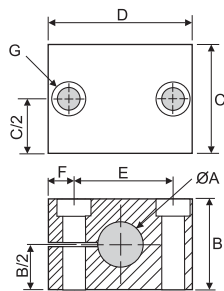
	A	B	C	D	E	F	G	ØH	ØI	ØK	L
BES 08.0-KB-4-F	28	30	12	20	4	5	6	8	3.4	6	3.4
BES 12.0-KB-4-F	28	35	16	17	5.5	6	8	12	4.3	8	4
BES 18.0-KB-4-F	28	40	22	17	5.5	6	11	18	4.3	8	4
BES 30.0-KB-4-F	34	56	34	22	6	7	17	30	6.4	10	6

Material: Aluminum

Note for aluminum clamps with positive stop:

The switching distance of the proximity sensor may be reduced by use of these clamps. Note this when using this clamping system.

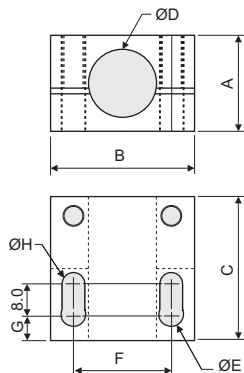
Slotted clamp mount without positive stop



	A	B	C	D	E	F	G
BES 08.0-KB-6	8	16.0	19.2	25.4	18.4	3.5	4-40 SHCS
BES 12.0-KB-6	12	25.4	19.2	38.1	25.0	6.6	10-32 SHCS
BES 18.0-KB-6	18	31.8	25.4	38.1	30.7	3.7	8-32 SHCS
BES 30.0-KB-6	30	50.8	33.1	63.5	51.6	6.0	1/4 SHCS

Material: Aluminum

Bunker Block®II without positive stop



	A	B	C	ØD	ØE	F	G	ØH
BES 08.0-KB-10*	12.7	28.58	35	8	5.5	17	6.45	4.5
BES 12.0-KB-10*	19.05	34.92	38.1	12	5.5	22	7	4.5
BES 18.0-KB-10*	25.4	38.1	38.1	18	6.5	26	7	5.5
BES 30.0-KB-10*	38.1	60	44.45	30	8.5	42	6.45	6.5

Material: Steel, black zinc chromate coated

* Also available for welding environments (copper plated steel). Add /W to end of ordering code.

Ordering example: BES 12.0-KB-10/W.

Note: No Prox Mount is required. Sensor mounts directly in Bunker Block®II.

Bunker Block® for R01Z block sensors

BES R01-SH-4-A

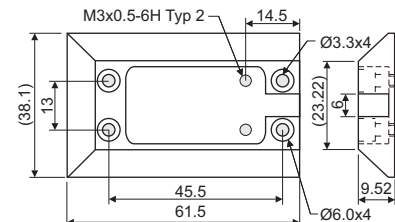
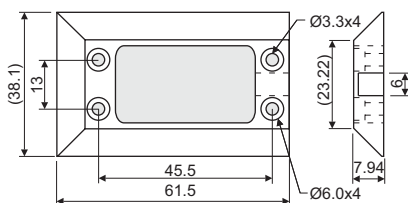
Material: Aluminum

Overtop for retro-fit installations

BES R01-SH-4-B

Material: Aluminum

Socket-style for new installations



Accessories for Inductive Sensors

Weld Repel™

Weld Repel™

Weld cells are a hot and abusive environment where sensor cable failure can be a daily occurrence. Extend the life of your sensor cables and other equipment by using Balluff's Weld Repel™ line of accessories. Weld Repel™ Jacket, Wrap and Sheets will provide comprehensive protection for your vulnerable weld cell components.



Weld Repel™ Sheets

Part Number	BKS-PS-914/16-SI	BKS-PS-914/16-SI-00,91
Length Info.	3 ft x custom length in ft	3 ft x ft sheet
Thickness	1.58 mm	1.58 mm
Max. Length	165 ft per roll	165 ft per roll
Elongation	600%	600%
Tear Strength	150 PSI	150 PSI
Temperature	-65°C to 233°C (-80°F to 450°F)	-65°C to 233°C (-80°F to 450°F)



WELD Jacket

WELD-JACKET-1/2"	Silicone & fiberglass 1/2" diameter (by the foot)
WELD-JACKET-3/4"	Silicone & fiberglass 3/4" diameter (by the foot)



Bunker Block®

Machined AL	Prox Mount Required	Description
BES 12.0-KB-9L	BES 08,0-KH-2L/W	M8 sensors (40 mm+)
BES 16.0-KB-9L	BES 12,0-KH-2L/W	M12 sensors (40 mm+)
BES 24.0-KB-9L	BES 18,0-KH-2L/W	M18 sensors (40 mm+)
BES 36.0-KB-9L	BES 30,0-KH-2L/W	M30 sensors (40 mm+)
BES 12.0-KB-9S	BES 08,0-KH-2S/W	M8 sensors (short)
BES 16.0-KB-9S	BES 12,0-KH-2S/W	M12 sensors (short)
BES 24.0-KB-9S	BES 18,0-KH-2S/W	M18 sensors (short)
BES 36.0-KB-9S	BES 30,0-KH-2S/W	M30 sensors (short)

Weld Repel™ Wrap

BKS PW-26/20-SI-TR-03,5	1" wide x 12 ft clear silicone wrap
BKS PW-51/30-SI-TR-11	2" wide x 36 ft clear silicone wrap



Weld Repel™ Jacket (order by the meter)

	ID	ID	Rollsize
BKS-PT-7/16-SI	1/4" dia.	7 mm	15 m
BKS-PT-10/16-SI	3/8" dia.†	10 mm†	15 m†
BKS-PT-13/16-SI	1/2" dia.††	13 mm††	15 m††
BKS-PT-16/16-SI	5/8" dia.**	16 mm**	15 m**
BKS-PT-19/16-SI	3/4" dia.	19 mm	15 m
BKS-PT-38/16-SI	1.5" dia.	38 mm	7.5 m
BKS-PT-50/16-SI	2" dia.	50 mm	7.5 m

* Recommended for use with M12 (micro) single ended cables

** Recommended for use with M12 (micro) double ended cables

† Recommended for use with M8 (nano) single ended cables

†† Recommended for use with M8 (nano) double ended cables

Specifications

Temperature Rating	-85°F to 500°F
Electrical Insulation	400 Volts/mil thickness (wrap only)
Rating	700 PSI (wrap only)
Tensile Strength	300% (wrap only)
Elongation	Clear Silicone
Material	



Bunker Block® II without positive stop

Copper Plated Steel	Description
BES 08.0-KB-10/W	M8 sensors
BES 12.0-KB-10/W	M12 sensors
BES 18.0-KB-10/W	M18 sensors
BES 30.0-KB-10/W	M30 sensors



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

Tube switch

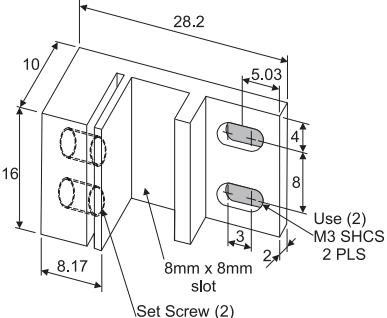
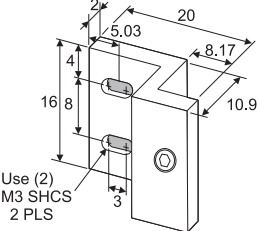
Banking screw

Cushioned mounts

Clamping holder overview

Accessories for Inductive Sensors

Mounting brackets for 8x8 block sensors & seal nuts

Description	Compression Block Mount for 8mm x 8mm Sensors	Set Screw Block Mount for 8mm x 8mm Sensors
		
Ordering Code	BES Q08-KH-1	BES Q08-HW-4
Material	Anodized Aluminum	Anodized Aluminum

Description	Pressure Seal Nut
-------------	-------------------

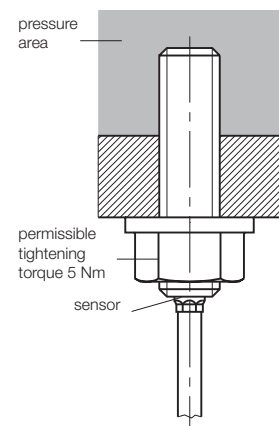
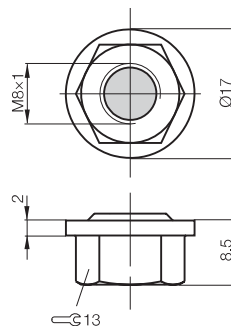


Fig. 1

Ordering Code	BES 08-DM-1
Material	This is used to seal pressure rated proximity switches. It seals against both liquids and gases, and can be removed and tightened again up to five times. For use with BES 516-300-S289-B0-D-PU-

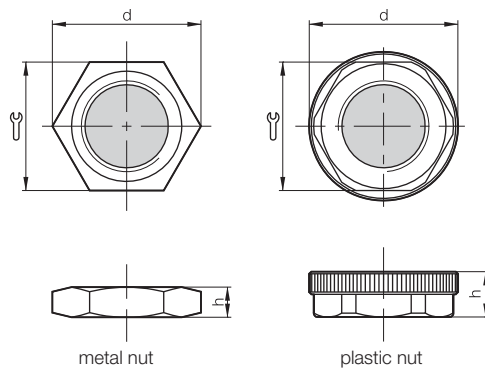
See Fig. 1 for mounting guidelines.

Accessories for Inductive Sensors

Nuts

Mounting Nuts

Description



Ordering Code	Ordering code = Part no.					
Material	Metal nuts	Part no.	Material	d	wrench	h
	M8×1	500557	steel galvanized	15	13	4
	M12×1	500462	Ms nickel plated	20	17	4
	M18×1	500152	Ms nickel plated	28	24	4
	M30×1.5	500252	Ms nickel plated	42	36	5
	Stainless steel nuts					
	M5×0.5	605313	1.4305 (303)	8.9	8	2.7
	M12×1	636981	1.4305 (303)	20	17	4
	M18×1	636982	1.4301 (304)	28	24	4
	M30×1.5	636983	1.4401 (304)	42	36	5
	Plastic nuts					
	M12×1	507936	PA 6.6	19.7	17	6
	M18×1	606841	PA 6.6	28	24	8
	M30×1.5	610292	PA 6.6	40	36	8

Spring type lockwasher for M5 sensors: part no. 710256
 Toothed lockwasher for M8 sensors: part no. 500558
 Toothed lockwasher for M12 sensors: part no. 500552



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

Tube switch

Banking screw

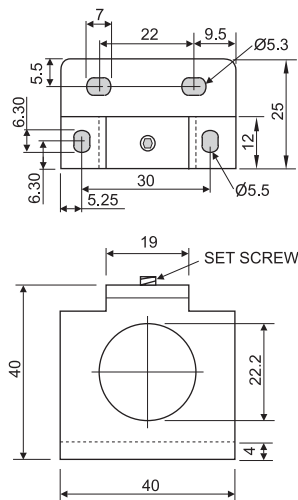
Cushioned mounts

Clamping holder overview

Accessories for Inductive Sensors

Mounting brackets for block sensors

Description	Q40 Optional Metal Mounting Bracket
Ordering Code	BES Q40-HW-2



Slotted Mounting Bracket
BES Q40-HW-1*
Material: Aluminum



Protection Cap
BES Q40-SH-2*
Material: PA 6



Protective Cover
BES Q40-SH-1*
For use with
BES Q40KFU-...A-...
Material: Coated brass

*Consult factory for dimensions

Accessories for Inductive Sensors

Sensor protection devices

Ceramic Faces



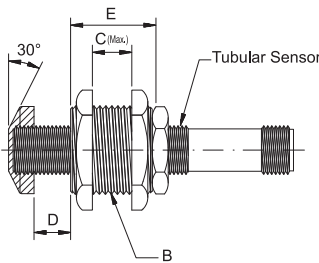
		Diameter (mm)	Thickness (mm)
604094	M8x1	5.8	0.3
619341	M12x1	10.4	0.3
505933	M18x1	15.2	0.5
634036	M30x1.5	27.9	0.5

* An epoxy similar to Loctite 480-40 is recommended.

Protects sensor face from weld spatter and abrasives.

- Minimal sensing distance affect (0.3-0.5 mm)
- Held in place with epoxy*
- Extends life of sensor
- Provides physical and thermal protection to sensor face

Cushioned Prox Mount



		Nut Flats	B	C	D	E
BESA 08-CM*	M8x1	22	M16x1.5	11	10	19
BESA 12-CM*	M12x1	29	M22x1.5	15	10	19
BESA 18-CM*	M18x1	35	M30x1.5	15	10	25
BESA 30-CM*	M30x1.5	51	M47x1.5	25	15	25

* Above part numbers are for shielded sensors. For unshielded sensors, alter part number in the following manner: BESA ...-N-CM.

For applications where impact to the sensor by the target is inevitable, cushioned Prox Mounts extend the life of the sensor by allowing up to 15mm of target overtravel. D = travel distance. Sensor returns to original location after intrusion is removed.



Inductive sensors

Global DC 3-wire

DC 3-/4-wire

DC 2-wire

AC/DC 2-wire

AC 2-wire

Special properties

Analog distance measurement

Accessories

Pulse

Extension

Sensor tester, testing and setting device

Analog switching device

Assembly aids for Uni and Unicomact sensors

Protective covering for Unicomact sensors

Protective nuts

Positive stop

Tube switch

Banking screw

Cushioned mounts

Clamping holder overview



Capacitive Sensors

Capacitive sensors for object detection

Balluff capacitive sensors are used for object and level detection. They measure all materials – even non-conductive ones such as liquids, granules and powders – in direct contact or through a container wall. Difficult environments such as high temperature and pressure, stainless steel and Teflon housing or a wide supply voltage are not a problem for the capacitive sensors. These sensors are available in different designs, including particularly small versions and adhesive sensors.

The SmartLevel is the ideal level sensor for water based conductive media. This is because it compensates for humidity, foam and deposits of any kind, even through thick glass and plastic walls.



Capacitive Sensors

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Basic information and definitions can be found on **page 952**.



Capacitive Sensors

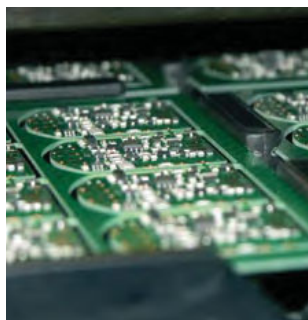
Performance spectrum

It would be hard to imagine not having capacitive sensors in industrial automation, because they bring reliability to object and level detection. Balluff capacitive sensors show what they can do in situations where other capacitive sensors reach their limit.

With extreme precision, BCS sensors check:

- Stack height
- Level
- Presence
- Volume

In doing so, they are not affected by dust, reflection or object properties and color. And they also measure objects with absolute reliability through glass and plastic walls, without being impeded by external factors.



Balluff capacitive sensors provide more solutions to solve challenging applications.

The ideal level sensor, SmartLevel not only sees through thicker glass and plastic walls, it also compensates for moisture, foam and deposits. SmartLevel is able to provide solutions in applications that would have been impossible before.





Capacitive sensors

Introduction
Sensors in use
Product overview

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



SmartLevel sensors take off in the Airbus A380

Airbus is equipping the rest rooms in its 4-engine large-body A380 with a mixer tap. The heart of this exclusive system in the elegant Airbus design are compact SmartLevel capacitive sensors from Balluff. These enable passengers to conveniently select the desired water temperatures with the assistance of an LED indicator. The show-stopper: sensing errors are impossible, since SmartLevel sensors ignore clinging dirt, liquid films and soap foam. Touching the faucet triggers a switching operation, even if a wet paper towel covers it.



SMARTLEVEL

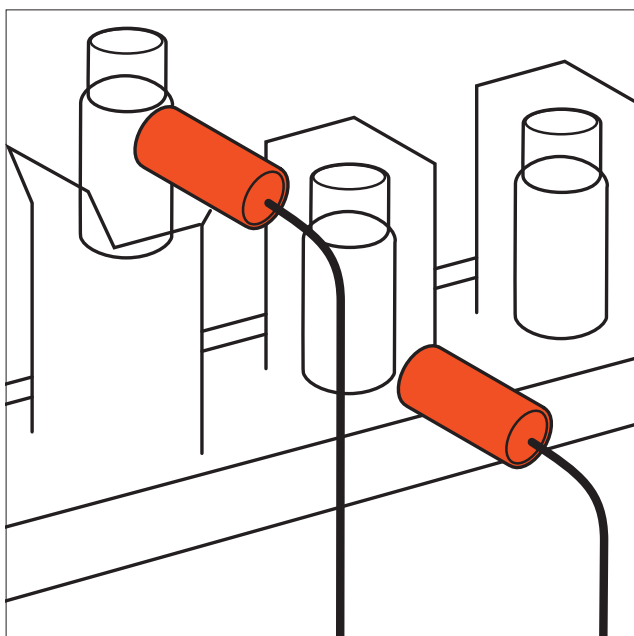
Capacitive Sensors

Sensors in use

Capacitive sensors measure metallic or non-metallic objects, levels of granular materials, powder, viscous or liquid media. The sensor can be used in direct contact with the object to be measured, or as a contactless sensors. This is because they work extremely reliable, even through container walls.

Whether contacting or contactless, the capacitive sensors from Balluff are suited for difficult applications.

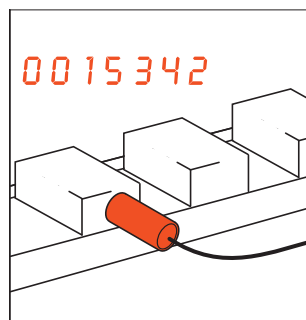
Packaging lines: Checking packaging and volume



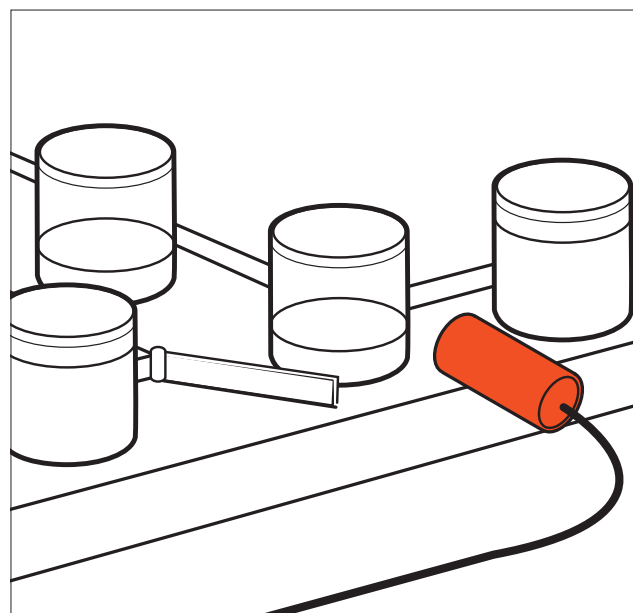
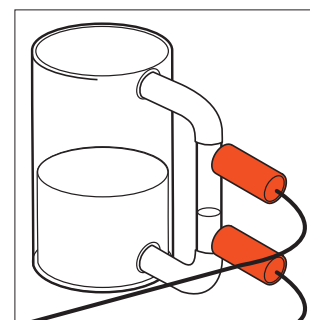
Industries

- Handling and automation
- Specialty machine construction
- Automotive industry
- Semiconductor industry
- Electronics industry (circuit boards, CD and DVD manufacturing, etc.)
- Food industry
- Bottling and packaging
- Chemical industry
- Industrial cleaning technology
- Pharmaceuticals and medical technology
- Plastic and rubber industry
- Timber and furniture industry
- Paper and printing industry
- Energy generation

Transfer lines: Determining number of pieces



Water tanks: Regulating inflow and controlling pumps



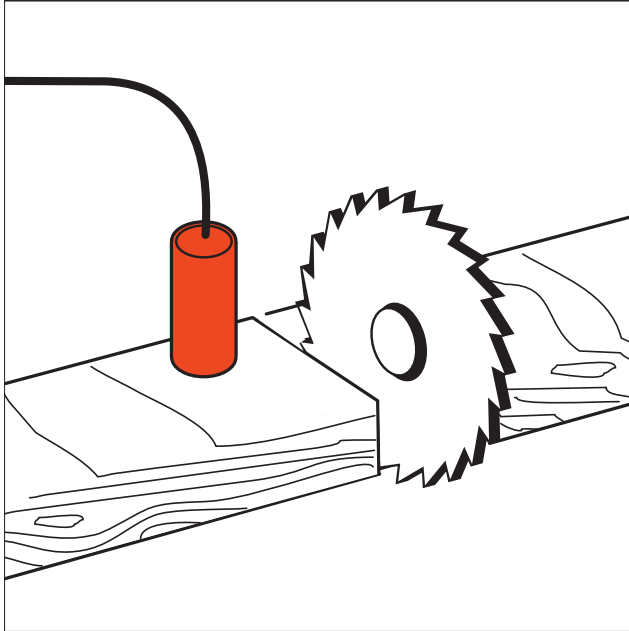
Bottling plants: Checking fill level and controlling the ejector station



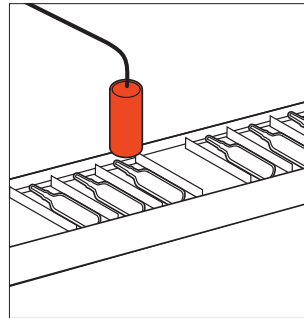
Capacitive Sensors

Sensors in use

Wood processing: Measuring wood and thickness



Packaging systems: Checking completeness



Capacitive
sensors
Introduction
Sensors in use
Product
overview

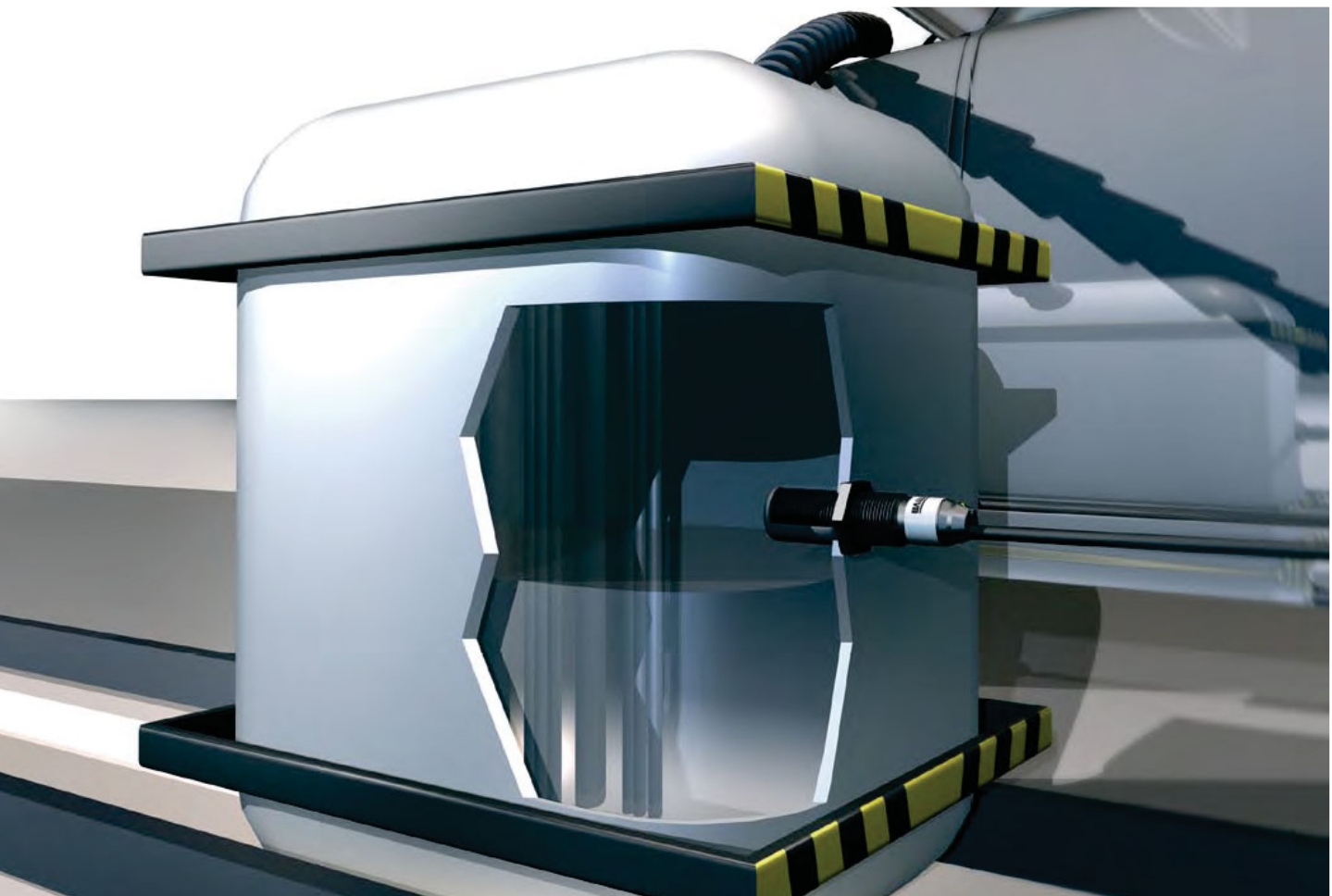
Capacitive
sensors for
object detection

Capacitive
sensors for
level detection

Capacitive
sensors
with special
properties

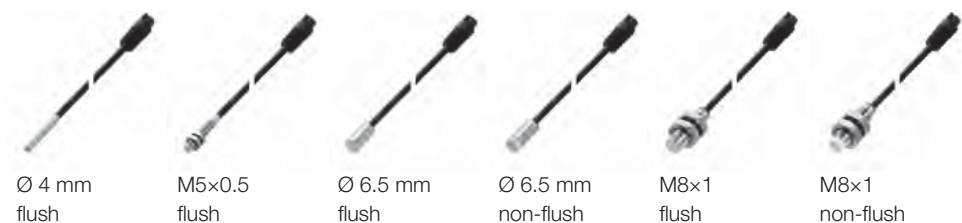
Capacitive
sensors for
analog distance
measurement

Accessories
for capacitive
sensors



Capacitive Sensors

Product overview



	Ø 4 mm flush	M5x0.5 flush	Ø 6.5 mm flush	Ø 6.5 mm non-flush	M8x1 flush	M8x1 non-flush	
Power supply							
DC	■	■	■	■	■	■	
AC/DC							
Housing materials							
Stainless steel	■	■	■	■	■	■	
Plastic							
PTFE (Teflon®)							
Connection							
Connector			■	■	■	■	
Cable with connector	■	■	■	■	■	■	
Cable			■	■	■	■	
Special properties							
Global series							
High temperature rated							
Function diagnostics							
SmartLevel							
Compensate for moisture, foam and deposits							
Penetrate glass or plastic walls over 10 mm thick							
Detection of aqueous to highly conductive media							
Virtually no adjustment or cleaning required							
Areas of application							
Object detection	Page 781	Page 781	Page 781	Page 782	Page 782	Page 782	
Direct sensing of bulk product and powdery media							
Sensing bulk product and powdered media through a con- tainer wall up to approx. 4mm							
Direct sensing of non-conduc- tive liquid and paste-like media							
Sensing non-conductive liquids and paste-like media through a container wall up to approx. 4mm							
Direct sensing of conductive liquids (SmartLevel technology)							

Capacitive Sensors

Product overview



Ø 10 mm
flush



Ø 10 mm
non-flush



M12x1
flush



M12x1
non-flush



M18x1
flush



M18x1
non-flush



Ø 22 mm
flush



Ø 30 mm
flush

	Ø 10 mm flush	Ø 10 mm non-flush	M12x1 flush	M12x1 non-flush	M18x1 flush	M18x1 non-flush	Ø 22 mm flush	Ø 30 mm flush
	■	■	■	■	■	■	■	■
						■		
	■	■	■	■	■	■	■	■
			■	■	■	■		
				■		■		
			■	■	■	■		
	■	■	■	■	■	■		
	■	■	■	■	■	■	■	■
			Page 790...791	Page 803...805	Page 791	Page 805...807 Page 829		
						Page 815		
						Page 815		
						Page 815		
	Page 783	Page 783	Page 783 + 789...791		Page 791		Page 792	Page 792
				Page 803...805		Page 805...807		
					Page 791		Page 792	Page 792
				Page 803...805		Page 805...807		
					Page 791		Page 792	Page 792
						Page 815		



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Capacitive
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with special
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Capacitive
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analog distance
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Accessories
for capacitive
sensors

Capacitive Sensors

Product overview



M30×1.5 flush M30×1.5 non-flush Ø 34 mm flush Disk designs Ø 18...30 mm Disc shapes Ø 50 mm Micro-Box 16×34×8 mm

	M30×1.5 flush	M30×1.5 non-flush	Ø 34 mm flush	Disk designs Ø 18...30 mm	Disc shapes Ø 50 mm	Micro-Box 16×34×8 mm	
Power supply							
DC	■	■	■	■	■	■	
AC/DC		■					
Housing materials							
Stainless steel	■	■		■			
Plastic	■	■	■		■	■	
PTFE (Teflon®)		■			■		
Connection							
Connectors	■	■	■		■		
Cable with connector				■		■	
Cable	■	■	■	■	■	■	
Terminal housing							
Special properties							
Global series	Page 792...793	Page 807...808	Page 793				
High temperature rated		Page 829					
Pressure rated							
Stick-on, flexible							
Degree of protection IP 68							
SmartLevel							
Compensate for moisture, foam and deposits		Page 816			Page 823	Page 824	
Penetrate glass or plastic walls over 10 mm thick		Page 816			Page 823	Page 824 (up to 8 mm)	
Detection of aqueous to highly conductive media		Page 816			Page 823	Page 824	
Virtually no adjustment or cleaning required		Page 816			Page 823	Page 824	
Areas of application							
Object detection	Page 792...793		Page 793	Page 785+795	Page 796	Page 797	
Direct sensing of bulk product and powder media	Page 792...793 (flush installation)	Page 807...808	Page 793 (flush installation)	Page 785+795 (flush installation)	Page 796 (flush installation)		
Sensing bulk product and powdered media through a container wall up to approx. 4 mm	Page 792...793		Page 793	Page 785+795	Page 796	Page 797	
Direct sensing of non-conductive liquid and paste-like media		Page 807...808					
Sensing non-conductive liquids and paste-like media through a container wall up to approx. 4mm	Page 792...793		Page 793	Page 785+795	Page 796	Page 797	
Direct sensing of conductive liquids (SmartLevel technology)		Page 816					
Detecting conductive liquids through a container wall even over 10 mm thick (SmartLevel technology)		Page 816				Page 824 (up to 8 mm)	

Capacitive Sensors

Product overview



40x40x10 mm

90x16x4 mm

Ø 7x52 mm

Micro-Level
M12x1,
G 1/4", NPT 1/4"

M18x1,
R 3/8",
NPTF 3/8"

M18x1,
R 3/8",
NPTF 3/8"

	■	■	■	■	■	■		
	■	■		■				
			■		■	■		
	■	■		■		■		
	■		■	■				
					■			
	Page 799							
			Page 815	Page 818...821 Page 810...812 Page 818...821	Page 813 Page 813 (10 bar)	Page 829 Page 829 (6 bar)		
		Page 831			Page 813			
	Page 825		Page 815	Page 818...821				
	Page 825		Page 815					
	Page 825		Page 815	Page 818...821				
	Page 825		Page 815	Page 818...821				
	Page 799	Page 831			Page 813	Page 829		
	Page 799	Page 831						
				Page 810...812	Page 813	Page 829		
	Page 799	Page 831						
			Page 815	Page 810...812				
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Capacitive Sensors

Capacitive sensors for object detection

Industry standard capacitive sensors are M12 to M30 models. For small parts detection or installation in tight mounting spaces, however, smaller form factors are needed. The Balluff product line therefore offers a large selection of sizes and form factors. The small capacitive sensors can be calibrated remotely, simply using a separate sensor amplifier. And their rugged stainless steel housing ensures reliability even under challenging conditions. Capacitive sensors for object detection from Balluff employ a straight-line electrical field. These sensors detect solid bodies (e.g. wafers, PCBs, cartons, paper stacks, bottles, plastic blocks and plates) and sense liquids through walls made of glass and plastic (thickness max. 4 mm). Advantage: The straight-line electrical field also enables media having a low dielectric constant to be detected.





Capacitive Sensors for Object Detection

Contents

Mini-sensors

Cylinder designs	781
Disk designs	784

Standard sensors

Cylinder designs	787
Disk designs	795
Block design housings	797



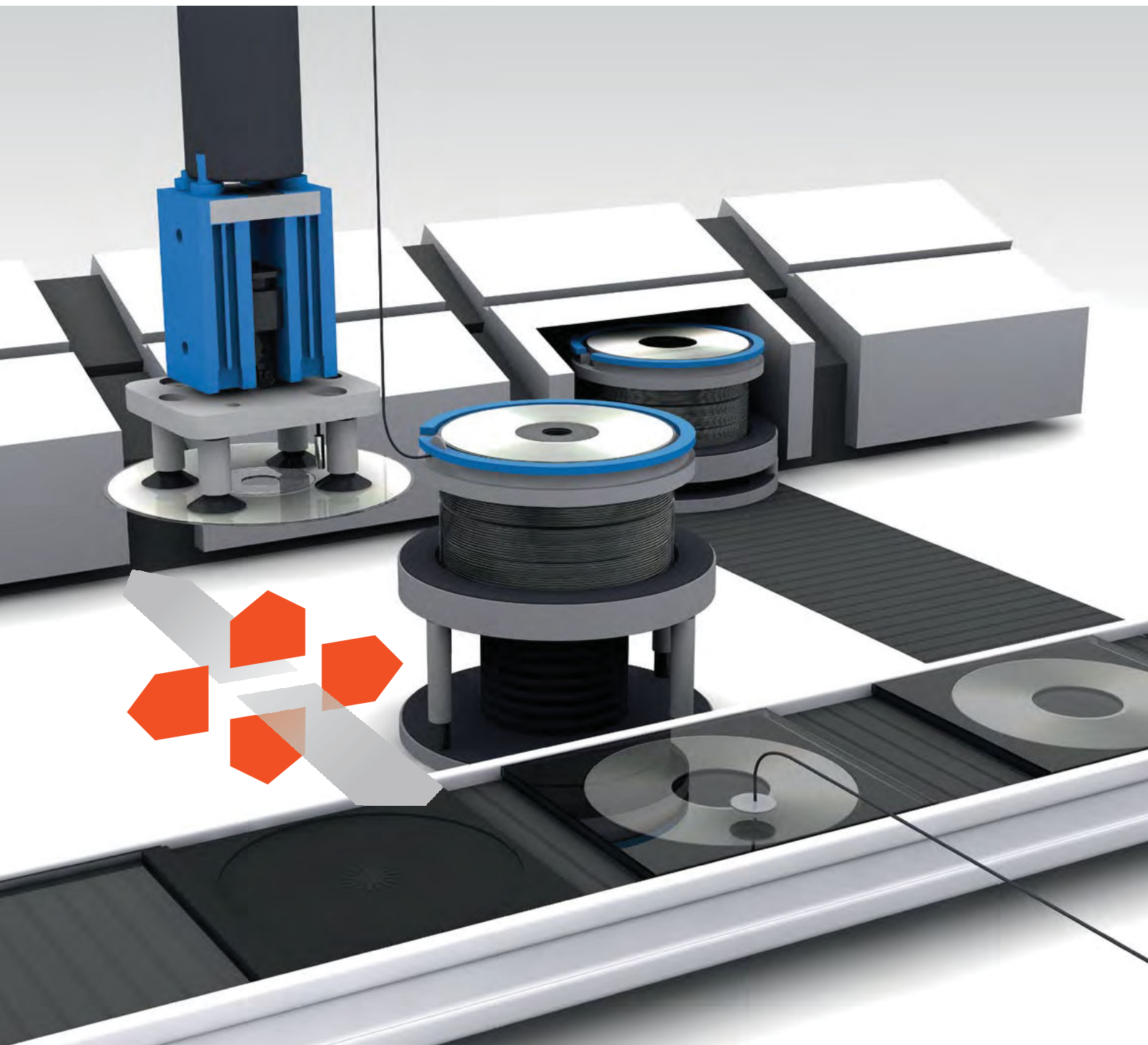


Capacitive Sensors for Object Detection

Mini-sensors

CD/DVD production: Checking stack height

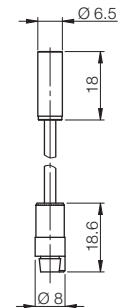
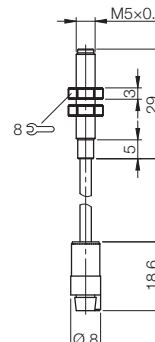
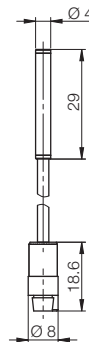
During CD/DVD production, Capacitive sensors monitor the stacks of CDs and DVDs on a spindle. As soon as the maximum stack height is reached, the sensor sends a message that allows the finished stack to be transported further to end packaging and the next empty spindle to be prepared. And it does this with absolute reliability, without allowing itself to be influenced by the reflective surface.





Size		Ø 4 mm	M5×0.5	Ø 6.5 mm
Installation type		Flush	Flush	Flush
Rated switching distance s _n		0.1...1 mm	0.1...1 mm	0.1...1.5 mm
With sensor amplifier	Ordering code	BCS0010	BCS0011	BCS0012
	Part number	BCS G04T4D-XXS10C-EP02-GZ01-002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS G06T4B-XXS15C-EP02-GZ01-002
Supply voltage U _B		4...8 V DC	4...8 V DC	4...8 V DC
Rated insulation voltage U _i		75 V DC	75 V DC	75 V DC
Ambient temperature T _a		−30...+80 °C	−30...+80 °C	−30...+80 °C
Switching frequency f		100 Hz	100 Hz	100 Hz
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Material	Housing	Stainless steel	Stainless steel	Stainless steel
	Sensing surface	PTFE	PTFE	PTFE
	Cover	POM	POM	POM
Connection		2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²

Sensor amplifiers for capacitive mini-sensors can be found on page 841.



Capacitive sensors

Capacitive sensors for object detection

Mini-sensors
Standard sensors

Capacitive sensors for level detection

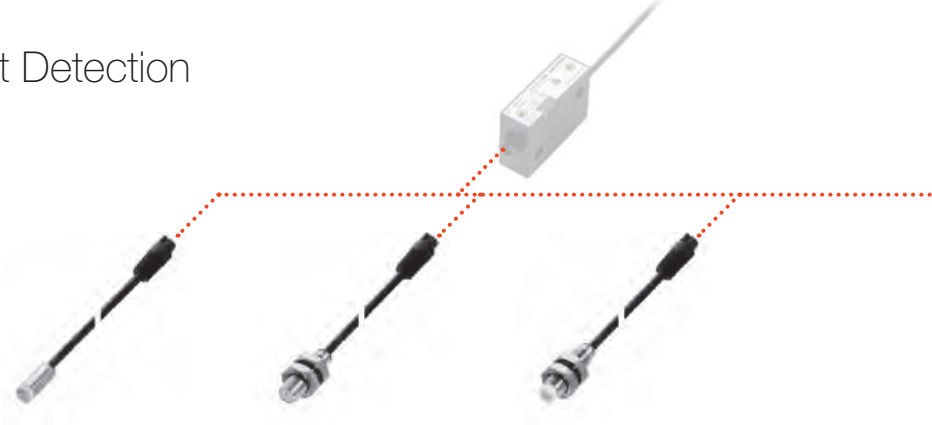
Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

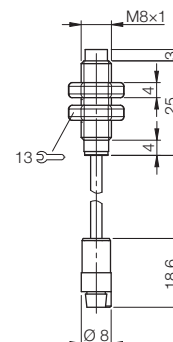
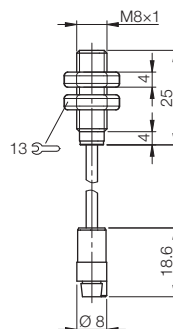
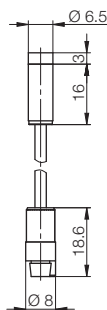
Capacitive Sensors for Object Detection

**Mini-sensors, cylinder designs,
Ø 6.5 mm, M8×1**



Size		Ø 6.5 mm	M8 × 1	M8 × 1	
Installation type		Not flush	Flush	Not flush	
Rated switching distance s_n		0.1...3 mm	0.1...1.5 mm	0.1...3 mm	
With sensor amplifier	Ordering code	BCS0013	BCS0014	BCS0015	
	Part number	BCS G06T4B-XXS30G-EP02-GZ01-002	BCS M08T4C-XXS15C-EP02-GZ01-002	BCS M08T4C1-XXS30G-EP02-GZ01-002	
Supply voltage U_B		4...8 V DC	4...8 V DC	4...8 V DC	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Ambient temperature T_a		-30...+80 °C	-30...+80 °C	-30...+80 °C	
Switching frequency f		100 Hz	100 Hz	100 Hz	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Material	Housing	Stainless steel	Stainless steel	Stainless steel	
	Sensing surface	PTFE	PTFE	PTFE	
	Cover	POM	POM	POM	
Connection		2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²	

Sensor amplifiers for
capacitive mini-sensors
can be found on page 841.





Ø 10 mm	Ø 10 mm	M12×1	M12×1	
Flush	Not flush	Flush	Not flush	
0.1...4 mm	1...8 mm	0.1...4 mm	1...8 mm	
BCS0016	BCS0017	BCS0018	BCS0019	
BCS G10T4B-XXS40C-EP02-GZ01-002	BCS G10T4C-XXS80G-EP02-GZ01-002	BCS M12T4D-XXS40C-EP02-GZ01-002	BCS M12T4D1-XXS80G-EP02-GZ01-002	
4...8 V DC	4...8 V DC	4...8 V DC	4...8 V DC	
75 V DC	75 V DC	75 V DC	75 V DC	
-30...+80 °C	-30...+80 °C	-30...+80 °C	-30...+80 °C	
100 Hz	100 Hz	100 Hz	100 Hz	
IP 67	IP 67	IP 67	IP 67	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	
PTFE	PTFE	PTFE	PTFE	
POM	POM	POM	POM	
2 m PUR cable, 3×0.14 mm²	2 m PUR cable, 3×0.14 mm²	2 m PUR cable, 3×0.14 mm²	2 m PUR cable, 3×0.14 mm²	



Capacitive
sensors

Capacitive
sensors for
object detection

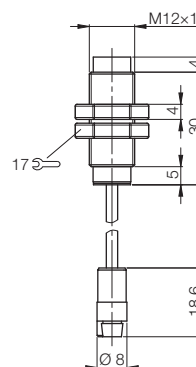
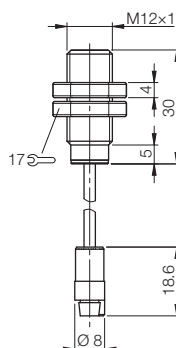
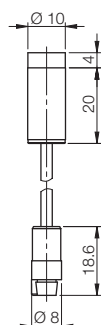
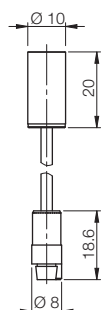
Mini-sensors
Standard
sensors

Capacitive
sensors for
level detection

Capacitive
sensors
with special
properties

Capacitive
sensors for
analog distance
measurement

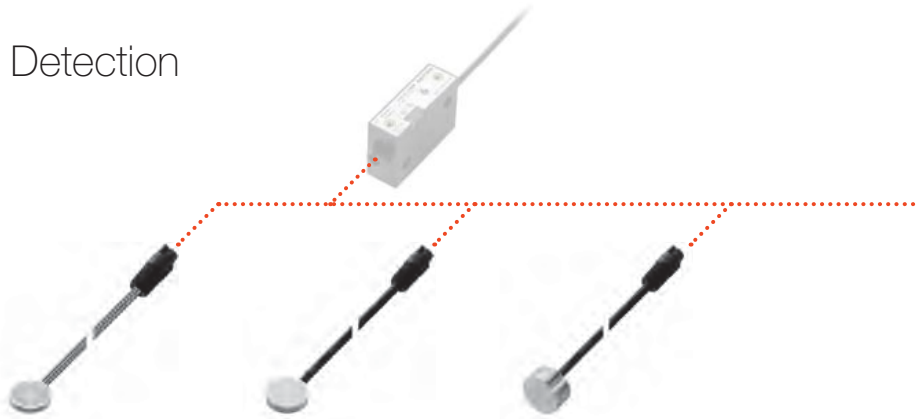
Accessories
for capacitive
sensors



Capacitive Sensors for Object Detection

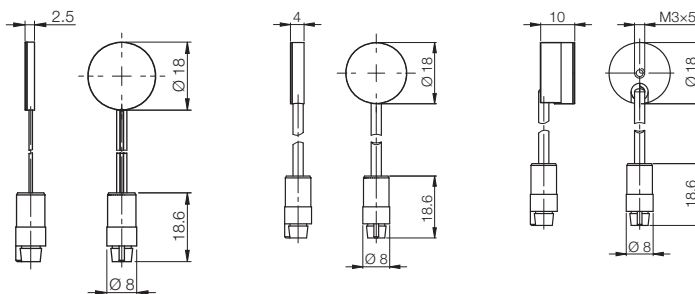
Mini-sensors, disk designs,

Ø 18 mm



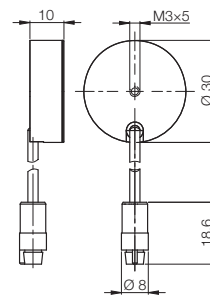
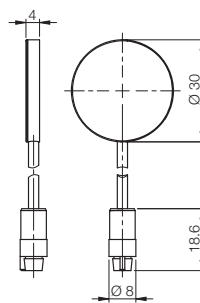
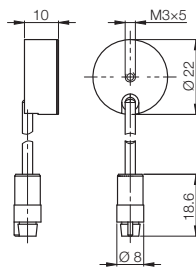
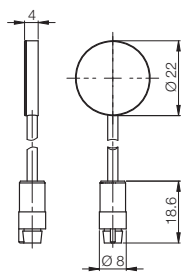
Size	Ø 18x2.5 mm	Ø 18x4 mm	Ø 18x10 mm	
Installation type	Flush	Flush	Flush	
Rated switching distance s_n	0.1...3 mm	1...5 mm	1...5 mm	
With sensor amplifier	Ordering code	Ordering code	Ordering code	
	Part number	Part number	Part number	
Supply voltage U_B	4...8 V DC	4...8 V DC	4...8 V DC	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Ambient temperature T_a	-30...+70 °C	-30...+80 °C	-30...+80 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	
Degree of protection as per IEC 60529	IP 66	IP 66	IP 66	
Material	Housing	Housing	Housing	
	Sensing surface	Sensing surface	Sensing surface	
Connection	2 m PVC cable, 3x0.09 mm ²	2 m PUR cable, 3x0.14 mm ²	2 m PUR cable, 3x0.14 mm ²	

Sensor amplifiers for capacitive mini-sensors can be found on page 841.





Ø 22×4 mm	Ø 22×10 mm	Ø 30×4 mm	Ø 30×10 mm	
Flush	Flush	Flush	Flush	
1...10 mm	1...10 mm	1...15 mm	1...15 mm	
BCS001F	BCS001H	BCS001J	BCS001K	
BCS D22T405-XXS10C-EP02-GZ01-002	BCS D22T408-XXS10C-EP02-GZ01-002	BCS D30T406-XXS15C-EP02-GZ01-002	BCS D30T409-XXS15C-EP02-GZ01-002	
4...8 V DC	4...8 V DC	4...8 V DC	4...8 V DC	
75 V DC	75 V DC	75 V DC	75 V DC	
-30...+80 °C	-30...+80 °C	-30...+80 °C	-30...+80 °C	
100 Hz	100 Hz	100 Hz	100 Hz	
IP 66	IP 66	IP 66	IP 66	
Stainless steel	Stainless steel	Stainless steel	Stainless steel	
PTFE	PTFE	PTFE	PTFE	
2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²	2 m PUR cable, 3×0.14 mm ²	




Capacitive
sensors

Capacitive
sensors for
object detection
Mini-sensors
Standard
sensors

Capacitive
sensors for
level detection

Capacitive
sensors
with special
properties

Capacitive
sensors for
analog distance
measurement

Accessories
for capacitive
sensors

Capacitive Sensors for Object Detection

Sensors in use

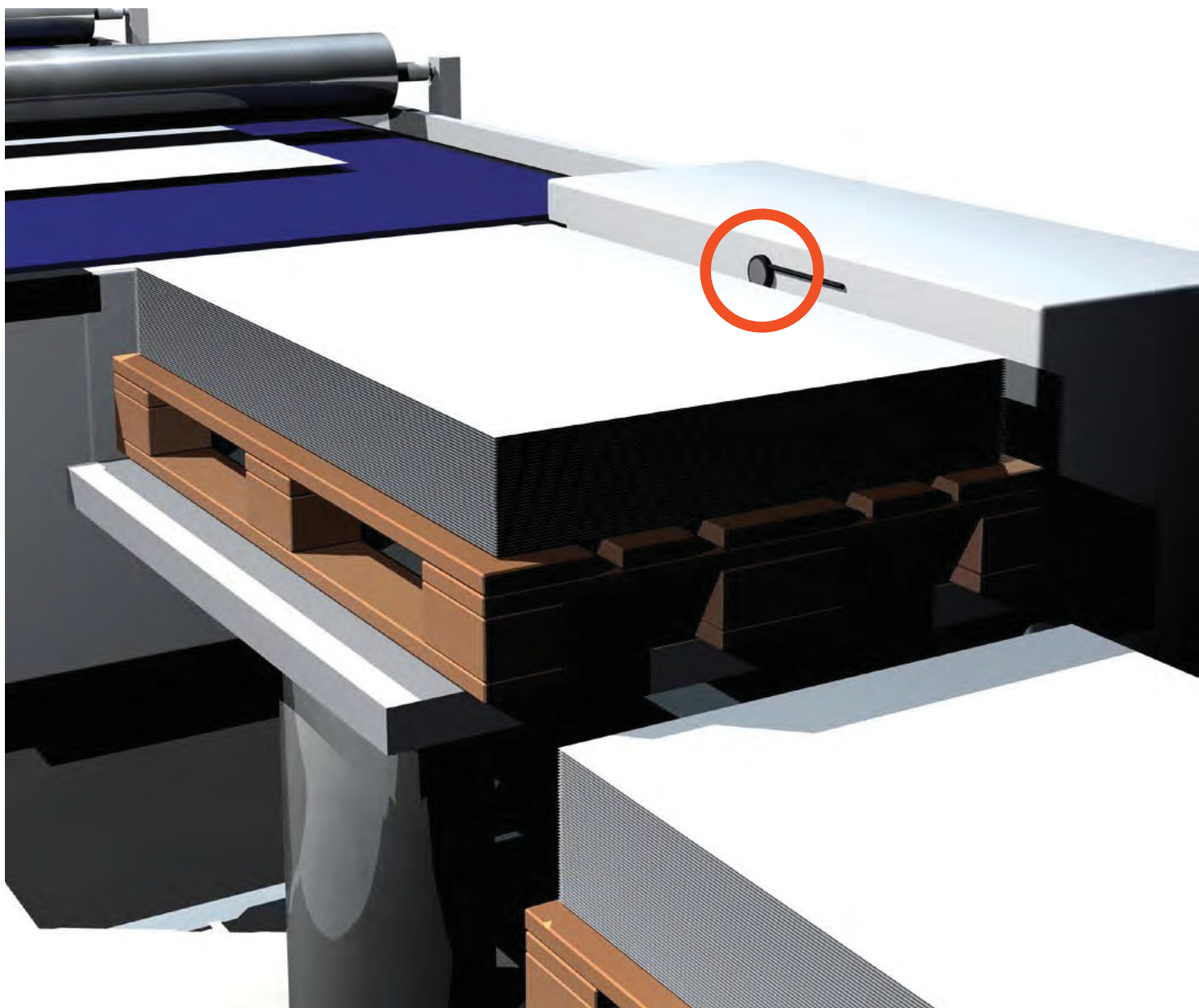
Paper and printing industry:

Stack height control in sheet-fed offset printing

Integrated in printing, folding and bookbinding machines, capacitive sensors not only check stack height, but also provide for perfect stacking of the papers, so that there is as little waste as possible during further processing.

Despite a dirty environment (due to paper dust and anti-set-off spray powder), the sensor works perfectly. Laterally or from above, it measures stack heights even in small increments, and raises and lowers the stack as soon as it recognizes its height.

In the **paper cutting machine**, the capacitive sensor also measures the width of the stack to be cut, so that the cutting pressure of the cutting knife can be set in relation to it. In doing so, it proves to be not only insensitive to dust, but also completely uninfluenced by different colors of paper.



Capacitive Sensors for Object Detection

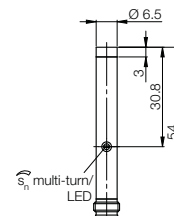
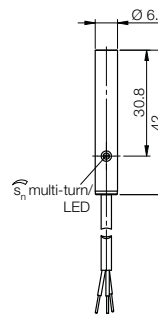
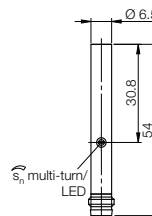
Standard sensors, cylinder designs, DC 3-wire, Ø 6.5 mm



Size	Ø 6.5 mm	Ø 6.5 mm	Ø 6.5 mm
Installation type	Flush	Flush	Not flush
Rated switching distance s_n	0.1...1.5 mm	0.1...1.5 mm	0.1...3 mm
PNP, NO	Ordering code BCS001R ^②	Ordering code BCS001L ^①	Ordering code BCS0022 ^②
	Part number BCS G06T4D2-PSM15C-S49G	Part number BCS G06T4E1-PSM15C-EP02	Part number BCS G06T4D2-PSM30G-S49G
PNP, NC	Ordering code BCS001T ^⑦	Ordering code BCS001M ^⑤	Ordering code BCS0023 ^⑦
	Part number BCS G06T4D2-POM15C-S49G	Part number BCS G06T4E1-POM15C-EP02	Part number BCS G06T4D2-POM30G-S49G
NPN, NO	Ordering code BCS001U ^④	Ordering code BCS001N ^③	Ordering code BCS0024 ^④
	Part number BCS G06T4D2-NSM15C-S49G	Part number BCS G06T4E1-NSM15C-EP02	Part number BCS G06T4D2-NSM30G-S49G
NPN, NC	Ordering code BCS001W ^⑩	Ordering code BCS001P ^⑨	Ordering code BCS0025 ^⑩
	Part number BCS G06T4D2-NOM15C-S49G	Part number BCS G06T4E1-NOM15C-EP02	Part number BCS G06T4D2-NOM30G-S49G
Supply voltage U_B	11...30 V DC	11...30 V DC	11...30 V DC
Voltage drop U_d at I_o	≤ 2 V	≤ 2 V	≤ 2 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Output current max.	50 mA	50 mA	50 mA
No-load supply current I_o max.	≤ 10 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-10...+70 °C	-10...+70 °C	-10...+70 °C
Switching frequency f	100 Hz	100 Hz	100 Hz
Output function indicator	Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 65	IP 65	IP 65
Material			
Housing	Stainless steel	Stainless steel	Stainless steel
Sensing surface	PTFE	PTFE	PTFE
Cover	PA	POM	PA
Connection	M8 connector, 3-pin	2 m PUR cable, 3×26 AWG	M8 connector, 3-pin
Suggested mating cable	BCC M313-0000-10-001-PX43T2-050		BCC M313-0000-10-001-PX43T2-050

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive sensors

Capacitive sensors for object detection
Mini-sensors

Standard sensors

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors for Object Detection

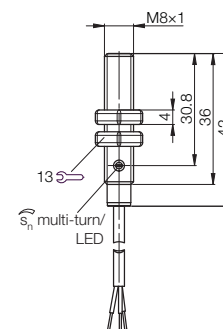
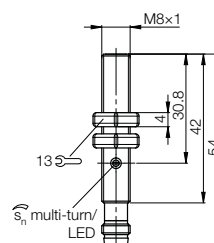
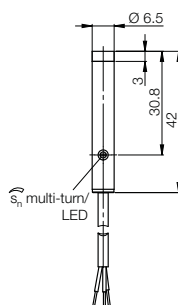
**Standard sensors, cylinder designs, DC 3-wire,
Ø 6.5 mm, M8×1**



Size	Ø 6.5 mm	M8×1	M8×1	
Installation type	Not flush	Flush	Flush	
Rated switching distance s_n	0.1...3 mm	0.1...1.5 mm	0.1...1.5 mm	
PNP, NO	Ordering code BCS001Y ①	BCS002A ②	BCS0026 ①	
	Part number BCS G06T4E1-PSM30G-EP02	BCS M08T4E2-PSM15C-S49G	BCS M08T4E1-PSM15C-EP02	
PNP, NC	Ordering code BCS001Z ⑤	BCS002C ⑦	BCS0027 ⑤	
	Part number BCS G06T4E1-POM30G-EP02	BCS M08T4E2-POM15C-S49G	BCS M08T4E1-POM15C-EP02	
NPN, NO	Ordering code BCS0020 ③	BCS002E ④	BCS0028 ③	
	Part number BCS G06T4E1-NSM30G-EP02	BCS M08T4E2-NSM15C-S49G	BCS M08T4E1-NSM15C-EP02	
NPN, NC	Ordering code BCS0021 ⑧	BCS002F ⑩	BCS0029 ⑧	
	Part number BCS G06T4E1-NOM30G-EP02	BCS M08T4E2-NOM15C-S49G	BCS M08T4E1-NOM15C-EP02	
Supply voltage U_B	11...30 V DC	11...30 V DC	11...30 V DC	
Voltage drop U_d at I_o	≤ 2 V	≤ 2 V	≤ 2 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Output current max.	50 mA	50 mA	50 mA	
No-load supply current I_o max.	≤ 10 mA	≤ 10 mA	≤ 10 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-10...+70 °C	-10...+70 °C	-10...+70 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	
Output function indicator	Yellow LED	Yellow LED	Yellow LED	
Degree of protection as per IEC 60529	IP 65	IP 65	IP 65	
Material				
Housing	Stainless steel	Stainless steel	Stainless steel	
Sensing surface	PTFE	PTFE	PTFE	
Cover	POM	Stainless steel	POM	
Connection	2 m PUR cable, 3×26 AWG	M8 connector, 3-pin	2 m PUR cable, 3×26 AWG	
Suggested mating cable		BCC M313-0000-10-001-PX43T2-050		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.

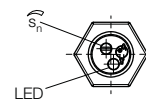
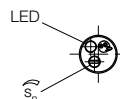
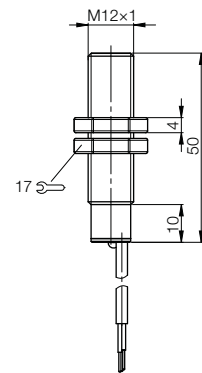
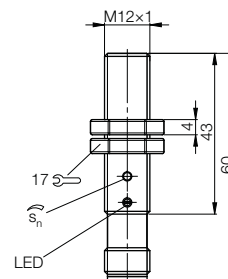
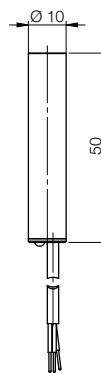
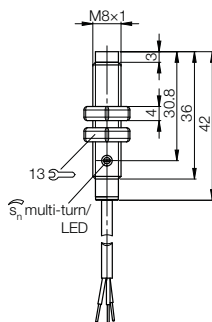
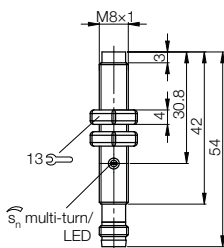


Capacitive Sensors for Object Detection

Standard sensors, cylinder designs, DC 3-wire, M81, Ø 10 mm, M12x1



M8x1	M8x1	Ø 10 mm	M12x1	M12x1
Not flush	Not flush	Flush	Flush	Flush
0.1...3 mm	0.1...3 mm	1...4 mm	1...4 mm	1...4 mm
BCS002M ②	BCS002H ①	BCS002T ①	BCS0037 ②	BCS002Z ①
BCS M08T4E2-PSM30G-S49G	BCS M08T4E1-PSM30G-EP02	BCS G10T4H-PSM40C-EP02	BCS M12T4D2-PSM40C-S04G	BCS M12T4G1-PSM40C-EP02
BCS002N ⑦	BCS002J ⑤	BCS002U ⑤	BCS0038 ⑦	BCS0030 ⑤
BCS M08T4E2-POM30G-S49G	BCS M08T4E1-POM30G-EP02	BCS G10T4H-POM40C-EP02	BCS M12T4D2-POM40C-S04G	BCS M12T4G1-POM40C-EP02
BCS002P ④	BCS002K ③	BCS002W ③	BCS0039 ④	BCS0031 ③
BCS M08T4E2-NSM30G-S49G	BCS M08T4E1-NSM30G-EP02	BCS G10T4H-NSM40C-EP02	BCS M12T4D2-NSM40C-S04G	BCS M12T4G1-NSM40C-EP02
BCS002R ⑩	BCS002L ⑧	BCS002Y ⑧	BCS00AC ⑩	BCS0032 ⑧
BCS M08T4E2-NOM30G-S49G	BCS M08T4E1-NOM30G-EP02	BCS G10T4H-NOM40C-EP02	BCS M12T4D2-NOM40C-S04G	BCS M12T4G1-NOM40C-EP02
11...30 V DC	11...30 V DC	12...35 V DC	12...35 V DC	12...35 V DC
≤ 2 V	≤ 2 V	≤ 0.8 V	≤ 1.5 V	≤ 0.8 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
50 mA	50 mA	200 mA	200 mA	200 mA
≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-10...+70 °C	-10...+70 °C	-30...+70 °C	-30...+70 °C	-30...+70 °C
100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
Yellow LED	Yellow LED	Yellow LED	Yellow LED	Yellow LED
IP 65	IP 65	IP 65	IP 65	IP 65
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PTFE	PTFE	PTFE	PTFE	PTFE
Stainless steel	POM	POM	PA	POM
M8 connector, 3-pin	2 m PUR cable, 3x26 AWG	2 m PUR cable, 3x26 AWG	M12 connector, 4-pin	2 m PUR cable, 3x26 AWG
BCC M313-0000-10-001-PX43T2-050			BCC M415-0000-1A-003-PX44T2-050	



Capacitive sensors

Capacitive sensors for object detection
Mini-sensors

Standard sensors

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors for Object Detection

Standard sensors, cylinder designs, DC 3-wire, M12x1



Global



Global

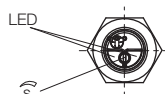
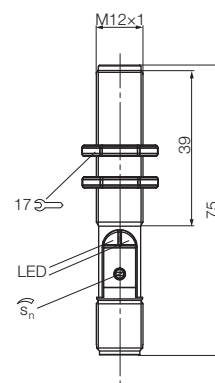
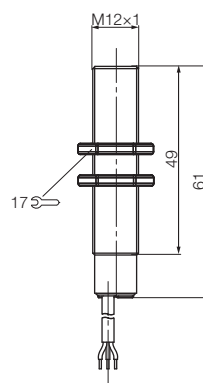
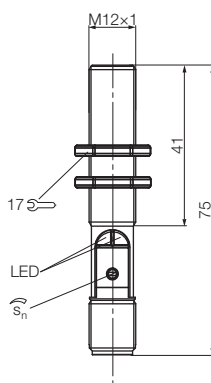


Global

Size	M12x1	M12x1	M12x1	
Installation type	Flush	Flush	Flush	
Rated switching distance s_n	1...4 mm	1...4 mm	1...4 mm	
PNP, NO	Ordering code BCS00P0 ^②	BCS00R4 ^①	BCS00PJ ^②	
	Part number BCS M12B4G2-PSC40D-S04K	BCS M12B4I1-PSC40D-EP02	BCS M12BBG2-PSC40D-S04K	
PNP, NC	Ordering code BCS00P1 ^⑥	BCS00P8 ^⑤	BCS00PK ^⑥	
	Part number BCS M12B4G2-POC40D-S04K	BCS M12B4I1-POC40D-EP02	BCS M12BBG2-POC40D-S04K	
NPN, NO	Ordering code BCS00P2 ^④	BCS00P9 ^③	BCS00PL ^④	
	Part number BCS M12B4G2-NSC40D-S04K	BCS M12B4I1-NSaC40D-EP02	BCS M12BBG2-NSC40D-S04K	
NPN, NC	Ordering code BCS00P3 ^⑨	BCS00PA ^⑧	BCS00PM ^⑨	
	Part number BCS M12B4G2-NOC40D-S04K	BCS M12B4I1-NOC40D-EP02	BCS M12BBG2-NOC40D-S04K	
Supply voltage U_B	10... 30 V DC	10... 30 V DC	10... 30 V DC	
Voltage drop U_d at I_e	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Output current max.	100 mA	100 mA	100 mA	
No-load supply current I_0 max.	≤ 15 mA	≤ 15 mA	≤ 15 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-25...+85 °C	-25...+85 °C	-25...+85 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	
Supply voltage/Output function indicator	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Material				
Housing	Stainless steel	Stainless steel	PBT	
Sensing surface	PBT	PBT	PBT	
Cover	PA 12, PBT	PA 12	PA 12, PBT	
Connection	M12 connector, 4-pin	2 m PUR cable, 3×26 AWG	M12 connector, 4-pin	
Suggested mating cable	BCC M415-0000-1A-003-VX44T2-050-C013		BCC M415-0000-1A-003-VX44T2-050-C013	

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors for Object Detection

Standard sensors, cylinder designs, DC 3-wire, Mx12, M18x1



Capacitive sensors

Capacitive sensors for object detection

Mini-sensors

Standard sensors

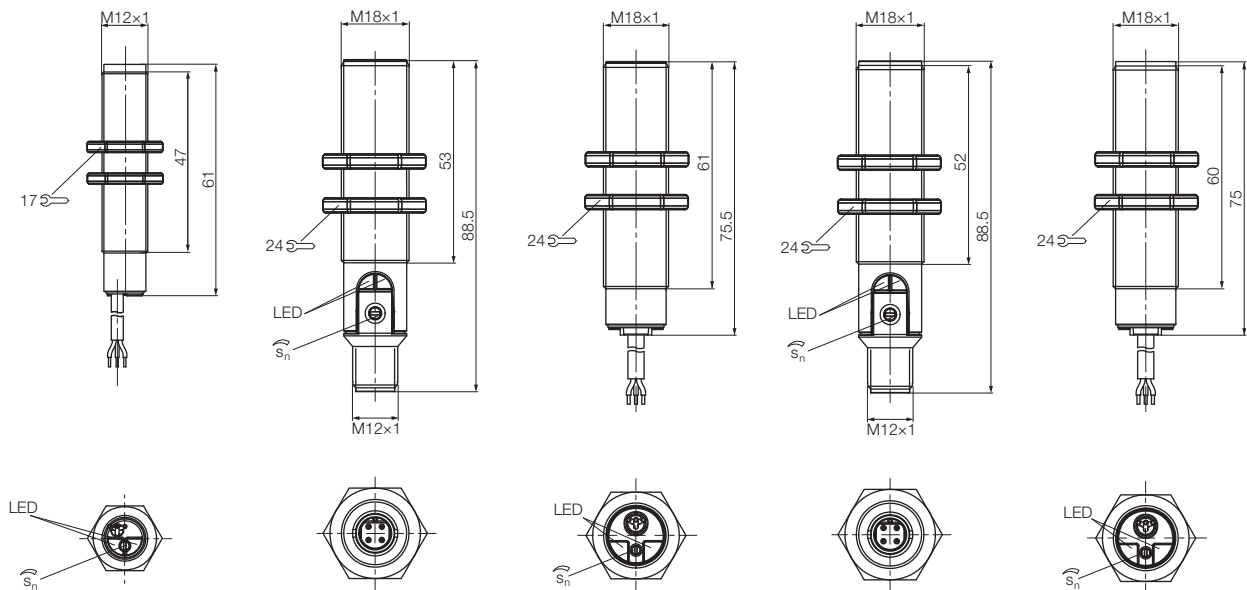
Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

M12x1	M18x1	M18x1	M18x1	M18x1	M18x1
Flush	Flush	Flush	Flush	Flush	Flush
1...4 mm	2...8 mm	2...8 mm	2...8 mm	2...8 mm	2...8 mm
BCS00PU ①	BCS00MF ②	BCS00LK ①	BCS00M8 ②	BCS00NZ ①	
BCS M12BBI1-PSC40D-EP02	BCS M18B4I3-PSC80D-S04K	BCS M18B4N1-PSC80D-EP02	BCS M18BBI3-PSC80D-S04K	BCS M18B4N1-PSC80D-EP02	
BCS00PW ⑤	BCS00M4 ⑥	BCS00LR ⑤	BCS00MH ⑥	BCS00M1 ⑤	
BCS M12BBI1-POC40D-EP02	BCS M18B4I3-POC80D-S04K	BCS M18B4N1-POC80D-EP02	BCS M18BBI3-POC80D-S04K	BCS M18BBN1-POC80D-EP02	
BCS00PY ③	BCS00M5 ④	BCS00LN ③	BCS00MJ ④	BCS00M2 ③	
BCS M12BBI1-NSC40D-EP02	BCS M18B4I3-NSC80D-S04K	BCS M18B4N1-NSC80D-EP02	BCS M18BBI3-NSC80D-S04K	BCS M18BBN1-NSC80D-EP02	
BCS00PZ ⑧	BCS00M6 ⑨	BCS00LP ⑧	BCS00MK ⑨	BCS00M3 ⑧	
BCS M12BBI1-NOC40D-EP02	BCS M18B4I3-NOC80D-S04K	BCS M18B4N1-NOC80D-EP02	BCS M18BBI3-NOC80D-S04K	BCS M18BBN1-NOC80D-EP02	
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	
≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	
100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	
Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
IP 67	IP 67	IP 67	IP 67	IP 67	
PBT	Stainless steel	Stainless steel	PBT	PBT	
PBT	PBT	PBT	PBT	PBT	
PA 12	PA 12, PBT	PA 12	PA 12, PBT	PA 12	
2 m PUR cable, 3×26 AWG	M12 connector, 4-pin	2 m PUR cable, 3×22 AWG	M12 connector, 4-pin	2 m PUR cable, 3×22 AWG	
	BCC M415-0000-1A-003-VX44T2-050-C013		BCC M415-0000-1A-003-VX44T2-050-C013		



Capacitive Sensors for Object Detection

Standard sensors, cylinder designs, DC 3-wire,

Ø 22 mm, Ø 30 mm, M30×1.5

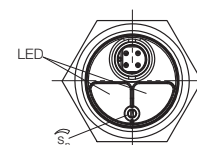
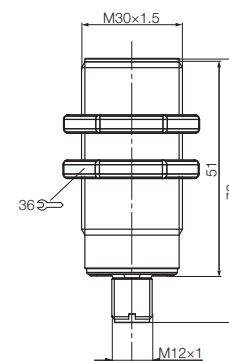
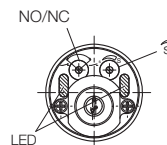
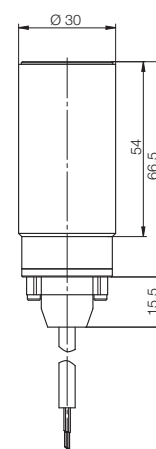
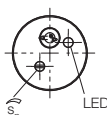
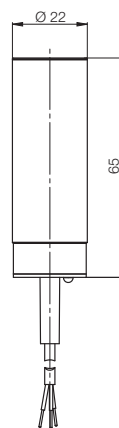


Global

Size	Ø 22 mm	Ø 30 mm	M30×1.5	
Installation type	Flush	Flush	Flush	
Rated switching distance s_n	2...10 mm	2...20 mm	2...15 mm	
PNP, NO	Ordering code BCS0033 ^①		BCS00MR ^②	
	Part number BCS D22V4M1-PSC10C-EV02		BCS M30B4I2-PSC15D-S04K	
PNP, NC	Ordering code BCS0034 ^⑤		BCS00MT ^⑥	
	Part number BCS D22V4M1-POC10C-EV02		BCS M30B4I2-POC15D-S04K	
PNP, NO/NC, switch selectable	Ordering code	BCS004H ^①		
	Part number	BCS D30B4M3-PPC20C-EP02		
NPN, NO	Ordering code BCS0035 ^③		BCS00MU ^④	
	Part number BCS D22V4M1-NSC10C-EV02		BCS M30B4I2-NSC15D-S04K	
NPN, NC	Ordering code BCS0036 ^⑧		BCS00MW ^⑨	
	Part number BCS D22V4M1-NOC10C-EV02		BCS M30B4I2-NOC15D-S04K	
NPN, NO/NC, switch selectable	Ordering code	BCS004J ^③		
	Part number	BCS D30B4M3-NPC20C-EP02		
Supply voltage U_B	10...35 V DC	10...35 V DC	10...30 V DC	
Voltage drop U_d at I_B	≤ 1.5 V	≤ 1.8 V	≤ 1.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Output current max.	300 mA	300 mA	100 mA	
No-load supply current I_0 max.	≤ 10 mA	≤ 15 mA	≤ 15 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-30...+60 °C	-30...+70 °C	-25...+85 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	
Supply voltage/Output function indicator	No/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 64	IP 67	
Material				
Housing	Stainless steel	Stainless steel	Stainless steel	
Sensing surface	PVC	PBT	PBT	
Cover	PVC	PBT, PE	PA 12, PBT	
Connection	2 m PVC cable, 3×24 AWG	2 m PUR cable, 3×22 AWG	M12 connector, 4-pin	
Suggested mating cable			BCC M415-0000-1A-003-VX44T2-050-C013	

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



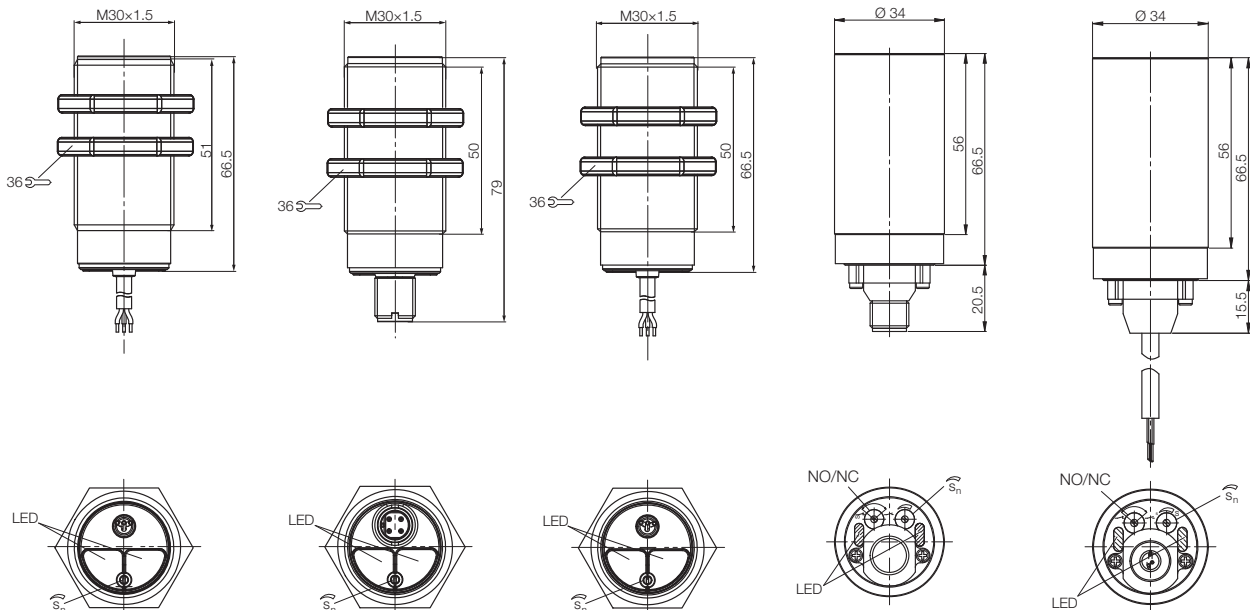
Capacitive Sensors for Object Detection

Standard sensors, cylinder designs, DC 3-wire, M30×1.5, Ø 34 mm



M30×1.5	M30×1.5	M30×1.5	Ø 34 mm	Ø 34 mm
Flush	Flush	Flush	Flush	Flush
2...15 mm	2...15 mm	2...15 mm	1...25 mm	1...25 mm
BCS00N2 ①	BCS00NA ②	BCS00NM ①		
BCS M30B4I1-PSC15D-EP02	BCS M30BBI2-PSC15D-S04K	BCS M30BBI1-PSC15D-EP02		
BCS00N3 ⑤	BCS00NC ⑥	BCS00NN ⑤		
BCS M30B4I1-POC15D-EP02	BCS M30BBI2-POC15D-S04K	BCS M30BBI1-POC15D-EP02		
			BCS004Z ②	BCS004W ①
			BCS G34VVM2-PPM20C-S04G	BCS G34VVM3-PPM20C-EP02
BCS00N4 ③	BCS00NE ④	BCS00NP ③		
BCS M30B4I1-NSC15D-EP02	BCS M30BBI2-NSC15D-S04K	BCS M30BBI1-NSC15D-EP02		
BCS00N5 ⑧	BCS00NF ⑨	BCS00NR ⑧		
BCS M30B4I1-NOC15D-EP02	BCS M30BBI2-NOC15D-S04K	BCS M30BBI1-NOC15D-EP02		
			BCS0050 ④	BCS004Y ③
			BCS G34VVM2-NPM20C-S04G	BCS G34VVM3-NPM20C-EP02
10...30 V DC	10...30 V DC	10...30 V DC	10...35 V DC	10...35 V DC
≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 1.8 V	≤ 1.8 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	300 mA	300 mA
≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-25...+85 °C	-25...+85 °C	-25...+85 °C	-30...+70 °C	-30...+70 °C
100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED
IP 67	IP 67	IP 67	IP 64	IP 64
Stainless steel	PBT	PBT	PVC	PVC
PBT	PBT	PBT	PVC	PVC
PA 12, PBT	PA 12, PBT	PA 12, PBT	PBT, PE	PBT, PE
2 m PUR cable, 3×22 AWG	M12 connector, 4-pin BCC M415-0000-1A-003-VX44T2-050-C013	2 m PUR cable, 3×22 AWG	M12 connector, 4-pin BCC M415-0000-1A-001-PX43T2-050	2 m PUR cable, 3×22 AWG

- Capacitive sensors
- Capacitive sensors for object detection
- Mini-sensors
- Standard sensors
- Capacitive sensors for level detection
- Capacitive sensors with special properties
- Capacitive sensors for analog distance measurement
- Accessories for capacitive sensors



Capacitive Sensors for Object Detection

Standard sensors in use

Food and pharmaceutical industry: presence check in the packaging process

If, for example, bottles in individual cartons are to be packaged perfectly, capacitive sensors optimize the packaging process. In this way, the BCS checks whether the bottle is present as desired after packaging, without the carton wall being able to impede the process. In doing so, it makes no difference whether the bottle is made of glass or plastic. Capacitive sensors provide a quick, reliable result, which is also more cost-effective than a weighing system.

Special machine construction: Determining numbers of pieces

Whether screws, nuts or springs made of metallic or non-metallic material, capacitive sensors check for completeness. To do so, they accurately determine the exact number of pieces, without wear or contact through container walls up to 4 mm thick. If the tube is even thicker, there are other capacitive solutions available from us.



Capacitive Sensors for Object Detection

Standard sensors, disk designs, DC 3-wire, Ø 22 mm, Ø 30 mm



Capacitive sensors

Capacitive sensors for object detection
Mini-sensors

Standard sensors

Capacitive sensors for level detection

Capacitive sensors with special properties

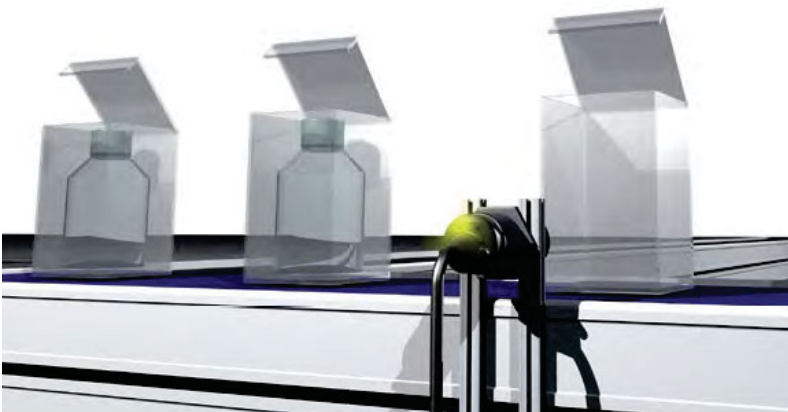
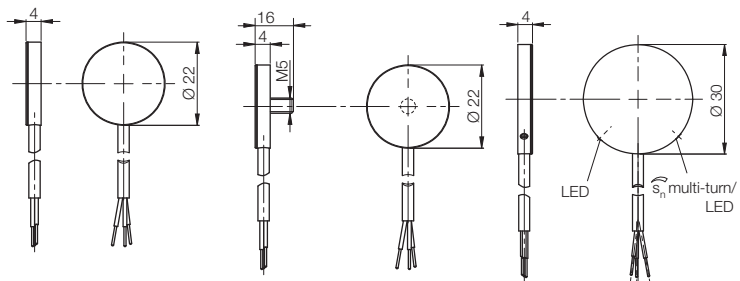
Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Size	Ø 22×4 mm	Ø 22×4 mm	Ø 30×4 mm
Installation type	Flush	Flush	Flush
Rated switching distance s_n	6 mm ±10 %	6 mm ±10 %	2...15 mm
PNP, NO	Ordering code BCS003H ①	Ordering code BCS00HK ①	Ordering code BCS003A ①
	Part number BCS D22T403-PSM60C-EP02	Part number BCS D22T402-PSM60C-EP02	Part number BCS D30T401-PSC15C-EP02
PNP, NC	Ordering code		Ordering code BCS003C ⑤
	Part number		Part number BCS D30T401-POC15C-EP02
NPN, NO	Ordering code BCS003J ③		Ordering code BCS003E ③
	Part number BCS D22T403-NSM60C-EP02		Part number BCS D30T401-NSC15C-EP02
NPN, NC	Ordering code		Ordering code BCS003F ⑧
	Part number		Part number BCS D30T401-NOC15C-EP02
Supply voltage U_B	12...30 V DC	12...30 V DC	10...35 V DC
Voltage drop U_d at I_o	≤ 0.8 V	≤ 0.8 V	≤ 0.8 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Output current max.	300 mA	300 mA	300 mA
No-load supply current I_o max.	≤ 10 mA	≤ 10 mA	≤ 10 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-30...+70 °C	-30...+70 °C	-30...+70 °C
Switching frequency f	100 Hz	100 Hz	100 Hz
Output function indicator			Yellow LED
Degree of protection as per IEC 60529	IP 64	IP 64	IP 67
Material	Housing: Stainless steel	Housing: Stainless steel	Housing: Stainless steel
	Sensing surface: PTFE	Sensing surface: PTFE	Sensing surface: PTFE
Connection	2 m PUR cable, 3×26 AWG	2 m PUR cable, 3×26 AWG	2 m PUR cable, 3×26 AWG
Suggested mating cable			

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors for Object Detection

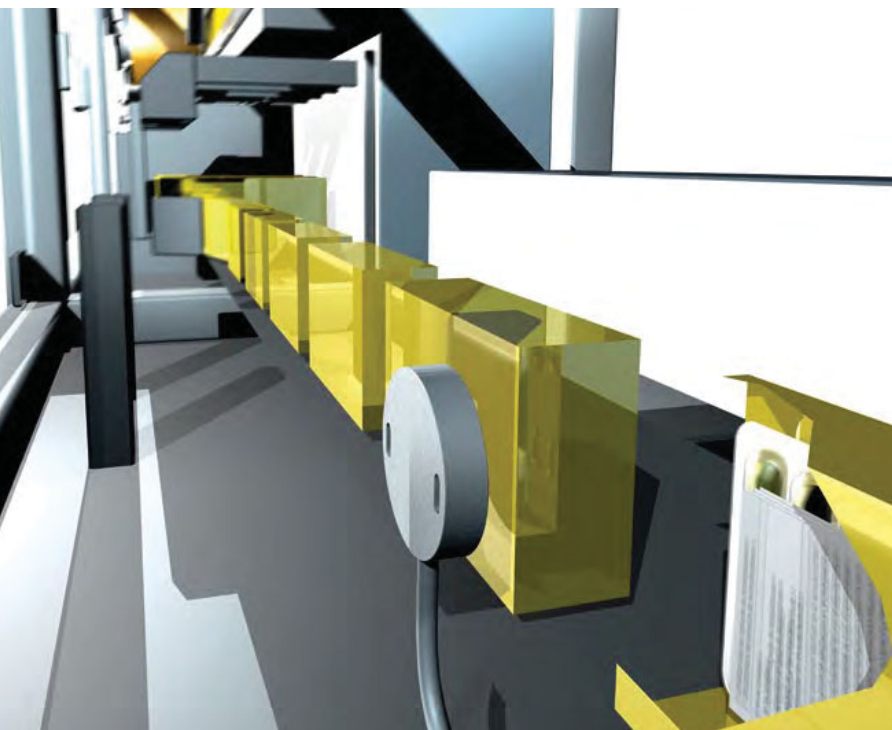
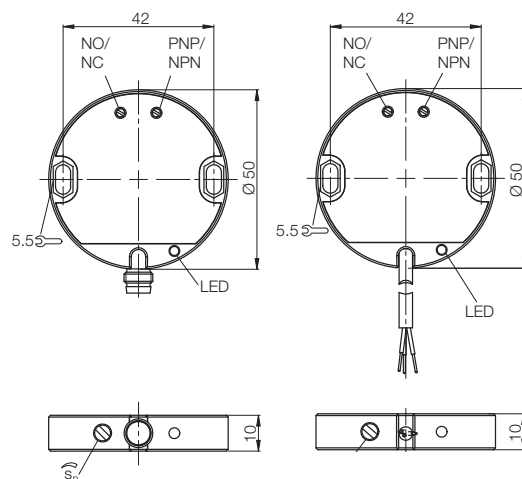
Standard sensors, disk designs, DC 3-wire, Ø 50 mm



Size	Ø 50×10 mm	Ø 50×10 mm
Installation type	Flush	Flush
Rated switching distance s_n	2...25 mm	2...25 mm
PNP/NPN and NO/NC, wiring selected	Ordering code BCS003L ①	Ordering code BCS003K ①
Part number	BCS D500003-YPC25C-S49G	BCS D500002-YPC25C-EV02
Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d at I_o	≤ 2 V	≤ 2 V
Rated insulation voltage U_i	75 V DC	75 V DC
Output current max.	150 mA	150 mA
No-load supply current I_o max.	≤ 15 mA	≤ 15 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-30...+60 °C	-30...+60 °C
Switching frequency f	50 Hz	50 Hz
Output function indicator	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 65	IP 67
Material		
Housing	POM	POM
Sensing surface	POM	POM
Cover	POM	POM
Connection	M8 connector, 3-pin	2 m PVC cable, 3×22 AWG
Suggested mating cable		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors for Object Detection

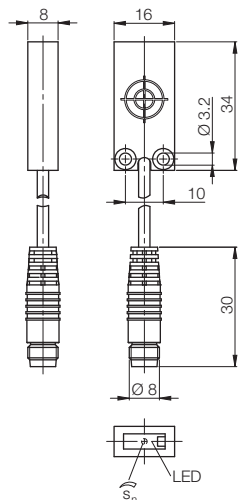
Standard sensors, block designs, DC 3-wire, 16×34×8 mm MicroBox



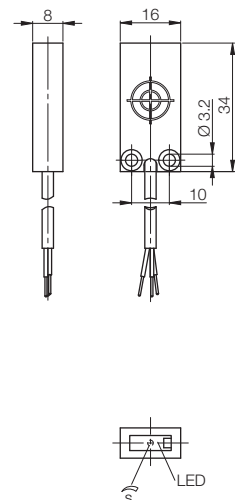
Size	16×34×8 mm MicroBox	16×34×8 mm MicroBox
Installation type	Flush	Flush
Rated switching distance s_n	1...8 mm	1...8 mm
PNP, NO	Ordering code BCS0055 ^② Part number BCS R08RR01-PSM80C-EP00,2-GS49	BCS0051 ^① BCS R08RR01-PSM80C-EP02
PNP, NC	Ordering code BCS0056 ^⑦ Part number BCS R08RR01-POM80C-EP00,2-GS49	BCS0052 ^⑤ BCS R08RR01-POM80C-EP02
NPN, NO	Ordering code BCS0057 ^④ Part number BCS R08RR01-NSM80C-EP00,2-GS49	BCS0053 ^③ BCS R08RR01-NSM80C-EP02
NPN, NC	Ordering code BCS0058 ^⑩ Part number BCS R08RR01-NOM80C-EP00,2-GS49	BCS0054 ^⑧ BCS R08RR01-NOM80C-EP02
Supply voltage U_B	12...30 V DC	12...30 V DC
Voltage drop U_d at I_e	≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i	75 V DC	75 V DC
Output current max.	50 mA	50 mA
No-load supply current I_0 max.	≤ 10 mA	≤ 10 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-30...+70 °C	-30...+70 °C
Switching frequency f	100 Hz	100 Hz
Output function indicator	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 67	IP 67
Material	Housing PP	PP
	Sensing surface PP	PP
	Cover PP	PP
Connection	0.2 m PUR cable with M8 3-pin connector	2 m PUR cable, 3×26 AWG
Suggested mating cable	BCC M313-0000-10-001-PX43T2-050	

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Mounting frame included in delivery



Mounting frame included in delivery



Capacitive sensors

Capacitive sensors for object detection
Mini-sensors

Standard sensors

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors for Object Detection

**Standard sensors, block designs, DC 3-wire,
40x40x10 mm, Uniflat**

The cost-effective Global series now also provides capacitive sensors in a flat design: in compact plastic housing in 40x40x10 mm. With cable or pigtail connection. And there is an LED display for supply voltage and switching status.

Applications

The BCS capacitive sensors Q40 Uniflat detect oil or granular material through non-metallic walls up to 6 mm thick. Through its installation on the container bottom, it becomes the ideal leak detector.

Application examples

- Checking volume in infeed systems
- Checking content in transport packaging
- Detecting fill level through containers
- Detecting leaks

Switching distance

Switching distance can be set precisely from 1 to 20 mm, with a 20-turn potentiometer.

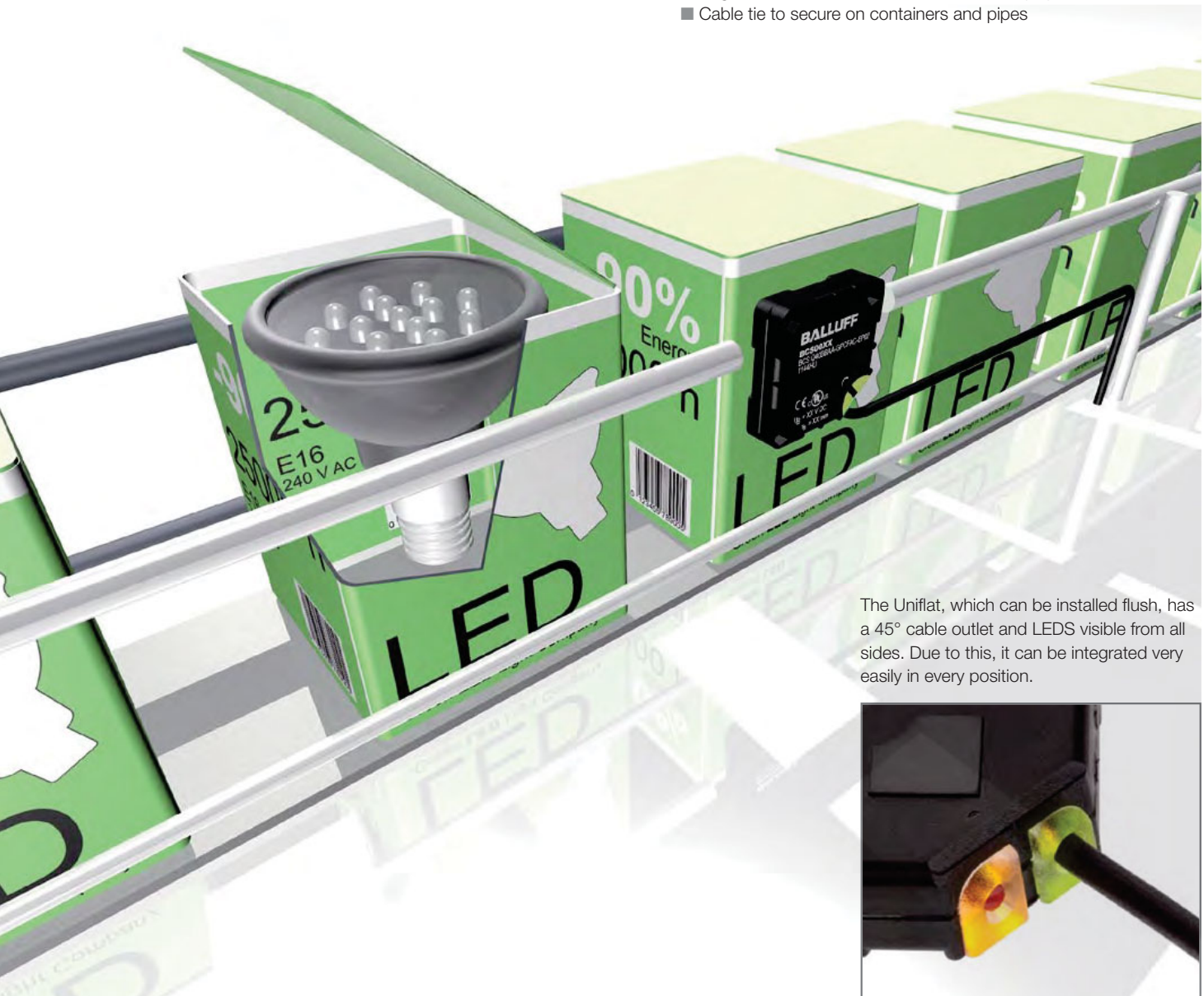
The capacitive Q40 Uniflat provides a PNP or NPN output, which is available as either normally open or as normally closed.

Installation

The capacitive sensors BCS Q40 Uniflat can be installed flush and can be secured in different ways with screws, cable ties or angle brackets. In addition, its universal 45° cable output provides for additional flexibility.

Mounting options

- M4 through bolts
- M3 with double-sided anti-rotation element for nuts
- Sunken M4 assembly with screw DIN 920
- Angle brackets available for Balluff assembly system
- Cable tie to secure on containers and pipes



The Uniflat, which can be installed flush, has a 45° cable outlet and LEDs visible from all sides. Due to this, it can be integrated very easily in every position.

Capacitive Sensors for Object Detection

Standard sensors, block designs, DC 3-wire, 40×40×10 mm, Uniflat



Global

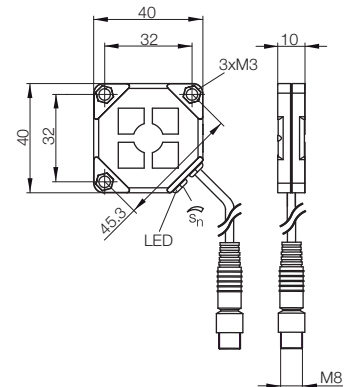
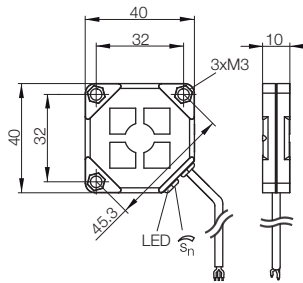


Global

Size		40×40×10 mm Uniflat	40×40×10 mm Uniflat
Installation type		Flush	Flush
Rated switching distance s_n		1...20 mm	1...20 mm
PNP/NPN and NO/NC, wiring selected	Ordering code	BCS00TR ^①	
	Part number	BCS Q40BBAA-GPC20C-EP02	
PNP, NO	Ordering code		BCS00U6 ^②
	Part number		BCS Q40BBAA-PSC20C-EP00,3-GS49
PNP, NC	Ordering code		BCS00U5 ^⑥
	Part number		BCS Q40BBAA-POC20C-EP00,3-GS49
Supply voltage U_B		10... 30 V DC	10... 30 V DC
Voltage drop U_d at I_o		≤ 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_o max.		≤ 15 mA	≤ 15 mA
Polarity reversal protected/output miswiring protected/short-circuit protected		No/No/Yes	Yes/Yes/Yes
Ambient temperature T_a		-5...+85 °C	-5...+85 °C
Switching frequency f		100 Hz	100 Hz
Supply voltage/Output function indicator		Green LED/Yellow LED	Green LED/Yellow LED
Degree of protection as per IEC 60529		IP 67	IP 67
Material	Housing	PBT	PBT
	Sensing surface	PBT	PBT
	Cover	PBT	PBT
Connection		2 m PUR cable, 3×26 AWG	0.3 m PUR cable with M8, 3-pin connector
Suggested mating cable			BCC M313-0000-10-001-PX43T2-050

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



- Capacitive sensors
- Capacitive sensors for object detection
- Mini-sensors
- Standard sensors**
- Capacitive sensors for level detection
- Capacitive sensors with special properties
- Capacitive sensors for analog distance measurement
- Accessories for capacitive sensors



Capacitive Sensors

Capacitive sensors for level detection

Capacitive sensors for level detection use their sensing surface to detect the product, bulk material or liquid (e.g. plastic granulate, sugar, oil, aqueous media) directly or through a container wall. Advantage: Their spherical electrical field effectively compensates for deposits on the sensing surface of the sensor.





Capacitive Sensors for Level Detection

Contents

Standard sensors

Cylinder designs 803

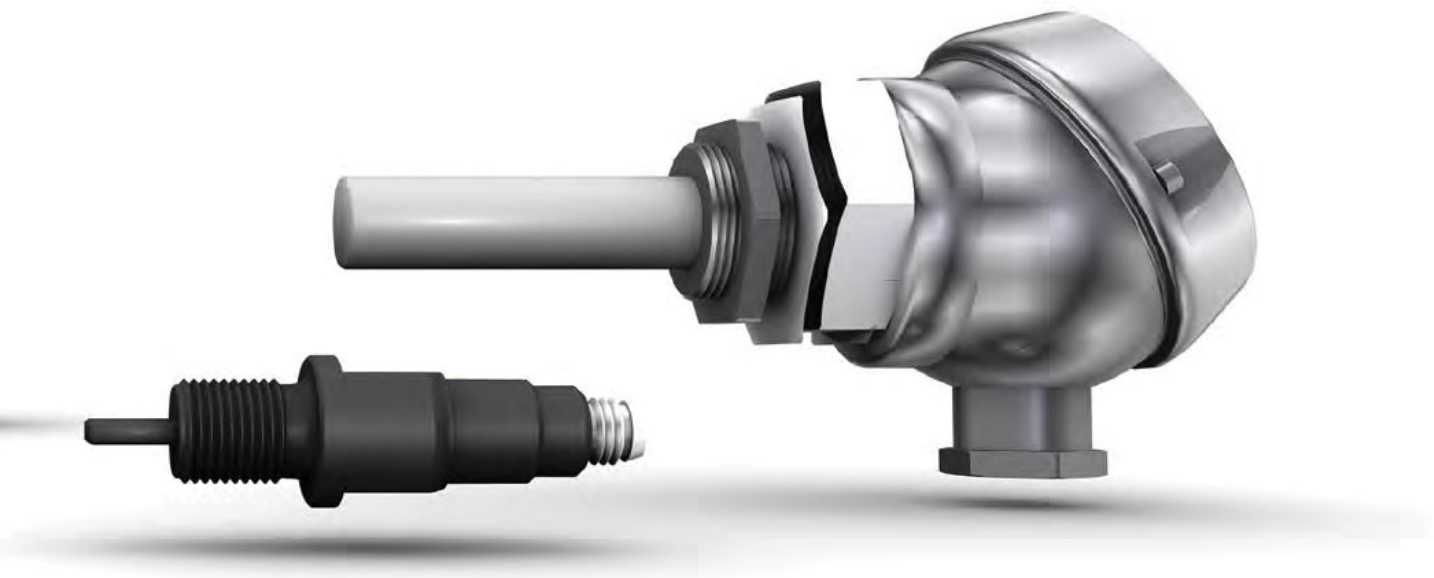
SmartLevel sensors

Cylinder designs 814

SmartLevel 500+ 817

Disk designs 822

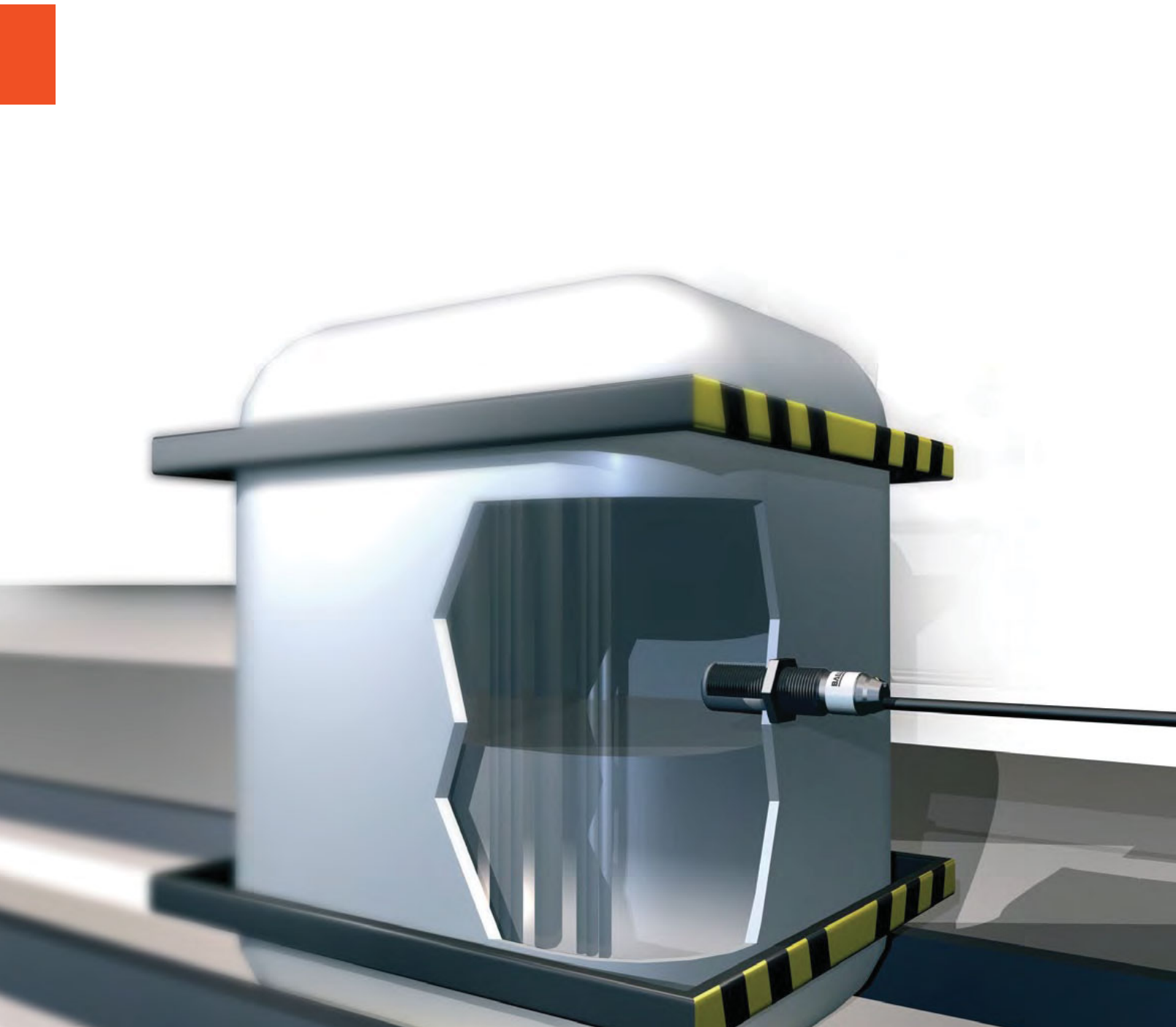
Block designs 824



Capacitive Sensors for Level Detection

Sensors in use

Whether in coolant reservoir tanks or on glass bypass tubes, the capacitive sensor reliably detects the level and thereby helps to prevent damage to the machine from running it dry.



Capacitive Sensors for Level Detection

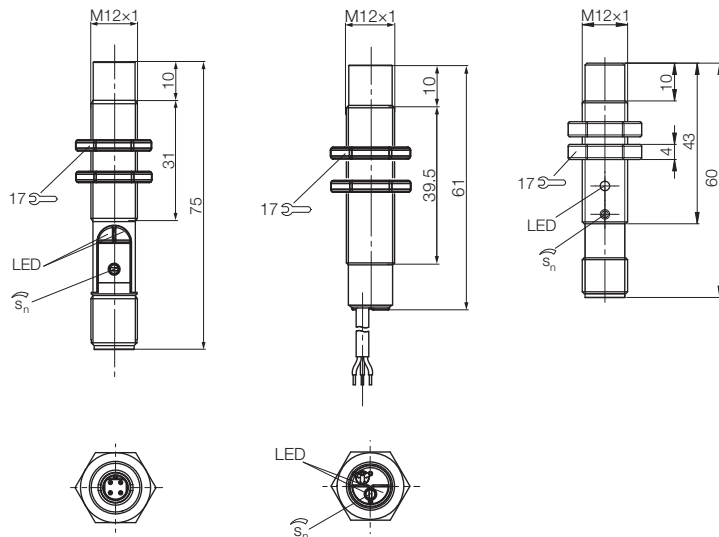
Standard sensors, cylinder designs, DC 3-wire, M12x1



Size	M12x1	M12x1	M12x1
Installation type	Not flush	Not flush	Not flush
Rated switching distance s_n	1...8 mm	1...8 mm	1...8 mm
PNP, NO	Ordering code BCS00P4 ^②	BCS00PC ^①	BCS0062 ^②
	Part number BCS M12B4E2-PSC80H-S04K	BCS M12B4G1-PSC80H-EP02	BCS M12T4D2-PSM80G-S04G
PNP, NC	Ordering code BCS00P5 ^⑥	BCS00PE ^⑤	BCS0063 ^⑦
	Part number BCS M12B4E2-POC80H-S04K	BCS M12B4G1-POC80H-EP02	BCS M12T4D2-POM80G-S04G
NPN, NO	Ordering code BCS00P6 ^④	BCS00PF ^③	BCS0064 ^④
	Part number BCS M12B4E2-NSC80H-S04K	BCS M12B4G1-NSC80H-EP02	BCS M12T4D2-NSM80G-S04G
NPN, NC	Ordering code BCS00P7 ^⑨	BCS00PH ^⑧	BCS0065 ^⑩
	Part number BCS M12B4E2-NOC80H-S04K	BCS M12B4G1-NOC80H-EP02	BCS M12T4D2-NOM80G-S04G
Supply voltage U_B	10...30 V DC	10...30 V DC	12...35 V DC
Voltage drop U_d at I_o	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Output current max.	100 mA	100 mA	200 mA
No-load supply current I_o max.	≤ 15 mA	≤ 15 mA	≤ 10 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a	-25...+85 °C	-25...+85 °C	-30...+70 °C
Switching frequency f	100 Hz	100 Hz	100 Hz
Output function indicator	Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 67	IP 67	IP 65
Material			
Housing	Stainless steel	Stainless steel	Stainless steel
Sensing surface	PBT	PBT	PTFE
Cover	PA 12, PBT	PA 12	PA
Connection	M12 connector, 4-pin	2 m PUR cable, 3x26 AWG	M12 connector, 4-pin
Suggested mating cable	BCC M415-0000-1A-003-VX44T2-050-C013		BCC M415-0000-1A-003-PX44T2-050

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Standard sensors

SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors for Level Detection

Standard sensors, cylinder designs, DC 3-wire, M12x1



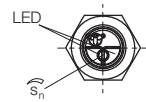
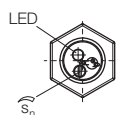
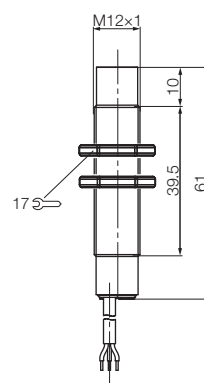
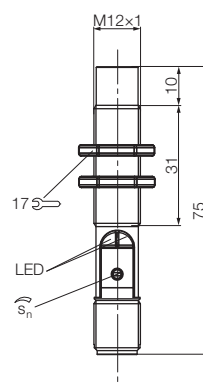
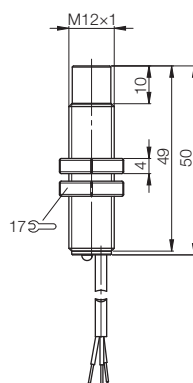
Global

Global

Size		M12x1	M12x1	M12x1	
Installation type		Not flush	Not flush	Not flush	
Rated switching distance s_n		1...8 mm	1...8 mm	1...8 mm	
PNP, NO	Ordering code	BCS005F ①	BCS00PN ②	BCS00R0 ①	
	Part number	BCS M12T4G1-PSM80G-EP02	BCS M12BBE2-PSC80H-S04K	BCS M12BBG1-PSC80H-EP02	
PNP, NC	Ordering code	BCS005H ⑤	BCS00PP ⑥	BCS00R1 ⑤	
	Part number	BCS M12T4G1-POM80G-EP02	BCS M12BBE2-POC80H-S04K	BCS M12BBG1-POC80H-EP02	
NPN, NO	Ordering code	BCS005J ③	BCS00PR ④	BCS00R2 ③	
	Part number	BCS M12T4G1-NSM80G-EP02	BCS M12BBE2-NSC80H-S04K	BCS M12BBG1-NSC80H-EP02	
NPN, NC	Ordering code	BCS005K ⑧	BCS00PT ⑨	BCS00R3 ⑧	
	Part number	BCS M12T4G1-NOM80G-EP02	BCS M12BBE2-NOC80H-S04K	BCS M12BBG1-NOC80H-EP02	
Supply voltage U_B		12...35 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_e		≤ 0.8 V	≤ 1.5 V	≤ 1.5 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Output current max.		200 mA	100 mA	100 mA	
No-load supply current I_0 max.		≤ 10 mA	≤ 15 mA	≤ 15 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a		-30...+70 °C	-25...+85 °C	-25...+85 °C	
Switching frequency f		100 Hz	100 Hz	100 Hz	
Supply voltage/Output function indicator		No/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
Degree of protection as per IEC 60529		IP 65	IP 67	IP 67	
Material	Housing	Stainless steel	PBT	PBT	
	Sensing surface	PTFE	PBT	PBT	
	Cover	POM	PA 12, PBT	PA 12	
Connection		2 m PUR cable, 3x26 AWG	M12 connector, 4-pin	2 m PUR cable, 3x26 AWG	
Suggested mating cable			BCC M415-0000-1A-003-VX44T2-050-C013		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors for Level Detection

Standard sensors, cylinder designs, DC 3-wire, Mx12, M18x1



Particularly EMC-proof

M12x1	M12x1	M18x1	M18x1	M18x1
Not flush	Not flush	Not flush	Not flush	Not flush
1...8 mm	1...6 mm	2..15 mm	2..15 mm	2...15 mm
BCS006Z ①	BCS009J ①	BCS00ME ②	BCS00M7 ①	BCS006A ②
BCS M12TTG1-PSM80G-ET02	BCS M12TTI1-PSM60G-ET02-E	BCS M18B4G2-PSC15H-S04K	BCS M18B4H1-PSC15H-EP02	BCS M18T4G2-PSC15G-S04G
BCS0070 ⑤	BCS009K ⑤	BCS00ML ⑥	BCS00M9 ⑤	BCS006C ⑦
BCS M12TTG1-POM80G-ET02	BCS M12TTI1-POM60G-ET02-E	BCS M18B4G2-POC15H-S04K	BCS M18B4H1-POC15H-EP02	BCS M18T4G2-POC15G-S04G
BCS0071 ③	BCS009L ③	BCS00MM ④	BCS00MA ③	BCS006E ④
BCS M12TTG1-NSM80G-ET02	BCS M12TTI1-NSM60G-ET02-E	BCS M18B4G2-NSC15H-S04K	BCS M18B4H1-NSC15H-EP02	BCS M18T4G2-NSC15G-S04G
BCS0072 ⑧	BCS009M ⑧	BCS00MN ⑨	BCS00MC ⑧	BCS006F ⑩
BCS M12TTG1-NOM80G-ET02	BCS M12TTI1-NOM60G-ET02-E	BCS M18B4G2-NOC15H-S04K	BCS M18B4H1-NOC15H-EP02	BCS M18T4G2-NOC15G-S04G
12...35 V DC	12...35 V DC	10...30 V DC	10...30 V DC	10...35 V DC
≤ 0.8 V	≤ 0.8 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
200 mA	200 mA	100 mA	100 mA	300 mA
≤ 10 mA	≤ 10 mA	≤ 15 mA	≤ 15 mA	≤ 10 mA
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
-30...+70 °C	-30...+60 °C	-25...+85 °C	-25...+85 °C	-30...+70 °C
100 Hz	25 Hz	100 Hz	100 Hz	100 Hz
No/Red LED	No/Red LED	Green LED/Yellow LED	Green LED/Yellow LED	No/Yellow LED
IP 65	IP 65	IP 67	IP 67	IP 67
PTFE	PTFE	Stainless steel	Stainless steel	Stainless steel
PTFE	PTFE	PBT	PBT	PTFE
PTFE	PTFE	PA 12, PBT	PA 12	PA
2 m PTFE cable, 3×26 AWG	2 m PTFE cable, 3×26 AWG	M12 connector, 4-pin BCC M415-0000-1A-003-VX44T2-050-Q013	2 m PUR cable, 3×22 AWG	M12 connector, 4-pin BCC M415-0000-1A-003-PX44T2-050



Capacitive sensors

Capacitive sensors for object detection

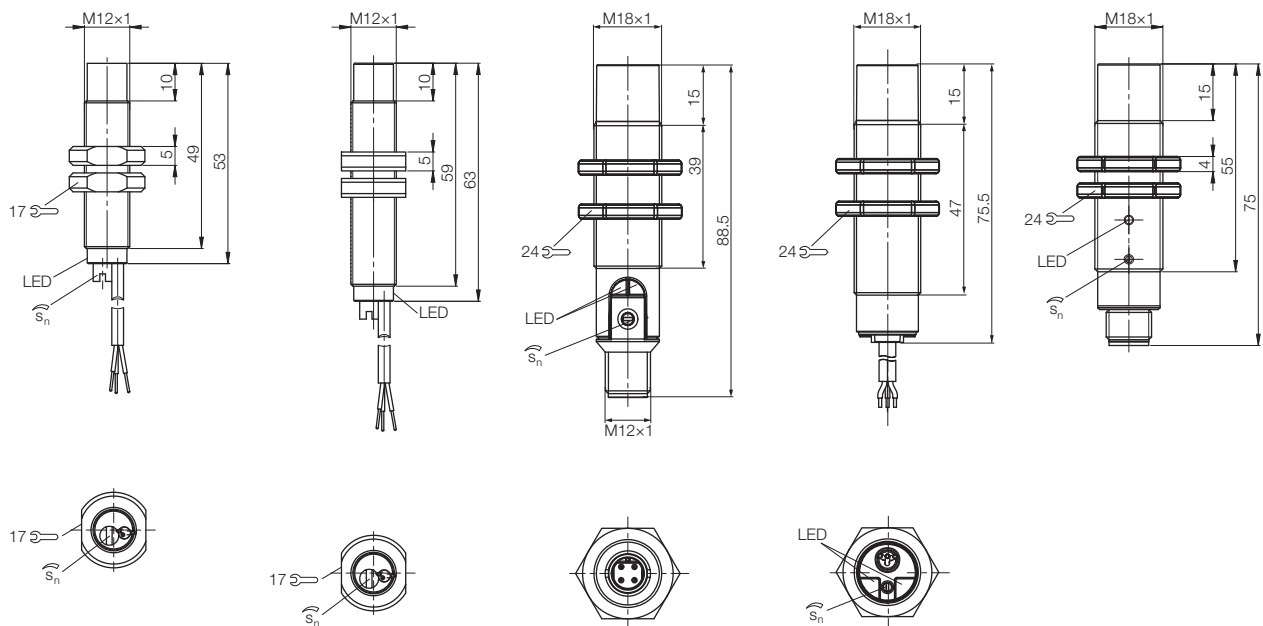
Capacitive sensors for level detection

Standard sensors
SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



Capacitive Sensors for Level Detection

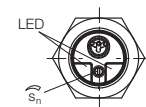
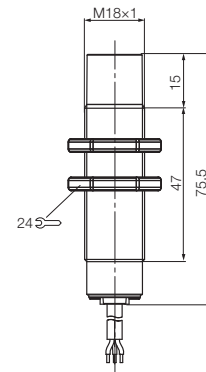
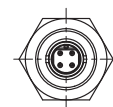
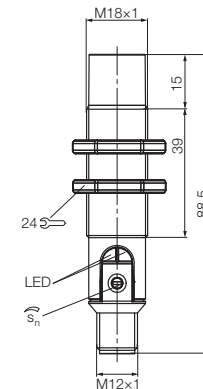
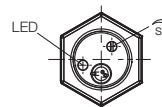
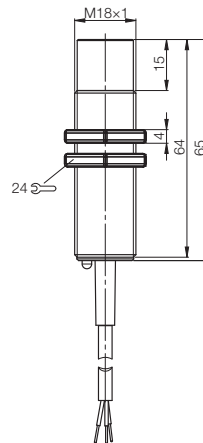
Standard sensors, cylinder designs, DC 3-wire, M18x1



Size	M18x1	M18x1	M18x1	
Installation type	Not flush	Not flush	Not flush	
Rated switching distance s_n	2...15 mm	2..15 mm	2..15 mm	
PNP, NO	Ordering code BCS005R ①	BCS00LM ②	BCS00LL ①	
Part number	BCS M18T4I1-PSC15G-DV02	BCS M18BBG2-PSC15H-S04K	BCS M18BBH1-PSC15H-EP02	
PNP, NC	Ordering code BCS005T ⑤	BCS00LT ⑥	BCS00LY ⑤	
Part number	BCS M18T4I1-POC15G-DV02	BCS M18BBG2-POC15H-S04K	BCS M18BBH1-POC15H-EP02	
PNP, NO/NC, switch selectable	Ordering code			
Part number				
NPN, NO	Ordering code BCS005U ③	BCS00LU ④	BCS00LZ ③	
Part number	BCS M18T4I1-NSC15G-DV02	BCS M18BBG2-NSC15H-S04K	BCS M18BBH1-NSC15H-EP02	
NPN, NC	Ordering code BCS005W ⑧	BCS00LW ⑨	BCS00M0 ⑧	
Part number	BCS M18T4I1-NOC15G-DV02	BCS M18BBG2-NOC15H-S04K	BCS M18BBH1-NOC15H-EP02	
NPN, NO/NC, switch selectable	Ordering code			
Part number				
Supply voltage U_B	10...35 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d at I_o	≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	
Output current max.	300 mA	100 mA	100 mA	
No-load supply current I_o max.	≤ 10 mA	≤ 15 mA	≤ 15 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Ambient temperature T_a	-30...+70 °C	-25...+85 °C	-25...+85 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	
Supply voltage/Output function indicator	No/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
Degree of protection as per IEC 60529	IP 67	IP 67	IP 67	
Material				
Housing	Stainless steel	PBT	PBT	
Sensing surface	PTFE	PBT	PBT	
Cover	POM	PA 12, PBT	PA 12	
Connection	2 m PVC cable, 3x24 AWG	M12 connector, 4-pin	2 m PUR cable, 3x22 AWG	
Suggested mating cable		BCC M415-0000-1A-003-VX44T2-050-C013		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors for Level Detection

Standard sensors, cylinder designs, DC 3-wire, M18×1, M30×1.5



M18×1	M30×1.5	M30×1.5	M30×1.5	M30×1.5	M30×1.5
Not flush	Not flush	Not flush	Not flush	Not flush	Not flush
2...15 mm	1...25 mm	1...25 mm	1...30 mm	1...30 mm	2...30 mm
BCS0073 ①	BCS00MY ②	BCS00N6 ①			
BCS M18TTI2-PSC15G-AT02	BCS M30B4E2-PSC25H-S04K	BCS M30B4E1-PSC25H-EP02			
BCS0074 ⑤	BCS00MZ ⑥	BCS00N7 ⑤			
BCS M18TTI2-POC15G-AT02	BCS M30B4E2-POC25H-S04K	BCS M30B4E1-POC25H-EP02			
			BCS007L ②	BCS007J ①	
			BCS M30T4M2-PPC30G-S04G	BCS M30T4M3-PPC30G-EP02	
BCS0075 ③	BCS00N0 ④	BCS00N8 ③			
BCS M18TTI2-NSC15G-AT02	BCS M30B4E2-NSC25H-S04K	BCS M30B4E1-NSC25H-EP02			
BCS0076 ⑧	BCS00N1 ⑨	BCS00N9 ⑧			
BCS M18TTI2-NOC15G-AT02	BCS M30B4E2-NOC25H-S04K	BCS M30B4E1-NOC25H-EP02			
			BCS007M ④	BCS007K ③	
			BCS M30T4M2-NPC30G-S04G	BCS M30T4M3-NPC30G-EP02	
10...35 V DC	10...30 V DC	10...30 V DC	10...35 V DC	10...35 V DC	
≤ 1.5 V	≤ 1.5 V	≤ 1.5 V	≤ 1.8 V	≤ 1.8 V	
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	
300 mA	100 mA	100 mA	300 mA	300 mA	
≤ 10 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
-30...+70 °C	-25...+85 °C	-25...+85 °C	-30...+70 °C	-30...+70 °C	
100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	
No/Red LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
IP 67	IP 67	IP 67	IP 64	IP 64	
PTFE	Stainless steel	Stainless steel	Stainless steel	Stainless steel	
PTFE	PBT	PBT	PTFE	PTFE	
PTFE	PA 12, PBT	PA 12, PBT	PBT, PE	PBT, PE	
2 m PTFE cable, 3×24 AWG	M12 connector, 4-pin	2 m PUR cable, 3×22 AWG	M12 connector, 4-pin	2 m PUR cable, 3×22 AWG	
	BCC M415-0000-1A-003-VX44T2-050-C013		BCC M415-0000-1A-003-PX44T2-050		



Capacitive sensors

Capacitive sensors for object detection

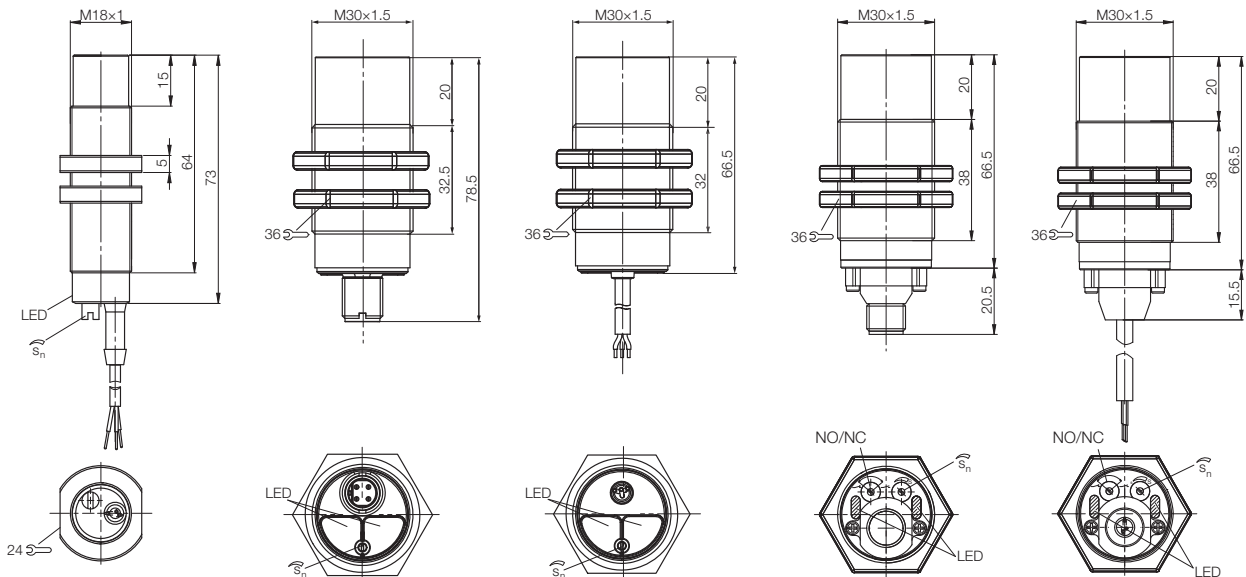
Capacitive sensors for level detection

Standard sensors
SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



Capacitive Sensors for Level Detection

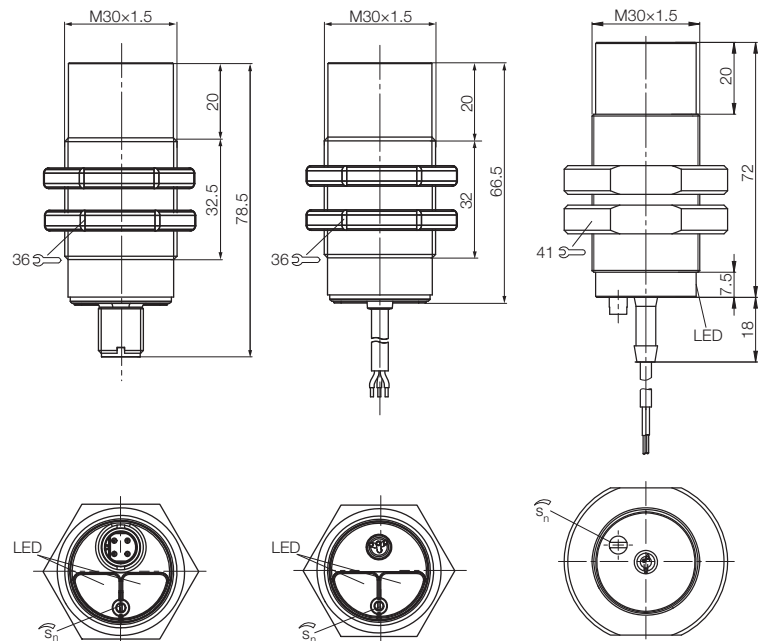
Standard sensors, cylinder designs, DC 3-wire, M30×1.5



Size		M30×1.5	M30×1.5	M30×1.5
Installation type		Not flush	Not flush	Not flush
Rated switching distance s_n		1...25 mm	1...25 mm	2...30 mm
PNP, NO	Ordering code	BCS00NH	BCS00NT	BCS0077
	Part number	BCS M30BBE2-PSC25H-S04K ②	BCS M30BBE1-PSC25H-EP02 ①	BCS M30TTH2-PSC30G-AT02 ①
PNP, NC	Ordering code	BCS00NJ	BCS00NU	BCS0078
	Part number	BCS M30BBE2-POC25H-S04K ⑥	BCS M30BBE1-POC25H-EP02 ⑤	BCS M30TTH2-POC30G-AT02 ⑤
NPN, NO	Ordering code	BCS00NK	BCS00NW	BCS0079
	Part number	BCS M30BBE2-NSC25H-S04K ④	BCS M30BBE1-NSC25H-EP02 ③	BCS M30TTH2-NSC30G-AT02 ③
NPN, NC	Ordering code	BCS00NL	BCS00NY	BCS007A
	Part number	BCS M30BBE2-NOC25H-S04K ⑨	BCS M30BBE1-NOC25H-EP02 ⑧	BCS M30TTH2-NOC30G-AT02 ⑧
Supply voltage U_B		10...30 V DC	10...30 V DC	10...35 V DC
Voltage drop U_d at I_o		≤ 1.5 V	≤ 1.5 V	≤ 1.8 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC
Output current max.		100 mA	100 mA	300 mA
No-load supply current I_o max.		≤ 15 mA	≤ 15 mA	≤ 10 mA
Polarity reversal protected/output miswiring protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-25...+85 °C	-25...+85 °C	-30...+70 °C
Switching frequency f		100 Hz	100 Hz	100 Hz
Supply voltage/Output function indicator		Green LED/Yellow LED	Green LED/Yellow LED	No/Red LED
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Material	Housing	PBT	PBT	PTFE
	Sensing surface	PBT	PBT	PTFE
	Cover	PA 12, PBT	PA 12, PBT	PTFE
Connection		M12 connector, 4-pin	2 m PUR cable, 3×22 AWG	2 m PTFE cable, 3×26 AWG
Suggested mating cable		BCC M415-0000-1A-003-VX44T2-050-C013		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.





Capacitive Sensors for Level Detection

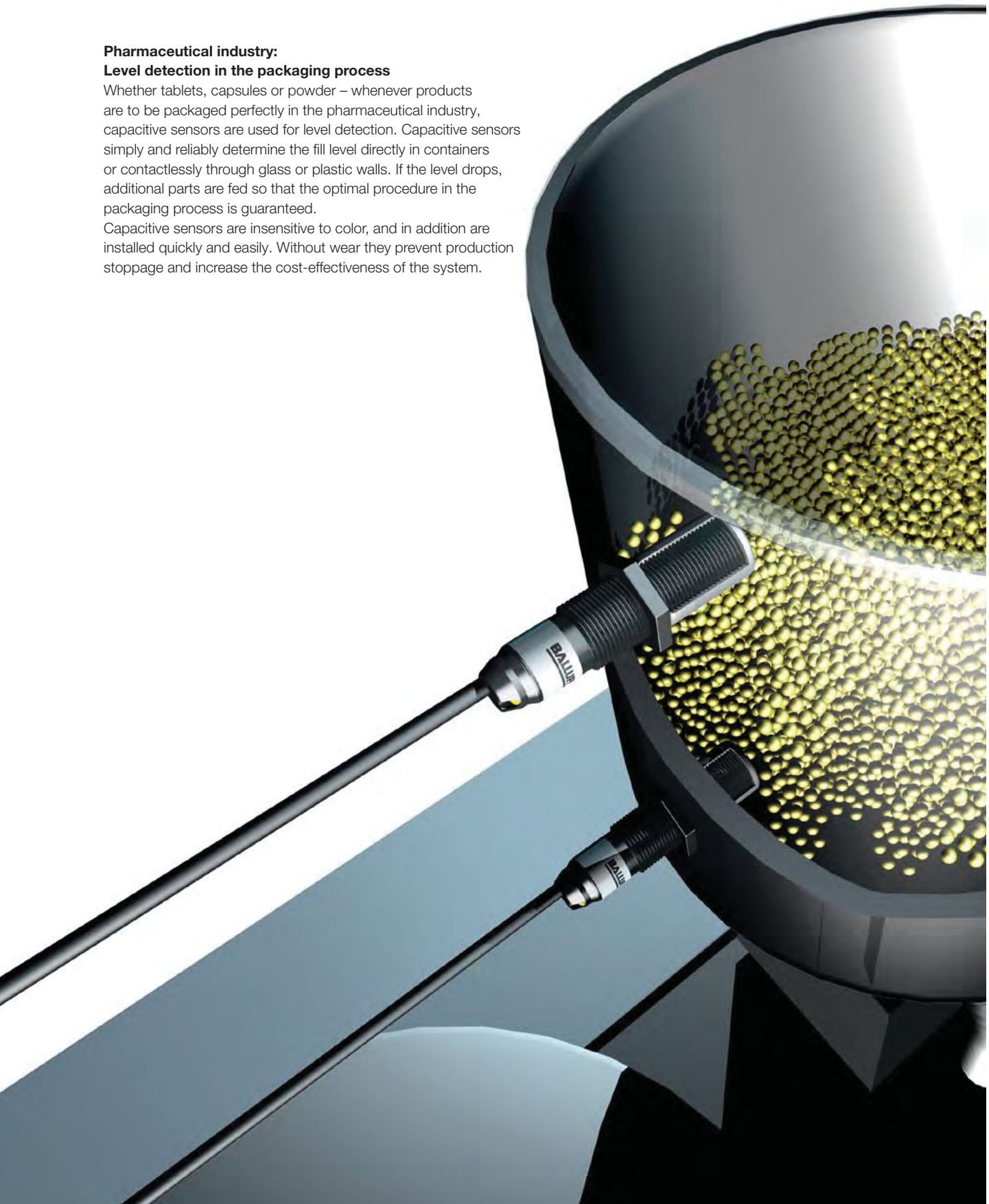
Sensors in use

Pharmaceutical industry:

Level detection in the packaging process

Whether tablets, capsules or powder – whenever products are to be packaged perfectly in the pharmaceutical industry, capacitive sensors are used for level detection. Capacitive sensors simply and reliably determine the fill level directly in containers or contactlessly through glass or plastic walls. If the level drops, additional parts are fed so that the optimal procedure in the packaging process is guaranteed.

Capacitive sensors are insensitive to color, and in addition are installed quickly and easily. Without wear they prevent production stoppage and increase the cost-effectiveness of the system.



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Standard sensors

SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors for Level Detection

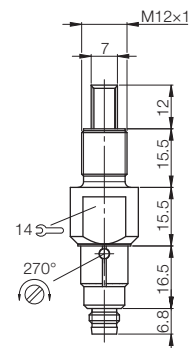
**Standard sensors, cylinder designs, DC 3-wire,
M12×1, G 1/4", NPT 1/4" MicroLevel**



Size	M12×1 MicroLevel	
Installation type	Not flush	
Rated switching distance s_n	Level adjustable	
PNP/NPN and NO/NC, wiring selected	Ordering code	BCS009T ①
	Part number	BCS S41SS01-GPCFNG-S49G
Supply voltage U_B	10...35 V DC	
Voltage drop U_d at I_e	≤ 3 V	
Rated insulation voltage U_i	75 V DC	
Output current max.	50 mA	
No-load supply current I_0 max.	≤ 20 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	No/No/Yes	
Ambient temperature T_a	-10...+70 °C	
Switching frequency f	5 Hz	
Supply voltage/Output function indicator	Green LED/Yellow LED	
Degree of protection as per IEC 60529	IP 67 (sensing surface: IP 68 at max. 10 bar)	
Material	Housing	PSU
	Sensing surface	PSU
	Cover	PSU
Connection	M8 connector, 3-pin	
Suggested mating cables	BCC M313-0000-10-001-PX43T2-050	

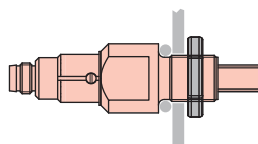
With level sensors in the MicroLevel housing, an adjustment is only necessary in exceptional cases. The potentiometer has a setting path of 270° and has to be carefully adjusted.

For the protective covering (M18 or G 1/2") for MicroLevel sensors, see Section Accessories, page 848.



① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



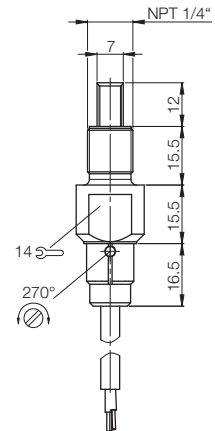
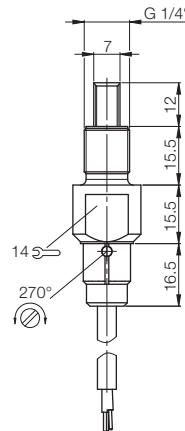
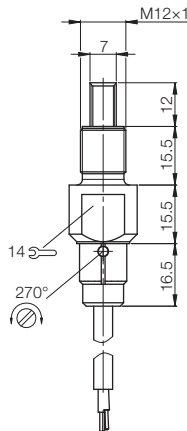
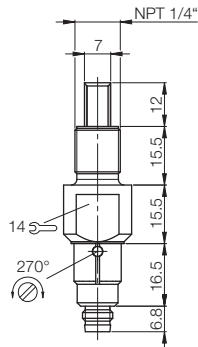
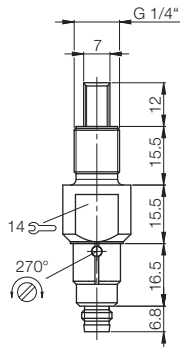
The **standard mounting** uses through-holes with included nut. This can be ignored when threaded holes are used or serve as additional security. Sealing is accomplished using an O-ring or gasket.

Capacitive Sensors for Level Detection

Standard sensors, cylinder designs, DC 3-wire, M12×1, G 1/4", NPT 1/4" MicroLevel



G 1/4" MicroLevel	NPT 1/4" MicroLevel	M12×1 MicroLevel	G 1/4" MicroLevel	NPT 1/4" MicroLevel
Not flush	Not flush	Not flush	Not flush	Not flush
Level adjustable	Level adjustable	Level adjustable	Level adjustable	Level adjustable
BCS009U ⓘ	BCS009W ⓘ	BCS009N ⓘ	BCS009P ⓘ	BCS009R ⓘ
BCS S41SS02-GPCFNG-S49G	BCS S41SS03-GPCFNG-S49G	BCS S40SS01-GPCFNG-EP02	BCS S40SS02-GPCFNG-EP02	BCS S40SS03-GPCFNG-EP02
10...35 V DC	10...35 V DC	10...35 V DC	10...35 V DC	10...35 V DC
≤ 3 V	≤ 3 V	≤ 3 V	≤ 3 V	≤ 3 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
50 mA	50 mA	50 mA	50 mA	50 mA
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
No/No/Yes	No/No/Yes	No/No/Yes	No/No/Yes	No/No/Yes
-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C	-10...+70 °C
5 Hz	5 Hz	5 Hz	5 Hz	5 Hz
Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED
IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)
PSU	PSU	PSU	PSU	PSU
PSU	PSU	PSU	PSU	PSU
PSU	PSU	PSU	PSU	PSU
M8 connector, 3-pin BCC M313-0000-10-001-PX43T2-050	M8 connector, 3-pin BCC M313-0000-10-001-PX43T2-050	2 m PUR cable, 3×22 AWG	2 m PUR cable, 3×22 AWG	2 m PUR cable, 3×22 AWG



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Standard sensors

SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors for Level Detection

**Standard sensors, cylinder designs, DC 3-wire,
M12×1, G 1/4", NPT 1/4" MicroLevel**



Reverse installation



Reverse installation



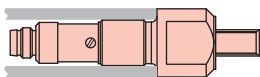
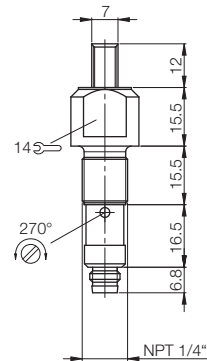
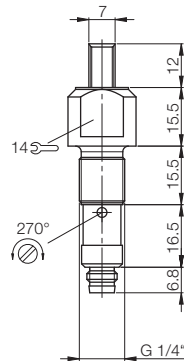
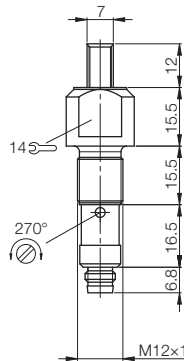
Reverse installation

Size		M12×1 MicroLevel	G 1/4" MicroLevel	NPT 1/4" MicroLevel	
Installation type		Not flush	Not flush	Not flush	
Rated switching distance s_n		Level adjustable	Level adjustable	Level adjustable	
PNP, NO	Ordering code				
	Part number				
PNP, NC	Ordering code				
	Part number				
NPN, NO	Ordering code				
	Part number				
NPN, NC	Ordering code				
	Part number				
PNP/NPN and NO/NC, wiring selected	Ordering code	BCS009Y ^①	BCS009Z ^①	BCS00A0 ^①	
	Part number	BCS S42SS01-GPCFNG-S49G	BCS S42SS02-GPCFNG-S49G	BCS S42SS03-GPCFNG-S49G	
Supply voltage U_B		10...35 V DC	10...35 V DC	10...35 V DC	
Voltage drop U_d at I_o		≤ 3 V	≤ 3 V	≤ 3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Output current max.		50 mA	50 mA	50 mA	
No-load supply current I_o max.		≤ 20 mA	≤ 20 mA	≤ 20 mA	
Polarity reversal protected/output miswiring protected/ short-circuit protected		No/No/Yes	No/No/Yes	No/No/Yes	
Ambient temperature T_a		-10...+70 °C	-10...+70 °C	-10...+70 °C	
Switching frequency f		5 Hz	5 Hz	5 Hz	
Supply voltage/Output function indicator		Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	
Degree of protection as per IEC 60529		IP 64 (sensing surface: IP 68 at max. 10 bar)	IP 64 (sensing surface: IP 68 at max. 10 bar)	IP 64 (sensing surface: IP 68 at max. 10 bar)	
Material	Housing	PSU	PSU	PSU	
	Sensing surface	PSU	PSU	PSU	
	Cover	PSU	PSU	PSU	
Connection		M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	
Suggested mating cable		BCC M313-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050	

With level sensors in a MicroLevel housing, an adjustment is only necessary in exceptional cases. The potentiometer has a setting path of 270° for adjustment.

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



The **reverse mounting** in a tube of any desired length for fashioning "point-switching" rod sensors. The sealing can be done with an O-ring or with a flat seal.

Capacitive Sensors for Level Detection

Standard sensors, cylinder designs, DC 3-wire, M18×1, R 3/8", NPTF 3/8"



Pressure rated to 10 bar



Pressure rated to 10 bar



Pressure rated to 10 bar

M18×1	R 3/8"	NPTF 3/8"
Not flush	Not flush	Not flush
Level adjustable	Level adjustable	Level adjustable
BCS006H ①	BCS006M ①	BCS00A6 ①
BCS S01T401-PSCFNG-KM16-T02	BCS S02T401-PSCFNG-KM16-T02	BCS S03T401-PSCFNH-KM16-T02
BCS006J ⑤	BCS006N ⑤	BCS00A7 ⑤
BCS S01T401-POCFNG-KM16-T02	BCS S02T401-POCFNG-KM16-T02	BCS S03T401-POCFNH-KM16-T02
BCS006K ③	BCS006P ③	BCS00A8 ③
BCS S01T401-NSCFNG-KM16-T02	BCS S02T401-NSCFNG-KM16-T02	BCS S03T401-NSCFNH-KM16-T02
BCS006L ⑧	BCS006R ⑧	BCS00A9 ⑧
BCS S01T401-NOCFNG-KM16-T02	BCS S02T401-NOCFNG-KM16-T02	BCS S03T401-NOCFNH-KM16-T02
10...35 V DC	10...35 V DC	10...35 V DC
≤ 2.7 V	≤ 2.7 V	≤ 2.7 V
75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA
≤ 10 mA	≤ 10 mA	≤ 10 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-30...+125 °C	-30...+125 °C	-30...+125 °C
5 Hz	5 Hz	5 Hz
No/Yellow LED	No/Yellow LED	No/Yellow LED
IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)
Cast aluminum	Cast aluminum	Cast aluminum
PTFE	PTFE	PTFE
Cast aluminum	Cast aluminum	Cast aluminum
Screw terminals	Screw terminals	Screw terminals



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

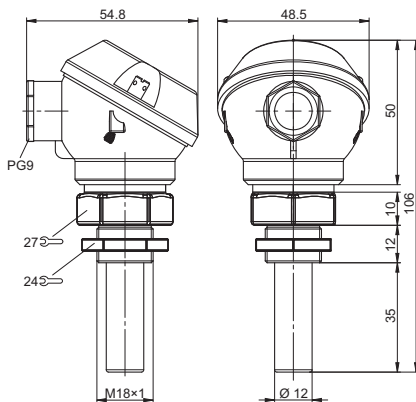
Standard sensors

SmartLevel sensors

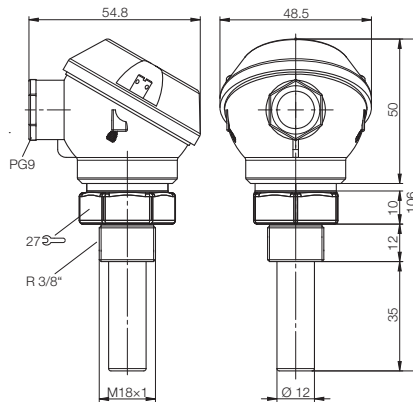
Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

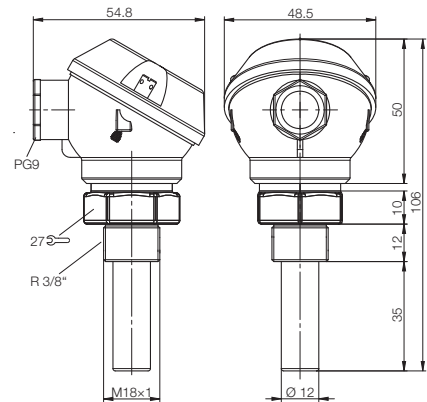
Accessories for capacitive sensors



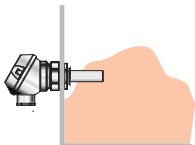
Gasket not included in the delivery.



Gasket not included in the delivery.



Gasket not included in the delivery.



Adjustment:

The adjustment is carried out with a potentiometer. The objective is to set a middle value between the turn-on and turn-off point when the sensor is damped. In individual cases when temperature swings are great and very sticky media are used a slight readjustment may be necessary. Otherwise, our adjustment instructions for non-flush mount sensor versions apply.

SmartLevel sensors exceed limits

Simply describing the output of SmartLevel sensors as level sensors for reliable sensing of liquids and conductive media does not do its strengths justice. This is because SmartLevel can do much more – when all other capacitive sensors reach their limit.

SmartLevel

- Compensate for moisture, foam and deposits.
- Penetrate wall thicknesses of glass and plastic even over 10 mm.
- Detect aqueous to highly conductive media.
- Have a chemically resistant housing made of PTFE.

In short: SmartLevel sensors exceed limits. This is because they are the solution in applications that, until now, were extremely difficult.

SmartLevel sensors also reduce costs, because they

- Provide freedom from cleaning in most applications
- Reduced use of materials
- Only require low construction effort (for example, bypass tubes are omitted)

In this way, SmartLevel sensors optimize the production process and increase the application security.



SmartLevel sensors are assigned to fluid sensors, which we label in orange.



Size		
Installation type		
Rated switching distance s_n		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
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/output miswiring protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f		
Output function indicator		
Degree of protection as per IEC 60529		
Material	Housing	
	Sensing surface	
	Cover	
Connection		
Suggested mating cable		

① = Connection-Switching diagram, see page 849.



SmartLevel sensors take off

Airbus is equipping the rest rooms in their 4-engine large-body A380 with a mixer tap. The heart of this exclusive system in the elegant Airbus design are compact SmartLevel capacitive sensors. These enable passengers to conveniently select the desired water temperature with the assistance of an LED indicator. The show-stopper: sensing errors are impossible, since SmartLevel sensors ignore clinging dirt, liquid films and soap foam. Touching the faucet triggers a switching operation, even if a wet paper towel covers it.

Capacitive Sensors for Level Detection

SMART^{LEVEL}, cylinder design, DC 3-wire,
Ø 7 mm, M18×1



SMART^{LEVEL} 15



SMART^{LEVEL} 15



SMART^{LEVEL} 15



SMART^{LEVEL} 15

Ø 7×52 mm	M18×1	M18×1	M18×1
Not flush	Not flush	Not flush	Not flush
Fixed adjustment, media-dependent	Media-dependent	Media-dependent	Media-dependent
BCS009C ①	BCS008T ②	BCS007N ①	BCS008A ①
BCS S20TT01-PSLFAG-ET02	BCS M18VW1-PSCFAG-S49G	BCS M18VW1-PSCFAG-DV02	BCS M18TTI2-PSCFAG-AT02
BCS009E ⑤	BCS008U ⑦	BCS007P ⑤	BCS008C ⑤
BCS S20TT01-POLFAG-ET02	BCS M18VW1-POCFAG-S49G	BCS M18VW1-POCFAG-DV02	BCS M18TTI2-POCFAG-AT02
BCS0088 ③	BCS008W ④	BCS007R ③	BCS008E ③
BCS M30TTH2-NSCFAG-AT02	BCS M18VW1-NSCFAG-S49G	BCS M18VW1-NSCFAG-DV02	BCS M18TTI2-NSCFAG-AT02
BCS0089 ⑧	BCS008Y ⑩	BCS007T ⑧	BCS008F ⑧
BCS M30TTH2-NOCFAG-AT02	BCS M18VW1-NOCFAG-S49G	BCS M18VW1-NOCFAG-DV02	BCS M18TTI2-NOCFAG-AT02
10...30 V DC	10...35 V DC	10...35 V DC	10...35 V DC
≤ 1.5 V	≤ 1.8 V	≤ 1.8 V	≤ 1.8 V
75 V DC	75 V DC	75 V DC	75 V DC
50 mA	300 mA	300 mA	300 mA
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
No/No/No	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
+5...+100 °C	-10...+60 °C	-10...+60 °C	-10...+60 °C
10 Hz	2 Hz	2 Hz	2 Hz
No	Yellow LED	Yellow LED	Red LED
IP 66	IP 64	IP 64	IP 64
PTFE	PVC	PVC	PTFE
PTFE	PVC	PVC	PTFE
PTFE	PVC	PVC	PTFE
2 m PTFE cable, 3×26 AWG	M8 connector, 3-pin	2 m PVC cable, 3×24 AWG	2 m PTFE cable, 3×26 AWG
	BCC M313-0000-10-001-VX43T2-050		



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

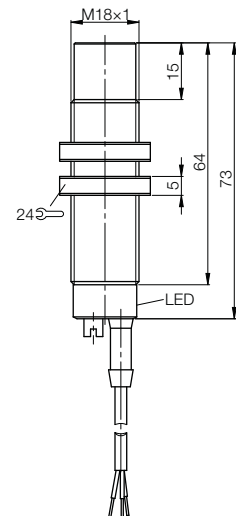
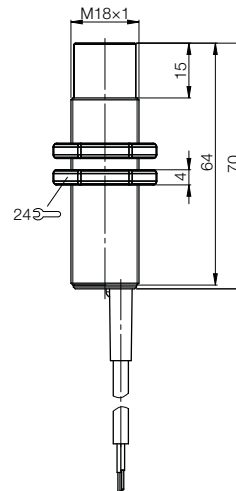
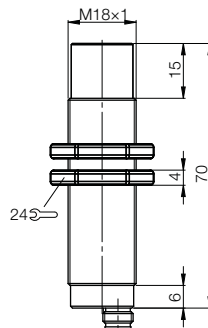
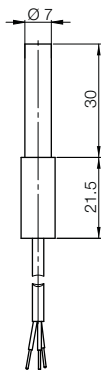
Standard sensors

SmartLevel sensors

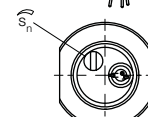
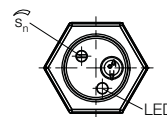
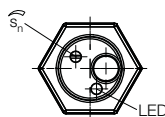
Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



For direct installation in containers:
The non-flush sensors for level detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing surface. Sensors in stainless steel housing meet IP 67 at the sensing surface.



Capacitive Sensors for Level Detection

SMART^{LEVEL}, cylinder design, DC 3-wire,
M30×1.5

SMART^{LEVEL}



SmartLevel sensors are assigned to fluid sensors, which we label in orange.



SMART^{LEVEL} 15



SMART^{LEVEL} 15

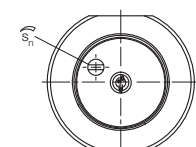
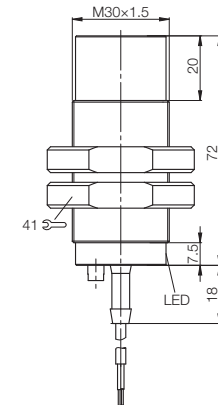
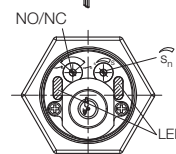
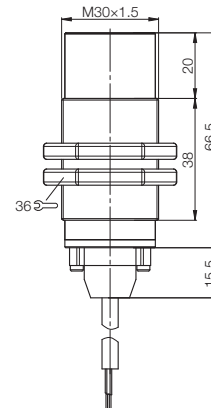
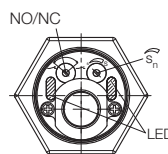
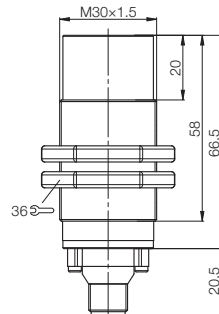


SMART^{LEVEL} 15

Size		M30×1.5	M30×1.5	M30×1.5
Installation type		Not flush	Not flush	Not flush
Rated switching distance s_n		Media-dependent	Media-dependent	Media-dependent
PNP, NO	Ordering code			BCS0086 ^①
	Part number			BCS M30TTH2-PSCFAG-AT02
PNP, NC	Ordering code			BCS0087 ^⑤
	Part number			BCS M30TTH2-POCFAG-AT02
PNP, NO/NC, switch selectable	Ordering code	BCS007Y ^②	BCS007U ^①	
	Part number	BCS M30BBM2-PPCFAG-S04G	BCS M30BBM3-PPCFAG-EP02	
NPN, NO	Ordering code			BCS0088 ^③
	Part number			BCS M30TTH2-NSCFAG-AT02
NPN, NC	Ordering code			BCS0089 ^⑧
	Part number			BCS M30TTH2-NOCFAG-AT02
NPN, NO/NC, switch selectable	Ordering code	BCS007Z ^⑥	BCS007W ^③	
	Part number	BCS M30BBM2-NPCFAG-S04G	BCS M30BBM3-NPCFAG-EP02	
Supply voltage U_B		10...35 V DC	10...35 V DC	10...35 V DC
Voltage drop U_d at I_B		≤ 1.8 V	≤ 1.8 V	≤ 1.8 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC
Output current max.		300 mA	300 mA	300 mA
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA	≤ 20 mA
Polarity reversal protected/output miswiring protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Ambient temperature T_a		-10...+60 °C	-10...+60 °C	-10...+60 °C
Switching frequency f		2 Hz	2 Hz	2 Hz
Supply voltage/Output function indicator		Green LED/Yellow LED	Green LED/Yellow LED	No/Red LED
Degree of protection as per IEC 60529		IP 64	IP 64	IP 64
Material	Housing	PBT	PBT	PTFE
	Sensing surface	PBT	PBT	PTFE
	Cover	PBT, PE	PBT, PE	PTFE
Connection		M12 connector, 4-pin	2 m PUR cable, 3×22 AWG	2 m PTFE cable, 3×24 AWG
Suggested mating cable		BCC M415-0000-1A-003-PX44T2-050		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors with Special Properties

SMART^{LEVEL} 500+, cylinder designs, DC 3-wire, M30×1.5, Ø 30 mm

- Detecting highly conductive acids, such as sulphuric or hydrochloric acid, through plastic or glass containers that are up to 10 mm thick
- Reliable detection of levels in food items, such as ketchup or mustard, despite heavy deposits
- Detecting concentrated cleaning agents in plastic containers



SmartLevel sensors are assigned to fluid sensors, which we label in orange.

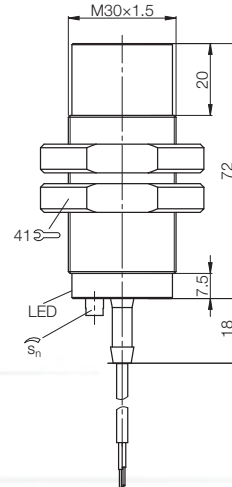


SMART^{LEVEL} 500+

Industrial wastewater
Disinfection agent
Table salt solution
Ketchup/mustard
Phosphoric acid (10 %)
Sulfuric acid (10 %)
Calcium chloride (30 %)
Hydrochloric acid (40 %)
Nitric acid (12 %)
SMART^{LEVEL} 500+ Approx. 50...500 mS and greater

Size	M30×1.5	
Installation type	Not flush	
Rated switching distance s_n	Media-dependent	
PNP/NPN and NO/NC, wiring selected	Ordering code	BCS00TZ ①
	Part number	BCS M30TTH2-GPCFVG-AT02
Supply voltage U_B	10...30 V DC	
Voltage drop U_d at I_o	≤ 2 V	
Rated insulation voltage U_i	75 V DC	
Output current max.	100 mA	
No-load supply current I_o max.	< 15 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	No/No/Yes	
Ambient temperature T_a	-10...+60 °C	
Switching frequency f	5 Hz	
Supply voltage/Output function indicator	No/Red LED	
Degree of protection as per IEC 60529	IP 67	
Material	Housing	PTFE
	Sensing surface	PTFE
	Cover	PTFE
Connection	2 m PTFE cable, 3×0.2 mm ²	

① = Connection-Switching diagram, see page 849.
Additional cable lengths on request.



Capacitive sensors

Capacitive sensors for object detection

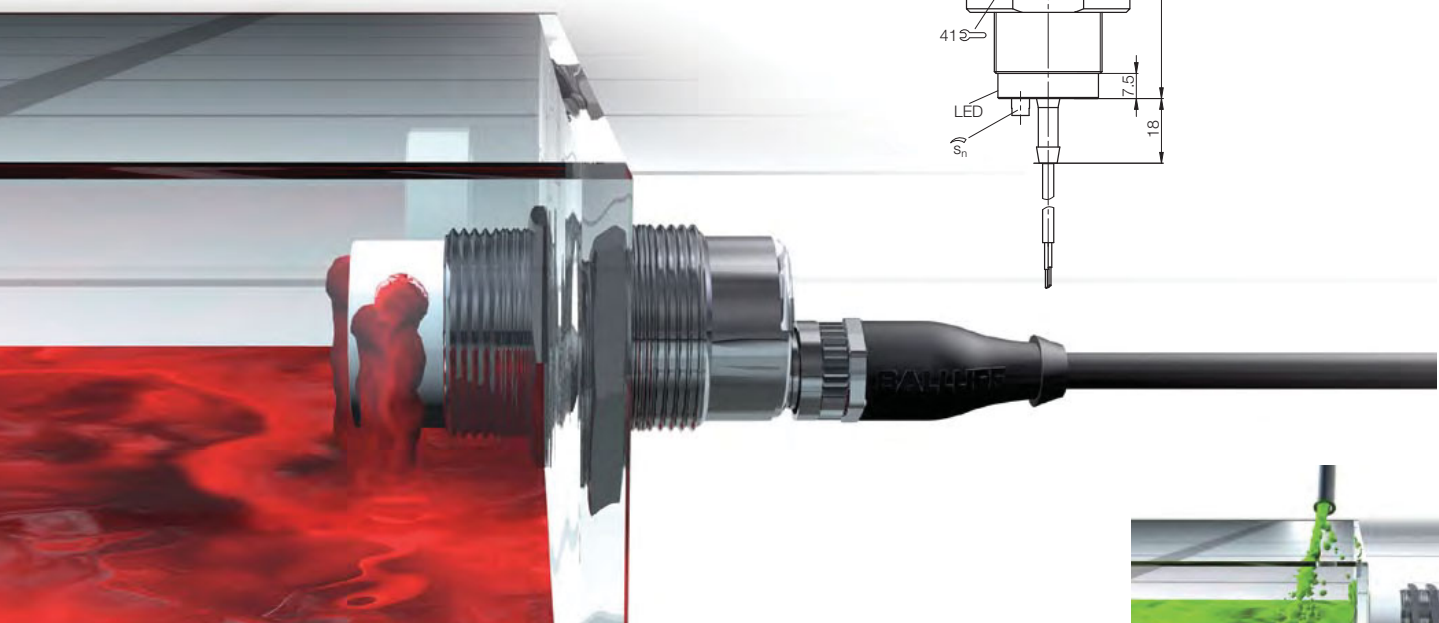
Capacitive sensors for level detection

Standard sensors

SmartLevel sensors

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



Capacitive Sensors for Level Detection

SMART^{LEVEL}, cylinder design, DC 3-wire,
M12×1, G 1/4", NPT 1/4" MicroLevel



SmartLevel sensors are
assigned to fluid sensors,
which we label in orange.



SMART^{LEVEL} 15



SMART^{LEVEL} 15

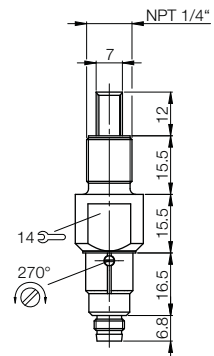
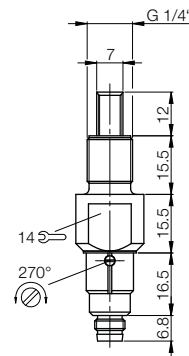
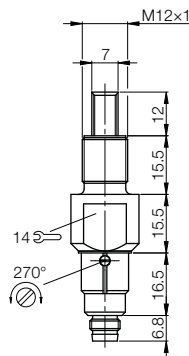


SMART^{LEVEL} 15

Size	M12×1 MicroLevel	G 1/4" MicroLevel	NPT 1/4" MicroLevel
Installation type	Not flush	Not flush	Not flush
Rated switching distance s_n	Media-dependent	Media-dependent	Media-dependent
PNP/NPN and NO/NC, wiring selected	Ordering code Part number	Ordering code Part number	Ordering code Part number
Supply voltage U_B	10...35 V DC	10...35 V DC	10...35 V DC
Voltage drop U_d at I_e	≤ 3 V	≤ 3 V	≤ 3 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Output current max.	50 mA	50 mA	50 mA
No-load supply current I_0 max.	≤ 20 mA	≤ 20 mA	≤ 20 mA
Polarity reversal protected/output miswiring protected/ short-circuit protected	No/No/Yes	No/No/Yes	No/No/Yes
Ambient temperature T_a	-10...+105 °C	-10...+105 °C	-10...+105 °C
Switching frequency f	5 Hz	5 Hz	5 Hz
Supply voltage/Output function indicator	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED
Degree of protection as per IEC 60529	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)
Material	Housing	PSU	PSU
	Sensing surface	PSU	PSU
	Cover	PSU	PSU
Connection	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
Suggested mating cable	BCC M313-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050

With level sensors in the MicroLevel housing,
an adjustment is only necessary in exceptional cases.
The potentiometer has a setting path of 270°
and has to be carefully adjusted.

For the protective covering
(M18 or G 1/2") for
MicroLevel sensors,
see Section Accessories,
page 848.



① = Connection-Switching diagram, see page 849.



Capacitive
sensors

Capacitive
sensors for
object detection

Capacitive
sensors for
level detection

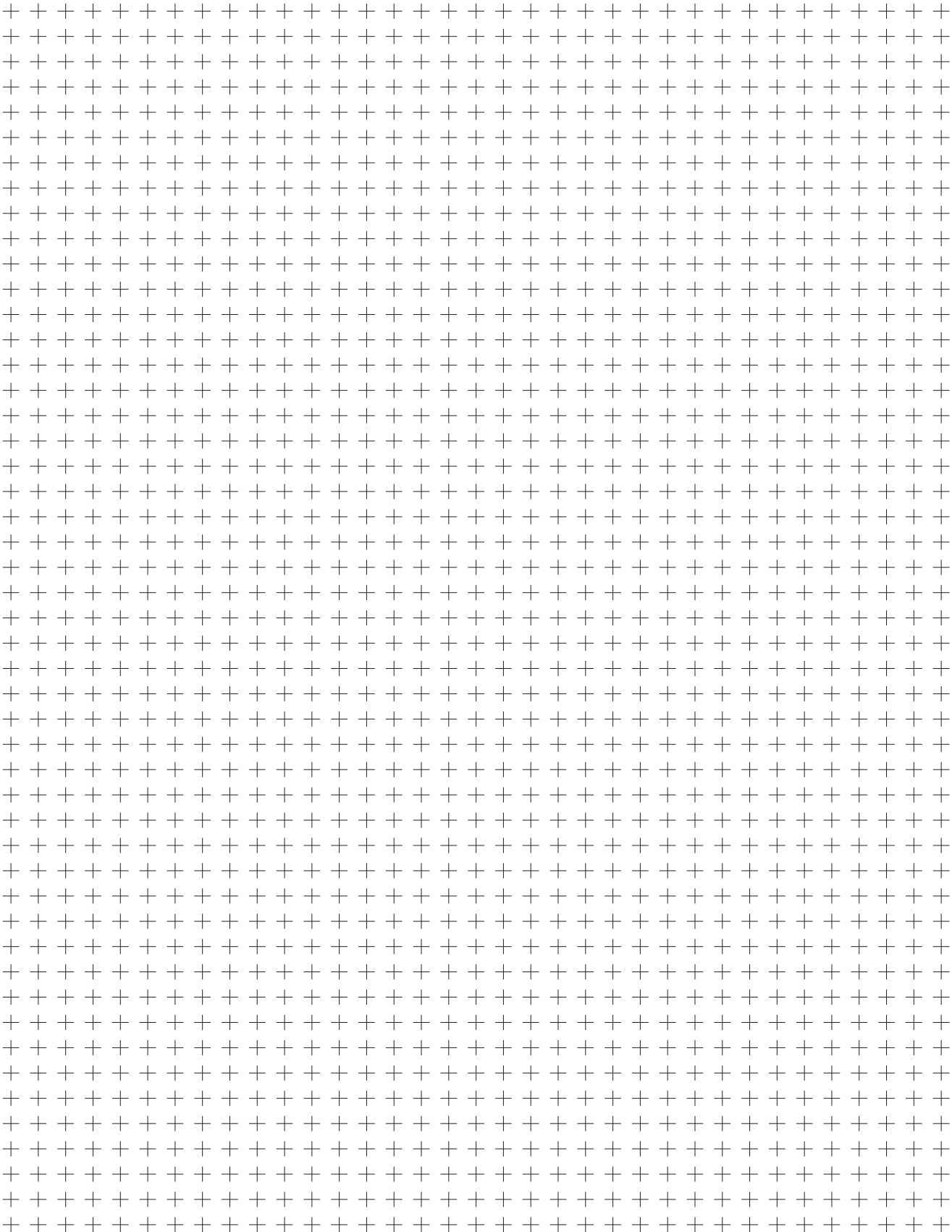
Standard
sensors

SmartLevel
sensors

Capacitive
sensors
with special
properties

Capacitive
sensors for
analog distance
measurement

Accessories
for capacitive
sensors



Capacitive Sensors for Level Detection

SMARTLEVEL, cylinder design, DC 3-wire,
M12×1, G 1/4", NPT 1/4" MicroLevel

SMARTLEVEL



SmartLevel sensors are assigned to fluid sensors, which we label in orange.



SMARTLEVEL 15

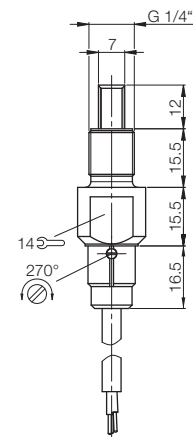
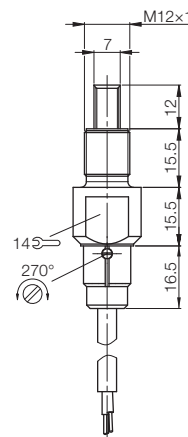


SMARTLEVEL 15

Size	M12×1 MicroLevel	G 1/4" MicroLevel
Installation type	Not flush	Not flush
Rated switching distance s_n	Media-dependent	Media-dependent
PNP/NPN and NO/NC, wiring selected	Ordering code BCS008Z ^①	Ordering code BCS0090 ^①
Part number	BCS S40SS01-GPCFAG-EP02	BCS S40SS02-GPCFAG-EP02
Supply voltage U_B	10...35 V DC	10...35 V DC
Voltage drop U_d at I_o	≤ 3 V	≤ 3 V
Rated insulation voltage U_i	75 V DC	75 V DC
Output current max.	50 mA	50 mA
No-load supply current I_o max.	≤ 20 mA	≤ 20 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	No/No/Yes	No/No/Yes
Ambient temperature T_a	-10...+105 °C	-10...+105 °C
Switching frequency f	5 Hz	5 Hz
Supply voltage/Output function indicator	Green LED/Yellow LED	Green LED/Yellow LED
Degree of protection as per IEC 60529	IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 67 (sensing surface: IP 68 at max. 10 bar)
Material	Housing PSU	PSU
	Sensing surface PSU	PSU
	Cover PSU	PSU
Connection	2 m PUR cable, 3x22 AWG	2 m PUR cable, 3x22 AWG
Suggested mating cable		

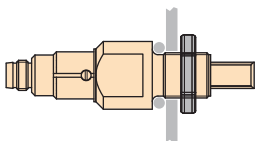
With level sensors in the MicroLevel housing, an adjustment is only necessary in exceptional cases. The potentiometer has a setting path of 270° and has to be carefully adjusted.

For the protective covering (M18 or G 1/2") for MicroLevel sensors, see Section Accessories, page 848.



① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



The **standard mounting** uses through-holes with included nut. This can be ignored when threaded holes are used or serve as additional security. Sealing is done with an O-ring or gasket.

Capacitive Sensors for Level Detection

SMART^{LEVEL}, cylinder design, DC 3-wire,
M12×1, G 1/4", NPT 1/4" MicroLevel



SMART^{LEVEL} 15



Reverse installation
SMART^{LEVEL} 15

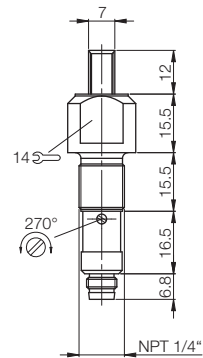
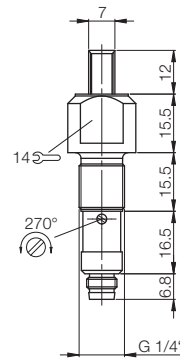
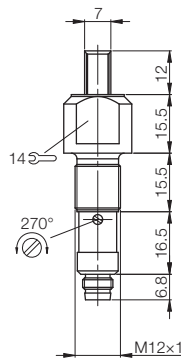
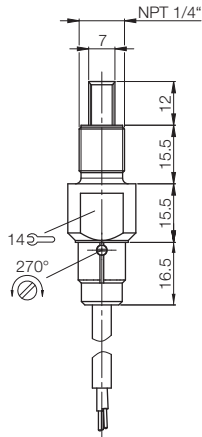


Reverse installation
SMART^{LEVEL} 15



Reverse installation
SMART^{LEVEL} 15

NPT 1/4" MicroLevel	M12×1 MicroLevel	G 1/4" MicroLevel	NPT 1/4" MicroLevel
Not flush	Not flush	Not flush	Not flush
Media-dependent	Media-dependent	Media-dependent	Media-dependent
BCS0091 ⁽¹⁾	BCS0098 ⁽¹⁾	BCS0099 ⁽¹⁾	BCS009A ⁽¹⁾
BCS S40SS03-GPCFAG-EP02	BCS S42SS01-GPCFAG-S49G	BCS S42SS02-GPCFAG-S49G	BCS S42SS03-GPCFAG-S49G
10...35 V DC	10...35 V DC	10...35 V DC	10...35 V DC
≤ 3 V	≤ 3 V	≤ 3 V	≤ 3 V
75 V DC	75 V DC	75 V DC	75 V DC
50 mA	50 mA	50 mA	50 mA
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
No/No/Yes	No/No/Yes	No/No/Yes	No/No/Yes
-10...+105 °C	-10...+105 °C	-10...+105 °C	-10...+105 °C
5 Hz	5 Hz	5 Hz	5 Hz
Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED	Green LED/Yellow LED
IP 67 (sensing surface: IP 68 at max. 10 bar)	IP 64 (sensing surface: IP 68 at max. 10 bar)	IP 64 (sensing surface: IP 68 at max. 10 bar)	IP 64 (sensing surface: IP 68 at max. 10 bar)
PSU	PSU	PSU	PSU
PSU	PSU	PSU	PSU
PSU	PSU	PSU	PSU
2 m PUR cable, 3x22 AWG	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
	BCC M313-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

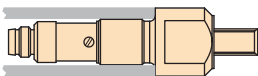
Standard sensors

SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



Reverse mounting in a tube of any desired length for fashioning "point-switching" rod sensors. The sealing can be done with an O-ring or with a flat seal.

Capacitive Sensors for Level Detection

SMARTLEVEL, disk designs, DC 3-wire,

Ø 50 mm

SMARTLEVEL

The SmartLevel capacitive sensor is always well put to use if applications are difficult to find solutions for, whether in the semiconductor industry, in special machine design, in the food and packaging segment or in industrial cleaning technology. For conductive media, the SmartLevel 15 is recommended. And in highly conductive media, SmartLevel 50 is best used.

Wafer processing (semiconductor industry)

During wafer processing, SmartLevel monitors the overflow of hydrochloric acid through a container wall, so that it can come into contact with condensate containing salt. The highly conductive deposit of the condensate does not, however, impede it.

Cold deformation (oil spraying system in special machine design)

Likewise, the SmartLevel ignores highly conductive graphite deposits when it reliably measures the level of an oil-graphite mixture through the wall of a plastic container in special machine construction. Through this, it is ensured that the mixture can be continuously sprayed on metal plates, in order to better be able to bend it during cold deformation.

Filling bottles of body lotion (packaging industry)

The SmartLevel is suited for detecting conductive, paste-type media which can cause heavier deposits. Therefore, it is ideally used during filling of bottles of body lotion. Through a 10 mm-thick inspection glass, it monitors their fill level in stainless steel containers with absolute reliability and, through its external positioning, also reduces the effort for cleaning.

Brining pretzels (food industry)

SmartLevel also finds use directly in foaming media. For example, in the stainless steel container of a system in which pretzels are sprayed with caustic soda lye. In doing so, it controls the minimum-maximum fill level of the caustic soda lye with absolute reliability.

Cleaning metal parts (industrial cleaning technology)

SmartLevel controls the fill level of a supply tank for cleaning metal parts, because it can compensate for foam, grease and film. Water spray and temperatures up to 105 °C do not impede it. In addition, its PTFE sleeve protects it from aggressive media.



SmartLevel sensors are assigned to fluid sensors, which we label in orange.



Size		
Installation type		
Rated switching distance s_n		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
PNP, NO/NC, switch selectable	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
NPN, NO/NC, switch selectable	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_o		
Rated insulation voltage U_i		
Output current max.		
No-load supply current I_o max.		
Polarity reversal protected/output miswiring protected/short-circuit protected		
Ambient temperature T_a		
Switching frequency f		
Output function indicator		
Degree of protection as per IEC 60529		
Material	Housing	
	Sensing surface	
	Cover	
Connection		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Capacitive Sensors for Level Detection

SMART^{LEVEL}, disk designs, DC 3-wire, Ø 50 mm



SMART^{LEVEL} 15



SMART^{LEVEL} 15



SMART^{LEVEL} 50



SMART^{LEVEL} 50

Ø 50×10 mm	Ø 50×10 mm	Ø 50×10 mm	Ø 50×10 mm
Flush	Flush	Flush	Flush
Media-dependent	Media-dependent	Media-dependent	Media-dependent
	BCS0080 ①	BCS00CK ①	BCS00UW ①
	BCS D50TT05-PSCFAC-ET02	BCS D50O006-PSFSC-EV02	BCS D50TT06-PSCFSC-ET02
	BCS0081 ⑤	BCS00CM ⑤	BCS00UY ⑤
	BCS D50TT05-POCFAC-ET02	BCS D50O006-POFSC-EV02	BCS D50TT06-POCFSC-ET02
BCS0084 ①			
BCS D50O004-PPCFAC-EV02			
	BCS0082 ③	BCS00HE ③	BCS00WO ③
	BCS D50TT05-NSCFAC-ET02	BCS D50O006-NSFSC-EV02	BCS D50TT06-NSCFSC-ET02
	BCS0083 ⑧	BCS00C1 ⑧	BCS00UZ ⑧
	BCS D50TT05-NOCFAC-ET02	BCS D50O006-NOFSC-EV02	BCS D50TT06-NOCFSC-ET02
BCS0085 ③			
BCS D50O004-NPCFAC-EV02			
10...35 V DC	10...35 V DC	10...30 V DC	10...30 V DC
≤ 1.8 V	≤ 1.8 V	≤ 1.8 V	≤ 1.8 V
75 V DC	75 V DC	75 V DC	75 V DC
300 mA	300 mA	300 mA	300 mA
≤ 20 mA	≤ 20 mA	≤ 10 mA	≤ 10 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
-10...+60 °C	-10...+60 °C	-10...+60 °C	-10...+60 °C
2 Hz	2 Hz	2 Hz	2 Hz
Yellow LED	Red LED	Yellow LED	Red LED
IP 67	IP 67	IP 67	IP 67
POM	PTFE	POM	PTFE
POM	PTFE	POM	PTFE
POM	PTFE	POM	PTFE
2 m PVC cable, 3×24 AWG	2 m PTFE cable, 3×26 AWG	2 m PVC cable, 3×24 AWG	2 m PTFE cable, 3×26 AWG



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

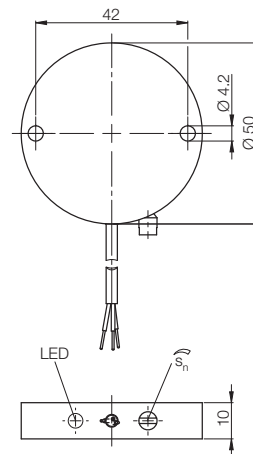
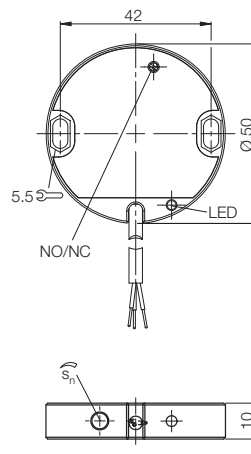
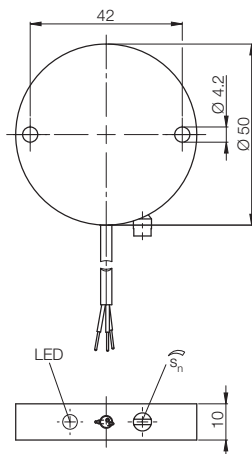
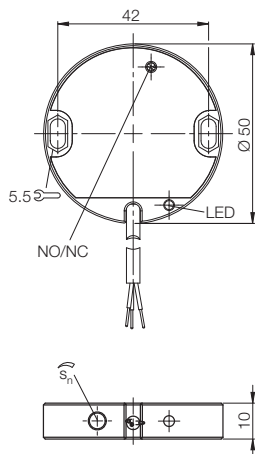
Standard sensors

SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



Capacitive Sensors for Level Detection

SMARTLEVEL, block design, DC 3-wire,
16×34×8 mm Micro-Box

SMARTLEVEL



SmartLevel sensors are
assigned to fluid sensors,
which we label in orange.



SMARTLEVEL 15

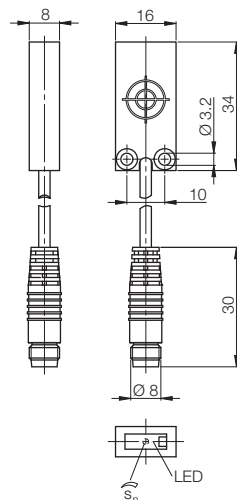


SMARTLEVEL 15

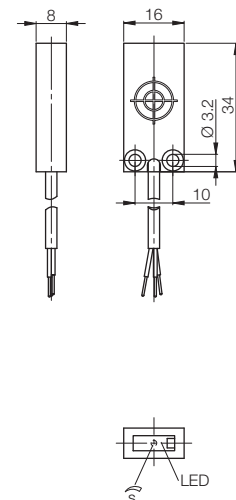
Size	16×34×8 mm Micro-Box		16×34×8 mm Micro-Box
Installation type	Flush		Flush
Rated switching distance s_n	Media-dependent		Media-dependent
PNP NO	Ordering code	BCS008M ②	BCS008H ①
	Part number	BCS R08RR01-PSMFAC-EP00,2-GS49	BCS R08RR01-PSMFAC-EP02
PNP NC	Ordering code	BCS008N ⑦	BCS008J ⑤
	Part number	BCS R08RR01-POMFAC-EP00,2-GS49	BCS R08RR01-POMFAC-EP02
NPN NO	Ordering code	BCS008P ④	BCS008K ③
	Part number	BCS R08RR01-NSMFAC-EP00,2-GS49	BCS R08RR01-NSMFAC-EP02
NPN NC	Ordering code	BCS008R ⑩	BCS008L ⑧
	Part number	BCS R08RR01-NOMFAC-EP00,2-GS49	BCS R08RR01-NOMFAC-EP02
Supply voltage U_B	12...30 V DC		12...30 V DC
Voltage drop U_d at I_o	≤ 1.5 V		≤ 1.5 V
Rated insulation voltage U_i	75 V DC		75 V DC
Output current max.	50 mA		50 mA
No-load supply current I_o max.	≤ 10 mA		≤ 10 mA
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes		Yes/Yes/Yes
Ambient temperature T_a	-30...+70 °C		-30...+70 °C
Switching frequency f	2 Hz		2 Hz
Output function indicator	Yellow LED		Yellow LED
Degree of protection as per IEC 60529	IP 67		IP 67
Material	Housing	PP	PP
	Sensing surface	PP	PP
	Cover	PP	PP
Connection	0.2 m PUR cable, with M8 3-pin connector		2 m PUR cable, 3×26 AWG
Suggested mating cable	BCC M313-0000-10-001-VX43T2-050		

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Mounting frame included in delivery.



Mounting frame included in delivery.

Capacitive Sensors for Level Detection

SMARTLEVEL, block design, DC 3-wire,
40×40×10 mm Uniflat



SmartLevel sensors are assigned to fluid sensors, which we label in orange.



SMARTLEVEL 15



SMARTLEVEL 15

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/NPN and NO/NC, wiring selected	Ordering code BCS00TP ^①	
	Part number BCS Q40BBAA-GPCFAC-EP02	
PNP NO	Ordering code	BCS00U8 ^②
	Part number	BCS Q40BBAA-PSCFAC-EP00,3-GS49
PNP NC	Ordering code	BCS00U7 ^⑥
	Part number	BCS Q40BBAA-POCFAC-EP00,3-GS49
Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d at I_B	≤ 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/output miswiring protected/short-circuit protected	No/No/Yes	Yes/Yes/Yes
Ambient temperature T_a	-5...+85 °C	-5...+85 °C
Switching frequency f	10 Hz	10 Hz
Supply voltage/Output function indicator	Green LED/Yellow LED	Green LED/Yellow LED
Degree of protection as per IEC 60529	IP 67	IP 67
Material	Housing PBT	PBT
	Sensing surface PBT	PBT
	Cover PBT	PBT
Connection	2 m PUR cable, 3×26 AWG	0.3 m PUR cable with M8 3-pin connector
Suggested mating cable		BCC M313-0000-10-001-PX43T2-050



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Standard sensors

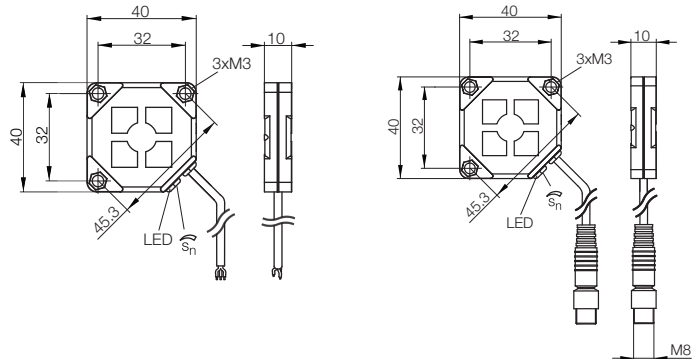
SmartLevel sensors

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

① = Connection-Switching diagram, see page 849.



The new capacitive SmartLevel sensors in the Uniflat design detects conductive media through non-metallic container walls with a thickness up to 10 mm.

Installation is quick and easy. This is because they can be screwed on or attached to bypass tubes with cable ties. The connection is made using a 2 m cable or a short pigtail line with an M8 plug.

The codable output function provides PNP or NPN and normally open or normally closed functionality.

SmartLevel

- Suppress foam and deposits
- Easy to install on tubes with cable ties
- Regular cleaning can be omitted



Capacitive Sensors

Capacitive sensors with special properties

Balluff capacitive sensors are available in high temperature and pressure ratings, stainless steel and Teflon housings for harsh environments, a wide supply voltage range and especially compact designs are all available in the BCS family. Capacitive adhesive sensors adapt to the shape of the housing with great flexibility.





Capacitive Sensors with Special Properties

Contents

Capacitive sensors with special properties

High temperature rated sensors	828
High pressure rated sensor	830
Flexible adhesive sensor	831
AC/DC 2-wire sensors	832



Capacitive Sensors with Special Properties

High temperature rated sensors, cylinder designs, DC 3-wire

+250 °C

Balluff high-temperature capacitive sensors can be used for level detection of liquid, paste-like or powdery media at high temperatures up to 250 °C. To withstand such extreme conditions, the housing of the high-temperature rated sensors is made of stainless steel and the sensor heads of PTFE. The sensors are also used with a special Triax sensor cable and a separate amplifier.



Size		
Installation type		
Rated switching distance s_n		
With sensor amplifier	Ordering code	
	Part number	
Supply voltage U_B		
Ambient temperature T_a		
Degree of protection as per IEC 60529		
Material	Housing	
	Sensing surface	
	Cover	
Connection		

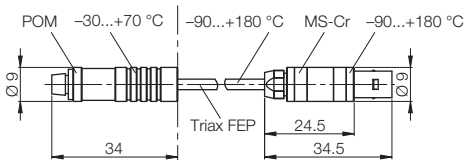
Sensor amplifiers for capacitive high pressure rated sensors can be found on page 841.



Additional cable lengths on request.

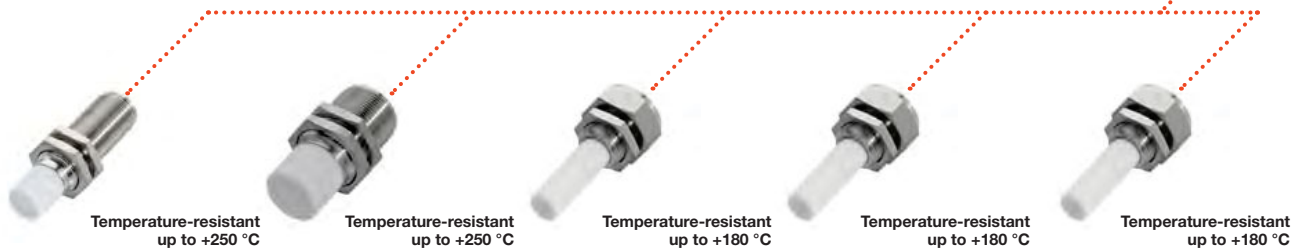


Description	Connectors for high-temperature sensors
Ordering code	BCC04JW
Part number	BCC Z003-020
Ambient temperature T_a	See drawing
Degree of protection as per IEC 60529	IP 54
Connection	2 m Triax FEP



Capacitive Sensors with Special Properties

High temperature rated sensors, cylinder designs, DC 3-wire, M18, M30, R 3/8", NPTF 3/8"



M18x1	M30x1.5	M18x1	R 3/8"	NPTF 3/8"
Not flush	Not flush	Not flush	Not flush	Not flush
1...10 mm	1...20 mm	Level adjustable	Level adjustable	Level adjustable
BCS00A1	BCS00A2	BCS00A3	BCS00A4	BCS00A5
BCS M18T4H1-XXS10H-SZ02-T08	BCS M30T4G1-XXS20H-SZ02-T08	BCS S10T401-XXSFNC-SZ02-T07	BCS S10T402-XXSFNC-SZ02-T07	BCS S10T403-XXSFNC-SZ02-T07
4...8 V DC	4...8 V DC	4...8 V DC	4...8 V DC	4...8 V DC
-180...+250 °C	-180...+250 °C	-10...+180 °C	-10...+180 °C	-10...+180 °C
IP 54	IP 54	IP 54 (sensing surface: IP 68 at max. 6 bar)	IP 54 (sensing surface: IP 68 at max. 6 bar)	IP 54 (sensing surface: IP 68 at max. 6 bar)
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PTFE	PTFE	PTFE	PTFE	PTFE
PTFE, MS-Cr	PTFE, MS-Cr	PTFE, MS-Cr	PTFE, MS-Cr	PTFE, MS-Cr
Triax sensor cable	Triax sensor cable	Triax sensor cable	Triax sensor cable	Triax sensor cable



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

High temperature rated sensors

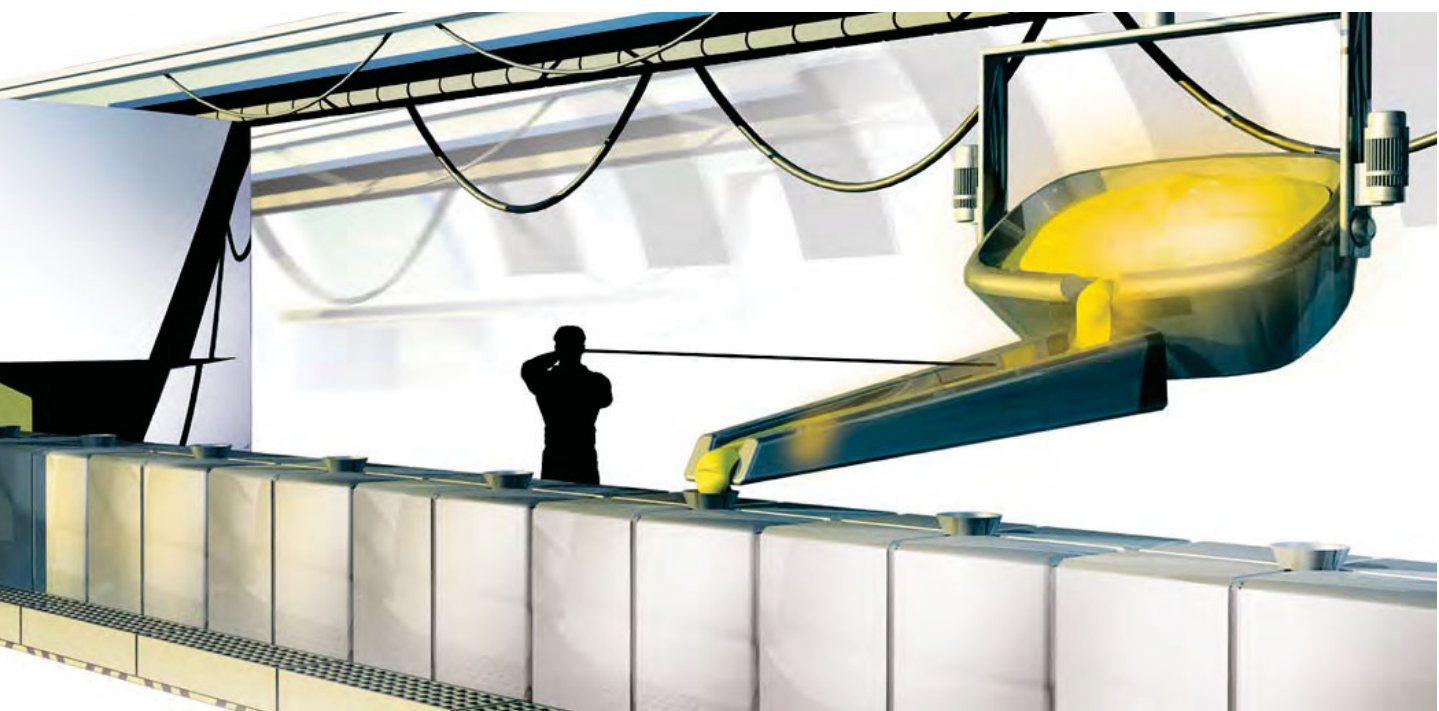
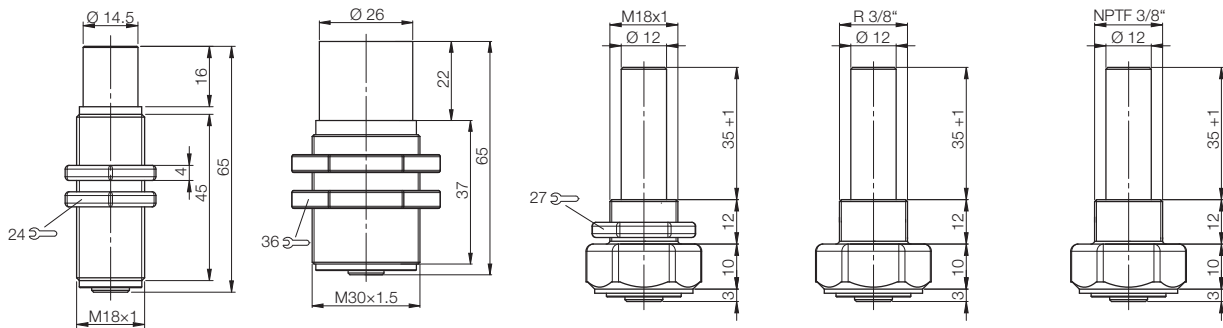
High pressure-resistant sensors

Adhesive sensors

AC/DC 2-wire sensors

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors



Capacitive Sensors with Special Properties

High pressure rated sensors, cylinder designs, DC 3-wire, M12

up to 150 bar



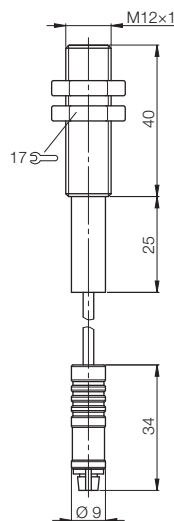
Pressure rated to 150 bar

Size	M12×1	
Installation type	Flush	
Rated switching distance s_n	1 mm	
With sensor amplifier	Ordering code	BCS00CR
	Part number	BCS M12EG2-XXS10B-BT01-GZ01-501
Supply voltage U_B	4...8 V DC	
Rated insulation voltage U_i (protection class)	75 V DC	
Ambient temperature T_a	0...+70 °C	
Degree of protection as per IEC 60529	IP 67	
Material	Housing	Stainless steel
	Sensing surface	PTFE
	Cover	POM
Connection	Triax sensor cable	

Sensor amplifiers for capacitive high pressure rated sensors can be found on page 841.

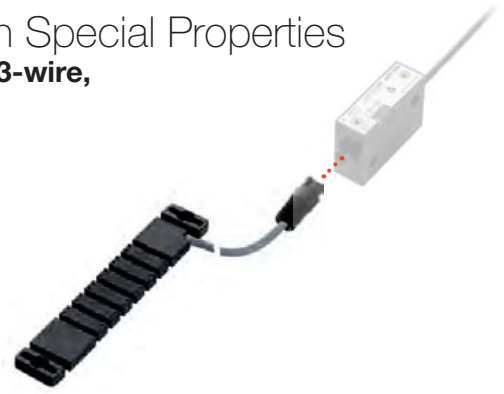


Additional cable lengths on request.



Capacitive Sensors with Special Properties

Flexible adhesive sensor, DC 3-wire, 90×16×4 mm

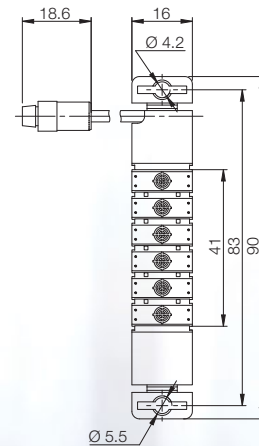


Size	90×16×4 mm	
Installation type	Flush	
Rated switching distance s_n	0...10 mm	
With sensor amplifier	Ordering code	BCS000Y
	Part number	BCS F01CP01-XXS10C-EP02-GZ01-002
Supply voltage U_B	4...8 V DC	
Rated insulation voltage U_i	75 V DC	
Ambient temperature T_a	0...+60 °C	
Switching frequency f	100 Hz	
Degree of protection as per IEC 60529	IP 60	
Material	Housing	PC, PUR
	Sensing surface	PUR
Connection	2 m PUR cable, 26 AWG	

Sensor amplifiers for capacitive adhesive sensors can be found on page 841.



Additional cable lengths on request.



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

High temperature rated sensors

High pressure-resistant sensors

Adhesive sensors

AC/DC 2-wire sensors

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

Capacitive Sensors with Special Properties

**AC/DC, cylinder designs, 2-wire,
M18, M30, Ø 34 mm**

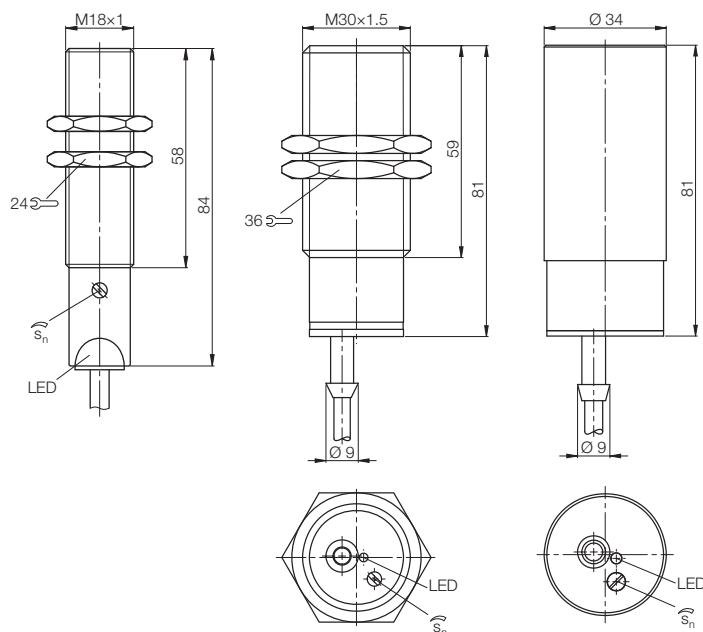
AC/DC



Size	M18x1	M30x1.5	Ø 34 mm
Installation type	Not flush	Not flush	Not flush
Rated switching distance s_n	8 mm	15 mm	20 mm
NO	Ordering code BCS000K ^⑫	BCS000W ^⑫	BCS0007 ^⑫
	Part number BCS M18KM3-UST80G-BV02	BCS M30KN2-UST15G-AV02	BCS G34KN2-UST20G-AV02
NC	Ordering code BCS000J ^⑬	BCS000U ^⑬	BCS0006 ^⑬
	Part number BCS M18KM3-UOT80G-BV02	BCS M30KN2-UOT15G-AV02	BCS G34KN2-UOT20G-AV02
Supply voltage U_B	20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC
Voltage drop U_d at I_e	≤ 6 V	≤ 10 V	≤ 10 V
Rated insulation voltage U_i (protection class)	250 V AC (□)	250 V AC (□)	250 V AC (□)
Output current max.	350 mA (AC)/100 mA (DC)	250 mA (AC)/100 mA (DC)	250 mA (AC)/100 mA (DC)
Short-circuit protected	No	No	No
Ambient temperature T_a	-25...+80 °C	-25...+70 °C	-25...+70 °C
Switching frequency f	25 Hz (AC)/50 Hz (DC)	25 Hz (AC)/40 Hz (DC)	25 Hz (AC)/40 Hz (DC)
Output function indicator	Yellow LED	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 67	IP 65	IP 65
Material			
Housing	PBT	PBT	PBT
Sensing surface	PBT	PBT	PBT
Cover	PBT	PBT	PBT
Connection	2 m PVC cable, 3x22 AWG	2 m PVC cable, 3x22 AWG	2 m PVC cable, 3x20 AWG

① = Connection-Switching diagram, see page 849.

Additional cable lengths on request.



Mounting cuff included in delivery.



Capacitive
sensors

Capacitive
sensors for
object detection

Capacitive
sensors for
level detection

Capacitive
sensors
with special
properties

High
temperature
rated sensors

High pressure-
resistant
sensors

Adhesive
sensors

AC/DC
2-wire
sensors

Capacitive
sensors for
analog distance
measurement

Accessories
for capacitive
sensors



Capacitive Sensors

Capacitive sensors for analog distance measurement

Capacitive sensors for analog distance measurement have a measuring range of 0 to 8 mm. Their current output signal is 4 to 20 mA. They are installed flush and are available in an M18 housing.



Capacitive Sensor for Analog Distance Measurement

Contents

Standard sensor
Cylinder design

837



Capacitive Sensor for Analog Distance Measurement

Object color and surface properties do not influence its measurement results.

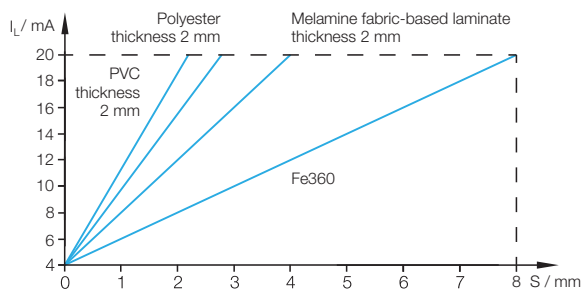
Technical details

- Adjustable measuring range of 0...8 mm
- Flush installation
- Output signal, current 4...20 mA
- Housing M18

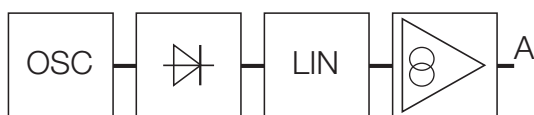
Function

The capacitive distance sensor measures objects that are in its response range without contact. As soon as the object enters it, the electrical field changes its sensing surface and, with it, the output current. In this way, material composition, size and distance of the object to the sensing surface can be determined.

The output signal (4...20 mA) can be adapted to the material using the potentiometer (LED lights green). It is evaluated directly on the analog output of the controller.



Added plus: A blinking LED signals to the user a high-impedance load.



Capacitive Sensor for Analog Distance Measurement Standard sensor, cylinder design, DC 3-wire, M18×1



Distance sensors are assigned the linear position sensing and measurement that we have marked in blue.



Size	M18×1	
Installation type	Flush	
Measuring range	0...8 mm	
Output current	4...20 mA	
PNP/NPN and NO/NC, wiring selected	Ordering code	BCW0001
	Part number	BCW M18B4M1-ICM80C-DV02
Supply voltage U_B	12...35 V DC	
Rated insulation voltage U_i	75 V DC	
No-load supply current I_0 max.	< 17 mA	
Polarity reversal protected/output miswiring protected/short-circuit protected	Yes/Yes/Yes, with load monitoring	
Ambient temperature T_a	-10 to +55 °C	
Switching frequency f	100 Hz (3 dB limit frequency)	
Supply voltage/Output function indicator	Green LED/Red LED	
Degree of protection as per IEC 60529	IP 67	
Material	Housing	Stainless steel
	Sensing surface	PBT
Connection	2 m PVC cable, 3 x 24 AWG	



Capacitive sensors

Capacitive sensors for object detection

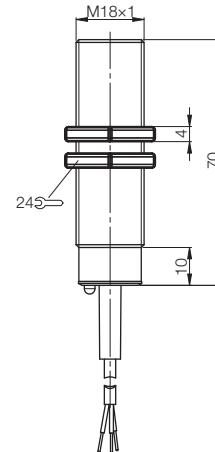
Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

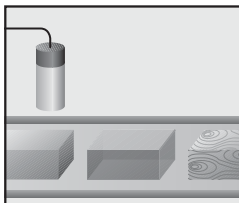
Cylinder designs

Accessories for capacitive sensors

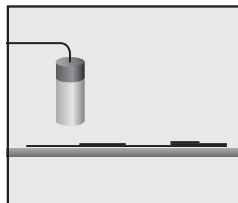


Applications

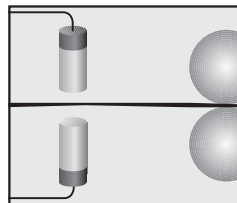
The capacitive analog sensor makes linear evaluation of a position possible for the first time; as soon as an object is located within the sensor's measuring range, a precise output current is produced. The uses shown represent only a fraction of the multifaceted application options provided by the capacitive analog sensor.



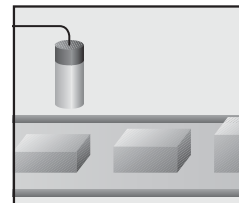
Material selection



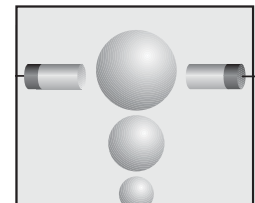
Measuring nonmetallic coating thicknesses



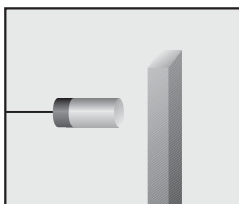
Product thickness monitoring



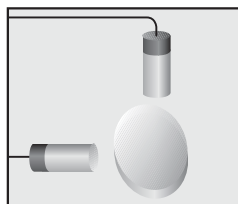
Height measurement



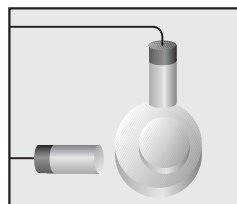
Determining diameters



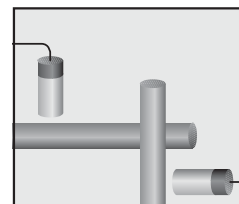
Static/Dynamic movement



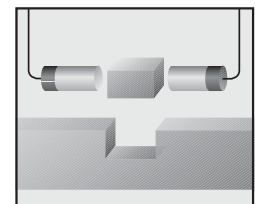
Registering radial runout



Concentricity and eccentricity



Axial and radial concentricity deviation



Monitoring fit



Capacitive Sensors

Special accessories for capacitive sensors

The numerous varieties of capacitive sensors for individual solutions are enhanced by custom matched accessories. For example, there are switching devices for particular flexibility with varying voltage, in order to be able to attach the sensors optimally. Precisely matched mounting elements ensure exact positioning.





Accessories for Capacitive Sensors

Contents

Accessories for capacitive sensors

Sensor amplifiers

841

Adapters

848





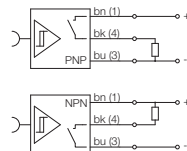
Accessories for capacitive sensors

Sensor amplifier for capacitive sensors without internal amplifier



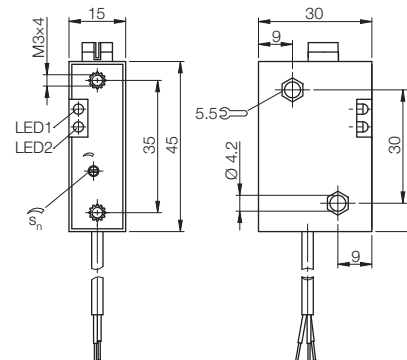
Size	45×30×15 mm	
PNP NO	Ordering code	BAE009E
	Part number	BAE SA-CS-001-PS
PNP NC	Ordering code	BAE009F
	Part number	BAE SA-CS-001-PO
NPN NO	Ordering code	BAE009H
	Part number	BAE SA-CS-001-NS
NPN NC	Ordering code	BAE009J
	Part number	BAE SA-CS-001-NO
Supply voltage U_B		12...35 V DC
Voltage drop U_d at I_o		0.8 V
Rated insulation voltage U_i		75 V DC
Output current max.		300 mA
No-load supply current I_o max.		20 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes
Ambient temperature T_a		-30...+70 °C
Switching frequency f		100 Hz
Supply voltage/Output function indicator		Green LED/Yellow LED
Degree of protection as per IEC 60529		IP 67
Material	Housing	PC
Connection		2 m PUR cable 3×26 AWG

Pin assignments



Function overview

- LED 1: Switching state indicator
- LED 2: Shows supply voltage
- Item 1: Through-hole
Ø 4.2 mm, hexagonal on both sides
for inserting an M3 nut



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors
Sensor amplifiers
Adapters

Accessories for Capacitive Sensors

Sensor amplifier for two capacitive sensors, without internal amplifier

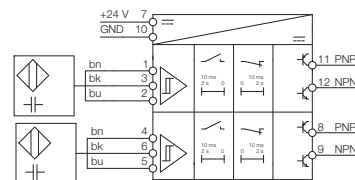
Technical details

- Two separate sensor amplifiers in one housing
- Connection for two capacitive sensors without internal amplifier
- PNP and NPN transistor output
- Function normally open/ normally closed can be switched
- Actuation delay (normally open) selectable 10 ms/2 s
- Turn-off delay (normally closed) selectable 10 ms/2s
- Clamping terminal
- Switching distance for sensors separately adjustable
- Switching status indicated by two separate LEDs

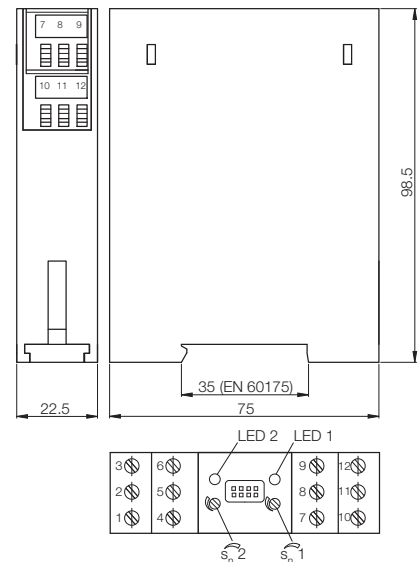
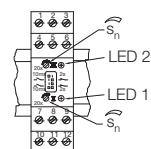


Size	98.5×75×22.5 mm
Installation type	DIN rail (EN 60751)
PNP/NPN and NO/NC, wiring selected	Ordering code BAE009P
Part number	BAE SA-CS-002-YP
Supply voltage U_B	10...35 V DC
Voltage drop U_d at I_o	0.8 V
Rated insulation voltage U_i	75 V DC
Output current max.	300 mA
No-load supply current I_o max.	15 mA
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes
Ambient temperature T_a	-30...+70 °C
Switching frequency f	100 Hz
Output function indicator	Yellow LED
Degree of protection as per IEC 60529	IP 40 (IP 20 at terminal box)
Material	Housing
Connection	max. 14 AWG

Pin assignments



Display



Accessories for Capacitive Sensors

Sensor amplifier with logic for two capacitive sensors without internal amplifier

Sensor amplifier with logic

- Connection for two capacitive sensors without internal amplifier
- Two outputs each PNP/NPN for Q and Q
- Pick-up delay selectable 10 ms/2 s
- Function OR, AND, RS-FF, min/max selectable
- Clamping terminal
- Switching distance for sensors separately adjustable
- Switching status indicated by two separate LEDs

OR function

Output Q active when one or both sensors are damped.

AND function

Output Q active only when both sensors are damped.

RS-FF function

Output Q active when the sensor is first damped on the Set input. This status is retained until the sensor is damped on the Reset input.

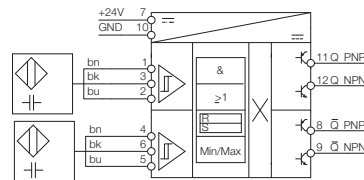
Function min/max

Output Q active when both sensors are damped. The output is only reset when both sensors are undamped.

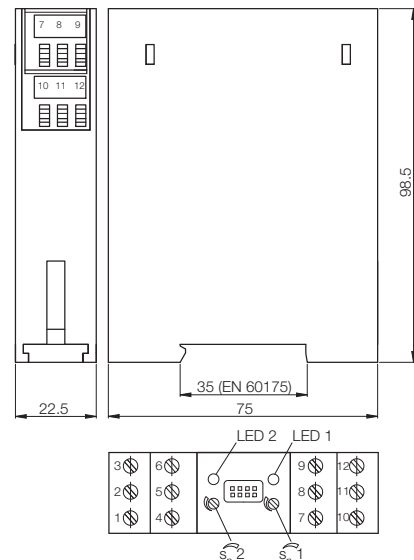
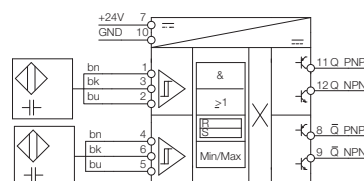


Size	98.5×75×22.5 mm	
Installation type	DIN rail (EN 60751)	
PNP/NPN and NO/NC, wiring selected	Ordering code	BAE009R
	Part number	BAE SA-CS-003-YP
Supply voltage U_B	10...35 V DC	
Voltage drop U_d at I_o	0.8 V	
Rated insulation voltage U_i	75 V DC	
Output current max.	300 mA	
No-load supply current I_o max.	25 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Ambient temperature T_a	-30...+70 °C	
Switching frequency f	100 Hz	
Output function indicator	Yellow LED	
Degree of protection as per IEC 60529	IP 40 (IP 20 at terminal box)	
Material	Housing	PC
Connection	Max. 14 AWG	

Pin assignments



Display



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors
Sensor amplifiers
Adapters

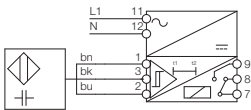
Accessories for Capacitive Sensors

Sensor amplifier for one capacitive sensor without internal amplifier

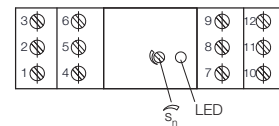
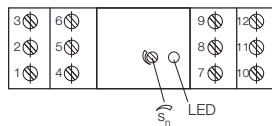
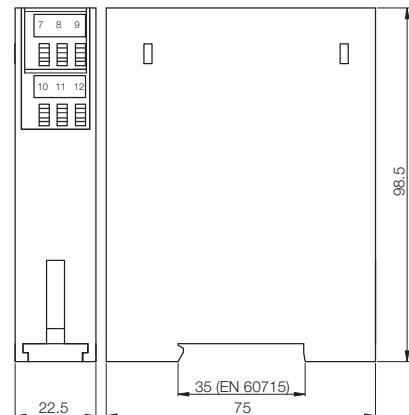
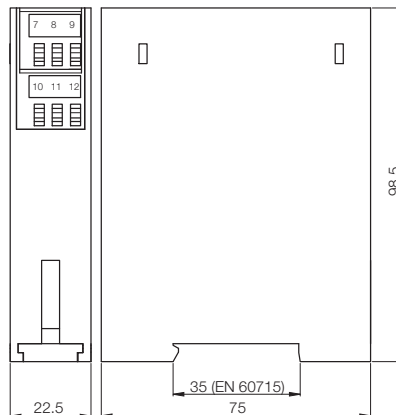
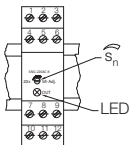


Size	98.5×75×22.5 mm	98.5×75×22.5 mm
Installation type	DIN rail (EN 60751)	DIN rail (EN 60751)
PNP/NPN and NO/NC, wiring selected	Ordering code BAE009K	BAE009L
Part number	BAE SA-CS-006-XR	BAE SA-CS-007-XR
Supply voltage U_B	230 V AC	115 V AC
Rated insulation voltage U_i (protection class)	250 V AC (II)	250 V AC (II)
Output current max.	8 A	8 A
No-load supply current I_0 max.	20 mA	20 mA
Polarity reversal protected/transposition protected/short-circuit protected	Floating relay	Floating relay
Ambient temperature T_a	-30...+70 °C	-30...+70 °C
Switching frequency f	10 Hz	10 Hz
Output function indicator	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 20	IP 20
Material Housing	PC	PC
Connection	Max. 14 AWG	Max. 14 AWG

Pin assignments



Display



Accessories for Capacitive Sensors

Sensor amplifier with Min/Max level control for two capacitive sensors without internal amplifier



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

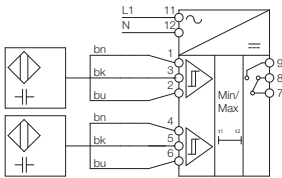
Capacitive sensors for analog distance measurement

Accessories for capacitive sensors

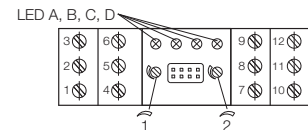
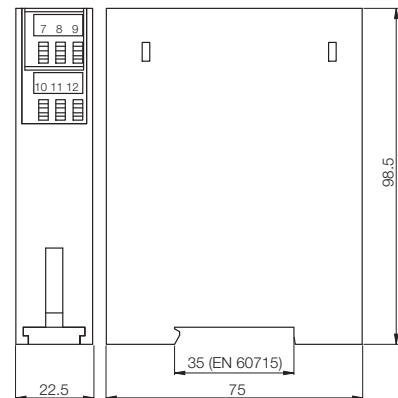
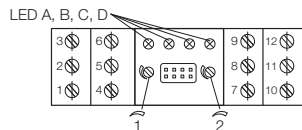
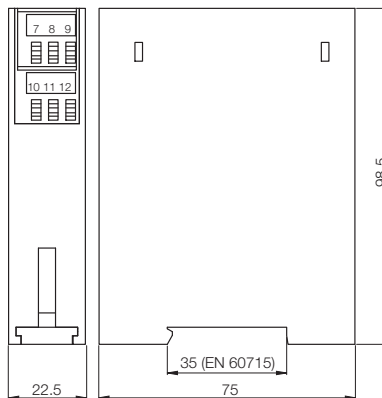
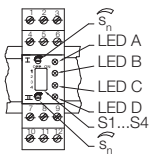
Sensor amplifiers
Adapters

Size	98.5×75×22.5 mm	98.5×75×22.5 mm
Installation type	DIN rail (EN 60751)	DIN rail (EN 60751)
PNP/NPN and NO/NC, wiring selected	Ordering code Part number	Ordering code Part number
Supply voltage U_B	BAE009T BAE SA-CS-004-XR	BAE009U BAE SA-CS-005-XR
Rated insulation voltage U_i (protection class)	230 V AC	115 V AC
Output current max.	250 V AC (II)	250 V AC (II)
No-load supply current I_0 max.	8 A	8 A
Polarity reversal protected/transposition protected/short-circuit protected	20 mA	40 mA
Ambient temperature T_a	Floating relay	Floating relay
Switching frequency f	-30...+70 °C	-30...+70 °C
Output function indicator	5 Hz	5 Hz
Degree of protection as per IEC 60529	Yellow LED	Yellow LED
Material Housing	IP 40 (IP 20 terminal enclosure)	IP 40 (IP 20 terminal enclosure)
Connection	PC	PC
	Max. 14 AWG	Max. 14 AWG

Pin assignments



Display



Function

When both sensors are undamped, the relay turns on - "LED" empty" lights up (contact 7/9 closed). If the Min sensor is damped, "Fill LED" lights up. When both sensors are damped, the relay turns off - "LED full" lights up (contact 7/9 open). If the Max sensor is damped, "LED empty" lights up. The relay does not turn on until both sensors are again undamped.

Other functions are selectable using the mini dip switches.

Dip switch functions

- S1 – Time delay max-sensor (off: approx. 0.2 s; on: approx. 5 s)
- S2 – Time delay min-sensor (off: approx. 0.2 s; on: approx. 5 s)
- S3 – Power-on setup (off: fill; on: empty)
- S4 – Output (relay inverse)

Function indicators

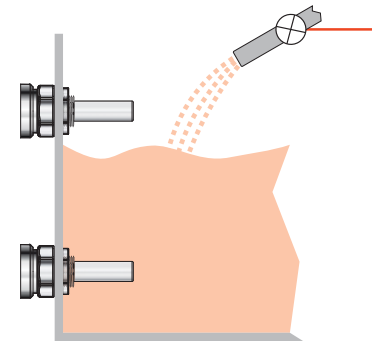
- A – Full
- B – Fill
- C – Empty
- D – Empty

Sensor adjustment

- Max sensor: Pot I
- Min sensor: Pot II

Applications

- Min and max level control
- Input for connecting two capacitive sensors for level sensing, adjustable separately using two potentiometers
- Switch-on delay for min and max sensor can be selected separately



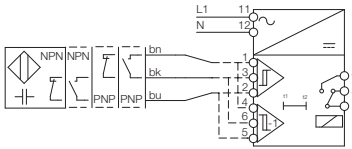
Accessories for Capacitive Sensors

Sensor amplifiers with timer function and potential-free changeover contact for one capacitive sensor

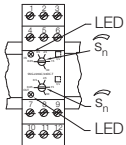


Size	98.5×75×22.5 mm	98.5×75×22.5 mm
Installation type	DIN rail (EN 60751)	DIN rail (EN 60751)
Potential-free changeover contact	Ordering code BAE009W	BAE009Y
	Part number BAE SA-XE-010-XR	BAE SA-XE-011-XR
Supply voltage U_B	230 V AC	115 V AC
Rated insulation voltage U_i (protection class)	250 V AC (II)	250 V AC (II)
Output current max.	8 A	8 A
No-load supply current I_0 max.	20 mA	40 mA
Ambient temperature T_a	-30...+70 °C	-30...+70 °C
Switching frequency f	10 Hz	10 Hz
Pick-up delay	0.05...30 s	0.05...30 s
Release delay	0.05...30 s	0.05...30 s
Output function indicator	Yellow LED	Yellow LED
Degree of protection as per IEC 60529	IP 20	IP 20
Material	Housing	PC
Connection	Screw terminals	Screw terminals

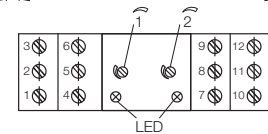
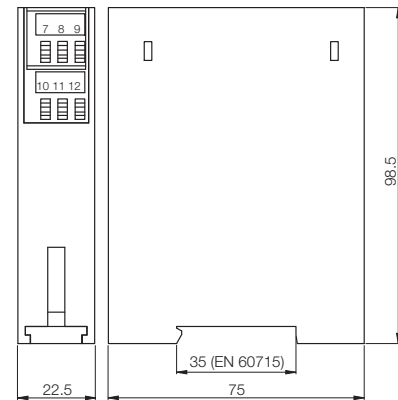
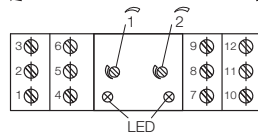
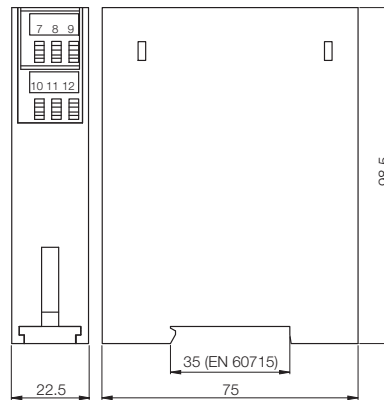
Pin assignments



Display



Not suitable for devices with a output stage that can be coded (e.g. BCS S4...)



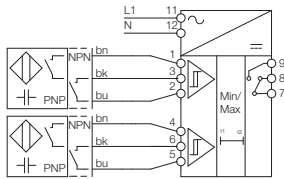
Accessories for Capacitive Sensors

Sensor amplifiers with Min/Max level control and potential-free changeover contact for two capacitive sensors

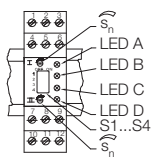


Size	98.5×75×22.5 mm		98.5×75×22.5 mm
Installation type	DIN rail (EN 60751)		DIN rail (EN 60751)
Potential-free changeover contact	Ordering code	BAE009Z	BAE00A0
	Part number	BAE SA-XE-012-XR	BAE SA-XE-013-XR
Supply voltage U_B	230 V AC		115 V AC
Rated insulation voltage U_i (protection class)	250 V AC (II)		250 V AC (II)
Output current max.	8 A		8 A
No-load supply current I_0 max.	20 mA		40 mA
Ambient temperature T_a	-30...+70 °C		-30...+70 °C
Switching frequency f	5 Hz		5 Hz
Output function indicator	Yellow LED		Yellow LED
Degree of protection as per IEC 60529	IP 20		IP 20
Material	Housing	PC	PC
Connection	Screw terminals		Screw terminals

Pin assignments



Display



Not suitable for devices with codable final stage (e.g. BCS S4...)

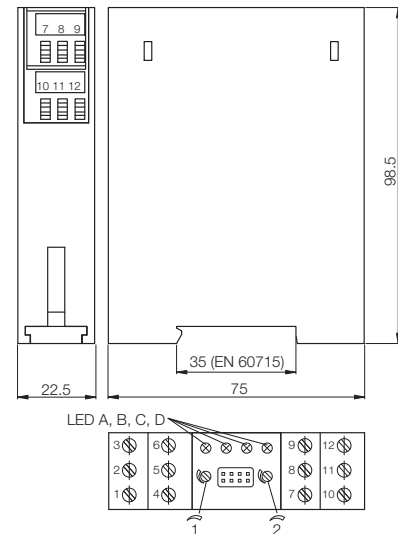
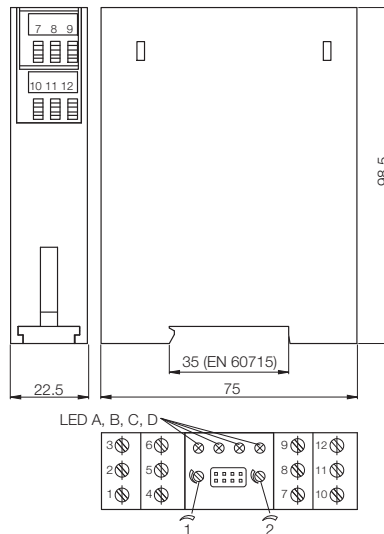
Function

When both sensors are undamped, the relay turns on - "empty" LED lights up (contacts 7/9 are closed). If the Min sensor is damped, the "fill" LED lights up. When both sensors are damped, the relay turns off - "full" LED lights up (contacts 7/9 are open). If the Max sensor is damped, the "empty" LED lights up. The relay does not turn on until both sensors are again undamped.

Other functions are selectable using the mini dip switches.

Dip switch functions

S1 – Time delay max-sensor (off: approx. 0.2 s; on: approx. 5 s)
 S2 – Time delay min-sensor (off: approx. 0.2 s; on: approx. 5 s)
 S3 – Power-on setup (off: fill; on: empty)
 S4 – Output (inverse relay)

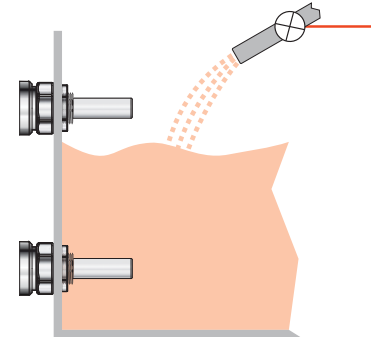


Function indicators

A – Full
 B – Fill
 C – Empty
 D – Empty

Applications

- Min and Max level control
- Automatic PNP and NPN input voltage for connecting two normally open sensors
- DC short-circuit protected
- Turn-on delay for Min and Max sensor selectable independently



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

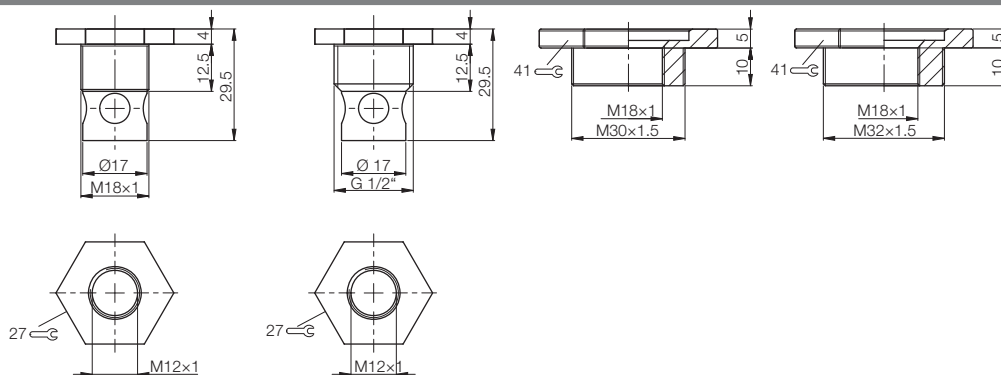
Accessories for capacitive sensors
Sensor amplifiers
 Adapters

Accessories for Capacitive Sensors

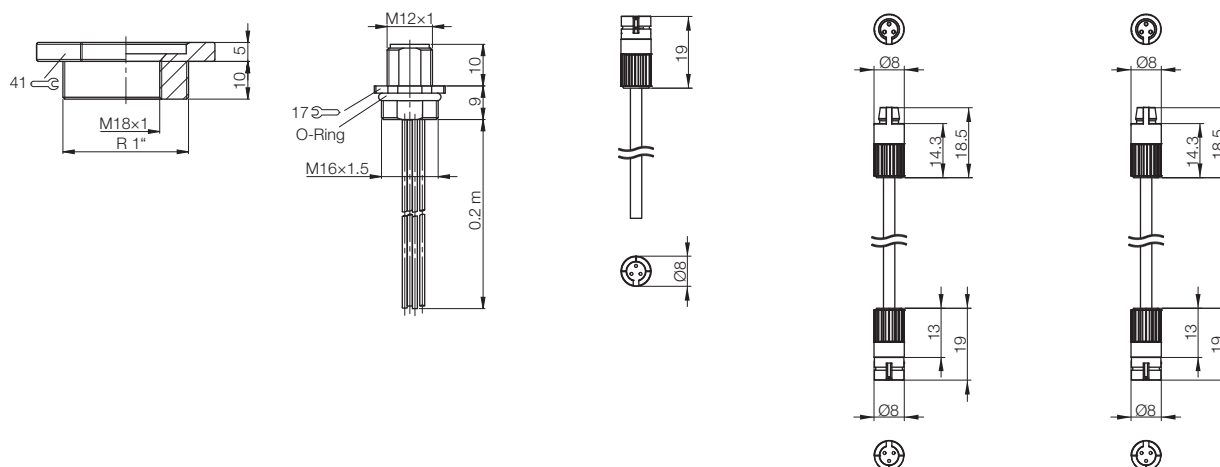
Adapters



Description	Adapter for Micro-Level M12 to M18	Adapter for Micro-Level M12 to G 1/2"	Adapter for BCS S01/2/3 M18 to M30	Adapter for BCS S01/2/3 M18 to M32
Ordering code	BAM018J	BAM018K	BAM018E	BAM018F
Part number	BAM AD-XA-002-M12/M18-4	BAM AD-XA-002-M12/G1/2"-4	BAM AD-XA-001-M18/M30-4	BAM AD-XA-001-M18/M32x1,5-4
Material	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Ambient temperature T _a				
Connection				



Description	Adapter for BCS S01/2/3 M18 to R 1"	Adapter for BCS S01/2/3 M16 to M12	Cable adapter for capacitive mini-sensors	Cable adapter for capacitive mini-sensors	Cable adapter for capacitive mini-sensors
Ordering code	BAM018H	BCC04JT	BCC04JU	BCC04JY	BCC04JZ
Part number	BAM AD-XA-001-M18/R1"-4	BCC M454-0000-2A-RM004-020	BCC Z001-002	BCC Z002-030	BCC Z002-080
Material	Stainless steel	MS-Ni/PA			
Ambient temperature T _a		-30...+70 °C			
Connection		0.2 m PVC cable, 3x0.25 mm ²	0.2 m PUR cable	3 m PUR cable	8 m PUR cable



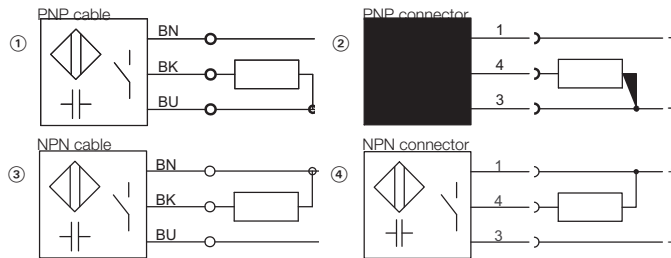


Capacitive Sensors wiring diagrams

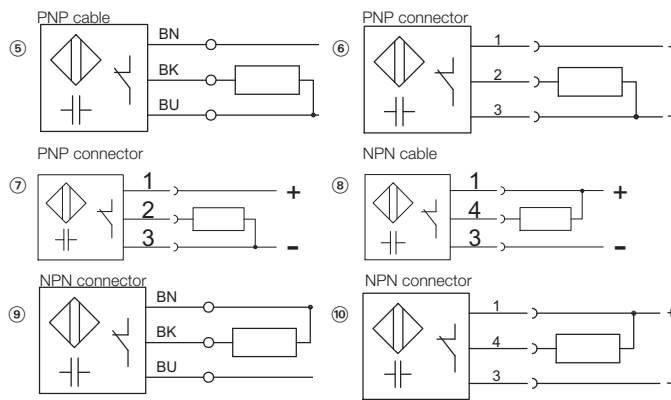
Connection-Switching diagrams

Wiring diagrams

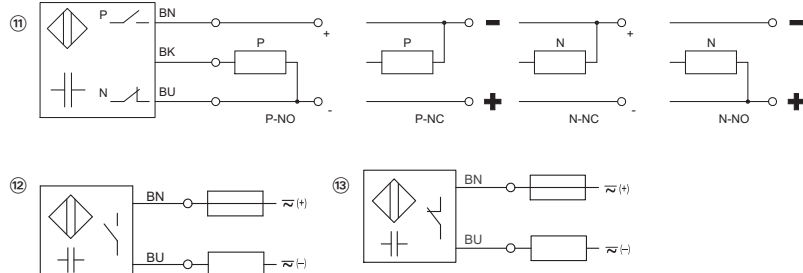
NO



NC



PNP/NPN selectable



Capacitive sensors

Capacitive sensors for object detection

Capacitive sensors for level detection

Capacitive sensors with special properties

Capacitive sensors for analog distance measurement

Accessories for capacitive sensors
Sensor amplifiers
Adapters

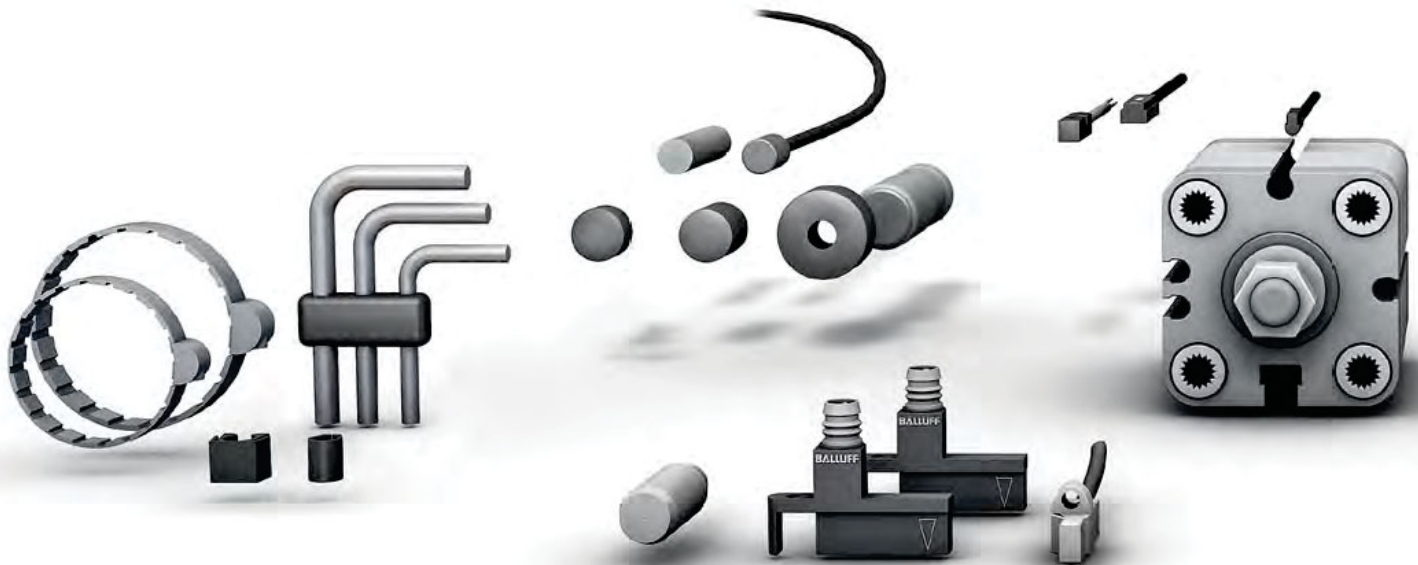


Magnetic Cylinder Sensors

Magnetic cylinder sensors for object detection

The primary application for magnetic sensors is to provide end of stroke and position detection on pneumatic cylinders.

- Lifetime warranty
- Low hysteresis, precise switch points
- Long service life due to lack of contact and wear
- Shock and vibration-resistant
- Compact sizes; perfect for short stroke cylinders





Magnetic Cylinder Sensors

Contents

Magnetic cylinder sensors

Introduction	852
Product overview	854

Magnetic cylinder sensors with mounting system

BMF 103	858
BMF 303	862
BMF 305	866
BMF 21	872

Magnetic cylinder sensors with a compact design

BMF 204 Global	876
BMF 214 Global	878
BMF 243 Global	880
BMF 235 Global	882
BMF 307	884

Magnetic cylinder sensors with special properties

Robust metal housings - BMF 32M	888
Robust metal housings - BMF 305M	890
For the food industry - BMF 10E	891
Weld immune - BMF 32M, BMF 305M, BMF 305K, BMF 315M	892
High temperature up to 105 °C - BMF 305M, BMF 315M	894
Radially magnetized magnets - BMF 103K, BMF 303K	895
Reed switches - BMF 305K	896
Reed switches - BMF 307K	897

Magnetic sensors for object detection

Ø 6.5 mm, M8x1, M12x1	900
Magnets	902

Magneto-inductive displacement sensors for analog position measurement

Micro-BIL	906
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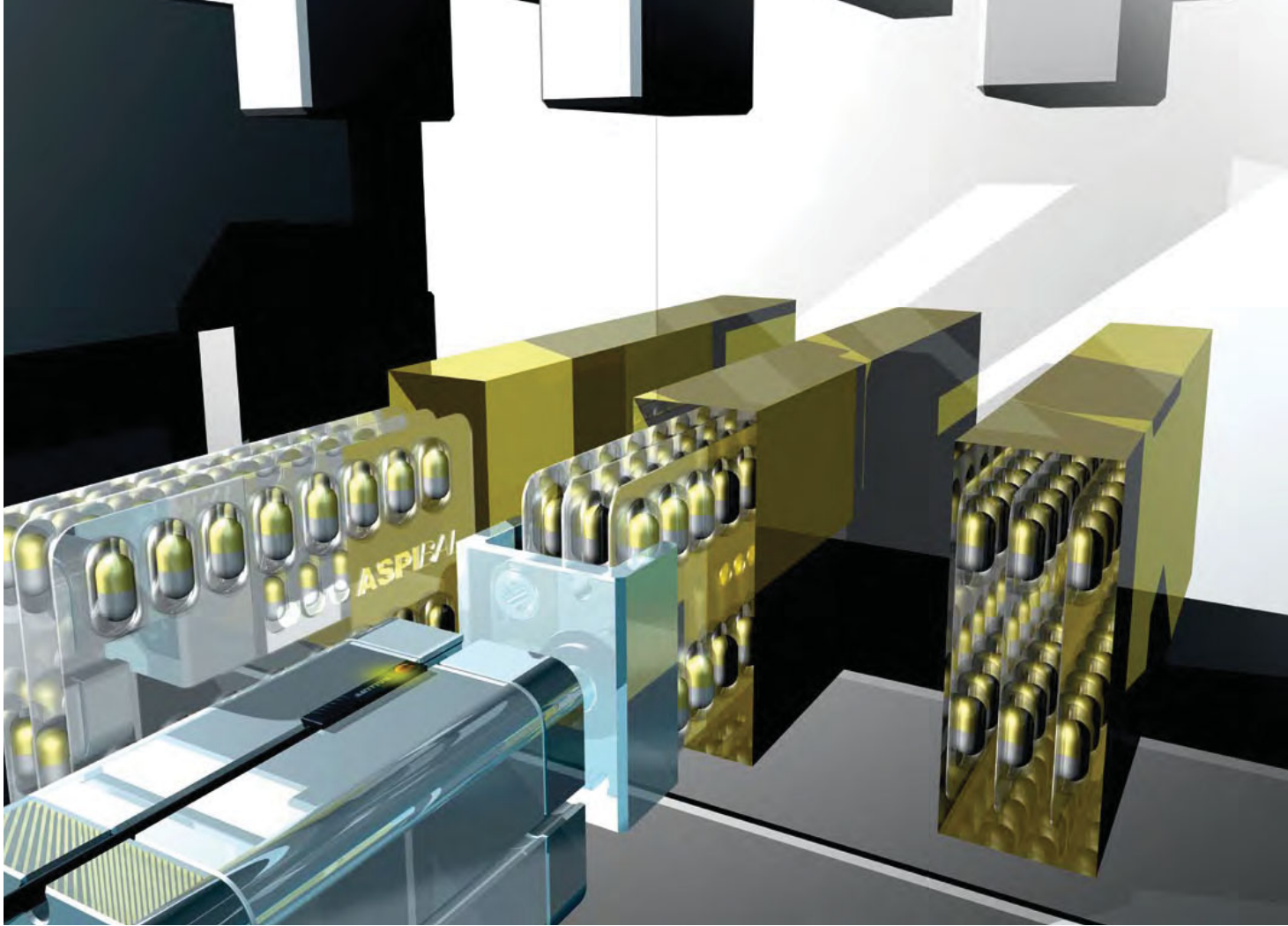
Accessories for magnetic cylinder sensors

Cable clips	910
Tube cuffs	910
Tools	911



Basic information and definitions can be found on **page 952**.





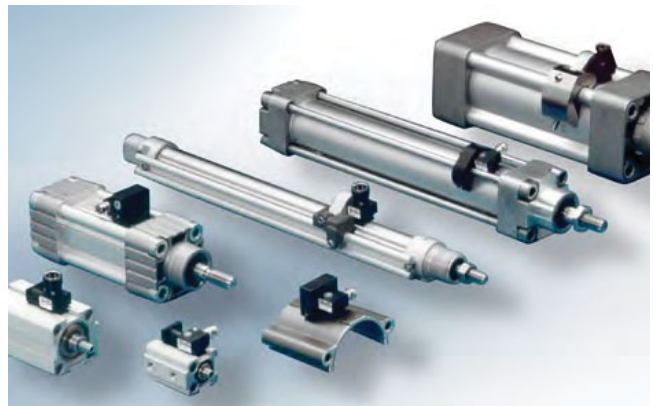
Reliable and wear-free position detection on all pneumatic cylinders – Improved sensor performance and reliability results in less downtime and increased productivity.

Magnetic cylinder sensors are used 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. Balluff cylinder sensors provide reliable position detection, low hysteresis and high noise immunity. The piston position is reliably detected even at high speeds with no contact bounce, no moving parts or double switch points.



Mini-sensors for mini-actuators – Better integration options

Balluff offers ideal solutions for short-stroke cylinders and mini-grippers. The mini cylinder switches from Balluff are among the smallest on the market and have a precise switching point.



The right sensor for each cylinder – Reduce costs with fewer sensors:

Virtually any cylinder size and make can be covered with the small number of designs as well as fastening and mounting materials. A special sensor element enables Balluff sensors to be used on any cylinder from virtually any manufacturer.

Sensors with mounting system or compact sensors – Which sensor is optimal for your application?

	Sensors with mounting system	Compact sensors
Would you like to use just one sensor for a variety of cylinder types?	☒ Reduce the number of types – sensors!	☐
Do you need to change out sensors quickly and easily?	☒ Switching point remains the same with “stay put” brackets	☐
Do you always use the same standard cylinder type (T- or C-slot)?	☐	☒ Simple to install, compact

Know your cylinder? Find your sensor. Balluff's exclusive, easy to use online Pneumatic Resource Center is designed to help you select the best solution for specific cylinder models.

Visit:
www.balluff.us/bmfcenter

Our standard sensors have a perfect mounting system: Magnetic cylinder sensors BMF with our mounting system have a captive switching point and can be used universally.

Compact sensors with an integrated holding element feature compact design and ease of installation.



Magnetic cylinder sensors with special properties

on page 887

Magnetic sensors for object detection

on page 899



Magnetic cylinder sensors
Performance spectrum

Product overview

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

Magnetic Cylinder Sensors

Product overview

		Magnetic cylinder sensors with mounting system					Magnetic cylinder sensors with a compact design			
										
BMF series		103	303	305	21	32	204	214	243	235
Mini housing		■	■				■	■	■	■
Standard housing				■	■	■				
Global							■	■	■	■
Properties										
Integral connector				page 867	page 872	page 888				
Cable with connector		page 859	page 863	page 867			page 876	page 878	page 880	page 882
Cable versions		page 859	page 863	page 867	page 872		page 876	page 878	page 880	page 882
V-Twin		page 859	page 863	page 867			page 876	page 878	page 880	page 882
Robust metal housing				page 890		page 888				
For the food industry										
Weld-immune electronics				page 892		page 892				
High-temperature resistant up to 105 °C				page 894						
For radially magnetized magnets		page 895	page 895							
Reed switches				page 896						
Tubular housing with a long range										
For analog distance measurement										
Cylinder profile										
	Size 10 slot (C-slot)	Festo, Sommer, Bosch	■	■			■		■	
	Rounded groove (C-slot)	SMC, Bimba, Schunk General	■	■				■	■	
	T-slot		■	■	■					■
	Round cylinder	General	■	■	■	■				■
	Dovetail slot	Bosch, Parker, Norgren	■	■	■	■				
	Trapezoidal guide	Bosch		■	■					
	C-slot, large	Numatics, Norgren		■	■					
	with rail/SMC slot A and slot B	SMC		■	■					
	Profile cylinder and tie rod 5...11 mm	General	■	■	■	■				■
	Profile cylinder and tie rod 9...15 mm	General		■	■	■				■
	Profile cylinder and tie rod 14...20 mm	General		■	■	■				■
	U-slot	SMC CP95		■						



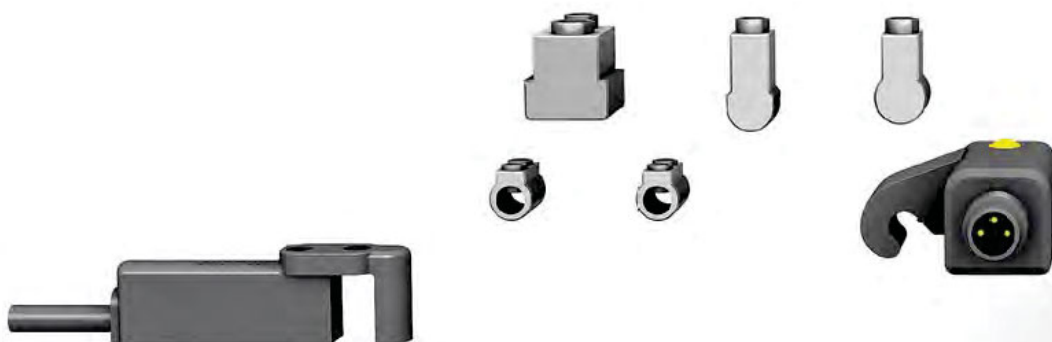
Accessories for magnetic cylinder sensors



Magnetic Cylinder Sensors

Magnetic cylinder sensors with mounting system

With its standard sensors for grippers and pneumatic cylinders, Balluff provides a flexible solution for position detection with standard sensors and the perfect mounting system. Magnetic cylinder sensors with mounting system are suited for use on mini-grippers and in short-stroke cylinders (BMF 103), for miniaturized (BMF 303) as well as for larger actuators (BMF 305). The switching point is set just once and remains intact, even when replacing the sensor. This way you increase the functional reliability of your equipment. Replacement is significantly easier and more secure even at difficult-to-access locations. By selecting the right mounting brackets you can adapt these sensors to virtually all pneumatic cylinder types.



Magnetic Cylinder Sensors with Mounting System

Contents

Magnetic cylinder sensors with mounting system

BMF 103	858
BMF 103 mounting brackets	860
BMF 303	862
BMF 303 mounting brackets	864
BMF 305	866
BMF 305 mounting brackets	868
BMF 21	872
BMF 21 mounting brackets	873



Magnetic Cylinder Sensors with Mounting System

BMF 103

The sensor for positioning monitoring on miniature grippers and short stroke cylinders. Precise switch point for monitoring even the smallest piston movements.



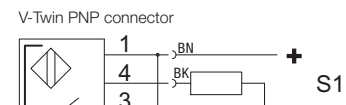
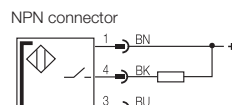
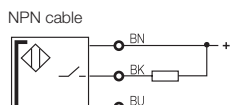
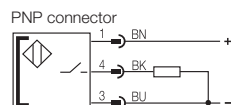
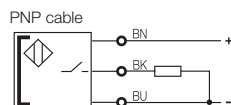
Series		
Properties		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d		
Rated insulation voltage I_o		
Rated operating current I_o		
Polarity reversal protected/transposition protected/short-circuit protected		
Rated switching field strength I_{H_n}		
Assured switching field strength I_{H_a}		
Temperature drift of switch-on point of I_{H_n}		
Ambient temperature T_a		
On/off delay		
Degree of protection as per IEC 60529		
Approval		
Housing material		
Cable		
Suggested mounting cable		

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 103 can be found on page 860.

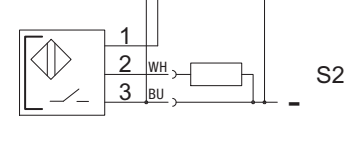
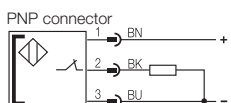
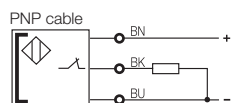
Additional cable lengths on request

Wiring diagrams

NO contact



NC contact



Magnetic Cylinder Sensors with Mounting System

BMF 103



BMF 103	BMF 103	BMF 103	BMF 103	BMF 103
Perpendicular cable exit sensor with M5 connector	Perpendicular cable exit sensor with M8 connector	Perpendicular cable exit V-Twin with M8 connector	Perpendicular cable exit with M12 connector	Perpendicular cable exit sensor with PUR cable
BMF001J	BMF001L	BMF001R	BMF001K	BMF001E
BMF 103K-PS-C-2A-S26-00,3	BMF 103K-PS-C-2A-SA2-S49-00,3	BMF 103K-PS-C-2A-SA95-S75-00,3	BMF 103K-PS-C-2A-S4-00,5	BMF 103K-PS-C-2A-PU-02
	BMF0015			BMF0013
	BMF 103K-PO-C-2A-SA2-S49-00,3			BMF 103K-PO-C-2A-PU-02
	BMF0011			BMF000Y
	BMF 103K-NS-C-2A-SA2-S49-00,3			BMF 103K-NS-C-2A-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 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
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
LCP	LCP	LCP	LCP	LCP
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.5 m PUR cable with M8 connector, 4-pin	2 m PUR cable
BKS-B 25-3-PU-05	BCC M313-0000-10-001-PX43T2-050	BCC M314-0000-10-003-PX43T2-050	BCC M415-0000-1A-003-PX44T2-050	28 AWG



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

BMF 103
BMF 303
BMF 305
BMF 21
Total Productive Maintenance

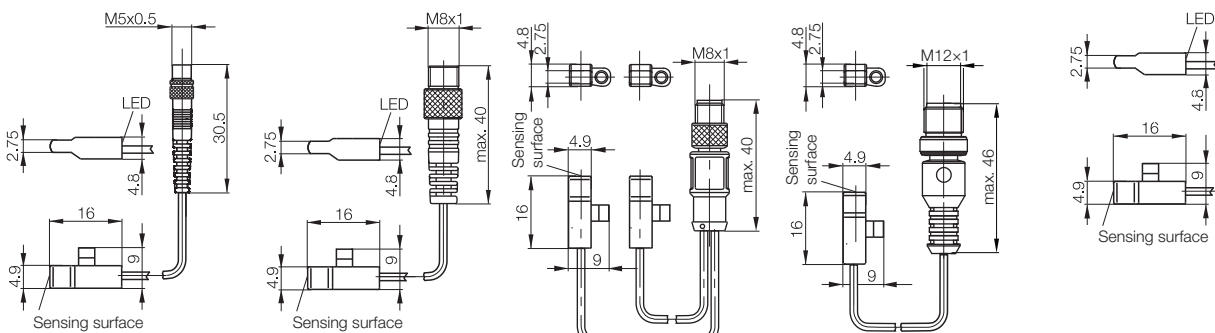
Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Suitable mounting brackets for BMF 103 can be found on **page 860**.

Magnetic Cylinder Sensors with Mounting System

BMF 103 mounting bracket



Mounting bracket for Slot	BMF 103	BMF 103	BMF 103	BMF 103	
	C-slot	C-slot Size 10 slot	C-slot	C-slot Size 10 slot	
Ordering code	BAM00K8	BAM00K9	BAM00KN	BAM00KP	
Part number	BMF 103-HW-41	BMF 103-HW-42	BMF 103-HW-85	BMF 103-HW-87	
Installation advantages					
Cylinder type, for example	SMC, Bimba, Schunk	Festo, Sommer, Bosch	SMC, Bimba, Schunk	Festo, Sommer, Bosch	
Dimensions of cylinder slot					



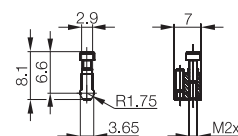
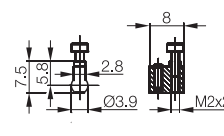
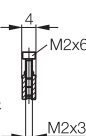
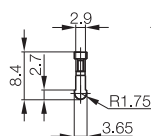
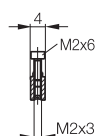
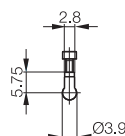
Switching point adjusted in seconds! Open screw with one turn, adjust position, tighten.



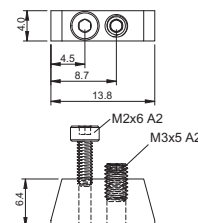
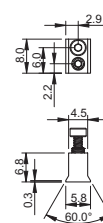
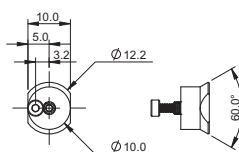
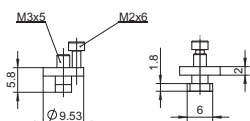
Switching point cannot be lost. Even if you replace the sensor, the adjusted switching point is permanently set by the mounting bracket.



Can be inserted into slot from above.



Mounting bracket for Slot	BMF 103	BMF 103	BMF 103	BMF 103	
	Bimba flat1	Dovetail	Dovetail	Dovetail	
Ordering code	BAM00KC	BAM00KJ	BAM00KF	BAM01ML	
Part number	BMF 103-HW-63	BMF 103-HW-75	BMF 103-HW-68	BMF 103-HW-108	
Installation advantages					
Cylinder type, for example	Bimba	Numatics	Fabco Pancake	Compact air	
Dimensions of cylinder slot					



Magnetic Cylinder Sensors with Mounting System BMF 103 mounting bracket



BMF 103	BMF 103	BMF 103	BMF 103	BMF 103
C-slot	C-slot Size 10 slot	T-slot	Round Cylinder	Tie rod
BAM01K6	BAM01K7	BAM00KA	BAM01E2	BAM00KH
BMF 103-HW-100	BMF 103-HW-102	BMF 103-HW-43	BMF 103-HW-93	BMF 103-HW-74
SMC, Bimba, Schunk	Festo, Sommer, Bosch	Festo, Bosch, SMC	Without slot, round cylinder Ø8...80 mm with tube cuff	Phd



Magnetic
cylinder
sensors

Magnetic
cylinder
sensors with
mounting
system

BMF 103
BMF 303
BMF 305
BMF 21
Total Productive
Maintenance

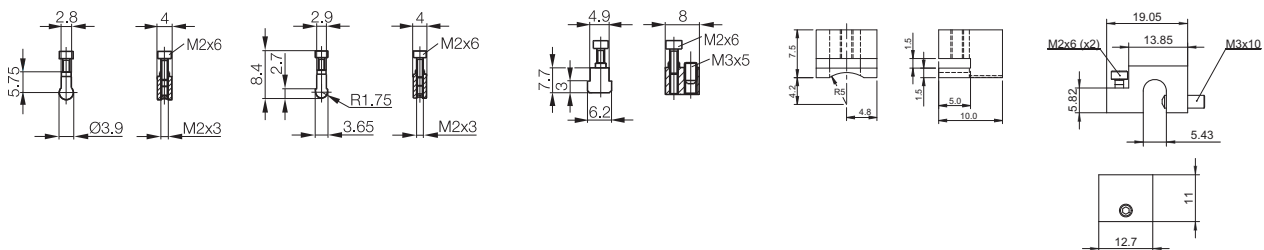
Magnetic
cylinder
sensors with
a compact
design

Magnetic
cylinder
sensors with
special
properties

Magnetic
sensors for
object detection

Magneto-
inductive
displacement
sensors for
analog position
measurement

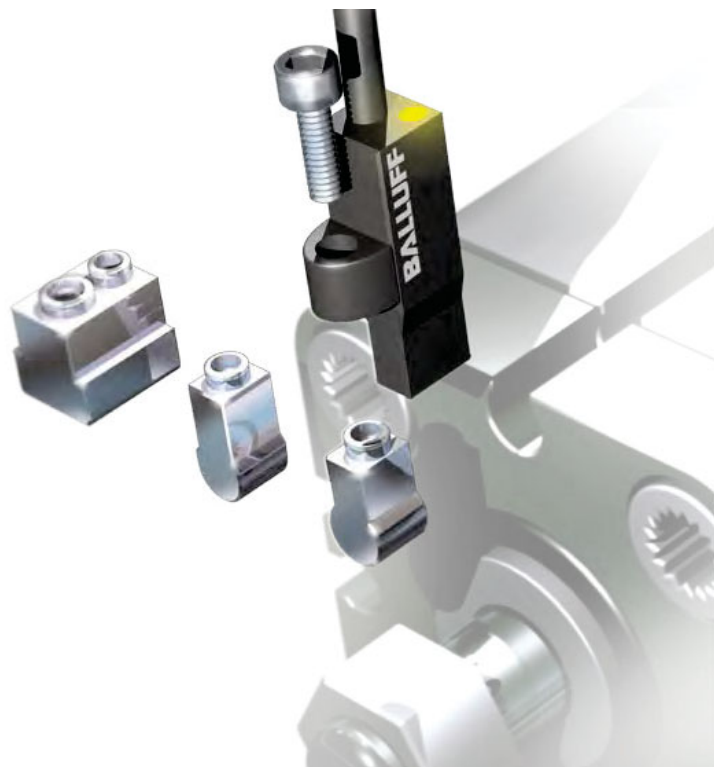
Accessories
for magnetic
cylinder sensors



Recommended accessories (please order separately)



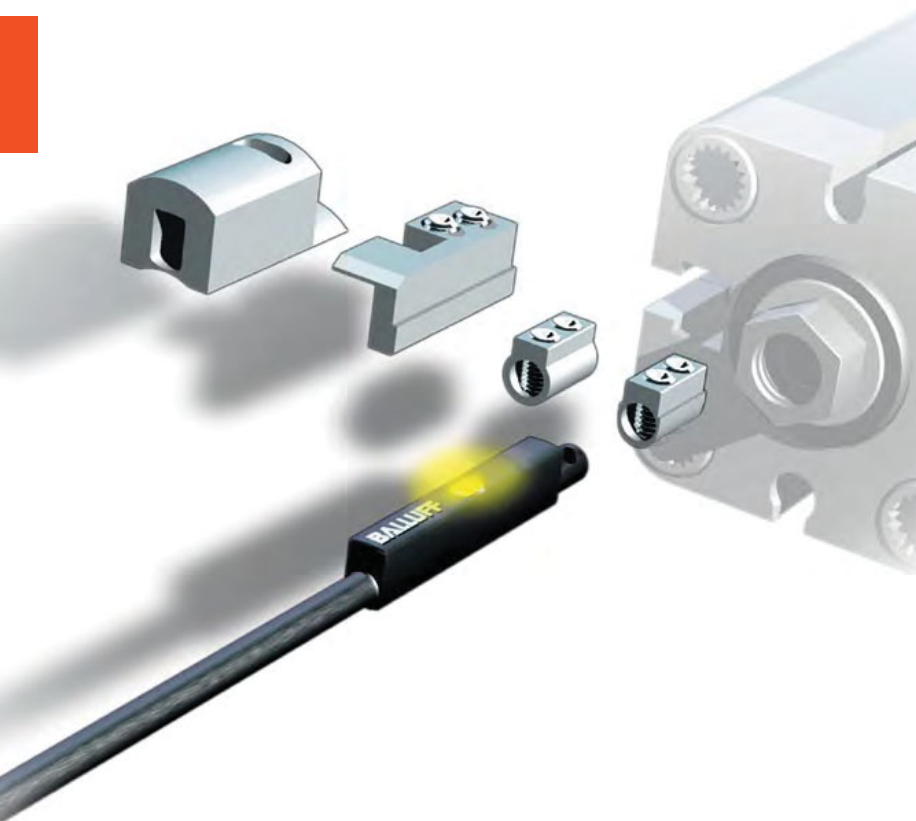
Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.



Magnetic Cylinder Sensors with Mounting System

BMF 303

The universal sensor for position monitoring on small grippers and cylinders. A variety of mounting brackets enables adapting to virtually every miniaturized pneumatic actuator on the market.

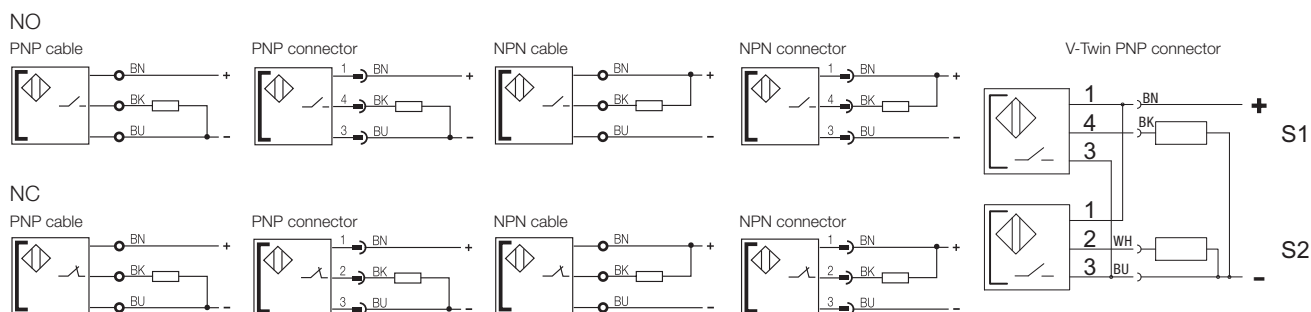


Series		
Properties		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_S		
Voltage drop U_d		
Rated insulation voltage U_i		
Rated operating current I_o		
Polarity reversal protected/transposition protected/short-circuit protected		
Rated switching field strength I_{H_n}		
Assured switching field strength I_{H_a}		
Hysteresis of I_{H_n}		
Temperature drift of switch-on point of I_{H_n}		
On/off delay		
Ambient temperature T_a		
Degree of protection as per IEC 60529		
Approval		
Housing material		
Cable		
Suggested mating cable		

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 303 can be found on page 864.

Additional cable lengths on request

Wiring diagrams



Magnetic Cylinder Sensors with Mounting System

BMF 303



BMF 303	BMF 303	BMF 303	BMF 303	BMF 303
Cylinder sensor for all common cylinders with M5 connector	Cylinder sensor for all common cylinders with M8 connector	V-Twin variant for all common cylinders with M8 connector	V-Twin variant for all common cylinders with M12 connector	Cylinder sensor for all common cylinders with direct PUR cable
BMF003Z	BMF0043	BMF004F	BMF004E	BMF003U
BMF 303K-PS-C-2A-S26-00,3	BMF 303K-PS-C-2A-SA2-S49-00,3	BMF 303K-PS-C-2A-SA95-S75-00,3	BMF 303K-PS-C-2A-SA95-S4-00,3	BMF 303K-PS-C-2A-PU-02
	BMF0039			BMF0036
	BMF 303K-PO-C-2A-SA2-S49-00,3			BMF 303K-PO-C-2A-PU-02
BMF0033	BMF0034			BMF0031
BMF 303K-NS-C-2A-S26-00,3	BMF 303K-NS-C-2A-SA2-S49-00,3			BMF 303K-NS-C-2A-PU-02
	BMF002Y			BMF002U
	BMF 303K-NO-C-2A-SA2-S49-00,3			BMF 303K-NO-C-2A-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 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
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 45%	≤ 45%	≤ 45%	≤ 45%	≤ 45%
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
LCP	LCP	LCP	LCP	LCP
0.3 m PUR cable with M5 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable
BKS-B 25-3-PU-05	BCC M313-0000-10-001-PX43T2-050	BCC M314-0000-10-003-PX43T2-050	BCC M415-0000-1A-003-PX44T2-050	28 AWG



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

BMF 103

BMF 303

BMF 305

BMF 21

Total Productive Maintenance

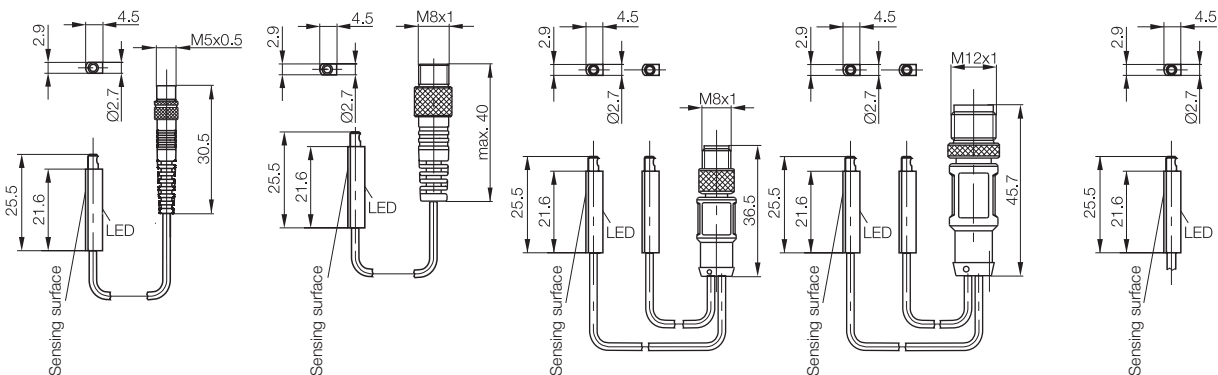
Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

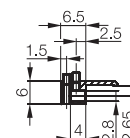
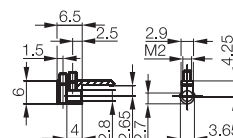
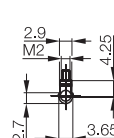
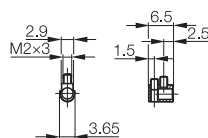
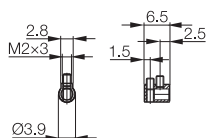


Suitable mounting brackets for BMF 303 can be found on **page 864**

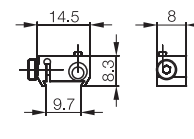
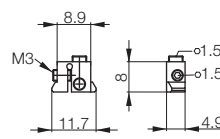
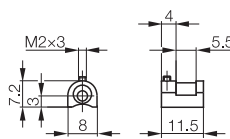
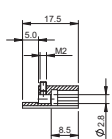
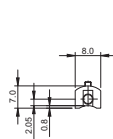
Magnetic Cylinder Sensors with Mounting System BMF 303 mounting bracket



Mounting bracket for Slot	BMF 303 C-slot	BMF 303 C-slot Size 10 slot	BMF 303 C-slot	BMF 303 C-slot Size 10 slot	
Ordering code	BAM00KZ	BAM00L0	BAM01F0	BAM00L1	
Part number	BMF 303-HW-28	BMF 303-HW-30	BMF 303-HW-97	BMF 303-HW-31	
Installation advantages					
Cylinder type, for example	SMC, Bimba, Schunk	Festo, Sommer, Bosch	SMC, Bimba, Schunk	Festo, Sommer, Bosch	
Dimensions of cylinder slot					



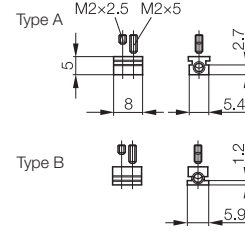
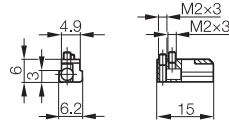
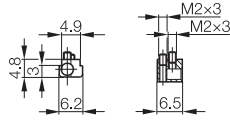
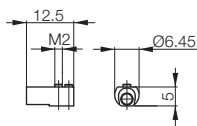
Mounting bracket for Slot	BMF 303 Round Cylinder	BMF 303 Round cylinder	BMF 303 Dovetail	BMF 303 Trapezoidal slot	
Ordering code	BAM00L3	BAM00L7	BAM01K9	BAM00LF	
Part number	BMF 303-HW-34	BMF 303-HW-59	BMF 303-HW-101	BMF 303-HW-80	
Installation advantages					
Cylinder type, for example	Without slot, round cylinder Ø8...80 mm with tube cuff	Without slot, round cylinder Ø 8...80 mm with tube cuff	Bosch, Parker, Norgren	Bosch	
Dimensions of cylinder slot					



Magnetic Cylinder Sensors with Mounting System BMF 303 mounting bracket



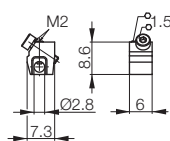
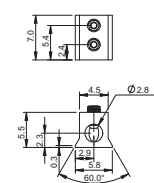
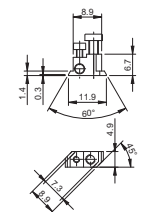
BMF 303	BMF 303	BMF 303	BMF 303	BMF 303
C-slot, large	T-slot	T-slot	T-slot	T-slot
BAM00LA	BAM00L4	BAM00L2	BAM00L6	BAM00L8
BMF 303-HW-62	BMF 303-HW-40	BMF 303-HW-33	BMF 303-HW-51	BMF 303-HW-60



Expansion of the HW-51 with HW-60: for fastening the sensor next to the slot. This lets you attach two sensors to the cylinder even when space is tight. For example, 2x HW-51 + 2x HW-60 or 2x HW-51 + 1x HW-60



BMF 303	BMF 303	BMF 303
Dovetail	Dovetail	U-slot
BAM00L5	BAM00LE	BAM01K4
BMF 303-HW-44	BMF 303-HW-69	BMF 303-HW-103



Sensor disappears in the slot.



Switching point adjusted in seconds! Open screw with one turn, adjust position, tighten.



Switching point cannot be lost. Even if you replace the sensor, the adjusted switching point is permanently set by the mounting bracket.



Can be inserted into slot from above.

Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

BMF 103

BMF 303

BMF 305

BMF 21

Total Productive Maintenance

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

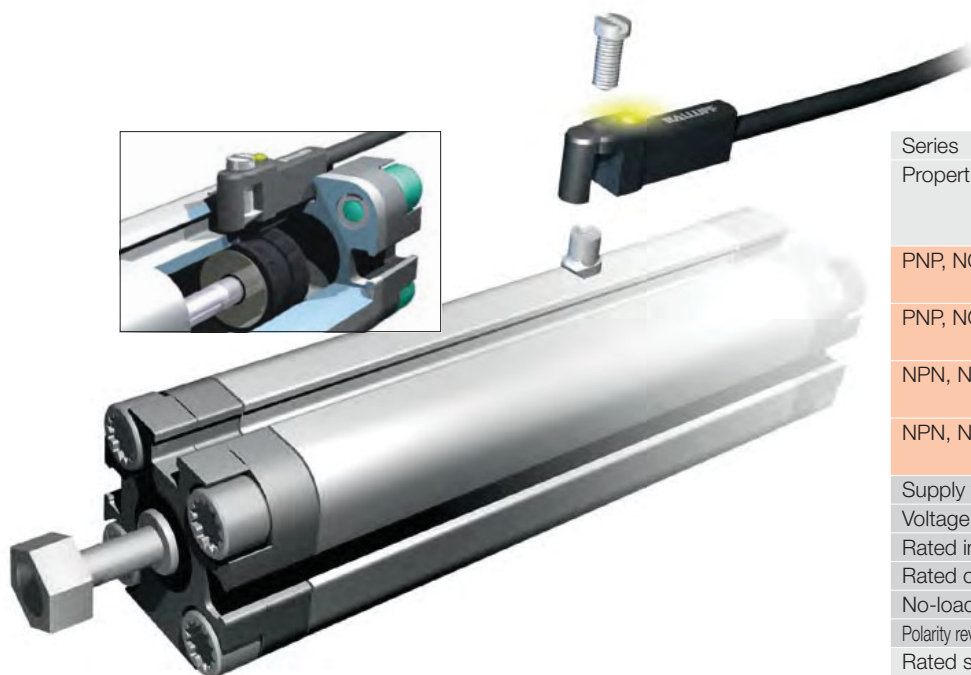
Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

Magnetic Cylinder Sensors with Mounting System

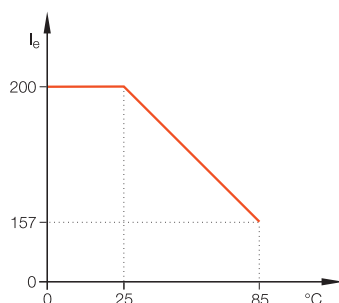
BMF 305

The universal sensor for position monitoring on large actuators



Series Properties		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d		
Rated insulation voltage U_i		
Rated operating current I_o		
No-load supply current I_0 max.		
Polarity reversal protected/transposition protected/short-circuit protected		
Rated switching field strength $ H_n $		
Assured switching field strength $ H_a $		
Hysteresis of $ H_n $		
Temperature drift of switch-on point of $ H_n $		
On/off delay		
Ambient temperature T_a		
Degree of protection as per IEC 60529		
Approval		
Material	Housing	
Cable		
Suggested mating cable		

Temperature load curve



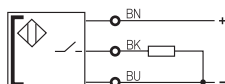
Basic information and definitions can be found on page 952, associated mounting brackets for BMF 305 can be found on page 868.

Additional cable lengths on request

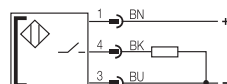
Wiring diagrams

NO

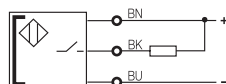
PNP cable



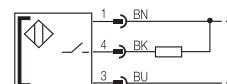
PNP connector



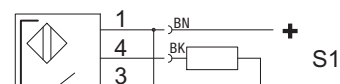
NPN cable



NPN connector

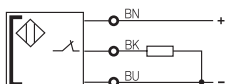


V-Twin PNP connector

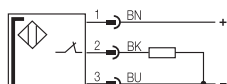


NC

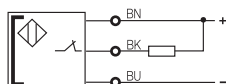
PNP cable



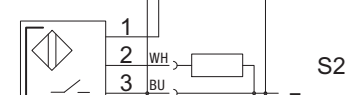
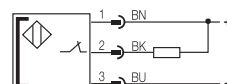
PNP connector



NPN cable



NPN connector



Magnetic Cylinder Sensors with Mounting System

BMF 305



BMF 305	BMF 305	BMF 305	BMF 305	BMF 305
Universal position monitoring with M8 connector	Universal position monitoring with M8 connector	Universal position monitoring with M12 connector	Universal position monitoring with M12 connector	Universal position monitoring with PUR cable
BMF005L	BMF0060	BMF0058	BMF005Z	BMF0056
BMF 305K-PS-C-2-SA2-S49-00,3	BMF 305K-PS-C-2-SA95-S75-00,3	BMF 305K-PS-C-2-S4-00,2	BMF 305K-PS-C-2-SA95-S4-00,3	BMF 305K-PS-C-2-PU-02
BMF0055				BMF0052
BMF 305K-PO-C-2-SA2-S49-00,3				BMF 305K-PO-C-2-PU-02
BMF0050				BMF004W
BMF 305K-NS-C-2-SA2-S49-00,3				BMF 305K-NS-C-2-PU-02
BMF004U				BMF004P
BMF 305K-NO-C-2-SA2-S49-00,3				BMF 305K-NO-C-2-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 3.1 V	≤ 3.1 V	≤ 2 V	≤ 3.1 V	≤ 3.1 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	100 mA	200 mA	200 mA
≤ 30 mA	≤ 30 mA	≤ 5 mA	≤ 30 mA	≤ 30 mA
Yes/Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 45%	≤ 45%	≤ 45%	≤ 45%	≤ 45%
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms	≤ 0.07 ms	≤ 0.05 ms	≤ 0.05 ms
-25...+85 °C	-25...+85 °C	-25...+70 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
LCP	LCP	LCP	LCP	LCP
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.2 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable
BCC M313-0000-10-001-PX43T2-050	BCC M314-0000-10-003-PX43T2-050	BCC M415-0000-1A-003-PX44T2-050	BCC M415-0000-1A-003-PX44T2-050	26 AWG



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

BMF 103

BMF 303

BMF 305

BMF 21

Total Productive Maintenance

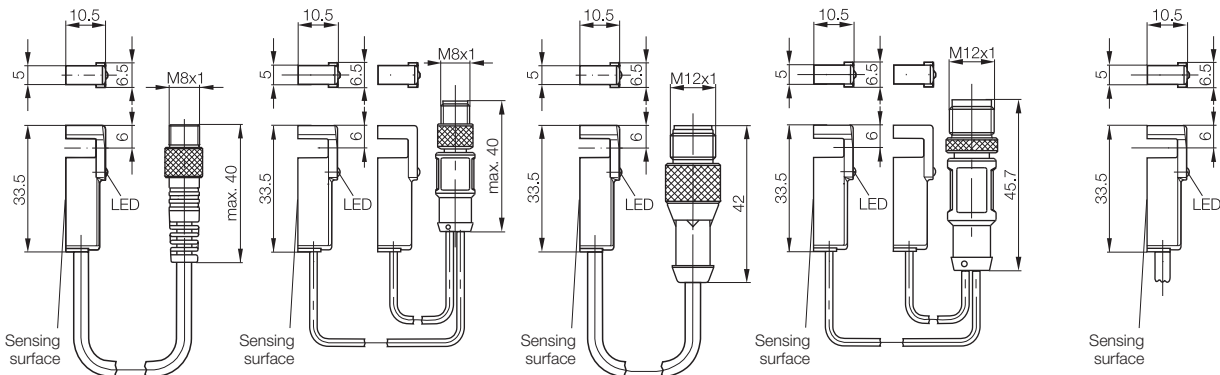
Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

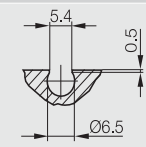
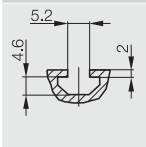
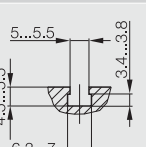
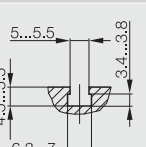
Accessories for magnetic cylinder sensors

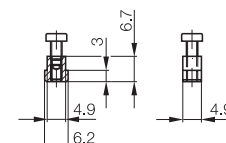
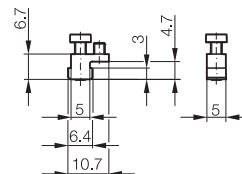
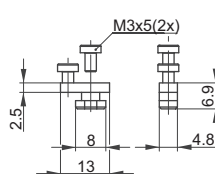
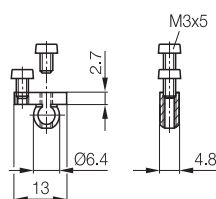


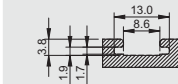
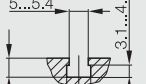
Suitable mounting brackets for BMF 305 can be found on **page 868**

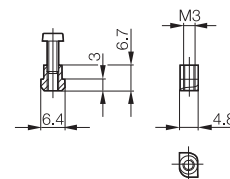
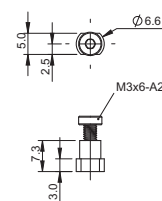
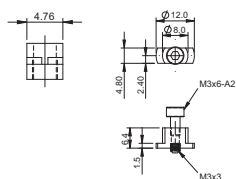
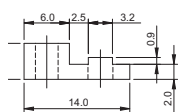
Magnetic Cylinder Sensors with Mounting System BMF 305 mounting bracket



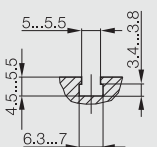
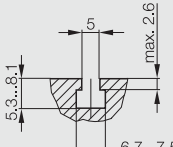
Mounting bracket for Slot	BMF 305  C-slot, large	BMF 305  C-slot, large	BMF 305  T-slot	BMF 305  T-slot	
Ordering code	BAM00LW	BAM01C4	BAM00LH	BAM00LJ	
Part number	BMF 305-HW-32	BMF 305-HW-92	BMF 305-HW-17	BMF 305-HW-20	
Installation advantages					
Cylinder type, for example	Norgren	Numatics	Festo, SMC, Bosch	Festo, SMC, Bosch	
Dimensions of cylinder slot					



Mounting bracket for Slot	BMF 305  T-slot	BMF 305  T-slot	BMF 305  T-slot	BMF 305  T-slot	
Ordering code	BAM00M6	BAM00M7	BAM0017	BAM00LN	
Part number	BMF 305-HW-52	BMF 305-HW-53	BMF 305-HW-91	BMF 305-HW-23	
Installation advantages					
Cylinder type, for example	SMC	PHD	Parker, 3MA, 4MA	Festo, SMC, Bosch	
Dimensions of cylinder slot					



Magnetic Cylinder Sensors with Mounting System BMF 305 mounting bracket

				
BMF 305	BMF 305	BMF 305	BMF 305	BMF 305
T-slot	T-slot	L-slot	L-slot	T-slot
BAM01EZ	BAM00LM	BAM00MO	BAM00M9	BAM00M5
BMF 305-HW-98	BMF 305-HW-22	BMF 305-HW-37	BMF 305-HW-64	BMF 305-HW-50
				
Festo, SMC, Bosch	Festo, SMC, Bosch	Parker, SST, ER	Bosch	
				



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

BMF 103

BMF 303

BMF 305

BMF 21

Total Productive Maintenance

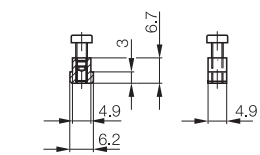
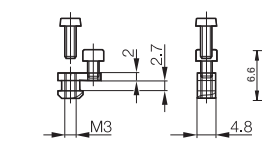
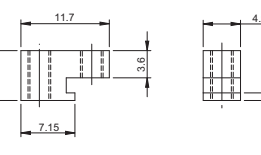
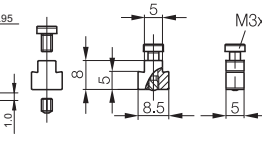
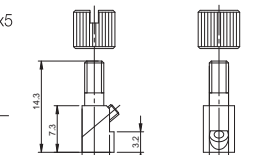
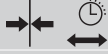
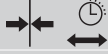
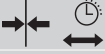
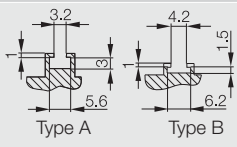
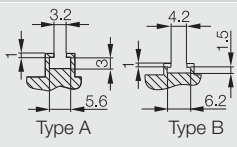
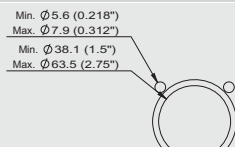
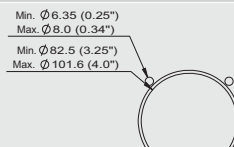
Magnetic cylinder sensors with a compact design

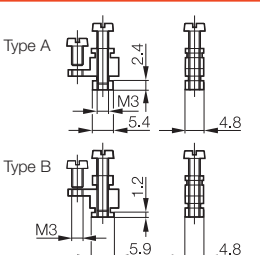
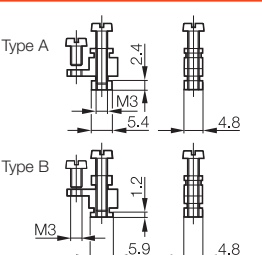
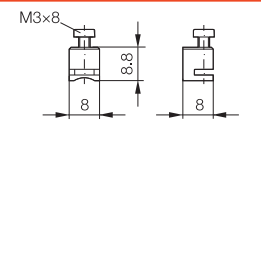
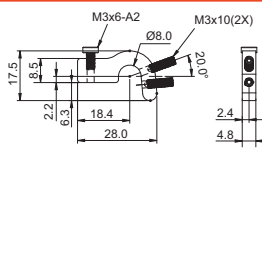
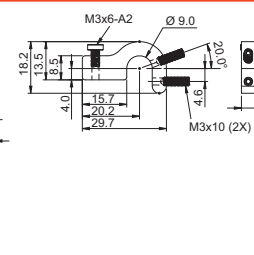
Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

				
BMF 305	BMF 305	BMF 305	BMF 305	BMF 305
T-slot	T-slot	Round cylinder	Tie rod	Tie rod
BAM00LT	BAM01EY	BAM00LP	BAM00MC	BAM00ME
BMF 305-HW-26	BMF 305-HW-99	BMF 305-HW-24	BMF 305-HW-70	BMF 305-HW-71
				
SMC	SMC	Round cylinder Ø 8...80 mm		
				

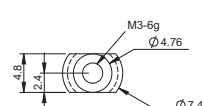
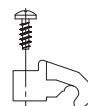
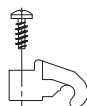
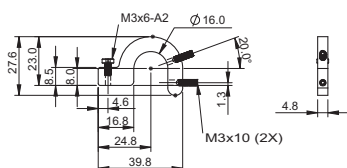
				
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Magnetic Cylinder Sensors with Mounting System

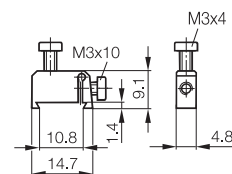
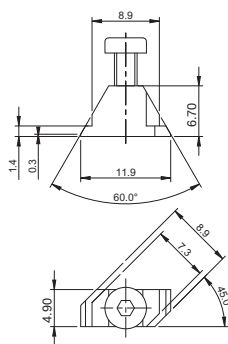
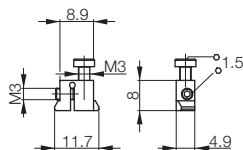
BMF 305 mounting bracket



Mounting bracket for Slot	BMF 305 	BMF 305 	BMF 305 	BMF 305 	
Ordering code	BAM00MF	BAM00LL	BAM00LL	BAM00LY	
Part number	BMF 305-HW-72	BMF 305-HW-21	BMF 305-HW-21	BMF 305-HW-35	
Installation advantages					
Cylinder type, for example		For profile/tie rod cylinders 6.5 mm in conjunction with BAM00KY	For profile/tie rod cylinders 6.5...17 mm in conjunction with BAM00KT	Tol-o-matic	
Dimensions of cylinder slot	Min. $\varnothing 12.7$ (0.5") Max. $\varnothing 15.8$ (0.6") Min. $\varnothing 127.0$ (5.0") Max. $\varnothing 203.2$ (8.0") 				



Mounting bracket for Slot	BMF 305 	BMF 305 	BMF 305
Ordering code	BAM01K8	BAM00LR	BAM00LU
Part number	BMF 305-HW-106	BMF 305-HW-25	BMF 305-HW-27
Installation advantages			
Cylinder type, for example		T-slot	Bosch
Dimensions of cylinder slot	13...13.4 11 3.0 60° 		



Magnetic Cylinder Sensors with Mounting System BMF 305 mounting bracket



BMF 305	BMF 305	BMF 305	BMF 305	BMF 305
z Dovetail	z Dovetail	z Dovetail	z Dovetail	z Dovetail
BAM00LZ	BAM00M1	BAM00M2		BAM00M3
BMF 305-HW-36	BMF 305-HW-38	BMF 305-HW-39	BMF 305-HW-45	BMF 305-HW-46
Numatics	De-Sta-Co	Compact air	Norgren 92000	Norgren 46000



Magnetic
cylinder
sensors

Magnetic
cylinder
sensors with
mounting
system
BMF 103
BMF 303
BMF 305
BMF 21
Total Productive
Maintenance

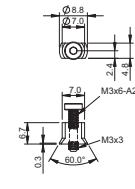
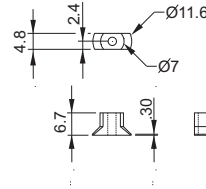
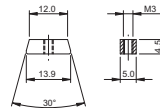
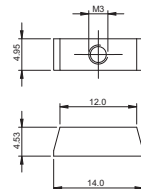
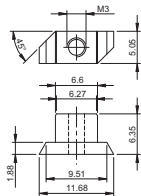
Magnetic
cylinder
sensors with
a compact
design

Magnetic
cylinder
sensors with
special
properties

Magnetic
sensors for
object detection

Magneto-
inductive
displacement
sensors for
analog position
measurement

Accessories
for magnetic
cylinder sensors



Can be inserted in slot from above.
Quick and time-saving.



Switching point adjusted in seconds! Open screw with one
turn, adjust position, tighten.



Switching point cannot be lost. Even if you replace the
sensor, the adjusted switching point is permanently set by
the mounting bracket.



Recommended accessories
(please order separately)



Special accessories for magnetic cylinder sensors, such as
installation tools, cable clips, or tube cuffs, can be found in
this catalog on page 910.

Magnetic Cylinder Sensors with Mounting System

BMF 21

Integral swinging bracket arm for self adjustment across a wide range of cylinder diameters.

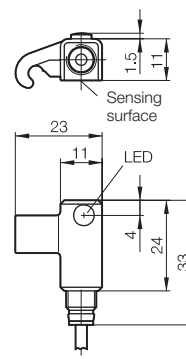
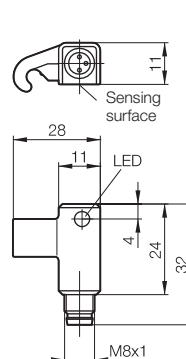
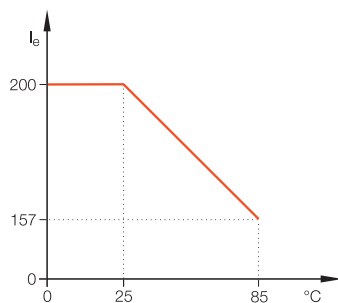


Series	BMF 21	BMF 21
Properties	For cylinders with tie rod, DUO rail, round cylinder and profile cylinder with M8 connector	For cylinders with tie rod, DUO rail, round cylinder and profile cylinder with direct PUR cable
PNP, NO	Ordering code Part number	BMF0029 BMF 21K-PS-C-2-S49
NPN, NO	Ordering code Part number	BMF0023 BMF 21K-NS-C-2-S49
Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d	≤ 3.1 V	≤ 3.1 V
Rated insulation voltage U_i	75 V DC	75 V DC
Rated operating current I_o	200 mA	200 mA
No-load supply current I_o max.	≤ 30 mA	≤ 30 mA
Polarity reversal/short-circuit protected	Yes/Yes	Yes/Yes
Rated switching field strength $I H_n I$	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
Assured switching field strength $I H_a I$	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
Hysteresis of $I H_n I$	$\leq 45\%$	$\leq 45\%$
Temperature drift of switch-on point of $I H_n I$	≤ 0.3 %/°C	≤ 0.3 %/°C
Turn-on delay	≤ 0.05 ms	≤ 0.05 ms
Turn-off delay	≤ 0.05 ms	≤ 0.05 ms
Ambient temperature T_a	-25...+85 °C	-25...+85 °C
Degree of protection as per IEC 60529	IP 67	IP 67
Approval	CE, cULus	CE
Housing material	PBT (fiberglass reinforced)	PBT (fiberglass reinforced)
Cable/suggested mating cable	BCC M313-0000-10-001-PX43T2-050	26 AWG

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 21 can be found on page 873.

Additional cable lengths on request

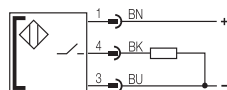
Temperature load curve



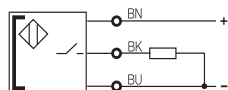
Wiring diagrams

NO

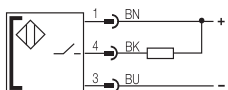
PNP cable



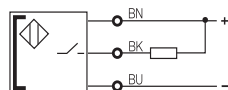
PNP connector



NPN cable



NPN connector



Magnetic Cylinder Sensors with Mounting System BMF 21 mounting bracket



Stainless steel

Mounting bracket for Slot	BMF 21	BMF 21	BMF 21	BMF 21
	Tie rod	Profile/tie rod	Profile/tie rod	Round cylinder
Ordering code	BAM00KY	BAM00KT	BAM00KU	BAM00KW
Part number	BMF 21-HW-8	BMF 21-HW-10	BMF 21-HW-10-E	BMF 21-HW-11
Cylinder type	For pneumatic cylinders with tie rod. Any piston diameter, tie rod diameter up to 6.5 mm . Pneumatic cylinder with DUO rail (Festo), any piston diameter	For pneumatic cylinders with tie rod. Any piston diameter, tie rod diameter up to 17 mm . For pneumatic cylinder with tie rod integrated in housing (profile). Any piston diameter, profile width up to 17 mm .	For pneumatic cylinders with tie rod. Any piston diameter, tie rod diameter up to 17 mm . For pneumatic cylinder with tie rod integrated in housing (profile). Any piston diameter, profile width up to 17 mm . 303 Stainless steel	For pneumatic cylinders without tie rod/rail. Piston diameter 8...80 mm . Mounting bracket usable only with hose clamps.
Cylinder				



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

BMF 103
BMF 303
BMF 305

BMF 21
Total Productive Maintenance

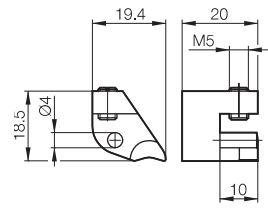
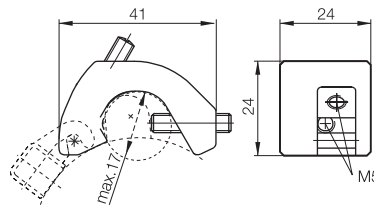
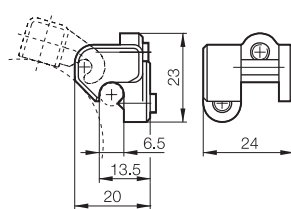
Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.





Magnetic Cylinder Sensors

Magnetic cylinder sensors with a compact design

Compact magnetic cylinder sensors are adapted to C-slot and T-slot shapes and thus have a perfect hold. They can be installed flush in the respective slot either by sliding in or dropping in from above.

Global: The complete series of standard sensors

Magnetic standard cylinder sensors are standard stock, can be used around the world, and meet worldwide standards. They offer an optimal price/performance ratio.

Compact designs for

- Insertion from above or the side
- Cable and connector versions
- V-Twin variants available



Global



Magnetic Cylinder Sensors with a Compact Design

Contents

Magnetic cylinder sensors with a compact design

BMF 204 Global	876
BMF 214 Global	878
BMF 243 Global	880
BMF 235 Global	882
BMF 307	884



Magnetic Cylinder Sensors with a Compact Design BMF 204 Global

Installed and adjusted quickly and easily

The retaining element is integrated into the sensor.

Can also be used in space-critical applications

Flush-fitting, the sensor "disappears" in the slot.

Optimum solution for every gripper and short-stroke cylinder

Miniature design, extremely short

C-slot (size 10 slot) Slide-in Global



Series	
Properties	
PNP, NO	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d	
Rated insulation voltage U_i	
Rated operating current I_o	
No-load supply current I_0 max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Rated switching field strength $I H_n I$	
Assured switching field strength $I H_a I$	
Temperature drift of switch-on point of $I H_n I$	
On/off delay	
Ambient temperature T_a	
Degree of protection as per IEC 60529	
Approval	
Housing material	
Cable	
Suggested mating cable	
Installation	
Slot	

Basic information and definitions can be found on page 952.

Additional cable lengths on request

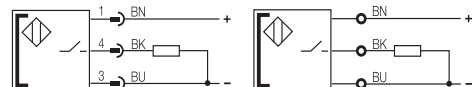


The BMF 204 and BMF 214 have an impressive, extremely compact design.

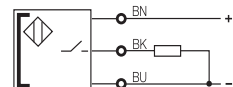
Wiring diagrams

NO

PNP cable



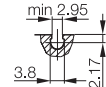
PNP connector



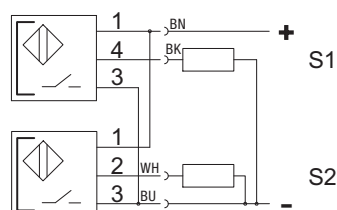
Slot dimension

C-slot (size 10 slot)

e.g. Festo



V-Twin PNP connector





Magnetic Cylinder Sensors with a Compact Design

BMF 204 Global



BMF 204	BMF 204	BMF 204	BMF 204	BMF 204
Small housing for the Festo C-slot with M8 connector	Small housing V-Twin for the Festo C-slot with M8 connector	Small housing for the Festo C-slot with M12 connector	Small housing V-Twin for the Festo C-slot with M12 connector	Small housing for the Festo C-slot with PUR cable
BMF0002	BMF0006	BMF00A6	BMF0005	BMF0001
BMF 204K-PS-C-2A-SA2-S49-00,3	BMF 204K-PS-C-2A-SA95-S75-00,3	BMF 204K-PS-C-2A-SA2-S4-00,3	BMF 204K-PS-C-2A-SA95-S4-00,3	BMF 204K-PS-C-2A-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 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
≤ 8 mA	≤ 8 mA	≤ 8 mA	≤ 8 mA	≤ 8 mA
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 0.3%/°C	≤ 0.3%/°C	≤ 0.3%/°C	≤ 0.3%/°C	≤ 0.3%/°C
≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable, 28 AWG
BOC M313-0000-10-001-VX43T2-050-C013	BOC M314-0000-10-003-VX44T2-050-C013	BOC M415-0000-1A-003-VX44T2-050-C013	BOC M415-0000-1A-003-VX44T2-050-C013	
Slide-in	Slide-in	Slide-in	Slide-in	28 AWG Slide-in
U C-slot (size 10 slot)	U C-slot (size 10 slot)	U C-slot (size 10 slot)	U C-slot (size 10 slot)	U C-slot (size 10 slot)



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

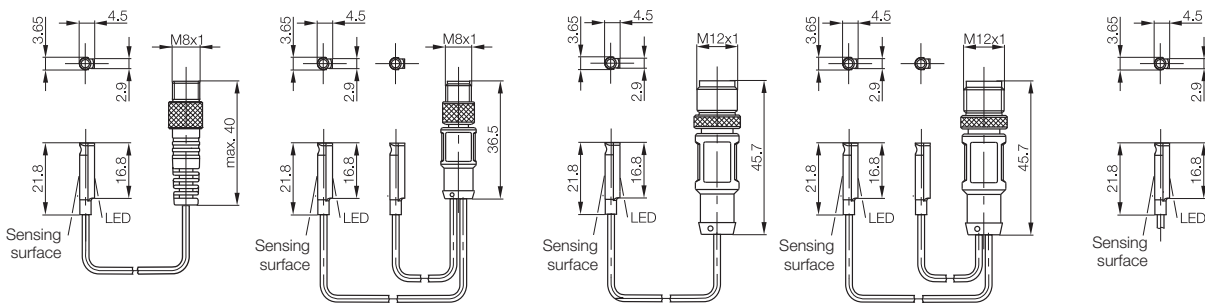
BMF 204 Global
BMF 214 Global
BMF 243 Global
BMF 235 Global
BMF 307

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

Magnetic Cylinder Sensors with a Compact Design BMF 214 Global

Installed and adjusted quickly and easily

The retaining element is integrated into the sensor.

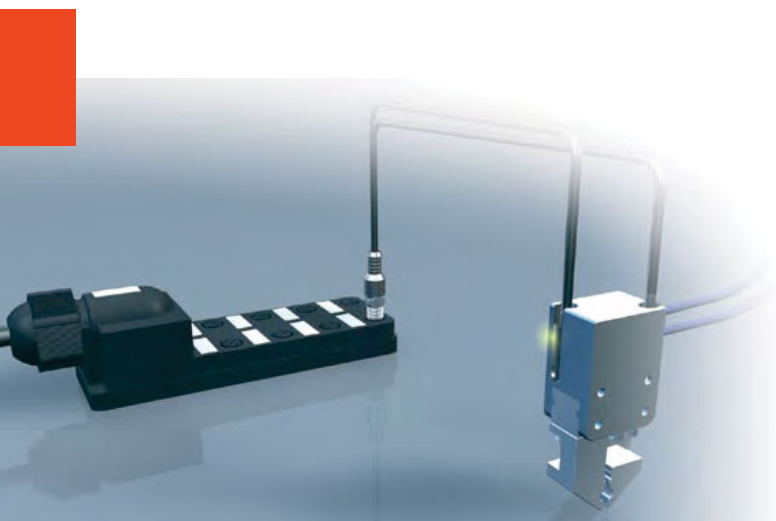
Can also be used in space-critical applications

Flush-fitting, the sensor "disappears" in the slot.

Optimum solution for every gripper and short-stroke cylinder

Miniature design, extremely short.

C-slot (rounded slot) Slide-in Global



V-Twin – two sensors, one connector

- Less installation hardware
- Less wiring
- Less installation time
- Less cost

Series	
Properties	
PNP, NO	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d	
Rated insulation voltage U_i	
Rated operating current I_o	
No-load supply current I_0 max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Rated switching field strength $I H_n I$	
Assured switching field strength $I H_a I$	
Temperature drift of switch-on point of $I H_n I$	
On/off delay	
Ambient temperature T_a	
Degree of protection as per IEC 60529	
Approval	
Housing material	
Cable	
Suggested mounting cable	
Installation	
Slot	

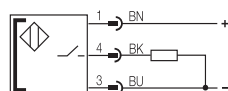
Basic information and definitions can be found on page 952.

Additional cable lengths on request

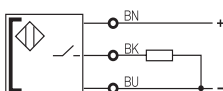
Wiring diagrams

NO contact

PNP cable



PNP connector



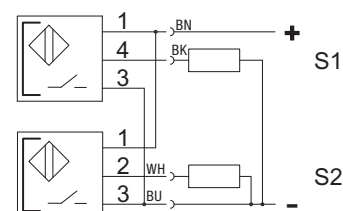
Slot dimension

C-slot (rounded slot)

e.g. SMC



V-Twin PNP connector





Magnetic Cylinder Sensors with a Compact Design

BMF 214 Global



BMF 214	BMF 214	BMF 214	BMF 214	BMF 214
Small housing for the SMC C-slot with M8 connector	Small housing V-Twin for the SMC C-slot with M8 connector	Small housing for the SMC C-slot with M12 connector	Small housing V-Twin for the SMC C-slot with M12 connector	Small housing for the SMC C-slot with PUR cable
BMF00A2	BMF00A5	BMF00FC	BMF00A4	BMF00A1
BMF 214K-PS-C-2A-SA2-S49-00,3	BMF 214K-PS-C-2A-SA95-S75-00,3	BMF 214K-PS-C-2A-SA2-S4-00,3	BMF 214K-PS-C-2A-SA95-S4-00,3	BMF 214K-PS-C-2A-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 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
≤ 8 mA	≤ 8 mA	≤ 8 mA	≤ 8 mA	≤ 8 mA
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 0.3%/°C	≤ 0.3%/°C	≤ 0.3%/°C	≤ 0.3%/°C	≤ 0.3%/°C
≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable,
BCC M313-0000-10-001-VX43T2-050-C013	BCC M314-0000-10-003-VX44T2-050-C013	BCC M415-0000-1A-003-VX44T2-050-C013	BCC M415-0000-1A-003-VX44T2-050-C013	28 AWG
Slide-in	Slide-in	Slide-in	Slide-in	Slide-in
U C-slot (rounded slot)	U C-slot (rounded slot)	U C-slot (size 10 slot)	U C-slot (rounded slot)	U C-slot (rounded slot)



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

BMF 204 Global

BMF 214 Global

BMF 243 Global

BMF 235 Global

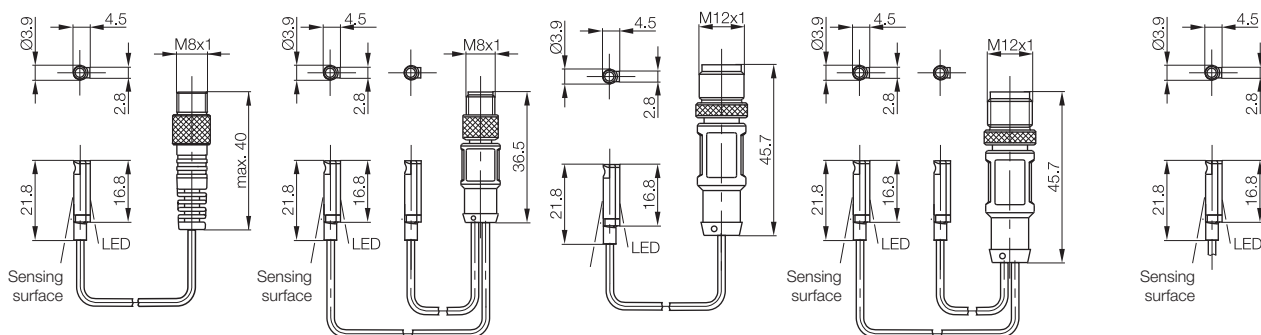
BMF 307

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

Magnetic Cylinder Sensors with a Compact Design

BMF 243 Global

New mounting concept

Solid hold in the slot, sensor cannot be wrenched from the slot.

Can be installed in the slot from above

Can be installed even on cylinders with an end plate.

Compact design, i.e. can be mounted flush

Can also be used in space-critical applications

Short housing (24 mm)

Can also be used in space-critical applications



C-slot (rounded slot and size 10 slot)

Drop-in

Global



Series Properties		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d		
Rated insulation voltage U_i		
Rated operating current I_o		
No-load supply current I_o max.		
Polarity reversal protected/transposition protected/short-circuit protected		
Rated switching field strength $I H_n I$		
Assured switching field strength $I H_a I$		
On/off delay		
Ambient temperature T_a		
Degree of protection as per IEC 60529		
Approval		
Housing material		
Cable		
Suggested mating cable		
Installation		
Slot		

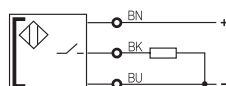
Basic information and definitions can be found on page 952.

Additional cable lengths on request

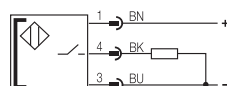
Wiring diagrams

NO

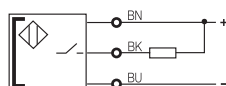
PNP cable



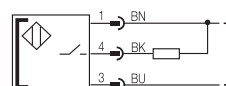
PNP connector



NPN cable

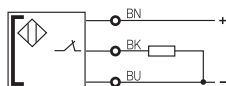


NPN connector

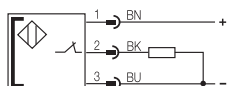


NC contact

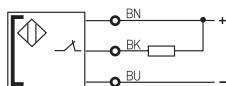
PNP cable



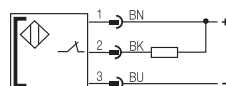
PNP connector



NPN cable



NPN connector





Magnetic Cylinder Sensors with a Compact Design

BMF 243 Global



Global



Global



Global



Global

BMF 243	BMF 243	BMF 243	BMF 243
The new standard for every C-slot (rounded slot) with M8 connector	The new standard for every C-slot (rounded slot) with M8 connector	The new standard for every C-slot (rounded slot) with M12 connector	The new standard for every C-slot (rounded slot) with direct PUR cable
BMF00EL	BMF00ET	BMF00ER	BMF00EF
BMF 243K-PS-C-2A-SA2-S49-00,3	BMF 243K-PS-C-2A-SA95-S75-00,3	BMF 243K-PS-C-2A-SA2-S4-00,3	BMF 243K-PS-C-2A-PU-02
BMF00EM			BMF00EH
BMF 243K-PO-C-2A-SA2-S49-00,3			BMF 243K-PO-C-2A-PU-02
BMF00EN			BMF00EJ
BMF 243K-NS-C-2A-SA2-S49-00,3			BMF 243K-NS-C-2A-PU-02
BMF00EP			BMF00EK
BMF 243K-NO-C-2A-SA2-S49-00,3			BMF 243K-NO-C-2A-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2.4 V	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V
75 V DC	75 V DC	75 V DC	75 V DC
100 mA	100 mA	100 mA	100 mA
7.5 mA	7.5 mA	7.5 mA	7.5 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
2 kA/m (25 Gauss)	2 kA/m (25 Gauss)	2 kA/m (25 Gauss)	2 kA/m (25 Gauss)
≥ 2.4 kA/m (30 Gauss)	≥ 2.4 kA/m (30 Gauss)	≥ 2.4 kA/m (30 Gauss)	≥ 2.4 kA/m (30 Gauss)
≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms	≤ 0.07 ms/≤ 0.07 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus
PA 12 and A2 steel	PA 12 and A2 steel	PA 12 and A2 steel	PA 12 and A2 steel
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable
BCC M313-0000-10-001-VX43T2-050-C013	BCC M314-0000-10-003-VX43T2-050-C013	BCC M415-0000-1A-003-VX44T2-050-C013	28 AWG
Drop-in	Drop-in	Drop-in	Drop-in
┐ C-slot (rounded slot and size 10 slot)	┐ C-slot (rounded slot and size 10 slot)	┐ C-slot (rounded slot and size 10 slot)	┐ C-slot (rounded slot and size 10 slot)



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

BMF 204 Global

BMF 214 Global

BMF 243 Global

BMF 235 Global

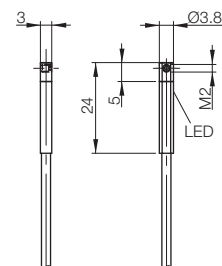
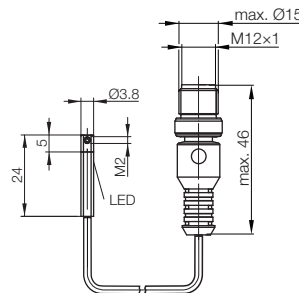
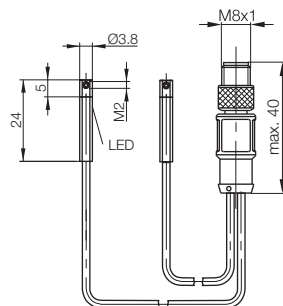
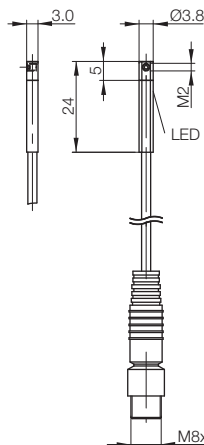
BMF 307

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories
(please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

Magnetic Cylinder Sensors with a Compact Design

BMF 235 Global

T-slot Drop-in Global

Very bright LED

Reliable detection of switching
function from far away
(25 m in bright factory building).

New mounting concept

Solid hold in the slot, sensor
cannot be wrenched from the
slot.

Knurled screw

Sensor screws in firmly, extreme-
ly secure hold in any slot (e.g.
Parker, Festo, SMC, Bosch).



Series Properties		
PNP, NO	Ordering code	
	Part number	
PNP, NC	Ordering code	
	Part number	
NPN, NO	Ordering code	
	Part number	
NPN, NC	Ordering code	
	Part number	
Supply voltage U_B		
Voltage drop U_d		
Rated insulation voltage U_i		
Rated operating current I_o		
No-load supply current I_0 max.		
Polarity reversal protected/transposition protected/short-circuit protected		
Rated switching field strength $I H_n I$		
Assured switching field strength $I H_a I$		
Temperature drift of switch-on point of $I H_n I$		
On/off delay		
Ambient temperature T_a		
Degree of protection as per IEC 60529		
Approval		
Housing material		
Cable		
Suggested mating cable		
Installation		
Slot		



Basic information and definitions can be found on page 952.

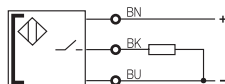
Additional cable lengths on request

See page 884 for mounting brackets for tie-rod and round body cylinders.

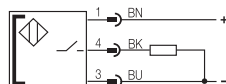
Wiring diagrams

NO

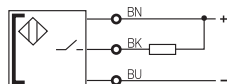
PNP cable



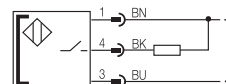
PNP connector



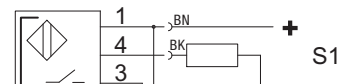
NPN cable



NPN connector

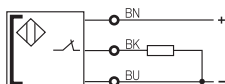


V-Twin PNP connector

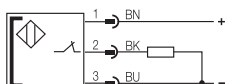


NC contact

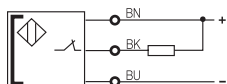
PNP cable



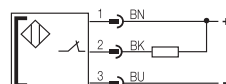
PNP connector



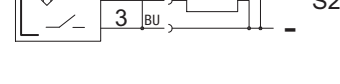
NPN cable



NPN connector



V-Twin PNP connector





Magnetic Cylinder Sensors with a Compact Design

BMF 235 Global



BMF 235	BMF 235	BMF 235	BMF 235	BMF 235
The new standard for every T-slot with M8 connector	The new standard for every T-slot V-Twin with M8 connector	The new standard for every T-slot with M12 connector	The new standard for every T-slot V-Twin with M12 connector	The new standard for every T-slot with direct PUR cable
BMF00C4 BMF 235K-PS-C-2A-SA2-S49-00,3	BMF00CA BMF 235K-PS-C-2A-SA95-S75-00,3	BMF00C5 BMF 235K-PS-C-2A-SA2-S4-00,3	BMF00C9 BMF 235K-PS-C-2A-SA95-S4-00,3	BMF00AR BMF 235K-PS-C-2A-PU-02
BMF00C6 BMF 235K-PO-C-2A-SA2-S49-00,3				BMF00AT BMF 235K-PO-C-2A-PU-02
BMF00C2 BMF 235K-NS-C-2A-SA2-S49-00,3				BMF00AU BMF 235K-NS-C-2A-PU-02
BMF00C3 BMF 235K-NO-C-2A-SA2-S49-00,3				BMF00AW BMF 235K-NO-C-2A-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 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
6 mA	6 mA	6 mA	6 mA	6 mA
Yes/No/Yes	Yes/No/Yes	Yes/No/Yes	Yes/No/Yes	Yes/No/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
≤ 0.1 ms/≤ 0.1 ms	≤ 0.1 ms/≤ 0.1 ms	≤ 0.1 ms/≤ 0.1 ms	≤ 0.1 ms/≤ 0.1 ms	≤ 0.1 ms/≤ 0.1 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
PA12	PA12	PA12	PA12	PA12
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable
BOC M313-0000-10-001-VX43T2-050-C013	BOC M314-0000-10-003-VX43T2-050-C013	BOC M415-0000-1A-003-VX44T2-050-C013	BOC M415-0000-1A-003-VX44T2-050-C013	28 AWG
Drop-in	Drop-in	Drop-in	Drop-in	Drop-in
┘┐ T-slot	┘┐ T-slot	┘┐ T-slot	┘┐ T-slot	┘┐ T-slot



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

BMF 204 Global

BMF 214 Global

BMF 243 Global

BMF 235 Global

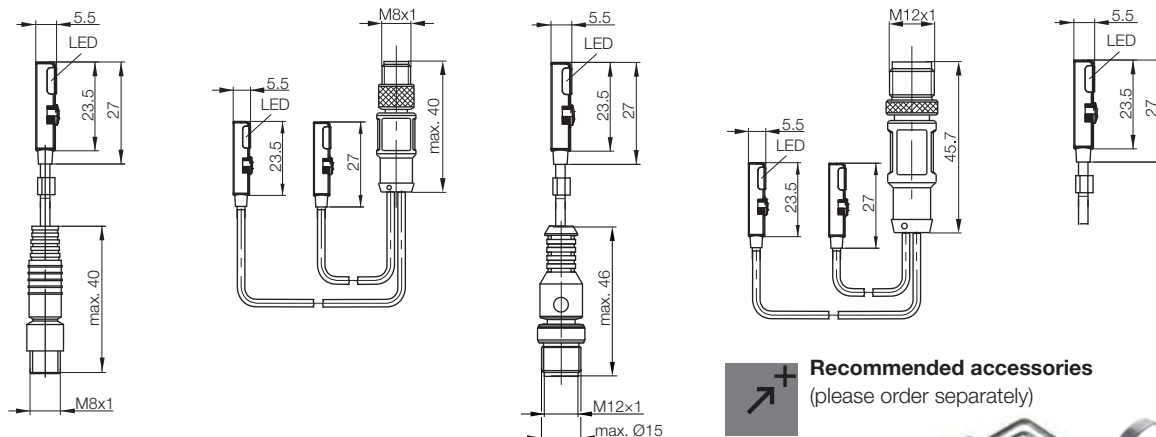
BMF 307

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as installation tools, cable clips, or tube cuffs, can be found in this catalog on page 910.

Magnetic Cylinder Sensors with a Compact Design

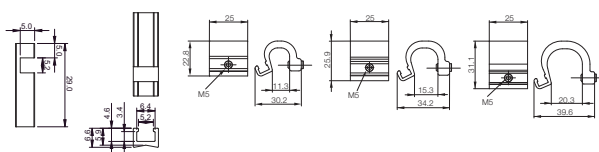
BMF 307

The robust and compact sensor for the T-slot. The shape is adapted to the slot and guarantees a strong hold. The sensor slides into the slot from the end.

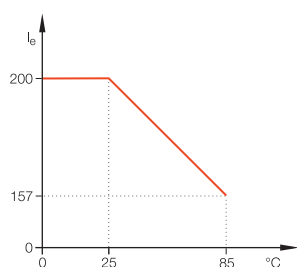
T-slot Slide-in



Mounting bracket for	BMF 235, 307, 315	BMF 235, 307, 315	BMF 235, 307, 315	BMF 235, 307, 315
Slot	Round body	Profile/tie rod	Profile/tie rod	Profile/tie rod
Ordering code	BAM0149	BAM01M9	BAM01MA	BAM01MC
Part number	BMF 307-HW-112	BMF 235-HW-109	BMF 235-HW-110	BMF 235-HW-111
Cylinder type, for example	For round body cylinders requires tube cuff	For profile/tie rod cylinders 5...11 mm	For profile/tie rod cylinders 9...15 mm	For profile/tie rod cylinders 14...20 mm



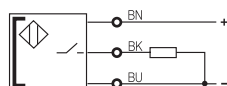
Temperature load curve



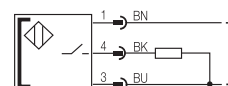
Wiring diagrams

NO

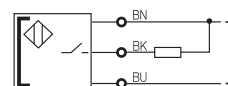
PNP cable



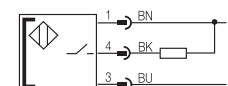
PNP connector



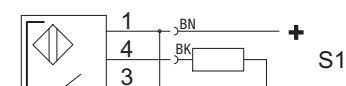
NPN cable



NPN connector

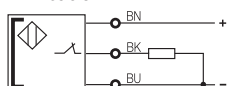


V-Twin PNP connector

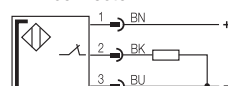


NC contact

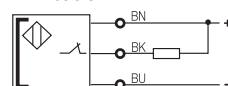
PNP cable



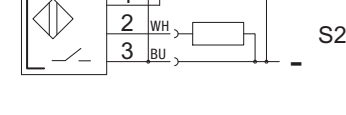
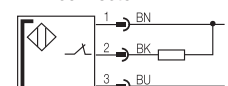
PNP connector



NPN cable



NPN connector



Series	
Properties	
PNP, NO	Ordering code
	Part number
PNP, NC	Ordering code
	Part number
NPN, NO	Ordering code
	Part number
NPN, NC	Ordering code
	Part number
Supply voltage U_B	
Voltage drop U_d	
Rated insulation voltage U_i	
Rated operating current I_o	
No-load supply current I_0 max.	
Polarity reversal protected/transposition protected/short-circuit protected	
Rated switching field strength I_{Hn}	
Assured switching field strength I_{Ha}	
Temperature drift of switch-on point of I_{Hn}	
On/off delay	
Ambient temperature T_a	
Degree of protection as per IEC 60529	
Approval	
Housing material	
Cable	
Suggested mating cable	
Installation	
Slot	

Basic information and definitions can be found on page 952.

Additional cable lengths on request



Magnetic Cylinder Sensors with a Compact Design

BMF 307



BMF 307	BMF 307	BMF 307	BMF 307	BMF 307
The compact sensor for the T-slot with M8 connector	The compact sensor for the T-slot with V-Twin M8 connector	The compact sensor for the T-slot with M12 connector	The compact sensor for the T-slot with V-Twin M12 connector	The compact sensor for the T-slot with direct PUR cable
BMF0072	BMF0077	BMF006Y	BMF0076	BMF006U
BMF307K-PS-C-2-SA2-S49-00,3	BMF307K-PS-C-2-SA95-S75-00,3	BMF307K-PS-C-2-S4-00,2	BMF307K-PS-C-2-SA95-S4-00,3	BMF307K-PS-C-2-PU-02
BMF006T				BMF006M
BMF307K-PO-C-2-SA2-S49-00,3				BMF307K-PO-C-2-PU-02
BMF006L				BMF006H
BMF307K-NS-C-2-SA2-S49-00,3				BMF307K-NS-C-2-PU-02
BMF006E				BMF0069
BMF307K-NO-C-2-SA2-S49-00,3				BMF307K-NO-C-2-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 3.1 V	≤ 3.1 V	≤ 3.1 V	≤ 3.1 V	≤ 3.1 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
30 mA	30 mA	30 mA	30 mA	30 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)	≥ 2 kA/m (25 Gauss)
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
LCP	LCP	LCP	LCP	LCP
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 4-pin	0.2 m PUR cable with M12 connector, 4-pin	0.3 m PUR cable with M12 connector, 4-pin	2 m PUR cable
BCC M313-0000-10-001-PX43T2-050	BCC M314-0000-10-003-PX43T2-050	BCC M415-0000-1A-003-PX44T2-050	BCC M415-0000-1A-003-PX44T2-050	26 AWG
Slide-in	Slide-in	Slide-in	Slide-in	Slide-in
┌┐ T-slot	┌┐ T-slot	┌┐ T-slot	┌┐ T-slot	┌┐ T-slot



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

BMF 204 Global

BMF 214 Global

BMF 243 Global

BMF 235 Global

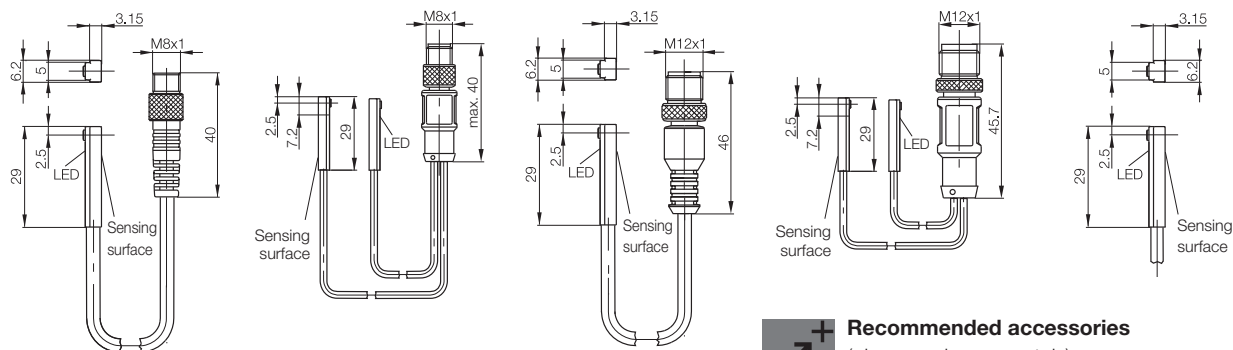
BMF 307

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories
(please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.



Magnetic Cylinder Sensors

Magnetic cylinder sensors with special properties

Our magnetic cylinder sensors with special properties such as stainless steel housing, high temperature and weld field immune come in many different varieties. By means of their broad spectrum, the special features solve almost all applications – even in demanding environments.





Magnetic Cylinder Sensors with Special Properties

Contents

Magnetic cylinder sensors with special properties

Robust metal housings - BMF 32M	888
Robust metal housings - BMF 305M	890
For the food industry - BMF 10E	891
Weld-immune electronics - BMF 32M, BMF 305M, BMF 305K, BMF 315M	892
Temperature-resistant up to 105 °C - BMF 305M, BMF 315M	894
For radially magnetized magnets - BMF 103K, BMF 303K	895
Reed switches - BMF 305K	896
Reed switches - BMF 307K	897



Magnetic Cylinder Sensors with Special Properties

Robust metal housing BMF 32M

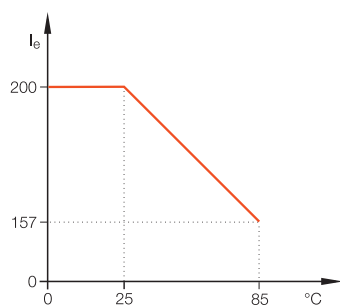
Metal housing



Series	BMF 32M	BMF 32M
Properties	Robust metal housing with M8 integral connector	Robust metal housing with M12 integral connector
PNP, NO	Ordering code Part number	BMF0088 BMF 32M-PS-C-2-S49
NPN, NO	Ordering code Part number	BMF0086 BMF 32M-NS-C-2-S49
		BMF0087 BMF 32M-PS-C-2-S4
		BMF0085 BMF 32M-NS-C-2-S4
Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d	≤ 3.1 V	≤ 3.1 V
Rated insulation voltage U_i	75 V DC	75 V DC
Rated operating current I_o	200 mA	200 mA
No-load supply current I_o max.	15 mA	15 mA
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes
Rated switching field strength $ H_n $	1.2 kA/m	1.2 kA/m
Assured switching field strength $ H_a $	2 kA/m	2 kA/m
Hysteresis of $ H_n $	45%	45%
Temperature drift of switch-on point of $ H_n $	0.3%	0.3%
On/off delay	≤ 0.05 ms/ ≤ 0.05 ms	≤ 0.05 ms/ ≤ 0.05 ms
Ambient temperature T_a	-25...+85 °C	-25...+85 °C
Degree of protection as per IEC 60529	IP 67	IP 67
Approval	CE, cULus	CE, cULus
Housing material	Aluminum	Aluminum
Suggested mating cable	BCC M323-0000-10-001-PX43T2-050	BCC M425-0000-1A-003-PX44T2-050
Installation	Can be installed on cylinder with 60°- or 90°-trapezoidal slot or with mounting bracket	Can be installed on cylinder with 60°- or 90°-trapezoidal slot or with mounting bracket

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 32M can be found on page 891.

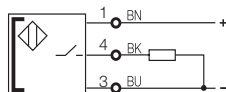
Temperature load curve



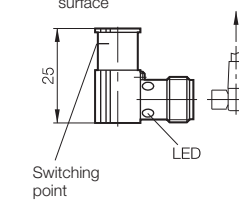
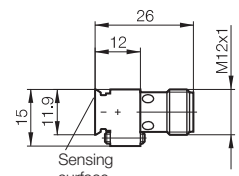
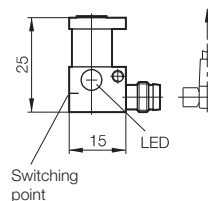
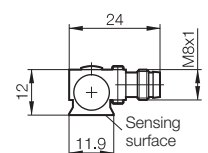
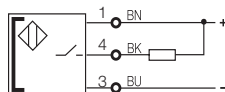
Wiring diagrams

NO

PNP connector



NPN connector



Magnetic Cylinder Sensors with Special Properties

Robust metal housing BMF 32M



Mounting bracket for Slot	BMF 32M 	BMF 32M 	BMF 32M 	BMF 32M 	BMF 32M
Ordering code	BAM00MT	BAM00MU	BAM00MW	BAM00MY	BAM00MZ
Part number	BMF 32-HW-13	BMF 32-HW-14	BMF 32-HW-15	BMF 32-HW-16	BMF 32-HW-49
Cylinder type	For pneumatic cylinders with tie rod, any piston diameter, tie rod diameter max. 11 mm	For pneumatic cylinders with trap-ezoidal rail (Bosch) type: 0 822... ■ 350 ■ 351 ■ 352 ■ 353 ■ 354 ■ 355 Any piston diameter	For pneumatic cylinders with tie rod, any piston diameter, tie rod diameter up to 17 mm Pneumatic cylinder with tie rod integrated in the housing (profile), any piston diameter, profile width up to 17 mm	For pneumatic cylinders with tie rod, any piston diameter, tie rod diameter up to 6.5 mm Pneumatic cylinder with DUO rail (Festo), any piston diameter	Small tie rod cylinders 3/4" to 1-1/8" bore
Cylinder					



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Robust metal housing

For the food industry

Weld-immune electronics

Temperature-resistant up to 105 °C

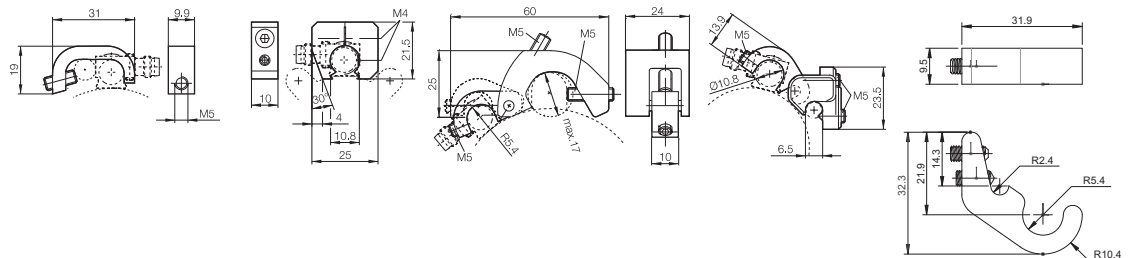
For radially magnetized magnets

Reed switches

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Recommended accessories (please order separately)

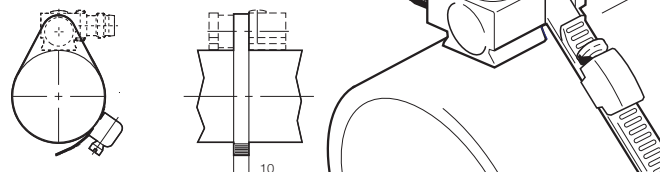


Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

Hose clamp BMF size 10...18

Made of stainless steel for pneumatic cylinders without tie rod/rail, piston diameter up to 80 mm

Please order hose clamp separately. See page 910.



Magnetic Cylinder Sensors with Special Properties

Robust metal housing BMF 305M

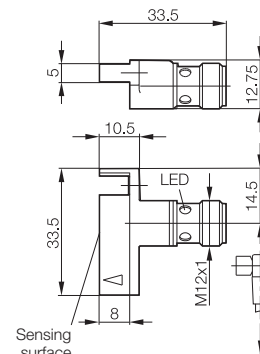
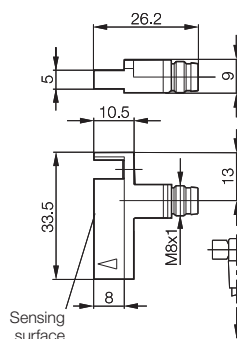
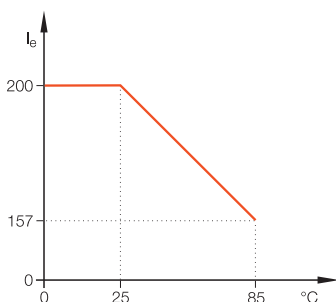
Metal housing



Series	BMF 305M	BMF 305M
Properties	The robust universal sensor made of metal for position monitoring with M8 connector	The robust universal sensor made of metal for position monitoring with M12 connector
PNP, NO	Ordering code Part number	BMF008F BMF 305M-PS-C-2-S49
NPN, NO	Ordering code Part number	BMF008C BMF 305M-NS-C-2-S49
Supply voltage U_B	10...30 V DC	10...30 V DC
Voltage drop U_d	≤ 3.1 V	≤ 3.1 V
Rated insulation voltage U_i	75 V DC	75 V DC
Rated operating current I_o	200 mA	200 mA
No-load supply current I_o max.	30 mA	15 mA
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes
Rated switching field strength $I H_n I$	1.2 kA/m (15 Gauss)	1.2 kA/m (15 Gauss)
Assured switching field strength $I H_a I$	2 kA/m (25 Gauss)	2 kA/m (25 Gauss)
Hysteresis of $I H_n I$	45%	45%
Temperature drift of switch-on point of $I H_n I$	0.3%	0.3%
On/off delay	≤ 0.05 ms/ ≤ 0.05 ms	≤ 0.05 ms/ ≤ 0.05 ms
Ambient temperature T_a	-25...+85 °C	-25...+85 °C
Degree of protection as per IEC 60529	IP 67	IP 67
Approval	CE, cULus	CE, cULus
Housing material	Aluminum	Aluminum
Suggested mating cable	BCC M323-0000-10-001-PX43T2-050	BCC M425-0000-1A-003-PX44T2-050

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 305M can be found on page 870.

Temperature load curve



Recommended accessories
(please order separately)

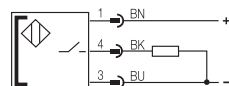


Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

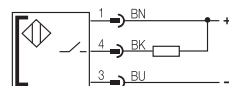
Wiring diagrams

NO

PNP connector



NPN connector



Stainless steel

Magnetic Cylinder Sensors with Special Properties For the food industry BMF 10E

BMF 10E – developed for the higher demands of the food industry. Extremely robust due to its one-piece, stainless steel housing.

ECOLAB

CE

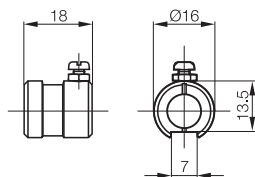


Mounting bracket:

BMF 10E-HW-19 made of stainless steel 1.4571

Ordering code: BAM00KR

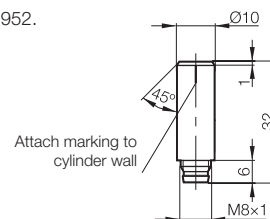
(please order separately)



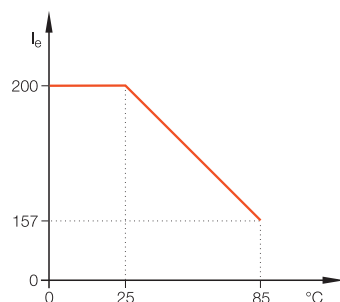
Please order tube cuff separately. See page 910.

Series	BMF 10E
Properties	The stainless steel sensor specially for the food industry
PNP, NO	Ordering code BMF001Z
	Part number BMF 10E-PS-D-2-SA1-S49
Supply voltage U_B	10...30 V DC
Voltage drop U_d	≤ 3.1 V
Rated insulation voltage U_i	75 V DC
Rated operating current I_a	200 mA
No-load supply current I_0 max.	12 mA
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes
Rated switching field strength $I H_n$	1.2 kA/m (15 Gauss)
Assured switching field strength $I H_a$	2 kA/m (25 Gauss)
Hysteresis of $I H_n$	45%
Temperature drift of switch-on point of $I H_n$	0.3%
On/off delay	≤ 0.05 ms/ ≤ 0.05 ms
Ambient temperature T_a	-40...+85 °C
Degree of protection as per IEC 60529	IP 69K
Approval	CE
Housing material	Stainless steel 1.4571
Suggested mating cable	BCC S323-0000-10-004-PX0334-050

Basic information and definitions can be found on page 952.



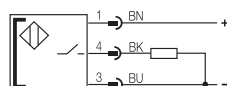
Temperature load curve



Wiring diagrams

NO

PNP connector



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Robust metal housing

For the food industry

Weld-immune electronics

Temperature-resistant up to 105 °C

For radially magnetized magnets

Reed switches

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

Magnetic Cylinder Sensors with Special Properties With weld-immune electronics BMF 32M, BMF 305M, BMF 305K

Weld-immune electronics

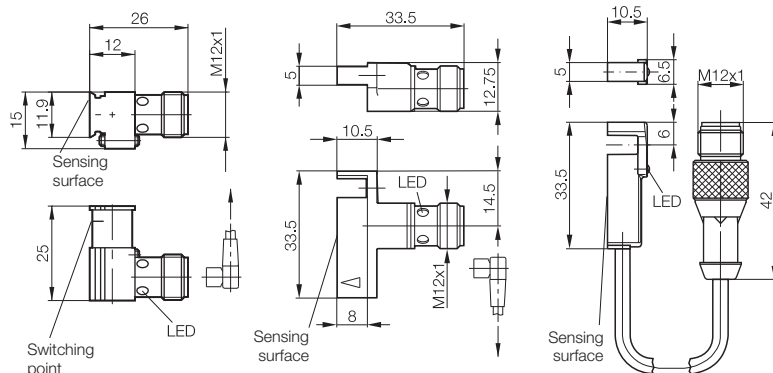


Series		BMF 32M	BMF 305M	BMF 305K	
Properties		Robust housing with M12 integral connector	Robust universal sensor made of metal for position monitoring with M12 integral connector	Universal for position monitoring with M12 connector	
PNP, NO	Ordering code	BMF008A	BMF0067	BMF0061	
	Part number	BMF 32M-PS-W-2-S4	BMF 305M-PS-W-2-S4	BMF 305K-PS-W-2-SA3-S4-00,8	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	
Voltage drop U_d		≤ 4 V	≤ 4 V	≤ 4 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Rated operating current I_o		200 mA	200 mA	200 mA	
No-load supply current I_o max.		30 mA	30 mA	20 mA	
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	
Rated switching field strength $ H_n $		1.2 kA/m	1.2 kA/m	1.2 kA/m	
Assured switching field strength $ H_a $		2 kA/m	2 kA/m	2 kA/m	
On/off delay		≤ 50 ms/ ≤ 50 ms	≤ 50 ms/ ≤ 50 ms	≤ 50 ms/ ≤ 50 ms	
Ambient temperature T_a		-25...+70 °C	-25...+70 °C	-25...+70 °C	
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67	
Approval		CE	CE, cULus	CE, cULus	
Material	Housing	Aluminum	Aluminum	LCP	
Cable				0.8 m PUR cable M12 connector, 4-pin BCC M415-0000-1A-003-PX44T2-050	
Suggested mating cable		BCC M425-0000-1A-003-PX44T2-050	BCC M415-0000-1A-003-PX44T2-050	BCC M415-0000-1A-003-PX44T2-050	
Installation		Can be installed on cylinder with 60° or 90°-trapezoidal slot or with mounting bracket	Installation with mounting bracket	Installation with mounting bracket	

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 32M can be found on page 889; for BMF 305M and 305K see page 868.

Suitable for AC welding environments

The series BMF 3...-W- are suitable for applications with extreme conditions. The metal housings are resistant to weld splatter. Applications with welding currents of over 25 kA do not impair the functionality of the sensor. The output state of the sensor is stored during AC welding.



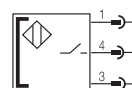
Wiring diagrams

NO

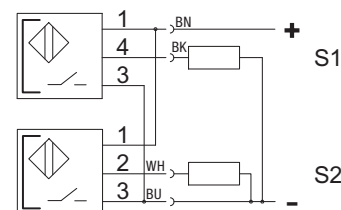
PNP cable



PNP connector



V-Twin PNP connector



Magnetic Cylinder Sensors with Special Properties With weld-immune electronics BMF 315M



With connector LED

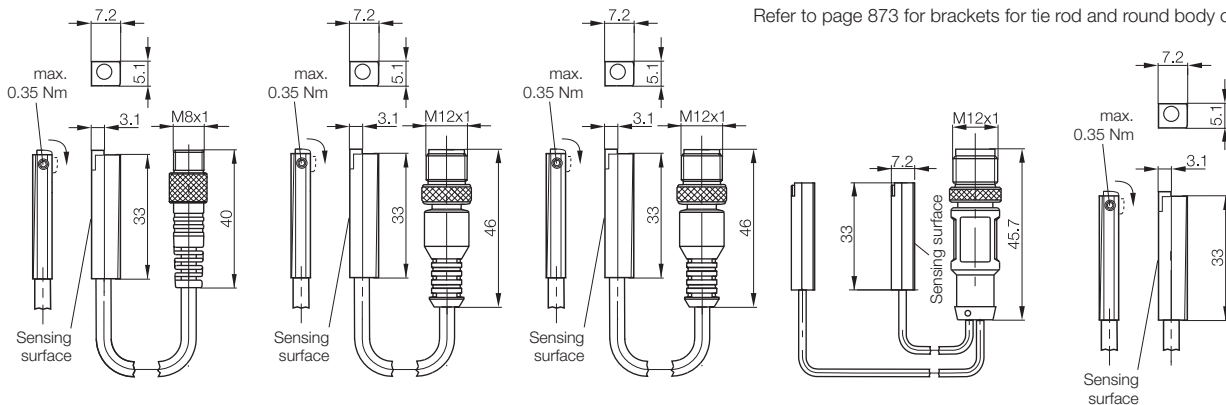
BMF 315M	BMF 315M	BMF 315M	BMF 315M	BMF 315M
Metal drop-in compact T-slot sensor for demanding applications with an M8 connector	Metal drop-in compact T-slot sensor for demanding applications with an M12 connector	Metal drop-in compact T-slot sensor for demanding applications with an M12 connector	Metal drop-in compact T-slot sensor for demanding applications with an V-Twin M12 connector	Metal drop-in compact T-slot sensor for demanding applications with a PUR cable
BMF0082	BMF0081	BMF00C1	BMF0084	BMF007Z
BMF 315M-PS-W-2-S49-00,3	BMF 315M-PS-W-2-S4-00,3	BMF 315M-PS-W-2-SA4-S4-00,3	BMF 315M-PS-W-2-SA95-S4-00,3	BMF 315M-PS-W-2-PU-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 4 V	≤ 4 V	≤ 4 V	≤ 4 V	≤ 4 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
20 mA	20 mA	20 mA	20 mA	20 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
1.2 kA/m	1.2 kA/m	1.2 kA/m	1.2 kA/m	1.2 kA/m
2 kA/m	2 kA/m	2 kA/m	2 kA/m	2 kA/m
≤ 50 ms/≤ 50 ms	≤ 50 ms/≤ 50 ms	≤ 50 ms/≤ 50 ms	≤ 50 ms/≤ 50 ms	≤ 50 ms/≤ 50 ms
-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+85 °C	-25...+70 °C
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
0.3 m PUR cable with M8 connector, 3-pin BCC M313-0000-10-001-PX43T2-050	0.3 m PUR cable with M12 connector, 4-pin BCC M415-0000-1A-003-PX44T2-050	0.3 m PUR cable with M12 connector, 4-pin BCC M415-0000-1A-003-PX44T2-050	0.3 m PUR cable with M12 connector, 4-pin BCC M415-0000-1A-003-PX44T2-050	2 m PUR cable
Drop-in T-slot	Drop-in T-slot	Drop-in T-slot	Drop-in T-slot	Drop-in T-slot



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design



Refer to page 873 for brackets for tie rod and round body cylinders

Magnetic cylinder sensors with special properties

Robust metal housing

For the food industry

Weld-immune electronics

Temperature-resistant up to 105 °C

For radially magnetized magnets

Reed switches

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

Magnetic Cylinder Sensors with Special Properties

High-temperature resistant up to 105 °C

BMF 305M, 315M

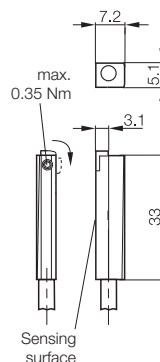
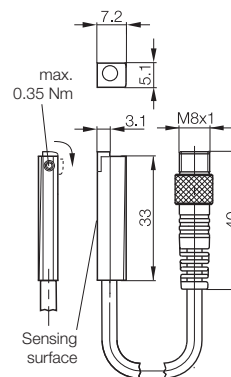
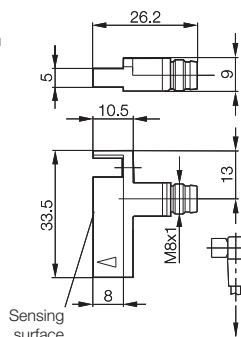
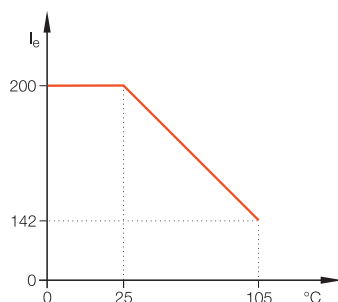
105 °C



Series	BMF 305M	BMF 315M	BMF 315M
Properties	Universal for position monitoring with integral M8 connector	For particularly demanding applications with an M8 connector	For particularly demanding applications with a direct PUR cable
PNP, NO	Ordering code BMF0066	BMF007Y	BMF007U
Part number	BMF 305M-PS-C-2-SA4-S49	BMF 315M-PS-D-2-SA3-S49-00,3	BMF 315M-PS-D-2-SA3-PU-02
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d	≤ 3.1 V	≤ 3.1 V	≤ 3.1 V
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC
Rated operating current I_o	200 mA	200 mA	200 mA
No-load supply current I_o max.	15 mA	15 mA	15 mA
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Rated switching field strength $I H_n I$	1.2 kA/m	1.2 kA/m	1.2 kA/m
Assured switching field strength $I H_a I$	2 kA/m	2 kA/m	2 kA/m
On/off delay	≤ 0.05 ms/ ≤ 0.05 ms	≤ 0.05 ms/ ≤ 0.05 ms	≤ 0.05 ms/ ≤ 0.05 ms
Ambient temperature T_a	-25...105 °C	-25...105 °C	-25...105 °C
Degree of protection as per IEC 60529	IP 65	IP 67	IP 67
Approval	CE	CE, cULus	CE, cULus
Housing material	Aluminum	Aluminum	Aluminum
Cable		0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable
Suggested mating cable	BCC M323-0000-10-001-PX43T2-050	BCC M313-0000-10-001-PX43T2-050	28 AWG
Installation	Installation with mounting bracket	Drop-in T-slot	Drop-in T-slot

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 305M can be found on page 868.

Temperature load curve



Recommended accessories (please order separately)

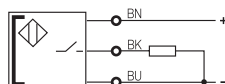


Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

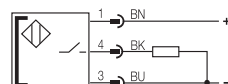
Wiring diagrams

NO

PNP cable



PNP connector



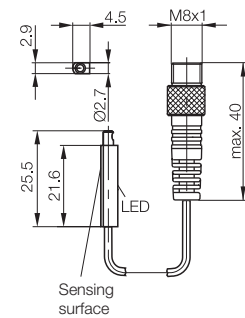
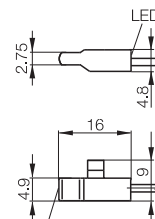
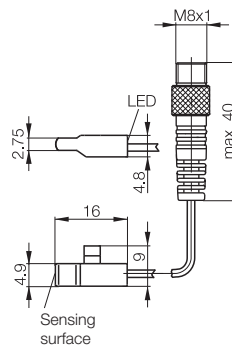
Radially magnetized

Magnetic Cylinder Sensors with Special Properties For radially magnetized magnets BMF 103K, BMF 303K



Series		BMF 103K	BMF 103K	BMF 303K
Properties		Perpendicular cable exit with M8 connector	Perpendicular cable exit with PUR cable	Cylinder sensor for all common cylinders with M8 connector
PNP, NO	Ordering code	BMF001P	BMF001N	BMF004C
	Part number	BMF 103K-PS-C-2A-SA7-S49-00,3	BMF 103K-PS-C-2A-SA7-PU-02	BMF 303K-PS-C-2A-SA7-S49-00,3
PNP, NC	Ordering code			BMF00AH
	Part number			BMF 303K-PO-C-2A-SA7-S49-00,3
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d		≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC
Rated operating current I_o		100 mA	100 mA	100 mA
No-load supply current I_o max.		8 mA	8 mA	8 mA
Polarity reversal protected/transposition protected/short-circuit protected		Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
Rated switching field strength $I H_n I$		1.2 kA/m	1.2 kA/m	1.2 kA/m
Assured switching field strength $I H_a I$		2 kA/m	2 kA/m	2 kA/m
On/off delay		≤ 0.07 ms/ ≤ 0.07 ms	≤ 0.07 ms/ ≤ 0.07 ms	≤ 0.07 ms/ ≤ 0.07 ms
Ambient temperature T_a		-25...+85 °C	-25...+85 °C	-25...+85 °C
Degree of protection as per IEC 60529		IP 67	IP 67	IP 67
Approval		CE, cULus	CE, cULus	CE, cULus
Housing material		LCP	LCP	LCP
Cable		0.3 m PUR cable with M8 connector, 3-pin	2 m PUR cable	0.3 m PUR cable with M8 connector, 3-pin
Suggested mating cable		BCC M313-0000-10-001-PX43T2-050		BCC M313-0000-10-001-PX43T2-050
Installation		Installation with mounting bracket	Installation with mounting bracket	Installation with mounting bracket

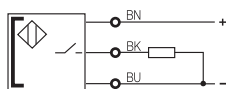
Basic information and definitions can be found on page 952, associated mounting brackets for BMF 103K can be found on page 860; for BMF 303K see page 864.



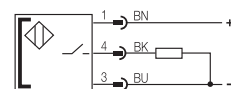
Wiring diagrams

NO

PNP cable

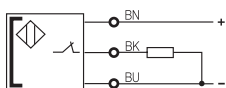


PNP connector

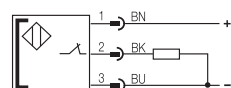


NC contact

PNP cable



PNP connector



Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Robust metal housing

For the food industry

Weld-immune electronics

Temperature-resistant up to 105 °C

For radially magnetized magnets

Reed switches

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

Magnetic Cylinder Sensors with Special Properties

Reed switch BMF 305K

Reed



Series		BMF 305K Reed	BMF 305K Reed	BMF 305K Reed
Properties		Universal position monitoring reed switch	Universal position monitoring reed switch	Universal position monitoring reed switch
PNP, NO (DC)	Ordering code	BMF0063	BMF0062	
	Part number	BMF 305K-R-PS-F-3-S49-00,2	BMF 305K-R-PS-F-3-03	
NO (AC)/polarized, NO (DC)	Ordering code			BMF0064
	Part number			BMF 305K-R-US-L-3-03
Sensed medium		Magnetic field	Magnetic field	Magnetic field
Supply voltage U_B		10...30 V DC	10...30 V DC	6...240 V AC/DC
Switching capacity max. reed contact		10 W	10 W	10 W
Rated operating current I_o		500 mA	500 mA	128 mA at 24 V AC/DC 86 mA at 115 V AC/DC 43 mA at 230 V AC/DC
Minimum operational current I_m				3 mA
Polarity reversal protected/transposition protected/short-circuit protected		No/No/No	No/No/No	No/No/No
On/off delay		≤ 0.7 ms/ ≤ 0.7 ms	≤ 0.7 ms/ ≤ 0.7 ms	≤ 0.7 ms/ ≤ 0.7 ms
Ambient temperature T_a		-20...+70 °C	-20...+70 °C	-20...+70 °C
Degree of protection as per IEC 60529		IP 65	IP 65	IP 65
Approval		CE	CE	CE
Housing material		LCP	LCP	LCP
Cable		0.2 m PUR cable with M8 connector, 3-pin	3 m PVC, 26 AWG	3 m PVC, 26 AWG
Suggested mating cable		BCC M313-0000-10-001-PX43T2-050		
Installation		Installation with mounting bracket	Installation with mounting bracket	Installation with mounting bracket

Basic information and definitions can be found on page 952, associated mounting brackets for BMF 305K can be found on page 868.

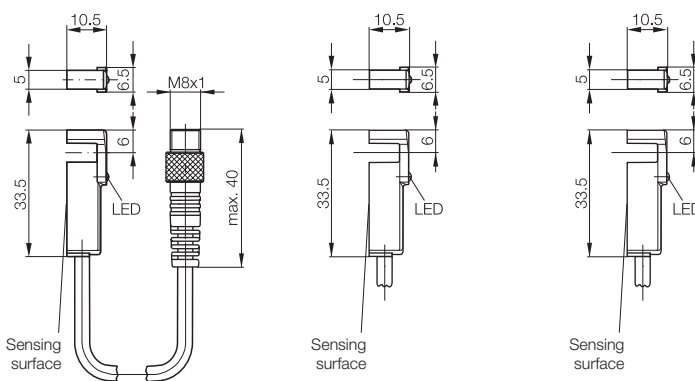
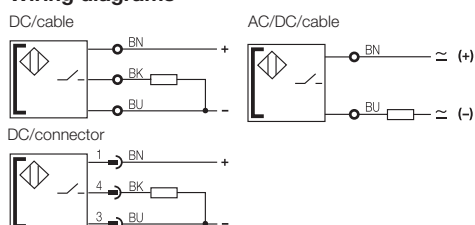
Recommended short circuit protection equipment:

Miniature fuse in accordance with IEC60127-2 Sheet 1, ≤ 2 A (fast-acting). The fuse has to lie in the load current line. The fuse must not be routed into the output line.

The **reed switches BMF 305K-R-...** have an LED to indicate function and act as an adjustment aid. The recovery diode for switching an inductive load is already integrated. For sensing the piston position in pneumatic cylinders you can choose between electronic and mechanical cylinder switches. Select whichever one fits your application.

- Fast and easy to install
- Compatible with all common cylinder sizes using corresponding mounting brackets
- No loss of the switching point when replacing a switch

Wiring diagrams



Recommended accessories (please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.

Magnetic Cylinder Sensors with Special Properties

Reed switch BMF 307K



Series		BMF 307K Reed	BMF 307K Reed	BMF 307K Reed
Properties		The compact sensor for the T-slot slide-in reed switch	The compact sensor for the T-slot slide-in reed switch	The compact sensor for the T-slot slide-in reed switch
PNP, NO (DC)	Ordering code	BMF00CP		
	Part number	BMF 307K-R-PS-F-3-02,5		
NO (AC)/ polarized, NO (DC)	Ordering code		BMF0078	BMF008P
	Part number		BMF 307K-R-AS-L-3-S49-00,2	BMF 307K-R-AS-L-3-03
Sensed medium		Magnetic field	Magnetic field	Magnetic field
Supply voltage U_B		10...30 V DC	4...30 V AC/DC	4...30 V AC/DC
Switching capacity max. reed contact		10 W	10 W	10 W
Rated operating current I_o		500 mA	128 mA at 24 V DC	128 mA at 24 V DC
Minimum operational current I_m			3 mA	3 mA
Polarity reversal protected/transposition protected/short-circuit protected		No/No/No	No/No/No	No/No/No
On/off delay		≤ 0.7 ms/ ≤ 0.2 ms	≤ 0.7 ms/ ≤ 0.2 ms	≤ 0.7 ms/ ≤ 0.2 ms
Ambient temperature T_a		-20...+70 °C	-20...+70 °C	-20...+70 °C
Degree of protection as per IEC 60529		IP 65	IP 65	IP 65
Approval		CE, cULus	CE	CE
Housing material		LCP	LCP	LCP
Cable		2.5 m PVC cable, 26 AWG	0.2 m PUR cable with M8 connector, 3-pin	3 m PVC cable, 26 AWG
Suggested mating cable			BCC M313-0000-10-001-PX43T2-050	
Installation		Slide-in	Slide-in	Slide-in
Slot		T-slot	T-slot	T-slot

Refer to page 884 for mounting brackets for tie rod and round body cylinders.

Basic information and definitions can be found on page 952.

Additional cable lengths on request

Recommended short circuit protection equipment:

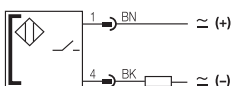
Miniature fuse in accordance with IEC60127-2 Sheet 1, ≤ 2 A (fast-acting). The fuse has to lie in the load current line. The fuse must not be routed into the output line.

The **reed switches BMF 307K-R-...** have an LED to indicate function and act as an adjustment aid. The recovery diode for switching an inductive load is already integrated. For sensing the piston position in pneumatic cylinders you can choose between electronic and mechanical cylinder switches. Select whichever one fits your application.

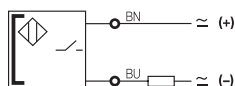
Without mounting bracket for installation in cylinders with T-slot, e.g. Festo: ADVU, ADN, DRQ, DGP; SMC, Bosch. When using reed switches you should verify functionality on the pneumatic cylinder by means of pre-testing.

Wiring diagrams

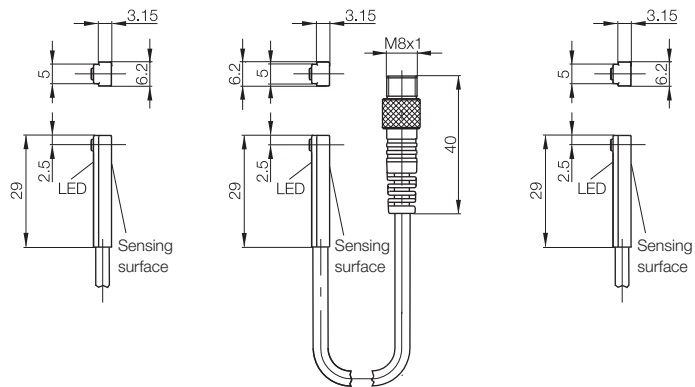
Example connectors



Cable



BU ——— Connect to ground on controller side!



Refer to page 884 for mounting brackets for the tie rod and round body cylinders.



Recommended accessories

(please order separately)



Special accessories for magnetic cylinder sensors, such as **installation tools, cable clips, or tube cuffs**, can be found in this catalog on page 910.



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Robust metal housing

For the food industry

Weld-immune electronics

Temperature-resistant up to 105 °C

For radially magnetized magnets

Reed switches

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Magnetic Cylinder Sensors

Magnetic sensors for object detection

Magnetic sensors for object detection in classic cylindrical housings have several application benefits:

- Significantly longer switching distances compared with inductive sensors of the same size
- Switch through walls of non-ferrous metal and aluminum without reducing the switching distance
- Activate from the front or side
- Flush installation in steel
- Respond to north and south pole
- Wear-free
- Vibration-resistant
- Output protected against inductive spikes





Magnetic Sensors for Object Detection

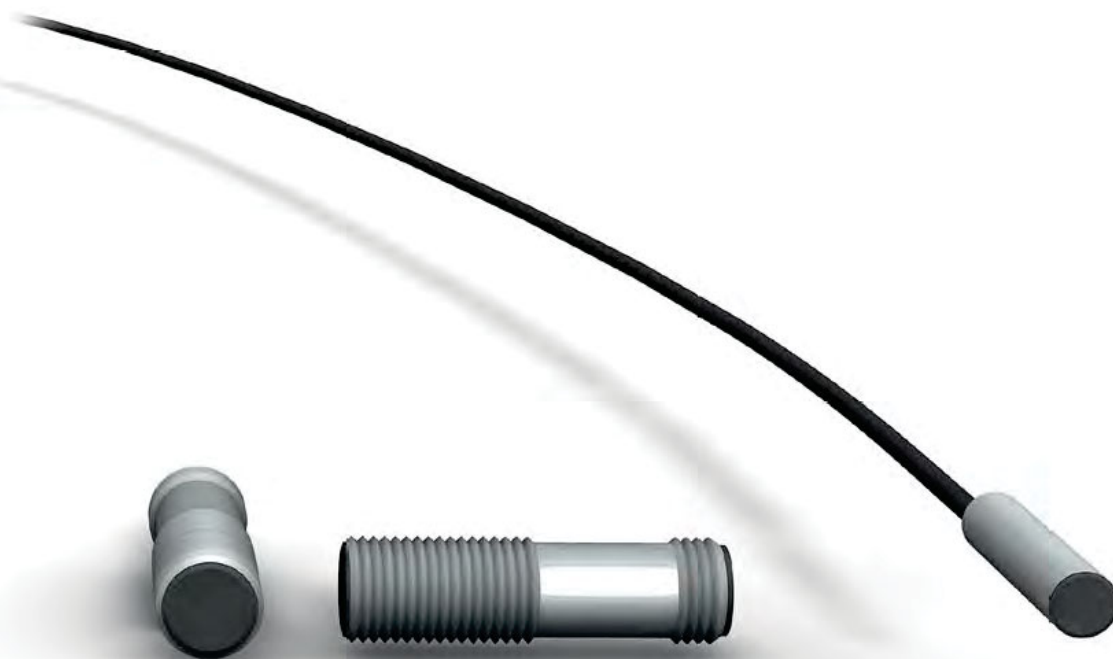
Contents

Form factors

Ø 6.5 mm - BMF 07M	900
M8×1 - BMF 08M	901
M12×1 - BMF 12M	901

Magnets

Ø 4 mm	902
Ø 10 mm	902
Ø 15 mm	903
Ø 25 mm	903
Ø 22.1 mm	903
16×12 mm	903

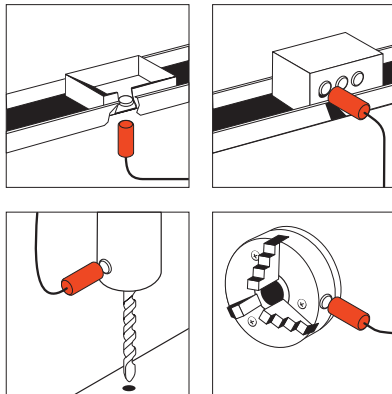


Magnetic Sensors for Object Detection

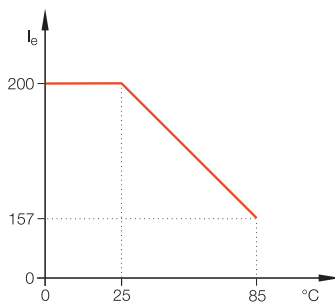
Designs, Ø 6.5 mm

Magnetic sensors feature small, extremely compact designs. Their magnets for position sensing offer longer switching distances. This means that you can detect positions up to 90 mm away using a single sensor with a diameter of 6.5 mm. These sensors are industrial grade. Positions can also be detected through non-metallic containers or pipes. The detection of codes using magnets is also possible.

- Non-contact position sensing up to a distance of 90 mm
- Object detection through non-magnetizable materials
- Compact sensors and small magnets provide optimum installation conditions



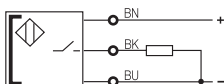
Temperature load curve



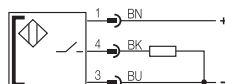
Wiring diagrams

NO

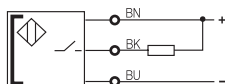
PNP cable



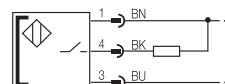
PNP connector



NPN cable



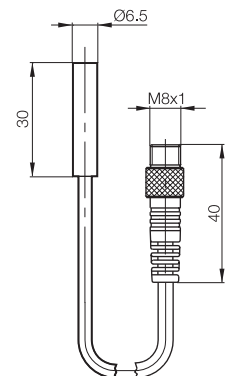
NPN connector



Series	BMF 07M	
Maximum switching distance (with BAM01EL)	90 mm	
PNP, NO	Ordering code	BMF000L
	Part number	BMF 07M-PS-D-2-SA2-S49-00,3
NPN, NO	Ordering code	BMF000C
	Part number	BMF 07M-NS-D-2-SA2-S49-00,3
Supply voltage U _B	10...30 V DC	
Voltage drop U _d	≤ 3.1 V	
Rated insulation voltage U _i	75 V DC	
Rated operating current I ₀	200 mA	
No-load supply current I ₀ max.	≤ 30 mA	
Polarity reversal protected/transposition protected/short-circuit protected	Yes/Yes/Yes	
Rated switching field strength I H _n I	1.2 kA/m	
Assured switching field strength I H _a I	≥ 2 kA/m	
Hysteresis of I H _n I	≤ 45%	
Temperature drift of switch-on point of I H _n I	≤ 0.3 %/°C	
On/off delay	≤ 0.05 ms/≤ 0.05 ms	
Ambient temperature T _a	-25...+85 °C	
Function ready/error indicator		
Degree of protection as per IEC 60529	IP 67	
Approval	CE, cULus	
Housing material	Brass-coated	
Cable	0.3 m PUR cable with M8 connector, 3-pin	
Suggested mating cable	BCC M313-0000-10-001-PX43T2-050	

Basic information and definitions can be found on page 952, magnets on page 904.

Additional cable lengths on request



Magnetic Sensors for Object Detection

Designs, Ø 6.5 mm, M8x1, M12x1



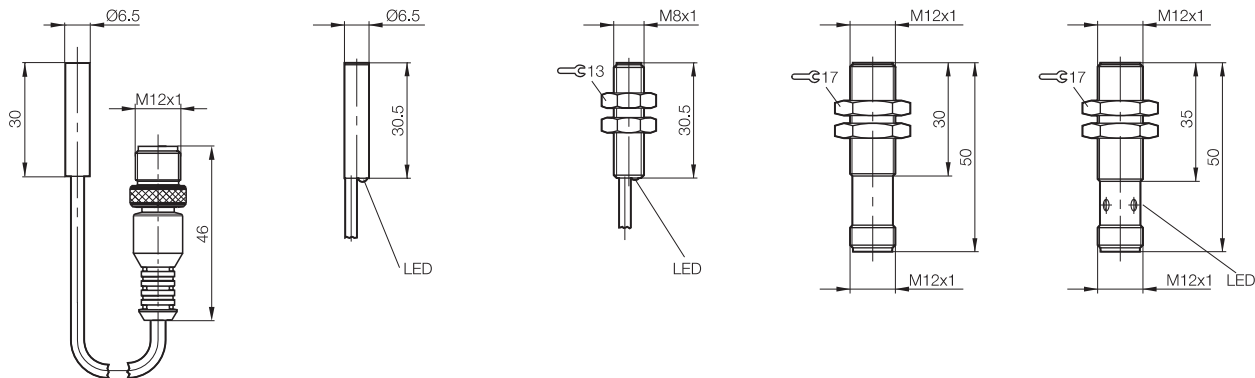
BMF 07M 90 mm	BMF 07M 90 mm	BMF 08M 90 mm	BMF 12M 90 mm	BMF 12M 90 mm
BMF000J	BMF000E	BMF000P	BMF0022	BMF00C7
BMF 07M-PS-D-2-S4-00,6	BMF 07M-PS-C-2-KPU-02	BMF 08M-PS-C-2-KPU-02	BMF 12M-PS-D-2-S4	BMF 12M-PS-C-2-S4
	BMF0008	BMF000M	BMF0021	
	BMF 07M-NS-C-2-KPU-02	BMF 08M-NS-C-2-KPU-02	BMF 12M-NS-D-2-S4	
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 3.1 V	≤ 3.1 V	≤ 3.1 V	≤ 3.1 V	≤ 3.1 V
75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 15 mA
Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes	Yes/Yes/Yes
1.2 kA/m	1.2 kA/m	1.2 kA/m	1.2 kA/m	1.2 kA/m
≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m	≥ 2 kA/m
≤ 45%	≤ 45%	≤ 45%	≤ 45%	≤ 45%
≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C	≤ 0.3 %/°C
≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms	≤ 0.05 ms/≤ 0.05 ms
-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+70 °C
	LED yellow	LED yellow		LED yellow
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated
0.6 m PUR cable with M12 connector, 4-pin	2 m PUR cable 26 AWG	2 m PUR cable 26 AWG	M12 connector, 4-pin	M12 connector, 4-pin
BCC M415-0000-1A-003-PX44T2-050			BCC M415-0000-1A-003-PX44T2-050	BCC M415-0000-1A-003-PX44T2-050



Magnetic
cylinder
sensors

Magnetic
cylinder
sensors with
mounting
system

Magnetic
cylinder
sensors with
a compact
design



Magnetic
cylinder
sensors with
special
properties

Magnetic
sensors for
object detection

Form factors
Magnets

Magneto-
inductive
displacement
sensors for
analog position
measurement

Accessories
for magnetic
cylinder sensors

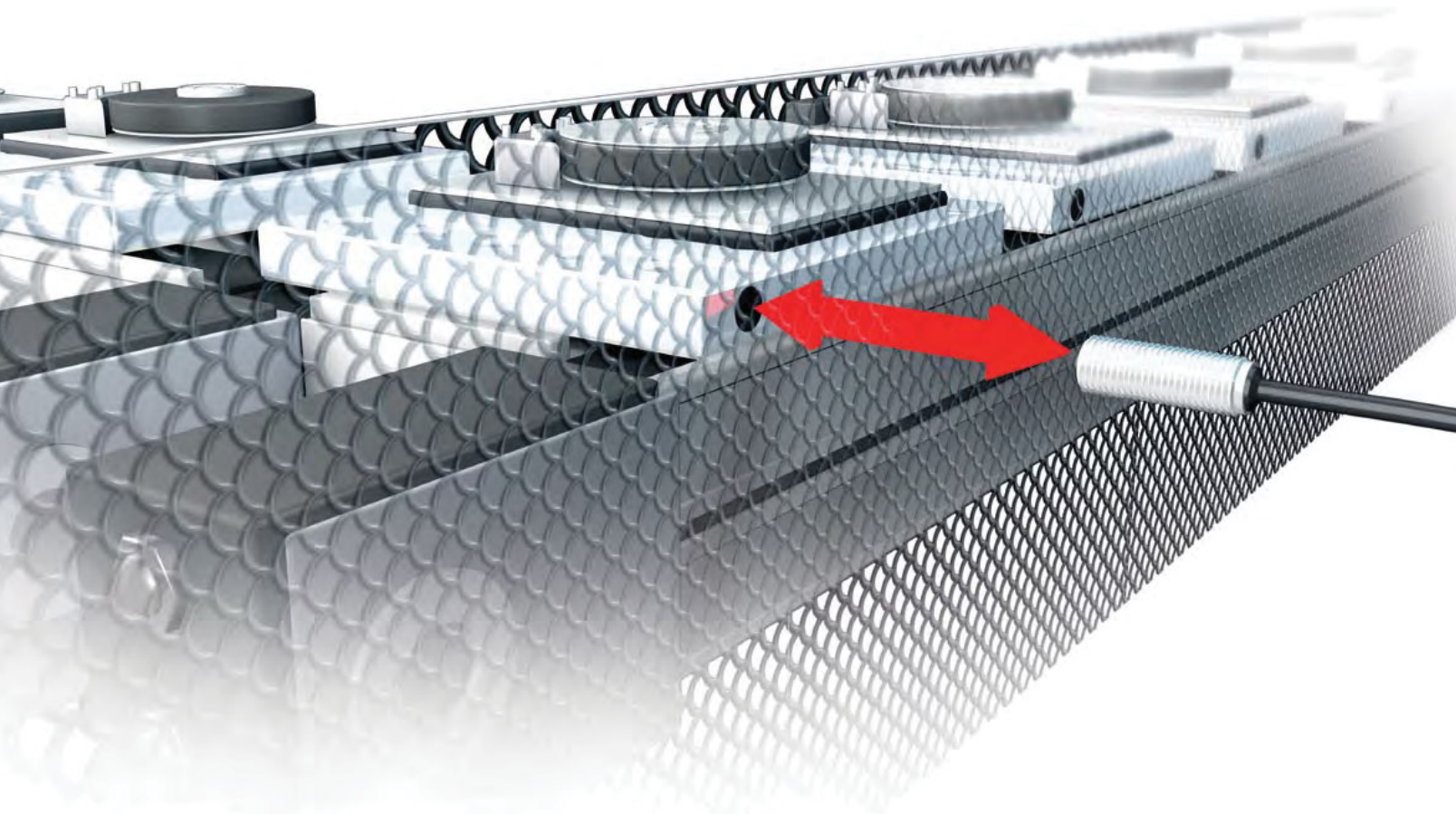
Magnetic Sensors for Object Detection

Magnets



Size	Ø 4 mm	Ø 10 mm	
Ordering code	709084	620961	
Part number	RUNDMAGNET 4.0X 5.0	RUNDMAGNET 10.0X10.0	
Height	5 mm	10 mm	
Maximum switching distance	5 mm	15 mm	
Material	Strontium ferrite	Hard ferrite	

Reliable switching is guaranteed from 0 mm to the switching distance indicated in the table. The specified switching distances are determined from series measurements and should be considered a starting point for selecting a suitable magnet.



Magnetic Sensors for Object Detection

Magnets



	Ø 15 mm	Ø 15 mm	Ø 25 mm with hole for M5 screw	Ø 22.1 mm with hole for M5 screw	16x12 mm
	BAM01EJ	BAM01EK	BAM01EL	BAM01EM	620260
	BAM TG-MF-006	BAM TG-MF-007	BAM TG-MF-008	BAM TG-MF-009	MAGNETPLATTE 16X12X3
	10 mm	15 mm	15 mm	10.5 mm	3 mm
	40 mm	65 mm	90 mm	40 mm	28 mm
	Neodymium iron boron	Neodymium iron boron	Neodymium iron boron	Ferrite with plastic encapsulation	Samarium cobalt



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Form factors
Magnets

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors



Magnetic Cylinder Sensors

Magneto-inductive displacement sensors for analog position measurement

Magneto-inductive displacement sensors for analog position measurement can be quickly and easily installed in T-slots. They detect end positions and intermediate positions individually and flexibly. The magneto-inductive displacement sensor Micro-BIL provides non-contact and absolute measurement on pneumatic miniature grippers or compact cylinders with integrated permanent magnets.





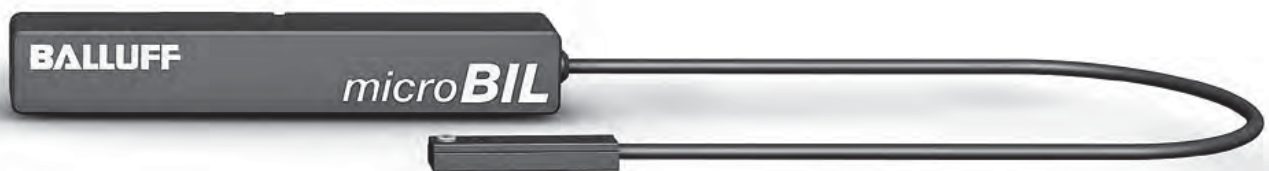
Magneto-inductive Displacement Sensors for Analog Position Measurement

Contents

**Magneto-inductive displacement sensors
for analog position measurement**

Micro-BIL

906



Magneto-inductive Distance Sensors

Micro-BIL

The Micro-BIL provides absolute measurement of the positions on pneumatic miniature grippers or compact cylinders with integrated permanent magnets. Moreover, the sensor element can be installed in the T-slot very easily. The analog output signal enables individual and flexible detection of end positions and intermediate positions on gripper jaws or pistons.

Features

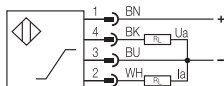
Wear-free since the measuring position is detected without contact

- Insensitive to shock and vibration
- Absolute output signal: Voltage or current (cable break monitoring possible)
- Adjustable measuring range / magnetic field strength
- Easiest installation in the T-slot

A button enables adjustment to various magnetic field strengths. The technical data refer to reference measurements. Different grippers/cylinders having differing magnetic fields may affect the technical data.

Original mounting brackets and screws are recommended for attaching the Micro-BIL. Please order accessories separately.

Wiring diagram



Connect either the voltage or current output.



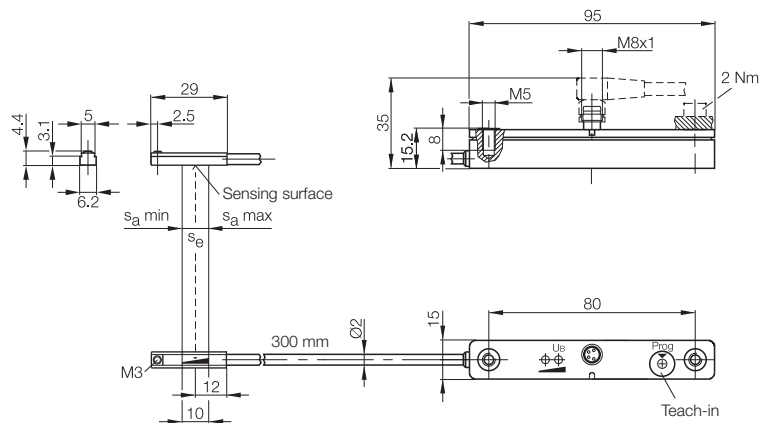


Magnetic cylinder sensors with special properties

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

A perspective view of a rectangular metal plate. It features a central longitudinal slot and a central screw. There are also smaller slots and a circular feature on the right side.





Magnetic Cylinder Sensors

Accessories for magnetic cylinder sensors

In order to be able to accurately mount and adjust sensors, you need the right tools and accessories. We offer you practical cable clips, tube cuffs, and tool sets designed for mounting Balluff sensors.



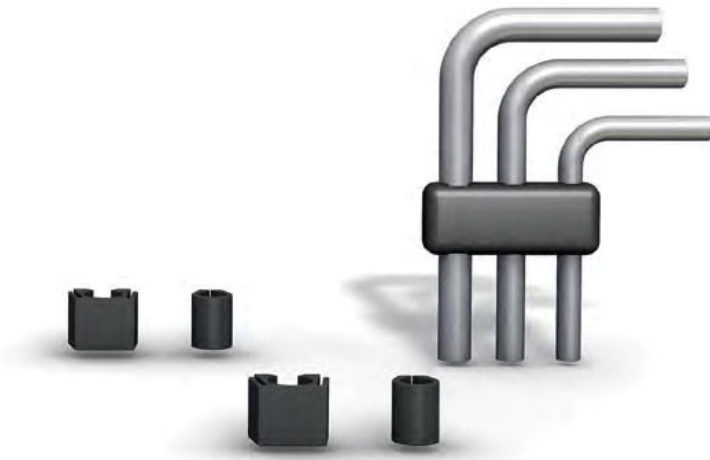


Accessories for Magnetic Cylinder Sensors

Contents

Accessories for magnetic cylinder sensors

Cable clips	910
Tube cuffs	910
Tools	911



Accessories for Magnetic Cylinder Sensors

Cable clips, tube cuffs



Part number	Cable clip for T-slot	Cable clip for C-slot
Type	Packaging unit: 50 pieces	Packaging unit: 50 pieces
Use	For cable routing and strain relief	For cable routing and strain relief
Ordering code	BAM01EA	BAM01EC
Part number	BAM CC-XA-028-T05-P	BAM CC-XA-025-C03-P
Material	Plastic	Plastic



Piston diameter	BMF 303-HW-59 with tube cuff BMF size _		BMF 305-HW-24 with tube cuff BMF size _		BMF 21-HW-11 with tube cuff BMF size _		BMF 32 with tube cuff BMF size _		BMF 235-HW-112 with tube cuff BMF size _		BMF 10E-HW-19 with tube cuff BMF size _	
≤ 8 mm			0	BAM00N2					0	BAM00N2		
8...10 mm	1	BAM00N3	1	BAM00N3	10	BAM001H	10	BAM001H	1	BAM00N3	2	BAM00N4
12 mm	2	BAM00N4	1	BAM00N3	10	BAM001H	10	BAM001H	1	BAM00N3	2	BAM00N4
16 mm	2	BAM00N4	1	BAM00N3	12	BAM001K	12	BAM001K	1	BAM00N3	3	BAM00N5
20 mm	2	BAM00N4	2	BAM00N4	12	BAM001K	12	BAM001K	2	BAM00N4	3	BAM00N5
25 mm	2	BAM00N4	2	BAM00N4	12	BAM001K	12	BAM001K	2	BAM00N4	3	BAM00N5
32 mm	3	BAM00N5	3	BAM00N5	13	BAM001L	13	BAM001L	3	BAM00N5	4	BAM00N6
40 mm	4	BAM00N6	4	BAM00N6	14	BAM001M	14	BAM001M	4	BAM00N6	5	BAM00N7
50 mm	5	BAM00N7	5	BAM00N7	15	BAM001N	15	BAM001N	5	BAM00N7	6	BAM00N8
63 mm	6	BAM00N8	6	BAM00N8	16	BAM001P	16	BAM001P	6	BAM00N8	8	BAM00NA
70 mm	8	BAM00NA	8	BAM00NA	18	BAM001T	18	BAM001T	8	BAM00NA	8	BAM00NA
80 mm	7	BAM00N9	7	BAM00N9	17	BAM001R	17	BAM001R	7	BAM00N9	10	BAM01TC
90 mm	10	BAM01TC	10	BAM01TC					10	BAM01TC	10	BAM01TC
100 mm	9	BAM01F4	9	BAM01F4					9	BAM01F4	9	BAM01F4



Accessories for Magnetic Cylinder Sensors

Tools



Part number	BMF Hex Key	Hex key set 0.7-2.0
Type	Folding Allen key set, with additional blades, 8-piece	
Use	Tool set for all BMF sensors and BMF angle brackets as well as for sensors having a potentiometer, e.g. BOS, BCS, BUS etc.	Tool set for BMF sensors and BMF angle brackets
Material No.	139868	123264
Material	Blade: chrome vanadium steel, fully hardened, galvanically treated. Grip: ergonomic, fiberglass reinforced housing, 55 mm long.	

		mm
0.7		
0.9		
1.3		
1.5		
2.0		
2.5		
		3.0
	PH00	

0.71
0.89
1.27
1.5
2.0

Application

Practical folding holder for Allen keys to prevent them from getting lost. Especially good for turning very small screws, for example, for tightening down or accurately adjusting sensors.

Sturdy housing with release button for easily selecting the right blade. Eyelet with matching carabiner hook. Self-service packaging for hanging with a Euro hole tab.



Magnetic cylinder sensors

Magnetic cylinder sensors with mounting system

Magnetic cylinder sensors with a compact design

Magnetic cylinder sensors with special properties

Magnetic sensors for object detection

Magneto-inductive displacement sensors for analog position measurement

Accessories for magnetic cylinder sensors

Cable clips
Hose clamps
Tools



Industrial Networking and Connectivity

Cables, cordsets and connectors

From our extensive product line we have put together a selection for you that covers the most important applications in object detection.



Cables, cordsets and connectors

Contents



You will find many additional products from our total product line in "Industrial networking and connectivity – A guide to industrial network architecture" or online at: www.balluff.us.

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Basic information and definitions can be found on page 952.





Sensor & Actuator Cables

Size	M5	M8	M12	
Configurations	Single-Ended & Double-Ended	Single-Ended, Double-Ended	Single-Ended, Double-Ended	
Conductors	3-wire, 4-wire	3-wire, 4-wire	3, 4, 4+PE, 5, 8, 12-wire	
LED Versions	No	Yes	Yes	
Shielded Versions	No	Yes	Yes	
Page #	926	927 - 929	931 - 937	



Mini Size Cables

Size	7/8"	1"	1 1/8"	
Configurations	Single-Ended, Double-Ended, Tees, Bulkheads, Converters	Single-Ended, Double-Ended	Single-Ended, Double-Ended	
Conductors	US Color Code: 3 & 4-wire DC Color Code: 4 & 5-wire	6, 7, 8-wire	9, 10, 12, 19-wire	
Color Codes Available	US AC, DC	---	---	
Shielded Versions	No	No	No	
Page #	940	See Networking Catalog	See Networking Catalog	



Junction Blocks (MIBs)

Size	M8	M12	M12, M16, M23	
Configurations	Quick Disconnect, Cable Out	Quick Disconnect, Cable Out, Terminal Blocks	Homerun Cables	
Conductors	4-port & 8-port, 3-wire & 4-wire	4-port & 8-port, 3+PE & 4+PE	8-wire, 12-wire, 19-wire	
LED Versions	Yes	Yes	No	
Shielded Versions	No	No	No	
Page #	942	943	942 - 943	

Connectivity Solutions

Overview quick selector



	M8 and M12 Specialty	Splitters	1/2" AC	DIN A, DIN B, IND B, DIN C, IND C
	High Temp, Coil Cable, Stainless, IP69K, ECOLAB, Global cable	M8 & M12, V & U Styles	Single-Ended, Double-Ended	Single-Ended, Pigtail, V-Splitter
	3-wire, 4-wire, 4+PE	3-wire, 3+PE	3, 4, 5, 6-wire	2+PE
	Yes	Yes	No	Yes
	No	No	Yes	Yes
	See Networking Catalog	938 - 939	930	See Networking Catalog



Receptacles

	M8	M12	1/2" AC, 7/8", 1", 1 1/8"	M23
	M8x0.5	1/4"-18NPT, 1/2"-14NPT, M16x1.5	1/4"-18NPT, 1/2"-14NPT, M16x1.5, M20x1.5	M20x1.5
	3-wire, 4-wire	3, 4, 4+PE, 5, 8-wire	3, 4, 5, 6-wire, 7, 8, 9, 10-wire, 12, 19-wire	12-wire, 19-wire
	DC	DC	US AC, DC	---
	Metal	Metal	Metal	Metal
	See Networking Catalog	See Networking Catalog	See Networking Catalog	See Networking Catalog



Cables, cordsets and connectors

Overview quick selector
Sensor cable part number builder
BCC part number matrix
Technical specifications
Connectors
M5
M8 nano
1/2" AC micro
M12 micro
Splitters
7/8" mini
7/8" to M12 adapters
Junction Blocks /homerun cables
Field attachables
Wrenches



Field Attachables

	M8	M12	1/2" AC, 7/8"	M23
	Piercon, Screw Terminal, Soldercup	Insulation Displacement, Screw Terminal, Spring Clamp	Screw Terminal	Solder Cup
	3-wire, 4-wire	3, 4, 5, 8, 12-wire	3, 4, 5-wire	12, 19-wire
	No	No	No	No
	No	Yes	No	No
	944	946-949	950	See Networking Catalog

Connectivity Solutions

Sensor cable part number builder

Balluff's new line of sensor cordsets offers many benefits to the automation world. Balluff can globally offer cordsets that fit almost any standard sensor or actuator application. This offering includes features such as consistent and accurate IP ratings, a wide range of cable jackets, a full range of overmold configurations, and high quality rugged materials.

Select your cordset in 4 easy steps:

1. Pick your connector types (single/double, right angle/straight)
2. Pick your electrical information and LEDs
3. Pick your jacket material and color
4. Pick your cordset length

Complete Part Number Example:

BCC M415-0000-1A-008-VX44T2-050

- M12 single ended, straight female (M415-0000-1A)
- 4-wire, 2x PNP LED (008)
- Yellow PVC, 4-wire (VX44T2)
- 5 m cable (050)



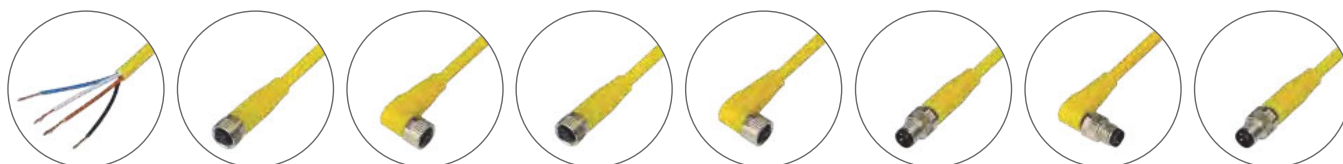
Step 1

BCC - - - - -

Cordset Connector Selection

Single-ended and double-ended cordsets can be made using the chart below. Available in industry standard M8 and M12 sizes, these cordsets come in a variety of head combinations; single-ended, straight to straight, right angle to straight, and right angle to right angle. To select your cordset, start by selecting the female connector that will match your sensor. Next, follow the row across until you find the required end that will go back to your controller, homerun cordset, MIB, etc.

Female (sensor end)	Connector Types	Male (controller, homerun cable, MIB end)			
		Single Ended Female	3-wire M8 Straight Male	3-wire M8 Right Angle Male	4-wire M8 Straight Male
	Single-Ended Male		M313-0000-20	M323-0000-20	M314-0000-20
	M8 Straight Female 3-wire	M313-0000-10	M313-M313-30	M313-M323-30	
	M8 Right Angle Female 3-wire	M323-0000-10	M323-M313-30	M323-M323-30	
	M8 Straight Female 4-wire	M314-0000-10			M314-M314-30
	M8 Right Angle Female 4-wire	M324-0000-10			M324-M314-30
	M12 Straight Female	M415-0000-1A	M415-M313-3F	M415--M323-3F	M415-M314-3F
	M12 Right Angle Female	M425-0000-1A	M425-M313-3F	M425-M323-3F	M425-M314-3F



Single Ended

M8 Female 3-wire

M8 Female 3-wire

M8 Female 4-wire

M8 Female 4-wire

M8 Male 3-wire

M8 Male 3-wire

M8 Male 4-wire

Step 2

BCC - - - - -

Cordset Wiring and LEDs

Both 3- and 4-wire cordsets are available in single- and double-ended cordsets, as well as two and three LEDs. To select your cordset, start with Step 1 on previous page. Then decide if you need 3- or 4-wire and whether or not you want an LED in the overmolded head.

Single Ended Cordsets			
Head 1 and 2	3-wire N/O	3-wire N/C	4-wire
No LED	001	002	003
2x PNP LED	004	005	008
3x PNP LED**			010
2x NPN LED	006	007	009



No LED

Double Ended Cordsets			
Head 1	Head 2	3-wire N/O	4-wire
No LED	No LED	300	304
2x PNP LED	No LED	602	606
3x PNP LED**	No LED		650
2x NPN LED	No LED	603	607
2x PNP LED	2x PNP LED*	302	306
2x NPN LED	2x NPN LED*	303	307
3x PNP LED**	2x PNP LED*		651



2x LED

3x LED

2x = 1 power LED and 1 signal LED
3x = 1 power LED and 2 signal LEDs

*M12 right angle male only
**M12 right angle female only

Male (controller, homerun cable, MIB end)					
4-wire M8 Right Angle Male	3-wire M12 Straight Male	3-wire M12 Right Angle Male	4-wire M12 Straight Male	4-wire M12 Right Angle Male	
M324-0000-20	M413-0000-2A	M423-0000-2A	M414-0000-2A	M424-0000-2A	
	M313-M413-3E	M313-M423-3E			
	M323-M413-3E	M323-M423-3E			
M314-M324-30			M314-M414-3E	M314-M424-3E	
M324-M324-30			M324-M414-3E	M324-M424-3E	
M415-M324-3F	M415-M413-3A	M415-M423-3A	M415-M414-3A	M415-M424-3A	
M425-M324-3F	M425-M413-3A	M425-M423-3A	M425-M414-3A	M425-M424-3A	



M8 Male
4-wire

M12 Female

M12 Female

M12 Male
3-wire

M12 Male
3-wire

M12 Male
4-wire

M12 Male
4-wire



Cables, cordsets and connectors
Overview
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BCC part number matrix
Technical specifications
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M5
M8 nano
1/2" AC micro
M12 micro
Splitters
7/8" mini
7/8" to M12
adapters
Junction
Blocks
/homerun
cables
Field
attachables
Wrenches

Step 3

BCC _ _ _ _ - _ _ _ - _ _ _ _ - _ _ _ _

Raw Cable Type

To select your raw cable, first decide on the correct jacket for the application and then on a jacket color.

- PVC: For standard automation applications
- PUR: For abrasion and extreme fluid resistance
- TPE: For High-flex and for use in heavy duty environments

Jacket Color and Material				
Material	Color	Conductor	3-wire	4-wire
PVC	Yellow	22 AWG	VX43T2	VX44T2
PVC	Gray	0.34 mm ²	VX8334	VX8434
PUR	Yellow	22 AWG	PX43T2	PX44T2
PUR	Black	0.34 mm ²	PX0334	PX0434
TPE	Yellow	22 AWG	EX43T2	EX44T2



PVC, PUR, TPE



PVC



PUR

Step 4

BCC - - - - -

Cordset Length

Select from our standard cordset lengths below. Contact the factory for custom cordset length selections.

Double Length Options	
Length	Ordering Information
0.3 m	003
0.6 m	006
1 m	010
1.5 m	015
2 m	020
3 m	030
5 m	050

Single Length Options	
Length	Ordering Information
2 m	020
5 m	050
10 m	100



Cables, cordsets and connectors

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quick selector
Sensor cable
part number
builder
BCC part
number matrix
Technical
specifications
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M8 nano
1/2" AC micro
M12 micro
Splitters
7/8" mini
7/8" to M12
adapters
Junction
Blocks
/homerun
cables
Field
attachables
Wrenches



Need help finding a cross?
Need help selecting a part?

Visit us online: www.balluff.us
Call or email our technical support group at:
1-800-543-8390
technical.support@balluff.com

BCC M415 - M424 - 3A - 304 - VX44T2 - 020 - C008

Head 1

Head 2

Code

Wiring

Raw Cable

Length

Custom

Head 1 & Head 2 Configuration

Connector Size & Type:

M3	M8 Nano DC - Ni Plated Brass
M4	M12 Micro DC - Ni Plated Brass
S3	M8 Nano DC - Stainless 1.4404
S4	M12 Micro DC - Stainless 1.4404
0000	(Head 2) Single-Ended Cable

Connector Direction:

1	Straight Plastic Overmolded
2	Right Angle Plastic Overmolded

Number of Visible Connections:

5	M12 Female
no. poles	Any other configuration

Code Configuration

Gender Type:

1	Female Internal Threads
2	Male External Threads
3	Female Int - Male Ext
5	Female Int - Female Int
6	Male Ext - Male Ext

Connector Coding

A	M12 Sensor Cables (typical) (A-coded)
0	M8 Sensor Cables (typical) (No coding)
B	M12 Profibus Cables (B-coded)
D	M12 Ethernet Cables (D-coded) (Profinet, EtherNet/IP)
E	M8-M12 Double-Ended Cables
F	M12-M8 Double-Ended Cables

Wiring Configurations

See next page for configurations

Note: Part Number Matrix is designed for information purposes only. Not all configurations are possible. Consult factory for part number availability.

Raw Cable Configuration

Jacket Material:

V	PVC
P	PUR
E	TPE

Special Designator:

X	Nothing
C	Coiled Cable
H	High Temperature
S	Shielded
W	Weld Resistant / High Shore
M	Solid Conductor, Unshielded

Jacket Color:

0	Black	2	Red (CC-Link)
3	Orange	4	Yellow (standard)
5	Green (Profinet)	6	Blue (EtherNet/IP)
7	Violet (Profibus)	8	Grey (standard/DeviceNet)

Number of Poles

#	3-pole thru 9-poles
A	10-pole
C	12-pole

Conductor Profile

T2	22 AWG	W8	18 AWG
25	0.25mm ²	34	0.34mm ²
50	0.50mm ²		

Length Configuration

Cable Length:

003	0.3 meters
020	2.0 meters
100	10.0 meters

Special Lengths:

05/14	0.5m coiled, 1.4m stretch
2D5	2.5 decimeters (25cm)
10X	100 meters

Custom Configurations

Custom Values:

C002	Grey Overmold
C008	WeldRepel™ Applied
C013	GlobalLine, Black Overmold

Connectivity Solutions

BCC part number matrix

Standard Cordsets

Wiring	Poles	Shield	Head 1	Head 2
001	3-wire	---	N/O	---
002	3-wire	---	N/C	---
003	4-wire	---	Comp.	---
004	3-wire	---	N/O PNP LED	---
005	3-wire	---	N/C PNP LED	---
006	3-wire	---	N/O NPN LED	---
007	3-wire	---	N/C NPN LED	---
008	4-wire	---	N/O PNP LED	---
009	4-wire	---	N/O NPN LED (M12 Female Only)	---
010	4-wire	---	Comp. PNP LED	---
300	3-wire	---	N/O	N/O
302	3-wire	---	N/O PNP LED	N/O PNP LED
304	4-wire	---	Comp.	Comp.
306	4-wire	---	N/O PNP LED	N/O PNP LED
313	5-wire	---	Comp. and Gnd	---
602	3-wire	---	N/O PNP LED	N/O
603	3-wire	---	N/O NPN LED	N/O
606	4-wire	---	N/O PNP LED	Comp.
607	4-wire	---	N/O NPN LED	Comp.
650	4-wire	---	Comp. PNP LED	Comp.
651	4-wire	---	Comp. PNP LED	N/O PNP LED

Shielded Cordsets and High Conductor Counts

014	4-wire	Nut	BN,WH,BU,BK	---
016	5-wire	Nut	BN,WH,BU,BK,GY	---
017	5-wire	---	BN,WH,BU,BK,GY	---
034	4-wire+PE	---	BN,WH,BU,BK,GNYE	---
036	3-wire	Nut	BN,BU,BK (N/O)	---
037	3-wire	Nut	BN,BU,BK (N/C)	---
039	5-wire	---	Comp. PNP LED	---
040	4-wire+PE	---	Comp. PNP LED	---
043	4-wire+PE	Nut	BN,WH,BU,BK,GNYE	---
044	8-wire	---	WH,GN,YE,GY,BN,PK,BU,RD	---
046	8-wire	Nut	WH,BN,GN,YE,GY,PK,BU,RD	---
049	12-wire	---	BN,BU,WH,GN,PK,YE,BK,GY,RD,VI,GYPK,RDBU	---
325	12-wire	---	BN,BU,WH,GN,PK,YE,BK,GY,RD,VI,GYPK,RDBU	---



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BCC M414 - M425 - M425 - U2010 - 003

Head 1 (Splitter) Head 2 (Head A) Head 3 (Head B) Splitter Code Length

Head 1 Configuration

Connector Size & Type:

M4 M12 Micro DC - Ni Plated Brass

Connector Direction:

1 Straight Plastic Overmolded

Number of Visible Connections:

3-pole thru 8-poles

Head 2 & Head 3 Configuration

Connector Size & Type:

M3 M8 Nano DC - Ni Plated Brass

M4 M12 Micro DC - Ni Plated Brass

0000 (Head 2, Head 3) Open Splitter

Connector Direction:

1 Straight Plastic Overmolded

2 Right Angle Plastic Overmolded

Number of Visible Connections:

5 M12 Female

no. poles Any other configuration

Splitter Code

Code	Type	Wiring	Head 1	Head 2	Head 3	Cable	Body
U0003	U Splitter	A00	M12 Male	M12 Female	M12 Female	---	BK PVC
U0014	U Splitter	A00	M12 Male	M8 3-pole Female	M8 3-pole Female	---	BK PVC
U2002	V Splitter	A00	M12 Male	M12 Female	M12 Female	YE TPE	YE TPU
U2009	V Splitter	A13	M12 Male	Leads	Leads	YE PVC	YE TPU
U2010	V Splitter	A00	M12 Male	M12 Female	M12 Female	YE PVC	YE TPU
U2011	V Splitter	A07	M12 Male	M12 Female	M12 Female	YE TPE	YE TPU
U2012	V Splitter	A00	M12 Male	M8 Female	M8 Female	YE PVC	YE TPU

Wiring Configuration

Wiring	Head 1	Head 2	Head 3	Logic	LED
A00	4-wire	3-wire N/O (H1=pin 4)	3-wire N/O (H1=pin 2)	Splitter	---
A07	4-wire	3-wire N/O (H1=pin 4)	3-wire N/O (H1=pin 2)	Splitter	(H2&H3) PNP
A13	4-wire	BN,BU,BK (H1=pin 4)	BN,BU,BK (H1=pin 2)	Splitter	---

Length Configuration

Cable Length:

003 0.3 meters

020 2.0 meters

100 10.0 meters

*Head 2 & Head 3 lengths are equal

Note: Part Number Matrix is designed for information purposes only. Not all configurations are possible. Consult factory for part number availability.

Connectivity Solutions

BCC part number matrix

BCC A315 - A325 - 30 - 335 - VX45W6 - 020

Head 1

Head 2

Code

Wiring

Raw Cable

Length

Head 1 & Head 2 Configuration

Connector Size & Type:

A3	7/8" MINI Size I
A4	1" MINI Size II
A5	1 1/8" MINI Size III
0000	(Head 2) Single-Ended Cable

Connector Direction:

1	Straight Plastic Overmolded
2	Right Angle Plastic Overmolded

Number of Visible Connections:

#	3-pole thru 9-poles
A	10-pole
C	12-pole
L	19-pole

Code Configuration

Gender Type:

1	Female Internal Threads
2	Male External Threads
3	Female Int - Male Ext
7	Female Int - Male Int
C	Male Internal Threads
D	Female External Threads

Connector Coding:

0	All configurations (typical)
----------	------------------------------

Wiring Configurations

Single-Ended	Double-Ended	Poles
003	304	4-wire DC
063	335	5-wire DC
071	345	3-wire AC
072	346	4-wire AC
085	357	6-wire
086	358	7-wire
087	359	8-wire
088	360	9-wire
089	355	10-wire
090	362	12-wire
091	363	19-wire

Raw Cable Configuration

Jacket Material:

V	PVC
P	PUR
E	TPE

Special Designator:

X	nothing
S	Shielded

Jacket Color:

0	Black
4	Yellow (standard)
8	Grey

Number of Poles:

#	1-pole thru 9-poles
A	10-pole
C	12-pole
L	19-pole

Conductor Profile:

W6	16 AWG
W8	18 AWG
A5	1.50mm2

Length Configuration

Cable Length:

003	0.3 meters
020	2.0 meters
100	10.0 meters



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Note: Part Number Matrix is designed for information purposes only. Not all configurations are possible. Consult factory for part number availability.

BCC M434 - 0000 - 2A - 000 - 55X450 - 000

Connector (Place Holder) Code (Place Holder) Configuration (Place Holder)

Field Attachable Connector

Connector Size & Type:

M3	M8 Nano DC
M4	M12 Micro DC
S3	M8 Nano DC - Stainless
S4	M12 Micro DC - Stainless
A2	1/2" Micro AC
A3	7/8" MINI Size I

Connector Direction:

3	Straight Plastic Field Attachable
4	Right Angle Plastic Field Attachable
7	Straight Metal Field Attachable
8	Right Angle Metal Field Attachable

Number of Visible Connections:

5	M12 Female
no. poles	Any other configuration

Code Configuration

Gender Type:

1	Female Internal Threads
2	Male External Threads

Connector Coding

A	M12 Sensor Connectors (typical)
0	M8 & 7/8" (typical)
B	M12 Profibus Connectors
D	M12 Ethernet Connectors (Profinet, EtherNet/IP)

Configuration Breakdown

Cable Gland Minimum Diameter

1	min Ø 2.5mm	2	min Ø 3.0mm
3	min Ø 3.5mm	4	min Ø 4.0mm
5	min Ø 6.0mm	6	min Ø 8.0mm
7	min Ø 10mm	8	min Ø 12mm
9	min Ø 14mm	0	min Ø 5.0mm
A	min Ø 2.1mm or 4.0mm		

Connection Technology

1	Screw Terminals
2	PIERCECON Terminals
3	Insulation Displacement Terminals
4	Solder Cup Terminals
5	Spring Type Terminals

Cable Type

X	no cable
----------	----------

Number of Poles

#	1-pole thru 9-poles
A	10-pole
C	12-pole

Maximum Conductor Profile

25	0.25mm ²	34	0.34mm ²
50	0.50mm ²	75	0.75mm ²
A5	1.50mm ²		

Note: Part Number Matrix is designed for information purposes only. Not all configurations are possible. Consult factory for part number availability.

Connectivity Solutions

Technical specifications



22AWG Bulk Cables

Jacket Material	PVC		PUR		TPE	
Application	General Automation		Cut & Fluid Resistant, Halogen Free		High Flex, Weld Slag Resistant	
Jacket Color	Yellow		Yellow		Yellow	
Conductor Gauge	22AWG		22AWG		22AWG	
Ambient temp (moving)	-5...105°C		-25...80°C		-40...105°C	
Ambient temp (fixed)	-40...105°C		-50...80°C		-50...105°C	
Bending Cycles	> 2 Million		> 2 Million		> 10 Million	
Rating					PTLC tray rated	
Bulk Cable (100 m)	BCC0AE7	BCC0AE8	BCC0AE9	BCC0AEA	BCC0AEC	BCC0AEE
Number of Conductors	3	4	3	4	3	4
Cable Diameter (mm)	4.7 ± 0.15	5.0 ± 0.15	4.3 ± 0.20	4.7 ± 0.20	5.3 ± 0.13	5.3 ± 0.13



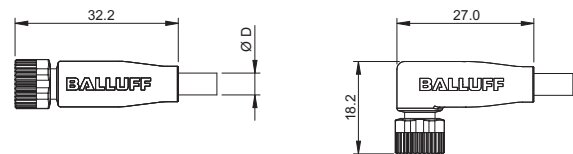
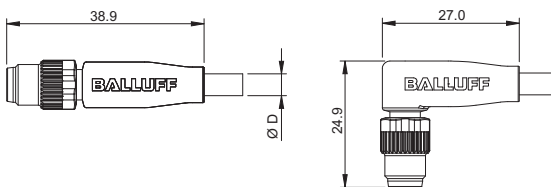
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M8 connectors, male straight and right-angle



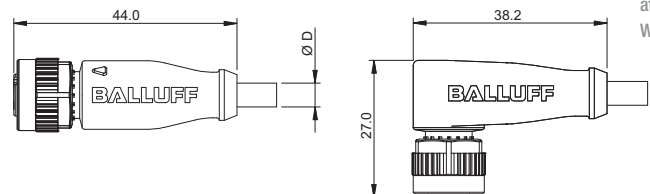
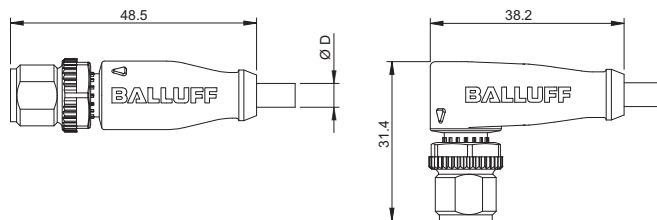
M8 connectors, female straight and right-angle



M12 connectors, male straight and right-angle



M12 connectors, female straight and right-angle



Connectivity Solutions

M5 single-ended cordsets

M5-M8 double-ended cordsets



M5 Single-Ended

Type	M5 Female	M5 Female
Configuration	Straight	Right Angle
Voltage Rating	30 VAC/VDC	30 VAC/VDC
Amperage	1 A	1 A
3-wire, non-LED	BKS-B 25-1-PU-03	BKS-B 26-1-PU-03
4-wire, non-LED	BKS-B 25-3-PU-03	BKS-B 26-3-PU-03



M5-M8 Double-Ended

Type	M5 Female - M8 Male	M5 Female - M8 Male
Configuration	Straight - Straight	Right Angle - Straight
Voltage Rating	30 VAC/VDC	30 VAC/VDC
Amperage	1 A	1 A
3-wire, non-LED	BKS-B 25-1/GS49-PU-01	BKS-B 26-1/GS49-PU-01

Connectivity Solutions

M8 Nano single-ended cordsets



M8 Single-Ended Female

Type	M8 Female	M8 Female
Configuration	Straight	Right Angle
Voltage Rating	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire), 10-30 VDC (LED)
Amperage	4 A	4 A
3-wire, non-LED	BCC M313-0000-10-001-EX43T2- _ _ _	BCC M323-0000-10-001- _ X43T2- _ _ _
3-wire, PNP-LED, N/O signal		BCC M323-0000-10-004- _ X43T2- _ _ _
3-wire, NPN-LED, N/O signal		BCC M323-0000-10-006- _ X43T2- _ _ _
4-wire, non-LED	BCC M314-0000-10-003-EX44T2- _ _ _	BCC M324-0000-10-003- _ X44T2- _ _ _

Standard Cable Jackets:

V = PVC

P = PUR

E = TPE

Standard Lengths Available:

020 = 2 m

050 = 5 m

100 = 10 m



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M8 Single-Ended Shielded

Type	M8 Female	M8 Female
Configuration	Straight	Right Angle
Voltage Rating	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)
Amperage	4 A	4 A
Conductor Cross-Section	0.34 mm ²	0.34 mm ²
3-wire, non-LED, shielded	BCC M313-0000-10-036- _ S_334- _ _ _	BCC M323-0000-10-036- _ S_334- _ _ _
4-wire, non-LED, shielded	BCC M314-0000-10-014- _ S_434- _ _ _	BCC M324-0000-10-014- _ S_434- _ _ _

Standard Cable Jackets:

VS8 = PVC (grey, 8)

PS0 = PUR (black, 0)

Standard Lengths Available:

020 = 2 meters

050 = 5 meters

100 = 100 meters

Connectivity Solutions

M8-M8 double-ended cordsets

M8-M12 double-ended cordsets



M8-M8 Double-Ended

Type	M8 Female - M8 Male	M8 Female - M8 Male	
Configuration	Straight - Straight	Right Angle - Straight	
Voltage Rating	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire), 10-30 VDC (LED)	
Amperage	4 A	4 A	
3-wire, non-LED	BCC M313-M313-30-300- _X43T2- _ _ _	BCC M323-M313-30-300- _X43T2- _ _ _	
3-wire, PNP-LED, N/O, Head 1		BCC M323-M313-30-602- _X43T2- _ _ _	
3-wire, NPN-LED, N/O, Head 1		BCC M323-M313-30-603- _X43T2- _ _ _	
4-wire, non-LED	BCC M314-M314-30-304- _X44T2- _ _ _	BCC M324-M314-30-304- _X44T2- _ _ _	



M8-M12 Double-Ended

Type	M8 Female - M12 Male	M8 Female - M12 Male	
Configuration	Straight - Straight	Right Angle - Straight	
Voltage Rating	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire), 10-30 VDC (LED)	
Amperage	4 A	4 A	
3-wire, non-LED	BCC M313-M413-3E-300- _X43T2- _ _ _	BCC M323-M413-3E-300- _X43T2- _ _ _	
3-wire, PNP-LED, N/O, Head 1		BCC M323-M413-3E-602- _X43T2- _ _ _	
3-wire, NPN-LED, N/O, Head 1		BCC M323-M413-3E-603- _X43T2- _ _ _	
4-wire, non-LED	BCC M314-M414-3E-304- _X44T2- _ _ _	BCC M324-M414-3E-304- _X44T2- _ _ _	

Connectivity Solutions

M8-M8 double-ended cordsets

M8-M12 double-ended cordsets



M8 Female - M8 Male	M8 Female - M8 Male
Straight - Right Angle	Right Angle - Right Angle
60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire), 10-30 VDC (LED)
4 A	4 A
BCC M313-M323-30-300- _X43T2- _ _ _	BCC M323-M323-30-300- _X43T2- _ _ _
	BCC M323-M323-30-602- _X43T2- _ _ _
	BCC M323-M323-30-603- _X43T2- _ _ _
BCC M314-M324-30-304- _X44T2- _ _ _	BCC M324-M324-30-304- _X44T2- _ _ _

Standard Cable Jackets:

V = PVC

P = PUR

E = TPE

Standard Lengths Available:

003 = 0.3 m

006 = 0.6 m

010 = 1.0 m

015 = 1.5 m

020 = 2 m

030 = 3 m

050 = 5 m



M8 Female - M12 Male	M8 Female - M12 Male
Straight - Right Angle	Right Angle - Right Angle
60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire)	60 VAC/VDC (3-wire), 30 VAC/VDC (4-wire), 10-30 VDC (LED)
4 A	4 A
BCC M313-M423-3E-300- _X43T2- _ _ _	BCC M323-M423-3E-300- _X43T2- _ _ _
	BCC M323-M423-3E-602- _X43T2- _ _ _
	BCC M323-M423-3E-603- _X43T2- _ _ _
BCC M314-M424-3E-304- _X44T2- _ _ _	BCC M324-M424-3E-304- _X44T2- _ _ _

Standard Cable Jackets:

V = PVC

P = PUR

E = TPE

Standard Lengths Available:

003 = 0.3 m

006 = 0.6 m

010 = 1.0 m

015 = 1.5 m

020 = 2 m

030 = 3 m

050 = 5 m



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Connectivity Solutions

1/2" Micro AC single-ended cordsets



1/2" Dual Keyway Single-Ended

Type	1/2" Dual Keyway Female	1/2" Dual Keyway Female
Configuration	Straight	Right Angle
Voltage Rating	250 VAC / VDC	250 VAC / VDC
Amperage	4 A	4 A
3-wire, 22AWG	C21 AE3-00-_Y-__F	C21 BE3-00-_Y-__F
3-wire, 22 AWG, Stainless Steel Nut	C21 AS3-00-_Y-__F	C21 BS3-00-_Y-__F
3-wire, 18AWG	C21 AE3-00-VY-__F-8	C21 BE3-00-VY-__F-8
4-wire, 18AWG	C21 AE4-00-VY-__F-8	C21 BE4-00-VY-__F-8
4-wire, 22 AWG, Braided Shield	C21 AE4-00-VY-__FB	C21 BE4-00-VY-__FB
5-wire, 22 AWG, Braided Shield	C21 AE5-00-VY-__FB	
6-wire, 22 AWG, Braided Shield	C21 AE6-00-VY-__FB	C21 BE6-00-VY-__FB

Standard Cable Jackets:

V = PVC

T = TPE

Single-Ended Std Lengths:

060F = 6 feet

120F = 12 feet

150F = 15 feet

300F = 30 feet

Connectivity Solutions

M12 Micro DC single-ended cordsets



M12 Single-Ended

Type	M12 Female	M12 Female
Configuration	Straight	Right Angle
Voltage Rating	250 VAC/VDC (3&4-wire), 36 VDC (LED)	250 VAC/VDC (3&4-wire), 36 VDC (LED)
Amperage	4 A	4 A
3-wire, non-LED, N/O signal	BCC M415-0000-1A-001- _X43T2- _ _ _	BCC M425-0000-1A-001- _X43T2- _ _ _
3-wire, non-LED, N/C signal	BCC M415-0000-1A-002- _X43T2- _ _ _	BCC M425-0000-1A-002- _X43T2- _ _ _
3-wire, PNP-LED, N/O signal	BCC M415-0000-1A-004- _X43T2- _ _ _	BCC M425-0000-1A-004- _X43T2- _ _ _
3-wire, PNP-LED, N/C signal	BCC M415-0000-1A-005- _X43T2- _ _ _	BCC M425-0000-1A-005- _X43T2- _ _ _
3-wire, NPN-LED, N/O signal	BCC M415-0000-1A-006- _X43T2- _ _ _	BCC M425-0000-1A-006- _X43T2- _ _ _
3-wire, NPN-LED, N/C signal	BCC M415-0000-1A-007- _X43T2- _ _ _	BCC M425-0000-1A-007- _X43T2- _ _ _
4-wire, non-LED, N/O and N/C signal	BCC M415-0000-1A-003- _X44T2- _ _ _	BCC M425-0000-1A-003- _X44T2- _ _ _
4-wire, PNP-LED, N/O signal	BCC M415-0000-1A-008- _X44T2- _ _ _	BCC M425-0000-1A-008- _X44T2- _ _ _
4-wire, PNP-LED, N/O and N/C signal		BCC M425-0000-1A-010- _X44T2- _ _ _
4-wire, NPN-LED, N/O signal	BCC M415-0000-1A-009- _X44T2- _ _ _	BCC M425-0000-1A-009- _X44T2- _ _ _

Standard Cable Jackets:

V = PVC

P = PUR

E = TPE

Standard Lengths Available:

020 = 2 m

050 = 5 m

100 = 10 m



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Connectivity Solutions

M12-M12 double-ended cordsets



M12-M12 Double-Ended

Type	M12 Female - M12 Male		
Configuration	Straight - Straight		
Voltage Rating	250 VAC / VDC (non-LED), 10-30 VDC (LED)		
Amperage	4 A		
	Female LED	Male LED	
3-wire, non-LED	---	---	BCC M415-M413-3A-300-_X43T2-__
3-wire, PNP-LED, Head 1	N/O	---	BCC M415-M413-3A-602-_X43T2-__
3-wire, PNP-LED, Head 1&2	N/O	N/O	
3-wire, NPN-LED, Head 1	N/O	---	BCC M415-M413-3A-603-_X43T2-__
4-wire, non-LED	---	---	BCC M415-M414-3A-304-_X44T2-__
4-wire, PNP-LED, Head 1	N/O	---	BCC M415-M414-3A-606-_X44T2-__
4-wire, PNP-LED, Head 1	N/O and N/C	---	
4-wire, PNP-LED, Head 1 & 2	N/O	N/O	
4-wire, PNP-LED, Head 1 & 2	N/O and N/C	N/O	
4-wire, NPN-LED, Head 1	N/O	---	BCC M415-M414-3A-607-_X44T2-__

Standard Cable Jackets:

V = PVC

P = PUR

E = TPE

Standard Lengths Available:

003 = 0.3 m

006 = 0.6 m

010 = 1.0 m

015 = 1.5 m

020 = 2 m

030 = 3 m

050 = 5 m

Connectivity Solutions

M12-M12 double-ended cordsets



M12 Female - M12 Male	M12 Female - M12 Male	M12 Female - M12 Male
Right Angle - Straight	Straight - Right Angle	Right Angle - Right Angle
250 VAC / VDC (non-LED), 10-30 VDC (LED)	250 VAC / VDC (non-LED), 10-30 VDC (LED)	250 VAC / VDC (non-LED), 10-30 VDC (LED)
4 A	4 A	4 A
BCC M425-M413-3A-300- _X43T2- _ _ _	BCC M415-M423-3A-300- _X43T2- _ _ _	BCC M425-M423-3A-300- _X43T2- _ _ _
BCC M425-M413-3A-602- _X43T2- _ _ _	BCC M415-M423-3A-602- _X43T2- _ _ _	BCC M425-M423-3A-602- _X43T2- _ _ _
BCC M425-M413-3A-603- _X43T2- _ _ _	BCC M415-M423-3A-602- _X43T2- _ _ _	BCC M425-M423-3A-602- _X43T2- _ _ _
BCC M425-M414-3A-304- _X44T2- _ _ _	BCC M415-M423-3A-302- _X43T2- _ _ _	BCC M425-M423-3A-302- _X43T2- _ _ _
BCC M425-M414-3A-606- _X44T2- _ _ _	BCC M415-M423-3A-603- _X43T2- _ _ _	BCC M425-M423-3A-603- _X43T2- _ _ _
BCC M425-M414-3A-650- _X44T2- _ _ _	BCC M415-M424-3A-304- _X44T2- _ _ _	BCC M425-M424-3A-304- _X44T2- _ _ _
BCC M425-M414-3A-651- _X44T2- _ _ _	BCC M415-M424-3A-606- _X44T2- _ _ _	BCC M425-M424-3A-606- _X44T2- _ _ _
BCC M425-M414-3A-607- _X44T2- _ _ _	BCC M415-M424-3A-306- _X44T2- _ _ _	BCC M425-M424-3A-650- _X44T2- _ _ _
	BCC M415-M424-3A-607- _X44T2- _ _ _	BCC M425-M424-3A-306- _X44T2- _ _ _
		BCC M425-M424-3A-651- _X44T2- _ _ _
		BCC M425-M424-3A-607- _X44T2- _ _ _



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Connectivity Solutions

M12-M8 double-ended cordsets



M12-M8 Double-Ended

Type	M12 Female - M8 Male		
Configuration	Straight - Straight		
Voltage Rating	60 VAC/VDC (3-wire)		
	30 VAC/VDC (4-wire)		
	10-30 VDC (LED)		
Amperage	4 A		
	Female LED	Male LED	
3-wire, non-LED	---	---	BCC M415-M313-3F-300-__X43T2-__
3-wire, PNP-LED, Head 1	N/O	---	BCC M415-M313-3F-602-__X43T2-__
3-wire, NPN-LED, Head 1	N/O	---	BCC M415-M313-3F-603-__X43T2-__
4-wire, non-LED	---	---	BCC M415-M314-3F-304-__X44T2-__
4-wire, PNP-LED, Head 1	N/O	---	BCC M415-M314-3F-606-__X44T2-__
4-wire, PNP-LED, Head 1	N/O and N/C	---	
4-wire, NPN-LED, Head 1	N/O	---	BCC M415-M314-3F-607-__X44T2-__

Standard Cable Jackets:

V = PVC

P = PUR

E = TPE

Standard Lengths Available:

003 = 0.3 m

006 = 0.6 m

010 = 1.0 m

015 = 1.5 m

020 = 2 m

030 = 3 m

050 = 5 m

Connectivity Solutions

M12-M8 double-ended cordsets



M12 Female - M8 Male	M12 Female - M8 Male	M12 Female - M8 Male
Right Angle - Straight	Straight - Right Angle	Right Angle - Right Angle
60 VAC/VDC (3-wire)	60 VAC/VDC (3-wire)	60 VAC/VDC (3-wire)
30 VAC/VDC (4-wire)	30 VAC/VDC (4-wire)	30 VAC/VDC (4-wire)
10-30 VDC (LED)	10-30 VDC (LED)	10-30 VDC (LED)
4 A	4 A	4 A
BCC M425-M313-3F-300- _X43T2- _ _ _	BCC M415-M323-3F-300- _X43T2- _ _ _	BCC M425-M323-3F-300- _X43T2- _ _ _
BCC M425-M313-3F-602- _X43T2- _ _ _	BCC M415-M323-3F-602- _X43T2- _ _ _	BCC M425-M323-3F-602- _X43T2- _ _ _
BCC M425-M313-3F-603- _X43T2- _ _ _	BCC M415-M323-3F-603- _X43T2- _ _ _	BCC M425-M323-3F-603- _X43T2- _ _ _
BCC M425-M314-3F-304- _X44T2- _ _ _	BCC M415-M324-3F-304- _X44T2- _ _ _	BCC M425-M324-3F-304- _X44T2- _ _ _
BCC M425-M314-3F-606- _X44T2- _ _ _	BCC M415-M324-3F-606- _X44T2- _ _ _	BCC M425-M324-3F-606- _X44T2- _ _ _
BCC M425-M314-3F-650- _X44T2- _ _ _		BCC M425-M324-3F-650- _X44T2- _ _ _
BCC M425-M314-3F-607- _X44T2- _ _ _	BCC M415-M324-3F-607- _X44T2- _ _ _	BCC M425-M324-3F-607- _X44T2- _ _ _



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M12 4-wire+PE, 5-wire, 8-wire, 12-wire cordsets



M12 Single-Ended

Type	M12 Female	M12 Female
Configuration	Straight	Right Angle
Voltage Rating	(4p+PE, 5p = 125 V), (8p = 60 V), (12p = 30 V)	(4p+PE, 5p = 125 V), (8p = 60 V), (12p = 30 V)
Amperage	(4p+PE, 5p = 4 A), (8p = 2 A), (12p = 1 A)	(4p+PE, 5p = 4 A), (8p = 2 A), (12p = 1 A)
Conductor Cross-Section	(5p = 0.34 mm ²), (8p, 12p = 0.25 mm ²)	(5p = 0.34 mm ²), (8p, 12p = 0.25 mm ²)
4-wire+PE, non-LED	BCC M415-0000-1A-034-PX0534-__ _	BCC M425-0000-1A-034-PX0534-__ _
4-wire+PE, PNP-LED, N/O & N/C signals		BCC M425-0000-1A-040-PX0534-__ _
5-wire, non-LED	BCC M415-0000-1A-017-PX0534-__ _	BCC M425-0000-1A-017-PX0534-__ _
5-wire, PNP-LED, N/O & N/C signals		BCC M425-0000-1A-039-PX0534-__ _
8-wire, non-LED	BCC M418-0000-1A-044-PX0825-__ _	BCC M428-0000-1A-044-PX0825-__ _
12-wire, non-LED	BCC M41C-0000-1A-049-_X_C25-__ _	BCC M42C-0000-1A-049-_X_C25-__ _

Standard Cable Jackets:

VX8= PVC (grey, 8)

PX0 = PUR (black, 0)

Standard Lengths Available:

020 = 2 m

050 = 5 m

100 = 100 m



M12 Double-Ended

Type	M12 Female - M12 Male	M12 Female - M12 Male
Configuration	Straight - Straight	Right Angle - Straight
Voltage Rating	4p+PE & 5p = 125V, 8p=60V, 12p = 30V	125V
Amperage	4p+PE & 5p = 4A, 8p=2A, 12p = 1A	4A
Conductor Cross-Section	4p+PE & 5p = 0.34 mm ² , 8p & 12p = 0.25 mm ² . Yellow = 22 AWG	0.34 mm ²
Cable Jacket Material	Black PUR, Yellow TPE, Yellow PVC	Black PUR
4-wire+PE, non-LED	BCC M415-M415-3A-313-PX0534-__ _	BCC M425-M415-3A-313-PX0534-__ _
4-wire+PE, PNP-N/O & N/C signals		BCC M425-M415-3A-661-PX0534-__ _
5-wire, non-LED	BCC M415-M415-3A-312-PX0534-__ _	BCC M425-M415-3A-312-PX0534-__ _
5-wire, PNP-N/O & N/C signals		BCC M425-M415-3A-660-PX0534-__ _
8-wire, non-LED	BCC M418-M418-3A-342-PX0825-__ _	
12-wire, non-LED	BCC M41C-M41C-3A-325-PX0C25-__ _	

Available Lengths:

003 = 0.3 m 020 = 2.0 m

006 = 0.6 m 030 = 3.0 m

010 = 1.0 m 050 = 5.0 m

015 = 1.5 m 100 = 10.0 m

Connectivity Solutions

M12 shielded cordsets



M12 Single-Ended Shielded

Type	M12 Female	M12 Female
Configuration	Straight	Right Angle
Voltage Rating	(3p, 4p = 250 V), (4p+PE, 5p = 125 V), (8p = 60 V)	(3p, 4p = 250 V), (4p+PE, 5p = 125 V), (8p = 60 V)
Amperage	(3p, 4p = 4 A), (5p = 4 A), (8p = 2 A)	(3p, 4p = 4 A), (5p = 4 A), (8p = 2 A)
Conductor Cross-Section	(3p, 4p, 5p = 0.34 mm ²), (8p = 0.25 mm ²)	(3p, 4p, 5p = 0.34 mm ²), (8p = 0.25 mm ²)
3-wire, non-LED, N/O signal, shielded	BCC M415-0000-1A-036- _S_ 334- _ _ _	BCC M425-0000-1A-036- _S_ 334- _ _ _
3-wire, non-LED, N/C signal, shielded	BCC M415-0000-1A-037- _S_ 334- _ _ _	BCC M425-0000-1A-037- _S_ 334- _ _ _
4-wire, non-LED, shielded	BCC M415-0000-1A-014- _S_ 434- _ _ _	BCC M425-0000-1A-014- _S_ 434- _ _ _
4-wire+PE, non-LED, shielded	BCC M415-0000-1A-043-PS0534- _ _ _	BCC M425-0000-1A-043-PS0534- _ _ _
5-wire, non-LED, shielded	BCC M415-0000-1A-016-PS0525- _ _ _	
8-wire, non-LED, shielded	BCC M418-0000-1A-046-PS0825- _ _ _	BCC M428-0000-1A-046-PS0825- _ _ _

Standard Cable Jackets:

VS8 = PVC (grey, 8)

PS0 = PUR (black, 0)

Standard Lengths Available:

020 = 2 meters

050 = 5 meters

100 = 100 meters



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Connectivity Solutions

M8 and M12 splitters



M8 Splitters

Type	M8 Female (x2) - M12 Male	M8 Female (x2) - M12 Male	
Configuration	Straight - Straight	Right Angle - Straight	
Voltage Rating	60 VAC / 75 VDC	60 VAC / 75 VDC	
Amperage	4 A	4 A	
Wiring	Jacket Mat.		
3-wire, non-LED	PVC	BCC M414-M313-M313-U2012-__ _	BCC M414-M323-M323-U2012-__ _
3-wire, non-LED	PUR (black)		
3-wire, OR Logic	PUR (black)		



M12 Splitters

Type	Flying Leads (x2) - M12 Male	M12 Female (x2) - M12 Male	
Configuration	Open - Straight	Straight - Straight	
Voltage Rating	250 VAC / VDC	250 VAC / VDC	
Amperage	4 A	4 A	
Wiring	Jacket Mat.		
3-wire, non-LED, N/O	PVC	BCC M414-0000-0000-U2009-__ _	BCC M414-M415-M415-U2010-__ _
3-wire, non-LED, N/O	TPE		BCC M414-M415-M415-U2002-__ _
3-wire, PNP-LED, N/O	TPE		BCC M414-M415-M415-U2011-__ _
3-wire+PE, non-LED, N/O	PVC (black)		
3-wire, AND Logic	TPE		C04 EEC-04-TY-002M-V-F039
4-wire+PE, OR Logic	PVC (black)		
4-wire, N/C or N/O, non-LED	PUR (black)		BCC M414-M415-M415-U2018-002

Connectivity Solutions

M8 and M12 splitters



M8 Female (x2) - M8 Male	M8 Female (x2) - M12 Male
Straight - Straight	U-style
30 VAC / 30 VDC	60 VAC / 60 VDC
4 A	4 A
	BCC M415-M313-M313-U0014-000
BCC M314-M313-M313-U2024-_-_-	
BCC M313-M313-M313-U2017-003	

Standard Lengths Available:

003 = 0.3 m
006 = 0.6 m
010 = 1.0 m
020 = 2 m
050 = 5 m



M12 Female (x2) - M12 Male	M12 Female (x2) - M12 Male
Right Angle - Straight	U-style
250 VAC / VDC	250 VAC / VDC
4 A	4 A
	BCC M414-M425-M425-U2010-_-_-
BCC M414-M425-M425-U2002-_-_-	
BCC M414-M425-M425-U2011-_-_-	
	BCC M415-M415-M415-U0003-000
	BCC M415-M415-M415-U0016-000

Standard Lengths Available:

003 = 0.3 m
006 = 0.6 m
010 = 1.0 m
020 = 2 m
050 = 5 m

Flying Lead Standard Lengths:

020 = 2 m
050 = 5 m



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Connectivity Solutions

7/8" single-ended MINI cordset



7/8" Single-Ended

Type	7/8" Female (Int Threads)	7/8" Female (Int Threads)
Configuration	Straight	Right Angle
Voltage Rating	300 V AC/DC	300 V AC/DC
Amperage	12 A (3-wire)/9 A (4- and 5-wire)	12 A (3-wire)/9 A (4- and 5-wire)
Conductor Cross-Section	16 AWG	16 AWG
3-wire US-Color Code	BCC A313-0000-10-071-VX43W6-__ _	BCC A323-0000-10-071-VX43W6-__ _
4-wire US-Color Code	BCC A314-0000-10-072-VX44W6-__ _	BCC A324-0000-10-072-VX44W6-__ _
4-wire DC-Color Code	BCC A314-0000-10-003- _X44W6-__ _	BCC A324-0000-10-003- _X44W6-__ _
5-wire DC-Color Code	BCC A315-0000-10-063-VX45W6-__ _	BCC A325-0000-10-063-VX45W6-__ _

Standard Cable Jackets:

V = PVC

E = TPE

Standard Lengths Available:

020 = 2 meters

050 = 5 meters

100 = 10 meters

150 = 15 meters

200 = 20 meters



16 AWG Bulk Cables

Bulk Cable	BCC0AEF	BCC0AEH	BCC0AEJ	BCC0APC	BCC0AEK
Jacket Material	PVC	PVC	PVC	TPE	PVC
Length	100 m	100 m	100 m	100 m	100 m
Number of Conductors	3	4	4	4	5
Conductor Color Code	US AC	US AC	DC	DC	DC
Jacket Color	Yellow	Yellow	Yellow	Yellow	Yellow
Conductor Gauge	16 AWG	16 AWG	16 AWG	16 AWG	16 AWG
Cordsets Used	7/8"	7/8"	7/8"	7/8"	7/8"
Temperature Rating	-40...105°C	-40...105°C	-40...105°C	-40...105°C	-40...105°C
Cable Diameter (mm)	10.24 ± 0.20 mm	10.67 ± 0.25 mm	10.67 ± 0.25 mm	10.67 ± 0.25 mm	12.57 ± 0.25 mm

Connectivity Solutions

7/8" to M12 adapters



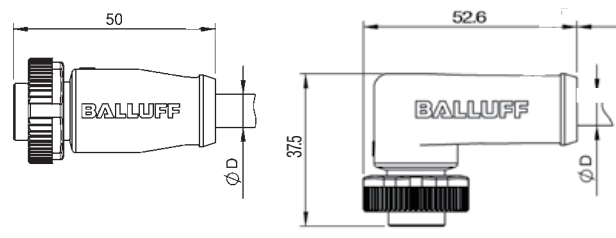
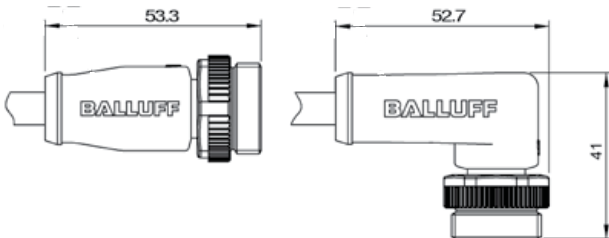
7/8" Double-Ended - Internal Threads to External Threads

Type	7/8" to M12 Converter	M12 to 7/8" Converter
Configuration	Female - Male	Female - Male
Voltage Rating	300 V	300 V
Amperage	4 A	4 A
3-wire	BCC0A7E BCC A313-M413-3E-RA031-000	BCC0A7J BCC M415-A313-3F-RA023-000
4-wire	BCC0A7F BCC A314-M414-3E-RA032-000	BCC0A7K BCC M415-A314-3F-RA034-000
5-wire	BCC0A7H BCC A315-M415-3E-RA033-000	BCC0A7L BCC M415-A315-3F-RA035-000

7/8" connectors, male straight and right-angle



7/8" connectors, female straight and right-angle



You will find many additional products in our total product line, "Industrial networking and connectivity – A guide to industrial network architecture" or online at: www.balluff.us.



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M8 junction blocks



M8 Junction Blocks (MIBs) - Quick Disconnect

Type	M12 Quick Disconnect	M12 Quick Disconnect
Configuration	4 port	8 port
Voltage Rating	10...30 VDC	10...30 VDC
Current Rating / Block	6 A	6 A
Current Rating / Contact	2 A	2 A
Suggested Homerun Cable	BCC M4_8-0000-1A-044-PX0825-_-_-	BCC M4_C-0000-1A-049-PX0C25-_-_-
3-wire, PNP-LED	BPI 4M303P-2K-00-SM48T	BPI 8M303P-2K-00-SM4CT



M8 Junction Blocks (MIBs) - Cable Out

Type	Cable Out	Cable Out
Configuration	4 port	8 port
Voltage Rating	10...30 VDC	10...30 VDC
Current Rating / Block	6 A	6 A
Current Rating / Contact	2 A	2 A
3-wire, PNP-LED	BPI 4M303P-2K-00-KPX60-_-_-	BPI 8M303P-2K-00-KPXA0-_-_-
4-wire, PNP-LED	BPI 4M304P-2K-00-KPXA0-_-_-	BPI 8M304P-2K-00-KP XK0-_-_-

Standard Lengths Available:

030 = 3 meters
050 = 5 meters
100 = 10 meters
150 = 15 meters



M8 Blocks - M12 Homerun Cables

Type	M12 Female	M12 Female
Configuration	Straight	Right Angle
Voltage Rating	(8p = 60 V), (12p = 30 V)	(8p = 60 V), (12p = 30 V)
Amperage	(8p = 2 A), (12p = 1 A)	(8p = 2 A), (12p = 1 A)
8-wire	BCC M418-0000-1A-044-PX0825-_-_-	BCC M428-0000-1A-044-PX0825-_-_-
12-wire	BCC M41C-0000-1A-049-PX0C25-_-_-	BCC M42C-0000-1A-049-PX0C25-_-_-

Standard Lengths Available:

020 = 2 meters
050 = 5 meters
100 = 10 meters

For more variations see
Networking Catalog



Connectivity Solutions

M12 junction blocks



M12 Junction Blocks (MIBs) - Quick Disconnect

Type	M23 Quick Disconnect	M23 Quick Disconnect
Configuration	4 port	8 port
Voltage Rating	10...30 VDC	10...30 VDC
Current Rating / Block	6 A	12 A
Current Rating / Contact	2 A	2 A
Suggested Homerun Cable (3-wire)	BCC M6_C-0000-10-065-PX0BP4-__ _	BCC M6_C-0000-10-065-PX0BP4-__ _
Suggested Homerun Cable (4-wire)	BCC M6_L-0000-10-022-PX0LP4-__ _	BCC M6_L-0000-10-022-PX0LP4-__ _
3-wire+PE, PNP-LED	BPI 4M4A4P-2K-00-SM6CT	BPI 8M4A4P-2K-00-SM6CT
4-wire+PE, PNP-LED	BPI 4M4A5P-2K-00-SM6LT	BPI 8M4A5P-2K-00-SM6LT



M12 Junction Blocks (MIBs) - Cable Out

Type	Cable Out	Cable Out
Configuration	4 port	8 port
Voltage Rating	10...30 VDC	10...30 VDC
Current Rating / Block	6 A	12 A
Current Rating / Contact	2 A	2 A
3-wire+PE, PNP-LED	BPI 4M4A4P-2K-00-KPX70-__ _	BPI 8M4A4P-2K-00-KPXB0-__ _
4-wire+PE, PNP-LED	BPI 4M4A5P-2K-00-KPXB0-__ _	BPI 8M4A5P-2K-00-KPXL0-__ _

Standard Lengths Available

030 = 3 meters

050 = 5 meters

100 = 10 meters

150 = 15 meters



M12 Blocks - M23 Homerun Cables

Type	M23 Female	M23 Female
Configuration	Straight	Right Angle
Voltage Rating	(12p = 250 VAC/VDC), (19p = 125 VAC/VDC)	(12p = 250 VAC/VDC), (19p = 125 VAC/VDC)
Amperage	(12p = 8 A), (19p = 3x8 A)	(12p = 8 A), (19p = 3x8 A)
12-wire	BCC M61C-0000-10-065-PX0BP4-__ _	BCC M62C-0000-10-065-PX0BP4-__ _
19-wire	BCC M61L-0000-10-022-PX0LP4-__ _	BCC M62L-0000-10-022-PX0LP4-__ _

Standard Lengths Available:

020 = 2 meters

050 = 5 meters

100 = 10 meters



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For more variations see
Networking Catalog





M8 Female Field Attachables

Type	M8 Female	M8 Female	
Configuration	Straight	Straight	
Housing	Plastic/Metal	Plastic	
Connection	Piercon Terminals	Screw Terminals	
Conductor Maximum	0.14...0.38 mm ² (26...22 AWG)	0.14...0.50 mm ² (26...20 AWG)	
No. of Conductors	Cable Ø Range	Order Code Part Number	
3-wire	3...5 mm	BCC09EU BCC M333-0000-10-000-22X334-000	
	3.5...5 mm		BCC06Z1 BCC M333-0000-10-000-31X350-000
4-wire	3...5 mm	BCC09EY BCC M334-0000-10-000-22X434-000	
	3.5...5 mm		BCC06Z5 BCC M334-0000-10-000-31X450-000



M8 Male Field Attachables

Type	M8 Male	M8 Male	
Configuration	Straight	Straight	
Housing	Plastic/Metal	Plastic	
Connection	Piercon Terminals	Screw Terminals	
Conductor Maximum	0.14...0.38 mm ² (26...22 AWG)	0.14...0.50 mm ² (26...20 AWG)	
No. of Conductors	Cable Ø Range	Order Code Part Number	
3-wire	3...5 mm	BCC09EW BCC M333-0000-20-000-22X334-000	
	3.5...5 mm		BCC0E7N BCC M333-0000-20-000-31X350-000-C027
4-wire	3...5 mm	BCC09EZ BCC M334-0000-20-000-22X434-000	
	3.5...5 mm		BCC06Z7 BCC M334-0000-20-000-31X450-000

Connectivity Solutions

M8 field attachables



M8 Female	M8 Female
Straight	Right Angle
Plastic/Metal	Plastic
Solder Cup	Solder Cup
0.14...0.38 mm ² (26...22 AWG)	0.14...0.38 mm ² (26...22 AWG)
BCC06YW	BCC06YY
BCC M333-0000-10-000-34X325-000	BCC M343-0000-10-000-34X325-000

Standard Cable Information

Jacket	Wires	Conductors	Diameter
Yellow PVC	3	22 AWG	4.7 ± 0.15 mm
Yellow PVC	4	22 AWG	5.0 ± 0.15 mm
Grey PVC	3	0.34 mm ²	4.5 ± 0.15 mm
Grey PVC	4	0.34 mm ²	4.8 ± 0.15 mm
Yellow PUR	3	22 AWG	4.3 ± 0.20 mm
Yellow PUR	4	22 AWG	4.7 ± 0.20 mm
Black PUR	3	0.34 mm ²	4.3 ± 0.20 mm
Black PUR	4	0.34 mm ²	4.7 ± 0.20 mm
Yellow TPE	3	22 AWG	5.3 ± 0.13 mm
Yellow TPE	4	22 AWG	5.3 ± 0.13 mm



M8 Male	M8 Male
Straight	Right Angle
Plastic/Metal	Plastic
Solder Cup	Solder Cup
0.14...0.38 mm ² (26...22 AWG)	0.14...0.38 mm ² (26...22 AWG)
BCC06YZ	BCC06Z0
BCC M333-0000-20-000-34X325-000	BCC M343-0000-20-000-34X325-000

Standard Cable Information

Jacket	Wires	Conductors	Diameter
Yellow PVC	3	22 AWG	4.7 ± 0.15 mm
Yellow PVC	4	22 AWG	5.0 ± 0.15 mm
Grey PVC	3	0.34 mm ²	4.5 ± 0.15 mm
Grey PVC	4	0.34 mm ²	4.8 ± 0.15 mm
Yellow PUR	3	22 AWG	4.3 ± 0.20 mm
Yellow PUR	4	22 AWG	4.7 ± 0.20 mm
Black PUR	3	0.34 mm ²	4.3 ± 0.20 mm
Black PUR	4	0.34 mm ²	4.7 ± 0.20 mm
Yellow TPE	3	22 AWG	5.3 ± 0.13 mm
Yellow TPE	4	22 AWG	5.3 ± 0.13 mm



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7/8" to M12
adapters
Junction
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cables
**Field
attachables**
Wrenches

Connectivity Solutions

M12 female field attachables



M12 Female Field Attachables

Type	M12 Female	M12 Female	M12 Female	
Configuration	Straight	Straight	Straight	
Housing	Plastic	Plastic	Plastic	
Connection	Screw Terminals	Insulation Displacement	Spring Clamp	
Conductor Range	0.14...0.75 mm² (26...18 AWG)	0.14...0.34 mm² (26...22 AWG)	0.14...0.50 mm² (26...20 AWG)	
No. of Conductors	Allowable Cable Ø	Order Code Part Number		
4-wire	4...6 mm	BCC06Z9 BCC M435-0000-1A-000-41X475-000	BCC06ZY BCC M435-0000-1A-000-43X434-000	
	5...8 mm			
	6...8 mm	BCC06F6 BCC M435-0000-1A-000-51X475-000		BCC06Y6 BCC M435-0000-1A-000-55X450-000
5-wire	2.1...3 mm or 4...5 mm	BCC09JP BCC M435-0000-1A-000-A1X575-000		
	4...6 mm	BCC06ZF BCC M435-0000-1A-000-41X575-000		
	5...8 mm			
	6...8 mm	BCC06W9 BCC M435-0000-1A-000-51X575-000		
8-wire	4...6 mm (shielded)		BCC04MC BCC M478-0000-1A-000-43X834-000	
	6...8 mm (0.14...0.50 mm²)	BCC0A03 BCC M438-0000-1A-000-51X850-000		
12-wire	6...8 mm (0.14...0.25 mm²)			BCC0A05* (solder cup) BCC M43C-0000-1A-000-54XC25-000

Jacket	Wires	Conductors	Diameter
Yellow PVC	3	22 AWG	4.7 ± 0.15 mm
Yellow PVC	4	22 AWG	5.0 ± 0.15 mm
Grey PVC	3	0.34 mm²	4.5 ± 0.15 mm
Grey PVC	4	0.34 mm²	4.8 ± 0.15 mm
Yellow PUR	3	22 AWG	4.3 ± 0.20 mm
Yellow PUR	4	22 AWG	4.7 ± 0.20 mm

Jacket	Wires	Conductors	Diameter
Black PUR	3	0.34 mm²	4.3 ± 0.20 mm
Black PUR	4	0.34 mm²	4.7 ± 0.20 mm
Yellow TPE	3	22 AWG	5.3 ± 0.13 mm
Yellow TPE	4	22 AWG	5.3 ± 0.13 mm

*Consult factory for availability.

Connectivity Solutions

M12 female field attachables



M12 Female	M12 Female	M12 Female	M12 Female
Right Angle	Straight	Straight	Right Angle
Plastic	Metal (shielded)	Stainless Steel	Stainless Steel
Screw Terminals	Screw Terminals	Screw Terminals	Screw Terminals
0.14...0.75 mm² (26...18 AWG)	0.14...0.75 mm² (26...18 AWG)	0.14...0.75 mm² (26...18 AWG)	0.14...0.75 mm² (26...18 AWG)
BCC06ZA	BCC06ZM	BCC097P	BCC097T
BCC M445-0000-1A-000-41X475-000	BCC M475-0000-1A-000-01X475-000	BCC S435-0000-1A-000-41X575-000	BCC S445-0000-1A-000-41X575-000
BCC06Y8	BCC06ZN	BCC097R	BCC097U
BCC M445-0000-1A-000-51X475-000	BCC M475-0000-1A-000-01X575-000	BCC S435-0000-1A-000-51X575-000	BCC S445-0000-1A-000-51X575-000
BCC06ZH			
BCC M445-0000-1A-000-41X575-000			
BCC06ZJ			
BCC M445-0000-1A-000-51X575-000			
BCC04ME (IDC)			
BCC M488-0000-1A-000-43X834-000			



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Wrenches

Connectivity Solutions

M12 male field attachables



M12 Male Field Attachables

Type	M12 Male	M12 Male	M12 Male	
Configuration	Straight	Straight	Straight	
Housing	Plastic	Plastic	Plastic	
Connection	Screw Terminals	Insulation Displacement	Spring Clamp	
Conductor Maximum	0.14...0.75 mm ² (26...18 AWG)	0.14...0.34 mm ² (26...22 AWG)	0.14...0.50 mm ² (26...20 AWG)	
No. of Conductors	Allowable Cable Ø	Order Code Part Number		
4-wire	4...6 mm	BCC06M4 BCC M434-0000-2A-000-41X475-000	BCC08C0 BCC M434-0000-2A-000-43X434-000	
	5...8 mm			
	6...8 mm	BCC06F7 BCC M434-0000-2A-000-51X475-000		BCC06Y5 BCC M434-0000-2A-000-55X450-000
5-wire	2.1...3 mm or 4...5 mm	BCC09JW BCC M435-0000-2A-000-A1X575-000		
	4...6 mm	BCC06YA BCC M435-0000-2A-000-41X575-000		
	5...8 mm			
	6...8 mm	BCC06EY BCC M435-0000-2A-000-51X575-000		
8-wire	4...6 mm	BCC01KR C04 CNT-9		
	6...8 mm (0.14...0.50 mm ²)	BCC0A04 BCC M438-0000-2A-000-51X850-000		
12-wire	6...8 mm (0.14...0.25 mm ²)			BCC0A06* (solder cup) BCC M43C-0000-2A-000-54XC25-000

Jacket	Wires	Conductors	Diameter
Yellow PVC	3	22 AWG	4.7 ± 0.15 mm
Yellow PVC	4	22 AWG	5.0 ± 0.15 mm
Grey PVC	3	0.34 mm ²	4.5 ± 0.15 mm
Grey PVC	4	0.34 mm ²	4.8 ± 0.15 mm
Yellow PUR	3	22 AWG	4.3 ± 0.20 mm
Yellow PUR	4	22 AWG	4.7 ± 0.20 mm

Jacket	Wires	Conductors	Diameter
Black PUR	3	0.34 mm ²	4.3 ± 0.20 mm
Black PUR	4	0.34 mm ²	4.7 ± 0.20 mm
Yellow TPE	3	22 AWG	5.3 ± 0.13 mm
Yellow TPE	4	22 AWG	5.3 ± 0.13 mm

*Consult factory for availability.



BALLUFF | 949

Connectivity Solutions

1/2" Micro AC and 7/8" mini field attachables



1/2" Field Attachables

Type	1/2" Female	1/2" Male
Configuration	Straight	Right Angle
Housing	Plastic	Plastic
Connection	Screw Terminals	Screw Terminals
Cable Gland	PG7	PG7
No. of Conductors	Order Code Part Number	
Female	BCC01ZL	BCC08AU
	C21 AN3-7	BCC A233-0000-10-000-41X3W8-000
Male	BCC080J	BCC08AY
	C21 CN3-7	BCC A233-0000-20-000-41X3W8-000
	BCC0206	BCC08AW
	C21 BN3-7	BCC A243-0000-10-000-41X3W8-000
	BCC020E	BCC08AZ
	C21 DN3-7	BCC A243-0000-20-000-41X3W8-000



7/8" Field Attachables

Type	7/8" Female	7/8" Male
Configuration	Straight	Straight
Housing	Plastic	Plastic
Connection	Screw Terminals	Screw Terminals
Conductor Maximum	0.14...1.50 mm ² (26...16 AWG)	0.14...1.50 mm ² (26...16 AWG)
No. of Conductors	Allowable Cable Ø	Order Code Part Number
3-wire	10...12 mm	BCC0ATA
		BCC A333-0000-10-000-71X3A5-000
4-wire	10...12 mm	BCC0708
		BCC A334-0000-10-000-71X4A5-000
5-wire	12...14 mm	BCC0ATH
		BCC A335-0000-10-000-81X5A5-000
		BCC0ATE
		BCC A333-0000-20-000-71X3A5-000
		BCC070C
		BCC A334-0000-20-000-71X4A5-000
		BCC0ATF
		BCC A335-0000-20-000-81X5A5-000

Jacket Material	PVC	PVC	PVC	PVC
Number of Conductors	3	4	4	5
Cable Diameter (mm)	10.24 ± 0.20 mm	10.67 ± 0.25 mm	10.67 ± 0.25 mm	12.57 ± 0.25 mm

IP67 Torque Wrenches

By using a calibrated IP67 torque wrench on the hex nut with every cordset, you can ensure the IP67 rating at the sensor or at the MIB, which will protect your sensor signals even in the wettest environments.

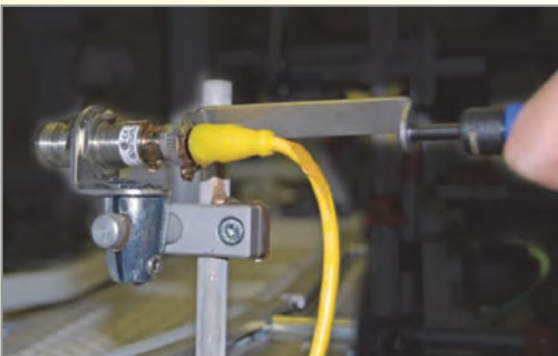


Description	Order Code Part Number
M8, 0.4 Nm torque rating	BAM00ZL BAM TO-CC-001-M3-0,4/8,0
M12, 0.6 Nm torque rating	BAM00ZM BAM TO-CC-001-M4-0,6/12,0
7/8", 1.5 Nm torque rating	BAM00ZN BAM TO-CC-001-A3-1,5/24,0

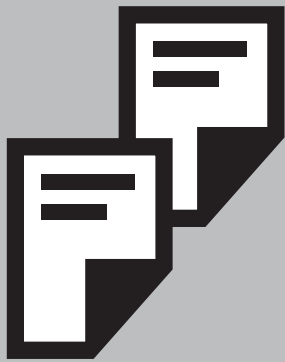


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1/2" AC micro
M12 micro
Splitters
7/8" mini
7/8" to M12
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Wrenches

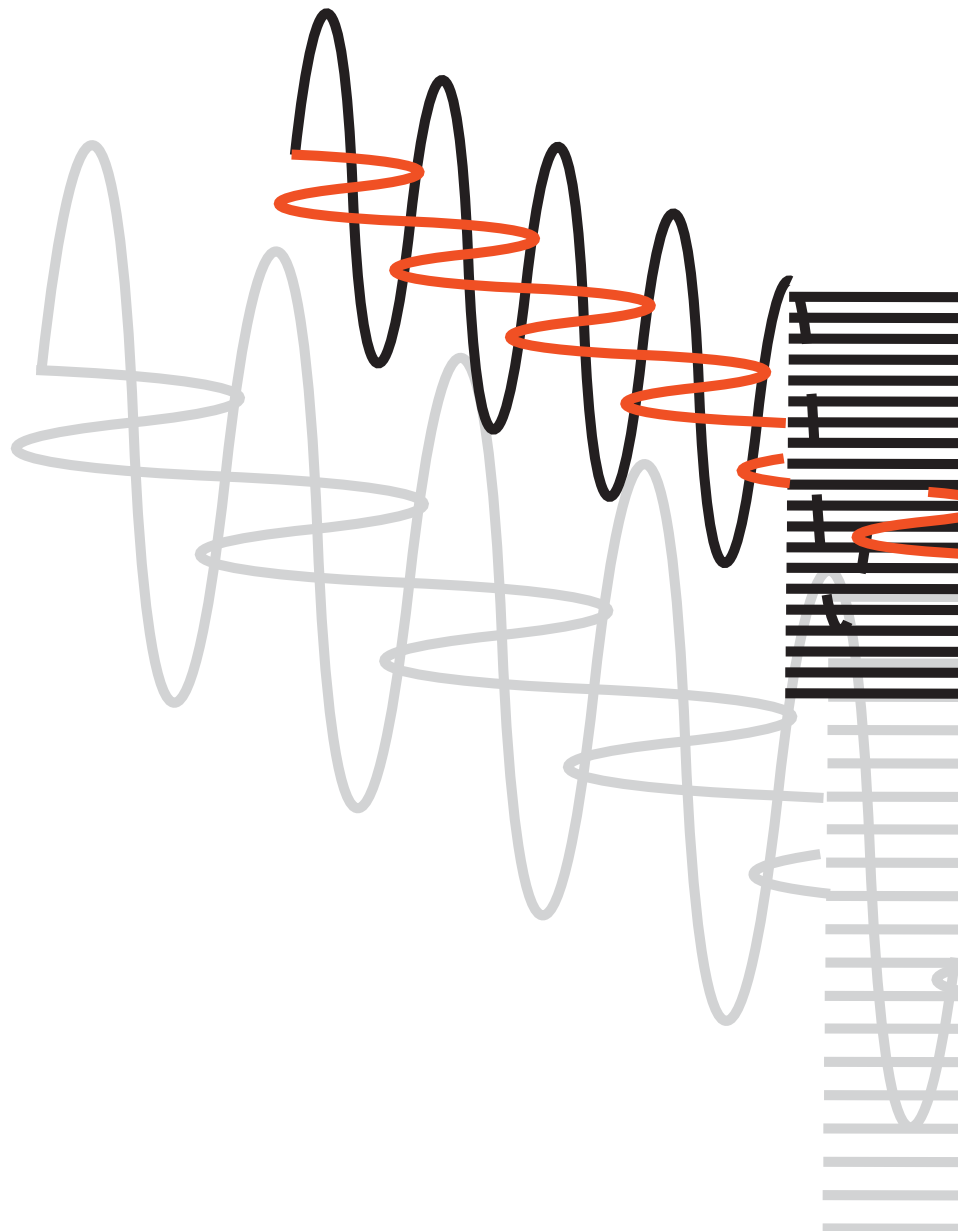
Possible Wet/Oily Environment



In this scenario there is a connection between cordsets, with the final connection to a sensor. This scenario is characteristic of homerun cables, patch cables, and adapter cables. The connection between cordsets can sometimes lie in an unexpected, oily or wet environment at the bottom of a work cell. By using a combination of a new Balluff cordset with hexagonal coupling nut and a properly calibrated torque wrench, the sensor connection is IP67 guaranteed. By ratcheting when the connection is properly sealed, it does not allow over-torque, which can be just as bad as too little torque.



Basic Information and Definitions



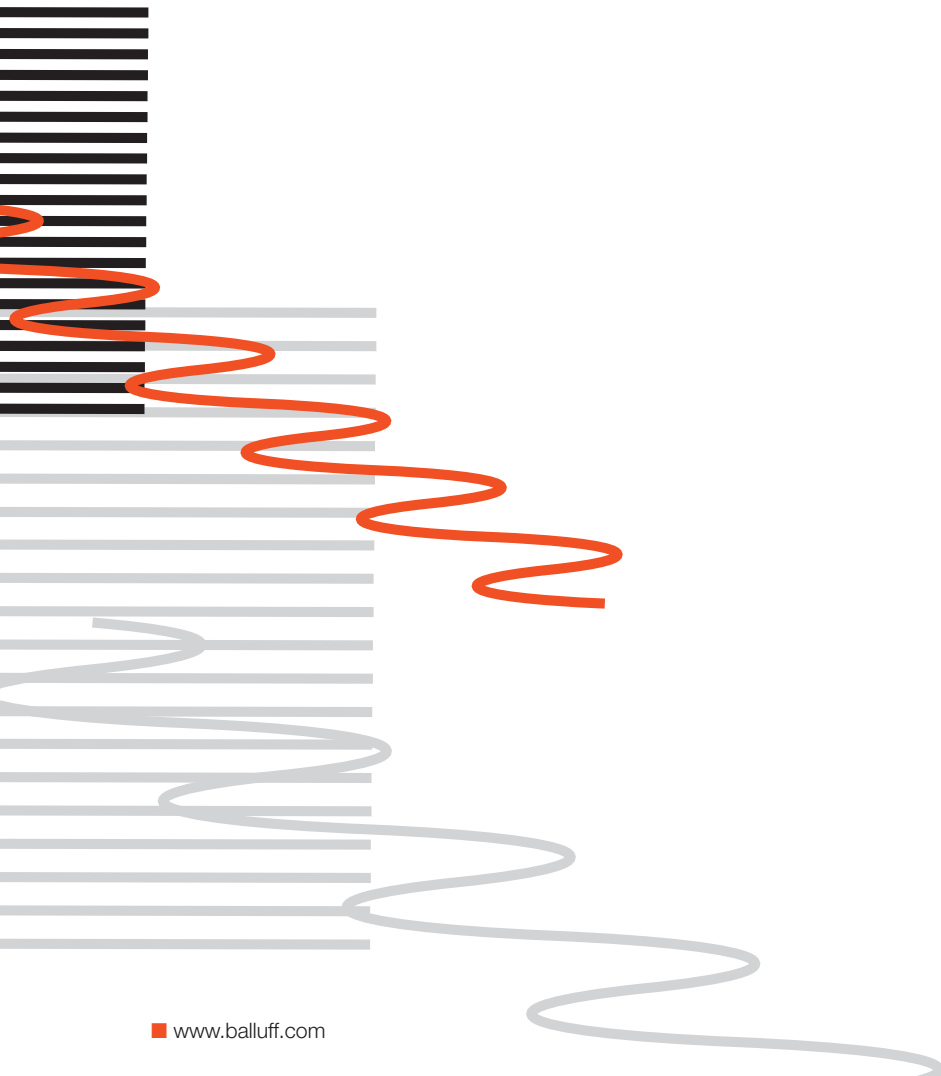


Basic Information and Definitions

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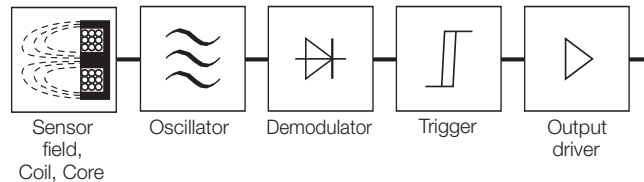
Inductive sensors

Principle

... of inductive proximity sensors is based on the interaction between metallic conductors and an electromagnetic alternating field. Eddy currents are induced in the metallic damping material, which removes energy from the field and reduces the height of the oscillation amplitude. This change is processed in the inductive sensor, which changes its output state accordingly.

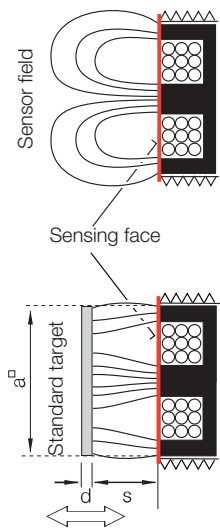
Function groups

... of the Balluff proximity switch are:



Sensing face

... is the area through which the high-frequency sensor field enters the air space. It is determined primarily by the base of the shell core and corresponds roughly to the surface area of the shell core cap.



Standard target

... is a square plate of Fe 360 (ISO 630), used to define sensing distances per EN 60947-5-2. The thickness is $d = 1 \text{ mm}$; and the side length a corresponds to

- the diameter of the circle of the “sensing face”
- or
- $3 \times s_n$, if the value is greater than the given diameter.

Correction factor

... gives the reduction in sensing distances for target materials which are not made of Fe 360. Unless otherwise noted.

Material	Factor
steel	1.0
copper	0.25...0.45
brass	0.35...0.50
aluminum	0.30...0.45
stainless steel	0.60...1.00
nickel	0.65...0.75
cast iron	0.93...1.05

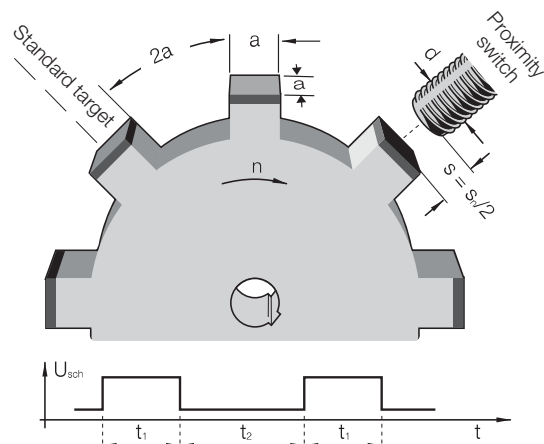
Switching frequency f

.. refers to the maximum number of switching operations per second.

Damping is per EN 60947-5-2 with standard targets on a rotating, non-conducting disk. The surface area ratio of iron to non-conductor must be 1 : 2.

The rated value of the switching frequency is reached when

- either the turn-on signal $t_1 = 50 \mu\text{s}$ or the
- turn-off signal $t_2 = 50 \mu\text{s}$



Delay Times

Start-up delay t_v

... is the time from when the supply voltage is applied, and the proximity switch assumes the ready state. This time may not be longer than 300 ms. During this time there must be no fault signal longer than 2 ms.

Temperature Effects and Limits

Temperature drift

... is the deviation of the effective operating distance with the temperature range of $-25\text{ °C} \leq T_a \leq +70\text{ °C}$. Per EN 60947-5-2 it is: $\Delta s_r/s_r \leq 10\%$

Ambient temperature range T_a

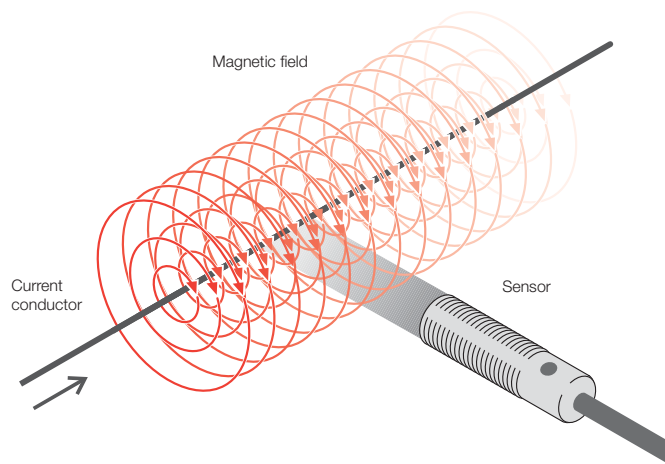
... is the temperature range over which the function of the switch is guaranteed.

Magnetic Field Immunity

Principle

Error-free function depends on the magnitude of the welding current and the distance of the sensor from the current carrying line.

Design and circuitry techniques ensure that magnetic field immune proximity switches remain unaffected by magnetic fields.



Basic
information

Inductive sensors

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Capacitive
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Inductive sensors

Supply voltage U_B

... is the permissible voltage range in which certain safe operation of the switch is guaranteed (including ripple σ). It is indicated in the catalog section for each product.

Rated operating voltage U_e

... is the supply voltage U_B used for testing without tolerances. To determine the rated and limit values, the sensor must be operated using U_e . It is:

- for DC switches **$U_e = 24 V_{DC}$**
- for AC and AC/DC switches **$U_e = 110 V_{AC}$**

Voltage drop U_d

... is the voltage measured across the load of a closed (conducting) sensor at load current I_e .

Rated insulation voltage U_i

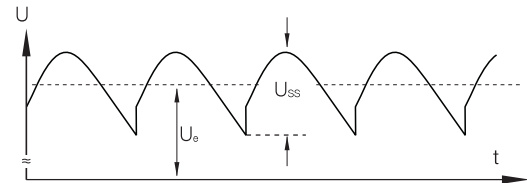
... of a proximity switch is the voltage to which the isolation tests and the creep distances are referenced. For proximity switches the highest rated operating voltage must be considered as the rated isolation voltage.

Rated supply frequency

... of the power supply for AC devices is 50 to 60 Hz.

Ripple σ (%)

... is the AC voltage (peak-to-peak of U_e) overlaid on the DC voltage U_e given in percent. To operate DC switches, a filtered DC voltage having a ripple of max. 15 % (per DIN 41755) is required.



U_e = rated operational voltage

U_{ss} = oscillation width

$$\text{Ripple } \sigma = \frac{U_{ss}}{U_e} \times 100 [\%]$$

Rated operating current I_e

... is the permissible constant output current that may flow through the load R_L .

Off-state current I_r

... is the residual current flowing through the load when a proximity switch is not conducting (open).

Max. inrush I_k

... in the case of alternating current indicates the current I_k (A_{eff}) which is permitted to flow during a given turn-on time t_k (ms) and at a given frequency (Hz).

Short circuit current

... is 100 A, i. e., per EN 60947-5-2 the power supply during testing in short circuit mode must be able to provide at least 100 A for a short duration. This current is prescribed in the standard in order to test the short-circuit strength.

No-load supply current I_0

... is the current, which flows in the switch, without the need for a load to be connected (only with 3- and 4-wire-switches). This current supplies the sensor electronics.



Basic Information and Definitions

Inductive sensors

Minimum operating current I_m

... is the smallest load current required for function of the switch when ON.

Output resistance R_a

... is the resistance between the output and the supply voltage which is built into the switch; see "Output circuits".

Load capacitance

... is the permissible total capacitance on the output of the switch, including line capacitance.

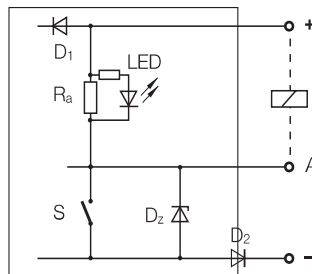
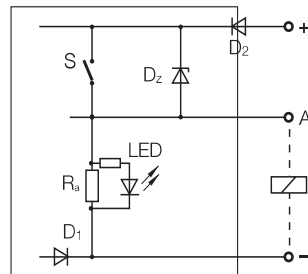
Output Circuits

Driver stages

3-wire
DC switches

PNP, sourcing
(current source)

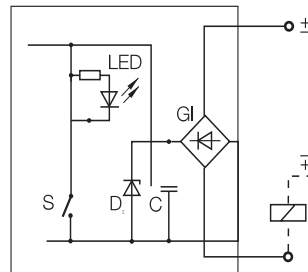
NPN, sinking
(current sink)



S = semiconductor switch
 R_a = output resistance
 D_z = Z-Diode, limiter
 D_1 = pol. rev. protect. diode
 D_2 = pol. rev. protect. diode in load current circuit (for short protection types only)
 LED = light emitting diode

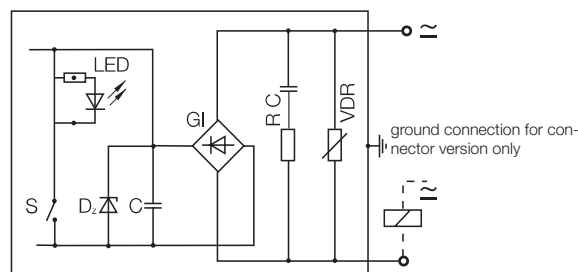
2-wire
DC switches

Non-polarized



S = semiconductor switch
 D_z = Z-Diode, limiter
 C = capacitor
 GI = bridge rectifier
 LED = light emitting diode

2-wire
AC and AC/DC switches
(universal current switches)



S = semiconductor switch
 D_z = Z-Diode, limiter
 C = filter capacitor
 RC = HF-Peak-limiter
 GI = bridge rectifier
 LED = light emitting diode
 VDR = voltage spike limiter



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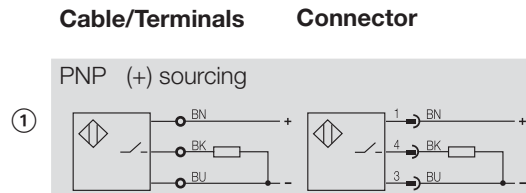
Basic Information and Definitions

Inductive sensors

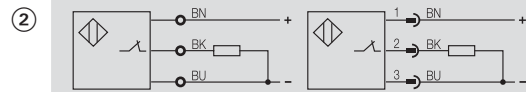
Wiring Diagrams

DC 3/4-Wire

Normally open



Normally closed

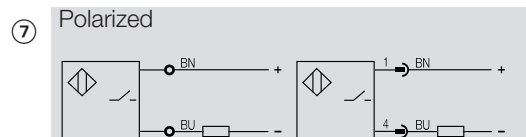


NO/NC

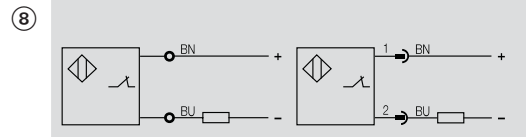


DC 2-Wire

Normally open

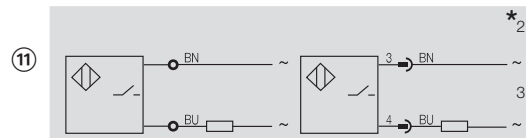


Normally closed

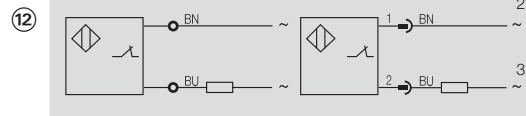


AC-Sensors

Normally open

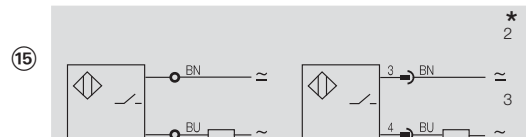


Normally closed

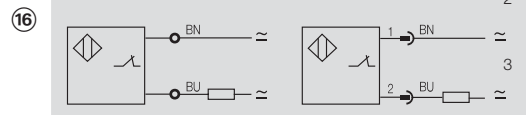


AC/DC-Sensors

Normally open



Normally closed



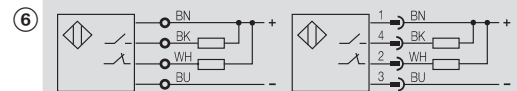
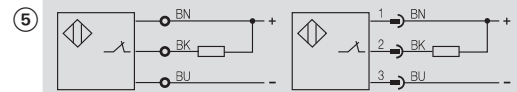
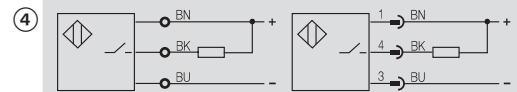
Wire colors

Coding per DIN IEC 60757

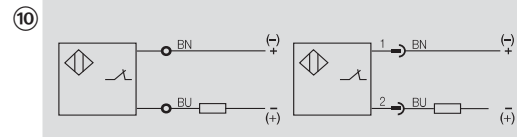
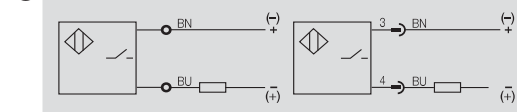
BN	brown
BK	black
BU	blue
WH	white

Cable/Terminals Connector

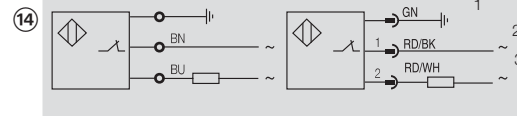
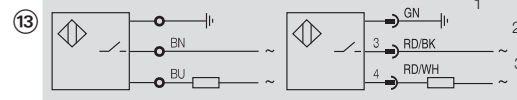
NPN (-) sinking



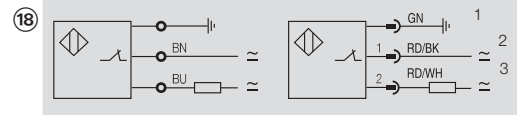
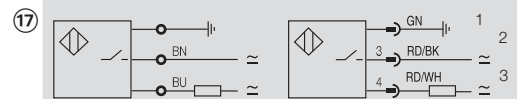
Non-polarized



with protection ground



with protection ground



*Pin assignments shown are based on the U.S. standard for cable connectors

Basic Information and Definitions

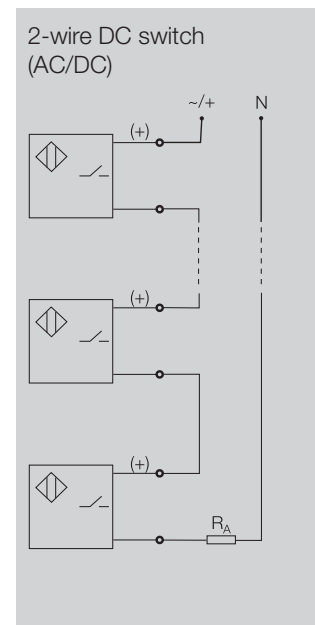
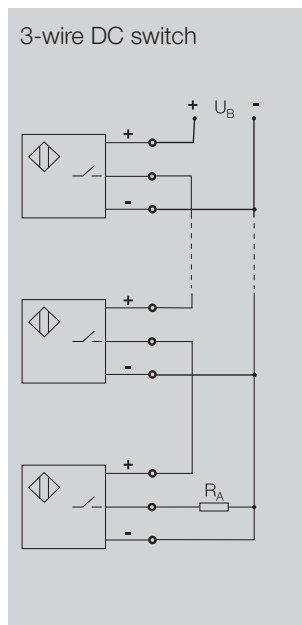
Inductive sensors

Series connection

... can cause a time delay (e. g. start-up delay). The number of connected proximity switches is limited by the total voltage drop (sum of all U_d).

In the case of 2-wire sensors it is limited by the addition of the minimum supply voltages. For 3-wire switches, the load capacity of the output stage represents a further limitation, since the current consumption I_0 of all switches is added to the rated current I_e .

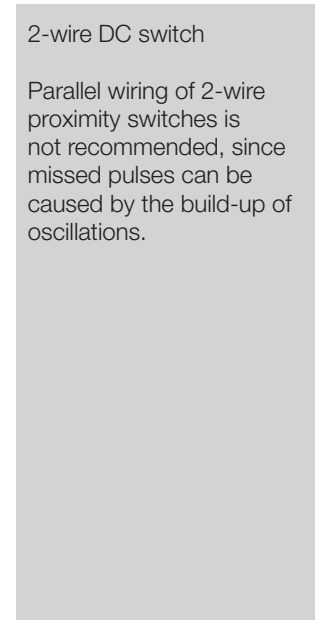
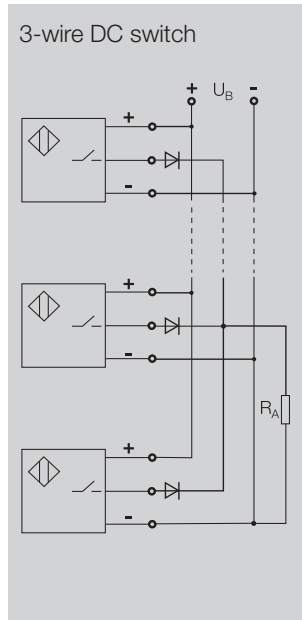
The ready delay time t_v is the ready delay of a sensor $\times$ (number of sensors $n-1$).



For parallel connection

... of proximity switches with LED it is recommended that the outputs of the individual switches be decoupled using diodes (as shown).

This prevents all LED's from lighting-up when the output state of one switch is turned on.



Utilization categories

per EN 60947-5-2/
IEC 60947-5-2

Category

AC 12	AC-switch
AC 140	AC-switch
DC 12	DC-switch
DC 13	DC-switch

Typical load applications

Resistive and semiconductor loads, optocouplers
Small electromagnetic load $I_a \leq 0.2$ A; e. g. contactor relay
Resistive and semiconductor loads, optocouplers
Electromagnets



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Polarity reversal protected	... protected against any possible lead reversal for sensors with short circuit protection. ...protected against reversal of plus/minus leads for sensors without short circuit protection.
Cable break protection	... in 3-wire sensors prevents improper function. A diode prevents the current from flowing via the output line A.
Short circuit protected (sensors with a maximum voltage of 60 V DC)	... is achieved in Balluff sensors using pulsing or thermal short circuit protection circuits. The output stage is thereby protected against overload and short circuit. The trigger current for the short circuit protection is higher than the rated operating current I_e . Currents from switching and load capacitances are specified in the sensor data and do not result in triggering, but rather are masked by a short delay in the output circuit.
Short circuit/overload protected (universal AC/DC sensors)	... AC or AC/DC sensors are often operated with a relay or contactor as the load. AC switching devices (contactors/relays) create a significantly higher load ($6...10 \times$ rated current) when they are first energized as compared with their static operation due to the fact that the core is still open. The static value of the load (current) is not reached until several milliseconds later. Not until the magnetic field is closed does the max. permissible rated operating current I_e flow through the sensor. This means that the threshold value for a short circuit condition in these sensors must lie significantly higher and would, if for example the contactor is prevented for mechanical or electrical reasons from fully closing, result in an overload on the sensors. This is where the overload protection comes into play. It is designed as slow-acting (time-delayed). Its trigger threshold lies only slightly above the maximum permissible I_e. A response (i. e. turn-off) is delayed, depending on the magnitude of the overload, by more than 20 milliseconds. This ensures that properly working relays and contactors can be switched normally, while defective devices will not destroy the Balluff sensor. The short circuit/overload protection is generally of a bi-stable design, which means that it must be reset by turning off the supply voltage to the sensor.

Basic Information and Definitions

Inductive sensors response curves

Axial and radial damping

When damping in an **axial direction** the standard target is moved concentric to the system axis. The switchpoint is thereby determined only by the distance “s” from the sensing face of the sensor. When damping in the **radial direction**, the location of the switchpoint is additionally affected by the radial distance “r” of the target from the system axis.

The diagram shows the **response curves**, which indicate the dependency of the switchpoint on “s” and “r”. The primary purpose of this drawing is to show the possibility of damping using a lateral approach and the difference compared with axial approach.

Application

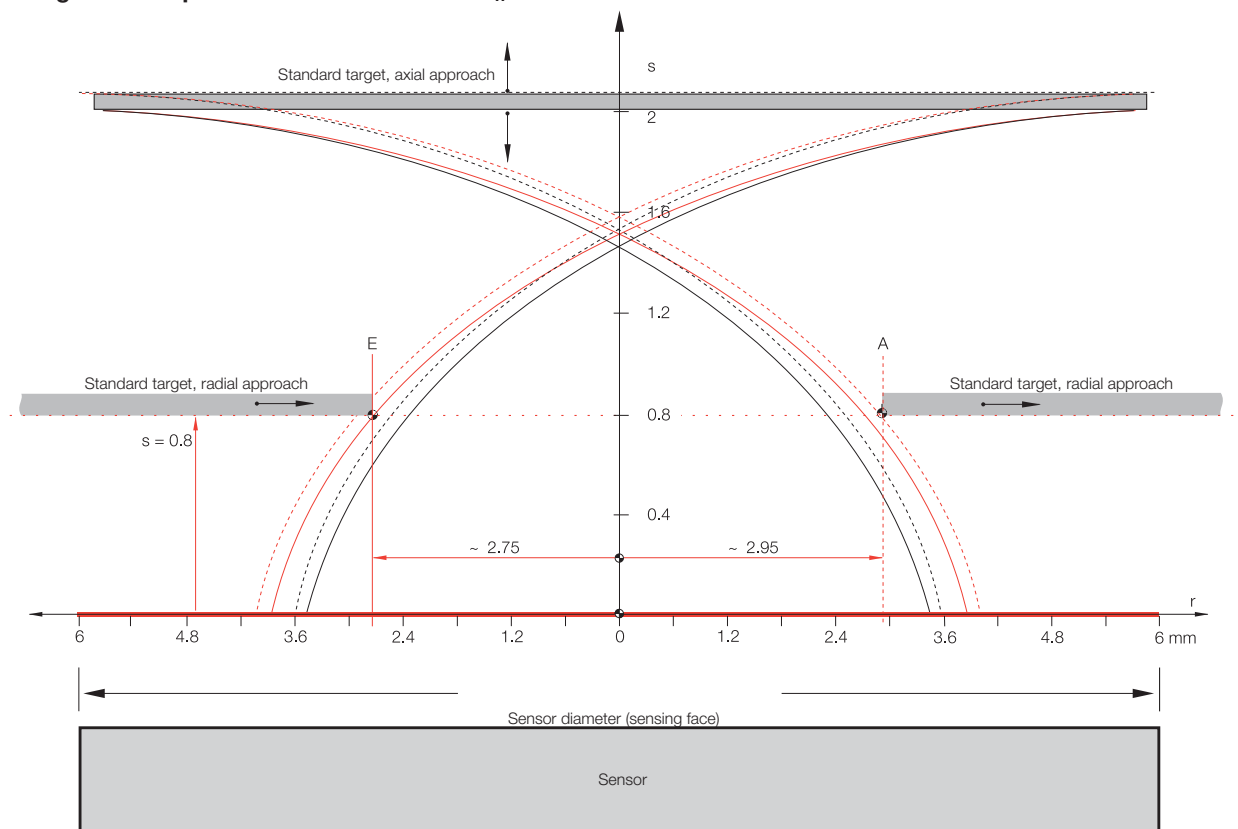
Due in part to manufacturing tolerances within a production run, the exact switchpoint must in any case be established on site. The solid lines represent the respective switchpoint (E), the dashed lines indicate the turn-off point (A). The red lines apply to switches with a clear zone, and the black lines for flush mount types. Since the switching operation can be induced from either direction, the curves are shown mirrored from the system axis.

Examples

Passing objects on conveyor lines generate a signal change when their front edge crosses the turn-on curve on the entry side. The signal reverses again when the back edge of the passing object crosses the (mirrored) turn-off curve on the opposite side. With **reversing parts** (e. g. limit of travel), the signal reversal occurs at the turn-off curve on the same side.

Typical approach curves

using the example of an M12 sensor with s_n 2 mm



The **vertical axis** in the diagram shows the distance of the switchpoint from the sensing face. It is referenced to the nominal sensing distance s_n . At a distance of 0.8 mm, a laterally approaching target reaches the solid line turn-on curve at point “E” and leaves the turn-off curve at point “A”.

The **horizontal axis** in the diagram is referenced to the radius of the sensing face. The zero point of this axis lies in the center of the shell core cap. In our example for the M12 switch, the radius is $r = 6$ mm. Example: The distance of the turn-on and turn-off point (from the system axis) is typically $E \sim 2.75$ mm, $A \sim 2.95$ mm.



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Switching Distances

Switching distance s

... is the distance between the standard target and the sensing face of the proximity switch at which a signal change is generated per EN 60947-5-2. For "normally open" this means from OFF to ON and for normally closed from ON to OFF.

Rated operating distance s_n

... is a theoretical value, which does not take into account manufacturing tolerances, operating temperatures, supply voltages, etc.

Effective operating distance s_r

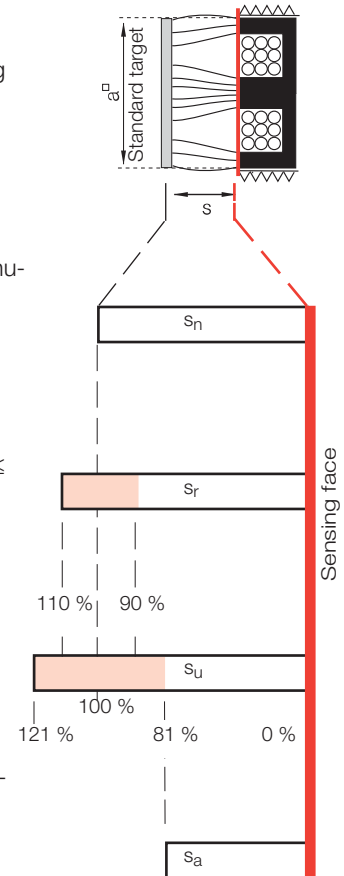
... is the switching distance of a single proximity switch measured under specified conditions, e.g. flush mountable, rated operating voltage U_e , temperature $T_a = +23\text{ °C} \pm 5\text{ °C}$ ($0.9 s_n \leq s_r \leq 1.1 s_n$).

Useful operating distance s_u

... is the switching distance of a single proximity switch under specified temperature and voltage conditions ($0.81 s_n \leq s_u \leq 1.21 s_n$).

Assured operating distance s_a

... is any switching distance for which an operation of the proximity switch within the permissible operating conditions (temperatures, voltages) is guaranteed ($0 \leq s_a \leq 0.81 s_n$).



Switching distance identifier

		Housing	Switching distance
none	standard switching distance per IEC 60947-5-2	Ø 3 mm*	1 mm flush
Switching distance 2X	"2x" the switching distance vs. standard	Ø 4 mm/M5*	1.5 mm flush
		Ø 6.5 mm...M30	1.5...2x
Switching distance 3X	"3x" the switching distance vs. standard	Ø 3 mm*	3 mm non-flush
		Ø 4 mm/M5*	5 mm non-flush
Switching distance 4X	"4x" the switching distance vs. standard	Ø 6.5 mm...M12	2.2...3x
		M18...M30	depending on version

*Switching distance in mm. The switching distances for these sensors are not standardized.

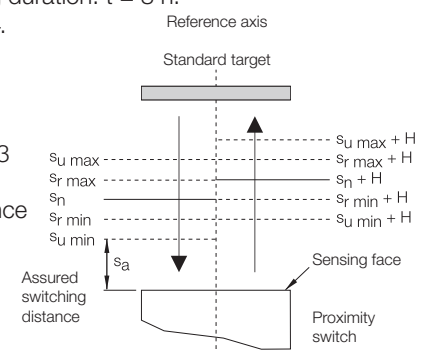
Repeat accuracy R

... of s_r is determined at rated operating voltage U_e under the following conditions: Temperature: $T = +23\text{ °C} \pm 5\text{ °C}$ Relative humidity: $\leq 90\%$ Measuring duration: $t = 8\text{ h}$. The permissible deviation per EN 60947-5-2 is $R \leq 0.1 s_r$.

Hysteresis H

(switching hysteresis when target is backed off)

... is given as a percentage of the effective operating distance s_r . It is measured at an ambient temperature of $+23\text{ °C} \pm 5$ and at the rated operational voltage. It must be less than 20% of the effective operating distance (s_r). $H \leq 0.2 s_r$



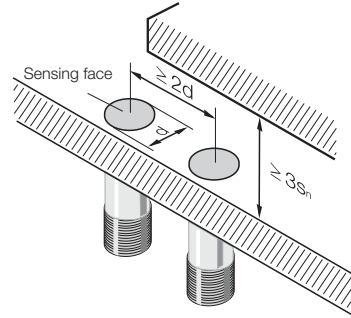


Installation in Metal

Sensors with standard switching distance

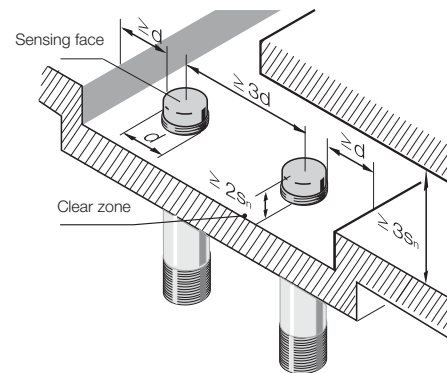
Flush mountable proximity switches

... can be installed with their sensing faces flush to the metal. The distance from opposing metal surfaces must be $\geq 3s_n$ and the distance between two proximity switches (side-by-side) $\geq 2d$.



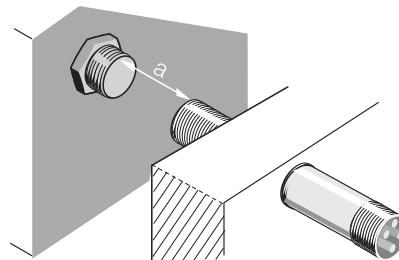
Non-flush mountable proximity switches

... can be identified by their “caps”, since they have no metal housing surrounding the area of the sensing face. The sensing face must extend $\geq 2s_n$ from the metallic installation medium. The distance from opposing metal surfaces must be $\geq 3s_n$ and the distance between two adjacent proximity switches $\geq 3d$.



Opposing installation of 2 sensors

... requires for all inductive proximity switches a minimum distance of $\geq 3d$ between the sensing face.



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Installation medium

Ferromagnetic materials: Iron, steel or other magnetizable materials.

Alloys: Brass, aluminum or other non-magnetizable materials.

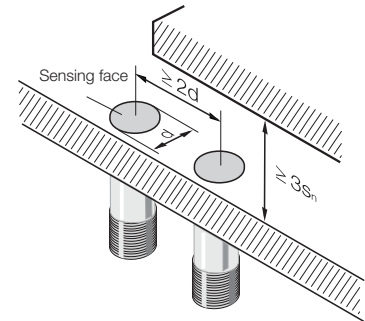
Other materials: Plastics, electrically non-conducting materials.

Installation in Metal

Sensors with switching distance indicator 2X

Flush mountable proximity switches

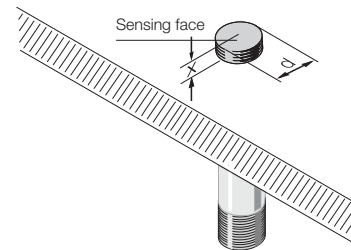
... can be installed with their sensing faces flush to the metal. Installation in alloy may result in a reduction of the switching distance. The distance to opposing switches must be $\geq 3s_n$, and the distance between adjacent switches (side-by-side) must be $\geq 2d$. In order to install the sensor in ferromagnetic materials, the following guidelines are used for dimension "x".



3-wire DC

Housing size d	Dimension x
Ø 3 mm	1 mm
Ø 4 mm	1.5 mm
M5	1.5 mm
Ø 6.5 mm	0 mm
M8	0 mm
M12	1.5 mm
M18	2.5 mm
M30	3.5 mm

For Factor 1 sensors the dimension x is not needed for installation in metal.

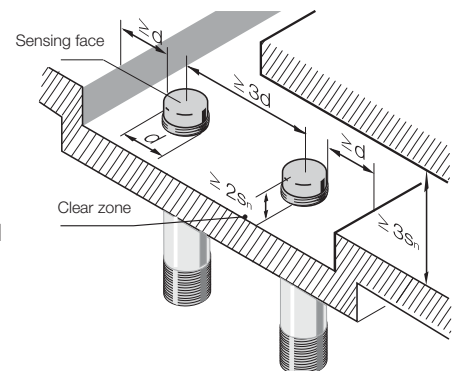


2-wire DC

Housing size d	Dimension x
M8	0 mm
M12	0 mm
M18	0.7 mm
M30	3.5 mm

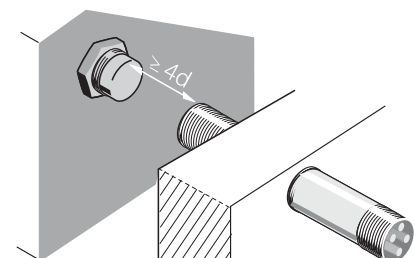
Non-flush mountable proximity switches

... can be identified by their "caps", since they have no metal housing surrounding the area of the sensing face. The sensing face must extend $\geq 2s_n$ from the metallic installation medium. The distance from opposing metal surfaces must be $\geq 3s_n$ and the distance between sensors $\geq 3d$.



Opposing installation of 2 sensors

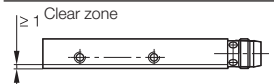
... requires for all inductive proximity switches a minimum distance of $\geq 4d$ between the sensing face.

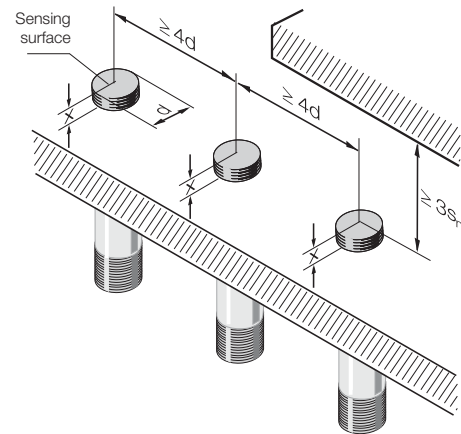


Installation in Metal Sensors with switching distance indicator 3X and 4X

Quasi-flush mountable proximity switches

... require a space behind the sensing face which is free of conducting materials. Under this condition the specified switching distance is available without limitation. Dimension "x" (see fig.) indicates the shortest distance between the sensing face and the conductive material behind it.

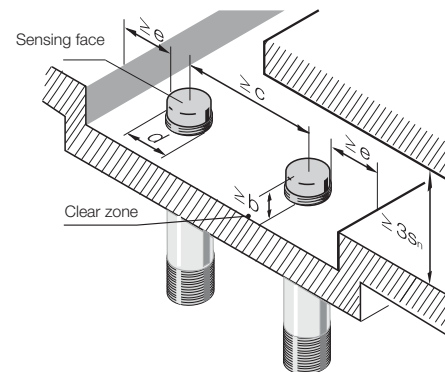
Housing size d	Switching distance 3X		Switching distance 4X	
	Dimension "x" for installation in		Dimension "x" for installation in	
	ferromagnetic materials	other metals	ferromagnetic materials	other metals
Ø 6.5 mm, M8	2.0 mm	1.0 mm	3.0 mm	2.0 mm
M12	2.5 mm	2.0 mm	4.0 mm	3.0 mm
M18	4.0 mm	2.5 mm		
M30	8.0 mm	4.0 mm		
8x8 mm				



Non-flush mountable proximity switches

... can be identified by their "caps", since they have no metal housing surrounding the area of the sensing face. The distance from opposing metal surfaces must be $\geq 3s_n$. Installation conditions:

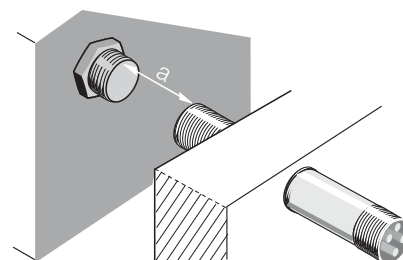
Housing size d	Dimension b	Dimension c	Dimension e
Ø 3 mm	$\geq 10 \text{ mm}$	$\geq 30 \text{ mm}$	$\geq 10 \text{ mm}$
Ø 4 mm	15 mm	40 mm	20 mm
M5	$\geq 15 \text{ mm}$	$\geq 40 \text{ mm}$	$\geq 20 \text{ mm}$
Ø 6.5 mm	$\geq 8 \text{ mm}$	$\geq 32 \text{ mm}$	$\geq 8 \text{ mm}$
M8	$\geq 8 \text{ mm}$	$\geq 32 \text{ mm}$	$\geq 8 \text{ mm}$
M12	$\geq 10 \text{ mm}$	$\geq 48 \text{ mm}$	$\geq 12 \text{ mm}$
M18	$\geq 20 \text{ mm}$	$\geq 72 \text{ mm}$	$\geq 18 \text{ mm}$
M30	$\geq 35 \text{ mm}$	$\geq 120 \text{ mm}$	$\geq 30 \text{ mm}$
	in steel		
	$\geq 25 \text{ mm}$		
	in alloy		
	$\geq 20 \text{ mm}$		
	in stainless steel		



Opposing installation of 2 sensors

... requires for all inductive proximity switches a minimum distance of $\geq 5d$ between the sensing faces. For exceptions see table.

Housing size	Dimension a
Ø 3 mm	20 mm
Ø 4 mm	45 mm
M5	45 mm



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SteelFace® Sensors

To assure proper function, the values in the table below and the figure to the right should be observed. (Fig. 1)

	A
Switching distance 2X	$\geq 2d$
Switching distance 3X	$\geq 4d$

When installing in metals, the values for dimension x shown in the following table must be observed. When these guidelines are followed, the effective switching distance S_r will deviate less than $\pm 10\%$. Values are in mm. (Fig. 2)

Sensor	x	x	x	x
2X Flush Mount	Steel	Aluminum	Brass	Stainless Steel
M8	0mm	6mm	6mm	5mm
M12	0mm	8mm	8mm	7mm
M18	0mm	11mm	11mm	10mm
3X Quasi Flush Mount				
M12	7mm	12mm	12mm	10mm
M18	14mm	12mm	14mm	16mm
M30	28mm	28mm	28mm	35mm
3X Non-Flush Mount				
M12	25mm	15mm	17mm	25mm
M18	45mm	25mm	25mm	45mm
M30	70mm	40mm	40mm	70mm

Opposing Installation of Two Sensors

This configuration requires a minimum separation of $\geq 3 S_n$ between the active surfaces for M8 thru M30, 2x and 3x sensors. (Fig. 3)

Reduction factors for target material

2X Flush Mount	Steel	Aluminum	Brass	Copper	Stainless Steel
M12	1.0mm	0.8...1mm	0.7...0.85mm	0.85...1.3mm	0.5...0.9mm
M18	1.0mm	0.8...1mm	0.7...0.85mm	0.85...1.3mm	0.5...0.8mm
M30	1.0mm	0.7...1mm	0.7...0.9mm	0.9...1.2mm	0.5...1mm
3X Quasi Flush Mount					
M12	1.0mm	1.0mm	0.8mm	1.0mm	1.0mm
M18	1.0mm	0.7mm	0.7mm	0.7mm	1.0mm
M30	1.0mm	0.7mm	0.7mm	1.0mm	1.0mm
Ferrous Only					
M8	1.0mm	-	-	-	0.45mm
M12	1.0mm	-	-	-	0.25mm
M18	1.0mm	-	-	-	0.5mm
M30	1.0mm	-	-	-	0.7mm
Non-Ferrous Only					
M8	-	-	-	-	-
M12	-	1.0mm	1.1mm	0.9mm	-
M18	-	1.0mm	1.1mm	0.9mm	-
M30	-	1.0mm	1.1mm	0.9mm	-

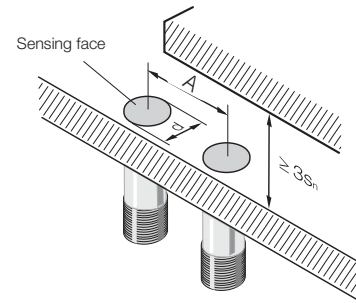


Fig. 1

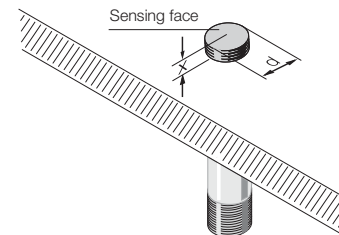


Fig. 2

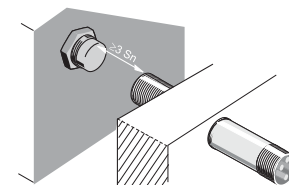


Fig. 3



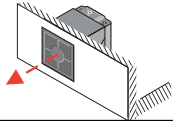
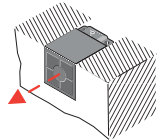
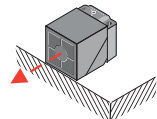
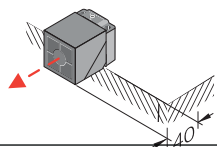
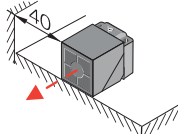
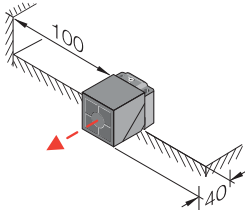
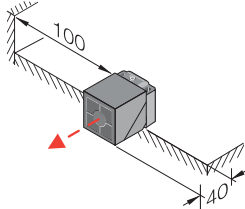
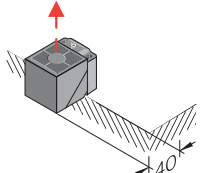
Basic Information and Definitions

Inductive sensors

Mounting Guidelines for 40x40x62 Sensor with Bracket Variations

Original = Plastic

Optional BES Q40-HW-2 = Metal

Sensing distance S_n	15 mm		20 mm		35 mm		40 mm	
Bracket	Plastic	Metal	Plastic	Metal	Plastic	Metal	Plastic	Metal
	Yes	Yes	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	Yes	Yes	No	Yes	No



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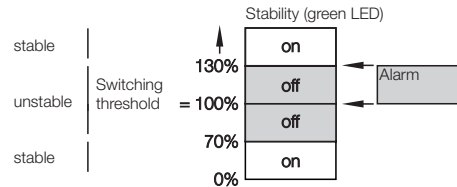
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Adjustable Sensitivity

The ability of the sensor to discriminate between different levels of light incidence on the receiver. Used primarily to black out background objects, discriminate between materials, or transparent objects.

Alarm output

The alarm output at the receiver (PNP open collector – 30 mA) triggers a warning signal in the case of functional interruptions, which can be caused by contamination or mechanical de-adjustment. The alarm output is activated if the received signal lies in the alarm range for a defined amount of time.



For series BOS 18M Teach-in, the entire product family, including diffuse and retroreflective sensors, is equipped with an alarm output.

Alignment

Relation of the emitter and receiver. Proper alignment is necessary to achieve maximum sensitivity to objects being sensed.

Ambient Light

Light that is present in a given area; e.g., inside, outside, incandescent, or fluorescent. In some cases, ambient light may affect photoelectric controls.

Ambient Light Rejection

There are basically 3 different ways for the receiver to differentiate the emitter's signal from the ambient light. As a practical consideration in setting up a system, it is advised to direct the receiver away from strong external light sources, such as the sun or industrial lighting.

1. Modulation - Pulsed light is different from continuous ambient light.
2. Filters - Filters block most of the visible light spectrum so that a modulated signal is more easily detected.
3. Focal Arrangement - Lenses are used at the emitter and receiver to focus the beam for optimum signal transmission. This lens arrangement actually makes the image of the emitter focus on the receiver just like a camera would focus an image on a sheet of film.

Ambient temperature

The ambient temperature is the temperature range in which the function of the photoelectric switch is guaranteed. Balluff Standard: $-15^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$

Amplifier

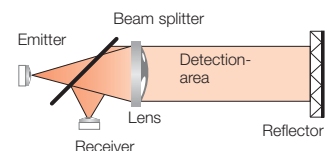
A device that enables an input signal to control an output signal of that device.

Analog Sensors

The output current or voltage is proportional to the target distance or surface.

Autocollimation

Emitter and receiver use a common lens. The emitter light passes through the beam splitter and the lens to the reflector. The reflector bounces the emitter light back to the lens. This gives retroreflective sensors that work with autocollimation a small, round beam profile. Additional benefits: no dead zone for scanning and for the reflector, better small parts detection, and the switching characteristic is independent of the approach direction.



Axial Approach

When a target to be detected approaches the sensing face "head on."

Background suppression (BGS)

Through the background suppression, objects within a set switching distance are detected, without being impeded by the reflective background, and nearly independent of color and surface of the object (object reflection). Background suppression is achieved by cutting the beam from the emitter to the receiver. To do so, it divides the visible field into an active area and the background. In addition, by dividing the receiver into at least two adjacent areas (e. g. by using a dual diode or a PSD- element) and by means of a geometric arrangement (triangulation), the actual position of the object within the sensing range can be determined. Through this, the object and the background can be distinguished accurately. Diffuse sensors with background suppression are characterized by low gray value shift and hysteresis.



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Beam Pattern

In the operation of thru-beam and retroreflective sensors, a degree of deviation from absolute alignment of the emitter and receiver (within which the beam intensity is sufficient to activate the receiver) determines the beam pattern.

Color Mark Detector

A sensor designed to differentiate between different colored marks, or between a color mark and the background color it appears on. The contrast between the two marks, not the true color of the mark, is used for this detection. The color mark detector is available with either Red or Green LED emitters for this purpose.

Color Registration/Mark Detection

Proximity (diffuse) sensing mode that detects the contrast between two colors on a surface.

Light Source Code:

G = Green

R = Red

RG = Red or Green

X = not possible

		White	Yellow	Yellow-Red	Yellow-Grn.	Orange	Red	Cyan	Magenta	Blue	Purple	Green	Black
White			G	G	RG	G	G	RG	RG	RG	RG	RG	RG
Yellow	G		X	RG	G	G	RG	G	RG	RG	RG	RG	RG
Yellow-Red	G	X		R	G	G	RG	G	RG	RG	RG	RG	RG
Yellow-Grn	RG	RG	R		R	R	R	G	RG	G	RG	RG	RG
Orange	G	G	G	R		X	R	G	RG	RG	RG	RG	RG
Red	G	G	G	R	X		R	R	RG	RG	RG	RG	RG
Cyan	RG	RG	GR	R	R	R		R	R	RG	G	RG	RG
Magenta	RG	G	G	G	G	R	R		R	X	R	RG	RG
Blue	RG	RG	RG	RG	RG	RG	R	R		R	R	R	RG
Purple	RG	RG	RG	G	RG	RG	RG	X	R		R	R	RG
Green	RG	RG	RG	RG	RG	RG	G	R	R	R		R	RG
Black	RG	RG	RG	RG	RG	RG	RG	RG	RG	R	R	G	RG

Figure 1 Light source color selection chart

Color Registration Sensor

The color registration sensor is a highly specialized diffuse proximity sensor that has the ability to detect fine changes in contrast on a surface. But unlike the standard diffuse proximity sensor, this type of unit uses a powerful lens system and must be positioned at a specific focal distance from the target.

Complementary Outputs

Sensors with both N.O. and N.C. outputs that change state simultaneously.

Component System

Separately mounted optical sensing head and amplifier used for remote sensing applications.

Constant Current Source

Source which provides constant current to the output of a sensing transistor, and allows the voltage at the output to vary from zero up to the supply voltage.

Contamination

(influence on the response range)

Contamination reduces the specified response range of sensors and fiber optics compared to clean air, because the dirt- and dust particles

- deposit on the lenses and impair their light transmission,
- and absorb and scatter light in the beam path.

An oil-free source of compressed air can be used to prevent the effects of dirt and contamination due to impure air.

Contamination indicator

The contamination indicator (green) lights in the safe zone if the input energy exceeds the threshold energy by at least 30 %.

The threshold energy, at which a signal change affects the output, is defined at 100 %.

From this, the safe zone results

- if the input signal exceeds at least **130 %** of the threshold energy
- if the input signal exceeds at least **70 %** of the threshold energy.



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Contamination indicator

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■ if the input signal exceeds at least **70 %** of the threshold energy.

		Stability (green LED)		Output (red LED)
stable		on	on	off
unstable	Switching- threshold = 100%	off	on	off
		off	off	on
stable		on	off	on
		0%		

Correction factors (for diffuse sensors)

For objects with varying reflection characteristics, the range can be determined by using the correction factors shown. See the adjacent table.

Correction factor	Object, surface
1	Paper, white, matte 200 g/m ²
1.2...1.6	Metal, shiny
1.2...1.8	Aluminum, black anodized
1	Styrofoam, white
0.6	Cotton fabric, white
0.5	PVC, gray
0.4	Wood, rough
0.3	Cardboard, black, shiny
0.1	Cardboard, black, matte

Current Consumption

Maximum amount of current required to properly operate a sensor.

Current Sinking

NPN output - an output type such that when it is ON, current flow is from the load into the device's output, then to ground. Output is normal high. The sensor "sinks" current from the load through the sensor to ground. The load is connected between the positive lead of the supply and the output lead of the sensor.

Current Sourcing

PNP output - an output type such that when it is ON, current flow is from the device into the load. Output is normally low. The sensor "sources" current to the load. The load is connected between the output lead and the negative ground lead of the supply. Considered safer than NPN outputs due to the way current flows when wired up.

Dark Operation (Mode)

Dark mode output is energized when the target is present (proximity output is energized when target is not detected). Output mode that will result in an output from a device when light from the emitter is not being received upon the receiver. The beam is being interrupted, thus creating an output.

Degree of contamination

Pure air	Ideal conditions
Trace contamination	Relatively clean air in indoor rooms
Slight contamination	Workshop- and storage rooms
Moderate contamination	Dirty and dusty environments; switching distance is reduced to $s = 0.5 s_u$
High contamination	Heavy precipitation, whirled-up particles and swarf: Functional failure of the photoelectric sensor is possible.
Highest contamination	Coal dust precipitating on the lens. Photoelectric sensor function may fail.

Detectable Object

Refers to the requirements of an object size, reflection qualities, light transmission properties, in order for that object to be detected by the photoelectric sensor.



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Photoelectric sensors

Differential

The distance between the operating point and the release point as the target is moving away. It is expressed as either a linear dimension or in number of degrees. The distance between the operating points where the target enters the sensing field (sensor energizes) to the release point (sensor re-energizes).

All discrete sensing technologies must have a differential. In some technologies, differential occurs as a by-product of the basic laws of physics; however, in other technologies it must be manufactured through additional circuitry.

Photoelectrics - The distinctive property of a photoelectric sensor that results in the operation point being different from the release point. This distance is expressed as a % of the total sensing distance of the photoelectric sensor. It is the distance difference between the operating point when approaching the photoelectric and the release point when moving away from the photoelectric.

Diffuse

Where the unit senses the light directly from the target. The emitter and receiver are in the same housing, the same as retroreflective; however, the receiver is more sensitive to the weaker light that is diffused by the surface of the target.

Directional Angle

The angular range within which an emitter, receiver, emitter/receiver pair or reflector can be rotated or shifted about on the optical axis and still have the photoelectric properly operate.

Double Pole Double Throw (DPDT)

Sensors that make and break two separate circuits. This circuit provides a normally open and normally closed contact for each pole.

Dynamic Optical Window

Thru-beam sensors in an array used to detect moving parts in a confined operating space while ignoring non-moving parts.

Effective Sensing Distance

This is the actual sensing distance realized by the sensor installed in the actual application. The effective sensing distance will be no less than the usable sensing distance, and is usually closer to the nominal in average circumstances.

Emitter

A device that emits light when an electric current is passed through it. Emitters can give off visible light (red, green, blue, white) but the majority used for industrial applications emits invisible electromagnetic waves (infrared).

Emitter light

Photoelectric sensors use mainly the following transmission components:

- **Red light LED:** Visible light, well-suited as an orientation aid and for sensor adjustment.
- **Infrared LED (IR):** Invisible beam with high energy.
- **Red light laser:** Visible light, optimal for detecting small parts and high ranges due to the physical properties of the laser.



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Excess Gain

The measure of light energy striking the receiver above the threshold required to activate the receiver. Excess gain is used to predict the performance of optical sensors in various environments.

Target (diffuse mode only)	% of light reflected	Required excess gain
Kodak white test card	90%	1.0
White bond paper	82%	1.1
Clear white pine wood	75%	1.2
Brown kraft paper	65%	1.4
Clear plastic bottle	40%	2.3
Black polyester/ cloth felt	25%	3.6
Dark cotton cloth	20%	4.5
Rough wood pallet	20%	4.5
Old black conveyor belting	16%	5.6
New black conveyor belting	9%	10.0
Flatblack paint	4%	22.5
Black rubber tire	2%	45

Table 1: Excess gain based on target type (assumes clean air)

Environmental condition	Required excess gain
Clean air(no buildup of dirt, ideal conditions)	1.0
Slight contamination (office environment)	2.0
Low contamination (light industry warehouse)	5.0
Moderate contamination (machining, humidity)	15
Heavy contamination (washdown, oilfilm, grain dust)	50

Table 2: Excess gain based on Environmental Conditions (assumes clean air)

Excess Gain Ratio

Maximum light available at a given distance. Level of light intensity needed to operate the photoelectric sensor.

Fiber Optic Cables



Optical conductors are made of glass or plastic with a diameter of as little as 50 µm and bunched in bundles of several hundred individual fibers to form so-called fiber optics. The fiber ends are ground and polished to meet the quality criteria of the optical industry.

The individual fibers are coated with a very thin layer of lubricant. This reduces friction against the outer jacket and between the fibers, so that broken fibers are prevented even when the cable is continuously flexed. The transmission properties are guaranteed through this over a long span of time.

The ends of the bundles are potted with the connection sleeve and the jacket. Balluff fiber optics thus have an IP 67 rating (IP 65 for metal jacket). Moisture and aggressive media cannot hurt either the fibers or the slide coating, so the optical properties remain unaffected.

This design distributes axial pull forces evenly over all the fibers, and protects the individual fibers from excessive pull loads.

Polyurethane jacket

- Temperature T = +85 °C
- Excellent chemical resistance
- Flexible
- No embrittlement from oils and cooling emulsions.

Metal jacket

- Temperature T = +150 °C
- Resistant to hot swarf
- Flexible
- Crush-resistant

Corrugated metal tube, silicon jacketed

- Temperature T = +150 °C
- Highly flexible
- Crush-resistant
- Can be sterilized.



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Fiber Optic Sensing	The use of fiber optic cables and a fiber optic amplifier to remotely sense in either a confined location or an environment that a normal sensor will not function (High temperatures, chemicals).
Fixed Focus	A diffuse reflective photoelectric sensor that the optical axis of the emitter and receiver is adjusted to a focal point or it utilizes an aperture to focus on an area in front of the sensor.
Focusable Diffuse	A diffuse reflective photoelectric sensor that either allows the optical axis of the emitter and receiver to be adjusted to a focal point or it utilizes an aperture to focus on an area in front of the sensor.
Fork sensor	Fork sensors are through-beam designs in which the emitter and receiver are arranged across from each other in a U-shaped housing. Through the housing type, alignment and electrical connection are simplified. Different ranges are available by selecting different housing configurations. Fork openings of 5...220 mm are possible in various increments. The built-in potentiometer and apertures allow you to adjust the fork sensors easily for detecting parts down to a diameter of 60 µm.
Gray value shift	Gray value shift is the switching distance difference when calibrating using different object reflectivities. The sensor is calibrated for a distance using a Kodak-gray card with 90 % reflection. With the Kodak-gray card with 18 % reflection, the distance achieved with it is measured. The difference between these two switchpoints in % is referred to as the gray value shift. The smaller the gray value shift, the more color-independently the sensor operates.
Hysteresis	The distance between the operating point and the release point as the target is moving away in order to make a precise determination of target presence without factors of the environment intervening to create a noisy output signal. (see Differential)
Interface	Translates the presence of a target into an electrical signal.
Internal Reflection	Internal reflection occurs whenever a light ray strikes the surface of a medium whose refractive index is less than that of the medium in which the light is traveling. An example of this is a light source in water, where light is internally reflected from the surface of air. The amount of light that is reflected depends upon the angle at which it hits the surface. The critical angle is 49°. At this angle the ray of light is completely contained within the medium.
Lasers, laser class	The purpose of laser protection classes is to protect persons from laser radiation by specifying limit values. Based on this, the lasers used are classified according to a scale reflecting the degree of hazard. The calculations and associated limit values relevant for the classification are described in the standard EN 60825-1:2001-11. The grouping is based on a combination of output power and wavelength, taking into account emission duration, number of pulses and angle extension. Balluff sensors work in the following laser protection classes: Class 1: Not dangerous, no protective measures. Class 2: Low output, lid-closing reflex sufficient for protection. With devices of protection class 2, the eye closes on its own due to the lid closing reflex before it has been open to the beam for too long. Laser warning signs on the device and possibly also on the machine in which a laser is being used are sufficient. Additional protective measures are not required. When using devices of protection classes 1 and 2, no laser safety officer is necessary in the company.
Lateral Approach	When the target to be detected approaches the sensing face from the side (slide by).
Leakage Current	The amount of current that flows through, or leaks from, the output of an energized device when the device is in the OFF state. Most common problem involves leakage current when a device is wired as an input to a programmable logic controller. Leakage current should be less than 1.7mA.
LED (Light Emitting Diode)	Solid state device that produces visible red, green or yellow light or invisible infrared light radiation. Indicator on a sensor that emits visible light to show operation of the unit. Infrared types are used for emitters. Red or green types are used also as emitters in special applications (polarized, plastic fiber optics, etc.)



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Light Incident

The condition met when light from the emitter is reaching, or incident upon, the receiver.

Light Interrupted

The condition met when light from the emitter is not reaching, or incident upon, the receiver.

Light Operation (Mode)

Light mode output is energized when the target is not present (proximity output is energized when target is detected).

	Thru-beam & retro sensor	Diffuse sensor
Light-on	Normally closed	Normally open
Dark-on	Normally open	Normally closed

Table 3

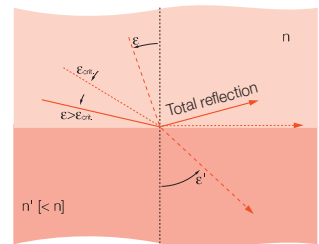
Output mode that will result in an output turning ON when light from the emitter is incident upon the receiver.

Light Refraction

Light beams experience a change in direction (interruption) at the border between two optical media with different optical thicknesses (e.g. glass/air). The degree of interruption depends on the quotients of the optical thicknesses of both media and on the angle of incidence ϵ to the optical axis.

$$\sin \epsilon' = \frac{n}{n'} \sin \epsilon$$

If a light beam travels from a dense medium, n , into a thinner one, n' , its course there will show a greater angle ϵ' . However, above $\epsilon_{crit.}$ (boundary angle at which the broken beam runs parallel to the boundary layer), it again enters the medium with the thickness n ; this means that a total reflection is pending.

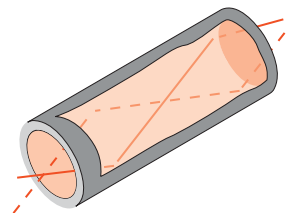


Light Source

Type of light used in the emitter portion of the photoelectric. Most common, pulse modulated LED or incandescent lamp.

Light transmission by total reflection

Without the total reflection at boundary layers described above, fiber optics of today's quality would not be feasible. They consist of a cylindrical, light-conducting core and a surrounding thin-wall jacket. The optical density n of the core is greater than that of the jacket. A light beam is always completely reflected at the junction between core and jacket, and can therefore never leave the core in a radial direction. Theoretically, the light is not weakened by these reflections; however, contamination and small defects both in the core material as well as the boundary layer do cause losses (attenuation) and effectively limit the fiber optic length over which reliable information can be transmitted.



Line-Powered Sensor

A sensor that draws its operating current directly from the line. Its operating current does not flow through the load, and a minimum of three (3-wire) connections is required. A 4-wire has complimentary outputs and requires four connections.

Loads

There are basically two different kinds of loads:
Resistive - Lamps, heaters, solid state PLC input modules
Inductive - Relays and solenoid valves

Load-Powered

A sensor that draws its operating current (leakage current) through the load. The sensor is always in series with the load and only two connections are required.

Method of Detection

Sensing technique used by the photoelectric sensor. Three types - Thru Beam, Retroreflective, or Diffuse Reflective.



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Minimum Load	Minimum current that the external load must draw to ensure proper operation of the photoelectric sensor. Most often associated with standard AC 2-wire devices.
Luminescence	To locate invisible marks on objects, so-called luminescent materials (contained in special chalks, inks, paints etc.) are used which can only be made visible under ultraviolet (UV) light. The fluorescent materials convert the invisible UV light (short wavelength, here 380 nm) into visible light (between blue 450 nm and dark red 780 nm). This effect is called photoluminescence. The visible light can then be detected as usual by the receiver component of the sensor.
Maximum Load	The most current that can flow through a device continually without damaging the device.
Method of Detection	Sensing technique used by the photoelectric sensor. Three types - Thru Beam, Retroreflective, or Diffuse Reflective.
Minimum Load	Minimum current that the external load must draw to ensure proper operation of the photoelectric sensor. Most often associated with standard AC 2-wire devices.
Modulated LED	Pulsations of light at a specific frequency reduce interference from ambient light and increase sensing distance.
Mutual Interference	A feature in photoelectric sensors that eliminates false-signaling between similar protection sensors mounted next to (or in close proximity to) each other.
N.C. (Normally Closed)	Current flow through the sensing device is possible only when the device is in the off state or de-energized. Contacts are closed when the sensor is not operated and when there is no external force on the actuator. The sensor opens a circuit to the load when a target is detected or sensor is operated.
N.O. (Normally Open)	Current flow through the device is not possible when the device is de-energized (turned OFF). Contacts are open when the sensor is not operated and when there is not external force on the actuator. The sensor closes a circuit to the load when a target is detected or sensor is operated.
Nominal Sensing Distance	The rated operating distance for which the sensor is designed. This value should only be taken as a guide, since no manufacturing tolerances or changes in external operating environment are taken into account. You should be aware that manufacturers arrive at performance standards for their products using standardized criteria so you can compare "apples to apples" in determining which product is right for your application. These criteria reflect, to a reasonable extent, the real performance that can be expected in an "average" controlled environment.
Non-Incendive	Unable to release sufficient electrical or thermal energy under normal operating conditions to cause ignition of specific hazardous materials. Non-incendive equipment can be used without additional precautions in Division 2 hazardous locations where the hazardous materials can be present only in case of accidental rupture or breakdown of the enclosure containing them.
Non-Inductive Ratings	This rating indicates the resistive load only that the contacts can make or break. Resistive ratings are generally based on a 75% power factor for AC.
NPN	A transistor having an n-type semiconductor as its emitter and collector and a p-type semiconductor as its base.
Observable Time	Observable time is the real time that the target can be observed by the sensor.
Off Delay	The time required for the interface to trigger a change of state when a target is removed from the sensing area.
On Delay	The duration of time required for the interface to trigger an output change of state when a target is introduced to the sensing area.
One-Shot	An output signal produced for a preset time that is independent of the duration of the input signal. It may begin at the start of the input signal or be delayed.
Opaque	Material which neither reflects, emits, nor allows light to pass through it. Photoelectric controls easily detect opaque objects.
Operating Distance	The distance from the sensing face to the plane of the target's path once it reaches the operating point.



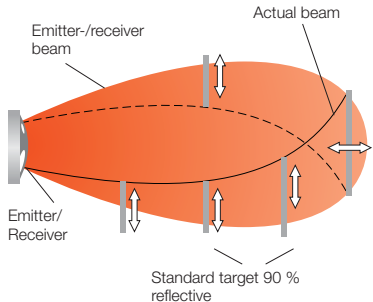
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Operating Mode	Two possible modes that will cause the sensor to operate and produce an output: Light-ON or Dark-ON mode.
Operating Point	The point at which a target is sensed as it approaches the sensing field of the sensor. Also called the "trip point."
Operating Range	The range in the x, y, and z plane that will cause the sensor to operate when a detectable object is in it.
Output Circuit	Interfaces with data acquisition systems (PLCs, dedicated controllers, etc.) or other control circuits (relays, counters, timers, etc.).
Output Transistor	A semiconductor device used to provide ON/OFF sensing of external loads.
Photoelectric Sensor	A light sensitive device that converts visible and infrared light waves into an electrical signal. A no-touch sensor consisting of a light emitter and detector. Its output turns on or off, depending on the absence or presence of this light at the detector that is determined by the absence or presence of a target.
Permitted humidity	The permitted humidity is 35 to 85 % (not condensed). With diffuse types, the emitter and receiver are integrated into a single housing. The alignment to a detection object is largely uncritical. A target object (e. g. a standard target which is 90 % reflective) bounces a part of the light from its surface back to the receiver. If the standard target reaches the response curve (see image), the output signal changes. The sensing distance depends on the size, shape, color and properties of the reflective object surface. Using a Kodak-gray card with 90 % reflectivity (like white paper), distances of up to 2 m can be obtained. 
Power-Up Delay	A target is present in the sensing area when power is applied, the output state does not change. For confidence, the delay must last longer than the duration of any start-up transient.
Proximity Diffuse	Sensing mode with emitter and receiver in the same housing. Light is bounced back at the receiver by the target. Also called direct detection.
Pulse Modulated	Light sources that are pulsed (ON/OFF) at a high frequency by an oscillator circuit. The receiver of a pulse modulated photoelectric only receives light at that frequency, thus minimizing interference from ambient light.
Receiver	A device that changes its electrical characteristic when light is received. Receivers can be photovoltaic cells, photo-transistors, photodiodes, and photoresistors.
Release Point	The point at which a sensor returns to its original state as the target leaves the sensing field. Also called "reset point."
Pilot Duty	Rating of contacts when making or breaking inductive loads such as coils and solenoids; based on a .35 power factor.
PNP	A junction type transistor having a p-type semiconductor as its emitter and collector and an n-type semiconductor as its base.

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Photoelectric sensors

Polarity reversal protection

The power supply connections can be reversed without destroying the sensor. In combination with the short-circuit protection, there is protection against total reversal.

Polarized

Visible light from the emitter of a retroreflective photoelectric sensor that is filtered so as to be projected in only one plane. The receiver of a polarized unit is filtered to accept only light that is reflected perpendicular to the emitted light. Corner cube reflectors are required to properly rotate the emitted light source.

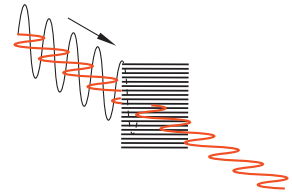
Polarizing filters

When do you need them?

A part of the emitter light in retroreflective systems is reflected directly back to the receiver from target objects with shiny surfaces, e. g. stainless steel, aluminum or tinplate. Simple Retroreflective light sensors can therefore not reliably distinguish reflected light from the object and reflected light. Erroneous readings therefore cannot be ruled out. For this reason, Balluff retroreflective light sensors are alternatively equipped with **polarizing filters**, which, together with a **Balluff reflector**, an **optically activated prismatic mirror**, form a selective barrier against the reflected light from the object, but still allow the reflector light to occur.

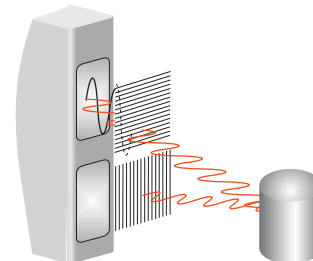
How do they work?

Light consists of a wide variety of individual beams, which all sinusoidally oscillate on their dispersal axes. Their oscillation levels, however, are independent of one another and can take on any angle position desired (see image). If they meet a polarizing filter (fine line grid), then only the beams oscillating parallel to the grid level are let through, and the vertically oscillating ones are entirely deleted. Of all the other oscillation planes, only the portion which consists of parallel components is allowed to pass.



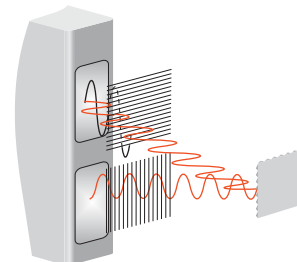
To suppress mirror reflections

Behind the filter, the light only oscillates parallel to the polarization plane. For this light, an additional 90° rotated polarizing filter becomes an impassable barrier. With a 90° rotated polarizing filter in front of both the emitter and receiver of a retroreflective system, you can therefore prevent the reflected light of a reflecting target object from falsely triggering the signal of the photo-receiver.



For reliable detection of reflective target objects

On the other hand, the light reflected from the triple mirror, with its polarization plane rotated by 90° as described above, is allowed to pass unhindered by this filter. The receiver of a retroreflective system is thereby fully shielded even when a reflecting target object enters the beam, so that the object is still reliably detected.



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Polarized Retroreflective

A retroreflective system that can detect, in addition to normal opaque objects, the shiny objects that fool a normal reflex sensor. This includes mirrors, metal straps, foils, metal boxes, cans, shrink-wrap and Mylar tape.

Power Consumption

Maximum amount of power required to properly operate the device.

Power-Up Delay

A target is present in the sensing area when power is applied, the output state does not change. For confidence, the delay must last longer than the duration of any start-up transient.

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Proximity Diffuse

Sensing mode with emitter and receiver in the same housing. Light is bounced back at the receiver by the target. Also called direct detection.

Pulse Modulated

Light sources that are pulsed (ON/OFF) at a high frequency by the oscillator circuit. The receiver of a pulse modulated photoelectric only receives light at that frequency, thus minimizing interference from ambient light

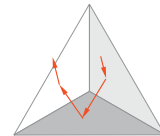
Receiver

A device that changes its electrical characteristic when light is received. Receivers can be photovoltaic cells, photo-transistors, photodiodes, and photoresistors.

Reflectors

(optically active triple mirrors)

The two-dimensional principle of retroreflection described above can be carried over to a spatial system with three mirrors which are oriented at right angles to each other (one corner of a cube standing on its point). A light beam entering this system is totally reflected by all three surfaces and exits parallel to the incident beam. Triple mirrors are called optically active, because they also turn the polarization level of the reflected light beam by 90° . This property first enables a secure recognition of reflective detection objects, together with a **polarization filter** with retroreflective light sensors.



Each six triple mirrors are to be arranged into a hexagon and arranged in a honeycomb next to each other. Their orientation with respect to the light beam is then totally unproblematic. These are generally made of plastics with high optical density, injected as sheets or pressed into flexible tape.



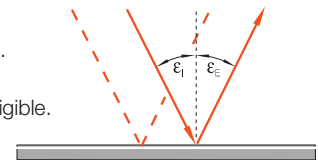
Reflection

What is it?

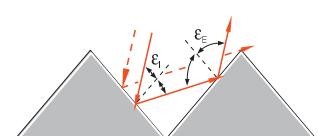
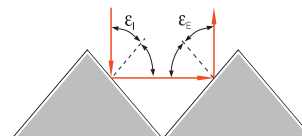
Light beams extend to a straight line in free space. Upon striking an object, they are reflected. Depending on the surface composition of the object, one of three types of reflection occurs: total reflection, retroreflection, and diffuse reflection.

The total reflection reaches a highly reflective (mirroring) surface.

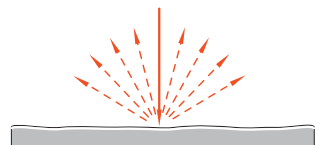
The angle of incidence is thereby the same as the angle of reflection $\epsilon_i = \epsilon_E$. The reflection losses are in the ideal case negligible.



The retroreflection is caused by two mirrors aligned vertically to each other. A light beam is again projected back through double reflection in the same direction. The angle of incidence can thus be altered in a relatively wide range.



Diffuse reflection occurs on an uneven and rough surface. It can be illustrated through a wide variety of poorly reflective and differently aligned miniature mirrors. Incidental light is widely "scattered" from such a surface. The reflection losses are higher the darker and more matte finished the surface is. Diffuse sensors, for example, detect diffuse reflecting light from target objects.

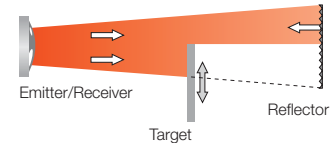




Basic Information and Definitions

Photoelectric sensors

Release Point	The point at which a sensor returns to its original state at the target leaves the sensing field. Also called "reset point".
Repeatability	A measure of the maximum variance in the operating distance that can be experienced in successive operations of a sensor under specified operating conditions.
Repeat Accuracy	The measure of variation in operating distance between successive operations under constant operating conditions. This measurement is often expressed as a maximum percentage of the "operating distance" (i.e., 5%). Note: The target must also remain within the sensing field long enough to allow the load sufficient time to respond to the output signal of the sensor.
Resistive Ratings	This rating indicates the resistive load only that the contacts can make or break. Resistive ratings are generally based on 75% power factor for AC.
Response Time	It is defined as being the duration of time required for the interface to trigger an output. Measure of time lapse between receipt of an input signal by a receiver to the activation of its putput.
Retroreflective	With retroreflective light sensors, the emitter and the receiver are in a single housing. A reflector on the opposite side of the beam bounces the emitter's light back to the receiver. A target object interrupts the reflected light beam and causes a change in the output signal. With reflective interfaces, it is advisable that the light reflected from the object is to be blanked out with a polarizing filter in front of the receiver optics, in order to prevent possible error signals.
Reverse Polarity	Internal circuitry that protects a device from being ruined if proper polarity of voltages is not maintained when wiring the device.
SCP	Short Circuit Protection without external fusing. In DC it also includes overload protection.
Sensing Distance	The maximum distance at which, under specifications, a photoelectric sensor can detect a target.
Sensing Mode	Dark or Light mode condition to the receiver in activating its output.
Sensing Range	The maximum operating range at which the sensor will reliably detect a standard target under conditions of nominal voltage and temperature. The distance between an emitter and a receiver, reflector, or object in the path of the beam within which nominal operation is achievable.
Short-circuit protected	The output leads can be connected to the wrong potential without destroying the sensor. Together with their polarity reversal protection, these sensors are completely protected against miswiring.
Short Circuit Protection	Internal circuitry that protects the solid state sensor in the event that the protection load becomes shorted.
Sinking	A device that switches the negative supply voltage to a load wired to the positive supply voltage. NPN type sensor.
Slot Sensor	A self-contained thru-beam sensor shaped like a slot or fork. The spacing between the emitter and receiver can vary.
Solid State	A device, circuit or system whose operation is dependent upon any combination of optical, electrical, or magnetic phenomena within a solid—generally referred to as having an infinite life and no moving parts.
Sourcing	A device that switches a positive voltage to a load wired to the negative supply voltage. PNP type sensor.



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Photoelectric sensors

Specular Reflection

The perfect, mirror-like reflection of the light off of a target's surface.

Stability

The output state of the photoelectric is stable ON, unstable, or stable OFF. Unstable outputs cause the system to perform erratically. Unstable output occurs when the amount of light incident on the receiver is near the trigger level of the device.

Standard Target

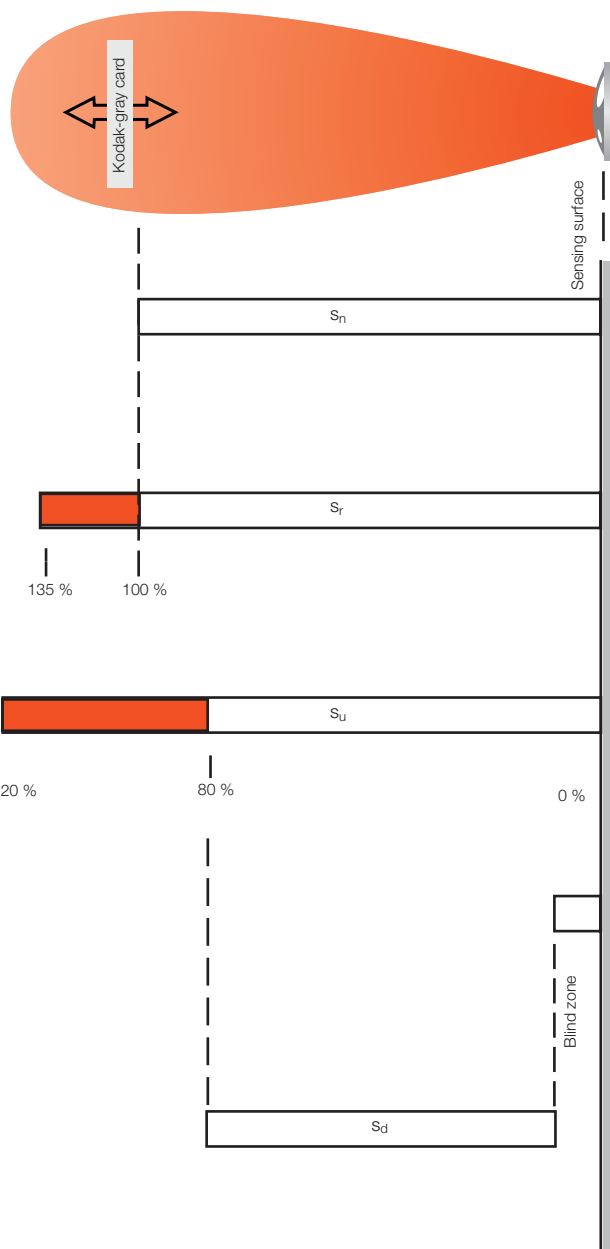
An object with standardized dimensions or characteristics — common among manufacturers — used in the product laboratory to determine benchmark performance characteristics for a sensor.

Supply Voltage

The nominal voltage, or voltage range, at which the device is designed to be operated continuously.

Switching distance s

The switching distance is the distance between the standard target and the “sensing surface” of the light sensor for causing a signal change (per EN 60947-5-2).



Rated switching

The rated switching distance is a switching distance-characteristic, which does not take into account manufacturing tolerances, sample differences, operating temperatures, supply voltages, etc.

Real switching distance s_r

The actual switching distance is the switching distance at measured voltage U_e , taking into account the manufacturing tolerances at an ambient temperature of ($T = +23\text{ °C} \pm 0.5$).

Usable switching

The usable switching distance is the permitted switching distance within fixed voltage- and temperature limits ($0.80\ s_n \leq s_u \leq 1.20\ s_n$).

Blind zone

The blind zone is the range between the sensing surface and the minimum switching distance in which a detection object cannot be detected.

Detection range s_d

The detection range is the area in which the switching distance of a photoelectric sensor to the standard target can be set.

Basic Information and Definitions

Photoelectric sensors

Teach-in

Sensor settings are no longer carried out with potentiometers or slide switches with Teach-in-sensors. Everything is controlled by pressing a button. The microcontroller integrated in Teach-in-sensors enables the complete control of the setting process by buttons. Through defined setting steps, there is the advantage that the sensor cannot be set in an unreliable range. The micro controller also assumes control of the contamination indicator and the contamination output. A wide variety of Balluff Teach-in-switches have remote control; the setting process via Teach-in can also be triggered externally via cable.

Technical data, general

	Photoelectric sensor					Background suppression			Retroreflective sensor			Through-beam sensor			
Rated switching distance s_n	100 mm	200 mm	400 mm	1 m	2 m	120 mm	250 mm	1.1 m	2 m	4 m	8 m	5 m	8 m	16 m	50 m
Actual switching distance (in % of s_n)	125	125	125	135	150	135	135	135	150	150	150	150	150	150	150
Switching hysteresis (in %)	≤ 20	≤ 20	≤ 25	≤ 15	≤ 15	≤ 1	≤ 1	≤ 1	≤ 10	≤ 10	≤ 10	≤ 15	≤ 15	≤ 15	≤ 15
Ø the response beam at $s_n/2$ typical (mm)	20	25	150	300	300	6	10	25	50	100	150				
Ø of the active area (mm)												8	12	12	20

Temperature drift

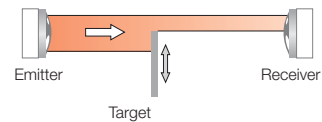
The temperature drift is the switching point shift at temperature changes in % of s_r .

Test input

The test input of the emitter interrupts its light impulses and, through that, enables the function check of emitter and receiver. If Test+ is used, then Test- has to be at 0 V, and if Test- is used, then Test+ has to be placed at 10...30 V. The receiver-output has to switch every time if there is a voltage of 10...30 V DC (Test+) or 0 V DC (Test-) at the test input. Contamination or maladjustment of the optical axis causes the emitter signal to reach the receiver only weakly, if at all. Therefore, the output will not switch, even though the test input is activated. The test function corresponds to a remote monitoring of the photoelectric sensor and enables a preventive system control.

Thru-Beam

Through-beam sensors consist of separate emitter- and receiver units which have to be aligned opposite each other at the two sides of the detection range. A target interrupts the light beam and causes the receiver to switch, regardless of the surface characteristics. In unfavorable conditions (e.g. dust, moisture, oil), you achieve the best results with through-beam sensors. Ranges of up to 50 m can be achieved.



Timing

Links the trigger and the output circuit. The time duration of this link can be as fast as technology will permit, or controlled for a desired effect.

Translucent

Material which permits the passage of light to some extent.

Transmission

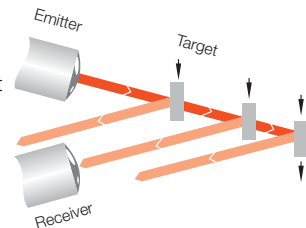
The transmission is a measure for the light transmission ability of a medium. It is defined as the ratio of: – passed to – entering light (in %). Diffuse transmission is the term which is used when the light is partially or completely diffused.

Transparent

Targets that permit transmission of essentially all incident light.

Triangulation

With a triangulation, the emitter- and the receiver beam are cut by a photoelectric sensor at a pointed angle. A target object will only be detected in the range where the beams overlap. The emitter light which is reflected or diffused from objects outside this limited zone cannot be registered by the photo-receiver. With the triangulation, relatively small changes in distance can be recognized (e.g. slots, offsets on shafts). Color and shape of the object have very little effect on the registration.



Trigger or Threshold Level

Triggers the output circuit when the signal reaches a predetermined level.

Turn-off delay

The turn-off delay is the time which the sensor requires for actuation when the target object leaves the sensing zone, at a transmission efficiency factor of 0.5.



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Turn-on delay

The switching delay is the time which the sensor requires for actuation when the target object leaves the sensing zone, at a transmission efficiency factor of 2.

Usable Sensing Distance

Taking the actual operating conditions into account, the usable sensing distance is the maximum reliable operating range for a given system. The most important factors to consider are atmospheric environment and the reflective nature of the target.

Visible Light

Measured in wavelength. Wavelengths of visible light range between 400 and 700 nanometers.

Basic Information and Definitions

Capacitive sensors

Ambient temperature T_a

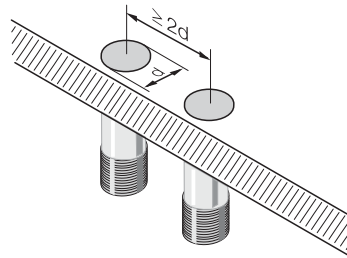
The ambient temperature determines the temperature range in which the sensor may be operated. Balluff manufactures both sensors for the standard temperature range $-30...+70^\circ\text{C}$ and sensors for more stringent temperature requirements up to max. $+250^\circ\text{C}$.

Effective switching distance s_r

The real switching distance is the switching distance of a single proximity switch measured under specified conditions such as flush mounting, rated operating voltage U_e , temperature $T_a = +23^\circ\text{C} \pm 5^\circ\text{C}$. For capacitive sensors, the effective switching distance s_r can be set using a potentiometer.

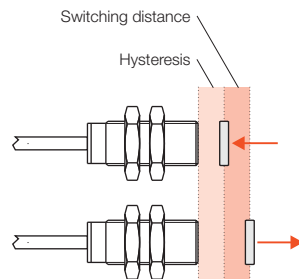
Flush-mount (shielded) Proximity switches

Flush mountable sensors can be installed with their sensing surface flush to the metal. The distance between two proximity switches (in row mounting) must be $\geq 2d$.



Hysteresis

The hysteresis is the difference in distance between the switch-on point (for an object that is approaching) and the switch-off point (for an object that is receding).



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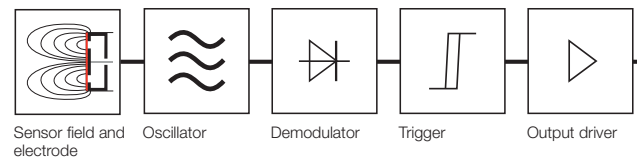
Capacitive sensors

Operating principle

The non-contacting capacitive sensor converts a variable of interest in technical production terms (e.g. object or level) into a signal which can be processed further. The function is based on the alteration in the electrical field around its active zone. The sensor is comprised essentially of:

- Sensor electrode and shielding
- Oscillator
- Demodulator
- Trigger
- Output driver

These two electrodes form the open capacitor of the sensing surface. This is part of an RC oscillator.



When metallic or non-metallic objects approach the sensing surface of the capacitive sensor, the capacitance changes and the oscillator begins to oscillate. This causes the trigger stage down stream of the oscillator to trip, and the switching amplifier to change its output status. The switching function at the output is either an N.O., N.C. or changeover contact, depending on the type of unit involved. The function of the capacitive sensor can be explained using the equation for capacitance:

$$C = \epsilon_0 \times \epsilon_r \times F \times (1/S)$$

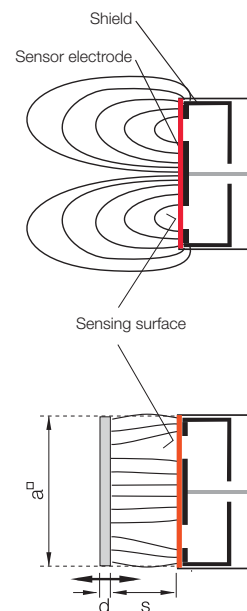
ϵ_r : Relative dielectric constant
(property of the target medium)

ϵ_0 : Absolute dielectric constant, unchanging

F: Area

S: Distance

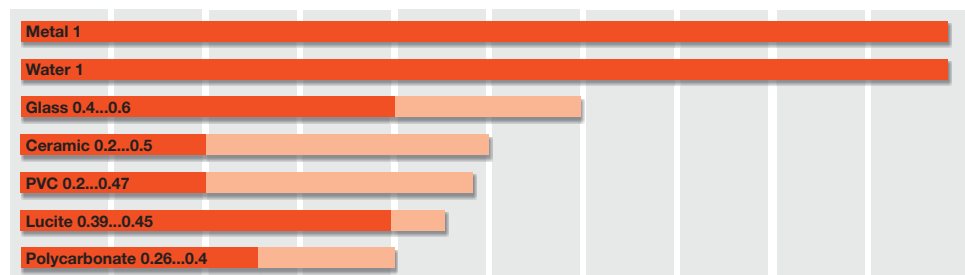
From the formula above it follows that objects which have a sufficiently large relative dielectric coefficient (ϵ_r) and area will be detected by the capacitive sensor. Besides the **standard (multi-purpose) sensor technology**, in which the sensor is a part of the oscillator circuit, there are also more modern processes designed to meet special application requirements.



Operating conditions and correction factors

If an electrically non-conducting actuation element (target) enters the sensor field, the capacitance changes proportionally to ϵ_r and to the immersion depth or to the distance to the sensing surface. Since the rated switching distance s_n is based on a grounded standard target made of Fe 360, the switching distances must be corrected when using other materials.

Correction factors for typical materials



Correction factors should be determined using the target material directly.

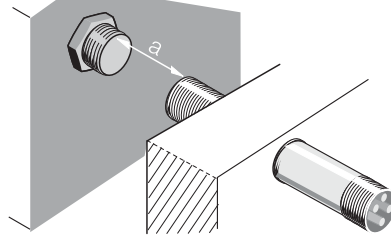


Basic Information and Definitions

Capacitive sensors

Opposing Installation of two sensors

The opposite installation of two sensors requires a minimum distance of $a \geq 4d$ between the sensing surfaces.



Output current or operating current I_o

The output current is the maximum current with which the output of the sensor may be loaded in continuous operation.

Polarity reversal protection

The sensor electronics are protected against possible polarity reversal or interchanging of the connection wires.

Rated switching distance s_n

The rated switching distance is a parameter without taking manufacturing tolerances, parameter scatter and external influences such as temperature and voltage into account.

Repeat accuracy

Repeatability is the maximum sensing distance differential between any two measurements, measured within 8 hours with multiple "approaches" to the object being scanned. The repeat accuracy generally lies between 2 and 5% of the effective switching distance s_n .

Residual ripple

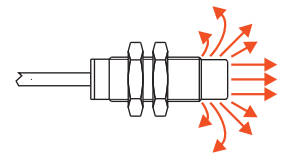
The residual ripple is the maximum permissible AC voltage which may be superimposed on the supply voltage U_S without affecting the function of the sensor.

Sensing surface

The sensing surface is the area through which the high-frequency sensor field enters the air space. It is determined mainly by the surface area of the cover cap and corresponds approximately to the area of the outer sensor electrode.

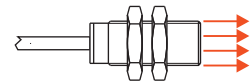
Sensors for level detection (non-flush/unshielded sensor version)

These sensors have a spherical electrical field. These units are designed to detect the product, bulk goods or liquids (e.g. granulate, sugar, flour, corn, sand, or oil and water) with their sensing surface, by touching the medium or through the container wall. The choice of the appropriate sensor depends on the operating conditions and the kind of medium and should in each case be tested beforehand with samples.



Sensors for object detection (flush)

These sensors have a straight-line electric field. They recognize fixed bodies (e.g. wafers, components, circuit boards, hybrids, cartons, stacks of paper, bottles, plastic blocks and boards), measure liquids through a separating wall (glass or plastic, thickness max. 4 mm) and, in individual cases, are to be pre-tested with samples.



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Shielded sensors

Normally, the rectilinear field of flush-mounted sensors scans objects from a distance. To ensure flawless switching of the sensor, the maximum switching distance must be checked before using the device. The following example applications show how you can do this.



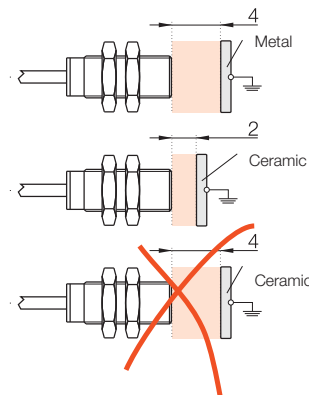
Detecting solid bodies made of different materials

A shielded capacitive sensor will be used to detect a ceramic plate. The sensor is set to the maximum rated switching distance s_n of, for example, 4mm from metal or by approximation from your hand. With this preset distance of 4 mm, move the sensor towards the ceramic plate. The rated switching distance s_n to the ceramic plate has been reduced to approx. 2mm.

The distance of 2 mm is now the maximum permissible switching distance for the ceramic plate. You can also adjust for smaller sensing distances than 2mm.

Important!

To ensure that our sensors work reliably within their technical specifications, they have a greater sensing distance than the indicated maximum rated switching distance s_n . If the user now adjusts the switching distance for the above described ceramic plate to 4mm, the sensor will operate outside the permitted range. This entails a risk that temperature and other environmental factors, plus electrical interference in the mains, may lead to faulty switching by the sensor.

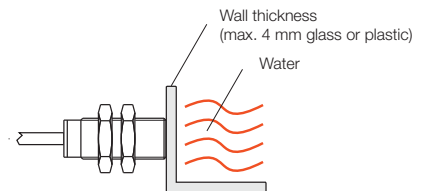


Sensing levels through container walls

A shielded capacitive sensor will be used to detect a liquid, e.g. water, through the container wall. This partition wall may only be made of glass or plastic. The basic calculation for the thickness of the wall thickness yields a value in millimeters of approx. 10 to 20% of the switching distance, but max. 4mm (for standard sensors).

The sensor's face (sensing surface) is now glued to the glass or plastic wall or mounted on it in a maximally form-fitting configuration. The tank is then filled with water until approx. 30 to 50% of the sensor's sensing surface is covered.

Particularly when small and ultra-small quantities of liquid are being scanned, and if the sensor has not been mounted in a form-fitting configuration (flat sensor surface on a tank wall with a small radius), 30% should be selected as the coverage area. Now turn the sensor's potentiometer counter-clockwise (lower sensitivity) until the sensor switches off (for NO versions "LED OFF"). Now turn the potentiometer clockwise again (higher sensitivity) just enough until the LED, and thus the output signal, switch on again. Using the calibration process described here ensures that the sensor does not detect the wall or the media residues on the wall, but only switches when the liquid has again reached the above-described level of 30 to 50%.





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Capacitive sensors

Short-circuit protection and overload protection

All DC sensors feature this protection device. In the event of overload or short-circuit at the output, the output transistor is automatically switched off. As soon as the malfunction has been corrected, the output stage is reset to normal functioning.

Standard target

The standard target is a grounded, square plate made of Fe 360 (ISO 630), with the switching distance determined per EN 60947-5-2. The thickness is $d = 1 \text{ mm}$; and the side length a corresponds to

- The diameter of the registered circle of the “sensing surface” or
- $3 s_r$, if the value is greater than the given diameter.

Standby current

The no-load supply is the power consumption of the sensor with a maximum operating voltage U_0 and with no connected load.

Supply voltage U_s

The supply voltage is the voltage range in which flawless functioning of the sensor is assured. It includes all voltage tolerances and ripple.

Switching frequency

The switching frequency is a succession of periodically repeated activation and de-activation of the sensor during an established interval (one second). Measuring method in conformity with IEC 60947-5-2.

Temperature drift

The temperature drift specifies the amount by which the switching distance can change based on the temperature. This lies between 15 and 20% of the real switching distance s_r ($-5...+55 \text{ }^\circ\text{C}$).



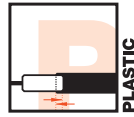
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Unshielded sensors

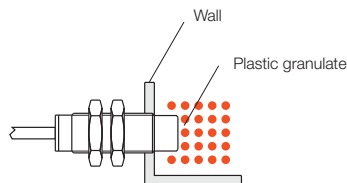
These capacitive sensors with their spherical electrical field are especially suited as level detectors for liquids, granulates or powders.



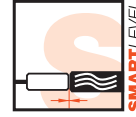
Sensing levels directly in the container

An unshielded capacitive sensor will be used to detect a granulate in a tank. The sensor is now installed in the tank with its sensing surface (clear zone at the head as described in the catalog), in a configuration ensuring that the head is completely covered by the product.

Now turn the sensor's potentiometer counter-clockwise (lower sensitivity) until the LED, and thus the output signal, switch off. Now turn the potentiometer clockwise again (higher sensitivity) just enough until the LED, and thus the output signal, switch on again. Then turn the potentiometer another ¼-turn (90°-rotation) clockwise. This is to compensate for possible temperature fluctuations or changes in the moisture level of the product being scanned. If a medium has a high ϵ_r , especially water, the sensor will react much more sensitively. Therefore, the adjustment should be made for around 50 to 80% coverage, or a sensor in the **SMARTLEVEL** series should be used.



With level sensors in the MicroLevel housing, an adjustment is only necessary in exceptional cases. This potentiometer has a setting path of 270° and has to be carefully adjusted > no limit stop.



Detecting levels of conductive liquids directly in the container or through a container wall

The ideal level sensors **SMARTLEVEL** detect liquid media directly and all conductive or adhesive liquids through thicker container walls. And they do it without adjustment as long as the wall thickness does not exceed 6mm. For thicker walls the **SMARTLEVEL** will need to be adjusted. Adjustment is possible with the container empty or full.

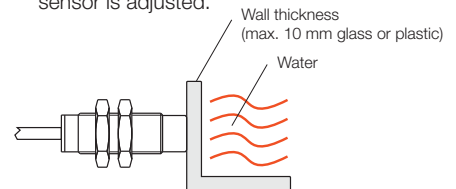
Adjusting with a full container

First fill the container and install the sensor on the container wall. Now the **SMARTLEVEL** has contact and turns itself on.

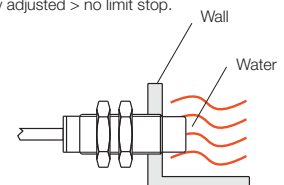
Now turn the potentiometer slowly counter-clockwise until the sensor turns off. Now slowly turn the potentiometer (with the sensor switched off) clockwise until the sensor turns on again. At the turn-on point then turn the potentiometer another half-turn (approx. 180°) clockwise and the **SMARTLEVEL** sensor is adjusted.

Adjusting with an empty container

Install the **SMARTLEVEL** sensor on the container wall. Now the **SMARTLEVEL** has contact and turns itself on. Now turn the potentiometer slowly counter-clockwise until the sensor turns off. Now slowly turn the potentiometer (with the sensor switched off) clockwise until the sensor turns on again. At the turn-on point the potentiometer only needs to be turned 3 times by approx. 360° counter-clockwise and the **SMARTLEVEL** sensor is adjusted.



With level sensors in the MicroLevel housing, an adjustment is only necessary in exceptional cases. This potentiometer has a setting path of 270° and has to be carefully adjusted > no limit stop.



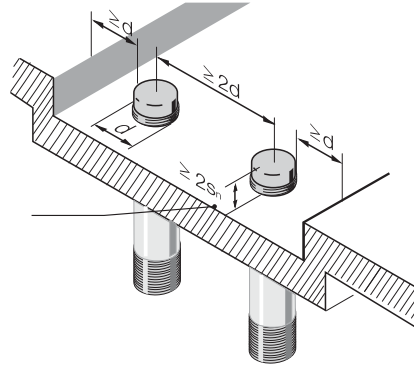
For more information, visit us online!

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Capacitive sensors

Unshielded proximity switches

The sensing surface must extend $\geq 2s_n$ from the metallic installation medium. The distance between two proximity switches must be $\geq 2d$.



Voltage drop U_d

The voltage drop is the voltage measured across the active output of the proximity switch when carrying the operational current flows under specified conditions.



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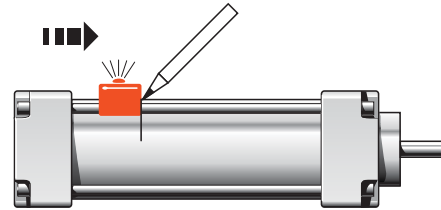
Magnetic cylinder sensors

Adjustment and installation

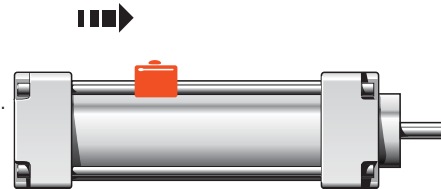
1. Set piston to end position.



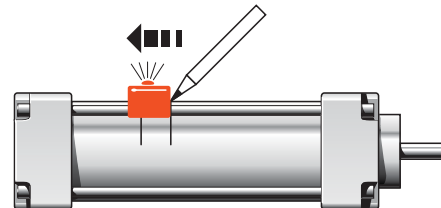
2. Slide sensor (with power on) from the cylinder edge to the 1st switch-on point (LED on). Mark the edge of the sensor on the cylinder.



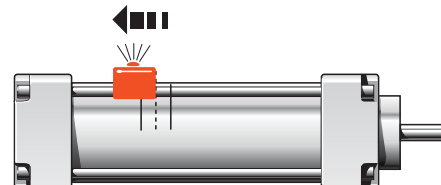
3. Continue to slide the sensor until the output is off (LED off).



4. Slide sensor back to 2nd switch-on point. Mark the edge of the sensor on the cylinder.



5. Install the sensor with the edge between the two marked points.





Basic Information and Definitions

Magnetic cylinder sensors

Benefits

Magnetic electronic cylinder sensors of the series BMF query the piston position with pneumatic and hydraulic cylinders and grippers.

Depending on the model, the sensor housing will be made of plastic, aluminum, brass or stainless steel.

Balluff offers a comprehensive variety of form factors and mounting brackets for your pneumatic cylinders with the BMF- sensors. Most require only one sensor model with various mounting brackets for the different cylinder manufacturers and -sizes. This reduces your inventory costs. Mounting with our brackets allows sensors to be replaced without losing your switchpoints.

- Reliable, bounce-free switching
- Long service life
- Non-contact, wear-free piston sensing
- Insensitive to contamination
- Detects piston position through the cylinder wall
- Space-saving design, small sizes and shapes
- Can be installed on any common cylinder size with corresponding mounting bracket
- Significantly greater switching distances for the same size
- Switches through alloy and aluminum walls without a reduction in switching distance
- Magnet can be flush mounted in steel
- Polarity reversal protected
- Supply voltage 10...30 V DC
- Responds to both magnetic field directions equally
- Semiconductor sensor, wear-free
- Vibration-resistant
- Short-circuit protected
- Housing material is highly resistant to aggressive media

BMF V-Twin

BMF V-Twin is a sophisticated and cost-effective plug concept with two sensors and a plug. During installation, you will reduce costs and gain back time.

Low initial costs compared to two individual sensors:

BMF 204/214 approx. 20 % savings

BMF 303/305 approx. 30 % savings

BMF 307 approx. 35 % savings

Space in the splitter box for twice as many sensors.



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Effective distance s_e

The effective distance is the point in the middle of the linear range s_l , used as a reference point for other specifications.

Function

Permanent magnets are installed in the piston ring of the pneumatic cylinder, which recognize the magnetic cylinder sensor by the non-magnetic cylinder walls. As the piston approaches, the sensor changes its output signal state.

Basic Information and Definitions

Magnetic cylinder sensors

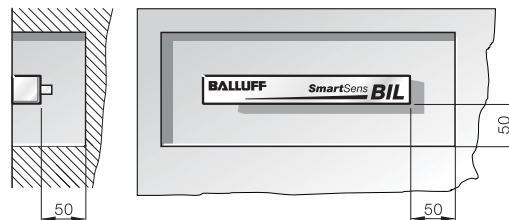
Installation notices

It is recommended that the BIL and position encoder be installed- or attached to non-magnetizable materials, such as non-ferrous metals, austenitic steels, plastics, etc. This applies both to the installation of the sensor as well as the magnet.

Magnetizable materials may affect the geometry and strength of the effective sensing magnetic field.

Magnetic fields near the BIL can affect the output signal depending on their location and the strength of the output signal. This also applies to position sensors of neighboring BILs.

Recommended minimum distances from magnetizable materials or other BILs



Units in mm

Installation notices

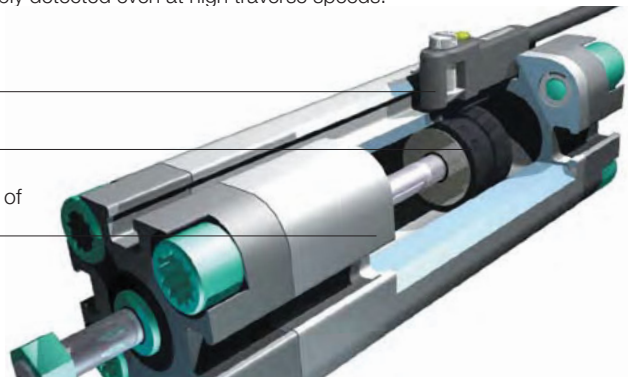
Magnetic cylinder sensors

Magnetic cylinder sensors are used chiefly on cylinders and grippers for monitoring the piston position. The sensor detects the field from the magnet embedded in the piston. Thanks to non-contacting position detection, electronic magnetic field sensors from Balluff function reliably and without wear, with no contact erosion, no bouncing, no sticking and just one switching point. The piston position is reliably detected even at high traverse speeds.

Magnetic cylinder sensor BMF _____

Magnet ring _____

Non-magnetic cylinder wall made of aluminum or stainless steel _____



Linear position sensors with analog output

Displacement sensors with analog output are sensors that generate a continually varying output signal that depends on the distance between its sensing surface and the location of the position encoder relative to the sensor (BIL).

Linear range s_l

The linear range corresponds to the working range in which the displacement sensor exhibits a defined linearity.

Magnetic sensors for object detection

While for the magnetic cylinder sensors for pneumatic cylinders, the magnet is integrated in the cylinder piston, an external magnet is needed for position sensing with cylindrical magnetic field sensors. Cylindrical magnetic field sensors are characterized by their small, extremely compact design and very high switching distances. This means that you can query positions up to 90 mm away in a non-contact method using a single sensor with a diameter of 6.5 mm. These sensors are industrial grade and resistant to soiling. Positions can also be retrieved through containers or pipes because magnetic fields can penetrate many non-magnetizable materials. The detection of codes using magnets is also possible.

Measuring speed

Through measurement speed, the position (with BIL) of a linear moving object can be measured accurately. The direction of movement of the object is parallel to its sensing face.

Basic Information and Definitions

Magnetic cylinder sensors

Mounting distances Adjustment and installation

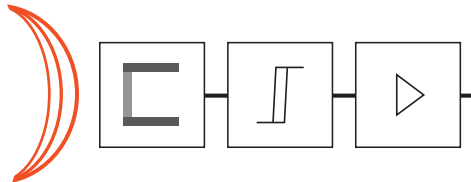
The response travel of a magnetic field sensitive sensor is virtually independent of the field strength of typical piston magnets. This design and operating principle eliminates multiple switchpoints. When using multiple magnetic field-sensitive BMF-sensors, these can be installed directly next to or behind one another.



Non-linearity

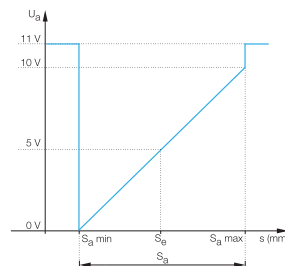
Non-linearity specifies the maximum deviation of the characteristic from a straight reference line. This value applies to the linear range.

Operating principle

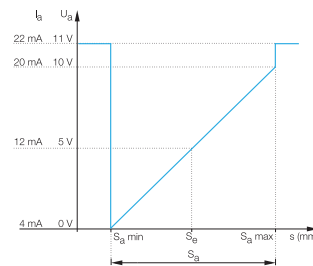


Output curves

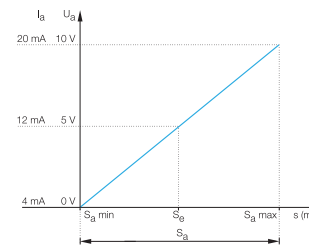
BIL AMD0



BIL EMD0



BIL EDO



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Repeat accuracy R

The repeat accuracy is the value of output signal changes under defined conditions, expressed as a percentage of the upper distance. In doing so, you have to measure in the lower, upper and middle areas of the linear range. It corresponds to the repeat accuracy R of proximity switches and is determined under the same standardized conditions (EN 60947-5-2).

Displacement sensors with analog output achieve the value R of $\leq 5\%$ defined in the standard.

Repeat accuracy R_{BWN}

Repeat accuracy describes the precision an analog sensor achieves when moving to a measuring point multiple times. The value specified on the basis of the Balluff Factory Standard (BWN Pr. 44) describes the maximum deviation from this measuring point.

Response time

The response time is the time a sensor requires to reliably and steadily change the output signal. The specified time, which has been determined at the maximum measuring speed, includes both the electrical response time of the sensor and the time for the mechanical change of the damping state.

Slope

The slope is a measure of the sensitivity of the sensor with respect to a distance change. This physical relationship can be calculated for travel sensors as follows:

$$\text{Slope } S \text{ [V/mm]} = \frac{U_{a \text{ max}} - U_{a \text{ min}}}{s_{a \text{ max}} - s_{a \text{ min}}}$$

or

$$\text{Slope } S \text{ [mA/mm]} = \frac{I_{a \text{ max}} - I_{a \text{ min}}}{s_{a \text{ max}} - s_{a \text{ min}}}$$

Basic Information and Definitions

Magnetic cylinder sensors

Temperature coefficient TC

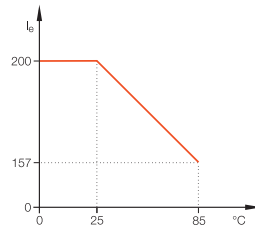
The temperature coefficient describes the deviation of the sensor output signal under the influence of a temperature change, and thus also represents a quality criterion for the sensor.

Temperature drift

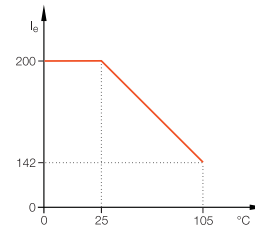
The temperature drift is the shift a point experiences on the actual output curve at different temperatures. The temperature drift is described by the temperature coefficient.

Temperature load curve

For series BMF 10E, BMF 21, BMF 32, BMF 305, BMF 307, BMF 315.



for series **BMF 305M...SA4** and **BMF 315M...SA3**, with increased temperature range (-25...+105 °C).

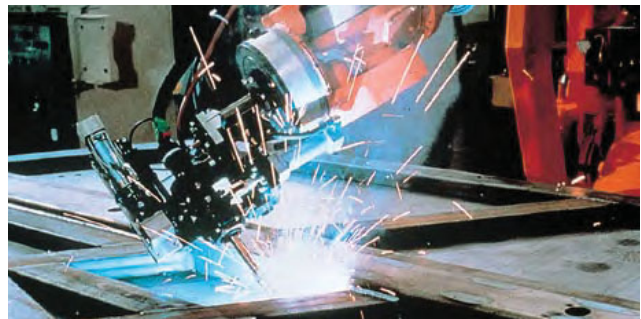
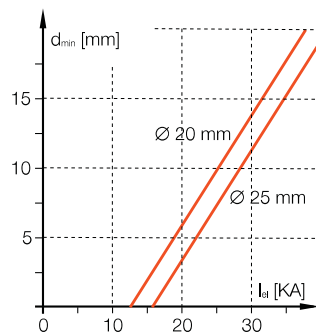


Tolerance T

The tolerance is a variable that defines the manufacturing tolerance band of the output curve, thereby determining the maximum sample deviation.

Using in AC welding environments

The magnetic cylinder sensors BMF 305M/315M/32M-...-W-... can be operated in external fields up to a field strength of $E_{\max} = 200$ kA/m. This limit is often exceeded in the direct vicinity of high current lines, e.g. welding equipment. The sensor should therefore be mounted at a distance $d_{\min}$ from such lines, as shown in the diagram below showing the relationship between current and conductor diameter.





Basic Information and Definitions

Cable stranding for cable out sensors

PUR Cable

No. x Cross-Section of the Conductors [mm ²]	Type	Stranding	Cable Outside Diameter
2 x 0.14	LiFY-Y-11Y-0	72 x 0.05	3.9 ± 0.2
2 x 0.14	LiFY-Y-11Y-0	72 x 0.05	3.2 ± 0.2
2 x 0.34	LiFY-Y-11Y-0	42 x 0.10	4.9 ± 0.2
2 x 0.50	LiFY-Y-11Y-0	256 x 0.05	6.0 ± 0.2
3 x 0.14	LiFY-Y-11Y-0	72 x 0.05	3.5 ± 0.2
3 x 0.14	LiFY-Y-11Y-0	72 x 0.05	2.9 ± 0.2
3 x 0.25	LiFY-Y-11Y-0	128 x 0.05	4.5 ± 0.2
3 x 0.34	LiY I8-11Y-0	19 x 0.15	4.9 ± 0.2
3 x 0.34	LiFY-Y-11Y-0	42 x 0.10	4.9 ± 0.2
3 x 0.75	LiFY-Y-11Y-0	384 x 0.05	6.7 ± 0.2
4 x 0.14	LiFY-Y-11Y-0	72 x 0.05	3.7 ± 0.2
4 x 0.25	LiFY-Y-11Y-0	128 x 0.05	5.1 ± 0.2
4 x 0.25	LiFY-Y-11Y-0	32 x 0.10	5.1 ± 0.2
4 x 0.34	LiY I8-11Y-0	19 x 0.15	5.5 ± 0.2

PVC Cable

2 x 0.14	LiFYY-0	72 x 0.05	3.0 ± 0.2
2 x 0.14	LiFYY-0	18 x 0.10	3.0 ± 0.2
2 x 0.34	LiFYY-0	7 x 0.25	4.9 ± 0.2
3 x 0.14	LiFYY-0	18 x 0.10	3.5 ± 0.2
3 x 0.14	LiFYY-0	18 x 0.10	2.9 ± 0.2
3 x 0.14	LiFYY-0	18 x 0.10	3.5 ± 0.2
3 x 0.25	LiFYY-0	14 x 0.15	4.5 ± 0.2
3 x 0.34	LiFYY-0	7 x 0.25	4.9 ± 0.2
4 x 0.25	LiFYY-0	14 x 0.15	5.1 ± 0.2

Comparison of PVC to PUR Cable - Cable Out Sensors

This table is a comparison of the PVC jacketed cable used for standard proximity sensors and Balluff PUR cable.

Number of Conductors	Size		PVC Cable		PUR Cable	
	mm ²	AWG	# Strands x Dia.	Jacket O.D.#	# Strands x Dia.	Jacket O.D.#
2	0.14	26	72 x 0.05 mm	3.0 ± 0.2 mm	72 x 0.05 mm	3.0 ± 0.2 mm
3	0.14	26	18 x 0.1 mm	3.4 ± 0.3 mm	72 x 0.05 mm	3.5 ± 0.2 mm
4	0.14	26	18 x 0.1 mm	3.8 ± 0.3 mm	72 x 0.05 mm	3.9 ± 0.2 mm
4	0.25	24	14 x 0.15 mm	4.9 ± 0.3 mm	128 x 0.05 mm	5.1 ± 0.2 mm
2	0.34	22	7 x 0.25 mm	4.4 ± 0.3 mm	180 x 0.05 mm	4.5 ± 0.2 mm
3	0.34	22	7 x 0.25 mm	4.8 ± 0.3 mm	180 x 0.05 mm	4.9 ± 0.2 mm
2	0.5	20	16 x 0.20 mm	5.6 ± 0.2 mm	256 x 0.05 mm	5.6 ± 0.2 mm
2	0.75	18	24 x 0.20 mm	5.8 ± 0.2 mm	384 x 0.05 mm	6.3 ± 0.2 mm
3	0.75	18	24 x 0.20 mm	6.1 ± 0.2 mm	384 x 0.05 mm	6.7 ± 0.2 mm
4	0.75	18	24 x 0.20 mm	6.7 ± 0.2 mm	384 x 0.05 mm	6.9 ± 0.2 mm



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Chemical resistance cable out sensors

The following ratings are general guidelines, designed only to be used as an initial screening tool. Keep in mind that dynamic vs. static application, temperature, and chemical mixtures can significantly affect or change these ratings either positively or negatively. Careful testing under actual conditions is essential. Accuracy for these ratings is not given or implied.

Cable Type
Sensor Jackets

PUR = Polyurethane
P/E = Polyethylene
PVC = Polyvinylchloride (vinyl)

RATINGS:

1 = little or no effect
2 = minor effect
3 = moderate effect
4 = severe effect

	P U R	P / E	P / V		P U R	P / E	P / V		P U R	P / E	P / V
Acetic Acid, Glacial	4	1	4	Ethyl Ether	3	—	—	Phenol	3	2	3
Acetic Acid, 30%	4	1	4	Ethylene Chloride	4	3	4	Phenyl Ethyl Ether	4	—	—
Acetone	4	2	4	Ethylene Glycol	4	1	1	Phosphoric Acid-45%	1	2	2
Acetylene	4	1	1	Ethylene Oxide	4	3	3	Picking Solution	4	—	—
Alkylene	4	—	—	Ethylene Trichloride	4	—	—	Picric Acid	2	—	4
Aluminum Chloride (aq)	3	2	1	Ferric Chloride (aq)	1	1	1	Potassium Acetate (aq)	4	—	—
Aluminum Nitrate (aq)	3	—	—	Ferric Nitrate (aq)	1	2	1	Potassium Chloride (aq)	1	1	1
Ammonia Anhydrous	4	2	1	Ferric Sulfate (aq)	1	1	1	Potassium Cyanide (aq)	1	1	1
Ammonia Gas (cold)	3	—	—	Fluorine (Liquid)	4	3	4	Potassium Hydroxide (aq)	4	1	1
Ammonia Gas (hot)	4	—	—	Formaldehyde (RT)	4	2	1	Producer Gas	1	1	1
Ammonium Chloride	1	1	1	Formic Acid	3	2	1	Propane	3	3	1
Ammonium Sulfate (aq)	1	1	1	Freon 11	4	3	1	Propyl Alcohol	4	—	—
Amyl Alcohol	4	2	1	Freon 12	1	3	1	Propylene	4	—	—
Amyl Naphthalene	4	—	—	Freon 22	4	—	2	Propylene Oxide	4	—	—
Animal Fats	1	—	—	Fuel Oil	2	3	1	Pydraul, 10E, 29 ELT	4	—	—
Aqua Regia	4	2	3	Furfural Glucose	4	1	1	Pydraul, 30E, 50E, 65E	4	—	—
Arsenic Acid	3	2	1	Glue	1	1	3	Pydraul, 115E	4	—	—
Asphalt	2	1	1	Glycerin	1	1	1	Pydraul, 230E, 312C, 540C	4	—	—
ASTM Fuel A	2	—	—	Glycois	4	—	—	Rapeseed Oil	2	—	—
ASTM Fuel B	3	—	—	Green Sulfate Liquor	1	—	—	Red Oil (MIL-H-5606)	1	—	—
ASTM Fuel C	3	1	1	Hexane	2	3	2	RJ-1 (MIL-F-23338 B)	1	—	—
Barium Chloride (aq)	1	1	1	Hydraulic Oil	1	1	1	RP-1 (MIL-F-25576 C)	1	—	—
Beer	2	1	1	Hydrochloric Acid (cold) 37%	4	2	2	Salt Water	2	1	1
Beet Sugar Liquors	4	1	1	Hydrochloric Acid (hot) 37%	4	—	—	Sewage	4	—	—
Benzene	3	3	3	Hydrofluoric Acid (Conc.) Cold	3	—	—	Silicate Esters	1	—	—
Benzine	2	—	—	Hydrofluoric Acid (conc.) Hot	4	—	—	Silicone Oils	1	1	1
Blast Furnace Gas	4	—	—	Hydrogen Gas	1	1	1	Silver Nitrate	1	2	1
Bleach Solutions	4	—	1	Isobutyl Alcohol	4	—	—	Sigdol 500	4	—	—
Borax	1	1	2	Isocetane	2	—	—	Sigdol 700	4	—	—
Boric Acid	1	1	1	Isopropyl Acetate	4	2	4	Soap Solutions	3	3	1
Brake Fluid	4	—	—	Isopropyl Alcohol	3	—	—	Sodium Chloride (aq)	1	1	1
Brine	2	4	3	Isopropyl Ether	2	1	2	Sodium Hydroxide (aq)	4	2	1
Bromine Water	4	—	—	Kerosene	1	3	4	Sodium Peroxide (aq)	4	1	2
Bunker Oil	2	—	—	Lacquers	4	2	3	Sodium Phosphate (aq)	1	—	—
Butane	1	3	3	Lacquer Solvents	4	2	3	Sodium Sulfate (aq)	1	1	1
Butter	1	—	—	Lard	1	2	1	Soy Bean Oil	2	1	1
Butyl Alcohol	4	1	2	Lavender Oil	4	—	—	Steam Under 300°F	4	—	—
Butylene	4	1	1	Lead Acetate (aq)	4	1	1	Steam Over 300°F	4	—	—
Calcium Chloride (aq)	1	2	1	Linseed Oil	2	3	1	Stoddard Solvent	1	3	3
Calcium Hydroxide (aq)	1	2	1	Lubricating Oils	2	4	2	Styrene	3	—	4
Calcium Nitrate (aq)	1	—	—	Lye	4	—	—	Sucrose Solution	4	—	—
Calcium Sulfide (aq)	1	—	—	Magnesium Chloride (aq)	1	1	1	Sulfuric Acid (Dilute)	3	1	1
Cane Sugar Liquors	4	—	1	Magnesium Hydroxide (aq)	4	1	1	Sulfuric Acid (Conc.)	4	3	4
Carbolic Acid	3	2	3	Mercury	1	1	2	Sulfuric Acid (20% Oleum)	4	—	—
Carbon Dioxide	1	3	1	Methane	3	—	—	Sulfurous Acid	3	2	1
Carbonic Acid	1	2	1	Methyl Acetate	4	2	4	Tannic Acid	1	2	1
Carbon Monoxide	1	2	1	Methyl Acrylate	4	—	—	Tetrochloroethylene	4	2	4
Carbon Tetrachloride	4	2	2	Methyl Alcohol	4	1	1	Toluene	4	3	4
Caster Oil	1	—	1	Methyl Butyl Ketone	4	—	1	Transformer Oil	1	—	—
Chlorine (dry)	4	2	1	Methyl Chloride	4	3	4	Transmission Fluid Type A	1	—	—
Chlorine (wet)	4	—	—	Methylene Chloride	4	3	4	Trichloroethane	4	—	3
Chloroform	4	3	4	Methyl Ethyl Ketone	4	2	4	Trichloroethylene	4	3	4
Chlorox	4	—	—	Methyl Isobutyl Ketone	4	—	—	Turbine Oil	1	3	1
Chromic Acid	4	1	1	Milk	4	1	1	Turpentine	4	3	2
Citric Acid	1	1	2	Mineral Oil	1	2	1	Varnish	3	3	4
Coal Tar	3	—	—	Naphtha	2	1	3	Vinyl Chloride	4	2	1
Coconut Oil	2	—	1	Naphthalene	2	1	4	Water	1	1	1
Cod Liver Oil	1	—	1	Natural Gas	2	—	—	Whiskey, Wines	2	3	1
Coke Oven Gas	4	—	—	Neatsfoot Oil	1	—	—	White Oil	1	—	—
Copper Chloride (aq)	1	2	1	Nitric Acid (Conc.)	4	3	4	Wood Oil	3	—	—
Copper Cyanide (aq)	1	2	1	Nitric Acid (Dilute)	3	—	4	Xylene	4	3	4
Corn Oil	1	3	2	Nitroethane	4	—	—	Zinc Acetate (aq)	4	—	—
Cotton Seed Oil	1	2	2	Nitrogen	1	—	—	Zinc Chloride (aq)	1	1	1
Cresol	4	3	4	N-Octane	4	—	—				
Cyclohexane	1	2	4	Oleic Acid	2	3	3				
Denatured Alcohol	4	—	—	Oleum Spirits	3	4	4				
Detergent Solution	4	1	1	Olive Oil	1	1	3				
Diesel Oil	3	3	1	Oxygen-Cold	1	—	—				
Dioxane	4	—	—	Oxygen (200-400°F)	4	—	—				
Dowtherm Oil	3	—	—	Paint Thinner	4	—	—				
Dry Cleaning Fluids	4	—	—	Perchloric Acid	4	—	—				
Ethane	3	—	4	Perchloroethylene	4	4	3				
Ethyl Acrylate	4	—	—	Petroleum-Below 250°F	2	—	—				
Ethyl Alcohol	4	—	—	Petroleum-above 250°F	4	—	—				
Ethyl Benzene	4	—	—								
Ethyl Cellulose	2	—	—								
Ethyl Chloride	2	—	—								



General Properties of TPE Jacketed Cable

- Oil Resistant
 - 10 million+ rolling C-track Flex Cycles
 - 10 million Tick/Tock Test Cycles
 - Temperature Rating: 105°C to -24°C
 - Flame Retardant
 - Sunlight Resistant
 - Weld Flash Resistant
 - Bend Radius = 10 x O.D.
- 3 wire O.D. = 5.1 mm
4 wire O.D. = 5.3 mm

Resistance to Acids & Bases

Chemical	TPE	PVC	Neoprene	PUR
30% Sulfuric Acid	R	R	R	R
10% Nitric Acid	R	R	R	R
Glacial Acidic Acid	S	NR	R	-
Carbon Tetrachloride	NR	NR	NR	-
10% Sodium Hydroxide	R	R	S	S
10% Ammonium Hydroxide	R	R	S	S
20% HCL	R	R	R	-

Resistance to Oils & Fuels

Chemical	TPE	PVC	Neoprene	PUR
Mobil Oil DTE 26	R	-	-	-
Mobil Oil DTE 24	R	-	-	-
Castor Oil	R	-	-	R
Simeol	R	-	-	-
Trimsol	R	-	-	-
ASTM Oil 1, 2 or 3	R	S	S	-
Transformer Oil	S	S	R	R
Diesel Fuel	S	NR	S	L
Gasoline	S	NR	S	S
Kerosine	R	R	S	L

KEY: **R** = Recommended - Unaffected by chemical
S = Satisfactory - Very little effect
L = Limited use - Chemical attack probable with slow deterioration
NR = NOT recommended - Severe attack is imminent



Castrol Coolant Testing

Castrol Oils	TPE	PUR
Control Water	1.392	1.671
WS3-908D 10%	3.671	7.331
WS3-933B 10%	7.028	11.499
WY4-876A 10%	2.518	8.702
SYNTILO 9904 10%	1.547	1.918
SUPEREDGE 6768 10%	5.872	12.576
WS3-908D conc	0.688	5.491
WS3-933B conc	3.392	10.763
WY4-876A conc	-0.839	-0.289
SYNTILO 9904 conc	-0.489	0.145
SUPEREDGE 6768 conc	2.737	8.475

This testing was done by removing a piece of jacket material from the test cables and placing them in a bath of various Castrol coolants for 6 weeks. The solutions were kept at a constant temperature of 120°F (based on a standard operating temperature for machine coolants of 80-90°F). The mass of the samples were measured before the testing and at 1 week intervals during the testing. These values are a 6 week average mass percentage increase or decrease.

Note: In every coolant environment that has been field tested, TPE has performed as good or better than PUR.

Relative Cable Performance

Resistance to:	PVC	PUR	TPE
Oxidation	E	E	O
Heat	G - E	E	O
Oil	F	O	O
Low Temperature Flexibility	P - G	E	O
Weather, Sun	G - E	E	O
Ozone	E	E	E
Abrasion	F - G	E	E
Electrical Properties	F - G	E	E
Flame	E	E	O
Nuclear Radiation	F	E	P
Water	G - E	G - E	E
Acid	G - E	E	E
Alkali	G - E	E	E
Gasoline	P	E	E
Benzol	P - F	E	E
Degreaser Solvents	P - F	E	E
Alcohol	G - E	E	E
Weld Slag	F	E	E

KEY:

P = Poor
F = Fair
G = Good
E = Excellent
O = Outstanding

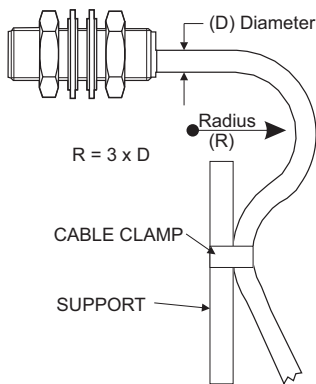
Note: These relative ratings are based on average performance. Special selective compounding of the jacket can improve the performance.

Mounting Suggestions for Cable-out Sensors

To obtain the maximum cable life from a cable-out sensor, the following mounting guidelines should be followed. These guidelines apply to both types of cable jackets supplied: Polyvinyl-chloride (PVC) and Polyurethane (PUR). The bend radius values shown apply to all cable-out sensors and all pigtail (cable with moulded connector) sensors with potted in cables.

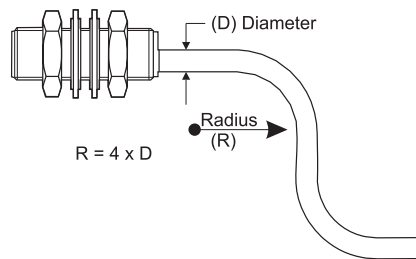
Tension (fixed) Installation

The minimum bend radius should be 3 times the cable diameter.



Non-tensioned Installation

The minimum bend radius should be 4 times the cable diameter.



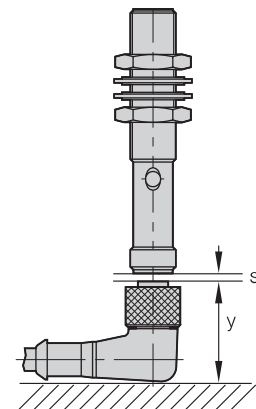
NOTE: Even when the minimum bend radius is observed, unintentional stress can be placed on the rear of the sensor body at the cable exit. Proper cable loops should be maintained to prevent unnecessary stress to this area.

Tightening torques

For permissible tightening torque, see data sheets or sensor packaging.

Removal clearance

The removal clearance refers to the necessary clearance which must be allowed for when removing the connector without difficulty. It results from the connector height "y" plus a space "s", which is determined mainly by the spatial conditions.



Housing tolerances for unthreaded tubular sensors

Diameter tolerance

Ø 3 mm	± 0.1
Ø 4 mm	± 0.1
Ø 6.5 mm	± 0.15
Ø 8 mm	± 0.15



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Use and characteristics

Al

Aluminum wrought alloy

Standard aluminum for cut shaping. Can be anodized. Used for housings and fastening parts.

CuZn

Brass

Standard housing material. Nickel plated for surface protection.

Stainless steel

Excellent corrosion resistance and strength.
Quality 1.4034, 1.4104: (430F)
Standard material.
Quality 1.4305 (303), 1.4301: (304)
Standard material for food grade applications.
Quality 1.4401 (316), 1.4404, 1.4571: (316T)
For food grade applications with heightened requirements for chemical resistance

GD-Al

Cast aluminum

Low specific gravity. Good strength and wear resistance. Some types can be anodized.

GD-Zn

Cast zinc

Good wear and strength. Usually with protective surface coating.

Plastics

ABS

Acrylonitrile Butadiene
Styrene

Impact-resistant, stiff, flame retarding, self-extinguishing

AES/CP

Acrylonitrile-Ethylene-propyl-
ene-Styrene

Impact resistant, inflexible, limited chemical resistance. Used for housings.

EP

Epoxy resin

Duromer, molding resin, highest mechanical strength and temperature resistance. Very good dimensional stability. Non-melting.

LCP

Liquid Crystalline Polymer

High mechanical strength and temperature resistance. Very good chemical resistance. Inherently non-flammable.

PA 6, PA 66, PA mod., PA 12

Polyamide

Good mechanical strength. Temperature resistance. PA 12 approved for food industry applications.

PA transp.

Transparent polyamide

Transparent, hard, inflexible. Good chemical resistance.

PBT, PBTP

Polybuteneterephthalate

High mechanical strength and temperature resistance. Some types flame-retardant. Good chemical resistance. Good oil resistance.



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Plastics

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PC

Polycarbonate

PEEK

Polyetheretherketone

PEI

Polyetherimide

PMMA

Polymethylmethacrylate

POM

Polyoxymethylene

PP

Polypropylene

PPE

Polyphenylenether

PTFE

Polytetrafluorethylene

PUR

Polyurethane

PVC

Polyvinylchloride

PVDF

Polyvinylidenefluoride

TPE

Thermoplastic elastomer

Use and characteristics

Clear, hard, elastic and impact resistant. Good temperature resistance. Limited chemical resistance.

Thermoplastic. Very high strength and temperature resistance. Good chemical resistance. Can be sterilized, good resistance to ionizing radiation.

High mechanical strength and good temperature resistance. Good chemical resistance against many solvents. Transparent with amber-yellow inherent color (not pigmented).

Clear, transparent, hard, scratch-resistance, UV resistant, mainly for optical applications.

High impact resistance, good mechanical strength. Good chemical resistance.

Very good electrical properties. Impact resistant, tough, mechanically resilient. Very low water absorption. Good to very good chemical resistance.

Tough, inflexible, high mechanical strength over a wide temperature range. Good chemical resistance. Good hot water resistance.

Very good temperature and chemical resistance.

Elastic, abrasion-resistant, impact-resistant. Good resistance to oils, greases, solvents (used for gaskets and cable jackets).

Good mechanical strength and chemical resistance (used for cable).

Thermoplastic. High temperature resistance and mechanical strength. Good chemical resistance (similar to PTFE).

A Thermoplastic compound which combines the best properties of PVC and rubber insulation. Resistant to oils, chemicals, acids, solvents and weld slag.

Other

Glass

Good chemical resistance and strength. Used primarily in optical applications (lenses, covering panes).

Ceramic

Very good strength and chemical resistance. Electrically insulating. Excellent temperature resistance.



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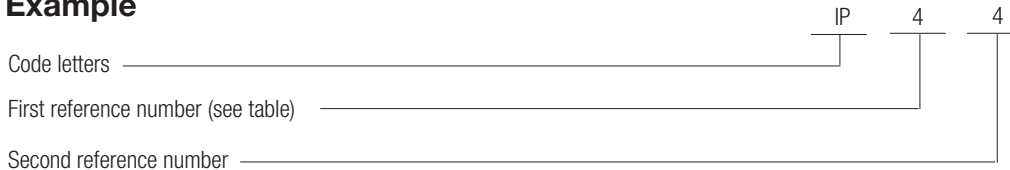
IEC enclosure standards

The IEC publication 529 and DIN Standard number 40050 both address the classification of degrees of protection provided by enclosures. The following is a brief overview of the coding system described in these standards.

General

The degrees of protection are indicated by a symbol consisting of the two code letters IP, always the same, (International Protection) and two reference numbers indicating the degree of protection.

Example



First Number <i>**Test and assessment in italic</i>	Second Number <i>*Test and assessment in italic</i>
0 = no special protection. <i>*no test</i>	0 = no special protection <i>*no test</i>
1 = protected against a rigid sphere of 50mm ø <i>* A rigid 50 mm sphere must not pass through an opening with an applied force of 50 N.</i>	1 = protected vertical falling water <i>* Dripping device or sprinkler nozzle in accordance with DIN 40 053 part 1 or part 5 respectively.</i>
2 = protected against solid objects greater than 12.5mm ø. <i>* A rigid 12 mm sphere must not pass through an opening with an applied force of 30 N.</i>	2 = protected against vertical falling water drops when enclosure tilted at 15° <i>* Dripping device or sprinkler nozzle in accordance with DIN 40 053 part 1 or part 5 respectively.</i>
3 = protected against solid objects greater than 2.5mm. <i>* A straight rigid steel wire 2.5 mm in dia. must not enter the equipment with an applied force of 3 N.</i>	3 = protected against splashing water at an angle up to 60° <i>* Oscillating tube or spray nozzle in accordance with DIN 40 053 part 2 or part 3 respectively depending on the shape and size of sample.</i>
4 = protected against solid objects greater than 1mm. <i>* A straight rigid steel wire 1 mm in dia. must not enter the equipment with an applied force of 1 N.</i>	4 = protected against splashing water from any direction <i>* Oscillating tube or spray nozzle in accordance with DIN 40 053 part 2 or part 3 respectively depending on the shape and size of the sample.</i>
5 = dust protected <i>* A straight rigid steel wire 1 mm in dia. must not enter the equipment with an applied force of 1 N. Also, dust chamber test to DIN 40 052.</i>	5 = protected against water jets <i>* Jet nozzle of nominal size 6 in accordance with DIN 40 053 part 4.</i>
6 = dust-tight and complete protection against contact. <i>* A straight rigid steel wire 1 mm in dia. must not enter the equipment with an applied force of 1 N. Also, dust chamber test to DIN 40 052.</i>	6 = protected against powerful water jets <i>* Jet nozzle of nominal size 12 in accordance with DIN 40 053 part 4.</i>
	7 = protected from the effects of temporary immersion. <i>* Enclosure is completely immersed in water and the following conditions must be met: a) water must be at least 150 mm over the highest point of the enclosure b) lowest part of the enclosure must be at least 1 m below the surface c) test must last for at least 30 minutes d) water temperature must not deviate by more than 5°C; Water must not enter in harmful quantities.</i>
	8 = protected from the effects of continuous immersion <i>* Test conditions have to be agreed to by the manufacturer and the customer but can not be less stringent than those described in 7 above.</i>
	9K = protected from the effects of high pressure steam cleaning per DIN 40050 part 9

Note:

This standard does not specify degree of protection of electrical against mechanical damage, against the risk of explosion or against conditions such as moisture (produced for example by condensation), corrosive vapors, fungus or vermin.

Quality and the environment

Quality management system as per DIN EN ISO 9001:2008

Balluff companies	
Balluff GmbH	Germany
Balluff SIE Sensorik GmbH	Germany
Balluff Controles Eléctricos Ltda.	Brazil
Balluff Sensors (Chengdu) Co., Ltd.	China
Balluff Ltd.	Great Britain
Balluff Automation S.R.L.	Italy
Balluff Canada Inc.	Canada
Balluff de México S.A. de C.V.	Mexico
Balluff GmbH	Austria
Balluff Sp. z o.o.	Poland
Balluff Hy-Tech AG	Switzerland
Balluff Sensortechnik AG	Switzerland
Balluff S.L.	Spain
Balluff CZ, s.r.o	Czech Republic
Balluff Elektronika Kft.	Hungary
Balluff Inc.	USA



Environmental management system as per DIN EN ISO 14001:2009

Balluff companies	
Balluff GmbH	Germany
Balluff Sensors (Chengdu) Co., Ltd.	China
Balluff Elektronika KFT	Hungary

Testing laboratory

The Balluff testing laboratory operates in accordance with ISO/IEC 17025 and is accredited by DAkkS for testing electromagnetic compatibility (EMC).



Balluff products comply with EU directives

Products that require labeling are subject to a conformity evaluation process according to the EU directive and the product is labeled with the CE marking.

Balluff products fall under the following EU directive:

2004/108/EC	EMC directive
2006/95/EC	Low Voltage Directive valid for products with supply voltage $\geq 75 \text{ V DC} / \geq 50 \text{ V AC}$
94/9/EC	ATEX-directive valid for products with Ex-label



Product approvals

Product approvals are awarded by domestic and international institutions. Their symbols affirm that our products meet the specifications of these institutions.

"US Safety System" and "Canadian Standards Association" under the auspices of Underwriters Laboratories Inc. (cUL).

CCC-Code by the Chinese CQC.



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Degree of protection (enclosure rating)

IP 60...67

EN 60529/IEC 60529

IP 68 per BWN Pr. 20

Balluff Factory Standard (BWN):
Temperature storage 48 h at 60 °C,
8 temperature cycles per EN 60068-
2-14/IEC 60068-2-14 between the
reference temperatures as per data
sheet, 1 h under water,

IP 68 per BWN Pr. 27

Balluff Factory Standard (BWN):
Product testing for DIN 40050
Part 9

24 h under water, isolation testing, 8
temperature cycles per EN 60068-
2-14/IEC 60068-2-14 between the
reference temperatures as per data
sheet, 7 days under water, insulation
test.

IP 69K

Testing of products for use in the
food industry.

Protection against infiltration of water
under high pressure and steam
cleaning.



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EMC (Electromagnetic Compatibility)

Emissions, RF noise voltage and RF noise radiation from electrical equipment	EN 55011
Static discharge immunity (ESD)	EN 61000-4-2/IEC 61000-4-2
Radio frequency immunity (RFI)	EN 61000-4-3/IEC 61000-4-3
Immunity to fast transients (burst)	EN 61000-4-4/IEC 61000-4-4
Immunity to line-carried noise induced by high-frequency fields	EN 61000-4-6/IEC 61000-4-6
Immunity to voltage dips and voltage interruptions	EN 61000-4-11/IEC 61000-4-11
Surge-voltage stability	EN 60947-5-2/IEC 60947-5-2

Environmental simulation

Vibration, sinusoidal:	EN 60068-2-6/IEC 60068-2-6
Shock	EN 60068-2-27/IEC 60068-2-27
Continuous shock	EN 60068-2-29/IEC 60068-2-29

Ex-zone

Electrical equipment for explosive atmospheres, general requirements. Succeeded by:	EN 50014
Electrical equipment for gas explosive atmospheres, general requirements.	EN 60079-0
Electrical equipment for explosive atmospheres, intrinsically-safe "i".	EN 50020
For conformity, see product marking.	

FMS approval for select sensors and sensing amplifiers

FMS: Factory Mutual System.
Factory Mutual Research Corp. (FMRC) researches, tests and creates standards designed to prevent property loss through fire or other hazards. The FMS logo and the "APPROVED" approbation indicate that the manufacturer's product meets the current FM requirements for this product class.
J.I. OR1HO.AX and
J.I. 4V9A4.AX.



Insulation class

II	EN 60947-5-2/IEC 60947-5-2
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Sensors

Low-voltage equipment	EN 60947-5-2/IEC 60947-5-2
NAMUR sensors	EN 60947-5-6/IEC 60947-5-6



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Fractions	Decimals	mm	Fractions	Decimals	mm	Fractions	Decimals	mm
—	.0004	.01	29/64	.4531	11.509	1 1/32	1.0312	26.194
—	.004	.10	15/32	.46875	11.906	1 1/16	1.062	26.988
—	.01	.25	—	.4724	12	—	1.063	27
1/64	.0156	.397	31/64	.48437	12.303	1 3/32	1.094	27.781
—	.0197	.50	—	.492	12.5	—	1.1024	28
—	.0295	.75	1/2	.500	12.700	1 1/8	1.125	28.575
1/32	.03125	.794	—	.5118	13	—	1.1417	29
—	.0394	1	33/64	.5156	13.097	1 5/32	1.156	29.369
3/64	.0469	1.191	17/32	.53125	13.494	—	1.1811	30
—	.059	1.5	35/64	.54687	13.891	1 3/16	1.1875	30.163
1/16	.0625	1.588	—	.5512	14	1 7/32	1.219	30.956
5/64	.0781	1.984	9/16	.5625	14.288	—	1.2205	31
—	.0787	2	—	.571	14.5	1 1/4	1.250	31.750
3/32	.094	2.381	37/64	.57812	14.684	—	1.2598	32
—	.0984	2.5	—	.5906	15	1 9/32	1.281	32.544
7/64	.1093	2.776	19/32	.59375	15.081	—	1.2992	33
—	.1181	3	39/64	.60937	15.478	1 5/16	1.312	33.338
1/8	.1250	3.175	5/8	.6250	15.875	—	1.3386	34
—	.1378	3.5	—	.6299	16	1 11/32	1.344	34.131
9/64	.1406	3.572	41/64	.6406	16.272	1 3/8	1.375	34.925
5/32	.15625	3.969	—	.6496	16.5	—	1.3779	35
—	.1575	4	21/32	.65625	16.669	1 13/32	1.406	35.719
11/64	.17187	4.366	—	.6693	17	—	1.4173	36
—	.177	4.5	43/64	.67187	17.066	1 7/16	1.438	36.513
3/16	.1875	4.763	11/16	.6875	17.463	—	1.4567	37
—	.1969	5	45/64	.7031	17.859	1 15/32	1.469	37.306
13/64	.2031	5.159	—	.7087	18	—	1.4961	38
—	.2165	5.5	23/32	.71875	18.256	1 1/2	1.500	38.100
7/32	.21875	5.556	—	.7283	18.5	1 17/32	1.531	38.894
15/64	.23437	5.953	47/64	.73437	18.653	—	1.5354	39
—	.2362	6	—	.7480	19	1 9/16	1.562	39.688
1/4	.2500	6.350	3/4	.7500	19.050	—	1.5748	40
—	.2559	6.5	49/64	.7656	19.447	1 19/32	1.594	40.481
17/64	.2656	6.747	25/32	.78125	19.844	—	1.6142	41
—	.2756	7	—	.7874	20	1 5/8	1.625	41.275
9/32	.28125	7.144	51/64	.79687	20.241	—	1.6535	42
—	.2953	7.5	13/16	.8125	20.638	1 21/32	1.6562	42.069
19/64	.29687	7.541	—	.8268	21	1 11/16	1.6875	42.863
5/16	.3125	7.938	53/64	.8281	21.034	—	1.6929	43
—	.3150	8	27/32	.84375	21.431	1 23/32	1.719	43.656
21/64	.3281	8.334	55/64	.85937	21.828	—	1.7323	44
—	.335	8.5	—	.8662	22	1 3/4	1.750	44.450
11/32	.34375	8.731	7/8	.8750	22.225	—	1.7717	45
—	.3543	9	57/64	.8906	22.622	1 25/32	1.781	45.244
23/64	.35937	9.128	—	.9055	23	—	1.8110	46
—	.374	9.5	29/32	.90625	23.019	1 13/16	1.8125	46.038
3/8	.3750	9.525	59/64	.92187	23.416	1 27/32	1.844	46.831
25/64	.3906	9.922	15/16	.9375	23.813	—	1.8504	47
—	.3937	10	—	.9449	24	1 7/8	1.875	47.625
13/32	.4062	10.319	61/64	.9531	24.209	—	1.8898	48
—	.413	10.5	31/32	.96875	24.606	1 29/32	1.9062	48.419
27/64	.42187	10.716	—	.9843	25	—	1.9291	49
—	.4331	11	1	1.000	25.4	1 15/16	1.9375	49.213
7/16	.4375	11.113	—	1.0236	26	—	1.9685	50

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Inches			Inches			Inches		
Fractions	Decimals	mm	Fractions	Decimals	mm	Fractions	Decimals	mm
1 31/32	1.969	50.006	—	3.2677	83	—	5.9055	150
2	2.000	50.800	—	3.3071	84	6	6.000	152.400
—	2.0079	51	3 5/16	3.312	84.1377	6 1/4	6.250	158.750
—	2.0472	52	—	3.3464	85	—	6.2992	160
2 1/16	2.062	52.388	3 3/8	3.375	85.725	6 1/2	6.500	165.100
—	2.0866	53	—	3.3858	86	—	6.6929	170
2 1/8	2.125	53.975	—	3.4252	87	6 3/4	6.750	171.450
—	2.126	54	3 7/16	3.438	87.313	7	7.000	177.800
—	2.165	55	—	3.4646	88	—	7.0866	180
2 3/16	2.1875	55.563	3 1/2	3.500	88.900	—	7.4803	190
—	2.2047	56	—	3.5039	89	7 1/2	7.500	190.500
—	2.244	57	—	3.5433	90	—	7.8740	200
2 1/4	2.250	57.150	3 9/16	3.562	90.4877	8	8.000	203.200
—	2.2835	58	—	3.5827	91	—	8.2677	210
2 5/16	2.312	58.738	—	3.622	92	8 1/2	8.500	215.900
—	2.3228	59	3 5/8	3.625	92.075	—	8.6614	220
—	2.3622	60	—	3.6614	93	9	9.000	228.600
2 3/8	2.375	60.325	3 11/16	3.6875	93.663	—	9.0551	230
—	2.4016	61	—	3.7008	94	—	9.4488	240
2 7/16	2.438	61.913	—	3.7401	95	9 1/2	9.500	241.300
—	2.4409	62	3 3/4	3.750	95.250	—	9.8425	250
—	2.4803	63	—	3.7795	96	10	10.000	254.000
2 1/2	2.500	63.500	3 13/16	3.8125	96.838	—	10.2362	260
—	2.5197	64	—	3.8189	97	—	10.6299	270
—	2.559	65	—	3.8583	98	11	11.000	279.400
2 9/16	2.562	65.088	3 7/8	3.875	98.425	—	11.0236	280
—	2.5984	66	—	3.8976	99	—	11.4173	290
2 5/8	2.625	66.675	—	3.9370	100	—	11.8110	300
—	2.638	67	3 15/16	3.9375	100.013	12	12.000	304.800
—	2.6772	68	—	3.9764	101	13	13.000	330.200
2 11/16	2.6875	68.263	4	4.000	101.600	—	13.7795	350
—	2.7165	69	4 1/16	4.062	103.188	14	14.000	355.600
2 3/4	2.750	69.850	4 1/8	4.125	104.775	15	15.000	381
—	2.7559	70	—	4.1338	105	—	15.7480	400
—	2.7953	71	4 3/16	4.1875	106.363	16	16.000	406.400
2 13/16	2.8125	71.438	4 1/4	4.250	107.950	17	17.000	431.800
—	2.8346	72	4 5/16	4.312	109.538	—	17.7165	450
—	2.8740	73	—	4.3307	110	18	18.000	457.200
2 7/8	2.875	73.025	4 3/8	4.375	111.125	19	19.000	482.600
—	2.9134	74	4 7/16	4.438	112.713	—	19.6850	500
2 15/16	2.9375	74.613	4 1/2	4.500	114.300	20	20.000	508
—	2.9527	75	—	4.5275	115	21	21.000	533.400
—	2.9921	76	4 9/16	4.562	115.888	22	22.000	558.800
3	3.000	76.200	4 5/8	4.625	117.475	23	23.000	584.200
—	3.0315	77	—	4.7244	120	24	24.000	609.600
3 1/16	3.062	77.788	4 3/4	4.750	120.650	25	25.000	635.000
—	3.0709	78	4 7/8	4.875	123.825	26	26.000	660.400
—	3.1102	79	—	4.9212	125	27	27.000	685.800
3 1/8	3.125	79.375	5	5.000	127	28	28.000	711.200
—	3.1496	80	—	5.1181	130	29	29.000	736.600
3 3/16	3.1875	80.963	5 1/4	5.250	133.350	30	30.000	762.000
—	3.1890	81	5 1/2	5.500	139.700	31	31.000	787.400
—	3.2283	82	—	5.5118	140	32	32.000	812.800
3 1/4	3.250	82.550	5 3/4	5.750	146.050	33	33.000	838.200



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Length

Inches (") to Millimeters (mm) $\text{mm} = \text{in} \times 25.4$

Inches	mm	Inches	mm	Inches	mm	Inches	mm
0.001	0.0254	1/8	3.175	10	254.0	22	558.8
0.005	0.127	1/4	6.350	11	279.4	23	584.2
0.010	0.254	1/2	12.700	12	304.8	24	609.6
0.015	0.381	3/4	19.050	13	330.2	25	635.0
0.020	0.508	1	25.4	14	355.6	26	660.4
0.030	0.762	2	50.8	15	381.0	27	685.8
0.040	1.016	3	76.2	16	406.4	28	711.2
0.050	1.270	4	101.6	17	431.8	29	736.6
0.060	1.524	5	127.0	18	457.2	30	762.0
0.070	1.778	6	152.4	19	482.6	40	1016.0
0.080	2.032	7	177.8	20	508.0	50	1270.0
0.090	2.286	8	203.2	21	533.4		
		9	228.6				

Microinches (μ") to Micrometers (μm)

μ"	μm	μ"	μm	μ"	μm	μ"	μm
1	0.0254	5	0.127	40	1.016	300	7.62
2	0.0508	10	0.254	50	1.270	400	10.16
3	0.0762	20	0.508	100	2.540	500	12.70
4	0.1016	30	0.762	200	5.080	1000	25.40

Pressure

Pounds per Square Inch (psi) to Kilopascal (kPa) and bar $1 \text{ psi} = 0.0691 \text{ bar}$ $1 \text{ bar} = 14.47 \text{ psi}$

psi	kPa	bar	psi	kPa	bar	psi	kPa	bar	psi	kPa	bar
1	6.90	0.0691	5	34.48	0.346	40	275.80	2.758	300	2068.50	20.685
2	13.79	0.138	10	68.95	0.690	50	344.80	3.448	400	2758.00	27.580
3	20.69	0.207	20	137.90	1.379	100	689.50	6.895	500	3447.50	34.475
4	27.58	0.276	30	206.85	2.069	200	1378.95	13.790	1000	6895.00	68.950

Temperature

Fahrenheit (°F) to Celcius (°C) $^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$ (Values for °C are rounded off)

F°	C°	F°	C°	F°	C°	F°	C°
-40	-40	30	-1	100	38	170	77
-30	-34	40	4	110	43	180	82
-20	-29	50	10	120	49	190	88
-10	-23	60	16	130	54	200	93
0	-18	70	21	140	60	210	99
10	-12	80	27	150	66	220	104
20	-7	90	32	160	71	230	110



Basic Information and Definitions

Metric to US measures conversion tables

Length

Millimeters (mm) to Inches (") $\text{in} = \text{mm} \times 0.03937$

mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches
0.1000	0.004	1	0.039	6	0.236	20	0.787	200	7.874
0.2000	0.008	2	0.079	7	0.276	30	1.181	300	11.811
0.3000	0.012	3	0.118	8	0.315	40	1.575	400	15.748
0.400	0.016	4	0.157	9	0.354	50	1.969	500	19.685
0.500	0.020	5	0.197	10	0.394	100	3.937	1000	39.37

Micrometers (μm) to Microinches (μ")

μ m	μ"	μ m	μ"	μ m	μ"	μ m	μ"	μ m	μ"
0.1	3.937	0.5	19.69	4	157.5	8	315.0	40	1575
0.2	7.874	1	39.37	5	196.9	9	354.3	50	1969
0.3	11.811	2	78.74	6	236.2	10	394	100	3937
0.4	15.75	3	118.0	7	275.6	20	787		
						30	1181		

Pressure

Kilopascal (kPa) to Pounds per Square Inch (psi)

kPa	psi	kPa	psi	kPa	psi	kPa	psi	kPa	psi
1	0.145	10	1.45	50	7.25	400	58.0	3000	435
2	0.290	20	2.90	100	14.50	500	72.5	4000	580
3	0.435	30	4.35	200	29.0	1000	145.0	5000	725
4	0.580	40	5.80	300	43.5	2000	290	10000	1450
5	0.725								



Basic information
Inductive sensors
Photoelectric sensors
Capacitive sensors
Magnetic cylinder sensors
Cables
Materials
IEC Standards
Quality/Standards
Conversion Tables

Temperature

Celsius (°C) to Fahrenheit (°F) $^{\circ}\text{F} = 9/5 (^{\circ}\text{C}) + 32^{\circ}$

C°	F°	C°	F°	C°	F°	C°	F°	C°	F°	C°	F°
-15	5	5	41	25	77	45	113	65	149	85	185
-10	14	10	50	30	86	50	122	70	158	90	194
-5	23	15	59	35	95	55	131	75	167	95	203
0	32	20	68	40	104	60	140	80	176	100	212



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BAE SA-CS-001-NO	BAE009J	841	BAW M12MD-UAC40F-S04G	BAW000Z	724	BCC 0000-0000-00-072-VX44W6-10X	BCC0AEH	940
BAE SA-CS-001-NS	BAE009H	841	BAW M12ME-UAC20B-S04G	BAW0010	723	BCC A233-0000-10-000-41X3W8-000	BCC08AU	950
BAE SA-CS-001-PO	BAE009F	841	BAW M12ME-UAD50B-BP01	BAW0011	723	BCC A233-0000-20-000-41X3W8-000	BCC08AY	950
BAE SA-CS-001-PS	BAE009E	841	BAW M12MF2-UAC40F-BP00,2-GS04	BAW0014	724	BCC A243-0000-10-000-41X3W8-000	BCC08AW	950
BAE SA-CS-002-YP	BAE009P	842	BAW M12MF2-UAC40F-BP03	BAW0017	724	BCC A243-0000-20-000-41X3W8-000	BCC08AZ	950
BAE SA-CS-003-YP	BAE009R	843	BAW M12MG2-IAC20B-BP00,2-GS04	BAW0019	723	BCC A313-0000-10-071-VX43W6-___	N/A	940
BAE SA-CS-004-XR	BAE009T	845	BAW M12MG2-IAC20B-BP03	BAW001C	723	BCC A313-M413-3E-RA031-000	BCC0A7E	941
BAE SA-CS-005-XR	BAE009U	845	BAW M12MG2-ICC20B-BP00,2-GS04	BAW001F	721	BCC A314-0000-10-003-_X44W6-___	N/A	940
BAE SA-CS-006-XR	BAE009K	844	BAW M12MG2-ICC20B-BP03	BAW001H	722	BCC A314-0000-10-072-VX44W6-___	N/A	940
BAE SA-CS-007-XR	BAE009L	844	BAW M12MG2-UAC20B-BP00,2-GS04	BAW001J	722	BCC A314-M414-3E-RA032-000	BCC0A7F	941
BAE SA-XE-010-XR	BAE009W	846	BAW M12MG2-UAC20B-BP03	BAW001L	723	BCC A315-0000-10-063-VX45W6-___	N/A	940
BAE SA-XE-011-XR	BAE009Y	846	BAW M12MH1-ICC40F-S04G	BAW003N	725	BCC A315-M415-3E-RA033-000	BCC0A7H	941
BAE SA-XE-012-XR	BAE009Z	847	BAW M12MI-UAC20B-S04G	BAW001P	722	BCC A323-0000-10-071-VX43W6-___	N/A	940
BAE SA-XE-013-XR	BAE00A0	847	BAW M18ME-ICC50B-BP03	BAW001T	727	BCC A324-0000-10-003-_X44W6-___	N/A	940
BAM			BAW M18ME-ICC50B-S04G	BAW001U	727	BCC A324-0000-10-072-VX44W6-___	N/A	940
BAM AD-XA-001-M18/M30-4	BAM018E	848	BAW M18ME-UAC50B-BP00,2-GS04	BAW001Z	725	BCC A325-0000-10-063-VX45W6-___	N/A	940
BAM AD-XA-001-M18/M32x1,5-4	BAM018F	848	BAW M18ME-UAC50B-BP03	BAW0022	726	BCC A333-0000-10-000-71X3A5-000	BCC0ATA	950
BAM AD-XA-001-M18/R1"-4	BAM018H	848	BAW M18ME-UAC50B-S04G	BAW0025	725	BCC A333-0000-20-000-71X3A5-000	BCC0ATE	950
BAM AD-XA-002-M12/G1/2"-4	BAM018K	848	BAW M18ME-UAE50B-S04G-K	BAW0026	725	BCC A334-0000-10-000-71X4A5-000	BCC0708	950
BAM AD-XA-002-M12/M18-4	BAM018J	848	BAW M18MG-UAC16F-S04G-K	BAW0029	728	BCC A334-0000-20-000-71X4A5-000	BCC070C	950
BAM CC-XA-025-C03-P	BAM01EC	910	BAW M18MG-UAC80F-S04G	BAW002C	728	BCC A335-0000-10-000-81X5A5-000	BCC0ATH	950
BAM CC-XA-028-T05-P	BAM01EA	910	BAW M18MI2-UAC50B-BP05-002	BAW002M	726	BCC A335-0000-20-000-81X5A5-000	BCC0ATF	950
BAM FS-XE-001-M5-4	BAM01AZ	753	BAW M18MI-BLC50B-S04G	BAW002F	727	BCC M313-0000-10-001-EX43T2-___	N/A	927
BAM FS-XE-002-D4-4	BAM01C0	752	BAW M18MI-ICC50B-S04G	BAW002H	727	BCC M313-0000-10-036-_S_334-___	N/A	927
BAM FS-XE-003-M5-4	BAM019Y	753	BAW M18MI-UAC50B-S04G	BAW002J	727	BCC M313-M313-30-300-_X43T2-___	N/A	928
BAM FS-XE-004-M8-4	BAM019W	753	BAW M18MM-UAZ50B-BP05-505	BAW002K	725	BCC M313-M313-M313-U2017-003	BCC0A07	939
BAM LS-FO-001-M6-L	BAM01PA	462	BAW M30ME-UAC10B-S04G	BAW002U	726	BCC M313-M323-30-300-_X43T2-___	N/A	929
BAM LS-FO-002-F	BAM01U2	462	BAW M30ME-UAC15F-S04G	BAW002W	728	BCC M313-M413-3E-300-_X43T2-___	N/A	928
BAM MB-X0-005-B04-4	BAM01E8	431	BAW MKK-050.19-S4	BAW002Y	729	BCC M313-M423-3E-300-_X43T2-___	N/A	929
BAM MB-X0-006-B05-4	BAM01FK	430	BAW MKZ-471.19-S4	BAW003K	734	BCC M314-0000-10-003-EX44T2-___	N/A	927
BAM MB-X0-007-B05-4	BAM01FM	430	BAW R03KC-UAE40B-BP00,3-GS26	BAW003M	729	BCC M314-0000-10-014-_S_434-___	N/A	927
BAM PC-X0-005-08M-4	BAM01Y5	458	BAW R03KC-UAE40B-BP00,3-GS49	BAW0030	731	BCC M314-M313-M313-U2024-___	N/A	939
BAM PC-X0-005-18M-4	BAM01NC	459	BAW R03KC-UAE40B-BP03	BAW0031	731	BCC M314-M314-30-304-_X44T2-___	N/A	928
BAM PC-X0-006-23K-1	BAM01L8	455	BAW R06AC-UAF20B-EP03	BAW0032	732	BCC M314-M324-30-304-_X44T2-___	N/A	928
BAM PC-X0-006-50K-1	BAM01U6	455	BAW R06AC-UAF20B-S49G	BAW0033	733	BCC M314-M414-3E-304-_X44T2-___	N/A	928
BAM TG-MF-006	BAM01EJ	903	BAW Z01AC-BLD50B-DP03	BAW0034	732	BCC M314-M424-3E-304-_X44T2-___	N/A	929
BAM TG-MF-007	BAM01EK	903	BAW Z01AC-UAD50B-DP03-K	BAW003A	733	BCC M323-0000-10-001-_X43T2-___	N/A	927
BAM TG-MF-008	BAM01EL	903	BAW Z05AC-BLD50B-BP00,75-GS04	BAW003E	733	BCC M323-0000-10-004-_X43T2-___	N/A	927
BAM TG-MF-009	BAM01EM	903	BAW Z08EO-UAD20B-S04G-H11	BAW003W	733	BCC M323-0000-10-006-_X43T2-___	N/A	927
BAM TO-CC-001-A3-1,5/24,0	BAM00ZN	951		BAW0040	730	BCC M323-0000-10-036-_S_334-___	N/A	927
BAM TO-CC-001-M3-0,4/8,0	BAM00ZL	951	BCC			BCC M323-M313-30-300-_X43T2-___	N/A	928
BAM TO-CC-001-M4-0,6/12,0	BAM00ZM	951	BCC 0000-0000-00-001-EX43T2-10X	BCC0AEC	925	BCC M323-M313-30-602-_X43T2-___	N/A	928
BAW			BCC 0000-0000-00-001-PX43T2-10X	BCC0AE9	925	BCC M323-M313-30-603-_X43T2-___	N/A	928
BAW G06EE-UAF20B-EP03-K	BAW000J	720	BCC 0000-0000-00-001-VX43T2-10X	BCC0AE7	925	BCC M323-M323-30-300-_X43T2-___	N/A	929
BAW G06EF-UAC20B-S49G	BAW000L	720	BCC 0000-0000-00-003-EX44T2-10X	BCC0AEE	925	BCC M323-M323-30-602-_X43T2-___	N/A	929
BAW M08EF-UAC15B-S49G	BAW000M	721	BCC 0000-0000-00-003-EX44W6-10X	BCC0APC	940	BCC M323-M323-30-603-_X43T2-___	N/A	929
BAW M08EH-UAD15B-S04G	BAW003R	721	BCC 0000-0000-00-003-PX44T2-10X	BCC0AEA	925	BCC M323-M413-3E-300-_X43T2-___	N/A	928
BAW M08EI-UAD15B-BP00,2-GS04	BAW000N	720	BCC 0000-0000-00-003-VX44T2-10X	BCC0AE8	925	BCC M323-M413-3E-602-_X43T2-___	N/A	928
BAW M08EI-UAD15B-BP03	BAW000T	721	BCC 0000-0000-00-003-VX44W6-10X	BCC0AEJ	940	BCC M323-M413-3E-603-_X43T2-___	N/A	928
			BCC 0000-0000-00-063-VX45W6-10X	BCC0AEK	940	BCC M323-M423-3E-300-_X43T2-___	N/A	929
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BCC M324-M324-30-304-_X44T2-___	N/A	929	BCC M415-M314-3F-607-_X44T2-___	N/A	934	BCC M425-M313-3F-603-_X43T2-___	N/A	935
BCC M324-M414-3E-304-_X44T2-___	N/A	928	BCC M415-M323-3F-300-_X43T2-___	N/A	935	BCC M425-M314-3F-304-_X44T2-___	N/A	935
BCC M324-M424-3E-304-_X44T2-___	N/A	929	BCC M415-M323-3F-602-_X43T2-___	N/A	935	BCC M425-M314-3F-606-_X44T2-___	N/A	935
BCC M333-0000-10-000-22X334-000	BCC09EU	944	BCC M415-M323-3F-603-_X43T2-___	N/A	935	BCC M425-M314-3F-607-_X44T2-___	N/A	935
BCC M333-0000-10-000-31X350-000	BCC06Z1	944	BCC M415-M324-3F-304-_X44T2-___	N/A	935	BCC M425-M314-3F-650-_X44T2-___	N/A	935
BCC M333-0000-10-000-34X325-000	BCC06YW	945	BCC M415-M324-3F-606-_X44T2-___	N/A	935	BCC M425-M323-3F-300-_X43T2-___	N/A	935
BCC M333-0000-20-000-22X334-000	BCC09EW	944	BCC M415-M324-3F-607-_X44T2-___	N/A	935	BCC M425-M323-3F-602-_X43T2-___	N/A	935
BCC M333-0000-20-000-31X350-000-C027	BCC0E7N	944	BCC M415-M413-3A-300-_X43T2-___	N/A	932	BCC M425-M323-3F-603-_X43T2-___	N/A	935
BCC M333-0000-20-000-34X325-000	BCC06YZ	945	BCC M415-M413-3A-602-_X43T2-___	N/A	932	BCC M425-M324-3F-304-_X44T2-___	N/A	935
BCC M334-0000-10-000-22X434-000	BCC09EY	944	BCC M415-M413-3A-603-_X43T2-___	N/A	932	BCC M425-M324-3F-606-_X44T2-___	N/A	935
BCC M334-0000-10-000-31X450-000	BCC06Z5	944	BCC M415-M414-3A-304-_X44T2-___	N/A	932	BCC M425-M324-3F-607-_X44T2-___	N/A	935
BCC M334-0000-20-000-22X434-000	BCC09EZ	944	BCC M415-M414-3A-606-_X44T2-___	N/A	932	BCC M425-M324-3F-650-_X44T2-___	N/A	935
BCC M334-0000-20-000-31X450-000	BCC06Z7	944	BCC M415-M414-3A-607-_X44T2-___	N/A	932	BCC M425-M413-3A-300-_X43T2-___	N/A	933
BCC M343-0000-10-000-34X325-000	BCC06YY	945	BCC M415-M415-3A-312-PX0534-___	N/A	936	BCC M425-M413-3A-602-_X43T2-___	N/A	933
BCC M343-0000-20-000-34X325-000	BCC06Z0	945	BCC M415-M415-3A-313-PX0534-___	N/A	936	BCC M425-M413-3A-603-_X43T2-___	N/A	933
BCC M4_8-0000-1A-044-PX0825-___	N/A	942	BCC M415-M415-M415-U0003-000	BCC089P	939	BCC M425-M414-3A-304-_X44T2-___	N/A	933
BCC M4_C-0000-1A-049-PX0C25-___	N/A	942	BCC M415-M415-M415-U0016-000	BCC09MU	939	BCC M425-M414-3A-606-_X44T2-___	N/A	933
BCC M414-0000-0000-U2009-___	N/A	938	BCC M415-M423-3A-300-_X43T2-___	N/A	933	BCC M425-M414-3A-607-_X44T2-___	N/A	933
BCC M414-M313-M313-U2012-___	N/A	938	BCC M415-M423-3A-302-_X43T2-___	N/A	933	BCC M425-M414-3A-650-_X44T2-___	N/A	933
BCC M414-M323-M323-U2012-___	N/A	938	BCC M415-M423-3A-602-_X43T2-___	N/A	933	BCC M425-M414-3A-651-_X44T2-___	N/A	933
BCC M414-M415-M415-U2002-___	N/A	938	BCC M415-M423-3A-603-_X43T2-___	N/A	933	BCC M425-M415-3A-312-PX0534-___	N/A	936
BCC M414-M415-M415-U2010-___	N/A	938	BCC M415-M424-3A-304-_X44T2-___	N/A	933	BCC M425-M415-3A-313-PX0534-___	N/A	936
BCC M414-M415-M415-U2011-___	N/A	939	BCC M415-M424-3A-306-_X44T2-___	N/A	933	BCC M425-M415-3A-660-PX0534-___	N/A	936
BCC M414-M415-M415-U2018-002	BCC0A0J	938	BCC M415-M424-3A-606-_X44T2-___	N/A	933	BCC M425-M415-3A-661-PX0534-___	N/A	936
BCC M414-M425-M425-U2002-___	N/A	939	BCC M415-M424-3A-607-_X44T2-___	N/A	933	BCC M425-M423-3A-300-_X43T2-___	N/A	933
BCC M414-M425-M425-U2010-___	N/A	939	BCC M418-0000-1A-044-PX0825-___	N/A	936	BCC M425-M423-3A-302-_X43T2-___	N/A	933
BCC M414-M425-M425-U2011-___	N/A	939	BCC M418-0000-1A-044-PX0825-___	N/A	942	BCC M425-M423-3A-602-_X43T2-___	N/A	933
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BCC M415-0000-1A-002-_X43T2-___	N/A	931	BCC M418-M418-3A-342-PX0825-___	N/A	936	BCC M425-M424-3A-304-_X44T2-___	N/A	933
BCC M415-0000-1A-003-_X44T2-___	N/A	931	BCC M41C-0000-1A-049-_X_C25-___	N/A	936	BCC M425-M424-3A-306-_X44T2-___	N/A	933
BCC M415-0000-1A-004-_X43T2-___	N/A	931	BCC M41C-0000-1A-049-PX0C25-___	N/A	942	BCC M425-M424-3A-606-_X44T2-___	N/A	933
BCC M415-0000-1A-005-_X43T2-___	N/A	931	BCC M41C-M41C-3A-325-PX0C25-___	N/A	936	BCC M425-M424-3A-607-_X44T2-___	N/A	933
BCC M415-0000-1A-006-_X43T2-___	N/A	931	BCC M425-0000-1A-001-_X43T2-___	N/A	931	BCC M425-M424-3A-650-_X44T2-___	N/A	933
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BCS M18B4H1-POC15H-EP02	BCS00M9	805	BCS M18VVN-PSCFAG-S49G	BCS008T	815	BCS M30TTH2-POCFAG-AT02	BCS0087	816
BCS M18B4H1-PSC15H-EP02	BCS00M7	805	BCS M30B4E1-NOC25H-EP02	BCS00N9	807	BCS M30TTH2-PSC30G-AT02	BCS0077	808
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BCS M18B4I3-POC80D-S04K	BCS00M4	791	BCS M30B4E1-PSC25H-EP02	BCS00N6	807	BCS Q40BBAA-GPCFAC-EP02	BCS00TP	825
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BES 517-140-M4-H-S4	BES020T	589	BES G06EA-NSD15B-S49G	BES025F	504	BES IKO-S5-100-W-4-S	BES02T5	705
BES 517-140-M5-H	BES020U	590	BES G06EA-POC15B-EP02	BES025H	506	BES IKRD-K-050-N-1-S	BES02T6	706
BES 517-140-M5-H-S4	BES020W	591	BES G06EA-POD15B-S49G	BES025J	504	BES IKRD-K-050-P-1-O	BES02T7	706
BES 517-223-M3-E	BES020Y	627	BES G06EA-POD20B-S49G	BES025K	507	BES IKRD-K-050-P-1-S	BES02T8	706
BES 517-223-U3-E-S21	BES0242	627	BES G06EA-PSC15B-EP02	BES025M	506	BES IKU-011.23-G-S4-SA2	BES02TE	707
BES 517-223-U3-E-S5	BES0243	627	BES G06EA-PSD15B-S49G	BES025N	504	BES IKU-011-P-1-S-S4-SA1	BES02TC	707
BES 517-223-U4-E-S21	BES0245	628	BES G06EB-NOC40F-S49G	BES0002	503	BES IKU-011T.28-G-S4	BES02TF	709
BES 517-223-U4-E-S5	BES0246	628	BES G06EB-NSC40F-S49G	BES0003	503	BES IKU-015.05-G-S5-SA1	BES02TJ	711
BES 517-223-U5-E-S21	BES0248	629	BES G06EB-POC40F-S49G	BES0004	503	BES IKU-015.23-G-S4-SA1	BES02TK	707
BES 517-223-U5-E-S5	BES0249	629	BES G06EB-PSC40F-S49G	BES0005	503	BES IKU-015-23-G-S4	BES02TH	707
BES 517-223-U7-EL-S21	BES024C	629	BES G06ED-NOC40F-BV02	BES0007	503	BES IKU-031.28-S4	BES02TN	709
BES 517-224-M5-E	BES024F	631	BES G06ED-NSC40F-BV02	BES0009	503	BES IKV-025.23-G-Z-S4	BES02TW	713
BES 517-224-M5-E-S21	BES023C	631	BES G06ED-POC40F-BV02	BES000C	503	BES IKV-045.23-G-Z-S4	BES02TY	713
BES 517-224-U5-E-S5	BES01ZJ	631	BES G06ED-PSC40F-BV02	BES000F	503	BES IKV-K-010-P0-1-Y	BES02U0	712
BES 517-351-N0-C-02	BES01ML	568	BES G06EE-NOC20B-S49G-003	BES03T0	503	BES IKV-K-010-PS-1-Y	BES02U1	712
BES 517-351-N0-C-S49-00.2	BES01MT	568	BES G06EE-NSC20B-S49G-003	BES03RZ	503	BES IKV-K-025-NS-1-Y	BES02U2	713
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BES 517-398-N0-C-02	BES01N4	568	BES G06EE-PSC20B-S49G-003	BES03R9	503	BES IKV-K-025-PS-1-Y	BES02U4	713
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BES 517-460-U5-L-D-S5	BES022U	639	BES G06EH-NSC40F-S49G	BES03T2	503	BES IKVS-015.23-G-S4	BES03JC	711
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BES G04EC-NOC08B-S26G	BES011W	494	BES G06EH-POC40F-S49G	BES03T1	503	BES IKV-S4-010-NS-1-Y-TD	BES02U8	712
BES G04EC-NSC08B-S26G	BES011Y	494	BES G06EH-PSC20B-S49G	BES03P4	503	BES IKV-S4-010-PS-1-Y	BES02U9	712
BES G04EC-POC08B-S26G	BES0120	494	BES G06EH-PSC40F-S49G	BES03P5	503	BES IKV-S4-025-NS-1-Y-TD	BES02UE	713
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BES M05ED-NSC50F-S26G	BES0136	499	BES M08ED-PSC25F-S04G	BES01P3	527	BES M08EF-PSC20B-BP00,3-GS49	BES03TU	523
BES M05ED-NSD08B-BP00,3-GS49-R03	BES03LF	645	BES M08ED-PSC40F-BV02	BES000Z	480	BES M08EF-PSC20B-BP02	BES014L	524
BES M05ED-NSD08B-BP02-R03	BES03L9	645	BES M08EE-NOC15B-S04G	BES013R	515	BES M08EF-PSC20B-BP02-003	BES00CW	479
BES M05ED-POC08B-BP00,3-GS49-R01	BES03K9	643	BES M08EE-NOC15B-S04G-003	BES00C2	476	BES M08EF-PSC40F-S49G	BES014M	529
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BES M05ED-POC50F-S26G	BES0139	499	BES M08EE-NOC15B-S49G-003	BES00C3	476	BES M08EG1-PSC15S-S04G-S	BES02YZ	665
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BES M05ED-POD08B-BP02-R03	BES03L8	645	BES M08EE-NOC20B-S04G-003	BES00C4	477	BES M08EG-NOC40F-BV02	BES0011	480
BES M05ED-PSC08B-BP00,3-GS49-R01	BES03K8	643	BES M08EE-NOC20B-S49G	BES013W	520	BES M08EG-NSC25F-S04G	BES01P5	527
BES M05ED-PSC15B-S26G	BES013A	501	BES M08EE-NOC20B-S49G-003	BES00C5	477	BES M08EG-NSC40F-BV02	BES0013	480
BES M05ED-PSC50F-EP00,3-GS04	BES013C	499	BES M08EE-NSC15B-S04G	BES013Y	515	BES M08EG-POC25F-S04G	BES01P6	527
BES M05ED-PSC50F-EP02	BES013E	499	BES M08EE-NSC15B-S04G-003	BES00C6	476	BES M08EG-POC40F-BV02	BES0015	480
BES M05ED-PSC50F-S26G	BES013H	499	BES M08EE-NSC15B-S49G	BES013Z	515	BES M08EG-PSC15B-S49G	BES01P7	515
BES M05ED-PSD05B-ES02-T01	BES02J2	670	BES M08EE-NSC15B-S49G-003	BES00C7	476	BES M08EG-PSC25F-S04G	BES01P8	527
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BES M08MH1-PSC30B-S04G-101	BES02PW	526	BES M12EI-NSC40B-S04G-S	BES02N8	666	BES M12MG-GOC30B-BV02	BES024L	599
BES M08MH1-PSC30B-S49G	BES02WA	525	BES M12EI-NSC40B-S04G-S01	BES02N9	667	BES M12MG-GSC30B-BP00,3-GS04	BES0042	598
BES M08MI-NOC15B-BV02	BES03PJ	477	BES M12EI-POC40B-S04G	BES02FT	532	BES M12MG-GSC30B-BP00,3-GS04-101	BES0326	598
BES M08MI-NOC15B-S49G	BES03PK	476	BES M12EI-POC40B-S04G	BES02FT	674	BES M12MG-GSC30B-BV02	BES0045	599
BES M08MI-NOC20B-BV02	BES03TF	479	BES M12EI-POC40B-S04G-L01	BES0434	682	BES M12MG-NOC80F-BV02	BES0049	483
BES M08MI-NOC20B-S49G	BES03TJ	478	BES M12EI-PSC40B-S04G	BES02FU	532	BES M12MG-NOC80F-S04G	BES004A	483
BES M08MI-NSC15B-BV02	BES002F	477	BES M12EI-PSC40B-S04G	BES02FU	674	BES M12MG-NSC80F-BV02	BES004E	483
BES M08MI-NSC15B-S49G	BES002K	476	BES M12EI-PSC40B-S04G-009	BES038C	533	BES M12MG-NSC80F-S04G	BES004F	483
BES M08MI-NSC20B-BV02	BES002P	479	BES M12EI-PSC40B-S04G-009	BES038C	675	BES M12MG-POC80F-BV02	BES004J	483
BES M08MI-NSC20B-S49G	BES002U	478	BES M12EI-PSC40B-S04G-L01	BES0435	682	BES M12MG-POC80F-S04G	BES004K	483
BES M08MI-NSC40B-BP00,2-GS04	BES01ZR	527	BES M12EI-PSC40B-S04G-S	BES02NA	666	BES M12MG-PSC40A-S04G-W12	BES0452	687
BES M08MI-NSC40B-S49G	BES01ZT	526	BES M12EI-PSC40B-S04G-S01	BES02NC	667	BES M12MG-PSC80F-BV02	BES004M	483
BES M08MI-POC15B-BV02	BES0030	477	BES M12MC1-NSC10F-S04G	BES02WJ	537	BES M12MG-PSC80F-S04G	BES004N	483
BES M08MI-POC15B-S49G	BES03P6	476	BES M12MC1-PSC10F-S04G	BES02WK	537	BES M12MG-UOC30B-BV02	BES024M	599
BES M08MI-POC20B-BV02	BES03TH	479	BES M12MD1-NSC80E-S04G	BES02YU	687	BES M12MG-USC30B-BV03	BES004U	599
BES M08MI-POC20B-S49G	BES0033	478	BES M12MD1-PSC80E-S04G-W	BES02JW	687	BES M12MI-NOC20B-BV02	BES03PR	481
BES M08MI-PSC15B-BV02	BES0037	477	BES M12MD1-PSC80E-S04G-W01	BES02JY	699	BES M12MI-NOC20B-S04G	BES004Y	481
BES M08MI-PSC15B-S49G	BES003C	476	BES M12MD-NOC20B-BP02-003	BES00CY	481	BES M12MI-NOC40B-BV02	BES03PT	482
BES M08MI-PSC20B-BP00,2-GS04	BES003E	479	BES M12MD-NOC40B-BP02-003	BES00CZ	482	BES M12MI-NOC40B-S04G	BES004Z	482
BES M08MI-PSC20B-BV02	BES003K	479	BES M12MD-NOC80F-S04G	BES01PR	483	BES M12MI-NSC20B-BV02	BES00FL	481

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BES M12MI-NSC40B-BV02	BES00FM	482	BES M18ME-NOC80B-S04G-003	BES03RN	485	BES M30EG1-NSC80S-S04G-S	BES02ZF	669
BES M12MI-NSC40B-S04G	BES0059	482	BES M18ME-NSC50B-S04G-003	BES00ER	484	BES M30EG1-PSC80N-S04G-S	BES02ZH	669
BES M12MI-NSH80B-S04G	BES01ZY	535	BES M18ME-NSC80B-S04G-003	BES00ET	485	BES M30EG1-PSC80S-S04G-S	BES02ZJ	669
BES M12MI-POC20B-BV02	BES00FP	481	BES M18ME-POC50B-S04G-003	BES00EU	484	BES M30MD-NOC10B-BP02-003	BES03TE	487
BES M12MI-POC20B-S04G	BES005F	481	BES M18ME-POC80B-S04G-003	BES00EW	485	BES M30MD-NSC10B-BP02-003	BES00FO	487
BES M12MI-POC40B-BV02	BES005L	482	BES M18ME-PSC50B-S04G-003	BES00EY	484	BES M30MD-NSC15B-BP02-003	BES00F1	489
BES M12MI-POC40B-S04G	BES005N	482	BES M18ME-PSC80B-S04G-003	BES00EZ	485	BES M30MD-POC10B-BP02-003	BES03TC	487
BES M12MI-PSC20B-BV02	BES005U	481	BES M18MF1-PSC50A-S04G-W	BES02K9	689	BES M30MD-POC15B-BP02-003	BES00F2	489
BES M12MI-PSC20B-S04G	BES0060	481	BES M18MF1-PSC50A-S04G-W01	BES02KA	699	BES M30MD-PSC10B-BP02-003	BES00F3	487
BES M12MI-PSC30B-S04G-W	BES02K1	698	BES M18MF-GOC70B-S04G	BES02NL	600	BES M30MD-PSC15B-BP02-003	BES00F4	489
BES M12MI-PSC30B-S04G-W01	BES02K2	698	BES M18MF-GSC70B-S04G	BES0328	600	BES M30ME-NOC10B-S04G-003	BES03TA	487
BES M12MI-PSC40B-BV02	BES0064	482	BES M18MF-UOC70B-S04G	BES02NN	600	BES M30ME-NSC10B-S04G-003	BES00F5	487
BES M12MI-PSC40B-S04G	BES0068	482	BES M18MF-USC70B-S04G	BES02NR	600	BES M30ME-POC10B-S04G-003	BES00F6	487
BES M12MI-PSH80B-S04G	BES01ZN	535	BES M18MG1-NSC12B-S04G	BES02Y8	542	BES M30ME-POC15B-S04G-003	BES00F7	488
BES M12ML-PSC30A-S04G-W01	BES02K4	687	BES M18MG1-PSC12B-S04G	BES02Y9	542	BES M30ME-PSC10B-S04G-003	BES00F8	487
BES M18EE1-PSY50B-S04G-L01	BES0441	683	BES M18MG-GOC70B-BP00,3-GS04	BES039L	601	BES M30ME-PSC15B-S04G-003	BES00F9	488
BES M18EE1-PSY80F-S04G-L01	BES0442	683	BES M18MG-GOC70B-BV02	BES02NT	601	BES M30MF-GOC15B-BP00,3-GS04	BES03H4	605
BES M18EF1-PSC20F-S04G-S	BES02Y1	669	BES M18MG-GSC70B-BP00,3-GS04	BES006C	601	BES M30MF-GOC15B-BV02	BES0279	605
BES M18EG1-NSC10Z-S04G-S11	BES02Y2	668	BES M18MG-GSC70B-BP00,3-GS04-101	BES0329	601	BES M30MF-GOC15B-S04G	BES027C	603
BES M18EG1-NSC50S-S04G-S	BES02Z6	667	BES M18MG-GSC70B-BV02	BES00FA	601	BES M30MF-GOC15B-S04K	BES027J	603
BES M18EG1-POC50S-S04G-S	BES02Z7	667	BES M18MG-NOC16F-BV02	BES006L	486	BES M30MF-GSC15B-BP00,3-GS04	BES008Y	605
BES M18EG1-PSC10Z-S04G-S11	BES02Y3	668	BES M18MG-NSC16F-BV02	BES006P	486	BES M30MF-GSC15B-BP00,3-GS04-101	BES032A	604
BES M18EG1-PSC50N-S04G-S	BES02Z8	667	BES M18MG-POC16F-BV02	BES006U	486	BES M30MF-GSC15B-BV02	BES008R	605
BES M18EG1-PSC50S-S04G-S	BES02Z9	667	BES M18MG-POC16F-S04G	BES03RL	486	BES M30MF-GSC15B-S04G	BES027L	603
BES M18EI-NOC80B-S04G	BES02FW	541	BES M18MG-PSC12A-S04G-W	BES03YW	691	BES M30MF-GSC15B-S04K	BES008W	603
BES M18EI-NSC72B-S04G-S	BES02NF	668	BES M18MG-PSC16F-BV02	BES006Z	486	BES M30MF-UOC15B-BV02	BES027A	605
BES M18EI-NSC72B-S04G-S01	BES02NH	668	BES M18MG-PSC16F-S04G	BES03RM	486	BES M30MF-UOC15B-S04G	BES027F	603
BES M18EI-NSC80B-S04G	BES02FY	541	BES M18MG-PSC80A-S04G-W	BES03YT	689	BES M30MF-UOC15B-S04K	BES027H	604
BES M18EI-POC80B-S04G	BES02FZ	541	BES M18MG-UOC70B-BV02	BES02NU	602	BES M30MF-USC15B-BV02	BES0091	605
BES M18EI-POC80B-S04G	BES02FZ	676	BES M18MG-USC70B-BV02	BES0073	602	BES M30MF-USC15B-S04G	BES027E	603
BES M18EI-POC80B-S04G-L01	BES0438	683	BES M18MI-NOC50B-BV02	BES03RR	485	BES M30MF-USC15B-S04K	BES0094	604
BES M18EI-PSC72B-S04G-S	BES02NJ	668	BES M18MI-NOC80B-BV02	BES03T4	485	BES M30MG1-NSC40F-S04G	BES02YH	551
BES M18EI-PSC72B-S04G-S01	BES02NK	668	BES M18MI-NOC80B-S04G	BES0077	485	BES M30MG1-PSC40F-S04G	BES02YJ	551
BES M18EI-PSC80B-S04G	BES02H0	541	BES M18MI-NSC50B-BV02	BES007A	485	BES M30MI1-NSC22B-S04G	BES02YK	549
BES M18EI-PSC80B-S04G	BES02H0	676	BES M18MI-NSC80B-BV02	BES00FE	485	BES M30MI1-POC22B-S04G	BES02YL	549
BES M18EI-PSC80B-S04G-L01	BES0437	683	BES M18MI-NSC80B-S04G	BES007L	485	BES M30MI1-PSC22B-S04G	BES02YM	549
BES M18EL-POC12E-S04G	BES01R0	691	BES M18MI-POC50B-BV02	BES007R	485	BES M30MI-NOC10B-BV02	BES0096	487
BES M18EL-PSH50A-S04G	BES01R1	689	BES M18MI-POC50B-S04G	BES043J	484	BES M30MI-NOC10B-S04K	BES0097	487
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BES M18MD1-PSC12B-S04G	BES02Y5	542	BES M18MI-POC80B-S04G	BES03RP	485	BES M30MI-NOC15B-S04K	BES0098	488
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BES M18MD-NOC80B-BP02-003	BES00EH	485	BES M18MI-PSC50B-BV02	BES0082	485	BES M30MI-NSC10B-S04K	BES009H	487
BES M18MD-NSC50B-BP02-003	BES00EJ	484	BES M18MI-PSC50B-S04G	BES0086	484	BES M30MI-NSC15B-BV02	BES03RH	489
BES M18MD-NSC80B-BP02-003	BES00EK	485	BES M18MI-PSC70B-S04G-W	BES02KC	700	BES M30MI-NSC15B-S04K	BES009J	488
BES M18MD-POC50B-BP02-003	BES00EL	484	BES M18MI-PSC70B-S04G-W01	BES02KE	700	BES M30MI-POC10B-BV02	BES009M	487
BES M18MD-POC80B-BP02-003	BES00EM	485	BES M18MI-PSC80B-BV02	BES008E	485	BES M30MI-POC10B-S04G	BES043H	487
BES M18MD-PSC12E-S04G-W01	BES02K8	701	BES M18MI-PSC80B-S04G	BES008L	485	BES M30MI-POC10B-S04K	BES009P	487
BES M18MD-PSC50B-BP02-003	BES00EN	484	BES M18ML-PSC12E-S04G-W	BES02KF	691	BES M30MI-POC15B-BV02	BES009T	489
BES M18MD-PSC80B-BP02-003	BES00EP	485	BES M18ML-PSC12E-S04G-W01	BES02KH	691	BES M30MI-POC15B-S04G	BES03RK	488
BES M18ME1-NSC20F-S04G	BES02Y6	546	BES M18ML-PSC50A-S04G-W	BES02KJ	689	BES M30MI-POC15B-S04K	BES009U	488
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BES M30MI-PSC13B-S04G-W	BES02KL	701	BES Q08MEC-NSC15B-S49G	BES03U8	556	BES Q40-HW-2	BAM00JY	744
BES M30MI-PSC13B-S04G-W01	BES03F1	702	BES Q08MEC-NSC20B-EP00,3-GS26	BES041Y	559	BES Q40-HW-2	BAM00JY	766
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BES M30MI-PSC15B-S04G	BES00AF	488	BES Q08MEC-NSC20B-S26G	BES03Y9	557	BES Q40KEU-PAH25F-S04G	BES0210	579
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BES M30ML-NSC15F-S04G-002	BES03AT	550	BES Q08MEC-POC15B-EP00,3-GS26	BES041K	557	BES Q40KEU-U0U25F-S21G	BES0213	625
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BES M30ML-PSC15F-S04G-002	BES03AL	550	BES Q08MEC-POC15B-EP02	BES03Y5	557	BES Q40KEU-USU25F-S21G	BES022F	625
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BES M30MM-NOC30F-S04K	BES00AL	489	BES Q08MEC-POC20B-EP00,3-GS26	BES041W	559	BES Q40KFU-GSH15B-S04G	BES0303	608
BES M30MM-NSC30F-BV02	BES00AN	489	BES Q08MEC-POC20B-EP00,3-GS49	BES041P	559	BES Q40KFU-NAC25F-S04G	BES022J	579
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BES M30MM-PSC30F-S04G	BES03RE	489	BES Q08MEC-PSC15B-EP02	BES03TZ	557	BES Q40KFU-PAC35E-S04G-W01	BES021K	695
BES M30MM-PSC30F-S04K	BES00AZ	489	BES Q08MEC-PSC15B-S26G	BES03U1	556	BES Q40KFU-PSC15A-S04G	BES021P	693
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BES Q05AC-NSC08B-S26G	BES01RA	553	BES Q08MEC-PSC20B-S26G	BES03U4	557	BES Q40KFU-PSC35E-S04G	BES0220	695
BES Q05AC-NSC15B-EP02	BES01RC	555	BES Q08MEC-PSC20B-S49G	BES03Y8	559	BES Q40KFU-PSC35E-S04G-W01	BES0221	695
BES Q05AC-NSC15B-S26G	BES01RE	554	BES Q08ZC-NOC20B-BP02	BES01TL	560	BES Q40KFU-PSC40E-S04G	BES0223	695
BES Q05AC-NSC15B-S49G	BES01RF	554	BES Q08ZC-NOC20B-BV02	BES01RU	560	BES Q40KFU-PSC40F-S04G-012	BES0308	579
BES Q05AC-POC08B-S26G	BES01RH	553	BES Q08ZC-NOC20B-S49G	BES01RW	559	BES Q40KHU-PAC20B-S04G	BES03PN	578
BES Q05AC-POC15B-EP02	BES01RJ	555	BES Q08ZC-NSC20B-BP02	BES01RZ	560	BES Q40KU-GPH20F-KM21	BES0309	609
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BES Q05AC-PSC08B-S26G	BES01RM	553	BES Q08ZC-POC20B-BP02	BES01T7	560	BES Q40-SH-2	BAM00K1	747
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BES Q05AC-PSC15B-EP02	BES01RN	555	BES Q08ZC-POC20B-S49G	BES01TF	559	BES Q80KA-GSH50B-S04Q	BES030A	610
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BES Q05AC-PSC15B-S49G	BES01RR	554	BES Q08ZC-PSC20B-BV02	BES01TZ	560	BES Q80KA-PAH40B-S04Q	BES0225	589
BES Q08-HW-4	BAM00NF	764	BES Q08ZC-PSC20B-S49G	BES01U2	559	BES Q80KA-PAH50F-S04Q	BES0226	591
BES Q08-KH-1	BAM00NH	764	BES Q08ZC-PSC25B-S49G	BES01U3	561	BES Q80KA-PSH40B-S04Q	BES0227	589
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BES Q08MEC-NOC15B-EP00,3-GS49	BES041H	557	BES Q08ZE-NOC20B-S49G	BES01U6	559	BES R01EC-PSC50A-BP00,3-GS04-W50	BES04AH	669
BES Q08MEC-NOC15B-EP02	BES03U7	557	BES Q08ZE-NSC20B-BP02	BES01U7	561	BES R01EC-PSC50A-BP00,3-GS04-W51	BES049Y	669
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BAM015A	BES 516-MB-18	760	BAM01FM	BAM MB-XO-007-B05-4	430	BAW001H	BAW M12MG2-ICC20B-BP03	722
BAM015C	BES 516-MB-30	760	BAM01H6	BOS R-31	423	BAW001J	BAW M12MG2-UAC20B-BP00,2-GS04	722
BAM015U	BESA-08-CM	756	BAM01H7	BOS R-38	425	BAW001L	BAW M12MG2-UAC20B-BP03	723
BAM015W	BESA-12-CM	757	BAM01H8	BOS R-39	424	BAW001P	BAW M12MI-UAC20B-S04G	722
BAM015Y	BESA-18-CM	757	BAM01H9	BOS R-41	424	BAW001T	BAW M18ME-ICC50B-BP03	727
BAM015Z	BESA-30-CM	757	BAM01HA	BOS R-42	425	BAW001U	BAW M18ME-ICC50B-S04G	727
BAM0179	BKS-PS-914/16-SI	763	BAM01HC	BOS R-43	425	BAW001Z	BAW M18ME-UAC50B-BP00,2-GS04	725
BAM017A	BKS-PS-914/16-SI-00,91	763	BAM01HE	BOS R-44	423	BAW0022	BAW M18ME-UAC50B-BP03	726
BAM017F	BKS-PT-10/16-SI	763	BAM01HF	BOS R-45	428	BAW0025	BAW M18ME-UAC50B-S04G	725
BAM017M	BKS-PT-16/16-SI	763	BAM01JM	BOS R-50	426	BAW0026	BAW M18ME-UAE50B-S04G-K	725
BAM017P	BKS-PT-19/16-SI	763	BAM01JN	BOS R-47	421	BAW0029	BAW M18MG-UAC16F-S04G-K	728
BAM017T	BKS-PT-38/16-SI	763	BAM01JP	BOS R-46	421	BAW002C	BAW M18MG-UAC80F-S04G	728
BAM017W	BKS-PT-13/16-SI	763	BAM01K4	BMF 303-HW-103	865	BAW002F	BAW M18MI-BLC50B-S04G	727
BAM017Y	BKS-PT-50/16-SI	763	BAM01K6	BMF 103-HW-100	861	BAW002H	BAW M18MI-IAC50B-S04G	727
BAM0182	BKS PW-51/30-SI-TR-11	763	BAM01K7	BMF 103-HW-102	861	BAW002J	BAW M18MI-ICC50B-S04G	727
BAM018E	BAM AD-XA-001-M18/M30-4	848	BAM01K8	BMF 305-HW-106	870	BAW002K	BAW M18MI-UAC50B-S04G	725
BAM018F	BAM AD-XA-001-M18/M32x1,5-4	848	BAM01K9	BMF 303-HW-101	864	BAW002M	BAW M18MI2-UAC50B-BP05-002	726
BAM018H	BAM AD-XA-001-M18/R1"-4	848	BAM01KM	BOS 12,0-KB-1	441	BAW002U	BAW M18MM-UAZ50B-BP05-505	726
BAM018J	BAM AD-XA-002-M12/M18-4	848	BAM01KU	BOS R-51	423	BAW002W	BAW M30ME-UAC10B-S04G	728
BAM018K	BAM AD-XA-002-M12/G1/2"-4	848	BAM01L8	BAM PC-XO-006-23K-1	455	BAW002Y	BAW M30ME-UAC15F-S04G	729
BAM019H	BOS R-6-0,1	426	BAM01LA	BOS R-48	421	BAW0030	BAW R03KC-UAE40B-BP00,3-GS26	731
BAM019J	BOS R-6-1	426	BAM01M9	BMF 235-HW-109	884	BAW0031	BAW R03KC-UAE40B-BP00,3-GS49	731
BAM019K	BOS R-7-0,1	426	BAM01MA	BMF 235-HW-110	884	BAW0032	BAW R03KC-UAE40B-BP03	732
BAM019L	BOS R-7-1	427	BAM01MC	BMF 235-HW-111	884	BAW0033	BAW R06AC-UAF20B-EP03	733
BAM019M	BOS R-8-0,1	426	BAM01ML	BMF 103-HW-108	860	BAW0034	BAW R06AC-UAF20B-S49G	732
BAM019N	BOS R-8-1	427	BAM01NC	BAM PC-XO-005-18M-4	459	BAW003A	BAW Z01AC-BLD50B-DP03	733
BAM019P	BOS R-171	428	BAM01NH	BOS R-49	423	BAW003E	BAW Z01AC-UAD50B-DP03-K	733
BAM019R	BOS R-17-0,1	428	BAM01PA	BAM LS-FO-001-M6-L	462	BAW003K	BAW MKK-050.19-S4	734
BAM019T	BOS R-17-0,25	428	BAM01T3	BOS R-52	422	BAW003M	BAW MKZ-471.19-S4	729
BAM019W	BAM FS-XE-004-M8-4	753	BAM01TC	SCHLAUCHSCHELLE BMF-GR.10	910	BAW003N	BAW M12MH1-ICC40F-S04G	725
BAM019Y	BAM FS-XE-003-M5-4	753	BAM01TC	SCHLAUCHSCHELLE BMF-GR.10	910			



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BCC00HJ	BKS-B 25-1/GS49-PU-01	926	BCC08AW	BCC A243-0000-10-000-41X3W8-000	950	BCS0007	BCS G34KN2-UST20G-AV02	832
BCC00HK	BKS-B 25-3-PU-03	926	BCC08AY	BCC A233-0000-20-000-41X3W8-000	950	BCS000J	BCS M18KM3-UOT80G-BV02	832
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BCC00HN	BKS-B 26-1/GS49-PU-01	926	BCC08C0	BCC M434-0000-2A-000-43X434-000	948	BCS000U	BCS M30KN2-UOT15G-AV02	832
BCC00HP	BKS-B 26-3-PU-03	926	BCC097K	BCC S435-0000-2A-000-41X575-000	949	BCS000W	BCS M30KN2-UST15G-AV02	832
BCC01KR	C04 CNT-9	948	BCC097L	BCC S435-0000-2A-000-51X575-000	949	BCS000Y	BCS F01CP01-XXS10C-EP02-GZ01-002	831
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BCC0206	C21 BN3-7	950	BCC097P	BCC S435-0000-1A-000-41X575-000	947	BCS0012	BCS G06T4B-XXS15C-EP02-GZ01-002	781
BCC020E	C21 DN3-7	950	BCC097R	BCC S435-0000-1A-000-51X575-000	947	BCS0013	BCS G06T4B-XXS30G-EP02-GZ01-002	782
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BCC04JZ	BCC Z002-080	848	BCC09EY	BCC M334-0000-10-000-22X434-000	944	BCS0018	BCS M12T4D-XXS40C-EP02-GZ01-002	783
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BCC06ZE	BCC M444-0000-2A-000-51X475-000	949	BCC0AEC	BCC 0000-0000-00-001-EX43T2-10X	925	BCS0023	BCS G06T4D2-POM30G-S49G	787
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BCC06ZH	BCC M445-0000-1A-000-41X575-000	947	BCC0AEF	BCC 0000-0000-00-071-VX43W6-10X	940	BCS0025	BCS G06T4D2-NOM30G-S49G	787
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BCS004H	BCS D30B4M3-PPC20C-EP02	792	BCS007L	BCS M30T4M2-PPC30G-S04G	807	BCS009M	BCS M12TTI1-NOM60G-ET02-E	805
BCS004J	BCS D30B4M3-NPC20C-EP02	792	BCS007M	BCS M30T4M2-NPC30G-S04G	807	BCS009N	BCS S40SS01-GPCFNG-EP02	811
BCS004W	BCS G34VVM3-PPM20C-EP02	793	BCS007N	BCS M18WV1-PSCFAG-DV02	815	BCS009P	BCS S40SS02-GPCFNG-EP02	811
BCS004Y	BCS G34VVM3-NPM20C-EP02	793	BCS007P	BCS M18WV1-POCFAG-DV02	815	BCS009R	BCS S40SS03-GPCFNG-EP02	811
BCS004Z	BCS G34VVM2-PPM20C-S04G	793	BCS007R	BCS M18WV1-NSCFAG-DV02	815	BCS009T	BCS S41SS01-GPCFNG-S49G	810
BCS0050	BCS G34VVM2-NPM20C-S04G	793	BCS007T	BCS M18WV1-NOCFAG-DV02	815	BCS009U	BCS S41SS02-GPCFNG-S49G	811
BCS0051	BCS R08RR01-PSM80C-EP02	797	BCS007U	BCS M30BBM3-PPCFAG-EP02	816	BCS009W	BCS S41SS03-GPCFNG-S49G	811
BCS0052	BCS R08RR01-POM80C-EP02	797	BCS007W	BCS M30BBM3-NPCFAG-EP02	816	BCS009Y	BCS S42SS01-GPCFNG-S49G	812
BCS0053	BCS R08RR01-NSM80C-EP02	797	BCS007Y	BCS M30BBM2-PPCFAG-S04G	816	BCS009Z	BCS S42SS02-GPCFNG-S49G	812
BCS0054	BCS R08RR01-NOM80C-EP02	797	BCS007Z	BCS M30BBM2-NPCFAG-S04G	816	BCS00A0	BCS S42SS03-GPCFNG-S49G	812
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BCS0057	BCS R08RR01-NSM80C-EP00,2-GS49	797	BCS0082	BCS D50TT05-NSCFAC-ET02	823	BCS00A3	BCS S10T401-XXSFNC-SZ02-T07	829
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BCS005F	BCS M12T4G1-PSM80G-EP02	804	BCS0084	BCS D500004-PPCFAC-EV02	823	BCS00A5	BCS S10T403-XXSFNC-SZ02-T07	829
BCS005H	BCS M12T4G1-POM80G-EP02	804	BCS0085	BCS D500004-NPCFAC-EV02	823	BCS00A6	BCS S03T401-PSCFNH-KM16-T02	813
BCS005J	BCS M12T4G1-NSM80G-EP02	804	BCS0086	BCS M30TTH2-PSCFAG-AT02	816	BCS00A7	BCS S03T401-POCFNH-KM16-T02	813
BCS005K	BCS M12T4G1-NOM80G-EP02	804	BCS0087	BCS M30TTH2-POCFAG-AT02	816	BCS00A8	BCS S03T401-NSCFNH-KM16-T02	813
BCS005R	BCS M18T4I1-PSC15G-DV02	806	BCS0088	BCS M30TTH2-NSCFAG-AT02	815	BCS00A9	BCS S03T401-NOCFNH-KM16-T02	813
BCS005T	BCS M18T4I1-POC15G-DV02	806	BCS0088	BCS M30TTH2-NSCFAG-AT02	816	BCS00AC	BCS M12T4D2-NOM40C-S04G	789
BCS005U	BCS M18T4I1-NSC15G-DV02	806	BCS0089	BCS M30TTH2-NOCFAG-AT02	815	BCS00C1	BCS D500006-NOCFSC-EV02	823



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BCS00HE	BCS D500006-NSCFSC-EV02	823	BCS00NF	BCS M30BB12-NOC15D-S04K	793	BCS00U8	BCS Q40BBAA-PSCFAC-EP00,3-GS49	825
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BCS00M0	BCS M18BBH1-NOC15H-EP02	806	BCS00NZ	BCS M18BBN1-PSC80D-EP02	791	BES0009	BES G06ED-NSC40F-BV02	503
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BCS00M4	BCS M18B4I3-POC80D-S04K	791	BCS00P3	BCS M12B4G2-NOC40D-S04K	790	BES000K	BES M08EB-NSC40F-S49G	479
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BCS00M7	BCS M18B4H1-PSC15H-EP02	805	BCS00P6	BCS M12B4E2-NSC80H-S04K	803	BES000P	BES M08ED-NOC40F-BV02	480
BCS00M8	BCS M18BBI3-PSC80D-S04K	791	BCS00P7	BCS M12B4E2-NOC80H-S04K	803	BES000T	BES M08ED-NSC40F-BV02	480
BCS00M9	BCS M18B4H1-POC15H-EP02	805	BCS00P8	BCS M12B4I1-POC40D-EP02	790	BES000W	BES M08ED-POC40F-BV02	480
BCS00MA	BCS M18B4H1-NSC15H-EP02	805	BCS00P9	BCS M12B4I1-NSC40D-EP02	790	BES000Z	BES M08ED-PSC40F-BV02	480
BCS00MC	BCS M18B4H1-NOC15H-EP02	805	BCS00PA	BCS M12B4I1-NOC40D-EP02	790	BES0011	BES M08EG-NOC40F-BV02	480
BCS00ME	BCS M18B4G2-PSC15H-S04K	805	BCS00PC	BCS M12B4G1-PSC80H-EP02	803	BES0013	BES M08EG-NSC40F-BV02	480
BCS00MF	BCS M18B4I3-PSC80D-S04K	791	BCS00PE	BCS M12B4G1-POC80H-EP02	803	BES0015	BES M08EG-POC40F-BV02	480
BCS00MH	BCS M18BBI3-POC80D-S04K	791	BCS00PF	BCS M12B4G1-NSC80H-EP02	803	BES0017	BES M08EG-PSC40F-BV02	480
BCS00MJ	BCS M18BBI3-NSC80D-S04K	791	BCS00PH	BCS M12B4G1-NOC80H-EP02	803	BES0018	BES M08EH-NOC40F-S04G	480
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BCS00ML	BCS M18B4G2-POC15H-S04K	805	BCS00PK	BCS M12BBG2-POC40D-S04K	790	BES001A	BES M08EH-NSC40F-S04G	480
BCS00MM	BCS M18B4G2-NSC15H-S04K	805	BCS00PL	BCS M12BBG2-NSC40D-S04K	790	BES001C	BES M08EH-NSC40F-S49G	479
BCS00MN	BCS M18B4G2-NOC15H-S04K	805	BCS00PM	BCS M12BBG2-NOC40D-S04K	790	BES001E	BES M08EH-POC40F-S04G	480
BCS00MR	BCS M30B4I2-PSC15D-S04K	792	BCS00PN	BCS M12BBE2-PSC80H-S04K	804	BES001F	BES M08EH-POC40F-S49G	479
BCS00MT	BCS M30B4I2-POC15D-S04K	792	BCS00PP	BCS M12BBE2-POC80H-S04K	804	BES001H	BES M08EH-PSC40F-S04G	480
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BCS00MW	BCS M30B4I2-NOC15D-S04K	792	BCS00PT	BCS M12BBE2-NOC80H-S04K	804	BES001L	BES M08MG-GSC20B-BV02	596
BCS00MY	BCS M30B4E2-PSC25H-S04K	807	BCS00PU	BCS M12BB11-PSC40D-EP02	791	BES001T	BES M08MG-USC20B-BV02	596
BCS00MZ	BCS M30B4E2-POC25H-S04K	807	BCS00PW	BCS M12BB11-POC40D-EP02	791	BES001Y	BES M08ME1-USC20B-S04G	595
BCS00N0	BCS M30B4E2-NSC25H-S04K	807	BCS00PY	BCS M12BB11-NSC40D-EP02	791	BES001Z	BES M08MG-GSC20B-BP00,3-GS04	595
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BCS00N2	BCS M30B4I1-PSC15D-EP02	793	BCS00R0	BCS M12BBG1-PSC80H-EP02	804	BES0023	BES M08MH1-NOC15B-S04G	477
BCS00N3	BCS M30B4I1-POC15D-EP02	793	BCS00R1	BCS M12BBG1-POC80H-EP02	804	BES0024	BES M08MH1-NSC15B-S04G	477
BCS00N4	BCS M30B4I1-NSC15D-EP02	793	BCS00R2	BCS M12BBG1-NSC80H-EP02	804	BES0025	BES M08MH1-NSC20B-S04G	478
BCS00N5	BCS M30B4I1-NOC15D-EP02	793	BCS00R3	BCS M12BBG1-NOC80H-EP02	804	BES0026	BES M08MH1-POC15B-S04G	477
BCS00N6	BCS M30B4E1-PSC25H-EP02	807	BCS00R4	BCS M12B4I1-PSC40D-EP02	790	BES0027	BES M08MH1-PSC15B-S04G	477
BCS00N7	BCS M30B4E1-POC25H-EP02	807	BCS00TP	BCS Q40BBAA-GPCFAC-EP02	825	BES0028	BES M08MH1-PSC20B-S04G	478
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BES0030	BES M08MI-POC15B-BV02	477	BES0097	BES M30MI-NOC10B-S04K	487	BES00E2	BES M12MD-POC20B-BP02-003	481
BES0033	BES M08MI-POC20B-S49G	478	BES0098	BES M30MI-NOC15B-S04K	488	BES00E3	BES M12MD-POC40B-BP02-003	482
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BES005F	BES M12MI-POC20B-S04G	481	BES00C2	BES M08EE-NOC15B-S04G-003	476	BES00F0	BES M30MD-NSC10B-BP02-003	487
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BES0077	BES M18MI-NOC80B-S04G	485	BES00CJ	BES M08EE-PSC15B-S49G-003	476	BES00FL	BES M12MI-NSC20B-BV02	481
BES007A	BES M18MI-NSC50B-BV02	485	BES00CK	BES M08EE-PSC20B-S49G-003	477	BES00FM	BES M12MI-NSC40B-BV02	482
BES007L	BES M18MI-NSC80B-S04G	485	BES00CL	BES M08EF-NOC15B-BP02-003	477	BES00FP	BES M12MI-POC20B-BV02	481
BES007R	BES M18MI-POC50B-BV02	485	BES00CM	BES M08EF-NOC20B-BP02-003	479	BES00FT	BES 516-3005-E4-C-PU-02	501
BES0082	BES M18MI-PSC50B-BV02	485	BES00CN	BES M08EF-NSC15B-BP02-003	477	BES00FW	BES 516-3005-E4-C-S4-00,3	501
BES0086	BES M18MI-PSC50B-S04G	484	BES00CP	BES M08EF-NSC20B-BP02-003	479	BES00H1	BES 516-3005-E4-C-S49-00,3	500
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BES008L	BES M18MI-PSC80B-S04G	485	BES00CT	BES M08EF-POC20B-BP02-003	479	BES00H3	BES 516-3005-G-E4-C-PU-02	498
BES008R	BES M30MF-GSC15B-BV02	605	BES00CU	BES M08EF-PSC15B-BP02-003	477	BES00H5	BES 516-3005-G-E4-C-S26-00,3	501
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BES01JW	BES 516-367-S4-C	539	BES01R0	BES M18EL-POC12E-S04G	691	BES01Y3	BES R04KC-NSC15B-EV02	563
BES01K2	BES 516-370-B0-C-02	531	BES01R1	BES M18EL-PSH50A-S04G	689	BES01Y7	BES R04KC-POC15B-EP00,2-GS26	563
BES01K6	BES 516-370-S4-C	530	BES01R6	BES Q05AC-NOC08B-S26G	553	BES01Y8	BES R04KC-POC15B-EP00,3-GS49	563
BES01K7	BES 516-371-E0-C-02	507	BES01R7	BES Q05AC-NOC15B-EP02	555	BES01YC	BES R04KC-PSC15B-EP00,2-GS26	563
BES01KH	BES 516-371-G-S49-C	508	BES01R8	BES Q05AC-NOC15B-S26G	554	BES01YE	BES R04KC-PSC15B-EP00,3-GS49	563
BES01KJ	BES 516-371-S49-C	504	BES01R9	BES Q05AC-NOC15B-S49G	554	BES01YF	BES R04KC-PSC15B-EP02	563
BES01KW	BES 516-371-SA13-PU-02	509	BES01RA	BES Q05AC-NSC08B-S26G	553	BES01YJ	BES R04KC-PSC15B-EV02	563
BES01L1	BES 516-372-E0-C-02	507	BES01RC	BES Q05AC-NSC15B-EP02	555	BES01YM	BES R04KC-PSC25F-EP00,3-GS49	563
BES01L7	BES 516-375-B0-C-02	531	BES01RE	BES Q05AC-NSC15B-S26G	554	BES01YN	BES R04KC-PSC25F-EP02	565
BES01LA	BES 516-375-S4-C	530	BES01RF	BES Q05AC-NSC15B-S49G	554	BES01YT	BES R04KC-PSC25F-EV02	564
BES01LC	BES 516-377-E0-C-02	519	BES01RH	BES Q05AC-POC08B-S26G	553	BES01YW	BES R05KB-NOC40B-EV02	573
BES01LH	BES 516-377-E0-C-PU-02	519	BES01RJ	BES Q05AC-POC15B-EP02	555	BES01Z1	BES R05KB-NSC40B-S49A	573
BES01LN	BES 516-377-E0-C-S49-00,3	517	BES01RK	BES Q05AC-POC15B-S26G	554	BES01Z2	BES R05KB-POC40B-S49A	573
BES01LP	BES 516-377-G-S49-C	521	BES01RL	BES Q05AC-POC15B-S49G	554	BES01Z3	BES R05KB-PSC20B-BP00,3-GS49	572
BES01LR	BES 516-377-S49-C	515	BES01RM	BES Q05AC-PSC08B-S26G	553	BES01Z4	BES R05KB-PSC20B-EP02	573
BES01LT	BES 516-378-E0-C-02	519	BES01RN	BES Q05AC-PSC15B-EP02	555	BES01Z7	BES R05KB-PSC20B-S49A	572
BES01LZ	BES 516-378-S49-C	515	BES01RP	BES Q05AC-PSC15B-S26G	554	BES01Z8	BES R05KB-PSC40B-EP00,3-GS04	573
BES01M0	BES 516-383-E0-C-02	528	BES01RR	BES Q05AC-PSC15B-S49G	554	BES01ZA	BES R05KB-PSC40B-EV02	573
BES01M6	BES 516-383-S49-C	527	BES01RU	BES Q08ZC-NOC20B-BV02	560	BES01ZE	BES R05KB-PSC40B-S49A	573
BES01M7	BES 516-384-E0-C-02	528	BES01RW	BES Q08ZC-NOC20B-S49G	559	BES01ZF	BES 516-3040-I02-C-S49	553
BES01MA	BES 516-384-E0-C-S49-00,2	528	BES01RZ	BES Q08ZC-NSC20B-BP02	560	BES01ZH	BES 516-3042-I02-C-S49	553
BES01ML	BES 517-351-N0-C-02	568	BES01T2	BES Q08ZC-NSC20B-BV02	560	BES01ZJ	BES 517-224-U5-E-S5	631
BES01MT	BES 517-351-N0-C-S49-00,2	568	BES01T3	BES Q08ZC-NSC20B-S49G	559	BES01ZK	BES 516-344-H2-Y	574
BES01MY	BES 517-352-N0-C-02	568	BES01T7	BES Q08ZC-POC20B-BP02	560	BES01ZN	BES M12MI-PSH80B-S04G	535
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BES01NA	BES 517-398-N0-C-S49-00,2	568	BES01TF	BES Q08ZC-POC20B-S49G	559	BES01ZT	BES M08MI-NSC40B-S49G	526
BES01NF	BES 517-399-N0-C-02	568	BES01TL	BES Q08ZC-NOC20B-BP02	560	BES01ZU	BES M08MI-PSC40B-BP00,2-GS04	527
BES01NM	BES 517-399-N0-C-S49-00,2	568	BES01TN	BES Q08ZC-PSC20B-BP02	560	BES01ZW	BES M08MI-PSC40B-S49G	526
BES01NP	BES G06EF-PSC40F-S49G	511	BES01TZ	BES Q08ZC-PSC20B-BV02	560	BES01ZY	BES M12MI-NSH80B-S04G	535
BES01NR	BES G06MI-NSC40B-S49G	511	BES01U2	BES Q08ZC-PSC20B-S49G	559	BES0201	BES 517-132-M3-H	581
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BES01NY	BES G08EG-PSC15B-BV02	512	BES01U4	BES Q08ZC-PSC30B-S49G	561	BES0204	BES 517-132-M4-H	584
BES01P0	BES M04EC-PSD06B-BP02	497	BES01U6	BES Q08ZE-NOC20B-S49G	559	BES0205	BES 517-132-M4-H-S4	585
BES01P1	BES M08EA-NSD20B-S49G	520	BES01U7	BES Q08ZE-NSC20B-BP02	561	BES0206	BES 517-132-M5-H	586
BES01P2	BES M08ED-NSC25F-S04G	527	BES01UA	BES Q08ZE-NSC20B-BV02	561	BES0207	BES 517-132-M5-H-S4	587
BES01P3	BES M08ED-PSC25F-S04G	527	BES01UC	BES Q08ZE-NSC20B-S49G	559	BES020A	BES 517-132-M6-H-S4	583
BES01P5	BES M08EG-NSC25F-S04G	527	BES01UE	BES Q08ZE-POC20B-BP02	561	BES020C	BES 517-132-M7-H	587
BES01P6	BES M08EG-POC25F-S04G	527	BES01UH	BES Q08ZE-POC20B-BV02	561	BES020E	BES 517-132-M7-H-S4	587
BES01P7	BES M08EG-PSC15B-S49G	515	BES01UK	BES Q08ZE-POC20B-S49G	559	BES020H	BES 517-134-M3-H-S4	582
BES01P8	BES M08EG-PSC25F-S04G	527	BES01UM	BES Q08ZE-PSC20B-BP02	561	BES020J	BES 517-134-M4-H	584
BES01P9	BES M08EG1-PSC40F-S04G	529	BES01UR	BES Q08ZE-PSC20B-BV02	561	BES020K	BES 517-134-M5-H	586
BES01PA	BES M08EH-NOC15B-S04G	515	BES01UW	BES Q08ZE-PSC20B-S49G	559	BES020N	BES 517-134-M6-H-S4	583
BES01PC	BES M08EH-NSC15B-S04G	515	BES01UY	BES Q08ZE-PSC25B-S49G	561	BES020P	BES 517-134-M6-H-S5	583
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BES01PF	BES M08EH-PSC15B-S04G	515	BES01W1	BES R01ZC-NSC70B-BP00,2-GS49	569	BES020T	BES 517-140-M4-H-S4	589
BES01PH	BES M08EH-PSC20B-S04G	522	BES01W2	BES R01ZC-PAC70B-BP00,2-GS04	570	BES020U	BES 517-140-M5-H	590
BES01PN	BES M12EG-PSC80F-S04G	537	BES01WE	BES R01ZC-PSC70B-BP00,2-GS49	569	BES020W	BES 517-140-M5-H-S4	591
BES01PR	BES M12MD-NOC80F-S04G	483	BES01WF	BES R01ZC-PSC70B-BP00,3-GS49	569	BES020Y	BES 517-223-M3-E	627
BES01PT	BES M12MD-NSC80F-S04G	483	BES01WP	BES R03KC-PSC30B-BP00,3-GS49	566	BES0210	BES Q40KEU-PAH25F-S04G	579
BES01PU	BES M12MD-POC80F-S04G	483	BES01WR	BES R03KC-PSC30B-EP02	566	BES0211	BES Q40KEU-U0U15B-S21G	625



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BES0217	BES Q40KFU-PAC20B-S04G	577	BES0254	BES G06E60-PSC15B-EP00,3-GS49	505	BES028E	BES 516-209-S5-E	616
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BES021H	BES Q40KFU-PAC35E-S04G	695	BES0257	BES G06E60-PSC20B-EP00,3-GS49	508	BES028T	BES 516-211-E5-E-S5	617
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BES021P	BES Q40KFU-PSC15A-S04G	693	BES0259	BES G06EA-NOC15B-EP02	506	BES0291	BES 516-212-E5-E-S5	617
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BES021Z	BES Q40KFU-PSC30F-S04G	579	BES025E	BES G06EA-NSC15B-EP02	506	BES029A	BES 516-213-G-E5-E-S21	619
BES0220	BES Q40KFU-PSC35E-S04G	695	BES025F	BES G06EA-NSD15B-S49G	504	BES029H	BES 516-214-E5-E-S21	618
BES0221	BES Q40KFU-PSC35E-S04G-W01	695	BES025H	BES G06EA-POC15B-EP02	506	BES029T	BES 516-215-E5-E-S21	620
BES0223	BES Q40KFU-PSC40E-S04G	695	BES025J	BES G06EA-POD15B-S49G	504	BES029W	BES 516-215-E5-E-S5	620
BES0225	BES Q80KA-PAH40B-S04Q	589	BES025K	BES G06EA-POD20B-S49G	507	BES02A2	BES 516-216-E5-E-S21	620
BES0226	BES Q80KA-PAH50F-S04Q	591	BES025M	BES G06EA-PSC15B-EP02	506	BES02A4	BES 516-216-E5-E-S5	620
BES0227	BES Q80KA-PSH40B-S04Q	589	BES025N	BES G06EA-PSD15B-S49G	504	BES02AA	BES 516-217-E5-E-S21	621
BES0228	BES Q80KA-PSH50F-S04Q	591	BES0260	BES K06K40-NOC15B-FP02	506	BES02AE	BES 516-217-E5-E-S5	621
BES022A	BES Q40KEU-USU15B-S21G	625	BES0261	BES K06K40-NSC15B-FP02	506	BES02AK	BES 516-218-E5-E-S21	621
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BES022U	BES 517-460-U5-L-D-S5	639	BES026E	BES K06K60-POC15B-EP02	506	BES02AY	BES 516-420-E5-L-S21	636
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BES0245	BES 517-223-U4-E-S21	628	BES026Y	BES M08EA-POC15B-EP02	518	BES02E1	BES 515-123-S4-C	545
BES0246	BES 517-223-U4-E-S5	628	BES026Z	BES M08EA-POC20B-EP02	523	BES02E3	BES 515-207-S21-E	615
BES0248	BES 517-223-U5-E-S21	629	BES0270	BES M08EA-POD15B-S49G	514	BES02E4	BES 515-209-S21-E	615
BES0249	BES 517-223-U5-E-S5	629	BES0272	BES M08EA-PSC15B-EP00,3-GS26	516	BES02E5	BES 515-211-E5-E-S21	617
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BES024J	BES M12MF-GOC30B-S04G	597	BES0276	BES M08EA-PSC20B-EP00,3-GS49	522	BES02EH	BES 515-325-B0-C-PU-03	674
BES024K	BES M12MF-UOC30B-S04G	597	BES0277	BES M08EA-PSD15B-S49G	514	BES02EK	BES 515-325-E5-T-S4	679
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BES024N	BES M08ME1-GOC20B-S04G	595	BES027A	BES M30MF-UOC15B-BV02	605	BES02EN	BES 515-326-B0-C-PU-03	676
BES024P	BES M08ME1-UOC20B-S04G	595	BES027C	BES M30MF-GOC15B-S04G	603	BES02ET	BES 515-326-E5-T-S4	538
BES024R	BES M08MG-GOC20B-BV02	596	BES027E	BES M30MF-USC15B-S04G	603	BES02ET	BES 515-326-E5-T-S4	679
BES024T	BES M08MG-UOC20B-BV02	596	BES027F	BES M30MF-UOC15B-S04G	603	BES02EU	BES 515-326-S4-C	539
BES024W	BES G06E60-NOC15B-EP02	505	BES027H	BES M30MF-UOC15B-S04K	604	BES02EU	BES 515-326-S4-C	676
BES024Y	BES G06E60-NSC15B-EP00,3-GS49	505	BES027J	BES M30MF-GOC15B-S04K	603	BES02F0	BES 515-327-E5-T-S4	679
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BES02F7	BES 515-356-E4-C-03	675	BES02K4	BES M12ML-PSC30A-S04G-W01	687	BES02TJ	BES IKU-015.05-G-S5-SA1	711
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BES02FC	BES 515-356-S4-C	675	BES02KA	BES M18MF1-PSC50A-S04G-W01	699	BES02TW	BES IKV-025.23-G-Z-S4	713
BES02FH	BES 515-360-B0-C-PU-03	677	BES02KC	BES M18MI-PSC70B-S04G-W	700	BES02TY	BES IKV-045.23-G-Z-S4	713
BES02FK	BES 515-360-E5-T-S4	543	BES02KE	BES M18MI-PSC70B-S04G-W01	700	BES02U0	BES IKV-K-010-PO-1-Y	712
BES02FK	BES 515-360-E5-T-S4	679	BES02KF	BES M18ML-PSC12E-S04G-W	691	BES02U1	BES IKV-K-010-PS-1-Y	712
BES02FL	BES 515-360-S4-C	544	BES02KH	BES M18ML-PSC12E-S04G-W01	691	BES02U2	BES IKV-K-025-NS-1-Y	713
BES02FL	BES 515-360-S4-C	677	BES02KJ	BES M18ML-PSC50A-S04G-W	689	BES02U3	BES IKV-K-025-PO-1-Y	713
BES02FM	BES 515-360-SA12-S4-T	543	BES02KK	BES M18ML-PSC50A-S04G-W01	689	BES02U4	BES IKV-K-025-PS-1-Y	713
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BES02FR	BES M12EI-NSC40B-S04G	674	BES02N4	BES M08EH1-NSC20B-S04G-S01	665	BES02U9	BES IKV-S4-010-PS-1-Y	712
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BES02FU	BES M12EI-PSC40B-S04G	532	BES02N8	BES M12EI-NSC40B-S04G-S	666	BES02UR	BES G06MH1-PSC30B-S04G	510
BES02FU	BES M12EI-PSC40B-S04G	674	BES02N9	BES M12EI-NSC40B-S04G-S01	667	BES02UT	BES G06MI-NOC30B-S49G	510
BES02FW	BES M18EI-NOC80B-S04G	541	BES02NA	BES M12EI-PSC40B-S04G-S	666	BES02UU	BES G06MI-NSC30B-S49G	510
BES02FY	BES M18EI-NSC80B-S04G	541	BES02NC	BES M12EI-PSC40B-S04G-S01	667	BES02UW	BES G06MI-POC30B-S49G	510
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BES02FZ	BES M18EI-POC80B-S04G	676	BES02NH	BES M18EI-NSC72B-S04G-S01	668	BES02UZ	BES M08MG1-NOC60F-S49G	529
BES02H0	BES M18EI-PSC80B-S04G	541	BES02NJ	BES M18EI-PSC72B-S04G-S	668	BES02W0	BES M08MG1-NSC60F-S04G	529
BES02H0	BES M18EI-PSC80B-S04G	676	BES02NK	BES M18EI-PSC72B-S04G-S01	668	BES02W2	BES M08MG1-POC60F-S49G	529
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BES02H7	BES 516-114-SA1-05	671	BES02NR	BES M18MF-USC70B-S04G	600	BES02W7	BES M08MH1-NSC30B-S04G	525
BES02HC	BES 516-120-SA2	671	BES02NT	BES M18MG-GOC70B-BV02	601	BES02W8	BES M08MH1-NSC30B-S49G	525
BES02HE	BES 516-125-SA1-05	671	BES02NU	BES M18MG-UOC70B-BV02	602	BES02W9	BES M08MH1-PSC30B-S04G	525
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BES02HU	BES 516-325-SA19-03	670	BES02P4	BES 516-355-SA96-G-E5-Y-S4	541	BES02WF	BES M12EG1-NSC60Z-S04G-S11	667
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BES02JA	BES 516-326-S4-W	699	BES02RZ	BES IKN-S5-070-W-4-0	705	BES02WR	BES M12MF1-PSC10F-S04G	537
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BES02ZJ	BES M30EG1-PSC80S-S04G-S	669	BES03J6	BES M08EF-NSC15B-BP02	519	BES03T2	BES G06EH-NSC40F-S49G	503
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BES0303	BES Q40KFU-GSH15B-S04G	608	BES03JN	BES M05EC-PSC08B-S26G-R01	643	BES03T6	BES M08MH1-NOC20B-S04G	478
BES0306	BES Q40KFU-PSC20B-S04G-012	578	BES03JP	BES M05EC-POC08B-S26G-R01	643	BES03T7	BES M18ME-NOC50B-S04G-003	484
BES0308	BES Q40KFU-PSC40F-S04G-012	579	BES03JT	BES M05EC-NOC08B-S26G-R01	643	BES03T8	BES M18MD-NOC50B-BP02-003	484
BES0309	BES Q40KU-GPH20F-KM21	609	BES03K8	BES M05ED-PSC08B-BP00.3-GS49-R01	643	BES03TA	BES M30ME-NOC10B-S04G-003	487
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BES0328	BES M18MF-GSC70B-S04G	600	BES03MZ	BES M30ML-PSC20E-S04G-W01	693	BES03U7	BES Q08MEC-NOC15B-EP02	557
BES0329	BES M18MG-GSC70B-BP00.3-GS04-101	601	BES03P0	BES M08EA-PSC05B-EP02	513	BES03U8	BES Q08MEC-NSC15B-S49G	556
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BES041F	BES Q08MEC-NSC15B-EP00,3-GS49	557	BES048E	BES R04MC-PSC20B-EP00,2-GS49	563	BF00023	BFO 18A-LGG-SMG-10-0,5	294
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BES041P	BES Q08MEC-POC20B-EP00,3-GS49	559	BFB0002	BFB 75K-001-N-S75	249	BF0002C	BFO 18A-XAA-MZG-30-2,5	297
BES041R	BES Q08MEC-NSC20B-EP00,3-GS49	559	BFB0003	BFB 75K-001-P-02	249	BF0002E	BFO 18A-XAA-MZG-30-3	297
BES041T	BES Q08MEC-NOC20B-EP00,3-GS49	559	BFB0004	BFB 75K-001-P-S75	249	BF0002F	BFO 18A-XAA-SMG-30-0,5	297
BES041U	BES Q08MEC-PSC20B-EP00,3-GS26	559	BFB0005	BFB 75K-002-N-S75	251	BF0002H	BFO 18A-XAA-SMG-30-1	297
BES041W	BES Q08MEC-POC20B-EP00,3-GS26	559	BFB0006	BFB 75K-002-P-S75	251	BF0002J	BFO 18A-XAA-SMG-30-1,5	297
BES041Y	BES Q08MEC-NSC20B-EP00,3-GS26	559	BFB0007	BFB 75K-003-N-02	251	BF0002K	BFO 18A-XAA-SMG-30-2	297
BES041Z	BES Q08MEC-NOC20B-EP00,3-GS26	559	BFB0008	BFB 75K-003-P-02	251	BF0002L	BFO 18A-XAA-SMG-30-3	297
BES0423	BES M08EE-POC25B-S49G	525	BFB000C8	BFO D25 LA-HD-EAK-465-02	279	BF0002M	BFO 18A-XAA-UZG-30-0,5	297
BES0427	BES M08EE-PSC25B-S49G	525				BF0002N	BFO 18A-XAA-UZG-30-1	297
BES0428	BES Z06K-PSC16F-S49G	715	BFO			BF0002P	BFO 18A-XAA-UZG-30-1,5	297
BES0429	BES Z06K-PSC16F-BP00,1-GS04	715	BF00002	BFO D22-LA-TB-EAK-10-02	275	BF0002R	BFO 18A-XAA-UZG-30-2	297
BES0430	BES G12EE1-PSY20B-S04G-L02	681	BF00004	BFO D22-XA-SB-EAK-20-02	283	BF0002T	BFO 18A-XAA-UZG-30-3	297
BES0431	BES G12EE1-PSY40F-S04G-L02	682	BF00005	BFO D22-XA-UB-EAK-20-02	284	BF0002U	BFO 18A-XAC-SMG-30-0,5	297
BES0432	BES M12EE-POC40B-S04G-L01	681	BF00006	BFO D22-XB-UB-EAK-15-02	284	BF0002W	BFO 18A-XAC-SMG-30-1	297
BES0433	BES M12EE-PSC40B-S04G-L01	681	BF00007	BFO D22-XBF-LB-EAK-15-02	283	BF0002Y	BFO 18A-XAC-SMG-30-1,5	297
BES0434	BES M12EI-POC40B-S04G-L01	682	BF0000C	BFO N22-LA-FB-EAK-05-01	276	BF0002Z	BFO 18A-XAC-SMG-30-2,5	297
BES0435	BES M12EI-PSC40B-S04G-L01	682	BF0000E	BFO D22-LAH-ZB-EAK-10-02	280	BF00030	BFO 18A-XAC-SMG-30-3	297
BES0436	BES M12EI-NSC40B-S04G-L01	682	BF0000F	BFO 18A-LAA-MZG-20-0,5	295	BF00031	BFO 18A-XAE-MZG-30-0,5	297
BES0437	BES M18EI-PSC80B-S04G-L01	683	BF0000H	BFO 18A-LAA-MZG-20-1	295	BF00032	BFO 18A-XAE-MZG-30-1	297
BES0438	BES M18EI-POC80B-S04G-L01	683	BF0000J	BFO 18A-LAA-MZG-20-1,5	295	BF00033	BFO 18A-XAE-MZG-30-1,5	297
BES0439	BES G18EE1-PSY50B-S04G-L02	683	BF0000L	BFO 18A-LAA-MZG-20-3	295	BF00034	BFO 18A-XAE-MZG-30-2	297
BES043A	BES G18EE1-PSY80F-S04G-L02	683	BF0000M	BFO 18A-LAA-UZG-20-0,5	295	BF00035	BFO 18A-XAE-MZG-30-2,5	297
BES043H	BES M30MI-POC10B-S04G	487	BF0000N	BFO 18A-LAA-UZG-20-1	295	BF00036	BFO 18A-XAE-MZG-30-3	297
BES043J	BES M18MI-POC50B-S04G	484	BF0000R	BFO 18A-LAA-UZG-20-2	295	BF00037	BFO 18A-XAE-SMG-30-0,5	297
BES043T	BES 515-326-SA49-D-TF-02	673	BF0000T	BFO 18A-LAA-UZG-20-3	295	BF00038	BFO 18A-XAE-SMG-30-1	297
BES043U	BES 515-360-SA13-D-TF-02	673	BF0000U	BFO 18A-LCC-SMG-20-0,5	295	BF00039	BFO 18A-XAE-SMG-30-2	297
BES043W	BES 515-327-SA22-D-TF-02	673	BF0000W	BFO 18A-LCC-SMG-20-1	295	BF0003A	BFO 18A-XAE-SMG-30-3	297
BES043Y	BES 515-362-SA4-D-TF-02	673	BF0000Z	BFO 18A-LCC-UZG-20-1	295	BF0003C	BFO 18A-XAE-UZG-30-0,5	297
BES0441	BES M18EE1-PSY50B-S04G-L01	683	BF00010	BFO 18A-LCC-UZG-20-1,5	295	BF0003E	BFO 18A-XAE-UZG-30-1	297



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BF0003J	BFO 18A-XAF-MZG-15-1	296	BF0005R	BFO D22-LA-RB-EAK-10-02	276	BF000EP	BFO N22-XC-02B-PAG-16-0,9	306
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BF0003M	BFO 18A-XAF-SMG-15-0,5	296	BF0005W	BFO D22-LAT-KB-EAK-10-02	274	BF000EW	BFO N48-LA-02D-PAG-95-0,9	303
BF0003N	BFO 18A-XAF-SMG-15-1	296	BF0005Z	BFO D22-XA-CD-EAK-110-02	287	BF000EY	BFO N48-LA-04K-PAG-32-0,9	303
BF0003P	BFO 18A-XAF-SMG-15-3	296	BF00060	BFO D22-XA-ED-EAK-250-02	287	BF000EZ	BFO N48-LA-03K-PAG-16-0,9	303
BF0003R	BFO 18A-XAG-MZG-15-0,5	296	BF00061	BFO D22-XA-LB-EAK-20-02	282	BF000FO	BFO N48-XC-02K-PAG-32-0,9	309
BF0003T	BFO 18A-XAG-MZG-15-1	296	BF00062	BFO D22-XA-MB-PAK-10-02	286	BF000F1	BFO N48-XC-02B-PAG-24-0,9	308
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BF0004F	BFO 18V-LDD-SMG-23-1	295	BF000C6	BFO D10-LAH-CK-EAK-05-02	281	BF000FY	BFO N48-LA-04B-PAG-32-1,8	303
BF0004H	BFO 18V-LDD-SMG-23-1,5	295	BF000C7	BFO D10-LAH-DK-EAK-05-02	281	BF000FZ	BFO N48-XC-06B-PAG-32-1,8	308
BF0004J	BFO 18V-LDD-SMG-23-2	295	BF000C9	BFO D22-XB-UB-EAK-15-SA1-02	463	BF000H0	BFO N48-XC-02K-MZG-32-1,8	309
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BF00054	BFO D10-XA-RB-EAK-10-02	285	BF000E3	BFO N48-XC-01K-MZG-32-0,9	310	BGL0002	BGL 10A-002-S49	350
BF00055	BFO D10-XAH-KB-EAK-10-02	284	BF000E4	BFO N48-XC-04K-MZG-32-0,9	310	BGL0003	BGL 10A-005-S49	354
BF00056	BFO D13-LA-QB-EAK-05-02	277	BF000E6	BFO N48-XC-01B-MZG-16-0,9	309	BGL0004	BGL 10A-006-S49	354
BF00057	BFO D13-LA-WB-EAK-05-02	277	BF000E7	BFO N48-XC-02D-MZG-95-0,9	311	BGL0005	BGL 10A-007-S49	358
BF00058	BFO D13-LG-05-EAK-30-02	280	BF000E9	BFO N48-XC-04B-MZG-32-0,9	311	BGL0006	BGL 10A-008-S49	358
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BF0005C	BFO D13-XB-KB-EAK-10-02	285	BF000EE	BFO N48-XC-06B-MZG-32-0,9	309	BGL0009	BGL 120A-003-S49	363
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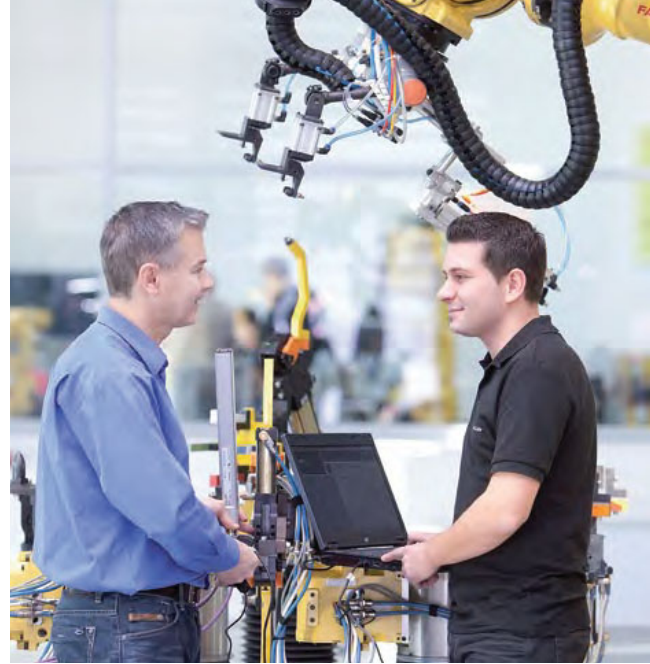


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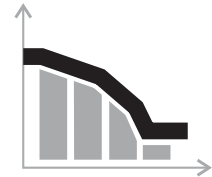
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- Selection of the correct identification procedure for an assembly line
- IO-Link concept as a cost-effective alternative to conventional wiring
- System consulting for radio frequency identification (RFID): identification in adverse environments
- Recognizing multiple containers on a pallet in goods

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Real-world examples:

- Setting up an optical checkpoint with the BVS vision sensor
- Consulting and support during the programming of BIS RFID systems
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Fully customized products: Order individual versions according to your requirements: from preassembly to engineering services. And take advantage of the optimum.

Real-world examples:

- Extending the housing of a BHS high-pressure resistant inductive sensor
- Extra threads for the housing cover of a BTL micropulse travel sensor
- Customer-specific holder for a RFID data carrier
- Adaptation of the characteristics for BAW analog sensors

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- **Professional sensor use:** Select effective principles, install sensors professionally and secure the reliable operation of your application
- **RFID:** The right data at the right time at the right place
- **Vision sensor:** Using an image processing sensor, ensure manufacturing quality in three steps
- **Vision sensor ident:** Reliably identify data matrix codes with an image processing sensor
- **Industrial networking with IO-Link:** Manage signals intelligently and cost-effectively

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