

Photoelectric Sensors Principles

Only true specialists can excel in any given area. This is why Balluff has expanded its product range of photoelectric sensors, which has always been designed to meet the most varied of challenges.

We consider ourselves as a partner and consultant for our customers. We are constantly improving and expanding our product range, so that when you come to us you will find the best solution.

2.0

The most significant new additions are:

- Series BOS 2K
- Series BOS 5K
- Series BOS 12M
- Series BOS 18M
- Series BOS 26K
- Fiber optic base units BFB 75K
- Plastic fiber optics
- Series BOD 26K

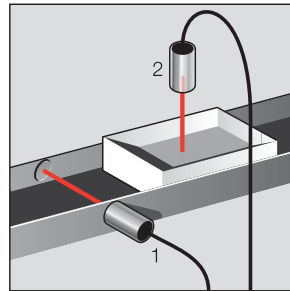
2.0.2 Applications

2.0.8 Product overview

2.0.16 Principles, definitions

The application examples are shown in simplified form. Complete part numbers are not provided for the recommended sensors since the exact model will vary from application to application. Our applications assistance group will help you to find the optimal solution.

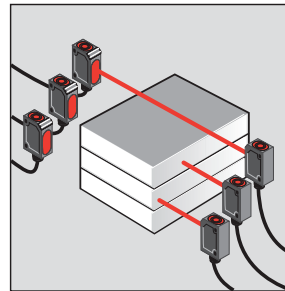
Sensing size and contents of containers



BOS 18M-...-1QB-... Retroreflective
BOS R-1 Reflector
BOS 18M-...-1HA-... Diffuse with background suppression and adjustable switching distance

The retroreflective sensor (1) indicates the presence of the box. Boxes can be counted or the length of a box determined (from the pulse duration). The diffuse sensor (2) has background suppression (background suppression) and its range is adjustable. It checks the contents of the boxes on the conveyor belt.

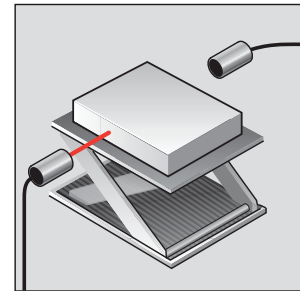
Sensing stack height



BLS 15K-... Emitter
BLE 15K-... Receiver

Each through-beam pair checks a certain stack height. Several sensors can be mounted over each other. The sensing accuracy in the vertical axis is just a few millimeters if the supplied apertures are used.

Guiding a moveable stage

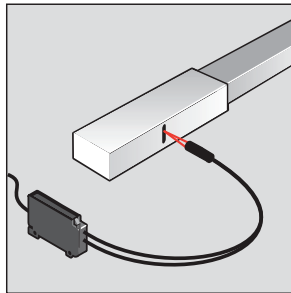


BLE 18M-... Receiver
BLS 18M-... Emitter
BOS 18-BL-2 Slit aperture

The sensors are arranged so that the upper metal block breaks the light beam. When the block is removed for processing, the beam path is open. The sensor gives a signal, and the stage is automatically raised by the height of a block.



Sensing a read mark



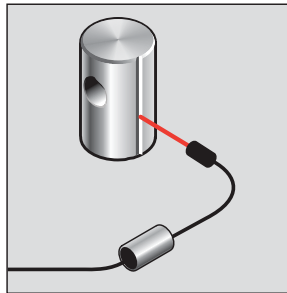
BFB 75K-...

Base units
for plastic
fiber optics
Fiber optics

BFO ...

A marking (light band) on a dark background (belt, tube, container etc.) can be detected. Here a base unit for fiber optics and a plastic fiber optic cable are used.

Detecting a groove



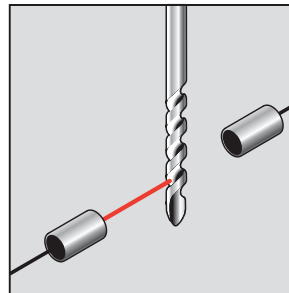
BOS 18M-...-1PD-...

Diffuse with
adjustable
sensing
distance
Fiber optic
cable

BFO 18-...

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

Drill break monitor

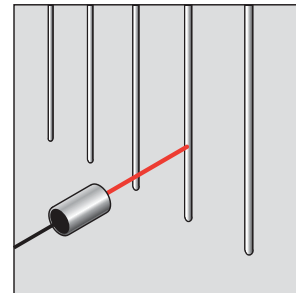


BLS 18M-...
BLE 18M-...
BOS 18-BL-2

Emitter
Receiver
Double slit
diaphragm for
through-beams

Broken drill detection from a distance of 2 meters can be accomplished using a through-beam system with double slit diaphragm. Drills larger than approx. 2 mm diameter can be checked. To detect even smaller drills (up to $\varnothing$ 0.1 mm), use a laser through-beam sensor.

Small parts detection



BOS 18M-...

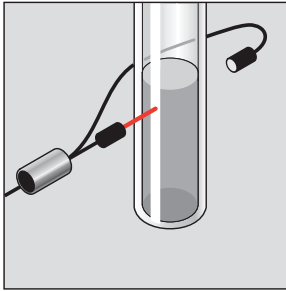
Diffuse with
adjustable
sensing
distance
Plano-convex
lens
BOS 18-PK-1
BOS 18M-...-1HA-... Diffuse with
background
suppression

BOS 18-PK-1

Detection of small parts while masking the background is done using a BOS 18-PK-1 optical adapter. For example, threads with a diameter of 0.05 mm could be sensed, whereby color is not a factor. The sensing range here is approx. 0...13 mm. Longer ranges can be achieved by using diffuse sensors with background suppression.

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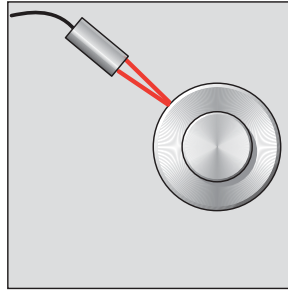
**Level detection in
transparent containers**



BOS 18M-...-1PD-... Diffuse
BFO 18A-... Fiber optics

A diffuse sensor with fiber optic attachment is used as a through-beam to monitor the level in a transparent container (cylinder). If there is no liquid at the height of the sensor, the light beam is not interrupted and instead arrives at the receiver. If there is liquid at the height of the sensor, the light beam is deflected by the receiver. The switch changes its output condition.

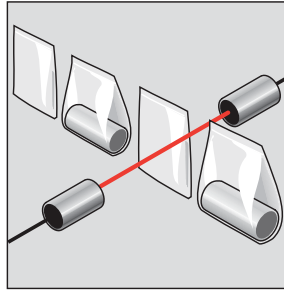
**Differentiating
various diameters**



BOS 18M-...-1HA-... Diffuse with
background
suppression
and adjustable
switching
distance

To detect various shaft diameters, a diffuse sensor with background suppression (background suppression) is calibrated so that it switches when the diameter is large. If there is a small diameter at the check point, it is recognized as "background". The switch does not change.

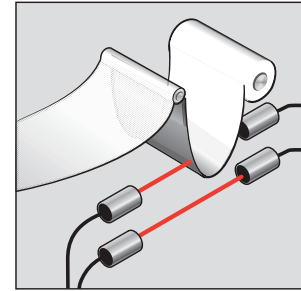
**Checking contents
of a package**



BLE 18M-... Receiver
BLS 18M-... Emitter
BOS 18-BL-1 Diaphragm
for through-
beams

A through-beam version is used to check the contents of the packaging. Emitter and receiver are arranged such that the light beam passes through the packaging. If the package is empty, the intensity is sufficient to illuminate the receiver. If, however, there are contents in the package, the contents interrupt this beam from the emitter. The switching output changes.

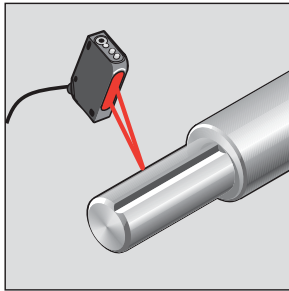
Slack control



BLE 18M-... Receiver
BLS 18M-... Emitter

Two through-beam sensors can be used to control the guiding of a roller conveyor. 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 paths are clear, more roll tension is needed. If both are interrupted, there is too much material (slack) present.

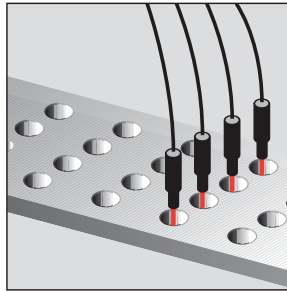
Parts positioning



BOS 26K-...-1LHB-... Laser sensor with background suppression and adjustable switching distance

For the positioning of a turned part, a previous slot can be used. A laser light diffuse sensor is set with background suppression such that it detects the surface of the rotating 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.

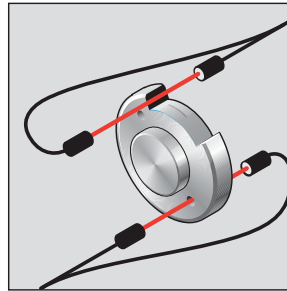
Level control of granules in small packages



BFB 75K-... Base units for plastic fiber optics
BFO ... Fiber optics

A group of sensors monitors the contents of a whole row of small packets on a conveyor belt. The plastic fiber optics cable can be user-cut to the desired length. Standard supplied length is 2 meters.

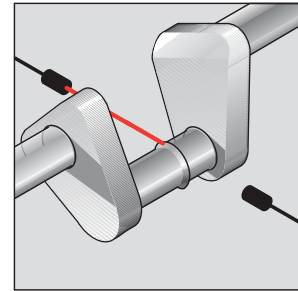
Quality control on workpieces



BFB 75K-... Base units for plastic fiber optics
BFO ... Fiber optics

Multiple sensors with fiber optic attachments simultaneously check different features of a workpiece. Only if all holes, screws, tolerances and surface qualities are present, will the workpiece be accepted. Later failures and stalling are thus avoided.

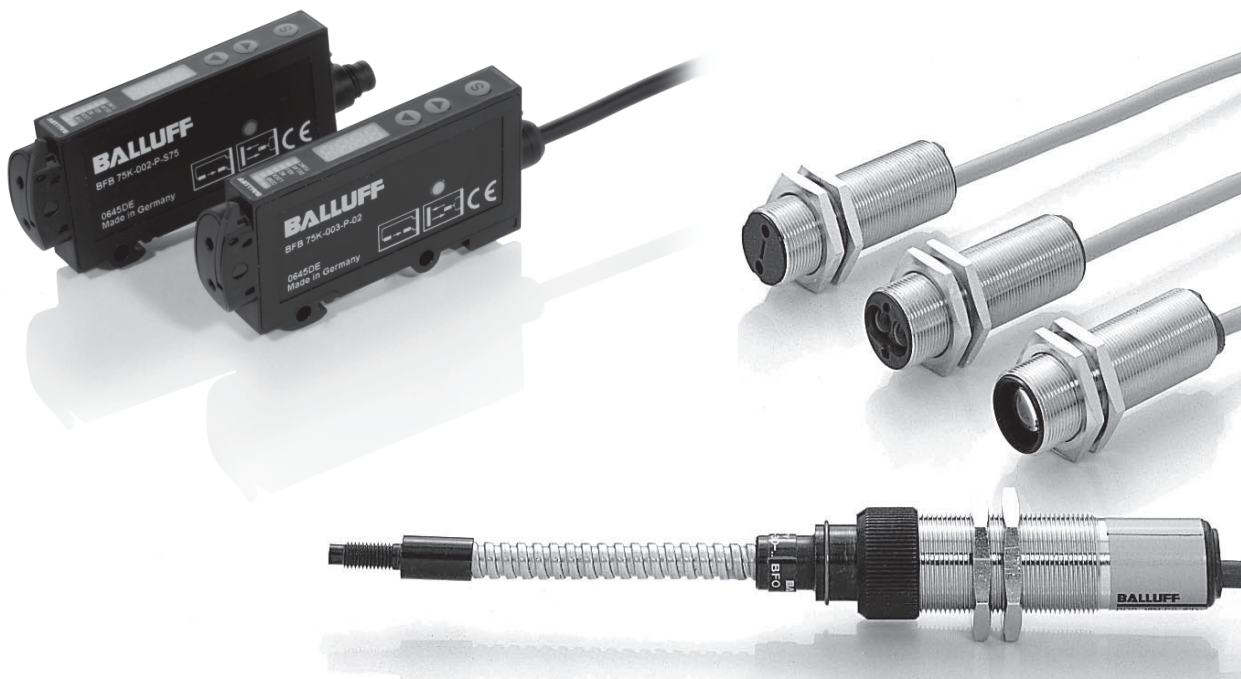
Detecting a bead on a cam shaft



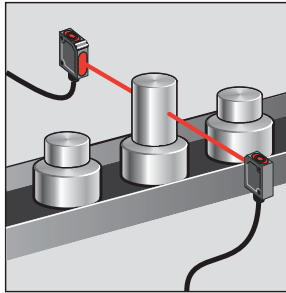
BOS 18M-...-1PD-... Diffuse with adjustable sensing distance
BFO 18-... Fiber optics cable

To determine whether a bead is present or not, a fiber optic attachment is used with a diffuse sensor. The fiber optic is arranged on a level parallel to the camshaft. If a bead is present, the light beam is interrupted. With no bead, the beam path is free.

2.0



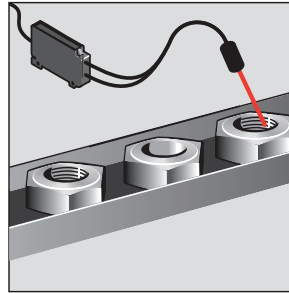
Part sorting



BLS 6K-...
BLE 6K-... Emitter
Receiver

To sort out parts which vary in height, a through-beam sensor can be used. By pressing a button you can calibrate the BLS/BLE 6K so that the taller part interrupts the light beam and can be separated out. The teach-in procedure allows you to make this setting rapidly and adjust it to changing requirements.

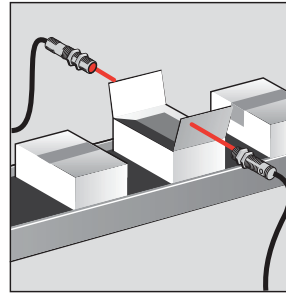
Thread checking



BFB 75K-... Base units
for plastic
fiber optics
Fiber optics
BFO ...

Prior to assembling nuts, a check needs to be made to determine whether threads are present or not. If the threads are present, they will reflect the light back to the fiber optics and the sensor will operate. If no threads are present, total reflection takes place on the bare wall of the hole and no light returns to the fiber optics. There is no breaker signal on the sensor.

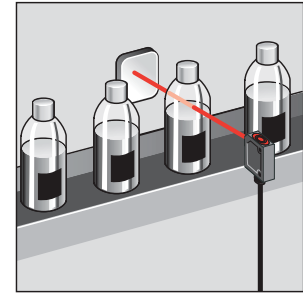
Packaging inspection



BLS 12M-... Emitter
BLE 12M-... Receiver

To check whether a packaging is correctly closed, a through-beam sensor is configured so that the light path is just above the packaging. If the packaging is not correctly closed, the obstructing lid interrupts the light beam and the through-beam sensor signals this.

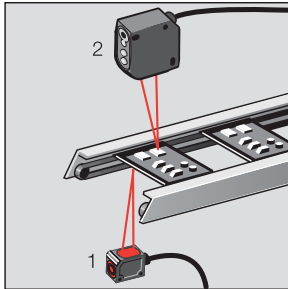
**Counting
transparent bottles**



BOS 6K-.../
BOS 21M-... Retroreflective
for glass
sensing

Reliable sensing of transparent objects, which absorb very little light, is best done using retroreflective sensors with low hysteresis. Using the BOS 6K with teach-in calibration you can even change the calibration setting while the process is running. It is no longer necessary to stop the process, since the sensors can, for example, be calibrated during the warm-up phase.

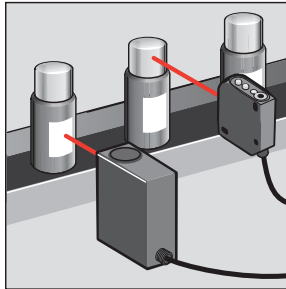
Circuit board inspection/ positioning



BOS 15K Diffuse focused
BOS 26K Laser diffuse sensor with background suppression

To bring the circuit board to a particular inspection position, a focused diffuse sensor (1) is used. The circuit board crosses the light path of the sensor exactly at its focal point, thus enabling maximum precision. The small light spot from the laser diffuse sensor (2) and the background suppression can be used to check whether even small components are present on the board.

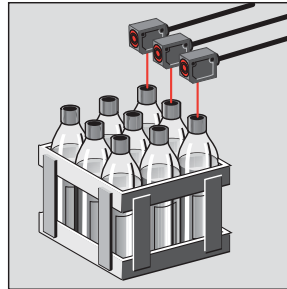
Final inspection: labels, caps



BKT Contrast sensor
BOS 26K Diffuse with background suppression

For 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. Advantage of background suppression: if no cap is present, the threaded closure can be suppressed.

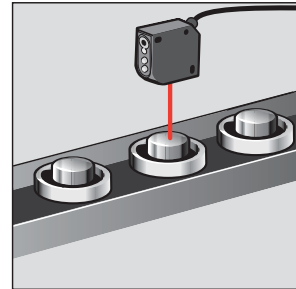
Checking for caps



BOS 26K Diffuse with background suppression
BOS 18M Diffuse with background suppression

Depending on installation circumstances and the required switching distance, a wide variety of diffuse sensors with background suppression can be employed. For tight mounting spaces the BOS 6K is ideal. If maximum resolution is required, the BOS 18M is the best choice; and if greater sensing range is needed, sensors from the series BOS 26K, BOS 36K or BOS 65K will solve the problem.

Checking for correct quantity



BOS 26K Diffuse with background suppression

Diffuse sensors with background suppression are used to check in detail whether an assembly process has been completed. These sense small objects with high precision and are not misled by different colors. Using laser sensors with background suppression allows even finer details to be detected.

2.0

								
Type	BOS 08M	BOS 12M	BOS 18M Potentiometer	BOS 18M Laser	BOS 18MR Laser	BOS 18M teach-in	BOS 18MR	
Housing material	Metal	Metal	Metal	Metal	Metal	Metal	Metal	
Sensing distance/range								
Through-beam Emitter/receiver	0...1.1 m	0...3 m, 0...5 m 0...30 m	16 m	0...60 m	0...60 m	16 m	0...16 m	
Retroreflective			4 m					
Retroreflective with polarizing filter	25...550 mm	0...1.5 m	2 m		0.1...9 m	2 m	0...2 m	
Retroreflective for detecting glass								
Diffuse	0...55 mm	100 mm, 200 mm, 400 mm	100 mm, 200 mm, 400 mm, 1 m		0...250 mm	400 mm	400 mm	
Diffuse with background suppression		0...24 mm, 10...60 mm	10...120 mm, 40...120 mm	30...150 mm			10...120 mm, 40...120 mm	
Fiber optic Base unit			depending on fiber type					
Technical data								
Supply voltage	10...30 V DC	10...30 V DC	10...30 V DC, 20...250 V AC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC, 10...36 V DC	
Output Function	PNP NO/NC	PNP NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP NO/NC	PNP NO/NC	
Connection	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector	Connector	
Operating temperature	-10...+60 °C	-20...+60 °C	-20...+60 °C	-15...+55 °C	-10...+50 °C	-15...+55 °C	-25...+55 °C	
Degree of protection per IEC 60529	IP 67	IP 67	IP 65/IP 67	IP 67	IP 67	IP 67	IP 67	
Light	red	Infrared/red/laser	Infrared/red	Laser	Laser	Infrared/red	red	
Dimensions	M8x50...57.5 mm	M12x65...74 mm	M18x62...95 mm	M18x79...85 mm	M18x79...93.5 mm	M18x70...72 mm	M18x78.6...82 mm	
Features				Focusable through-beam version	Focusable through-beam version	Alarm output		

see starting page

2.1.4

2.1.8

2.1.20

2.1.30

2.1.34

2.1.40

2.1.44

							
BOS 18E Stainless steel	BOS 18KF Plastic	BOS 18KF Laser Plastic	BOS 18KW Plastic	BOS 18KW Laser Plastic	BOS 18K Plastic	BOS 18KR Plastic	BOS 30M Metal
16 m	0...20 m	0...60 m	0...15 m	0...50 m	0...13 m	0...11 m	
4 m	0.1...5 m						
2 m	0.1...4.5 m	0.1...16 m	0.1...3 m	0.1...9 m	0.1...2.2 m	0.1...1.7 m	
	0.1...1.7 m		0.1...1.7 mm				
100 mm, 200 mm, 400 mm	0...100 mm, 0...400 mm, 0...700 mm	0...350 mm	0...80 mm, 0...400 mm	0...250 mm	0...300 mm	0...250 mm	0...2 m
40 mm	50...100 mm 100 mm, 40...100 mm		50...100 mm 100 mm				
							depending on fiber type
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
PNP NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC
Connector	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector
-20...+75 °C	-25...+55 °C	-10...+50 °C	-25...+55 °C	-10...+50 °C	-25...+55 °C	-25...+55 °C	-20...+60 °C
IP 68	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 65
Infrared/red	Infrared/red	Laser	Infrared/red	Laser	Infrared/red	Infrared/red	Infrared
M18x70 mm	M18x67...81.5 mm	M18x67...81.5 mm	M18x79...93.5 mm	M18x79...93.5 mm	M18x67...81.5 mm	M18x79...93.5 mm	M30x92...108 mm
Tighter sealing, glass or plastic fiber optics	flexible mounting options	flexible mounting options	flexible mounting options	flexible mounting options			
2.1.48	2.1.54	2.1.62	2.1.72	2.1.78	2.1.86	2.1.88	2.1.94

								
Type	BOS Q08M	BOS 2K	BOS 5K	BOS 6K	BOS 6K Laser	BOS 15K	BOS 21M	
Housing material	Metal	Plastic	Plastic	Plastic	Plastic	Plastic	Metal	
Sensing distance/range								
Through-beam Emitter/receiver	0...1.1 m	0...1.2 m	0...10 m	0...6.5 m		0...5 m	0...20 m	
Retroreflective								
Retroreflective with polarizing filter	25...550 mm	45...800 mm	0.1...4 m	5...700 mm 0.05...3 m	0.05...1.5 m	0.1...2 m	0.1...8 m, 0...4 m	
Retroreflective for detecting glass				5...500 mm			0...2 m	
Diffuse	0...55 mm	1...55 mm	0...900 mm, 50...200 mm	20...300 mm		12 mm, 100 mm, 500 mm	0.01...1 m, 0.05...2 m	
Diffuse with background suppression		1...15 mm 1...30 mm	40...200 mm	25...100 mm	20...60 mm, 30...110 mm		20...200 mm, 70...200 mm	
Fiber optic Base unit				depending on fiber type				
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	10...30 V DC	
Output Function	PNP NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	
Connection	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector	
Operating temperature	-10...+60 °C	-20...+50 °C	-25...+55 °C	-20...+60 °C	-20...+60 °C	-15...+55 °C	-25...+55 °C	
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67	IP 67	IP 66	IP 67	
Light	red	red	Infrared/red	Infrared/red	Laser	Infrared/red	Infrared/red	
Dimensions	8×8×44...59 mm	20.6×12.5×7.6 mm	19.5×31.5×10.8 mm	32×20×12 mm	20×30×12 mm	29×44×13 mm	41.5×49×15 mm	
Features				teach-in	teach-in	also with axial light exit	Through-beam with autocollimation	

see starting page

2.1.98

2.1.102

2.1.112

2.1.120

2.1.126

2.1.132

2.1.138

									
BOS 21M Laser Metal	BOS 26K Plastic	BOS 26K Laser Plastic	BOS 36K Plastic	BOS 65K Plastic					
0...60 m			0...50 m	0...50 m					
	0...5.5 mm	0...20 m							
0.1...20 m			0.1...8 m	0.3...8 m					
0...600 mm			10...2000 mm	50...2000 mm					
50...100 mm	30...300 mm, 150...600 mm	30...150 mm, 50...300 mm	100...500 mm	200...1100 mm					
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC, 17...264 V AC/DC					
PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP NO/NC	PNP/NPN NO/NC					
Connector	Connector	Connector	Connector	Connector/ terminal chamber					
-10...+50 °C	-20...+60 °C	-15...+45 °C	-10...+55 °C	-20...+55 °C					
IP 67	IP 67	IP 67	IP 66	IP 67					
Laser	Infrared/red	Laser	Infrared/red	Infrared/red					
41.5x49x15 mm	50x50x17 mm	50x50x17 mm	55x65x20 mm	73x85x32 mm					
	Through-beam with autocollimation	Through-beam with autocollimation	rotatable connector	Time functions, Alarm output Universal voltage					

2.1.142

2.1.150

2.1.152

2.1.158

2.1.165

								
Type	BFB 75K	BOS 73K	BOS 74K	BOS 6K	BOS 18KF			
Housing material	Plastic	Plastic	Plastic	Plastic	Plastic			
Sensing distance/range								
Fiber optic Base unit	depending on fiber type	depending on fiber type	depending on fiber type	depending on fiber type	depending on fiber type			
Fiber optics								
Distance sensor								
Diffuse with background suppression								
Technical data								
Supply voltage	10...30 V DC	11...26 V DC	10...30 V DC	10...30 V DC	10...30 V DC			
Output Function	PNP/NPN NO/NC	PNP NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC			
Connection	Connector/Cable	Connector/Cable	Connector/Cable	Connector/Cable	Connector/Cable			
Operating temperature	-20...+60 °C	-25...+55 °C	-10...+60 °C	-20...+60 °C	-25...+55 °C			
Degree of protection per IEC 60529	IP 64	IP 54	IP 66	IP 67	IP 67			
Light	red	red	red	red	red			
Dimensions	35x65x10.5 mm	30x60x9 mm	41x69x12 mm	27x37x12 mm	M18x82.5...87 mm			
Features	with display Analog output	with display						

see starting page

2.2.5

2.2.9

2.2.11

2.2.13

2.2.15

								
	BFO	BFO 18	BOD 6K	BOD 18KF	BOD 26K Laser	BOD 63M Laser	BOD 66M	BOD 66M Laser
	Plastic	Polyurethane, metal, silicon	Plastic	Plastic	Plastic	Metal	Metal	Metal
			20...80 mm	50...100 mm	45...85, 30...100, 80... 300 mm	200...2000 mm 200...6000 mm	100...600 mm	200...2000 mm
			20...80 mm		30...100 mm, 80... 300 mm	200...2000 mm 200...6000 mm	100...600 mm	200...2000 mm
			15...30 V DC	10...30 V DC	18...28 V DC 18...30 V DC	15...30 V DC	18...30 V DC	18...30 V DC
			analog PNP NO/NC	analog	analog/PNP NO/NC	analog/PNP NO	analog/PNP NO	analog/PNP NO
			Connector/ Cable	Connector/ Cable	Connector/ Cable	Connector	Connector	Connector
	-40...+115 °C	-20...+85 °C, -20...+170 °C	-20...+60 °C	-25...+55 °C	-10...+60 °C	-10...+55 °C	-20...+50 °C	-20...+50 °C
			IP 67	IP 67	IP 67	IP 65	IP 65	IP 65
	for red light	for infrared light	red	red	Laser	Laser	red	Laser
			20×32×12 mm	M18×77...81.5 mm	50×50×17 mm	90×70×35 mm	73×90×30 mm	73×90×30 mm
		Special lengths possible	Teach-in		adjustable Measuring range			
	2.2.18	2.2.28	2.2.35	2.2.37	2.2.39	2.2.47	2.2.51	2.2.53

2.0

								
Type	BKT 6K	BKT 18KF	BKT 21M	BKT M	BLT 18KF	BLT 21M	BLT M	
Housing material	Plastic	Plastic	Metal	Metal	Metal	Metal	Metal	
Sensing distance/range								
Contrast sensor	40...150 mm	10 mm	19 mm	9 mm (18 mm)				
Luminescence sensor					8...20 mm	0...40 mm	9...18 mm	
Color sensor								
Fork sensor								
Angle sensor								
Dynamic optical window								
Light grid								
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	10...30 V DC	
Output Function	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	analog/PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	analog/PNP/NPN NO/NC	
Connection	Connector/ Cable	Connector/ Cable	Connector	Connector/ Cable	Connector/ Cable	Connector	Connector	
Operating temperature	-20...+60 °C	-25...+55 °C	-25...+55 °C	-10...+55 °C	-25...+55 °C	-10...+55 °C	-10...+55 °C	
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	
Light	Laser	white	white	red/green	UV	UV	UV	
Dimensions	20×30×12 mm	M18×77...81.5 mm	42.5×50×15 mm	62×83×31 mm	M18×77...81.5 mm	42.5×50×15 mm	62×83×31 mm	
Features	focused light beam			Interchangeable optics			other sensing distances with added lenses	

see starting page

2.2.57

2.2.59

2.2.61

2.2.63

2.2.69

2.2.71

2.2.73

							
BFS 26K	BFS 27K	BGL	BGL 21	BWL Standard Metal	BWL Automotive Metal	BOWA	BLG
Plastic	Plastic	Metal	Metal	Metal	Metal	Metal	Metal
12...32, 15...30, 18... 22 mm	5...45 mm						
		5, 10, 20, 30, 50, 80, 120, 180, 220 mm	2 mm fixed				
				40, 54, 68, 90, 110 mm	22x22, 43x43, 42x62 mm		
						40x80, 80x80, 120x80 mm fixed	
							0.15...2.1 m
12...28 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	24 V DC
3 × PNP NO	3 × PNP/NPN NO; RS 485	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP/NPN NO/NC	PNP NO	PNP NO	PNP/analog NO
Connector	Connector	Connector	Connector	Connector	Connector	Connector	Connector
-10...+55 °C	-10...+55 °C	-10...+60 °C	0...+55 °C	-10...+60 °C	-10...+60 °C	-10...+55 °C	0...+55 °C
IP 67	IP 67	IP 67	IP 65	IP 67	IP 67	IP 65	IP 65
white	white	Red/laser	red/green	Red/laser	Infrared	Infrared	Infrared
50x50x17 mm	50x50x25 mm	depending on type	90x26x20 mm	depending on type	depending on type	depending on type	depending on type
various light spot sizes	Display, high switching frequencies	stackable	for label sensing	stackable		Dynamic measurement	Various measuring field heights
2.2.79	2.2.81	2.2.84	2.2.91	2.2.94	2.2.98	2.2.102	2.2.107

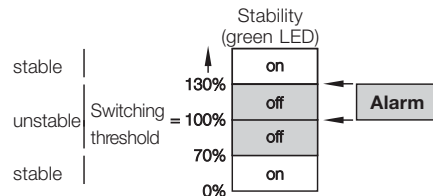
2.0

Wire colors
designation
per DIN IEC 60757

BN	brown
BK	black
BU	blue
OG	orange
WH	white
RD	red
GY	gray

The **alarm output** ...
(for series BOS 15,
BOS 18 teach-in, BOS 25,
BOS 65, BOS 74)

... in the receiver (PNP open collector – 30 mA). The receiver is equipped with an alarm output. It acts as a warning signal when the function is affected by contamination or mechanical maladjustment. The alarm output is activated when the receive signal is present in the alarm range for a defined



length of time. For series BOS 18M teach-in and BOS 65K the entire family,

including diffuse and retroreflective, is equipped with an alarm.

Analog output

A sensor with an analog output does not switch at a particular target distance. These devices have an analog output with a distance-dependent output

signal. The output voltage is proportional to the object point in the sensing area. These systems operate on the same principle as sensors with background

suppression. They generate a linear output signal within a certain range (measuring range)

Turn-off delay ...

... is the time which the sensor requires for actuation

when the target object leaves the sensing zone, at a

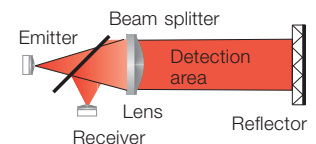
transmission efficiency factor of 0.5.

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 having

autocollimation a small, round beam profile. And there are further benefits: no dead zone for sensing and for the reflector, better small parts detection, and the switching characteristic is

independent of the approach direction.



Dark switching
per DIN 44030

Light receiver

non-illuminated
illuminated

Amplifier

conducting
non-conducting

Consumer

switched on
switched off

Turn-on delay ...

... is the response time a sensor needs if the target

object enters the sensing zone, with the transmission

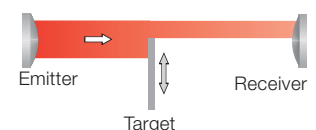
efficiency at a factor of 2.

Through-beam

Through-beam sensors consist of separate emitter and receiver units which must be aligned on opposite sides of the sensing path. A target interrupts the light beam and causes the receiver to switch,

regardless of the surface characteristics. Through-beam versions are best in unfavorable conditions (e.g. dust, moisture, oil).

Ranges of up to 50 m can be achieved.



Color sensing

Sensors for color recognition detect objects based on their color. The sensor is

calibrated so that it recognizes objects having a certain color.

Objects with different colors do not generate a switching signal.

Fiber optics

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 over a longer period 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 $T = +85\text{ °C}$
- Excellent chemical resistance
- Flexible
- No embrittlement from oils and cooling emulsions.

Metal corrugated tube, silicon jacketed

- Temperature $T = +150\text{ °C}$
- Highly flexible
- Crush-resistant
- Can be sterilized.

Metal jacket

- Temperature $T = +150\text{ °C}$
- Resistant to hot chips
- Flexible
- Crush-resistant

Focusing

To achieve a smaller light spot, the light beam from the emitter is focused using lenses. Focusing and the resulting light spot allow the

switch to better detect small parts and details. Focusing is often used with retroreflective sensors, as well as with diffuse sensors,

and in conjunction with background suppression.

Ambient light ...

... is the portion of light which is picked up by the

receiver, but does not originate from the emitter.

Fork sensor

Fork sensors are through-beam designs in which the emitter and receiver are arranged opposing in a U-shaped housing. The fixed housing makes alignment and the electrical connection easier. Different ranges are

available by selecting different housing configurations. Slot openings of between 5 and 220 mm in various step sizes are available. The built-in potentiometer and diaphragms allow you to adjust the fork sensors

easily for detecting parts down to a diameter of 60 mm.

Gray scale shift

Gray scale 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 % Reflexion. A Kodak gray card having 18 % Reflexion is used and the resulting distance measured. The difference between these

two switchpoints in % is referred to as the gray scale shift. The smaller the gray scale shift the less color-dependent the sensor will be.

Light switching per DIN 44030

Light receiver

illuminated
non-illuminated

Amplifier

conducting
non-conducting

Consumer

switched on
switched off

Background suppression
(background suppression)

Background suppression allows objects within a certain switching distance to be detected without being affected by a reflecting background and virtually independent of object reflectivity (color or surface texture).
Background suppression is realized by allowing the beam cones of the emitter

and receiver to intersect. This results in a division of the field of view 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. These two design features allow the object to be reliably distinguished from the background. Diffuse sensors with background suppression are characterized by low gray scale shift and hysteresis.

Hysteresis H ...

...is the distance between the switchpoints for a target

approaching and then receding from a

photoelectric switch.

Kodak gray card

The "standard target" for photoelectric sensors is the Kodak gray card. This is a cardboard sheet whose

surface has a defined degree of reflectivity. The side with 90 % reflection is used for determining the range of

diffuse sensors, and the side with 18 % for determining the gray scale shift.

Correction factors
(for diffuse types)

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

Short circuit protection

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.

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 for the classification are described in 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 operate in the following laser protection classes

Class 1: harmless, no protective measures necessary

Class 2: low power, eyelid reflex is sufficient protection.

For devices in Class 2 the eye protects itself from looking too long into the beam through the eyelid reflex. Appropriate warning labels must be affixed to the device and in some cases to the machine in which the laser is used. No other mechanical or optical protection measures are required. When using devices from class 1 and 2, no person responsible for laser protection needs to be present.

Light as a sensor medium ...

...is used in numerous areas of technology and in everyday life in controlling applications. Generally a change in the light intensity in an optical beam (between emitter and receiver) caused by a target object is evaluated. Depending on the properties of this object and the characteristics of the optical beam, the light beam is either interrupted or

reflected, or even scattered. Pulsed infrared LED's are normally used as the emitter, and phototransistors as the receiver. The output signal is for the most part independent of the ambient light conditions, since visible light can be easily filtered out. In critical sensing applications, diffuse sensors or through-beam systems with red light LED's are used,

since the light beam and the sensing point can be visually seen and more easily adjusted. Balluff offers three sensor types for the various application requirements: diffuse, retroreflective, and through-beam sensors.

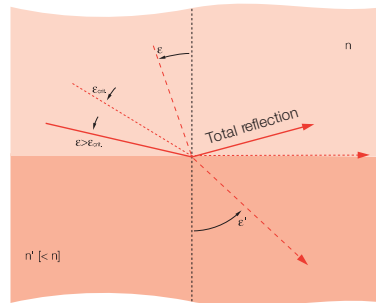
Light refraction

Light beams experience a change in direction at the surfaces of two optical media with differing optical density (e. g. glass/air), i. e. they are refracted. The degree of refraction is dependent on the quotients of the optical densities n 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' . Above $\epsilon_{crit.}$ (critical angle, at which the deflected

beam runs parallel to the boundary layer), however, it re-enters the medium with density n , i. e. here there is total reflection.

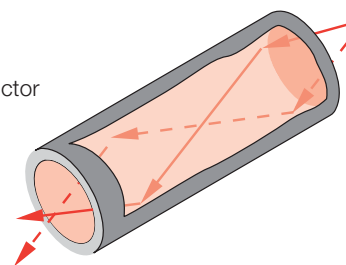


Light transmission by total reflection

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 conductor

length over which reliable information can be propagated.

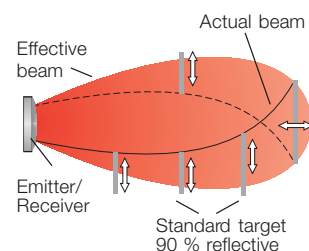


Diffuse

With diffuse types the emitter and receiver are integrated into a single housing. Orientation to the target is not critical. 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. Once the standard target

enters the effective beam (see illustration), a change in the output switching state occurs. The sensing distance depends upon size, shape, color and surface characteristics of the reflecting target object. Using a Kodak gray card with 90 % reflectivity (like

white paper), distances of up to 2 m can be obtained.



Max. **humidity ...**

... is 35...85 %
(non-condensing).

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.

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 systems can thus not reliably distinguish

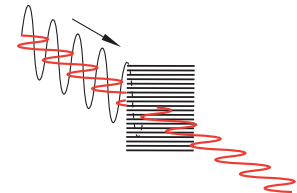
reflected „object light“ from „reflector light“. False switching can therefore not be ruled out. Balluff retroreflective sensors are available with **polarizing filters**, which together with a **Balluff reflector**, an **“optically active” prism**

mirror, provide a selective barrier against the reflected “object light” while still allowing the “reflector light” to pass freely.

How do they work?

Light consists of a number of „single beams“, all of which oscillate sinusoidally around their propagation axes. Their polarization planes are, however, independent of each other and can assume any angle orientation (see figure). When they meet a polarizing filter (fine grid lines), only the beams oscillating parallel

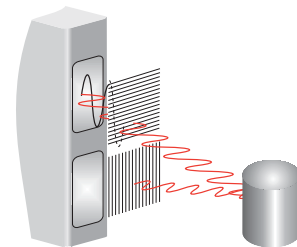
to the grid plane are allowed to pass, and those oscillating at right angles to the grid are canceled out. Of all the other polarization planes, only the portion which consists of parallel components is allowed to pass.



... for blocking reflected light

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.

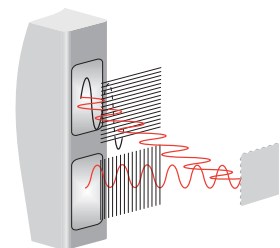
With a 90° rotated polarizing filter in front of both the emitter and receiver of a retroreflective system, you can therefore prevent the reflected light of a reflecting target object from falsely triggering the signal of the photo-receiver.



... for reliable detection of reflecting 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 retro-reflective system is thereby fully shielded even when a reflecting target object enters the beam, so that the object is still reliably detected.



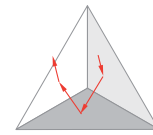
Reflectors

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 said to be **“optically active”**, because they also rotate the polarization level of the reflected light beam by 90°. This characteristic is needed – together with a

polarizing filter (see page 2.0.20) – to provide reliable detection of reflecting objects using retroreflective sensor systems.



Six triple-mirrors are combined into a hexagon and arranged in honeycomb fashion. 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

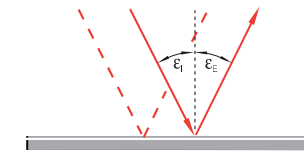
reflection occurs: total reflection, retroreflection, and diffuse reflection.

2.0

Total reflection ...

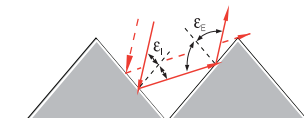
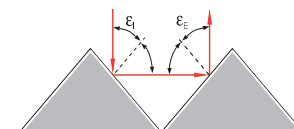
... occurs with a highly shiny (reflecting) surface. The angle of incidence of a light beam is thereby the same as the angle of reflection ($\alpha = \epsilon$).

The reflection losses are in the ideal case negligible.



Retroreflection ...

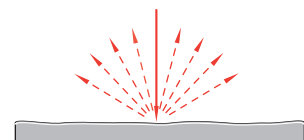
... is caused by two mirrors at vertical angles to each other. The double reflection causes a light beam to be bounced back in the same direction. The angle of incidence can thus be altered in a relatively wide range.



Diffuse reflection ...

... occurs with an uneven and rough surface. It can be demonstrated with a variety of poorly-reflecting and differently-aligned miniature mirrors. Incidental light is widely „scattered“ from such a surface. The reflection losses

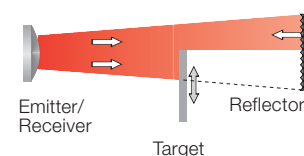
are higher the darker and more matte finished the surface is. Diffuse sensors, for example, detect diffuse reflecting light from target objects.



Retroreflective

Retroreflective types have the emitter and receiver integrated into 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 surfaces it is recommended that the light reflected from the object be filtered out using a polarizing filter in front of the receiver, in order to prevent any possible fault signals.



Switching distance

Switching distance s ...

... is the distance between the target plate and the „sensing face“ of the diffuse sensor when the signal changes (as per EN 60947-5-2).

Rated-switching distance s_n ...

... is a switching distance parameter which ignores manufacturing tolerances, random variance, and external influences like temperature and voltage.

Actual switching distance s_r ...

... is the switching distance at rated voltage U_n taking into account manufacturing tolerances at rated ambient temperature ($T = +23\text{ °C} \pm 0.5$).

Useful switching distance s_u ...

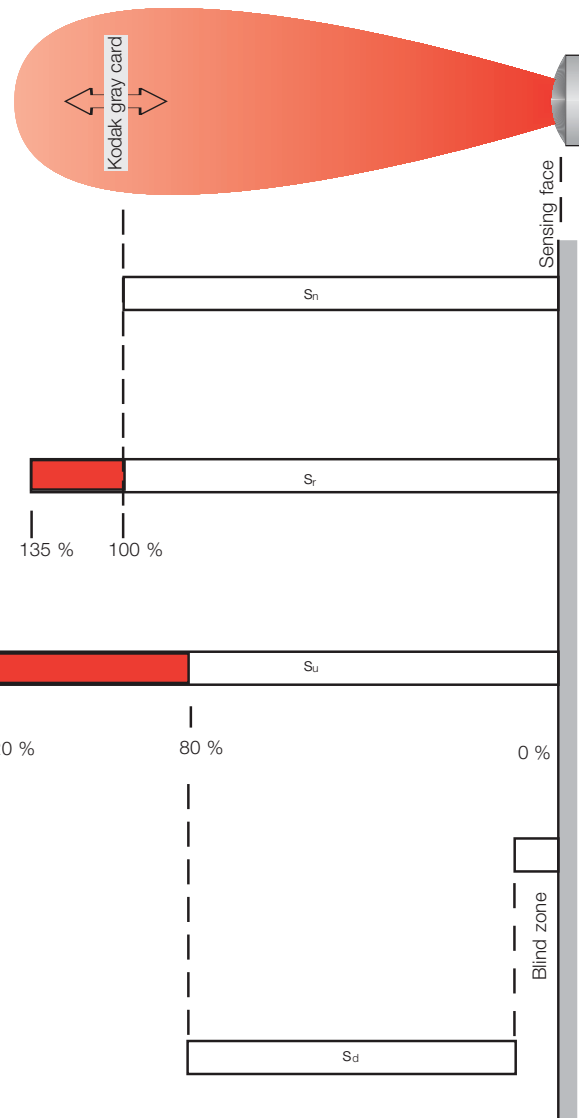
... is the permissible switching distance within specified voltage and temperature ranges ($0.80 s_n \leq s_u \leq 1.20 s_n$).

Blind zone ...

... is the area between the "sensing face" and minimum switching distance, within which an object cannot be detected.

Detection range s_d ...

... is the area within which the switching distance of a photoelectric switch can be set using a standard target.



Emitter light

Optical sensors generally use the following emitter components:

Red light-LED

Visible light, good as an alignment aid and for sensor adjustment.

Infrared-LED (IR)

Invisible beam with high energy.

Red light laser

Visible light whose physical properties make it ideal for small parts detection and long ranges.

Teach-in

Sensor settings on teach-in sensors do not have to be made using a potentiometer or slide switches; everything is controlled with the push of a button. The microcontroller integrated into teach-in sensors allows the entire setup sequence to be controlled by pressing the

button. The use of defined calibration steps also means that the sensor cannot be calibrated for an unreliable zone. The microcontroller also assumes control of the contamination indicator and the contamination output. A variety of Balluff teach-in sensors also provide the

option of remote operation, whereby the teach-in calibration process is initiated "externally" through a cable line.

Technical Data, general

	Diffuse					Background suppression			Retroreflective			Through-beam			
Rated operating 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 of the response beam at $s_n/2$ typ. (mm)	20	25	150	300	300	6	10	25	50	100	150				
Ø of the active area (mm)												8	12	12	20

Temperature drift ...

... is the switchpoint shift with changing temperature in % of s_n .

The **test input** ...
(for series BOS 15, BOS 25, BOS 36, BOS 65, BOS 74)

... for the emitter interrupts the light pulses from the emitter and allows the function of emitter and receiver to be checked. When using Test+, Test- must be at 0 V, when using Test-, Test+ must be at 10...30 V.

The receiver output must switch each time when a voltage of 10...30 V DC (Test+) or 0 V (Test-) is present on 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 provides a remote check of the through-beam type and serves as a preventative measure.

Transmission ...

... is a measure for the lights transmission ability of a medium.

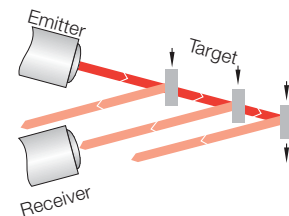
It is defined as the ratio of:
– passed to
– entering light (in %).

Diffuse transmission is the term which is used when the light is partially or completely diffused.

In triangulation ...

... the light cones of a through-beam system intersect each other at a narrow angle. A target object will **only be registered in the area** where the cones overlap. The emitter light which is reflected or diffused from objects outside this limited

zone cannot be registered by the photo-receiver. With this triangulation method relatively small distance changes (e.g. grooves, shaft recesses) are identified. Color and shape of the object have very little effect on the registration.



Ambient operating temperature ...

... is the temperature range within which reliable operation of the photoelectric

switch is guaranteed. Balluff standard:
–15 °C ≤ T_a ≤ +55 °C

Polarity reversal protection

The supply voltage leads can be reversed without destroying the sensor. In combination with the short

circuit protection, these sensors are completely protected against miswiring.

Contamination ...
(influence on the sensing range)

... reduces the indicated sensing range of sensors and fiber optics as compared with „pure air“, because the dirt and dust particles:

- accumulate on the lenses and impair their light transparency,
- absorb and scatter light in the beam path.

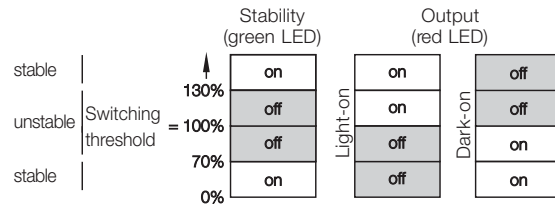
An oil-free source of compressed air can be used to prevent the effects of dirt and contamination due to impure air.

The **contamination indicator (green) ...**
(for series BOS 15, BOS 18 (some), BOS 25, BOS 65, BOS 74)

... illuminates in the „safe“ range, where the input energy is at least 30 % over or under the „threshold energy“.
The “threshold energy”, at which a signal change on the output is triggered, is defined as 100 %.
The “safe” range is therefore reached when:

– the input signal is at **130 %** or more of the threshold energy

– the input signal is at **70 %** or less than the threshold energy.



Contamination scale

Pure air	Ideal conditions
Trace contamination	Relatively clean air in indoor rooms
Slight contamination	Tool and storage rooms
Moderate contamination	Dusty and vaporous environment Switching distance reduced by a factor of $s = 0.5 s_u$
High contamination	Heavy precipitations, swirling flakes and chips Photoelectric sensor function may fail
Highest contamination	Coal dust precipitating on the lens Photoelectric sensor function may fail

Resistance

to mechanical impact
per EN 60068-2-27

Pulse shape: half-sine
Peak acceleration:
 $300 \frac{m}{s^2}$ ($30 g_n$)
Pulse duration: 11 ms

3 shocks per main axis
and direction, for a total of
18 shocks

to continuous shock
per EN 60068-2-29

Pulse shape: half-sine
Peak acceleration:
 $1000 \frac{m}{s^2}$ ($100 g_n$)
Pulse duration: 2 ms

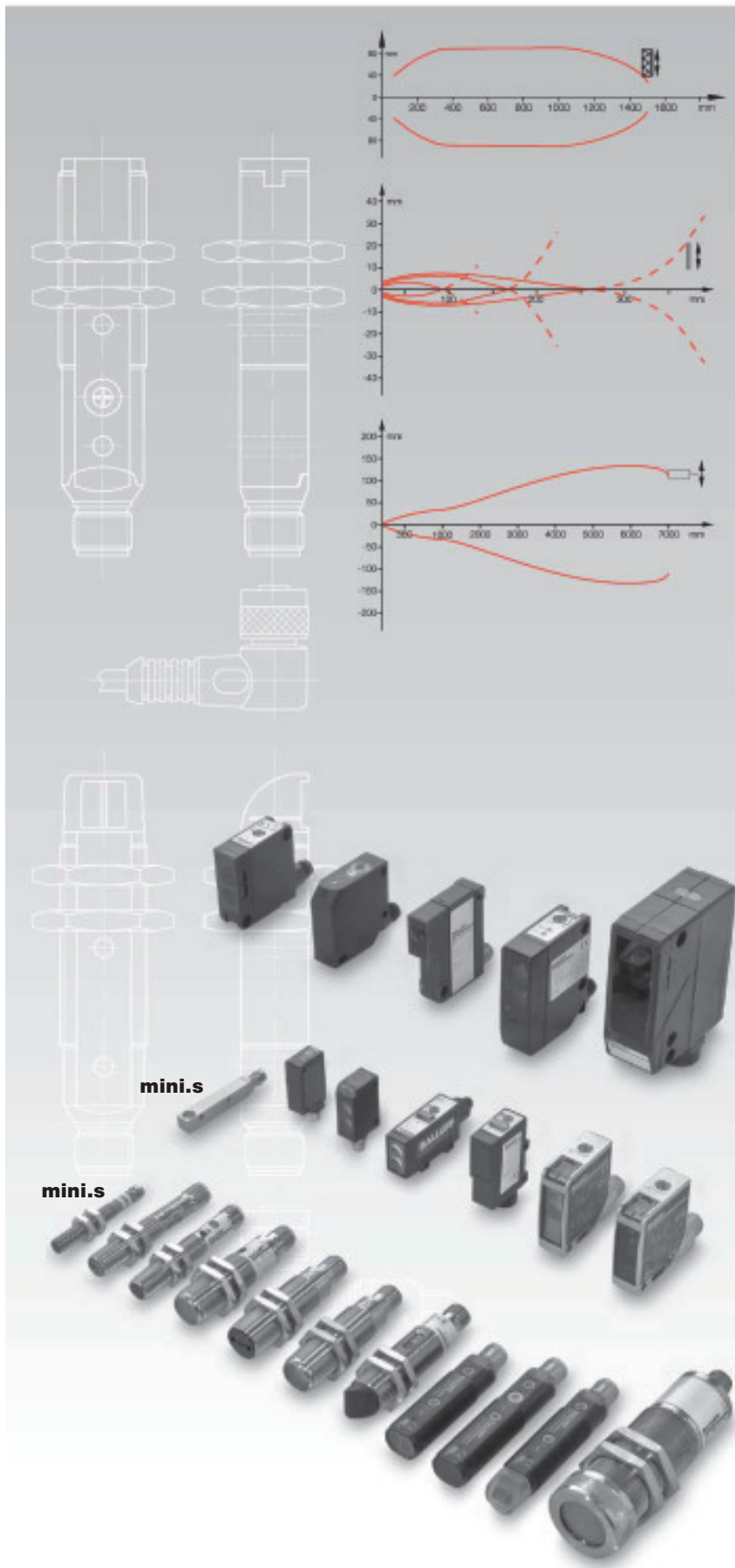
4,000 shocks per main axis
and direction, i. e. 24,000
shocks in total

to mechanical vibration
per EN 60068-2-6

Frequency range:
10...2000 Hz
Amplitude: 1 mm
(peak-to-peak) to 122 Hz
 $30 g_n$ above 122 Hz

Duration: 20 for each
position and direction

Photoelectric Sensors - Standard



- 2.1.2 BOS 08M**
M8 Metal
- 2.1.6 BOS 12M**
M12 Metal
- 2.1.16 BOS 18M**
M18 Metal
with potentiometer
tough
with teach-in
Laser
with AC voltage
with angled head
- 2.1.46 BOS 18E**
M18 stainless steel
- 2.1.52 BOS 18KF**
M18 plastic
Laser
- 2.1.70 BOS 18KW**
M18 plastic
with angled head
Laser
- 2.1.84 BOS 18K(R)**
M18 plastic
- 2.1.92 BOS 30M**
M30 metal
- 2.1.96 Cube style BOS Q08M**
mini.s
- 2.1.100 BOS 2K**
mini.s
- 2.1.110 BOS 5K**
mini.s
with potentiometer
- 2.1.118 BOS 6K**
mini.s
with teach-in
Laser
- 2.1.130 BOS 15K**
- 2.1.136 BOS 21M**
Laser
- 2.1.148 BOS 26K**
Laser
- 2.1.156 BOS 36K**
- 2.1.162 BOS 65K**

2.1

**The new dimension from
Balluff – small in size,
big in performance**

Miniaturization in the Balluff line continues at full pace. The new Opto-mini.s BOS 08M sensors stand out with ease of handling and fixed sensing distances and ranges.

This sensor family includes diffuse sensors in tubular M8 housing, retroreflective and through-beam sensors.

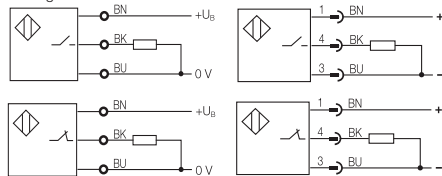
These small photoelectric sensors open up possibilities in high-dynamic applications such as on robot gripper arms. Here is where components with the lightest weight, a small footprint and yet the greatest switching precision are demanded.

In short: The new BOS 08M are small, tough, flexible and economical.



Wiring diagrams

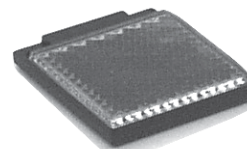
Diffuse, Retroreflective,
Through-beam Receiver



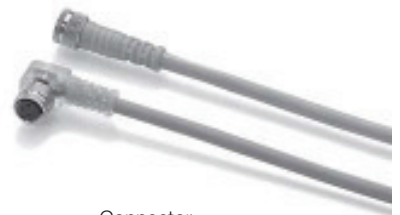
Through-beam emitter



**Recommended
accessories**
please order separately



Reflector
BOS R-9



Connector
BKS-_ 48/BKS-_ 49

Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U _B	Con- nection		Special features		Page
		Red light	Infrared	PNP- Transistor	NPN- Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 3-pin	Cable	Polarizing filter		
 Diffuse														
BOS 08M-PS-RD11-S49	0...55 mm	■		■		■		500 Hz	■	■				2.1.4
BOS 08M-PO-RD11-S49	0...55 mm	■		■			■	500 Hz	■	■				2.1.4
BOS 08M-PS-RD11-02	0...55 mm	■		■		■		500 Hz	■		■			2.1.4
BOS 08M-PO-RD11-02	0...55 mm	■		■			■	500 Hz	■		■			2.1.4
 Retroreflective														
BOS 08M-PS-PR11-S49	25...550 mm	■		■			■	500 Hz	■	■		■		2.1.4
BOS 08M-PO-PR11-S49	25...550 mm	■		■		■		500 Hz	■	■		■		2.1.4
BOS 08M-PS-PR11-02	25...550 mm	■		■			■	500 Hz	■		■	■		2.1.5
BOS 08M-PO-PR11-02	25...550 mm	■		■		■		500 Hz	■		■	■		2.1.5
 Through-beam														
BOS 08M-PS-RE10-S49	0...1.1 m	■		■			■	500 Hz	■	■				2.1.5
BOS 08M-PO-RE10-S49	0...1.1 m	■		■		■		500 Hz	■	■				2.1.5
BOS 08M-PS-RE10-03	0...1.1 m	■		■			■	500 Hz	■		■			2.1.5
BOS 08M-PO-RE10-03	0...1.1 m	■		■		■		500 Hz	■		■			2.1.5
BOS 08M-X-RS10-S49	0...1.1 m	■							■	■				2.1.5
BOS 08M-X-RS10-03	0...1.1 m	■							■		■			2.1.5

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

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Connectors ...
page 5.2 ...

Photoelectric Sensors

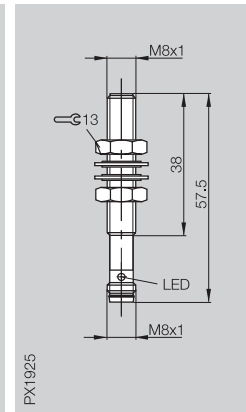
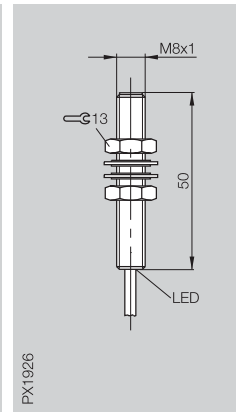
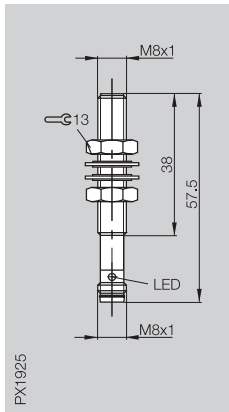
BOS 08M
Sensing distance 55 mm
Range 550 mm

Diffuse	Sensing distance
Retroreflective	Range
Through-beam	Range

0...55 mm

0...55 mm

25...550 mm



Diffuse



PNP, NO	55 mm
PNP, NC	55 mm

BOS 08M-PS-RD11-S49
BOS 08M-PO-RD11-S49

BOS 08M-PS-RD11-02
BOS 08M-PO-RD11-02

Retroreflective



PNP, NO	550 mm	polarizing filter
PNP, NC	550 mm	polarizing filter

BOS 08M-PS-PR11-S49
BOS 08M-PO-PR11-S49

Through-beam



PNP, NO	1.1 m	Receiver
PNP, NC	1.1 m	Receiver
	1.1 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	10 %	10 %	10 %
No-load supply current I_0 max.	20 mA	20 mA	20 mA
Switching output	PNP-Transistor	PNP-Transistor	PNP-Transistor
Output current	100 mA	100 mA	100 mA
Switching type	Light- or dark-on	Light- or dark-on	Light- or dark-on
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V	≤ 2 V
Settings	fixed	fixed	fixed

Optical data

Recommended sensing distance/range	0...50 mm	0...50 mm	25...550 mm
Emitter, light type	LED, red light	LED, red light	LED, red light
Wavelength	640 nm	640 nm	640 nm

Indicators

Light reception indicator	LED yellow	LED yellow	LED yellow
Output function indicator			

Time data

Response time	1 ms	1 ms	1 ms
Switching frequency f	500 Hz	500 Hz	500 Hz

Mechanical data

Dimensions	M8x57.5 mm	M8x50 mm	M8x57.5 mm
Connection	M8 connector, 3-pin	2 m cable, PUR	M8 connector, 3-pin
No. of wires $\times$ cross-section		3x0.14 mm ²	
Housing material	Nickel plated brass	Nickel plated brass	Nickel plated brass
Optical surface	PMMA	PMMA	PMMA
Weight	13 g	47 g	13 g

Ambient data

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

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

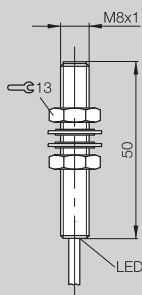
25...550 mm

0...1.1 m

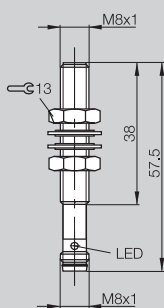
0...1.1 m

0...1.1 m

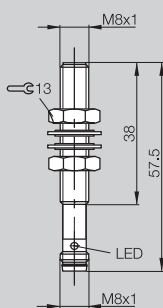
0...1.1 m



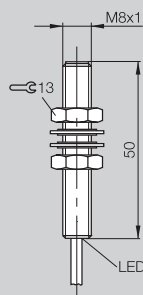
PX1926



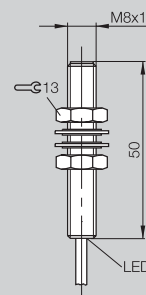
PX1925



PX1925



PX1926



PX1926

BOS 08M-PS-PR11-02
BOS 08M-PO-PR11-02

BOS 08M-PS-RE10-S49
BOS 08M-PO-RE10-S49

BOS 08M-X-RS10-S49

BOS 08M-PS-RE10-03
BOS 08M-PO-RE10-03

BOS 08M-X-RS10-03

10...30 V DC

10 %

20 mA

PNP-Transistor

100 mA

Light- or dark-on

≤ 2 V

fixed

25...500 mm

LED, red light

640 nm

LED yellow

1 ms

500 Hz

M8x50 mm

2 m cable, PUR

3x0.14 mm²

Nickel plated brass

PMMA

47 g

IP 67

yes

yes

-10...+60 °C

EN 60947-5-2

10...30 V DC

10 %

15 mA

PNP-Transistor

100 mA

Light- or dark-on

≤ 2 V

fixed

0...1 m

LED red

1 ms

500 Hz

M8x57.5 mm

M8 connector, 3-pin

Nickel plated brass

PMMA

13 g

IP 67

yes

yes

-10...+60 °C

EN 60947-5-2

10...30 V DC

10 %

15 mA

fixed

0...1 m

LED, red light

640 nm

1 ms

500 Hz

M8x57.5 mm

M8 connector, 3-pin

Nickel plated brass

PMMA

13 g

IP 67

yes

yes

-10...+60 °C

EN 60947-5-2

10...30 V DC

10 %

15 mA

PNP-Transistor

100 mA

Light- or dark-on

≤ 2 V

fixed

0...1 m

LED red

1 ms

500 Hz

M8x50 mm

3 m cable, PUR

3x0.14 mm²

Nickel plated brass

PMMA

47 g

IP 67

yes

yes

-10...+60 °C

EN 60947-5-2

10...30 V DC

10 %

15 mA

fixed

0...1 m

LED, red light

640 nm

1 ms

500 Hz

M8x50 mm

3 m cable, PUR

2x0.14 mm²

Nickel plated brass

PMMA

47 g

IP 67

yes

yes

-10...+60 °C

EN 60947-5-2

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...

One feature stands out in all these ingenious designs: **Simplicity.**

Series **BOS 12M** represents a radical simplification of sensor technology for the most common applications.

All the sensors are enclosed in the same housing as a typical inductive proximity switch (M12×1). This means **photoelectric sensors and inductive proximity switches are mechanically and electrically compatible!**

As for mounting, there is no simpler concept for sensors than a bore hole.

This brings simplification to the design of the system or machine, makes conversions of the sensing principle easier while using **multi-use of the accessories** to reduce inventory. That means **standardization and simplification** of the sensors. Series BOS 12M in the tough metal housing is fully potted, with an enclosure rating of IP 67.

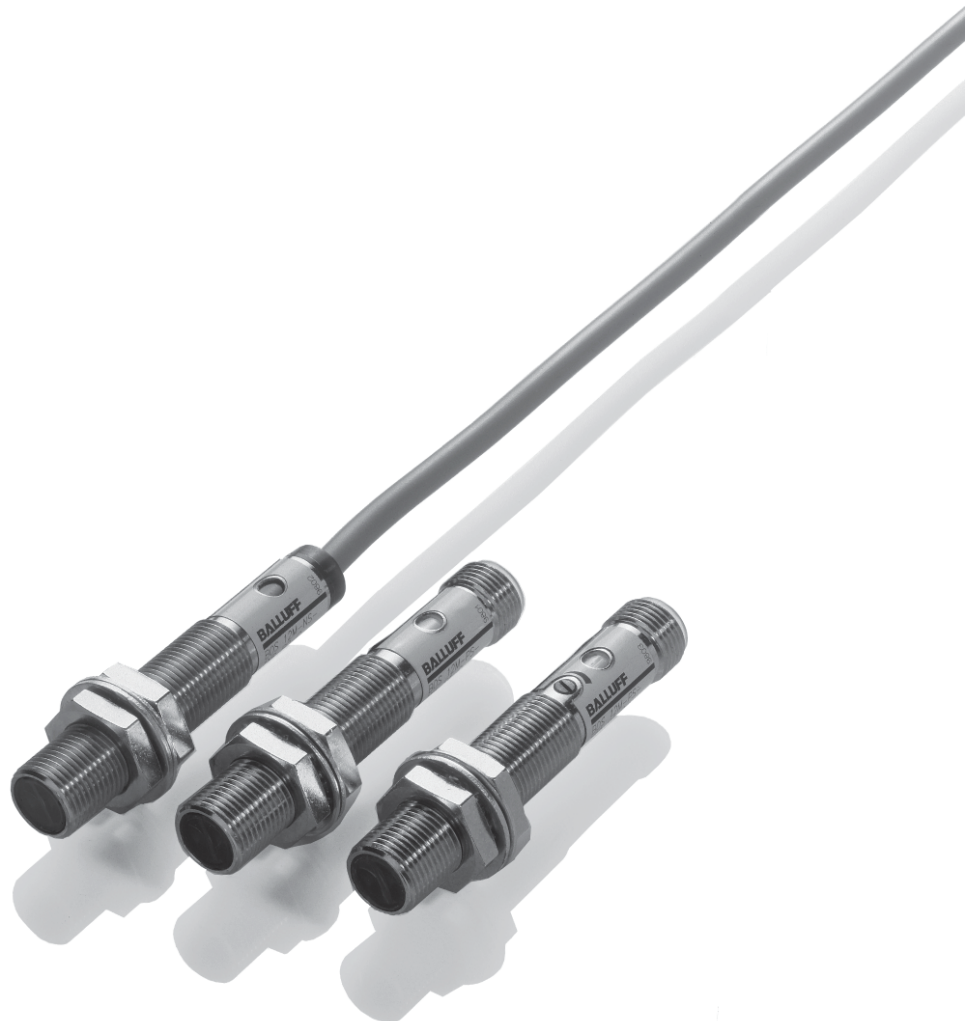
There is a new laser through-beam model available in 2 versions. For long range or small parts detection.

Features

- Supply voltage 10...30 V DC, polarity reversal protected
- Function indicator for the output
- Degree of protection IP 67
- Standard (M12×1) metal housing
- Red and infrared light versions
- Fixed and adjustable sensitivity
- PNP or NPN, light switching or dark switching
- Cable and connector versions (M12 connector)

Applications

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



Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U _B	Con- nection	Features		Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable, 3 m	Polarizing filter	Teach-in
 Diffuse with HGA														
BOS 12M-PS-1N1I-S4-C	0...24 mm	■			■		■		1 kHz	■	■			2.1.8
BOS 12M-PU-1HA-S4-C	10...60 mm	■			■		■	■	1 kHz	■	■		■	2.1.8
 Diffuse														
BOS 12M-PS-1YA-S4-C	1...100 mm	■			■		■		200 Hz	■	■			2.1.8
BOS 12M-PO-1YA-S4-C	1...100 mm	■			■			■	200 Hz	■	■			2.1.8
BOS 12M-PS-1YA-B0-C-03	1...100 mm	■			■		■		200 Hz	■		■		2.1.9
BOS 12M-PO-1YA-B0-C-03	1...100 mm	■			■			■	200 Hz	■		■		2.1.9
BOS 12M-PS-1YB-S4-C	1...200 mm	■			■		■		200 Hz	■	■			2.1.9
BOS 12M-PO-1YB-S4-C	1...200 mm	■			■			■	200 Hz	■	■			2.1.9
BOS 12M-PS-1YB-B0-C-03	1...200 mm	■			■		■		200 Hz	■		■		2.1.9
BOS 12M-PO-1YB-B0-C-03	1...200 mm	■			■			■	200 Hz	■		■		2.1.9
BOS 12M-PS-1PD-S4-C	1...400 mm		■		■		■		200 Hz	■	■			2.1.9
BOS 12M-PO-1PD-S4-C	1...400 mm		■		■			■	200 Hz	■	■			2.1.9
BOS 12M-PS-1PD-B0-C-03	1...400 mm		■		■		■		200 Hz	■		■		2.1.9
BOS 12M-PO-1PD-B0-C-03	1...400 mm		■		■			■	200 Hz	■		■		2.1.9
 Retro-reflective														
BOS 12M-PS-1QA-S4-C	0...1,5 m	■			■			■	200 Hz	■	■		■	2.1.10
BOS 12M-PO-1QA-S4-C	0...1,5 m	■			■		■		200 Hz	■	■		■	2.1.10
BOS 12M-PS-1QA-B0-C-03	0...1,5 m	■			■			■	200 Hz	■		■	■	2.1.10
BOS 12M-PO-1QA-B0-C-03	0...1,5 m	■			■		■		200 Hz	■		■	■	2.1.10
 Through-beam														
BLE 12M-PA-1PD-S4-C	0...5 m	■			■		■	■	500 Hz	■	■			2.1.11
BLE 12M-PA-1PD-B0-C-03	0...5 m	■			■		■	■	500 Hz	■		■		2.1.11
BLS 12M-XX-1RD-S4-L	0...5 m	■								■	■			2.1.11
BLS 12M-XX-1RD-B0-L-03	0...5 m	■								■		■		2.1.11
 Laser Through-beam 														
BOS 12M-PA-LE10-S4				■	■		■	■	1 kHz	■	■			2.1.13
BOS 12M-PA-LE10-03				■	■		■	■	1 kHz	■		■		2.1.13
BOS 12M-NA-LE10-S4				■		■	■	■	1 kHz	■	■			2.1.13
BOS 12M-NA-LE10-03				■		■	■	■	1 kHz	■		■		2.1.13
BOS 12M-XT-LS11-S4	0...3 m			■						■	■			2.1.15
BOS 12M-XT-LS11-03	0...3 m			■						■		■		2.1.15
BOS 12M-XT-LS12-S4	0...30 m			■						■	■			2.1.15
BOS 12M-XT-LS12-03	0...30 m			■						■		■		2.1.15

2.1**2.3**Photoelectric
sensors
accessories
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Photoelectric Sensors

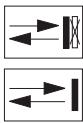
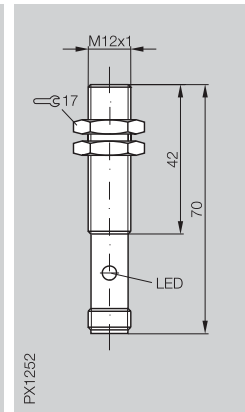
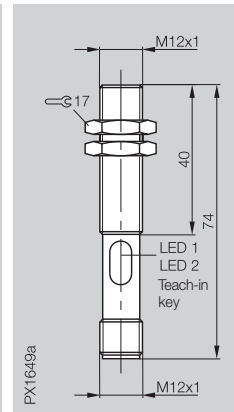
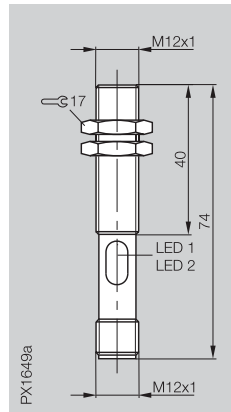
BOS 12M
Sensing distance 24 mm,
60 mm, 100 mm

Diffuse with background suppression Sensing distance
Diffuse Sensing distance

0...24 mm

10...60 mm

1...100 mm



Diffuse

PNP 24 mm HGA
PNP 10...60 mm HGA, Teach-in
PNP 100 mm
PNP 100 mm
PNP 200 mm
PNP 200 mm
PNP 400 mm
PNP 400 mm

BOS 12M-PS-1N1-S4-C

BOS 12M-PU-1HA-S4-C

BOS 12M-PS-1YA-S4-C
BOS 12M-PO-1YA-S4-C

Electrical data

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

10...30 V DC
10 %
 ≤ 25 mA
PNP-Transistor
100 mA
Light-on
 ≤ 2.4 V
fixed

10...30 V DC
10 %
 ≤ 25 mA
PNP-Transistor
100 mA
Light-dark-on (selectable)
 ≤ 2.4 V
Teach-in

10...30 V DC
10 %
 ≤ 20 mA
PNP-Transistor
 ≤ 200 mA
Light- or dark-on
 ≤ 2.5 V
fixed

Optical data

Emitter, light type
Wavelength
Light spot diameter
Distance hysteresis (18 %/18 %)
Gray value shift (90 %/18 %)

LED, red light
660 nm
5x5 mm
 ≤ 5 %
 ≤ 5 %

LED, red light
660 nm
5x5 mm at 50 mm
 ≤ 5 %
 ≤ 10 %

LED, red light
660 nm

Indicators

Output function indicator
Stability indicator

LED yellow
LED green

LED yellow
LED green

LED yellow

Time data

Response time
Switching frequency f

0.5 ms
1 kHz

0.5 ms
1 kHz

2.5 ms
200 Hz

Mechanical data

Dimensions
Connection
No. of wires x cross-section
Housing material
Optical surface
Weight

M12x74 mm
M12 connector, 4-pin

M12x74 mm
M12 connector, 4-pin

M12x70 mm
M12 connector, 4-pin

Nickel plated brass
PMMA
30 g

Nickel plated brass
PMMA
30 g

Nickel plated brass
PMMA
30 g

Ambient data

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

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-15...+55 °C
5 kLux

Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page 2.1.12 and 2.1.13.

1...100 mm	1...200 mm	1...200 mm	1...400 mm	1...400 mm
BOS 12M-PS-1YA-B0-C-03 BOS 12M-PO-1YA-B0-C-03	BOS 12M-PS-1YB-S4-C BOS 12M-PO-1YB-S4-C	BOS 12M-PS-1YB-B0-C-03 BOS 12M-PO-1YB-B0-C-03	BOS 12M-PS-1PD-S4-C BOS 12M-PO-1PD-S4-C	BOS 12M-PS-1PD-B0-C-03 BOS 12M-PO-1PD-B0-C-03
10...30 V DC 10 % ≤ 20 mA PNP-Transistor ≤ 200 mA Light- or dark-on ≤ 2.5 V fixed	10...30 V DC 10 % ≤ 20 mA PNP-Transistor ≤ 200 mA Light- or dark-on ≤ 2.5 V fixed	10...30 V DC 10 % ≤ 20 mA PNP-Transistor ≤ 200 mA Light- or dark-on ≤ 2.5 V fixed	10...30 V DC 10 % ≤ 20 mA PNP-Transistor ≤ 200 mA Light- or dark-on ≤ 2.5 V Potentiometer 270°	10...30 V DC 10 % ≤ 20 mA PNP-Transistor ≤ 200 mA Light- or dark-on ≤ 2.5 V Potentiometer 270°
LED, red light 660 nm	LED, red light 660 nm	LED, red light 660 nm	LED, infrared light 880 nm	LED, infrared light 880 nm
LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
2.5 ms 200 Hz	2.5 ms 200 Hz	2.5 ms 200 Hz	2.5 ms 200 Hz	2.5 ms 200 Hz
M12×65 mm 3 m cable, PVC 3×0.34 mm² Nickel plated brass PMMA 136 g	M12×70 mm M12 connector, 4-pin Nickel plated brass PMMA 30 g	M12×65 mm 3 m cable, PVC 3×0.34 mm² Nickel plated brass PMMA 136 g	M12×70 mm M12 connector, 4-pin Nickel plated brass PMMA 30 g	M12×65 mm 3 m cable, PVC 3×0.34 mm² Nickel plated brass PMMA 136 g
IP 67 yes yes -15...+55 °C 5 kLux	IP 67 yes yes -15...+55 °C 5 kLux	IP 67 yes yes -15...+55 °C 5 kLux	IP 67 yes yes -15...+55 °C 5 kLux	IP 67 yes yes -15...+55 °C 5 kLux

*Ordering example for NPN transistor:

BOS 12M- -1YA-S4-C

Output

NS NPN NO
NO NPN NC

2.1

2.3

Photoelectric
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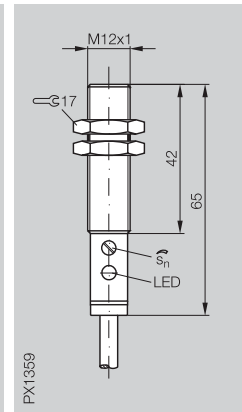
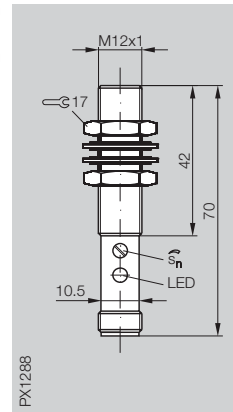
Connectors ...
page 5.2 ...

Retroreflective with polarizing filter
Through-beam

Range
Range

0...1.5 m

0...1.5 m



Retroreflective

PNP 1.5 m Polarizing filter
PNP 1.5 m Polarizing filter

BOS 12M-PS-1QA-S4-C
BOS 12M-PO-1QA-S4-C

BOS 12M-PS-1QA-B0-C-03
BOS 12M-PO-1QA-B0-C-03

Through-beam

PNP 5 m Receiver
5 m Emitter

Electrical data

Supply voltage U_B

10...30 V DC

10...30 V DC

Ripple

10 %

10 %

No-load supply current I_0 max.

≤ 20 mA

≤ 20 mA

Switching output

PNP-Transistor

PNP-Transistor

Output current

≤ 200 mA

≤ 200 mA

Switching type

Light- or dark-on

Light- or dark-on

Voltage drop U_d at I_e

≤ 2.5 V

≤ 2.5 V

Settings

Potentiometer 270°

Potentiometer 270°

Optical data

Emitter, light type

LED, red light

LED, red light

Wavelength

660 nm

660 nm

Indicators

Power-on indicator

Output function indicator

LED yellow

LED yellow

Time data

Response time

2.5 ms

2.5 ms

Switching frequency f

200 Hz

200 Hz

Mechanical data

Dimensions

M12x70 mm

M12x65 mm

Connection

M12 connector, 4-pin

3 m cable, PVC

No. of wires × cross-section

3×0.34 mm²

Housing material

Nickel plated brass

Nickel plated brass

Optical surface

PMMA

PMMA

Weight

30 g

136 g

Ambient data

Degree of protection per IEC 60529

IP 67

IP 67

Polarity reversal protected

yes

yes

Short circuit protected

yes

yes

Ambient temperature range T_a

-15...+55 °C

-15...+55 °C

Ambient light rejection

5 kLux

5 kLux

Retroreflective values referenced to R1 reflector.

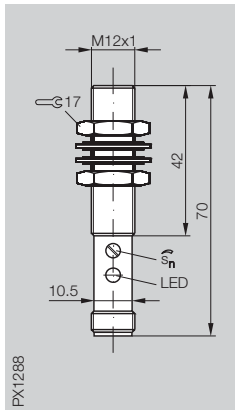
Wiring diagrams, characteristics and accessories see page 2.1.12 and 2.1.13.

0...5 m

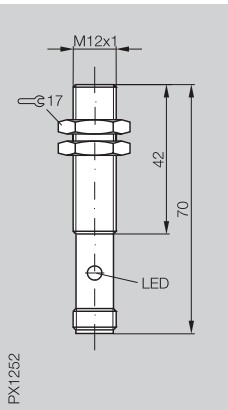
0...5 m

0...5 m

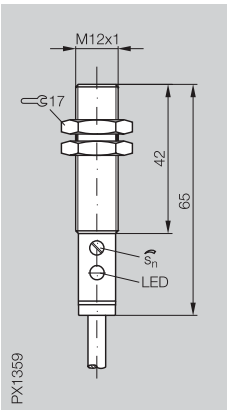
0...5 m



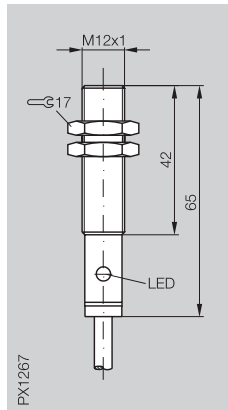
PX1288



PX1252



PX1359



PX1267

BLE 12M-PA-1PD-S4-C

BLS 12M-XX-1RD-S4-L

BLE 12M-PA-1PD-B0-C-03

BLS 12M-XX-1RD-B0-L-03

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10 %

10 %

10 %

10 %

≤ 20 mA

≤ 20 mA

≤ 20 mA

≤ 20 mA

PNP-Transistor

PNP-Transistor

≤ 200 mA

≤ 200 mA

Light- and dark-on

Light- and dark-on

≤ 2.5 V

≤ 2.5 V

Potentiometer 270°

Potentiometer 270°

LED, red light
660 nmLED, red light
660 nmLED, red light
660 nmLED, red light
660 nm

LED yellow

LED green

LED yellow

LED green

1 ms

1 ms

500 Hz

500 Hz

M12×70 mm
M12 connector, 4-pinM12×70 mm
M12 connector, 4-pinM12×65 mm
3 m cable, PVC
3×0.34 mm²M12×65 mm
3 m cable, PVC
3×0.34 mm²Nickel plated brass
PMMA
30 gNickel plated brass
PMMA
30 gNickel plated brass
PMMA
136 gNickel plated brass
PMMA
136 g

IP 67

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

yes

yes

-15...+55 °C

-15...+55 °C

-15...+55 °C

-15...+55 °C

5 kLux

5 kLux

5 kLux

5 kLux

*Ordering example for NPN transistor:

BOS 12M- -1YA-S4-C

Output

NS NPN NO**NO** NPN NC

2.1

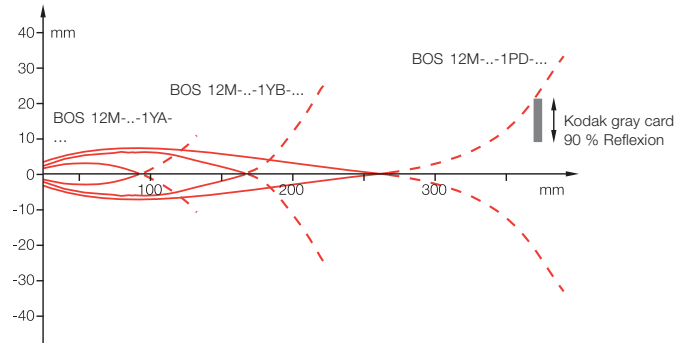
2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

5

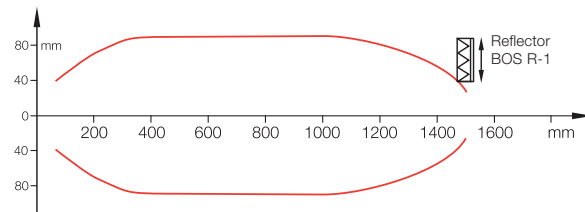
Connectors ...
page 5.2 ...

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



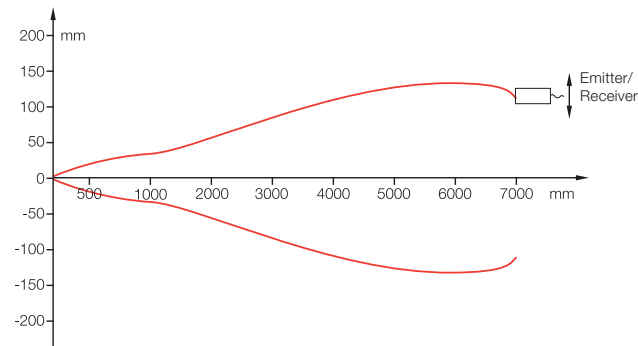
Sensing distance measured with side approach of Kodak gray card.

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



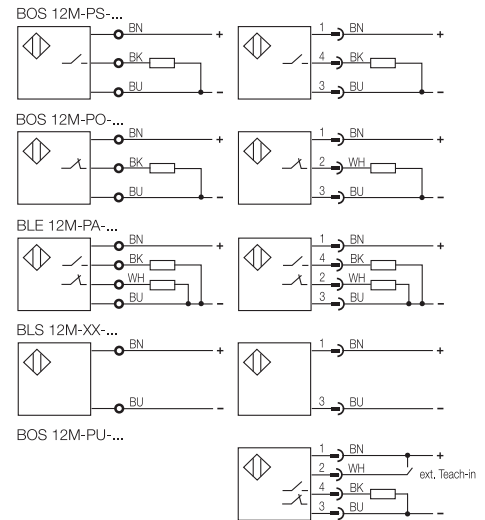
Range measured using side approach with reflector.

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



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

Wiring diagrams



Alignment aid

The additional function indicator on the receiver of the through-beam sensor enables fast and simple alignment between 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 extinguishes. This indicates an optical connection between emitter and receiver. It is also well visible when the sensor is flush mounted.



2.1

2.3

Photoelectric sensors accessories page 2.3.2 ...

Recommended accessories

please order separately



5

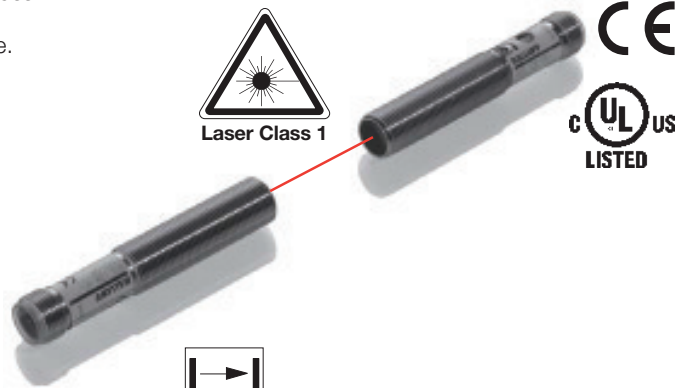
Connectors ... page 5.2 ...

The basis of the BOS 12 laser through-beam sensor 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 connector or cable style.

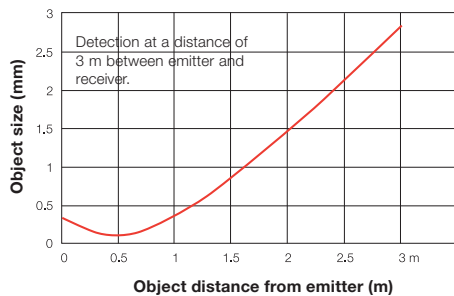
Laser through-beam

Range

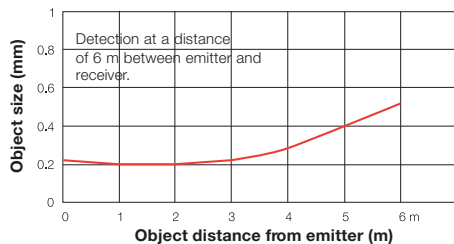


Small parts detection

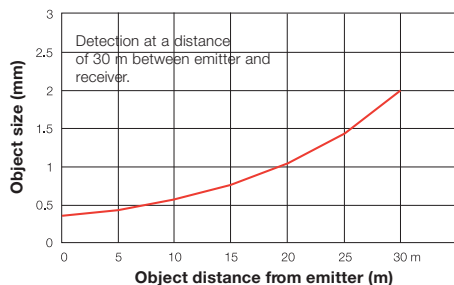
BOS 12M-XT-LS11-..



BOS 12M-XT-LS12-..



BOS 12M-XT-LS12-..



Through-beam

Emitter	High resolution	50 µm at focus
	Long range	30 m
Receiver	PNP	
	NPN	

Electrical data

Supply voltage U_B

Ripple

No-load supply current I_0 max.

Switching output

Output current

Switching type

Voltage drop U_d at I_e

Settings

Optical data

Emitter, light type

Wavelength

Laser class

Light spot diameter

Indicators

Output function indicator

Time data

Response time

Switching frequency f

Mechanical data

Connection

No. of wires × cross-section

Housing material

Optical surface

Weight

Ambient data

Degree of protection per IEC 60529

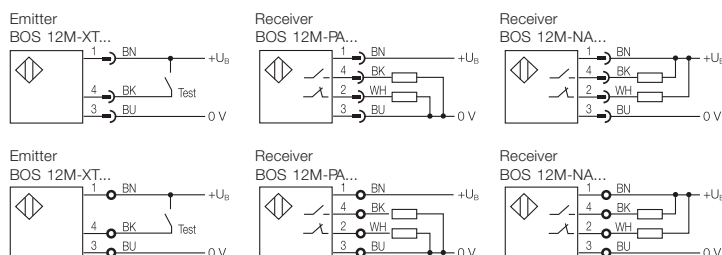
Polarity reversal protected

Short circuit protected

Ambient temperature range T_a

Ambient light rejection

Wiring diagrams



M12 Metal Laser

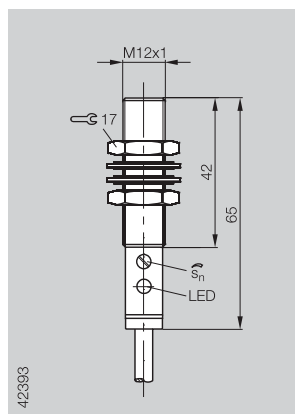
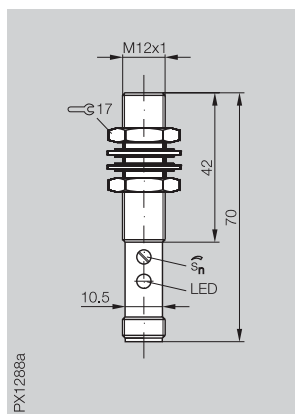
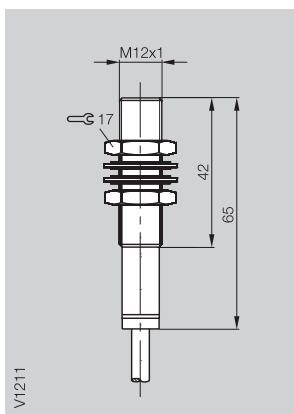
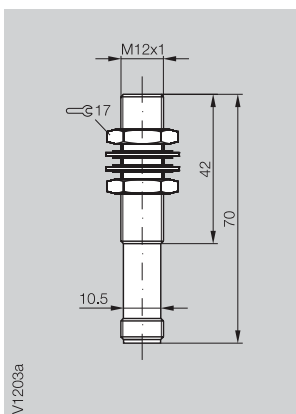


Photoelectric Sensors

BOS 12M
Laser Through-beam
Range 3 m, 30 m

0...3 m/0...30 m

0...3 m/0...30 m



BOS 12M-Xt-LS11-S4
BOS 12M-Xt-LS12-S4

BOS 12M-Xt-LS11-03
BOS 12M-Xt-LS12-03

BOS 12M-PA-LE10-S4
BOS 12M-NA-LE10-S4

BOS 12M-PA-LE10-03
BOS 12M-NA-LE10-03

10...30 V DC
10 %
≤ 10 mA

10...30 V DC
10 %
≤ 10 mA

10...30 V DC
10 %
≤ 15 mA
PNP- or NPN-Transistor
≤ 200 mA
Light-/dark-on (complementary)
≤ 2.5 V
Potentiometer 270°

10...30 V DC
10 %
≤ 15 mA
PNP- or NPN-Transistor
≤ 200 mA
Light-/dark-on (complementary)
≤ 2.5 V
Potentiometer 270°

Laser, red light
655 nm
1

Laser, red light
655 nm
1

LED yellow

LED yellow

0.5 ms
1 kHz

0.5 ms
1 kHz

M12 connector, 4-pin

3 m cable, PVC
3x0.34 mm²

M12 connector, 4-pin

3 m cable, PVC
4x0.34 mm²

Nickel plated brass
Glass
30 g

Nickel plated brass
Glass
140 g

Nickel plated brass
PMMA
30 g

Nickel plated brass
PMMA
140 g

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

-10...+50 °C
EN 60947-5-2

-10...+50 °C
EN 60947-5-2

-10...+50 °C
EN 60947-5-2

-10...+50 °C
EN 60947-5-2

Recommended accessories
please order separately



Adjusting unit
BMS AD-M-002-D12/D12



Clamp
BOS 12.0-BS-1



Connector
BKS-_19/BKS-_20

2.1

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...



BOS 18M Standard

The **BOS 18M** series in metal housing (nickel plated brass) has established itself as a standard in automation technology. Long sensing distances and ranges as well as full-feature versions (e.g. background suppression or laser light) are characteristic of this series.

Features

- Supply voltage 10...30 V DC, polarity reversal protected
- Output short circuit protected
- Degree of protection IP 67
- High resistance to ambient light and pulse spikes

Applications

- Non-contact through-beam sensing
- Packaging
- Parts counting
- Small parts detection
- Assembly and handling automation
- Conveying
- Machine tool building



BOS 18M Tough

Sensors in M18 metal housing for elevated ambient requirements

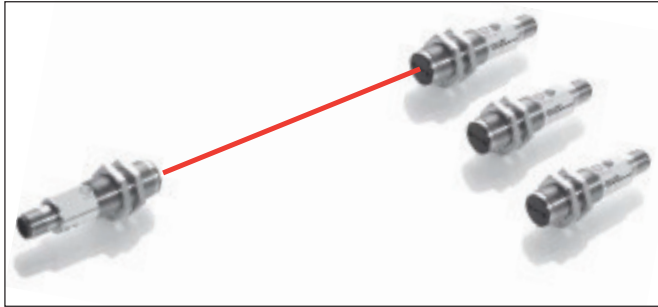
The sensors described here are classics. They have proven themselves over many years in the machine tool industry. They are tightly sealed, tough, precise and reliable.

Features

- Sealing test according to a strict Balluff factory standard
- Increased electrical isolation and EMC
- High load capacity (including capacitive loads)
- Industry compliant

Applications

- Material feed monitoring
- Workpiece monitoring
- Tool break monitoring
- Positioning tasks
- Checking for correct quantity
- Movement checking



BOS 18M Teach-in

The **BOS 18M with Teach-in** are optically, mechanically and electrically compatible with the potentiometer version, so that they can also be used in existing applications.

Diffuse, retroreflective and through-beam versions are available. The teach-in function makes setup even simpler and more efficient.

Normally closed and normally open settings are made by simply pressing a button, requiring just one output line. The extra line is then used as a contamination output.

2.1

2.3

Photoelectric sensors accessories page 2.3.2 ...



BOS 18M(R) 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.

Features

- Long ranges (50 m)
- High switching frequency (1.5 kHz)
- Straight and right-angle versions

Applications

- 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.

Features

- Standard M18x1 housing made of metal (nickel plated brass)
- All sensors use visible red light
- Degree of protection IP 67
- Supply voltage 10...30 V DC, polarity reversal protected
- Output short circuit protected

Applications

- Roller conveyors
- Conveying lines
- Packaging

BOS 18MR Angled Head

5

Connectors ... page 5.2 ...

Type	Sensing distance/ range	Light exit		Light type			Output		Output function		Switching frequency	U _B	Con- nec- tion	Features	Page		
		Straight	Right angle	Red light	Infrared	Laser	PNP- Transistor	NPN-Transistor	Light-on	Dark on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
 Diffuse with HGA																	
BOS 18M-PA-1HA-S4-C	40...120 mm	■		■			■		■	■	600 Hz	■	■				2.1.20
BOS 18MR-PA-1HA-S4-C	40...120 mm		■	■			■		■	■	600 Hz	■	■				2.1.44
BOS 18M-PS-1HA-E5-C-S4	10...120 mm	■		■			■		■		500 Hz	■	■				2.1.20
BOS 18MR-PS-1HA-E5-C-S4	10...120 mm		■	■			■		■		500 Hz	■	■				2.1.44
BOS 18M-PSV-LH22-S4	30...150 mm	■				■	■		■		500 Hz	■	■				2.1.31
BOS 18M-POV-LH22-S4	30...150 mm	■				■	■			■	500 Hz	■	■				2.1.31
BOS 18M-NSV-LH22-S4	30...150 mm	■				■		■	■		500 Hz	■	■				2.1.31
BOS 18M-NOV-LH22-S4	30...150 mm	■				■		■		■	500 Hz	■	■				2.1.31
 Diffuse																	
BOS 18M-PS-1XA-E5-C-S4	0...100 mm	■			■		■		■		100 Hz	■	■				2.1.26
BOS 18M-PO-1XA-E5-C-S4	0...100 mm	■			■		■			■	100 Hz	■	■				2.1.26
BOS 18M-PS-1XA-E4-C-03	0...100 mm	■			■		■		■		100 Hz	■		■			2.1.26
BOS 18M-PO-1XA-E4-C-03	0...100 mm	■			■		■			■	100 Hz	■		■			2.1.26
BOS 18M-PA-1PA-E5-C-S4	0...100 mm	■			■		■		■	■	100 Hz	■	■				2.1.21
BOS 18M-PA-1PA-E4-C-03	0...100 mm	■			■		■		■	■	100 Hz	■		■			2.1.21
BOS 18M-PS-1XB-E5-C-S4	0...200 mm	■			■		■		■		100 Hz	■	■				2.1.26
BOS 18M-PO-1XB-E5-C-S4	0...200 mm	■			■		■			■	100 Hz	■	■				2.1.26
BOS 18M-PS-1XB-E4-C-03	0...200 mm	■			■		■		■		100 Hz	■		■			2.1.26
BOS 18M-PO-1XB-E4-C-03	0...200 mm	■			■		■			■	100 Hz	■		■			2.1.26
BOS 18M-PA-LD10-S4	0...350 mm	■				■	■		■	■	1.5 kHz	■	■				2.1.32
BOS 18M-PA-LD10-02	0...350 mm	■				■	■		■	■	1.5 kHz	■		■			2.1.32
BOS 18M-NA-LD10-S4	0...350 mm	■				■		■	■	■	1.5 kHz	■	■				2.1.32
BOS 18M-NA-LD10-02	0...350 mm	■				■		■	■	■	1.5 kHz	■		■			2.1.32
BOS 18MR-PA-LD10-S4	0...250 mm		■			■	■		■	■	1.5 kHz	■	■				2.1.34
BOS 18MR-PA-LD10-02	0...250 mm		■			■	■		■	■	1.5 kHz	■		■			2.1.34
BOS 18MR-NA-LD10-S4	0...250 mm		■			■		■	■	■	1.5 kHz	■	■				2.1.34
BOS 18MR-NA-LD10-02	0...250 mm		■			■		■	■	■	1.5 kHz	■		■			2.1.34
BOS 18M-PS-1PD-E4-C-03	0...400 mm	■			■		■		■		100 Hz	■		■			2.1.27
BOS 18M-PO-1PD-E4-C-03	0...400 mm	■			■		■			■	100 Hz	■		■			2.1.27
BOS 18M-PA-1PD-E5-C-S4	0...400 mm	■			■		■		■	■	100 Hz	■	■				2.1.21
BOS 18M-PA-1PD-E4-C-03	0...400 mm	■			■		■		■	■	100 Hz	■		■			2.1.21
BOS 18M-PU-1PD-SA5-C	0...400 mm	■			■		■		■	■	1 kHz	■	■				2.1.21
BOS 18M-PU-1PD-SA4-C	0...400 mm	■			■		■		■	■	1 kHz	■		■			2.1.22
BOS 18M-PU-1PD-S4-C	0...400 mm	■			■		■		■	■	500 Hz	■	■			■	2.1.41
BOS 18MR-PS-1OD-E5-C-S4	0...400 mm		■	■			■		■		1 kHz	■	■				2.1.45
BOS 18M-PA-1PF-E5-C-S4	0...1 m	■			■		■		■	■	200 Hz	■	■				2.1.22
BOS 18M-GU-1PF-S4-Y	0...1 m	■			■		■	■	■	■	1 kHz		■				2.1.23
 Retroreflective																	
BOS 18M-PA-1QB-E5-C-S4	2 m	■		■			■		■	■	100 Hz	■	■		■		2.1.23
BOS 18M-PA-1QB-E4-C-03	2 m	■		■			■		■	■	100 Hz	■		■	■		2.1.23
BOS 18M-NA-1QB-E5-C-S4	2 m	■		■				■	■	■	100 Hz	■	■		■		2.1.23
BOS 18M-NA-1QB-E4-C-03	2 m	■		■				■	■	■	100 Hz	■		■	■		2.1.23
BOS 18M-PU-1QB-S4-C	2 m	■		■			■		■	■	500 Hz	■	■		■	■	2.1.41
BOS 18MR-PS-1QB-E5-C-S4	2 m		■	■			■		■	■	1 kHz	■	■		■		2.1.45

Type	Sensing distance/ range	Light exit	Light type	Output	Output function	Switching frequency	U _B	Conne- ction	Features	Page							
		Straight	Right angle	Red light	Infrared	Laser	PNP- Transistor	NPN- Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
 Retroreflective																	
BOS 18M-PS-1RB-E5-C-S4	2 m	■			■		■			■	100 Hz	■	■				2.1.27
BOS 18M-PO-1RB-E5-C-S4	2 m	■			■		■		■		100 Hz	■	■				2.1.27
BOS 18M-PS-1RB-E4-C-03	2 m	■			■		■			■	100 Hz	■		■			2.1.27
BOS 18M-PO-1RB-E4-C-03	2 m	■			■		■		■		100 Hz	■		■			2.1.27
BOS 18M-PA-1VD-E5-C-S4	4 m	■			■		■		■	■	100 Hz	■	■				2.1.23
BOS 18M-NA-1VD-E5-C-S4	4 m	■			■			■	■	■	100 Hz	■	■				2.1.23
BOS 18M-NA-1VD-E4-C-03	4 m	■			■			■	■	■	100 Hz	■		■			2.1.23
BOS 18M-PS-1RD-E5-C-S4	4 m	■			■		■			■	100 Hz	■	■				2.1.27
BOS 18M-PO-1RD-E5-C-S4	4 m	■			■		■		■		100 Hz	■	■				2.1.27
BOS 18M-PS-1RD-E4-C-03	4 m	■			■		■			■	100 Hz	■		■			2.1.27
BOS 18M-PO-1RD-E4-C-03	4 m	■			■		■		■		100 Hz	■		■			2.1.27
BOS 18MR-PA-LR10-S4	0,1...9 m		■			■	■		■	■	1.5 kHz	■	■		■		2.1.34
BOS 18MR-PA-LR10-02	0,1...9 m		■			■	■		■	■	1.5 kHz	■		■	■		2.1.35
BOS 18MR-NA-LR10-S4	0,1...9 m		■			■		■	■	■	1.5 kHz	■	■		■		2.1.34
BOS 18MR-NA-LR10-02	0,1...9 m		■			■		■	■	■	1.5 kHz	■		■	■		2.1.35
BOS 18M-PA-LR10-S4	0,1...16 m	■				■	■		■	■	1.5 kHz	■	■		■		2.1.32
BOS 18M-PA-LR10-02	0,1...16 m	■				■	■		■	■	1.5 kHz	■		■	■		2.1.33
BOS 18M-NA-LR10-S4	0,1...16 m	■				■		■	■	■	1.5 kHz	■	■		■		2.1.32
BOS 18M-NA-LR10-02	0,1...16 m	■				■		■	■	■	1.5 kHz	■		■	■		2.1.33
 Through-beam																	
BLE 18M-PU-1PP-S4-C	0...16 m	■			■		■		■	■	500 Hz	■	■			■	2.1.41
BLE 18M-PS-1P-E5-C-S4	0...16 m	■			■		■			■	500 Hz	■	■				2.1.27
BLE 18M-PO-1P-E5-C-S4	0...16 m	■			■		■		■		100 Hz	■	■				2.1.27
BLE 18M-PS-1P-E4-C-03	0...16 m	■			■		■			■	100 Hz	■		■			2.1.27
BLE 18M-PO-1P-E4-C-03	0...16 m	■			■		■		■		100 Hz	■		■			2.1.27
BLE 18MR-PA-1PP-E5-C-S4	0...16 m		■	■			■		■	■	1 kHz	■	■				2.1.45
BLE 18M-BA-1LT-S4-C	0...50 m	■				■	■	■	■	■	6 kHz	■	■				2.1.39
BLE 18MR-BA-1LT-S4-C	0...50 m		■			■	■		■	■	6 kHz	■	■				2.1.39
BOS 18MR-PA-LE10-S4	0...50 m		■			■	■		■	■	1.5 kHz	■	■				2.1.35
BOS 18MR-PA-LE10-02	0...50 m		■			■	■		■	■	1.5 kHz	■		■			2.1.35
BOS 18MR-NA-LE10-S4	0...50 m		■			■		■	■	■	1.5 kHz	■	■				2.1.35
BOS 18MR-NA-LE10-02	0...50 m		■			■		■	■	■	1.5 kHz	■		■			2.1.35
BOS 18M-PA-LE10-S4	0...60 m	■				■	■		■	■	1.5 kHz	■	■				2.1.33
BOS 18M-PA-LE10-02	0...60 m	■				■	■		■	■	1.5 kHz	■		■			2.1.33
BOS 18M-NA-LE10-S4	0...60 m	■				■		■	■	■	1.5 kHz	■	■				2.1.33
BOS 18M-NA-LE10-02	0...60 m	■				■		■	■	■	1.5 kHz	■		■			2.1.33
BLS 18M-XX-1P-S4-L	0...16 m	■			■							■	■			■	2.1.41
BLS 18M-XX-1P-E5-L-S4	0...16 m	■			■							■	■				2.1.27
BLS 18M-XX-1P-E4-L-03	0...16 m	■			■							■		■			2.1.27
BLS 18MR-XX-1P-E5-L-S4	0...16 m		■	■								■	■				2.1.45
BLS 18M-XX-1LT-S4-C	0...50 m	■				■						■	■				2.1.39
BLS 18MR-XX-1LT-S4-C	0...50 m		■			■						■	■				2.1.39
BOS 18M-XT-LS10-S4	0...60 m	■				■						■	■				2.1.33
BOS 18M-XT-LS10-02	0...60 m	■				■						■		■			2.1.33
BOS 18MR-XT-LS10-S4	0...60 m		■			■						■	■				2.1.35
BOS 18MR-XT-LS10-02	0...60 m		■			■						■		■			2.1.35

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Photoelectric
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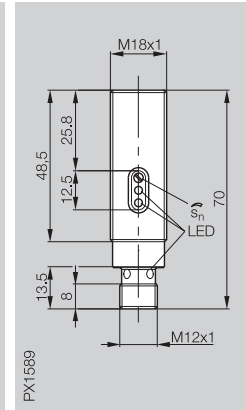
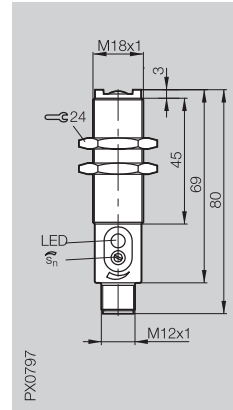
5

Connectors ...
page 5.2 ...

Diffuse with background suppression	Sensing distance
Diffuse	Sensing distance

40...120 mm

10...120 mm



Diffuse



PNP	40...120 mm	HGA
PNP	10...120 mm	HGA
PNP	100 mm	
PNP	400 mm	

BOS 18M-PA-1HA-S4-C

BOS 18M-PS-1HA-E5-C-S4

Electrical data

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

10...30 V DC
10 %
≤ 30 mA
PNP-Transistor
200 mA
Light- and dark-on
≤ 2.5 V
18-turn potentiometer

10...36 V DC
20 %
≤ 30 mA
PNP-Transistor
200 mA
Light-on
≤ 2 V
Potentiometer 270°

Optical data

Emitter, light type
Wavelength

LED, red light
660 nm

LED, red light
660 nm

Indicators

Output function indicator
Stability indicator

LED yellow
no

LED yellow
no

Time data

Response time
Switching frequency f

0.8 ms
600 Hz

1 ms
500 Hz

Mechanical data

Dimensions
Connection
No. of wires × cross-section
Housing material
Optical surface
Weight

M18×80 mm
M12 connector, 4-pin
Nickel plated brass
Glass
62 g

M18×70 mm
M12 connector, 4-pin
Nickel plated brass
Glass
50 g

Ambient data

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

IP 67
yes
yes
-15...+55 °C
2 kLux

IP 67
yes
yes
-25...+55 °C
5 kLux

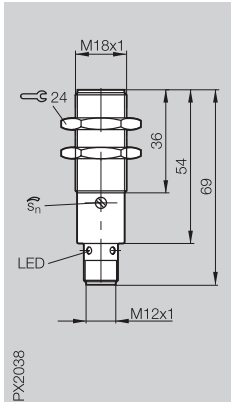
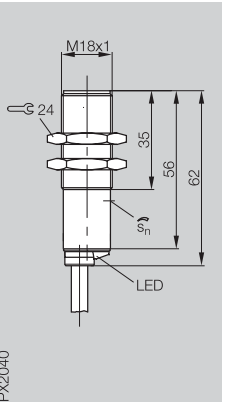
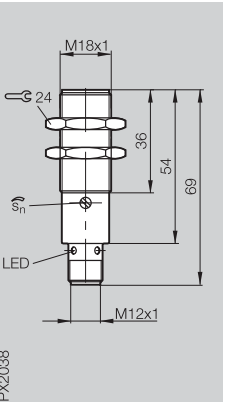
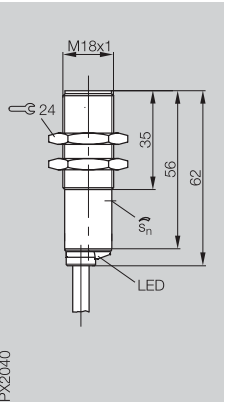
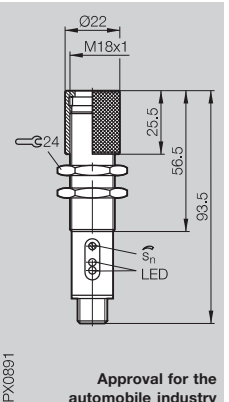
Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page 2.1.24 and 2.1.25.

M18 Metal with potentiometer

Photoelectric Sensors

BOS 18M
Sensing distance 100 mm,
400 mm

0...100 mm	0...100 mm	0...400 mm	0...400 mm	0...400 mm
				
PX2038	PX2040	PX2038	PX2040	PX0891
				Approval for the automobile industry
BOS 18M-PA-1PA-E5-C-S4	BOS 18M-PA-1PA-E4-C-03	BOS 18M-PA-1PD-E5-C-S4	BOS 18M-PA-1PD-E4-C-03	BOS 18M-PU-1PD-SA5-C
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
10 %	10 %	10 %	10 %	10 %
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 25 mA
PNP-Transistor	PNP-Transistor	PNP-Transistor*	PNP-Transistor*	PNP-Transistor
200 mA	200 mA	200 mA	200 mA	200 mA
Light- and dark-on	Light- and dark-on	Light- and dark-on	Light- and dark-on	Light-/dark-on (selectable)
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.4 V
Potentiometer 270°	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°	18-turn potentiometer
LED, infrared	LED, infrared	LED, infrared	LED, infrared	LED, infrared
880 nm	880 nm	880 nm	880 nm	880 nm
LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
no	no	no	no	LED green/red
5 ms	5 ms	5 ms	5 ms	0.5 ms
100 Hz	100 Hz	100 Hz	100 Hz	1 kHz
M18×69 mm	M18×62 mm	M18×69 mm	M18×62 mm	M18×93.5 mm
M12 connector, 4-pin	3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC	M12 connector, 4-pin
	4×0.25 mm ²		4×0.25 mm ²	
Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
PMMA	PMMA	PMMA	PMMA	Glass
40 g	140 g	40 g	140 g	100 g
IP 67	IP 67	IP 67	IP 67	IP 65
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-20...+60 °C
5 kLux	5 kLux	5 kLux	5 kLux	2 kLux

*NPN versions on request

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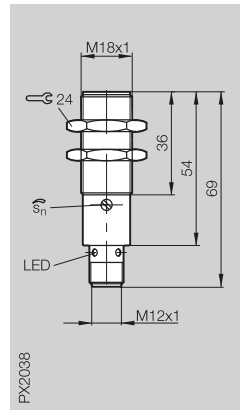
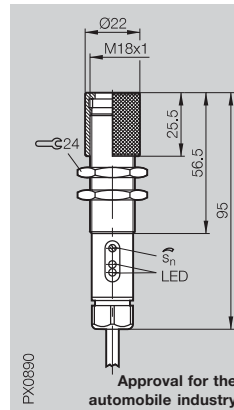
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Connectors ...
page 5.2 ...

Diffuse	Sensing distance
Retroreflective	Range

0...400 mm

0...1 m



Diffuse



PNP	400 mm
PNP	1 m
PNP/NPN	1 m

BOS 18M-PU-1PD-SA4-C

BOS 18M-PA-1PF-E5-C-S4

Retroreflective



PNP	2 m	Polarizing filter
NPN	2 m	Polarizing filter
PNP	4 m	
NPN	4 m	

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 25 mA
Switching output	PNP-Transistor
Output current	200 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_0	≤ 2.4 V
Settings	18-turn potentiometer

10...30 V DC
10 %
≤ 20 mA
PNP-Transistor
200 mA
Light- and dark-on
≤ 2.5 V
Potentiometer 270°

Optical data

Emitter, light type	LED, infrared
Wavelength	880 nm

LED, infrared
880 nm

Indicators

Output function indicator	LED yellow
Stability indicator	LED green/red

LED yellow
no

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

2.5 ms
200 Hz

Mechanical data

Dimensions	M18×95 mm
Connection	3 m cable, PVC
No. of wires × cross-section	3×0.25 mm ²
Housing material	Nickel plated brass
Optical surface	Glass
Weight	200 g

M18×69 mm
M12 connector, 4-pin
Nickel plated brass
PMMA
40 g

Ambient data

Degree of protection per IEC 60529	IP 65
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-20...+60 °C
Ambient light rejection	2 kLux

IP 67
yes
yes
-5...+55 °C
5 kLux

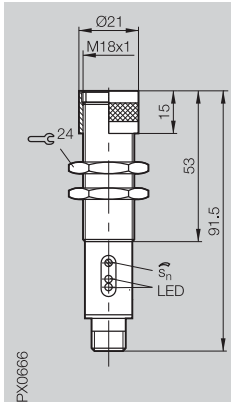
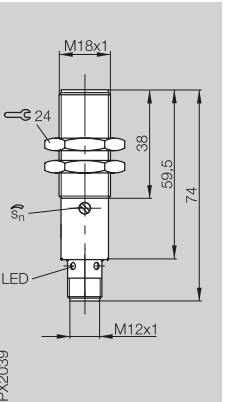
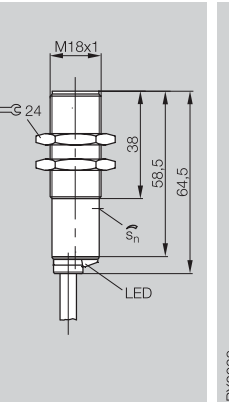
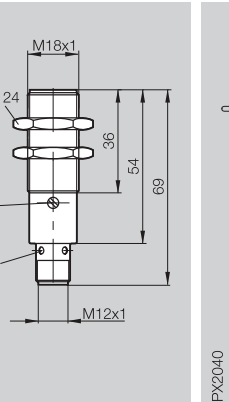
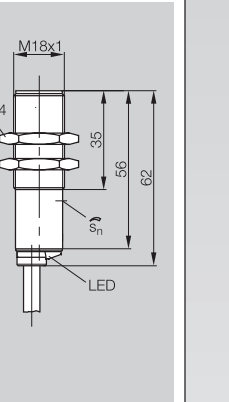
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page 2.1.24 and 2.1.25.

M18 Metal with potentiometer

Photoelectric Sensors

BOS 18M
Sensing distance 1 m
Range 2 m, 4 m

0...1 m	2 m	2 m	4 m	4 m
				
PX0666	PX2039	PX2041	PX2038	PX2040
BOS 18M-GU-1PF-S4-Y				
	BOS 18M-PA-1QB-E5-C-S4 BOS 18M-NA-1QB-E5-C-S4	BOS 18M-PA-1QB-E4-C-03 BOS 18M-NA-1QB-E4-C-03	BOS 18M-PA-1VD-E5-C-S4 BOS 18M-NA-1VD-E5-C-S4	BOS 18M-NA-1VD-E4-C-03
11...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
10 %	10 %	10 %	10 %	10 %
≤ 25 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
PNP and NPN (push-pull) 200 mA	PNP- or NPN-Transistor 200 mA	PNP- or NPN-Transistor 200 mA	PNP- or NPN-Transistor 200 mA	PNP- or NPN-Transistor 200 mA
Light-/dark-on (selectable) ≤ 2.5 V	Light- and dark-on ≤ 2.5 V	Light- and dark-on ≤ 2.5 V	Light- and dark-on ≤ 2.5 V	Light- and dark-on ≤ 2.5 V
18-turn potentiometer	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
LED, infrared 880 nm	LED, red light 660 nm	LED, red light 660 nm	LED, infrared 880 nm	LED, infrared 880 nm
LED yellow LED green/red	LED yellow no	LED yellow no	LED yellow no	LED yellow no
0.5 ms	5 ms	5 ms	5 ms	5 ms
1 kHz	100 Hz	100 Hz	100 Hz	100 Hz
M18×91.5 mm M12 connector, 4-pin	M18×74 mm M12 connector, 4-pin	M18×64.5 mm 3 m cable, PVC 3×0.34 mm²	M18×69 mm M12 connector, 4-pin	M18×62 mm 3 m cable, PVC 3×0.34 mm²
Nickel plated brass Glass	Nickel plated brass PMMA	Nickel plated brass PMMA	Nickel plated brass PMMA	Nickel plated brass PMMA
100 g	40 g	140 g	40 g	160 g
IP 65	IP 67	IP 67	IP 65	IP 65
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
-20...+60 °C	-15...+55 °C	-15...+55 °C	-5...+55 °C	-5...+55 °C
1 kLux	5 kLux	5 kLux	5 kLux	5 kLux

2.1

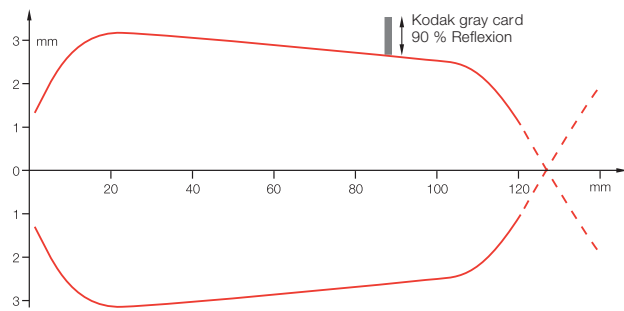
2.3

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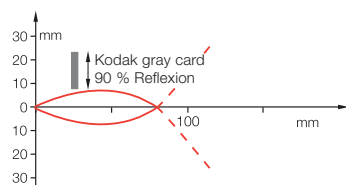
Connectors ...
page 5.2 ...

Diffuse with background suppression BOS 18M-_A-1HA-...



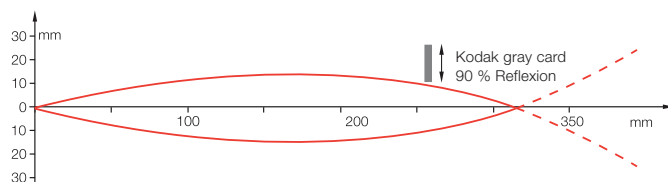
Sensing distance measured with side approach of Kodak gray card.

Diffuse BOS 18M-PA-1PA-...



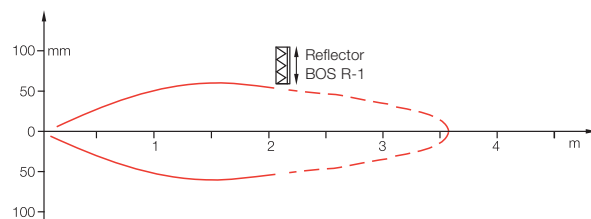
Sensing distance measured with side approach of Kodak gray card.

Diffuse BOS 18M-_A-1PD-...



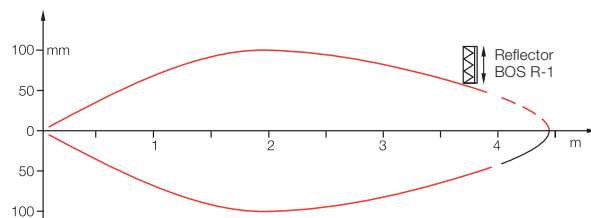
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 18M-_A-1QB-...



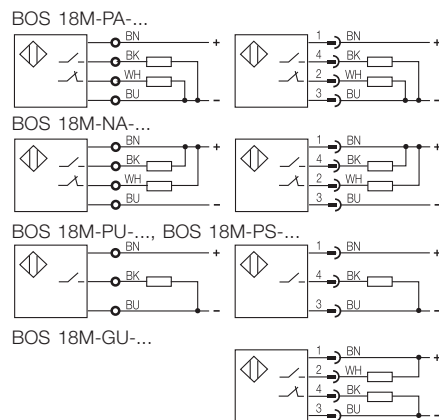
Range measured using side approach with reflector.

Retroreflective BOS 18M-_A-1VD-...



Range measured using side approach with reflector.

Wiring diagrams



2.1

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Photoelectric
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Note for BOS 18M-PU/GU-...

To invert the final stage
function, move or
remove the jumper.



Front view

Recommended accessories please order separately



Round aperture
BOS 18-BL-1



Reflector
BOS R-1



Air shield
BOS 18-LT-1



Mounting clamp
BOS 18,0-KB-1



Cover nut
BOS 18-SM-2

Deflection head
BOS 18-UK-10

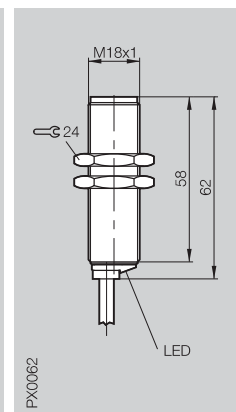
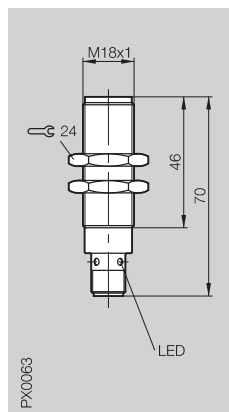


Connector
BKS-_ 19/BKS-_ 20

5

Connectors ...
page 5.2 ...

Diffuse	Sensing distance	0...100 mm/0...200 mm	0...100 mm/0...200 mm
Retroreflective	Range		
Through-beam	Range		



Diffuse



PNP, light-on	100 mm	BOS 18M-PS-1XA-E5-C-S4	BOS 18M-PS-1XA-E4-C-03
PNP, dark-on	100 mm	BOS 18M-PO-1XA-E5-C-S4	BOS 18M-PO-1XA-E4-C-03
PNP, light-on	200 mm	BOS 18M-PS-1XB-E5-C-S4	BOS 18M-PS-1XB-E4-C-03
PNP, dark-on	200 mm	BOS 18M-PO-1XB-E5-C-S4	BOS 18M-PO-1XB-E4-C-03
PNP, light-on	400 mm	Poti	
PNP, dark-on	400 mm	Poti	

Retroreflective



PNP, dark-on	2 m		
PNP, light-on	2 m		
PNP, dark-on	4 m		
PNP, light-on	4 m		

Through-beam



PNP, dark-on	16 m	Receiver	
PNP, light-on	16 m	Receiver	
	16 m	Emitter	

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 20 mA	≤ 20 mA
Switching output	PNP-Transistor*	PNP-Transistor*
Output current	200 mA	200 mA
Switching type	Light- or dark-on	Light- or dark-on
Voltage drop U_d at I_0	≤ 2.5 V	≤ 2.5 V
Settings	fixed	fixed

Optical data

Emitter, light type	LED, infrared	LED, infrared
Wavelength	880 nm	880 nm

Indicators

Power-on indicator		
Output function indicator	LED yellow	LED yellow

Time data

Response time	5 ms	5 ms
Switching frequency f	100 Hz	100 Hz

Mechanical data

Dimensions	M18x70 mm	M18x62 mm
Connection	M12 connector, 4-pin	3 m cable, PVC
No. of wires x cross-section		3x0.34 mm ²
Housing material	Nickel plated brass	Nickel plated brass
Optical surface	PMMA	PMMA
Weight	40 g	160 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-5...+55 °C	-5...+55 °C
Ambient light rejection	5 kLux	5 kLux

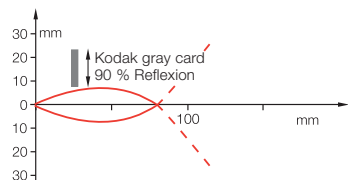
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

*NPN versions on request.

0...400 mm	2 m/4 m	2 m/4 m	0...16 m	0...16 m
BOS 18M-PS-1PD-E4-C-03 BOS 18M-PO-1PD-E4-C-03				
	BOS 18M-PS-1RB-E5-C-S4 BOS 18M-PO-1RB-E5-C-S4 BOS 18M-PS-1RD-E5-C-S4 BOS 18M-PO-1RD-E5-C-S4	BOS 18M-PS-1RB-E4-C-03 BOS 18M-PO-1RB-E4-C-03 BOS 18M-PS-1RD-E4-C-03 BOS 18M-PO-1RD-E4-C-03		
			BLE 18M-PS-1P-E5-C-S4 BLE 18M-PO-1P-E5-C-S4 BLS 18M-XX-1P-E5-L-S4	BLE 18M-PS-1P-E4-C-03 BLE 18M-PO-1P-E4-C-03 BLS 18M-XX-1P-E4-L-03
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
10 %	10 %	10 %	10 %	10 %
≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA (BLS ≤ 40 mA)	≤ 20 mA (BLS ≤ 40 mA)
PNP-Transistor*	PNP-Transistor*	PNP-Transistor*	PNP-Transistor*	PNP-Transistor*
200 mA	200 mA	200 mA	200 mA	200 mA
Light- or dark-on	Light- or dark-on	Light- or dark-on	Light- or dark-on	Light- or dark-on
≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
18-turn potentiometer	fixed	fixed	fixed	fixed
LED, infrared	LED, infrared	LED, infrared	LED, infrared	LED, infrared
880 nm	880 nm	880 nm	880 nm	880 nm
LED yellow	LED yellow	LED yellow	LED yellow (BLS) LED yellow (BLE)	LED yellow (BLS) LED yellow (BLE)
5 ms	5 ms	5 ms	5 ms	5 ms
100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
M18×67.5 mm	M18×69 mm	M18×61 mm	M18×70 mm	M18×62 mm
3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC
3×0.34 mm ²		3×0.34 mm ²		3×0.34 mm ²
Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
PMMA	PMMA	PMMA	PMMA	PMMA
160 g	40 g	160 g	40 g	160 g
IP 67	IP 67	IP 67	IP 67	IP 67
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C
2 kLux	2 kLux	2 kLux	2 kLux	2 kLux

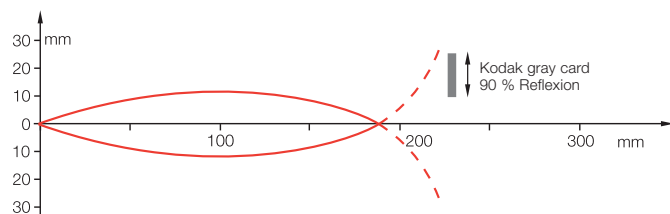
Wiring diagrams, characteristics and accessories see page 2.1.28 and 2.1.29.

Diffuse BOS 18M-P_-1XA-...



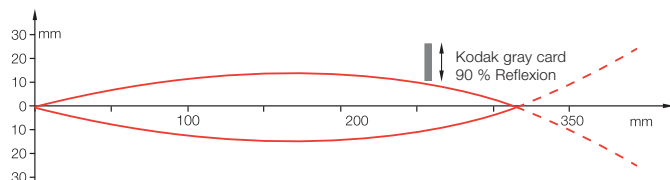
Sensing distance measured with side approach of Kodak gray card.

Diffuse BOS 18M-P_-1XB-...



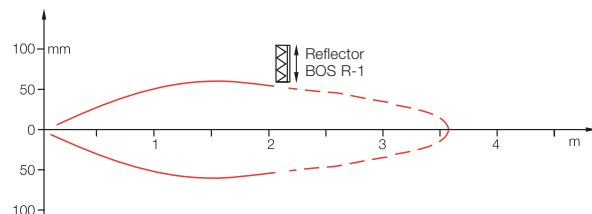
Sensing distance measured with side approach of Kodak gray card.

Diffuse BOS 18M-P_-1PD-...



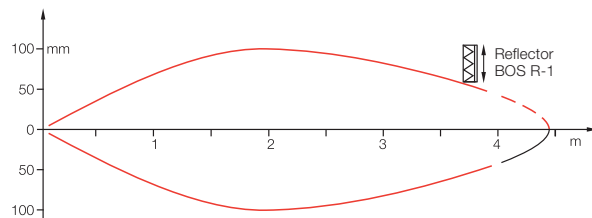
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 18M-P_-1RB-...



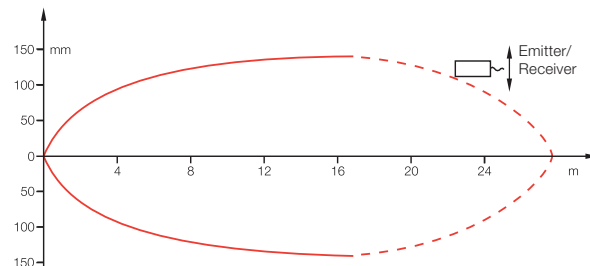
Range measured using side approach with reflector.

Retroreflective BOS 18M-P_-1RD-...



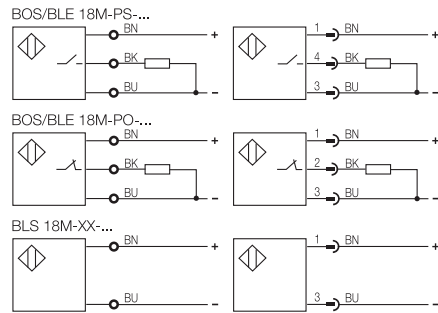
Range measured using side approach with reflector.

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



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

Wiring diagrams



2.1

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

Recommended accessories please order separately



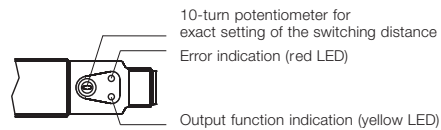
5

Connectors ...
page 5.2 ...

The new **BOS 18M** Laser diffuse sensor with background suppression is ideal for small parts detection with objects as small as 0.1 mm in diameter. The 10-turn potentiometer enables highly precise setting of the background suppression. Incorrect measurements and contamination are indicated by an LED and the error output.



Indicators and operating elements



Red LED

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

Yellow LED

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

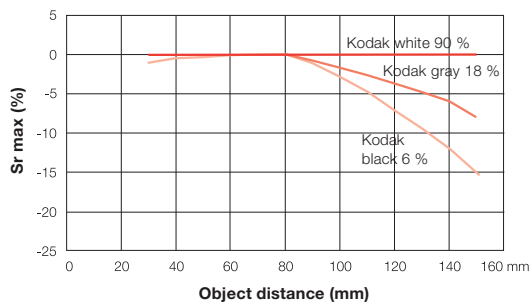
Error output

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

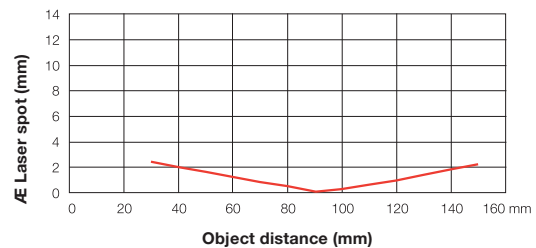
Potentiometer

Used for precise setting of the switching point and background suppression.

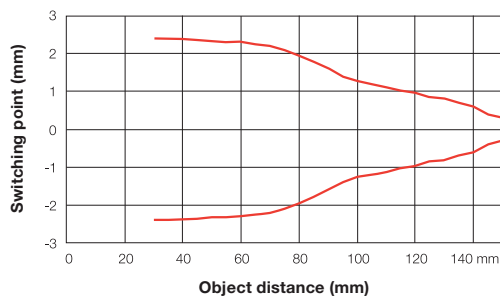
Gray scale shift



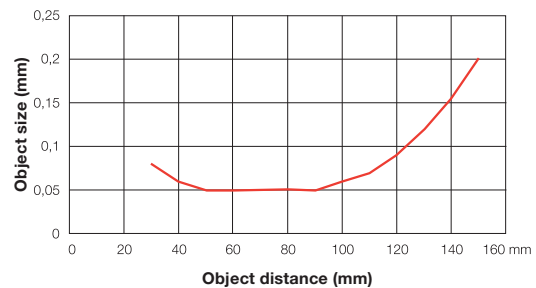
Light spot diameter at distance



Turn-on point for lateral approach



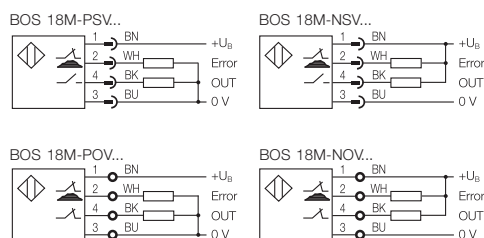
Smallest detectable part



Recommended accessories

please order separately

Wiring diagrams



Mounting clamp
BOS 18,0-KB-1



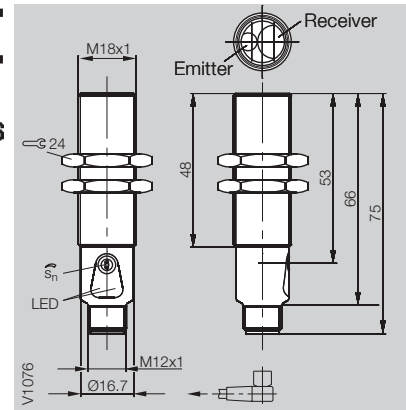
Connector
BKS-_ 19/BKS-_ 20



Diffuse with background suppression

Sensing distance

30...150 mm



Diffuse with background suppression

PNP	NO	30...150 mm HGA
NPN	NO	30...150 mm HGA
PNP	NC	30...150 mm HGA
NPN	NC	30...150 mm HGA

BOS 18M-PSV-LH22-S4
BOS 18M-NSV-LH22-S4
BOS 18M-POV-LH22-S4
BOS 18M-NOV-LH22-S4

Electrical data

Supply voltage U_B

10...30 V DC

Ripple

10 %

No-load supply current I_0 max.

≤ 30 mA

Switching output

PNP- or NPN-Transistor

Output current

100 mA

Switching type

Light- or dark-on

Voltage drop U_d at I_o

≤ 2.5 V

Settings

10-turn potentiometer

Error output

PNP- or NPN (NC)

Optical data

Emitter, light type

Laser, red light

Wavelength

670 nm

Laser class

2

Light spot diameter

see table

Indicators

Output function indicator

LED yellow

Error indicator

LED red

Time data

Response time

1 ms

Switching frequency f

500 Hz

Mechanical data

Dimensions

M18x75 mm

Connection

M12 connector, 4-pin

Housing material

Nickel plated brass

Optical surface

PMMA

Weight

70 g

Ambient data

Degree of protection per IEC 60529

IP 67

Polarity reversal protected

yes

Short circuit protected

yes

Ambient temperature range T_a

-5...+55 °C

Ambient light rejection

10 kLux

Diffuse values referenced to Kodak gray card 90% Reflexion.



Connector orientation

2.1

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...

Photoelectric Sensors

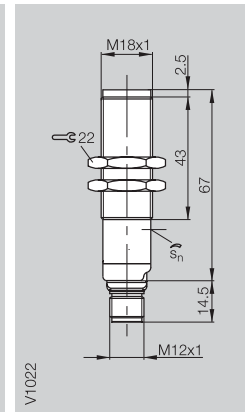
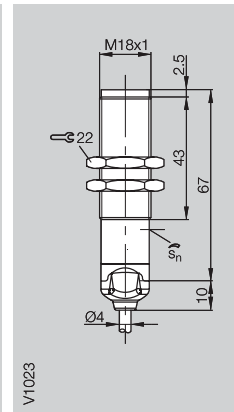
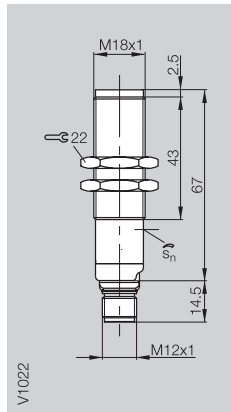
BOS 18M Laser
Sensing distance 350 mm
Range 16 m

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range
Through-beam	maximum range

0...350 mm

0...350 mm

0.1...16 m



Diffuse

PNP	350 mm
NPN	350 mm

BOS 18M-PA-LD10-S4
BOS 18M-NA-LD10-S4

BOS 18M-PA-LD10-02
BOS 18M-NA-LD10-02

Retroreflective

PNP	0.1...16 m	Polarizing filter
NPN	0.1...16 m	Polarizing filter

BOS 18M-PA-LR10-S4
BOS 18M-NA-LR10-S4

Through-beam

PNP	60 m	Receiver
NPN	60 m	Receiver
	60 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA	≤ 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output current	100 mA	100 mA	100 mA
Switching type	Light- and dark-on	Light- and dark-on	Light- and dark-on
Voltage drop U_d at I_e	≤ 2 V	≤ 2 V	≤ 2 V
Settings	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
Help functions			

Optical data

Recommended sensing distance/range	0...350 mm	0...350 mm	0.1...16 m
Emitter, light type	Laser, red light	Laser, red light	Laser, red light
Wavelength	650 nm	650 nm	650 nm
Laser class	1	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	approx. 0.9 mm at 1 m approx. 2 mm at 3 m

Indicators

Power-on indicator			
Output function indicator	LED yellow	LED yellow	LED yellow
Stability indicator	LED green	LED green	LED green

Time data

Response time	333 μ s	333 μ s	333 μ s
Switching frequency f	1.5 kHz	1.5 kHz	1.5 kHz

Mechanical data

Dimensions	M18x81.5 mm	M18x77 mm	M18x81.5 mm
Connection	M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires $\times$ cross-section		4x0.14 mm ²	
Housing material	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated
Optical surface	PMMA	PMMA	PMMA
Weight	60 g	110 g	60 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67	IP 67
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Ambient temperature range T_a	-10...+50 °C	-10...+50 °C	-10...+50 °C
Reference standard	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

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

M18 Metal Laser



Photoelectric Sensors

BOS 18M Laser
Range 16 m, 60 m

0.1...16 m	0...60 m	0...60 m	0...60 m	0...60 m
 V1023	 V1022	 V1026	 V1023	 V1027
BOS 18M-PA-LR10-02 BOS 18M-NA-LR10-02				
	BOS 18M-PA-LE10-S4 BOS 18M-NA-LE10-S4	BOS 18M-XT-LS10-S4	BOS 18M-PA-LE10-02 BOS 18M-NA-LE10-02	BOS 18M-XT-LS10-02
10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V Potentiometer 270°	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V Potentiometer 270°	10...30 V DC ≤ 2 V ≤ 30 mA Test input	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V Potentiometer 270°	10...30 V DC ≤ 2 V ≤ 30 mA Test input
0.1...16 m Laser, red light 650 nm 1 approx. 0.9 mm at 1 m approx. 2 mm at 3 m	0...60 m Laser, red light 650 nm 1 approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m	0...60 m Laser, red light 650 nm 1	0...60 m Laser, red light 650 nm 1 approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m	0...60 m Laser, red light 650 nm 1
LED yellow LED green	LED green LED yellow	LED green	LED green LED yellow	LED green
333 µs 1.5 kHz	333 µs 1.5 kHz		333 µs 1.5 kHz	
M18×77 mm 2 m cable, PVC 4×0.14 mm ² CuZn chrome plated PMMA 110 g	M18×81.5 mm M12 connector, 4-pin CuZn chrome plated PMMA 60 g	M18×71.5 mm M12 connector, 4-pin CuZn chrome plated PMMA 60 g	M18×77 mm 2 m cable, PVC 4×0.14 mm ² CuZn chrome plated PMMA 110 g	M18×67 mm 2 m cable, PVC 4×0.14 mm ² CuZn chrome plated PMMA 110 g
IP 67 yes yes -10...+50 °C EN 60947-5-2	IP 67 yes yes -10...+50 °C EN 60947-5-2	IP 67 yes yes -10...+50 °C EN 60947-5-2	IP 67 yes yes -10...+50 °C EN 60947-5-2	IP 67 yes yes -10...+50 °C EN 60947-5-2

Wiring diagrams, characteristics and accessories see page 2.1.36 and 2.1.37.

2.1

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

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Connectors ...
page 5.2 ...

Photoelectric Sensors

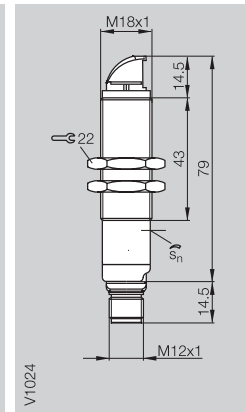
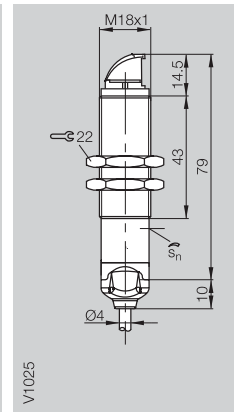
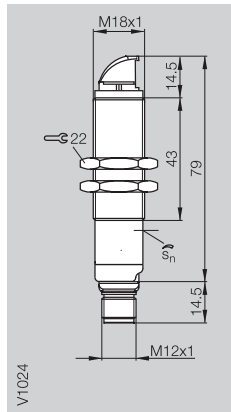
BOS 18MR Laser
Sensing distance 250 mm
Range 9 m

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range
Through-beam	maximum range

0...250 mm

0...250 mm

0.1...9 m



Diffuse



PNP	250 mm
NPN	250 mm

BOS 18MR-PA-LD10-S4
BOS 18MR-NA-LD10-S4

BOS 18MR-PA-LD10-02
BOS 18MR-NA-LD10-02

Retroreflective



PNP	0.1...9 m	Polarizing filter
NPN	0.1...9 m	Polarizing filter

BOS 18MR-PA-LR10-S4
BOS 18MR-NA-LR10-S4

Through-beam



PNP	50 m	Receiver
NPN	50 m	Receiver
	50 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_e	≤ 2 V
Settings	Potentiometer 270°
Help functions	

10...30 V DC
≤ 2 V
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light- and dark-on
≤ 2 V
Potentiometer 270°

10...30 V DC
≤ 2 V
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light- and dark-on
≤ 2 V
Potentiometer 270°

10...30 V DC
≤ 2 V
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light- and dark-on
≤ 2 V
Potentiometer 270°

Optical data

Recommended sensing distance/range	0...250 mm
Emitter, light type	Laser, red light
Wavelength	650 nm
Laser class	1
Resolution	approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm

0...250 mm
Laser, red light
650 nm
1
approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm

0...250 mm
Laser, red light
650 nm
1
approx. 0.3 mm at 50 mm approx. 0.3 mm at 100 mm approx. 0.5 mm at 150 mm

0.1...9 m
Laser, red light
650 nm
1
approx. 0.9 mm at 1 m approx. 2 mm at 3 m

Indicators

Power-on indicator	
Output function indicator	LED yellow
Stability indicator	LED green

LED yellow
LED green

LED yellow
LED green

LED yellow
LED green

Time data

Response time	333 μ s
Switching frequency f	1.5 kHz

333 μ s
1.5 kHz

333 μ s
1.5 kHz

333 μ s
1.5 kHz

Mechanical data

Dimensions	M18x93.5 mm
Connection	M12 connector, 4-pin
No. of wires $\times$ cross-section	4x0.14 mm ²
Housing material	CuZn chrome plated
Optical surface	PMMA
Weight	60 g

M18x93.5 mm
M12 connector, 4-pin
4x0.14 mm ²
CuZn chrome plated
PMMA
110 g

M18x89 mm
2 m cable, PVC
4x0.14 mm ²
CuZn chrome plated
PMMA
60 g

M18x93.5 mm
M12 connector, 4-pin
CuZn chrome plated
PMMA
60 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-10...+50 °C
Reference standard	EN 60947-5-2

IP 67
yes
yes
-10...+50 °C
EN 60947-5-2

IP 67
yes
yes
-10...+50 °C
EN 60947-5-2

IP 67
yes
yes
-10...+50 °C
EN 60947-5-2

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

M18 Metal Laser with Angle Head



**Photoelectric
Sensors**

BOS 18MR Laser
Range 9 m, 50 m

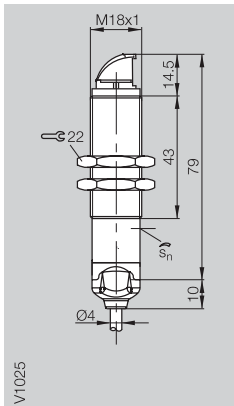
0.1...9 m

0...50 m

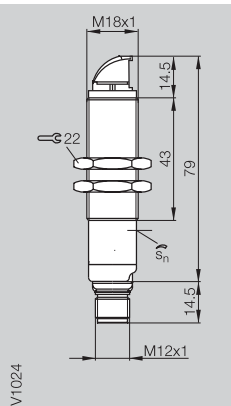
0...50 m

0...50 m

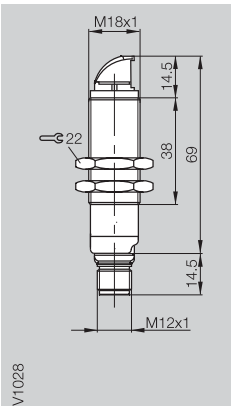
0...50 m



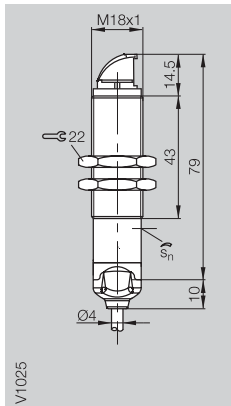
V1025



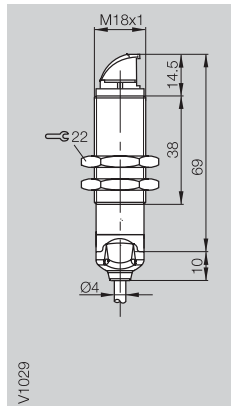
V1024



V1028



V1025



V1029

BOS 18MR-PA-LR10-02
BOS 18MR-NA-LR10-02

BOS 18MR-PA-LE10-S4
BOS 18MR-NA-LE10-S4

BOS 18MR-XT-LS10-S4

BOS 18MR-PA-LE10-02
BOS 18MR-NA-LE10-02

BOS 18MR-XT-LS10-02

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor
100 mA

Light- and dark-on
≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor
100 mA

Light- and dark-on
≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 30 mA

Test input

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor
100 mA

Light- and dark-on
≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 30 mA

Test input

0.1...9 m

Laser, red light

650 nm

1

approx. 0.9 mm at 1 m
approx. 2 mm at 3 m

0...50 m

Laser, red light

650 nm

1

approx. 2.5 mm at 5 m
approx. 5 mm at 10 m
approx. 10 mm at 20 m

0...50 m

Laser, red light

650 nm

1

0...50 m

Laser, red light

650 nm

1

approx. 2.5 mm at 5 m
approx. 5 mm at 10 m
approx. 10 mm at 20 m

0...50 m

Laser, red light

650 nm

1

LED yellow
LED green

LED green
LED yellow

LED green

LED green
LED yellow

LED green

333 µs
1.5 kHz

333 µs
1.5 kHz

333 µs
1.5 kHz

M18×89 mm
2 m cable, PVC

4×0.14 mm²

CuZn chrome plated
PMMA

110 g

M18×93.5 mm
M12 connector, 4-pin

CuZn chrome plated

PMMA

60 g

M18×83.5 mm
M12 connector, 4-pin

CuZn chrome plated

PMMA

60 g

M18×89 mm
2 m cable, PVC

4×0.14 mm²

CuZn chrome plated
PMMA

110 g

M18×79 mm
2 m cable, PVC

4×0.14 mm²

CuZn chrome plated
PMMA

110 g

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

Wiring diagrams, characteristics and accessories see page 2.1.36 and 2.1.37.

www.balluff.com

BALLUFF

2.1.35

2.1

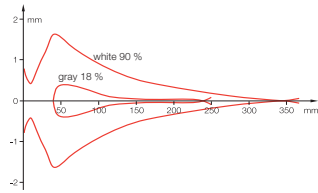
2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

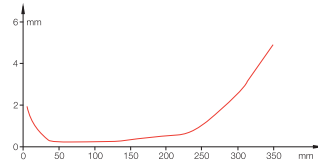
5

Connectors ...
page 5.2 ...

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

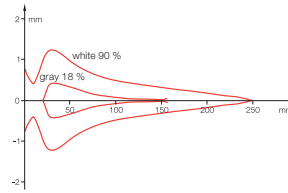


Detection range

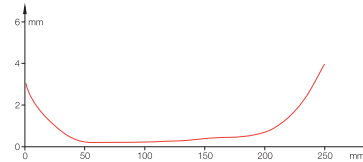


Resolution

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

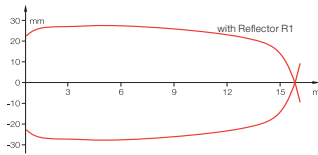


Detection range

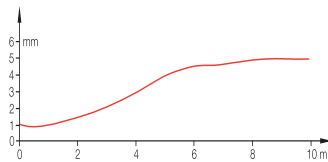


Resolution

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

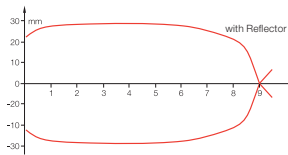


Detection range

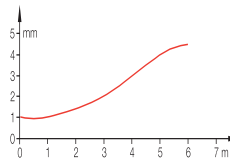


Resolution

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

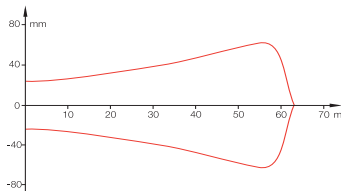


Detection range

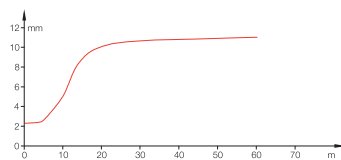


Resolution

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

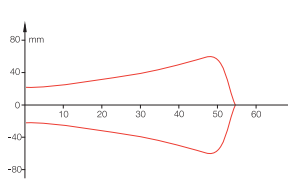


Detection range

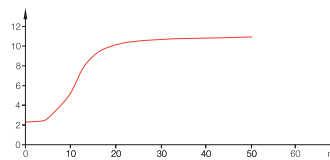


Resolution

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



Detection range



Resolution

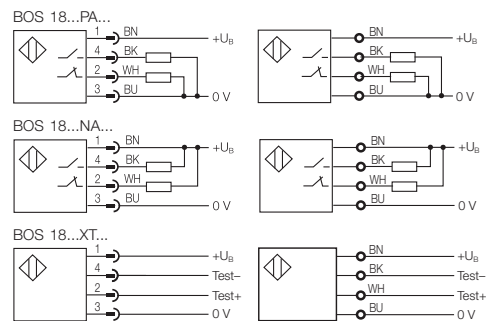
M18 Metal Laser with angle head



**Photoelectric
Sensors**

BOS 18M Laser
Connection
Accessories

Wiring diagrams



2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

Recommended accessories please order separately



Reflector
BOS R-1



Connector
BKS-_ 19/BKS-_ 20



Mounting clamp
BOS 18,0-KB-1



Mounting bracket
BES 18-HW-1



Cover nut
BOS 18-SM-1
for BOS 18M Laser



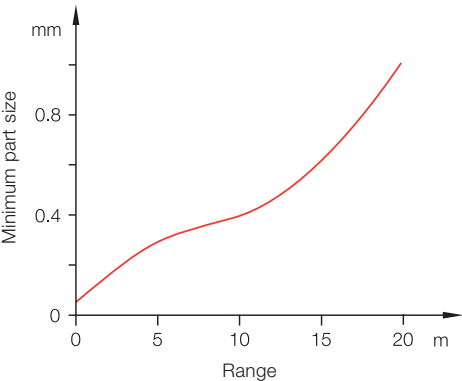
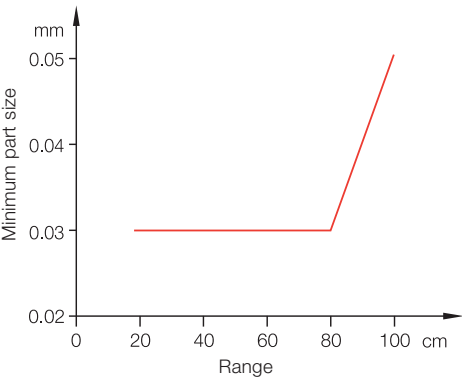
Air shield
BOS 18-LT-1
for BOS 18M Laser

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Connectors ...
page 5.2 ...

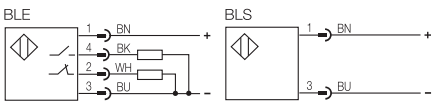
Accuracy diagram

Smallest detectable part size
as a function of range.



Beam spot vertical to transport direction of the object.

Wiring diagrams



Using the included focusing
tool the beam can be
focused on a particular
point. At this point small
parts can be optimally
detected.

At a distance of 20...80 cm
between emitter and receiver
parts with a diameter
of up to 0.03 mm can be
detected.



Laser through-beam range



PNP	50 m	Receiver
	50 m	Emitter

Electrical data

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

Optical data

Emitter, light type
Wavelength
Laser class
Light spot diameter

Indicators

Output function indicator
Stability indicator

Time data

Response time
Switching frequency f

Mechanical data

Connection
Housing material
Optical surface
Weight

Ambient data

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



Connector orientation

M18 Metal Laser



Photoelectric Sensors

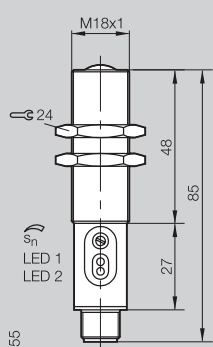
BOS 18M
Laser Through-beam
Range 50 m

0...50 m

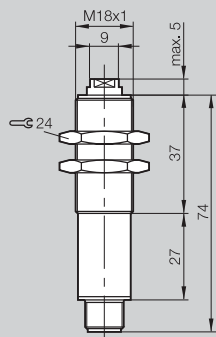
0...50 m

0...50 m

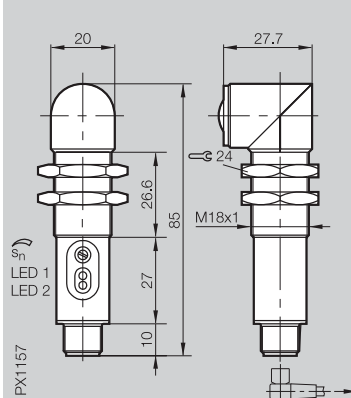
0...50 m



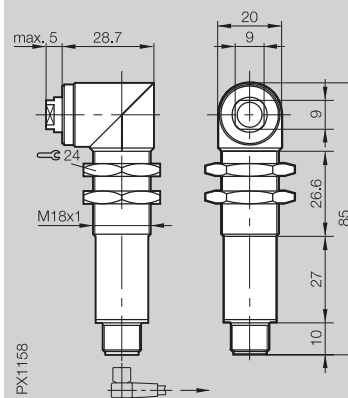
PX1155



PX1156



PX1157



PX1158

BLE 18M-BA-1LT-S4-C

BLS 18M-XX-1LT-S4-C

BLE 18MR-BA-1LT-S4-C

BLS 18MR-XX-1LT-S4-C

10...30 V DC

≤ 15 mA

PNP-Transistor

200 mA

Light-/dark-on (complementary)

≤ 2.5 V

18-turn potentiometer

10...30 V DC

≤ 10 mA

Laser, red light

650 nm

2

focusable

LED yellow

LED green/red

≤ 0.08 ms

6 kHz

M12 connector, 4-pin

Nickel plated brass

Glass

45 g

IP 65

yes

yes

-15...+55 °C

2 kLux

M12 connector, 4-pin

Nickel plated brass

Glass

45 g

IP 65

yes

yes

-15...+55 °C

2 kLux

10...30 V DC

≤ 15 mA

PNP-Transistor

200 mA

Light-/dark-on (complementary)

≤ 2.5 V

18-turn potentiometer

LED yellow

LED green/red

≤ 0.08 ms

6 kHz

M12 connector, 4-pin

Nickel plated brass

Glass

50 g

IP 65

yes

yes

-15...+55 °C

2 kLux

10...30 V DC

≤ 10 mA

Laser, red light

650 nm

2

focusable

M12 connector, 4-pin

Nickel plated brass

Glass

50 g

IP 65

yes

yes

-15...+55 °C

2 kLux

2.1

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Photoelectric sensors
accessories
page 2.3.2 ...

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Connectors ...
page 5.2 ...

Recommended accessories

please order separately

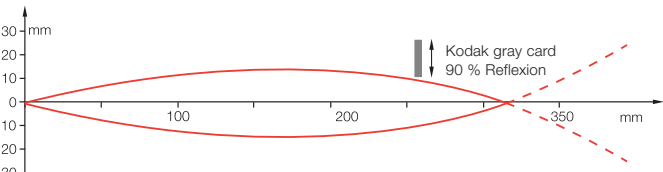


Mounting clamp
BOS 18,0-KB-1



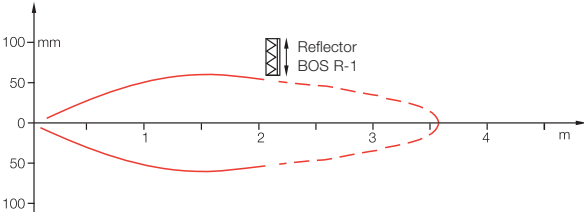
Connector
BKS-19/BKS-20

Diffuse BOS 18M-PU-1PD-...



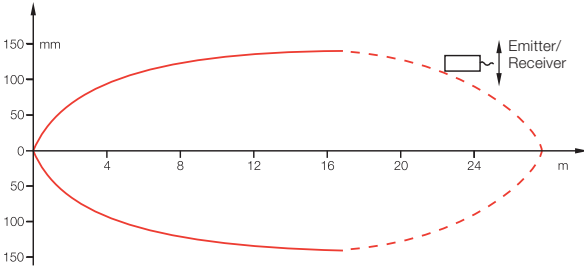
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 18M-...-1QB-...



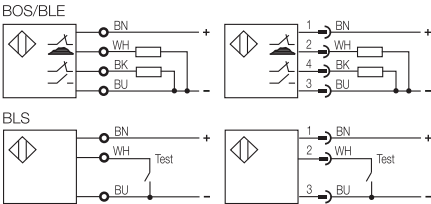
Range measured using side approach with reflector.

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



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

Wiring diagrams



Diffuse	Sensing distance
Retroreflective	Range
Through-beam	Range



Diffuse

PNP 400 mm Alarm output



Retroreflective

PNP 2 m Alarm output, polarizing filter



Through-beam

PNP 16 m Receiver, alarm output
16 m Emitter, test input

Electrical

Supply voltage U_B

No-load supply current I_0 max.

Switching output

Output current

Switching type

Voltage drop U_d at I_e

Settings

Help functions

Optical data

Emitter, light type

Wavelength

Indicators

Power-on indicator

Output function indicator

Contamination indicator

Time data

Response time

Switching frequency f

Mechanical data

Connection

Housing material

Material of sensing face

Weight

Ambient data

Degree of protection per IEC 60529

Polarity reversal protected

Short circuit protected

Ambient temperature range T_a

Ambient light rejection

Diffuse values referenced to Kodak gray card
90% Reflexion.
Retroreflective values referenced to
Reflector R1.

M18 Metal with Teach-in

Photoelectric Sensors

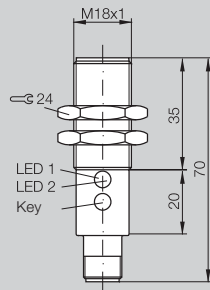
BOS 18M with Teach-in
Sensing distance 400 mm
Range 2 m, 16 m

0...400 mm

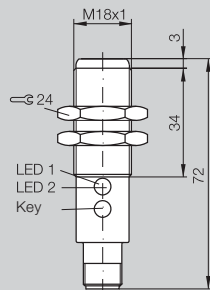
2 m

0...16 m

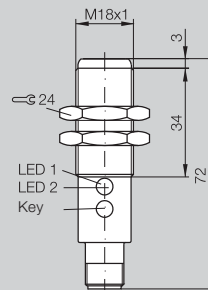
0...16 m



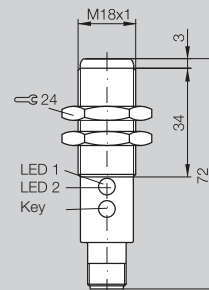
PX1400a



PX1401a



PX1401a



PX1401a

BOS 18M-PU-1PD-S4-C

BOS 18M-PU-1QB-S4-C

BLE 18M-PU-1PP-S4-C

BLS 18M-XX-1P-S4-L

10...30 V DC

≤ 25 mA

PNP-Transistor

200 mA

Light-/dark-on (selectable)

≤ 2.5 V

Teach-in

Contamination output

LED, infrared

880 nm

LED yellow

LED green

1 ms

500 Hz

M12 connector, 4-pin

Nickel plated brass

PMMA

65 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

≤ 25 mA

PNP-Transistor

200 mA

Light-/dark-on (selectable)

≤ 2.5 V

Teach-in

Contamination output

LED, red light

660 nm

LED yellow

LED green

1 ms

500 Hz

M12 connector, 4-pin

Nickel plated brass

Glass

65 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

≤ 25 mA

PNP-Transistor

200 mA

Light-/dark-on (selectable)

≤ 2.5 V

Teach-in

Contamination output

LED, infrared

LED yellow

LED green

1 ms

500 Hz

M12 connector, 4-pin

Nickel plated brass

Glass

65 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

≤ 25 mA

Teach-in

LED, infrared

880 nm

LED yellow

5

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Photoelectric sensors
accessories
page 2.3.2 ...

Connectors ...
page 5.2 ...

Recommended accessories
please order separately



Reflector
BOS R-1



Mounting clamp
BOS 18,0-KB-1

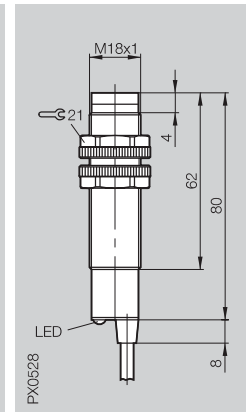
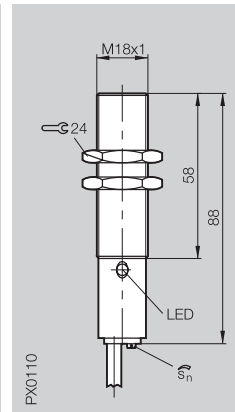
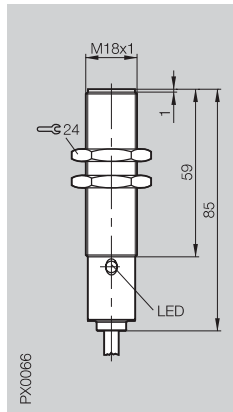


Connector
BKS- 19/BKS- 20

Photoelectric Sensors

BOS 18 (AC)
Sensing distance 100 mm, 200 mm
Range 2 m, 16 m

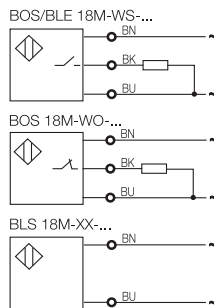
Diffuse	Sensing distance	0...100 mm/0...200 mm	0...200 mm	
Retroreflective	Range	2 m		
Through-beam	Range			0...16 m



	Diffuse				
	Diode-jumper	100 mm	BOS 18M-WS-7XA-B0-L-03		
		200 mm	BOS 18M-WS-7XB-B0-L-03		
		200 mm Poti		BOS 18M-WS-7PB-B1-L-03	
	Retroreflective				
	Diode-jumper	2 m	BOS 18M-WS-7RB-B0-L-03		
	Through-beam				
	Diode jumper	16 m Receiver			BLE 18K-WS-7P-B0-L-03
		16 m Emitter			BLS 18K-XX-7P-B0-L-03
Electrical data					
Supply voltage U_B		20...250 V AC	20...250 V AC	20...240 V AC	
No-load supply current I_0 max.		≤ 15 mA	≤ 15 mA	≤ 15 mA	
Switching output		Diode jumper	Diode jumper	Diode jumper	
Output current		200 mA	200 mA	200 mA	
Switching type		Light- or dark-on	Light-on	Dark-on	
Voltage drop U_d at I_0		≤ 4 V	≤ 4 V	≤ 4 V	
Settings		no	16-turn potentiometer	no	
Optical data					
Emitter, light type		LED, infrared	LED, infrared	LED, infrared	
Wavelength		880 nm	880 nm	880 nm	
Indicators					
Output function indicator		LED red	LED red	LED red	
Time data					
Response time		50 ms	50 ms	20 ms	
Switching frequency f		10 Hz	10 Hz	25 Hz	
Mechanical data					
Connection		3 m cable, PVC	3 m cable, PVC	3 m cable, PVC	
No. of wires x cross-section		3x0.34 mm ²	3x0.34 mm ²	3x0.34 mm ²	
Housing material		Nickel plated brass	Nickel plated brass	PA	
Material of sensing face		PMMA	PMMA	PMMA	
Weight		160 g	160 g	175 g	
Ambient data					
Degree of protection per IEC 60529		IP 67	IP 67	IP 67	
Polarity reversal protected		yes	yes	yes	
Short circuit protected		no	no	no	
Ambient temperature range T_a		-15...+55 °C	-15...+55 °C	-15...+55 °C	
Ambient light rejection		5 kLux	5 kLux	5 kLux	

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

Wiring diagrams

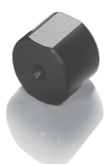


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Photoelectric
sensors
accessories
page 2.3.2 ...

**Recommended
accessories**
please order separately



Round aperture
BOS 18-BL-1



Reflector
BOS R-1



Air shield
BOS 18-LT-1



Mounting clamp
BOS 18,0-KB-1



Connector
BKS-_ 19/BKS-_ 20

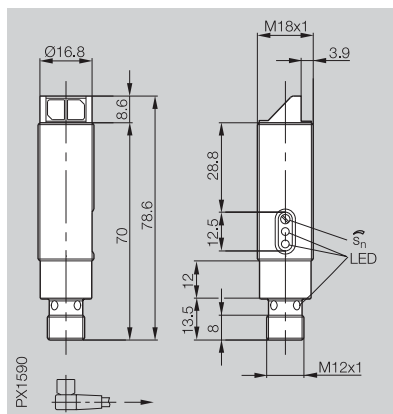
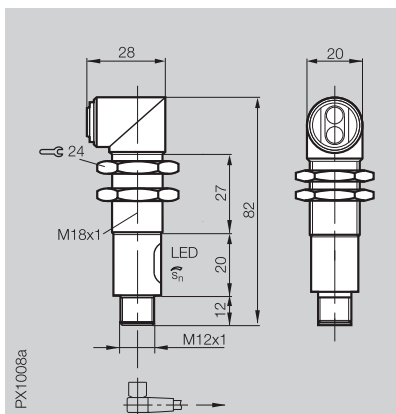
5

Connectors ...
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Diffuse	Sensing distance
Retroreflective	Range
Through-beam	Range

40...120 mm

10...120 mm



Diffuse

PNP	40...120 mm	HGA
PNP	10...120 mm	HGA
PNP	400 mm	

BOS 18MR-PA-1HA-S4-C



Retroreflective

PNP	2 m	Polarizing filter
-----	-----	-------------------

BOS 18MR-PS-1HA-E5-C-S4



Through-beam

PNP	16 m	Receiver
	16 m	Emitter, test input

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP-Transistor
Output current	200 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2.5 V
Settings	18-turn potentiometer

10...36 V DC

20 %

≤ 20 mA

PNP-Transistor

200 mA

Light-on

≤ 2 V

Potentiometer 270°

Help functions

Optical data

Emitter, light type	LED, red light
Wavelength	660 nm

LED, red light

660 nm

Indicators

Output function indicator	LED yellow
Stability indicator	no

2 × LED yellow

LED green

Time data

Response time	0.8 ms
Switching frequency f	600 Hz

≤ 1 ms

500 Hz

Mechanical data

Dimensions	M18×82 mm
Connection	M12 connector, 4-pin
Housing material	Nickel plated brass
Optical surface	Glass
Weight	62 g

Dimensions	M18×78.6 mm
Connection	M12 connector, 4-pin
Housing material	Nickel plated brass
Optical surface	Glass
Weight	57 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-15...+55 °C
Ambient light rejection	2 kLux

IP 67

yes

yes

-25...+55 °C

10 kLux

Diffuse values referenced to Kodak gray card 90% Reflexion.

Retroreflective values referenced to R1 reflector.



Connector orientation

M18 Metal with angled head

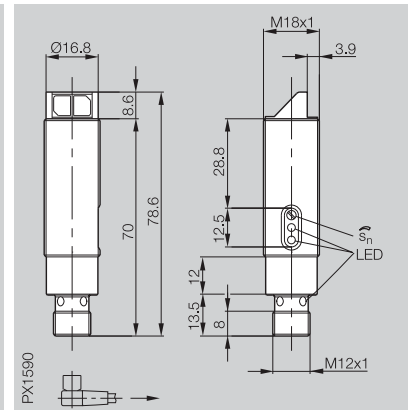
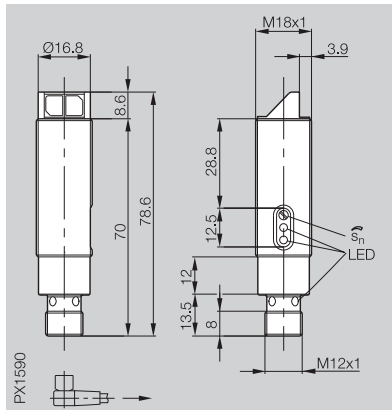
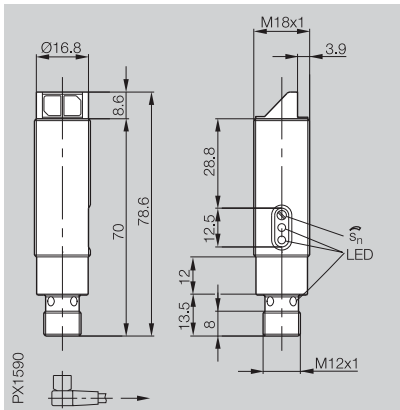
Photoelectric Sensors

BOS 18MR
Sensing distance 400 mm
Range 2 m, 16 m

0...400 mm

2 m

0...16 m



BOS 18MR-PS-1OD-E5-C-S4

BOS 18MR-PS-1QB-E5-C-S4

BLE 18MR-PA-1PP-E5-C-S4
BLS 18MR-XX-1P-E5-L-S4

10...36 V DC

20 %

≤ 20 mA

PNP-Transistor

200 mA

Light-on

≤ 2 V

Potentiometer 270°

10...36 V DC

20 %

≤ 20 mA

PNP-Transistor

200 mA

Dark-on

≤ 2 V

Potentiometer 270°

10...36 V DC

20 %

≤ 20 mA

PNP-Transistor

200 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

Test input emitter

LED, red light

660 nm

LED, red light

660 nm

LED, red light

660 nm

2 × LED yellow

LED green

2 × LED yellow

LED green

2 × LED yellow (BLE only)

LED green (BLE only)

≤ 0.5 ms

1 kHz

≤ 0.5 ms

1 kHz

≤ 0.5 ms

1 kHz

M18×78.6 mm

M12 connector, 4-pin

Nickel plated brass

Glass

57 g

M18×78.6 mm

M12 connector, 4-pin

Nickel plated brass

Glass

56 g

M18×78.6 mm

M12 connector, 4-pin

Nickel plated brass

Glass

57 g

IP 67

yes

yes

-25...+55 °C

10 kLux

IP 67

yes

yes

-25...+55 °C

10 kLux

IP 67

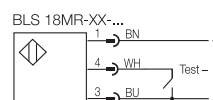
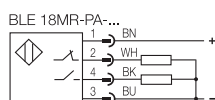
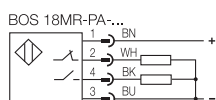
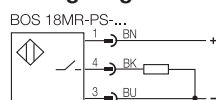
yes

yes

-25...+55 °C

10 kLux

Wiring diagrams



Connector
BKS-19/BKS-20

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Photoelectric
sensors
accessories
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Connectors ...
page 5.2 ...

Photoelectric sensors from the **Opto-PROXINOX** series are made of corrosion-proof **stainless steel 1.4571** and are, therefore, not subject to wear and tear. Nor are there any compromises with the optical surface, with its 2 mm thick glass element (also plastic for the food industry). The nightmare of lost name-plates is also over: the stainless steel 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.

The **BOS 18E** series includes diffuse sensors with fixed sensing distances of 100 mm, 200 mm and 400 mm. They are manufactured to precise tolerances. This makes them ideal for rapid and uncomplicated assembly. The use of high-visibility 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. An ideal sensor for harsh environments, for example in the food processing and machine tools industry, where a sensor with large function reserves is demanded!

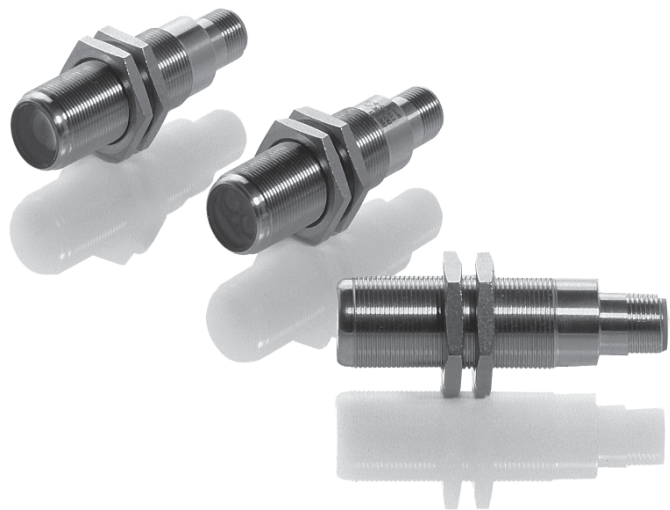
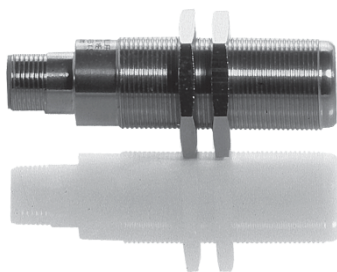
Features

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

Applications

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

**Tested to BWN Pr. 27
(IP 68 for the food industry)**



Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U _B	Connec- tion		Special features	Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on			M12 connector, 4-pin	Cable	Polarizing filter	
 Diffuse with HGA													
BOS 18E-PS-1N2M-S4-D	0...40 mm	■		■		■		100 Hz	■	■			2.1.48
 Diffuse													
BOS 18E-PS-1YA-E5-D-S4	0...100 mm	■		■		■		100 Hz	■	■			2.1.48
BOS 18E-PO-1YA-E5-D-S4	0...100 mm	■		■		■		100 Hz	■	■			2.1.48
BOS 18E-PS-1XA-SA1-S4	0...100 mm		■	■		■		100 Hz	■	■			2.1.49
BOS 18E-PS-1YB-E5-D-S4	0...200 mm	■		■		■		100 Hz	■	■			2.1.48
BOS 18E-PS-1XB-SA1-S4	0...200 mm		■	■		■		100 Hz	■	■			2.1.49
BOS 18E-PS-1YD-E5-D-S4	0...400 mm	■		■		■		100 Hz	■	■			2.1.48
BOS 18E-PS-1XD-SA1-S4	0...400 mm		■	■		■		100 Hz	■	■			2.1.49
 Retroreflective													
BOS 18E-PS-1UB-E5-D-S4	2 m	■		■		■		100 Hz	■	■		■	2.1.49
BOS 18E-PS-1UB-SA1-D-S4	2 m	■		■		■		100 Hz	■	■		■	2.1.49
BOS 18E-PS-1WD-E5-D-S4	4 m	■		■		■		100 Hz	■	■			2.1.49
 Through-beam													
BLE 18E-PS-1P-E5-D-S4	16 m		■	■		■		100 Hz	■	■			2.1.49
BLE 18E-PO-1P-E5-D-S4	16 m		■	■		■		100 Hz	■	■			2.1.49
BLE 18E-PS-1P-SA1-S4	16 m		■	■		■		100 Hz	■	■			2.1.49
BLS 18E-XX-1P-E5-X-S4	16 m		■						■	■			2.1.49
BLS 18E-XX-1P-SA1-S4	16 m		■						■	■			2.1.49

2.1

2.3

Photoelectric
sensors
accessories
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Connectors ...
page 5.2 ...

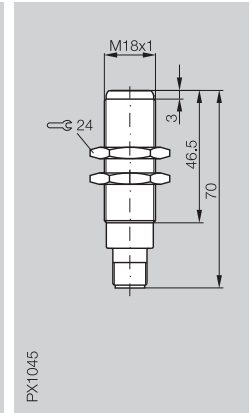
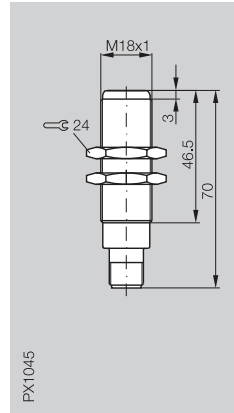
Photoelectric Sensors

BOS 18E
Sensing distance 40 mm, 100 mm,
200 mm, 400 mm

Diffuse with background suppression	Sensing distance
Diffuse	Sensing distance
Retroreflective	Range
Through-beam	Range



stainless steel



Diffuse



PNP, light-on	40 mm
PNP, light-on	100 mm
PNP, dark-on	100 mm
PNP, light-on	200 mm
PNP, light-on	400 mm

BOS 18E-PS-1N2M-S4-D

BOS 18E-PS-1YA-E5-D-S4
BOS 18E-PO-1YA-E5-D-S4
BOS 18E-PS-1YB-E5-D-S4
BOS 18E-PS-1YD-E5-D-S4

Retroreflective



PNP, dark-on	2 m	Polarizing filter
PNP, dark-on	4 m	

Through-beam



PNP, dark-on	16 m	Receiver
PNP, light-on	16 m	Receiver
		Emitter

Electrical data

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

10...30 V DC
15 %
≤ 20 mA
PNP-Transistor
200 mA
Light-on
≤ 2.5 V
fixed

10...30 V DC
10 %
≤ 20 mA
PNP-Transistor
200 mA
Light- or dark-on
≤ 2.5 V
fixed

Optical data

Emitter, light type
Wavelength

LED, red light
660 nm

LED, red light
660 nm

Time data

Response time
Switching frequency f

5 ms
100 Hz

5 ms
100 Hz

Mechanical data

Dimensions
Connection
Housing material
Optical surface
Weight

M18x70 mm
M12 connector, 4-pin
Stainless steel 1.4571
Glass
55 g

M18x70 mm
M12 connector, 4-pin
Stainless steel 1.4571
Glass
55 g

Ambient data

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

IP 69K and IP 68 per BWN Pr. 27
yes
yes
-5...+75 °C
2 kLux

IP 69K and IP 68 per BWN Pr. 27
yes
yes
-20...+75 °C
2 kLux

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

Wiring diagrams, characteristics and accessories see page 2.1.50 and 2.1.51.

M18 stainless steel

Photoelectric Sensors

BOS 18E, Sensing distance
100 mm, 200 mm, 400 mm
Range 2 m, 4 m, 16 m

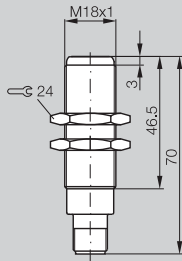
0...100/0...200/0...400 mm

2 m/4 m

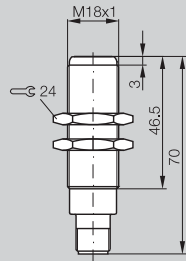
2 m

16 m

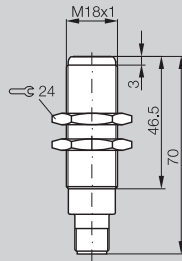
16 m



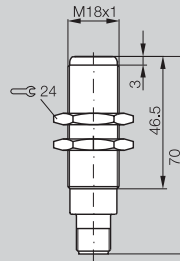
PX1045



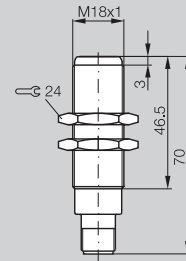
PX1045



PX1045



PX1045



PX1045

BOS 18E-PS-1XA-SA1-S4

BOS 18E-PS-1XB-SA1-S4

BOS 18E-PS-1XD-SA1-S4

BOS 18E-PS-1UB-E5-D-S4
BOS 18E-PS-1WD-E5-D-S4

BOS 18E-PS-1UB-SA1-S4

BLE 18E-PS-1P-E5-D-S4
BLE 18E-PO-1P-E5-D-S4
BLS 18E-XX-1P-E5-X-S4

BLE 18E-PS-1P-SA1-S4
BLS 18E-XX-1P-SA1-S4

10...30 V DC

15 %

≤ 20 mA

PNP-Transistor

200 mA

Light-on

≤ 2.5 V

fixed

LED, infrared
880 nm

5 ms

100 Hz

M18×70 mm
M12 connector, 4-pin
Stainless steel 1.4571
PMMA scratch-resistant
55 g

IP 69K and
IP 68 per BWN Pr. 27
yes
yes
-5...+75 °C
2 kLux

10...30 V DC

10 %

≤ 20 mA

PNP-Transistor

200 mA

Dark-on

≤ 2.5 V

fixed

LED, red light
660 nm

5 ms

100 Hz

M18×70 mm
M12 connector, 4-pin
Stainless steel 1.4571
Glass
40 g

IP 69K and
IP 68 per BWN Pr. 27
yes
yes
-20...+75 °C
2 kLux

10...30 V DC

15 %

≤ 20 mA

PNP-Transistor

200 mA

Dark-on

≤ 2.5 V

fixed

LED, red light
660 nm

5 ms

100 Hz

M18×70 mm
M12 connector, 4-pin
Stainless steel 1.4571
PMMA scratch-resistant
40 g

IP 69K and
IP 68 per BWN Pr. 27
yes
yes
-20...+75 °C
2 kLux

10...30 V DC

15 %

≤ 15 mA (BLS ≤ 40 mA)

PNP-Transistor

200 mA

Light- or dark-on

≤ 2.5 V

fixed

LED, infrared
880 nm

5 ms

100 Hz

M18×70 mm
M12 connector, 4-pin
Stainless steel 1.4571
Glass
55 g (40 g)

IP 69K and
IP 68 per BWN Pr. 27
yes
yes
-5...+75 °C
2 kLux

10...30 V DC

15 %

≤ 15 mA (BLS ≤ 35 mA)

PNP-Transistor

200 mA

Dark-on

≤ 2.5 V

fixed

LED, infrared
880 nm

5 ms

100 Hz

M18×70 mm
M12 connector, 4-pin
Stainless steel 1.4571
PMMA scratch-resistant
55 g (40 g)

IP 69K and
IP 68 per BWN Pr. 27
yes
yes
-5...+75 °C
2 kLux

2.1

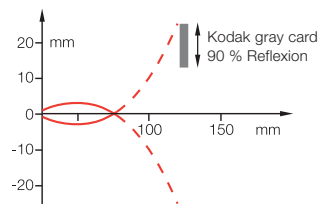
2.3

Photoelectric sensors
accessories
page 2.3.2 ...

5

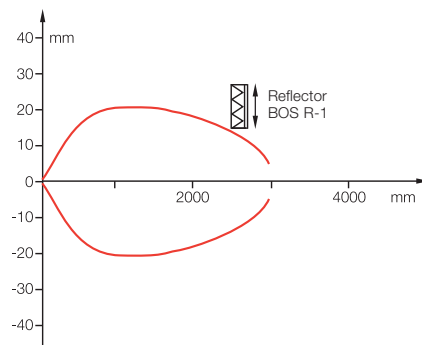
Connectors ...
page 5.2 ...

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



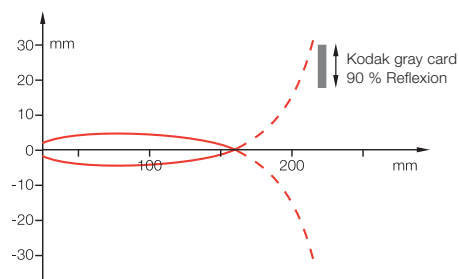
Sensing distance measured with side approach of Kodak gray card.

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



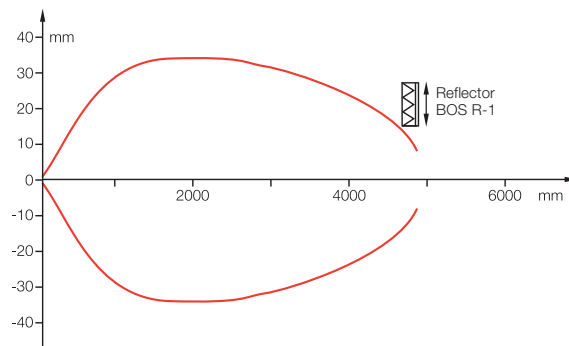
Range measured using side approach with reflector.

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



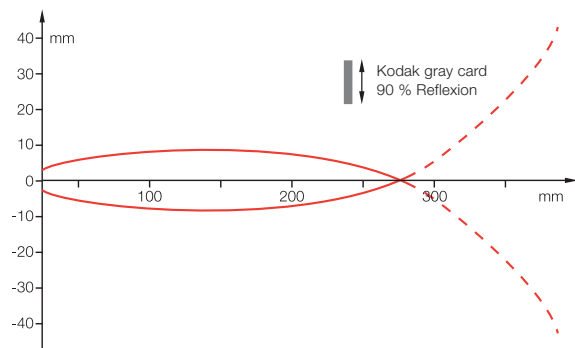
Sensing distance measured with side approach of Kodak gray card.

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



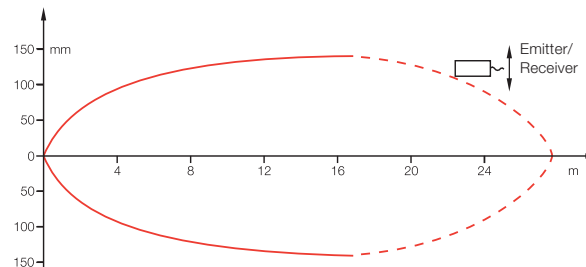
Range measured using side approach with reflector.

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



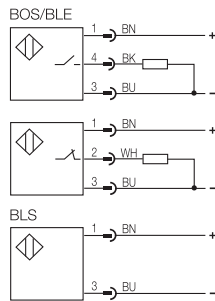
Sensing distance measured with side approach of Kodak gray card.

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



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

Wiring diagrams



2.1

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...

Recommended accessories

please order separately



Round aperture
BOS 18-BL-1



Reflector
BOS R-1



Air shield
BOS 18-LT-1



Mounting clamp
BOS 18,0-KB-1



Connector
BKS-S 20E

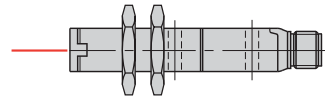
**BOS 18KF –
standards redefined**

The redesigned 18K series doesn't just look different, it features new sensors and improved technical data.

The sensors are available with red or infrared light or as Class 1 laser type. Sensor settings are made using a potentiometer or teach-in process.

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		Output function		Switching frequency	U _B	Con- nection	Special features		Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin Cable	Polarizing filter	Teach-in	
Diffuse with HGA														
BOS 18KF-PA-1HA-S4-C	50...100 mm	■			■		■	■	500 Hz	■	■		■	2.1.54
BOS 18KF-NA-1HA-S4-C	50...100 mm	■				■	■	■	500 Hz	■	■		■	2.1.54
BOS 18KF-PA-1HA-C-02	50...100 mm	■			■		■	■	500 Hz	■		■	■	2.1.54
BOS 18KF-NA-1HA-C-02	50...100 mm	■				■	■	■	500 Hz	■		■	■	2.1.54
BOS 18KF-PA-1N1R-S4-C	100 mm	■			■		■	■	1 kHz	■	■			2.1.55
BOS 18KF-NA-1N1R-S4-C	100 mm	■				■	■	■	1 kHz	■	■			2.1.55
BOS 18KF-PA-1N1R-C-02	100 mm	■			■		■	■	1 kHz	■		■		2.1.55
BOS 18KF-NA-1N1R-C-02	100 mm	■				■	■	■	1 kHz	■		■		2.1.55
Diffuse with VGA														
BOS 18KF-PA-1GA-S4-C	40...100 mm	■			■		■	■	250 Hz	■	■		■	2.1.55
BOS 18KF-NA-1GA-S4-C	40...100 mm	■				■	■	■	250 Hz	■	■		■	2.1.55
BOS 18KF-PA-1GA-C-02	40...100 mm	■			■		■	■	250 Hz	■		■	■	2.1.55
BOS 18KF-NA-1GA-C-02	40...100 mm	■				■	■	■	250 Hz	■		■	■	2.1.55
Diffuse														
BOS 18KF-PA-1XA-S4-C	0...100 mm		■		■		■	■	1 kHz	■	■			2.1.56
BOS 18KF-NA-1XA-S4-C	0...100 mm		■			■	■	■	1 kHz	■	■			2.1.56
BOS 18KF-PA-1XA-C-02	0...100 mm		■		■		■	■	1 kHz	■		■		2.1.56
BOS 18KF-NA-1XA-C-02	0...100 mm		■			■	■	■	1 kHz	■		■		2.1.56
BOS 18KF-PA-1LOC-S4-C	0...350 mm			■	■		■	■	1.5 kHz	■	■			2.1.62
BOS 18KF-NA-1LOC-S4-C	0...350 mm			■		■	■	■	1.5 kHz	■	■			2.1.62
BOS 18KF-PA-1LOC-C-02	0...350 mm			■	■		■	■	1.5 kHz	■		■		2.1.62
BOS 18KF-NA-1LOC-C-02	0...350 mm			■		■	■	■	1.5 kHz	■		■		2.1.62

Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U _B	Conne- ction	Special features		Page	
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Glass sensing	
 Diffuse															
BOS 18KF-PA-1PD-S4-C	0...400 mm		■		■		■	■	1 kHz	■	■				2.1.57
BOS 18KF-NA-1PD-S4-C	0...400 mm		■			■	■	■	1 kHz	■	■				2.1.57
BOS 18KF-PA-1PD-C-02	0...400 mm		■		■		■	■	1 kHz	■		■			2.1.57
BOS 18KF-NA-1PD-C-02	0...400 mm		■			■	■	■	1 kHz	■		■			2.1.57
BOS 18KF-PA-1PE-S4-C	0...700 mm		■		■		■	■	1 kHz	■	■				2.1.57
BOS 18KF-NA-1PE-S4-C	0...700 mm		■			■	■	■	1 kHz	■	■				2.1.57
BOS 18KF-PA-1PE-C-02	0...700 mm		■		■		■	■	1 kHz	■		■			2.1.57
BOS 18KF-NA-1PE-C-02	0...700 mm		■			■	■	■	1 kHz	■		■			2.1.57
 Retroreflective															
BOS 18KF-PA-1TB-S4-C	0.1...1.7 m	■			■		■	■	1 kHz	■	■		■	■	2.1.58
BOS 18KF-NA-1TB-S4-C	0.1...1.7 m	■				■	■	■	1 kHz	■	■		■	■	2.1.58
BOS 18KF-PA-1TB-C-02	0.1...1.7 m	■			■		■	■	1 kHz	■		■	■	■	2.1.58
BOS 18KF-NA-1TB-C-02	0.1...1.7 m	■				■	■	■	1 kHz	■		■	■	■	2.1.58
BOS 18KF-PA-1QD-S4-C	0.1...4.5 m	■			■		■	■	1 kHz	■	■		■		2.1.59
BOS 18KF-NA-1QD-S4-C	0.1...4.5 m	■				■	■	■	1 kHz	■	■		■		2.1.59
BOS 18KF-PA-1QD-C-02	0.1...4.5 m	■			■		■	■	1 kHz	■		■	■		2.1.59
BOS 18KF-NA-1QD-C-02	0.1...4.5 m	■				■	■	■	1 kHz	■		■	■		2.1.59
BOS 18KF-PA-1RE-S4-C	0.1...5 m	■			■		■	■	1 kHz	■	■				2.1.59
BOS 18KF-NA-1RE-S4-C	0.1...5 m	■				■	■	■	1 kHz	■	■				2.1.59
BOS 18KF-PA-1RE-C-02	0.1...5 m	■			■		■	■	1 kHz	■		■			2.1.59
BOS 18KF-NA-1RE-C-02	0.1...5 m	■				■	■	■	1 kHz	■		■			2.1.59
BOS 18KF-PA-1LQP-S4-C	0.1...16 m			■	■		■	■	1.5 kHz	■	■		■		2.1.63
BOS 18KF-NA-1LQP-S4-C	0.1...16 m			■		■	■	■	1.5 kHz	■	■		■		2.1.63
BOS 18KF-PA-1LQP-C-02	0.1...16 m		■	■			■	■	1.5 kHz	■		■	■		2.1.63
BOS 18KF-NA-1LQP-C-02	0.1...16 m			■		■	■	■	1.5 kHz	■		■	■		2.1.63
 Through-beam															
BLE 18KF-PA-1PP-S4-C	0...20 m		■		■		■	■	250 Hz	■	■				2.1.60
BLE 18KF-NA-1PP-S4-C	0...20 m		■			■	■	■	250 Hz	■	■				2.1.60
BLE 18KF-PA-1PP-C-02	0...20 m		■		■		■	■	250 Hz	■		■			2.1.61
BLE 18KF-NA-1PP-C-02	0...20 m		■			■	■	■	250 Hz	■		■			2.1.61
BLE 18KF-PA-1LT-S4-C	0...60 m			■	■		■	■	1.5 kHz	■	■				2.1.64
BLE 18KF-NA-1LT-S4-C	0...60 m			■		■	■	■	1.5 kHz	■	■				2.1.64
BLE 18KF-PA-1LT-C-02	0...60 m			■	■		■	■	1.5 kHz	■		■			2.1.65
BLE 18KF-NA-1LT-C-02	0...60 m			■		■	■	■	1.5 kHz	■		■			2.1.65
BLS 18KF-XX-1P-S4-L	0...20 m		■							■	■				2.1.60
BLS 18KF-XX-1P-L-02	0...20 m		■							■		■			2.1.61
BLS 18KF-XX-1LT-S4-L	0...60 m			■						■	■				2.1.64
BLS 18KF-XX-1LT-L-02	0...60 m			■						■		■			2.1.65

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

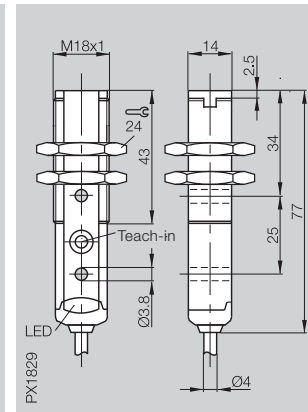
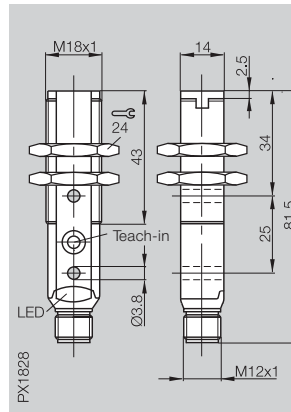
5

Connectors ...
page 5.2 ...

Diffuse with background suppression	maximum sensing distance
Diffuse with fore- and background suppression	maximum sensing distance

50...100 mm

50...100 mm



Diffuse



PNP	50...100 mm	HGA
NPN	50...100 mm	HGA

BOS 18KF-PA-1HA-S4-C
BOS 18KF-NA-1HA-S4-C

BOS 18KF-PA-1HA-C-02
BOS 18KF-NA-1HA-C-02



PNP	100 mm	HGA
NPN	100 mm	HGA
PNP	40...100 mm	VGA + HGA
NPN	40...100 mm	VGA + HGA

Electrical data

Supply voltage U_B

10...30 V DC

10...30 V DC

Ripple

≤ 2 V

≤ 2 V

No-load supply current I_0 max.

≤ 30 mA

≤ 30 mA

Switching output

PNP- or NPN-Transistor

PNP- or NPN-Transistor

Output current

100 mA

100 mA

Switching type

Light- and dark-on

Light- and dark-on

Voltage drop U_d at I_0

≤ 2 V

≤ 2 V

Settings

Teach-in

Teach-in

Optical data

Recommended sensing distance

50...100 mm

50...100 mm

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

Indicators

Output function indicator

LED yellow

LED yellow

Stability indicator

LED green/red

LED green/red

Time data

Response time

1 ms

1 ms

Switching frequency f

500 Hz

500 Hz

Mechanical data

Dimensions

M18×81.5 mm

M18×77 mm

Connection

M12 connector, 4-pin

2 m cable, PVC

No. of wires × cross-section

4×0.14 mm²

Housing material

PBT

PBT

Optical surface

PMMA

PMMA

Weight

25 g

75 g

Ambient data

Degree of protection per IEC 60529

IP 67

IP 67

Polarity reversal protected

yes

yes

Short circuit protected

yes

yes

Ambient temperature range T_a

-25...+55 °C

-25...+55 °C

Reference standard

EN 60947-5-2

EN 60947-5-2

Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page **2.1.66** to **2.1.69**.

Photoelectric Sensors

BOS 18KF
Sensing distance 100 mm

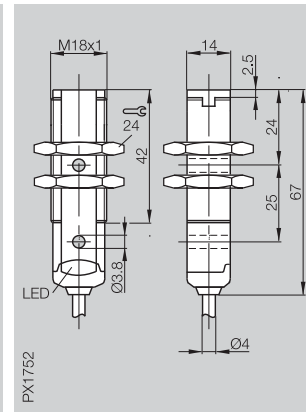
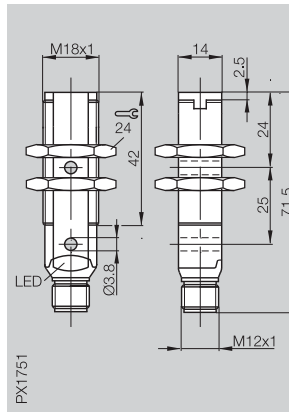
BALLUFF 2.1.55

Connectors ...
page 5.2 ...

Diffuse maximum sensing distance

0...100 mm

0...100 mm



Diffuse

PNP	100 mm
NPN	100 mm
PNP	400 mm
NPN	400 mm
PNP	700 mm
NPN	700 mm

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V

Settings

Optical data

Recommended sensing distance	0...100 mm
Emitter, light type	LED, infrared
Wavelength	880 nm
Light spot diameter	approx. 80 mm at 100 mm

Indicators

Output function indicator	LED yellow
Stability indicator	

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

Mechanical data

Dimensions	M18x71.5 mm
Connection	M12 connector, 4-pin
No. of wires $\times$ cross-section	4x0.14 mm ²
Housing material	PBT
Optical surface	PMMA
Weight	25 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-25...+55 °C
Reference standard	EN 60947-5-2

Diffuse values referenced to Kodak gray card 90% Reflexion.

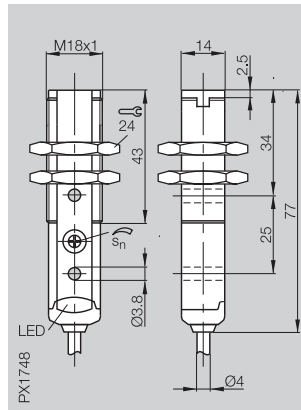
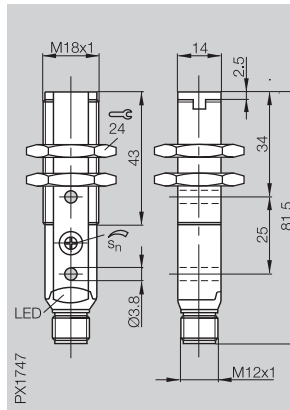
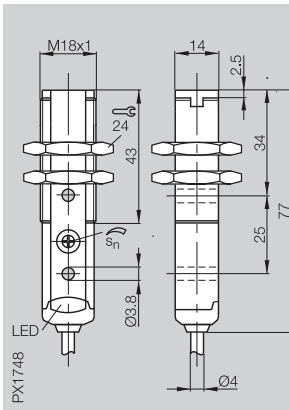
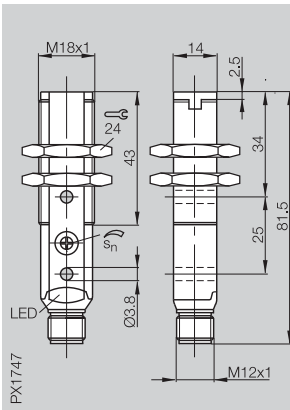
Wiring diagrams, characteristics and accessories see page 2.1.66 to 2.1.69.

0...400 mm

0...400 mm

0...700 mm

0...700 mm

BOS 18KF-PA-1PD-S4-C
BOS 18KF-NA-1PD-S4-CBOS 18KF-PA-1PD-C-02
BOS 18KF-NA-1PD-C-02BOS 18KF-PA-1PE-S4-C
BOS 18KF-NA-1PE-S4-CBOS 18KF-PA-1PE-C-02
BOS 18KF-NA-1PE-C-02

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

≤ 2 V

≤ 2 V

≤ 2 V

≤ 2 V

≤ 35 mA

≤ 35 mA

≤ 35 mA

≤ 35 mA

PNP- or NPN-Transistor

PNP- or NPN-Transistor

PNP- or NPN-Transistor

PNP- or NPN-Transistor

100 mA

100 mA

100 mA

100 mA

Light- and dark-on

Light- and dark-on

Light- and dark-on

Light- and dark-on

≤ 2 V

≤ 2 V

≤ 2 V

≤ 2 V

Potentiometer 270°

Potentiometer 270°

Potentiometer 270°

Potentiometer 270°

0...350 mm

0...350 mm

0...600 mm

0...600 mm

LED, infrared

LED, infrared

LED, infrared

LED, infrared

880 nm

880 nm

880 nm

880 nm

approx. 100 mm at 300 mm

approx. 100 mm at 300 mm

approx. 200 mm at 600 mm

approx. 200 mm at 600 mm

LED yellow

LED yellow

LED yellow

LED yellow

LED green

LED green

LED green

LED green

0.5 ms

0.5 ms

0.5 ms

0.5 ms

1 kHz

1 kHz

1 kHz

1 kHz

M18x81.5 mm

M18x77 mm

M18x81.5 mm

M18x77 mm

M12 connector, 4-pin

2 m cable, PVC

M12 connector, 4-pin

2 m cable, PVC

4x0.14 mm²4x0.14 mm²

PBT

PBT

PBT

PBT

PMMA

PMMA

PMMA

PMMA

25 g

75 g

25 g

75 g

IP 67

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

yes

yes

-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

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

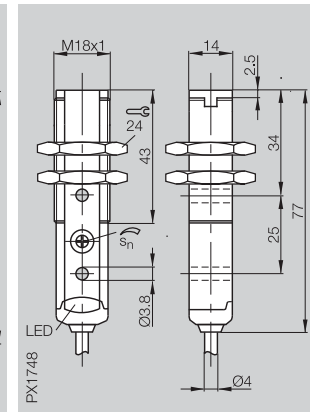
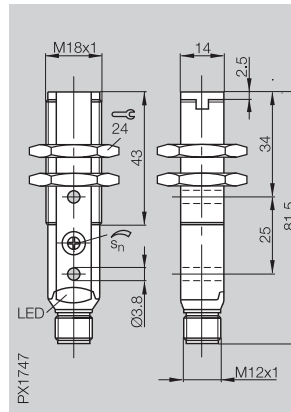
5

Connectors ...
page 5.2 ...

Retroreflective for transparent materials	Range
Retroreflective with polarizing filter	maximum range
Retroreflective	maximum range

0.1...1.7 m

0.1...1.7 m



Retroreflective

PNP	0.1...1.7 m	Polarizing filter
NPN	0.1...1.7 m	Polarizing filter
PNP	0.1...4.5 m	Polarizing filter
NPN	0.1...4.5 m	Polarizing filter
PNP	0.1...5 m	
NPN	0.1...5 m	

BOS 18KF-PA-1TB-S4-C
BOS 18KF-NA-1TB-S4-C

BOS 18KF-PA-1TB-C-02
BOS 18KF-NA-1TB-C-02

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V
Settings	Potentiometer 270°

10...30 V DC
≤ 2 V
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light- and dark-on
≤ 2 V
Potentiometer 270°

Optical data

Recommended sensing distance	0.1...1.4 m
Emitter, light type	LED, red light
Wavelength	660 nm
Light spot diameter	approx. 45 mm at 1 m

0.1...1.4 m
LED, red light
660 nm
approx. 45 mm at 1 m

Indicators

Output function indicator	LED yellow
Stability indicator	LED green

LED yellow
LED green

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

0.5 ms
1 kHz

Mechanical data

Dimensions	M18x81.5 mm
Connection	M12 connector, 4-pin
No. of wires $\times$ cross-section	
Housing material	PBT
Optical surface	PMMA
Weight	25 g

M18x77 mm
2 m cable, PVC
4x0.14 mm ²
PBT
PMMA
25 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-25...+55 °C
Reference standard	EN 60947-5-2

IP 67
yes
yes
-25...+55 °C
EN 60947-5-2

Retroreflective values referenced to R1 reflector.

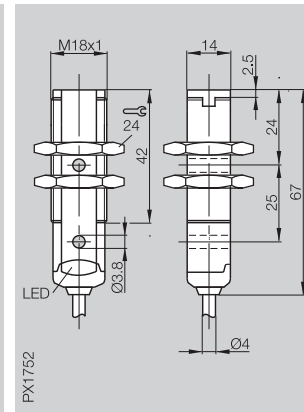
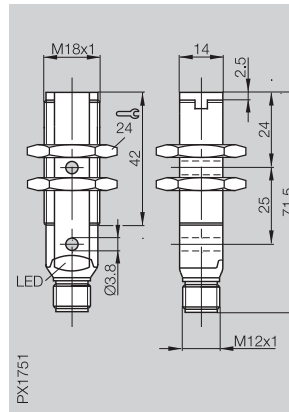
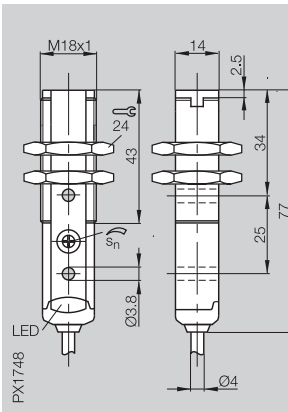
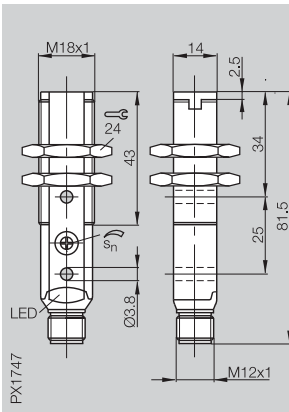
Wiring diagrams, characteristics and accessories see page **2.1.66** to **2.1.69**.

0.1...4.5 m

0.1...4.5 m

0.1...5 m

0.1...5 m



BOS 18KF-PA-1QD-S4-C
BOS 18KF-NA-1QD-S4-C

BOS 18KF-PA-1QD-C-02
BOS 18KF-NA-1QD-C-02

BOS 18KF-PA-1RE-S4-C
BOS 18KF-NA-1RE-S4-C

BOS 18KF-PA-1RE-C-02
BOS 18KF-NA-1RE-C-02

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

≤ 2 V

≤ 2 V

≤ 2 V

≤ 2 V

≤ 35 mA

≤ 35 mA

≤ 35 mA

≤ 35 mA

PNP- or NPN-Transistor

PNP- or NPN-Transistor

PNP- or NPN-Transistor

PNP- or NPN-Transistor

100 mA

100 mA

100 mA

100 mA

Light- and dark-on

Light- and dark-on

Light- and dark-on

Light- and dark-on

≤ 2 V

≤ 2 V

≤ 2 V

≤ 2 V

Potentiometer 270°

Potentiometer 270°

fixed

fixed

0.1...4 m

0.1...4 m

0.1...5 m

0.1...5 m

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

LED yellow

LED yellow

LED yellow

LED yellow

LED green

LED green

LED green

LED green

0.5 ms

0.5 ms

0.5 ms

0.5 ms

1 kHz

1 kHz

1 kHz

1 kHz

M18x81.5 mm

M18x77 mm

M18x71.5 mm

M18x77 mm

M12 connector, 4-pin

2 m cable, PVC

M12 connector, 4-pin

2 m cable, PVC

4x0.14 mm²

4x0.14 mm²

PBT

PBT

PBT

PBT

PMMA

PMMA

PMMA

PMMA

25 g

75 g

25 g

25 g

IP 67

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

yes

yes

-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

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2.3

Photoelectric sensors
accessories
page 2.3.2 ...

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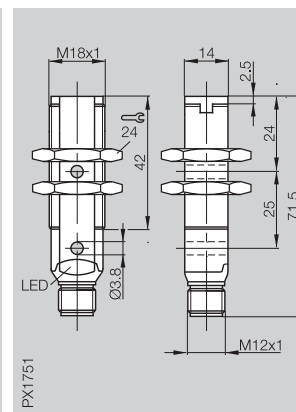
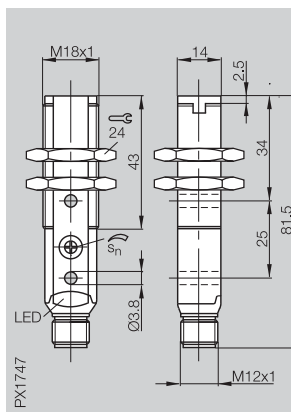
Connectors ...
page 5.2 ...

Through-beam

maximum range

0...20 m

0...20 m



Through-beam

PNP	20 m	Receiver
NPN	20 m	Receiver
	20 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V
Settings	Potentiometer 270°

Help functions

Optical data

Recommended range	0...15 m	0...15 m
Emitter, light type		LED, infrared
Wavelength		880 nm
Light spot diameter		approx. 500 mm at 15 m

Indicators

Power-on indicator	LED green	LED green
Output function indicator	LED yellow	

Time data

Response time	2 ms
Switching frequency f	250 Hz

Mechanical data

Dimensions	M18×81.5 mm	M18×71.5 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
No. of wires x cross-section		
Housing material	PBT	PBT
Optical surface	PMMA	PMMA
Weight	25 g	25 g

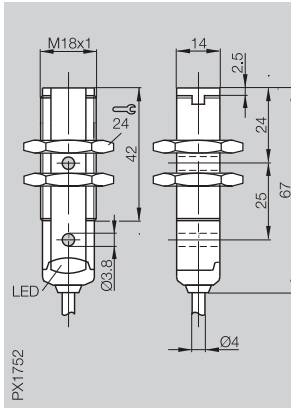
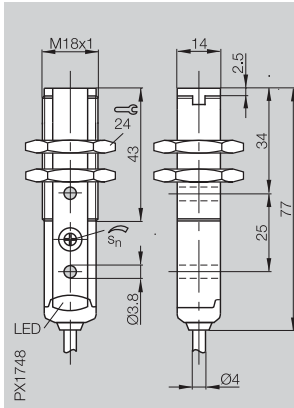
Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C
Reference standard	EN 60947-5-2	EN 60947-5-2

Wiring diagrams, characteristics and accessories see page 2.1.66 to 2.1.69.

0...20 m

0...20 m



BLE 18KF-PA-1PP-C-02
BLE 18KF-NA-1PP-C-02

BLS 18KF-XX-1P-L-02

10...30 V DC

10...30 V DC

≤ 2 V

≤ 2 V

≤ 30 mA

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

Test input

0...15 m

0...15 m

LED, infrared

880 nm

approx. 500 mm at 15 m

LED green

LED green

LED yellow

2 ms

250 Hz

M18x77 mm

M18x67 mm

2 m cable, PVC

2 m cable, PVC

4x0.14 mm²

4x0.14 mm²

PBT

PBT

PMMA

PMMA

75 g

75 g

IP 67

IP 67

yes

yes

yes

yes

-25...+55 °C

-25...+55 °C

EN 60947-5-2

EN 60947-5-2

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Photoelectric
sensors
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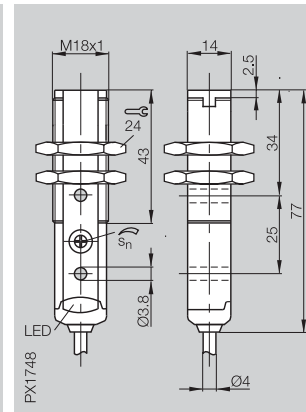
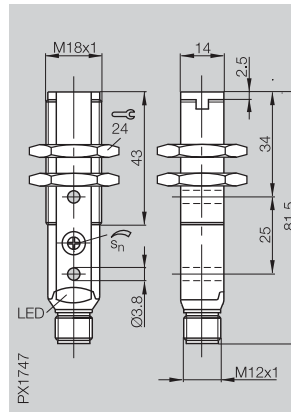
5

Connectors ...
page 5.2 ...

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range

0...350 mm

0...350 mm



	Diffuse			
	PNP	350 mm	BOS 18KF-PA-1LOC-S4-C	BOS 18KF-PA-1LOC-C-02
	NPN	350 mm	BOS 18KF-NA-1LOC-S4-C	BOS 18KF-NA-1LOC-C-02
	Retroreflective			
	PNP	0.1...16 m Polarizing filter		
	NPN	0.1...16 m Polarizing filter		
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 2 V	≤ 2 V
No-load supply current I_0 max.			≤ 35 mA	≤ 35 mA
Switching output			PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output current			100 mA	100 mA
Switching type			Light- and dark-on	Light- and dark-on
Voltage drop U_d at I_e			≤ 2 V	≤ 2 V
Settings			Potentiometer 270°	Potentiometer 270°
Optical data				
Recommended sensing distance/range			0...350 mm	0...350 mm
Emitter, light type			Laser, red light	Laser, red light
Wavelength			650 nm	650 nm
Laser class			Class 1	Class 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
Indicators				
Power-on indicator			LED green	LED green
Output function indicator			LED yellow	LED yellow
Time data				
Response time			333 μ s	333 μ s
Switching frequency f			1.5 kHz	1.5 kHz
Mechanical data				
Dimensions			M18x81.5 mm	M18x77 mm
Connection			M12 connector, 4-pin	2 m cable, PVC
No. of wires $\times$ cross-section				4x0.14 mm ²
Housing material			PBT	PBT
Optical surface			PMMA	PMMA
Weight			25 g	75 g
Ambient data				
Degree of protection per IEC 60529			IP 67	IP 67
Polarity reversal protected			yes	yes
Short circuit protected			yes	yes
Ambient temperature range T_a			-10...+50 °C	-10...+50 °C
Reference standard			EN 60947-5-2	EN 60947-5-2

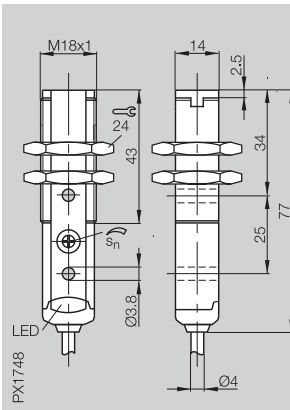
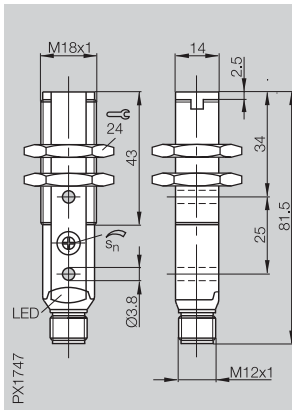
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page 2.1.66 to 2.1.69.



0.1...16 m

0.1...16 m



BOS 18KF-PA-1LQP-S4-C
BOS 18KF-NA-1LQP-S4-C

BOS 18KF-PA-1LQP-C-02
BOS 18KF-NA-1LQP-C-02

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

0.1...16 m

Laser, red light

650 nm

Class 1

approx. 0.9 mm at 1 m

approx. 2 mm at 3 m

0.1...16 m

Laser, red light

650 nm

Class 1

approx. 0.9 mm at 1 m

approx. 2 mm at 3 m

LED green

LED yellow

LED green

LED yellow

333 µs

1.5 kHz

333 µs

1.5 kHz

M18x81.5 mm

M12 connector, 4-pin

M18x77 mm

2 m cable, PVC

4x0.14 mm²

PBT

PMMA

25 g

PBT

PMMA

75 g

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

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2.3

Photoelectric sensors
accessories
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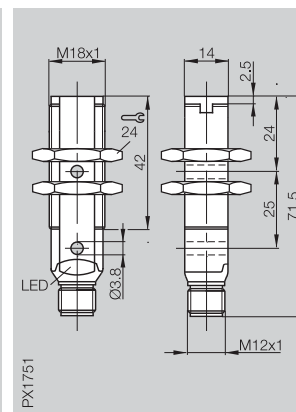
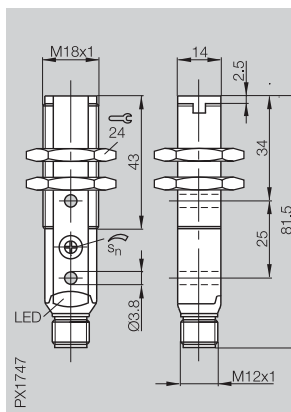
Connectors ...
page 5.2 ...

Through-beam

maximum range

0...60 m

0...60 m



Through-beam

PNP	60 m	Receiver
NPN	60 m	Receiver
	60 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V
Settings	Potentiometer 270°

Optical data

Recommended sensing distance/range	0...60 m
Emitter, light type	
Wavelength	
Laser class	
Resolution	

Indicators

Power-on indicator	LED green
Output function indicator	LED yellow

Time data

Response time	333 μ s
Switching frequency f	1.5 kHz

Mechanical data

Dimensions	M18x81.5 mm	M18x71.5 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
No. of wires x cross-section		
Housing material	PBT	PBT
Optical surface	PMMA	PMMA
Weight	25 g	25 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-10...+50 °C	-10...+50 °C
Reference standard	EN 60947-5-2	EN 60947-5-2

BLS 18KF-XX-1LT-S4-L

Test input

0...60 m
Laser, red light
650 nm

Class 1
approx. 2.5 mm at 5 m
approx. 5 mm at 10 m
approx. 10 mm at 20 m

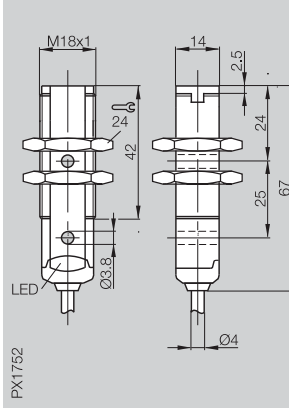
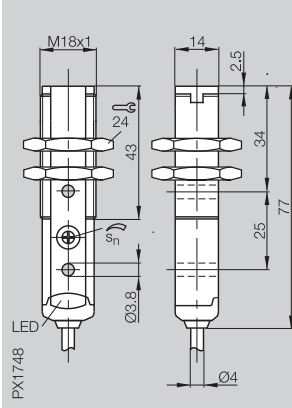
LED green

Wiring diagrams, characteristics and accessories see page 2.1.66 to 2.1.69.



0...60 m

0...60 m



BLE 18KF-PA-1LT-C-02
BLE 18KF-NA-1LT-C-02

BLS 18KF-XX-1LT-L-02

10...30 V DC

10...30 V DC

≤ 2 V

≤ 2 V

≤ 30 mA

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

Test input

0...60 m

0...60 m

Laser, red light

650 nm

Class 1

approx. 2.5 mm at 5 m

approx. 5 mm at 10 m

approx. 10 mm at 20 m

LED green

LED green

LED yellow

333 µs

1.5 kHz

M18x77 mm

2 m cable, PVC

4x0.14 mm²

PBT

PMMA

75 g

M18x67 mm

2 m cable, PVC

4x0.14 mm²

PBT

PMMA

75 g

IP 67

IP 67

yes

yes

yes

yes

-10...+50 °C

-10...+50 °C

EN 60947-5-2

EN 60947-5-2

2.1

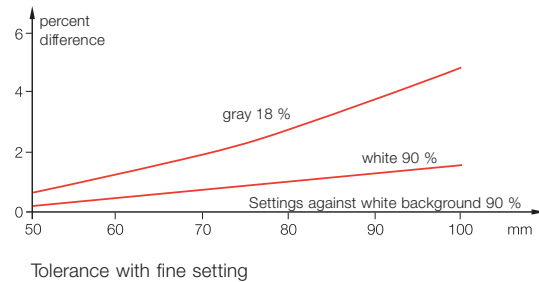
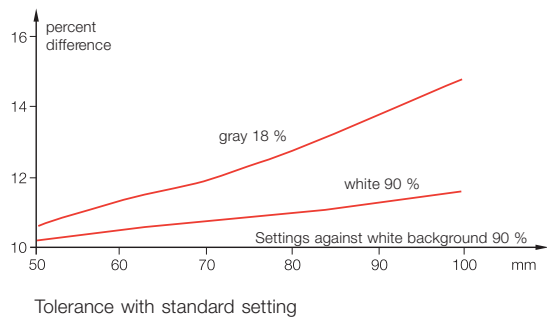
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Photoelectric sensors
accessories
page 2.3.2 ...

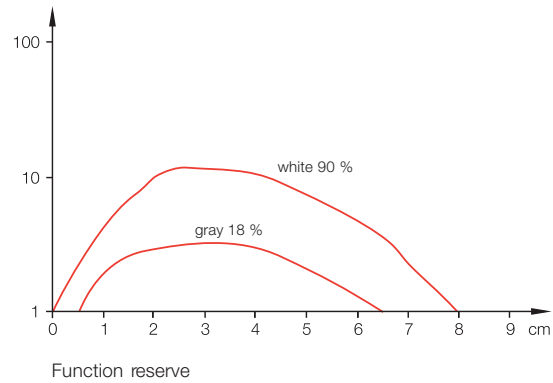
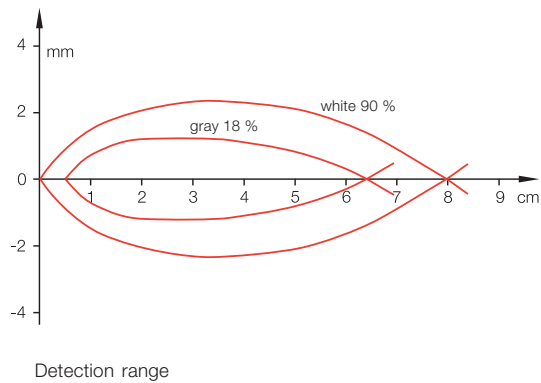
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Connectors ...
page 5.2 ...

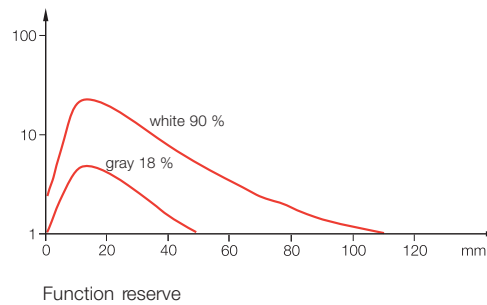
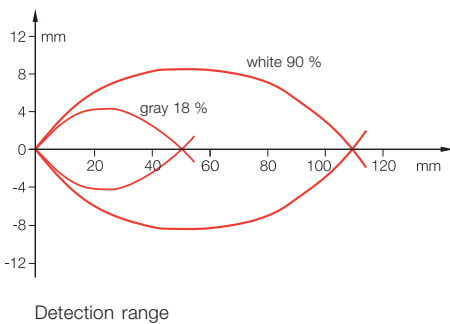
Diffuse BOS 18KF-...-1HA-...



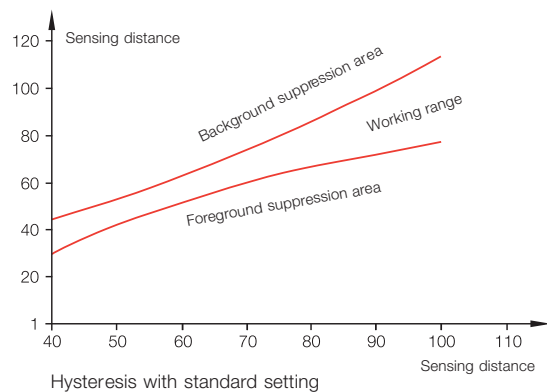
Diffuse BOS 18KF-...-1N1R-...

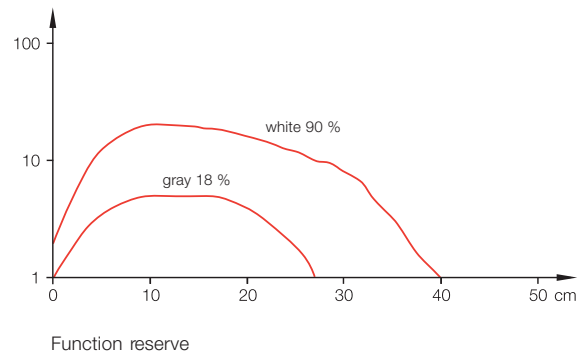
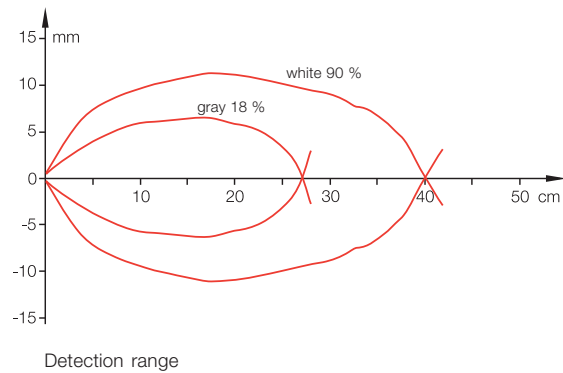
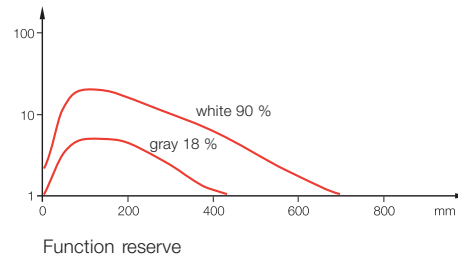
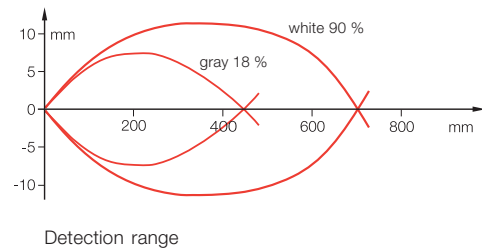
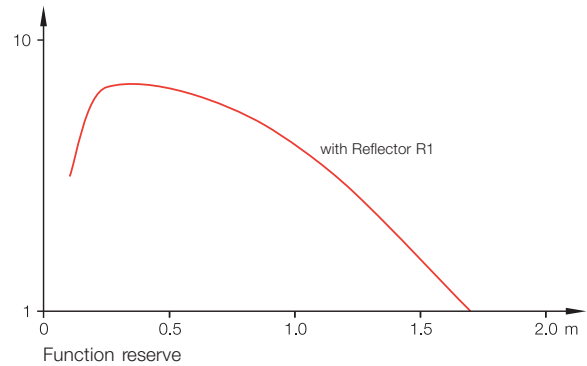
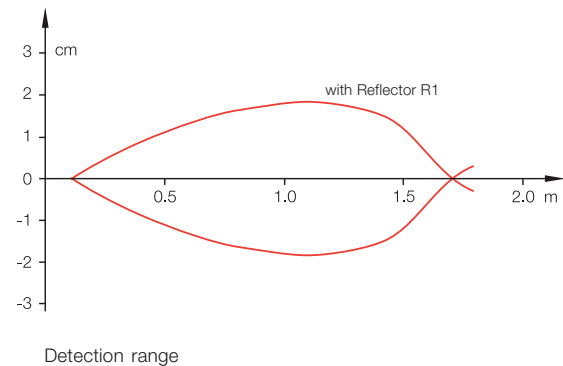
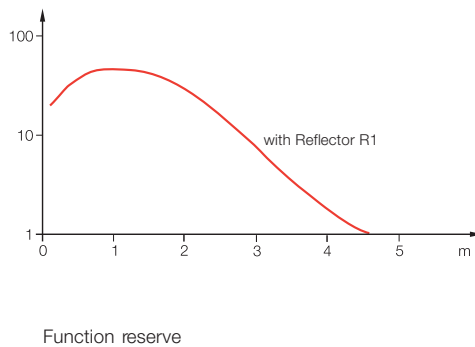
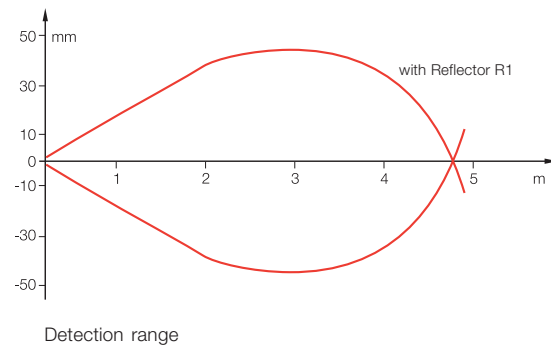


Diffuse BOS 18KF-...-1XA-...

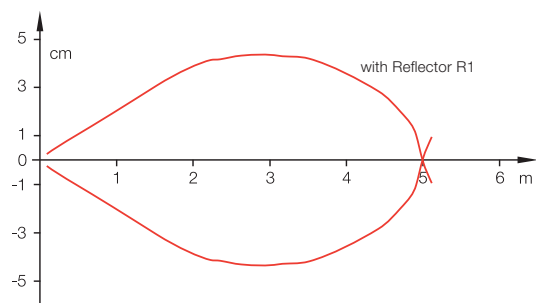


Diffuse BOS 18KF-...-1GA-...

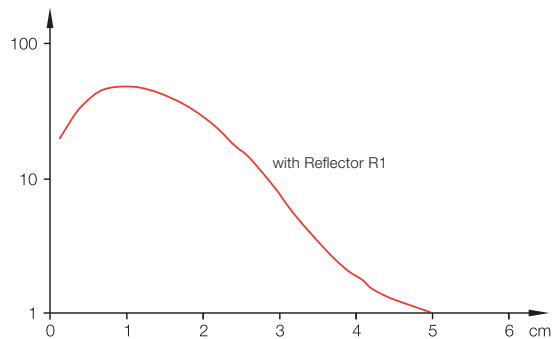


Diffuse BOS 18KF-...-1PD-...**Diffuse BOS 18KF-...-1PE-...****Retroreflective BOS 18KF-...-1TB-...****Retroreflective BOS 18KF-...-1QD-...****2.1****2.3**Photoelectric
sensors
accessories
page 2.3.2 ...**5**Connectors ...
page 5.2 ...

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

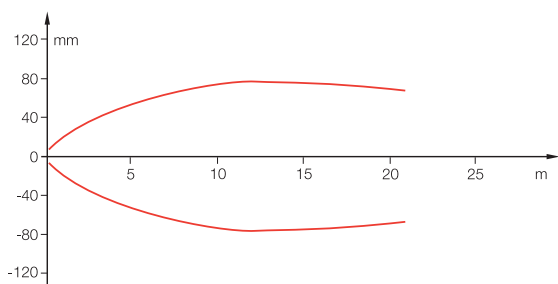


Detection range

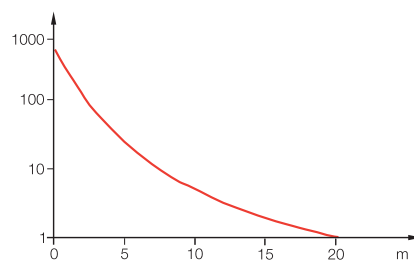


Function reserve

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

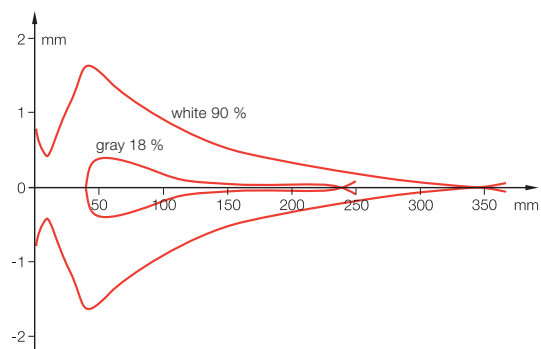


Detection range

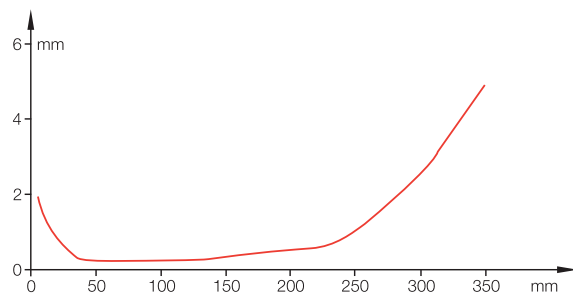


Function reserve

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

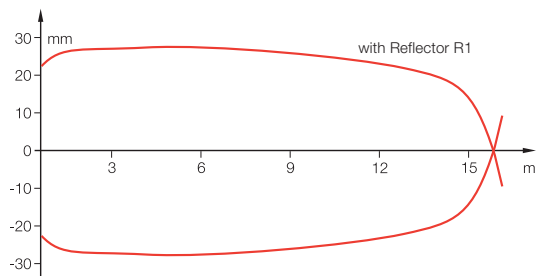


Detection range

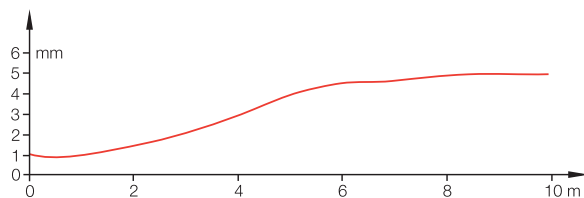


Resolution

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

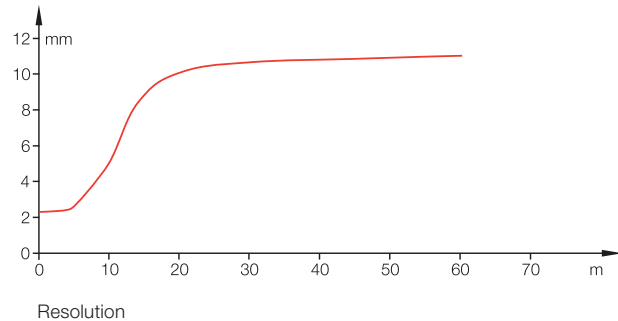
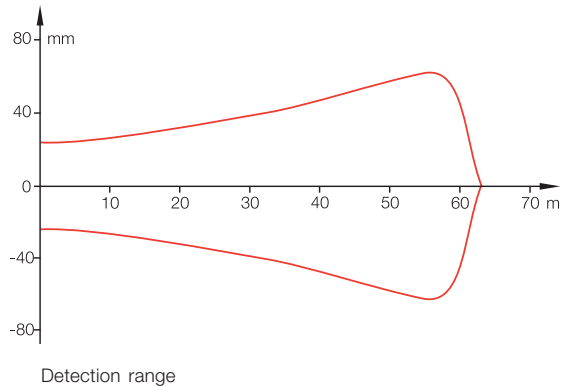


Detection range

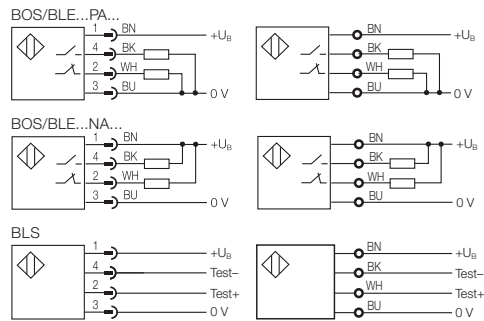


Resolution

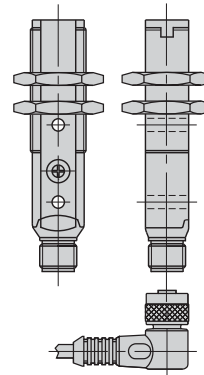
Through-beam BLE/BLS 18KF...-1LT...



Wiring diagrams



Connector orientation



BOS 18KF

Recommended accessories please order separately



Reflector
BOS R-1



Connector
BKS_ 19/BKS_ 20



Mounting clamp
BOS 18,0-KB-1



Mounting bracket
BES 18-HW-1



Round aperture
BOS 18-BL-1
for BLE/BLS 18KF



Protective end cap
BOS 18-SM-1
for BOS 18KF and
BOS 18KF Laser



Air shield
BOS 18-LT-1 for
BOS 18KF and
BOS 18KF Laser

2.1

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...

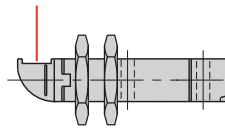
BOS 18KW – standards redefined

The redesigned 18K series doesn't just look different, it features new sensors and improved technical data.

The sensors are available with red or infrared light or as Class 1 laser type. Sensor settings are made using a potentiometer or teach-in process.

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		Output function		Switching frequency	U _B	Connect- ion	Special features		Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on				Polarizing filter	Teach-in	
 Diffuse with HGA														
BOS 18KW-PA-1HA-S4-C	50...100 mm	■			■		■	■	500 Hz	■	■		■	2.1.72
BOS 18KW-NA-1HA-S4-C	50...100 mm	■				■	■	■	500 Hz	■	■		■	2.1.72
BOS 18KW-PA-1HA-C-02	50...100 mm	■			■		■	■	500 Hz	■		■	■	2.1.72
BOS 18KW-NA-1HA-C-02	50...100 mm	■				■	■	■	500 Hz	■		■	■	2.1.72
BOS 18KW-PA-1LOB-S4-C	100 mm	■			■		■	■	1 kHz	■	■		■	2.1.73
BOS 18 KW-NA-1N1R-S4-C	100 mm	■				■	■	■	1 kHz	■	■		■	2.1.73
BOS 18 KW-PA-1N1R-C-02	100 mm	■			■		■	■	1 kHz	■		■	■	2.1.73
BOS 18 KW-NA-1N1R-C-02	100 mm	■				■	■	■	1 kHz	■		■	■	2.1.73

Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U _B	Conne- ction	Special features		Page	
		Red light	Infrared	Laser	PNP- Transistor	NPN- Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
 Diffuse															
BOS 18KW-PA-1XA-S4-C	0...80 mm		■		■		■	■	1 kHz	■	■				2.1.73
BOS 18KW-NA-1XA-S4-C	0...80 mm		■			■	■	■	1 kHz	■	■				2.1.73
BOS 18KW-PA-1XA-C-02	0...80 mm		■		■		■	■	1 kHz	■		■			2.1.73
BOS 18KW-NA-1XA-C-02	0...80 mm		■			■	■	■	1 kHz	■		■			2.1.73
BOS 18KW-PA-1LOB-S4-C	0...250 mm			■	■		■	■	1.5 kHz	■	■				2.1.78
BOS 18KW-NA-1LOB-S4-C	0...250 mm			■		■	■	■	1.5 kHz	■	■				2.1.78
BOS 18KW-PA-1LOB-C-02	0...250 mm			■	■		■	■	1.5 kHz	■		■			2.1.78
BOS 18KW-NA-1LOB-C-02	0...250 mm			■		■	■	■	1.5 kHz	■		■			2.1.78
BOS 18KW-PA-1PD-S4-C	0...400 mm		■		■		■	■	1 kHz	■	■				2.1.74
BOS 18KW-NA-1PD-S4-C	0...400 mm		■			■	■	■	1 kHz	■	■				2.1.74
BOS 18KW-PA-1PD-C-02	0...400 mm		■		■		■	■	1 kHz	■		■			2.1.74
BOS 18KW-NA-1PD-C-02	0...400 mm		■			■	■	■	1 kHz	■		■			2.1.74
 Retroreflective															
BOS 18KW-PA-1TB-S4-C	0.1...1.7 m	■			■		■	■	1 kHz	■	■		■		2.1.75
BOS 18KW-NA-1TB-S4-C	0.1...1.7 m	■				■	■	■	1 kHz	■	■		■		2.1.75
BOS 18KW-PA-1TB-C-02	0.1...1.7 m	■			■		■	■	1 kHz	■		■	■		2.1.75
BOS 18KW-NA-1TB-C-02	0.1...1.7 m	■				■	■	■	1 kHz	■		■	■		2.1.75
BOS 18KW-PA-1QC-S4-C	0.1...3 m	■			■		■	■	1 kHz	■	■		■		2.1.75
BOS 18KW-NA-1QC-S4-C	0.1...3 m	■				■	■	■	1 kHz	■	■		■		2.1.75
BOS 18KW-PA-1QC-C-02	0.1...3 m	■			■		■	■	1 kHz	■		■	■		2.1.75
BOS 18KW-NA-1QC-C-02	0.1...3 m	■				■	■	■	1 kHz	■		■	■		2.1.75
BOS 18KW-PA-1LQH-S4-C	0.1...9 m			■	■		■	■	1.5 kHz	■	■		■		2.1.79
BOS 18KW-NA-1LQH-S4-C	0.1...9 m			■		■	■	■	1.5 kHz	■	■		■		2.1.79
BOS 18KW-PA-1LQH-C-02	0.1...9 m			■	■		■	■	1.5 kHz	■		■	■		2.1.79
BOS 18KW-NA-1LQH-C-02	0.1...9 m			■		■	■	■	1.5 kHz	■		■	■		2.1.79
 Through-beam															
BLE 18KW-PA-1PP-S4-C	0...15 m		■		■		■	■	250 Hz	■	■				2.1.76
BLE 18KW-NA-1PP-S4-C	0...15 m		■			■	■	■	250 Hz	■	■				2.1.76
BLE 18KW-PA-1PP-C-02	0...15 m		■		■		■	■	250 Hz	■		■			2.1.77
BLE 18KW-NA-1PP-C-02	0...15 m		■			■	■	■	250 Hz	■		■			2.1.77
BLE 18KW-PA-1LT-S4-C	0...50 m			■	■		■	■	1.5 kHz	■	■				2.1.80
BLE 18KW-NA-1LT-S4-C	0...50 m			■		■	■	■	1.5 kHz	■	■				2.1.80
BLE 18KW-PA-1LT-C-02	0...50 m			■	■		■	■	1.5 kHz	■		■			2.1.81
BLE 18KW-NA-1LT-C-02	0...50 m			■		■	■	■	1.5 kHz	■		■			2.1.81
BLS 18KW-XX-1P-S4-L	0...15 m		■							■	■				2.1.76
BLS 18KW-XX-1P-L-02	0...15 m		■							■		■			2.1.77
BLS 18KW-XX-1LT-S4-L	0...50 m			■						■	■				2.1.80
BLS 18KW-XX-1LT-L-02	0...50 m			■						■		■			2.1.81

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

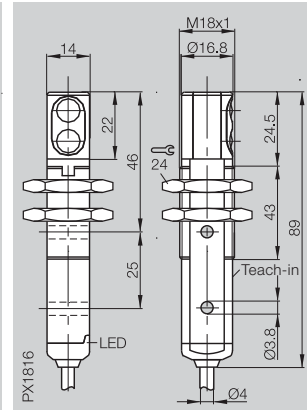
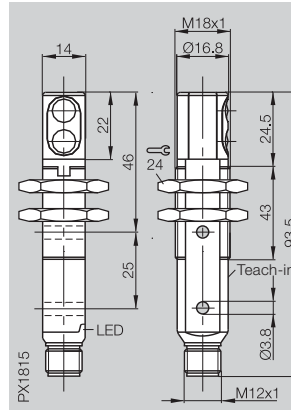
5

Connectors ...
page 5.2 ...

Diffuse with background suppression	maximum sensing distance
Diffuse	maximum sensing distance

50...100 mm

50...100 mm



Diffuse



PNP 50...100 mm HGA



NPN 50...100 mm HGA

PNP 100 mm HGA

NPN 100 mm HGA



PNP 0...80 mm



NPN 0...80 mm

Electrical data

Supply voltage U_B

10...30 V DC

10...30 V DC

Ripple

≤ 2 V

≤ 2 V

No-load supply current I_0 max.

≤ 30 mA

≤ 30 mA

Switching output

PNP- or NPN-Transistor

PNP- or NPN-Transistor

Output current

100 mA

100 mA

Switching type

Light- and dark-on

Light- and dark-on

Voltage drop U_d at I_e

≤ 2 V

≤ 2 V

Settings

Teach-in

Teach-in

Optical data

Recommended sensing distance

50...100 mm

50...100 mm

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

Indicators

Output function indicator

LED yellow

LED yellow

Stability indicator

LED green/red

LED green/red

Time data

Response time

1 ms

1 ms

Switching frequency f

500 Hz

500 Hz

Mechanical data

Dimensions

M18×93.5 mm

M18×89 mm

Connection

M12 connector, 4-pin

2 m cable, PVC

No. of wires × cross-section

4×0.14 mm²

Housing material

PBT

PBT

Optical surface

PMMA

PMMA

Weight

25 g

75 g

Ambient data

Degree of protection per IEC 60529

IP 67

IP 67

Polarity reversal protected

yes

yes

Short circuit protected

yes

yes

Ambient temperature range T_a

-25...+55 °C

-25...+55 °C

Reference standard

EN 60947-5-2

EN 60947-5-2

Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page 2.1.82 and 2.1.83.

M18 Plastic with Angle Head

Photoelectric Sensors

BOS 18KW
Sensing distance
80 mm, 100 mm

100 mm	100 mm	0...80 mm	0...80 mm
BOS 18KW-PA-1N1R-S4-C BOS 18KW-NA-1N1R-S4-C	BOS 18KW-PA-1N1R-C-02 BOS 18KW-NA-1N1R-C-02	BOS 18KW-PA-1XA-S4-C BOS 18KW-NA-1XA-S4-C	BOS 18KW-PA-1XA-C-02 BOS 18KW-NA-1XA-C-02
10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V fixed	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V fixed	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V fixed	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V fixed
0...80 mm LED, red light 630 nm approx. 25 mm at 80 mm	0...80 mm LED, red light 630 nm approx. 25 mm at 80 mm	0...80 mm LED, infrared 880 nm approx. 55 mm at 100 mm	0...80 mm LED, infrared 880 nm approx. 55 mm at 100 mm
LED yellow	LED yellow	LED yellow	LED yellow
0.5 ms 1 kHz	0.5 ms 1 kHz	0.5 ms 1 kHz	0.5 ms 1 kHz
M18x83.5 mm M12 connector, 4-pin	M18x79 mm 2 m cable, PVC 4x0.14 mm ²	M18x83.5 mm M12 connector, 4-pin	M18x79 mm 2 m cable, PVC 4x0.14 mm ²
PBT PMMA 25 g	PBT PMMA 75 g	PBT PMMA 25 g	PBT PMMA 75 g
IP 67 yes yes -25...+55 °C EN 60947-5-2	IP 67 yes yes -25...+55 °C EN 60947-5-2	IP 67 yes yes -25...+55 °C EN 60947-5-2	IP 67 yes yes -25...+55 °C EN 60947-5-2

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

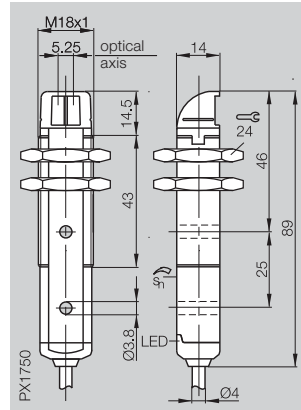
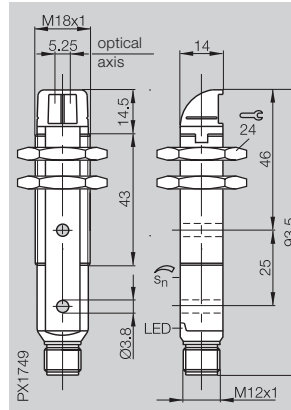
5

Connectors ...
page 5.2 ...

Diffuse	maximum sensing distance
Retroreflective with glass detection	maximum range
Retroreflective with polarizing filter	maximum range

0...400 mm

0...400 mm



Diffuse



PNP	400 mm
NPN	400 mm

BOS 18KW-PA-1PD-S4-C
BOS 18KW-NA-1PD-S4-C

BOS 18KW-PA-1PD-C-02
BOS 18KW-NA-1PD-C-02

Retroreflective



PNP	0.1...1.7 m	Polarizing filter, glass detection
NPN	0.1...1.7 m	Polarizing filter, glass detection
PNP	0.1...3 m	Polarizing filter
NPN	0.1...3 m	Polarizing filter

Electrical data

Supply voltage U_B

10...30 V DC

10...30 V DC

Ripple

≤ 2 V

≤ 2 V

No-load supply current I_0 max.

≤ 35 mA

≤ 35 mA

Switching output

PNP- or NPN-Transistor

PNP- or NPN-Transistor

Output current

100 mA

100 mA

Switching type

Light- and dark-on

Light- and dark-on

Voltage drop U_d at I_o

≤ 2 V

≤ 2 V

Settings

Potentiometer 270°

Potentiometer 270°

Optical data

Recommended sensing distance

0...350 mm

0...350 mm

Emitter, light type

LED, infrared

LED, infrared

Wavelength

880 nm

880 nm

Light spot diameter

approx. 35 mm at 400 mm

approx. 35 mm at 400 mm

Indicators

Output function indicator

LED yellow

LED yellow

Stability indicator

LED green

LED green

Time data

Response time

0.5 ms

0.5 ms

Switching frequency f

1 kHz

1 kHz

Mechanical data

Dimensions

M18×93.5 mm

M18×89 mm

Connection

M12 connector, 4-pin

2 m cable, PVC

No. of wires × cross-section

4×0.14 mm²

Housing material

PBT

PBT

Optical surface

PMMA

PMMA

Weight

25 g

75 g

Ambient data

Degree of protection per IEC 60529

IP 67

IP 67

Polarity reversal protected

yes

yes

Short circuit protected

yes

yes

Ambient temperature range T_a

-25...+55 °C

-25...+55 °C

Reference standard

EN 60947-5-2

EN 60947-5-2

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

Wiring diagrams, characteristics and accessories see page **2.1.82** and **2.1.83**.

M18 Plastic with Angle Head

Photoelectric Sensors

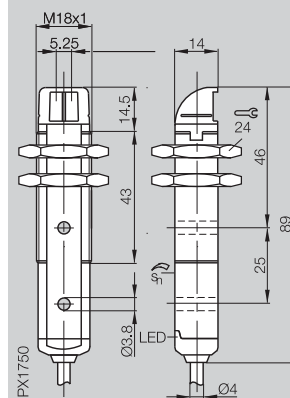
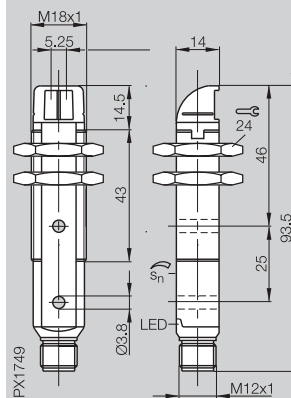
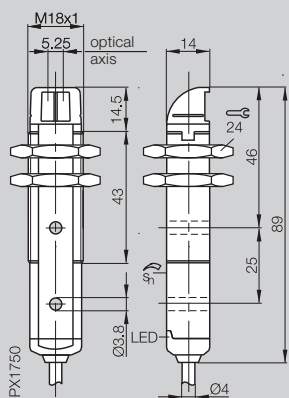
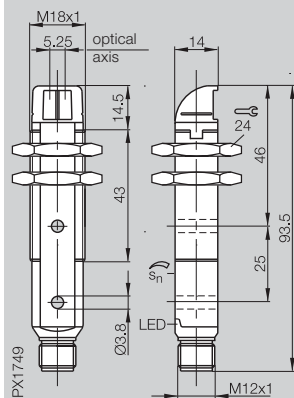
BOS 18KW
Range 1.7 m, 3 m

0.1...1.7 m

0.1...1.7 m

0.1...3 m

0.1...3 m



BOS 18KW-PA-1TB-S4-C
BOS 18KW-NA-1TB-S4-C

BOS 18KW-PA-1TB-C-02
BOS 18KW-NA-1TB-C-02

BOS 18KW-PA-1QC-S4-C
BOS 18KW-NA-1QC-S4-C

BOS 18KW-PA-1QC-C-02
BOS 18KW-NA-1QC-C-02

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

0.1...1.4 m

LED, red light

660 nm

approx. 60 mm at 1 m

0.1...1.4 m

LED, red light

660 nm

approx. 60 mm at 1 m

0.1...2.5 m

LED, red light

660 nm

approx. 60 mm at 2 m

0.1...2.5 m

LED, red light

660 nm

approx. 60 mm at 2 m

LED yellow

LED green

LED yellow

LED green

LED yellow

LED green

LED yellow

LED green

0.5 ms

1 kHz

0.5 ms

1 kHz

0.5 ms

1 kHz

0.5 ms

1 kHz

M18×93.5 mm

M12 connector, 4-pin

M18×89 mm

2 m cable, PVC

4×0.14 mm²

M18×93.5 mm

M12 connector, 4-pin

M18×89 mm

2 m cable, PVC

4×0.14 mm²

PBT

PMMA

25 g

PBT

PMMA

75 g

PBT

PMMA

25 g

PBT

PMMA

75 g

IP 67

yes

yes

-25...+55 °C

EN 60947-5-2

IP 67

yes

yes

-25...+55 °C

EN 60947-5-2

IP 67

yes

yes

-25...+55 °C

EN 60947-5-2

IP 67

yes

yes

-25...+55 °C

EN 60947-5-2

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

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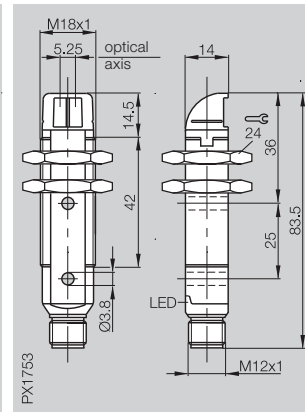
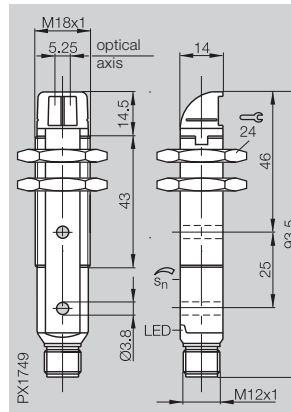
Connectors ...
page 5.2 ...

Through-beam

maximum range

0...15 m

0...15 m



Through-beam

PNP	15 m	Receiver
NPN	15 m	Receiver
	15 m	Emitter

BLE 18KW-PA-1PP-S4-C
BLE 18KW-NA-1PP-S4-C

BLS 18KW-XX-1P-S4-L

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V
Settings	Potentiometer 270°

10...30 V DC

≤ 2 V

≤ 35 mA

Test input

Optical data

Recommended range	0...10 m
Emitter, light type	LED, infrared
Wavelength	880 nm
Light spot diameter	approx. 470 mm at 10 m

Indicators

Power-on indicator	LED green
Output function indicator	LED yellow

Time data

Response time	2 ms
Switching frequency f	250 Hz

Mechanical data

Dimensions	M18×93.5 mm	M18×83.5 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
No. of wires x cross-section		
Housing material	PBT	PBT
Optical surface	PMMA	PMMA
Weight	25 g	25 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C
Reference standard	EN 60947-5-2	EN 60947-5-2

Wiring diagrams, characteristics and accessories see page 2.1.82 and 2.1.83.

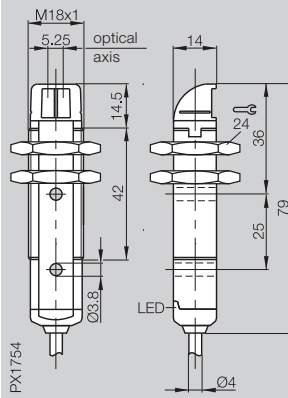
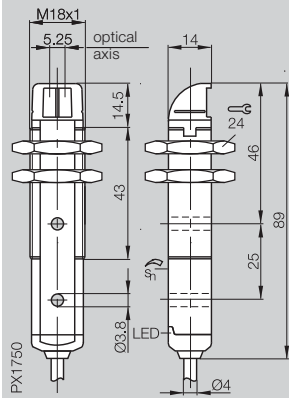
M18 Plastic with Angle Head

Photoelectric
Sensors

BOS 18KW
Range 15 m

0...15 m

0...15 m



BLE 18KW-PA-1PP-C-02
BLE 18KW-NA-1PP-C-02

BLS 18KW-XX-1P-L-02

10...30 V DC

10...30 V DC

≤ 2 V

≤ 2 V

≤ 30 mA

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

Test input

0...10 m

0...10 m

LED, infrared

880 nm

approx. 470 mm at 10 m

LED green

LED green

LED yellow

2 ms

250 Hz

M18x89 mm

M18x79 mm

2 m cable, PVC

2 m cable, PVC

4x0.14 mm²

4x0.14 mm²

PBT

PBT

PMMA

PMMA

75 g

75 g

IP 67

IP 67

yes

yes

yes

yes

-25...+55 °C

-25...+55 °C

EN 60947-5-2

EN 60947-5-2

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

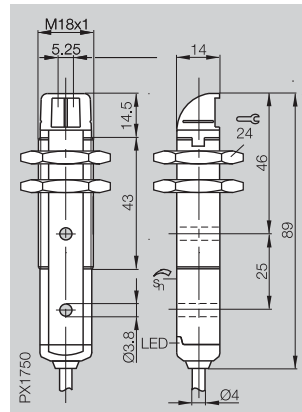
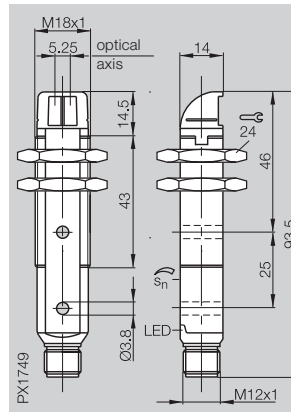
5

Connectors ...
page 5.2 ...

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range

0...250 mm

0...250 mm



Diffuse



PNP	250 mm
NPN	250 mm

BOS 18KW-PA-1LOB-S4-C
BOS 18KW-NA-1LOB-S4-C

BOS 18KW-PA-1LOB-C-02
BOS 18KW-NA-1LOB-C-02

Retroreflective



PNP	0.1...9 m	Polarizing filter
NPN	0.1...9 m	Polarizing filter

Electrical data

Supply voltage U_B

10...30 V DC

10...30 V DC

Ripple

≤ 2 V

≤ 2 V

No-load supply current I_0 max.

≤ 35 mA

≤ 35 mA

Switching output

PNP- or NPN-Transistor

PNP- or NPN-Transistor

Output current

100 mA

100 mA

Switching type

Light- and dark-on

Light- and dark-on

Voltage drop U_d at I_e

≤ 2 V

≤ 2 V

Settings

Potentiometer 270°

Potentiometer 270°

Optical data

Recommended sensing distance/range

0...250 mm

0...250 mm

Emitter, light type

Laser, red light

Laser, red light

Wavelength

650 nm

650 nm

Laser class

Class 1

Class 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

Indicators

Power-on indicator

LED green

LED green

Output function indicator

LED yellow

LED yellow

Time data

Response time

333 µs

333 µs

Switching frequency f

1.5 kHz

1.5 kHz

Mechanical data

Dimensions

M18×93.5 mm

M18×89 mm

Connection

M12 connector, 4-pin

2 m cable, PVC

No. of wires × cross-section

4×0.14 mm²

Housing material

PBT

PBT

Optical surface

PMMA

PMMA

Weight

25 g

75 g

Ambient data

Degree of protection per IEC 60529

IP 67

IP 67

Polarity reversal protected

yes

yes

Short circuit protected

yes

yes

Ambient temperature range T_a

-10...+50 °C

-10...+50 °C

Reference standard

EN 60947-5-2

EN 60947-5-2

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

Wiring diagrams, characteristics and accessories see page 2.1.82 and 2.1.83.

BOS 18KW Laser
Range 9 m

2.1

2.3
Photoelectric sensors accessories page 2.3.2 ...

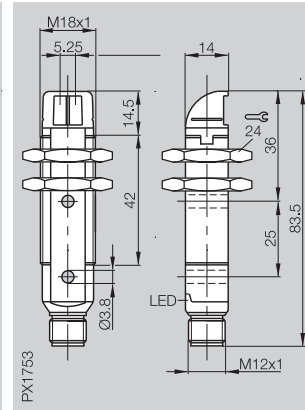
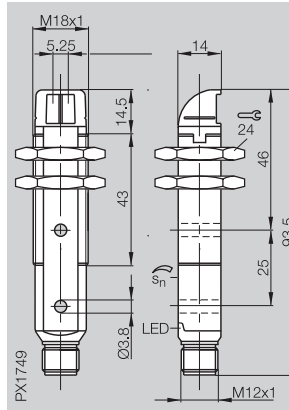
5
Connectors ... page 5.2 ...

Through-beam

maximum range

0...50 m

0...50 m



Through-beam

PNP	50 m	Receiver
NPN	50 m	Receiver
	50 m	Emitter

BLE 18KW-PA-1LT-S4-C
BLE 18KW-NA-1LT-S4-C

BLS 18KW-XX-1LT-S4-L

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V
Settings	Potentiometer 270°
Help functions	

10...30 V DC
 ≤ 2 V
 ≤ 35 mA

Optical data

Recommended sensing distance/range	0...50 m
Emitter, light type	
Wavelength	
Laser class	
Resolution	

Test input
0...50 m
Laser, red light
650 nm
Class 1
approx. 2.5 mm at 5 m
approx. 5 mm at 10 m
approx. 10 mm at 20 m

Indicators

Power-on indicator	LED green
Output function indicator	LED yellow

LED green

Time data

Response time	333 μ s
Switching frequency f	1.5 kHz

Mechanical data

Dimensions	M18×93.5 mm	M18×83.5 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
No. of wires × cross-section		
Housing material	PBT	PBT
Optical surface	PMMA	PMMA
Weight	25 g	25 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-10...+50 °C	-10...+50 °C
Reference standard	EN 60947-5-2	EN 60947-5-2

Wiring diagrams, characteristics and accessories see page 2.1.82 and 2.1.83.

M18 Plastic Laser with Angle Head

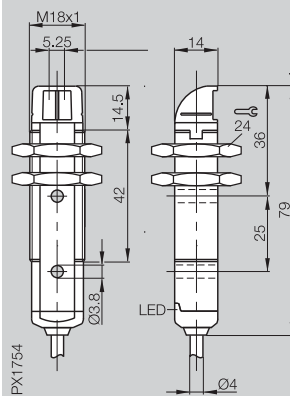
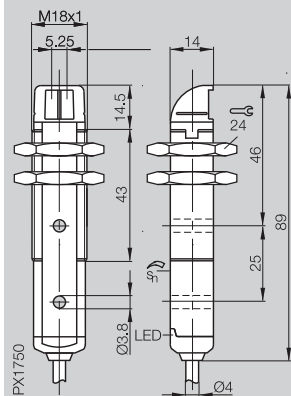


Photoelectric Sensors

BOS 18KW Laser
Range 50 m

0...50 m

0...50 m



BLE 18KW-PA-1LT-C-02
BLE 18KW-NA-1LT-C-02

BLS 18KW-XX-1LT-L-02

10...30 V DC

10...30 V DC

≤ 2 V

≤ 2 V

≤ 30 mA

≤ 35 mA

PNP- or NPN-Transistor

100 mA

Light- and dark-on

≤ 2 V

Potentiometer 270°

Test input

0...50 m

0...50 m

Laser, red light

650 nm

Class 1

approx. 2.5 mm at 5 m

approx. 5 mm at 10 m

approx. 10 mm at 20 m

LED green

LED yellow

LED green

333 µs

1.5 kHz

M18x89 mm

2 m cable, PVC

4x0.14 mm²

PBT

PMMA

75 g

M18x79 mm

2 m cable, PVC

4x0.14 mm²

PBT

PMMA

75 g

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

IP 67

yes

yes

-10...+50 °C

EN 60947-5-2

2.1

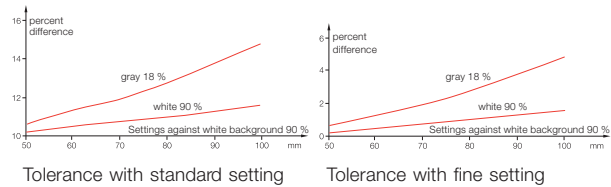
2.3

Photoelectric sensors
accessories
page 2.3.2 ...

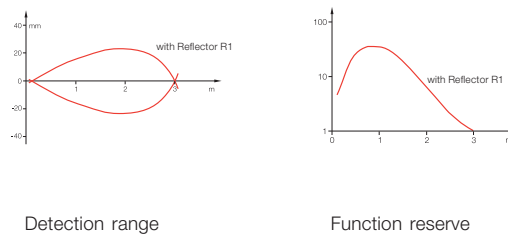
5

Connectors ...
page 5.2 ...

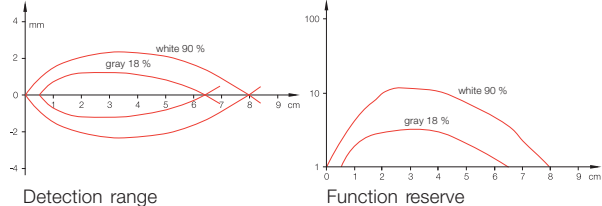
Diffuse BOS 18KW-...-1HA-...



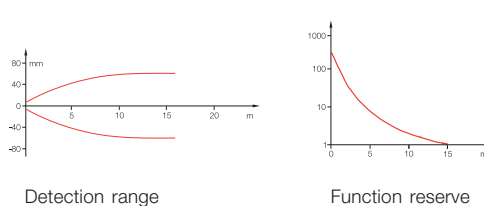
Retroreflective BOS 18KW-...-1QC-...



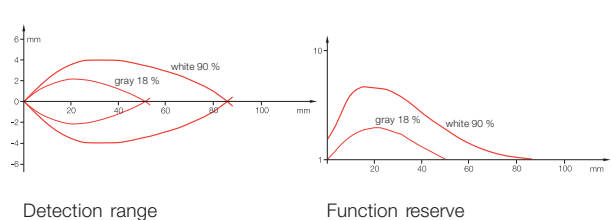
Diffuse BOS 18KW-...-1N1R-...



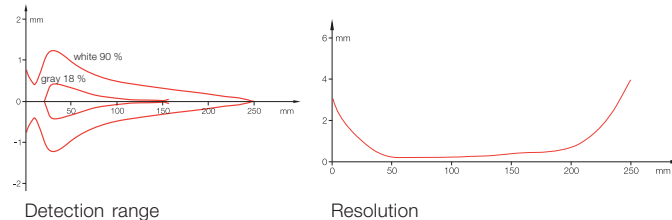
Through-beam BLE/BLS 18KW-...-1PP/1P-...



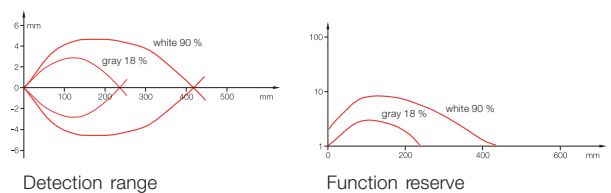
Diffuse BOS 18KW-...-1XA-...



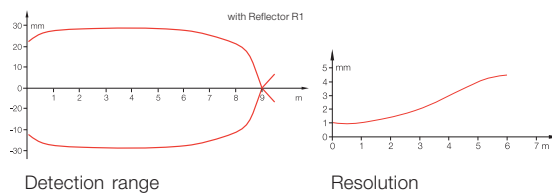
Diffuse BOS 18KW-...-1LOB-...



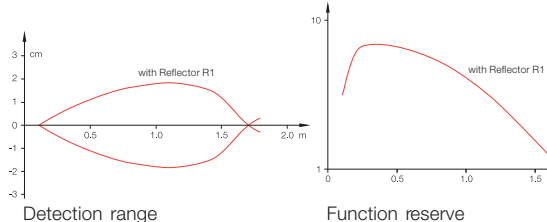
Diffuse BOS 18KW-...-1PD-...



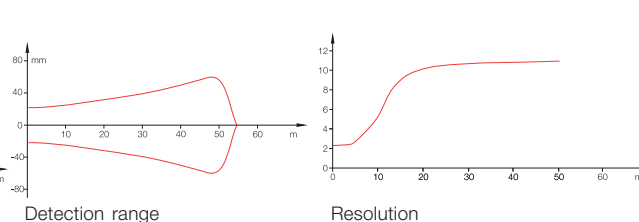
Retroreflective BOS 18KW-...-1LQH-...



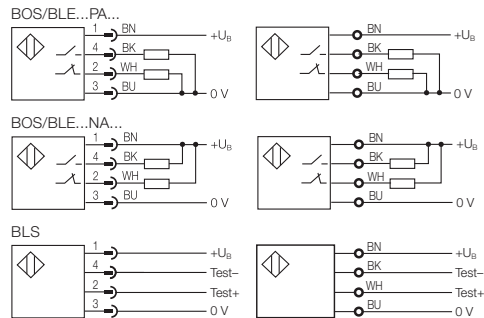
Retroreflective BOS 18KW-...-1TB-...



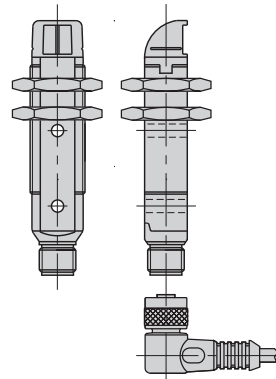
Through-beam BLE/BLS 18KW-...-1LT-...



Wiring diagrams



Connector orientation



Recommended accessories please order separately



Mounting clamp
BOS 18,0-KB-1



Mounting bracket
BES 18-HW-1



Reflector
BOS R-1



Connector
BKS-_ 19/BKS-_ 20

2.1

2.3

Photoelectric
sensors
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page 2.3.2 ...

5

Connectors ...
page 5.2 ...

With our **BOS 18K(R)** Balluff offers a particularly economical automation solution for detecting objects in any application.

Diffuse, retroreflective and through-beam sensors in axial and radial configuration, with PNP or NPN output, as well as cable or connector, versions are available.



Type	Sensing distance/ range	Light exit		Light type		Output		Output function		Switching frequency	U _B	Conne- ction	Special features		Page
		Straight	Right angle	Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	
 Diffuse															
BOS 18K-PU-ID10-S4	0...300 mm	■			■	■		■	■	500 Hz	■	■			2.1.86
BOS 18K-NU-ID10-S4	0...300 mm	■			■		■	■	■	500 Hz	■	■			2.1.86
BOS 18K-PU-ID10-02	0...300 mm	■			■	■		■	■	500 Hz	■		■		2.1.86
BOS 18K-NU-ID10-02	0...300 mm	■			■		■	■	■	500 Hz	■		■		2.1.86
BOS 18KR-PU-ID10-S4	0...250 mm		■		■	■		■	■	500 Hz	■	■			2.1.88
BOS 18KR-NU-ID10-S4	0...250 mm		■		■		■	■	■	500 Hz	■	■			2.1.88
BOS 18KR-PU-ID10-02	0...250 mm		■		■	■		■	■	500 Hz	■		■		2.1.88
BOS 18KR-NU-ID10-02	0...250 mm		■		■		■	■	■	500 Hz	■		■		2.1.88
 Retroreflective															
BOS 18K-PU-PR10-S4	0.1...2.2 m	■		■		■		■	■	500 Hz	■	■		■	2.1.86
BOS 18K-NU-PR10-S4	0.1...2.2 m	■		■			■	■	■	500 Hz	■	■		■	2.1.86
BOS 18K-PU-PR10-02	0.1...2.2 m	■		■		■		■	■	500 Hz	■		■	■	2.1.87
BOS 18K-NU-PR10-02	0.1...2.2 m	■		■			■	■	■	500 Hz	■		■	■	2.1.87
BOS 18KR-PU-PR10-S4	0.1...1.7 m		■	■		■		■	■	500 Hz	■	■		■	2.1.88
BOS 18KR-NU-PR10-S4	0.1...1.7 m		■	■			■	■	■	500 Hz	■	■		■	2.1.88
BOS 18KR-PU-PR10-02	0.1...1.7 m		■	■		■		■	■	500 Hz	■		■	■	2.1.89
BOS 18KR-NU-PR10-02	0.1...1.7 m		■	■			■	■	■	500 Hz	■		■	■	2.1.89
 Through-beam															
BOS 18K-PU-IE10-S4	0...13 m	■			■	■		■	■	250 Hz	■	■			2.1.87
BOS 18K-NU-IE10-S4	0...13 m	■			■		■	■	■	250 Hz	■	■			2.1.87
BOS 18K-PU-IE10-02	0...13 m	■			■	■		■	■	250 Hz	■		■		2.1.87
BOS 18K-NU-IE10-02	0...13 m	■			■		■	■	■	250 Hz	■		■		2.1.87
BOS 18K-XT-IS10-S4	0...13 m	■			■							■			2.1.87
BOS 18K-XT-IS10-02	0...13 m	■			■								■		2.1.87
BOS 18KR-PU-IE10-S4	0...11 m		■		■	■		■	■	250 Hz	■	■			2.1.89
BOS 18KR-NU-IE10-S4	0...11 m		■		■		■	■	■	250 Hz	■	■			2.1.89
BOS 18KR-PU-IE10-02	0...11 m		■		■	■		■	■	250 Hz	■		■		2.1.89
BOS 18KR-NU-IE10-02	0...11 m		■		■		■	■	■	250 Hz	■		■		2.1.89
BOS 18KR-XT-IS10-S4	0...11 m		■		■							■			2.1.89
BOS 18KR-XT-IS10-02	0...11 m		■		■								■		2.1.89

2.1

2.3

Photoelectric
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Connectors ...
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Photoelectric Sensors

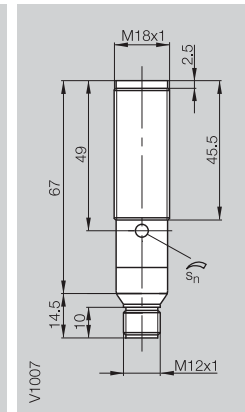
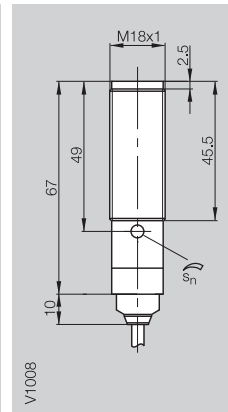
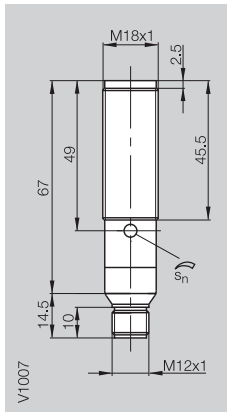
BOS 18K
Sensing distance 300 mm
Range 2.2 m

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range
Through-beam	maximum range

0...300 mm

0...300 mm

0.1...2.2 m



Diffuse

PNP	300 mm
NPN	300 mm

BOS 18K-PU-ID10-S4
BOS 18K-NU-ID10-S4

BOS 18K-PU-ID10-02
BOS 18K-NU-ID10-02



Retroreflective

PNP	0.1...2.2 m
NPN	0.1...2.2 m

BOS 18K-PU-PR10-S4
BOS 18K-NU-PR10-S4



Through-beam

PNP	13 m	Receiver
NPN	13 m	Receiver
	13 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA	≤ 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output current	100 mA	100 mA	100 mA
Switching type	Light- and dark-on	Light- and dark-on	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V	≤ 2 V
Settings	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°

Optical data

Recommended sensing distance/range	0...300 mm	0...300 mm	0.1...2 m
Emitter, light type	LED, infrared	LED, infrared	LED, red light
Wavelength	880 nm	880 nm	660 nm

Light spot diameter

Indicators

Power-on indicator			
Output function indicator	LED yellow	LED yellow	LED yellow

Time data

Response time	1 ms	1 ms	1 ms
Switching frequency f	500 Hz	500 Hz	500 Hz

Mechanical data

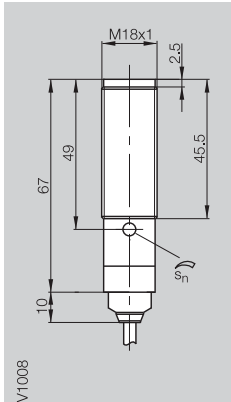
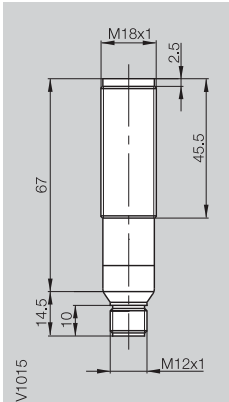
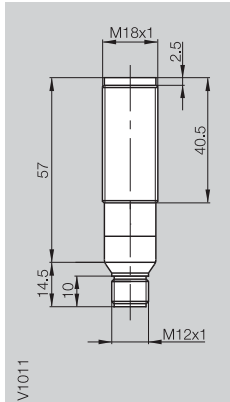
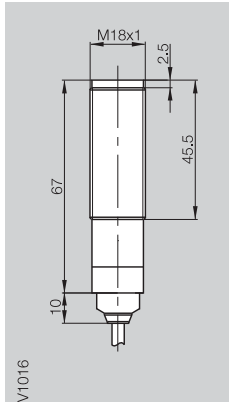
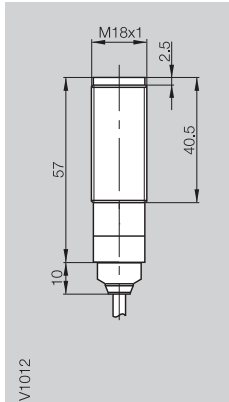
Dimensions	M18x81.5 mm	M18x77 mm	M18x81.5 mm
Connection	M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires x cross-section		4x0.14 mm ²	
Housing material	ABS	ABS	ABS
Lens material	PMMA	PMMA	PMMA
Weight	25 g	75 g	25 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67	IP 67
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C	-25...+55 °C

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

Wiring diagrams, characteristics and accessories see page 2.1.90 and 2.1.91.

0.1...2.2 m	0...13 m	0...13 m	0...13 m	0...13 m
				
BOS 18K-PU-PR10-02 BOS 18K-NU-PR10-02				
	BOS 18K-PU-IE10-S4 BOS 18K-NU-IE10-S4	BOS 18K-XT-IS10-S4	BOS 18K-PU-IE10-02 BOS 18K-NU-IE10-02	BOS 18K-XT-IS10-02
10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V Potentiometer 270°	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V fixed	10...30 V DC ≤ 2 V ≤ 35 mA fixed	10...30 V DC ≤ 2 V ≤ 35 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V fixed	10...30 V DC ≤ 2 V ≤ 35 mA fixed
0.1...2 m LED, red light 660 nm	0...12 m	0...12 m LED, infrared 880 nm	0...12 m	0...12 m LED, infrared 880 nm
LED yellow	LED yellow	LED green	LED yellow	LED green
1 ms 500 Hz	2 ms 250 Hz		2 ms 250 Hz	
M18×77 mm 2 m cable, PVC 4×0.14 mm ² ABS PMMA 75 g	M18×81.5 mm M12 connector, 4-pin ABS PMMA 25 g	M18×71.5 mm M12 connector, 4-pin ABS PMMA 25 g	M18×77 mm 2 m cable, PVC 4×0.14 mm ² ABS PMMA 75 g	M18×67 mm 2 m cable, PVC 4×0.14 mm ² ABS PMMA 75 g
IP 67 yes yes	IP 67 yes yes	IP 67 yes yes	IP 67 yes yes	IP 67 yes yes
EN 60947-5-2 -25...+55 °C	EN 60947-5-2 -25...+55 °C	EN 60947-5-2 -25...+55 °C	EN 60947-5-2 -25...+55 °C	EN 60947-5-2 -25...+55 °C

2.1

2.3

Photoelectric
sensors
accessories
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Connectors ...
page 5.2 ...

Photoelectric Sensors

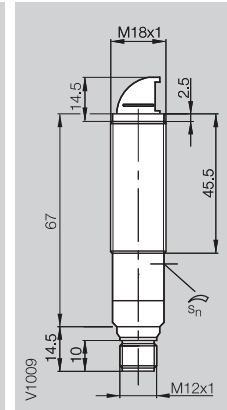
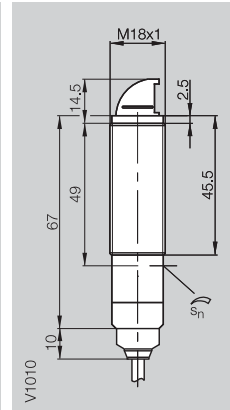
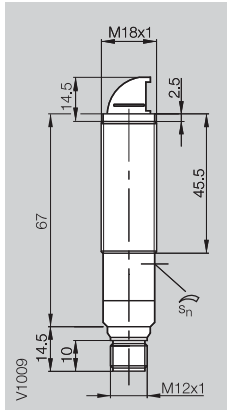
BOS 18KR
Sensing distance 250 mm,
Range 1.7 m

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range
Diffuse	maximum range

0...250 mm

0...250 mm

0.1...1.7 m



Diffuse



PNP	250 mm
NPN	250 mm

BOS 18KR-PU-ID10-S4
BOS 18KR-NU-ID10-S4

BOS 18KR-PU-ID10-02
BOS 18KR-NU-ID10-02

Retroreflective



PNP	0.1...1.7 m
NPN	0.1...1.7 m

BOS 18KR-PU-PR10-S4
BOS 18KR-NU-PR10-S4

Through-beam



PNP	11 m	Receiver
NPN	11 m	Receiver
	11 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA	≤ 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output current	100 mA	100 mA	100 mA
Switching type	Light- and dark-on	Light- and dark-on	Light- and dark-on
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V	≤ 2 V
Settings	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°

Optical data

Recommended sensing distance/range	0...250 mm	0...250 mm	0.1...1.5 m
Emitter, light type	LED, infrared	LED, infrared	LED, red light
Wavelength	880 nm	880 nm	660 nm

Light spot diameter

Indicators

Power-on indicator			
Output function indicator	LED yellow	LED yellow	LED yellow

Time data

Response time	1 ms	1 ms	1 ms
Switching frequency f	500 Hz	500 Hz	500 Hz

Mechanical data

Dimensions	M18x93.5 mm	M18x89 mm	M18x93.5 mm
Connection	M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires x cross-section		4x0.14 mm ²	
Housing material	ABS	ABS	ABS
Lens material	PMMA	PMMA	PMMA
Weight	25 g	75 g	25 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67	IP 67
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C	-25...+55 °C

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

Wiring diagrams, characteristics and accessories see page 2.1.90 and 2.1.91.

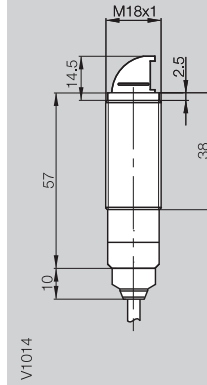
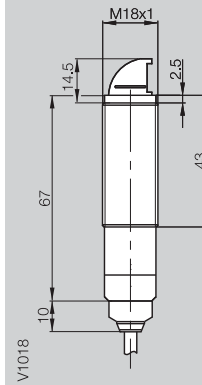
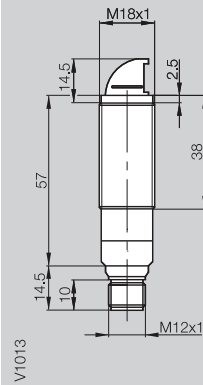
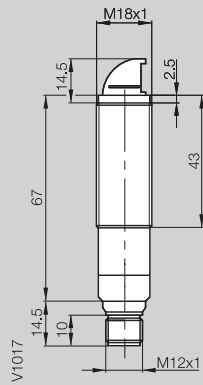
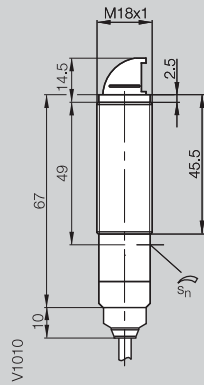
0.1...1.7 m

0...11 m

0...11 m

0...11 m

0...11 m

BOS 18KR-PU-PR10-02
BOS 18KR-NU-PR10-02BOS 18KR-PU-IE10-S4
BOS 18KR-NU-IE10-S4

BOS 18KR-XT-IS10-S4

BOS 18KR-PU-IE10-02
BOS 18KR-NU-IE10-02

BOS 18KR-XT-IS10-02

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

≤ 35 mA

≤ 35 mA

≤ 35 mA

≤ 35 mA

≤ 35 mA

PNP- or NPN-Transistor
100 mAPNP- or NPN-Transistor
100 mAPNP- or NPN-Transistor
100 mALight- and dark-on
≤ 2 VLight- and dark-on
≤ 2 VLight- and dark-on
≤ 2 V

Potentiometer 270°

fixed

fixed

fixed

fixed

0.1...1.5 m

0...10 m

0...10 m

0...10 m

0...10 m

LED, red light
660 nmLED, infrared
880 nmLED, infrared
880 nm

LED yellow

LED yellow

LED green

LED yellow

LED green

1 ms

2 ms

2 ms

500 Hz

250 Hz

250 Hz

M18×89 mm
2 m cable, PVC
4×0.14 mm²M18×93.5 mm
M12 connector, 4-pinM18×83.5 mm
M12 connector, 4-pinM18×89 mm
2 m cable, PVC
4×0.14 mm²M18×79 mm
2 m cable, PVC
4×0.14 mm²

ABS

ABS

ABS

ABS

ABS

PMMA

PMMA

PMMA

PMMA

PMMA

75 g

25 g

25 g

75 g

75 g

IP 67

IP 67

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

yes

yes

yes

yes

EN 60947-5-2

EN 60947-5-2

EN 60947-5-2

EN 60947-5-2

EN 60947-5-2

-25...+55 °C

-25...+55 °C

-25...+55 °C

-25...+55 °C

-25...+55 °C

2.1

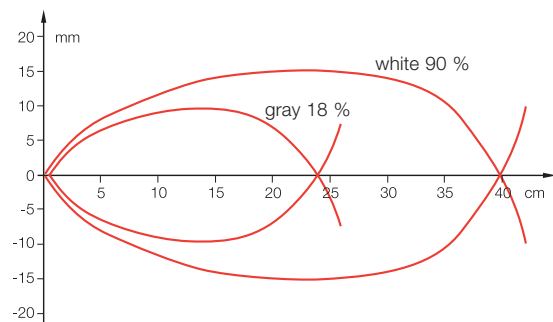
2.3

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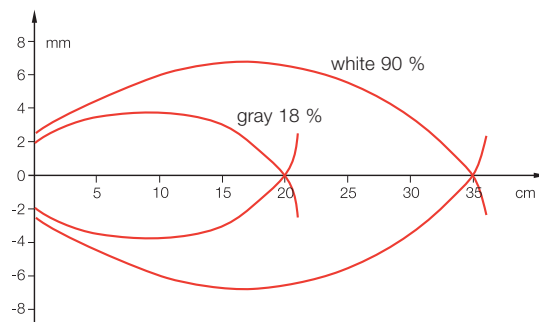
5

Connectors ...
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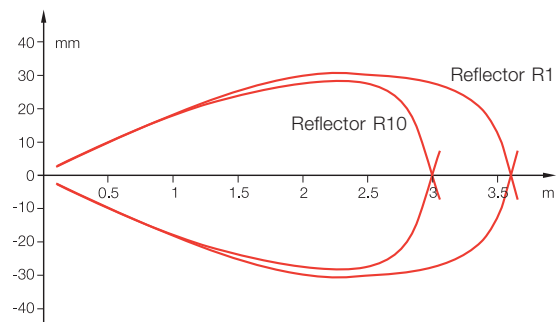
Diffuse BOS 18K--ID10--...



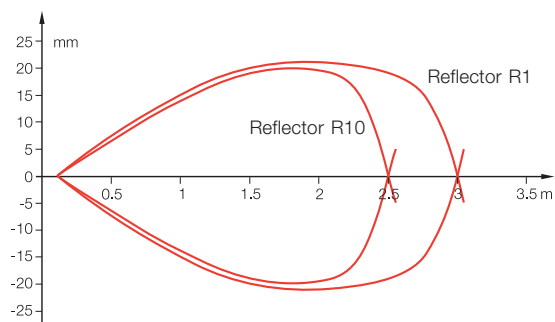
Diffuse BOS 18KR--ID10--...



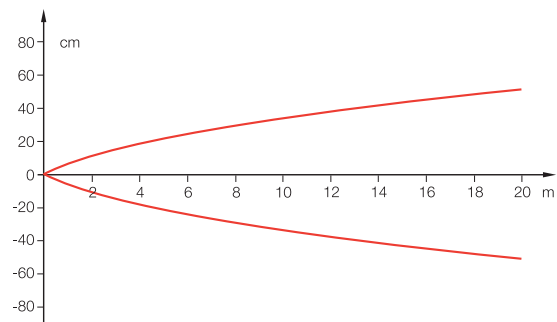
Retroreflective BOS 18K--PR10--...



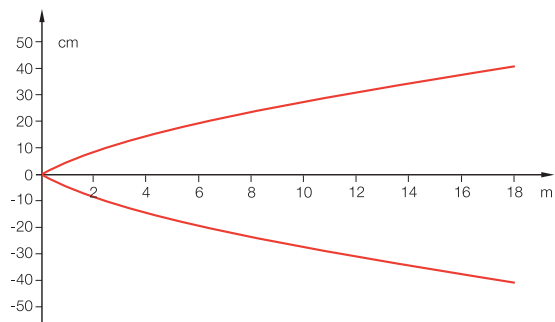
Retroreflective BOS 18KR--PR10--...



Through-beam BOS 18K--IE10--...

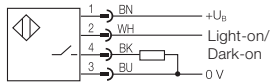


Through-beam BOS 18KR--IE10--...

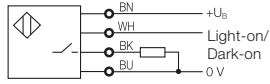


Wiring diagrams

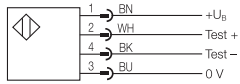
BOS 18K/KR-PU-ID10/PR10-S4



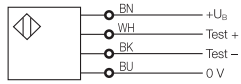
BOS 18K/KR-PU-ID10/PR10-02



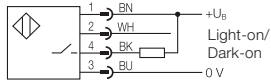
BOS 18K-XT-IS10-S4



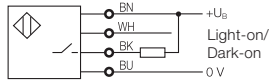
BOS 18K-XT-IS10-02



BOS 18K-NU-IE10-S4



BOS 18K-NU-IE10-02



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Photoelectric sensors
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Recommended accessories please order separately



Mounting clamp
BOS 18,0-KB-1



Mounting bracket
BES 18-HW-1

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Connectors ...
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Reflector
BOS R-10



Reflector
BOS R-1



Connector
BKS-_ 19/BKS-_ 20

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

The long sensing distance of 2 m provides high function reserve amongst unfavorable working conditions. A tough glass disk protects the optics from things like hot chips, and the 18-turn potentiometer enables exact sensitivity setting. In addition an integrated contamination indicator warns you in time when the optics are beginning to be affected by dirt or other effects.

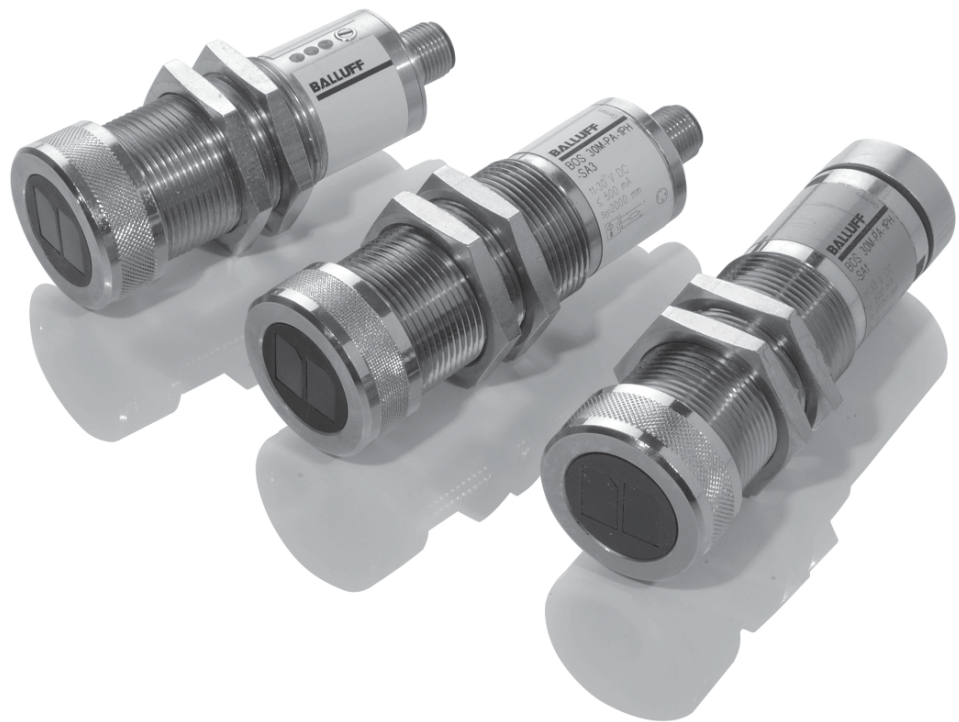
Together with special glass fiber optics BFO 18V-... Balluff offers a high-performance and tough product – particularly suitable for the automobile industry.

Features

- Long sensing distance
- Tough design (metal housing and glass protective shield)
- 18-turn potentiometer
- Normally open/normally closed option
- Compatible with special glass fiber optics
- Automobile industry approved
- Contamination indicator

Applications

- Automobile industry
- Conveying and warehousing
- Construction machinery
- Woodworking industry
- Where harsh conditions prevail



Type	Sensing distance	Light type		Output		Output function		Switching frequency	U _B	Connection		Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	BKS-S 1, 5-pin	
 Diffuse												
BOS 30M-PU-1PH-SA -C	0...2 m		■	■		■	■	100 Hz	■		■	2.1.94
BOS 30M-PU-1PH-SA3-C	0...2 m		■	■		■	■	100 Hz	■	■		2.1.94
BOS 30M-GA-1PH-S4-C	0...2 m		■	■	■	■	■	100 Hz	■	■		2.1.94

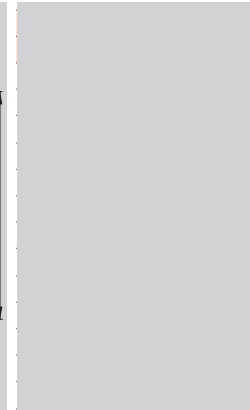
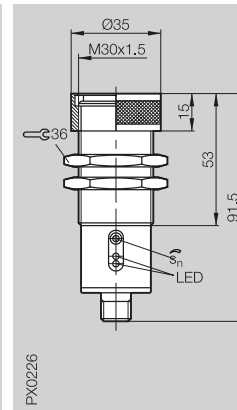
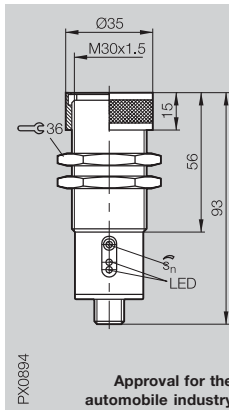
2.1**2.3**

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Diffuse	Sensing distance	0...2 m	0...2 m



Diffuse

PNP	2 m	Daylight filter
PNP/NPN	2 m	Daylight filter

BOS 30M-PU-1PH-SA3-C

BOS 30M-GA-1PH-S4-C

Electrical

Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA
Switching output	PNP-Transistor	PNP- and NPN-Transistor (push-pull)
Output current	200 mA	200 mA
Switching type	Light- and dark-on	Light- and dark-on
Voltage drop U_d at I_o	≤ 2.4 V	≤ 2.4 V
Settings	18-turn potentiometer	18-turn potentiometer

Optical data

Emitter, light type	LED, infrared	LED, infrared
Wavelength	880 nm	880 nm

Indicators

Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Stability indicator	LED red	LED red

Time data

Response time	5 ms	5 ms
Switching frequency f	100 Hz	100 Hz

Mechanical data

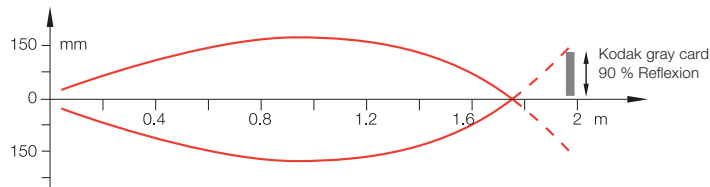
Dimensions	M30×93 mm	M30×91.5 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
Housing material	Nickel plated brass	Nickel plated brass
Optical surface	Glass	Glass
Weight	230 g	230 g

Ambient data

Degree of protection per IEC 60529	IP 65	IP 65
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-20...+60 °C	-20...+60 °C

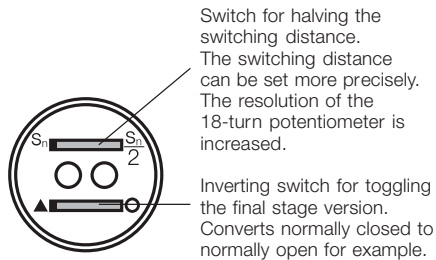
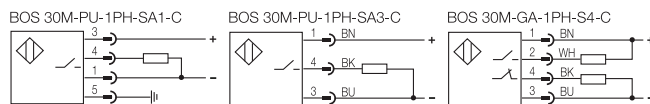
Diffuse values referenced to Kodak gray card 90% Reflexion, 400×400 mm.

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



Sensing distance measured with side approach of Kodak gray card.

Wiring diagrams



Recommended accessories

please order separately



Adapter
BFO 30-A1



Mounting clamp
BOS 30.0-KB-1



Connector
BKS-19/BKS-20

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Photoelectric sensors
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Miniaturization in the Balluff line continues at full pace. The new Opto-mini.s **BOS Q08M** sensors stand out with their ease of handling and fixed sensing distances and ranges.

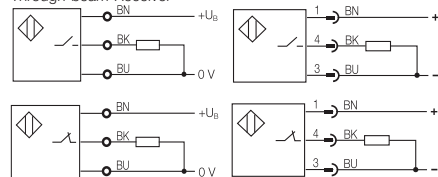
The sensor family includes diffuse types in block style housing with 8 mm side length, retroreflective and through-beam types.

These small photoelectric sensors open up possibilities in high-dynamic applications such as on robot gripper arms. Here is where components with the lightest weight, a small footprint and yet the greatest switching precision are demanded.



Wiring diagrams

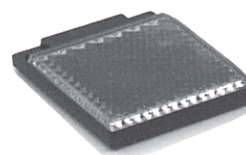
Diffuse, Retroreflective, Through-beam Receiver



Through-beam emitter



Recommended accessories
please order separately



Reflector
BOS R-9



Connector
BKS-_ 48/BKS-_ 49

Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U _B	Conne- ction		Special features	Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on			M8 connector, 3-pin	Cable, 3 m	Polarizing filter	
 Diffuse									10...30 V DC				
BOS Q08M-PS-RD10-S49	0...55 mm	■		■		■		500 Hz	■	■			2.1.98
BOS Q08M-PO-RD10-S49	0...55 mm	■		■			■	500 Hz	■	■			2.1.98
BOS Q08M-PS-RD10-03	0...55 mm	■		■		■		500 Hz	■		■		2.1.98
BOS Q08M-PO-RD10-03	0...55 mm	■		■			■	500 Hz	■		■		2.1.98
 Retroreflective													
BOS Q08M-PS-PR10-S49	25...550 mm	■		■			■	500 Hz	■	■		■	2.1.98
BOS Q08M-PO-PR10-S49	25...550 mm	■		■		■		500 Hz	■	■		■	2.1.98
BOS Q08M-PS-PR10-03	25...550 mm	■		■			■	500 Hz	■		■	■	2.1.99
BOS Q08M-PO-PR10-03	25...550 mm	■		■		■		500 Hz	■		■	■	2.1.99
 Through-beam													
BOS Q08M-PS-RE10-S49	0...1.1 m	■		■			■	500 Hz	■	■			2.1.99
BOS Q08M-PO-RE10-S49	0...1.1 m	■		■		■		500 Hz	■	■			2.1.99
BOS Q08M-PS-RE10-03	0...1.1 m	■		■			■	500 Hz	■		■		2.1.99
BOS Q08M-PO-RE10-03	0...1.1 m	■		■		■		500 Hz	■		■		2.1.99
BOS Q08M-X-RS10-S49	0...1.1 m	■							■	■			2.1.99
BOS Q08M-X-RS10-03	0...1.1 m	■							■		■		2.1.99

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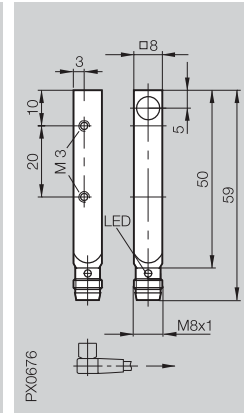
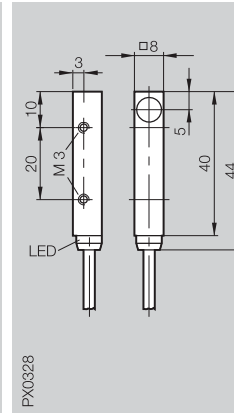
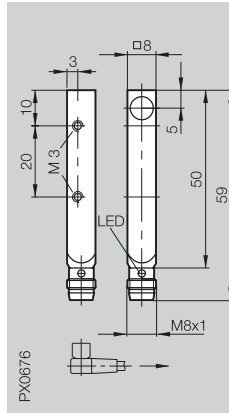
Connectors ...
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Diffuse	maximum sensing distance
Retroreflective	maximum range
Through-beam	maximum range

0...55 mm

0...55 mm

25...550 mm



Diffuse



PNP, NO	55 mm
PNP, NC	55 mm

BOS Q08M-PS-RD10-S49
BOS Q08M-PO-RD10-S49

BOS Q08M-PS-RD10-03
BOS Q08M-PO-RD10-03

Retroreflective



PNP, NO	25...550 mm	Polarizing filter
PNP, NC	25...550 mm	Polarizing filter

BOS Q08M-PS-PR10-S49
BOS Q08M-PO-PR10-S49

Through-beam



PNP, NO	1.1 m	Receiver
PNP, NC	1.1 m	Receiver
	1.1 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	10 %	10 %	10 %
No-load supply current I_0 max.	≤ 20 mA	≤ 20 mA	≤ 20 mA
Switching output	PNP-Transistor	PNP-Transistor	PNP-Transistor
Output current	100 mA	100 mA	100 mA
Switching type	Light- or dark-on	Light- or dark-on	Light- or dark-on
Voltage drop U_d at I_e	≤ 2 V	≤ 2 V	≤ 2 V
Settings	fixed	fixed	fixed

Optical data

Recommended sensing distance/range	0...50 mm	0...50 mm	25...500 mm
Emitter, light type	LED, red light	LED, red light	LED, red light
Wavelength	640 nm	640 nm	640 nm

Indicators

Output function indicator	LED red	LED red	LED red
---------------------------	---------	---------	---------

Time data

Response time	1 ms	1 ms	1 ms
Switching frequency f	500 Hz	500 Hz	500 Hz

Mechanical data

Dimensions	8×59×8 mm	8×44×8 mm	8×59×8 mm
Connection	M8 connector, 3-pin	3 m Cable PUR	M8 connector, 3-pin
No. of wires × cross-section		3×0.14 mm ²	
Housing material	Nickel plated Gd-Zn	Nickel plated Gd-Zn	Nickel plated Gd-Zn
Optical surface	PMMA	PMMA	PMMA
Weight	13 g	47 g	13 g

Ambient data

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

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



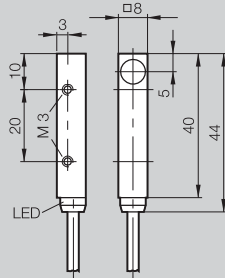
25...550 mm

0...1.1 m

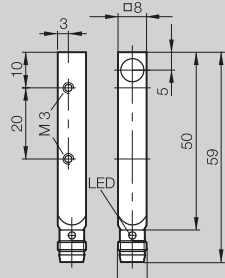
0...1.1 m

0...1.1 m

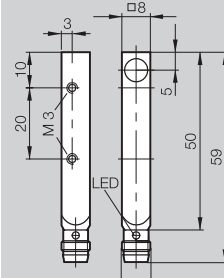
0...1.1 m



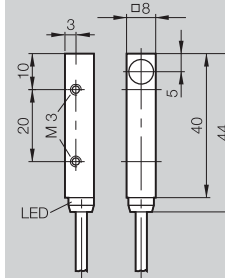
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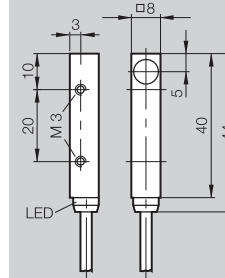
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PX0676



PX0328



PX0328

BOS Q08M-PS-PR10-03
BOS Q08M-PO-PR10-03BOS Q08M-PS-RE10-S49
BOS Q08M-PO-RE10-S49

BOS Q08M-X-RS10-S49

BOS Q08M-PS-RE10-03
BOS Q08M-PO-RE10-03

BOS Q08M-X-RS10-03

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10 %

10 %

10 %

10 %

10 %

≤ 20 mA

≤ 15 mA

≤ 15 mA

≤ 15 mA

≤ 15 mA

PNP-Transistor

PNP-Transistor

PNP-Transistor

100 mA

100 mA

100 mA

Light- or dark-on

Light- or dark-on

Light- or dark-on

≤ 2 V

≤ 2 V

≤ 2 V

fixed

fixed

fixed

fixed

fixed

25...500 mm

0...1 m

0...1 m

0...1 m

0...1 m

LED, red light
640 nmLED, red light
640 nmLED, red light
640 nm

LED red

LED red

LED red

1 ms

1 ms

1 ms

500 Hz

500 Hz

500 Hz

8×44×8 mm

8×59×8 mm

8×59×8 mm

8×44×8 mm

8×44×8 mm

3 m Cable PUR

M8 connector, 3-pin

M8 connector, 3-pin

3 m Cable PUR

3 m Cable PUR

3×0.14 mm²2×0.14 mm²3×0.14 mm²2×0.14 mm²

Nickel plated Gd-Zn

Nickel plated Gd-Zn

Nickel plated Gd-Zn

Nickel plated Gd-Zn

Nickel plated Gd-Zn

PMMA

PMMA

PMMA

PMMA

PMMA

47 g

13 g

13 g

47 g

47 g

IP 67

IP 67

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

yes

yes

yes

yes

-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

2.1

2.3

Photoelectric
sensors
accessories
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5

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

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 family with diffuse, retroreflective and through-beam models, as well as diffuse with background suppression. That means this series offers the complete functionality demanded of a modern sensor family.



Type	Sensing/ scan range	Light type	Output	Output- function	Switching frequency	U _B	Connection	Special features	Page
		Red light	PNP-Transistor NPN-Transistor	Light-on Dark-on		10...30 V DC	M8 connector, 3-pin M8 connector, 4-pin Cable	Polarizing filter	
 Diffuse with HGA									
BOS 2K-PS-RH10-00,2-S49	1...15 mm	■	■	■	800 Hz	■	■		2.1.102
BOS 2K-PO-RH10-00,2-S49	1...15 mm	■	■	■	800 Hz	■	■		2.1.102
BOS 2K-PS-RH10-00,2-S75	1...15 mm	■	■	■	800 Hz	■	■		2.1.102
BOS 2K-PS-RH10-02	1...15 mm	■	■	■	800 Hz	■		■	2.1.103
BOS 2K-NS-RH10-02	1...15 mm	■	■	■	800 Hz	■		■	2.1.103
BOS 2K-NO-RH10-02	1...15 mm	■	■	■	800 Hz	■		■	2.1.103
BOS 2K-PS-RH11-00,2-S49	1...30 mm	■	■	■	800 Hz	■	■		2.1.103
BOS 2K-PS-RH11-00,2-S75	1...30 mm	■	■	■	800 Hz	■	■		2.1.103
BOS 2K-PS-RH11-02	1...30 mm	■	■	■	800 Hz	■		■	2.1.103
BOS 2K-PO-RH11-02	1...30 mm	■	■	■	800 Hz	■		■	2.1.103
BOS 2K-NS-RH11-02	1...30 mm	■	■	■	800 Hz	■		■	2.1.103
 Diffuse									
BOS 2K-PS-RD10-00,2-S49	1...55 mm	■	■	■	800 Hz	■	■		2.1.104
BOS 2K-PS-RD10-00,2-S75	1...55 mm	■	■	■	800 Hz	■	■		2.1.104
BOS 2K-PS-RD10-02	1...55 mm	■	■	■	800 Hz	■		■	2.1.104
BOS 2K-NS-RD10-02	1...55 mm	■	■	■	800 Hz	■		■	2.1.104
 Retroreflective									
BOS 2K-PS-PR10-00,2-S49	45...800 mm	■	■	■	800 Hz	■	■	■	2.1.105
BOS 2K-PO-PR10-00,2-S49	45...800 mm	■	■	■	800 Hz	■	■	■	2.1.105
BOS 2K-PS-PR10-00,2-S75	45...800 mm	■	■	■	800 Hz	■	■	■	2.1.105
BOS 2K-PS-PR10-02	45...800 mm	■	■	■	800 Hz	■		■	2.1.105
BOS 2K-PO-PR10-02	45...800 mm	■	■	■	800 Hz	■		■	2.1.105
BOS 2K-NS-PR10-02	45...800 mm	■	■	■	800 Hz	■		■	2.1.105
BOS 2K-NO-PR10-02	45...800 mm	■	■	■	800 Hz	■		■	2.1.105
 Through-beam									
BOS 2K-PS-RE10-00,2-S49	0...1.2 m	■	■	■	200 Hz	■	■		2.1.106
BOS 2K-PS-RE10-00,2-S75	0...1.2 m	■	■	■	200 Hz	■	■		2.1.107
BOS 2K-PS-RE10-02	0...1.2 m	■	■	■	200 Hz	■		■	2.1.107
BOS 2K-PO-RE10-02	0...1.2 m	■	■	■	200 Hz	■		■	2.1.107
BOS 2K-NS-RE10-02	0...1.2 m	■	■	■	200 Hz	■		■	2.1.107
BOS 2K-X-RS10-00,2-S49	0...1.2 m	■				■	■		2.1.106
BOS 2K-X-RS10-00,2-S75	0...1.2 m	■				■			2.1.107
BOS 2K-X-RS10-02	0...1.2 m	■				■		■	2.1.107

2.1

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Photoelectric
Sensors
Accessories
Page 2.3.2 ...

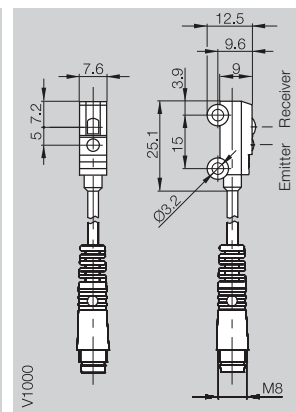
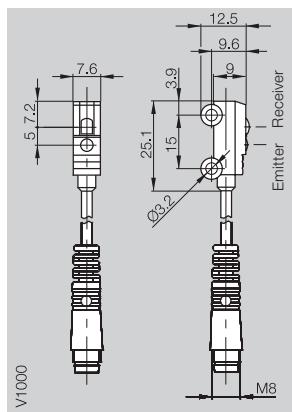
5

Connectors ...
Page 5.2 ...

Diffuse with background suppression maximum sensing distance

1...15 mm

1...15 mm



Diffuse with background suppression

PNP NO	1...15 mm
PNP NC	1...15 mm
NPN NO	1...15 mm
NPN NC	1...15 mm
PNP NO	1...30 mm
PNP NC	1...30 mm
NPN NO	1...30 mm

BOS 2K-PS-RH10-00,2-S49
BOS 2K-PO-RH10-00,2-S49

BOS 2K-PS-RH10-00,2-S75

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 5 V pp
No-load supply current I_0 max.	≤ 20 mA
Switching output	PNP- or NPN-Transistor
Output current	50 mA
Switching type	Light- or dark-on
Voltage drop U_d at I_0	≤ 2 V
Settings	fixed

10...30 V DC
 ≤ 5 V pp
 ≤ 20 mA
PNP- or NPN-Transistor
50 mA
Light- or dark-on
 ≤ 2 V
fixed

10...30 V DC
 ≤ 5 V pp
 ≤ 20 mA
PNP-Transistor
50 mA
Light-on
fixed

Optical data

Recommended range	1...15 mm
Emitter, light type	Pin-Point LED, red light
Wavelength	640 nm
Light spot diameter	approx. 1.2 mm at 8 mm approx. 2.5 mm at 15 mm

1...15 mm
Pin-Point LED, red light
640 nm
approx. 1.2 mm at 8 mm
approx. 2.5 mm at 15 mm

1...15 mm
Pin-Point LED, red light
640 nm
approx. 1.2 mm at 8 mm
approx. 2.5 mm at 15 mm

Indicators

Output function indicator	LED red
---------------------------	---------

LED red

LED red

Time data

Response time	0.6 ms
Switching frequency f	800 Hz

0.6 ms
800 Hz

0.6 ms
800 Hz

Mechanical data

Dimensions	12.5x20.6x7.6 mm
Connection	M8 connector, 3-pin
No. of wires x cross-section	
Housing material	ABS
Lens material	PMMA
Weight	20 g

12.5x20.6x7.6 mm
M8 connector, 3-pin

12.5x20.6x7.6 mm
M8 connector, 4-pin

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient light rejection	EN 60947-5-2
Ambient temperature range T_a	-20...+50 °C

IP 67
yes
yes
EN 60947-5-2
-20...+50 °C

IP 67
yes
yes
EN 60947-5-2
-20...+50 °C

Diffuse values referenced to Kodak gray card 90% Reflexion.

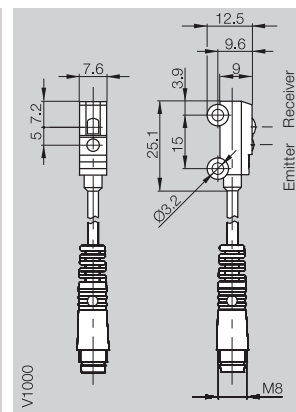
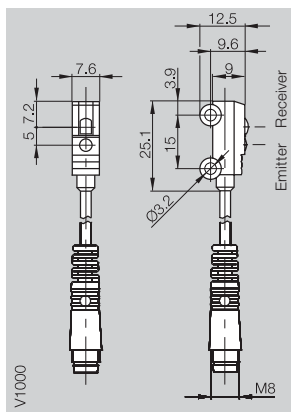
Wiring diagrams, characteristics and accessories see page 2.1.108 and 2.1.109.

1...15 mm		1...30 mm		1...30 mm		1...30 mm	
V1001		V1000		V1000		V1001	
BOS 2K-PS-RH10-02							
BOS 2K-NS-RH10-02							
BOS 2K-NO-RH10-02		BOS 2K-PS-RH11-00,2-S49		BOS 2K-PS-RH11-00,2-S75		BOS 2K-PS-RH11-02	
						BOS 2K-PO-RH11-02	
						BOS 2K-NS-RH11-02	
10...30 V DC		10...30 V DC		10...30 V DC		10...30 V DC	
≤ 5 V pp		≤ 5 V pp		≤ 5 V pp		≤ 5 V pp	
≤ 20 mA		≤ 20 mA		≤ 20 mA		≤ 20 mA	
PNP- or NPN-Transistor		PNP-Transistor		PNP-Transistor		PNP- or NPN-Transistor	
50 mA		50 mA		50 mA		50 mA	
Light- or dark-on		Light-on		Light-on		Light- or dark-on	
≤ 2 V							
fixed		fixed		fixed		fixed	
1...15 mm		1...30 mm		1...30 mm		1...30 mm	
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	
LED red		LED red		LED red		LED red	
0.6 ms		0.6 ms		0.6 ms		0.6 ms	
800 Hz		800 Hz		800 Hz		800 Hz	
12.5×20.6×7.6 mm		12.5×20.6×7.6 mm		12.5×20.6×7.6 mm		12.5×20.6×7.6 mm	
2 m cable, PVC		M8 connector, 3-pin		M8 connector, 4-pin		2 m cable, PVC	
3×0.09 mm ²						3×0.09 mm ²	
ABS		ABS		ABS		ABS	
PMMA		PMMA		PMMA		PMMA	
18 g		20 g		20 g		18 g	
IP 67		IP 67		IP 67		IP 67	
yes		yes		yes		yes	
yes		yes		yes		yes	
EN 60947-5-2		EN 60947-5-2		EN 60947-5-2		EN 60947-5-2	
-20...+50 °C		-20...+50 °C		-20...+50 °C		-20...+50 °C	

Diffuse	maximum sensing distance
Retroreflective with polarizing filter	maximum range

1...55 mm

1...55 mm



Diffuse

PNP NO	1...55 mm
NPN NO	1...55 mm

BOS 2K-PS-RD10-00,2-S49

BOS 2K-PS-RD10-00,2-S75

Retroreflective

PNP NO	45...800 mm	Polarizing filter
PNP NC	45...800 mm	Polarizing filter
NPN NO	45...800 mm	Polarizing filter
NPN NC	45...800 mm	Polarizing filter

Electrical data

Supply voltage U_B

10...30 V DC

10...30 V DC

Ripple

≤ 5 V

≤ 5 V

No-load supply current I_0 max.

≤ 20 mA

≤ 20 mA

Switching output

PNP-Transistor

PNP-Transistor

Output current

50 mA

50 mA

Switching type

Light-on

Light-on

Voltage drop U_d at I_o

≤ 2 V

≤ 2 V

Settings

fixed

fixed

Optical data

Recommended sensing distance/range

1...55 mm

1...55 mm

Emitter, light type

Pin-Point LED, red light

Pin-Point LED, red light

Wavelength

640 nm

640 nm

Light spot diameter

approx. 3.5 mm at 50 mm

approx. 3.5 mm at 50 mm

Indicators

Output function indicator

LED red

LED red

Time data

Response time

0.6 ms

0.6 ms

Switching frequency f

800 Hz

800 Hz

Mechanical data

Dimensions

12.5×20.6×7.6 mm

12.5×20.6×7.6 mm

Connection

M8 connector, 3-pin

M8 connector, 4-pin

No. of wires × cross-section

Housing material

ABS

ABS

Lens material

PMMA

PMMA

Weight

20 g

20 g

Ambient data

Degree of protection per IEC 60529

IP 67

IP 67

Polarity reversal protected

yes

yes

Short circuit protected

yes

yes

Ambient light rejection

EN 60947-5-2

EN 60947-5-2

Ambient temperature range T_a

-20...+50 °C

-20...+50 °C

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

Wiring diagrams, characteristics and accessories see page **2.1.108** and **2.1.109**.

2.1

2.3

5

Photoelectric Sensors

Accessories

Page 2.3.2 ...

Connectors ...

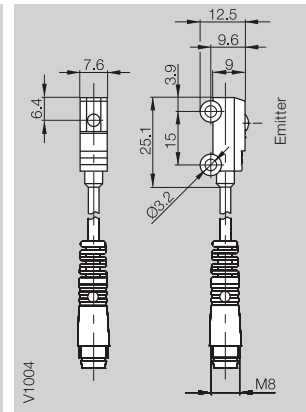
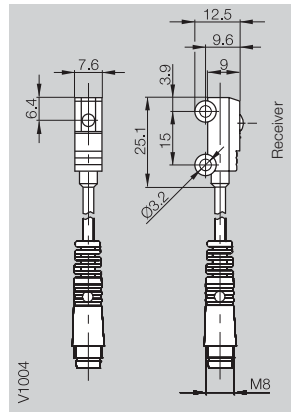
Page 5.2 ...

Through-beam

maximum range

0...1,2 m

0...1,2 m



Through-beam

PNP NO	1.2 m	Receiver
PNP NC	1.2 m	Receiver
NPN NO	1.2 m	Receiver
	1.2 m	Emitter

BOS 2K-PS-RE10-00,2-S49

BOS 2K-X-RS10-00,2-S49

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 5 V
No-load supply current I_0 max.	≤ 10 mA
Switching output	PNP-Transistor
Output current	50 mA
Switching type	Dark-on
Voltage drop U_d at I_o	≤ 2 V
Settings	fixed

Supply voltage U_B	10...30 V DC
Ripple	≤ 5 V
No-load supply current I_0 max.	≤ 20 mA

Optical data

Recommended range	0...1 m	0...1 m
Emitter, light type	Red light	Pin-Point LED, red light
Wavelength	640 nm	640 nm
Light spot diameter		

Indicators

Output function indicator	LED red
---------------------------	---------

Time data

Response time	2.5 ms
Switching frequency f	200 Hz

Mechanical data

Dimensions	12.5×20.6×7.6 mm	12.5×20.6×7.6 mm
Connection	M8 connector, 3-pin	M8 connector, 3-pin
No. of wires × cross-section		
Housing material	ABS	ABS
Lens material	PMMA	PMMA
Weight	20 g	20 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-20...+50 °C	-20...+50 °C

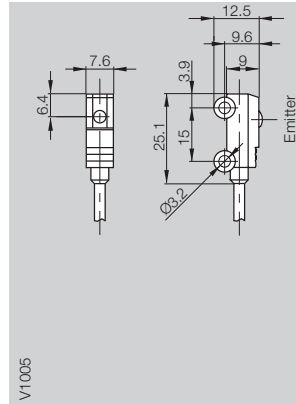
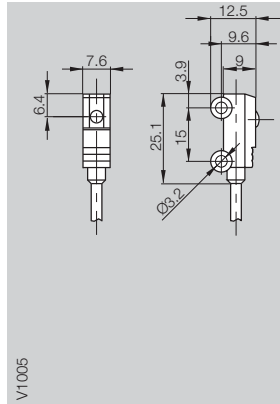
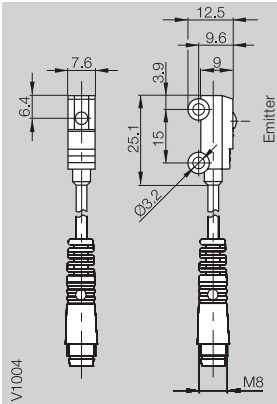
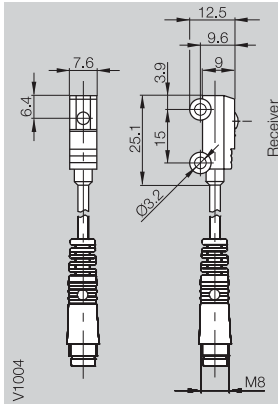
Wiring diagrams, characteristics and accessories see page 2.1.108 and 2.1.109.

0...1,2 m

0...1,2 m

0...1,2 m

0...1,2 m



BOS 2K-PS-RE10-00,2-S75

BOS 2K-X-RS10-00,2-S75

BOS 2K-PS-RE10-02
BOS 2K-PO-RE10-02
BOS 2K-NS-RE10-02

BOS 2K-X-RS10-02

10...30 V DC
≤ 5 V
≤ 10 mA
PNP-Transistor
50 mA
Dark-on
≤ 2 V
fixed

10...30 V DC
≤ 5 V
≤ 20 mA

10...30 V DC
≤ 5 V
≤ 10 mA
PNP- or NPN-Transistor
50 mA
Light- or dark-on
≤ 2 V
fixed

10...30 V DC
≤ 5 V
≤ 20 mA

0...1 m
Red light
640 nm

0...1 m
Pin-Point LED, red light
640 nm

0...1 m
Red light
640 nm

0...1 m
Pin-Point LED, red light
640 nm

LED red

LED red

2.5 ms
200 Hz

2.5 ms
200 Hz

12.5×20.6×7.6 mm
M8 connector, 4-pin

12.5×20.6×7.6 mm
M8 connector, 4-pin

12.5×20.6×7.6 mm
2 m cable, PVC
3×0.09 mm²

12.5×20.6×7.6 mm
2 m cable, PVC
3×0.09 mm²

ABS
PMMA
20 g

ABS
PMMA
20 g

ABS
PMMA
18 g

ABS
PMMA
18 g

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

EN 60947-5-2
-20...+50 °C

EN 60947-5-2
-20...+50 °C

EN 60947-5-2
-20...+50 °C

EN 60947-5-2
-20...+50 °C

2.1

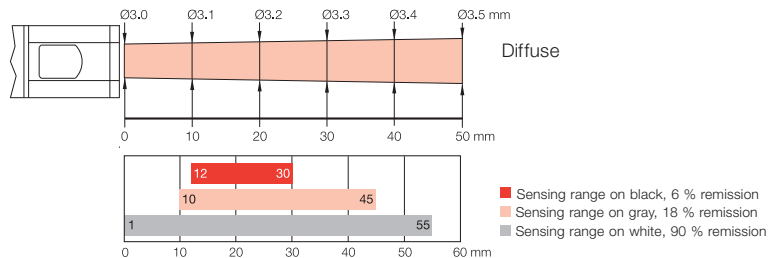
2.3

Photoelectric
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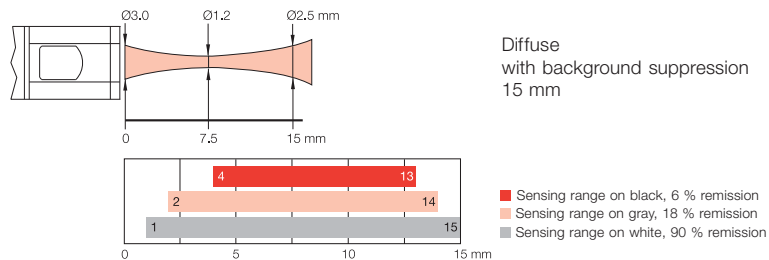
5

Connectors ...
Page 5.2 ...

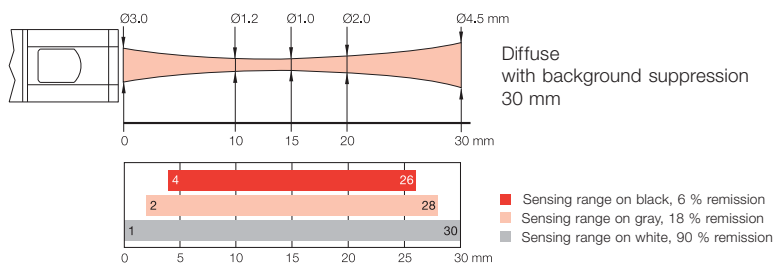
**Light spot diameter
Diffuse, 50 mm**



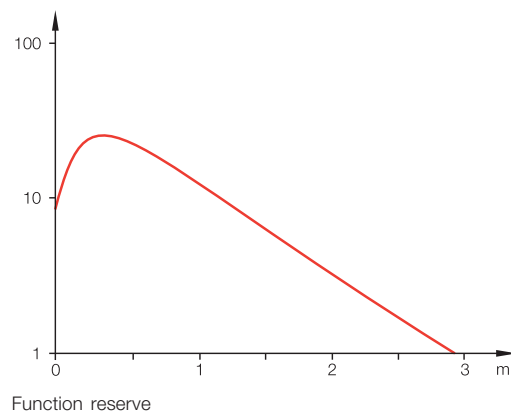
**Light spot diameter
Diffuse with
background suppression,
15 mm**



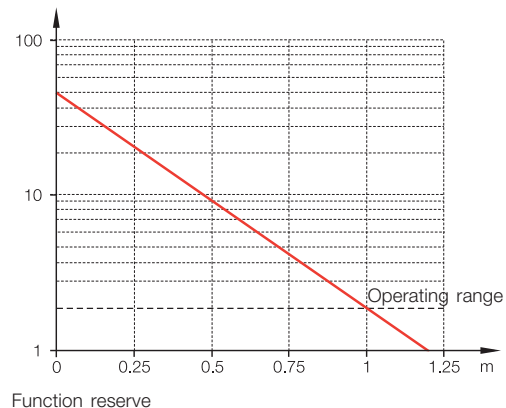
**Light spot diameter
Diffuse with
background suppression,
30 mm**



Retroreflective



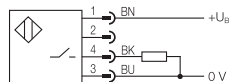
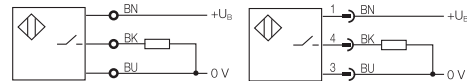
Through-beam



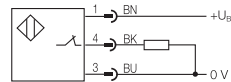
Wiring diagrams

Diffuse

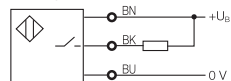
PNP light-on



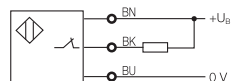
PNP dark-on



NPN light-on

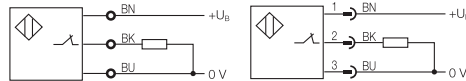


NPN dark-on

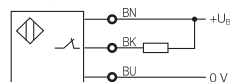


Retroreflective, through-beam receiver

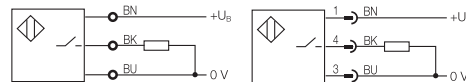
PNP light-on



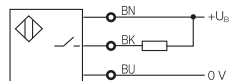
NPN light-on



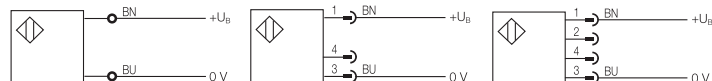
PNP dark-on



NPN dark-on



Through-beam emitter



Recommended accessories

please order separately

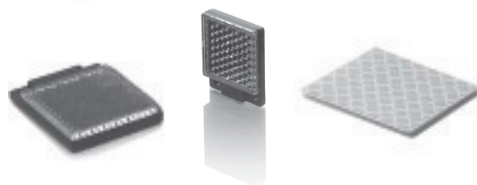
Mounting brackets

BOS 2-HW-1
BOS 2-HW-2
BOS 2-HW-3
(from left
to right)



Reflectors

BOS R-9
BOS R-26
BOS R-30
(from left
to right)



Connectors

BKS-S 74
BKS-S 48
(from left
to right)



2.1

2.3

Photoelectric
Sensors
Accessories
Page 2.3.2 ...

5

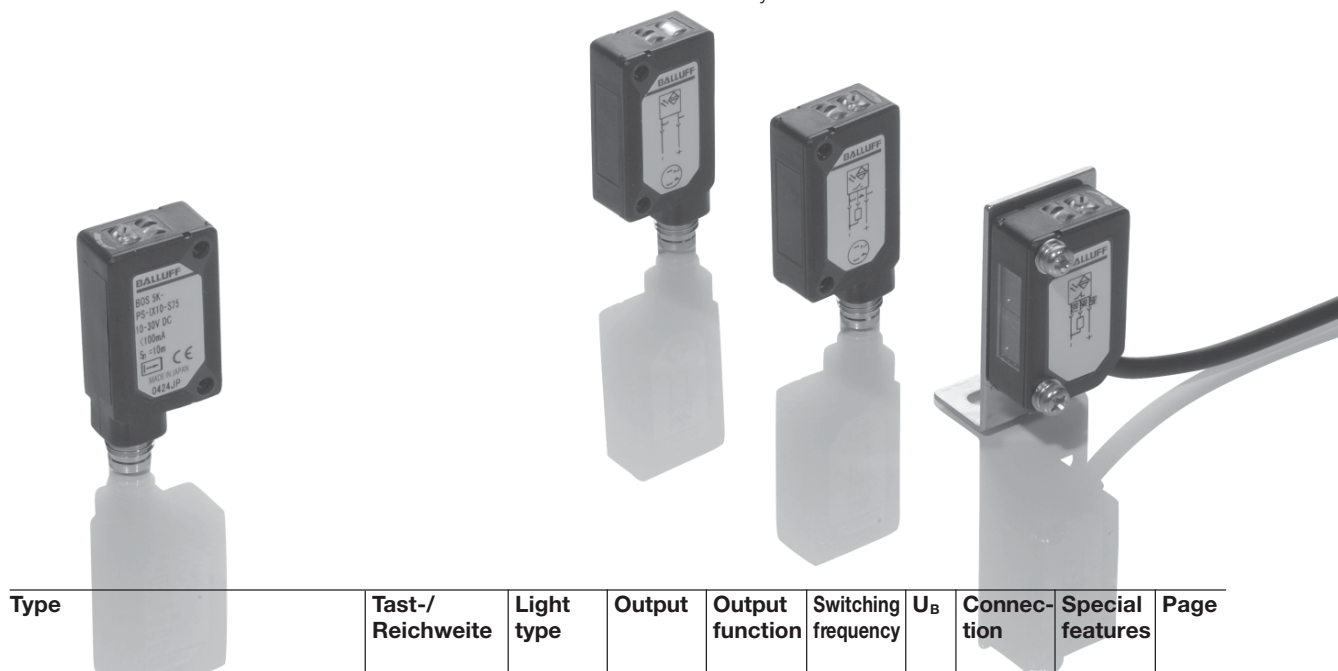
Connectors ...
Page 5.2 ...

Small sensors are easier to install and are even sometimes the only alternative. The optical performance of these miniature sensors is astounding. Choose between integrated cable or an M8 connector for connecting these sensors.

This series includes various diffuse sensors with background suppression, diffuse with narrow spot geometry, energetic diffuse, retroreflective models with polarizing filter and through-beam sensors.

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

- A small, compact form factor
- Emphasis on essential, basic functions
- Attractive price position in the lower price segment
- Large range of accessories for increased functionality



Type	Tast-/ Reichweite	Light type		Output		Output function		Switching frequency	U _B	Conne- ction	Special features		Page
		Red light	Infrared	PNP- Transistor	NPN- Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	Cable	Polarizing filter	
 Diffuse with HGA													
BOS 5K-PS-RH12-S75	40...200 mm	■		■		■		500 Hz	■	■			2.1.112
BOS 5K-PO-RH12-S75	40...200 mm	■		■			■	500 Hz	■	■			2.1.112
BOS 5K-PS-RH12-02	40...200 mm	■		■		■		500 Hz	■		■		2.1.112
BOS 5K-PO-RH12-02	40...200 mm	■		■			■	500 Hz	■		■		2.1.112
BOS 5K-NS-RH12-S75	40...200 mm	■			■	■		500 Hz	■	■			2.1.112
BOS 5K-NO-RH12-S75	40...200 mm	■			■		■	500 Hz	■	■			2.1.112
BOS 5K-NS-RH12-02	40...200 mm	■			■	■		500 Hz	■		■		2.1.112
BOS 5K-NO-RH12-02	40...200 mm	■			■		■	500 Hz	■		■		2.1.112

Type	Tast-/ Reichweite	Light type		Output		Output function		Switching frequency	U _B	Conne- ction	Special features	Page	
		Red light	Infrared	PNP- Transistor	NPN- Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	Cable	Polarizing filter	
 Diffuse													
BOS 5K-PS-ID10-S75	0...900 mm		■	■		■		500 Hz	■	■			2.1.113
BOS 5K-PO-ID10-S75	0...900 mm		■	■			■	500 Hz	■	■			2.1.113
BOS 5K-PS-ID10-02	0...900 mm		■	■		■		500 Hz	■		■		2.1.113
BOS 5K-PO-ID10-02	0...900 mm		■	■			■	500 Hz	■		■		2.1.113
BOS 5K-NS-ID10-S75	0...900 mm		■		■	■		500 Hz	■	■			2.1.113
BOS 5K-NO-ID10-S75	0...900 mm		■		■		■	500 Hz	■	■			2.1.113
BOS 5K-NS-ID10-02	0...900 mm		■		■	■		500 Hz	■		■		2.1.113
BOS 5K-NO-ID10-02	0...900 mm		■		■		■	500 Hz	■		■		2.1.113
 Diffuse small beam													
BOS 5K-PS-RD11-S75	50...200 mm	■		■		■		500 Hz	■	■			2.1.113
BOS 5K-PO-RD11-S75	50...200 mm	■		■			■	500 Hz	■	■			2.1.113
BOS 5K-PS-RD11-02	50...200 mm	■		■		■		500 Hz	■		■		2.1.113
BOS 5K-PO-RD11-02	50...200 mm	■		■			■	500 Hz	■		■		2.1.113
BOS 5K-NS-RD11-S75	50...200 mm	■			■	■		500 Hz	■	■			2.1.113
BOS 5K-NO-RD11-S75	50...200 mm	■			■		■	500 Hz	■	■			2.1.113
BOS 5K-NS-RD11-02	50...200 mm	■			■	■		500 Hz	■		■		2.1.113
BOS 5K-NO-RD11-02	50...200 mm	■			■		■	500 Hz	■		■		2.1.113
 Retroreflective													
BOS 5K-PS-RR10-S75	0,1...4 m	■		■			■	500 Hz	■	■		■	2.1.114
BOS 5K-PO-RR10-S75	0,1...4 m	■		■		■		500 Hz	■	■		■	2.1.114
BOS 5K-PO-RR10-S75-S	0,1...4 m	■		■		■		500 Hz	■	■			2.1.114
BOS 5K-PS-RR10-02	0,1...4 m	■		■			■	500 Hz	■		■	■	2.1.115
BOS 5K-PO-RR10-02	0,1...4 m	■		■		■		500 Hz	■		■	■	2.1.115
BOS 5K-NS-RR10-S75	0,1...4 m	■			■		■	500 Hz	■	■		■	2.1.114
BOS 5K-NO-RR10-S75	0,1...4 m	■			■	■		500 Hz	■	■		■	2.1.114
BOS 5K-NO-RR10-S75-S	0,1...4 m	■			■	■		500 Hz	■	■			2.1.114
BOS 5K-NS-RR10-02	0,1...4 m	■			■		■	500 Hz	■		■	■	2.1.115
BOS 5K-NO-RR10-02	0,1...4 m	■			■	■		500 Hz	■		■	■	2.1.115
 Through-beam													
BOS 5K-PS-IX10-S75	0...10 m		■	■			■	500 Hz	■	■			2.1.115
BOS 5K-PO-IX10-S75	0...10 m		■	■		■		500 Hz	■	■			2.1.115
BOS 5K-PO-IX10-S75-S	0...10 m		■	■		■		500 Hz	■	■			2.1.115
BOS 5K-PS-IX10-02	0...10 m		■	■			■	500 Hz	■		■		2.1.115
BOS 5K-PO-IX10-02	0...10 m		■	■		■		500 Hz	■		■		2.1.115
BOS 5K-NS-IX10-S75	0...10 m		■		■		■	500 Hz	■	■			2.1.115
BOS 5K-NO-IX10-S75	0...10 m		■		■	■		500 Hz	■	■			2.1.115
BOS 5K-NO-IX10-S75-S	0...10 m		■		■	■		500 Hz	■	■			2.1.115
BOS 5K-NS-IX10-02	0...10 m		■		■		■	500 Hz	■		■		2.1.115
BOS 5K-NO-IX10-02	0...10 m		■		■	■		500 Hz	■		■		2.1.115

2.1

2.3

Photoelectric
Sensors
Accessories
Page 2.3.2 ...

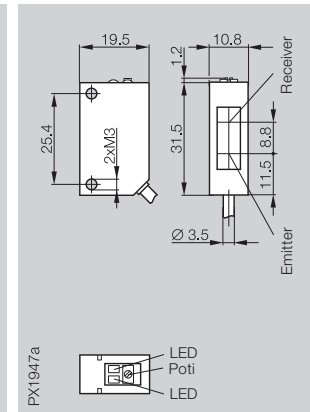
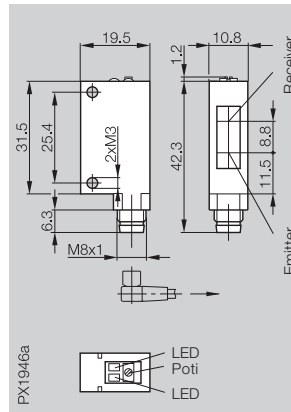
5

Connectors ...
Page 5.2 ...

Diffuse with background suppression	Sensing distance
Diffuse	Sensing distance
Diffuse small beam	Sensing distance

50...200 mm

50...200 mm



Diffuse with HGA

PNP, NO	50...200 mm
NPN, NO	50...200 mm
PNP, NC	50...200 mm
NPN, NC	50...200 mm

BOS 5K-PS-RH12-S75
BOS 5K-NS-RH12-S75
BOS 5K-PO-RH12-S75
BOS 5K-NO-RH12-S75

BOS 5K-PS-RH12-02
BOS 5K-NS-RH12-02
BOS 5K-PO-RH12-02
BOS 5K-NO-RH12-02

Diffuse

PNP, NO	900 mm
NPN, NO	900 mm
PNP, NC	900 mm
NPN, NC	900 mm

Diffuse small beam

PNP, NO	50...200 mm
NPN, NO	50...200 mm
PNP, NC	50...200 mm
NPN, NC	50...200 mm

Electrical data

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

10...30 V DC
≤ 2 V DC
≤ 30 mA
PNP- or NPN-Transistor
100 mA
Light- or dark-on
≤ 1.2 V DC
Potentiometer 270°

10...30 V DC
≤ 2 V DC
≤ 30 mA
PNP- or NPN-Transistor
100 mA
Light- or dark-on
≤ 1.2 V DC
Potentiometer 270°

Optical data

Emitter, light type
Wavelength

LED, red light
660 nm

LED, red light
660 nm

Indicators

Output function indicator
Stability indicator

LED yellow
LED green

LED yellow
LED green

Time data

Response time
Switching frequency f

1 ms
500 Hz

1 ms
500 Hz

Mechanical data

Dimensions
Connection
No. of wires × cross-section
Housing material
Optical surface
Weight

19.5×31.5×10.8 mm
M8 connector, 4-pin
PC/PBT
PC
10 g

19.5×31.5×10.8 mm
2 m cable, PVC
3×0.2 mm ²
PC/PBT
PC
50 g

Ambient data

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

IP 67
yes
yes
-25...+55 °C
5 kLux (artificial light)/10 kLux (sunlight)

IP 67
yes
yes
-25...+55 °C
5 kLux (artificial light)/10 kLux (sunlight)

Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page 2.1.116 and 2.1.117.

mini.s with potentiometer

Photoelectric Sensors

BOS 5K
Sensing distance 200 mm,
900 mm

0...900 mm	0...900 mm	50...200 mm	50...200 mm
BOS 5K-PS-ID10-S75	BOS 5K-PS-ID10-02		
BOS 5K-NS-ID10-S75	BOS 5K-NS-ID10-02		
BOS 5K-PO-ID10-S75	BOS 5K-PO-ID10-02		
BOS 5K-NO-ID10-S75	BOS 5K-NO-ID10-02		
		BOS 5K-PS-RD11-S75	BOS 5K-PS-RD11-02
		BOS 5K-NS-RD11-S75	BOS 5K-NS-RD11-02
		BOS 5K-PO-RD11-S75	BOS 5K-PO-RD11-02
		BOS 5K-NO-RD11-S75	BOS 5K-NO-RD11-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
≤ 2 V DC	≤ 2 V DC	≤ 2 V DC	≤ 2 V DC
≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA
PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
100 mA	100 mA	100 mA	100 mA
Light- or dark-on	Light- or dark-on	Light- or dark-on	Light- or dark-on
≤ 1.2 V DC	≤ 1.2 V DC	≤ 1.2 V DC	≤ 1.2 V DC
Potentiometer 270°	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
LED, infrared	LED, infrared	LED, red light	LED, red light
880 nm	880 nm	660 nm	660 nm
LED yellow	LED yellow	LED yellow	LED yellow
LED green	LED green	LED green	LED green
1 ms	1 ms	1 ms	1 ms
500 Hz	500 Hz	500 Hz	500 Hz
19.5×31.5×10.8 mm	19.5×31.5×10.8 mm	19.5×31.5×10.8 mm	19.5×31.5×10.8 mm
M8 connector, 4-pin	2 m cable, PVC	M8 connector, 4-pin	2 m cable, PVC
	3×0.2 mm ²		3×0.2 mm ²
PC/PBT	PC/PBT	PC/PBT	PC/PBT
PC	PC	PC	PC
10 g	50 g	10 g	50 g
IP 67	IP 67	IP 67	IP 67
yes	yes	yes	yes
yes	yes	yes	yes
-25...+55 °C	-25...+55 °C	-25...+55 °C	-25...+55 °C
5 kLux (artificial light)/10 kLux (sunlight)	5 kLux (artificial light)/10 kLux (sunlight)	5 kLux (artificial light)/10 kLux (sunlight)	5 kLux (artificial light)/10 kLux (sunlight)



2.1

2.3

Photoelectric
Sensors
Accessories
Page 2.3.2 ...

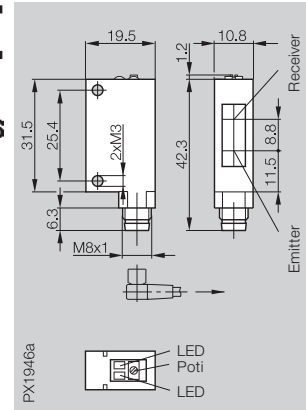
5

Connectors ...
Page 5.2 ...

Retroreflective
Through-beam

Range
Range

0,1...4 m



Retroreflective



PNP, NO	0,1...4 m	Polarizing filter	
NPN, NO	0,1...4 m	Polarizing filter	
PNP, NC	0,1...4 m	Polarizing filter	
NPN, NC	0,1...4 m	Polarizing filter	
PNP, NC	0,1...4 m	Polarizing filter	Special output configuration
NPN, NC	0,1...4 m	Polarizing filter	Special output configuration

BOS 5K-PS-RR10-S75
BOS 5K-NS-RR10-S75
BOS 5K-PO-RR10-S75
BOS 5K-NO-RR10-S75
BOS 5K-PO-RR10-S75-S
BOS 5K-NO-RR10-S75-S

Through-beam



PNP, NO	10 m	Emitter + Receiver	
NPN, NO	10 m	Emitter + Receiver	
PNP, NC	10 m	Emitter + Receiver	
NPN, NC	10 m	Emitter + Receiver	
PNP, NC	10 m	Emitter + Receiver	Special output configuration
NPN, NC	10 m	Emitter + Receiver	Special output configuration

Electrical data

Operating voltage U_B

Ripple

No-load supply current I_0 max.

Switching output

Output current

Switching type

Voltage drop U_d at I_o

Settings

10...30 V DC

≤ 2 V DC

≤ 30 mA

PNP- or NPN-Transistor

100 mA

Light- or dark-on

≤ 1.2 V DC

Potentiometer 270°

Optical data

Emitter, light type

Wavelength

LED, red light

660 nm

Indicators

Power-on indicator

Output function indicator

Stability indicator

LED yellow

LED green

Time data

Response time

Switching frequency f

1 ms

500 Hz

Mechanical data

Dimensions

Connection

No. of wires × cross-section

Housing material

Optical surface

Weight

19.5×31.5×10.8 mm

M8 connector, 4-pin

PC/PBT

PMMA

10 g

Ambient data

Degree of protection per IEC 60529

Polarity reversal protected

Short circuit protected

Ambient temperature range T_a

Ambient light rejection

IP 67

yes

yes

-25...+55 °C

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

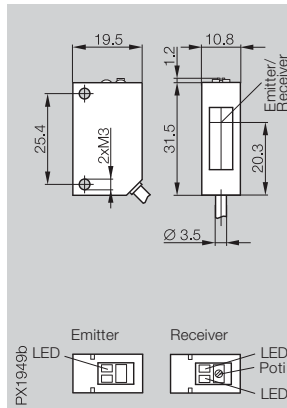
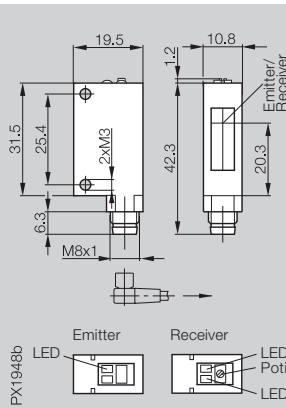
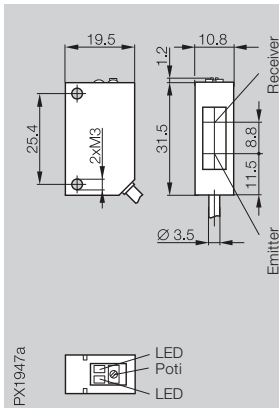
Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page 2.1.116 and 2.1.117.

0,1...4 m

0...10 m

0...10 m



BOS 5K-PS-RR10-02
BOS 5K-NS-RR10-02
BOS 5K-PO-RR10-02
BOS 5K-NO-RR10-02

BOS 5K-PS-IX10-S75
BOS 5K-NS-IX10-S75
BOS 5K-PO-IX10-S75
BOS 5K-NO-IX10-S75
BOS 5K-PO-IX10-S75-S
BOS 5K-NO-IX10-S75-S

BOS 5K-PS-IX10-02
BOS 5K-NS-IX10-02
BOS 5K-PO-IX10-02
BOS 5K-NO-IX10-02

10...30 V DC
≤ 2 V DC
≤ 30 mA
PNP- or NPN-Transistor
100 mA
Light- or dark-on
≤ 1.2 V DC
Potentiometer 270°

10...30 V DC
≤ 2 V DC
≤ 20 mA (Receiver), ≤ 15 mA (Emitter)
PNP- or NPN-Transistor
100 mA
Light- or dark-on
≤ 1.2 V DC
Potentiometer 270°

10...30 V DC
≤ 2 V DC
≤ 20 mA (Receiver), ≤ 15 mA (Emitter)
PNP- or NPN-Transistor
100 mA
Light- or dark-on
≤ 1.2 V DC
Potentiometer 270°

LED, red light
660 nm

LED, infrared
880 nm

LED, infrared
880 nm

LED yellow
LED green

LED green (emitter)
LED yellow (receiver)
LED green (receiver)

LED green (emitter)
LED yellow (receiver)
LED green (receiver)

1 ms
500 Hz

≤ 1 ms
500 Hz

≤ 1 ms
500 Hz

19.5×31.5×10.8 mm
2 m cable, PVC
3×0.2 mm²
PC/PBT
PMMA
50 g

19.5×31.5×10.8 mm
M8 connector, 4-pin
PC/PBT
PC
10 g each

19.5×31.5×10.8 mm
2 m cable, PVC
3(2)×0.2 mm² (emitter)
PC/PBT
PC
50 g each

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

-25...+55 °C

-25...+55 °C

-25...+55 °C

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

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

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



2.1

2.3

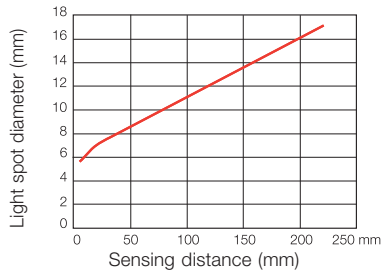
Photoelectric
Sensors
Accessories
Page 2.3.2 ...

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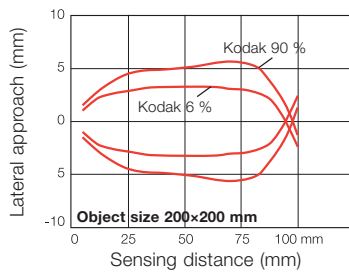
Connectors ...
Page 5.2 ...

Diffuse with background suppression BOS 5K-__RH12-__

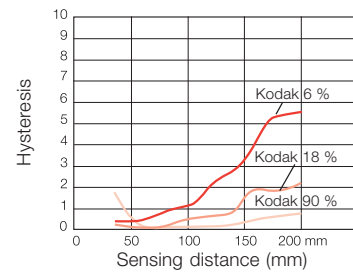
Light spot diameter



Characteristic response curve (HGA 100 mm)

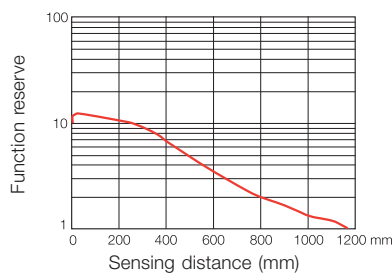


Sensing distance vs. hysteresis

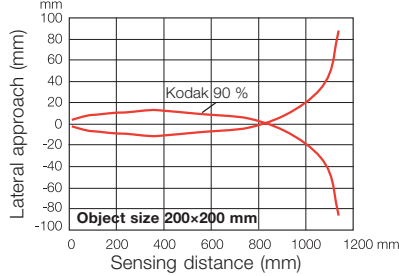


Diffuse BOS 5K-__ID10-__

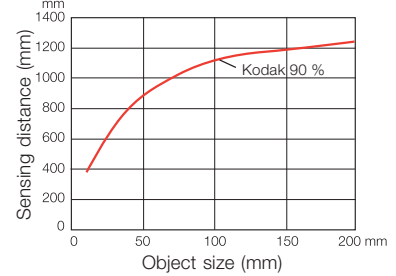
Receiving characteristics



Characteristic response curve

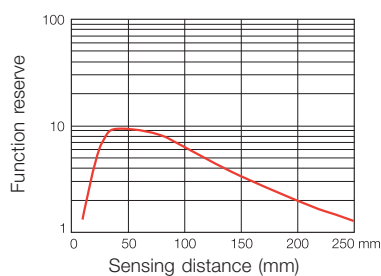


Object size vs. Sensing distance

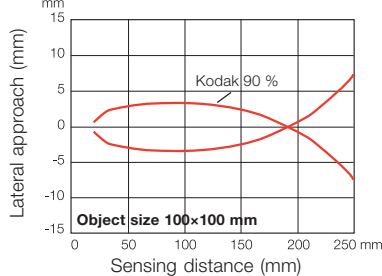


Diffuse small beam BOS 5K-__RD11-__

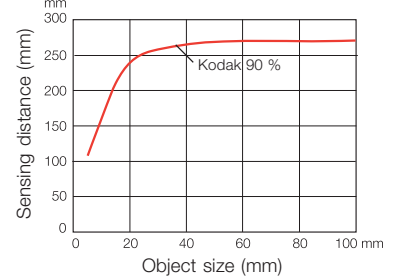
Receiving characteristics



Characteristic response curve

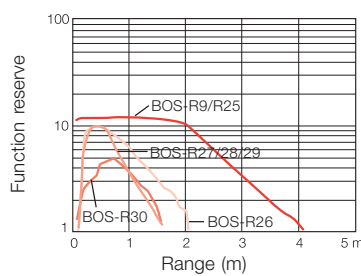


Object size vs. Sensing distance

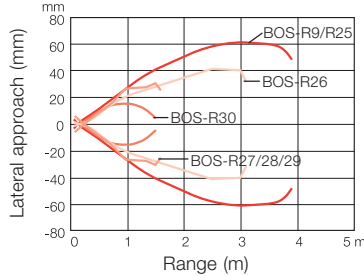


Reflexionslichtschranke BOS 5K-__RR10-__

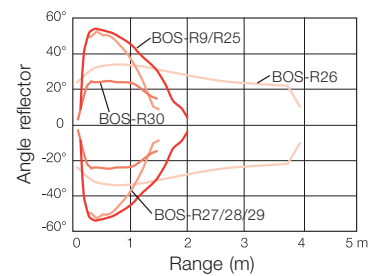
Receiving characteristics



Characteristic response curve

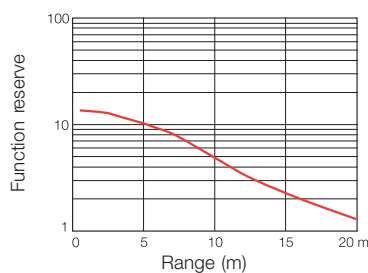


Angle offset

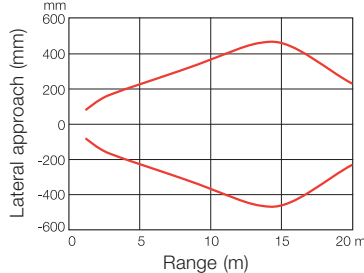


Einweglichtschranke BOS 5K-__IX10-__

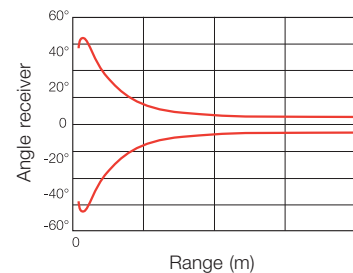
Receiving characteristics



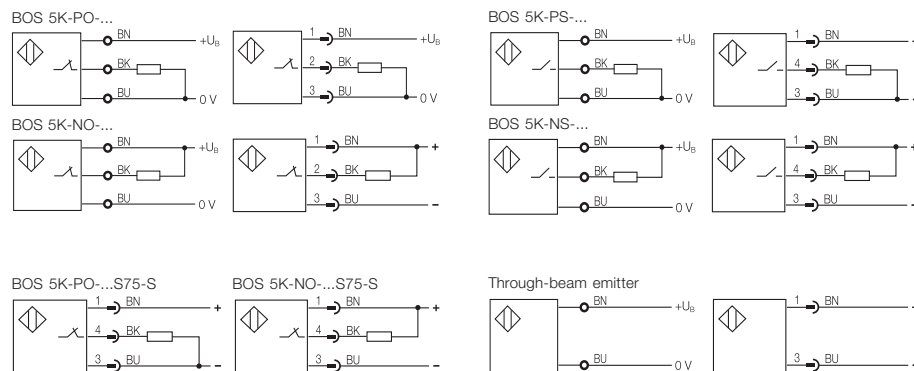
Characteristic response curve



Angle offset



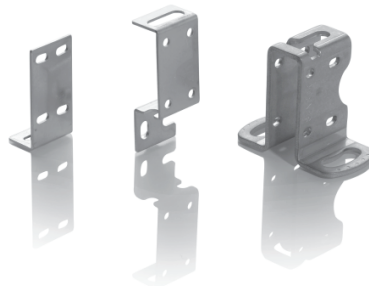
Wiring diagrams



Recommended accessories please order separately

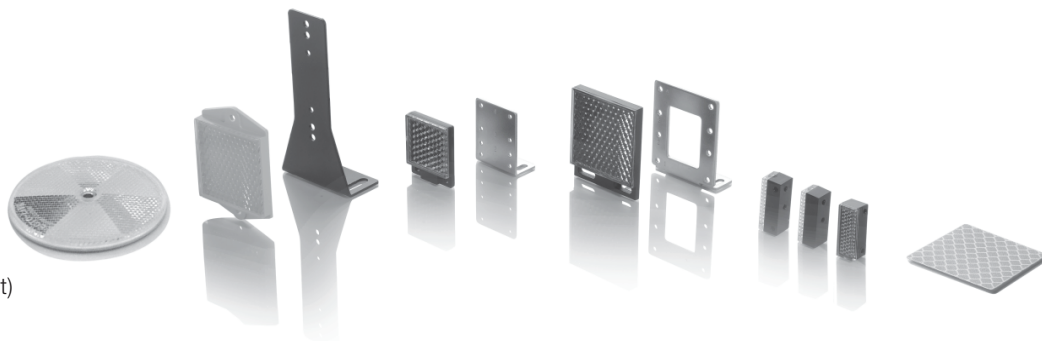
Mounting brackets

BOS 5-HW-1
BOS 5-HW-2
BOS 5-HW-3
(from left to right)



Reflectors, Reflector mounting bracket

BOS R-1
BOS R-25
BOS 5-HW-4
BOS R-26
BOS 5-HW-5
BOS R-9
BOS 5-HW-6
BOS R-27
BOS R-28
BOS R-29
BOS R-30
(from left to right)



Slit apertures, vertical

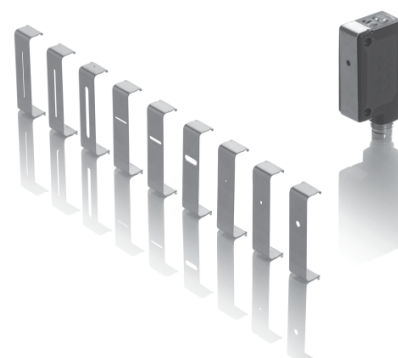
BOS 5-BL-1
BOS 5-BL-2
BOS 5-BL-3

Slit apertures, horizontal

BOS 5-BL-4
BOS 5-BL-5
BOS 5-BL-6

Round apertures

BOS 5-BL-7
BOS 5-BL-8
BOS 5-BL-9
(from left to right)



Connector

BKS-S 74/BKS-S 75



2.1

2.3

Photoelectric
Sensors
Accessories
Page 2.3.2 ...

5

Connectors ...
Page 5.2 ...

Its high performance specs allow the **BOS 6K** to be used virtually anywhere. These sensors are particularly useful for tight mounting spaces. The small size allows better integration into the machine. Red light and background suppression make the sensor extremely user-friendly.

In addition, several laser versions are available for absolute small parts detection. Automatic calibration using the control lines means the sensor can be installed at virtually inaccessible locations. Dynamic teach-in means less and less attention needs to be paid to the sensors.

Features

- Teach-in button plus control line
- Dynamic teach-in possible (i. e., without stopping the machine)
- Multi-function display visible from any direction
- Key disabling
- Versions with 3- or 4-pin M8 connector or with 2 m cable
- Solid construction with IP 67 rating
- Red light and laser versions

Applications

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

Type	Sensing/ Range	Light type	Output	Output function	Switching frequency	U _B	Connection	Special features	Page
		Red light Laser	PNP- Transistor NPN- Transistor	Light-on Dark-on		10...30 V DC	M8 connector, 4-pin M8 connector, 3-pin Cable	Polarizing filter	
 Diffuse with HGA									
BOS 6K-PU-1HA-S75-C	25...100 mm	■	■	■	1 kHz	■	■		2.1.120
BOS 6K-NU-1HA-S75-C	25...100 mm	■	■	■	1 kHz	■	■		2.1.120
BOS 6K-PU-1HA-S49-C	25...100 mm	■	■	■	1 kHz	■	■		2.1.120
BOS 6K-PU-1HA-C-02	25...100 mm	■	■	■	1 kHz	■		■	2.1.121
BOS 6K-NU-1HA-C-02	25...100 mm	■	■	■	1 kHz	■		■	2.1.121
BOS 6K-PU-1LHA-S75-C	20...60 mm	■	■	■	1 kHz	■	■		2.1.126
BOS 6K-NU-1LHA-S75-C	20...60 mm	■	■	■	1 kHz	■	■		2.1.126
BOS 6K-PU-1LHA-C-02	20...60 mm	■	■	■	1 kHz	■		■	2.1.126
BOS 6K-NU-1LHA-C-02	20...60 mm	■	■	■	1 kHz	■		■	2.1.126
BOS 6K-PU-1LHA-SA1-S75-C	30...110 mm	■	■	■	1 kHz	■	■		2.1.127
BOS 6K-NU-1LHA-SA1-S75-C	30...110 mm	■	■	■	1 kHz	■	■		2.1.127
BOS 6K-PU-1LHA-SA1-C-02	30...110 mm	■	■	■	1 kHz	■		■	2.1.127
BOS 6K-NU-1LHA-SA1-C-02	30...110 mm	■	■	■	1 kHz	■		■	2.1.127

Type	Sensing/ Range	Light type		Output		Output function		Switching frequency	U _B	Connection			Special features		Page
		Red light	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	M8 connector, 3-pin	Cable	Polarizing filter	Glass sensing	
 Diffuse															
BOS 6K-PU-1OC-S75-C	20...300 mm	■		■		■	■	1 kHz	■	■					2.1.121
BOS 6K-NU-1OC-S75-C	20...300 mm	■			■	■	■	1 kHz	■	■					2.1.121
BOS 6K-PU-1OC-S49-C	20...300 mm	■		■		■	■	1 kHz	■		■				2.1.121
BOS 6K-PU-1OC-C-02	20...300 mm	■		■		■	■	1 kHz	■			■			2.1.121
BOS 6K-NU-1OC-C-02	20...300 mm	■			■	■	■	1 kHz	■			■			2.1.121
 Retroreflective															
BOS 6K-PU-1TA-S75-C	0...500 mm	■		■		■	■	1 kHz	■	■			■	■	2.1.122
BOS 6K-NU-1TA-S75-C	0...500 mm	■			■	■	■	1 kHz	■	■			■	■	2.1.122
BOS 6K-PU-1TA-C-02	0...500 mm	■		■		■	■	1 kHz	■			■	■	■	2.1.122
BOS 6K-NU-1TA-C-02	0...500 mm	■			■	■	■	1 kHz	■			■	■	■	2.1.122
BOS 6K-PU-1QA-S75-C	50...700 mm	■		■		■	■	1 kHz	■	■			■	■	2.1.123
BOS 6K-NU-1QA-S75-C	50...700 mm	■			■	■	■	1 kHz	■	■			■	■	2.1.123
BOS 6K-PU-1QA-S49-C	50...700 mm	■		■		■	■	1 kHz	■		■		■	■	2.1.123
BOS 6K-PU-1QA-C-02	50...700 mm	■		■		■	■	1 kHz	■			■	■	■	2.1.123
BOS 6K-NU-1QA-C-02	50...700 mm	■			■	■	■	1 kHz	■			■	■	■	2.1.123
BOS 6K-PU-1LQA-S75-C	0,05...1,5 m		■	■		■	■	4 kHz	■	■			■		2.1.127
BOS 6K-NU-1LQA-S75-C	0,05...1,5 m		■		■	■	■	4 kHz	■	■			■		2.1.127
BOS 6K-PU-1LQA-C-02	0,05...1,5 m		■	■		■	■	4 kHz	■			■	■		2.1.127
BOS 6K-NU-1LQA-C-02	0,05...1,5 m		■		■	■	■	4 kHz	■			■	■		2.1.127
BOS 6K-PU-1QC-S75-C	0,05...3 m	■		■		■	■	1 kHz	■	■			■		2.1.124
BOS 6K-NU-1QC-S75-C	0,05...3 m	■			■	■	■	1 kHz	■	■			■		2.1.124
BOS 6K-PU-1QC-S49-C	0,05...3 m	■		■		■	■	1 kHz	■		■		■		2.1.124
BOS 6K-PU-1QC-C-02	0,05...3 m	■		■		■	■	1 kHz	■			■	■		2.1.125
BOS 6K-NU-1QC-C-02	0,05...3 m	■			■	■	■	1 kHz	■			■	■		2.1.125
 Through-beam															
BLE 6K-PU-1E-S75-C	0...6,5 m	■		■		■	■	500 Hz	■	■					2.1.125
BLE 6K-NU-1E-S75-C	0...6,5 m	■			■	■	■	500 Hz	■	■					2.1.125
BLE 6K-PU-1E-S49-C	0...6,5 m	■		■		■	■	500 Hz	■		■				2.1.125
BLE 6K-PU-1E-C-02	0...6,5 m	■		■		■	■	500 Hz	■			■			2.1.125
BLE 6K-NU-1E-C-02	0...6,5 m	■			■	■	■	500 Hz	■			■			2.1.125
BLS 6K-XX-1E-S75-C	0...6,5 m	■							■	■					2.1.125
BLS 6K-XX-1E-S49-C	0...6,5 m	■							■		■				2.1.125
BLS 6K-XX-1E-C-02	0...6,5 m	■							■			■			2.1.125

2.1

2.3

Photoelectric
Sensors
Accessories
Page 2.3.2 ...

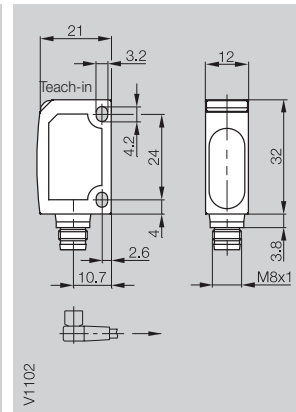
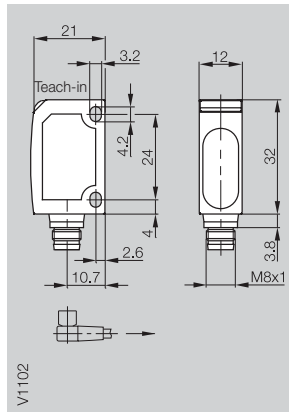
5

Connectors ...
Page 5.2 ...

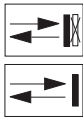
Diffuse with background suppression	maximum sensing distance
Diffuse	maximum sensing distance

25...100 mm

25...100 mm



Diffuse



PNP	25...100 mm	HGA
NPN	25...100 mm	HGA
PNP	20...300 mm	
NPN	20...300 mm	

BOS 6K-PU-1HA-S75-C
BOS 6K-NU-1HA-S75-C

BOS 6K-PU-1HA-S49-C

Electrical data

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

10...30 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 35 mA
PNP-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

Optical data

Recommended sensing distance
Emitter, light type
Wavelength
Light spot diameter
Distance hysteresis (18 %/18 %)
Gray value shift (90 %/18 %)

25...100 mm
LED, red light
660 nm
ca. 5x5 mm at 60 mm
≤ 5 %
≤ 10 %

25...100 mm
LED, red light
660 nm
ca. 5x5 mm at 60 mm
≤ 5 %
≤ 10 %

Indicators

Switching state indicator
Stability indicator

LED yellow
LED green

LED yellow
LED green

Time data

Response time
Switching frequency f

0.5 ms
1 kHz

0.5 ms
1 kHz

Mechanical data

Dimensions
Connection
No. of wires x cross-section
Housing material
Optical surface
Weight

21x32x12 mm
M8 connector, 4-pin
impact-resistant ABS
PMMA
40 g

21x32x12 mm
M8 connector, 3-pin
impact-resistant ABS
PMMA
40 g

Ambient data

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

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-20...+60 °C
5 kLux

Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page **2.1.128** and **2.1.129**.

¹⁾ $U_{imp} = 500$ V

mini.s with teach-in

Photoelectric Sensors

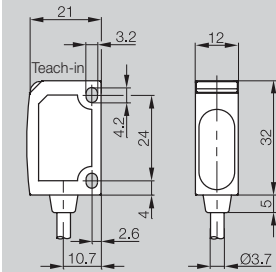
BOS 6K
Sensing distance 100 mm,
300 mm

25...100 mm

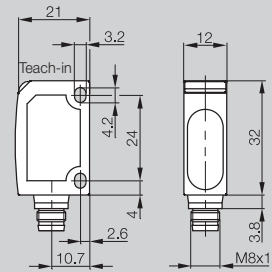
20...300 mm

20...300 mm

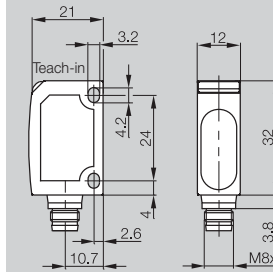
20...300 mm



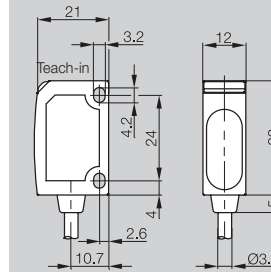
V1103



V1102



V1102



V1103

BOS 6K-PU-1HA-C-02
BOS 6K-NU-1HA-C-02

BOS 6K-PU-1OC-S75-C
BOS 6K-NU-1OC-S75-C

BOS 6K-PU-1OC-S49-C

BOS 6K-PU-1OC-C-02
BOS 6K-NU-1OC-C-02

10...30 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 35 mA
PNP-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

25...100 mm
LED, red light
660 nm
ca. 5×5 mm at 60 mm
≤ 5 %
≤ 10 %

20...300 mm
LED, red light
660 nm
ca. 12×12 mm at 160 mm
≤ 10 %

20...300 mm
LED, red light
660 nm
ca. 12×12 mm at 160 mm
≤ 10 %

20...300 mm
LED, red light
660 nm
ca. 12×12 mm at 160 mm
≤ 10 %

LED yellow
LED green

LED yellow
LED green

LED yellow
LED green

LED yellow
LED green

0.5 ms
1 kHz

0.5 ms
1 kHz

0.5 ms
1 kHz

0.5 ms
1 kHz

21×32×12 mm
2 m cable, PVC
4×0.14 mm²
impact-resistant ABS
PMMA
120 g

21×32×12 mm
M8 connector, 4-pin
impact-resistant ABS
PMMA
40 g

21×32×12 mm
M8 connector, 3-pin
impact-resistant ABS
PMMA
40 g

21×32×12 mm
2 m cable, PVC
4×0.14 mm²
impact-resistant ABS
PMMA
120 g

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-20...+60 °C
5 kLux



Connector orientation

2.1

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Photoelectric
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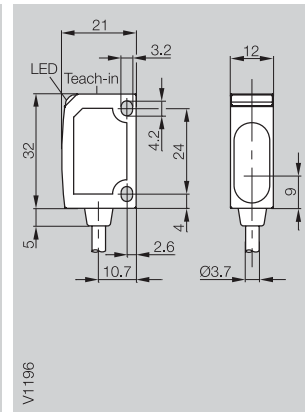
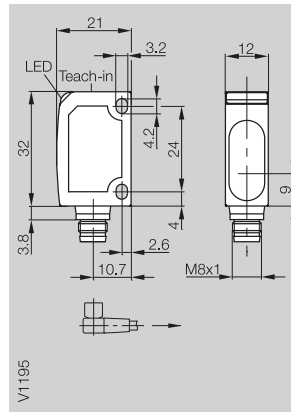
5

Connectors ...
Page 5.2 ...

Retroreflective with polarizing filter maximum range

0...500 mm

0...500 mm



Retroreflective

PNP	0...500 mm Polarizing filter, glass detection, autocollimation
NPN	0...500 mm Polarizing filter, glass detection, autocollimation
PNP	50...700 mm Polarizing filter, glass detection
NPN	50...700 mm Polarizing filter, glass detection

Electrical data

Supply voltage U_B	10...30 V DC
No-load supply current I_0 max.	≤ 25 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_0	≤ 2.4 V
Settings	teach-in

Optical data

Recommended range	0...500 mm
Emitter, light type	LED, red light
Wavelength	660 nm
Light spot diameter	20x20 mm up to 500 mm

Indicators

Switching state indicator	LED yellow
Stability indicator	LED green

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

Mechanical data

Dimensions	21x32x12 mm
Connection	M8 connector, 4-pin
No. of wires x cross-section	
Housing material	impact-resistant ABS
Optical surface	PMMA
Weight	40 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-20...+60 °C
Ambient light rejection	5 kLux

BOS 6K-PU-1TA-S75-C
BOS 6K-NU-1TA-S75-C

BOS 6K-PU-1TA-C-02
BOS 6K-NU-1TA-C-02

10...30 V DC
≤ 25 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 25 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

0...500 mm
LED, red light
660 nm
20x20 mm up to 500 mm

0...500 mm
LED, red light
660 nm
20x20 mm up to 500 mm

LED yellow
LED green

LED yellow
LED green

0.5 ms
1 kHz

0.5 ms
1 kHz

21x32x12 mm
M8 connector, 4-pin

21x32x12 mm
2 m cable, PVC

impact-resistant ABS
PMMA
40 g

impact-resistant ABS
PMMA
120 g

IP 67
yes
yes
-20...+60 °C
5 kLux

IP 67
yes
yes
-20...+60 °C
5 kLux

Only usable with R22 reflector

Retroreflective values referenced to R9/R22 reflector.

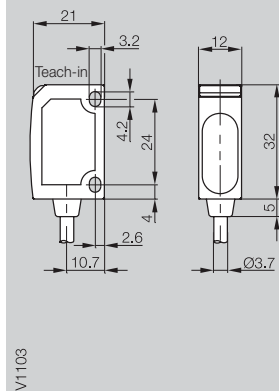
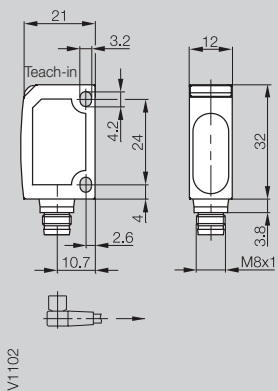
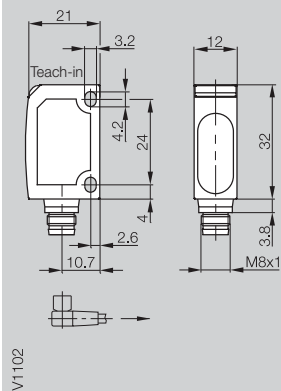
Wiring diagrams, characteristics and accessories see page 2.1.128 and 2.1.129.

¹⁾ $U_{imp} = 500$ V

50...700 mm

50...700 mm

50...700 mm



BOS 6K-PU-1QA-S75-C
BOS 6K-NU-1QA-S75-C

BOS 6K-PU-1QA-S49-C

BOS 6K-PU-1QA-C-02
BOS 6K-NU-1QA-C-02

10...30 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 35 mA
PNP-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

0...500 mm
LED, red light
660 nm
20×20 mm up to 500 mm

0...500 mm
LED, red light
660 nm
20×20 mm up to 500 mm

0...500 mm
LED, red light
660 nm
20×20 mm up to 500 mm

LED yellow
LED green

LED yellow
LED green

LED yellow
LED green

0.5 ms
1 kHz

0.5 ms
1 kHz

0.5 ms
1 kHz

21×32×12 mm
M8 connector, 4-pin

21×32×12 mm
M8 connector, 3-pin

21×32×12 mm
2 m cable, PVC
4×0.14 mm²

impact-resistant ABS
PMMA
40 g

impact-resistant ABS
PMMA
40 g

impact-resistant ABS
PMMA
120 g

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

-20...+60 °C
5 kLux

-20...+60 °C
5 kLux

-20...+60 °C
5 kLux



Connector orientation

2.1

2.3

Photoelectric
Sensors
Accessories
Page 2.3.2 ...

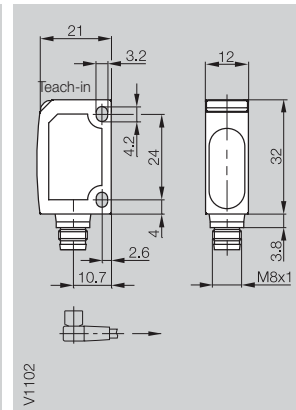
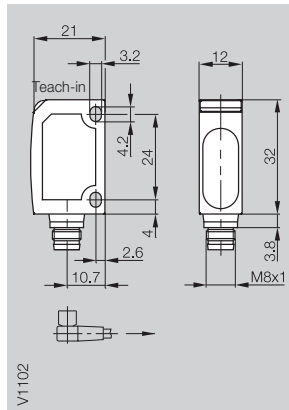
5

Connectors ...
Page 5.2 ...

Retroreflective with polarizing filter	maximum range
Through-beam	maximum range

0,05...3 m

0,05...3 m



Retroreflective

PNP	0,05...3 m	Polarizing filter
NPN	0,05...3 m	Polarizing filter

BOS 6K-PU-1QC-S75-C
BOS 6K-NU-1QC-S75-C

BOS 6K-PU-1QC-S49-C

Through-beam

PNP	6,5 m	Receiver
NPN	6,5 m	Receiver
	6,5 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC
No-load supply current I_0 max.	≤ 25 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_e	≤ 2.4 V
Settings	teach-in

10...30 V DC
≤ 25 mA
PNP-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

Optical data

Recommended range	0.05...2.5 m
Emitter, light type	LED, red light
Wavelength	660 nm
Light spot diameter	ca. 75x75 mm at 1.5 m

0.05...2.5 m
LED, red light
660 nm
ca. 75x75 mm at 1.5 m

Indicators

Switching state indicator	LED yellow
Stability indicator	LED green

LED yellow
LED green

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

0.5 ms
1 kHz

Mechanical data

Dimensions	21x32x12 mm
Connection	M8 connector, 4-pin
No. of wires x cross-section	
Housing material	impact-resistant ABS
Optical surface	PMMA
Weight	10 g

21x32x12 mm
M8 connector, 3-pin
impact-resistant ABS
PMMA
10 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-20...+60 °C
Ambient light rejection	EN 60947-5-2

IP 67
yes
yes
-20...+60 °C
EN 60947-5-2

Retroreflective values referenced to R9 reflector.

Wiring diagrams, characteristics and accessories see page 2.1.128 and 2.1.129.

¹⁾ U_{imp} = 500 V

BOS 6K
Range 3 m, 6,5 m



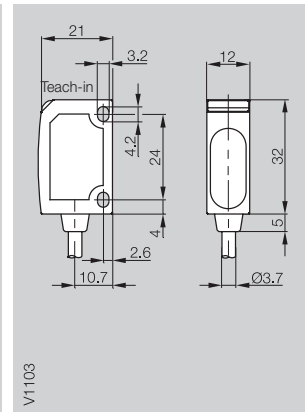
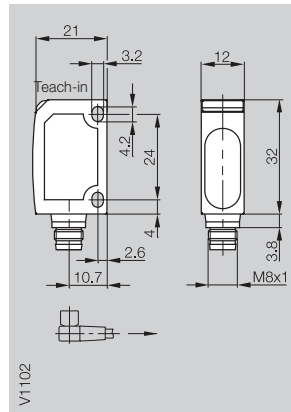
Connector orientation

Connectors ...
Page 5.2 ...

Diffuse with background suppression	maximum sensing distance
Retroreflective with polarizing filter	maximum range

20...60 mm

20...60 mm



Diffuse



PNP	20...60 mm	HGA
NPN	20...60 mm	HGA
PNP	30...110 mm	HGA
NPN	30...110 mm	HGA

BOS 6K-PU-1LHA-S75-C
BOS 6K-NU-1LHA-S75-C

BOS 6K-PU-1LHA-C-02
BOS 6K-NU-1LHA-C-02

Reflexionslichtschranke



PNP	0.05...1.5 m	Polarizing filter
NPN	0.05...1.5 m	Polarizing filter

Electrical data

Supply voltage U_B	10...30 V DC
No-load supply current I_0 max.	≤ 25 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_0	≤ 2.4 V
Settings	teach-in

10...30 V DC
≤ 25 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

10...30 V DC
≤ 25 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (selectable)
≤ 2.4 V
teach-in

Optical data

Recommended sensing distance/range	20...60 mm
Emitter, light type	Laser, red light
Wavelength	650 nm
Laser class	1
Light spot diameter	0.5 mm at focus (35 mm)
Distance hysteresis (18 %/18 %)	≤ 2 % up to focal point, ≤ 6 % up to end
Gray value shift (90 %/18 %)	≤ 7 %

20...60 mm
Laser, red light
650 nm
1
0.5 mm at focus (35 mm)
≤ 2 % up to focal point, ≤ 6 % up to end
≤ 7 %

20...60 mm
Laser, red light
650 nm
1
0.5 mm at focus (35 mm)
≤ 2 % up to focal point, ≤ 6 % up to end
≤ 7 %

Indicators

Switching state indicator	LED yellow
Stability indicator	LED green

LED yellow
LED green

LED yellow
LED green

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

0.5 ms
1 kHz

0.5 ms
1 kHz

Mechanical data

Dimensions	21×32×12 mm
Connection	M8 connector, 4-pin
No. of wires × cross-section	4×0.14 mm ²
Housing material	impact-resistant ABS
Optical surface	PMMA
Weight	10 g

21×32×12 mm
M8 connector, 4-pin
4×0.14 mm ²
impact-resistant ABS
PMMA
10 g

21×32×12 mm
2 m cable, PVC
4×0.14 mm ²
impact-resistant ABS
PMMA
40 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-20...+60 °C
Ambient light limit	EN 60947-5-2

IP 67
yes
yes
-20...+60 °C
EN 60947-5-2

IP 67
yes
yes
-20...+60 °C
EN 60947-5-2

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

Wiring diagrams, characteristics and accessories see page 2.1.128 and 2.1.129.

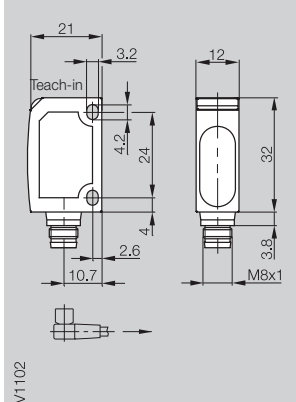
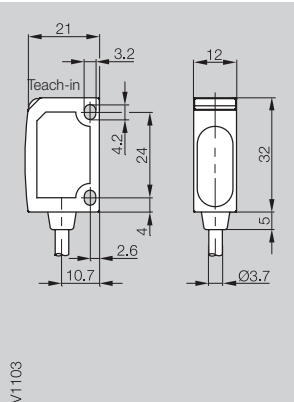
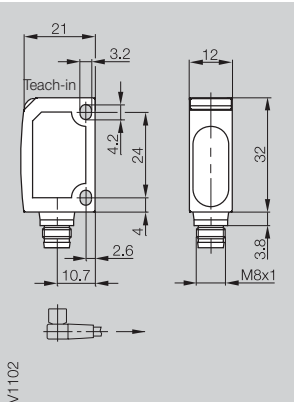
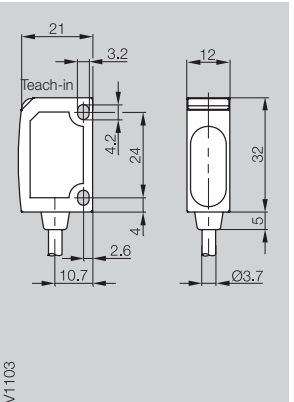
¹⁾ $U_{imp} = 500$ V

mini.s Laser with teach-in



**Photoelectric
Sensors**

BOS 6K Laser
Sensing distance 110 mm
Range 1,5 m

30...110 mm	30...110 mm	0,05...1,5 m	0,05...1,5 m
			
BOS 6K-PU-1LHA-SA1-S75-C BOS 6K-NU-1LHA-SA1-S75-C	BOS 6K-PU-1LHA-SA1-C-02 BOS 6K-NU-1LHA-SA1-C-02	BOS 6K-PU-1LQA-S75-C BOS 6K-NU-1LQA-S75-C	BOS 6K-PU-1LQA-C-02 BOS 6K-NU-1LQA-C-02
10...30 V DC ≤ 25 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (selectable) ≤ 2.4 V teach-in	10...30 V DC ≤ 25 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (selectable) ≤ 2.4 V teach-in	10...30 V DC ≤ 25 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (selectable) ≤ 2.4 V teach-in	10...30 V DC ≤ 25 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (selectable) ≤ 2.4 V teach-in
30...110 mm Laser, red light 650 nm 2 0,7 mm at focus (85 mm ± 15 mm) ≤ 5 % up to focal point, ≤ 7 % up to end ≤ 7 %	30...110 mm Laser, red light 650 nm 2 0,7 mm at focus (85 mm ± 15 mm) ≤ 5 % up to focal point, ≤ 7 % up to end ≤ 7 %	0.05...1 m Laser, red light 650 nm 1 1 mm in 300 mm	0.05...1 m Laser, red light 650 nm 1 1 mm in 300 mm
LED yellow LED green	LED yellow LED green	LED yellow LED green	LED yellow LED green
0.5 ms 1 kHz	0.5 ms 1 kHz	0.5 ms 4 kHz	0.5 ms 4 kHz
21×32×12 mm M8 connector, 4-pin	21×32×12 mm 2 m cable, PVC 4×0.14 mm ²	21×32×12 mm M8 connector, 4-pin	21×32×12 mm 2 m cable, PVC 4×0.14 mm ²
impact-resistant ABS PMMA 10 g	impact-resistant ABS PMMA 40 g	impact-resistant ABS PMMA 10 g	impact-resistant ABS PMMA 40 g
IP 67 yes yes	IP 67 yes yes	IP 67 yes yes	IP 67 yes yes
-20...+60 °C EN 60947-5-2	-20...+60 °C EN 60947-5-2	-20...+60 °C EN 60947-5-2	-20...+60 °C EN 60947-5-2

 Connector orientation

2.1

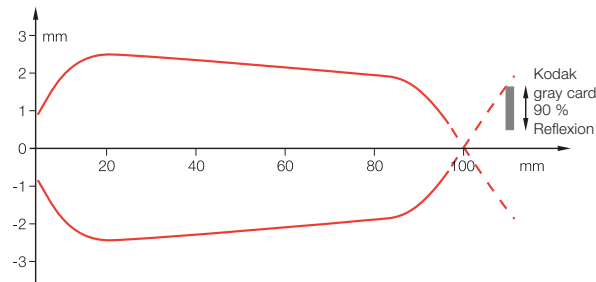
2.3

Photoelectric
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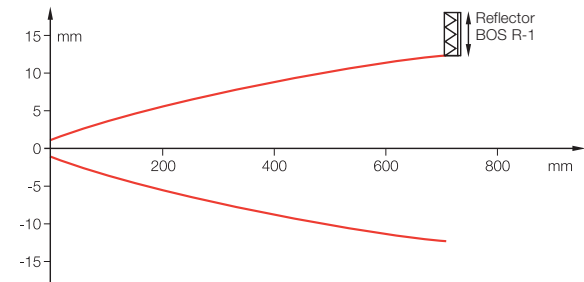
Connectors ...
Page 5.2 ...

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



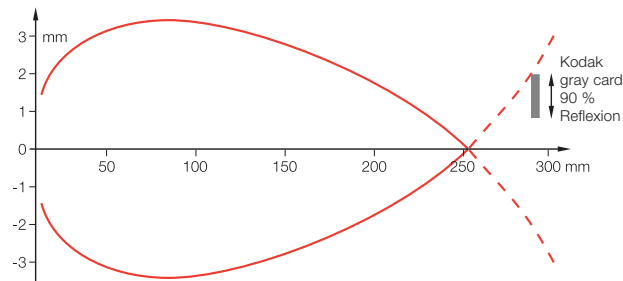
Range measured with side approach of Kodak gray card.

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



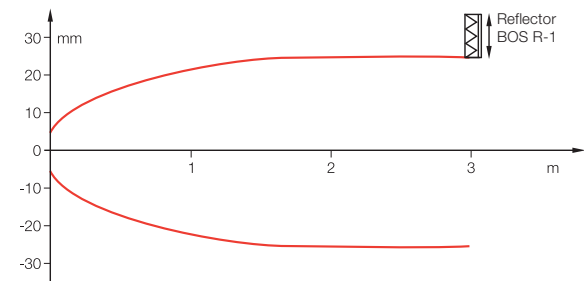
Range measured with side approach of reflector.

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



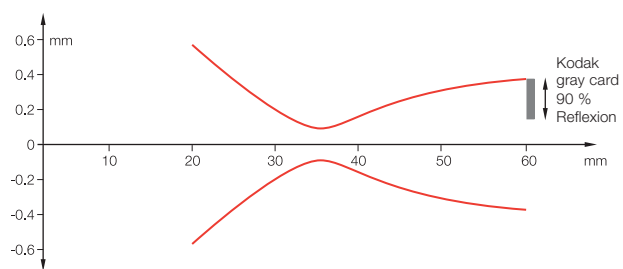
Range measured with side approach of Kodak gray card.

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



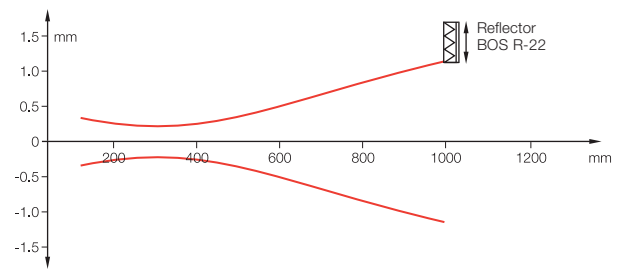
Range measured with side approach of reflector.

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



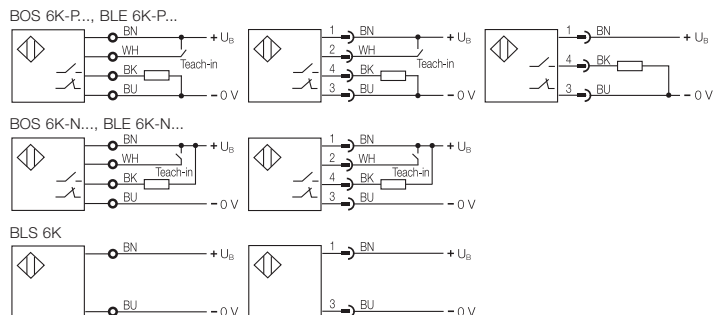
Range measured with side approach of Kodak gray card.

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

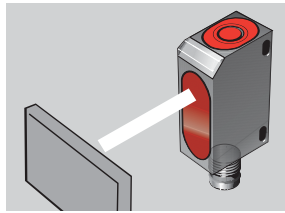


Range measured with side approach of reflector.

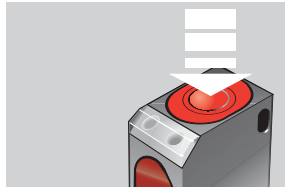
Wiring diagrams



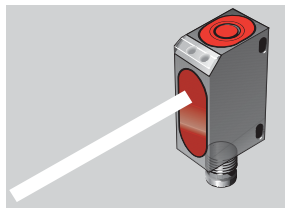
Diffuse



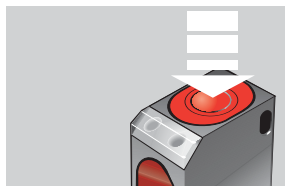
Align sensor with the object.



Press button for approx. 3 sec. until both LED's blink together.

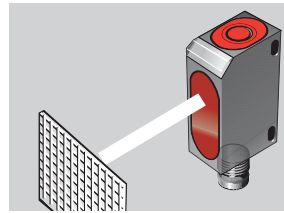


Remove object from beam path.

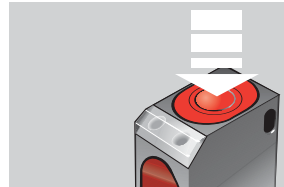


Hold down button for 1 sec. Green LED blinks briefly and then comes full on. The sensor is ready. If both LEDs blink together, repeat your settings.

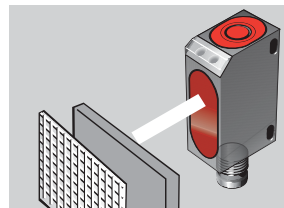
Retroreflective/through-beam



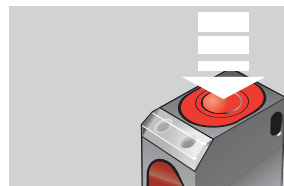
Direct sensor at reflector/receiver.



Press button for approx. 3 sec. until both LED's blink together.



Bring objects into detection range.



Hold down button for 1 sec. Green LED blinks briefly and then comes full on. The sensor is ready. If both LEDs blink together, repeat your settings.

2.1

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Photoelectric Sensors
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Page 2.3.2 ...

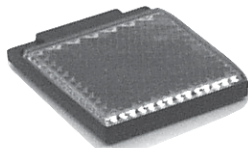
5

Connectors ...
Page 5.2 ...

Recommended accessories please order separately



Reflector
BOS R-1



Reflector
BOS R-9



Reflector
BOS R-22



Mounting
bracket
BOS 6-HW-1



Connector
BKS-S 74/BKS-S 75

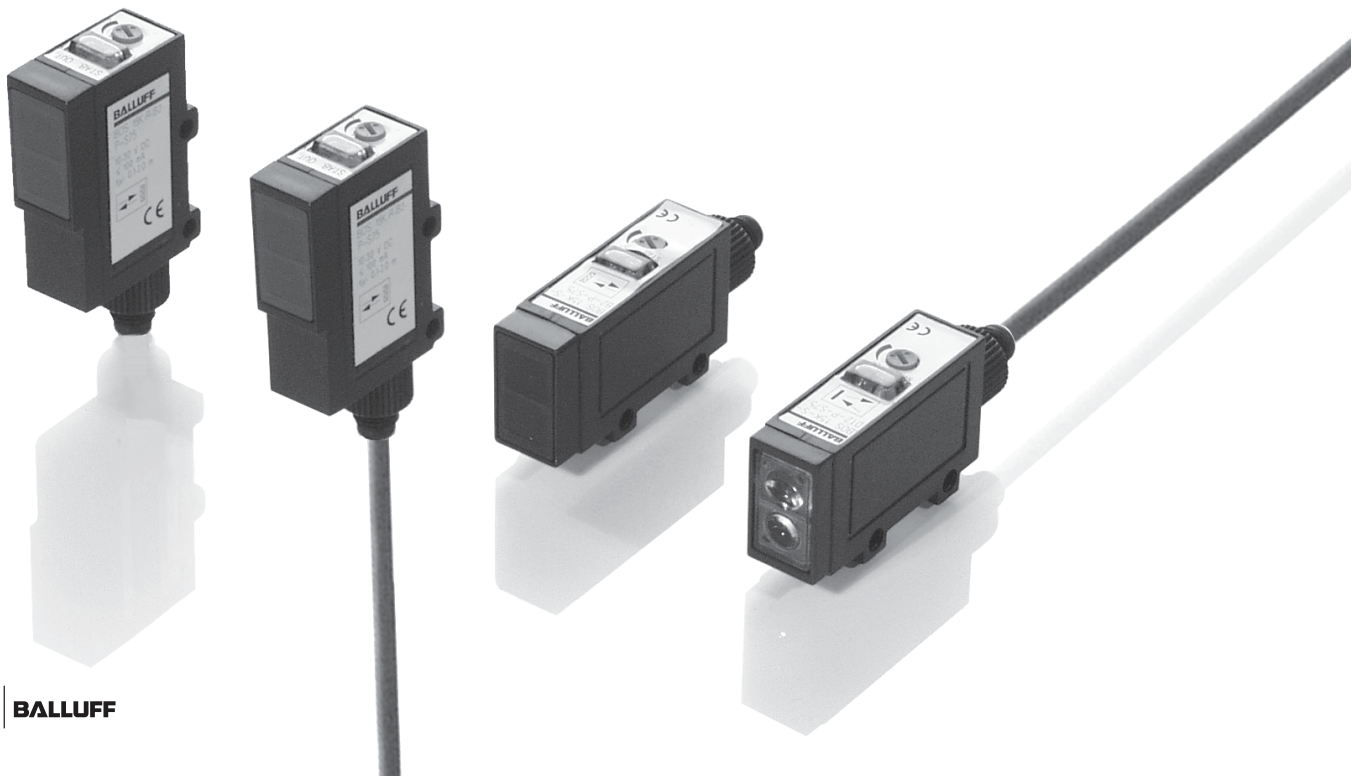
BOS 15K

Somewhat larger and available in two mechanical versions (straight and right-angle), the BOS 15K is the ideal size for the most common applications in packaging machines and handling and assembly systems.

The familiar sensitivity setting using an easily accessible potentiometer, along with the number of versions, make this sensor ideal for installation in machines and systems of small and medium size.

Features

- Two housing versions (straight and angled)
- Potentiometer for sensitivity setting
- Cross-talk protection
- NO/NC switching using an input line
- Through-beam with test input and alarm output



Type	Sensing/ Range	Light exit		Light type		Output			Output function		Switching frequency	U _B	Connec- tion	Special features		Page
		Straight	Right-angle	Red light	Infrared	PNP-Transistor	NPN-Transistor	Alarm output	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	Cable , 2 m	Polarizing filter	Test input
 Diffuse																
BOS 15K-R-C10-P-S75	0...100 mm		■		■	■			■	■	500 Hz	■	■			2.1.132
BOS 15K-S-C10-P-S75	0...100 mm	■			■	■			■	■	500 Hz	■	■			2.1.133
BOS 15K-R-C10-02	0...100 mm		■		■	■	■		■	■	500 Hz	■		■		2.1.133
BOS 15K-S-C10-02	0...100 mm	■			■	■	■		■	■	500 Hz	■		■		2.1.133
BOS 15K-R-C50-P-S75	0...500 mm		■			■			■	■	500 Hz	■	■			2.1.132
BOS 15K-S-C50-P-S75	0...500 mm	■				■			■	■	500 Hz	■	■			2.1.133
BOS 15K-R-C50-02	0...500 mm		■			■	■		■	■	500 Hz	■		■		2.1.133
BOS 15K-S-C50-02	0...500 mm	■				■	■		■	■	500 Hz	■		■		2.1.133
BOS 15K-R-D12-P-S75	12 mm		■	■		■			■	■	800 Hz	■	■			2.1.132
BOS 15K-S-D12-P-S75	12 mm	■		■		■			■	■	800 Hz	■	■			2.1.133
BOS 15K-R-D12-02	12 mm		■	■		■	■		■	■	800 Hz	■		■		2.1.133
BOS 15K-S-D12-02	12 mm	■		■		■	■		■	■	800 Hz	■		■		2.1.133
 Retroreflective																
BOS 15K-R-B2-P-S75	0,1...2 m		■	■		■			■	■	500 Hz	■	■		■	2.1.132
BOS 15K-S-B2-P-S75	0,1...2 m	■		■		■			■	■	500 Hz	■	■		■	2.1.133
BOS 15K-R-B2-02	0,1...2 m		■	■		■	■		■	■	500 Hz	■		■	■	2.1.133
BOS 15K-S-B2-02	0,1...2 m	■		■		■	■		■	■	500 Hz	■		■	■	2.1.133
 Through-beam																
BLE 15K-R-F5-P-S75	0...5 m		■		■	■			■	■	250 Hz	■	■			2.1.132
BLE 15K-S-F5-P-S75	0...5 m	■			■	■			■	■	250 Hz	■	■			2.1.133
BLE 15K-R-F5-02	0...5 m		■		■	■	■		■	■	250 Hz	■		■		2.1.133
BLE 15K-S-F5-02	0...5 m	■			■	■	■		■	■	250 Hz	■		■		2.1.133
BLS 15K-R-G5-S75	0...5 m		■		■							■	■		■	2.1.132
BLS 15K-S-G5-S75	0...5 m	■			■							■	■		■	2.1.133
BLS 15K-R-G5-02	0...5 m		■		■							■		■	■	2.1.133
BLS 15K-S-G5-02	0...5 m	■			■							■		■	■	2.1.133

2.1

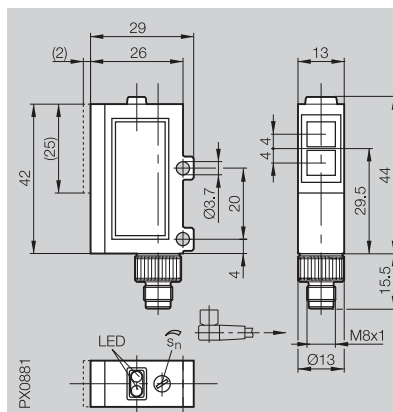
2.3

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Diffuse	Sensing distance	12 mm/0...100 mm/0...500 mm
Retroreflective	Range	0,1...2 m
Through-beam	Range	0...5 m



Diffuse

	PNP/NPN, PNP	100 mm	Infrared light	BOS 15K-R-C10-P-S75
	PNP/NPN, PNP	500 mm	Infrared light	BOS 15K-R-C50-P-S75
	PNP/NPN, PNP	12 mm	Red light, focused	BOS 15K-R-D12-P-S75



Retroreflective

	PNP/NPN, PNP	0,1...2 m	Red light, polarizing filter	BOS 15K-R-B2-P-S75
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Through-beam

	PNP/NPN, PNP	5 m	Receiver	Infrared light	BLE 15K-R-F5-P-S75	
		5 m	Emitter	Infrared light	BLS 15K-R-G5-S75	

Electrical

Supply voltage U_B	10...30 V DC
Ripple	2 V DC
No-load current I_0 max.	≤ 30 mA
Switching output	PNP-Transistor
Output current	≤ 100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_e	≤ 1.5 V
Settings	Potentiometer 270°
Help function	Test input for BLS

Indicators

Power-on indicator	LED red (BLS)
Output function indicator	LED red
Stability indicator	LED green

Time data

Response time	≤ 1 ms (BLE ≤ 2 ms)
Switching frequency f	500 Hz (BLE 250 Hz)

Mechanical data

Dimensions	29×42×13 mm
Connection	M8 connector, 4-pin

No. of wires $\times$ cross-section	ABS connector, 4 pin
Housing material	ABS
Optical surface	PMMA
Weight	20 g

Ambient data

Degree of protection per IEC 60529	IP 66
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T _a	-15...+55 °C
Ambient light rejection	3 kLux/10 kLux sunlight

For through-beam types the emitter and receiver are located in the lower optics.

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

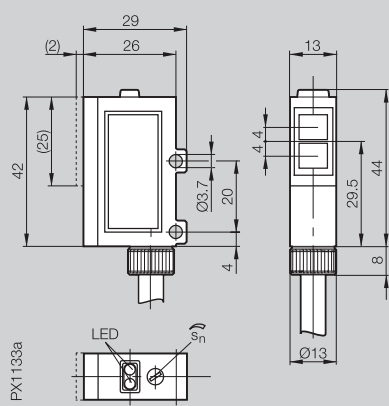
Wiring diagrams, characteristics and accessories see page **2.1.134** und **2.1.135**.



Connector orientation

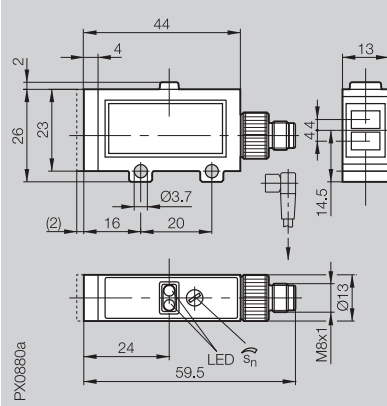
12 mm/0...100 mm/0...500 mm

0,1...2 m
0...5 m



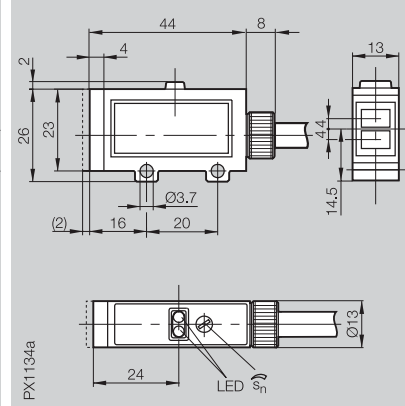
12 mm/0...100 mm/0...500 mm

0,1...2 m
0...5 m



12 mm/0...100 mm/0...500 mm

0,1...2 m
0...5 m



BOS 15K-R-C10-02
BOS 15K-R-C50-02
BOS 15K-R-D12-02

BOS 15K-S-C10-P-S75
BOS 15K-S-C50-P-S75
BOS 15K-S-D12-P-S75

BOS 15K-S-C10-02
BOS 15K-S-C50-02
BOS 15K-S-D12-02

BOS 15K-R-B2-02

BOS 15K-S-B2-P-S75

BOS 15K-S-B2-02

BLE 15K-R-F5-02
BLS 15K-R-G5-02

BLE 15K-S-F5-P-S75
BLS 15K-S-G5-S75

BLE 15K-S-F5-02
BLS 15K-S-G5-02

10...30 V DC

10...30 V DC

10...30 V DC

2 V DC

2 V DC

2 V DC

≤ 30 mA

≤ 30 mA

≤ 30 mA

PNP- and NPN-Transistor selectable
≤ 100 mA

PNP-Transistor
≤ 100 mA

PNP- and NPN-Transistor selectable
≤ 100 mA

Light-/dark-on (selectable)

Light-/dark-on (selectable)

Light-/dark-on (selectable)

≤ 1.5 V

≤ 1.5 V

≤ 1.5 V

Potentiometer 270°

Potentiometer 270°

Potentiometer 270°

Test input for BLS

Test input for BLS

Test input for BLS

LED red (BLS)

LED red (BLS)

LED red (BLS)

LED red

LED red

LED red

LED green

LED green

LED green

≤ 1 ms (BLE ≤ 2ms)
500 Hz (BLE 250 Hz)

≤ 1 ms (BLE ≤ 2ms)
500 Hz (BLE 250 Hz)

≤ 1 ms (BLE ≤ 2ms)
500 Hz (BLE 250 Hz)

29×42×13 mm

44×26×13 mm

44×26×13 mm

2 m cable, PVC

M8 connector, 4-pin

2 m cable, PVC

4/5/6×0.34 mm²

4/5/6×0.34 mm²

ABS

ABS

ABS

PMMA

PMMA

PMMA

90 g

20 g

90 g

IP 66

IP 66

IP 66

yes

yes

yes

yes

yes

yes

-15...+55 °C

-15...+55 °C

-15...+55 °C

3 kLux/10 kLux sunlight

3 kLux/10 kLux sunlight

3 kLux/10 kLux sunlight

2.1

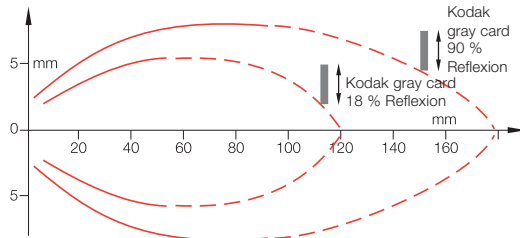
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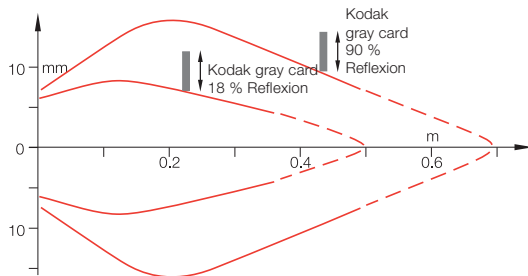
Connectors ...
Page 5.2 ...

Diffuse BOS 15K-...-C10-...



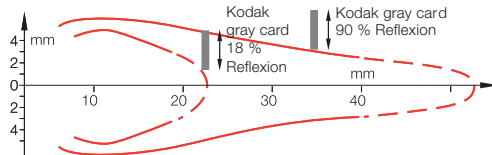
Range measured with side approach of Kodak gray card.

Diffuse BOS 15K-...-C50-...



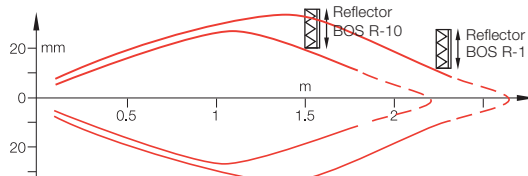
Range measured with side approach of Kodak gray card.

Diffuse with focused beam BOS 15K-...-D12-...



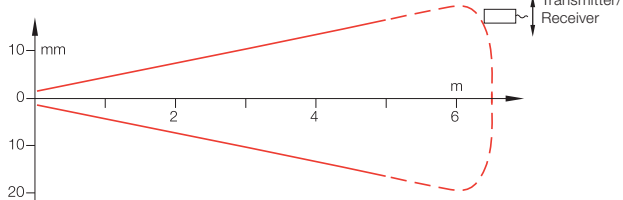
Range measured with side approach of Kodak gray card.

Retroreflective BOS 15K-...-B2-...



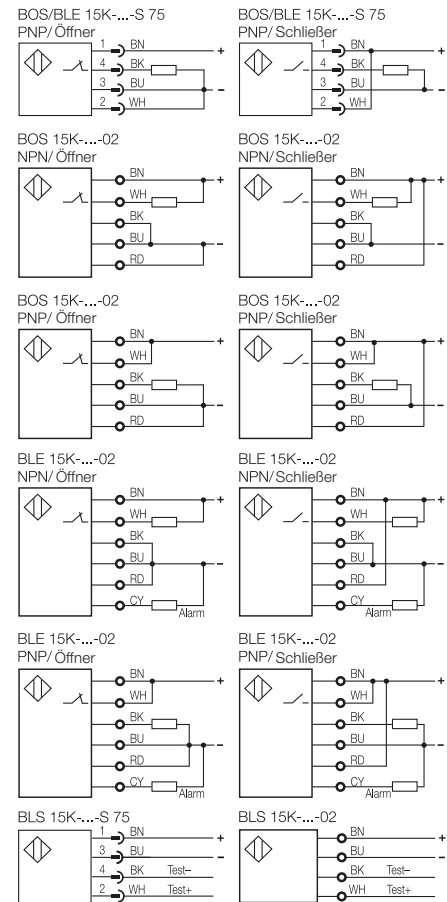
Range measured with side approach of reflector.

Through-beam BLE/BLS 15K-...



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

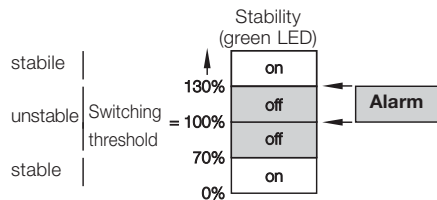
Wiring diagrams



Alarm output for receiver (cable version only)

The receiver is equipped with an alarm output. This signal output (PNP open collector 30 mA) is used to trigger a warning signal when there are function

disturbances which can be caused by contamination or mechanical maladjustment. The alarm output is activated if the receive signal remains in the alarm range for at least 3 sec.



Test input for emitter

The test input interrupts the light pulses from the emitter and thereby enables a function check of the sensor.

The receiver output must switch each time when the test input shows a voltage of 10...30 V DC (Test+) or 0 V DC (Test-) .

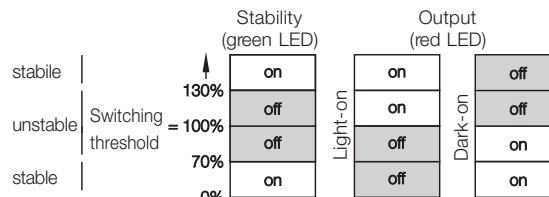
Contamination or maladjustment on the optical axis causes the emitter signal to reach the receiver only weakly, if at all. Therefore the output will not switch, even though the test input is activated. The test function is a kind of remote monitoring of the sensor, thereby providing preventive system checking.

Green Stability indicator

The "threshold energy" at which a signal change on the output is effected is defined as 100 %. The switching state is considered stable when the input energy exceeds or falls below the "threshold energy" by 30 %. The green LED then comes on.

This results in the "safe" range,

- when the input signal exceeds a minimum of 130 % of the threshold energy
- when the input signal falls below a minimum of 70 % of the threshold energy.



2.1

2.3

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Recommended accessories

please order separately



Connector
BKS-S 74/BKS-S 75

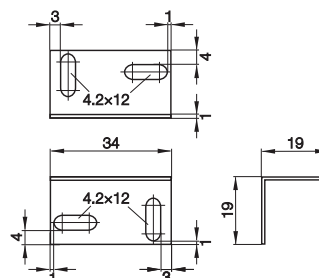
Slit apertures

(supplied with through-beam sensors)

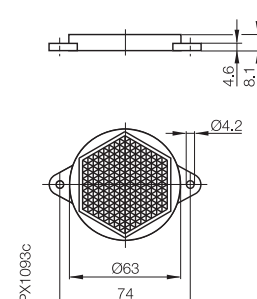


Slit width	0.5 mm	1 mm	2 mm
Range	0.5 m	1 m	2 m
Object size	> 0.5 mm	> 1 mm	> 2 mm

Mounting bracket (supplied)



Reflector BOS R-10 (supplied with retroreflective sensors)



5

Connectors ...
Page 5.2 ...

BOS 21M – a complete family in a compact, tough metal housing. Comprehensive functionality, use of the most modern sensor technologies and innovative manufacturing technology leave nothing to be desired for versatile application in robotics and automation, packaging, assembly and handling.

Teach-in switches and potentiometers assure fast startup as well as simple and economical operation of the sensor.

A wide range of accessories such as mounting brackets, stands, dovetail clamps etc. enable variable attachment of the products in any position.



Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U _B	Conne- ction	Special features				Page
		Red light	Infrared	Laser light	PNP-Transistor	NPN-Transistor	Light-on	Dark-on				Teach-in	Polarizing filter	Autocollimation	Glass sensing	
 Diffuse with HGA																
BOS 21M-PUS-LH12-S4	50...100 mm			■	■		■	■	1 kHz	■	■	■				2.1.142
BOS 21M-NUS-LH12-S4	50...100 mm			■		■	■	■	1 kHz	■	■	■				2.1.142
BOS 21M-PUS-RH12-S4	70...200 mm	■			■		■	■	1 kHz	■	■	■				2.1.138
BOS 21M-NUS-RH12-S4	70...200 mm	■				■	■	■	1 kHz	■	■	■				2.1.138
BOS 21M-PUS-RV13-S4	70...200 mm	■			■		■	■	1 kHz	■	■	■				2.1.139
BOS 21M-NUS-RV13-S4	70...200 mm	■				■	■	■	1 kHz	■	■	■				2.1.139
 Diffuse																
BOS 21M-PA-RD10-S4	0.01...1 m	■			■		■	■	500 Hz	■	■					2.1.139
BOS 21M-NA-RD10-S4	0.01...1 m	■				■	■	■	500 Hz	■	■					2.1.139
BOS 21M-PA-ID10-S4	0.05...2 m		■		■		■	■	500 Hz	■	■					2.1.139
BOS 21M-NA-ID10-S4	0.05...2 m		■			■	■	■	500 Hz	■	■					2.1.139
BOS 21M-PA-LD10-S4	0...600 mm			■	■		■	■	2 kHz	■	■					2.1.143
BOS 21M-NA-LD10-S4	0...600 mm			■		■	■	■	2 kHz	■	■					2.1.143
 Retroreflective																
BOS 21M-PA-PR10-S4	0.1...8 m	■			■		■	■	1 kHz	■	■		■			2.1.140
BOS 21M-NA-PR10-S4	0.1...8 m	■				■	■	■	1 kHz	■	■		■			2.1.140
BOS 21M-PA-LR10-S4	0.1...20 m			■	■		■	■	2 kHz	■	■		■			2.1.143
BOS 21M-NA-LR10-S4	0.1...20 m			■		■	■	■	2 kHz	■	■		■			2.1.143
BOS 21M-PA-PK10-S4	0...4 m	■			■		■	■	1 kHz	■	■		■	■		2.1.141
BOS 21M-NA-PK10-S4	0...4 m	■				■	■	■	1 kHz	■	■		■	■		2.1.141
BOS 21M-PA-PT10-S4	0...2 m	■			■		■	■	1 kHz	■	■		■	■	■	2.1.141
BOS 21M-NA-PT10-S4	0...2 m	■				■	■	■	1 kHz	■	■		■	■	■	2.1.141
 Through-beam																
BOS 21M-PA-IE10-S4	0...20 m		■		■		■	■	500 Hz	■	■					2.1.141
BOS 21M-NA-IE10-S4	0...20 m		■			■	■	■	500 Hz	■	■					2.1.141
BOS 21M-PA-LE10-S4	0...60 m			■	■		■	■	1.5 kHz	■	■					2.1.143
BOS 21M-NA-LE10-S4	0...60 m			■		■	■	■	1.5 kHz	■	■					2.1.143
BOS 21M-XT-IS11-S4	0...20 m		■							■	■					2.1.141
BOS 21M-XT-LS11-S4	0...60 m			■						■	■					2.1.143

2.1

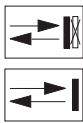
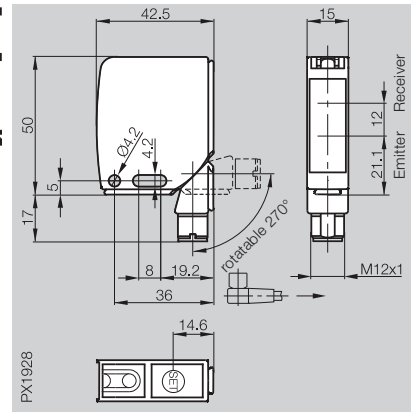
2.3

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Connectors ...
page 5.2 ...

Diffuse with background suppression	Sensing distance	70...200 mm
Diffuse with foreground suppression	Sensing distance	
Diffuse	Sensing distance	



Diffuse

PNP	70...200 mm	HGA	BOS 21M-PUS-RH12-S4
NPN	70...200 mm	HGA	BOS 21M-NUS-RH12-S4
PNP	70...200 mm	VGA + HGA	
NPN	70...200 mm	VGA + HGA	
PNP	0.01...1 m		
NPN	0.01...1 m		
PNP	0.05...2 m		
NPN	0.05...2 m		

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V DC
No-load supply current I_0 max.	≤ 50 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_o	2 V
Settings	Teach-in

Optical data

Recommended sensing distance	70...200 mm
Emitter, light type	LED, red light
Wavelength	670 nm

Indicators

Output function indicator	LED yellow
Stability indicator	LED green/red

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

Mechanical data

Dimensions	42.5×50×15 mm
Connection	M12 connector, 4-pin
Housing material	GD-Zn/Al
Optical surface	PMMA
Weight	76 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-10...+50 °C
Ambient light rejection	10 kLux

Diffuse values referenced to Kodak gray card 90% Reflexion.

Wiring diagrams, characteristics and accessories see page **2.1.144** to **2.1.147**.

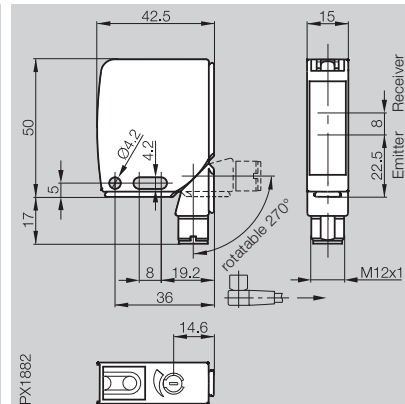
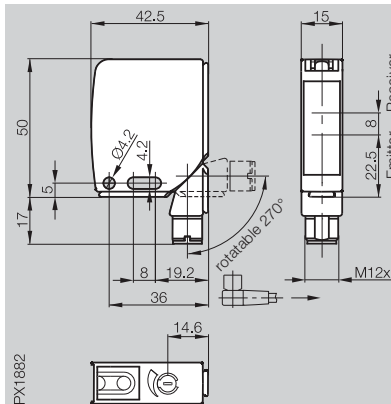
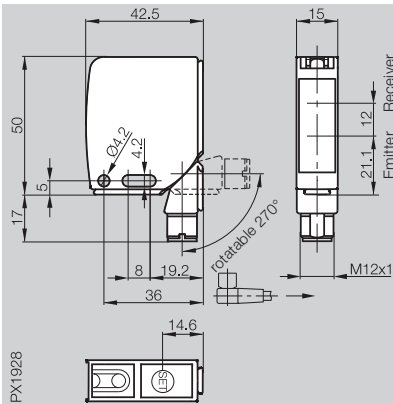


Connector orientation

70...200 mm

0.01...1 m

0.05...2 m



BOS 21M-PUS-RV13-S4
BOS 21M-NUS-RV13-S4

BOS 21M-PA-RD10-S4
BOS 21M-NA-RD10-S4

BOS 21M-PA-ID10-S4
BOS 21M-NA-ID10-S4

10...30 V DC

≤ 2 V DC

≤ 50 mA

PNP- or NPN-Transistor
100 mA

Light-/dark-on (selectable)

2 V

Teach-in

70...200 mm

LED, red light

670 nm

LED yellow

LED green

0.5 ms

1 kHz

42.5×50×15 mm

M12 connector, 4-pin

GD-Zn/Al

PMMA

76 g

IP 67

yes

yes

-10...+50 °C

10 kLux

10...30 V DC

≤ 2 V DC

≤ 35 mA

PNP- or NPN-Transistor
100 mA

Light-/dark-on (push-pull)

2 V

Potentiometer 270°

0.01...1 m

LED, red light

650 nm

LED yellow

LED green

1 ms

500 Hz

42.5×50×15 mm

M12 connector, 4-pin

GD-Zn/Al

PMMA

76 g

IP 67

yes

yes

-25...+55 °C

10 kLux

10...30 V DC

≤ 2 V DC

≤ 35 mA

PNP- or NPN-Transistor
100 mA

Light-/dark-on (push-pull)

2 V

Potentiometer 270°

0.05...2 m

LED, infrared

880 nm

LED yellow

LED green

1 ms

500 Hz

42.5×50×15 mm

M12 connector, 4-pin

GD-Zn/Al

PMMA

76 g

IP 67

yes

yes

-25...+55 °C

10 kLux

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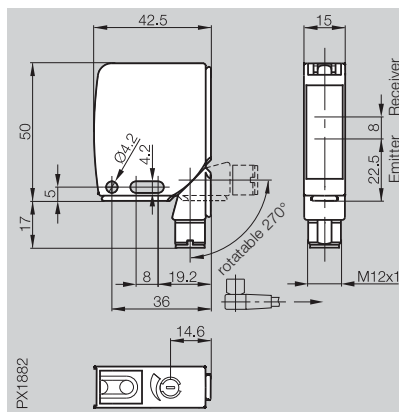
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Connectors ...
page 5.2 ...

Retroreflective with polarizing filter
Retroreflective Autocollimation
Retroreflective for glass sensing
Through-beam

Range
Range
Range
Range

0.1...8 m



Retroreflective



PNP	0.1...8 m	Polarizing filter
NPN	0.1...8 m	Polarizing filter
PNP	4 m	Polarizing filter, autocollimation
NPN	4 m	Polarizing filter, autocollimation
PNP	2 m	Polarizing filter, autocollimation, glass sensing
NPN	2 m	Polarizing filter, autocollimation, glass sensing

BOS 21M-PA-PR10-S4
BOS 21M-NA-PR10-S4



Through-beam



PNP	20 m	Receiver
NPN	20 m	Receiver
	20 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V DC
No-load supply current I_0 max.	≤ 35 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (push-pull)
Voltage drop U_d at I_0	2 V
Settings	Potentiometer 270°
Help functions	

Optical data

Recommended range	0.1...8 m
Emitter, light type	LED, red light
Wavelength	650 nm

Indicators

Power-on indicator	
Output function indicator	LED yellow
Stability indicator	LED green

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

Mechanical data

Dimensions	42.5x50x15 mm
Connection	M12 connector, 4-pin
Housing material	GD-Zn/Al
Optical surface	PMMA
Weight	76 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-25...+55 °C
Ambient light rejection	10 kLux

Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page 2.1.144 to 2.1.147.

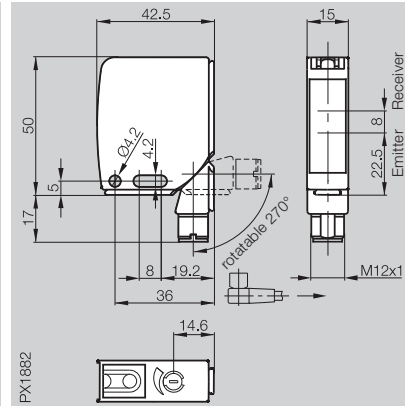
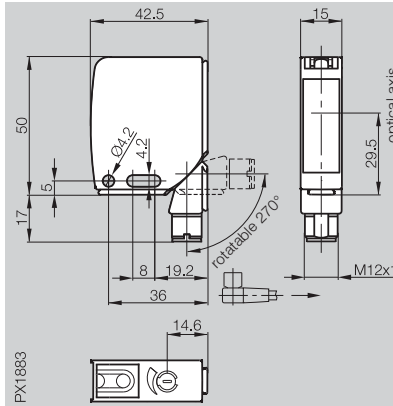
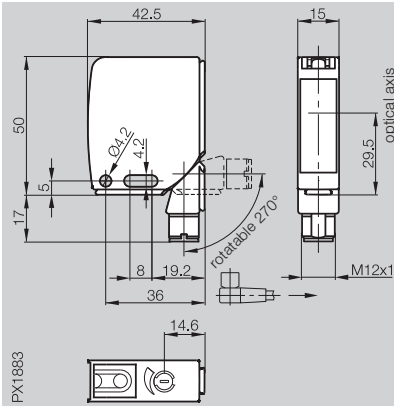


Connector orientation

0...4 m

0...2 m

0...20 m



BOS 21M-PA-PK10-S4
BOS 21M-NA-PK10-S4

BOS 21M-PA-PT10-S4
BOS 21M-NA-PT10-S4

BOS 21M-PA-IE10-S4
BOS 21M-NA-IE10-S4
BOS 21M-XT-IS11-S4

10...30 V DC
≤ 2 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (push-pull)
2 V
Potentiometer 270°

10...30 V DC
≤ 2 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (push-pull)
2 V
Potentiometer 270°

10...30 V DC
≤ 2 V DC
≤ 35 mA
PNP- or NPN-Transistor
100 mA
Light-/dark-on (push-pull)
2 V
Potentiometer 270°
Test input (emitter)

0...4 m
LED, red light
650 nm

0...2 m
LED, red light
650 nm

0...20 m
LED, infrared
880 nm

LED yellow
LED green

LED yellow

LED green (emitter)
LED yellow (receiver)
LED green (receiver)

0.5 ms
1 kHz

0.5 ms
1 kHz

1 ms
500 Hz

42.5×50×15 mm
M12 connector, 4-pin
GD-Zn/Al
Glass
78 g

42.5×50×15 mm
M12 connector, 4-pin
GD-Zn/Al
Glass*
78 g

42.5×50×15 mm
M12 connector, 4-pin
GD-Zn/Al
PMMA
75 g

IP 67
yes
yes
-25...+55 °C
10 kLux

IP 67
yes
yes
-25...+55 °C
10 kLux

IP 67
yes
yes
-25...+55 °C
10 kLux

*also available with PMMA

2.1

2.3

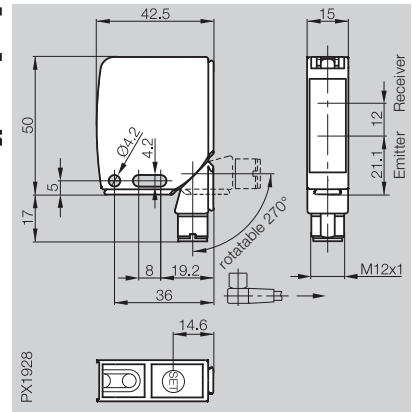
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Connectors ...
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Diffuse with background suppression	Sensing distance
Diffuse	Sensing distance
Retroreflective with polarizing filter	Range
Through-beam	Range

50...100 mm



Diffuse



PNP	50...100 mm	HGA
NPN	50...100 mm	HGA

BOS 21M-PUS-LH12-S4
BOS 21M-NUS-LH12-S4



PNP	600 mm	
NPN	600 mm	

Retroreflective



PNP	0.1...20 m	Polarizing filter
NPN	0.1...20 m	Polarizing filter

Through-beam



PNP	60 m	Receiver
NPN	60 m	Receiver
	60 m	Emitter

Electrical data

Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V DC
No-load supply current I_0 max.	60 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_e	2 V
Settings	Teach-in
Help functions	

Optical data

Recommended sensing distance/range	50...100 mm
Emitter, light type	Laser, red light
Wavelength	650 nm
Laser class	1

Indicators

Power-on indicator	
Output function indicator	LED yellow
Stability indicator	LED green/red

Time data

Response time	0.5 ms
Switching frequency f	1 kHz

Mechanical data

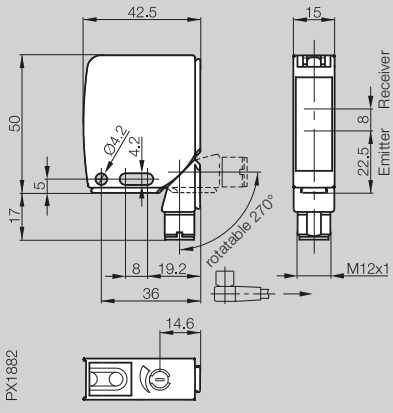
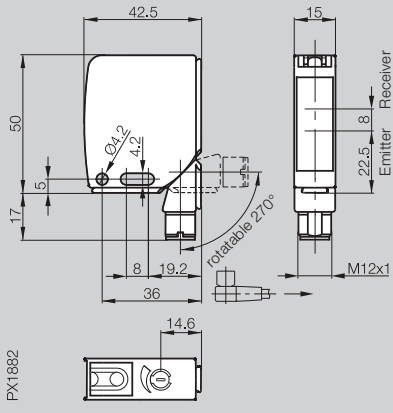
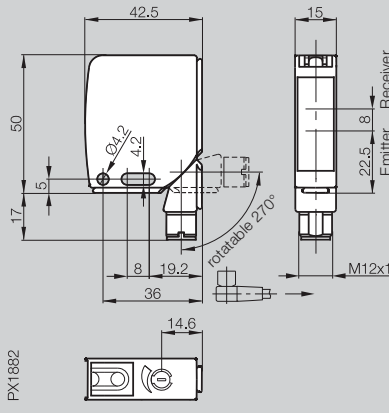
Dimensions	42.5×50×15 mm
Connection	M12 connector, 4-pin
Housing material	GD-Zn/Al
Optical surface	PMMA
Weight	77 g

Ambient data

Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient temperature range T_a	-10...+50 °C
Ambient light rejection	5 kLux

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



	0...600 mm	0.1...20 m	0...60 m
			
	BOS 21M-PA-LD10-S4 BOS 21M-NA-LD10-S4	BOS 21M-PA-LR10-S4 BOS 21M-NA-LR10-S4	BOS 21M-PA-LE10-S4 BOS 21M-NA-LE10-S4 BOS 21M-XL-LS11-S4
	10...30 V DC ≤ 2 V DC 35 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (push-pull) 2 V Potentiometer 270°	10...30 V DC ≤ 2 V DC 35 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (push-pull) 2 V Potentiometer 270°	10...30 V DC ≤ 2 V DC 35 mA PNP- or NPN-Transistor 100 mA Light-/dark-on (push-pull) 2 V Potentiometer 270° Test input (emitter)
	0...600 mm Laser, red light 650 nm 1	0.1...20 m Laser, red light 650 nm 1	0...60 m Laser, red light 650 nm 1
	LED green LED yellow	LED green LED yellow	LED green LED yellow
	0.25 ms 2 kHz	0.25 ms 2 kHz	0.33 ms 1.5 kHz
	42.5×50×15 mm M12 connector, 4-pin GD-Zn/Al PMMA 77 g	42.5×50×15 mm M12 connector, 4-pin GD-Zn/Al PMMA 77 g	42.5×50×15 mm M12 connector, 4-pin GD-Zn/Al PMMA 76 g
	IP 67 yes yes -10...+50 °C 5 kLux	IP 67 yes yes -10...+50 °C 5 kLux	IP 67 yes yes -10...+50 °C 5 kLux

2.1

2.3

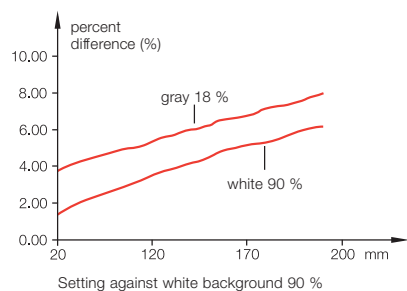
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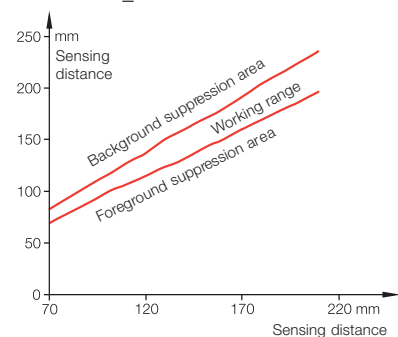
Wiring diagrams, characteristics and accessories see page **2.1.144** to **2.1.147**.

Diffuse with background suppression
BOS 21M-US-RH12-S4



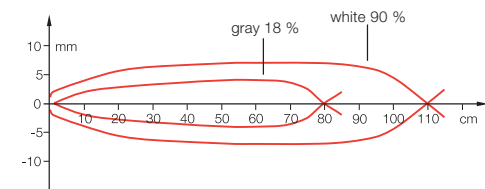
Detection range

Diffuse with fore- and background suppression
BOS 21M-US-RV13-S4

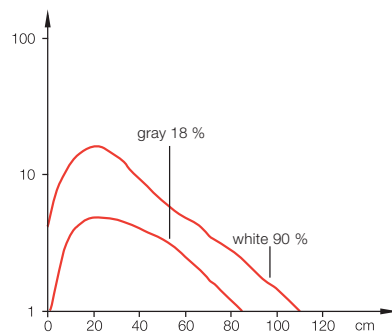


Detection range

Diffuse
BOS 21M-A-RD10-S4

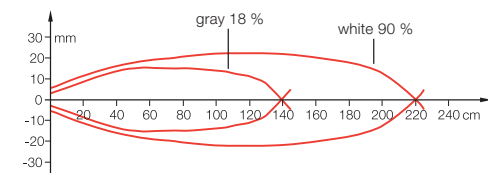


Detection range

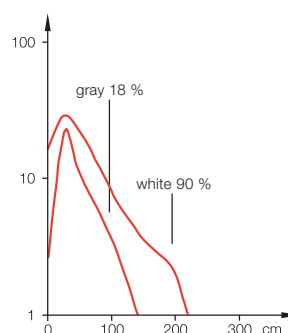


Function reserve

Diffuse long range
BOS 21M-A-ID10-S4

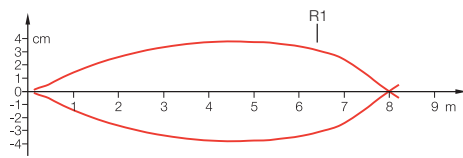


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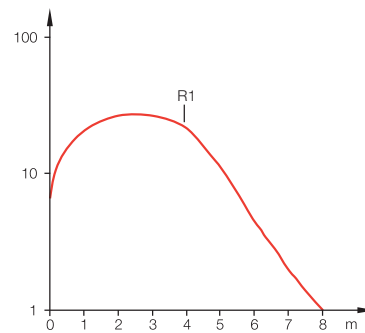


Function reserve

**Retroreflective polarized
BOS 21M- _A-PR10-S4**

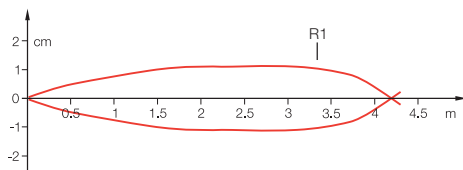


Detection range

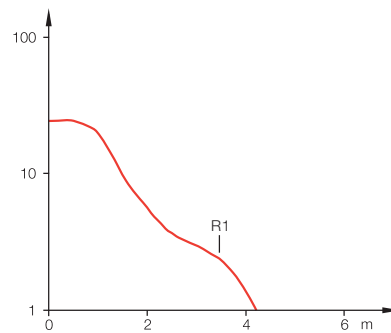


Function reserve

**Retroreflective autocollimation
BOS 21M- _A-PK10-S4**

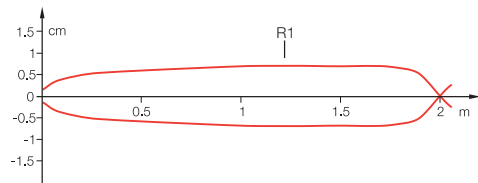


Detection range

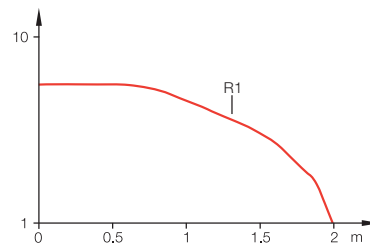


Function reserve

**Retroreflective glass sensing
BOS 21M- _A-PT10-S4**

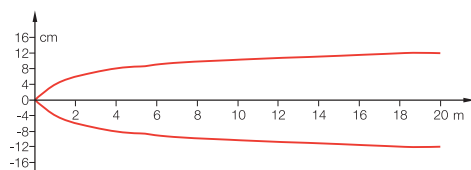


Detection range

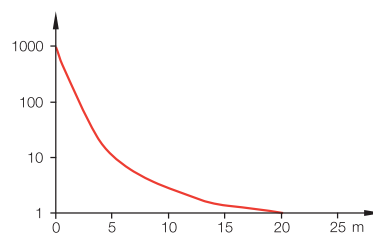


Resolution

**Through-beam
BOS 21M- _A-IE10-S4**



Detection range



Function reserve

2.1

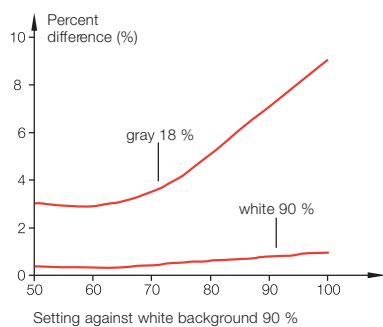
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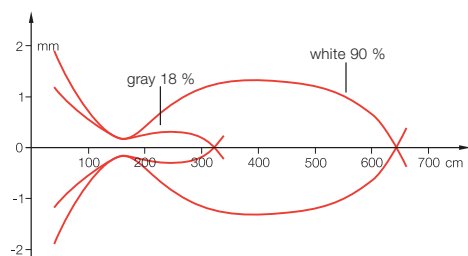
Connectors ...
page 5.2 ...

Laser diffuse with background suppression
BOS 21M-US-LH12-S4

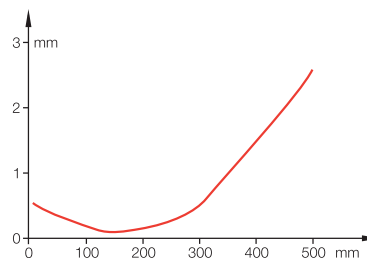


Tolerance with standard setting

Laser diffuse
BOS 21M-A-LD10-S4

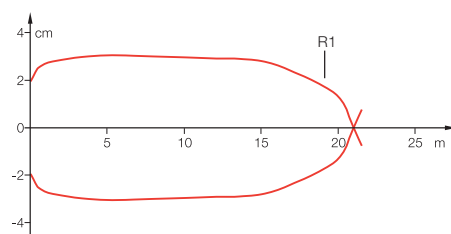


Detection range

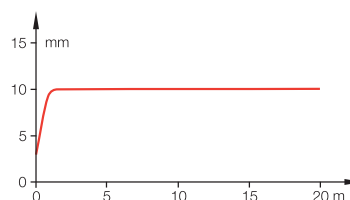


Resolution

Laser retroreflective polarized
BOS 21M-A-LR10-S4

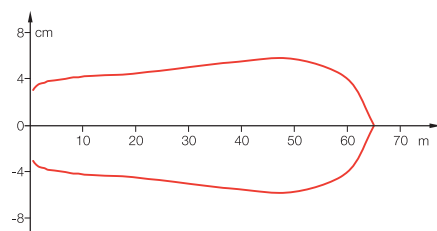


Detection range

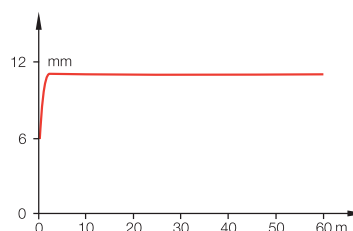


Resolution

Laser through-beam
BOS 21M-A-LE10-S4

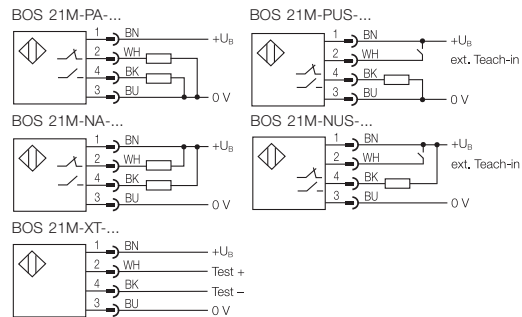


Detection range



Resolution

Wiring diagrams



Recommended accessories

please order separately



Mounting clamp
BOS 21-KH-1



Mounting clamp
BOS 21-KH-2



Mounting bracket
BOS 21-HW-1



Mounting bracket
BOS 21-HW-2



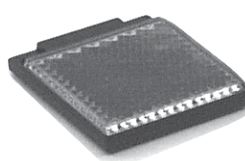
Adapter plate
BOS 21-AD-1



Holding system
BOS 21-HS-1



Reflector
BOS R-1



Reflector
BOS R-9



Connector
BKS-_19/BKS-_20

2.1

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

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Connectors ...
page 5.2 ...

The **BOS 26K** series represents the logical development of an already successful design: a uniform housing for all sensor types used. This makes the BOS 26K series compatible with series BOS 25K and complements it with new kinds of sensors with particular specifications and features:

- Laser sensors
- New, high-performance red light and infrared sensors
- Additional optical and mechanical functions.

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

The retroreflective models feature autocollimation, i.e., the emitter and receiver beams coincide geometrically. Advantage: Exact switching points for any desired side-approaching object in the entire beam path

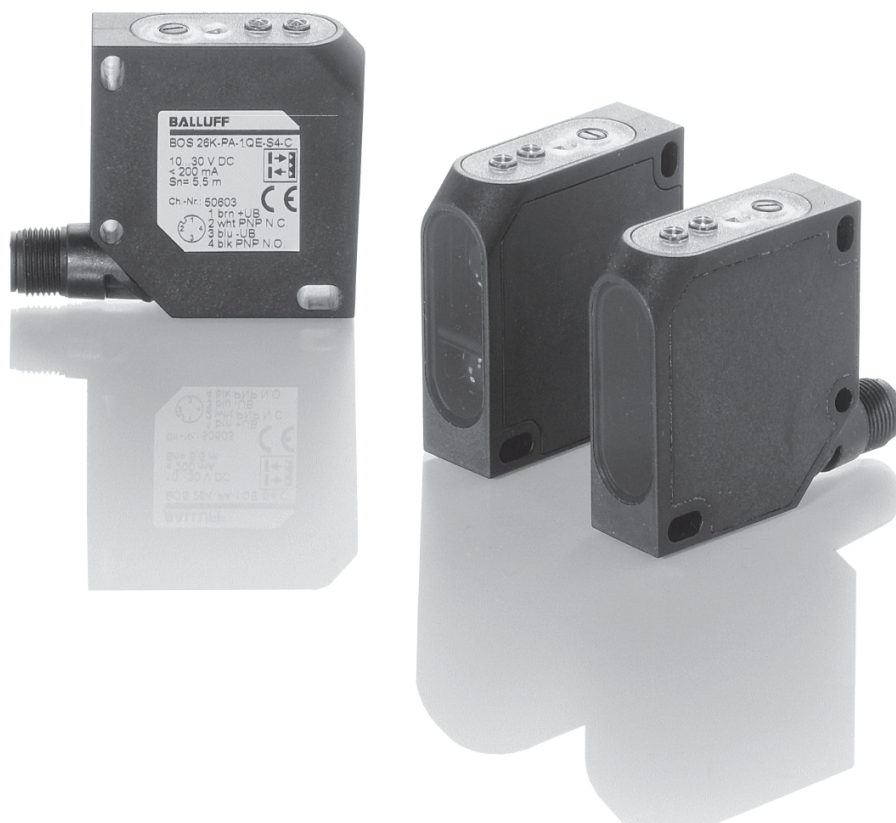
The diffuse model with background suppression **BOS 26K-...-1LHB**, with its focused light beam, can detect objects precisely in virtually any color between 30 and 150 mm. The focusing feature enables a spot size of just 0.1 mm at a distance of 80 mm.

Features

- Rotatable M12 connector
- Precise setting mechanism with two revolutions (720°)
- Clear character display for sensitivity setting
- Switching state and contamination display visible any direction
- Complementary PNP or NPN output
- High switching frequency for laser version

Applications

- Precise small part detection
- Positioning tasks
- Detail checking
- Conveyor inspection (background suppression)
- Conveying
- Automation
- Handling equipment, Robotics
- Machine tool building
- Specialty machines



Type	Sensing distance/ Range	Light type			Output		Output function		Switching frequency	U _B	Connec- tion	Help functions			Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on				Polarizing filter	Autocollimation	Alarm output	
 Diffuse with HGA															
BOS 26K-PA-1LHA-SA1-S4-C	40...60 mm			■	■		■	■	2.5 kHz	■	■				2.1.152
BOS 26K-NA-1LHA-SA1-S4-C	40...60 mm			■		■	■	■	2.5 kHz	■	■				2.1.152
BOS 26K-PA-1LHB-S4-C	30...150 mm			■	■		■	■	2.5 kHz	■	■				2.1.153
BOS 26K-NA-1LHB-S4-C	30...150 mm			■		■	■	■	2.5 kHz	■	■				2.1.153
BOS 26K-PA-1HC-S4-C	30...300 mm	■			■		■	■	1 kHz	■	■				2.1.150
BOS 26K-NA-1HC-S4-C	30...300 mm	■				■	■	■	1 kHz	■	■				2.1.150
BOS 26K-PA-1LHC-S4-C	50...300 mm			■	■		■	■	2.5 kHz	■	■				2.1.153
BOS 26K-NA-1LHC-S4-C	50...300 mm			■		■	■	■	2.5 kHz	■	■				2.1.153
BOS 26K-PA-1IE-S4-C	150...600 mm		■		■		■	■	800 Hz	■	■				2.1.151
BOS 26K-NA-1IE-S4-C	150...600 mm		■			■	■	■	800 Hz	■	■				2.1.151
 Retroreflective															
BOS 26K-PA-1QE-S4-C	0...5.5 m	■			■		■	■	1 kHz	■	■	■	■		2.1.151
BOS 26K-NA-1QE-S4-C	0...5.5 m	■				■	■	■	1 kHz	■	■	■	■		2.1.151
BOS 26K-PO-1QE-SA1-C	0...5.5 m	■			■		■		1 kHz	■	■	■	■	■	2.1.151
BOS 26K-PA-1LQP-S4-C	0...20 m			■	■		■	■	2.5 kHz	■	■	■	■		2.1.153
BOS 26K-NA-1LQP-S4-C	0...20 m			■		■	■	■	2.5 kHz	■	■	■	■		2.1.153

2.1

2.3

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Connectors ...
page 5.2 ...

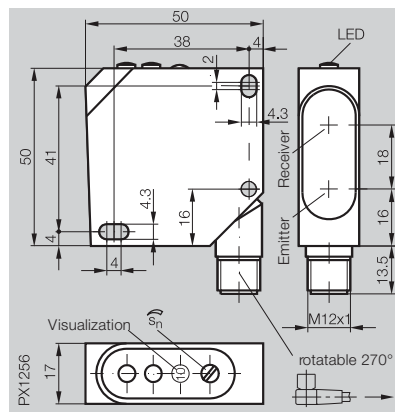
Diffuse with background suppression

Sensing distance

30...300 mm

Retroreflective with polarizing filter

Range



Diffuse



PNP	30...300 mm	HGA
NPN	30...300 mm	HGA
PNP	150...600 mm	HGA
NPN	150...600 mm	HGA

BOS 26K-PA-1HC-S4-C
BOS 26K-NA-1HC-S4-C

Retroreflective



PNP	5.5 m	Autocollimation
NPN	5.5 m	Autocollimation

Electrical data

Supply voltage U_B

10...30 V DC

Ripple

10 %

No-load supply current I_0 max.

≤ 35 mA

Switching output

PNP- or NPN-Transistor

Output current

200 mA

Switching type

Light-/dark-on (complementary)

Voltage drop U_d at I_o

≤ 2.4 V

Settings

2-turn potentiometer with indicator

Help functions

Optical data

Emitter, light type

LED, red light, pulsed

Wavelength

660 nm

Light spot diameter

approx. 8 mm at 200 mm

Distance hysteresis (18 %/18 %)

5 %

Gray value shift (90 %/18 %)

8 %

Indicators

Power-on indicator

LED green

Output function indicator

LED yellow

Stability indicator

LED red

Time data

Response time

0.5 ms

Switching frequency f

1 kHz

Mechanical data

Dimensions

50x50x17 mm

Connection

M12 connector, 4-pin

Housing material

Impact-resistant ABS

Optical surface

PMMA

Weight

35 g

Ambient data

Degree of protection per IEC 60529

IP 67

Polarity reversal protected

yes

Short circuit protected

yes

Ambient temperature range T_a

-20...+60 °C

Ambient light rejection per

EN 60947-5-2

Diffuse values referenced to Kodak gray card 90% Reflexion.

Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page **2.1.154** and **2.1.155**.

Connector orientation

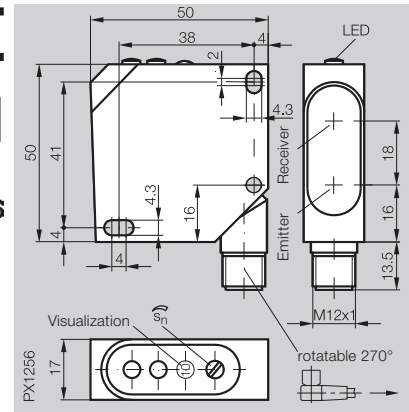
Diffuse with background suppression

Sensing distance

40...60 mm

Retroreflective with polarizing filter

Range



Diffuse



PNP	40...60 mm	HGA
NPN	40...60 mm	HGA
PNP	30...150 mm	HGA
NPN	30...150 mm	HGA
PNP	50...300 mm	HGA
NPN	50...300 mm	HGA

BOS 26K-PA-1LHA-SA1-S4-C
BOS 26K-NA-1LHA-SA1-S4-C

Retroreflective



PNP	20 m	Autocollimation
NPN	20 m	Autocollimation

Electrical data

Supply voltage U_B

10...30 V DC

Ripple

10 %

No-load supply current I_0 max.

≤ 50 mA

Switching output

PNP- or NPN-Transistor

Output current

200 mA

Switching type

Light-/dark-on (complementary)

Voltage drop U_d at I_e

≤ 2.4 V

Settings

2-turn potentiometer with indicators

Optical data

Emitter, light type

Laser, red light

Wavelength

670 nm

Laser class

2

Light spot diameter

see table

Distance hysteresis (18 %/18 %)

≤ 50 μm

Gray value shift (90 %/18 %)

1 %

Indicators

Power-on indicator

LED green

Output function indicator

LED yellow

Stability indicator

LED red

Time data

Response time

0.2 ms

Switching frequency f

2.5 kHz

Mechanical data

Dimensions

50x50x17 mm

Connection

M12 connector, 4-pin

Housing material

Impact-resistant ABS

Optical surface

PMMA

Weight

40 g

Ambient data

Degree of protection per IEC 60529

IP 67

Polarity reversal protected

yes

Short circuit protected

yes

Ambient temperature range T_a

-20...+45 °C

Ambient light rejection

EN 60947-5-2

Diffuse sensor values referenced to Kodak gray card 90 %
Reflexion. Retroreflective sensor values referenced to R22
reflector.

Light spot diameter [mm]

Sensing distance	40	45	50	55	60
Light spot-Ø	0.25	0.7	1.1	1.5	1.8



Connector orientation

Laser



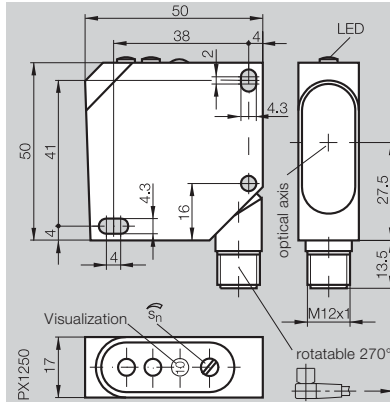
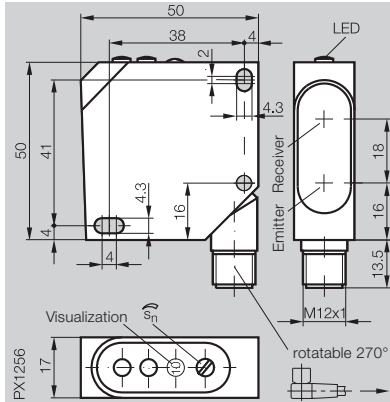
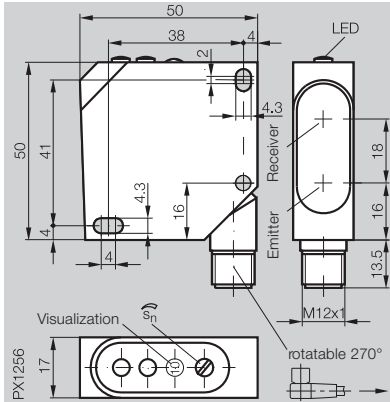
Photoelectric
Sensors

BOS 26K Laser
Sensing distance 150 mm,
300 mm, Range 20 m

30...150 mm

50...300 mm

0...20 m



BOS 26K-PA-1LHB-S4-C
BOS 26K-NA-1LHB-S4-C

BOS 26K-PA-1LHC-S4-C
BOS 26K-NA-1LHC-S4-C

BOS 26K-PA-1LQP-S4-C
BOS 26K-NA-1LQP-S4-C

10...30 V DC

10...30 V DC

10...30 V DC

10 %

10 %

10 %

≤ 50 mA

≤ 50 mA

≤ 40 mA

PNP- or NPN-Transistor

PNP- or NPN-Transistor

PNP- or NPN-Transistor

200 mA

200 mA

200 mA

Light-/dark-on (complementary)

Light-/dark-on (complementary)

Light-/dark-on (complementary)

≤ 2.5 V

≤ 2.4 V

≤ 2.4 V

2-turn potentiometer with indicator

2-turn potentiometer with indicator

2-turn potentiometer with indicator

Laser, red light

Laser, red light

Laser, red light

670 nm

670 nm

670 nm

2

2

1

see table

3×1 mm at 300 mm

15 mm in 12 m

5 %

2 %

8 %

5 %

LED green

LED green

LED green

LED yellow

LED yellow

LED yellow

LED red

LED red

LED red

0.2 ms

0.2 ms

0.2 ms

2.5 kHz

2.5 kHz

2.5 kHz

50×50×17 mm

50×50×17 mm

50×50×17 mm

M12 connector, 4-pin

M12 connector, 4-pin

M12 connector, 4-pin

Impact-resistant ABS

Impact-resistant ABS

Impact-resistant ABS

PMMA

PMMA

PMMA

40 g

40 g

40 g

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

-15...+45 °C

-20...+45 °C

-20...+45 °C

5 kLux

5 kLux

5 kLux

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

Light spot diameter [mm]

Range (m) 4 12 20
Light spot-Ø 5 15 24

2.1

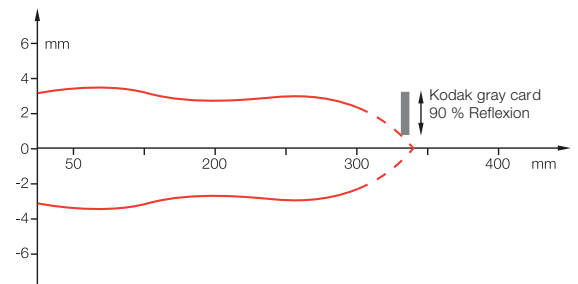
2.3

Photoelectric
sensors
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page 2.3.2 ...

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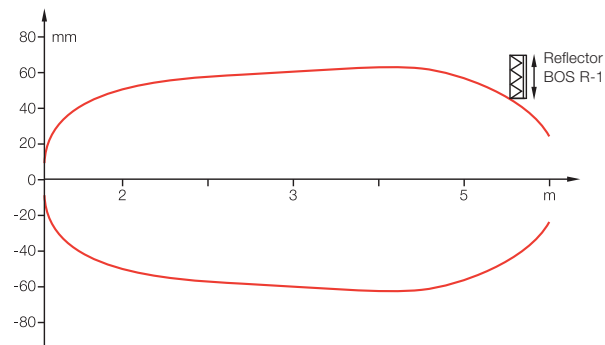
Connectors ...
page 5.2 ...

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



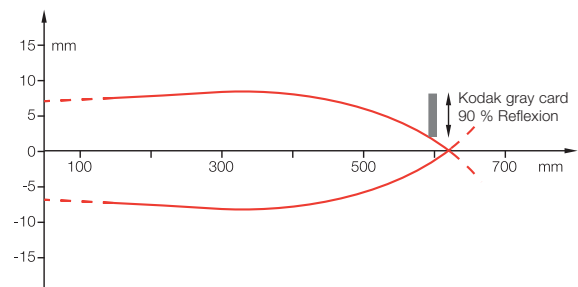
Sensing distance measured with side approach of Kodak gray card.

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



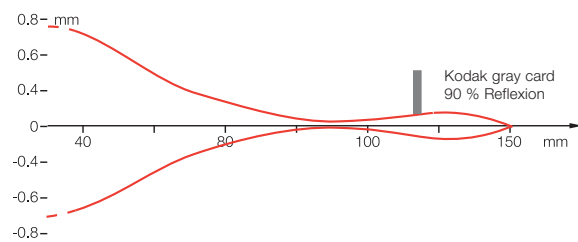
Range measured using side approach with reflector.

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



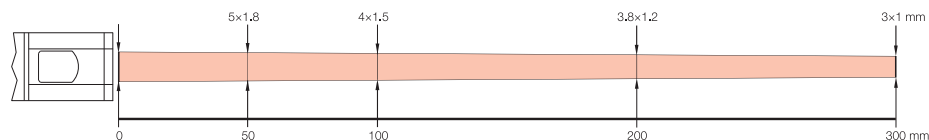
Sensing distance measured with side approach of Kodak gray card.

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

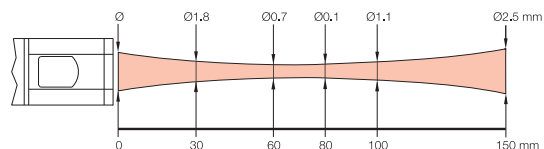


Sensing distance measured with side approach of Kodak gray card.

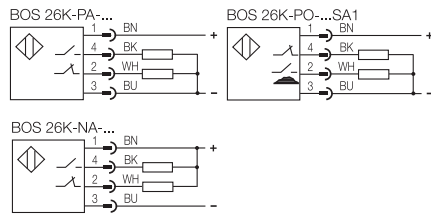
Light beam geometry BOS 26K...1LHC



Light beam geometry BOS 26K...1LHB



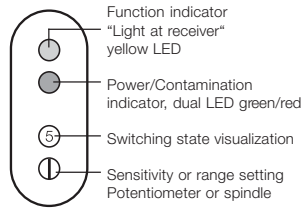
Wiring diagrams



Contamination indicator

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

Indicators and operating elements



Recommended accessories

please order separately



The **BOS 36K** series is ergonomic, compact (55×65×20 mm), and the connector is rotatable. The performance data are outstanding for a sensor this size. An easily accessible potentiometer is used for setting the sensitivity. The diffuse model with background suppression uses teach-in setting and visible red light. This virtually precludes any incorrect setting.

Features

- Push-pull output 200 mA, short circuit protected
- Function and stability indicators
- Degree of protection IP 66
- Compact plastic housing (ABS)
- Red light (background suppression and retroreflective)
- Teach-in (button background suppression)
- M12 connector, rotatable

Applications

- Wherever a higher performance is needed
- Conveying and warehousing
- Packaging machinery
- Access control
- Lift-type vehicles (not for safety applications)
- Wood industry
- Ceramics industry
- Automobile industry
- Gate and door control



Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U _B	Con- nection	Special features			Page	
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	Test input	
 Diffuse with HGA															
BOS 36K-PA-1HD-S4-C	100...500 mm	■		■		■	■	500 Hz	■	■			■		2.1.158
 Diffuse															
BOS 36K-PA-1PH-S4-C	0,01...2 m		■	■		■	■	500 Hz	■	■					2.1.159
 Retroreflective															
BOS 36K-PA-1QH-S4-C	0,1...8 m	■		■		■	■	500 Hz	■	■		■			2.1.159
 Through-beam															
BLE 36K-PA-1PT-S4-C	0...50 m		■	■		■	■	500 Hz	■	■					2.1.159
BLS 36K-XX-1T-S4-C	0...50 m		■						■	■				■	2.1.159

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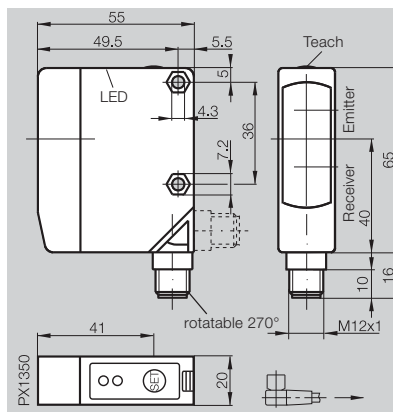
5

Connectors ...
page 5.2 ...

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

Sensing distance
Sensing distance
Range
Range

100...500 mm



Diffuse

PNP 100...500 mm HGA, Teach-in
PNP 0.01...2 m

BOS 36K-PA-1HD-S4-C



Retroreflective

PNP 0.1...8 m Polarizing filter



Through-beam

PNP 50 m Receiver
50 m Emitter

Electrical data

Supply voltage U_B

10...30 V DC

Ripple

2 V DC

No-load supply current I_0 max.

≤ 50 mA

Switching output

PNP-Transistor

Output current

200 mA

Switching type

Light/Dark (push-pull)

Voltage drop U_d at I_0

≤ 2 V

Settings

Teach-in

Help function

Optical data

Emitter, light type

LED, red light

Wavelength

660 nm

Light spot diameter

approx. 15 mm at 250 mm

Distance hysteresis (18 %/18 %)

20 %

Gray value shift (90 %/18 %)

8 %

Indicators

Power-on indicator

Output function indicator

LED yellow

Stability indicator

LED green/red

Time data

Response time

1 ms

Switching frequency f

500 Hz

Mechanical data

Dimensions

55×65×20 mm

Connection

M12 connector, 4-pin

Housing material

impact-resistant ABS

Optical surface

PMMA

Weight

50 g

Ambient data

Degree of protection per IEC 60529

IP 66

Polarity reversal protected

yes

Short circuit protected

yes

Ambient temperature range T_a

-10...+55 °C

Ambient light rejection

5 kLux

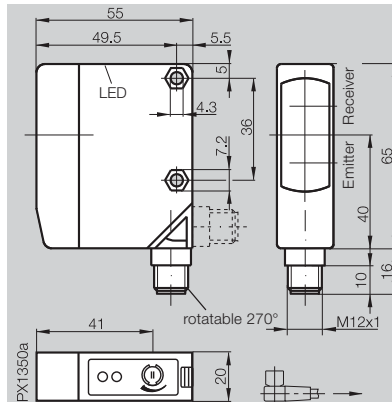
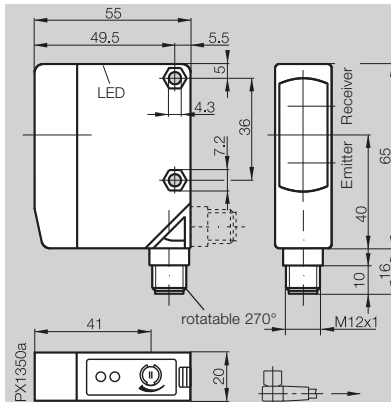
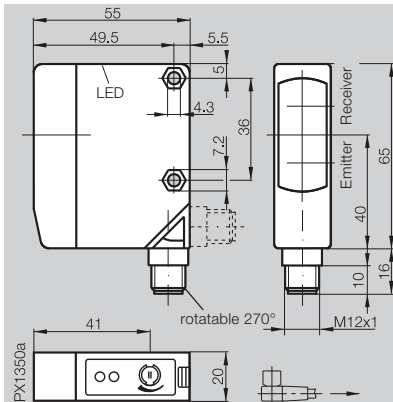
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page **2.1.160** and **2.1.161**.

0.01...2 m

0.1...8 m

0...50 m



BOS 36K-PA-1PH-S4-C

BOS 36K-PA-1QH-S4-C

**BLE 36K-PA-1PT-S4-C
BLS 36K-XX-1T-S4-C**

10...30 V DC

2 V DC

≤ 40 mA

PNP-Transistor

200 mA

Light/Dark (push-pull)

≤ 2 V

Potentiometer 270°

10...30 V DC

2 V DC

≤ 40 mA

PNP-Transistor

200 mA

Light/Dark (push-pull)

≤ 2 V

Potentiometer 270°

10...30 V DC

2 V DC

≤ 40 mA

PNP-Transistor

200 mA

Light/Dark (push-pull)

≤ 2 V

Potentiometer 270°

Test input (BLS)

LED, infrared
880 nm

LED, red light
660 nm

LED, infrared
880 nm

LED yellow
LED green

LED yellow
LED green

LED green (BLS)
LED yellow (BLE)
LED green (BLE)

1 ms

500 Hz

1 ms

500 Hz

1 ms

500 Hz

55×65×20 mm
M12 connector, 4-pin
impact-resistant ABS

55×65×20 mm
M12 connector, 4-pin
impact-resistant ABS

55×65×20 mm
M12 connector, 4-pin
impact-resistant ABS

PMMA

50 g

PMMA

50 g

PMMA

50 g

IP 66

yes

yes

-25...+55 °C

5 kLux

IP 66

yes

yes

-25...+55 °C

5 kLux

IP 66

yes

yes

-25...+55 °C

5 kLux



Connector orientation

2.1

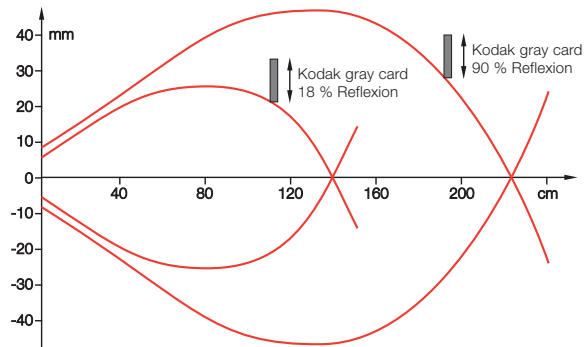
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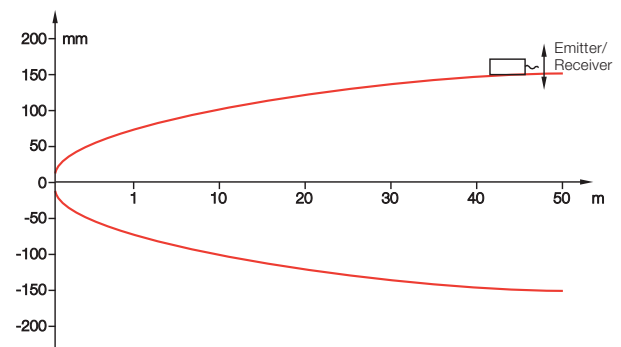
Connectors ...
page 5.2 ...

Diffuse BOS 36K-PA-1PH-S 4-C



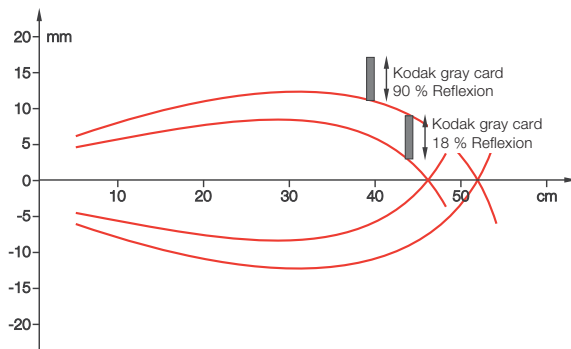
Sensing distance measured with side approach of Kodak gray card.

Through-beam BLE/BLS 36K-...



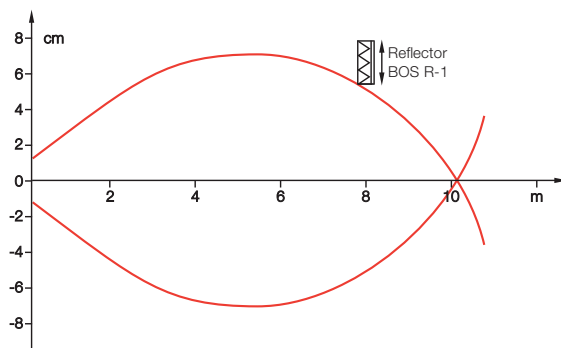
For the through-beam the maximum possible offset between emitter and receiver is measured.

Diffuse BOS 36K-PA-1HD-S 4-C



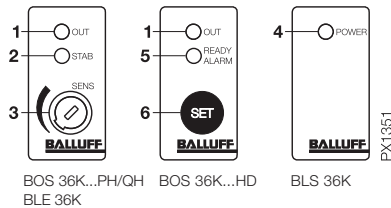
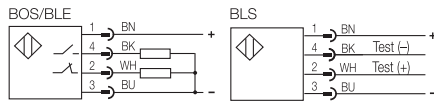
Sensing distance measured with side approach of Kodak gray card.

Retroreflective BOS 36K-PA-1QH-S 4-C



Range measured using side approach with reflector.

Wiring diagrams



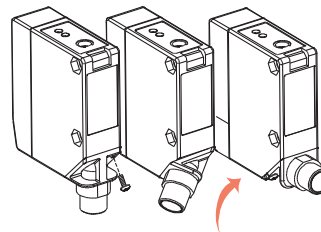
Indicators and operating elements

- 1 Output (yellow LED)**
Yellow LED indicates output function.
- 2 Contamination display (green LED)**
The green LED indicates when the received signal is 30 % above the switching threshold needed for switching.
- 3 Potentiometer for sensitivity setting**
- 4 Power indicator (green LED)**
- 5 READY/ALARM (2-color green/red LED)**
- 6 SET (setting button)**

2.1

2.3

Photoelectric
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Connector 270° rotatable

Recommended accessories

please order separately



Reflector
BOS R-1



Mounting bracket
BOS 36-HW-1



Connector
BKS-_ 19/BKS-_ 20

5

Connectors ...
page 5.2 ...

Only power helps in the long run! This is especially true under harsh conditions. This is why our **BOS 65K** has a 3 A output at 264 V AC/DC and a very long sensing range. It also comes with setup help, test input, alarm output and time functions. The same tough plastic housing series, with large wiring chamber, is offered with each of the following optical types:

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

The supply voltage can be 10...30 V DC or 17...264 V AC/DC in the universal version.

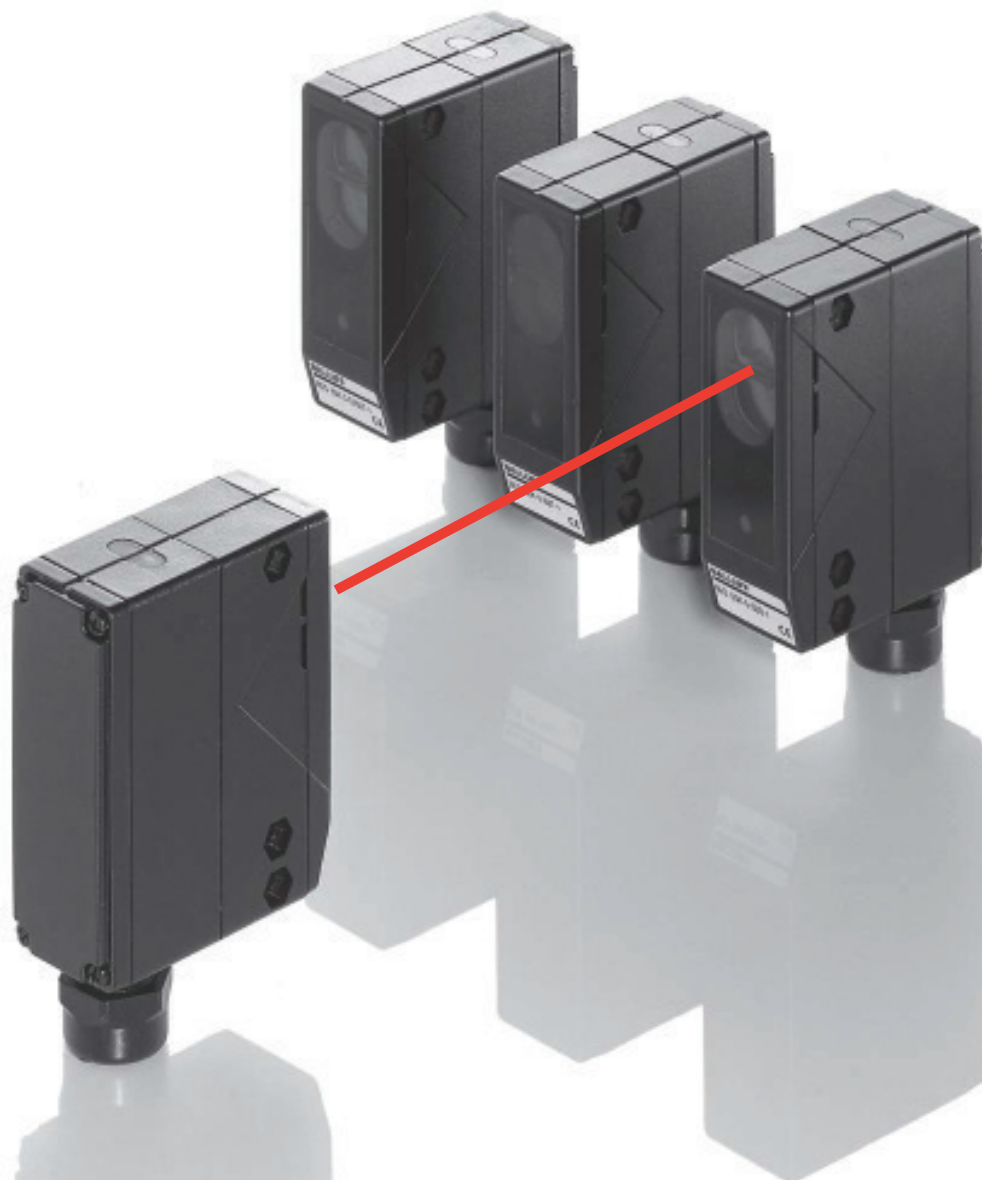
All DC versions come standard with PNP and NPN transistor outputs, and have an alarm output and test input. The universal voltage versions have a relay output. The retro- and through-beam versions use both visible red and infrared light.

Features

- Universal voltage model 17...264 V AC/DC with relay output
- DC 10...30 V with transistor output (PNP/NPN)
- Light switching/dark switching
- DC version standard with alarm output and test input
- Version with various time functions (2 times settable)
- Wiring chamber with PG 11 cord seal

Applications

- Conveying
- Machine tool building
- Packaging
- Assembly and handling automation
- Gate controls
- Inventory control



Type	Sensing distance/ range	Light type		Output			Output function		Switching frequency	U _B		Con- nection	Help functions				Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Relay	Light-on	Dark-on		10...30 V DC	17...264 V AC	M12 connector, 4-pin	Wiring chamber	Polarizing filter	Alarm output	Test input	
 Diffuse with HGA																	
BOS 65K-5-M110T-1	0.2...1.1 m		■	■	■		■	■	500 Hz	■			■		■	■	21.165
BOS 65K-5-M110T-2P-S4	0.2...1.1 m		■	■			■	■	500 Hz	■		■			■		21.165
BOS 65K-1-M110T-1	0.2...1.1 m		■			■	■	■	10 Hz		■		■				21.165
 Diffuse																	
BOS 65K-5-C200T-1	0.05...2 m		■	■	■		■	■	500 Hz	■			■		■	■	21.165
BOS 65K-5-C200T-2P-S4	0.05...2 m		■	■			■	■	500 Hz	■		■			■		21.165
BOS 65K-1-C200T-1	0.05...2 m		■			■	■	■	10 Hz		■		■				21.165
 Retroreflective																	
BOS 65K-5-B8T-1	0.3...8 m	■		■	■		■	■	500 Hz	■			■	■	■	■	21.165
BOS 65K-5-B8T-2P-S4	0.3...8 m	■		■			■	■	500 Hz	■		■		■	■		21.165
BOS 65K-1-B8T-1	0.3...8 m	■				■	■	■	10 Hz		■		■	■			21.165
 Through-beam																	
BLE 65K-5-F50T-1	0...50 m		■	■	■		■	■	500 Hz	■			■		■		21.165
BLE 65K-5-F50T-2P-S4	0...50 m		■	■	■		■	■	500 Hz	■		■			■		21.165
BLE 65K-1-F50T-1	0...50 m		■			■	■	■	10 Hz		■		■				21.165
BLS 65K-5-G50-1	0...50 m		■							■			■			■	21.165
BLS 65K-5-G50-2-S4	0...50 m		■							■		■				■	21.165
BLS 65K-1-G50-1	0...50 m		■								■		■				21.165

2.1

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Photoelectric sensors
accessories
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Connectors ...
page 5.2 ...

Diffuse with background suppression	maximum sensing distance
Diffuse	maximum sensing distance
Retroreflective	maximum range
Through-beam	maximum range



	Diffuse		
	PNP/NPN	0.2...1.1 m	HGA, time function
		0.05...2 m	Time function
	Relay	0.2...1.1 m	HGA, time function
		0.05...2 m	Time function
Retroreflective			
	PNP/NPN	0.3...8 m	Polarizing filter, red light, time function
	Relay	0.3...8 m	Polarizing filter, red light, time function
Through-beam			
	PNP/NPN	50 m	Receiver, time function
		50 m	Emitter
	Relay	50 m	Receiver, time function
		50 m	Emitter
Electrical data			
Supply voltage U_B			
No-load supply current I_0 max.			
Switching output			
Output current			
Switching type			
Voltage drop U_d at I_e			
Alarm output			
Settings			
Help function			
Indicators			
Power-on indicator			
Output function indicator			
Stability indicator			
Time data			
Response time			
Switching frequency f			
Time function			
Mechanical data			
Dimensions			
Connection			
max. conductor cross-section			
Housing material			
Optical surface			
Weight			
Ambient data			
Degree of protection per IEC 60529			
Polarity reversal protected			
Short circuit protected			
Ambient temperature range T_a			
Ambient light rejection			

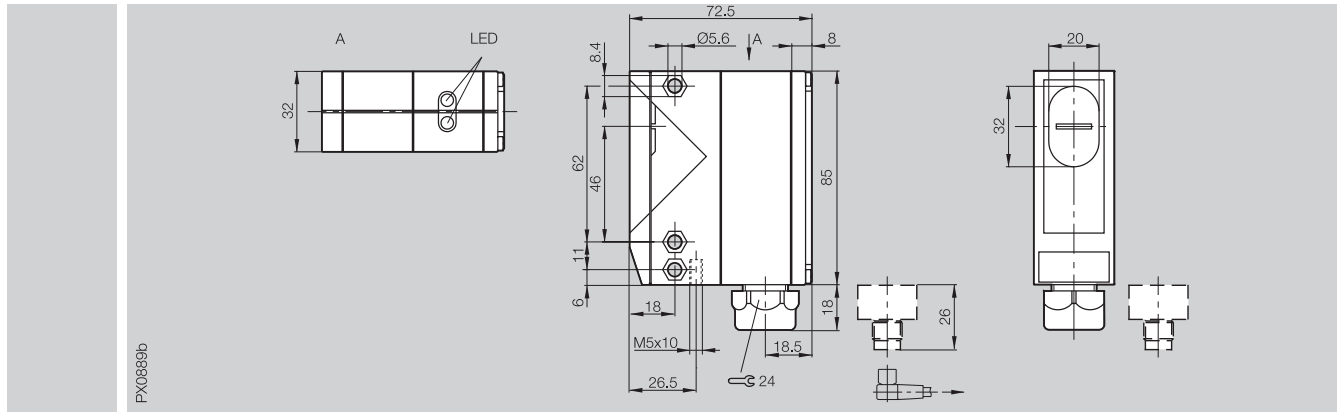
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page **2.1.166** and **2.1.167**.

Photoelectric Sensors

BOS 65K
Sensing distance 1.1 m, 2 m
Range 8 m, 50 m

0.2...1.1 m	0.2...1.1 m	0.2...1.1 m
0.05...2 m	0.05...2 m	0.05...2 m
0.3...8 m	0.3...8 m	0.3...8 m
0...50 m	0...50 m	0...50 m



BOS 65K-5-M110T-1 BOS 65K-5-C200T-1	BOS 65K-5-M110T-2P-S4 BOS 65K-5-C200T-2P-S4	BOS 65K-1-M110T-1 BOS 65K-1-C200T-1
BOS 65K-5-B8T-1	BOS 65K-5-B8T-2P-S4	BOS 65K-1-B8T-1
BLE 65K-5-F50T-1 BLS 65K-5-G50-1	BLE 65K-5-F50T-2P-S4 BLS 65K-5-G50-2-S4	BLE 65K-1-F50T-1 BLS 65K-1-G50-1
10...30 V DC ≤ 40 mA PNP and NPN Transistor 200 mA Light and dark (reversible) ≤ 2 V PNP-Transistor, 200 mA Potentiometer 270° Test input (except BLE)	10...30 V DC ≤ 40 mA PNP-Transistor 200 mA Light and dark (reversible) ≤ 1.5 V PNP-Transistor, 200 mA Potentiometer 270° Test input (for BLS)	17...264 V AC/DC Relay 3A, 250 V AC/24 V DC Light and dark (reversible) 0 V Potentiometer 270°
LED green (only for BLS) LED red LED green	LED green (only for BLS) LED red LED green	LED green (only for BLS) LED red LED green
1 ms 500 Hz selectable 0.02...12 sec.	1 ms 500 Hz selectable 0.02...12 sec.	20 ms 10 Hz selectable 0.02...12 sec.
72.5×85×32 mm Wiring chamber 0.75 mm ² PC PMMA 160 g	72.5×85×32 mm M12 connector, 4-pin PC PMMA 180 g	72.5×85×32 mm Wiring chamber 0.75 mm ² PC PMMA 160 g
IP 67 yes yes -20...+55 °C 3 kLux	IP 67 yes yes -20...+55 °C 3 kLux	IP 67 yes no -20...+55 °C 3 kLux



2.1

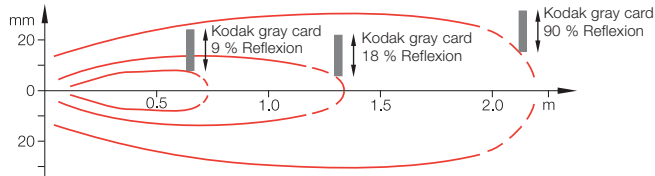
2.3

Photoelectric sensors
accessories
page 2.3.2 ...

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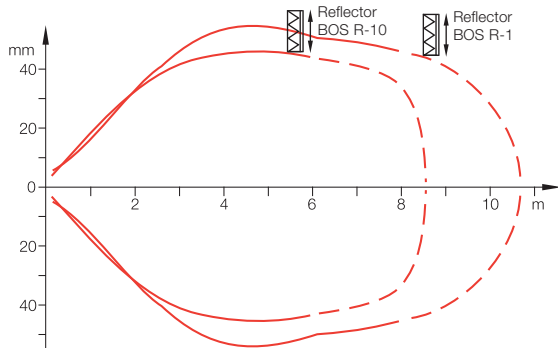
Connectors ...
page 5.2 ...

Diffuse BOS 65K-.-C200T-...



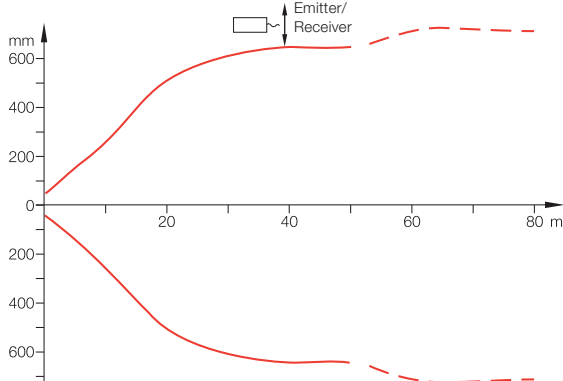
Sensing distance measured with side approach of Kodak gray card.

Retroreflective with polarizing filter BOS 65K-.-B8T-...



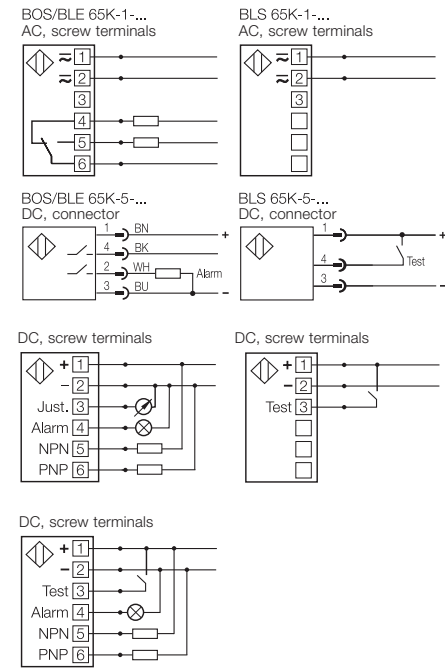
Range measured using side approach with reflector.

Through-beam BLE/BLS 65K-...



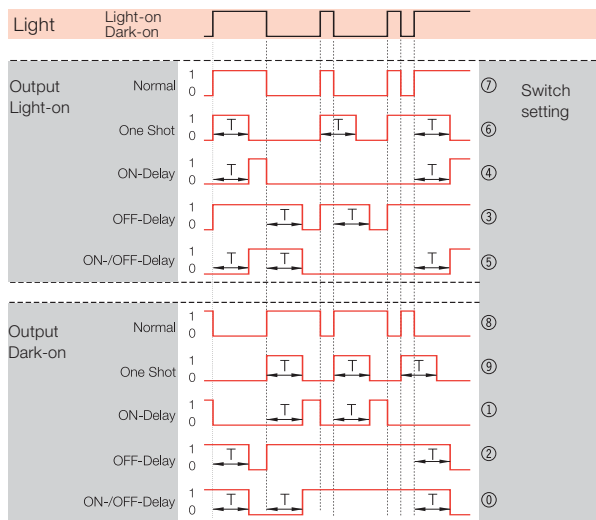
For the through-beam the maximum possible offset between emitter and receiver is measured.

Wiring diagrams



Access to the operating elements by removing the cover (rear).

Programmable time functions



Green stability display

The “threshold energy”, which results in a signal change on output, is defined as 100 %.

The switching state is considered stable when the input energy exceeds or falls below the “threshold energy” by 30 %. The green LED illuminates.

The “safe” range is therefore reached when

- the input signal exceeds at least 130% of the threshold energy
- the input signal falls below at least 70 % of the threshold energy.

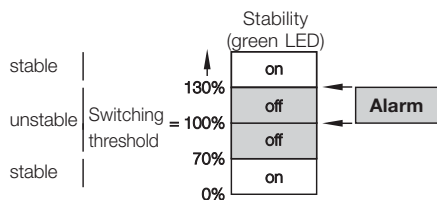
		Stability (green LED)		Output (red LED)	
stable	Switching threshold = 100%	130%	on	Light-on	on
		70%	off	Light-on	off
		70%	off	Dark-on	on
		0%	on	Dark-on	on

Alarm output for receiver, diffuse and retroreflective (DC)

The alarm output (PNP 200 ma) for DC versions generates a warning signal for malfunctions due to

contamination or mechanical maladjustment.

The alarm output is activated if the signal received remains in the alarm range for at least 3 s.



Test input for emitter, diffuse and retroreflective (DC)

The test input interrupts the light pulses from the emitter and thereby allows it to be tested for function.

When using the test input the input must be set to 10...30 V.

The output must change every time there is 10...30 V DC on the test input.

Contamination or maladjustment on the optical axis causes the emitter signal to reach the receiver only weakly, if at all.

Therefore the output will not change even though the test input is activated. The test function provides a remote check of the through-beam type and serves as a preventive system check.

Recommended accessories please order separately



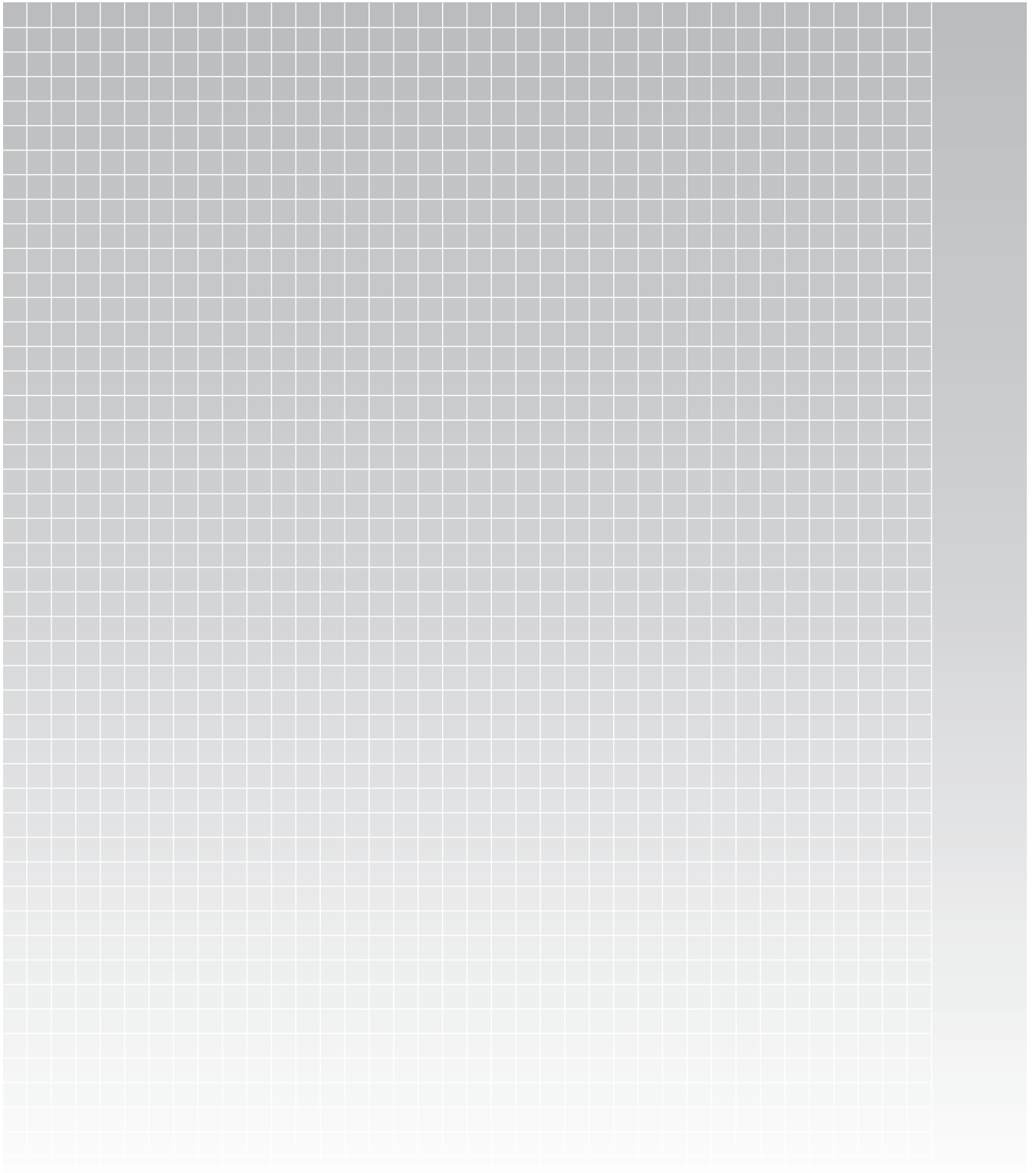
Reflector
BOS R-1



Mounting bracket
BOS 65-HW-1



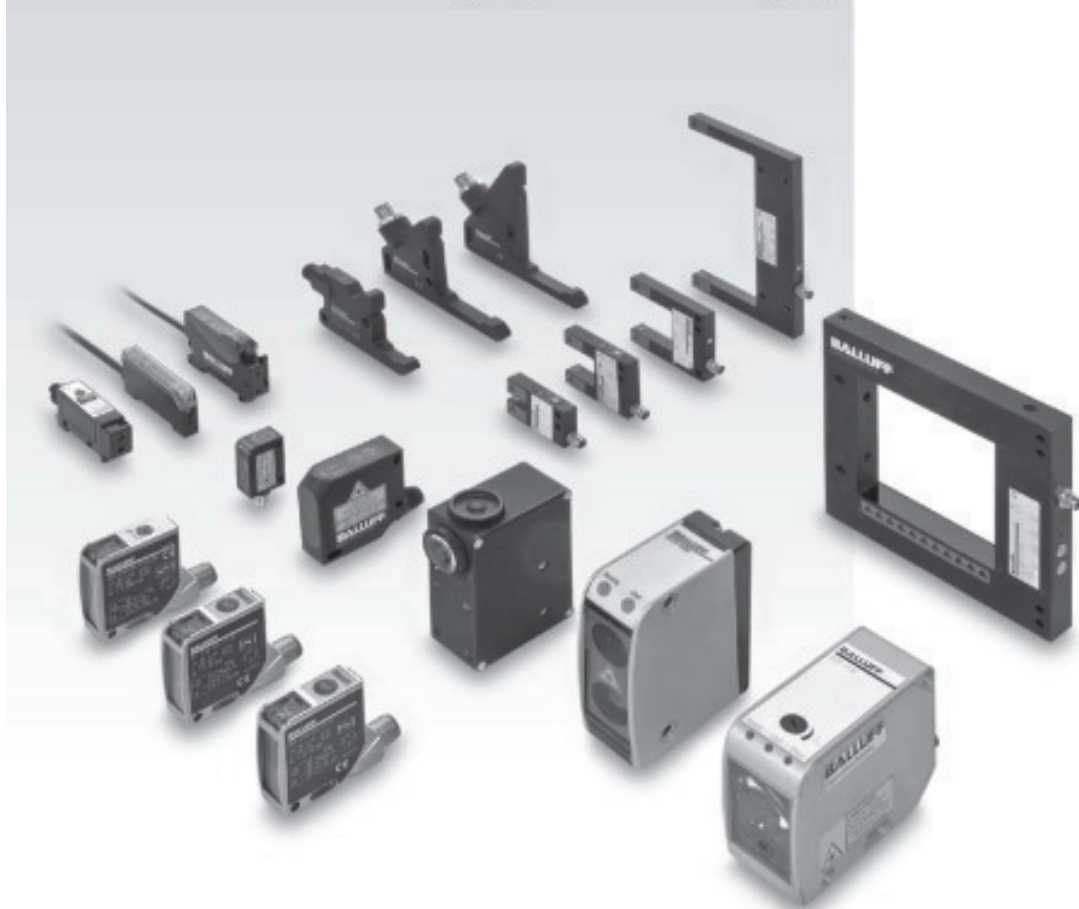
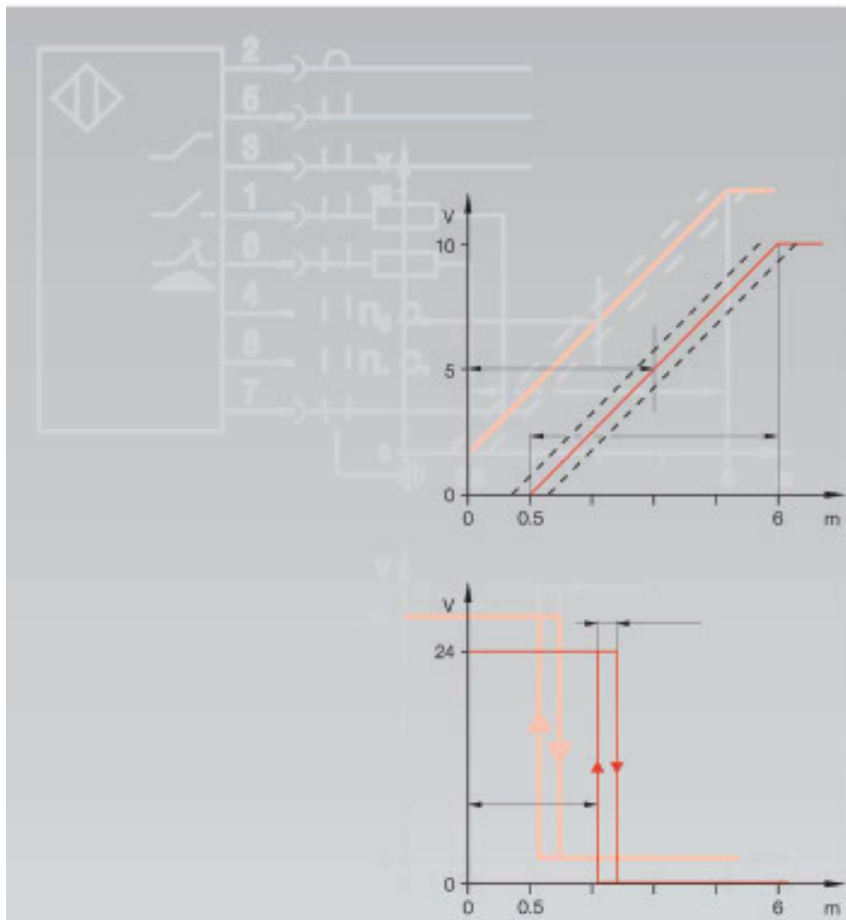
Connector
BKS-_ 19/BKS-_ 20



Photoelectric Sensors for Special Applications

- 2.2.2 BFB/BOS**
Fiber optic base units
- 2.2.16 BFO**
Plastic fiber optics
- 2.2.26 BFO 18**
Glass fiber optics
- 2.2.32 BOD**
Distance sensors
- 2.2.54 BKT**
Contrast sensor
- 2.2.66 BLT**
Luminescence sensor
- 2.2.76 BFS**
Color sensors
- 2.2.82 BGL**
Laser slot sensors
- 2.2.92 BWL**
Angle sensors
- 2.2.100 BOWA**
Dynamic optical windows
- 2.2.104 BLG**
Light grids

2.2



When there's no space for a photoelectric sensor, there is only one solution: user fiber optics!

If there are no particular demands for toughness and chemical resistance, then plastic fiber optics are the right choice.

A wide range of special base units with various performance and function features is available when using the fiber optics. From the simple version with potentiometer to the high-end unit with display.

Applications

- Small parts detection
- Suitable for tight mounting conditions
- Inspecting parts features
- Counting (e.g. counting drops)
- Precise parts positioning
- Assembly and handling
- Robotics

BFB 75K...



BOS 6K...



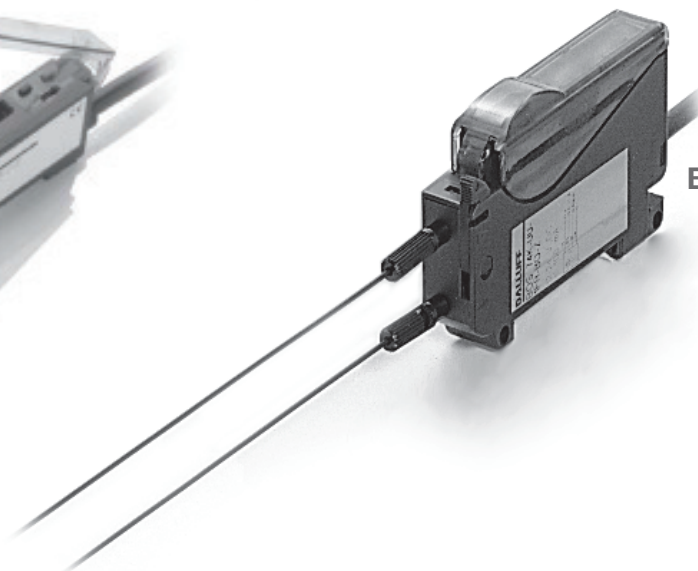
BOS 18KF...



BOS 73K...



BOS 74K...



Type	Light type	Output	Output function	Switching frequency	U _B	Connection	Special features	Page
	Red light	PNP - Transistor NPN - Transistor Analog output Alarm output	Light-on Dark-on		10...30 V DC 11...26 V DC	M8 connector, 3-pin M8 connector, 4-pin M12 connector, 4-pin Cable	Teach-in Display	
 Fiber optic base units								
BFB 75K-001-P-S75	■	■	■	■	1.5 kHz	■	■	2.2.5
BFB 75K-001-N-S75	■	■	■	■	1.5 kHz	■	■	2.2.5
BFB 75K-001-P-02	■	■	■	■	1.5 kHz	■	■	2.2.5
BFB 75K-001-N-02	■	■	■	■	1.5 kHz	■	■	2.2.5
BFB 75K-002-P-S75	■	■	■	■	8 kHz	■	■	2.2.7
BFB 75K-002-N-S75	■	■	■	■	8 kHz	■	■	2.2.7
BFB 75K-003-P-02	■	■	■	■	8 kHz	■	■	2.2.7
BFB 75K-003-N-02	■	■	■	■	8 kHz	■	■	2.2.7
BOS 73K-PU-1FR-C-02	■	■	■	■	1 kHz	■	■	2.2.9
BOS 73K-PU-1FR-C-S75-00,1	■	■	■	■	1 kHz	■	■	2.2.9
BOS 74K-UU-1FR-B0-Z-S49-00,2	■	■	■	■	1 kHz	■	■	2.2.11
BOS 74K-UU-1FR-B0-Z-02	■	■	■	■	1 kHz	■	■	2.2.11
BOS 74K-UU-1FS-B0-Z-02	■	■	■	■	8 kHz	■	■	2.2.11
BOS 6K-PU-1FR-S75-C	■	■	■	■	1 kHz	■	■	2.2.13
BOS 6K-PU-1FR-C-02	■	■	■	■	1 kHz	■	■	2.2.13
BOS 6K-NU-1FR-S75-C	■	■	■	■	1 kHz	■	■	2.2.13
BOS 6K-NU-1FR-C-02	■	■	■	■	1 kHz	■	■	2.2.13
BOS 18KF-PA-1FR-S4-C	■	■	■	■	1 kHz	■	■	2.2.15
BOS 18KF-PA-1FR-C-02	■	■	■	■	1 kHz	■	■	2.2.15
BOS 18KF-NA-1FR-S4-C	■	■	■	■	1 kHz	■	■	2.2.15
BOS 18KF-NA-1FR-C-02	■	■	■	■	1 kHz	■	■	2.2.15

2.2

2.3

Photoelectric sensors
accessories
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The BFB 75K-001...

is considered the basic model of the new series of fiber optic base units **BFB 75K** for DIN rail mount.

As an economical sensor it is ideally suited for standard applications.

Ease of setting using a teach-in procedure on the sensor or via an external teach line make the sensor especially user-friendly.

Features

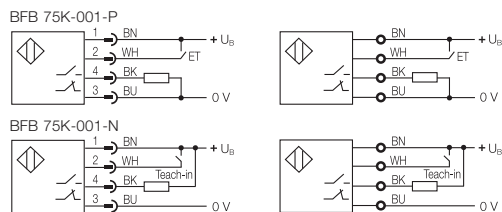
- Red light
- Teach-in
- Connector and cable versions



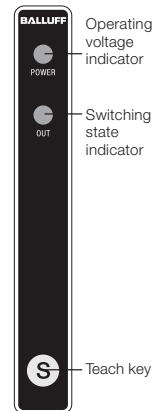
Mounting notes for fiber optics

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

Wiring diagrams



Control panel



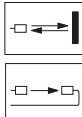
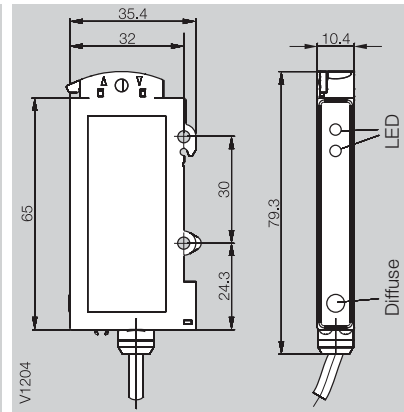
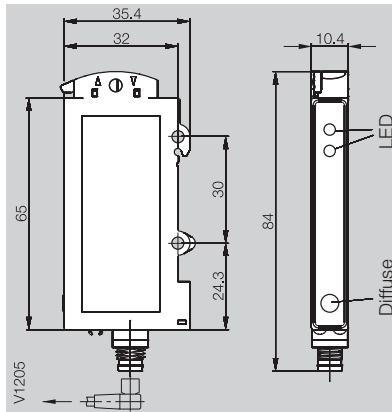
Recommended accessories

please order separately



Connector
BKS-S 74/BKS-S 75

Series	BFB 75K	BFB 75K
Plastic fiber optic base unit	for plastic fiber optics with outside diameter 2.2 mm depends on fiber optic cable	for plastic fiber optics with outside diameter 2.2 mm depends on fiber optics
Sensing distance/range		



Base unit

PNP	BFB 75K-001-P-S75	BFB 75K-001-P-02
NPN	BFB 75K-001-N-S75	BFB 75K-001-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	$\leq 10\%$	$\leq 10\%$
No-load supply current I_0 max.	≤ 20 mA	≤ 20 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	100 mA	100 mA
Voltage drop U_d at I_o	≤ 1.5 V	≤ 1.5 V
Settings	Teach-in	Teach-in
Optical data		
Emitter, light type	LED, red light	LED, red light
Wavelength	660 nm	660 nm
Light spot diameter	depends on fiber optics	depends on fiber optics
Time data		
Response time		
Switching frequency f	1.5 kHz	1.5 kHz
Indicators		
Power-on indicator	LED green	LED green
Switching state indicator	LED yellow	LED yellow
Mechanical data		
Connection	M8 connector, 4-pin	2 m cable, PVC
No. of wires $\times$ cross-section		4 $\times$ 0.14 mm ²
Housing material	ABS	ABS
Optical surface	depends on fiber optic cable	depends on fiber optic cable
Weight	20 g	50 g
Ambient data		
Degree of protection per IEC 60529	IP 64	IP 64
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-20...+60 °C	-20...+60 °C



Connector orientation

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Photoelectric sensors
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Connectors ...
page 5.2 ...

The BFB 75K-002... offers perfect performance as a high-end amplifier with 12-bit resolution, a 4-digit display and a switching frequency of up to 8 kHz. Various operating modes such as Fine or High Distance allows the sensor to be better adapted to the respective application. Configurable time functions, window programming and fine adjustment of a switching point round out the sensor.

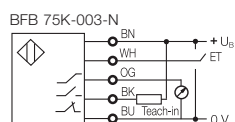
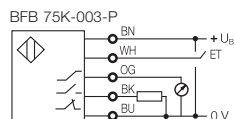
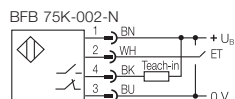
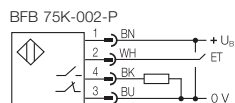
An additional analogue output makes the **BFB 75K-003...** version a great all-rounder. It provides an output signal proportional to remission or to the distance from the target. All functions of the BFB 75K-02 are also included.



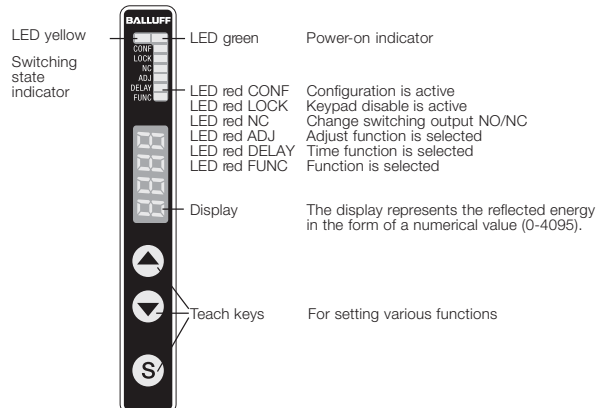
Operating mode	Standard	High Resolution	High switching frequency	Long range
Sensing distance*	150 mm	70 mm	70 mm	300 mm
Switching frequency	1 kHz	125 Hz	8 kHz	125 Hz

*depending on fiber optics used

Wiring diagrams



Control panel

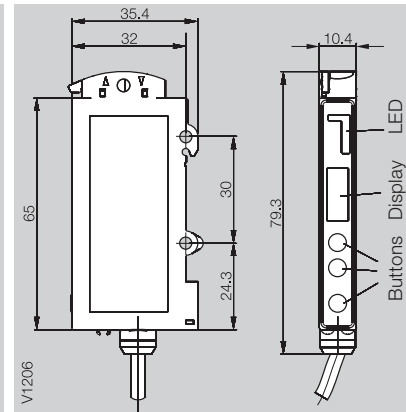
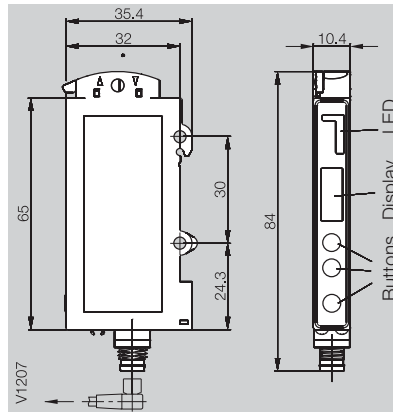


Recommended accessories
please order separately



Connector
BKS-S 74/BKS-S 75

Series	BFB 75K	BFB 75K
Plastic fiber optic base unit	for plastic fiber optics with outside diameter 2.2 mm	for plastic fiber optics with outside diameter 2.2 mm
Sensing distance/range	depends on fiber optics	depends on fiber optics



Base unit

PNP	BFB 75K-002-P-S75	BFB 75K-003-P-02
NPN	BFB 75K-002-N-S75	BFB 75K-003-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	$\leq 10\%$	$\leq 10\%$
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Analog output		0...10 V (max. 2 mA)
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	100 mA	100 mA
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V
Settings	Teach-in	Teach-in
Optical data		
Emitter, light type	LED, red light	LED, red light
Wavelength	630 nm	630 nm
Light spot diameter	depends on fiber optics	depends on fiber optics
Time data		
Switching frequency f	Standard Fast Mode	
	1 kHz 8 kHz	1 kHz 8 kHz
Time function	On- and/or off-delay 1...2000 ms adjustable	On- and/or off-delay 1...2000 ms adjustable
Indicators		
Power-on indicator	LED green	LED green
Switching state indicator	LED yellow	LED yellow
Status indicator	6x LED red	6x LED red
Display	4-digit	4-digit
Mechanical data		
Connection	M8 connector, 4-pin	2 m cable, PVC
No. of wires x cross-section		5x0.14 mm ²
Housing material	ABS	ABS
Optical surface	depends on fiber optic cable	depends on fiber optic cable
Weight	20 g	50 g
Ambient data		
Degree of protection per IEC 60529	IP 64	IP 64
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-20...+60 °C	-20...+60 °C

2.2

2.3

Photoelectric sensors
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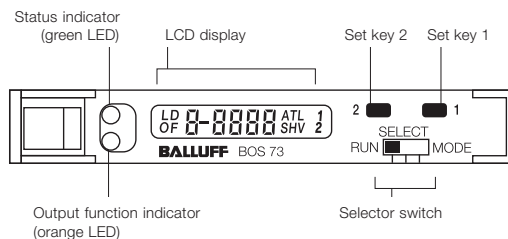
The **BOS 73K** with indicators simplifies operation of the sensor and gives an accurate overview of the settings. The display shows sensitivity, signal strength as well as ancillary functions. The switching point and hysteresis can be automatically acquired but also manually set. The powerful red light emitter permits very long sensing distances and ranges. A switching and alarm output is also provided, and time functions can also be set. Two transmission channels are provided for using multiple sensors without mutual interference.

Features

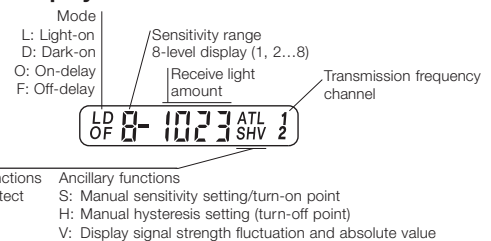
- LCD display with backlighting
- Teach-in calibration
- Powerful red light emitter for long ranges
- Contamination output
- All time functions can be set from 10...120 ms
- Two transmission channels



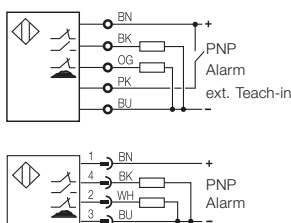
Control panel



Display



Wiring diagrams



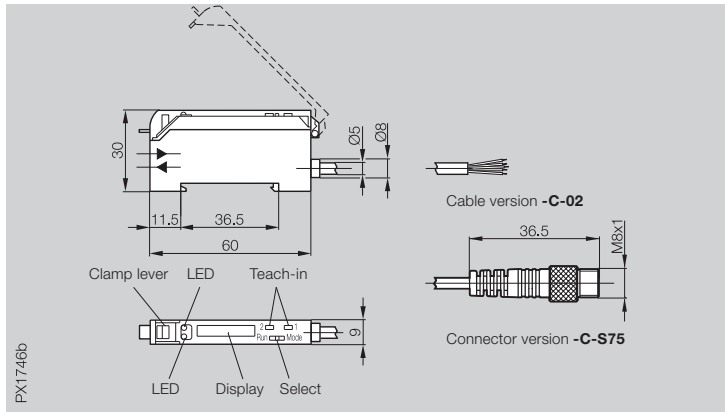
Recommended accessories

please order separately



Connector
BKS-S 74/BKS-S 75

Series	BOS 73K
Plastic fiber optic base unit	for plastic fiber optics with outside diameter 2.2 mm
Sensing distance/range	depends on fiber optics



Base unit

PNP	BOS 73K-PU-1FR-C-02	BOS 73K-PU-1FR-C-S75-00,1
Electrical data		
Supply voltage U_B	11...26 V DC	
Ripple	$\leq 10 \%$	
No-load supply current I_0 max.	≤ 50 mA	
Switching output	PNP-Transistor, open collector	
Switching type	Light-/dark-on (selectable)	
Output current	Switching output	100 mA
	Alarm output	50 mA
Voltage drop U_d at I_e	≤ 2 V	
Settings	teach-in/manually using buttons	
Optical data		
Emitter, light type	LED, red light	
Wavelength	660 nm	
Light spot diameter	depends on fiber optics	
Time data		
Response time	Channel 1: 0.5 ms Channel 2: 0.6 ms	
Switching frequency f (standard)	Channel 1: 1 kHz Channel 2: 833 kHz	
Time function	On- and/or off-delay 10...120 ms selectable	
Indicators		
Output function indicator	LED orange	
Stability indicator	LED green	
Display	Backlit LCD	
Mechanical data		
Connection	2 m cable, PVC	M8 connector, 4-pin
No. of wires $\times$ cross-section	5 $\times$ 0.2 mm ²	
Housing material	PC	
Optical surface	depends on fiber optic cable	
Weight (incl. holder)	80 g	
Ambient data		
Degree of protection per IEC 60529	IP 54	
Polarity reversal protected	yes	
Short circuit protected	yes	
Ambient temperature range T_a	-25...+55 °C	
Ambient light rejection	Artificial light ≤ 10 kLux, sunlight ≤ 20 kLux	

Mounting materials included!

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2.3

Photoelectric sensors
accessories
page 2.3.2 ...

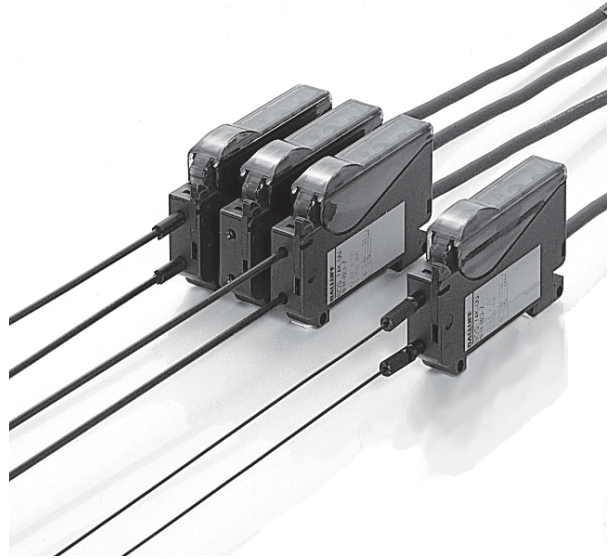
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Connectors ...
page 5.2 ...

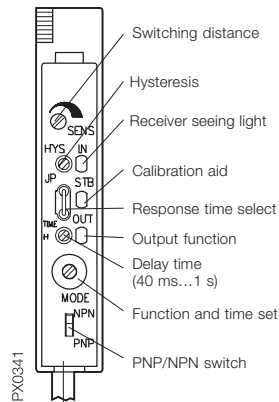
The **BOS 74K** offers maximum performance and adjusting flexibility (time functions, switching hysteresis) in various models for mastering even difficult applications.

Features

- Extended range
- 12-turn potentiometer for sensitivity setting
- Contamination indicator and alarm output
- Adjustable switching hysteresis
- Time functions (can be set from 40 ms...1 s)
- High-frequency version available (8 kHz)



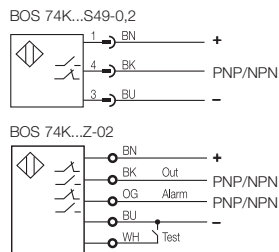
Indicators and operating elements



BOS 74K function table

Position	KV	EV	AV	WF	HS	DS	AE	AA	Function
0									KV: No delay
1									EV: On-delay
2									AV: Off-delay
3									WF: Wipe function
4									HS: Light-on
5									DS: Dark-on
6									AE: Alarm output
7									NO
8									AA: Alarm output
9									normally closed
A									■: Enabled
B									
C									
D									
E									
F									

Wiring diagrams



Recommended accessories

please order separately

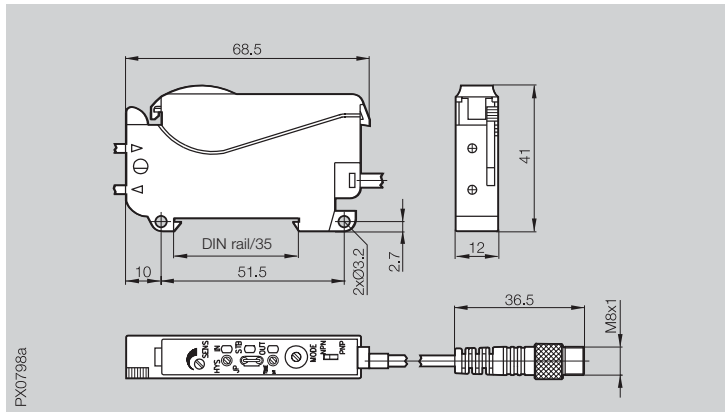


Mounting bracket
BOS 74-HW-1



Connector
BKS-_ 48/BKS-_ 49

Series	BOS 74K	BOS 74K	BOS 74K
Plastic fiber optic base unit	for plastic fiber optics with outside diameter 2.2 mm	for plastic fiber optics with outside diameter 2.2 mm	for plastic fiber optics with outside diameter 2.2 mm
Sensing distance/range	depends on fiber optic cable	depends on fiber optic cable	depends on fiber optic cable



Base unit

PNP/NPN	BOS 74K-UU-1FR-B0-Z-S49-00,2	BOS 74K-UU-1FR-B0-Z-02	BOS 74K-UU-1FS-B0-Z-02
PNP/NPN High-speed*			
Electrical data			
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	$\leq 10 \%$	$\leq 10 \%$	$\leq 10 \%$
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA	≤ 40 mA
Switching output	PNP and NPN Transistor	PNP and NPN Transistor	PNP and NPN Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	200 mA	200 mA	200 mA
Switching output		50 mA	50 mA
Alarm output			
Voltage drop U_d at I_0	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
Settings	12-turn potentiometer	12-turn potentiometer	12-turn potentiometer
Help functions		Test input	Test input
Optical data			
Emitter, light type	LED, red light	LED, red light	LED, red light
Wavelength	660 nm	660 nm	660 nm
Light spot diameter	depends on fiber optic cable	depends on fiber optic cable	depends on fiber optic cable
Time data			
Response time	≤ 500 μ s	≤ 500 μ s	≤ 60 μ s
Switching frequency f	1 kHz	1 kHz	8 kHz
Time functions	On-/off-delay selectable 40 ms...1 s	On-/off-delay selectable 40 ms...1 s	On-/off-delay selectable 40 ms...1 s
Indicators			
Output function indicator	LED red	LED red	LED red
Stability indicator	LED green	LED green	LED green
Receive indicator	LED yellow	LED yellow	LED yellow
Mechanical data			
Connection	0,2 m cable with M8 connector, 3-pin	2 m cable, PVC	2 m cable, PVC
No. of wires x cross-section		5x0.25 mm ²	5x0.25 mm ²
Housing material	PBT	PBT	PBT
Optical surface	depends on fiber optics	depends on fiber optics	depends on fiber optics
Weight	50 g	125 g	125 g
Ambient data			
Degree of protection per IEC 60529	IP 66	IP 66	IP 66
Polarity reversal protected	yes	yes	yes
Short circuit protected	yes	yes	yes
Ambient light rejection	10 kLux	10 kLux	10 kLux
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C	-10...+60 °C

*Range reduced by 30 %

2.2

2.3

Photoelectric sensors accessories page 2.3.2 ...

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Connectors ... page 5.2 ...

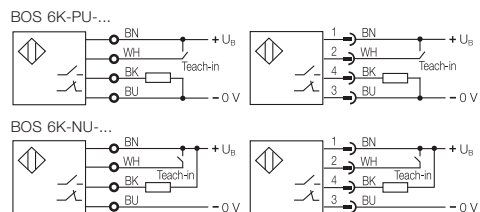
Series **BOS 6K** has been expanded to add a fiber optic base unit. The familiar teach-in concept has also been retained here. Together with the Series BFO fiber optics, an enclosure rating of IP 67 is provided.

Features

- Teach-in
- Contamination indicator
- Control line for ext. Teach-in
- Key disable



Wiring diagrams



Recommended accessories
please order separately

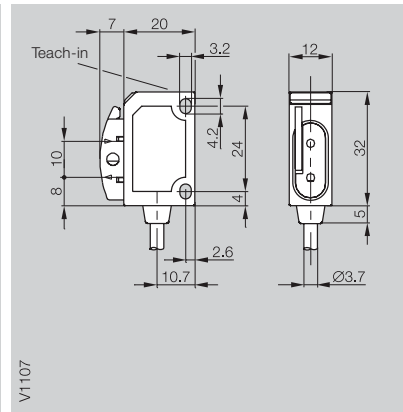
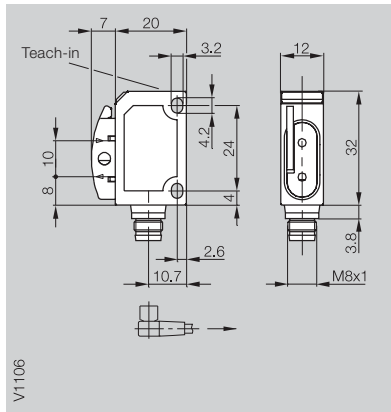


Mounting
bracket
BOS 6-HW-1



Connector
BKS-S 74/BKS-S 75

Series	BOS 6K	BOS 6K
Plastic fiber optic base unit	for plastic fiber optics with outside diameter 2.2 mm	for plastic fiber optics with outside diameter 2.2 mm
Sensing distance/range	depends on fiber optics	depends on fiber optics



Base unit

PNP	BOS 6K-PU-1FR-S75-C	BOS 6K-PU-1FR-C-02
NPN	BOS 6K-NU-1FR-S75-C	BOS 6K-NU-1FR-C-02

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	$\leq 15\%$ of U_B	$\leq 15\%$ of U_B
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	100 mA	100 mA
Voltage drop U_d at I_o	≤ 2.4 V	≤ 2.4 V
Settings	Teach-in	Teach-in

Optical data

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

Time data

Response time	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz

Indicators

Output function indicator	LED yellow	LED yellow
Stability indicator	LED green	LED green

Mechanical data

Connection	M8 connector, 4-pin	2 m cable, PVC
No. of wires $\times$ cross-section		4 $\times$ 0.14 mm ²
Housing material	ABS	ABS
Lens material	depends on fiber optic cable	depends on fiber optic cable
Weight	10 g	40 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-20...+60 °C	-20...+60 °C



Connector orientation

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Photoelectric sensors
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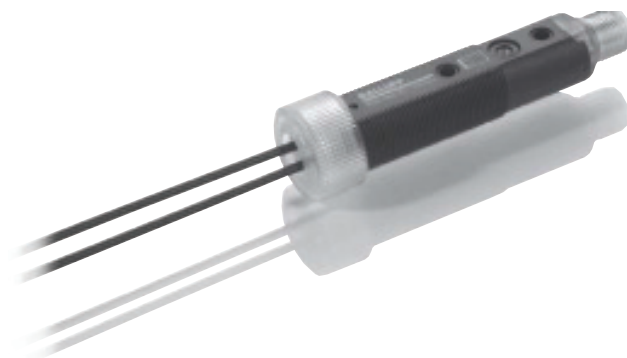
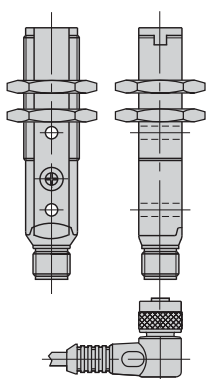
Connectors ...
page 5.2 ...

The **BOS 18KF** fiber optic base unit represents a further addition to the Balluff standard series. Ease of operation and installation make this sensor a highlight, with the practical feature of DIN rail mounting.

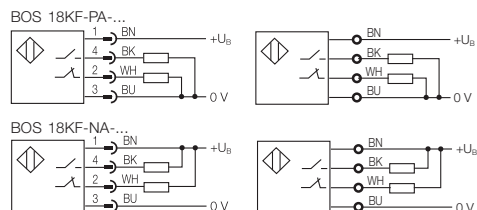
Features

- Sensitivity setting with a 270° potentiometer
- Cover nut for fiber optic cable adapting

Connector orientation



Wiring diagrams



Recommended accessories

please order separately



Mounting clamp
BOS 18,0-KB-1

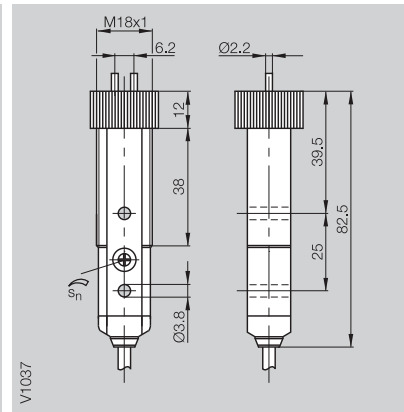
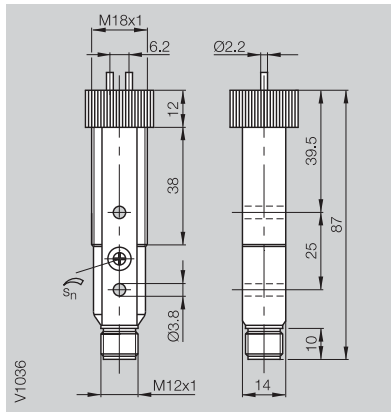


Mounting bracket
BES 18-HW-1



Connector
BKS-_ 19/BKS-_ 20

Series	BOS 18KF	BOS 18KF
Plastic fiber optic base unit	for plastic fiber optics with outside diameter 2.2 mm	for plastic fiber optics with outside diameter 2.2 mm
Sensing distance/range	depends on fiber optics	depends on fiber optics



Base unit

PNP	BOS 18KF-PA-1FR-S4-C	BOS 18KF-PA-1FR-C-02
NPN	BOS 18KF-NA-1FR-S4-C	BOS 18KF-NA-1FR-C-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light- and dark-on	Light- and dark-on
Output current	100 mA	100 mA
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V
Settings	Potentiometer 270°	Potentiometer 270°
Optical data		
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
Time data		
Response time	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz
Indicators		
Output function indicator	LED yellow	LED yellow
Stability indicator	LED green	LED green
Mechanical data		
Connection	M12 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section		4×0.14 mm ²
Housing material	PBT	PBT
Lens material	depends on fiber optic cable	depends on fiber optic cable
Weight	25 g	75 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C

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Photoelectric sensors
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Connectors ...
page 5.2 ...

There are basically two types of fiber optics: diffuse or through-beam. The diffuse models have an integrated emitter and receiver at the cable end. The through-beams use two separate cables.

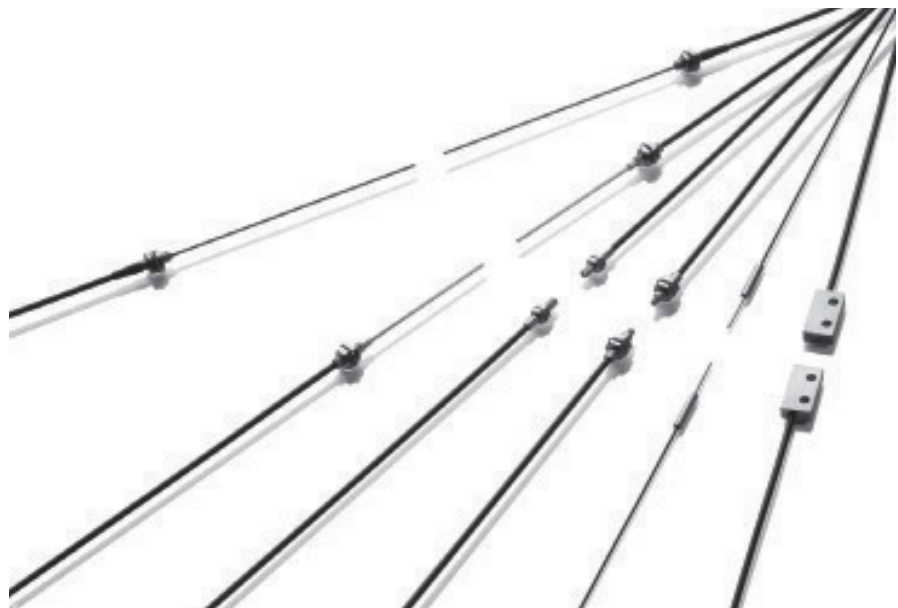
It's easy to see why fiber optics are so commonly used: The variety of end configurations, with straight or angled light exit, flexible optical head or coaxial fibers, the various fiber diameters and the ability to trim them to the desired length.

Another plus

For the ultimate in flexibility, fiber optics for user assembly are also available: any desired combinations are possible with the trim-to-length duplex cable and various end fittings.

Applications

- Small parts detection
- For tight mounting spaces
- Checking small parts features
- Counting (e.g. counting drops)
- Precise parts positioning
- Handling and assembly
- Robotics



Type	Optical head	Light exit		Fiber arrangement			Core diameter				Features			Page
		Straight	90°	Standard	Coaxial	Light grid	1.5 mm	1.0 mm	0.5 mm	0.25 mm	Bendable optical tip	Extended temperature range	Highly flexible	
 Through-beam fiber optics														
BFO D22-LA-KB-EAK-10-02	M4	■		■				■						2.2.18
BFO D22-LAH-KB-EAK-10-02	M4	■		■				■					■	2.2.18
BFO D22-LAT-KB-EAK-10-02	M4	■		■				■				■		2.2.18
BFO D22-LAP-KB-EAK-15-02	M4	■		■			■							2.2.19
BFO D22-LAS-EB-EAK-10-02	M4	■		■				■						2.2.19
BFO D22-LA-TB-EAK-10-02	M4	■		■				■			■			2.2.19
BFO D22-LA-NB-PZK-10-02	M4	■		■				■			■			2.2.19
BFO D22-LA-RB-EAK-10-02	M3	■		■				■						2.2.18
BFO N22-LA-FB-EAK-05-01	M2	■		■					■					2.2.18
BFO D10-LA-CB-EAK-05-02	Ø2	■		■					■					2.2.18
BFO D22-LA-QB-PAK-05-02	Ø3		■	■				■						2.2.19
BFO D13-LA-QB-EAK-05-02	Ø3		■	■					■					2.2.19
BFO D13-LA-WB-EAK-05-02	Ø2		■	■				■						2.2.19
BFO D22-LA-AD-EAK-52-02	20×10	■				■				■				2.2.20
BFO D22-LA-BD-EAK-52-02	15×15		■			■				■				2.2.20
BFO D25-LA-CD-EAK-110-02	19×25	■				■				■				2.2.20
BFO D25-LA-ED-EAK-250-02	19×38		■			■				■				2.2.20
BFO D13-LG-05-EAK-30-02	15×41		■							■				2.2.20
BFO D13-LG-10-EAK-30-02	20×32		■							■				2.2.20
 Diffuse fiber optics														
BFO D22-XA-LB-EAK-20-02	M6	■		■				■						2.2.22
BFO D22-XAH-LB-EAK-20-02	M6	■		■				■					■	2.2.22
BFO D22-XAT-LB-EAK-20-02	M6	■		■				■				■		2.2.22
BFO D22-XAP-LB-EAK-30-02	M6	■		■			■							2.2.23
BFO D22-XA-DB-EAK-20-01	M6	■		■				■						2.2.23
BFO D22-XB-LB-EAK-15-02	M6	■			■			■						2.2.23
BFO D22-XBF-LB-EAK-15-02	M6	■			■			■					■	2.2.23
BFO D22-XA-SB-EAK-20-02	M6	■		■				■			■			2.2.23
BFO D22-XA-UB-EAK-20-02	M4	■		■				■						2.2.22
BFO D22-XB-UB-EAK-15-02	M4	■			■			■						2.2.22
BFO D13-XB-KB-EAK-10-02	M4	■			■				■					2.2.22
BFO D10-XA-HB-EAK-10-02	M3	■		■					■		■			2.2.23
BFO D10-XA-RB-EAK-10-02	M3	■		■					■					2.2.23
BFO D13-XB-RB-EAK-10-02	M3	■			■				■					2.2.23
BFO D10-XA-GB-EAK-10-02	M3	■		■					■		■			2.2.23
BFO D13-XA-JB-EAK-20-02	Ø3	■		■				■						2.2.23
BFO D22-XA-MB-PAK-10-02	Ø3		■	■					■					2.2.24
BFO D22-XA-CD-EAK-110-02	19×25	■				■				■				2.2.24
BFO D22-XA-ED-EAK-250-02	19×38		■			■				■				2.2.24

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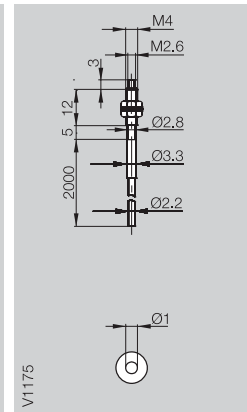
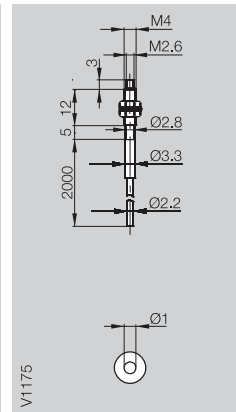
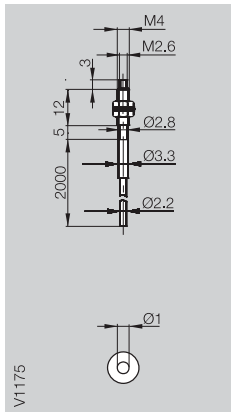
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Photoelectric sensors
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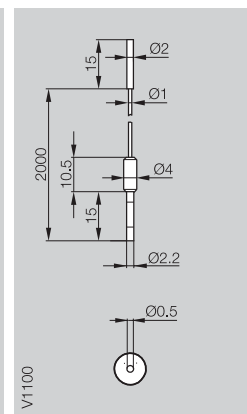
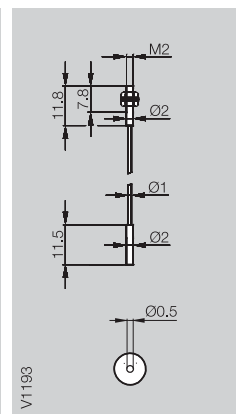
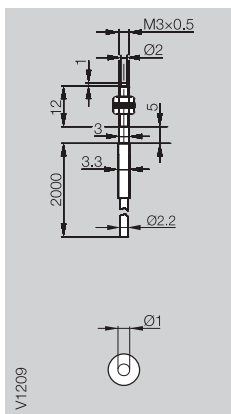
Connectors ...
page 5.2 ...

Optical head	M4 thread	M4 thread	M4 thread	
Features	Standard	Highly flexible	Temperature-rated	
Ø Jacket	2.2 mm	2.2 mm	2.2 mm	
Ø Core	1 mm	1 mm	1 mm	



Ordering code	BFO D22-LA-KB-EAK-10-02	BFO D22-LAH-KB-EAK-10-02	BFO D22-LAT-KB-EAK-10-02	
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 with BFB 75K-002** with BOS 73K with BOS 74K* with BOS 6K with BOS 18KF	500 mm 400 mm 500 mm 220 mm 220 mm 120 mm	400 mm 600 mm 500 mm 220 mm 230 mm 120 mm	

Optical head	M3 thread	M2 thread	Ø 2 mm	
Features	Standard	Precision	Precision	
Ø Jacket	2.2 mm	1.0 mm	1.0 mm	
Ø Core	1 mm	0.5 mm	0.5 mm	



Ordering code	BFO D22-LA-RB-EAK-10-02	BFO N22-LA-FB-EAK-05-01	BFO D10-LA-CB-EAK-05-02	
Fiber bending radius	≥ 25 mm	≥ 10 mm	≥ 15 mm	
Temperature range	-55...+70 °C	-30...+60 °C	-55...+70 °C	
Range	with BFB 75K-001 with BFB 75K-002** with BOS 73K with BOS 74K* with BOS 6K with BOS 18KF	500 mm 140 mm 140 mm 130 mm 60 mm 50 mm 20 mm	130 mm 130 mm 120 mm 50 mm	

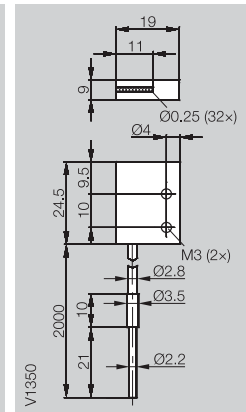
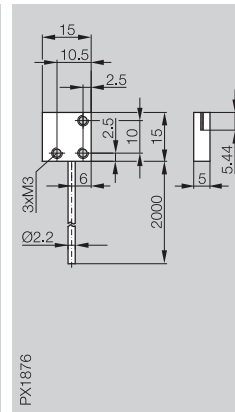
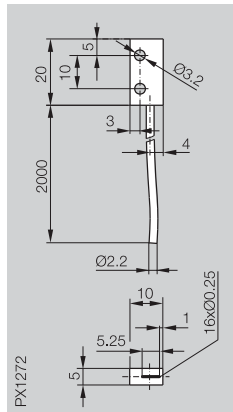
*When using base unit BOS 74K-UU-1FS-.. the sensing distance is reduced by 30 %.

**Range in Standard Mode.

	M4 thread Long range 2.2 mm 1.5 mm	M4 thread Spiral fibers 2.2 mm 1 mm	M4 thread Bendable optical tip 2.2 mm 1 mm	M4 thread Bendable optical tip 2.2 mm 1 mm	
BFO D22-LAP-KB-EAK-15-02	BFO D22-LAS-EB-EAK-10-02	BFO D22-LA-TB-EAK-10-02	BFO D22-LA-NB-PZK-10-02		
≥ 40 mm	≥ 25 mm	≥ 25 mm	≥ 25 mm		
≥ 10 mm	≥ 10 mm	≥ 10 mm	≥ 10 mm		
-55...+70 °C	-30...+60 °C	-30...+60 °C	-55...+70 °C		
800 mm	400 mm	450 mm	500 mm		
800 mm	400 mm	450 mm	500 mm		
800 mm	350 mm	400 mm	500 mm		
500 mm	190 mm	200 mm	230 mm		
500 mm	190 mm	200 mm	250 mm		
250 mm	100 mm	110 mm	120 mm		
Ø 3 mm	Ø 3 mm	Ø 2 mm			
Light exit on side	Light exit on side	Light exit on side			
2.2 mm	1.3 mm	1.3 mm			
1 mm	1 mm	0.5 mm			
BFO D22-LA-QB-PAK-05-02	BFO D13-LA-WB-EAK-05-02	BFO D13-LA-QB-EAK-05-02			
≥ 25 mm	≥ 25 mm	≥ 15 mm			
-40...+70 °C	-40...+70 °C	-35...+65 °C			
120 mm	75 mm	110 mm			
120 mm	75 mm	110 mm			
115 mm	70 mm	105 mm			
60 mm	35 mm	50 mm			
65 mm					
35 mm	20 mm	25 mm			

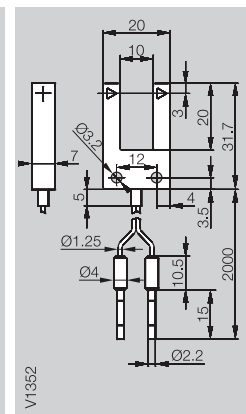
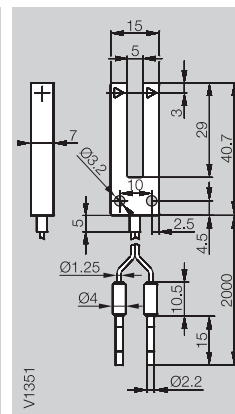
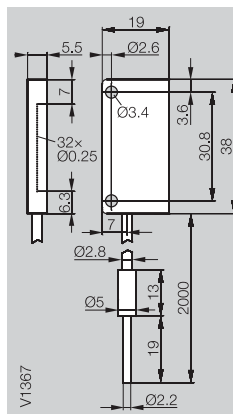
One fiber optic cable each for remitter and receiver are included per packing unit.

Optical head	20x10 mm	15x15 mm	19x25 mm
Features	Light grid	Light grid	Light grid
Jacket Ø	2.2 mm	2.2 mm	2.8 mm
Ø Core	16x0.25 mm	16x0.25 mm	32x0.25 mm



Ordering code	BFO D22-LA-AD-EAK-52-02	BFO D22-LA-BD-EAK-52-02	BFO D25-LA-CD-EAK-110-02
Fiber bending radius	≥ 25 mm	≥ 25 mm	≥ 60 mm
Temperature range	-35...+65 °C	-55...+70 °C	-55...+70 °C
Range	with BFB 75K-001 with BFB 75K-002** with BOS 73K with BOS 74K* with BOS 6K with BOS 18KF	450 mm 400 mm 400 mm 350 mm 210 mm 180 mm 110 mm	600 mm 600 mm 600 mm 370 mm 350 mm 230 mm

Optical head	19x38 mm	15x41 mm	20x32 mm
Features	Light grid	Fork	Fork
Ø Jacket	2.8 mm	2x1.25 mm	2x1.25 mm
Ø Core	32x0.25 mm	2x0.25 mm	2x0.25 mm



Ordering code	BFO D25-LA-ED-EAK-250-02	BFO D13-LG-05-EAK-30-02	BFO D13-LG-10-EAK-30-02
Fiber bending radius	≥ 60 mm	≥ 10 mm	≥ 10 mm
Temperature range	-55...+70 °C	-55...+70 °C	-55...+70 °C
Range	with BFB 75K-001 with BFB 75K-002** with BOS 73K with BOS 74K* with BOS 6K with BOS 18KF	550 mm 550 mm 550 mm 350 mm 360 mm 210 mm	5 mm 5 mm 5 mm 5 mm 5 mm 5 mm

*When using base unit BOS 74K-UU-1FS-.. the sensing distance is reduced by 30 %.

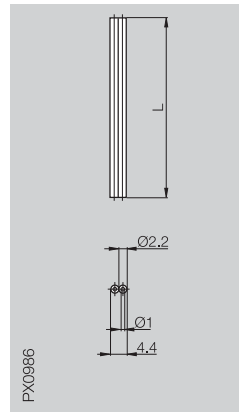
**Range in Standard Mode.

Individual solutions with user-assembled plastic fiber optics

If "off-the-rack" solutions are not what you're looking for, we have a better idea. Fiber optics can be user-cut to the desired length from a 20 m roll. This way you only use as much plastic fiber optic cable as you actually need. A considerable saving, 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 fiber optic cable is simply crimped into the end piece. Tedious gluing is eliminated. The end piece can be removed at any time.

Housing size	2.2x4.4 mm duplex cable
Through-beam	
Range for L = 2 m	150 mm
Cable length	20 m



Ordering code	BFO D22-LD-EAK-10-20
Ambient temperature range T _a	-40...+85 °C
Pull force on fiber optics and connection parts at 20 °C	6 N
Core Ø	2x1 mm
Jacket Ø	2.2 mm
Cutting tool BFO CT is included.	

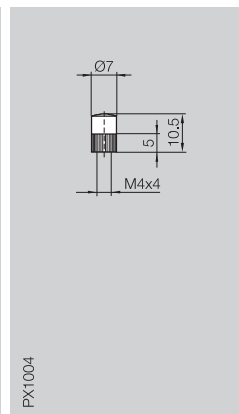
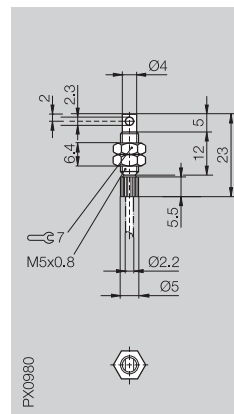
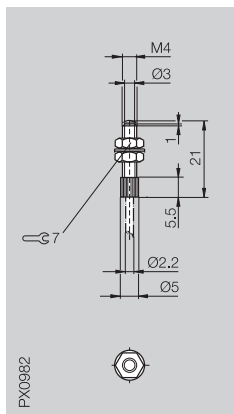
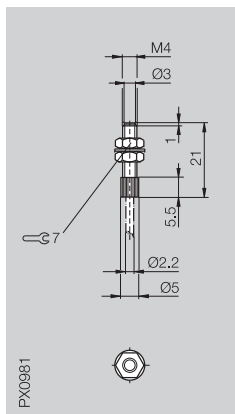
2.2

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Photoelectric sensors accessories
page 2.3.2 ...

Housing size	M4	M4	Ø 4 mm	Ø 7 mm
Features	End piece without lens	End piece with lens	90° end piece	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

Range when used with
2 m plastic fiber cable.



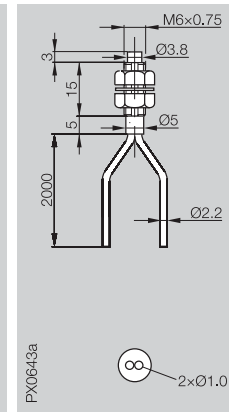
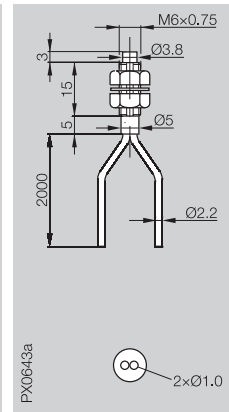
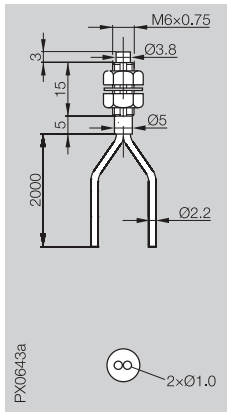
Ordering code	BFO D22-LA-BC-10	BFO D22-LA-CC-30	BFO D22-LA-AC-20	BFO 04-PK-1
Material				
- Optical surface	Plastic (fibers)	Glass	Glass	Glass
- Threaded tube	Stainless steel	Stainless steel	Stainless steel	Stainless steel



5

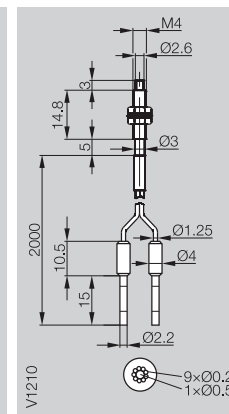
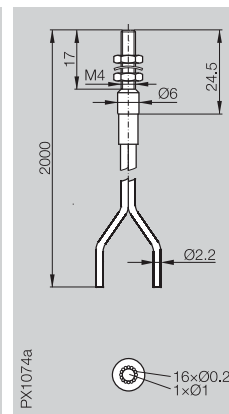
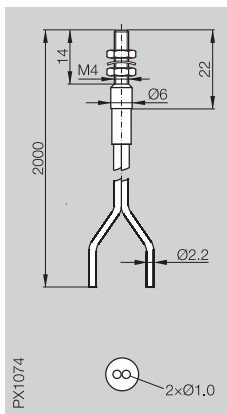
Connectors ...
page 5.2 ...

Optical head	M6 thread	M6 thread	M6 thread	
Features	Standard	Highly flexible	Temperature-rated	
Ø Jacket	2×2.2 mm	2×2.2 mm	2×2.2 mm	
Ø Core	2×1 mm	2×1 mm	2×1 mm	



Ordering code	BFO D22-XA-LB-EAK-20-02	BFO D22-XAH-LB-EAK-20-02	BFO D22-XAT-LB-EAK-20-02	
Fiber bending radius	≥ 25 mm	≥ 2 mm	≥ 25 mm	
Head bending radius				
Temperature range	-55...+70 °C	-40...+70 °C	-55...+115 °C	
Sensing distance	with BFB 75K-001 with BFB 75K-002** with BOS 73K with BOS 74K* with BOS 6K with BOS 18KF	150 mm 150 mm 150 mm 80 mm 100 mm 50 mm	120 mm 120 mm 120 mm 60 mm 70 mm 30 mm	130 mm 130 mm 130 mm 80 mm 90 mm 50 mm

Optical head	M4 thread	M4 thread	M4 thread	
Features	Standard	Coaxial	Coaxial	
Ø Jacket	2×2.2 mm	2×2.2 mm	2×1.25 mm	
Ø Core	2×1 mm	1×1 mm/16×0.25 mm	1×0.5 mm/9×0.25 mm	

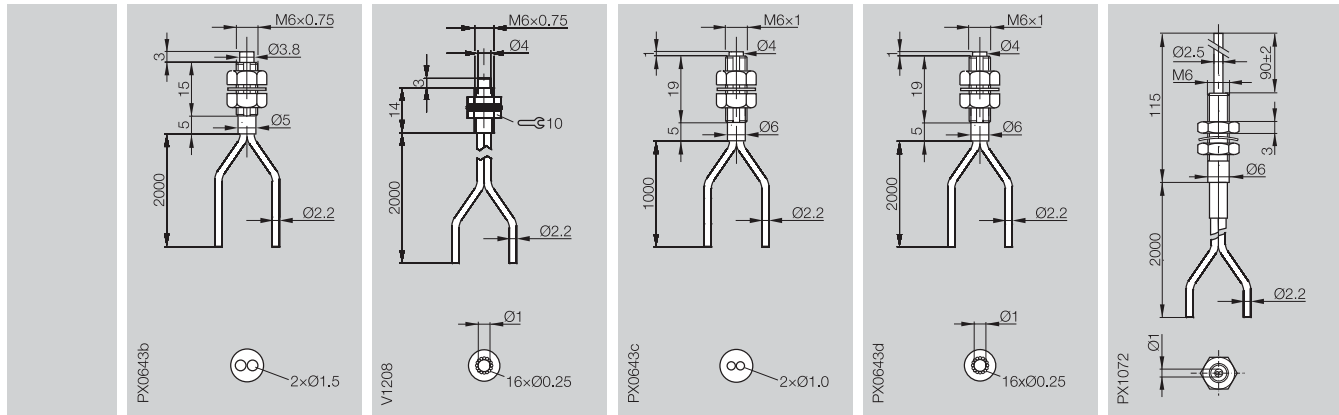


Ordering code	BFO D22-XA-UB-EAK-20-02	BFO D22-XB-UB-EAK-15-02	BFO D13-XB-KB-EAK-10-02	
Fiber bending radius	≥ 25 mm	≥ 25 mm	≥ 15 mm	
Head bending radius				
Temperature range	-35...+65 °C	-40...+60 °C	-55...+70 °C	
Sensing distance	with BFB 75K-001 with BFB 75K-002** with BOS 73K with BOS 74K* with BOS 6K with BOS 18KF	120 mm 120 mm 120 mm 70 mm 80 mm 40 mm	130 mm 130 mm 130 mm 80 mm 90 mm 50 mm	60 mm 60 mm 60 mm 30 mm 20 mm

*When using base unit BOS 74K-UU-1FS-.. the sensing distance is reduced by 30 %.

**Sensing distance in Standard Mode.

M6 thread	M6 thread	M6×1 thread	M6×1 thread	M6 thread
Long range	Coaxial	Standard	Coaxial, flexible	Bendable optical tip
2×2.2 mm	2×2.2 mm	2×2.2 mm	2×2.2 mm	2×2.2 mm
2×1.5 mm	1×1 mm/16×0.25 mm	2×1 mm	1×1 mm/16×0.25 mm	2×1 mm



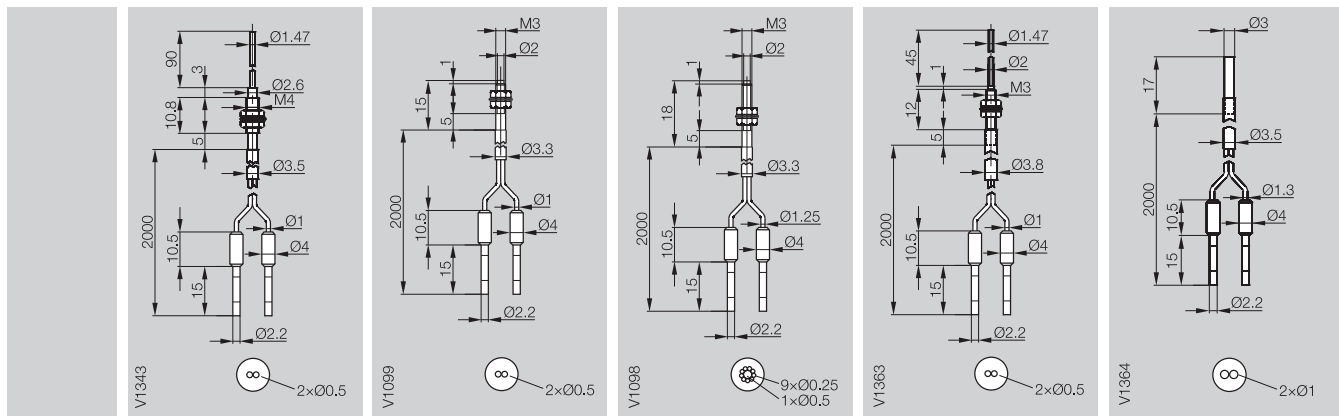
BFO D22-XAP-LB-EAK-30-02	BFO D22-XB-LB-EAK-15-02	BFO D22-XA-DB-EAK-20-01	BFO D22-XBF-LB-EAK-15-02	BFO D22-XA-SB-EAK-20-02
≥ 40 mm	≥ 25 mm	≥ 25 mm	≥ 5 mm	≥ 25 mm
-55...+70 °C	-55...+70 °C	-40...+60 °C	-40...+60 °C	-35...+65 °C
180 mm	120 mm	140 mm	110 mm	130 mm
180 mm	120 mm	140 mm	110 mm	130 mm
180 mm	120 mm	140 mm	120 mm	130 mm
130 mm	70 mm	90 mm	60 mm	80 mm
130 mm	80 mm	100 mm	70 mm	90 mm
100 mm	50 mm	50 mm	30 mm	40 mm

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Photoelectric sensors
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M4 thread	M3 thread	M3 thread	M3 thread	Ø 3 mm
Bendable optical tip	Standard	Coaxial	Bendable optical tip	Standard
2×1 mm	2×1 mm	2×1.25 mm	2×1 mm	2×2.2 mm
2×0.5 mm	2×0.5 mm	1×0.5 mm/9×0.25 mm	2×0.5 mm	2×1 mm

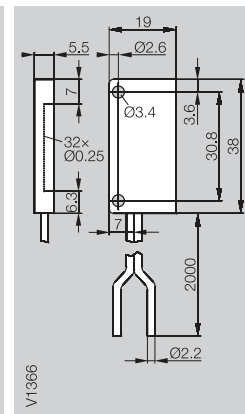
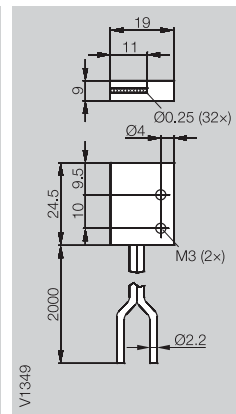
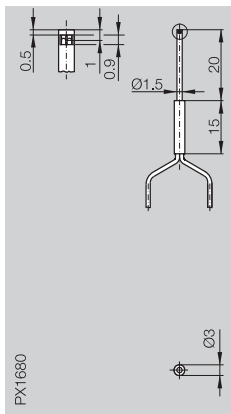


BFO D10-XA-HB-EAK-10-02	BFO D10-XA-RB-EAK-10-02	BFO D13-XB-RB-EAK-10-02	BFO D10-XA-GB-EAK-10-02	BFO D13-XA-JB-EAK-20-02
≥ 15 mm	≥ 15 mm	≥ 15 mm	≥ 15 mm	≥ 25 mm
≥ 10 mm	≥ 10 mm	≥ 10 mm	≥ 10 mm	≥ 10 mm
-55...+70 °C	-55...+70 °C	-40...+60 °C	-35...+65 °C	-55...+70 °C
50 mm	50 mm	60 mm	50 mm	130 mm
50 mm	50 mm	60 mm	50 mm	130 mm
40 mm	40 mm	30 mm	40 mm	130 mm
20 mm	20 mm	20 mm	20 mm	80 mm
10 mm	10 mm	20 mm	10 mm	50 mm

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Connectors ...
page 5.2 ...

Optical head	Ø 3 mm	19x25 mm	19x38 mm
Features	Light exit on side	Light grid	Light grid
Ø Jacket	2x1 mm	2.2 mm	2.2 mm
Ø Core	2x0.5 mm	32x0.25 mm	32x0.25 mm

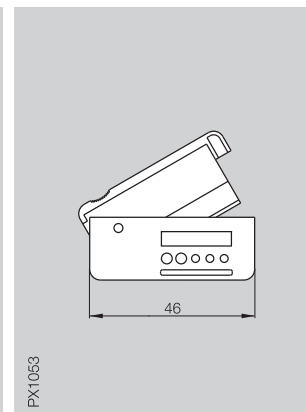
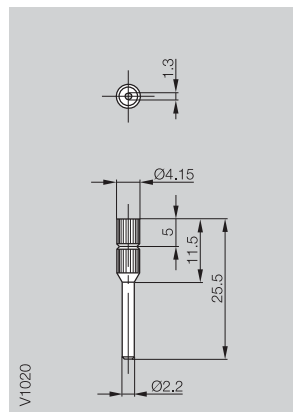
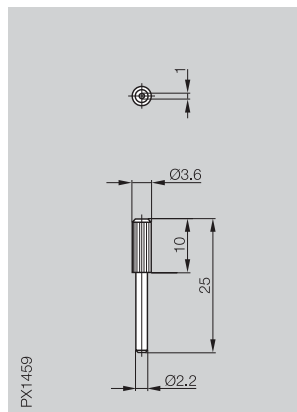


Ordering code		BFO D22-XA-MB-PAK-10-02	BFO D22-XA-CD-EAK-110-02	BFO D22-XA-ED-EAK-250-02
Fiber bending radius		≥ 25 mm	≥ 25 mm	≥ 25 mm
Temperature range		-40...+70 °C	-55...+70 °C	-55...+70 °C
Sensing distance	with BFB 75K-001	35 mm	100 mm	90 mm
	with BFB 75K-002**	35 mm	100 mm	90 mm
	with BOS 73K	25 mm	100 mm	90 mm
	with BOS 74K*	10 mm	60 mm	50 mm
	with BOS 6K		70 mm	60 mm
	with BOS 18KF		40 mm	30 mm

*When using base unit BOS 74K-UU-1FS-.. the sensing distance is reduced by 30 %.

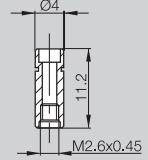
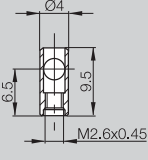
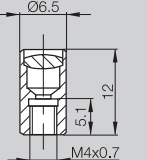
**Sensing distance in Standard Mode.

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 to Ø 2.2 mm



Ordering code	BFO D10-LA-DC-10	BFO D13-LA-EC-10	BFO CT
---------------	------------------	------------------	--------

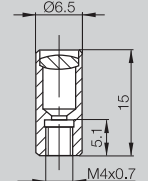
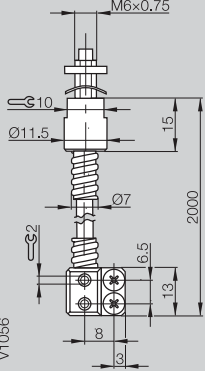
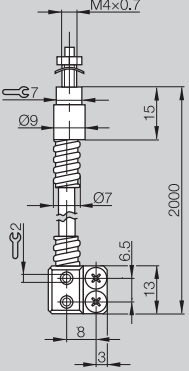


	Lens for through-beam fiber optics M2.6x0.45	90° Rotatable head for through-beam fiber optics M2.6x0.45	Focusing lens for coaxial diffuse fiber optics M4x0.7
			
	V1052	V1053	V1054
Ordering code	BFO 02-PK-1	BFO 02-UK-1	BFO 04-FL-1
Range/sensing distance with corresponding fiber optic cable	×10	×0.7	19 mm ±2 mm
Packaging unit	2 pcs.	2 pcs.	1 pc.

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Photoelectric sensors accessories
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	Focusing lens for coaxial diffuse fiber optics M4x0.7	Metal corrugated tube (stainless steel) for fiber optics M6x0.75	Metal corrugated tube (stainless steel) for fiber optics M4x0.7
			
	V1055	V1056	V1057
Ordering code	BFO 04-FL-2	BFO 06-FS-1	BFO 04-FS-1
Range/sensing distance with corresponding fiber optic cable	7 mm ±2 mm		
Packaging unit	1 pc.	1 pc.	1 pc.

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Connectors ...
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Series **BFO 18** glass fiber optic cables are designed for series BOS 18M tubular sensors and are used wherever a high level of function reserve or chemical resistance is required. Extreme temperatures are also no problem.

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

Construction from the outside in

UZG type

Polyurethane jacket
Strain relief
Glass fiber bundle

- Flexible
- Excellent chemical resistance
- Does not get brittle from oils and coolant emulsions
- Temperature range -20...+85 °C

MZG type

Corrugated metal armor
Strain relief
Glass fiber bundle

- High temperature-rated -20...+170 °C (if not flexed up to +250 °C)
- Flexible
- Crush-resistant
- Resistant to hot chips

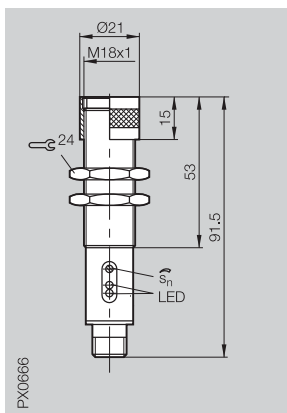
SMG type

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

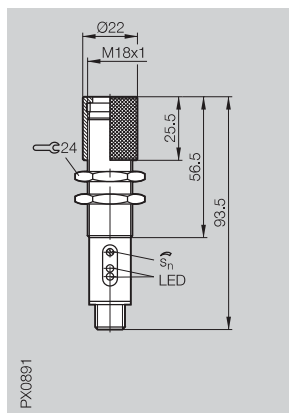
- Extended temperature range -40...+150 °C
- Very flexible
- Crush-resistant

Recommended diffuse base units

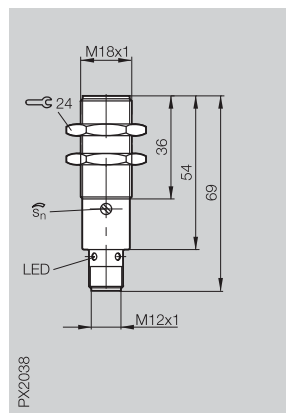
(see page 2.1.23/24/25 and 2.1.94)



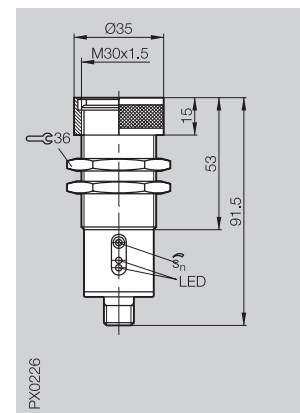
BOS 18M-GU-1PF-...



BOS 18M-PU-1PD-SA...



BOS 18M-PA-1PF-...,
BOS 18M-PA-1PD-...

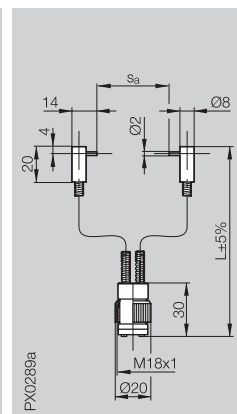
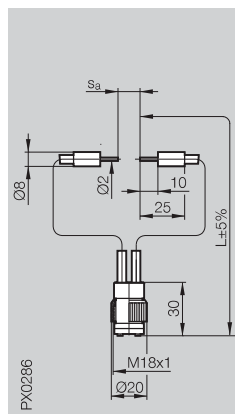


BOS 30M-GA-1PH-...

Type	Max. sensing distance	Version		Light exit		Auto- mobile approval	Page
		Through-beam	Diffuse	Straight	Right angle		
 Fiber optics							
BFO 18A-LGG-...-10...	400 mm	■		■			2.2.28
BFO 18A-LFF-...-10...	400 mm	■			■		2.2.28
BFO 18A-LAA-...-20...	700 mm	■		■			2.2.29
BFO 18A-LCC-...-20...	700 mm	■		■			2.2.29
BFO 18A-LEE-...-20...	700 mm	■			■		2.2.29
BFO 18V-LCC-...-23...	2000 mm	■		■		■	2.2.29
BFO 18V-LDD-...-23...	2000 mm	■			■	■	2.2.29
BFO 18A-XAG-...-15...	50 mm		■	■			2.2.30
BFO 18A-XAF-...-15...	50 mm		■		■		2.2.30
BFO 18A-XAA-...-30...	100 mm		■	■			2.2.31
BFO 18A-XAC-...-30...	100 mm		■	■			2.2.31
BFO 18A-XAE-...-30...	100 mm		■		■		2.2.31
BFO 18V-XAC-...-30...	200 mm		■	■		■	2.2.31
BFO 18V-XAD-...-30...	200 mm		■		■	■	2.2.31

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Through-beam with	BOS 18M-...-PD-...	Range	100 mm	100 mm
	BOS 18M-...-1PF-...	Range	400 mm	400 mm
	BOS 30M-...	Range		



Ordering code	Type	UZG		
	Type	MZG	BFO 18A-LGG-MZG-10-	BFO 18A-LFF-MZG-10-
	Type	SMG	BFO 18A-LGG-SMG-10-	BFO 18A-LFF-SMG-10-
Diameter of glass fiber bundle			1 mm	1 mm
Max. pull force on fiber optics and connection parts			80 N	80 N
Min. bending radius			60 mm	60 mm
For use 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-...	no	no	no

Please append the desired length L of the fiber optics cable to the ordering code.

Corrections from 0.5 m to max. 2 m possible. Example:

BFO 18...-20-**0.5** for **0.5 m** fiber length

BFO 18...-20-**2** for **2 m** fiber length

Note!

With a through-beam fiber optic cable, the normally open signal of the base unit is converted into a normally closed signal!

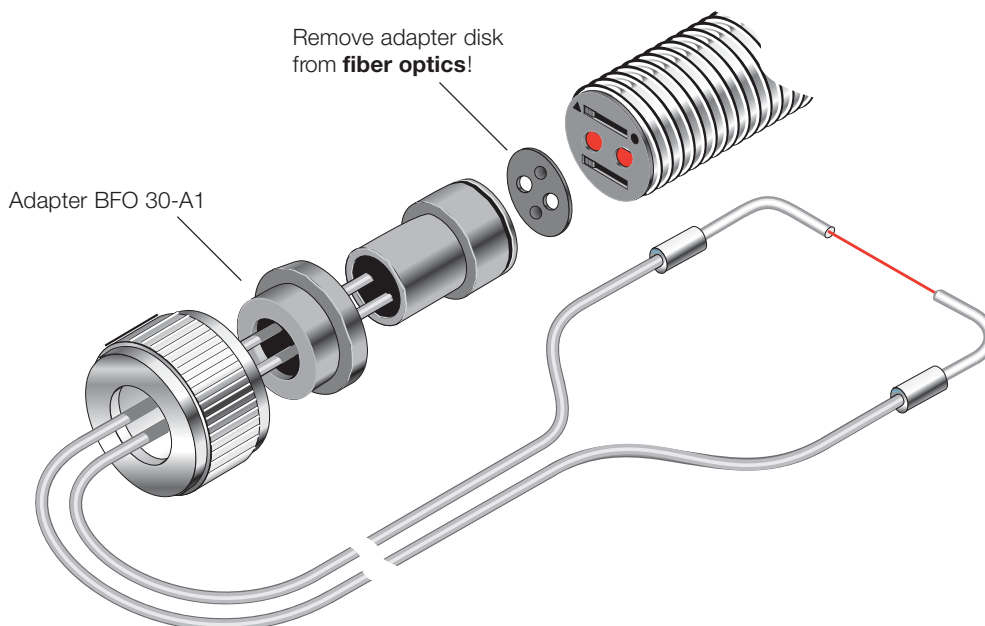


	200 mm 700 mm	200 mm 700 mm	200 mm 700 mm	200 mm 2000 mm	200 mm 2000 mm
	PX0380	PX0285	PX0288	PX0284 Approval for the automobile industry	PX0294 Approval for the automobile industry
	BFO 18A-LAA-UZG-20- BFO 18A-LAA-MZG-20-	BFO 18A-LCC-UZG-20- BFO 18A-LCC-SMG-20-	BFO 18A-LEE-UZG-20- BFO 18A-LEE-MZG-20- BFO 18A-LEE-SMG-20-	BFO 18V-LCC-MZG-23- BFO 18V-LCC-SMG-23-	BFO 18V-LDD-MZG-23- BFO 18V-LDD-SMG-23-
	2 mm	2 mm	2 mm	2 mm	2 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)

For BOS 30M-... use Adapter BFO 30-A1!
see page **2.3.17**

Installation note

BOS 30M with BFO 18V



2.2

2.3

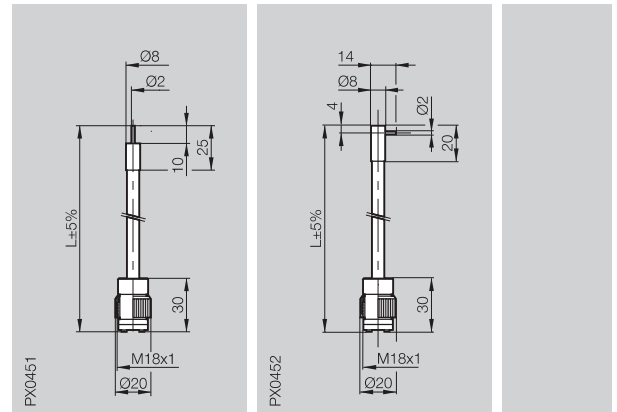
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Diffuse with	BOS 18M-...-PD-.../BOS 18M-...-1PF-...	Sensing distance
	BOS 30M-...	Sensing distance
Retroreflective with	BOS 18M-...-PD-.../BOS 18M-...-1PF-...	Range
	BOS 30M-...	Range

10 mm/50 mm	10 mm/50 mm
300 mm/1000 mm	300 mm/1000 mm



Ordering code	Type	UZG		
	Type	MZG	BFO 18A-XAG-MZG-15-	BFO 18A-XAF-MZG-15-
	Type	SMG		BFO 18A-XAF-SMG-15-
Diameter of glass fiber bundle			1.5 mm	1.5 mm
Max. pull force on fiber optics and connection parts			80 N	80 N
Min. bending radius			60 mm	60 mm
For use 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-S4-Y	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)
	BOS 18M-PA-1PF-...	yes	yes	yes
	BOS 30M-...	no	no	no
Sensing distance with	BOS 18M-PA-1PD-...	10 mm	10 mm	10 mm
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	10 mm	10 mm	10 mm
	BOS 18M-...-1PF-...	50 mm	50 mm	50 mm
	BOS 30M-...			
Range with	BOS 18M-PA-1PD-...	300 mm	300 mm	300 mm
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	300 mm	300 mm	300 mm
	BOS 18M-...-1PF-...	1000 mm	1000 mm	1000 mm
	BOS 30M-...			

Sensing distances referenced to Kodak gray card 90 % Reflexion.

Diffuse with glass fiber optics used as retroreflective:
Ranges are referenced to BOS R-1 reflector.

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

Please append the desired length L of the fiber optics cable to the ordering code!

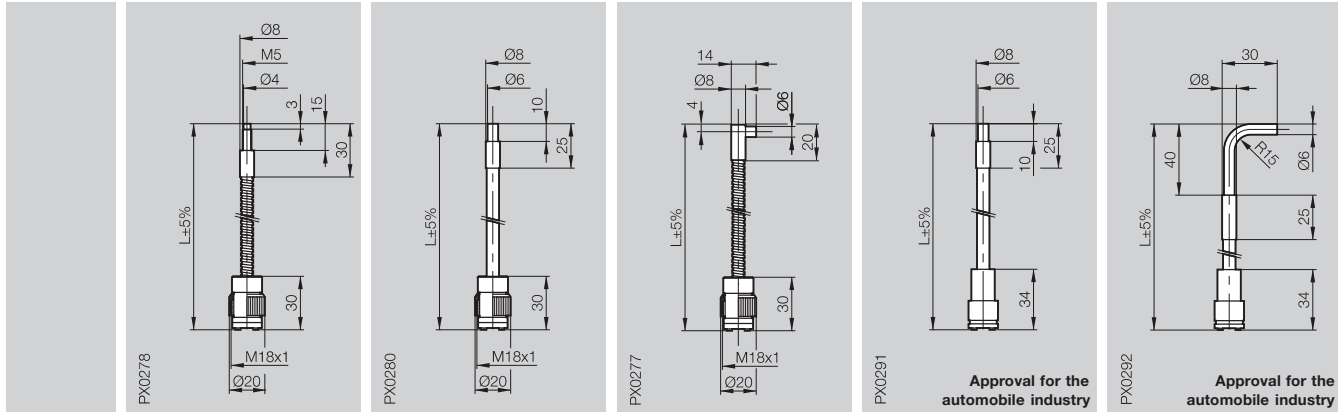
Corrections from 0.5 m to max. 2 m possible.

Example:

BFO 18...-30-**0.5** for **0.5 m** fiber length

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

20 mm/100 mm	20 mm/100 mm	20 mm/100 mm	20 mm	20 mm
500 mm/1000 mm	500 mm/1000 mm	500 mm/1000 mm	200 mm	200 mm
			500 mm	500 mm
			2000 mm	2000 mm

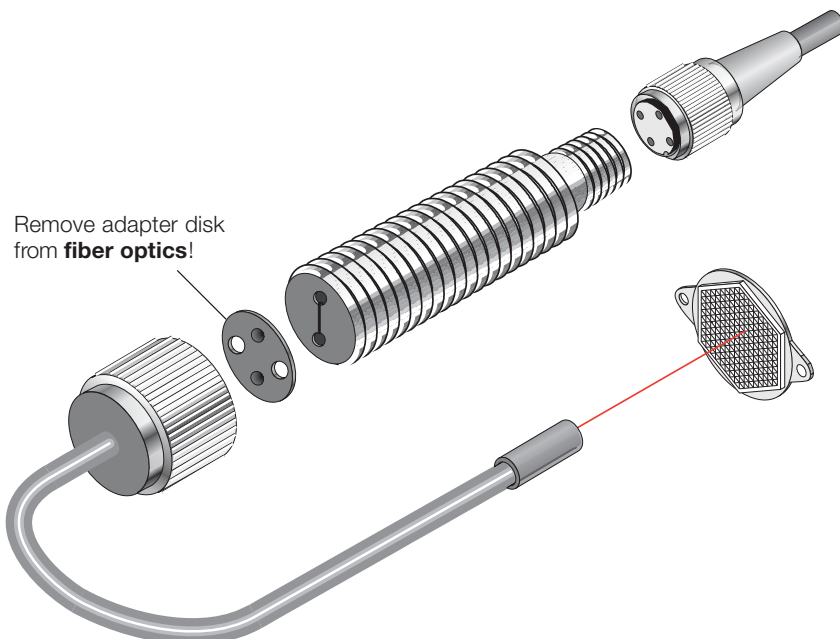


BFO 18A-XAA-UZG-30-	BFO 18A-XAC-SMG-30-	BFO 18A-XAE-UZG-30-	BFO 18V-XAC-MZG-30-	BFO 18V-XAD-MZG-30-
BFO 18A-XAA-MZG-30-		BFO 18A-XAE-MZG-30-	BFO 18V-XAC-SMG-30-	BFO 18V-XAD-MZG-30-
BFO 18A-XAA-SMG-30-		BFO 18A-XAE-SMG-30-		BFO 18V-XAD-SMG-30-
3 mm	3 mm	3 mm	3 mm	3 mm
80 N	80 N	80 N	80 N	80 N
60 mm	60 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	200 mm	200 mm
100 mm	100 mm	100 mm	500 mm	500 mm
500 mm	500 mm	500 mm	2000 mm	2000 mm
500 mm	500 mm	500 mm		
1000 mm	1000 mm	1000 mm		

For BOS 30M-... use Adapter BFO 30-A1!
see page 2.3.17

Installation note

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



2.2

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...

Optical distance sensors are used when distances of objects need to be measured or monitored or their precise position determined.

Distance measurement is based on the principles

of triangulation or speed of flight measurement.

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.

Applications

- Control tasks (grinding machines)
- Sensing
- Object positioning
- Level detection



Type	Working range	Resolution	Light type	Analog Output	Output	U _B	Connection	Page
			Red light Laser light	0...10 V 1...10 V 4...20 mA	Interface RS485 PNP-Transistor Alarm output	10...30 V DC 15...30 V DC 18...30 V DC	M8 connector, 4-pin M12 connector, 5-pin M12 connector, 8-pin Cable	
 Distance sensor								
BOD 6K-RA01-S75-C	20...80 mm	n.a.	■	■	■	■	■	2.2.35
BOD 6K-RA01-C-02	20...80 mm	n.a.	■	■	■	■	■	2.2.35
BOD 18KF-RA01-S4-C	50...100 mm	1 mm	■	■		■	■	2.2.37
BOD 18KF-RA01-C-02	50...100 mm	1 mm	■	■		■	■	2.2.37
BOD 26K-LA01-S4-C	45...85 mm	80 µm	■	■		■	■	2.2.39
BOD 26K-LA01-C-06	45...85 mm	80 µm	■	■		■	■	2.2.39
BOD 26K-LA02-S4-C	45...85 mm	20 µm	■	■		■	■	2.2.39
BOD 26K-LA02-C-06	45...85 mm	20 µm	■	■		■	■	2.2.39
BOD 26K-LB04-S115-C	30...100 mm	70 µm	■	■	■	■	■	2.2.41
BOD 26K-LBR04-S115-C	30...100 mm	70 µm	■	■	■	■	■	2.2.41
BOD 26K-LB05-S115-C	80...300 mm	220 µm	■	■	■	■	■	2.2.43
BOD 26K-LBR05-S115-C	80...300 mm	220 µm	■	■	■	■	■	2.2.43
BOD 26K-LB06-S92-C	30...100 mm	70 µm	■	■	■	■	■	2.2.45
BOD 26K-LB07-S92-C	80...300 mm	220 µm	■	■	■	■	■	2.2.45
BOD 63M-LA01-S115	500...6000 mm	2 mm	■	■	■	■	■	2.2.47
BOD 63M-LB01-S115	500...6000 mm	2 mm	■	■	■	■	■	2.2.47
BOD 66M-RA01-S92-C	100...600 mm	0.5 mm	■	■	■	■	■	2.2.51
BOD 66M-RB01-S92-C	100...600 mm	0.5 mm	■	■	■	■	■	2.2.51
BOD 66M-LA04-S92-C	200...2000 mm	5 mm	■	■	■	■	■	2.2.53
BOD 66M-LB04-S92-C	200...2000 mm	5 mm	■	■	■	■	■	2.2.53

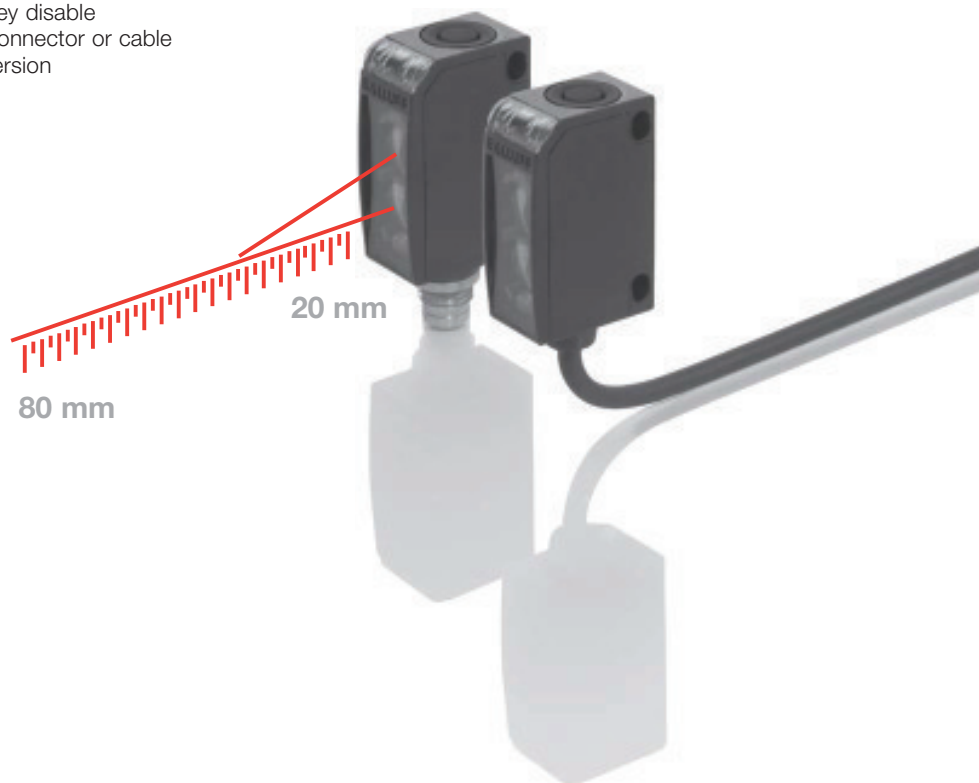
2.2**2.3**Photoelectric
sensors
accessories
page 2.3.2 ...**5**Connectors ...
page 5.2 ...

The **BOD 6K** provides a distance-proportional analog output signal with falling voltage over a fixed measuring range of 20 to 80 mm.

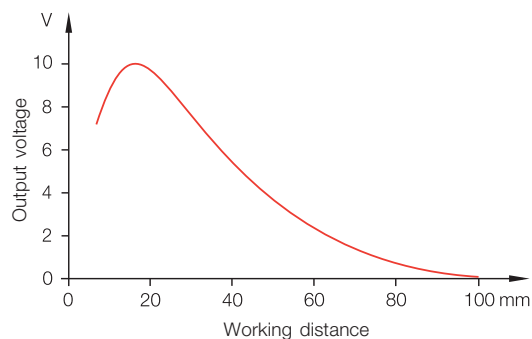
With an output, adjustable using teach-in, the sensor can also be used as a diffuse type with background suppression.

Features

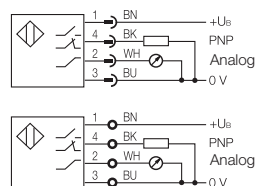
- Fixed measuring range between 20...80 mm
- Analog output 0...10 V
- Adjustable background suppression
- Output PNP, NO/NC
- Teach-in
- Key disable
- Connector or cable version



Analog output BOD 6K-RA01



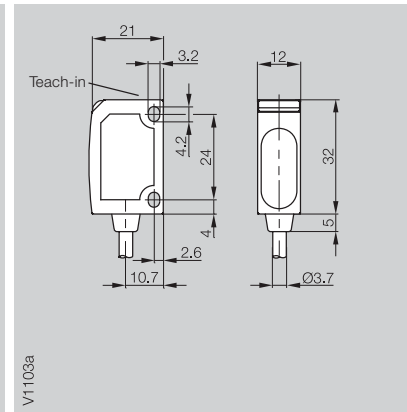
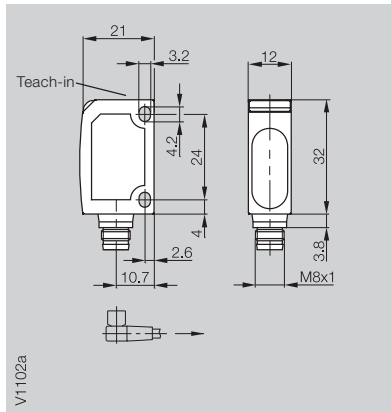
Wiring diagram



Recommended accessories please order separately



Series	BOD 6K	BOD 6K
Working range	20...80 mm	20...80 mm
Measuring range	60 mm	60 mm

**Distance sensor**

PNP	BOD 6K-RA01-S75-C	BOD 6K-RA01-C-02
Electrical data		
Supply voltage U_B	15...30 V DC	15...30 V DC
Ripple	$\leq 15\%$ of U_B	$\leq 15\%$ of U_B
No-load supply current I_0 max.	≤ 30 mA at 24 V DC	≤ 30 mA at 24 V DC
Analog output	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)
Cutoff frequency	200 Hz	200 Hz
Switching output	PNP-Transistor	PNP-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	100 mA	100 mA
Voltage drop U_d at I_o	≤ 2.4 V	≤ 2.4 V
Settings	Teach-in	Teach-in
Optical data		
Emitter, light type	LED, red light	LED, red light
Wavelength	660 nm	660 nm
Light spot diameter	5x5 mm at 60 mm	5x5 mm at 60 mm
Time data		
On-/off-delay	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz
Indicators		
Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions	21x32x12 mm	21x32x12 mm
Connection	M8 connector, 4-pin	2 m cable, PVC
No. of wires x cross-section		4x0.14 mm ²
Housing material	ABS	ABS
Optical surface	PMMA	PMMA
Weight	40 g	120 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-20...+60 °C	-20...+60 °C
Ambient light rejection	5 kLux	5 kLux

Measurement values referenced to Kodak gray card 90% Reflexion, 100x100 mm.



Connector orientation

2.2**2.3**

Photoelectric
sensors
accessories
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Connectors ...
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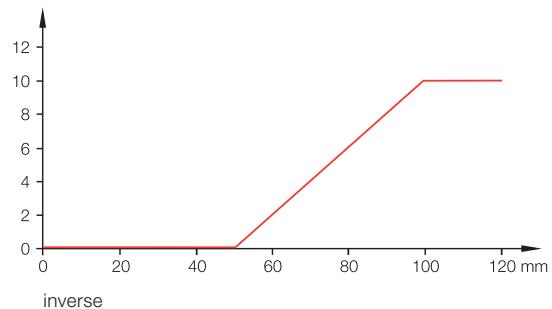
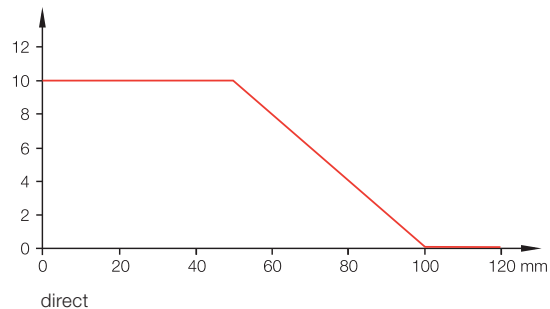
The **BOD 18KF** provides an analog signal proportional to the distance of the object. At the same time the distance is visualized by the light intensity of the yellow LED. The red LED turns on when the target is outside the measuring range.

Features

- Fixed measuring range between 50...100 mm
- Analog output 0...10 V
- Output curve can be rising or falling (direct/inverse)
- Resolution 1 mm
- Connector or cable version



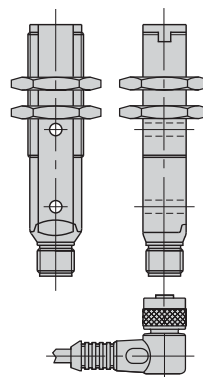
Analog output



Wiring diagrams



Connector orientation



Recommended accessories

please order separately



Mounting clamp
BOS 18,0-KB-1



Mounting
bracket
BES 18-HW-1

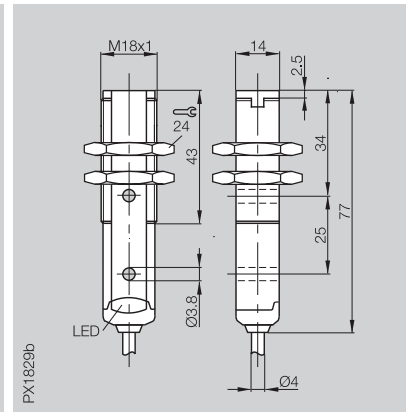
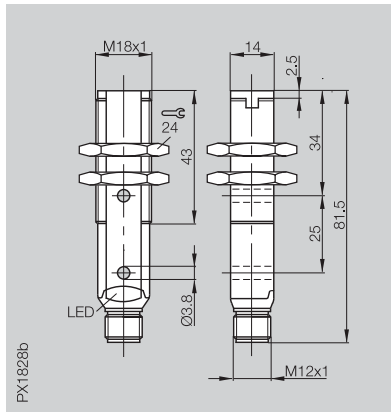


Connector
Straight BKS-_ 19
Right-angle BKS-_ 20

Series	BOD 18KF	BOD 18KF
Working range	50...100 mm	50...100 mm
Measuring range	50 mm	50 mm

**Distance sensor**

PNP	BOD 18KF-RA01-S4-C	BOD 18KF-RA01-C-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 30 mA	≤ 30 mA
Analog output	0...10 V	0...10 V
Output curve	Rising/falling	Rising/falling
Settings	fixed	fixed
Optical data		
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
Resolution	1 mm/200 mV	1 mm/200 mV
Time data		
Limit frequency f	150 Hz	150 Hz
Indicators		
Output function*	LED yellow	LED yellow
Measuring range**	LED red	LED red
Mechanical data		
Dimensions	M18×81.5 mm	M18×77 mm
Connection	M12 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section		4×0.14 mm ²
Housing material	PBT	PBT
Lens material	PMMA	PMMA
Weight	25 g	75 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C

**2.2****2.3**Photoelectric
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accessories
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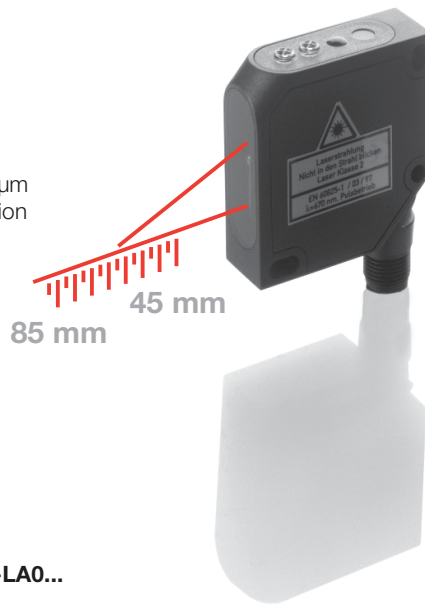
Measurement values referenced to Kodak gray card 90% Reflexion, 100×100 mm.

*Proportional to output

**Turns on when object is outside the measuring range

Features

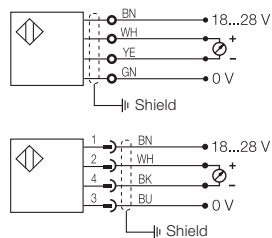
- Fixed measuring range between 45...85 mm
- Analog output 0...10 V
- Resolution 20 μm or 80 μm
- Connector or cable version



Analog output BOD 26K-LA0...



Wiring diagrams



Recommended accessories
please order separately



Mounting bracket
BOS 26-HW-1



Connector
BKS-S 19-14-PU-05

Series	
Working range	
Measuring range	



Distance sensor

Electrical data

Supply voltage U_B
Ripple
No-load supply current I_0 max.
Analog output
Settings

Optical data

Emitter, light type
Wavelength
Laser class
Light spot diameter
Temperature drift
Resolution
Linearity

Time data

Cutoff frequency
Rise time (from 10 % to 90 %)
Fall-off time (from 90 % to 10 %)

Indicators

Power-on indicator
Contamination indicator

Mechanical data

Dimensions
Connection
No. of wires $\times$ cross-section
Housing material
Optical surface
Weight

Ambient data

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

Measured values referenced to
Kodak gray card 90 % Reflexion.

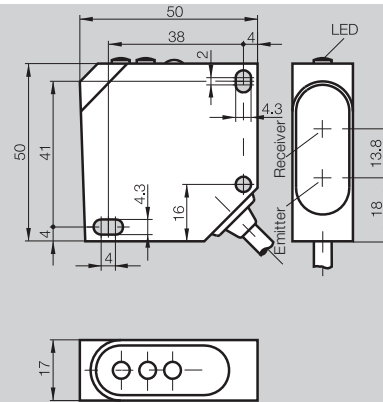
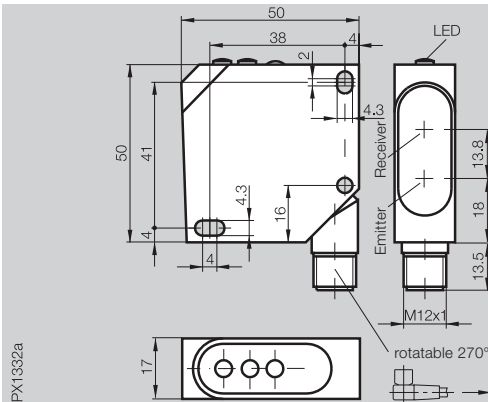


Connector orientation



BOD 26K
45...85 mm
40 mm

BOD 26K
45...85 mm
40 mm



BOD 26K-LA01-S4-C

BOD 26K-LA02-S4-C

BOD 26K-LA01-C-06

BOD 26K-LA02-C-06

18...28 V DC
10 %
≤ 35 mA
0...10 V (max. 3 mA)
fixed

18...28 V DC
10 %
≤ 35 mA
0...10 V (max. 3 mA)
fixed

18...28 V DC
10 %
≤ 35 mA
0...10 V (max. 3 mA)
fixed

18...28 V DC
10 %
≤ 35 mA
0...10 V (max. 3 mA)
fixed

Laser, red light
670 nm
2
≤ 0.8 mm at 65 mm
18 µm/°C
80 µm
≤ 1 %

Laser, red light
670 nm
2
≤ 0.8 mm at 65 mm
18 µm/°C
20 µm
≤ 1 %

Laser, red light
670 nm
2
≤ 0.8 mm at 65 mm
18 µm/°C
80 µm
≤ 1 %

Laser, red light
670 nm
2
≤ 0.8 mm at 65 mm
18 µm/°C
20 µm
≤ 1 %

400 Hz
3 ms
2 ms

40 Hz
30 ms
20 ms

400 Hz
3 ms
2 ms

40 Hz
30 ms
20 ms

LED green
LED red

LED green
LED red

LED green
LED red

LED green
LED red

50×50×17 mm
M12 connector, 4-pin

50×50×17 mm
M12 connector, 4-pin

50×50×17 mm
6 m cable, PVC

50×50×17 mm
6 m cable, PVC

impact-resistant ABS
PMMA
40 g

impact-resistant ABS
PMMA
40 g

impact-resistant ABS
PMMA
600 g

impact-resistant ABS
PMMA
600 g

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

IP 67
yes
yes

EN 60947-5-2
0...+45 °C

EN 60947-5-2
0...+45 °C

EN 60947-5-2
0...+45 °C

EN 60947-5-2
0...+45 °C

2.2

2.3

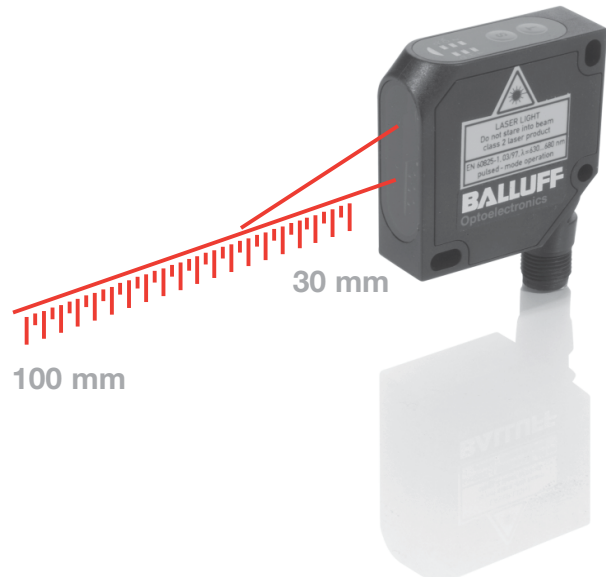
Photoelectric sensors
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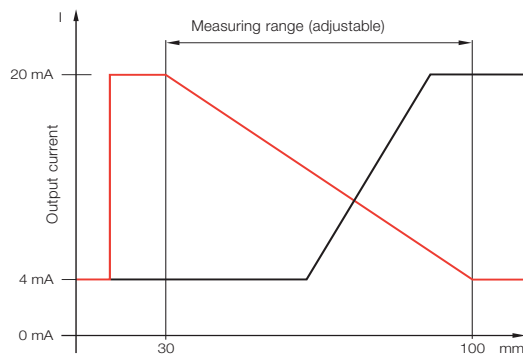
Connectors ...
page 5.2 ...

Features

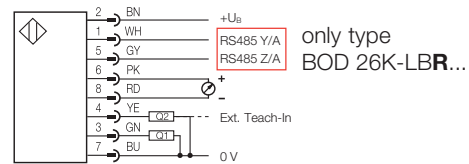
- Adjustable measuring range between 30...100 mm
- Analog output 4...20 mA adjustable: rising or falling
- Option with RS485-Interface (for Master-slave mode) and for visualization on a PC (additional software required)
- 2 switching outputs with adjustable switch points
- Teach-in
- Adjustable averaging
- Numerous additional functions



Analog output BOD 26K-LB(R)04...



Wiring diagram



Connector diagram



Recommended accessories please order separately



Mounting bracket
BOS 26-HW-1



Connector
Straight, 5 m
BKS-S139-PU-05
Right-angle, 5 m
BKS-S138-PU-05



Photoelectric Sensors

BOD 26K-LB
Laser Distance Sensors

Series	BOD 26K	BOD 26K
Working range	30...100 mm	30...100 mm
Measuring range	adjustable max. 70 mm	adjustable max. 70 mm



Distance sensor

PNP	BOD 26K-LB04-S115-C	BOD 26K-LBR04-S115-C
Electrical data		
Supply voltage U_B	18...30 V DC	18...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA
Analog output	4...20 mA	4...20 mA
Interface		RS485
Switching output	2 × PNP-Transistor	2 × PNP-Transistor
Output current	100 mA	100 mA
Switching type	Light- or dark-on	Light- or dark-on
Settings	Teach-in	Teach-in
Additional functions		Master-slave mode
Optical data		
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
Time data		
Switching frequency f	1 kHz	1 kHz
Time functions	50 ms pulse extension	50 ms pulse extension
Indicators		
Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions	50×50×17 mm	50×50×17 mm
Connection	M12 connector, 8-pin	M12 connector, 8-pin
Housing material	impact-resistant ABS	impact-resistant ABS
Optical surface	PMMA	PMMA
Weight	43 g	43 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C

Measured values referenced to Kodak gray card 90 % Reflexion.



Connector orientation

2.2

2.3

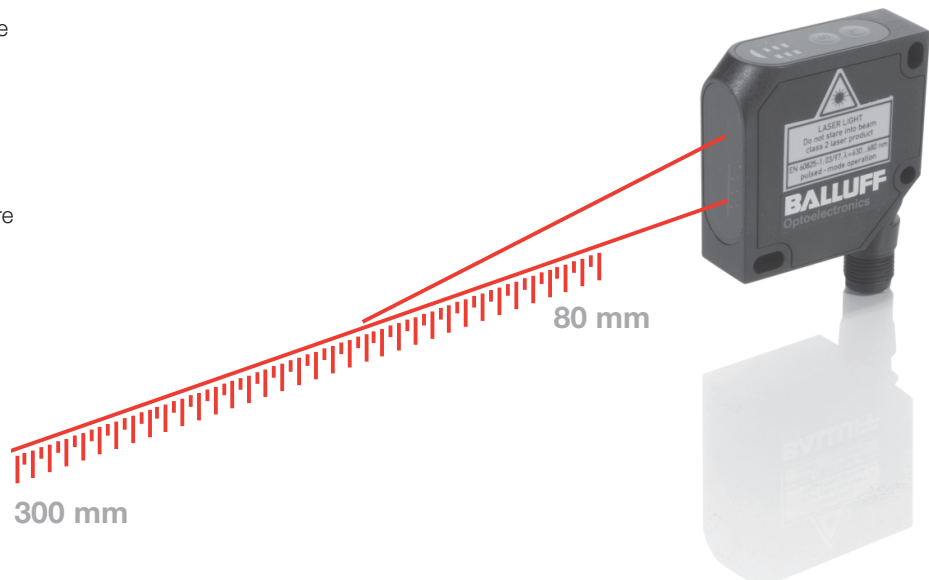
Photoelectric
sensors
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5

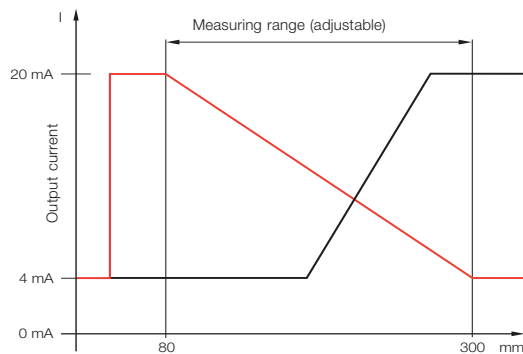
Connectors ...
page 5.2 ...

Features

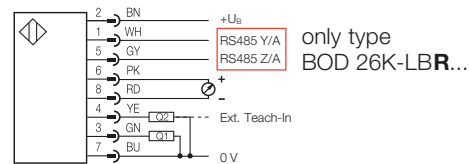
- Measuring range adjustable between 80...300 mm
- Analog output 4...20 mA adjustable: rising or falling
- Option with RS485-Interface (for Master-slave mode) and for visualization on a PC (additional software required)
- 2 switching outputs with adjustable switch points
- Teach-in
- Adjustable averaging
- Numerous additional functions



Analog output BOD 26K-LB(R)05...



Wiring diagram



Connector diagram



Recommended accessories please order separately



Mounting bracket
BOS 26-HW-1



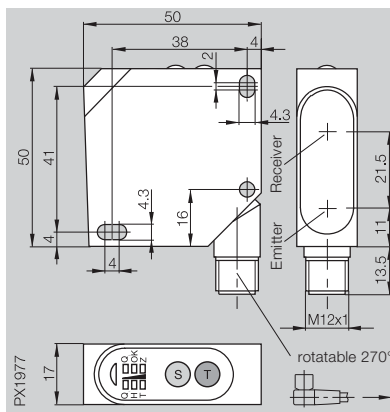
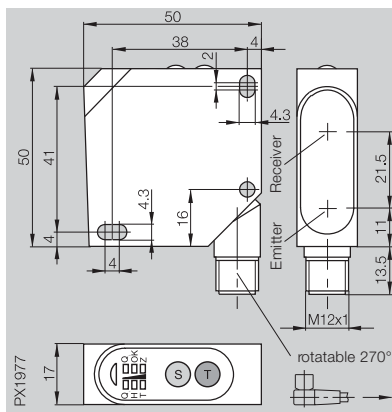
Connector
Straight, 5 m
BKS-S139-PU-05
Right-angle, 5 m
BKS-S138-PU-05



Photoelectric Sensors

BOD 26K-LB
Laser Distance Sensors

Series	BOD 26K	BOD 26K
Working range	80...300 mm	80...300 mm
Measuring range	adjustable max. 220 mm	adjustable max. 220 mm



Distance sensor

PNP	BOD 26K-LB05-S115-C	BOD 26K-LBR05-S115-C
Electrical data		
Supply voltage U_B	18...30 V DC	18...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA
Analog output	4...20 mA	4...20 mA
Interface		RS485
Switching output	2 × PNP-Transistor	2 × PNP-Transistor
Output current	100 mA	100 mA
Switching type	Light- or dark-on	Light- or dark-on
Settings	Teach-in	Teach-in
Additional functions		Master-slave mode
Optical data		
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
Time data		
Switching frequency f	1 kHz	1 kHz
Time functions	50 ms pulse extension	50 ms pulse extension
Indicators		
Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions	50×50×17 mm	50×50×17 mm
Connection	M12 connector, 8-pin	M12 connector, 8-pin
Housing material	impact-resistant ABS	impact-resistant ABS
Optical surface	PMMA	PMMA
Weight	43 g	43 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C

Measured values referenced to Kodak gray card 90 % Reflexion.



Connector orientation

2.2

2.3

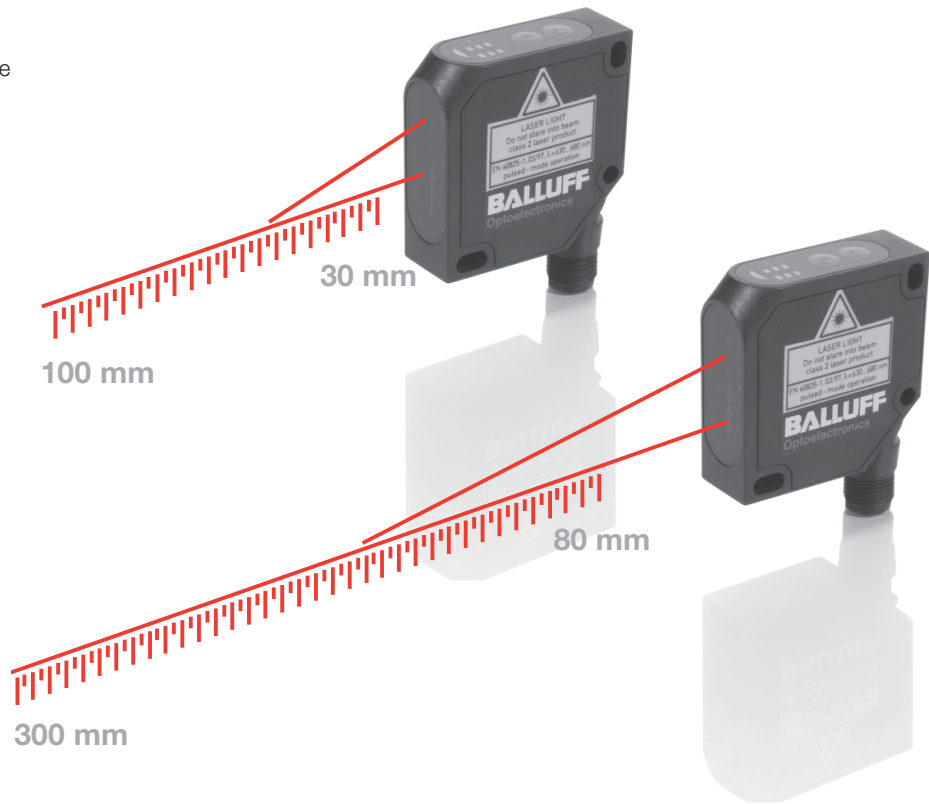
Photoelectric sensors
accessories
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5

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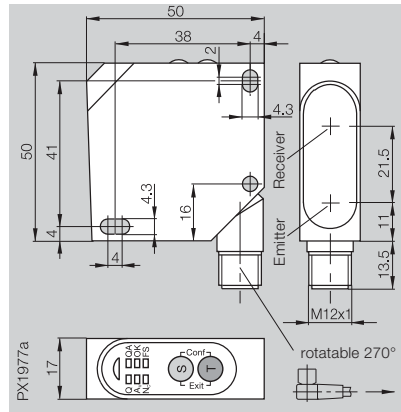
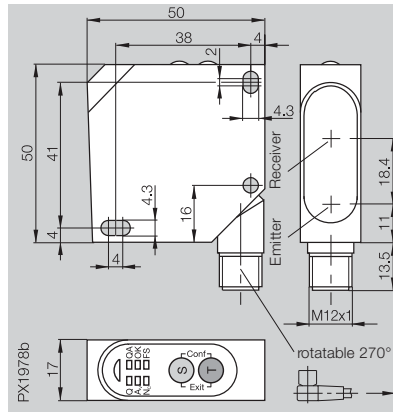
Features

- Adjustable measuring range
- Analog output 4...20 mA
adjustable: rising or falling
- 1 switching output with
adjustable switch points
- Teach-in
- Laser beam can be
turned off





Series	BOD 26K	BOD 26K
Working range	30...100 mm	80...300 mm
Measuring range	adjustable max. 70 mm	adjustable max. 220 mm



Distance sensor

PNP	BOD 26K-LB06-S92-C	BOD 26K-LB07-S92-C
Electrical data		
Supply voltage U_B	18...30 V DC	18...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 40 mA	≤ 40 mA
Analog output	4...20 mA	4...20 mA
Switching output	1 x PNP-Transistor	1 x PNP-Transistor
Output current	100 mA	100 mA
Switching type	Light- or dark-on	Light- or dark-on
Settings	Teach-in	Teach-in
Optical data		
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	≤ 70 μ m	≤ 220 μ m
Linearity	≤ 175 μ m	≤ 550 μ m
Time data		
Switching frequency f	1 kHz	1 kHz
Time functions	50 ms pulse extension	50 ms pulse extension
Indicators		
Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions	50x50x17 mm	50x50x17 mm
Connection	M12 connector, 5-pin	M12 connector, 5-pin
Housing material	impact-resistant ABS	impact-resistant ABS
Optical surface	PMMA	PMMA
Weight	43 g	43 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C

Measured values referenced to Kodak gray card 90 % Reflexion.



Connector orientation

2.2

2.3

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Connectors ...
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The **BOD 63M** in its tough metal housing has a working range of 200...2000/6000 mm. It features adjustable background fade-out and an analog output of 0...10 V or 4...20 mA.

Speed of light measurement enables longer ranges than triangulation-based or energetic diffuse sensors.

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 great distances and operating in difficult conditions. e.g. if sensing must be performed "externally" in process 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 particular sensing range
- Background suppression (HGA) over the entire working range
- Analog, binary 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 angle to the light beam
- Flexible solutions for position sensing, level detection and monitoring, distance and height measurement, quality assurance applications



Laser class
(see page 2.0.18)

The emitter meets Laser Class 2 per EN 60825-1:2001-11. This means no additional safety measures are necessary.

Install the device so that the laser warning label is easily visible.



Recommended accessories please order separately

Connector
Straight, 5 m
BKS-S139-PU-05
Right-angle, 5 m
BKS-S138-PU-05

Mounting bracket
BOD 63-HW-1

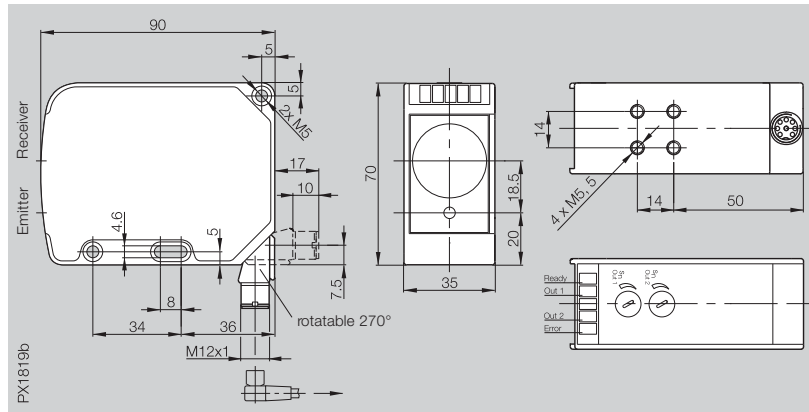


IO-Link

These sensors are also available as IO-Link types. Please request our separate IO-Link brochure!



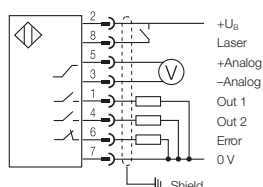
Series	BOD 63M	BOD 63M
Working range	200...2000 mm	200...2000 mm
Measuring range	1800 mm	1800 mm



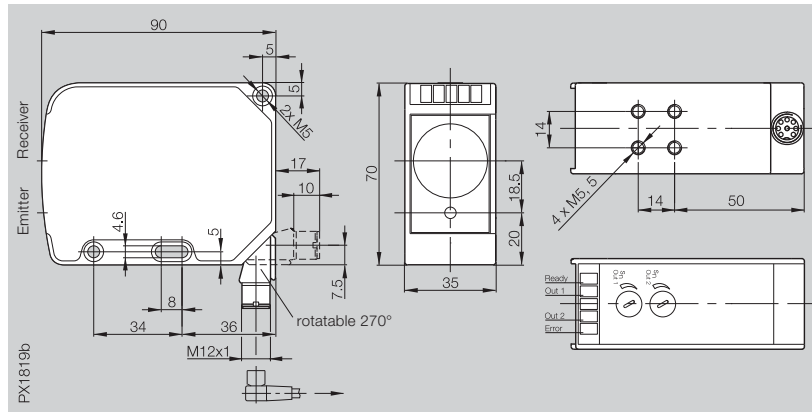
Ordering code	BOD 63M-LA02-S115	BOD 63M-LB02-S115
Electrical data		
Supply voltage U_B	15...30 V DC	15...30 V DC
No-load current I_0 max. at U_B 24 V DC	≤ 75 mA	≤ 75 mA
Analog output	0...10 V	4...20 mA
Switching outputs	2x PNP normally open	2x PNP normally open
Error output	PNP normally closed	PNP normally closed
Output current	200 mA	200 mA
Switching output	200 mA	200 mA
Error output	200 mA	200 mA
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V
Settings	4-turn potentiometer	4-turn potentiometer
Optical data		
Emitter, light type	Laser, red light	Laser, red light
Wavelength	660 nm	660 nm
Laser class	2 per EN 60825	2 per EN 60825
Light spot diameter	10 mm	10 mm
Resolution	≤ 1 mm	≤ 1 mm
Gray value shift	≤ 2 %	≤ 2 %
Repeat accuracy per BWN	$\leq \pm 3$ mm	$\leq \pm 3$ mm
Temperature drift	≤ 0.6 mm/°C	≤ 0.6 mm/°C
Linearity	$\leq \pm 2$ %	$\leq \pm 2$ %
Switching hysteresis	≤ 10 mm	≤ 10 mm
Time data		
Ready delay	≤ 20 ms	≤ 20 ms
Response time	≤ 2 ms	≤ 2 ms
Switching frequency f	≥ 250 Hz	≥ 250 Hz
Indicators		
Supply voltage	LED green	LED green
Switching output	2x LED yellow	2x LED yellow
Stability indicator	LED red	LED red
Mechanical data		
Dimensions	90x70x35 mm	90x70x35 mm
Connection	M12 connector, 8-pin	M12 connector, 8-pin
Housing material	Anodized Al	Anodized Al
Optical surface	Glass	Glass
Weight incl. holder	260 g	260 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C
Ambient light rejection	≤ 10 kLux	≤ 10 kLux



Wiring diagram



Series	BOD 63M	BOD 63M
Working range	200...6000 mm	200...6000 mm
Measuring range	5800 mm	5800 mm

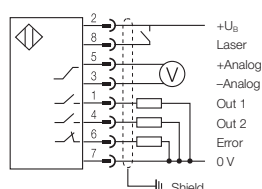


Ordering code	BOD 63M-LA04-S115	BOD 63M-LB04-S115
Electrical data		
Supply voltage U_B	15...30 V DC	15...30 V DC
No-load current I_0 max. at U_B 24 V DC	≤ 75 mA	≤ 75 mA
Analog output	0...10 V	4...20 mA
Switching outputs	2x PNP normally open	2x PNP normally open
Error output	PNP normally closed	PNP normally closed
Output current	200 mA	200 mA
Switching output	200 mA	200 mA
Error output	200 mA	200 mA
Voltage drop U_d at I_e	≤ 2 V	≤ 2 V
Settings	4-turn potentiometer	4-turn potentiometer
Optical data		
Emitter, light type	Laser, red light	Laser, red light
Wavelength	660 nm	660 nm
Laser class	2 per EN 60825	2 per EN 60825
Light spot diameter	10 mm	10 mm
Resolution	≤ 1 mm	≤ 1 mm
Gray value shift	≤ 1.5 %	≤ 1.5 %
Repeat accuracy per BWN	$\leq \pm 4$ mm	$\leq \pm 4$ mm
Temperature drift	≤ 1.5 mm/°C	≤ 1.5 mm/°C
Linearity	$\leq \pm 1$ %	$\leq \pm 1$ %
Switching hysteresis	≤ 15 mm	≤ 15 mm
Time data		
Ready delay	≤ 20 ms	≤ 20 ms
Response time	≤ 2 ms	≤ 2 ms
Switching frequency f	≥ 250 Hz	≥ 250 Hz
Indicators		
Supply voltage	LED green	LED green
Switching output	2x LED yellow	2x LED yellow
Stability indicator	LED red	LED red
Mechanical data		
Dimensions	90x70x35 mm	90x70x35 mm
Connection	M12 connector, 8-pin	M12 connector, 8-pin
Housing material	Anodized Al	Anodized Al
Optical surface	Glass	Glass
Weight incl. holder	260 g	260 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C
Ambient light rejection	≤ 10 kLux	≤ 10 kLux



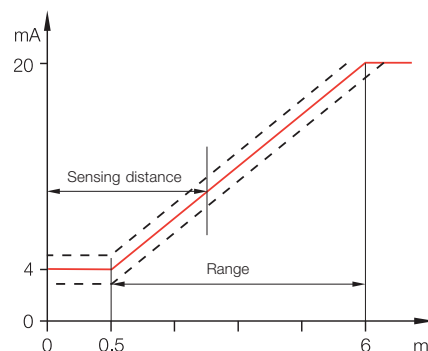
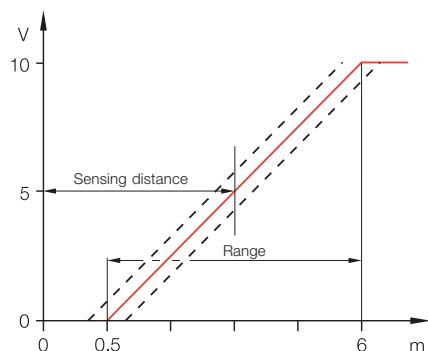
Connector orientation

Wiring diagram

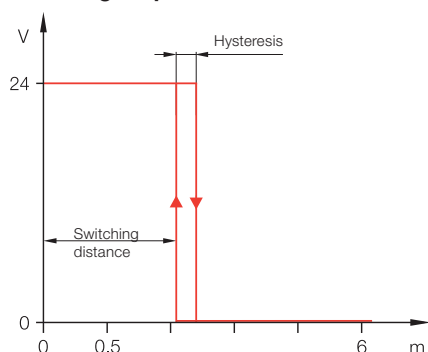




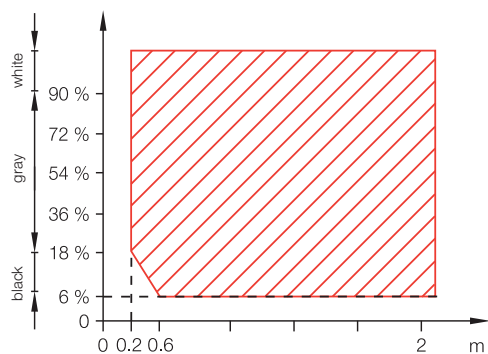
Analog output



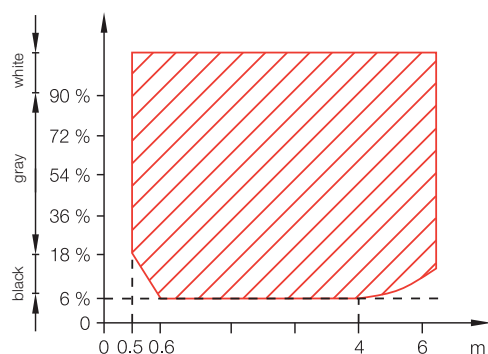
Switching output



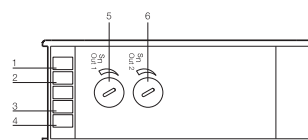
Measuring range BOD 63M-LA/LB02... depending on object reflection



Measuring range BOD 63M-LA/LB04... depending on object reflection



Indicators and operating elements



- 1 Power (green)
- 2 Switching output Out 1 (yellow)
- 3 Switching output Out 2 (yellow)
- 4 Stability indicator (red)
- 5 Potentiometer Out 1, 4 turns
- 6 Potentiometer Out 2, 4 turns

Connector diagram

Pin outs	Cable color	Out 1
1	white	Out 1
2	brown	+U _B
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 ring	Braided shield	Shield

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 diffuse type 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

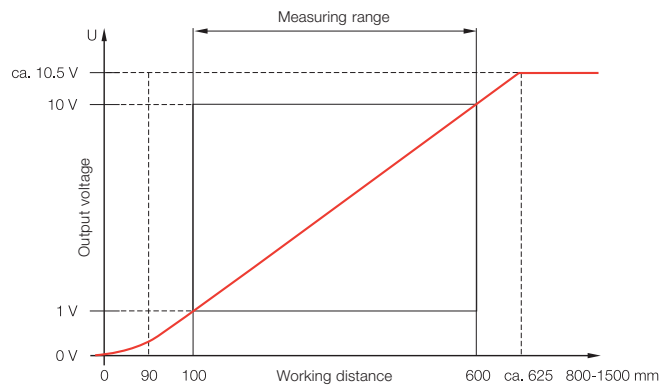
- Extremely color- and ambient light insensitive
- Working range 100...600 mm
- Resolution 0.5 mm
- Analog output with voltage (1...10 V) or current (4...20 mA)
- PNP output teachable
- Tough metal housing
- Scratch-resistant glass optics

Applications

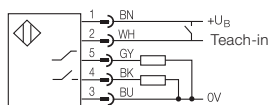
- Level monitoring
- Positioning tasks
- Winding diameter measurement
- Profile measurement
- Sag control



Analog output BOD 66M-R...



Wiring diagram



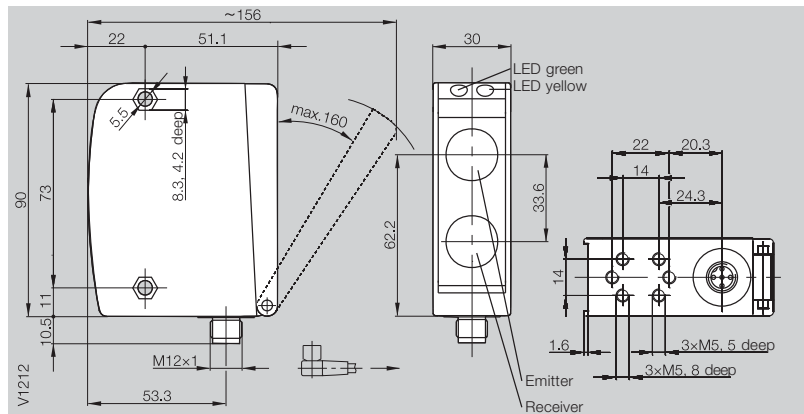
Connector diagram



Recommended accessories please order separately



Series	BOD 66M	BOD 66M
Working range	100...600 mm	100...600 mm
Measuring range	500 mm	500 mm

**Distance sensor**

PNP	BOD 66M-RA01-S92-C	BOD 66M-RB01-S92-C
Electrical data		
Supply voltage U_B	18...30 V DC	18...30 V DC
Ripple	$\leq 15\%$ of U_B	$\leq 15\%$ of U_B
No-load supply current I_0 max.	≤ 150 mA	≤ 150 mA
Analog output	1...10 V	4...20 mA
Switching output	PNP-Transistor	PNP-Transistor
Switching type	Light-on	Light-on
Output current	250 mA	250 mA
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V
Settings	Teach-in	Teach-in
Optical data		
Emitter, light type	LED, red light	LED, red light
Wavelength	660 nm	660 nm
Light spot diameter	ca. 10 mm	ca. 10 mm
Resolution	≤ 0.5 mm	≤ 0.5 mm
Gray value shift (90 %/6 %)	$\leq 1\%$	$\leq 1\%$
Repeat accuracy	$\pm 0.5\%$	$\pm 0.5\%$
Temperature drift	0.2 mm/°C	0.2 mm/°C
Absolute measuring accuracy**	$\pm 2\%$ (of the measured distance)	$\pm 2\%$ (of the measured distance)
Time data		
On-/off-delay	≤ 100 ms	≤ 100 ms
Ready delay	≤ 300 ms	≤ 300 ms
Switching frequency f	20...100 Hz*	20...100 Hz*
Indicators		
Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions	73×90×30 mm	73×90×30 mm
Connection	M12 connector, 5-pin	M12 connector, 5-pin
Housing material	anodized Al	anodized Al
Optical surface	Glass	Glass
Weight	250 g	250 g
Ambient data		
Degree of protection per IEC 60529	IP 65	IP 65
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-20...+50 °C	-20...+50 °C
Ambient light rejection	≤ 5 kLux	≤ 5 kLux

*depending on object reflectivity

**Target $\geq 50 \times 50$ mm²

Connector orientation

2.2

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

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page 5.2 ...

The BOD 66M-L_04

features an analog as well as an additional switching output.

It measures object position over a range of 200...2000 mm. The switching output (with background fade-out) can also be set in the same range using a teach-in procedure. Forward-looking laser and CCD technology ensure accuracy and reliability.

Features

- Laser class 2
- Small light spot over the entire range
- CCD array for high color independence and ambient light rejection
- Analog current or voltage output over 200...2000 mm
- PNP output, teach-in
- Tough metal housing
- Scratch-resistant glass optics

Applications

- Background suppression up to 2 m
- Analog measurement up to 2 m of distance
- Positioning tasks

Laser class

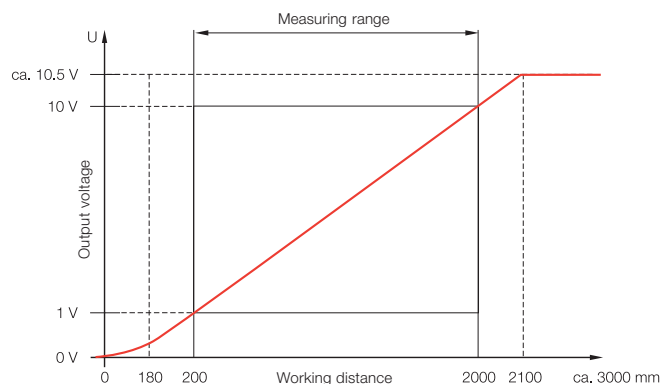
(see page 2.0.18)

The emitter meets Laser Class 2 per EN 60825-1:2001-11. This means no additional safety measures are necessary.

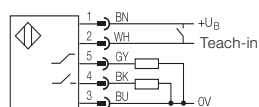
Install the device so that the laser warning label is easily visible.



Analog output BOD 66M-L...



Wiring diagram

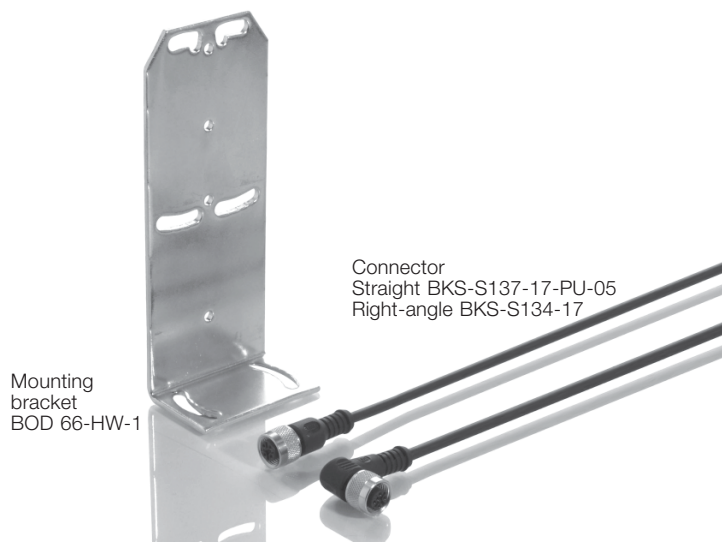


Connector diagram



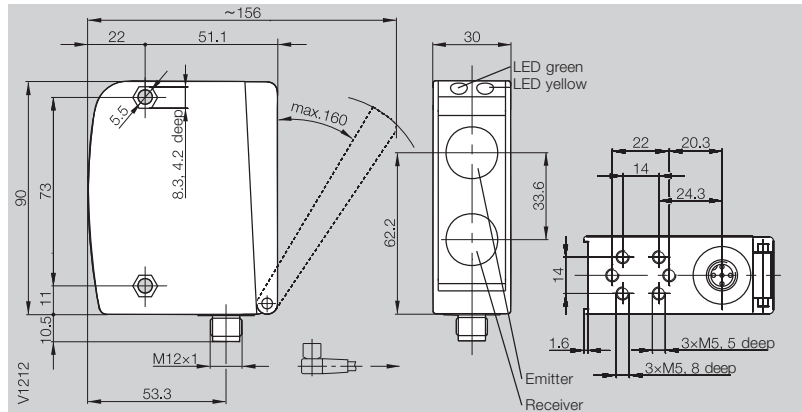
Recommended accessories

please order separately





Series	BOD 66M	BOD 66M
Working range	200...2000 mm	200...2000 mm
Measuring range	1800 mm	1800 mm



Distance sensor

PNP	BOD 66M-LA04-S92-C	BOD 66M-LB04-S92-C
Electrical data		
Supply voltage U_B	18...30 V DC	18...30 V DC
Ripple	$\leq 15\%$ of U_B	$\leq 15\%$ of U_B
No-load supply current I_0 max.	≤ 150 mA	≤ 150 mA
Analog output	1...10 V	4...20 mA
Switching output	PNP-Transistor	PNP-Transistor
Switching type	Light-on	Light-on
Output current	250 mA	250 mA
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V
Settings	Teach-in	Teach-in
Optical data		
Emitter, light type	Laser, red light	Laser, red light
Wavelength	660 nm	660 nm
Laser class	2	2
Light spot diameter	$3 \times 12 \text{ mm}^2$ at 2 m	$3 \times 12 \text{ mm}^2$ at 2 m
Resolution	≤ 5 mm	≤ 5 mm
Gray value shift (90 %/6 %)	$\leq 1\%$	$\leq 1\%$
Repeat accuracy	$\pm 0.5\%$	$\pm 0.5\%$
Temperature drift	0.6 mm/°C	0.6 mm/°C
Absolute measuring accuracy**	$\pm 2\%$ (of the measured distance)	$\pm 2\%$ (of the measured distance)
Time data		
On-/off-delay	≤ 100 ms	≤ 100 ms
Ready delay	≤ 300 ms	≤ 300 ms
Switching frequency f	10...100 Hz*	10...100 Hz*
Indicators		
Power-on indicator	LED green	LED green
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions	73x90x30 mm	73x90x30 mm
Connection	M12 connector, 5-pin	M12 connector, 5-pin
Housing material	anodized Al	anodized Al
Optical surface	Glass	Glass
Weight	250 g	250 g
Ambient data		
Degree of protection per IEC 60529	IP 65	IP 65
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-20...+50 °C	-20...+50 °C
Ambient light rejection	≤ 5 kLux	≤ 5 kLux

*depending on object reflectivity

**Target $\geq 50 \times 50 \text{ mm}^2$



→ Connector orientation

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2.3

Photoelectric sensors
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Contrast sensors are high-resolution diffuse sensors that distinguish objects based on their gray values. Color, brightness and reflectivity have a strong effect on the measuring result.

When gray values differ only slightly the measuring distance should be kept equal. The resolution of the sensor decreases with increasing range.

A variety of models with various light types and functions are available.

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



Type	Range	Light type			Output			Output function		Switching frequency	U _B	Connection			Special features	Page
		White light	Red and green light	Laser light	PNP - Transistor	NPN - Transistor	Analog output	Light-on	Dark-on			10...30 V DC	M8 connector, 4-pin	M12 connector, 4-pin		
 Contrast Sensor																
BKT 6K-001-P-S75	40...150 mm			■	■			■	■	1 kHz	■	■				2.2.57
BKT 6K-001-N-S75	40...150 mm			■		■		■	■	1 kHz	■	■				2.2.57
BKT 6K-001-P-02	40...150 mm			■	■			■	■	1 kHz	■			■		2.2.57
BKT 6K-001-N-02	40...150 mm			■		■		■	■	1 kHz	■			■		2.2.57
BKT 18KF-001-P-S4	10 mm	■			■			■	■	5 kHz	■		■			2.2.59
BKT 18KF-001-N-S4	10 mm	■				■		■	■	5 kHz	■		■			2.2.59
BKT 18KF-001-P-02	10 mm	■				■		■	■	5 kHz	■			■		2.2.59
BKT 18KF-001-N-02	10 mm	■				■		■	■	5 kHz	■			■		2.2.59
BKT 21M-002-P-S4	19 mm	■			■			■	■	5 kHz	■		■			2.2.61
BKT 21M-002-N-S4	19 mm	■				■		■	■	5 kHz	■		■			2.2.61
BKT M-15-U-S4	6...12 mm*		■		■	■	■	■	■	10 kHz	■		■			2.2.63
BKT M-15L-U-S4	6...12 mm*		■		■	■	■	■	■	10 kHz	■		■			2.2.63
BKT M-11-U-03	6...12 mm*		■		■	■	■	■	■	10 kHz	■			■		2.2.63
BKT M-11L-U-03	6...12 mm*		■		■	■	■	■	■	10 kHz	■			■		2.2.63
BKT M-15C-U-S4	6...12 mm*	■			■	■	■	■	■	20 kHz	■		■			2.2.65
BKT M-45-U-S4	0...3 mm	■			■	■	■	■	■	20 kHz	■		■		■	2.2.65

*Longer ranges using interchangeable optics

2.2

2.3

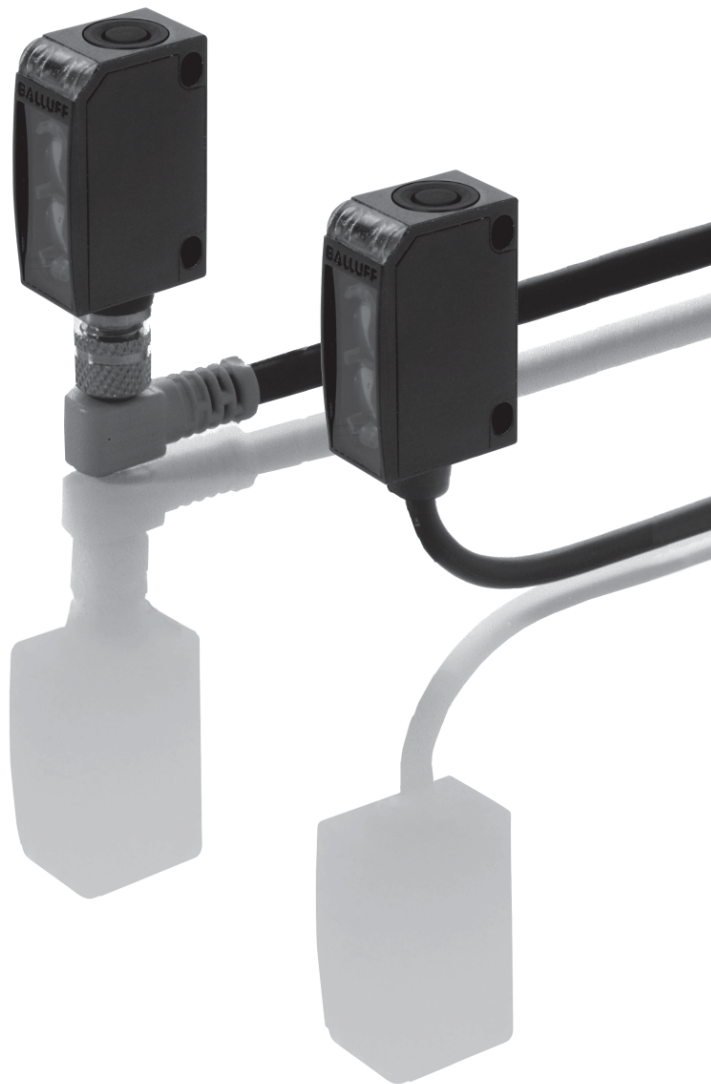
Photoelectric sensors
accessories
page 2.3.2 ...

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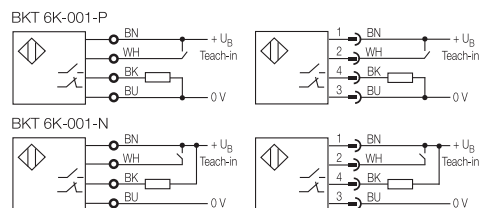
Connectors ...
page 5.2 ...

The **BKT 6K** laser contrast sensor is designed for reliable detection of small-area contrast differences. Even the narrowest lines can be definitively sensed over 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



Mounting bracket
BOS 6-HW-1



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

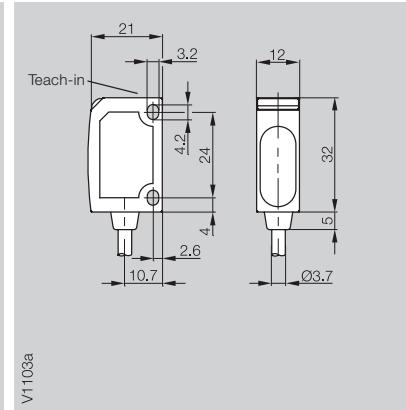
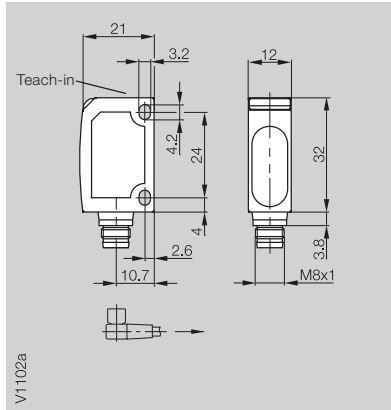
Laser Contrast Sensor



**Photoelectric
Sensors**

BKT 6K
Laser Contrast Sensor

Series	BKT 6K	BKT 6K
Working distance	40...150 mm*	40...150 mm*



Contrast Sensor

PNP	BKT 6K-001-P-S75	BKT 6K-001-P-02
NPN	BKT 6K-001-N-S75	BKT 6K-001-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	100 mA	100 mA
Voltage drop U_d at I_0	≤ 2.4 V	≤ 2.4 V
Settings	Teach-in	Teach-in
Optical data		
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 focus (85 mm ±15 mm)	0.7 mm at focus (85 mm ±15 mm)
Time data		
Response time	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz
Indicators		
Output function indicator	LED yellow	LED yellow
Stability indicator	LED green	LED green
Mechanical data		
Connection	M8 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section		4×0.14 mm ²
Housing material	impact-resistant ABS	impact-resistant ABS
Optical surface	PMMA	PMMA
Weight	40 g	120 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-20...+60 °C	-20...+60 °C

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

Contrast sensor values referenced to Kodak gray card 90% Reflexion, 100×100 mm.



Connector orientation

2.2

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

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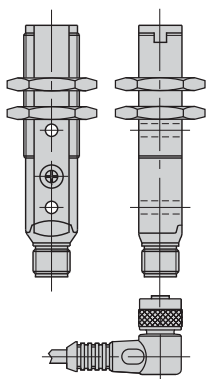
Connectors ...
page 5.2 ...

The **BKT 18KF** contrast sensor uses white light and can be programmed with the push of a button. It detects colored markings as well as gray levels on various surfaces. In the standard setting the sensor operates using dark-on.

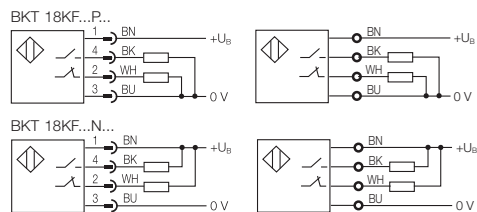
A precise setting is available for slight contrast differences. The output function can also be selected in this setting.



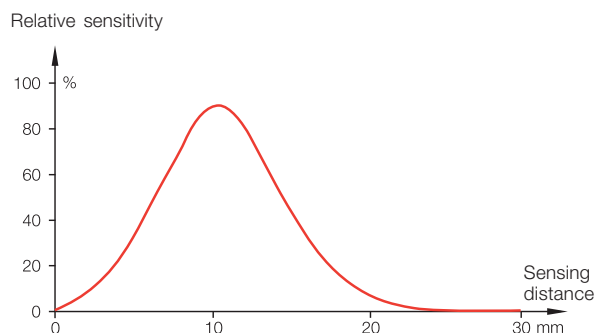
Connector orientation



Wiring diagrams



Function diagram



Recommended accessories please order separately



Mounting clamp
BOS 18,0-KB-1

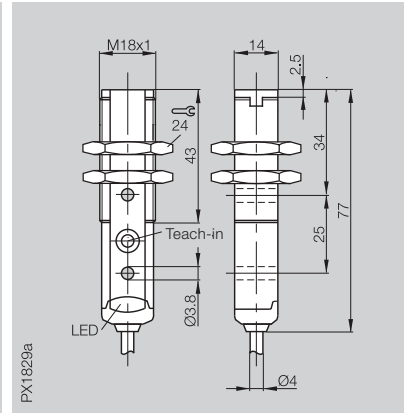
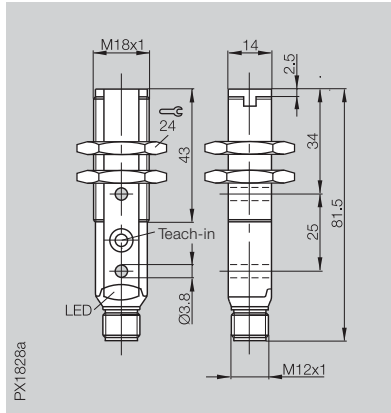


Mounting bracket
BES 18-HW-1



Connector
Straight BKS-_ 19
Right-angle BKS-_ 20

Series	BKT	BKT
Working distance	10 mm ±2 mm	10 mm ±2 mm



Contrast Sensor

PNP	BKT 18KF-001-P-S4	BKT 18KF-001-P-02
NPN	BKT 18KF-001-N-S4	BKT 18KF-001-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light- and dark-on	Light- and dark-on
Output current	100 mA	100 mA
Voltage drop U_a at I_0	≤ 2 V	≤ 2 V
Settings	Teach-in	Teach-in
Optical data		
Emitter, light type	LED, white light	LED, white light
Wavelength	400...700 nm	400...700 nm
Light spot diameter	approx. 4.5 mm at 10 mm	approx. 4.5 mm at 10 mm
Time data		
Response time	100 µs	100 µs
Switching frequency f	5 kHz	5 kHz
Indicators		
Output function indicator	LED yellow	LED yellow
Operating/error indicator	LED green/red	LED green/red
Mechanical data		
Dimensions	M18×81.5 mm	M18×77 mm
Connection	M12 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section		4×0.14 mm ²
Housing material	PBT	PBT
Lens material	PMMA	PMMA
Weight	25 g	75 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C

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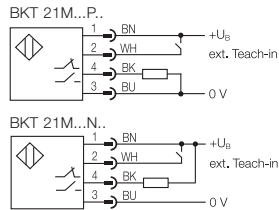
Connectors ...
page 5.2 ...

The **BKT 21M** contrast sensor uses white light and can be programmed with 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).

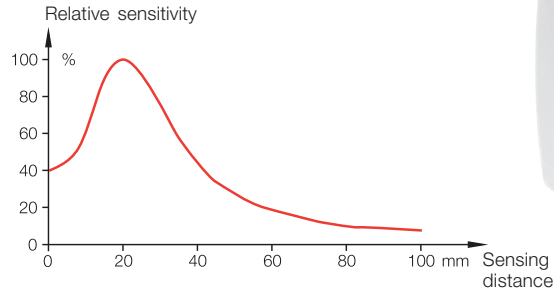
A precise setting is available for slight contrast differences. The output function can also be selected in this setting.



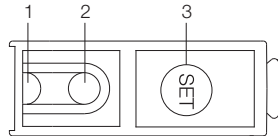
Wiring diagrams



Function diagram



Indicators and operating elements



- 1 Output function indicator (yellow)
- 2 Operating/error indicator (green/red)
- 3 SET key

Recommended accessories

please order separately



Mounting clamp
BOS 21-KH-1



Mounting clamp
BOS 21-KH-2



Mounting bracket
BOS 21-HW-1

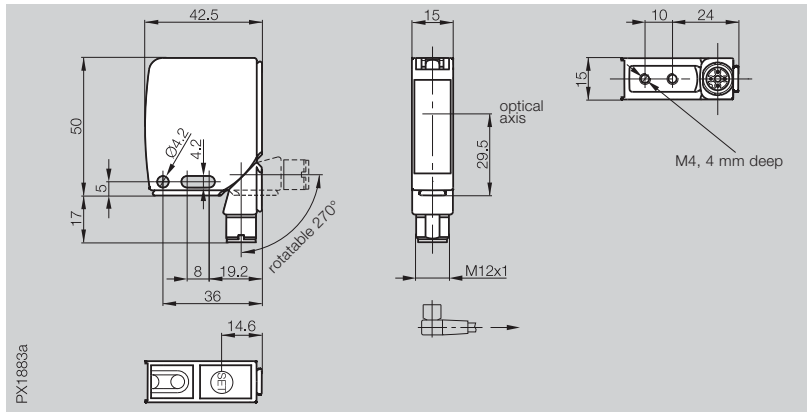


Mounting bracket
BOS 21-HW-2



Connector
Straight BKS-_ 19
Right-angle BKS-_ 20

Series	BKT
Working distance	19 mm ±2 mm



Contrast Sensor

PNP	BKT 21M-002-P-S4
NPN	BKT 21M-002-N-S4
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V DC
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (settable in precise mode)
Voltage drop U_d at I_0	≤ 2 V
Settings	Teach-in
Additional functions	Key disabling possible
Optical data	
Emitter, light type	LED, white light
Wavelength	400...700 nm
Light spot diameter	3.5 mm in 19 mm
Time data	
Response time	0.1 ms
Switching frequency f	5 kHz
Time functions	20 ms off-delay
Indicators	
Output function indicator	LED yellow
Operating/error indicator	LED green/red
Mechanical data	
Dimensions	42.5×50×15 mm
Connection	M12 connector, 4-pin
Housing material	GD-Zn/Al
Optical surface	Glass
Weight	80 g
Ambient data	
Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient light rejection	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C



Connector orientation

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Connectors ...
page 5.2 ...

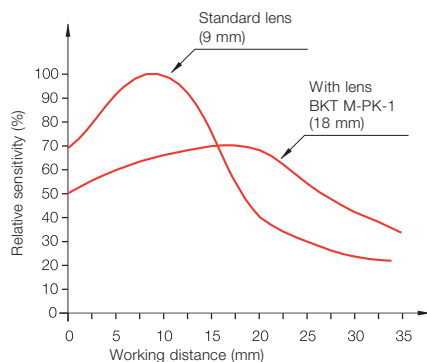
In this device the microprocessor takes over the entire setup process. The latter monitors and synchronizes the emitter, receiver and output circuits, for optimum switching frequency, repeatability and insensitivity to interference and ambient light. The user needs only to press two keys for setting the sensor for the marking and the background. Remote control of the key functions and remote selection of 4 previously stored contrast ratios is available in the cable version depending on lead selection.

It is also possible to enable a turn-off delay or to disable the keys. The sensor output is switched between NPN and PNP. All models have an analog output whose signal is proportional to the light intensity reflected from the target. The sensor lens can be placed in two positions, for setting the exit surface straight or rotated 90° from the sensor axis.

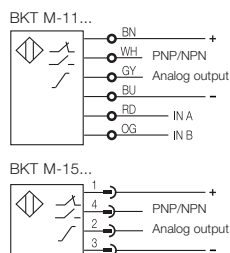
Features

- Optional vertical or horizontal light spot
- Automatic selection of red or green emitter light
- Automatic setting of light-on/dark-on
- Remote key functions and 4 storable programs (cable version)
- Time delay and key lock
- Interchangeable optics (straight and 90°)
- Analog output

Function diagram



Wiring diagrams



Recommended accessories

please order separately

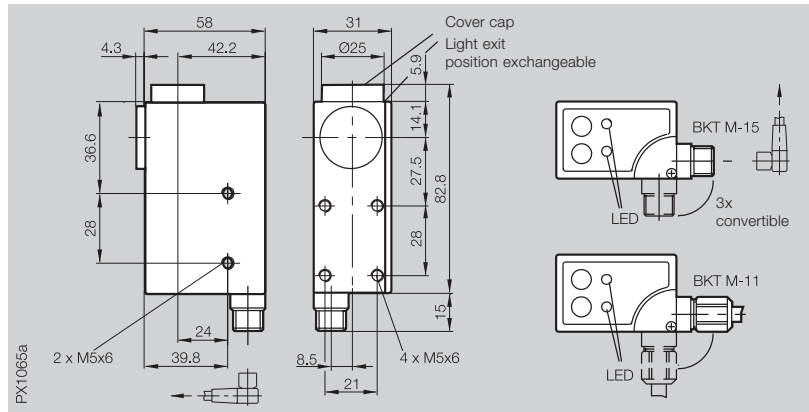


Lens
BKT M-PK-1



Connector
Straight BKS-S 19-3
Right-angle BKS-S 20-3

Series	BKT	BKT
Working distance	9 mm ±3 mm	9 mm ±3 mm
Working distance with lens PK-1	18 mm ±4 mm	18 mm ±4 mm



Contrast Sensor

PNP/NPN	vertical spot	☉
PNP/NPN	horizontal spot	☿

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	2 V DC	2 V DC
No-load supply current I_0 max.	≤ 80 mA	≤ 80 mA
Switching output	PNP- and NPN-Transistor (selectable)	PNP- and NPN-Transistor (selectable)
Output current	200 mA	200 mA
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Voltage drop U_a at I_0	≤ 2 V	≤ 2 V
Analog output	0...5.5 V DC*	0...5.5 V DC*
Settings	Teach-in	Teach-in
Additional functions	Key disabling possible	Key disabling possible

Optical data

Emitter, light type	LED red/green	LED red/green
Wavelength	630 nm/526 nm	630 nm/526 nm
Light spot diameter	1.5x5 mm**	1.5x5 mm**

Time data

Response time	50 µs	50 µs
Switching frequency f	10 kHz	10 kHz
Time function	20 ms off-delay selectable	20 ms off-delay selectable

Indicators

Ready indicator	LED green	LED green
Output function indicator	LED red	LED red

Mechanical data

Connection	M12 connector, 4-pin	3 m cable, PVC
No. of wires x cross-section		6x0.34 mm² with shield
Housing material	GD-Zn	GD-Zn
Optical surface	Glass	Glass
Weight	310 g	600 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-10...+55 °C	-10...+55 °C

*2.5 V DC with Kodak gray card 90% Reflexion

**2x7 mm with BKT M-PK1



→ Connector orientation

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Photoelectric sensors
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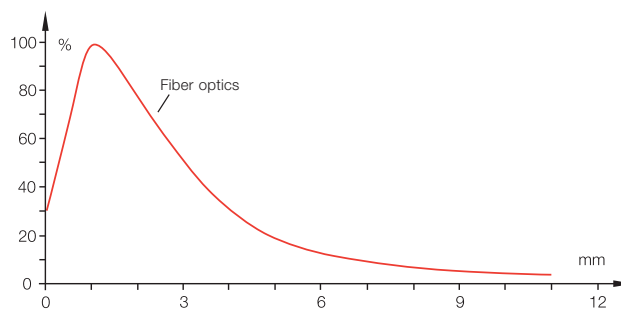
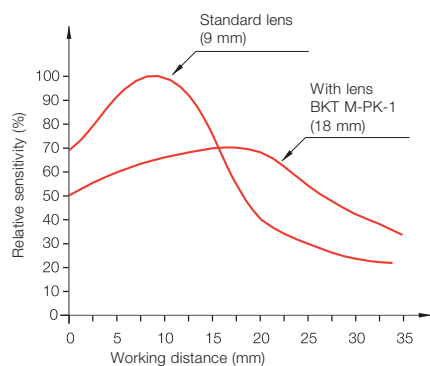
Connectors ...
page 5.2 ...

The Series **BKT M...** contrast sensors are also available with white light. Models with a round light spot or with a fiber optic port are available.

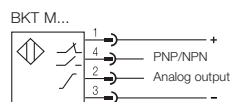
Features

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

Function diagrams



Wiring diagram



Recommended accessories please order separately

Fiber optics
BFO KTS-XBH-MZG-00-1

Lens
BKT M-PK-1

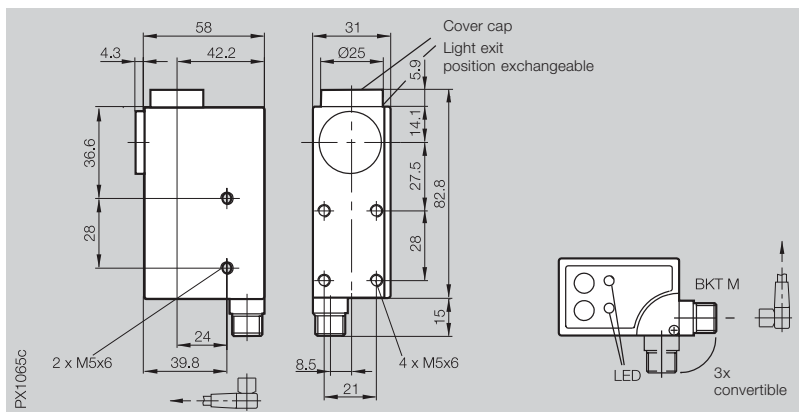
Connector
Straight BKS-S 19-3
Right-angle BKS-S 20-3

Contrast Sensor with white light

Photoelectric Sensors

BKT M
Contrast Sensor
with white light

Series	BKT	BKT
Working distance		9 mm ±3 mm
Working distance with lens PK-1		18 mm ±4 mm
Working distance with fiber optics (diffuse)	0...3 mm	



Contrast Sensor

PNP/NPN for fiber optics
PNP/NPN round spot

Electrical data

	BKT M-45-U-S4	BKT M-15C-U-S4
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	2 V DC	2 V DC
No-load supply current I_0 max.	≤ 80 mA	≤ 80 mA
Switching output	PNP- and NPN-Transistor (selectable)	PNP- and NPN-Transistor (selectable)
Output current	200 mA	200 mA
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Voltage drop U_a at I_0	≤ 2 V	≤ 2 V
Analog output	0...5.5 V DC*	0...5.5 V DC*
Settings	Teach-in	Teach-in
Additional functions	Key disabling possible	Key disabling possible

Optical data

Emitter, light type	LED white	LED white
Wavelength	400...700 nm	400...700 nm

Time data

Response time	25 µs	25 µs
Switching frequency f	20 kHz	20 kHz
Time function	20 ms off-delay selectable	20 ms off-delay selectable

Indicators

Ready indicator	LED green	LED green
Output function indicator	LED red	LED red

Mechanical data

Connection	M12 connector, 4-pin	M12 connector, 4-pin
Housing material	GD-Zn	GD-Zn
Optical surface	Glass	Glass
Weight	310 g	310 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-10...+55 °C	-10...+55 °C

*2.5 V DC with Kodak gray card 90 % Reflexion



Connector orientation

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Photoelectric
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Photoelectric sensors usually detect the target or the desired target features themselves. When this isn't possible, markings are applied to the object and these are detected by the sensor. But what do you do when you can't apply visible markings to the object? Very simple: apply invisible markings!

How does that work? You use so-called fluorescent materials (contained in special chalks, inks, paints, etc.), which are only visible in ultraviolet (UV) light. The fluorescent materials change the invisible UV light into visible light. This effect is called photoluminescence. The visible light can then be detected as normal by the receiver portion of the sensor.

Applications

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



Type	Sensing distance	Light type	Output			Output function		Switching frequency	U _B	Con- nection	Page
		UV light	PNP-Transistor	NPN-Transistor	Analog output	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin Cable	
 Luminescence Sensor											
BLT 18KF-001-P-S4	8...20 mm	■	■			■	■	1 kHz	■	■	2.2.69
BLT 18KF-001-N-S4	8...20 mm	■		■		■	■	1 kHz	■	■	2.2.69
BLT 18KF-001-P-02	8...20 mm	■	■			■	■	1 kHz	■	■	2.2.69
BLT 18KF-001-N-02	8...20 mm	■		■		■	■	1 kHz	■	■	2.2.69
BLT 21M-001-P-S4	0...40 mm	■	■			■	■	2 kHz	■	■	2.2.71
BLT 21M-001-N-S4	0...40 mm	■		■		■	■	2 kHz	■	■	2.2.71
BLT M-15-U-S4	9...18 mm	■	■	■	■	■	■	1 kHz	■	■	2.2.73
BLT M-11-U-03	9...18 mm	■	■	■	■	■	■	1 kHz	■	■	2.2.73
BLT M-55-U-S4	20...40 mm	■	■	■	■	■	■	2 kHz	■	■	2.2.75

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Photoelectric sensors
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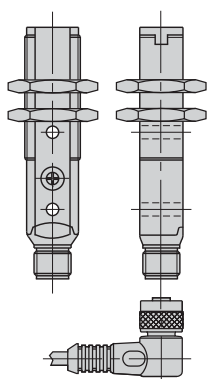
Connectors ...
page 5.2 ...

The **BLT 18KF** luminescence sensor detects any type of luminescent markings on any surface and automatically adjusts to ambient conditions. Setting is accomplished by pressing a key (markings with greater luminescence are detected as the background).

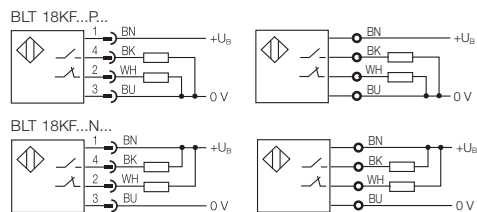
A precise setting is available for weakly luminescent markings. In this setting the output function can also be selected.



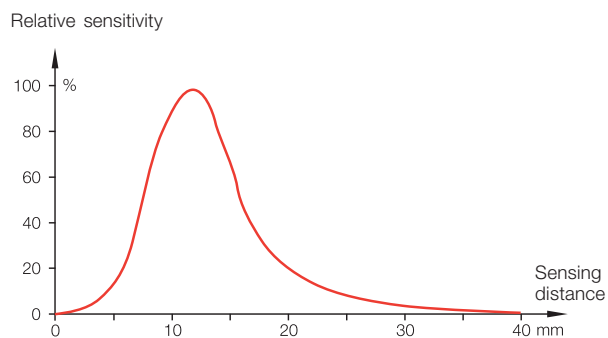
Connector orientation



Wiring diagrams



Function diagram



Recommended accessories

please order separately



Mounting clamp
BOS 18,0-KB-1



Mounting bracket
BES 18-HW-1



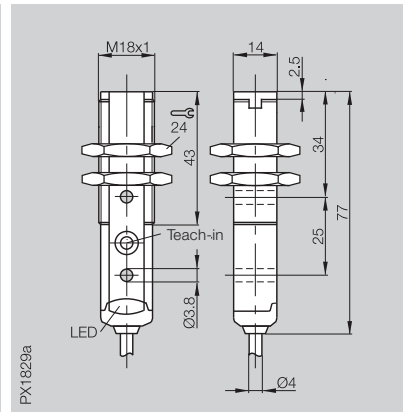
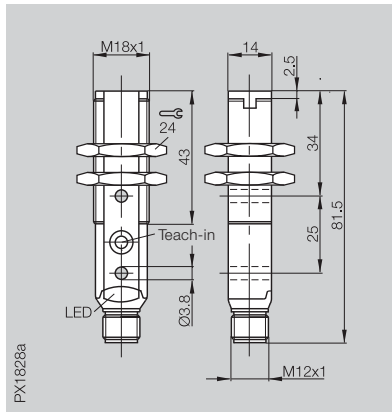
Connector
Straight BKS-_ 19
Right-angle BKS-_ 20

Series	BLT	BLT
Working range	8...20 mm	8...20 mm



Luminescence Sensor

PNP	BLT 18KF-001-P-S4	BLT 18KF-001-P-02
NPN	BLT 18KF-001-N-S4	BLT 18KF-001-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light- and dark-on	Light- and dark-on
Output current	100 mA	100 mA
Voltage drop U_d at I_0	≤ 2 V	≤ 2 V
Settings	Teach-in	Teach-in
Optical data		
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
Time data		
Response time	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz
Indicators		
Output function indicator	LED yellow	LED yellow
Operating/Error indicator	LED green/red	LED green/red
Mechanical data		
Dimensions	M18x81.5 mm	M18x77 mm
Connection	M12 connector, 4-pin	2 m cable, PVC
No. of wires x cross-section		4x0.14 mm ²
Housing material	PBT	PBT
Lens material	PMMA	PMMA
Weight	25 g	75 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-25...+55 °C	-25...+55 °C



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Photoelectric sensors
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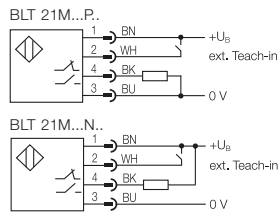
Connectors ...
page 5.2 ...

BLT 21M luminescence sensors detect all kinds of luminescent markings on any background. The sensor is calibrated with the simple push of a button. In the standard setting the sensor is light-switching (markings with greater luminescence are recognized as the background).

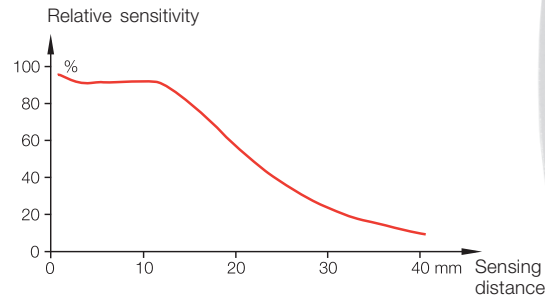
A precise setting is available for weakly luminescent markings. In this setting the output function can also be selected.



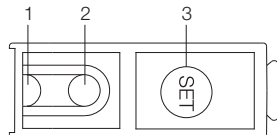
Wiring diagrams



Function diagram



Indicators and operating elements



- 1 Output function indicator (yellow)
- 2 Operating/Error indicator (green/red)
- 3 SET key

Recommended accessories

please order separately



Mounting clamp
BOS 21-KH-1



Mounting clamp
BOS 21-KH-2



Mounting bracket
BOS 21-HW-1

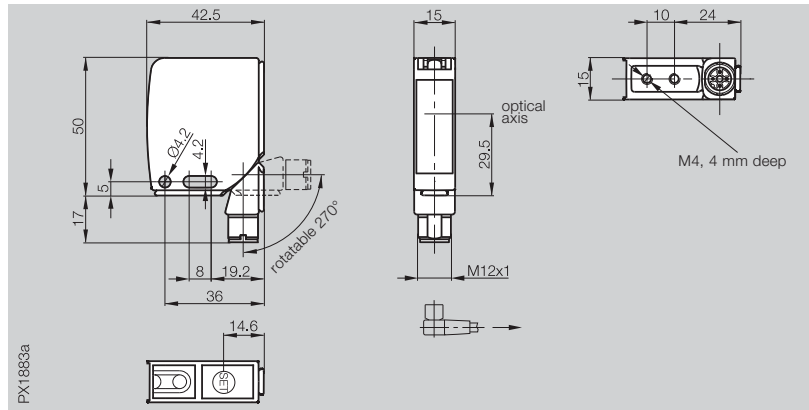


Mounting bracket
BOS 21-HW-2



Connector
Straight BKS-_ 19
Right-angle BKS-_ 20

Series	BLT
Working range	0...40 mm



PX1883a



Luminescence Sensor

PNP	BLT 21M-001-P-S4
NPN	BLT 21M-001-N-S4
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	≤ 2 V DC
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light-/dark-on (settable in precise mode)
Voltage drop U_d at I_0	≤ 2 V
Settings	Teach-in
Additional functions	Key disabling possible
Optical data	
Emitter, light type	LED, UV
Wavelength	370 nm
Light spot diameter	ca. 1.5 mm at 10 mm
Time data	
Response time	250 μ s
Switching frequency f	2 kHz
Time functions	20 ms off-delay
Indicators	
Output function indicator	LED yellow
Operating/error indicator	LED green/red
Mechanical data	
Dimensions	42.5x50x15 mm
Connection	M12 connector, 4-pin
Housing material	GD-Zn/Al
Optical surface	Glass
Weight	80 g
Ambient data	
Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient light rejection per	EN 60947-5-2
Ambient temperature range T_a	-10...+55 °C



Connector orientation

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Photoelectric sensors
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Connectors ...
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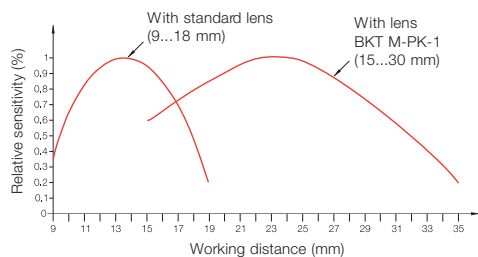
The Balluff luminescence sensor is equipped with a modern UV source so that no external UV lamp is needed. A microcontroller handles the evaluation using a teach-in procedure. By simply pressing a key the BLT learns the difference between the fluorescent marking and the background. If the difference is too slight and can not be reliably discriminated, this is indicated by an error message (flashing LED). The sensing distance is typically 9 to 18 mm. Additional lenses are available to increase the sensing distance.

Configuring two internal DIP switches allows you to set a turn-off delay of 20 ms or disable the keys. The PNP/NPN output is also adjustable. An analog signal proportional to the light reflected by the marking rounds out the functionality of the BLT.

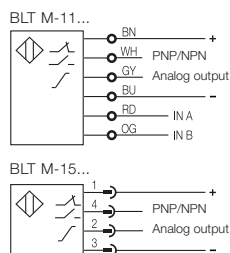
Features

- UV source:
LED, 100,000 hour life
- Push-button setting
- Automatic setting
of light-on/dark-on
- Time delay selectable
- Analog output
0...7 V DC standard
- M12 connector rotatable
(3 positions)
- Key disabling possible

Function diagram



Wiring diagrams



Recommended accessories

please order separately

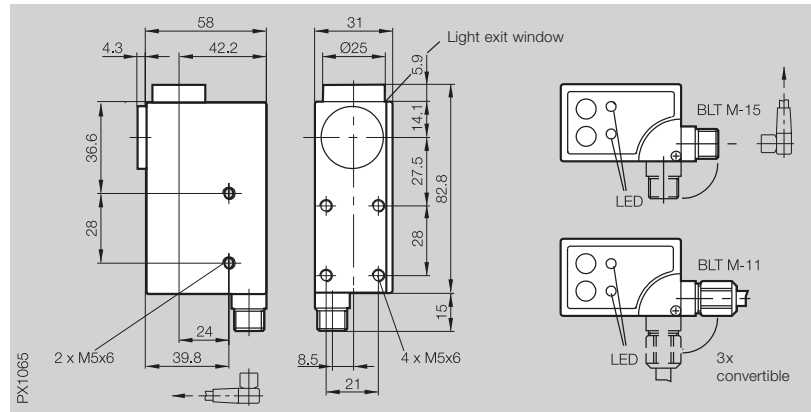


Lens
BKT M-PK-1



Connector
Straight BKS-S 19-3
Right-angle BKS-S 20-3

Series	BLT	BLT
Working range	9...18 mm	9...18 mm
Working range with lens PK-1	15...30 mm	15...30 mm
Working range with fiber optic cable	0...30 mm	0...30 mm



Luminescence Sensor

	BLT M-15-U-S4	BLT M-11-U-03
PNP/NPN		
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	2 V DC	2 V DC
No-load supply current I_0 max.	≤ 80 mA	≤ 80 mA
Switching output	PNP- and NPN-Transistor (selectable)	PNP- and NPN-Transistor (selectable)
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	200 mA	200 mA
Voltage drop U_A at I_0	≤ 2 V	≤ 2 V
Analog output	0...7 V DC	0...7 V DC
Settings	Teach-in	Teach-in
Additional functions	Key disabling possible	Key disabling possible
Optical data		
Emitter, light type	LED, UV	LED, UV
Wavelength	380 nm	380 nm
Light spot diameter	5 mm at focal point	5 mm at focal point
Time data		
Response time	0.5 ms	0.5 ms
Switching frequency f	1 kHz	1 kHz
Time functions	20 ms off-delay selectable	20 ms off-delay selectable
Indicators		
Ready indicator	LED green	LED green
Output function indicator	LED red	LED red
Mechanical data		
Connection	M12 connector, 4-pin	3 m cable, PVC
No. of wires × cross-section		6×0.34 mm ² with shield
Housing material	GD-Zn	GD-Zn
Optical surface	Glass	Glass
Weight	310 g	450 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient light rejection	EN 60947-5-2	EN 60947-5-2
Ambient temperature range T_a	-10...+55 °C	-10...+55 °C



Please note! Lenses not interchangeable for BLT M.

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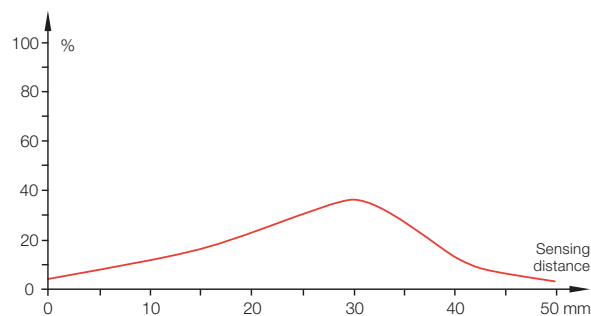
The Balluff **BLT M-55-...** luminescence sensor is equipped with a high-power UV LED, so that long sensing distances are possible using the appropriate lenses. For tight mounting conditions an adaptable fiber optic cable provides additional solution options.

Features

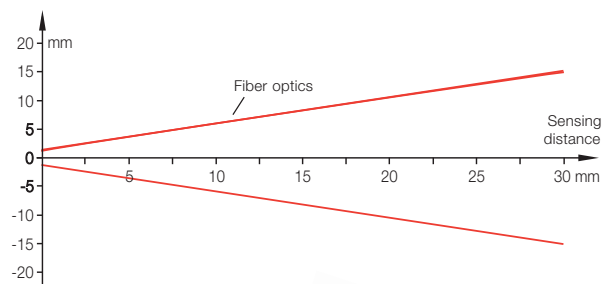
- High-Power UV LED
- High switching frequency of 2 kHz
- Fiber optic cable compatibility
- Push-button setting
- Analog output 0...7 V DC standard

Function diagrams

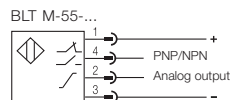
Relative sensitivity



Detection range



Wiring diagram



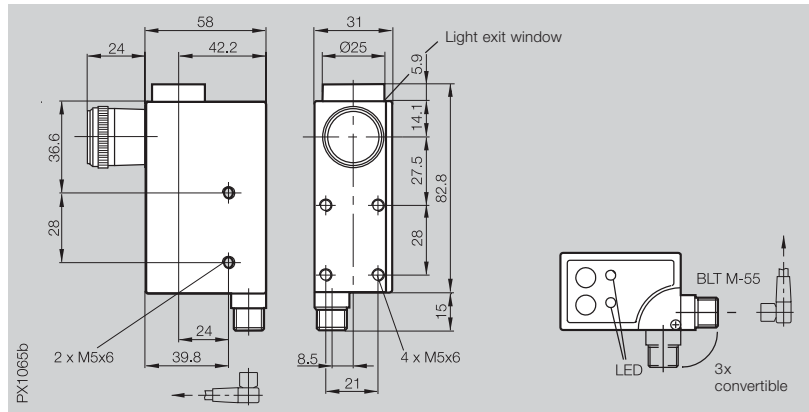
Recommended accessories please order separately

Fiber optic cable
BFO LTS-...-TAF-00- _ _



Connector
Straight BKS-S 19-3
Right-angle BKS-S 20-3

Series	BLT
Working range	20...40 mm
Working range with fiber optic cable	0...30 mm



Luminescence Sensor

PNP/NPN	BLT M-55-U-S4
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	2 V DC
No-load supply current I_0 max.	≤ 80 mA
Switching output	PNP- and NPN-Transistor (selectable)
Switching type	Light-/dark-on (selectable)
Output current	200 mA
Voltage drop U_d at I_0	≤ 2 V
Analog output	0...7 V DC
Settings	Teach-in
Additional functions	Key disabling possible
Optical data	
Emitter, light type	LED, HP-UV
Wavelength	370 nm
Light spot diameter	3 mm at focal point
Time data	
Response time	250 μs
Switching frequency f	2 kHz
Time functions	20 ms off-delay selectable
Indicators	
Ready indicator	LED green
Output function indicator	LED red
Mechanical data	
Connection	M12 connector, 4-pin
Housing material	GD-Zn
Optical surface	Glass
Weight	310 g
Ambient data	
Degree of protection per IEC 60529	IP 67
Polarity reversal protected	yes
Short circuit protected	yes
Ambient light rejection	EN 60947-5-2
Ambient temperature range T_a	-10...+55 °C



Connector orientation

Please note! Lenses not interchangeable for BLT M.

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The series **BFS 26K** and **BFS 27K** 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).

Applications

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

Simplify and speed up automated processes using these versatile color sensors – for detecting color shades in carpets or textiles, as well as color markings on packaging or labels.

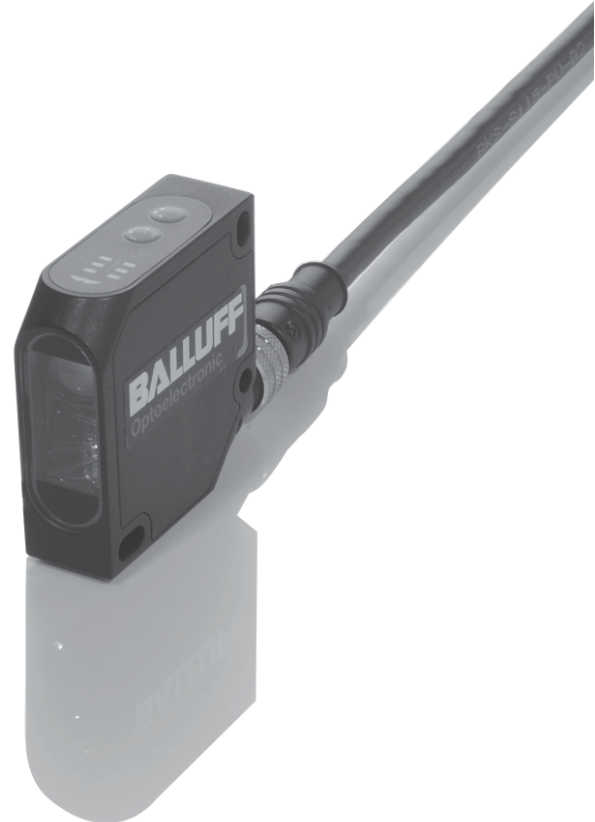
With dimensions of just 50×50×17 mm and a rotatable connector, the **BFS 26K** fits in tight areas and can be programmed either using a control line or by means of 2 keys via teach-in.

The various light spot geometry configurations of the respective sensors (round, rectangular or square) allow even the smallest color markings to be reliably discriminated.

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
- Teach-in and external teach-in
- M12 connector rotatable by 270°
- 3 different colors can be identified at the same time
- 5-stage adjustable color tolerance



The **BFS 27K** with a clearly organized operating panel and large display enables simple teaching of various colors and selection of all functions using teach-in.

Modes C (color type) and C+I (color type + intensity) as well as 10 tolerance levels can be set separately for all 3 channels. Pulse extension of 0..40 ms can also be selected and is applied to all channels.

Balluff sensorware allows the set functions to be visualized over the RS 485 interface.

Features

- Display
- Autocollimation
- Versions with high switching frequency or for dark colors
- Color type or color type + intensity modes
- Serial interface RS485

Type	Sensing distance	Light type	Output			Output function	Switching frequency	U _B	Connection	Special features			Page
		White light	3 × PNP-Transistor	3 × NPN-Transistor	Interface RS485	Light-on		10...30 V DC 12...28 V DC	M12 connector, 8-pin	Reflector mode	Color intensity measurement	Color scan	
 Color Sensors													
BFS 26K-PS-L01-S115	12...32 mm	■	■			■	500 Hz	■	■	■		■	2.2.79
BFS 26K-PS-L02-S115-C	15...30 mm	■	■			■	500 Hz	■	■				2.2.79
BFS 26K-PS-L03-S115-C	18...22 mm	■	■			■	500 Hz	■	■			■	2.2.79
BFS 27K-PS-L01-S115	5...45 mm	■	■			■	1.5 kHz	■	■		■		2.2.81
BFS 27K-NS-L01-S115	5...45 mm	■		■		■	1.5 kHz	■	■		■		2.2.81
BFS 27K-PSR-L01-S115	5...45 mm	■	■		■	■	1.5 kHz	■	■		■		2.2.81
BFS 27K-NSR-L01-S115	5...45 mm	■		■	■	■	1.5 kHz	■	■		■		2.2.81
BFS 27K-PS-L02-S115	5...45 mm	■	■			■	500 Hz	■	■		■		2.2.81
BFS 27K-NS-L02-S115	5...45 mm	■		■		■	500 Hz	■	■		■		2.2.81
BFS 27K-PSR-L02-S115	5...45 mm	■	■		■	■	500 Hz	■	■		■		2.2.81
BFS 27K-NSR-L02-S115	5...45 mm	■		■	■	■	500 Hz	■	■		■		2.2.81

2.2

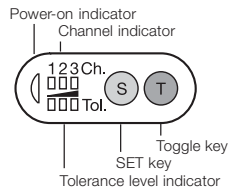
2.3

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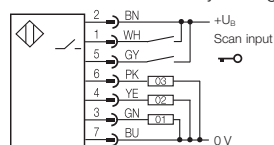
Indicators and operating elements



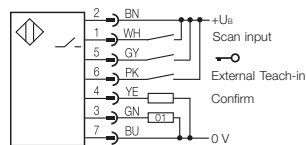
Wiring diagrams

Two modes are available.

1. Normal mode "factory setting"

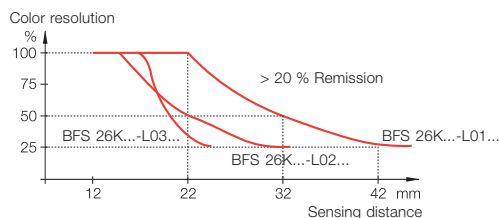


2. External Teach-in
setting using „special functions“



Disabling input:
> 12 V = keys disabled
< 3 V = keys not disabled

Color resolution/Sensing distance diagram



Recommended accessories

please order separately



Mounting bracket
BOS 26-HW-1



Connector
BKS-S139-PU-05

Series	
Working range	Diffuse mode
Working range	Reflector mode



Color sensor

PNP

Electrical data

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

Optical data

Emitter, light type
Light spot geometry
Light spot diameter
Sensing distance tolerance
Color resolution tolerance

Indicators

Power-on indicator
Output function indicator Ch. 1...Ch. 3
Output function indicator Tol. 1...Tol. 5

Time data

Ready delay
Response time
Switching frequency f
Time functions

Mechanical data

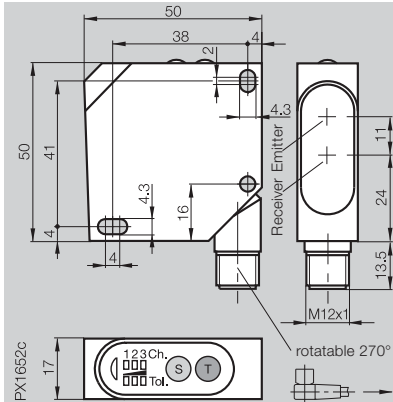
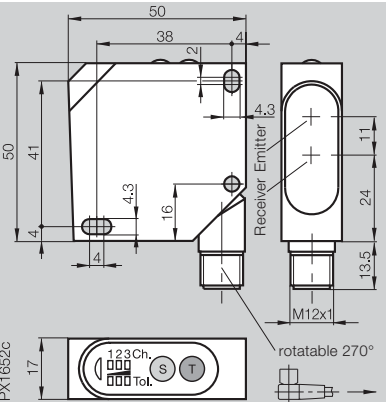
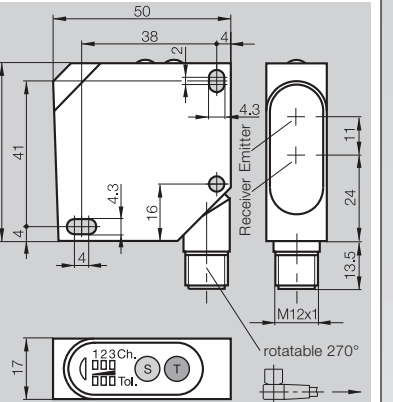
Dimensions
Connection
Housing material
Optical surface
Weight

Ambient data

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



Connector orientation

BFS 26K 12...32 mm 50...200 mm	BFS 26K 15...30 mm	BFS 26K 18...22 mm
		
BFS 26K-PS-L01-S115	BFS 26K-PS-L02-S115-C	BFS 26K-PS-L03-S115-C
12...28 V DC	12...28 V DC	12...28 V DC
10 %	10 %	10 %
≤ 40 mA	≤ 40 mA	≤ 40 mA
3 × PNP-Transistor	3 × PNP-Transistor	3 × PNP-Transistor
100 mA	100 mA	100 mA
Light-on	Light-on	Light-on
≤ 2.4 V	≤ 2.4 V	≤ 2.4 V
Teach-in	Teach-in	Teach-in
Pulsed white light round	Pulsed white light square	Pulsed white light rectangular
Ø 4 mm at 22 mm sensing distance ±6 mm for Tol. 3 settable in 5 levels	2×2 mm at 22 mm sensing distance ±5 mm for Tol. 3 settable in 5 levels	5×1 mm at 22 mm sensing distance ±2 mm for Tol. 3 settable in 5 levels
LED green 3 × LED yellow 3 × LED red	LED green 3 × LED yellow 3 × LED red	LED green 3 × LED yellow 3 × LED red
300 ms 1 ms 500 Hz 50 ms turn-off delay selectable	300 ms 1 ms 500 Hz 50 ms turn-off delay selectable	300 ms 1 ms 500 Hz 50 ms turn-off delay selectable
50×50×17 mm M12 connector, 8-pin impact-resistant ABS PMMA 40 g	50×50×17 mm M12 connector, 8-pin impact-resistant ABS PMMA 40 g	50×50×17 mm M12 connector, 8-pin impact-resistant ABS PMMA 40 g
IP 67 yes yes -10...+55 °C EN 60947-5-2	IP 67 yes yes -10...+55 °C EN 60947-5-2	IP 67 yes yes -10...+55 °C EN 60947-5-2

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Variants

The BFS 27K-...-**L01** with a switching frequency of 1.5 kHz is designed for color detection in fast processes, such as packaging in the food industry or of pharmaceutical products.

The BFS 27K-...-**L02** variant features excellent color sensitivity with dark colors. This makes it outstanding for quality assurance and for parts detection.

Operating modes

C Color type

In C mode the sensor uses increased depth of field (contrast).

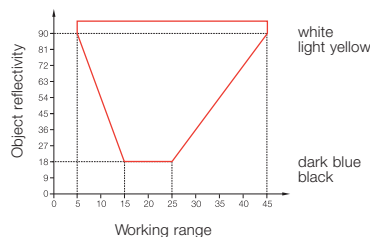
This is used for detecting colors on shiny, highly reflective or matte surfaces.

C+I Color type + intensity

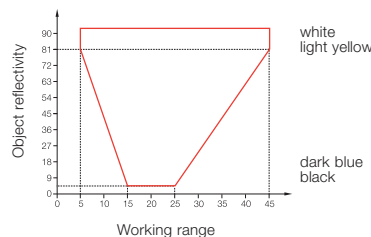
In the C+I setting color intensity is also evaluated. This allows even the finest color nuances to be discriminated. Even the finest gray levels can be detected.

Function diagrams

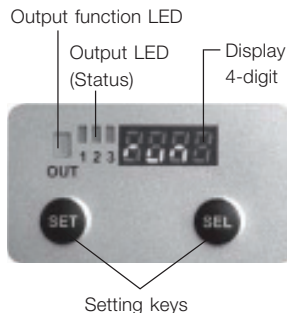
BFS 27K-...-L01



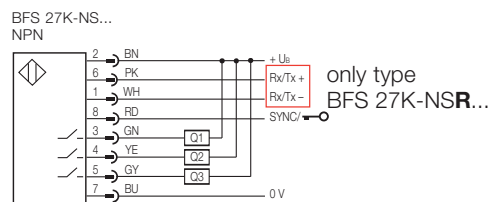
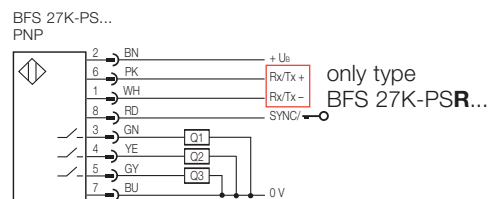
BFS 27K-...-L02



Operating panel and display



Wiring diagrams



Recommended accessories

please order separately

Mounting bracket
BOS 35-HW-1



Adapter plate
BOS 21-AD-1



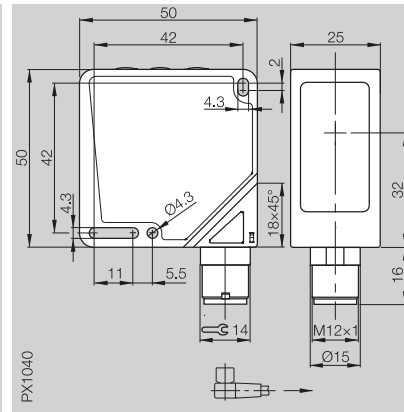
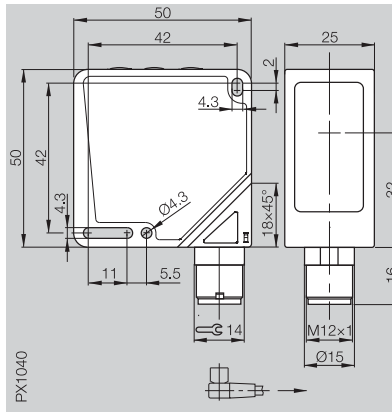
Mounting clamp
with ball joint
BOS 18,0-KB-1



Connector
right-angle, 5 m
BKS-S138-PU-05
straight, 5 m
BKS-S139-PU-05



Series	BFS 27K	BFS 27K
Working range	5...45 mm*	5...45 mm*



Color sensor

PNP		BFS 27K-PS-L01-S115	BFS 27K-PS-L02-S115
NPN		BFS 27K-NS-L01-S115	BFS 27K-NS-L02-S115
PNP	with RS485	BFS 27K-PS R -L01-S115	BFS 27K-PS R -L02-S115
NPN	with RS485	BFS 27K-NS R -L01-S115	BFS 27K-NS R -L02-S115

Electrical data

Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 60 mA	≤ 60 mA
Switching output	3 $\times$ PNP- or NPN-Transistor	3 $\times$ PNP- or NPN-Transistor
Output current	100 mA	100 mA
Switching type	Light-on	Light-on
Voltage drop U_d at I_e	≤ 2 V	≤ 2 V
Settings	Teach-in	Teach-in

Optical data

Emitter, light type	LED, white light	LED, white light
Wavelength	400...700 nm	400...700 nm
Light spot diameter	≥ 4 mm	≥ 4 mm
Tolerance levels	10 per channel (can be set)	10 per channel (can be set)

Indicators

Display	4-digit 7-segment display green	4-digit 7-segment display green
Output function indicator	LED yellow	LED yellow
Output indicator	3 × LED green	3 × LED green

Time data

Response time	335 μ s	5 ms (standard), 1 ms (fast)
Switching frequency f	1.5 kHz	100 Hz (standard), 500 Hz (fast)
Time functions	Pulse lengthening 0...40 ms	Pulse lengthening 0...40 ms

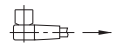
Mechanical data

Dimensions	50×50×25 mm	50×50×25 mm
Connection	M12 connector, 8-pin	M12 connector, 8-pin
Housing material	ABS	ABS
Optical surface	Glass	Glass
Weight	100 g	100 g

Ambient data

Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T _a	-10...+55 °C	-10...+55 °C

*see function diagrams



Connector orientation

Software

The software for the **R** model (RS485) can be downloaded for free at our homepage **www.balluff.de**.

www.balluff.de

- Document type

Software/Descriptions

Software for the BFS 27K

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

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

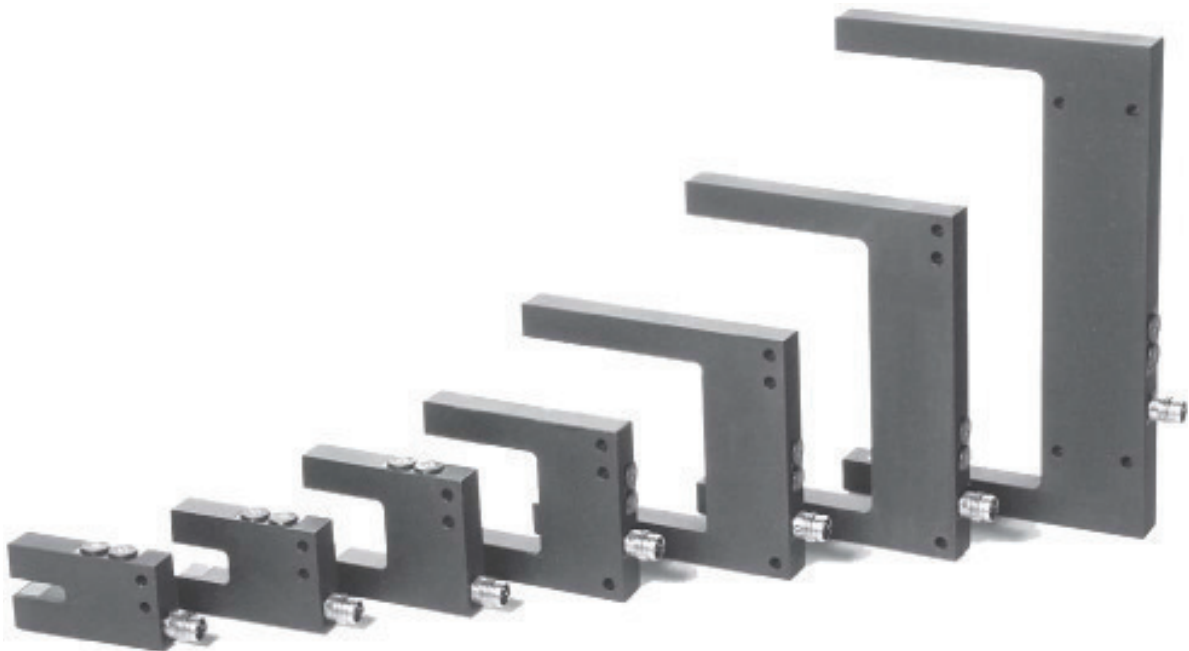
Laser slot sensors are the logical extension of this proven concept. They are unbeatable when it comes to accuracy, detail discrimination and operating reliability. Balluff laser slot sensors are ideal for precise positioning as well as reliable detection of fast-moving processes and small parts. This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

Features

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

Applications

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



Type	Slot opening	Resolution	Light type				Output		Output function		Switching frequency	U _B	Connec- tion	Page
			Red light	Laser light	Infrared	Red and green light	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 3-pin	
 Slot Sensors														
BGL 5A-001-S49	5 mm	0.3 mm	■				■		■	■	3 kHz	■	■	2.2.84
BGL 5A-002-S49	5 mm	0.3 mm	■					■	■	■	3 kHz	■	■	2.2.84
BGL 10A-001-S49	10 mm	0.3 mm	■				■		■	■	3 kHz	■	■	2.2.84
BGL 10A-002-S49	10 mm	0.3 mm	■					■	■	■	3 kHz	■	■	2.2.84
BGL 20A-001-S49	20 mm	0.3 mm	■				■		■	■	1.5 kHz	■	■	2.2.85
BGL 20A-002-S49	20 mm	0.3 mm	■					■	■	■	1.5 kHz	■	■	2.2.85
BGL 30A-001-S49	30 mm	0.3 mm	■				■		■	■	1.5 kHz	■	■	2.2.85
BGL 30A-002-S49	30 mm	0.3 mm	■					■	■	■	1.5 kHz	■	■	2.2.85
BGL 30A-003-S49	30 mm	50 µm		■			■		■	■	5 kHz	■	■	2.2.88
BGL 30A-004-S49	30 mm	50 µm		■				■	■	■	5 kHz	■	■	2.2.88
BGL 50A-001-S49	50 mm	0.4 mm	■				■		■	■	1.5 kHz	■	■	2.2.85
BGL 50A-002-S49	50 mm	0.4 mm	■					■	■	■	1.5 kHz	■	■	2.2.85
BGL 50A-003-S49	50 mm	80 µm		■			■		■	■	5 kHz	■	■	2.2.89
BGL 50A-004-S49	50 mm	80 µm		■				■	■	■	5 kHz	■	■	2.2.89
BGL 80A-001-S49	80 mm	0.4 mm	■				■		■	■	1.5 kHz	■	■	2.2.86
BGL 80A-002-S49	80 mm	0.4 mm	■					■	■	■	1.5 kHz	■	■	2.2.86
BGL 80A-003-S49	80 mm	0.1 mm		■			■		■	■	5 kHz	■	■	2.2.89
BGL 80A-004-S49	80 mm	0.1 mm		■				■	■	■	5 kHz	■	■	2.2.89
BGL 120A-001-S49	120 mm	0.5 mm	■				■		■	■	1.5 kHz	■	■	2.2.87
BGL 120A-002-S49	120 mm	0.5 mm	■					■	■	■	1.5 kHz	■	■	2.2.87
BGL 120A-003-S49	120 mm	0.15 mm		■			■		■	■	5 kHz	■	■	2.2.89
BGL 120A-004-S49	120 mm	0.15 mm		■				■	■	■	5 kHz	■	■	2.2.89
BGL 180A-001-S49	180 mm	0.6 mm	■				■		■	■	1.5 kHz	■	■	2.2.87
BGL 180A-002-S49	180 mm	0.6 mm	■					■	■	■	1.5 kHz	■	■	2.2.87
BGL 220A-001-S49	220 mm	0.6 mm	■				■		■	■	1.5 kHz	■	■	2.2.87
BGL 220A-002-S49	220 mm	0.6 mm	■					■	■	■	1.5 kHz	■	■	2.2.87
BGL 21-AV	2 mm	0.25 mm			■		■	■	■	■	7.5 kHz	■	■	2.2.91
BGL 21-AS	2 mm	0.25 mm			■		■	■	■	■	15 kHz	■	■	2.2.91
BGL 21-AR	2 mm	0.5 mm			■		■	■	■	■	7.5 kHz	■	■	2.2.91
BGL 21-AH	2 mm	0.5 mm				■	■	■	■	■	7.5 kHz	■	■	2.2.91

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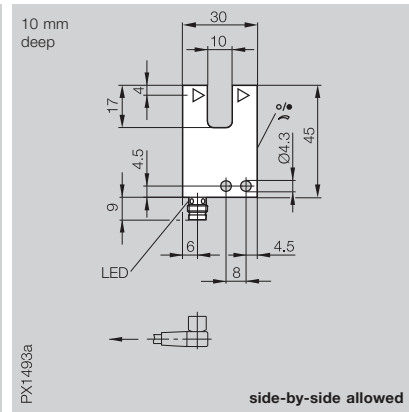
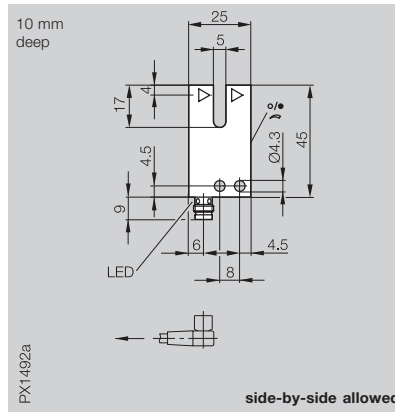
2.3

Photoelectric sensors
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Connectors ...
page 5.2 ...

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



Slot sensor

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

Electrical data

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

Optical data

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

Time data

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

Indicators

Output function indicator	LED yellow	LED yellow	
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Mechanical data

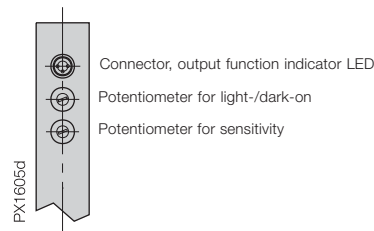
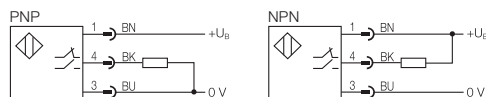
Dimensions	25x45x10 mm	30x45x10 mm	
Connection	M8 connector, 3-pin	M8 connector, 3-pin	
Housing material	GD-Zn	GD-Zn	
Optical surface	Glass	Glass	
Weight	20 g	23 g	

Ambient data

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

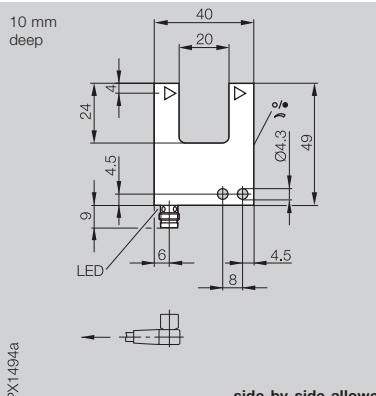
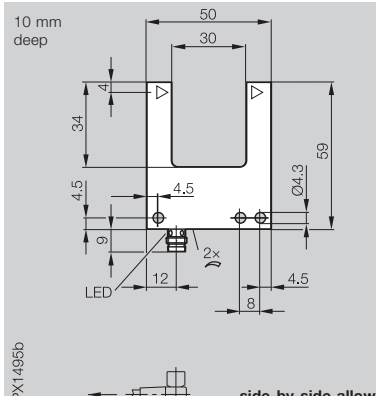
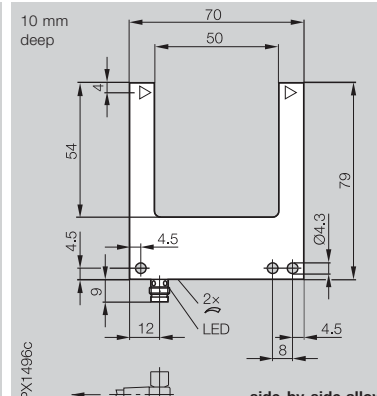


Wiring diagrams



Photoelectric Sensors

BGL Slot Sensors

	BGL 20 mm 24 mm	BGL 30 mm 34 mm	BGL 50 mm 54 mm
			
	BGL 20A-001-S49 BGL 20A-002-S49	BGL 30A-001-S49 BGL 30A-002-S49	BGL 50A-001-S49 BGL 50A-002-S49
	10...30 V DC 10 % < 35 mA PNP- or NPN-Transistor Light-/dark-on (selectable) 200 mA ≤ 3 V (PNP)/≤ 2.5 V (NPN) Potentiometer 270°	10...30 V DC 10 % < 35 mA PNP- or NPN-Transistor Light-/dark-on (selectable) 200 mA ≤ 3 V (PNP)/≤ 2.5 V (NPN) Potentiometer 270°	10...30 V DC 10 % ≤ 35 mA PNP- or NPN-Transistor Light-/dark-on (selectable) 200 mA ≤ 3 V (PNP), ≤ 2.5 V (NPN) Potentiometer 270°
	LED, red light 640 nm 0.3 mm 20 µm ≤ 0.1 mm	LED, red light 640 nm 0.3 mm 20 µm ≤ 0.1 mm	LED, red light 640 nm 0.4 mm 40 µm ≤ 0.15 mm
	0.33 ms 1.5 kHz	0.33 ms 1.5 kHz	0.33 ms 1.5 kHz
	LED yellow	LED yellow	LED yellow
	40x49x10 mm M8 connector, 3-pin GD-Zn Glass 28 g	50x59x10 mm M8 connector, 3-pin GD-Zn Glass 36 g	70x79x10 mm M8 connector, 3-pin GD-Zn Glass 107 g
	IP 67 yes yes -10...+60 °C EN 60947-5-2	IP 67 yes yes -10...+60 °C EN 60947-5-2	IP 67 yes yes -10...+60 °C EN 60947-5-2

Connectors ...
page 5.2 ...

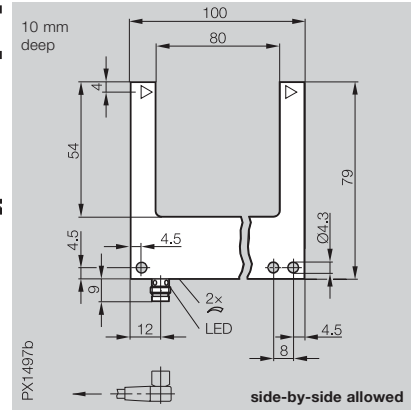
Recommended accessories

please order separately

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



Series	BGL
Slot opening	80 mm
Slot depth	54 mm



Slot sensor

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

Electrical data

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

Optical data

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

Time data

Response time	0.33 ms
Switching frequency f	1.5 kHz

Indicators

Output function indicator	LED yellow
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Mechanical data

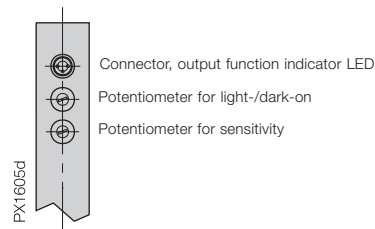
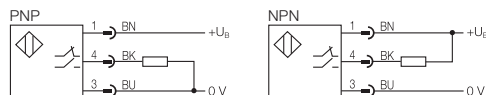
Dimensions	100×79×10 mm
Connection	M8 connector, 3-pin
Housing material	GD-Zn
Optical surface	Glass
Weight	140 g

Ambient data

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



Wiring diagrams



BGL 120 mm 54 mm		BGL 180 mm 114 mm		BGL 220 mm 114 mm	
BGL 120A-001-S49 BGL 120A-002-S49		BGL 180A-001-S49 BGL 180A-002-S49		BGL 220A-001-S49 BGL 220A-002-S49	
10...30 V DC		10...30 V DC		10...30 V DC	
10 %		10 %		10 %	
≤ 35 mA		≤ 35 mA		≤ 35 mA	
PNP- or NPN-Transistor		PNP- or NPN-Transistor		PNP- or NPN-Transistor	
Light-/dark-on (selectable)		Light-/dark-on (selectable)		Light-/dark-on (selectable)	
200 mA		200 mA		200 mA	
≤ 3 V (PNP), ≤ 2.5 V (NPN)		≤ 3 V (PNP), ≤ 2.5 V (NPN)		≤ 3 V (PNP), ≤ 2.5 V (NPN)	
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	
0.33 ms		0.33 ms		0.33 ms	
1.5 kHz		1.5 kHz		1.5 kHz	
LED yellow		LED yellow		LED yellow	
140×84×10 mm		200×144×10 mm		240×144×10 mm	
M8 connector, 3-pin		M8 connector, 3-pin		M8 connector, 3-pin	
GD-Zn		GD-Zn		GD-Zn	
Glass		Glass		Glass	
118 g		190 g		220 g	
IP 67		IP 67		IP 67	
yes		yes		yes	
yes		yes		yes	
-10...+60 °C		-10...+60 °C		-10...+60 °C	
EN 60947-5-2		EN 60947-5-2		EN 60947-5-2	

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Photoelectric sensors
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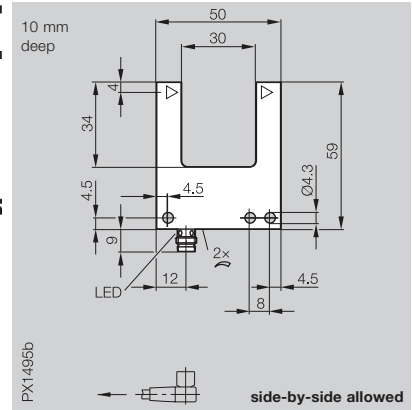
Connectors ...
page 5.2 ...

Recommended accessories
please order separately

Connector
Straight BKS- 48
Right-angle BKS- 49



Series	BGL
Slot opening	30 mm
Slot depth	34 mm



Slot sensor

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

Electrical data

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

Optical data

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

Time data

Response time	0.16 ms
Switching frequency f	5 kHz

Indicators

Output function indicator	LED yellow
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Mechanical data

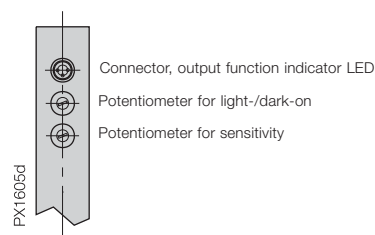
Dimensions	50x59x10 mm
Connection	M8 connector, 3-pin
Housing material	GD-Zn
Optical surface	Glass
Weight	66 g

Ambient data

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



Wiring diagrams



Laser Through-Beam Slot Sensors



**Photoelectric
Sensors**

**BGL Laser
Slot Sensors**

BGL 50 mm 54 mm		BGL 80 mm 54 mm		BGL 120 mm 54 mm	
BGL 50A-003-S49 BGL 50A-004-S49		BGL 80A-003-S49 BGL 80A-004-S49		BGL 120A-003-S49 BGL 120A-004-S49	
10...30 V DC		10...30 V DC		10...30 V DC	
10 %		10 %		10 %	
≤ 20 mA		≤ 20 mA		≤ 20 mA	
PNP- or NPN-Transistor		PNP- or NPN-Transistor		PNP- or NPN-Transistor	
200 mA		200 mA		200 mA	
Light-/dark-on (selectable)		Light-/dark-on (selectable)		Light-/dark-on (selectable)	
≤ 3 V (PNP), ≤ 2.5 V (NPN)		≤ 3 V (PNP), ≤ 2.5 V (NPN)		≤ 3 V (PNP), ≤ 2.5 V (NPN)	
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		15 µm	
≤ 25 µm		≤ 30 µm		≤ 50 µm	
0.16 ms		0.16 ms		0.16 ms	
5 kHz		5 kHz		5 kHz	
LED yellow		LED yellow		LED yellow	
70x79x10 mm		100x79x10 mm		140x84x10 mm	
M8 connector, 3-pin		M8 connector, 3-pin		M8 connector, 3-pin	
GD-Zn		GD-Zn		GD-Zn	
Glass		Glass		Glass	
110 g		135 g		210 g	
IP 67		IP 67		IP 67	
yes		yes		yes	
yes		yes		yes	
-10...+60 °C		-10...+60 °C		-10...+60 °C	
5 kLux		5 kLux		5 kLux	

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Photoelectric
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Connectors ...
page 5.2 ...

**Recommended
accessories**
please order separately

Connector
Straight BKS- 48
Right-angle BKS- 49



The **BGL 21 slot sensor** is a photoelectric sensor using a microcontroller for the setup process and function monitoring. All the user needs to do is press a button and access all the data needed for the sensor setting. Both the top and bottom side of the sensor have an adjustment aid printed for indicating the position in which the object must be located.

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

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

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

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

Features

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

Applications

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



Series	
Slot opening	
Slot depth	



Slot sensor

PNP/NPN
Object property*

Electrical data

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

Optical data

Emitter, light type
Wavelength
Resolution (smallest discernible part)

Time data

Response time
Switching frequency f

Indicators

Output function indicator
Function ready/error indicator

Mechanical data

Dimensions
Connection
Housing material
Optical surface
Weight

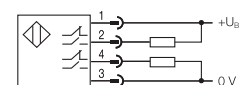
Ambient data

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



Connector orientation

Wiring diagram



BGL 21
Slot Sensors

Connectors ...
page 5.2 ...



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

The Balluff **BWL Standard** angle sensors are a further development of the BGL slot sensors. With virtually identical technical data, these use a new form factor to solve even more applications. The form factor and beam geometry enable approach and detection of objects from virtually any direction. Red light and laser versions are of course available.

Applications

- Assembly and handling
- Robotic systems
- Position and location control

Advantages

- High accuracy
- Visible light spot for easy alignment
- Can be installed even in tight mounting conditions



The Balluff **BWL Auto-motive** angle sensor is a powerful through-beam 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 powerful infrared emitter ensures high function reserve. This product represents an elegant solution for a variety of applications. Various form factors provide for optimum flexibility.

Applications

- Robotic systems
- Position and location control



Type	Optical axis	Light type			Output		Output function		Switching frequency	U _B	Conne- ction		Page
		Infrared	Red light	Laser	PNP-Transistor	NPN-Transistor	Dark-on	Light-on		10...30 V DC	M8 connector, 3-pin	M12 connector, 4-pin	
 Angle sensors Standard													
BWL 4040D-R011-S49	40/40 mm		■		■		■	■	1.5 kHz	■	■		2.2.94
BWL 4040D-R012-S49	40/40 mm		■			■	■	■	1.5 kHz	■	■		2.2.94
BWL 4040D-L011-S49	40/40 mm			■	■		■	■	5 kHz	■	■		2.2.96
BWL 4040D-L012-S49	40/40 mm			■		■	■	■	5 kHz	■	■		2.2.96
BWL 5454D-R011-S49	54/54 mm		■		■		■	■	1.5 kHz	■	■		2.2.94
BWL 5454D-R012-S49	54/54 mm		■			■	■	■	1.5 kHz	■	■		2.2.94
BWL 5454D-L011-S49	54/54 mm			■	■		■	■	5 kHz	■	■		2.2.96
BWL 5454D-L012-S49	54/54 mm			■		■	■	■	5 kHz	■	■		2.2.96
BWL 6868D-R011-S49	68/68 mm		■		■		■	■	1.5 kHz	■	■		2.2.95
BWL 6868D-R012-S49	68/68 mm		■			■	■	■	1.5 kHz	■	■		2.2.95
BWL 6868D-L011-S49	68/68 mm			■	■		■	■	5 kHz	■	■		2.2.97
BWL 6868D-L012-S49	68/68 mm			■		■	■	■	5 kHz	■	■		2.2.97
BWL 9090D-R011-S49	90/90 mm		■		■		■	■	1.5 kHz	■	■		2.2.95
BWL 9090D-R012-S49	90/90 mm		■			■	■	■	1.5 kHz	■	■		2.2.95
BWL 9090D-L011-S49	90/90 mm			■	■		■	■	5 kHz	■	■		2.2.97
BWL 9090D-L012-S49	90/90 mm			■		■	■	■	5 kHz	■	■		2.2.97
BWL 110110D-R011-S49	110/110 mm		■		■		■	■	1.5 kHz	■	■		2.2.95
BWL 110110D-R012-S49	110/110 mm		■			■	■	■	1.5 kHz	■	■		2.2.95
BWL 110110D-L011-S49	110/110 mm			■	■		■	■	5 kHz	■	■		2.2.97
BWL 110110D-L012-S49	110/110 mm			■		■	■	■	5 kHz	■	■		2.2.97
 Angle sensors Automotive													
BWL 2222B-001-S4	22/22 mm	■			■		■		1 kHz	■		■	2.2.98
BWL 2222C-001-S4	22/22 mm	■			■		■		1 kHz	■		■	2.2.98
BWL 4241A-001-S4	43/43 mm	■			■		■		1 kHz	■		■	2.2.99
BWL 4241A-001-S49	43/43 mm	■			■		■		1 kHz	■	■		2.2.99
BWL 4260A-001-S4	42/62 mm	■			■		■		1 kHz	■		■	2.2.99
BWL 4260A-001-S49	42/62 mm	■			■		■		1 kHz	■	■		2.2.99

2.2

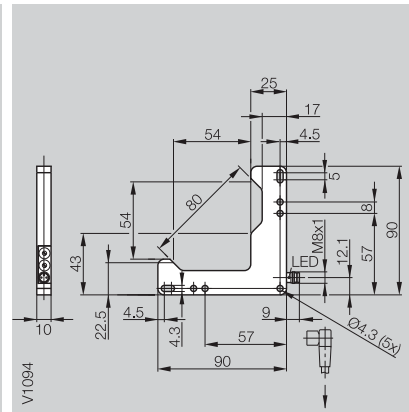
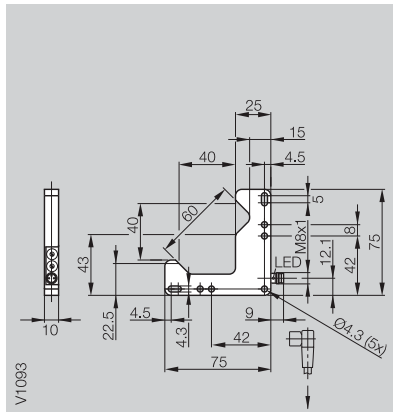
2.3

Photoelectric sensors accessories
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Connectors ...
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Series	BWL	BWL	
Optical axis	40/40 mm	54/54 mm	



Angle Sensor

PNP	BWL 4040D-R011-S49	BWL 5454D-R011-S49	
NPN	BWL 4040D-R012-S49	BWL 5454D-R012-S49	

Electrical data

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

Optical data

Emitter, light type	LED, red light	LED, red light	
Wavelength	640 nm	640 nm	
Resolution (smallest discernible part)	0.4 mm	0.4 mm	
Repeat accuracy	≤ 40 μ m	≤ 60 μ m	
Switching hysteresis	≤ 0.15 mm	≤ 0.2 mm	

Time data

Response time	0.33 ms	0.33 ms	
Switching frequency f	1.5 kHz	1.5 kHz	

Indicators

Output function indicator	LED yellow	LED yellow	
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Mechanical data

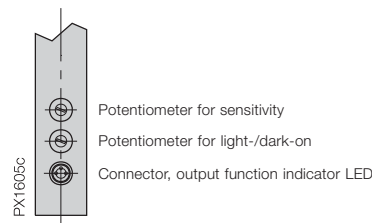
Dimensions			
Connection	M8 connector, 3-pin	M8 connector, 3-pin	
Housing material	GD-Zn	GD-Zn	
Optical surface	Glass	Glass	
Weight	94 g	125 g	

Ambient data

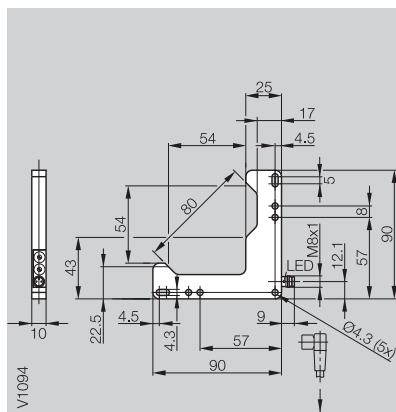
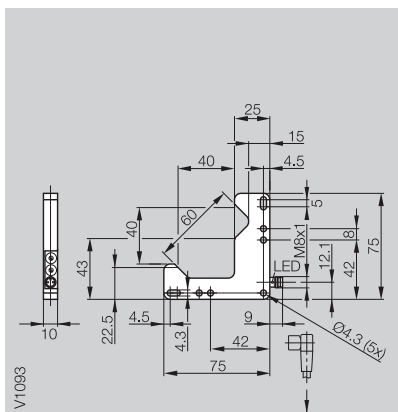
Degree of protection per IEC 60529	IP 67	IP 67	
Polarity reversal protected	yes	yes	
Short circuit protected	yes	yes	
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C	
Ambient light rejection per	EN 60947-5-2	EN 60947-5-2	



Wiring diagrams



Series	BWL	BWL	
Optical axis	40/40 mm	54/54 mm	



Angle sensor

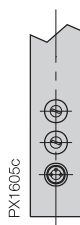
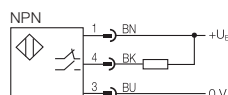
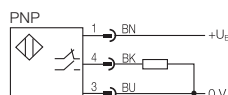


Single channel	BWL 4040D-L011-S49	BWL 5454D-L011-S49
PNP	BWL 4040D-L012-S49	BWL 5454D-L012-S49
NPN		
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	200 mA	200 mA
Voltage drop U_d at I_0	≤ 3 V (PNP)/ ≤ 2.5 V (NPN)	≤ 3 V (PNP)/ ≤ 2.5 V (NPN)
Settings	Potentiometer 270°	Potentiometer 270°
Optical data		
Emitter, light type	Laser, red light	Laser, red light
Wavelength	640 nm	640 nm
Laser class	1	1
Resolution (smallest discernible part)	80 μ m	0.1 mm
Repeat accuracy	≤ 10 μ m	≤ 10 μ m
Switching hysteresis	≤ 25 μ m	≤ 35 μ m
Time data		
Response time	0.16 ms	0.16 ms
Switching frequency f	5 kHz	5 kHz
Indicators		
Output function indicator	LED yellow	LED yellow
Mechanical data		
Dimensions		
Connection	M8 connector, 3-pin	M8 connector, 3-pin
Housing material	GD-Zn	GD-Zn
Optical surface	Glass	Glass
Weight	94 g	125 g
Ambient data		
Degree of protection per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short circuit protected	yes	yes
Ambient temperature range T_a	-10...+60 °C	-10...+60 °C
Ambient light rejection per	EN 60947-5-2	EN 60947-5-2



Connector orientation

Wiring diagrams



Potentiometer for sensitivity

Potentiometer for light-/dark-on

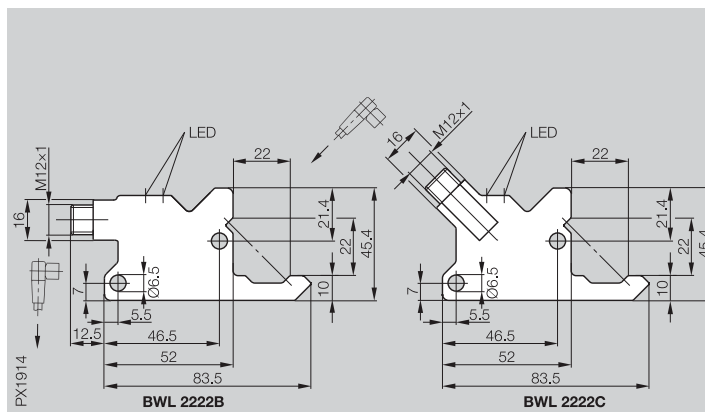
Connector, output function indicator LED

BWL Standard Laser Angle Sensors

5
Connectors ...
page 5.2 ...

Straight BKS- 48
Right-angle BKS- 49

Series	BWL	BWL	
Optical axis	22 mm/22 mm	22 mm/22 mm	



Angle sensor

PNP

Electrical data

Supply voltage U_B

Ripple

No-load supply current I_0 max.

Switching output

Output current

Switching type

Voltage drop U_A at I_o

Optical data

Emitter, light type

Wavelength

Time data

Ready delay

Response time

Switching frequency f

Indicators

Power-on indicator

Output function indicator

Mechanical data

Dimensions

Connection

Housing material

Optical surface

Weight

Ambient data

Degree of protection per IEC 60529

Polarity reversal protected

Short circuit protected

Ambient temperature range T_a

Ambient light rejection per

BWL 2222B-001-S4

BWL 2222C-001-S4

10...30 V DC

15 %

≤ 35 mA

PNP-Transistor

≤ 200 mA

Dark-on

≤ 2.5 V

LED, infrared

880 nm

100 ms

≤ 0.5 ms

1 kHz

LED green

LED yellow

45.4×83.5×10.7 mm

M12 connector, 4-pin

corrosion-resistant steel

PMMA

106 g

IP 67

yes

yes

-10...+60 °C

EN 60947-5-2

10...30 V DC

15 %

≤ 35 mA

PNP-Transistor

≤ 200 mA

Dark-on

≤ 2.5 V

LED, infrared

880 nm

100 ms

≤ 0.5 ms

1 kHz

LED green

LED yellow

45.4×83.5×10.7 mm

M12 connector, 4-pin

corrosion-resistant steel

PMMA

99 g

IP 67

yes

yes

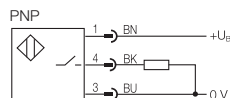
-10...+60 °C

EN 60947-5-2



Connector orientation

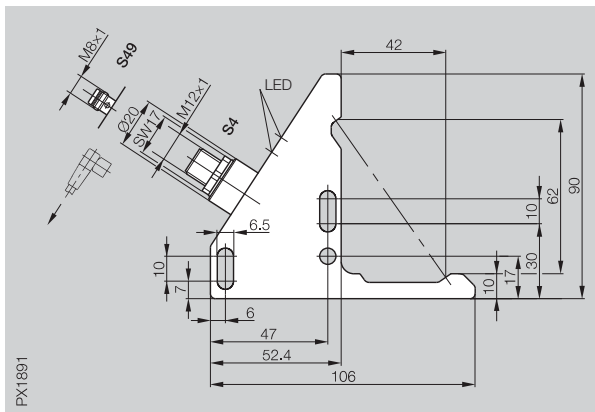
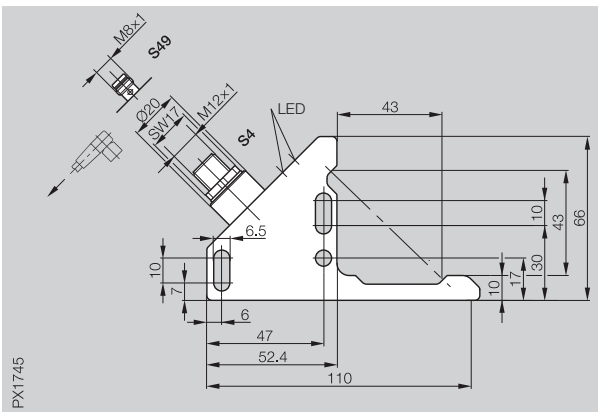
Wiring diagram



Photoelectric Sensors

BWL Angle Sensors

	BWL	BWL	BWL	BWL
	43 mm/43 mm	43 mm/43 mm	42 mm/62 mm	42 mm/62 mm



	BWL 4241A-001-S4	BWL 4241A-001-S49	BWL 4260A-001-S4	BWL 4260A-001-S49
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	15 %	15 %	15 %	15 %
	≤ 35 mA	≤ 35 mA	≤ 35 mA	≤ 35 mA
	PNP-Transistor	PNP-Transistor	PNP-Transistor	PNP-Transistor
	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
	Dark-on	Dark-on	Dark-on	Dark-on
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	LED, infrared	LED, infrared	LED, infrared	LED, infrared
	880 nm	880 nm	880 nm	880 nm
	100 ms	100 ms	100 ms	100 ms
	≤ 0.5 ms	≤ 0.5 ms	≤ 0.5 ms	≤ 0.5 ms
	1 kHz	1 kHz	1 kHz	1 kHz
	LED green	LED green	LED green	LED green
	LED yellow	LED yellow	LED yellow	LED yellow
	66×110×10.7 mm	66×110×10.7 mm	90×106×10.7 mm	90×106×10.7 mm
	M12 connector, 4-pin	M8 connector, 3-pin	M12 connector, 4-pin	M8 connector, 3-pin
	corrosion-resistant steel	corrosion-resistant steel	corrosion-resistant steel	corrosion-resistant steel
	PMMA	PMMA	PMMA	PMMA
	148 g	124 g	181 g	155 g
	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes
	yes	yes	yes	yes
	-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

2.3

Photoelectric
sensors
accessories
page 2.3.2 ...

Connectors ...
page 5.2 ...

Recommended accessories

please order separately

Connector
Straight BKS- 19
Right-angle BKS- 20

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



Dynamic optical windows are an extension of the slot sensors. Instead of one light beam as with the slot sensors, the dynamic optical windows use a number of parallel light beams. This arrangement makes it possible to sense objects not just at a point, but over a range (window).

A special optical arrangement ensures consistently high resolution at each place in the window.

The BOWA sensors are dynamic, which means that parts are detected in the active area when they are moving.

Features

- High resolution across the entire area
- Dynamic operation
- Only moving objects are detected, so feed trays etc. do not affect the measurement
- Detects small parts down to 0.8 mm
- Adjustable output signal duration
- Adjustable sensitivity
- Three window sizes
- Standard M8 connector

Applications

- Compressed air feeding of small parts
- Thread break monitoring
- Eject monitoring
- Counting/separating parts



Type	Active range	Resolution	Light type		Output		Output function		Working principle		U _B	Conne- ction	Page
			Infrared		PNP-Transistor		Dark-on		Dynamic		10...30 V DC	M8 connector, 3-pin	
 Dynamic Optical Windows													
BOWA 0408-PS-C-S49	40x80 mm	0.8 mm	■		■		■	■			■	■	2.2 102
BOWA 0808-PS-C-S49	80x80 mm	1 mm	■		■		■	■			■	■	2.2 103
BOWA 1208-PS-C-S49	120x80 mm	1.5 mm	■		■		■	■			■	■	2.2 103

2.2

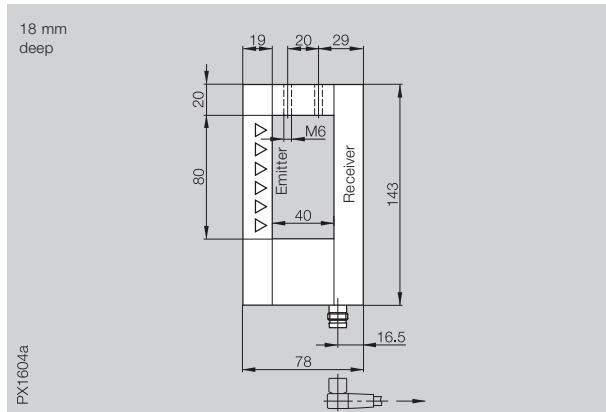
2.3

Photoelectric sensors
accessories
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Connectors ...
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Series	BOWA
Active area	40×80 mm



Dynamic optical window

PNP

BOWA 0408-PS-C-S49

Electrical data

Supply voltage U_B

10...30 V DC

Ripple

10 %

No-load supply current I_0 max.

≤ 85 mA

Switching output

PNP-Transistor

Switching type

Dark-on

Output current

200 mA

Voltage drop U_d at I_o

≤ 3.5 V

Settings

2× potentiometers 270°

Optical data

Emitter, light type

LED, infrared

Wavelength

880 nm

Resolution (smallest discernible part)

0.8 mm

Time data

Ready delay

≤ 100 ms

Turn-on delay

0.2 ms

Signal duration

10...300 ms adjustable

Switching frequency f

3...100 Hz

Indicators

Power-on indicator

LED green

Output function indicator

LED red

Mechanical data

Dimensions

143×78×18 mm

Connection

M8 connector, 3-pin

Housing material

Anodized Al

Optical surface

PMMA

Weight

280 g

Ambient data

Degree of protection per IEC 60529

IP 65

Polarity reversal protected

yes

Short circuit protected

yes

Ambient temperature range T_a

-10...+55 °C

Ambient light rejection per

EN 60947-5-2

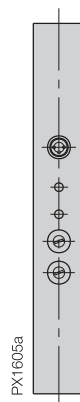
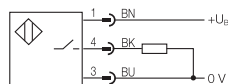


Connector orientation

Note when using for ambient light:

The receiver is located on the connector side.

Wiring diagram



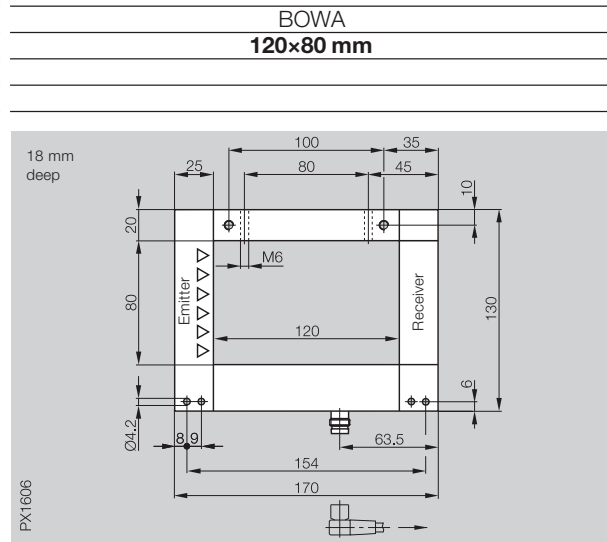
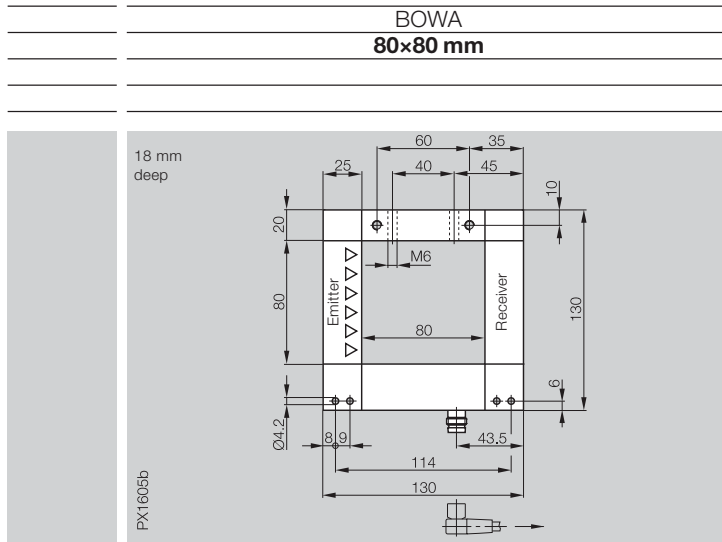
Connector

Power-on LED

Output signal LED

Signal duration potentiometer

Potentiometer for sensitivity



BOWA 0808-PS-C-S49
10...30 V DC
10 %
≤ 125 mA
PNP-Transistor
Dark-on
200 mA
≤ 3.5 V
2× potentiometers 270°
LED, infrared
880 nm
1 mm
≤ 100 ms
0.2 ms
10...300 ms adjustable
3...100 Hz
LED green
LED red
130×130×18 mm
M8 connector, 3-pin
Anodized Al
PMMA
400 g
IP 65
yes
yes
-10...+55 °C
EN 60947-5-2

BOWA 1208-PS-C-S49
10...30 V DC
10 %
≤ 150 mA
PNP-Transistor
Dark-on
200 mA
≤ 3.5 V
2× potentiometers 270°
LED, infrared
880 nm
1.5 mm
≤ 100 ms
0.2 ms
10...300 ms adjustable
3...100 Hz
LED green
LED red
130×170×18 mm
M8 connector, 3-pin
Anodized Al
PMMA
480 g
IP 65
yes
yes
-10...+55 °C
EN 60947-5-2

2.2

2.3

Photoelectric sensors
accessories
page 2.3.2 ...

5

Connectors ...
page 5.2 ...

Recommended accessories please order separately

Connector
Straight BKS_- 48
Right-angle BKS_- 49



Light grids are available in various measuring field heights of 100, 150 and 300 mm and include both long and short ranges. This means reliable detection of wide and very large objects is no longer a problem. The light grids with a measuring 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. Alignment and installation is user-friendly and problem-free.

The system features an analog voltage output for direct representation of the height or width of an object. An additional switching output indicates whether the object is within the monitored range.

Features

- Easy to connect
- Easy to install
- Ready to use
- No cumbersome parameter setting
- Ranges
150 mm...2.1 m
- Measuring field heights
100, 150, 300 mm
- Analog output

Applications

- Counting parts
- Height measurement and height checking
- Presence detection
- Slack and position checking
- Pallet checking
- Web monitoring
- Position and material monitoring



Type	Measuring field height	Range	Resolution	Light type	Output	Output function	U _B	Connection	Page
		0.15...2.1 m	5 mm 7 mm	Infrared	PNP-Transistor Analog 0...10 V	Dark-on	24 V DC	M12 connector	
 Light grid									
BLG 1-010-210-050-PV01-SX	100 mm	■	■	■	■	■	■	■	2.2.107
BLG 1-010-210-070-PV01-SX	100 mm	■	■	■	■	■	■	■	2.2.107
BLG 1-015-210-050-PV01-SX	150 mm	■	■	■	■	■	■	■	2.2.107
BLG 1-015-210-070-PV01-SX	150 mm	■	■	■	■	■	■	■	2.2.107
BLG 1-030-210-070-PV01-SX	300 mm	■	■	■	■	■	■	■	2.2.107

2.2

2.3

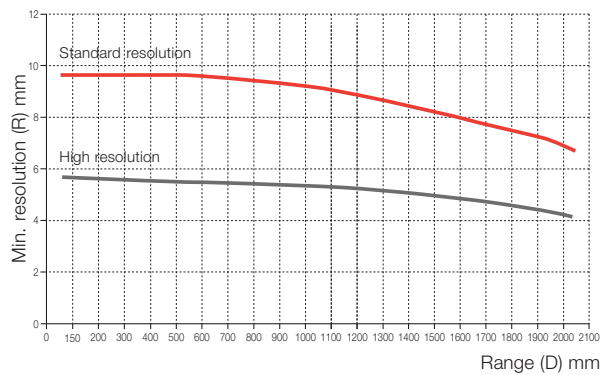
Photoelectric sensors
accessories
page 2.3.2 ...

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Connectors ...
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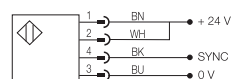
Resolution Diagram

Range 0.15...2.1 m

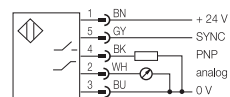


Wiring diagrams

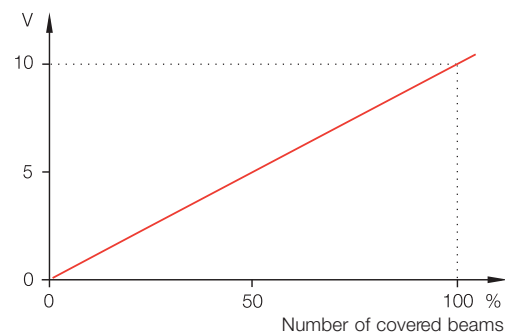
Transmitter



Output sensor



Analog output



Mounting bracket (included)



Recommended accessories please order separately

Emitter:

4-pin connector
Straight BKS- 19
Right-angle BKS- 20

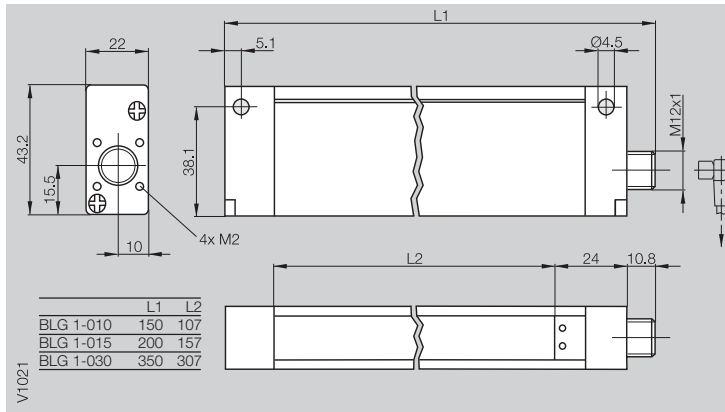


Receiver:

5-pin connector
Straight BKS-S137-17-PU-05
Right-angle BKS-S134-17



Series	BLG	BLG	BLG
Measuring field height	100 mm	150 mm	300 mm

**Light grid 0.15...2.1 m range**

PNP	Resolution 7 mm	BLG 1-010-210-070-PV01-SX	BLG 1-015-210-070-PV01-SX	BLG 1-030-210-070-PV01-SX
	Resolution 5 mm	BLG 1-010-210-050-PV01-SX	BLG 1-015-210-050-PV01-SX	

Electrical data

Supply voltage U_B	24 V DC	24 V DC	24 V DC
Ripple	15 %	15 %	15 %
No-load	≤ 150 mA	≤ 150 mA	≤ 150 mA
supply current I_0 max.	≤ 50 mA no-load	≤ 50 mA no-load	≤ 50 mA no-load
Switching output	PNP-Transistor	PNP-Transistor	PNP-Transistor
Output current	100 mA	100 mA	100 mA
Switching type	Dark-on	Dark-on	Dark-on
Voltage drop U_d at I_0	≤ 1.5 V/10 mA	≤ 1.5 V/10 mA	≤ 1.5 V/10 mA
Analog output	0...10 V	0...10 V	0...10 V
Settings	fixed	fixed	fixed

Optical data

Emitter, light type	LED, infrared	LED, infrared	LED, infrared
Wavelength	880 nm	880 nm	880 nm

Indicators

Power-on indicator emitter/receiver	LED green	LED green	LED green
Output function indicator receiver	LED orange	LED orange	LED orange

Mechanical data

Dimensions	see drawing	see drawing	see drawing
Connection type	Emitter	Emitter	Emitter
	Receiver	Receiver	Receiver
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin
Housing material	Al black anodized	Al black anodized	Al black anodized
Optical surface	PMMA	PMMA	PMMA
Weight	300 g	340 g	510 g

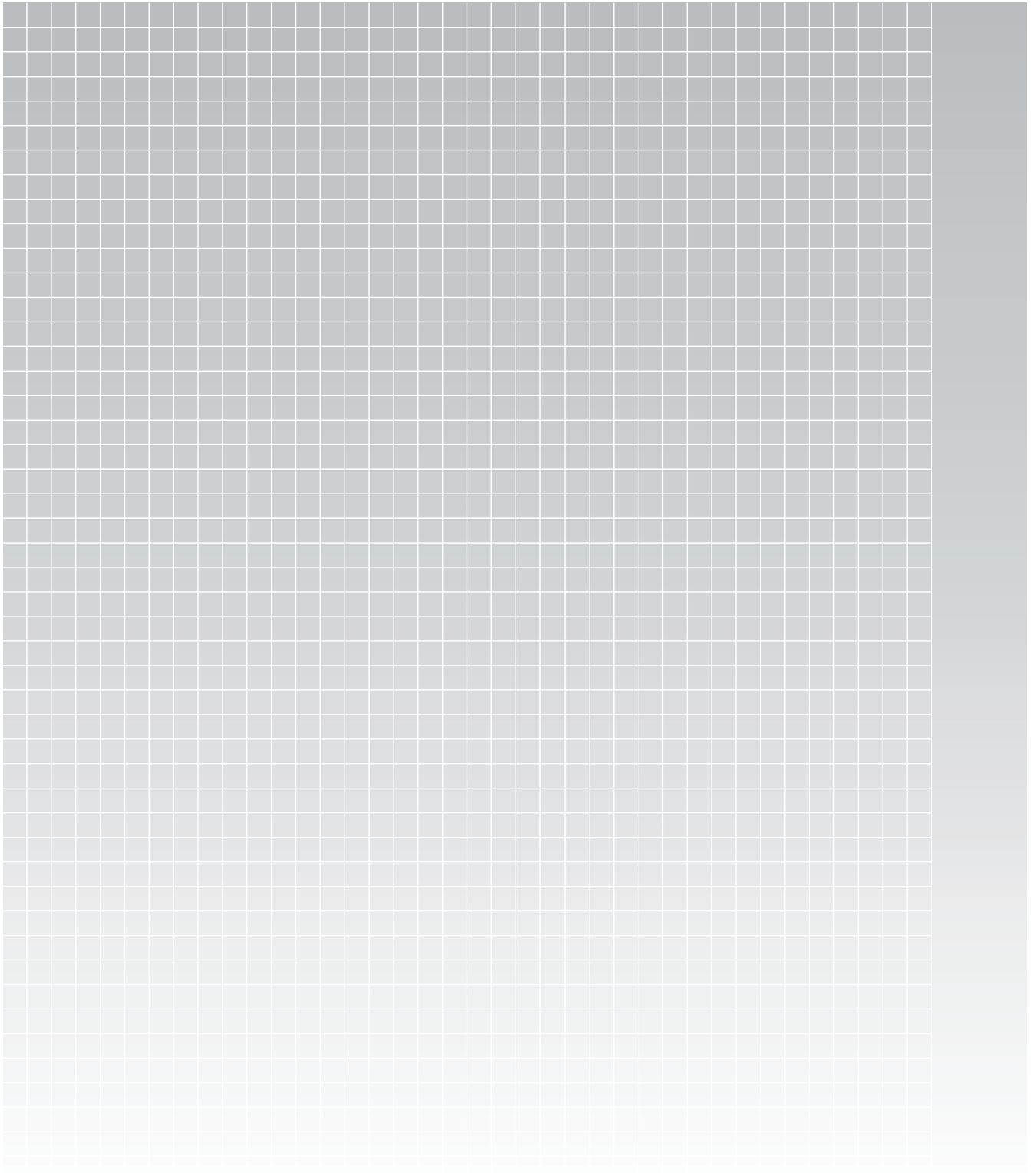
Ambient data

Degree of protection per IEC 60529	IP 65	IP 65	IP 65
Short circuit protected	yes	yes	yes
Ambient temperature range T_a	0...+55 °C	0...+55 °C	0...+55 °C



→ Connector orientation

2.2**2.3**Photoelectric
sensors
accessories
page 2.3.2 ...**5**Connectors ...
page 5.2 ...



Accessories for Photoelectric Sensors

Reflectors

- 2.3.2 Round
- 2.3.3 Rectangular
- 2.3.4 For laser
retroreflectives
- 2.3.5 Reflective tape

Mounting materials

- 2.3.6 Mounting brackets
- 2.3.8 Clamps,
adapter plate,
reflector mounting
bracket
- 2.3.9 Mounting cuff,
Mounting clamps
- 2.3.10 Holding systems

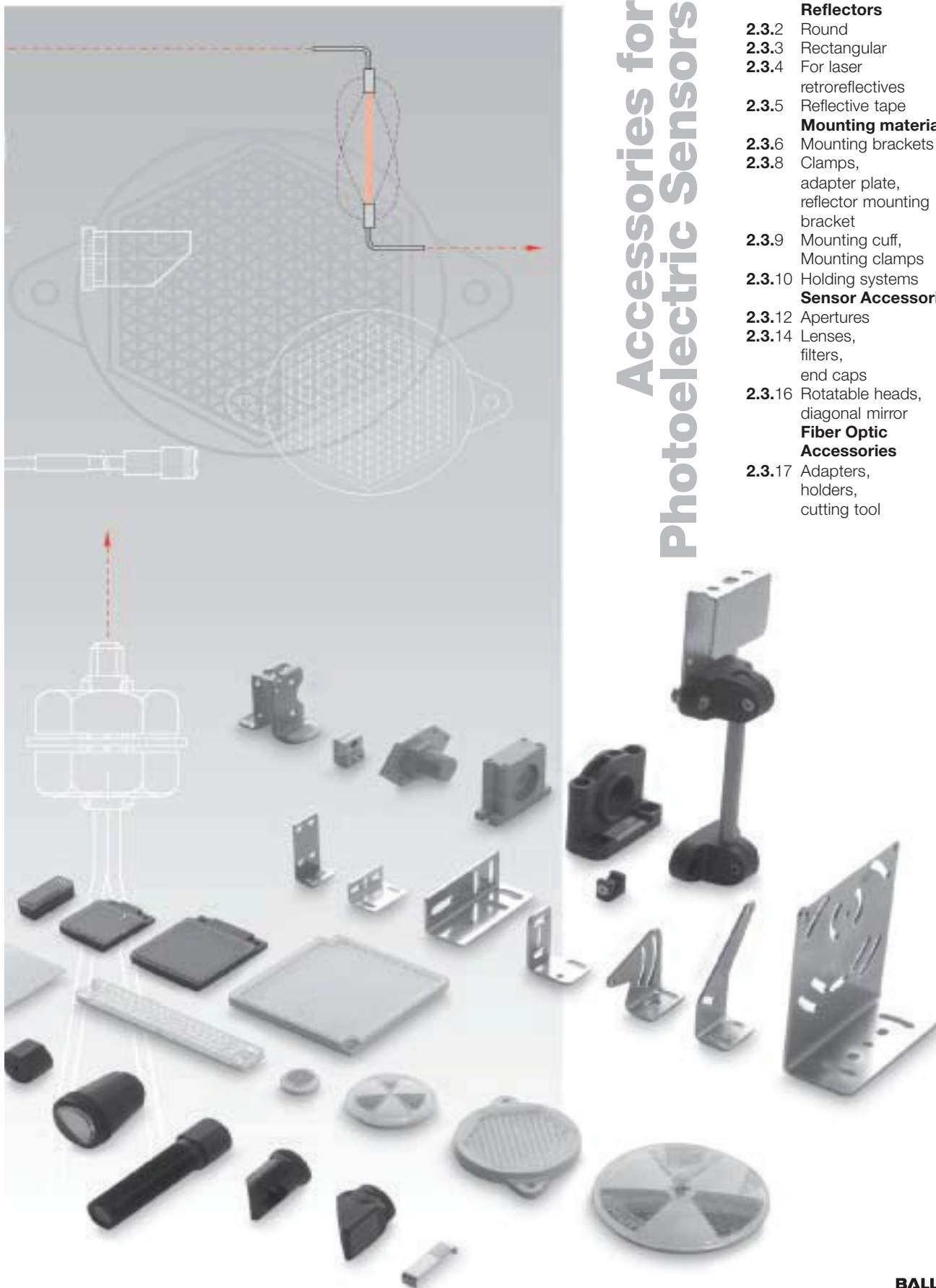
Sensor Accessories

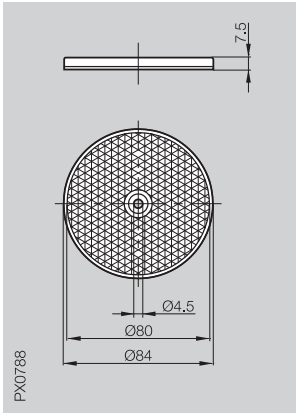
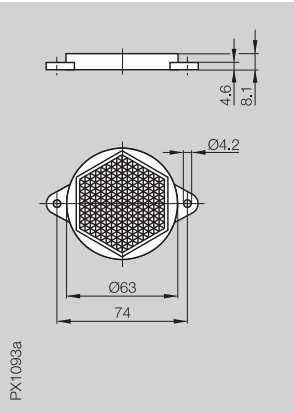
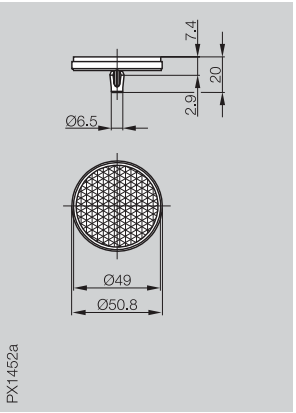
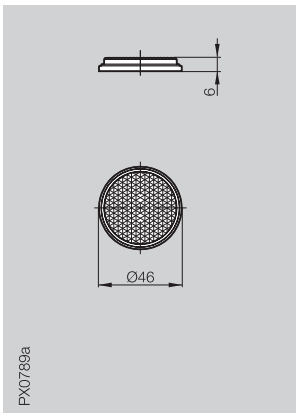
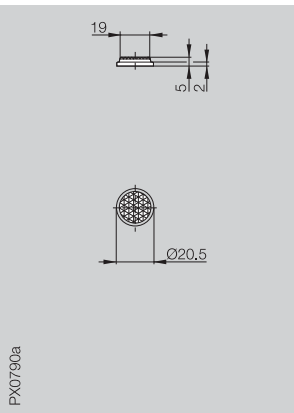
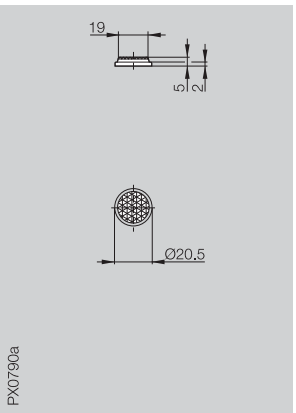
- 2.3.12 Apertures
- 2.3.14 Lenses,
filters,
end caps
- 2.3.16 Rotatable heads,
diagonal mirror

Fiber Optic Accessories

- 2.3.17 Adapters,
holders,
cutting tool

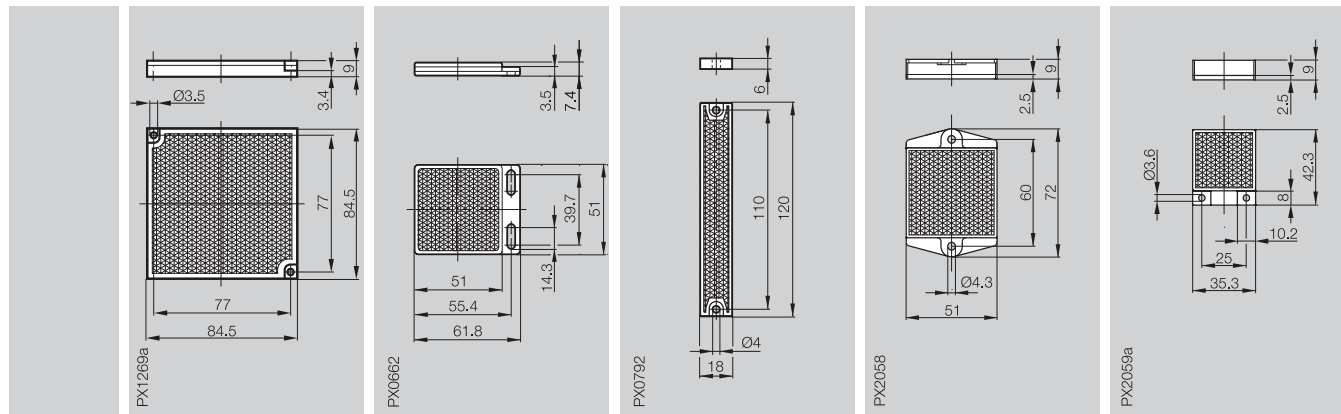
2.3



Size	Reflector Ø 84 mm	Reflector Ø 63	Reflector Ø 51 mm	
Attachment	M4 screw	two M4 screws	Rivet with mounting tabs	
				
Ordering code	BOS R-1	BOS R-10	BOS R-14	
Material	PMMA	PMMA	PC	
Mounting accessories	BOS 21-AD-1			
Special features	Standard reflector		Chemical resistant	
Temperature range	0...+65 °C	0...+65 °C	0...+100 °C	
Reference sensing range	100 %	60 %	60 %	
Size	Reflector Ø 46 mm	Reflector Ø 20 mm	Reflector Ø 20 mm	
Attachment	glue	glue	glue	
				
Ordering code	BOS R-2	BOS R-3	BOS R-15	
Material	PMMA	PMMA	ABS/PMMA	
Mounting accessories				
Special features			Resistant to chemicals	
Temperature range	0...+65 °C	0...+65 °C	0...+110 °C	
Reference sensing range	60 %	25 %	25 %	

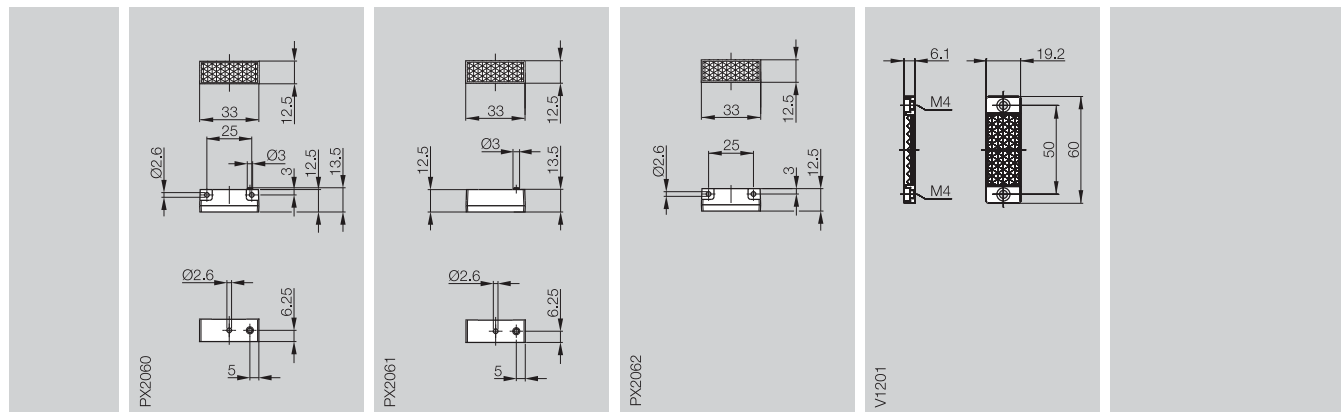


Reflector 84×84 mm	Reflector 51×62 mm	Reflector 18×120 mm	Reflector 51×72 mm	Reflector 35×42 mm
two M3 screws	two M4 screws	two M4 screws	two M4 screws	two M3 screws

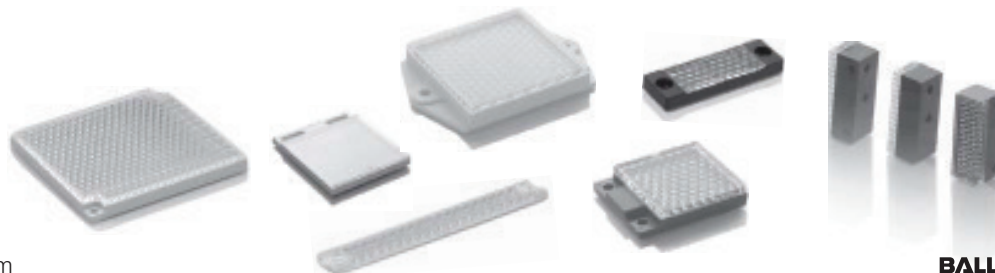


BOS R-11	BOS R-9	BOS R-5	BOS R-25	BOS R-26
PMMA	PMMA	PMMA	PMMA	PMMA
High-performance reflector	BOS 5-HW-6		BOS 5-HW-4	BOS 5-HW-5
0...+50 °C	0...+50 °C	0...+50 °C	0...+50 °C	0...+50 °C
125 %	100 %	40 %	100 %	60 %

Reflector 33×12 mm	Reflector 33×12 mm	Reflector 33×12 mm	Reflector 19×60 mm	
Screws	Rear screws	Side screws	two M4 screws	



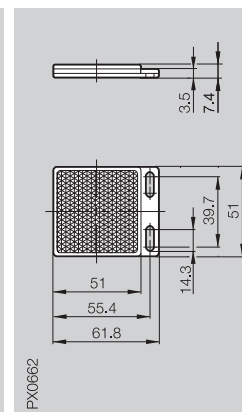
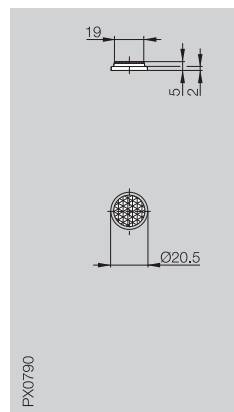
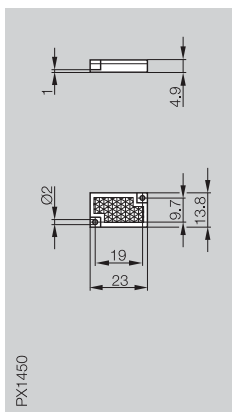
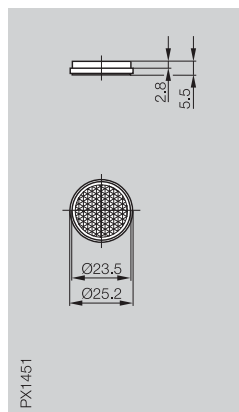
BOS R-27	BOS R-28	BOS R-29	BOS R-33	
PMMA	PMMA	PMMA	PMMA	
BOS 5-HW-1/2		BOS 5-HW-1/2		
0...+50 °C	0...+50 °C	0...+50 °C	-20...+85 °C	
40 %	40 %	40 %	50 %	



Photoelectric Sensors Accessories

Reflectors
for laser retroreflective types

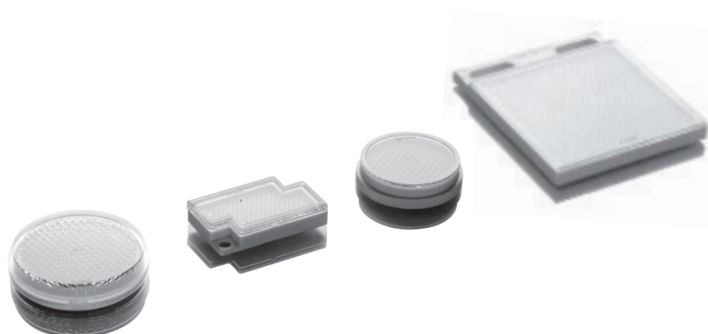
Size	Reflector Ø 25 mm	Reflector 14×23 mm	Reflector Ø 20 mm	Reflector 51×62 mm
Attachment	glue	two M2 screws	glue	two M4 screws

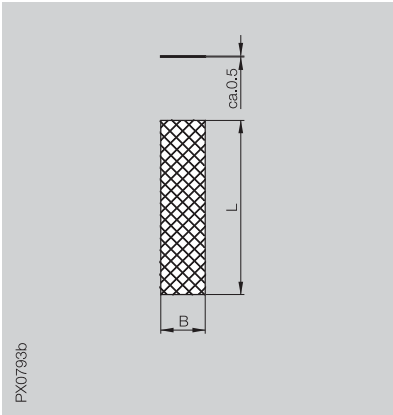
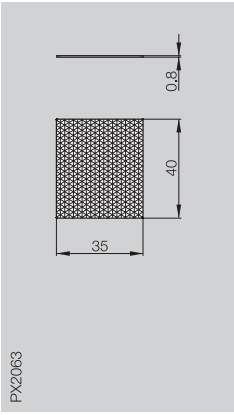


Ordering code	BOS R-13	BOS R-12	BOS R-16	BOS R-22
Material	PMMA	ABS/PMMA	ABS/PMMA	ABS/PMMA
Mounting accessories				BOS 5-HW-6
Special features		Miniature reflector for laser retroreflectives	Miniature reflector for laser retroreflectives	
Temperature range	0...+55 °C	0...+55 °C	-20...+60 °C	-10...+60 °C

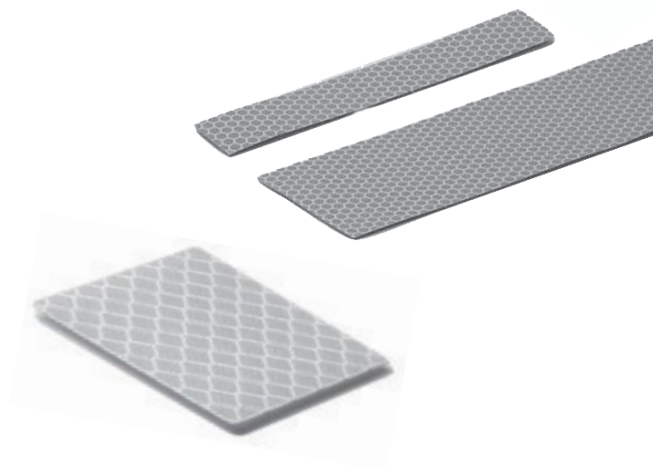
when used with laser through-beam sensors BOS 6K/BOS 18K_/BOS 26K/BOS 21M

Range with				
BOS 6K-PU-1LQA-...	2 m	2 m	2 m	2 m
BOS 18KF-PA-1LQP-...	16 m	10 m	11 m	16 m
BOS 18KW-PA-1LQH-...	9 m	6 m	7 m	9 m
BOS 26K-PA-1LQK-...	16 m	7 m	7 m	25 m
BOS 21M-PA-LR10-...	15 m	7 m	7 m	20 m



Size	Reflective tape see below	Reflective tape 40x35 mm
Attachment	self-adhesive	self-adhesive
		
Ordering code	BOS R-6-... (not for polarized light) BOS R-7-... (also for polarized light) BOS R-8-... (also for polarized light)	BOS R-30 (also for polarized light)
Reference sensing range	40 % (for 100x50 mm)	

Dimensions LxW	Ordering code
45 mmx50 mm	BOS R-6-45
250 mmx50 mm	BOS R-6-0,25
22 mmx50 mm	BOS R-7-22
250 mmx50 mm	BOS R-7-0,25
22 mmx25 mm	BOS R-8-22
250 mmx25 mm	BOS R-8-0,25

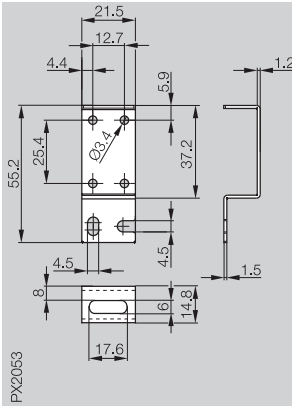


Description Use	Mounting bracket for BOS 2K	Mounting bracket for BOS 2K	Mounting bracket for BOS 2K	Mounting bracket for BOS 5K
	V1042	V1043	V1044	PX2052
Ordering code	BOS 2-HW-1	BOS 2-HW-2	BOS 2-HW-3	BOS 5-HW-1

Description Use	Mounting bracket for BOS 21M	Mounting bracket for BOS 21M	Mounting bracket for BOS 21M
	PX1961	PX1962a	PX1963a
Ordering code	BOS 21-HW-1	BOS 21-HW-2	BOS 21-HW-3

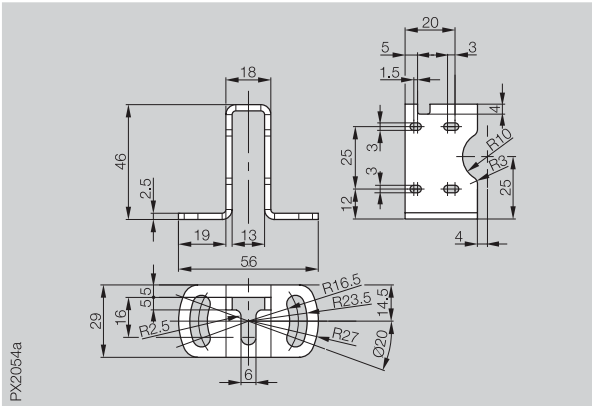


Mounting bracket
for BOS 5K



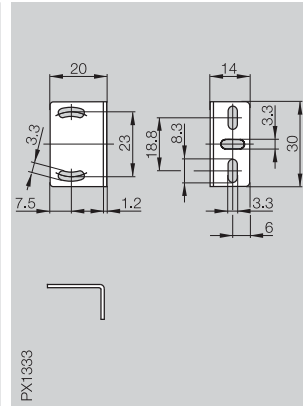
BOS 5-HW-2

Mounting bracket
for BOS 5K



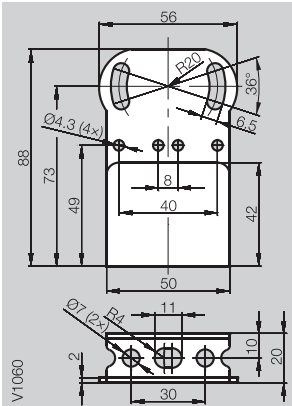
BOS 5-HW-3

Mounting bracket
for BOS 6K and BOS 21M



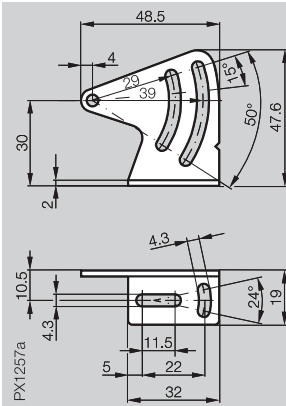
BOS 6-HW-1

Mounting bracket
for BOS 21M



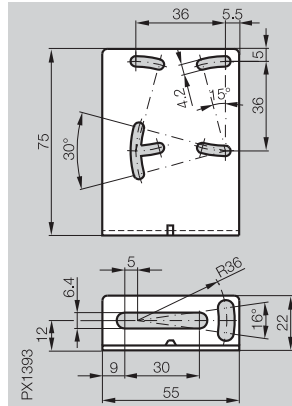
BOS 21-HW-4

Mounting bracket
for BOS 26K, BOS 25K
and BOS 21M



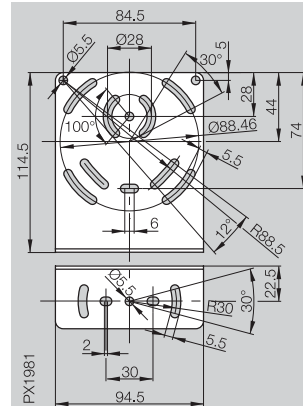
BOS 26-HW-1

Mounting bracket
for BOS 36K



BOS 36-HW-1

Mounting bracket
for BOD 63M



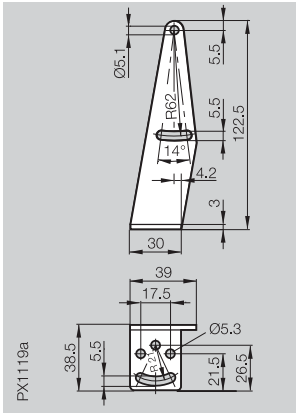
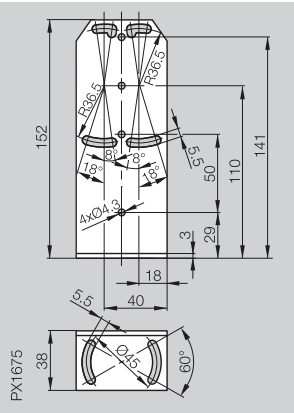
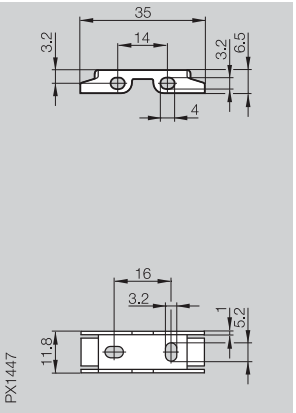
BOD 63-HW-1

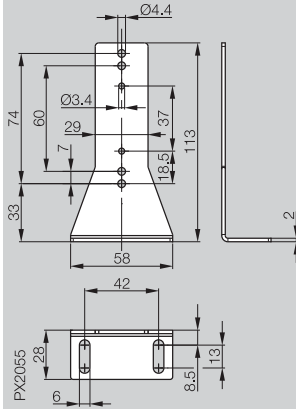
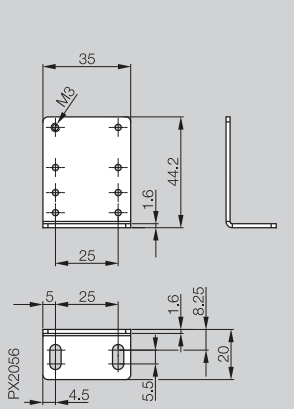
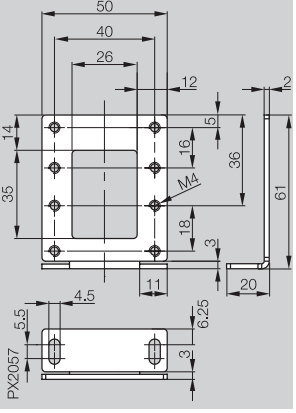
2.3



5

Holders ...
page 5.2 ...

Description Use	Mounting bracket for BOS 65K	Mounting bracket for BOD 66M	Mounting bracket for BOS 74K
			
Ordering code	BOS 65-HW-1	BOD 66-HW-1	BOS 74-HW-1

Description Use	Mounting bracket for reflector BOS R-10 and BOS R-25	Mounting bracket for reflector BOS R-26	Mounting bracket for reflector BOS R-9 and BOS R-22
			
Ordering code	BOS 5-HW-4	BOS 5-HW-5	BOS 5-HW-6



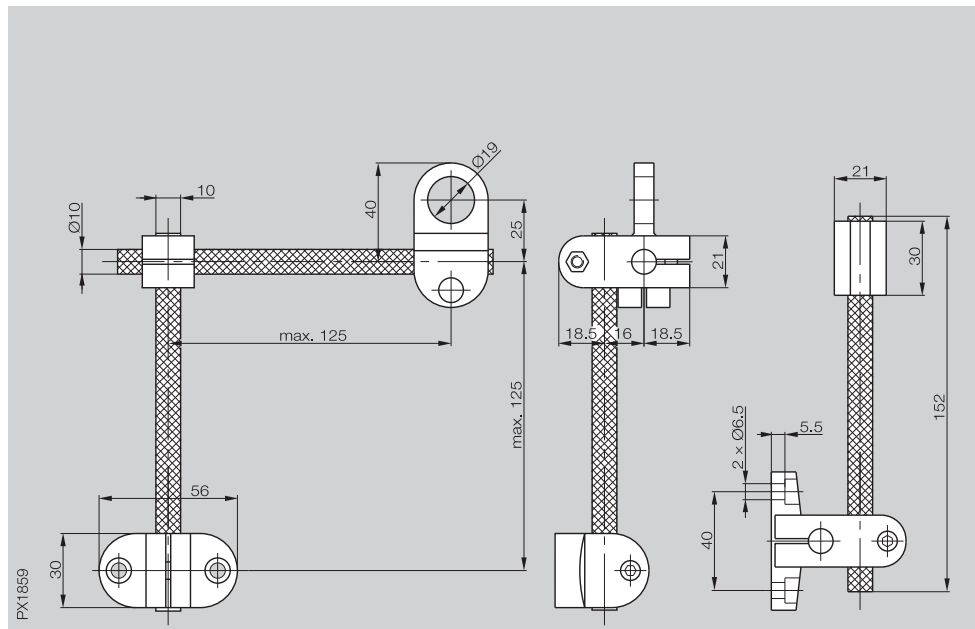
2.3



Description
Use

Holding system

for flexible installation,
for all tubular sensors with M18 outside thread
may be combined with other Balluff accessories



Ordering code

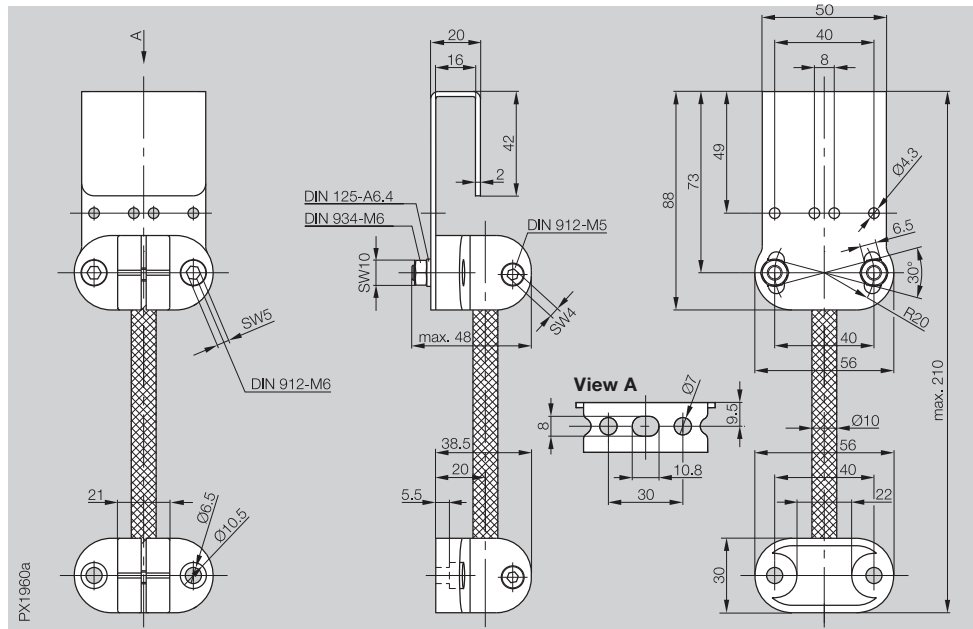
BOS 18-HS-1



Description
Use

Holding system

for flexible installation,
for sensors in series BOS 21M
may be combined with other Balluff accessories

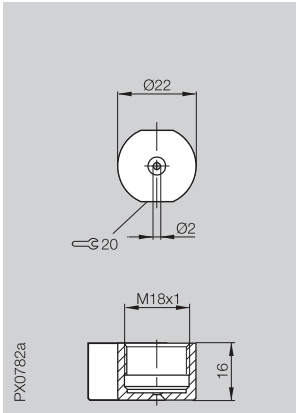
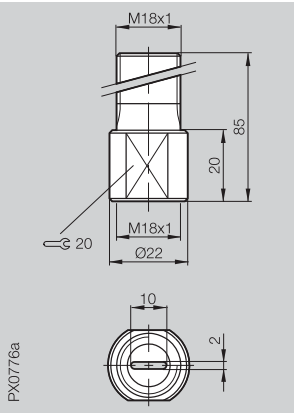
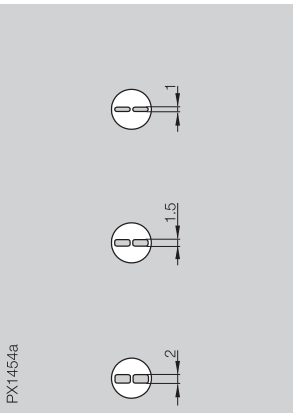


Ordering code

BOS 21-HS-1

2.3



Description Use	Round aperture for BLE/BLS 18	Double slit aperture for BLE/BLS 18	Slit aperture for BLE/BLS 12M
			
Ordering code	BOS 18-BL-1	BOS 18-BL-2	BOS 12-BL-1

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:

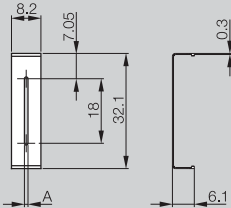
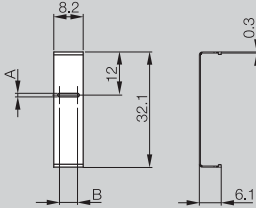
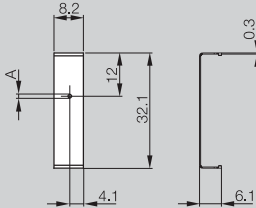
- Small parts detection, i.e. 1 mm drill, aperture on emitter only
- Through-beams may be mounted close to one another
- Highly reflective parts directly next to the light path do not interfere

Slit width in mm	Range in m	Object size in mm
1	0.5	> 1
1.5	1	> 1.5
2	2	> 2

Aperture on emitter	Aperture on receiver	Range in m
○	○	∞
○	○	2

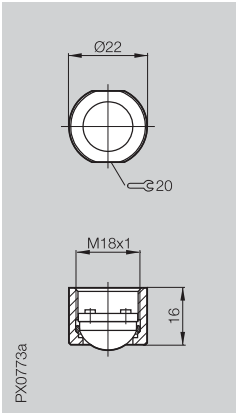
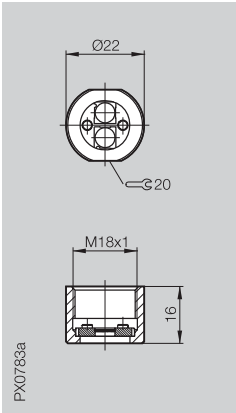
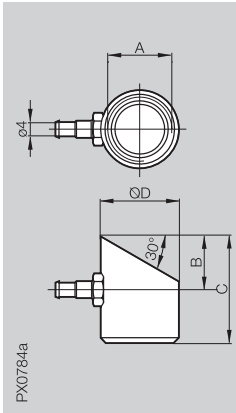
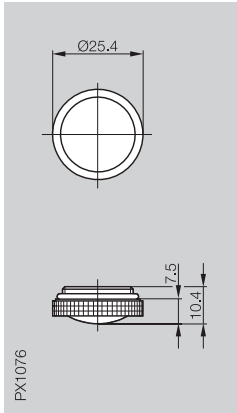
Aperture position emitter	Aperture position receiver	Range in m
—	—	3
—	—	2
—	—	2



Description Use	Slit aperture vertical for through-beams BOS 5K	Slit aperture horizontal for through-beams BOS 5K	Round aperture for through-beams BOS 5K																												
	<table><thead><tr><th></th><th>A</th></tr></thead><tbody><tr><td>BOS 5-BL-1</td><td>0.5 mm</td></tr><tr><td>BOS 5-BL-2</td><td>1 mm</td></tr><tr><td>BOS 5-BL-3</td><td>2 mm</td></tr></tbody></table>		A	BOS 5-BL-1	0.5 mm	BOS 5-BL-2	1 mm	BOS 5-BL-3	2 mm	<table><thead><tr><th></th><th>A</th><th>B</th></tr></thead><tbody><tr><td>BOS 5-BL-4</td><td>0.5 mm</td><td>6 mm</td></tr><tr><td>BOS 5-BL-5</td><td>1 mm</td><td>5 mm</td></tr><tr><td>BOS 5-BL-6</td><td>2 mm</td><td>4.5 mm</td></tr></tbody></table>		A	B	BOS 5-BL-4	0.5 mm	6 mm	BOS 5-BL-5	1 mm	5 mm	BOS 5-BL-6	2 mm	4.5 mm	<table><thead><tr><th></th><th>A</th></tr></thead><tbody><tr><td>BOS 5-BL-7</td><td>0.5 mm</td></tr><tr><td>BOS 5-BL-8</td><td>1 mm</td></tr><tr><td>BOS 5-BL-9</td><td>2 mm</td></tr></tbody></table>		A	BOS 5-BL-7	0.5 mm	BOS 5-BL-8	1 mm	BOS 5-BL-9	2 mm
	A																														
BOS 5-BL-1	0.5 mm																														
BOS 5-BL-2	1 mm																														
BOS 5-BL-3	2 mm																														
	A	B																													
BOS 5-BL-4	0.5 mm	6 mm																													
BOS 5-BL-5	1 mm	5 mm																													
BOS 5-BL-6	2 mm	4.5 mm																													
	A																														
BOS 5-BL-7	0.5 mm																														
BOS 5-BL-8	1 mm																														
BOS 5-BL-9	2 mm																														
Ordering code	BOS 5-BL-1 BOS 5-BL-2 BOS 5-BL-3	BOS 5-BL-4 BOS 5-BL-5 BOS 5-BL-6	BOS 5-BL-7 BOS 5-BL-8 BOS 5-BL-9																												



Plano-convex lens,
polarizing filters, air shield

Description	Plano-convex lens	Polarizing filter	Air shield	Lens	
Use	for all BOS 18 diffuse sensors for background suppression and small parts detection	only for BOS 18M-...-1RD-...	for BOS 12/BOS 18 for 4 mm I. D. tube	for BKT and BLT for extending range	
					
Ordering code	BOS 18-PK-1	BOS 18-PF-1	BOS 1_-LT-1	BKT M-PK-1	

Advantages:

- Sensing range adjustable 0...40 mm
- Low switching point shift, e.g. for different colors or surface properties
- Background fade-out allows detection of objects in front of a reflective background
- Small parts detection down to 0.05 mm using focusing plano-convex lens with a working range of approx. 0...13 mm

Housing material:

PA 6

Plano-convex lens:

Glass

Polarizing filters are used for reliably sensing highly reflective objects. They prevent faulty switching. Reflecting or shiny parts will 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%.

Housing material:

PA 6

Polarizing filter:

IR polarizer

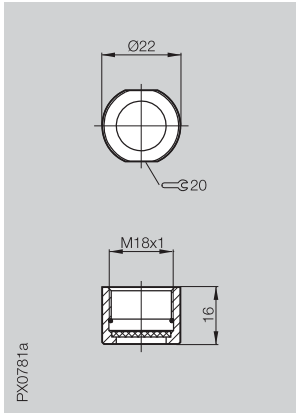
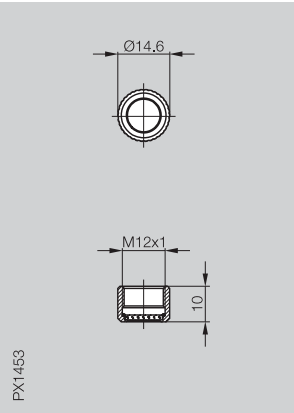
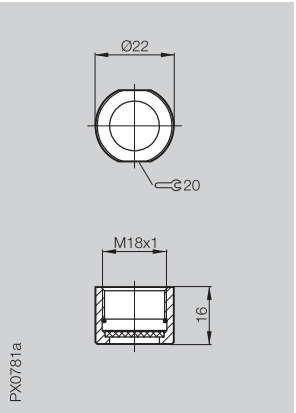
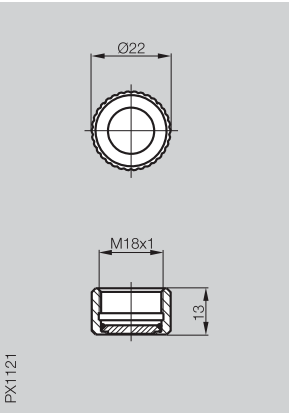
The air shield with a compressed air source prevents premature contamination of the optics.

	BOS 12-LT-1	BOS 18-LT-1
A	M12x1	M18x1
B	14	15
C	25	30
D	14	22

Using the supplementary lens increases the range of the BKT from 9 mm to 18 mm.

This corresponds to a working range of 15...30 mm when using with the BLT.



Neutral density filter for BOS 18	Cover nut for BOS 12	Cover nut for BOS 18	Cover nut for BOS 18 with flat front surface
			
BOS 18-NF-_*	BOS 12-SM-1	BOS 18-SM-1	BOS 18-SM-2

* 1 = 50 % transmission
2 = 75 % transmission

Neutral density filters weaken the infalling light, without changing its spectral characteristics. The neutral filter is made of glass with a vacuum coated material layer. This is hard, non-peeling and resistant to aging. Clean the filter using standard commercial optical cleaners.

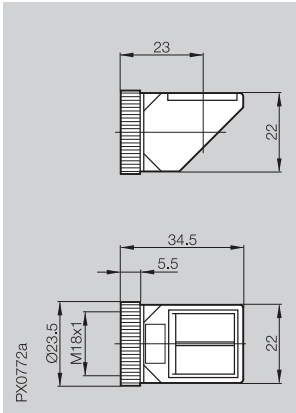
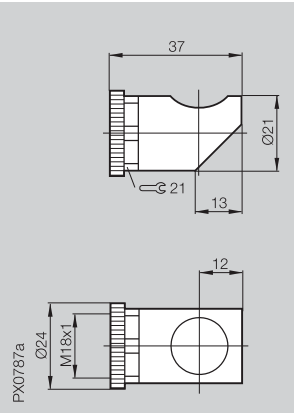
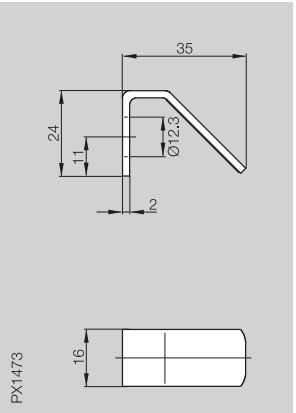
Housing material:
PA 6

The protective end cap is made with tempered glass and can be used with all M12 photoelectric switches. These caps are used to protect the optics from mechanical or thermal damage. Sparks from welding will not damage the hardened glass lens.

The protective end cap is made with tempered glass and can be used with all M18 photoelectric switches. These caps are used to protect the optics from mechanical or thermal damage. Sparks from welding will not damage the hardened glass lens.

The protective cap can be used in combination with all BOS 18M and BOS 18K sensors. It protects the optics from the effects of welding splatter, for example. 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 means no dust deposits can form which would otherwise result in a loss of range. A ring between the sensor and protective glass makes sure the system is sealed.



Description	90° Rotatable head	90° Rotatable head	Diagonal mirror
Use	for diffuse, retroreflective and through-beams BOS 18 (except laser)	for diffuse, retroreflective and through-beams BOS 18	for diffuse and through-beams BOS 12
			
Ordering code	BOS 18-UK-_*	BOS 18-UK-10	BOS 12-WS-1

* 1 = see table
2 = see table

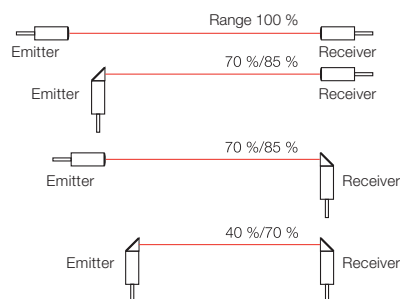


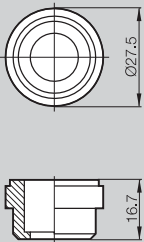
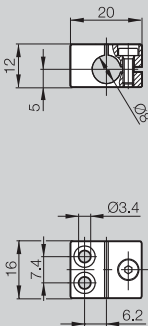
When using the diagonal mirror the sensing range is reduced by 30 % for the M12 diffuse and M12 through-beam sensors. Not suitable for retroreflective sensors.

Rotatable heads, suitable combinations

All BOS 18 photoelectric sensors can be equipped with a 90° rotatable head. The table shows the appropriate rotatable head for each switch type and indicates the corresponding reduction factor (RF) to apply to the range. In the case of a through-beam sensor both the emitter and receiver can be fitted with a 90° rotatable head. Each rotatable head reduces the range by approx. 15 % to 30 %.

Diffuse	BOS 18-UK-1	BOS 18-UK-2	BOS 18-UK-10
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			
BOS 18...-RB-... 2 m		RF = 20 %	RF = 20 %
BOS 18...-RD-... 4 m		RF = 20 %	RF = 20 %
Through-beam			
BLE 18...-P-... 16 m		RF = 15 %	RF = 30 %
BLS 18...-XX-... 16 m		RF = 15 %	RF = 30 %



Description Use	Adapter for glass fiber optics BFO 18V for connecting to BOS 30M	Holder for glass fiber optics and sensors with a corresponding diameter	
			
Ordering code	BFO 30-A1	BFO 08,0-KB-1	

