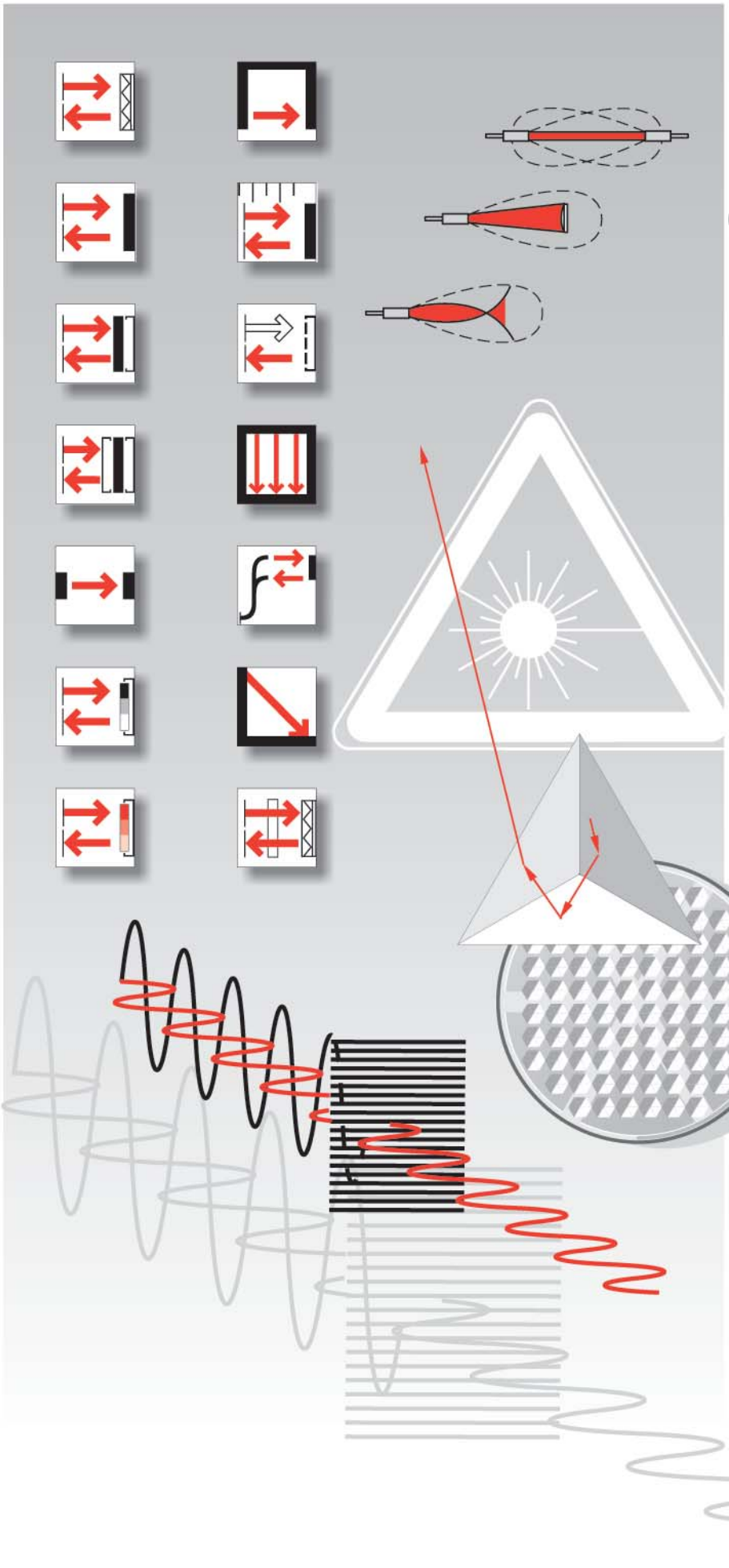
BALLUFF

sensors worldwide

Object Detection

... inductive, photoelectric, magnetic field, capacitive



Photoelectric Sensors Principles

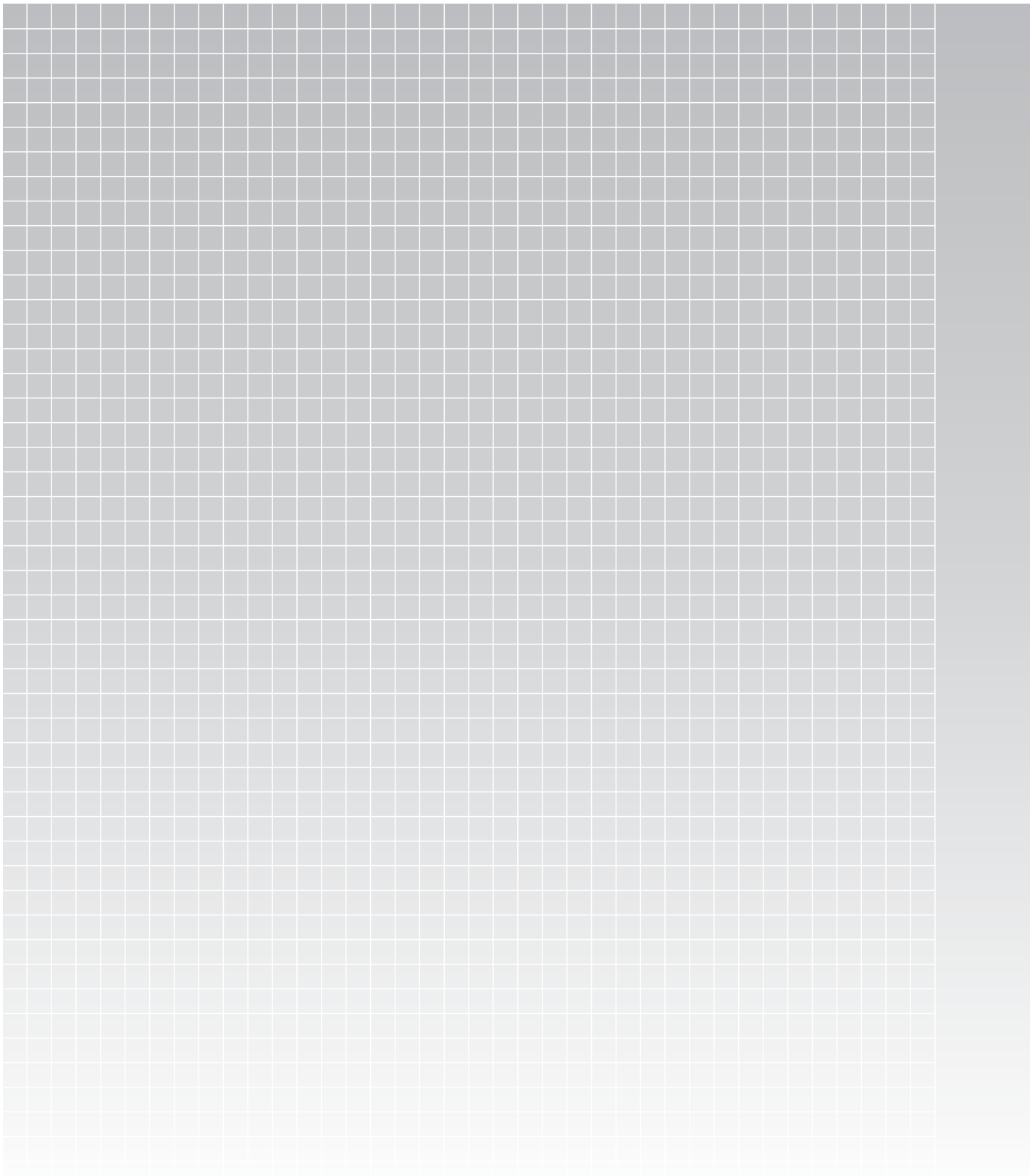
Only true specialists can excel in any given area. This is why Balluff has expanded its product range of photoelectric sensors, which has always been designed to meet the most varied of challenges.

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.

The most significant new additions are:

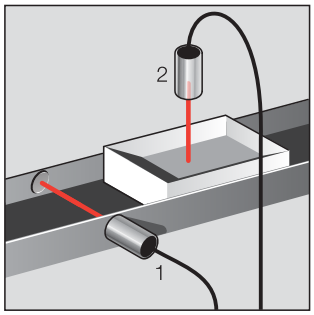
- Series BOS 2K
- Series BOS 5K
- Series BOS 12M
- Series BOS 18M
- Series BOS 26K
- Fiber optic base units BFB 75K
- Plastic fiber optics
- Series BOD 26K

2.0



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.

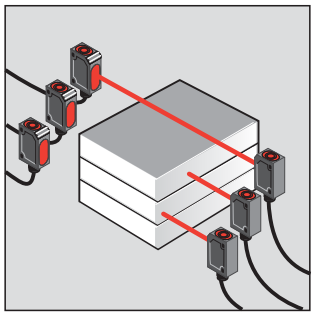
Sensing size and contents of containers



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.

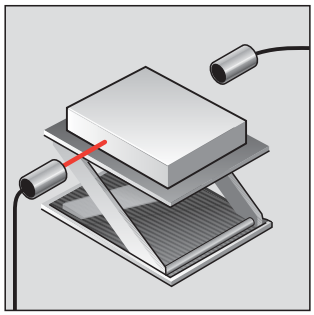
Sensing stack height



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.

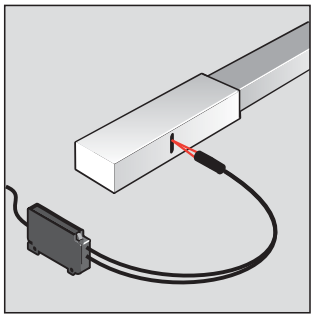
Guiding a moveable stage



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.

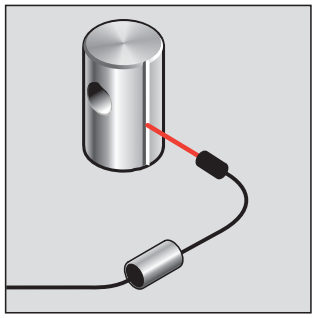
Sensing a read mark



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

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.

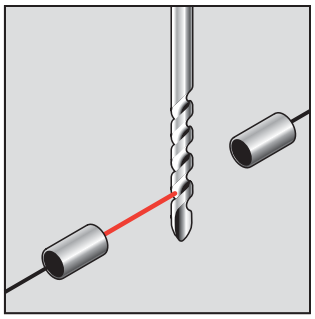
Detecting a groove



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

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.

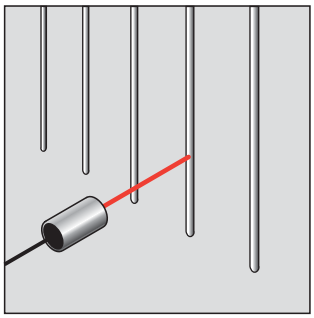
Drill break monitor



BLS 18M-... Emitter
BLE 18M-... Receiver
BOS 18-BL-2 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 ∅ 0.1 mm), use a laser through-beam sensor.

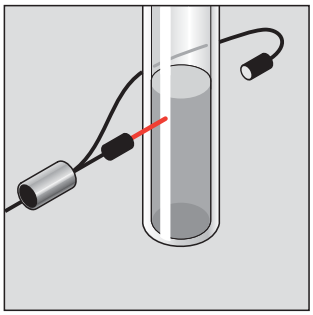
Small parts detection



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

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.

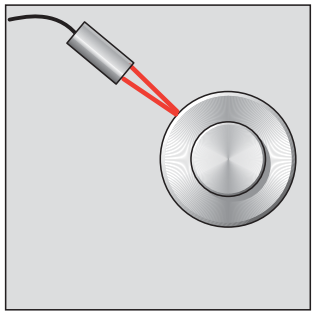
Level detection in transparent containers



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.

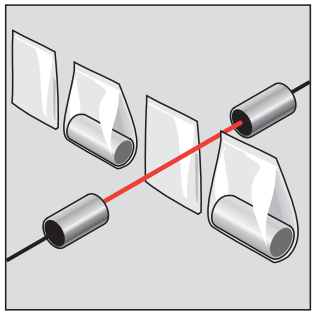
Differentiating various diameters



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.

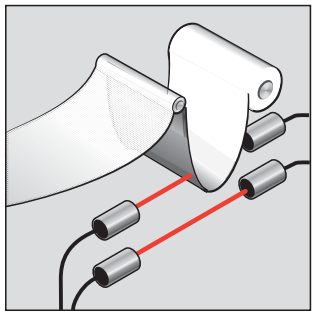
Checking contents of a package



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.

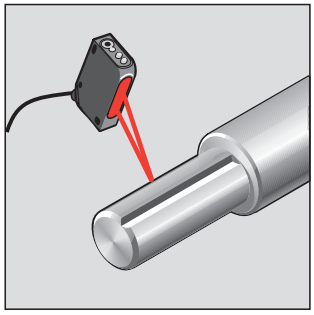
Slack control



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.

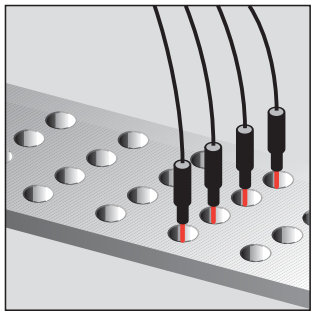
Parts positioning



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.

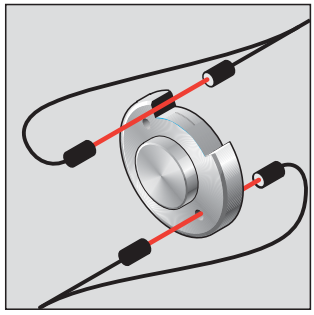
Level control of granules in small packages



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.

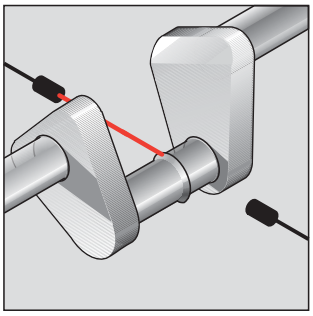
Quality control on workpieces



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.

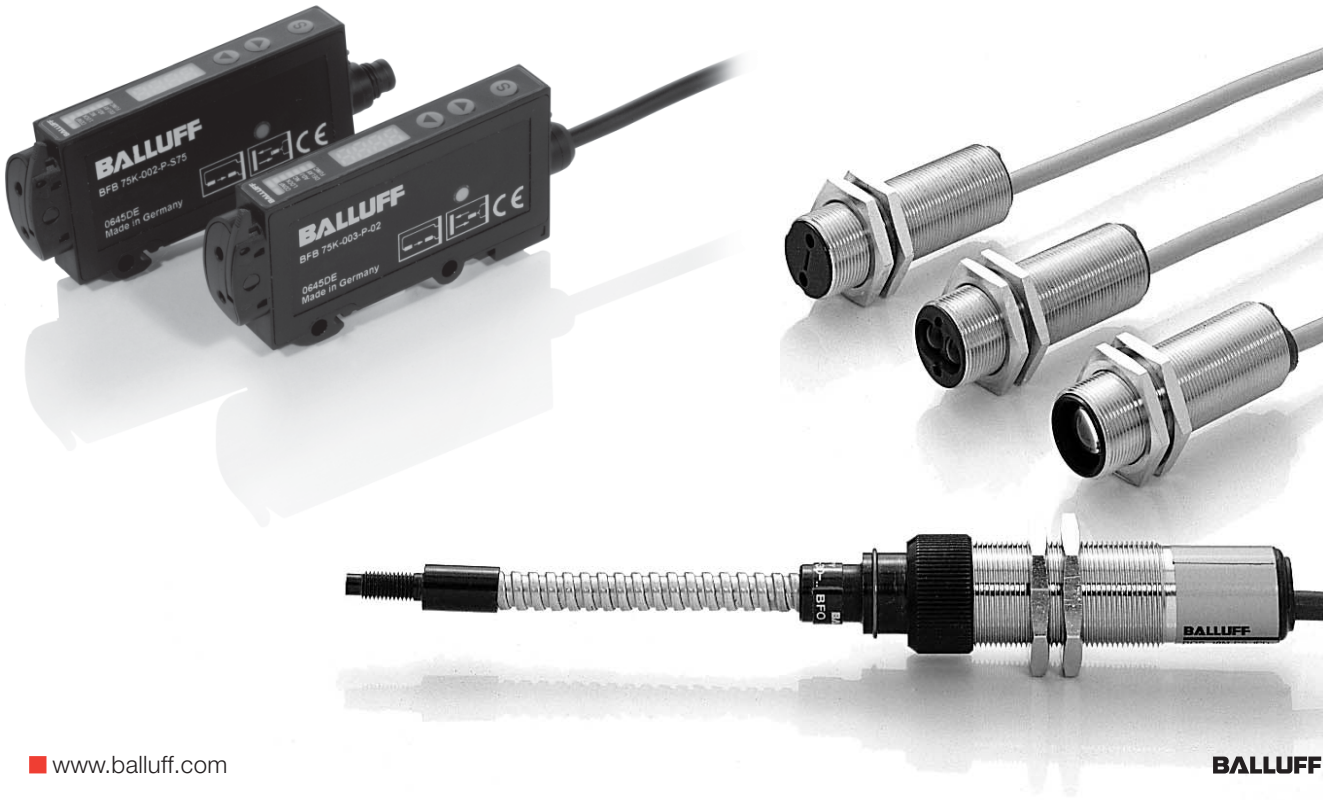
Detecting a bead on a cam shaft



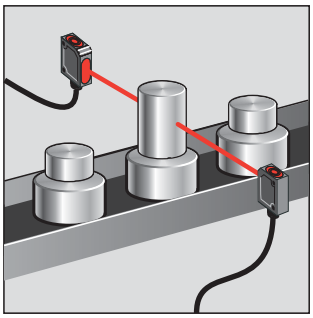
BOS 18M-..-1PD-... Diffuse with adjustable sensing distance
BFO 18-... Fiber optics cable

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



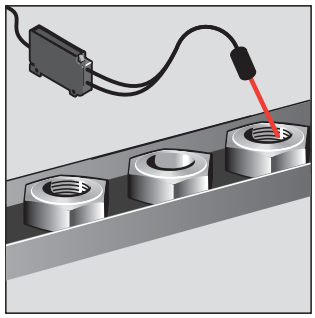
Part sorting



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

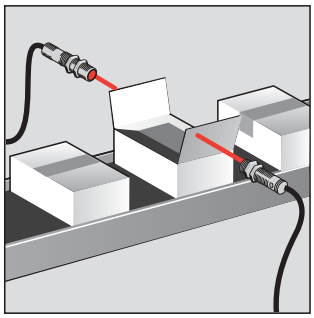
Thread checking



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

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.

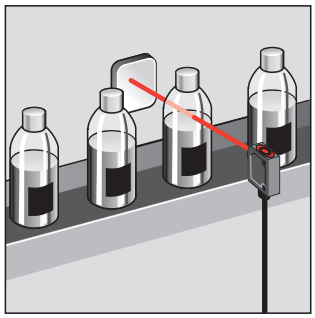
Packaging inspection



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.

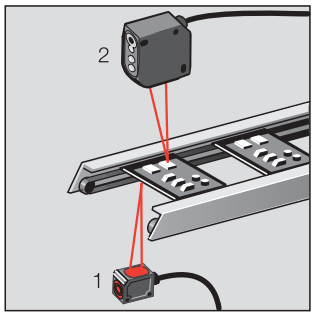
Counting transparent bottles



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.

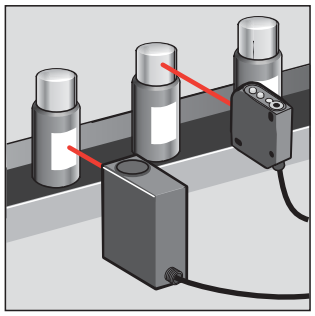
Circuit board inspection/ positioning



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.

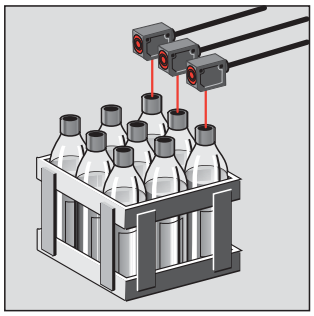
Final inspection: labels, caps



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.

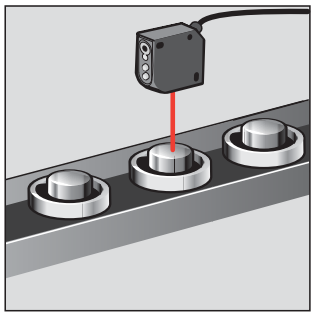
Checking for caps



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.

	mini.s						
							
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	M8×50...57.5 mm	M12×65...74 mm	M18×62...95 mm	M18×79...85 mm	M18×79...93.5 mm	M18×70...72 mm	M18×78.6...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
	M18×70 mm	M18×67...81.5 mm	M18×67...81.5 mm	M18×79...93.5 mm	M18×79...93.5 mm	M18×67...81.5 mm	M18×79...93.5 mm	M30×92...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

	mini.s						
							
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			
	41.5×49×15 mm	50×50×17 mm	50×50×17 mm	55×65×20 mm	73×85×32 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	35×65×10.5 mm	30×60×9 mm	41×69×12 mm	27×37×12 mm	M18×82.5...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 Plastic	**BFO 18** Polyurethane, metal, silicon	**BOD 6K** Plastic	**BOD 18KF** Plastic	**BOD 26K Laser** Plastic	**BOD 63M Laser** Metal	**BOD 66M** Metal	**BOD 66M Laser** 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

							
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

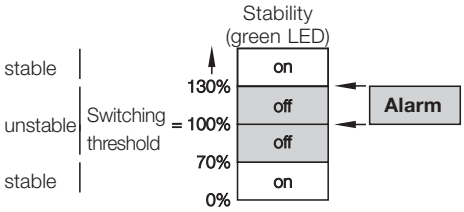
	BFS 26K Plastic	BFS 27K Plastic	BGL Metal	BGL 21 Metal	BWL Standard Metal	BWL Automotive Metal	BOWA Metal	BLG Metal
								
	12...32, 15...30, 18... 22 mm	5...45 mm						
			5, 10, 20, 30, 50, 80, 120, 180, 220 mm	2 mm fixed				
					40, 54, 68, 90, 110 mm	22×22, 43×43, 42×62 mm		
							40×80, 80×80, 120×80 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
	50×50×17 mm	50×50×25 mm	depending on type	90×26×20 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

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

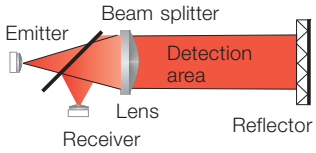
A sensor with an analog output does not switch at a particular target distance. These devices have an analog output with a distance-dependent output signal. The output voltage is proportional to the object point in the sensing area. These systems operate on the same principle as sensors with background 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

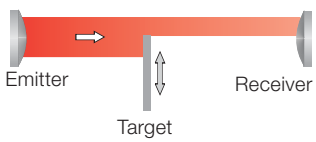
Light receiver	**Amplifier**	**Consumer**
non-illuminated	conducting	switched on
illuminated	non-conducting	switched off

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 °C
- Excellent chemical resistance
- Flexible
- No embrittlement from oils and cooling emulsions.

Metal corrugated tube, silicon jacketed

- Temperature T = +150 °C
- Highly flexible
- Crush-resistant
- Can be sterilized.

Metal jacket

- Temperature T = +150 °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	**Amplifier**	**Consumer**
illuminated	conducting	switched on
non-illuminated	non-conducting	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/m²
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 ...

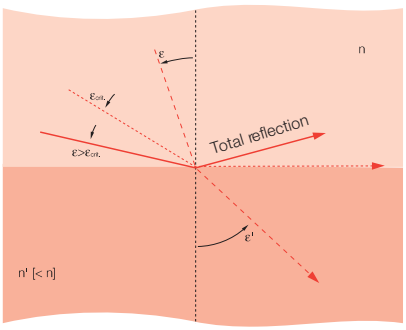
...is used in numerous areas of technology and in everyday life in controlling applications. Generally a change in the light intensity in an optical beam (between emitter and receiver) caused by a target object is evaluated. Depending on the properties of this object and the characteristics of the optical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

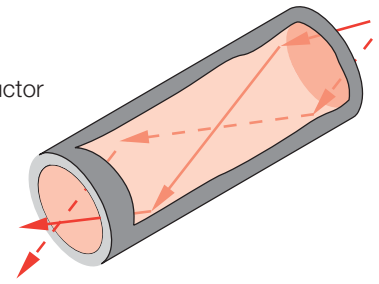
$$\sin \varepsilon' = \frac{n}{n'} \sin \varepsilon$$

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 $\varepsilon_{crit.}$ (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.



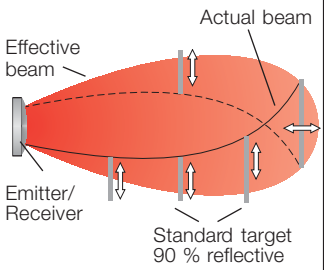
Light transmission by total reflection

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.

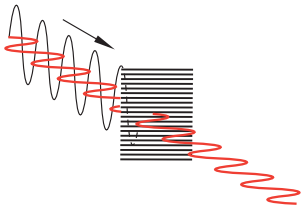
Polarizing filters

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?

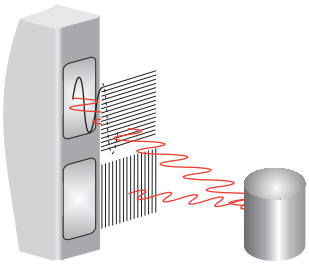
Light consists of a number of „single beams“, all of which oscillate sinusoidally around their propagation axes. Their polarization planes are, however, independent of each other and can assume any angle orientation (see figure). When they meet a polarizing filter (fine grid lines), only the beams oscillating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

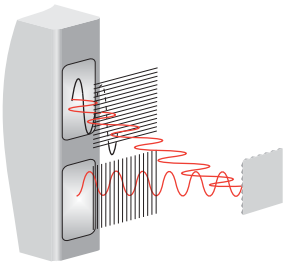
With a 90° rotated polarizing filter in front of both the emitter and receiver of a retroreflective system, you can therefore prevent the reflected light of a reflecting target object from falsely triggering the signal of the photo-receiver.



... for reliable detection of reflecting target objects

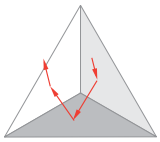
On the other hand, the light reflected from the triple mirror, with its polarization plane rotated by 90° as described above, is allowed to pass unhindered by this filter.

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?

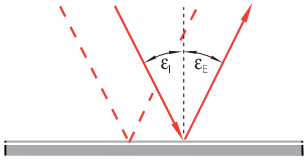
Light beams extend to a straight line in free space. Upon striking an object, they are reflected.

Depending on the surface composition of the object, one of three types of reflection occurs: total reflection, retroreflection, and diffuse reflection.

Total reflection ...

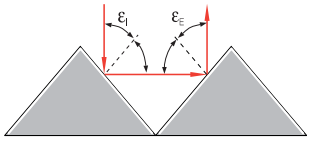
... occurs with a highly shiny (reflecting) surface. The angle of incidence of a light beam is thereby the same as the angle of reflection ($\varepsilon_I = \varepsilon_E$).

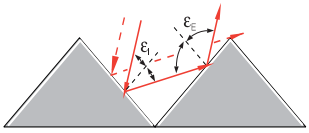
The reflection losses are in the ideal case negligible.



Retroreflection ...

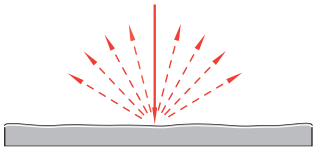
... is caused by two mirrors at vertical angles to each other. The double reflection causes a light beam to be bounced back in the same direction.
The angle of incidence can thus be altered in a relatively wide range.





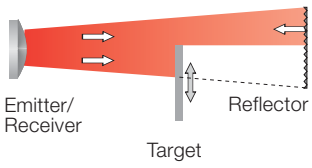
Diffuse reflection ...

... 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

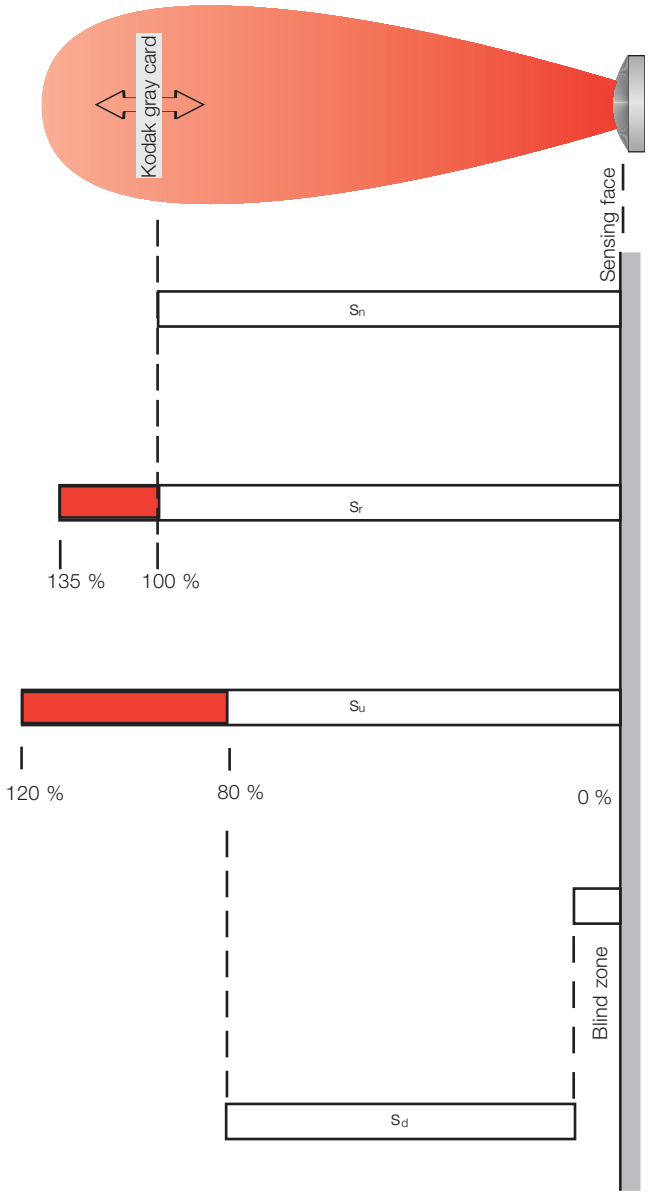
Retroreflective types have the emitter and receiver integrated into a single housing.A reflector on the opposite side of the beam bounces the emitter's light back to the receiver.
A target object interrupts the reflected light beam and causes a change in the output signal.
With reflective surfaces it 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_e taking into account manufacturing tolerances at rated ambient temperature (T = +23 °C ±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

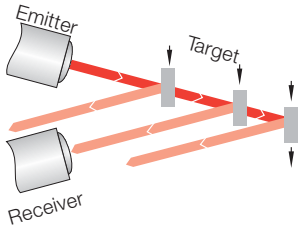
	Diffuse					Background suppression			Retroreflective			Through-beam			
Rated operating distance s_n	100 mm	200 mm	400 mm	1 m	2 m	120 mm	250 mm	1.1 m	2 m	4 m	8 m	5 m	8 m	16 m	50 m
Actual switching distance (in % of s_n)	125	125	125	135	150	135	135	135	150	150	150	150	150	150	150
Switching hysteresis (in %)	≤ 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_r.

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:
$-15\ °C \leq T_a \leq +55\ °C$

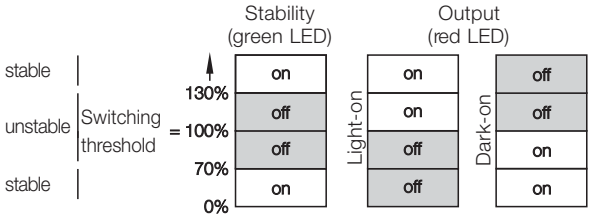
Polarity reversal protection The supply voltage leads can be reversed without destroying the sensor. In combination with the short circuit protection, these sensors are completely protected against miswiring.

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.

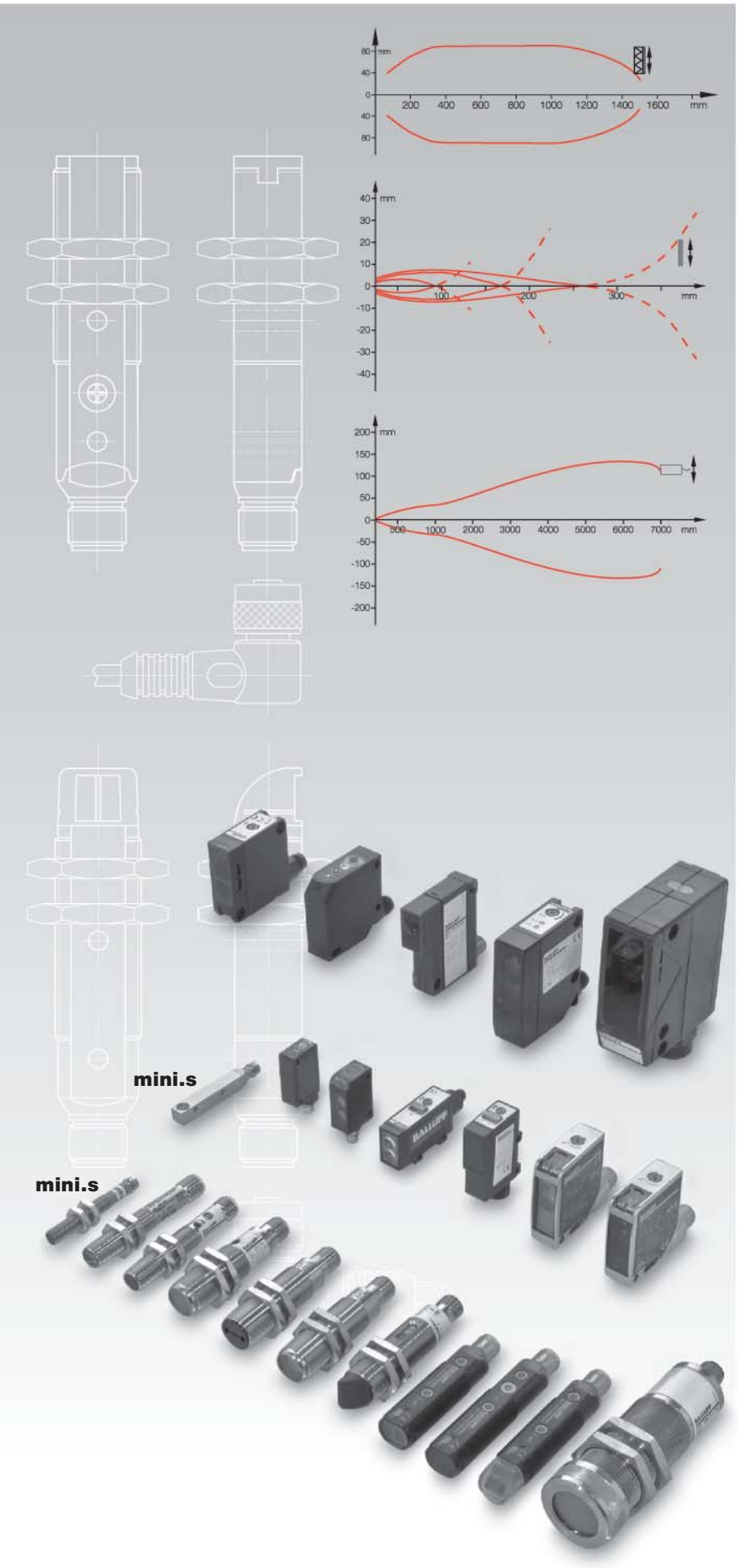


Contamination scale

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 600068-2-6	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

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.

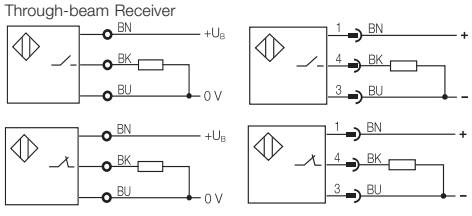
This sensor family includes diffuse sensors in tubular M8 housing, retroreflective and through-beam sensors.

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.

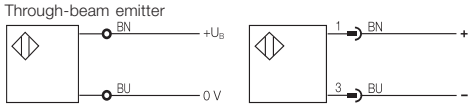
In short: The new BOS 08M are small, tough, flexible and economical.

Wiring diagrams

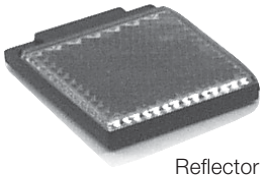
Diffuse, Retroreflective,
Through-beam Receiver



Through-beam emitter



Recommended accessories
please order separately



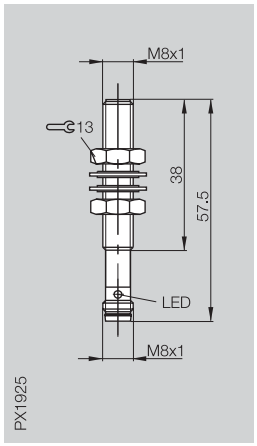
Reflector
BOS R-9

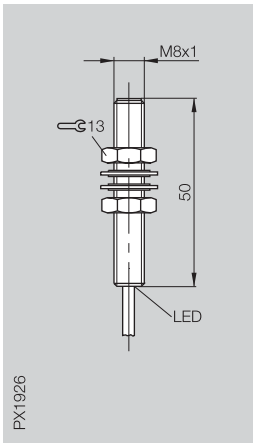
Connector
BKS-_ 48/BKS-_ 49

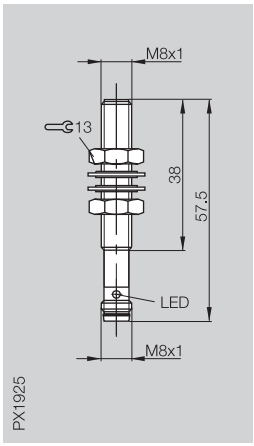
Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U_B	Connection		Special features		Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 3-pin	Cable	Polarizing filter		
Diffuse														
BOS 08M-PS-RD11-S49	0...55 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 ...
5
Connectors ... page 5.2 ...

Diffuse	Sensing distance	**0...55 mm**	**0...55 mm**		
Retroreflective	Range			**25...550 mm**	
Through-beam	Range				

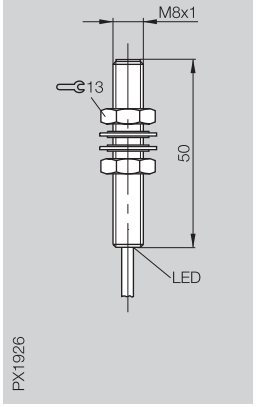
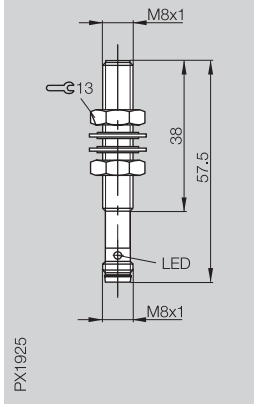
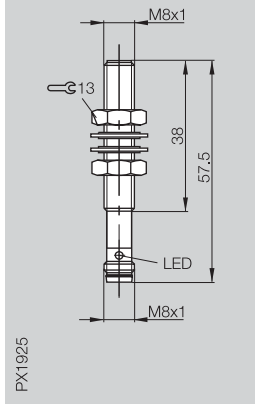
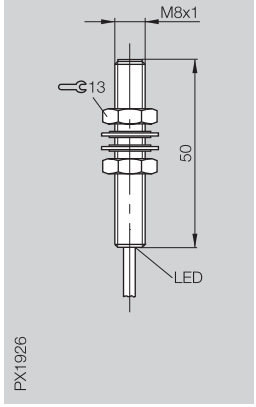
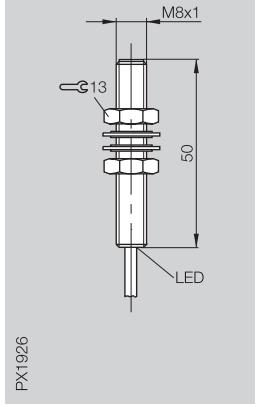






Diffuse					
PNP, NO	55 mm		BOS 08M-PS-RD11-S49	BOS 08M-PS-RD11-02	
PNP, NC	55 mm		BOS 08M-PO-RD11-S49	BOS 08M-PO-RD11-02	
Retroreflective					
PNP, NO	550 mm	polarizing filter			BOS 08M-PS-PR11-S49
PNP, NC	550 mm	polarizing filter			BOS 08M-PO-PR11-S49
Through-beam					
PNP, NO	1.1 m	Receiver			
PNP, 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_e			≤ 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			M8×57.5 mm	M8×50 mm	M8×57.5 mm
Connection			M8 connector, 3-pin	2 m cable, PUR	M8 connector, 3-pin
No. of wires × cross-section				3×0.14 mm²	
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**
					
	BOS 08M-PS-PR11-02 BOS 08M-PO-PR11-02				
		BOS 08M-PS-RE10-S49 BOS 08M-PO-RE10-S49		BOS 08M-PS-RE10-03 BOS 08M-PO-RE10-03	
			BOS 08M-X-RS10-S49		BOS 08M-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		LED, red light		LED, red light
	640 nm		640 nm		640 nm
	LED yellow				
		LED red		LED red	
	1 ms	1 ms		1 ms	
	500 Hz	500 Hz		500 Hz	
	M8×50 mm	M8×57.5 mm	M8×57.5 mm	M8×50 mm	M8×50 mm
	2 m cable, PUR	M8 connector, 3-pin	M8 connector, 3-pin	3 m cable, PUR	3 m cable, PUR
	3×0.14 mm²			3×0.14 mm²	2×0.14 mm²
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	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 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.

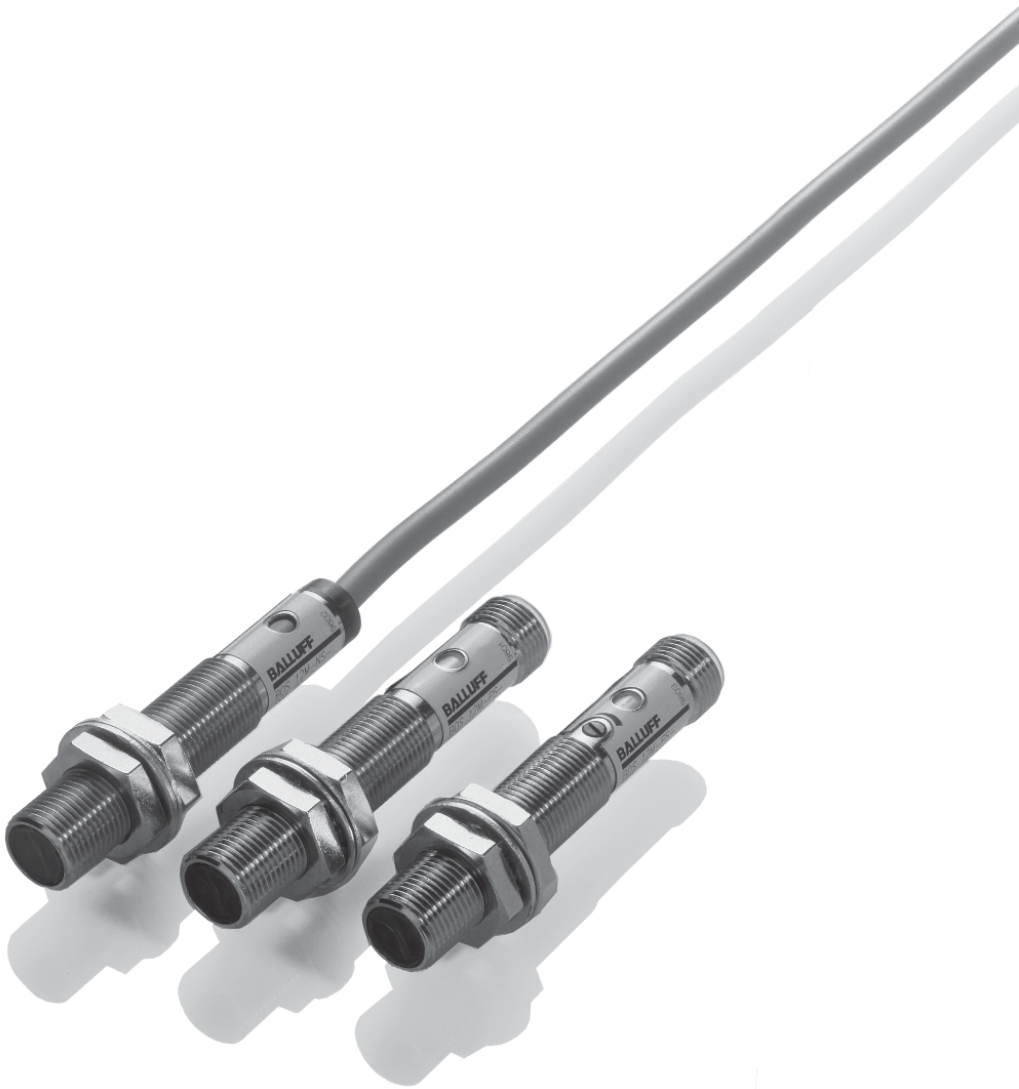
There is a new laser through-beam model available in 2 versions. For long range or small parts detection.

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

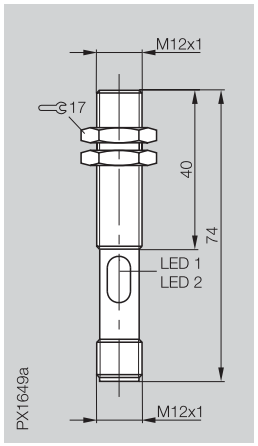
- General automation tasks
- Assembly and handling
- Machine tools
- Packaging
- Robots
- Machine tool building

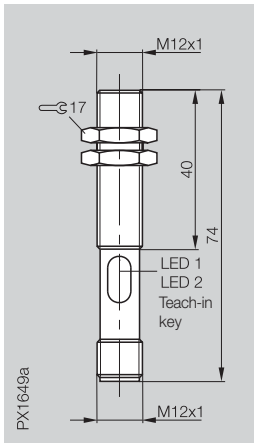


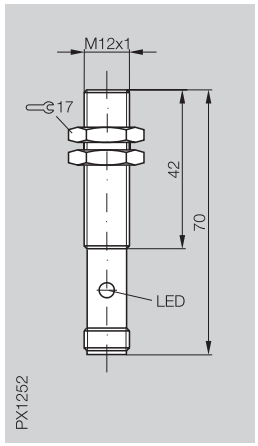
Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U_B	Connection		Features		Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable, 3 m	Polarizing filter	Teach-in	
Diffuse with HGA															
BOS 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 page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse with background suppression	Sensing distance	**0...24 mm**	**10...60 mm**	
Diffuse	Sensing distance			**1...100 mm**



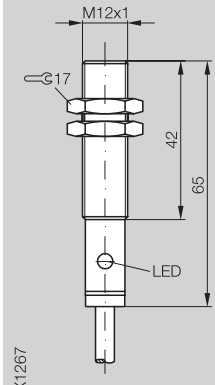
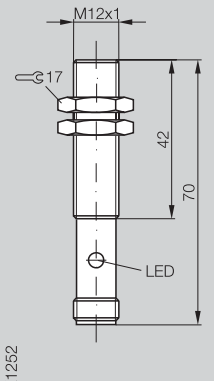
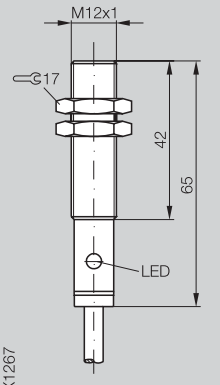
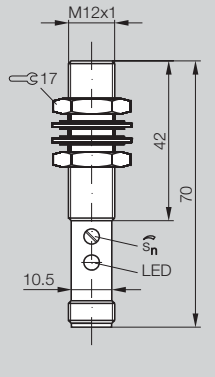
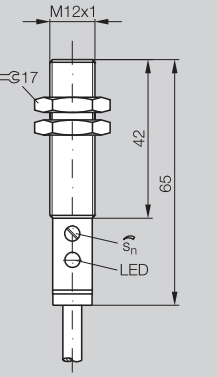




Diffuse			
PNP 24 mm HGA	BOS 12M-PS-1N1I-S4-C		
PNP 10...60 mm HGA, Teach-in		BOS 12M-PU-1HA-S4-C	
PNP 100 mm			BOS 12M-PS-1YA-S4-C
PNP 100 mm			BOS 12M-PO-1YA-S4-C
PNP 200 mm			
PNP 200 mm			
PNP 400 mm			
PNP 400 mm			
Electrical data			
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC
Ripple	10 %	10 %	10 %
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA	≤ 20 mA
Switching output*	PNP-Transistor	PNP-Transistor	PNP-Transistor
Output current	100 mA	100 mA	≤ 200 mA
Switching type	Light-on	Light-/dark-on (selectable)	Light- or dark-on
Voltage drop U_d at I_e	≤ 2.4 V	≤ 2.4 V	≤ 2.5 V
Settings	fixed	Teach-in	fixed
Optical data			
Emitter, light type	LED, red light	LED, red light	LED, red light
Wavelength	660 nm	660 nm	660 nm
Light spot diameter	5×5 mm	5×5 mm at 50 mm	
Distance hysteresis (18 %/18 %)	≤ 5 %	≤ 5 %	
Gray value shift (90 %/18 %)	≤ 5 %	≤ 10 %	
Indicators			
Output function indicator	LED yellow	LED yellow	LED yellow
Stability indicator	LED green	LED green	
Time data			
Response time	0.5 ms	0.5 ms	2.5 ms
Switching frequency f	1 kHz	1 kHz	200 Hz
Mechanical data			
Dimensions	M12×74 mm	M12×74 mm	M12×70 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
No. of wires × cross-section			
Housing material	Nickel plated brass	Nickel plated brass	Nickel plated brass
Optical surface	PMMA	PMMA	PMMA
Weight	30 g	30 g	30 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	–20...+60 °C	–20...+60 °C	–15...+55 °C
Ambient light rejection	5 kLux	5 kLux	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...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	≤ 20 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
	fixed	fixed	fixed	Potentiometer 270°	Potentiometer 270°
	LED, red light	LED, red light	LED, red light	LED, infrared light	LED, infrared light
	660 nm	660 nm	660 nm	880 nm	880 nm
	LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
	2.5 ms	2.5 ms	2.5 ms	2.5 ms	2.5 ms
	200 Hz	200 Hz	200 Hz	200 Hz	200 Hz
	M12×65 mm	M12×70 mm	M12×65 mm	M12×70 mm	M12×65 mm
	3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC
	3×0.34 mm²		3×0.34 mm²		3×0.34 mm²
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	PMMA	PMMA	PMMA	PMMA	PMMA
	136 g	30 g	136 g	30 g	136 g
	IP 67	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	–15...+55 °C	–15...+55 °C	–15...+55 °C	–15...+55 °C	–15...+55 °C
	5 kLux	5 kLux	5 kLux	5 kLux	5 kLux

*Ordering example for NPN transistor:
BOS 12M-_ _ -1YA-S4-C

Output

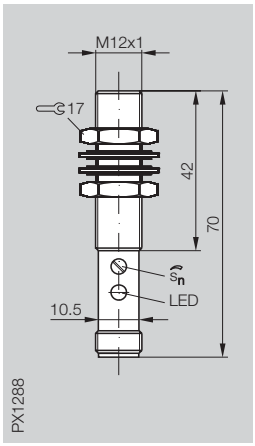
NS NPN NO
NO NPN NC

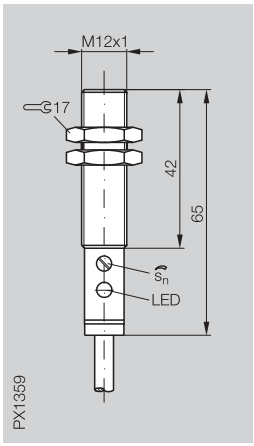
2.1

2.3
Photoelectric sensors accessories page 2.3.2 ...

5
Connectors ... page 5.2 ...

Retroreflective with polarizing filter	Range	**0...1.5 m**	**0...1.5 m**	
Through-beam	Range			

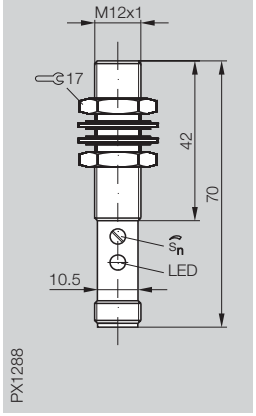
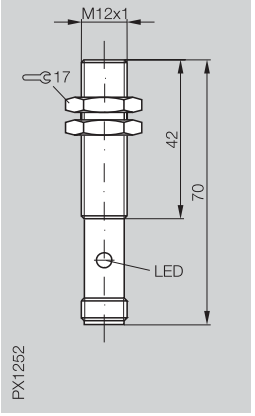
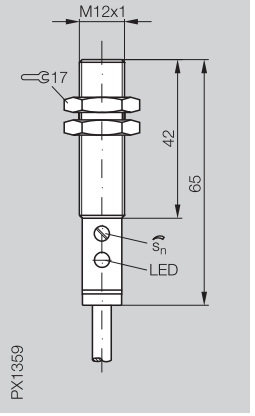
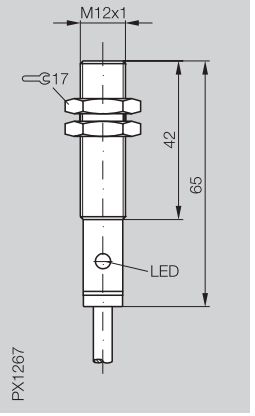




Retroreflective				
PNP 1.5 m	Polarizing filter	BOS 12M-PS-1QA-S4-C	BOS 12M-PS-1QA-B0-C-03	
PNP 1.5 m	Polarizing filter	BOS 12M-PO-1QA-S4-C	BOS 12M-PO-1QA-B0-C-03	
Through-beam				
PNP 5 m	Receiver			
5 m	Emitter			
Electrical data				
Supply voltage U_B		10...30 V DC	10...30 V DC	
Ripple		10 %	10 %	
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		M12×70 mm	M12×65 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**
				
	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	LED, red light	LED, red light	LED, red light
	660 nm	660 nm	660 nm	660 nm
		LED green		LED green
	LED yellow		LED yellow	
	1 ms		1 ms	
	500 Hz		500 Hz	
	M12×70 mm	M12×70 mm	M12×65 mm	M12×65 mm
	M12 connector, 4-pin	M12 connector, 4-pin	3 m cable, PVC	3 m cable, PVC
			3×0.34 mm²	3×0.34 mm²
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	PMMA	PMMA	PMMA	PMMA
	30 g	30 g	136 g	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

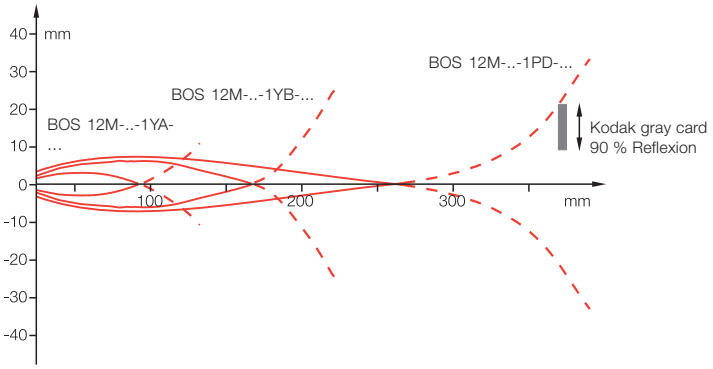
*Ordering example for NPN transistor:
BOS 12M-_ _ -1YA-S4-C

Output

NS NPN NO
NO NPN NC

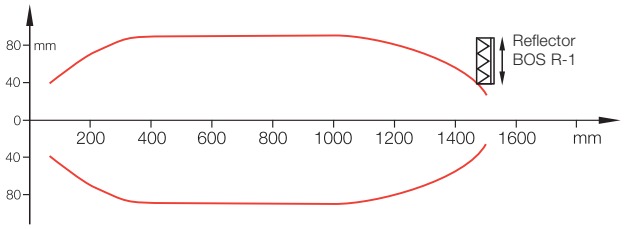
2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

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



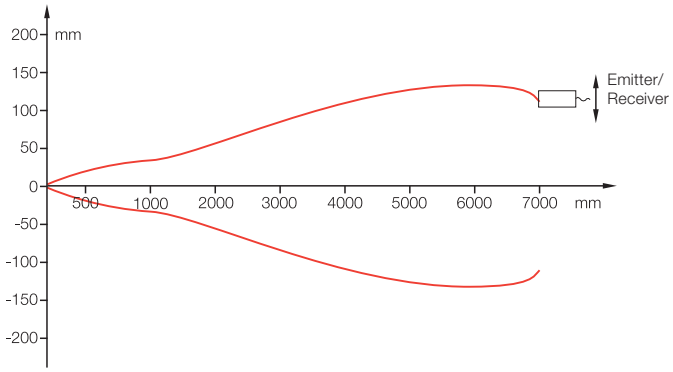
Sensing distance measured with side approach of Kodak gray card.

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



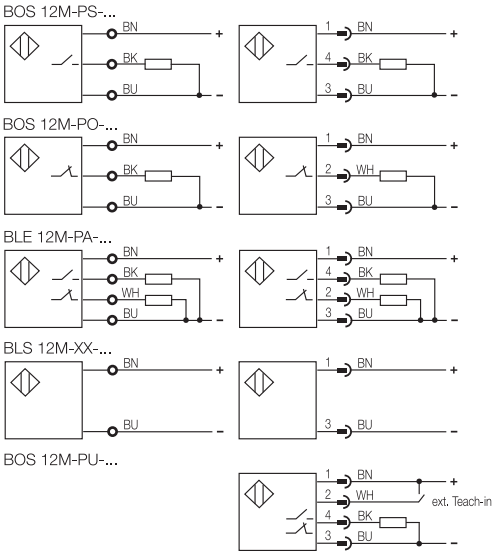
Range measured using side approach with reflector.

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



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

Wiring diagrams



Alignment aid

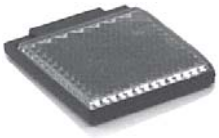
The additional function indicator on the receiver of the through-beam sensor enables fast and simple alignment between emitter and receiver.

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.

Recommended accessories
please order separately


Cover nut
BOS 12-SM-1


Reflector
BOS R-1


Reflector
BOS R-9


Angled mirror
BOS 12-WS-1


Mounting cuff
BOS 12.0-BS-1


Air shield
BOS 12-LT-1


Slit apertures
BOS 12-BL-1

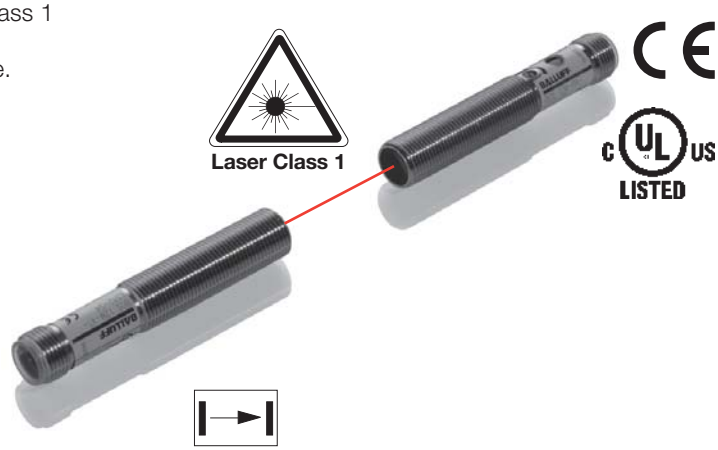

Connector
BKS-_ 19/BKS-_ 20

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
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.

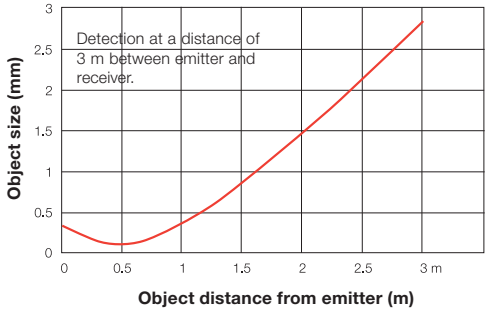
All sensors are Laser Class 1 and are available as connector or cable style.

Laser through-beam — Range

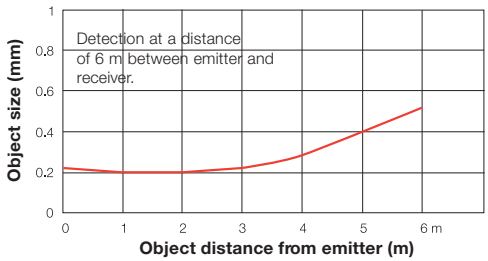


Small parts detection

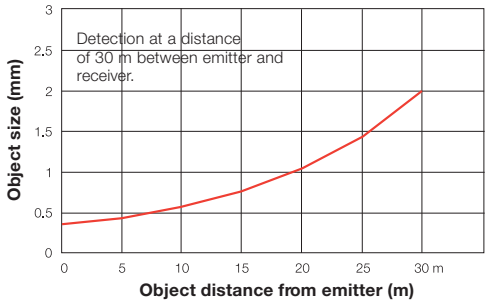
BOS 12M-XT-**LS11**-..



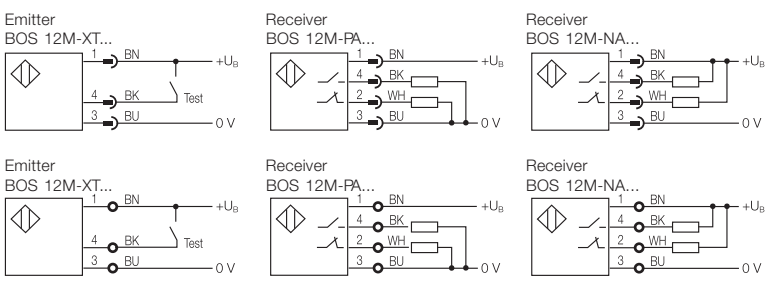
BOS 12M-XT-**LS12**-..



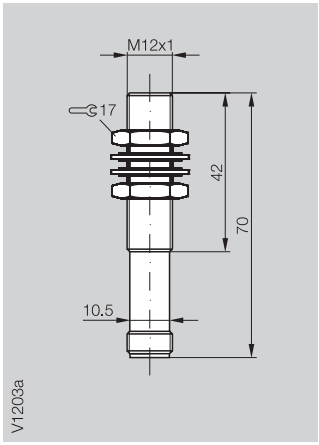
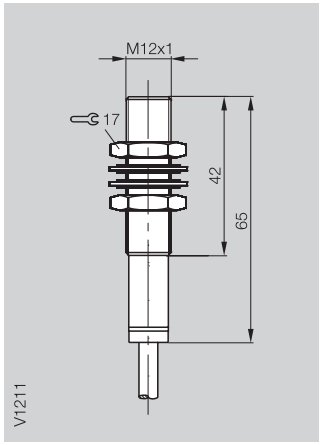
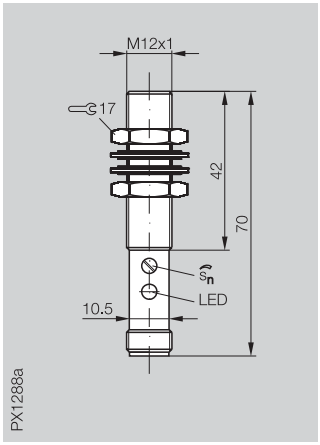
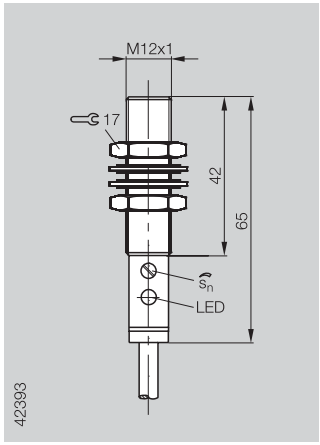
BOS 12M-XT-**LS12**-..



Wiring diagrams



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		

	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...30 V DC	10...30 V DC	10...30 V DC
	10 %	10 %	10 %	10 %
	≤ 10 mA	≤ 10 mA	≤ 15 mA	≤ 15 mA
			PNP- or NPN-Transistor	PNP- or NPN-Transistor
			≤ 200 mA	≤ 200 mA
			Light-/dark-on (complementary)	Light-/dark-on (complementary)
			≤ 2.5 V	≤ 2.5 V
			Potentiometer 270°	Potentiometer 270°
	Laser, red light	Laser, red light		
	655 nm	655 nm		
	1	1		
			LED yellow	LED yellow
			0.5 ms	0.5 ms
			1 kHz	1 kHz
	M12 connector, 4-pin	3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC
		3×0.34 mm²		4×0.34 mm²
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	Glass	Glass	PMMA	PMMA
	30 g	140 g	30 g	140 g
	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes
	yes	yes	yes	yes
	–10...+50 °C	–10...+50 °C	–10...+50 °C	–10...+50 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

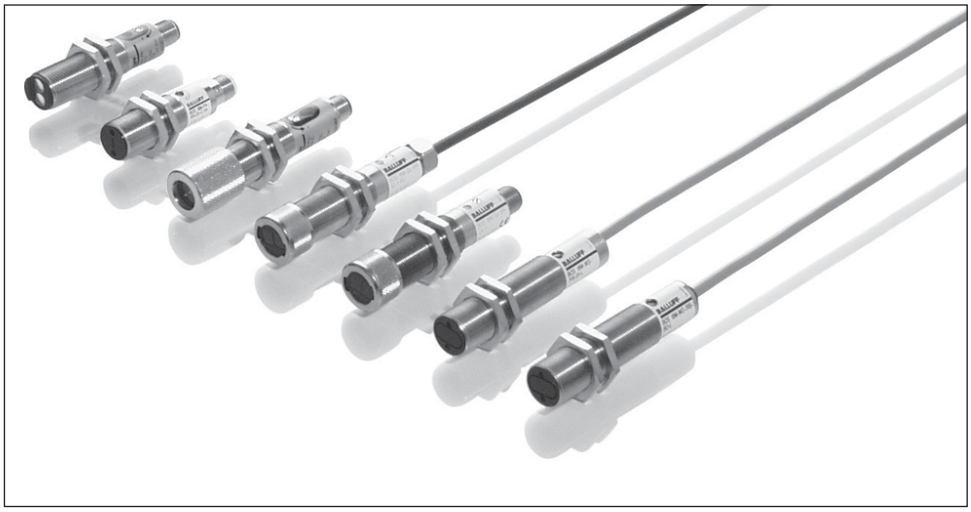
Recommended accessories
please order separately

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

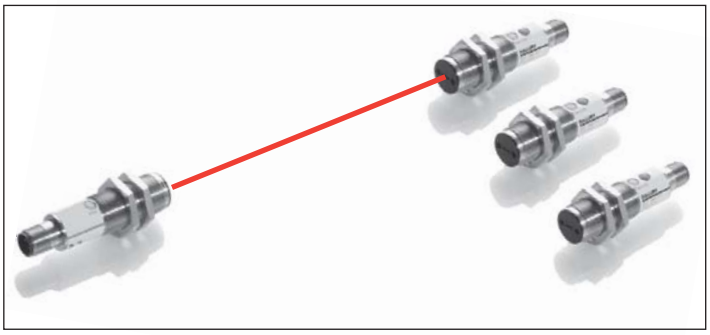
The sensors described here are classics. They have proven themselves over many years in the machine tool industry. They are tightly sealed, tough, precise and reliable.

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.

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

BOS 18MR Angled Head

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 M18×1 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

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

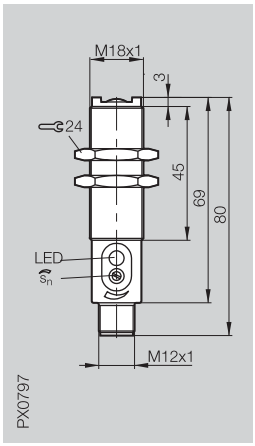
Type	Sensing distance/ range	Light exit		Light type			Output		Output function		Switching frequency	U_B	Connec-tion		Features		Page
		Straight	Right angle	Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
Diffuse 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

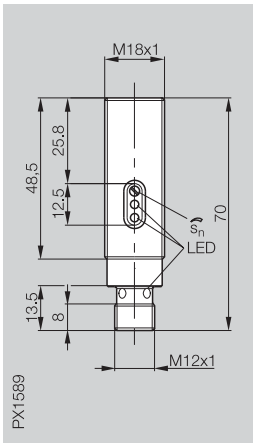
Type	Sensing distance/ range	Light exit		Light type			Output		Output function		Switching frequency	U_B	Connec-tion		Features		Page
		Straight	Right angle	Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
Retroreflective																	
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

AC versions on page **2.1**.42

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse with background suppression	Sensing distance	**40...120 mm**	**10...120 mm**
Diffuse	Sensing distance		

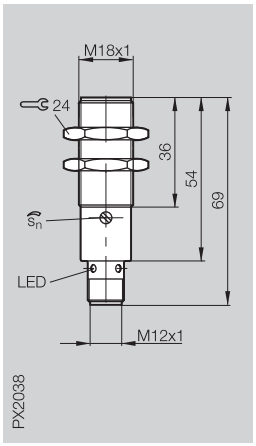
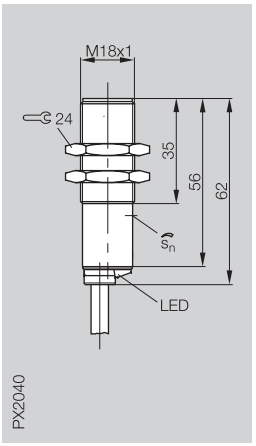
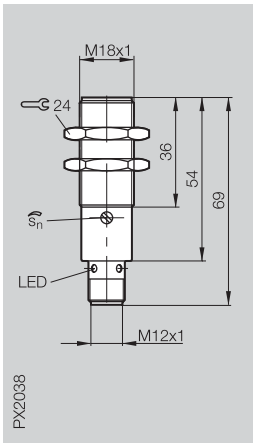
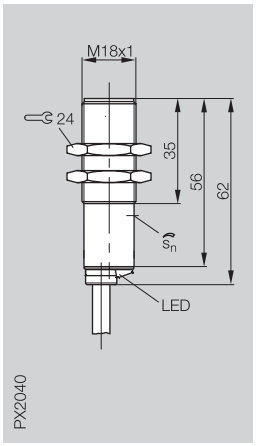
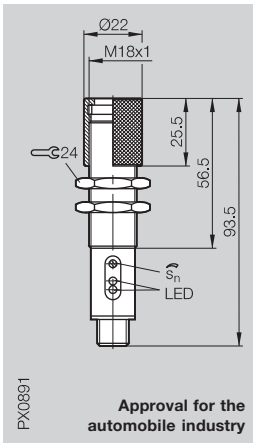




Diffuse					
PNP	40...120 mm	HGA	BOS 18M-PA-1HA-S4-C		
PNP	10...120 mm	HGA		BOS 18M-PS-1HA-E5-C-S4	
PNP	100 mm				
PNP	400 mm				
Electrical data					
Supply voltage U_B			10...30 V DC	10...36 V DC	
Ripple			10 %	20 %	
No-load supply current I_0 max.			≤ 30 mA	≤ 30 mA	
Switching output			PNP-Transistor	PNP-Transistor	
Output current			200 mA	200 mA	
Switching type			Light- and dark-on	Light-on	
Voltage drop U_d at I_e			≤ 2.5 V	≤ 2 V	
Settings			18-turn potentiometer	Potentiometer 270°	
Optical data					
Emitter, light type			LED, red light	LED, red light	
Wavelength			660 nm	660 nm	
Indicators					
Output function indicator			LED yellow	LED yellow	
Stability indicator			no	no	
Time data					
Response time			0.8 ms	1 ms	
Switching frequency f			600 Hz	500 Hz	
Mechanical data					
Dimensions			M18×80 mm	M18×70 mm	
Connection			M12 connector, 4-pin	M12 connector, 4-pin	
No. of wires × cross-section					
Housing material			Nickel plated brass	Nickel plated brass	
Optical surface			Glass	Glass	
Weight			62 g	50 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	–25...+55 °C	
Ambient light rejection			2 kLux	5 kLux	

Diffuse values referenced to Kodak gray card 90% Reflexion.

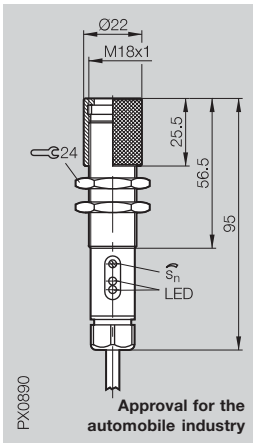
Wiring diagrams, characteristics and accessories see page **2.1.**24 and **2.1.**25.

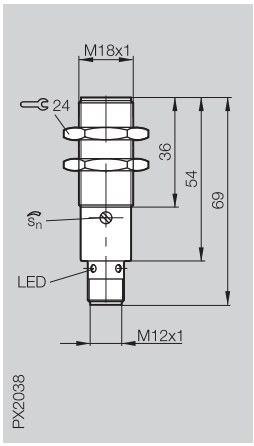
	0...100 mm	0...100 mm	0...400 mm	0...400 mm	0...400 mm
					 **Approval for the automobile industry**
	BOS 18M-PA-1PA-E5-C-S4	BOS 18M-PA-1PA-E4-C-03	BOS 18M-PA-1PD-E5-C-S4	BOS 18M-PA-1PD-E4-C-03	BOS 18M-PU-1PD-SA5-C
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	10 %	10 %	10 %	10 %	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 mm²		4×0.25 mm²	
	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

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse	Sensing distance	**0...400 mm**	**0...1 m**	
Retroreflective	Range			

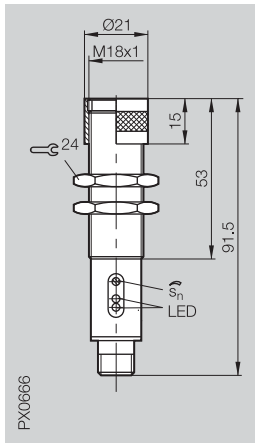
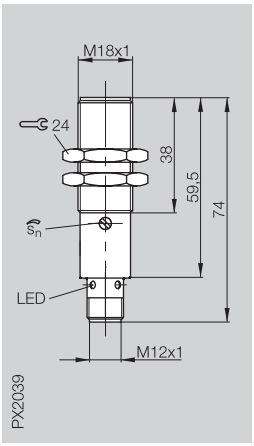
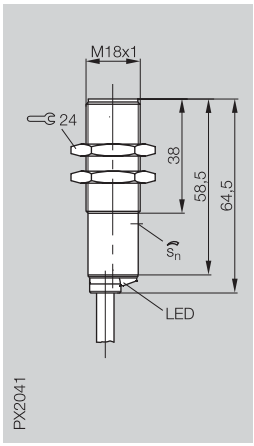
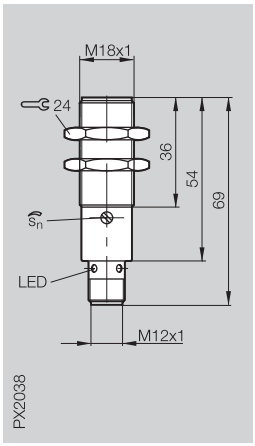
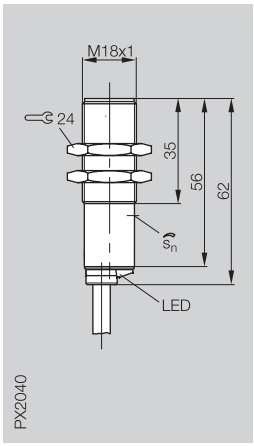




Diffuse					
PNP	400	mm		BOS 18M-PU-1PD-SA4-C	
PNP	1	m			BOS 18M-PA-1PF-E5-C-S4
PNP/NPN	1	m			
Retroreflective					
PNP	2	m	Polarizing filter		
NPN	2	m	Polarizing filter		
PNP	4	m			
NPN	4	m			
Electrical data					
Supply voltage U_B				10...30 V DC	10...30 V DC
Ripple				10 %	10 %
No-load supply current I_0 max.				≤ 25 mA	≤ 20 mA
Switching output				PNP-Transistor	PNP-Transistor
Output current				200 mA	200 mA
Switching type				Light-/dark-on (selectable)	Light- and dark-on
Voltage drop U_d at I_e				≤ 2.4 V	≤ 2.5 V
Settings				18-turn potentiometer	Potentiometer 270°
Optical data					
Emitter, light type				LED, infrared	LED, infrared
Wavelength				880 nm	880 nm
Indicators					
Output function indicator				LED yellow	LED yellow
Stability indicator				LED green/red	no
Time data					
Response time				0.5 ms	2.5 ms
Switching frequency f				1 kHz	200 Hz
Mechanical data					
Dimensions				M18×95 mm	M18×69 mm
Connection				3 m cable, PVC	M12 connector, 4-pin
No. of wires × cross-section				3×0.25 mm²	
Housing material				Nickel plated brass	Nickel plated brass
Optical surface				Glass	PMMA
Weight				200 g	40 g
Ambient data					
Degree of protection per IEC 60529				IP 65	IP 67
Polarity reversal protected				yes	yes
Short circuit protected				yes	yes
Ambient temperature range T_a				–20...+60 °C	–5...+55 °C
Ambient light rejection				2 kLux	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.

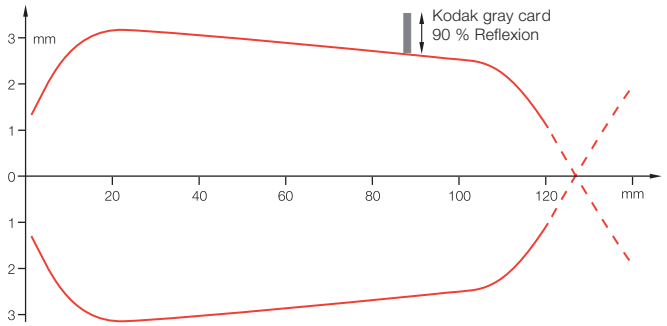
	0...1 m	**2 m**	**2 m**	**4 m**	**4 m**
					
	BOS 18M-GU-1PF-S4-Y				
		BOS 18M-PA-1QB-E5-C-S4 BOS 18M-NA-1QB-E5-C-S4	BOS 18M-PA-1QB-E4-C-03 BOS 18M-NA-1QB-E4-C-03		
				BOS 18M-PA-1VD-E5-C-S4 BOS 18M-NA-1VD-E5-C-S4	BOS 18M-NA-1VD-E4-C-03
	11...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	10 %	10 %	10 %	10 %	10 %
	≤ 25 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
	PNP and NPN (push-pull)	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
	200 mA	200 mA	200 mA	200 mA	200 mA
	Light-/dark-on (selectable)	Light- and dark-on	Light- and dark-on	Light- and dark-on	Light- and dark-on
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	18-turn potentiometer	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
	LED, infrared	LED, red light	LED, red light	LED, infrared	LED, infrared
	880 nm	660 nm	660 nm	880 nm	880 nm
	LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
	LED green/red	no	no	no	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	M18×74 mm	M18×64.5 mm	M18×69 mm	M18×62 mm
	M12 connector, 4-pin	M12 connector, 4-pin	3 m cable, PVC	M12 connector, 4-pin	3 m cable, PVC
			3×0.34 mm²		3×0.34 mm²
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	Glass	PMMA	PMMA	PMMA	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
Photoelectric sensors accessories page 2.3.2 ...

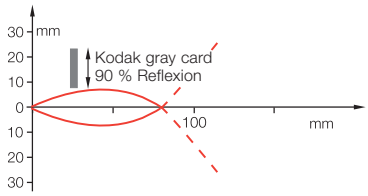
5
Connectors ... page 5.2 ...

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



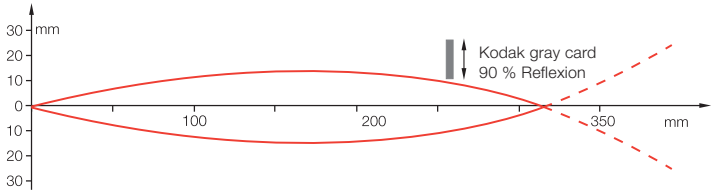
Sensing distance measured with side approach of Kodak gray card.

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



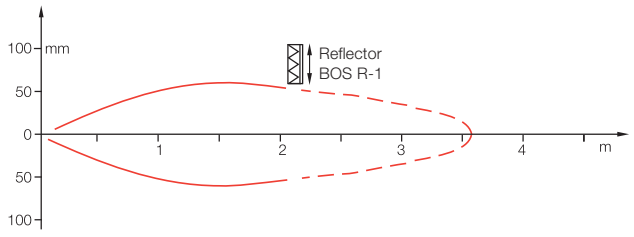
Sensing distance measured with side approach of Kodak gray card.

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



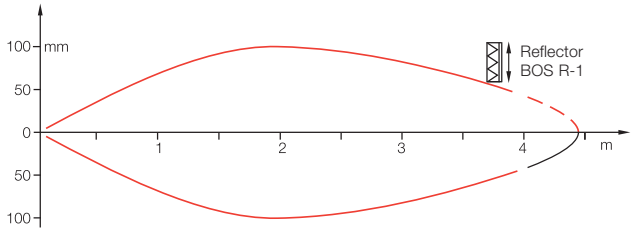
Sensing distance measured with side approach of Kodak gray card.

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



Range measured using side approach with reflector.

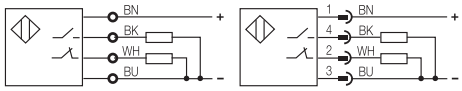
Retroreflective BOS 18M-_A-1VD-...



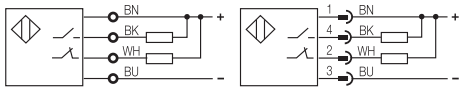
Range measured using side approach with reflector.

Wiring diagrams

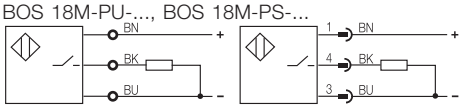
BOS 18M-PA-...



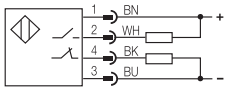
BOS 18M-NA-...



BOS 18M-PU-..., BOS 18M-PS-...



BOS 18M-GU-...



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

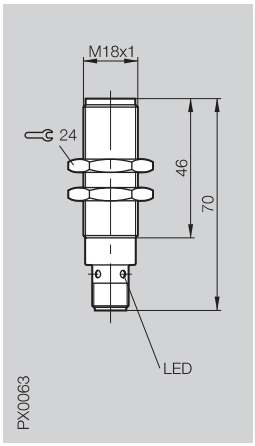
Connector
BKS-_ 19/BKS-_ 20

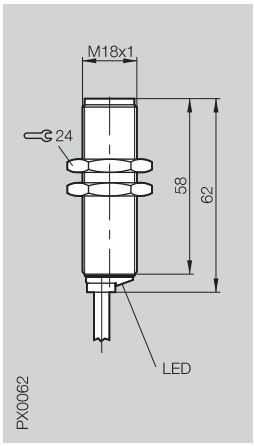
Cover nut
BOS 18-SM-2

Deflection head
BOS 18-UK-10

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
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			

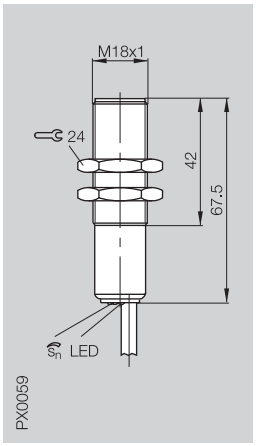
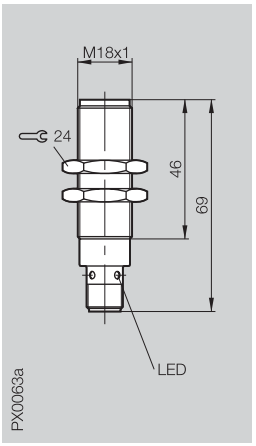
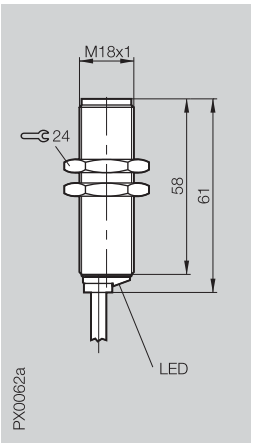
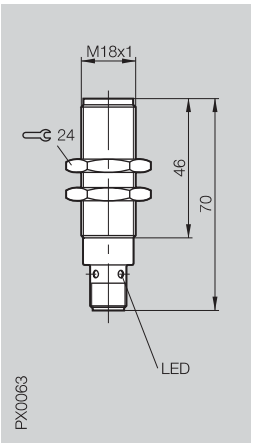
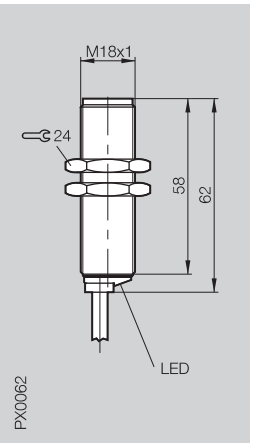




Diffuse					
PNP, light-on	100	mm		BOS 18M-PS-1XA-E5-C-S4	BOS 18M-PS-1XA-E4-C-03
PNP, dark-on	100	mm		BOS 18M-PO-1XA-E5-C-S4	BOS 18M-PO-1XA-E4-C-03
PNP, light-on	200	mm		BOS 18M-PS-1XB-E5-C-S4	BOS 18M-PS-1XB-E4-C-03
PNP, dark-on	200	mm		BOS 18M-PO-1XB-E5-C-S4	BOS 18M-PO-1XB-E4-C-03
PNP, light-on	400	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_e				≤ 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				M18×70 mm	M18×62 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				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.

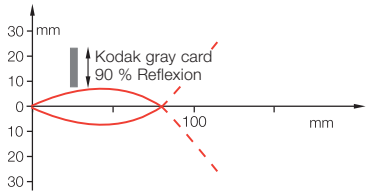
*NPN versions on request.

	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 (BLS)	LED yellow (BLS)
	LED yellow	LED yellow	LED yellow	LED yellow (BLE)	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 mm²		3×0.34 mm²		3×0.34 mm²
	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.

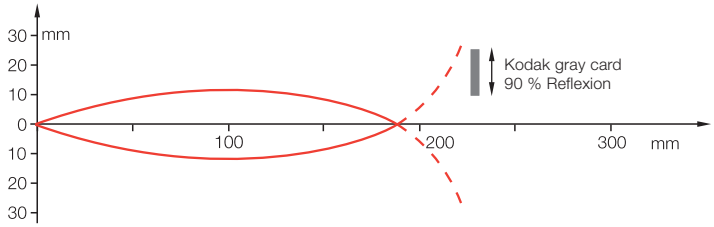
2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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



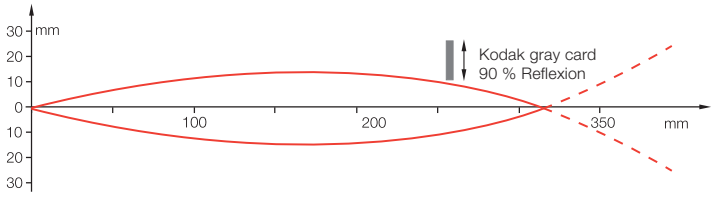
Sensing distance measured with side approach of Kodak gray card.

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



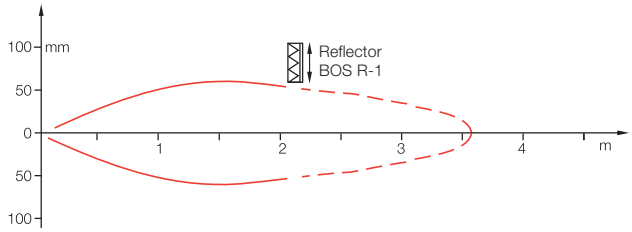
Sensing distance measured with side approach of Kodak gray card.

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



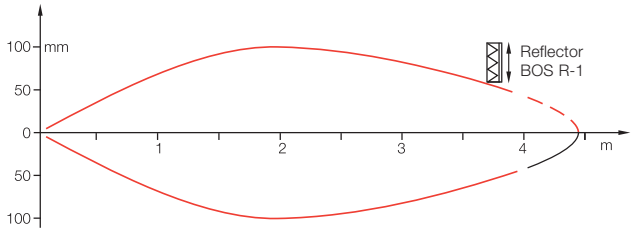
Sensing distance measured with side approach of Kodak gray card.

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



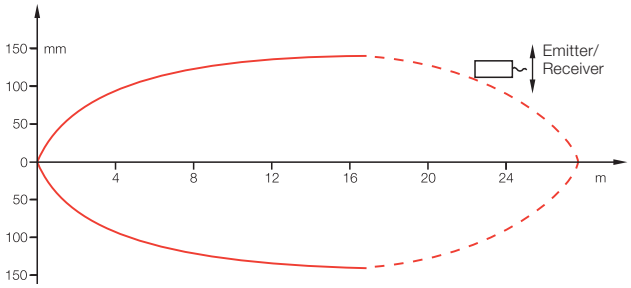
Range measured using side approach with reflector.

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



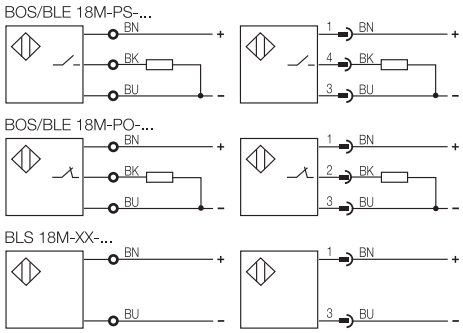
Range measured using side approach with reflector.

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 ...

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

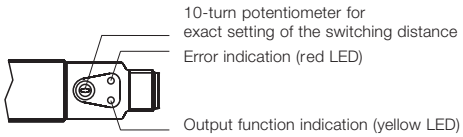
Connector
BKS-_ 19/BKS-_ 20

Deflection head
BOS 18-UK-10

Cover nut
BOS 18-SM-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



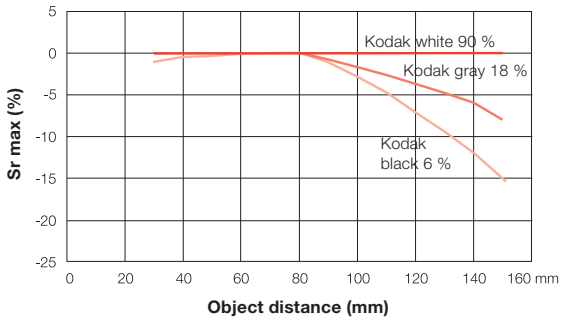
Red LED
The red LED turns on when the sensor is working in an unsafe range. The red LED flashes when there is a short circuit on the output.

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

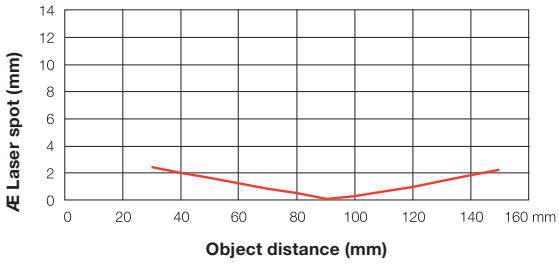
Error output
The error output is active when the sensor is working in an unsafe range.

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

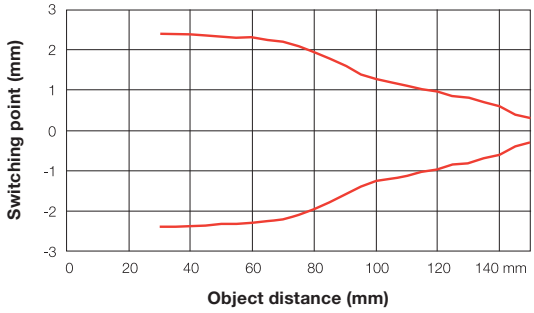
Gray scale shift



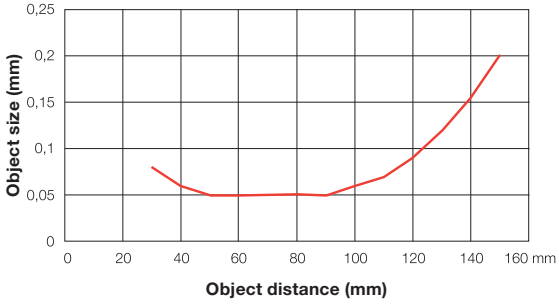
Light spot diameter at distance



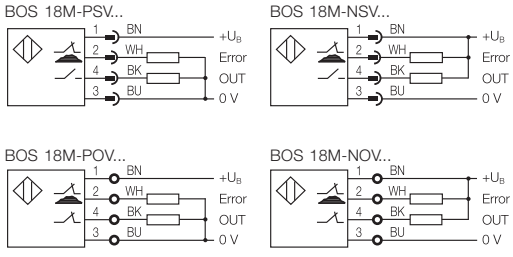
Turn-on point for lateral approach



Smallest detectable part



Wiring diagrams



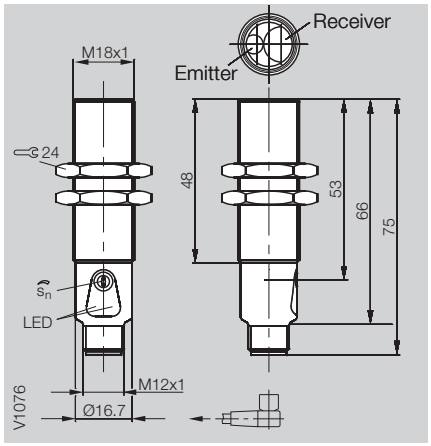
Recommended accessories

please order separately

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	BOS 18M-PSV-LH22-S4
NPN	NO	30...150 mm HGA	BOS 18M-NSV-LH22-S4
PNP	NC	30...150 mm HGA	BOS 18M-POV-LH22-S4
NPN	NC	30...150 mm HGA	BOS 18M-NOV-LH22-S4

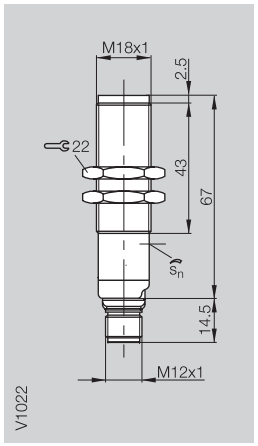
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 30 mA
Switching output	PNP- or NPN-Transistor
Output current	100 mA
Switching type	Light- or dark-on
Voltage drop U_d at I_e	≤ 2.5 V
Settings	10-turn potentiometer
Error output	PNP- or NPN (NC)
Optical data	
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	M18×75 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

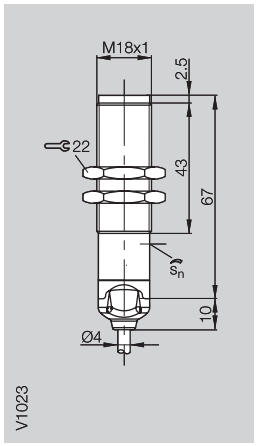
Diffuse values referenced to Kodak gray card 90% Reflexion.

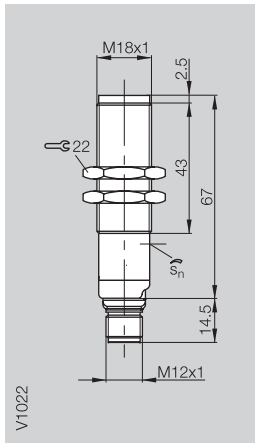
Connector orientation

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse	maximum sensing distance	**0...350 mm**	**0...350 mm**		
Retroreflective with polarizing filter	maximum range			**0.1...16 m**	
Through-beam	maximum range				

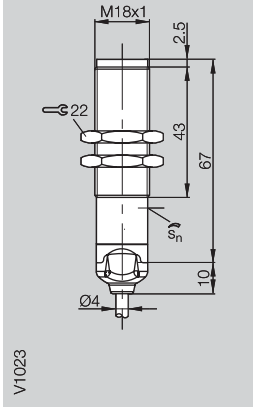
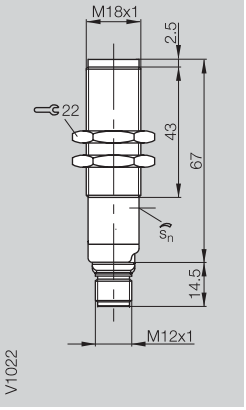
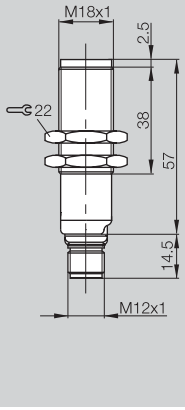
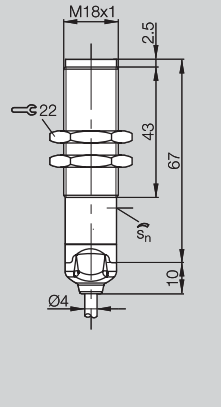
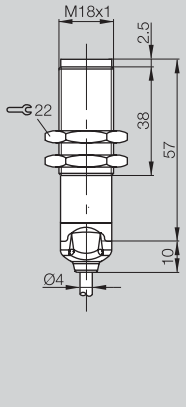






Diffuse					
PNP	350 mm		BOS 18M-PA-LD10-S4	BOS 18M-PA-LD10-02	
NPN	350 mm		BOS 18M-NA-LD10-S4	BOS 18M-NA-LD10-02	
Retroreflective					
PNP	0.1...16 m	Polarizing filter			BOS 18M-PA-LR10-S4
NPN	0.1...16 m	Polarizing filter			BOS 18M-NA-LR10-S4
Through-beam					
PNP	60 m	Receiver			
NPN	60 m	Receiver			
	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 µs	333 µs	333 µs
Switching frequency f			1.5 kHz	1.5 kHz	1.5 kHz
Mechanical data					
Dimensions			M18×81.5 mm	M18×77 mm	M18×81.5 mm
Connection			M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires × cross-section				4×0.14 mm²	
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.

	0.1...16 m	**0...60 m**	**0...60 m**	**0...60 m**	**0...60 m**
					
	BOS 18M-PA-LR10-02 BOS 18M-NA-LR10-02				
		BOS 18M-PA-LE10-S4 BOS 18M-NA-LE10-S4		BOS 18M-PA-LE10-02 BOS 18M-NA-LE10-02	
			BOS 18M-XT-LS10-S4		BOS 18M-XT-LS10-02
	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	≤ 30 mA	≤ 35 mA	≤ 30 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor		PNP- or NPN-Transistor	
	100 mA	100 mA		100 mA	
	Light- and dark-on	Light- and dark-on		Light- and dark-on	
	≤ 2 V	≤ 2 V		≤ 2 V	
	Potentiometer 270°	Potentiometer 270°		Potentiometer 270°	
			Test input		Test input
	0.1...16 m	0...60 m	0...60 m	0...60 m	0...60 m
	Laser, red light	Laser, red light	Laser, red light	Laser, red light	Laser, red light
	650 nm	650 nm	650 nm	650 nm	650 nm
	1	1	1	1	1
	approx. 0.9 mm at 1 m approx. 2 mm at 3 m	approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m		approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m	
		LED green	LED green	LED green	LED green
	LED yellow LED green	LED yellow		LED yellow	
	333 µs	333 µs		333 µs	
	1.5 kHz	1.5 kHz		1.5 kHz	
	M18×77 mm	M18×81.5 mm	M18×71.5 mm	M18×77 mm	M18×67 mm
	2 m cable, PVC	M12 connector, 4-pin	M12 connector, 4-pin	2 m cable, PVC	2 m cable, PVC
	4×0.14 mm²			4×0.14 mm²	4×0.14 mm²
	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated
	PMMA	PMMA	PMMA	PMMA	PMMA
	110 g	60 g	60 g	110 g	110 g
	IP 67	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	–10...+50 °C	–10...+50 °C	–10...+50 °C	–10...+50 °C	–10...+50 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

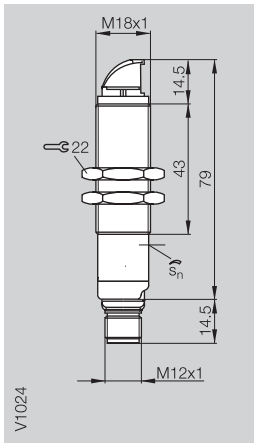
Wiring diagrams, characteristics and accessories see page **2.1.**36 and **2.1.**37.

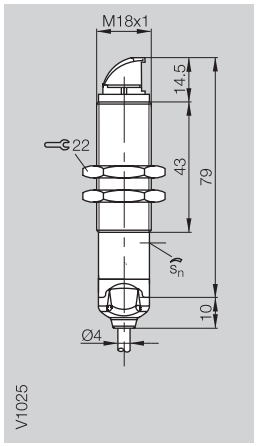
2.1

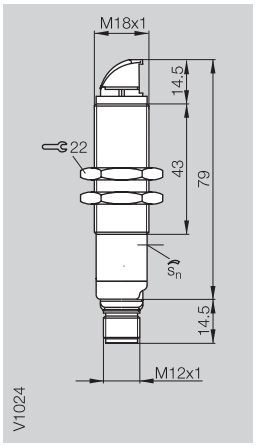
2.3
Photoelectric sensors accessories page 2.3.2 ...

5
Connectors ... page 5.2 ...

Diffuse	maximum sensing distance	**0...250 mm**	**0...250 mm**		
Retroreflective with polarizing filter	maximum range			**0.1...9 m**	
Through-beam	maximum range				

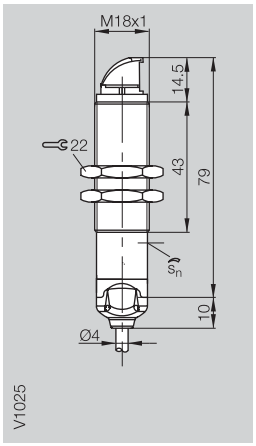
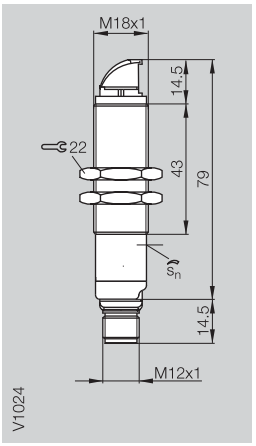
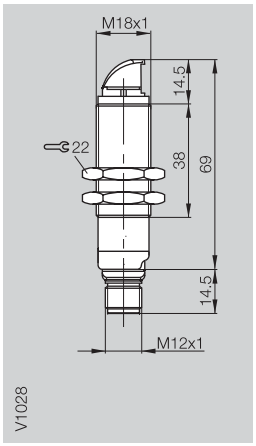
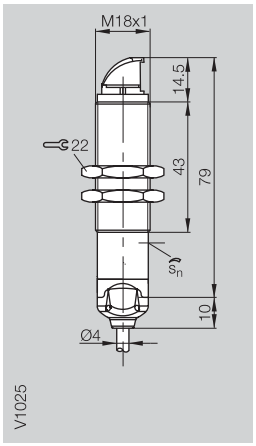
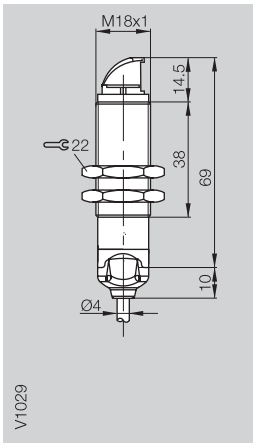






Diffuse					
PNP	250 mm		BOS 18MR-PA-LD10-S4	BOS 18MR-PA-LD10-02	
NPN	250 mm		BOS 18MR-NA-LD10-S4	BOS 18MR-NA-LD10-02	
Retroreflective					
PNP	0.1...9 m	Polarizing filter			BOS 18MR-PA-LR10-S4
NPN	0.1...9 m	Polarizing filter			BOS 18MR-NA-LR10-S4
Through-beam					
PNP	50 m	Receiver			
NPN	50 m	Receiver			
	50 m	Emitter			
Electrical data					
Supply voltage U_B			10...30 V DC	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...250 mm	0...250 mm	0.1...9 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 µs	333 µs	333 µs
Switching frequency f			1.5 kHz	1.5 kHz	1.5 kHz
Mechanical data					
Dimensions			M18×93.5 mm	M18×89 mm	M18×93.5 mm
Connection			M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires × cross-section				4×0.14 mm²	
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.

	0.1...9 m	**0...50 m**	**0...50 m**	**0...50 m**	**0...50 m**
					
	BOS 18MR-PA-LR10-02 BOS 18MR-NA-LR10-02				
		BOS 18MR-PA-LE10-S4 BOS 18MR-NA-LE10-S4		BOS 18MR-PA-LE10-02 BOS 18MR-NA-LE10-02	
			BOS 18MR-XT-LS10-S4		BOS 18MR-XT-LS10-02
	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	≤ 30 mA	≤ 35 mA	≤ 30 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor		PNP- or NPN-Transistor	
	100 mA	100 mA		100 mA	
	Light- and dark-on	Light- and dark-on		Light- and dark-on	
	≤ 2 V	≤ 2 V		≤ 2 V	
	Potentiometer 270°	Potentiometer 270°		Potentiometer 270°	
			Test input		Test input
	0.1...9 m	0...50 m	0...50 m	0...50 m	0...50 m
	Laser, red light	Laser, red light	Laser, red light	Laser, red light	Laser, red light
	650 nm	650 nm	650 nm	650 nm	650 nm
	1	1	1	1	1
	approx. 0.9 mm at 1 m approx. 2 mm at 3 m	approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m		approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m	
		LED green	LED green	LED green	LED green
	LED yellow LED green	LED yellow		LED yellow	
	333 µs	333 µs		333 µs	
	1.5 kHz	1.5 kHz		1.5 kHz	
	M18×89 mm	M18×93.5 mm	M18×83.5 mm	M18×89 mm	M18×79 mm
	2 m cable, PVC	M12 connector, 4-pin	M12 connector, 4-pin	2 m cable, PVC	2 m cable, PVC
	4×0.14 mm²			4×0.14 mm²	4×0.14 mm²
	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated	CuZn chrome plated
	PMMA	PMMA	PMMA	PMMA	PMMA
	110 g	60 g	60 g	110 g	110 g
	IP 67	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	–10...+50 °C	–10...+50 °C	–10...+50 °C	–10...+50 °C	–10...+50 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

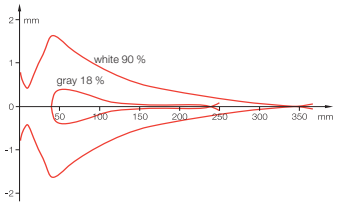
Wiring diagrams, characteristics and accessories see page **2.1.**36 and **2.1.**37.

2.1

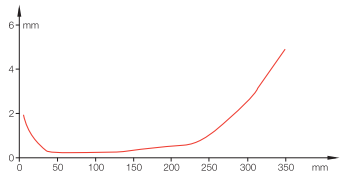
2.3
Photoelectric sensors accessories page 2.3.2 ...

5
Connectors ... page 5.2 ...

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

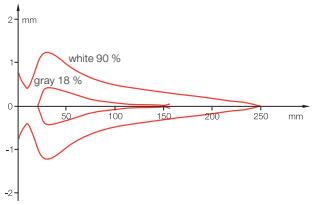


Detection range

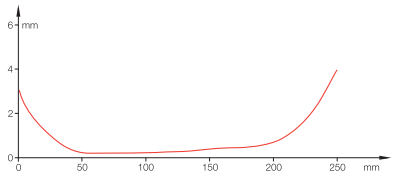


Resolution

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

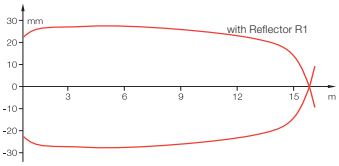


Detection range

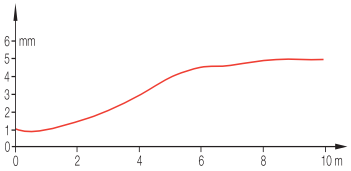


Resolution

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

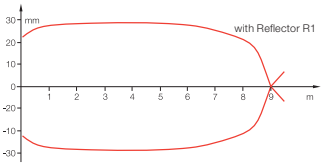


Detection range

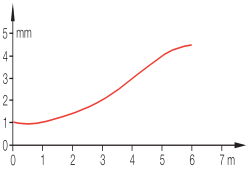


Resolution

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

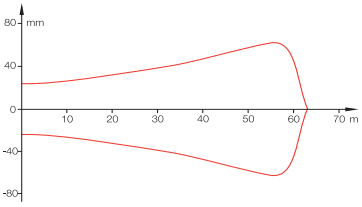


Detection range

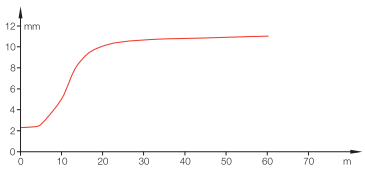


Resolution

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

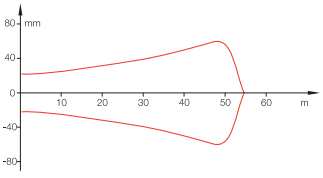


Detection range

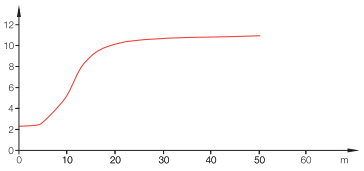


Resolution

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

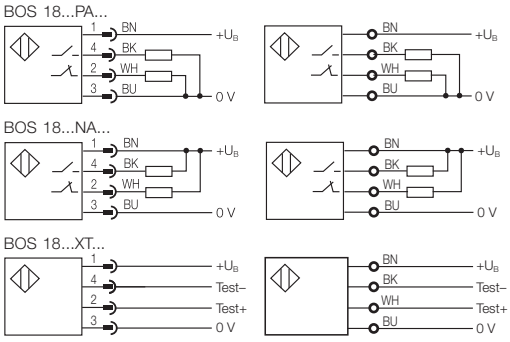


Detection range



Resolution

Wiring diagrams



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

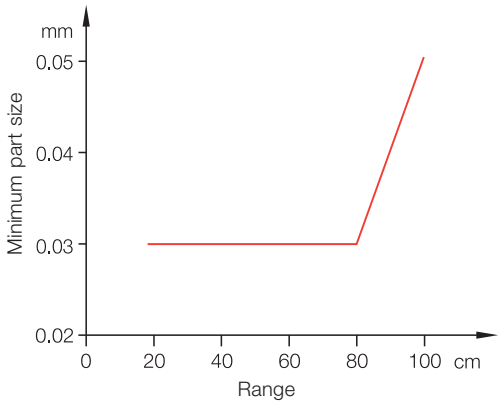
2.1
2.3
Photoelectric sensors accessories
page 2.3.2 ...
5
Connectors ...
page 5.2 ...

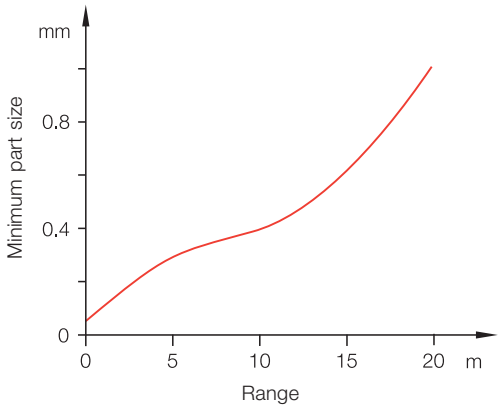
Laser through-beam range

CE

Accuracy diagram

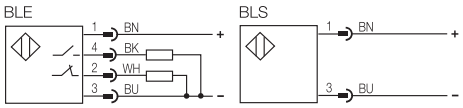
Smallest detectable part size as a function of range.





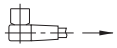
Beam spot vertical to transport direction of the object.

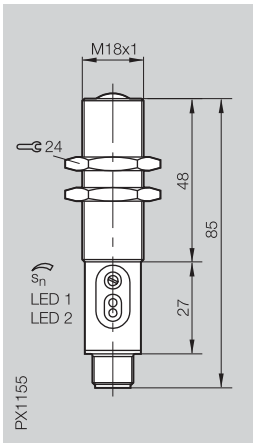
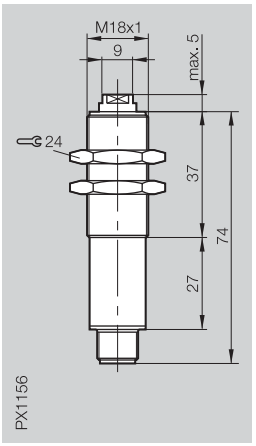
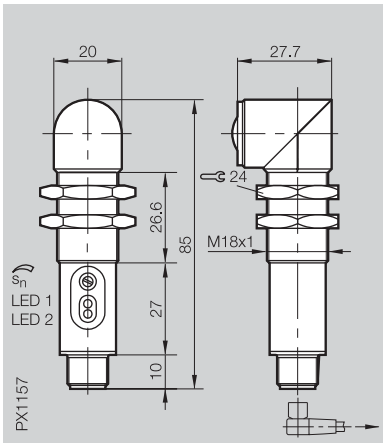
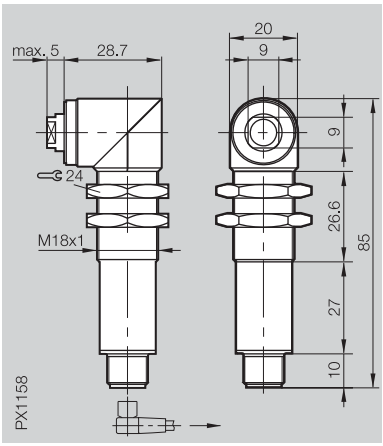
Wiring diagrams



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.

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

	0...50 m	0...50 m	0...50 m	0...50 m
				
	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	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 15 mA	≤ 10 mA	≤ 15 mA	≤ 10 mA
	PNP-Transistor		PNP-Transistor	
	200 mA		200 mA	
	Light-/dark-on (complementary)		Light-/dark-on (complementary)	
	≤ 2.5 V		≤ 2.5 V	
	18-turn potentiometer		18-turn potentiometer	
		Laser, red light		Laser, red light
		650 nm		650 nm
		2		2
		focusable		focusable
	LED yellow		LED yellow	
	LED green/red		LED green/red	
	≤ 0.08 ms		≤ 0.08 ms	
	6 kHz		6 kHz	
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	Glass	Glass	Glass	Glass
	45 g	45 g	50 g	50 g
	IP 65	IP 65	IP 65	IP 65
	yes	yes	yes	yes
	yes	yes	yes	yes
	–15...+55 °C	–15...+55 °C	–15...+55 °C	–15...+55 °C
	2 kLux	2 kLux	2 kLux	2 kLux

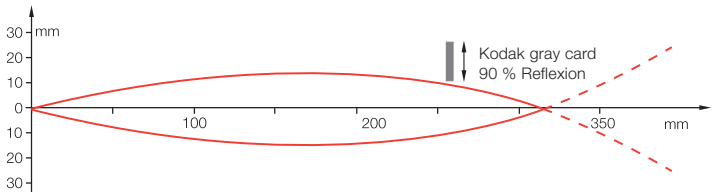
Recommended accessories
please order separately

Mounting clamp
BOS 18,0-KB-1

Connector
BKS-_ 19/BKS-_ 20

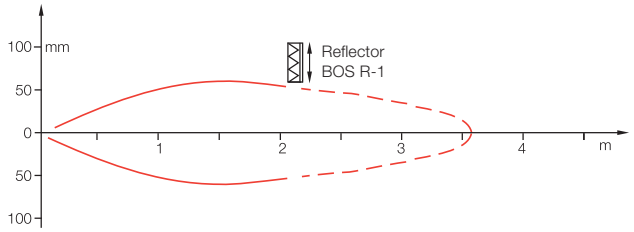
2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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



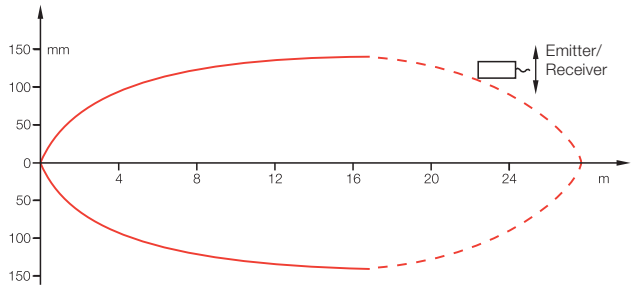
Sensing distance measured with side approach of Kodak gray card.

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



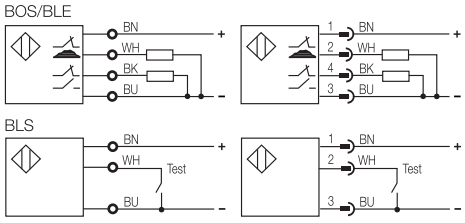
Range measured using side approach with reflector.

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



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

Wiring diagrams



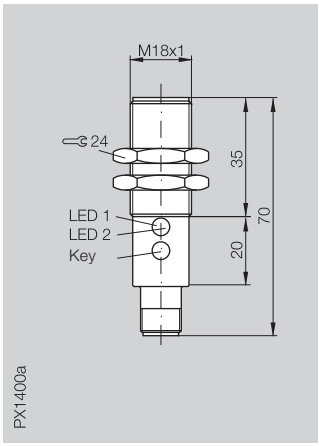
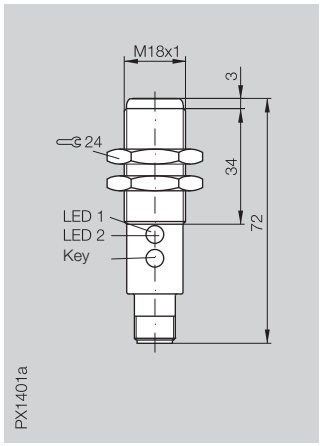
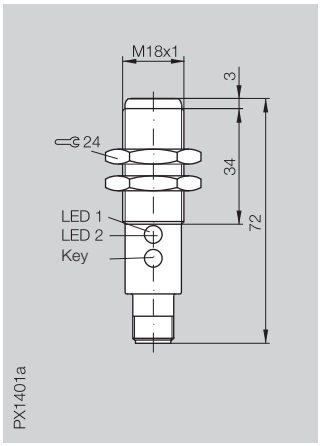
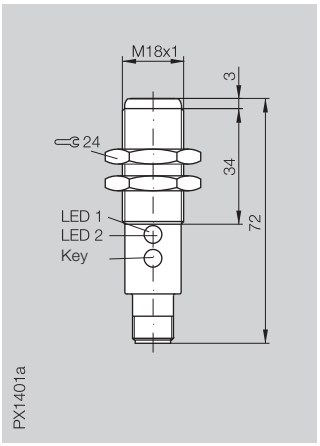
Diffuse		Sensing distance
Retroreflective		Range
Through-beam		Range

CE

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.

	0...400 mm	**2 m**	**0...16 m**	**0...16 m**
				
	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	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 mA
	PNP-Transistor	PNP-Transistor	PNP-Transistor	
	200 mA	200 mA	200 mA	
	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)	
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	
	Teach-in	Teach-in	Teach-in	Teach-in
	Contamination output	Contamination output	Contamination output	
	LED, infrared	LED, red light	LED, infrared	LED, infrared
	880 nm	660 nm		880 nm
				LED yellow
	LED yellow	LED yellow	LED yellow	
	LED green	LED green	LED green	
	1 ms	1 ms	1 ms	
	500 Hz	500 Hz	500 Hz	
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	Nickel plated brass	Nickel plated brass	Nickel plated brass	Nickel plated brass
	PMMA	Glass	Glass	Glass
	65 g	65 g	65 g	65 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

Recommended accessories
please order separately

Reflector
BOS R-1

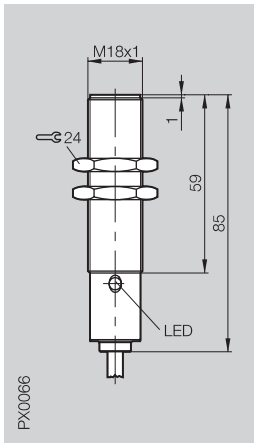
Mounting clamp
BOS 18,0-KB-1

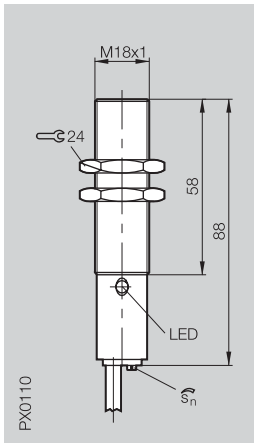
Connector
BKS-_ 19/BKS-_ 20

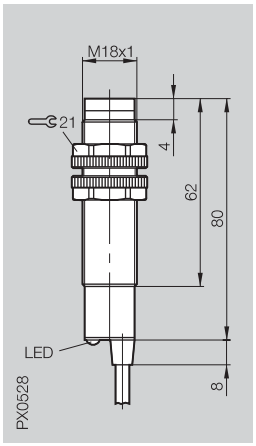
2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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**



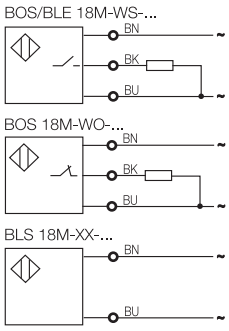




Diffuse				
Diode-jumper	100 mm	BOS 18M-WS-7XA-B0-L-03		
	200 mm	BOS 18M-WS-7XB-B0-L-03		
	200 mm Poti		BOS 18M-WS-7PB-B1-L-03	
Retroreflective				
Diode-jumper	2 m	BOS 18M-WS-7RB-B0-L-03		
Through-beam				
Diode jumper	16 m Receiver			BLE 18K-WS-7P-B0-L-03
	16 m Emitter			BLS 18K-XX-7P-B0-L-03
Electrical 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_e		≤ 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 × cross-section		3×0.34 mm²	3×0.34 mm²	3×0.34 mm²
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



2.1
2.3
Photoelectric sensors accessories
page 2.3.2 ...
5
Connectors ...
page 5.2 ...

Recommended accessories
please order separately

Cover nut
BOS 18-SM-2

Deflection head
BOS 18-UK-10

Round aperture
BOS 18-BL-1

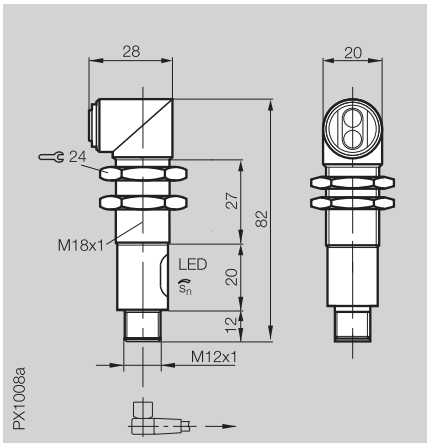
Reflector
BOS R-1

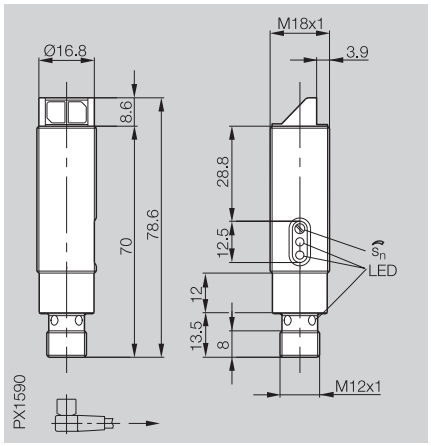
Air shield
BOS 18-LT-1

Mounting clamp
BOS 18,0-KB-1

Connector
BKS-_ 19/BKS-_ 20

Diffuse	Sensing distance	**40...120 mm**	**10...120 mm**
Retroreflective	Range		
Through-beam	Range		

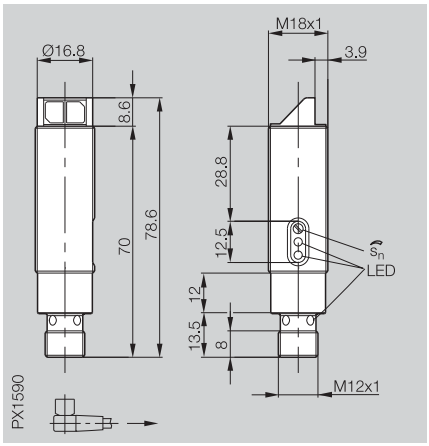
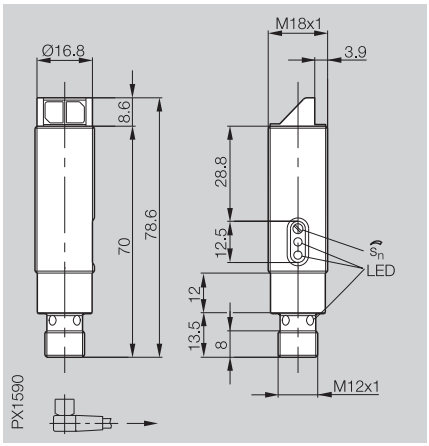
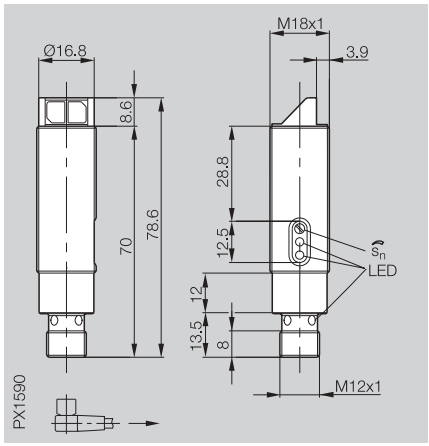




Diffuse					
PNP	40...120	mm	HGA	BOS 18MR-PA-1HA-S4-C	
PNP	10...120	mm	HGA		BOS 18MR-PS-1HA-E5-C-S4
PNP	400	mm			
Retroreflective					
PNP	2	m	Polarizing filter		
Through-beam					
PNP	16	m	Receiver		
	16	m	Emitter, test input		
Electrical data					
Supply voltage U_B				10...30 V DC	10...36 V DC
Ripple				10 %	20 %
No-load supply current I_0 max.				≤ 30 mA	≤ 20 mA
Switching output				PNP-Transistor	PNP-Transistor
Output current				200 mA	200 mA
Switching type				Light- and dark-on	Light-on
Voltage drop U_d at I_e				≤ 2.5 V	≤ 2 V
Settings				18-turn potentiometer	Potentiometer 270°
Help functions					
Optical data					
Emitter, light type				LED, red light	LED, red light
Wavelength				660 nm	660 nm
Indicators					
Output function indicator				LED yellow	2 × LED yellow
Stability indicator				no	LED green
Time data					
Response time				0.8 ms	≤ 1 ms
Switching frequency f				600 Hz	500 Hz
Mechanical data					
Dimensions				M18×82 mm	M18×78.6 mm
Connection				M12 connector, 4-pin	M12 connector, 4-pin
Housing material				Nickel plated brass	Nickel plated brass
Optical surface				Glass	Glass
Weight				62 g	57 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	–25...+55 °C
Ambient light rejection				2 kLux	10 kLux

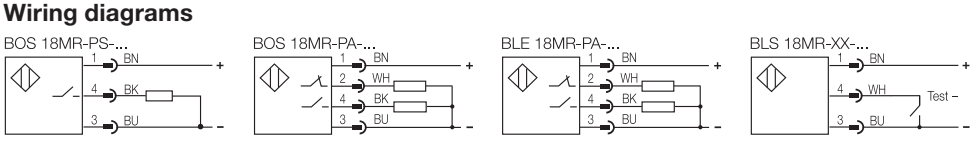
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

Connector orientation

	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	10...36 V DC	10...36 V DC
	20 %	20 %	20 %
	≤ 20 mA	≤ 20 mA	≤ 20 mA
	PNP-Transistor	PNP-Transistor	PNP-Transistor
	200 mA	200 mA	200 mA
	Light-on	Dark-on	Light- and dark-on
	≤ 2 V	≤ 2 V	≤ 2 V
	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
			Test input emitter
	LED, red light	LED, red light	LED, red light
	660 nm	660 nm	660 nm
	2 × LED yellow	2 × LED yellow	2 × LED yellow (BLE only)
	LED green	LED green	LED green (BLE only)
	≤ 0.5 ms	≤ 0.5 ms	≤ 0.5 ms
	1 kHz	1 kHz	1 kHz
	M18×78.6 mm	M18×78.6 mm	M18×78.6 mm
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	Nickel plated brass	Nickel plated brass	Nickel plated brass
	Glass	Glass	Glass
	57 g	56 g	57 g
	IP 67	IP 67	IP 67
	yes	yes	yes
	yes	yes	yes
	–25...+55 °C	–25...+55 °C	–25...+55 °C
	10 kLux	10 kLux	10 kLux

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Wiring diagrams



Connector
BKS-_ 19/BKS-_ 20

Photoelectric sensors from the **Opto-PROXINOX** series are made of corrosion-proof **stainless steel 1.4571** and are, therefore, not subject to wear and teach. 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!

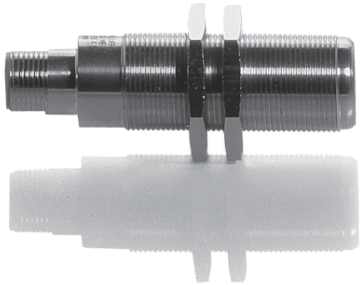
Features

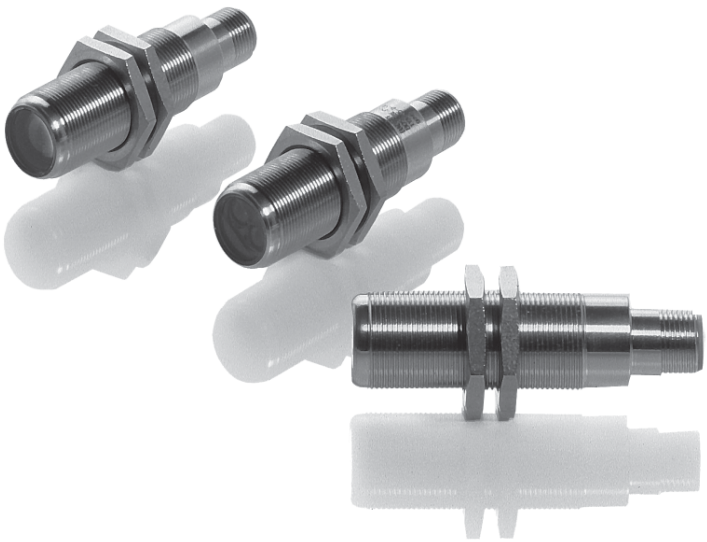
- Supply voltage 10...30 V DC, polarity reversal protected
- Output short circuit protected
- Tough stainless steel housing without holes and with stainless nuts
- Enclosure rating IP 68 (BWN Pr. 27), can also withstand steam cleaning
- Optical surface of tough 2 mm Borofloat glass or scratch-resistant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



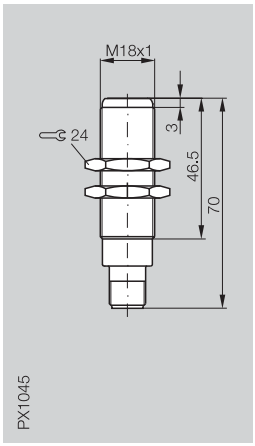


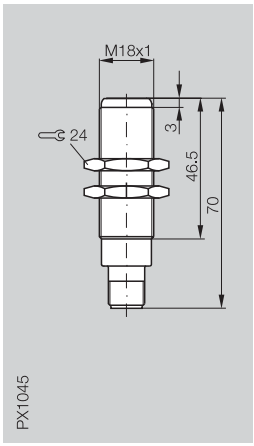
Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U_B	Connection		Special features		Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter		
Diffuse with HGA														
BOS 18E-PS-1N2M-S4-D	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 page 2.3.2 ...
5 Connectors ... page 5.2 ...

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

Diffuse with background suppression	Sensing distance	**0...40 mm**	
Diffuse	Sensing distance		**0...100/0...200/0...400 mm**
Retroreflective	Range		
Through-beam	Range		



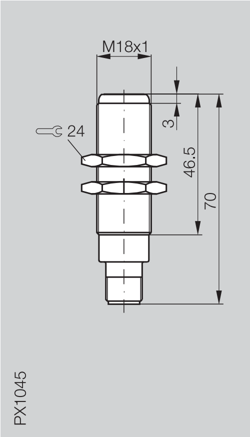
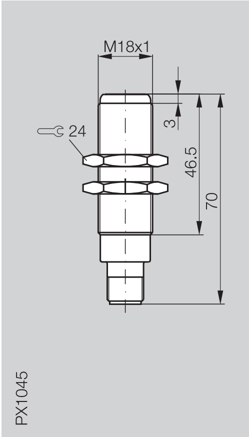
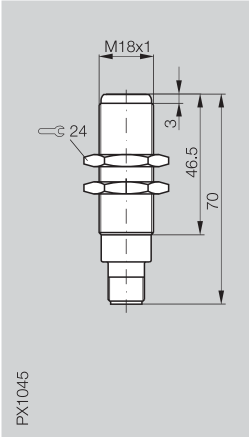
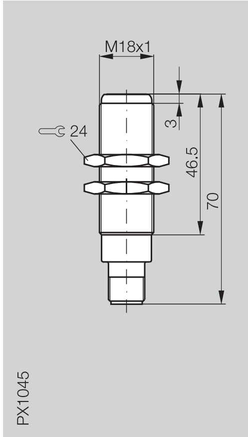
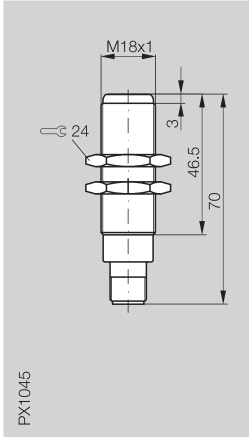


stainless steel

Diffuse					
PNP, light-on	40	mm		BOS 18E-PS-1N2M-S4-D	
PNP, light-on	100	mm			BOS 18E-PS-1YA-E5-D-S4
PNP, dark-on	100	mm			BOS 18E-PO-1YA-E5-D-S4
PNP, light-on	200	mm			BOS 18E-PS-1YB-E5-D-S4
PNP, light-on	400	mm			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				10...30 V DC	10...30 V DC
Ripple				15 %	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-on	Light- or dark-on
Voltage drop U_d at I_e				≤ 2.5 V	≤ 2.5 V
Settings				fixed	fixed
Optical data					
Emitter, light type				LED, red light	LED, red light
Wavelength				660 nm	660 nm
Time data					
Response time				5 ms	5 ms
Switching frequency f				100 Hz	100 Hz
Mechanical data					
Dimensions				M18×70 mm	M18×70 mm
Connection				M12 connector, 4-pin	M12 connector, 4-pin
Housing material				**Stainless steel 1.4571**	**Stainless steel 1.4571**
Optical surface				Glass	Glass
Weight				55 g	55 g
Ambient data					
Degree of protection per IEC 60529				IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27
Polarity reversal protected				yes	yes
Short circuit protected				yes	yes
Ambient temperature range T_a				–5...+75 °C	–20...+75 °C
Ambient light rejection				2 kLux	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.

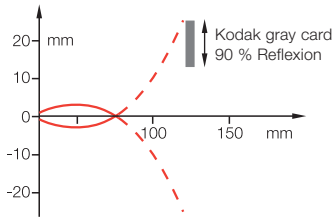
	0...100/0...200/0...400 mm				
		2 m/4 m	**2 m**		
				16 m	**16 m**
					
	BOS 18E-PS-1XA-SA1-S4				
	BOS 18E-PS-1XB-SA1-S4				
	BOS 18E-PS-1XD-SA1-S4				
		BOS 18E-PS-1UB-E5-D-S4	BOS 18E-PS-1UB-SA1-S4		
		BOS 18E-PS-1WD-E5-D-S4			
				BLE 18E-PS-1P-E5-D-S4	BLE 18E-PS-1P-SA1-S4
				BLE 18E-PO-1P-E5-D-S4	
				BLS 18E-XX-1P-E5-X-S4	BLS 18E-XX-1P-SA1-S4
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	15 %	10 %	15 %	15 %	15 %
	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 15 mA (BLS ≤ 40 mA)	≤ 15 mA (BLS ≤ 35 mA)
	PNP-Transistor	PNP-Transistor	PNP-Transistor	PNP-Transistor	PNP-Transistor
	200 mA	200 mA	200 mA	200 mA	200 mA
	Light-on	Dark-on	Dark-on	Light- or dark-on	Dark-on
	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V	≤ 2.5 V
	fixed	fixed	fixed	fixed	fixed
	LED, infrared	LED, red light	LED, red light	LED, infrared	LED, infrared
	880 nm	660 nm	660 nm	880 nm	880 nm
	5 ms	5 ms	5 ms	5 ms	5 ms
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
	M18×70 mm	M18×70 mm	M18×70 mm	M18×70 mm	M18×70 mm
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	Stainless steel 1.4571	**Stainless steel 1.4571**	**Stainless steel 1.4571**	**Stainless steel 1.4571**	**Stainless steel 1.4571**
	PMMA scratch-resistant	Glass	PMMA scratch-resistant	Glass	PMMA scratch-resistant
	55 g	40 g	40 g	55 g (40 g)	55 g (40 g)
	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	–5...+75 °C	–20...+75 °C	–20...+75 °C	–5...+75 °C	–5...+75 °C
	2 kLux	2 kLux	2 kLux	2 kLux	2 kLux

2.1

2.3
Photoelectric sensors accessories page 2.3.2 ...

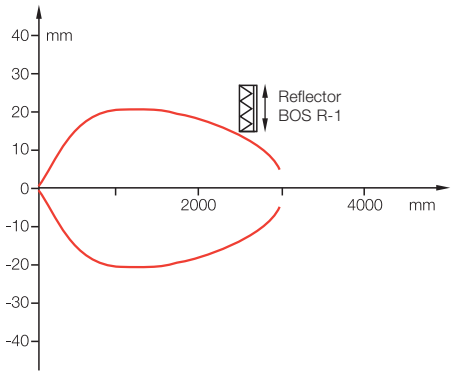
5
Connectors ... page 5.2 ...

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



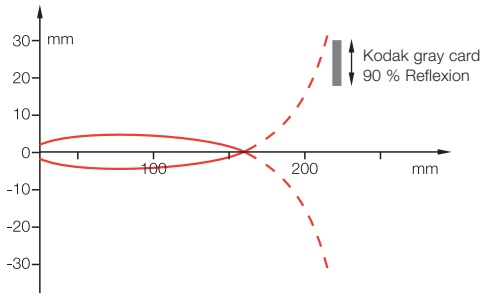
Sensing distance measured with side approach of Kodak gray card.

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



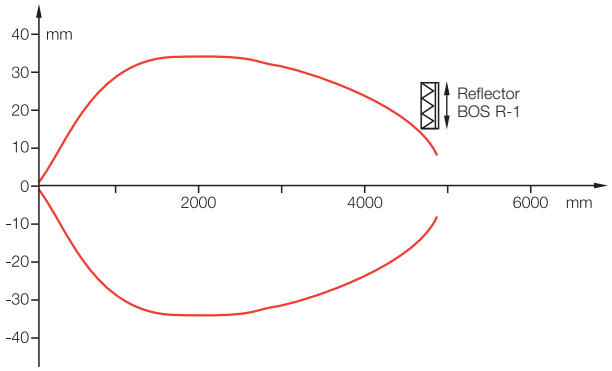
Range measured using side approach with reflector.

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



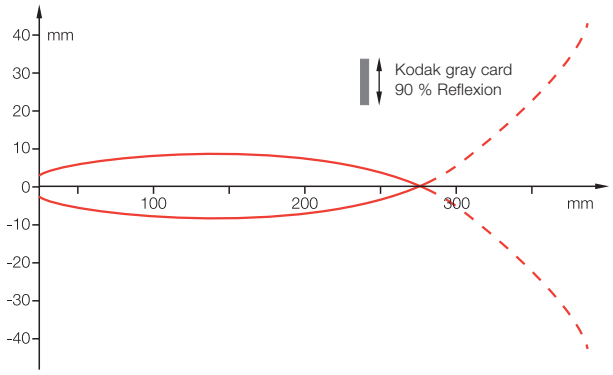
Sensing distance measured with side approach of Kodak gray card.

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



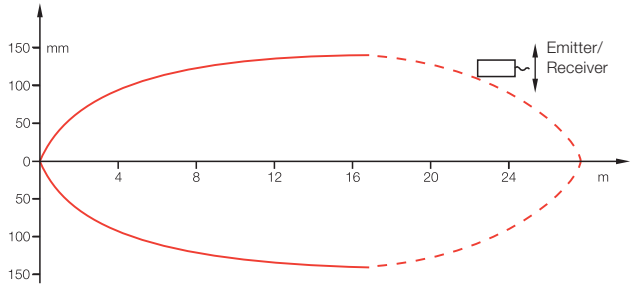
Range measured using side approach with reflector.

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



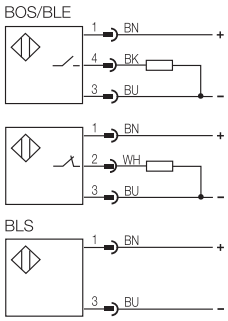
Sensing distance measured with side approach of Kodak gray card.

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

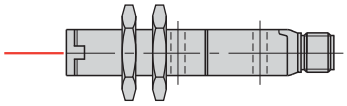
BOS 18KF – standards redefined

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.

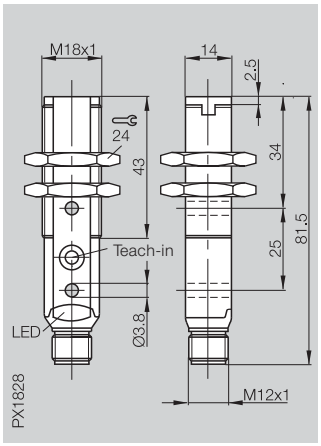


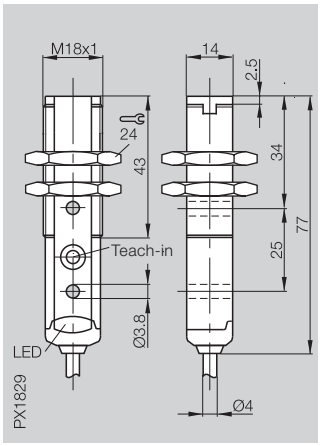
Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U_B	Connec-tion		Special features		Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
Diffuse with HGA															
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	Connection		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	**50...100 mm**	**50...100 mm**	
Diffuse with fore- and background suppression	maximum sensing distance			

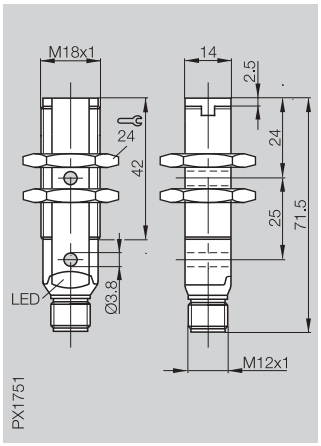
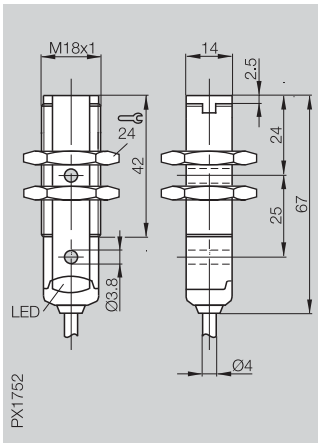
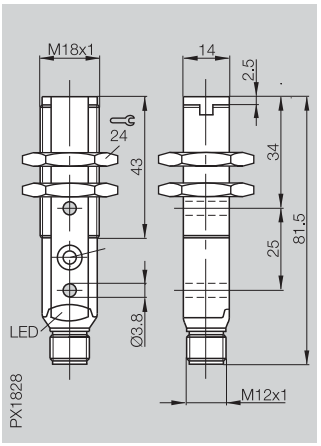
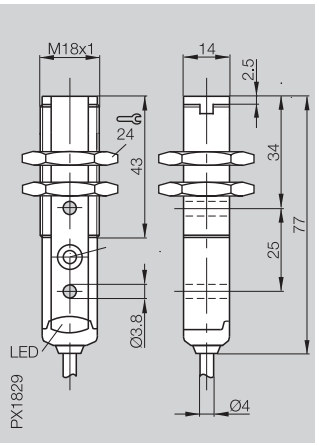




	Diffuse				
	PNP	50...100 mm	HGA	BOS 18KF-PA-1HA-S4-C	BOS 18KF-PA-1HA-C-02
	NPN	50...100 mm	HGA	BOS 18KF-NA-1HA-S4-C	BOS 18KF-NA-1HA-C-02
	PNP	100 mm	HGA		
	NPN	100 mm	HGA		
	PNP	40...100 mm	VGA + HGA		
	NPN	40...100 mm	VGA + HGA		
	Electrical data				
	Supply voltage U_B			10...30 V DC	10...30 V DC
	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_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. 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

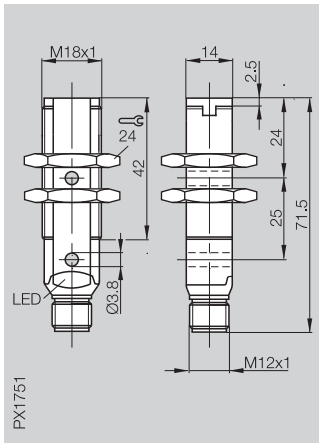
Diffuse values referenced to Kodak gray card 90% Reflexion.

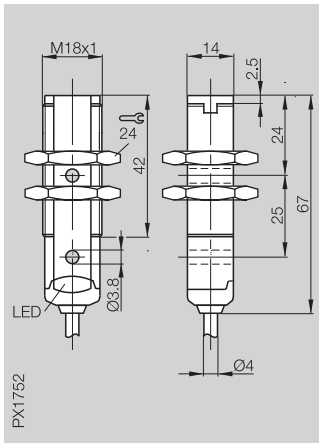
Wiring diagrams, characteristics and accessories see page **2.1.**66 to **2.1.**69.

	100 mm	100 mm	40...100 mm	40...100 mm
				
	BOS 18KF-PA-1N1R-S4-C BOS 18KF-NA-1N1R-S4-C	BOS 18KF-PA-1N1R-C-02 BOS 18KF-NA-1N1R-C-02	BOS 18KF-PA-1GA-S4-C BOS 18KF-NA-1GA-S4-C	BOS 18KF-PA-1GA-C-02 BOS 18KF-NA-1GA-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	≤ 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- and dark-on	Light- and dark-on	Light- and dark-on	Light- and dark-on
	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
	fixed	fixed	Teach-in	Teach-in
	100 mm	100 mm	40...100 mm	40...100 mm
	LED, red light	LED, red light	LED, red light	LED, red light
	630 nm	630 nm	630 nm	630 nm
	approx. 20 mm at 100 mm	approx. 20 mm at 100 mm	approx. 8 mm at 100 mm	approx. 8 mm at 100 mm
	LED yellow LED green/red	LED yellow LED green/red	LED yellow LED green/red	LED yellow LED green/red
	0.5 ms 1 kHz	0.5 ms 1 kHz	2 ms 250 Hz	2 ms 250 Hz
	M18×71.5 mm M12 connector, 4-pin	M18×67 mm 2 m cable, PVC 4×0.14 mm²	M18×81.5 mm M12 connector, 4-pin	M18×77 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 ...
5
Connectors ... page 5.2 ...

Diffuse	maximum sensing distance	**0...100 mm**	**0...100 mm**

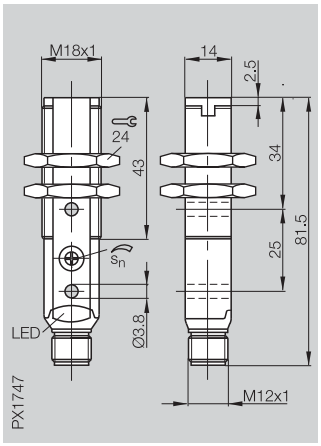
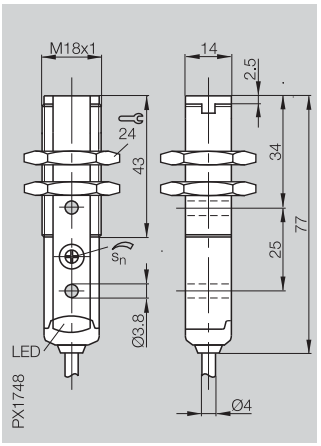
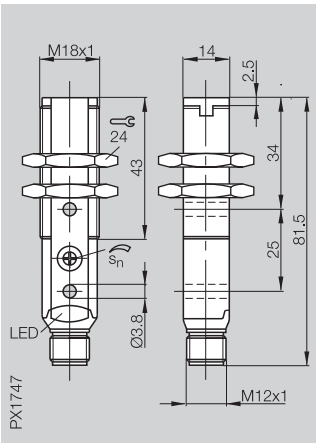
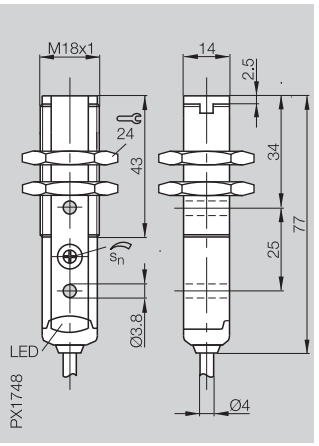




Diffuse			
PNP	100 mm	BOS 18KF-PA-1XA-S4-C	BOS 18KF-PA-1XA-C-02
NPN	100 mm	BOS 18KF-NA-1XA-S4-C	BOS 18KF-NA-1XA-C-02
PNP	400 mm		
NPN	400 mm		
PNP	700 mm		
NPN	700 mm		
Electrical data			
Supply voltage U_B		10...30 V DC	10...30 V DC
Ripple		≤ 2 V	≤ 2 V
No-load supply current I_0 max.		≤ 35 mA	≤ 35 mA
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			
Optical data			
Recommended sensing distance		0...100 mm	0...100 mm
Emitter, light type		LED, infrared	LED, infrared
Wavelength		880 nm	880 nm
Light spot diameter		approx. 80 mm at 100 mm	approx. 80 mm at 100 mm
Indicators			
Output function indicator		LED yellow	LED yellow
Stability indicator			
Time data			
Response time		0.5 ms	0.5 ms
Switching frequency f		1 kHz	1 kHz
Mechanical data			
Dimensions		M18×71.5 mm	M18×67 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

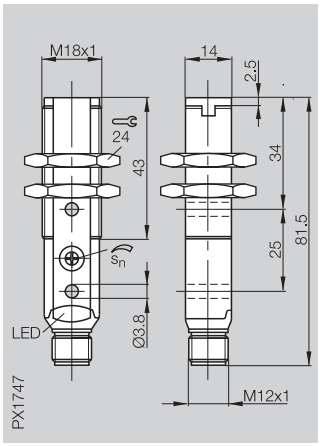
Diffuse values referenced to Kodak gray card 90% Reflexion.

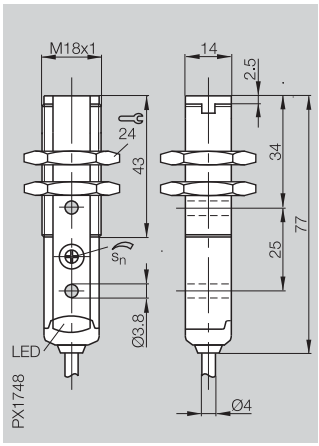
Wiring diagrams, characteristics and accessories see page **2.1.**66 to **2.1.**69.

	0...400 mm	0...400 mm	0...700 mm	0...700 mm
				
	BOS 18KF-PA-1PD-S4-C BOS 18KF-NA-1PD-S4-C	BOS 18KF-PA-1PD-C-02 BOS 18KF-NA-1PD-C-02	BOS 18KF-PA-1PE-S4-C BOS 18KF-NA-1PE-S4-C	BOS 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 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
	M18×81.5 mm M12 connector, 4-pin	M18×77 mm 2 m cable, PVC 4×0.14 mm²	M18×81.5 mm M12 connector, 4-pin	M18×77 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 ...
5
Connectors ... page 5.2 ...

Retroreflective for transparent materials	Range	**0.1...1.7 m**	**0.1...1.7 m**
Retroreflective with polarizing filter	maximum range		
Retroreflective	maximum range		

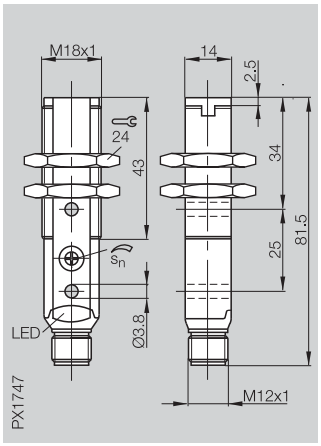
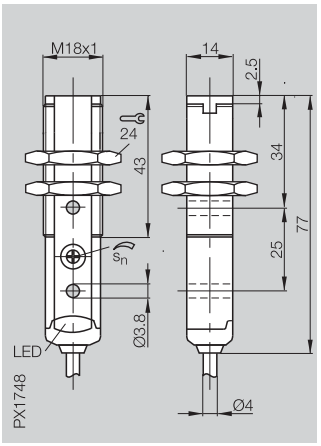
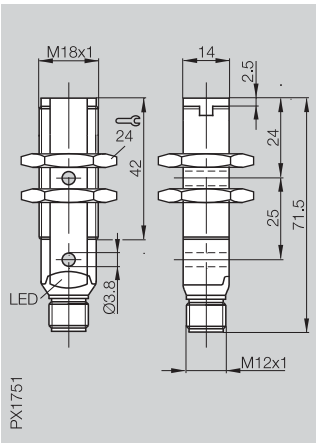
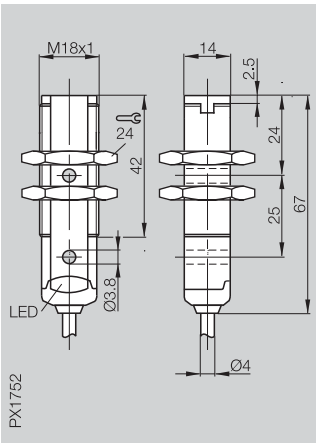




Retroreflective					
PNP	0.1...1.7 m	Polarizing filter	BOS 18KF-PA-1TB-S4-C	BOS 18KF-PA-1TB-C-02	
NPN	0.1...1.7 m	Polarizing filter	BOS 18KF-NA-1TB-S4-C	BOS 18KF-NA-1TB-C-02	
PNP	0.1...4.5 m	Polarizing filter			
NPN	0.1...4.5 m	Polarizing filter			
PNP	0.1...5 m				
NPN	0.1...5 m				
Electrical data					
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			0.1...1.4 m	0.1...1.4 m	
Emitter, light type			LED, red light	LED, red light	
Wavelength			660 nm	660 nm	
Light spot diameter			approx. 45 mm at 1 m	approx. 45 mm at 1 m	
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			M18×81.5 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	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	

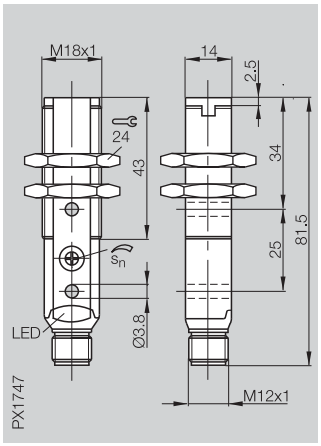
Retroreflective values referenced to R1 reflector.

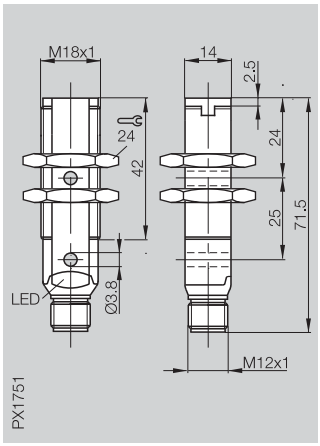
Wiring diagrams, characteristics and accessories see page **2.1.**66 to **2.1.**69.

	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
	M18×81.5 mm	M18×77 mm	M18×71.5 mm	M18×77 mm
	M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin	2 m cable, PVC
		4×0.14 mm²		4×0.14 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

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

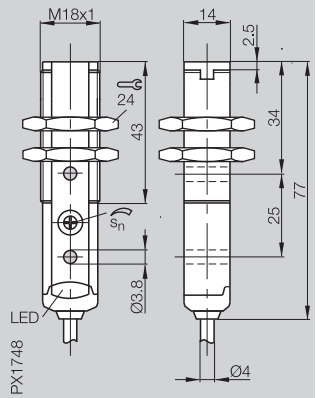
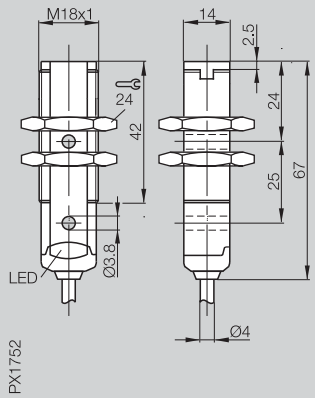
Through-beam	maximum range	**0...20 m**	**0...20 m**	





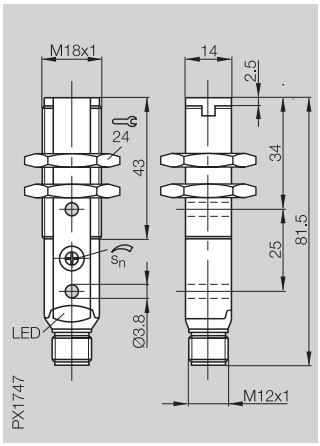
Through-beam				
PNP	20 m	Receiver	BLE 18KF-PA-1PP-S4-C	
NPN	20 m	Receiver	BLE 18KF-NA-1PP-S4-C	
	20 m	Emitter		BLS 18KF-XX-1P-S4-L
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 2 V	≤ 2 V
No-load supply current I_0 max.			≤ 30 mA	≤ 35 mA
Switching output			PNP- or NPN-Transistor	
Output current			100 mA	
Switching type			Light- and dark-on	
Voltage drop U_d at I_e			≤ 2 V	
Settings			Potentiometer 270°	
Help functions				Test input
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 × 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

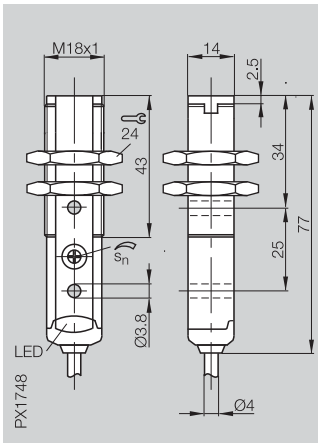
Wiring diagrams, characteristics and accessories see page **2.1.**66 to **2.1.**69.

	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			
	M18×77 mm	M18×67 mm		
	2 m cable, PVC	2 m cable, PVC		
	4×0.14 mm²	4×0.14 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	**0...350 mm**	**0...350 mm**
Retroreflective with polarizing filter	maximum range		

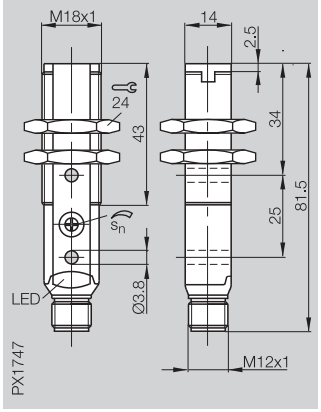
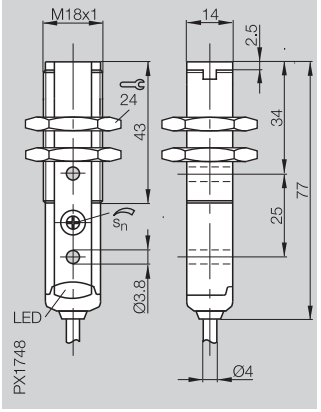




Diffuse				
PNP	350 mm		BOS 18KF-PA-1LOC-S4-C	BOS 18KF-PA-1LOC-C-02
NPN	350 mm		BOS 18KF-NA-1LOC-S4-C	BOS 18KF-NA-1LOC-C-02
Retroreflective				
PNP	0.1...16 m	Polarizing filter		
NPN	0.1...16 m	Polarizing filter		
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 2 V	≤ 2 V
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 µs	333 µs
Switching frequency f			1.5 kHz	1.5 kHz
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			–10...+50 °C	–10...+50 °C
Reference standard			EN 60947-5-2	EN 60947-5-2

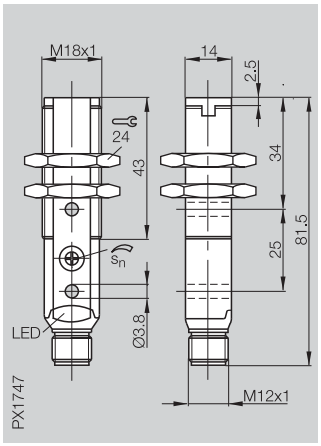
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

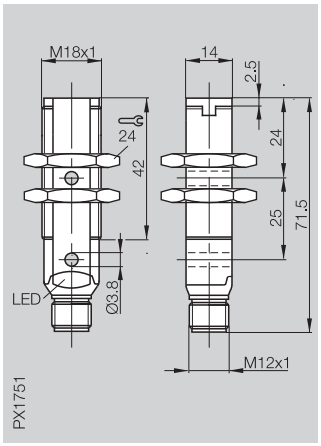
Wiring diagrams, characteristics and accessories see page **2.1.**66 to **2.1.**69.

	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	10...30 V DC
	≤ 2 V	≤ 2 V
	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor
	100 mA	100 mA
	Light- and dark-on	Light- and dark-on
	≤ 2 V	≤ 2 V
	Potentiometer 270°	Potentiometer 270°
	0.1...16 m	0.1...16 m
	Laser, red light	Laser, red light
	650 nm	650 nm
	Class 1	Class 1
	approx. 0.9 mm at 1 m approx. 2 mm at 3 m	approx. 0.9 mm at 1 m approx. 2 mm at 3 m
	LED green	LED green
	LED yellow	LED yellow
	333 µs	333 µs
	1.5 kHz	1.5 kHz
	M18×81.5 mm	M18×77 mm
	M12 connector, 4-pin	2 m cable, PVC 4×0.14 mm²
	PBT	PBT
	PMMA	PMMA
	25 g	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
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

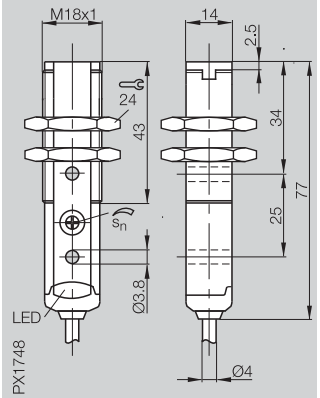
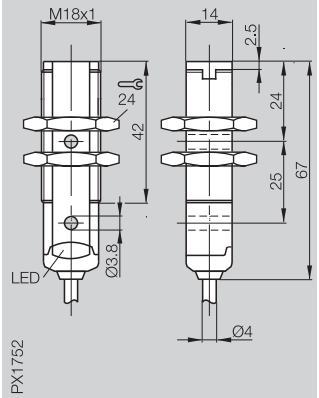
Through-beam	maximum range	**0...60 m**	**0...60 m**	





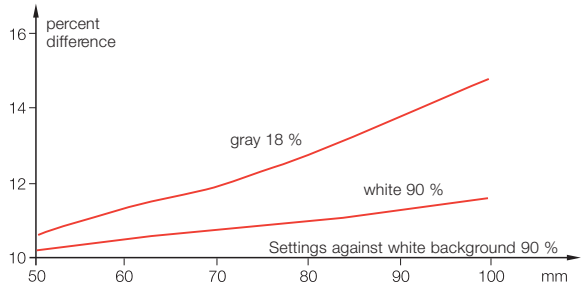
Through-beam				
PNP	60 m	Receiver	BLE 18KF-PA-1LT-S4-C	
NPN	60 m	Receiver	BLE 18KF-NA-1LT-S4-C	
	60 m	Emitter		BLS 18KF-XX-1LT-S4-L
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 2 V	≤ 2 V
No-load supply current I_0 max.			≤ 30 mA	≤ 35 mA
Switching output			PNP- or NPN-Transistor	
Output current			100 mA	
Switching type			Light- and dark-on	
Voltage drop U_d at I_e			≤ 2 V	
Settings			Potentiometer 270°	
Help functions				Test input
Optical data				
Recommended sensing distance/range			0...60 m	0...60 m
Emitter, light type				Laser, red light
Wavelength				650 nm
Laser class				Class 1
Resolution				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	LED green
Output function indicator			LED yellow	
Time data				
Response time			333 µs	
Switching frequency f			1.5 kHz	
Mechanical data				
Dimensions			M18×81.5 mm	M18×71.5 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.**66 to **2.1.**69.

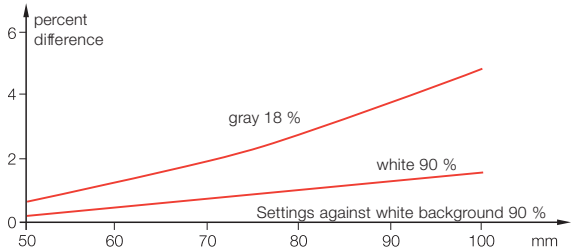
	0...60 m	**0...60 m**		
				
	BLE 18KF-PA-1LT-C-02 BLE 18KF-NA-1LT-C-02	BLS 18KF-XX-1LT-L-02		
	10...30 V DC ≤ 2 V ≤ 30 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V Potentiometer 270°	10...30 V DC ≤ 2 V ≤ 35 mA Test input		
	0...60 m	0...60 m Laser, red light 650 nm Class 1 approx. 2.5 mm at 5 m approx. 5 mm at 10 m approx. 10 mm at 20 m		
	LED green LED yellow	LED green		
	333 µs 1.5 kHz			
	M18×77 mm 2 m cable, PVC 4×0.14 mm² PBT PMMA 75 g	M18×67 mm 2 m cable, PVC 4×0.14 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 18KF-..-1HA-...



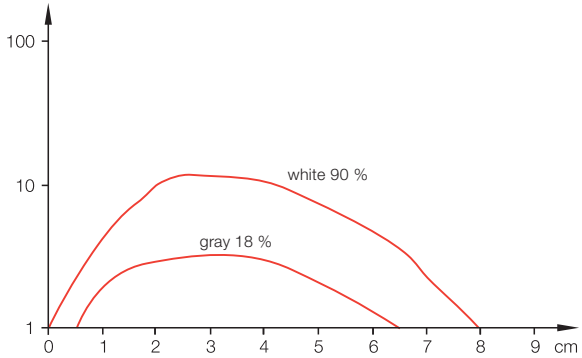
Tolerance with standard setting



Tolerance with fine setting

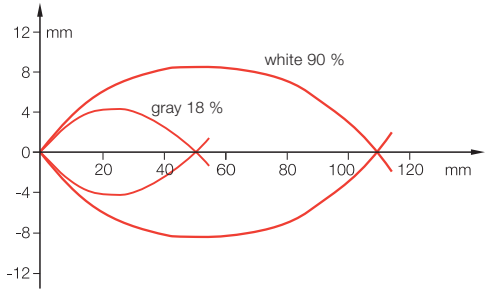
Diffuse BOS 18KF-..-1N1R-...

Detection range

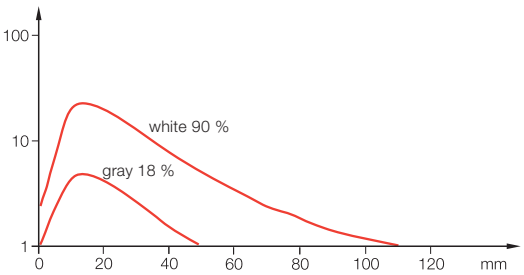


Function reserve

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

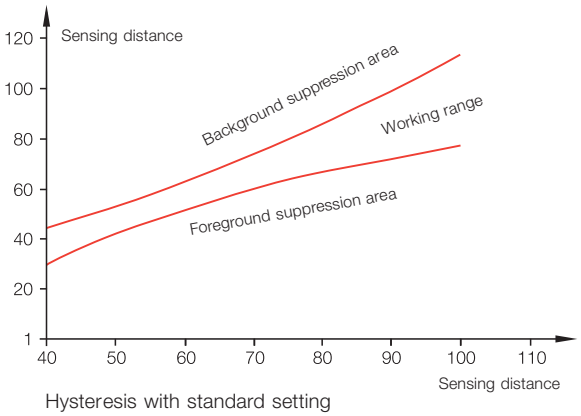


Detection range



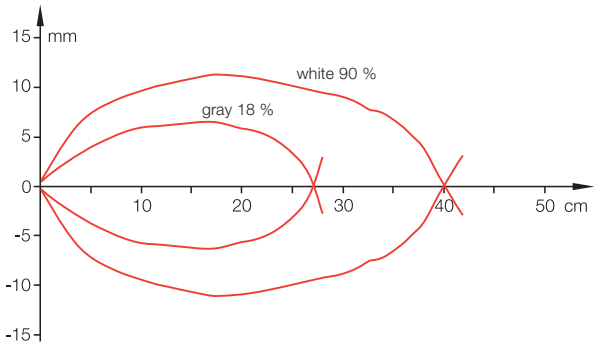
Function reserve

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

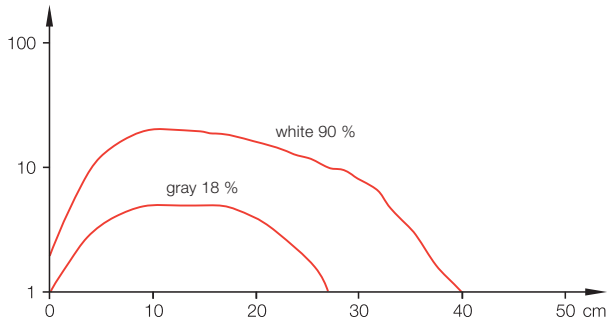


Hysteresis with standard setting

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

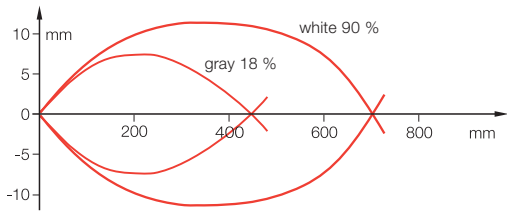


Detection range

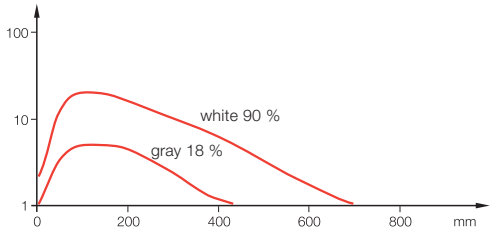


Function reserve

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

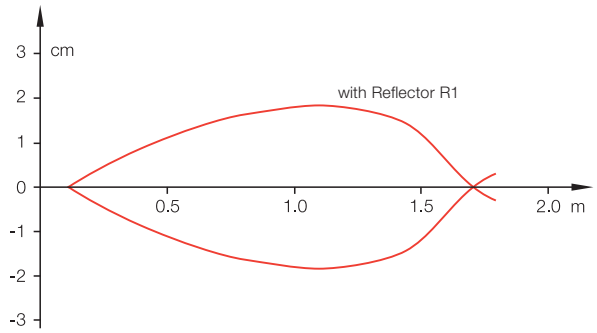


Detection range

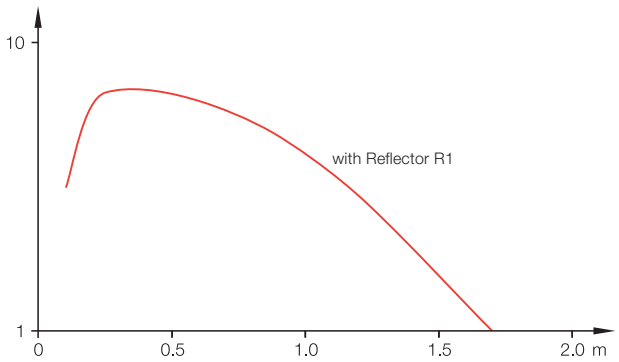


Function reserve

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

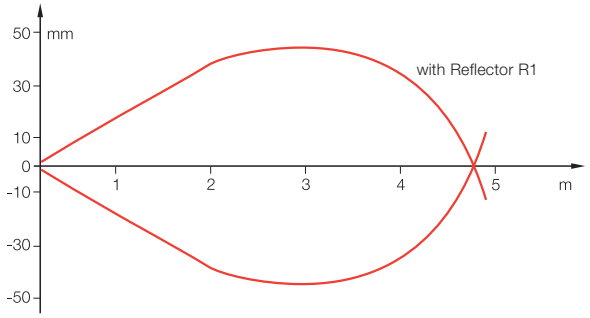


Detection range

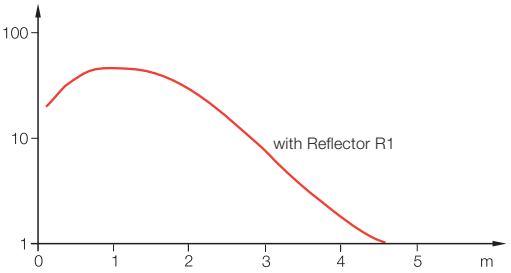


Function reserve

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



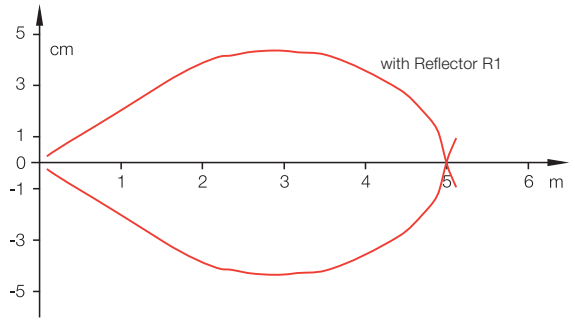
Detection range



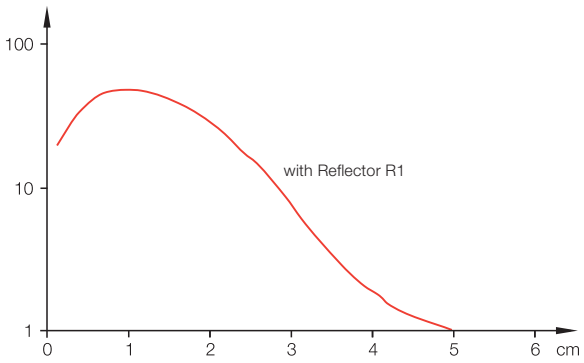
Function reserve

2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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

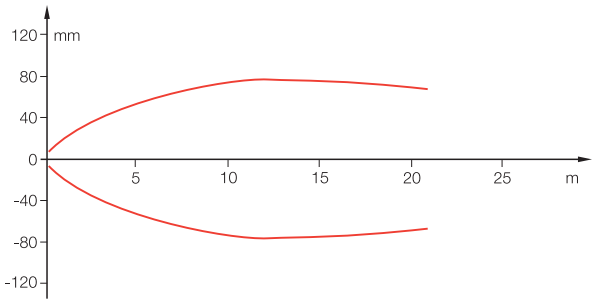


Detection range

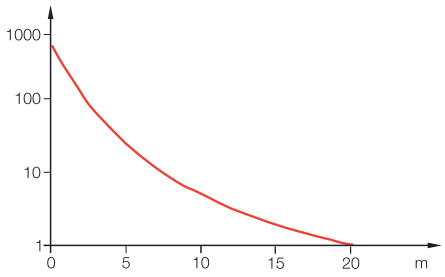


Function reserve

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

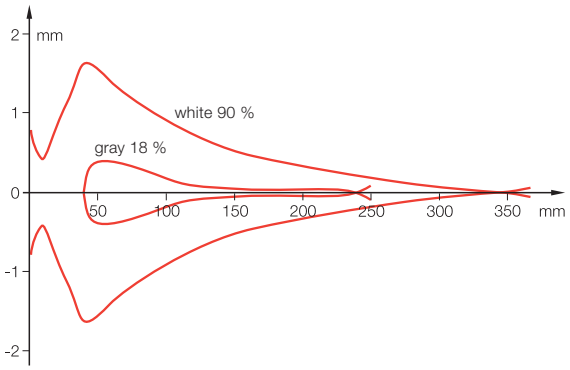


Detection range

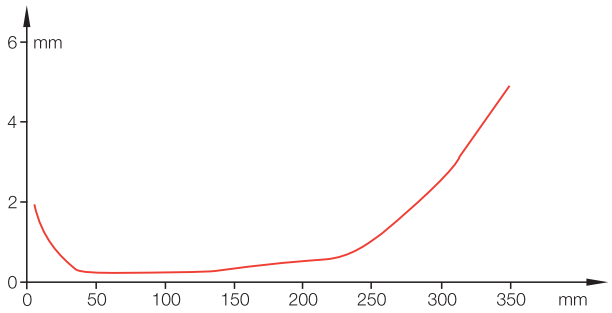


Function reserve

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

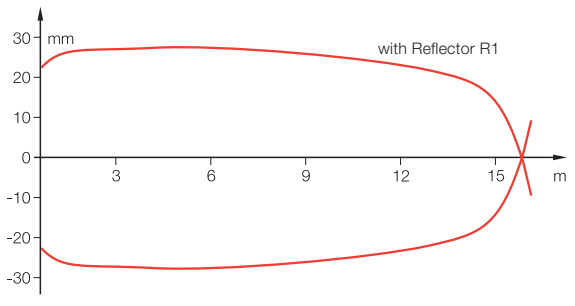


Detection range

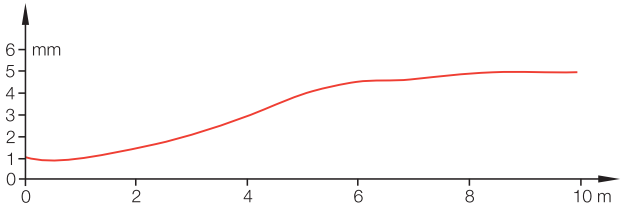


Resolution

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

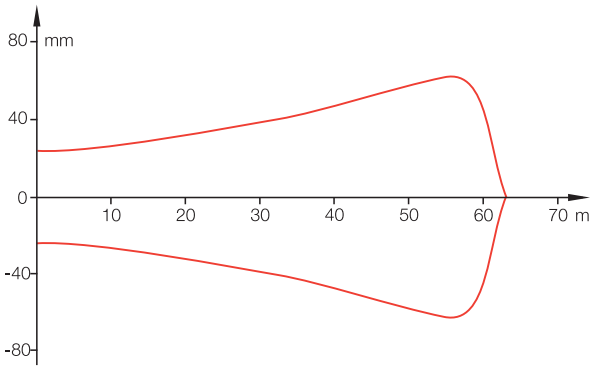


Detection range

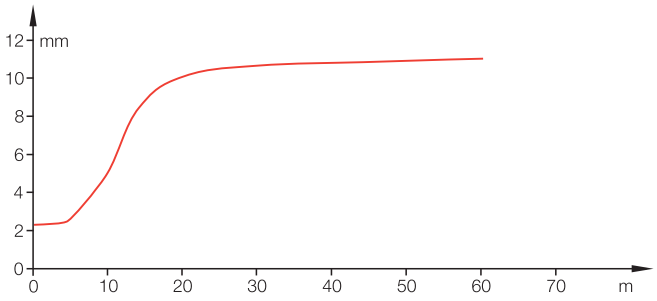


Resolution

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

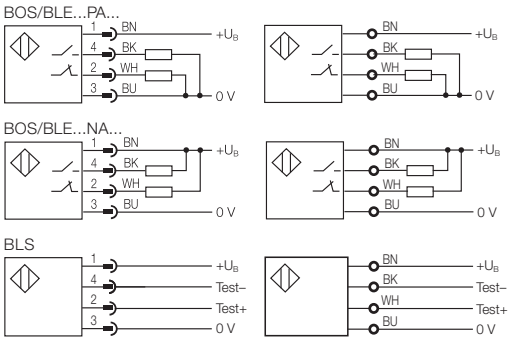


Detection range

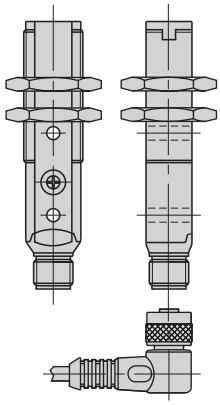


Resolution

Wiring diagrams



Connector orientation



BOS 18**KF**

2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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

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

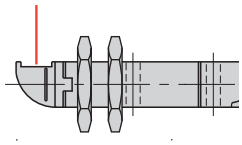
BOS 18KW – standards redefined

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.

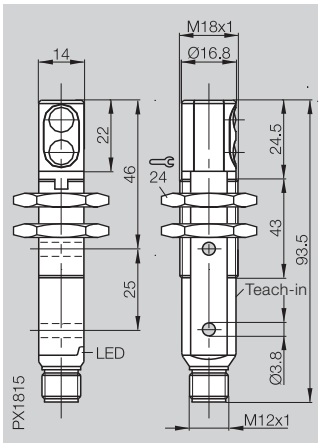


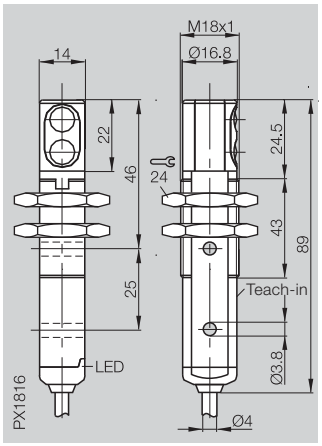
Type	Sensing distance/ range	Light type			Output		Output function		Switching frequency	U_B	Connect-ion		Special features		Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	Teach-in	
Diffuse with HGA															
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	Connection		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	**50...100 mm**	**50...100 mm**	
Diffuse	maximum sensing distance			

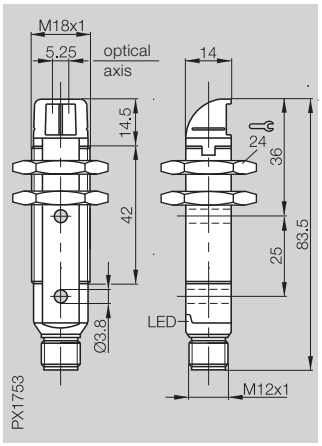
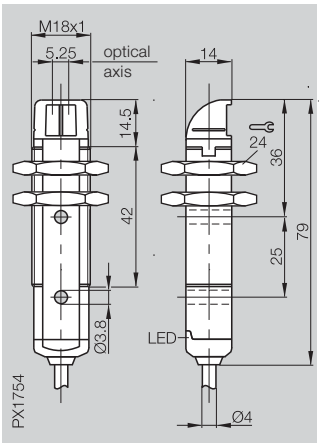
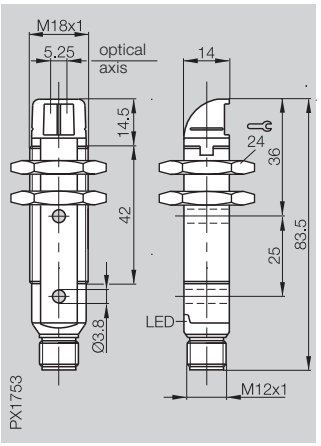
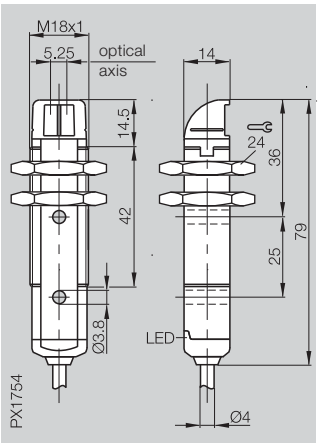




Diffuse				
PNP	50...100 mm	HGA	BOS 18KW-PA-1HA-S4-C	BOS 18KW-PA-1HA-C-02
NPN	50...100 mm	HGA	BOS 18KW-NA-1HA-S4-C	BOS 18KW-NA-1HA-C-02
PNP	100 mm	HGA		
NPN	100 mm	HGA		
PNP	0...80 mm			
NPN	0...80 mm			
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 2 V	≤ 2 V
No-load supply 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

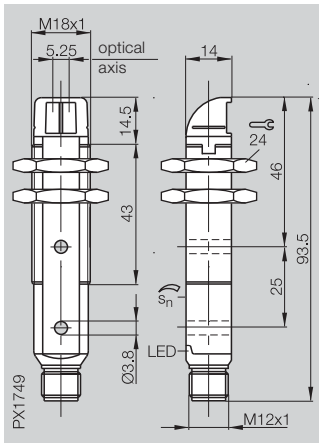
Diffuse values referenced to Kodak gray card 90% Reflexion.

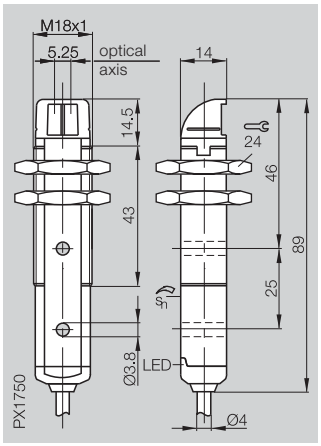
Wiring diagrams, characteristics and accessories see page **2.1.**82 and **2.1.**83.

	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	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
	fixed	fixed	fixed	fixed
	0...80 mm	0...80 mm	0...80 mm	0...80 mm
	LED, red light	LED, red light	LED, infrared	LED, infrared
	630 nm	630 nm	880 nm	880 nm
	approx. 25 mm at 80 mm	approx. 25 mm at 80 mm	approx. 55 mm at 100 mm	approx. 55 mm at 100 mm
	LED yellow	LED yellow	LED yellow	LED yellow
	0.5 ms	0.5 ms	0.5 ms	0.5 ms
	1 kHz	1 kHz	1 kHz	1 kHz
	M18×83.5 mm	M18×79 mm	M18×83.5 mm	M18×79 mm
	M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin	2 m cable, PVC
		4×0.14 mm²		4×0.14 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 ...

Diffuse	maximum sensing distance	**0...400 mm**	**0...400 mm**
Retroreflective with glass detection	maximum range		
Retroreflective with polarizing filter	maximum range		

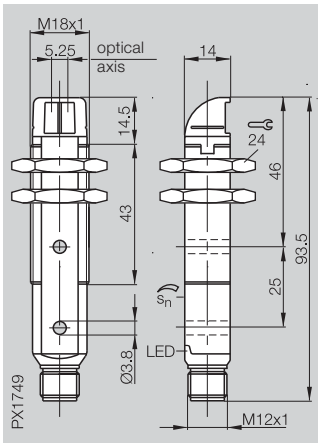
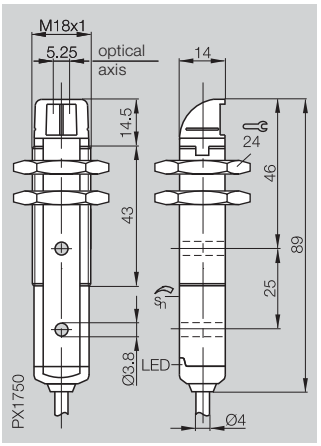
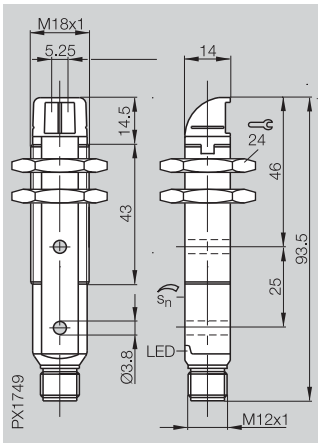
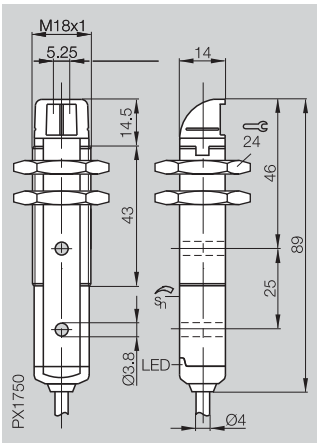




Diffuse				
PNP	400 mm		BOS 18KW-PA-1PD-S4-C	BOS 18KW-PA-1PD-C-02
NPN	400 mm		BOS 18KW-NA-1PD-S4-C	BOS 18KW-NA-1PD-C-02
Retroreflective				
PNP	0.1...1.7 m	Polarizing filter, glass detection		
NPN	0.1...1.7 m	Polarizing filter, glass detection		
PNP	0.1...3 m	Polarizing filter		
NPN	0.1...3 m	Polarizing 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_e			≤ 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

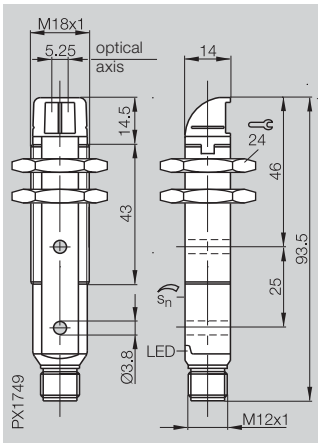
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

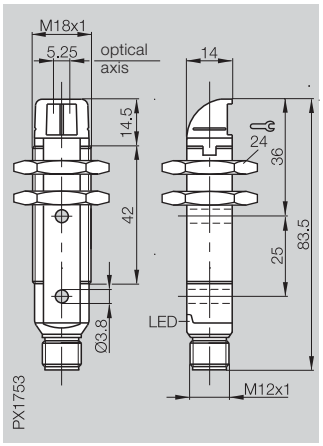
Wiring diagrams, characteristics and accessories see page **2.1.**82 and **2.1.**83.

	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	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°
	0.1...1.4 m	0.1...1.4 m	0.1...2.5 m	0.1...2.5 m
	LED, red light	LED, red light	LED, red light	LED, red light
	660 nm	660 nm	660 nm	660 nm
	approx. 60 mm at 1 m	approx. 60 mm at 1 m	approx. 60 mm at 2 m	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 ...
5
Connectors ... page 5.2 ...

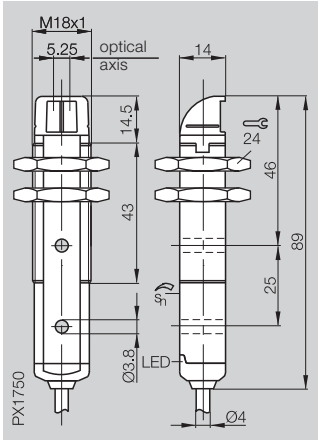
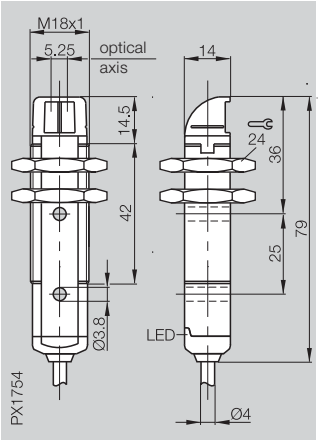
Through-beam	maximum range	**0...15 m**	**0...15 m**	





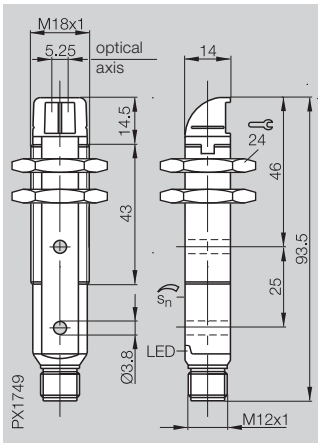
Through-beam				
PNP	15 m	Receiver	BLE 18KW-PA-1PP-S4-C	
NPN	15 m	Receiver	BLE 18KW-NA-1PP-S4-C	
	15 m	Emitter		BLS 18KW-XX-1P-S4-L
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 2 V	≤ 2 V
No-load supply current I_0 max.			≤ 30 mA	≤ 35 mA
Switching output			PNP- or NPN-Transistor	
Output current			100 mA	
Switching type			Light- and dark-on	
Voltage drop U_d at I_e			≤ 2 V	
Settings			Potentiometer 270°	
Help functions				Test input
Optical data				
Recommended range			0...10 m	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	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 × 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

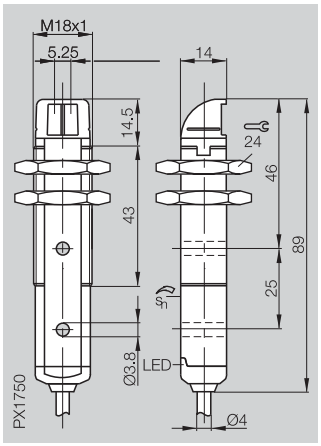
Wiring diagrams, characteristics and accessories see page **2.1.**82 and **2.1.**83.

	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				
	M18×89 mm	M18×79 mm			
	2 m cable, PVC	2 m cable, PVC			
	4×0.14 mm²	4×0.14 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	**0...250 mm**	**0...250 mm**
Retroreflective with polarizing filter	maximum range		

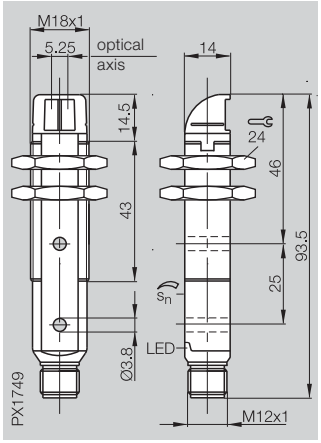
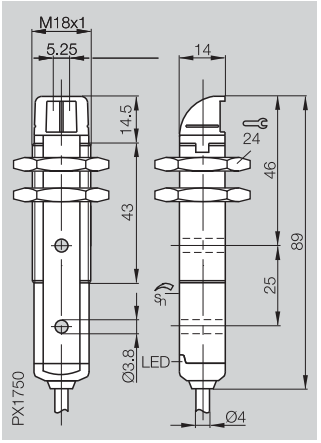




Diffuse					
PNP	250 mm			BOS 18KW-PA-1LOB-S4-C	BOS 18KW-PA-1LOB-C-02
NPN	250 mm			BOS 18KW-NA-1LOB-S4-C	BOS 18KW-NA-1LOB-C-02
Retroreflective					
PNP	0.1...9 m	Polarizing filter			
NPN	0.1...9 m	Polarizing filter			
Electrical data					
Supply voltage U_B				10...30 V DC	10...30 V DC
Ripple				≤ 2 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.

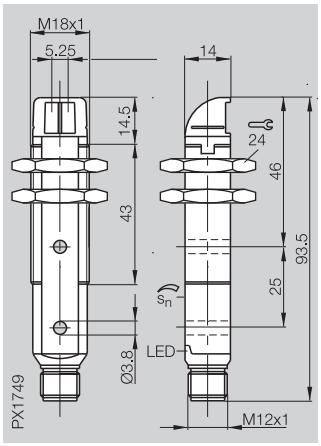
	0.1...9 m	**0.1...9 m**		
				
	BOS 18KW-PA-1LQH-S4-C BOS 18KW-NA-1LQH-S4-C	BOS 18KW-PA-1LQH-C-02 BOS 18KW-NA-1LQH-C-02		
	10...30 V DC	10...30 V DC		
	≤ 2 V	≤ 2 V		
	≤ 35 mA	≤ 35 mA		
	PNP- or NPN-Transistor	PNP- or NPN-Transistor		
	100 mA	100 mA		
	Light- and dark-on	Light- and dark-on		
	≤ 2 V	≤ 2 V		
	Potentiometer 270°	Potentiometer 270°		
	0.1...9 m	0.1...9 m		
	Laser, red light	Laser, red light		
	650 nm	650 nm		
	Class 1	Class 1		
	approx. 0.9 mm at 1 m approx. 2 mm at 3 m	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		
	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		
	IP 67 yes yes –10...+50 °C EN 60947-5-2	IP 67 yes yes –10...+50 °C EN 60947-5-2		

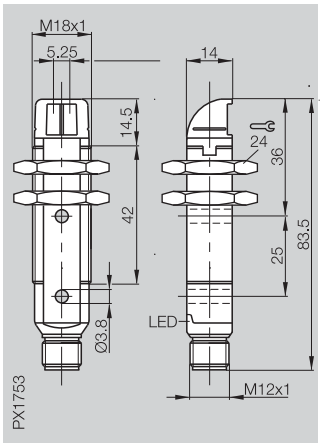
2.1

2.3
Photoelectric sensors accessories
page 2.3.2 ...

5
Connectors ...
page 5.2 ...

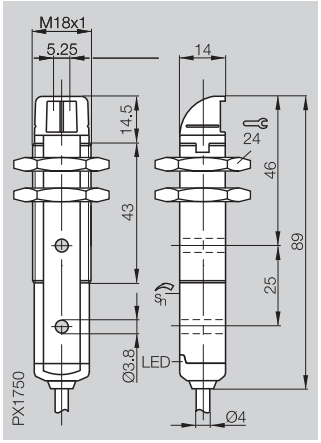
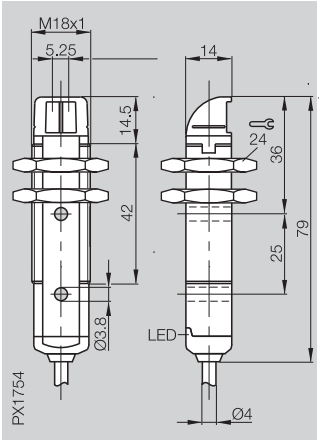
Through-beam	maximum range	**0...50 m**	**0...50 m**	





Through-beam				
PNP	50 m	Receiver	BLE 18KW-PA-1LT-S4-C	
NPN	50 m	Receiver	BLE 18KW-NA-1LT-S4-C	
	50 m	Emitter		BLS 18KW-XX-1LT-S4-L
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	≤ 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				Test input
Optical data				
Recommended sensing distance/range			0...50 m	0...50 m
Emitter, light type				Laser, red light
Wavelength				650 nm
Laser class				Class 1
Resolution				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	LED green
Output function indicator			LED yellow	
Time data				
Response time			333 µs	
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.

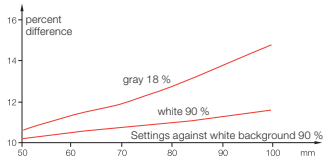
	0...50 m	**0...50 m**		
				
	BLE 18KW-PA-1LT-C-02 BLE 18KW-NA-1LT-C-02	BLS 18KW-XX-1LT-L-02		
	10...30 V DC ≤ 2 V ≤ 30 mA PNP- or NPN-Transistor 100 mA Light- and dark-on ≤ 2 V Potentiometer 270°	10...30 V DC ≤ 2 V ≤ 35 mA Test input		
	0...50 m	0...50 m Laser, red light 650 nm Class 1 approx. 2.5 mm 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			
	M18×89 mm 2 m cable, PVC 4×0.14 mm² PBT PMMA 75 g	M18×79 mm 2 m cable, PVC 4×0.14 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

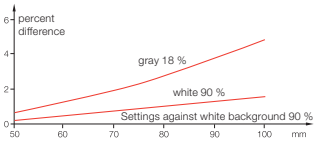
2.3
Photoelectric sensors accessories page 2.3.2 ...

5
Connectors ... page 5.2 ...

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

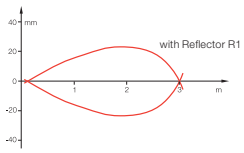


Tolerance with standard setting



Tolerance with fine setting

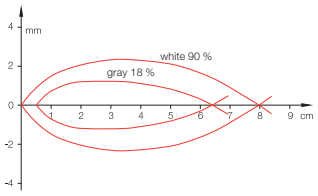
Retroreflective BOS 18KW-..-1QC-...



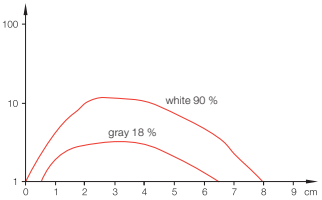
Detection range

Function reserve

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

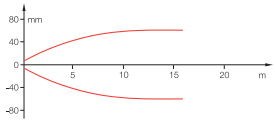


Detection range

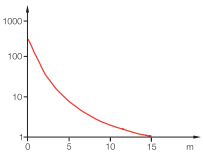


Function reserve

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

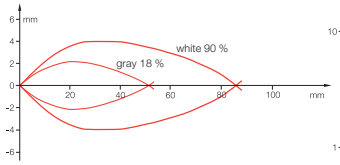


Detection range

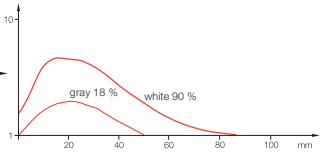


Function reserve

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

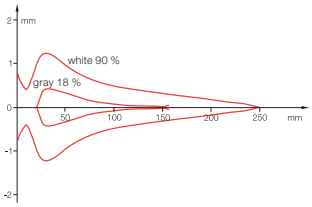


Detection range

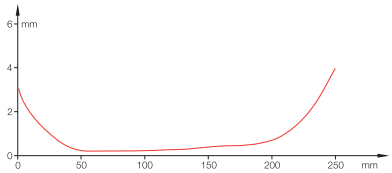


Function reserve

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

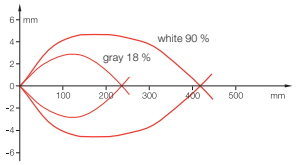


Detection range

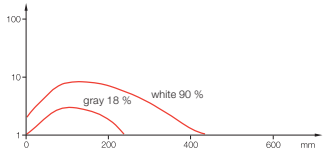


Resolution

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

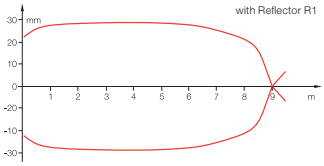


Detection range

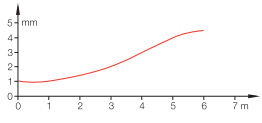


Function reserve

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

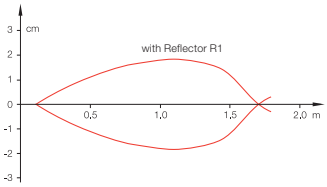


Detection range

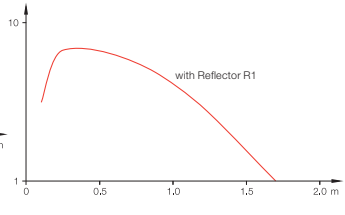


Resolution

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

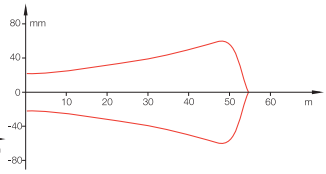


Detection range

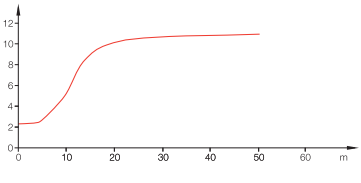


Function reserve

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

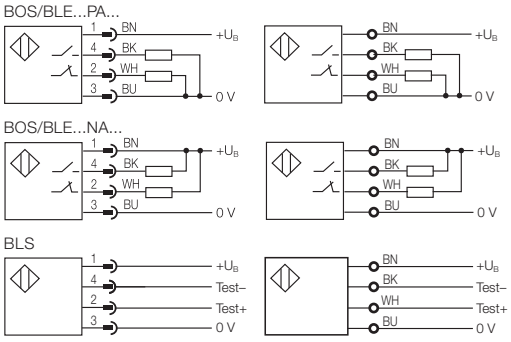


Detection range

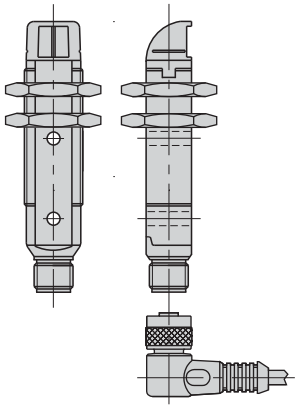


Resolution

Wiring diagrams



Connector orientation



2.1
2.3
Photoelectric sensors accessories
page 2.3.2 ...
5
Connectors ...
page 5.2 ...

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

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

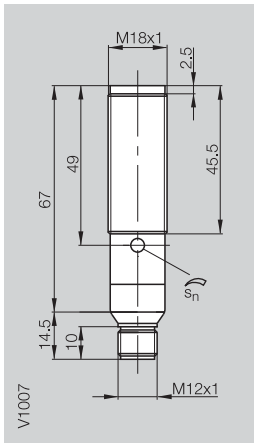
Diffuse, retroreflective and through-beam sensors in axial and radial configuration, with PNP or NPN output, as well as cable or connector, versions are available.

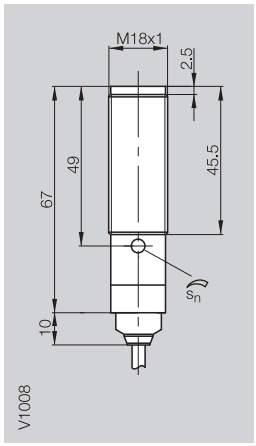
Type	Sensing distance/ range	Light exit		Light type		Output		Output function		Switching frequency	U_B	Connec-tion		Special features		Page
		Straight	Right angle	Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter		
Diffuse																
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

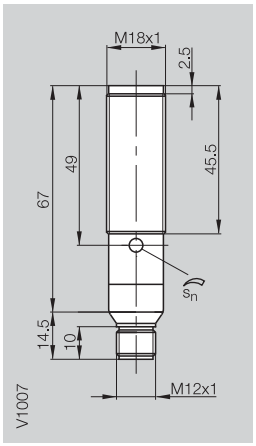
2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

BOS 18K
Sensing distance 300 mm
Range 2.2 m

Diffuse	maximum sensing distance	**0...300 mm**	**0...300 mm**	
Retroreflective with polarizing filter	maximum range			**0.1...2.2 m**
Through-beam	maximum range			



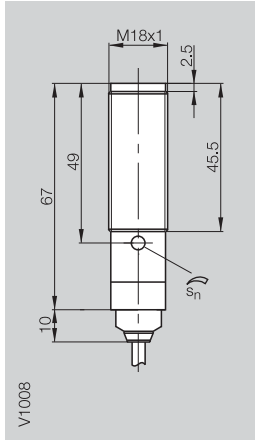
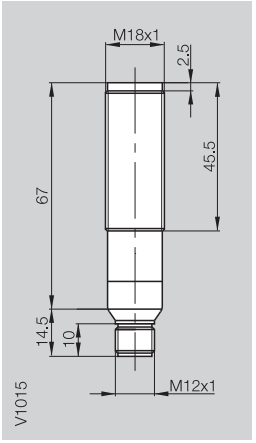
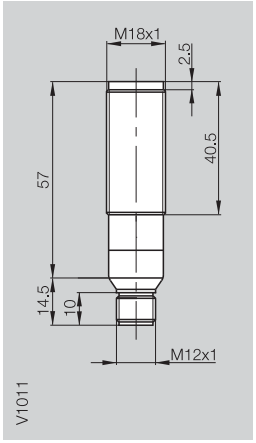
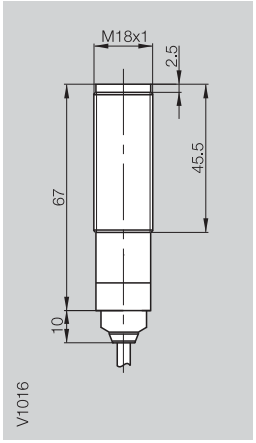
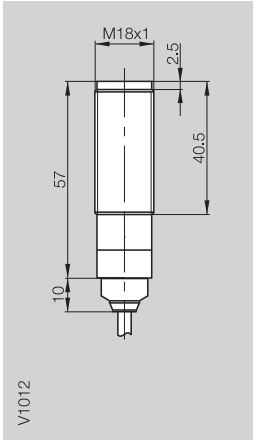




Diffuse				
PNP 300 mm		BOS 18K-PU-ID10-S4	BOS 18K-PU-ID10-02	
NPN 300 mm		BOS 18K-NU-ID10-S4	BOS 18K-NU-ID10-02	
Retroreflective				
PNP 0.1...2.2 m				BOS 18K-PU-PR10-S4
NPN 0.1...2.2 m				BOS 18K-NU-PR10-S4
Through-beam				
PNP 13 m	Receiver			
NPN 13 m	Receiver			
13 m	Emitter			
Electrical data				
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_e		≤ 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		M18×81.5 mm	M18×77 mm	M18×81.5 mm
Connection		M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires × cross-section			4×0.14 mm²	
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.

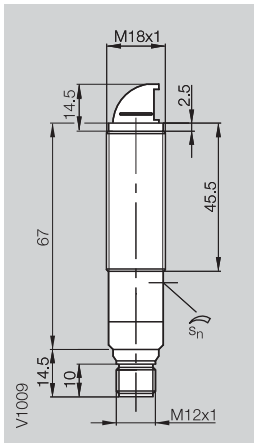
Wiring diagrams, characteristics and accessories see page **2.1.**90 and **2.1.**91.

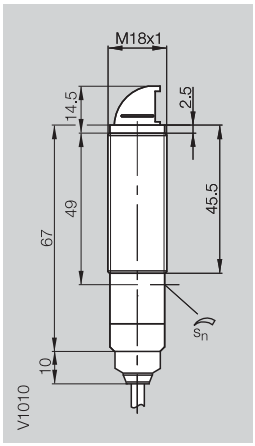
	0.1...2.2 m	**0...13 m**	**0...13 m**	**0...13 m**	**0...13 m**
					
	BOS 18K-PU-PR10-02 BOS 18K-NU-PR10-02				
		BOS 18K-PU-IE10-S4 BOS 18K-NU-IE10-S4		BOS 18K-PU-IE10-02 BOS 18K-NU-IE10-02	
			BOS 18K-XT-IS10-S4		BOS 18K-XT-IS10-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
	≤ 35 mA	≤ 35 mA	≤ 35 mA	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor		PNP- or NPN-Transistor	
	100 mA	100 mA		100 mA	
	Light- and dark-on	Light- and dark-on		Light- and dark-on	
	≤ 2 V	≤ 2 V		≤ 2 V	
	Potentiometer 270°	fixed	fixed	fixed	fixed
	0.1...2 m	0...12 m	0...12 m	0...12 m	0...12 m
	LED, red light		LED, infrared		LED, infrared
	660 nm		880 nm		880 nm
			LED green		LED green
	LED yellow	LED yellow		LED yellow	
	1 ms	2 ms		2 ms	
	500 Hz	250 Hz		250 Hz	
	M18×77 mm	M18×81.5 mm	M18×71.5 mm	M18×77 mm	M18×67 mm
	2 m cable, PVC	M12 connector, 4-pin	M12 connector, 4-pin	2 m cable, PVC	2 m cable, PVC
	4×0.14 mm²			4×0.14 mm²	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

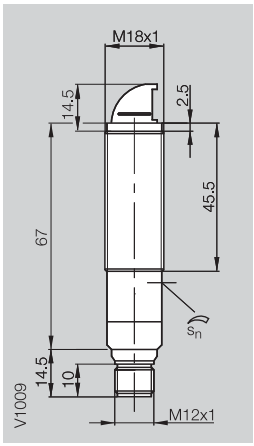
2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

BOS 18KR
Sensing distance 250 mm,
Range 1.7 m

Diffuse	maximum sensing distance	**0...250 mm**	**0...250 mm**	
Retroreflective with polarizing filter	maximum range			**0.1...1.7 m**
Diffuse	maximum range			



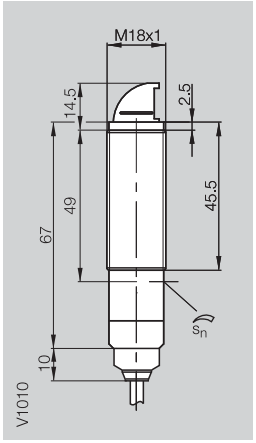
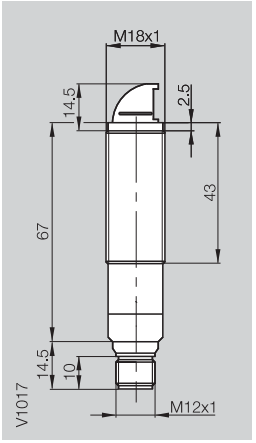
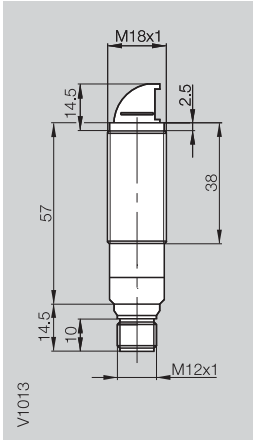
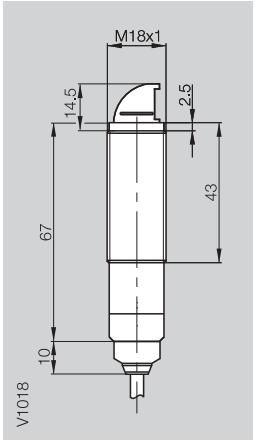
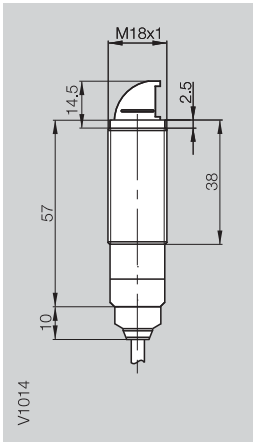




Diffuse				
PNP	250 mm	BOS 18KR-PU-ID10-S4	BOS 18KR-PU-ID10-02	
NPN	250 mm	BOS 18KR-NU-ID10-S4	BOS 18KR-NU-ID10-02	
Retroreflective				
PNP	0.1...1.7 m			BOS 18KR-PU-PR10-S4
NPN	0.1...1.7 m			BOS 18KR-NU-PR10-S4
Through-beam				
PNP	11 m Receiver			
NPN	11 m Receiver			
	11 m Emitter			
Electrical data				
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_e		≤ 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		M18×93.5 mm	M18×89 mm	M18×93.5 mm
Connection		M12 connector, 4-pin	2 m cable, PVC	M12 connector, 4-pin
No. of wires × cross-section			4×0.14 mm²	
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

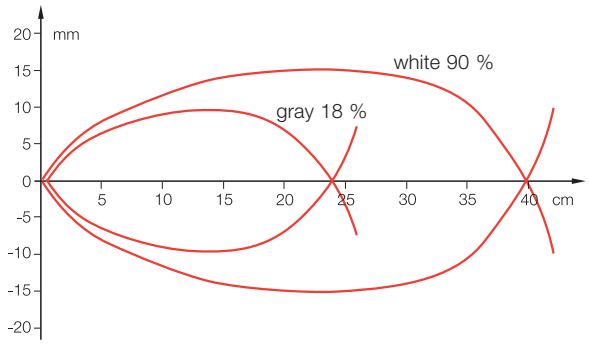
Diffuse values referenced to Kodak gray card 90% Reflexion.
Retroreflective values referenced to R1 reflector.

Wiring diagrams, characteristics and accessories see page **2.1.**90 and **2.1.**91.

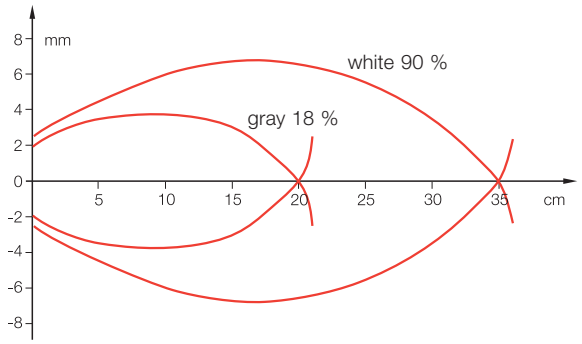
	0.1...1.7 m	**0...11 m**	**0...11 m**	**0...11 m**	**0...11 m**
					
	BOS 18KR-PU-PR10-02 BOS 18KR-NU-PR10-02				
		BOS 18KR-PU-IE10-S4 BOS 18KR-NU-IE10-S4		BOS 18KR-PU-IE10-02 BOS 18KR-NU-IE10-02	
			BOS 18KR-XT-IS10-S4		BOS 18KR-XT-IS10-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 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	PNP- or NPN-Transistor		PNP- or NPN-Transistor	
	100 mA	100 mA		100 mA	
	Light- and dark-on	Light- and dark-on		Light- and dark-on	
	≤ 2 V	≤ 2 V		≤ 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		LED, infrared		LED, infrared
	660 nm		880 nm		880 nm
			LED green		LED green
	LED yellow	LED yellow		LED yellow	
	1 ms	2 ms		2 ms	
	500 Hz	250 Hz		250 Hz	
	M18×89 mm	M18×93.5 mm	M18×83.5 mm	M18×89 mm	M18×79 mm
	2 m cable, PVC	M12 connector, 4-pin	M12 connector, 4-pin	2 m cable, PVC	2 m cable, PVC
	4×0.14 mm²			4×0.14 mm²	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 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

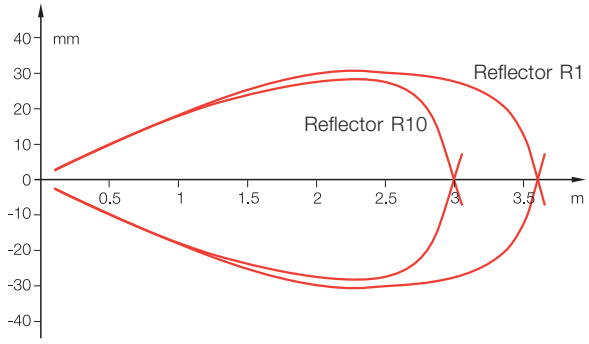
Diffuse BOS 18K-..-ID10-...



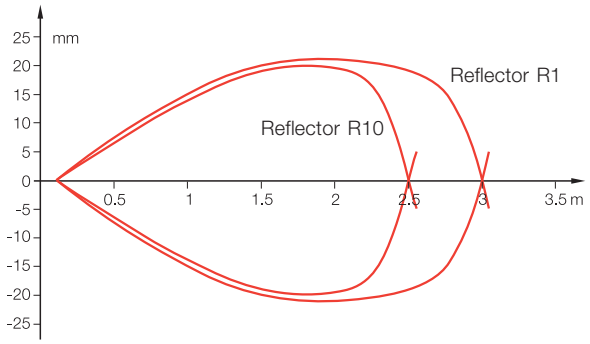
Diffuse BOS 18KR-..-ID10-...



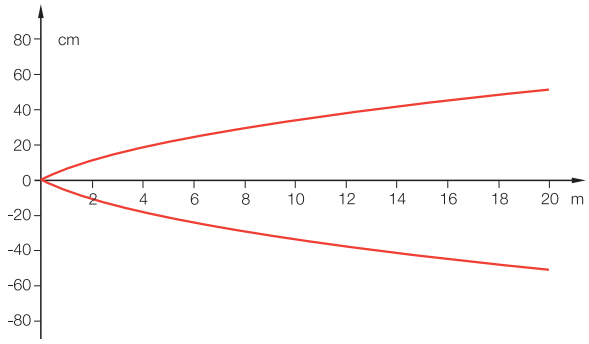
Retroreflective BOS 18K-..-PR10-...



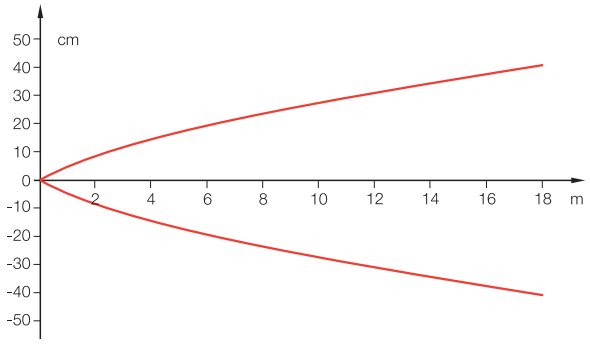
Retroreflective BOS 18KR-..-PR10-...



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

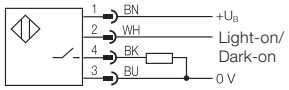


Through-beam BOS 18KR-..-IE10-...

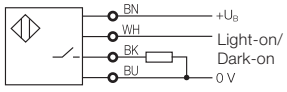


Wiring diagrams

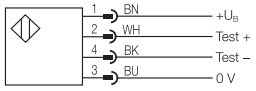
BOS 18K/KR-PU-ID10/PR10-S4



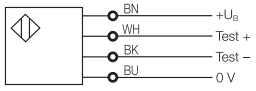
BOS 18K/KR-PU-ID10/PR10-02



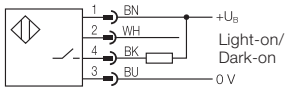
BOS 18K-XT-IS10-S4



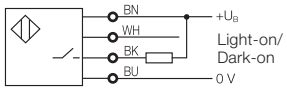
BOS 18K-XT-IS10-02



BOS 18K-NU-IE10-S4



BOS 18K-NU-IE10-02



Recommended accessories

please order separately

Mounting clamp
BOS 18,0-KB-1

Mounting bracket
BES 18-HW-1

Reflector
BOS R-10

Reflector
BOS R-1

Connector
BKS-_ 19/BKS-_ 20

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

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.

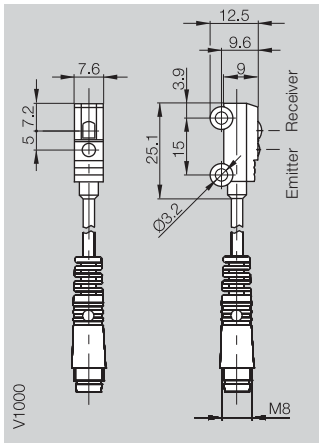
Unmatched ranges up to 1.2 m and fast response times ensure compatibility with dynamic applications.

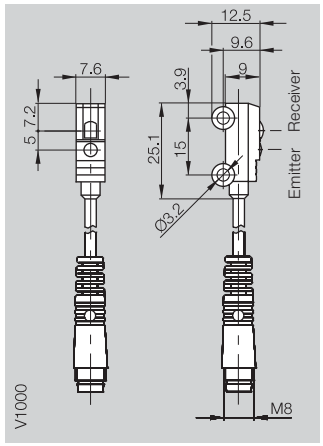
The BOS 2K series is a complete family with diffuse, retroreflective and through-beam models, as well as diffuse with background suppression. That means this series offers the complete functionality demanded of a modern sensor family.

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
2.3
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**

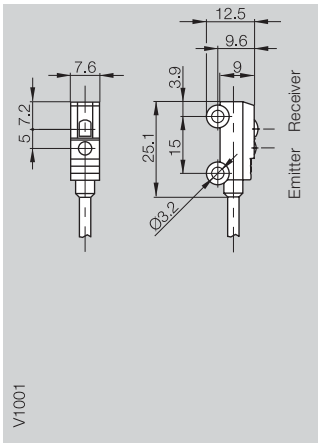
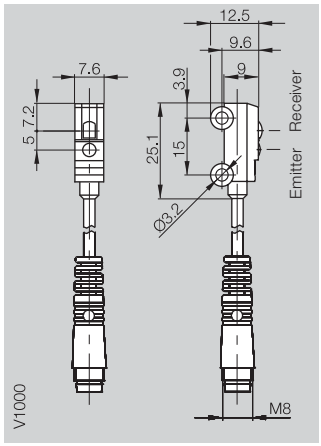
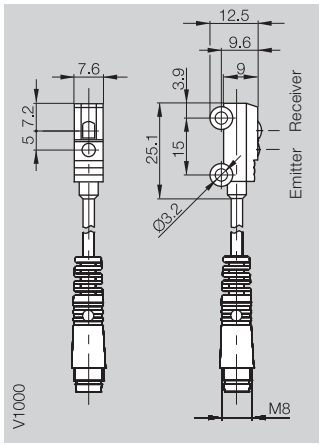
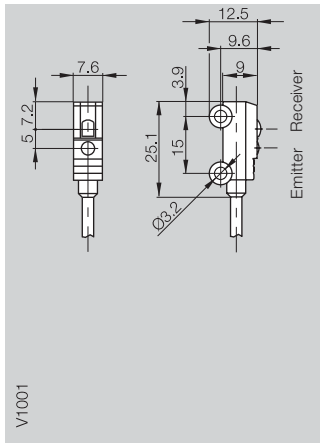




Diffuse with background suppression			
PNP NO	1...15 mm	BOS 2K-PS-RH10-00,2-S49	BOS 2K-PS-RH10-00,2-S75
PNP NC	1...15 mm	BOS 2K-PO-RH10-00,2-S49	
NPN NO	1...15 mm		
NPN NC	1...15 mm		
PNP NO	1...30 mm		
PNP NC	1...30 mm		
NPN NO	1...30 mm		
Electrical data			
Supply voltage U_B		10...30 V DC	10...30 V DC
Ripple		≤ 5 V pp	≤ 5 V pp
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA
Switching output		PNP- or NPN-Transistor	PNP-Transistor
Output current		50 mA	50 mA
Switching type		Light- or dark-on	Light-on
Voltage drop U_d at I_e		≤ 2 V	
Settings		fixed	fixed
Optical data			
Recommended range		1...15 mm	1...15 mm
Emitter, light type		Pin-Point LED, red light	Pin-Point LED, red light
Wavelength		640 nm	640 nm
Light spot diameter		approx. 1.2 mm at 8 mm approx. 2.5 mm at 15 mm	approx. 1.2 mm at 8 mm approx. 2.5 mm at 15 mm
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.

Wiring diagrams, characteristics and accessories see page **2.1.**108 and **2.1.**109.

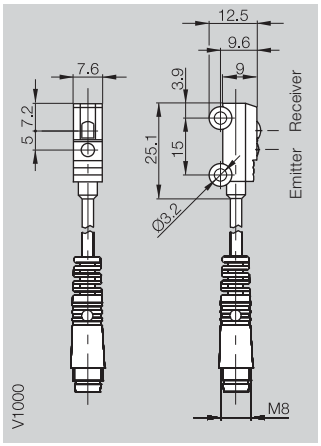
	1...15 mm	1...30 mm	1...30 mm	1...30 mm
				
	BOS 2K-PS-RH10-02 BOS 2K-NS-RH10-02 BOS 2K-NO-RH10-02	BOS 2K-PS-RH11-00,2-S49	BOS 2K-PS-RH11-00,2-S75	BOS 2K-PS-RH11-02 BOS 2K-PO-RH11-02 BOS 2K-NS-RH11-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 5 V pp	≤ 5 V pp	≤ 5 V pp	≤ 5 V pp
	≤ 20 mA	≤ 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. 2.5 mm at 15 mm	approx. 1.0 mm at 15 mm approx. 4.5 mm at 30 mm	approx. 1.0 mm at 15 mm approx. 4.5 mm at 30 mm	approx. 1.0 mm at 15 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 3×0.09 mm²	M8 connector, 3-pin	M8 connector, 4-pin	2 m cable, PVC 3×0.09 mm²
	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

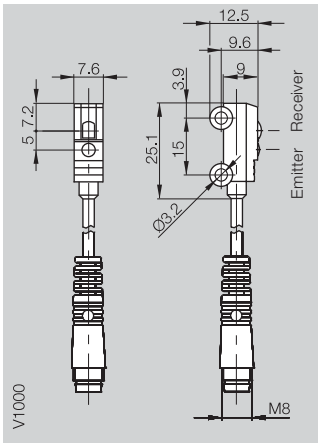
2.1

2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...

5
Connectors ...
Page 5.2 ...

Diffuse	maximum sensing distance	**1...55 mm**	**1...55 mm**
Retroreflective with polarizing filter	maximum range		

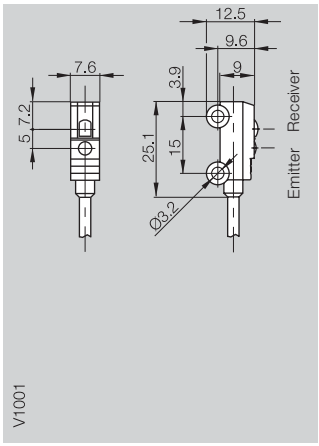
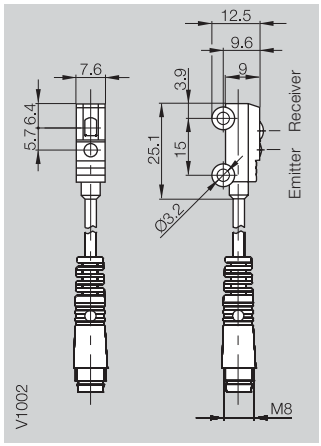
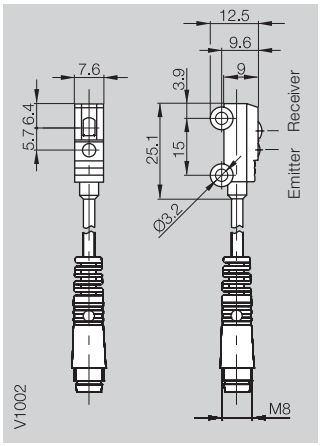
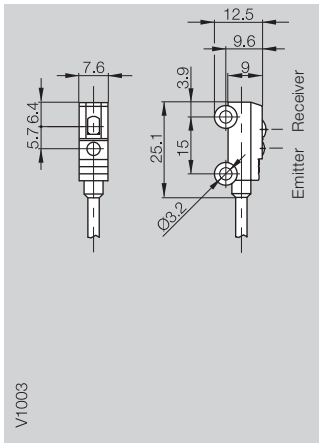




Diffuse					
PNP NO	1...55 mm		BOS 2K-PS-RD10-00,2-S49	BOS 2K-PS-RD10-00,2-S75	
NPN NO	1...55 mm				
Retroreflective					
PNP NO	45...800 mm	Polarizing filter			
PNP NC	45...800 mm	Polarizing filter			
NPN NO	45...800 mm	Polarizing filter			
NPN NC	45...800 mm	Polarizing filter			
Electrical data					
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_e			≤ 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.

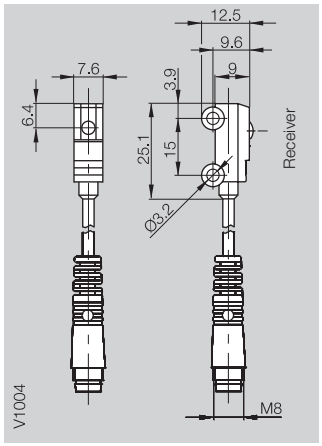
	1...55 mm	**45...800 mm**	**45...800 mm**	**45...800 mm**
				
	BOS 2K-PS-RD10-02 BOS 2K-NS-RD10-02			
		BOS 2K-PS-PR10-00,2-S49 BOS 2K-PO-PR10-00,2-S49	BOS 2K-PS-PR10-00,2-S75	BOS 2K-PS-PR10-02 BOS 2K-PO-PR10-02 BOS 2K-NS-PR10-02 BOS 2K-NO-PR10-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 5 V	≤ 5 V	≤ 5 V	≤ 5 V
	≤ 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-on	Light- or dark-on	Dark-on	Light- or dark-on
	≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
	fixed	fixed	fixed	fixed
	1...55 mm	25...500 mm	25...500 mm	25...500 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. 3.5 mm at 50 mm	approx. 10 mm at 100 mm	approx. 10 mm at 100 mm	approx. 10 mm at 100 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 mm²			3×0.09 mm²
	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

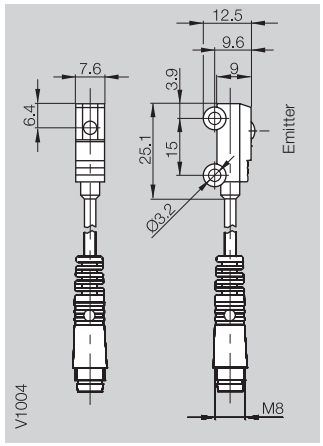
2.1

2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...

5
Connectors ...
Page 5.2 ...

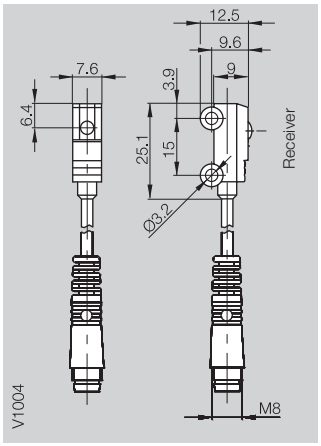
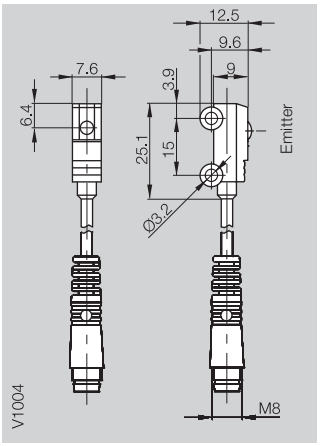
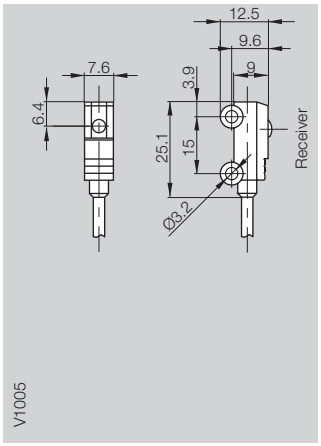
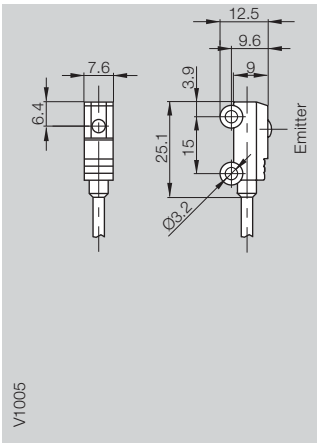
Through-beam	maximum range	**0...1,2 m**	**0...1,2 m**	





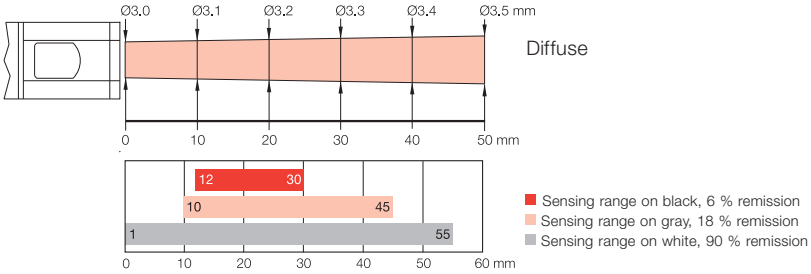
Through-beam				
PNP NO	1.2 m	Receiver	BOS 2K-PS-RE10-00,2-S49	
PNP NC	1.2 m	Receiver		
NPN NO	1.2 m	Receiver		
	1.2 m	Emitter		BOS 2K-X-RS10-00,2-S49
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
Ripple			≤ 5 V	≤ 5 V
No-load supply current I_0 max.			≤ 10 mA	≤ 20 mA
Switching output			PNP-Transistor	
Output current			50 mA	
Switching type			Dark-on	
Voltage drop U_d at I_e			≤ 2 V	
Settings			fixed	
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.

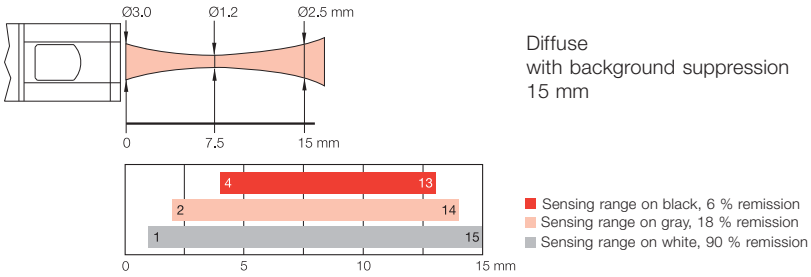
	0...1,2 m	0...1,2 m	0...1,2 m	0...1,2 m
				
	BOS 2K-PS-RE10-00,2-S75	BOS 2K-X-RS10-00,2-S75	BOS 2K-PS-RE10-02 BOS 2K-PO-RE10-02 BOS 2K-NS-RE10-02	BOS 2K-X-RS10-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 5 V	≤ 5 V	≤ 5 V	≤ 5 V
	≤ 10 mA	≤ 20 mA	≤ 10 mA	≤ 20 mA
	PNP-Transistor		PNP- or NPN-Transistor	
	50 mA		50 mA	
	Dark-on		Light- or dark-on	
	≤ 2 V		≤ 2 V	
	fixed		fixed	
	0...1 m	0...1 m	0...1 m	0...1 m
	Red light	Pin-Point LED, red light	Red light	Pin-Point LED, red light
	640 nm	640 nm	640 nm	640 nm
	LED red		LED red	
	2.5 ms		2.5 ms	
	200 Hz		200 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
	M8 connector, 4-pin	M8 connector, 4-pin	2 m cable, PVC	2 m cable, PVC
			3×0.09 mm²	3×0.09 mm²
	ABS	ABS	ABS	ABS
	PMMA	PMMA	PMMA	PMMA
	20 g	20 g	18 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

2.1
2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...
5
Connectors ...
Page 5.2 ...

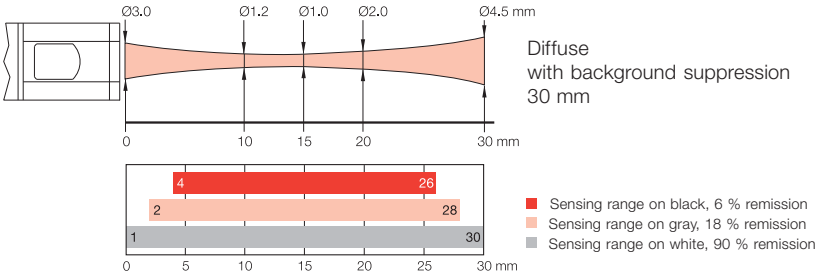
Light spot diameter Diffuse, 50 mm



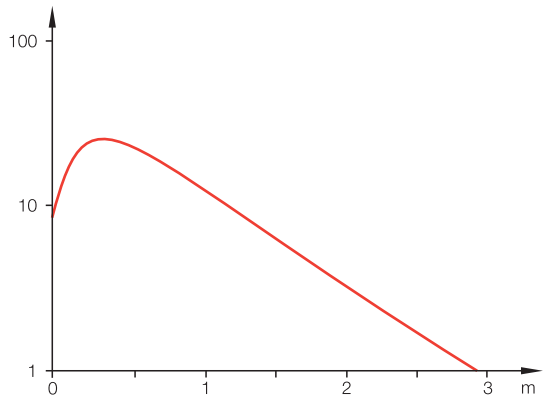
Light spot diameter Diffuse with background suppression, 15 mm



Light spot diameter Diffuse with background suppression, 30 mm

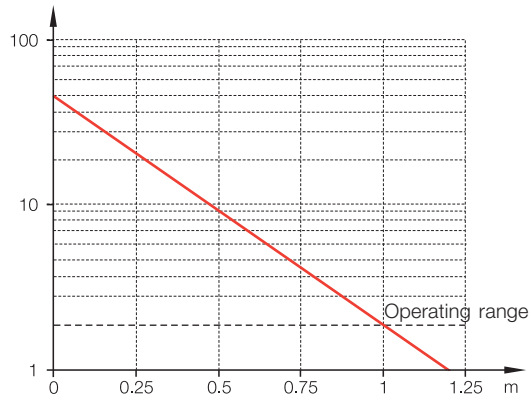


Retroreflective



Function reserve

Through-beam

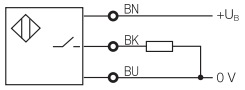


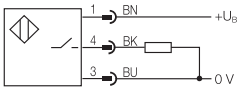
Function reserve

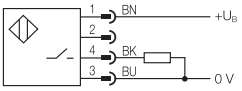
Wiring diagrams

Diffuse

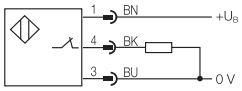
PNP light-on



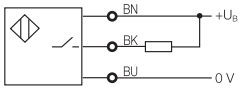




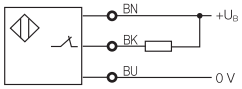
PNP dark-on



NPN light-on

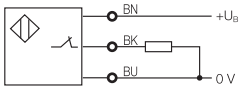


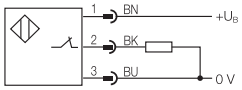
NPN dark-on



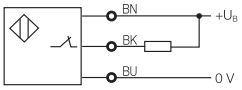
Retroreflective, through-beam receiver

PNP light-on

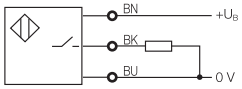


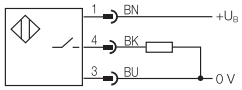


NPN light-on

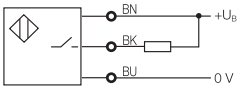


PNP dark-on

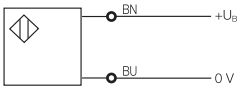


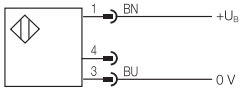


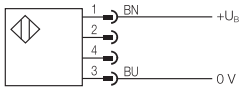
NPN dark-on



Through-beam emitter







Recommended accessories

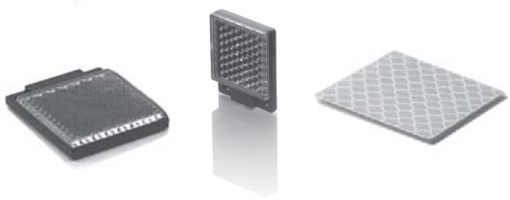
please order separately

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)

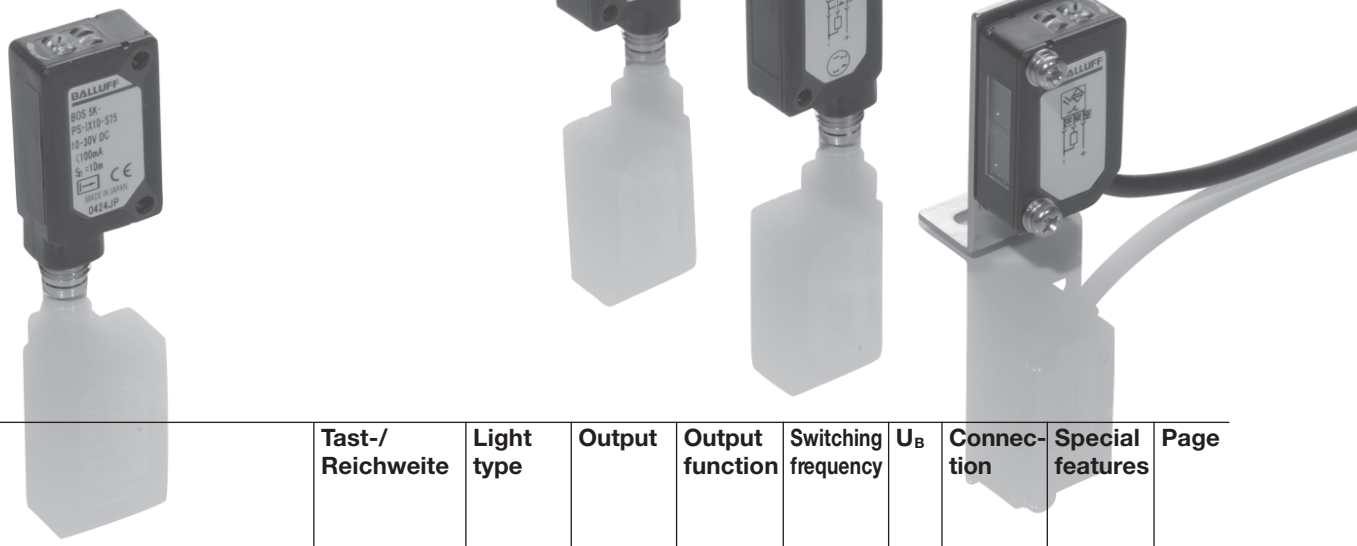
2.1
2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...
5
Connectors ...
Page 5.2 ...

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

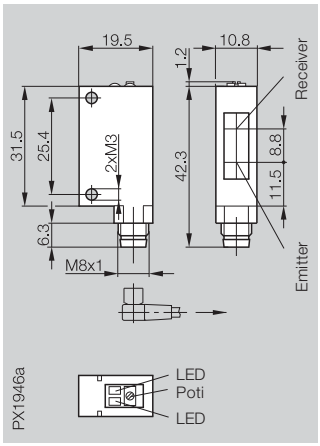


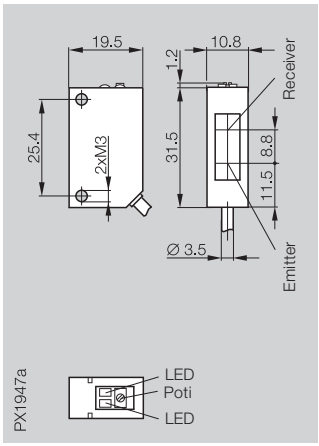
Type	Tast-/ Reichweite	Light type		Output		Output function		Switching frequency	U_B	Connection		Special features		Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	Cable	Polarizing filter		
Diffuse with HGA														
BOS 5K-PS-RH12-S75	40...200 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	Connec-tion		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	**50...200 mm**	**50...200 mm**
Diffuse	Sensing distance		
Diffuse small beam	Sensing distance		

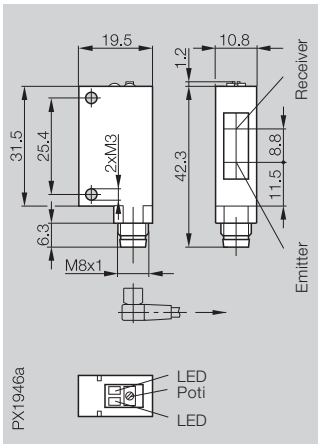
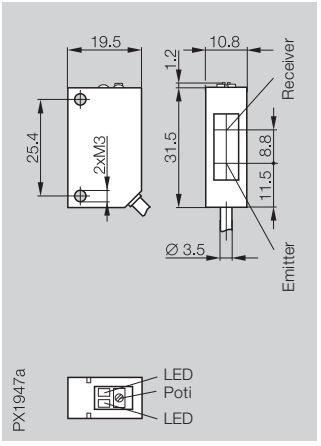
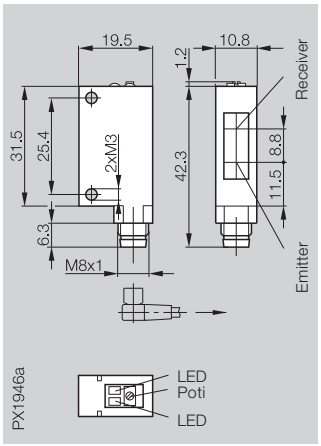
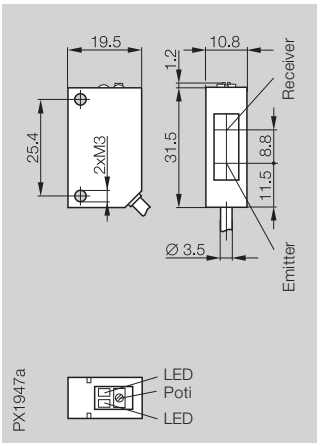




Diffuse with HGA			
PNP, NO	50...200 mm	BOS 5K-PS-RH12-S75	BOS 5K-PS-RH12-02
NPN, NO	50...200 mm	BOS 5K-NS-RH12-S75	BOS 5K-NS-RH12-02
PNP, NC	50...200 mm	BOS 5K-PO-RH12-S75	BOS 5K-PO-RH12-02
NPN, NC	50...200 mm	BOS 5K-NO-RH12-S75	BOS 5K-NO-RH12-02
Diffuse			
PNP, NO	900 mm		
NPN, NO	900 mm		
PNP, NC	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		10...30 V DC	10...30 V DC
Ripple		≤ 2 V DC	≤ 2 V DC
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- or dark-on	Light- or dark-on
Voltage drop U_d at I_e		≤ 1.2 V DC	≤ 1.2 V DC
Settings		Potentiometer 270°	Potentiometer 270°
Optical data			
Emitter, light type		LED, red light	LED, red light
Wavelength		660 nm	660 nm
Indicators			
Output function indicator		LED yellow	LED yellow
Stability indicator		LED green	LED green
Time data			
Response time		1 ms	1 ms
Switching frequency f		500 Hz	500 Hz
Mechanical data			
Dimensions		19.5×31.5×10.8 mm	19.5×31.5×10.8 mm
Connection		M8 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section			3×0.2 mm²
Housing material		PC/PBT	PC/PBT
Optical surface		PC	PC
Weight		10 g	50 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
Ambient light rejection		5 kLux (artificial light)/10 kLux (sunlight)	5 kLux (artificial light)/10 kLux (sunlight)

Diffuse values referenced to Kodak gray card 90% Reflexion.

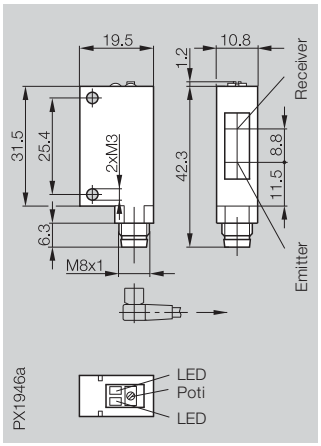
Wiring diagrams, characteristics and accessories see page **2.1.**116 and **2.1.**117.

	0...900 mm	**0...900 mm**	**50...200 mm**	**50...200 mm**
				
	BOS 5K-PS-ID10-S75 BOS 5K-NS-ID10-S75 BOS 5K-PO-ID10-S75 BOS 5K-NO-ID10-S75	BOS 5K-PS-ID10-02 BOS 5K-NS-ID10-02 BOS 5K-PO-ID10-02 BOS 5K-NO-ID10-02		
			BOS 5K-PS-RD11-S75 BOS 5K-NS-RD11-S75 BOS 5K-PO-RD11-S75 BOS 5K-NO-RD11-S75	BOS 5K-PS-RD11-02 BOS 5K-NS-RD11-02 BOS 5K-PO-RD11-02 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 mm²		3×0.2 mm²
	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)

 Connector orientation

2.1
2.3 Photoelectric Sensors Accessories Page 2.3.2 ...
5 Connectors ... Page 5.2 ...

Retroreflective	Range	**0,1...4 m**
Through-beam	Range	

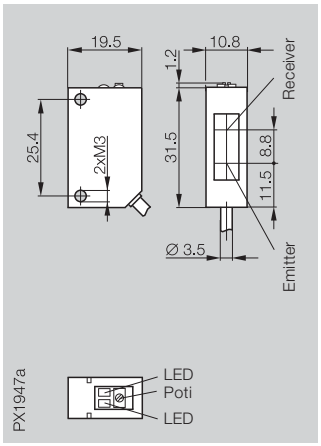
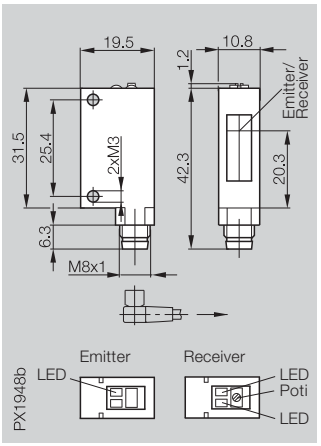
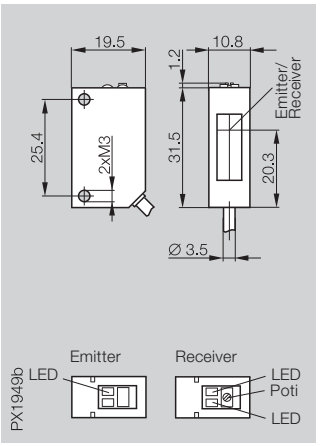


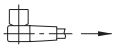
Retroreflective					
PNP, NO	0,1...4 m	Polarizing filter			BOS 5K-PS-RR10-S75
NPN, NO	0,1...4 m	Polarizing filter			BOS 5K-NS-RR10-S75
PNP, NC	0,1...4 m	Polarizing filter			BOS 5K-PO-RR10-S75
NPN, NC	0,1...4 m	Polarizing filter			BOS 5K-NO-RR10-S75
PNP, NC	0,1...4 m	Polarizing filter	Special output configuration		BOS 5K-PO-RR10-S75-S
NPN, NC	0,1...4 m	Polarizing filter	Special output configuration		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	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- or dark-on
Voltage drop U_d at I_e	≤ 1.2 V DC
Settings	Potentiometer 270°
Optical data	
Emitter, light type	LED, red light
Wavelength	660 nm
Indicators	
Power-on indicator	
Output function indicator	LED yellow
Stability indicator	LED green
Time data	
Response time	1 ms
Switching frequency f	500 Hz
Mechanical data	
Dimensions	19.5×31.5×10.8 mm
Connection	M8 connector, 4-pin
No. of wires × cross-section	
Housing material	PC/PBT
Optical surface	PMMA
Weight	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	–25...+55 °C
Ambient light rejection	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.

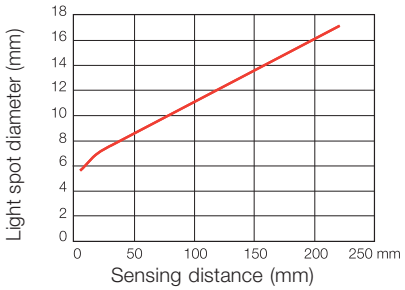
0,1...4 m	**0...10 m**	**0...10 m**
		
BOS 5K-PS-RR10-02 BOS 5K-NS-RR10-02 BOS 5K-PO-RR10-02 BOS 5K-NO-RR10-02		
	BOS 5K-PS-IX10-S75 BOS 5K-NS-IX10-S75 BOS 5K-PO-IX10-S75 BOS 5K-NO-IX10-S75 BOS 5K-PO-IX10-S75-S BOS 5K-NO-IX10-S75-S	BOS 5K-PS-IX10-02 BOS 5K-NS-IX10-02 BOS 5K-PO-IX10-02 BOS 5K-NO-IX10-02
10...30 V DC	10...30 V DC	10...30 V DC
≤ 2 V DC	≤ 2 V DC	≤ 2 V DC
≤ 30 mA	≤ 20 mA (Receiver), ≤ 15 mA (Emitter)	≤ 20 mA (Receiver), ≤ 15 mA (Emitter)
PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
100 mA	100 mA	100 mA
Light- or dark-on	Light- or dark-on	Light- or dark-on
≤ 1.2 V DC	≤ 1.2 V DC	≤ 1.2 V DC
Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
LED, red light	LED, infrared	LED, infrared
660 nm	880 nm	880 nm
	LED green (emitter)	LED green (emitter)
LED yellow	LED yellow (receiver)	LED yellow (receiver)
LED green	LED green (receiver)	LED green (receiver)
1 ms	≤ 1 ms	≤ 1 ms
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
2 m cable, PVC	M8 connector, 4-pin	2 m cable, PVC
3×0.2 mm²		3(2)×0,2 mm² (emitter)
PC/PBT	PC/PBT	PC/PBT
PMMA	PC	PC
50 g	10 g each	50 g each
IP 67	IP 67	IP 67
yes	yes	yes
yes	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)

 Connector orientation

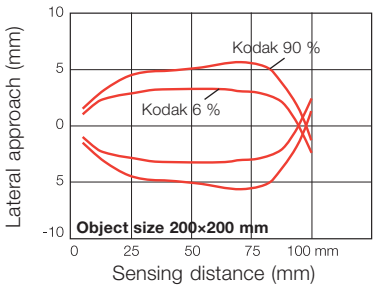
2.1
2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...
5
Connectors ...
Page 5.2 ...

Diffuse with background suppression BOS 5K-_ _-RH12-_ _

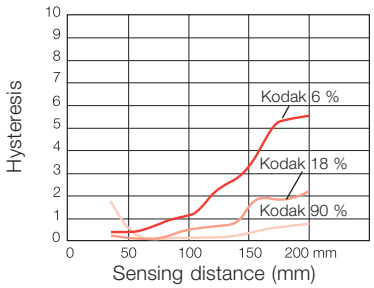
Light spot diameter



Characteristic response curve (HGA 100 mm)

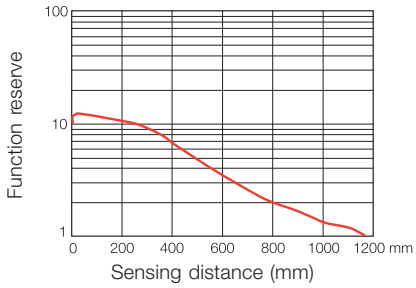


Sensing distance vs. hysteresis

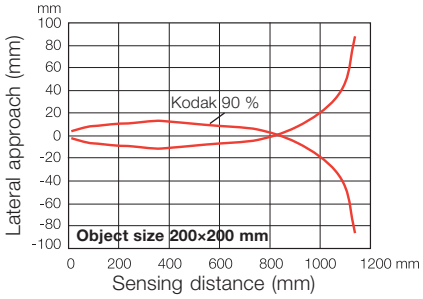


Diffuse BOS 5K-_ _-ID10-_ _

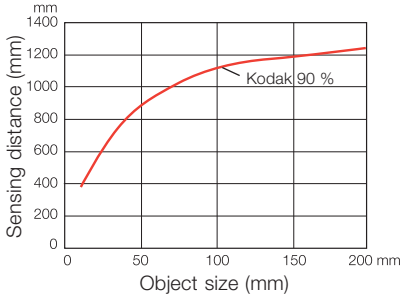
Receiving characteristics



Characteristic response curve

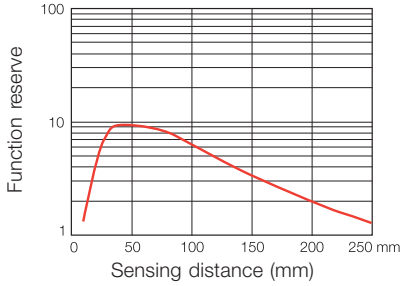


Object size vs. Sensing distance

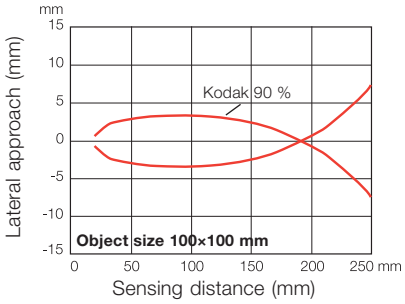


Diffuse small beam BOS 5K-_ _-RD11-_ _

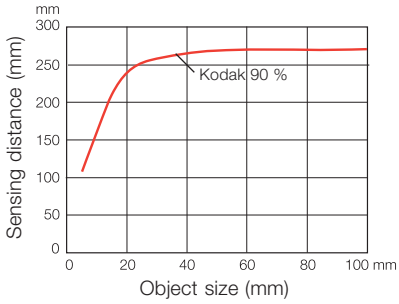
Receiving characteristics



Characteristic response curve

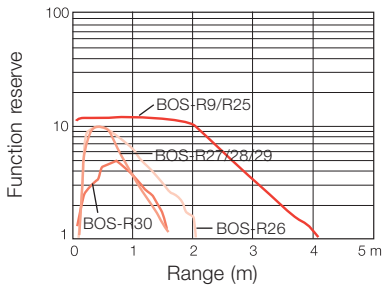


Object size vs. Sensing distance

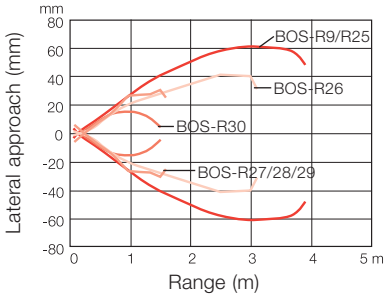


Reflexionslichtschranke BOS 5K-_ _-RR10-_ _

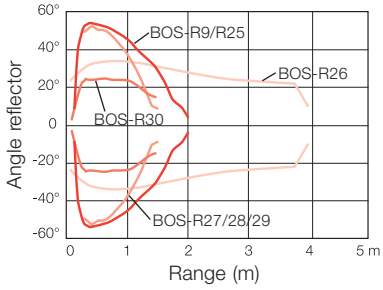
Receiving characteristics



Characteristic response curve

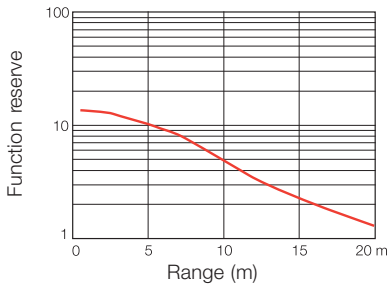


Angle offset

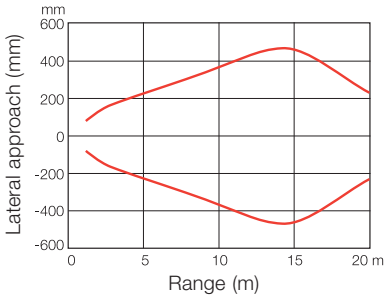


Einweglichtschranke BOS 5K-_ _-IX10-_ _

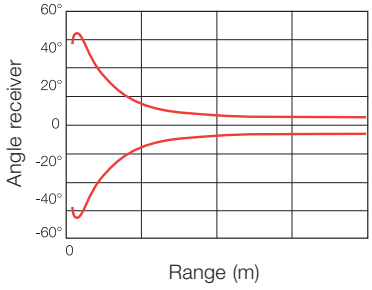
Receiving characteristics



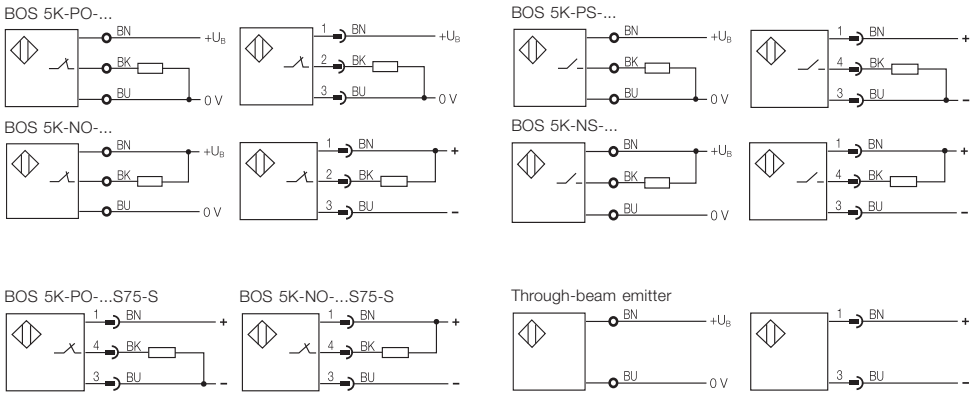
Characteristic response curve



Angle offset

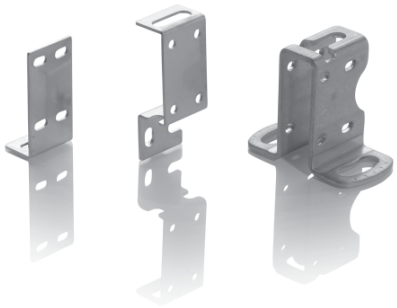


Wiring diagrams

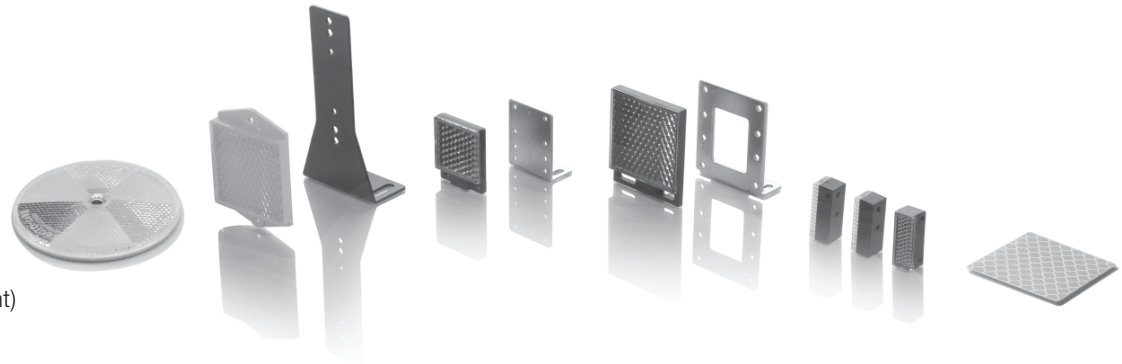


Recommended accessories
please order separately

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



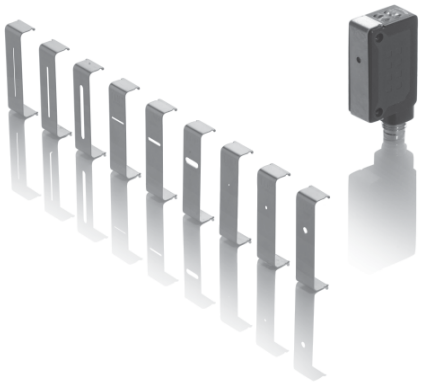
Reflectors,
Reflector mounting bracket
BOS R-1
BOS R-25
BOS 5-HW-4
BOS R-26
BOS 5-HW-5
BOS R-9
BOS 5-HW-6
BOS R-27
BOS R-28
BOS R-29
BOS R-30
(from left to right)



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

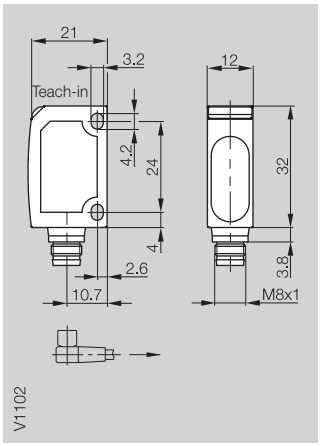
- Packaging machinery
- Handling and assembly
- Specialty machines
- Printing and paper machines

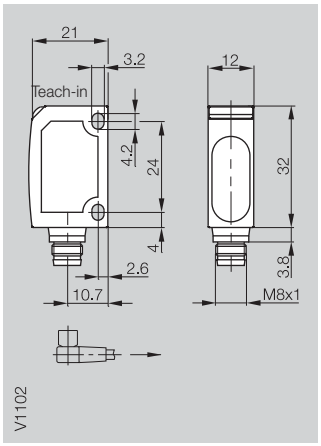
Type	Sensing/ Range	Light type		Output		Output function		Switching frequency	U_B	Connection			Special features		Page
		Red light	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	M8 connector, 3-pin	Cable	Polarizing filter		
Diffuse with HGA															
BOS 6K-PU-1HA-S75-C	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	**25...100 mm**	**25...100 mm**	
Diffuse	maximum sensing distance			



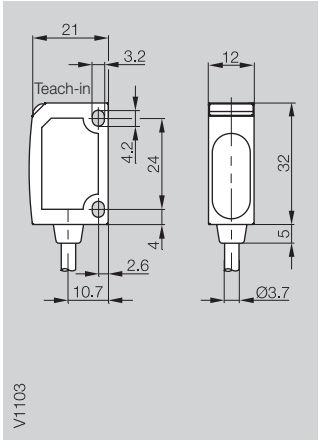
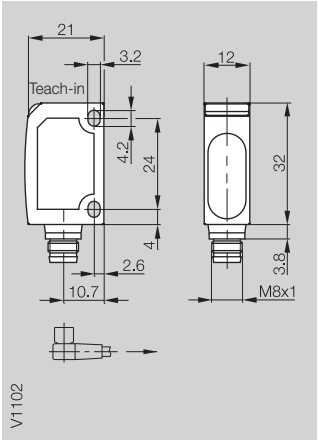
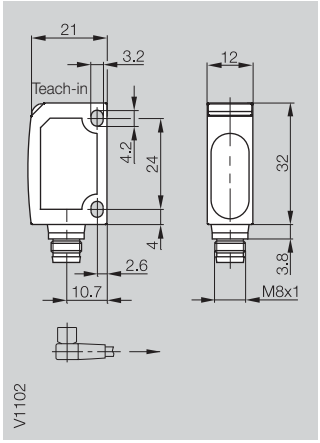
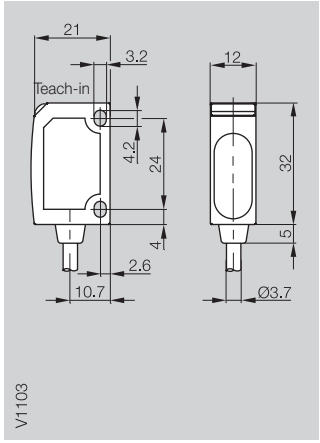


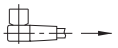
Diffuse				
PNP	25...100 mm	HGA	BOS 6K-PU-1HA-S75-C	BOS 6K-PU-1HA-S49-C
NPN	25...100 mm	HGA	BOS 6K-NU-1HA-S75-C	
PNP	20...300 mm			
NPN	20...300 mm			
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
No-load supply current I_0 max.			≤ 35 mA	≤ 35 mA
Switching output			PNP- or NPN-Transistor	PNP-Transistor
Output current			100 mA	100 mA
Switching type			Light-/dark-on (selectable)	Light-/dark-on (selectable)
Voltage drop U_d at I_e			≤ 2.4 V	≤ 2.4 V
Settings			teach-in	teach-in
Optical data				
Recommended sensing distance			25...100 mm	25...100 mm
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Light spot diameter			ca. 5×5 mm at 60 mm	ca. 5×5 mm at 60 mm
Distance hysteresis (18 %/18 %)			≤ 5 %	≤ 5 %
Gray value shift (90 %/18 %)			≤ 10 %	≤ 10 %
Indicators				
Switching state 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			21×32×12 mm	21×32×12 mm
Connection			M8 connector, 4-pin	M8 connector, 3-pin
No. of wires × cross-section				
Housing material			impact-resistant ABS	impact-resistant ABS
Optical surface			PMMA	PMMA
Weight			40 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 temperature range T_a			–20...+60 °C	–20...+60 °C
Ambient light rejection			5 kLux	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.

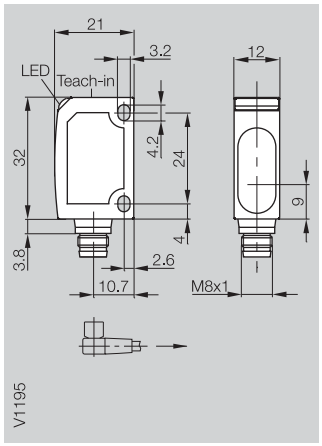
[1] U_{imp} = 500 V

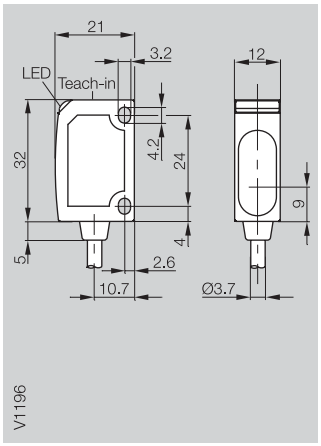
	25...100 mm	20...300 mm	20...300 mm	20...300 mm
				
	BOS 6K-PU-1HA-C-02 BOS 6K-NU-1HA-C-02	BOS 6K-PU-1OC-S75-C BOS 6K-NU-1OC-S75-C	BOS 6K-PU-1OC-S49-C	BOS 6K-PU-1OC-C-02 BOS 6K-NU-1OC-C-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 35 mA	≤ 35 mA	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP-Transistor	PNP- or NPN-Transistor
	100 mA	100 mA	100 mA	100 mA
	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)
	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V
	teach-in	teach-in	teach-in	teach-in
	25...100 mm	20...300 mm	20...300 mm	20...300 mm
	LED, red light	LED, red light	LED, red light	LED, red light
	660 nm	660 nm	660 nm	660 nm
	ca. 5×5 mm at 60 mm	ca. 12×12 mm at 160 mm	ca. 12×12 mm at 160 mm	ca. 12×12 mm at 160 mm
	≤ 5 %	≤ 10 %	≤ 10 %	≤ 10 %
	≤ 10 %			
	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
	21×32×12 mm	21×32×12 mm	21×32×12 mm	21×32×12 mm
	2 m cable, PVC	M8 connector, 4-pin	M8 connector, 3-pin	2 m cable, PVC
	4×0.14 mm²			4×0.14 mm²
	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS
	PMMA	PMMA	PMMA	PMMA
	120 g	40 g	40 g	120 g
	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes
	yes	yes	yes	yes
	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
	5 kLux	5 kLux	5 kLux	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	**0...500 mm**	**0...500 mm**



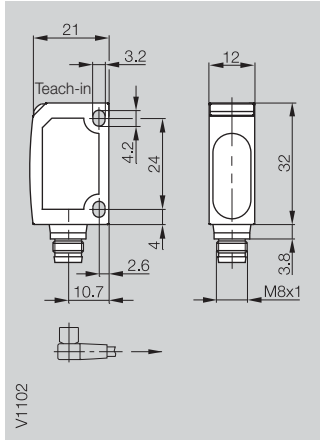
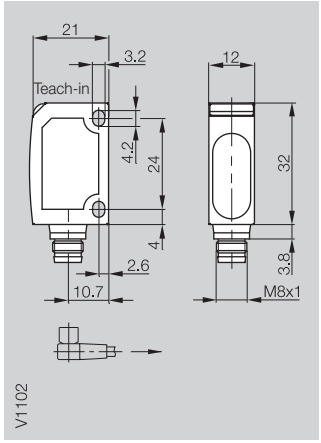
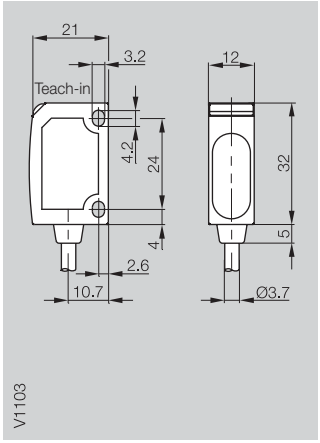


Retroreflective			
PNP	0...500 mm Polarizing filter, glass detection, autocollimation	BOS 6K-PU-1TA-S75-C	BOS 6K-PU-1TA-C-02
NPN	0...500 mm Polarizing filter, glass detection, autocollimation	BOS 6K-NU-1TA-S75-C	BOS 6K-NU-1TA-C-02
PNP	50...700 mm Polarizing filter, glass detection		
NPN	50...700 mm Polarizing filter, glass detection		
Electrical data			
Supply voltage U_B		10...30 V DC	10...30 V DC
No-load supply current I_0 max.		≤ 25 mA	≤ 25 mA
Switching output		PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output current		100 mA	100 mA
Switching type		Light-/dark-on (selectable)	Light-/dark-on (selectable)
Voltage drop U_d at I_e		≤ 2.4 V	≤ 2.4 V
Settings		teach-in	teach-in
Optical data			
Recommended range		0...500 mm	0...500 mm
Emitter, light type		LED, red light	LED, red light
Wavelength		660 nm	660 nm
Light spot diameter		20×20 mm up to 500 mm	20×20 mm up to 500 mm
Indicators			
Switching state 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		21×32×12 mm	21×32×12 mm
Connection		M8 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section			4×0.14 mm²
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 temperature range T_a		–20...+60 °C	–20...+60 °C
Ambient light rejection		5 kLux	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.

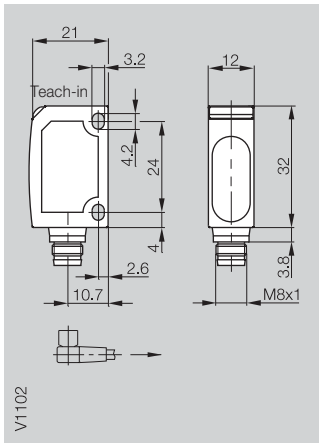
[1] U_{imp} = 500 V

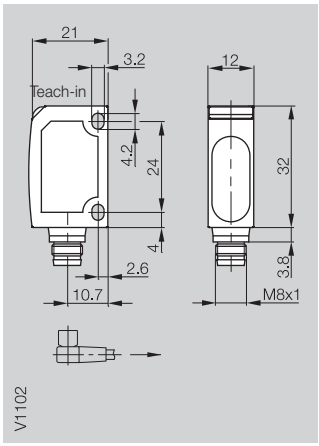
50...700 mm	**50...700 mm**	**50...700 mm**	
			
BOS 6K-PU-1QA-S75-C BOS 6K-NU-1QA-S75-C	BOS 6K-PU-1QA-S49-C	BOS 6K-PU-1QA-C-02 BOS 6K-NU-1QA-C-02	
10...30 V DC	10...30 V DC	10...30 V DC	
≤ 35 mA	≤ 35 mA	≤ 35 mA	
PNP- or NPN-Transistor	PNP-Transistor	PNP- or NPN-Transistor	
100 mA	100 mA	100 mA	
Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)	
≤ 2.4 V	≤ 2.4 V	≤ 2.4 V	
teach-in	teach-in	teach-in	
0...500 mm	0...500 mm	0...500 mm	
LED, red light	LED, red light	LED, red light	
660 nm	660 nm	660 nm	
20×20 mm up to 500 mm	20×20 mm up to 500 mm	20×20 mm up to 500 mm	
LED yellow	LED yellow	LED yellow	
LED green	LED green	LED green	
0.5 ms	0.5 ms	0.5 ms	
1 kHz	1 kHz	1 kHz	
21×32×12 mm	21×32×12 mm	21×32×12 mm	
M8 connector, 4-pin	M8 connector, 3-pin	2 m cable, PVC	
		4×0.14 mm²	
impact-resistant ABS	impact-resistant ABS	impact-resistant ABS	
PMMA	PMMA	PMMA	
40 g	40 g	120 g	
IP 67	IP 67	IP 67	
yes	yes	yes	
yes	yes	yes	
–20...+60 °C	–20...+60 °C	–20...+60 °C	
5 kLux	5 kLux	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	**0,05...3 m**	**0,05...3 m**
Through-beam		maximum range		



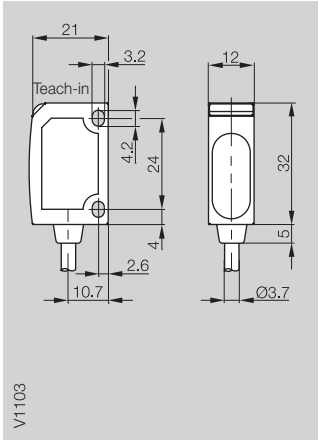
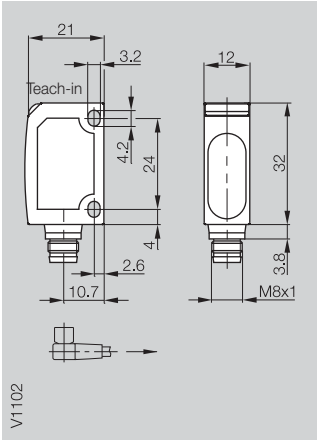
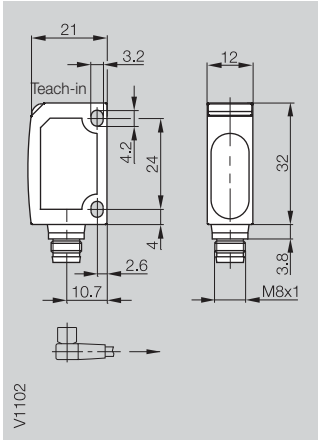
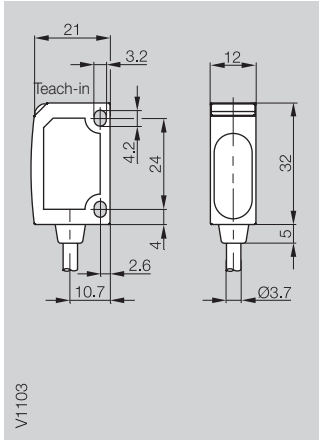


Retroreflective				
PNP	0,05...3 m	Polarizing filter	BOS 6K-PU-1QC-S75-C	BOS 6K-PU-1QC-S49-C
NPN	0,05...3 m	Polarizing filter	BOS 6K-NU-1QC-S75-C	
Through-beam				
PNP	6,5 m	Receiver		
NPN	6,5 m	Receiver		
	6,5 m	Emitter		
Electrical data				
Supply voltage U_B			10...30 V DC	10...30 V DC
No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA
Switching output			PNP- or NPN-Transistor	PNP-Transistor
Output current			100 mA	100 mA
Switching type			Light-/dark-on (selectable)	Light-/dark-on (selectable)
Voltage drop U_d at I_e			≤ 2.4 V	≤ 2.4 V
Settings			teach-in	teach-in
Optical data				
Recommended range			0.05...2.5 m	0.05...2.5 m
Emitter, light type			LED, red light	LED, red light
Wavelength			660 nm	660 nm
Light spot diameter			ca. 75×75 mm at 1.5 m	ca. 75×75 mm at 1.5 m
Indicators				
Switching state 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			21×32×12 mm	21×32×12 mm
Connection			M8 connector, 4-pin	M8 connector, 3-pin
No. of wires × cross-section				
Housing material			impact-resistant ABS	impact-resistant ABS
Optical surface			PMMA	PMMA
Weight			10 g	10 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			EN 60947-5-2	EN 60947-5-2

Retroreflective values referenced to R9 reflector.

Wiring diagrams, characteristics and accessories see page **2.1.**128 and **2.1.**129.

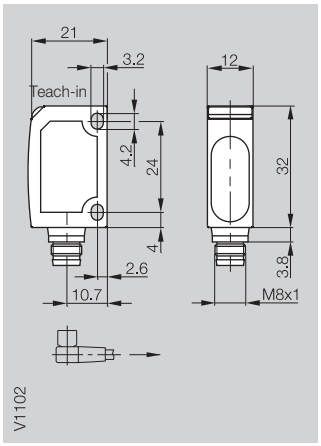
[1] U_{imp} = 500 V

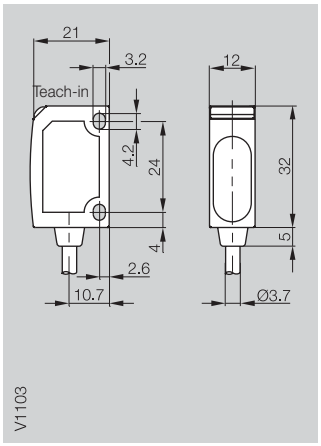
	0,05...3 m	**0...6,5 m**	**0...6,5 m**	**0...6,5 m**
				
	BOS 6K-PU-1QC-C-02 BOS 6K-NU-1QC-C-02			
		BLE 6K-PU-1E-S75-C BLE 6K-NU-1E-S75-C BLS 6K-XX-1E-S75-C	BLE 6K-PU-1E-S49-C BLS 6K-XX-1E-S49-C	BLE 6K-PU-1E-C-02 BLE 6K-NU-1E-C-02 BLS 6K-XX-1E-C-02
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP-Transistor	PNP- or NPN-Transistor
	100 mA	100 mA	100 mA	100 mA
	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)
	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V
	teach-in	teach-in	teach-in	teach-in
	0.05...2.5 m	0...6 m	0...6 m	0...6 m
	LED, red light	LED, red light	LED, red light	LED, red light
	660 nm	660 nm	660 nm	660 nm
	ca. 75×75 mm at 1.5 m			
	LED yellow	LED yellow	LED yellow	LED yellow
	LED green	LED green	LED green	LED green
	0.5 ms	1 ms	1 ms	1 ms
	1 kHz	500 Hz	500 Hz	500 Hz
	21×32×12 mm	21×32×12 mm	21×32×12 mm	21×32×12 mm
	2 m cable, PVC	M8 connector, 4-pin	M8 connector, 3-pin	2 m cable, PVC
	4×0.14 mm²			4×0.14 mm²
	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS
	PMMA	PMMA	PMMA	PMMA
	40 g	10 g	10 g	40 g
	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes
	yes	yes	yes	yes
	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

Connector orientation

2.1
2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...
5
Connectors ...
Page 5.2 ...

Diffuse with background suppression	maximum sensing distance	**20...60 mm**	**20...60 mm**
Retroreflective with polarizing filter	maximum range		



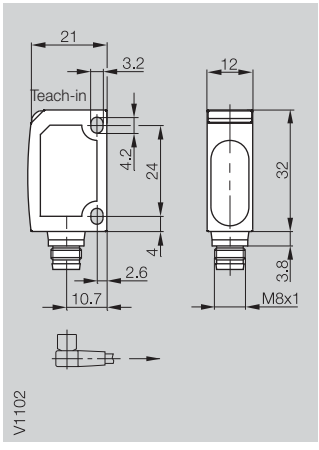
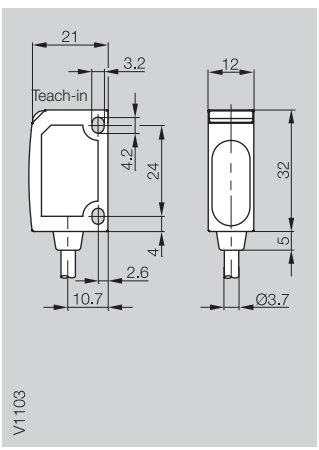
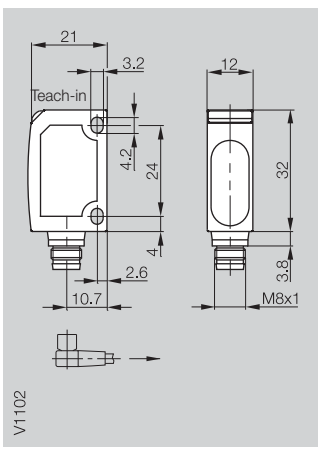
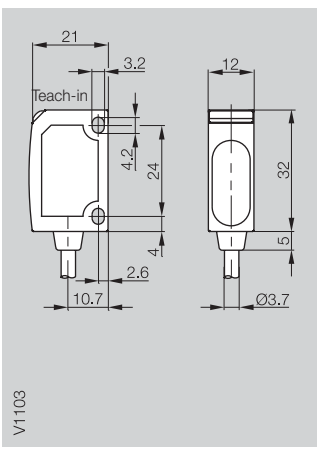


	Diffuse				
	PNP	20...60 mm	HGA	BOS 6K-PU-1LHA-S75-C	BOS 6K-PU-1LHA-C-02
	NPN	20...60 mm	HGA	BOS 6K-NU-1LHA-S75-C	BOS 6K-NU-1LHA-C-02
	PNP	30...110 mm	HGA		
	NPN	30...110 mm	HGA		
	Reflexionslichtschranke				
	PNP	0.05...1.5 m	Polarizing filter		
	NPN	0.05...1.5 m	Polarizing filter		
	Electrical data				
	Supply voltage U_B			10...30 V DC	10...30 V DC
	No-load supply current I_0 max.			≤ 25 mA	≤ 25 mA
	Switching output			PNP- or NPN-Transistor	PNP- or NPN-Transistor
	Output current			100 mA	100 mA
	Switching type			Light-/dark-on (selectable)	Light-/dark-on (selectable)
	Voltage drop U_d at I_e			≤ 2.4 V	≤ 2.4 V
	Settings			teach-in	teach-in
	Optical data				
	Recommended sensing distance/range			20...60 mm	20...60 mm
	Emitter, light type			Laser, red light	Laser, red light
	Wavelength			650 nm	650 nm
	Laser class			1	1
	Light spot diameter			0.5 mm at focus (35 mm)	0.5 mm at focus (35 mm)
	Distance hysteresis (18 %/18 %)			≤ 2 % up to focal point, ≤ 6 % up to end	≤ 2 % up to focal point, ≤ 6 % up to end
	Gray value shift (90 %/18 %)			≤ 7 %	≤ 7 %
	Indicators				
	Switching state 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			21×32×12 mm	21×32×12 mm
	Connection			M8 connector, 4-pin	2 m cable, PVC
	No. of wires × cross-section				4×0.14 mm²
	Housing material			impact-resistant ABS	impact-resistant ABS
	Optical surface			PMMA	PMMA
	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 temperature range T_a			–20...+60 °C	–20...+60 °C
	Ambient light limit			EN 60947-5-2	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.

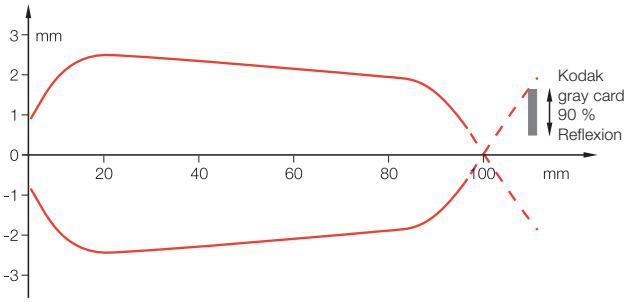
[1] U_{imp} = 500 V

	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	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 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-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)
	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V	≤ 2.4 V
	teach-in	teach-in	teach-in	teach-in
	30...110 mm	30...110 mm	0.05...1 m	0.05...1 m
	Laser, red light	Laser, red light	Laser, red light	Laser, red light
	650 nm	650 nm	650 nm	650 nm
	2	2	1	1
	0,7 mm at focus (85 mm ± 15 mm)	0,7 mm at focus (85 mm ± 15 mm)	1 mm in 300 mm	1 mm in 300 mm
	≤ 5 % up to focal point, ≤ 7 % up to end	≤ 5 % up to focal point, ≤ 7 % up to end		
	≤ 7 %	≤ 7 %		
	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	4 kHz	4 kHz
	21×32×12 mm	21×32×12 mm	21×32×12 mm	21×32×12 mm
	M8 connector, 4-pin	2 m cable, PVC	M8 connector, 4-pin	2 m cable, PVC
		4×0.14 mm²		4×0.14 mm²
	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS
	PMMA	PMMA	PMMA	PMMA
	10 g	40 g	10 g	40 g
	IP 67	IP 67	IP 67	IP 67
	yes	yes	yes	yes
	yes	yes	yes	yes
	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

Connector orientation

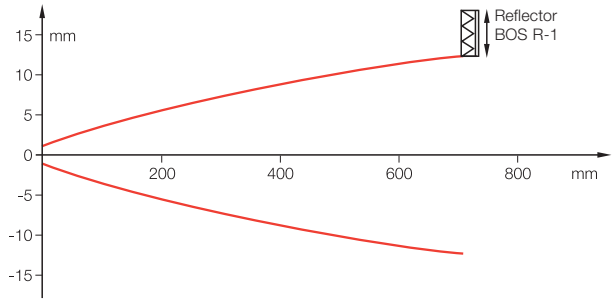
2.1
2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...
5
Connectors ...
Page 5.2 ...

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



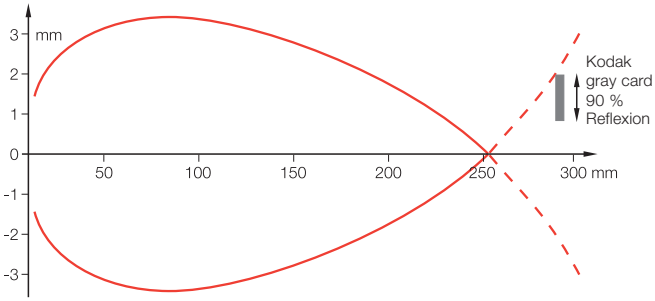
Range measured with side approach of Kodak gray card.

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



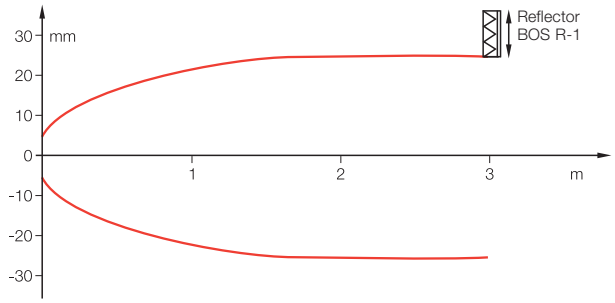
Range measured with side approach of reflector.

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



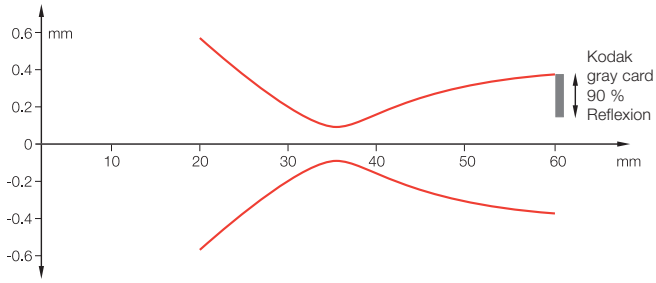
Range measured with side approach of Kodak gray card.

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



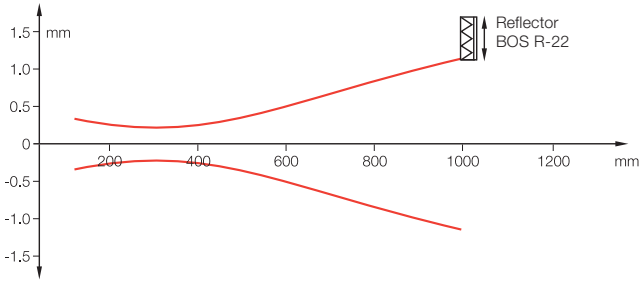
Range measured with side approach of reflector.

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



Range measured with side approach of Kodak gray card.

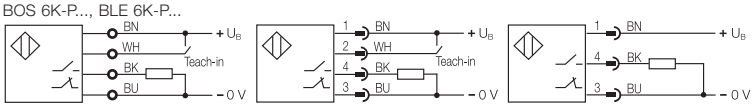
Retroreflective BOS 6K-...-1LQA-...



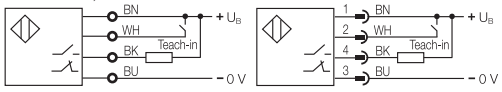
Range measured with side approach of reflector.

Wiring diagrams

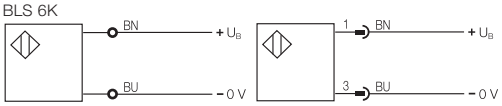
BOS 6K-P..., BLE 6K-P...



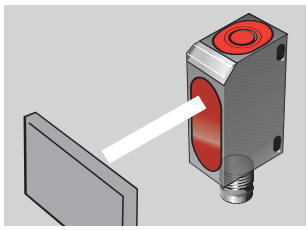
BOS 6K-N..., BLE 6K-N...



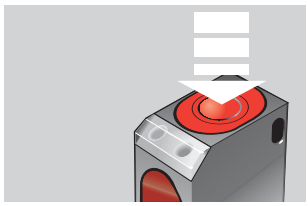
BLS 6K



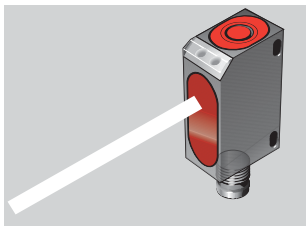
Diffuse



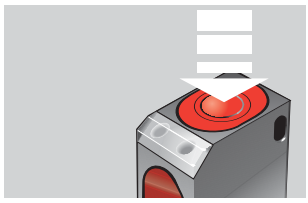
Align sensor with the object.



Press button for approx. 3 sec. until both LED's blink together.

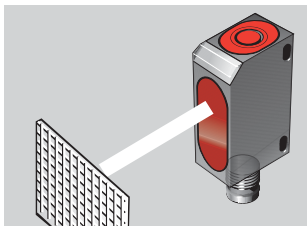


Remove object from beam path.

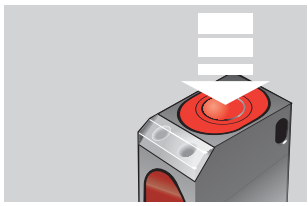


Hold down button for 1 sec. Green LED blinks briefly and then comes full on. The sensor is ready.
If both LEDs blink together, repeat your settings.

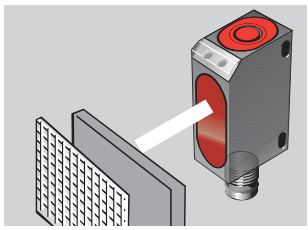
Retroreflective/through-beam



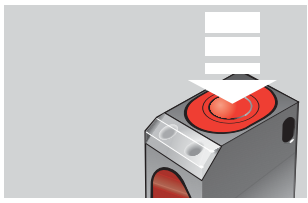
Direct sensor at reflector/ receiver.



Press button for approx. 3 sec. until both LED's blink together.



Bring objects into detection range.

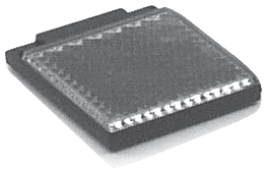


Hold down button for 1 sec. Green LED blinks briefly and then comes full on. The sensor is ready.
If both LEDs blink together, repeat your settings.

2.1
2.3
Photoelectric Sensors Accessories
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

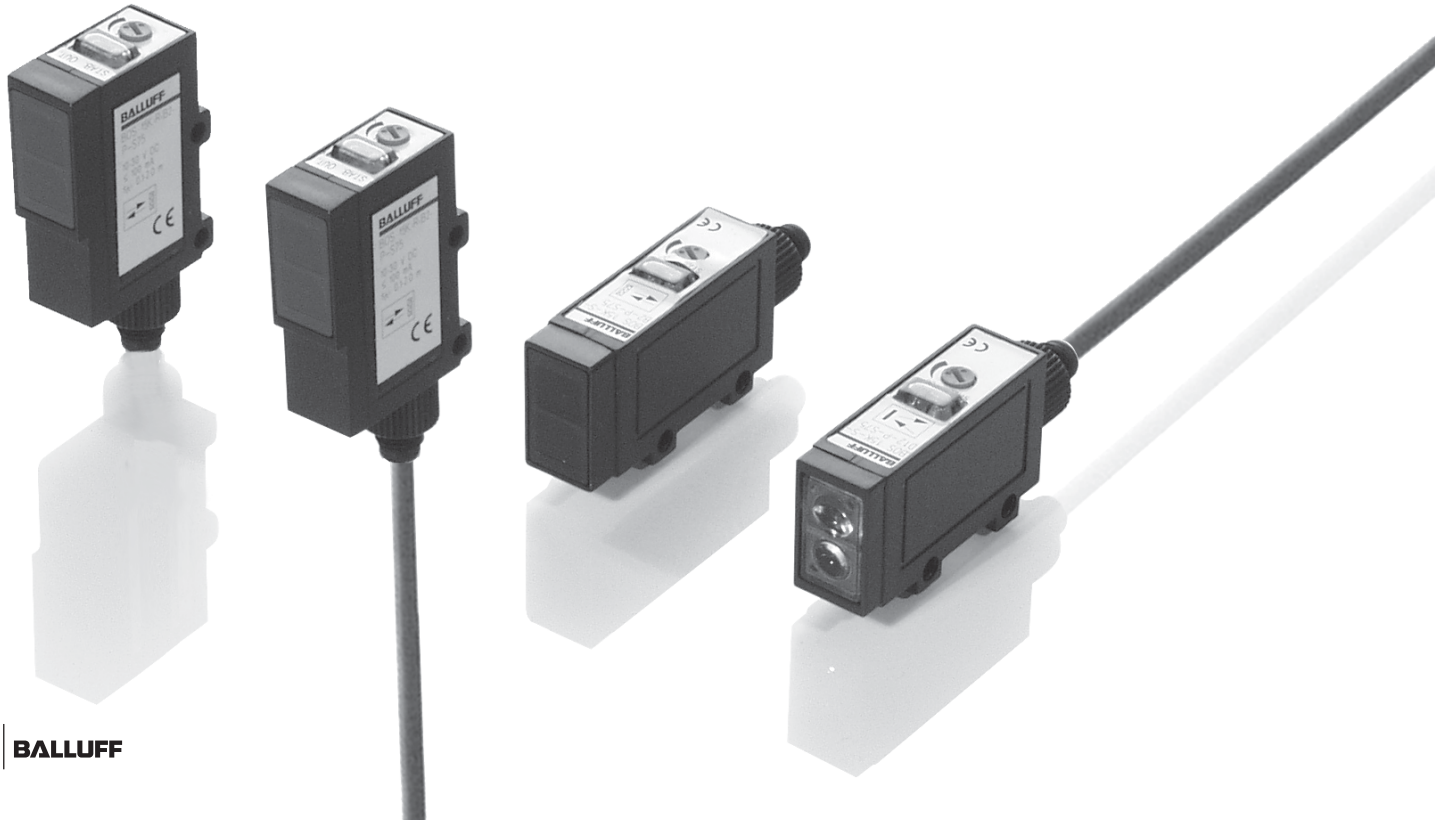
Connector
BKS-S 74/BKS-S 75

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

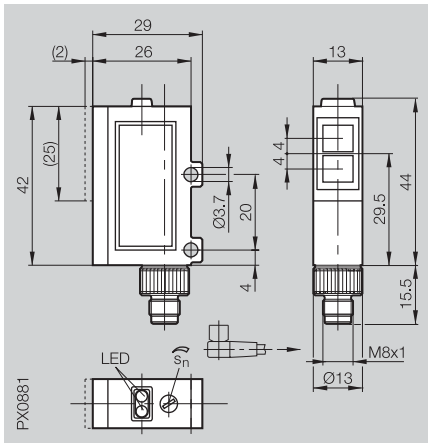


Type	Sensing/ Range	Light exit		Light type		Output			Output function		Switching frequency	U_B	Connec-tion		Special features		Page
		Straight	Right-angle	Red light	Infrared	PNP-Transistor	NPN-Transistor	Alarm output	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	Cable , 2 m	Polarizing filter	Test 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
Photoelectric Sensors Accessories
Page 2.3.2 ...
5
Connectors ...
Page 5.2 ...

BOS 15K
Sensing distance 12 mm, 100 mm, 500 mm
Range 2 m, 5 m

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
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

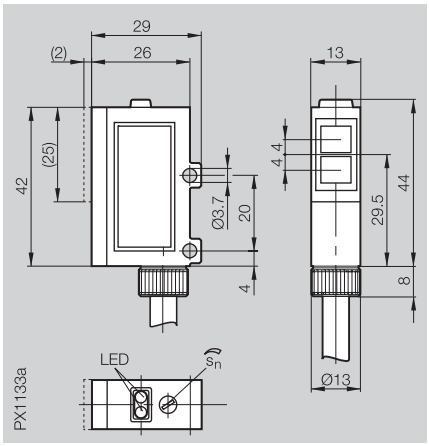
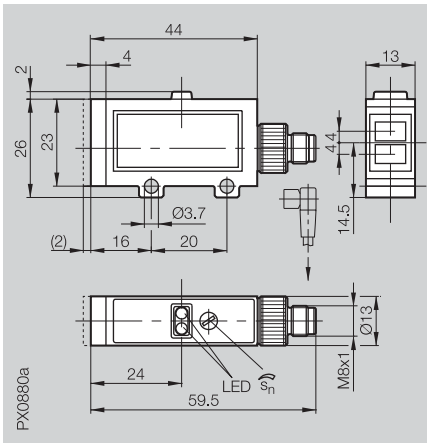
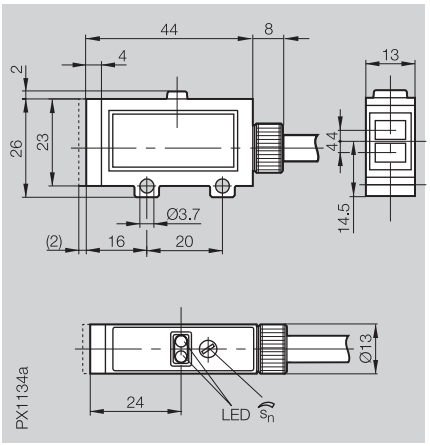
Electrical	
Supply voltage U_B	10...30 V DC
Ripple	2 V DC
No-load current I_0 max.	≤ 30 mA
Switching output	PNP-Transistor
Output current	≤ 100 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_e	≤ 1.5 V
Settings	Potentiometer 270°
Help function	Test input for BLS
Indicators	
Power-on indicator	LED red (BLS)
Output function indicator	LED red
Stability indicator	LED green
Time data	
Response time	≤ 1 ms (BLE ≤ 2ms)
Switching frequency f	500 Hz (BLE 250 Hz)
Mechanical data	
Dimensions	29×42×13 mm
Connection	M8 connector, 4-pin
No. of wires × cross-section	
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

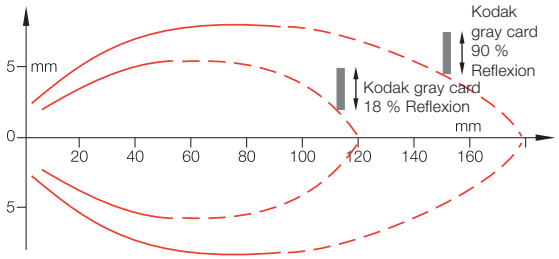
	12 mm/0...100 mm/0...500 mm **0,1...2 m** **0...5 m**	**12 mm/0...100 mm/0...500 mm** **0,1...2 m** **0...5 m**	**12 mm/0...100 mm/0...500 mm** **0,1...2 m** **0...5 m**
			
	BOS 15K-R-C10-02 BOS 15K-R-C50-02 BOS 15K-R-D12-02	BOS 15K-S-C10-P-S75 BOS 15K-S-C50-P-S75 BOS 15K-S-D12-P-S75	BOS 15K-S-C10-02 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 2 V DC ≤ 30 mA PNP- and NPN-Transistor selectable ≤ 100 mA Light-/dark-on (selectable) ≤ 1.5 V Potentiometer 270° Test input for BLS	10...30 V DC 2 V DC ≤ 30 mA PNP-Transistor ≤ 100 mA Light-/dark-on (selectable) ≤ 1.5 V Potentiometer 270° Test input for BLS	10...30 V DC 2 V DC ≤ 30 mA PNP- and NPN-Transistor selectable ≤ 100 mA Light-/dark-on (selectable) ≤ 1.5 V Potentiometer 270° Test input for BLS
	LED red (BLS) LED red LED green	LED red (BLS) LED red LED green	LED red (BLS) LED red 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 2 m cable, PVC 4/5/6×0.34 mm² ABS PMMA 90 g	44×26×13 mm M8 connector, 4-pin ABS PMMA 20 g	44×26×13 mm 2 m cable, PVC 4/5/6×0.34 mm² ABS PMMA 90 g
	IP 66 yes yes –15...+55 °C 3 kLux/10 kLux sunlight	IP 66 yes yes –15...+55 °C 3 kLux/10 kLux sunlight	IP 66 yes yes –15...+55 °C 3 kLux/10 kLux sunlight

2.1

2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...

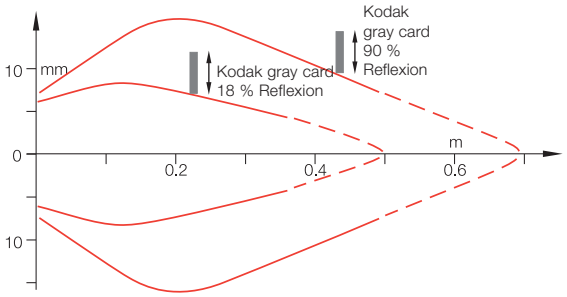
5
Connectors ...
Page 5.2 ...

Diffuse BOS 15K-..-C10-...



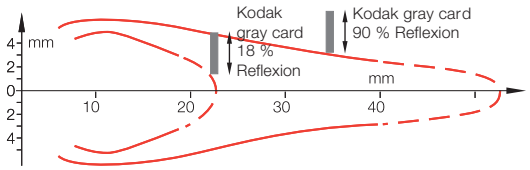
Range measured with side approach of Kodak gray card.

Diffuse BOS 15K-..-C50-...



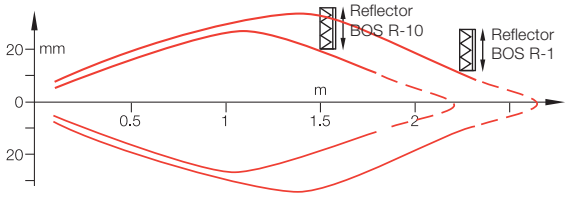
Range measured with side approach of Kodak gray card.

Diffuse with focused beam BOS 15K-..-D12-...



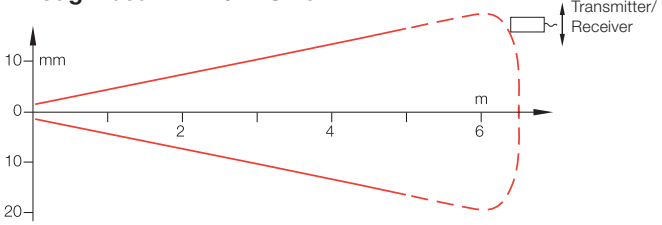
Range measured with side approach of Kodak gray card.

Retroreflective BOS 15K-..-B2-...



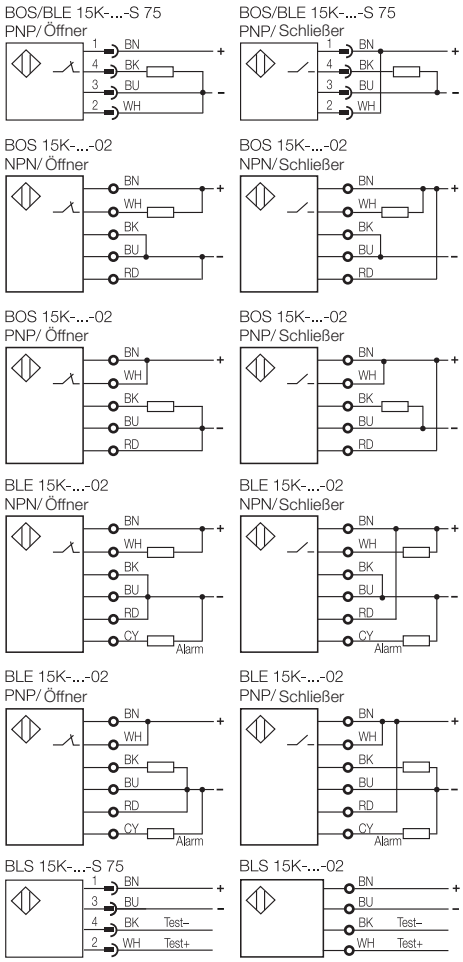
Range measured with side approach of reflector.

Through-beam BLE/BLS 15K-...



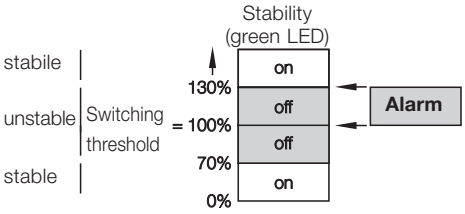
For the through-beam sensor the maximum possible offset between emitter and receiver is measured.

Wiring diagrams



Alarm output for receiver (cable version only)

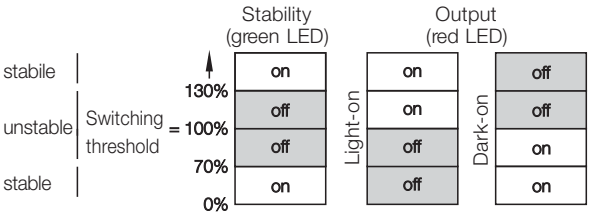
The receiver is equipped with an alarm output. This signal output (PNP open collector 30 mA) is used to trigger a warning signal when there are function disturbances which can be caused by contamination or mechanical maladjustment. The alarm output is activated if the receive signal remains in the alarm range for at least 3 sec.



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.



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.

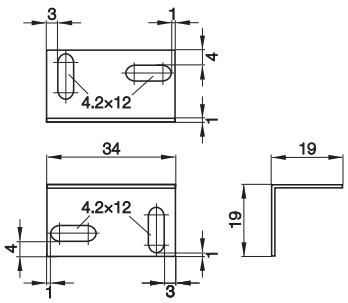
Recommended accessories
please order separately

Connector
BKS-S 74/BKS-S 75

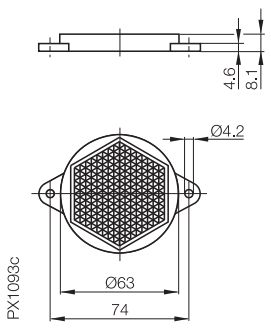
Slit apertures
(supplied with through-beam sensors)

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)



2.1
2.3
Photoelectric Sensors Accessories
Page 2.3.2 ...
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.

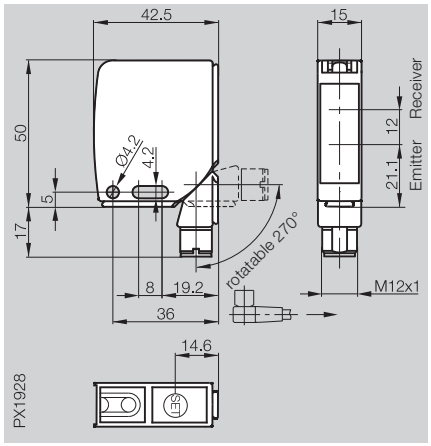
Teach-in switches and potentiometers assure fast startup as well as simple and economical operation of the sensor.

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	Connec-tion	Special features				Page
		Red light	Infrared	Laser light	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	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
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Diffuse with background suppression	Sensing distance	**70...200 mm**
Diffuse with foreground suppression	Sensing distance	
Diffuse	Sensing distance	



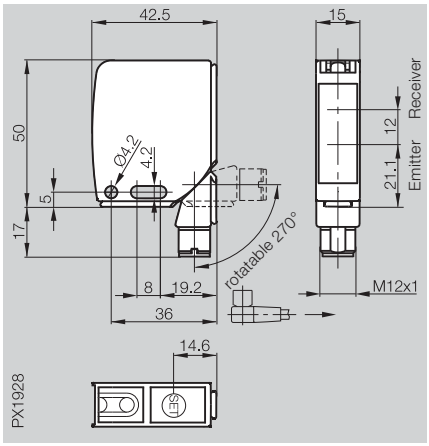
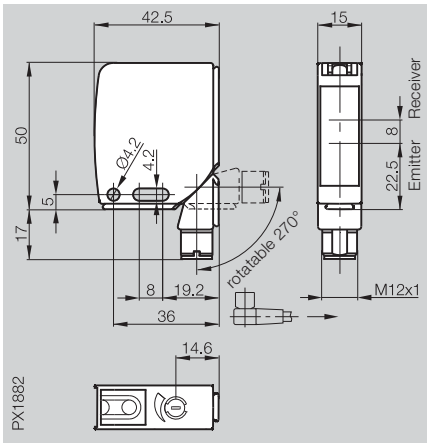
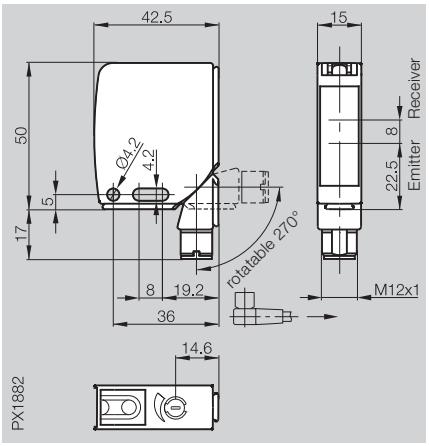
Diffuse			
PNP	70...200 mm	HGA	BOS 21M-PUS-RH12-S4
NPN	70...200 mm	HGA	BOS 21M-NUS-RH12-S4
PNP	70...200 mm	VGA + HGA	
NPN	70...200 mm	VGA + HGA	
PNP	0.01...1 m		
NPN	0.01...1 m		
PNP	0.05...2 m		
NPN	0.05...2 m		

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_e	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

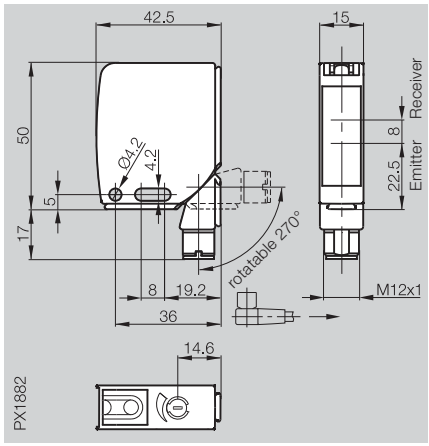
	70...200 mm	**0.01...1 m**	**0.05...2 m**
			
	BOS 21M-PUS-RV13-S4 BOS 21M-NUS-RV13-S4	BOS 21M-PA-RD10-S4 BOS 21M-NA-RD10-S4	BOS 21M-PA-ID10-S4 BOS 21M-NA-ID10-S4
	10...30 V DC	10...30 V DC	10...30 V DC
	≤ 2 V DC	≤ 2 V DC	≤ 2 V DC
	≤ 50 mA	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
	100 mA	100 mA	100 mA
	Light-/dark-on (selectable)	Light-/dark-on (push-pull)	Light-/dark-on (push-pull)
	2 V	2 V	2 V
	Teach-in	Potentiometer 270°	Potentiometer 270°
	70...200 mm	0.01...1 m	0.05...2 m
	LED, red light	LED, red light	LED, infrared
	670 nm	650 nm	880 nm
	LED yellow	LED yellow	LED yellow
	LED green	LED green	LED green
	0.5 ms	1 ms	1 ms
	1 kHz	500 Hz	500 Hz
	42.5×50×15 mm	42.5×50×15 mm	42.5×50×15 mm
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	GD-Zn/Al	GD-Zn/Al	GD-Zn/Al
	PMMA	PMMA	PMMA
	76 g	76 g	76 g
	IP 67	IP 67	IP 67
	yes	yes	yes
	yes	yes	yes
	–10...+50 °C	–25...+55 °C	–25...+55 °C
	10 kLux	10 kLux	10 kLux

2.1

2.3
Photoelectric sensors accessories page 2.3.2 ...

5
Connectors ... page 5.2 ...

Retroreflective with polarizing filter	Range	**0.1...8 m**
Retroreflective Autocollimation	Range	
Retroreflective for glass sensing	Range	
Through-beam	Range	



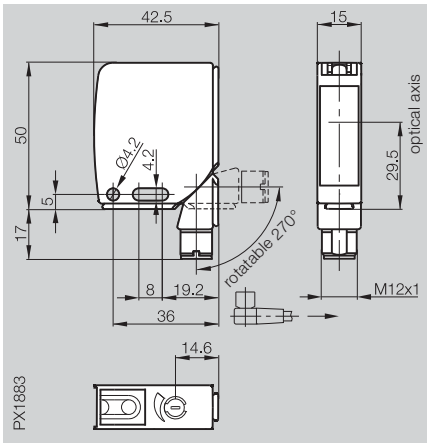
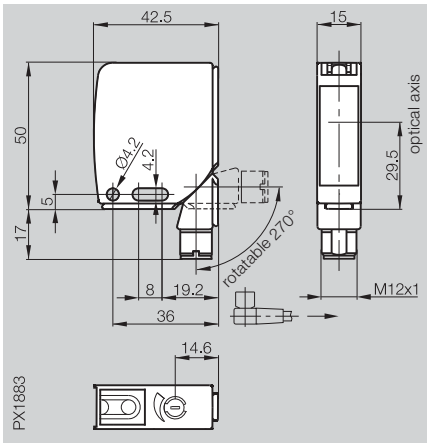
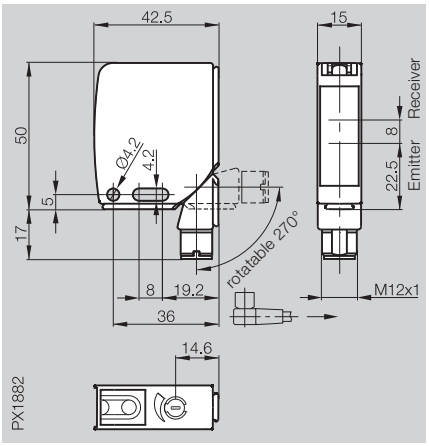
	Retroreflective			
	PNP	0.1...8 m	Polarizing filter	BOS 21M-PA-PR10-S4
	NPN	0.1...8 m	Polarizing filter	BOS 21M-NA-PR10-S4
	PNP	4 m	Polarizing filter, autocollimation	
	NPN	4 m	Polarizing filter, autocollimation	
	PNP	2 m	Polarizing filter, autocollimation, glass sensing	
	NPN	2 m	Polarizing filter, autocollimation, glass sensing	
	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_e	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	42.5×50×15 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	–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.

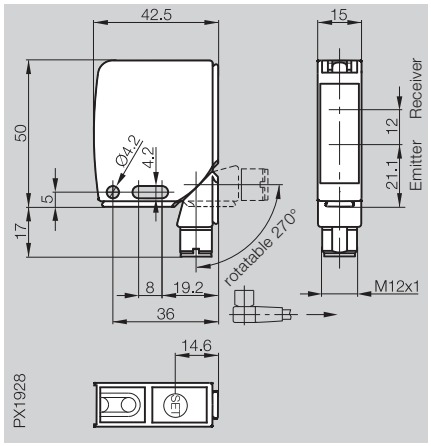
Connector orientation

	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	10...30 V DC	10...30 V DC
	≤ 2 V DC	≤ 2 V DC	≤ 2 V DC
	≤ 35 mA	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
	100 mA	100 mA	100 mA
	Light-/dark-on (push-pull)	Light-/dark-on (push-pull)	Light-/dark-on (push-pull)
	2 V	2 V	2 V
	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
			Test input (emitter)
	0...4 m	0...2 m	0...20 m
	LED, red light	LED, red light	LED, infrared
	650 nm	650 nm	880 nm
			LED green (emitter)
	LED yellow	LED yellow	LED yellow (receiver)
	LED green		LED green (receiver)
	0.5 ms	0.5 ms	1 ms
	1 kHz	1 kHz	500 Hz
	42.5×50×15 mm	42.5×50×15 mm	42.5×50×15 mm
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	GD-Zn/Al	GD-Zn/Al	GD-Zn/Al
	Glass	Glass*	PMMA
	78 g	78 g	75 g
	IP 67	IP 67	IP 67
	yes	yes	yes
	yes	yes	yes
	–25...+55 °C	–25...+55 °C	–25...+55 °C
	10 kLux	10 kLux	10 kLux

*also available with PMMA

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse with background suppression	Sensing distance	**50...100 mm**
Diffuse	Sensing distance	
Retroreflective with polarizing filter	Range	
Through-beam	Range	

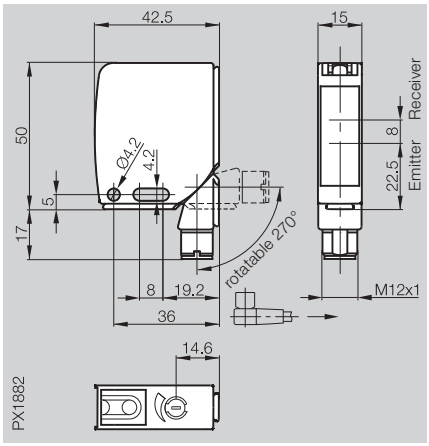
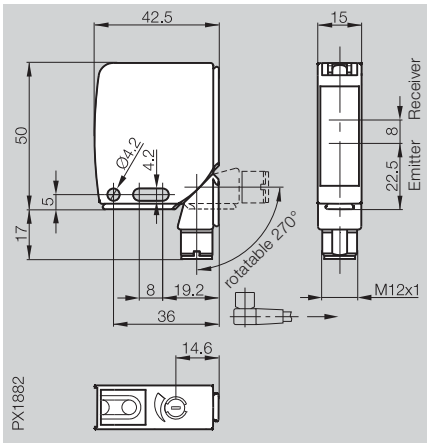
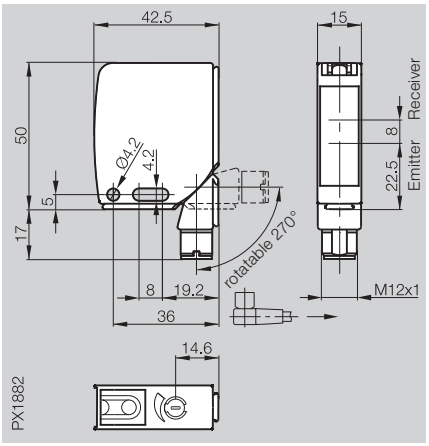


	Diffuse			
	PNP	50...100 mm	HGA	BOS 21M-PUS-LH12-S4
	NPN	50...100 mm	HGA	BOS 21M-NUS-LH12-S4
	PNP	600 mm		
	NPN	600 mm		
	Retroreflective			
	PNP	0.1...20 m	Polarizing filter	
	NPN	0.1...20 m	Polarizing filter	
	Through-beam			
	PNP	60 m	Receiver	
	NPN	60 m	Receiver	
		60 m	Emitter	

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.

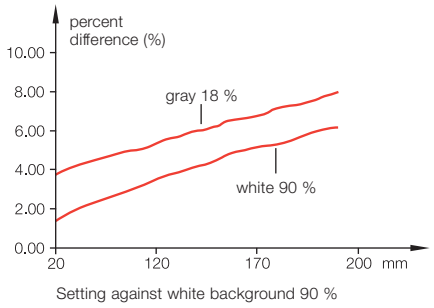
Connector orientation

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-XT-LS11-S4
10...30 V DC	10...30 V DC	10...30 V DC
≤ 2 V DC	≤ 2 V DC	≤ 2 V DC
35 mA	35 mA	35 mA
PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
100 mA	100 mA	100 mA
Light-/dark-on (push-pull)	Light-/dark-on (push-pull)	Light-/dark-on (push-pull)
2 V	2 V	2 V
Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
		Test input (emitter)
0...600 mm	0.1...20 m	0...60 mm
Laser, red light	Laser, red light	Laser, red light
650 nm	650 nm	650 nm
1	1	1
LED green	LED green	LED green
LED yellow	LED yellow	LED yellow
0.25 ms	0.25 ms	0.33 ms
2 kHz	2 kHz	1.5 kHz
42.5×50×15 mm	42.5×50×15 mm	42.5×50×15 mm
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
GD-Zn/Al	GD-Zn/Al	GD-Zn/Al
PMMA	PMMA	PMMA
77 g	77 g	76 g
IP 67	IP 67	IP 67
yes	yes	yes
yes	yes	yes
–10...+50 °C	–10...+50 °C	–10...+50 °C
5 kLux	5 kLux	5 kLux

Wiring diagrams, characteristics and accessories see page **2.1.**144 to **2.1.**147.

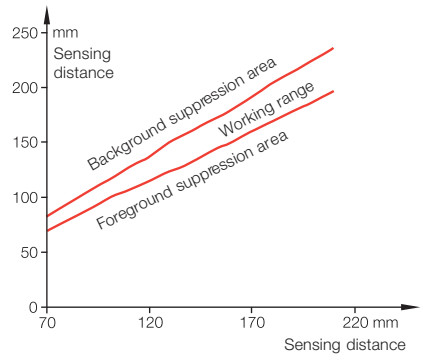
2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse with background suppression
BOS 21M-_US-RH12-S4



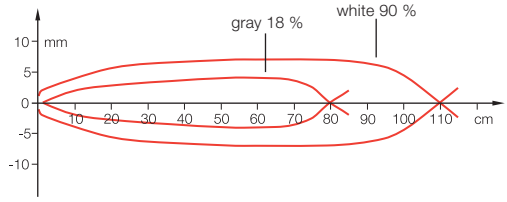
Detection range

Diffuse with fore- and background suppression
BOS 21M-_US-RV13-S4

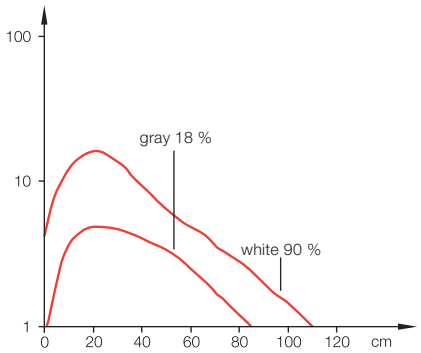


Detection range

Diffuse
BOS 21M-_A-RD10-S4

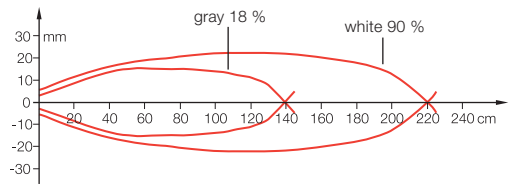


Detection range

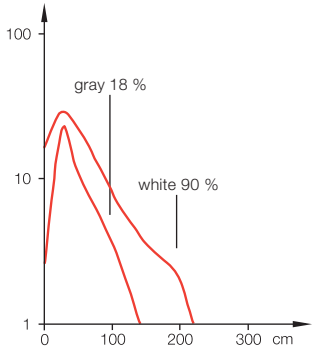


Function reserve

Diffuse long range
BOS 21M-_A-ID10-S4

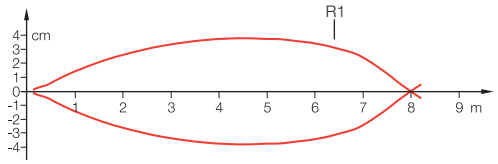


Detection range

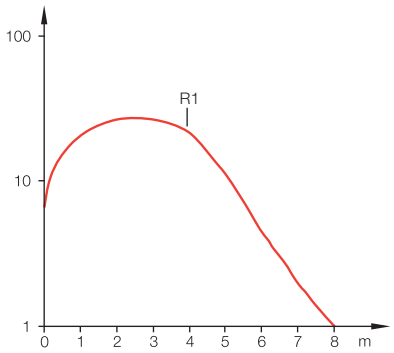


Function reserve

Retroreflective polarized
BOS 21M-_A-PR10-S4

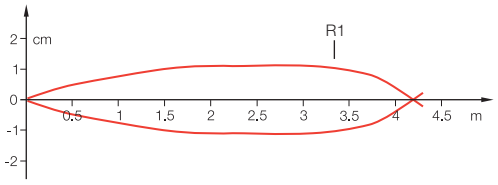


Detection range

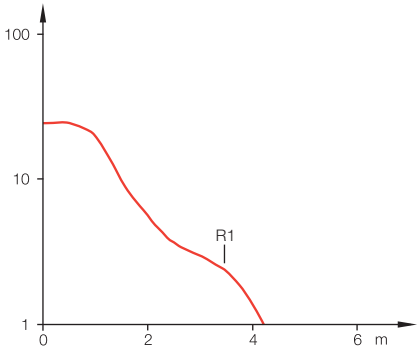


Function reserve

Retroreflective autocollimation
BOS 21M-_A-PK10-S4

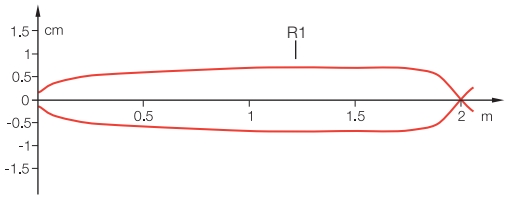


Detection range

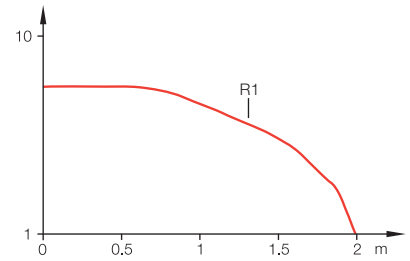


Function reserve

Retroreflective glass sensing
BOS 21M-_A-PT10-S4

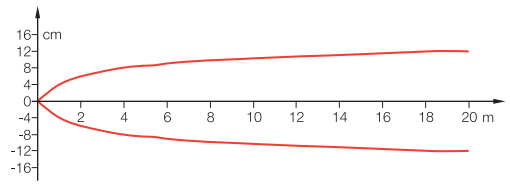


Detection range

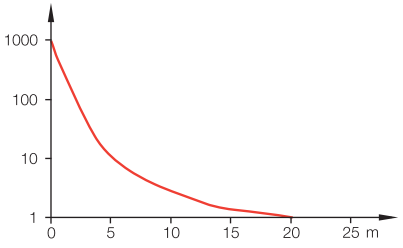


Resolution

Through-beam
BOS 21M-_A-IE10-S4



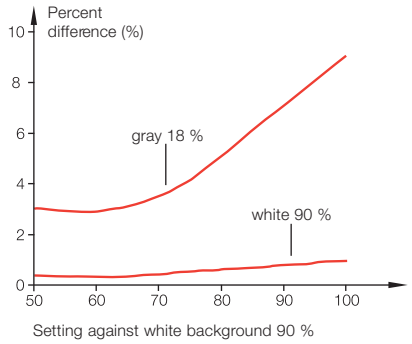
Detection range



Function reserve

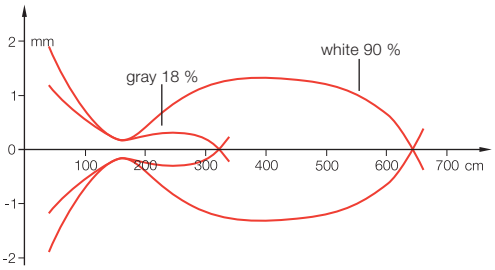
2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Laser diffuse with background suppression
BOS 21M-_US-LH12-S4

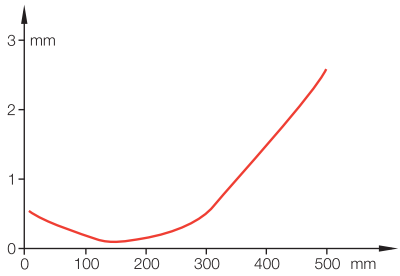


Tolerance with standard setting

Laser diffuse
BOS 21M-_A-LD10-S4

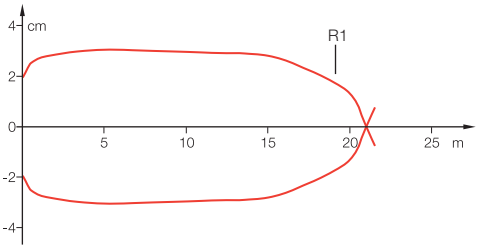


Detection range

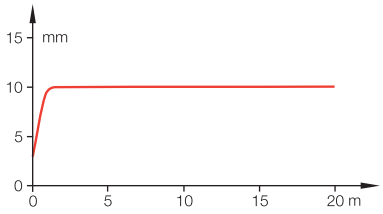


Resolution

Laser retroreflective polarized
BOS 21M-_A-LR10-S4

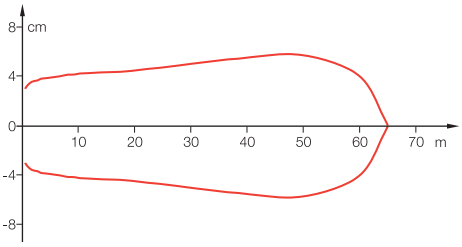


Detection range

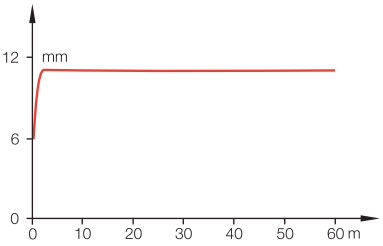


Resolution

Laser through-beam
BOS 21M-_A-LE10-S4



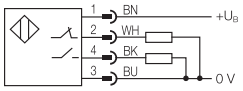
Detection range



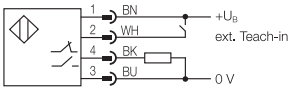
Resolution

Wiring diagrams

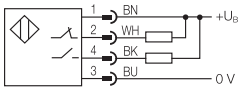
BOS 21M-PA-...



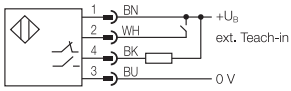
BOS 21M-PUS-...



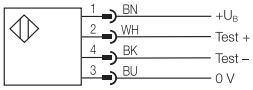
BOS 21M-NA-...



BOS 21M-NUS-...



BOS 21M-XT-...



Recommended accessories

please order separately

Mounting clamp
BOS 21-KH-1

Mounting clamp
BOS 21-KH-2

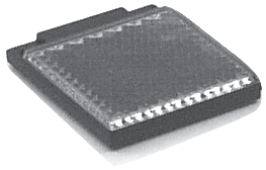
Mounting bracket
BOS 21-HW-1

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 ...
5 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

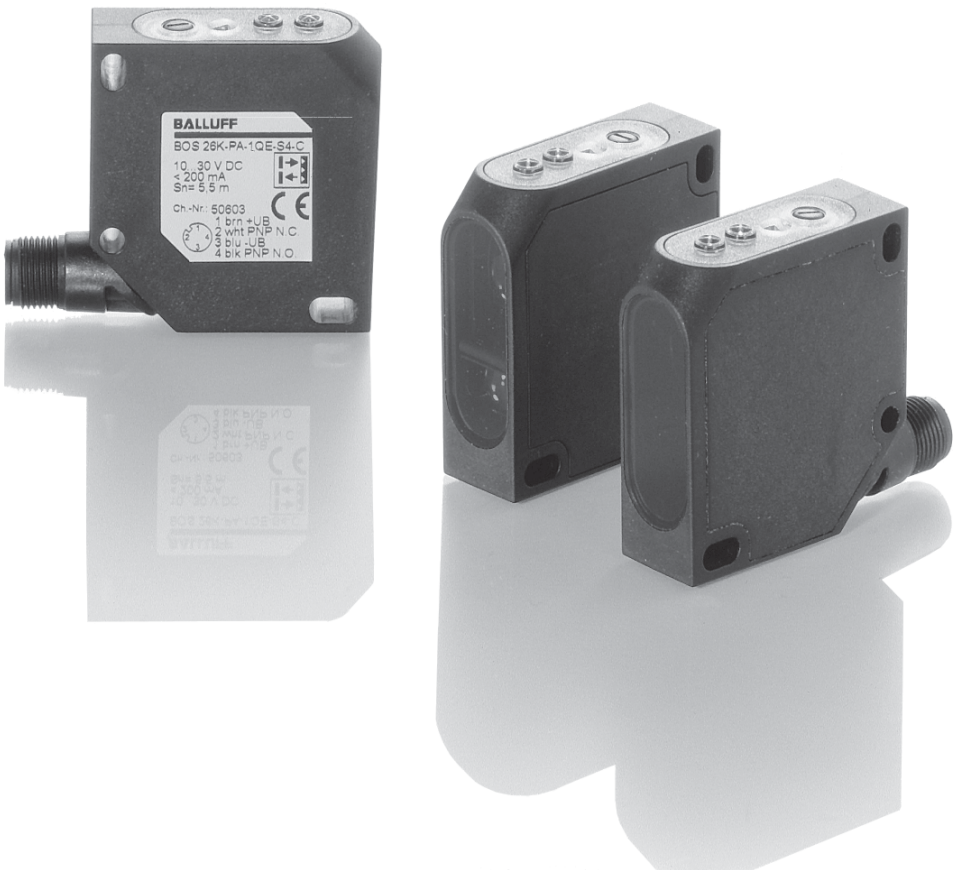
The diffuse model with background suppression **BOS 26K-..-1LHB,** with its focused light beam, can detect objects precisely in virtually any color between 30 and 150 mm. The focusing feature enables a spot size of just 0.1 mm at a distance of 80 mm.

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

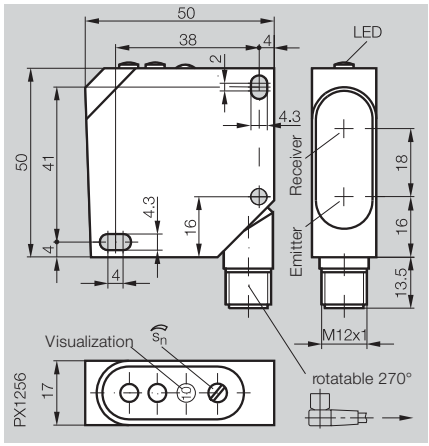
- Precise small part detection
- Positioning tasks
- Detail checking
- Conveyor inspection (background suppression)
- Conveying
- Automation
- Handling equipment, Robotics
- Machine tool building
- Specialty machines



Type	Sensing distance/ Range	Light type			Output		Output function		Switching frequency	U_B	Connection		Help functions			Page
		Red light	Infrared	Laser	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin		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
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Diffuse with background suppression	Sensing distance	**30...300 mm**
Retroreflective with polarizing filter	Range	

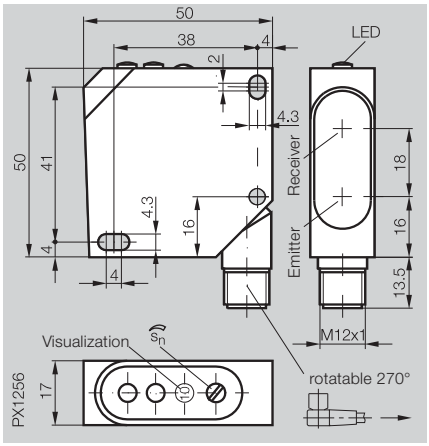
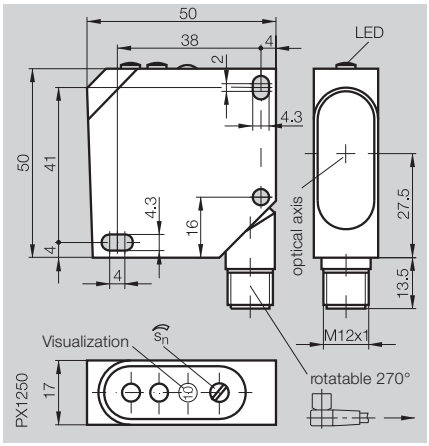
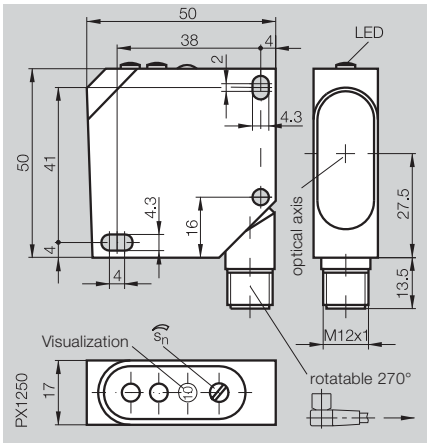


	Diffuse			
	PNP	30...300 mm	HGA	BOS 26K-PA-1HC-S4-C
	NPN	30...300 mm	HGA	BOS 26K-NA-1HC-S4-C
	PNP	150...600 mm	HGA	
	NPN	150...600 mm	HGA	
	Retroreflective			
	PNP	5.5 m	Autocollimation	
	NPN	5.5 m	Autocollimation	

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_e	≤ 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	50×50×17 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.

150...600 mm	**0...5.5 m**	**0...5.5 m**
		
BOS 26K-PA-1IE-S4-C BOS 26K-NA-1IE-S4-C	BOS 26K-PA-1QE-S4-C BOS 26K-NA-1QE-S4-C	BOS 26K-PO-1QE-SA1-C
10...30 V DC	10...30 V DC	10...30 V DC
10 %	10 %	10 %
≤ 70 mA	≤ 30 mA	≤ 30 mA
PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP-Transistor
200 mA	200 mA	200 mA
Light-/dark-on (complementary)	Light-/dark-on (complementary)	Light-on
≤ 2.4 V	≤ 2.4 V	≤ 2.4 V
2-turn potentiometer with indicators	2-turn potentiometer with indicator	2-turn potentiometer with indicator
		Contamination output
LED, infrared, pulsed	LED, red light, pulsed	LED, red light, pulsed
880 nm	660 nm	660 nm
approx. 20 mm at 400 mm		
5 %		
12 %		
LED green	LED green	LED green
LED yellow	LED yellow	LED yellow
LED red	LED red	LED red
0.625 ms	0.5 ms	0.5 ms
800 Hz	1 kHz	1 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
35 g	35 g	35 g
IP 67	IP 67	IP 67
yes	yes	yes
yes	yes	yes
–20...+60 °C	–20...+60 °C	–20...+60 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

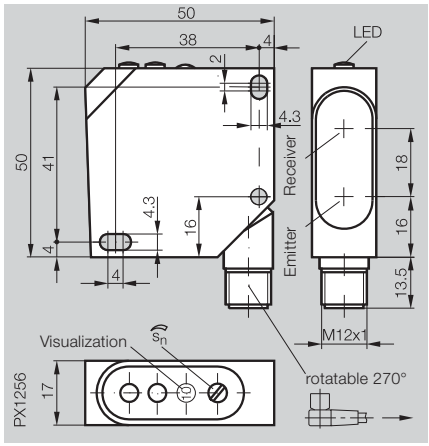
Connector orientation

2.1

2.3
Photoelectric sensors accessories
page 2.3.2 ...

5
Connectors ...
page 5.2 ...

Diffuse with background suppression	Sensing distance	**40...60 mm**
Retroreflective with polarizing filter	Range	



	Diffuse		
	PNP 40...60 mm	HGA	BOS 26K-PA-1LHA-SA1-S4-C
	NPN 40...60 mm	HGA	BOS 26K-NA-1LHA-SA1-S4-C
	PNP 30...150 mm	HGA	
	NPN 30...150 mm	HGA	
	PNP 50...300 mm	HGA	
	NPN 50...300 mm	HGA	
	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		50×50×17 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

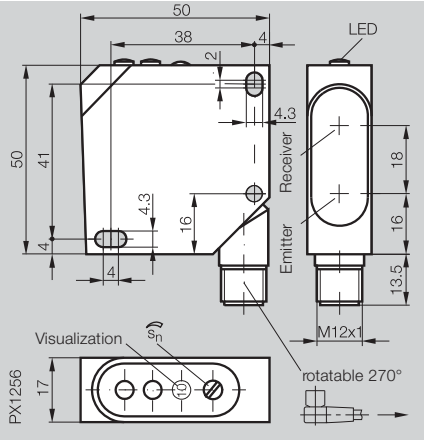
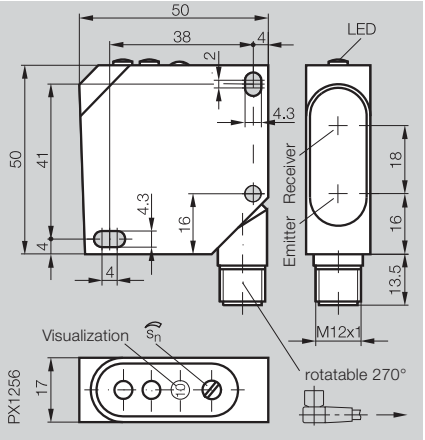
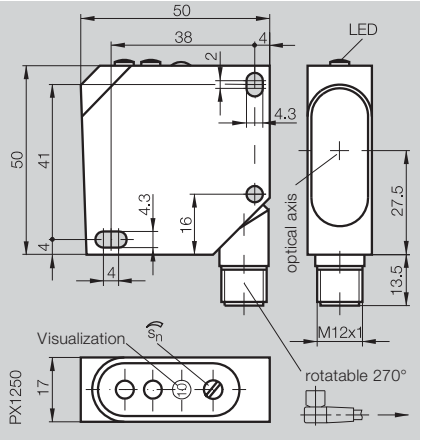
Diffuse sensor values referenced to Kodak gray card 90 % Reflexion. Retroreflective sensor values referenced to R22 reflector.

Light spot diameter [mm]

Sensing distance	40	45	50	55	60
Light spot-Ø	0.25	0.7	1.1	1.5	1.8

Wiring diagrams, characteristics and accessories see page **2.1.**154 and **2.1.**155.

Connector orientation

	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]

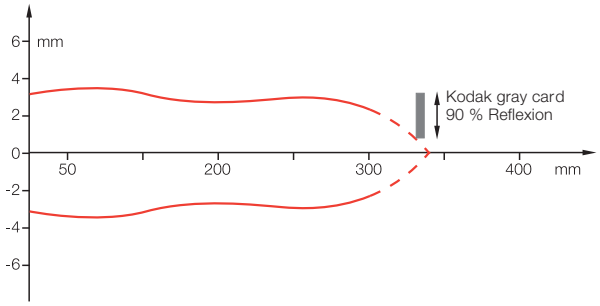
Sensing distance	50	100	200
Light spot Ø	5×1.8	4×1.5	3.8×1.2

Light spot diameter [mm]

Range (m)	4	12	20
Light spot-Ø	5	15	24

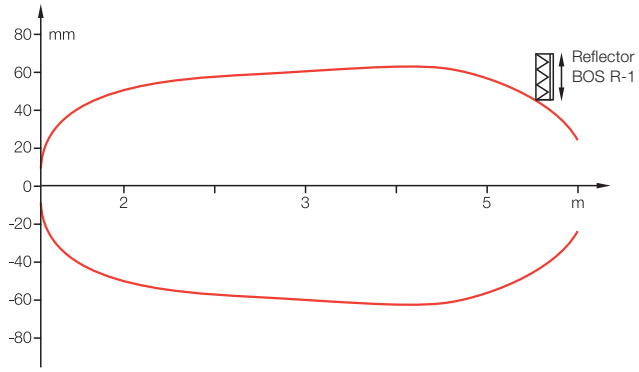
2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

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



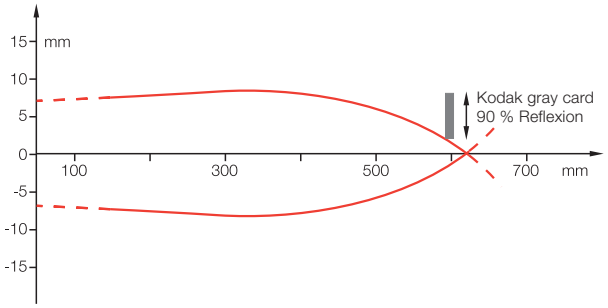
Sensing distance measured with side approach of Kodak gray card.

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



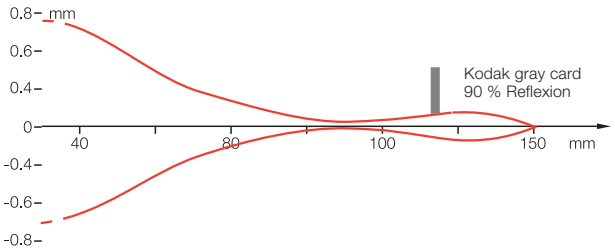
Range measured using side approach with reflector.

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



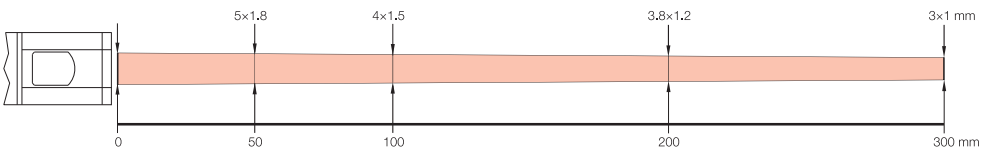
Sensing distance measured with side approach of Kodak gray card.

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

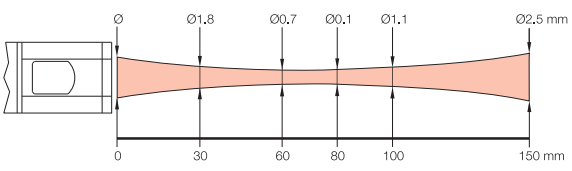


Sensing distance measured with side approach of Kodak gray card.

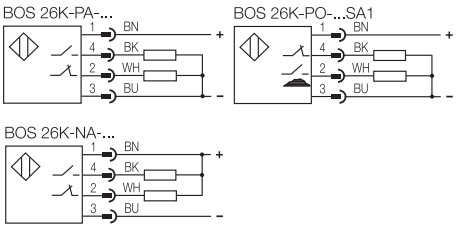
Light beam geometry BOS 26K...1LHC



Light beam geometry BOS 26K...1LHB



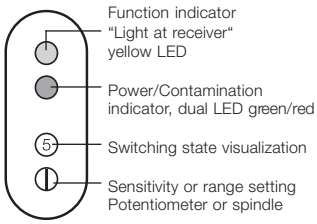
Wiring diagrams



Contamination indicator

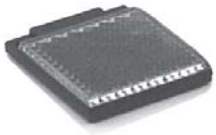
The BOS 26K has 2 display LED's: yellow for indicating function and green/red for indicating status and contamination. Should the received light drop below a certain level, this will be indicated by a red LED. This allows contamination or maladjustment to be detected early.

Indicators and operating elements



Recommended accessories

please order separately



Reflector
BOS R-9

Reflector
BOS R-1

Adapter plate
BOS 21-AD-1

Laser reflector
BOS R-22

Laser reflector
BOS R-12

Laser reflector
BOS R-13

Mounting bracket
BOS 26-HW-1

Connector
BKS-_ 19/BKS-_ 20

2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

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

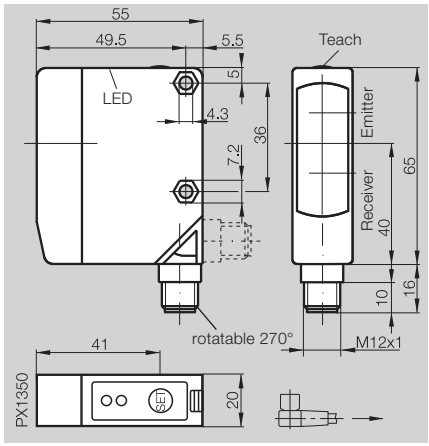
Applications

- 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	Connection		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

2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

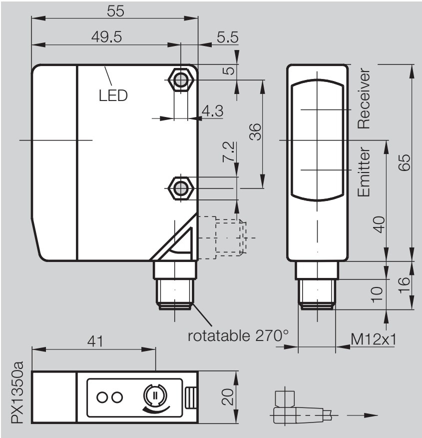
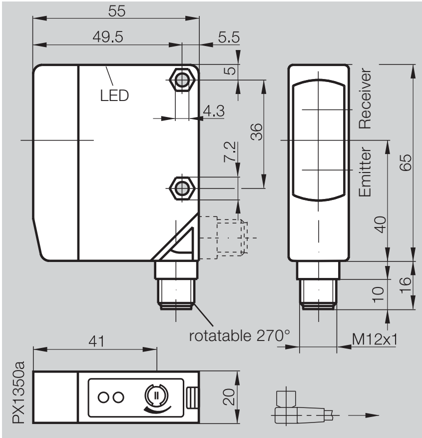
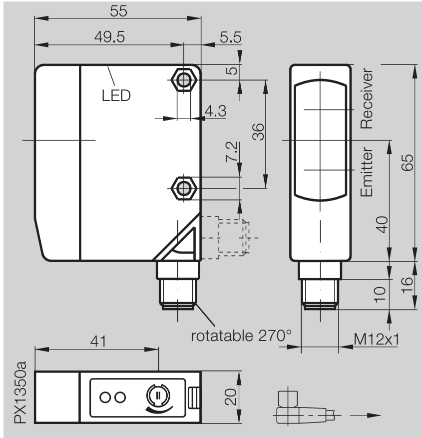
Diffuse with background suppression	Sensing distance	**100...500 mm**
Diffuse	Sensing distance	
Retroreflective with polarizing filter	Range	
Through-beam	Range	

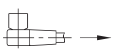


Diffuse				
PNP	100...500	mm	HGA, Teach-in	BOS 36K-PA-1HD-S4-C
PNP	0.01...2	m		
Retroreflective				
PNP	0.1...8	m	Polarizing filter	
Through-beam				
PNP	50	m	Receiver	
	50	m	Emitter	
Electrical data				
Supply voltage U_B				10...30 V DC
Ripple				2 V DC
No-load supply current I_0 max.				≤ 50 mA
Switching output				PNP-Transistor
Output current				200 mA
Switching type				Light/Dark (push-pull)
Voltage drop U_d at I_e				≤ 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	10...30 V DC	10...30 V DC
	2 V DC	2 V DC	2 V DC
	≤ 40 mA	≤ 40 mA	≤ 40 mA
	PNP-Transistor	PNP-Transistor	PNP-Transistor
	200 mA	200 mA	200 mA
	Light/Dark (push-pull)	Light/Dark (push-pull)	Light/Dark (push-pull)
	≤ 2 V	≤ 2 V	≤ 2 V
	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
			Test input (BLS)
	LED, infrared	LED, red light	LED, infrared
	880 nm	660 nm	880 nm
			LED green (BLS)
	LED yellow	LED yellow	LED yellow (BLE)
	LED green	LED green	LED green (BLE)
	1 ms	1 ms	1 ms
	500 Hz	500 Hz	500 Hz
	55×65×20 mm	55×65×20 mm	55×65×20 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
	50 g	50 g	50 g
	IP 66	IP 66	IP 66
	yes	yes	yes
	yes	yes	yes
	–25...+55 °C	–25...+55 °C	–25...+55 °C
	5 kLux	5 kLux	5 kLux

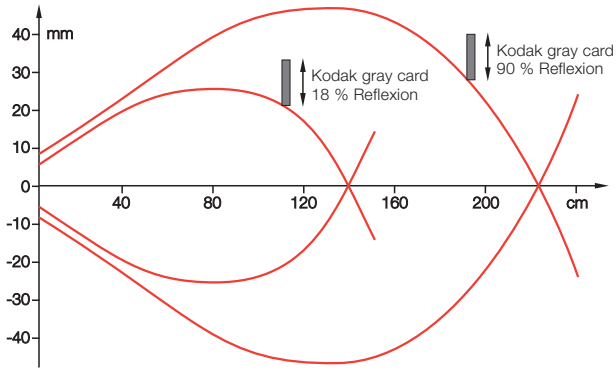
 Connector orientation

2.1

2.3
Photoelectric sensors accessories page 2.3.2 ...

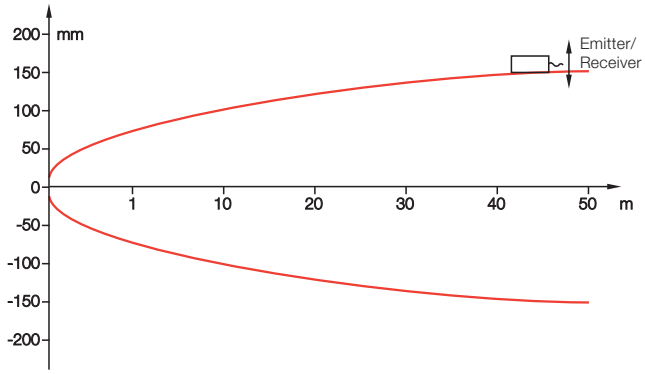
5
Connectors ... page 5.2 ...

Diffuse BOS 36K-PA-1PH-S 4-C



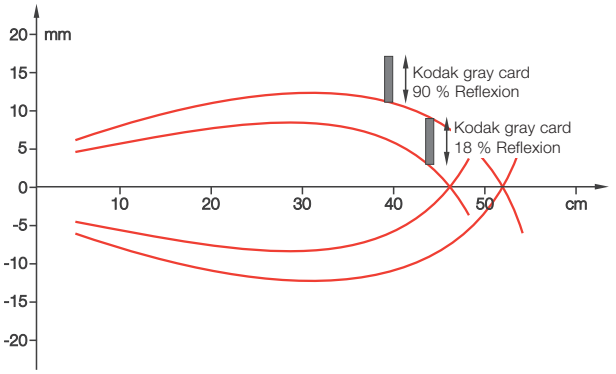
Sensing distance measured with side approach of Kodak gray card.

Through-beam BLE/BLS 36K-...



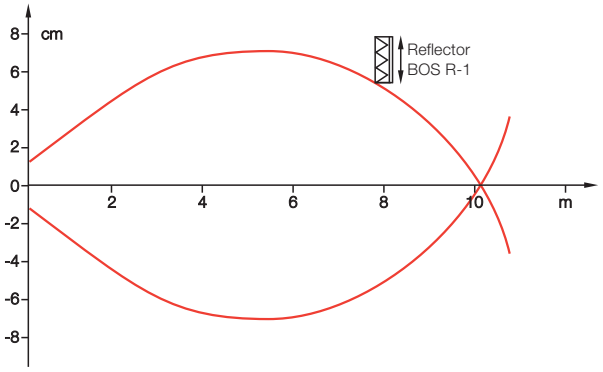
For the through-beam the maximum possible offset between emitter and receiver is measured.

Diffuse BOS 36K-PA-1HD-S 4-C



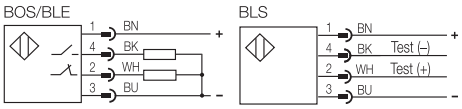
Sensing distance measured with side approach of Kodak gray card.

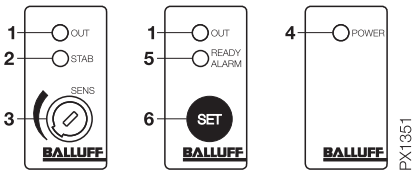
Retroreflective BOS 36K-PA-1QH-S 4-C



Range measured using side approach with reflector.

Wiring diagrams





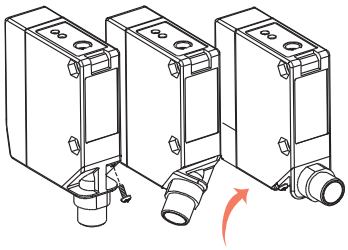
BOS 36K...PH/QH
BLE 36K

BOS 36K...HD

BLS 36K

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)



Connector 270° rotatable

2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Recommended accessories
please order separately

Reflector
BOS R-1

Mounting bracket
BOS 36-HW-1

Connector
BKS-_ 19/BKS-_ 20

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

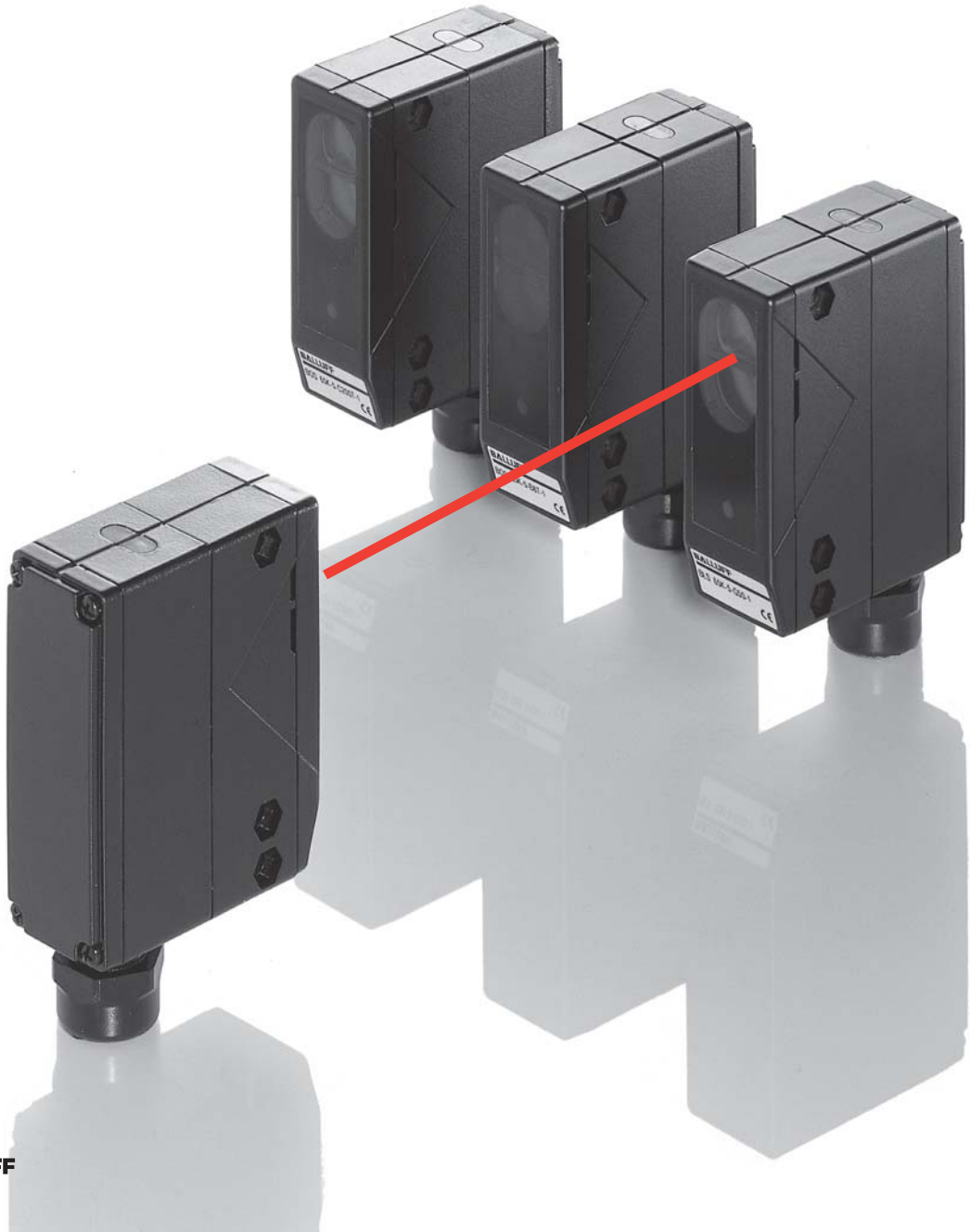
The supply voltage can be 10...30 V DC or 17...264 V AC/DC in the universal version.
All DC versions come standard with PNP and NPN transistor outputs, and have an alarm output and test input. The universal voltage versions have a relay output. The retro- and through-beam versions use both visible red 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		Connec-tion		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	■			■		■	■	**2.1**.165
BOS 65K-5-M110T-2P-S4	0.2...1.1 m		■	■			■	■	500 Hz	■		■			■		**2.1**.165
BOS 65K-1-M110T-1	0.2...1.1 m		■			■	■	■	10 Hz		■		■				**2.1**.165
Diffuse																	
BOS 65K-5-C200T-1	0.05...2 m		■	■	■		■	■	500 Hz	■			■		■	■	**2.1**.165
BOS 65K-5-C200T-2P-S4	0.05...2 m		■	■			■	■	500 Hz	■		■			■		**2.1**.165
BOS 65K-1-C200T-1	0.05...2 m		■			■	■	■	10 Hz		■		■				**2.1**.165
Retroreflective																	
BOS 65K-5-B8T-1	0.3...8 m	■		■	■		■	■	500 Hz	■			■	■	■	■	**2.1**.165
BOS 65K-5-B8T-2P-S4	0.3...8 m	■		■			■	■	500 Hz	■		■		■	■		**2.1**.165
BOS 65K-1-B8T-1	0.3...8 m	■				■	■	■	10 Hz		■		■	■			**2.1**.165
Through-beam																	
BLE 65K-5-F50T-1	0...50 m		■	■	■		■	■	500 Hz	■			■		■		**2.1**.165
BLE 65K-5-F50T-2P-S4	0...50 m		■	■	■		■	■	500 Hz	■		■			■		**2.1**.165
BLE 65K-1-F50T-1	0...50 m		■			■	■	■	10 Hz		■		■				**2.1**.165
BLS 65K-5-G50-1	0...50 m		■							■			■			■	**2.1**.165
BLS 65K-5-G50-2-S4	0...50 m		■							■		■				■	**2.1**.165
BLS 65K-1-G50-1	0...50 m		■								■		■				**2.1**.165

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
Retroreflective	maximum range
Through-beam	maximum range

CE

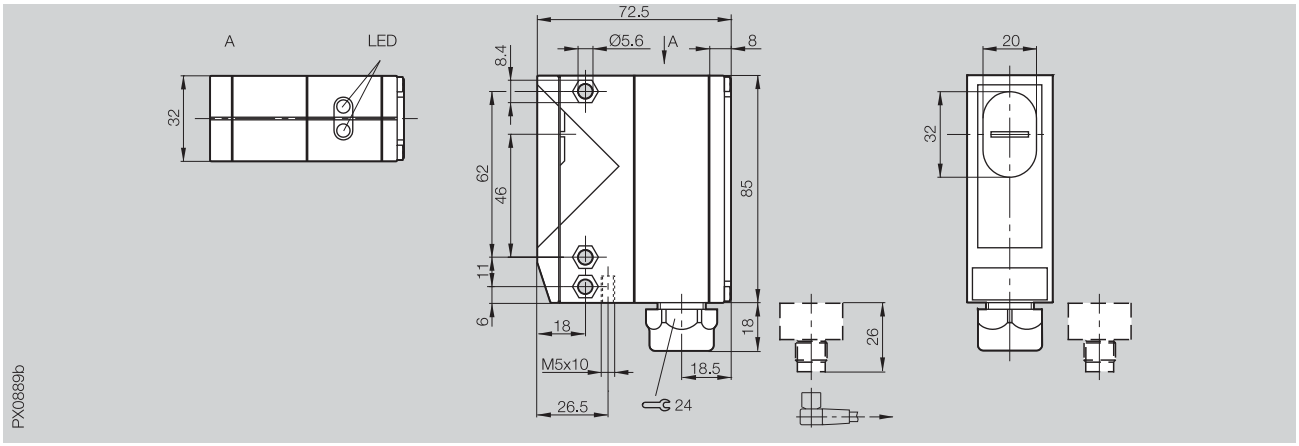
Diffuse			
PNP/NPN	0.2...1.1	m	HGA, time function
	0.05...2	m	Time function
Relay	0.2...1.1	m	HGA, time function
	0.05...2	m	Time function
Retroreflective			
PNP/NPN	0.3...8	m	Polarizing filter, red light, time function
Relay	0.3...8	m	Polarizing filter, red light, time function
Through-beam			
PNP/NPN	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.

	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**

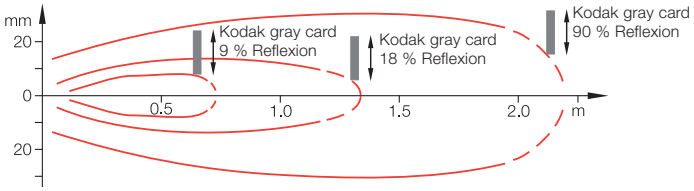


	BOS 65K-5-M110T-1	BOS 65K-5-M110T-2P-S4	
	BOS 65K-5-C200T-1	BOS 65K-5-C200T-2P-S4	
			BOS 65K-1-M110T-1
			BOS 65K-1-C200T-1
	BOS 65K-5-B8T-1	BOS 65K-5-B8T-2P-S4	
			BOS 65K-1-B8T-1
	BLE 65K-5-F50T-1	BLE 65K-5-F50T-2P-S4	
	BLS 65K-5-G50-1	BLS 65K-5-G50-2-S4	
			BLE 65K-1-F50T-1
			BLS 65K-1-G50-1
	10...30 V DC	10...30 V DC	17...264 V AC/DC
	≤ 40 mA	≤ 40 mA	
	PNP and NPN Transistor	PNP-Transistor	Relay 3A, 250 V AC/24 V DC
	200 mA	200 mA	
	Light and dark (reversible)	Light and dark (reversible)	Light and dark (reversible)
	≤ 2 V	≤ 1.5 V	0 V
	PNP-Transistor, 200 mA	PNP-Transistor, 200 mA	
	Potentiometer 270°	Potentiometer 270°	Potentiometer 270°
	Test input (except BLE)	Test input (for BLS)	
	LED green (only for BLS)	LED green (only for BLS)	LED green (only for BLS)
	LED red	LED red	LED red
	LED green	LED green	LED green
	1 ms	1 ms	20 ms
	500 Hz	500 Hz	10 Hz
	selectable 0.02…12 sec.	selectable 0.02…12 sec.	selectable 0.02…12 sec.
	72.5×85×32 mm	72.5×85×32 mm	72.5×85×32 mm
	Wiring chamber	M12 connector, 4-pin	Wiring chamber
	0.75 mm²		0.75 mm²
	PC	PC	PC
	PMMA	PMMA	PMMA
	160 g	180 g	160 g
	IP 67	IP 67	IP 67
	yes	yes	yes
	yes	yes	no
	–20...+55 °C	–20...+55 °C	–20...+55 °C
	3 kLux	3 kLux	3 kLux

Connector orientation

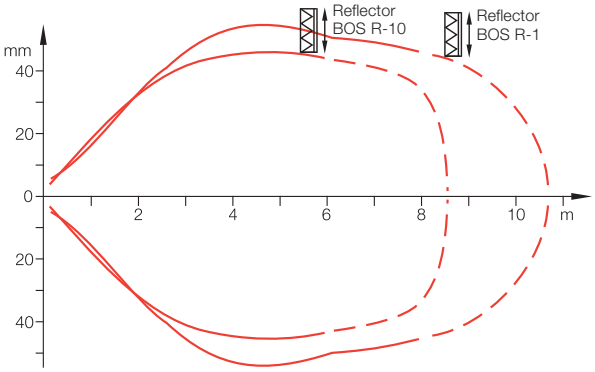
2.1
2.3 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

Diffuse BOS 65K-.-C200T-...



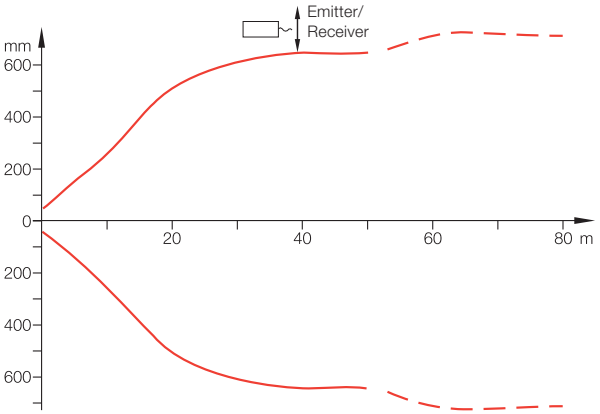
Sensing distance measured with side approach of Kodak gray card.

Retroreflective with polarizing filter BOS 65K-.-B8T-...



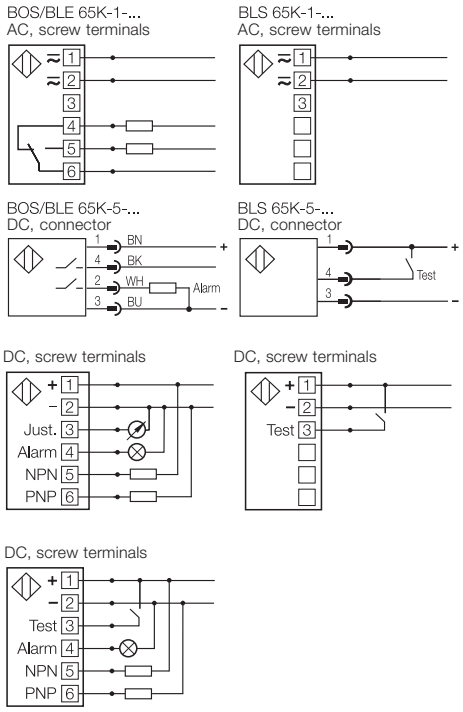
Range measured using side approach with reflector.

Through-beam BLE/BLS 65K-...



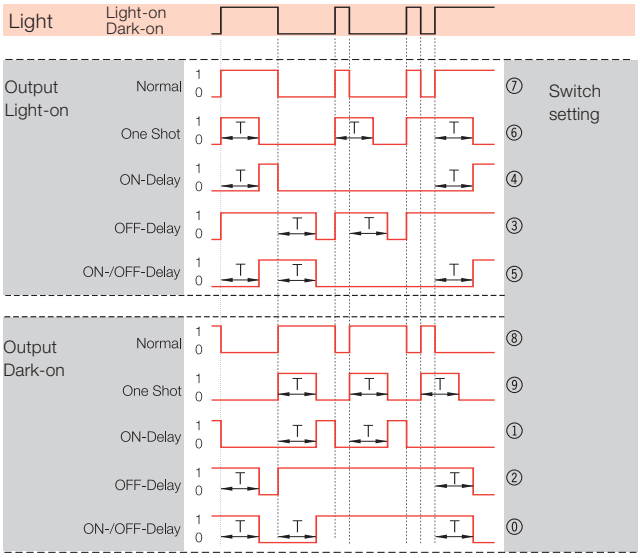
For the through-beam the maximum possible offset between emitter and receiver is measured.

Wiring diagrams



Access to the operating elements by removing the cover (rear).

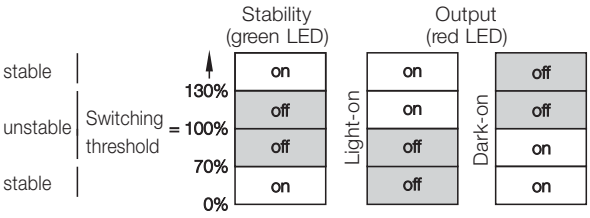
Programmable time functions



Green stability display

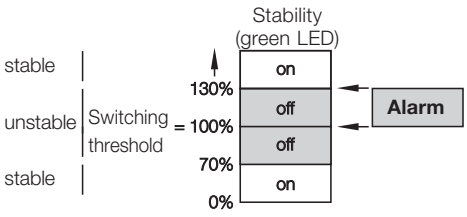
The “threshold energy”, which results in a signal change on output, is defined as 100 %.
The switching state is considered stable when the input energy exceeds or falls below the “threshold energy” by 30 %. The green LED illuminates.

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.



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.

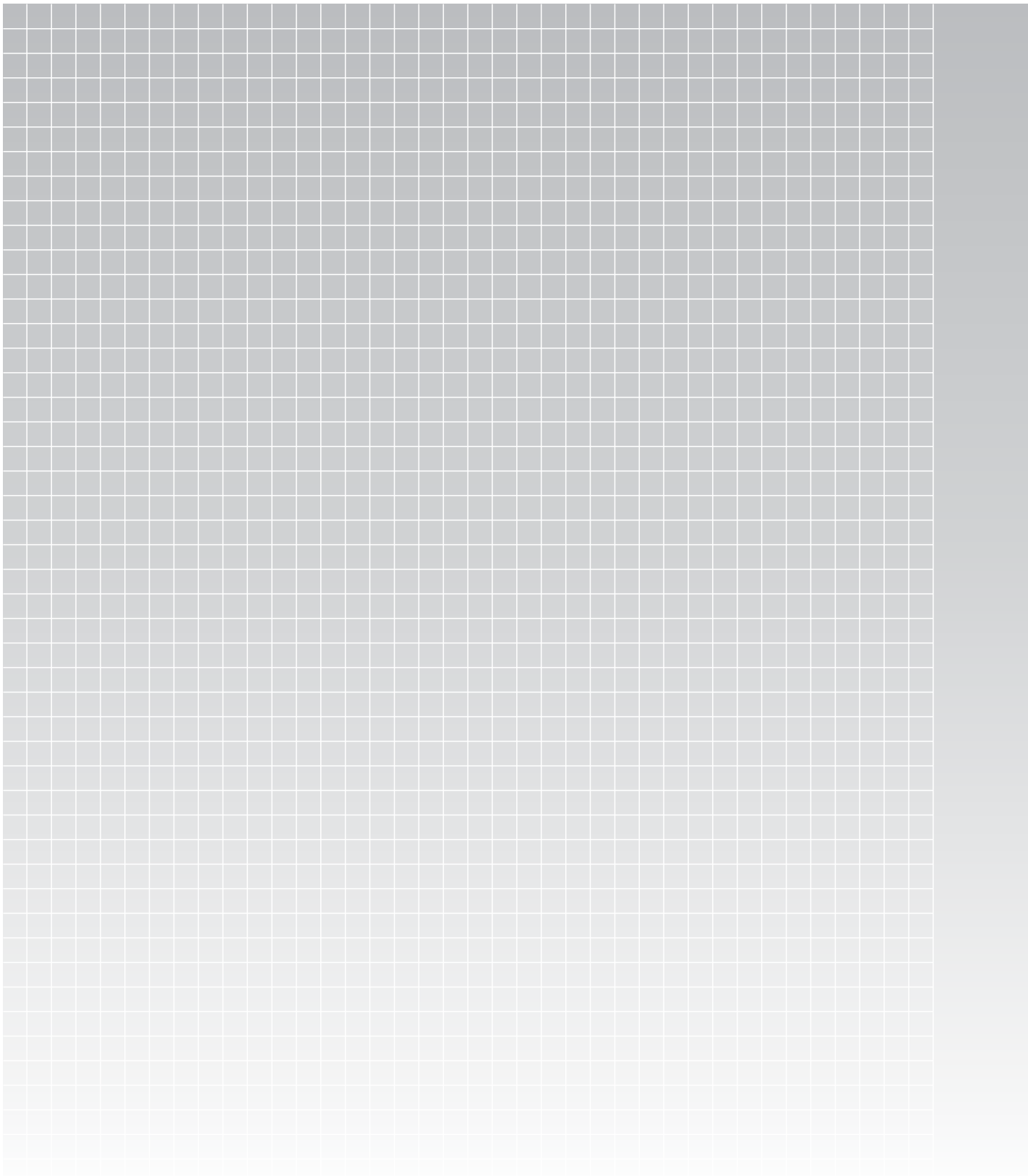
2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Recommended accessories
please order separately

Reflector
BOS R-1

Mounting bracket
BOS 65-HW-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.

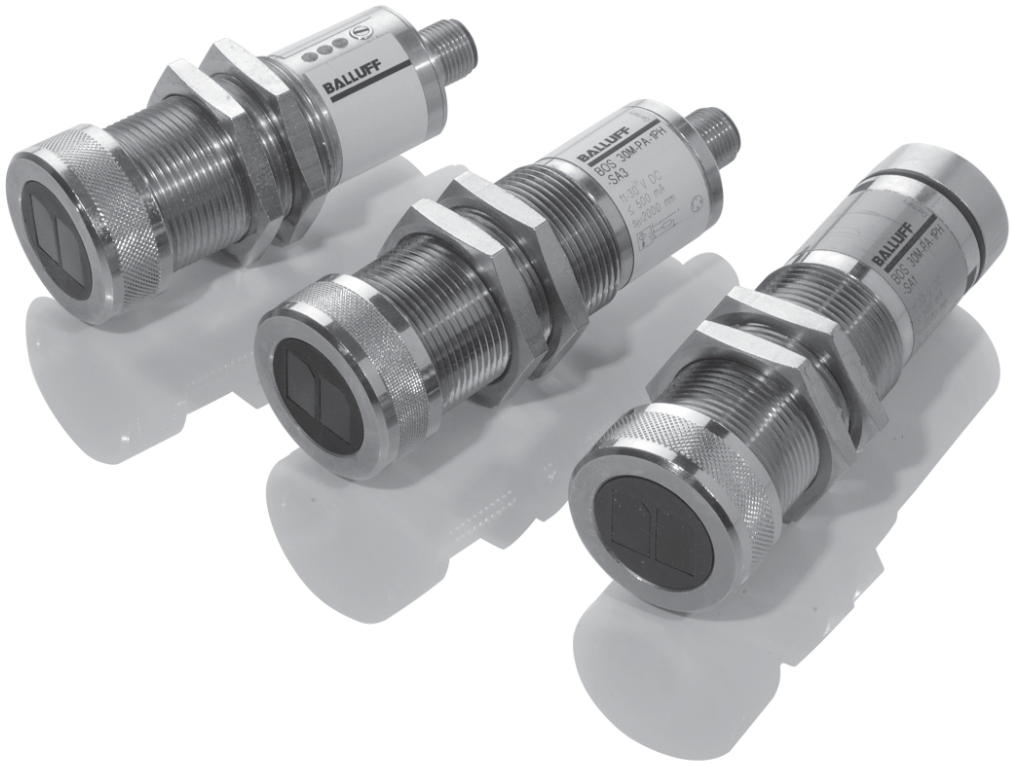
Together with special glass fiber optics BFO 18V-... Balluff offers a high-performance and tough product – particularly suitable for the automobile industry.

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
- Atomobile industry approved
- Contamination indicator

Applications

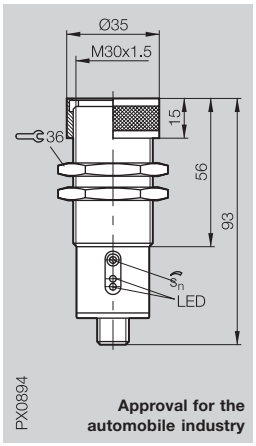
- Automobile industry
- Conveying and warehousing
- Construction machinery
- Woodworking industry
- Where harsh conditions prevail

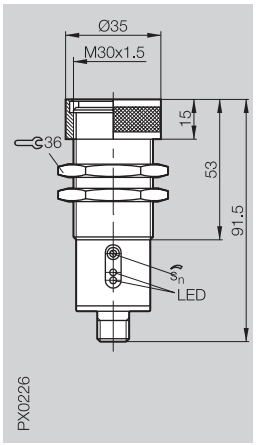


Type	Sensing distance	Light type		Output		Output function		Switching frequency	U_B	Connection		Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	BKS-S 1, 5-pin	
Diffuse												
BOS 30M-PU-1PH-SA -C	0...2 m		■	■		■	■	100 Hz	■		■	**2.1.**94
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 Photoelectric sensors accessories page 2.3.2 ...
5 Connectors ... page 5.2 ...

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

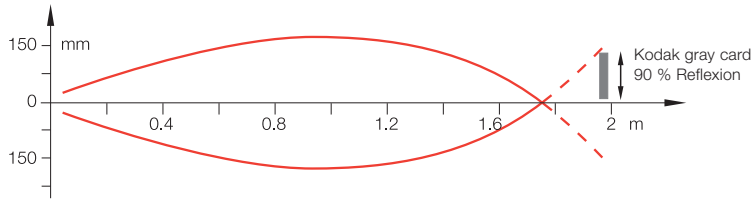




Diffuse					
PNP	2 m	Daylight filter	BOS 30M-PU-1PH-SA3-C		
PNP/NPN	2 m	Daylight filter		BOS 30M-GA-1PH-S4-C	
Electrical					
Supply voltage U_B			10...30 V DC	10...30 V DC	
Ripple			10 %	10 %	
No-load supply current I_0 max.			≤ 40 mA	≤ 40 mA	
Switching output			PNP-Transistor	PNP- and NPN-Transistor (push-pull)	
Output current			200 mA	200 mA	
Switching type			Light- and dark-on	Light- and dark-on	
Voltage drop U_d at I_e			≤ 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	

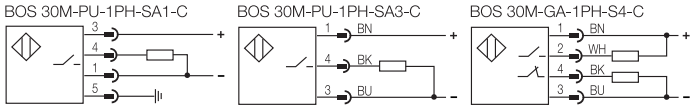
Diffuse values referenced to Kodak gray card 90% Reflexion, 400×400 mm.

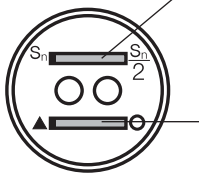
Diffuse BOS 30M-..-1PH-...



Sensing distance measured with side approach of Kodak gray card.

Wiring diagrams





Switch for halving the switching distance. The switching distance can be set more precisely. The resolution of the 18-turn potentiometer is increased.

Inverting switch for toggling the final stage version. Converts normally closed to normally open for example.

Recommended accessories
please order separately

Adapter
BFO 30-A1

Mounting clamp
BOS 30.0-KB-1

Connector
BKS-_ 19/BKS-_ 20

2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

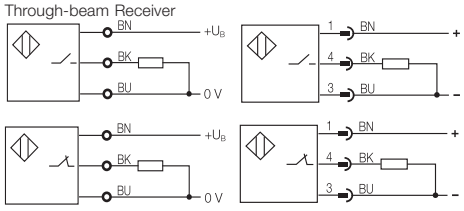
Miniaturization in the Balluff line continues at full pace. The new Opto-mini.s **BOS Q08M** sensors stand out with their ease of handling and fixed sensing distances and ranges.

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

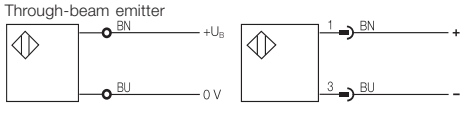
These small photoelectric sensors open up possibilities in high-dynamic applications such as on robot gripper arms. Here is where components with the lightest weight, a small footprint and yet the greatest switching precision are demanded.

Wiring diagrams

Diffuse, Retroreflective, Through-beam Receiver

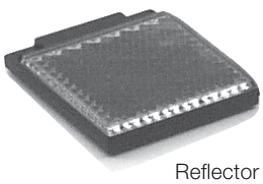


Through-beam emitter



Recommended accessories

please order separately



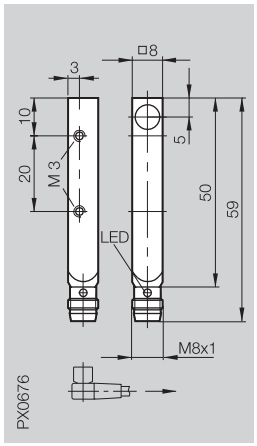
Reflector
BOS R-9

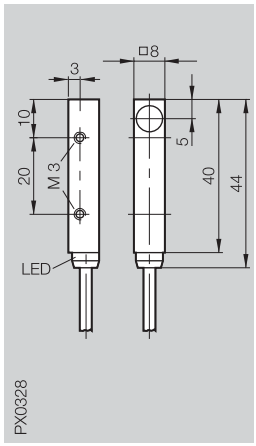
Connector
BKS-_ 48/BKS-_ 49

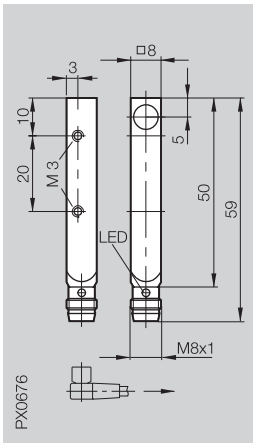
Type	Sensing distance/ range	Light type		Output		Output function		Switching frequency	U_B	Connec-tion		Special features		Page
		Red light	Infrared	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 3-pin	Cable, 3 m	Polarizing filter		
Diffuse														
BOS Q08M-PS-RD10-S49	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

2.1
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Diffuse	maximum sensing distance	**0...55 mm**	**0...55 mm**	
Retroreflective	maximum range			**25...550 mm**
Through-beam	maximum range			



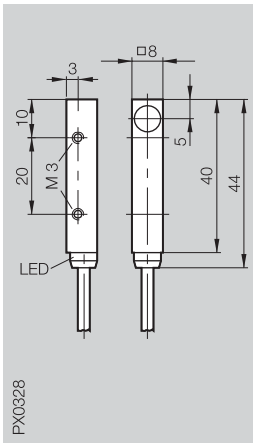
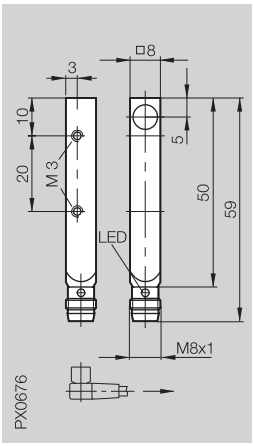
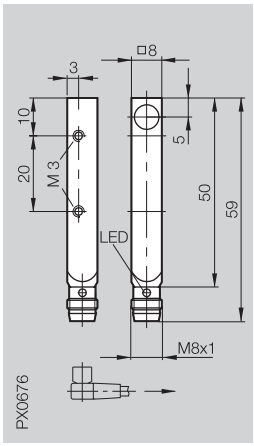
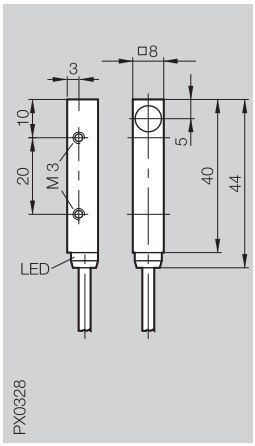
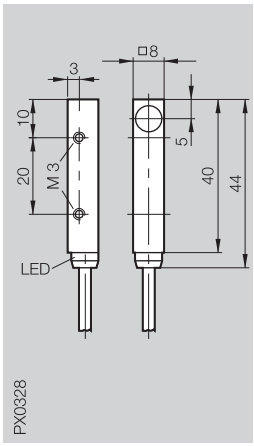




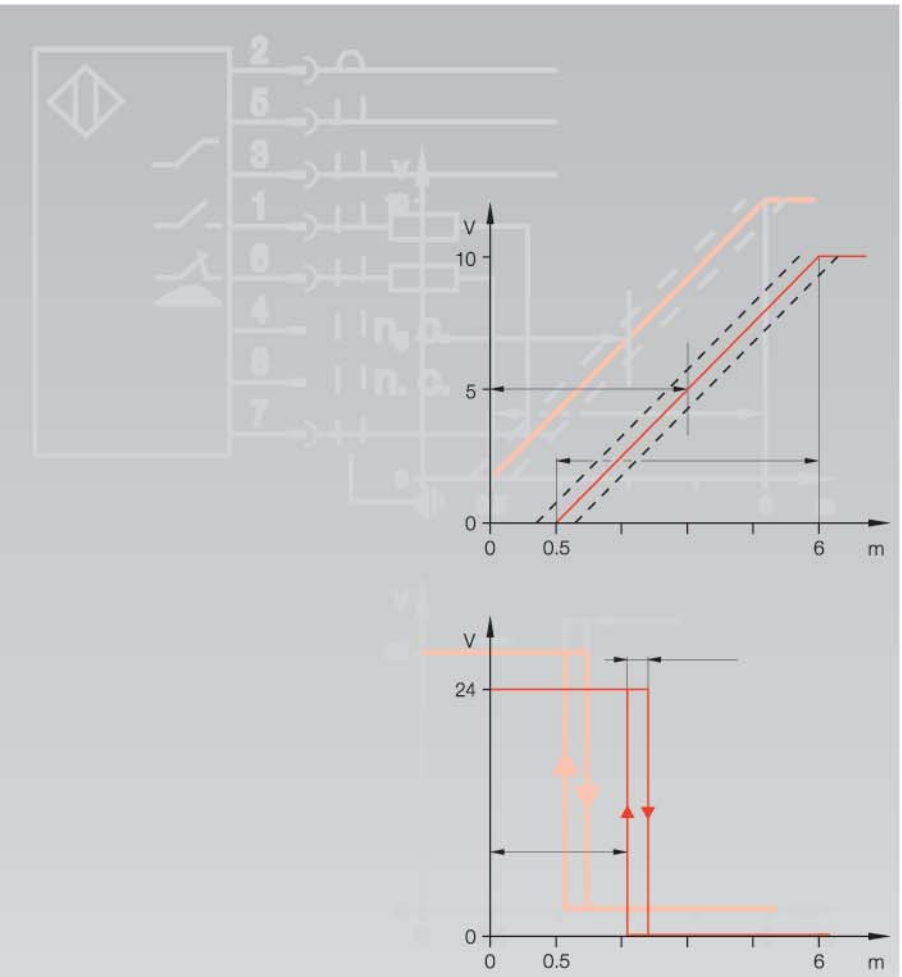
Diffuse					
PNP, NO	55 mm		BOS Q08M-PS-RD10-S49	BOS Q08M-PS-RD10-03	
PNP, NC	55 mm		BOS Q08M-PO-RD10-S49	BOS Q08M-PO-RD10-03	
Retroreflective					
PNP, NO	25...550 mm	Polarizing filter			BOS Q08M-PS-PR10-S49
PNP, NC	25...550 mm	Polarizing filter			BOS Q08M-PO-PR10-S49
Through-beam					
PNP, NO	1.1 m	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 mm²	
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.

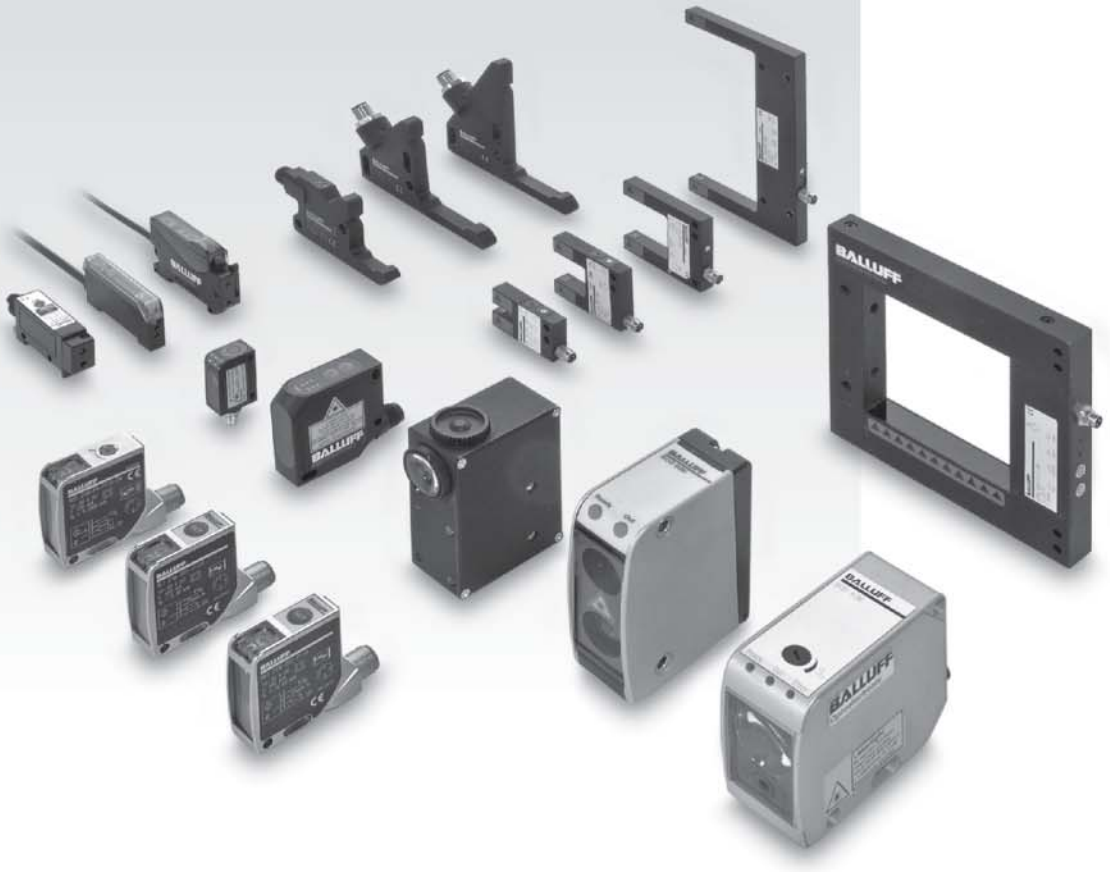
Connector orientation

	25...550 mm	**0...1.1 m**	**0...1.1 m**	**0...1.1 m**	**0...1.1 m**
					
	BOS Q08M-PS-PR10-03 BOS Q08M-PO-PR10-03				
		BOS 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		LED, red light		LED, red light
	640 nm		640 nm		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 mm²			3×0.14 mm²	2×0.14 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 page 2.3.2 ...
5 Connectors ... page 5.2 ...



Photoelectric Sensors for Special Applications



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 an ambient temperature or 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

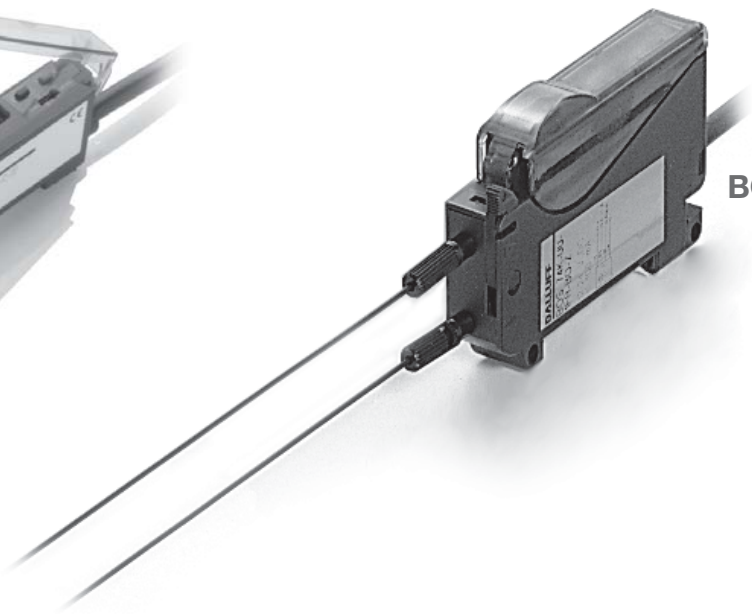
BFB 75K...

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 page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

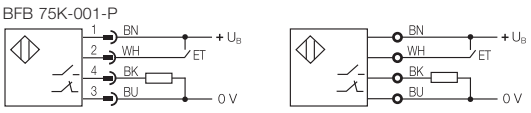
Features

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

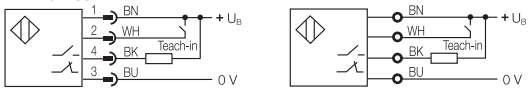
Mounting notes for fiber optics
The resistance of the sealing ring must be overcome when connecting the fiber optics to the base unit.

Wiring diagrams

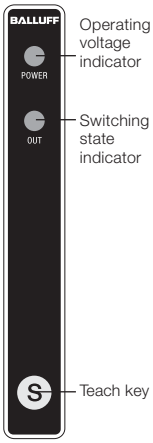
BFB 75K-001-P



BFB 75K-001-N



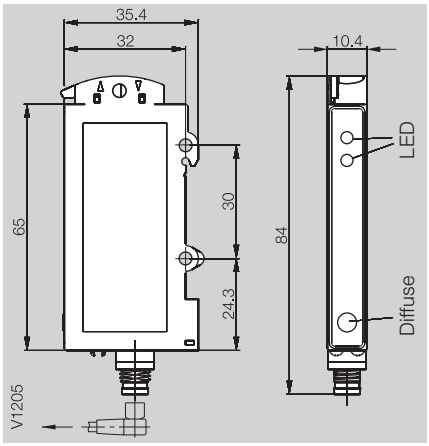
Control panel

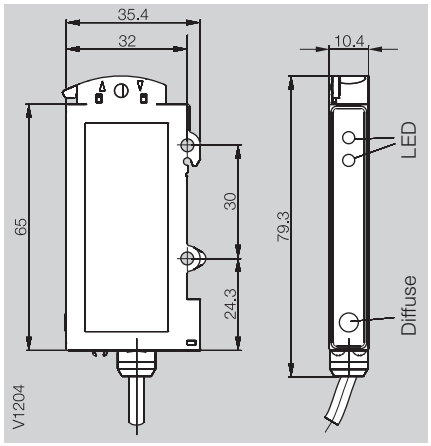


Recommended accessories
please order separately

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 optic cable	depends on fiber optics





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	≤ 10 %	≤ 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_e	≤ 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 × cross-section		4×0.14 mm²
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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

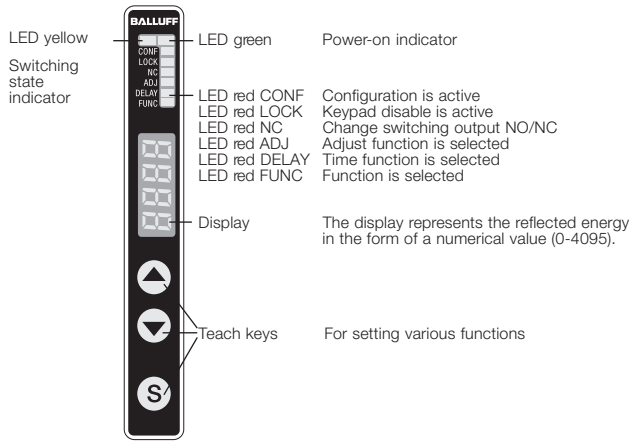
The BFB **75K-002...** offers perfect performance as a high-end amplifier with 12-bit resolution, a 4-digit display and a switching frequency of up to 8 kHz. Various operating modes such as Fine or High Distance allows the sensor to be better adapted to the respective application. Configurable time functions, 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

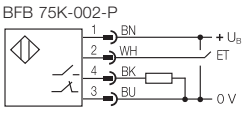
*depending on fiber optics used

Control panel

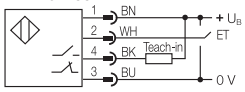


Wiring diagrams

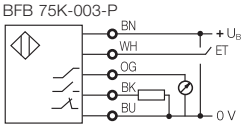
BFB 75K-002-P



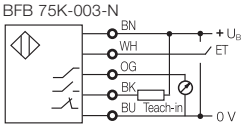
BFB 75K-002-N



BFB 75K-003-P



BFB 75K-003-N

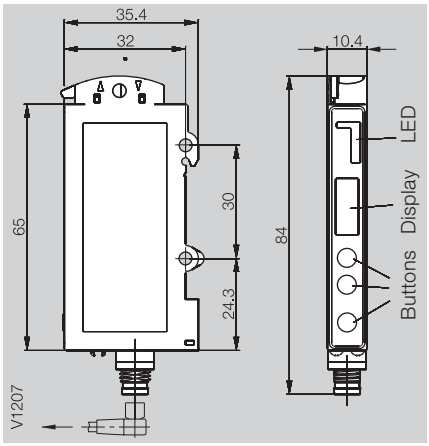


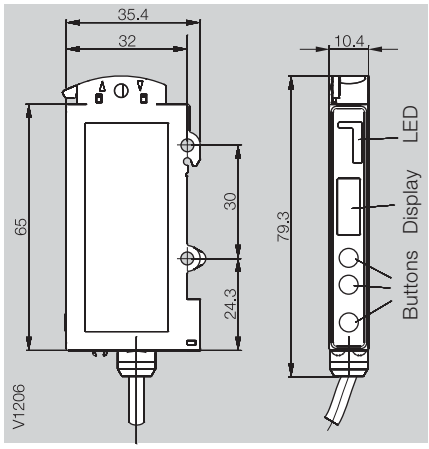
Recommended accessories

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		≤ 10 %	≤ 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_e		≤ 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	1 kHz	1 kHz
	Fast Mode	8 kHz	8 kHz
Time function		On- and/or off-delay	On- and/or off-delay
		1...2000 ms adjustable	1...2000 ms adjustable
Indicators			
Power-on indicator		LED green	LED green
Switching state indicator		LED yellow	LED yellow
Status indicator		6× LED red	6× LED red
Display		4-digit	4-digit
Mechanical data			
Connection		M8 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section			5×0.14 mm²
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

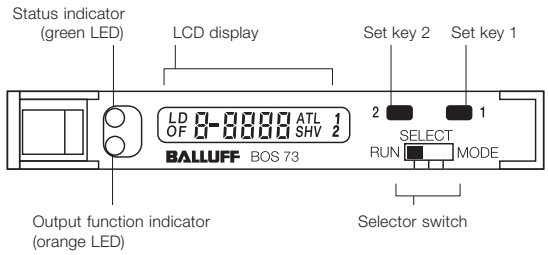
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

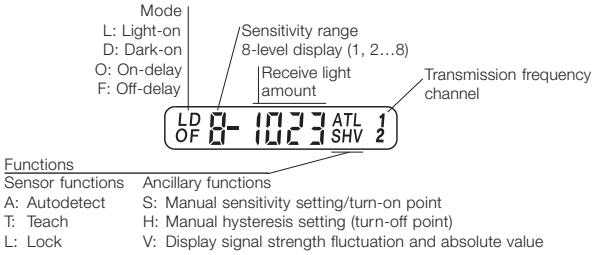
Features

- 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

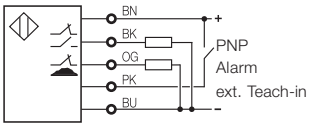
Control panel

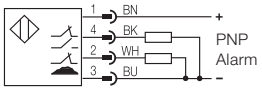


Display



Wiring diagrams

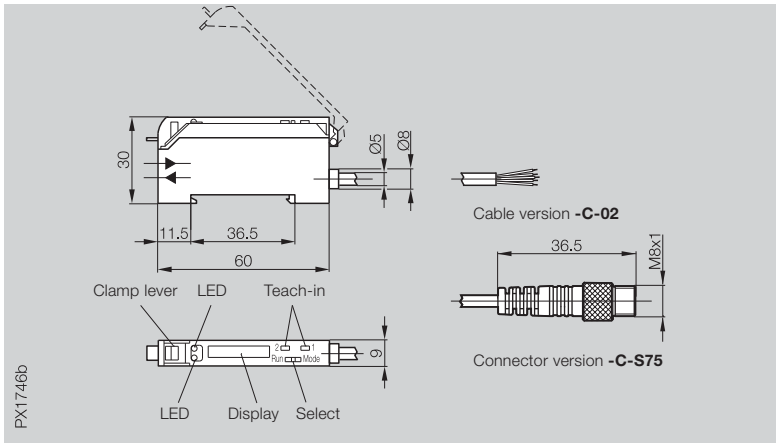




Recommended accessories
please order separately

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		≤ 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 × cross-section		5×0.2 mm²	
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	

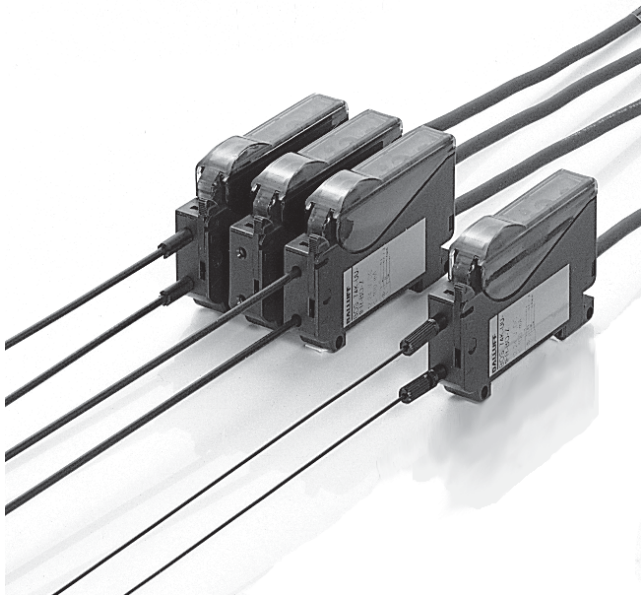
Mounting materials included!

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

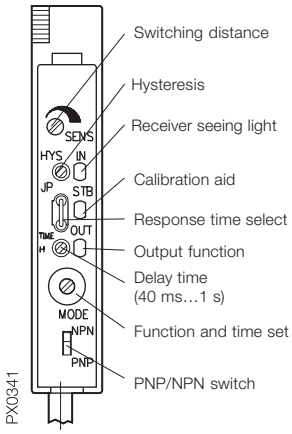
The **BOS 74K** offers maximum performance and adjusting flexibility (time functions, switching hysteresis) in various models for mastering even difficult applications.

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



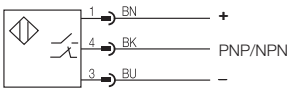
BOS 74K function table

Position	KV	EV	AV	WF	HS	DS	AE	AA
0			■			■	■	
1				■		■	■	
2	■					■	■	
3		■				■	■	
4			■		■		■	
5				■	■		■	
6	■				■		■	
7		■			■		■	
8			■			■		■
9				■		■		■
A	■					■		■
B		■				■		■
C			■		■			■
D				■	■			■
E	■				■			■
F		■			■			■

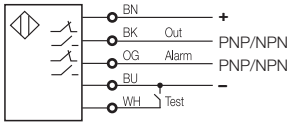
Function
KV: No delay
EV: On-delay
AV: Off-delay
WF: Wipe function
HS: Light-on
DS: Dark-on
AE: Alarm output NO
AA: Alarm output normally closed
■: Enabled

Wiring diagrams

BOS 74K...S49-0,2



BOS 74K...Z-02

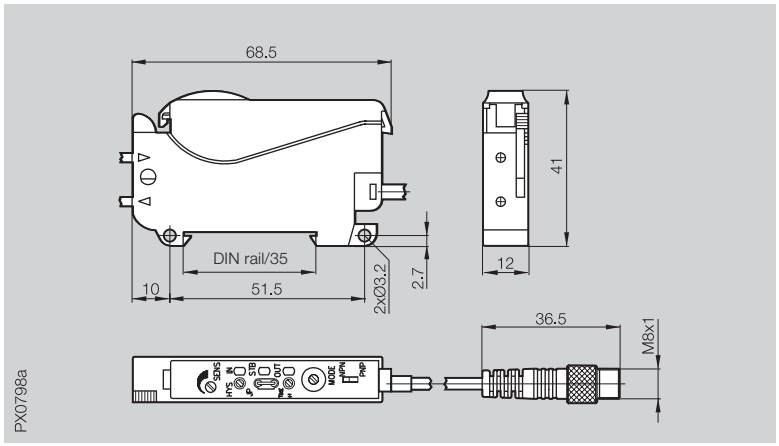


Recommended accessories
please order separately

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	
PNP/NPN	High-speed*			BOS 74K-UU-1FS-B0-Z-02
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.		≤ 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	Switching output	200 mA	200 mA	200 mA
	Alarm output		50 mA	50 mA
Voltage drop U_d at I_e		≤ 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 µs	≤ 500 µs	≤ 60 µs
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 × cross-section			5×0.25 mm²	5×0.25 mm²
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

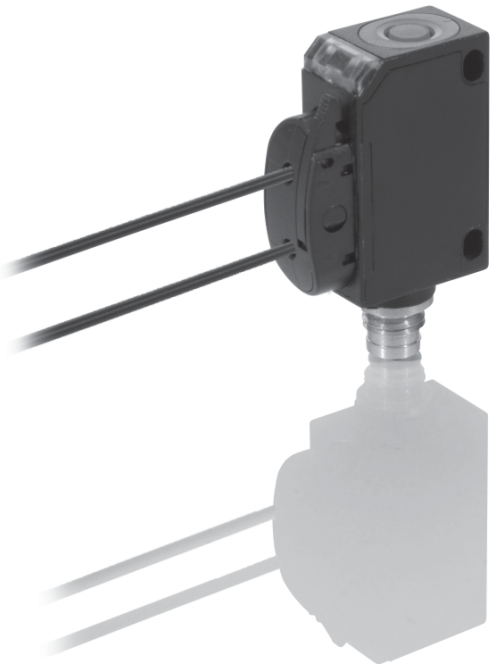
*Range reduced by 30 %

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
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.

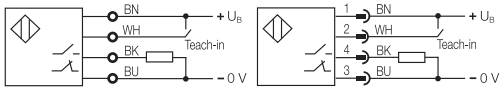
Features

- Teach-in
- Contamination indicator
- Control line for ext. Teach-in
- Key disable

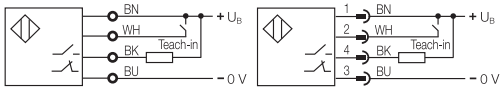


Wiring diagrams

BOS 6K-PU-...



BOS 6K-NU-...



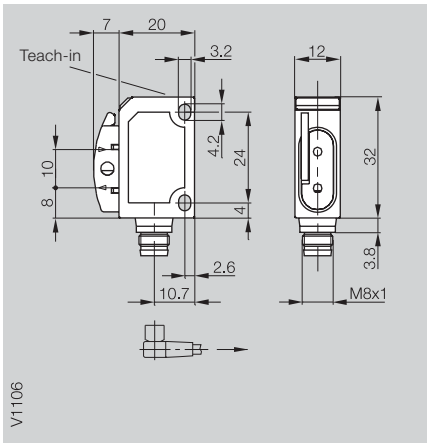
Recommended accessories

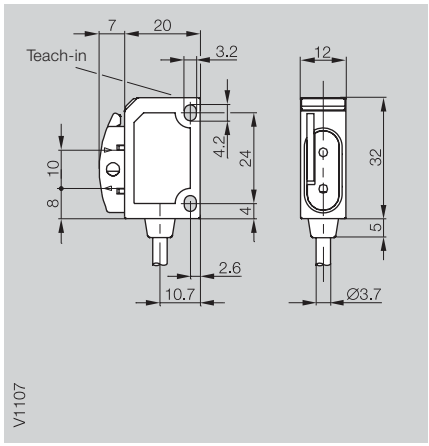
please order separately

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	≤ 15 % of U_B	≤ 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_e	≤ 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 × cross-section		4×0.14 mm²
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

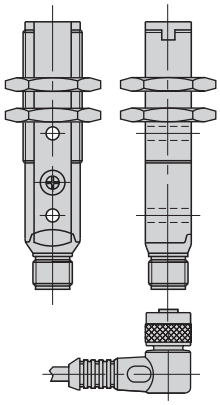
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

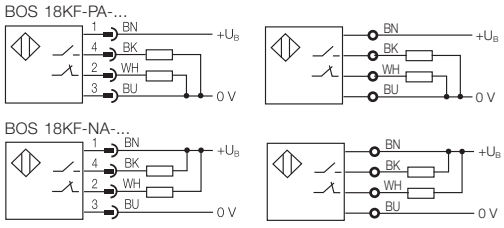
Features

- Sensitivity setting with a 270° potentiometer
- Cover nut for fiber optic cable adapting

Connector orientation



Wiring diagrams



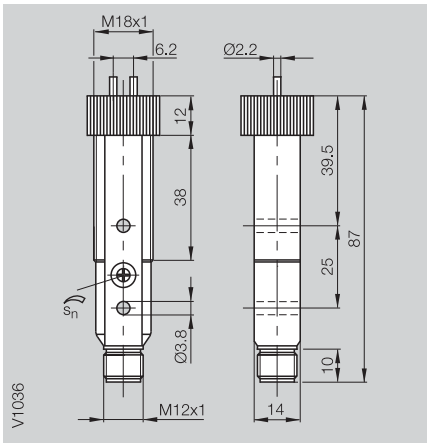
Recommended accessories
please order separately

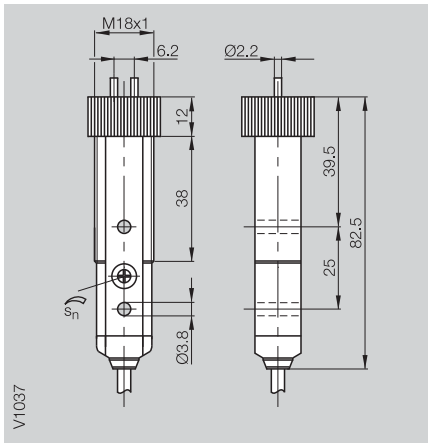
Mounting clamp
BOS 18,0-KB-1

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_e	≤ 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 mm²
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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
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.

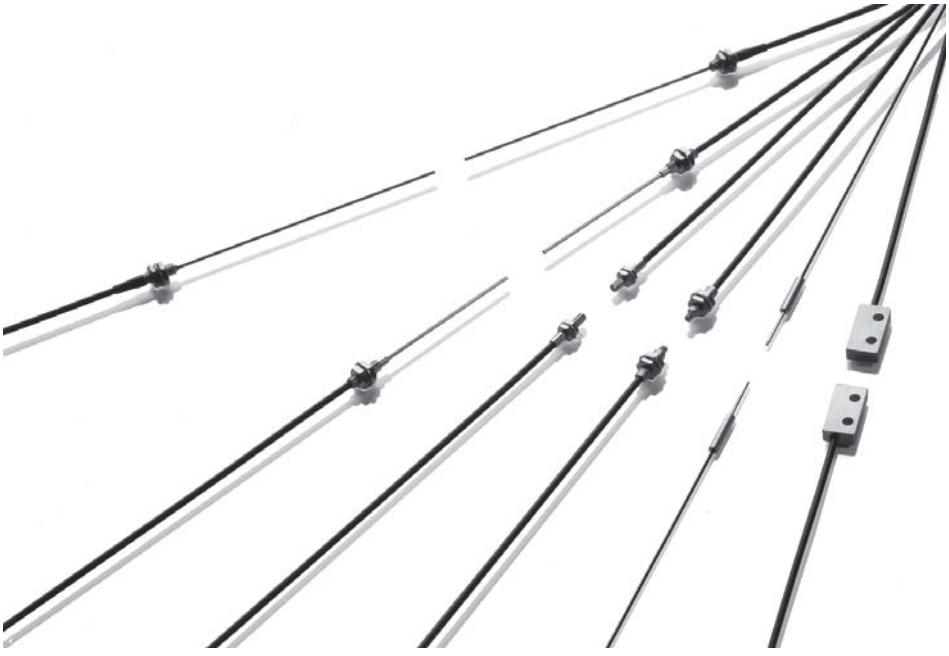
It's easy to see why fiber optics are so commonly used: The variety of end configurations, with straight or angled light exit, flexible optical head or coaxial fibers, the various fiber diameters and the ability to trim them to the desired length.

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

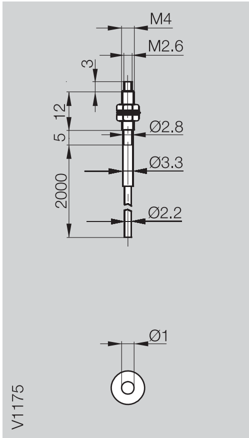
- Small parts detection
- For tight mounting spaces
- Checking small parts features
- Counting (e.g. counting drops)
- Precise parts positioning
- Handling and assembly
- Robotics

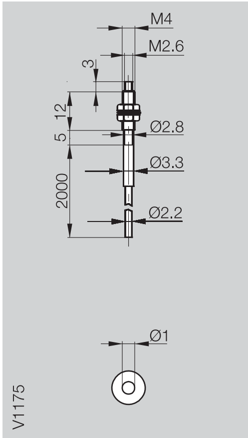


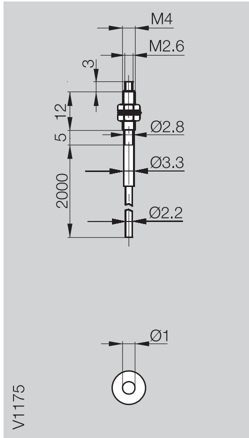
Type	Optical head	Light exit		Fiber arrangement			Core diameter				Features			Page
		Straight	90°	Standard	Coaxial	Light grid	1.5 mm	1.0 mm	0.5 mm	0.25 mm	Bendable optical tip	Extended temperature range	Highly flexible	
Through-beam fiber optics														
BFO D22-LA-KB-EAK-10-02	M4	■		■				■						**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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Optical head		M4 thread	M4 thread	M4 thread
Features		Standard	Highly flexible	Temperature-rated
∅ Jacket		2.2 mm	2.2 mm	2.2 mm
∅ Core		1 mm	1 mm	1 mm

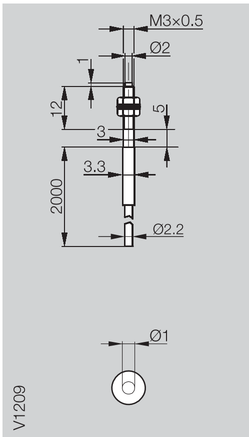


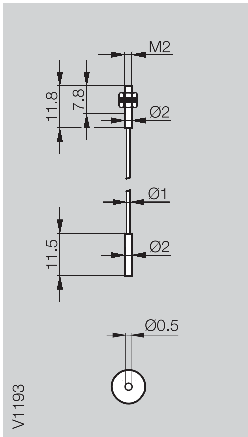


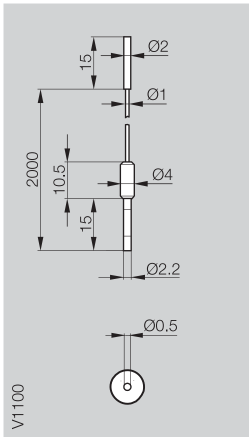


Ordering code		BFO D22-LA-KB-EAK-10-02	BFO D22-LAH-KB-EAK-10-02	BFO D22-LAT-KB-EAK-10-02
Fiber bending radius		≥ 25 mm	≥ 2 mm	≥ 25 mm
Head bending radius				
Temperature range		–55...+70 °C	–40...+70 °C	–55...+115 °C
Range	with BFB 75K-001	500 mm	400 mm	600 mm
	with BFB 75K-002**	500 mm	400 mm	600 mm
	with BOS 73K	500 mm	400 mm	500 mm
	with BOS 74K*	220 mm	190 mm	220 mm
	with BOS 6K	220 mm	200 mm	230 mm
	with BOS 18KF	120 mm	90 mm	120 mm

Optical head		M3 thread	M2 thread	∅ 2 mm
Features		Standard	Precision	Precision
∅ Jacket		2.2 mm	1.0 mm	1.0 mm
∅ Core		1 mm	0.5 mm	0.5 mm

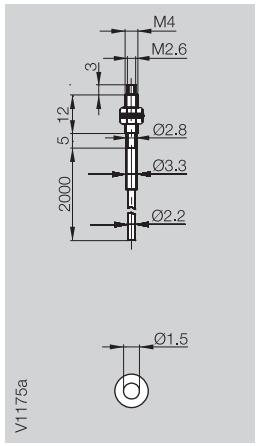
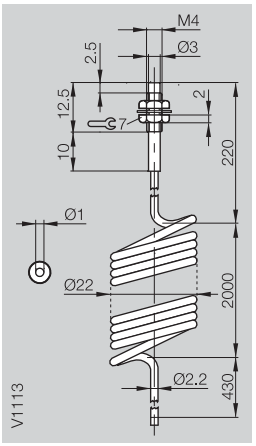
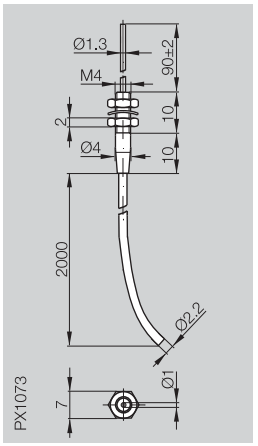
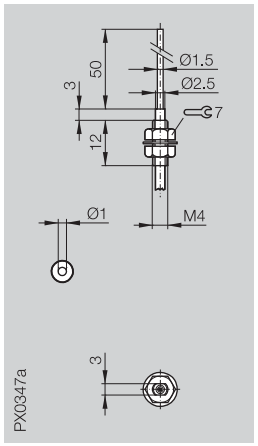
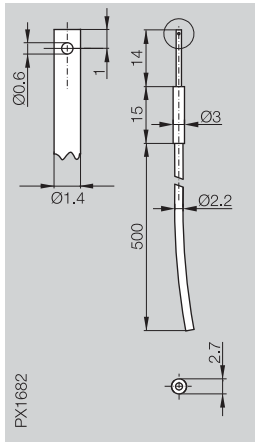
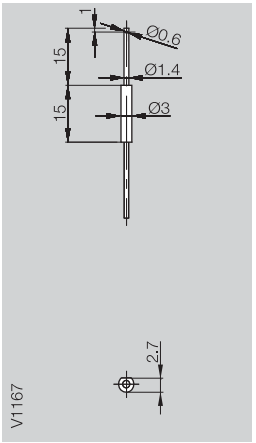
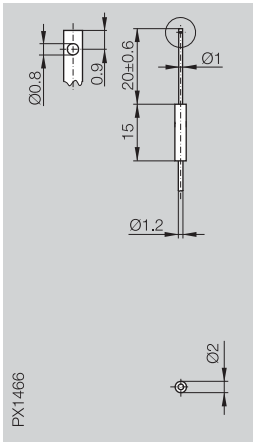






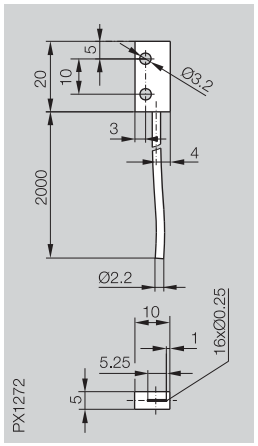
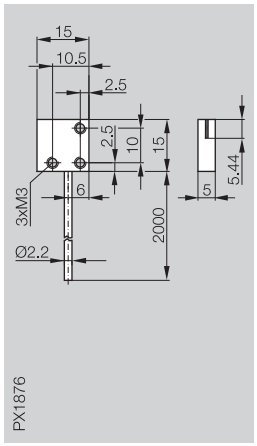
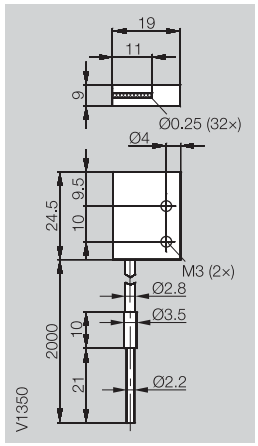
Ordering code		BFO D22-LA-RB-EAK-10-02	BFO N22-LA-FB-EAK-05-01	BFO D10-LA-CB-EAK-05-02
Fiber bending radius		≥ 25 mm	≥ 10 mm	≥ 15 mm
Temperature range		–55...+70 °C	–30...+60 °C	–55...+70 °C
Range	with BFB 75K-001	500 mm	140 mm	130 mm
	with BFB 75K-002**	500 mm	140 mm	130 mm
	with BOS 73K	450 mm	130 mm	120 mm
	with BOS 74K*	200 mm	60 mm	50 mm
	with BOS 6K	220 mm	50 mm	
	with BOS 18KF	100 mm	20 mm	

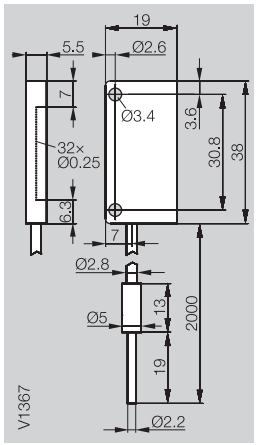
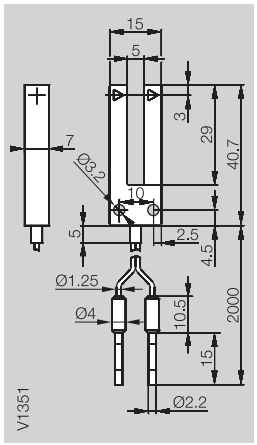
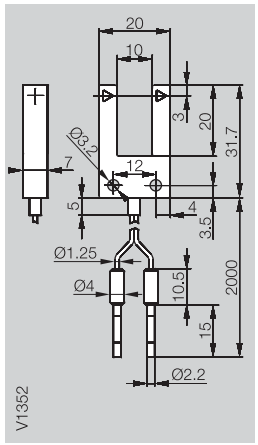
*When using base unit BOS 74K-UU-1FS-.. the sensing distance is reduced by 30 %.
**Range in Standard Mode.

M4 thread	M4 thread	M4 thread	M4 thread	
Long range	Spiral fibers	Bendable optical tip	Bendable optical tip	
2.2 mm	2.2 mm	2.2 mm	2.2 mm	
1.5 mm	1 mm	1 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	
–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.

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Optical head		20×10 mm	15×15 mm	19×25 mm
Features		Light grid	Light grid	Light grid
Jacket Ø		2.2 mm	2.2 mm	2.8 mm
Ø Core		16×0.25 mm	16×0.25 mm	32×0.25 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	450 mm	400 mm	600 mm
	with BFB 75K-002**	450 mm	400 mm	600 mm
	with BOS 73K	400 mm	350 mm	600 mm
	with BOS 74K*	200 mm	210 mm	370 mm
	with BOS 6K	220 mm	180 mm	350 mm
	with BOS 18KF	130 mm	110 mm	230 mm

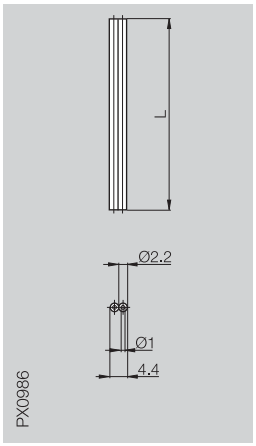
Optical head		19×38 mm	15×41 mm	20×32 mm
Features		Light grid	Fork	Fork
Ø Jacket		2.8 mm	2×1.25 mm	2×1.25 mm
Ø Core		32×0.25 mm	2×0.25 mm	2×0.25 mm
				
Ordering code		BFO D25-LA-ED-EAK-250-02	BFO D13-LG-05-EAK-30-02	BFO D13-LG-10-EAK-30-02
Fiber bending radius		≥ 60 mm	≥ 10 mm	≥ 10 mm
Temperature range		–55...+70 °C	–55...+70 °C	–55...+70 °C
Range	with BFB 75K-001	550 mm	5 mm	10 mm
	with BFB 75K-002**	550 mm	5 mm	10 mm
	with BOS 73K	550 mm	5 mm	10 mm
	with BOS 74K*	350 mm	5 mm	10 mm
	with BOS 6K	360 mm	5 mm	10 mm
	with BOS 18KF	210 mm	5 mm	10 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 optics 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	**2.2×4.4 mm duplex cable**
Through-beam	
Range for L = 2 m	**150 mm**
Cable length	20 m

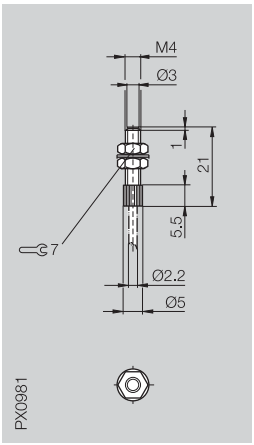


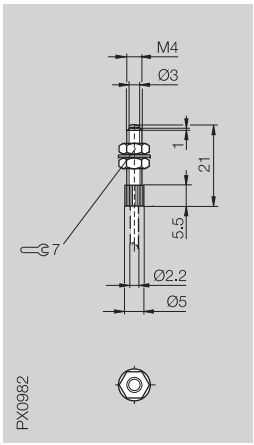
Ordering code	BFO D22-LD-EAK-10-20
Ambient temperature range T_a	–40...+85 °C
Pull force on fiber optics and connection parts at 20 °C	6 N
Core Ø	2×1 mm
Jacket Ø	2.2 mm

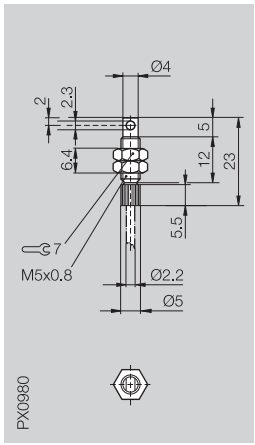
Cutting tool BFO CT is included.

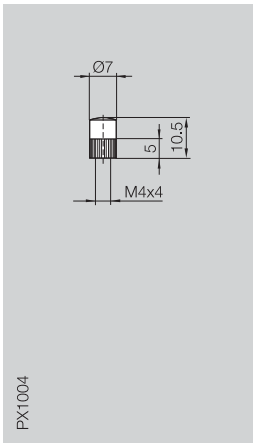
Housing size	**M4**	**M4**	**Ø 4 mm**	**Ø 7 mm**
Features	End piece without lens	End piece with lens	90° end piece	Lens
Used with	BFO D22-LD-EAK-10-..	BFO D22-LD-EAK-10-..	BFO D22-LD-EAK-10-..	BFO D22-LA-BC-10
Range	**150 mm**	**450 mm**	**150 mm**	**1500 mm**

Range when used with 2 m plastic fiber cable.





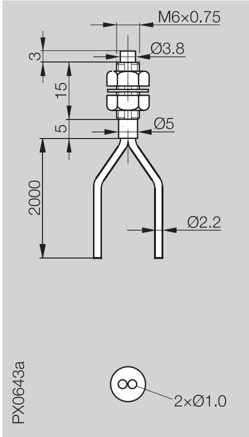


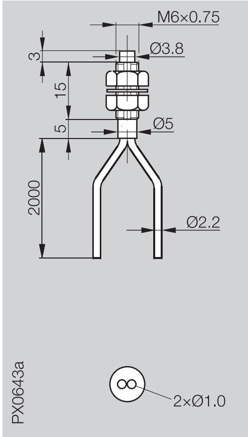


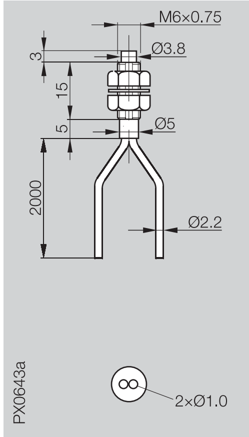
Ordering code	BFO D22-LA-BC-10	BFO D22-LA-CC-30	BFO D22-LA-AC-20	BFO 04-PK-1
Material				
– Optical surface	Plastic (fibers)	Glass	Glass	Glass
– Threaded tube	Stainless steel	Stainless steel	Stainless steel	Stainless steel

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
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

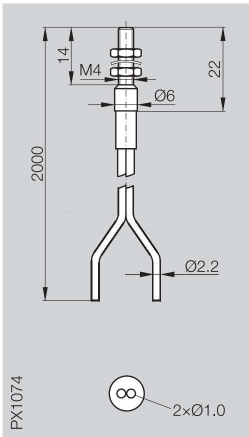


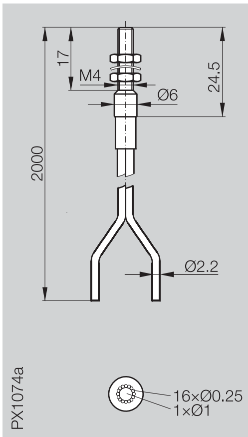


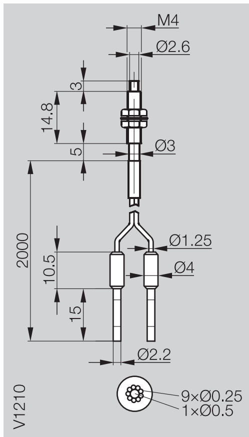


Ordering code		BFO D22-XA-LB-EAK-20-02	BFO D22-XAH-LB-EAK-20-02	BFO D22-XAT-LB-EAK-20-02
Fiber bending radius		≥ 25 mm	≥ 2 mm	≥ 25 mm
Head bending radius				
Temperature range		–55...+70 °C	–40...+70 °C	–55...+115 °C
Sensing distance	with BFB 75K-001	150 mm	120 mm	130 mm
	with BFB 75K-002**	150 mm	120 mm	130 mm
	with BOS 73K	150 mm	120 mm	130 mm
	with BOS 74K*	80 mm	60 mm	80 mm
	with BOS 6K	100 mm	70 mm	90 mm
	with BOS 18KF	50 mm	30 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

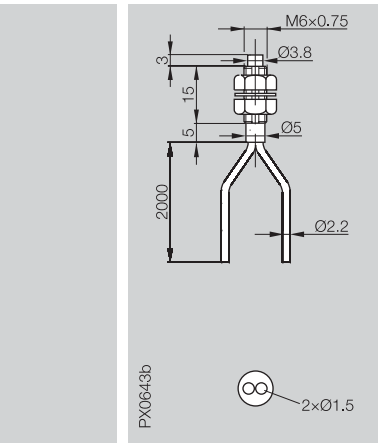
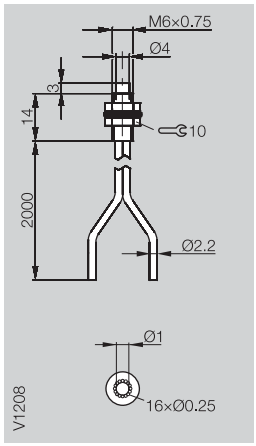
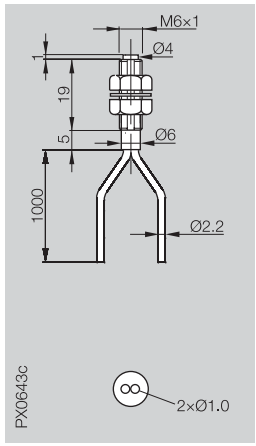
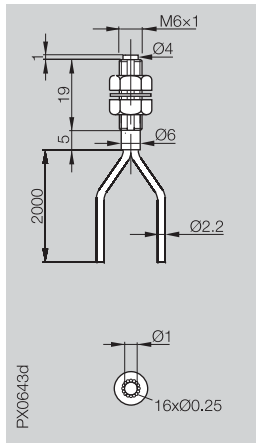
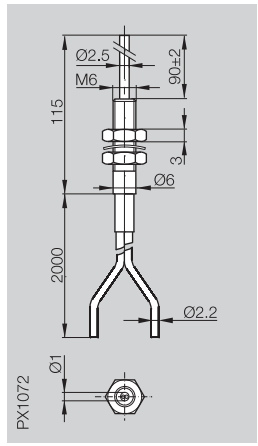
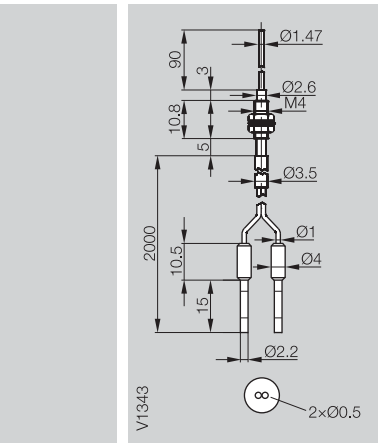
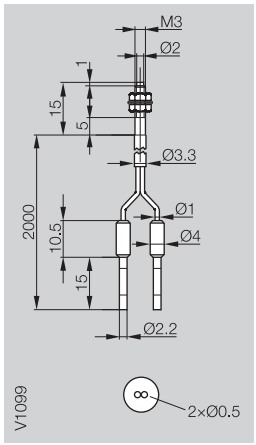
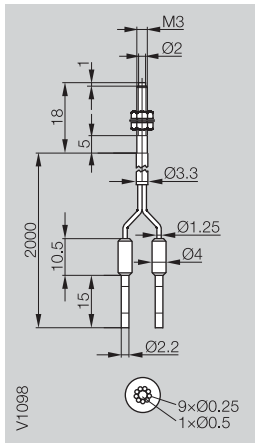
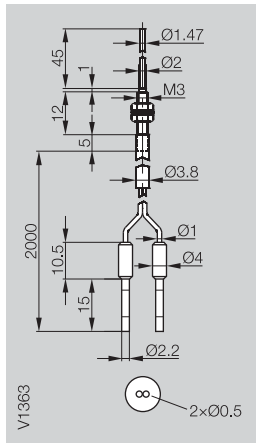
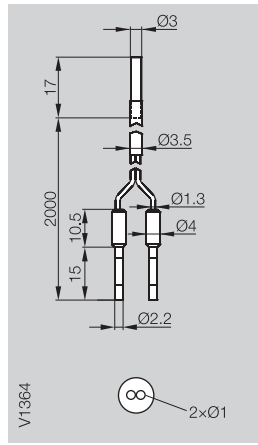




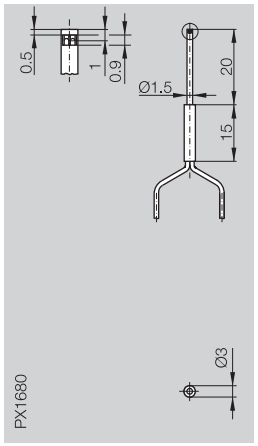
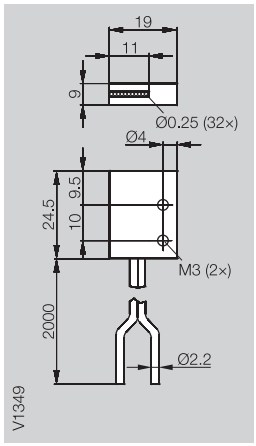
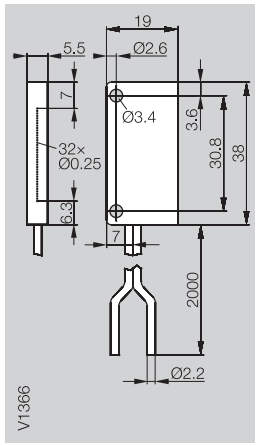


Ordering code		BFO D22-XA-UB-EAK-20-02	BFO D22-XB-UB-EAK-15-02	BFO D13-XB-KB-EAK-10-02
Fiber bending radius		≥ 25 mm	≥ 25 mm	≥ 15 mm
Head bending radius				
Temperature range		–35...+65 °C	–40...+60 °C	–55...+70 °C
Sensing distance	with BFB 75K-001	120 mm	130 mm	60 mm
	with BFB 75K-002**	120 mm	130 mm	60 mm
	with BOS 73K	120 mm	130 mm	60 mm
	with BOS 74K*	70 mm	80 mm	30 mm
	with BOS 6K	80 mm	90 mm	
	with BOS 18KF	40 mm	50 mm	20 mm

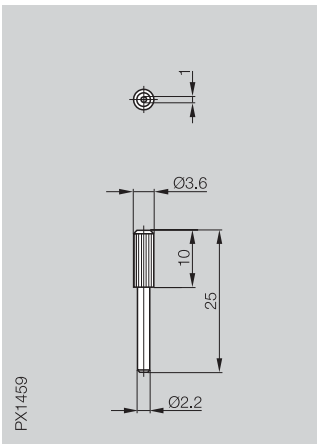
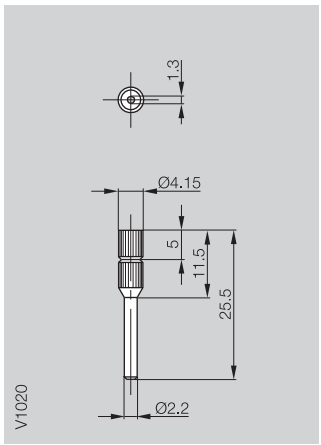
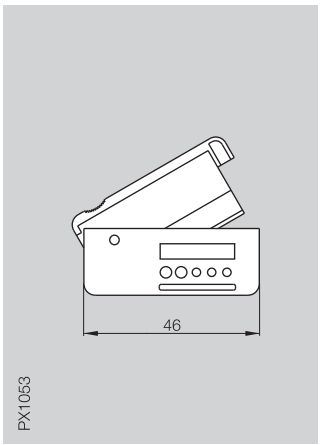
*When using base unit BOS 74K-UU-1FS-.. the sensing distance is reduced by 30 %.
**Sensing distance in Standard Mode.

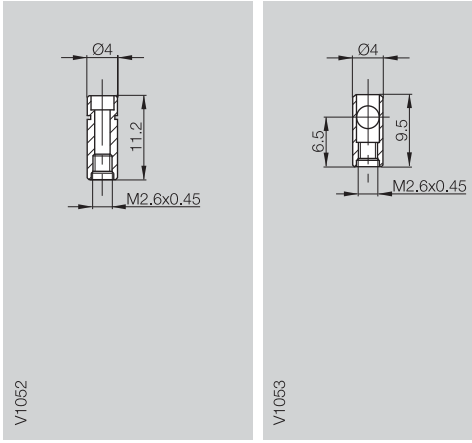
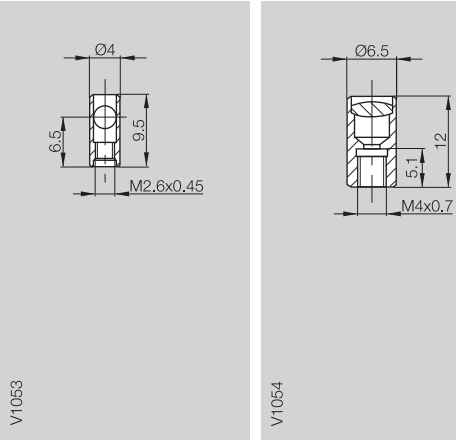
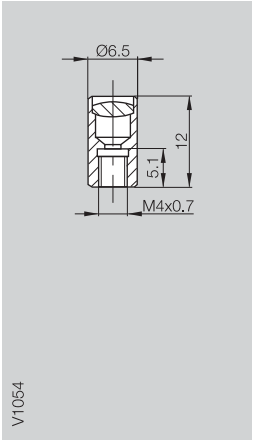
	M6 thread	M6 thread	M6×1 thread	M6×1 thread	M6 thread
	Long range	Coaxial	Standard	Coaxial, flexible	Bendable optical tip
	2×2.2 mm	2×2.2 mm	2×2.2 mm	2×2.2 mm	2×2.2 mm
	2×1.5 mm	1×1 mm/16×0.25 mm	2×1 mm	1×1 mm/16×0.25 mm	2×1 mm
					
	BFO D22-XAP-LB-EAK-30-02	BFO D22-XB-LB-EAK-15-02	BFO D22-XA-DB-EAK-20-01	BFO D22-XBF-LB-EAK-15-02	BFO D22-XA-SB-EAK-20-02
	≥ 40 mm	≥ 25 mm	≥ 25 mm	≥ 5 mm	≥ 25 mm
					≥ 15 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
	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	
	–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		40 mm	130 mm
	20 mm	20 mm	30 mm	20 mm	80 mm
	10 mm	10 mm	20 mm	10 mm	50 mm

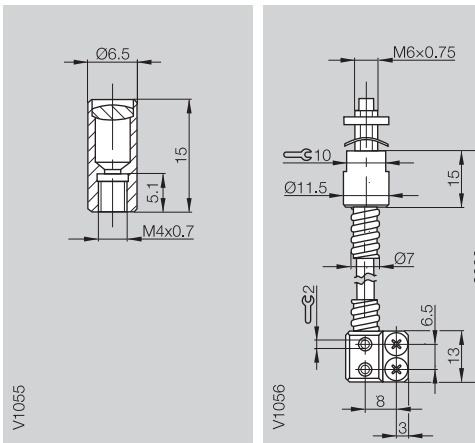
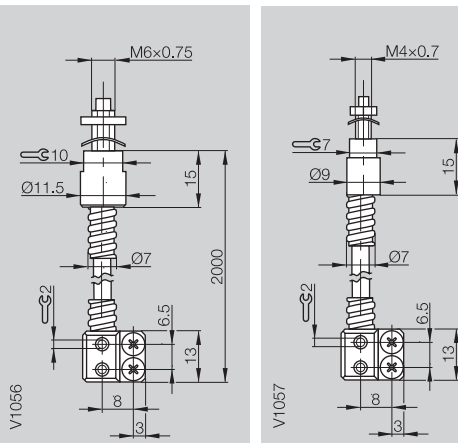
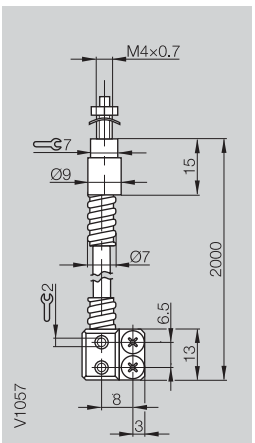
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Optical head		Ø 3 mm	19×25 mm	19×38 mm
Features		Light exit on side	Light grid	Light grid
Ø Jacket		2×1 mm	2.2 mm	2.2 mm
Ø Core		2×0.5 mm	32×0.25 mm	**32×0.25 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 M2.6×0.45	90° Rotatable head for through-beam fiber optics M2.6×0.45	Focusing lens for coaxial diffuse fiber optics M4×0.7
				
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.

	Focusing lens for coaxial diffuse fiber optics M4×0.7	Metal corrugated tube (stainless steel) for fiber optics M6×0.75	Metal corrugated tube (stainless steel) for fiber optics M4×0.7
				
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.

2.2
2.3
Photoelectric sensors accessories
page 2.3.2 ...
5
Connectors ...
page 5.2 ...

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

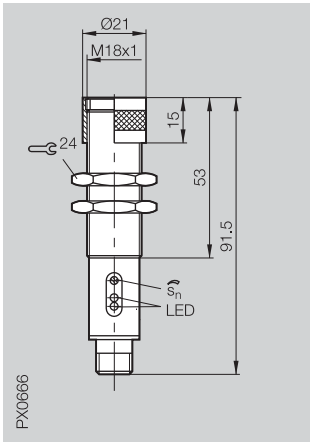
MZG type
Corrugated metal armor
Strain relief
Glass fiber bundle

- High temperature-rated –20...+170 °C (if not flexed up to+250 °C)
- Flexible
- Crush-resistant
- Resistant to hot chips

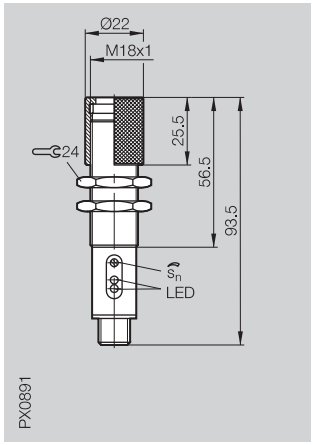
SMG type
Silicon protection jacket
Corrugated metal armor with strain relief
Glass fiber bundle

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

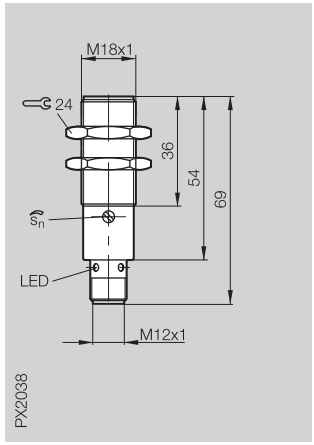
Recommended diffuse base units
(see page **2.1.**23/24/25 and **2.1.**94)



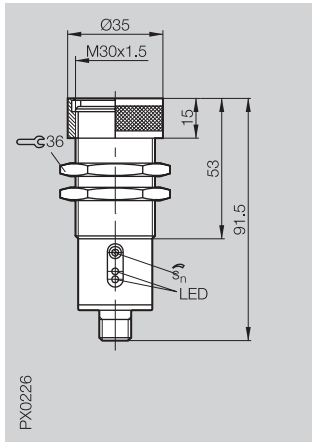
BOS 18M-GU-1PF-...



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



BOS 18M-PA-1PF-...,
BOS 18M-PA-1PD-...

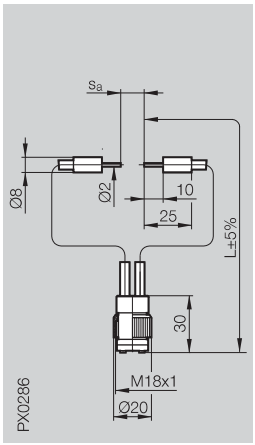


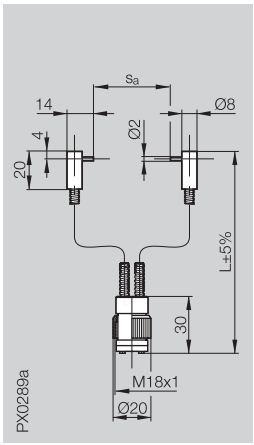
BOS 30M-GA-1PH-...

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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Through-beam with	BOS 18M-...-PD-...	Range	**100 mm**	**100 mm**	
	BOS 18M-...-1PF-...	Range	**400 mm**	**400 mm**	
	BOS 30M-...	Range			



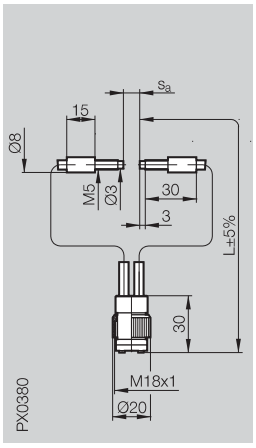
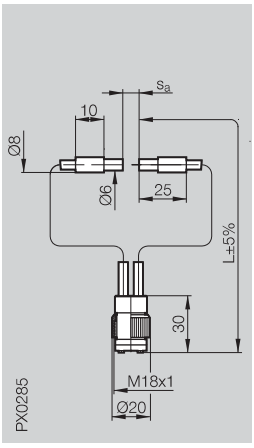
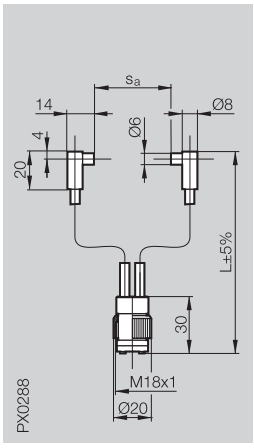
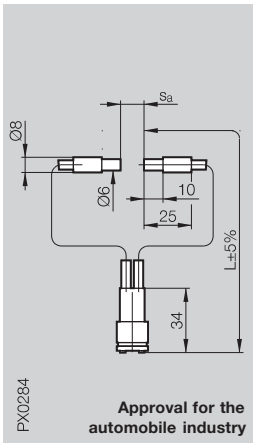
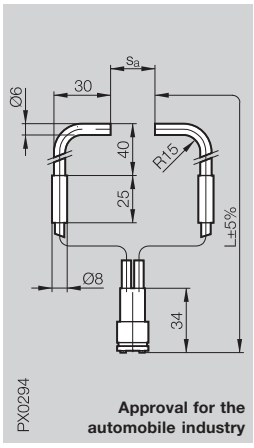


Ordering code	Type	UZG		
	Type	MZG	BFO 18A-LGG-MZG-10-	BFO 18A-LFF-MZG-10-
	Type	SMG	BFO 18A-LGG-SMG-10-	BFO 18A-LFF-SMG-10-

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
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	yes (remove adapter disk)	yes (remove adapter disk)
	BOS 18M-GU-1PF-...	yes (remove adapter disk)	yes (remove adapter disk)
	BOS 18M-PA-1PF-...	yes	yes
	BOS 30M-...	no	no

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**
					
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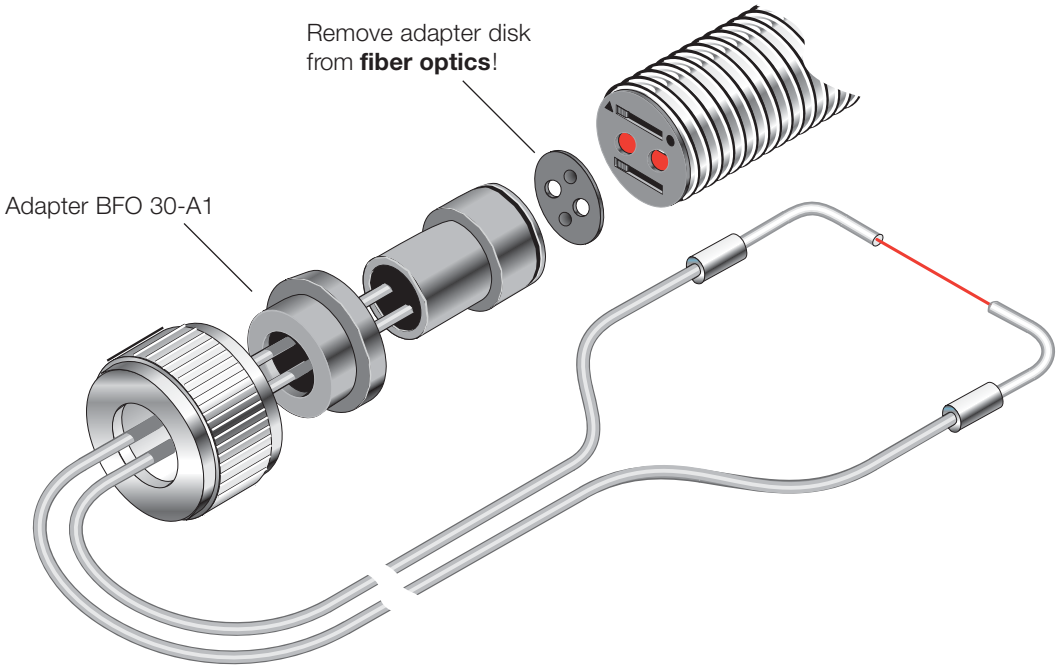
	2 mm	2 mm	2 mm	2 mm	2 mm
	80 N	80 N	80 N	80 N	80 N
	60 mm	60 mm	60 mm	60 mm	60 mm
	yes	yes	yes	no	no
	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)
	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)	no	no
	yes	yes	yes	no	no
	no	no	no	yes (remove adapter disk)	yes (remove adapter disk)

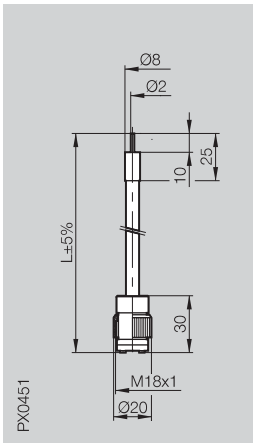
For BOS 30M-... use Adapter BFO 30-A1!
see page **2.3.**17

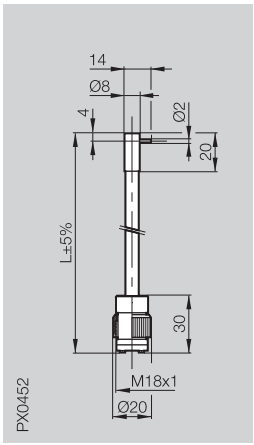
Installation note
BOS 30M with BFO 18V



2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Diffuse with	BOS 18M-...-PD-.../BOS 18M-...-1PF-...	Sensing distance	**10 mm/50 mm**	**10 mm/50 mm**	
	BOS 30M-...	Sensing distance			
Retroreflective with	BOS 18M-...-PD-.../BOS 18M-...-1PF-...	Range	**300 mm/1000 mm**	**300 mm/1000 mm**	
	BOS 30M-...	Range			





Ordering code	Type	UZG		
	Type	MZG	BFO 18A-XAG-MZG-15-	BFO 18A-XAF-MZG-15-
	Type	SMG		BFO 18A-XAF-SMG-15-

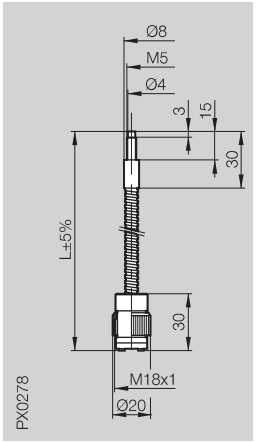
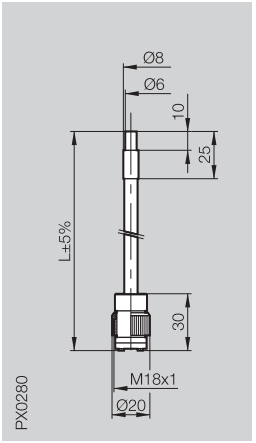
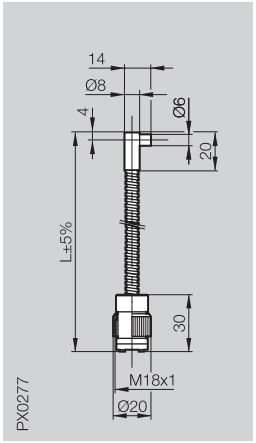
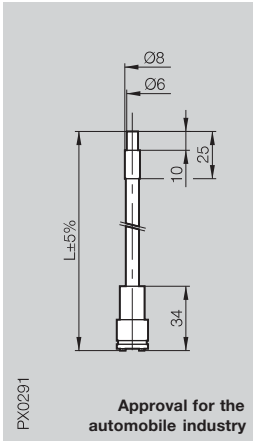
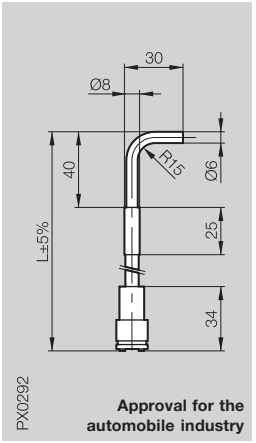
Diameter of glass fiber bundle		1.5 mm	1.5 mm
Max. pull force on fiber optics and connection parts		80 N	80 N
Min. bending radius		60 mm	60 mm
For use with	BOS 18M-PA-1PD-...	yes	yes
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	yes (remove adapter disk)	yes (remove adapter disk)
	BOS 18M-GU-1PF-S4-Y	yes (remove adapter disk)	yes (remove adapter disk)
	BOS 18M-PA-1PF-...	yes	yes
	BOS 30M-...	no	no
Sensing distance with	BOS 18M-PA-1PD-...	10 mm	10 mm
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	10 mm	10 mm
	BOS 18M-...-1PF-...	50 mm	50 mm
	BOS 30M-...		
Range with	BOS 18M-PA-1PD-...	300 mm	300 mm
	BOS 18M-PU-1PD-SA1.../-SA4.../-SA5...	300 mm	300 mm
	BOS 18M-...-1PF-...	1000 mm	1000 mm
	BOS 30M-...		

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.

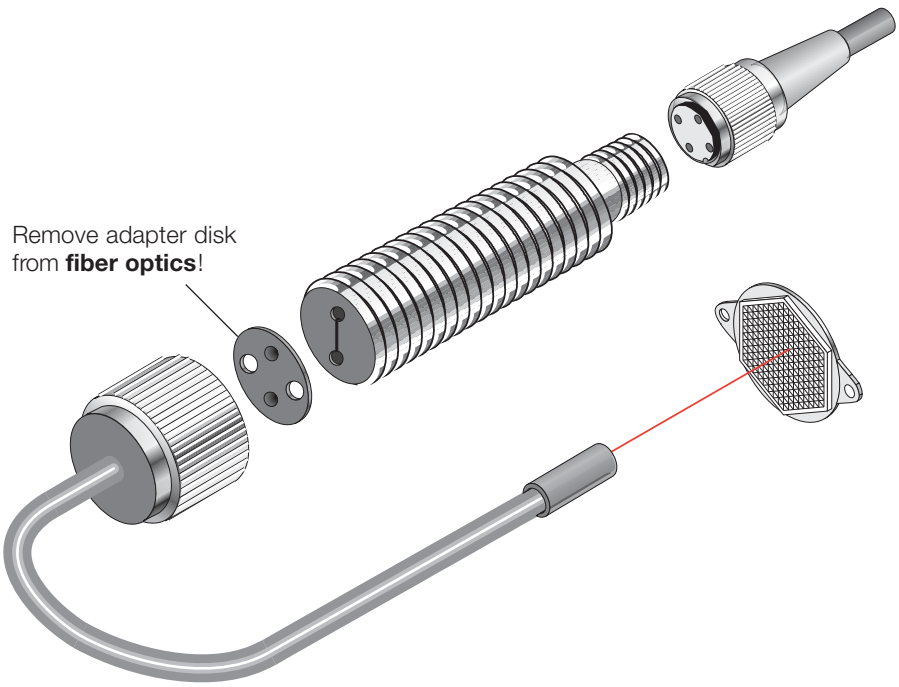
Please append the desired length L of the fiber optics cable to the ordering code!
Corrections from 0.5 m to max. 2 m possible.
Example:
BFO 18...-30-**0.5** for **0.5 m** fiber length
BFO 18...-30-**2** for **2 m** fiber length

	20 mm/100 mm	**20 mm/100 mm**	**20 mm/100 mm**	**20 mm**	**20 mm**
				200 mm	**200 mm**
	500 mm/1000 mm	**500 mm/1000 mm**	**500 mm/1000 mm**	**500 mm**	**500 mm**
				2000 mm	**2000 mm**
				 **Approval for the automobile industry**	 **Approval for the automobile industry**
	BFO 18A-XAA-UZG-30-		BFO 18A-XAE-UZG-30-		
	BFO 18A-XAA-MZG-30-		BFO 18A-XAE-MZG-30-	BFO 18V-XAC-MZG-30-	BFO 18V-XAD-MZG-30-
	BFO 18A-XAA-SMG-30-	BFO 18A-XAC-SMG-30-	BFO 18A-XAE-SMG-30-	BFO 18V-XAC-SMG-30-	BFO 18V-XAD-SMG-30-
	3 mm	3 mm	3 mm	3 mm	3 mm
	80 N	80 N	80 N	80 N	80 N
	60 mm	60 mm	60 mm	60 mm	60 mm
	yes	yes	yes	no	no
	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)
	yes (remove adapter disk)	yes (remove adapter disk)	yes (remove adapter disk)	no	no
	yes	yes	yes	no	no
	no	no	no	yes (remove adapter disk)	yes (remove adapter disk)
	20 mm	20 mm	20 mm		
	20 mm	20 mm	20 mm	20 mm	20 mm
	100 mm	100 mm	100 mm		
				200 mm	200 mm
	500 mm	500 mm	500 mm		
	500 mm	500 mm	500 mm	500 mm	500 mm
	1000 mm	1000 mm	1000 mm		
				2000 mm	2000 mm

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 optic cable**!



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	Reso-lution	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

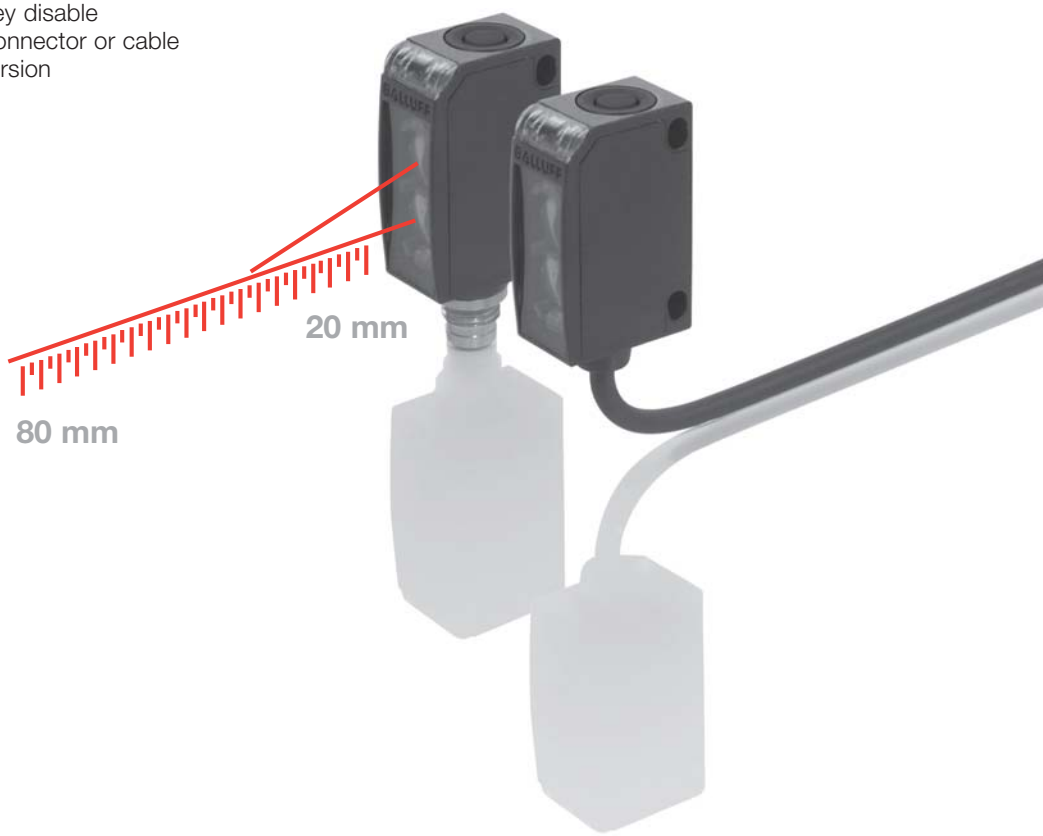
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

The **BOD 6K** provides a distance-proportional analog output signal with falling voltage over a fixed measuring range of 20 to 80 mm.

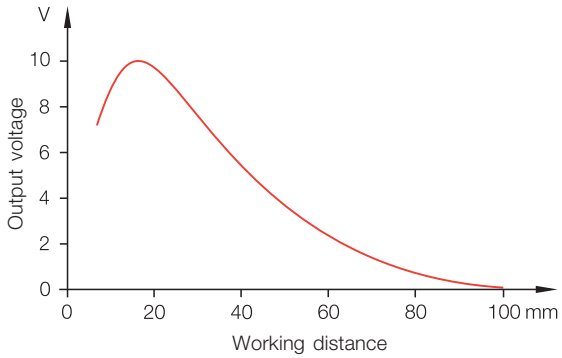
With an output, adjustable using teach-in, the sensor can also be used as a diffuse type with background suppression.

Features

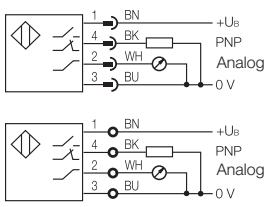
- Fixed measuring range between 20...80 mm
- Analog output 0...10 V
- Adjustable background suppression
- Output PNP, NO/NC
- Teach-in
- Key disable
- Connector or cable version



Analog output BOD 6K-RA01



Wiring diagram

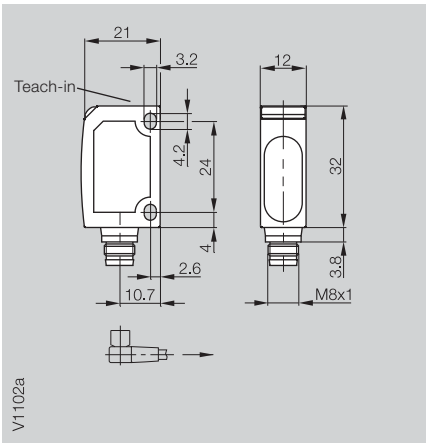


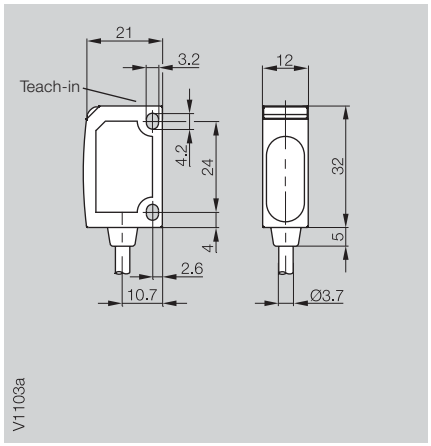
Recommended accessories
please order separately

Mounting bracket
BOS 6-HW-1

Connector
Straight BKS-S 74
Right-angle BKS-S 75

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	≤ 15 % of U_B	≤ 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_e	≤ 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	5×5 mm at 60 mm	5×5 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	21×32×12 mm	21×32×12 mm
Connection	M8 connector, 4-pin	2 m cable, PVC
No. of wires × cross-section		4×0.14 mm²
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, 100×100 mm.

Connector orientation

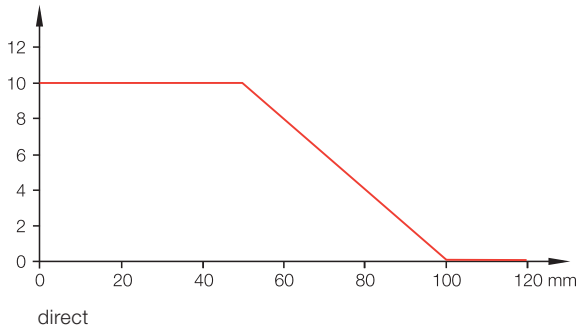
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

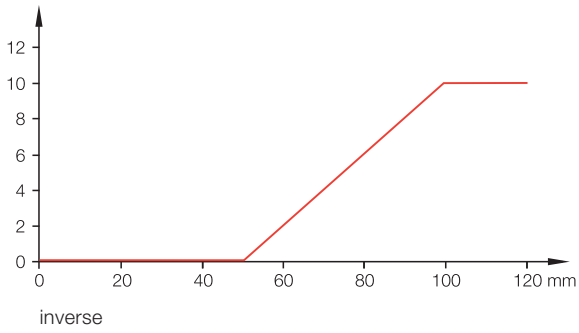
Features

- 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

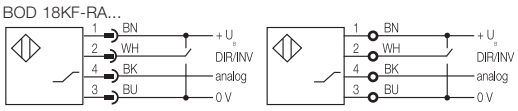


direct

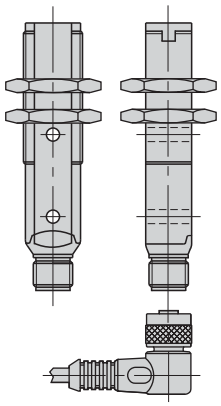


inverse

Wiring diagrams



Connector orientation



Recommended accessories

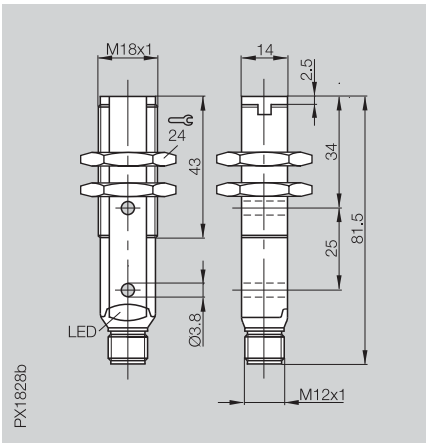
please order separately

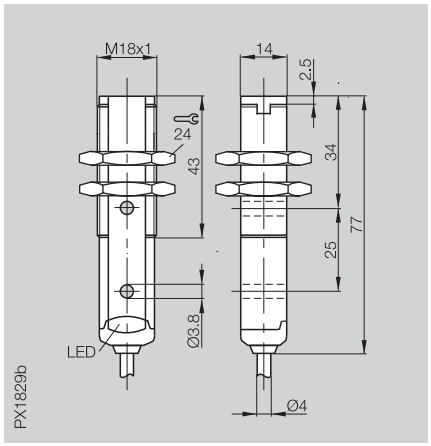

Mounting clamp
BOS 18,0-KB-1


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 mm²
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

Measurement values referenced to Kodak gray card 90% Reflexion, 100×100 mm.

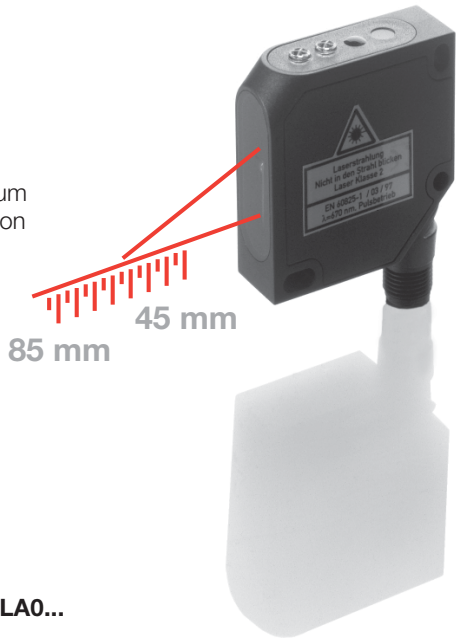
*Proportional to output
**Turns on when object is outside the measuring range

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Series	
Working range	
Measuring range	

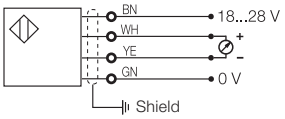
Features

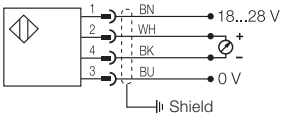
- Fixed measuring range between 45...85 mm
- Analog output 0...10 V
- Resolution 20 µm or 80 µm
- Connector or cable version



Analog output BOD 26K-LA0...

Wiring diagrams





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 × 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	

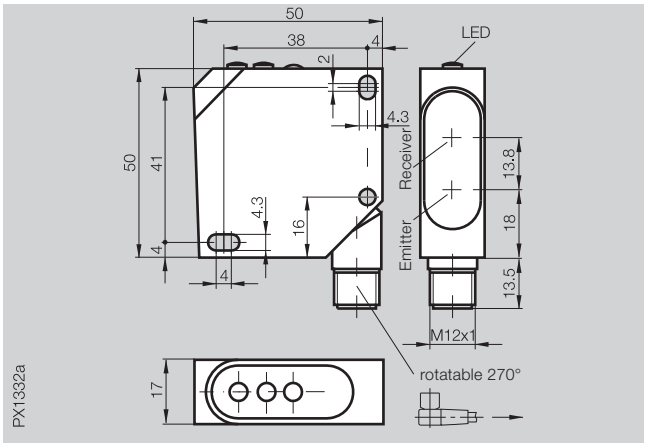
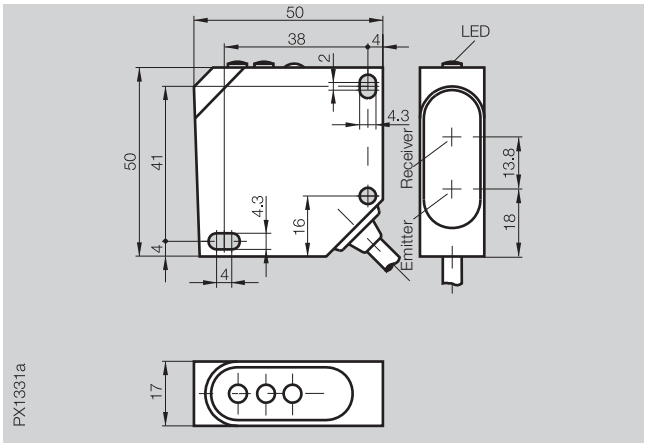
Measured values referenced to Kodak gray card 90 % Reflexion.

Connector orientation

Recommended accessories
please order separately

Mounting bracket
BOS 26-HW-1

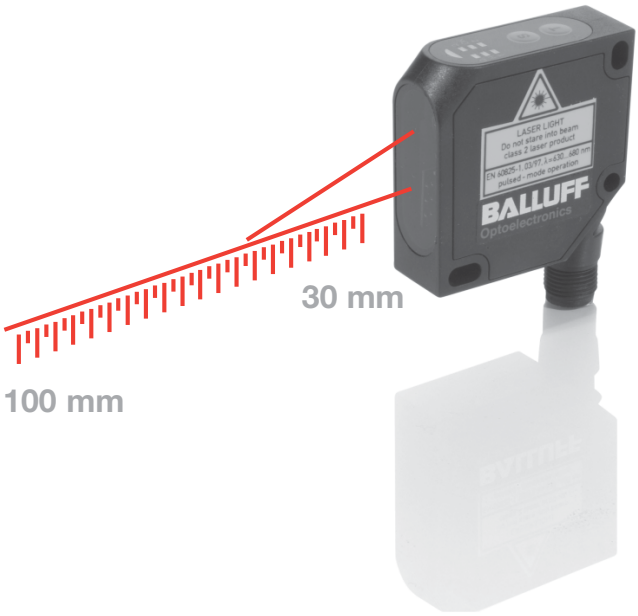
Connector
BKS-S 19-14-PU-05

	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	18...28 V DC	18...28 V DC	18...28 V DC
	10 %	10 %	10 %	10 %
	≤ 35 mA	≤ 35 mA	≤ 35 mA	≤ 35 mA
	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)	0...10 V (max. 3 mA)
	fixed	fixed	fixed	fixed
	Laser, red light	Laser, red light	Laser, red light	Laser, red light
	670 nm	670 nm	670 nm	670 nm
	2	2	2	2
	≤ 0.8 mm at 65 mm	≤ 0.8 mm at 65 mm	≤ 0.8 mm at 65 mm	≤ 0.8 mm at 65 mm
	18 µm/°C	18 µm/°C	18 µm/°C	18 µm/°C
	80 µm	**20 µm**	**80 µm**	**20 µm**
	≤ 1 %	≤ 1 %	≤ 1 %	≤ 1 %
	400 Hz	**40 Hz**	**400 Hz**	**40 Hz**
	3 ms	30 ms	3 ms	30 ms
	2 ms	20 ms	2 ms	20 ms
	LED green	LED green	LED green	LED green
	LED red	LED red	LED red	LED red
	50×50×17 mm	50×50×17 mm	50×50×17 mm	50×50×17 mm
	M12 connector, 4-pin	M12 connector, 4-pin	6 m cable, PVC	6 m cable, PVC
			4×0.25 mm²	4×0.25 mm²
	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS	impact-resistant ABS
	PMMA	PMMA	PMMA	PMMA
	40 g	40 g	600 g	600 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
	0...+45 °C	0...+45 °C	0...+45 °C	0...+45 °C

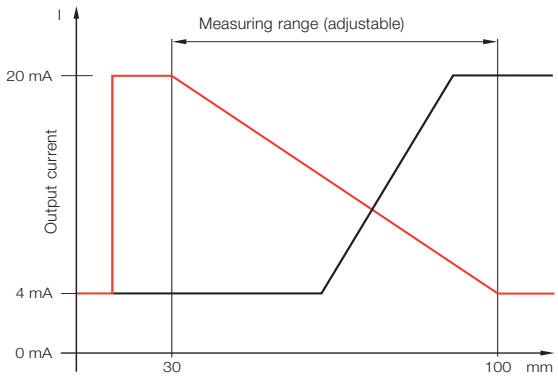
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Features

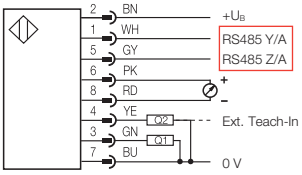
- Adjustable measuring range between 30...100 mm
- Analog output 4...20 mA adjustable: rising or falling
- Option with RS485-Interface (for Master-slave mode) and for visualization on a PC (additional software required)
- 2 switching outputs with adjustable switch points
- Teach-in
- Adjustable averaging
- Numerous additional functions



Analog output BOD 26K-LB(R)04...

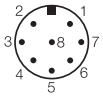


Wiring diagram



only type
BOD 26K-LB**R**...

Connector diagram

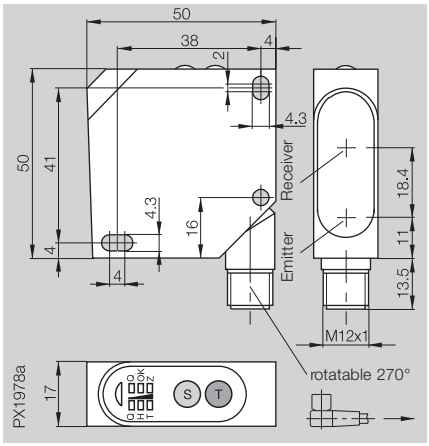


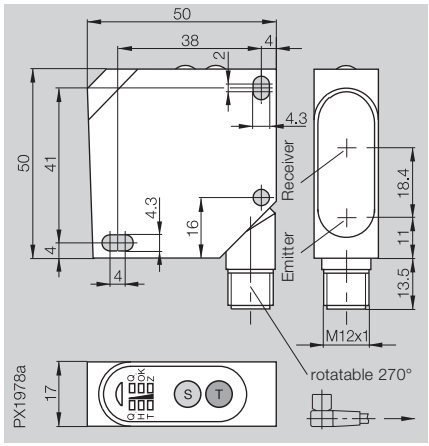
Recommended accessories
please order separately

Mounting bracket
BOS 26-HW-1

Connector
Straight, 5 m
BKS-S139-PU-05
Right-angle, 5 m
BKS-S138-PU-05

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

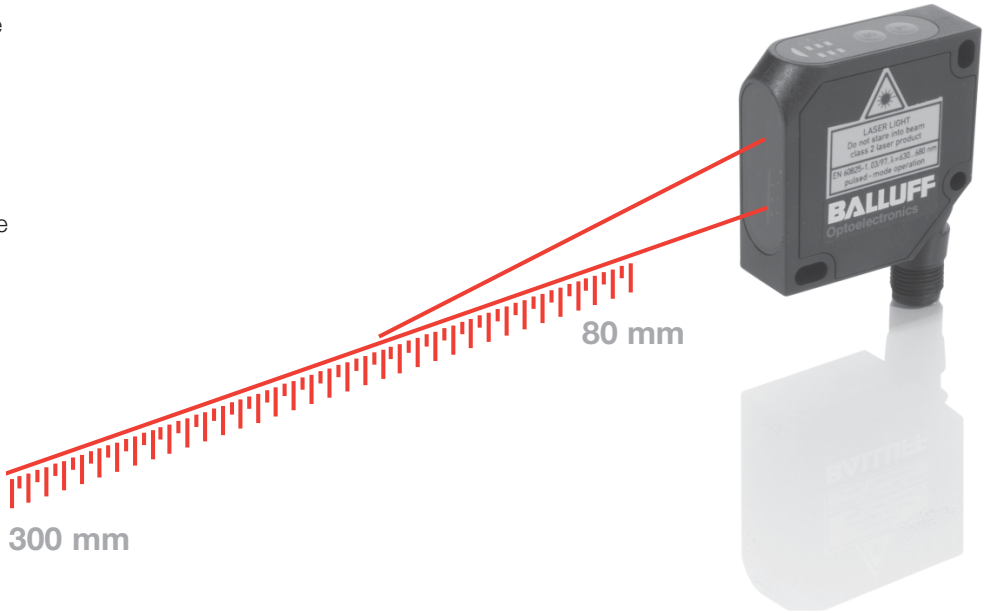
Measured values referenced to Kodak gray card 90 % Reflexion.

Connector orientation

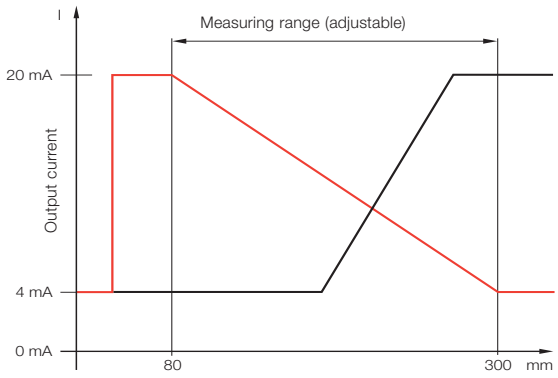
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Features

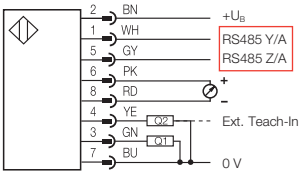
- Measuring range adjustable between 80...300 mm
- Analog output 4...20 mA adjustable: rising or falling
- Option with RS485-Interface (for Master-slave mode) and for visualization on a PC (additional software required)
- 2 switching outputs with adjustable switch points
- Teach-in
- Adjustable averaging
- Numerous additional functions



Analog output BOD 26K-LB(R)05...

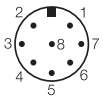


Wiring diagram



only type
BOD 26K-LB**R**...

Connector diagram



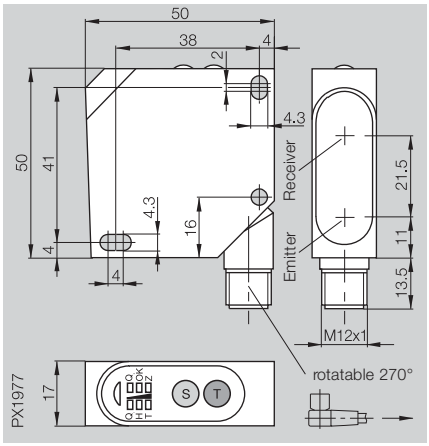
Recommended accessories

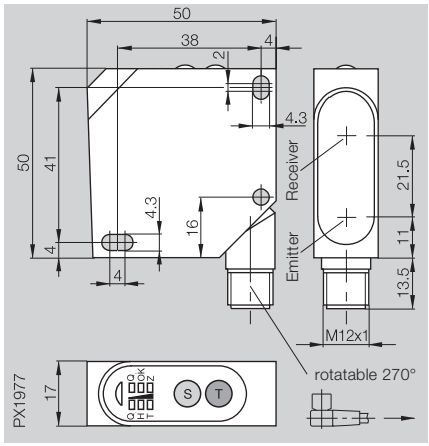
please order separately

Mounting bracket
BOS 26-HW-1

Connector
Straight, 5 m
BKS-S139-PU-05
Right-angle, 5 m
BKS-S138-PU-05

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

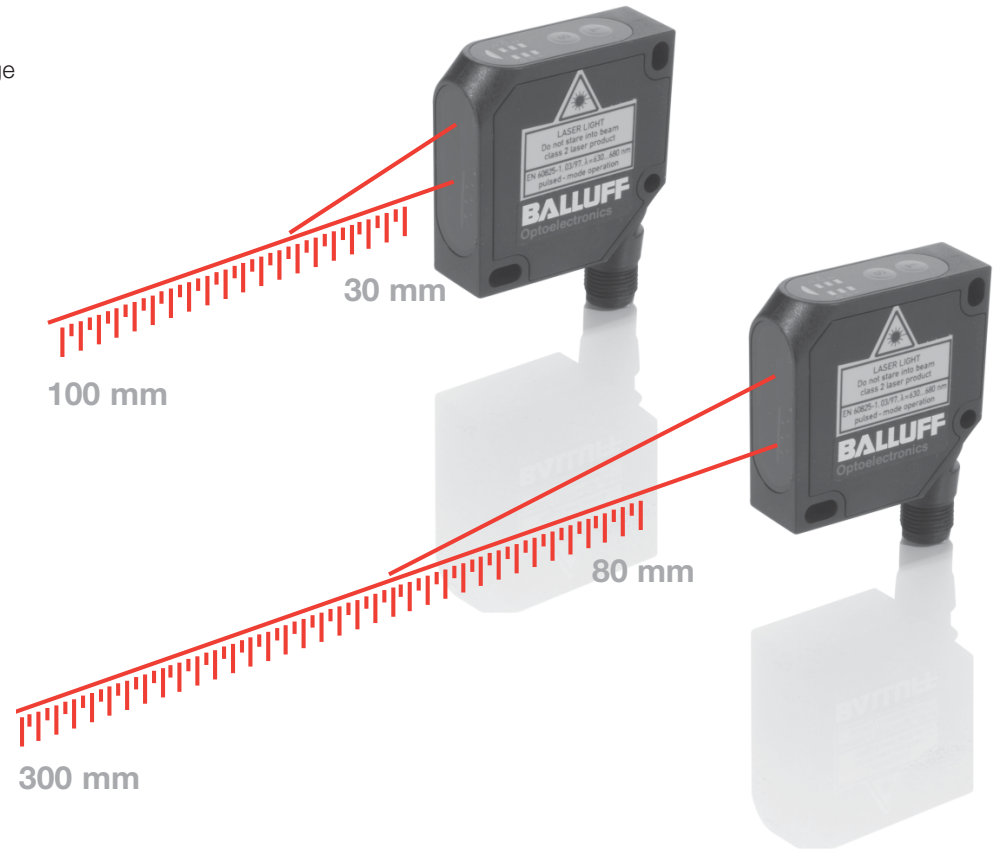
Measured values referenced to Kodak gray card 90 % Reflexion.

Connector orientation

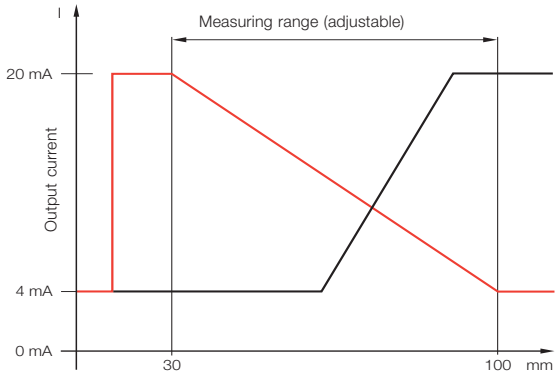
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Features

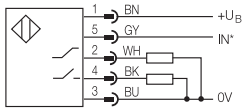
- Adjustable measuring range
- Analog output 4...20 mA adjustable: rising or falling
- 1 switching output with adjustable switch points
- Teach-in
- Laser beam can be turned off



Analog output BOD 26K-LB06...



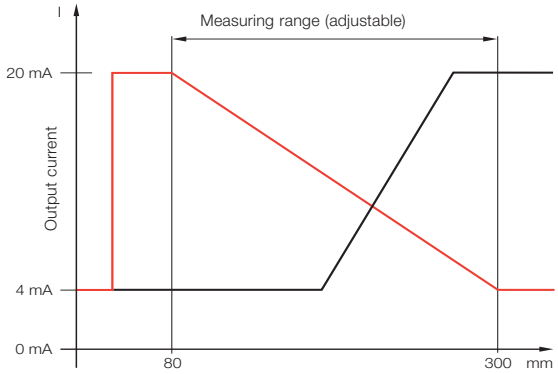
Wiring diagram



*Laser shut-off (+UB)
Key disable (0V)

Connector diagram

Analog output BOD 26K-LB(R)07...

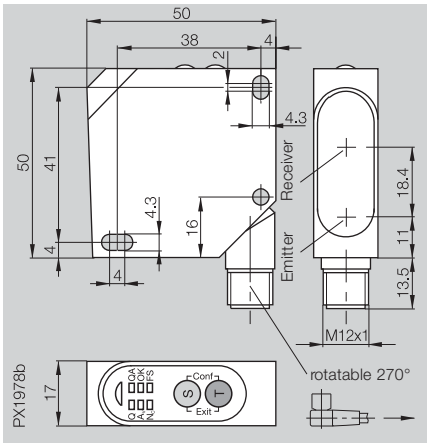


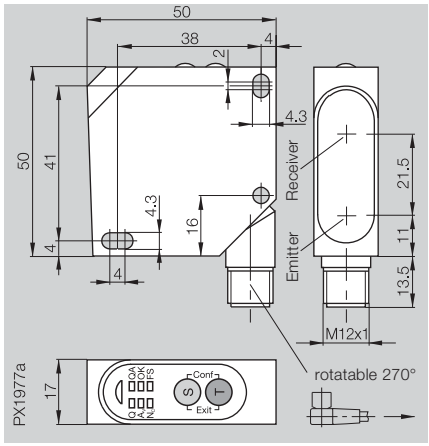
Recommended accessories
please order separately

Mounting bracket
BOS 26-HW-1

Connector
Straight BKS-S137-17-PU-05
Right-angle BKS-S134-17

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 × PNP-Transistor	1 × 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 µm	≤ 220 µm
Linearity	≤ 175 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, 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
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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

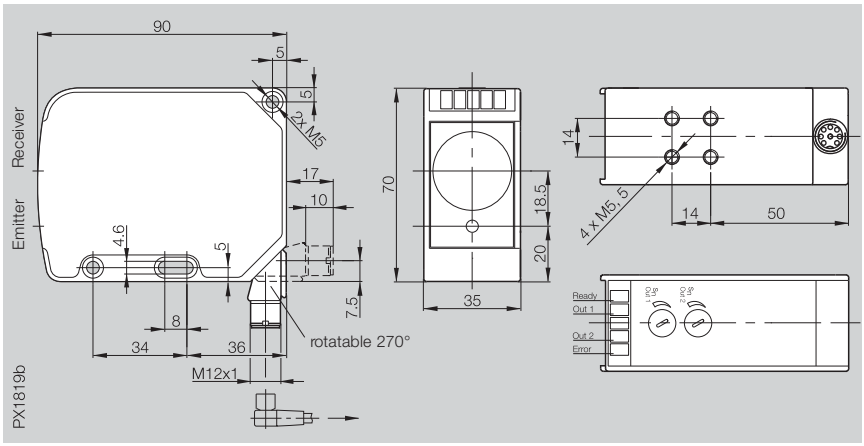
Connector
Straight, 5 m
BKS-S139-PU-05
Right-angle, 5 m
BKS-S138-PU-05

Mounting bracket
BOD 63-HW-1

IO-Link

These sensors are also available as IO-Link types. Please request our separate IO-Link brochure!

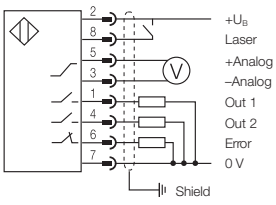
Series	BOD 63M	BOD 63M
Working range	**200...2000 mm**	**200...2000 mm**
Measuring range	**1800 mm**	**1800 mm**



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_e 24 V DC		≤ 75 mA	≤ 75 mA
Analog output		**0...10 V**	**4...20 mA**
Switching outputs		2× PNP normally open	2× PNP normally open
Error output		PNP normally closed	PNP normally closed
Output current	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		≤ 2 %	≤ 2 %
Repeat accuracy per BWN		≤ ±3 mm	≤ ±3 mm
Temperature drift		≤ 0.6 mm/°C	≤ 0.6 mm/°C
Linearity		≤ ±2%	≤ ±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		2× LED yellow	2× LED yellow
Stability indicator		LED red	LED red
Mechanical data			
Dimensions		90×70×35 mm	90×70×35 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

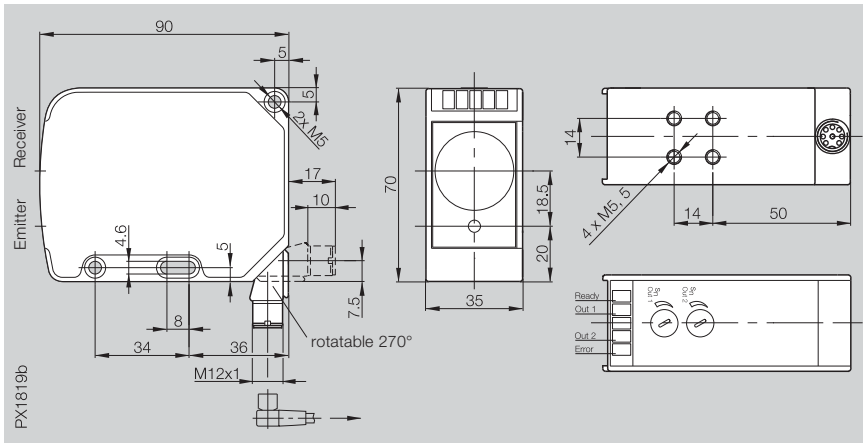
Connector orientation

Wiring diagram



2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

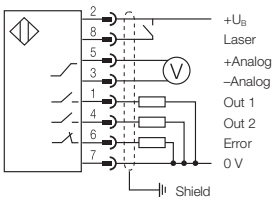
Series	BOD 63M	BOD 63M
Working range	**200...6000 mm**	**200...6000 mm**
Measuring range	**5800 mm**	**5800 mm**



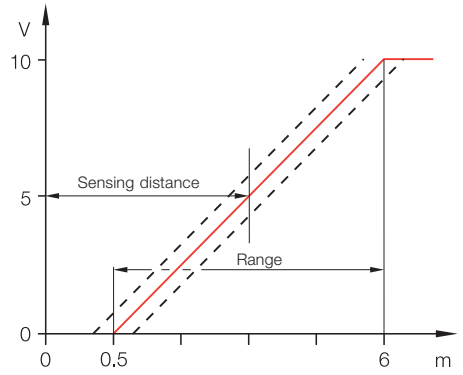
Ordering code		BOD 63M-LA04-S115	BOD 63M-LB04-S115
Electrical data			
Supply voltage U_B		15...30 V DC	15...30 V DC
No-load current I_0 max. at U_e 24 V DC		≤ 75 mA	≤ 75 mA
Analog output		**0...10 V**	**4...20 mA**
Switching outputs		2× PNP normally open	2× PNP normally open
Error output		PNP normally closed	PNP normally closed
Output current	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		≤ ±4 mm	≤ ±4 mm
Temperature drift		≤ 1.5 mm/°C	≤ 1.5 mm/°C
Linearity		≤ ±1%	≤ ±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		2× LED yellow	2× LED yellow
Stability indicator		LED red	LED red
Mechanical data			
Dimensions		90×70×35 mm	90×70×35 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

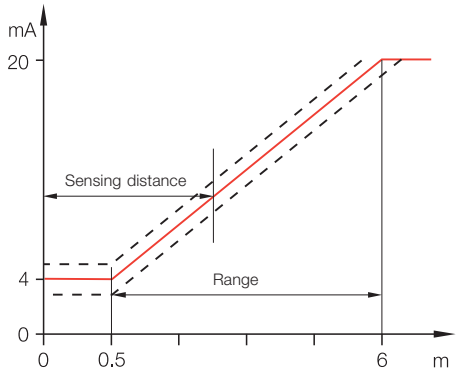
Connector orientation

Wiring diagram

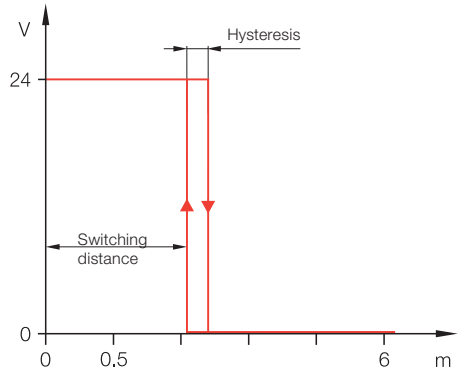


Analog output

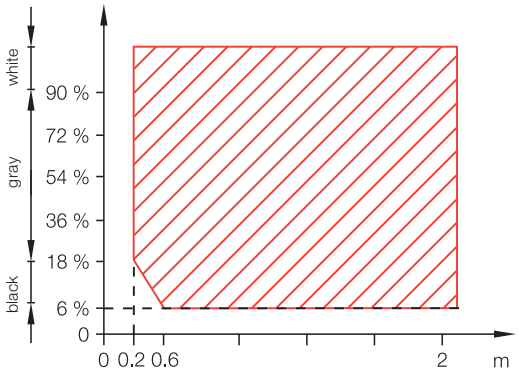




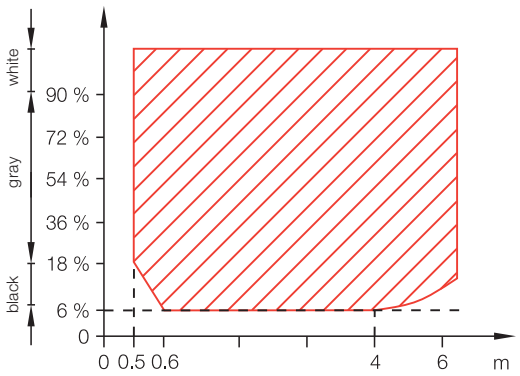
Switching output



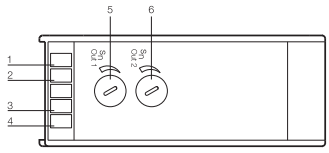
Measuring range BOD 63M-LA/LB02... depending on object reflection



Measuring range BOD 63M-LA/LB04... depending on object reflection

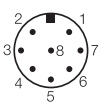


Indicators and operating elements



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	
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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

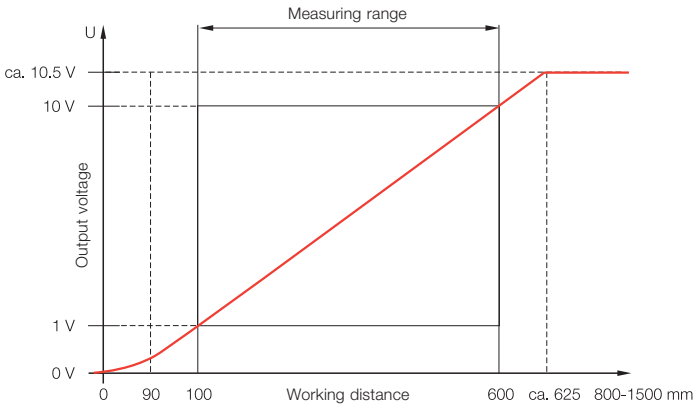
Features

- 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

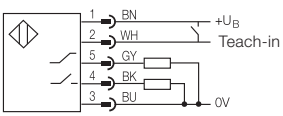
Applications

- Level monitoring
- Positioning tasks
- Winding diameter measurement
- Profile measurement
- Sag control

Analog output BOD 66M-R...



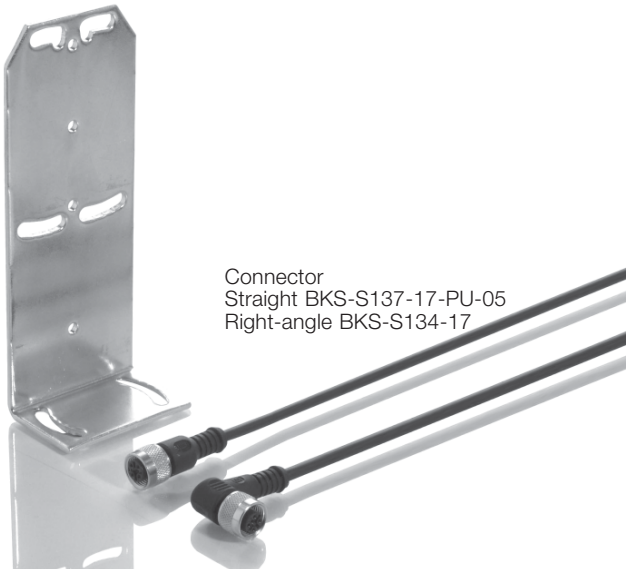
Wiring diagram



Connector diagram

Recommended accessories

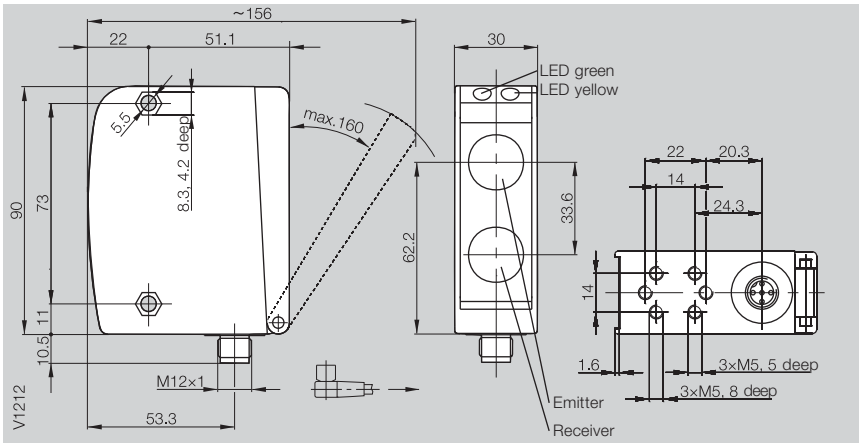
please order separately



Connector
Straight BKS-S137-17-PU-05
Right-angle BKS-S134-17

Mounting bracket
BOD 66-HW-1

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	≤ 15 % of U_B	≤ 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_e	≤ 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 %)	≤ 1 %	≤ 1 %
Repeat accuracy	± 0.5 %	± 0.5 %
Temperature drift	0.2 mm/°C	0.2 mm/°C
Absolute measuring accuracy**	±2 % (of the measured distance)	±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 ≥ 50×50 mm²

Connector orientation

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... 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 tech-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

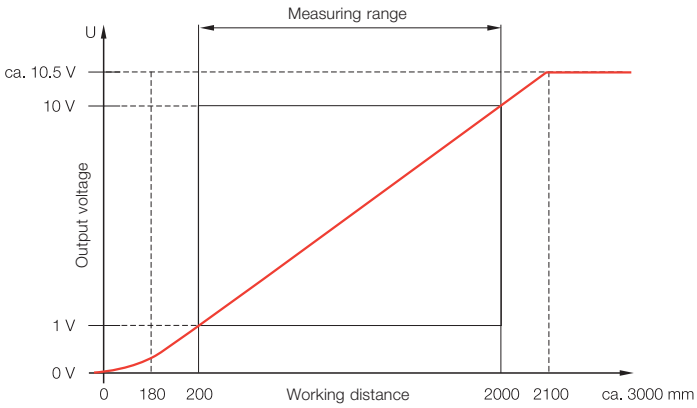
Laser class

(see page **2.0.**18)

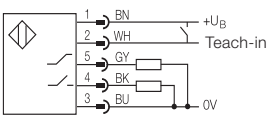
The emitter meets Laser Class 2 per EN 60825-1:2001-11. This means no additional safety measures are necessary.

Install the device so that the laser warning label is easily visible.

Analog output BOD 66M-L...



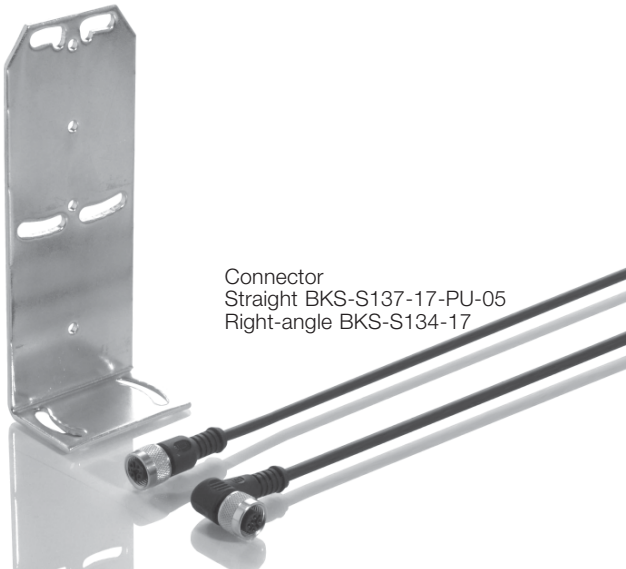
Wiring diagram



Connector diagram

Recommended accessories

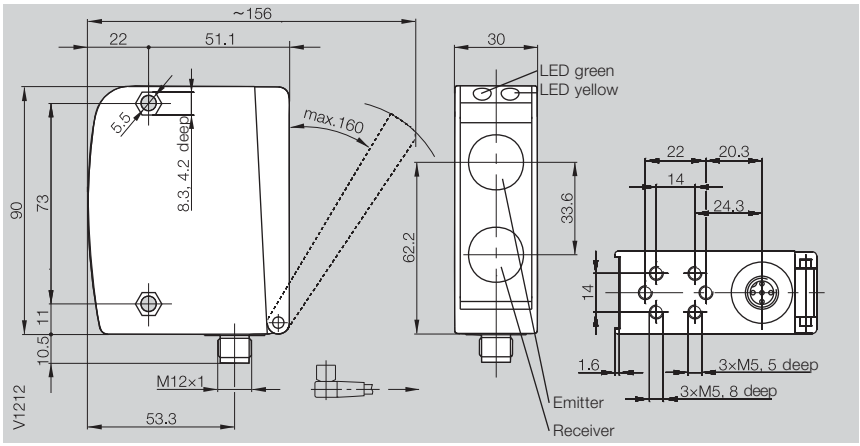
please order separately



Connector
Straight BKS-S137-17-PU-05
Right-angle BKS-S134-17

Mounting bracket
BOD 66-HW-1

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	≤ 15 % of U_B	≤ 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_e	≤ 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 × 12 mm² at 2 m	3 × 12 mm² at 2 m
Resolution	≤ 5 mm	≤ 5 mm
Gray value shift (90 %/6 %)	≤ 1 %	≤ 1 %
Repeat accuracy	± 0.5 %	± 0.5 %
Temperature drift	0.6 mm/°C	0.6 mm/°C
Absolute measuring accuracy**	±2 % (of the measured distance)	±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	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 ≥ 50×50 mm²

Connector orientation

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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

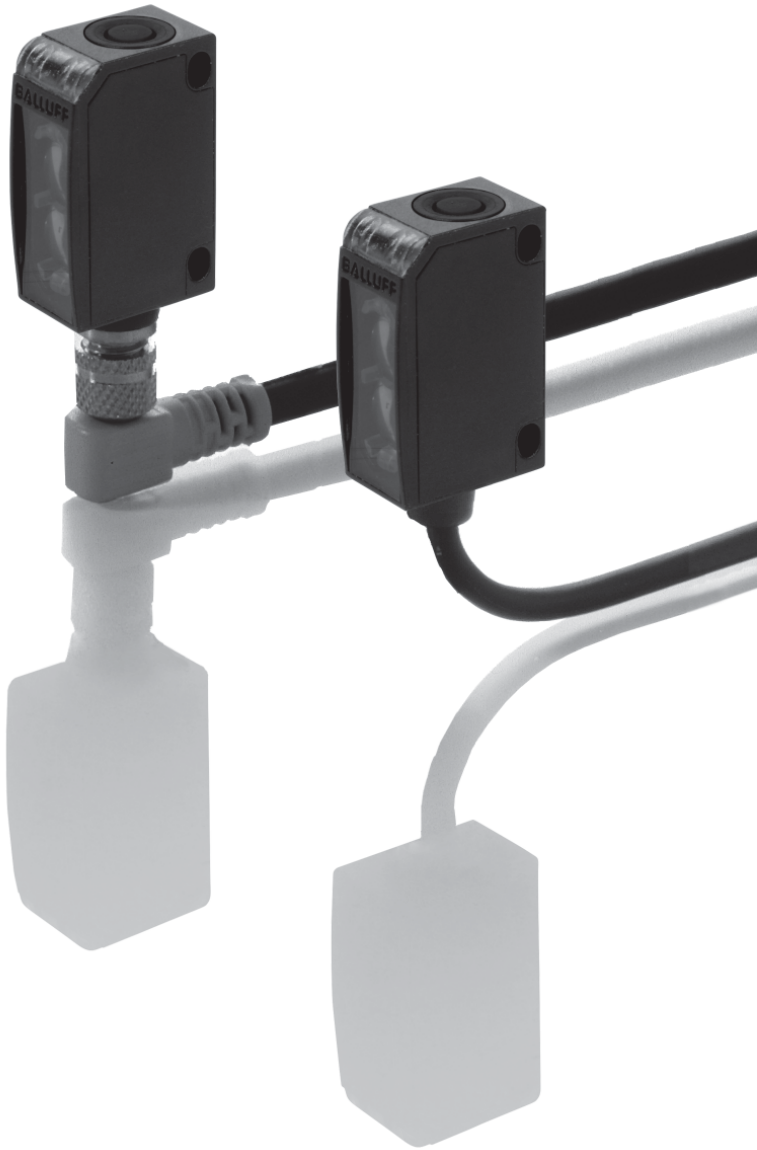
Type	Range	Light type			Output			Output function		Switching frequency	U_B	Connection			Special features		Page
		White light	Red and green light	Laser light	PNP-Transistor	NPN-Transistor	Analog output	Light-on	Dark-on		10...30 V DC	M8 connector, 4-pin	M12 connector, 4-pin	Cable	for adapting fiber optics		
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 ...
5
Connectors ... page 5.2 ...

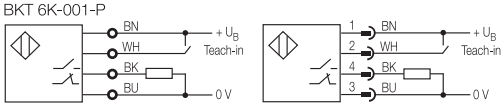
The **BKT 6K** laser contrast sensor is designed for reliable detection of small-area contrast differences. Even the narrowest lines can be definitively sensed over the optimum working range of 70...100 mm. Larger areas are capable of being detected outside this range.

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

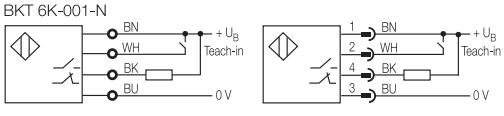


Wiring diagrams

BKT 6K-001-P



BKT 6K-001-N



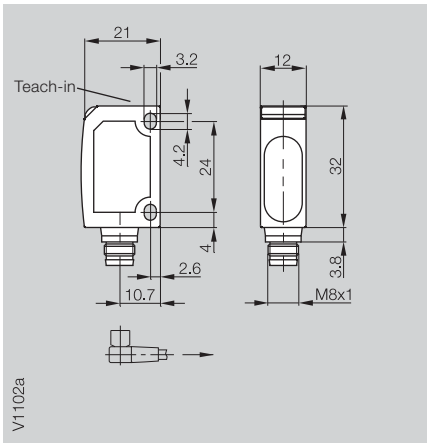
Recommended accessories

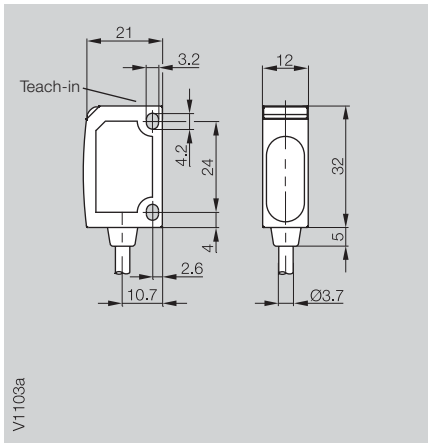
please order separately

Mounting bracket
BOS 6-HW-1

Connector
Straight BKS-S 74
Right-angle BKS-S 75

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_e	≤ 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 mm²
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.

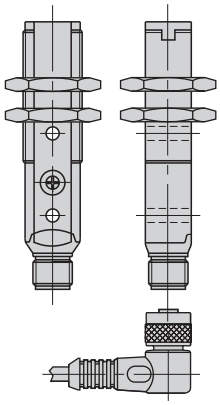
Connector orientation

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

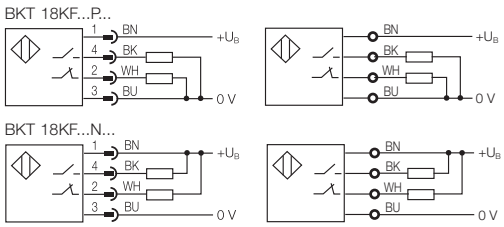
The **BKT 18KF** contrast sensor uses white light and can be programmed with the push of a button. It detects colored markings as well as gray levels on various surfaces. In the standard setting the sensor operates using dark-on.

A precise setting is available for slight contrast differences. The output function can also be selected in this setting.

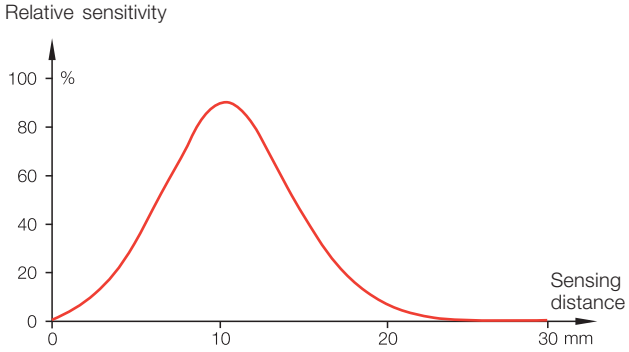
Connector orientation



Wiring diagrams



Function diagram



Recommended accessories

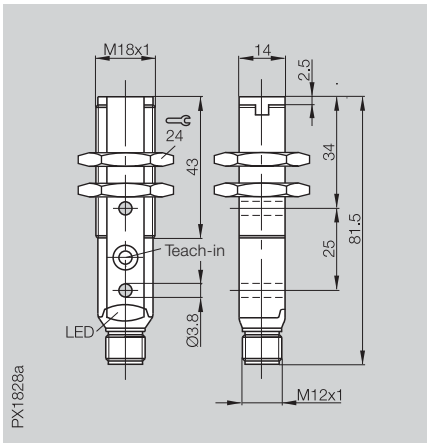
please order separately

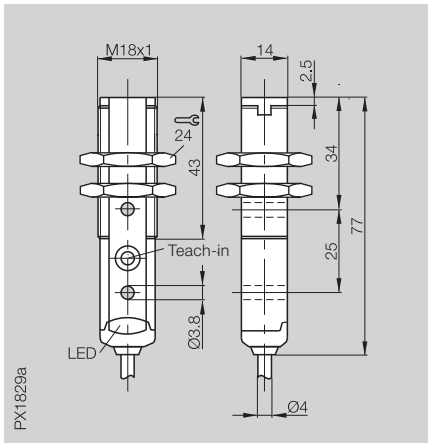
Mounting clamp
BOS 18,0-KB-1

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**





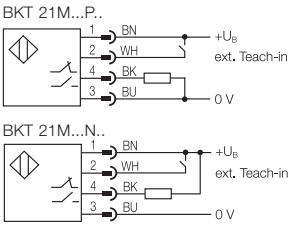
Contrast Sensor		
PNP	BKT 18KF-001-P-S4	BKT 18KF-001-P-02
NPN	BKT 18KF-001-N-S4	BKT 18KF-001-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light- and dark-on	Light- and dark-on
Output current	100 mA	100 mA
Voltage drop U_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	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 mm²
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 sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

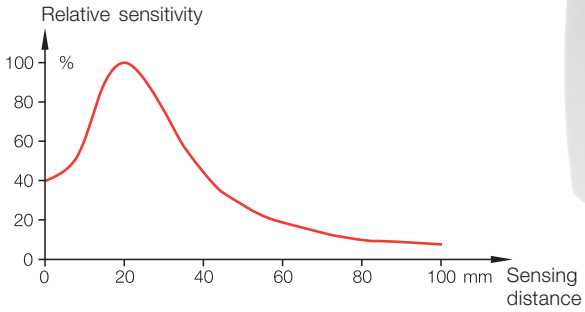
The **BKT 21M** contrast sensor uses white light and can be programmed with the push of a button. It detects colored markings as well as gray levels on various surfaces. In its standard setting the sensor is dark-switching (markings with less light intensity are detected as the background).

A precise setting is available for slight contrast differences. The output function can also be selected in this setting.

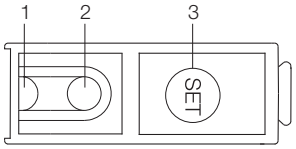
Wiring diagrams



Function diagram



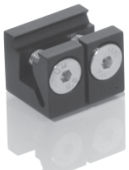
Indicators and operating elements



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



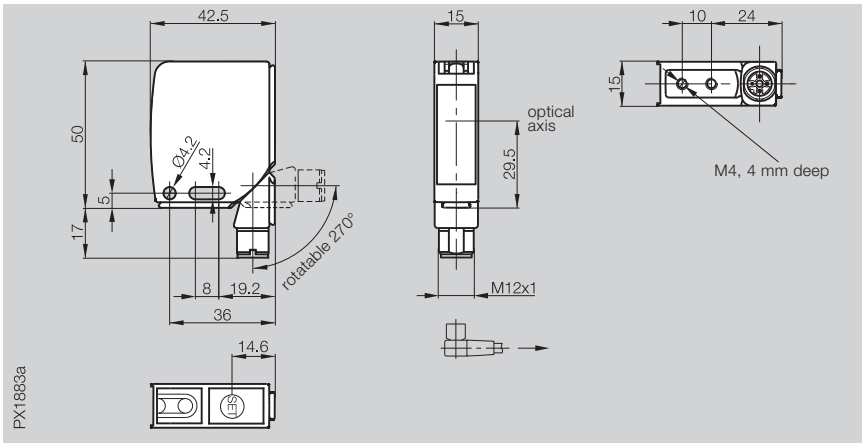
Mounting clamp
BOS 21-KH-2

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_e	≤ 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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

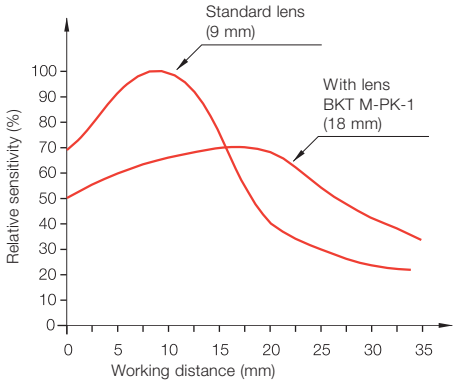
In this device the microprocessor takes over the entire setup process. The latter monitors and synchronizes the emitter, receiver and output circuits, for optimum switching frequency, repeatability and insensitivity to interference and ambient light.
The user needs only to press two keys for setting 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

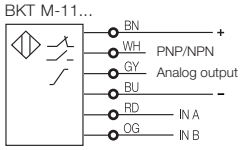
- Optional vertical or horizontal light spot
- Automatic selection of red or green emitter light
- Automatic setting of light-on/dark-on
- Remote key functions and 4 storable programs (cable version)
- Time delay and key lock
- Interchangeable optics (straight and 90°)
- Analog output

Function diagram

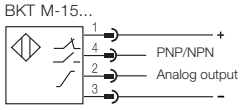


Wiring diagrams

BKT M-11...



BKT M-15...

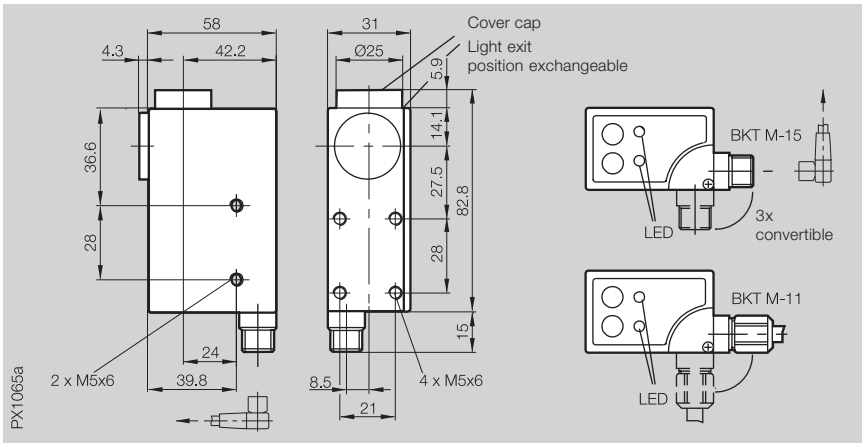


Recommended accessories
please order separately

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	⊖	BKT M-15-U-S4	BKT M-11-U-03
PNP/NPN	horizontal spot	ⓘ	BKT M-15L-U-S4	BKT M-11L-U-03
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_d at I_e			≤ 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			1.5×5 mm**	1.5×5 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 × cross-section				6×0.34 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
**2×7 mm with BKT M-PK1

Connector orientation

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

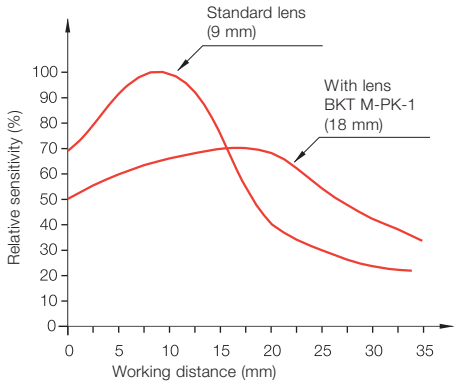
BKT M
Contrast sensor with white light

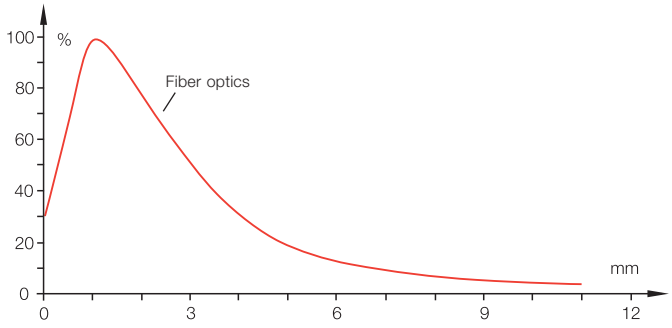
The Series **BKT M...** contrast sensors are also available with white light. Models with a round light spot or with a fiber optic port are available.

Features

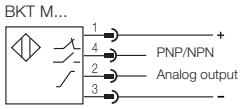
- Round light spot
- White light
- Automatic setting of light-on/dark-on
- Time delay and key lock selectable
- Interchangeable optics (straight and 90°)
- Analog output

Function diagrams





Wiring diagram



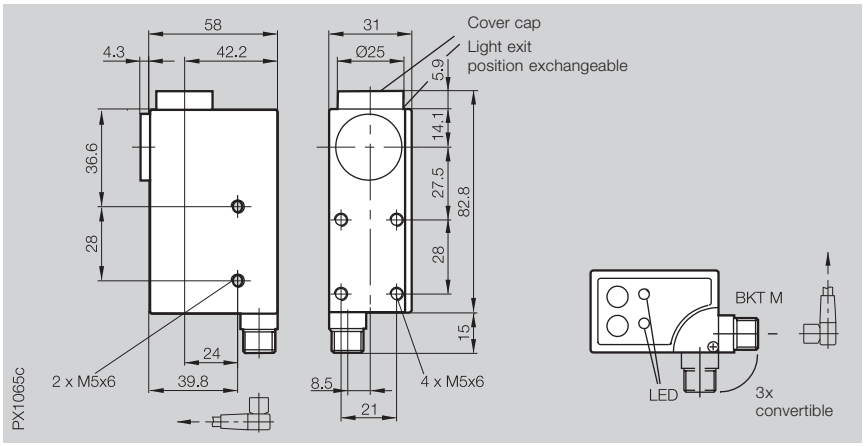
Recommended accessories
please order separately

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

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	BKT M-45-U-S4	
PNP/NPN round spot		BKT M-15C-U-S4
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_d at I_e	≤ 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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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

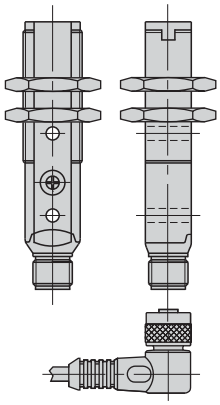
Type	Sensing distance	Light type		Output			Output function		Switching frequency	U_B	Connection		Page
		UV light		PNP-Transistor	NPN-Transistor	Analog output	Light-on	Dark-on		10...30 V DC	M12 connector, 4-pin	Cable	
Luminescence Sensor													
BLT 18KF-001-P-S4	8...20 mm	■		■			■	■	1 kHz	■	■		**2.2.**69
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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

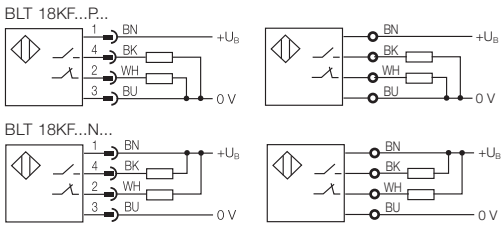
The **BLT 18KF** luminescence sensor detects any type of luminescent markings on any surface and automatically adjusts to ambient conditions. Setting is accomplished by pressing a key (markings with greater luminescence are detected as the background).

A precise setting is available for weakly luminescent markings. In this setting the output function can also be selected.

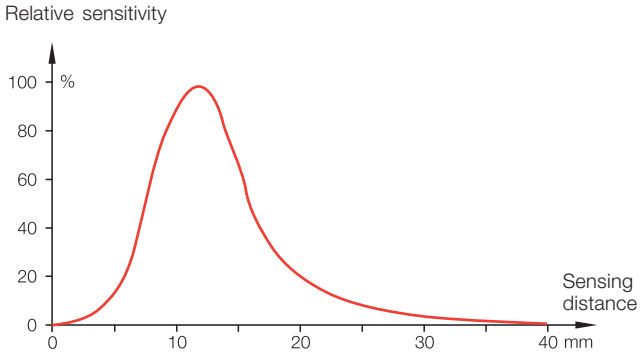
Connector orientation



Wiring diagrams



Function diagram



Recommended accessories

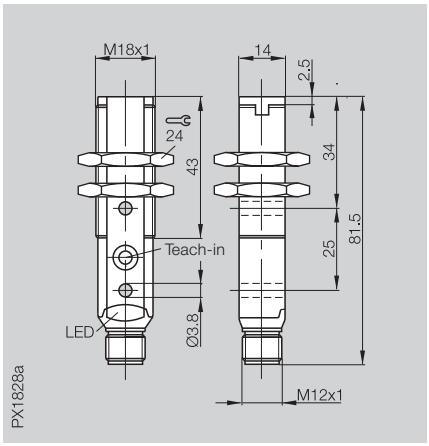
please order separately

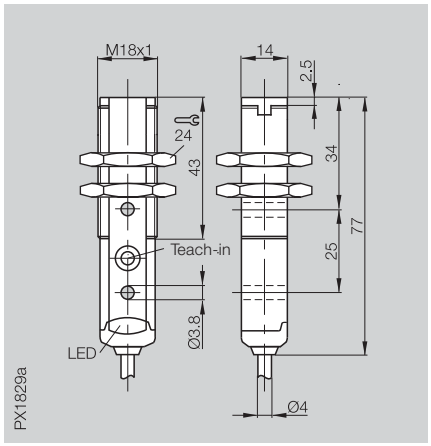
Mounting clamp
BOS 18,0-KB-1

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

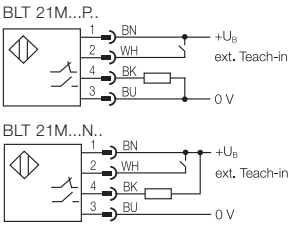
PNP	BLT 18KF-001-P-S4	BLT 18KF-001-P-02
NPN	BLT 18KF-001-N-S4	BLT 18KF-001-N-02
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	≤ 2 V	≤ 2 V
No-load supply current I_0 max.	≤ 25 mA	≤ 25 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light- and dark-on	Light- and dark-on
Output current	100 mA	100 mA
Voltage drop U_d at I_e	≤ 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	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
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 sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

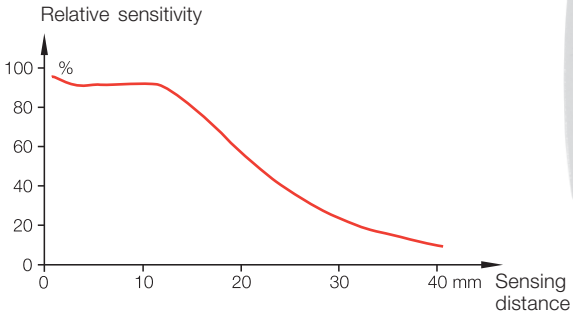
BLT 21M luminescence sensors detect all kinds of luminescent markings on any background. The sensor is calibrated with the simple push of a button. In the standard setting the sensor is light-switching (markings with greater luminescence are recognized as the background).

A precise setting is available for weakly luminescent markings. In this setting the output function can also be selected.

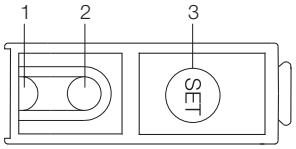
Wiring diagrams



Function diagram



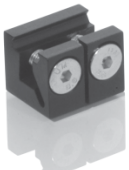
Indicators and operating elements



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

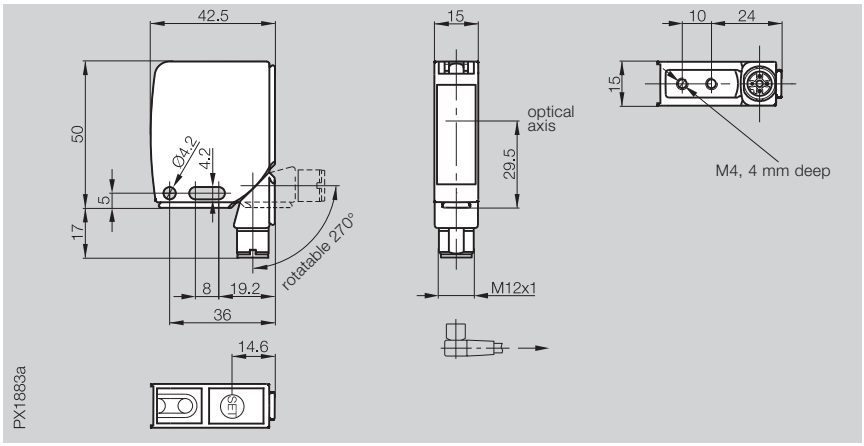

Mounting clamp
BOS 21-KH-2


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**



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_e	≤ 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 µs
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	42.5×50×15 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 per	EN 60947-5-2
Ambient temperature range T_a	–10...+55 °C

Connector orientation

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

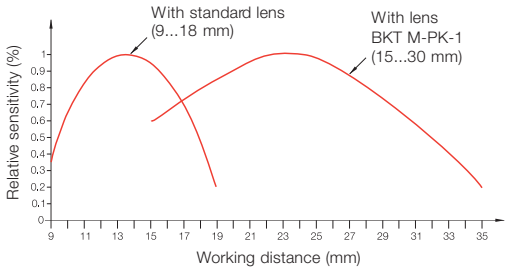
The Balluff luminescence sensor is equipped with a modern UV source so that no external UV lamp is needed. A microcontroller handles the evaluation using a teach-in procedure.
By simply pressing a key the BLT learns the difference between the fluorescent marking and the background. If the difference 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

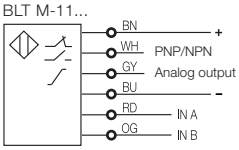
- UV source:
  LED, 100,000 hour life
- Push-button setting
- Automatic setting
  of light-on/dark-on
- Time delay selectable
- Analog output
  0...7 V DC standard
- M12 connector rotatable
  (3 positions)
- Key disabling possible

Function diagram

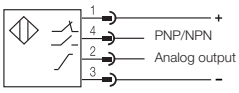


Wiring diagrams

BLT M-11...



BLT M-15...

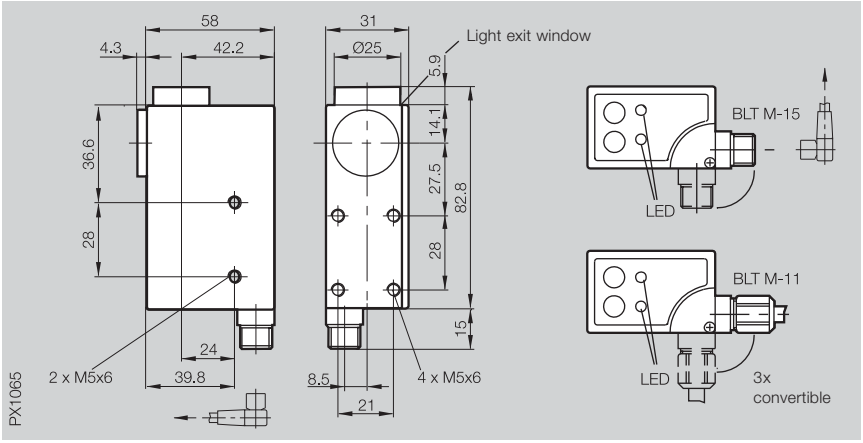


Recommended accessories
please order separately

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

PNP/NPN	BLT M-15-U-S4	BLT M-11-U-03
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_d at I_e	≤ 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 mm² 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

Connector orientation

Please note! Lenses not interchangeable for BLT M.

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

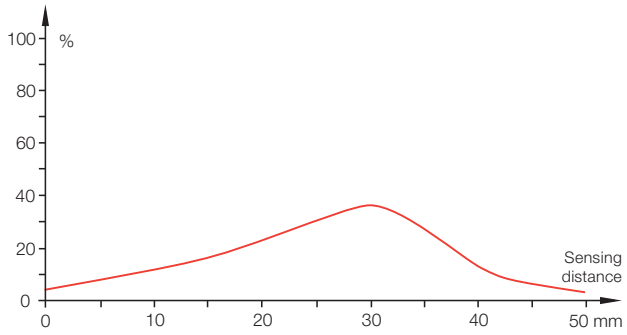
The Balluff **BLT M-55-...** luminescence sensor is equipped with a high-power UV LED, so that long sensing distances are possible using the appropriate lenses. For tight mounting conditions an adaptable fiber optic cable provides additional solution options.

Features

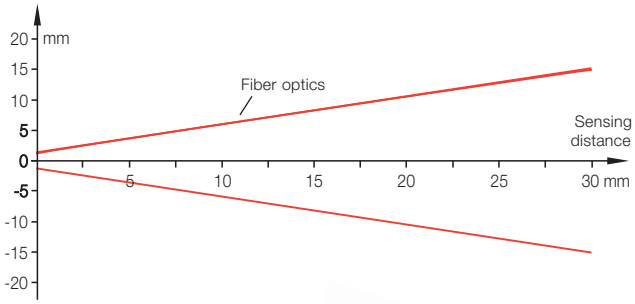
- High-Power UV LED
- High switching frequency of 2 kHz
- Fiber optic cable compatibility
- Push-button setting
- Analog output 0...7 V DC standard

Function diagrams

Relative sensitivity

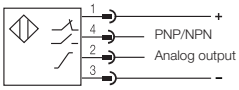


Detection range



Wiring diagram

BLT M-55-...



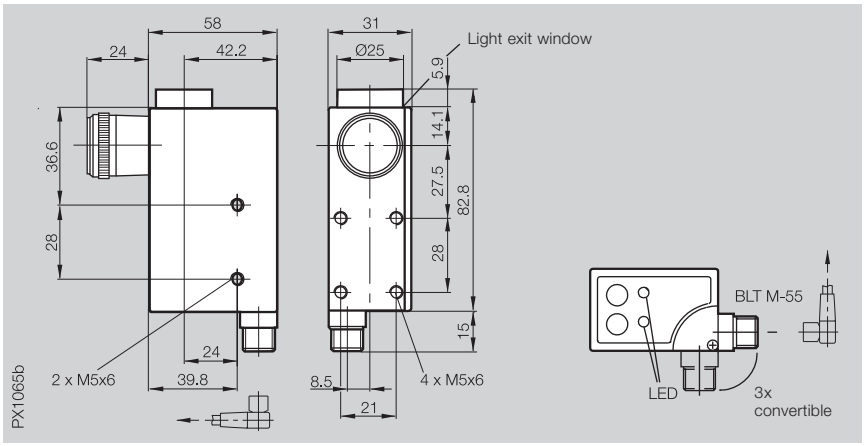
Recommended accessories

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_e	≤ 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.

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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

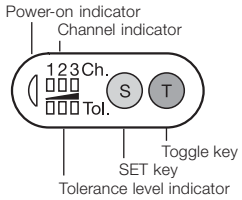
- Display
- Autocollimation
- Versions with high switching frequency or for dark colors
- Color type or color type + intensity modes
- Serial interface RS485

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
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

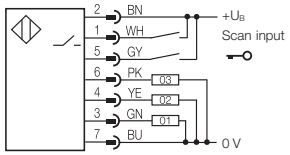
Series	
Working range	Diffuse mode
Working range	Reflector mode

Indicators and operating elements

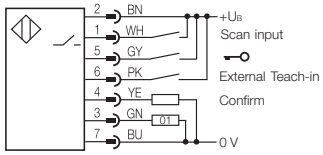


Wiring diagrams

Two modes are available.
1. Normal mode “factory setting”

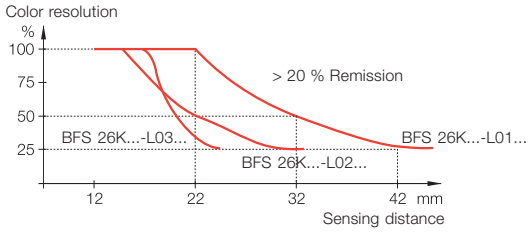


2. External Teach-in setting using „special functions“



Disabling input:
> 12 V = keys disabled
< 3 V = keys not disabled

Color resolution/Sensing distance diagram



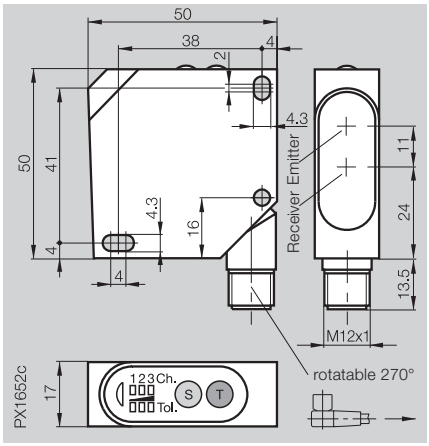
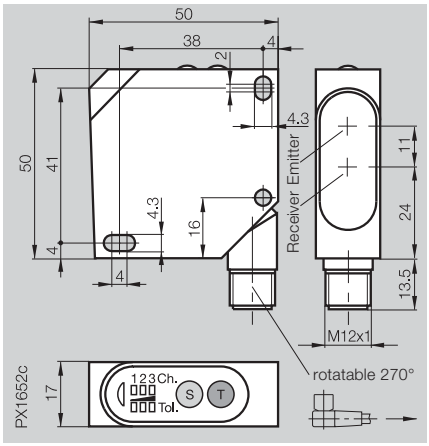
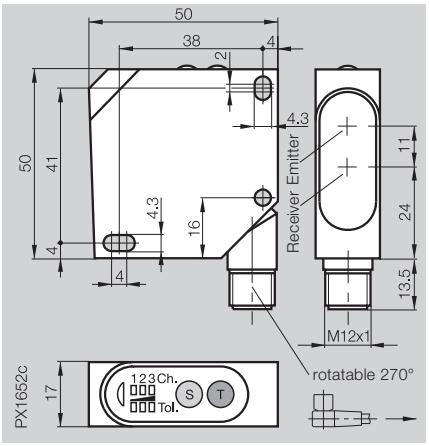
Recommended accessories
please order separately

Mounting bracket
BOS 26-HW-1

Connector
BKS-S139-PU-05

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	Pulsed white light	Pulsed white light
round	square	rectangular
∅ 4 mm at 22 mm sensing distance	2×2 mm at 22 mm sensing distance	5×1 mm at 22 mm sensing distance
±6 mm for Tol. 3	±5 mm for Tol. 3	±2 mm for Tol. 3
settable in 5 levels	settable in 5 levels	settable in 5 levels
LED green	LED green	LED green
3 × LED yellow	3 × LED yellow	3 × LED yellow
3 × LED red	3 × LED red	3 × LED red
300 ms	300 ms	300 ms
1 ms	1 ms	1 ms
500 Hz	500 Hz	500 Hz
50 ms turn-off delay selectable	50 ms turn-off delay selectable	50 ms turn-off delay selectable
50×50×17 mm	50×50×17 mm	50×50×17 mm
M12 connector, 8-pin	M12 connector, 8-pin	M12 connector, 8-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
–10...+55 °C	–10...+55 °C	–10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

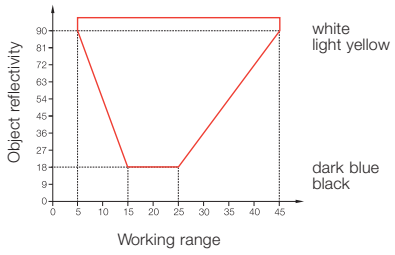
Operating modes

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.

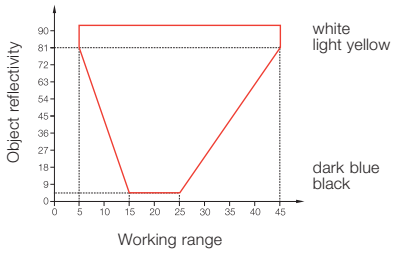
C+I Color type + intensity
In the C+I setting color intensity is also evaluated. This allows even the finest color nuances to be discriminated. Even the finest gray levels can be detected.

Function diagrams

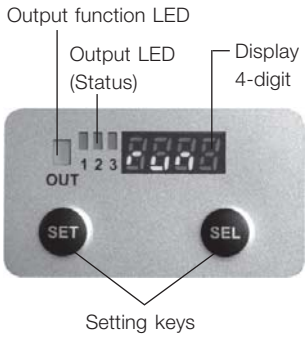
BFS 27K-...-L01



BFS 27K-...-L02

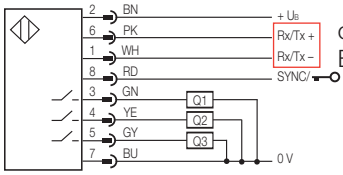


Operating panel and display



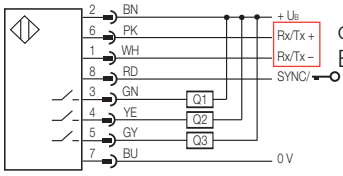
Wiring diagrams

BFS 27K-PS...
PNP



only type
BFS 27K-PS**R**...

BFS 27K-NS...
NPN



only type
BFS 27K-NS**R**...

Recommended accessories
please order separately

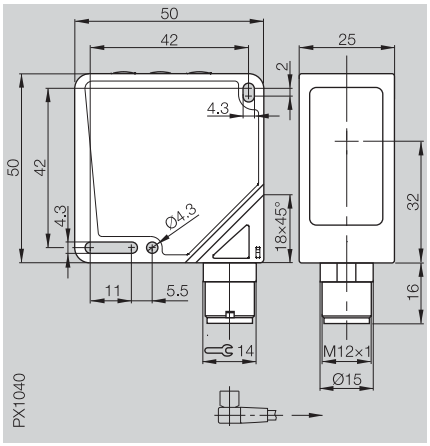
Mounting bracket
BOS 35-HW-1

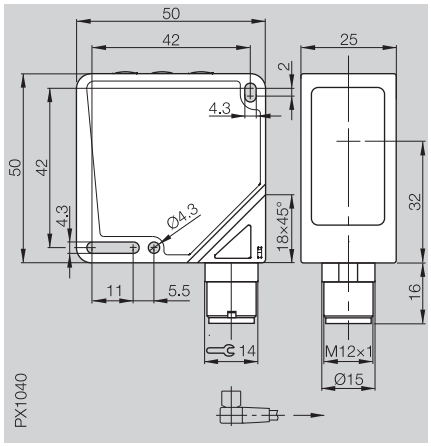
Adapter plate
BOS 21-AD-1

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 × PNP- or NPN-Transistor	3 × 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 µs	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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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.

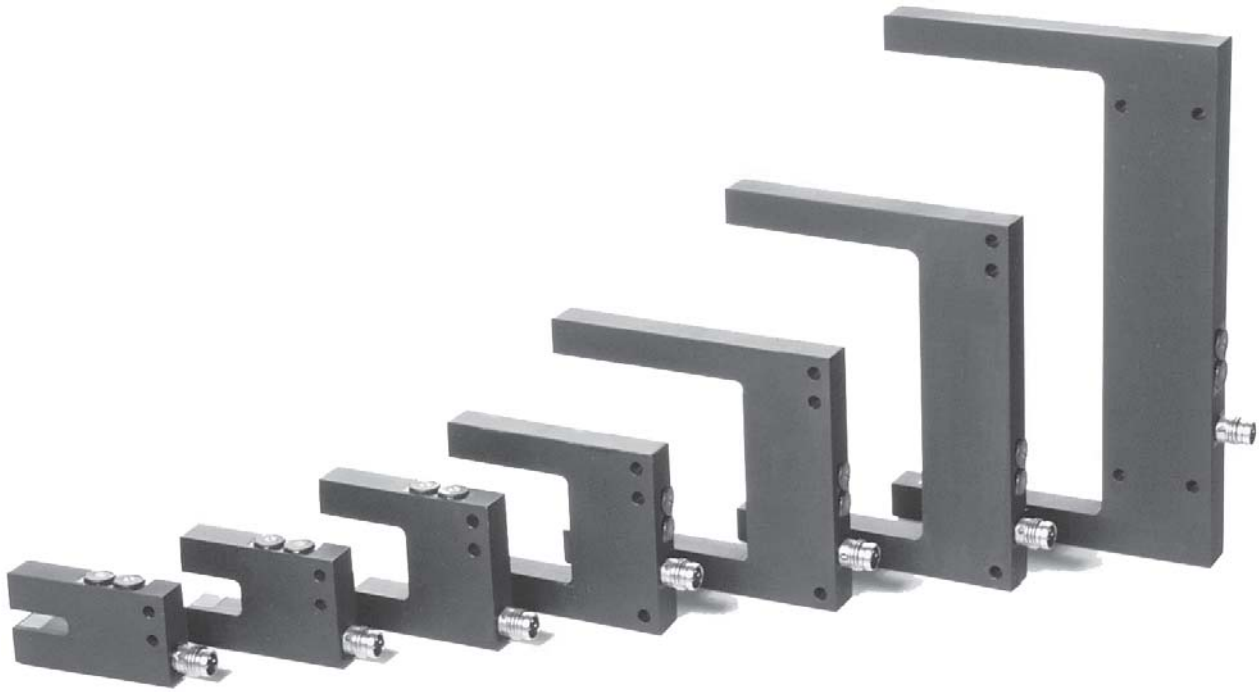
Laser slot sensors are the logical extension of this proven concept. They are unbeatable when it comes to accuracy, detail discrimination and operating reliability. Balluff laser slot sensors are ideal for precise positioning as well as reliable detection of fast-moving processes and small parts. This 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

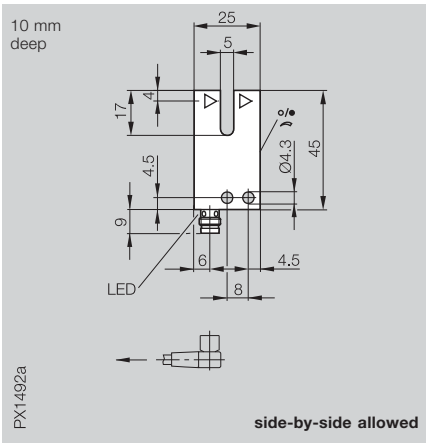
- Parts sensing on conveyor and feed belts
- Label sensing on transparent backing material
- Dimension checking
- Counting parts in assembly lines
- Tool break monitoring
- Position monitoring
- Feed control on automatic assembly equipment
- Checking for completeness (e.g. connector pins)
- Level monitoring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

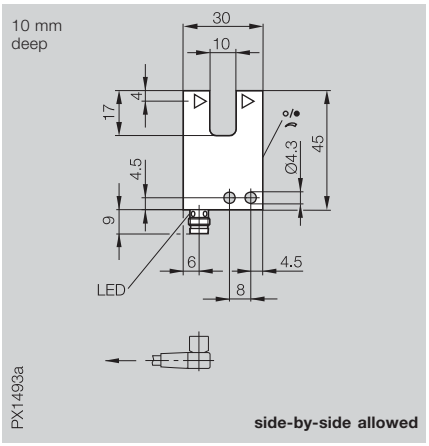


Type	Slot opening	Resolution	Light type				Output		Output function		Switching frequency	U_B	Connection		Page
			Red light	Laser light	Infrared	Red and green light	PNP-Transistor	NPN-Transistor	Light-on	Dark-on		10...30 V DC	M8 connector, 3-pin		
Slot Sensors															
BGL 5A-001-S49	5 mm	0.3 mm	■				■		■	■	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

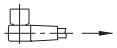
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Series	BGL	BGL
Slot opening	**5 mm**	**10 mm**
Slot depth	17 mm	17 mm

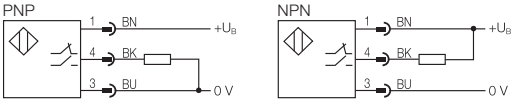


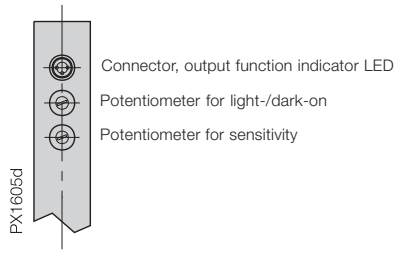


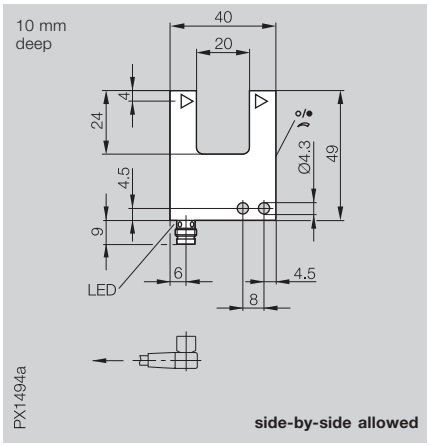
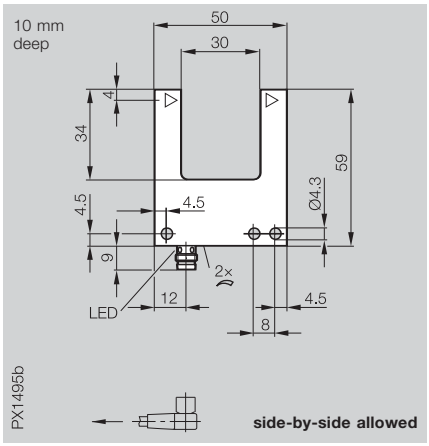
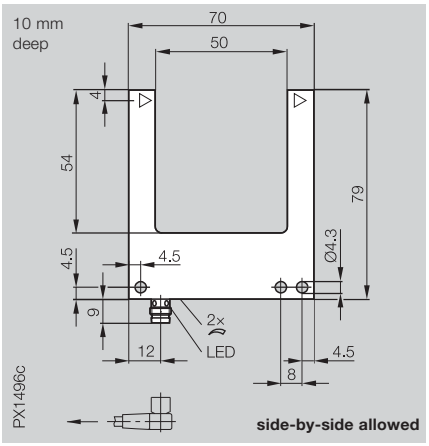
Slot sensor		
PNP	BGL 5A-001-S49	BGL 10A-001-S49
NPN	BGL 5A-002-S49	BGL 10A-002-S49
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	< 35 mA	< 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Switching type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	200 mA	200 mA
Voltage drop U_d at I_e	≤ 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 µm	20 µm
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
Mechanical data		
Dimensions	25×45×10 mm	30×45×10 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


Connector orientation

Wiring diagrams





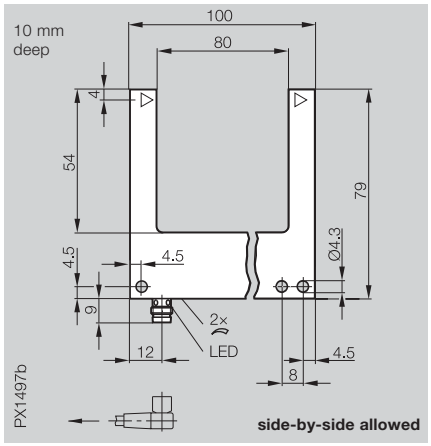
	BGL **20 mm** 24 mm	BGL **30 mm** 34 mm	BGL **50 mm** 54 mm
			
	BGL 20A-001-S49 BGL 20A-002-S49	BGL 30A-001-S49 BGL 30A-002-S49	BGL 50A-001-S49 BGL 50A-002-S49
	10...30 V DC	10...30 V DC	10...30 V DC
	10 %	10 %	10 %
	< 35 mA	< 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- or NPN-Transistor
	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
	0.3 mm	0.3 mm	0.4 mm
	20 µm	20 µm	40 µm
	≤ 0.1 mm	≤ 0.1 mm	≤ 0.15 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
	40×49×10 mm	50×59×10 mm	70×79×10 mm
	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
	GD-Zn	GD-Zn	GD-Zn
	Glass	Glass	Glass
	28 g	36 g	107 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

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

Series	BGL
Slot opening	**80 mm**
Slot depth	54 mm

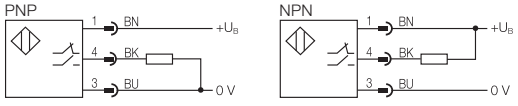


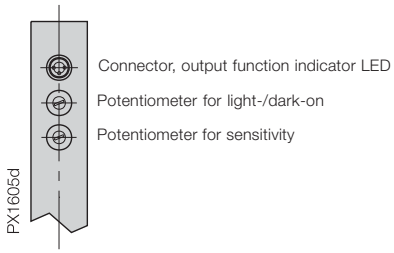
Slot sensor

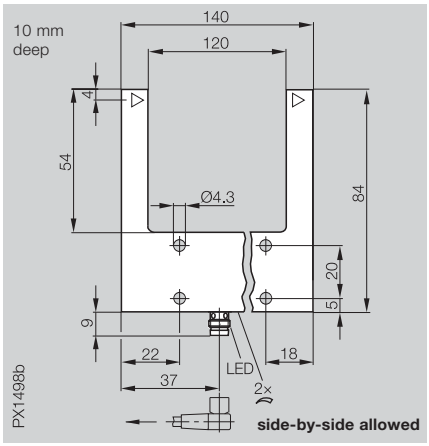
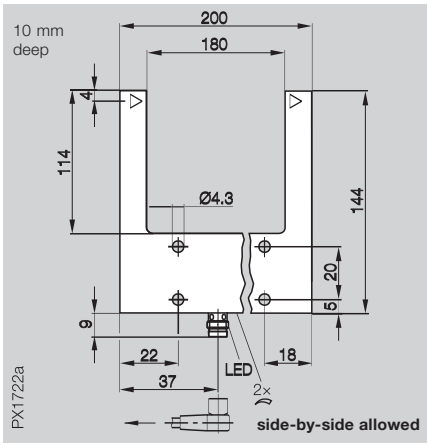
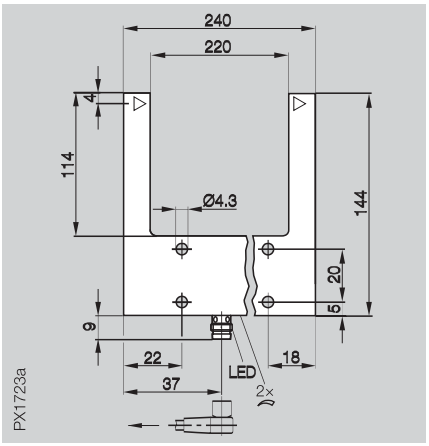
PNP	BGL 80A-001-S49
NPN	BGL 80A-002-S49
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 35 mA
Switching output	PNP- or NPN-Transistor
Output current	Light-/dark-on (selectable)
Switching type	200 mA
Voltage drop U_d at I_e	≤ 3 V (PNP), ≤ 2.5 V (NPN)
Settings	Potentiometer 270°
Optical data	
Emitter, light type	LED, red light
Wavelength	640 nm
Resolution (smallest discernible part)	0.4 mm
Repeat accuracy	60 µm
Switching hysteresis	≤ 0.2 mm
Time data	
Response time	0.33 ms
Switching frequency f	1.5 kHz
Indicators	
Output function indicator	LED yellow
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

Connector orientation

Wiring diagrams





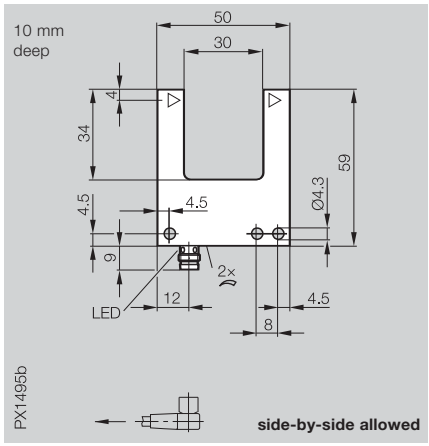
	BGL	BGL	BGL
	120 mm	**180 mm**	**220 mm**
	54 mm	114 mm	114 mm
			
	BGL 120A-001-S49 BGL 120A-002-S49	BGL 180A-001-S49 BGL 180A-002-S49	BGL 220A-001-S49 BGL 220A-002-S49
	10...30 V DC	10...30 V DC	10...30 V DC
	10 %	10 %	10 %
	≤ 35 mA	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	PNP- 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

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

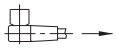
Recommended accessories
please order separately

Connector
Straight BKS-_ 48
Right-angle BKS-_ 49

Series	BGL
Slot opening	**30 mm**
Slot depth	34 mm

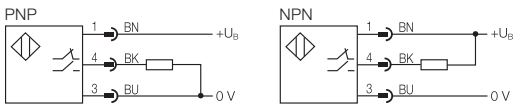


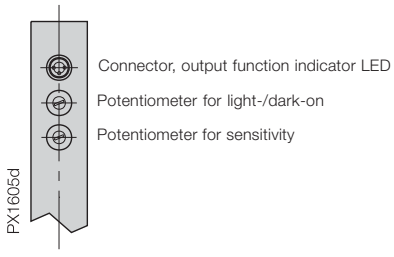
Slot sensor	
PNP	BGL 30A-003-S49
NPN	BGL 30A-004-S49
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 20 mA
Switching output	PNP- or NPN-Transistor
Output current	200 mA
Switching type	Light-/dark-on (selectable)
Voltage drop U_d at I_e	≤ 3 V (PNP), ≤ 2.5 V (NPN)
Settings	Potentiometer 270°
Optical data	
Emitter, light type	Laser, red light
Wavelength	650 nm
Laser class	1
Resolution (smallest discernible part)	50 µm
Repeat accuracy	10 µm
Switching hysteresis	≤ 20 µm
Time data	
Response time	0.16 ms
Switching frequency f	5 kHz
Indicators	
Output function indicator	LED yellow
Mechanical data	
Dimensions	50×59×10 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

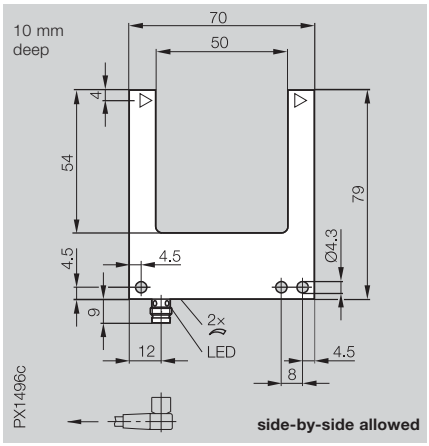
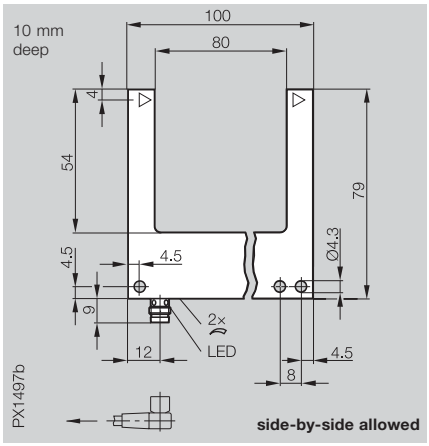
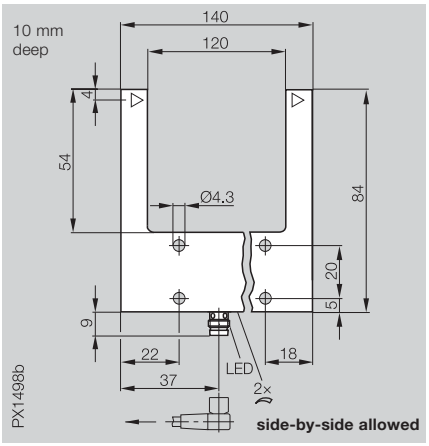


Connector orientation

Wiring diagrams





	BGL	BGL	BGL
	50 mm	**80 mm**	**120 mm**
	54 mm	54 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
	70×79×10 mm	100×79×10 mm	140×84×10 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

Recommended accessories
please order separately

Connector
Straight BKS-_ 48
Right-angle BKS-_ 49

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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 to 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	

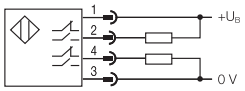
CE

Slot sensor

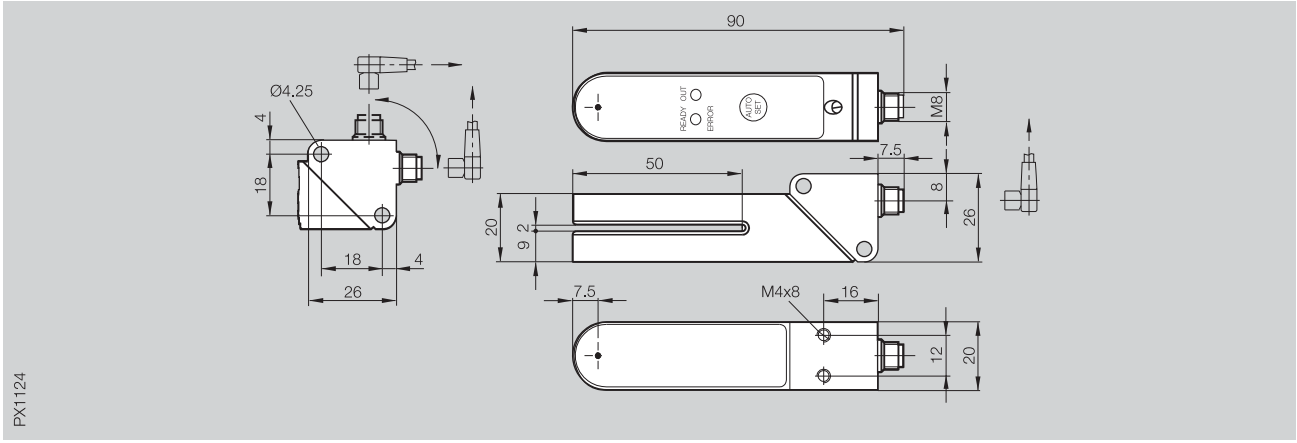
PNP/NPN	
Object property*	
Electrical data	
Supply voltage U_B	
Ripple	
No-load supply current I_0 max.	
Switching output	
Switching type	
Output current	
Voltage drop U_d at I_e	
Settings	
Optical data	
Emitter, light type	
Wavelength	
Resolution (smallest discernible part)	
Time data	
Response time	
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	BGL	BGL	BGL
	2 mm	**2 mm**	**2 mm**	**2 mm**
	50 mm	50 mm	50 mm	50 mm



	BGL 21-AH	BGL 21-AV	BGL 21-AS	BGL 21-AR
	Colored and transparent on colored or neutral substrate	Transparent or see-through on transparent substrate	Opaque on see-through or transparent substrate	Opaque on see-through or transparent substrate
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	2 V	2 V	2 V	2 V
	≤ 55 mA	≤ 55 mA	≤ 55 mA	≤ 55 mA
	PNP and NPN Transistor	PNP and NPN Transistor	PNP and NPN Transistor	PNP and NPN Transistor
	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)	Light-/dark-on (selectable)
	100 mA	100 mA	100 mA	100 mA
	≤ 1.2 V	≤ 1.2 V	≤ 1.2 V	≤ 1.2 V
	Teach-in	Teach-in	Teach-in	Teach-in
	LED, red light/green light	LED, infrared	LED, infrared	LED, infrared
	635 nm/535 nm	880 nm	880 nm	880 nm
	0.5 mm	0.25 mm	0.25 mm	0.5 mm
	133 µs	133 µs	66 µs	133 µs
	7.5 kHz	7.5 kHz	15 kHz	7.5 kHz
	LED yellow	LED yellow	LED yellow	LED yellow
	LED red/green	LED red/green	LED red/green	LED red/green
	90×26×20 mm	90×26×20 mm	90×26×20 mm	90×26×20 mm
	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin
	Anodized Al	Anodized Al	Anodized Al	Anodized Al
	Glass	Glass	Glass	Glass
	100 g	100 g	100 g	100 g
	IP 65	IP 65	IP 65	IP 65
	yes	yes	yes	yes
	yes	yes	yes	yes
	0...+55 °C	0...+55 °C	0...+55 °C	0...+55 °C
	3 kLux (artificial light)/ 10 kLux (sunlight)	3 kLux (artificial light)/ 10 kLux (sunlight)	3 kLux (artificial light)/ 10 kLux (sunlight)	3 kLux (artificial light)/ 10 kLux (sunlight)

* Object transparent	Impinging light fully penetrates the object
Object transparent	Impinging light penetrates the object partially or is reflected
Object opaque	Impinging light does not penetrate the object

Recommended accessories
please order separately

Connector
Straight BKS-S 74
Right-angle BKS-S 75

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

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 Automotive** 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.

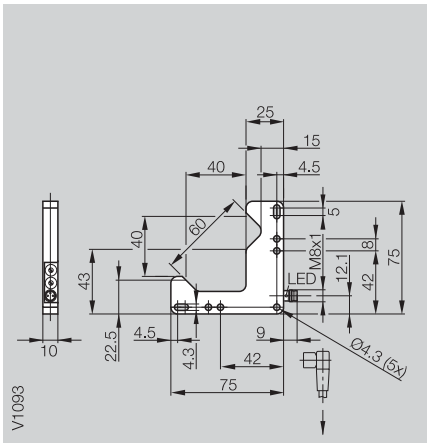
Applications

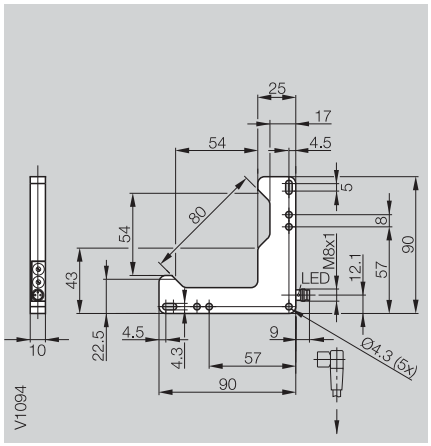
- Robotic systems
- Position and location control

Type	Optical axis	Light type			Output		Output function		Switching frequency	U_B	Connection		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

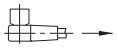
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Series	BWL	BWL
Optical axis	**40/40 mm**	**54/54 mm**

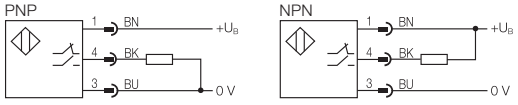


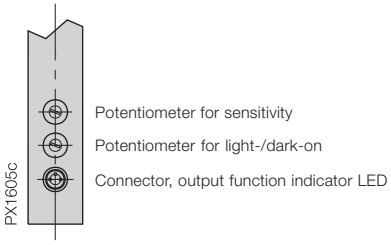


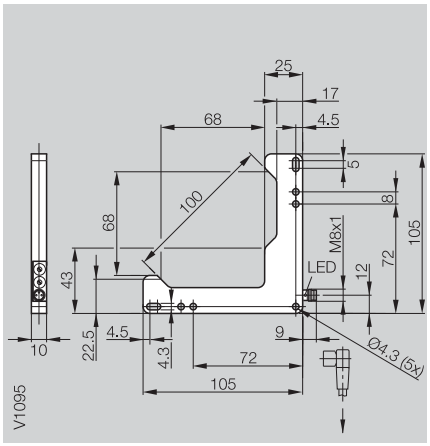
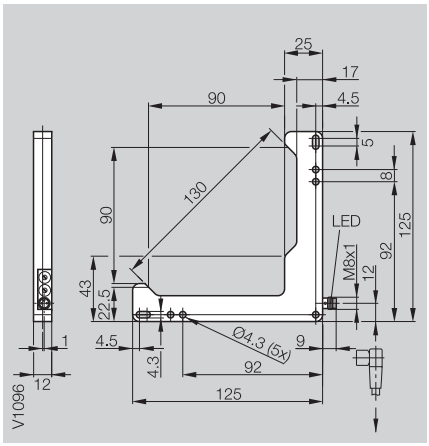
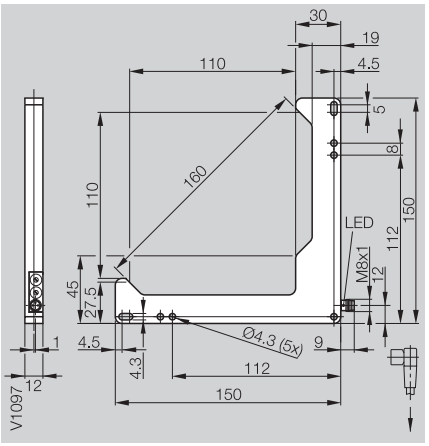
Angle Sensor		
PNP	BWL 4040D-R011-S49	BWL 5454D-R011-S49
NPN	BWL 4040D-R012-S49	BWL 5454D-R012-S49
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA
Switching output	PNP- or NPN-Transistor	PNP- or NPN-Transistor
Output type	Light-/dark-on (selectable)	Light-/dark-on (selectable)
Output current	200 mA	200 mA
Voltage drop U_d at I_e	≤ 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 µm	≤ 60 µm
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
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



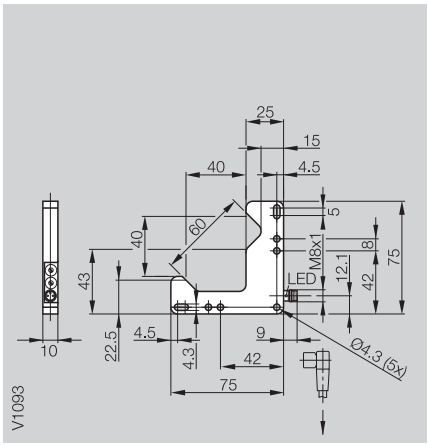
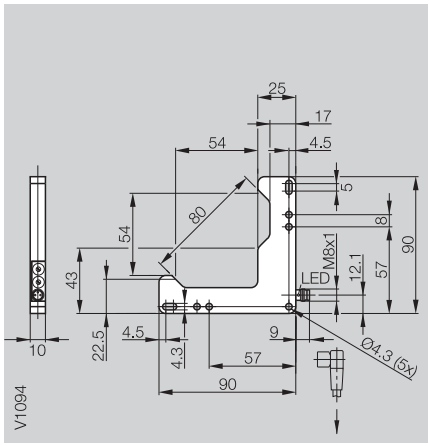


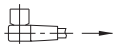
	BWL **68/68 mm**	BWL **90/90 mm**	BWL **110/110 mm**
			
	BWL 6868D-R011-S49 BWL 6868D-R012-S49	BWL 9090D-R011-S49 BWL 9090D-R012-S49	BWL 110110D-R011-S49 BWL 110110D-R012-S49
	10...30 V DC	10...30 V DC	10...30 V DC
	10 %	10 %	10 %
	≤ 35 mA	≤ 35 mA	≤ 35 mA
	PNP- or NPN-Transistor	PNP- or NPN-Transistor	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
	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
	GD-Zn	GD-Zn	GD-Zn
	Glass	Glass	Glass
	150 g	233 g	334 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

Recommended accessories
please order separately

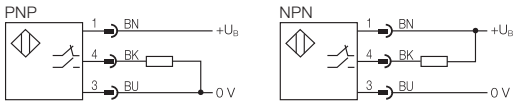
Connector
Straight BKS-_ 48
Right-angle BKS-_ 49

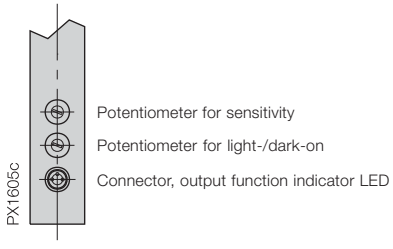
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

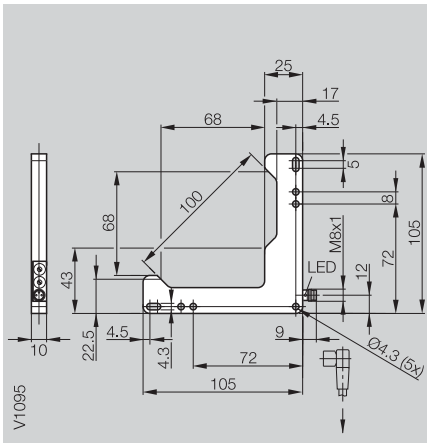
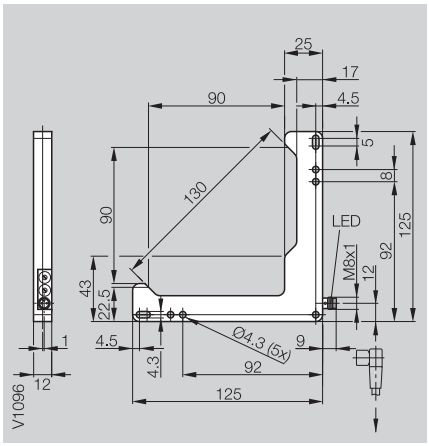
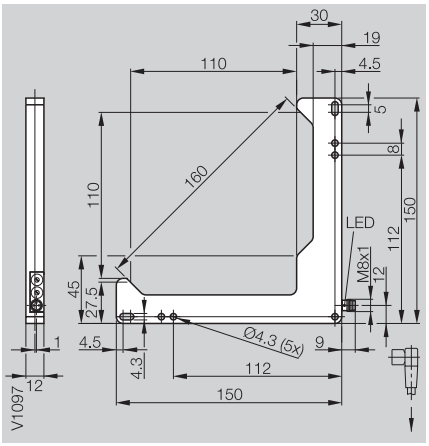
Series	BWL	BWL
Optical axis	**40/40 mm**	**54/54 mm**
		
Angle sensor		
PNP	BWL 4040D-L011-S49	BWL 5454D-L011-S49
NPN	BWL 4040D-L012-S49	BWL 5454D-L012-S49
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	10 %	10 %
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA
Switching output	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_e	≤ 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 µm	0.1 mm
Repeat accuracy	≤ 10 µm	≤ 10 µm
Switching hysteresis	≤ 25 µm	≤ 35 µm
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





	BWL **68/68 mm**	BWL **90/90 mm**	BWL **110/110 mm**
			
	BWL 6868D-L011-S49 BWL 6868D-L012-S49	BWL 9090D-L011-S49 BWL 9090D-L012-S49	BWL 110110D-L011-S49 BWL 110110D-L012-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°
	Laser, red light	Laser, red light	Laser, red light
	640 nm	640 nm	640 nm
	1	1	1
	0.12 mm	0.15 mm	0.2 mm
	≤ 15 µm	≤ 15 µm	≤ 20 µm
	≤ 40 µm	≤ 50 µm	≤ 70 µm
	0.16 ms	0.16 ms	0.16 ms
	5 kHz	5 kHz	5 kHz
	LED yellow	LED yellow	LED yellow
	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin
	GD-Zn	GD-Zn	GD-Zn
	Glass	Glass	Glass
	150 g	233 g	334 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

LED yellow

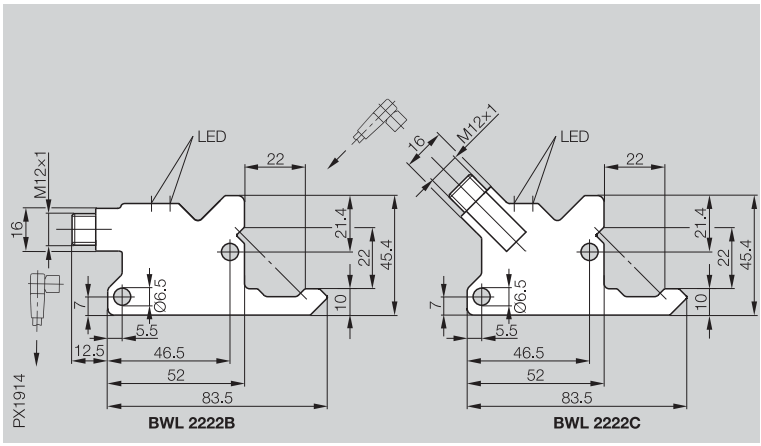
50×59×10 mm
M8 connector, 3-pin
GD-Zn

Recommended accessories
please order separately

Connector
Straight BKS-_ 48
Right-angle BKS-_ 49

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Series	BWL	BWL
Optical axis	22 mm/22 mm	22 mm/22 mm

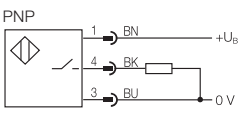


Angle sensor

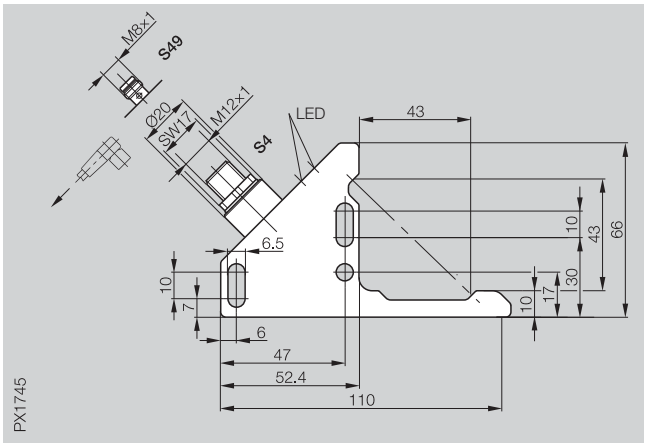
PNP	BWL 2222B-001-S4	BWL 2222C-001-S4
Electrical data		
Supply voltage U_B	10...30 V DC	10...30 V DC
Ripple	15 %	15 %
No-load supply current I_0 max.	≤ 35 mA	≤ 35 mA
Switching output	PNP-Transistor	PNP-Transistor
Output current	≤ 200 mA	≤ 200 mA
Switching type	Dark-on	Dark-on
Voltage drop U_d at I_e	≤ 2.5 V	≤ 2.5 V
Optical data		
Emitter, light type	LED, infrared	LED, infrared
Wavelength	880 nm	880 nm
Time data		
Ready delay	100 ms	100 ms
Response time	≤ 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	45.4×83.5×10.7 mm	45.4×83.5×10.7 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
Housing material	corrosion-resistant steel	corrosion-resistant steel
Optical surface	PMMA	PMMA
Weight	106 g	99 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

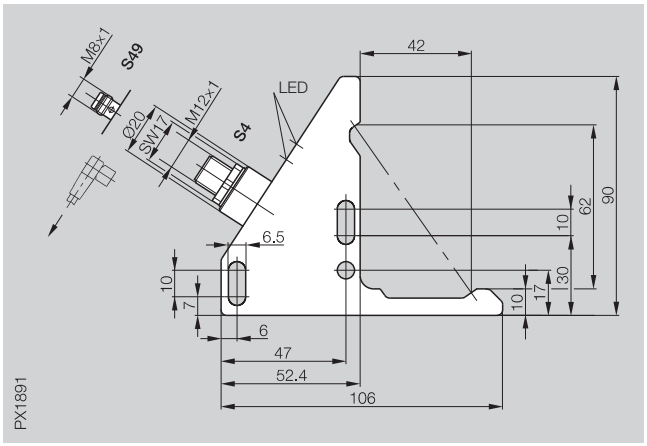
Connector orientation

Wiring diagram



	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

Recommended accessories
please order separately

Connector
Straight BKS-_ 19
Right-angle BKS-_ 20

Connector
Straight BKS-_ 48
Right-angle BKS-_ 49

2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

BOWA
Dynamic Optical Windows

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

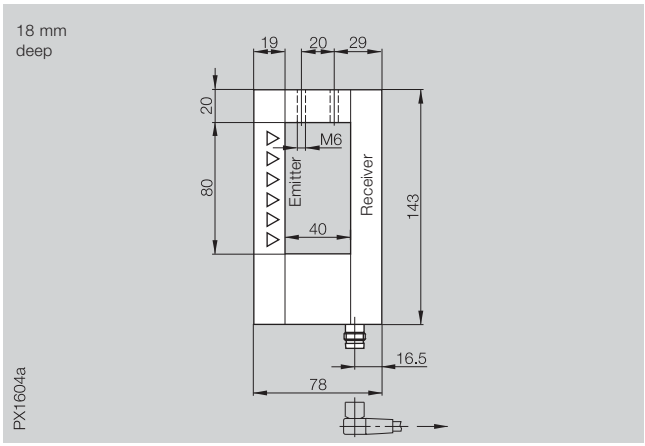
Applications

- 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	Connection		Page
			Infrared		PNP-Transistor			Dark-on	Dynamic		10...30 V DC	M8 connector, 3-pin		
Dynamic Optical Windows														
BOWA 0408-PS-C-S49	40×80 mm	0.8 mm	■		■			■	■		■	■		**2.2**.102
BOWA 0808-PS-C-S49	80×80 mm	1 mm	■		■			■	■		■	■		**2.2**.103
BOWA 1208-PS-C-S49	120×80 mm	1.5 mm	■		■			■	■		■	■		**2.2**.103

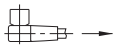
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

Series	BOWA
Active area	**40×80 mm**



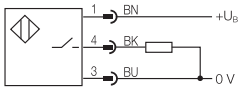
Dynamic optical window

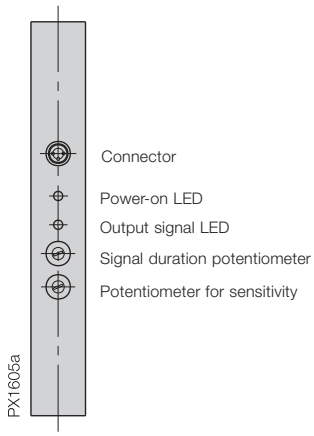
PNP	BOWA 0408-PS-C-S49
Electrical data	
Supply voltage U_B	10...30 V DC
Ripple	10 %
No-load supply current I_0 max.	≤ 85 mA
Switching output	PNP-Transistor
Switching type	Dark-on
Output current	200 mA
Voltage drop U_d at I_e	≤ 3.5 V
Settings	2× potentiometers 270°
Optical data	
Emitter, light type	LED, 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

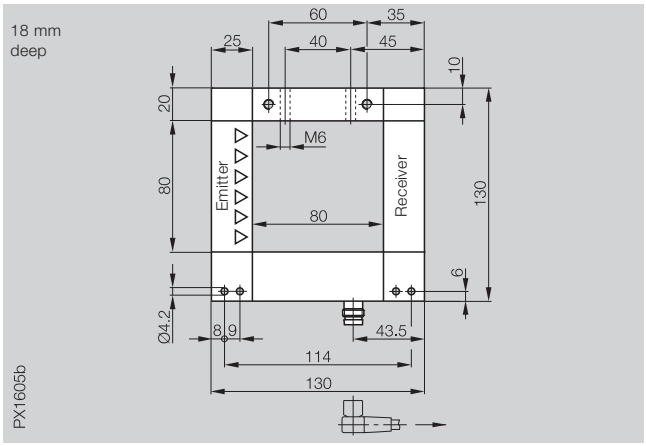
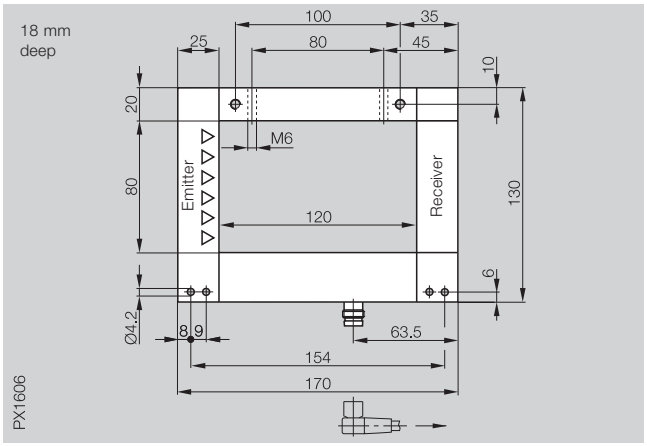
 Connector orientation

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

Wiring diagram





BOWA **80×80 mm**	BOWA **120×80 mm**
	
BOWA 0808-PS-C-S49	BOWA 1208-PS-C-S49
10...30 V DC	10...30 V DC
10 %	10 %
≤ 125 mA	≤ 150 mA
PNP-Transistor	PNP-Transistor
Dark-on	Dark-on
200 mA	200 mA
≤ 3.5 V	≤ 3.5 V
2× potentiometers 270°	2× potentiometers 270°
LED, infrared	LED, infrared
880 nm	880 nm
1 mm	1.5 mm
≤ 100 ms	≤ 100 ms
0.2 ms	0.2 ms
10...300 ms adjustable	10...300 ms adjustable
3...100 Hz	3...100 Hz
LED green	LED green
LED red	LED red
130×130×18 mm	130×170×18 mm
M8 connector, 3-pin	M8 connector, 3-pin
Anodized Al	Anodized Al
PMMA	PMMA
400 g	480 g
IP 65	IP 65
yes	yes
yes	yes
–10...+55 °C	–10...+55 °C
EN 60947-5-2	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

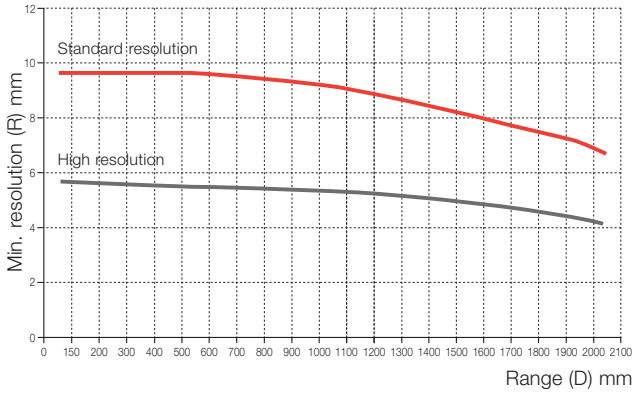
- Counting parts
- Height measurement and height checking
- Presence detection
- Slack and position checking
- Pallet checking
- Web monitoring
- Position and material monitoring

Type	Measuring field height	Range		Reso-lution		Light type		Output		Output function		U_B	Connec-tion		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 ...
5
Connectors ... page 5.2 ...

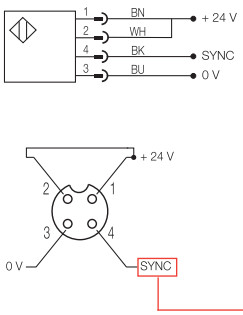
Resolution Diagram

Range 0.15...2.1 m

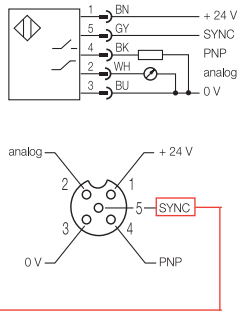


Wiring diagrams

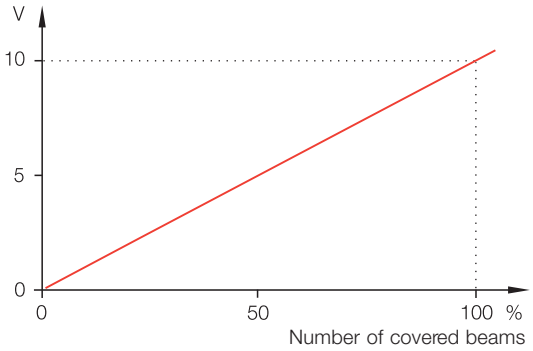
Transmitter



Output sensor



Analog output



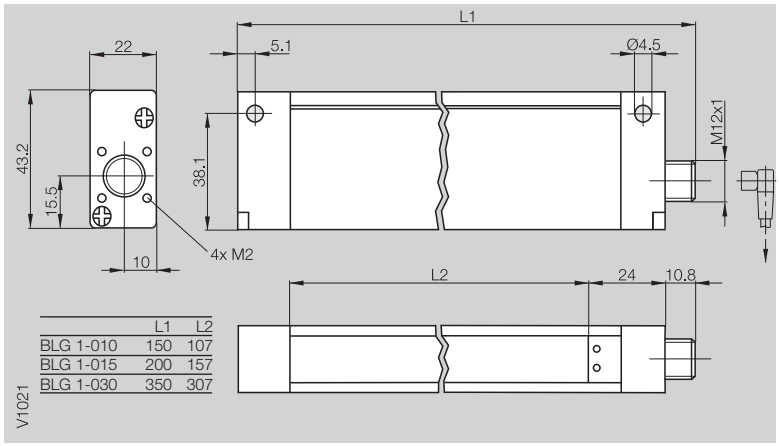
Mounting bracket
(included)

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**

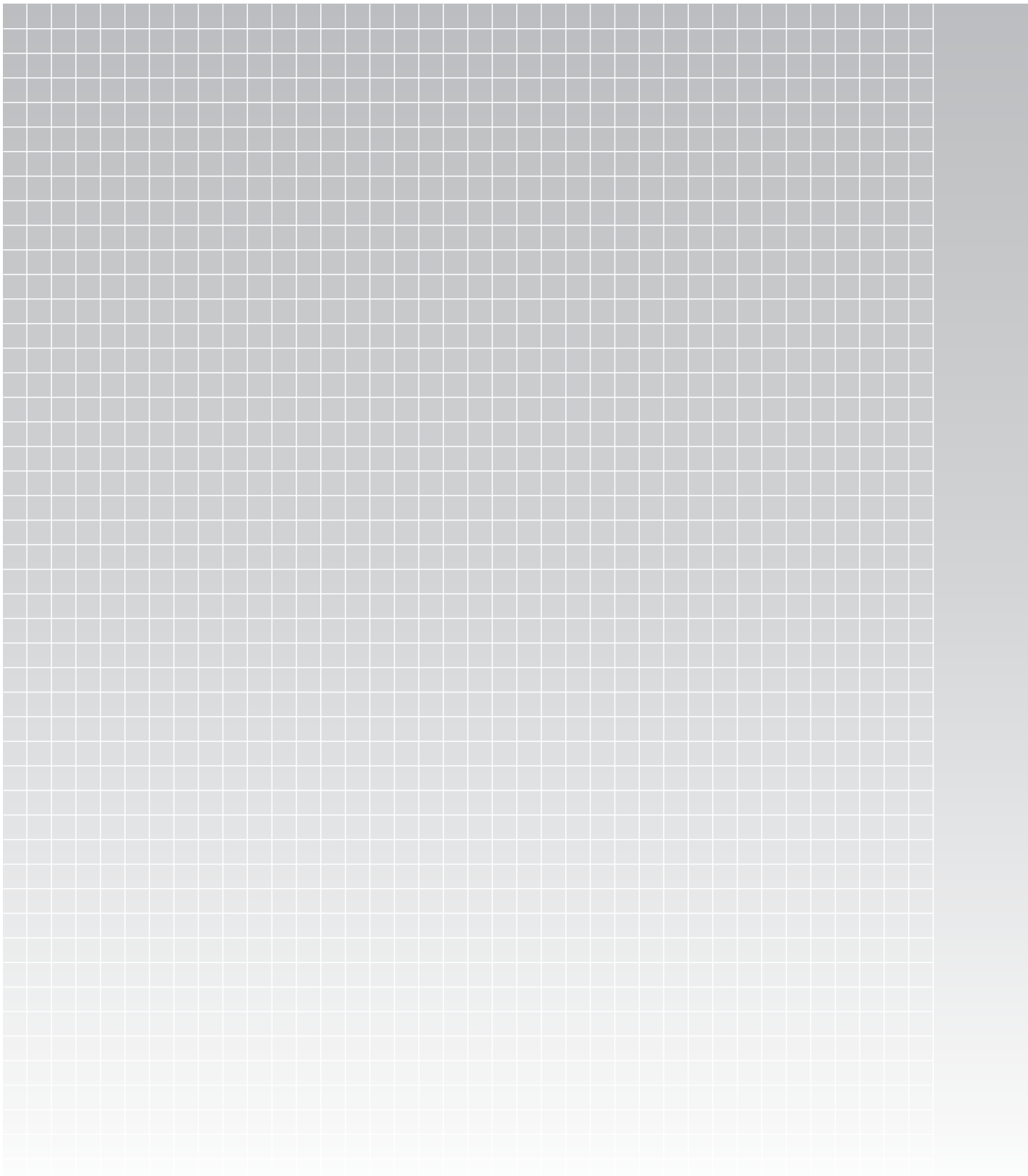


Light grid 0.15...2.1 m range

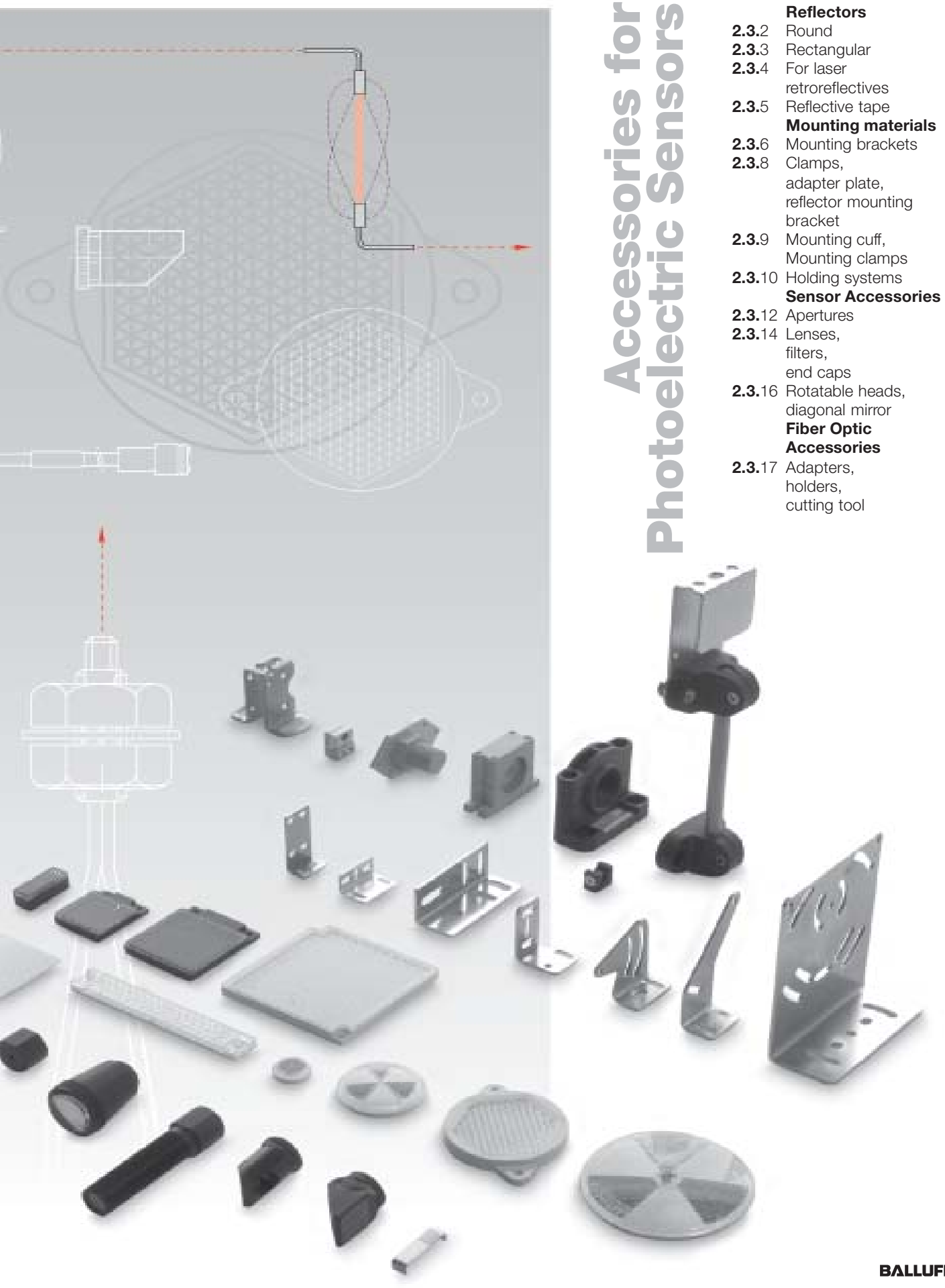
PNP	Resolution 7 mm	BLG 1-010-210-070-PV01-SX	BLG 1-015-210-070-PV01-SX	BLG 1-030-210-070-PV01-SX
	Resolution 5 mm	BLG 1-010-210-050-PV01-SX	BLG 1-015-210-050-PV01-SX	
Electrical data				
Supply voltage U_B		24 V DC	24 V DC	24 V DC
Ripple		15 %	15 %	15 %
No-load	Emitter	≤ 150 mA	≤ 150 mA	≤ 150 mA
supply current I_0 max.	Receiver	≤ 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_e		≤ 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	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin
	Receiver	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

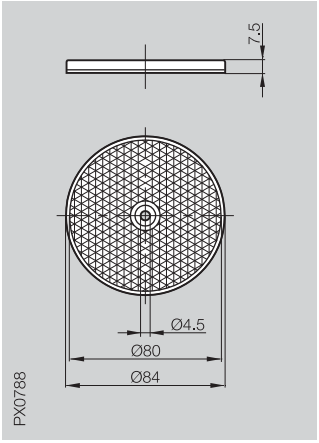
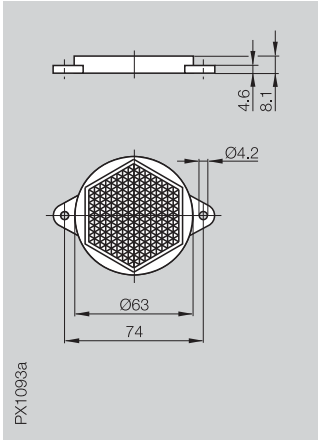
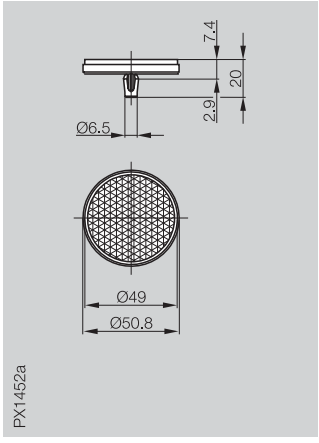
Connector orientation

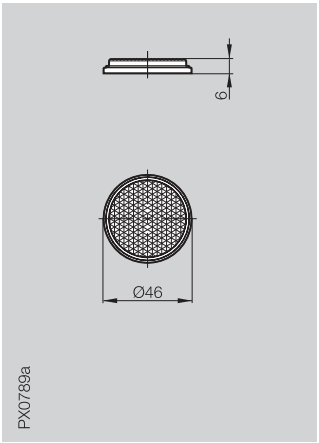
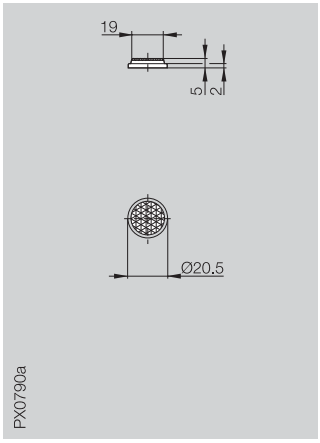
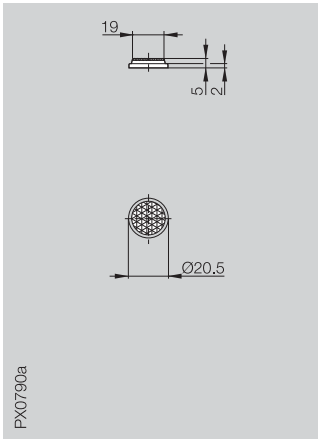
2.2
2.3
Photoelectric sensors accessories page 2.3.2 ...
5
Connectors ... page 5.2 ...

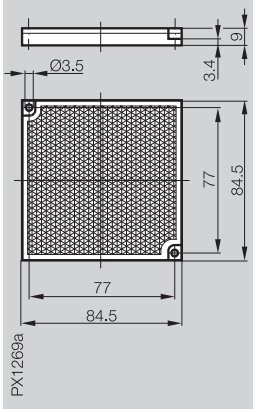
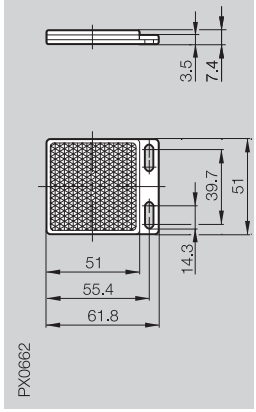
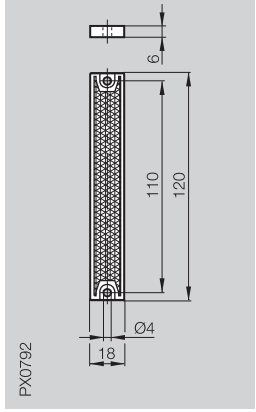
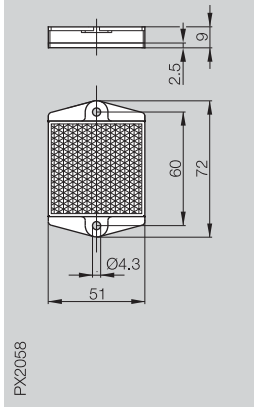
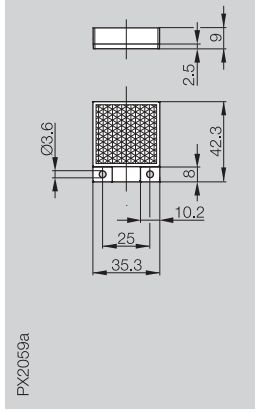


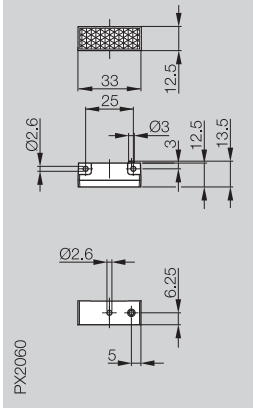
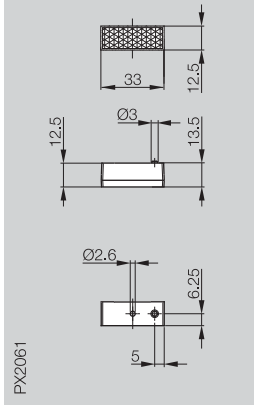
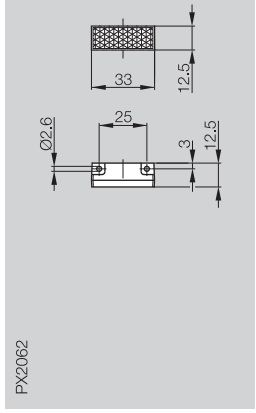
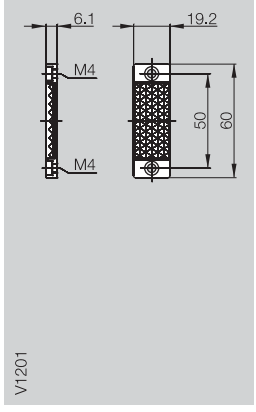
Accessories for Photoelectric Sensors

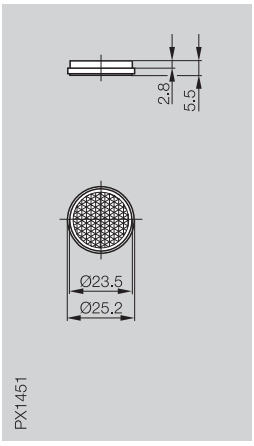
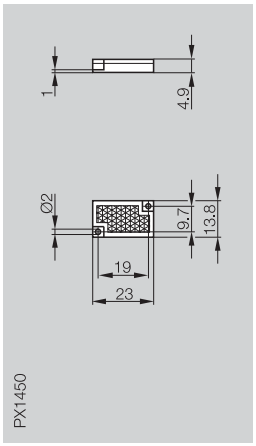
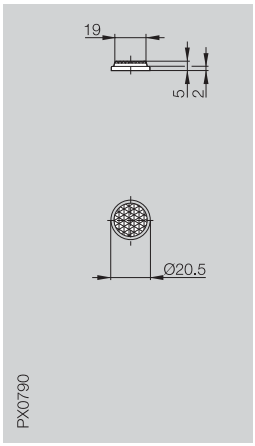
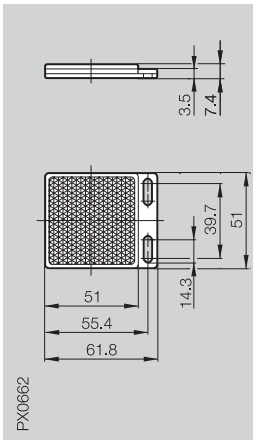


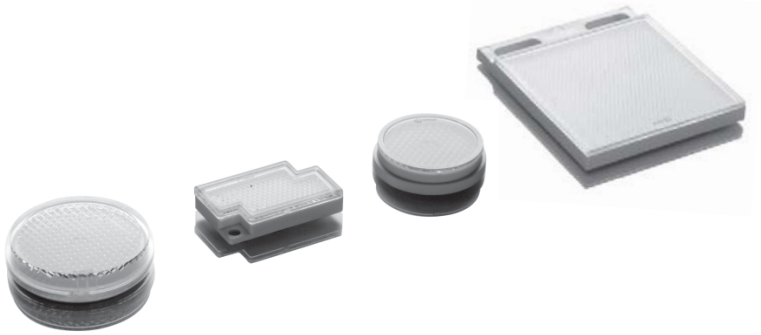
Size	**Reflector ∅ 84 mm**	**Reflector ∅ 63**	**Reflector ∅ 51 mm**	
Attachment	M4 screw	two M4 screws	Rivet with mounting tabs	
				
Ordering code	BOS R-1	BOS R-10	BOS R-14	
Material	PMMA	PMMA	PC	
Mounting accessories	BOS 21-AD-1			
Special features	Standard reflector		Chemical resistant	
Temperature range	0...+65 °C	0...+65 °C	0...+100 °C	
Reference sensing range	100 %	60 %	60 %	

Size	**Reflector ∅ 46 mm**	**Reflector ∅ 20 mm**	**Reflector ∅ 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 %	

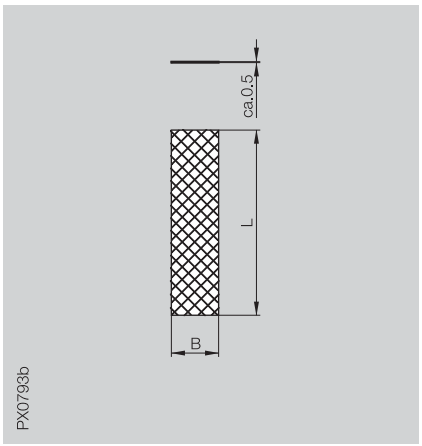
Reflector 84×84 mm	**Reflector 51×62 mm**	**Reflector 18×120 mm**	**Reflector 51×72 mm**	**Reflector 35×42 mm**
two M3 screws	two M4 screws	two M4 screws	two M4 screws	two M3 screws
				
BOS R-11	BOS R-9	BOS R-5	BOS R-25	BOS R-26
PMMA	PMMA	PMMA	PMMA	PMMA
	BOS 5-HW-6		BOS 5-HW-4	BOS 5-HW-5
High-performance reflector				
0...+50 °C	0...+50 °C	0...+50 °C	0...+50 °C	0...+50 °C
125 %	100 %	40 %	100 %	60 %

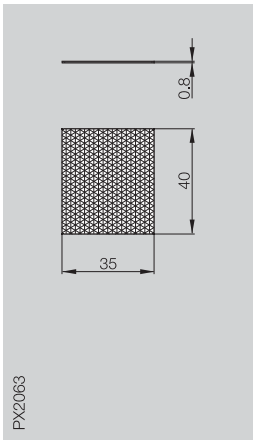
Reflector 33×12 mm	**Reflector 33×12 mm**	**Reflector 33×12 mm**	**Reflector 19×60 mm**	
Screws	Rear screws	Side screws	two M4 screws	
				
BOS R-27	BOS R-28	BOS R-29	BOS R-33	
PMMA	PMMA	PMMA	PMMA	
BOS 5-HW-1/2		BOS 5-HW-1/2		
0...+50 °C	0...+50 °C	0...+50 °C	–20...+85 °C	
40 %	40 %	40 %	50 %	

Size	**Reflector ∅ 25 mm**	**Reflector 14×23 mm**	**Reflector ∅ 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



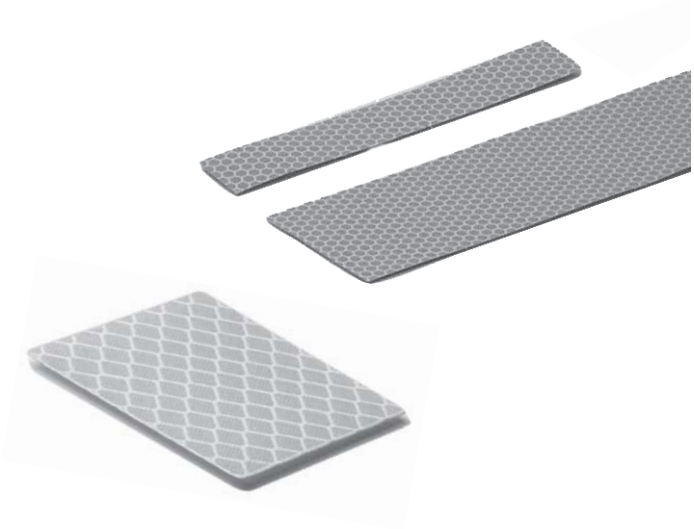
Size	**Reflective tape see below**	**Reflective tape 40×35 mm**
Attachment	self-adhesive	self-adhesive

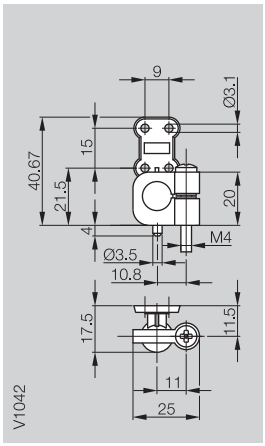
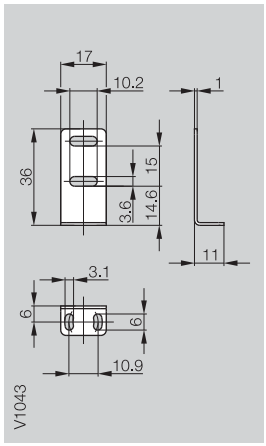
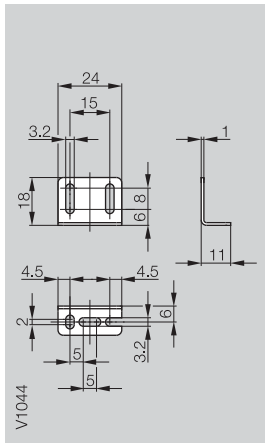
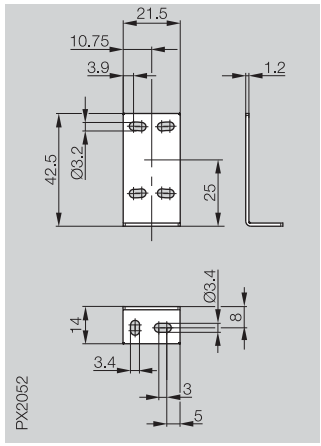


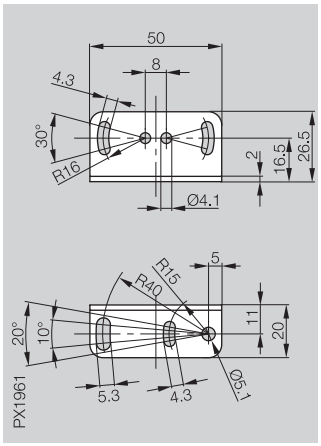
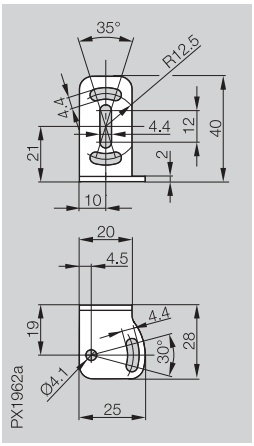
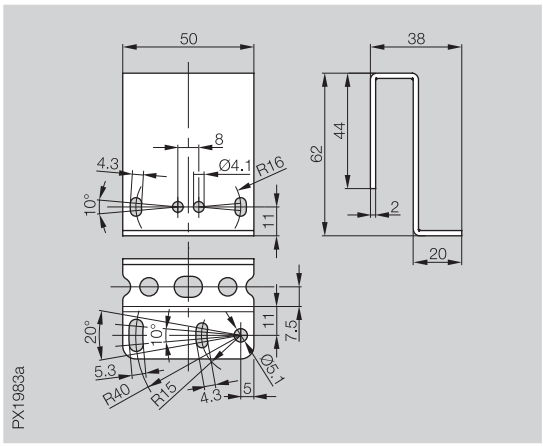


Ordering code	BOS R-6-... (not for polarized light) BOS R-7-... (also for polarized light) BOS R-8-... (also for polarized light)	BOS R-30 (also for polarized light)
Reference sensing range	40 % (for 100×50 mm)	

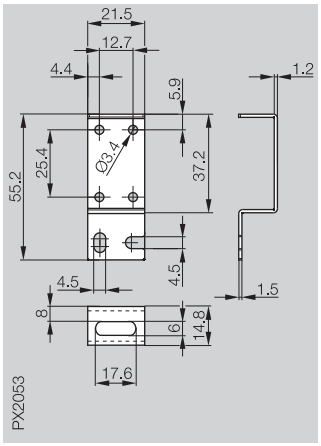
Dimensions L×W	**Ordering code**
45 m×50 mm	BOS R-6-45
250 mm×50 mm	BOS R-6-0,25
22 m×50 mm	BOS R-7-22
250 mm×50 mm	BOS R-7-0,25
22 m×25 mm	BOS R-8-22
250 mm×25 mm	BOS R-8-0,25



Description	**Mounting bracket**	**Mounting bracket**	**Mounting bracket**	**Mounting bracket**	
Use	for BOS 2K	for BOS 2K	for BOS 2K	for BOS 5K	
					
Ordering code	BOS 2-HW-1	BOS 2-HW-2	BOS 2-HW-3	BOS 5-HW-1	

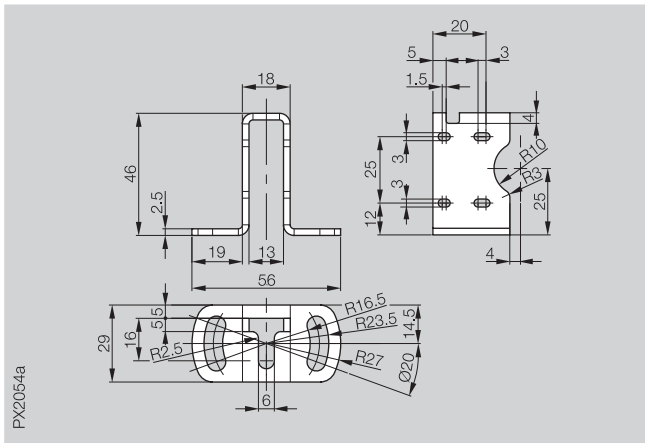
Description	**Mounting bracket**	**Mounting bracket**	**Mounting bracket**	
Use	for BOS 21M	for BOS 21M	for BOS 21M	
				
Ordering code	BOS 21-HW-1	BOS 21-HW-2	BOS 21-HW-3	

Mounting bracket
for BOS 5K



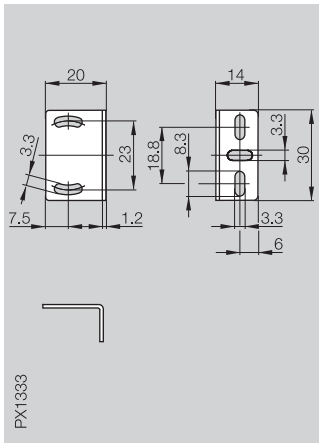
BOS 5-HW-2

Mounting bracket
for BOS 5K



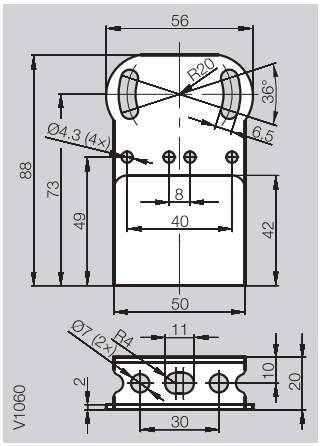
BOS 5-HW-3

Mounting bracket
for BOS 6K and BOS 21M



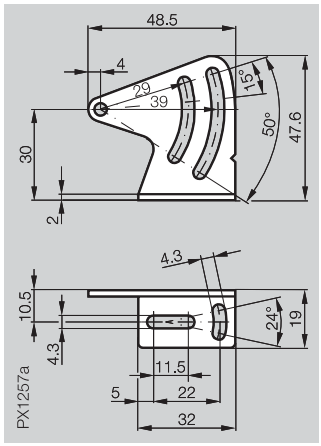
BOS 6-HW-1

Mounting bracket
for BOS 21M



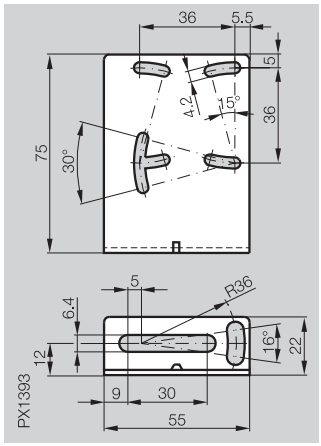
BOS 21-HW-4

Mounting bracket
for BOS 26K, BOS 25K and BOS 21M



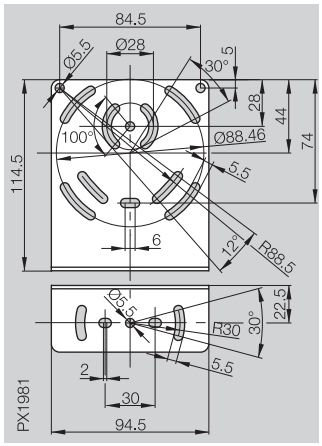
BOS 26-HW-1

Mounting bracket
for BOS 36K



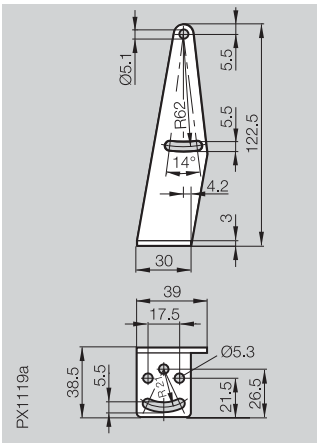
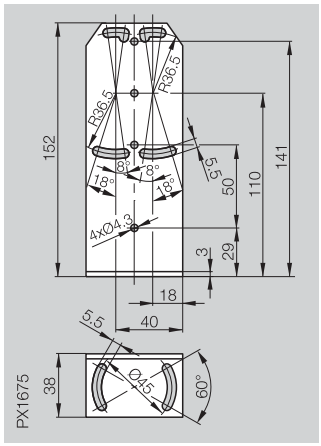
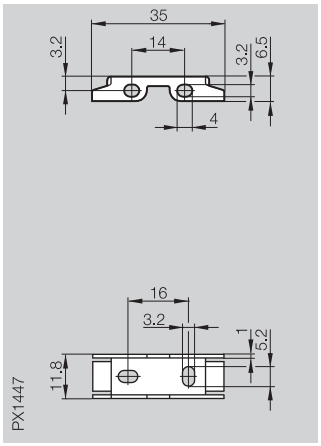
BOS 36-HW-1

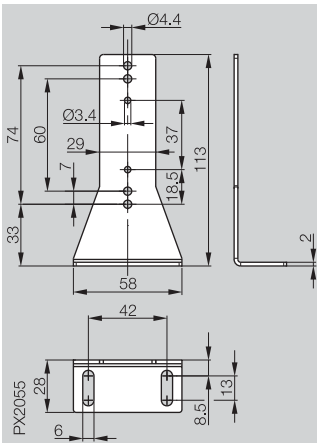
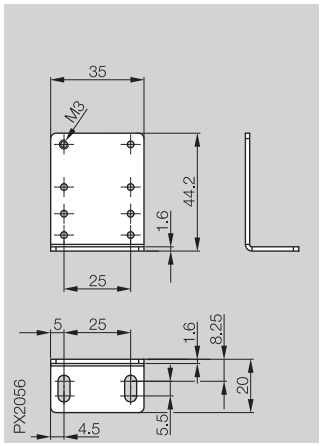
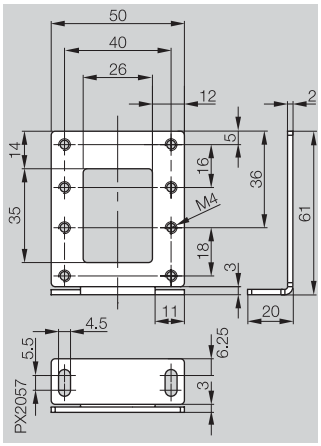
Mounting bracket
for BOD 63M

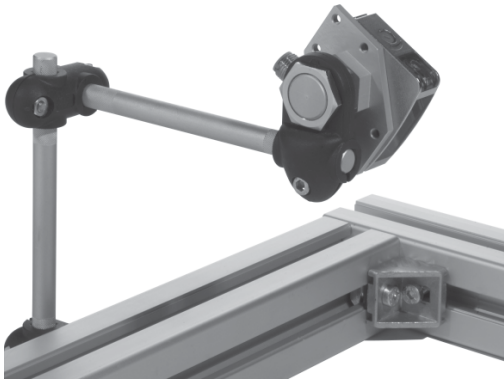


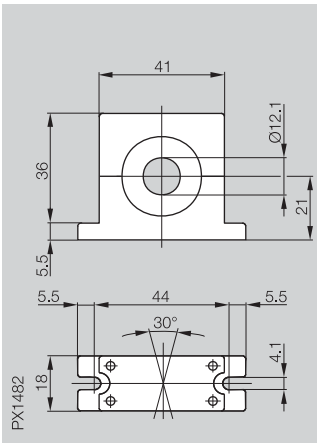
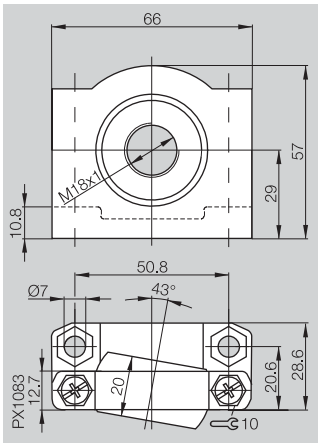
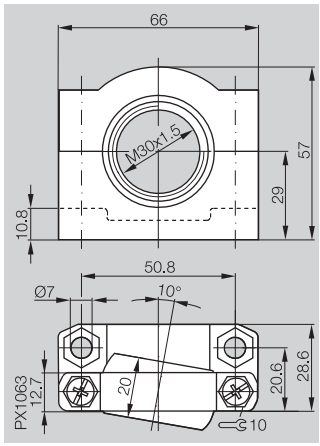
BOS 63-HW-1

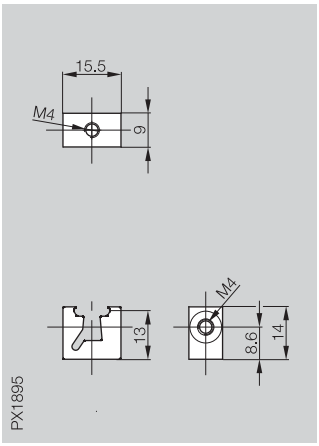
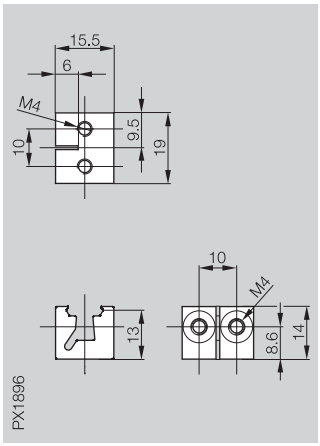
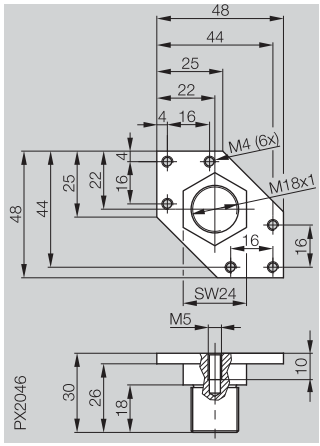
2.3
5
Holders ...
page 5.2 ...

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



Description Use	**Mounting cuff** for tubular sensors with M12 outside thread	**Mounting clamp with ball joint** for tubular sensors with M18 outside thread	**Mounting clamp with ball joint** for tubular sensors with M30 outside thread
			
Ordering code	BOS 12,0-BS-1	BOS 18,0-KB-1	BOS 30,0-KB-1

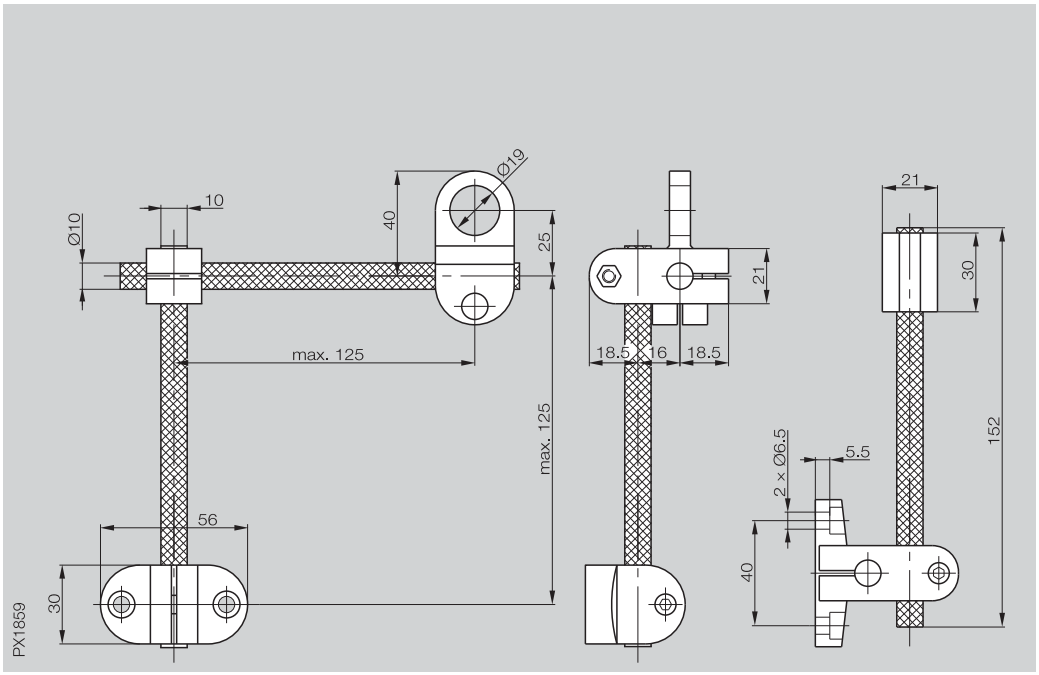
Description Use	**Clamp** for BOS 21M	**Clamp** for BOS 21M	**Adapter plate** for BOS 21M, BOS 25K, BOS 26K and BOS R-1
			
Ordering code	BOS 21-KH-1	BOS 21-KH-2	BOS 21-AD-1

2.3

5

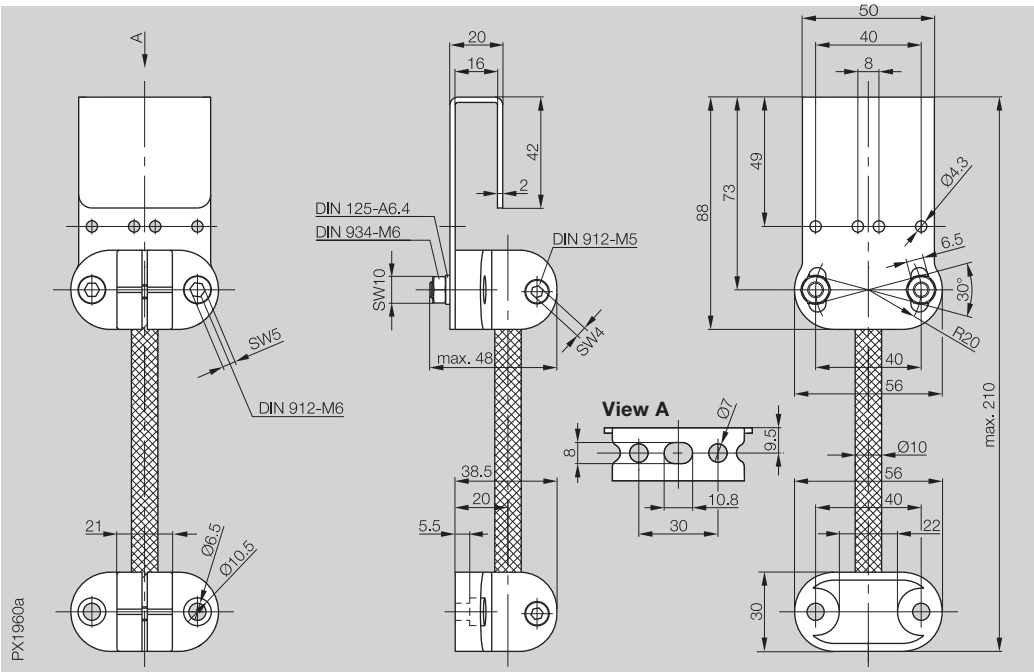
Holders ...
page 5.2 ...

Description	**Holding system**
Use	for flexible installation, for all tubular sensors with M18 outside thread may be combined with other Balluff accessories

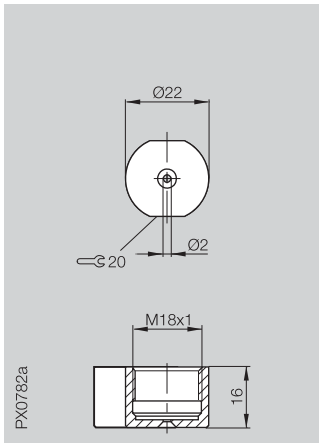
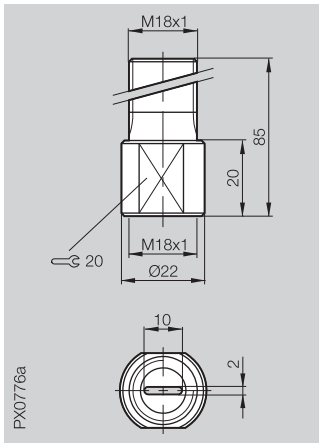
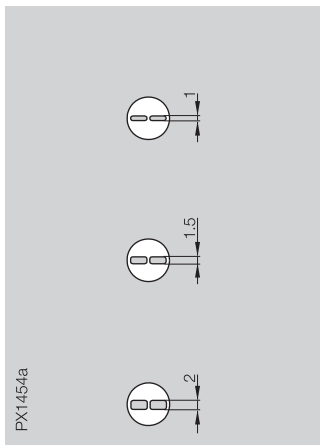


Ordering code	BOS 18-HS-1

Description	**Holding system**
Use	for flexible installation, for sensors in series BOS 21M may be combined with other Balluff accessories



Ordering code	BOS 21-HS-1

Description	**Round aperture**	**Double slit aperture**	**Slit aperture**
Use	for BLE/BLS 18	for BLE/BLS 18	for BLE/BLS 12M
			
Ordering code	BOS 18-BL-1	BOS 18-BL-2	BOS 12-BL-1

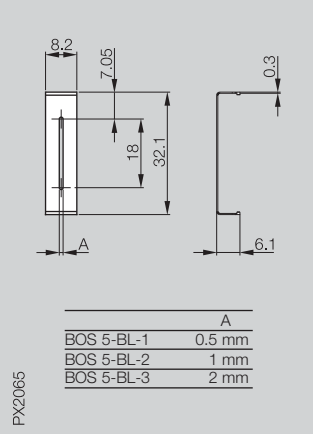
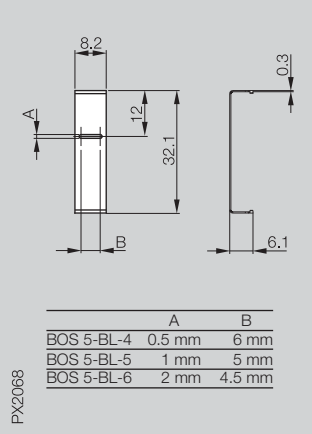
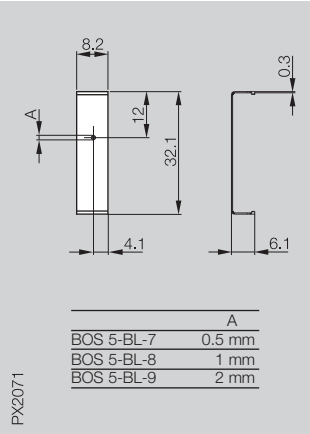
The round and slit apertures restrict the beam diameter. This allows you to detect small parts over a large range. The emitter and receiver must be exactly aligned with each other.

Aperture on emitter	Aperture on receiver	Range in m
○		8
	○	8
○	○	2

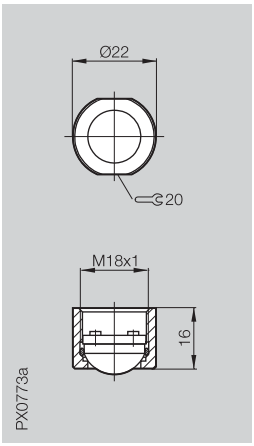
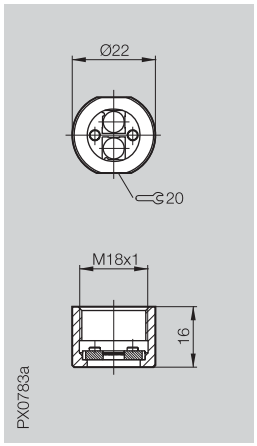
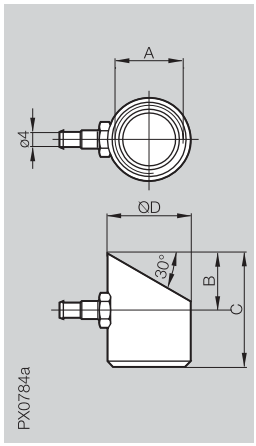
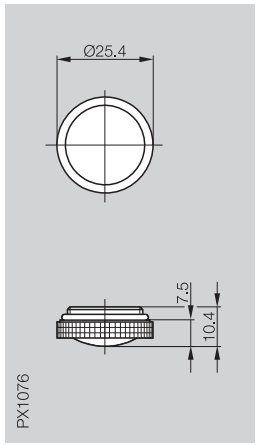
Advantages:
- Small parts detection, i.e. 1 mm drill, aperture on emitter only
- Through-beams may be mounted close to one another
- Highly reflective parts directly next to the light path do not interfere

Aperture position emitter	Aperture position receiver	Range in m
▯	▯	3
▭	▯	2
▯	▭	2

Slit width in mm	Range in m	Object size in mm
1	0.5	> 1
1.5	1	> 1.5
2	2	> 2

Description	Slit aperture vertical	Slit aperture horizontal	Round aperture
Use	for through-beams BOS 5K	for through-beams BOS 5K	for through-beams BOS 5K
	 BOS 5-BL-1 A 0.5 mm BOS 5-BL-2 1 mm BOS 5-BL-3 2 mm	 BOS 5-BL-4 A 0.5 mm B 6 mm BOS 5-BL-5 1 mm 5 mm BOS 5-BL-6 2 mm 4.5 mm	 BOS 5-BL-7 A 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

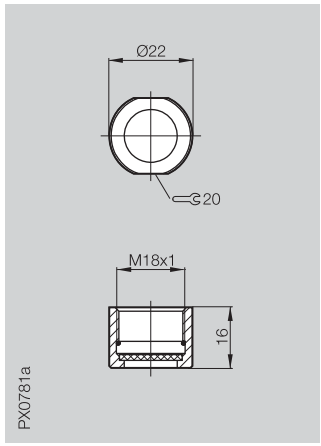
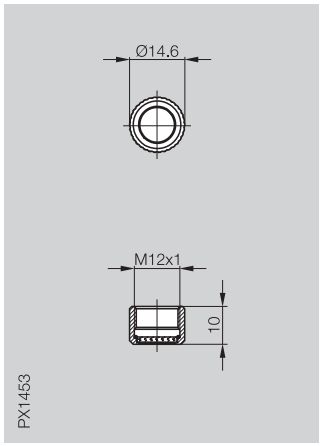
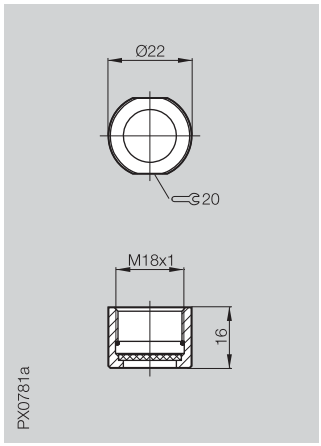
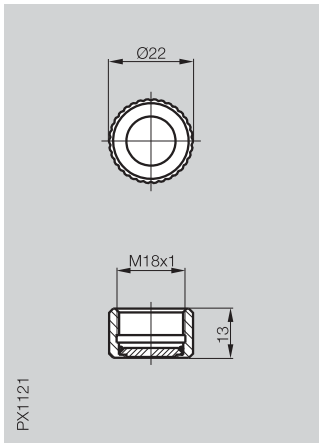
Polarizing filters are used for reliably sensing highly reflective objects. They prevent faulty switching. Reflecting or shiny parts will not cause faulty switching. The polarizing filters guarantee that only the light reflected back by the reflector is detected.
They reduce the sensing range by 50%.

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	M12×1	M18×1
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

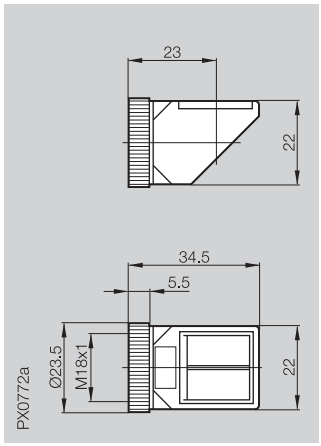
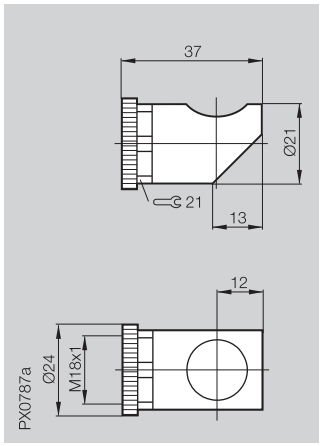
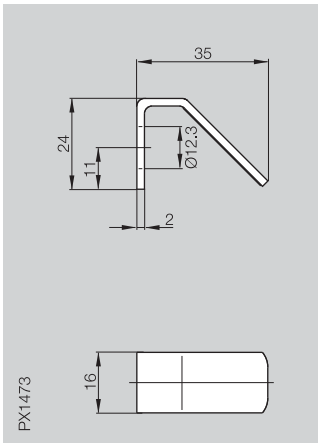
Neutral density filters weaken the infalling light, without changing its spectral characteristics.
The neutral filter is made of glass with a vacuum coated material layer. This is hard, non-peeling and resistant to aging.
Clean the filter using standard commercial optical cleaners.

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 Use	**90° Rotatable head** for diffuse, retroreflective and through-beams BOS 18 (except laser)	**90° Rotatable head** for diffuse, retroreflective and through-beams BOS 18	**Diagonal mirror** for diffuse and through-beams BOS 12
			
Ordering code	BOS 18-UK-_*	BOS 18-UK-10	BOS 12-WS-1

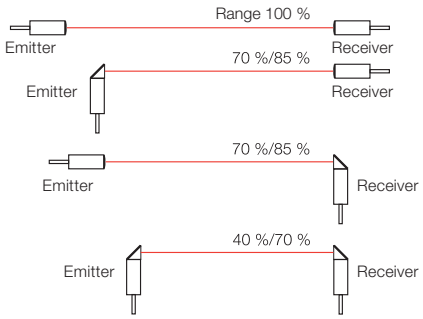
*1 = see table
2 = see table

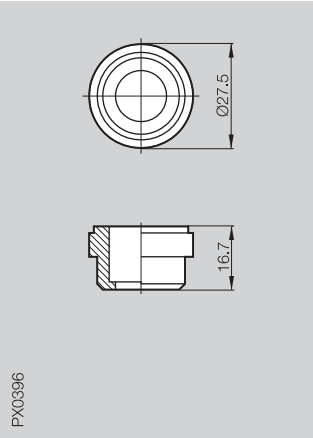
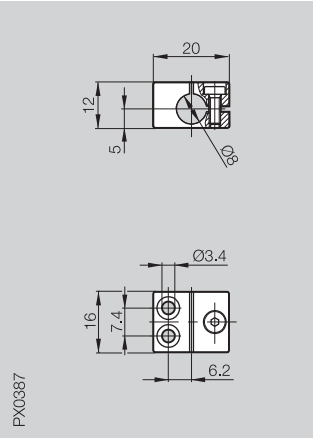
When using the diagonal mirror the sensing range is reduced by 30 % for the M12 diffuse and M12 through-beam sensors. Not suitable for retroreflective sensors.

Rotatable heads, suitable combinations

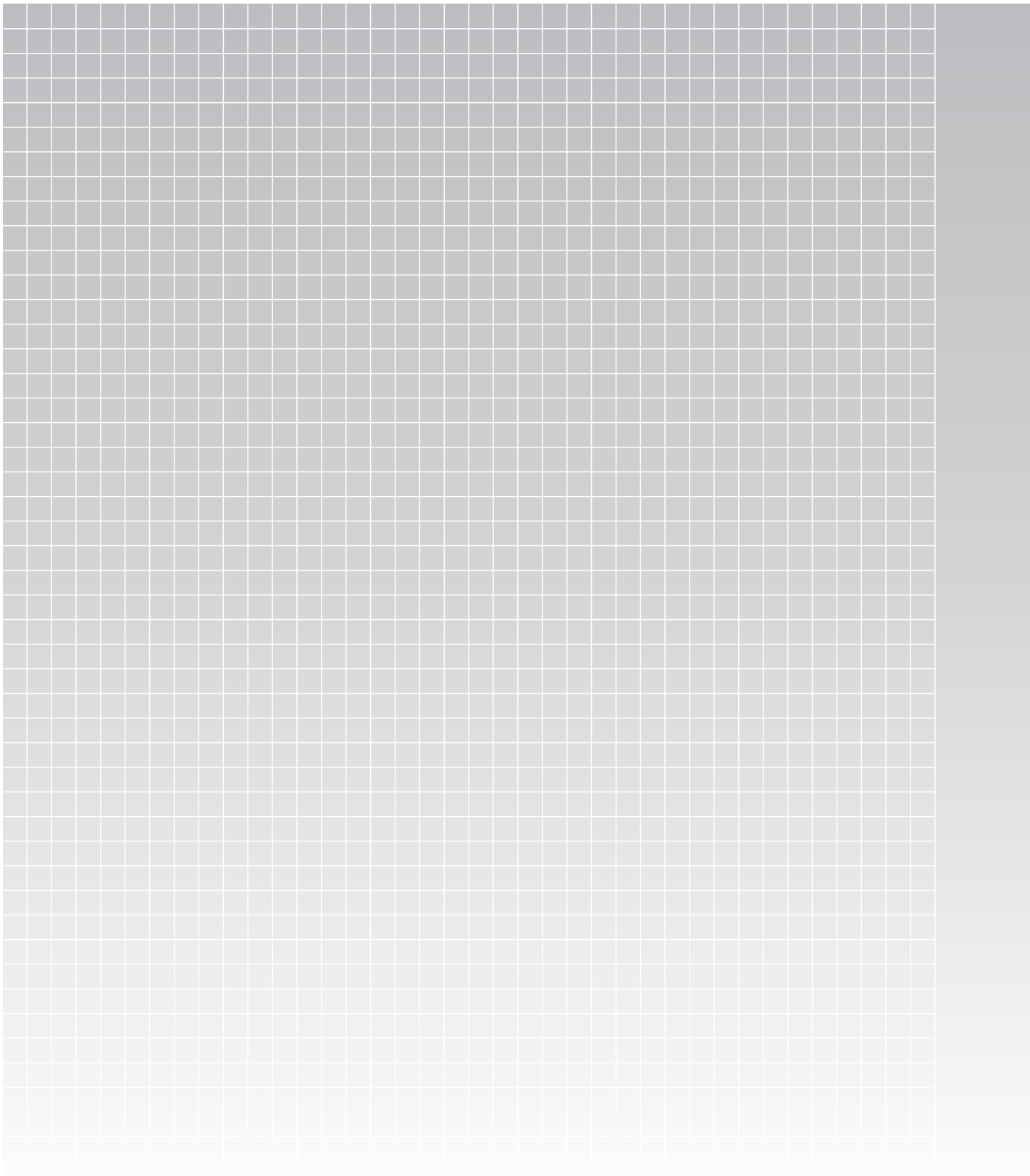
All BOS 18 photoelectric sensors can be equipped with a 90° rotatable head. The table shows the appropriate rotatable head for each switch type and indicates the corresponding reduction factor (RF) to apply to the range.
In the case of a through-beam sensor both the emitter and receiver can be fitted 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	**Adapter**	**Holder**	
Use	for glass fiber optics BFO 18V for connecting to BOS 30M	for glass fiber optics and sensors with a corresponding diameter	
			
Ordering code	BFO 30-A1	BFO 08,0-KB-1	

2.3



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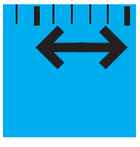
sensors worldwide

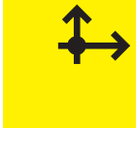
Object Detection

Object Detection



Linear Position Sensing

Industrial Identification



Industrial Networking and Connectivity

Mechanical Accessories

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

www.balluff.com

No. 862399 E · Edition 0811; Subject to modification. Replaces edition 0805.

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