



Only true specialists are capable of achieving top results. So Balluff has expanded its product range with optosensors designed for an equally wide range of applications. We will be glad to assist you in selecting the right optosensors for your applications.

**Tubular Sensors in Metal Housing**

- 2.1.2 BOS 12M
- 2.1.7 BOS 18 overview
- 2.1.9 BOS 18M with potentiometer
- 2.1.14 BOS 18M with teach-in
- 2.1.17 BOS 18M high-precision laser thru-beams
- 2.1.21 BOS 18M rugged sensors for machine tools
- 2.1.24 BOS 18E in stainless, sensors for the foods industry

**Tubular Sensors in Plastic Housing**

- 2.1.27 BOS 18K with potentiometer
- 2.1.30 BOS 18K with laser

**Tubular High Performance Sensors**

- 2.1.34 BOS 30M
- Small Sensors**
- 2.1.37 BOS 6K, BOS 15K overview
- 2.1.38 BOS 6K with teach-in
- 2.1.42 BOS 15K with potentiometer

**Block Style Sensors**

- 2.1.46 BOS 25K, BOS 26K, BOS 35K overview
- 2.1.47 BOS 25K with potentiometer
- 2.1.51 BOS 26K precision
- 2.1.54 BOS 26K laser
- 2.1.57 BOS 35K rugged sensors

**High Performance Sensors**

- 2.1.60 BOS 36K, BOS 65K overview
- 2.1.61 BOS 36K compact sensors
- 2.1.65 BOS 65K versatile sensors

Small sensors have a clear advantage: they are easier to install and they can be installed in many locations where no other sensor will fit. And the optical performance of these miniature sensors is amazing. For electrically connecting the sensors we have selected both a fixed cable as well as a small 3- or 4-pin M8 connector.

## BOS 6K

For the tightest spaces the BOS 6K series is ideal. Automatic calibration using the control lines means the sensor can be installed at virtually inaccessible locations. Red light and background suppression make the sensor extremely user-friendly. Dynamic teach-in means less and less attention needs to be paid to the sensors.


The special features include:

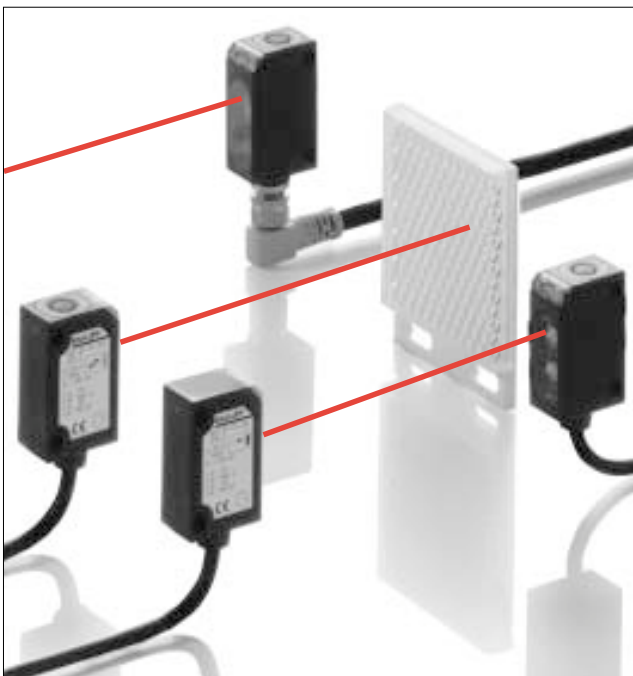
- Teach-in button plus control line
- Dynamic teach-in
- Red light
- Background suppression
- Approvals



## BOS 15K

Somewhat larger and available in two mechanical variations (straight and right angle), the BOS 15K is the ideal size for the most common applications in packaging machinery and handline and assembly equipment. Sensitivity setting using an easily accessible potentiometer and the number of various form factors make this sensor ideal for installing in machines and systems of small and medium size. This series features:

- Two housing variations (straight and right angle)
- Cross-talk protection
- Line-controlled N.O./N.C. selection
- Thru-beam with test input and alarm output
- Approvals 



BOS 6K



BOS 15K

2.1

2.3

Accessories  
Optosensors  
page 2.3.2 ...

6

Connectors ...  
page 6.2 ...

**Applications**

Its high performance specs allow the **BOS 6K** to be used virtually anywhere.

The BOS 6K is ideal for:

- Packaging machinery
- Handling and assembly technology
- Specialized machines
- Printing and paper machinery

**Features**

- Teach-in button plus control line
- Dynamic teach-in possible (i. e., without stopping the machine)
- Ergonomic design (e. g., teach-in button, mounting design)
- Multi-function display visible from any direction
- Uses highly-visible red light
- Pushbutton light on/dark on setting/control line
- Versions with 3- or 4-pin M8 connector or with 2 m cable
- Solid workmanship with IP 67 protection

Sensors supplied standard with 2 m cable. Other lengths on request.



Connector orientation



Series	
Diffuse	sensing range
Retroreflective	sensing range
Thru-beam	sensing range



Diffuse			
	PNP O/●	25...100 mm	HGA
	NPN O/●	25...100 mm	HGA
	PNP O/●	5...300 mm	energetic
	NPN O/●	5...300 mm	energetic
Retroreflective			
	PNP O/●	0,5 m	polarizing filter, glass detection
	NPN O/●	0,5 m	polarizing filter, glass detection
	PNP O/●	2,5 m	polarizing filter
	NPN O/●	2,5 m	polarizing filter
Thru-beam			
	PNP O/●	6 m	receiver
	NPN O/●	6 m	receiver
		6 m	emitter

Supply voltage $U_B$	
Voltage drop $U_d$ at $I_e$	
Rated isolation voltage $U_i$	
Rated operational current $I_e$	
No-load supply current $I_0$ max.	
Protected against polarity reversal	
Short circuit protected	
Permissible capacitance	
On/off delay (standard)	
Frequency of operating cycles $f$ (standard)	
Utilization category	
Output	
Output function	
Permissible ambient light	
Sensitivity/range adjustment	
Function indicator (receiver sees light)	
Contamination indication	
Ambient temperature range $T_a$	
Degree of protection per IEC 60529	
Insulation class	
Housing material	
Material of sensing face	
Connection	
No. of wires x conductor cross section	
Recommended connector	
Weight	
Emitter type	
Light spot diameter	
Hysteresis (18 %/18 %)	
Gray value shift (90 %/18 %)	
O/● = Light-on/dark-on	

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

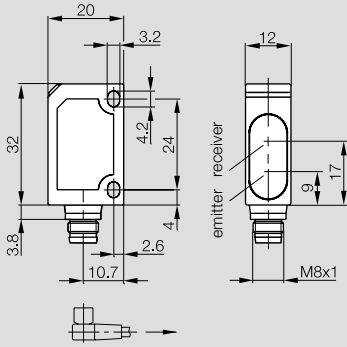
For wiring diagrams, characteristics and accessories see page 2.1.40 and 2.1.41.

# Small Sensors with Teach-in

# Optoelectronic Sensors

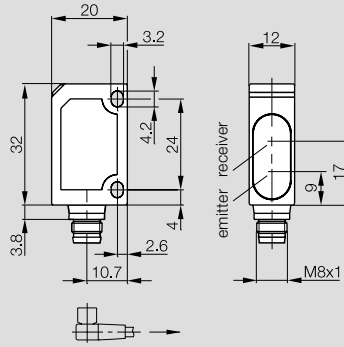
BOS 6K  
Range 100 mm, 300 mm,  
0.5 m, 2.5 m, 6 m

BOS 6K  
25...100/5...300 mm  
0.5 m/2.5 m  
6 m



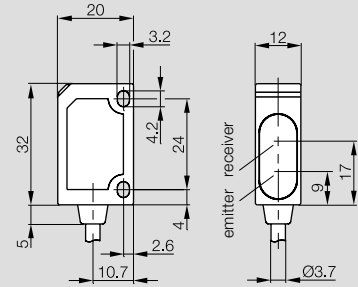
PX1318b

BOS 6K  
25...100/5...300 mm  
0.5 m/2.5 m  
6 m



PX1318b

BOS 6K  
25...100/5...300 mm  
0.5 m/2.5 m  
6 m



PX1321b

BOS 6K-PU-1**HA**-S 75-C  
BOS 6K-NU-1**HA**-S 75-C  
BOS 6K-PU-1**OC**-S 75-C  
BOS 6K-NU-1**OC**-S 75-C

BOS 6K-PU-1**HA**-S 49-C  
BOS 6K-PU-1**OC**-S 49-C

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

BOS 6K-PU-1**QA**-S 75-C  
BOS 6K-NU-1**QA**-S 75-C  
BOS 6K-PU-1**QC**-S 75-C  
BOS 6K-NU-1**QC**-S 75-C

BOS 6K-PU-1**QA**-S 49-C  
BOS 6K-PU-1**QC**-S 49-C

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

BLE 6K-PU-1E-S 75-C  
BLE 6K-NU-1E-S 75-C  
BLS 6K-XX-1E-S 75-C

BLE 6K-PU-1E-S 49-C  
BLS 6K-XX-1E-S 49-C

BLE 6K-PU-1E-C-02  
BLE 6K-NU-1E-C-02  
BLS 6K-XX-1E-C-02

10...30 V DC  
≤ 2.4 V  
250 V AC  
100 mA  
≤ 35 mA

10...30 V DC  
≤ 2.4 V  
250 V AC  
100 mA  
≤ 35 mA

10...30 V DC  
≤ 2.4 V  
250 V AC  
100 mA  
≤ 35 mA

yes  
yes  
0.33 µF  
0.5 ms  
1000 Hz  
DC 13  
PNP/NPN  
O/● selectable  
5000 lux  
teach-in  
LED yellow  
LED green  
-20...+60 °C  
IP 67  
☐

yes  
yes  
0.33 µF  
0.5 ms  
1000 Hz  
DC 13  
PNP/NPN  
O/● selectable  
5000 lux  
teach-in  
LED yellow  
LED green  
-20...+60 °C  
IP 67  
☐

yes  
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0.33 µF  
0.5 ms  
1000 Hz  
DC 13  
PNP/NPN  
O/● selectable  
5000 lux  
teach-in  
LED yellow  
LED green  
-20...+60 °C  
IP 67  
☐

ABS impact resistant  
PMMA  
connector

ABS impact resistant  
PMMA  
connector

ABS impact resistant  
PMMA  
2 m cable, PVC  
4 × 0.14 mm<sup>2</sup>

BKS-B 74/BKS-B 75  
40 g  
red 660 nm  
see table  
see table  
see table

BKS-B 48/BKS-B 49  
40 g  
red 660 nm  
see table  
see table  
see table

120 g (with 2 m cable)  
red 660 nm  
see table  
see table  
see table

	...HA...	...OC...	...QA...	...QC...
Light spot diameter	< 5 × 5 mm over entire s <sub>n</sub>	< 12 × 12 mm over entire s <sub>n</sub>	20 × 20 mm at 500 mm s <sub>n</sub>	75 × 75 mm at 2 m s <sub>n</sub>
Hysteresis	< 5 %	< 10 %		
Gray value shift	< 10 %			

2.1

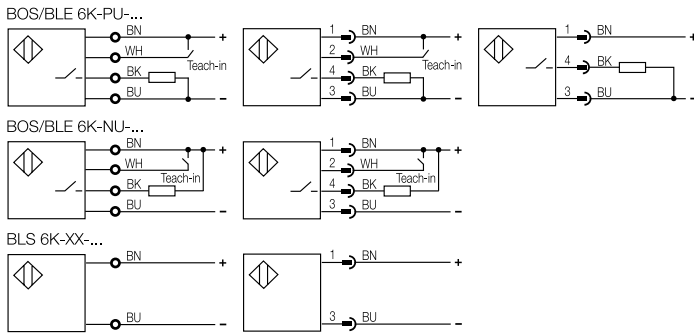
2.3

Accessories  
Optosensors  
page 2.3.2 ...

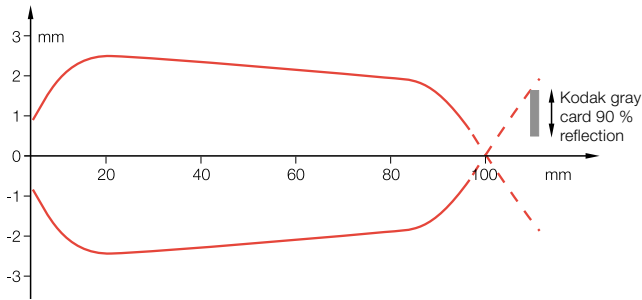
6

Connectors ...  
page 6.2 ...

Wiring diagrams

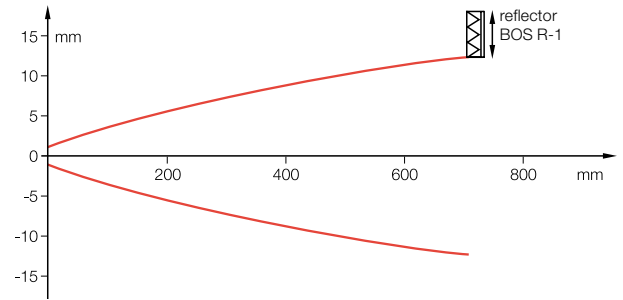


Diffuse BOS 6K-...-1HA-...



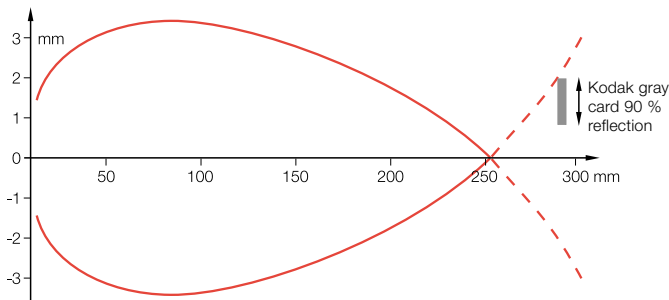
Sensing distance measured with lateral approach using Kodak gray card.

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



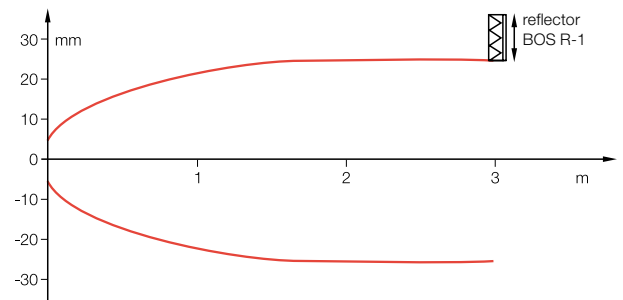
Sensing distance measured with lateral approach using reflector.

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



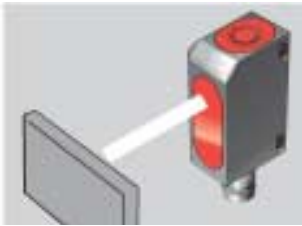
Sensing distance measured with lateral approach using Kodak gray card.

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



Sensing distance measured with lateral approach using reflector.

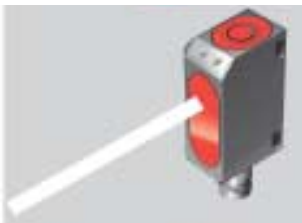
## Diffuse



Direct sensor at object.



Hold button down for approx. 3 sec until both LED's flash together.

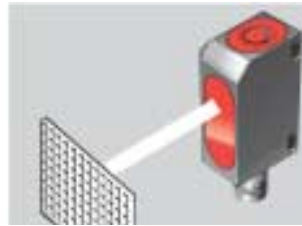


Remove objects from beam path.



Hold button down for 1 sec. Green LED flashes briefly and then comes full on. Sensor is ready. If both LED's flash together, repeat settings.

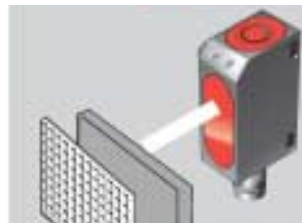
## Retroreflective/Thru-beam



Direct sensor at reflector/receiver.



Hold button down for approx. 3 sec until both LED's flash together.



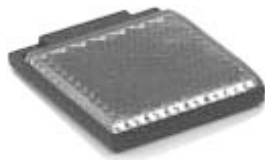
Bring object into beam path.



Hold button down for 1 sec. Green LED flashes briefly and then comes full on. Sensor is ready. If both LED's flash together, repeat settings.

## Recommended accessories

please order separately



Reflector  
BOS R-9



Mounting bracket  
BOS 6-HW-1



Connector  
BKS-B 74/BKS-B 75

# 2.1

# 2.3

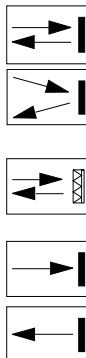
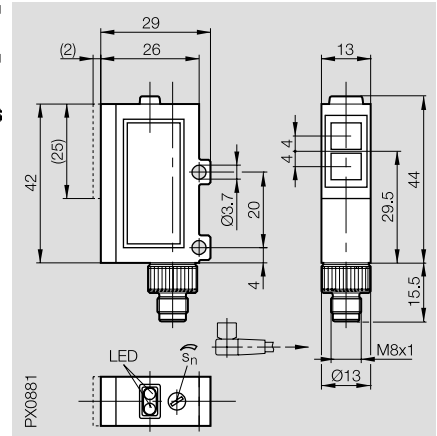
Accessories  
Optosensors  
page 2.3.2 ...

# 6

Connectors ...  
page 6.2 ...

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

Series		BOS 15K right angle
Diffuse	sensing range	<b>12 mm/100 mm/500 mm</b>
Retroreflective	sensing range	<b>2 m</b>
Thru-beam	sensing range	<b>5 m</b>



### Diffuse

PNP/NPN, PNP	○ / ●	100 mm	
PNP/NPN, PNP	○ / ●	500 mm	
PNP/NPN, PNP	○ / ●	12 mm	red light, focussed

### Retroreflective

PNP/NPN, PNP	○ / ●	2 m	red light, polariz. filter
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### Thru-beam

PNP/NPN, PNP	○ / ●	5 m	receiver
		5 m	emitter

BOS 15K-R-C10-P-S 75
BOS 15K-R-C50-P-S 75
BOS 15K-R-D12-P-S 75
BOS 15K-R-B2-P-S 75
BLE 15K-R-F5-P-S 75
BLS 15K-R-G5-P-S 75

## Features

- Supply voltage 10...30 V DC, reverse polarity protected
- Output short circuit protected
- Light-on/dark-on selectable
- Sensitivity adjustment with potentiometer
- Setup aid and stability display with green LED
- IP 66
- Flat window discourages dust accumulation
- Can be DIN rail mounted (fiber optic version)

Supply voltage $U_B$	10...30 V DC
Voltage drop $U_d$ at $I_e$	$\leq 1.5$ V
Rated isolation voltage $U_i$	75 V DC
Rated operational current $I_e$	$\leq 100$ mA
No-load supply current $I_0$ max.	$\leq 30$ mA
Protected against polarity reversal	yes
Short circuit protected	yes
Permissible capacitance	0.5 $\mu$ F
On/off delay (Standard)	$\leq 1$ ms
Frequency of operating cycles $f$ (Standard)	500 Hz
Utilization category	DC 13
Output	PNP
Output function	○ / ● selectable
Permissible ambient light	3000 lux
Sensitivity/range adjustment	potentiometer 0...270°
Function indicator (receiver sees light)	LED red
Contamination indication	LED green
Ambient temperature range $T_a$	-15...+55 °C
Degree of protection per IEC 60529	IP 66

## Applications

- Direct object sensing
- Object detection using fiber optics
- Parts counting in machine design and conveying, packaging machinery, and assembly lines

Housing material	ABS
Material of sensing face	PMMA
Connection	connector
No. of wires x conductor cross section	
Recommended connector	BKS-B 74/BKS-B 75
Weight	30 g

○/● = Light-on/dark-on

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

For wiring diagrams, characteristics and accessories see page 2.1.44 and 2.1.45.

Sensors supplied standard with 2 m cable. Other lengths on request.



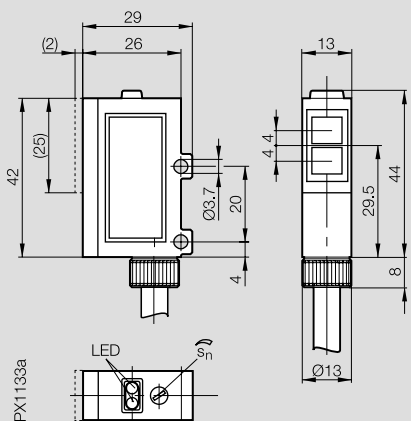
# Small Sensors with Potentiometer

## Optoelectronic Sensors

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

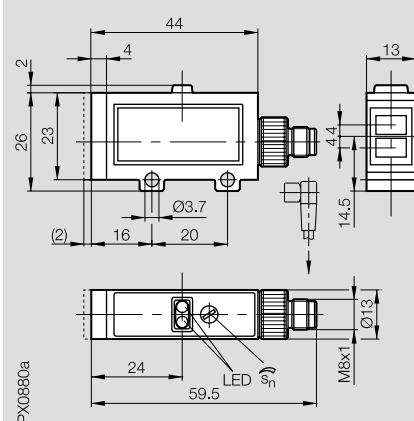
BOS 15K right angle  
12 mm/100 mm/500 mm

2 m  
5 m



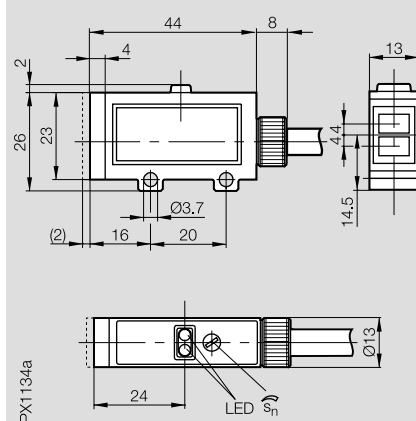
BOS 15K straight  
12 mm/100 mm/500 mm

2 m  
5 m



BOS 15K straight  
12 mm/100 mm/500 mm

2 m  
5 m



BOS 15K-R-C10-02  
BOS 15K-R-C50-02  
BOS 15K-R-D12-02

BOS 15K-S-C10-P-S 75  
BOS 15K-S-C50-P-S 75  
BOS 15K-S-D12-P-S 75

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-S 75

BOS 15K-S-B2-02

BLE 15K-R-F5-02  
BLS 15K-R-G5-02

BLE 15K-S-F5-P-S 75  
BLS 15K-S-G5-P-S 75

BLE 15K-S-F5-02  
BLS 15K-S-G5-02

10...30 V DC

10...30 V DC

10...30 V DC

≤ 1.5 V

≤ 1.5 V

≤ 1.5 V

75 V DC

75 V DC

75 V DC

≤ 100 mA

≤ 100 mA

≤ 100 mA

≤ 30 mA

≤ 30 mA

≤ 30 mA

yes

yes

yes

yes

yes

yes

0.5 μF

0.5 μF

0.5 μF

≤ 1 ms

≤ 1 ms

≤ 1 ms

500 Hz

500 Hz

500 Hz

DC 13

DC 13

DC 13

PNP/NPN selectable

PNP

PNP/NPN selectable

○ / ● selectable

○ / ● selectable

○ / ● selectable

3000 lux

3000 lux

3000 lux

potentiometer 0...270°

potentiometer 0...270°

potentiometer 0...270°

LED red

LED red

LED red

LED green

LED green

LED green

-15...+55 °C

-15...+55 °C

-15...+55 °C

IP 66

IP 66

IP 66

ABS

ABS

ABS

PMMA

PMMA

PMMA

2 m cable, PVC

connector

2 m cable, PVC

4 × 0.34 mm<sup>2</sup>

4 × 0.34 mm<sup>2</sup>

85 g (with 2 m cable)

BKS-B 74/BKS-B 75

30 g

85 g (with 2 m cable)



2.1

2.3

Accessories  
Optosensors  
page 2.3.2 ...

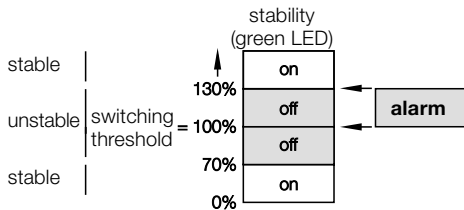
6

Connectors ...  
page 6.2 ...

**Alarm output for receiver (cable version only)**

The alarm output is activated if the receiver signal stays in the alarm range for at least 3 seconds.

The receiver is equipped with an alarm output. Any malfunctions caused by contamination or mechanical maladjustment are reported on this signal output (PNP open collector 30 mA) as a warning signal.



**Test input for emitter**

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 thru-beam type and serves as a preventative measure.

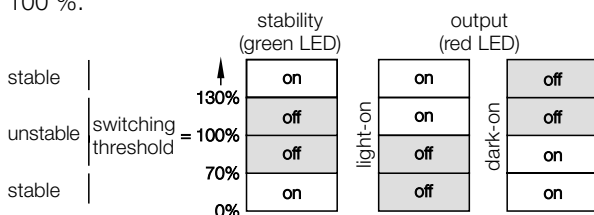
The test input for the emitter interrupts the light pulses from the emitter and allows the function of emitter and receiver to be checked (when using Test+, Test- must be at 0 V, when using Test-, Test+ must be at 10...30 V). The receiver output must switch each time when a voltage of 10...30 V DC (Test+) or 0 V (Test-) is present on the test input. Contamination or maladjustment on the optical

**Green stability display**

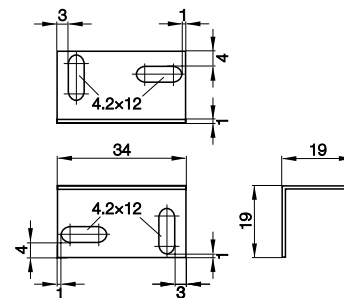
The "safe" range is therefore reached when

- the input signal is at 130 % or more of the threshold energy
- the input signal is at 70 % or less than the threshold energy.

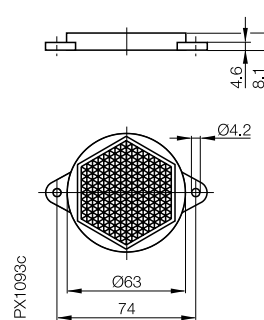
The green stability display illuminates in the "safe" range, where the input energy is at least 30 % over or under the "threshold energy". The "threshold energy" at which a signal change is effected, is defined as 100 %.



**Mounting bracket (supplied)**



**Reflector BOS R-10 (supplied with retroreflective models)**



**Slit apertures**

(supplied with thru-beam models)



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

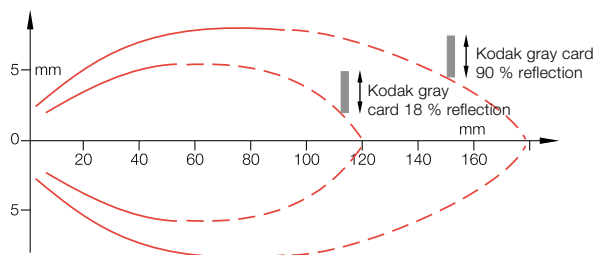
**Recommended accessories**

please order separately



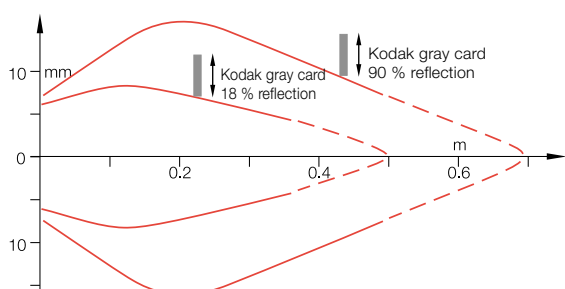
Connector BKS-B 74/BKS-B 75

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



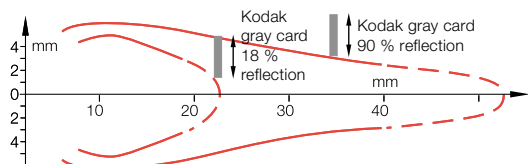
Sensing distance measured with lateral approach using Kodak gray card.

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



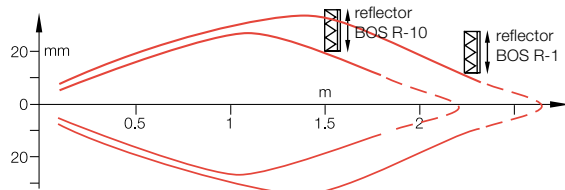
Sensing distance measured with lateral approach using Kodak gray card.

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



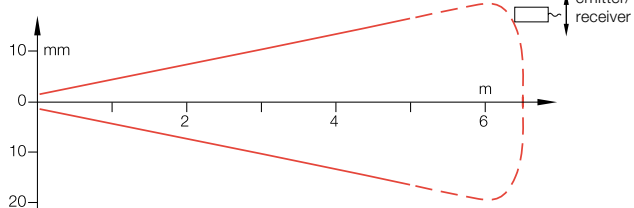
Sensing distance measured with lateral approach using Kodak gray card.

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



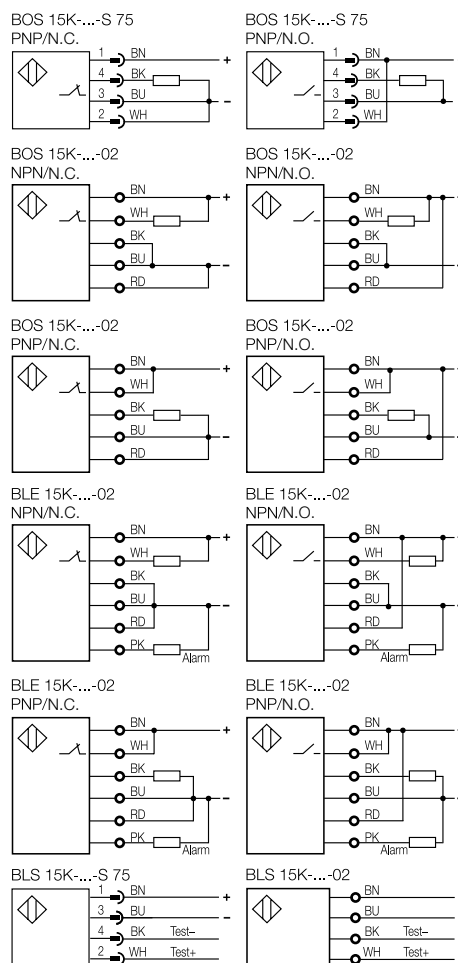
Sensing distance measured with lateral approach using reflector.

#### Thru-beam BLE/BLS 15K-...



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

#### Wiring diagrams



2.1

2.3

Accessories  
Optosensors  
page 2.3.2 ...

6

Connectors ...  
page 6.2 ...