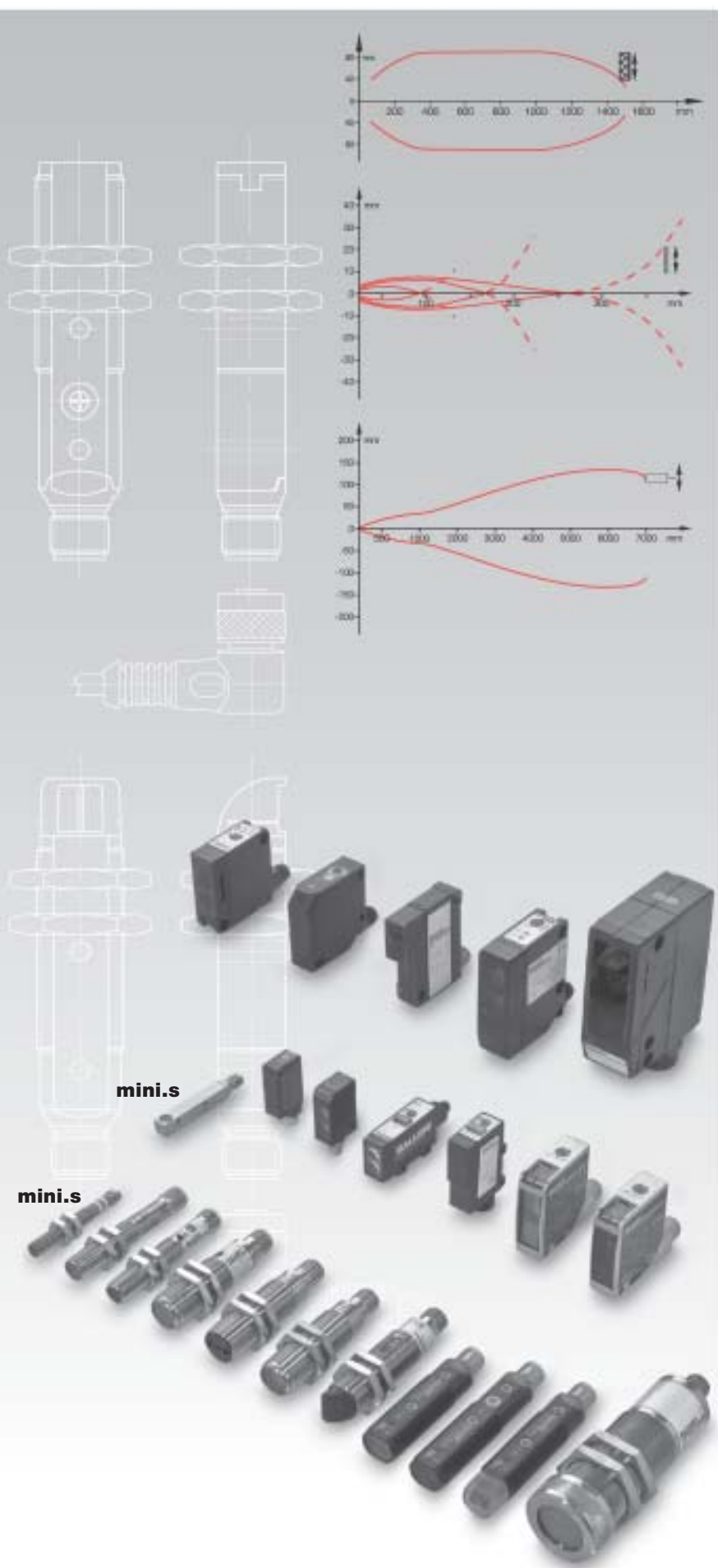


# Photoelectric Sensors - Standard



- 2.1.2 Tubular BOS 08M**  
M8 metal
- 2.1.6 BOS 12M**  
M12 metal
- 2.1.14 BOS 18M**  
M18 metal  
with potentiometer  
Rugged  
with teach-in  
Laser  
with AC  
voltage  
with angle head
- 2.1.36 BOS 18E**  
M18 stainless steel
- 2.1.42 BOS 18KF**  
M18 plastic  
Laser
- 2.1.54 BOS 18KW**  
M18 plastic  
with angle head  
Laser
- 2.1.66 BOS 30M**  
M30 metal
- 2.1.70 Block style BOS Q08M**  
mini.s
- 2.1.74 BOS 5K**  
mini.s  
with potentiometer
- 2.1.82 BOS 6K**  
mini.s  
with teach-in  
Laser
- 2.1.90 BOS 15K**
- 2.1.96 BOS 21M**  
Laser
- 2.1.108 BOS 25K**
- 2.1.114 BOS 26K**  
Laser
- 2.1.122 BOS 35K**
- 2.1.128 BOS 36K**
- 2.1.134 BOS 65K**



**BOS 18M standard**

The **BOS 18M** series in metal housing (nickel plated brass) has established itself as the standard in automation. Long range and sensing distance as well as sophisticated technology (such as background suppression or laser light) are today the standard for this series.

**Features**

- Supply voltage 10...30 V DC, polarity reverse protected
- Outputs short protected
- IP 67 protection
- High resistance to ambient light and electrical noise

**Applications**

- Non-contact
- Packaging
- Parts counting
- Small parts recognition
- Assembly and handling automation
- Conveying
- Machine building



**BOS 18M rugged**

**Sensors in M18 metal housing for harsh environments**

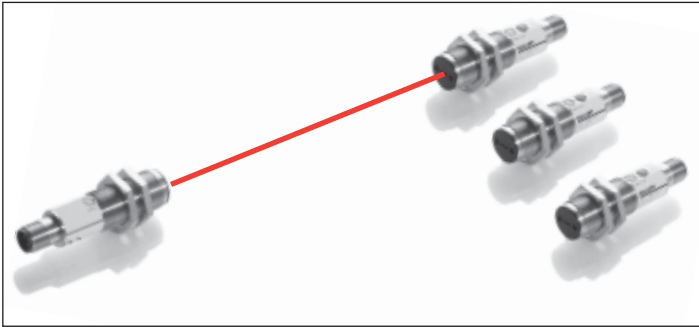
The sensors shown here are classics. They have proven themselves over many years in the machine tool industry. They are well-sealed, rugged, precise and reliable.

**Features**

- Sealing test according to heightened Balluff factory standard
- Increased electrical insulation and EMC
- High load capacity (even with capacitive loads)
- Industry-conformal

**Applications**

- Monitoring material feed
- Workpiece monitoring
- Tool break monitoring
- Positioning tasks
- Completeness checking
- Movement monitoring

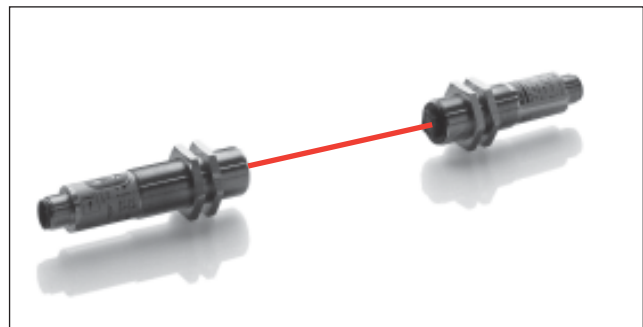


**BOS 18M teach-in**

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

Diffuse, retroreflective and through-beam models are available. The teach-in function makes setting up the sensor even easier.

The choice between NC/NO is made by pressing a button, so that only one output line is needed. The available line is then used as a contamination output.



**BOS 18M Laser through-beams**

The movable optics on the emitter allows the beam to be focused at any desired point between the emitter and receiver. The best small parts detection is in a range of 20...80 cm.

Here the beam cross-section can be focused to a minimum diameter of 0.03 mm.

**Features**

- Long range (50 m)
- Very high switching frequency (6 kHz)
- Straight and right angle versions

**Applications**

- Drill break monitoring
- Precise part positioning
- Fast object counting



The **BOS 18MR** product family features an integrated right angle mirror made of scratch-resistant glass which is firmly attached to the housing. Installation from the front is no problem thanks to the non-protruding optical head.

**Features**

- Standard M18x1 metal housing (nickel plated brass)
- All sensors with visible red light
- Enclosure rating IP 67
- Supply voltage 10...30 V DC, polarity reversal protected
- Output short circuit protected

**Applications**

- Roller conveyors
- Conveying lines
- Packaging industry

**BOS 18MR right angle head**



**2.1**



**2.3**

Photoelectric sensors accessories page 2.3.2 ...

**6**

Connectors page 6.2 ...

Type	Range	Light type			Light exit		Output		Switching type		Switching frequency	U <sub>B</sub>	Connection		Special features		Page
		Red light	Infrared	Laser	Straight	Right angle	PNP-Transistor	NPN-Transistor	Light-on	Dark-on			10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	
 <b>Diffuse with HGA</b>																	
BOS 18M-PA-1HA-S4-C	40...120 mm	■			■		■		■	■	600 Hz	■	■				2.1.18
BOS 18MR-PA-1HA-S4-C	40...120 mm	■				■	■		■	■	600 Hz	■	■				2.1.34
BOS 18M-PS-1HA-E5-C-S4	10...120 mm	■			■		■		■		500 Hz	■	■				2.1.18
BOS 18MR-PS-1HA-E5-C-S4	10...120 mm	■				■	■		■		600 Hz	■	■				2.1.34
 <b>Diffuse</b>																	
BOS 18M-PS-1XA-E5-C-S4	0...100 mm		■		■		■		■		100 Hz	■	■				2.1.24
BOS 18M-PO-1XA-E5-C-S4	0...100 mm		■		■		■		■		100 Hz	■	■				2.1.24
BOS 18M-PS-1XA-E4-C-03	0...100 mm		■		■		■		■		100 Hz	■		■			2.1.24
BOS 18M-PO-1XA-E4-C-03	0...100 mm		■		■		■		■		100 Hz	■		■			2.1.24
BOS 18M-PA-1PA-E5-C-S4	0...100 mm		■		■		■		■	■	100 Hz	■	■				2.1.19
BOS 18M-PA-1PA-E4-C-03	0...100 mm		■		■		■		■	■	100 Hz	■		■			2.1.19
BOS 18M-PS-1XB-E5-C-S4	0...200 mm		■		■		■		■		100 Hz	■	■				2.1.24
BOS 18M-PO-1XB-E5-C-S4	0...200 mm		■		■		■		■		100 Hz	■	■				2.1.24
BOS 18M-PS-1XB-E4-C-03	0...200 mm		■		■		■		■		100 Hz	■		■			2.1.24
BOS 18M-PO-1XB-E4-C-03	0...200 mm		■		■		■		■		100 Hz	■		■			2.1.24
BOS 18M-PS-1PD-E4-C-03	0...400 mm		■		■		■		■		100 Hz	■		■			2.1.25
BOS 18M-PO-1PD-E4-C-03	0...400 mm		■		■		■		■		100 Hz	■		■			2.1.25
BOS 18M-PA-1PD-E5-C-S4	0...400 mm		■		■		■		■	■	100 Hz	■	■				2.1.19
BOS 18M-PA-1PD-E4-C-03	0...400 mm		■		■		■		■	■	100 Hz	■	■				2.1.19
BOS 18M-NA-1PD-E5-C-S4	0...400 mm		■		■		■	■	■	■	100 Hz	■	■				2.1.19
BOS 18M-NA-1PD-E4-C-03	0...400 mm		■		■		■	■	■	■	100 Hz	■		■			2.1.19
BOS 18M-PU-1PD-SA5-C	0...400 mm		■		■		■		■	■	1 kHz	■	■				2.1.19
BOS 18M-PU-1PD-SA4-C	0...400 mm		■		■		■		■	■	1 kHz	■		■			2.1.20
BOS 18M-PU-1PD-S4-C	0...400 mm		■		■		■		■	■	500 Hz	■	■			■	2.1.29
BOS 18MR-PS-1OD-E5-C-S4	0...400 mm	■				■	■		■		1 kHz	■	■				2.1.35
BOS 18M-PA-1PF-E5-C-S4	0...1000 mm		■		■		■		■	■	200 Hz	■	■				2.1.20
BOS 18M-GU-1PF-S4-Y	0...1000 mm		■		■		■	■	■	■	1 kHz		■				2.1.21

Type	Range	Light type			Light exit		Output		Switching type		Switching frequency	U <sub>B</sub>	Connection		Special features		Page
		Red light	Infrared	Laser	Straight	Right angle	PNP- Transistor	NPN- Transistor	Light-on	Dark-on			10...30 V DC	M12 connector, 4-pin	Cable	Polarizing filter	
 <b>Retroreflective</b>																	
BOS 18M-PA-1QB-E5-C-S4	2 m	■			■		■		■	■	100 Hz	■	■		■		<b>2.1.21</b>
BOS 18M-PA-1QB-E4-C-03	2 m	■			■		■		■	■	100 Hz	■		■	■		<b>2.1.21</b>
BOS 18M-NA-1QB-E5-C-S4	2 m	■			■			■	■	■	100 Hz	■	■		■		<b>2.1.21</b>
BOS 18M-NA-1QB-E4-C-03	2 m	■			■			■	■	■	100 Hz	■		■	■		<b>2.1.21</b>
BOS 18M-PU-1QB-S4-C	2 m	■					■		■	■	500 Hz	■	■		■	■	<b>2.1.29</b>
BOS 18MR-PS-1QB-E5-C-S4	2 m	■				■	■			■	1 kHz	■	■		■		<b>2.1.35</b>
BOS 18M-PS-1RB-E5-C-S4	2 m		■		■		■			■	100 Hz	■	■				<b>2.1.25</b>
BOS 18M-PO-1RB-E5-C-S4	2 m		■		■		■		■		100 Hz	■	■				<b>2.1.25</b>
BOS 18M-PS-1RB-E4-C-03	2 m		■		■		■			■	100 Hz	■		■			<b>2.1.25</b>
BOS 18M-PO-1RB-E4-C-03	2 m		■		■		■		■		100 Hz	■		■			<b>2.1.25</b>
BOS 18M-PA-1VD-E5-C-S4	4 m		■		■		■		■	■	100 Hz	■	■				<b>2.1.21</b>
BOS 18M-PA-1VD-E4-C-03	4 m		■		■		■		■	■	100 Hz	■		■			<b>2.1.21</b>
BOS 18M-NA-1VD-E5-C-S4	4 m		■		■			■	■	■	100 Hz	■	■				<b>2.1.21</b>
BOS 18M-NA-1VD-E4-C-03	4 m		■		■			■	■	■	100 Hz	■		■			<b>2.1.21</b>
BOS 18M-PS-1RD-E5-C-S4	4 m		■		■		■			■	100 Hz	■	■				<b>2.1.25</b>
BOS 18M-PO-1RD-E5-C-S4	4 m		■		■		■		■		100 Hz	■	■				<b>2.1.25</b>
BOS 18M-PS-1RD-E4-C-03	4 m		■		■		■			■	100 Hz	■		■			<b>2.1.25</b>
BOS 18M-PO-1RD-E4-C-03	4 m		■		■		■		■		100 Hz	■		■			<b>2.1.25</b>
 <b>Through-beam</b>																	
BLE 18M-BA-1LT-S4-C	0...50 m		■		■		■		■	■	6 kHz	■	■				<b>2.1.31</b>
BLE 18MR-BA-1LT-S4-C	0...50 m		■		■		■		■	■	6 kHz	■	■				<b>2.1.31</b>
BLE 18M-PU-1PP-S4-C	0...16 m		■		■		■		■	■	500 Hz	■	■			■	<b>2.1.29</b>
BLE 18M-PS-1P-E5-C-S4	0...16 m		■		■		■			■	100 Hz	■	■				<b>2.1.25</b>
BLE 18M-PO-1P-E5-C-S4	0...16 m		■		■		■		■		100 Hz	■	■				<b>2.1.25</b>
BLE 18M-PS-1P-E4-C-03	0...16 m		■		■		■			■	100 Hz	■		■			<b>2.1.25</b>
BLE 18M-PO-1P-E4-C-03	0...16 m		■		■		■		■		100 Hz	■		■			<b>2.1.25</b>
BLE 18MR-PA-1PP-E5-C-S4	0...16 m	■				■	■		■	■	1 kHz	■	■				<b>2.1.35</b>
BLS 18M-XX-1LT-S4-C	0...50 m			■	■							■	■				<b>2.1.31</b>
BLS 18MR-XX-1LT-S4-C	0...50 m			■	■							■	■				<b>2.1.31</b>
BLS 18M-XX-1P-S4-L	0...16 m		■		■							■	■			■	<b>2.1.29</b>
BLS 18M-XX-1P-E5-L-S4	0...16 m		■		■							■	■				<b>2.1.25</b>
BLS 18M-XX-1P-E4-L-03	0...16 m		■		■							■		■			<b>2.1.25</b>
BLS 18MR-XX-1P-E5-C-S4	0...16 m	■				■						■	■				<b>2.1.35</b>

Versions with AC voltage see page **2.1.32**

**2.1**

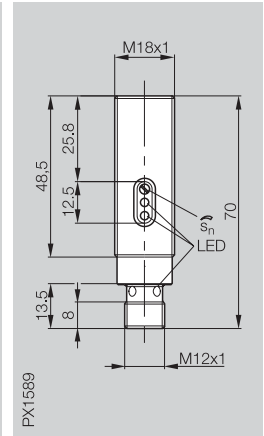
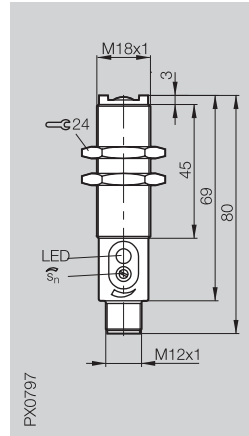
**2.3**

Photoelectric sensors accessories page 2.3.2 ...

**6**

Connectors page 6.2 ...

Diffuse with background suppression	Range	<b>40...120 mm</b>	<b>10...120 mm</b>
Diffuse	Range		



**Diffuse**

PNP	40...120 mm	HGA	BOS 18M-PA-1HA-S 4-C	
PNP	10...120 mm	HGA		BOS 18M-PS-1HA-E5-C-S 4
PNP	100 mm			
PNP	400 mm			
NPN	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- and dark-on
Voltage drop $U_d$ at $I_o$	≤ 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

**Indicator**

Output function indicator	LED yellow	LED yellow
Stability indicator	no	no

**Time specifications**

Response time	0.8 ms	1 ms
Frequency of operating cycles $f$	600 Hz	500 Hz

**Mechanical data**

Dimensions	M18x80 mm	M18x70 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% reflective.

Wiring diagrams, characteristics and accessories see page 2.1.22 and 2.1.23.

# M18 metal with potentiometer

## Photoelectric Sensors

BOS 18M  
Range 100 mm, 400 mm

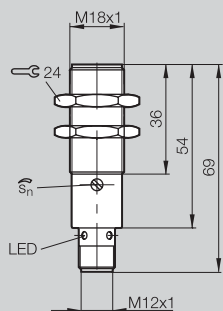
0...100 mm

0...100 mm

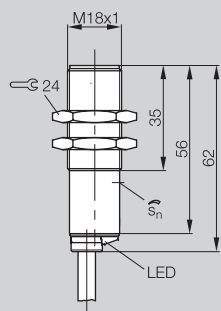
0...400 mm

0...400 mm

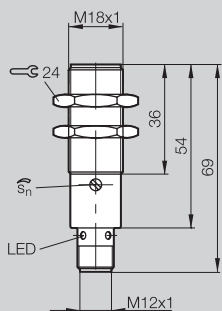
0...400 mm



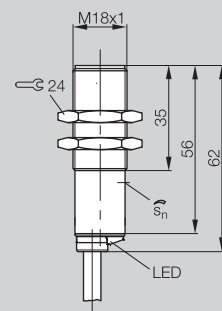
PX2038



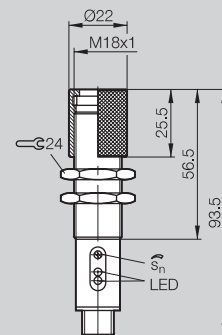
PX2040



PX2038



PX2040



PX0891

approval for  
the automobile industry

BOS 18M-PA-1PA-E5-C-S 4

BOS 18M-PA-1PA-E4-C-03

BOS 18M-PA-1PD-E5-C-S 4  
BOS 18M-NA-1PD-E5-C-S 4

BOS 18M-PA-1PD-E4-C-03  
BOS 18M-NA-1PD-E4-C-03

BOS 18M-PU-1PD-SA 5-C

10...30 V DC

10 %

≤ 20 mA

PNP-Transistor

200 mA

Light- and dark-on

≤ 2.5 V

Potentiometer 270°

LED, infrared  
880 nm

LED yellow  
no

5 ms  
100 Hz

M18×69 mm  
M12 connector, 4-pin

Nickel plated brass  
PMMA  
40 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

10 %

≤ 20 mA

PNP-Transistor

200 mA

Light- and dark-on

≤ 2.5 V

Potentiometer 270°

LED, infrared  
880 nm

LED yellow  
no

5 ms  
100 Hz

M18×62 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

Nickel plated brass  
PMMA  
140 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

10 %

≤ 20 mA

PNP or NPN-Transistor

200 mA

Light- and dark-on

≤ 2.5 V

Potentiometer 270°

LED, infrared  
880 nm

LED yellow  
no

5 ms  
100 Hz

M18×69 mm  
M12 connector, 4-pin

Nickel plated brass  
PMMA  
40 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

10 %

≤ 20 mA

PNP or NPN-Transistor

200 mA

Light- and dark-on

≤ 2.5 V

Potentiometer 270°

LED, infrared  
880 nm

LED yellow  
no

5 ms  
100 Hz

M18×62 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

Nickel plated brass  
PMMA  
140 g

IP 67

yes

yes

-15...+55 °C

5 kLux

10...30 V DC

10 %

≤ 25 mA

PNP-Transistor

200 mA

Light-/dark-on (selectable)

≤ 2.4 V

18-turn potentiometer

LED, infrared  
880 nm

LED yellow  
LED green/red

0.5 ms  
1 kHz

M18×93.5 mm  
M12 connector, 4-pin

Nickel plated brass  
Glass  
100 g

IP 65

yes

yes

-20...+60 °C

2 kLux

2.1

2.3

Photoelectric  
sensors  
accessories  
page 2.3.2 ...

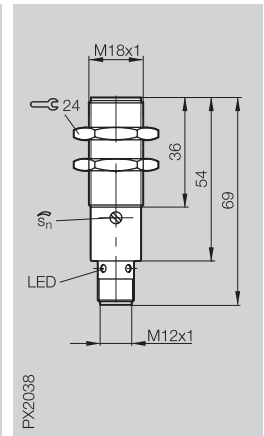
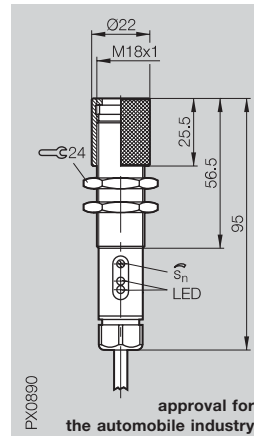
6

Connectors  
page 6.2 ...

Diffuse	Range
Retroreflective	Range

**0...400 mm**

**0...1 m**



**Diffuse**

PNP	400 mm
PNP	1000 mm
PNP/NPN	1000 mm

BOS 18M-PU-1PD-SA 4-C
-----------------------

BOS 18M-PA-1PF-E5-C-S 4
-------------------------

**Retroreflective**



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

**Electrical data**

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

10...30 V DC
10 %
≤ 25 mA
PNP-Transistor
200 mA
Light-/dark-on (selectable)
≤ 2.4 V
18-turn potentiometer

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

**Optical data**

Emitter, light type	LED, infrared
Wavelength	880 nm

LED, infrared
880 nm

LED, infrared
880 nm

**Indicator**

Output function indicator	LED yellow
Stability indicator	LED green/red

LED yellow
LED green/red

LED yellow
no

**Time specifications**

Response time	0.5 ms
Frequency of operating cycles $f$	1 kHz

0.5 ms
1 kHz

2.5 ms
200 Hz

**Mechanical data**

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

M18×95 mm
3 m cable, PVC
3×0.25 mm <sup>2</sup>
Nickel plated brass
Glass
200 g

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

**Ambient data**

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

IP 65
yes
yes
-20...+60 °C
2 kLux

IP 67
yes
yes
-5...+55 °C
5 kLux

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

Wiring diagrams, characteristics and accessories see page 2.1.22 and 2.1.23.



# M18 metal with potentiometer

## Photoelectric Sensors

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

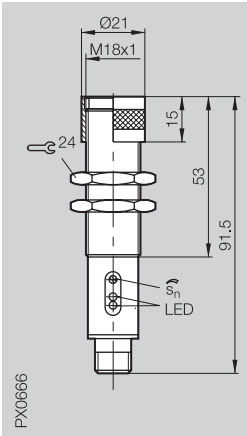
0...1 m

2 m

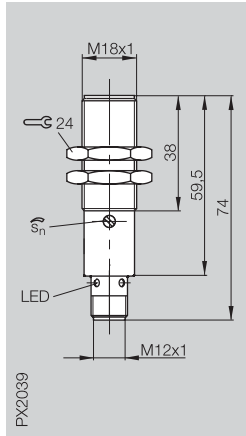
2 m

4 m

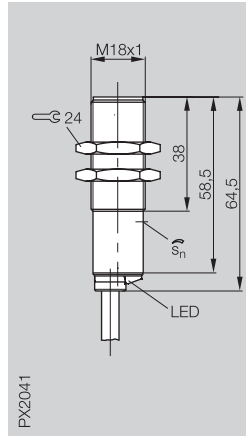
4 m



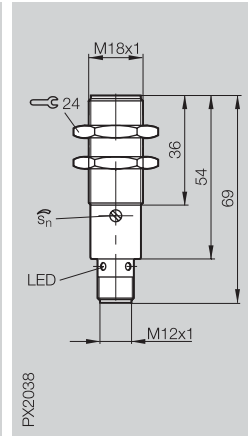
PX0666



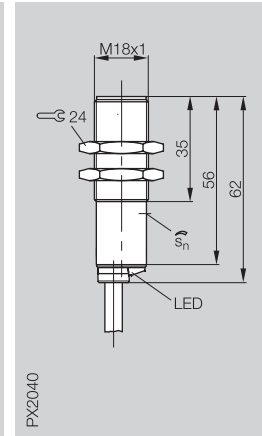
PX2039



PX2041



PX2038



PX2040

BOS 18M-GU-1PF-S 4-Y

BOS 18M-PA-1QB-E5-C-S 4  
BOS 18M-NA-1QB-E5-C-S 4

BOS 18M-PA-1QB-E4-C-03  
BOS 18M-NA-1QB-E4-C-03

BOS 18M-PA-1VD-E5-C-S 4  
BOS 18M-NA-1VD-E5-C-S 4

BOS 18M-PA-1VD-E4-C-03  
BOS 18M-NA-1VD-E4-C-03

11...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10...30 V DC

10 %

10 %

10 %

10 %

10 %

≤ 25 mA

≤ 20 mA

≤ 20 mA

≤ 20 mA

≤ 20 mA

PNP and NPN (push-pull)  
200 mA

PNP- or NPN-Transistor  
200 mA

PNP- or NPN-Transistor  
200 mA

PNP- or NPN-Transistor  
200 mA

PNP- or NPN-Transistor  
200 mA

Light-/dark-on (selectable)  
≤ 2.5 V

Light- and dark-on  
≤ 2.5 V

Light- and dark-on  
≤ 2.5 V

Light- and dark-on  
≤ 2.5 V

Light- and dark-on  
≤ 2.5 V

18-turn potentiometer

Potentiometer 270°

Potentiometer 270°

Potentiometer 270°

Potentiometer 270°

LED, infrared  
880 nm

LED, red light  
660 nm

LED, red light  
660 nm

LED, infrared  
880 nm

LED, infrared  
880 nm

LED yellow  
LED green/red

LED yellow  
no

LED yellow  
no

LED yellow  
no

LED yellow  
no

0.5 ms

5 ms

5 ms

5 ms

5 ms

1 kHz

100 Hz

100 Hz

100 Hz

100 Hz

M18×91.5 mm  
M12 connector, 4-pin

M18×74 mm  
M12 connector, 4-pin

M18×64,5 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

M18×69 mm  
M12 connector, 4-pin

M18×62 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

Nickel plated brass  
Glass  
100 g

Nickel plated brass  
PMMA  
40 g

Nickel plated brass  
PMMA  
140 g

Nickel plated brass  
PMMA  
40 g

Nickel plated brass  
PMMA  
140 g

IP 65

IP 67

IP 67

IP 67

IP 67

yes

yes

yes

yes

yes

yes

yes

yes

yes

yes

-20...+60 °C

-15...+55 °C

-15...+55 °C

-15...+55 °C

-15...+55 °C

1 kLux

5 kLux

5 kLux

5 kLux

5 kLux

2.1

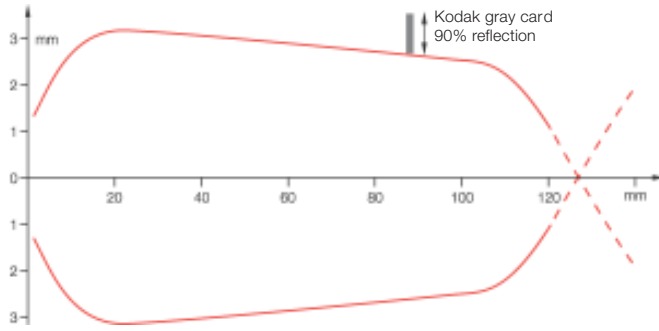
2.3

Photoelectric  
sensors  
accessories  
page 2.3.2 ...

6

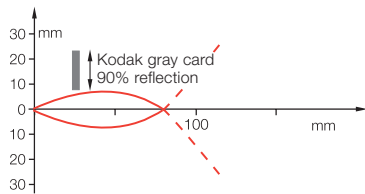
Connectors  
page 6.2 ...

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



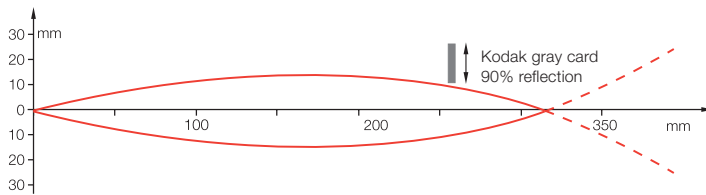
Range measured using side approach with Kodak gray card.

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



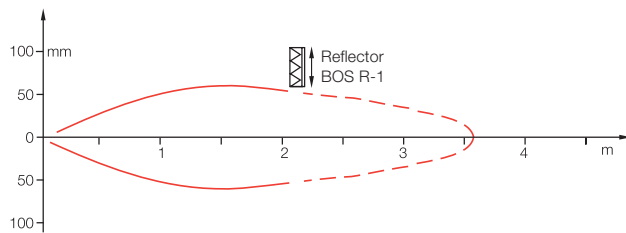
Range measured using side approach with Kodak gray card.

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



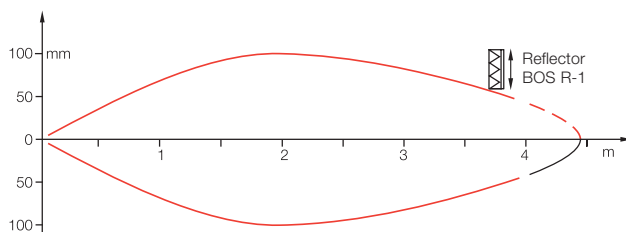
Range measured using side approach with Kodak gray card.

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



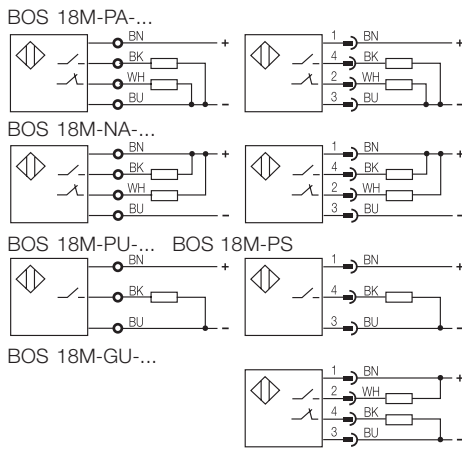
Range measured using side approach with reflector.

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



Range measured using side approach with reflector.

#### Wiring diagrams



2.1

2.3

Photoelectric  
sensors  
accessories  
page 2.3.2 ...

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

Moving or removing  
the jumper inverts the final  
stage function.



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



Swivel head  
BOS 18-UK-10

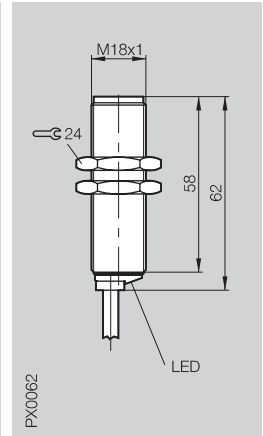
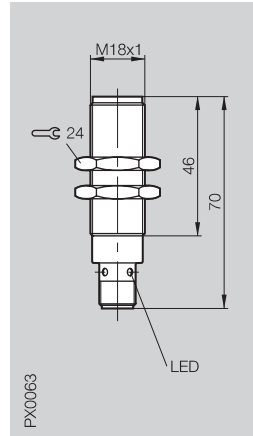


Connector  
BKS-\_ 19/BKS-\_ 20

Protective end cap  
BOS 18-SM-2



Diffuse	Range	<b>0...100 mm/0...200 mm</b>	<b>0...100 mm/0...200 mm</b>
Retroreflective	Range		
Through-beam	Range		



<b>Diffuse</b>					
	PNP, light-on	100 mm		BOS 18M-PS-1XA-E5-C-S 4	BOS 18M-PS-1XA-E4-C-03
	PNP, dark-on	100 mm		BOS 18M-PO-1XA-E5-C-S 4	BOS 18M-PO-1XA-E4-C-03
	PNP, light-on	200 mm		BOS 18M-PS-1XB-E5-C-S 4	BOS 18M-PS-1XB-E4-C-03
	PNP, dark-on	200 mm		BOS 18M-PO-1XB-E5-C-S 4	BOS 18M-PO-1XB-E4-C-03
	PNP, light-on	400 mm	Poti		
	PNP, dark-on	400 mm	Poti		
<b>Retroreflective</b>					
	PNP, dark-on	2 m			
	PNP, light-on	2 m			
	PNP, dark-on	4 m			
	PNP, light-on	4 m			
<b>Through-beam</b>					
	PNP, dark-on	16 m	Receiver		
	PNP, light-on	16 m	Receiver		
		16 m	Emitter		
<b>Electrical data</b>					
	Supply voltage $U_B$			10...30 V DC	10...30 V DC
	Ripple			10 %	10 %
	No-load supply current $I_0$ max.			≤ 20 mA	≤ 20 mA
	Switching output			PNP-Transistor*	PNP-Transistor*
	Output current			200 mA	200 mA
	Switching type			Light- or dark-on	Light- or dark-on
	Voltage drop $U_d$ at $I_0$			≤ 2.5 V	≤ 2.5 V
	Settings			fixed	fixed
<b>Optical data</b>					
	Emitter, light type			LED, infrared	LED, infrared
	Wavelength			880 nm	880 nm
<b>Indicator</b>					
	Power-on indicator				
	Output function indicator			LED yellow	LED yellow
<b>Time specifications</b>					
	Response time			5 ms	5 ms
	Frequency of operating cycles $f$			100 Hz	100 Hz
<b>Mechanical data</b>					
	Dimensions			M18×70 mm	M18×62 mm
	Connection			M12 connector, 4-pin	3 m cable, PVC
	No. of wires × cross-section				3×0.34 mm <sup>2</sup>
	Housing material			Nickel plated brass	Nickel plated brass
	Optical surface			PMMA	PMMA
	Weight			40 g	160 g
<b>Ambient data</b>					
	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			2 kLux	2 kLux

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

\*NPN versions on request.

# M18 metal rugged

## Photoelectric Sensors

BOS 18M  
Range 400 mm,  
2 m, 4 m, 16 m

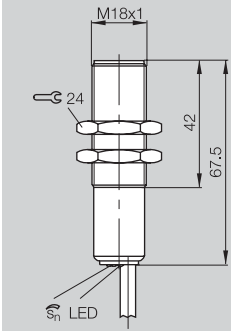
0...400 mm

2 m/4 m

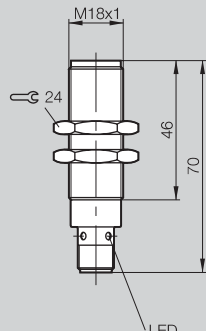
2 m/4 m

0...16 m

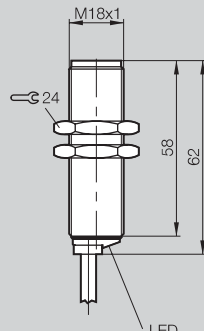
0...16 m



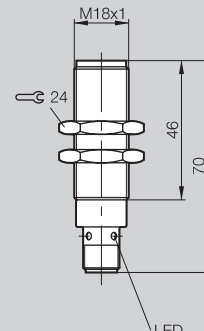
PX0059



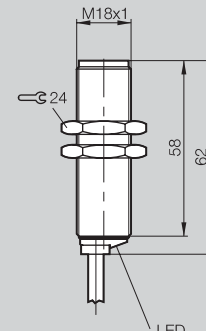
PX0063



PX0062



PX0063



PX0062

BOS 18M-PS-1PD-E4-C-03  
BOS 18M-PO-1PD-E4-C-03

BOS 18M-PS-1RB-E5-C-S 4  
BOS 18M-PO-1RB-E5-C-S 4  
BOS 18M-PS-1RD-E5-C-S 4  
BOS 18M-PO-1RD-E5-C-S 4

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-S 4  
BLE 18M-PO-1P-E5-C-S 4  
BLS 18M-XX-1P-E5-L-S 4

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 %  
≤ 20 mA  
PNP-Transistor\*  
200 mA  
Light- or dark-on  
≤ 2.5 V  
18-turn potentiometer

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

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

10...30 V DC  
10 %  
≤ 20 mA (BLS ≤ 40 mA)  
PNP-Transistor\*  
200 mA  
Light- or dark-on  
≤ 2.5 V  
fixed

10...30 V DC  
10 %  
≤ 20 mA (BLS ≤ 40 mA)  
PNP-Transistor\*  
200 mA  
Light- or dark-on  
≤ 2.5 V  
fixed

LED, infrared  
880 nm

LED, infrared  
880 nm

LED, infrared  
880 nm

LED, infrared  
880 nm

LED, infrared  
880 nm

LED yellow

LED yellow

LED yellow

LED yellow (for BLS)  
LED yellow (for BLE)

LED yellow (for BLS)  
LED yellow (for BLE)

5 ms  
100 Hz

5 ms  
100 Hz

5 ms  
100 Hz

5 ms  
100 Hz

5 ms  
100 Hz

M18×67,5 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

M18×70 mm  
M12 connector, 4-pin

M18×62 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

M18×70 mm  
M12 connector, 4-pin

M18×62 mm  
3 m cable, PVC  
3×0.34 mm<sup>2</sup>

Nickel plated brass  
PMMA  
160 g

Nickel plated brass  
PMMA  
40 g

Nickel plated brass  
PMMA  
160 g

Nickel plated brass  
PMMA  
40 g

Nickel plated brass  
PMMA  
160 g

IP 67  
yes  
yes  
-5...+55 °C  
2 kLux

IP 67  
yes  
yes  
-5...+55 °C  
2 kLux

IP 67  
yes  
yes  
-5...+55 °C  
2 kLux

IP 67  
yes  
yes  
-5...+55 °C  
2 kLux

IP 67  
yes  
yes  
-5...+55 °C  
2 kLux

2.1

2.3

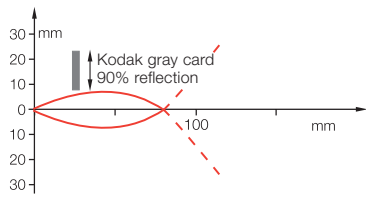
Photoelectric sensors accessories page 2.3.2 ...

6

Connectors page 6.2 ...

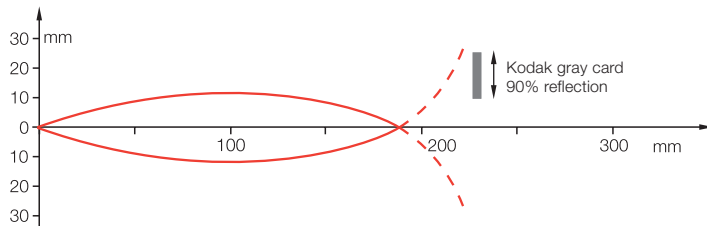
Wiring diagrams, characteristics and accessories see page 2.1.26 and 2.1.27.

**Diffuse BOS 18M-P\_-1XA-...**



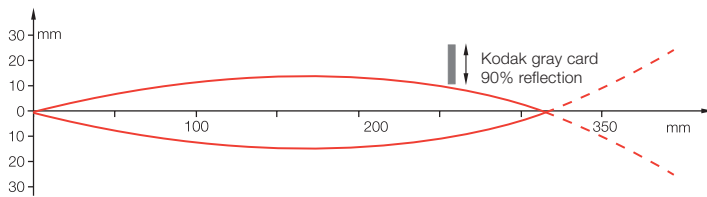
Range measured using side approach with Kodak gray card.

**Diffuse BOS 18M-P\_-1XB-...**



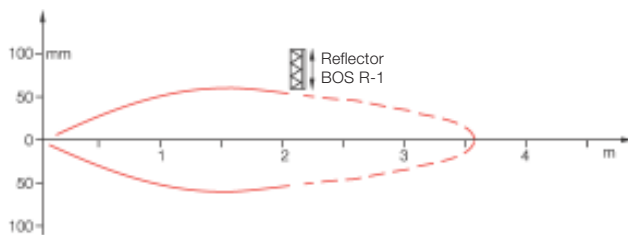
Range measured using side approach with Kodak gray card.

**Diffuse BOS 18M-P\_-1PD-...**



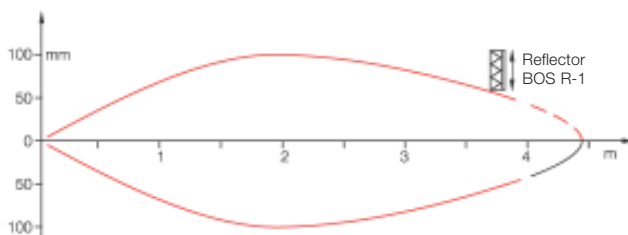
Range measured using side approach with Kodak gray card.

**Retroreflective BOS 18M-P\_-1RB-...**



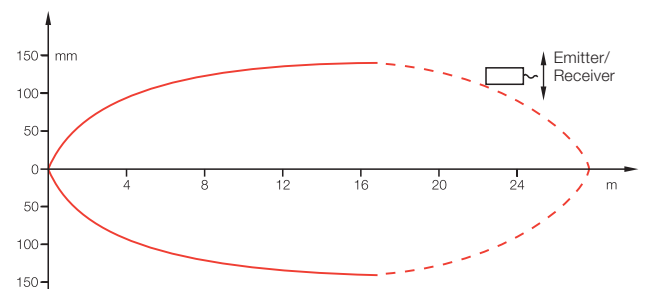
Range measured using side approach with reflector.

**Retroreflective BOS 18M-P\_-1RD-...**



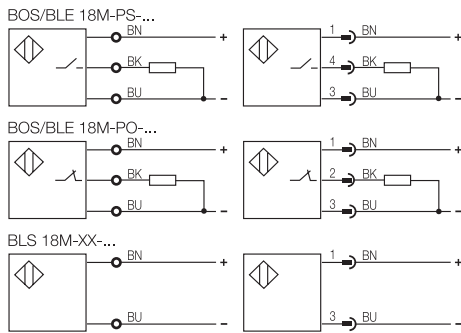
Range measured using side approach with reflector.

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



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

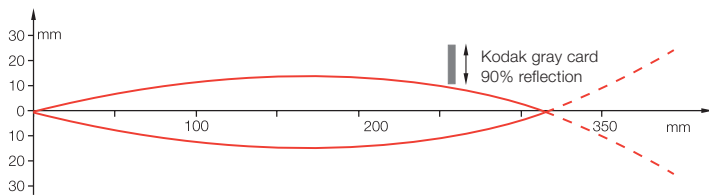
#### Wiring diagrams



#### Recommended accessories please order separately

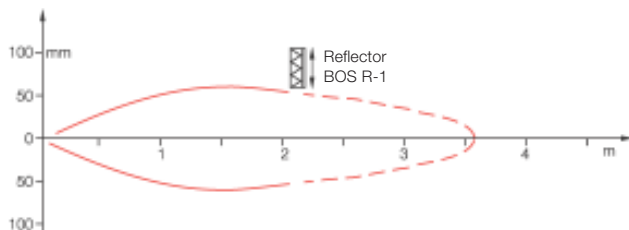


**Diffuse BOS 18M-PU-1PD-...**



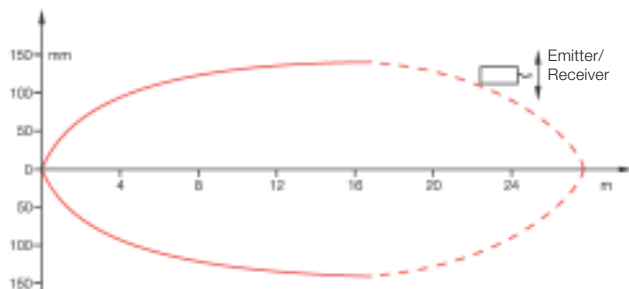
Range measured using side approach with Kodak gray card.

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



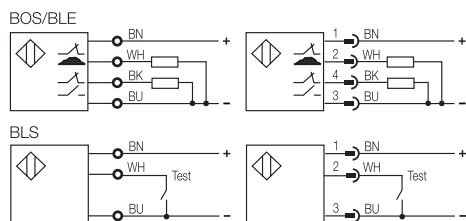
Range measured using side approach with reflector.

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



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

**Wiring diagrams**



Diffuse	Range
Retroreflective	Range
Through-beam	Range



**Diffuse**

PNP 400 mm Alarm output



**Retroreflective**

PNP 2 m Alarm output, polarizing filter



**Through-beam**

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

**Electrical 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

Help functions

**Optical data**

Emitter, light type

Wavelength

**Indicator**

Power-on indicator

Output function indicator

Contamination indicator

**Time specifications**

Response time

Frequency of operating cycles  $f$

**Mechanical data**

Connection

Housing material

Active surface material

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% reflection.  
Retroreflective values referenced to R1 reflector.



# M18 metal with teach-in

## Photoelectric Sensors

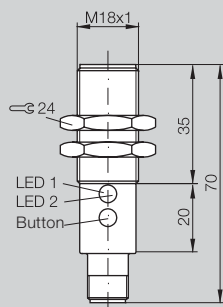
BOS 18M with teach-in  
Range 400 mm, 2 m, 16 m

0...400 mm

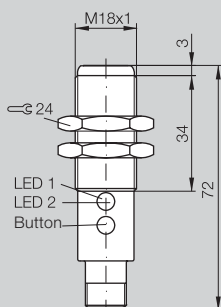
2 m

0...16 m

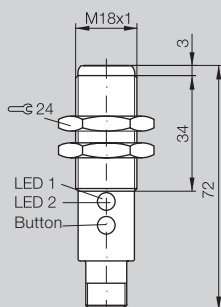
0...16 m



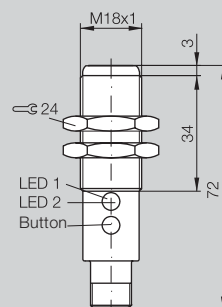
PX1400a



PX1401a



PX1401a



PX1401a

BOS 18M-PU-1PD-S 4-C

BOS 18M-PU-1QB-S 4-C

BLE 18M-PU-1PP-S 4-C

BLS 18M-XX-1P-S 4-L

10...30 V DC  
≤ 25 mA

PNP-Transistor  
200 mA

Light-/dark-on (selectable)  
≤ 2.5 V  
teach-in

Contamination output

LED, infrared  
880 nm

LED yellow  
LED green

1 ms  
500 Hz

M12 connector, 4-pin  
Nickel plated brass

PMMA  
65 g

IP 67  
yes  
yes

-15...+55 °C  
5 kLux

10...30 V DC  
≤ 25 mA

PNP-Transistor  
200 mA

Light-/dark-on (selectable)  
≤ 2.5 V  
teach-in

Contamination output

LED, red light  
660 nm

LED yellow  
LED green

1 ms  
500 Hz

M12 connector, 4-pin  
Nickel plated brass

Glass  
65 g

IP 67  
yes  
yes

-15...+55 °C  
5 kLux

10...30 V DC  
≤ 25 mA

PNP-Transistor  
200 mA

Light-/dark-on (selectable)  
≤ 2.5 V  
teach-in

Contamination output

LED, infrared

LED yellow  
LED green

1 ms  
500 Hz

M12 connector, 4-pin  
Nickel plated brass

Glass  
65 g

IP 67  
yes  
yes

-15...+55 °C  
5 kLux

10...30 V DC  
≤ 25 mA

teach-in

LED, infrared  
880 nm

LED yellow

M12 connector, 4-pin  
Nickel plated brass

Glass  
65 g

IP 67  
yes  
yes

-15...+55 °C  
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 ...

6

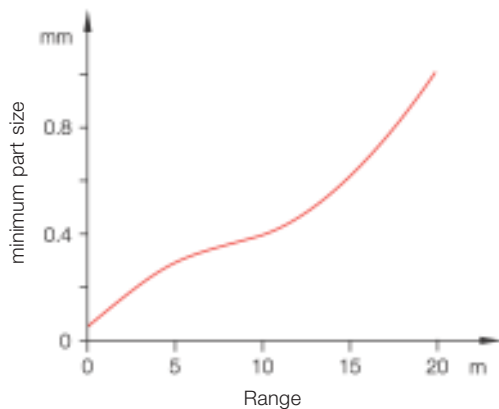
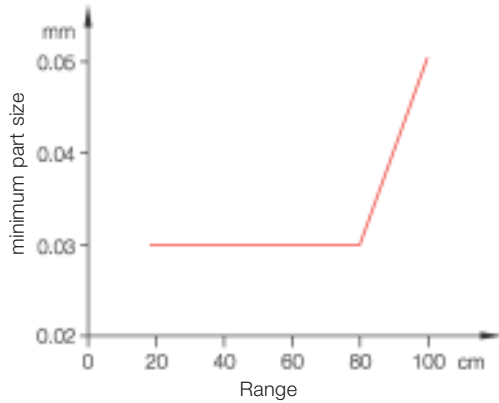
Connectors  
page 6.2 ...

Laser through-beam Range



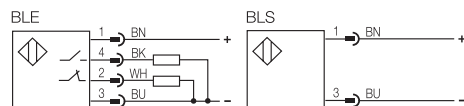
### Accuracy diagram

Smallest detectable part size as a function of range.



Beam spot vertical to traverse direction of the object.

### Wiring diagrams



The included focusing tool is used to focus the beam to a point. Optimum small parts detection is then possible in this point.  
At a distance of 20...80 cm from emitter to receiver parts down to a diameter of 0.03 mm can then 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

### Indicator

Output function indicator  
Stability indicator

### Time specifications

Response time  
Frequency of operating cycles  $f$

### 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



# M18 metal Laser



## Photoelectric Sensors

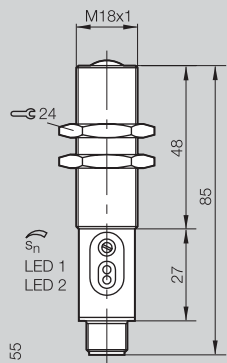
BOS 18M  
Laser through-beam  
Range 50 m

0...50 m

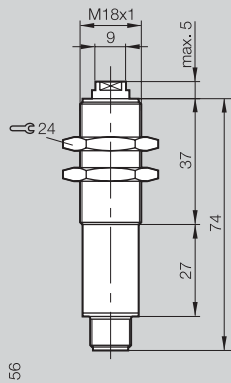
0...50 m

0...50 m

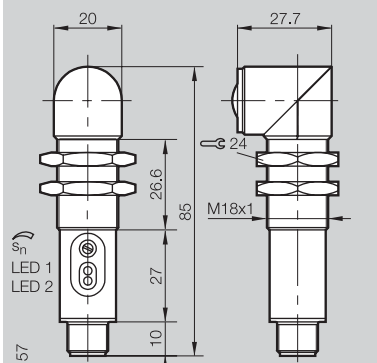
0...50 m



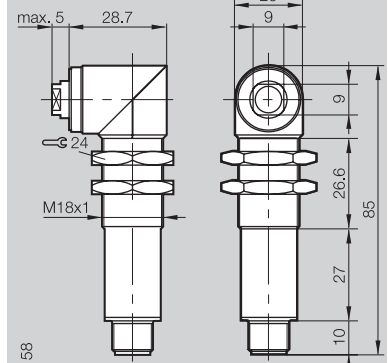
PX1155



PX1156



PX1157



PX1158

BLE 18M-BA-1LT-S 4-C

BLS 18M-XX-1LT-S 4-C

BLE 18MR-BA-1LT-S 4-C

BLS 18MR-XX-1LT-S 4-C

10...30 V DC

≤ 15 mA

PNP-Transistor

200 mA

Light- and dark-on (push-pull)

≤ 2.5 V

18-turn potentiometer

10...30 V DC

≤ 10 mA

Laser, red light

660 nm

2

focusable

LED yellow

LED green/red

≤ 0.08 ms

6 kHz

M12 connector, 4-pin  
Nickel plated brass

Glass

45 g

IP 65

yes

yes

-15...+55 °C

2 kLux

M12 connector, 4-pin  
Nickel plated brass

Glass

45 g

IP 65

yes

yes

-15...+55 °C

2 kLux

10...30 V DC

≤ 15 mA

PNP-Transistor

200 mA

Light- and dark-on (push-pull)

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Nickel plated brass

Glass

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-15...+55 °C

2 kLux

10...30 V DC

≤ 10 mA

Laser, red light

660 nm

2

focusable

LED yellow

LED green/red

≤ 0.08 ms

6 kHz

M12 connector, 4-pin  
Nickel plated brass

Glass

50 g

IP 65

yes

yes

-15...+55 °C

2 kLux

### Recommended accessories

please order separately



Mounting clamp  
BOS 18,0-KB-1



Connector  
BKS-\_19/BKS-\_20

2.1

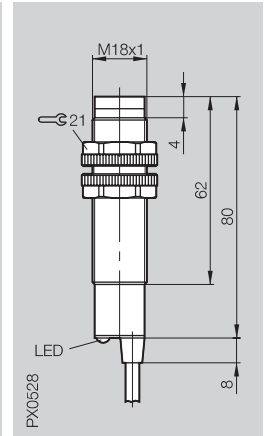
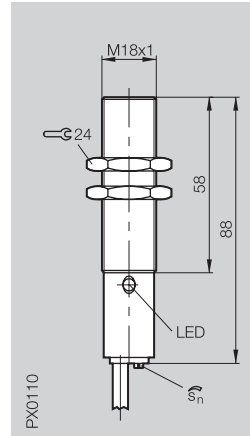
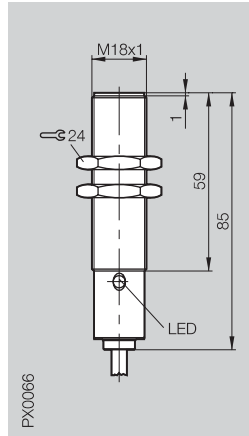
2.3

Photoelectric sensors  
accessories  
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Connectors  
page 6.2 ...

Diffuse	Range	<b>0...100 mm/0...200 mm</b>	<b>0...200 mm</b>	
Retroreflective	Range	<b>2 m</b>		
Through-beam	Range			<b>0...16 m</b>



	<b>Diffuse</b>				
	Diode	100 mm	BOS 18M-WS-7XA-B0-L-03		
	Diode bridge	100 mm	BOS 18M-WO-7XA-B0-L-03		
		200 mm	BOS 18M-WS-7XB-B0-L-03		
		200 mm Poti		BOS 18M-WS-7PB-B1-L-03	

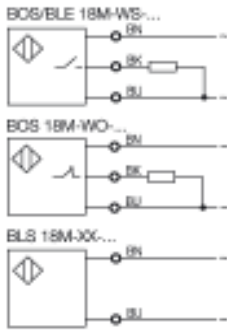
	<b>Retroreflective</b>				
	Diode	2 m	BOS 18M-WS-7RB-B0-L-03		
	Diode bridge	2 m	BOS 18M-WO-7RB-B0-L-03		

	<b>Through-beam</b>				
	Diode br.	16 m Receiver			BLE 18K-WS-7P-B0-L-03
		16 m Emitter			BLS 18K-XX-7P-B0-L-03

<b>Electrical data</b>					
Supply voltage $U_B$	20...250 V AC		20...250 V AC	20...240 V AC	
No-load supply current $I_0$ max.	$\leq 15$ mA		$\leq 15$ mA	$\leq 15$ mA	
Switching output	Diode bridge		Diode bridge	Diode bridge	
Output current	200 mA		200 mA	200 mA	
Switching type	Light- or dark-on		Light-on	Light- or dark-on	
Voltage drop $U_d$ at $I_0$	$\leq 4$ V		$\leq 4$ V	$\leq 4$ V	
Settings	no		16-turn potentiometer	no	
<b>Optical data</b>					
Emitter, light type	LED, infrared		LED, infrared	LED, infrared	
Wavelength	880 nm		880 nm	880 nm	
<b>Indicator</b>					
Output function indicator	LED red		LED red	LED red	
<b>Time specifications</b>					
Response time	50 ms		50 ms	20 ms	
Frequency of operating cycles $f$	10 Hz		10 Hz	25 Hz	
<b>Mechanical data</b>					
Connection	3 m cable, PVC		3 m cable, PVC	3 m cable, PVC	
No. of wires $\times$ cross-section	3 $\times$ 0.34 mm <sup>2</sup>		3 $\times$ 0.34 mm <sup>2</sup>	3 $\times$ 0.34 mm <sup>2</sup>	
Housing material	Nickel plated brass		Nickel plated brass	PA	
Active surface material	PMMA		PMMA	PMMA	
Weight	160 g		160 g	175 g	
<b>Ambient data</b>					
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% reflective.  
Retroreflective values referenced to reflector R1.

#### Wiring diagrams



#### 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



Swivel head  
BOS 18-UK-10



Protective end cap  
BOS 18-SM-2



Connector  
BKS-\_ 19/BKS-\_ 20

2.1

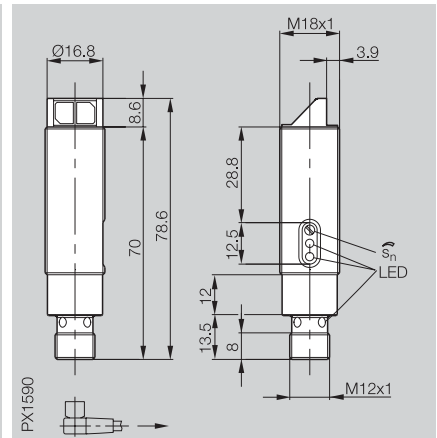
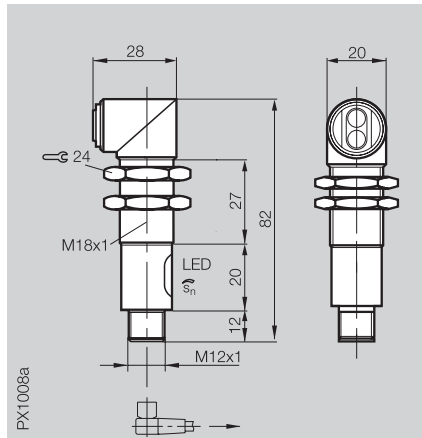
2.3

Photoelectric  
sensors  
accessories  
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Diffuse	Range
Retroreflective	Range
Through-beam	Range

**40...120 mm**

**10...120 mm**



**Diffuse**

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

BOS 18MR-PA-1HA-S 4-C

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



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

10...30 V DC

10...36 V DC

10 %

20 %

≤ 30 mA

≤ 20 mA

PNP-Transistor

PNP-Transistor

200 mA

200 mA

Light- and dark-on

Light-on

≤ 2.5 V

≤ 2 V

18-turn potentiometer

Potentiometer 270°

**Help functions**

**Optical data**

Emitter, light type	LED, red light
Wavelength	660 nm

LED, red light

LED, red light

660 nm

660 nm

**Indicator**

Output function indicator	LED yellow
Stability indicator	no

LED yellow

2 × LED yellow

no

LED green

**Time specifications**

Response time	0.8 ms
Frequency of operating cycles $f$	600 Hz

0.8 ms

≤ 1 ms

600 Hz

500 Hz

**Mechanical data**

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

M18×82 mm

M18×78.6 mm

M12 connector, 4-pin

M12 connector, 4-pin

Nickel plated brass

Nickel plated brass

Glass

Glass

62 g

57 g

**Ambient data**

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

IP 67

IP 67

yes

yes

yes

yes

-15...+55 °C

-25...+55 °C

2 kLux

10 kLux

Diffuse values referenced to Kodak gray card 90% reflective.

Retroreflective values referenced to reflector R1.



Connector orientation

# M18 metal with angle head

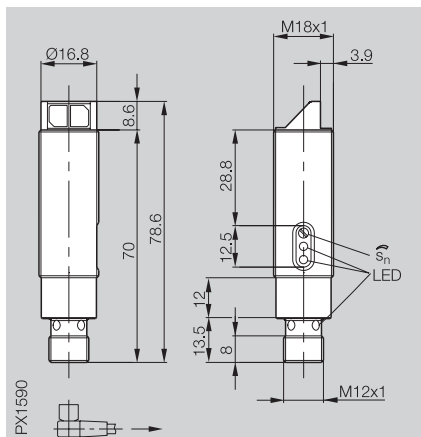
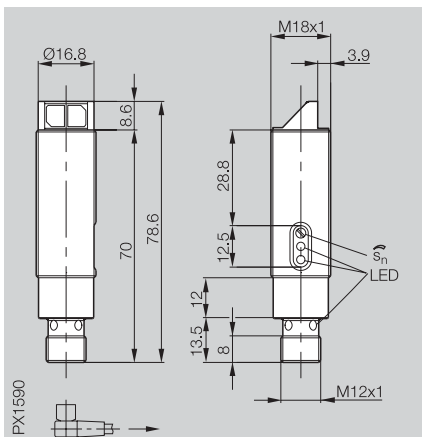
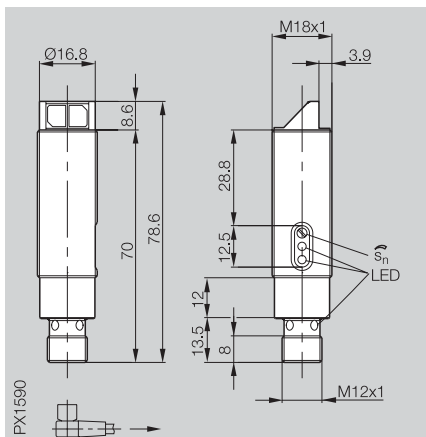
## Photoelectric Sensors

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

0...400 mm

2 m

0...16 m



BOS 18MR-PS-10D-E5-C-S4

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

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

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

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

10...36 V DC  
20 %  
≤ 20 mA  
PNP-Transistor  
200 mA  
Light- and dark-on  
≤ 2 V  
Potentiometer 270°  
Test input on emitter

LED, red light  
660 nm

LED, red light  
660 nm

LED, red light  
660 nm

2 × LED yellow  
LED green

2 × LED yellow  
LED green

2 × LED yellow (only for BLE)  
LED green (only for BLE)

≤ 0.5 ms  
1 kHz

≤ 0.5 ms  
1 kHz

≤ 0.5 ms  
1 kHz

M18×78.6 mm  
M12 connector, 4-pin  
Nickel plated brass  
Glass  
57 g

M18×78.6 mm  
M12 connector, 4-pin  
Nickel plated brass  
Glass  
56 g

M18×78.6 mm  
M12 connector, 4-pin  
Nickel plated brass  
Glass  
57 g

IP 67  
yes  
yes

IP 67  
yes  
yes

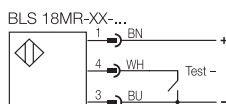
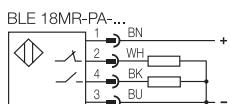
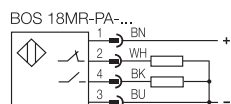
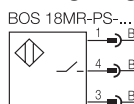
IP 67  
yes  
yes

-25...+55 °C  
10 kLux

-25...+55 °C  
10 kLux

-25...+55 °C  
10 kLux

### Wiring diagrams



Connector  
BKS-19/BKS-20

2.1

2.3

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