

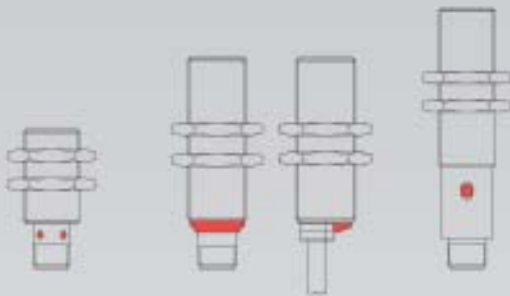
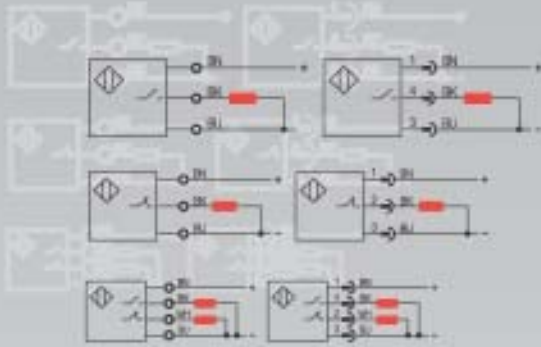
# Inductive – DC 3-/4-wire

## Our standard line in 3- and 4-wire DC versions

In this comprehensive line Balluff offers proximity switches from  $\varnothing$  3 mm to 80x80 mm for virtually any application in the field of automation.

These high-quality sensors have been developed and manufactured to the state-of-the-art in accordance with all relevant standards. Our 100 % final inspection of all products is your assurance that only carefully tested sensors leave our plants.

- 1.1.2  $\varnothing$  3 mm
- 1.1.3  $\varnothing$  4 mm
- 1.1.5  $\varnothing$  4 mm, M5
- 1.1.6 M5
- 1.1.8  $\varnothing$  6.5 mm
- 1.1.12  $\varnothing$  8 mm
- 1.1.13 M8
- 1.1.22 M12
- 1.1.30 M18
- 1.1.38 M30
- 1.1.44 Block style housings continuation



Short housing

**Blackline**  
Mid-length with maximum thread length

Long housing

mini.s



# Inductive Sensors

DC 3-wire  
Block style housings  
s<sub>n</sub> 5 mm

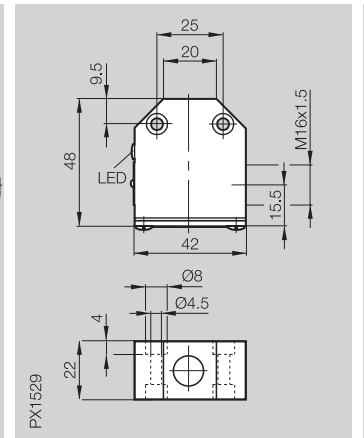
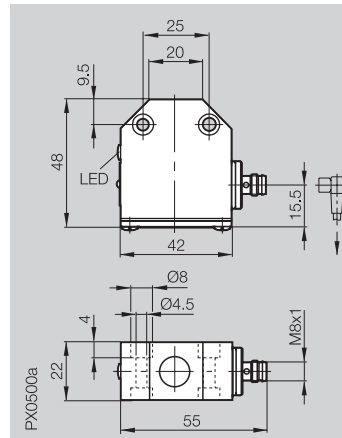
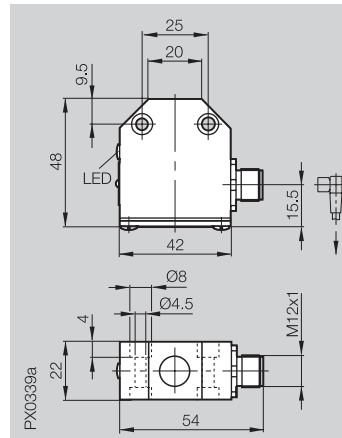
42×48×22 mm

Housing size  
Mounting (see notes starting p. 1.0.11)  
Rated operating distance s<sub>n</sub>  
Assured operating distance s<sub>a</sub>

**42×48×22 mm**  
flush  
**5 mm**  
0...4.1 mm

**42×48×22 mm**  
flush  
**5 mm**  
0...4.1 mm

**42×48×22 mm**  
flush  
**5 mm**  
0...4.1 mm



**PNP**  
NO ①  
NC ②  
complementary ③

BES 516-346-H2-Y-S 4  
BES 516-341-H2-Y-S 4

BES 516-346-H2-Y-S 49

BES 516-346-H2-Y  
BES 516-341-H2-Y

**NPN**  
NO ④  
NC ⑤  
complementary ⑥

BES 516-344-H2-Y  
BES 516-340-H2-Y

Rated operational voltage U<sub>e</sub>  
Supply voltage U<sub>B</sub>  
Voltage drop U<sub>d</sub> at I<sub>e</sub>  
Rated insulation voltage U<sub>i</sub>  
Rated operational current I<sub>e</sub>  
No-load supply current I<sub>0</sub> max.  
Off-state current I<sub>r</sub>  
Polarity reversal protected  
Short circuit protected  
Permissible load capacitance

24 V DC  
10...30 V DC  
≤ 3.5 V  
75 V DC  
130 mA  
≤ 25 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

24 V DC  
10...30 V DC  
≤ 3.5 V  
75 V DC  
130 mA  
≤ 25 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

24 V DC  
10...30 V DC  
≤ 3.5 V  
75 V DC  
130 mA  
≤ 25 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

Repeat accuracy R  
Ambient temperature range T<sub>a</sub>  
Frequency of operating cycles f  
Utilization category  
Function indicator

≤ 5 %  
-25...+70 °C  
500 Hz  
DC 13  
yes

≤ 5 %  
-25...+70 °C  
500 Hz  
DC 13  
yes

≤ 5 %  
-25...+70 °C  
500 Hz  
DC 13  
yes

Degree of protection per IEC 60529

IP 67

IP 67

IP 67

Housing material  
Material of sensing face  
Connection  
max. wire cross-section

Anodized GD-Al  
PA 12  
Connector

Anodized GD-Al  
PA 12  
Connector

Anodized GD-Al  
PA 12  
Screw terminals  
to 2.5 mm<sup>2</sup>

Recommended connector

BKS- 19/BKS- 20

BKS- 48/BKS- 49

① Wiring diagrams see page 1.0.6



Connector orientation

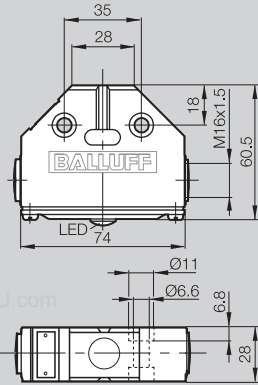


# 74x60.5x28 mm

## Inductive Sensors

DC 4-wire  
Block style housings  
s<sub>n</sub> 7 mm

**74x60.5x28 mm**  
flush  
**7 mm**  
0...5.7 mm



BES 516-161-H3-L

BES 516-160-H3-L

24 V DC  
10...30 V DC  
≤ 1.5 V  
75 V DC  
400 mA  
≤ 30 mA  
≤ 130 µA  
yes  
no  
≤ 1 µF  
≤ 5 %  
-25...+70 °C  
300 Hz  
DC 13  
yes

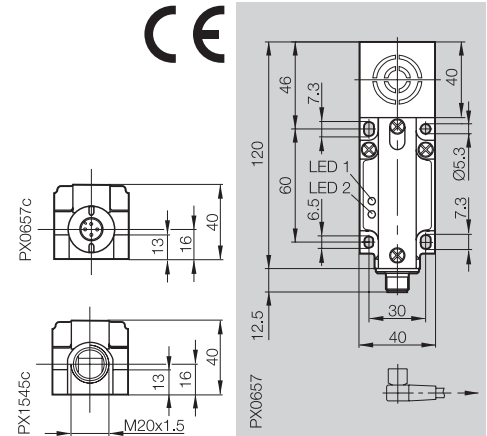
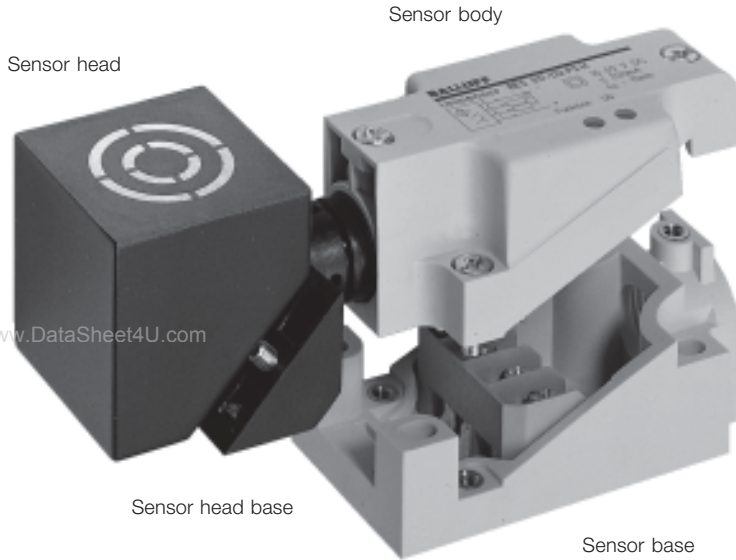
IP 67

Anodized GD-Al  
PA 12  
Screw terminals  
to 2.5 mm<sup>2</sup>

For additional multiple and single position limit switches in main catalog "The Mechanical Line", on CD-ROM or online!



Housing size	<b>40x40x120 mm</b> Unisensor
Mounting (see notes starting p. 1.0.11)	flush
Rated operating distance $s_n$	<b>15 mm</b>
Assured operating distance $s_a$	0...12.2 mm



### The Unisensor – multiple uses

- The Unisensor is made up of three modular components: sensor head (including sensor head base), sensor body and sensor base.
- Easily removable pin contacts join sensor head and sensor body, that means easy interchange of the modules without wiring.
- Sensor base with wiring terminals, self-lifting pressure plates and ample wiring room.
- Sensor head rotatable in 5 different positions for easy adaption to any application (see installation drawings).
- Plastic housing of PBT.
- DIN EN 60947-5-2 mounting dimensions.
- LED for supply voltage.
- LED for function indication
- Also available in special configuration for the automotive industry
- Cable fitting not included.

- In the complementary version, output terminals 2 or 4 can be wired to configure the switch as normally-closed (terminal 2) or normally-open (terminal 4). Connecting both terminals allows the switch to be used as both (see connection diagram ③ or ⑥).

### Positioning the sensor head

- Loosen the two holding screws on sensor head
- Rotate sensor head 180°
- tighten holding screws

### Rotating the sensor head

- Loosen holding screws
- Rotate the sensor head (complete with sensor head base) into the required position (range 270°)
- Tighten holding screws
- Sensor head is protected against over-rotation

PNP complementary ③ BES 517-132-M3-H-S 4

NPN complementary ⑥

Rated operational voltage $U_o$	24 V DC
Supply voltage $U_B$	10...55 V DC
Voltage drop $U_d$ at $I_o$	≤ 2.5 V
Rated insulation voltage $U_i$	250 V AC
Rated operational current $I_o$	200 mA
No-load supply current $I_o$ max.	≤ 20 mA
Off-state current $I_l$	≤ 80 µA
Polarity reversal protected	yes
Short circuit protected	yes
Permissible load capacitance	≤ 1 µF

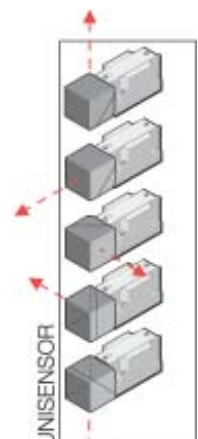
Repeat accuracy R	≤ 5 %
Ambient temperature range $T_a$	-25...+70 °C
Frequency of operating cycles f	100 Hz
Utilization category	DC 13
Function/power indicator	yes/yes

Degree of protection per IEC 60529	IP 67
Insulation class	□
Housing material	PBT
Material of sensing face	PBT
Connection	Connector
max. wire cross-section	

Recommended connector	BKS- 19/BKS- 20
possible mounting options	Fig. 1 to 5

③ Wiring diagrams see page 1.0.6

Switching distance ■■ see page 1.0.10



# 40×40×120 mm

## Inductive Sensors

DC 4-wire  
Block style housings  
s<sub>n</sub> 15 mm, 20 mm, 30 mm

1.1

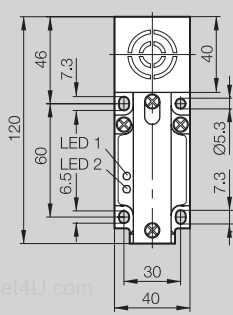
**40×40×120 mm Unisensor**  
flush  
**15 mm**  
0...12.2 mm

**40×40×120 mm Unisensor**  
flush  
**20 mm**  
0...16.2 mm

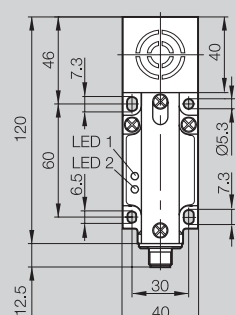
**40×40×120 mm Unisensor**  
flush  
**20 mm**  
0...16.2 mm

**40×40×120 mm Unisensor**  
non-flush  
**30 mm**  
0...24.3 mm

**40×40×120 mm Unisensor**  
non-flush  
**30 mm**  
0...24.3 mm

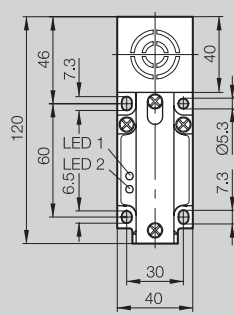


PX1545



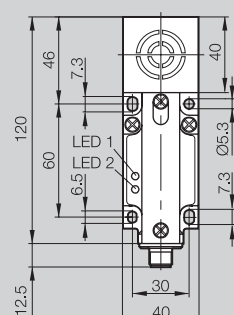
PX0657

Switching distance ■■

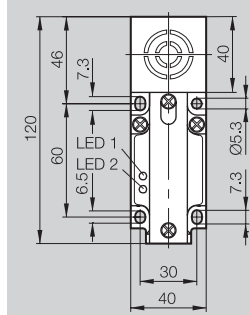


PX1545

Switching distance ■■



PX0657



PX1545

BES 517-132-M3-H

BES 517-132-M6-H-S 4

BES 517-132-M6-H

BES 517-132-M5-H-S 4

BES 517-132-M5-H

BES 517-134-M3-H

BES 517-134-M6-H-S 4

BES 517-134-M6-H

BES 517-134-M5-H-S 4

BES 517-134-M5-H

24 V DC

24 V DC

24 V DC

24 V DC

24 V DC

10...55 V DC

10...55 V DC

10...55 V DC

10...55 V DC

10...55 V DC

≤ 2.5 V

≤ 2.5 V

≤ 2.5 V

≤ 2.5 V

≤ 2.5 V

250 V AC

250 V AC

250 V AC

250 V AC

250 V AC

200 mA

200 mA

200 mA

200 mA

200 mA

≤ 20 mA

≤ 20 mA

≤ 20 mA

≤ 20 mA

≤ 20 mA

≤ 80 μA

≤ 80 μA

≤ 80 μA

≤ 80 μA

≤ 80 μA

yes

yes

yes

yes

yes

yes

yes

yes

yes

yes

≤ 1 μF

≤ 1 μF

≤ 1 μF

≤ 1 μF

≤ 1 μF

≤ 5 %

≤ 5 %

≤ 5 %

≤ 5 %

≤ 5 %

-25...+70 °C

-25...+70 °C

-25...+70 °C

-25...+70 °C

-25...+70 °C

100 Hz

50 Hz

50 Hz

60 Hz

60 Hz

DC 13

DC 13

DC 13

DC 13

DC 13

yes/yes

yes/yes

yes/yes

yes/yes

yes/yes

IP 67

IP 67

IP 67

IP 67

IP 67



PBT

PBT

PBT

PBT

PBT

PBT

PBT

PBT

PBT

PBT

Screw terminals  
to 2.5 mm<sup>2</sup>

Connector

Screw terminals  
to 2.5 mm<sup>2</sup>

Connector

Screw terminals  
to 2.5 mm<sup>2</sup>

Fig. 1 to 5

BKS-\_ 19/BKS-\_ 20

Fig. 1 to 5

Fig. 1 to 5

BKS-\_ 19/BKS-\_ 20

Fig. 4 and 5

Fig. 4 and 5

### Mounting options



Fig. 1

Fig. 2

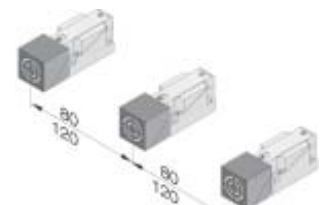
Fig. 3

Fig. 4

Fig. 5

### Row mounting

flush 80 mm  
non-flush 120 mm



6

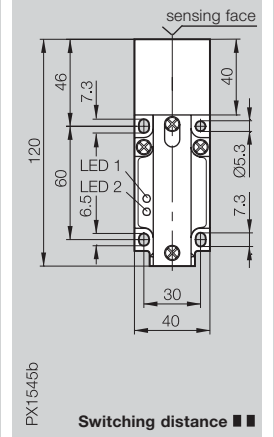
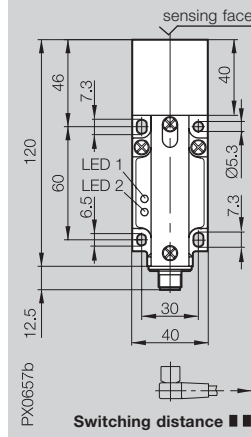
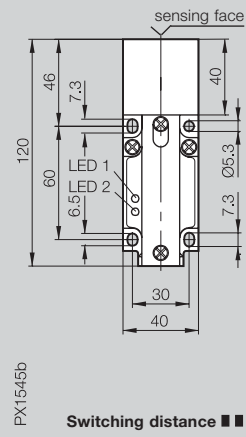
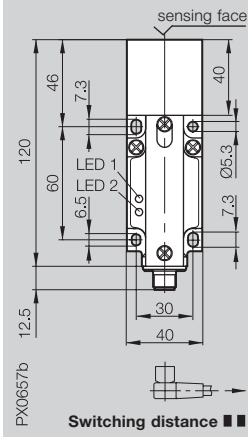
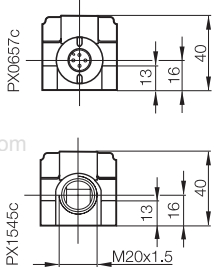
Connectors,  
mounting  
plate ...  
page 6.2 ...

# Inductive Sensors

DC 3-/4-wire  
Block style housings  
s<sub>n</sub> 25/40 mm, 40 mm

## 40x40x120 mm

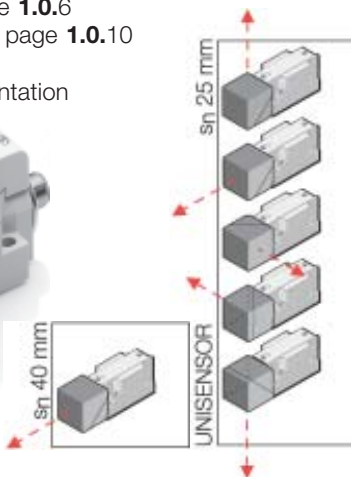
Housing size	<b>40x40x120 mm Unisensor</b>	<b>40x40x120 mm Unisensor</b>	<b>40x40x120 mm Unisensor</b>	<b>40x40x120 mm Unisensor</b>
Mounting (see notes starting p. 1.0.11)	non-flush	non-flush	non-flush	non-flush
Rated operating distance s <sub>n</sub>	<b>programmable 25/40 mm</b>	<b>programmable 25/40 mm</b>	<b>40 mm</b>	<b>40 mm</b>
Assured operating distance s <sub>a</sub>	0...20.3 mm/0...32.4 mm	0...20.3 mm/0...32.4 mm	0...32.4 mm	0...32.4 mm



PNP	NO ①	BES 517-385-V-C-S 4	BES 517-385-MV-C		
	complementary ③			BES 517-132-M7-H-S 4	BES 517-132-M7-H
NPN	complementary ⑥				
Rated operational voltage U <sub>e</sub>	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Supply voltage U <sub>B</sub>	10...30 V DC	10...30 V DC	10...30 V DC	10...55 V DC	10...55 V DC
Voltage drop U <sub>d</sub> at I <sub>e</sub>	≤ 3.5 V	≤ 3.5 V	≤ 3.5 V	≤ 2.5 V	≤ 2.5 V
Rated insulation voltage U <sub>i</sub>	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
Rated operational current I <sub>e</sub>	200 mA	200 mA	200 mA	200 mA	200 mA
No-load supply current I <sub>0</sub> max.	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 20 mA	≤ 20 mA
Off-state current I <sub>f</sub>	≤ 80 μA	≤ 80 μA	≤ 80 μA	≤ 80 μA	≤ 80 μA
Polarity reversal protected	yes	yes	yes	yes	yes
Short circuit protected	yes	yes	yes	yes	yes
Permissible load capacitance	≤ 1 μF	≤ 1 μF	≤ 1 μF	≤ 1 μF	≤ 1 μF
Repeat accuracy R	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %	≤ 5 %
Ambient temperature range T <sub>a</sub>	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
Frequency of operating cycles f	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
Utilization category	DC 13	DC 13	DC 13	DC 13	DC 13
Function/power indicator	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67	IP 67
Insulation class	□	□	□	□	□
Housing material	PBT	PBT	PBT	PBT	PBT
Material of sensing face	PBT	PBT	PBT	PBT	PBT
Connection	Connector	Screw terminals	Connector	Screw terminals	Screw terminals
max. wire cross-section		to 2.5 mm <sup>2</sup>		to 2.5 mm <sup>2</sup>	to 2.5 mm <sup>2</sup>
Recommended connector	BKS- _19/BKS- _20		BKS- _19/BKS- _20		
possible mounting options	s <sub>n</sub> 40 mm Fig. 1 and 2 s <sub>n</sub> 25 mm Fig. 1 to 3	s <sub>n</sub> 40 mm Fig. 1 and 2 s <sub>n</sub> 25 mm Fig. 1 to 3	Fig. 1 and 2	Fig. 1 and 2	Fig. 1 and 2

① Wiring diagrams see page 1.0.6  
Switching distance ■ ■ see page 1.0.10

Connector orientation



### Mounting options

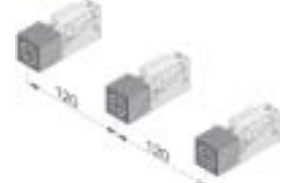


Fig. 1

Fig. 2

Fig. 3

### Row mounting



# 80×80×40 mm

# Inductive Sensors

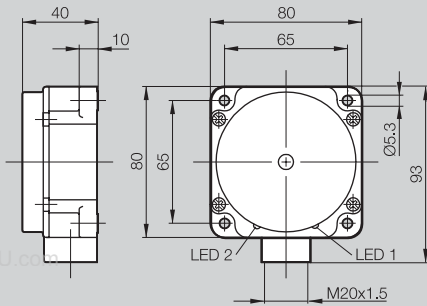
DC 4-wire  
Block style housings  
s<sub>n</sub> 40 mm, 50 mm

**80×80×40 mm** Maxisensor  
flush  
**40 mm**  
0...32.4 mm

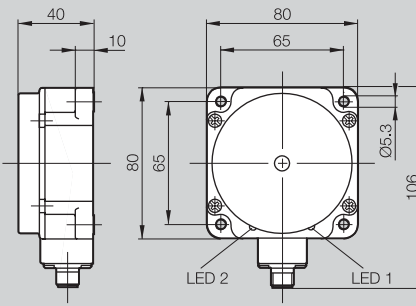
**80×80×40 mm** Maxisensor  
non-flush  
**50 mm**  
0...40.5 mm

**80×80×40 mm** Maxisensor  
flush  
**40 mm**  
0...32.4 mm

**80×80×40 mm** Maxisensor  
non-flush  
**50 mm**  
0...40.5 mm



PX1573



PX0656a

1.1

BES 517-139-M4-H

BES 517-139-M5-H

BES 517-139-M4-H-S 4

BES 517-139-M5-H-S 4

BES 517-140-M5-H

BES 517-140-M5-H-S 4

24 V DC  
10...55 V DC  
≤ 2.5 V  
250 V AC  
200 mA  
≤ 15 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

24 V DC  
10...55 V DC  
≤ 2.5 V  
250 V AC  
200 mA  
≤ 15 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

24 V DC  
10...55 V DC  
≤ 2.5 V  
250 V AC  
200 mA  
≤ 15 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

24 V DC  
10...55 V DC  
≤ 2.5 V  
250 V AC  
200 mA  
≤ 15 mA  
≤ 80 µA  
yes  
yes  
≤ 1 µF

≤ 5 %  
-25...+70 °C  
50 Hz  
DC 13  
yes/yes

≤ 5 %  
-25...+70 °C  
100 Hz  
DC 13  
yes/yes

≤ 5 %  
-25...+70 °C  
50 Hz  
DC 13  
yes/yes

≤ 5 %  
-25...+70 °C  
100 Hz  
DC 13  
yes/yes

IP 67

IP 67

IP 67

IP 67



PBT

PBT

PBT

PBT

PBT

PBT

PBT

PBT

Screw terminals  
to 2.5 mm<sup>2</sup>

Screw terminals  
to 2.5 mm<sup>2</sup>

Connector

Connector

Fig. 1 to 4

Fig. 4

BKS- 19/BKS- 20  
Fig. 1 to 4

BKS- 19/BKS- 20  
Fig. 4

## Mounting in steel



Fig. 1

## Mounting in non-ferrous metals



Fig. 2

## Mounting in steel/ non-ferrous metals

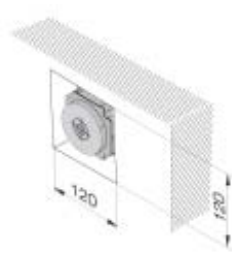


Fig. 3

## Mounting on steel/ non-ferrous metals



Fig. 4



6

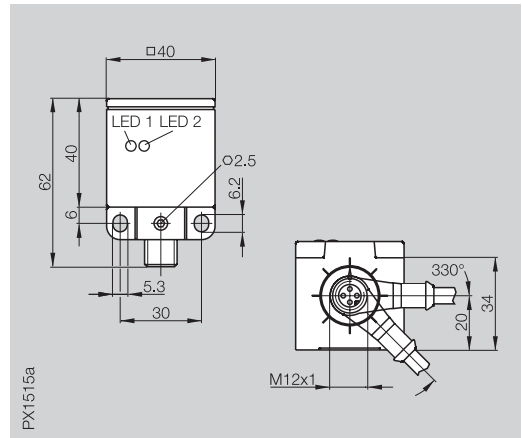
Connectors,  
mounting  
plate ...  
page 6.2 ...

# Inductive Sensors

DC 4-wire  
Block style housings  
 $s_n$  20 mm

## 40x40x62 mm

Housing size	40x40x62 mm Unicomcompact
Mounting (see notes starting p. 1.0.11)	flush
Rated operating distance $s_n$	20 mm
Assured operating distance $s_a$	0...16.2 mm

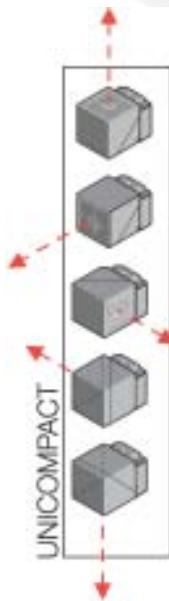


www.DataSheet4U.com

### Unicomcompact

The flexible sensor for versatile application in machine and systems building and wherever space is at a premium.

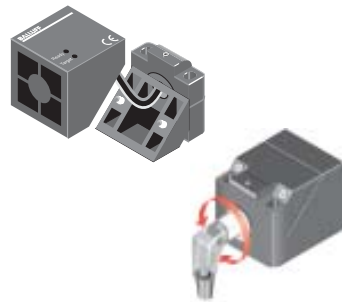
The connector can be oriented in all directions, the cable is always where it needs to be.



PNP	complementary ③
NPN	complementary ⑥
Rated operational voltage $U_o$	24 V DC
Supply voltage $U_B$	10...30 V DC
Voltage drop $U_d$ at $I_o$	≤ 2.5 V
Rated insulation voltage $U_i$	250 V AC
Rated operational current $I_o$	200 mA
No-load supply current $I_o$ max.	≤ 20 mA
Off-state current $I_r$	≤ 80 µA
Polarity reversal protected	yes
Short circuit protected	yes
Permissible load capacitance	≤ 1 µF
Repeat accuracy R	≤ 5 %
Ambient temperature range $T_a$	-25...+70 °C
Frequency of operating cycles f	50 Hz
Utilization category	DC 13
Function/power indicator	yes/yes
Degree of protection per IEC 60529	IP 67
Insulation class	□
Housing material	PBT
Material of sensing face	PBT
Connection	Connector
Approval	cULus
Recommended connector	BKS-_ 19/BKS-_ 20

BES Q40KFU-PAC20B-S04G

③ Wiring diagrams see page 1.0.6



### Mounting socket BES Q40-HW-2

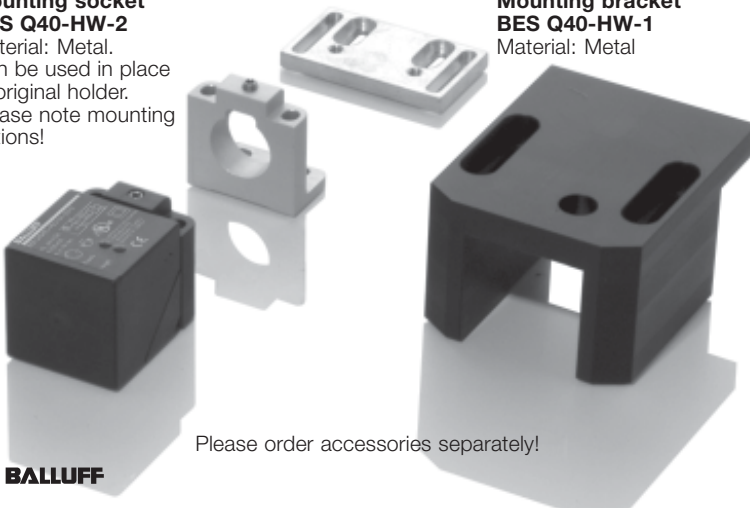
Material: Metal.  
Can be used in place of original holder.  
Please note mounting options!

### Mounting bracket BES Q40-HW-1

Material: Metal

### Protective cover BES Q40-SH-2

Material: PA 6



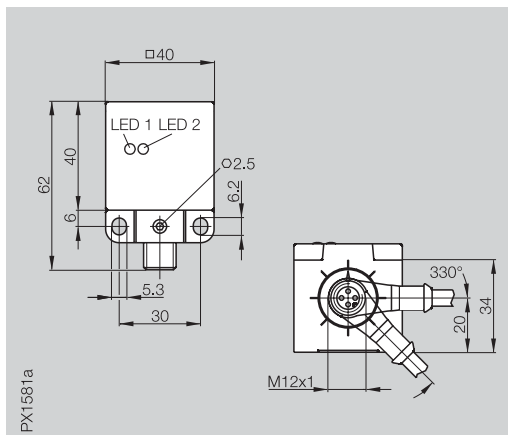
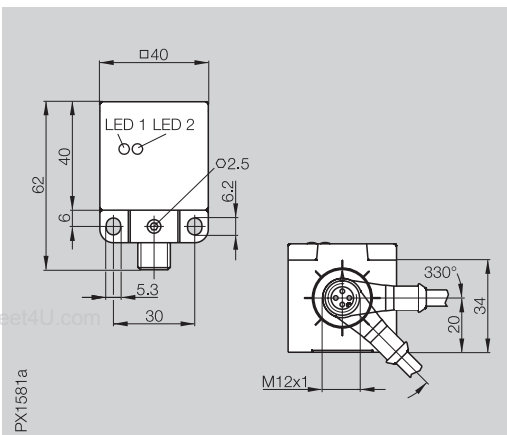
Please order accessories separately!

# 40x40x62 mm Inductive Sensors

DC 4-wire  
Block style housings  
s<sub>n</sub> 25 mm, 30 mm

**40x40x62 mm** Unicomcompact  
non-flush  
**25 mm**  
0...20.3 mm

**40x40x62 mm** Unicomcompact  
non-flush  
**30 mm**  
0...24.3 mm



1.1

BES Q40KFU-PAC30F-S04G

BES Q40KFU-NAC25F-S04G

24 V DC  
10...30 V DC  
≤ 2.5 V  
250 V AC  
200 mA  
≤ 20 mA  
≤ 80 μA  
yes  
yes  
≤ 1 μF

24 V DC  
10...30 V DC  
≤ 2.5 V  
250 V AC  
200 mA  
≤ 20 mA  
≤ 80 μA  
yes  
yes  
≤ 1 μF

≤ 5 %  
-25...+70 °C  
50 Hz  
DC 13  
yes/yes

≤ 5 %  
-25...+70 °C  
50 Hz  
DC 13  
yes/yes

IP 67  
□  
PBT  
PBT  
Connector

IP 67  
□  
PBT  
PBT  
Connector

cULus  
BKS-\_ 19/BKS-\_ 20

cULus  
BKS-\_ 19/BKS-\_ 20

## Permissible mounting options

Rated operating distance s<sub>n</sub>

20 mm  
25 mm  
30 mm

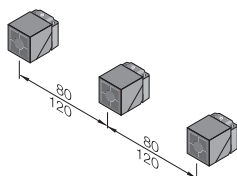
attached with  
original holder (plastic)  
holder BES Q40-HW-2 (metal)  
original holder (plastic)  
holder BES Q40-HW-2 (metal)  
original holder (plastic)  
holder BES Q40-HW-2 (metal)

permissible

20 mm	yes	yes	yes	yes	yes	yes	yes	yes	yes
25 mm	yes	yes	yes	yes	yes	yes	yes	yes	yes
30 mm	no	no	no	yes	no	yes	yes	yes	yes
	no	no	no	yes	no	yes	yes	yes	yes
	no	no	no	yes	no	yes	yes	no	no

## Row mounting

flush 80 mm  
non-flush 120 mm



6

Connectors,  
holders ...  
page 6.2 ...