










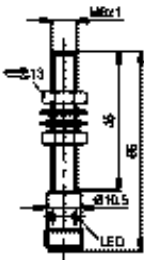
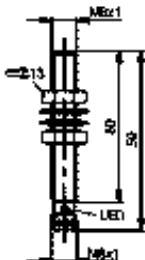
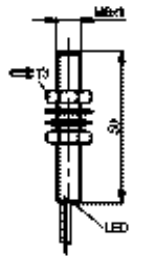
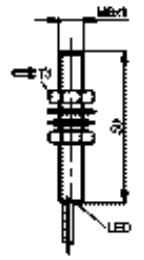
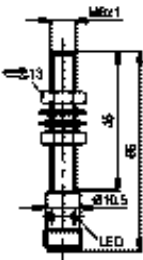
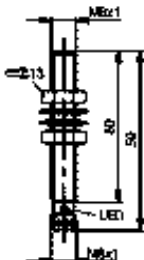





# Blackline

The New Industry Standard

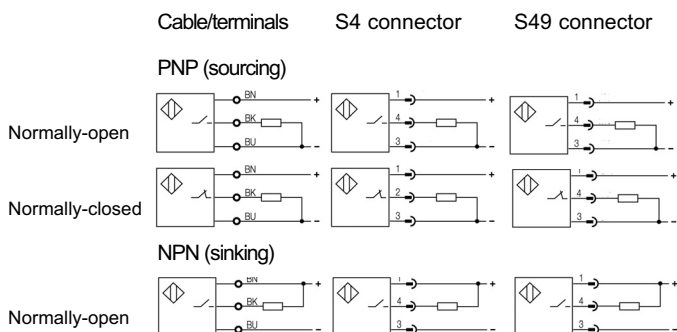
The new generation 'Industry Standard' specification sensor ideal for standard applications, Blackline is available in a variety of metal housings with integral cable or connector.

With its ***Lifetime Guarantee***, you can rely on Blackline sensors for risk free non-contact sensing solutions,

# Blackline Inductive Sensors

	 1 xSn	 1 xSn	 1 xSn	 2 xSn	 2 xSn	 2 xSn
Housing size	M8x1	M8x1	M8x1	M8x1	M8x1	M8x1
Mounting	flush	flush	flush	quasi-flush*	quasi-flush*	quasi-flush*
Rated operating distance $s_n$	1.5mm	1.5mm	1.5mm	2mm	2mm	2mm
Assured operating distance $s_a$	0...1.2mm	0...1.2mm	0...1.2mm	0...1.6mm	0...1.6mm	0...1.6mm
 Optical Setup	 Quick Change	 Extended Range				
						
	PX1634	PX1634	PX1671	PX1671	PX1634	PX1634
<b>PNP</b> Normally-open N/O	BES M08MH1-PSC15B-S04G	BES M08MI-PSC15BS49G	BES M08MI-PSC15B-BV	BES M08MI-PSC20B-BV	BES M08MH1-PSC20B-S04G	BES M08MI-PSC20B-S49G
<b>PNP</b> Normally-closed N/C	BES M08MH1-POC15B-S04G		BES M08MI-POC15B-BV			
<b>NPN</b> Normally-open N/O	BES M08MH1-NSC15B-S04G	BES M08MI-NSC15B-S49G	BES M08MI-NSC15B-BV	BES M08MI-NSC20B-BV	BES-M08MH1-NSC20B-S04G	BES-M08MI-NSC20B-S49G
Rated operational voltage $U_e$	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Supply voltage $U_B$	12...30 V DC	12...30 V DC	12...30 V DC	12...30 V DC	12...30 V DC	12...30 V DC
Voltage drop $U_d$ at $I_e$	$\leq 3$ V	$\leq 3$ V	$\leq 3$ V	$\leq 2$ V	$\leq 2$ V	$\leq 3$ V
Rated insulation voltage $U_i$	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
Rated operational current $I_e$	100 mA	100 mA	100 mA	100 mA	100 mA	100 mA
No-load supply current $I_o$ max	$\leq 12$ mA	$\leq 10$ mA	$\leq 12$ mA	$\leq 10$ mA	$\leq 10$ mA	$\leq 10$ mA
Off-state current $I_r$	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A
Protected against polarity reversal	yes	yes	yes	yes	yes	yes
Short circuit protected	yes	yes	yes	yes	yes	yes
Load capacity	$\leq 0.5$ $\mu$ F	$\leq 0.5$ $\mu$ F	$\leq 0.5$ $\mu$ F	$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F	$\leq 0.5$ $\mu$ F
Repeat accuracy R	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %
Ambient temperature range $T_a$	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
Frequency of operating cycles f	600 Hz	1000 Hz	600 Hz	700 Hz	600 Hz	700 Hz
Utilization categories	DC 13	DC 13	DC 13	DC 13	DC 13	DC 13
Function indication	yes	yes	yes	yes	yes	yes
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
Insulation Class						
Housing material	CuZn nickel plated	CuZn nickel plated	CuZn nickel plated	CuZn nickel plated	CuZn nickel plated	CuZn nickel plated
Material of sensing face	PBT	PBT	PBT	PBT	PBT	PBT
Connection	connector	connector	cable	cable	cable	cable
No. of wires x conductor cross section			3 x 0.14mm <sup>2</sup>	3 x 0.14mm <sup>2</sup>	3 x 0.14mm <sup>2</sup>	3 x 0.14mm <sup>2</sup>
Approval	cULus	cULus	cULus	cULus	cULus	cULus
Recommended connector	BK-804000E03M050	BK-403000E03M020			BK-804000E03M050	BK-403000E03M030

## Connection Diagrams



## Mounting Bracket Examples



For a comprehensive selection of mounting brackets refer to page 46



**Optical  
Setup Aid**



**Quick  
Change**



**Extended  
Range**

**BALLUFF**  
Sensors Worldwide



M12x1

flush

2mm

0...1.6mm

M12x1

flush

2mm

0...1.6mm



M12x1

quasi-flush\*

4mm

0...3.2mm



M12x1

quasi-flush\*

4 mm

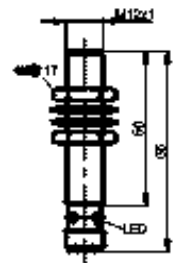
0...3.2mm

Housing size

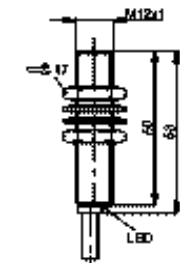
Mounting

Rated operating distance  $s_n$

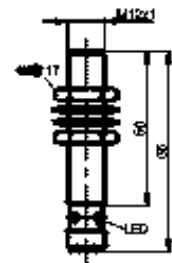
Assured operating distance  $s_a$



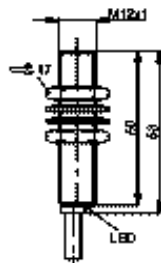
PN1437



PN1423



PN1437



PN1423

BES M12MI-PSC20B-S04G

BES M12MI-PSC20B-BV

BES M12MI-PSC40B-S04G

BES M12MI-PSC40B-BV

PNP Normally-open N/O

PNP Normally-closed N/C

BES-M12MI-NSC20B-S04G

BES-M12MI-NSC20B-BV

BES-M12MI-NSC40B-S04G

BES M12MI-NSC40B-BV

NPN Normally-open N/O

24 V DC

24 V DC

24 V DC

24 V DC

Rated operational voltage  $U_e$

12...30 V DC

12...30 V DC

12...30 V DC

12...30 V DC

Supply voltage  $U_B$

< 2.5 V

< 2.5 V

< 2.5 V

< 2.5 V

Voltage drop  $U_d$  at  $I_e$

750 V AC

250 V AC

250 V AC

250 V AC

Rated insulation voltage  $U_i$

200 mA

200 mA

200 mA

200 mA

Rated operational current  $I_e$

< 15 mA

< 15 mA

< 15 mA

< 15 mA

No-load supply current  $I_o$  max

< 20  $\mu$ A

< 20  $\mu$ A

< 20  $\mu$ A

< 20  $\mu$ A

Off-state current  $I_r$

yes

yes

yes

yes

Protected against polarity reversal

yes

yes

yes

yes

Short circuit protected

< 1  $\mu$ F

< 1  $\mu$ F

< 1  $\mu$ F

< 1  $\mu$ F

Load capacity

< 5 %

< 5 %

< 5 %

< 5 %

Repeat accuracy R

-25...+70 °C

-25...+70 °C

-25...+70 °C

-25...+70 °C

Ambient temperature range  $T_a$

1200 Hz

1200 Hz

300 Hz

300 Hz

Frequency of operating cycles f

DC 13

DC 13

DC 13

DC 13

Utilization categories

yes

yes

yes

yes

Function indication

IP 68 acc BWN Pr20

IP 68 acc BWN Pr20

IP 68 acc BWN Pr20

IP 68 acc BWN Pr20

Degree of protection per IEC 60529

☐

☐

☐

☐

Insulation Class

CuZn nickel plated

CuZn nickel plated

CuZn nickel plated

CuZn nickel plated

Housing material

PA12

PA12

LCP

LCP

Material of sensing face

connector

cable

connector

cable

Connection

cULus

3 x 0.34mm<sup>2</sup>  
cULus

cULus

3 x 0.34mm<sup>2</sup>  
cULus

No. of wires x conductor cross section

BK-804000E03M050

BK-804000E03M050

cULus

Approval  
Recommended connector

## Connector Cable Options

	S49 - M8 3 pole, 3 wire	S4 - M12 4 pole, 4 wire
Straight	3m BK-403000E03M030	BK-804000E03M030
	5m BK-403000E03M050	BK-804000E03M050
	10m BK-403000E03M100	BK-804000E03M100
90°	3m BK-403001E03M030	BK-804001E03M030
	5m BK-403001E03M050	BK-804001E03M050
	10m BK-403001E03M100	BK-804001E03M100

Replace E03 in part no with P03 for PUR cable - chemical resistant

Replace E03 in part no with S20 for SJTO braided cable - welding spec.

(Note: Standard 4 wire M12 connectors can be used for both normally open and normally closed sensors. 3 wire M12 connectors are available if required for normally open sensors only.








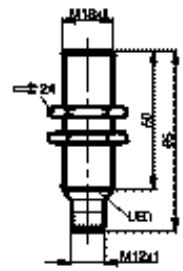
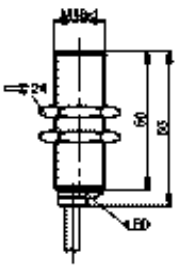
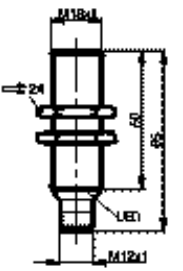
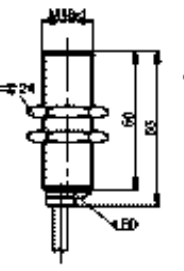
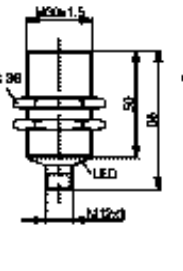
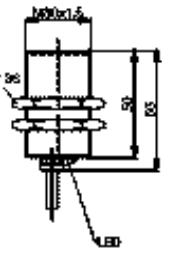







### \* Quasi-flush Mountable Proximity Switches

Require a space behind the active surface which is free of conducting materials. Under this condition the specified switching distance is available without limitation. Dimension "x" (see fig.) indicates the shortest distance between the active surface and the conducting material behind it to achieve the specified switching distance.

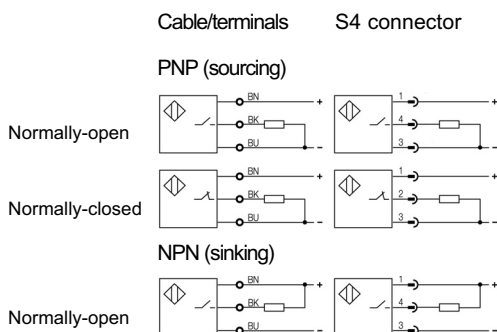
This is a selection of our most popular items. To select from our full product range call us for our latest comprehensive catalogue 'The Sensor Line' (catalogue or CD)



# Blackline Inductive Sensors

						
Housing size	<b>M18x1</b>	<b>M18x1</b>	<b>M18x1</b>	<b>M18x1</b>	<b>M30x 1.5</b>	<b>M30x 1.5</b>
Mounting	flush	flush	quasi-flush*	quasi-flush*	flush	flush
Rated operating distance $s_n$	<b>5 mm</b>	<b>5 mm</b>	<b>8 mm</b>	<b>8 mm</b>	<b>10 mm</b>	<b>10 mm</b>
Assured operating distance $s_a$	0...4 mm	0...4.1 mm	0...6.5 mm	0...6.5 mm	0...8.1 mm	0...8.1 mm
 <b>Optical Setup</b>						
 <b>Quick Change</b>						
 <b>Extended Range</b>						
<b>PNP</b> Normally-open N/O	BES M18MI-PSC50B-S04K	BES M18MI-PSC50B-BV	BES M18MI-PSC80B-S04K	BES M18MI-PSC80B-BV	BES M30MI-PSC10B-S04K	BES M30MI-PSC10B-BV
<b>PNP</b> Normally-closed N/C		BESM18MI-POC50B-BV			BES M30MI-POC10B-S04K	
<b>NPN</b> Normally-open N/O	BES M18MI-NSC50B-S04K	BES M18MI-NSC50B-BV	BES M18MI-NSC80B-S04K	BES M18MI-NSC80B-BV	BES M30MI-NSC10B-S04K	BES M30MI-NSC10B-BV
Rated operational voltage $U_e$	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Supply voltage $U_B$	12...30 V DC	12...30 V DC	12...30 V DC	12...30 V DC	12...30 V DC	12...30 V DC
Voltage drop $U_d$ at $I_e$	$\leq 2.5$ V	$\leq 2.5$ V	$\leq 2.5$ V	$\leq 2.5$ V	$\leq 2.5$ V	$\leq 2.5$ V
Rated insulation voltage $U_i$	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
Rated operational current $I_e$	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
No-load supply current $I_o$ max	$\leq 15$ mA	$\leq 15$ mA	$\leq 15$ mA	$\leq 15$ mA	$\leq 10$ mA	$\leq 10$ mA
Off-state current $I_r$	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A	$\leq 20$ $\mu$ A
Protected against polarity reversal	yes	yes	yes	yes	yes	yes
Short circuit protected	yes	yes	yes	yes	yes	yes
Load capacity	$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F	$\leq 1$ $\mu$ F
Repeat accuracy R	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %	$\leq 5$ %
Ambient temperature range $T_a$	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
Frequency of operating cycles f	700 Hz	700 Hz	150 Hz	150 Hz	400 Hz	400 Hz
Utilization categories	DC 13	DC 13	DC 13	DC 13	DC 13	DC 13
Function indication	yes	yes	yes	yes	yes	yes
Degree of protection per IEC 60529	IP 68 acc BWN Pr20	IP 68 acc BWN Pr20	IP 68 acc BWN Pr20	IP 68 acc BWN Pr20	IP 68 acc BWN Pr20	IP 68 acc BWN Pr20
Insulation Class						
Housing material	CuZn nickel plated/ PA6 transparent	CuZn nickel plated	CuZn nickel plated/ PA6 transparent	CuZn nickel plated	CuZn nickel plated	CuZn nickel plated
Material of sensing face	PA 12	PA 12	PA12	PA12	PA12	PA12
Connection	connector	cable	connector	cable	connector	cable
No. of wires x conductor cross section		3 x 0.34mm <sup>2</sup>		3 x 0.34mm <sup>2</sup>		3 x 0.34mm <sup>2</sup>
Approval	cULus	cULus		cULus		cULus
Recommended connector	BK-804000E03M050		BK-804000E03M050		BK-804000E03M050	

## Connection Diagrams



## Mounting Bracket Examples



For a comprehensive selection of mounting brackets refer to page 46