

# IBS06 3-wire DC



## Miniaturized proximity inductive sensors



### Benefits

- **A complete family.** Available in Ø6.5 mm male thread robust stainless steel housings with an operating distance of 2 mm.
- **Easy to install.** The user can choose between short and long body housings in 2 m PVC cable or M8-disconnect plug versions.
- **High precision.** The onboard advanced microcontroller ensures better stability with respect to environmental influences, with highly repeatable measurements between -25 and +80°C.
- **Integrated diagnostic function** with flashing LED in the event of a short circuit or overload
- **Easy customization to specific OEM requests:** different cable lengths and materials, special labelling, customized pig-tail solutions with special cables and connectors are possible on request.

### Description

IBS06 series represents the optimal solution for industrial automation equipment in applications where space is limited, but long switching distance is needed, including tool-selection and textile machines. The advanced electronics is encapsulated in a robust stainless steel housing. The availability of the M8-plug and 2m-PVC cable connection in short or long housing construction allows flexible mounting. Output is open collector NPN or PNP transistors.

### Applications

- Non contact detection of metal objects in general position-sensing and presence-sensing in industrial applications
- Particularly suitable for rotational speed monitoring thanks to the high operating frequency

## References

### Order code

 I B S 06  F 02

Enter the code option instead of

Code	Option	Description
I	-	Inductive sensor
B	-	Cylindrical housing with smooth barrel
S	-	Stainless steel housing
06	-	Ø6.5 mm housing
<input type="checkbox"/>	S	Short housing
	L	Long housing
F	-	Flush
02	-	Sensing distance 2mm
<input type="checkbox"/>	NO	NPN – normally open output
	NC	NPN – normally closed output
	PO	PNP – normally open output
	PC	PNP – normally closed output
<input type="checkbox"/>	M5	M8 plug
	(null)	2 m PVC cable

Additional characters can be used for customized versions.

### Selection guide

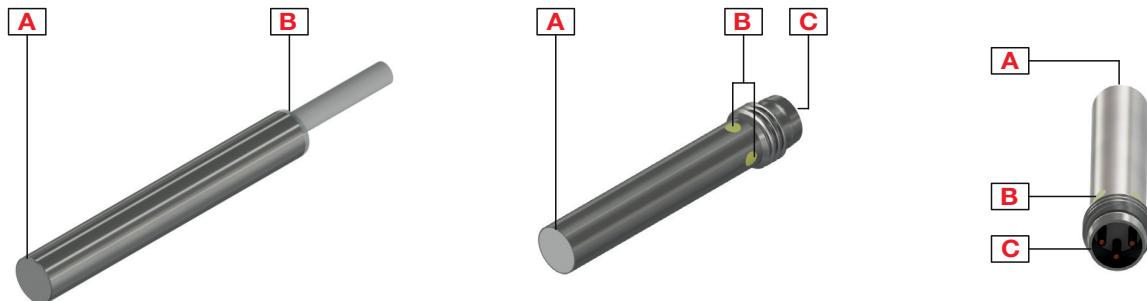
#### Extended range, short housing

Con- nec- tion	Rated operating distance Sn	Dete- ction princi- ple	Ordering no. NPN, Normally open	Ordering no. PNP, Normally open	Ordering no. NPN, Normally closed	Ordering no. PNP, Normally closed
Cable	2 mm	Flush	IBS06SF02NO	IBS06SF02PO	IBS06SF02NC	IBS06SF02PC
Plug			IBS06SF02NOM5	IBS06SF02POM5	IBS06SF02NCM5	IBS06SF02PCM5

#### Extended range, long housing

Con- nec- tion	Rated operating distance Sn	Dete- ction princi- ple	Ordering no. NPN, Normally open	Ordering no. PNP, Normally open	Ordering no. NPN, Normally closed	Ordering no. PNP, Normally closed
Cable	2 mm	Flush	IBS06LF02NO	IBS06LF02PO	IBS06LF02NC	IBS06LF02PC
Plug			IBS06LF02NOM5	IBS06LF02POM5	IBS06LF02NCM5	IBS06LF02PCM5

## Structure



Element	Component	Function
A	Sensing face	Flush
B	LED	Yellow LED: Output flashing: short circuit or overload indication
C	M8, 3 pin, male connector	For plug versions only

# Sensing

## Detection

<b>Rated operating distance <math>S_n</math></b>	Extended range: 2 mm flush
<b>Reference target</b>	The operating distance is measured according to IEC 60947-5-2, using a standard target moving axially. This target is square shape 1 mm thickness, made of steel e.g. type Fe 360 as defined in ISO 630 and it shall be of the rolled finish. The length of the side of the square is equal to – the diameter of the circle inscribed on the active surface of the sensing face, or – three times the rated operating distance $S_n$ whichever is greater
<b>Assured operating sensing distance (<math>S_a</math>)</b>	$0 \leq S_a \leq 0.81 \times S_n$ (e.g. with $S_n$ of 2 mm, $S_a$ is 0 ... 1.62 mm)
<b>Effective operating distance (<math>S_r</math>)</b>	$0.9 \times S_n \leq S_r \leq 1.1 \times S_n$
<b>Usable operating distance (<math>S_u</math>)</b>	$0.9 \times S_r \leq S_u \leq 1.1 \times S_r$
<b>Temperature drift</b>	$\leq \pm 10\%$
<b>Hysteresis (H)</b>	1...20%

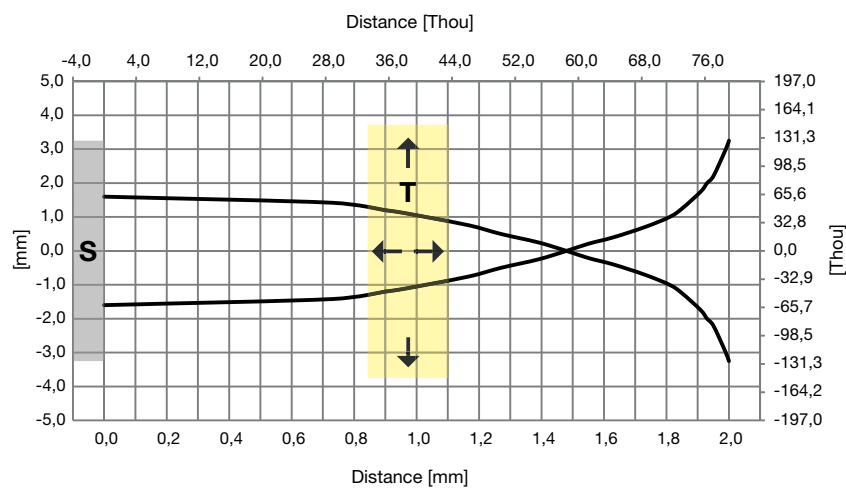
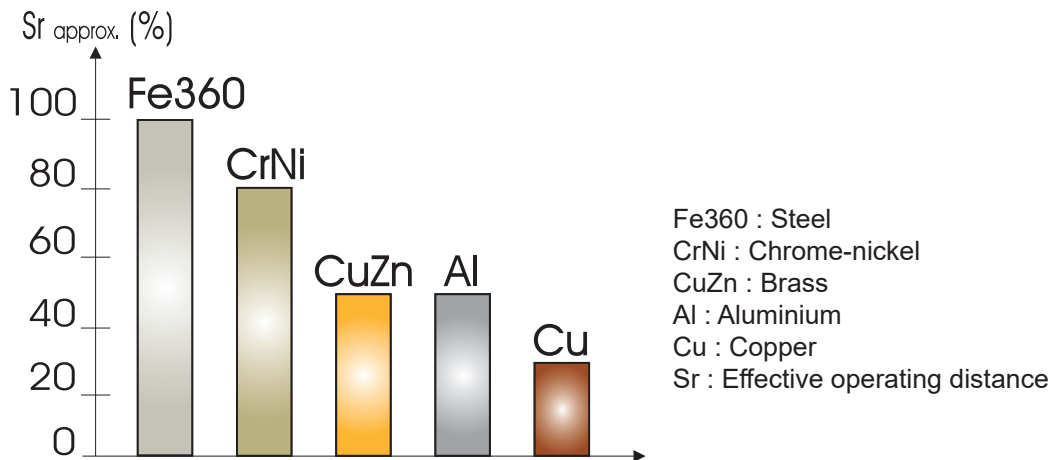


Fig. 1 Flush, 2 mm

## Correction factors

The specific operating distance  $S_n$  refers to defined measuring conditions. The following data have to be considered as general guidelines.



**Fig. 2** The rated operating distance is reduced by the use of metals and alloys other than Fe360. The most important reduction factors for inductive proximity sensors are shown in the figure.

### Accuracy

Repeat accuracy (R)	≤ 5%
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## Features

### Power Supply

Rated operational voltage ( $U_b$ )	10 to 36 VDC (ripple included)
Ripple ( $U_{rpp}$ )	≤ 10%
No load supply current ( $I_o$ )	≤ 16 mA
Power ON delay ( $t_o$ )	≤ 20 ms

### Outputs

Output functions	NPN or PNP by sensor type
Output configuration	N.O. and N.C. by sensor type
Output current ( $I_o$ )	≤ 200 mA @ 50°C (122°F); ≤ 150 mA @ 50°C...80°C (122°F...176°F)
OFF-state current ( $I_o$ )	≤ 50 μA
Voltage drop ( $U_d$ )	Max. 1.6 VDC @ 200 mA
Protection	Short-circuit, reverse polarity, transients and overload
Voltage transient	1 kV/0.5 J

### Response times

Operating frequency (f)	≤ 2 KHz
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## Indication



### Standard IO mode:

Yellow LED	Output	Description
OFF	OFF	N.O. output, target not present N.C. output, target present
ON	ON	N.O. output, target present N.C. output, target not present
Blinking	f: 2Hz	Short-circuit or overload

## Environmental

Ambient temperature	Operating: -25° to +80°C (-13° to +176°F)	
	Storage: -30° to +80°C (-22° to +176°F)	
Ambient humidity	Operating: 35% to 95%	
	Storage: 35% to 95%	
Vibration	10 to 55 Hz, amplitude 1.0 mm; sweep cycle 5 min; in X, Y and Z direction	IEC 60068-2-6
Shock	30 G /11 ms. 10 shocks in X, Y and Z direction	IEC 60068-2-27
Degree of protection	IP67	IEC 60529; EN 60947-1

## Compatibility and conformity

EMC protection IEC 60947-5-2	IEC 61000-4-2 Electrostatic discharge	8 kV air discharge 4 kV contact discharge
	IEC 61000-4-3 Radiated radiofrequency	3 V/m
	IEC 61000-4-4 Burst immunity	2 kV
	IEC 61000-4-6 Conducted radio frequency	3 V
	IEC 61000-4-8 Power frequency magnetic fields	30 A/m
MTTF <sub>d</sub>	2914 years @ 50°C (122°F)	
Approvals	 	
	CCC is not required for products rated ≤ 36 V	

## Mechanical data

Weight max.	Cable version: short: 32.2g; long: 33g. Plug version: short: 3.7g; long: 4.7g.
Mounting	Flush mountable
Material	Housing: stainless steel AISI304 Front cap: Grey thermoplastic polyester
Max tightening torque	7 Nm

**Electrical connection**

<b>Cable</b>	2m, 3 x 0.14 mm <sup>2</sup> , Ø3.2 mm, PVC, grey, oil proof, laser write
<b>Plug</b>	M8 x 1 quick disconnect, 3 pin, male connector

# Connection Diagrams

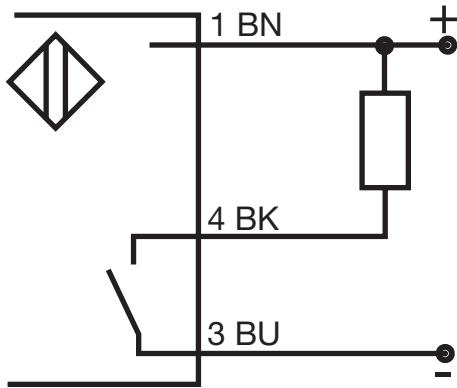


Fig. 3 NPN - Normally open

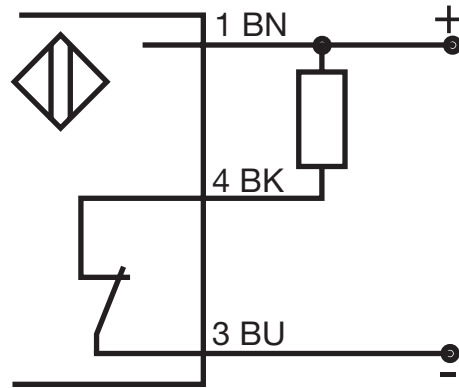


Fig. 4 NPN - Normally closed

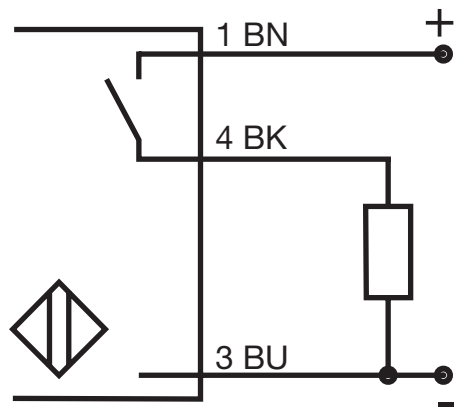


Fig. 5 PNP - Normally open

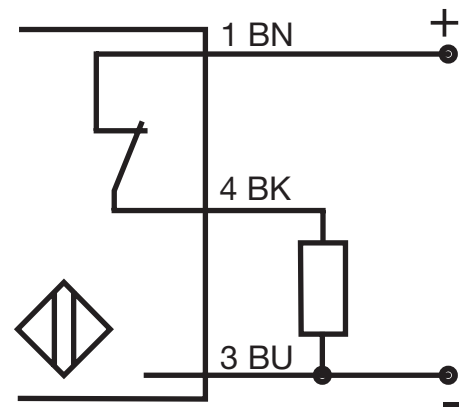
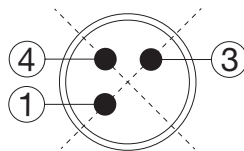


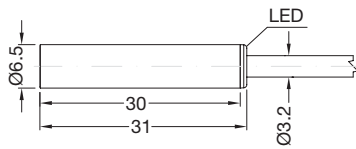
Fig. 6 PNP - Normally closed

Colour code		
BN: brown	BK: black	BU: blue

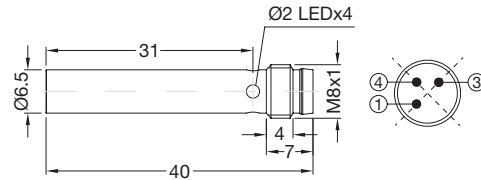




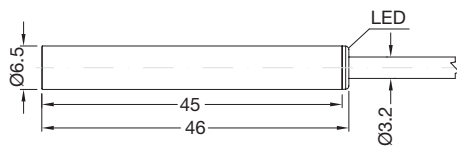
## Dimensions [mm]



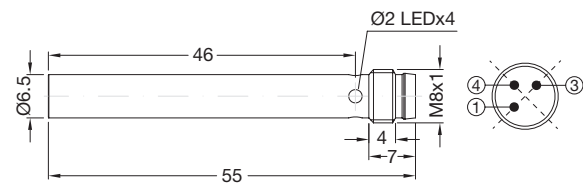
**Fig. 7** Short body, flush version, cable



**Fig. 8** Short body, flush version, plug

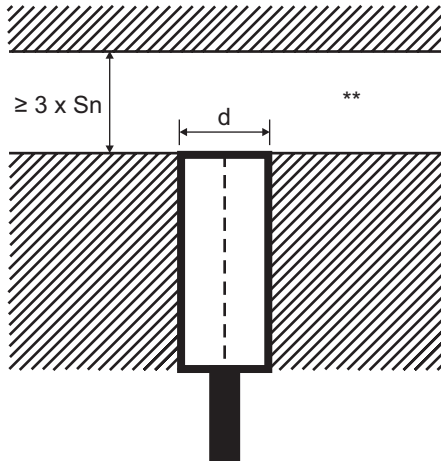


**Fig. 9** Long body, flush version, cable

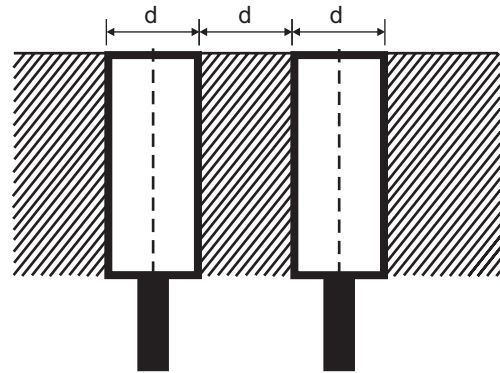


**Fig. 10** Long body, flush version, plug

## Installation

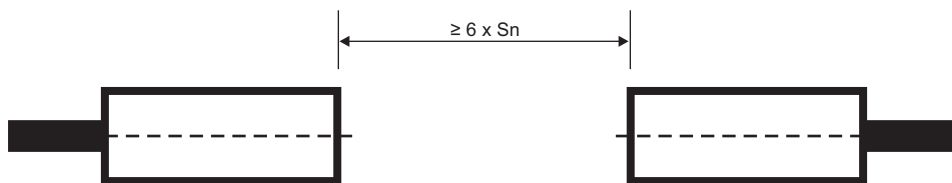


**Fig. 11** Flush sensor, when installed in damping material



**Fig. 12** Flush sensors, when installed together in damping material

### ▶ Sensors installed opposite each other



**Fig. 13** For sensors installed opposite each other, a minimum space of  $6 \times S_n$  (the nominal sensing distance) must be observed

\*\* Free zone or non-damping material

$S_n$ : nominal sensing distance  
 d: sensor diameter: 6.5 mm

### ▶ Cable version

