

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

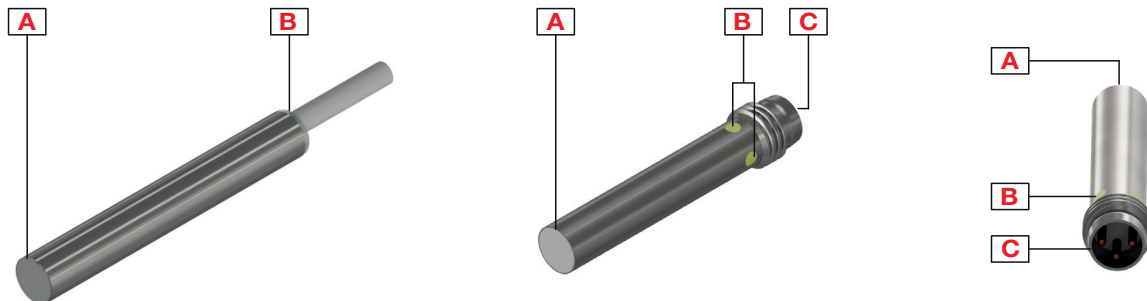
Extended range, short housing

| 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

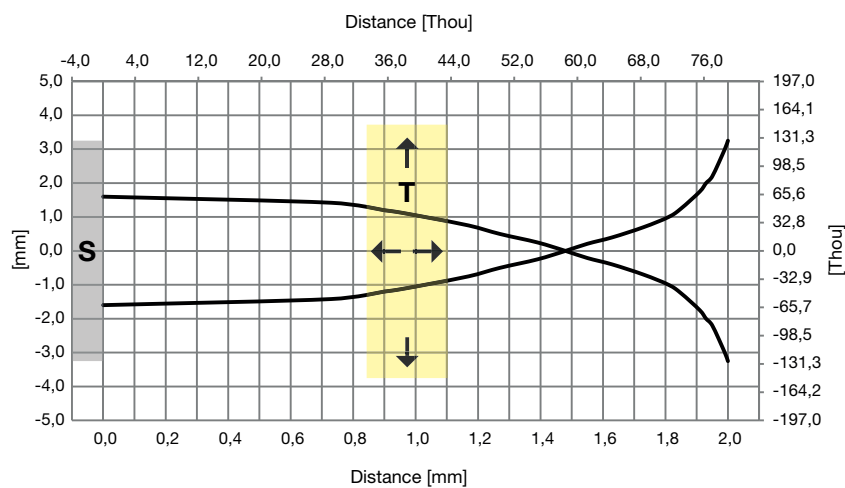


| Element | Component | Function |
|---------|---------------------------|---|
| A | Sensing face | Flush |
| B | LED | Yellow LED: Output flashing: short circuit or overload indication |
| C | M8, 3 pin, male connector | For plug versions only |

Sensing

Detection

| | |
|--|---|
| Rated operating distance S_n | Extended range: 2 mm flush |
| Reference target | 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 |
| Assured operating sensing distance (S_a) | $0 \leq S_a \leq 0.81 \times S_n$ (e.g. with S_n of 2 mm, S_a is 0 ... 1.62 mm) |
| Effective operating distance (S_r) | $0.9 \times S_n \leq S_r \leq 1.1 \times S_n$ |
| Usable operating distance (S_u) | $0.9 \times S_r \leq S_u \leq 1.1 \times S_r$ |
| Temperature drift | $\leq \pm 10\%$ |
| Hysteresis (H) | 1...20% |



Correction factors

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

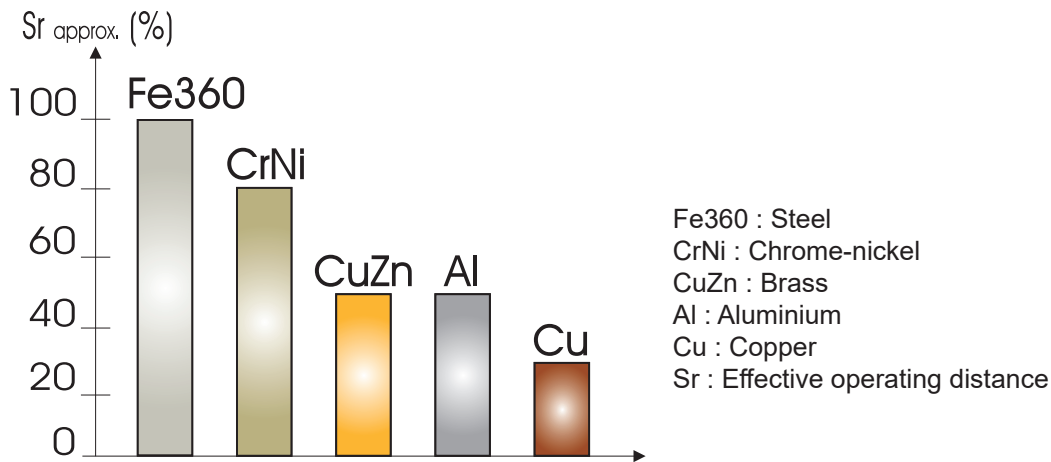


Fig. 2 The rated operating distance is reduced by the use of metals and alloys other than Fe360. The most important reduction factors for inductive proximity sensors are shown in the figure.

Accuracy

| | |
|---------------------|------|
| Repeat accuracy (R) | ≤ 5% |
|---------------------|------|

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 |
|-------------------------|---------|

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 _d | 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**

| | |
|--------------|---|
| Cable | 2m, 3 x 0.14 mm ² , Ø3.2 mm, PVC, grey, oil proof, laser write |
| Plug | M8 x 1 quick disconnect, 3 pin, male connector |

Connection Diagrams

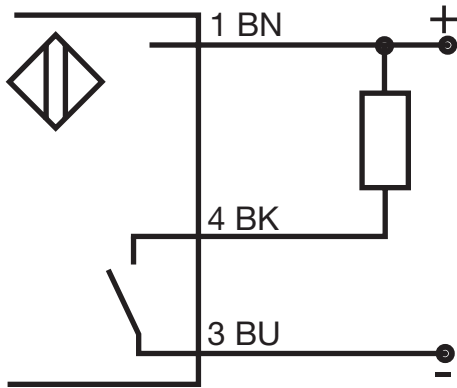


Fig. 3 NPN - Normally open

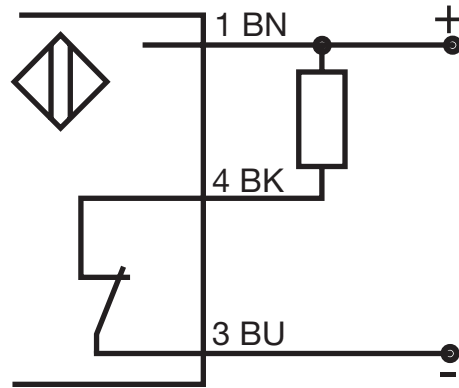


Fig. 4 NPN - Normally closed

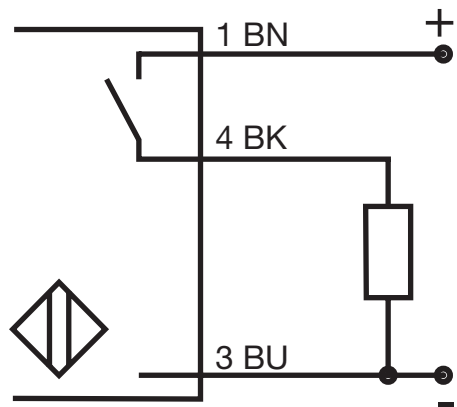


Fig. 5 PNP - Normally open

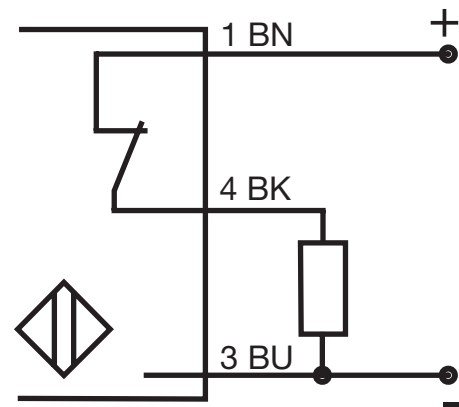
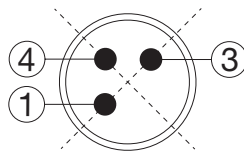


Fig. 6 PNP - Normally closed

| Colour code | | |
|-------------|-----------|----------|
| BN: brown | BK: black | BU: blue |



Dimensions [mm]

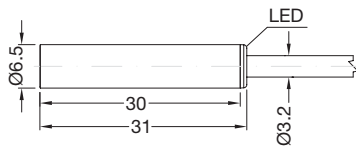


Fig. 7 Short body, flush version, cable

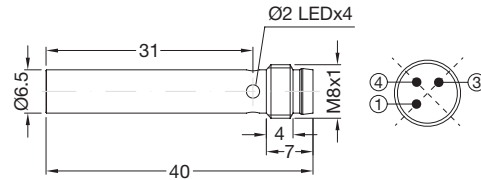


Fig. 8 Short body, flush version, plug

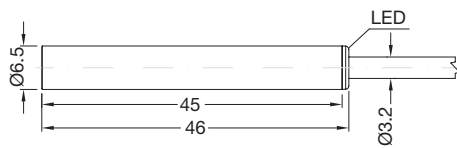


Fig. 9 Long body, flush version, cable

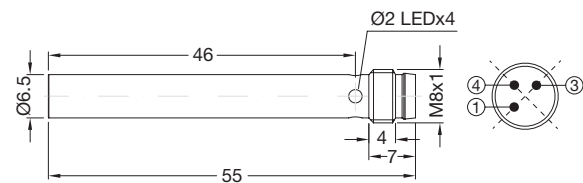


Fig. 10 Long body, flush version, plug

Installation

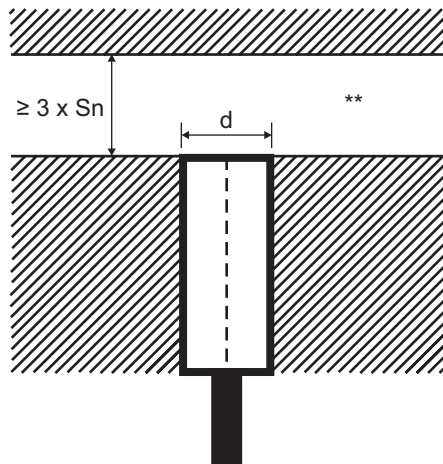


Fig. 11 Flush sensor, when installed in damping material

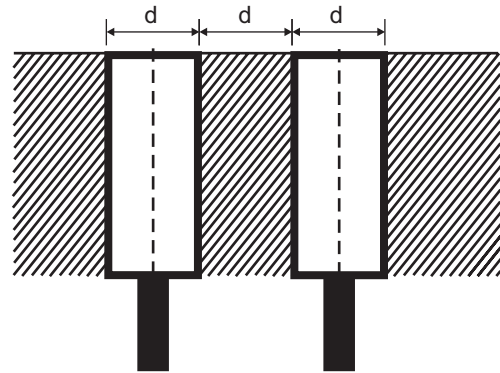


Fig. 12 Flush sensors, when installed together in damping material

▶ Sensors installed opposite each other

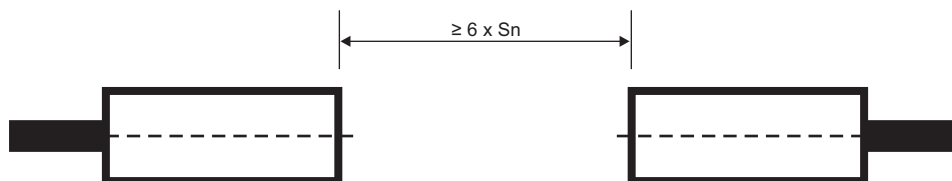


Fig. 13 For sensors installed opposite each other, a minimum space of $6 \times S_n$ (the nominal sensing distance) must be observed

** Free zone or non-damping material

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

▶ Cable version

