

# Inductive sensor

## NSB5-18GM45-2E2-V1-M1-S2D2



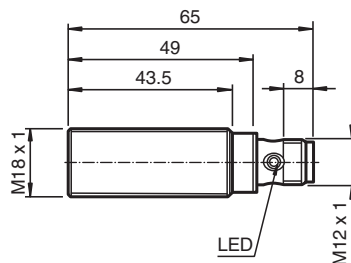
- No unusable area
- 5 mm flush
- Use of standard metallic actuating surfaces
- Applications up to Cat. 2, PLd/SIL 2 possible (can be used redundantly up to Cat. 3, PLe/SIL 3)
- LED for switching state and fault indication
- E1-Type approval
- Safety outputs OSSD
- Extended temperature range  
-40 ... +85 °C
- TÜV certified



### Function

The inductive safety sensors are TÜV-certified in accordance with the EU Machinery Directive, Performance Level PLd, Category 2, and SIL2. They are used to safeguard machines and plant components, as well as for reliable position detection in this environment. With their OSSD interface for reliable, redundant shutdown of electronic outputs, they enable easy connection to a safety PLC or fail-safe control interfaces. They can also be operated as standard sensors. The sensors reliably detect standard metal objects in front of the sensor face without coding or similar; there is no blind zone. High characteristic safety values allow longer testing intervals than comparable solutions with a microcontroller. 2 sensors can be connected with 2-channel redundancy and allow PLe as a Category 3 solution.

### Dimensions



### Technical Data

#### General specifications

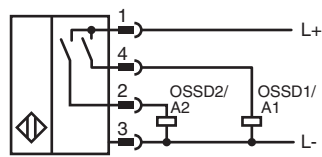
|                            |       |                                                                                     |
|----------------------------|-------|-------------------------------------------------------------------------------------|
| Switching function         |       | 2 x normally open (NO)                                                              |
| Output type                |       | PNP                                                                                 |
| Rated operating distance   | $s_n$ | 5 mm                                                                                |
| Installation               |       | flush                                                                               |
| Output polarity            |       | DC                                                                                  |
| Assured operating distance | $s_a$ | 0 ... 4.05 mm                                                                       |
| Actuating element          |       | Reference target according EN IEC 60947-5-2 (FE360 - ST37K)<br>18 mm x 18 mm x 1 mm |
| Reduction factor $r_{AI}$  |       | 0.5                                                                                 |

## Technical Data

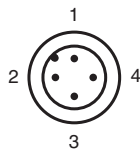
|                                                 |           |                                                                                                                                                                                        |
|-------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reduction factor $r_{Cu}$                       |           | 0.4                                                                                                                                                                                    |
| Reduction factor $r_{304}$                      |           | 0.85                                                                                                                                                                                   |
| Reduction factor $r_{Brass}$                    |           | 0.55                                                                                                                                                                                   |
| Output type                                     |           | 4-wire                                                                                                                                                                                 |
| <b>Nominal ratings</b>                          |           |                                                                                                                                                                                        |
| Operating voltage                               | $U_B$     | 18 ... 30 V                                                                                                                                                                            |
| Rated operating voltage                         | $U_e$     | 24 V                                                                                                                                                                                   |
| Switching frequency                             | $f$       | 0 ... 30 Hz                                                                                                                                                                            |
| Hysteresis                                      | $H$       | typ. 5%                                                                                                                                                                                |
| Reverse polarity protection                     |           | reverse polarity protected                                                                                                                                                             |
| Short-circuit protection                        |           | pulsing                                                                                                                                                                                |
| Overload resistance                             |           | yes                                                                                                                                                                                    |
| Voltage drop                                    | $U_d$     | $\leq 3$ V<br>at $I_L$ (sum of all outputs) max. 50 mA                                                                                                                                 |
| Rated insulation voltage                        | $U_{BIS}$ | 30 V                                                                                                                                                                                   |
| Operating current                               | $I_L$     | 1 ... 30 mA per output                                                                                                                                                                 |
| Off-state current                               | $I_r$     | 0 ... 0.5 mA                                                                                                                                                                           |
| No-load supply current                          | $I_0$     | $\leq 15$ mA                                                                                                                                                                           |
| Time delay before availability                  | $t_v$     | $\leq 300$ ms                                                                                                                                                                          |
| Switching state indicator                       |           | LED, yellow                                                                                                                                                                            |
| Error indicator                                 |           | LED, red                                                                                                                                                                               |
| <b>Functional safety related parameters</b>     |           |                                                                                                                                                                                        |
| Safety Integrity Level (SIL)                    |           | SIL 2                                                                                                                                                                                  |
| Performance level (PL)                          |           | PL d                                                                                                                                                                                   |
| Category                                        |           | Cat. 2                                                                                                                                                                                 |
| MTTF <sub>d</sub>                               |           | > 7500 a                                                                                                                                                                               |
| Mission Time ( $T_M$ )                          |           | 20 a                                                                                                                                                                                   |
| Diagnostic Coverage (DC)                        |           | min. 60 %                                                                                                                                                                              |
| Assured release distance of a PDDb              | $S_{ar}$  | 7.5 mm                                                                                                                                                                                 |
| <b>Compliance with standards and directives</b> |           |                                                                                                                                                                                        |
| Standard conformity                             |           |                                                                                                                                                                                        |
| Standards                                       |           | EN IEC 60947-5-2:2007<br>EN IEC 60947-5-3:2013<br>EN ISO 13849-1:2015<br>EN IEC 61508:2010<br>EN 62061:2005+AC:2010+A1:2013+A2:2015<br>compatible with EN ISO 61131-2:2007 Typ 1, 2, 3 |
| <b>Approvals and certificates</b>               |           |                                                                                                                                                                                        |
| UL approval                                     |           | cULus Listed, General Purpose, Class 2 Power Source                                                                                                                                    |
| CCC approval                                    |           | CCC approval / marking not required for products rated $\leq 36$ V                                                                                                                     |
| E1 Type approval                                |           | 10R-06                                                                                                                                                                                 |
| <b>Ambient conditions</b>                       |           |                                                                                                                                                                                        |
| Ambient temperature                             |           | -40 ... 85 °C (-40 ... 185 °F)                                                                                                                                                         |
| Storage temperature                             |           | -40 ... 85 °C (-40 ... 185 °F)                                                                                                                                                         |
| Altitude                                        |           | $\leq 2000$ m above MSL                                                                                                                                                                |
| <b>Mechanical specifications</b>                |           |                                                                                                                                                                                        |
| Connection type                                 |           | Connector plug M12 x 1, 4-pin                                                                                                                                                          |
| Housing material                                |           | brass, nickel-plated                                                                                                                                                                   |
| Sensing face                                    |           | PBT                                                                                                                                                                                    |
| Degree of protection                            |           | IP68 / IP69                                                                                                                                                                            |
| Mass                                            |           | 45 g                                                                                                                                                                                   |
| <b>General information</b>                      |           |                                                                                                                                                                                        |
| Scope of delivery                               |           | 2 self locking nuts in scope of delivery                                                                                                                                               |

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Connection



Connection Assignment



Wire colors in accordance with EN 60947-5-2

|   |    |         |
|---|----|---------|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue)  |
| 4 | BK | (black) |

Commissioning

**Note for Setting the Safety Control**  
The sensor has a self-monitoring function for the outputs. Therefore, to avoid any malfunctions of the sensor, deactivate all test pulses of the connected safety controller to the sensor.

Accessories

|                                                                                     |                               |                                                                                                                                                                            |
|-------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>BF 18</b>                  | Mounting flange, 18 mm                                                                                                                                                     |
|  | <b>V1-G-S-BK2M-PUR-A-V1-G</b> | Cordset M12 socket yellow straight to M12 plug yellow straight A-coded, 4-pin, PUR cable weld spatter resistant black, UL approved, drag chain suitable, torsion resistant |
|  | <b>V1-W-S-BK2M-PUR-A-V1-G</b> | Cordset M12 socket yellow angled to M12 plug yellow straight A-coded, 4-pin, PUR cable weld spatter resistant black, UL approved, drag chain suitable, torsion resistant   |

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