



### Basic features

|                     |                     |
|---------------------|---------------------|
| Additional features | Function monitoring |
| Approval/Conformity | CE                  |
|                     | EAC                 |
|                     | WEEE                |
| Basic standard      | IEC 60947-5-2       |

### Display/Operation

|                    |    |
|--------------------|----|
| Function indicator | no |
| Power indicator    | no |

### Electrical connection

|                                   |                            |
|-----------------------------------|----------------------------|
| Connection                        | M12x1-Male, 4-pin, A-coded |
| Polarity reversal protected       | yes                        |
| Protection against device mix-ups | yes                        |
| Short-circuit protection          | yes                        |

### Electrical data

|                                      |                |
|--------------------------------------|----------------|
| Load capacitance max. at $U_e$       | 0.15 $\mu$ F   |
| Min. operating current $I_m$         | 1 mA           |
| No-load current $I_o$ max., damped   | 25 mA          |
| No-load current $I_o$ max., undamped | 25 mA          |
| Operating voltage $U_b$              | 20...30 VDC    |
| Output resistance $R_a$              | Open collector |
| Rated insulation voltage $U_i$       | 75 V DC        |
| Rated operating current $I_e$        | 130 mA         |
| Rated operating voltage $U_e$ DC     | 24 V           |
| Rated short circuit current          | 100 A          |
| Ready delay $t_v$ max.               | 50 ms          |
| Residual current $I_r$ max.          | 80 $\mu$ A     |
| Ripple max. (% of $U_e$ )            | 15 %           |
| Switching frequency                  | 300 Hz         |
| Utilization category                 | DC -12         |
| Voltage drop static max.             | 2.5 V          |

### Environmental conditions

|                         |                                 |
|-------------------------|---------------------------------|
| Ambient temperature     | -25...70 °C                     |
| Contamination scale     | 3                               |
| EN 60068-2-27, Shock    | Half-sinus, 30 gn, 11 ms        |
| EN 60068-2-6, Vibration | 55 Hz, amplitude 1 mm, 3x30 min |
| Protection degree       | IP67                            |

### Functional safety

|              |       |
|--------------|-------|
| MTTF (40 °C) | 990 a |
|--------------|-------|

Inductive Sensors  
**BES 113-3019-SA1-S4**  
**Order Code: BES02M5**



**Material**

|                          |                      |
|--------------------------|----------------------|
| Housing material         | Brass, nickel plated |
| Material sensing surface | PA 12                |
| Surface protection       | nickel plated        |

**Mechanical data**

|                   |                |
|-------------------|----------------|
| Dimension         | Ø 12 x 91.5 mm |
| Installation      | non-flush      |
| Size              | M12x1          |
| Tightening torque | 10 Nm          |

**Output/Interface**

|                  |                          |
|------------------|--------------------------|
| Switching output | PNP normally closed (NC) |
|------------------|--------------------------|

**Range/Distance**

|                                  |             |
|----------------------------------|-------------|
| Assured operating distance Sa    | 2.9 mm      |
| Hysteresis H max. (% of Sr)      | 15.0 %      |
| Rated operating distance Sn      | 3.7 mm      |
| Real switching distance sr       | 3.7 mm      |
| Repeat accuracy max. (% of Sr)   | 5.0 %       |
| Temperature drift max. (% of Sr) | 10 %        |
| Tolerance Sr                     | -10 %/+20 % |

**Remarks**

Max. cable length: 50 m.

Test pulses ≤ 0.5 ms typ. 160 Hz are superimposed on the output signal which are missing when there is a fault (single fault) in the sensor.

The sensor is functional again after the overload has been eliminated.

For more information about MTTF and B10d see MTTF / B10d Certificate

Indication of the MTTF- / B10d value does not represent a binding composition and/or life expectancy assurance; these are simply experiential values with no warranty implications. These declared values also do not extend the expiration period for defect claims or affect it in any way.

**Connector Drawings**



**Wiring Diagrams**

