



## Model Number

NRN10-12GM40-E2-IO-C-V1

## Features

- 10 mm non-flush
- Reduction factor = 1
- Magnetic field resistant
- Weld Immune
- IO-link interface for service and process data
- Switch point mode or window mode can be set
- Switching function, stability alarm and pulse extension can be set

## Description

Reduction factor 1 sensors reliably detect different metals with the same switch state. The integrated IO-Link interface enables clear identification of the sensor and diagnosis of the sensor condition. When using the sensor, parameters and operating modes can be optimally configured specifically for the intended application. In addition to setting the switching function and a pulse extension, the user can select either switch point mode or window mode in combination with a stability alarm. In switch point mode, the stability alarm signals the detection of an object in the area between the assured operating distance and operating distance  $s_n$ . In window mode, it signals the detection of an object below the window between operating distance  $s_n$  and the nearest operating distance. A stability alarm is displayed to the user via a flashing LED and process data.

## Accessories

### IO-Link-Master02-USB

IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

### BF 12

Mounting flange, 12 mm

### EXG-12

Quick mounting bracket with dead stop

### V1-G

Female connector, M12, 4-pin, field attachable

### V1-W

Female connector, M12, 4-pin, field attachable

### V1-G-2M-PUR

Female cordset, M12, 4-pin, PUR cable

### V1-W-2M-PUR

Female cordset, M12, 4-pin, PUR cable

## Technical Data

### General specifications

|                            |       |                                           |
|----------------------------|-------|-------------------------------------------|
| Switching function         |       | Normally open/closed (NO/NC) programmable |
| Output type                |       | PNP                                       |
| Rated operating distance   | $s_n$ | 10 mm (factory setting)                   |
| Near operating distance    |       | 8 mm (can be activated by software)       |
| Installation               |       | non-flush                                 |
| Output polarity            |       | DC                                        |
| Assured operating distance | $s_a$ | 0 ... 8.1 mm                              |
| Reduction factor $r_{Al}$  |       | 1                                         |
| Reduction factor $r_{Cu}$  |       | 1                                         |
| Reduction factor $r_{304}$ |       | 1                                         |
| Reduction factor $r_{316}$ |       | 1                                         |
| Output type                |       | 3-wire                                    |

### Nominal ratings

|                                |       |                                                                                                        |
|--------------------------------|-------|--------------------------------------------------------------------------------------------------------|
| Operating voltage              | $U_B$ | 10 ... 30 V DC                                                                                         |
| Switching frequency            | $f$   | 0 ... 1300 Hz (switch point mode)<br>0 ... 80 Hz (window mode, switch point mode with stability alarm) |
| Hysteresis                     | $H$   | typ. 3 %                                                                                               |
| Reverse polarity protection    |       | reverse polarity protected                                                                             |
| Short-circuit protection       |       | pulsing                                                                                                |
| Voltage drop                   | $U_d$ | $\leq 0.5$ V                                                                                           |
| Operating current              | $I_L$ | 0 ... 200 mA                                                                                           |
| Off-state current              | $I_r$ | 0 ... 0.5 mA typ. 60 $\mu$ A at 25 °C                                                                  |
| No-load supply current         | $I_0$ | $\leq 15$ mA                                                                                           |
| Time delay before availability | $t_v$ | $\leq 150$ ms                                                                                          |
| Constant magnetic field        | $B$   | 200 mT                                                                                                 |
| Alternating magnetic field     | $B$   | 200 mT                                                                                                 |
| Status indicator               |       | Multihole-LED, yellow                                                                                  |

### Functional safety related parameters

|                          |       |
|--------------------------|-------|
| MTTF <sub>d</sub>        | 362 a |
| Mission Time ( $T_M$ )   | 20 a  |
| Diagnostic Coverage (DC) | 0 %   |

### Interface

|                             |                                                                                                    |
|-----------------------------|----------------------------------------------------------------------------------------------------|
| Interface type              | IO-Link ( via C/Q = pin 4 )                                                                        |
| Transfer rate               | COM 2 (38.4 kBaud)                                                                                 |
| IO-Link Revision            | 1.1                                                                                                |
| Min. cycle time             | 2.3 ms                                                                                             |
| Process data width          | Process data input (control system side): 2 Bit<br>Process data output (control system side): none |
| SIO mode support            | yes                                                                                                |
| Device ID                   | 0x201114 (2101524)                                                                                 |
| Compatible master port type | A                                                                                                  |

### Ambient conditions

|                     |                                |
|---------------------|--------------------------------|
| Ambient temperature | -25 ... 70 °C (-13 ... 158 °F) |
| Storage temperature | -40 ... 85 °C (-40 ... 185 °F) |

### Mechanical specifications

|                      |                                |
|----------------------|--------------------------------|
| Connection type      | Connector plug M12 x 1 , 4-pin |
| Housing material     | Brass, PTFE coated             |
| Sensing face         | PPS                            |
| Degree of protection | IP67                           |
| Mass                 | 24 g                           |

### Factory settings

|                 |                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| Default setting | operating mode = switch point mode with stability alarm<br>switching function = Normally open (NO)<br>switching distance = 10 mm |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|

### General information

|                   |                                          |
|-------------------|------------------------------------------|
| Scope of delivery | 2 self locking nuts in scope of delivery |
|-------------------|------------------------------------------|

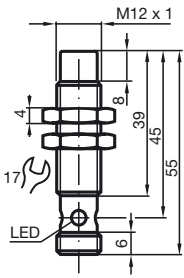
### Compliance with standards and directives

|                     |                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------|
| Standard conformity |                                                                                             |
| Standards           | EN 60947-5-2:2007<br>EN 60947-5-2/A1:2012<br>IEC 60947-5-2:2007<br>IEC 60947-5-2 AMD 1:2012 |

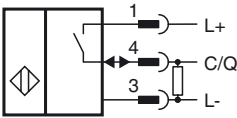
### Approvals and certificates

|                                 |                                                                    |
|---------------------------------|--------------------------------------------------------------------|
| Protection class                | II                                                                 |
| Rated insulation voltage        | $U_i$ 60 V                                                         |
| Rated impulse withstand voltage | $U_{imp}$ 800 V                                                    |
| UL approval                     | cULus Listed, General Purpose<br>Class 2 power source              |
| CCC approval                    | CCC approval / marking not required for products rated $\leq 36$ V |

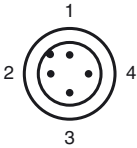
Dimensions



Electrical Connection



Pinout

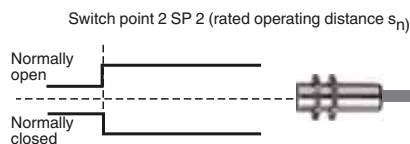


Wire colors in accordance with EN 60947-5-2

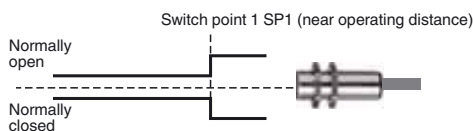
|   |    |         |
|---|----|---------|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue)  |
| 4 | BK | (black) |

## Switching output modes

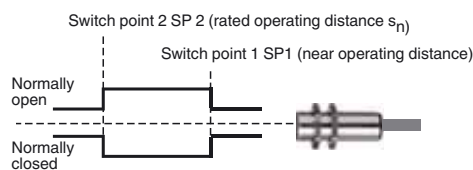
### Switch point mode at rated operating distance $s_n$



### Switch point mode with near operating distance

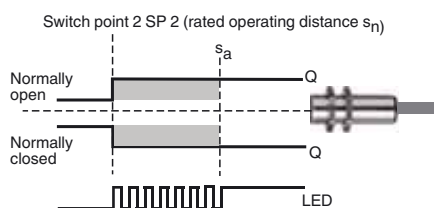


### Window mode



## Stability alarm

### Switch point mode with stability alarm (factory default)



### Window mode with stability alarm

