



## Model Number

NJ10-30GK-SN-10M

## Features

- 10 mm flush
- Usable up to SIL 3 acc. to IEC 61508
- ATEX approval Ex-i and Ex-nA/tc for zone 0-2 and zone 20-22
- Degree of protection IP68

## Application



### Danger!

In safety-related applications the sensor must be operated with a qualified fail safe interface from Pepperl+Fuchs, such as KFD2-SH-EX1. Consider the "exida Functional Safety Assessment" document which is available on [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com) as an integral part of this product's documentation.

## Accessories

**BF 30**  
Mounting flange, 30 mm

## Technical Data

### General specifications

|                              |                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switching function           | Normally closed (NC)                                                                                                                                                                                                                                                                                                                                                                        |
| Output type                  | NAMUR with safety function                                                                                                                                                                                                                                                                                                                                                                  |
| Rated operating distance     | $s_n$ 10 mm                                                                                                                                                                                                                                                                                                                                                                                 |
| Installation                 | flush                                                                                                                                                                                                                                                                                                                                                                                       |
| Assured operating distance   | $s_a$ 0 ... 8.1 mm                                                                                                                                                                                                                                                                                                                                                                          |
| Reduction factor $r_{AI}$    | 0.4                                                                                                                                                                                                                                                                                                                                                                                         |
| Reduction factor $r_{Cu}$    | 0.3                                                                                                                                                                                                                                                                                                                                                                                         |
| Reduction factor $r_{304}$   | 0.85                                                                                                                                                                                                                                                                                                                                                                                        |
| Safety Integrity Level (SIL) | up to SIL3 acc. to IEC 61508 <b>Danger!</b> In safety-related applications the sensor must be operated with a qualified fail safe interface from Pepperl+Fuchs, such as KFD2-SH-EX1. Consider the "exida Functional Safety Assessment" document which is available on <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> as an integral part of this product's documentation. |
| Output type                  | 2-wire                                                                                                                                                                                                                                                                                                                                                                                      |

### Nominal ratings

|                              |                  |
|------------------------------|------------------|
| Nominal voltage              | $U_o$ 8.2 V      |
| Switching frequency          | $f$ 0 ... 300 Hz |
| Current consumption          |                  |
| Measuring plate not detected | $\geq 3$ mA      |
| Measuring plate detected     | $\leq 1$ mA      |

### Functional safety related parameters

|                                |         |
|--------------------------------|---------|
| Safety Integrity Level (SIL)   | SIL 3   |
| MTTF <sub>d</sub>              | 11850 a |
| Mission Time (T <sub>M</sub> ) | 20 a    |
| Diagnostic Coverage (DC)       | 0 %     |

### Ambient conditions

|                     |                                 |
|---------------------|---------------------------------|
| Ambient temperature | -50 ... 100 °C (-58 ... 212 °F) |
|---------------------|---------------------------------|

### Mechanical specifications

|                      |                                    |
|----------------------|------------------------------------|
| Connection type      | cable silicone, 10 m               |
| Core cross-section   | 0.75 mm <sup>2</sup>               |
| Housing material     | Crastin (PBT), black               |
| Sensing face         | Crastin (PBT), black               |
| Degree of protection | IP68                               |
| Cable                |                                    |
| Cable diameter       | 6 mm $\pm$ 0.2 mm                  |
| Bending radius       | > 10 x cable diameter              |
| Note                 | Security relevant only up to -40°C |

### General information

|                           |                         |
|---------------------------|-------------------------|
| Use in the hazardous area | see instruction manuals |
|---------------------------|-------------------------|

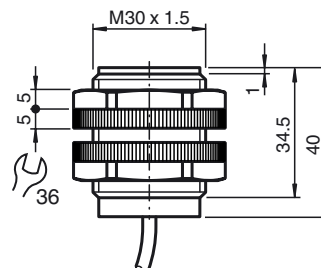
### Compliance with standards and directives

|                     |                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------|
| Standard conformity |                                                                                             |
| NAMUR               | EN 60947-5-6:2000<br>IEC 60947-5-6:1999                                                     |
| 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

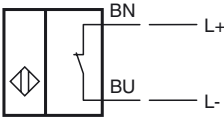
|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| EAC conformity | TR CU 012/2011                                                     |
| UL approval    | cULus Listed, General Purpose                                      |
| CCC approval   | CCC approval / marking not required for products rated $\leq 36$ V |

## Dimensions





Electrical Connection



**Data for application in connection with hazardous areas**

|                            |                                  |
|----------------------------|----------------------------------|
| Equipment protection level | Ga , Gb , Gc (nA) , Da , Dc , Mb |
|----------------------------|----------------------------------|

**Equipment protection level Ga**

|                    |                  |
|--------------------|------------------|
| Type of protection | intrinsic safety |
| CE marking         | CE 0102          |

**Certificates**

|                   |                                             |
|-------------------|---------------------------------------------|
| Appropriate type  | NJ 10-30GK-SN...                            |
| ATEX certificate  | PTB 00 ATEX 2049 X                          |
| ATEX marking      | Ⓔ II 1G Ex ia IIC T6...T1 Ga                |
| Standards         | EN 60079-0:2012+A11:2013 , EN 60079-11:2012 |
| IECEx certificate | IECEx PTB 11.0092X                          |
| IECEx marking     | Ex ia IIC T6...T1 Ga                        |
| Standards         | IEC 60079-0:2011 , IEC 60079-11:2011        |

|                                |       |                                                                |
|--------------------------------|-------|----------------------------------------------------------------|
| Effective internal capacitance | $C_i$ | $\leq 120 \text{ nF}$<br>A cable length of 10 m is considered. |
|--------------------------------|-------|----------------------------------------------------------------|

|                               |       |                                                                         |
|-------------------------------|-------|-------------------------------------------------------------------------|
| Effective internal inductance | $L_i$ | $\leq 150 \text{ }\mu\text{H}$<br>A cable length of 10 m is considered. |
|-------------------------------|-------|-------------------------------------------------------------------------|

|                                                          |                                                                                                                                        |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Maximum permissible ambient temperature $T_{\text{amb}}$ | Also observe the maximum permissible ambient temperature stated in the general technical data.<br>Keep to the lower of the two values. |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|

**for ATEX**

at  $U_i = 16 \text{ V}$  ,  $I_i = 25 \text{ mA}$  ,  $P_i = 34 \text{ mW}$  ,  
 T6 : 57 °C (134.6 °F)  
 T5 : 69 °C (156.2 °F)  
 T4 : 97 °C (206.6 °F)  
 T3 : 97 °C (206.6 °F)  
 T2 : 97 °C (206.6 °F)  
 T1 : 97 °C (206.6 °F)  
 at  $U_i = 16 \text{ V}$  ,  $I_i = 25 \text{ mA}$  ,  $P_i = 64 \text{ mW}$  ,  
 T6 : 52 °C (125.6 °F)  
 T5 : 64 °C (147.2 °F)  
 T4 : 92 °C (197.6 °F)  
 T3 : 92 °C (197.6 °F)  
 T2 : 92 °C (197.6 °F)  
 T1 : 92 °C (197.6 °F)  
 at  $U_i = 16 \text{ V}$  ,  $I_i = 52 \text{ mA}$  ,  $P_i = 169 \text{ mW}$  ,  
 T6 : 34 °C (93.2 °F)  
 T5 : 46 °C (114.8 °F)  
 T4 : 74 °C (165.2 °F)  
 T3 : 74 °C (165.2 °F)  
 T2 : 74 °C (165.2 °F)  
 T1 : 74 °C (165.2 °F)  
 at  $U_i = 16 \text{ V}$  ,  $I_i = 76 \text{ mA}$  ,  $P_i = 242 \text{ mW}$  ,  
 T6 : 22 °C (71.6 °F)  
 T5 : 34 °C (93.2 °F)  
 T4 : 61 °C (141.8 °F)  
 T3 : 61 °C (141.8 °F)  
 T2 : 61 °C (141.8 °F)  
 T1 : 61 °C (141.8 °F)

**for IECEx**

at  $U_i = 16 \text{ V}$  ,  $I_i = 25 \text{ mA}$  ,  $P_i = 34 \text{ mW}$  ,  
 T6 : 73 °C (163.4 °F)  
 T5 : 88 °C (190.4 °F)  
 T4 : 100 °C (212 °F)  
 T3 : 100 °C (212 °F)  
 T2 : 100 °C (212 °F)  
 T1 : 100 °C (212 °F)  
 at  $U_i = 16 \text{ V}$  ,  $I_i = 25 \text{ mA}$  ,  $P_i = 64 \text{ mW}$  ,  
 T6 : 69 °C (156.2 °F)  
 T5 : 84 °C (183.2 °F)  
 T4 : 100 °C (212 °F)  
 T3 : 100 °C (212 °F)  
 T2 : 100 °C (212 °F)  
 T1 : 100 °C (212 °F)  
 at  $U_i = 16 \text{ V}$  ,  $I_i = 52 \text{ mA}$  ,  $P_i = 169 \text{ mW}$  ,  
 T6 : 51 °C (123.8 °F)  
 T5 : 66 °C (150.8 °F)  
 T4 : 80 °C (176 °F)  
 T3 : 68 °C (154.4 °F)  
 T2 : 80 °C (176 °F)  
 T1 : 80 °C (176 °F)  
 at  $U_i = 16 \text{ V}$  ,  $I_i = 76 \text{ mA}$  ,  $P_i = 242 \text{ mW}$  ,  
 T6 : 39 °C (102.2 °F)  
 T5 : 54 °C (129.2 °F)  
 T4 : 61 °C (141.8 °F)  
 T3 : 61 °C (141.8 °F)  
 T2 : 61 °C (141.8 °F)  
 T1 : 61 °C (141.8 °F)

**Equipment protection level Gb**

|                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Type of protection                                       | intrinsic safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |
| CE marking                                               | CE 0102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |
| Certificates                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |
| Appropriate type                                         | NJ 10-30GK-SN...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |
| ATEX certificate                                         | PTB 00 ATEX 2049 X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| ATEX marking                                             | Ex II 1G Ex ia IIC T6...T1 Ga                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |
| Standards                                                | EN 60079-0:2012+A11:2013 , EN 60079-11:2012                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |
| IECEX certificate                                        | IECEX PTB 11.0092X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| IECEX marking                                            | Ex ia IIC T6...T1 Ga                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |
| Standards                                                | IEC 60079-0:2011 , IEC 60079-11:2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |
| Effective internal capacitance                           | C <sub>i</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ≤ 120 nF<br>A cable length of 10 m is considered. |
| Effective internal inductance                            | L <sub>i</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ≤ 150 μH<br>A cable length of 10 m is considered. |
| Maximum permissible ambient temperature T <sub>amb</sub> | Also observe the maximum permissible ambient temperature stated in the general technical data.<br>Keep to the lower of the two values.<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 25 mA , P <sub>i</sub> = 34 mW ,<br>T6 : 73 °C (163.4 °F)<br>T5 : 88 °C (190.4 °F)<br>T4 : 100 °C (212 °F)<br>T3 : 100 °C (212 °F)<br>T2 : 100 °C (212 °F)<br>T1 : 100 °C (212 °F)<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 25 mA , P <sub>i</sub> = 64 mW ,<br>T6 : 69 °C (156.2 °F)<br>T5 : 84 °C (183.2 °F)<br>T4 : 100 °C (212 °F)<br>T3 : 100 °C (212 °F)<br>T2 : 100 °C (212 °F)<br>T1 : 100 °C (212 °F)<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 52 mA , P <sub>i</sub> = 169 mW ,<br>T6 : 51 °C (123.8 °F)<br>T5 : 66 °C (150.8 °F)<br>T4 : 80 °C (176 °F)<br>T3 : 80 °C (176 °F)<br>T2 : 80 °C (176 °F)<br>T1 : 80 °C (176 °F)<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 76 mA , P <sub>i</sub> = 242 mW ,<br>T6 : 39 °C (102.2 °F)<br>T5 : 54 °C (129.2 °F)<br>T4 : 61 °C (141.8 °F)<br>T3 : 61 °C (141.8 °F)<br>T2 : 61 °C (141.8 °F)<br>T1 : 61 °C (141.8 °F) |                                                   |

**Equipment protection level Gc (nA)**

|                                                   |                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of protection                                | "n"                                                                                                                                                                                                                                                                                    |
| CE marking                                        |                                                                                                                                                                                                     |
| Certificates                                      |                                                                                                                                                                                                                                                                                        |
| ATEX certificate                                  | PF 15 CERT 3754 X                                                                                                                                                                                                                                                                      |
| ATEX marking                                      |  II 3G Ex nA IIC T6 Gc                                                                                                                                                                              |
| Standards                                         | EN 60079-0:2012+A11:2013 , EN 60079-15:2010                                                                                                                                                                                                                                            |
| Possible characteristics                          | maximum operating voltage $U_{Bmax}$ , load current $I_L$ , minimum series resistance $R_V$ , maximum analog output voltage $U_{Amax}$ , maximum analog output current $I_{Amax}$                                                                                                      |
| Maximum permissible ambient temperature $T_{amb}$ | Also observe the maximum permissible ambient temperature stated in the general technical data.<br>Keep to the lower of the two values.<br>using an amplifier in accordance with EN 60947-5-6 : 58 °C (136.4 °F)<br>at $U_{Bmax} = 9\text{ V}$ , $R_V = 562\ \Omega$ : 58 °C (136.4 °F) |

**Equipment protection level Da**

|                                                          |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of protection                                       |                | intrinsic safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CE marking                                               |                |  0102                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Certificates                                             |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Appropriate type                                         |                | NJ 10-30GK-SN...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ATEX certificate                                         |                | PTB 00 ATEX 2049 X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ATEX marking                                             |                |  II 1D Ex ia IIIC T135°C Da                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Standards                                                |                | EN 60079-0:2012+A11:2013 , EN 60079-11:2012                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| IECEX certificate                                        |                | IECEX PTB 11.0092X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| IECEX marking                                            |                | Ex ia IIIC T135°C Da                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Standards                                                |                | IEC 60079-0:2011 , IEC 60079-11:2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Effective internal capacitance                           | C <sub>i</sub> | ≤ 120 nF<br>A cable length of 10 m is considered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Effective internal inductance                            | L <sub>i</sub> | ≤ 150 μH<br>A cable length of 10 m is considered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Maximum permissible ambient temperature T <sub>amb</sub> |                | Also observe the maximum permissible ambient temperature stated in the general technical data.<br>Keep to the lower of the two values.<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 25 mA , P <sub>i</sub> = 34 mW : 100 °C (212 °F)<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 25 mA , P <sub>i</sub> = 64 mW : 100 °C (212 °F)<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 52 mA , P <sub>i</sub> = 169 mW : 80 °C (176 °F)<br>at U <sub>i</sub> = 16 V , I <sub>i</sub> = 76 mA , P <sub>i</sub> = 242 mW : 61 °C (141.8 °F) |

**Equipment protection level Dc**

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of protection                                | Protection by enclosure "tc"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| CE marking                                        | CE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Certificates</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ATEX certificate                                  | PF 15 CERT 3774 X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ATEX marking                                      | Ⓔ II 3D Ex tc IIIC T80°C Dc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Standards                                         | EN 60079-0:2012+A11:2013 , EN 60079-31:2014                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Possible characteristics                          | maximum operating voltage $U_{Bmax}$ , maximum load current $I_{Lmax}$ , minimum series resistance $R_V$ , maximum analog output voltage $U_{Amax}$ , maximum analog output current $I_{Amax}$                                                                                                                                                                                                                                                                                                                   |
| Maximum permissible ambient temperature $T_{amb}$ | Also observe the maximum permissible ambient temperature stated in the general technical data.<br>Keep to the lower of the two values.<br>using an amplifier in accordance with EN 60947-5-6 : 58 °C (136.4 °F)<br>at $U_{Bmax} = 9\text{ V}$ , $R_V = 562\ \Omega$ : 58 °C (136.4 °F)                                                                                                                                                                                                                           |
| <b>Equipment protection level Mb</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Type of protection                                | intrinsic safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Certificates</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Appropriate type                                  | NJ 10-30GK-SN...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| IECEx certificate                                 | IECEx PTB 11.0092X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| IECEx marking                                     | Ex ia I Mb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Standards                                         | IEC 60079-0:2011 , IEC 60079-11:2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Effective internal capacitance $C_i$              | $\leq 120\text{ nF}$<br>A cable length of 10 m is considered.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Effective internal inductance $L_i$               | $\leq 150\ \mu\text{H}$<br>A cable length of 10 m is considered.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Maximum permissible ambient temperature $T_{amb}$ | Also observe the maximum permissible ambient temperature stated in the general technical data.<br>Keep to the lower of the two values.<br>at $U_i = 16\text{ V}$ , $I_i = 25\text{ mA}$ , $P_i = 34\text{ mW}$ : 100 °C (212 °F)<br>at $U_i = 16\text{ V}$ , $I_i = 25\text{ mA}$ , $P_i = 64\text{ mW}$ : 100 °C (212 °F)<br>at $U_i = 16\text{ V}$ , $I_i = 52\text{ mA}$ , $P_i = 169\text{ mW}$ : 80 °C (176 °F)<br>at $U_i = 16\text{ V}$ , $I_i = 76\text{ mA}$ , $P_i = 242\text{ mW}$ : 61 °C (141.8 °F) |