



Model Number

NJ3-18GK-S1N-5M

Features

- Nonferrous targets
- 3 mm flush in ST37 / 1.0037
- 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 as an integral part of this product's documentation.

Accessories

BF 18

Mounting flange, 18 mm

Technical Data

General specifications

| | | |
|------------------------------|-------|---|
| Switching function | | Normally open (NO) |
| Output type | | NAMUR with safety function |
| Rated operating distance | s_n | 3 mm |
| Installation | | flush in mild steel |
| Assured operating distance | s_a | 0 ... 2.4 mm |
| Actual operating distance | s_r | 2.7 ... 3.3 mm typ. |
| Reduction factor r_{AI} | | 1 |
| Reduction factor r_{CU} | | 1 |
| Reduction factor r_{304} | | 0 |
| Safety Integrity Level (SIL) | | up to SIL3 acc. to IEC 61508 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 as an integral part of this product's documentation. |

Output type

Nominal ratings

| | | |
|------------------------------|-------|--------------|
| Nominal voltage | U_o | 8.2 V |
| Switching frequency | f | 0 ... 200 Hz |
| Current consumption | | |
| Measuring plate not detected | | ≤ 1 mA |
| Measuring plate detected | | ≥ 3 mA |

Functional safety related parameters

| | | |
|--------------------------------|--|---------|
| Safety Integrity Level (SIL) | | SIL 3 |
| MTTF _d | | 10660 a |
| Mission Time (T _M) | | 20 a |
| Diagnostic Coverage (DC) | | 0 % |

Ambient conditions

| | | |
|---------------------|--|---------------------------------|
| Ambient temperature | | -25 ... 100 °C (-13 ... 212 °F) |
|---------------------|--|---------------------------------|

Mechanical specifications

| | | |
|----------------------|--|----------------------------|
| Connection type | | cable silicone , 5 m |
| Core cross-section | | 0.75 mm ² |
| Housing material | | Crastin (PBT), black |
| Sensing face | | Crastin (PBT), black |
| Degree of protection | | IP68 |
| Cable | | |
| Cable diameter | | 6.8 mm ± 0.2 mm |
| Bending radius | | > 10 x cable diameter |
| Note | | only for non-ferrous metal |

General information

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

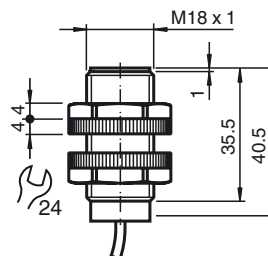
Compliance with standards and directives

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

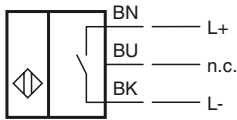
Approvals and certificates

| | | |
|--------------------|--|--|
| EAC conformity | | TR CU 012/2011 |
| FM approval | | |
| Control drawing | | 116-0165 |
| UL approval | | cULus Listed, General Purpose |
| Ordinary Location | | E87056 |
| Hazardous Location | | E501628 |
| Control drawing | | 116-0454 |
| CCC approval | | CCC approval / marking not required for products rated ≤36 V |

Dimensions



Electrical Connection



Data for application in connection with hazardous areas

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

Equipment protection level Ga

Type of protection intrinsic safety

CE marking  0102**Certificates**

Appropriate type NJ 3-18GK-S1N...

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 ≤ 70 nF
A cable length of 10 m is considered.Effective internal inductance L_i ≤ 200 μ H
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.
Keep to the lower of the two values.

for ATEX

at $U_i = 16$ V , $I_i = 25$ mA , $P_i = 34$ 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 $U_i = 16$ V , $I_i = 25$ mA , $P_i = 64$ 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 $U_i = 16$ V , $I_i = 52$ mA , $P_i = 169$ 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 $U_i = 16$ V , $I_i = 76$ mA , $P_i = 242$ 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 $U_i = 16$ V , $I_i = 25$ mA , $P_i = 34$ 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 $U_i = 16$ V , $I_i = 25$ mA , $P_i = 64$ 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 $U_i = 16$ V , $I_i = 52$ mA , $P_i = 169$ mW ,
T6 : 51 °C (123.8 °F)
T5 : 66 °C (150.8 °F)
T4 : 80 °C (176 °F)
T3 : 80 °C (176 °F)
T2 : 80 °C (176 °F)
T1 : 80 °C (176 °F)

at $U_i = 16$ V , $I_i = 76$ mA , $P_i = 242$ 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 3-18GK-S1N... | |
| 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 | ≤ 70 nF A cable length of 10 m is considered. |
| Effective internal inductance | L_i | ≤ 200 μ H 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. Keep to the lower of the two values. at $U_i = 16$ V , $I_i = 25$ mA , $P_i = 34$ 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 $U_i = 16$ V , $I_i = 25$ mA , $P_i = 64$ 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 $U_i = 16$ V , $I_i = 52$ mA , $P_i = 169$ mW , T6 : 51 °C (123.8 °F) T5 : 66 °C (150.8 °F) T4 : 80 °C (176 °F) T3 : 80 °C (176 °F) T2 : 80 °C (176 °F) T1 : 80 °C (176 °F) at $U_i = 16$ V , $I_i = 76$ mA , $P_i = 242$ 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 Gc (ic)

| | | |
|---|--|---|
| Type of protection | intrinsic safety | |
| CE marking | CE | |
| Certificates | | |
| ATEX certificate | PF 13 CERT 2895 X | |
| ATEX marking | II 3G Ex ic IIC T6...T1 Gc | |
| Standards | EN 60079-0:2012+A11:2013 , EN 60079-11:2012 | |
| Effective internal capacitance | C_i | ≤ 70 nF A cable length of 10 m is considered. |
| Effective internal inductance | L_i | ≤ 200 μ H 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. Keep to the lower of the two values. at $U_i = 20$ V , $I_i = 25$ mA , $P_i = 34$ mW , T6 : 70 °C (158 °F) T5 : 85 °C (185 °F) T4 : 100 °C (212 °F) T3 : 100 °C (212 °F) T2 : 100 °C (212 °F) T1 : 100 °C (212 °F) at $U_i = 20$ V , $I_i = 25$ mA , $P_i = 64$ 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 $U_i = 20$ V , $I_i = 52$ mA , $P_i = 169$ mW , T6 : 51 °C (123.8 °F) T5 : 66 °C (150.8 °F) T4 : 80 °C (176 °F) T3 : 80 °C (176 °F) T2 : 80 °C (176 °F) T1 : 80 °C (176 °F) at $U_i = 20$ V , $I_i = 76$ mA , $P_i = 242$ 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 Gc (nA)

| | |
|---|--|
| Type of protection | "n" |
| CE marking | CE |
| Certificates | |
| ATEX certificate | PF 15CERT3754 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. Keep to the lower of the two values. using an amplifier in accordance with EN 60947-5-6 : 58 °C (136.4 °F) 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 | CE 0102 |
| Certificates | |
| Appropriate type | NJ 3-18GK-S1N... |
| 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_i | $\leq 70\text{ nF}$ A cable length of 10 m is considered. |
| Effective internal inductance L_i | $\leq 200\ \mu\text{H}$ 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. Keep to the lower of the two values. at $U_i = 16\text{ V}$, $I_i = 25\text{ mA}$, $P_i = 34\text{ mW}$: 100 °C (212 °F) at $U_i = 16\text{ V}$, $I_i = 25\text{ mA}$, $P_i = 64\text{ mW}$: 100 °C (212 °F) at $U_i = 16\text{ V}$, $I_i = 52\text{ mA}$, $P_i = 169\text{ mW}$: 80 °C (176 °F) at $U_i = 16\text{ V}$, $I_i = 76\text{ mA}$, $P_i = 242\text{ mW}$: 61 °C (141.8 °F) |

Equipment protection level Dc

| | |
|---|--|
| Type of protection | Protection by enclosure "tc" |
| CE marking | CE |
| Certificates | |
| 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. Keep to the lower of the two values. using an amplifier in accordance with EN 60947-5-6 : 58 °C (136.4 °F) at $U_{Bmax} = 9\text{ V}$, $R_V = 562\ \Omega$: 58 °C (136.4 °F) |

Equipment protection level Mb

| | |
|---|--|
| Type of protection | intrinsic safety |
| Certificates | |
| Appropriate type | NJ 3-18GK-S1N... |
| 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 | $\leq 70\text{ nF}$ A cable length of 10 m is considered. |
| Effective internal inductance L_i | $\leq 200\ \mu\text{H}$ 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. Keep to the lower of the two values. at $U_i = 16\text{ V}$, $I_i = 25\text{ mA}$, $P_i = 34\text{ mW}$: 100 °C (212 °F) at $U_i = 16\text{ V}$, $I_i = 25\text{ mA}$, $P_i = 64\text{ mW}$: 100 °C (212 °F) at $U_i = 16\text{ V}$, $I_i = 52\text{ mA}$, $P_i = 169\text{ mW}$: 80 °C (176 °F) at $U_i = 16\text{ V}$, $I_i = 76\text{ mA}$, $P_i = 242\text{ mW}$: 61 °C (141.8 °F) |

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