



Model Number

NJ3-18GK-S1N

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

2-wire

Nominal ratings

Nominal voltage	U_o	8.2 V
Switching frequency	f	0 ... 200 Hz
Suitable for 2:1 technology		yes, Reverse polarity protection diode not required
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)
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Mechanical specifications

Connection type	cable silicone, 2 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
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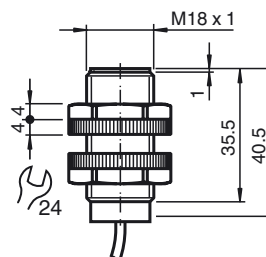
Compliance with standards and directives

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

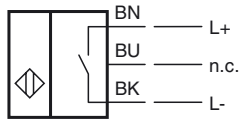
Approvals and certificates

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)	

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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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