



Model Number

NJ5-18GK-SN-10M

Features

- 5 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 as an integral part of this product's documentation.

Technical Data

General specifications

Switching function	Normally closed (NC)
Output type	NAMUR with safety function
Rated operating distance	s_n 5 mm
Installation	flush
Assured operating distance	s_a 0 ... 4.05 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 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 ... 500 Hz
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA

Functional safety related parameters

Safety Integrity Level (SIL)	SIL 3
MTTF _d	11850 a
Mission Time (T _M)	20 a
Diagnostic Coverage (DC)	0 %

Ambient conditions

Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
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Mechanical specifications

Connection type	cable silicone, 10 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 mm $\pm$ 0.2 mm
Bending radius	> 10 x cable diameter

General information

Use in the hazardous area	see instruction manuals
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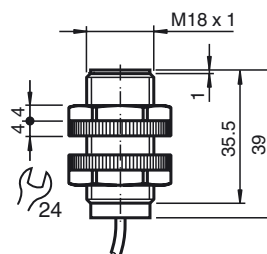
Compliance with standards and directives

Standard conformity	
NAMUR	EN 60947-5-6:2000 IEC 60947-5-6:1999
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

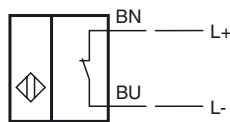
EAC conformity	TR CU 012/2011
FM approval	
Control drawing	116-0165
UL approval	cULus Listed, General Purpose
Ordinary Location	E87056
Hazardous Location	E501628
Control drawing	116-0454
CCC approval	CCC approval / marking not required for products rated ≤ 36 V

Dimensions





Electrical Connection



Data for application in connection with hazardous areas

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

Type of protection	intrinsic safety
CE marking	CE 0102

Certificates

Appropriate type	NJ5-18GK-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	$\leq 120 \text{ nF}$ A cable length of 10 m is considered.
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Effective internal inductance	L_i	$\leq 200 \text{ }\mu\text{H}$ A cable length of 10 m is considered.
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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.
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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 : 80 °C (176 °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	NJ5-18GK-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 _i	≤ 120 nF A cable length of 10 m is considered.
Effective internal inductance	L _i	≤ 200 μH 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		
Certificates		
ATEX certificate	PF13CERT2895 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	$\leq 120\text{ nF}$ A cable length of 10 m is considered.
Effective internal inductance	L_i	$\leq 200\text{ }\mu\text{H}$ 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 $U_i = 20\text{ V}$, $I_i = 25\text{ mA}$, $P_i = 34\text{ mW}$, T6 : $70\text{ }^{\circ}\text{C}$ ($158\text{ }^{\circ}\text{F}$) T5 : $85\text{ }^{\circ}\text{C}$ ($185\text{ }^{\circ}\text{F}$) T4 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) T3 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) T2 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) T1 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) at $U_i = 20\text{ V}$, $I_i = 25\text{ mA}$, $P_i = 64\text{ mW}$, T6 : $69\text{ }^{\circ}\text{C}$ ($156.2\text{ }^{\circ}\text{F}$) T5 : $84\text{ }^{\circ}\text{C}$ ($183.2\text{ }^{\circ}\text{F}$) T4 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) T3 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) T2 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) T1 : $100\text{ }^{\circ}\text{C}$ ($212\text{ }^{\circ}\text{F}$) at $U_i = 20\text{ V}$, $I_i = 52\text{ mA}$, $P_i = 169\text{ mW}$, T6 : $51\text{ }^{\circ}\text{C}$ ($123.8\text{ }^{\circ}\text{F}$) T5 : $66\text{ }^{\circ}\text{C}$ ($150.8\text{ }^{\circ}\text{F}$) T4 : $80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$) T3 : $80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$) T2 : $80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$) T1 : $80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$) at $U_i = 20\text{ V}$, $I_i = 76\text{ mA}$, $P_i = 242\text{ mW}$, T6 : $39\text{ }^{\circ}\text{C}$ ($102.2\text{ }^{\circ}\text{F}$) T5 : $54\text{ }^{\circ}\text{C}$ ($129.2\text{ }^{\circ}\text{F}$) T4 : $61\text{ }^{\circ}\text{C}$ ($141.8\text{ }^{\circ}\text{F}$) T3 : $61\text{ }^{\circ}\text{C}$ ($141.8\text{ }^{\circ}\text{F}$) T2 : $61\text{ }^{\circ}\text{C}$ ($141.8\text{ }^{\circ}\text{F}$) T1 : $61\text{ }^{\circ}\text{C}$ ($141.8\text{ }^{\circ}\text{F}$)	

Equipment protection level Gc (nA)

Type of protection	"n"
CE marking	CE
Certificates	
ATEX certificate	PF 15CERT3754 X
ATEX marking	Ex 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} , 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 Da

Type of protection	intrinsic safety
CE marking	CE 0102
Certificates	
Appropriate type	NJ5-18GK-SN...
ATEX certificate	PTB 00 ATEX 2049 X
ATEX marking	Ex II 1D Ex ia IIC T135°C Da
Standards	EN 60079-0:2012+A11:2013, EN 60079-11:2012
IECEx certificate	IECEx PTB 11.0092X
IECEx marking	Ex ia IIC T135°C Da
Standards	IEC 60079-0:2011, IEC 60079-11:2011
Effective internal capacitance C_i	$\leq 120\text{ nF}$ 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 15CERT3774 X
ATEX marking	Ex II 3D Ex tc IIC 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 current I_{Amax} , maximum analog output voltage U_{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	NJ5-18GK-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	$\leq 120\text{ nF}$ 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)