



Model Number

NJ2-11-SN

Features

- 2 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.

Accessories

BF 11
Mounting flange, 11 mm

Technical Data

General specifications

Switching function	Normally closed (NC)
Output type	NAMUR with safety function
Rated operating distance	2 mm
Installation	flush
Assured operating distance	0 ... 1.62 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 ... 3000 Hz
Suitable for 2:1 technology		yes, with reverse polarity protection diode
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	10660 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, 2 m
Core cross-section	0.34 mm ²
Housing material	Valox (PBT), black
Sensing face	Valox (PBT), black
Degree of protection	IP68
Cable	
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

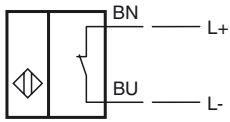
Approvals and certificates

FM approval	
Control drawing	116-0165
UL approval	cULus Listed, General Purpose
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 (nA) , Da , Dc , Mb
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Equipment protection level Ga

Type of protection	intrinsic safety
CE marking	CE 0102

Certificates

Appropriate type	NJ 2-11-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	$\leq 50 \mu F$ A cable length of 10 m is considered.
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Effective internal inductance	L_i	$\leq 150 \mu H$ 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 $U_i = 16 V$, $I_i = 25 mA$, $P_i = 34 mW$,
 T6 : 56 °C (132.8 °F)
 T5 : 68 °C (154.4 °F)
 T4 : 96 °C (204.8 °F)
 T3 : 96 °C (204.8 °F)
 T2 : 96 °C (204.8 °F)
 T1 : 96 °C (204.8 °F)

at $U_i = 16 V$, $I_i = 25 mA$, $P_i = 64 mW$,
 T6 : 49 °C (120.2 °F)
 T5 : 61 °C (141.8 °F)
 T4 : 89 °C (192.2 °F)
 T3 : 89 °C (192.2 °F)
 T2 : 89 °C (192.2 °F)
 T1 : 89 °C (192.2 °F)

at $U_i = 16 V$, $I_i = 52 mA$, $P_i = 169 mW$,
 T6 : 28 °C (82.4 °F)
 T5 : 40 °C (104 °F)
 T4 : 68 °C (154.4 °F)
 T3 : 68 °C (154.4 °F)
 T2 : 68 °C (154.4 °F)
 T1 : 68 °C (154.4 °F)

at $U_i = 16 V$, $I_i = 76 mA$, $P_i = 242 mW$,
 T6 : 13 °C (55.4 °F)
 T5 : 25 °C (77 °F)
 T4 : 53 °C (127.4 °F)
 T3 : 53 °C (127.4 °F)
 T2 : 53 °C (127.4 °F)
 T1 : 53 °C (127.4 °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 : 66 °C (150.8 °F)
 T5 : 81 °C (177.8 °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 : 45 °C (113 °F)
 T5 : 60 °C (140 °F)
 T4 : 89 °C (192.2 °F)
 T3 : 89 °C (192.2 °F)
 T2 : 89 °C (192.2 °F)
 T1 : 89 °C (192.2 °F)

at $U_i = 16 V$, $I_i = 76 mA$, $P_i = 242 mW$,
 T6 : 30 °C (86 °F)
 T5 : 45 °C (113 °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)

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Equipment protection level Gb

Type of protection	intrinsic safety	
CE marking	CE 0102	
Certificates		
Appropriate type	NJ 2-11-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	≤ 50 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 150 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 : 66 °C (150.8 °F) T5 : 81 °C (177.8 °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 : 45 °C (113 °F) T5 : 60 °C (140 °F) T4 : 89 °C (192.2 °F) T3 : 89 °C (192.2 °F) T2 : 89 °C (192.2 °F) T1 : 89 °C (192.2 °F) at $U_i = 16 V$, $I_i = 76 mA$, $P_i = 242 mW$, T6 : 30 °C (86 °F) T5 : 45 °C (113 °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)	

Equipment protection level Gc (nA)

Type of protection	"n"	
CE marking	CE	
Certificates		
ATEX certificate	PF 15 CERT 3754 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 : 57 °C (134.6 °F) at $U_{Bmax} = 9 V$, $R_V = 562 \Omega$: 57 °C (134.6 °F)	

Equipment protection level Da

Type of protection	intrinsic safety	
CE marking	CE 0102	
Certificates		
Appropriate type	NJ 2-11-SN...	
ATEX certificate	PTB 00 ATEX 2049 X	
ATEX marking	Ex 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	≤ 50 nF A cable length of 10 m is considered.
Effective internal inductance	L_i	≤ 150 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 $U_i = 16 V$, $I_i = 25 mA$, $P_i = 34 mW$: 100 °C (212 °F) at $U_i = 16 V$, $I_i = 25 mA$, $P_i = 64 mW$: 100 °C (212 °F) at $U_i = 16 V$, $I_i = 52 mA$, $P_i = 169 mW$: 89 °C (192.2 °F) at $U_i = 16 V$, $I_i = 76 mA$, $P_i = 242 mW$: 74 °C (165.2 °F)	

Equipment protection level Dc

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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 : 57 °C (134.6 °F) at $U_{Bmax} = 9 V$, $R_V = 562 \Omega$: 57 °C (134.6 °F)	
Equipment protection level Mb		
Type of protection	intrinsic safety	
Certificates		
Appropriate type	NJ 2-11-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	$\leq 50 \text{ nF}$ A cable length of 10 m is considered.
Effective internal inductance	L_i	$\leq 150 \mu\text{H}$ 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 $U_i = 16 V$, $I_i = 25 \text{ mA}$, $P_i = 34 \text{ mW}$: 100 °C (212 °F) at $U_i = 16 V$, $I_i = 25 \text{ mA}$, $P_i = 64 \text{ mW}$: 100 °C (212 °F) at $U_i = 16 V$, $I_i = 52 \text{ mA}$, $P_i = 169 \text{ mW}$: 89 °C (192.2 °F) at $U_i = 16 V$, $I_i = 76 \text{ mA}$, $P_i = 242 \text{ mW}$: 74 °C (165.2 °F)	