



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	s_n 2 mm
Installation	flush
Assured operating distance	s_a 0 ... 1.62 mm
Reduction factor r_{Al}	0.4
Reduction factor r_{Cu}	0.3
Reduction factor r_{304}	0.85
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

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
Category	1G; 2G; 3G; 1D; 3D

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

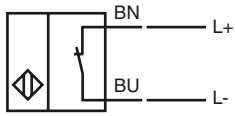
Approvals and certificates

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



Release date: 2017-04-12 10:41 Date of issue: 2017-04-12 250951_eng.xml

Equipment protection level Ga

Effective internal inductivity	C_i
Effective internal inductance	L_i
Ambient temperature	

$\leq 50 \text{ nF}$; a cable length of 10 m is considered.

$\leq 150 \text{ }\mu\text{H}$; a cable length of 10 m is considered.

Details of the correlation between the type of circuit connected, the maximum permissible ambient temperature, the temperature class, and the effective internal reactance values can be found on the EC-type examination certificate. **Note:** Use the temperature table for category 1 !!! The 20 % reduction in accordance with EN 1127-1 has already been applied to the temperature table for category 1.

Equipment protection level Gb

Effective internal inductivity C_i
 Effective internal inductance L_i
 Maximum permissible ambient temperature T_{amb}

$\leq 50 \text{ nF}$; a cable length of 10 m is considered.

$\leq 150 \text{ }\mu\text{H}$; a cable length of 10 m is considered.

Details of the correlation between the type of circuit connected, the maximum permissible ambient temperature, the temperature class, and the effective internal reactance values can be found on the EC-type examination certificate.

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Equipment protection level Gc (nA)

Instruction

Device category 3G (nA)

Certificate

CE marking

ATEX marking

Standards

General

Installation, commissioning

Maintenance

Special conditionsMinimum series resistance R_V Maximum operating voltage U_{Bmax} Maximum permissible ambient temperature T_{Umax} at $U_{Bmax}=9\text{ V}$, $R_V=562\ \Omega$

using an amplifier in accordance with EN 60947-5-6

Protection from mechanical danger

Protection from UV light

Protection of the connection cable

Protection against transients

Material selection accessories

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PF 15CERT3754 X

CE

II 3G Ex nA IIC T6 Gc

The Ex-related marking can also be printed on the enclosed label.

EN 60079-0:2012+A11:2013, EN 60079-15:2010

Ignition protection category "n"

Use is restricted to the following stated conditions

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The data stated in the data sheet are restricted by this operating instruction! The special conditions must be observed!

Laws and/or regulations and standards governing the use or intended usage goal must be observed. If the Ex-related marking is printed only on the supplied label, then this must be attached in the immediate vicinity of the sensor. The sticking surface for the label must be clean and free from grease. The attached label must be legible and indelible, including in the event of possible chemical corrosion.

No changes can be made to apparatus, which are operated in hazardous areas.

Repairs to these apparatus are not possible.

A minimum series resistance R_V is to be provided between the power supply voltage and the proximity switch in accordance with the following list. This can also be assured by using a switch amplifier.

The maximum permissible operating voltage U_{Bmax} is restricted to the values in the following list. Tolerances are not permissible.

Values can be obtained from the following list, depending on the max. operating voltage U_{Bmax} and the minimum series resistance R_V .

57 °C (134.6 °F)

57 °C (134.6 °F)

The sensor must not be exposed to **ANY FORM** of mechanical danger.

The sensor and the connection cable must be protected from damaging UV-radiation. This can be achieved when the sensor is used in internal areas.

The connection cable must be prevented from being subjected to tension and torsional loading.

Ensure transient protection is provided and that the maximum value of the transient protection (140% of 85 V) is not exceeded.

When selecting accessories, ensure that the material allows the temperature of the enclosure to rise to up to 70 °C.

Equipment protection level Da

Instruction

Device category 1D

EC-Type Examination Certificate

CE marking

ATEX marking

Standards

Appropriate type

Effective internal inductivity C_i Effective internal inductance L_i

General

Permissible ambient temperature range

Installation, commissioning

Maintenance

Special conditions

Protection from mechanical danger

Electrostatic charge

Degree of protection required when installing connecting components

Manual electrical apparatus for hazardous areas

for use in hazardous areas with combustible dust

PTB 00 ATEX 2049 X

CE 0102

Ex II 1D Ex ia IIC T135°C Da

The Ex-related marking can also be printed on the enclosed label.

EN 60079-0:2012+A11:2013 EN 60079-11:2012

Ignition protection "Intrinsic safety" Use is restricted to the following stated conditions

NJ 2-11-SN...

 ≤ 50 nF ; a cable length of 10 m is considered. ≤ 150 μ H

A cable length of 10 m is considered.

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual. The EU-type examination certificate has to be observed. The ATEX directive and therefore the EU-type-examination certificates generally apply only to the use of electrical apparatus under atmospheric conditions. The device has been checked for suitability for use at ambient temperatures of ≥ 60 °C by the named certification authority. The surface temperature of the device remains within the required limits.

For the use of apparatus outside of atmospheric conditions, a reduction of the permissible minimum ignition energies may need to be considered.

Details of the correlation between the type of circuit connected, the maximum permissible ambient temperature, the surface temperature, and the effective internal reactance values can be found on the EC-type-examination certificate. **The maximum permissible ambient temperature of the data sheet must be noted, in addition, the lower of the two values must be maintained.**

Laws and/or regulations and standards governing the use or intended usage goal must be observed. The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety. If the Ex-related marking is printed only on the supplied label, then this must be attached in the immediate vicinity of the sensor. The sticking surface for the label must be clean and free from grease. The attached label must be legible and indelible, including in the event of possible chemical corrosion.

No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

When using the device in a temperature range of -60 °C to -20 °C, protect the sensor against the effects of impact by installing an additional enclosure. The information regarding the minimum ambient temperature for the sensor as provided in the datasheet must also be observed.

Do not attach the nameplate provided in areas where electrostatic charge can build up.

The connecting parts of the sensor must be set up in such a way that degree of protection IP20, in accordance with IEC 60529, is achieved as a minimum.

Equipment protection level Dc (tc)

Instruction

Device category 3D

Certificate

CE marking

ATEX marking

Standards

General

Installation, commissioning

Maintenance

Special conditionsMinimum series resistance R_V Maximum operating voltage U_{Bmax} Maximum permissible ambient temperature T_{Umax} at $U_{Bmax}=9\text{ V}$, $R_V=562\ \Omega$

using an amplifier in accordance with EN 60947-5-6

Protection from mechanical danger

Protection from UV light

Protection of the connection cable

Electrostatic charge

Manual electrical apparatus for hazardous areas

for use in hazardous areas with combustible dust

PF 15CERT3774 X

CE

Ex II 3D Ex tc IIIC T80°C Dc

The Ex-related marking can also be printed on the enclosed label.

EN 60079-0:2012+A11:2013, EN 60079-31:2014

Protection by enclosure "tc" Some of the information in this instruction manual is more specific than the information provided in the datasheet.

The corresponding datasheets, declarations of conformity, EC-type examination certificates, certifications, and control drawings, where applicable (see datasheets), form an integral part of this document. These documents can be found at www.pepperl-fuchs.com. The maximum surface temperature of the device was determined without a layer of dust on the apparatus. Some of the information in this instruction manual is more specific than the information provided in the datasheet.

Laws and/or regulations and standards governing the use or intended usage goal must be observed. If the Ex-related marking is printed only on the supplied label, then this must be attached in the immediate vicinity of the sensor. The sticking surface for the label must be clean and free from grease. The attached label must be legible and indelible, including in the event of possible chemical corrosion.

No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

A minimum series resistance R_V is to be provided between the power supply voltage and the proximity switch in accordance with the following list. This can also be assured by using a switch amplifier.

The maximum permissible operating voltage U_{Bmax} must be restricted to the values given in the following list. Tolerances are not permitted.

Values can be obtained from the following list, depending on the max. operating voltage $U_{b\ max}$ and the minimum series resistance R_V .

57 °C (134.6 °F)

57 °C (134.6 °F)

The sensor must not be exposed to **ANY FORM** of mechanical danger.

The sensor and the connection cable must be protected from damaging UV-radiation. This can be achieved when the sensor is used in internal areas.

The connection cable must be prevented from being subjected to tension and torsional loading.

Do not attach the nameplate provided in areas where electrostatic charge can build up.