



Model Number

NJ2-11-N

Features

- 2 mm flush
- Usable up to SIL 2 acc. to IEC 61508

Accessories

BF 11
Mounting flange, 11 mm

Technical Data

General specifications

| | | |
|----------------------------|-------|----------------------|
| Switching function | | Normally closed (NC) |
| Output type | | NAMUR |
| Rated operating distance | s_n | 2 mm |
| Installation | | flush |
| Assured operating distance | s_a | 0 ... 1.62 mm |
| Actual operating distance | s_r | 1.8 ... 2.2 mm |
| Reduction factor r_{AI} | | 0.4 |
| Reduction factor r_{CU} | | 0.3 |
| Reduction factor r_{304} | | 0.85 |

Nominal ratings

| | | |
|------------------------------|-------|--------------------------------------|
| Nominal voltage | U_o | 8.2 V (R_i approx. 1 k Ω) |
| Switching frequency | f | 0 ... 3000 Hz |
| Hysteresis | H | 0.5 ... 3.5 typ. 2 % |
| Current consumption | | |
| Measuring plate not detected | | ≥ 3 mA |
| Measuring plate detected | | ≤ 1 mA |

Functional safety related parameters

| | |
|--------------------------|--------|
| MTTF _d | 5887 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 PVC , 2 m |
| Core cross-section | 0.34 mm ² |
| Housing material | PVDF |
| Sensing face | PVDF |
| 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 IEC 60947-5-2:2007 |

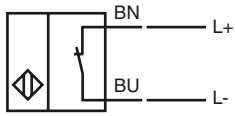
Approvals and certificates

| | |
|-----------------|--|
| 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



Equipment protection level Ga

Instruction

Device category 1G
 EC-Type Examination Certificate
 CE marking

ATEX marking

Standards

Appropriate type

Effective internal inductivity C_i Effective internal inductance L_i

General

Ambient temperature

Installation, commissioning

Maintenance

Special conditions


Protection from mechanical danger

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PTB 00 ATEX 2048 X

CE 0102

 II 1G Ex ia IIC T6...T1 Ga 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-N...

≤ 45 nF ; a cable length of 10 m is considered.

≤ 50 μH ; 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 special conditions must be adhered to!

The ATEX directive and therefore the EU-type examination certificates apply in general only to the use of electrical apparatus under atmospheric conditions.

The use in ambient temperatures of > 60 °C was tested with regard to hot surfaces by the mentioned certification authority.

If the equipment is not used under atmospheric conditions, a reduction of the permissible minimum ignition energies may have to be taken into consideration.

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.

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.

The associated apparatus must satisfy the requirements of category ia.

Due to the possible danger of ignition, which can arise due to faults and/or transient currents in the equipotential bonding system, galvanic isolation of the power supply and signal circuit is preferable. Associated apparatus without electrical isolation must only be used if the appropriate requirements of IEC 60079-14 are met. 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.

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.

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.

Equipment protection level Gb

Instruction

Device category 2G

EC-Type Examination Certificate

CE marking

ATEX marking

Standards

Appropriate type

Effective internal inductivity C_i Effective internal inductance L_i

General

Maximum permissible ambient temperature T_{amb}

Installation, commissioning

Maintenance

Special conditions


Protection from mechanical danger

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PTB 00 ATEX 2048 X

CE 0102

 II 1G Ex ia IIC T6...T1 Ga 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-N...

 $\leq 45 \text{ nF}$; a cable length of 10 m is considered. $\leq 50 \text{ }\mu\text{H}$; 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 special conditions must be adhered to!

The ATEX directive and therefore the EU-type examination certificates apply in general only to the use of electrical apparatus under atmospheric conditions.

The use in ambient temperatures of $> 60 \text{ }^\circ\text{C}$ was tested with regard to hot surfaces by the mentioned certification authority.

If the equipment is not used under atmospheric conditions, a reduction of the permissible minimum ignition energies may have to be taken into consideration.

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.

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.

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.

When using the device in a temperature range of $-60 \text{ }^\circ\text{C}$ to $-20 \text{ }^\circ\text{C}$, 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.

Equipment protection level Gc (nL)

Note

This instruction is only valid for products according to EN 60079-15:2005, valid until 01-May-2013

Instruction**Manual electrical apparatus for hazardous areas****Device category 3G (nL)**

for use in hazardous areas with gas, vapour and mist

CE marking

CE 0102

ATEX marking

Ex II 3G Ex nL IIC T6 X

Standard conformity

EN 60079-15:2005 Ignition protection category "n"
Use is restricted to the following stated conditions

Effective internal capacitance C_i

≤ 45 nF ; a cable length of 10 m is considered.

Effective internal inductance L_i

≤ 50 μ H ; A cable length of 10 m is considered.

General

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!

The ATEX Directive applies only to the use of apparatus under atmospheric conditions.

If you use the device outside atmospheric conditions, consider that the permissible safety parameters should be reduced.

Installation, commissioning

Laws and/or regulations and standards governing the use or intended usage goal must be observed. The sensor must only be operated with an energy-limited circuit, which satisfies the requirements of IEC 60079-15. The explosion group complies with the connected, supplying, power limiting circuit.

Maintenance

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

Special conditions

for $P_i=34$ mW, $I_i=25$ mA, T6

55 °C (131 °F)

for $P_i=34$ mW, $I_i=25$ mA, T5

55 °C (131 °F)

for $P_i=34$ mW, $I_i=25$ mA, T4-T1

55 °C (131 °F)

for $P_i=64$ mW, $I_i=25$ mA, T6

55 °C (131 °F)

for $P_i=64$ mW, $I_i=25$ mA, T5

55 °C (131 °F)

for $P_i=64$ mW, $I_i=25$ mA, T4-T1

55 °C (131 °F)

for $P_i=169$ mW, $I_i=52$ mA, T6

35 °C (95 °F)

for $P_i=169$ mW, $I_i=52$ mA, T5

35 °C (95 °F)

for $P_i=169$ mW, $I_i=52$ mA, T4-T1

35 °C (95 °F)

for $P_i=242$ mW, $I_i=76$ mA, T6

20 °C (68 °F)

for $P_i=242$ mW, $I_i=76$ mA, T5

20 °C (68 °F)

for $P_i=242$ mW, $I_i=76$ mA, T4-T1

20 °C (68 °F)

Protection from mechanical danger

The sensor must not be exposed to **ANY FORM** of mechanical danger. When used in the temperature range below -20 °C the sensor should be protected from knocks by the provision of an additional housing.

Protection from UV light

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.

Protection of the connection cable

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

Connection parts

The connection parts are to be installed, such that a minimum protection class of IP20 is achieved, in accordance with IEC 60529.

Equipment protection level Gc (ic)

Instruction

Device category 3G (ic)

Certificate of Compliance

CE marking

ATEX marking

Standards

Effective internal inductivity C_i Effective internal inductance L_i

General

Installation, commissioning

Maintenance

Special conditionsfor $P_i=34$ mW, $I_i=25$ mA, T6for $P_i=34$ mW, $I_i=25$ mA, T5for $P_i=34$ mW, $I_i=25$ mA, T4-T1for $P_i=64$ mW, $I_i=25$ mA, T6for $P_i=64$ mW, $I_i=25$ mA, T5for $P_i=64$ mW, $I_i=25$ mA, T4-T1for $P_i=169$ mW, $I_i=52$ mA, T6for $P_i=169$ mW, $I_i=52$ mA, T5for $P_i=169$ mW, $I_i=52$ mA, T4-T1for $P_i=242$ mW, $I_i=76$ mA, T6for $P_i=242$ mW, $I_i=76$ mA, T5for $P_i=242$ mW, $I_i=76$ mA, T4-T1

Protection from mechanical danger

Connection parts

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

PF 13 CERT 2895 X

CE

Ⓔ II 3G Ex ic IIC T6...T1 Gc

The Ex-significant identification is on the enclosed adhesive label

EN 60079-0:2012+A11:2013 EN 60079-11:2012 Ignition protection category "ic"
Use is restricted to the following stated conditions ≤ 45 nF ; a cable length of 10 m is considered. ≤ 50 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 data stated in the data sheet are restricted by this operating instruction!

The special conditions must be observed!

The ATEX Directive applies only to the use of apparatus under atmospheric conditions.

If you use the device outside atmospheric conditions, consider that the permissible safety parameters should be reduced.

Laws and/or regulations and standards governing the use or intended usage goal must be observed. The sensor must only be operated with energy-limited circuits, which satisfy the requirements of IEC 60079-11. The explosion group complies with the connected, supplying, power limiting circuit. If the Ex-relevant identification is printed exclusively on the adhesive label provided, this label must be affixed in the immediate vicinity of the sensor! The background surface to which the adhesive label is to be applied must be clean and free from grease! The applied label must be durable and remain legible, with due consideration of the possibility of chemical corrosion!

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

55 °C (131 °F)

55 °C (131 °F)

55 °C (131 °F)

55 °C (131 °F)

55 °C (131 °F)

55 °C (131 °F)

35 °C (95 °F)

35 °C (95 °F)

35 °C (95 °F)

20 °C (68 °F)

20 °C (68 °F)

20 °C (68 °F)

The sensor must not be mechanically damaged.

When used in the temperature range below -20 °C the sensor should be protected from knocks by the provision of an additional housing.

The connection parts are to be installed, such that a minimum protection class of IP20 is achieved, in accordance with IEC 60529.

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

Maximum permissible ambient temperature T_{amb}

Installation, commissioning

Maintenance

Special conditions

Protection from mechanical danger


Electrostatic charge

Manual electrical apparatus for hazardous areas

for use in hazardous areas with combustible dust

PTB 00 ATEX 2048 X

CE 0102

 II 1D Ex ia IIIC 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-N...

 ≤ 45 nF ; a cable length of 10 m is considered. ≤ 50 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 apply in general only to the use of electrical apparatus under atmospheric conditions.

The use in ambient temperatures of > 60 °C was tested with regard to hot surfaces by the mentioned certification authority.

If the equipment is not used under atmospheric conditions, a reduction of the permissible minimum ignition energies may have to be taken into consideration.

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.

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.

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.

Equipment protection level Dc

| | | |
|--|------------|--|
| Note | | This instruction is only valid for products according to EN 50281-1-1, valid until 30-September-2008 Note the ex-marking on the sensor or on the enclosed adhesive label |
| Instruction | | Manual electrical apparatus for hazardous areas |
| Device category 3D | | for use in hazardous areas with non-conducting combustible dust |
| CE marking | |  0102 |
| ATEX marking | |  II 3D IP68 T 112 °C (233.6 °F) X |
| Standards | | EN 50281-1-1 Protection via housing Use is restricted to the following stated conditions |
| General | | 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 adhered to! |
| Installation, commissioning | | Laws and/or regulations and standards governing the use or intended usage goal must be observed. |
| Maintenance | | No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. |
| Special conditions | | |
| Maximum operating voltage | U_{Bmax} | The maximum permissible operating voltage U_{Bmax} must be restricted to the values given in the following list. Tolerances are not permitted. |
| Minimum series resistance | R_V | 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. |
| Maximum heating (Temperature rise) | | Values can be obtained from the following list, depending on the max. operating voltage U_{bmax} and the minimum series resistance R_V . |
| at $U_{Bmax}=9\text{ V}$, $R_V=562\ \Omega$ | | 12 K |
| using an amplifier in accordance with EN 60947-5-6 | | 12 K |
| Protection from mechanical danger | | The sensor must not be mechanically damaged. |
| Protection of the connection cable | | The connection cable must be prevented from being subjected to tension and torsional loading. |

Equipment protection level Dc (tD)

Note

This instruction is only valid for products according to EN 61241-0:2006 and EN 61241-1:2004
Note the ex-marking on the sensor or on the enclosed adhesive label

Instruction

Manual electrical apparatus for hazardous areas

Device category 3D

for use in hazardous areas with non-conducting combustible dust

CE marking

CE I

ATEX marking

Ex II 3D Ex tD A22 IP67 T80°C X

Standards

EN 61241-0:2006, EN 61241-1:2004
Protection via housing "tD"

Use is restricted to the following stated conditions

General

The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.
The maximum surface temperature has been determined in accordance with method A without a dust layer on the equipment.
The data stated in the data sheet are restricted by this operating instruction!
The special conditions must be adhered to!

Installation, commissioning

Laws and/or regulations and standards governing the use or intended usage goal must be observed.

Maintenance

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

Repairs to these apparatus are not possible.

Special conditions

Minimum series resistance R_V

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.

Maximum operating voltage U_{Bmax}

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

Maximum permissible ambient temperature T_{Umax}

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

at $U_{Bmax}=9V$, $R_V=562\Omega$

57 °C (134.6 °F)

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

57 °C (134.6 °F)

Protection from mechanical danger

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

Protection from UV light

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.

Protection of the connection cable

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