



Model Number

NJ5-11-N-G

Features

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

Technical Data

General specifications

Switching function	Normally closed (NC)
Output type	NAMUR
Rated operating distance	s_n 5 mm non-flush
Installation	
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
Output type	2-wire

Nominal ratings

Nominal voltage	U_o 8.2 V (R_i approx. 1 k Ω)
Switching frequency	f 0 ... 3000 Hz
Hysteresis	H typ. 5 %
Suitable for 2:1 technology	yes, Reverse polarity protection diode not required
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA

Functional safety related parameters

MTTF _d	11774 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 PVC, 2 m
Core cross-section	0.34 mm ²
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	PVDF
Degree of protection	IP68
Cable	
Bending radius	> 10 x cable diameter

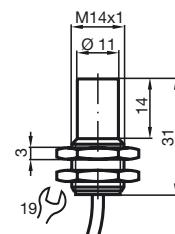
General information

Use in the hazardous area	see instruction manuals
Category	2G; 3G; 1D; 3D

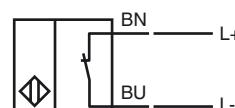
Compliance with standards and directives

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	
UL approval	cULus Listed, General Purpose
CCC approval	CCC approval / marking not required for products rated ≤ 36 V

Dimensions



Electrical Connection



Equipment protection level Gb

Instruction

Device category 2GEC-Type Examination Certificate
CE marking

ATEX marking

Standards

Appropriate type

Effective internal inductivity C_i
Effective internal inductance L_i
GeneralMaximum 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 gas, vapour and mist

PTB 00 ATEX 2048 X
CE 0102 II 2G Ex ia IIC T6...T1 Gb 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 5-11-N...

 $\leq 45 \text{ nF}$; a cable length of 10 m is considered. $\leq 50 \mu\text{H}$; 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 $> 60^\circ\text{C}$ 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°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.

Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding.

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)**

CE marking

for use in hazardous areas with gas, vapour and mist

CE 0102

ATEX marking

Standard conformity

Ex II 3G Ex nL IIC T6 X

EN 60079-15:2005 Ignition protection category "n"

Use is restricted to the following stated conditions

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

≤ 50 µH ; a cable length of 10 m is considered.

Effective internal capacitance C_i Effective internal inductance L_i

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.

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.

Installation, commissioning

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

Maintenance

Special conditionsfor $P_i=34$ 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

32 °C (89.6 °F)

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

32 °C (89.6 °F)

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

32 °C (89.6 °F)

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

16 °C (60.8 °F)

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

16 °C (60.8 °F)

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

16 °C (60.8 °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.

Electrostatic charge

Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding.

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

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

Certificate

for use in hazardous areas with gas, vapour and mist

CE marking

PF 13 CERT 2895 X

CE

ATEX marking

II 3G Ex ic IIC T6...T1 Gc

The Ex-significant identification is on the enclosed adhesive label

Standards

EN 60079-0:2012+A11:2013 EN 60079-11:2012 Ignition protection category "ic"

Effective internal inductivity C_i

Use is restricted to the following stated conditions

Effective internal inductance L_i $\leq 45 \text{ nF}$; a cable length of 10 m is considered.

General

 $\leq 50 \mu\text{H}$; A cable length of 10 m is considered.

Installation, commissioning

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.

Maintenance

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!

Special conditionsfor $P_i=34 \text{ mW}$, $I_i=25 \text{ mA}$, T6

55 °C (131 °F)

for $P_i=34 \text{ mW}$, $I_i=25 \text{ mA}$, T5

55 °C (131 °F)

for $P_i=34 \text{ mW}$, $I_i=25 \text{ mA}$, T4-T1

55 °C (131 °F)

for $P_i=64 \text{ mW}$, $I_i=25 \text{ mA}$, T6

55 °C (131 °F)

for $P_i=64 \text{ mW}$, $I_i=25 \text{ mA}$, T5

55 °C (131 °F)

for $P_i=64 \text{ mW}$, $I_i=25 \text{ mA}$, T4-T1

55 °C (131 °F)

for $P_i=169 \text{ mW}$, $I_i=52 \text{ mA}$, T6

55 °C (131 °F)

for $P_i=169 \text{ mW}$, $I_i=52 \text{ mA}$, T5

32 °C (89.6 °F)

for $P_i=169 \text{ mW}$, $I_i=52 \text{ mA}$, T4-T1

32 °C (89.6 °F)

for $P_i=242 \text{ mW}$, $I_i=76 \text{ mA}$, T6

32 °C (89.6 °F)

for $P_i=242 \text{ mW}$, $I_i=76 \text{ mA}$, T5

16 °C (60.8 °F)

for $P_i=242 \text{ mW}$, $I_i=76 \text{ mA}$, T4-T1

16 °C (60.8 °F)

Protection from mechanical danger

16 °C (60.8 °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.

Electrostatic charge

Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding.

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 Da

Instruction

Device category 1DEC-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

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 5-11-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 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.

Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding.

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

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	
ATEX marking	 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_B max and the minimum series resistance R_V .
at $U_{Bmax}=9$ V, $R_V=562$ Ω	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.
Electrostatic charge	Electrostatic charges must be avoided on the mechanical housing components. Dangerous electrostatic charges on the mechanical housing components can be avoided by incorporating these in the equipotential bonding.