0102

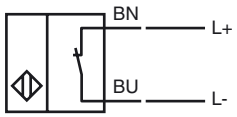
## Model Number

**NCN4-12GM35-N0**

## Features

- **4 mm non-flush**
- **Usable up to SIL2 acc. to IEC 61508**

## Connection

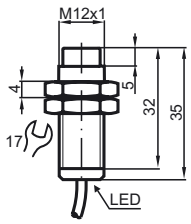



## Accessories

**EXG-12**
Quick mounting bracket with dead stop

**BF 12**
Mounting flange, 12 mm

## Dimensions




## Technical Data

| | | |
|---|---|---|
| **General specifications** | | |
| Switching element function | | NAMUR, NC |
| Rated operating distance | $s_n$ | 4 mm |
| Installation | | non-flush |
| Output polarity | | NAMUR |
| Assured operating distance | $s_a$ | 0 ... 3.24 mm |
| Reduction factor $r_{Al}$ | | 0.37 |
| Reduction factor $r_{Cu}$ | | 0.36 |
| Reduction factor $r_{304}$ | | 0.74 |
| **Nominal ratings** | | |
| Nominal voltage | $U_o$ | 8.2 V ($R_i$ approx. 1 kΩ) |
| Switching frequency | f | 0 ... 800 Hz |
| Hysteresis | H | 1 ... 10 typ. 5 % |
| Reverse polarity protected | | reverse polarity protected |
| Short-circuit protection | | yes |
| Current consumption | | |
| Measuring plate not detected | | ≥ 3 mA |
| Measuring plate detected | | ≤ 1 mA |
| Indication of the switching state | | all direction LED, yellow |
| **Functional safety related parameters** | | |
| $MTTF_d$ | | 2520 a |
| Mission Time ($T_M$) | | 20 a |
| Diagnostic Coverage (DC) | | 0 % |
| **Ambient conditions** | | |
| Ambient temperature | | -25 ... 100 °C (-13 ... 212 °F) |
| Storage temperature | | -40 ... 100 °C (-40 ... 212 °F) |
| **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 | | PBT |
| Protection degree | | IP66 / IP67 |
| **General information** | | |
| Scope of delivery | | 2 self locking nuts in scope of delivery |
| 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<br>IEC 60947-5-6:1999 |
| Electromagnetic compatibility | | NE 21:2007 |
| Standards | | EN 60947-5-2:2007<br>IEC 60947-5-2:2007 |
| **Approvals and certificates** | | |
| FM approval | | |
| Control drawing | | 116-0165F |
| UL approval | | cULus Listed, General Purpose |
| CSA approval | | cCSAus Listed, General Purpose |
| CCC approval | | Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval. |

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**ATEX 1G**

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|---|---|
| Instruction | **Manual electrical apparatus for hazardous areas** |
| Device category 1G | for use in hazardous areas with gas, vapour and mist |
| Directive conformity | 94/9/EG |
| Standard conformity | EN 60079-0:2006, EN 60079-11:2007, EN 60079-26:2007<br>Ignition protection "Intrinsic safety"<br>Use is restricted to the following stated conditions |
| CE symbol | CE 0102 |
| Ex-identification | Ex II 1G Ex ia IIC T6 |
| EC-Type Examination Certificate | PTB 00 ATEX 2048 X |
| Appropriate type | NCN4-12GM...-N0... |
| Effective internal capacitance $C_i$ | ≤ 95 nF ; a cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | ≤ 100 µH ; a cable length of 10 m is considered. |
| Cable length | Dangerous electrostatic charges on the fixed connection cable must be taken into account for lengths equal to and exceeding the following values: |
| Explosion group IIA | 100 cm |
| Explosion group IIB | 50 cm |
| Explosion group IIC | 8 cm |
| General | The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.<br>The EC-Type Examination Certificate has to be observed. The special conditions must be adhered to!<br>Directive 94/9/EG and hence also EC-Type Examination Certificates apply in general only to the use of electrical apparatus under atmospheric conditions.<br>The use in ambient temperatures of > 60 °C was tested with regard to hot surfaces by the mentioned certification authority.<br>If the equipment is not used under atmospheric conditions, a reduction of the permissible minimum ignition energies may have to be taken into consideration. |
| Highest permissible ambient temperature | The temperature ranges, according to temperature class, are given in the EC-Type Examination Certificate. Note: Use the temperature table for category 1 !!! The 20 % reduction in accordance with EN 1127-1:2007 has already been accounted for in the temperature table for category 1. |
| Installation, Comissioning | Laws and/or regulations and standards governing the use or intended usage goal must be observed.<br>The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety.<br>The associated apparatus must satisfy the requirements of category ia.<br>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. |
| Maintenance | No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. |

**Special conditions**

| | |
|---|---|
| Protection from 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. |
| Electrostatic charging | 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. |

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**ATEX 2G**

| | |
|---|---|
| Instruction | **Manual electrical apparatus for hazardous areas** |
| **Device category 2G** | for use in hazardous areas with gas, vapour and mist |
| Directive conformity | 94/9/EG |
| Standard conformity | EN 60079-0:2006, EN 60079-11:2007<br>Ignition protection "Intrinsic safety"<br>Use is restricted to the following stated conditions |
| CE symbol | CE 0102 |
| Ex-identification | Ex II 1G Ex ia IIC T6 |
| EC-Type Examination Certificate | PTB 00 ATEX 2048 X |
| Appropriate type | NCN4-12GM...-N0... |
| Effective internal capacitance $C_i$ | ≤ 95 nF ; a cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | ≤ 100 µH ; 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 EC-Type Examination Certificate has to be observed. The special conditions must be adhered to!<br>Directive 94/9/EG and hence also EC-Type Examination Certificates apply in general only to the use of electrical apparatus under atmospheric conditions.<br>The use in ambient temperatures of > 60 °C was tested with regard to hot surfaces by the mentioned certification authority.<br>If the equipment is not used under atmospheric conditions, a reduction of the permissible minimum ignition energies may have to be taken into consideration. |
| Highest permissible ambient temperature | The temperature ranges, according to temperature class, are given in the EC-Type Examination Certificate. |
| Installation, Comissioning | 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. |
| Maintenance | No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. |
| **Special conditions** | |
| Protection from 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. |
| Electrostatic charging | 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. |

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**ATEX 1D**

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|---|---|
| Instruction | **Manual electrical apparatus for hazardous areas** |
| **Device category 1D** | for use in hazardous areas with combustible dust |
| Directive conformity | 94/9/EG |
| Standard conformity | IEC 61241-11:2002: draft; prEN61241-0:2002<br>type of protection intrinsic safety "iD"<br>Use is restricted to the following stated conditions |
| CE symbol | CE 0102 |
| Ex-identification | Ex II 1D Ex iaD 20 T 108 °C (226.4 °F) |
| EC-Type Examination Certificate | ZELM 03 ATEX 0128 X |
| Appropriate type | NCN4-12GM...-N0... |
| Effective internal capacitance $C_i$ | ≤ 95 nF ; a cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | ≤ 100 µH ; 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.<br>The EC-Type Examination Certificate has to be observed.<br>The special conditions must be adhered to! |
| Maximum housing surface temperature | The maximum surface temperature of the housing is given in the EC-Type Examination Certificate. |
| Installation, Comissioning | Laws and/or regulations and standards governing the use or intended usage goal must be observed.<br>The intrinsic safety is only assured in connection with an appropriate related apparatus and according to the proof of intrinsic safety.<br>The associated apparatus must satisfy at least the requirements of category ia IIB or iaD. Because of the possibility of the danger of ignition, which can arise due to faults and/or transient currents in the equipotential bonding system, galvanic isolation in the power supply and signal circuits is preferable. Associated apparatus without electrical isolation must only be used if the appropriate requirements of IEC 60079-14 are met.<br>The intrinsically safe circuit has to be protected against influences due to lightning. When used in the isolating wall between Zone 20 and Zone 21 or Zone 21 und Zone 22 the sensor must not be exposed to any mechanical danger and must be sealed in such a way, that the protective function of the isolating wall is not impaired. The applicable directives and standards 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** | |
| Electrostatic charging | 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.<br>The connection cables are to be laid in accordance with EN 50281-1-2 and must not normally be subjected to chaffing during use. |

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**ATEX 3D**

| | |
|---|---|
| Note | **This instruction is only valid for products according to EN 50281-1-1, valid until 30-September-2008**<br>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 |
| Directive conformity | 94/9/EG |
| Standard conformity | EN 50281-1-1<br>Protection via housing<br>Use is restricted to the following stated conditions |
| CE symbol | CE 0102 |
| Ex-identification | Ex II 3D IP67 T 109 °C (228.2 °F) X |
| General | The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.<br>The data stated in the data sheet are restricted by this operating instruction! The special conditions must be adhered to! |
| Installation, Comissioning | 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.<br>Repairs to these apparatus are not possible. |
| **Special conditions** | |
| Minimum series resistance $R_V$ | A minimum series resistance RV 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 UBmax must be restricted to the values given in the following list. Tolerances are not permitted. |
| Maximum heating (Temperature rise) | Values can be obtained from the following list, depending on the max. operating voltage Ub max and the minimum series resistance Rv. |
| at $U_{Bmax}$=9 V, $R_V$=562 Ω | 9 K |
| using an amplifier in accordance with EN 60947-5-6 | 9 K |
| Protection from mechanical danger | The sensor must not be mechanically damaged. |
| Electrostatic charging | 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. |
| Protection of the connection cable | The connection cable must be prevented from being subjected to tension and torsional loading. |

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**ATEX 3D (tD)**

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|---|---|
| Note | **This instruction is only valid for products according to EN 61241-0:2006 and EN 61241-1:2004**<br>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 |
| Directive conformity | 94/9/EG |
| Standard conformity | EN 61241-0:2006, EN 61241-1:2004<br>Protection via housing "tD"<br>Use is restricted to the following stated conditions |
| CE symbol | CE |
| Ex-identification | Ex II 3D Ex tD A22 IP67 T80°C X |
| General | The apparatus has to be operated according to the appropriate data in the data sheet and in this instruction manual.<br>The maximum surface temperature has been determined in accordance with method A without a dust layer on the equipment.<br>The data stated in the data sheet are restricted by this operating instruction!<br>The special conditions must be adhered to! |
| Installation, Comissioning | 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.<br>Repairs to these apparatus are not possible. |

**Special conditions**

| | |
|---|---|
| Minimum series resistance $R_V$ | A minimum series resistance RV 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 UBmax 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 Ub max and the minimum series resistance Rv. |
| at $U_{Bmax}$=9 V, $R_V$=562 Ω | 61 °C (141.8 °F) |
| using an amplifier in accordance with EN 60947-5-6 | 61 °C (141.8 °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. |
| Electrostatic charging | 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. |
| Protection of the connection cable | The connection cable must be prevented from being subjected to tension and torsional loading. |

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**ATEX 3G (nL)**

| | |
|---|---|
| Instruction | **Manual electrical apparatus for hazardous areas** |
| **Device category 3G (nL)** | for use in hazardous areas with gas, vapour and mist |
| Directive conformity | 94/9/EG |
| Standard conformity | EN 60079-15:2005 Ignition protection category "n"<br>Use is restricted to the following stated conditions |
| CE symbol | CE 0102 |
| Ex-identification | Ex II 3G Ex nL IIC T6 X |
| Effective internal capacitance $C_i$ | ≤ 95 nF ; a cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | ≤ 100 µH ; 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!<br>The special conditions must be observed! |
| Installation, Comissioning | 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**

| | |
|---|---|
| Maximum permissible ambient temperature $T_{Umax}$ at Ui = 20 V | |
| for Pi=34 mW, Ii=25 mA, T6 | 55 °C (131 °F) |
| for Pi=34 mW, Ii=25 mA, T5 | 55 °C (131 °F) |
| for Pi=34 mW, Ii=25 mA, T4-T1 | 55 °C (131 °F) |
| for Pi=64 mW, Ii=25 mA, T6 | 55 °C (131 °F) |
| for Pi=64 mW, Ii=25 mA, T5 | 55 °C (131 °F) |
| for Pi=64 mW, Ii=25 mA, T4-T1 | 55 °C (131 °F) |
| for Pi=169 mW, Ii=52 mA, T6 | 52 °C (125.6 °F) |
| for Pi=169 mW, Ii=52 mA, T5 | 52 °C (125.6 °F) |
| for Pi=169 mW, Ii=52 mA, T4-T1 | 52 °C (125.6 °F) |
| for Pi=242 mW, Ii=76 mA, T6 | 44 °C (111.2 °F) |
| for Pi=242 mW, Ii=76 mA, T5 | 44 °C (111.2 °F) |
| for Pi=242 mW, Ii=76 mA, T4-T1 | 44 °C (111.2 °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. |
| Electrostatic charging | 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. |
| 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. |

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**ATEX 3G (ic)**

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|---|---|
| Instruction | **Manual electrical apparatus for hazardous areas** |
| **Device category 3G (ic)** | for use in hazardous areas with gas, vapour and mist |
| Directive conformity | 94/9/EG |
| Standard conformity | EN 60079-11:2007 Ignition protection category "ic"<br>Use is restricted to the following stated conditions |
| CE symbol | CE |
| Ex-identification | Ex II 3G Ex ic IIC T6 X |
| Effective internal capacitance $C_i$ | ≤ 95 nF ; a cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | ≤ 100 µH ; 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!<br>The special conditions must be observed! |
| Installation, Comissioning | 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. |
| Maintenance | No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible. |

**Special conditions**

| | |
|---|---|
| Maximum permissible ambient temperature $T_{Umax}$ at Ui = 20 V | |
| for Pi=34 mW, Ii=25 mA, T6 | 55 °C (131 °F) |
| for Pi=34 mW, Ii=25 mA, T5 | 55 °C (131 °F) |
| for Pi=34 mW, Ii=25 mA, T4-T1 | 55 °C (131 °F) |
| for Pi=64 mW, Ii=25 mA, T6 | 55 °C (131 °F) |
| for Pi=64 mW, Ii=25 mA, T5 | 55 °C (131 °F) |
| for Pi=64 mW, Ii=25 mA, T4-T1 | 55 °C (131 °F) |
| for Pi=169 mW, Ii=52 mA, T6 | 52 °C (125.6 °F) |
| for Pi=169 mW, Ii=52 mA, T5 | 52 °C (125.6 °F) |
| for Pi=169 mW, Ii=52 mA, T4-T1 | 52 °C (125.6 °F) |
| for Pi=242 mW, Ii=76 mA, T6 | 44 °C (111.2 °F) |
| for Pi=242 mW, Ii=76 mA, T5 | 44 °C (111.2 °F) |
| for Pi=242 mW, Ii=76 mA, T4-T1 | 44 °C (111.2 °F) |
| Protection from mechanical danger | The sensor must not be mechanically damaged.<br>When used in the temperature range below -20 °C the sensor should be protected from knocks by the provision of an additional housing. |
| Electrostatic charging | 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. |

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