



Model Number

NCB4-12GM40-N0

Features

- 4 mm embeddable
- Usable up to SIL2 acc. to IEC 61508

Connection

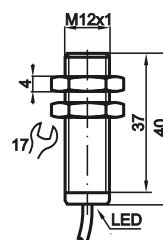


Accessories

BF 12

Mounting flange, 12 mm

Dimensions



Technical Data

General specifications

Switching element function		NAMUR, NC
Rated operating distance	s_n	4 mm
Installation		embeddable
Output polarity		NAMUR
Assured operating distance	s_a	0 ... 3.24 mm
Reduction factor r_{AI}		0.41
Reduction factor r_{Cu}		0.39
Reduction factor r_{304}		0.78

Nominal ratings

Nominal voltage	U_o	8.2 V (R_i approx. 1 k Ω)
Switching frequency	f	0 ... 1500 Hz
Hysteresis	H	1 ... 15 typ. 5 %
Reverse polarity protected		reverse polarity protected
Short-circuit protection		yes
Suitable for 2:1 technology		yes, Reverse polarity protection diode not required
Current consumption		
Measuring plate not detected		≥ 2.2 mA
Measuring plate detected		≤ 1 mA
Indication of the switching state		all direction LED, yellow

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	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

Compliance with standards and directives

Standard conformity	
NAMUR	EN 60947-5-6:2000 IEC 60947-5-6:1999
Electromagnetic compatibility	NE 21:2007
Standards	EN 60947-5-2:2007 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.

ATEX 1G

Instruction

Device category 1G

Directive conformity

Standard conformity

CE symbol

Ex-identification

EC-Type Examination Certificate

Appropriate type

Effective internal capacitance C_i Effective internal inductance L_i

Cable length

Explosion group IIA

Explosion group IIB

Explosion group IIC

General

Highest permissible ambient temperature

Installation, Commissioning

Maintenance

Special conditions

Protection from mechanical danger

Electrostatic charging

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist


94/9/EG

EN 60079-0:2006, EN 60079-11:2007, EN 60079-26:2007

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

 0102

 II 1G Ex ia IIC T6

PTB 00 ATEX 2048 X

NCB4-12GM...-N0...

≤ 120 nF ; a cable length of 10 m is considered.

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

Dangerous electrostatic charges on the fixed connection cable must be taken into account for lengths equal to and exceeding the following values:

100 cm

50 cm

8 cm

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!

Directive 94/9/EG and hence also EC-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.

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.

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.

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

Repairs to these apparatus are not possible.

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

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.

ATEX 2G

Instruction

Device category 2G

Directive conformity

Standard conformity

CE symbol

Ex-identification

EC-Type Examination Certificate

Appropriate type

Effective internal capacitance C_i Effective internal inductance L_i

General

Highest permissible ambient temperature

Installation, Commissioning

Maintenance

Special conditions

Protection from mechanical danger

Electrostatic charging

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

94/9/EG

EN 60079-0:2006, EN 60079-11:2007

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

 0102

 II 1G Ex ia IIC T6

PTB 00 ATEX 2048 X

NCB4-12GM...-N0...

 ≤ 120 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 EC-Type Examination Certificate has to be observed. The special conditions must be adhered to!

Directive 94/9/EG and hence also EC-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.

The temperature ranges, according to temperature class, are given in 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.

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

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

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.

ATEX 3D

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
Directive conformity	94/9/EG
Standard conformity	EN 50281-1-1 Protection via housing Use is restricted to the following stated conditions
CE symbol	 0102
Ex-identification	 II 3D IP67 T 111 °C (231.8 °F) X
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! Laws and/or regulations and standards governing the use or intended usage goal must be observed.
Installation, Commissioning	No changes can be made to apparatus, which are operated in hazardous areas.
Maintenance	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 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 $U_{Bmax}=9\text{ V}$, $R_V=562\ \Omega$	11 K
using an amplifier in accordance with EN 60947-5-6	11 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.

ATEX 3G (nL)

Note

This instruction is only valid for products according to EN 60079-15:2003, valid until 31-May-2008

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

for use in hazardous areas with gas, vapour and mist
94/9/EG

Directive conformity

EN 60079-15:2003 Ignition protection category "n"
Use is restricted to the following stated conditions

Standard conformity

 0102

CE symbol

Ex-identification

 II 3G EEx nL IIC T6 X

Effective internal capacitance C_i

≤ 120 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!

Directive 94/9EG is generally applicable only to the use of electrical apparatus operating at atmospheric conditions.

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

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

Maximum permissible ambient temperature T_{Umax} at $U_i = 20$ V

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

74 °C (165.2 °F)

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

89 °C (192.2 °F)

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

100 °C (212 °F)

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

69 °C (156.2 °F)

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

84 °C (183.2 °F)

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

100 °C (212 °F)

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

51 °C (123.8 °F)

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

66 °C (150.8 °F)

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

74 °C (165.2 °F)

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

39 °C (102.2 °F)

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

52 °C (125.6 °F)

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

52 °C (125.6 °F)

Protection from mechanical danger

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 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.

ATEX 3G (ic)

Instruction

Device category 3G (ic)

Directive conformity

Standard conformity

CE symbol

Ex-identification

Effective internal capacitance C_i Effective internal inductance L_i

General

Installation, Commissioning

Maintenance

Special conditionsMaximum permissible ambient temperature T_{Umax} at $U_i = 20$ Vfor $P_i=34$ 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

Electrostatic charging

Connection parts

Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

94/9/EG

EN 60079-11:2007 Ignition protection category "ic"

Use is restricted to the following stated conditions


 II 3G Ex ic IIC T6 X

 ≤ 120 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!

Directive 94/9/EG is generally applicable only to the use of electrical apparatus operating at atmospheric conditions.

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

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.

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

Repairs to these apparatus are not possible.

74 °C (165.2 °F)

89 °C (192.2 °F)

100 °C (212 °F)

69 °C (156.2 °F)

84 °C (183.2 °F)

100 °C (212 °F)

51 °C (123.8 °F)

66 °C (150.8 °F)

74 °C (165.2 °F)

39 °C (102.2 °F)

52 °C (125.6 °F)

52 °C (125.6 °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 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.

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