0102

Model Number

NCB4-12GM40-N0

Features

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

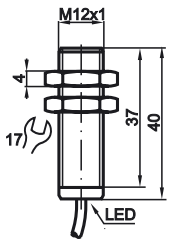
Accessories

BF 12
Mounting flange, 12 mm

Technical Data

General specifications		
Switching element function		NAMUR, NC
Rated operating distance	s_n	4 mm
Installation		flush
Output polarity		NAMUR
Assured operating distance	s_a	0 ... 3.24 mm
Reduction factor r_{Al}		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 kΩ)
Switching frequency	f	0 ... 1500 Hz
Hysteresis	H	1 ... 15 typ. 5 %
Reverse polarity protection		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
Switching state indication		all direction LED, yellow
Functional safety related parameters		
$MTTF_d$		3010 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		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		CCC approval / marking not required for products rated ≤36 V

Dimensions



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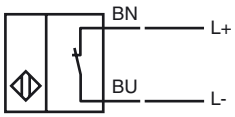
Electrical Connection



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ATEX 1G

Instruction	**Manual electrical apparatus for hazardous areas**
Device category 1G	for use in hazardous areas with gas, vapour and mist
EC-Type Examination Certificate	PTB 00 ATEX 2048 X
CE marking	CE 0102
ATEX marking	Ex II 1G Ex ia IIC T6 Ga
Directive conformity	94/9/EG
Standards	EN 60079-0:2009, EN 60079-11:2007, EN 60079-26:2007 Ignition protection "Intrinsic safety" Use is restricted to the following stated conditions
Appropriate type	NCB4-12GM...-N0...
Effective internal capacitance C_i	≤ 120 nF ; a cable length of 10 m is considered.
Effective internal inductance L_i	≤ 50 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. 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.
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. 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.
Maintenance	No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

Specific 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
EC-Type Examination Certificate	PTB 00 ATEX 2048 X
CE marking	CE 0102
ATEX marking	Ex II 1G Ex ia IIC T6 Ga
Directive conformity	94/9/EG
Standards	EN 60079-0:2009, EN 60079-11:2007 Ignition protection "Intrinsic safety" Use is restricted to the following stated conditions
Appropriate type	NCB4-12GM...-N0...
Effective internal capacitance C_i	≤ 120 nF ; a cable length of 10 m is considered.
Effective internal inductance L_i	≤ 50 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! 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.
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.

Specific 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 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
CE marking	CE 0102
ATEX marking	Ex II 3G EEx nL IIC T6 X
Directive conformity	94/9/EG
Standard conformity	EN 60079-15:2003 Ignition protection category "n" Use is restricted to the following stated conditions
Effective internal capacitance C_i	≤ 120 nF ; a cable length of 10 m is considered.
Effective internal inductance L_i	≤ 50 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! 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.

Specific conditions

Maximum permissible ambient temperature T_{Umax} at Ui = 20 V	
for Pi=34 mW, Ii=25 mA, T6	74 °C (165.2 °F)
for Pi=34 mW, Ii=25 mA, T5	89 °C (192.2 °F)
for Pi=34 mW, Ii=25 mA, T4-T1	100 °C (212 °F)
for Pi=64 mW, Ii=25 mA, T6	69 °C (156.2 °F)
for Pi=64 mW, Ii=25 mA, T5	84 °C (183.2 °F)
for Pi=64 mW, Ii=25 mA, T4-T1	100 °C (212 °F)
for Pi=169 mW, Ii=52 mA, T6	51 °C (123.8 °F)
for Pi=169 mW, Ii=52 mA, T5	66 °C (150.8 °F)
for Pi=169 mW, Ii=52 mA, T4-T1	74 °C (165.2 °F)
for Pi=242 mW, Ii=76 mA, T6	39 °C (102.2 °F)
for Pi=242 mW, Ii=76 mA, T5	52 °C (125.6 °F)
for Pi=242 mW, Ii=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.

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ATEX 3G (ic)

Instruction	**Manual electrical apparatus for hazardous areas**
Device category 3G (ic)	for use in hazardous areas with gas, vapour and mist
CE marking	CE 0102
ATEX marking	Ex II 3G Ex ic IIC T6 Gc X
Directive conformity	94/9/EG
Standards	EN 60079-0:2009, EN 60079-11:2007 Ignition protection category "ic" Use is restricted to the following stated conditions
Effective internal capacitance C_i	≤ 120 nF ; a cable length of 10 m is considered.
Effective internal inductance L_i	≤ 50 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! 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.

Specific conditions

Maximum permissible ambient temperature T_{Umax} at Ui = 20 V	
for Pi=34 mW, Ii=25 mA, T6	74 °C (165.2 °F)
for Pi=34 mW, Ii=25 mA, T5	89 °C (192.2 °F)
for Pi=34 mW, Ii=25 mA, T4-T1	100 °C (212 °F)
for Pi=64 mW, Ii=25 mA, T6	69 °C (156.2 °F)
for Pi=64 mW, Ii=25 mA, T5	84 °C (183.2 °F)
for Pi=64 mW, Ii=25 mA, T4-T1	100 °C (212 °F)
for Pi=169 mW, Ii=52 mA, T6	51 °C (123.8 °F)
for Pi=169 mW, Ii=52 mA, T5	66 °C (150.8 °F)
for Pi=169 mW, Ii=52 mA, T4-T1	74 °C (165.2 °F)
for Pi=242 mW, Ii=76 mA, T6	39 °C (102.2 °F)
for Pi=242 mW, Ii=76 mA, T5	52 °C (125.6 °F)
for Pi=242 mW, Ii=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.

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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** 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 0102
ATEX marking	Ex II 3D IP67 T 111 °C (231.8 °F) X
Directive conformity	94/9/EG
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, 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. Repairs to these apparatus are not possible.
Specific 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	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.
Protection of the connection cable	The connection cable must be prevented from being subjected to tension and torsional loading.
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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