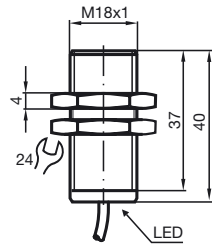


Comfort series  
 5 mm embeddable  
 Usable up to SIL2 acc. to  
 IEC 61508

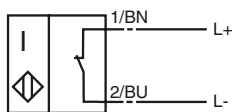


CE 0102

General specifications	
Switching element function	NAMUR NC
Rated operating distance $s_n$	5 mm
Installation	embeddable
Output polarity	NAMUR
Assured operating distance $s_a$	0 ... 4.05 mm
Reduction factor $r_{AI}$	0.35
Reduction factor $r_{Cu}$	0.3
Reduction factor $r_{V2A}$	0.74
Nominal ratings	
Nominal voltage $U_o$	8 V
Switching frequency $f$	0 ... 1000 Hz
Hysteresis $H$	1 ... 15 typ. 5 %
Reverse polarity protection	protected against reverse polarity
Short-circuit protection	yes
Current consumption	
Measuring plate not detected	$\geq 3$ mA
Measuring plate detected	$\leq 1$ mA
Indication of the switching state	all direction LED, yellow
Standard conformity	
EMC in accordance with	IEC / EN 60947-5-2:2004; NE 21
Standards	DIN EN 60947-5-6 (NAMUR)
Ambient conditions	
Ambient temperature	-25 ... 100 °C (248 ... 373 K)
Storage temperature	-40 ... 100 °C (233 ... 373 K)
Mechanical specifications	
Connection type	2 m, PVC cable
Core cross-section	0.75 mm <sup>2</sup>
Housing material	Stainless steel
Sensing face	PBT
Protection degree	IP67
General information	
Use in the hazardous area	see instruction manuals
Category	1G; 2G; 3G; 1D; 3D

### Connection type:

N / N0



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## 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 50014:1997; EN 50020:1994; EN 50284:1999

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

CE 0102

Ex II 1G EEx ia IIC T6

PTB 00 ATEX 2048 X

NCB5-18GM...-N0...

$\leq 95$  nF ; a cable length of 10 m is considered.

$\leq 100$   $\mu$ H ; 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:

78 cm

39 cm

6 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 1127-1:1997 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 on the metal housing components must be avoided. Dangerous electrostatic charges on the metal housing components can be avoided by incorporating these components 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 50014:1997, EN 50020:1994

Ignition protection "Intrinsic safety"

Use is restricted to the following stated conditions

CE 0102

Ex II 1G EEx ia IIC T6

PTB 00 ATEX 2048 X

NCB5-18GM...-N0...

$\leq 95$  nF ; a cable length of 10 m is considered.

$\leq 100$   $\mu$ 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 on the metal housing components must be avoided. Dangerous electrostatic charges on the metal housing components can be avoided by incorporating these components in the equipotential bonding.

## ATEX 3G (nA)

Instruction

### Device category 3G (nA)

Directive conformity

Standard conformity

CE symbol

Ex-identification

General

Installation, Commissioning

Maintenance

Special conditions

Minimum series resistance  $R_V$

Maximum operating voltage  $U_{Bmax}$

Maximum permissible ambient temperature  $T_{Umax}$

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

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

Protection from mechanical danger

Protection from UV light

Electrostatic charging

Protection of the connection cable

## Manual electrical apparatus for hazardous areas

for use in hazardous areas with gas, vapour and mist

94/9/EG

EN 60079-15:2003

Ignition protection category "n"

Use is restricted to the following stated conditions

CE 0102

II 3G EEx nA IIC T6 X

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!

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

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

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.

The maximum permissible operating voltage  $U_{Bmax}$  is restricted to the values in the following list. Tolerances are not permissible.

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

61 °C

61 °C

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

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

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

## ATEX 1D

Instruction

### Device category 1D

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

Maximum housing surface temperature

Installation, Commissioning

Maintenance

Special conditions

Electrostatic charging

## Manual electrical apparatus for hazardous areas

for use in hazardous areas with combustible dust  
94/9/EG

IEC 61241-11:2002: draft; prEN61241-0:2002  
type of protection intrinsic safety "iD"  
Use is restricted to the following stated conditions

CE 0102

Ex II 1D Ex iaD 20 T 108 °C

The Ex-significant identification is on the enclosed adhesive label

ZELM 03 ATEX 0128 X

NCB5-18GM...-N0...

≤ 95 nF ; a cable length of 10 m is considered.

≤ 100 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 EC-Type Examination Certificate has to be observed.

The special conditions must be adhered to!

The maximum surface temperature of the housing is 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.

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. The intrinsically safe circuit has to be protected against influences due to lightning.

The adhesive label provided must be affixed in the immediate vicinity of the sensor! The surface to which the label is applied must be clean, flat and free from grease!

The affixed adhesive label must be readable and durable, taking account of the possibility of chemical corrosion!

When used in the isolating wall between Zone 20 and Zone 21 or Zone 21 and 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.

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

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

The connection cables are to be laid in accordance with EN 50281-1-2 and must not normally be subjected to chaffing during use.

## ATEX 3D

Instruction

### Device category 3D

Directive conformity

Standard conformity

CE symbol

Ex-identification

General

Installation, Commissioning

Maintenance

Special conditions

Minimum series resistance  $R_V$

Maximum operating voltage  $U_{Bmax}$

Maximum heating (Temperature rise)

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

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

Protection from mechanical danger

Electrostatic charging

Protection of the connection cable

## Manual electrical apparatus for hazardous areas

for use in hazardous areas with non-conducting combustible dust


94/9/EG

EN 50281-1-1

Protection via housing

Use is restricted to the following stated conditions

 0102

 II 3D IP67 T 109 °C X

The Ex-significant identification is on the enclosed adhesive label

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.

The adhesive label provided must be affixed in the immediate vicinity of the sensor! The surface to which the label is applied must be clean, flat and free from grease!

The affixed adhesive label must be readable and durable, taking account 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.

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.

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

Values can be obtained from the following list, depending on the max. operating voltage  $U_b$  max and the minimum series resistance  $R_v$ .

9 °C

9 °C

The sensor must not be mechanically damaged.

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

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

## ATEX 3G (nL)

Instruction

### Device category 3G (nL)

Directive conformity

Standard conformity

CE symbol

Ex-identification

Effective internal capacitance  $C_i$

Effective internal inductance  $L_i$

General

Installation, Commissioning

Maintenance

[Fett]Special conditions

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

for $P_i=34 mW$ , $I_i=25 mA$ , T6	70 °C
for $P_i=34 mW$ , $I_i=25 mA$ , T5	85 °C
for $P_i=34 mW$ , $I_i=25 mA$ , T4-T1	100 °C
for $P_i=64 mW$ , $I_i=25 mA$ , T6	70 °C
for $P_i=64 mW$ , $I_i=25 mA$ , T5	85 °C
for $P_i=64 mW$ , $I_i=25 mA$ , T4-T1	100 °C
for $P_i=169 mW$ , $I_i=52 mA$ , T6	62 °C
for $P_i=169 mW$ , $I_i=52 mA$ , T5	77 °C
for $P_i=169 mW$ , $I_i=52 mA$ , T4-T1	81 °C
for $P_i=242 mW$ , $I_i=76 mA$ , T6	54 °C
for $P_i=242 mW$ , $I_i=76 mA$ , T5	63 °C
for $P_i=242 mW$ , $I_i=76 mA$ , T4-T1	63 °C

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

CE 0102

II 3G EEx nL IIC T6 X The Ex-significant identification is on the enclosed adhesive label

$\leq 95 nF$  ; a cable length of 10 m is considered.

$\leq 100 \mu H$  ; 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 94/9EG 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.

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 60079-15. The explosion group depends on the connected and energy-limited supply circuit.

The adhesive label provided must be affixed in the immediate vicinity of the sensor! The surface to which the label is applied must be clean, flat and free from grease!

The affixed adhesive label must be readable and durable, taking account 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.

The sensor must not be mechanically damaged.

When used in the temperature range below  $-20^{\circ}C$  the sensor should be protected from knocks by the provision of an additional housing.

Electrostatic charges on the metal housing components must be avoided. Dangerous electrostatic charges on the metal housing components can be avoided by incorporating these components 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.