Model Number

NCB5-18GM40-N0

Features

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

Accessories

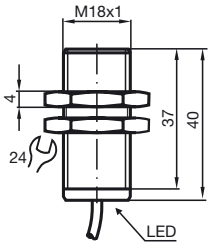
EXG-18
Quick mounting bracket with dead stop

BF 18
Mounting flange, 18 mm

Technical Data

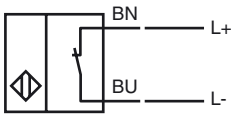
General specifications		
Switching function		Normally closed (NC)
Output type		NAMUR
Rated operating distance	s_n	5 mm
Installation		flush
Assured operating distance	s_a	0 ... 4.05 mm
Actual operating distance	s_r	4.5 ... 5.5 mm typ. 5 mm
Reduction factor r_{Al}		0.35
Reduction factor r_{Cu}		0.3
Reduction factor r_{304}		0.74
Nominal ratings		
Nominal voltage	U_o	8.2 V (R_i approx. 1 kΩ)
Switching frequency	f	0 ... 400 Hz
Hysteresis	H	1 ... 15 typ. 5 %
Reverse polarity protection		reverse polarity protected
Short-circuit protection		yes
Current consumption		
Measuring plate not detected		≥ 3 mA
Measuring plate detected		≤ 1 mA
Switching state indicator		all direction LED, yellow
Functional safety related parameters		
$MTTF_d$		2040 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		0.75 mm^2
Housing material		Stainless steel 1.4305 / AISI 303
Sensing face		PBT
Degree of protection		IP66 / IP67
Cable		
Bending radius		> 10 x cable diameter
General information		
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 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		116-0165
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



Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Electrical Connection



Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Equipment protection level Ga

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…T1 Ga The Ex-related marking can also be printed on the enclosed label.
Standards		EN 60079-0:2012+A11:2013 EN 60079-11:2012 Ignition protection "Intrinsic safety" Use is restricted to the following stated conditions
Appropriate type		NCB5-18GM...-N0...
Effective internal inductivity	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 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 °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		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. **Note:** Use the temperature table for category 1 !!! The 20 % reduction in accordance with EN 1127-1 has already been applied to the temperature table for category 1.
Installation, commissioning		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. 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.
Maintenance		No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.
Special conditions		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.
Protection from mechanical danger		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 charge		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.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Equipment protection level Gb

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		Ⓔx II 1G Ex ia IIC T6…T1 Ga The Ex-significant identification is on the enclosed adhesive label
Standards		EN 60079-0:2012+A11:2013 EN 60079-11:2012 Ignition protection "Intrinsic safety" Use is restricted to the following stated conditions
Appropriate type		NCB5-18GM...-N0...
Effective internal inductivity	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 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 °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.
Maximum permissible ambient temperature T_{amb}		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.
Installation, commissioning		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.
Maintenance		No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.
Special conditions		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.
Protection from mechanical danger		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 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.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

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)	for use in hazardous areas with gas, vapour and mist
CE marking	CE 0102
ATEX marking	Ex II 3G Ex nL IIC T6 X The Ex-significant identification is on the enclosed adhesive label
Standard conformity	EN 60079-15:2005 Ignition protection category "n" Use is restricted to the following stated conditions
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! 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.
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 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!
Maintenance	No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

Special conditions

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.
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.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Equipment protection level Gc (ic)

Instruction		**Manual electrical apparatus for hazardous areas**
Device category 3G (ic)		for use in hazardous areas with gas, vapour and mist
Certificate of Compliance		PF 13 CERT 2895 X
CE marking		CE
ATEX marking		Ex 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" Use is restricted to the following stated conditions
Effective internal inductivity	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! 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.
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 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 adhesivelabel 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!
Maintenance		No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

Special conditions

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. 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.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Equipment protection level Da

Instruction		**Manual electrical apparatus for hazardous areas**
Device category 1D		for use in hazardous areas with combustible dust
EC-Type Examination Certificate		PTB 00 ATEX 2048 X
CE marking		CE 0102
ATEX marking		Ⓔx II 1D Ex ia IIIC T135°C Da The Ex-related marking can also be printed on the enclosed label.
Standards		EN 60079-0:2012+A11:2013 EN 60079-11:2012 Ignition protection "Intrinsic safety" Use is restricted to the following stated conditions
Appropriate type		NCB5-18GM...-N0...
Effective internal inductivity	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 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.
Maximum permissible ambient temperature T_{amb}		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.**
Installation, commissioning		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.
Maintenance		No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.
Special conditions		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.
Protection from mechanical danger		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 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. Do not attach the nameplate provided in areas where electrostatic charge can build up.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Equipment protection level Dc

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 109 °C (228.2 °F) X The Ex-significant identification is on the enclosed adhesive label
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, commissioning	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!
Maintenance	No changes can be made to apparatus, which are operated in hazardous areas. Repairs to these apparatus are not possible.

Special conditions

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.
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 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.
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.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml

Equipment protection level Dc (tc)

Instruction	**Manual electrical apparatus for hazardous areas**
Device category 3D	for use in hazardous areas with combustible dust
Certificate of Compliance	PF 15CERT3774 X
CE marking	CE 0102
ATEX marking	Ex II 3D Ex tc IIIC T80°C Dc The Ex-related marking can also be printed on the enclosed label.
Standards	EN 60079-0:2012+A11:2013, EN 60079-31:2014 Protection by enclosure "tc" Some of the information in this instruction manual is more specific than the information provided in the datasheet.
General	The corresponding datasheets, declarations of conformity, EC-type examination certificates, certifications, and control drawings, where applicable (see datasheets), form an integral part of this document. These documents can be found at www.pepperl-fuchs.com. The maximum surface temperature of the device was determined without a layer of dust on the apparatus. Some of the information in this instruction manual is more specific than the information provided in the datasheet.
Installation, commissioning	Laws and/or regulations and standards governing the use or intended usage goal must be observed. 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 adhesivelabel 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!
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 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.
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. Do not attach the nameplate provided in areas where electrostatic charge can build up.

Release date: 2016-11-09 09:10 Date of issue: 2016-11-09 181108_eng.xml