

# Instruction Manual

## 1. Marking

Inductive sensor NBB20-U1K-E2-3G-3D
ATEX marking Ⓜ II 3G Ex ec IIC T6...T1 Gc Ⓜ II 3D Ex tc IIIC T80°C Dc
IECEx marking Ex ec IIC T6...T1 Gc Ex tc IIIC T80°C Dc

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The certificate may contain several Ex markings. Depending on the respective device, the Ex markings specified in the certificate may be only partially valid. You will find the Ex markings valid for the device on the respective nameplate or in this document.

## 2. Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

## 3. Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The trained and qualified personnel must have read and understood the instruction manual.

## 4. Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EU-type examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

For specific device information, scan the QR code on the device or enter the serial number in the serial number search at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

## 5. Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Technical data provided in the datasheet may be partly restrained by the information given in this instruction manual.

Use the device only within the specified ambient and operating conditions.

The device is an electrical apparatus for hazardous areas.

The certificate 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.

The device can be used in hazardous areas containing gas, vapor, and mist.

The device can be used in hazardous areas containing combustible dust.

## 6. Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

## 7. Mounting and Installation

Observe the installation instructions according to IEC/EN 60079-14.

Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.

Attach the nameplate supplied in the immediate vicinity of the device.

Attach the nameplate so that it is legible and indelible. Take the ambient conditions into account.

Do not mount a damaged or polluted device.

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

The transport protection does not meet the requirements for the degree of protection in accordance with IEC/EN 60529.

If you use the device in environments subject to adverse conditions, you must protect the device accordingly.

Do not remove the warning markings.

Prevent the inside of the device from becoming contaminated when the connector is disconnected.

Before you close the surrounding enclosure, ensure that the seals are clean, undamaged, and correctly fitted.

### 7.1. Requirements for Equipment Protection Level Gc (ec)

The device is designed for use in an environment with pollution degree 3 according to IEC/EN 60664-1.

Observe the tightening torque of the terminal screws.

When selecting materials for accessories consider that the temperature of the housing can rise up to 70 °C.

Provide a transient protection. Ensure that the peak value of the transient protection does not exceed 140 % of 85 V.

### 7.2. Requirements for Equipment Protection Level Dc

Do not connect the device to a mains circuit.

The device is designed for use in an environment with pollution degree 3 according to IEC/EN 60664-1.

Observe the tightening torque of the terminal screws.

When selecting materials for accessories consider that the temperature of the housing can rise up to 70 °C.

The maximum surface temperature of the device was determined without a dust layer on the apparatus.

### 7.3. Specific Conditions of Use

Mount the device so that it complies with the specified degree of protection according to IEC/EN 60529.

#### 7.3.1. Requirements in Relation to Electrostatics

Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

Do not mount the supplied nameplate in areas that can be electrostatically charged.

You can reduce the electrostatic hazards by minimizing the generation of static electricity. For example, you have the following options to minimize the generation of static electricity:

- Control the environmental humidity.
- Protect the device from direct airflow.
- Ensure a continuous drain off of the electrostatic charges.

#### 7.3.1.1. Requirements for Equipment Protection Level Gc (ec)

Usage in Gas Group IIC:

Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, or maintaining the device.

#### 7.3.1.2. Requirements for Equipment Protection Level Dc

Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, or maintaining the device.

#### 7.3.2. Requirements to Mechanics

##### 7.3.2.1. Requirements for Equipment Protection Level Gc (ec)

Mount the device in a way that the device is protected against mechanical hazard.

Do not connect or disconnect the electrical connection when energized.

##### 7.3.2.2. Requirements for Equipment Protection Level Dc

Mount the device in a way that the device is protected against mechanical hazard.

Do not connect or disconnect the electrical connection when energized.

#### 7.3.3. Requirements in Relation to Ultraviolet Radiation

##### 7.3.3.1. Requirements for Equipment Protection Level Gc (ec)

Mount the device in such a way that it is protected from ultraviolet radiation.

Install the cables and connection lines in such a way that they are protected from ultraviolet radiation.

##### 7.3.3.2. Requirements for Equipment Protection Level Dc

Mount the device in such a way that it is protected from ultraviolet radiation.

Install the cables and connection lines in such a way that they are protected from ultraviolet radiation.

### 7.4. Requirements for Cable Glands

Seal the housing. Use a seal that is suitable for the specified application.

#### 7.4.1. Requirements for Equipment Protection Level Gc (ec)

Only use cable glands that are suitably certified for the application.

Only use cable glands with a temperature range appropriate to the application.

Ensure that the degree of protection is not violated by the cable glands.

#### 7.4.2. Requirements for Equipment Protection Level Dc

Only use cable glands that are suitably certified for the application.  
Only use cable glands with a temperature range appropriate to the application.  
Ensure that the degree of protection is not violated by the cable glands.

### 8. Operation, Maintenance, Repair

Observe the specific conditions of use.  
Safety-relevant markings are found on the nameplate of the device or the nameplate supplied.  
Do not use a damaged or polluted device.  
Do not repair, modify, or manipulate the device.  
Modifications are permitted only if approved in this instruction manual and in the device-related documentation.  
If there is a defect, always replace the device with an original device.  
Do not remove the warning markings.  
Prevent the inside of the device from becoming contaminated when the connector is disconnected.  
Before you close the surrounding enclosure, ensure that the seals are clean, undamaged, and correctly fitted.

#### 8.1. Requirements for Equipment Protection Level Gc (ec)

Do not exceed the maximum permissible operating voltage  $U_{Bmax}$ .  
Tolerances are not permitted.  
Do not exceed the maximum permitted output current. Prevent short circuits.

#### 8.2. Requirements for Equipment Protection Level Dc

Do not exceed the maximum permissible operating voltage  $U_{Bmax}$ .  
Tolerances are not permitted.  
Do not exceed the maximum permitted output current. Prevent short circuits.

### 9. Delivery, Transport, Disposal

Check the packaging and contents for damage.  
Check if you have received every item and if the items received are the ones you ordered.  
Keep the original packaging. Always store and transport the device in the original packaging.  
Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.  
The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.

### 10. National Ex approvals

CCC-EX "e":	2024322315005962 Ex ec IIC T6...T1 Gc
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CCC-EX "t":	2024322315005982 Ex tc IIIC T80°C Dc
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INMETRO-EX "e"	TÜV 22.0562 X
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INMETRO-EX "t"	TÜV 23.0984 X
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### 11. Safety-Relevant Technical Data

#### 11.1. Electro-mechanical connection

Terminal connection	
Insulation stripping length	5 mm - 7 mm
Conductor	Solid or flexible (incl. wire end ferrule for flexible conductors)
Cross section	0,5 mm <sup>2</sup> - 2,5 mm <sup>2</sup>
Maximum Tightening torque	1,2 Nm + 10 %
Opening for cable gland	
Thread and tolerance	M20x1,5 8H
Material	PA
Sealing	O-ring or washer gasket
Surface roughness	> 3,2
Wall thickness / Thread depth	15 mm / 10 mm
Maximum Tightening torque	7 Nm
Further tightening torques	

Enclosure screws	1,8 Nm
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#### 11.2. Equipment protection level Gc (ec)

Type of protection	Protection by increased safety "ec"
CE marking	CE
Certificates	
ATEX certificate	TÜV 20 ATEX 8525 X
ATEX marking	Ⓜ II 3G Ex ec IIC T6...T1 Gc
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-7:2015-12, EN IEC 60079-7/A1:2018-01
IECEx certificate	IECEx TUR 21.0019X
IECEx marking	Ex ec IIC T6...T1 Gc
IECEx standards	IEC 60079-0:2017-12, IEC 60079-7 Edition 5.1:2017-08
Minimum ingress protection	IP 54 according to IEC/EN 60529
Minimum permissible ambient temperature in °C	Ta min: -25 °C
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. Maximum operating voltage $U_{Bmax}$ Maximum load current $I_{Lmax}$ Minimum series resistance $R_V$ Maximum analog output voltage $U_{Amax}$ Maximum analog output current $I_{Amax}$ at $U_{Bmax} = 30$ V, $I_{Lmax} = 200$ mA: 50 °C at $U_{Bmax} = 30$ V, $I_{Lmax} = 100$ mA: 52 °C at $U_{Bmax} = 30$ V, $I_{Lmax} = 30$ mA: 54 °C

#### 11.3. Equipment protection level Dc

Type of protection	Protection by enclosure "tc"
CE marking	CE
Certificates	
ATEX certificate	TÜV 20 ATEX 8526 X
ATEX marking	Ⓜ II 3D Ex tc IIIC T80°C Dc
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-31:2014-07, IEC 60079-31:2022-01
IECEx certificate	IECEx TUR 21.0020X
IECEx marking	Ex tc IIIC T80°C Dc
IECEx standards	IEC 60079-0:2017-12, IEC 60079-31:2022-01
Minimum ingress protection	IP 6x according to IEC/EN 60529
Minimum permissible ambient temperature in °C	Ta min: -25 °C
Maximum permissible ambient temperature in °C	Also observe the maximum permissible ambient temperature stated in the general technical data. Keep to the lower of the two values. Maximum operating voltage $U_{Bmax}$ Maximum load current $I_{Lmax}$ Minimum series resistance $R_V$ Maximum analog output voltage $U_{Amax}$ Maximum analog output current $I_{Amax}$ at $U_{Bmax} = 30$ V, $I_{Lmax} = 200$ mA: 50 °C at $U_{Bmax} = 30$ V, $I_{Lmax} = 100$ mA: 52 °C at $U_{Bmax} = 30$ V, $I_{Lmax} = 30$ mA: 54 °C