Instruction Manual

1. Marking

Inductive sensor
NCN3-F31K-N4-K
ATEX marking
Ⓔx II 1G Ex ia IIC T6...T1 Ga
Ⓔx II 1G Ex ia IIC T6...T1 Ga
Ⓔx II 3G Ex ic IIC T6...T1 Gc
IECEx marking
Ex ia IIC T6...T1 Ga
Ex ia IIC T6...T1 Ga
Ex ia I Mb

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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 dismounting lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismounting 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.

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com/device-information.

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.

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 underground parts of mines as well as those parts of surface installations of such mines containing firedamp and/or combustible dust.

5.1. Requirements for Equipment Protection Level Ga

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

For usage according to ATEX Directive and according to EN 1127-1, the reduction of the surface temperature to 80 % is not considered.

5.2. Requirements for Equipment Protection Level Gb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

5.3. Requirements for Equipment Protection Level Mb

Refer to the relevant certificate to see the relationship between the connected circuit type, the maximum permitted ambient temperature, the effective inner reactances, and if applicable the surface temperature or the temperature class.

The suitability for use of the device at ambient temperatures >60 °C in conjunction with hot surfaces has been checked by the notified body.

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.

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

Do not remove the warning markings.

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

7.1. Requirements for Usage as Intrinsically Safe Apparatus

When connecting intrinsically safe devices with intrinsically safe circuits of associated apparatus, observe the maximum peak values with regard to explosion protection (verification of intrinsic safety). Observe the standards IEC/EN 60079-14 or IEC/EN 60079-25.

The type of protection is determined by the connected intrinsically safe circuit.

Mount the device with at least a degree of protection of IP20 according to IEC/EN 60529.

7.2. Specific Conditions of Use

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

7.2.1. 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.

7.2.1.1. Requirements for Equipment Protection Level Ga

Usage in Gas Groups IIB/IIC:

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

7.2.1.2. Requirements for Equipment Protection Level Gb

Usage in Gas Group IIC:

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

7.2.1.3. Requirements for Equipment Protection Level Gc (ic)

Usage in Gas Group IIC:

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

7.2.2. Requirements to Mechanics

7.2.2.1. Requirements for Usage as Intrinsically Safe Apparatus

Protect the device from impact effects if it is used in the temperature range between the minimum permissible ambient temperature and -20 °C.

The minimum permissible ambient temperature is -60°C.

Mount the device with at least a degree of protection of IP20 according to IEC/EN 60529.

Protect cables and cable glands from tensile load and torsional stress or use certified cable glands.

7.3. Requirements for Cable Glands

Seal the housing. Use a seal that is suitable for the specified application.
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.
Before you close the surrounding enclosure, ensure that the seals are clean, undamaged, and correctly fitted.

8.1. Requirements for Usage as Intrinsically Safe Apparatus

Only operate the device with intrinsically safe circuits according to IEC/EN 60079-11.
The type of protection is determined by the connected intrinsically safe circuit.

8.2. Requirements for Equipment Protection Level Ga

Observe the temperature table for the corresponding equipment protection level in the certificate.
Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.3. Requirements for Equipment Protection Level Gb

Observe the temperature table for the corresponding equipment protection level in the certificate.
Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

8.4. Requirements for Equipment Protection Level Mb

Observe the temperature table for the corresponding equipment protection level in the certificate.
Also observe the maximum permissible ambient temperature stated in the technical data. Keep to the lower of the two values.

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 "i"	2020322315002262 , 2026322315007436 GB/T 3836.1-2021, GB/T 3836.4-2021 Ex ia IIC T6...T1 Ga Ex ia IIC T6...T1 Gb
INMETRO-EX "i"	TÜV 13.1137 X-001 , TÜV 26.0086 X
UL-HAZLOC "i":	E501628 116-0456
KCC-EX "i" (Ga):	19-AV4BO-0029X
ANZEx "i":	ANZEx 21.3004X
IA "i":	MASC MS/18-0930X
CCOE "i"	A/P/HQ/HN/104/5802 (P618669)

11. Safety-Relevant Technical Data

11.1. Equipment protection level Ga

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NCN3-F31K-N4...
ATEX certificate	TÜV 99 ATEX 1479 X
ATEX marking	Ex II 1G Ex ia IIC T6...T1 Ga
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx TUN 17.0021X
IECEx marking	Ex ia IIC T6...T1 Ga
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 100 nF The value applies to one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH The value applies to one sensor circuit. A cable length of 10 m is considered.
Maximum values of the valve circuit	U_i = 32 V; I_i = 240 mA; C_i = 10 nF; L_i = 20 µH The value applies to each valve circuit. A cable length of 10 m is considered.
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.
for ATEX and IECEx	U_i = 15 V, I_i = 25 mA, P_i = 34 mW T6: 70 °C T5: 85 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 15 V, I_i = 25 mA, P_i = 64 mW T6: 70 °C T5: 85 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 15 V, I_i = 52 mA, P_i = 169 mW T6: 65 °C T5: 80 °C T4: 90 °C T3: 90 °C T2: 90 °C T1: 90 °C

11.2. Equipment protection level Gb

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NCN3-F31K-N4...
ATEX certificate	TÜV 99 ATEX 1479 X
ATEX marking	Ex II 1G Ex ia IIC T6...T1 Ga
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx TUN 17.0021X
IECEx marking	Ex ia IIC T6...T1 Ga
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 100 nF The value applies to one sensor circuit. A cable length of 10 m is considered.

Effective internal inductance L_i	max. 100 µH The value applies to one sensor circuit. A cable length of 10 m is considered.
Maximum values of the valve circuit	U_i = 32 V; I_i = 240 mA; C_i = 10 nF; L_i = 20 µH The value applies to each valve circuit. A cable length of 10 m is considered.
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. U_i = 15 V, I_i = 25 mA, P_i = 34 mW T6: 70 °C T5: 85 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 15 V, I_i = 25 mA, P_i = 64 mW T6: 70 °C T5: 85 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 15 V, I_i = 52 mA, P_i = 169 mW T6: 65 °C T5: 80 °C T4: 90 °C T3: 90 °C T2: 90 °C T1: 90 °C

11.3. Equipment protection level Gc (ic)

Type of protection	Intrinsic safety
CE marking	CE
Certificates	
ATEX certificate	PF13CERT2895X
ATEX marking	Ex II 3G Ex ic IIC T6...T1 Gc
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
Effective internal capacitance C_i	max. 100 nF The value applies to one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH The value applies to one sensor circuit. A cable length of 10 m is considered.
Maximum values of the valve circuit	U_i = 32 V; I_i = 240 mA; C_i = 10 nF; L_i = 20 µH The value applies to each valve circuit. A cable length of 10 m is considered.
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. U_i = 20 V, I_i = 25 mA, P_i = 34 mW T6: 70 °C T5: 85 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 20 V, I_i = 25 mA, P_i = 64 mW T6: 70 °C T5: 85 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 20 V, I_i = 52 mA, P_i = 169 mW T6: 65 °C T5: 80 °C T4: 90 °C T3: 90 °C T2: 90 °C T1: 90 °C

11.4. Equipment protection level Mb

Type of protection	Intrinsic safety
Certificates	
Appropriate type	NCN3-F31K-N4...
IECEx certificate	IECEx TUN 17.0021X
IECEx marking	Ex ia I Mb
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 100 nF The value applies to one sensor circuit. A cable length of 10 m is considered.
Effective internal inductance L_i	max. 100 µH The value applies to one sensor circuit. A cable length of 10 m is considered.
Maximum values of the valve circuit	U_i = 32 V; I_i = 240 mA; C_i = 10 nF; L_i = 20 µH The value applies to each valve circuit. A cable length of 10 m is considered.
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. U_i = 15 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 15 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 15 V, I_i = 52 mA, P_i = 169 mW 90 °C