Instruction Manual

1. Marking

Inductive sensor
NJ3-18GK-S1N-5M
ATEX marking
Ⓔx II 1G Ex ia IIC T6...T1 Ga
Ⓔx II 1G Ex ia IIC T6...T1 Ga
Ⓔx II 3G Ex ec IIC T6...T1 Gc
Ⓔx II 1D Ex ia IIIC T_{200}135°C Da
Ⓔx II 3D Ex tc IIIC T80°C Dc
IECEx marking
Ex ia IIC T6...T1 Ga
Ex ia IIC T6...T1 Ga
Ex ec IIC T6...T1 Gc
Ex ia IIIC T_{200}135°C Da
Ex tc IIIC T80°C Dc
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, scan the QR code on the device or enter the serial number in the serial number search at 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.

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.

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 Da

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.

5.4. 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.

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.

7.2. 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.

Install a series resistor R_V between the supply voltage and the device.

Alternatively, use a switch amplifier according to IEC/EN 60947-5-6.

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.

7.3. 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.

Install a series resistor R_V between the supply voltage and the device.

Alternatively, use a switch amplifier according to IEC/EN 60947-5-6.

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.

7.4. Specific Conditions of Use

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

7.4.1. 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.

7.4.1.1. Requirements for Equipment Protection Level Ga

Usage in Gas Group IIC:

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

7.4.1.2. Requirements for Equipment Protection Level Da

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

7.4.1.3. Requirements for Equipment Protection Level Dc

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

7.4.2. Requirements to Mechanics

7.4.2.1. Requirements for Usage as Intrinsically Safe Apparatus

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

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

7.4.2.2. Requirements for Equipment Protection Level Gc (ec)

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

protect the cables from tensile load and torsional stress.

7.4.2.3. Requirements for Equipment Protection Level Dc

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

protect the cables from tensile load and torsional stress.

7.4.3. Requirements in Relation to Ultraviolet Radiation

7.4.3.1. 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.

7.4.3.2. 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.

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.

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 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.

8.5. Requirements for Equipment Protection Level Da

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.

8.6. 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.

8.7. 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"	2020322315002308 Ex ia IIC T6...T1 Ga Ex ia IIC T6...T1 Gb Ex ia IIIC T_{200}135°C Da
CCC-EX "e":	2024322315005947 Ex ec IIC T6...T1 Gc
CCC-EX "t":	2024322315005860 Ex tc IIIC T80°C Dc
INMETRO-EX "e"	TÜV 22.0561 X
INMETRO-EX "t"	TÜV 23.0983 X
UL-HAZLOC "i":	E501628 116-0454
KCC-EX "i":	22-AV4BO-0037X
UKEx "i":	CML 21UKEX2977X
UKEx "e":	TÜV 20 ATEX 8523 X
UKEx "t":	TÜV 20 ATEX 8524 X
ECAS-Ex "i":	24-07-119447/E24-07-123450/NB0002
ECAS-Ex "t":	23-11-90553/E23-11-093309/NB0002
IA "i":	MASC MS/17-2382X
IA "e":	MASC S/22-8539X
IA "t":	MASC S/22-8540X

11. Safety-Relevant Technical Data

11.1. Equipment protection level Ga

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ3-18GK-S1N...
ATEX certificate	PTB 00 ATEX 2049 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 PTB 11.0092X
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. 70 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 200 µH 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	U_i = 16 V, I_i = 25 mA, P_i = 34 mW T6: 73 °C T5: 88 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW T6: 69 °C T5: 84 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW T6: 51 °C T5: 66 °C T4: 80 °C T3: 80 °C T2: 80 °C T1: 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW T6: 39 °C T5: 54 °C T4: 61 °C T3: 61 °C T2: 61 °C T1: 61 °C
for IECEx	U_i = 16 V, I_i = 25 mA, P_i = 34 mW T6: 73 °C T5: 88 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW T6: 69 °C T5: 84 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW T6: 51 °C T5: 66 °C T4: 80 °C T3: 80 °C T2: 80 °C T1: 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW T6: 39 °C T5: 54 °C T4: 61 °C T3: 61 °C T2: 61 °C T1: 61 °C

11.2. Equipment protection level Gb

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ3-18GK-S1N...
ATEX certificate	PTB 00 ATEX 2049 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 PTB 11.0092X
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. 70 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 200 µH 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 = 16 V, I_i = 25 mA, P_i = 34 mW T6: 73 °C T5: 88 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW T6: 69 °C T5: 84 °C T4: 100 °C T3: 100 °C T2: 100 °C T1: 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW T6: 51 °C T5: 66 °C T4: 80 °C T3: 80 °C T2: 80 °C T1: 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW T6: 39 °C T5: 54 °C T4: 61 °C T3: 61 °C T2: 61 °C T1: 61 °C

11.3. Equipment protection level Gc (ec)

Type of protection	Protection by increased safety "ec"
CE marking	CE
Certificates	
ATEX certificate	TÜV 20 ATEX 8523 X
ATEX marking	Ex 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 21.0017X
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: -40 °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. at U_{Bmax} = 9 V, R_V = 562 Ohm: 64 °C using an amplifier in accordance with EN 60947-5-6: 64 °C

11.4. Equipment protection level Da

Type of protection	Intrinsic safety
CE marking	CE-0102
Certificates	
Appropriate type	NJ3-18GK-S1N...
ATEX certificate	PTB 00 ATEX 2049 X
ATEX marking	Ex II 1D Ex ia IIIC T_{200}135°C Da
ATEX standards	EN IEC 60079-0:2018-07, EN 60079-11:2012-01
IECEx certificate	IECEx PTB 11.0092X
IECEx marking	Ex ia IIIC T_{200}135°C Da
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 70 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 200 µH 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 = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 62 °C

11.5. Equipment protection level Dc

Type of protection	Protection by enclosure "tc"
CE marking	CE
Certificates	
ATEX certificate	TÜV 20 ATEX 8524 X
ATEX marking	Ex 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 21.0018X
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: -40 °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} = 9 V, R_V = 562 Ohm: 64 °C using an amplifier in accordance with EN 60947-5-6: 64 °C

11.6. Equipment protection level Mb

Type of protection	Intrinsic safety
Certificates	
Appropriate type	NJ3-18GK-S1N...
IECEx certificate	IECEx PTB 11.0092X
IECEx marking	Ex ia I Mb
IECEx standards	IEC 60079-0:2017-12, IEC 60079-11:2011-06
Effective internal capacitance C_i	max. 70 nF A cable length of 10 m is considered.
Effective internal inductance L_i	max. 200 µH 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 = 16 V, I_i = 25 mA, P_i = 34 mW 100 °C U_i = 16 V, I_i = 25 mA, P_i = 64 mW 100 °C U_i = 16 V, I_i = 52 mA, P_i = 169 mW 80 °C U_i = 16 V, I_i = 76 mA, P_i = 242 mW 61 °C