# Instruction Manual

## 1. Marking

| |
|---|
| Inductive sensor |
| NCB2-12GM35-N0-5M |
| ATEX marking |
| II 1G Ex ia IIC T6...T1 Ga |
| II 1G Ex ia IIC T6...T1 Ga |
| II 1D Ex ia IIIC $T_{200}$135°C Da |
| II 3D Ex tc IIIC T80°C Dc |
| IECEx marking |
| Ex ia IIC T6...T1 Ga |
| Ex ia IIC T6...T1 Ga |
| Ex ia IIIC $T_{200}$135°C Da |
| Ex tc IIIC T80°C Dc |
| Ex ia I Mb |

| |
|---|
| Pepperl+Fuchs Group |
| Lilienthalstraße 200, 68307 Mannheim, Germany |
| Internet: www.pepperl-fuchs.com |

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 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.

### 7.3. 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.

Avoid inadmissibly high electrostatic charge of the metal housing components on the device.

Include the metal housing components in the equipotential bonding.

#### 7.3.2. Requirements to Mechanics

##### 7.3.2.1. 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.

##### 7.3.2.2. 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.

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

##### 7.3.3.1. 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 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.

### 8.5. 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.

### 8.6. 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" | 2020322315002255<br>GB/T 3836.1-2021, GB/T 3836.4-2021<br>Ex ia IIC T6...T1 Ga<br>Ex ia IIC T6...T1 Gb<br>Ex ia IIIC $T_{200}$135°C Da |

| | |
|---|---|
| CCC-EX "t": | 2024322315005860<br>GB/T 3836.1-2021, GB/T 3836.31-2021<br>Ex tc IIIC T80°C Dc |

| | |
|---|---|
| INMETRO-EX "i" | TÜV 23.1385 X |

| | |
|---|---|
| INMETRO-EX "t" | TÜV 23.0983 X |

| | |
|---|---|
| UL-HAZLOC "i": | E501628<br>116-0452 |

| | |
|---|---|
| KCC-EX "i" (Ga): | 09-AV4BO-0225/0226/0227 |

| | |
|---|---|
| JPEx "i": | CML 23JPN2306X |

| | |
|---|---|
| ANZEx "i": | ANZEx 18.3018X |

| | |
|---|---|
| ECAS-Ex "i": | 25-05-150267/E25-05-156234/NB0002 |

| | |
|---|---|
| ECAS-Ex "t": | 25-11-171026/E25-11-178180/NB0002 |

| | |
|---|---|
| IA "i": | MASC S/17-1745X |

| | |
|---|---|
| IA "t": | MASC S/22-8540X |

| | |
|---|---|
| ITRI (TS Mark) "i": | ML091200705G75 |

| | |
|---|---|
| CCOE "i" | A/P/HQ/HN/104/5871 (P654292) |

## 11. Safety-Relevant Technical Data

### 11.1. Equipment protection level Ga

| | |
|---|---|
| Type of protection | Intrinsic safety |
| CE marking | CE-0102 |
| Certificates | |
| Appropriate type | NCB2-12GM...-N0... |
| ATEX certificate | PTB 00 ATEX 2048 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 11.0037X |
| 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. 90 nF<br>A cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | max. 100 µH<br>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 | $U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 34 mW<br>T6: 76 °C<br>T5: 91 °C<br>T4: 100 °C<br>T3: 100 °C<br>T2: 100 °C<br>T1: 100 °C<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 64 mW<br>T6: 73 °C<br>T5: 88 °C<br>T4: 100 °C<br>T3: 100 °C<br>T2: 100 °C<br>T1: 100 °C<br>$U_i$ = 16 V, $I_i$ = 52 mA, $P_i$ = 169 mW<br>T6: 62 °C<br>T5: 77 °C<br>T4: 81 °C<br>T3: 81 °C<br>T2: 81 °C<br>T1: 81 °C<br>$U_i$ = 16 V, $I_i$ = 76 mA, $P_i$ = 242 mW<br>T6: 54 °C<br>T5: 63 °C<br>T4: 63 °C<br>T3: 63 °C<br>T2: 63 °C<br>T1: 63 °C |

### 11.2. Equipment protection level Gb

| | |
|---|---|
| Type of protection | Intrinsic safety |
| CE marking | CE-0102 |
| Certificates | |
| Appropriate type | NCB2-12GM...-N0... |
| ATEX certificate | PTB 00 ATEX 2048 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 11.0037X |
| 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. 90 nF<br>A cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | max. 100 µH<br>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.<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 34 mW<br>T6: 76 °C<br>T5: 91 °C<br>T4: 100 °C<br>T3: 100 °C<br>T2: 100 °C<br>T1: 100 °C<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 64 mW<br>T6: 73 °C<br>T5: 88 °C<br>T4: 100 °C<br>T3: 100 °C<br>T2: 100 °C<br>T1: 100 °C<br>$U_i$ = 16 V, $I_i$ = 52 mA, $P_i$ = 169 mW<br>T6: 62 °C<br>T5: 77 °C<br>T4: 81 °C<br>T3: 81 °C<br>T2: 81 °C<br>T1: 81 °C<br>$U_i$ = 16 V, $I_i$ = 76 mA, $P_i$ = 242 mW<br>T6: 54 °C<br>T5: 63 °C<br>T4: 63 °C<br>T3: 63 °C<br>T2: 63 °C<br>T1: 63 °C |

### 11.3. Equipment protection level Da

| | |
|---|---|
| Type of protection | Intrinsic safety |
| CE marking | CE-0102 |
| Certificates | |
| Appropriate type | NCB2-12GM...-N0... |
| ATEX certificate | PTB 00 ATEX 2048 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 11.0037X |
| 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. 90 nF<br>A cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | max. 100 µH<br>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.<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 34 mW<br>100 °C<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 64 mW<br>100 °C<br>$U_i$ = 16 V, $I_i$ = 52 mA, $P_i$ = 169 mW<br>63 °C<br>$U_i$ = 16 V, $I_i$ = 76 mA, $P_i$ = 242 mW |

### 11.4. Equipment protection level Dc

| | |
|---|---|
| Type of protection | Protection by enclosure "tc" |
| CE marking | CE |
| Certificates | |
| ATEX certificate | TÜV 20 ATEX 8524 X |

| | |
|---|---|
| ATEX marking | Ⓔx II 3D Ex tc IIIC T80°C Dc |
| ATEX standards | EN IEC 60079-0:2018-07, EN IEC 60079-31:2024-03 |
| 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.<br>Maximum operating voltage $U_{Bmax}$<br>Maximum load current $I_{Lmax}$<br>Minimum series resistance $R_V$<br>Maximum analog output voltage $U_{Amax}$<br>Maximum analog output current $I_{Amax}$<br>at $U_{Bmax}$ = 9 V, $R_V$ = 562 Ohm: 64 °C<br>using an amplifier in accordance with EN 60947-5-6: 64 °C |

### 11.5. Equipment protection level Mb

| | |
|---|---|
| Type of protection | Intrinsic safety |
| Certificates | |
| Appropriate type | NCB2-12GM...-N0... |
| IECEx certificate | IECEx PTB 11.0037X |
| IECEx marking | Ex ia I Mb |
| IECEx standards | IEC 60079-0:2017-12, IEC 60079-11:2011-06 |
| Effective internal capacitance $C_i$ | max. 90 nF<br>A cable length of 10 m is considered. |
| Effective internal inductance $L_i$ | max. 100 µH<br>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.<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 34 mW<br>100 °C<br>$U_i$ = 16 V, $I_i$ = 25 mA, $P_i$ = 64 mW<br>100 °C<br>$U_i$ = 16 V, $I_i$ = 52 mA, $P_i$ = 169 mW<br>81 °C<br>$U_i$ = 16 V, $I_i$ = 76 mA, $P_i$ = 242 mW<br>63 °C |