[1] **EU-TYPE EXAMINATION CERTIFICATE** - Translation

[2] Equipment or protective systems
intended for use in potentially explosive atmospheres, Directive 2014/34/EU

[3] EU-type examination certificate number **IBExU18ATEX1060 X** | Issue 2

[4] Product: **Thermocouples and resistance thermometer**
Type: TPtHrXiA(T), TPtSrXiA(T), TTeHrXiA(T), TPtMiXiAo(T), TTeSrXiA(T), TTeMiXiAo(T)
TPtHrXdA(T), TPtSrXdA(T), TTeHrXdA(T), TPtPAXd(T), TTeSrXdA(T), TTePAXd(T)

[5] Manufacturer: ARMANO Messtechnik GmbH | ARMANO Messtechnik GmbH

[6] Address: Am Gewerbepark 9
08344 Grünhain-Beierfeld
GERMANY

Manometerstraße 5
46487 Wesel
GERMANY

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH, notified body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report IB-18-3-0165.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-11:2012, EN 60079-26:2015 and EN 60079-31:2014
except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:

Types: TPtHrXiA(T), TPtSrXiA(T), TTeHrXiA(T), TTeSrXiA(T):

Ⓔx II 1G Ex ia IIC T6...T1 Ga
Ⓔx II 1/2G Ex ia IIC T6...T1 Ga/Gb
Ⓔx II 2G Ex ia IIC T6...T1 Gb
Ⓔx II 2G Ex ib IIC T6...T1 Gb
Ⓔx II 1D Ex ia IIIC T80 °C...T440 °C Da
Ⓔx II 1/2D Ex ia IIIC T80 °C...T440 °C Da/Db
Ⓔx II 2D Ex ia IIIC T80 °C...T440 °C Db
Ⓔx II 2D Ex ib IIIC T80 °C...T440 °C Db

Types: TPtHrXdA(T), TPtSrXdA(T), TTeHrXdA(T), TTeSrXdA(T), TPtPAXd(T), TTePAXd(T):

Ⓔx II 1G Ex ia db IIC T6…T1 Ga
Ⓔx II 1/2G Ex db IIC T6…T1 Ga/Gb
Ⓔx II 1/2G Ex ia/db IIC T6…T1 Ga/Gb
Ⓔx II 2G Ex db IIC T6…T1 Gb
Ⓔx II 1D Ex ia tb IIIC T80 °C…T440 °C Da
Ⓔx II 2D Ex tb IIIC T80 °C…T440 °C Db
Ⓔx II 1/2D Ex ia/tb IIIC T80 °C…T440 °C Da/Db

Types: TPtMiXiAo(T), TTeMiXiAo(T):

Ⓔx II 1G Ex ia IIC T6…T1 Ga
Ⓔx II 2G Ex ia IIC T6…T1 Gb
Ⓔx II 2G Ex ib IIC T6…T1 Gb
Ⓔx II 1D Ex ia IIIC T80 °C…T440 °C Da
Ⓔx II 2D Ex ia IIIC T80 °C…T440 °C Db
Ⓔx II 2D Ex ib IIIC T80 °C…T440 °C Db

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By order

Dipl.-Ing. [FH] Henker

Zertifizierungsstelle Explosionsschutz IBExU Institut für Sicherheitstechnik GmbH * Kenn-Nr. 0637 *

- Seal -
(notified body number 0637)

Certificates without signature and seal are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2019-03-27

[13] **Schedule**

[14] **Certificate number IBExU18ATEX1060 X** | Issue 2

[15] **Description of product**

The temperature sensors mentioned under [4] are used for registration, control and threshold monitoring of process temperatures and are intended for use in explosion hazard areas of zone 0 or 1 and 20 or 21.

The temperature sensors are implemented as resistance thermometers or thermocouples, which transform the temperature at the measurement point into an electrical parameter (resistance, voltage). In combination with appropriate transmitters temperatures in the range of -200 °C...+600 °C (resistance thermometer) or, resp., -40 °C...+1800 °C (thermocouples) can be registered.

The temperature sensors are implemented in type of protection flameproof enclosure "d" or protection by enclosure "t". They consist of a replaceable transducer with potted lead wires and a flameproof connection head with integrated terminal or electronic transmitter. Both components are connected via a neck tube and a screw joint. The measuring end of the transducer equipped with a protection tube is inserted into the process.

There are types which are designed in type of protection intrinsic safety "i". Also the combination of intrinsic safety and flameproof enclosure or intrinsic safety and protection by enclosure is possible.

Optinally the sensors are equipped with a process display.

Technical data:

maximum voltage	U_i	30 V
maximum current	I_i	250 mA
maximum power gas explosive atmospheres dust explosive atmospheres	P_i	 1.9 W 650 mW, T_{amb} < 70 °C 550 mW, T_{amb} ≥ 70 °C...85 °C
ambient temperature at connection head	T_{amb}	-40 °C...+85 °C

The permitted power P_i depends on the used power supply, the maximum ambient temperature and the temperature class assigned. The maximum permissible surface temperature can be taken from the operating instructions.

Variations compared to issue 1 of this certificate:

The manufacturer's name has been changed.

[16] **Test report**
The test results are recorded in the confidential test report IB-18-3-0165 of 2019-03-26.

The test documents are part of the test report and they are listed there.

Summary of the test results
The thermocouples and resistance thermometer mentioned under [4] still fulfil the requirements of explosion safety for an electrical equipment of Group II and category 1G or 2G in type of protection "i" or flameproof enclosure "d" or the combination of both types of protection as well as category 1D or 2D in type of protection "i" or protection by enclosure "t" or the combination of both types of protection.

Safety information:
The pressure and the temperature range of the potentially explosive atmosphere must be between 0.8 bar to 1.1 bar and -20 °C to +60 °C for applications requiring Category 1 or Category 1/2 equipment,

If the temperature sensor is operated outside these atmospheric conditions, this EC type-examination certificate may be used for as a guide. Additional tests and assessment are recommended for the specific operating conditions.

[17] **Specific conditions of use**

- For compliance with the above mentioned temperature class / maximum surface temperature at the connection head, the maximum power dissipation Pmax must not be exceeded. This must be guaranteed under fault conditions by adequate means (e.g. a fuse connected in series to the consumer).
- The permissible media temperature depends on the maximum permissible input power Pi, the temperature class assigned and the ambient temperature range. The ambient temperature range is determined by the components used. Additional information can be found in the operating instructions.
- For equipment variants with ambient temperature > 60 °C heat-resistant gable glands and connection cables (min. 95 °C) must be used.
- By means of the process, higher of lower operating temperature can occur at the measuring tip; however, the permissible service temperature at the connection head must not be exceeded. This has to be ensured by the customer under the respective operational conditions by means of an adequate length of the transducer and the protection armature. Referring to this, the length of the neck tube must be selected so that heating or cooling of the connection head by means of the process is negligible.
- Flameproof joints are not intended to be repaired.
- The operator must ensure that the devices are installed in the protection tubes in such a way that protection class IP67 is guaranteed and that no zone entrainment can occur.
- Unused cable glands must be closed with blanking elements certified according to the type of protection.
- If the wall thickness of a protective tube is between 0.2 mm and 1 mm, the devices must not be exposed to environmental stresses which could adversely affect the partition wall.
- Built-in electronic components (transmitters, digital displays) in devices with Ex i type of protection must have their own certificate. The conditions as well as intrinsically safe parameter of the corresponding certificate must be met.
- The types TPtMiXiAo(T), TTeMiXiAo(T) may only be used if they are installed in a suitable housing.
- For thermocouples with an earthed measuring point, the intrinsically safe circuits must be regarded as galvanically connected to the earth potential from a safety perspective and potential equalisation must exist throughout the entire process of setting up the intrinsically safe circuits. In addition, special conditions according to EN/IEC 60079-14 must be observed for the connection.
- Sensors using light metal housing parts (e.g. connection heads made of aluminium or protection tubes made of titanium) must be installed in applications requiring an EPL Ga or Da in such a way that sparks due to impact and friction between the light metal and steel are excluded (except stainless steel if the presence of rust particles can be excluded).

[18] **Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:
None

[19] **Drawings and Documents**

The documents are listed in the test report.

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By order

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Freiberg, 2019-03-27