



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx PTB 11.0111X issue No.:0 Certificate history:

Status: **Current**

Date of Issue: **2012-03-09** Page 1 of 4

Applicant: **ABB Automation Products GmbH**
Borsigstr. 2
63755 Alzenau
Germany

Electrical Apparatus: **Temperature sensor, type TS...**
Optional accessory:

Type of Protection: **Intrinsic Safety "i"**

Marking: Ex ia IIC T6 Ga or Ex ib IIC T6 Gb or Ex ib IIC T6 Ga/Gb

*Approved for issue on behalf of the IECEx
Certification Body:*

Dr.-Ing. U. Johannsmeyer

Position:

Department Head "Intrinsic Safety and Safety of Systems"

*Signature:
(for printed version)*

Date:

2012-04-24

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany





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Manufacturer: **ABB Automation Products GmbH**
Schillerstr. 72
32425 Minden
Germany

Manufacturing location(s):

**ABB Automation
Products GmbH**
Schillerstr. 72
32425 Minden

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2007-10 Edition: 5	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-11 : 2006 Edition: 5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-26 : 2006 Edition: 2	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

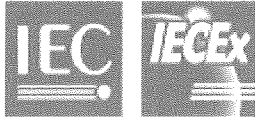
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

DE/PTB/ExTR11.0094/00

Quality Assessment Report:

DE/TUN/QAR06.0012/03



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Schedule

EQUIPMENT:

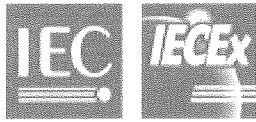
Equipment and systems covered by this certificate are as follows:

The thermocouples or resistive thermometers are used for temperature measurements in various applications. The temperature sensors may be used with or without isolating element (protective tube). The temperature sensors may be manufactured with diameters of 3 mm to 8 mm. For diameters of 6 mm or more 2 intrinsically safe circuits may exist in one temperature sensor. Thermocouples may be connected as follows, single thermocouple and double thermocouple. Resistive thermometers may be connected in 2-wire, 3-wire and 4-wire connection. For diameters of 6 mm or more double 2-wire and double 3-wire circuits may be connected.

Combinations of operational modes, thermal and electrical data see schedule

CONDITIONS OF CERTIFICATION: YES as shown below:

All possible combinations of operation modes and mounting methods of the temperature sensors of type series TS... shall be listed in the operating instructions manual (see schedule)



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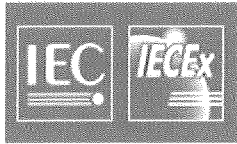
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Additional information:

For further information see schedule



The temperature sensors, types TS... are used for temperature measurements in various applications. They may be used with or without isolating element (protective tube). The temperature sensors may be manufactured with diameters of 3 mm to 8 mm. For diameters of 6 mm or more 2 intrinsically safe circuits may exist in one temperature sensor. Thermocouples may be connected as follows, single thermocouple and double thermocouple. Resistive thermometers may be connected in 2-wire, 3-wire and 4-wire connection. For diameters of 6 mm or more double 2-wire and double 3-wire circuits may be connected.

For relationship between previous and new type designation reference is made to the table:

	Previous type designation	New type designation
MI T	Mantel-Thermoelement (sheathed thermocouple)	TSC... Temperature Sensor Cable
MI R	Mantel-Widerstandsthermometer (sheathed resistance thermometer)	TSC... Temperature Sensor Cable
IS T	Thermoelement Messeinsatz (thermocouple measuring insert)	TSA... Temperature Sensor Accessory
IS R	Widerstands-Messeinsatz (resistance measuring insert)	TSA... Temperature Sensor Accessory
WT..	Schutzrohr verschweißt (protective tube, welded)	TSP... Temperature Sensor Process
TW..	Schutzrohr gebohrt (protective tube, drilled)	TSP... Temperature Sensor Process
ET..	Schutzrohrmontage (protective tube installation)	TSP... / TSC...
MP..	Stufen-Temperaturfühler (step-temperature sensor)	TSM... Temperature Sensor Multipoint
HY..	Hygiene-Temperaturfühler (hygiene temperature sensor)	TSS... Temperature Sensor Sanitary
BE..	Lagerfühler (bearing sensor)	TSP... / TSC...

Electrical data

only for connection to a certified intrinsically safe circuit of type of protection Ex ia IIC
or Ex ib IIC

Maximum values:

$$U_i = 30 \text{ V}$$

$$I_i = 101 \text{ mA}$$

$$L_i = 15 \text{ } \mu\text{H/m}$$

$$C_i = 280 \text{ pF/m}$$

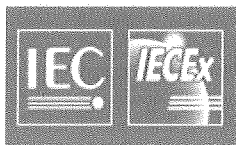
or

$$U_i = 25 \text{ V}$$

$$I_i = 158 \text{ mA}$$

$$L_i = 15 \text{ } \mu\text{H/m}$$

$$C_i = 280 \text{ pF/m}$$



or

$$U_i = 20 \text{ V}$$

$$I_i = 309 \text{ mA}$$

$$L_i = 15 \text{ } \mu\text{H/m}$$

$$C_i = 280 \text{ pF/m}$$

The special conditions are as follows:

All possible combinations of operation modes and mounting methods of the temperature sensors of type series TS... shall be listed in the operating instructions manual.

Temperature sensors of category EPL Ga shall provide only one intrinsically safe circuit and shall be connected only to intrinsically safe circuits of protection level "ia".

When the temperature sensors are connected to an intrinsically safe circuit of protection level "ib" the application as category EPL Ga equipment is only permissible if the temperature sensors are mounted into a protective tube or if separating elements are used. In this case the minimum wall thickness is ≥ 1 mm for stainless steels and ≥ 3 mm for other steels.

Temperature sensors of category EPL Gb with a minimum diameter of 3 mm may be designed with Pt 100 in 2-, 3- or 4-wire connection, wire-wound measuring resistance or sheet measuring resistance or as single or double thermocouple. Wire-wound measuring resistances may also be installed as double 2-wire or double 3-wire circuitry. Sensors having a minimum diameter of 6 mm may also be operated in double 4-wire connection using wire-wound or sheet measuring resistances or double thermocouples.

When double sensors are connected to two intrinsically safe circuits the summation of voltage or current respectively shall be taken into consideration due to small clearances. For permissible maximum values in case of voltage- or current-summation, reference is made to the pairs of values specified in the electrical data.

Near the terminals the permissible range of the ambient temperature is -40 °C up to $+80$ °C.

Enclosures made of non-metallic materials shall provide a surface resistance of $< 10^9$ Ohm according to IEC 60079-11.

The alloy of light-metal enclosures shall not contain more than 7.5 % Mg by mass.

Only cable glands for which an EC-type examination certificate is available shall be used as cable entry elements.

The temperature sensors shall be included in the local equipotential bonding system.