IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

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

Certificate No.:	**IECEx IBE 19.0001X**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 4	Issue 3 (2025-08-07) Issue 2 (2021-12-13) Issue 1 (2021-01-28) Issue 0 (2019-04-08)
Date of Issue:	2026-01-06		

Applicant: **PHOENIX CONTACT GmbH & Co. KG**
Flachsmarktstraße 8
32825 Blomberg
Germany

Equipment: **Temperature Signal Conditioner type [MACX,IOA] MCR(-EX)-RTD-I(-SP)(-C)(-...), [MACX,IOA] MCR(-EX)-TC-I(-SP)(-C)(-...) and IOA MCR(-EX)-T-I(-C)(-...)**

Optional accessory:

Type of Protection: **Intrinsic safety "ia" in combination with increased safety "ec"**

Marking: **For MACX MCR-EX-[RTD,TC]-I(-SP)(-C)(-...) and IOA MCR-EX-[RTD,TC,T]-I(-C)(-...):**

[Ex ia Ma] I
[Ex ia Ga] IIC
[Ex ia Da] IIIC
Ex ec [ia Ga] IIC T4 Gc

For MACX MCR-[RTD,TC]-I(-SP)(-C)(-...) and IOA MCR-[RTD,TC,T]-I(-C)(-...):

Ex ec IIC T4 Gc

Approved for issue on behalf of the IECEx Certification Body: **Dr.-Ing. Peter Cimalla**

Position: **Deputy Head of department Certification Body**

Signature:
(for printed version)

Date:
(for printed version) 2026-01-06

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Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg
Germany

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Manufacturer: **PHOENIX CONTACT GmbH & Co. KG**
Flachsmarktstraße 8
32825 Blomberg
Germany

Manufacturing locations: **PHOENIX CONTACT GmbH & Co. KG**
Flachsmarktstraße 8
32825 Blomberg
Germany

PHOENIX CONTACT GmbH & Co.KG
Dringenauer Straße 30
31812 Bad Pyrmont
Germany

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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

IEC 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

This Certificate **does not** indicate compliance with 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 Reports:

DE/IBE/ExTR18.0047/00 DE/IBE/ExTR18.0047/01 DE/IBE/ExTR18.0047/02
DE/IBE/ExTR18.0047/03 DE/IBE/ExTR18.0047/04

Quality Assessment Report:

NL/DEK/QAR11.0009/10

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The modules MACX MCR(-Ex)-[RTD,TC]-I(-SP)(-C)(-…) and IOA MCR(-Ex)-[RTD,TC,T]-I (-C)(-…) are temperature signal conditioner for the use with standard 4…20 mA output signal. The modules MACX MCR-Ex-[RTD,TC]-I(-SP)(-C)(-…) and IOA MCR-Ex-[RTD,TC,T]-I (-C)(-…) have intrinsically safe inputs. While the temperature signal conditioner MACX MCR(-Ex)-[RTD,TC]-I(-SP)(-C)(-…) are intended for mounting on 35 mm top hat rails, the IOA MCR(-Ex)-[RTD,TC,T]-I(-C)(-…) are desired for a connection via a VIP I/O-Marshalling basis element.

The intrinsically safe circuits can also be connected to apparatus which are located in areas where combustible dust can be present. It must be guaranteed, that only apparatus may be connected to this circuits which are designed and certified for this use.

The temperature signal may be provided either by means of resistance elements or thermocouple elements.

For technical data see annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:
The temperature signal conditioner type IOA MCR-EX-... with type of protection "ia" must only be used in circuits with overvoltage category I or II in accordance with IEC 60664-1, and must be mounted in a suitable enclosure, which complies with the requirements of IEC 60079-0 and provides a degree of protection not less than IP54. As an alternative to the IP54 enclosure, the type IOA MCR-EX-... is restricted to installation and use in environments providing pollution degree 2 or better according to IEC 60664-1.

When the temperature signal conditioners type MACX… and type IOA… are installed in Zone 2 applying type of protection “ec”, the pollution level shall be limited to pollution degree 2 or better as defined in IEC 60664-1, and the modules must be mounted in a suitable enclosure which complies with the requirements of IEC 60079-0 and provides a degree of protection not less than IP54. Furthermore, the clearance and creepage distances requirements of IEC 60079-7 must be observed.

The permitted ambient temperature range is -40 °C…+70 °C.

Detailed information for the intrinsically safe parameter are mentioned in the installation notes.

The µUSB programming interface must not be connected, disconnected or used in potentially explosive atmospheres..

Connecting and disconnecting of non-intrinsically safe circuits in Zone 2 is only permitted in a de-energized state or when no potentially explosive atmosphere is present.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
The intrinsic safety capability of the µUSB configuration interface was removed.

Annex:

Annex_IBE19.0001X_issue04.pdf

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Technical data:

		MACX RTD/TC	IOA RTD/TC	IOA T
ambient temperature range	T_{amb}	-40 °C … +70 °C		
rated insulation voltage		300 V_{eff} / 375 V_{peak}	150 V_{eff} / 212 V_{peak}	150 V_{eff} / 212 V_{peak}
Terminal 1.1-1.2 / P2+, P2-:				
maximum voltage	U_m	253 V AC / 125 V DC	121 V AC / 121 V DC	121 V AC / 121 V DC
nominal voltage	U_n	24 V DC (19.2 … 30 V DC)		
Terminal 3.1-3.2 / Chn+, Chn-:				
as associated apparatus	U_m	253 V AC / 125 V DC	121 V AC / 121 V DC	121 V AC / 121 V DC
in zone 2 / EPL Gc	U_{max}	30 V DC		
Type …MCR-EX…: Terminal 4.1-4.2 / nA, nC; Terminal 5.1-5.2 / nB, nD (Ex ia):				
maximum output voltage	U_o	6 V	6 V	6 V
RTD 4-wire	I_o	16.6 mA	16.6 mA	7.8 mA
RTD 3-wire	I_o	13.0 mA	13.0 mA	4.7 mA
Potentiometer	I_o	13.0 mA	13.0 mA	4.7 mA
RTD 2-wire	I_o	7.1 mA	7.1 mA	2.9 mA
TC + external CJC	I_o	16.8 mA	16.8 mA	7.9 mA
TC + plugged CJC connector	I_o	7.1 mA	7.1 mA	2.9 mA
mV input	I_o	4.3 mA	4.3 mA	3.4 mA
RTD 2x2 wire	I_o	16.6 mA	16.6 mA	7.8 mA
maximum output power	P_o	25.2 mW (linear, max.)	25.2 mW (linear, max.)	11.8 mW (linear, max.)
effective internal capacitance	C_i	44 nF		
effective internal inductance	L_i	negligible		
Type …MCR…: Terminal 4.1-4.2 / nA, nC; Terminal 5.1-5.2 / nB, nD (Ex ec):				
Input signal		±1000mV (mV/TO) 2000mV (RTD/RTD in Poti-Modus)		

For circuits including inductances and capacitances the following has to be observed:
The values for L_o and C_o, mentioned in the certificate are allowed for:

- distributed inductance and capacitance e.g. as in a cable or
- if the total *L*i of the external circuit (excluding the cable) is < 1 % of the *L*o value or
- if the total *C*i of the external circuit (excluding the cable) is < 1 % of the *C*o value.

Terminal 4.1-4.2, 5.1-5.2 / nA, nC, nB, nD:

	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA, Ex ia I
C_o	40 µF	1000 µF	1000 µF
L_o	100 mH	460 mH	850 mH

The values of L_o and C_o determined in the certificate shall be reduced to 50 % or taken from the following table if both of the following conditions are met:

- the total *L*i of the external circuit (excluding the cable) ≥ 1 % of the *L*o value and
- the total *C*i of the external circuit (excluding the cable) ≥ 1 % of the *C*o value.

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The reduced capacitance of the external circuit (including cable) shall not be greater than 1 µF for Groups I, IIA, and IIB and 600 nF for Group IIC.

Terminal 4.1-4.2, 5.1-5.2 / nA, nC, nB, nD:

	Ex ia IIC	Ex ia IIB/IIA, Ex ia IIIC, Ex ia I
C_o	600 nF	1 µF
L_o	100 mH	100 mH

If using the device in altitudes between 2000 m and 5000 m above sea level the advices for derating from the instructions have to be taken into account.

Derating T_{amb}, U_m and $U_{Isolation}$ according to IEC 61131-2:2017 and IEC 61010-1:2010 as elevation above sea level increases for type MACX:

Altitude:	T_{amb}:	U_m:	$U_{Isolation}$:
≤ 2000 m	-40 °C … +70 °C	253 V AC / 125 V DC	375 V_{peak} / 300 V_{eff}
> 2000 m … ≤ 3000 m	-40 °C … +63 °C	190 V AC / 110 V DC	190 V
> 3000 m … ≤ 4000 m	-40 °C … +56 °C	60 V	60 V
> 4000 m … ≤ 5000 m	-40 °C … +49 °C	60 V	60 V

Derating T_{amb}, U_m and $U_{Isolation}$ according to IEC 61131-2:2017 and IEC 61010-1:2010 as elevation above sea level increases for type IOA:

Altitude:	T_{amb}:	U_m:	$U_{Isolation}$:
≤ 2000 m	-40 °C … +70 °C	121 V AC / 121 V DC	212 V_{peak} / 150 V_{eff}
> 2000 m … ≤ 3000 m	-40 °C … +63 °C	121 V AC / 121 V DC	212 V_{peak} / 150 V_{eff}
> 3000 m … ≤ 4000 m	-40 °C … +56 °C	121 V AC / 121 V DC	212 V_{peak} / 150 V_{eff}
> 4000 m … ≤ 5000 m	-40 °C … +49 °C	33 V AC / 33 V DC	89 V_{peak} / 63 V_{eff}