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 10.0002X**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 4	Issue 3 (2020-10-07) Issue 2 (2016-04-14) Issue 1 (2012-07-27) Issue 0 (2010-04-06)
Date of Issue:	2021-12-21		

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

Equipment: **NAMUR Switch Isolating Amplifier (Ex i and Non Ex i) type MACX *** (-EX)-SL-xNAM-yR-UP(-SP)...**

Optional accessory:

Type of Protection: **Intrinsic safety or increased safety in combination with intrinsic safety and type of protection "n"**

Marking: **type MACX ***-EX-SL-xNAM-yR-UP(-SP)....**

[Ex ia Ma] I
[Ex ia Ga] IIC
[Ex ia Da] IIIC

Ex ec [ia Ga] nC IIC T4 Gc
-40 °C ≤ T_{amb} ≤ +60 °C / +70 °C

type MACX *-SL-xNAM-yR-UP(-SP)....**

Ex ec nC IIC T4 Gc
-40 °C ≤ T_{amb} ≤ +60 °C / +70 °C

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

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

Signature: (for printed version)

Date: 2021-12-21

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 www.iecex.com or use of this QR Code.

Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg
Germany

IECEx Certificate of Conformity

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

Additional manufacturing locations:

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 60079-15:2017 Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
Edition:5.0

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/ExTR10.0002/00 DE/IBE/ExTR10.0002/01 DE/IBE/ExTR10.0002/02
DE/IBE/ExTR10.0002/03 DE/IBE/ExTR10.0002/04

Quality Assessment Report:

NL/DEK/QAR11.0009/08

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

The NAMUR Switch Isolating Amplifiers MACX ***-EX-SL-xNAM-yR-UP(-SP)... are used for the intrinsically safe and galvanically isolated operation of proximity switches with NAMUR behaviour or potential-free switches and resistance-connected switches. They are equipped with a wide voltage range supply. The equipment is provided for installation in zone 2 or in the safe area as associated apparatus. The intrinsically safe signal circuits may be routed into areas that require EPL Ma, Ga (Zone 0) or Da (Zone 20).

The NAMUR Switch Isolating Amplifiers MACX ***-SL-xNAM-yR-UP(-SP)... are used for galvanically isolated operation of proximity switches with NAMUR behaviour or potential-free switches and resistance-connected switches. They are intended for the use in zone 2.

The voltage difference between input and output circuit or supply can be up to 375 V peak. The modules are equipped with a circuit for the detection of line faults.

The technical data are mentioned in the Annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:
Special conditions for safe use in zone 2:

- The NAMUR Switch Isolating Amplifiers MACX ***(-EX)-SL-xNAM-yR-UP(-SP)... have to be installed in a certified housing fulfilling the requirements of IEC 60079-0 or another recognized type of protection for operation in zone 2.
- Connecting and disconnecting of non-intrinsically safe circuits are not allowed in energized state in Zone 2.
- The DIP Switches may only be used if no explosive atmosphere is present.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
The ambient temperature range is extended to +70 °C.

Annex:

Annex_IBE10.0002_04.pdf

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Technical data:
The following values apply for types: MACX ***-EX-SL-xNAM-yR-UP(-SP)...

Environmental data	
Ambient temperature range	-40 °C up to + 60 °C -40 °C up to + 70 °C (with ≥ 6 mm distance to other devices)
Degree of protection of the enclosure	≥ IP20

Electrical data			
1.	**Power Supply (1.1 and 1.2)**		
	rated voltage range	U_n	24 ... 230 V DC or AC
	supply current	I_n	< 42 mA (24 V DC); max. < 80 mA (20 V AC)
	power consumption	P_n	< 1.1 W
	maximum r.m.s. or d.c. voltage	U_m	253 V AC / 125 DC
	galvanically separated up to a peak voltage	U_p	375 V
2.	**Intrinsically safe sensor circuit (4.1 and 4.3/5.1 and 5.3)**		
	maximum output voltage	U_O	9.56 V
	maximum output current	I_O	10.3 mA
	maximum output power	P_O	25 mW
	characteristic		linear (928 Ω)
	internal capacitance, inductance	$C_i;L_i$	negligible
3.	**Relay output (2.1 ... 2.3 / 3.1 ... 3.3)**		
	maximum switching voltage	U_S	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
	maximum switching power	P_S	500 VA

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

- distributed inductances and capacitances, 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 Ci of the external circuit (excluding the cable) is < 1 % of the Co value.

	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA, Ex ia I
C_O	3.6 µF	26 µF	210 µF
L_O	300 mH	1000 mH	1000 mH

The values of L_O and C_O, mentioned in this certificate shall be reduced to 50 % or taken from the following table if both of the following conditions are met:

- the total Li of the external circuit (excluding the cable) is ≥ 1 % of the Lo value and
- the total Ci of the external circuit (excluding the cable) is ≥ 1 % of the Co value.

	Ex ia IIC					Ex ia I, Ex ia IIB/IIA, Ex ia			
C_O	510 nF	580 nF	600 nF	600 nF	600 nF	1 µF	1 µF	1 µF	1 µF
L_O	100 mH	50 mH	5 mH	1 mH	10 µH	100 mH	5 mH	1 mH	10 µH

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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.

The following values apply for types: MACX ***-SL-xNAM-yR-UP-…

Environmental data	
Ambient temperature range	-40 °C up to + 60 °C -40 °C up to + 70 °C (with ≥ 6 mm distance to other devices)
Degree of protection of the enclosure	≥ IP 20

Electrical data			
1.	**Power Supply (1.1 and 1.2)**		
	rated voltage range	U_n	24 ... 230 V DC or AC
	supply current	I_n	< 42 mA (24 V DC); max. < 80 mA (20 V AC)
	power consumption	P_n	< 1.1 W
	galvanically separated up to	U	300 V_{eff} according to IEC 61010
2.	**NAMUR sensor circuit (4.1 and 4.3/5.1 and 5.3)**		
	rated output voltage	U	8 V ± 10 %
	nominal output current	I	8 mA ± 10 %
3.	**Relay output (2.1 ... 2.3 / 3.1 ... 3.3)**		
	maximum switching voltage	U_S	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
	maximum switching power	P_S	500 VA

If using the device in altitudes between 2000 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 $U_{Isolation\ „ec“}$ as elevation above sea level increases:

Height:	T_{amb}:	T_{amb} with Derating*:	U_m:	$U_{Isolation\ „ec“}$:
≤ 2000 m	-40 °C…+60 °C	-40 °C…+70 °C	253 V AC / 125 V DC	265 V
>2000 m … ≤ 3000 m	-40 °C…+54 °C	-40 °C…+63 °C	190 V AC / 110 V DC	190 V
>3000 m … ≤ 4000 m	-40 °C…+48 °C	-40 °C…+56 °C	60 V	60 V
>4000 m … ≤ 5000 m	-40 °C…+42 °C	-40 °C…+49 °C	60 V	60 V

* T_{amb} with derating: With 6mm distance around all sides of the housing and only when mounted vertically (DIN rail horizontally).