



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 IBE 08.0002X	Issue No: 3	<u>Certificate history:</u>
Status:	Current	Page 1 of 4	Issue No. 3 (2017-05-11)
Date of Issue:	2017-05-11		Issue No. 2 (2013-02-20)
Applicant:	PHOENIX CONTACT GmbH & Co. KG Flachmarktstraße 8 32825 Blomberg Germany		Issue No. 1 (2010-11-26)
Equipment:	Valve Solenoid Driver MACX MCR-EX-SL-SD-2*-**-LP(-SP)		Issue No. 0 (2008-06-30)
<i>Optional accessory:</i>			
Type of Protection:	Intrinsic Safety, Type 'n'		
Marking:	Type 21-25, 21-40, 21-45, 24-28 [Ex ia Ga] IIC/IIB/IIA [Ex ia Da] IIIC Ex nA [ia IIC Ga] IIC T4 Gc Type 21-60 [Ex ia Ga] IIB/IIA [Ex ia Da] IIIC Ex nA [ia IIB Ga] IIC T4 Gc		

Approved for issue on behalf of the IECEx
Certification Body:

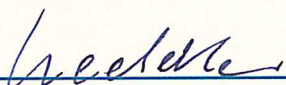
Prof. Dr. Tammo Redeker

Position:

Head of Certification Body

Signature:
(for printed version)

Date:


2017-05-11

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:

IBExU Institut für Sicherheitstechnik GmbH
Certification Body
Fuchsmühlenweg 7
09599 Freiberg
Germany





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Manufacturer: **PHOENIX CONTACT Electronics GmbH**
Dringenauer Straße 30
31821 Bad Pyrmont
Germany

Additional Manufacturing location(s):

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 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-15 : 2010 Edition:4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

*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/IBE/ExTR08.0003/00	DE/IBE/ExTR08.0003/01	DE/IBE/ExTR08.0003/02
DE/IBE/ExTR08.0003/03		

Quality Assessment Report:

NL/DEK/QAR11.0009/05



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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The Valve Solenoid Driver MACX MCR-EX-SL-SD-2*-*-LP(-SP) are used for the intrinsically safe and galvanically isolated control of solenoid valves, simple apparatus or LEDs. The device is intended for the use in the safe area or in explosive atmospheres which require EPL "Gc". The intrinsically safe circuits may conduct in areas which require EPL "Ga" or "Da". The Valve Solenoid Drivers are designed in one-channel.

For additional information as well as technical data see Annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:

- The intrinsically safe circuit is separated galvanically safe up to 375 V (peak value) from the non-intrinsically safe circuit.
- The valve solenoid driver MACX MCR-EX-SL-SD-2*-*-LP(-SP) has to be assemble in a suitable and separately certified housing fulfilling the requirements of IEC 60079-15 (degree of protection at least IP54 according to IEC 60529) or another recognized type of protection according to IEC 60079-0, Clause 1, when installed in Zone 2.
- The connecting and disconnecting is not permitted when energized.



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

A new DC/DC coupler is used in the non-intrinsically safe part.

An alternate enclosure may be used.

The ambient temperature range has been increased to -40 °C up to +60 °C.

Annex:

[Annex2IBE08.0002_03.pdf](#)



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IBEXU

ANNEX TO CERTIFICATE No.:

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Module designation:

Module designation	nominal output voltage [V]	Output current [mA]	current [mA]	Power [W]
MACX MCR-EX-SL-SD-21-25-LP(-SP)	21.9	25	100	0.9
MACX MCR-EX-SL-SD-21-40-LP(-SP)	21.9	40	100	1.2
MACX MCR-EX-SL-SD-21-45-LP(-SP)	21.9	45	100	1.3
MACX MCR-EX-SL-SD-21-60-LP(-SP)	21.9	60	130	1.3
MACX MCR-EX-SL-SD-24-48-LP(-SP)	24	48	130	1.4

Technical data

Ambient temperature range	T_a	-40 °C to +60 °C
Degree of protection		≥ IP20 acc. to IEC 60529
Power supply circuit (non-intrinsically safe)		
rated voltage	U_N	19.2 ... 30 V DC
maximum DC voltage	U_m	125 V
maximum r.m.s. AC voltage	U_m	253 V

Intrinsically safe output circuit (linear characteristics)

Modul type	21-25	21-40	21-45	21-60	24-48
Ex ia	IIC	IIC	IIC	IIB	IIC
U_o [V]	25.1				27.7
I_o [mA]	39	87	141	188	101
P_o [mW]	245	550	882	1180	697
C_i	negligible				
L_i	negligible				
R_i [Ω]	641.1	287	178.6	133.4	275.7



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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 C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.

type 21-25	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA
C_o	0.108 μ F	0.83 μ F	2.93 μ F
L_o	22 mH	90 mH	170 mH
type 21-40	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA
C_o	0.108 μ F	0.83 μ F	2.93 μ F
L_o	5 mH	20 mH	45 mH
type 21-45	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA
C_o	0.108 μ F	0.83 μ F	2.93 μ F
L_o	2 mH	8.5 mH	17 mH
type 21-60	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA
C_o	-	0.83 μ F	2.93 μ F
L_o	-	4 mH	7.5 mH
type 24-48	Ex ia IIC	Ex ia IIB/IIIC	Ex ia IIA
C_o	0.085 μ F	0.663 μ F	2.2 μ F
L_o	4 mH	17 mH	35 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 L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
- the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.

type 21-25	Ex ia IIC					Ex ia IIB, Ex ia IIIC				Ex ia IIA			
C_o [nF]	68	68	68	79	108	270	430	470	830	470	660	680	1000
L_o [mH]	20	10	5	1	0.1	100	5	1	0.1	100	5	1	0.1
type 21-40	Ex ia IIC					Ex ia IIB, Ex ia IIIC				Ex ia IIA			
C_o [nF]	52	65	82	108	108	380	380	440	820	600	610	640	1000
L_o [mH]	2	1	0.5	0.2	0.1	10	5	1	0.1	20	5	1	0.1
type 21-45	Ex ia IIC					Ex ia IIB, Ex ia IIIC				Ex ia IIA			
C_o [nF]	108	108	108	108	108	340	340	400	800	550	550	690	1000
L_o [mH]	0.05	0.02	0.01	0.005	0.001	5	2	1	0.1	10	2	0.5	0.1
type 21-60	Ex ia IIC					Ex ia IIB, Ex ia IIIC				Ex ia IIA			
C_o [nF]	-	-	-	-	-	300	370	460	790	510	560	660	1000
L_o [mH]	-	-	-	-	-	2	1	0.5	0.1	5	1	0.5	0.1
type 24-48	Ex ia IIC					Ex ia IIB, Ex ia IIIC				Ex ia IIA			
C_o [nF]	68	68	68	79	108	250	250	350	663	440	440	680	960
L_o [mH]	20	10	5	1	0.1	10	5	1	0.1	20	5	1	0.1

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



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