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 BVS 07.0010

Issue No: 5

Certificate history:
Issue No. 5 (2018-07-17)
Issue No. 4 (2010-06-10)
Issue No. 3 (2010-01-06)
Issue No. 2 (2009-05-12)
Issue No. 1 (2008-08-12)
Issue No. 0 (2007-06-04)

Status: **Current**

Date of Issue: **2018-07-17**

Applicant: **Kirchgaesser Industrieelektronik GmbH**
Am Rosenbaum 6
40882 Ratingen
Germany

Equipment: **Flow meter type MID-EX-E/C*********

Optional accessory:

Type of Protection: **Equipment protection by intrinsic safety "i"**

Marking:
Ex ia I Mb

Approved for issue on behalf of the IECEx Certification Body: Jörg Koch

Position: Head of Certification Body

Signature:
(for printed version)

Date: 17.7.18

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.

Certificate issued by:

DEKRA EXAM GmbH
Dinnendahlstrasse 9
44809 Bochum
Germany

DEKRA EXAM GmbH

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Manufacturer:	**Kirchgaesser Industrieelektronik GmbH** Am Rosenbaum 6 40882 Ratingen **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 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 : 2017 Edition:7.0	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

*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/BVS/ExTR07.0011/05

Quality Assessment Report:

DE/BVS/QAR06.0014/03

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

General product information:

The flow meter type MID-EX-********** is supplied by an intrinsically safe power supply circuit and is used for continuous measurements of electrically conductive liquids in pipelines in potentially explosive atmospheres that require the use of apparatus providing level of protection Ex ia I Mb.

Description:

The flow meter consists of an enclosure made of stainless steel, brass or bronze and plastic for the flow sensor and optionally for the pressure and / or temperature sensor and an electronic enclosure made of plastic material (surface resistance ≤ 109 Ω), which contains printed circuit boards fitted with electronic components, partially embedded in casting compound.
The upper part of the electronic enclosure is carried out as terminal box for the IS circuits of the flow meter.
The version MID-EX-E********** is designed as compact version of the flow meter.
The version MID-EX-C********** is designed as transducer, intended to be interconnected to Kirchgaesser evaluation and / or display units or signal converters respectively, which are subject to other IECEx Certificates of Conformity.
The version MID-EX-EM********* / MID-EX-ET********* respectively, is designed as flow meter, providing CANopen output signal.
The opto-isolator circuits according to Rating 2.) and 3.), or the 3- wire / 4-wire current- or voltage-signal circuit according to Rating 4.) a) b) c) for optionally external IS power supply are available 'exclusive-or' only.
Due to variations with regard to applied electrical connection facilities and internal wiring, the opto-isolator circuits (frequency signal outputs 1 and 2 / programmable switching outputs 1 and 2) or the optionally external powered analogue signal outputs 1 and 2 may be segregated or not segregated from the power supply circuit of the flow meter according to Rating 1.).
Listing of all components used, referring to older standards: Not applicable

Type Code

See Annex

Rating

See Annex

SPECIFIC CONDITIONS OF USE: NO

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

- Update of approved standards to IEC 60079-0 Ed. 7 / IEC 60079-0-11 Ed. 6
- minor changes of circuitry, not affecting intrinsic safety parameters listed in 'Parameters'
- alternate gasket material.

Annex:

BVS_07_0010_Kirchgaesser_Annex_issue_5.pdf

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Annex

Type Code

Flow meter type MID-EX- * * * * * * * * * * *

(asterisk no.) 0 1 2 to 7 8 9 10

Asterisk no.	Code	Feature
0	E	Compact version
	C	Kirchgaesser remote control unit, indicator or signal converter
1	S	Without pressure measuring feature
	P	Pressure measuring feature
	M	Pressure + temperature measuring feature (MID-EX-E* with CANopen; U_i = 9 V only)
	T	Pressure + temperature measuring feature (MID-EX-E* with CANopen; U_i = 13.5 V only)
2 to 7	*	Variation code not relevant to Ex application

Electrical connection		
Asterisk no.	Code	Feature
8	A	Terminals + one cable entry
	B	Terminals + two cable entries
	C	Connector type BN4160
	D	Connector type BN4160 + terminals / cable entry
	E	Connector type ME 2A *
	F	Connector type ME 2A * + terminals / cable entry
	G	Connector type 845 size 1
	H	Connector type 845 size 1+ terminals / cable entry
	J	Connector type 845 size 2 J
	K	Connector type 845 size 2 + terminals / cable entry
	L	Connector type SKK24*
	M	Connector type SKK24* + terminals / cable entry
	N	Connector type G4A5M
	O	Connector type G4A5M + terminals / cable entry
	P	1 x Connector type M12 (5 pole)
	R	2 x Connector type M12 (5 pole)
	S	Connector type SKK45M
	T	Connector type SKK45M + terminals / cable entry

Signal output features					
Asterisk no.	Code	Configuration	Asterisk no	Code	Parameter
9	1	One opto-isolator	10	1	Frequency 5 - 15 Hz
	2	Two opto-isolators		2	Switching output (programmable)
	3	One current output		3	Current max. 25 mA [1]
	4	Two current outputs		4	Current max. 25 mA [2]
	5	One voltage output		5	Voltage max. 13.5 V [1]
	6	Two voltage outputs		6	Voltage max. 13.5 V [2]
	7	One serial output		7	CANopen [1]
				8	Frequency (internal protocol) [1]

[1]) no galvanic separation; common ground with supply circuit
[2]) galvanic separation provided, requires external IS supply

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Rating

1.) Intrinsically safe supply circuit

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
E*******A**, E*******B**, C*******A78, E*******D**, E*******F**, E*******H**, E*******K**, E*******M**, E*******O**, E*******T**	N / A	N / A	1.1 - 1.2
E*******C**	1	7 - 5	N / A
E*******E**, E*******N**	1	3 - 4	N / A
ES******G**, C*******G78, E*******J**, C*******J78, E*******L**, C*******L78, C*******N78	1	1 - 2	N / A
E*******P**, C*******P78	1	2 - 3	N / A
E*******R77	1, 2	2 - 3	N / A
E*******S**	1	1 - 4	N / A
Parameters			
Voltage U_i (excluding MID-EX-EM*******77)	DC 13.5 V		
Voltage U_i (MID-EX-EM*******77)	DC 9.0 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	negligible		
effective internal inductance L_i	negligible		

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2.) Opto-isolator circuit 1

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
E*******A**, E*******B**	N / A	N / A	2.1 - 2.2
ES******C1*, EP******P2*	1	4 [1])	N / A
E*******D**, ES******P1*	1	4 - 5	N / A
E*******E**, E*******F**, E*******M**, ES******N1*, E*******O**	1	1 - 2	N / A
E*******R77, EP******L2*	1	3 [1])	N / A
E*******H**	1	3 - 2	N / A
ES******L1*, E*******J** E*******K**	1	3 - 4	N / A
ES******S1*	1	2 - 3	N / A
EP******N2*	1	1 [1])	N / A
EP******S2*	1	2 [1])	N / A
E*******T**	1	1 - 4	N / A
Parameters			
Voltage U_i	DC 13.5 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	negligible		
effective internal inductance L_i	negligible		

[1]): common GND with supply circuit in 1.)

3.) Opto-isolator circuit 2

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
EP******A2*, EP******B2*, EP******D2*, EP******H2*	N / A	N / A	3.1 - 3.2
EP******E2*, EP******F2*, EP******J2*, EP******K2*	1	5 - 6	N / A
EP******M2*, EP******O2*	1	3 - 4	N / A
EP******P2*	1	5 [1])	N / A
EP******L2*	1	4 [1])	N / A
EP******N2*	1	2 [1])	N / A
EP******S2*	1	3 [1])	N / A
EP******T2*	1	2 - 3	N / A
Parameters			
Voltage U_i	DC 13.5 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	negligible		
effective internal inductance L_i	negligible		

[1]): common GND with supply circuit in 1.)

4.) Current- or voltage-signal circuit

Due to galvanic separation from all other circuits of the flow meter, this 3-wire or 4-wire circuit may be powered optionally by external IS power supply or may be interconnected to the supply circuit in 1).

a) Power supply; external or interconnected to the supply circuit

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
E*******A**, E*******B**	N / A	N / A	3.1 - 3.2
E*******E*4, E*******E*6, E*******F**, E*******H** , E*******M**	1	1 - 2	N / A
E*******J*4, E*******J*6, E*******K*4, E*******K*6, E*******O**	1	3 - 4	N / A
E*******T*4, E*******T*6	1	1 - 4	N / A
E *******G**, E*******L**, E*******N**, E*******E*3, E*******E*5, E*******J*3, E*******J*5, E*******K*3, E*******K*5, E*******T*3, E*******T*5	connected to supply circuit in 1)		
Parameters			
Voltage U_i	DC 13.5 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	6.5 µF		
effective internal inductance L_i	negligible		

b) Current- or voltage-signal circuit; signal line 1

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
E*******A**, E*******B**	N / A	N / A	2.1 [2])
E*******E**, E*******F**, E*******J**, E*******K**	1	5 [2])	N / A
ES******G**, E*******H**, E*******L**, E*******M**	1	3 [2])	N / A
E*******N**, E*******O**	1	1 [2])	N / A
E*******P**	1	4 [2])	N / A
E*******S**, E*******T**	1	2 [2])	N / A
Parameters			
Voltage U_i	DC 13.5 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	6.5 µF		
effective internal inductance L_i	negligible		

[2]) common GND with the supply circuit listed in 4.) a)

c.) Current- or voltage-signal circuit; signal line 2

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
E*******A**, E*******B**, E*******H**	N / A	N / A	2.2 [3])
E*******E**, E*******F**, E*******J**, E*******K**	1	6 [3])	N / A
E*******L**, E*******M**	1	4 [3])	N / A
E*******N**, E*******O**	1	2 [3])	N / A
E*******P**	1	5 [3])	N / A
EP******S**, EP******T**	1	3 [3])	N / A
Parameters			
Voltage U_i	DC 13.5 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	6.5 µF		
effective internal inductance L_i	negligible		

[3]) common GND with the supply circuit listed in 4.) a)

d.) Serial output

Flow meter type MID-EX-**********	electrical connection		
version	connector-socket		terminals
	number	Pin number	number
E*******P77	1	1, 4 – 5	N / A
E*******R77	1, 2	1, 4 – 5	N / A
C*******A78	N / A	N / A	1.3
C*******G78, C*******J78, C*******L78, C*******N78	1	3 [4])	N / A
C*******P78	1	4 [4])	N / A
Parameters			
Voltage U_i (excluding MID-EX-EM*******77)	DC 13.5 V		
Voltage U_i (MID-EX-EM*******77)	DC 9.0 V		
Current I_i	N / A		
Power P_i	N / A		
effective internal capacitance C_i	negligible (excluding MID-EX-E********77)		
	6.5 µF (MID-EX-E********77)		
effective internal inductance L_i	negligible		

[4]) common GND with the supply circuit listed in 4.) a).

5.) Ambient- / process temperature range

MID-EX-C**********:	0 °C ≤ T_a ≤ +80 °C
MID-EX-E* (MID-EX-E********77 excluded):	0 °C ≤ T_a ≤ +60 °C
MID-EX-E* (only MID-EX-E********77):	0 °C ≤ T_a ≤ +80 °C
process temperature range (all versions)	0 °C ≤ T_p ≤ +100 °C