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 12.0018X

Issue No: 0

Certificate history:
Issue No. 0 (2012-06-12)

Status: **Current**

Date of Issue: **2012-06-12**

Applicant: **Hans Turck GmbH & Co. KG**
Witzlebenstr. 7
45472 Mülheim an der Ruhr
Germany

Equipment: **Analog input module, types AIH40Ex, AIH41Ex and AI42Ex**
Optional accessory:

Type of Protection: **Intrinsic Safety "i", Protection by Intrinsic Safety "iD"**

Marking: Ex ib [ia Ga] IIC T4 Gb and [Ex ia III C Da] alternative Ex ib [ia] IIC T4 and [Ex ia IIIC]

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:

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:

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

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

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Manufacturer: **Werner Turck GmbH & Co. KG**
Goethestr. 7
58553 Halver
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 : 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 61241-11 : 2005 Edition:1	Electrical apparatus for use in the presence of combustible dusts - Part 11: Protection by intrinsic safety 'iD'

*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/ExTR12.0017/00

Quality Assessment Report:

DE/PTB/QAR06.0013/02

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The 4-channel analog input modules form part of the fieldbus system excom for the subrack unit, type MT... .

The analog input modules of type AIH40Ex are manufactured as HART-version. They are used for the supply of *passive* 2-wire measuring transducers (sensors) and for the data logging of analog measuring signals.

The analog input modules of type AIH41Ex are used for the connection of *active* intrinsically safe sensors with HART-communication.

The analog input modules of type AI42Ex are used for the supply of *passive* 2-wire measuring transducers (sensors) without HART-communication and for the data logging of analog measuring signals.

For further information see schedule

SPECIFIC CONDITIONS OF USE: YES as shown below:

In the fieldbus system excom the 4-channel analog input modules, type AIH40Ex, type AIH41Ex and AI42Ex shall only be operated in combination with the subrack unit, type MT... .

Annex:

C120018_schedule.pdf

Schedule

The 4-channel analog input modules form part of the fieldbus system excom for the subrack unit, type MT... .

The analog input modules of type AIH40Ex are manufactured as HART-version. They are used for the supply of *passive* 2-wire measuring transducers (sensors) and for the data logging of analog measuring signals.

The analog input modules of type AIH41Ex are used for the connection of *active* intrinsically safe sensors with HART-communication.

The analog input modules of type AI42Ex are used for the supply of *passive* 2-wire measuring transducers (sensors) without HART-communication and for the data logging of analog measuring signals.

All modules are intended for the safe electrical isolation of intrinsically safe measuring circuits of category ia from intrinsically circuits of category ib.

Each analog input module provides either only passive measuring transducer supply circuits (modules, type AIH40Ex and type AI42Ex) or only active input circuits (module, type AIH41Ex).

The permissible range of the ambient temperature is -20 °C up to +60 °C.

Electrical data

I) AC-supply circuit ..... type of protection Intrinsic Safety Ex ib IIC
terminals 15, 16, only for connection to the certified intrinsically safe circuit according to PTB 00 ATEX 2194 U

Maximum values:

U_i	=	20	V AC	(amplitude)
f	=	307	kHz	±5 kHz
P_v	≈	1.5	W	(internal power consumption)

The AC-supply circuit is electrically isolated from the intrinsically safe field circuits and the CAN-signal circuits of the module in accordance with EN 60079-11, table 5, up to a voltage of 60 V.

II) Signal circuit (CAN-Bus)..... system-internal circuit designed to type of protection
(terminals CAN-Bus 1: 9/10 Intrinsic Safety Ex ib IIC
terminals CAN-Bus 2: 11/12) without external connection facilities

The signal circuit (CAN-supply) is safely electrically isolated from all other intrinsically safe circuits up to a voltage of 30 V (EN 60079-11, table 5).

The signal circuit (bus-line 1) and the signal circuit (bus-line 2) are safely electrically isolated from each other in accordance with EN 60079-11, table 5, up to a voltage of 30 V. They are, however, interconnected (only) inside the module.

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III) Adress encoding circuit — system-internal circuit designed to type of protection Intrinsic Safety Ex ib IIC without external connection facilities

IV) Types AIH40Ex and AI42Ex

Measuring transducer circuits..... type of protection Intrinsic Safety Ex ia IIC
for passive sensors or Ex ia IIIC

terminal posts
channel 1: +1/-3
channel 2: +7/-9
channel 3: +13/-15
channel 4: +19/-21)

Maximum values per channel:

U_o = 22.1 V
I_o = 93 mA
P_o = 640 mW

trapezoidal output characteristic

U_Q = 27.54 V
R = 298 Ω
C_i = 1.1 nF
L_i = 220 µH

For relationship between type of protection, explosion group and permissible external reactances, reference is made to the table:

	Ex ia resp. Ex ib	
	IIC/IIIC	IIB/IIIC
L_o	0.5 mH	2 mH
C_o	65 F	270 nF

V) Type AIH41Ex

Measuring transducer circuits..... type of protection Intrinsic Safety Ex ia IIC
for active sensors or Ex ia IIIC

terminal posts
channel 1: +4/-2
channel 2: +10/-8
channel 3: +16/-14
channel 4: +22/-20

Maximum values per channel:

U_o = 7.2 V
I_o = 16 mA
P_o = 29 mW

linear output characteristic

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C_i = 1.1 nF
L_i = 110 µH

The four channels of the measuring transducer circuits are electrically interconnected via ground. They are safely electrically isolated from each other up to a peak value of the voltage of 30 V. Therefore the values specified in the following tables apply to each channel.

Va) Active intrinsically safe sensors with linear output characteristic

For relationship between the electrical maximum values for active sensors and the permissible maximum values for the external reactances referred to the type of protection, reference is made to the table:

Active sensors (linear characteristic)		Ex ia / ib IIC Ex ia IIIC		Ex ia / ib IIB Ex ia IIIC	
U_i	I_i	L_O	C_O	L_O	C_O
2 V	100 mA	1.89 mH	958 nF	9.8 mH	3.79 µF
5 V	100 mA	1.89 mH	548 nF	9.8 mH	2.09 µF
10 V	100 mA	1.89 mH	288 nF	9.8 mH	1.09 µF
15 V	100 mA	0.89 mH	108 nF	9.8 mH	630 nF
16.5 V	100 mA	0.89 mH	87.9 nF	9.8 mH	508 nF
20 V	100 mA	0.89 mH	61.9 nF	9.8 mH	318 nF
22 V	100 mA	0.89 mH	52.9 nF	9.8 mH	248 nF
25 V	100 mA	0.89 mH	43.9 nF	9 mH	178 nF
28 V	100 mA	0.44 mH	42.9 nF		
30 V	100 mA			4.89 mH	138 nF

Vb) Active intrinsically safe sensors with trapezoidal output characteristic

For relationship between the electrical maximum values for active sensors and the permissible maximum values for the external reactances referred to the type of protection, reference is made to the table:

Active sensors (trapezoidal characteristic)		Ex ia / ib IIC Ex ia IIIC		Ex ia / ib IIB Ex ia IIIC	
U_i	I_i	L_O	C_O	L_O	C_O
22 V	93 mA	0.39 mH	63.9 nF	1.89 mH	268 nF

Vc) Active intrinsically safe sensors with rectangular or trapezoidal output characteristic

For relationship between the electrical maximum values for active sensors and the permissible maximum values for the external reactances referred to the type of protection, reference is made to the table:

Active sensors (rectangular or trapezoidal characteristic)		Ex ia / ib IIC Ex ia IIIC		Ex ia / ib IIB Ex ia IIIC	
U_i	I_i	L_O	C_O	L_O	C_O
2 V	100 mA	1.89 mH	958 nF	4.89 mH	4.3 µF

5	V	100	mA	1.89	mH	518	nF	4.89	mH	2.4	µF
10	V	90	mA	0.89	mH	288	nF	4.89	mH	1.2	µF
15	V	56	mA	0.89	mH	86	nF	4.89	mH	608	nF
16.5	V	49	mA	0.89	mH	64	nF	4.89	mH	468	nF
20	V	35	mA	0.89	mH	57	nF	4.89	mH	288	nF
16.5	V	97	mA	-		-		1.89	mH	398	nF
20	V	80	mA	-		-		0.89	mH	318	nF
22	V	65	mA	-		-		0.89	mH	298	nF
25	V	50	mA	-		-		0.89	mH	278	nF

Special conditions of save use

In the fieldbus system excom the 4-channel analog input modules, type AIH40Ex, type AIH41Ex and AI42Ex shall only be operated in combination with the subrack unit, type MT... .