

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin



(1) **EC-TYPE-EXAMINATION CERTIFICATE** (Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**



(3) EC-type-examination Certificate Number:

PTB 99 ATEX 2053 X

(4) Equipment: Measuring transducer type TR04-Ex and type TR104-Ex

(5) Manufacturer: Hartmann & Braun GmbH & Co.KG

(6) Address: D-63754 Alzenau

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 99-28302.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997

EN 50020:1994

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:



II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz

Braunschweig, May 10, 1999

By order:

(signature)

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

5 pages, correct and complete as regards content.

By order:

Dipl.-Ing. Wilkens

Braunschweig, August 04, 1999

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EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

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(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2053 X

(15) Description of equipment

The measuring transducers type TR04-Ex and type TR104-Ex with interconnection to sensors are used for the detection, amplification and transmission of measured values in intrinsically safe circuits. With the installation of maximum two measuring transducers of type TR04-Ex into a housing for cascading bar-holders the type designation of this assembly is TR104-Ex.

The assignment of temperature class and maximum permissible ambient temperature for the measuring transducers type TR 04-Ex and type TR 104-Ex is shown in the following table:

temperature class	maximum permissible ambient temperature
T6	50°C
T5	65°C
T4	85°C

Electrical data

Measuring transducer type TR 04-Ex

Supply circuit type of protection Intrinsic Safety EEx ia IIC/IIB resp.
(terminal clamps resp. EEx ib IIC/IIB
solder terminations + and -) only for connection to a certified intrinsically safe circuit
Maximum values: $U_i = 29.4 \text{ V}$
 $I_i = 130 \text{ mA}$
 $P_i = 800 \text{ mW}$

The effective internal inductances and capacitances are negligibly small.

Measuring circuit (three-wire type of protection Intrinsic Safety EEx ia IIC/IIB resp.
connection) (terminal clamps resp. EEx ib IIC/IIB
solder terminations 1, 2 and 3)

Maximum values: $U_o = 6.8 \text{ V}$
 $I_o = 130 \text{ mA}$
 $P_o = 383 \text{ mW}$

Load current for connected intrinsically safe sensors:
 $I \leq 56.3 \text{ mA}$

effective internal capacitance: 365 nF
the effective internal inductance is negligibly small.

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The maximum permissible values for the external capacitance resp. inductance are shown in the following table:

	EEx ia/ib IIC	EEx ia/ib IIB
C_o	285 nF	2.16 μ F
L_o	0.5 mH	2 mH

Measuring circuit (4-wire connection) (terminal clamps resp. solder terminations 1, 2, 3 and 4)

type of protection Intrinsic Safety EEx ia IIC/IIB resp. EEx ib IIC/IIB

Maximum values: $U_o = 6.8$ V
 $I_o = 130$ mA
 $P_o = 383$ mW

Load current for connected intrinsically safe sensors:
 $I \leq 56.3$ mA

effective internal capacitance: 415 nF
 the effective internal inductance is negligibly small.

The maximum permissible values for the external capacitance resp. inductance are shown in the following table:

	EEx ia/ib IIC	EEx ia/ib IIB
C_o	235 nF	2.11 μ F
L_o	0.5 mH	2 mH

The category of the intrinsically safe measuring circuit is determined by the category of the connected intrinsically safe supply circuit. Measuring circuit and supply circuit are electrically interconnected.

Measuring transducer type TR 104-Ex

Supply circuit(s).....
 type/variant Pt100 3L:
 (channel 1: terminals 31+ and 32-)
 (channel 2: terminals 41+ and 42-)
 type/variant Pt100 4L
 (single channel: terminals 31+ and 32-)

type of protection Intrinsic Safety EEx ia IIC/IIB resp. EEx ib IIC/IIB

only for connection to certified intrinsically safe circuits

maximum values: $U_i = 29.4$ V
 $I_i = 130$ mA
 $P_i = 800$ mW

The effective internal inductances and capacitances are negligibly small.

Measuring circuits.....
 type/variant Pt100 3L
 (channel 1: terminals 12 and 13
 resp. 11, 12 and 13)
 (channel 2: terminals 22 and 23
 resp. 21, 22 and 23)

type of protection Intrinsic Safety EEx ia IIC/IIB resp. EEx ib IIC/IIB

Maximum values per circuit: $U_o = 6.8$ V
 $I_o = 130$ mA
 $P_o = 383$ mW

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SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2053 X

Load current for connected intrinsically safe sensors:
 $I \leq 56.3 \text{ mA}$

effective internal capacitance: 365 nF
the effective internal inductance is negligibly small.

The maximum permissible values for the external capacitance resp. inductance are shown in the following table:

	EEx ia/ib IIC	EEx ia/ib IIB
C_o	285 nF	2.16 μ F
L_o	0.5 mH	2 mH

Measuring circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB resp.
type/variant Pt100 4L EEx ib IIC/IIB
(single channel:
terminals 11, 12, 13 and 14)

Maximum values: $U_o = 6.8 \text{ V}$
 $I_o = 130 \text{ mA}$
 $P_o = 383 \text{ mW}$

Load current for connected intrinsically safe sensors:
 $I \leq 56.3 \text{ mA}$

effective internal capacitance: 415 nF
the effective internal inductance is negligibly small.

The maximum permissible values for the external capacitance resp. inductance are shown in the following table:

	EEx ia/ib IIC	EEx ia/ib IIB
C_o	235 nF	2.11 μ F
L_o	0.5 mH	2 mH

The category of the intrinsically safe measuring circuit is determined by the category of the connected intrinsically safe supply circuit. Measuring circuit and supply circuit are electrically interconnected.

(16) Report PTB Ex 99-28302

(17) Special conditions for safe use

1. The connection facilities of the measuring transducer type TR 04-Ex shall be installed in such a way that at least the degree of protection IP 20 according to IEC-publication 60529:1989 is met.
2. The minimum permissible ambient temperature for the measuring transducer type TR 04-Ex is $-40 \text{ }^\circ\text{C}$.

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3. The minimum permissible ambient temperature for the measuring transducer type TR 104-Ex is -20 °C .
4. To avoid inadmissible electrostatic charging of the plastic housing of the measuring transducer TR 104-Ex a warning label has to point to this danger.

(18) Essential health and safety requirements

Met by standards

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, May 10, 1999

(signature)

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor