

CERTIFICATE

(1) EU-Type Examination

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 12ATEX0161 X** Issue Number: **2**

(4) Product: **RTD-Thermometers, Type TR...-...,
Thermocouple-Thermometers, Type TC...-... and TEC420
RTD Inserts, Type TPR100 and iTHERM, Type TS111
Thermocouple Inserts, Type TPC100
Cable sensor, Type TSC310 and TST310
RTD and Thermocouple Sensors iTHERM, Type TM211
Temperature Assembly iTHERM Type TM41...-...**

(5) Manufacturer: **Endress+Hauser Wetzler GmbH**

(6) Address: **Obere Wank 1, 87484 Nesselwang, Germany**

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

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR12.0058/01.

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

EN 60079-0 : 2012 + A11 : 2013 EN 60079-11 : 2012 EN 60079-26 : 2015

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

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



**II 1 G Ex ia IIC T6...T1 Ga
II 1/2 G Ex ia IIC T6...T1 Ga/Gb
II 1 D Ex ia IIIC T85 °C...T450 °C Da
II 1/2 D Ex ia IIIC T85 °C...T450 °C Da/Db**

Date of certification: 29 November 2018

DEKRA Certification B.V.

R. Schuller
Certification Manager



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(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 12ATEX0161 X**

Issue No. 2

(15) **Description**

The Insert for RTD Thermometers, Type TPR100-... and iTHERM Type TS111-..., the Insert for Thermocouple Thermometers, Type TPC100-..., the Cable Thermometer, Type TST310-... and Type TSC310-... and the RTD or Thermocouple Temperature Sensors, iTHERM Type TM211 are used to convert the temperature of a process medium into an electrical signal.

The insert is used with a mounting head, made of aluminium, stainless steel or conductive plastic. The mounting head contains either a temperature transmitter or connection terminals for connection of the RTD or TC sensor to an external temperature transmitter.

The Temperature Sensors Type TR...-..., Type TC...-... and Type TEC420 and iTHERM Type TM411 and Type TM412 consist of RTD or Thermocouple insert Type TPR100-..., Type TPC100-... or Type TS111 and a mounting head with a thermowell.

The sensor is a single or dual Pt100 resistance element (wire wound or thin film) or a thermocouple element, mounted in a stem with a diameter of 3 mm or 6 mm and a length depending on the application.

The sensor can be used in a 3 or a 4 wire measurement system or in a dual 2 wire or 3 wire measurement system if a dual temperature sensor element is mounted.

The mounting head, including the cable entry device provides a degree of protection of at least IP2X in accordance with EN 60529 for application in explosive gas atmospheres.

The mounting head, including the cable entry device provides a degree of protection of at least IP6X in accordance with EN 60529 for application in explosive dust atmospheres.

Thermal data

For each dual or single element, the temperature class T6...T1 and the maximum surface temperature T85 °C...T450 °C is depending on the process temperature and the Supply/output circuit power P_i , in accordance with the following tables:

Insert diameter	Temperature class/max temperature T	$P_i \leq 50 \text{ mW}$	$P_i \leq 100 \text{ mW}$	$P_i \leq 200 \text{ mW}$	$P_i \leq 500 \text{ mW}$
		Max. allowed process temperature [°C]			
3 mm, 3 mm (dual) or 6 mm (dual)	T1/450 °C	426	415	396	343
	T2/300 °C	276	265	246	193
	T3/200 °C	181	170	151	98
	T4/135 °C	116	105	86	33
	T5/ 95 °C	81	70	51	-2
	T6/ 85 °C	66	55	36	-17
6 mm	T1/450 °C	433	428	420	398
	T2/300 °C	283	278	270	248
	T3/200 °C	188	183	175	153
	T4/135 °C	123	118	110	88
	T5/ 95 °C	88	83	75	53
	T6/ 85 °C	73	68	60	38

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Insert diameter	Temperature class/max temperature T	$P_i \leq 650 \text{ mW}$	$P_i \leq 750 \text{ mW}$	$P_i \leq 800 \text{ mW}$	$P_i \leq 1000 \text{ mW}$
		Max. allowed process temperature [°C]			
3 mm, 3 mm (dual) or 6 mm (dual)	T1/450 °C	333	320	312	280
	T2/300 °C	183	170	162	130
	T3/200 °C	88	75	62	30
	T4/135 °C	23	10	2	-30
	T5/ 95 °C	-12	-25	-33	
	T6/ 85 °C	-27	-40		
6 mm	T1/450 °C	388	381	377	361
	T2/300 °C	238	231	227	211
	T3/200 °C	143	136	127	111
	T4/135 °C	78	71	67	51
	T5/ 95 °C	43	36	32	16
	T6/ 85 °C	28	21	17	1

The ambient temperature at the mounting head may be directly influenced by the process temperature, but is restricted to the range -40 °C ... +130 °C, or by the specifications of the applied integral temperature transmitter and the optional display, if appropriate.

For thermometers with two mounted head transmitters the allowed ambient temperature is 10K lower than each head transmitter's certified ambient temperature.

For thermocouple inserts, the temperature class T6...T1 and the maximum surface temperature T85 °C...T450 °C are equal to the process temperature.

For further details regarding the temperature classification respectively the maximum surface temperature and the maximum process and ambient temperatures, allowed for the different versions and in relation to the maximum input power P_i , refer to the instruction manual.

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Electrical data

Supply/output circuit:

for insert options with terminal block, flying leads or thermometer, all types:

in type of protection intrinsic safety Ex ia IIC and Ex ia IIIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 140 \text{ mA}$; $P_i = 1 \text{ W}$.

C_i and L_i , for types TS111/TPx100:

Sensor type	Insertion Length IL		Flying leads		Terminal block	
	C_i [F/m]	L_i [H/m]	C_i [F]	L_i [H]	C_i [F]	L_i [H]
Single	2,00E-10	1,00E-06	1,96E-11	9,80E-08	4,60E-12	2,30E-08
Dual	4,00E-10	2,00E-06	3,92E-11	1,96E-07	9,20E-12	4,60E-08

Calculation formula for options with flying leads or terminal block only:

$$C_i = C_i \text{ Insertion length IL} \times \text{IL} + C_i \text{ Flying leads}$$

$$L_i = L_i \text{ Insertion length IL} \times \text{IL} + L_i \text{ Flying leads}$$

$$C_i = C_i \text{ Insertion length IL} \times \text{IL} + C_i \text{ Terminal block}$$

$$L_i = L_i \text{ Insertion length IL} \times \text{IL} + L_i \text{ Terminal block}$$

C_i and L_i , for types TSx310:

Sensor type	Insertion Length NL		Connection		Length Extension L	
	C_i [F/m]	L_i [H/m]	C_i [F]	L_i [H]	C_i [F/m]	L_i [H/m]
Single	2,00E-10	1,00E-06	2,50E-11	1,25E-07	2,00E-10	1,00E-06
Dual	4,00E-10	2,00E-06	5,00E-11	2,50E-07	4,00E-10	2,00E-06

Calculation formula for cable thermometer:

$$C_i = C_i \text{ Sensor length NL} \times \text{NL} + C_i \text{ connection} + C_i \text{ Cable L} \times \text{L}$$

$$L_i = L_i \text{ Sensor length NL} \times \text{NL} + L_i \text{ connection} + L_i \text{ Cable L} \times \text{L}$$

Refer to the tables above for the relation between P_i and the maximum process temperature, the temperature class and the maximum surface temperature.

From the safety point of view, the circuit of versions of the following temperature sensors and inserts shall be considered to be connected to ground (for details, the instruction manual, provided with the equipment, shall be observed):

- Type TPC100-..., with diameter 3 mm, single or dual
- Type TSC310-..., with diameter 1.5 mm, 2 mm, 3 mm or 4,5 mm, single or dual
- Type TST310-... and Type TM211, with diameter 3 mm.

For Temperature Sensors with a mounted intrinsically safe Temperature Transmitter, the electrical parameters of the transmitter shall be observed.

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Installation instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

(16) **Report Number**

No. NL/DEK/ExTR12.0058/01.

(17) **Specific conditions of use**

If the mounting head of the Temperature Sensor is made of aluminium and if it is mounted in an area where the use of category 1 G apparatus is required, the head must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.

For Temperature Sensors Type TST310-..., TSC310-... and TM211, if intended for use in explosive gas atmospheres where the use of apparatus of category 1 G is required, electrostatic charges on the cable shall be avoided.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/DEK/ExTR12.0058/01.

(20) **Certificate history**

Issue 1 - 215360400	initial certificate
Issue 2 - 223137300	<ol style="list-style-type: none">1. Changes in nomenclature and features2. Assessed per EN 60079-0:2012+A11 and EN 60079-26:20153. Minor constructional changes