

# 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 24ATEX0055X** Issue Number: **0**

(4) Product: **Temperature assemblies, Type TM611**

(5) Manufacturer: **Endress+Hauser Wetzler GmbH+Co. KG**

(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 mentioned in item (16).

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

**EN IEC 60079-0 : 2018**  
**EN 60079-31 : 2014**

**EN 60079-1 : 2014**

**EN 60079-11 : 2012**

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 2 G	Ex db IIC T6...T1 Gb
II 2 D	Ex tb IIIC T85 °C...T450 °C Db
II 1 G	Ex ia IIC T6...T1 Ga
II 2 G	Ex ia IIC T6...T1 Gb
II 1 D	Ex ia IIIC T <sub>200</sub> 85 °C...T <sub>200</sub> 450 °C Da
II 2 D	Ex ia IIIC T85 °C...T450 °C Db

Date of certification: 13 September 2024

DEKRA Certification B.V.

R. Schuller  
Certification Manager



Throughout this document, a point is used as the decimal separator.

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(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 24ATEX0055X** Issue No. **0**

(15) **Description**

The temperature assembly type TM611 consists of a certified thermometer, type TM111 or TSx310 assembled with a coupling element, type TT611 which is designed for a non-invasive temperature measurement with a suitable 3 mm sensor.

The terminal head or field transmitter, including the cable entry device provides a degree of protection of at least IP2X in accordance with IEC 60529 for application in explosive gas atmospheres, type of protection Ex ia.

The terminal head or field transmitter, including the cable entry device provides a degree of protection of at least IP6X in accordance with IEC 60079-0 and IEC 60529 for application in explosive dust atmospheres.

Separate parts are approved under following certificates:

The Temperature assemblies type TM111 in type of protection Ex db, Ex tb are separately certified by IECEx DEK 18.0056X / DEKRA 18ATEX0103 X.

The Thermometers iTHERM type TM111 in type of protection Ex i, EPL Ga, Gb, Db are separately certified by IECEx EPS 18.0074X / EPS 18 ATEX 1 152 X.

The Temperature sensors type TST310, TSC310 in type of protection Ex i, EPL Ga, Da are separately certified by IECEx DEK 12.0049X / DEKRA 12ATEX0161 X.

For type designation, electrical, thermal data and marking see Annex 1 to Report mentioned in item (16).

**Installation instructions**

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

(16) **Report Number**

NL/DEK/ExTR24.0040/00.



(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 24ATEX0055X** Issue No. 0

(17) **Specific conditions of use**

For maximum surface temperature, ambient temperature range and maximum process temperatures see Annex 1 to Report mentioned in item (16) and safety instructions.

For Ex d, Ex t type of protection, suffix code a = 86, 8F

- The flameproof joints are not intended to be repaired.<sup>1</sup>
- It shall be verified, taking into account the worst case process and ambient temperatures:
  - that the temperature of the enclosure at the process connection point does not exceed the ambient temperature range of the assembly
  - that the temperature of the used TT611 coupling element does not exceed the service temperature range as listed in Annex 1.
- Temperature assemblies with flying leads (type TM611 suffix code g = 0A) shall be provided with a round transmitter of max. 2.2 W with a main diameter not exceeding 45 mm and a sensor signal of max 10 Vdc and 1 mA.

Note: <sup>1</sup> applies only for suffix code a = 86

For Ex i type of protection, suffix code a = 84, 8J

- From the safety point of view, the circuit of versions of the following temperature sensors and inserts shall be considered to be connected to earth (for details, the instruction manual, provided with the equipment, shall be observed): Type TM611 with diameter 3 mm, single or dual
- The thermometer must be installed so, that even in the event of rare incidents, an ignition source due to impact or friction between the enclosure and iron/steel is excluded.
- When the coupling element, type TT611, is made of aluminum, if it is mounted in an area where the use of EPL Ga and Da apparatus is required, it must be installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- For Cable thermometer, suffix code b = B, C, if intended for use in explosive gas atmospheres where the use of apparatus of Equipment Protection Level Ga 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 test report number mentioned in item (16).

## Type designation

Type Suffix code

TM611- abcdefghijklmnopqrstu

Suffix code	Explanation	Value	Explanation
a	Approval	8F	ATEX IECEx II 2 D Ex tb IIIC Db
		86	ATEX IECEx II 2 G Ex db IIC Gb II 2 D Ex tb IIIC Db
		8J	ATEX IECEx II 2 G Ex ia IIC Gb II 1 G Ex ia IIC Ga *6
		84	ATEX IECEx II 2 G Ex ia IIC Gb, II 2 D Ex ia IIIC Db II 1 G Ex ia IIC Ga, II 1 D Ex ia IIIC Da *6
b	Thermometer Design	A	Industrial thermometer, G1/2 connection
		B *2	Cable thermometer RTD, G1/2 connection
		C *2	Cable thermometer TC, G1/2 connection
c	Pipe outer diameter; Material; Form	n.s. *1	Not relevant for Explosion Safety
d	Neck length E	A	43mm (1.7")
		B	55mm (2.2")
		C	93mm (3.7")
		D	105mm (4.1")
		E	143mm (5.6")
		F	155mm (6.1")
		X	... mm (100...500mm)
e	Sensor Type; Measuring Range; Material	A	1xPt100 TF; -50...+400 °C; 316L
		B	1xPt100 WW; -200...+600 °C; 316L
		C	2xPt100 WW; -200...+600 °C; 316L
		L	1xTC type J; max. 800 °C; 316L
		M	2xTC type J; max. 800 °C; 316L
		N	1xTC type K; max. 1100 °C; Alloy600
		O	2xTC type K; max. 1100 °C; Alloy600
f	Sensor Standard; Classification	n.s. *1	Not relevant for Explosion Safety
g	Electrical Connection	0A	Flying leads
		1A	Terminal block
		2C	4-20mA, 1-channel TMT71, head transmitter DIN B
		2H	4-20 mA, 1-channel TMT31, PCP 0.15 K, head transmitter DIN B
		2I	4-20 mA, 1-channel TMT31, PCP 0.1 K, head transmitter DIN B
		3A	HART, 1-channel TMT72, head transmitter DIN B
		3C	HART, 2-channel TMT82, head transmitter DIN B
		3D	HART, 2-channel TMT82, SIL head transmitter DIN B
		3F	4-20mA HART, 2-channel TMT82 SIL OIML/MID for gas, head transmitter DIN B
		3I	4-20mA HART, 2-channel TMT82 SIL OIML/MID for liquids, head transmitter DIN B
		4A	FOUNDATION Fieldbus, 2-channel TMT85, head transmitter DIN B
		5A	PROFIBUS PA, 2-channel TMT84, head transmitter DIN B
		6B	PROFINET w. Ethernet-APL/SPE, TMT86, head transmitter DIN B

Suffix code	Explanation	Value	Explanation
		6C	PROFINET w. Ethernet-APL/SPE, TMT86 SIL, conformity + PROFIsafe, head transmitter DIN B
h	Terminal Head; Material; Protect. Class:	A0 *2	Cable Thermometer without housing
		A1	TA30A comfort flip cover; Alu; IP66/68
		A2	TA30A + display, comfort flip cover; Alu; IP66/68
		A3 *2	TA20AB small, cover screwed; Alu; IP66
		D1	TA30D comfort, high flip cover; Alu; IP66/68
		E2 *3	TA30EB comfort, screwed cover; Alu; IP66/68
		E3 *3	TA30EB+display, comfort screwed cover; Alu; IP66/68
		H1	TA30H Ex d/XP; 316L; IP66/68
		H2	TA30H Ex d/XP + display; 316L; IP66/68
		H3	TA30H Ex d/XP; Alu; IP66/68
		H4	TA30H Ex d/XP + display; Alu; IP66/68
		H5 *2	TA30H field housing, display frontal; Alu; IP66/68
		H6 *2	TA30H field housing, display frontal; 316; IP66/68
		P1 *3	TA30P small, high flip cover; PA black; IP65; BASF Standard
		R1 *2	TA30R small, screwed cover; 316L blasted; IP68
		R2 *3	TA30R small + display; 316L blasted; IP68
		R3 *2	TA30R small, screwed high cover; 316L blasted; IP68
		R4 *3	TA30R small + display; 316L polished; IP68
R5 *2	TA30R small, screwed cover; 316L polished; IP68		
R6 *2	TA30R small, screwed high cover; 316L polished; IP68		
i	Cable entry Terminal head	0 *2	Without housing
		A	1x thread M20x1.5
		B	1x thread NPT1/2
		C *4	1x thread G1/2
		D	2x thread M20x1.5
		E	2x thread NPT1/2
j	Wire; Sheath	A	Not needed
		C *6	4-wire, max. +200°C; PTFE+PTFE
		D *6	2x3-wire, max. +180°C; PTFE+Silicone
		G *6	TC extension cable; Glass fibre
		H *6	TC extension cable; PVC blue
k	Length Extension Wires Cable Probe	A	Not needed
		X *6	... mm, extension cable (500...10.000mm)
l	Device Model	n.s.*1	Not relevant for Explosion Safety
m	Second Transmitter (Mounted)	GC *2	4-20mA, 1-channel TMT71, head transmitter DIN B
		GD *2	4-20mA HART, 1-channel TMT72, head transmitter DIN B
		GE *2	4-20mA HART, 2-channel TMT82, head transmitter DIN B
		GF *2	4-20mA HART, 2-channel TMT82 SIL, head transmitter DIN B
		GG *2	PROFIBUS PA, 2-channel TMT84, head transmitter DIN B
		GH *2	FOUNDATION Fieldbus, 2-channel TMT85, head transmitter DIN B
		GK *2	PROFINET over Ethernet-APL/SPE, TMT86, 10Mbit/s, head transmitter DIN B
		GL *2	PROFINET over Ethernet-APL/SPE, TMT86, SIL conformity + PROFIsafe, 10Mbit/s, head transmitter DIN B

Suffix code	Explanation	Value	Explanation
n	Service	n.s.*1	Not relevant for Explosion Safety
o	Test, Certificate, Declaration	n.s.*1	Not relevant for Explosion Safety
p	Additional Approval	n.s.*1	Not relevant for Explosion Safety
q	Additional option	n.s.*1	Not relevant for Explosion Safety
r	Accessory mounted	n.s.*1	Not relevant for Explosion Safety
s	Calibration Thermometer	n.s.*1	Not relevant for Explosion Safety
t	Calibration Points $\geq 0$ °C	n.s.*1	Not relevant for Explosion Safety
u	Calibration Points $\leq 0$ °C	n.s.*1	Not relevant for Explosion Safety
v	Firmware Version	n.s.*1	Not relevant for Explosion Safety

\*1 n.s. means the value is neither related to Explosion Safety nor in the scope.

\*2 only possible when suffix code a = 8J, 84

\*3 only possible when suffix code a = 8J

\*4 only possible when suffix code a = 8F, 8J, 84

\*5 only possible when suffix code a = 8F, 86

\*6 only possible when suffix code b = B, C

## Thermal data

The relation between the type, electrical connection, temperature class, maximum surface temperature, ambient temperature range and process temperature range is shown in the following tables.

For suffix a = 8F, 86 (Ex db, Ex tb):

Temperature assemblies with RTD temperature sensors				
Electrical connection*1	Temperature class	Maximum surface temperature	Ambient temperature range	Process temperature range
				Insert diameter 3 mm
Type TM611				
Terminal block*2: 1A	T6	T85 °C	-50 °C to +70 °C	-50 °C to +55 °C
	T5	T100 °C	-50 °C to +80 °C	-50 °C to +70 °C
	T4	T135 °C	-50 °C to +120 °C	-50 °C to +105 °C
	T3	T200 °C	-50 °C to +120 °C	-50 °C to +170 °C
	T2	T300 °C	-50 °C to +120 °C	-50 °C to +265 °C
	T1	T450 °C	-50 °C to +120 °C	-50 °C to +415 °C
Type TM611				
Flying leads: 0A Transmitter TMT31: 2H, 2I TMT71: 2C TMT72: 3A TMT82: 3C, 3D, 3F, 3I TMT84: 5A TMT85: 4A TMT86: 6B, 6C	T6	T85 °C	-40 °C to +65 °C	-50 °C to +55 °C
	T5	T100 °C	-40 °C to +80 °C	-50 °C to +70 °C
	T4	T135 °C	-40 °C to +85 °C	-50 °C to +105 °C
	T3	T200 °C	-40 °C to +85 °C	-50 °C to +170 °C
	T2	T300 °C	-40 °C to +85 °C	-50 °C to +265 °C
	T1	T450 °C	-40 °C to +85 °C	-50 °C to +415 °C

Temperature assemblies with thermocouple temperature sensors				
Electrical connection <sup>*1</sup>	Temperature class	Maximum surface temperature	Ambient temperature range	Process temperature range
Type TM611				
Terminal block <sup>*2</sup> : 1A	T6	T85 °C	-50 °C to +70 °C	-50 °C to +85 °C
	T5	T100 °C	-50 °C to +80 °C	-50 °C to +100 °C
	T4	T135 °C	-50 °C to +120 °C	-50 °C to +135 °C
	T3	T200 °C	-50 °C to +120 °C	-50 °C to +200 °C
	T2	T300 °C	-50 °C to +120 °C	-50 °C to +300 °C
	T1	T450 °C	-50 °C to +120 °C	-50 °C to +450 °C
Type TM611				
Flying leads: 0A Transmitter TMT71: 2C TMT72: 3A TMT82: 3C, 3D, 3F, 3I TMT84: 5A TMT85: 4A TMT86: 6B, 6C	T6	T85 °C	-40 °C to +65 °C	-50 °C to +85 °C
	T5	T100 °C	-40 °C to +80 °C	-50 °C to +100 °C
	T4	T135 °C	-40 °C to +85 °C	-50 °C to +135 °C
	T3	T200 °C	-40 °C to +85 °C	-50 °C to +200 °C
	T2	T300 °C	-40 °C to +85 °C	-50 °C to +300 °C
	T1	T450 °C	-40 °C to +85 °C	-50 °C to +450 °C

\*1: Suffix code j

\*2: In an enclosure with a blind cover: suffix code k = A1, D1, H1 or H3.

Coupling element, type TT611 for TM611:

material	Service temperature range
AlSi 1MgMn	-50 °C to +150 °C
1.4404, 1.4529, 2.4816, 2.4819	-50 °C to +450 °C
1.4547	-20 °C to +400 °C
1.4539	-50 °C to +425 °C
1.4462	-30 °C to +300 °C
1.4410	-35 °C to +260 °C

For suffix a = 8J, 84 (Ex ia):

For each dual or single element, the temperature class T6...T1 and the maximum surface temperature  $T_{20085\text{ °C}} \dots T_{200450\text{ °C}}$  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)	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

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)	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		

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 -50°C ... +130°C for types TA30A, TA30D and TA30H or by the specifications of the applied integral temperature transmitter and the optional display, if appropriate. The lower temperature of -60°C is possible with marking Ex ia IIC Gb only.

For thermometers with two mounted head transmitters the allowed ambient temperature is 12K lower than each head transmitter's certified ambient temperature.

For thermocouple inserts, the temperature class T6...T1 and the maximum surface temperature  $T_{200} 85 \text{ °C} \dots T_{200} 450 \text{ °C}$  are equal to the process temperature.

For all types of protection suffix a = 8J, 84 or 8F, 86 (Ex ia or Ex db, Ex tb):

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.



### Electrical data

For suffix a = 8F, 86 (Ex db, Ex tb):

Power supply transmitters: max. 42 Vdc, 23 mA

Sensor: max. 10 Vdc, 1 mA

For suffix a = 8J, 84 (Ex ia):

Supply/output circuit:

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:

Electrical connection <sup>*1</sup>	U <sub>i</sub>	I <sub>i</sub>	P <sub>i</sub>	C <sub>i</sub>	L <sub>i</sub>
TMT71: 2C	30 V	100 mA	800 mW	0	0
TMT72: 3A	30 V	100 mA	800 mW	0	0
TMT82: 3C, 3D, 3F, 3I	30 V	130 mA	800 mW	0	0
TMT84: 5A	FISCO field device				
TMT85: 4A	FISCO field device				
TMT86: 6B, 6C	FISCO field device				
Terminal block: 1A	30 V	140 mA	1000 mW	See tables below	
Flying leads: 0A <sup>*2</sup>	30 V	140 mA	1000 mW	See tables below	

\*1: Suffix code j

\*2: also applies for suffix code b = B, C (TSx310)

C<sub>i</sub> and L<sub>i</sub>, for suffix code j = 0A, 1A

Sensor type	Neck Length E		Flying leads		Terminal block	
	C <sub>i</sub> [F/m]	L <sub>i</sub> [H/m]	C <sub>i</sub> [F]	L <sub>i</sub> [H]	C <sub>i</sub> [F]	L <sub>i</sub> [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:

$$C_i = C_{i \text{ Neck Length E}} \times E + C_{i \text{ Flying leads}}$$

$$L_i = L_{i \text{ Neck Length E}} \times E + L_{i \text{ Flying leads}}$$

$$C_i = C_{i \text{ Neck Length E}} \times E + C_{i \text{ Terminal block}}$$

$$L_i = L_{i \text{ Neck Length E}} \times E + L_{i \text{ Terminal block}}$$

$C_i$  and  $L_i$ , for suffix code b = B, C:

Sensor type	Neck Length E		Connection		Length Extension Wires 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-08	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:

$$C_i = C_i \text{ Neck Length E} \times E + C_i \text{ Sensor Tip} + C_i \text{ Cable connection} + C_i \text{ Length Extension Wires L} \times L$$

$$L_i = L_i \text{ Neck Length E} \times E + L_i \text{ Sensor Tip} + L_i \text{ Cable connection} + L_i \text{ Length Extension Wires L} \times L$$

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 temperature sensors with diameter 3mm shall be considered to be connected to ground (for details, the instruction manual, provided with the equipment, shall be observed):

### Marking

Type	Suffix code a	Suffix code b	ATEX code	IEC code
TM611	8F	A	⊕ II 2 D	Ex tb IIIC T85 °C...T450 °C Db
	86	A	⊕ II 2 G	Ex db IIC T6...T1 Gb
			⊕ II 2 D	Ex tb IIIC T85 °C...T450 °C Db
	8J	A	⊕ II 2 G	Ex ia IIC T6...T1 Gb
	84	A	⊕ II 2 G	Ex ia IIC T6...T1 Gb
			⊕ II 2 D	Ex ia IIIC T85 °C...T450 °C Db
8J	B, C	⊕ II 1 G	Ex ia IIC T6...T1 Ga	
84	B, C	⊕ II 1 G ⊕ II 1 D	Ex ia IIC T6...T1 Ga Ex ia IIIC T <sub>200</sub> 85 °C...T <sub>200</sub> 450 °C Da	