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Safety Instructions
iTHERM TM111, iTHERM TM131

EAC: Ga/Gb Ex ia IIC T6...T1 X
Ex ia IIIC T85°C...450°C Da/Db X

Endress+Hauser
People for Process Automation

iTHERM TM111, iTHERM TM131

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Associated documentation

This document is an integral part of the following Operating Instructions and Technical Information:

Associated documentation for iTHERM TM111
- Operating instructions: BA01915T/09
- Technical information: TI01445T/09

Associated documentation for iTHERM TM131
- Operating instructions: BA01915T/09
- Technical information: TI01373T/09

Supplementary Documentation

Explosion-protection brochure: CP00021Z/11

The Explosion-protection brochure is available: In the download area of the Endress+Hauser website: www.endress.com → Download → Advanced → Documentation code: CP00021Z

Certificates

EAC certificate of conformity according to TR CU 012/2011

The thermometers meet the fundamental health and safety requirements for the design and construction of devices and protective systems intended for use in potentially explosive atmospheres.

Certification body:

НАНИО "ЦСВЭ"

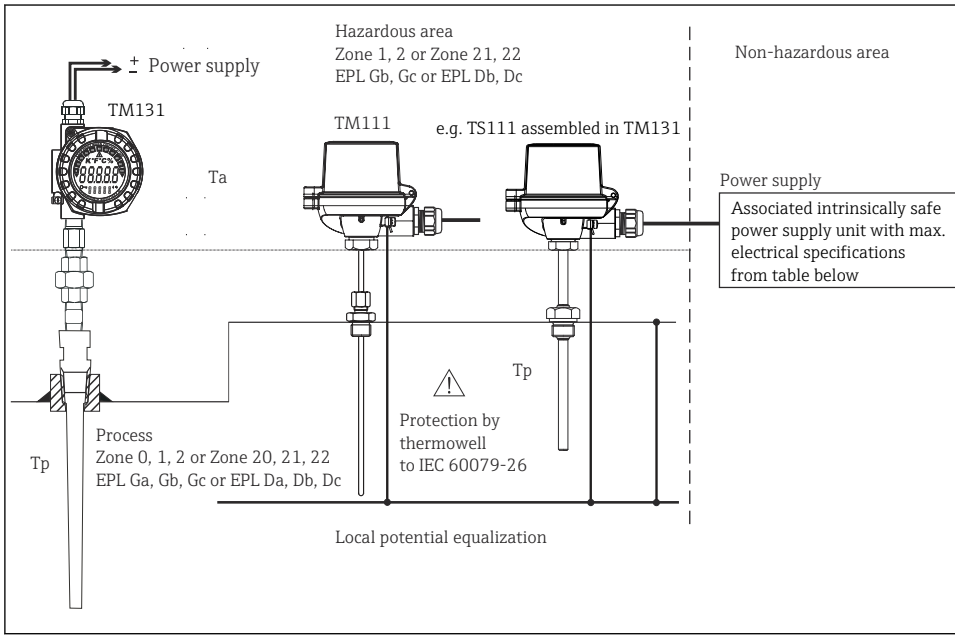
Certificate number:

ЕАЭС RU C-DE.AA87.B.00767/21

Affixing the certificate number certifies conformity with the following standards:

- GOST 31610.0-2014 (IEC 60079-0:2011)
- GOST 31610.11-2014 (IEC 60079-11:2011)
- GOST 31610.26-2012 / IEC 60079-26:2006

Safety instructions



Safety Instructions: General

- Comply with the installation and safety instructions in the Operating Instructions.
- Install the device according to the manufacturer's instructions and any other valid standards and regulations (e.g. GOST 30852.13 (IEC 60079-14)).
- The housing of the thermometer must be connected to the local potential equalization or installed in a grounded metallic piping or tank respectively.
- It cannot be taken for granted that when using compression fittings with non metallic olives that there is a secure grounding when installing in a metal system. This means that an additional safe connection to the local potential equalization needs to be used.
- For using of a plug-in connector (e.g. PA-connector by Weidmüller) is to be observed that the requirements for the respective category and the operating temperature are followed.

Safety instructions: Installation in equipment of Group III

- Sensors for thermometers without thermowell (e.g. TM111) are to be mechanically protected by thermowell providing a degree of protection of at least IP5X and in compliance with the enclosure requirements to GOST 31610.0 (IEC 60079-0).
- Seal the cable entries tight with certified cable glands (min. IP6X) IP6X according to IEC/EN 60529.
- The provided cable entries to option code glands are suitable ATEX/ IECEx Ex certified glands with a temperature range of −20 to +95 °C.
- For operating the thermometer at an ambient temperature under −20 °C, appropriate cables, cable entries and sealing facilities permitted for this application must be used.
- For ambient temperatures higher than +70 °C, use suitable heat-resisting cables or wires, cable entries and sealing facilities for Ta +5K above surrounding.
- For using of a plug-in connector (e.g. PA-connector by Weidmüller) is to be observed that the requirements for the respective category and the operating temperature are followed.
- The thermometer must be installed and maintained so, that even in the event of rare incidents, an ignition source due to impact or friction between the housing and iron/steel is excluded.

⚠ WARNING

Explosive atmosphere

▶ In an explosive atmosphere, do not open the device when voltage is supplied (ensure that at least IP6X is maintained during operation).

Safety instructions: Intrinsic safety

- Comply with the installation and safety instructions in the Operating Instructions.
- Install the device according to the manufacturer's instructions and any other valid standards and regulations (e.g. GOST 30852.13 (IEC 60079-14)).
- Observe the safety instructions for the used transmitters.
- The display, type TID10, may only be installed in Zone 1 (EPL Gb) or Zone 2 (EPL Gc).
- The type of protection changes as follows when the devices are connected to certified intrinsically safe circuits of Category ib: **Ex ib IIC**.
  When connecting to an intrinsically safe ib circuit, do not operate the sensor at Zone 0 without any thermowell according to GOST 31610.26 (IEC 60079-26).
- The inserts with dual circuits (Ø3 mm and 6 mm) and Ø3 mm are not isolated to the metallic sheath in conformance with GOST 31610.11 (IEC 60079-11) chapter 6.3.13.

- When connecting dual sensors make sure that the potential equalizations are at the same local potential equalization.
- Inserts with 3 mm diameter or grounded inserts, e.g. type TSx11 must be connected to the local potential equalization.
- For inserts with 3 mm diameter or grounded inserts, e.g. type TSx11 an intrinsically safe supply with galvanic isolation must be used.

Safety instructions: Special conditions

- The thermometer must be installed so, that even in the event of rare incidents, an ignition source due to impact or friction between the housing and iron/steel is excluded.
- Avoid electrostatic charging of the plastic housing (do not rub dry).

Safety instructions: Partition wall

Install the thermometer in a partition wall which is in compliance with GOST 31610.26 (IEC 60079-26) in reference to its ultimate application.

Thermal data

Associated intrinsically safe power supply unit with maximum electrical specifications below the characteristic values of the assembled transmitter:

Transmitter	Ui	Ii	Pi	Ci	Li
TMT71/TMT72	30 V	100 mA	800 mW	0	0
TMT82	30 V	130 mA	800 mW	0	0
TMT142/ TMT142B	30 V	130 mA	800 mW	5 nF	0
TMT162 HART	30 V	300 mA	1000 mW	0	0
TMT162 PA/FF	FISCO field device				
TMT84, TMT85	FISCO field device				
Terminal block	30 V	140 mA	1000 mW	See tables below	
Flying leads	30 V	140 mA	1000 mW	See tables below	

Sensor type	Insertion Length IL		Flying leads		Terminal block	
	C_i/m	L_i/m	C_i	L_i	C_i	L_i
Single	200 pF	1 µH	56.4 pF	282 nH	4.6 pF	23 nH
Dual	400 pF	2 µH	113 pF	564 nH	9.2 pF	46 nH

Calculation formula for options with flying leads only:

- $C_i = C_{i\ \text{Insertion length IL}} \times IL + C_{i\ \text{Flying leads}}$
- $L_i = L_{i\ \text{Insertion length IL}} \times IL + L_{i\ \text{Flying leads}}$

Calculation formula for options with terminal block only:

- $C_i = C_{i\ \text{Insertion length IL}} \times IL + C_{i\ \text{Terminal block}}$
- $L_i = L_{i\ \text{Insertion length IL}} \times IL + L_{i\ \text{Terminal block}}$

Type of protection (EAC)	Type
Ga/Gb Ex ia IIC T6…T1 X Ex ia IIIC T85°C…450°C Da/Db X	TM111, TM131

The dependency of the ambient and process temperatures upon the temperature class for assembly with transmitters:

Type	Assembled Transmitter	Temperature class	Ambient temperature range housing	Maximum surface temperature housing
TM111, TM131 TS111, TS211	TMT84, TMT85 TMT162 PA, FF	T6	−40 °C ≤ Ta ≤ +55 °C	T85 °C
		T5	−40 °C ≤ Ta ≤ +70 °C	T100 °C
		T4	−40 °C ≤ Ta ≤ +85 °C	T135 °C

Type	Assembled Transmitter	Temperature class	Ambient temperature range housing	Maximum surface temperature housing
	TMT71, TMT72 TMT162 HART TMT142/142B HART	T6	−50 °C ≤ Ta ≤ +55 °C	T85 °C
		T5	−50 °C ≤ Ta ≤ +70 °C	T100 °C
		T4	−50 °C ≤ Ta ≤ +85 °C	T135 °C
	TMT82 [1)]	T6	−50 °C ≤ Ta ≤ +58 °C	T85 °C
		T5	−50 °C ≤ Ta ≤ +75 °C	T100 °C
		T4	−50 °C ≤ Ta ≤ +85 °C	T135 °C
	TMT8x, TMT7x with display	T6	−40 °C ≤ Ta ≤ +55 °C	T85 °C
		T5	−40 °C ≤ Ta ≤ +70 °C	T100 °C
		T4	−40 °C ≤ Ta ≤ +85 °C	T135 °C

1) Ambient temperature -52 °C is possible for TMT82 head transmitter with marking Ex ia IIIC 85°C…120°C Da/Db X without display and in the case of TA30H, TA30A, TA30D and with marking Ga/Gb Ex ia IIC T6…T1 X without display.

Type	Assembled Transmitter	Insert diameter	Process temperature range	Temperature class/ maximum surface temperature sensor
TM111, TM131 TS111, TS211	TMT8x [1)], TMT7x TMT142/142B HART	3 mm, 3 mm dual or 6 mm dual	−50 °C ≤ Tp ≤ +66 °C	T6/T85 °C
			−50 °C ≤ Tp ≤ +81 °C	T5/T100 °C
			−50 °C ≤ Tp ≤ +116 °C	T4/T135 °C
			−50 °C ≤ Tp ≤ +181 °C	T3/T200 °C
			−50 °C ≤ Tp ≤ +276 °C	T2/T300 °C
			−50 °C ≤ Tp ≤ +426 °C	T1/T450 °C
		6 mm	−50 °C ≤ Tp ≤ +73 °C	T6/T85 °C
			−50 °C ≤ Tp ≤ +88 °C	T5/T100 °C
			−50 °C ≤ Tp ≤ +123 °C	T4/T135 °C
			−50 °C ≤ Tp ≤ +188 °C	T3/T200 °C
			−50 °C ≤ Tp ≤ +283 °C	T2/T300 °C
			−50 °C ≤ Tp ≤ +433 °C	T1/T450 °C

1) Ambient temperature -52 °C is possible for TMT82 head transmitter with marking Ex ia IIIC 85°C…120°C Da/Db X without display and in the case of TA30H, TA30A, TA30D and with marking Ga/Gb Ex ia IIC T6…T1 X without display.

Type	Assembled Transmitter	Insert diameter	Process temperature range	Temperature class/maximum surface temperature sensor
TM131 TS211	TMT162	3 mm, 3 mm dual or 6 mm dual	−50 °C ≤ Tp ≤ +64 °C	T6/T85 °C
			−50 °C ≤ Tp ≤ +79 °C	T5/T100 °C
			−50 °C ≤ Tp ≤ +114 °C	T4/T135 °C
			−50 °C ≤ Tp ≤ +179 °C	T3/T200 °C
			−50 °C ≤ Tp ≤ +279 °C	T2/T300 °C
			−50 °C ≤ Tp ≤ +424 °C	T1/T450 °C
		6 mm	−50 °C ≤ Tp ≤ +71 °C	T6/T85 °C
			−50 °C ≤ Tp ≤ +86 °C	T5/T100 °C
			−50 °C ≤ Tp ≤ +121 °C	T4/T135 °C
			−50 °C ≤ Tp ≤ +186 °C	T3/T200 °C
			−50 °C ≤ Tp ≤ +286 °C	T2/T300 °C
			−50 °C ≤ Tp ≤ +431 °C	T1/T450 °C

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

The dependency of the ambient and process temperatures upon the temperature class for assembly without transmitter (terminal block):

Insert diameter	Temperature class/ Maximum surface temperature	Tp (process) - maximum allowed process temperature (sensor)				
		Pi ≤ 50 mW	Pi ≤ 100 mW	Pi ≤ 200 mW	Pi ≤ 500 mW	Pi ≤ 650 mW
3 mm, 3 mm dual or 6 mm dual	T1/T450 °C	426 °C	415 °C	396 °C	343 °C	333 °C
	T2/T300 °C	276 °C	265 °C	246 °C	193 °C	183 °C
	T3/T200 °C	181 °C	170 °C	151 °C	98 °C	88 °C
	T4/T135 °C	116 °C	105 °C	86 °C	33 °C	23 °C
	T5/T100 °C	81 °C	70 °C	51 °C	−2 °C	−12 °C
	T6/T85 °C	66 °C	55 °C	36 °C	−17 °C	−27 °C
6 mm	T1/T450 °C	433 °C	428 °C	420 °C	398 °C	388 °C
	T2/T300 °C	283 °C	278 °C	270 °C	248 °C	238 °C
	T3/T200 °C	188 °C	183 °C	175 °C	153 °C	143 °C
	T4/T135 °C	123 °C	118 °C	110 °C	88 °C	78 °C
	T5/T100 °C	88 °C	83 °C	75 °C	53 °C	43 °C
	T6/T85 °C	73 °C	68 °C	60 °C	38 °C	28 °C

Insert diameter	Temperature class/ Maximum surface temperature	Tp (process) - maximum allowed process temperature (sensor)			Ta (ambient) - ambient temperature (housing) [1]
		Pi ≤ 750 mW	Pi ≤ 800 mW	Pi ≤ 1 000 mW	
3 mm, 3 mm dual or 6 mm dual	T1/T450 °C	320 °C	312 °C	280 °C	−40 °C ≤ Ta ≤ +130 °C
	T2/T300 °C	170 °C	162 °C	130 °C	
	T3/T200 °C	75 °C	62 °C	30 °C	
	T4/T135 °C	10 °C	2 °C	−30 °C	−40 °C ≤ Ta ≤ +116 °C
	T5/T100 °C	−25 °C	−33 °C	-	−40 °C ≤ Ta ≤ +81 °C
	T6/T85 °C	−40 °C	-	-	−40 °C ≤ Ta ≤ +66 °C
6 mm	T1/T450 °C	381 °C	377 °C	361 °C	−40 °C ≤ Ta ≤ +130 °C
	T2/T300 °C	231 °C	227 °C	211 °C	
	T3/T200 °C	136 °C	127 °C	111 °C	
	T4/T135 °C	71 °C	67 °C	51 °C	−40 °C ≤ Ta ≤ +123 °C
	T5/T100 °C	36 °C	32 °C	16 °C	−40 °C ≤ Ta ≤ +88 °C
	T6/T85 °C	21 °C	17 °C	1 °C	−40 °C ≤ Ta ≤ +73 °C

1) The ambient temperature at the terminal head may be directly influenced by the process temperature, but its restricted to the range −40 to +130 °C, besides tor types TA30A, TA30D and TA30H with a restricted range −50 to +130 °C. For thermometers with two mounted head transmitters the allowed ambient temperature is up to 12 Klower 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.

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