XA02114T/09/EN/03.24-00
71666561
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Safety Instructions
iTHERM TM111, iTHERM TM131

TM111: Ex db IIC T1...T6 Gb
Ex tb IIIC T85 °C...T450 °C Db

TM131: Ex db IIC T1...T6 Ga/Gb
Ex ta IIIC T_{200} T85 °C...T_{200} T450 °C Da - Process
Ex tb IIIC T85 °C...T450 °C Db - Enclosure

Endress+Hauser
People for Process Automation

iTHERM TM111, iTHERM TM131

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About this document

The document number of these Safety Instructions (XA) must match the information on the nameplate.

Associated documentation

To commission the device, please observe the Operating Instructions pertaining to the device:
www.endress.com/<product code>, e.g. TM111

Supplementary documentation

Explosion protection brochure: CP00021Z

The explosion protection brochure is available on the Internet:
www.endress.com/Downloads

Certificates and declarations

NEPSI certificate

Certificate number: GYJ24.1170X

Affixing the certificate number certifies conformity with the following standards (depending on the device version)

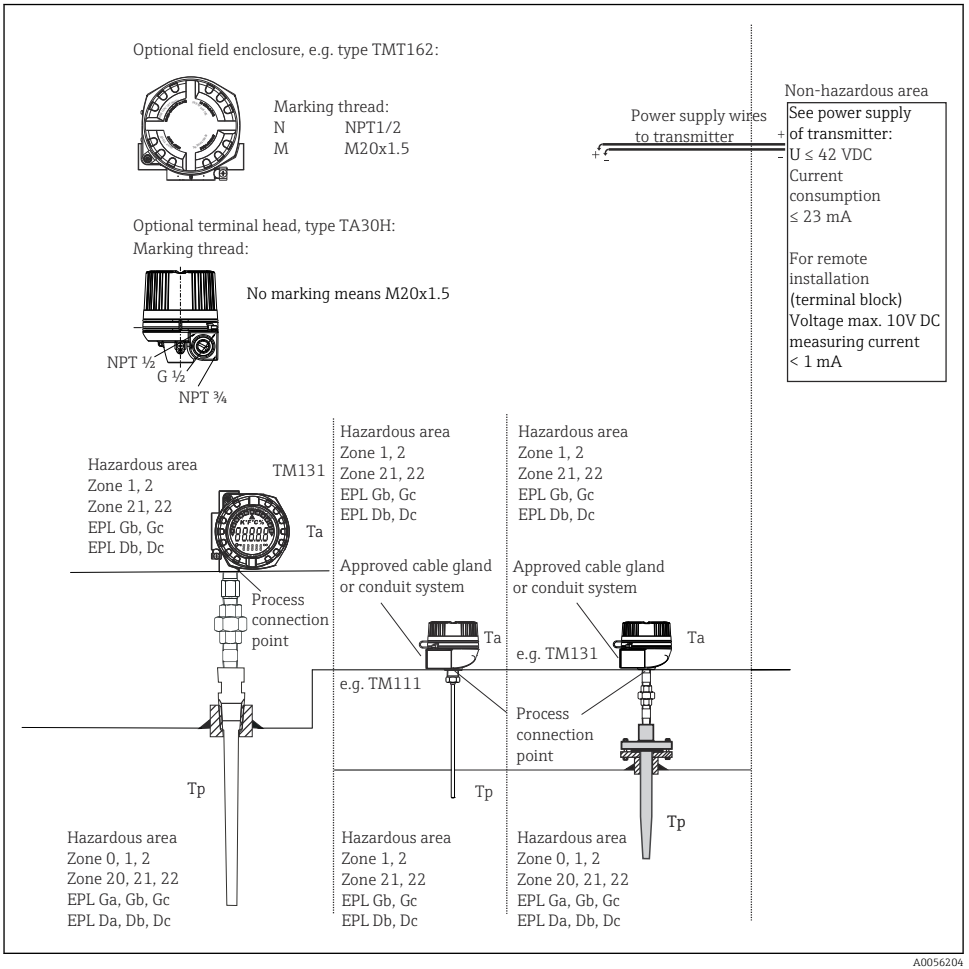
- GB/T 3836.1-2021
- GB/T 3836.2-2021
- GB/T 3836.31-2021

Please refer to NEPSI/CCC certificates for conditions of safe use.

Manufacturer address

Endress+Hauser Wetzer GmbH + Co. KG
Obere Wank 1
87484 Nesselwang, Germany

Safety instructions



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Safety instructions: Installation of protection flameproof

- 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. EN/IEC 60079-14).
- The housing of the thermometer must be connected to the potential matching line.

- Only the approved wire entries as specified in paragraph 10 of IEC/EN 60079-14, paragraph 16 of IEC/EN 60079-0, paragraph 13 of IEC/EN 60079-1 must be used.
- For connection through a conduit entry approved for this purpose the associated sealing facility shall be mounted directly to the housing.
- Seal the cable entries with certified cable glands and or blanking elements which have at least type of protection Ex db and Ex tb suitable for Group IIC and IIIC (degree of protection IP6X).
- The maximum specified ambient temperature Ta at terminal head not be exceeded.
- For operating the thermometer housing at an ambient temperature under −20 °C appropriate cables and cable entries 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 +5 K above surrounding.
- During operation, the cover must be screwed all the way in and the cover's safety catch must be fastened.
- 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.

⚠ WARNING

Explosive atmosphere

▶ Do not open the electrical connection of the power supply circuit under voltage in an explosive atmosphere.

Safety instructions: Installation of Dust ignition protection

- 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. EN/IEC 60079-14).
- Seal the cable entries tight with certified cable which have at least type of protection Ex tb suitable for Group IIIC (degree of protection IP6X).
- In case of installation and repair apply a torque for process connection of 50 to 70 Nm for terminal heads suffix code i = A1, A2, D1 (TA30A, TA30D).
- For assure that the temperature assembly has a degree of protection of IP6X the user shall provide a thermowell or equivalent component at the process side
- The housing of the thermometer must be connected to the potential matching line.
- For ambient temperatures higher than +70 °C, use suitable heat-resisting cables or wires, cable entries and sealing facilities for Ta +5 K above surrounding.

⚠ WARNING

Explosive atmosphere

- ▶ In an explosive atmosphere, do not open the device when voltage is supplied (ensure that the IP6x housing protection is maintained during operation).

Safety instructions: Partition wall

The provided thermowells to suffix code = e are out of material as follows:

B1, B2, B3, B4	AISI316L/W.1.4404
C1, C2, C3, C4	AISI 316Ti/1.4571
D1, D2	Hastelloy® C-276
E1, E2	Alloy 600
F1, F2	AISI316/W.1.4401
G1	AISI446/W.1.4762
H1	AISI321/ W.1.4541
I1, I2	AISI 316Ti/1.4571 and Tantal
YY	the thermowell material is listed in the manufacturer's website (CER viewer or Asset Central Viewer)

Instructions for option:

TM131-abc...

c	**Thermometer Design:**
A	W/o neck, DIN43772 form 2, 3, 5, 8

- Install the thermometer in a partition wall which is in compliance with IEC/EN 60079-26 in reference to its ultimate application.
- Use only thermowells out of corrosion resistant materials complying with IEC/EN 60079-0 chapter 8.3 (e.g. AISI316/W.1.4401, AISI316L/W.1.4404, AISI 316Ti/1.4571...) with a wall thickness of at least 1 mm.
- Use thermowells suitable for the process conditions.
- Providing a degree of protection of at least IP6X when assembled.

Safety instructions: Specific conditions of use

- The flameproof joints are not intended to be repaired.
- 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 and
  - the temperature of the optionally used RB**1NS union does not exceed the service temperature range of −50 to +150 °C for following option:

TM131-abc...

c	**Thermometer Design:**
M	Nipple-union connection NPT½"
N	Nipple-union-nipple connection NPT½"

- When provided with special varnishing (type TM111 suffix code i = YY, type TM131 suffix code m = YY) refer to the instructions “Safety notes varnish XA01369T/09/A2/01.16” for guidance to minimize the risk from electrostatic discharge.
- Temperature assemblies with flying leads (type TM111 suffix code h = 0A, type TM131 suffix code l = 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 V_{DC} and 1 mA.

Type TM111

- Sensors with a diameter of 3 mm (suffix code b = A) shall be protected by a thermowell.
- Sensors with other diameters (suffix code b = Y) shall be protected by a thermowell unless excluded by the product information available on the manufacturer’s website (CER viewer or Asset Central Viewer) and the safety instructions for optional thermocouples and RTDs (document 10000013456).
  These safety instructions show, depending on the sensor details, when protection by a thermowell is required. The viewer on the website shows the sensor details for each serial number of the assembly.

Type TM131

The sensor shall be protected by the thermowell as provided or by a thermowell as specified in the instructions.

Sensor

- As the flameproof product suitable certified cable glands or blanking plugs for unused holes approved by ExTL according to GB/T 3836.1-2021 and GB/T 3836.2-2021 with Ex marking “Ex db IIC Gb” shall be used and correctly installed. As the dust product, suitable certified cable glands or blanking plugs for unused holes approved by ExTL according to GB/T 3836.31-2021 with Ex marking “Ex tb IIIC Db” shall be used and correctly installed, after installation, degree of protection of enclosure is at least IP66/IP68 according to GB/T 4208-2017. The cable glands and blanking plugs to be used shall suitable for the product working conditions.
- Any maintenance shall be performed only when the warning of “Do not open when energized” is observed.
- Clean the surface of this product termly when using in combustible dust atmosphere.
- The user shall not change the configuration in order to maintain/ ensure the explosion protection performance of this product. Any change may impair safety.
- For installation, use and maintenance of this product, the end user shall observe the instruction manual and the following standards:
  GB/T 3836.13-2021 “Explosive atmospheres- Part 13: Equipment repair, overhaul, reclamation and modification”.
  GB/T 3836.15-2017 “Explosive atmospheres- Part 15: Electrical installations design, selection and erection”.
  GB/T 3836.16-2022 “Explosive atmospheres- Part 16: Electrical installations inspection and maintenance”.
  GB50257-2014 “Code for construction and acceptance of electric equipment on fire and device for explosion hazard electrical installation engineering”.
  GB15577-2018 “Safety regulations for dust explosion prevention and protection”

Temperature tables

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

Temperature assemblies with RTD temperature sensors				
Electrical connection [1]	**Temperature class/ Maximum surface temperature**	**Ambient temperature range**	**Process temperature range Insert diameter 3 mm, 6 mm dual**	**Process temperature range Insert diameter 6 mm**
Type TM111				
Terminal block (1A) [2]	T6/T85 °C	−50 to +70 °C	−50 to +55 °C	−50 to +68 °C
	T5/T100 °C	−50 to +80 °C	−50 to +70 °C	−50 to +83 °C
	T4/T135 °C	−50 to +120 °C	−50 to +105 °C	−50 to +118 °C
	T3/T200 °C	−50 to +120 °C	−50 to +170 °C	−50 to +183 °C
	T2/T300 °C	−50 to +120 °C	−50 to +265 °C	−50 to +278 °C
	T1/T450 °C	−50 to +120 °C	−50 to +415 °C	−50 to +428 °C
Type TM111 and Type TM131				
Flying leads (0A) or Transmitter TMT31 (2H, 2I) TMT71 (2C) TMT72 (3A) TMT82 (3C, 3D, 3F) TMT84 (5A) TMT85 (4A) TMT86 (6B, 6C) TMT180 (2A, 2B)	T6/T85 °C	−40 to +65 °C	−50 to +55 °C	−50 to +68 °C
	T5/T100 °C	−40 to +80 °C	−50 to +70 °C	−50 to +83 °C
	T4/T135 °C	−40 to +85 °C	−50 to +105 °C	−50 to +118 °C
	T3/T200 °C	−40 to +85 °C	−50 to +170 °C	−50 to +183 °C
	T2/T300 °C	−40 to +85 °C	−50 to +265 °C	−50 to +278 °C
	T1/T450 °C	−40 to +85 °C	−50 to +415 °C	−50 to +428 °C
Type TM131				
Terminal block (1A) [2]	T6/T85 °C	−50 to +70 °C	−50 to +55 °C	−50 to +68 °C
	T5/T100 °C	−50 to +80 °C	−50 to +70 °C	−50 to +83 °C
	T4/T135 °C	−50 to +90 °C	−50 to +105 °C	−50 to +118 °C
	T3/T200 °C	−50 to +90 °C	−50 to +170 °C	−50 to +183 °C
	T2/T300 °C	−50 to +90 °C	−50 to +265 °C	−50 to +278 °C
	T1/T450 °C	−50 to +90 °C	−50 to +415 °C	−50 to +428 °C
Transmitter TMT142: 7A TMT162: 2D, 2E, 2F, 2G, 4B, 4C, 5B, 5C	T6/T85 °C	−40 to +55 °C	−50 to +55 °C	−50 to +68 °C
	T5/T100 °C	−40 to +70 °C	−50 to +70 °C	−50 to +83 °C
	T4/T135 °C	−40 to +80 °C	−50 to +105 °C	−50 to +118 °C
	T3/T200 °C	−40 to +80 °C	−50 to +170 °C	−50 to +183 °C

Temperature assemblies with RTD temperature sensors				
Electrical connection [1]	**Temperature class/ Maximum surface temperature**	**Ambient temperature range**	**Process temperature range Insert diameter 3 mm, 6 mm dual**	**Process temperature range Insert diameter 6 mm**
	T2/T300 °C	−40 to +80 °C	−50 to +265 °C	−50 to +278 °C
	T1/T450 °C	−40 to +80 °C	−50 to +415 °C	−50 to +428 °C

1) TM111 suffix code h, TM131 suffix code l.
2) in an enclosure with a blind cover; TM111 suffix code i / TM131 suffix code m = A1, D1, H1, H3.

Temperature assemblies with thermocouple temperature sensors			
Electrical connection [1]	**Temperature class/ Maximum surface temperature**	**Ambient temperature range**	**Process temperature range**
Type TM111			
Terminal block (1A) [2]	T6/T85 °C	−50 to +70 °C	−50 to +85 °C
	T5/T100 °C	−50 to +80 °C	−50 to +100 °C
	T4/T135 °C	−50 to +120 °C	−50 to +135 °C
	T3/T200 °C	−50 to +120 °C	−50 to +200 °C
	T2/T300 °C	−50 to +120 °C	−50 to +300 °C
	T1/T450 °C	−50 to +120 °C	−50 to +450 °C
Type TM111 and Type TM131			
Flying leads (0A) or Transmitter TMT71 (2C) TMT72 (3A) TMT82 (3C, 3D, 3F) TMT84 (5A) TMT85 (4A) TMT86 (6B, 6C)	T6/T85 °C	−40 to +65 °C	−50 to +85 °C
	T5/T100 °C	−40 to +80 °C	−50 to +100 °C
	T4/T135 °C	−40 to +85 °C	−50 to +135 °C
	T3/T200 °C	−40 to +85 °C	−50 to +200 °C
	T2/T300 °C	−40 to +85 °C	−50 to +300 °C
	T1/T450 °C	−40 to +85 °C	−50 to +450 °C
Type TM131			
Terminal block (1A) [2]	T6/T85 °C	−50 to +70 °C	−50 to +85 °C
	T5/T100 °C	−50 to +80 °C	−50 to +100 °C
	T4/T135 °C	−50 to +90 °C	−50 to +135 °C
	T3/T200 °C	−50 to +90 °C	−50 to +200 °C
	T2/T300 °C	−50 to +90 °C	−50 to +300 °C
	T1/T450 °C	−50 to +90 °C	−50 to +450 °C

Temperature assemblies with thermocouple temperature sensors			
Electrical connection [1]	**Temperature class/ Maximum surface temperature**	**Ambient temperature range**	**Process temperature range**
Transmitter TMT142: 7A TMT162: 2D, 2E, 2F, 2G, 4B, 4C, 5B, 5C	T6/T85 °C	−40 to +55 °C	−50 to +85 °C
	T5/T100 °C	−40 to +70 °C	−50 to +100 °C
	T4/T135 °C	−40 to +80 °C	−50 to +135 °C
	T3/T200 °C	−40 to +80 °C	−50 to +200 °C
	T2/T300 °C	−40 to +80 °C	−50 to +300 °C
	T1/T450 °C	−40 to +80 °C	−50 to +450 °C

1) TM111 suffix code h, TM131 suffix code l.
2) in an enclosure with a blind cover; TM111 suffix code i / TM131 suffix code m = A1, D1, H1, H3.

Electrical connection data

Type	Electrical data
TM111 TM131	Power supply U_b Transmitter TMT162: max. 40 V_{DC}, 3 W Transmitter TMT142B: max. 36 V_{DC}, 1 W other Transmitter: max. 42 V_{DC}, 23 mA Sensor: max. 10 V_{DC}, 1 mA

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