

# Safety Instructions

## iTHERM TM1x1

1Ex d IIC T6...T1 Gb X

Ga/Gb Ex d IIC T6...T1 X

Ex tb IIIC 85°C...450°C Db X

Ex ta/tb IIIC 85°C...450°C Da/Db X



# iTHERM TM1x1

## Table of contents

|   |    |
|---|----|
| About this document .....   | 3  |
| Associated documentation .....                                      | 3  |
| Supplementary documentation .....                                   | 3  |
| Certificates and declarations .....                                 | 3  |
| Manufacturer address .....  | 3  |
| Safety instructions .....   | 4  |
| Safety instructions: Installation of protection flameproof .....    | 4  |
| Safety instructions: Installation of Dust ignition protection ..... | 5  |
| Safety instructions: Partition wall .....                           | 6  |
| Safety instructions: Specific conditions of use .....               | 7  |
| Temperature tables .....  | 8  |
| Electrical connection data .....                                    | 10 |

**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/](http://www.endress.com/)<product code>, e.g. iTHERM TM111

**Supplementary documentation**

Explosion protection brochure: CP00021Z

The explosion protection brochure is available on the Internet:

[www.endress.com/Downloads](http://www.endress.com/Downloads)

**Certificates and declarations****EAC certificate**

The device 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: ТОО/Ж ШС "Т-Стандарт"
- Certificate number: EAЭC KZ 7500525.05.01.01857

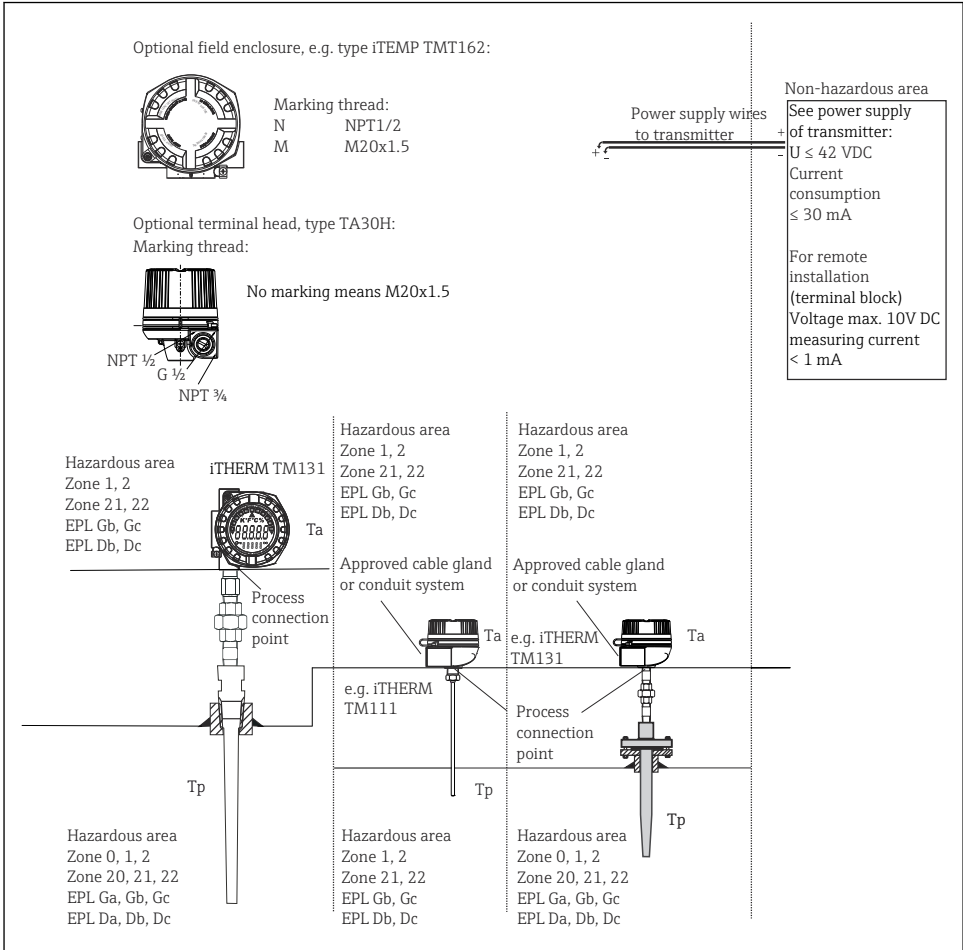
Affixing the certificate number certifies conformity with the following standards:

- GOST 31610.0-2019 (IEC 60079-0:2017)
- GOST IEC 60079-1-2013
- GOST IEC 60079-31-2013
- GOST 31610.26-2016 (IEC 60079-26:2014)

**Manufacturer address**

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

# Safety instructions



A0046875

## 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  $T_a$  at terminal head not be exceeded.
- For operating the thermometer housing at an ambient temperature under  $-20\text{ }^\circ\text{C}$  appropriate cables and cable entries permitted for this application must be used.
- For ambient temperatures higher than  $+70\text{ }^\circ\text{C}$ , use suitable heat-resisting cables or wires, cable entries and sealing facilities for  $T_a +5\text{ K}$  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**

**Potentially explosive atmospheres**

- ▶ Do not open the electrical connection of the supply circuit when energized if there is a potentially 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  $+70\text{ }^\circ\text{C}$ , use suitable heat-resisting cables or wires, cable entries and sealing facilities for  $T_a +5\text{ K}$  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:*

**iTHERM 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:

**iTHERM TM131-abc...**

|          |                                      |
|----------|--------------------------------------|
| <b>c</b> | <b>Thermometer Design:</b>           |
| <b>M</b> | Nipple-union connection NPT½"        |
| <b>N</b> | Nipple-union-nipple connection NPT½" |

- When provided with special varnishing (type iTHERM TM111 suffix code i = YY, type iTHERM 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 iTHERM TM111 suffix code h = OA, type TM131 suffix code l = OA) 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<sub>DC</sub> and 1 mA.

**Type iTHERM 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 iTHERM TM131**

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

## 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 <sup>1)</sup>  | Temperature class/<br>Maximum surface temperature | Ambient temperature range | Process temperature range<br>Insert diameter<br>3 mm, 6 mm dual | Process temperature range<br>Insert diameter<br>6 mm |
| Type iTHERM TM111  |   |                           |   |  |
| Terminal block<br>(1A) <sup>2)</sup>   | 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 iTHERM TM111 and Type iTHERM TM131  |   |                           |   |  |
| Flying leads (0A) or<br>Transmitter iTEMP<br>TMT31 (2H, 2I)<br>TMT71 (2C)<br>TMT72 (3A)<br>TMT82 (3C, 3D, 3F)<br>TMT84 (5A)<br>TMT85 (4A)<br>TMT86 (6B, 6C)<br>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 iTHERM TM131                                 |                           |   |  |
| Terminal block<br>(1A) <sup>2)</sup>   | 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<br>iTEMP TMT142: 7A<br>iTEMP TMT162: 2D,<br>2E, 2F, 2G, 4B, 4C,<br>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 <sup>1)</sup>                 | Temperature class/<br>Maximum surface<br>temperature | Ambient<br>temperature range | Process temperature<br>range<br>Insert diameter<br>3 mm, 6 mm dual | Process temperature<br>range<br>Insert diameter<br>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) iTHERM TM111 suffix code h, iTHERM TM131 suffix code l.  
 2) in an enclosure with a blind cover; iTHERM TM111 suffix code i / iTHERM TM131 suffix code m = A1, D1, H1, H3.

| Temperature assemblies with thermocouple temperature sensors  |  |                              |                              |
|---|--|------------------------------|------------------------------|
| Electrical connection <sup>1)</sup>   | Temperature class/<br>Maximum surface<br>temperature | Ambient temperature<br>range | Process temperature<br>range |
| Type iTHERM TM111   |  |                              |                              |
| Terminal block (1A) <sup>2)</sup>   | 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 iTHERM TM111 and Type iTHERM TM131   |  |                              |                              |
| Flying leads (0A) or<br>Transmitter iTEMP<br>TMT71 (2C)<br>TMT72 (3A)<br>TMT82 (3C, 3D, 3F)<br>TMT84 (5A)<br>TMT85 (4A)<br>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 iTHERM TM131   |  |                              |                              |
| Terminal block (1A) <sup>2)</sup>   | 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 <sup>1)</sup>                                    | Temperature class/<br>Maximum surface<br>temperature | Ambient temperature<br>range | Process temperature<br>range |
| Transmitter<br>TMT142: 7A<br>TMT162: 2D, 2E, 2F, 2G,<br>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) iTHERM TM111 suffix code h, iTHERM TM131 suffix code l.  
 2) in an enclosure with a blind cover; iTHERM TM111 suffix code i / iTHERMTM131 suffix code m = A1, D1, H1, H3.

## Electrical connection data

| Type               | Electrical data  |
|--------------------|--|
| iTHERM TM111/TM131 | $U_b \leq 42 V_{DC}$<br>Current consumption $\leq 30 \text{ mA}$<br>Remote installation:<br>Voltage max. $10 V_{DC}$<br>Measuring current $I < 1 \text{ mA}$ |





71665582

[www.addresses.endress.com](http://www.addresses.endress.com)

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