Safety Instructions

iTEMP TMT71, TMT72, TMT82, TMT84, TMT85, TMT86, TMT182B

ATEX:  
Ex ia IIC Txxx °C Dc, Ex tc IIC Txxx °C Dc  
Ex tc IIC Txxx °C Dc, Ex tc IIC Dc  
Ex nA IIC T6 Gc, Ex ec IIC T6 Gc  
Ex nA IIC Gc, Ex ec IIC Gc
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Associated documentation

All documentation is available on the Internet:
www.endress.com/Deviceviewer
(enter the serial number from the nameplate).

If not yet available, a translation into EU languages can be ordered.

To commission the device, please observe the Operating Instructions pertaining to the device:
www.endress.com/<product code>, e.g. TMT86

Supplementary documentation

Explosion protection brochure: CP00021Z
The explosion protection brochure is available on the Internet:
www.endress.com/Downloads

Certificates and declarations

EU Declaration of Conformity
Declaration number: EC_00187
Affixing the certificate number certifies conformity with the following standards (depending on the device version)
- EN IEC 60079-0: 2018
- EN 60079-7: 2015
- EN 60079-11: 2012
- EN 60079-15: 2010
- EN 60079-31: 2014
The EU Declaration of Conformity is available on the Internet:
www.endress.com/Downloads

UKCA Declaration of Conformity
Declaration number: UK_00423

Certificate holder
Endress+Hauser Wetzer GmbH + Co. KG
Obere Wank 1
87484 Nesselwang, Germany
### Safety Instructions:

<table>
<thead>
<tr>
<th>Hazardous area</th>
<th>Hazardous area</th>
<th>Non-hazardous area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 22 or Zone 2</td>
<td>Zone 22 or Zone 2</td>
<td>e.g. TMT8x</td>
</tr>
<tr>
<td>EPL Dc or Gc</td>
<td>EPL Dc or Gc</td>
<td>TMT7x</td>
</tr>
</tbody>
</table>

Remote mount sensor configuration
- e.g. RTD or TC Sensor (simple apparatus)
- optional two channels
- For Zone 20 and Zone 21 use sensor with EU-Type Examination Certificate

Power supply see table electrical connection data below

Local potential equalisation

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1. **Installation of the head transmitter**

### Safety Instructions: Installation

- 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 glands (min. IP6X) IP6X according to EN/IEC 60529.
- The provided cable entries to option code glands are suitable ATEX/ IECEx Ex certified cable glands with a temperature range of –20 to +95 °C.
- For operating the transmitter at an ambient temperature under –20 °C, appropriate cables, cable entries and sealing facilities permitted for this application must be used.
- The device must be connected to the local potential equalization.
- The device should never be used for hybrid mixtures (gas, dust, air).
- When installing, make sure that the housing and cable glands used meet the requirements according to EN/IEC 60079-0 for Group III enclosures.
- For ambient temperatures higher than +70 °C, use suitable heat-resisting cables or wires, cable entries and sealing facilities for $T_a +5 K$ above surrounding.
- Clean the housing regularly to avoid a layer of dust accumulating on the housing.
- The device must be installed and maintained 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**

- 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: Ex ia, Ex tc, Ex nA**

**Dust ignition protection by intrinsic safety “i”**

- In the case of Ex ia explosion protection, the power must be supplied with an associated electrical apparatus.
- The device shall be installed completely inside an additional enclosure, providing a degree of protection of not less than IP 5X according to EN/IEC 60079-0 and EN/IEC 60079-31.

**Dust ignition protection by enclosure “t”**

- In the event of conductive dust, a housing that maintains a degree of protection of at least IP 6X as per EN/IEC 60529 must be used.
- In the event of non-conductive dust, a housing that maintains a degree of protection of at least IP 54 as per EN/IEC 60529 must be used.

**Protection by type of protection “n” and "ec"**

**WARNING**

**Explosive atmosphere**

- In an explosive atmosphere, do not open the device when voltage is supplied (ensure that at least the IP 54 housing protection is maintained during operation).
**Terminal specification**

<table>
<thead>
<tr>
<th>Category</th>
<th>Torque</th>
<th>Cable version</th>
<th>Cable cross-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw terminals</td>
<td>0.5 Nm</td>
<td>Solid or flexible</td>
<td>≤ 2.5 mm² (14 AWG)</td>
</tr>
<tr>
<td>Push-in terminals (cable</td>
<td>-</td>
<td>Solid or flexible</td>
<td>0.2 to 1.5 mm² (24 to 16 AWG)</td>
</tr>
<tr>
<td>version, stripping length =</td>
<td>-</td>
<td>Flexible with wire</td>
<td>0.25 to 1.5 mm² (24 to 16 AWG)</td>
</tr>
<tr>
<td>min. 10 mm (0.39 in)</td>
<td></td>
<td>and ferrules with/</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>without plastic ferrule</td>
<td></td>
</tr>
</tbody>
</table>

**Safety instructions:**

**For type of protection Ex i:**

Observe the applicable safety Instructions

- XA00102T for TMT82 or
- XA0069R for TMT84/TMT85 or
- XA01736T for TMT7x/L2022x or
- XA02905T for TMT182B or
- XA02852T for TMT86/E2054HAPL

and its connection values for intrinsically safe explosion protection with the designation: II1G Ex ia IIC T6 or II2G Ex ia IIC T6

- Due to the risk of discharge, the non-metallic parts of the equipment and of all non-metallic accessories have to be protected from electrostatic charging during installation and operation (e.g. only wipe with a damp cloth and do not expose to high voltage fields).
- The use of the CDI interface is not allowed in Hazardous locations.
For type of protection Ex nA:
Applicable for option field housing AA or A, AB or B and AC or C (head transmitter as component only):

- For use in the type of protection Ex nA, and for Zone 2 (EPL Gc) application, the head transmitter shall be installed completely inside an additional enclosure, providing a degree of protection of not less than IP 54 according to EN/IEC 60079-0 and EN/IEC 60079-15. The ambient temperature within the end use enclosure shall not exceed the limits of the permissible ambient temperature range. Clearances, creepage distances, and separations as defined in EN/IEC 60079-15 must be considered for the installation.
- The end user shall ensure appropriate earthing of the metallic field housing (optional) and all metallic accessories if used (wall or pipe mounting accessories for the field housing and the DIN rail clip for the head transmitter) upon installation.
- The TMT82 does not have any surface that achieves a temperature greater than 135 °C/100 °C/85 °C with a 5K safety factor when operated under full load conditions at an ambient of range of 85 °C/75 °C/58 °C respectively.
- The TMT71/L20221/TMT72/L20222/TMT84/TMT85 does not have any surface that achieves a temperature greater than 135 °C/100 °C/85 °C with a 5K safety factor when operated under full load conditions at an ambient of range of 85 °C/70 °C/55 °C respectively.
- For full certification as an electrical equipment for use in EPL Gc or Dc the tests according to EN/IEC 60079-0:2017 section 5.2 and 5.3 have to be carried out. Based on the test results a temperature class shall be assigned.
For type of protection Ex ec:
Applicable for option field housing AA or A, AB or B and AC or C (head transmitter as component only):

- For use in the type of protection increased safety Ex ec, and for Zone 2 (EPL Gc) application, the head transmitter shall be installed completely inside an additional enclosure, providing a degree of protection of not less than IP 54 according to EN/IEC 60079-0 and EN/IEC 60079-7. The ambient temperature within the end use enclosure shall not exceed the limits of the permissible ambient temperature range. Clearances, creepage distances, and separations as defined in EN/IEC 60079-7 must be considered for the installation.

The end user shall ensure appropriate earthing of the metallic field housing (optional) and all metallic accessories if used (wall or pipe mounting accessories for the field housing and the DIN rail clip for the head transmitter) upon installation.

- The TMT82 does not have any surface that achieves a temperature greater than 135 °C/100 °C/85 °C with a 5K safety factor when operated under full load conditions at an ambient of range of 85 °C/75 °C/58 °C respectively.

- The TMT71/L20221/TMT72/L20222/TMT182B/TMT84/TMT85/TMT86/E2054HAPL does not have any surface that achieves a temperature greater than 135 °C/100 °C/85 °C with a 5K safety factor when operated under full load conditions at an ambient of range of 85 °C/70 °C/55 °C respectively.

- For full certification as an electrical equipment for use in EPL Gc or Dc the tests according to EN/IEC 60079-0:2017 section 5.2 and 5.3 have to be carried out. Based on the test results a temperature class shall be assigned.

Temperature tables

<table>
<thead>
<tr>
<th>Type</th>
<th>Type of protection</th>
<th>Ambient temperature</th>
<th>Maximum surface temperature housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMT82</td>
<td>Ex ia IIIC T85°C...T120°C Dc</td>
<td>-50 °C ≤ Ta ≤ +58 °C</td>
<td>T85°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 °C ≤ Ta ≤ +75 °C</td>
<td>T100°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-50 °C ≤ Ta ≤ +85 °C</td>
<td>T120°C</td>
</tr>
<tr>
<td>TMT84, TMT85 TMT86/E2054HAPL TMT71, TMT72/L20221, L20222 TMT182B</td>
<td>Ex ia IIIC T85°C...T120°C Dc</td>
<td>-40 °C ≤ Ta ≤ +55 °C</td>
<td>T85°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40 °C ≤ Ta ≤ +70 °C</td>
<td>T100°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40 °C ≤ Ta ≤ +85 °C</td>
<td>T120°C</td>
</tr>
<tr>
<td>TMT8x TMT71, TMT72/L20221, L20222 with display</td>
<td>Ex ia IIIC T85°C...T120°C Dc</td>
<td>-40 °C ≤ Ta ≤ +55 °C</td>
<td>T85°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40 °C ≤ Ta ≤ +70 °C</td>
<td>T100°C</td>
</tr>
<tr>
<td>Type</td>
<td>Type of protection</td>
<td>Ambient temperature</td>
<td>Maximum surface temperature housing</td>
</tr>
<tr>
<td>------</td>
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<td>-------------------------------------</td>
</tr>
<tr>
<td>TMT82</td>
<td>Ex tc IIIC T85°C...T105°C Dc</td>
<td>$-50 \leq T_a \leq +55 \degree C$</td>
<td>T85°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +70 \degree C$</td>
<td>T100°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td>T105°C</td>
</tr>
<tr>
<td>TMT84, TMT85 TMT86/E2054HAPL TMT71, TMT72/L20221, L20222</td>
<td>Ex tc IIIC T85°C...T105°C Dc</td>
<td>$-50 \leq T_a \leq +55 \degree C$</td>
<td>T85°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +70 \degree C$</td>
<td>T100°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td>T105°C</td>
</tr>
<tr>
<td>TMT82 TMT84, TMT85 TMT86/E2054HAPL TMT71, TMT72/L20221, L20222</td>
<td>Ex tc IIIC T105°C Dc</td>
<td>$-40 \leq T_a \leq +55 \degree C$</td>
<td>T105°C</td>
</tr>
<tr>
<td>TMT82 TMT84, TMT85 TMT86/E2054HAPL TMT71, TMT72/L20221, L20222</td>
<td>Ex tc IIIC Dc</td>
<td>$-40 \leq T_a \leq +85 \degree C$</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Type of protection</td>
<td>Ambient temperature</td>
<td>Temperature class</td>
</tr>
<tr>
<td>------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>TMT82</td>
<td>Ex nA IIC T6...T4 Gc</td>
<td>$-50 \leq T_a \leq +58 \degree C$</td>
<td>T6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +75 \degree C$</td>
<td>T5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td>T4</td>
</tr>
<tr>
<td>TMT84, TMT85 TMT71, TMT72/L20221, L20222</td>
<td>Ex nA IIC T6...T4 Gc</td>
<td>$-50 \leq T_a \leq +55 \degree C$</td>
<td>T6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +70 \degree C$</td>
<td>T5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td>T4</td>
</tr>
<tr>
<td>TMT84, TMT85 TMT71, TMT72/L20221, L20222 TMT86/E2054HAPL</td>
<td>Ex ec IIC T6...T4 Gc</td>
<td>$-50 \leq T_a \leq +55 \degree C$</td>
<td>T6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +70 \degree C$</td>
<td>T5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td>T4</td>
</tr>
<tr>
<td>TMT82 TMT84, TMT85 TMT71, TMT72/L20221, L20222 TMT86/E2054HAPL with display</td>
<td>Ex nA IIC T6...T4 Gc Ex ec IIC T6...T4 Gc</td>
<td>$-50 \leq T_a \leq +55 \degree C$</td>
<td>T6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +70 \degree C$</td>
<td>T5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td>T4</td>
</tr>
<tr>
<td>TMT82, TMT182B TMT71, TMT72/L20221, L20222</td>
<td>Ex nA IIC Gc Ex ec IIC Gc</td>
<td>$-50 \leq T_a \leq +85 \degree C$</td>
<td></td>
</tr>
<tr>
<td>TMT84, TMT85 TMT86/E2054HAPL</td>
<td>Ex nA IIC Gc Ex ec IIC Gc</td>
<td>$-40 \leq T_a \leq +85 \degree C$</td>
<td></td>
</tr>
</tbody>
</table>
## Electrical connection data

<table>
<thead>
<tr>
<th>Type</th>
<th>Type of protection</th>
<th>Power supply (terminals 1+ and 2-)</th>
<th>Sensor circuit (terminals 3 to 7)</th>
<th>Max. connection values</th>
</tr>
</thead>
</table>
| TMT82         | Ex ia IIC T85°C...T120°C Dc | $U_i \leq 30 \, V_{DC}$  
$I_i \leq 130 \, mA$  
$C_i = \text{negligible}$  
$L_i = \text{negligible}$ | $U_o \leq 7.6 \, V_{DC}$  
$I_o \leq 13 \, mA$  
$P_o \leq 24.7 \, mW$ | Ex ia  
IIC/IIIB/IIIA  
$L_o = 50 \, mH$  
$C_o = 4.5 \, \mu F$ |
| TMT84,  
TMT85 | Ex ia IIC T85°C...T120°C Dc | $U_i \leq 17.5 \, V_{DC}$  
$I_i \leq 500 \, mA$  
$C_i = 5 \, nF$  
$L_i = \text{negligible}$ | $U_o \leq 7.2 \, V_{DC}$  
$I_o \leq 25.9 \, mA$  
$P_o \leq 46.7 \, mW$ | Ex ia  
IIC/IIIB/IIIA  
$L_o = 50 \, mH$  
$C_o = 4.6 \, \mu F$ |
| TMT82         | Ex tc IIC T85 °C...T105 °C Dc  
Ex tc IIC T105 °C Dc  
Ex tc IIIC Dc  
Ex nA IIC T6...T4 Gc  
Ex nA IIC Gc | $U_b = 11$ to $42 \, V_{DC}$  
Output: 4 to 20 mA | | |
| TMT84,  
TMT85 | Ex tc IIC T85 °C...T105 °C Dc  
Ex tc IIC T105 °C Dc  
Ex tc IIIC Dc  
Ex nA IIC T6...T4 Gc  
Ex nA IIC Gc | $U_b = 9$ to $32 \, V_{DC}$  
Output: FOUNDATION Fieldbus™ PROFIBUS PA®  
Current consum. $\leq 11$ mA | | |
| TMT71,  
TMT72,  
L20221,  
L20222 | Ex ia IIC T85 °C...T120 °C Dc | $U_i \leq 30 \, V_{DC}$  
$I_i \leq 100 \, mA$  
$C_i = \text{negligible}$  
$L_i = \text{negligible}$ | $U_o \leq 4.3 \, V_{DC}$  
$I_o \leq 4.8 \, mA$  
$P_o \leq 5.2 \, mW$ | Ex ia  
IIC/IIIB/IIIA  
$L_o = 100 \, mH$  
$C_o = 18 \, \mu F$ |
| TMT182B       | Ex ia IIC T85 °C...T120 °C Dc | $U_i \leq 30 \, V_{DC}$  
$I_i \leq 100 \, mA$  
$C_i = \text{negligible}$  
$L_i = \text{negligible}$ | $U_o \leq 5 \, V_{DC}$  
$I_o \leq 5.4 \, mA$  
$P_o \leq 6.6 \, mW$ | Ex ia  
IIC/IIIB/IIIA  
$L_o = 100 \, mH$  
$C_o = 14 \, \mu F$ |
| TMT71,  
TMT72  
TMT182B,  
L20221,  
L20222 | Ex tc IIC T85 °C...T105 °C Dc  
Ex tc IIC T105 °C Dc  
Ex tc IIIC Dc  
Ex nA IIC T6...T4 Gc  
Ex ec IIC T6...T4 Gc  
Ex nA IIC Gc  
Ex ec IIC Gc | $U_b = 10$ to $36 \, V_{DC}$  
Output: 4...20mA | | |
<table>
<thead>
<tr>
<th>Type</th>
<th>Type of protection</th>
<th>Power supply (terminals 1+ and 2-)</th>
<th>Sensor circuit (terminals 3 to 7)</th>
<th>Max. connection values</th>
</tr>
</thead>
</table>
| TMT86/E2054HAPL       | Ex ia IIIC T85 °C...T120 °C Dc | $U_i \leq 17.5 \, V_{DC}$  
$I_i \leq 380 \, mA$  
$C_i = \text{negligible}$  
$L_i = \text{negligible}$ | $U_o \leq 3.71 \, V_{DC}$  
$I_o \leq 5.24 \, mA$  
$P_o \leq 4.86 \, mW$ | Ex ia  
IIIC/IIIB/IIIA  
$L_o = 100 \, mH$  
$C_o = 24 \, \mu F$ |
| TMT86/E2054HAPL       | Ex tc IIIC T85 °C...T105 °C Dc  
Ex ec IIIC T6...T4 Gc  
Ex ec IIIC Gc  
1) | $U_b = 9 \, V_{DC}$ | | |

1) for head transmitter as component only

<table>
<thead>
<tr>
<th>Category</th>
<th>Type of protection</th>
<th>Type</th>
</tr>
</thead>
</table>
| II 3D    | Ex ia IIIC T85°C...T120°C Dc | TMT82  
TMT84, TMT85  
TMT86/E2054HAPL  
TMT71, TMT72/L20221, L20222  
TMT182B |
| II 3D    | Ex tc IIIC T85°C...T105°C Dc | |
| II 3D    | Ex ec IIIC Dc               | |
| II 3G    | Ex nA IIIC T6...T4 Gc       | |
| II 3G    | Ex ec IIIC T6...T4 Gc       | |
| II 3G    | Ex nA IIIC Gc               | |
| II 3G    | Ex ec IIIC Gc               | |