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71624173
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Safety Instructions
TRxx, TCxx, TEC420, TS111, TM211, TM41x, TPx100, TSx310, TM1xx

RTD/TC thermometers

ATEX: Ex nA IIC T6 Gc
Ex ec IIC Txxx°C Gc
Ex tc IIIC Txxx°C Dc

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RTD/TC thermometers

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About this document

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

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. TM131

Supplementary documentation

Explosion protection brochure: CP00021Z

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

Manufacturer's certificates

EU Declaration of Conformity

Declaration number: EC_00169 X

The EU Declaration of Conformity is available on the Internet:
www.endress.com/Downloads

UKCA Declaration of Conformity

Declaration number: UK_00427

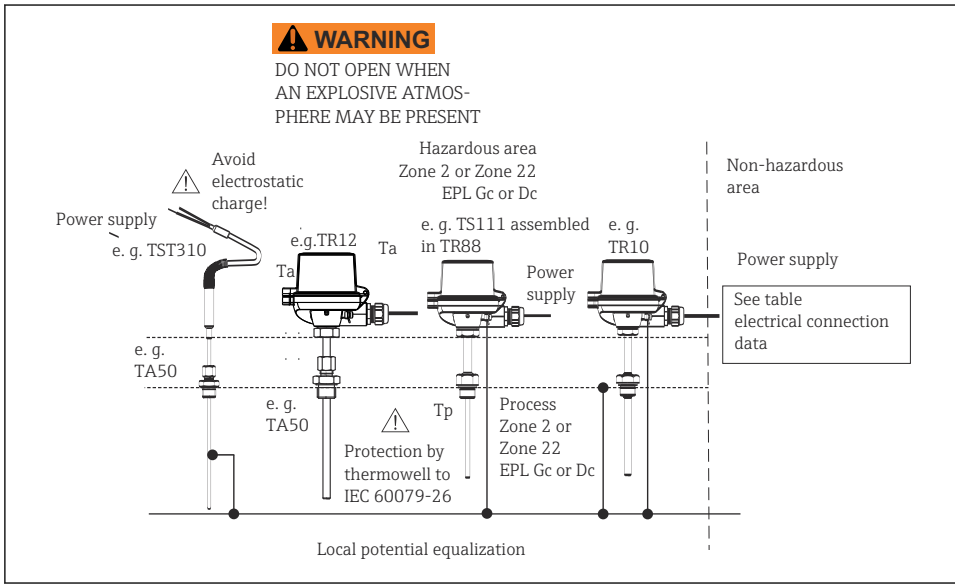
Affixing the certificate number certifies conformity with the following standards (depending on the device version)

- EN IEC 60079-0: 2018
- EN 60079-7: 2015
- EN 60079-15: 2010
- EN 60079-31: 2014

Manufacturer address

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

Safety instructions



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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. EN/IEC 60079-14).
- Seal the cable entries with certified cable glands and or blanking elements which have at least type of protection Ex ec or Ex tb suitable for Group IIC and IIIC (degree of protection IP6X).
- 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 thermometer at an ambient temperature under −20 °C and above +95 °C, appropriate cables, cable entries and sealing facilities permitted for this application must be used.
- The housing of the thermometer/sensor 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 (e.g. TA50, TA60, TA70) 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.

- Observe the safety instructions for the used transmitters.
- The device should never be used for hybrid mixtures (gas, dust, air).
- When using of a plug-in connector (e.g. TURCK PA-connector) is to be observed that the requirements for the respective category and the operating temperature are followed.

Safety instructions: Dust ignition protection by enclosure "t"

- 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.
- Clean the housing regularly to avoid a layer of dust accumulating on the housing.

Safety instructions: Specific conditions of use

- Sensors for thermometers without thermowell (e.g. TX62, TR24, TX88) are to be mechanically protected by thermowell or equivalent suitable for category 3 in compliance with EN/IEC 60079-0 and its ultimate application.
- For assure that the temperature assembly has a degree of protection of IP54 or IP6X depending on the ultimate application the user shall provide a thermowell or equivalent component at the process side.
- Sensors of TM111/TM112 with a diameter smaller than 6 mm or ¼" shall be protected by a thermowell.
- TM131, TM15x temperature sensors shall always be protected by a thermowell.
- 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.
  - the temperature of the optionally used RBFF1NS union does not exceed the service temperature range of −50 to +150 °C for following option:
    TM131-abc...
    TM151-abc...
    c Thermometer Design:
    M Nipple-union connection NPT½
    N Nipple-union-nipple connection NPT½
- Install only head transmitters not exceeding a maximum power dissipation of 2.2 W with a temperature input rating not exceeding 10 V_{DC} and 1 mA.
- 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 enclosure and iron/steel is excluded.

For type of protection Ex nA: (for inserts/sensors only)

For use in the type of protection Ex nA, and for Zone 2 (EPL Gc) application, the sensor/insert shall be installed completely inside an additional enclosure, providing a degree of protection of not less than IP54 according to IEC/EN 60079-0 and IEC/EN 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 IEC/EN 60079-15 must be considered for the installation.

For type of protection Ex t: (for inserts/sensors only)

For use in the type of protection Ex tc, and for Zone 22 (EPL Dc) application, the sensor/insert shall be installed completely inside an additional enclosure, providing a degree of protection of not less than IP54 in event of non-conductive dust or IP6X in event of conductive dust according to IEC/EN 60079-0 and IEC/EN 60079-31.

⚠ 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).

Temperature tables

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)
TR1x TC1x TM4xx TM1xx	TMT181 TMT182 TMT84/TMT85 TMT71, TMT72 TMT86	T6	−40 °C ≤ Ta ≤ +55 °C	T85 °C
		T5	−40 °C ≤ Ta ≤ +70 °C	T100 °C
		T4	−40 °C ≤ Ta ≤ +85 °C	T135 °C
	TMT162 TMT142	T6	−40 °C ≤ Ta ≤ +55 °C	T85 °C
		T5	−40 °C ≤ Ta ≤ +70 °C	T100 °C
		T4	−40 °C ≤ Ta ≤ +80 °C	T135 °C
	TMT31	T6	−40 °C ≤ Ta ≤ +50 °C	T85 °C
		T5	−40 °C ≤ Ta ≤ +65 °C	T100 °C
		T4	−40 °C ≤ Ta ≤ +85 °C	T135 °C

Type	Assembled transmitter	Temperature class	Ambient temperature range (housing)	Maximum surface temperature (housing)
	TMT82	T6	−40 °C ≤ Ta ≤ +58 °C	T85 °C
		T5	−40 °C ≤ Ta ≤ +75 °C	T100 °C
		T4	−40 °C ≤ Ta ≤ +85 °C	T135 °C
	TMT8x with display TMT7x with display Flying leads	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	Insert diameter	Process temperature	Temperature class/ maximum surface temperature (sensor)
TR1x TC1x TM4xx TM1xx	TMT18x TMT8x TMT7x TMT31 TMT142 Flying leads	3 mm (1/8"), 3 mm (1/8") dual or 6 mm (1/4") 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 (1/4")	−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

Type	Assembled transmitter	Insert diameter	Process temperature Tp [1)]	Temperature class/ maximum surface temperature (sensor)
TM412 TM112 TM131 TM151 TM152	TMT162	3 mm (1/8"), 3 mm (1/8") dual or 6 mm (1/4") 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 (1/4") dual	−50 °C ≤ Tp ≤ +71 °C	T6/T85 °C

Type	Assembled transmitter	Insert diameter	Process temperature Tp [1]	Temperature class/ maximum surface temperature (sensor)
			−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

1) Maximum process pressure see relevant Technical Information. 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 with terminal block or cable sensor, type TSx310 or TM211

Insert diameter	Temperature class/maximum surface temperature	Tp (process) - maximum allowed process temperature (sensor) [1]
3 mm (1/8"), 3 mm (1/8") dual or 6 mm (1/4") dual	T1/T450 °C	426 °C
	T2/T300 °C	276 °C
	T3/T200 °C	181 °C
	T4/T135 °C	116 °C
	T5/T100 °C	81 °C
	T6/T85 °C	66 °C
6 mm (1/4") dual	T1/T450 °C	433 °C
	T2/T300 °C	283 °C
	T3/T200 °C	188 °C
	T4/T135 °C	123 °C
	T5/T100 °C	88 °C
	T6/T85 °C	73 °C

1) Maximum process pressure see relevant Technical Information

Insert diameter	Temperature class/maximum surface temperature	Ta - ambient temperature (housing)
3 mm (1/8"), 3 mm (1/8") dual or 6 mm (1/4") dual	T1/T450 °C	−40 °C ≤ Ta ≤ +120 °C
	T2/T300 °C	
	T3/T200 °C	
	T4/T135 °C	−40 °C ≤ Ta ≤ +116 °C

Insert diameter	Temperature class/maximum surface temperature	Ta - ambient temperature (housing)
	T5/T100 °C	−40 °C ≤ Ta ≤ +81 °C
	T6/T85 °C	−40 °C ≤ Ta ≤ +66 °C
6 mm (1/4") dual	T1/T450 °C	−40 °C ≤ Ta ≤ +120 °C
	T2/T300 °C	
	T3/T200 °C	
	T4/T135 °C	−40 °C ≤ Ta ≤ +120 °C
	T5/T100 °C	−40 °C ≤ Ta ≤ +88 °C
	T6/T85 °C	−40 °C ≤ Ta ≤ +73 °C

Electrical connection data

Electronic	Supply voltage Ub	Output/Current consumption
TMT181	U ≤ 35 V_{DC}	4 to 20 mA
TMT182		
TMT82	U ≤42 V_{DC}	
TMT84, TMT85	U ≤32 V_{DC}	≤11 mA
TMT86	U ≤30 V_{DC}	
TMT71, TMT72	U ≤ 36 V_{DC}	4 to 20 mA
TMT31	U ≤ 36 V_{DC}	4 to 20 mA
TMT142 HART7	U ≤ 36 V_{DC}	4 to 20 mA
TMT162 HART7	U ≤ 42 V_{DC}	4 to 20 mA
TMT162 PA/FF	U ≤32 V_{DC}	≤11 mA
Terminal block	U ≤ 10 V_{DC}	≤1 mA

Category	Type of protection (ATEX)	Type
II3G	Ex nA IIC T6...T1 Gc	TR10, TR11, TR12, TR13, TR15, TR24, TR45, TR47, TR88, TR61, TR62, TR63, TR65, TR66, TM411, TM412, TS111, TM211, TST310 TM111, TM131, TC10, TC12, TC13, TC15, TC88, TEC420, TC61, TC62, TC63, TC65, TC66, TSC310 TPR100, TS111, TPC100
II3D	Ex tc IIIC T85 °C...T450 °C Dc	
II3G	Ex ec IIC T6...T1 Gc	TM111, TM112, TM131, TM151, TM152
II3D	Ex tc IIIC T85 °C...T450 °C Dc	

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