XA03588T/09/EN/01.25-00
71711101
2025-06-30

Safety Instructions
iTHERM MultiSens Flex TMS01

ATEX/IECEx: Ex ia IIC T6...T1 Ga
Ex ia IIC T6...T1 Ga/Gb
Ex ia IIIC T85°C...T450°C Da/Db
Ex ia/db IIC T6...T1 Ga/Gb
Ex ia/tb IIIC T85°C...T450°C Da/Db

Endress+Hauser
People for Process Automation

iTHERM MultiSens Flex TMS01

Table of contents

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. iTHERM TMS01

Supplementary documentation

Explosion protection brochure: CP00021Z

The Explosion-protection brochure is available:
- In the download area of the Endress+Hauser website: www.endress.com -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Certificates and declarations

IECEx certificate

Certificate number: IECEx IMQ 24.0012X

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

- IEC 60079-0: 2017
- IEC 60079-1: 2014
- IEC 60079-11: 2011
- IEC 60079-26: 2014
- IEC 60079-31: 2013

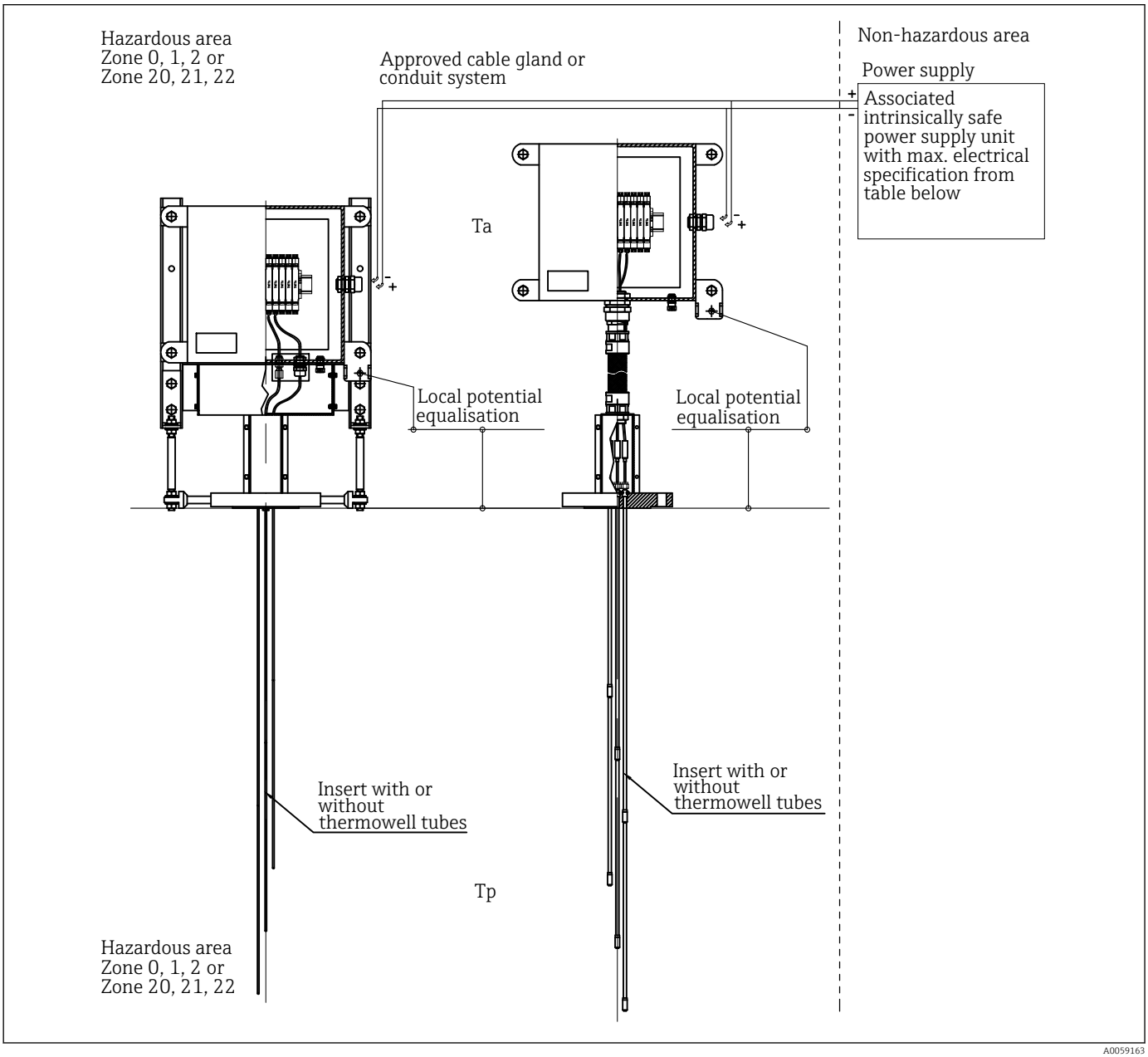
ATEX certificate

Certificate number: IMQ 24 ATEX 075X

Manufacturer address

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

Safety instructions



Safety instructions: General

- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
  - Be suitably qualified for their role and the tasks they perform
  - Be trained in explosion protection
  - Be familiar with national regulations or guidelines (e.g. IEC/EN 60079-14)
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- Only use the device in media to which the wetted materials have sufficient durability.
- The relationship between the permitted ambient temperature for the electronics housing, dependent on the range of application, and the temperature classes is shown in next tables.
- Alterations to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

Safety instructions: Installation in equipment of Group III

- Refer to the enclosed Safety instructions of assembled Transmitters.
- Refer to the marked maximum ratings for assembled temperature transmitter's supply.
- Install the sensor in thermometer/enclosure suitable for Group III in compliance with IEC/EN 60079-11 and IEC/EN 60079-0 and its ultimate application.
- 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.
- 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.
- The degree of protection shall be at least equal to IP6X throughout the equipment.
- The cable gland (or other accessories) chosen as ingress into junction box shall be certified accordingly to relevant Standards (IEC/EN 60079-0 and IEC/EN 60079-31).
- User must regularly clean enclosure external surface due to avoid formation and deposition of dust layers on the surface itself (the maximum allowed thickness of dust is equal to 5 mm).
- For dust 'Ex t' applications, the compression fittings installed on junction box connection thread must have PTFE or graphite sealing tape applied to maintain the approval stated.

Only for Group III

⚠ 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

Install the equipment in a partition wall which is in compliance with IEC/EN 60079-26 in reference to its ultimate application.

Only for iTHERM TMS01_010 = -84

⚠ 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).

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. EN/IEC 60079-14).
- Observe the safety instructions for the used transmitters (if any).
- Observe the safety instrcutions for the other used equipment.
- The device must be connected to the local potential equalization.
- Connect the device using suitable cable and wire entries of protection type "Intrinsic safety (Ex i)".
- For sensor elements an intrinsically safe supply with galvanic isolation must be used.
- Associated apparatus with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits shall be preferred.
- The type of protection changes as follows when the devices are connected to certified intrinsically safe circuits of Category Ex ib for Equipment Groups IIC and IIB: Ex ib IIC T6 or Ex ib IIB T6.
- Continuous duty temperature of the cable Ta +5 K.
- To maintain the ingress protection of the enclosure IP66: Install the enclosure cover, cable glands and blind plugs correctly.
- Close unused entry glands with sealing plugs.
- The pertinent guidelines must be observed when intrinsically safe circuits are connected together acc. IEC/EN 60079-14 (Proof of Intrinsic Safety).
- When connecting multiple sensors make sure that the potential equalizations are at the same local potential equalization.
- Pay attention to the maximum process conditions according to the manufacturer's operating Instructions.
- Respect the maximum ambient temperature permitted in base of used junction box, temperature transmitters and its number.
- Install the device to exclude any mechanical damage or friction. The device Connection Head enclosures, when made in Aluminum light alloy, shall be mounted in a way to avoid an ignition hazard due to impact or friction. Pay particular attention to flow conditions and tank fittings.

Safety instructions: Zone0/ Zone20

- The aluminum housing must **not** be installed in Zone 0(Ga)/Zone 20(Da), only the sensors or an optional mechanical protection (e.g. a thermowell) are allowed to extend through Zone 0(Ga)/ Zone 20(Da) as shown in the scheme on page 4
- The iTHERM TMS01_010 = -8A can be installed completely in Zone 0(Ga)/Zone 20(Da). Only Stainless Steel Junction box shall be used.
- Associated devices with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits are preferred.

Potential equalization

The device must be connected to the local potential equalization.

Safety instructions: Flameproof

- Only certified cable glands (or other accessories) in accordance to IEC/EN 60079-0 and IEC/EN 60079-1 shall be used. Cable entry system shall be in compliance with IEC/EN 60079-14 and/or other Local Regulations and Laws.
- User's cable entries always assure at least 5 engaged threads.
- The thread of cover must be always sprinkled by silicone grease (LOCTITE_8104 or LOXEAL_GS9) or copper paste or similar.
- The ground terminal board in and out is preview for the conductor which must be placed between the anti-rotation washer and the flat washer. If the connection is made by means of lug, this must be with an anti-rotation pin, or must be provide on fitting to avoid the rotation of the cable.
- Any unused holes in the enclosure must be closed with conical or cylindrical plugs in such way that anti-explosion seal characteristics of the enclosure are preserved. These plugs must only be removed with special tools.
- Degree of protection IP66 is guaranteed only if the cover is provided with an appropriate O-ring gasket; after each opening integrity of such gasket shall be verified.
- Any damaged parts may **only** be replaced or repaired by the manufacturer, unless of express authorization of itself. It is forbidden to machine further the junction box.
- As a general rule, whichever operations and maintenance on the electrical or mechanical parts or on the system, must be preceded from the interruption of the electrical supply system.

Ex d Compression Fitting - Junction box side

- When assembling the compression fitting, tighten the nut by hand and ensure that the nut is in the finger-tight position and mark/scribe it for a visual reference.
- Tight the nut to the required setting using the following table:

Insert Diameter	Torque settings (No. of turns past finger-tight)
≤ 4.5 mm	1 full turn
4.76 to 9.53 mm	3/4 turn

This equipment is not re-usable or repairable. Once installed it must be replaced if any damage is observed.

Version with Field Housing Transmitters Devices

When iTHERM TMS01 is fitted with Field Housing Transmitters (i.e. iTEMP TMT142B, iTEMP TMT162 - for iTHERM TMS01_220=-GA, -GB, -GC, -GD, -GG) the ambient temperature and temperature class is given by the following table:

Transmitter	EPL Gb			EPL Db		
	T6	T5	T4	T85 °C	T100 °C	T135 °C
iTEMP TMT162	–40 to +55 °C	–40 to +70 °C	–40 to +85 °C	–40 to +55 °C	–40 to +70 °C	–40 to +85 °C
iTEMP TMT142B	–50 to +55 °C	–50 to +70 °C	–50 to +85 °C	–40 to +55 °C	–40 to +70 °C	–40 to +85 °C

Electrical parameters in Chapter Electrical connection data:

Transmitter	Dissipated Power (W)
iTEMP TMT162	5.32 W
iTEMP TMT142B	1.00 W

Safety instructions: Specific conditions of use

- 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.
- When installing and commissioning the device, make sure that an electrostatic charge of the connection cable is avoided.
- As a rule of the thumb, the whole length of each thermoelement installed within the iTHERM TMS01 shall be limited to 200 m for single thermocouple, to 100 m for double and to 66.7 m for triple ones. For special applications (i.e. very long thermoelements), it shall always be verified the verification of total Capacitance and Inductance.
- When install the deivce, all the accessories used (e.g. cable glands, etc.) shall be certified according to IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-31, providing a degree of protection at least equal to the junction box one. For the correct choice of the cable entry system, please refer to IEC/EN 60079-14 (latest revision) and/or to National Regulations and Laws..
- Associated apparatus with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits are preferred.
- The separation between Zone 0/20 and Zone 1/21 shall be in compliance with requirements of IEC/EN 60079-26.
- The device shall be connected to the same local potential equalization in at least one point (alternatively through the junction box or at process connection). The user shall assess the functionality.
- For the use of the enclosures in environments with explosive atmosphere for the combustible dust presence, the following precautions must be taken: to avoid the accumulation of dust on the surfaces, the user must proceed with a regular cleaning of the enclosures; the dust layer shall always less than 5 mm.
- The width of the flameproof joints is superior to those specified in tables of IEC/EN 60079-1 standard.
- No battery is permitted within the device assemblies.
- The ambient temperature Ta shall not exceed the values given in tables into safety instructions.
- The Ambient Temperature range of the device, may vary depending on the number and the type of the transmitters mounted inside to the Connection Head. For a safe use of the products, the Safety Instructions shall be followed precisely.
- When the iTHERM TMS01_020= -C, -D, the maximum total length of each thermoelement shall be limited to 50 m for single thermocouple, to 25 m for double.
- If process temperatures are lower than −55 °C, the minimum ambient temperature of TMS01 shall be reduced to −50 °C and the minimum value of neck length shall be 240 mm.
- Process temperatures from −55 to −196 °C are permitted with the following materials only:
  - 316/1.4401 + 316L/1.4404, 304/1.4301 + 304L/1.4307, 316Ti/1.4571, 321/1.4541, 347/1.4550 according to Table B.2-11 of EN 13445-2.
  - Aloy 625 (UNS N06625), Alloy 800 (UNS N08800) and Alloy 825 (UNS N08825) according to Table A-1 of ASME B31-3.

Temperature tables

The dependency of PROCESS temperatures upon the temperature class for the device for RTD sensors:

Insert Diameter	Temperature class/ Maximum surface temperature	Maximum allowed process temperature (sensor) Tp (process)	
		Pi≤50 mW	Pi≤100 mW
1.5 mm 3.0 mm 4.8 mm 6.0 mm 8.0 mm	T1/T450 °C	426 °C	415 °C
	T2/T300 °C	276 °C	265 °C
	T3/T200 °C	181 °C	170 °C
	T4/T135 °C	116 °C	105 °C
	T5/T100 °C	81 °C	70 °C
	T6/T85 °C	66 °C	55 °C

For iTHERM TMS01_220=-GA, -GB, -GC, -GG, refer to column Pi≤100 mW for RTD inserts.

For TC sensors:

Insert Diameter	Temperature class/ Maximum surface temperature	Maximum allowed process temperature (sensor) Tp (process)
0.5 mm ÷ 12.7 mm iTHERM TS901	T1/T450 °C	440 °C
	T2/T300 °C	290 °C
	T3/T200 °C	195 °C
	T4/T135 °C	130 °C
	T5/T100 °C	95 °C
	T6/T85 °C	80 °C

Minimum process temperature	−196 °C

Ambient temperature:

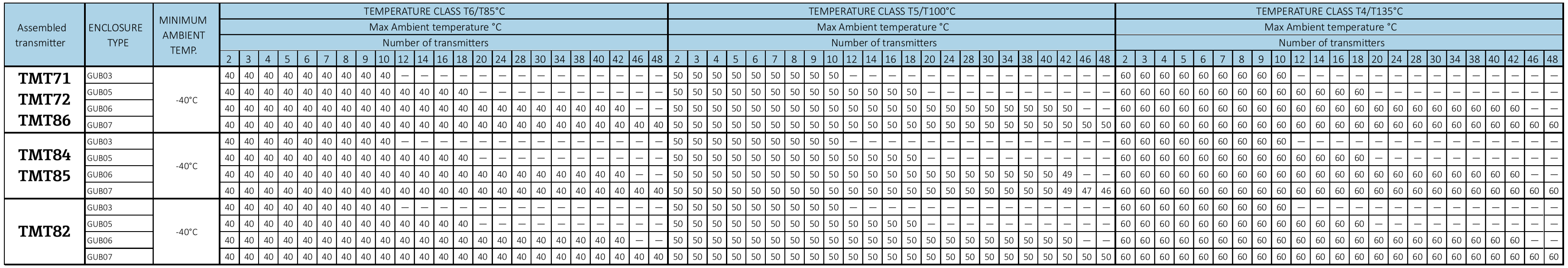
Minimum ambient temperature is Ta ≥ −55 °C (depending on enclosure)

Minimum ambient temperature is Ta ≥ −50 °C if process temperature is lower than −55 °C.

Minimum ambient temperatures for transmitters are as follows:

Assembled transmitters	Minimum ambient temperature
iTEMP TMT82	−52 °C
ITEMP TMT82_DIN	−40 °C
iTEMP TMT86	−52 °C
iTEMP TMT71	−50 °C
iTEMP TMT71_DIN	−50 °C
iTEMP TMT72	−50 °C
iTEMP TMT72_DIN	−50 °C
iTEMP TMT84	−40 °C
iTEMP TMT85	−40 °C

Maximum ambient temperature depends on product configuration:
- The type of enclosure selected
- The type and the number of mounted transmitters as summarized in the following tables:



Assembled transmitter	ENCLOSURE TYPE	MINIMUM AMBIENT TEMP.	TEMPERATURE CLASS T6/T85°C																						
			Max Ambient temperature °C																						
			Number of transmitters																						
			2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34	38	40	42	46	48
TMT71 **TMT72** **TMT86**	GUB03	-40°C	40	40	40	40	40	40	40	40	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		40	40	40	40	40	40	40	40	40	40	40	40	40	—	—	—	—	—	—	—	—	—	—
	GUB06		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	—	—
	GUB07		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
TMT84 **TMT85**	GUB03	-40°C	40	40	40	40	40	40	40	40	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		40	40	40	40	40	40	40	40	40	40	40	40	40	—	—	—	—	—	—	—	—	—	—
	GUB06		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	—	—
	GUB07		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
TMT82	GUB03	-40°C	40	40	40	40	40	40	40	40	40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		40	40	40	40	40	40	40	40	40	40	40	40	40	—	—	—	—	—	—	—	—	—	—
	GUB06		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	—	—
	GUB07		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Assembled transmitter	ENCLOSURE TYPE	MINIMUM AMBIENT TEMP.	TEMPERATURE CLASS T5/T100°C																						
			Max Ambient temperature °C																						
			Number of transmitters																						
			2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34	38	40	42	46	48
TMT71 **TMT72** **TMT86**	GUB03	-40°C	50	50	50	50	50	50	50	50	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		50	50	50	50	50	50	50	50	50	50	50	50	50	—	—	—	—	—	—	—	—	—	—
	GUB06		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	—	—
	GUB07		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
TMT84 **TMT85**	GUB03	-40°C	50	50	50	50	50	50	50	50	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		50	50	50	50	50	50	50	50	50	50	50	50	50	—	—	—	—	—	—	—	—	—	—
	GUB06		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	49	—	—
	GUB07		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	49	47	46
TMT82	GUB03	-40°C	50	50	50	50	50	50	50	50	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		50	50	50	50	50	50	50	50	50	50	50	50	50	—	—	—	—	—	—	—	—	—	—
	GUB06		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	—	—
	GUB07		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Assembled transmitter	ENCLOSURE TYPE	MINIMUM AMBIENT TEMP.	TEMPERATURE CLASS T4/T135°C																						
			Max Ambient temperature °C																						
			Number of transmitters																						
			2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34	38	40	42	46	48
TMT71 **TMT72** **TMT86**	GUB03	-40°C	60	60	60	60	60	60	60	60	60	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		60	60	60	60	60	60	60	60	60	60	60	60	60	—	—	—	—	—	—	—	—	—	—
	GUB06		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	—	—
	GUB07		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
TMT84 **TMT85**	GUB03	-40°C	60	60	60	60	60	60	60	60	60	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		60	60	60	60	60	60	60	60	60	60	60	60	60	—	—	—	—	—	—	—	—	—	—
	GUB06		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	—	—
	GUB07		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
TMT82	GUB03	-40°C	60	60	60	60	60	60	60	60	60	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	GUB05		60	60	60	60	60	60	60	60	60	60	60	60	60	—	—	—	—	—	—	—	—	—	—
	GUB06		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	—	—
	GUB07		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

A0059453

1 Temperature class for Ex d

Assembled transmitter	ENCLOSURE TYPE	MINIMUM AMBIENT TEMP.	TEMPERATURE CLASS T6/T85°C																						
			Max Ambient temperature °C																						
			Number of transmitters																						
			2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34	38	40	42	46	48
TMT71 TMT72 TMT86	CSX302019	-40°C	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX454519		40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–
	CSX594519		40	40	40	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–
	CSA 11	-40°C	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 13		40	40	40	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–
	CSA 35		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–
TMT84 TMT85	CSX302019	-40°C	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX454519		40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX594519		40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 11	-40°C	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 13		40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 35		40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–
TMT82	CSX302019	-40°C	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX454519		40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–
	CSX594519		40	40	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–
	CSA 11	-40°C	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 13		40	40	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–	–	–	–	–	–
	CSA 35		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	–	–	–	–	–

Assembled transmitter	ENCLOSURE TYPE	MINIMUM AMBIENT TEMP.	TEMPERATURE CLASS T5/T100°C																						
			Max Ambient temperature °C																						
			Number of transmitters																						
			2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34	38	40	42	46	48
TMT71 TMT72 TMT86	CSX302019	-40°C	55	55	55	55	55	55	55	55	53	50	47	44	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		55	55	55	55	55	55	55	55	55	53	50	47	44	–	–	–	–	–	–	–	–	–	–
	CSX454519		55	55	55	55	55	55	55	55	55	55	55	54	52	50	46	43	41	–	–	–	–	–	–
	CSX594519		55	55	55	55	55	55	55	55	55	55	55	55	55	55	52	49	48	45	42	40	–	–	–
	CSA 11	-40°C	55	55	55	55	55	55	55	55	55	55	55	54	52	–	–	–	–	–	–	–	–	–	–
	CSA 13		55	55	55	55	55	55	55	55	55	55	55	55	55	55	52	49	48	–	–	–	–	–	–
	CSA 35		55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	54	53	51	50
TMT84 TMT85	CSX302019	-40°C	55	55	52	47	43	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		55	55	54	50	46	42	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX454519		55	55	55	55	54	51	49	46	43	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX594519		55	55	55	55	55	55	54	52	50	46	42	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 11	-40°C	55	55	55	55	54	51	49	46	43	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 13		55	55	55	55	55	55	54	52	50	46	42	–	–	–	–	–	–	–	–	–	–	–	–
	CSA 35		55	55	55	55	55	55	55	55	55	55	54	52	50	48	43	–	–	–	–	–	–	–	–
TMT82	CSX302019	-40°C	55	55	55	55	55	55	55	55	54	50	46	42	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		55	55	55	55	55	55	55	55	55	53	50	46	43	–	–	–	–	–	–	–	–	–	–
	CSX454519		55	55	55	55	55	55	55	55	55	55	55	55	53	51	46	41	–	–	–	–	–	–	–
	CSX594519		55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	49	47	44	40	–	–	–	–
	CSA 11	-40°C	55	55	55	55	55	55	55	55	55	55	55	55	53	–	–	–	–	–	–	–	–	–	–
	CSA 13		55	55	55	55	55	55	55	55	55	55	55	55	55	55	53	49	47	–	–	–	–	–	–
	CSA 35		55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	54	52	51

Assembled transmitter	ENCLOSURE TYPE	MINIMUM AMBIENT TEMP.	TEMPERATURE CLASS T4/T135°C																						
			Max Ambient temperature °C																						
			Number of transmitters																						
			2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	30	34	38	40	42	46	48
TMT71 TMT72 TMT86	CSX302019	-40°C	65	65	65	65	65	65	65	65	65	65	62	59	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		65	65	65	65	65	65	65	65	65	65	65	62	59	–	–	–	–	–	–	–	–	–	–
	CSX454519		65	65	65	65	65	65	65	65	65	65	65	65	65	65	61	58	56	52	48	46	44	40	–
	CSX594519		65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	64	63	60	57	55	54	51	50
	CSA 11	-40°C	65	65	65	65	65	65	65	65	65	65	65	65	65	–	–	–	–	–	–	–	–	–	–
	CSA 13		65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	64	63	–	–	–	–	–	–
	CSA 35		65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
TMT84 TMT85	CSX302019	-40°C	65	65	65	65	62	58	54	49	45	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		65	65	65	65	65	61	57	54	50	42	–	–	–	–	–	–	–	–	–	–	–	–	–
	CSX454519		65	65	65	65	65	65	65	64	61	56	48	43	–	–	–	–	–	–	–	–	–	–	–
	CSX594519		65	65	65	65	65	65	65	65	65	63	57	53	49	45	–	–	–	–	–	–	–	–	–
	CSA 11	-40°C	65	65	65	65	65	65	65	64	61	56	48	43	–	–	–	–	–	–	–	–	–	–	–
	CSA 13		65	65	65	65	65	65	65	65	65	63	57	53	49	45	–	–	–	–	–	–	–	–	–
	CSA 35		65	65	65	65	65	65	65	65	65	65	65	65	65	63	58	54	52	47	43	41	–	–	–
TMT82	CSX302019	-40°C	65	65	65	65	65	65	65	65	65	62	56	52	–	–	–	–	–	–	–	–	–	–	–
	CSX303019		65	65	65	65	65	65	65	65	65	65	60	56	53	–	–	–	–	–	–	–	–	–	–
	CSX454519		65	65	65	65	65	65	65	65	65	65	65	65	63	61	56	51	49	44	–	–	–	–	–
	CSX594519		65	65	65	65	65	65	65	65	65	65	65	65	65	65	63	59	57	54	50	48	46	43	41
	CSA 11	-40°C	65	65	65	65	65	65	65	65	65	65	65	65	63	–	–	–	–	–	–	–	–	–	–
	CSA 13		65	65	65	65	65	65	65	65	65	65	65	65	65	65	63	59	57	–	–	–	–	–	–
	CSA 35		65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	64	62	61

A0059471

2 *Temperature class for Ex e*

Electrical connection data

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

Transmitter	Power supply			Sensor circuit		
	U_i	I_i	P_i	U_o	I_o	P_o
iTEMP TMT71/ TMT72 [1]	30 V	100 mA	800 mW/700 mW	4.3 V	4.8 mA	5.2 mW
iTEMP TMT82 [1]	30 V	130 mA	800 mW/770 mW	7.6 V/9 V	13 mA	24.7 mW/29.3 mW
iTEMP TMT84/ TMT85 [2]	17.5 V/24 V	380 mA/250 mA	2 187 mW	7.2 V	25.9 mA	46.7 mW
iTEMP TMT86 [3]	17.5 V	380 mA	800 mW	3.71 V	5.24 mA	4.86 mW
iTEMP TMT142B	30 V	300 mA	1 000 mW	7.6 V	13 mA	24.7 mW
iTEMP TMT162 [4] [5] [6]	17.5 V/24 V	500 mA/250 mA	5 320 mW/1 200 mW	7.6 V/8.6 V	29.3 mA/ 26.9 mA	55.6 mW/57.6 mW

1) Values on left: Head transmitter version / Values on right: DIN Rail version
2) Values on left: 17.5 V version / Values on right: 24 V version
3) FISCO field device
4) For sensor circuit: Values on left: Tranmsitters 4-20 mA / Values on right: Transmitters with Fieldbus connection
5) For power supply: Values on left: for FISCO / Values on right: LS.circuit
6) Not available for RTD

Supply circuit: in type of protection intrinsic safety Ex ia IIC and Ex ia IIIC, for connection to a certified intrinsically safe circuit with following maximum values for each intrinsic safe circuits:

Insert	U_i	I_i	P_i(RTD)	P_i(TC)
Single apparatus	9.8 V	30 mA	50 mW	60 mW
iTHERM TS901	9.0 V	80 mA	-	160 mW
iTHERM TS111	9.8 V	30 mA	50 mW	60 mW
iTHERM TSx310	9.8 V	30 mA	50 mW	60 mW

Capacitance and inductance assessment:

Insert	Single/Double/Triple	$C_{i\_nom,n}$	$L_{i\_nom,n}$
iTHERM TS901 [1] [2]	Single/Double	10.0 nF	50.0 µH
	Triple	-	-
iTHERM TS111	Single/Double	40.2 nF	200.8 µH
	Triple	N/A	N/A
iTHERM TSx310 [1]	Single/Double	40.0 nF	200.0 µH
	Triple	N/A	N/A

1) = an additional length of 20 m for the extension cables have been considered.
2) = maximum permitted length is 50 m for single and 25 mfor double.

Where **n** inidicates the intrinsic safe input circuits (from 2 up to 48).

Simple apparatus (only for TC´s):

Sensor type	Extension Cable		Sensor	
Single	200 pF/m	1 µH/m	200 pF/m	1 µH/m
Double	400 pF/m	2 µH/m	400 pF/m	2 µH/m
Triple	600 pF/m	3 µH/m	600 pF/m	3 µH/m

Determination of total inner capacitances C_i and inductances L_i for sensors:

- $C_i = C_{i\ Sensor\ X\ L\ Sensor} + C_{i\ Extension\ Cable\ X\ L\ Extension\ Cable}$, $C_i \leq 42.3$ nF
- $L_i = L_{i\ Sensor\ X\ L\ Sensor} + L_{i\ Extension\ Cable\ X\ L\ Extension\ Cable}$, $L_i \leq 201.3$uH

Category	Type of protection (ATEX/IECEx)	Type	Assembled Transmitters
II1G	Ex ia IIC T6...T1 Ga	iTHERM TMS01_010 = -8A	iTEMP TMT8x iTEMP TMT7x iTEMP TMT162 iTEMP TMT142B
II1/2G	Ex ia IIC T6...T1 Ga/Gb	iTHERM TMS01_010 = -8J	
II1/2D	Ex ia IIIC T85°C...T450°C Da/Db		
II1/2G	Ex ia/db IIC T6...T1 Ga/Gb	iTHERM TMS01_010 = -84	
II1/2D	Ex ia/tb IIIC T85°C...T450°C Da/Db		

www.addresses.endress.com

Endress+Hauser

People for Process Automation