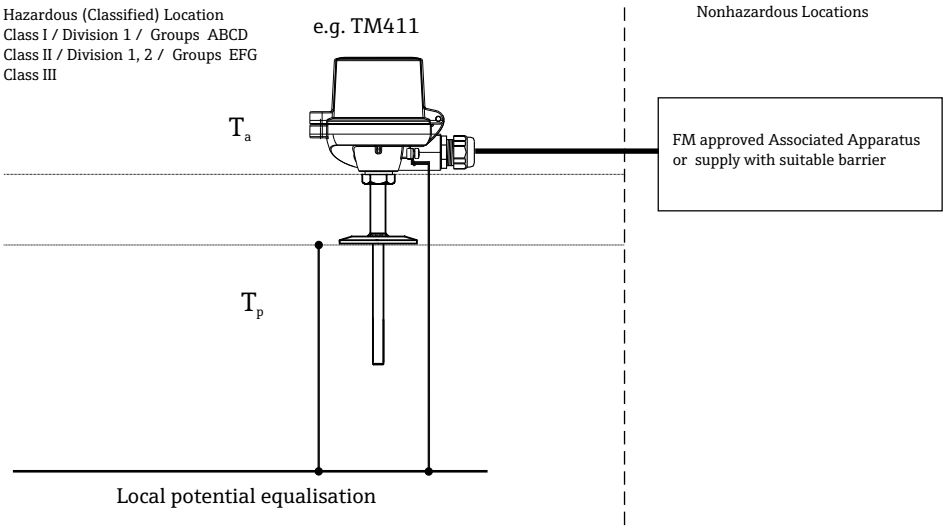

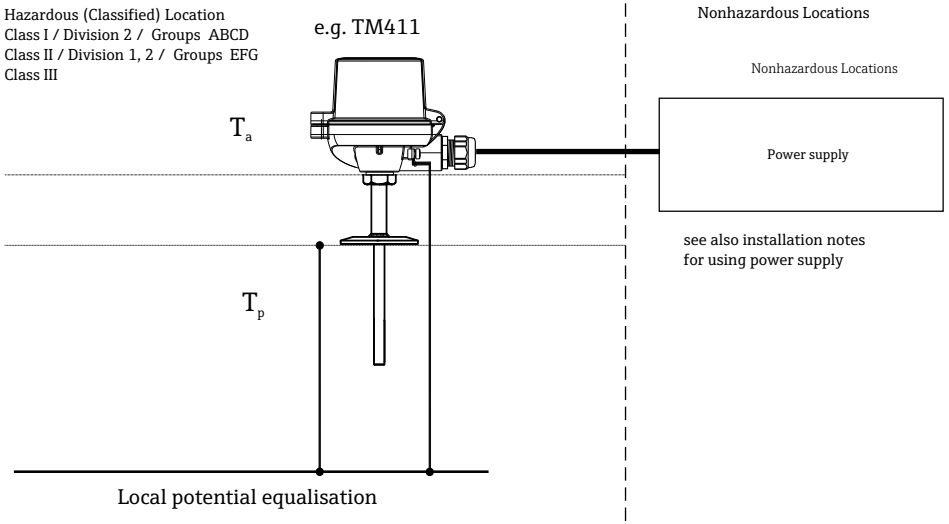

Installation Notes TM411, TM412

FM APPROVED

- FM approved apparatus must be installed in accordance with manufacturer's instructions.
- Install per temperature transmitter's control drawing when supplied with transmitter.
- Warning: Substitution of components may impair suitability for Class I, Division 2.
- Warning: 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.

DUST IGNITION PROOF **DIP** **Class II, III / Div. 1 / Groups EFG**

- A dust tight seal must be used for conduit entry when the temperature assembly is used in a Class II or Class III location.

INTRINSICALLY SAFE **IS** **Class I / Div. 1 / Groups ABCD**

- Installation should be in accordance with ANSI/ISA RP 12.6.01 "Installation of Intrinsically safe systems for Hazardous (classified) locations" and the National Electrical Code (ANSI/NFPA 70).
- FM approved associated apparatus or barrier is required.

NONINCENDIVE **NI** **Class I / Div. 2 / Groups ABCD**

- Depending on location install per National Electrical Code (NEC) using wiring methods described in article 500 through article 510.
- Intrinsic safety barrier not required.
- Warning: Do not disconnect equipment unless power has been switched off or the area is known to be non hazardous.
- Nonincendive field wiring installation
  The Nonincendive Field Wiring Circuit Concept allows interconnection of Nonincendive Field Wiring Apparatus with Associated Nonincendive Field Wiring Apparatus or Associated Intrinsically Safe Apparatus or Associated Apparatus not specifically examined in combination as a system using any of the wiring methods permitted for unclassified locations, when Voc ≤ Vmax, Ca ≥ Ci + Ccable, La ≥ Li + Lcable.
  For transmitter's or sensor's Nonincendive Field Wiring parameters see parameters below.
  For these current controlled circuits, the parameter Imax is not required and need not to be aligned with parameter Isc and It of the Associated Nonincendive Field Wiring Apparatus or Associated Apparatus.

(* The head transmitter TMT180 is only suitable for Class I, Division 2.

Associated intrinsically safe power supply unit with max. electrical specifications below the characteristic values for Entity or NIFW of the assembled transmitter:

Transmitter	Ui/Vmax	Ii/Imax	Pi	Ci	Li
TMT180*	30 V			144nF	0
TMT181	30 V	100 mA	750 mW	0	0
TMT182	30 V	100 mA	750 mW	0	0
TMT82	30 V	130 mA	800 mW	0	0
TMT84, TMT85	17.5 V	500 mA	5.5 W	5nF	10 µH
TMT162 HART	30V	300 mA	1 W	5.3 nF	0
TMT162 PA/FF	24 V	250 mA	1.2 W	5 nF	10 µH
without	30 V	140 mA	1000 mW	1nF	1mH

	Approved	Date (yyyy-mm-dd)	Drawing No.	Dwg.rev.	Revision no.	Revision date (yyyy-mm-dd)	Name	Material
	Pfanzelt	2013-04-03	10000005818	A	-	2017-07-25	MP	71407927
Volume (mm³)	Designed	Date (yyyy-mm-dd)	Unit	Scale	Title			Series
	Pfanzelt	2013-04-02	iTHERM TM411, TM412	1:1	CONTROL DRAWING FM XA01150T/09/EN/02.18			
Refer to protection notice ISO 16016	Edge of working parts ISO 13715	Geometrical tolerancing ISO 2768-mH-E	Part No. -	Format A4			Objekt version	Sheet 1 of 2

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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
TM411 TM412	TMT180*	T6	-40°C ≤ Ta ≤ +50°C
		T5	-40°C ≤ Ta ≤ +65°C
		T4	-40°C ≤ Ta ≤ +85°C
	TMT181 TMT182, TMT162 TMT84, TMT85	T6	-40°C ≤ Ta ≤ +55°C
		T5	-40°C ≤ Ta ≤ +70°C
		T4	-40°C ≤ Ta ≤ +85°C
	TMT82	T6	-40°C ≤ Ta ≤ +58°C
		T5	-40°C ≤ Ta ≤ +75°C
		T4	-40°C ≤ Ta ≤ +85°C
	TMT8x with display	T6	-40°C ≤ Ta ≤ +55°C
		T5	-40°C ≤ Ta ≤ +70°C
		T4	-40°C ≤ Ta ≤ +85°C

Type	Assembled transmitter	Insert diameter	Temperature class	Process temperature range Tp
TM411 TM412	TMT18x TMT8x TMT162	3mm, 3mm(dual), 6mm dual	T6	-50°C ≤ Tp ≤ +66°C (64°C)*
			T5	-50°C ≤ Tp ≤ +81°C (79°C)*
			T4	-50°C ≤ Tp ≤ +116°C (114°C)*
			T3	-50°C ≤ Tp ≤ +181°C (179°C)*
			T2	-50°C ≤ Tp ≤ +276°C (279°C)*
			T1	-50°C ≤ Tp ≤ +426°C (427°C)*
		6mm	T6	-50°C ≤ Tp ≤ +73°C (71°C)*
			T5	-50°C ≤ Tp ≤ +88°C (86°C)*
			T4	-50°C ≤ Tp ≤ +123°C (121°C)*
			T3	-50°C ≤ Tp ≤ +188°C (186°C)*
			T2	-50°C ≤ Tp ≤ +283°C (286°C)*
			T1	-50°C ≤ Tp ≤ +433°C (431°C)*

* Process temperature when sensor is supplied with TMT162

The dependency of the ambient and process temperatures upon the temperature class for assembly without transmitter (terminal block):

Insert diameter	Temperature class	Maximum allowed process temperature (sensor) Tp (process)				
		Pi ≤ 50 mW	Pi ≤ 100 mW	Pi ≤ 200 mW	Pi ≤ 500 mW	Pi ≤ 650 mW
3mm, 3mm (dual) or 6mm dual	T1	426°C	415°C	396°C	343°C	333°C
	T2	276°C	265°C	246°C	193°C	183°C
	T3	181°C	170°C	151°C	98°C	88°C
	T4	116°C	105°C	86°C	33°C	23°C
	T5	81°C	70°C	51°C	-2°C	-12°C
	T6	66°C	55°C	36°C	-17°C	-27°C
6mm	T1	433°C	428°C	420°C	398°C	388°C
	T2	283°C	278°C	270°C	248°C	238°C
	T3	188°C	183°C	175°C	153°C	143°C
	T4	123°C	118°C	110°C	88°C	78°C
	T5	88°C	83°C	75°C	53°C	43°C
	T6	73°C	68°C	60°C	38°C	28°C

Insert diameter	Temperature class	Maximum allowed process temperature (sensor) Tp (process)			Ambient temperature (housing), Ta (ambient)
		Pi ≤ 750 mW	Pi ≤ 800 mW	Pi ≤ 1000 mW	
3mm, 3mm (dual) or 6mm dual	T1	320°C	312°C	280°C	-40°C ≤ Ta ≤ +130°C
	T2	170°C	162°C	130°C	-40°C ≤ Ta ≤ +130°C
	T3	75°C	62°C	30°C	-40°C ≤ Ta ≤ +130°C
	T4	10°C	2°C	-30°C	-40°C ≤ Ta ≤ +116°C
	T5	-25°C	-33°C		-40°C ≤ Ta ≤ +81°C
	T6	-40°C			-40°C ≤ Ta ≤ +66°C
6mm	T1	381°C	377°C	361°C	-40°C ≤ Ta ≤ +130°C
	T2	231°C	227°C	211°C	-40°C ≤ Ta ≤ +130°C
	T3	136°C	127°C	111°C	-40°C ≤ Ta ≤ +130°C
	T4	71°C	67°C	51°C	-40°C ≤ Ta ≤ +123°C
	T5	36°C	32°C	16°C	-40°C ≤ Ta ≤ +88°C
	T6	21°C	17°C	1°C	-40°C ≤ Ta ≤ +73°C

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	Pfanzelt	2013-04-03	10000005818	-	-	-	-	71407927
Volume (mm³)	Designed	Date (yyyy-mm-dd)	Unit	Scale	Title			Series
	Pfanzelt	2013-04-02	iTHERM TM411, TM412	1:1	CONTROL DRAWING FM XA01150T/09/EN/02.18			
Refer to protection notice ISO 16016	Edge of working parts ISO 13715	Geometrical tolerancing ISO 2768-mH-E	Part No. -	Format A4			Objekt version	Sheet 2 of 2

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