

Micropilot M

FMR230: Enamel antenna

FMR231: PTFE antenna, non-conductive

FMR244, FMR245

F23 housing

PROFIBUS PA, FOUNDATION Fieldbus



- (de)** Sicherheitshinweise für elektrische Betriebsmittel für explosionsgefährdete Bereiche.
- (en)** Safety instructions for electrical apparatus certified for use in explosion-hazardous areas.
- (fr)** Conseils de sécurité pour matériels électriques destinés aux zones explosibles.
- (es)** Instrucciones de seguridad de aparatos eléctricos homologados para su utilización en áreas expuestas a riesgos de deflagración. Si no entiende este manual, puede pedir un ejemplar en su idioma.
- (it)** Istruzioni di sicurezza per apparecchiature elettriche certificate per l'utilizzo in aree con pericolo di esplosione. Se il presente manuale non risulta comprensibile potete ordinarne una copia tradotta nella vostra lingua.
- (nl)** Veiligheidsinstructies voor elektrisch materieel in explosiegevaarlijke omgeving. Wanneer u deze handleiding niet kunt lezen, kunt u een in uw landstaal vertaalde handleiding bij ons bestellen.
- (fi)** Turvallisuusohjeita sähkölaitteille, jotka on vahvistettu käytettäväksi räjähdysvaarallisilla alueilla. Jos et ymmärrä tätä käsikirjaa, voit tilata meiltä käännöksen omalla kansallisella kielelläsi.
- (sv)** Säkerhetsföreskrifter för elektrisk utrustning certifierad för användning i explosionsfarliga områden. Om du inte förstår denna manual, kan en översatt kopia på ditt eget språk beställas från oss.
- (da)** Sikkerhedsforskrifter for elektriske apparater certificeret til brug i eksplosionsfarlige områder. Hvis du ikke forstår denne manual, kan en oversat kopi af den på dit eget sprog bestilles fra os.
- (pt)** Instruções de segurança para dispositivos eléctricos certificados para utilização em áreas de risco de incêndio. Se não compreender este manual, pode encomendar-nos directamente uma cópia na sua língua.
- (el)** Οδηγίες ασφαλείας για ηλεκτρικές συσκευές που εγκρίνονται για χρήση σε περιοχές με κίνδυνο εκρήξεων. Αν δεν μπορείτε να κατανοήσετε το περιεχόμενο του εγχειριδίου αυτού, μπορείτε να παραγγείλετε από την εταιρεία μας ένα αντίτυπο μεταφρασμένο στη γλώσσα σας.



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Safety instructions for electrical apparatus for explosion-hazardous areas



Labelling:

Zone 0/1

- For atmospheres which are explosive due to gases, mist or vapour _____
- Sensor Zone 0, housing Zone 1 _____

Allocation of the assembly point hazardous zones to the category of the explosion-protected devices or sensors:

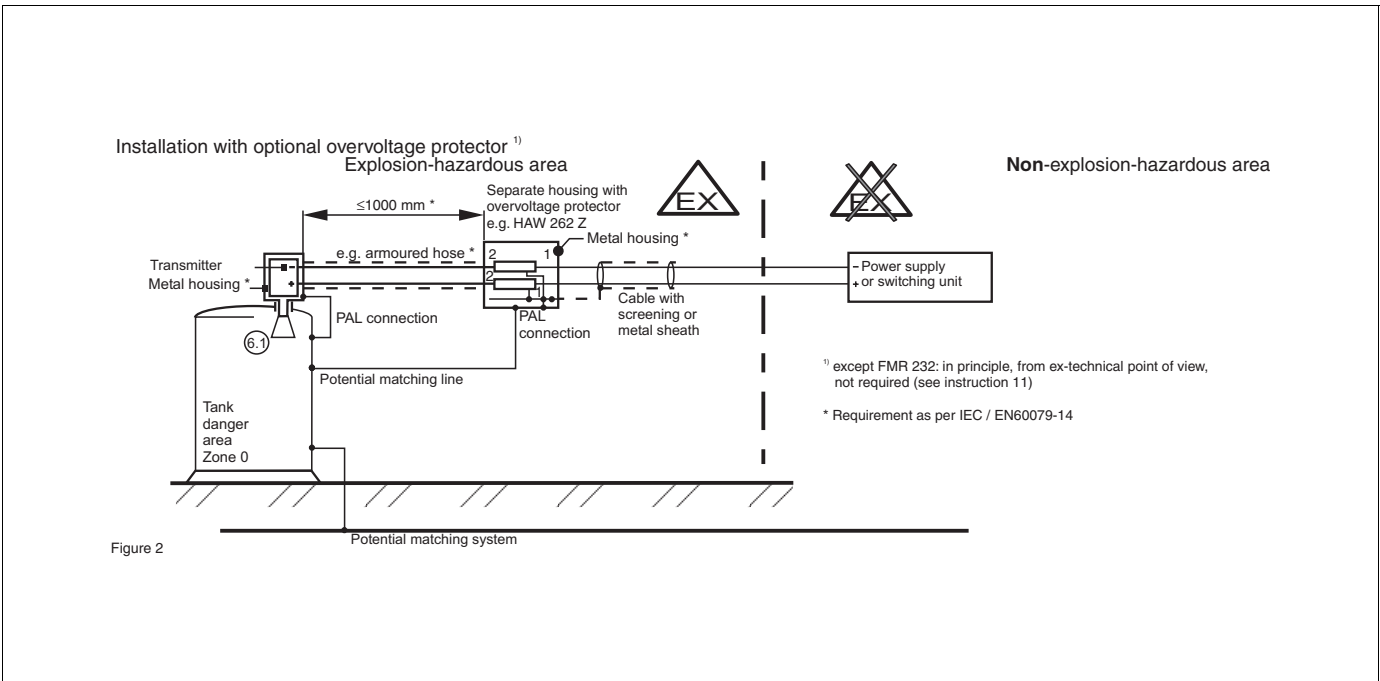
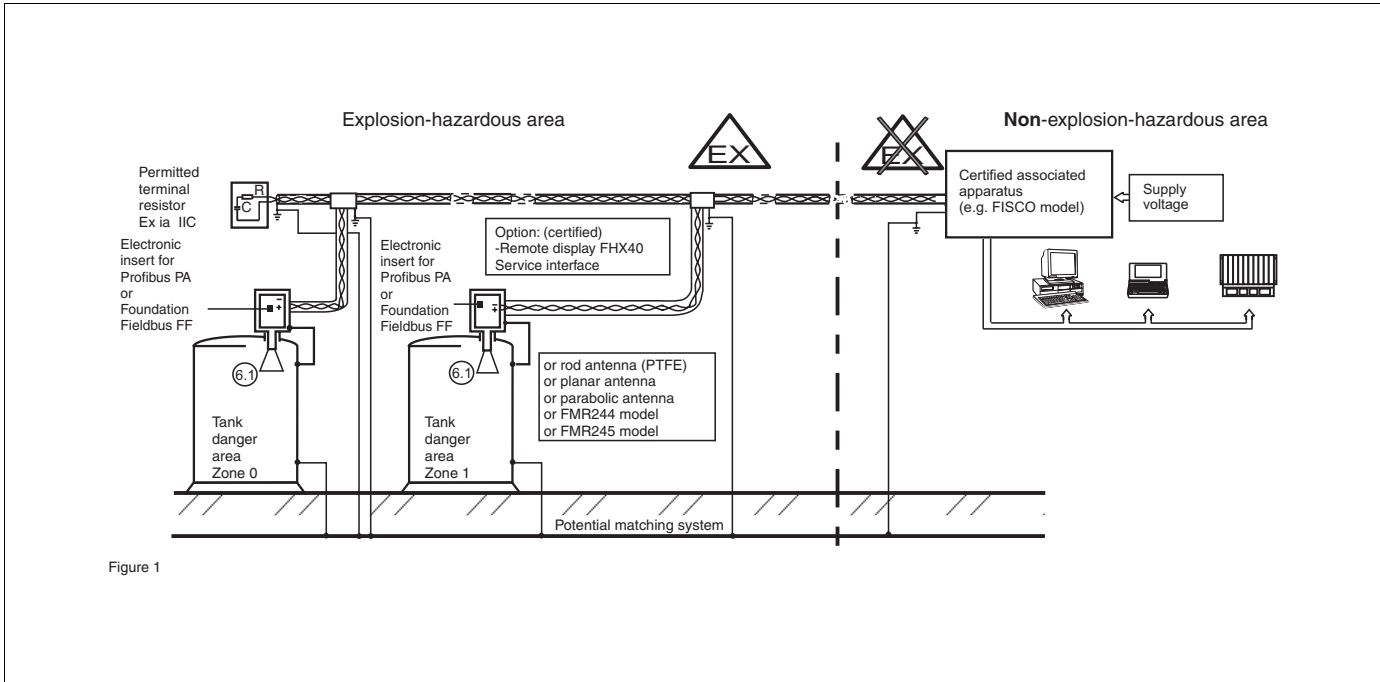
Hazardous zone at the assembly point	
Danger due to gases, mist or vapour	Zone 0
Danger due to gases, mist or vapour	Zone 1
Danger due to gases, mist or vapour	Zone 2

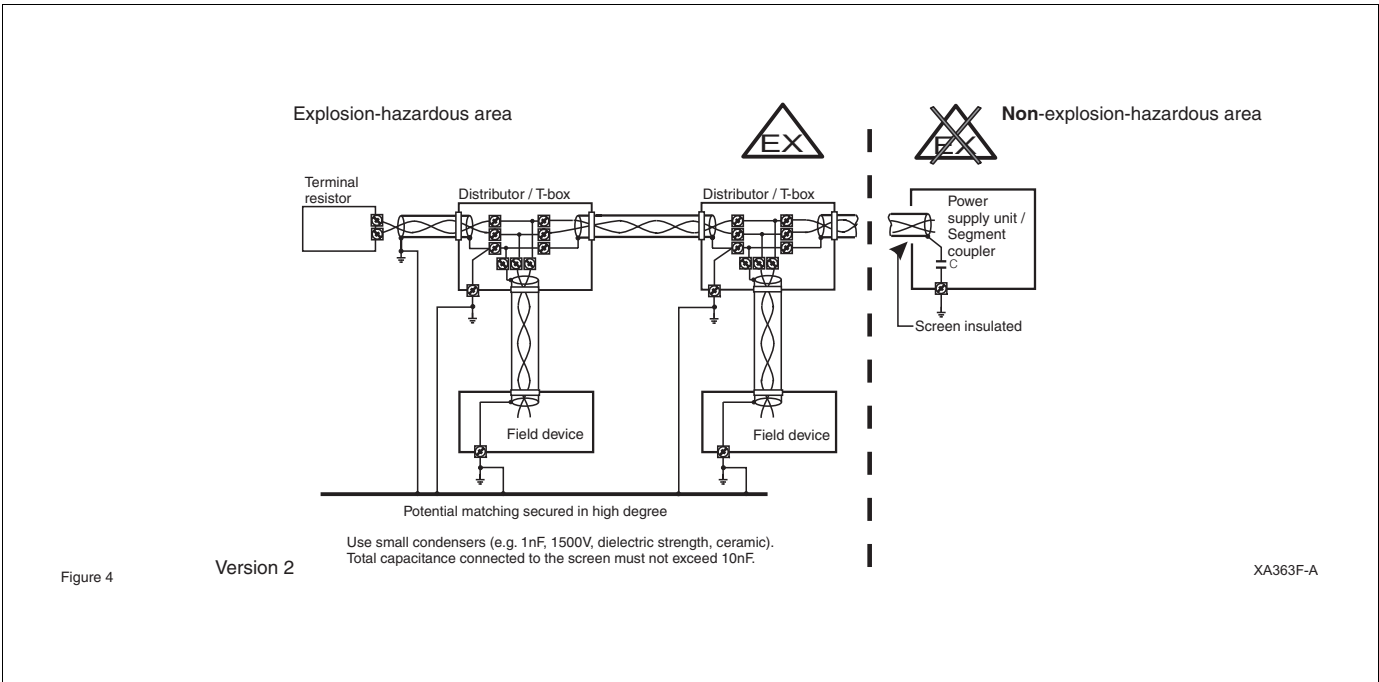
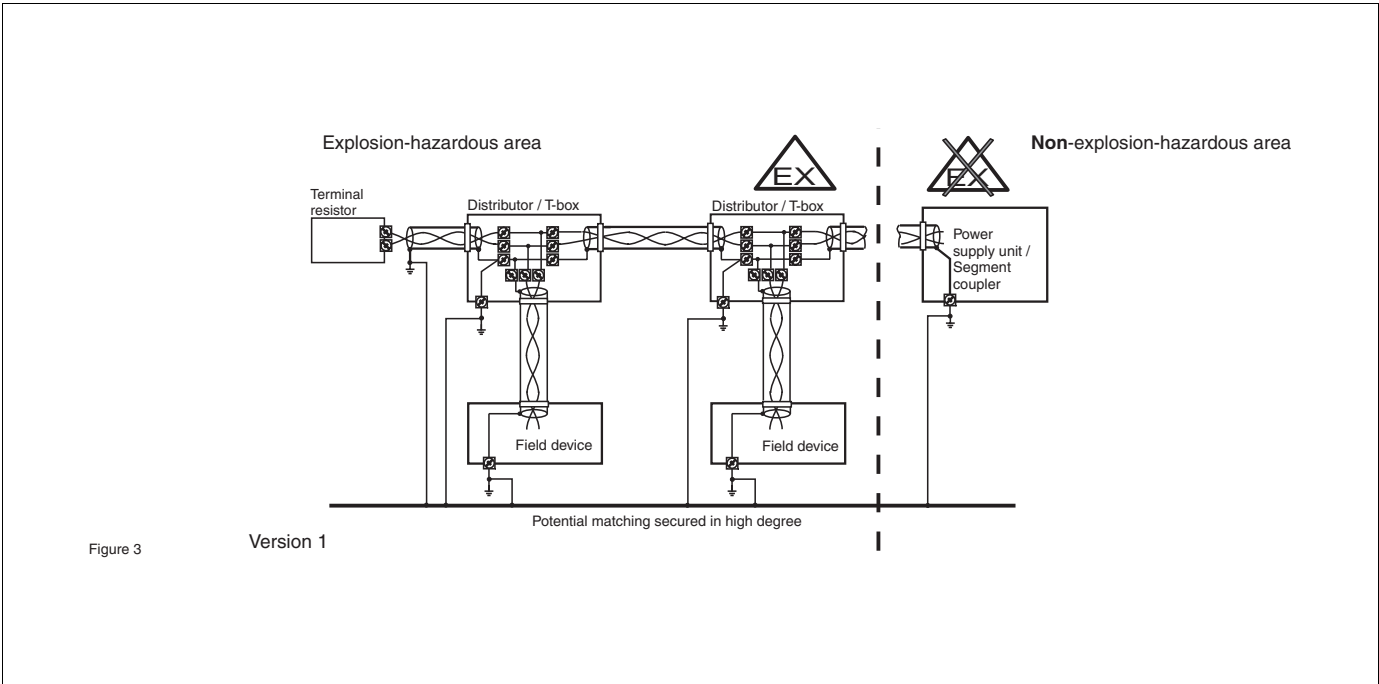
Labelling the type of protection:

Ex ia IIC T6...T1

- Explosion-protected electrical apparatus as per IEC standard (Ex) _____
- Type of protection _____
- Explosion group _____
- Temperature class _____







Certified associated apparatus	U _o = 17.5 V or U _o = 24 V I _o = 500 mA or I _o = 250 mA P _o = 5.5 W or P _o = 1.2 W	Electronic insert: PROFIBUS PA or FOUNDATION Fieldbus FF FISCO model or ENTITY concept (individual interconnection) [Ex ia] IIC or [Ex ib] IIC
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	Zone 0/1 or Zone 1	Housing Zone 1
Type of protection	Ex ia IIC T6..T1	IECEX PTB 04.0015X
Max. operating pressure	dependent on the antenna	

Housing	F23 (SS 316L)	-40 °C ≤ T _u ≤ 80 °C	optionally with or without VU331 display and operating module
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Option	Overvoltage protector	HAW 262 Z	intrinsically-safe power supply and signal circuit (4..20 mA)	e.g. route armoured hose up to the housing
	Remote display	e.g. FHX40	KEMA 02 ATEX 1203 IECEX TUN 04.0011	observe associated Safety Instructions (XA...)
	Service interface	Commubox with associated ToF cable		observe associated Safety Instructions (XA...)

Version	FMR230-..H.....	Horn antenna (enamelled)	up to 200 °C
	FMR231-.E or F.....	PTFE rod antenna	up to 150 °C
		Rod antenna (PTFE) with sanitary connection	up to 150 °C
		Rod antenna (PTFE) threaded connection PVDF	up to 80 °C
	FMR244-.....	Antenna with high chem. resistance	up to 130 °C
FMR245-.....	Antenna with high chem. resistance, easy to clean	up to 150 °C	

Safety-relevant instructions for installation in explosion-hazardous areas:

- 1.) Install the device according to the manufacturer's instructions and any other valid standards and regulations.
- 2.) The intrinsically-safe input power circuit of the Micropilot FMR23x is isolated from ground potential and has a dielectric strength of at least 500 V_{rms} with respect to it.
- 3.) The relationship between the permitted ambient temperature for the electronics housing, dependent on the range of application, and the temperature classes is shown in the tables (Tab. 1a, 1b and Tab. 2a, 2b).
- 4.) After aligning (rotating) the housing, retighten the fixing screw (Allen screw on the threaded neck).
- 4.1 If antenna extensions over 3 m-long are used, they should be fixed mechanically (using guy ropes).
- 5.) For grounding the screen, see figure 3 and figure 4.
- 6.) Continuous duty temperature of the cable ≥ T_{amb} +5 K.
- 6.1 Special condition (X marking):
The antenna on the Micropilot M FMR230, FMR231, FMR244 and FMR245 contain surfaces, which can become electrostatically charged.
For this reason, these antenna must not be arranged such that they can become dangerously charged from a flowing medium (e.g. filling curtain).
Avoid electrostatic charging when cleaning the antenna.
These special conditions are not applicable for areas, which require at least one of the apparatus in the following category and material group, for:
 - FMR230-..H: II 1/2 G and IIB; II 2 G and IIB
 - FMR231-.E: II 2 G and IIB (only without flange plating)
 - FMR244-: II 2 G and IIB
 - FMR245-: II 2 G and IIB for flanges with a size of ≤ DN 50 or 2"

Tab. 1a HART, PROFIBUS PA

Zone 1 - Application					
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 1	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature			
		FMR230	FMR231	FMR244	FMR245
T6	+80 °C +60 °C	+55 °C +60 °C	+50 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C
T5	+95 °C +75 °C	+65 °C +75 °C	+65 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C
T4	+130 °C +80 °C	+65 °C +80 °C	+55 °C +80 °C	+65 °C +80 °C	+65 °C +80 °C
T3 (functional)	+150 °C +80 °C	+60 °C +80 °C	+45 °C +80 °C	not permitted	+60 °C +80 °C
T3	+195 °C +80 °C	+45 °C +80 °C	not permitted	not permitted	not permitted
T2 (functional)	+250 °C +80 °C	+30 °C +80 °C	not permitted	not permitted	not permitted

permitted antenna temperature range must be observed
functional = limited by maximum permitted antenna temperature

Tab. 1b FOUNDATION Fieldbus

Zone 1 - Application					
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 1	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature			
		FMR230	FMR231	FMR244	FMR245
T6	+80 °C +60 °C	+45 °C +55 °C	+45 °C +55 °C	+50 °C +55 °C	+50 °C +55 °C
T5	+95 °C +75 °C	+60 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C
T4	+130 °C +80 °C	+65 °C +80 °C	+55 °C +80 °C	+65 °C +80 °C	+65 °C +80 °C
T3 (functional)	+150 °C +80 °C	+60 °C +80 °C	+45 °C +80 °C	not permitted	+60 °C +80 °C
T3	+195 °C +80 °C	+45 °C +80 °C	not permitted	not permitted	not permitted
T2 (functional)	+250 °C +80 °C	+30 °C +80 °C	not permitted	not permitted	not permitted

permitted antenna temperature range must be observed
functional = limited by maximum permitted antenna temperature

Instructions:

- 7.) The type of protection changes as follows when the transmitter is connected to certified intrinsically-safe circuits of Category Ex ib for Equipment Groups IIC and IIB: Ex ib IIC T6 and Ex ib IIB T6.
Do not operate the antenna in Zone 0 if the transmitter is connected to an intrinsically-safe circuit of Category Ex ib.
- 7.1 When interconnecting intrinsically-safe circuits, the regulations for interconnecting intrinsically-safe circuits must be observed (IEC/EN 60079-14); (Proof of Intrinsic Safety).
(E.g. when using Commubox or handheld terminal DXR375 or other certified apparatus or for installation according to the ENTITY concept).
- 8.) Option: overvoltage protector HAW262Z, see figure 2.
 - connect the external overvoltage protector and the measuring device to the local potential matching system,
 - establish potential matching both inside and outside of the explosion-hazardous area,
 - the cable connecting the overvoltage protector and the measuring device must be no longer than 1 m,
 - the cable must be routed protected, e.g. in an armoured hose.

Power supply and signal circuit in protection type: intrinsic safety Ex ia IIC or IIB		
Micropilot with electronic insert for PROFIBUS PA or FOUNDATION Fieldbus FF Ex ia IIC: as per FISCO model or ENTITY concept (individual interconnection)		
U _i = 17.5 V I _i = 500 mA P _i = 5.5 W	or U _i = 24 V I _i = 250 mA P _i = 1.2 W	L _i = 10 µH C _i = 5 nF Leak current ≤ 50 µA

Option: Power supply and signal circuit for remote display, e.g. FHX40, in protection type: intrinsic safety Ex ia IIC or IIB		
U _o = 4.2 V I _o = 34 mA P _o = 36 mW	effective inner inductance effective inner capacitance Characteristic curve: linear	L _i = negligible C _i = negligible

For connecting the Commubox service interface with the associated ToF cable:		
Commubox output + ToF cable: U _o = 3.74 V I _o = 9.9 mA P _o = 9.2 mW	effective inner inductance effective inner capacitance Characteristic curve: linear	L _i = negligible C _i = negligible
	for material group IIC: permitted outer inductance permitted outer capacitance	L _o ≤ 340 mH C _o ≤ 100 µF

When interconnected to a Micropilot M, the following results apply:

For material group:	L _o =	0.15 mH	0.5 mH	1 mH	2 mH	5 mH
IIC	C _o	≤ 8 µF	≤ 7 µF	≤ 5.5 µF	≤ 5 µF	≤ 4 µF
IIB	C _o	10 µF				

Zone 0 Safety Instructions:

- 9.) Potentially explosive air/vapour mixtures must only occur under atmospheric conditions:

$$-20\text{ °C} \leq T \leq +60\text{ °C}$$

$$0.8\text{ bar} \leq p \leq 1.1\text{ bar}$$

If no potentially explosive mixtures are present, or if additional protective measures have been taken according to EN 1127-1, the transmitters may be operated under other atmospheric conditions in accordance with the manufacturer's specifications.

- 10.) The antenna must only be used in media, for which the materials used have sufficient durability.
- 11.) Except for FMR 232 (planar antenna):
thanks to the design of the measuring device, an additional overvoltage protector for systems, which have to be protected against ignition caused by dangerous potential differences (e.g. due to the occurrence of atmospheric overvoltage) in accordance with e.g. TRbF 100 No. 8 (German national guideline) or IEC/EN 60079-14, is not required.
- 12.) Associated apparatus with galvanic isolation between intrinsically-safe and non-intrinsically-safe circuits are preferred.

Tab. 2a HART, PROFIBUS PA

Zone 0 - Application					
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 0 (see point 9)	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature			
		FMR230	FMR231	FMR244	FMR245
T6	+60 °C	+60 °C	+60 °C	+60 °C	+60 °C
T5	+60 °C	+75 °C	+75 °C	+75 °C	+75 °C
T4, T3, T2, T1	+60 °C	+80 °C	+80 °C	+80 °C	+80 °C

Tab. 2b FOUNDATION Fieldbus

Zone 0 - Application					
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 0 (see point 9)	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature			
		FMR230	FMR231	FMR244	FMR245
T6	+60 °C	+55 °C	+55 °C	+55 °C	+55 °C
T5	+60 °C	+70 °C	+70 °C	+70 °C	+70 °C
T4, T3, T2, T1	+60 °C	+80 °C	+80 °C	+80 °C	+80 °C

