Safety Instructions
Soliphant M
FTM50, FTM51, FTM52

Ex ia IIC T6 Ga
Ex ia IIC T6 Ga/Gb
Ex ia IIIC T65°C Da
Ex ia IIIC T65°C Da/Db

Document: XA00391F-B
Safety instructions for electrical apparatus for explosion-hazardous areas → 3

Endress+Hauser
People for Process Automation

Soliphant M
FTM50, FTM51, FTM52

Table of Contents

Associated documentation

This document is an integral part of the following Operating Instructions:
- KA00229F/00 (FTM50, FTM51)
- KA00230F/00 (FTM52)

Supplementary documentation

Explosion-protection brochure:
CP00021Z/11

The Explosion-protection brochure is available:
- In the download area of the Endress+Hauser website: www.endress.com → Download → Advanced → Documentation Code: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

IEC Declaration of Conformity

Certificate number:
IECEx DEK 15.0042 X

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

- IEC 60079-0: 2011
- IEC 60079-11: 2011
- IEC 60079-26: 2014

Other standards

Among other things, the following standards shall be observed for proper installation:
- IEC/EN 60079-14:2012: "Explosive atmospheres - Part 14: Electrical installations design, selection and erection."
- EN 1127-1:2011: "Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology."

Extended order code

The extended order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible. Additional information about the nameplate is provided in the associated Operating Instructions.

Structure of the extended order code

FTM5x	-	**********	+	A*B*C*D*E*F*G*..
Device type		Basic specifications		Optional specifications

* = Placeholder
At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

Basic specifications

The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available. The selected option of a feature can consist of several positions.

Optional specifications

The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = test, certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

Extended order code: Soliphant M

Device type

FTM50, FTM51, FTM52

Basic specifications

Position 1 (Approval)		
Selected option		**Description**
FTM5x	E	IEC Ex ia IIIC T65°C, Ex ia IIC T6[1)]

1) For detailed information → 🖹 6, "Safety instructions: Installation"

Position 6 (Electronics; Output)		
Selected option		**Description**
FTM5x	5	FEM55; 8/16 mA, 11-36 VDC
	7	FEM57; 2-wire PFM
	8	FEM58; NAMUR + test button (H-L signal)

Position 7 (Type of Probe)		
Selected option		**Description**
FTM50 FTM51 FTM52	A	Compact
	D, E	Cable > separate housing
	G, H	Cable, armoured > separate housing

Position 8 (Housing)		
Selected option		**Description**
FTM5x	H	T13 Alu IP66/68 NEMA Type 4X Encl., separate conn. compartment
	1	F16 Polyester IP66/67 NEMA Type 4X Encl. + transparent cover
	3	F17 Alu IP66/67 NEMA Type 4X Encl.
	5	F13 Alu IP66/68 NEMA Type 4X Encl.
	6	F27 316L IP67/68 NEMA Type 4X/6P Encl.
	7	F15 316L hygiene IP66/67 NEMA Type 4X/6P Encl.

Position 11 (Additional Option 2)		
Selected option		**Description**
FTM50 FTM51	A	Not selected
	C	EN10204-3.1 material (wetted parts), inspection certificate
	D, E	Temp. separator ≤150°C
	F, H	High temperature ≤280°C
	J, K	High temperature ≤230°C
	Y	Special version: High temperature ≤300°C
FTM52	A	Not selected

Optional specifications

No options specific to hazardous locations are available.

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
- 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.
- Avoid electrostatic charging:
  - Of plastic surfaces (e.g. housing, sensor element, special varnishing , attached additional plates, ..)
  - Of isolated capacities (e.g. isolated metallic plates)
- Refer to the temperature tables for the relationship between the permitted ambient temperature for the sensor and/or transmitter, depending on the range of application, and the temperature class (→ 🖹 10).
- Modifications 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: Special conditions

- Permitted ambient temperature range at the electronics housing: $-50\ °C \leq T_a \leq +70\ °C$. Observe the information in the temperature tables.

Basic specification, Position 7 (Type of Probe) = D, E, G, H

- The probe version with separate housing is only suited for fixed installation.

Basic specification, Position 7 (Type of Probe) = D, E

- Avoid electrostatic charging of the connecting cable between the separate housing and the sensor (e.g. friction, cleaning, maintenance, strong medium flow).

Basic specification, Position 7 (Type of Probe) = D, E
Basic specification, Position 8 (Housing) = H, 1, 3, 5

- In Zone 0 not permitted.

Basic specification, Position 8 (Housing) = H, 1, 3, 5

- Avoid sparks caused by impact and friction.

Basic specification, Position 8 (Housing) = 1

- Avoid electrostatic charging of the housing (e.g. friction, cleaning, maintenance, strong medium flow).

- In the event of additional or alternative special varnishing on the housing or other metal parts:
  - Observe the danger of electrostatic charging and discharge.
  - Do not rub surfaces with a dry cloth.

Safety instructions: Installation

Position 1 (Approval) = 1 in connection with Position 7 (Type of Probe) = A	
FTM50 FTM51	Ex ia IIIC T65 °C Da Ex ia IIIC $T_{500} = T_{a,max}$ +31 K Da[2)] Ex ia IIIC T65 °C Da/Db Ex ia IIC T6...T2 Ga[1) 3)] Ex ia IIC T6...T3 Ga[1) 4)] Ex ia IIC T6...T2 Ga/Gb[3)] Ex ia IIC T6...T3 Ga/Gb[4)]
FTM52	Ex ia IIIC T65 °C Da Ex ia IIIC $T_{500} = T_{a,max}$ +31 K Da[2)] Ex ia IIIC T65 °C Da/Db Ex ia IIC T6 Ga[1)] Ex ia IIC T6 Ga/Gb

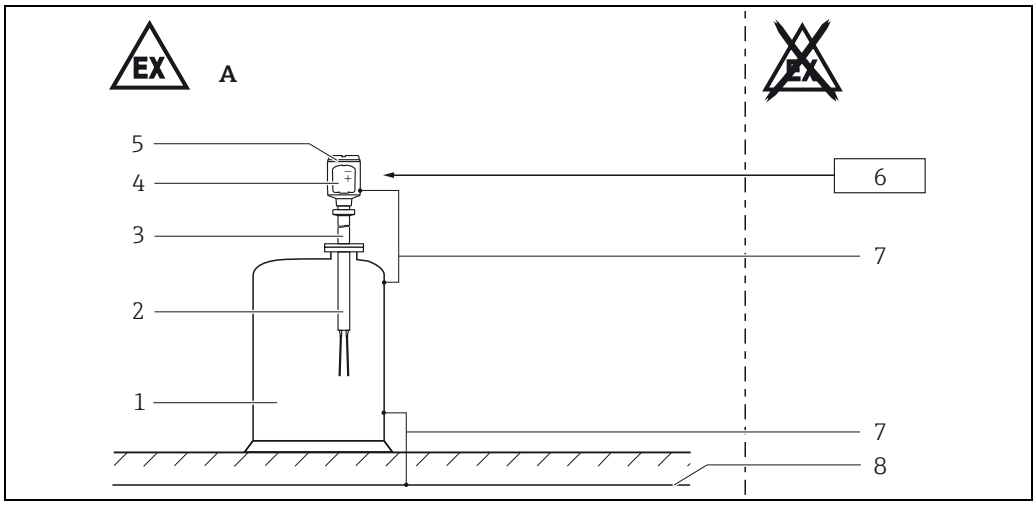
1) Only in connection with Position 8 (Housing) = 6, 7
2) Designation due to limited space only in this XA; not on the nameplate
3) Only in connection with Position 11 (Additional Option 2) = F, H, J, K, Y
4) Only in connection with Position 11 (Additional Option 2) = A, C

Position 1 (Approval) = 1 in connection with Position 7 (Type of Probe) = D, E	
Electronics housing FTM5x	Ex ia [ia Da] IIIC T65 °C Da Ex ia [ia Da] IIIC $T_{500} = T_a$ +31 K Da[1)] Ex ia [ia Da] IIIC T65 °C Db Ex ia [ia Db] IIIC T65 °C Db[1)] Ex ia [ia Gb] IIC T6 Gb[1)] Ex ia [ia Da] IIC T6 Gb[1)] Ex ia [ia Db] IIC T6 Gb[1)] Ex ia [ia Gb] IIC T6 Gb[1)]
Sensor housing FTM5x	Ex ia IIIC T65 °C Da Ex ia IIIC $T_{500} = T_{a,max}$ +5 K Da[1)] Ex ia IIIC T65 °C Da/Db[1)]
Sensor housing FTM50 FTM51	Ex ia IIC T6...T2 Ga/Gb Ex ia IIC T6...T3 Ga/Gb
Sensor housing FTM52	Ex ia IIC T6 Ga/Gb

1) Designation due to limited space only in this XA; not on the nameplate

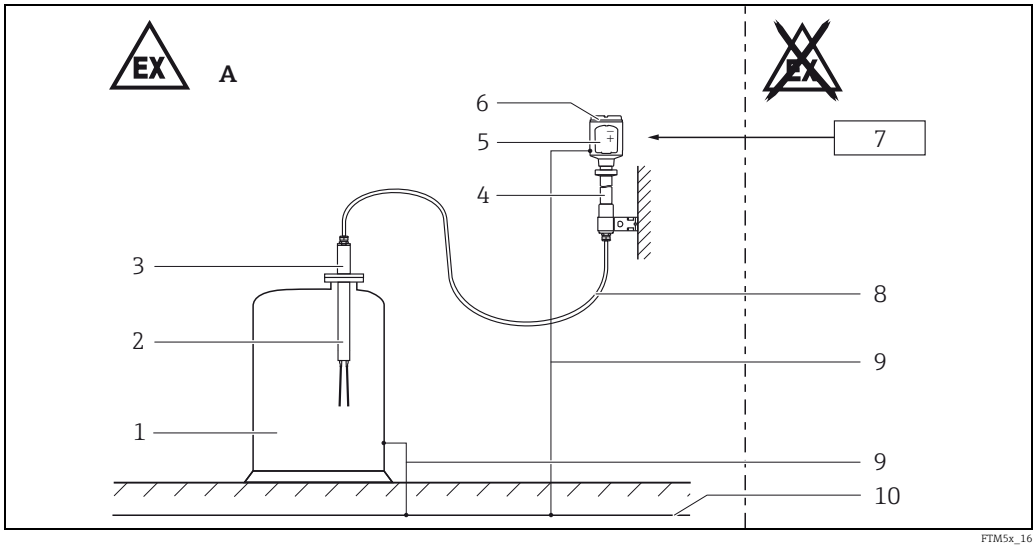
Position 1 (Approval) = 1 in connection with Position 7 (Type of Probe) = G, H	
Electronics housing FTM5x	Ex ia [ia Da] IIIC T65 °C Da Ex ia [ia Da] IIIC $T_{500} = T_a$ +31 K Da[2)] Ex ia [ia Ga] IIIC T65 °C Da[2)] Ex ia [ia Da] IIIC T65 °C Db Ex ia [ia Ga] IIIC T65 °C Db[2)] Ex ia [ia Db] IIIC T65°C Db[2)] Ex ia [ia Gb] IIC T6 Gb[2)] Ex ia [ia Da] IIC T6 Ga [1) 2)] Ex ia [ia Ga] IIC T6 Ga[1)] Ex ia [ia Da] IIC T6 Gb[2)] Ex ia [ia Ga] IIC T6 Gb Ex ia [ia Db] IIC T6 Gb[2)] Ex ia [ia Gb] IIC T6 Gb[2)]
Sensor housing FTM5x	Ex ia IIIC T65 °C Da Ex ia IIIC $T_{500} = T_{a,max}$ +5 K Da[2)] Ex ia IIIC T65 °C Da/Db[2)]
Sensor housing FTM50 FTM51	Ex ia IIC T6...T2 Ga[3)] Ex ia IIC T6...T3 Ga[4)] Ex ia IIC T6...T2 Ga/Gb[2) 3)] Ex ia IIC T6...T3 Ga/Gb[2) 4)]
Sensor housing FTM52	Ex ia IIC T6 Ga Ex ia IIC T6 Ga/Gb[2)]

1) Only in connection with Position 8 (Housing) = 6, 7
2) Designation due to limited space only in this XA; not on the nameplate
3) Only in connection with Position 11 (Additional Option 2) = F, H, J, K, Y
4) Only in connection with Position 11 (Additional Option 2) = A, C



1

A Basic specification, Position 8 (Housing) = 6, 7 and Position 7 (Type of Probe) = A:
– Zone 0, Zone 1, Zone 20 or Zone 21
Basic specification, Position 8 (Housing) = H, 1, 3, 5 and Position 7 (Type of Probe) = A:
– Zone 1, Zone 20 or Zone 21
1 Tank, Hazardous area Zone 0, Zone 1, Zone 20 or Zone 21
2 Version
3 Temperature separator (optional at 150 °C)
4 Electronic insert; Electronic compartment Ex ia
5 Housing
6 Power supply
7 Potential equalization line
8 Potential equalization



2

A Basic specification, Position 8 (Housing) = 6, 7 and Position 7 (Type of Probe) = G or H:
– Zone 0, Zone 1, Zone 20 or Zone 21
Basic specification, Position 8 (Housing) = H, 1, 3, 5 and Position 7 (Type of Probe) = D, E, G or H:
– Zone 1, Zone 20 or Zone 21
1 Tank, Hazardous area Zone 0, Zone 1, Zone 20 or Zone 21
2 Version
3 Sensor housing
4 Temperature separator (optional at 150 °C)
5 Electronic insert; Electronic compartment Ex ia
6 Electronics housing
7 Power supply
8 Connecting cable
9 Potential equalization line
10 Potential equalization

- Connect the device using suitable cable and wire entries of protection type "Intrinsic safety (Ex i)".
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection.
- Observe the maximum process conditions according to the manufacturer's Operating Instructions.
- At high medium temperatures, note flange pressure load capacity as a factor of temperature.
- Install the device to exclude any mechanical damage or friction during the application. Pay particular attention to flow conditions and tank fittings.
- Protect the connecting cable between the separate housing and the level sensor from tension and friction (e.g. due to electrostatic charge from medium flow).
- Use a process connection seal that meets the materials compatibility and temperature requirements.
- Support extension tube of the device if a dynamic load is expected.
- Continuous service temperature of the connecting cable: −40…≥ +85 °C; in accordance with the range of service temperature taking into account additional influences of the process conditions.
  For Da applications with complete immersion $T_{a,max}$ +35 K.

Basic specification, Position 8 (Housing) = 1, 3, 6, 7
- Perform the following to achieve the degree of protection IP66/67:
  – Screw the cover tight.
  – Mount the cable entry correctly.

Basic specification, Position 8 (Housing) = H, 5
- Perform the following to achieve the degree of protection IP66/68:
  – Screw the cover tight.
  – Mount the cable entry correctly.

Accessory high pressure sliding sleeve
- The high pressure sliding sleeve can be used for a continuous setting of the switch point and is suited for zone division if mounted properly (see Operating Instructions).

Application in gas
- When using under non-atmospheric pressures and non-atmospheric temperatures: The sensor part of the device approved for Zone 0 does not cause any ignition hazards.
- For operation in accordance with manufacturer's specifications:
  – Permissible medium temperatures: dependent on ambient temperature (→ 🖹 10 and 🖻 3-5)
  – Permissible pressures: −1 bar to 25 bar (FTM50/51), −1 bar to +2 bar (FTM52), dependent on process connection (see Operating Instructions).

Intrinsic safety

- The device is only suitable for connection to certified, intrinsically safe equipment with explosion protection Ex ia.
- The intrinsically safe input power circuit of the device is isolated from ground.
  The dielectric strength is at least 500 V_{rms}.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.

Potential equalization

- Integrate the device into the local potential equalization.

Safety instructions: Zone 0

- In the event of potentially explosive vapor/air mixtures, only operate the device under atmospheric conditions.
  – Temperature: −20 to +60 °C
  – Pressure: 80 to 110 kPA (0.8 to 1.1 bar)
  – Air with normal oxygen content, usually 21 % (V/V)
- If no potentially explosive mixtures are present, or if additional protective measures have been taken, the device may also be operated under non-atmospheric conditions in accordance with the manufacturer's specifications.
- Associated devices with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits are preferred.
- Only use the device in media to which the silicone rubber potting compound of the electronic insert and the housing made of 316L have sufficient durability.
- Only use the device in media to which the wetted materials have sufficient durability (e.g. process connection seal).
- When using under non-atmospehric conditions and if the manufacturer's specifications are observed: The sensor approved for the pressure vessel (Zone 0) does not cause any ignition hazards.

Safety instructions: Zone 0, Zone 20

- The device is designed for operation in Zone 0 or Zone 20. In the event of potentially explosive gas-air and dust-air mixtures occurring simultaneously: Suitability requires further assessment.

Temperature tables

Application in gas

The dependency of the ambient and process temperatures upon the temperature class:

Type Version	Temperature class	Process temperature (sensor), T_p (process)	Ambient temperature (electronics), T_a (ambient)
FTM50, FTM51 150 °C, 230 °C, 280 °C	T6	−50 °C to +85 °C	−50 °C to +55 °C *Basic specification, Position 8 (Housing) = 1*: −40 °C to +55 °C
FTM52 80 °C	T6	−40 °C to +80 °C	
FTM50, FTM51 150 °C, 230 °C, 280 °C	T5	−50 °C to +100 °C	→ 🖹 3-5
FTM50, FTM51 150 °C, 230 °C, 280 °C	T4	−50 °C to +135 °C	
FTM50, FTM51 150 °C 230 °C, 280 °C	T3 T3	−50 °C to +150 °C −50 °C to +200 °C	
FTM50, FTM51 230 °C, 280 °C	T2	−50 °C to +230 °C/+280 °C	

Application in dust

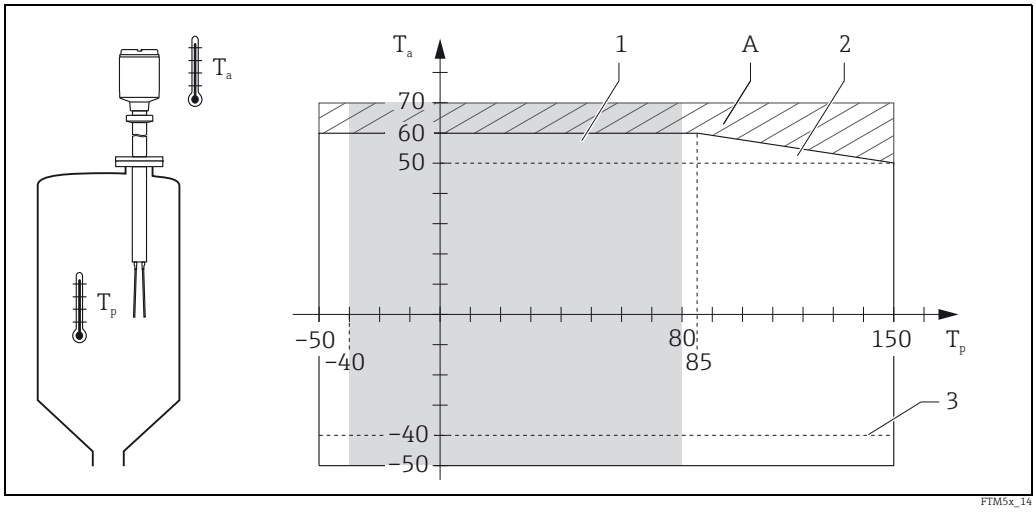
Deposited material with a layer up to 5 mm

Type	Surface temperature, T	Process temperature (sensor), T_p (process)	Ambient temperature (probe) *with Basic specification, Position 7 (Type of Probe) = D, E, G, H*	Ambient temperature (electronics), T_a (ambient)
FTM50 FTM51	Sensor: $T_{p,max}$ +5 K	−50 °C to +150 °C −50 °C to +300 °C	max. 120 °C	−50 °C...+60 °C *Basic specification, Position 8 (Housing) = 1*: −40 °C to +60 °C
FTM52	Housing: $T_{a,max}$ +5 K	−40 °C to +80 °C	max. 80 °C	

Deposited material with a layer of 500 mm

Type	Surface temperature, T_{500}	Process temperature (sensor), T_p (process)	Ambient temperature (probe) *with Basic specification, Position 7 (Type of Probe) = D, E, G, H*	Ambient temperature (electronics), T_a (ambient)
FTM50 FTM51	Sensor: $T_{p,max}$ +24 K	−50 °C to +150 °C −50 °C to +300 °C	max. 120 °C	−50 °C...+60 °C *Basic specification, Position 8 (Housing) = 1*: −40 °C to +60 °C
FTM52	Housing: $T_{a,max}$ +31 K	−40 °C to +80 °C	max. 80 °C	

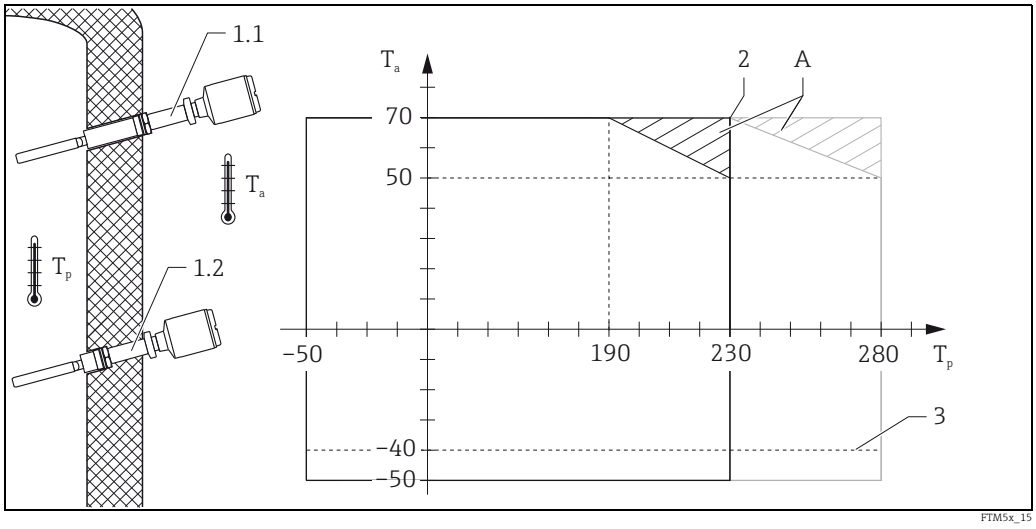
Compact version



3

T_a Ambient temperature in °C
T_p Process temperature in °C
A Additional temperature range for sensors with temperature separator (Basic specification, Position 11 (Additional Option 2) = D, E)
1 Device type FTM52
2 Device type FTM50, FTM51
3 T_a at Basic specification, Position 8 (Housing) = 1: Restriction to −40 °C

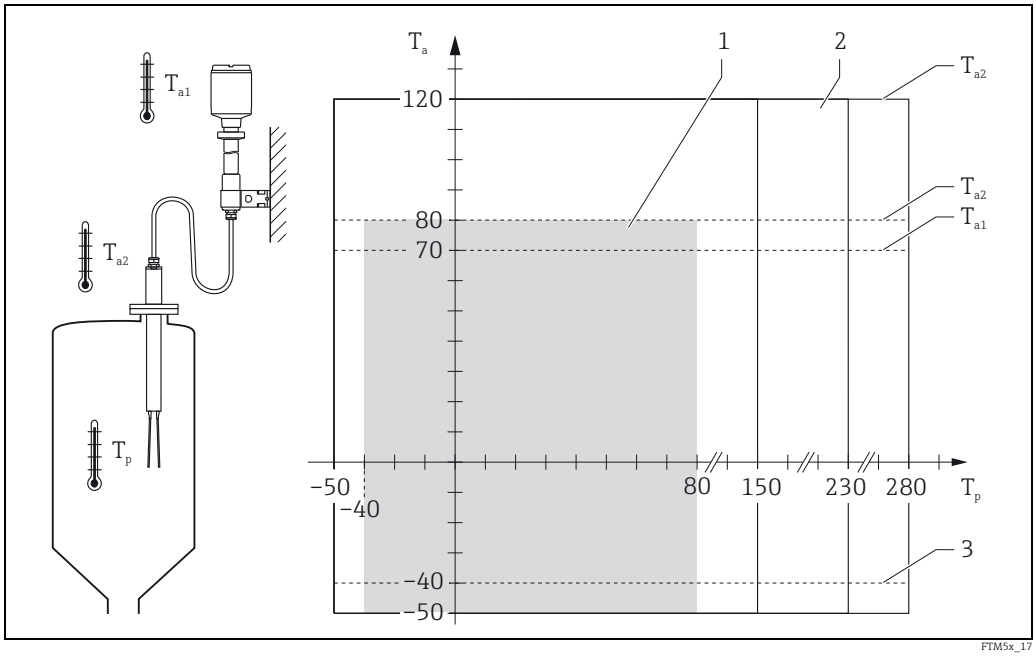
High temperature (only FTM50, FTM51)



4

T_a Ambient temperature in °C
T_p Process temperature in °C
A Additional temperature range for sensors with temperature separator outside the insulation
1 Temperature separator:
1.1 insulated
1.2 free-standing
2 Antistick coating: Possible up to max. 230 °C
3 T_a at Basic specification, Position 8 (Housing) = 1: Restriction to −40 °C

Version with separate housing



5

T_a Ambient temperature in °C
T_p Process temperature in °C
1 Device type FTM52
2 Device type FTM50, FTM51
3 T_a at Basic specification, Position 8 (Housing) = 1: Restriction to −40 °C

Connection data

Position 6 (Electronics; Output)	**Power supply**
5	U_i = 36 V, I_i = 100 mA, P_i = 1 W L_i = 0, C_i = 0
7	U_i = 16.7 V, I_i = 150 mA, P_i = 1 W L_i = 0, C_i = 0
8	U_i = 18 V, I_i = 52 mA, P_i = 170 mW L_i = 0, C_i = 30 nF

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