Safety Instructions
Liquiphant M, Liquiphant S FTL50/51(H), FTL51C, FTL70/71
PROFIBUS PA

Ex ia IIC/IIB T3...T6 Ga/Gb
Ex ia IIC T2...T6 Ga/Gb
Ex ia IIIC T80°C Da/Db

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Safety instructions for electrical apparatus for explosion-hazardous areas

Endress+Hauser
People for Process Automation

Liquiphant M, Liquiphant S
FTL50(H), FTL51(H), FTL51C, FTL70, FTL71

english

PROFIBUS PA

Associated Documentation

This document is an integral part of the following Operating Instructions:
KA00143F/00, KA00163F/00 (FTL50/51); KA00144F/00, KA00164F/00 (FTL50H/51H);
KA00162F/00, KA00165F/00 (FTL51C); KA00172F/00, KA00173F/00 (FTL70/71)

The Operating Instructions which are supplied and correspond to the device type apply.

Supplementary Documentation

Explosion-protection brochure:
CP00021Z/11

Designation

Explanation of the labelling and type of protection can be found in the explosion protection brochure.

Designation of type of protection

Ex	**ia**	**IIC**	**T3...T6**	**Ga/Gb**
Ex	**ia**	**IIB**	**T3...T6**	**Ga/Gb**
Ex	**ia**	**IIC**	**T2...T6**	**Ga/Gb**
Ex	**ia**	**IIIC**	**T80°C**	**Da/Db**

Applied standards

ABNT NBR IEC 60079-0 :2008
ABNT NBR IEC 60079-11:2009
ABNT NBR IEC 60079-26:2008
IEC 60079-27:2008
IEC 61241-11:2005

Safety instructions: General

Type of protection	Type
Ex ia IIC T3...T6 Ga/Gb Ex ia IIIC T80°C Da/Db	FTL50(H), FTL51(H), FTL51C with coating of enamel or conductive PFA
Ex ia IIB T3...T6 Ga/Gb	FTL51C with coating of ECTFE or non-conductive PFA
Ex ia IIC T2...T6 Ga/Gb Ex ia IIIC T80°C Da/Db	FTL70, FTL71

- 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 any other valid standards and regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- Only install the devices in media for 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)
- Relationship between the permitted ambient temperature for the electronics housing, dependent on the range of application, and the temperature classes: → 4 and 5.
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

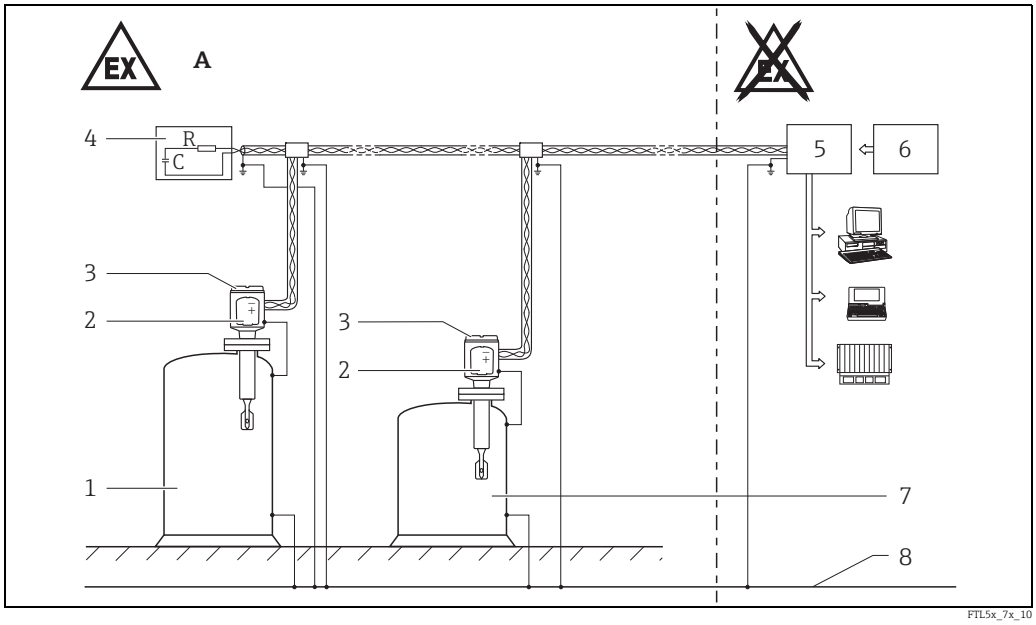
Safety instructions: Special conditions

Permitted ambient temperature range at the electronics housing: → 4 and 5.
Observe the information in the temperature tables.

Device type FTL51C
- Avoid electrostatic charging of the plastic surfaces, for plastic process connections or plastic coatings.

F16 housing
- Avoid electrostatic charging of the plastic housing (do not rub dry).

Safety instructions: Installation



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A *Zone 1, Zone 21*

1 *Tank; Zone 0, Zone 20*
2 *Electronic insert FEL50A*
3 *Housing*
4 *Permitted terminating resistor Ex ia IIC*
5 *Certified associated apparatus*
6 *Power supply*
7 *Tank; Zone 1, Zone 21*
8 *Potential equalization*

- 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.
- Connect the device using suitable cable and wire entries of protection type "Intrinsic safety (Ex i)".
- Continuous duty temperature of the cable T_a +5 K.
- To maintain the ingress protection of the housing IP66/67 install the housing cover and cable glands correctly.
- 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.
- Close unused entry glands with sealing plugs.
- The pertinent guidelines must be observed when intrinsically safe circuits are connected together (Proof of Intrinsic Safety).
- Connection of intrinsically safe PROFIBUS devices: 10 devices.
- Pay attention to 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.
- Support extension tube of the device if a dynamic load is expected.
- In case of additional or alternative special varnishing of the enclosure or other metallic parts the danger of an electrostatic charging must be observed. Do not rub surfaces with dry cloth.
- Perform the following to achieve the degree of protection IP66/67:
  - Screw the cover tight.
  - Mount the cable entry correctly.
- When mounting the device:
  - Exclude any mechanical damage or friction during the application.
  - Pay particular attention to flow conditions and tank fittings.

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 (→ Operating Instructions).

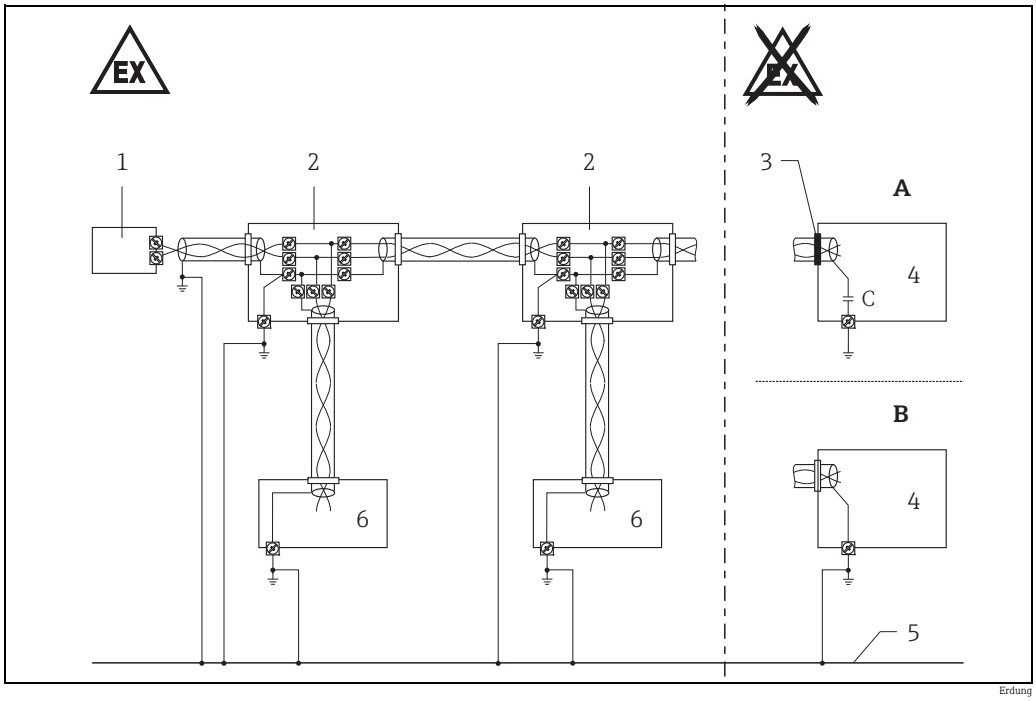
F13, F17, T13 housing
- Install the device to exclude impact and friction sparks on the aluminium housing.

Intrinsic safety

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

Potential equalization

- Integrate the device into the local potential equalization.
- For grounding the screen, → 2.



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A *Version 1*
Use small capacitors (e.g. 1 nF, 1500 V, dielectric strength, ceramic).
Total capacitance connected to the screen may not exceed 10 nF.
B *Version 2*

1 *Terminating resistor*
2 *Distributor/T box*
3 *Screen insulated*
4 *Supply unit/Segment coupler*
5 *Potential equalization (secured in high degree)*
6 *Field device*

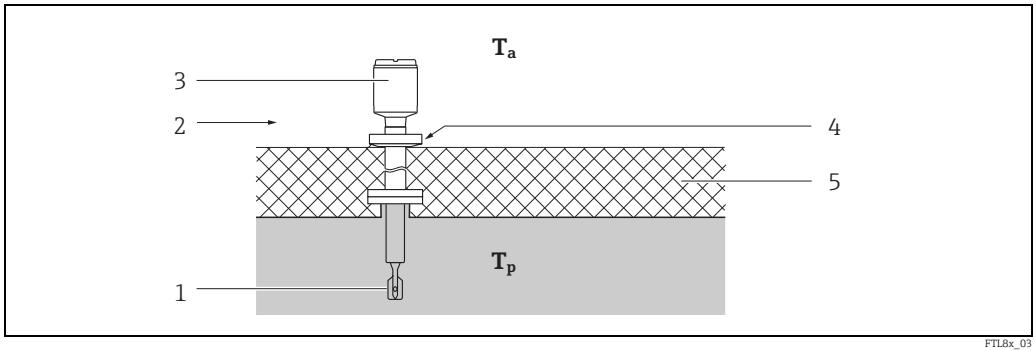
Safety instructions: Zone 0

- 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 transmitters may be operated under other atmospheric conditions in accordance with the manufacturer's specifications.
- Only install the devices in media for which the wetted materials have sufficient durability (e.g. process connection seal).
- The sensor part of the device approved for Zone 0 does not cause any ignition hazards if it is operated under non-atmospheric pressures and temperatures.

Explosion protection with heat insulation

Device type FTL70, FTL71

- While observing the "temperature derating", the device is suitable for process temperatures up to 300 °C (→ 🖹 9).
- When operating, ensure that you rule out contact between hot component surfaces and potentially explosive atmospheres beyond the limits of the corresponding temperature class (→ 🖹 8). Suitable measures: e.g. thermal insulation at container and/or pipes.
- The temperature of 85 °C specified at the reference point may not be exceeded.
- To protect the electronics, observe the specified ambient temperature at the electronics housing.



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T_a *Ambient temperature*
T_p *Process temperature*

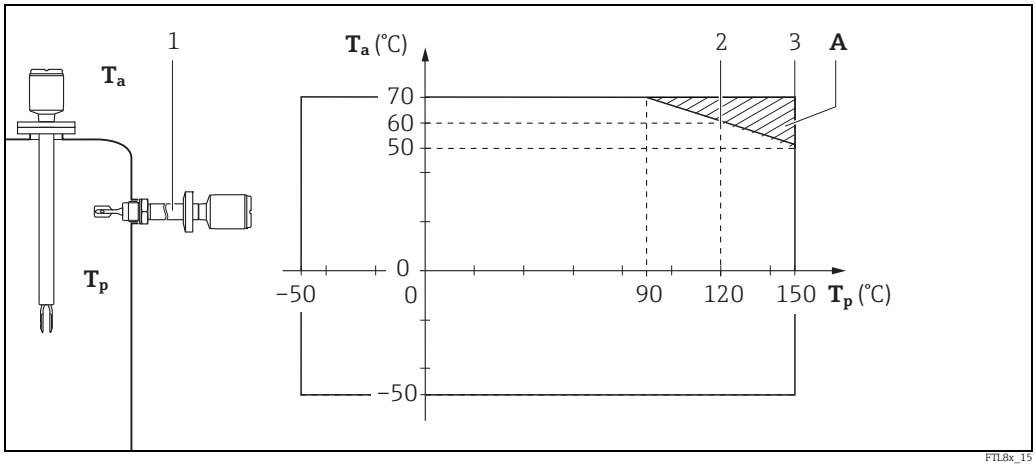
1 Sensor
2 Temperature class, e.g. T6
3 Housing
4 Reference point: max. +85 °C
5 E.g. thermal insulation

Temperature tables

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

Type	Temperature class	Process temperature (sensor), T_p (process)	Ambient temperature (electronics), T_a (ambient)
FTL50(H), FTL51(H); FTL51C (ECTFE, PFA or enamel coating)	T6	−50 °C... +85 °C	−50 °C ≤ T_a ≤ +60 °C
FTL70, FTL71		−60 °C... +85 °C	
FTL50(H), FTL51(H); FTL51C (ECTFE, PFA or enamel coating)	T5	−50 °C...+100 °C	FTL50, FTL51, FTL51C: −50 °C ≤ T_a ≤ +70 °C with temperature spacer; without temperature spacer → 4 FTL70, FTL71: −50 °C ≤ T_a ≤ +70 °C
FTL70, FTL71		−60 °C...+100 °C	
FTL51C (ECTFE coating)	T4	−50 °C...+120 °C	
FTL50(H), FTL51(H); FTL51C (PFA or enamel coating)	T4	−50 °C...+135 °C	
FTL70, FTL71		−60 °C...+135 °C	
FTL50(H), FTL51(H); FTL51C (PFA or enamel coating)	T3	−50 °C...+150 °C	
FTL70, FTL71	T3	−60 °C...+200 °C	−50 °C ≤ T_a ≤ +70 °C For restrictions, → 5
FTL70/71-..... L	T2	−60 °C...+230 °C	
FTL70/71-..... N	T2	−60 °C...+280 °C	
FTL70/71-..... Y	T2	−60 °C...+300 °C	

Device type FTL50(H), FTL51(H), FTL51C



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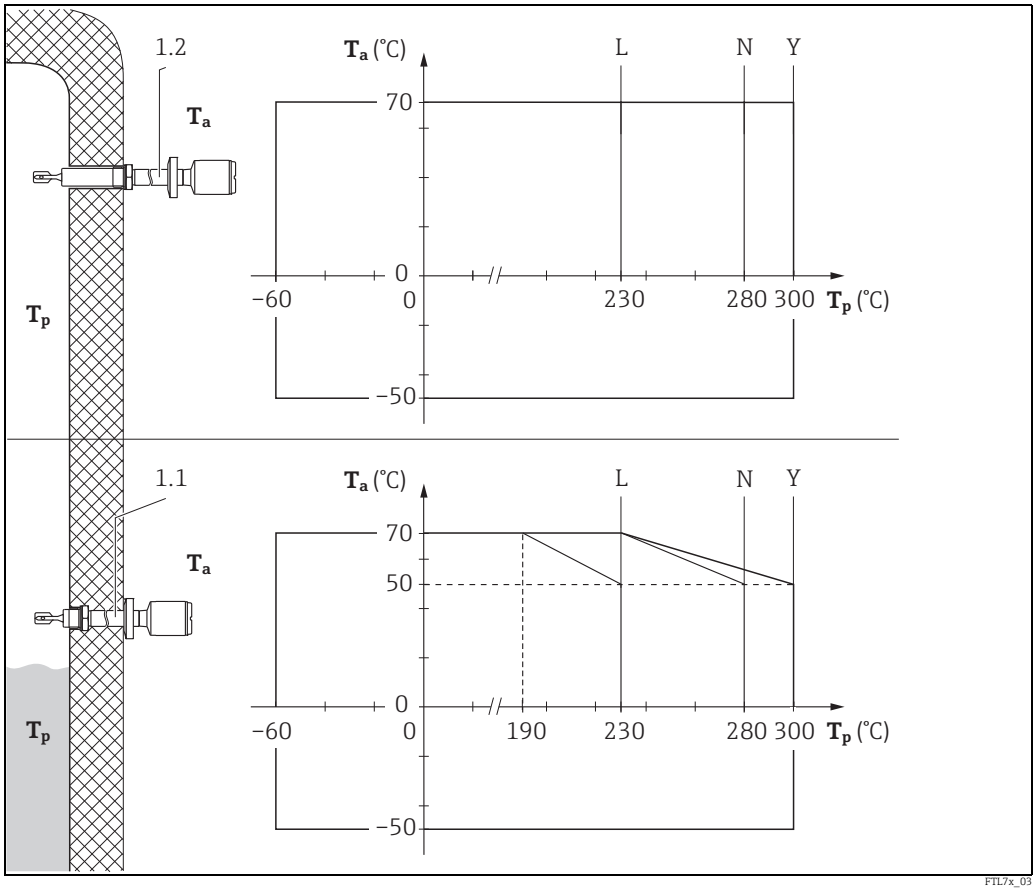
A *Additional temperature range for sensors with temperature spacer or pressure-tight bushing*

1 Temperature spacer or pressure-tight bushing
2 ECTFE
3 PFA, enamel

Device type FTL70, FTL71



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1 Temperature spacer:
1.1 isolated
1.2 free-standing

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