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

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

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

Electronic inserts:
FEL55 (8...16 mA, IS (Ex ia)), FEL56/58 (NAMUR, IS (Ex ia)), FEL57 (PFM, IS (Ex ia)), FEL50D

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 (e.g. IEC/EN 60079-14)
- 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: → 3 and 4.
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

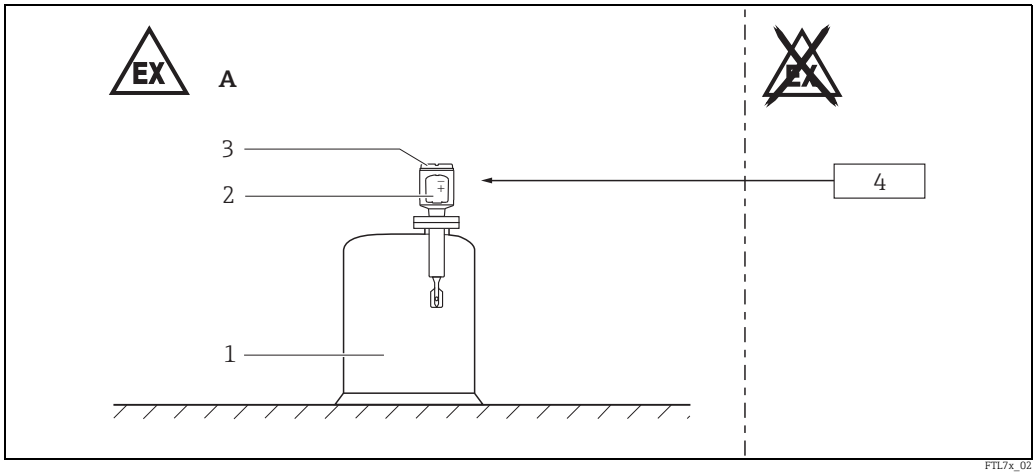
Safety instructions: Special conditions

- Permitted ambient temperature range at the electronics housing: $-50\ °C \leq T_a \leq +70\ °C$. Restrictions for FEL50D: $-50\ °C \leq T_a \leq +60\ °C$ (T6). Observe the information: → 3 and 4.

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*
3 *Housing*
- *T13, Aluminium with separate connection compartment*
- *F13, Aluminium*
- *F15, Stainless steel*
- *F16, Plastic: only Zones 1, 2*
- *F17, Aluminium*
- *F27, Stainless steel*

4 *FEL5x: Associated intrinsically safe power supply unit (→ 🖹 8, "Connection data")*
FEL50D: Only associated intrinsically safe power supply unit FML621 from E+H

- 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).
- 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

- The electrical apparatus must be integrated into the local potential equalization.

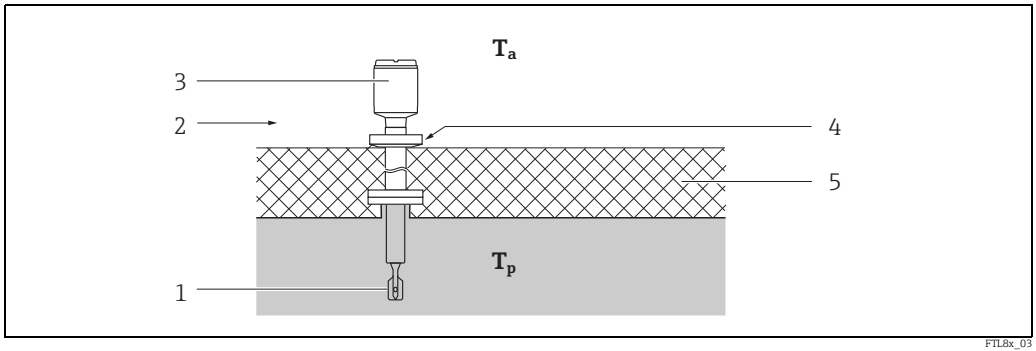
Safety instructions: Zone 0

- 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, according to EN 1127-1, 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 (→ 🖹 8).
- When operating, ensure that you rule out contact between hot component surfaces and potentially explosive atmospheres beyond the limits of the corresponding temperature class (→ 🖹 7). 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*

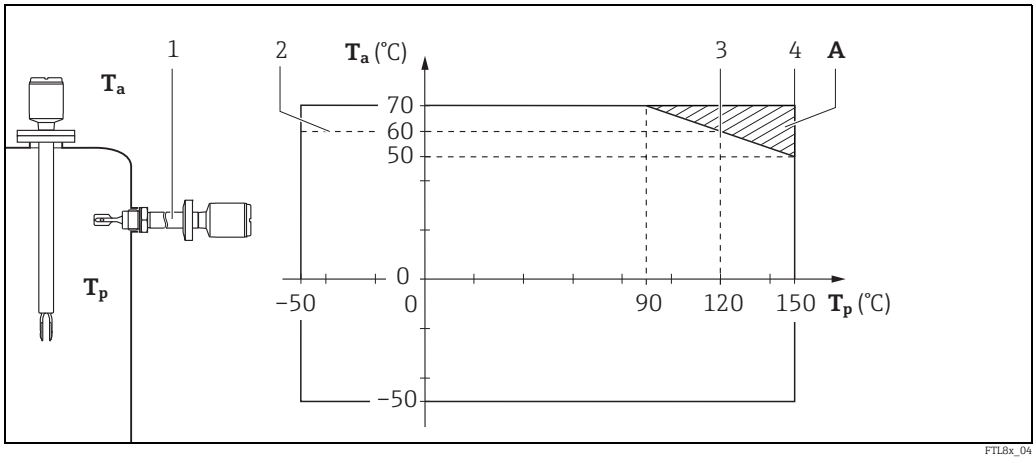
1 Sensor
2 Temperature class, e.g. T6
3 Housing
4 Reference point: max. +85 °C
5 E.g. thermal insulation

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...+70 °C with FEL50D: −50 °C...+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...+70 °C with temperature spacer; without temperature spacer → 3
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: −50 °C...+70 °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...+70 °C For restrictions, → 4
FTL70, FTL71- L	T2	−60 °C...+230 °C	
FTL70, FTL71- . . . . . N	T2	−60 °C...+280 °C	
FTL70, FTL71- . . . . . Y	T2	−60 °C...+300 °C	

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



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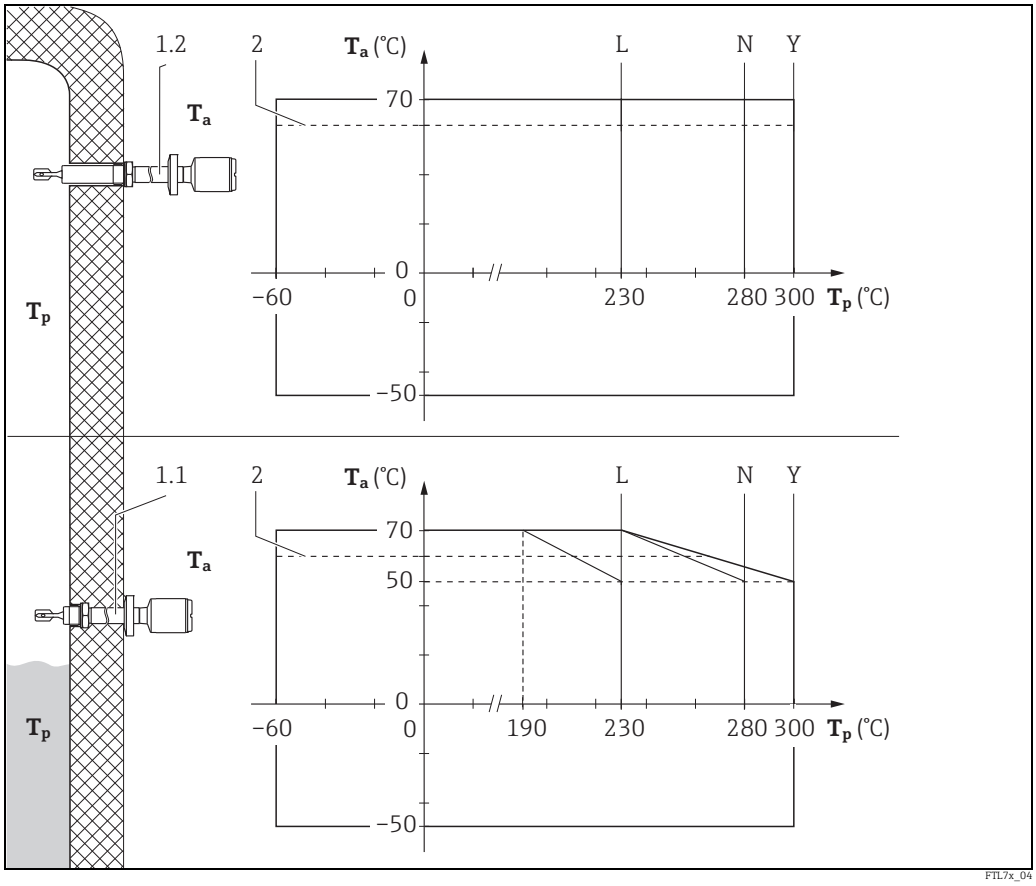
A *Additional temperature range for sensors with temperature spacer or pressure-tight bushing*

1 Temperature spacer or pressure-tight bushing
2 T_a for FEL50D: −50 °C...+60 °C (T6)
3 ECTFE
4 PFA, enamel

Device type FTL70, FTL71



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1 Temperature spacer:
1.1 isolated
1.2 free-standing
2 T_a for FEL50D: −50 °C...+60 °C (T6)

Connection data

Connection to power supply

- Associated intrinsically safe power supply unit with max. electrical specifications below the characteristic values of the electronic inserts

FEL55	FEL56	FEL57	FEL58
U_i = 36 V I_i = 100 mA P_i = 1 W L_i = 0 mH C_i = 0 nF	U_i = 16 V I_i = 52 mA P_i = 170 mW L_i = 0 mH C_i = 0 nF	U_i = 16.7 V I_i = 150 mA P_i = 1 W L_i = 0 mH C_i = 0 nF	U_i = 16 V I_i = 52 mA P_i = 170 mW L_i = 0 mH C_i = 0 nF

- Only associated intrinsically safe power supply unit FML621 from Endress+Hauser

FEL50D
U_i = 27.6 V I_i = 93 mA P_i = 640 mW L_i = 0.133 mH C_i = 2 nF

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