

# Safety Instructions

## Liquiphant M, Liquiphant S

### FTL50/51(H), FTL51C, FTL70/71

Ex de IIC/IIB T3...T6 Ga/Gb

Ex de IIC T2...T6 Ga/Gb

TÜV 13.0895 X



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Safety instructions for electrical apparatus for explosion-hazardous areas



# 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	de	IIC	T3...T6	Ga/Gb
Ex	de	IIB	T3...T6	Ga/Gb
Ex	de	IIC	T2...T6	Ga/Gb

### Applied standards


ABNT NBR IEC 60079-0 :2008  
 ABNT NBR IEC 60079-1 :2009  
 ABNT NBR IEC 60079-7 :2008  
 ABNT NBR IEC 60079-26:2008

**Safety instructions:**  
General


**Electronic inserts:**

FEL51, FEL52, FEL54, FEL55, FEL56, FEL57, FEL58, FEL50A, FEL50D

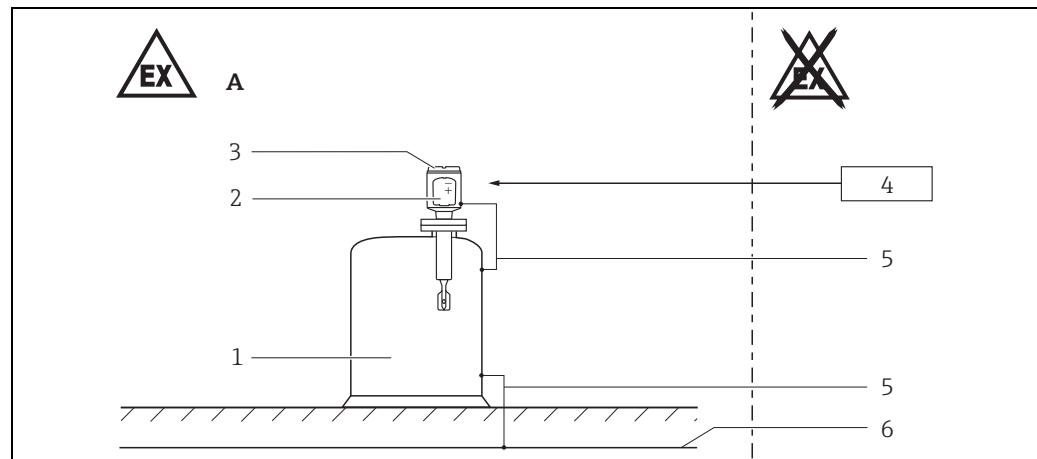
Type of protection/level of protection	Type
Ex de IIC T3...T6 Ga/Gb	FTL50(H), FTL51(H), FTL51C with coating of enamel or conductive PFA
Ex de IIB T3...T6 Ga/Gb	FTL51C with coating of ECTFE or non-conductive PFA
Ex de IIC T2...T6 Ga/Gb	FTL70, FTL71

- 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: →  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:  $-50\text{ °C} \leq T_a \leq +70\text{ °C}$ .  
Restrictions for FEL54:  $-50\text{ °C} \leq T_a \leq +60\text{ °C}$ . Observe the information: →  3 and 4.

**Safety instructions:**  
Installation



 1

- A** Zone 1
- 1 Tank; Zone 0, Zone 1
- 2 Electronic insert
- 3 Housing  
– T13, Aluminium with separate connection compartment
- 4 Power supply
- 5 Potential equalization line
- 6 Local 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.
- 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.
- Connect the device using suitable cable and wire entries or using piping systems of protection type "Increased safety (Ex e)".
- Use a connecting cable for continuous duty temperature  $\geq T_a + 5 \text{ K}$ .
- To maintain the ingress protection of the housing IP66/68, install the housing cover and cable glands correctly.
- 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.
- Install the device to exclude impact and friction sparks on the aluminium housing.
- 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.
- Do not open the electrical connection of the power supply circuit under voltage in an explosive atmosphere.
- Do not open the connection compartment cover under voltage in an explosive atmosphere.
- Only use suitable certified cable entries for the application.
- Observe national regulations or standards. Accordingly, the connection terminal does not include any ignition sources.
- For operating the transmitter housing at an ambient temperature under  $-20 \text{ }^\circ\text{C}$ , appropriate cables and cable entries permitted for this application must be used.
- For connection through a conduit entry approved for this purpose the associated sealing facility shall be mounted directly to the housing.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection. The plastic transport sealing plug does not meet this requirement and must therefore be replaced during installation.
- When mounting the device:
  - Exclude any mechanical damage or friction during the application.
  - Pay particular attention to flow conditions and tank fittings.
- Only use certified cable entries suitable for the application. Observe national regulations and standards. Accordingly, the connection terminal does not include any ignition sources.
- In potentially explosive atmospheres:
  - Do not open the electrical connection of the power supply circuit when energized.
  - Do not open the connection compartment cover and the electronics compartment cover when energized.
- Before operation:
  - Screw in the cover all the way.
  - Tighten the securing clamp on the cover.
- During operation, the cover must be screwed all the way in and the cover's safety catch must be fastened.

Electronics type	Cross section connecting wire	Tightening torque of terminal screw	Stripped insulation
FEL51/52, FEL55/56/57/58, FEL50A, FEL50D	$\leq 2.5 \text{ mm}^2$	0.4 Nm	6...8 mm
FEL54	0.5 - 2.5 $\text{mm}^2$	--	8...9 mm

#### 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).

**Safety instructions:**  
**Zone 0**

- Only operate devices in potentially explosive vapour/air mixtures 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.

**Instructions: Ex d joints**

- If required or if doubt: ask manufacturer for specifications.

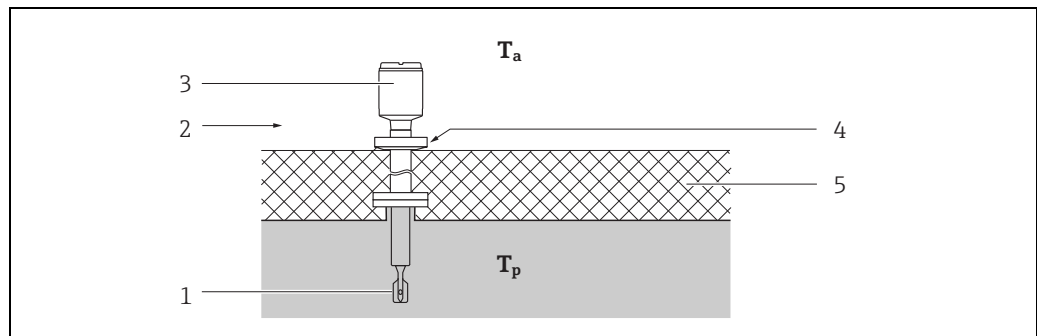
**Operating Instructions:**

- Do not open the connection or electronics compartments under voltage in an explosive atmosphere.
- Do not disconnect electrical connections under voltage in an explosive atmosphere.

**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 ( $\rightarrow$  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 ( $\rightarrow$  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.



2

$T_a$  Ambient temperature

$T_p$  Process temperature

1 Sensor

2 Temperature class, e.g. T6

3 Housing

4 Reference point: max.  $+85$  °C

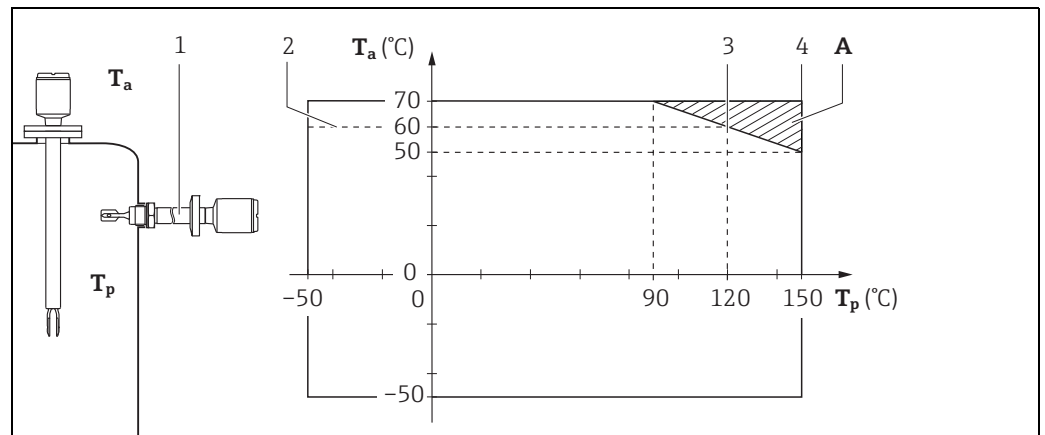
5 E.g. thermal insulation

Temperature tables

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

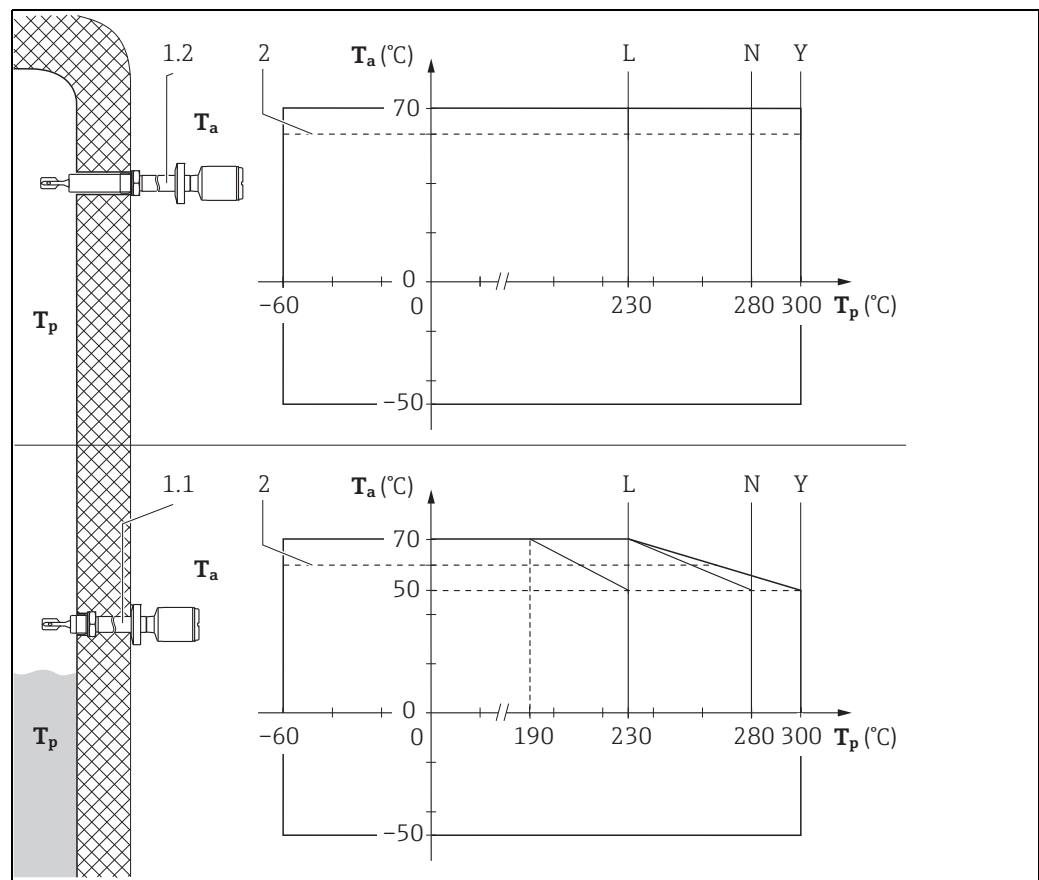
Type	Temperature class	Process temperature (sensor), $T_p$ (process)	Ambient temperature (electronics), $T_a$ (ambient)
FTL50(H), FTL51(H); FTL51C (ECTFE, PFA or enamel coating)	T6	-50 °C... +85 °C	-50 °C ≤ $T_a$ ≤ +70 °C with FEL54: -50 °C ≤ $T_a$ ≤ +60 °C
FTL70, FTL71		-60 °C... +85 °C	
FTL50(H), FTL51(H); FTL51C (ECTFE, PFA or enamel coating)	T5	-50 °C...+100 °C	FTL50(H), FTL51(H), FTL51C: -50 °C ≤ $T_a$ ≤ +70 °C with temperature spacer; without temperature spacer → 3
FTL70, FTL71		-60 °C...+100 °C	
FTL51C (ECTFE coating)	T4	-50 °C...+120 °C	FTL70, FTL71: -50 °C ≤ $T_a$ ≤ +70 °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	-50 °C ≤ $T_a$ ≤ +70 °C For restrictions, → 4
FTL70, FTL71	T3	-60 °C...+200 °C	
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



- A Additional temperature range for sensors with temperature spacer or pressure-tight bushing
- 1 Temperature spacer or pressure-tight bushing
- 2  $T_a$  for FEL54: -50 °C...+60 °C (T6)
- 3 ECTFE
- 4 PFA, enamel

Device type FTL70, FTL71



FTL7x\_04



- 1 Temperature spacer:
- 1.1 isolated
- 1.2 free-standing
- 2  $T_a$  for FEL54: -50 °C...+60 °C (T6)











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