

# Safety Instructions

## Liquiphant FailSafe

### FTL80, FTL81, FTL85

Ex ia IIC T6...T2 Ga

Ex ia IIC T6...T2 Ga/Gb



**EN** Document: XA00658F-A

Safety instructions for electrical apparatus for explosion-hazardous areas

→ 3

**ZH** 文档资料代号 : XA00658F-A

防爆危险区中使用的电气设备的安全指南

→ 13



# Liquiphant FailSafe FTL80, FTL81, FTL85

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<b>Associated documentation</b>	<p>This document is an integral part of the following Operating Instructions: BA01037F/00</p> <p>The Operating Instructions pertaining to the device apply.</p>									
<b>Supplementary documentation</b>	<p>Explosion-protection brochure: CP00021Z/11</p> <p>The Explosion-protection brochure is available:</p> <ul style="list-style-type: none"> <li>■ In the download area of the Endress+Hauser website: <a href="http://www.endress.com">www.endress.com</a> → Download → Advanced → Documentation Code: CP00021Z</li> <li>■ On the CD for devices with CD-based documentation</li> </ul>									
<b>Manufacturer's certificates</b>	<p><b>NEPSI Declaration of Conformity</b></p> <p>Certificate number: GYJ14.1057X</p> <p>Affixing the certificate number certifies conformity with the standards:</p> <ul style="list-style-type: none"> <li>■ GB3836.1-2010</li> <li>■ GB3836.4-2010</li> <li>■ GB3836.20-2010</li> </ul>									
<b>Extended order code</b>	<p>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.</p> <p><b>Structure of the extended order code</b></p> <table border="0" style="margin-left: 40px;"> <tr> <td style="text-align: center;">FTL8x</td> <td style="text-align: center;">- *****</td> <td style="text-align: center;">+ A*B*C*D*E*F*G*..</td> </tr> <tr> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> </tr> <tr> <td style="text-align: center;">Device type</td> <td style="text-align: center;">Basic specifications</td> <td style="text-align: center;">Optional specifications</td> </tr> </table> <p>* = Placeholder At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.</p> <ul style="list-style-type: none"> <li>■ <b>Basic specifications</b> 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.</li> <li>■ <b>Optional specifications</b> 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).</li> </ul> <p>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.</p>	FTL8x	- *****	+ A*B*C*D*E*F*G*..	-----	-----	-----	Device type	Basic specifications	Optional specifications
FTL8x	- *****	+ A*B*C*D*E*F*G*..								
-----	-----	-----								
Device type	Basic specifications	Optional specifications								

**Device type: FTL80, FTL81, FTL85**

## Basic specifications

Position	Selected option	Description
1, 2 Approval	FTL8x: NA NB	Ex ia IIC T6...T2 Ga Ex ia IIC T6...T2 Ga/Gb
3 Electronics; Output	FTL8x: S	FEL85; 2-wire, 4-20 mA
4 Display; Operating	FTL8x: A	LED; switch
5 Housing	FTL8x: A C D E H I	F16 Polyester, IP66/67 NEMA Type 4X Encl. F17 Alu, IP66/67 NEMA Type 4X Encl. F13 Alu, IP66/68 NEMA Type 4X/6P Encl. T13 Alu, separate conn. compartment, IP66/68 NEMA Type 4X/6P Encl. F15 316L hygiene, IP66/67 NEMA Type 4X Encl. F27 316L, IP66/68 NEMA Type 4X/6P Encl.
6 Electrical Connection	FTL8x: A B C D E I	Gland M20 Thread M20 Thread G1/2 Thread NPT1/2 Thread NPT3/4 Plug M12
7 Application	FTL80: A C D Y	Process max. 150 °C/302 °F, 64 bar/928 psi Process max. 230 °C/446 °F, 100 bar/1450 psi; incl. gas-tight feed through Process max. 280 °C/536 °F, 100 bar/1450 psi; incl. gas-tight feed through Process max. 300 °C/572 °F, 100 bar/1450 psi
	FTL81: A B C D Y	Process max. 150 °C/302 °F, 64 bar/928 psi Process max. 150 °C/302 °F, 100 bar/1450 psi Process max. 230 °C/446 °F, 100 bar/1450 psi; incl. gas-tight feed through Process max. 280 °C/536 °F, 100 bar/1450 psi; incl. gas-tight feed through Process max. 300 °C/572 °F, 100 bar/1450 psi
	FTL85: N P T	ECTFE, Process max. 120 °C/248 °F, 40 bar/580 psi PFA, Process max. 150 °C/302 °F, 40 bar/580 psi Enamel, Process max. 150 °C/302 °F, 25 bar/362 psi
9 Surface Refinement	FTL85: N P Q R T	Coating ECTFE Coating PFA (Edlon) Coating PFA (RubyRed) Coating PFA (conductive) Coating Enamel

## Optional specifications

ID	Selected option	Description
Mx Sensor Design	FTL8x: MP MR MS	Ambient temperature -50 °C/-58 °F Temperature separator Pressure tight feed through, incl. temperature separator
Nx Accessory Mounted	FTL8x: NA NC ND NE NH	Cover, housing F16 PA, transparent Cover, housing F17 Alu, window Cover, housing F13 Alu, window Cover, housing T13 Alu, window Cover, housing F15 316L, window

**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
- For installation, use and maintenance of the device, users must also observe the requirements stated in the Operating Instructions and the standards:
  - GB50257-1996: "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering".
  - GB3836.13-1997: "Electrical apparatus for explosive gas atmospheres, Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres".
  - GB3836.15-2000: "Electrical apparatus for explosive gas atmospheres, Part 15: Electrical installations in hazardous area (other than mines)".
  - GB3836.16-2006: "Electrical apparatus for explosive gas atmospheres, Part 16: Inspection and maintenance of electrical installation (other than mines)".
- 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 (→ 9).
- 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:  $-50\text{ °C} \leq T_a \leq +70\text{ °C}$ .  
Observe the information in the temperature tables.

Basic specification, Position 5 (Housing) = A

- In Zone 0, housing not permitted.
- Avoid electrostatic charging of the housing (e.g. friction, cleaning, maintenance, strong medium flow).

Basic specification, Position 5 (Housing) = C, D, E

- In Zone 0, avoid sparks caused by impact and friction.

Device type FTL85, Basic specification, Position 9 (Surface Refinement) = N, P, Q

- In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surfaces.

Gas group IIC

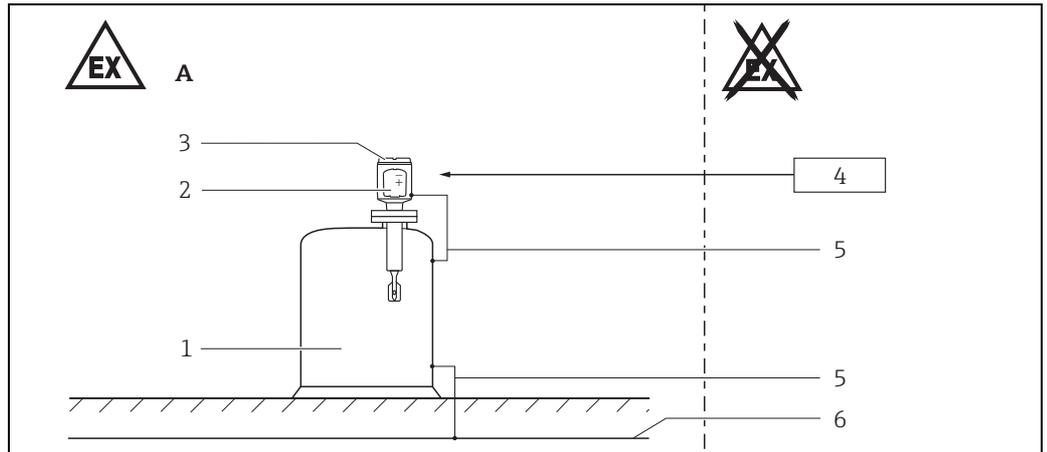
- If electrostatic charging of the probe can be avoided (e.g. through friction, cleaning, maintenance, strong medium flow), a probe coated with non-conductive material can be used.

Gas group IIB

- A probe coated with non-conductive material can be used.

- In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surfaces.
- 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



- A Zone 0, Zone 1
- 1 Tank; Zone 0, Zone 1
- 2 Electronic insert
- 3 Housing
- 4 Certified associated apparatus
- 5 Potential equalization line
- 6 Potential equalization

- Perform the following to achieve the degree of protection IP66/67:
  - Screw the cover tight.
  - Mount the cable entry correctly.
- 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.
- When mounting the device:
  - 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.
- Continuous service temperature of the connecting cable:  $-40$  to  $\geq +85$  °C; in accordance with the range of service temperature taking into account additional influences of the process conditions ( $T_{a,min}$ ), ( $T_{a,max} + 20$  K).

### 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).

### Basic specification, Position 5 (Housing) = C, D, E

- Avoid sparks caused by impact and friction.

### 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.

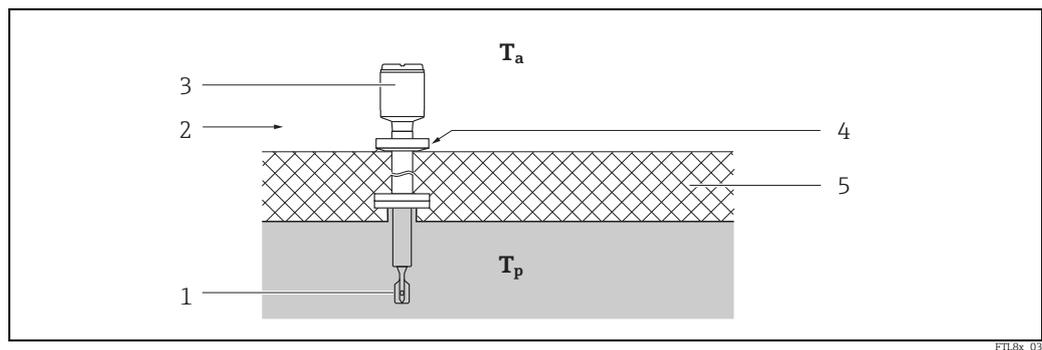
### Safety instructions: Zone 0

- 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.
- 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.
- 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 PBT, aluminum or 316L have sufficient durability.
- Only use the device in media to which the wetted materials have sufficient durability (e.g. process connection seal).

### Explosion protection with heat insulation

Device type FTL80, FTL81, Basic specification, Position 7 (Application) = C, D, Y

- While observing the "temperature derating", the device is suitable for process temperatures up to  $300$  °C ( $\rightarrow$  11).
- When operating, ensure that you rule out contact between hot component surfaces and potentially explosive atmospheres beyond the limits of the corresponding temperature class ( $\rightarrow$  9).  
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

## Ambient temperature electronics

When used in Zone 0
-20...+60 °C

When used outside Zone 0
-50...+70 °C

## Process temperature sensor

When used in Zone 0
-20...+60 °C

Device type FTL80, FTL81, Basic specification, Position 7 (Application) = A, B, C, D, Y

When used outside Zone 0
-50...+150 °C (A, B)
-60...+230 °C (C)
-60...+280 °C (D)
-60...+300 °C (Y)

Device type FTL85, Basic specification, Position 7 (Application) = N, P, T

When used outside Zone 0
-50...+120 °C (N)
-50...+150 °C (P, T)

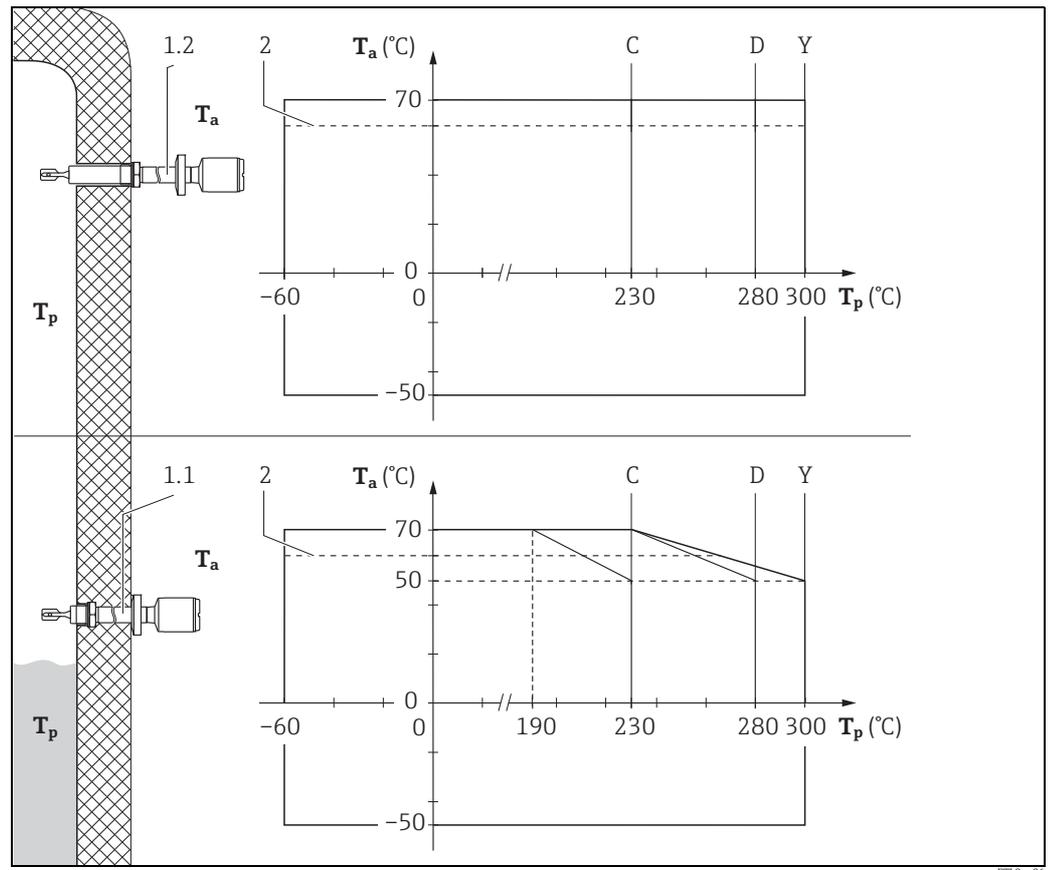
The dependency of the ambient and process temperatures upon the temperature class:

Device type FTL80, FTL81, Basic specification, Position 7 (Application) = A, B

Temperature class	Process temperature $T_p$ (process): sensor	Ambient temperature $T_a$ (ambient): electronics
T6	-50...+ 85 °C	-50...+60 °C
T5	-50...+100 °C	-50...+70 °C
T4	-50...+135 °C	Additional temperature range for sensors with optional specifications $Mx = MR, MS \rightarrow \text{☐ 3}$
T3	-50...+150 °C	



Device type FTL80, FTL81, Basic specification, Position 7 (Application) = C, D, Y



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- 1 Temperature separator:
- 1.1 insulated
- 1.2 free-standing
- 2  $T_a$  for  $T_p$ : -50...+60 °C

**Connection data**

Basic specification, Position 1, 2 (Approval) = NA, NB

**Ex ia**

- Power supply and signal circuit with protection type: intrinsic safety Ex ia IIC or IIB.



Note!

Only connect the device to terminals 1 and 2 or terminals 2 and 3, respectively.

<p><b>Terminal 1 (-)</b> MAX safety  <b>Terminal 2 (+)</b>  <b>Terminal 3 (-)</b> MIN safety</p>
<p>Power supply:</p> <p><math>U_i = 30 \text{ V}</math>  <math>I_i = 170 \text{ mA}</math>  <math>P_i = 1 \text{ W}</math></p> <p>effective inner inductance <math>L_i = 0 \text{ }\mu\text{H}</math>                  effective inner capacitance <math>C_i = 16 \text{ nF}</math></p>



# Liquiphant FailSafe

## FTL80、FTL81、FTL85

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## 相关文档资料

本文档是下列《操作手册》的组成部分：  
BA01037F  
各种设备须参考各自的《操作手册》。

## 补充文档资料

《防爆手册》：  
CP00021Z  
《防爆手册》的获取方式：  

- 登陆 Endress+Hauser 网站的下载区：  
www.endress.com → 下载 → 高级搜索 → 文档资料代号：CP00021Z
- 设备的随箱 CD 光盘

## 制造商证书

**NEPSI 一致性声明**

证书号：  
GYJ14.1057X

附带证书号的设备符合下列标准：

- GB3836.1-2010
- GB3836.4-2010
- GB3836.20-2010

## 扩展订货号

铭牌上标识有扩展订货号，设备上的铭牌位置应清晰可见。  
铭牌的详细信息请参考相关《操作手册》。

## 扩展订货号的结构

FTL8x	-	*****	+	A*B*C*D*E*F*G*..
设备型号		基本规格选项		可选规格选项

\* = 占位符

在此位置处，选择的规格选项以数字或字母显示，以替代占位符。

- 基本规格选项  
基本规格选项包括设备必须具有的选项 ( 必选项 )。位数取决于选项数量。  
选择的特定选项可能占多个位数。
- 可选规格选项  
可选规格选项描述了设备的其他特点 ( 可选项 )。  
位数取决于可选选项数量。  
选项代号由两位字符组成，便于标识 ( 例如：JA)。第一位选项 (ID) 表示选项组，由数字或字母组成 ( 例如：J = 测试、证书)。第二位选项表示选项组中的特性。  
( 例如：A = 3.1 材料 ( 接液部件 )，检测证书 )。

设备的详细信息请参考下列表格。表格中介绍了与爆炸危险区相关的每一位标准订货号和扩展订货号的选项 (ID)。

设备型号：FTL80、FTL81、FTL85

基本规格选项

订购选项	选型代号	说明
1、2 认证	FTL8x : NA NB	Ex ia IIC T6...T2 Ga Ex ia IIC T6...T2 Ga/Gb
3 电子插件；输出	FTL8x : S	FEL85 ; 两线制, 4...20 mA
4 显示；操作	FTL8x : A	LED 指示灯；开关
5 外壳	FTL8x : A C D E H I	F16 聚酯外壳, IP66/67 NEMA Type 4X ( 外壳 ) F17 铝外壳, IP66/67 NEMA Type 4X ( 外壳 ) F13 铝外壳, IP66/68 NEMA Type 4X/6P ( 外壳 ) T13 铝外壳, 独立接线腔, IP66/68 NEMA Type 4X/6P ( 外壳 ) F15 316L 外壳, 卫生型, IP66/67 NEMA Type 4X ( 外壳 ) F27 316L 外壳, IP66/68 NEMA Type 4X/6P ( 外壳 )
6 电气连接	FTL8x : A B C D E I	M20 缆塞 M20 螺纹 G1/2 螺纹 NPT1/2 螺纹 NPT3/4 螺纹 M12 插头
7 应用	FTL80 : A C D Y  FTL81 : A B C D Y  FTL85 : N P T	过程 : max. 150 °C (302 °F)、64 bar (928 psi) 过程 : max. 230 °C (446 °F)、100 bar (1450 psi) ; 带气密保护功能 过程 : max. 280 °C (536 °F)、100 bar (1450 psi) ; 带气密保护功能 过程 : max. 300 °C (572 °F)、100 bar (1450 psi)  过程 : max. 150 °C (302 °F)、64 bar (928 psi) 过程 : max. 150 °C (302 °F)、100 bar (1450 psi) 过程 : max. 230 °C (446 °F)、100 bar (1450 psi) ; 带气密保护功能 过程 : max. 280 °C (536 °F)、100 bar (1450 psi) ; 带气密保护功能 过程 : max. 300 °C (572 °F)、100 bar (1450 psi)  ECTFE, 过程 : max. 120 °C (248 °F)、40 bar (580 psi) PFA, 过程 : max. 150 °C (302 °F)、40 bar (580 psi) 瓷釉, 过程 : max. 150 °C (302 °F)、25 bar (362 psi)
9 表面处理	FTL85 : N P Q R T	ECTFE 涂层 PFA 涂层 (Edlon) PFA 涂层 (红宝石) PFA 涂层 (导电性) 瓷釉涂层

可选规格选项

订购选项 (ID)	选型代号	说明
Mx 传感器设计	FTL8x : MP MR MS	环境温度：-50 °C (-58 °F) 隔热管 气密保护功能, 带隔热管
Nx 安装附件	FTL8x : NA NC ND NE NH	盖板, F16 PA 外壳, 透明 盖板, F17 铝外壳, 窗口 盖板, F13 铝外壳, 窗口 盖板, T13 铝外壳, 窗口 盖板, F15 316L 外壳, 窗口

## 安全指南：概述

- 进行设备安装、电气连接、调试和维护的人员必须满足下列要求：
  - 具有承担任务和执行任务的适当资质
  - 经过防爆保护培训
  - 熟悉国家法规
- 安装、使用和维护设备时，用户必须遵守《操作手册》和标准中列举的要求：
  - GB50257-1996：“电气装置安装工程爆炸和火灾危险环境电气装置施工及验收规范”。
  - GB3836.13-1997：“爆炸性气体环境用电气设备，第13部分：爆炸性气体环境用电气设备的检修”。
  - GB3836.15-2000：“爆炸性气体环境用电气设备，第15部分：危险场所电气安装（煤矿除外）”。
  - GB3836.16-2006：“爆炸性气体环境用电气设备，第16部分：电气装置的检查和维护（煤矿除外）”。
- 按照制造商说明和国家法规安装设备。
- 超出规定电气参数、热参数和机械参数时，禁止使用设备。
- 仅允许在接液部件材料具有足够耐腐蚀能力的介质中使用。
- 避免静电电荷充电：
  - 塑料表面（例如：外壳、传感器单元、特殊抛光、安装的附加板等）
  - 隔离电容器（例如：隔离金属板）
- 传感器和/或变送器的允许环境温度（取决于应用范围）和温度等级之间的关系请参考温度表（→ 19）。
- 改装设备可能会影响防爆保护，必须由 Endress+Hauser 授权的专业人员执行此类操作。

## 安全指南：特殊条件

电子腔外壳的允许环境温度范围： $-50\text{ °C} \leq T_a \leq +70\text{ °C}$ 。  
注意温度表信息。

基本规格选项，选型代号 5（外壳）= A

- 在 0 区中，禁止使用外壳。
- 避免外壳的静电电荷充电（例如：摩擦、清洁、维护、强介质流）。

基本规格选项，选型代号 5（外壳）= C、D、E

- 在 0 区中，避免冲击和摩擦产生的火花。

设备型号 FTL85，基本规格选项，选型代号 9（表面处理）= N、P、Q

- 使用聚合材料或带聚合物涂层的过程连接时，避免塑料表面的静电电荷充电。

气体组 IIC

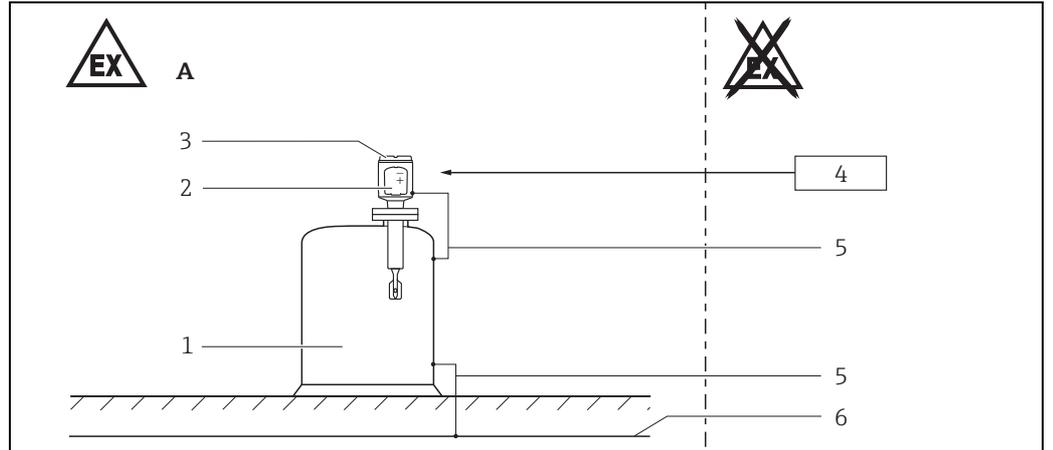
- 可以避免探头的静电电荷充电时，可以使用带非导电涂层材料的探头（例如：摩擦、清洁、维护、强介质流）。

气体组 IIB

- 可以使用带非导电涂层材料的探头。

- 使用聚合材料或带聚合物涂层的过程连接时，避免塑料表面的静电电荷充电。
- 在对外壳或其他金属部分做额外或特殊抛光时：
  - 注意静电电荷充电和放电带来的危险。
  - 请勿使用干布擦拭表面。

## 安全指南：安装



 1

A 0区、1区

- 1 罐体；0区、1区
- 2 电子插件
- 3 外壳
- 4 相关认证设备
- 5 等电势连接线
- 6 等电势

- 执行下列操作，确保 IP66/67 防护等级：
  - 拧紧外壳盖。
  - 正确安装电缆入口。
- 使用合适的电缆和“本安 (Ex i)”防爆保护的电缆入口连接设备。
- 使用满足防护等级要求的认证密封插头密封未使用的电缆入口。
- 注意制造商《操作手册》中的最高过程条件。
- 测量高温介质时，注意法兰的压力负载能力受温度的影响。
- 安装设备时：
  - 在应用过程中避免任何机械损坏或摩擦。
  - 注意流体条件和罐体装置。
- 可能出现动态负载时，支撑延伸管。
- 连接电缆的持续工作温度：-40...+85 °C；  
在符合工作温度范围的条件下，还应考虑过程条件的其他影响 ( $T_{a,min}$ )、( $T_{a,max} + 20$  K)。

附件：高压滑动套管

- 高压滑动套管可以连续调节开关点；正确安装时，可以在防爆区中使用 (→ 《操作手册》)。

基本规格选项，选型代号 5 (外壳) = C、D、E

- 避免冲击和摩擦产生的火花。

#### 本质安全

- 设备仅能连接防爆保护等级为 Ex ia 的本安认证设备。
- 设备的本安输入回路与接地隔离，且与接地的绝缘强度至少为  $500 V_{rms}$ 。
- 互连本安回路时，遵守相关指南要求。

#### 电势平衡

- 将设备集成至本地等电势系统中。

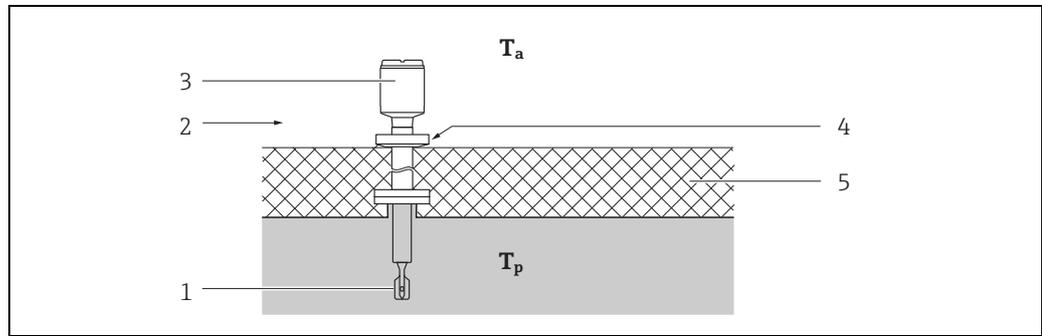
## 安全指南：0 区

- 蒸汽 / 空气混合物存在爆炸危险时，仅允许在大气环境下操作设备。
  - 温度：-20...+60 °C
  - 压力：80...110 kPA (0.8...1.1 bar)
  - 正常含氧量的空气，通常为 21 % (V/V)
 未出现潜在爆炸危险混合气体时，或已经采取其他防护措施时，可以根据制造商规范在非大气条件下操作设备。
- 在非大气压力和温度条件下使用时，通过 0 区认证的设备的传感器部分不会产生任何火花。
- 建议使用本安和非本安回路之间电气隔离的相关设备。
- 仅允许在电子插件的硅橡胶封装部件和 PBT、铝或 316L 外壳材料具有足够耐腐蚀能力的介质中使用。
- 仅允许在接液部件材料具有足够耐腐蚀能力的介质中使用（例如：过程连接密封圈）。

## 带隔热的防爆保护

设备型号 FTL80、FTL81，基本规格选项，选型代号 7 (应用) = C、D、Y

- 注意“减温”曲线，设备最高适用温度为 300 °C (→ 21)。
- 操作时，确保热部件表面不接触超出相应温度等级 (→ 19) 的潜在爆炸环境。  
合适的措施，例如：在容器和 / 或管道上安装保温层。
- 不得超出参考点的指定温度 85 °C。
- 为了保护电子插件，注意电子腔外壳的指定环境温度。



FTL8x\_03

2

- $T_a$  环境温度  
 $T_p$  过程温度  
 1 传感器  
 2 温度等级，例如：T6  
 3 外壳  
 4 参考点：max. +85 °C  
 5 例如：保温层

温度表

电子插件的环境温度

在 0 区中使用
-20...+60 °C

在 0 区之外使用
-50...+70 °C

传感器的过程温度

在 0 区中使用
-20...+60 °C

设备型号 FTL80、FTL81 : 基本规格选项, 选型代号 7 (应用) = A、B、C、D、Y

在 0 区之外使用
-50...+150 °C (A、B)
-60...+230 °C (C)
-60...+280 °C (D)
-60...+300 °C (Y)

设备型号 FTL85 : 基本规格选项, 选型代号 7 (应用) = N、P、T

在 0 区之外使用
-50...+120 °C (N)
-50...+150 °C (P、T)

环境温度和过程温度与温度等级之间的关系 :

设备型号 FTL80、FTL81 : 基本规格选项, 选型代号 7 (应用) = A、B

温度等级	过程温度 $T_p$ (过程) : 传感器	环境温度 $T_a$ (环境) : 电子插件
T6	-50...+ 85 °C	-50...+60 °C
T5	-50...+100 °C	-50...+70 °C
T4	-50...+135 °C	带可选规格选项 Mx = MR、MS 的传感器的扩展温度范围 → 3
T3	-50...+150 °C	

设备型号 FTL80、FTL81：基本规格选项，选型代号 7 (应用) = C、D、Y

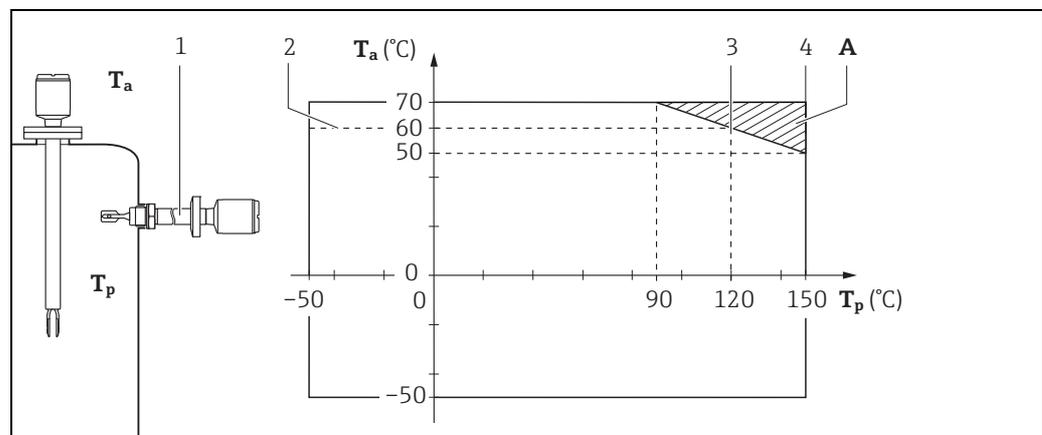
温度等级	过程温度 $T_p$ (过程)：传感器	环境温度 $T_a$ (环境)：电子插件
T6	-60...+ 85 °C	-50...+60 °C
T5	-60...+100 °C	受限范围 → 3
T4	-60...+135 °C	
T3	-60...+200 °C	
T2	-60...+230 °C (C) -60...+280 °C (D) -60...+300 °C (Y)	

设备型号 FTL85，基本规格选项，选型代号 7 (应用) = N、P、T

温度等级	过程温度 $T_p$ (过程)：传感器	环境温度 $T_a$ (环境)：电子插件
T6	-50...+ 85 °C	-50...+60 °C
T5	-50...+100 °C	带可选规格选项 Mx = MR、MS 的传感器的扩展温度范围 → 3
T4	-50...+120 °C (N)	
T4	-50...+135 °C (P、T)	
T3	-50...+150 °C (P、T)	

设备型号 FTL80、FTL81：基本规格选项，选型代号 7 (应用) = A、B

设备型号 FTL85：基本规格选项，选型代号 7 (应用) = N、P、T

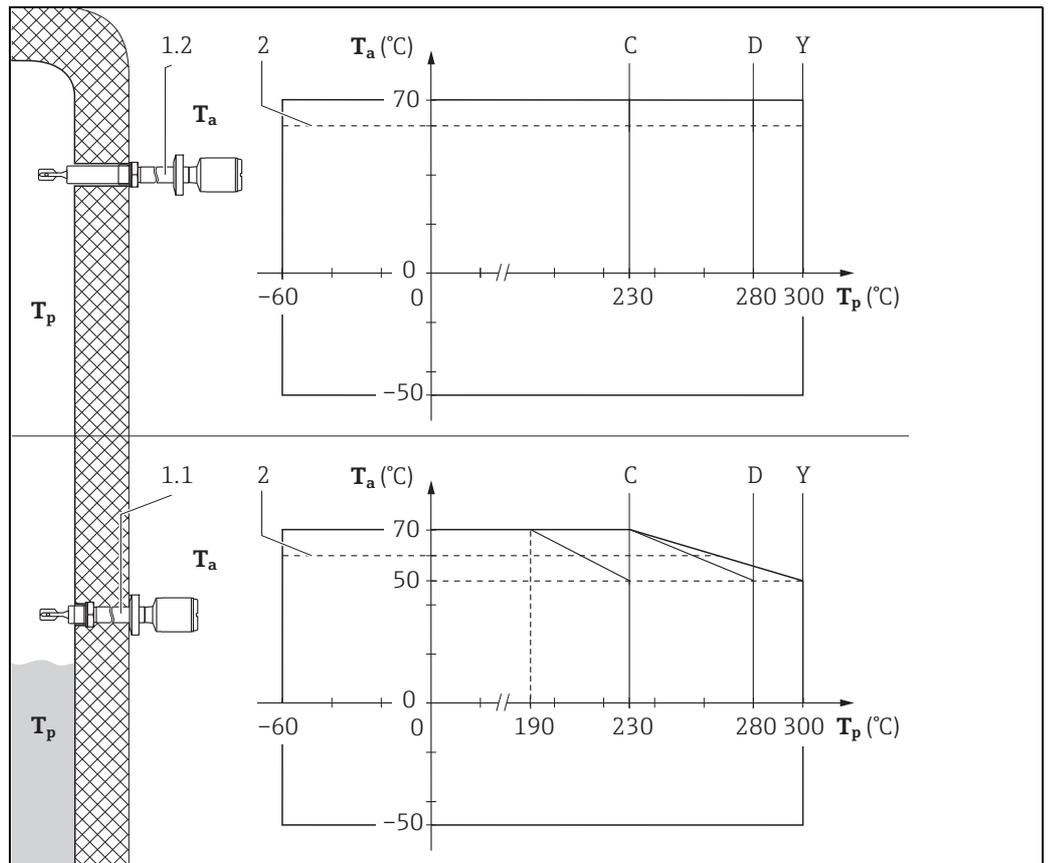


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A 带可选规格选项 Mx = MR、MS 的传感器的扩展温度范围

- 1 隔热管或气密保护功能
- 2  $T_a$  为 T6 时：-50...+60 °C
- 3 ECTFE
- 4 PFA、瓷釉

设备型号 FTL80、FTL81：基本规格选项，选型代号 7 (应用) = C、D、Y



4

- 1 隔热管：
- 1.1 绝缘
- 1.2 自由放置
- 2  $T_a$  为  $T_6$ ：-50...+60 °C

连接参数

基本规格选项，订购选项 1、2 (认证) = NA、NB

**Ex ia**

- 电源和信号回路的防爆保护：本安 Ex ia IIC 或 IIB。



注意！

仅将设备分别连接至接线端子 1 和 2，或接线端子 2 和 3。

接线端子 1 (-) 高限 接线端子 2 (+) 接线端子 3 (-) 低限
电源： $U_i = 30\text{ V}$ $I_i = 170\text{ mA}$ $P_i = 1\text{ W}$ 有效内部感抗 $L_i = 0\text{ }\mu\text{H}$ 有效内部容抗 $C_i = 16\text{ nF}$







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