

Safety Instructions

Liquiphant FailSafe

FTL80, FTL81, FTL85

II 1/2 G Ex ia IIC T6 Ga/Gb

II 1/2 D Ex ia IIIC T80°C Da/Db



Liquiphant FailSafe FTL80, FTL81, FTL85

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Associated documentation	<p>This document is an integral part of the following Operating Instructions: BA01037F/00</p>
Supplementary documentation	<p>Explosion-protection brochure: CP00021Z/11 The Explosion-protection brochure is available:</p> <ul style="list-style-type: none">■ In the download area of the Endress+Hauser website: www.endress.com -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z■ On the CD for devices with CD-based documentation
Manufacturer's certificates	<p>UK Declaration of Conformity</p> <p>Declaration Number: UK_00254</p> <p>The UK Declaration of Conformity is available: In the download area of the Endress+Hauser website: www.endress.com -> Downloads -> Declaration -> Type: UKCA Declaration -> Product Code: ...</p> <p>UKCA type-examination certificate</p> <p>Certificate number: CML 21UKEX2637X</p> <p>List of applied standards: See UK Declaration of Conformity.</p>
Manufacturer address	<p>Endress+Hauser SE+Co. KG Hauptstraße 1 79689 Maulburg, Germany Address of the manufacturing plant: See nameplate.</p>
Other standards	<p>Among other things, the following standards shall be observed in their current version for proper installation:</p> <ul style="list-style-type: none">■ IEC/EN 60079-14: "Explosive atmospheres - Part 14: Electrical installations design, selection and erection"■ EN 1127-1: "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

FTL8x	-	*****	+	A*B*C*D*E*F*G*..
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>

* = 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: Liquiphant FailSafe



The following specifications reproduce an extract from the product structure and are used to assign:

- This documentation to the device (using the extended order code on the nameplate).
- The device options cited in the document.

Device type

FTL80, FTL81, FTL85

Basic specifications

Position 1, 2 (Approval)		
Selected option	Description	
FTL8x	U2	UK Ex II 1/2 G Ex ia IIC T6 Ga/Gb UK Ex II 1/2 D Ex ia IIIC T80°C Da/Db

Position 3 (Electronics, Output)		
Selected option	Description	
FTL8x	S	FEL85; 2-wire, 4-20 mA

Position 4 (Display, Operation)		
Selected option	Description	
FTL8x	A	LED; switch

Position 5 (Housing)		
Selected option	Description	
FTL8x	C	F17 Alu, IP66/67 NEPA Type 4X Encl.
	D	F13 Alu, IP66/68 NEPA Type 4X/6P Encl.
	E	T13 Alu, separate conn. compartment, IP66/68 NEPA Type 4X/6P Encl.
	H	F15 316L hygiene, IP66/67 NEPA Type 4X Encl.
	I	F27 316L, IP66/68 NEPA Type 4X/6P Encl.

Position 6 (Electrical Connection)		
Selected option	Description	
FTL8x	A	Gland M20
	B	Thread M20
	C	Thread G1/2
	D	Thread NPT1/2
	E	Thread NPT3/4

Position 7 (Application)		
Selected option		Description
FTL80	A	Process max. 150 °C/302 °F, 64 bar/928 psi
	C	Process max. 230 °C/446 °F, 100 bar/1450 psi; incl. gas-tight feed through
	D	Process max. 280 °C/536 °F, 100 bar/1450 psi; incl. gas-tight feed through
	Y	Process max. 300 °C/572 °F, 100 bar/1450 psi
FTL81	A	Process max. 150 °C/302 °F, 64 bar/928 psi
	B	Process max. 150 °C/302 °F, 100 bar/1450 psi
	C	Process max. 230 °C/446 °F, 100 bar/1450 psi; incl. gas-tight feed through
	D	Process max. 280 °C/536 °F, 100 bar/1450 psi; incl. gas-tight feed through
	Y	Process max. 300 °C/572 °F, 100 bar/1450 psi
FTL85	P	PFA, Process max. 150 °C/302 °F, 40 bar/580 psi
	T	Enamel, Process max. 150 °C/302 °F, 25 bar/362 psi

Position 9 (Surface Refinement)		
Selected option		Description
FTL85	R	Coating PFA (conductive)
	T	Coating Enamel

Optional specifications

ID Mx (Sensor Design)		
Selected option		Description
FTL8x	MP	Ambient temperature -50 °C/-58 °F
	MR	Temperature separator
	MS	Pressure tight feed through, incl. temperature separator

ID Nx (Accessory Mounted)		
Selected option		Description
FTL8x	NC	Cover, housing F17 Alu, window
	ND	Cover, housing F13 Alu, window
	NE	Cover, housing T13 Alu, window
	NH	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
- 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. enclosure, 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.
- 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 enclosure:
 $-50\text{ °C} \leq T_a \leq +70\text{ °C}$

- Observe the information in the temperature tables.
- 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 enclosure or other metal parts:
 - Observe the danger of electrostatic charging and discharge.
 - Do not rub surfaces with a dry cloth.

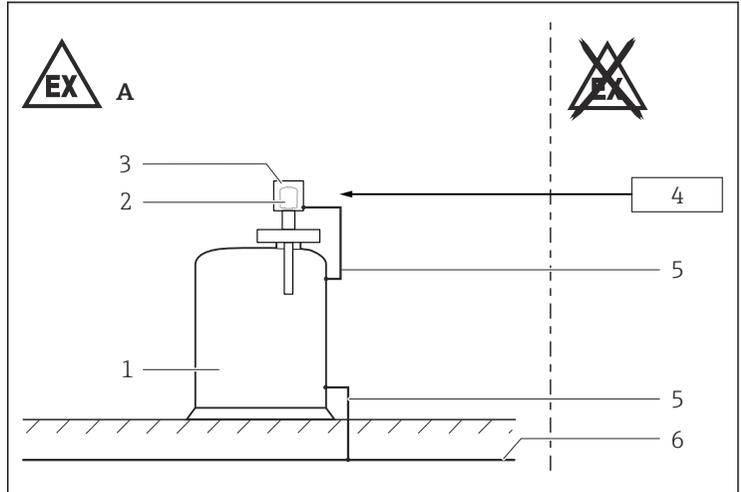
Basic specification, Position 5 = C, D, E

Avoid sparks caused by impact and friction.

Designation with "G" and "D"

When using in hybrid mixtures (gas and dust occurring simultaneously), observe additional measures for explosion protection.

Safety instructions: Installation



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- A Zone 1, Zone 21
- 1 Tank; Zone 0, Zone 1 or Zone 20, Zone 21
- 2 Electronic insert
- 3 Enclosure
- 4 Certified associated apparatus
- 5 Potential equalization line
- 6 Potential equalization

- After mounting and connecting the probe, ingress protection of the enclosure must be at least IP65.
- 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.

- 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.
- Continuous service temperature of the connecting cable: -40 °C to $\geq +85\text{ °C}$; in accordance with the range of service temperature taking into account additional influences of the process conditions ($T_{a,\min}$), ($T_{a,\max}+30\text{ K}$).

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 separation if mounted properly (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 $500\text{ V}_{\text{rms}}$.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.

Potential equalization

Integrate the device into the local potential equalization.

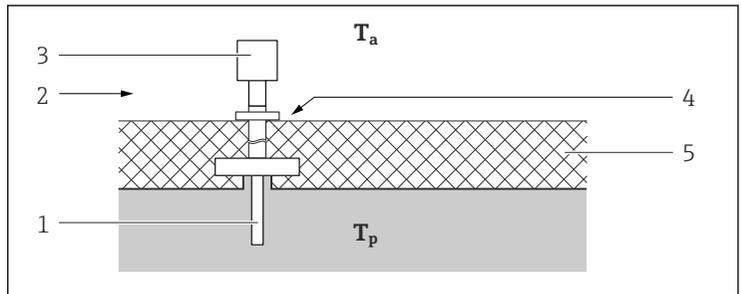
Safety instructions: Zone 0

- In the event of potentially explosive vapor/air mixtures, only operate the device under atmospheric conditions.
 - Temperature: -20 to $+60\text{ °C}$
 - 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.
- 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.
- 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 wetted materials have sufficient durability (e.g. process connection seal).

Explosion protection with heat insulation

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

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



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T_a Ambient temperature

T_p Process temperature

1 Sensor

2 Temperature class, e.g. T6

3 Enclosure

4 Reference point: max. +85 °C

5 E.g. thermal insulation

Temperature tables

Application in gas

Ambient temperature electronics

When used outside Zone 0
-50 to +70 °C

Process temperature sensor

When used in Zone 0
-20 to +60 °C

Device type *FTL80, FTL81*, Basic specification, Position 7 = A, B, C, D, Y

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

Device type *FTL85*, Basic specification, Position 7 = P, T

When used outside Zone 0
-50 to +150 °C

Application in dust

Probe in Zone 20, electronics housing in Zone 21
$T = T_a^{1)} + 10 \text{ K}$
$T_{500}^{2)} = T_a^{1)} + 30 \text{ K}$

- 1) T_a : Ambient temperature in °C
- 2) T_{500} : Deposited material with a layer of 500 mm

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

Device type *FTL80, FTL81*, Basic specification, Position 7 = A, B

Temperature class	Process temperature T_p (process): sensor	Ambient temperature T_a (ambient): electronics
T6	-50 to +85 °C	-50 to +60 °C
T5	-50 to +100 °C	-50 to +70 °C Additional temperature range for sensors with Optional specifications Mx = MR, MS →  3,  14
T4	-50 to +135 °C	
T3	-50 to +150 °C	

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

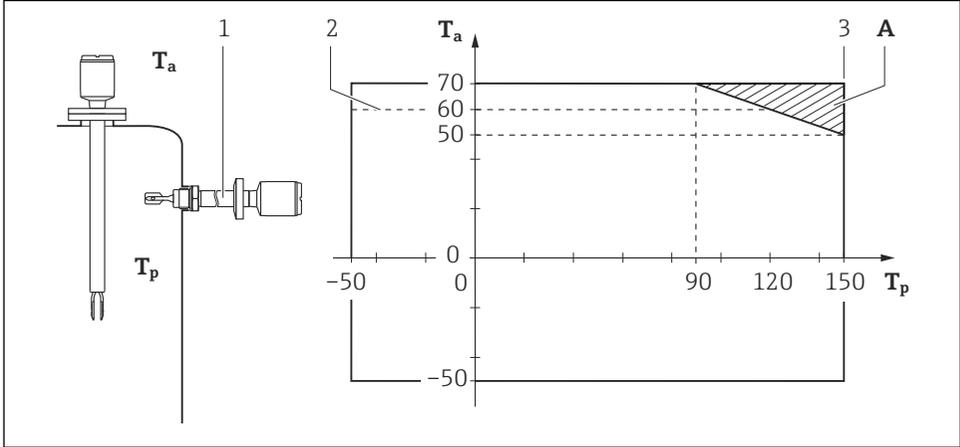
Temperature class	Process temperature T_p (process): sensor	Ambient temperature T_a (ambient): electronics
T6	-60 to +85 °C	-50 to +60 °C
T5	-60 to +100 °C	-50 to +70 °C For restrictions →  4,  15
T4	-60 to +135 °C	
T3	-60 to +200 °C	
T2	-60 to +230 °C (C) -60 to +280 °C (D) -60 to +300 °C (Y)	

Device type FTL85, Basic specification, Position 7 = P, T

Temperature class	Process temperature T_p (process): sensor	Ambient temperature T_a (ambient): electronics
T6	-50 to +85 °C	-50 to +60 °C
T5	-50 to +100 °C	-50 to +70 °C Additional temperature range for sensors with Optional specifications Mx = MR, MS →  3,  14
T4	-50 to +135 °C	
T3	-50 to +150 °C	

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

Device type FTL85, Basic specification, Position 7 = P, T



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T_a Ambient temperature

T_p Process temperature

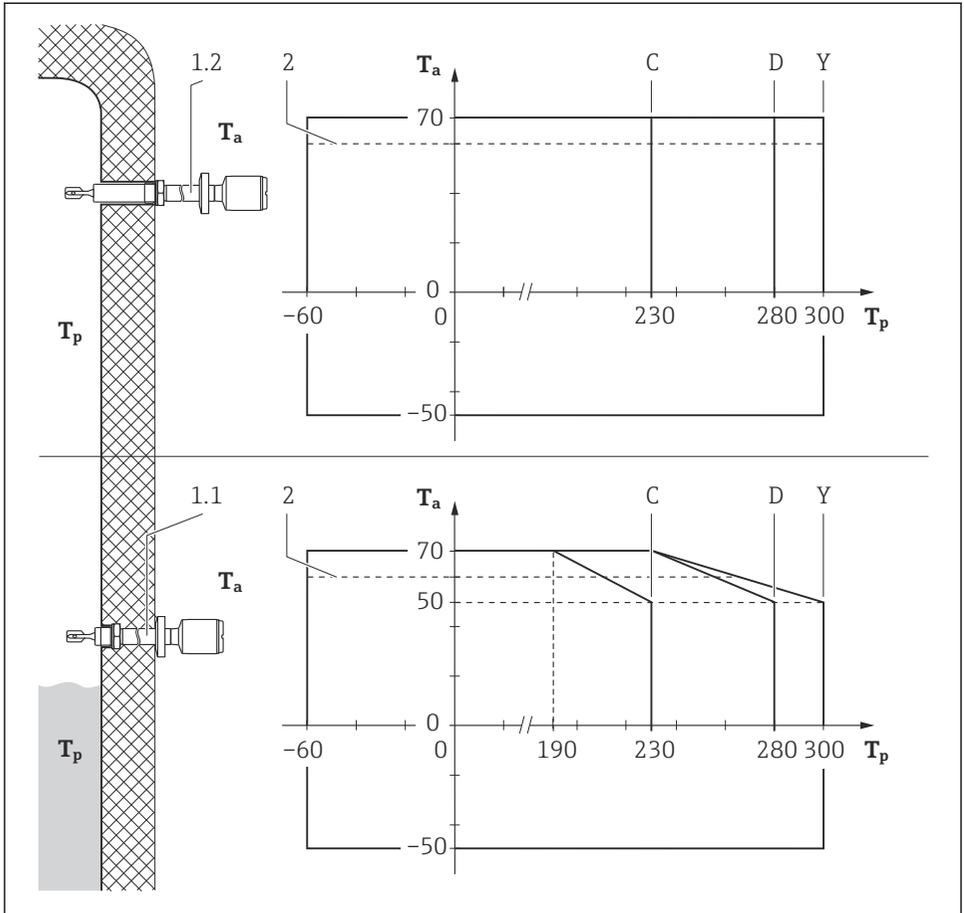
A Additional temperature range for sensors with Optional specifications Mx = MR, MS

1 Temperature separator or pressure tight feed through

2 T_a for T6: -50 to +60 °C

3 PFA, Enamel

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



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- T_a Ambient temperature
- T_p Process temperature
- 1 Temperature separator:
 - 1.1 insulated
 - 1.2 free-standing
- 2 T_a for T_6 : -50 to +60 °C

Connection data **Ex ia**

Power supply circuit with protection type: intrinsic safety Ex ia IIC,
Ex ia IIIC.



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

Terminal 1 (-) (MAX safety)

Terminal 2 (+)

Terminal 3 (-) (MIN safety)

Power supply

$U_i = 30 \text{ V}$

$I_i = 170 \text{ mA}$

$P_i = 1 \text{ W}$

effective inner inductance $L_i = 0$

effective inner capacitance $C_i = 16 \text{ nF}$



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