

# Safety Instructions

## Liquiphant M

### FTL50(H), FTL51(H)

ATEX: II 3 G Ex ec IIC Gc  
II 3 G Ex ec nC IIC Gc  
II 3 G Ex ic IIC Gc  
II 3 D Ex tc IIIC Dc






# Liquiphant M FTL50(H), FTL51(H)

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**About this document**

 This document has been translated into several languages. Legally determined is solely the English source text.

The document translated into EU languages is available:

- In the download area of the Endress+Hauser website:  
[www.endress.com](http://www.endress.com) -> Downloads -> Manuals and Datasheets -> Type: Ex Safety Instruction (XA) -> Text Search: ...
- In the Device Viewer: [www.endress.com](http://www.endress.com) -> Product tools -> Access device specific information -> Check device features

 If not yet available, the document can be ordered.

**Associated documentation**

This document is an integral part of the following Operating Instructions:

- KA00143F/00, KA00163F/00 (FTL50, FTL51)
- KA00144F/00, KA00164F/00 (FTL50H, FTL51H)

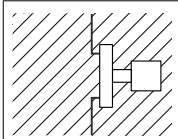
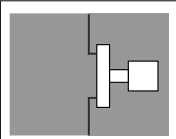
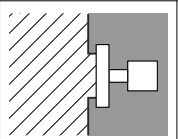
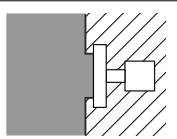
**Supplementary documentation**

Explosion-protection brochure: CP00021Z/11

The Explosion-protection brochure is available:

- In the download area of the Endress+Hauser website:  
[www.endress.com](http://www.endress.com) -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

**General notes:  
Combined approval**

			
Ex ec IIC Ex ec nC IIC Ex ic IIC Zone 2	Ex tc IIIC Zone 22	Ex ec IIC Ex ic IIC Zone 2	Ex tc IIIC Zone 22
		Ex ec IIC Ex ec nC IIC Ex ic IIC Zone 2	

The device is designed for operation in explosive gas or explosive dust atmosphere as shown in the sketch above. In the event of potentially

explosive gas-air and dust-air mixtures occurring simultaneously:  
Suitability requires further assessment.



A sequential change between gas and dust explosion protection is only possible if:

- A period with non-explosive atmosphere is realized during the transition or
- Special examinations are done which are not covered by the certificate

## Manufacturer's certificates

### EU Declaration of Conformity

Declaration Number:  
EU\_00959

The EU Declaration of Conformity is available:  
In the download area of the Endress+Hauser website:  
[www.endress.com](http://www.endress.com) -> Downloads -> Declaration ->  
Type: EU Declaration -> Product Code: ...

### EU type-examination certificate

Certificate number:  
EU 00959 X

List of applied standards: See EU Declaration of Conformity.

## Manufacturer address

Endress+Hauser SE+Co. KG  
Hauptstraße 1  
79689 Maulburg, Germany

Address of the manufacturing plant: See nameplate.

## Other standards

Among other things, the following standards shall be observed in their current version for proper installation:

- 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

FTL5x(H)	–	*****	+	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 M



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*

FTL50, FTL50H, FTL51, FTL51H

*Basic specifications*

Position 1 (Approval)		
Selected option		Description
FTL50(H)	4 <sup>1)</sup>	ATEX II 3 G Ex ec nC IIC T6...T3 Gc
FTL51(H)		ATEX II 3 D Ex tc IIIC Txxx°C Dc
	5 <sup>2)</sup>	ATEX II 3 G Ex ec IIC T6...T3 Gc
		ATEX II 3 G Ex ic IIC T6...T3 Gc
		ATEX II 3 D Ex tc IIIC Txxx°C Dc

- 1) Only in connection with Position 7 = 4  
 2) Ex ic IIC Gc only in combination with Position 7 = A, D, 5, 6, 7, 8

Position 5, 6 (Probe Length, Type)		
Selected option		Description
FTL50	AA	Compact
	IA	Compact; temp. separator
	QA	Compact; press.tight feed through
FTL50H	AC, AD	Compact
	IC, ID	Compact; temp. separator
	QC, QD	Compact; press.tight feed through
FTL51	BB, CB, DB	Length mm/in; 316L
	BE, CE, DE	Length mm/in; Alloy
	JB, KB, LB	Length mm/in; 316L + temp. separator
	JE, KE, LE	Length mm/in; Alloy + temp. separator
	RB, SB, TB	Length mm/in; 316L + press.tight feed through
	RE, SE, TE	Length mm/in; Alloy + press.tight feed through
	FTL51H	BC, BD, CC, CD, DC, DD
JC, JD, KC, KD, LC, LD		Length mm/in; temp. separator
RC, RD, SC, SD, TC, TD		Length mm/in; press.tight feed through

Position 7 (Electronics, Output)		
Selected option		Description
FTL50(H) FTL51(H)	A	FEL50A; PROFIBUS PA
	D	FEL50D; Density, Concentration
	1	FEL51; 2-wire 19-253 VAC
	2	FEL52; 3-wire PNP 10-55 VDC
	4	FEL54; relay DPDT 19-253 VAC, 19-55 VDC
	5	FEL55; 8/16 mA, 11-36 VDC
	6	FEL56; NAMUR
	7	FEL57; 2-wire PFM
	8	FEL58; NAMUR + test button

Position 8, 9 (Housing, Cable Entry)		
Selected option		Description
FTL50 FTL51	x1	F27; 316L
FTL50(H) FTL51(H)	C3 <sup>1)</sup>	Compact; IP66/68, 316L Hygiene; 5 m cable
	x5	F13; Alu
	x6	F15; 316L Hygiene
	x7	T13; Alu

1) Only in connection with Position 7 = 2, 8

### Optional specifications

No options specific to hazardous locations are available.


## Safety instructions: General

- The device is intended to be used in explosive atmospheres as defined in the scope of IEC 60079-0 or equivalent national standards. If no potentially explosive atmospheres are present or if additional protective measures have been taken: The device may be operated according to the manufacturer's specifications.
- 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.
- 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.
- Avoid electrostatic charging:
  - Of plastic surfaces (e.g. enclosure, sensor element, special varnishing, attached additional plates, ..)
  - Of isolated capacities (e.g. isolated metallic plates)
- Alterations 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**

- Limitations of the maximum ambient temperature at the electronics enclosure may be required dependent on device configuration, process temperatures and temperature classification.
- Details of limitations: →  11, "Temperature tables".
- In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surfaces.
- To avoid electrostatic charging: Do not rub surfaces with a dry cloth.
- In the event of additional or alternative special varnishing on the enclosure or other metal parts or for adhesive plates:
  - Observe the danger of electrostatic charging and discharge.
  - Do not install in the vicinity of processes ( $\leq 0.5$  m) generating strong electrostatic charges.

*Basic specification, Position 7 = 1, 4 and Basic specification, Position 8, 9 = x1, x5, x6, x7*

- In a condensing atmosphere: The device must not be serviced or installed.
- The device must be externally protected against transient overvoltage up to 140 % of the maximum voltage.

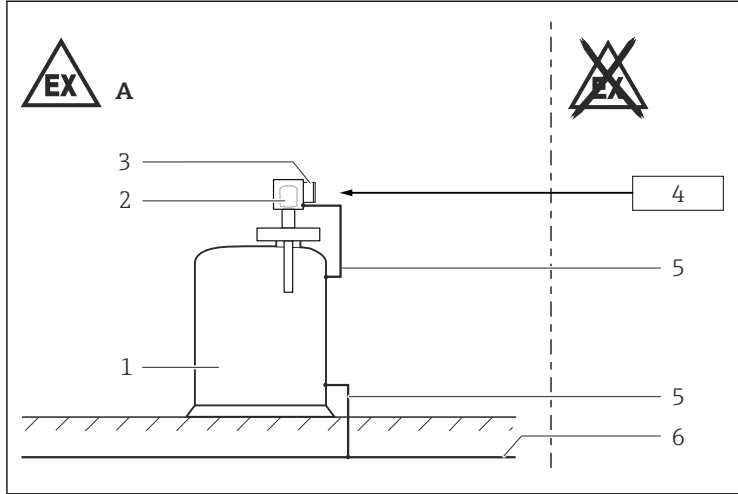
*Basic specification, Position 8, 9 = C3*

- The cable glands were tested with a low risk of mechanical danger (drop height 0.4 m with 1 kg mass) and must be mounted in a protected position if larger impact energy levels are expected.
- The enclosures don't have any external potential equalization terminal. Therefore, the safe bonding of the devices must be ensured via the yellow-green bonding wire of the cable or via the metallic process connection of the device.
- Do not disconnect electrical connections when energized.

*Basic specification, Position 8, 9 = x5, x6, x7*

Avoid sparks caused by impact and friction.

## Safety instructions: Installation



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### 1

A Zone 2, Zone 22

1 Tank; Zone 2, Zone 22

2 Electronic insert; Electronics compartment

3 Connection compartment Ex ec (only Basic specification, Position 8, 9 = x7)

4 Power supply or power supply unit

5 Potential equalization line

6 Potential equalization

- Perform the following to achieve the degree of protection IP66/67 or IP66/68:
  - Screw the cover tight.
  - Mount the cable entry correctly.
- 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.
- Only use certified cable entries suitable for the application. Observe national regulations and standards.

- When operating the transmitter enclosure at an ambient temperature under  $-20\text{ }^{\circ}\text{C}$ , use appropriate cables and cable entries permitted for this application.
- 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.
- Before operation:
  - Screw in the cover all the way.
  - Tighten the securing clamp on the cover.

*Basic specification, Position 1 = 4*

Continuous service temperature of the connecting cable:  $-50\text{ }^{\circ}\text{C}$  to  $\geq +115\text{ }^{\circ}\text{C}$ ; in accordance with the range of service temperature taking into account additional influences of the process conditions ( $T_{a,\text{min}}$ ), ( $T_{a,\text{max}} + 45\text{ K}$ ).

*Basic specification, Position 1 = 5 (only Ex ec, Ex ic)*

Continuous service temperature of the connecting cable:  $-50\text{ }^{\circ}\text{C}$  to  $\geq +85\text{ }^{\circ}\text{C}$ ; in accordance with the range of service temperature taking into account additional influences of the process conditions ( $T_{a,\text{min}}$ ), ( $T_{a,\text{max}} + 15\text{ K}$ ).

*Ex ec, Ex ec nC, Ex tc*

In potentially explosive atmospheres:

- Do not disconnect the electrical connection of the power supply circuit when energized.
- Do not open the connection compartment cover and the electronics compartment cover when energized.

### Accessory high pressure sliding sleeve

The high pressure sliding sleeve can be used for a continuous setting of the switch point (see Operating Instructions).

### Non-sparking

*Ex ec, Ex ec nC, Ex tc*

In potentially explosive atmospheres: Do not disconnect electrical connections when energized.

### Potential equalization

Integrate the device into the local potential equalization.

## Temperature tables

## Description notes



Unless otherwise indicated, the positions always refer to the basic specification.

**Zone 2**

1st line: Position 8, 9 = x1, x5, ...

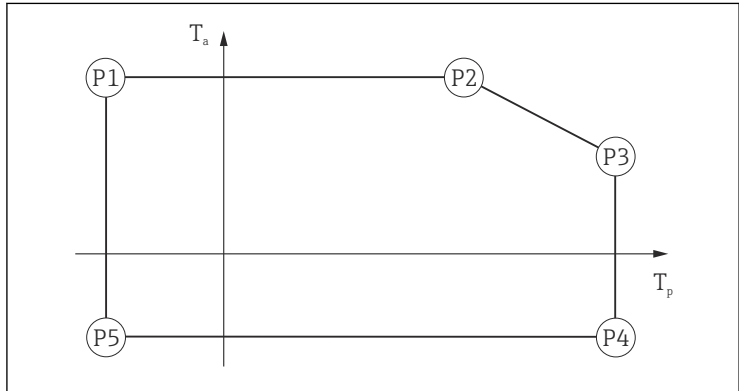
1st column: Position 5, 6 = Ax, Bx, ...

2nd column: Maximum load current

3rd column: Temperature classes T6 (85 °C) to T1 (450 °C)

Column P1 to P5: Position (temperature value) on the axes of the derating

- $T_a$ : Ambient temperature in °C
- $T_p$ : Process temperature in °C



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**Zone 22**

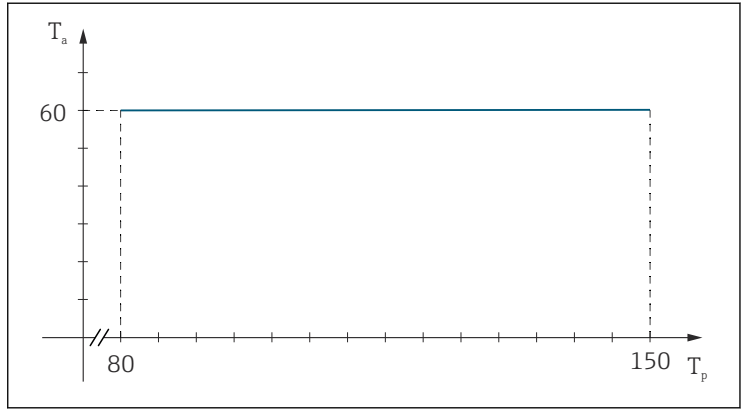
1st column: Position 5, 6 = Ax, Bx, ...

2nd column: Maximum load current

3rd column: Process temperature range in °C

4th column: Ambient temperature range in °C

5th column: Maximum surface temperature in °C

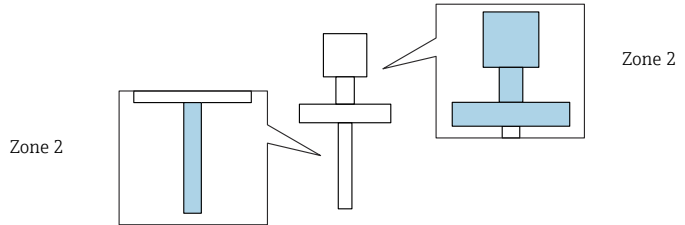


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$T_a$  Ambient temperature in °C

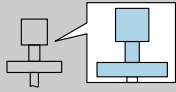
$T_p$  Process temperature in °C

### Zone 2



## Exec IIC

Position 7 = 1



= x1, x5, x6, x7

			P1		P2		P3		P4		P5	
			T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>
FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx	<b>180 mA</b>											
		T6	-50	52	53	52	80	40	80	-40	-50	-40
		T5	-50	67	68	67	95	55	95	-40	-50	-40
		T4	-50	70	78	70	130	47	130	-40	-50	-40
		T3...T1	-50	70	78	70	150	38	150	-40	-50	-40
FTL50, FTL50H: Ix, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx	<b>180 mA</b>											
		T6	-50	52	58	52	80	50	80	-40	-50	-40
		T5	-50	67	73	67	95	65	95	-40	-50	-40
		T4	-50	70	104	70	130	67	130	-40	-50	-40
		T3...T1	-50	70	104	70	150	65	150	-40	-50	-40
	<b>350 mA</b>											
		T6	-50	43	54	43	80	40	80	-40	-50	-40
		T5	-50	58	69	58	95	55	95	-40	-50	-40
		T4	-50	70	77	70	130	65	130	-40	-50	-40
		T3...T1	-50	70	77	70	150	63	150	-40	-50	-40

## Position 7 = 2

		= x1, C3, x5, x6, x7										
		P1		P2		P3		P4		P5		
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	
FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx	<b>350 mA</b>											
		T6	-50	70	70	70	80	70	80	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T5	-50	70	70	70	95	70	95	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T4	-50	70	70	70	130	55	130	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T3...T1	-50	70	70	70	150	45	150	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
FTL50, FTL50H: Ix, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx	<b>350 mA</b>											
		T6	-50	70	70	70	80	70	80	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T5	-50	70	70	70	95	70	95	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T4	-50	70	70	70	130	70	130	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T3...T1	-50	70	70	70	150	70	150	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>

1) Only in connection with Position 8, 9 = C3

## Position 7 = 5, 6, 7

		= x1, x5, x6, x7										
		P1		P2		P3		P4		P5		
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	
FTL50, FTL50H: Ax, Ix, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx												
		T6	-50	70	70	70	80	70	80	-40	-50	-40
		T5	-50	70	70	70	95	70	95	-40	-50	-40
		T4	-50	70	70	70	130	70	130	-40	-50	-40
		T3...T1	-50	70	70	70	150	70	150	-40	-50	-40

## Position 7 = 8

		= x1, C3, x5, x6, x7										
		P1		P2		P3		P4		P5		
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	
FTL50, FTL50H: Ax, Ix, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx												
		T6	-50	70	70	70	80	70	80	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T5	-50	70	70	70	95	70	95	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T4	-50	70	70	70	130	70	130	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>
		T3...T1	-50	70	70	70	150	70	150	-40 -25 <sup>1)</sup>	-50	-40 -25 <sup>1)</sup>

1) Only in connection with Position 8, 9 = C3



## Position 7 = A

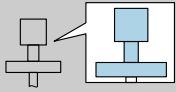
		P1		P2		P3		P4		P5	
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>
FTL50, FTL50H: Ax, lx, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx											
	T6	-50	60	70	60	80	60	80	-40	-50	-40
	T5	-50	60	70	60	95	60	95	-40	-50	-40
	T4	-50	60	70	60	130	60	130	-40	-50	-40
	T3...T1	-50	60	70	60	150	60	150	-40	-50	-40

## Position 7 = D

		P1		P2		P3		P4		P5	
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>
FTL50, FTL50H: Ax, lx, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx											
	T6...T1	-50	60	70	60	80	60	80	-40	-50	-40

## Exec nC IIC

Position 7 = 4



= x1, x5, x6, x7

			P1		P2		P3		P4		P5	
			T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>
FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx	<b>2 A</b>											
		T6	-50	52	53	52	80	40	80	-40	-50	-40
		T5	-50	67	68	67	95	55	95	-40	-50	-40
		T4	-50	70	78	70	130	47	130	-40	-50	-40
		T3...T1	-50	70	78	70	150	38	150	-40	-50	-40
FTL50, FTL50H: Ix, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx	<b>2 A</b>											
		T6	-50	52	58	52	80	50	80	-40	-50	-40
		T5	-50	67	73	67	95	65	95	-40	-50	-40
		T4	-50	70	104	70	130	67	130	-40	-50	-40
		T3...T1	-50	70	104	70	150	65	150	-40	-50	-40
	<b>4 A</b>											
		T6	-50	43	54	43	80	40	80	-40	-50	-40
		T5	-50	58	69	58	95	55	95	-40	-50	-40
		T4	-50	70	77	70	130	65	130	-40	-50	-40
		T3...T1	-50	70	77	70	150	63	150	-40	-50	-40

## Ex ic IIC

Position 7 = A, D, 5, 7

		= x1, x5, x6, x7										
		P1		P2		P3		P4		P5		
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	
FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx												
		T6	-50	55	55	55	75	45	75	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T5...T1	-50	55	55	55	90	40	90	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
FTL50, FTL50H: Ix, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx												
		T6	-50	55	65	55	75	50	75	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T5	-50	55	65	55	90	50	90	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T4	-50	55	65	55	125	50	125	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T3...T1	-50	55	65	55	150	45	150	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>

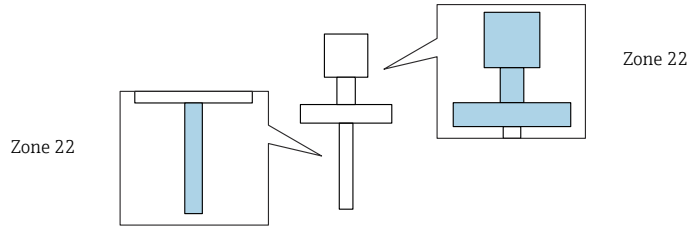
1) Only in connection with Position 8, 9 = x6

## Position 7 = 6, 8

		= x1, C3, x5, x6, x7										
		P1		P2		P3		P4		P5		
		T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	T <sub>p</sub>	T <sub>a</sub>	
FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx		T6	-50	55	67	55	75	55	75	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T5	-50	65	70	65	90	55	90	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T4...T1	-50	65	70	65	130	40	130	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
FTL50, FTL50H: Ix, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx		T6	-50	55	70	55	75	55	75	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T5	-50	65	95	65	95	65	95	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T4	-50	65	95	65	125	60	125	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>
		T3...T1	-50	65	95	65	150	60	150	-50 -40 <sup>1)</sup>	-50	-50 -40 <sup>1)</sup>

1) Only in connection with Position 8, 9 = x6

## Zone 22



## Ec tc III C

Position 7 = 1

FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx	<b>180 mA</b>			
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +70$	T80
		$-50 \leq T_p \leq +90$	$-40 \leq T_a \leq +66$	T80 to 90
		$-50 \leq T_p \leq +120$	$-40 \leq T_a \leq +53$	T80 to 120
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +40$	T80 to 150
FTL50, FTL50H: Ix, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx	<b>180 mA</b>			
		$-50 \leq T_p \leq +125$	$-40 \leq T_a \leq +70$	T80 to 125
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +67$	T80 to 150
	<b>350 mA</b>			
		$-50 \leq T_p \leq +116$	$-40 \leq T_a \leq +70$	T80 to 116
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +67$	T80 to 150

Position 7 = 2

FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx	<b>350 mA</b>			
		$-50 \leq T_p \leq +95$	$-40 \leq T_a \leq +70$ $-25 \leq T_a \leq +70^{1)}$	T80 to 95
		$-50 \leq T_p \leq +130$	$-40 \leq T_a \leq +55$ $-25 \leq T_a \leq +55^{1)}$	T80 to 130
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +45$ $-25 \leq T_a \leq +45^{1)}$	T80 to 150
FTL50, FTL50H: lx, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx	<b>350 mA</b>			
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +70$ $-25 \leq T_a \leq +70^{1)}$	T80 to 150

1) Only in connection with Position 8, 9 = C3

Position 7 = 4

FTL50, FTL50H: Ax FTL51, FTL51H: Bx, Cx, Dx	<b>2 A, 4 A</b>			
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +70$	T80
		$-50 \leq T_p \leq +90$	$-40 \leq T_a \leq +66$	T80 to 90
		$-50 \leq T_p \leq +120$	$-40 \leq T_a \leq +53$	T80 to 120
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +40$	T80 to 150
	<b>6 A</b>			
		$-50 \leq T_p \leq +90$	$-40 \leq T_a \leq +64$	T80 to 90
		$-50 \leq T_p \leq +120$	$-40 \leq T_a \leq +51$	T80 to 120
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +38$	T80 to 150
FTL50, FTL50H: lx, Qx FTL51, FTL51H: Jx, Kx, Lx, Rx, Sx, Tx	<b>2 A</b>			
		$-50 \leq T_p \leq +125$	$-40 \leq T_a \leq +70$	T80 to 125
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +67$	T80 to 150
	<b>4 A</b>			
		$-50 \leq T_p \leq +116$	$-40 \leq T_a \leq +70$	T80 to 116
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +67$	T80 to 150
	<b>6 A</b>			
		$-50 \leq T_p \leq +97$	$-40 \leq T_a \leq +70$	T80 to 97
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +65$	T80 to 150

*Position 7 = 5, 6, 7*

FTL50, FTL50H: Ax, Ix, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx				
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +70$	T80
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +50$	T80 to 150

*Position 7 = 8*

FTL50, FTL50H: Ax, Ix, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx				
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +70$ $-25 \leq T_a \leq +70$ <sup>1)</sup>	T80
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +50$ $-25 \leq T_a \leq +50$ <sup>1)</sup>	T80 to 150

1) Only in connection with Position 8, 9 = C3

*Position 7 = A*

FTL50, FTL50H: Ax, Ix, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx				
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +60$	T80
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +50$	T80 to 150

*Position 7 = D*

FTL50, FTL50H: Ax, Ix, Qx FTL51, FTL51H: Bx, Cx, Dx, Jx, Kx, Lx, Rx, Sx, Tx				
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +60$	T80

**Connection data** *Basic specification, Position 1 = 4*

<i>Basic specification, Position 7</i>	<b>Supply</b>
4	<p>U = 19 to 253 V<sub>AC</sub>, 50/60 Hz; P<sub>max</sub> ≤ 1.3 W or U = 19 to 55 V<sub>DC</sub></p> <p>Relay: I<sub>max</sub> ~ 6.0 A → U<sub>max</sub> = 253 V<sub>AC</sub>; P<sub>max</sub> = 1500 VA, cos φ = 1 P<sub>max</sub> = 750 VA, cos φ &gt; 0.7 I<sub>max</sub> ~ 6.0 A → U<sub>max</sub> = 30 V<sub>DC</sub> I<sub>max</sub> ~ 0.2 A → U<sub>max</sub> ≤ 125 V<sub>DC</sub></p>

*Basic specification, Position 1 = 5 (only Ex ec, Ex tc)*

<i>Basic specification, Position 7</i>	<b>Supply</b>
A	U = 9 to 32 V <sub>DC</sub> ; connection only to PROFIBUS PA I <sub>max</sub> ≤ 13.5 mA
D	U = 21 to 26 V; connection only to FML621 I <sub>max</sub> ≤ 16 mA
1	U = 19 to 253 V <sub>AC</sub> , 50/60 Hz; P <sub>max</sub> ≤ 0.83 W I <sub>max</sub> ≤ 350 mA
2	U = 10 to 55 V <sub>DC</sub> ; P <sub>max</sub> ≤ 0.83 W I <sub>max</sub> ≤ 350 mA
5	U = 11 to 36 V <sub>DC</sub> ; P <sub>max</sub> ≤ 0.6 W I <sub>max</sub> ≤ 22 mA
6, 8	U = 4 to 12.5 V <sub>DC</sub> ; P <sub>max</sub> ≤ 23 mW I <sub>max</sub> ≤ 3.5 mA
7	U = 9.5 to 12.5 V <sub>DC</sub> ; P <sub>max</sub> ≤ 150 mW I <sub>max</sub> ≤ 13 mA

*Basic specification, Position 1 = 5 (only Ex ic)*

<i>Basic specification, Position 7</i>	<b>Supply</b>	
A	<p>U<sub>i</sub> = 17.5 V P<sub>i</sub> = 5.5 W I<sub>i</sub> = 500 mA C<sub>i</sub> = 2.7 nF L<sub>i</sub> = 10 μH</p>	Fieldbus: PROFIBUS PA
D	<p>U<sub>i</sub> = 27.6 V P<sub>i</sub> = 640 mW I<sub>i</sub> = 93 mA C<sub>i</sub> = 2 nF L<sub>i</sub> = 0.133 mH</p>	Only associated intrinsically safe power supply unit FML621 from Endress+Hauser



<i>Basic specification, Position 7</i>	<b>Supply</b>	
5	$U_i = 36 \text{ V}$ $P_i = 1 \text{ W}$ $I_i = 100 \text{ mA}$ $C_i/L_i = 0$	Power supply unit with max. electrical specifications below the characteristic values of the electronic inserts
6, 8	$U_i = 16 \text{ V}$ $P_i = 170 \text{ mW}$ $I_i = 52 \text{ mA}$ $C_i = 30 \text{ nF}$ $L_i = 0$	Power supply unit with max. electrical specifications below the characteristic values of the electronic inserts
7	$U_i = 16.7 \text{ V}$ $P_i = 1 \text{ W}$ $I_i = 150 \text{ mA}$ $C_i/L_i = 0$	Power supply unit with max. electrical specifications below the characteristic values of the electronic inserts







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