XA00114F-J/00/EN/17.21
71543756
2021-09-27

Safety Instructions
Liquiphant M FTL51C

ATEX, IECEx: Ex db IIC Ga/Gb

Endress+Hauser
People for Process Automation

Liquiphant M FTL51C

Table of contents

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 -> Downloads -> Manuals and Datasheets -> Type: Ex Safety Instruction (XA) -> Text Search: ...
- In the Device Viewer: 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:

KA00162F/00, KA00165F/00

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 -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

EU Declaration of Conformity

Declaration Number:
EC_00455

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

EU type-examination certificate

Certificate number:
DEKRA 15 ATEX 0088 X

List of applied standards: See EU Declaration of Conformity.

IEC Declaration of Conformity

Certificate number:
IECEx DEK 15.0060X

Affixing the certificate number certifies conformity with the following standards (depending on the device version):

- IEC 60079-0 : 2017
- IEC 60079-1 : 2014
- IEC 60079-26 : 2021

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

FTL51C	–	**********	+	A*B*C*D*E*F*G*..
(Device type)		*(Basic specifications)*		*(Optional specifications)*

* = 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

FTL51C

Basic specifications

Position 1 (Approval)		
Selected option		**Description**
FTL51C	5	ATEX II 1/2 G Ex db IIC T6...T1 Ga/Gb IECEx Ex db IIC T6...T1 Ga/Gb

Position 5, 6 (Probe Length, Type)		
Selected option		**Description**
FTL51C	xK	ECTFE
	xL	PFA (Edlon)
	xM	PFA (RubyRed)

Position 7 (Electronics, Output)		
Selected option		**Description**
FTL51C	A	FEL50A; PROFIBUS PA
	D	FEL50D; density/concentration, density electronics w/o WHG approval
	1	FEL51; SIL 2-wire 19-253VAC
	2	FEL52; SIL 3-wire PNP 10-55VDC
	4	FEL54; SIL relay DPDT 19-253VAC/19-55VDC
	5	FEL55; SIL 8/16mA, 11-36VDC
	6	FEL56; SIL NAMUR (L-H signal)
	7	FEL57; SIL 2-wire PFM
	8	FEL58; SIL NAMUR+test button (H-L signal)

Position 8, 9 (Housing, Cable Entry)		
Selected option		**Description**
FTL51C	x1	F27, 316L
	x5	F13, Alu
	x7	T13, Alu, coated.; separate conn. compartment
	Ex	NPT thread
	Fx	G1/2 thread
	Gx	M20 gland

Position 11 (Additional Option 2)		
Selected option		**Description**
FTL51C	A	Not selected
	B	Temp. separator
	C	2nd line of defence (press.tight feed through)

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.
- 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.
- The probe is made of stainless steel or high corrosion-resistant alloy of thickness ≥ 1 mm.
- Only open the device under the following condition: 17 minutes have elapsed since the power supply was switched off.

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 (≤ 0.5 m) generating strong electrostatic charges.

Basic specification, Position 8, 9 = x1
Covers with glass window not permitted.

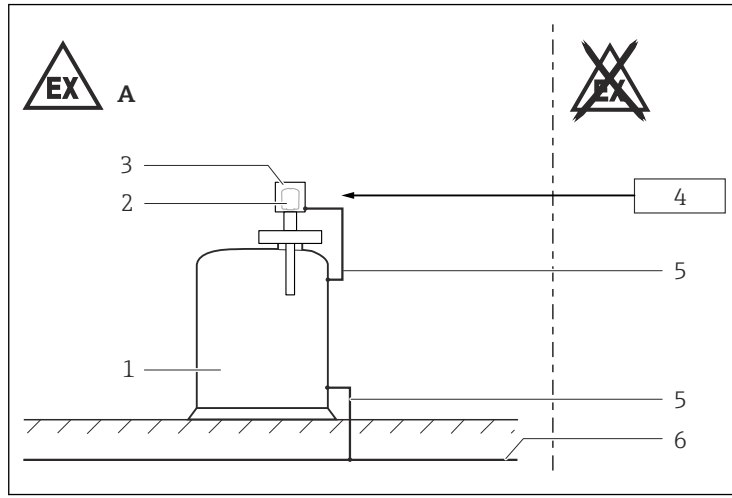
Basic specification, Position 8, 9 = x5, x7

- Covers with glass window only permitted for the following ambient temperatures:
  $-50\ °C \leq T_a \leq +70\ °C$
- Avoid sparks caused by impact and friction.

Device group IIC

- Sensors coated with non-conductive material can be used if avoiding electrostatic charging (e.g. through friction, cleaning, maintenance, strong medium flow).
- Marked with warning sign: “Avoid electrostatic charging”.

Safety instructions: Installation



1

A Zone 1
1 Tank; Zone 0, Zone 1
2 Electronic insert
3 Enclosure
4 Supply unit
5 Potential equalization line
6 Local potential equalization

- Before operation:
  - Screw in the cover all the way.
  - Tighten the securing clamp on the cover.
- 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.
- Perform the following to achieve the degree of protection IP66/68:
  - Screw the cover tight.
  - Mount the cable entry correctly.
- Support extension tube of the device if a dynamic load is expected.
- 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.
- Only use certified cable entries suitable for the application. Observe national regulations and standards. Accordingly, the connection terminal does not include any ignition sources.
- 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.
- The built-in metallic sealing plug is examined and approved for explosion protection type Ex d with the device.
- When operating the transmitter enclosure at an ambient temperature under −20 °C, use appropriate cables and cable entries permitted for this application.
- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the enclosure.

Basic specification, Position 8, 9 = Fx
Flameproof equipment with G threaded entry holes is not intended for new installations but only for replacement of equipment in existing installations. Application of this equipment shall comply with the local installation requirements.

Potential equalization

Integrate the device into the local potential equalization.

Safety instructions: Ex d joints

- If required or if in doubt: ask manufacturer for specifications.
- Flameproof joints are not intended to be repaired.

Temperature tables

Description notes

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

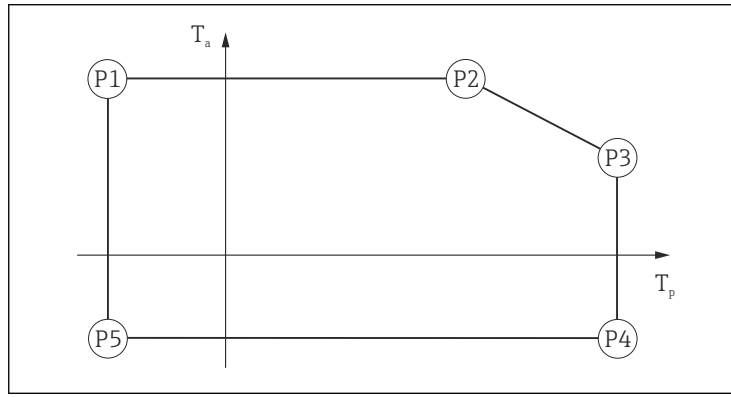
1st line: Position 8, 9 = x1, x5, ...

1st column: Position 11 = A, B, ...

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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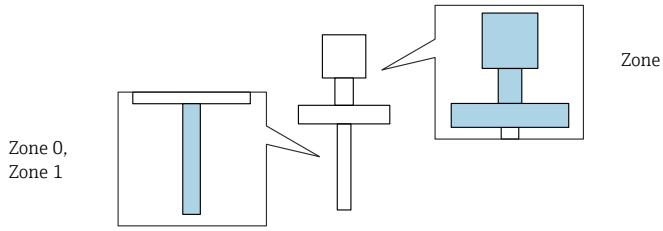
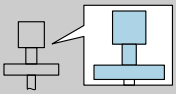
Zone 0, Zone 1



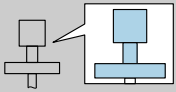
Position 7 = 1



= x1, x5

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A	**180 mA**											
		T6	−50	55	55	55	80	46	80	−60	−50	−60
		T5	−50	70	70	70	95	61	95	−60	−50	−60
		T4	−50	70	76	70	130 120 [1)]	50	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	76	70	150 120 [1)]	42	150 120 [1)]	−60	−50	−60
B, C	**180 mA**											
		T6	−50	55	55	55	80	53	80	−60	−50	−60
		T5	−50	70	70	70	95	68	95	−60	−50	−60
		T4	−50	70	94	70	130 120 [1)]	67	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	94	70	150 120 [1)]	65	150 120 [1)]	−60	−50	−60
	350 mA											
		T6	−50	37	49	37	80	34	80	−60	−50	−60
		T5	−50	52	64	52	95	49	95	−60	−50	−60
		T4	−50	69	69	69	130 120 [1)]	64	130 120 [1)]	−60	−50	−60
		T3...T1	−50	69	69	69	150 120 [1)]	62	150 120 [1)]	−60	−50	−60

1) Only in connection with Position 5, 6 = xK

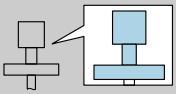


= *x7*

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A	**180 mA**											
		T6	–50	63	64	63	80	59	80	–60	–50	–60
		T5	–50	70	95	70	95	70	95	–60	–50	–60
		T4	–50	70	112	70	130 120 [1)]	66	130 120 [1)]	–60	–50	–60
		T3…T1	–50	70	112	70	150 120 [1)]	61	150 120 [1)]	–60	–50	–60
	350 mA											
		T6	–50	38	39	38	80	29	80	–60	–50	–60
		T5	–50	53	54	53	95	44	95	–60	–50	–60
		T4	–50	70	72	70	130 120 [1)]	57	130 120 [1)]	–60	–50	–60
		T3…T1	–50	70	72	70	150 120 [1)]	53	150 120 [1)]	–60	–50	–60
B, C	**180 mA**											
		T6	–50	62	70	62	80	62	80	–60	–50	–60
		T5	–50	70	95	70	95	70	95	–60	–50	–60
		T4	–50	70	130	70	130 120 [1)]	70	130 120 [1)]	–60	–50	–60
		T3…T1	–50	70	150	70	150 120 [1)]	70	150 120 [1)]	–60	–50	–60
	350 mA											
		T6	–50	36	70	36	80	36	80	–60	–50	–60
		T5	–50	51	95	51	95	51	95	–60	–50	–60
		T4	–50	67	130	67	130 120 [1)]	67	130 120 [1)]	–60	–50	–60
		T3…T1	–50	66	150	66	150 120 [1)]	66	150 120 [1)]	–60	–50	–60

1) Only in connection with Position 5, 6 = xK

Position 7 = 2

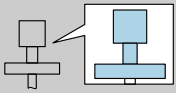


= x1, x5, x7

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A	**350 mA**											
		T6	−50	55	55	55	80	45	80	−60	−50	−60
		T5	−50	70	70	70	95	60	95	−60	−50	−60
		T4	−50	70	76	70	130 120 [1)]	50	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	76	70	150 120 [1)]	42	150 120 [1)]	−60	−50	−60
B, C	**350 mA**											
		T6	−50	55	55	55	80	52	80	−60	−50	−60
		T5	−50	70	70	70	95	67	95	−60	−50	−60
		T4	−50	70	94	70	130 120 [1)]	67	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	94	70	150 120 [1)]	65	150 120 [1)]	−60	−50	−60

1) Only in connection with Position 5, 6 = xK

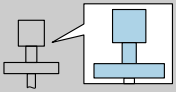
Position 7 = 4



= x1, x5

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A	**2 A**											
		T6	−50	52	52	52	80	40	80	−60	−50	−60
		T5	−50	67	67	67	95	55	95	−60	−50	−60
		T4	−50	70	77	70	130 120 [1]	70	130 120 [1]	−60	−50	−60
		T3...T1	−50	70	77	70	150 120 [1]	70	150 120 [1]	−60	−50	−60
B, C	**2 A**											
		T6	−50	52	52	52	80	49	80	−60	−50	−60
		T5	−50	67	67	67	95	63	95	−60	−50	−60
		T4	−50	70	100	70	130 120 [1]	67	130 120 [1]	−60	−50	−60
		T3...T1	−50	70	100	70	150 120 [1]	66	150 120 [1]	−60	−50	−60
	4 A											
		T6	−50	41	50	41	80	38	80	−60	−50	−60
		T5	−50	56	65	56	95	53	95	−60	−50	−60
		T4	−50	69	76	69	130 120 [1]	64	130 120 [1]	−60	−50	−60
		T3...T1	−50	69	76	69	150 120 [1]	63	150 120 [1]	−60	−50	−60

1) Only in connection with Position 5, 6 = xK

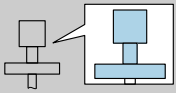


= *x7*

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A	**2 A**											
		T6	−50	55	56	55	80	50	80	−60	−50	−60
		T5	−50	70	71	70	95	65	95	−60	−50	−60
		T4	−50	70	94	70	130 120 [1)]	61	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	94	70	150 120 [1)]	57	150 120 [1)]	−60	−50	−60
B, C	**2 A**											
		T6	−50	55	59	55	80	53	80	−60	−50	−60
		T5	−50	70	74	70	95	68	95	−60	−50	−60
		T4	−50	70	130	70	130 120 [1)]	70	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	148	70	150 120 [1)]	69	150 120 [1)]	−60	−50	−60
	4 A											
		T6	−50	45	62	45	80	44	80	−60	−50	−60
		T5	−50	60	77	60	95	59	95	−60	−50	−60
		T4	−50	70	113	70	130 120 [1)]	69	130 120 [1)]	−60	−50	−60
		T3...T1	−50	70	115	70	150 120 [1)]	67	150 120 [1)]	−60	−50	−60

1) Only in connection with Position 5, 6 = xK

Position 7 = A, 5, 6, 7, 8

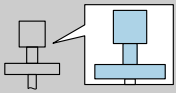


= *x1, x5, x7*

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A, B, C												
		T6	−50	70	75	70	80	65	80	−60	−50	−60
		T5	−50	70	95	70	95	70	95	−60	−50	−60
		T4	−50	70	100	70	130 120 [1]	70	130 120 [1]	−60	−50	−60
		T3...T1	−50	70	110	70	150 120 [1] [2]	70	150 120 [1]	−60	−50	−60

1) Only in connection with Position 5, 6 = xK
2)

Position 7 = D



= *x1, x5, x7*

			P1		P2		P3		P4		P5	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
A, B, C												
		T6...T1	−50	70	75	70	80	65	80	−40	−50	−40

Connection data

Basic specification, Position 7	**Power supply circuit**	**Output**
A	For connection to a Fieldbus	PROFIBUS PA or FOUNDATION Fieldbus
D	Only associated intrinsically safe power supply unit FML621 from Endress+Hauser	
1	U = 19 to 253 V_{AC}, 50/60 Hz; max. 0.96 VA	max. 350 mA
2	U = 10 to 55 V_{DC}; max. 0.83 W	PNP transistor; max. 350 mA
4	U = 19 to 253 V_{AC}, 50/60 Hz or 19 to 55 V_{DC}; max. 1.3 W	2 potential free change-over contacts; 4 A Ex d
5	U = 11 to 36 V_{DC}; max. 0.6 W	max. 22 mA
6	U = 4 to 12.5 V_{DC}; max. 0.23 W	NAMUR; max. 3.5 mA
7	U = max. 16.7 V_{DC}; max. 0.15 W	PFM; max. 12 mA
8	U = 4 to 12.5 V_{DC}; max. 0.23 W	NAMUR; max. 3.5 mA

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