

Safety Instructions

Liquiphant FTL51B

4-20 mA HART

Ex db IIC T6...T1 Ga/Gb

Ex db IIC T6...T1 Gb

Ex ta IIIC T₂₀₀ xxx°C Da/Ex tb IIIC T_L xxx°C Db

Ex tb IIIC T_L xxx°C Db



Liquiphant FTL51B

4-20 mA HART

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About this document

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

Associated documentation

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

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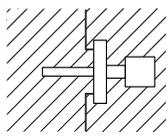
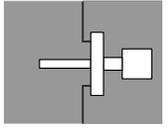
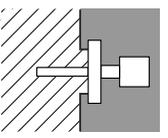
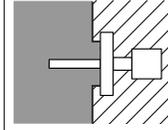
Supplementary documentation

Explosion protection brochure: CP00021Z

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

**General notes:
Combined approval**

							
Ex db IIC		Ex ta/tb IIIC		Ex db IIC		Ex ta/tb IIIC	
Zone 0 or Zone 1	Zone 1	Zone 20 or Zone 21	Zone 21	Zone 0 or Zone 1	Zone 21	Zone 20 or Zone 21	Zone 1

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

NEPSI Declaration of Conformity

Certificate number:
GYJ23.1197X

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

- GB/T 3836.1-2021
- GB/T 3836.2-2021
- GB/T 3836.31-2021

Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Address of the manufacturing plant: See nameplate.

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

FTL51B	-	*****	+	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



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

FTL51B

Basic specifications

Position 1, 2 (Approval)		
Selected option		Description
FTL51B	NM	NEPSI Ex db IIC T6...T1 Ga/Gb NEPSI Ex db IIC T6...T1 Gb NEPSI Ex ta IIIC T ₂₀₀ xxx°C Da/Ex tb IIIC T _L xxx°C Db NEPSI Ex tb IIIC T _L xxx°C Db

Position 3, 4 (Output)		
Selected option		Description
FTL51B	BA	FEL60H, 2-wire 4...20 mA HART+test button

Position 6 (Housing, Material)		
Selected option		Description
FTL51B	B	Single compartment; Alu, coated
	M	Dual compartment L-shape; Alu, coated
	N	Dual compartment L-shape; 316L

Position 7 (Electrical Connection)		
Selected option		Description
FTL51B	F	Thread M20, IP66/68 NEMA Type 4X/6P
	G	Thread G1/2 ¹⁾ , IP66/68 NEMA Type 4X/6P
	H	Thread NPT1/2, IP66/68 NEMA Type 4X/6P

1) Reduction M20x1.5 to G1/2 enclosed

Position 10 (Type of Probe)		
Selected option		Description
FTL51B	1	Compact version
	2	Extension tube
	3	Short tube version

Optional specifications

ID Jx, Kx (Test, Certificate, Declaration)		
Selected option		Description
FTL51B	JL	Ambient temperature -50°C/-58°F
	JN	Ambient temperature -52°C/-62°F
	JT	Ambient temperature -60°C/-76°F

ID Px, Rx (Accessory Enclosed)		
Selected option		Description
FTL51B	PA ¹⁾	Weather protection cover, 316L

1) Only in connection with Position 6 = M, N

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.
- For installation, use and maintenance of the device, users must also observe the requirements stated in the Operating Instructions and the standards:
 - GB 50257-2014: "Code for construction and acceptance of electric equipment on fire and explosion hazard electrical equipment installation engineering".
 - GB/T 3836.13-2021: "Explosive atmospheres, Part 13: Equipment repair, overhaul, reclamation and modification".
 - GB/T 3836.15-2017: "Explosive atmospheres, Part 15: Electrical installations design, selection and erection".
 - GB/T 3836.16-2022: "Explosive atmospheres, Part 16: Electrical installations inspection and maintenance".
 - GB/T 3836.18-2017: "Explosive atmospheres, Part 18: Intrinsically safe electrical systems".
 - GB 15577-2018: "Safety regulations for dust explosive prevention and protection". (Only if installed in dust hazardous area.)
- Devices suitable for zone separation (marked Ga/Gb or Da/Db) are always suitable for installation in the less critical zone (Gb or Db). Due to space limitations the corresponding marking maybe not indicated on the nameplate.
- 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
- Comply with the installation and safety instructions in the Operating Instructions.
- 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.
- 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**

Permitted ambient temperature range at the electronics enclosure:
 $-40\text{ °C} \leq T_a \leq +70\text{ °C}$

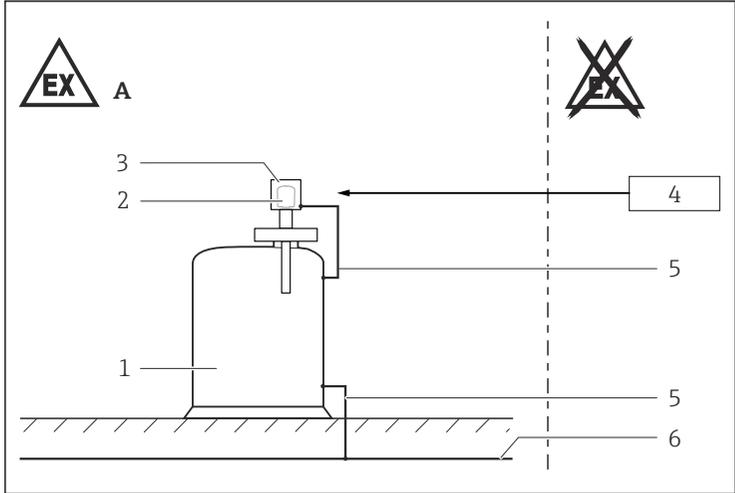
- Limitations of the maximum ambient temperature at the electronics enclosure may be required dependent on device configuration, process temperatures and temperature classification.
- Details of limitations: →  12 and →  16, "Temperature tables".
- To avoid electrostatic charging: Do not rub surfaces 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 ($\leq 0.5\text{ m}$) generating strong electrostatic charges.
- Avoid sparks caused by impact and friction.
- Covers with glass window only permitted for the following ambient temperatures:
 $-50\text{ °C} \leq T_a \leq +70\text{ °C}$

Optional specification, ID Px, Rx = PA

Connect the weather protection cover to the local potential equalization.

Ex db IIC T6...T1 Ga/Gb,
Ex db IIC T6...T1 Gb

Safety
instructions:
Installation



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

- After aligning (rotating) the enclosure, retighten the fixing screw.
- Before operation:
 - Screw in the cover all the way.
 - Tighten the securing screw 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.
- Continuous service temperature of the connecting cable / cable gland / cable entry: $\geq T_a + 20 \text{ K}$.
- Perform the following to achieve the degree of protection IP66/68:
 - Screw the cover tight.
 - Mount the cable entry correctly.

- Connect the device:
 - Using suitable cable and wire entries of protection type "Flameproof Enclosure (Ex db)".
 - Using piping systems of protection type "Flameproof Enclosure (Ex db)".
- 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 genuine spare parts from Endress+Hauser which are specified for the device.
- Only use certified cable entries suitable for the application. Observe national regulations and standards.
- 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 7 = G

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.

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).

Potential equalization

Integrate the device into the local potential equalization.

Optional specification, ID Px, Rx = PA

Connect the weather protection cover to 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.

Safety instructions: Zone 0

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.

Safety instructions: Zone separation Zone 0, Zone 1

The zone separation wall of the device is made of stainless steel or high corrosion-resistant alloy of thickness ≥ 1 mm.

Temperature tables

-  The specified ambient and process temperature ranges exclusively refer to the explosion protection and must not be exceeded. Operationally permitted ambient temperature ranges can be restricted depending on the version: See Operating Instructions.
- Do not exceed the max. ambient temperature at the enclosure.

 *Optional specification, ID Jx, Kx = JL*
Lower limit of the ambient temperature for explosion protection changes to -50 °C.

Optional specification, ID Jx, Kx = JN
Lower limit of the ambient temperature for explosion protection changes to -52 °C.

Optional specification, ID Jx, Kx = JT
Lower limit of the ambient temperature for explosion protection changes to -60 °C.

Basic specification, Position 10 = 1

Temperature class	Process temperature range	Ambient temperature range
T6	-40 °C $\leq T_p \leq +80$ °C -40 °C $\leq T_p \leq +60$ °C	-40 °C $\leq T_a \leq +55$ °C -40 °C $\leq T_a \leq +60$ °C
T5	-40 °C $\leq T_p \leq +95$ °C	-40 °C $\leq T_a \leq +60$ °C
T4	-40 °C $\leq T_p \leq +100$ °C -40 °C $\leq T_p \leq +130$ °C	-40 °C $\leq T_a \leq +60$ °C -40 °C $\leq T_a \leq +50$ °C
T3...T1	-40 °C $\leq T_p \leq +150$ °C	-40 °C $\leq T_a \leq +45$ °C

Basic specification, Position 10 = 2, 3

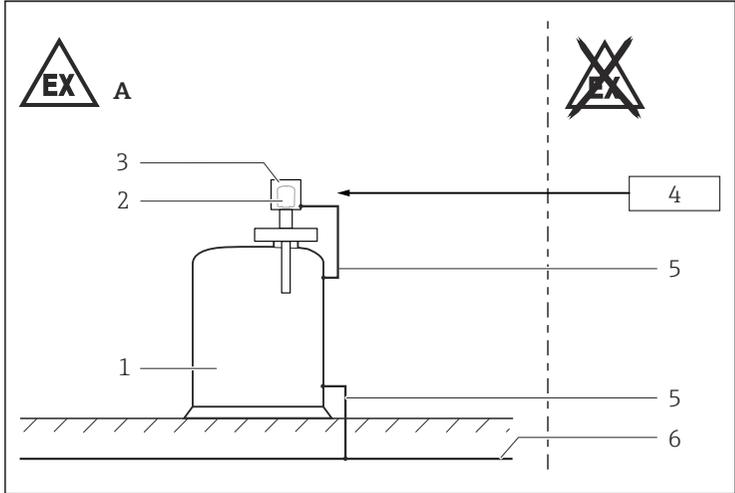
Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$ $-40\text{ °C} \leq T_p \leq +60\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$ $-40\text{ °C} \leq T_a \leq +70\text{ °C}$
T5	$-40\text{ °C} \leq T_p \leq +95\text{ °C}$	$-40\text{ °C} \leq T_a \leq +70\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$ $-40\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +70\text{ °C}$ $-40\text{ °C} \leq T_a \leq +70\text{ °C}$
T3...T1	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Connection data

Power supply
U ≤ 35 V _{DC} P ≤ 1 W

Ex ta IIIC T₂₀₀ xxx°C Da/Ex tb IIIC T_L xxx°C Db,
Ex tb IIIC T_L xxx°C Db

**Safety
instructions:
Installation**



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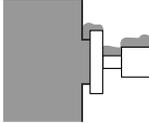
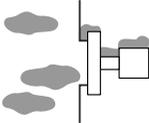
- A Zone 21
1 Tank; Zone 20, Zone 21
2 Electronic insert
3 Enclosure
4 Power supply unit
5 Potential equalization line
6 Local potential equalization

- After aligning (rotating) the enclosure, retighten the fixing screw.
- Do not open in a potentially explosive dust atmosphere.
- 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.
- Seal the cable entry or piping tight (see protection type of enclosure in the "Temperature tables" chapter).
- 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.

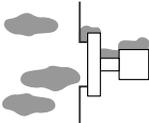
- Support extension tube of the device if a dynamic load is expected.
- Only use genuine spare parts from Endress+Hauser which are specified for the device.
- Before operation:
 - Screw in the cover all the way.
 - Tighten the securing screw on the cover.

Permitted ambient conditions

Ex ta IIIC T₂₀₀ xxx°C Da/Ex tb IIIC T_L xxx°C Db

Process Zone 20		Enclosure Zone 21
Continuous dust submersion		Dust accumulation or temporary explosive dust atmosphere
Continuous explosive dust atmosphere and deposits		Dust accumulation or temporary explosive dust atmosphere

Ex tb IIIC T_L xxx°C Db

Process Zone 21		Enclosure Zone 21
Continuous dust deposits or temporary explosive dust atmosphere		Dust accumulation or temporary explosive dust atmosphere

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).

Potential equalization

Integrate the device into the local potential equalization.

Optional specification, ID Px, Rx = PA

Connect the weather protection cover to the local potential equalization.

Temperature tables

-  The specified surface temperature takes into account all direct heat influences from process heat and self-heating at the enclosure.
- The T-marking is based on the process temperature of the compact designs.
- The specified ambient and process temperature ranges exclusively refer to the explosion protection and must not be exceeded. Operationally permitted ambient temperature ranges can be restricted depending on the version: See Operating Instructions.
- Do not exceed the max. ambient temperature at the enclosure.

 *Optional specification, ID Jx, Kx = JL*
 Lower limit of the ambient temperature for explosion protection changes to -50 °C.

 Protection type of enclosure: IP66/67

For detailed information see Technical Information.

Ex ta IIIC T₂₀₀ 155 °C Da / Ex tb IIIC T_L 155 °C Db

Ex tb IIIC T_L 155 °C Db

Basic specification, Position 10 = 1

Maximum surface temperature	Process temperature range	Ambient temperature range
T155 °C	-40 °C ≤ T _p ≤ +80 °C	-40 °C ≤ T _a ≤ +65 °C
	-40 °C ≤ T _p ≤ +100 °C	-40 °C ≤ T _a ≤ +60 °C
	-40 °C ≤ T _p ≤ +120 °C	-40 °C ≤ T _a ≤ +55 °C
	-40 °C ≤ T _p ≤ +150 °C	-40 °C ≤ T _a ≤ +50 °C

Basic specification, Position 10 = 2, 3

Maximum surface temperature	Process temperature range	Ambient temperature range
T155 °C	-40 °C ≤ T _p ≤ +80 °C	-40 °C ≤ T _a ≤ +70 °C
	-40 °C ≤ T _p ≤ +100 °C	-40 °C ≤ T _a ≤ +70 °C
	-40 °C ≤ T _p ≤ +120 °C	-40 °C ≤ T _a ≤ +70 °C
	-40 °C ≤ T _p ≤ +150 °C	-40 °C ≤ T _a ≤ +70 °C

Specific conditions of use:

- The surface temperature is
 - for equipment protection level (EPL) Da: T_{200} 155 °C (with 200 mm dust deposit)
 - and equipment protection level (EPL) Db: T_L 155 °C (with dust accumulation T_L)
- The surface temperature is for equipment protection level (EPL) Db: T_L 155 °C (with dust accumulation T_L)



T_L marking:

The assigned surface temperature without dust layer is the same.

Connection data

Power supply
$U \leq 35 V_{DC}$ $P \leq 1 W$



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www.addresses.endress.com
