

Safety Instructions

Liquiphant FTL51B

4-20 mA HART

Ex ia IIC T6...T1 Ga/Gb

Ex ia IIC T6...T1 Gb

Ex ia IIIC T₂₀₀ xxx°C Da/Ex ia IIIC T_L xxx°C Db

Ex ia 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:
BA02213F

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 ia IIC	Zone 1	Ex ia IIIC	Zone 21	Ex ia IIC	Zone 21	Ex ia IIIC	Zone 21
Zone 0 or Zone 1		Zone 20 or Zone 21		Zone 0 or Zone 1		Zone 20 or Zone 21	

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

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	NK	NEPSI Ex ia IIC T6...T1 Ga/Gb NEPSI Ex ia IIC T6...T1 Gb NEPSI Ex ia IIIC T ₂₀₀ xxx°C Da/Ex ia IIIC T _L xxx°C Db NEPSI Ex ia 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 5 (Display, Operation)		
Selected option		Description
FTL51B	A	W/o; switch
	E	Graphic display with touch control
	F	Graphic display with touch control+Bluetooth

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	B	Gland M20, brass nickel plated, IP66/68 NEMA Type 4X/6P
	C	Gland M20, 316L, IP66/68 NEMA Type 4X/6P
	F	Thread M20, IP66/68 NEMA Type 4X/6P
	G	Thread G1/2, IP66/68 NEMA Type 4X/6P
	H	Thread NPT1/2, IP66/68 NEMA Type 4X/6P

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

ID Mx (Sensor Design)		
Selected option		Description
FTL51B	MR	Temperature separator
	MS	Pressure tight feed through (Second line of defence)

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
FTL51B	NA ¹⁾	Overvoltage protection

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

ID Px, Rx (Accessory Enclosed)		
Selected option		Description
FTL51B	PA ¹⁾	Weather protection cover, 316L
	PB ²⁾	Weather protection cover, plastic

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

2) Only in connection with Position 6 = B


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, "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.

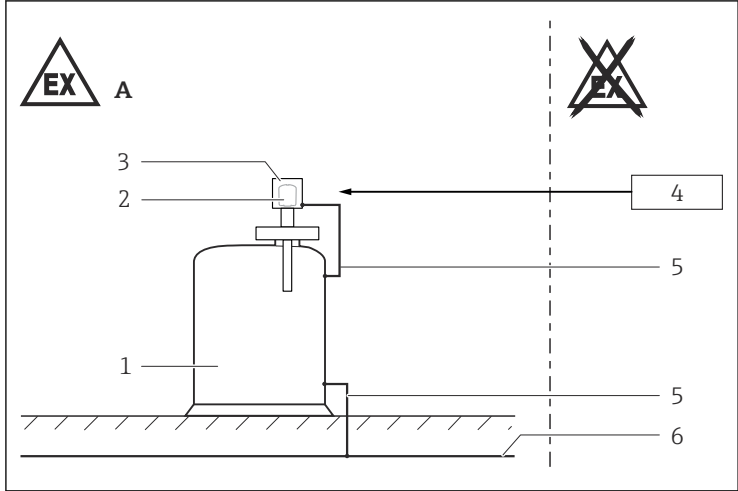
Optional specification, ID Px, Rx = PA

Connect the weather protection cover to the local potential equalization.

Optional specification, ID Px, Rx = PB

Avoid electrostatic charging of the weather protection cover (e.g. friction, cleaning, maintenance, strong medium flow).

Safety instructions: Installation



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- A Zone 1, Zone 21
 1 Tank; Zone 0, Zone 1, Zone 20, Zone 21
 2 Electronic insert
 3 Enclosure
 4 Associated intrinsically safe power supply units
 5 Potential equalization line
 6 Local potential equalization

- After aligning (rotating) the enclosure, retighten the fixing screw.
- Connect the device using suitable cable and wire entries of protection type "Intrinsic safety (Ex i)". An ingress protection of at least IP54 must be achieved.
- When the device is connected to certified intrinsically safe circuits of Category Ex ib for Equipment Groups IIC and IIB, the type of protection changes to Ex ib IIC and Ex ib IIB. Do not operate the sensor in Zone 0 if connecting to an intrinsically safe circuit of Category Ex ib.
- When the device is connected to certified intrinsically safe circuits of Category Ex ib for Equipment Groups IIIC and IIIB, the type of protection changes to Ex ib IIIC and Ex ib IIIB. Do not operate the sensor in Zone 20 if connecting to an intrinsically safe circuit of Category Ex ib.
- Continuous service temperature of the connecting cable: $\geq T_a + 20 \text{ K}$.
- Perform the following to achieve the degree of protection IP66/67:
 - Screw the cover tight.
 - Mount the cable entry correctly.

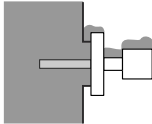
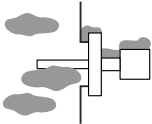
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.
- Observe the maximum process conditions according to the manufacturer's Operating Instructions.
- At high medium temperatures, 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.

Device group III, Application in dust

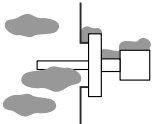
- To ensure the ingress protection IP66/67: Only use the unit-mounted cable entries, sealing plugs and O-rings.
- Supplied cable glands and metallic sealing plugs comply with the requirements of type of protection marked on the nameplate.

Permitted ambient conditions

Ex ia IIIC T₂₀₀ xxx°C Da/Ex ia 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 ia 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).

Intrinsic safety

- The device is only suitable for connection to certified, intrinsically safe equipment with explosion protection Ex ia / Ex ib.
- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least $500 V_{\text{rms}}$.

Optional specification, ID Nx, Ox = NA

The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least $290 V_{\text{rms}}$.

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: 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



Optional specification, ID Jx, Kx = JI

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 Px, Rx = PB

When using the weather protection cover: Reduce the admissible ambient temperature by 10 K.

Ex ia IIC T6...T1 Ga/Gb

- 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.

Basic specification, Position 5 = A

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +75\text{ °C}$ $-40\text{ °C} \leq T_p \leq +60\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$ $-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T5	$-40\text{ °C} \leq T_p \leq +90\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T4...T1	$-40\text{ °C} \leq T_p \leq +120\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$

with Optional specification, ID Mx = MR, MS

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +75\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T5	$-40\text{ °C} \leq T_p \leq +90\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +125\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T3...T1	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Basic specification, Position 5 = E, F

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +75\text{ °C}$ $-40\text{ °C} \leq T_p \leq +60\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$ $-40\text{ °C} \leq T_a \leq +50\text{ °C}$
T5	$-40\text{ °C} \leq T_p \leq +90\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
T4...T1	$-40\text{ °C} \leq T_p \leq +120\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$

with Optional specification, ID Mx = MR, MS

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +75\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T5	$-40\text{ °C} \leq T_p \leq +90\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +125\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T3...T1	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

Ex ia IIIC T₂₀₀ xxx°C Da/Ex ia IIIC T_L xxx°C Db

- 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.

For detailed information see Technical Information.

Ex ia IIIC T₂₀₀ 135 °C / 155 °C Da/Db

Ex ia IIIC T_L 135 °C / 155 °C Db

Basic specification, Position 5 = A

Maximum surface temperature	Process temperature range	Ambient temperature range
T135 °C	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +120\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$

with Optional specification, ID Mx = MR, MS

Maximum surface temperature	Process temperature range	Ambient temperature range
T155 °C	$-40\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Basic specification, Position 5 = E, F

Maximum surface temperature	Process temperature range	Ambient temperature range
T135 °C	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +120\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$

with Optional specification, ID Mx = MR, MS

Maximum surface temperature	Process temperature range	Ambient temperature range
T155 °C	$-40\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

Specific conditions of use:

- The surface temperature is
 - for equipment protection level (EPL) Da: T_{200} 135 °C / 155 °C (with 200 mm dust deposit)
 - and equipment protection level (EPL) Db: T_L 135 °C / 155 °C (with dust accumulation T_L)
- The surface temperature is for equipment protection level (EPL) Db: T_L 135 °C / 155 °C (with dust accumulation T_L)



T_L marking:

The assigned surface temperature without dust layer is the same.

Connection data

Power supply
$U_i \leq 30\text{ V}_{DC}$ $I_i \leq 300\text{ mA}$ $P_i \leq 1\text{ W}$ $C_i \leq 10\text{ nF}$ $L_i = 0$

Cable entry parameters

Ex ia IIC

Not relevant.

Ex ia IIIC

Cable gland: *Basic specification, Position 7 = B*

mandatory for Position 6 = B, M

Thread	Clamping range	Material	Sealing insert	O-ring
M20x1,5	ø 8 to 10.5 mm	Ms, nickel-plated	Silicone	EPDM (ø 17x2)

Cable gland: *Basic specification, Position 7 = C*

preferably for Position 6 = N and possible for Position 6 = B, M

Thread	Clamping range	Material	Sealing insert	O-ring
M20x1,5	ø 7 to 12 mm	1.4404	NBR	EPDM (ø 17x2)



- The tightening torque refers to cable glands installed by the manufacturer:
 - Recommended torque to connect the cable gland into the enclosure: 3.75 Nm
 - Recommended torque to tighten the cable into the cable gland: 3.5 Nm
 - Maximum torque to tighten the cable into the cable gland: 10 Nm
 - This value may be different depending on the type of cable. However, the maximum value must not be exceeded.
- Only suitable for fixed installation. The operator must pay attention to a suitable strain relief of the cable.
- To maintain the ingress protection of the enclosure: Install the enclosure cover, cable glands and blind plugs correctly.
- The cable glands are suitable for a low risk of mechanical danger (4 Joule) and must be mounted in a protected position if larger impact energy levels are expected.



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