

# Safety Instructions

## Liquiphant FTL64

4-20 mA HART

Control Drawing IS

Class I, II, III, Div. 1, Groups A-G

Class I, Div. 1, Groups A-D

Class I, Zone 0, AEx/Ex ia IIC Ga



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# Liquiphant FTL64

4-20 mA HART

## Table of contents

Associated documentation ..... 4

Certificates and declarations ..... 4

Certificate holder ..... 4

Extended order code ..... 4

Safety instructions: General ..... 7

Safety instructions: Specific conditions of use ..... 7

Safety instructions: Installation ..... 9

Intrinsic safety ..... 10

Process seals ..... 10

Explosion protection with heat insulation ..... 11

Temperature tables ..... 11

Connection data ..... 14

<b>Associated documentation</b>	<p>All documentation is available on the Internet: <a href="http://www.endress.com/Deviceviewer">www.endress.com/Deviceviewer</a> (enter the serial number from the nameplate).</p> <p>To commission the device, please observe the Operating Instructions pertaining to the device: BA02215F</p>
<b>Certificates and declarations</b>	<p><b>CSA C/US certificate</b></p> <p>Certificate number: CSA19CA80022351</p>
<b>Certificate holder</b>	<p>Endress+Hauser SE+Co. KG Hauptstraße 1 79689 Maulburg, Germany Address of the manufacturing plant: See nameplate.</p>
<b>Extended order code</b>	<p>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.</p>

**Structure of the extended order code**

FTL64	–	*****	+	A*B*C*D*E*F*G*..
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>
<p>* = Placeholder</p> <p>At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.</p>				

*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

FTL64

Basic specifications

Position 1, 2 (Approval)		
Selected option		Description
FTL64	CB	CSA C/US IS Cl. I, II, III, Div. 1, Gr. A-G; Cl. I, Zn. 0, AEx/Ex ia IIC T6 Ga
	CH	CSA C/US IS Cl. I, Div. 1, Gr. A-D; Cl. I, Zn. 0, AEx/Ex ia IIC T6 Ga

Position 3, 4 (Output)		
Selected option		Description
FTL64	BA	FEL60H, 2-wire 4...20 mA HART+test button

Position 5 (Display, Operation)		
Selected option		Description
FTL64	A	W/o; switch
	E	Graphic display with touch control
	F	Graphic display with touch control+Bluetooth

Position 6 (Housing, Material)		
Selected option		Description
FTL64	B	Single compartment; Alu, coated
	M	Dual compartment L-shape; Alu, coated
	N	Dual compartment L-shape; 316L

Position 8 (Application)		
Selected option		Description
FTL64	D	Process max 280°C/536°F, max 100bar
	E	Process max 230°C/446°F, max 100bar
	R	Process max 230°C/446°F, max 40bar (PFA)
	9	Special version: Process max 300°C/572°F, max 100bar

Position 9 (Surface Refinement)		
Selected option		Description
FTL64	A	Standard Ra<3,2um/126uin
	R	Coating PFA (conductive)

*Optional specifications*

ID Jx, Kx (Test, Certificate, Declaration)		
Selected option		Description
FTL64	JL	Ambient temperature -50°C/-58°F
	JN	Ambient temperature -52°C/-62°F

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
FTL64	NA <sup>1)</sup>	Overvoltage protection

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

ID Px, Rx (Accessory Enclosed)		
Selected option		Description
FTL64	PA <sup>1)</sup>	Weather protection cover, 316L
	PB <sup>2)</sup>	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 hazardous locations as defined in the Canadian Electrical Code, Part I or the National Electrical Code (NFPA70). 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
- 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: Specific conditions of use

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: →  11, "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 ( $\leq 0.5$  m) generating strong electrostatic charges.
- Avoid sparks caused by impact and friction.
- The high-temperature part of the device (fork/pipe/process connection/temperature spacer) is designed in type of protection XP/Ex db and has an IS/Ex ia connection to the electronics insert. The installation on the terminals of the device must always be carried out in type of protection IS/Ex i.

*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).

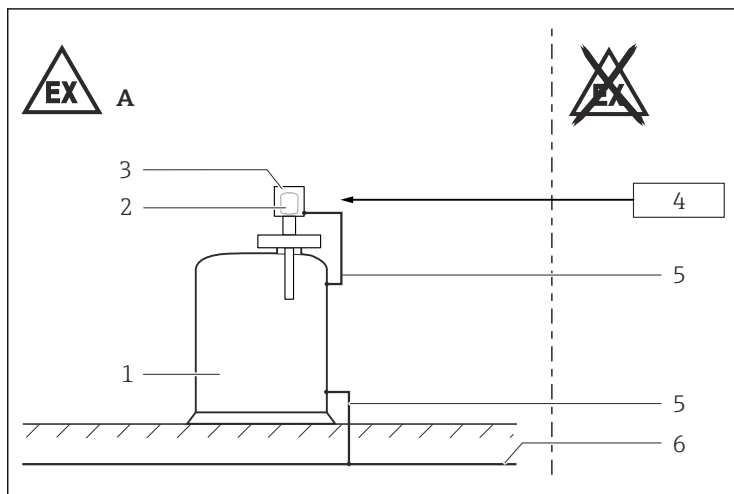
### **For hazardous location Group A, B and C / Group IIC and IIB**

*Basic specification, Position 9 = R*

- Due to the surface resistance  $1 \text{ G}\Omega$  ([R] PFA-conductive) or the enamel (glass) surface [T], these coatings are suitable without restrictions.
- Prevent damage to the conductive surface layer (e.g. by abrasion).



## Safety instructions: Installation



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- A Zone 0; Class I, II, III, Div. 1, Groups A-G  
 1 Tank; Zone 0; Class I, II, III, Div. 1, Groups A-G  
 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.
- Continuous service temperature of the connecting cable:  $\geq T_a + 20\text{ K}$ .
- 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.

### 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.

### Intrinsic safety

**Class I, Div. 1, Groups A-D, Class II, III, Div. 1, Groups E-G;  
Class I, Zone 0, AEx/Ex ia IIC T6 Ga**

### Entity installation

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- Use an intrinsic safety barrier or other associated equipment that is approved for the country in use and satisfies the following conditions:  

$$U_o (V_{oc}) \leq U_i (V_{max}), I_o (I_{sc}) \leq I_i (I_{max}), C_o (C_a) \geq C_i + C_{cable},$$

$$L_o (L_a) \geq L_i + L_{cable} \text{ and } P_o \leq P_i.$$
- For transmitter parameters: See "Connection data" section.
- Control room equipment may not use or generate over 250 V<sub>rms</sub>.
- Always follow the installation instructions provided by the intrinsic safety barrier manufacturer when installing this equipment.
- WARNINGS: Substitution of components may impair intrinsic safety.
- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least 500 V<sub>rms</sub>.

*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<sub>rms</sub>.

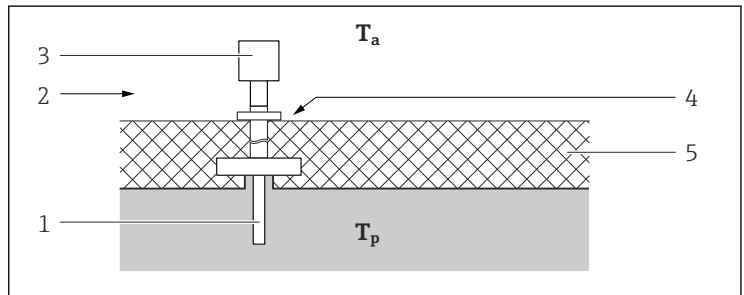
### Process seals

The device is rated as a Single Seal device and does not require the use of an external secondary process seal.

## Explosion protection with heat insulation

Basic specification, Position 8 = D, E, R, 9

- 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



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 Px, Rx = PB

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

**Class I, Div. 1; Zone 0**



- 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 8 = E, R*

*with Basic specification, Position 5 = A*

Temperature class	Process temperature range	Ambient temperature range
T6	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T5	$-60\text{ °C} \leq T_p \leq +95\text{ °C}$	$-40\text{ °C} \leq T_a \leq +70\text{ °C}$
T4	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T3	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T2	$-60\text{ °C} \leq T_p \leq +230\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$

*with Basic specification, Position 5 = E, F*

Temperature class	Process temperature range	Ambient temperature range
T6	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T5	$-60\text{ °C} \leq T_p \leq +95\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T4	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T3	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T2	$-60\text{ °C} \leq T_p \leq +230\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

*Basic specification, Position 8 = D, 9*

*with Basic specification, Position 5 = A*

Temperature class	Process temperature range	Ambient temperature range
T6	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T5	$-60\text{ °C} \leq T_p \leq +95\text{ °C}$	$-40\text{ °C} \leq T_a \leq +70\text{ °C}$
T4	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T3	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T2	$-60\text{ °C} \leq T_p \leq +280\text{ °C}$ $-60\text{ °C} \leq T_p \leq +290\text{ °C}^{1)}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$ $-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T1	$-60\text{ °C} \leq T_p \leq +300\text{ °C}^{1)}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$

1) Only in connection with Position 8 = 9

with Basic specification, Position 5 = E, F

Temperature class	Process temperature range	Ambient temperature range
T6	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T5	$-60\text{ °C} \leq T_p \leq +95\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T4	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T3	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T2	$-60\text{ °C} \leq T_p \leq +280\text{ °C}$ $-60\text{ °C} \leq T_p \leq +290\text{ °C}^{1)}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$ $-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T1	$-60\text{ °C} \leq T_p \leq +300\text{ °C}^{1)}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

1) Only in connection with Position 8 = 9

### Class I, III, Div. 1



- 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.

Basic specification, Position 8 = E, R

with Basic specification, Position 5 = A

Maximum surface temperature	Process temperature range	Ambient temperature range
T235 °C	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +70\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +230\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$

with Basic specification, Position 5 = E, F

Maximum surface temperature	Process temperature range	Ambient temperature range
T235 °C	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +230\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

Basic specification, Position 8 = D, 9

with Basic specification, Position 5 = A

Maximum surface temperature	Process temperature range	Ambient temperature range
T285 °C	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +70\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +280\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T305 °C	$-60\text{ °C} \leq T_p \leq +300\text{ °C}^{1)}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$

1) Only in connection with Position 8 = 9

with Basic specification, Position 5 = E, F

Maximum surface temperature	Process temperature range	Ambient temperature range
T285 °C	$-60\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +195\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-60\text{ °C} \leq T_p \leq +280\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T305 °C	$-60\text{ °C} \leq T_p \leq +300\text{ °C}^{1)}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

1) Only in connection with Position 8 = 9

Connection data

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

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