

Safety Instructions

Liquiphant FTL64

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

Ex db ia IIC T6...T1 Gb



Liquiphant FTL64

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About this document

The document number of these Safety Instructions (XA) must match the information on the nameplate.

Associated documentation

All documentation is available on the Internet:

www.endress.com/Deviceviewer

(enter the serial number from the nameplate).

To commission the device, please observe the Operating Instructions pertaining to the device:

BA02037F

Supplementary documentation

Special Documentation for cable gland M20 Ex d: SD02550F

Explosion protection brochure: CP00021Z

The explosion protection brochure is available on the Internet:

www.endress.com/Downloads

Certificates and declarations**Certificate of Conformity**

Certificate number:

CML 24JPN1308X

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

- JNIO SH-TR-46-1 : 2020
- JNIO SH-TR-46-2 : 2018
- JNIO SH-TR-46-6 : 2015
- IEC 60079-26 : 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

FTL64	–	*****	+	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

FTL64


Basic specifications

Position 1, 2 (Approval)		
Selected option		Description
FTL64	JB ¹⁾	JPN Ex db ia IIC T6...T1 Ga/Gb
		JPN Ex db ia IIC T6...T1 Gb

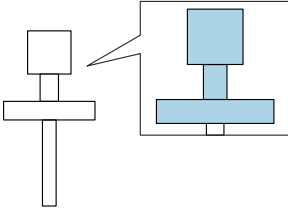
- 1)
- In connection with Position 3, 4 = A8 and Optional specification, ID Nx, Ox = NG:
The temperature classes change to T4...T1

Position 3, 4 (Output)		
Selected option		Description
FTL64	A7	FEL67, 2-wire PFM + test button
	A8	FEL68, 2-wire NAMUR + test button

Position 6 (Housing, Material)		
Selected option		Description
FTL64	A	Single compartment; plastic
	B	Single compartment; Alu, coated
	C	Single compartment; 316L, cast
	D	Single compartment; 316L, hygiene
	M	Dual compartment L-shape; Alu, coated



Shown in the temperature tables
exemplary as follows:


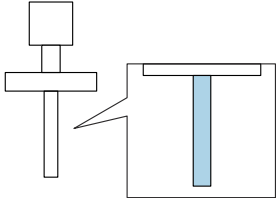


Position 7 (Electrical Connection)		
Selected option		Description
FTL64	A	Gland M20, plastic, IP66/68 NEMA Type 4X/6P
	B ¹⁾	Gland M20, brass nickel plated, IP66/68 NEMA Type 4X/6P
	C ²⁾	Gland M20, 316L, IP66/68 NEMA Type 4X/6P
	F	Thread M20, IP66/68 NEMA Type 4X/6P
	G	Thread G1/2, IP66/68 NEMA Type 4X/6P
	H ³⁾	Thread NPT1/2, IP66/68 NEMA Type 4X/6P
	I ⁴⁾	Thread NPT3/4, IP66/68 NEMA Type 4X/6P
	J	Gland M20, plastic blue, IP66/68 NEMA Type 4X/6P
	M ⁴⁾	Plug M12, IP66/67 NEMA Type 4X
	Y	Special version: Thread NPT1/2, IP66/68 NEMA Type 4X/6P

- 1) Only in connection with Position 6 = B, M
 2) Only in connection with Position 6 = B, C
 3) Only in connection with Position 6 = A
 4) Only in connection with Position 6 = B, C, M

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)
	Y	Coating ECTFE, PFA (Edlon, RubyRed), Enamel

Position 10 (Type of Probe)		
Selected option		Description
FTL64	1	Compact version
	2	Extension tube
<div><div></div><div>Shown in the temperature tables exemplary as follows:</div></div> <div></div>		

Optional specifications

ID Jx, Kx (Test, Certificate, Declaration)		
Selected option		Description
FTL64	JL ¹⁾	Ambient temperature -50°C/-58°F

1) Only in connection with Position 6 = B, C, M, Position 7 = B, C, F, G, I, Y

ID Mx (Sensor Design)		
Selected option		Description
FTL64	MA	Sensor remote, cable TPR, 2m/80in + mounting bracket, wall/ pipe, 316L
	MB	Sensor remote, cable TPR, 5m/200in + mounting bracket, wall/ pipe, 316L
	MC	Sensor remote, cable TPR, 10m/400in + mounting bracket, wall/ pipe, 316L
	MD	Sensor remote, cable TPR, 20m/800in + mounting bracket, wall/ pipe, 316L
	ME	Sensor remote, cable TPR, 30m/1200in + mounting bracket, wall/ pipe, 316L

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
FTL64	NF ¹⁾	Bluetooth
	NG ²⁾	Bluetooth for NAMUR output
	NJ	Cover with sight glass, glass
	NK	Cover with sight glass, plastic

- 1) Only in connection with Position 3, 4 = A7, Position 6 = A, B, M
 2) Only in connection with Position 3, 4 = A8, Position 6 = A, B, M

ID Px, Rx (Accessory Enclosed)		
Selected option		Description
FTL64	PA ¹⁾	Weather protection cover, 316L
	PB ²⁾	Weather protection cover, plastic
	R6 ³⁾	Test magnet

- 1) Only in connection with Position 6 = M
 2) Only in connection with Position 6 = B, C
 3) Only in connection with Position 3, 4 = A8

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.
- 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
- 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: →  14, "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.

Basic specification, Position 6 = A

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

Basic specification, Position 6 = B, M

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).

Optional specification, ID Px, Rx = R6

Suitable for use in explosion hazardous areas.

Device group IIC/IIB

Basic specification, Position 9 = R, Y (Enamel)

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

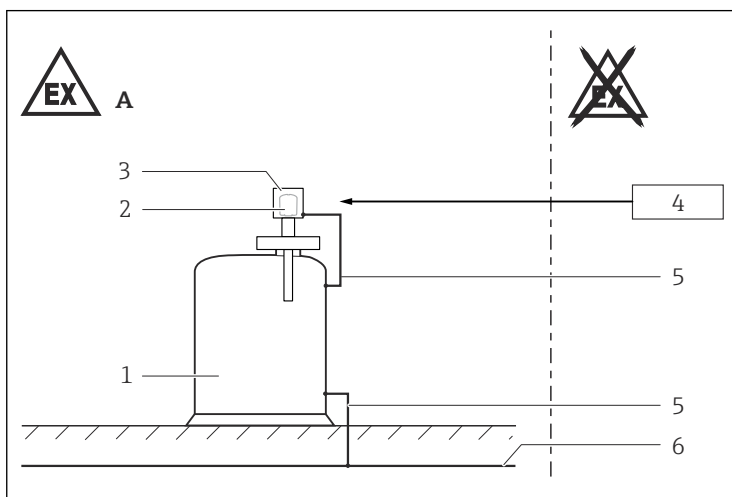
Basic specification, Position 9 = Y (ECTFE, PFA (Edlon, RubyRed))

- Probes can be used in gases of Group IIC if avoiding electrostatic charging (e.g. through friction, cleaning, maintenance, strong medium flow). These probes are marked by the warning sign "Avoid Electrostatic Charge".
- If electrostatic charging cannot be avoided: Probe can be used in gases of Group IIB.

Type of protection Ex db

- The high-temperature part of the device (fork/pipe/process connection/temperature spacer) is designed in type of protection Ex db and has an Ex ia connection to the electronics insert. The installation on the terminals of the device must always be carried out in type of protection Ex i.
- Flameproof joints of the Ex db parts of the device are not intended to be repaired.

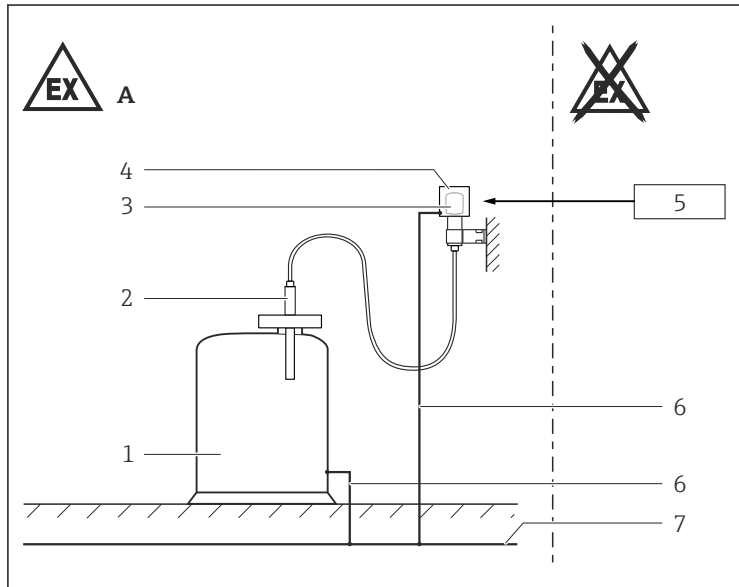
Safety instructions: Installation



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

Optional specification, ID Mx = MA - ME



A0055812

- A Zone 1
 1 Tank; Zone 0, Zone 1
 2 Sensor enclosure
 3 Electronic insert
 4 Electronics enclosure
 5 Associated intrinsically safe power supply units
 6 Potential equalization line
 7 Local potential equalization

- 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.
- 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.
- The device can be equipped with the Bluetooth® module: refer to the Operating Instructions and specifications in the "Bluetooth® module" chapter.

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_{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.

Bluetooth® module

Basic specification, Position 3, 4 = A7

If the device is equipped with the Bluetooth® module, no battery is required or allowed.

Basic specification, Position 3, 4 = A8

- If the device is equipped with the Bluetooth® module, a battery is required.
- Removal or replacement of the battery is only permitted in non-hazardous areas.
- Connection or disconnection of the Bluetooth® module is permitted in hazardous areas.

Only use one of the following battery types:

Manufacturer	Battery type
Tadiran	SL-360/S
XENO ENERGY	ER14505 / XL-060F

**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.

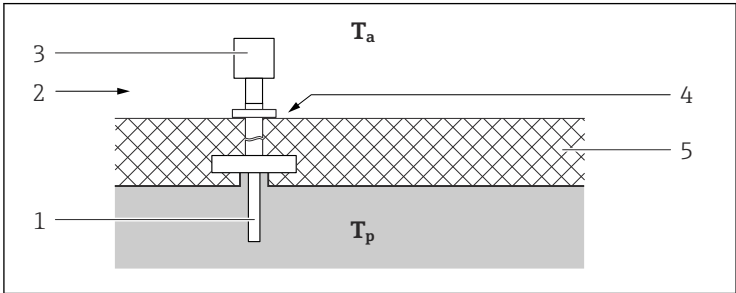
**Safety
instructions:
Zone separation
Zone 0, Zone 1**

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

**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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1

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.

General notes



Optional specification, ID Px, Rx = PB

When using the weather protection cover: Reduce the values T_a of P1, P2, P3 by 16 K.

Description notes



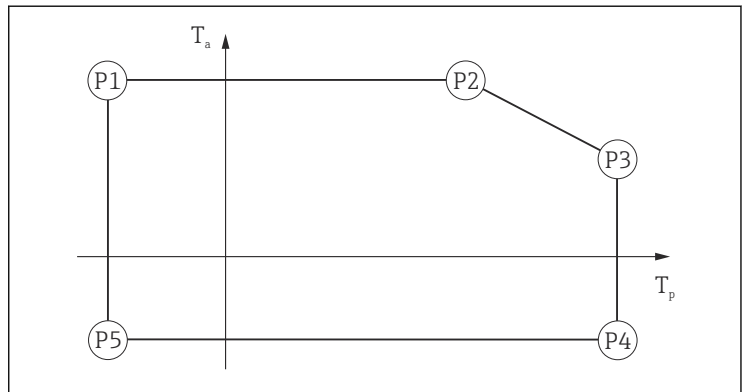
Unless otherwise indicated, the positions always refer to the basic specification.

1st column: Position 8 = A, B, ...

2nd column: Temperature classes T6 (85 °C) to T1 (450 °C)

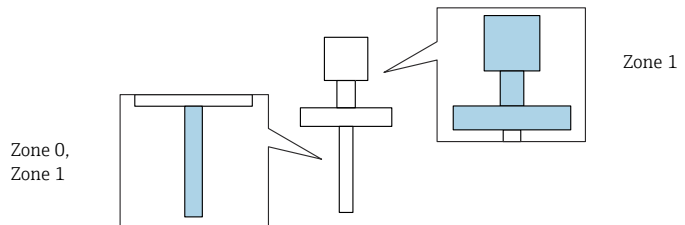
Column P1 to P5: Position (temperature value) on the axes of the derating

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



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Zone 0, Zone 1



Position 3, 4 = A7

E, R		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
	T6	-60	70	80	70 67 ¹⁾	80	70 67 ¹⁾	80	-40 -50 ²⁾	-60	-40 -50 ²⁾
	T5	-60	70	95	70	95	70	95		-60	
	T4	-60	70 67 ¹⁾	130	70 67 ¹⁾	130	70 67 ¹⁾	130		-60	
	T3	-60	70 60 ¹⁾	195	70 60 ¹⁾	195	70 60 ¹⁾	195		-60	
	T2...T1	-60	70 60 ¹⁾	210	70 60 ¹⁾	230	68 58 ¹⁾	230		-60	

- 1) Only in connection with Position 6 = D
 2) Only in connection with Optional specification, ID Jx, Kx = JL

D, 9		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
	T6	-60	70 67 ¹⁾	80	70 67 ¹⁾	80	70 67 ¹⁾	80	-40 -50 ²⁾	-60	-40 -50 ²⁾
	T5 ¹⁾	-60	70	95	70	95	70	95		-60	
	T4	-60	70 69 ¹⁾	130	70 69 ¹⁾	130	70 69 ¹⁾	130		-60	
	T3	-60	70 65 ¹⁾	195	70 65 ¹⁾	195	70 65 ¹⁾	195		-60	
	T2	-60	70 60 ¹⁾	270	70 60 ¹⁾	280 290 ³⁾	68 59 ¹⁾	280 290 ³⁾		-60	
	T1	-60	70 60 ¹⁾	270	70 60 ¹⁾	280 300 ³⁾	68 59 ¹⁾	280 300 ³⁾		-60	

- 1) Only in connection with Position 6 = D
 2) Only in connection with Optional specification, ID Jx, Kx = JL
 3) Only in connection with Position 8 = 9

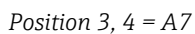
Position 3, 4 = A8

<i>E, R</i>		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
	T6 ¹⁾	-60	70 67 ²⁾	80	70 67 ²⁾	80	70	80	-40 -50 ³⁾	-60	-40 -50 ³⁾
	T5 ¹⁾	-60	70	95	70	95	70	95		-60	
	T4	-60	70 66 ¹⁾	130	70 66 ¹⁾	130	70 66 ¹⁾	130		-60	
	T3	-60	70 63 ¹⁾	195	70 63 ¹⁾	195	70 63 ¹⁾	195		-60	
	T2...T1	-60	70 61 ¹⁾ 67 ²⁾	230	70 61 ¹⁾ 67 ²⁾	230	70 61 ¹⁾ 67 ²⁾	230		-60	

- 1) Only in connection with Optional specification, ID Nx, Ox = NG: Temperature classes only valid for T4...T1
 2) Only in connection with Position 6 = D
 3) Only in connection with Optional specification, ID Jx, Kx = JL

<i>D, 9</i>		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
	T6 ¹⁾	-60	70	80	70	80	70	80	-40 -50 ²⁾	-60	-40 -50 ²⁾
	T5 ¹⁾	-60	70	95	70	95	70	95		-60	
	T4	-60	70 67 ¹⁾	130	70 67 ¹⁾	130	70 67 ¹⁾	130		-60	
	T3	-60	70 65 ¹⁾	195	70 65 ¹⁾	195	70 65 ¹⁾	195		-60	
	T2	-60	70 62 ¹⁾	280 290 ⁴⁾	70 62 ¹⁾	280 290 ⁴⁾	70 62 ¹⁾ 68 ³⁾	280 290 ⁴⁾		-60	
	T1	-60	70 62 ¹⁾ 68 ³⁾	280 300 ⁴⁾	70 62 ¹⁾ 68 ³⁾	280 300 ⁴⁾	70 62 ¹⁾ 68 ³⁾	280 300 ⁴⁾		-60	

- 1) Only in connection with Optional specification, ID Nx, Ox = NG: Temperature classes only valid for T4...T1
 2) Only in connection with Optional specification, ID Jx, Kx = JL
 3) Only in connection with Position 6 = D
 4) Only in connection with Position 8 = 9



E, R		P1			P2			P3			P4		P5	
		T_p	$T_a^{(1)}$	$T_a^{(2)}$	T_p	$T_a^{(1)}$	$T_a^{(2)}$	T_p	$T_a^{(1)}$	$T_a^{(2)}$	T_p	T_a	T_p	T_a
	T6	-60	70	70	80	70 68 ³⁾	70	80	70 68 ³⁾	70	80	-40 -50 ⁴⁾	-60	-40 -50 ⁴⁾
	T5	-60	70	90	95	70	90	95	70	90	95		-60	
	T4	-60	70	90	130	70	90	130	70	90	130		-60	
	T3	-60	70	90	195	70	90	195	70	90	195		-60	
	T2	-60	70	90	230	70	90	230	70	90	230		-60	
	T1	-60	70	90	230	70	90	230	70	90	230		-60	

- 1) Electronics enclosure (A)
- 2) Sensor enclosure (B)
- 3) Only in connection with Position 6 = D
- 4) Only in connection with Optional specification, ID Jx, Kx = JL

D, 9		P1			P2			P3			P4		P5	
		T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a	T _p	T _a
	T6	-60	70	70	80	70 68 ³⁾	70	80	70 68 ³⁾	70	80	-40 -50 ⁴⁾	-60	-40 -50 ⁴⁾
	T5	-60	70	90	95	70	90	95	70	90	95		-60	
	T4	-60	70	90	130	70	90	130	70	90	130		-60	
	T3	-60	70	90	195	70	90	195	70	90	195		-60	
	T2	-60	70	90	280 ⁵⁾ 290 ⁶⁾	70	90	280 ⁵⁾ 290 ⁶⁾	70	90	280 ⁵⁾ 290 ⁶⁾		-60	
	T1	-60	70	90	280 ⁵⁾ 300 ⁶⁾	70	90	280 ⁵⁾ 300 ⁶⁾	70	90	280 ⁵⁾ 300 ⁶⁾		-60	

- 1) Electronics enclosure (A)
- 2) Sensor enclosure (B)
- 3) Only in connection with Position 6 = D
- 4) Only in connection with Optional specification, ID Jx, Kx = JL
- 5) Only in connection with Position 8 = D
- 6) Only in connection with Position 8 = 9

Position 3, 4 = A8

E, R		P1			P2			P3			P4		P5	
		T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a	T _p	T _a
	T6 ³⁾	-60	70	70	80	70	70	80	70	70	80	-40 ⁴⁾ -50 ⁴⁾	-60	-40
	T5 ³⁾	-60	70	90	95	70	90	95	70	90	95		-60	-50 ⁴⁾
	T4	-60	70	90	130	70	90	130	70	90	130		-60	
	T3	-60	70	90	195	70	90	195	70	90	195		-60	
	T2	-60	70	90	230	70	90	230	70	90	230		-60	
	T1	-60	70	90	230	70	90	230	70	90	230		-60	

- 1) Electronics enclosure (A)
- 2) Sensor enclosure (B)
- 3) Only in connection with Optional specification, ID Nx, Ox = NG: Temperature classes only valid for T4...T1
- 4) Only in connection with Optional specification, ID Jx, Kx = JL

D, 9		P1			P2			P3			P4		P5	
		T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a ¹⁾	T _a ²⁾	T _p	T _a	T _p	T _a
	T6 ³⁾	-60	70	70	80	70	70	80	70	70	80	-40 ⁴⁾ -50 ⁴⁾	-60	-40
	T5 ³⁾	-60	70	90	95	70	90	95	70	90	95		-60	-50 ⁴⁾
	T4	-60	70	90	130	70	90	130	70	90	130		-60	
	T3	-60	70	90	195	70	90	195	70	90	195		-60	
	T2	-60	70	90	280 ⁵⁾ 290 ⁶⁾	70	90	280 ⁵⁾ 290 ⁶⁾	70	90	280 ⁵⁾ 290 ⁶⁾		-60	
	T1	-60	70	90	280 ⁵⁾ 300 ⁶⁾	70	90	280 ⁵⁾ 300 ⁶⁾	70	90	280 ⁵⁾ 300 ⁶⁾		-60	

- 1) Electronics enclosure (A)
- 2) Sensor enclosure (B)
- 3) Only in connection with Optional specification, ID Nx, Ox = NG: Temperature classes only valid for T4...T1
- 4) Only in connection with Optional specification, ID Jx, Kx = JL
- 5) Only in connection with Position 8 = D
- 6) Only in connection with Position 8 = 9

Connection data

Optional specification, ID Nx, Ox = NF, NG

When using the Bluetooth® module: No changes to the connection values.

Associated intrinsically safe power supply unit with max. electrical specifications below the characteristic values of the electronic inserts

<i>Basic specification, Position 3, 4</i>	Power supply circuit
A7	$U_i = 14.6\text{ V}$ $I_i = 100\text{ mA}$ $P_i = 633\text{ mW}$ $L_i = 0$ $C_i = 3\text{ nF}$
A8	$U_i = 16\text{ V}$ $I_i = 52\text{ mA}$ $P_i = 170\text{ mW}$ $L_i = 0$ $C_i = 30\text{ nF}$



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