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71674674
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Safety Instructions
Liquiphant FTL64

0/1Ex db ia IIC T6...T1 Ga/Gb X
1Ex db ia IIC T6...T1 Gb X
Ex ia IIIC Tx °C Da/Db X
Ex ia IIIC Tx °C Db X

Endress+Hauser
People for Process Automation

Liquiphant FTL64

Table of contents

About this document 4
Associated documentation 4
Supplementary documentation 4
General notes: Combined approval 4
Certificates and declarations 4
Manufacturer address 5
Extended order code 5
Safety instructions: General 9
Safety instructions: Specific conditions of use 10
Safety instructions: Installation 11
Safety instructions: Zone 0 14
Safety instructions: Zone separation Zone 0, Zone 1 14
Explosion protection with heat insulation 14
Temperature tables 15
Connection data 22

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:

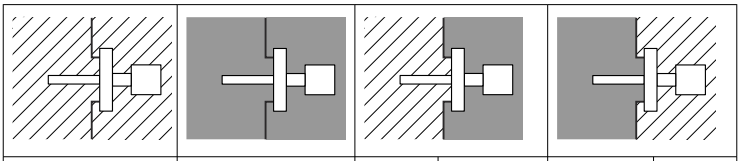
BA02037F

Supplementary documentation

Explosion protection brochure: CP00021Z

The explosion protection brochure is available on the Internet:
www.endress.com/Downloads

General notes: Combined approval



Ex ia IIC		Ex ia ta IIIC		Ex ia IIC	Ex ia ta IIIC	Ex ia ta IIIC	Ex ia IIC
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

Certificates and declarations

Certificate of Conformity TP TC 012/2011

Inspection authority:
LLP "T-Standard" (ТОО/ЖШС "Т-Стандарт")

Certificate number:
EAЭC KZ 7500525.01.01.01990

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

- GOST 31610.0-2019 (IEC 60079-0:2017)
- GOST IEC 60079-1-2013
- GOST 31610.11-2014 (IEC 60079-11:2011)
- GOST 31610.26-2016 (IEC 60079-26:2014)

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*..
(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

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

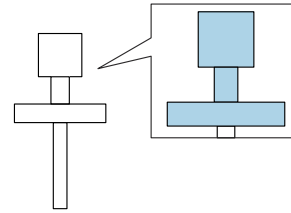
Position 1, 2 (Approval)		
Selected option		**Description**
FTL64	GK [1]	EAC 0/1Ex db ia IIC T6...T1 Ga/Gb X EAC 1Ex db ia IIC T6...T1 Gb X EAC Ex ia IIIC Tx °C Da/Db X EAC Ex ia IIIC Tx °C Db X

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	B	Single compartment; Alu, coated
	C	Single compartment; 316L, cast
	M	Dual compartment L-shape; Alu, coated

Shown in the temperature tables exemplary as follows:



Position 7 (Electrical Connection)		
Selected option		**Description**
FTL64	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
	I	Thread NPT3/4, IP66/68 NEMA Type 4X/6P
	Y	Special version: Thread NPT1/2, IP66/68 NEMA Type 4X/6P

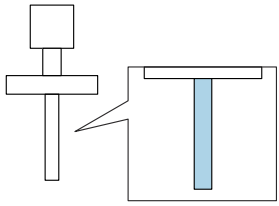
1) Only in connection with Position 6 = B, M
2) Only in connection with Position 6 = B, C

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

Shown in the temperature tables exemplary as follows:



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 3, 4 = A7, A8

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 = B, M
2) Only in connection with Position 3, 4 = A8, Position 6 = 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:
$-40\ °C \leq T_a \leq +70\ °C$

- 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: → 🖹 15, "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 (≤ 0.5 m) generating strong electrostatic charges.

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 and Device group III

Basic specification, Position 9 = R, Y (Enamel)
- Due to the surface resistance 1 GΩ (|R| PFA-conductive) or the enamel (glass) surface, these coatings are suitable without restrictions.
- Prevent damage to the conductive surface layer (e.g. by abrasion).

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.

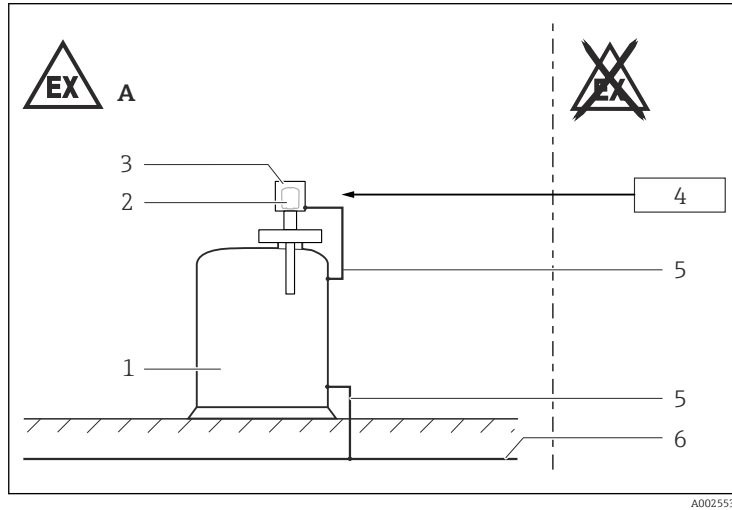
Type of protection Ex db

- 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.

Type of protection Ex ta

The high-temperature part of the device (fork/pipe/process connection/temperature spacer) is designed in type of protection Ex ta 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.

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

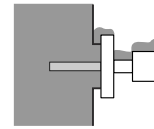
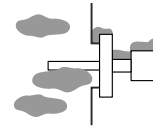
- When the device is connected to certified intrinsically safe circuits of Category Ex ib for Equipment Groups IIC and IIB, the type of protection changes to Ex ib IIC and Ex ib IIB.
- Continuous service temperature of the connecting cable: ≥ T_a+20 K.
- Perform the following to achieve the degree of 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.
- The device can be equipped with the Bluetooth® module: refer to the Operating Instructions and specifications in the "Bluetooth® module" chapter.

Device group III, Application in dust

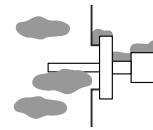
- To ensure the ingress protection IP66/67: Only use the unit-mounted cable entries, sealing plugs and O-rings.
- Supplied cable glands and metallic sealing plugs comply with the requirements of type of protection marked on the nameplate.
- In case of very strongly abrasive or corrosive media: Additionally protect the wetted surface of the sensor in order to avoid abrasion of the zone separation wall.

Permitted ambient conditions

Ex ia IIIC Tx °C Da/Db X

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 Tx °C Db X

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_{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

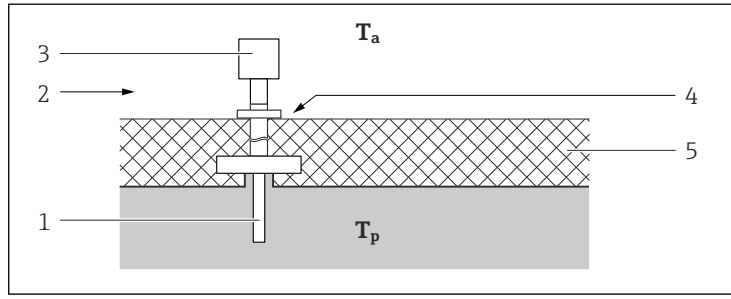
When using under non-atmospheric pressures and non-atmospheric temperatures: The sensor part of the device approved for Zone 0 does not cause any ignition hazards.

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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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

Ex ia IIC

Optional specification, ID Px, Rx = PB
When using the weather protection cover: Reduce the values T_a of P1, P2, P3 by 16 K.

Ex ia IIIC

Optional specification, ID Px, Rx = PB
When using the weather protection cover: Reduce the values T_a by 16 K.

Description notes

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

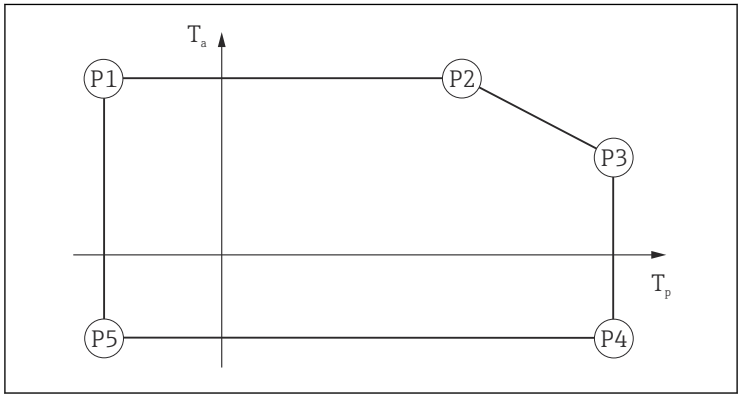
Zone 0, Zone 1

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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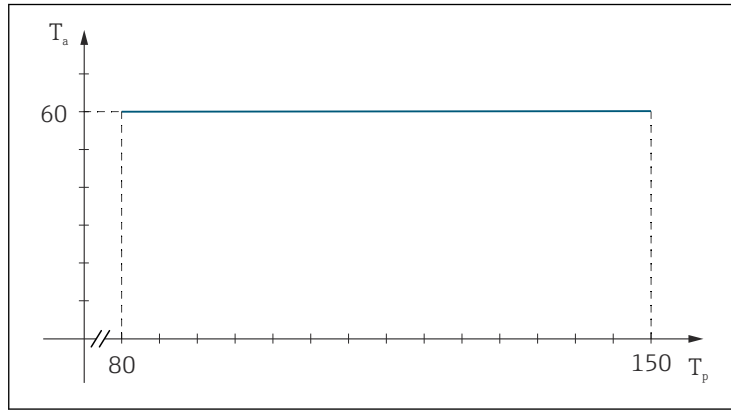
Zone 20, Zone 21 or Zone 21

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

2nd column: Process temperature range in °C

3rd column: Ambient temperature range in °C

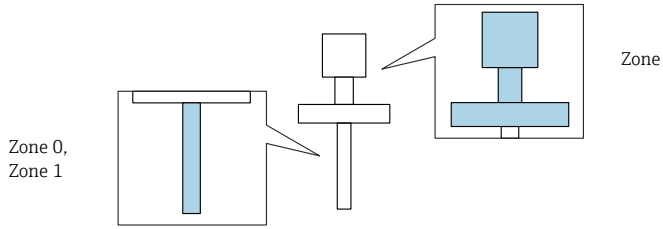
4th column: Maximum surface temperature in °C



T_a *Ambient temperature in °C*

T_p *Process temperature in °C*

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	80	70	80	–40 –50 [1]	–60	–40 –50 [1]
	T5	–60	70	95	70	95	70	95		–60	
	T4	–60	70	130	70	130	70	130		–60	
	T3	–60	70	195	70	195	70	195		–60	
	T2…T1	–60	70	210	70	230	68	230		–60	

1) 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	80	70	80	70	80	–40 –50 [1]	–60	–40 –50 [1]
	T5	–60	70	95	70	95	70	95		–60	
	T4	–60	70	130	70	130	70	130		–60	
	T3	–60	70	195	70	195	70	195		–60	
	T2	–60	70	270	70	280 290 [2]	68	280 290 [2]		–60	
	T1	–60	70	270	70	280 300 [2]	68	280 300 [2]		–60	

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

Position 3, 4 = A8

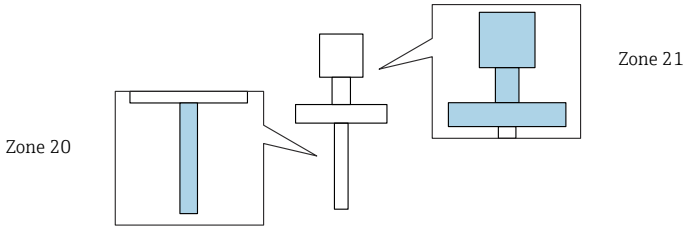
E, R		**P1**		**P2**		**P3**		**P4**		**P5**	
		T_p	**T_a**	**T_p**	**T_a**	**T_p**	**T_a**	**T_p**	**T_a**	**T_p**	**T_a**
	T6 [1]	−60	70	80	70	80	70	80	−40 −50 [2]	−60	−40 −50 [2]
	T5 [1]	−60	70	95	70	95	70	95		−60	
	T4	−60	70 66 [1]	130	70 66 [1]	130	70 66 [1]	130		−60	
	T3	−60	70 63 [1]	195	70 63 [1]	195	70 63 [1]	195		−60	
	T2...T1	−60	70 61 [1]	230	70 61 [1]	230	70 61 [1]	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 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 [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 [3]	70 62 [1]	280 290 [3]	70 62 [1]	280 290 [3]		−60	
	T1	−60	70 62 [1]	280 300 [3]	70 62 [1]	280 300 [3]	70 62 [1]	280 300 [3]		−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 8 = 9

Zone 20, Zone 21



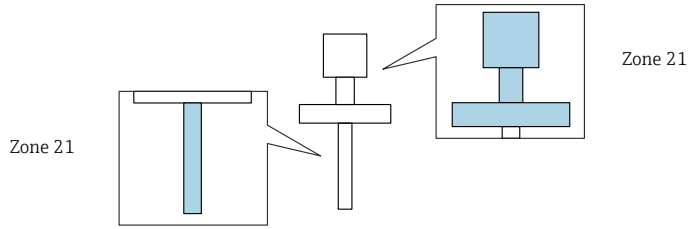
E, R			
	$-60 \le T_p \le +230$	$-40 \le T_a \le +60$ $-50 \le T_a \le +60$ [1]	Zone 20: T_{200} 245 [2]
			Zone 21: T_L 235 [3]

1) Only in connection with Optional specification, ID Jx, Kx = JL
2) With 200 mm dust deposit
3) With dust accumulation T_L

D, 9			
	$-60 \le T_p \le +280$ $-60 \le T_p \le +300$ [1]	$-40 \le T_a \le +60$ $-50 \le T_a \le +60$ [2]	Zone 20: T_{200} 295 [3]
			Zone 21: T_L 305 [4]

1) Only in connection with Position 8 = 9
2) Only in connection with Optional specification, ID Jx, Kx = JL
3) With 200 mm dust deposit
4) With dust accumulation T_L

Zone 21



E, R			
	$-60 \leq T_p \leq +230$	$-40 \leq T_a \leq +60$ $-50 \leq T_a \leq +60$ [1]	T_L 235 [2]

1) Only in connection with Optional specification, ID Jx, Kx = JL
2) With dust accumulation T_L

D, 9			
	$-60 \leq T_p \leq +280$ $-60 \leq T_p \leq +300$ [1]	$-40 \leq T_a \leq +60$ $-50 \leq T_a \leq +60$ [2]	T_L 285 [3] T_L 305 [1] [3]

1) Only in connection with Position 8 = 9
2) Only in connection with Optional specification, ID Jx, Kx = JL
3) With dust accumulation T_L

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

Basic specification, Position 3, 4	**Power supply circuit**
A7	U_i = 14.6 V I_i = 100 mA P_i = 633 mW L_i = 0 C_i = 3 nF
A8	U_i = 16 V I_i = 52 mA P_i = 170 mW L_i = 0 C_i = 30 nF

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 = C 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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