

Safety Instructions

Liquiphant FTL51B, FTL63

Ex ec IIC T6...T1 Gc

Ex ec nC IIC T6...T1 Gc

Ex tc IIIC T** °C Dc



Liquiphant FTL51B, FTL63

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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:

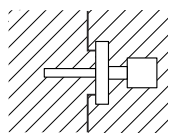
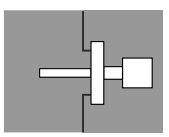
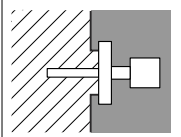
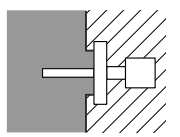
- BA01894F (FTL51B)
- BA02286F (FTL63)

Supplementary documentation


Explosion protection brochure: CP00021Z

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

**General notes:
 Combined approval**

					
Ex ec IIC Zone 2	Ex tc IIIC Zone 22	Ex ec IIC Zone 2	Ex tc IIIC Zone 22	Ex tc IIIC Zone 22	Ex ec IIC Zone 2

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

NEPSI Declaration of Conformity

Certificate number:
 GYJ21.1248X

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

- GB/T 3836.1-2021
- GB/T 3836.3-2021
- GB/T 3836.8-2021
- 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, FTL63	–	*****	+	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, FTL63

Basic specifications


Position 1, 2 (Approval)		
Selected option		Description
FTL51B	NL	NEPSI Ex ec IIC T6...T1 Gc ¹⁾
FTL63		NEPSI Ex ec nC IIC T6...T1 Gc ²⁾
		NEPSI Ex tc IIIC T** °C Dc

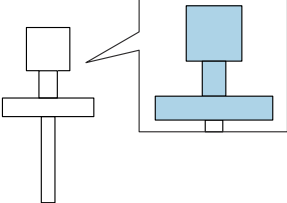
1) Only in connection with Position 3, 4 = A2, A7, A8, GA

2) Only in connection with Position 3, 4 = A3, A4

Position 3, 4 (Output)		
Selected option		Description
FTL51B	A2	FEL62, 3-wire PNP 10-55VDC + test button
FTL63	A3	FEL64DC, relay DPDT 9-20VDC
	A4	FEL64, relay DPDT 19-253VAC/19-55VDC contact 253V/6A + test button
	A7	FEL67, 2-wire PFM + test button
	A8	FEL68, 2-wire NAMUR + test button
	GA	FEL60D, density/concentration

Position 6 (Housing, Material)		
Selected option		Description
FTL51B	B	Single compartment; Alu, coated
FTL63	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
FTL51B	B ¹⁾	Gland M20, brass nickel plated, IP66/68 NEMA Type 4X/6P
FTL63	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

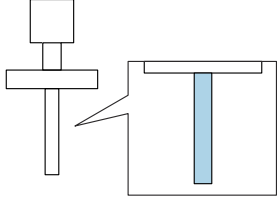
- 1) Only in connection with Position 6 = B, M
 2) Only in connection with Position 6 = B, C

Position 8 (Application)		
Selected option		Description
FTL51B	A ¹⁾	Process max 150°C/302°F, max 64bar
FTL63	B ¹⁾	Process max 150°C/302°F, max 100bar
	C ²⁾	Process max 80°C/176°F, max 25bar

- 1) Only in connection with Position 3, 4 = A2-A4, A7, A8
 2) Only in connection with Position 3, 4 = GA

Position 10 (Type of Probe)		
Selected option		Description
FTL51B FTL63	1	Compact version
	2	Extension tube
	3	Short tube version

 Shown in the temperature tables exemplary as follows:



Optional specifications

ID Mx (Sensor Design)		
Selected option		Description
FTL51B FTL63	MR	Temperature separator
	MS	Pressure tight feed through (Second line of defence)

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
FTL51B FTL63	NF ¹⁾	Bluetooth VU121, Labeling: VA13-02
	NG ²⁾	Prepared for Heartbeat Verification + Monitoring + Bluetooth VU121, Labeling: VA13-01

- 1) Only in connection with Position 3, 4 = A2-A4, 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
FTL51B FTL63	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 = A2-A4, 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.
- 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
- 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 3836.16-2017: "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.)
- 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.
- If the degree of protection IP66/67 or IP66/68 is ensured, the device may be installed in an environment of pollution degree 4.

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: → ☞ 13, "Temperature tables".
- In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surfaces.
- 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 = 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.

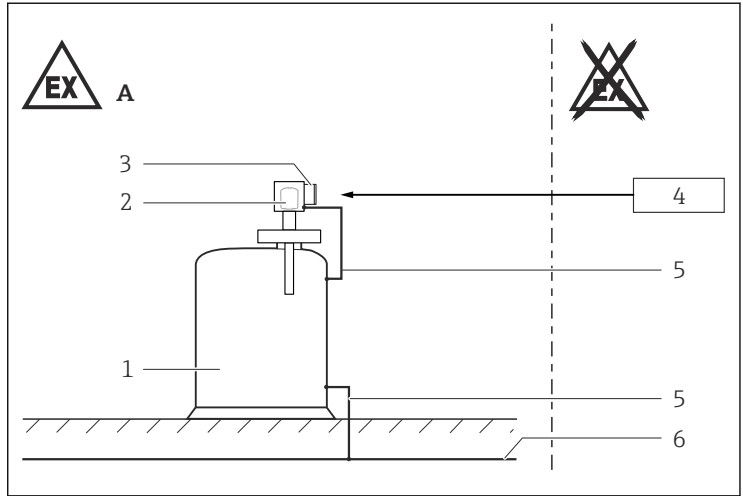
Optional specification, ID Px, Rx = PB

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.

Safety instructions: Installation



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- A Zone 2, Zone 22
- 1 Tank; Zone 2, Zone 22
- 2 Electronic insert; Electronics compartment
- 3 Connection compartment Ex ec
(only Basic specification, Position 6 = M)
- 4 Power supply or power supply unit
- 5 Potential equalization line
- 6 Potential equalization

- Perform the following to achieve the degree of protection IP66/67 or IP66/68:
 - Screw the cover tight.
 - Mount the cable entry correctly.
- 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 when energized.
- Continuous service temperature of the connecting cable / cable gland / cable entry:
 - Basic specification, Position 3, 4 = GA, A7, A8: $\geq T_a + 20 \text{ K}$
 - Basic specification, Position 3, 4 = A2: $\geq T_a + 35 \text{ K}$
 - Basic specification, Position 3, 4 = A3, A4: $\geq T_a + 45 \text{ K}$
 - Basic specification, Position 3, 4 = A2 in connection with Optional specification, ID Mx = MR, MS: $\geq T_a + 20 \text{ K}$
 - Basic specification, Position 3, 4 = A3, A4 in connection with Optional specification, ID Mx = MR, MS: $\geq T_a + 25 \text{ K}$

- 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 certified cable entries suitable for the application. Observe national regulations and standards. Accordingly, the connection terminal does not include any ignition sources.
- When operating the transmitter enclosure at an ambient temperature under $-20\text{ }^{\circ}\text{C}$, use appropriate cables and cable entries permitted for this application.
- Supplied cable glands and metallic sealing plugs comply with the requirements of type of protection marked on the nameplate.
- The device can be equipped with the Bluetooth® module: refer to the Operating Instructions and specifications in the "Bluetooth® module" chapter.
- 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.
- Before operation:
 - Screw in the cover all the way.
 - Tighten the securing clamp on the cover.

Cross section connecting wire	Tightening torque of terminal screw	Stripped insulation
0.2 to 2.5 mm ²	0.5 to 0.6 Nm	8 mm

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.

Accessory: Sliding sleeve

The sliding sleeve can be used for a continuous setting of the switch point (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.

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.
- Observe the information in the Safety Instructions (XA) included with the Bluetooth® module.

Temperature tables

General notes

Ex ec 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 tc 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 2

1st line: Position 6 = A, B, ...

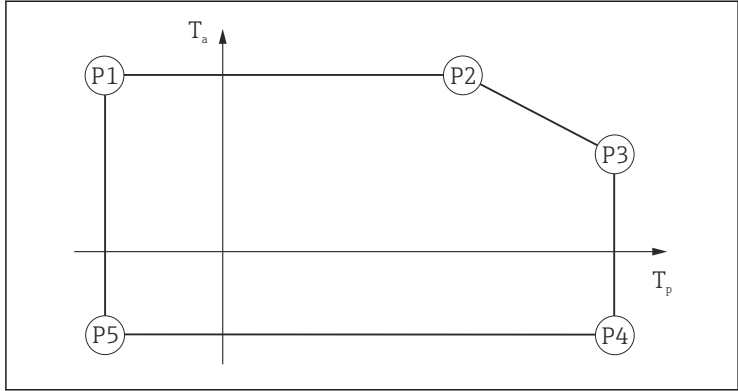
1st column: Position 8 = A, B, ...

2nd column: Maximum load current

3rd 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 22

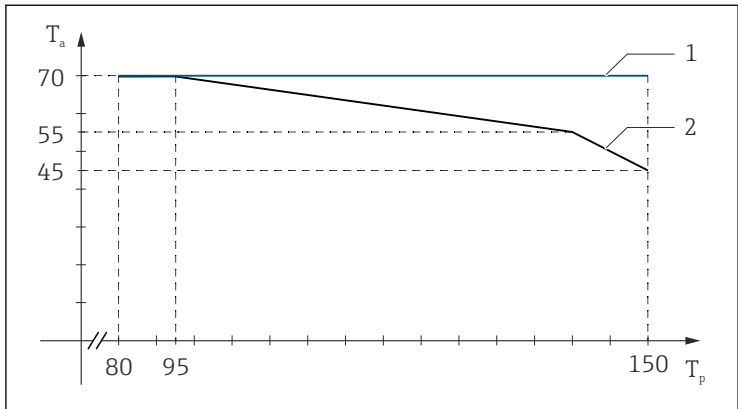
1st column: Position 8 = A, B, ...

2nd column: Maximum load current

3rd column: Process temperature range in °C

4th column: Ambient temperature range in °C

5th column: Maximum surface temperature in °C



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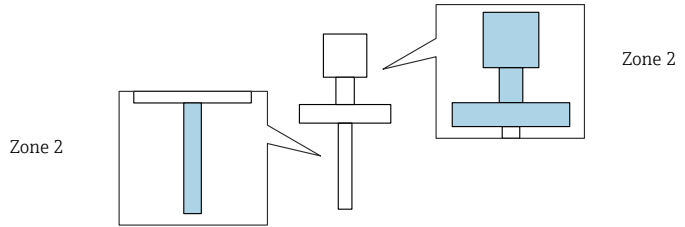
T_a Ambient temperature in °C

T_p Process temperature in °C

1 With Optional Specification, ID Mx = MR, ...

2 Without Optional Specification, ID Mx = MR, ...

Zone 2



Position 3, 4 = A2

Without Optional specification, ID Mx = MR, MS

A, B			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
		350 mA										
		T6	-50	70	70	70	80	70	80	-40	-50	-40
		T5	-50	70	70	70	95	70	95	-40	-50	-40
		T4	-50	70	70	70	130	55	130	-40	-50	-40
		T3...T1	-50	70	70	70	150	45	150	-40	-50	-40

With Optional specification, ID Mx = MR, MS

A, B			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
		350 mA										
		T6	-50	70	70	70	80	70	80	-40	-50	-40
		T5	-50	70	70	70	95	70	95	-40	-50	-40
		T4	-50	70	70	70	130	70	130	-40	-50	-40
		T3...T1	-50	70	70	70	150	70	150	-40	-50	-40

Position 3, 4 = A3, A4

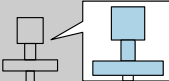
Without Optional specification, ID Mx = MR, MS

A, B		= B, C, M											
		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		
	2 A												
		T6	-50	52	53	52	80	40	80	-40	-50	-40	
		T5	-50	67	68	67	95	55	95	-40	-50	-40	
		T4	-50	70	78	70	130	47	130	-40	-50	-40	
		T3...T1	-50	70	78	70	150	38	150	-40	-50	-40	

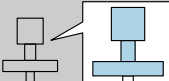
With Optional specification, ID Mx = MR, MS

A, B		= B, C, M											
		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		
	2 A												
		T6	-50	52	58	52	80	50	80	-40	-50	-40	
		T5	-50	67	73	67	95	65	95	-40	-50	-40	
		T4	-50	70	104	70	130	67	130	-40	-50	-40	
		T3...T1	-50	70	104	70	150	65	150	-40	-50	-40	
	4 A												
		T6	-50	43	54	43	80	40	80	-40	-50	-40	
		T5	-50	58	69	58	95	55	95	-40	-50	-40	
		T4	-50	70	77	70	130	65	130	-40	-50	-40	
		T3...T1	-50	70	77	70	150	63	150	-40	-50	-40	

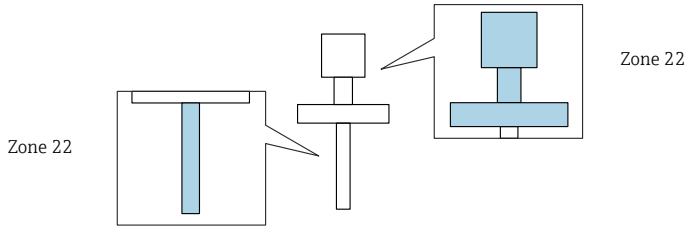
Position 3, 4 = A7, A8

 = B, C, M												
A, B			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	-50	70	70	70	80	70	80	-40	-50	-40
		T5	-50	70	70	70	95	70	95	-40	-50	-40
		T4	-50	70	70	70	130	70	130	-40	-50	-40
		T3...T1	-50	70	70	70	150	70	150	-40	-50	-40

Position 3, 4 = GA

 = B, C, M												
C			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...T1	-50	70	70	70	80	70	80	-40	-50	-40

Zone 22



Position 3, 4 = A2

Without Optional specification, ID Mx = MR, MS

A, B				
	350 mA			
		$-50 \leq T_p \leq +95$	$-40 \leq T_a \leq +70$	T -40 to +95
		$-50 \leq T_p \leq +130$	$-40 \leq T_a \leq +55$	T -40 to +130
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +45$	T -40 to +150

With Optional specification, ID Mx = MR, MS

A, B				
	350 mA			
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +70$	T -40 to +150

Position 3, 4 = A3, A4

Without Optional specification, ID Mx = MR, MS

A, B				
	2 A, 4 A			
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +70$	T -40 to +80
		$-50 \leq T_p \leq +90$	$-40 \leq T_a \leq +66$	T -40 to +90
		$-50 \leq T_p \leq +120$	$-40 \leq T_a \leq +53$	T -40 to +120
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +40$	T -40 to +150
	6 A			
		$-50 \leq T_p \leq +90$	$-40 \leq T_a \leq +64$	T -40 to +90
		$-50 \leq T_p \leq +120$	$-40 \leq T_a \leq +51$	T -40 to +120
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +38$	T -40 to +150

With Optional specification, ID Mx = MR, MS

A, B				
	2 A			
		$-50 \leq T_p \leq +125$	$-40 \leq T_a \leq +70$	T -40 to +125
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +67$	T -40 to +150
	4 A			
		$-50 \leq T_p \leq +116$	$-40 \leq T_a \leq +70$	T -40 to +116
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +67$	T -40 to +150
	6 A			
		$-50 \leq T_p \leq +97$	$-40 \leq T_a \leq +70$	T -40 to +97
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +65$	T -40 to +150

Position 3, 4 = A7, A8, GA

A, B, C				
		$-50 \leq T_p \leq +80$	$-40 \leq T_a \leq +70$	T -40 to +80
		$-50 \leq T_p \leq +150$	$-40 \leq T_a \leq +50$	T -40 to +150

Connection data

Optional specification, ID Nx, Ox = NF, NG

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

Basic specification, Position 3, 4	Power supply	
A2	U = 10 to 55 V _{DC} ; P _{max} < 0.5 W	I _{max} = 350 mA
A3	U = 9 to 20 V _{DC} ; P _{max} < 1 W	2 potential free change-over contacts; 2 A Ex e, 6 A Ex t 4 A Ex e, 6 A Ex t ¹⁾
A4	U = 19 to 253 V _{AC} , 50/60 Hz or 19 to 55 V _{DC} ; P _{max} < 25 VA or < 1.3 W	
A7	U = 9,5 to 12,5 V _{DC} ; PFM; I _{max} = 12 mA Connection only to power supply unit FTL325P or FTL375P from Endress+Hauser.	
A8	U = 4 to 8,2 V _{DC}	NAMUR; I _{max} = 3,8 mA
GA	U = 21 to 26 V _{DC} ; I _{max} = 16 mA Connection only to power supply unit FML621 from Endress+Hauser.	

1) Only in connection with Optional Specification ID Mx = MR, MS

Cable entry parameters

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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