

# Safety Instructions

## CNGmass

INMETRO: Zone 1  
Zone 21





# CNGmass

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**Associated documentation**

For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter serial number from nameplate.
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

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

Measuring device	Documentation code
CNGmass	BA01283D

*Additional documentation*

Contents	Document type	Documentation code
Explosion Protection	Brochure	CP00021Z/11

**Manufacturer's certificates****Declaration of conformity**

INMETRO CERTIFICADO DE CONFORMIDADE

**INMETRO certificate of conformity**

Certificate numbers:

- TÜV 18.0686X
- TÜV 23.0033X
- TÜV 23.0034X
- TÜV 23.0035X

Affixing the certificate number certifies conformity with the standards under [www.abnt.org.br](http://www.abnt.org.br) (depending on the device version).

- ABNT NBR IEC 60079-0: 2020
- ABNT NBR IEC 60079-7: 2018
- ABNT NBR IEC 60079-11: 2013
- ABNT NBR IEC 60079-31: 2014

**Certificate holder**

Endress+Hauser Flowtec AG  
Kägenstrasse 7  
4153 Reinach BL  
Switzerland

**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

*****	–	***** ... *****	+	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.			

#### *Device type*

The device and the device design is defined in the "Device type" section (Product root).

#### *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.

### Device type

Position	Order code for	Option selected	Description
1	Flow	D	D = Flow
2	Instrument family	B	Coriolis flowmeter
3	Product	C	C = CNGmass
4	Generation index	B	Platform generation
5, 6	Nominal diameter	08, 15, 25	Nominal diameter of sensor

## Basic specifications

Position	Order code	Selected Option	Explosion protection	
			Transmitter sensor	Safety Barrier Promass 100
1, 2	Approval	MM	Ex ia IIC T6...T1 Gb Ex tb IIIC Txx °C Db	Ex ec [ia Ga] IIC T4 Gc
		MU	Ex ia IIC T6...T1 Gb	
Txx °C for Group IIIC (dust) →  8				

Position	Order code for	Option selected	Description
3	Output, input	M	Modbus RS485
4	Display; Operation	A	W/o; via communication
5	Housing	A	Compact, alu, coated

## Optional specifications

ID	Order code for	Option selected	Description
Jx	Test, certificate	JM	Ambient temperature sensor -50 °C

### Safety instructions: General

- 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 or guidelines (e.g. ABNT NBR IEC 60079-14)
- 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.
- 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 classes.
- Alterations to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

- When using in hybrid mixtures (gas and dust occurring simultaneously), observe additional measures for explosion protection.
- Observe all the technical data of the device (see nameplate).
- Avoid electrostatic charge (e.g. caused by friction, cleaning, maintenance, strong currents in the medium):  
On the attached stainless steel nameplate and on painted metallic housings that are not integrated into the local potential equalization system.

## Safety instructions: Installation

- In potentially explosive atmospheres: Do not connect or disconnect the electrical connection of the power supply circuit when energized.
- Safety Barrier Promass 100
  - Only use the device with the safety barrier supplied.
  - Mount the safety barrier only in the non-hazardous area or in Zone 2. When mounting in Zone 2: mount the safety barrier in an enclosure. The enclosure must meet the requirements of ABNT NBR IEC 60079-15.
  - The connecting cable and the installation between the safety barrier and the device must meet the requirements of ABNT NBR IEC 60079-14.
  - Tighten the screws of all the terminals with a tightening torque of 0.5 to 0.6 Nm.
- Only use certified cable entries and connection plugs M12×1 suitable for the application. Please comply with the selection criteria as defined in ABNT NBR IEC 60079-14.
- Continuous service temperature of the connecting cable: -40 to +80 °C (-50 to +80 °C for optional specifications, ID Jx (test, certificate) = JM); however, at least in accordance with the range of service temperature taking into account additional influences of the process conditions ( $T_{a,min}$  and  $T_{a,max} + 20$  K).
- Supplied cable glands M20 × 1.5 are only suitable for fixed installation of cables and connections. In the installation, a strain relief must be provided.

## Intrinsic safety

- The device can be connected to the Endress+Hauser FXA291 service tool: refer to the Operating Instructions.
- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. ABNT NBR IEC 60079-14 , Proof of Intrinsic Safety).
- Observe the connection values when selecting the connection cable between Safety Barrier Promass 100 and the measuring device.

### Potential equalization

- Integrate the device into the potential equalization .
- If the ground connection has been established via the pipe as specified, it is also possible to integrate the sensor into the potential equalization system via the pipe.

### Safety instructions: Zone 21

- To ensure dust-tightness, securely seal all housing openings, cable entries and sealing plugs.
- Only open all housing briefly, ensuring that no dust or moisture enters the housing.
- The metal extensions and blind plugs supplied are tested and certified as part of the enclosure for explosion protection Ex tb IIIC. Plastic sealing plugs in extensions act as transport protection and have to be replaced by suitable, individually approved installation material. Supplied cable glands are separately certified and marked as components and meet device specification requirements.

### Temperature tables

#### Ambient temperature

Minimum ambient temperature:

- $T_a = -40\text{ °C}$
- *Optional specification, ID Jx (Test, Certificate) = JM*  
 $T_a = -50\text{ °C}$

Maximum ambient temperature:

$T_a = +60\text{ °C}$  depending on the medium temperature and temperature class

#### Medium temperature


*Minimum medium temperature*

$T_m = -50\text{ °C}$

*Maximum medium temperature*

$T_m$  for T6...T1 depending on the maximum ambient temperature  $T_a$

#### Compact version

Temperature values in brackets [ ] correspond to Txx °C for Group IIIC (dust). →  9



Basic specifications, position 5 (housing) = A

T <sub>a</sub> [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35	50	85	120	150	150	150
50	-	85	120	150	150	150
60	-	-	120	150	150	150

**Explosion hazards arising from gas and dust**

**Determining the temperature class and surface temperature with the temperature table**

- In the case of gas: Determine the temperature class as a function of the maximum ambient temperature T<sub>a</sub> and the maximum medium temperature T<sub>m</sub>.
- In the case of dust: Determine the maximum surface temperature as a function of the maximum ambient temperature T<sub>a</sub> and the maximum medium temperature T<sub>m</sub>.

**Example**

- Measured maximum ambient temperature: T<sub>ma</sub> = 47 °C
- Measured maximum medium temperature: T<sub>mm</sub> = 108 °C

	T <sub>a</sub> [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
	35	50	85	120	140	140	140
	50	-	85	120	140	140	140
	60	-	-	120	140	140	140
	35	50	85	120	140	140	140
	45	-	85	120	140	140	140
	50	-	-	120	140	140	140

1. Select device (optional).  
 2. In the column for the maximum ambient temperature T<sub>a</sub> select the temperature that is immediately greater than or equal to the maximum ambient temperature T<sub>ma</sub> that is present.  
 ↳ T<sub>a</sub> = 50 °C.  
 The row showing the maximum medium temperature is determined.  
 3. Determine the maximum surface temperature T<sub>ms</sub> as a function of the maximum ambient temperature T<sub>a</sub> and the maximum medium temperature T<sub>m</sub>.  
 4. Determine the temperature class as a function of the maximum surface temperature T<sub>ms</sub> and the maximum medium temperature T<sub>m</sub>.

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1 Procedure for determining the temperature class and surface temperature

1. Select device (optional).
2. In the column for the maximum ambient temperature T<sub>a</sub> select the temperature that is immediately greater than or equal to the maximum ambient temperature T<sub>ma</sub> that is present.
  - ↳ T<sub>a</sub> = 50 °C.
  - The row showing the maximum medium temperature is determined.



3. Select the maximum medium temperature  $T_m$  of this row, which is immediately greater than or equal to the maximum medium temperature  $T_{mm}$  that is present.
  - ↳ The column with the temperature class for gas is determined:  
 $108\text{ °C} \leq 120\text{ °C} \rightarrow T4$ .
4. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust:  $T4 = 135\text{ °C}$ .

**Connection values: Signal circuits**

The following tables contain specifications which are dependent on the transmitter type and its input and output assignment. Compare the following specifications with those on the nameplate of the transmitter.

**Terminal assignment**

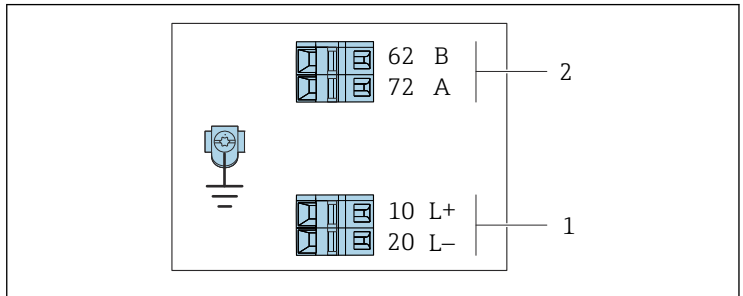
*Transmitter*

 The order code constitutes part of the extended order code. For detailed information on the device features and the structure of the extended order code →  5.


*Modbus RS485 connection version*

 For use in the intrinsically safe area. Connection via Safety Barrier Promass 100.

Order code for "Output", option **M**



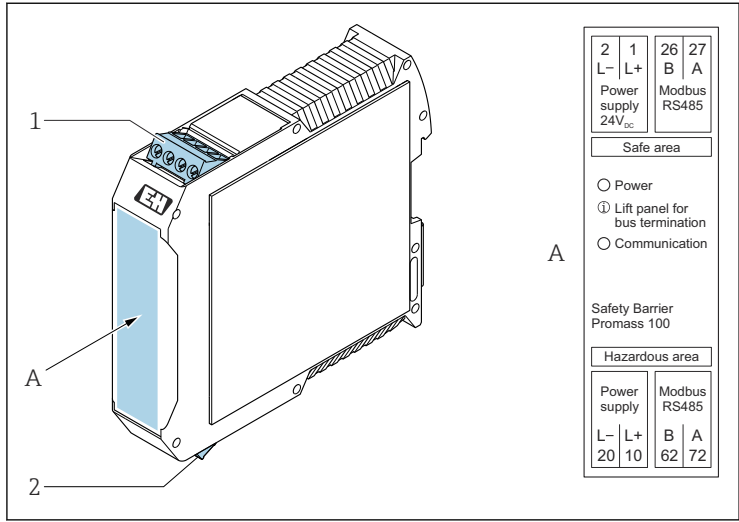
A0030219

 2 *Modbus RS485 terminal assignment, connection version for use in intrinsically safe areas (connection via Safety Barrier Promass 100)*

- 1 *Intrinsically safe power supply*
- 2 *Modbus RS485*

Order code "Output"	10 (L+)	20 (L-)	62 (B)	72 (A)
Option M	Intrinsically safe supply voltage		Modbus RS485 intrinsically safe	
Order code for "Output": Option M: Modbus RS485, for use in the intrinsically safe area (connection via Safety Barrier Promass 100)				

Safety Barrier Promass 100



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3 Safety Barrier Promass 100 with terminals

- 1 Non-hazardous area, Zone 2
- 2 Intrinsically safe area

**Intrinsically safe values**

These values only apply for the following device version:  
 Order code for "Output", option M "Modbus RS485", for use in intrinsically safe areas

Safety Barrier Promass 100

Safety-related values

Terminal numbers			
Supply voltage		Signal transmission	
2 (L-)	1 (L+)	26 (B)	27 (A)
$U_{nom} = DC\ 24\ V$ $U_{max} = AC\ 260\ V$		$U_{nom} = DC\ 5\ V$ $U_{max} = AC\ 260\ V$	

*Intrinsically safe values*

Terminal numbers			
Supply voltage		Signal transmission	
20 (L-)	10 (L+)	62 (B)	72 (A)
$U_o = 16.24 \text{ V}$ $I_o = 623 \text{ mA}$ $P_o = 2.45 \text{ W}$			

*Transmitter*

*Intrinsically safe values*

Terminal numbers			
Supply voltage		Signal transmission	
20 (L-)	10 (L+)	62 (B)	72 (A)
$U_i = 16.24 \text{ V}$ $I_i = 623 \text{ mA}$ $P_i = 2.45 \text{ W}$ $L_i = 0 \text{ }\mu\text{H}$ $C_i = 6 \text{ nF}$			

**Pin assignment, device plug**

*Device plug for signal transmission with supply voltage (device side), MODBUS RS485 (intrinsically safe)*

<p style="text-align: center; font-size: small;">A0029042</p>	Pin	Assignment		
	1	L+	Supply voltage, intrinsically safe	
	2	A	Modbus RS485 intrinsically safe	
	3	B		
	4	L-	Supply voltage, intrinsically safe	
	5		Grounding/shielding	
Coding	Plug/socket			
A	Plug			







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