

Safety Instructions

CNGmass

NEPSI: Zone 1, Zone 21 (Ex i version)

EN Document: XA01254D

Safety instructions for electrical apparatus for explosion-hazardous areas classified according to National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation (NEPSI) →  3

CNGmass

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Associated documentation

This document is an integral part of the following Operating Instructions:
BA01283D, CNGmass Modbus RS485

The Operating Instructions pertaining to the device apply.

Supplementary documentation

Explosion-protection brochure:
CP021Z/00

The Explosion-protection brochure is available:

- In the download area of the Endress+Hauser website: www.endress.com → Download → Advanced → Documentation Code: CP021Z
- On the CD for devices with CD-based documentation

Certificate of conformity

Certificate of conformity

- GB3836.1/4-2010
- GB12476.1-2000

Certificate number

GYJ13.1224

Inspection body

NEPSI, National Supervision and Inspection Centre for Explosion Protection and Safety of Intsumentation

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

*

—

* 1)

+

A*B*C*D*E*F*G*...

Device type

Basic specifications

Optional specifications

1)

* = Place holder: 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	Selected option	Description
1 Flow	D	D = flow
2 Instrument family	8	Coriolis flowmeter
3 Product	C	C = CNGmass
4 Generation index	B	Platform generation
5, 6 Nominal diameter	08, 15, 25	Nominal diameter of sensor

Relevant features of the device type and the basic specifications

The information applies to devices with the output of "Modbus RS485" (feature "M" for position 4 in the basic specifications).

Basic specifications Position 1, 2 Approval	Explosion protection	
	Transmitter/sensor	Safety Barrier Promass 100
NG	Ex ia IIC T1~T6 Gb DIP A21 T _A , T* IP6X	Ex nA [ia Ga] IIC T4 Gc

Optional specifications

No options specific to hazardous locations are available.

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 (e.g. GB3836.15-2000).
- Install the device according to the manufacturer's instructions and the following standards:
 - GB50257-1996 "Code for construction and acceptance of electric device for explosive atmospheres and fire hazard electrical equipment installation engineering"
 - GB3836.13-1997 "Electrical apparatus for explosive gas atmospheres – Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres"
 - GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres – Part 15: Electrical installations in hazardous area (other than mines)"
 - GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres – Part 16: Inspection and maintenance of electrical installation (other than mines)"
 - GB15577-2007 "Safety regulations for dust explosion prevention and protection". (Only if installed in dust hazardous areas.)
 - GB12476.2-2006 "Electrical apparatus for use in the presence combustible dust – Part 1-2: Electrical apparatus protected by enclosures and surface temperature limitation – selection, installation and maintenance". (Only if installed in dust hazardous areas.)
- 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.
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.
- Observe all the technical data of the device (see nameplate).
- When using in hybrid mixtures (gas and dust occurring simultaneously), observe additional measures for explosion protection.

Safety instructions: Installation

- The CNGmass should only be used with the supplied Safety Barrier Promass 100 (safety barrier).
- The Safety Barrier Promass 100 may only be installed in a non-hazardous area or Zone 2. If the safety barrier is installed in Zone 2, it must be installed in a housing. The housing must meet the requirements of GB3836.8-2003.
- Continuous service temperature of the connecting cable: -40 to $\geq +80$ °C (-50 to $\geq +80$ °C with Order code for "Test, certificate", option JM); 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).
- The connection cable and the installation between Safety Barrier Promass 100 and CNGmass must meet the requirements of GB3836.15-2000 (→ 8).
- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the housing.
- 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.
- Only use certified cable entries or sealing plugs. The metal sealing plugs supplied meet this requirement.
- Supplied cable glands M20 x 1.5 are only suitable for fixed cables and conducts. When installing 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.
- Note the connection values in the selection of the connection cable between Safety Barrier Promass 100 and CNGmass (→ 8).

Potential equalization

Integrate the device into the local 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 the transmitter housing and cable entries.
- Only open the transmitter housing briefly, ensuring that no dust or moisture enters the housing.

Temperature table

Ambient temperature

Minimum ambient temperature: $T_a = -40$ °C (-50 °C with order code for "Test, certificate", option JM)

Maximum ambient temperature: $T_a = +60$ °C depending on the medium temperature and temperature class

Medium temperature

Minimum medium temperature: $T_m = -50$ °C

Maximum medium temperature: T_m for T6...T1 depending on the maximum ambient temperature T_a

Temperature table for explosion hazards arising from gas and dust

Temperature values in brackets [] correspond to T_{xx} °C for dust. Example (→ 7)

T_a [°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 ambient temperature T_a and the medium temperature T_m .
- In the case of dust: Determine the maximum surface temperature as a function of the maximum ambient temperature T_a and the maximum medium temperature T_m .

Example of the maximum surface temperature for explosion hazards arising from dust

Device: CNGmass
Maximum ambient temperature: $T_a = 60\text{ }^{\circ}\text{C}$
Maximum medium temperature: $T_m = 98\text{ }^{\circ}\text{C}$

T_a [$^{\circ}\text{C}$]	T_6 [$85\text{ }^{\circ}\text{C}$]	T_5 [$100\text{ }^{\circ}\text{C}$]	T_4 [$135\text{ }^{\circ}\text{C}$]	T_3-T_1 [$200\text{ }^{\circ}\text{C}$]
35	50	85	120	150
50	—	85	120	150
60	—	—	120	150

$T_a = 60\text{ }^{\circ}\text{C}$

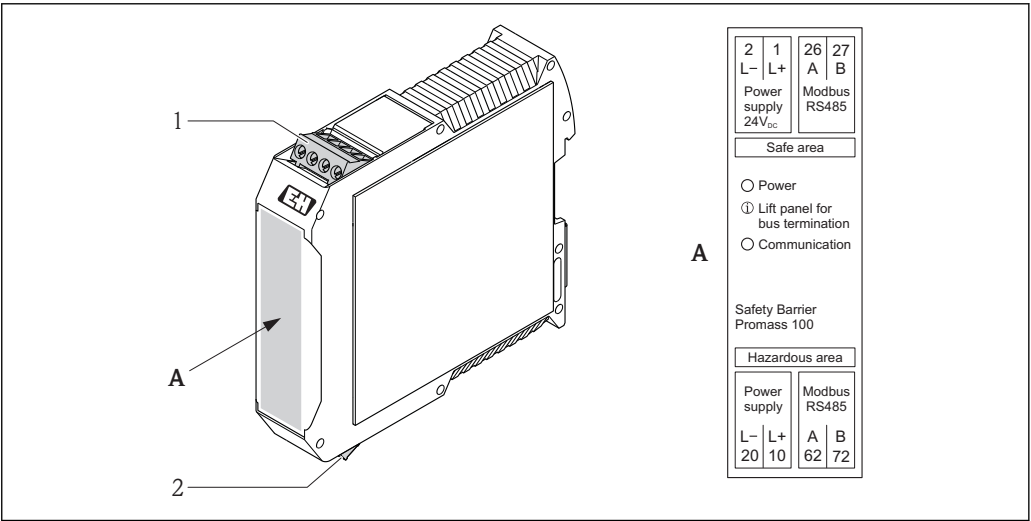
$T_m = 120\text{ }^{\circ}\text{C}$
($\leq 98\text{ }^{\circ}\text{C}$)

1 Procedure for determining the maximum surface temperature

1. Select the device (CNGmass) and ambient temperature T_a ($60\text{ }^{\circ}\text{C}$) in the associated temperature table.
 - ↳ The row showing the maximum medium temperature is determined.
2. Select the maximum medium temperature T_m ($98\text{ }^{\circ}\text{C}$), which is smaller than or equal to the maximum medium temperature of a cell.
 - ↳ The column with the temperature class for gas is determined ($120\text{ }^{\circ}\text{C} \rightarrow T_4$).
3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature: $T_4 = 135\text{ }^{\circ}\text{C} = \text{maximum surface temperature for dust}$.

Connection data: Signal circuits (intrinsically safe circuits)

Terminal assignment Safety Barrier Promass 100



2 Safety Barrier Promass 100

- 1 Non-hazardous area and Zone 2/Div. 2
- 2 Intrinsically safe area

Terminal assignment: Intrinsically safe area

Terminal numbers			
10 (L+)	20 (L-)	62 (A)	72 (B)
$U_0 = 16.24 \text{ V}$ $I_0 = 623 \text{ mA}$ $P_0 = 2.45 \text{ W}$ With IIC ¹⁾ : $C_0 = 0.433 \text{ } \mu\text{F}$, $L_0 = 92.8 \text{ } \mu\text{H}$, $L_0/R_0 = 14.6 \text{ } \mu\text{H}/\Omega$ With IIB: $C_0 = 2.57 \text{ } \mu\text{F}$, $L_0 = 372 \text{ } \mu\text{H}$, $L_0/R_0 = 58.3 \text{ } \mu\text{H}/\Omega$			

1) The gas group depends on the sensor and nominal diameter.

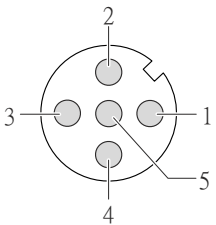
Terminal assignment transmitter

Connection only via Safety Barrier Promass 100

Terminal assignment transmitter intrinsically safe area

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

PIN assignment, device plug

	PIN	Assignment		Coding	Connector/ socket
 A0016809	1	L+	Supply voltage, Ex ia	A	Connector
	2	A	Modbus RS485, Ex ia		
	3	B	Modbus RS485, Ex ia		
	4	L-	Supply voltage, Ex ia		
	5		Grounding/shielding		

Connecting cable**Connecting cable between Safety Barrier Promass 100 and measuring device**

Comply with the maximum cable resistance specifications to ensure the operational reliability of the measuring device.

The maximum cable length for individual wire cross-sections is specified in the table below. Observe the maximum capacitance and inductance per unit length of the cable and connection values for hazardous areas.

Wire cross-section		Maximum cable length	
[mm ²]	[AWG]	[m]	[ft]
0.5	20	70	230
0.75	18	100	328
1.0	17	100	328
1.5	16	200	656
2.5	14	300	984

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