

# Safety Instructions **CNGmass**

## Division 1



Document: XA01374D

Safety instructions for electrical apparatus for explosion-hazardous areas classified according to the National Electrical Code (NEC) and Canadian Electrical Code (CEC)

# CNGmass

## Table of contents

Associated documentation .....	2
Supplementary documentation .....	2
Approvals .....	3
Order code .....	3
Safety instructions: General .....	4
Safety instructions: Mounting .....	4
Safety instructions: Installation .....	5
Temperature table .....	6
Connection data: Power supply .....	6
Connection data: Signal circuits (non-intrinsically safe circuits) .....	7
Service adapter .....	7
Technical Data .....	7

## Associated documentation

This document is an integral part of the following Operating Instructions:

- Modbus RS485
  - BA00123D, CNGmass

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](http://www.endress.com))

**Approvals**

**General**

The system meets the fundamental health and safety requirements for the design and construction of devices and protective systems intended for use in potentially explosive atmospheres in accordance with the National Electrical Code (NEC) and Canadian Electrical Code (CEC).

**No. / approval type**


E 330676

**Notified body**


UL: Underwriters Laboratories

**Identification**

The identification of the system must contain the following specifications:

	<ul style="list-style-type: none"> <li>▪ Class I, Groups ABCD</li> <li>▪ Class I, Zone 1, Group IIC</li> </ul>
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 Caution!

- The installation instructions for the safe use of the system must be observed: →  5.

**Order code**

The order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible.  
Additional information on the nameplate is provided in the associated Operating Instructions.

**Structure of the order code**



\* Placeholder: An option (number or letter) that depends on the device specification is displayed instead of the placeholders.

- **Device type**  
The device type section of the order code describes the device and the device construction.
- **Specifications**  
The number of positions depends on the number of features available. The selected option of a feature can consist of several positions.

More detailed information on the device is provided in the following tables. These tables describe the individual positions or IDs in the order code which are relevant to hazardous areas.

**Device type**

Position		Selected option	Description
1	Instrument family	8	Coriolis flow measuring system
2	Electronics	F	CNGmass 8FF transmitter
3	Sensor	F	Promass FP
4, 5	Nominal diameter	08 (3/8"), 15 (1/2"), 25 (1")	Nominal diameter of the sensor

**Basic specifications**

Position		Application/zone		
7	Approval	T	Compact version	<ul style="list-style-type: none"> <li>▪ Class I, Groups ABCD</li> <li>▪ Class I, Zone 1, Group IIC</li> </ul>
8	Housing	A	Compact version	Min. ambient temperature $T_{a\ min} = -40\ ^\circ\text{C}$ (-40 °F)
9	Cable entry	B		Thread: NPT 1/2"
12	Output	H, N		Non-intrinsically safe outputs

 Note!

For a detailed explanation of these values, regarding the available outputs and inputs, as well as a description of the associated terminal assignments and connection data: →  6 onwards.

### Safety instructions: General

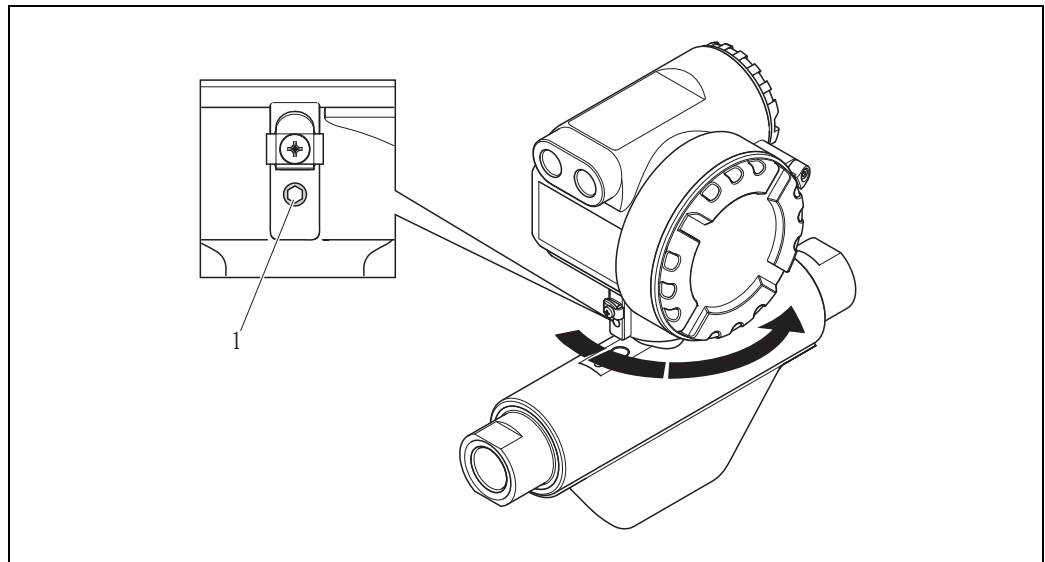
- Install all intrinsically safe circuits per Canadian Electrical Code (CEC) Part I Section 18 and Appendix F resp. per National Electrical Code (NEC) ANSI/ NFPA 70 and ISA RP 12.6 respecting the explosionproof integrity of the enclosure.
- Control room equipment shall not use or generate more than 250 V rms.
- The device must be integrated into the potential equalization system.
- It is not permissible to connect the service adapter whilst the atmosphere is considered to be explosive.
- Use of the devices is restricted to mediums against which the process-wetted materials are adequately resistant.
- Use supply wires suitable for +5 °C (+9 °F) above ambient temperature, but at least for +80 °C (+176 °F).
- Transmitter enclosure explosionproof for use in Class 1 Division 1 Groups A, B, C, D (factory sealed, conduit seal not required)
- Sensor circuits are intrinsically safe for Cl. I, Div. 1, Group A, B, C, D.
- Substitution of components may impair intrinsic safety.
- CNGmass is a dual seal related device.
- All ratings of the flow meter (see also nameplate) have to be respected.
- Installation, connection to the electricity supply, commissioning and maintenance of the devices must be carried out by qualified specialists trained to work on Ex-rated devices.
- Compliance with national regulations relating to the installation of devices in potentially explosive atmospheres is mandatory, if such regulations exist.

### Safety instructions: Mounting

#### Turning the transmitter housing

The transmitter housing can be rotated counterclockwise continuously up to 360°.

1. Loosen the Allen setscrew (1) partially, but do not unscrew it all the way.
2. Rotate the transmitter housing into the desired position.
3. Tighten the Allen setscrew (1).



A0006921

Fig. 1: Turning the transmitter housing

**Safety instructions:  
Installation**

- For terminals No. 22 to No. 27 of the transmitter, only devices with ratings  $U_m \leq 253 \text{ V}$  and  $I_m \leq 1 \text{ A}$  are allowed to be connected.
- The measuring device must only be used in the permitted temperature class.  
The values of the individual temperature classes can be found in the temperature table: → 6.

**Cable entries**

Cable entries for transmitter terminal compartment (XP version) power supply/communication cable.  
Choice of thread for cable entry: 1/2" NPT.

Make sure that the XP cable glands/entries are secured to prevent working loose.

**Cable specification**

You can find information about the cable specification in the associated Operating Instructions.

**Potential equalization**

The transmitter is to be securely connected to the potential equalization system using the screw terminal on the outside of the transmitter housing. Alternatively, the transmitter of the compact version can be connected to the potential equalization system via the pipeline if a ground connection via the pipeline according to regulations can be assured.

Note!

Further information about potential equalization, screening and grounding can be found in the associated Operating Instructions.

**Potential equalization with shield grounded at both sides for Modbus version**

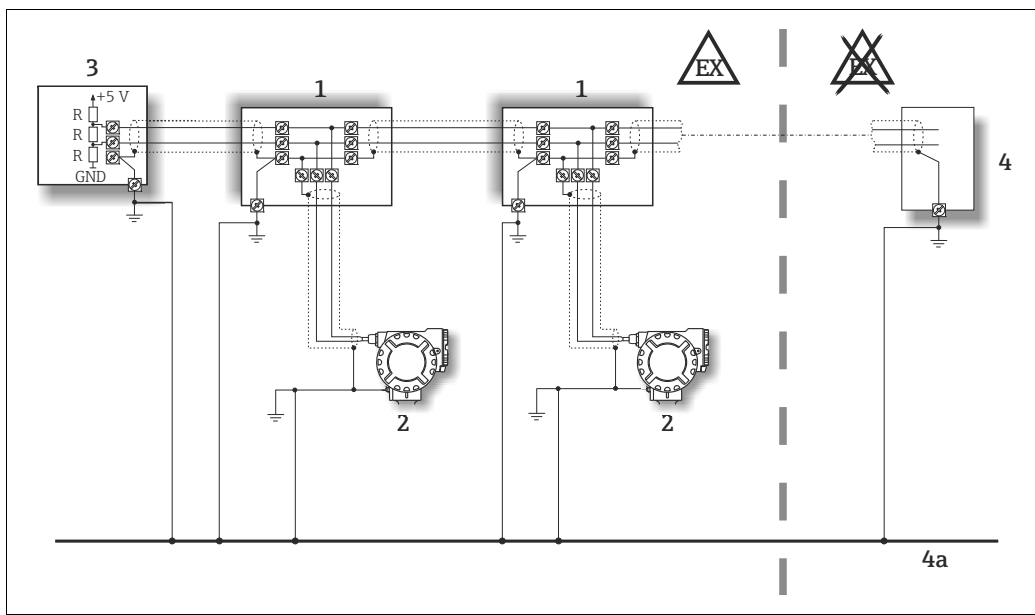


Fig. 2: Example for connecting potential equalization lines

- 1 Distributor/T-Box
- 2 Bus devices for potentially explosive atmospheres
- 3 Bus terminator Modbus RS485
- 4 Bus supply unit or automation system
- 4a Potential equalization line is fed out into the safe area

Note!

The length of the spur must be observed.

**Temperature table****Ambient temperature**

The minimum ambient temperature  $T_a$  for CNGmass is  $-40\text{ °C}$  ( $-40\text{ °F}$ ).

**Medium temperature**

The minimum medium temperature for CNGmass is  $-50\text{ °C}$  ( $-58\text{ °F}$ ).

Max. medium temperature [ $^{\circ}\text{C}$ ] ( $^{\circ}\text{F}$ ) for T1-T5 in relation to the maximum ambient temperature  $T_a$

	Nominal diameter [mm] ([in])	$T_a$ [ $^{\circ}\text{C}$ ] ([ $^{\circ}\text{F}$ ])	T5 +100 $^{\circ}\text{C}$ (+212 $^{\circ}\text{F}$ )	T4 +135 $^{\circ}\text{C}$ (+275 $^{\circ}\text{F}$ )	T3 +200 $^{\circ}\text{C}$ (+392 $^{\circ}\text{F}$ )	T2 +300 $^{\circ}\text{C}$ (+572 $^{\circ}\text{F}$ )	T1 +450 $^{\circ}\text{C}$ (+842 $^{\circ}\text{F}$ )
CNGmass 8FF**-...	08 (3/8"), 15 (1/2"), 25 (1")	+50 (+122)	95 (203)	125 (257)	125 (257)	125 (257)	125 (257)
	08 (3/8"), 15 (1/2")	+60 (+140)	90 (194)	125 (257)	125 (257)	125 (257)	125 (257)
	25 (1")		95 (203)				

**Connection data: Power supply**

All transmitters	1 L (+)	2 N (-)	⊕
Designation	Supply voltage		Protective earth
Functional values	AC: U = 20 to 28 V DC: U = 10 to 30 V  Power consumption: AC: < 4.0 VA DC: < 3.2 W		Caution! Pay attention to the grounding concepts of the plant!
Intrinsically safe circuit	no		
$U_m$	253 V AC		

**Connection data:  
Signal circuits (non-  
intrinsically safe circuits)**

 Note!

The following tables contain values/specifications that depend on the transmitter type code and the input and output assignment. Please compare the following data to the information shown on the nameplate of your measuring device.

**Terminal assignment for CNGmass 8FF**

Safety-related and functional values of signal circuits →  7

Order characteristic "Outputs" Basic specifications position 12	Terminal No.					
	22 (+)	23 (-)	24 (+)	25 (-)	26 (+)	27 (-)
<i>Non-convertible communication boards (fixed assignment)</i>						
H/N	Pulse / Frequency / Status output 2		Pulse / Frequency / Status output 1		Modbus RS485 <sup>1)</sup> B   A	
<sup>1)</sup> Modbus RS485: - Terminal 26 (+) → B (Rx/D/TxD-P) - Terminal 27 (-) → A (Rx/D/TxD-N)						

**Safety-related and functional values of signal circuits**

Signal circuits	Functional values	Safety-related values
Pulse/frequency output	galvanically isolated passive 30 V DC / 250 mA open collector  end frequency 100 to 5000 Hz	intrinsically safe = no U <sub>m</sub> = 253 V I <sub>m</sub> = 1 A
Status output	galvanically isolated passive 30 V DC / 250 mA open collector	
Modbus RS485	galvanically isolated RS485 as per Standard EIA/TIA-485	

**Service adapter**

The service adapter is only used for connecting service interfaces approved by Endress+Hauser.

 Warning!

It is not permissible to connect the service adapter whilst the atmosphere is considered to be explosive.

**Technical Data**

**Dimensions**

The dimensions of the instruments for the hazardous area correspond to those in the Technical Information documentation.

**Weight**

The weight of the Ex d version is equivalent to the weight in the Technical Information documentation.

 Note!

Technical Information for CNGmass → TI00077D

[www.addresses.endress.com](http://www.addresses.endress.com)

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