



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

## Safety Instructions

# CNGmass

## Division 1



**en** Document: XA000149D

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



# CNGmass

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## 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

160686-1882928

### Notified body

CSA: Canadian Standard Association

### Identification

The identification of the system must contain the following specifications:

CSA	CSA <sub>US</sub>
<ul style="list-style-type: none"> <li>■ Class I, Groups ABCD</li> <li>■ Class I, Zone 1, Group IIC</li> <li>■ Class II, Groups EFG</li> <li>■ Class III</li> </ul>	<ul style="list-style-type: none"> <li>■ XP-IS-DIP / I, II, III / 1 / ABCDEFG / T5-T1</li> </ul>



Caution!

- The installation instructions for the safe use of the system must be observed: → 6.

## 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

\* \* \* \* \* \_ \* \* \* \* \* \* \* \* \* \* \* \* \*

Device type

Specifications

\* 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	M, 8 Compact version <ul style="list-style-type: none"> <li>■ Class I, Groups ABCD</li> <li>■ Class I, Zone 1, Group IIC</li> <li>■ Class II, Groups EFG</li> <li>■ Class III</li> </ul>
8 Housing	A Compact version Min. ambient temperature $T_{a\min} = -40\text{ °C}$ ( $-40\text{ °F}$ )
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: → 7 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.
- Class II Group G: The surface temperature of the apparatus cannot exceed +165 °C (+329 °F). The user must limit the process temperature for Group G to +140 °C (+284 °F).
- 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) and dust-ignition proof for Class II, III Division 1 Groups E, F, G.
- Sensor circuits are intrinsically safe for Cl. I, Div. 1, Group A, B, C, D. Sensor enclosure is dust ignition proof for Cl. II, III, Div. 1, Group E, F, G.
- 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).

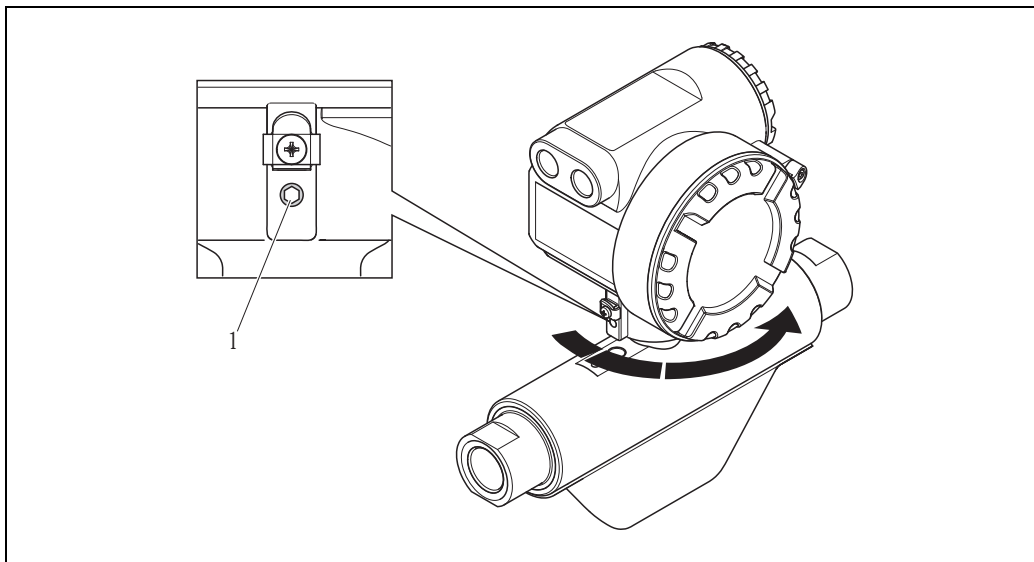


Fig. 1: Turning the transmitter housing

A0006921

## 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: → 7.

### Cable entries

Cable entries for transmitter terminal compartment (XP version) power supply/communication cable.  
Choice of thread for cable entry: ½" 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

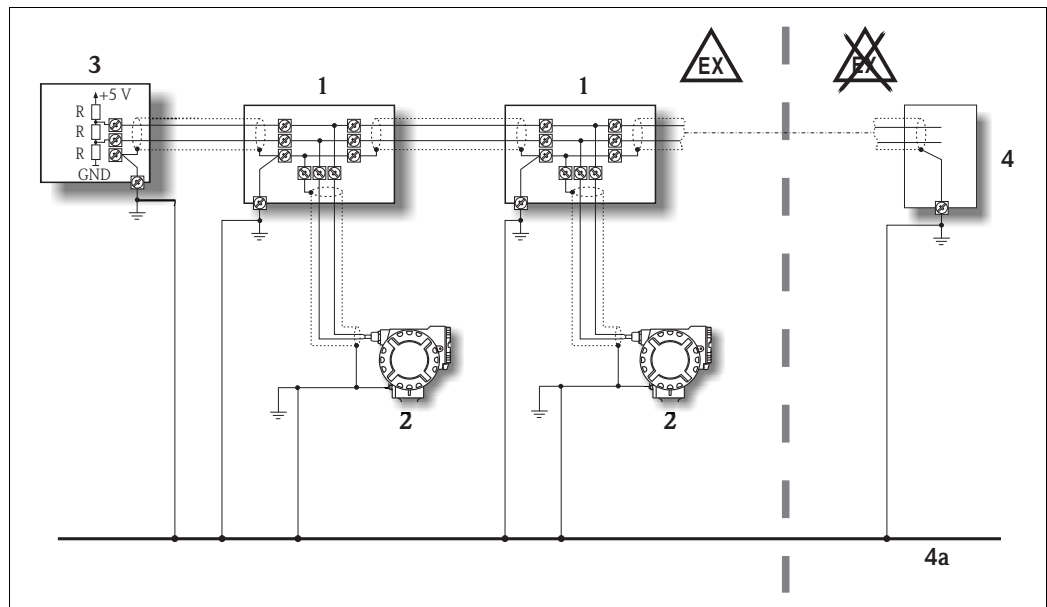


Fig. 2: Example for connecting potential equalization lines

- Distributor/T-Box
- Bus devices for potentially explosive atmospheres
- Bus terminator Modbus RS485
- Bus supply unit or automation system
- 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 $U_m$ = 253 V $I_m$ = 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.

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

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