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Safety Instructions
Proline Promass 100

Modbus RS485

EAC: Zone 1, Zone 0/1, Zone 21

Endress+Hauser
People for Process Automation

Proline Promass 100

Modbus RS485

Table of contents

About this document

The document number of these Safety Instructions (XA) must match the information on the nameplate.

Associated documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *Device Viewer* (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	Modbus RS485
Promass A 100	BA01179D
Promass E 100 (8E1B**-...)	BA01056D
Promass E 100 (8E1C**-...)	BA01711D
Promass F 100	BA01057D
Promass G 100	BA01345D
Promass H 100	BA01177D
Promass I 100	BA01058D
Promass O 100	BA01180D
Promass P 100	BA01059D
Promass S 100	BA01060D
Promass X 100	BA01181D

Additional documentation

Contents	Document type	Documentation code
Explosion Protection	Brochure	CP00021Z/11

Please note the documentation associated with the device.

Manufacturer's certificates

Measuring instruments meet 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 TR CU 012/2011.

Certification body

LLP "T-Standard"

Certificate number

ЕАЭС KZ 7500525.01.01.01551

Affixing the certificate number certifies conformity with the standards under (depending on the device version).

- ГОСТ 31610-0-2019 (IEC 60079-0-2017)
- ГОСТ 31610-11-2014 (IEC 60079-11-2011)
- ГОСТ 31610.26-2016 (IEC 60079-26:2014)
- ГОСТ IEC 60079-31-2013
- ГОСТ 31610.7-2017 (IEC 60079-7:2015)

Manufacturer address

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*...
(Device type)		*(Basic specifications)*		*(Optional specifications)*

* = 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	Instrument family	8	Coriolis flowmeter
2	Sensor	A, E, F, G, H, I, O, P, S, X [1)]	Sensor type
3	Transmitter	1	Transmitter type: 4-wire, compact version
4	Generation index	B, C	Platform generation
5, 6	Nominal diameter	Examples: 02, 04, 40, 50, 1H, 3E [2) 3)]	Nominal diameter of sensor

1) For replacement transmitter only: X
2) For the exact specification of the nominal diameter, see nameplate
3) For replacement transmitter only: XX

Basic specifications

Position	Order code for	Option selected	Device type		Type of protection	
			Position 2 Sensor	Position 5, 6 Nominal diameter	Transmitter Sensor	Safety Barrier Promass 100
1, 2	Approval	GM, BM, 85	A	01, 02, 04	1Ex ia IIC T6...T1 Gb X Ex tb IIIC T** °C Db X	2Ex ec [ia Ga] IIC T4 Gc X
			E, F	08, 15, 25, 40, 50		
			G	08, 15, 25		
			H, S, P	08, 15, 25, 40		
			I	08, 15, 16, 25, 26, 40		
			E	80	1Ex ia IIB T6...T1 Gb X Ex tb IIIC T** °C Db X	
			F, O	80, 1H, 1F, 2F		
			H, P, S	50		
			I	41, 50, 51, 80		
			X	3F		
		GN, BN, 84	E	80	1Ex ia IIC T6...T1 Gb X Ex tb IIIC T** °C Db X	
			F, O	80, 1H, 1F, 2F		
			H, P, S	50		
			I	41, 50, 51, 80		
			X	3F		
		GU, BU	A	01, 02, 04	1Ex ia IIC T6...T1 Gb X	
			E, F	08, 15, 25, 40, 50		
			G	08, 15, 25		
			H, S, P	08, 15, 25, 40		
			I	08, 15, 16, 25, 26, 40		
			E	80	1Ex ia IIB T6...T1 Gb X	
			F, O	80, 1H, 1F, 2F		
			H, P, S	50		
			I	41, 50, 51, 80		
			X	3F		
		GV, BV	E	80	1Ex ia IIC T6...T1 Gb X	
			F, O	80, 1H, 1F, 2F		
			H, P, S	50		
			I	41, 50, 51, 80		
			X	3F		
		GO, BO	F	08, 15, 25, 40, 50	Ga/Gb Ex ia IIC T6...T1 X Ex tb IIIC T** °C Db X	
			F, O	80, 1H, 1F, 2F	Ga/Gb Ex ia IIB T6...T1 X Ex tb IIIC T** °C Db X	
			X	3F		
		GP, BP	F, O	80, 1H, 1F, 2F	Ga/Gb Ex ia IIC T6...T1 X Ex tb IIIC T** °C Db X	
			X	3F		
		GQ, BQ	F	08, 15, 25, 40, 50	Ga/Gb Ex ia IIC T6...T1 X	
			F, O	80, 1H, 1F, 2F	Ga/Gb Ex ia IIB T6...T1 X	
			X	3F		

Position	Order code for	Option selected	Device type		Type of protection	
			Position 2 Sensor	Position 5, 6 Nominal diameter	Transmitter Sensor	Safety Barrier Promass 100
		GR, BR	F, O	80, 1H, 1F, 2F	Ga/Gb Ex ia IIC T6...T1 X	
			X	3F		
T** °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
		B	Compact hygienic, stainless
		C	Ultra compact hygienic, stainless
13, 14	Device Model [1)]	A1	1

1) Order code for "Device model" only for measuring devices with product code 8E1C

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. ГОСТ IEC 60079-14-2013)
- 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 ГОСТ 31610.7-2017 (IEC 60079-7:2015).
  - The connecting cable and the installation between the safety barrier and the device must meet the requirements of ГОСТ IEC 60079-14-2013.
  - 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 ГОСТ IEC 60079-14-2013.
- 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.
- Basic specification, order code for "Housing", option B, C:
  To protect the housing of stainless steel housings: Ensure that the housing gasket is flat and not bent when closing the housing cover. Replace bent gaskets.

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. ГОСТ IEC 60079-14-2013 , 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 0

Basic specification, position 1, 2 (Approval) = GO, GP, GQ, GR, BO, BP, BQ, BR

For sensors with EPL Ga/Gb the zone 0 is permitted in the measuring tube.

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:
- $T_{a, min}$ = −40 °C
- *Optional specification, ID Jx (Test, Certificate) = JM*
  $T_{a, min}$ = −50 °C

Maximum ambient temperature:
$T_{a, max}$ = +60 °C depending on the medium temperature and temperature class

Medium temperature

Minimum medium temperature

- Promass A, F, G, H, I, P, S, X:
  $T_{m, min}$ = −50 °C
- Promass E, O:
  $T_{m, min}$ = −40 °C

Maximum medium temperature

$T_{m, max}$ for T6…T1 depending on the maximum ambient temperature $T_{a, max}$.

Compact version

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

Basic specifications, position 5 (housing) = A, B

$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35	50	85	120	150 [1) 2)]	150 [1) 3) 4)]	150 [1) 3) 4)]
50	–	85	120	150 [1) 2)]	150 [1) 3) 4)]	150 [1) 3) 4)]
60	–	–	120	150 [1) 2)]	150 [1) 3) 4)]	150 [1) 3) 4)]

1) The medium temperature for Promass 8E1B**-… is limited to $T_{m, max}$ = 140 °C.
2) The following applies to specified sensors with a maximum medium temperature $T_{m, max\ range}$ = 205 °C: $T_{m, max}$ = 170 °C
3) The following applies to specified sensors with a maximum medium temperature $T_{m, max\ range}$ = 205 °C: $T_{m, max}$ = 205 °C
4) Maximum medium temperature = $T_{m, max}$240 °C for Promass F version with maximum $T_{m, max\ range}$ = 240 °C. For medium temperature above 205 °C, the transmitter shall not be installed above the sensor.

Basic specifications, position 5 (housing) = C

$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35	50	85	120	150 [1) 2)]	150 [1) 3) 4)]	150 [1) 3) 4)]
45	–	85	120	150 [1) 2)]	150 [1) 3) 4)]	150 [1) 3) 4)]
50	–	–	120	150 [1) 2)]	150 [1) 3) 4)]	150 [1) 3) 4)]

1) The medium temperature for Promass 8E1B**-… is limited to $T_{m, max}$ = 140 °C.
2) The following applies to specified sensors with a maximum medium temperature $T_{m, max\ range}$ = 205 °C: $T_{m, max}$ = 170 °C
3) The following applies to specified sensors with a maximum medium temperature $T_{m, max\ range}$ = 205 °C: $T_{m, max}$ = 205 °C
4) Maximum medium temperature = $T_{m, max}$240 °C for Promass F version with maximum $T_{m, max\ range}$ = 240 °C. For medium temperature above 205 °C, the transmitter shall not be installed above the sensor.

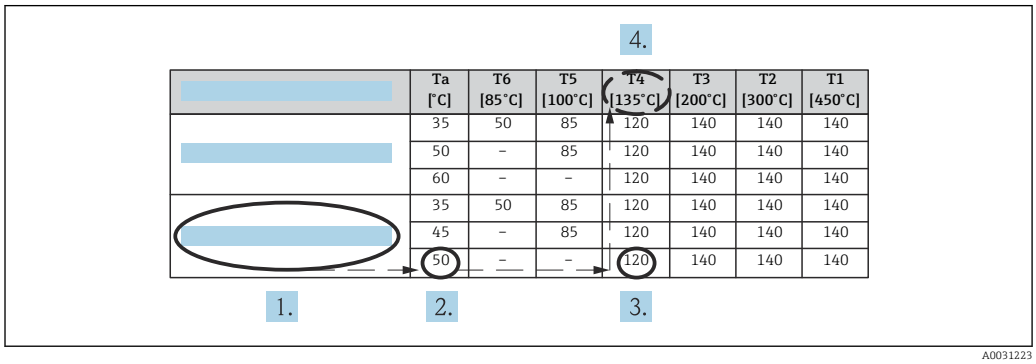
Explosion hazards arising from gas and dust

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 $T_{a, max}$ and the maximum medium temperature $T_{m, max}$.
- In the case of dust: Determine the maximum surface temperature as a function of the maximum ambient temperature $T_{a, max}$ and the maximum medium temperature $T_{m, max}$.

Example

- Measured maximum ambient temperature: $T_{a, max}$ = 47 °C
- Measured maximum medium temperature: $T_{m, max}$ = 108 °C



1 Procedure for determining the temperature class and surface temperature

1. Select device (optional).
2. In the column for the maximum ambient temperature $T_{a, max}$ select the temperature that is immediately greater than or equal to the maximum ambient temperature $T_{a, max}$ that is present.
   ↳ $T_{a, max}$ = 50 °C.
   The row showing the maximum medium temperature is determined.
3. Select the maximum medium temperature $T_{m,max}$ of this row, which is immediately greater than or equal to the maximum medium temperature $T_{m, max}$ that is present.
   ↳ The column with the temperature class for gas is determined: 108 °C ≤ 120 °C → T4.
4. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: T4 = 135 °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

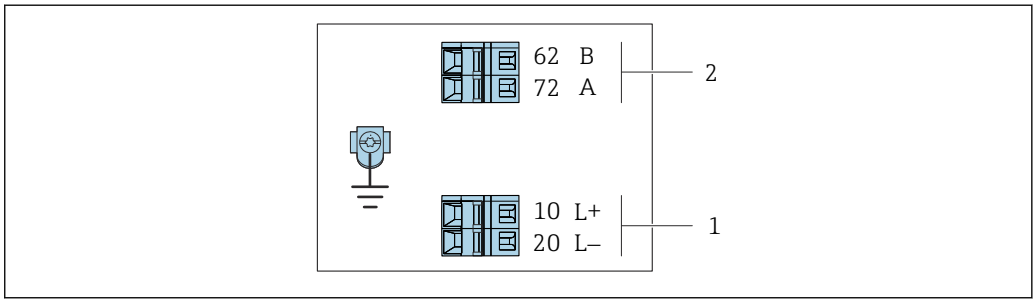
The order code constitutes part of the extended order code. For detailed information on the device features and the structure of the extended order code → 5.

Modbus RS485 connection version

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

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

Depending on the housing version, the transmitters can be ordered with terminals or device plugs.

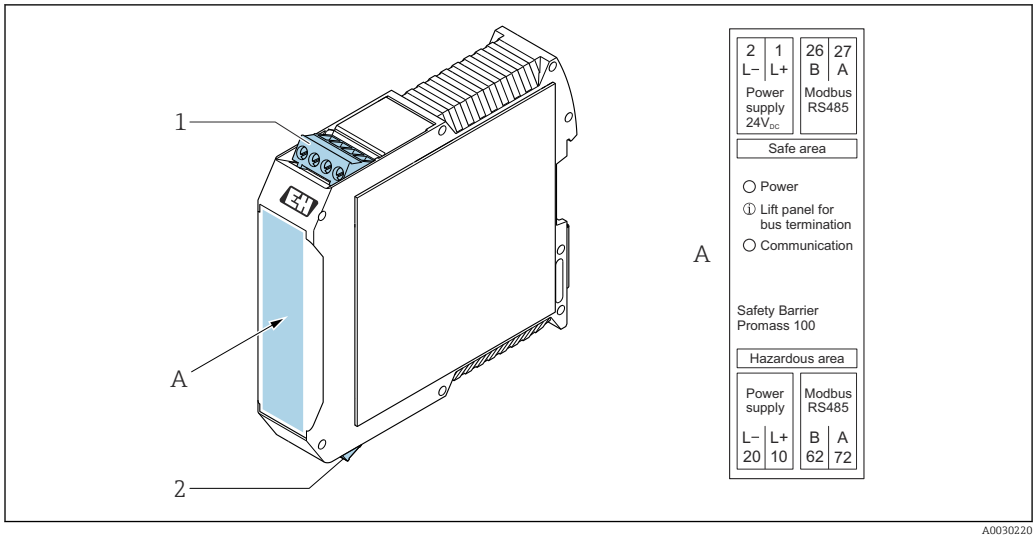


2 *Modbus RS485 terminal assignment, connection version for use in intrinsically safe areas (connection via Safety Barrier Promass 100)*

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



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 V I_o = 623 mA P_o = 2.45 W With IIC [1]: L_o = 92.8 µH, C_o = 0.433 µF, L_o/R_o = 14.6 µH/Ω With IIB: L_o= 372 µH, C_o = 2.57 µF, L_o/R_o = 58.3 µH/Ω			

1) The gas group depends on the sensor and nominal diameter → 🖹 5ff.

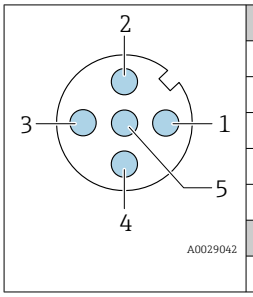
Transmitter

Intrinsically safe values

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

Pin assignment, device plug

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



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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