

Safety Instructions

Proline Promag P 10

JPN: Zone 1
Zone 21



Proline Promag P 10

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Associated documentation

All documentation is available:

- On the CD-ROM supplied (not included in the delivery for all device versions).
- Available for all device versions via:
 - Internet: www.endress.com/deviceviewer
 - Smart phone/tablet: *Endress+Hauser Operations App*
- In the Download Area of the Endress+Hauser web site: www.endress.com → Download.

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

Measuring device	Documentation code	
	HART	Modbus
Promag P 10	BA02069D	BA02072D

Additional documentation

Contents	Document type	Documentation code
Explosion Protection	Brochure	CP00021Z/11

Please note the documentation associated with the device.

Manufacturer's certificates**JPN Type Examination Certificate**

Certificate number:
CML 21JPN11264X

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

- JNIO SH-TR-46-1: 2020
- JNIO SH-TR-46-2: 2018
- JNIO SH-TR-46-5: 2018
- JNIO SH-TR-46-6: 2015
- JNIO SH-TR-46-9: 2018

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*...
<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	Instrument family	5	Electromagnetic flowmeter
2	Sensor	p ¹⁾	Sensor type
3	Transmitter	B	Transmitter type: 4-wire, compact version

Position	Order code for	Option selected	Description
4	Generation index	B	Platform generation
5, 6	Nominal diameter	DN 15 to 600 ²⁾	Nominal diameter of sensor

1) For replacement transmitter only: X

2) For replacement transmitter only: XX

Basic specifications

Position 1, 2 Order Code "Approval; Transmitter + Sensor" Option selected	Position 4, 5 Order Code "Output; Input" Option selected	Type of protection
JC	C, U	Ex db ib [ib] IIB T4...T1 Gb Ex tb [ib] IIIC T** °C Db
	B, M	Ex db ib IIB T4...T1 Gb Ex tb IIIC T** °C Db

Position	Order code for	Option selected	Description
6	Output, input 1	B	4-20mA HART, Pulse/frequency/switch output
		C	4-20mA HART, Pulse/frequency/switch output Ex i
		M	Modbus RS485, 4-20mA
		U	Modbus RS485, 4-20mA Ex i
7	Display; Operation	A	W/o; via communication
		H	W/o; SmartBlue app
		J	LCD, 2,40"; SmartBlue app
		K	LCD, 2,40"; Touch Screen, SmartBlue app
8	Housing	A	Compact, alu, coated
		P	Remote, alu, coated
17, 18	Device Model	A1	1

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 or guidelines (e.g. JNIOHS-TR-NO.44)
 - 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.
 - Modifications 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).
 - Open the housing cover of the transmitter housing in explosion protection Ex db only if one of the following conditions is met:
 - An explosive atmosphere is not present.
 - A waiting time of 10 minutes is observed after switching off the power supply.
- The following warning notice is on the device:
WARNING – AFTER DE-ENERGIZING, DELAY 10 MINUTES
BEFORE OPENING ENCLOSURE IN TYPE OF PROTECTION EX D
- Attached nameplates must be included in potential equalization.
 - Devices with damaged Ex d threads may no longer be used in hazardous location. It is not permitted to repair or mend Ex d threads.
 - Replaced transmitter or sensors shall not be re-used in any other application.

Safety instructions: Installation

- In potentially explosive atmospheres:
 - Do not disconnect the electrical connection of the power supply circuit when energized.
 - Do not open the connection compartment cover when energized.
- The following applies for transmitter with a connection compartment in Ex db IIB:
The device may only be opened after a waiting time of 10 minutes after the power supply has been switched off.
- Continuous service temperature of the connecting cable:
-40 to +80 °C; 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).
- 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 $M20 \times 1.5$ are only suitable for fixed installation of cables and connections. In the installation, a strain relief must be provided.
- Only use certified cable entries suitable for the application. Observe selection criteria as per JNIOOSH-TR-NO.44.
- The following applies when connecting the transmitter with a connection compartment in Ex db:

Only use separately certified cables and wire entries (Ex db IIB or Ex db IIC) which are suitable for operating temperatures up to 85 °C and for IP 66/67. If using conduit entries, the associated sealing mechanisms must be mounted directly on the housing.

Plastic sealing plugs act as transport protection and have to be replaced by suitable, individually approved installation material. The mounted metal thread extensions and blind plugs are tested and certified as part of the housing for type of protection Ex db IIB. The thread extension or the blind plug labeled as follows for identification purposes:

 - Md: $M20 \times 1.5$
 - d: NPT $\frac{1}{2}$ "
- The following cable glands approved by an Ex certification body may be installed on the devices with order code "Approval", option JC (for details, contact our service center):
 - Ex d, Ex t approved cable glands, e.g. EXTC-16MG
 - Ex d approved cable glands, e.g. KXBF-20·16
- Yellow cap attached to the cable glands is a transportation measure only, and is to be removed when the delivered device is installed.

- Information on our service center: Service Desk, 5-70-3 Nisshin-cho, Fuchu-shi, Tokyo-to
Tel: 042-314-1911
Fax: 042-314-1951
- When the measuring device is connected, attention must be paid to explosion protection at the transmitter.
- Please note the following if using an RFID TAG:
 - The RFID TAG shall never be exposed to high electromagnetic fields.
 - Electrostatic charge shall be avoided. The RFID TAG shall never be used next to strong charge-generating processes.
- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the enclosure.
- Only use certified sealing plugs. The metal sealing plugs supplied meet this requirement.

Intrinsic safety

- The device can be connected to the Endress+Hauser service tool FXA291; pay attention to the Operating Instructions. Connection to the service connector is only permitted if the atmosphere is not a potentially explosive atmosphere.
- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. JNIOOSH-TR-NO.44).
- For display use only battery from Renata type lithium CR1632, 3V.
- The use of the device without a display module is not permitted.

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 all housing openings, cable entries and sealing plugs.
- Only open all housing briefly, ensuring that no dust or moisture enters the housing.
- Only use certified cable entries and sealing plugs. The metal cable entries, extensions and sealing plugs supplied meet this requirement.

Temperature tables

Ambient temperature

Minimum ambient temperature

$$T_a = -40 \text{ }^\circ\text{C}$$

Maximum ambient temperature

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

Medium temperature*Minimum medium temperature*

$T_m = -40\text{ to }0\text{ °C}$ depending on the selected device version (see nameplate!)

Maximum medium temperature

T_m for T4...T1 depending on the maximum ambient temperature T_a

Compact version*Maximum medium temperature with or without thermal insulation according to Endress+Hauser specifications*

Without thermal insulation

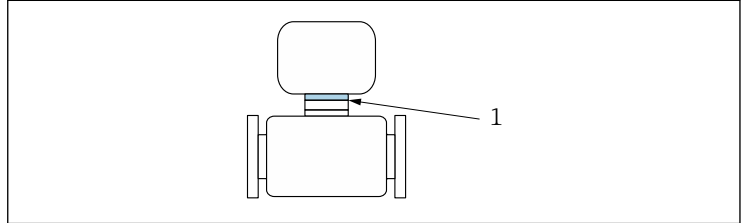
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation

Liner	T_a [°C]	T_m [°C]					
		T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
PTFE (110 °C)	55	-	-	110	110	110	110
	60	-	-	100	100	100	100
PTFE (130 °C)	55	-	-	130	130	130	130
	60	-	-	100	100	100	100
PFA	40	-	-	-	150	150	150
	55	-	-	130	130	130	150
	60	-	-	100	100	100	100


With thermal insulation without Endress+Hauser specifications

The specified reference temperature T_{ref} and the maximum medium temperature $T_{m,max}$ for each temperature class must not be exceeded:

→  10



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 1 Position of reference point for temperature measurement

1 Reference point

Reference temperature T_{ref}

T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
-	-	69	69	69	69

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 and the maximum 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

- Measured maximum ambient temperature: $T_{ma} = 63 \text{ °C}$
- Measured maximum medium temperature: $T_{mm} = 108 \text{ °C}$

T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80	95	130	150	150	150
55	-	95	130	150	150	150
60	-	95	130	150	150	150

Diagram annotations: A blue box '3.' is above the T4 header. A blue box '1.' is below the 60 value in the first column. A blue box '2.' is below the 130 value in the third column. A blue box '3.' is above the 135 °C value in the T4 header. Arrows indicate the selection process: an arrow points from the 60 value to the 130 value in the third column, and another arrow points from the 130 value in the third column to the 135 °C value in the T4 header.

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2 Procedure for determining the temperature class and surface temperature

1. In the column for the maximum ambient temperature T_a select the temperature that is immediately greater than or equal to the maximum ambient temperature T_{ma} that is present.

↳ $T_a = 60\text{ °C}$.

The row showing the maximum medium temperature is determined.

2. 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:
 $108\text{ °C} \leq 130\text{ °C} \rightarrow T_4$.

3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: $T_4 = 135\text{ °C}$.

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.

Safety-related values

Order code "Output; input"		Terminal assignment	Safety-related values
Option B	Current output 4 to 20 mA HART (active)	26 (+), 27 (-)	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$
	Current output 4 to 20 mA HART (passive)	24 (+), 25 (-)	
	Pulse/frequency/switch output	22 (+), 23 (-)	
Option M	Current output 4 to 20 mA (active)	26 (+), 27 (-)	
	Current output 4 to 20 mA (passive)	24 (+), 25 (-)	
	Modbus RS485	22 (B), 23 (A)	

Intrinsically safe values

Order code "Output; input"		Terminal assignment	Safety-related values
Option C	Current output 4 to 20 mA HART (active)	26 (+), 27 (-)	$U_0 = 22.3 V$ $I_0 = 93 mA$ $P_0 = 520 mW$ $L_0 = 8 mH$ $C_0 = 500 nF$ $U_i = 6.5 V$ $I_i = 10 mA$ $P_i = 20 mW$
	Current output 4 to 20 mA HART (passive)	24 (+), 25 (-)	$U_i = 30 V$ $I_i = 100 mA$ $P_i = 1.25 W$ $L_i = 0 \mu H$ $C_i = 6 nF$
	Pulse/frequency/switch output	22 (+), 23 (-)	$U_i = 30 V$ $I_i = 100 mA$ $P_i = 1.25 W$ $L_i = 0 \mu H$ $C_i = 10 nF$

Order code "Output; input"		Terminal assignment	Safety-related values
Option U	Current output 4 to 20 mA (active)	26 (+), 27 (-)	$U_0 = 22.3 \text{ V}$ $I_0 = 93 \text{ mA}$ $P_0 = 520 \text{ mW}$ $L_0 = 8 \text{ mH}$ $C_0 = 500 \text{ nF}$ $U_i = 6.5 \text{ V}$ $I_i = 10 \text{ mA}$ $P_i = 20 \text{ mW}$
	Current output 4 to 20 mA (passive)	24 (+), 25 (-)	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0 \text{ }\mu\text{H}$ $C_i = 6 \text{ nF}$
	Modbus RS485	22 (B), 23 (A)	$U_i = 4.2 \text{ V}$ $I_i = \text{N/A}$ $P_i = \text{N/A}$ $L_i = 0 \text{ }\mu\text{H}$ $C_i = 6 \text{ nF}$ $U_0 = 4.2 \text{ V}$ $I_0 = 120 \text{ mA}$ $P_0 = 130 \text{ mW}$ $L_0 = 10 \text{ mH}$ $C_0 = 900 \text{ }\mu\text{F}$ $L_0/R_0 = 1.2 \text{ mH}/\Omega$



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