

# Safety Instructions

## Proline Promag P 10

CSA: Class I Zone 2  
Class I Division 2





# Proline Promag P 10

## Table of contents

|  |    |
|--|----|
| Associated documentation .....           | 4  |
| Manufacturer's certificates .....        | 4  |
| Manufacturer address .....               | 4  |
| Extended order code .....                | 4  |
| Safety instructions: General .....       | 7  |
| Safety instructions: Installation .....  | 8  |
| Temperature tables .....                 | 9  |
| Connection values: Signal circuits ..... | 14 |

**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](http://www.endress.com/deviceviewer)
  - Smart phone/tablet: *Endress+Hauser Operations App*
- In the Download Area of the Endress+Hauser web site: [www.endress.com](http://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                 |
| Control drawing      |               | As wanted on the nameplate. |

Please note the documentation associated with the device.

**Manufacturer's certificates****Certificate number**

CSA 21CA80077052

**Notified body**

CSA Group

**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

$$\frac{\text{* * * * *}}{\text{(Device type)}} - \frac{\text{* * * * * ... * * * * *}}{\text{(Basic specifications)}} + \frac{\text{A*B*C*D*E*F*G*...}}{\text{(Optional specifications)}}$$

\* = 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 | 5               | Electromagnetic flowmeter  |
| 2        | Sensor            | P               | Sensor type                |
| 3        | Transmitter       | B               | Transmitter type:          |
| 4        | Generation index  | B               | Platform generation        |
| 5, 6     | Nominal diameter  | DN 15 to 600    | Nominal diameter of sensor |

## Basic specifications

### Compact version

| Position 1, 2<br>Order Code "Approval; Transmitter +<br>Sensor"<br>Option selected | Position 4, 5<br>Order Code "Output; Input"<br>Option selected | Type of protection                            |
|--|--|---|
| CZ   | C, U   | Cl.I Zone 2, AEx/Ex ec ic  ic  IIB T4...T1 Gc |
|  | B, M   | Cl.I Zone 2, AEx/Ex ec ic IIB T4...T1 Gc      |
| CS   | C, U   | Cl. I, Div. 2, Groups A-D T4...T1             |
|  | B, M   | Cl. I, Div. 2, Groups A-D T4...T1             |

### Remote version

| Position 1, 2<br>Order Code<br>"Approval;<br>Transmitter +<br>Sensor"<br>Option selected | Position 4, 5<br>Order Code<br>"Output; Input"<br>Option selected | Type of protection                       |  |
|--|---|--|--|
|  |   | Transmitter                              | Sensor                                   |
| CZ   | C, U  | Cl.I Zone 2, AEx/Ex ec ic  ic  IIB T4 Gc | Cl.I Zone 2, AEx/Ex ec ic IIB T4...T1 Gc |
|  | B, M  | Cl.I Zone 2, AEx/Ex ec ic  ic  IIB T4 Gc | Cl.I Zone 2, AEx/Ex ec ic IIB T4...T1 Gc |
| CS   | C, U  | Cl. I, Div. 2, Groups A-D T4             | Cl.I Zone 2, AEx/Ex ec ic IIB T4...T1 Gc |
|  | B, M  | Cl. I, Div. 2, Groups A-D T4             | Cl.I Zone 2, AEx/Ex ec ic IIB T4...T1 Gc |

| 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. CEC or NEC)
- 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.
- 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
- Attached nameplates must be included in potential equalization.
- Replaced transmitter or sensors shall not be re-used in any other application.

### **WARNING**

#### **Substitution of components is not permitted.**

- ▶ Substitution of components may impair suitability for Class I, Division 2.

## **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.
- 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 × 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 national regulations and standards.
- When the measuring device is connected, attention must be paid to explosion protection at the transmitter.
- Only use certified sealing plugs. The metal sealing plugs supplied meet this requirement.
- Equipment in type of protection AEx/Ex ec, shall be installed using a transient protection not exceeding 140% of the peak rated voltage value at the power supply terminals and IO terminals.

### **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. Proof of Intrinsic Safety).
- 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.



## Temperature tables

### Ambient temperature

*Minimum ambient temperature*

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

*Maximum ambient temperature*

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

*Transmitter housing*

| Transmitter housing material | $T_{a, \max}$ [°C] |             |             |
|------------------------------|--------------------|-------------|-------------|
|                              | T6 [85 °C]         | T5 [100 °C] | T4 [135 °C] |
| Aluminum                     | -                  | -           | 60          |

### Medium temperature

*Minimum medium temperature*

$T_m = -40$  to  $0 \text{ }^\circ\text{C}$  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*

| 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] |
| Without thermal insulation |            |            |             |             |             |             |             |
| 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         | 130         |
|                            | 60         | -          | -           | 100         | 100         | 100         | 100         |

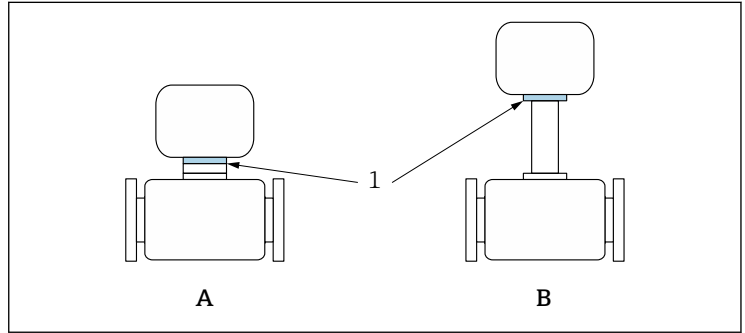
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation

| Liner         | T <sub>a</sub><br>[°C] | T <sub>m</sub> [°C] |                |                |                |                |                |
|---------------|------------------------|---------------------|----------------|----------------|----------------|----------------|----------------|
|               |                        | T6<br>[85 °C]       | T5<br>[100 °C] | T4<br>[135 °C] | T3<br>[200 °C] | T2<br>[300 °C] | T1<br>[450 °C] |
| PTFE (110 °C) | 55                     | -                   | -              | 110            | 110            | 110            | 110            |
|               | 60                     | -                   | -              | 100            | 110            | 110            | 110            |
| PTFE (130 °C) | 55                     | -                   | -              | 130            | 130            | 130            | 130            |
|               | 60                     | -                   | -              | 100            | 130            | 130            | 130            |
| PFA           | 40                     | -                   | -              | -              | 150            | 150            | 150            |
|               | 55                     | -                   | -              | 130            | 150            | 150            | 150            |
|               | 60                     | -                   | -              | 100            | 130            | 130            | 130            |

*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:

→  9



A0031198

- A Standard version  
 B Extended neck for insulation  
 1 Reference point ( $T_{ref}$ )

Reference temperature  $T_{ref}$

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

**Remote version**

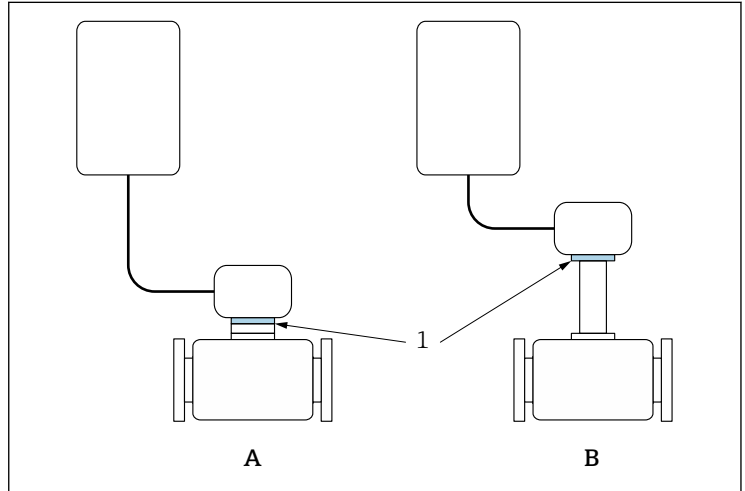
*Maximum medium temperature with or without thermal insulation  
according to Endress+Hauser specifications*

| Liner         | T <sub>a</sub><br>[°C] | T <sub>m</sub> [°C] |                |                |                |                |                |
|---------------|------------------------|---------------------|----------------|----------------|----------------|----------------|----------------|
|               |                        | T6<br>[85 °C]       | T5<br>[100 °C] | T4<br>[135 °C] | T3<br>[200 °C] | T2<br>[300 °C] | T1<br>[450 °C] |
| PTFE (110 °C) | 60                     | -                   | -              | 110            | 110            | 110            | 110            |
| PTFE (130 °C) | 60                     | -                   | -              | 130            | 130            | 130            | 130            |
| PFA           | 50                     | -                   | -              | 130            | 150            | 150            | 150            |
|               | 60                     | -                   | -              | 130            | 130            | 130            | 130            |


*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:

→  12



A0031199

 1 Position of reference point for temperature measurement

A Standard version

B Extended neck for insulation

1 Reference point ( $T_{ref}$ )

Reference temperature  $T_{ref}$

| T6<br>[85 °C] | T5<br>[100 °C] | T4<br>[135 °C] | T3<br>[200 °C] | T2<br>[300 °C] | T1<br>[450 °C] |
|---------------|----------------|----------------|----------------|----------------|----------------|
| -             | -              | 63             | 65             | 70             | 70             |

**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>B</b>            | Current output 4 to 20 mA HART (active)  | 26 (+), 27 (-)      | $U_N = 30 V_{DC}$<br>$U_M = 250 V_{AC}$ |
|                            | Current output 4 to 20 mA HART (passive) | 24 (+), 25 (-)      |   |
|                            | Pulse/frequency/switch output            | 22 (+), 23 (-)      |   |
| Option <b>M</b>            | 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 <b>C</b>            | Current output 4 to 20 mA HART (active)  | 26 (+), 27 (-)      | $U_0 = 22.3 V$<br>$I_0 = 93 mA$<br>$P_0 = 520 mW$<br>$L_0 = 29 mH$<br>$C_0 = 1400 nF$<br><br>$U_i = 6.5 V$<br>$I_i = 10 mA$<br>$P_i = 20 mW$ |
|                            | Current output 4 to 20 mA HART (passive) | 24 (+), 25 (-)      | $U_i = 30 V$<br>$I_i = 100 mA$<br>$P_i = 1.25 W$<br>$L_i = 0 \mu H$<br>$C_i = 6 nF$  |
|                            | Pulse/frequency/switch output            | 22 (+), 23 (-)      | $U_i = 30 V$<br>$I_i = 100 mA$<br>$P_i = 1.25 W$<br>$L_i = 0 \mu H$<br>$C_i = 10 nF$   |

| Order code "Output; input" |  | Terminal assignment | Safety-related values  |
|----------------------------|--|---------------------|--|
| Option U                   | Current output 4 to 20 mA<br>(active)  | 26 (+), 27 (-)      | $U_0 = 22.3 \text{ V}$<br>$I_0 = 93 \text{ mA}$<br>$P_0 = 520 \text{ mW}$<br>$L_0 = 29 \text{ mH}$<br>$C_0 = 1400 \text{ nF}$<br><br>$U_i = 6.5 \text{ V}$<br>$I_i = 10 \text{ mA}$<br>$P_i = 20 \text{ mW}$   |
|                            | Current output 4 to 20 mA<br>(passive) | 24 (+), 25 (-)      | $U_i = 30 \text{ V}$<br>$I_i = 100 \text{ mA}$<br>$P_i = 1.25 \text{ W}$<br>$L_i = 0 \text{ }\mu\text{H}$<br>$C_i = 6 \text{ nF}$  |
|                            | Modbus RS485                           | 22 (B), 23 (A)      | $U_i = 4.2 \text{ V}$<br>$I_i = \text{N/A}$<br>$P_i = \text{N/A}$<br>$L_i = 0 \text{ }\mu\text{H}$<br>$C_i = 6 \text{ nF}$<br><br>$U_0 = 4.2 \text{ V}$<br>$I_0 = 120 \text{ mA}$<br>$P_0 = 130 \text{ mW}$<br>$L_0 = 20 \text{ mH}$<br>$C_0 = 900 \text{ }\mu\text{F}$<br>$L/R = 2.5 \text{ mH}/\Omega$ |



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