

# Safety Instructions

## **Proline Promag 300**

UKEX: II3G





# Proline Promag 300

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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](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	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP
Promag H 300	BA01392D	BA01477D	BA01396D	BA01865D
Promag P 300	BA01393D	BA01478D	BA01397D	BA01853D
Promag W 300	BA01918D	BA01938D	BA01928D	BA01940D

Measuring device	Documentation code		
	Modbus RS485	EtherNet/IP	PROFINET
Promag H 300	BA01394D	BA01716D	BA01718D
Promag P 300	BA01395D	BA01717D	BA01719D
Promag W 300	BA01939D	BA01937D	BA01941D

*Additional documentation*

Contents	Document type	Documentation code
Remote display and operating module DKX001	Special documentation	SD01763D
	Safety Instructions II3G Ex nA or II3G Ex ec	XA02581D
Explosion Protection	Brochure	CP00021Z/11

Please note the documentation associated with the device.

**Manufacturer's certificates**

**UK Declaration of Conformity**

Documentation code: UK\_00104

**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

$$\begin{array}{c} \text{*****} \quad - \quad \text{***** ... *****} \quad + \quad \text{A*B*C*D*E*F*G*...} \\ \hline \text{(Device type)} \quad \quad \quad \text{(Basic specifications)} \quad \quad \quad \text{(Optional specifications)} \end{array}$$

\* = 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	H, P, W	Sensor type
3	Transmitter	3	Transmitter type: 4-wire, compact version
4	Generation index	B	Platform generation
5, 6	Nominal diameter	H: DN 2 to 150 P: DN 15 to 600 W: DN 25 to 2 400	Nominal diameter of sensor

## Basic specifications

Position 1, 2 Order code for "Approval" Option selected	Position 4, 5 Order code for "Output, input 1" Option selected	Type of protection	
		Transmitter	Sensor
US	BA, BB, GA, LA, MA, NA, RA, SA	Ex ec nC ic IIC T5...T1 Gc	Ex ec ic IIC T5...T1 Gc
	HA, TA	Ex ec nC ic [ic] IIC T5...T1 Gc	

Position	Order code for	Option selected	Description
4, 5	Output, input 1	BA	4-20mA HART
		GA	PROFIBUS PA
		HA	PROFIBUS PA Ex-i
		LA	PROFIBUS DP
		MA	Modbus RS485
		NA	EtherNet/IP 2-port switch integrated
		RA	PROFINET IO 2-port switch integrated
		SA	FOUNDATION Fieldbus
		TA	FOUNDATION Fieldbus Ex-i
6	Output, input 2	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive

Position	Order code for	Option selected	Description
		H	Relay
		I	4-20mA input
		J	Status input
7	Output, input 3	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		H	Relay
		I	4-20mA input
		J	Status input
8	Display; Operation	A	W/o; via communication
		F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
		M	W/o; prepared for remote display DKX001
		O	4-line, illuminated; touch control
9	Housing	A	Alu, coated
		B	Stainless, hygienic
11	Liner	A	PFA
		B	PFA High-temperature
		E	PTFE
		H	Hard rubber
		Q	PTFE 90°C
		U	Polyurethane
17, 18	Device Model	A1	1
		A2	2

## Optional specifications

ID	Order code for	Option selected	Description
Cx	Sensor option	CG	Extended neck for insulation <sup>1)</sup>
Px	Enclosed accessories	P8	Wireless antenna, wide area (external WLAN antenna) <sup>2)</sup>


1) Only for Promag W and Promag P available

2) The external WLAN antenna is available with the order code for "Accessory Enclosed", option P8.

### 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. EN 60079-14)
- 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).

### Safety instructions: Installation

- In the case of a horizontal orientation and the order code for "Housing", option B "Stainless, hygienic": install the transmitter at the side of or below the sensor.  
For more information on the orientation, see the Operating Instructions for the device →  4
- The following applies for devices with order code for "Housing", Option B "Stainless, hygienic": Thermal insulation is not allowed.
- 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).
- Only use certified cable entries suitable for the application. Observe selection criteria as per EN 60079-14.



- When the measuring device is connected, attention must be paid to explosion protection at the transmitter.
- Turning the transmitter housing
  - Loosen both hexagon socket screws until the transmitter housing can be turned.
  - Turn transmitter housing to desired position (mechanically limited); if necessary turn 270° in other direction.
  - Tighten both hexagon socket screws with a maximum of 7 Nm.
- 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.

### **Ex ec type of protection**

- In potentially explosive atmospheres: Do not disconnect the electrical connection of the power supply circuit when energized.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection.
- Only use certified cable entries or sealing plugs.
- Equipment in type of protection 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.
- For measuring devices with order code "Housing", option B "Stainless, hygienic" tighten the connection compartment cover hand-tight and then tighten it further 45° (corresponds to 15 Nm).

### **Optional external WLAN antenna**

- Connect the antenna bushing H337 to the transmitter housing and tighten by hand.
- Use only external antennas supplied by Endress+Hauser.
- Connect antenna or antenna cable with plug-in connector type N (MIL-STD-348) to antenna bushing H337.

### **Intrinsic safety**

Observe the guidelines for interconnecting intrinsically safe circuits (e.g. EN 60079-14 , Proof of Intrinsic Safety).



- When using the remote display and operating module DKX001 the internal display and operating module must be removed.
- When using the separate approved, remote display and operating module DKX001, only use the following variants: Basic specification of the remote display and operating module DKX001, order code "Approval", option US

## 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.
- The antenna bushing H337 of the external antenna must be integrated into the local potential equalization system. This is the case if the sensor is connected in accordance with the regulations via the coupling.

## Temperature tables

### Ambient temperature

*Minimum ambient temperature*

$$T_a = -40\text{ °C}$$

*Maximum ambient temperature*

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

### Medium temperature

*Minimum medium temperature*

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

*Maximum medium temperature*

$T_m$  for T5...T1 depending on the maximum ambient temperature  $T_a$

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

#### Promag H

DN	$T_a$ [°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							
2...150	50	-	95 <sup>1)</sup>	130	150	150	150
	55 <sup>2)</sup>	-	80 <sup>1)</sup>	130	150	150	150
	60 <sup>2)</sup>	-	-	100	100	100	100

- 1) The maximum admissible ambient temperature changes for devices with order code for "Housing", Option B "Stainless, hygienic" in connection with temperature class T5:  $T_a = T_a - 3\text{ K}$
- 2)  $T_a = 50\text{ °C}$  for optional specification, ID Cx (Sensor option) = CI (Fluid Temperature Probe)

*Promag P*

DN	Liner	T <sub>a</sub> [°C]	T <sub>m</sub> [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
Without thermal insulation								
15...600	PTFE	50	–	90	130	130	130	130
		55	–	–	130	130	130	130
		60	–	–	100	100	100	100
25...200	PFA	40	–	–	–	150	150	150
		45	–	95	130	130	130	130
		50	–	90	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								
15...300	PTFE	50	–	90	130	130	130	130
		55	–	–	130	130	130	130
		60	–	–	100	100	100	100
25...200	PFA	40	–	–	–	150	150	150
		45	–	95	130	130	130	130
		50	–	90	130	130	130	130
		60	–	–	100	100	100	100
High-temperature version (Order code for "Liner", option B) without thermal insulation								
25...200	PFA	45	–	95	130	180	180	180
		50	–	90	130	160	160	160
		60	–	–	100	100	100	100
High-temperature version (Order code for "Liner", option B) with thermal insulation								
25...200	PFA	45	–	95	130	170	170	170
		50	–	90	130	160	160	160
		60	–	–	100	100	100	100

*Promag W*

DN	Liner	T <sub>a</sub> [°C]	T <sub>m</sub> [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
Without thermal insulation								
25...300	PTFE	50	-	90	90	90	90	90
		55	-	-	90	90	90	90
		60	-	-	90	90	90	90
50...2400	Hard rubber	50	-	80	80	80	80	80
		60	-	-	80	80	80	80
25...1200	PU	50	-	50	50	50	50	50
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation								
25...300	PTFE	50	-	90	90	90	90	90
		55	-	-	90	90	90	90
		60	-	-	90	90	90	90
50...300	Hard rubber	50	-	80	80	80	80	80
		60	-	-	80	80	80	80
25...1200	PU	50	-	50	50	50	50	50

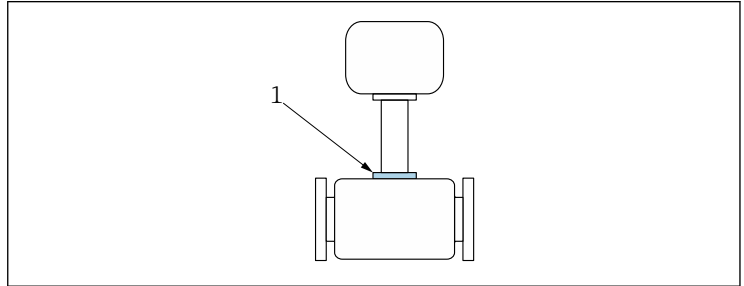
### With thermal insulation without Endress+Hauser specifications

#### NOTICE

The following applies for devices with order code for "Housing", Option B "Stainless, hygienic":

- ▶ Thermal insulation is not allowed.

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



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- 1 High-temperature version or extension neck for insulation: position of reference point for temperature measurement

1 Reference point ( $T_{ref}$ )

Reference temperature  $T_{ref}$

T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
-	62.2	74,0	75.6	75.6	75.6

## 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: supply voltage, input/outputs*

#### *HART*

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (-)	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.							

#### *FOUNDATION Fieldbus*

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (-)	26 (A)	27 (B)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.							

#### *PROFIBUS DP*

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.							

#### *PROFIBUS PA*

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.							

#### *Modbus RS485*

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.							

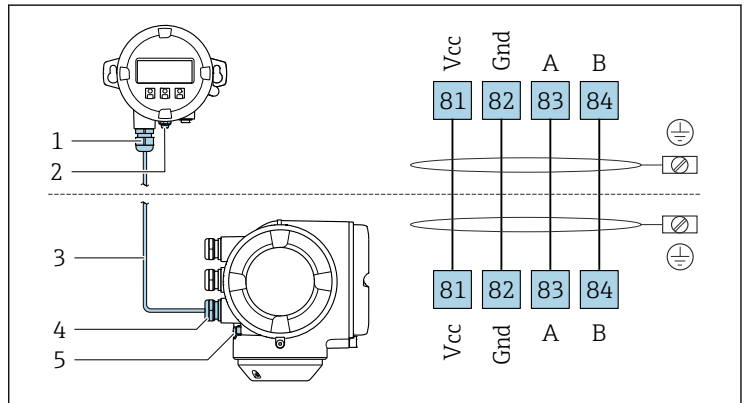
*PROFINET*

Supply voltage		Input/output 1	Input/output 2		Input/output 3	
1 (+)	2 (-)	PROFINET (RJ45 connector)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.						

*EtherNet/IP*

Supply voltage		Input/output 1	Input/output 2		Input/output 3	
1 (+)	2 (-)	EtherNet/IP (RJ45 connector)	24 (+)	25 (-)	22 (+)	23 (-)
Device-specific terminal assignment: adhesive label in terminal cover.						

*Remote display and operating module DKX001*



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- 1 Remote display and operating module DKX001
- 2 Protective earth (PE)
- 3 Connecting cable
- 4 Measuring device
- 5 Protective earth (PE)

## Safety-related values

Order code "Output; input 1"	Output type	Safety-related values "Output; input 1"	
		26 (+)	27 (-)
Option BA	Current output 4 to 20 mA HART	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option GA	PROFIBUS PA	$U_N = 32 V_{DC}$ $U_M = 250 V_{AC}$	
Option LA	PROFIBUS DP	$U_N = 32 V_{DC}$ $U_M = 250 V_{AC}$	
Option MA	Modbus RS485	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option SA	FOUNDATION Fieldbus	$U_N = 32 V_{DC}$ $U_M = 250 V_{AC}$	
Option NA	EtherNet/IP	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option RA	PROFINET	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	

Order code "Output; input 2"; "Output; input 3"	Output type	Safety-related values			
		Output; input 2		Output; input 3	
		24 (+)	25 (-)	22 (+)	23 (-)
Option B	Current output 4 to 20 mA	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			
Option D	User-configurable input/output	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			
Option E	Pulse/frequency/ switch output	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			
Option F	Double pulse output	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			
Option H	Relay output	$U_N = 30 V_{DC}$ $I_N = 100 mA_{DC}/500 mA_{AC}$ $U_M = 250 V_{AC}$			
Option I	Current input 4 to 20 mA	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			
Option J	Status input	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			



## Intrinsically safe values

Order code for "Output; input 1"	Output type	Intrinsically safe values "Output; input 1"	
		26 (+)	27 (-)
Option HA	PROFIBUS PA Ex i (STANDARD + FISCO)	$U_i = 32 \text{ V}$ $I_i = 570 \text{ mA}$ $P_i = 8.5 \text{ W}$ $L_i = 10 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$	
Option TA	FOUNDATION Fieldbus Ex i (STANDARD + FISCO)	$U_i = 32 \text{ V}$ $I_i = 570 \text{ mA}$ $P_i = 8.5 \text{ W}$ $L_i = 10 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$	

Order code for "Output; input 2"; "Output; input 3"	Output type	Intrinsically safe values			
		Output; input 2		Output; input 3	
		24 (+)	25 (-)	22 (+)	23 (-)
Option C	Current output 4 to 20 mA Ex i passive	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0$ $C_i = 0$			
Option G	Pulse/frequency/ switch output Ex i passive	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0$ $C_i = 0$			

## Remote display DKX001

Basic specification, position 1, 2 Approval	Terminal assignment	Basic specification, position 8 Display; Operation Option O
Option US	81, 82, 83, 84	$U_n = 3.3 \text{ V}$ $I_n = 150 \text{ mA}$







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