## Safety Instructions Proline Prosonic Flow P 500

INMETRO: Zone 1 Zone 21







## **Proline Prosonic Flow P 500**

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#### 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	Documentation code	
	HART Modbus RS485	
Prosonic Flow P 500	BA02025D	BA02026D

#### Additional documentation

Contents	Document type	Documentation code
Explosion Protection	Brochure	CP00021Z/11

Please note the documentation associated with the device.

# Certificates and<br/>declarationsDeclaration of conformityINMETRO CERTIFICADO DE CONFORMIDADE

#### **Certificate of Conformity**

Certificate number:

- TÜV 19.1341X
- TÜV 23.0040X
- TÜV 23.0041X
- TÜV 23.0042X

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

- ABNT NBR IEC 60079-0: 2020
- ABNT NBR IEC 60079-1: 2016
- ABNT NBR IEC 60079-7: 2018
- ABNT NBR IEC 60079-11: 2013
- ABNT NBR IEC 60079-26: 2016
- ABNT NBR IEC 60079-31: 2014

Manufacturer	Endress+Hauser Flowtec AG
address	Kägenstrasse 7
	4153 Reinach BL
	Switzerland

ExtendedThe extended order code is indicated on the nameplate, which is affixedorder codeto the device in such a way that it is clearly visible. Additional<br/>information about the nameplate is provided in the associated<br/>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.

Position	Order code for	Option selected	Description
1	Instrument family	9	Ultrasonic transit time flowmeter
2	Sensor	Р	Sensor type
3	Transmitter	5	Transmitter type: 4-wire, remote version
4	Generation index	В	Platform generation
5, 6	Nominal diameter	DN 154000	Nominal diameter of sensor

### Device type

	Proline 500
Orde	er code for "Integrated ISEM Electronic", option ${f B}$ "Transmitter"
1 2	Transmitter with integrated ISEM Sensor cable

## **Basic specifications**

Position 1, 2 Order code for "Approval" Option selected	Position 10 Order code for "Integrated ISEM electronics" Option selected	Type of protection Transmitter	Sensor
MB	В	Ex db eb ia [ia Ga] IIC T6T5 Gb Ex tb [ia Da] IIIC T85 °C Db	Ex ia IIC T6T1 Gb Ex ia IIIC T** °C Db
MD	В	Ex db ia [ia Ga] IIC T6T5 Gb Ex tb [ia Da] IIIC T85 °C Db	Ex ia IIC T6T1 Gb Ex ia IIIC T** °C Db

Position	Order code for	Option selected	Description
4, 5	Output, input 1	BA	4-20mA HART
		CA	4-20mA HART Ex-i passive
		CC	4-20mA HART Ex-i active
		MA	Modbus RS485
6	Output, input 2	А	W/o

Position	Order code for	Option selected	Description
		В	4-20mA
		С	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		Е	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		Н	Relay
		Ι	4-20mA input
		J	Status input
7	Output, input 3	А	W/o
		В	4-20mA
		С	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		Е	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		Н	Relay
		Ι	4-20mA input
		J	Status input
8	Display; Operation	F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
9	Integrated ISEM Electronic	В	Transmitter
10	Transmitter Housing	A	Alu, coated
		L	Cast, stainless
12	Sensor Version	AA	C-030
		AB	C-050
		AC	C-100
		AD	C-200
		AE	C-500
		AG	CH-050
		AH	CH-100
14	Process Temperature	A	-20 to +80 °C (-4 to +176 °F)
		В	-40 to +80 °C (-40 to +176 °F)

Position	Order code for	Option selected	Description
		С	0 to +170 °C (+32 to +338 °F)
		D	-40 to +100 °C (-40 to +212 °F)
		Е	-40 to +150 °C (-40 to +302 °F)
		Н	+150 to +220 °C (302 to +428 °F)
		Ι	+210 to +370 °C (410 to +698 °F)
		J	+350 to +550 °C (+662 to +1022 °F)
19	Device Model	A2	2

#### **Optional specifications**

ID	Order code for	Option selected	Description
Jx	Test, certificate	JN	Ambient temperature transmitter –50 $^\circ\text{C}$ ; sensor see specification
Px	Enclosed accessories	Р8	Wireless antenna, wide area (external WLAN antenna) <sup>1)</sup>

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

Safety instructions: General	<ul> <li>Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:</li> <li>Be suitably qualified for their role and the tasks they perform</li> <li>Be trained in explosion protection</li> <li>Be familiar with national regulations or guidelines (e.g. ABNT NBR IEC 60079-14)</li> <li>Install the device according to the manufacturer's instructions and</li> </ul>
	<ul> <li>Install the device according to the manufacturer's instructions and national regulations.</li> <li>Do not operate the device outside the specified electrical, thermal a mechanical parameters.</li> </ul>

- 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.

and

- Open the housing cover of the transmitter housing in explosion protection 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: Atenção - Aguardar 10 minutos após desenergização antes de abrir o invólucro do transmissor em tipo de proteção Ex d.

- In devices with damaged Ex d threads:
  - Use in hazardous areas is not permitted.
  - Repair of Ex d threads is not permitted.
- 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	• Continuous service temperature of the connecting cable: -40 to +80 °C (-50 to +60 °C for optional specification, ID Jx (Test, certificate) = JN); but at least according to the operating temperature range of the application plus allowance for process conditions ( $T_{a,min}$ and $T_{a,max}$ + 20 K).
	<ul> <li>Only use certified cable glands suitable for the application. Observe</li> </ul>
	selection criteria as per ABNT NBR IEC 60079-14.

• The following applies when connecting the transmitter with a connection compartment in Ex db: Only use separately certified cables and wire entries (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 IIC. The thread extension or the blind plug labeled as follows for identification purposes:

- Md: M20 x 1.5
- d: NPT <sup>1</sup>/<sub>2</sub>"
- Gd: G ½"

• The following applies when connecting the transmitter with a connection compartment in Ex eb:

Only use separately certified cable and wire entries and sealing plugs (Ex eb IIC) which are suitable for operating temperatures up to 85 °C and for IP 66/67. The cables must be routed such that they are securely seated, and sufficient strain relief must be ensured. The mounted metal thread extensions and blind plugs supplied are tested and certified as part of the housing for type of protection Ex eb IIC. Plastic sealing plugs 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.

- When the measuring device is connected, attention must be paid to the type of protection at the transmitter.
- 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 the device is energized.

Exception for the Ex eb connection compartment with intrinsically safe inputs and outputs: opening of the connection compartment is permitted for short period to perform live maintenance of intrinsically safe circuits. Internal non-intrinsically safe circuits are protected by an additional IP30 cover.

- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the enclosure.
- 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 sealing plugs. The metal sealing plugs supplied meet this requirement.
- Transmitters with Ex db eb approval must not be connected via the service interface (CDI-RJ45)! Order code "Approval; Transmitter; Sensor", options (Ex de): MB

### Optional external WLAN antenna

- The external WLAN antenna can be used only in conjunction with an Ex eb or Ex ec connection compartment.
   Order code for "Integrated ISEM Electronic", option B: Use with an Ex db connection compartment is not permitted.
- 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. ABNT NBR IEC 60079-14, proof of intrinsic safety).
- When the intrinsically safe Ex ia circuits of the device are connected to certified intrinsically safe circuits of Category Ex ib for Equipment Groups IIC or IIB, the type of protection changes to Ex ib IIC or Ex ib IIB.

#### Potential equalization

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

#### 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.
- Cable routing shall be arranged so that the cables are not exposed to friction effects and static buildup due to the passage of dust. Precautions shall be taken to prevent the build-up of static an surfaces of cables.

#### Temperature tables

#### Ambient temperature

Minimum ambient temperature

- $T_a = -40$  °C depending on the device version selected (see nameplate)
- Optional specification, ID Jx (Test, Certificate) = JN
  - $T_a = -50$  °C depending on the selected device variant (see nameplate)

Maximum ambient temperature

 $T_{a}$  = +80  $^{\circ}\mathrm{C}$  depending on the medium temperature, sensor and temperature class.

#### Proline 500 transmitter

T <sub>a</sub> [°C]			
T6 [85 °C]	T5 [100 °C]		
55	60		

#### Medium temperature

Minimum medium temperature

 $T_{m,\,min}$  = -40 °C depending on the sensor version.

Maximum medium temperature

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

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

For sensor type, temperature range and applicable device group, see name plate.

Sensor type	T <sub>m</sub>	[°C]	Ta	[°C]			T <sub>m, ma</sub>	<sub>ax</sub> [°C]		
	min	max	min	max	T6 [85 °C]	T5 [100 °C]	T4 [135 ℃]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
C-030-A	-40	120	-50	80	80	95	120	120	120	120
С-100-В	-40	80	-40	50	50	80	80	80	80	80
				80	-	80	80	80	80	80
C-100-C	0	170	-40	50	50	95	130	170	170	170
				80	-	95	130	170	170	170
С-200-В	-40	80	-40	65	65	80	80	80	80	80
				80	-	80	80	80	80	80
C-200-C	0	170	-40	65	65	95	130	170	170	170
				80	-	95	130	170	170	170
C-500-A	-40	150	-40	75	75	95	130	150	150	150
				80	-	95	130	150	150	150
CH-050-A	-40	435	-50	75	75	95	130	190	285	435
				80	-	95	130	190	285	435
CH-100-A	-40	435	-50	75	75	95	130	190	285	435
				80	-	95	130	190	285	435

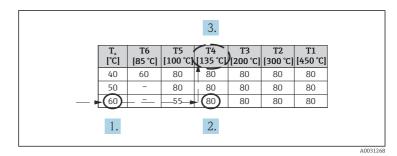
#### Explosion hazards arising from gas and dust

# 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  $T_{\rm m}.$

#### Example

- Measured maximum ambient temperature:  $T_{ma} = 55 \text{ °C}$
- Measured maximum medium temperature: T<sub>mm</sub> = 78 °C



I 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<sub>a</sub> = 60 °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: 78 °C  $\leq$  80 °C  $\rightarrow$  T4.
- 3. 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: supply voltage, input/outputs*

#### HART

Supply	voltage	Input/	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.						

#### 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.					

#### Safety-related values

Order code "Output; input 1"	Output type	Safety-related values "Output; input 1"		
		26 (+)	27 (-)	
Option <b>BA</b>	Current output 4 to 20 mA HART	$U_{\rm N} = 30 V_{\rm DC}$ $U_{\rm M} = 250 V_{\rm AC}$		
Option <b>MA</b>	Modbus RS485	$U_{\rm N} = 30 V_{\rm DC}$ $U_{\rm M} = 250 V_{\rm AC}$		

Order code	Output type	Safety-related values						
"Output; input 2"; "Output; input 3"		Output;	Output; input 2		t; input 2 Output;		; input 3	
		24 (+)	25 (-)	22 (+)	23 (-)			
Option <b>B</b>	Current output 4 to 20 mA	$U_{N} = 30 V_{DC}$ $U_{M} = 250 V_{AC}$						
Option <b>D</b>	User-configurable input/output	$U_{\rm N} = 30 V_{\rm I}$ $U_{\rm M} = 250 V_{\rm N}$	50					
Option <b>E</b>	Pulse/frequency/ switch output	$U_{\rm N} = 30 V_{\rm I}$ $U_{\rm M} = 250 V_{\rm N}$	50					
Option <b>F</b>	Pulse output, phase- shifted	$U_{\rm N} = 30 V_{\rm I}$ $U_{\rm M} = 250 V_{\rm N}$	50					

Order code	Output type	Safety-related values				
"Output; input 2"; "Output; input 3"		Output;	input 2	Output;	; input 3	
		24 (+)	25 (-)	22 (+)	23 (-)	
Option <b>H</b>	Relay output	$ \begin{array}{l} U_{N} = 30 \ V_{DC} \\ I_{N} = 100 \ mA_{DC} / 500 \ mA_{AC} \\ U_{M} = 250 \ V_{AC} \end{array} $				
Option <b>I</b>	Current input 4 to 20 mA	$U_{N} = 30 V_{DC}$ $U_{M} = 250 V_{AC}$				
Option <b>J</b>	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 CA	Current output 4-20mA HART Ex-i passive	$\begin{array}{l} U_i = 30 \ V \\ l_i = 100 \ mA \\ P_i = 1.25 \ W \\ L_i = 0 \ \mu H \\ C_i = 6 \ nF \end{array}$		
Option CC	Current output 4-20mA HART Ex-i active	$ \begin{array}{l} \textbf{Ex ia}^{1)} \\ \textbf{U}_0 = 21.8 \text{ V} \\ \textbf{I}_0 = 90 \text{ mA} \\ \textbf{P}_0 = 491 \text{ mW} \\ \textbf{L}_0 = 4.1 \text{ mH(IIC)} / \\ 15 \text{ mH(IIB)} \\ \textbf{C}_0 = 160 \text{ nF(IIC)} / \\ 1160 \text{ nF(IIE)} \\ \textbf{U}_i = 30 \text{ V} \\ \textbf{I}_i = 10 \text{ mA} \\ \textbf{P}_i = 0.3 \text{ W} \\ \textbf{I}_i = 5  \mu\text{H} \\ \textbf{C}_i = 6  n\text{F} \end{array} $		

1) Only for the order code for "Approval", option MB, MD

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



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