

Safety Instructions

Proline Prosonic Flow P 500

Class I, Zone 1
Zone 21



Proline Prosonic Flow P 500

Table of contents

Associated documentation	4
Certificates and declarations	4
Manufacturer address	4
Extended order code	4
Safety instructions: General	8
Safety instructions: Installation	9
Safety instructions: Zone 21	11
Temperature tables	11
Explosion hazards arising from gas and dust	13
Connection values: Signal circuits	15

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
Control drawing		As wanted on the nameplate.

Please note the documentation associated with the device.

Certificates and declarations

Certificate number

CSA 16.70087366

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

* * * * *	- * * * * * ... * * * * *	+ 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.

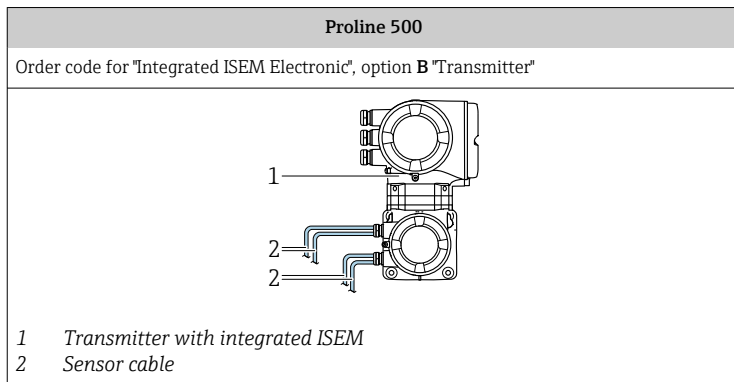
Optional specifications

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	9	Ultrasonic transit time flowmeter
2	Sensor	P	Sensor type
3	Transmitter	5	Transmitter type: 4-wire, remote version
4	Generation index	B	Platform generation
5, 6	Nominal diameter	DN 15...4000	Nominal diameter of sensor



Basic specifications

Position 1, 2 Order code for "Approval" Option selected	Position 9 Order code for "Integrated ISEM electronics" Option selected	Type of protection	
		Transmitter	Sensor
C2	B	Cl.I, Zone 1, AEx/Ex db eb ia [ia Ga] IIC T6...T5 Gb Zone 21, AEx/Ex tb [ia Da] IIIC T85 °C Db	Cl.I, Zone 1, AEx/Ex ia IIC T6...T1 Gb Zone 21, AEx/Ex ia IIIC T** °C Db
C4	B	Cl.I, Zone 1, AEx/Ex db ia [ia Ga] IIC T6...T5 Gb Zone 21, AEx/Ex tb [ia Da] IIIC T85 °C Db	Cl.I, Zone 1, AEx/Ex ia IIC T6...T1 Gb Zone 21, AEx/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	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	F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
9	Integrated ISEM Electronic	B	Transmitter
10	Transmitter Housing	A	Alu, coated
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)
		B	-40 to +80 °C (-40 to +176 °F)
		C	0 to +170 °C (+32 to +338 °F)
		D	-40 to +100 °C (-40 to +212 °F)
		E	-40 to +150 °C (-40 to +302 °F)
		H	+150 to +220 °C (302 to +428 °F)
		I	+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 °C; sensor see specification

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.
- 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.
- 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
- Observe all the technical data of the device (see nameplate).
- In devices with damaged Ex d threads:
 - Use in hazardous areas is not permitted.
 - Repair of Ex d threads is not permitted.
- 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.

WARNING

Substitution of components is not permitted.

- ▶ Substitution of components may impair intrinsic safety.

**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).
- Only use certified cable glands suitable for the application. Observe selection criteria as per CEC or NEC.
- The following applies when connecting the transmitter with a connection compartment in AEx/Ex db:
Only use separately certified cables and wire entries (Ex AEx/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 AEx/Ex db IIC. The thread extension or the blind plug labeled as follows for identification purposes:
d: NPT ½"
- The following applies when connecting the transmitter with a connection compartment in Ex AEx/Ex eb:
Only use separately certified cable and wire entries and sealing plugs (Ex AEx/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 AEx/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.
- Install the transmitter circuit wiring according to Canadian Electrical Code (CEC) respective National Electrical Code (NEC) using threaded conduit or other wiring methods in accordance with articles 500 to 510.
- 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): C2

AEx/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 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.

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. , 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 on surfaces of cables.

Temperature tables

Ambient temperature

Minimum ambient temperature

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

Maximum ambient temperature

$T_a = +80\text{ °C}$ depending on the medium temperature, sensor and temperature class.

Proline 500 transmitter

T_a [°C]	
T6 [85 °C]	T5 [100 °C]
55	60

Medium temperature*Minimum medium temperature*

$T_{m, \min} = -40\text{ °C}$ 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_m [°C]		T_a [°C]		$T_{m, max}$ [°C]					
	min	max	min	max	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
C-030-A	-40	120	-50	80	80	95	120	120	120	120
C-100-B	-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
C-200-B	-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_m .

Example

- Measured maximum ambient temperature: $T_{ma} = 55$ °C
- Measured maximum medium temperature: $T_{mm} = 78$ °C

T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	60	80	80	80	80	80
50	-	80	80	80	80	80
60	-	55	80	80	80	80

Diagram annotations: A blue box '3.' is above the T4 header. A blue box '1.' is below the 60 in the first column. A blue box '2.' is below the 80 in the third row, fourth column. A blue box '3.' is above the 80 in the third row, fourth column. Arrows indicate the selection process: an arrow points from the 60 in the first column to the 80 in the third row, fourth column, and another arrow points from the 80 in the third row, fourth column to the T4 header.

A0031268

1 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.

↳ $T_a = 60$ °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 ≤ 80 °C $\rightarrow T_4$.

3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: $T_4 = 135$ °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/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 BA	Current output 4 to 20 mA HART	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	
Option MA	Modbus RS485	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$	

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	Pulse output, phase- shifted	$U_N = 30 V_{DC}$ $U_M = 250 V_{AC}$			

Order code "Output; input 2"; "Output; input 3"	Output type	Safety-related values			
		Output; input 2		Output; input 3	
		24 (+)	25 (-)	22 (+)	23 (-)
Option 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 CA	Current output 4-20mA HART Ex-i passive	$U_i = 30 V$ $I_i = 100 mA$ $P_i = 1.25 W$ $L_i = 0 \mu H$ $C_i = 6 nF$	
Option CC	Current output 4-20mA HART Ex-i active	Ex ia ¹⁾ $U_0 = 21.8 V$ $I_0 = 90 mA$ $P_0 = 491 mW$ $L_0 = 4.1 mH(IIC)/$ $15 mH(IIB)$ $C_0 = 160 nF(IIC)/$ $1160 nF(IIB)$ $U_i = 30 V$ $I_i = 10 mA$ $P_i = 0.3 W$ $L_i = 5 \mu H$ $C_i = 6 nF$	

1) Only for the order code for "Approval", option C2, C4

Order code "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	$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0$ $C_i = 0$			



71642742

www.addresses.endress.com
