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Safety Instructions
Proline Prosonic Flow P 500

NEPSI: Zone 2

Endress+Hauser
People for Process Automation

Proline Prosonic Flow P 500

Table of contents

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 declarations

NEPSI Declaration of Conformity

Certificate number:

GYJ19.1240X

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

- GB/T 3836.1-2021
- GB/T 3836.3-2021
- GB/T 3836.4-2021
- GB/T 3836.8-2021

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*...
(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.

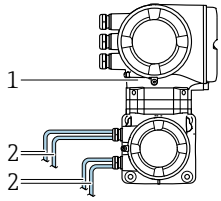
Optional specifications

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.

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

Proline 500
Order code for "Integrated ISEM Electronic", option **B** "Transmitter"
 *1 Transmitter with integrated ISEM* *2 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
NS	B	Ex ec nC ic |ic| IIC T4...T5 Gc	Ex ic IIC T1...T6 Gc or Ex ic IIB T1...T6 Gc [1)]

1) Sensors type C-200-A and I-100-A are available only for group IIB.

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
		H	Relay
		I	4-20mA input
		J	Status input

Position	Order code for	Option selected	Description
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
		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)
		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
Px	Enclosed accessories	P8	Wireless antenna, wide area (external WLAN antenna) [1]

1) 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. GB/T 3836.15-2017)
- Install the device according to the manufacturer's instructions and the following standards:
  - GB 50257-2014 "Code for construction and acceptance of electric device for explosive atmospheres and fire hazard electrical equipment installation engineering"
  - GB/T 3836.13-2021 "Explosive atmospheres – Part 13: Equipment repair, overhaul, reclamation and modification"
  - GB/T 3836.15-2017 "Explosive atmospheres – Part 15: Electrical installations design, selection and erection"
  - GB/T 3836.16-2017 "Explosive atmospheres – Part 16: Electrical installations inspection and maintenance"
  - GB/T 3836.18-2017 "Explosive atmospheres – Part 18: Intrinsically safe electrical systems"
- 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.
- 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).
- Only use certified cable glands suitable for the application. Observe selection criteria as per GB/T3836.15-2017.
- 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.

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.

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. GB/T 3836.15-2017 , proof of intrinsic safety).

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.

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 °C depending on the medium temperature, sensor and temperature class.

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T_a [°C]		
T6 [85 °C]	**T5 [100 °C]**	**T4 [135 °C]**
–	45	60

Medium temperature

Minimum medium temperature

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

Maximum medium temperature

$T_{m, max}$ for T1…T6 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-050-A	-20	80	-20	75	80	80	80	80	80	80
				80	–	80	80	80	80	80
C-100-A	-20	80	-20	75	75	80	80	80	80	80
				80	–	80	80	80	80	80
C-100-B	-40	80	-40	70	70	80	80	80	80	80
				80	–	80	80	80	80	80
C-100-C	0	170	-40	70	70	95	130	170	170	170
				80	–	95	130	170	170	170
C-200-B	-40	80	-40	75	75	80	80	80	80	80
				80	–	80	80	80	80	80
C-200-B	-40	80	-40	75	75	95	130	170	170	170
				80	–	95	130	170	170	170
C-200-C	0	170	-40	75	75	95	130	150	150	150
				80	–	95	130	150	150	150
C-500-A	-40	150	-40	75	75	95	130	190	285	435
				80	–	95	130	190	285	435
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

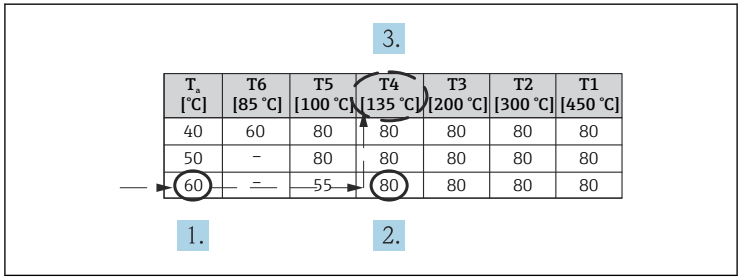
Explosion hazards arising from gas and dust

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



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 → 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/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 µH C_i = 6 nF	
Option CC	Current output 4-20mA HART Ex-i active	**Ex ic** [1] U_0 = 21.8 V I_0 = 90 mA P_0 = 491 mW L_0 = 9 mH(IIC)/ 39 mH(IIB) C_0 = 600 nF(IIC)/ 4 000 nF(IIB)	

1) Only for the order code for "Approval", option NS

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 V I_i = 100 mA P_i = 1.25 W L_i = 0 C_i = 0			
Option G	Pulse/frequency/switch output Ex-i passive	U_i = 30 V I_i = 100 mA P_i = 1.25 W L_i = 0 C_i = 0			

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