

Safety Instructions

Prosonic Flow G 500

EAC: Zone 1
Zone 21



Prosonic Flow G 500

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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
 - Smart phone/tablet: *Endress+Hauser Operations App*
- In the Download Area of the Endress+Hauser web site: www.endress.com → Download.

This document is an integral part of the following Operating Instructions:

Measuring device	Documentation code	
	HART	Modbus RS485
Prosonic Flow G 500	BA01836D	BA01837D

Additional documentation

Contents	Document type	Documentation code
Explosion Protection	Brochure	CP00021Z/11

Please note the documentation associated with the device.

Manufacturer's certificates

Flowmeters meet the fundamental health and safety requirements for the design and construction of devices and protective systems intended for use in potentially explosive atmospheres in accordance with TR CU 012/2011.

Certification body

ООО "НАНИО ЦСВЭ"

Certificate number

EAЭС RU C-CH.AA87.B.00509/20

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

- ГОСТ 31610.0-2014 (IEC 60079-0:2011)
- ГОСТ IEC 60079-1-2011
- ГОСТ Р МЭК 60079-7-2012
- ГОСТ 31610.15-2014 (IEC 60079-15:2010)
- ГОСТ IEC 60079-31-2013

Manufacturer address Endress+Hauser Flowtec AG
 Division Reinach
 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	G	Sensor type
3	Transmitter	5	Transmitter type: 4-wire, remote version
4	Generation index	B	Platform generation
5, 6	Nominal diameter	DN 25...300	Nominal diameter of sensor

Proline 500 – digital

Order code for "Integrated ISEM Electronic", option **A** "Sensor"

1 Transmitter
2 Connecting cable
3 Sensor connection housing with integrated ISEM

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
GJ, BJ	A	Non-Ex ¹⁾	1Ex ia IIC T6...T1 Gb X Ex ia tb IIIC T** °C Db X
GN, BN	A	2Ex nA nC IIC T5...T4 Gc X	1Ex ia IIC T6...T1 Gb X Ex ia tb IIIC T** °C Db X

1) The transmitter is located in a non-hazardous area.

Position	Order code for	Option selected	Description
4, 5	Output, input 1	BA	4-20mA HART
		MA	Modbus RS485
6	Output, input 2	A	W/o
		B	4-20mA
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		H	Relay
		I	4-20mA input
		J	Status input
7	Output, input 3	A	W/o
		B	4-20mA
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		H	Relay
		I	4-20mA input
		J	Status input
8	Output; input 4	A	W/o
		B	4-20mA
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		H	Relay
		I	4-20mA input
		J	Status input
9	Display; Operation	F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
10	Integrated ISEM Electronic	A	Sensor
11	Transmitter Housing	A	Alu, coated
		D	Polycarbonate
12	Sensor junction Housing	L	Cast, stainless
22	Device Model	A2	2

Optional specifications

ID	Order code for	Option selected	Description
Jx	Test, certificate	JP	Ambient temperature, transmitter -50 °C
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. GOCT IEC 60079-14-2013)
- 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.
- When using in hybrid mixtures (gas and dust occurring simultaneously), observe additional measures for explosion protection.
- For measuring device with digital signal transmission, order code for "Integrated ISEM electronics", Option A "Sensor" open the housing cover of the **sensor connection 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).
- 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 specifications, ID Jx (Test Certificate) = JP); 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 Γ OCT IEC 60079-14-2013.
- When the measuring device is connected, attention must be paid to explosion 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 energized.
- For measuring devices with order code "Approval", option BJ or GJ the transmitter housing (plastic) is allowed to be installed at most in a Pollution Degree 2 environment.
- Basic specification, order code for "Sensor connection housing", option B:
To protect the housing of stainless steel housings: Ensure that the housing gasket is flat and not bent when closing the housing cover. Replace bent gaskets.
- 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.

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. Γ OCT IEC 60079-14-2013 , 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 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.

Safety instructions: Zone 21

- To ensure dust-tightness, securely seal the transmitter and sensor housing, cable entries and sealing plugs.
- Only open the transmitter and sensor 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

$T_a = -40\text{ °C}$ depending on the selected device variant (see nameplate)

Maximum ambient temperature

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

Proline 500 – digital transmitter

Non-hazardous area, Zone 2

Transmitter housing material	T_a [°C]			
	Non-hazardous area	T6	T5	T4
Aluminum	60	-	45	60
Polycarbonate	60	-	-	-

Medium temperature

Minimum medium temperature

$T_m = -50\text{ °C}$

Maximum medium temperature

T_m for T6...T1 depending on the maximum ambient temperature T_a

Proline 500 - digital

Order code for "Integrated ISEM electronics", option A

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

With integrated pressure measuring cell

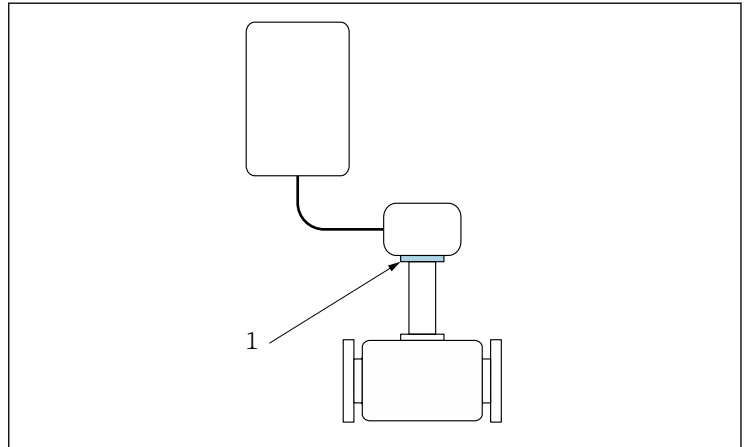
DN	T _a [°C]	T _m [°C]					
		T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
25...300	40	40	40	90	90	90	90
	55	-	40	90	90	90	90
	60	-	-	90	90	90	90

Without integrated pressure measuring cell

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]
25...300	60	70	85	120	150	150	150

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 .



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1 Position of reference point for temperature measurement

1 Reference point (T_{ref})

Reference temperature T_{ref}

T6 [80 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
69	71	75	77	77	77

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

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 illustrating the procedure for determining the temperature class and surface temperature. The table shows ambient temperature (T_a) and medium temperature (T_m) values. The maximum ambient temperature is 60 °C (circled in blue, labeled 1.). The maximum medium temperature is 80 °C (circled in blue, labeled 2.). The corresponding temperature class for gas is T4 (135 °C, circled in blue, labeled 3.).

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2 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 \leq 80 °C \rightarrow T4.

3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: $T_4 = 135$ °C.

**Connection data:
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		Input/output 4	
1 (+)	2 (-)	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Device-specific terminal assignment: adhesive label in terminal cover.									

Modbus RS485

Supply voltage		Input/output 1		Input/output 2		Input/output 3		Input/output 4	
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Device-specific terminal assignment: adhesive label in terminal cover.									

Safety-related values

Order code for "Output; input 1"	Output type	Safety-related values "Output; input 1"			
		26 (+)		27 (-)	
Option BA	Current output 4 to 20 mA HART	$U_{nom} = 30\text{ V}$ $U_{max} = 250\text{ V}$			
Option MA	Modbus RS485	$U_{nom} = 30\text{ V}$ $U_{max} = 250\text{ V}$			

Order code for "Output; input 2"; "Output; input 3" "Output; input 4"	Output type	Safety-related values					
		Output; input 2		Output; input 3		Output; input 4	
		24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Option B	Current output 4 to 20 mA	$U_{nom} = 30\text{ V}$ $U_{max} = 250\text{ V}$					
Option D	User configurable input/output	$U_{nom} = 30\text{ V}$ $U_{max} = 250\text{ V}$					
Option E	Pulse/frequency/switch output	$U_{nom} = 30\text{ V}$ $U_{max} = 250\text{ V}$					

Order code for "Output; input 2"; "Output; input 3" "Output; input 4"	Output type	Safety-related values					
		Output; input 2		Output; input 3		Output; input 4	
		24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Option F	Double pulse output	$U_{nom} = 30 \text{ V}$ $U_{max} = 250 \text{ V}$					
Option H	Relay output	$U_{nom} = 30 \text{ V}$ $I_{nom} = 100 \text{ mA DC}/500 \text{ mA AC}$ $U_{max} = 250 \text{ V}$					
Option I	Current input 4 to 20 mA	$U_{nom} = 30 \text{ V}$ $U_{max} = 250 \text{ V}$					
Option J	Status input	$U_{nom} = 30 \text{ V}$ $U_{max} = 250 \text{ V}$					



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