Safety Instructions Proline Prosonic Flow P 500

JPN: Zone 1 Zone 21







Proline Prosonic Flow P 500

Table of contents

Associated documentation 4
Certificates and declarations
Manufacturer address
Extended order code 4
Safety instructions: General 8
Safety instructions: Installation
Safety instructions: Zone 21 10
Temperature tables 10
Explosion hazards arising from gas and dust
Connection data: Signal circuits 12

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	JPN Type Examination Certificate
declarations	Certificate number:
	CML 17JPN2347X (Proline 500)
	Affixing the certificate number certifies conformity with the standards (depending on the device version).
	 JNIOSH-TR-46-1: 2020 JNIOSH-TR-46-2: 2018 JNIOSH-TR-46-6: 2015 JNIOSH-TR-46-9: 2018
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 specification is displayed instead of t	or let the p	ter) selected from the laceholders.

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 ¹⁾	Sensor	Р	Sensor type
3	Transmitter	5	Transmitter type: 4-wire, remote version
4	Generation index	В	Platform generation
5, 6 ²⁾	Nominal diameter	DN 154000	Nominal diameter of sensor

Device type

1) For replacement transmitter only: X

2) For replacement transmitter only: XX



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
JD	В	Ex db ia [ia Ga] IIC T6T5 Gb Ex tb [ia Da] IIIC T85 °C Db ¹⁾	Ex ia IIC T6T1 Gb Ex ia IIIC T** °C Db ¹⁾

1) The marking may be applied depending on users' applications.

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
		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

Position	Order code for	Option selected	Description
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		А	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	А	-20 to +80 °C (-4 to +176 °F)
		В	-40 to +80 °C (-40 to +176 °F)
		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

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. INIOSH-TR-NO.44)
	 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
	 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.

• Continuous service temperature of the connecting cable: Safety -40 to +80 °C (-50 to +60 °C for optional specification, ID Jx (Test, instructions: certificate) = JN); but at least according to the operating temperature Installation 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 JNIOSH-TR-NO.44. • 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 ½"

- Gd: G ½"
- The following cable glands approved by an Ex certification body may be installed on the devices with order code "Approval", option (for details, contact our service center):
 - Ex d, Ex t approved cable glands, e.g. EXTC-16MG
 - Ex d approved cable glands, e.g. KXBF-20-16
- Yellow cap attached to the cable glands is a transportation measure only, and is to be removed when the delivered device is installed.
- If the third cable gland is not used, remove it and seal the thread hole with Ex d blind plug (M20 x 1.5).
- Information on our service center: Service Desk, 5-70-3 Nisshin-cho, Fuchu-shi, Tokyo-to Tel: 042-314-1911
 Fax: 042-314-1951
- When the measuring device is connected, attention must be paid to the type of protection at the transmitter.
- 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.

Intrinsic safety

- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. JNIOSH-TR-NO.44).
- 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 .

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.
- Only use certified cable entries. The metal cable entries, extensions and sealing plugs supplied meet this requirement.
- 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 $^{\circ}\text{C}$ depending on the medium temperature, sensor and temperature class.

Proline 500 transmitter

Medium temperature

Minimum medium temperature

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

Maximum medium temperature

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

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

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



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.
 - $T_a = 60\ ^\circ \text{C}.$ The row showing the maximum medium temperature is determined.
- 2. Select the maximum medium temperature $T_{\rm m}$ of this row, which is immediately greater than or equal to the maximum medium temperature $T_{\rm mm}$ 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 = $135 \degree$ C.

Connection data: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	ly voltage Input/output Input/output 1 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 L	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	$U_{\rm N} = 30 V_{\rm DC}$ $U_{\rm M} = 250 V_{\rm AC}$		
Option MA	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		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	$U_{\rm N} = 30 V_{\rm DC}$ $U_{\rm M} = 250 V_{\rm AC}$			
Option F	Pulse output, phase- shifted	U _N = 30 V _{DC} U _M = 250 V _{AC}			

Order code	Output type	Safety-related values				
"Output; input 2"; "Output; input 3"		Output; input 2		ut; input 2 Output; input		
		24 (+) 25 (-) 22 (22 (+)	23 (-)	
Option H	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 I	Current input 4 to 20 mA	$U_{\rm N} = 30 V_{\rm DC}$ $U_{\rm M} = 250 V_{\rm AC}$				
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	$\begin{array}{l} U_i = 30 \ V \\ l_i = 100 \ mA \\ P_i = 1.25 \ W \\ L_i = 0 \ \mu H \\ C_i = 6 \ nF \end{array}$		
Option CC	Current output 4-20mA HART Ex-i active	$\begin{array}{l} C_{i} = 6 \text{ nF} \\ \hline \mathbf{Ex ia}^{1} \\ U_{0} = 21.8 \text{ V} \\ l_{0} = 90 \text{ mA} \\ P_{0} = 491 \text{ mW} \\ L_{0} = 4.1 \text{ mH(IIC)} \\ 15 \text{ mH(IIB)} \\ C_{0} = 160 \text{ nF(IIC)} \\ 1160 \text{ nF(IIB)} \\ U_{i} = 30 \text{ V} \\ l_{i} = 10 \text{ mA} \\ P_{i} = 0.3 \text{ W} \\ i_{L} = 5 \text{ \muH} \\ C_{0} = 6 \text{ nE} \end{array}$		

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

Order code	Output type	Intrinsically safe values				
"Output; input 2"; "Output; input 3"		Output; input 2		Output; 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 W			



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