

Safety Instructions

Proline Prosonic Flow B 200

Cl. I Div. 1, Zone 0 for IS
(Ex i Intrinsically safe version)



Document: XA01011D
Safety instructions for electrical apparatus for explosion-hazardous areas classified according to the National Electrical Code (NEC) and Canadian Electrical Code (CEC) →  3

Proline Prosonic Flow B 200

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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
Prosonic Flow B 200	BA01031D

Additional documentation:

Document type	Contents	Documentation code
Special documentation	Remote display FHX50	SD01007F
Special documentation	Overvoltage Protection (OVP)	SD01090F
Installation Drawing		As wanted on the nameplate.

Please note the documentation associated with the device.

Manufacturer's certificates

Certificate number

160686-2541184

Notified body

CSA: Canadian Standards Association

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



- **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	Selected option	Description
1	Instrument family	9	Ultrasonic transit time flowmeter
2	Sensor	B	Sensor type
3	Transmitter	2	Transmitter type: 2-wire, compact version
4	Generation index	B	Platform generation
5, 6	Nominal diameter	DN 50...200	Nominal diameter of sensor

Basic specifications

Position	Order code	Selected option	Description
1, 2	Approval	C2	cCSA _{US}
			Class I, Division 1, Groups A, B, C, D
3	Output	A	4-20mA HART
		B	4-20mA HART, pulse/frequency/switch output
		C	4-20mA HART + 4-20mA analog
		D	4-20mA HART, pulse/frequency/switch output, 4-20mA input
4	Display, Operation	A	W/o; via communication
		C	SD02 4-line; push buttons + data backup function
		E	SD03 4-line, illum.; touch control + data backup function
		L	Prepared for display FHX50 + M12 connection ¹⁾
		M	Prepared for display FHX50 + M12 custom connection ¹⁾

1) FHX50 is approved separately.

Optional specifications

ID	Order code	Selected option	Description
Nx	Accessory Mounted	NA	Overvoltage protection (OVP)

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 (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.
- 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.
- Observe all the technical data of the device (see nameplate).
- When using in hybrid mixtures (gas and dust occurring simultaneously), additional measures should be taken. Please see approval body.
- Class II Group G: The surface temperature of the apparatus cannot exceed +165 °C.
- Classification of Zones: When installed in Zone 1 the interior of the measuring tube is permissible for use in Zone 0.

⚠ 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; 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 CEC or NEC.
- When the measuring device is connected, attention must be paid to explosion protection at the transmitter
- Control room equipment shall not use or generate more than 250 V_{rms} .
- 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.
- Install all Intrinsically Safe Circuits:
 - Per Canadian Electrical Code (CEC) Part I Section 18 and Appendix F
 - Per National Electrical Code (NEC) ANSI/NFPA 70 and ISA RP 12.6

Intrinsic safety

- The device can be connected to the Endress+Hauser FXA291 service tool: refer to the Operating Instructions.
- The intrinsically safe input power circuit of the device is isolated from ground. If the device is equipped with only one input, the dielectric strength of the input to ground is at least $500 V_{\text{eff}}$. If the device is equipped with more than one input, the dielectric strength of each individual input to ground is at least $500 V_{\text{rms}}$, and the dielectric strength of the inputs vis-à-vis one another is also at least $500 V_{\text{rms}}$.
- The device can be connected to the remote display FHX50 which has Ex ia explosion protection: refer to the Special documentation and Ex documentation.

Potential equalization

- Integrate the device into the local potential equalization →  11.
- 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.

Overvoltage protection

Optional specification, ID Nx (Accessory Mounted) = NA

- Minimum ambient temperature when using Overvoltage Protection (OVP): -40 °C
- When using the internal overvoltage protection: Reduce the admissible ambient temperature at the housing by 2 K.
- For installations which require overvoltage protection to comply with national regulations or standards.
Install the device using overvoltage protection (e.g. HAW56x from Endress+Hauser).
- Observe the safety instructions of the overvoltage protection.
- If an overvoltage protection against atmospheric over voltages is required: no other circuits may leave the housing during normal operation without additional measures.
- The intrinsically safe input power circuit of the device is isolated from ground. If the device is only equipped with one input, the dielectric strength of the input is at least $290 V_{\text{rms}}$. If the device is equipped with more than one input, the dielectric strength of each individual input to ground is at least $290 V_{\text{rms}}$, and the dielectric strength of the inputs vis-à-vis one another is also at least $290 V_{\text{rms}}$.

Safety instructions:
Class II, Class III

- To ensure dust-tightness, securely seal the transmitter housing, cable entries and sealing plugs.
- Only open the transmitter housing briefly, ensuring that no dust or moisture enters the housing.
- 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 cable entries and sealing plugs. The cable entries and metal sealing plugs supplied meet this requirement.
- The remote display FHX50 is not suitable for installation in Class II, Class III.

Temperature tables

Ambient temperature

Minimum ambient temperature:

Basic specification, position 3 (Output; Input) = A, B, C, D

$$T_a = -40\text{ °C}$$

Maximum ambient temperature:

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

Medium temperature

Minimum medium temperature:

$$T_m = 0\text{ °C}$$

Maximum medium temperature:

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

Compact version

Basic specification, position 3 (Output; Input) = A

NOTICE

The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6.

The following applies for basic specification, position 1, 2 (Approval) = C2:

► $T_a = T_a - 2\text{ K}$

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	-	80	80	80	80	80

Basic specification, position 3 (Output; Input) = B

NOTICE

The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6.

The following applies for basic specification, position 1, 2 (Approval) = C2:

► $T_a = T_m - 2 \text{ K}$

T _a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	- ¹⁾	80	80	80	80	80
50	-	60 ²⁾	80	80	80	80
60	-	-	80	80	80	80

1) $T_m = 60 \text{ °C}$ for pulse/frequency/switch output $P_i \leq 0.85 \text{ W}$

2) $T_m = 80 \text{ °C}$ for pulse/frequency/switch output $P_i \leq 0.85 \text{ W}$

Basic specification, position 3 (Output; Input) = C

NOTICE

The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6.

The following applies for basic specification, position 1, 2 (Approval) = C2:

► $T_a = T_m - 2 \text{ K}$

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

Basic specification, position 3 (Output; Input) = D

NOTICE

The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6.

The following applies for basic specification, position 1, 2 (Approval) = C2:

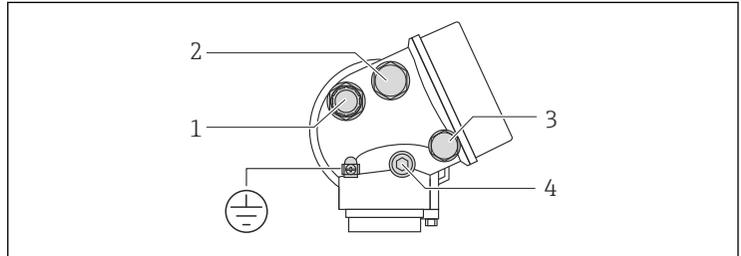
► $T_a = T_a - 2 K$

T _a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35	60	80	80	80	80	80
50	-	80	80	80	80	80
60	-	-	80	80	80	80

**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.

Connecting the transmitter



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Position	Basic specification, position 1, 2 Approval	Type of protection used for cable entry	Description	
1	Cable entry for output 1	C2	IS	-
2	Cable entry for output 2	C2	IS	-
3	Cable entry of the remote display and operating module FHX50	C2	IS	-

Position		Description
4	Pressure compensation plug	⚠ WARNING Housing degree of protection voided due to insufficient sealing of the housing. ▶ Do not open - not a cable entry.
⊕	Potential equalization	NOTICE Terminal for connection to potential equalization. ▶ Pay attention to the grounding concept of the facility.

Terminal assignment

Transmitter

 The order code is part of the extended order code. Detailed information on the codes for the device and on the structure of the extended order code →  5.

Connection versions

Order code for "Output"	Terminal numbers					
	Output 1		Output 2		Input	
	1 (+)	2 (-)	3 (+)	4 (-)	5 (+)	6 (-)
Option A	4-20 mA HART (passive)		-		-	
Option B ¹⁾	4-20 mA HART (passive)		Pulse/frequency/switch output (passive)		-	
Option C ¹⁾	4-20 mA HART (passive)		4-20 mA analog (passive)		-	
Option D ^{1) 2)}	4-20 mA HART (passive)		Pulse/frequency/switch output (passive)		4-20 mA current input (passive)	

- 1) Output 1 must always be used; output 2 is optional.
- 2) The integrated overvoltage protection is not used with option D: Terminals 5 and 6 (current input) are not protected against overvoltage.

Intrinsically safe values

 The order code is part of the extended order code. For detailed information on the features of the device and the structure of the extended order code →  5.

Type of protection IS

Order code for "Output"	Output type	Intrinsically safe values
Option A	4-20mA HART	$U_i = \text{DC } 30 \text{ V}$ $I_i = 300 \text{ mA}$ $P_i = 1 \text{ W}$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$
Option B	4-20mA HART	$U_i = \text{DC } 30 \text{ V}$ $I_i = 300 \text{ mA}$ $P_i = 1 \text{ W}$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$

Order code for "Output"	Output type	Intrinsically safe values
	Pulse/frequency/switch output	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 6\ nF$
Option C	4-20mA HART	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 30\ nF$
	4-20mA analog	
Option D	4-20mA HART	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 5\ nF$
	Pulse/frequency/switch output	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 6\ nF$
	4 to 20 mA current input	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 5\ nF$

Remote display FHX50

Basic specification, position 1, 2 Approval	Cable specification	Basic specification, position 4 Display, Operation Option L, M
Option C2	Max. cable length: 60 m (196.85 ft)	$U_o = 7,3\ V$
		$I_o = 327\ mA$
		$P_o = 362\ mW$
		$L_o = 149\ \mu H$
		$C_o = 388\ nF$
		$C_c \leq 125\ nF$
		$L_c \leq 149\ \mu H$

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