

Safety Instructions

Proline Prosonic Flow B 200

KCs: Zone 1
Ex ia version



Proline Prosonic Flow B 200

Table of contents

About this document	4
Associated documentation	4
Certificates and declarations	4
Manufacturer address	4
Extended order code	5
Safety instructions: General	7
Safety instructions: Installation	7
Temperature tables	9
Explosion hazards arising from gas and dust	10
Connection values: Signal circuits	11

About this document



The document number of these Safety Instructions (XA) must match the information on the nameplate.

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 instrument	Documentation code
	HART
Prosonic Flow B 200	BA01031D

Additional documentation

Contents	Document type	Documentation code
Remote display FHX50	Special documentation	SD01007F
	Safety Instructions Ex ia	XA02277F
Overvoltage Protection (OVP)	Special documentation	SD01090F
Explosion Protection	Brochure	CP00021Z/11

Certificates and declarations

KCs certificate of conformity

- 25-KA4BO-0799
- 25-KA4BO-0800

Affixing the certificate number certifies conformity with Protection device Safety Certification Notification No. 2021-22.

Manufacturer address

Endress+Hauser Flowtec AG
Kägenstrasse 7
4153 Reinach BL
Switzerland

Endress+Hauser Flowtec (China) Co. Ltd.
 Su-Hong-Zhong-Lu No. 465
 Suzhou Industrial Park
 215021 Suzhou
 Province Jiangsu
 China

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	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 for	Selected option	Type of protection
1, 2	Approval	KJ	Ex ia IIC T6...T1 Gb

Position	Order code for	Selected option	Description
3	Output; Input	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 + custom connection ¹⁾

1) FHX50 is separately approved.

Optional specifications

ID	Order code for	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 or guidelines (e.g. KS C IEC 60079-14)
- 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.
- Use the device only in media where the wetted materials are known to be suitable.
- 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.
- An additional assessment must be conducted to confirm that the device is suitable for installation in hybrid mixtures (explosive gas and dust occurring simultaneously).
- Observe all the technical data of the device (see nameplate).
- Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, cleaning or maintaining:
 - For external non-metallic surfaces, e.g. housing, attached additional plates, RFID tag.
 - For attached external metallic parts that are not integrated into the local potential equalization system, e.g. nameplate tag, RFID tag.
 - Do not use in areas where the devices/electronic housing are exposed to highly charge-generating processes, pneumatically conveyed dusts and/or charge spraying in an electrostatic coating process.
 - Do not rub surfaces dry. Clean only with moist cloth.
 - Information on electrostatic hazards and how to minimize the generation of static electricity can be found in the technical specification IEC/TS 60079-32-1.

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 glands suitable for the application. Observe selection criteria as per KS C IEC 60079-14.
- When the measuring device is connected, attention must be paid to the type of protection at the transmitter.

Intrinsic safety

- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. KS C IEC 60079-14 , proof of intrinsic safety).
- 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 $500 V_{\text{rms}}$. If the device is equipped with more than one input, the dielectric strength of each individual input to ground is at least $500 V_{\text{rms}}$, 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 with explosion protection; refer to the Special Documentation and Ex documentation.

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

The device's intrinsically safe input/output circuits are rated Ex ia IIC Ga. When connected to certified intrinsically safe apparatus with an Ex ib IIC Gb or Ex ib IIB Gb rating, the level of protection of the overall system becomes Ex ib IIC Gb or Ex ib IIB Gb , respectively.

Potential equalization

- The device must be connected to the potential equalization system using designated protective ground terminals.
- It is also possible to integrate the device into the potential equalization system through a pipe system, provided that the pipe system meets the grounding requirements of applicable national regulations.

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 according to 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 $290 V_{\text{rms}}$.

Temperature tables

Minimum ambient temperature

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

$$T_{a, \min} = -40 \text{ }^{\circ}\text{C}$$

Maximum ambient temperature

$T_{a, \max} = +60 \text{ }^{\circ}\text{C}$ depending on temperature class, maximum medium temperature and device-specific features. See the corresponding temperature tables.

Minimum medium temperature

$$T_{m, \min} = 0 \text{ }^{\circ}\text{C}$$

Maximum medium temperature

$T_{m, \max}$ varies depending on temperature class, maximum ambient temperature and device-specific features. See the corresponding temperature tables.

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

$T_{a, \max}$ [$^{\circ}\text{C}$]	$T_{m, \max}$					
	T6 [85 $^{\circ}\text{C}$]	T5 [100 $^{\circ}\text{C}$]	T4 [135 $^{\circ}\text{C}$]	T3 [200 $^{\circ}\text{C}$]	T2 [300 $^{\circ}\text{C}$]	T1 [450 $^{\circ}\text{C}$]
40 ¹⁾	60	80	80	80	80	80
50 ¹⁾	-	80	80	80	80	80
60 ¹⁾	-	80	80	80	80	80

- 1) The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6: $T_{a, \max} = T_{a, \max} - 2 \text{ K}$

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

$T_{a, \max}$ [$^{\circ}\text{C}$]	$T_{m, \max}$					
	T6 [85 $^{\circ}\text{C}$]	T5 [100 $^{\circ}\text{C}$]	T4 [135 $^{\circ}\text{C}$]	T3 [200 $^{\circ}\text{C}$]	T2 [300 $^{\circ}\text{C}$]	T1 [450 $^{\circ}\text{C}$]
40 ¹⁾	- ²⁾	80	80	80	80	80
50 ¹⁾	-	60 ³⁾	80	80	80	80
60 ¹⁾	-	-	80	80	80	80

- 1) The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6: $T_{a, \max} = T_{a, \max} - 2 \text{ K}$
 2) $T_{a, \max} = 60 \text{ }^{\circ}\text{C}$ for pulse/frequency/switch output $P_1 = 0.85 \text{ W}$
 3) $T_{a, \max} = 80 \text{ }^{\circ}\text{C}$ for pulse/frequency/switch output $P_1 = 0.85 \text{ W}$

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

$T_{a, \max}$ [°C]	$T_{m, \max}$					
	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40 ¹⁾	60	80	80	80	80	80
50 ¹⁾	–	80	80	80	80	80
60 ¹⁾	–	55	80	80	80	80

- 1) The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6: $T_{a, \max} = T_{a, \max} - 2 \text{ K}$

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

$T_{a, \max}$ [°C]	$T_{m, \max}$					
	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35 ¹⁾	60	80	80	80	80	80
50 ¹⁾	–	80	80	80	80	80
60 ¹⁾	–	–	80	80	80	80

- 1) The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6: $T_{a, \max} = T_{a, \max} - 2 \text{ K}$

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 $T_{a, \max}$ and the maximum medium temperature $T_{m, \max}$.
- In the case of dust: Determine the maximum surface temperature as a function of the maximum ambient temperature $T_{a, \max}$ and the maximum medium temperature $T_{m, \max}$.

Example

- Measured maximum ambient temperature: $T_{a, \max} = 55 \text{ °C}$
- Measured maximum medium temperature: $T_{m, \max} = 78 \text{ °C}$

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 annotations: 1. points to the value 60 in the first column; 2. points to the value 80 in the third column; 3. points to the value 135 °C in the header of the third column.

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1 Procedure for determining the temperature class and surface temperature

1. In the column for the maximum ambient temperature $T_{a, \max}$ select the temperature that is immediately greater than or equal to the maximum ambient temperature $T_{a, \max}$ that is present.

↳ $T_{a, \max} = 60 \text{ °C}$.
The row showing the maximum medium temperature is determined.

2. Select the maximum medium temperature $T_{m, \max}$ of this row, which is immediately greater than or equal to the maximum medium temperature $T_{m, \max}$ that is present.

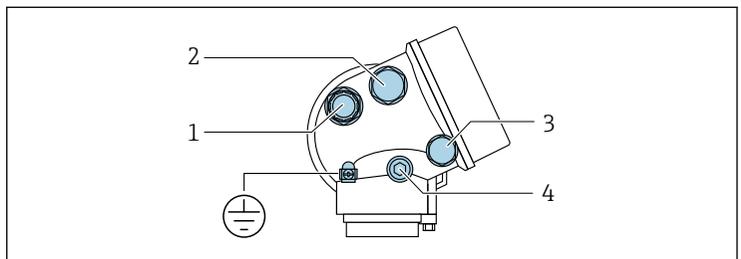
↳ The column with the temperature class for gas is determined:
 $78 \text{ °C} \leq 80 \text{ °C} \rightarrow T4$.

3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: $T4 = 135 \text{ °C}$.

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.

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	KJ	Ex ia	-
2	Cable entry for output 2	KJ	Ex ia	-
3	Optional order code ¹⁾ : Cable entry of the remote display and operating module FHX50	KJ	Ex ia	-
Position			Description	
4	Pressure compensation plug		NOTICE 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.	

1) Basic specification, position 4 (display; operation) = L, M

Terminal assignment

Transmitter

 The order code is part of the extended order code. Detailed information on the features of 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	4-20mA HART (passive)		-		-	
Option B ¹⁾	4-20mA HART (passive)		Pulse/frequency/ switch output (passive)		-	
Option C ¹⁾	4-20mA HART (passive)		4-20mA analog (passive)		-	
Option D ^{1) 2)}	4-20mA HART (passive)		Pulse/frequency/ switch output (passive)		4-20mA 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. Detailed information on the features of the device and on the structure of the extended order code →  5.

Type of protection Ex ia

Order Code "Output; Input" Selected option	Output type	Intrinsically safe values
A	4-20mA HART	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 5\ nF$
B	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	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 6\ nF$
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	
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	$U_i = DC\ 30\ V$ $I_i = 300\ mA$ $P_i = 1\ W$ $L_i = 0\ \mu H$ $C_i = 6\ nF$
	4-20mA 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 KJ	Max. cable length: 60 m (196.85 ft)	$U_o = 7.3 \text{ V}$
		$I_o = 327 \text{ mA}$
		$P_o = 362 \text{ mW}$
		$L_o = 149 \text{ }\mu\text{H}$
		$C_o = 388 \text{ nF}$
		$C_c \leq 125 \text{ nF}$
		$L_c \leq 149 \text{ }\mu\text{H}$



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