

Safety Instructions

Proline Prowirl 200


Zone 0

Class I, II, III, Division 1

IS (Ex i Intrinsically safe version)



Document: XA01639D

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

Proline Prowirl 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	FOUNDATION Fieldbus	PROFIBUS PA
Prowirl D 200	BA01685D	BA01693D	BA01689D
Prowirl F 200	BA01686D	BA01694D	BA01690D
Prowirl O 200	BA01687D	BA01695D	BA01691D
Prowirl R 200	BA01688D	BA01696D	BA01692D

Additional documentation:

Document type	Contents	Documentation code
Special documentation	Remote display FHX50	SD01007F
Safety Instructions	Remote display FHX50: Division 1	XA01095F
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

* * * * *	-	* * * * * ... * * * * *	+	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	Selected option	Description
1	Instrument family	7	Vortex flowmeter
2	Sensor	D, F, O, R	Sensor type
3	Transmitter	2	Transmitter type: 2-wire, compact version, remote version
4	Generation index	C	Platform generation
5, 6	Nominal diameter	D: DN 15 to 150 F: DN 15 to 300 O: DN 15 to 300 R: <ul style="list-style-type: none"> ■ Reducer DN 25 to 200 ■ Super reducer DN 40 to 250 	Nominal diameter of sensor

Basic specifications

Position	Order code	Selected option	Description
1, 2	Approval	C2	cCSA _{US}
			Class I, Division 1 for Groups ABCD; Class II for Groups EFG; Class III
			Zone 0, Ex ia IIC and AEx ia IIC
			Class I Zone 0
		CB	cCSA _{US}
			Class I, Division 1 for Group ABCD
			Zone 1, Ex ia IIC and AEx ia IIC
			Class I Zone 1
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
		E	FOUNDATION Fieldbus, Pulse/frequency/switch output
		G	PROFIBUS PA, Pulse/frequency/switch output
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⁾
8, 9	Sensor version; DSC sensor; measuring tube  Only available for sensors F, O, R with the HART communication protocol	DA	Mass steam; 316L; 316L (integrated pressure/temperature measurement), -200 to +400 °C (-328 to +750 °F)
		DB	Mass gas/liquid; 316L; 316L (integrated pressure/temperature measurement), -40 to +260 °C (-40 to +500 °F)

Position	Order code	Selected option	Description
		DC	Mass steam; Alloy 718; 316L (integrated pressure/temperature measurement), -200 to +400 °C (-328 to +750 °F)
		DD	Mass gas/liquid; Alloy 718; 316L (integrated pressure/temperature measurement), -40 to +100 °C (-40 to +212 °F)
11	Pressure component  Only available for sensors F, O, R with the HART communication protocol	A	Not used
		B	Pressure measuring cell 2bar/29psi abs
		C	Pressure measuring cell 4bar/58psi abs
		D	Pressure measuring cell 10bar/145psi abs
		E	Pressure measuring cell 40bar/580psi abs
		F	Pressure measuring cell 100bar/1450psi abs
		G	Pressure measuring cell 160bar/2320psi abs
16, 17	Device model	A1	1

1) FHX50 is approved separately.

Optional specifications

ID	Order code	Option selected	Description
Jx	Test, certificate	JN	Ambient temperature transmitter -50 °C
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.
- When using in hybrid mixtures (gas and dust occurring simultaneously), additional measures should be taken. Please see approval body.
- Observe all the technical data of the device (see nameplate).
- 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 (-50 to +80 °C for optional specifications, ID Jx (Test, Certificate) = JN); 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


Basic specification, position 8, 9 (sensor version; DSC sensor; measuring tube) = DA, DB, DC, DD and position 11 (pressure component) = B, C, D, E, F, G

- The maximum medium temperature is limited for device versions with a pressure component that is installed directly on the sensor F, O, R:
 - To 40 °C for T6 and T5
 - To 90 °C for T4 and T1
- In the case of T4 ... T1 and medium temperatures > 90 °C the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R.
 - The spacer tube must have a minimum length of 50 cm (1.97 in).
 - The spacer tube supplied meets this requirement.

Intrinsic safety

- The device can be connected to the Endress+Hauser FXA291 service tool: refer to the Operating Instructions.
- The device can be connected to the remote display FHX50 with IS explosion protection; refer to the Special Documentation and Ex documentation.

Potential equalization

- Integrate the device into the local potential equalization →  19.
- 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 metal cable entries, extensions and sealing plugs supplied meet this requirement.

Temperature tables

Ambient temperature

Minimum ambient temperature:

- *Basic specification, position 3 (Output; Input) = A, B, D in conjunction with optional specification, ID Jx (Test, Certificate) = JN*
 $T_a = -50\text{ °C}$
(Not permitted in conjunction with *optional specification, ID Nx (Accessory Mounted) = NA* → 9)
- *Basic specification, position 3 (Output; Input) = A, B, C, D, E, G*
 $T_a = -40\text{ °C}$

Maximum ambient temperature:

- Compact version
 $T_a = +70\text{ °C}$ depending on the medium temperature and temperature class
- Transmitter remote version
 $T_a = +75\text{ °C}$ depending on the medium temperature and temperature class
- Sensor remote version
 $T_a = +85\text{ °C}$ depending on the medium temperature and temperature class

Medium temperature

The following relationship of ambient temperature to medium temperature applies when $T_m < -50\text{ °C}$:

T_m [°C]	-50	-100	-150	-200
T_a [°C]	-50	-47	-44	-39

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:

► $T_a = T_m - 2\text{ K}$

Version with max. $T_m = 280\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
60	-	95 ^{2) 1)}	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
65	-	-	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
70	-	-	130 ¹⁾	-	-	-

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 2) $T_a = 55\text{ °C}$ for device versions with pressure component option DA, DB, DC, DD.

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:

► $T_a = T_m - 2\text{ K}$

Version with max. $T_m = 280\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35 ¹⁾	80 ²⁾	95 ²⁾	130 ²⁾	195 ²⁾	280 ²⁾	–
50 ³⁾	–	95 ²⁾	130 ²⁾	195 ²⁾	280 ²⁾	–
60	–	–	130 ²⁾	195 ²⁾	280 ²⁾	–
65	–	–	130 ²⁾	195 ²⁾	280 ^{2) 4)}	–
70	–	–	130 ²⁾	195 ^{2) 5)}	280 ^{2) 5)}	–

- 1) $T_a = 40\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 2) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures $> 90\text{ °C}$, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 3) $T_a = 55\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 4) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.7\text{ W}$
- 5) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.7\text{ W}$

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:

► $T_a = T_a - 2\text{ K}$

Version with max. $T_m = 280\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	–
55	–	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	–
60	–	–	130 ¹⁾	195 ¹⁾	280 ¹⁾	–
65	–	–	130 ¹⁾	195 ¹⁾	280 ^{1) 2)}	–
70	–	–	130 ¹⁾	–	–	–

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures $> 90\text{ °C}$, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 2) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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:

► $T_a = T_a - 2 \text{ K}$

Version with max. $T_m = 280 \text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
50	-	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
55	-	-	-	195 ¹⁾	280 ¹⁾	-
60	-	-	-	195 ¹⁾	-	-

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).

Basic specification, position 3 (Output; Input) = E, G

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:

► $T_a = T_a - 2 \text{ K}$

Version with max. $T_m = 280 \text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
50 ²⁾	-	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 ¹⁾	-
60	-	-	130 ¹⁾	195 ¹⁾	280 ¹⁾	-

Version with max. $T_m = 280\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
65	-	-	130 ¹⁾	195 ¹⁾	280 ^{1) 3)}	-
70	-	-	130 ¹⁾	195 ^{1) 4)}	280 ^{1) 4)}	-

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 2) $T_a = 60\text{ °C}$ for pulse/frequency/switch output $P_i = 0\text{ W}$
- 3) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_i = 0\text{ W}$
- 4) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_i = 0\text{ W}$

High-temperature 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:

► $T_a = T_a - 2\text{ K}$

Version with max. $T_m = 440\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
60	-	95 ^{1) 2)}	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
70	-	-	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 2) $T_a = 55\text{ °C}$ for device versions with pressure component option DA, DB, DC, DD.

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:

$$\blacktriangleright T_a = T_m - 2 \text{ K}$$

Version with max. $T_m = 440 \text{ }^\circ\text{C}$						
T_a [$^\circ\text{C}$]	T6 [$85 \text{ }^\circ\text{C}$]	T5 [$100 \text{ }^\circ\text{C}$]	T4 [$135 \text{ }^\circ\text{C}$]	T3 [$200 \text{ }^\circ\text{C}$]	T2 [$300 \text{ }^\circ\text{C}$]	T1 [$450 \text{ }^\circ\text{C}$]
35 ¹⁾	80 ²⁾	95 ²⁾	130 ²⁾	195 ²⁾	290 ²⁾	440 ²⁾
50 ³⁾	–	95 ²⁾	130 ²⁾	195 ²⁾	290 ²⁾	440 ²⁾
65	–	–	130 ²⁾	195 ²⁾	290 ²⁾	440 ²⁾
70	–	–	130 ²⁾	195 ^{2) 4)}	290 ²⁾	440 ^{2) 4)}

- 1) $T_a = 40 \text{ }^\circ\text{C}$ for pulse/frequency/switch output $P_i = 0.85 \text{ W}$
- 2) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to $40 \text{ }^\circ\text{C}$ for T6 ...T5 and to $90 \text{ }^\circ\text{C}$ for T4 ... T1. In the case of T4 ... T1 and medium temperatures $> 90 \text{ }^\circ\text{C}$, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 3) $T_a = 55 \text{ }^\circ\text{C}$ for pulse/frequency/switch output $P_i = 0.85 \text{ W}$
- 4) $T_a = 70 \text{ }^\circ\text{C}$ for pulse/frequency/switch output $P_i = 0.85 \text{ W}$

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:

$$\blacktriangleright T_a = T_m - 2 \text{ K}$$

Version with max. $T_m = 440 \text{ }^\circ\text{C}$						
T_a [$^\circ\text{C}$]	T6 [$85 \text{ }^\circ\text{C}$]	T5 [$100 \text{ }^\circ\text{C}$]	T4 [$135 \text{ }^\circ\text{C}$]	T3 [$200 \text{ }^\circ\text{C}$]	T2 [$300 \text{ }^\circ\text{C}$]	T1 [$450 \text{ }^\circ\text{C}$]
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
55	–	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾

Version with max. $T_m = 440\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
65	–	–	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
70	–	–	130 ¹⁾	195 ¹⁾²⁾	290 ¹⁾²⁾	440 ¹⁾²⁾

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 2) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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:

► $T_a = T_a - 2\text{ K}$

Version with max. $T_m = 440\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
50	–	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
55	–	–	–	195 ¹⁾	290 ¹⁾	440 ¹⁾
60	–	–	–	195 ¹⁾	290 ¹⁾	440 ¹⁾
65	–	–	–	–	290 ¹⁾	–

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).

Basic specification, position 3 (Output; Input) = E, G

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:

$$\blacktriangleright T_a = T_a - 2 \text{ K}$$

Version with max. $T_m = 440 \text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
50 ²⁾	–	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
65	–	–	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾
70	–	–	130 ¹⁾	195 ^{1) 3)}	290 ^{1) 3)}	440 ^{1) 3)}

- 1) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 2) $T_a = 60 \text{ °C}$ for pulse/frequency/switch output $P_i = 0 \text{ W}$
- 3) $T_a = 70 \text{ °C}$ for pulse/frequency/switch output $P_i = 0 \text{ W}$

Remote version**Transmitter**

Basic specification, position 3 Output; Input	Basic specification, position 1, 2 Approval	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]
A	All	40	60	75
B	All	35 ¹⁾	50 ²⁾	70 ³⁾
C	All	40	55	70 ⁴⁾
D	All	35 ⁵⁾	50 ⁵⁾	65
E G	All	40	55	70 ⁴⁾

- 1) $T_a = 40 \text{ °C}$ for pulse/frequency/switch output $P_i = 0.85 \text{ W}$
- 2) $T_a = 60 \text{ °C}$ for pulse/frequency/switch output $P_i = 0.85 \text{ W}$
- 3) $T_a = 75 \text{ °C}$ for pulse/frequency/switch output $P_i = 0.85 \text{ W}$
- 4) $T_a = 75 \text{ °C}$ for pulse/frequency/switch output $P_i = 0 \text{ W}$
- 5) The following applies for installations with overvoltage protection in conjunction with temperature class T5, T6 and basic specification, position 1, 2 (Approval) = C2:
 $T_a = T_a - 2 \text{ K}$

Sensor

Version with max. $T_m = 280\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
55	80 ^{1) 2)}	95 ²⁾	130 ²⁾	195 ²⁾	280 ²⁾	–
70	–	95 ^{2) 3)}	130 ²⁾	195 ²⁾	280 ²⁾	–
85	–	–	130 ²⁾	195 ²⁾	280 ²⁾	–

- 1) $T_a = 40\text{ °C}$ For device versions with pressure component option DA, DB, DC, DD.
- 2) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 3) $T_a = 55\text{ °C}$ for device versions with pressure component option DA, DB, DC, DD.

High-temperature version

Version with max. $T_m = 440\text{ °C}$						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
55	80 ^{1) 2)}	95 ²⁾	130 ²⁾	195 ²⁾	290 ²⁾	440 ²⁾
70	–	95 ^{2) 3)}	130 ²⁾	195 ²⁾	290 ²⁾	440 ²⁾
85	–	–	130 ²⁾	195 ²⁾	290 ²⁾	440 ²⁾

- 1) $T_a = 40\text{ °C}$ For device versions with pressure component option DA, DB, DC, DD.
- 2) For device versions with a pressure component that is installed directly on the sensor F, O, R, the maximum medium temperature is limited to 40 °C for T6 ...T5 and to and to 90 °C for T4 ... T1. In the case of T4 ... T1 and medium temperatures > 90 °C, the pressure component DPC21 must be installed using a spacer tube between the pressure component and the sensor F, O, R. The length of the spacer tube must be at least 50 cm (1.97 in).
- 3) $T_a = 55\text{ °C}$ for device versions with pressure component option DA, DB, DC, DD.

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.

Cable specification: Connecting cable for remote version

Cable parameter: $L/R \leq 38.2\ \mu\text{H}/\Omega$

The cable supplied by Endress+Hauser complies with the specifications.

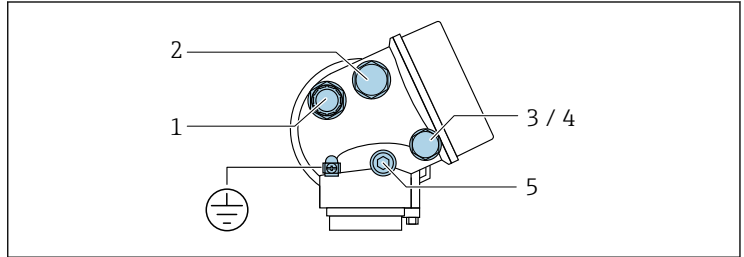
Cable specification for pressure measuring cell connecting cable

The cable connection between the transmitter and pressure component or between the sensor and pressure component has type of protection IS/Ex ia IIC.

Cable parameter: $L/R \leq 38.2 \mu\text{H}/\Omega$

The cable supplied by Endress+Hauser complies with the specifications.

Connecting the transmitter



A0034702



Position		Basic specification, position 1, 2 Approval	Type of protection used for cable entry	Description
1	Cable entry for output 1	C2, CB	IS/Ex ia/DIP IS/AEx ia/DIP	In the case of device versions with a plastic transport sealing plug, this plug does not meet the explosion protection requirements and must be replaced during installation by a suitable entry that meets the approval specifications. In the case of device versions with a cable entry, this entry has a separate component approval and meets the requirements of the explosion protection indicated on the nameplate
2	Cable entry for output 2	C2, CB	IS/Ex ia/DIP IS/AEx ia/DIP	In the case of device versions with metal extensions and sealing plugs, the latter are part of the device approval and meet the requirements of the explosion protection indicated on the nameplate. In the case of device versions with a cable entry, this entry has a separate component approval and meets the requirements of the explosion protection indicated on the nameplate.
3	Cable entry of the remote display and operating module FHX50	C2, CB	IS/Ex ia/DIP IS/AEx ia/DIP	-

4	Optional order code ¹⁾ : Cable entry of pressure measuring cell	CB	IS/Ex ia IS/AEx ia	-
Position		Description		
5	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 8, 9 (sensor version; DSC sensor; measuring tube) = DA, DA, DC, DD and position 11 (pressure component) = B, C, D, E, F, G

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	4-20 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)	
Option E ^{1) 3)}	FOUNDATION Fieldbus		Pulse/frequency/switch output (passive)		-	
Option G ^{1) 4)}	PROFIBUS PA		Pulse/frequency/switch output (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.
- 3) FOUNDATION Fieldbus with integrated reverse polarity protection.
- 4) PROFIBUS PA with integrated reverse polarity protection.

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.

Safety-related 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.

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)	$U_o = 7.3 \text{ V}$
		$I_o = 327 \text{ mA}$
		$P_o = 362 \text{ mW}$
		$L_o = 149 \text{ } \mu\text{H}$
		$C_o = 388 \text{ nF}$
		$C_c \leq 125 \text{ nF}$
		$L_c \leq 149 \text{ } \mu\text{H}$

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