Safety Instructions Proline Prowirl 200

NEPSI: Zone 1, Zone 0/1, Zone 21 Ex i version







Proline Prowirl 200

Table of contents

Associated documentation 4
Certificates and declarations
Certificate holder
Extended order code6
Safety instructions: General
Safety instructions: Installation
Safety instructions: Zone 0
Safety instructions: Zone 21
Temperature tables
Explosion hazards arising from gas and dust
Connection data: Signal circuits

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	Documentation code				
device	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

Contents	Document type	Documentation code	
Remote display FHX50	Special documentation	SD01007F	
	Safety Instructions Zone 0, Zone 21; Ex ia	XA01076F	
Overvoltage Protection (OVP)	Special documentation	SD01090F	
Explosion Protection	Brochure	CP00021Z/11	

Please note the documentation associated with the device.

Certificates and declarations

NEPSI Declaration of Conformity

Certificate number:

GYI18.1437X

Affixing the certificate number certifies conformity with the following standards (depending on the device version):

- GB/T 3836.1-2021
- GB/T 3836.4-2021
- GB 3836.20-2010
- GB/T 3836.31-2021

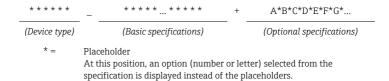
Certificate holder Endress+Hauser Flowtec AG

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



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	7	Vortex flowmeter
2	Sensor	D, F, O, R	Sensor type
3	Transmitter	2	Transmitter type: 2-wire, compact version Remote version

Position	Order code for	Option selected	Description
4	Generation index	С	Platform generation
5, 6	Nominal diameter	D: DN 15 to 150 F: DN 15 to 300 O: DN 15 to 300 R: Reducer DN 25 to 200 Super reducer DN 40 to 250	Nominal diameter of sensor

Basic specifications

Position	Order code for Option selected Type of protection		Type of protection
1, 2	Approval	NF	Ex ia IIC T1T6 Ga/Gb
		N4	Ex ia IIC T1T6 Ga/Gb, Ex tb IIIC T**°C Db

Position	Order code for	Selected option	Description
3	Output; Input	A	4-20mA HART
		В	4-20mA HART, Pulse/ frequency/switch output
		С	4-20mA HART + 4-20mA analog
		D	4-20mA HART, Pulse/ frequency/switch output, 4-20mA input
		Е	FOUNDATION Fieldbus, Pulse/frequency/switch output
		G	PROFIBUS PA, Pulse/ frequency/switch output
4	Display; Operation	A	W/o; via communication
		С	SD02 4-line; push buttons + data backup function
		Е	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⁾

Position	Order code for	Selected option	Description
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)
		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	А	Not used
	Only available for sensors F, O, R with the HART communication protocol.	В	Pressure measuring cell 2bar/29psi abs
	communication protocol.	С	Pressure measuring cell 4bar/58psi abs
		D	Pressure measuring cell 10bar/145psi abs
		Е	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 separately approved.

Optional specifications

ID	ID Order code for Option selected		Description	
Jx	Jx Test, certificate JN		Ambient temperature transmitter –50 °C	
Nx	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. GB/T 3836.15-2017)
- Install the device according to the manufacturer's instructions and the following standards:
 - GB 50257-2014 "Code for construction and acceptance of electric device for explosive atmospheres and fire hazard electrical equipment installation engineering"
 - GB/T 3836.13-2021 "Explosive atmospheres Part 13: Equipment repair, overhaul, reclamation and modification"
 - GB/T 3836.15-2017 "Explosive atmospheres Part 15: Electrical installations design, selection and erection"
 - GB/T 3836.16-2017 "Explosive atmospheres Part 16: Electrical installations inspection and maintenance"
 - GB/T 3836.18-2017 "Explosive atmospheres Part 18: Intrinsically safe electrical systems"
 - GB 15577-2018: "Safety regulations for dust explosion prevention and protection". (Only if installed in dust hazardous areas.)
- 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.
- 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.
- 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).

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 GB/T3836.15-2017.
- When the measuring device is connected, attention must be paid to explosion protection at the transmitter.
- The user shall not change the configuration in order to maintain/ ensure the protection performance of this product. Any change may impair safety.

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

- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. GB/T 3836.15-2017, 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 $500 \, V_{rms}$. If the device is equipped with more than one input, the dielectric strength of each individual input to ground is at least $500 \, V_{rms}$, and the dielectric strength of the inputs vis-à-vis one another is also at least $500 \, V_{rms}$.
- 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 Ex ia explosion protection; refer to the Special Documentation and Ex documentation.

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

 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.

 When the intrinsically safe Ex ic circuits of the device are connected to certified intrinsically safe circuits of Category Ex ic for Equipment Groups IIB, the type of protection changes from Ex ic IIC to Ex ic IIB.

Potential equalization

- Integrate the device into the potential equalization \rightarrow $\stackrel{\triangle}{=}$ 22.
- 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 enclosure 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_{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_{rms} , and the dielectric strength of the inputs vis-à-vis one another is also at least 290 V_{rms} .

Safety instructions: Zone 0 Basic specification, position 1, 2 (Approval) = NF, N4

The intrinsically safe version of the device can be used in the measuring pipe in Zone $\boldsymbol{0}$.

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.
- 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 $T_a = -50 \,^{\circ}\text{C}$

(Not permitted in conjunction with optional specification, ID Nx (Accessory Mounted) = $NA \rightarrow \square 11$)

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

$$T_a = -40 \,^{\circ}\text{C}$$

Maximum ambient temperature:

- Compact version
 - $T_{a}=\stackrel{-}{-}70\,^{\circ}\text{C}$ depending on the medium temperature and temperature class
- Transmitter remote version
 - T_{a} = +75 $^{\circ}\text{C}$ depending on the medium temperature and temperature class
- Sensor remote version
 - $T_{\text{a}} = +85\ ^{\circ}\text{C}$ depending on the medium temperature and temperature class

Medium temperature

The following relationship of ambient temperature to medium temperature applies when $T_{\rm m}$ < –50 $^{\circ}\text{C}$:

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) = NF. N4:

► $T_a = T_a - 2 \text{ K}$

Version	Version with max. T_m = 280 $^{\circ}$ C								
T _a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 ℃]	T3 [200°C]	T2 [300°C]	T1 [450 ℃]			
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⁾	-	-	-			

- 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 °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) = NF. N4:

► $T_a = T_a - 2 \text{ K}$

Version with max. T_m = 280 °C								
T _a [°C]	T6 [85 ℃]	T5 [100°C]	T4 [135 ℃]	T3 [200 °C]	T2 [300 ℃]	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⁾	-		

Version with max. $T_m = 280 ^{\circ}\text{C}$								
T _a [°C]	T6 [85 ℃]	T5 [100 ℃]	T4 [135 ℃]	T3 [200 °C]	T2 [300 °C]	T1 [450 ℃]		
65	-	-	130 ²⁾	195 ²⁾	280 4) 2)	-		
70	-	-	130 ²⁾	195 ^{5) 2)}	280 ⁵⁾	-		

- 1) $T_a = 40$ °C for pulse/frequency/switch output $P_i = 0.85$ 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 °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) $T_a = 55$ °C for pulse/frequency/switch output $P_i = 0.85$ W
- 4) $T_a = 65$ °C for pulse/frequency/switch output $P_i = 0.7$ W
- T_a = 70 °C for pulse/frequency/switch output P_i = 0.7 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) = NF, N4:

$$T_a = T_a - 2 K$$

Version with max. T_m = 280 °C								
T _a [°C]	T6 [85 ℃]	T5 [100 ℃]	T4 [135 ℃]	T3 [200 °C]	T2 [300 ℃]	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 2) 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) $T_a = 65$ °C for pulse/frequency/switch output $P_i = 0$ 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) = NF, N4:

$$T_a = T_a - 2 K$$

Version	Version with max. T_m = 280 °C								
T _a [°C]	T6 [85 °C]	T5 [100°C]	T4 [135 ℃]	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⁾	-	-			

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) = NF, N4:

$$T_a = T_a - 2 K$$

Version	Version with max. T_m = 280 °C								
T _a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 ℃]	T3 [200°C]	T2 [300°C]	T1 [450 ℃]			
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	280 1)	-			
50	_	95 ¹⁾	130 ^{1) 2)}	195 ^{1) 2)}	280 1) 2)	-			
60	-	_	130 ¹⁾	195 ¹⁾	280 1)	-			
65	-	-	130 ¹⁾	195 ¹⁾	280 ³⁾¹⁾	-			
70	_	_	130 ¹⁾	195 ^{4) 1)}	280 4) 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 $40\,^{\circ}\text{C}$ for T6 ... T5 and to $90\,^{\circ}\text{C}$ for T4 ... T1. In the case of T4 ... T1 and medium temperatures > $90\,^{\circ}\text{C}$, 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).

- 2) $T_a = 60$ °C for pulse/frequency/switch output $P_i = 0$ W
- 3) $T_a = 65$ °C for pulse/frequency/switch output $P_i = 0$ W
- 4) $T_a = 70 \,^{\circ}\text{C}$ for pulse/frequency/switch output $P_i = 0 \,^{\circ}\text{W}$

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) = NF, N4:

►
$$T_a = T_a - 2 \text{ K}$$

Version with max. $T_m = 440$ °C								
T _a [°C]	T6 T5 T4 T3 T2 [85 °C] [100 °C] [135 °C] [200 °C] [300 °C] [4				T1 [450 ℃]			
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 1)		
60	-	95 ^{2) 1)}	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾		
70	-	-	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 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) $T_a = 55$ °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) = NF, N4:

$$T_a = T_a - 2 K$$

Version with max. T_m = 440 °C								
T _a [°C]	T6 [85 ℃]	T5 [100°C]	T4 [135 ℃]	T3 [200 °C]	T2 [300 ℃]	T1 [450°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 ^{4) 2)}	290 ²⁾	440 4) 2)		

- 1) $T_a = 40$ °C for pulse/frequency/switch output $P_i = 0.85$ 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 °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) $T_a = 55$ °C for pulse/frequency/switch output $P_i = 0.85$ W
- 4) $T_a = 70$ °C for pulse/frequency/switch output $P_i = 0.85$ 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) = NF. N4:

►
$$T_a = T_a - 2 \text{ K}$$

Version with max. T_m = 440 $^{\circ}$ C									
T _a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 ℃]	T3 [200°C]	T2 [300 °C]	T1 [450 ℃]			
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 1)			
55	-	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 1)			
65	-	-	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 1)			
70	-	-	130 ¹⁾	195 ²⁾¹⁾	290 ²⁾¹⁾	440 2) 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) $T_a = 70$ °C for pulse/frequency/switch output $P_i = 0$ 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) = NF, N4:

 $T_a = T_a - 2 K$

Version with max. $T_m = 440$ °C								
T _a [°C]	T6 [85 ℃]	T5 [100°C]	T4 [135 ℃]	T3 [200 °C]	T2 [300 °C]	T1 [450 ℃]		
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⁾	-		

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) = NF, N4:

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

Version	Version with max. T_m = 440 °C								
T _a [°C]									
40	80 ¹⁾	95 ¹⁾	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾			
50	-	95 ¹⁾	130 ^{1) 2)}	195 ^{1) 2)}	290 1) 2)	440 1) 2)			
65	-	-	130 ¹⁾	195 ¹⁾	290 ¹⁾	440 ¹⁾			
70	-	-	130 ¹⁾	195 ^{3) 1)}	290 ^{3) 1)}	440 3) 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) $T_a = 60$ °C for pulse/frequency/switch output $P_i = 0$ W
- 3) $T_a = 70$ °C for pulse/frequency/switch output $P_i = 0$ W

Remote version

Transmitter

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

- 1) $T_a = 40$ °C for pulse/frequency/switch output $P_i = 0.85$ W
- 2) $T_a = 60$ °C for pulse/frequency/switch output $P_i = 0.85$ W
- 3) $T_a = 75$ °C for pulse/frequency/switch output $P_i = 0.85$ W
- 4) $T_a = 75$ °C for pulse/frequency/switch output $P_i = 0$ W
- 5) The following applies for installations with overvoltage protection in conjunction with temperature class T5, T6 and basic specification, position 1, 2 (Approval) = NF, N4: $T_a = T_a 2$ K

Sensor

Version with max. T_m = 280 °C								
T _a [°C]	T6 [85 ℃]	T5 [100°C]	T4 [135 ℃]	T3 [200°C]	T2 [300 °C]	T1 [450 ℃]		
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) $T_a = 40$ °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).
- T_a = 55 °C for device versions with pressure component option DA, DB, DC, DD.

Version with max. T_m = 440 $^{\circ}$ C						
T _a [°C]	T6 [85 ℃]	T5 [100°C]	T4 [135 ℃]	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)

High-temperature version

- 1) $T_a = 40$ °C For device versions with pressure component option DA, DB, DC, DD.
- 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).
- T_a = 55 °C for device versions with pressure component option DA, DB, DC, DD.

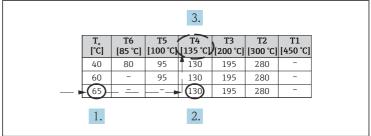
Explosion hazards arising from gas and dust

Determining the temperature class and surface temperature with the temperature table

- \blacksquare In the case of gas: Determine the temperature class as a function of the maximum ambient temperature T_a and the maximum medium temperature $T_m.$
- \blacksquare 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: $T_{ma} = 63 \, ^{\circ}\text{C}$
- Measured maximum medium temperature: $T_{mm} = 108 \, ^{\circ}\text{C}$



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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 select the temperature that is immediately greater than or equal to the maximum ambient temperature T_{ma} that is present.
 - $^{\mbox{\tiny L-}} \quad T_a = 65\,^{\circ}\mbox{C}.$ 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: $108 \,^{\circ}\text{C} \le 130 \,^{\circ}\text{C} \to T4$.
- 3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: T4 = 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.

Cable specification: Connecting cable for remote version

The sensor cable connection between the sensor and the transmitter has Ex ia type of protection.

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

The cable supplied by Endress+Hauser complies with this value.

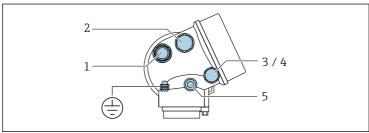
Cable specification for pressure measuring cell connecting cable

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

Cable parameter: $L/R \le 38.2 \mu H/\Omega$

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

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	NF N4	Ex ia Ex ia/Ex tb	The following applies for devices with basic specification, position 1, 2 (Approval) = N4: 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	NF N4	Ex ia Ex ia/Ex tb	The following applies for devices with basic specification, position 1, 2 (Approval) = N4: 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	Optional order code for ¹⁾ : Cable entry of the remote display and operating module FHX50	NF N4	Ex ia Ex ia/Ex tb	The following applies for devices with basic specification, position 1, 2 (Approval) = N4: 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.

4	Optional order code for ²⁾ : Pressure measuring cell cable entry	NF	Exia		
Pos	Position		Description		
5 Pressure compensation plug		Housing degree of prinousing. Do not open - not	otection voided due to insufficient sealing of the a cable entry.		
(4)	Potential equalization			ion to potential equalization. ne grounding concept of the facility.	

- Basic specification, position 4 (display; operation) = L, M 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, G1) 2)

Terminal assignment

Transmitter

i

Connection versions

Order code for	Terminal numbers						
"Output"	Output 1 Outpu		out 2	ut 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)}		A HART sive)	Pulse/frequency/ switch output (passive)		ch output 4-20mA current		
Option E ^{1) 3)}		FOUNDATION Pulse/frequency/ switch output - (passive)		switch output			
Option G ^{1) 4)}	PROFII	BUS PA	Pulse/frequency/ switch output (passive)		output -		

- 1) Output 1 must always be used; output 2 is optional.
- 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



Type of protection Ex ia

Order code for "Output"	Output type	Intrinsically safe values	
Option A	4-20mA HART	$\begin{split} &U_{l} = DC \; 30 \; V \\ &I_{l} = 300 \; mA \\ &P_{l} = 1 \; W \\ &L_{l} = 0 \; \mu H \\ &C_{l} = 5 \; nF \end{split}$	
Option B	4-20mA HART	$\begin{split} &U_i = DC \; 30 \; V \\ &I_i = 300 \; mA \\ &P_i = 1 \; W \\ &L_i = 0 \; \mu H \\ &C_i = 5 \; nF \end{split}$	
	Pulse/frequency/switch output	$\begin{split} &U_{i} = DC \; 30 \; V \\ &I_{i} = 300 \; mA \\ &P_{i} = 1 \; W \\ &L_{i} = 0 \; \mu H \\ &C_{i} = 6 \; nF \end{split}$	
Option C	4-20mA HART	$U_i = DC 30 V$	
	4-20mA analog	$\begin{split} I_i &= 300 \text{ mA} \\ P_i &= 1 \text{ W} \\ L_i &= 0 \mu\text{H} \\ C_i &= 30 \text{ nF} \end{split}$	
Option D	4-20mA HART	$\begin{split} &U_{i} = DC \; 30 \; V \\ &I_{i} = 300 \; mA \\ &P_{i} = 1 \; W \\ &L_{i} = 0 \; \mu H \\ &C_{i} = 5 \; nF \end{split}$	
	Pulse/frequency/switch output	$\begin{split} &U_{l} = DC \; 30 \; V \\ &I_{l} = 300 \; mA \\ &P_{l} = 1 \; W \\ &L_{l} = 0 \; \mu H \\ &C_{l} = 6 \; nF \end{split}$	
	4 to 20 mA current input	$\begin{split} &U_{i} = DC \; 30 \; V \\ &I_{i} = 300 \; mA \\ &P_{i} = 1 \; W \\ &L_{i} = 0 \; \mu H \\ &C_{i} = 5 \; nF \end{split}$	
Option E	FOUNDATION Fieldbus	$\begin{array}{llllllllllllllllllllllllllllllllllll$	
	Pulse/frequency/switch output	$\begin{split} &U_{l} = 30 \ V \\ &l_{i} = 300 \ mA \\ &P_{i} = 1 \ W \\ &L_{i} = 0 \ \mu H \\ &C_{i} = 6 \ nF \end{split}$	

Order code for "Output"	Output type	Intrinsically safe values		
Option G	PROFIBUS PA	$STANDARD \\ U_i = 30 \text{ V} \\ l_i = 300 \text{ mA} \\ P_i = 1.2 \text{ W} \\ L_i = 10 \mu\text{H} \\ C_i = 5 \text{ nF} \\ \\$	$\begin{aligned} & FISCO \\ & U_i = 17.5 \ V \\ & I_i = 550 \ mA \\ & P_i = 5.5 \ W \\ & L_i = 10 \ \mu H \\ & C_i = 5 \ nF \end{aligned}$	
	Pulse/frequency/switch output	$\begin{split} &U_i = 30 \ V \\ &I_i = 300 \ mA \\ &P_i = 1 \ W \\ &L_i = 0 \ \mu H \\ &C_i = 6 \ nF \end{split}$		

Safety-related values



Remote display FHX50

Basic specification, position 1, 2 Approval	Cable specification	Basic specification, position 4 Display; operation Option L, M	
		$U_0 = 7.3 \text{ V}$	
	Max. cable length: 60 m (196.85 ft)	I _o = 327 mA	
		P _o = 362 mW	
Option NF, N4		L ₀ = 149 μH	
		C _o = 388 nF	
		C _c ≤ 125 nF	
		L _c ≤ 149 μH	





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