

Safety Instructions

Proline Prowirl 200

EAC: Ga/Gb Ex db [ia] IIC T6...T1
1Ex db [ia] IIC T6...T1 Gb
Ex tb IIIC T** °C Db



Proline Prowirl 200

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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:

Prowirl 7*2B**-...

Measuring device	Documentation code		
	HART	FOUNDATION Fieldbus	PROFIBUS PA
Prowirl C 200	BA01152D	BA01215D	BA01220D
Prowirl D 200	BA01153D	BA01216D	BA01221D
Prowirl F 200	BA01154D	BA01217D	BA01222D
Prowirl O 200	BA01155D	BA01218D	BA01223D
Prowirl R 200	BA01156D	BA01219D	BA01224D

Prowirl 7*2C**-...

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

Contents	Document type	Documentation code
Remote display FHX50	Special documentation	SD01007F
	Safety Instructions <ul style="list-style-type: none"> ■ OEx ia IIC T6 Ga X ■ Ex ia IIIC T100° C Db ■ Ex ia IIIC T105° C Db 	XA01601F
Explosion Protection	Brochure	CP00021Z/11

Manufacturer's certificates

Flowmeters meet the fundamental health and safety requirements for the design and construction of devices and protective systems intended

for use in potentially explosive atmospheres in accordance with TR CU 012/2011.

Certification body

LLP "T-Standard"

Certificate number

EAЭC KZ 7500525.01.01.01269

Affixing the certificate number certifies conformity with the standards under (depending on the device version).

- ГОСТ 31610.0-2019 (IEC 60079-0-2017)
- ГОСТ IEC 60079-1-2013
- ГОСТ 31610.11-2014/IEC 6007911:2011
- ГОСТ 31610.26-2016/IEC 60079-26:2014
- ГОСТ IEC 60079-31-2013

Manufacturer address

Endress+Hauser Flowtec AG
35, rue de l'Europe
68700 Cernay
France

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	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
4	Generation index	B, 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 for	Option selected	Description
1, 2	Approval	GC, IC	Ga/Gb Ex db [ia] IIC T6...T1 or 1Ex db [ia] IIC T6...T1 Gb
		GK, IK	1Ex db [ia] IIC T6...T1 Gb
		G5, I5	Ga/Gb Ex db [ia] IIC T6...T1 or 1Ex db [ia] IIC T6...T1 Gb
			Ex tb IIIC T** °C Db

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
		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 + custom connection ¹⁾
8, 9	Sensor version; DSC sensor; measuring tube  Only available for sensors F, O, R, with Generation index C 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)

Position	Order code for	Selected option	Description
		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 Generation index C 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 ²⁾	Device Model	A1	1

1) FHX50 is separately approved.

2) Only for devices with order code for "Generation index", option C

Optional specifications

ID	Order code for	Option selected	Description
Jx	Test, certificate	JN	Ambient temperature transmitter -50 °C

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. ГОСТ IEC 60079-14-2013)
- 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.
- 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 glands suitable for the application. Observe selection criteria as per GOCT IEC 60079-14-2013. Accordingly, the connection terminal does not include any ignition sources.
- When the measuring device is connected, attention must be paid to the type of protection at the transmitter.
- In potentially explosive atmospheres:
 - Do not disconnect the electrical connection of the power supply circuit when energized.
Exception for connection compartment Ex eb with intrinsically safe inputs and outputs: opening of the connection compartment is permitted for short period to perform live maintenance. Internal Non-intrinsically safe circuits are protected by an additional IP30 cover.
 - Do not open the connection compartment cover when energized.
- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the enclosure.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection. The plastic transport sealing plug does not meet this requirement and must therefore be replaced during installation.
- Only use certified sealing plugs. The metal sealing plugs supplied meet this requirement.

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 explosion protection; refer to the Special Documentation and Ex documentation.

Potential equalization

- Integrate the device into the potential equalization .
- 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.

Safety instructions: Zone 0

Basic specification, position 1, 2 (Approval) = GC, IC, G5, I5

The intrinsically safe version of the device can be used in the measuring pipe in Zone 0.

Temperature tables for devices with generation index B

Ambient temperature

Minimum ambient temperature

Basic specification, position 3 (Output; Input) = A, B, D in conjunction with optional specification, ID Jx (Test, Certificate) = JN

$$T_a = -50\text{ °C}$$

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 $T_m < -50\text{ °C}$:

$T_m\text{ [°C]}$	-50	-100	-150	-200
$T_a\text{ [°C]}$	-50	-47	-44	-39

Compact version

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

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	95	130	195	280	–
60	–	95	130	195	280	–
65	–	–	130	195	280	–
70	–	–	130	–	–	–

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

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	95	130	195	280	–
55	–	95	130	195	280	–
65	–	–	130	195	280 ¹⁾	–
70	–	–	130	195 ²⁾	280 ²⁾	–

- 1) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.7\text{ W}$
- 2) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.7\text{ W}$

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

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	95	130	195	280	–
55	–	95	130	195	280	–
60	–	–	130	195	280	–
65	–	–	130	195	280 ¹⁾	–
70	–	–	130	–	–	–

- 1) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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

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	95	130	195	280	-
50	-	95	130	195	280	-
55	-	-	-	195	280	-
60	-	-	-	195	-	-

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

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	95	130	195	280	-
50 ¹⁾	-	95	130	195	280	-
60	-	-	130	195	280	-
65	-	-	130	195	280 ²⁾	-
70	-	-	130	195 ³⁾	280 ³⁾	-

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

High-temperature version

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

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	95	130	195	290	440
60	-	95	130	195	290	440
70	-	-	130	195	290	440

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

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	95	130	195	290	440
55	-	95	130	195	290	440
65	-	-	130	195	290	440
70	-	-	130	195 ¹⁾	290 ¹⁾	440 ¹⁾

1) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$

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

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	95	130	195	290	440
55	-	95	130	195	290	440
65	-	-	130	195	290	440
70	-	-	130	195 ¹⁾	290 ¹⁾	440 ¹⁾

1) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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

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	95	130	195	290	440
50	-	95	130	195	290	440
55	-	-	-	195	290	440
60	-	-	-	195	290	440
65	-	-	-	-	290	-

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

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	95	130	195	290	440
50 ¹⁾	-	95	130	195	290	440
65	-	-	130	195	290	440
70	-	-	130	195 ²⁾	290 ²⁾	440 ²⁾

1) $T_a = 60\text{ °C}$ for pulse/frequency/switch output $P_i = 0\text{ W}$

2) $T_a = 70\text{ °C}$ 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	50	65
E	All	40	55	70 ⁴⁾
G				

- 1) $T_a = 40\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 2) $T_a = 60\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 3) $T_a = 75\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 4) $T_a = 75\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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	95	130	195	280	–
70	–	95	130	195	280	–
85	–	–	130	195	280	–

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	95	130	195	290	440
70	–	95	130	195	290	440
85	–	–	130	195	290	440

Temperature tables for devices with generation index C

Ambient temperature

Minimum ambient temperature

Basic specification, position 3 (Output; Input) = A, B, D in conjunction with optional specification, ID Jx (Test, Certificate) = JN

$$T_a = -50\text{ °C}$$

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 $T_m < -50\text{ °C}$:

$T_m\text{ [°C]}$	-50	-100	-150	-200
$T_a\text{ [°C]}$	-50	-47	-44	-39

Compact version

Basic specification, position 3 (output; input) = A

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

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⁾	–
65	–	–	130 ¹⁾	195 ¹⁾	280 ^{2) 1)}	–
70	–	–	130 ¹⁾	195 ^{3) 1)}	280 ^{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) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.7\text{ W}$
- 3) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.7\text{ W}$

Basic specification, position 3 (output; input) = C

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⁾	–

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]
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) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

Basic specification, position 3 (output; input) = D

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

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	-	95 ¹⁾	130 ^{1) 2)}	195 ^{1) 2)}	280 ^{1) 2)}	-
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 ^{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 °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 $P_1 = 0\text{ W}$
- 3) $T_a = 65\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$
- 4) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

High-temperature version

Basic specification, position 3 (output; input) = A

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 ^{2) 1)}	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

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⁾
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) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_i = 0.85\text{ W}$

Basic specification, position 3 (output; input) = C

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⁾
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 ^{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) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

Basic specification, position 3 (output; input) = D

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

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	–	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) $T_a = 60\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$
- 3) $T_a = 70\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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	50	65
E	All	40	55	70 ⁴⁾
G				

- 1) $T_a = 40\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 2) $T_a = 60\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 3) $T_a = 75\text{ °C}$ for pulse/frequency/switch output $P_1 = 0.85\text{ W}$
- 4) $T_a = 75\text{ °C}$ for pulse/frequency/switch output $P_1 = 0\text{ W}$

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 ³⁾²⁾	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 ^{3) 2)}	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 $> 90\text{ °C}$, 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 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

- In the case of gas: Determine the temperature class as a function of the maximum ambient temperature T_a and the maximum medium temperature T_m .
- In the case of dust: Determine the maximum surface temperature as a function of the maximum ambient temperature T_a and the maximum medium temperature T_m .

Example

- Measured maximum ambient temperature: $T_{ma} = 63\text{ °C}$
- Measured maximum medium temperature: $T_{mm} = 108\text{ °C}$

T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80	95	130	195	280	-
60	-	95	130	195	280	-
65	-	-	130	195	280	-

Diagram annotations: A blue box '3.' is above the T4 header. A blue box '1.' is below the 65 value. A blue box '2.' is below the 130 value in the third row. A blue box '3.' is above the 135 °C value in the T4 header. Arrows indicate the selection process: from 65 to the 130 in the third row, and from the 130 in the T4 header to the 135 °C value.

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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.

↳ $T_a = 65 \text{ °C}$.

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:
 $108 \text{ °C} \leq 130 \text{ °C} \rightarrow T4$.

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

Connection 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.

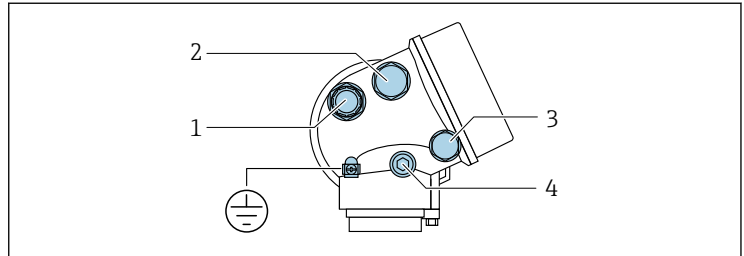
Cable specification: Connecting cable for remote version

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

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

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

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	GC, IC, GK, IK G5, I5	Ex d Ex d/Ex tb	<p>Plastic sealing plugs act as safeguards during transportation and must be replaced by suitable, individually approved installation material.</p> <p>The metal extensions and dummy plugs supplied are tested and certified as part of the housing for type of protection Ex db IIC. The various threaded versions are labeled as follows for identification purposes:</p> <ul style="list-style-type: none"> ▪ Md: M20 x 1.5 ▪ NPTd: NPT ½" ▪ Gd: G ½"
2	Cable entry for output 2	GC, IC, GK, IK G5, I5	Ex d Ex d/Ex tb	<p>Plastic sealing plugs act as safeguards during transportation and must be replaced by suitable, individually approved installation material.</p> <p>The metal extensions and dummy plugs supplied are tested and certified as part of the housing for type of protection Ex db IIC. The various threaded versions are labeled as follows for identification purposes:</p> <ul style="list-style-type: none"> ▪ Md: M20 x 1.5 ▪ NPTd: NPT ½" ▪ Gd: G ½"
3	Optional order code ¹⁾ : Cable entry of the remote display and operating module FHX50	GC, IC, GK, IK G5, I5	Ex ia Ex ia/Ex tb	<p>The following applies for devices with basic specification, position 1, 2 (Approval) = G5, I5: In the case of device versions with a metal sealing plug, this plug is part of the device approval and meets the requirements of the explosion protection indicated on the nameplate.</p> <p>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.</p>



Position		Basic specification, position 1, 2: Approval	Type of protection used for cable entry	Description
4	Optional order code ²⁾ : Cable entry of pressure measuring cell	GC, IC, GK, IK	Ex 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 4 (display; operation) = L, M

2) 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	4-20mA 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)	
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.

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.

Type of protection Ex d

Order code for "Output"	Output type	Safety-related values
Option A	4-20mA HART	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$
Option B	4-20mA HART	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$
	Pulse/frequency/switch output	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$ $P_{max} = 1\ W^{1)}$
Option C	4-20mA HART	$U_{nom} = DC\ 30\ V$ $U_{max} = 250\ V$
	4-20mA analog	
Option D	4-20mA HART	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$
	Pulse/frequency/switch output	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$ $P_{max} = 1\ W^{1)}$
	4 to 20 mA current input	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$
Option E	FOUNDATION Fieldbus	$U_{nom} = DC\ 32\ V$ $U_{max} = 250\ V$ $P_{max} = 0.88\ W$
	Pulse/frequency/switch output	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$ $P_{max} = 1\ W^{1)}$
Option G	PROFIBUS PA	$U_{nom} = DC\ 32\ V$ $U_{max} = 250\ V$ $P_{max} = 0.88\ W$
	Pulse/frequency/switch output	$U_{nom} = DC\ 35\ V$ $U_{max} = 250\ V$ $P_{max} = 1\ W^{1)}$

1) Internal circuit limited by $R_i = 760.5\ \Omega$

Remote display FHX50

Basic specification, position 1, 2 Approval	Cable specification	Basic specification, position 4 Display, Operation Option L, M
Option GC, IC, GK, IK, G5, I5	Max. cable length: 60 m (196.85 ft)	$U_o = 7,3 \text{ V}$
		$I_o = 327 \text{ mA}$
		$P_o = 362 \text{ mW}$
		$L_o = 149 \mu\text{H}$
		$C_o = 388 \text{ nF}$
		$C_c \leq 125 \text{ nF}$
$L_c \leq 149 \mu\text{H}$		



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