

Safety Instructions

Proline Prowirl 200

INMETRO: Zone 1, Zone 0/1
Ex d version



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:

| 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 Ex ia | XA01077F |
| Explosion Protection | Brochure | CP00021Z/11 |

Please note the documentation associated with the device.

Certificates and declarations

Declaration of conformity

INMETRO CERTIFICADO DE CONFORMIDADE

Certificate of Conformity

Certificate number:

- TÜV 18.0687
- TÜV 23.0020
- TÜV 23.0021
- TÜV 23.0022

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

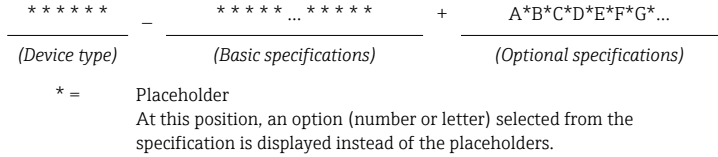
- ABNT NBR IEC 60079-0: 2020
- ABNT NBR IEC 60079-1: 2016
- ABNT NBR IEC 60079-11: 2013
- ABNT NBR IEC 60079-26: 2016

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 | 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 | Selected option | Type of protection | | |
|----------|----------------|-----------------|------------------------------|---------------------------|-------------------------|
| | | | Compact version | Remote version | |
| | | | | Transmitter | Sensor |
| 1, 2 | Approval | MC | Ex db [ia] IIC T6...T1 Ga/Gb | Ex db [ia] IIC T6...T1 Gb | Ex ia IIC T6...T1 Ga/Gb |

| Position | Order code for | Selected option | Description |
|----------|--------------------|-----------------|--|
| 3 | Output; Input | A | 4-20mA HART |
| | | B | 4-20mA HART, Pulse/frequency/switch output |
| | | 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⁾ |

| 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  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 separately approved.

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. ABNT NBR IEC 60079-14)
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- 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 ABNT NBR IEC 60079-14. Accordingly, the connection terminal does not include any ignition sources.
- When the measuring device is connected, attention must be paid to explosion protection at the transmitter.
- In potentially explosive atmospheres:
 - Do not disconnect the electrical connection of the power supply circuit when energized.
 - 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 Ex ia 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) = MC

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

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

$T_a = -50\text{ °C}$

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 ¹⁾²⁾ | 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 ¹⁾²⁾ | – |
| 70 | – | – | 130 ¹⁾ | 195 ¹⁾³⁾ | 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⁾ | – |
| 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) 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 °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 $P_i = 0\text{ W}$

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⁾ | - |
| 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 $P_1 = 0\text{ W}$
- 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 ^{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 $P_1 = 0.85\text{ W}$

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⁾ |
| 65 | - | - | 130 ¹⁾ | 195 ¹⁾ | 290 ¹⁾ | 440 ¹⁾ |
| 70 | - | - | 130 ¹⁾ | 195 ^{1) 2)} | 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 $P_i = 0\text{ W}$

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)} |

| 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⁾³⁾ | 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 | MC | 40 | 60 | 75 |
| B | MC | 35 ¹⁾ | 50 ²⁾ | 70 ³⁾ |
| C | MC | 40 | 55 | 70 ⁴⁾ |
| D | MC | 35 | 50 | 65 |
| E G | MC | 40 | 55 | 70 ⁴⁾ |

- 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 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 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.

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 illustrating the procedure for determining the temperature class and surface temperature. The table shows the relationship between ambient temperature (T_a), medium temperature (T_m), and surface temperature (T_s). The maximum ambient temperature T_a is 65 °C (circled in blue 1). The corresponding maximum medium temperature T_m is 130 °C (circled in blue 2). The temperature class for gas is determined as T4 (108 °C ≤ 130 °C → T4). The maximum surface temperature for dust T_4 is 135 °C (circled in blue 3).

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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.

↳ $T_a = 65$ °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 °C ≤ 130 °C → T4.

3. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: $T_4 = 135$ °C.

Connection values: Signal circuits

The following tables contain specifications which are dependent on the transmitter type and its input and output assignment. Compare the following specifications with those on the nameplate of the transmitter.

Cable specification: Connecting cable for remote version

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

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

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

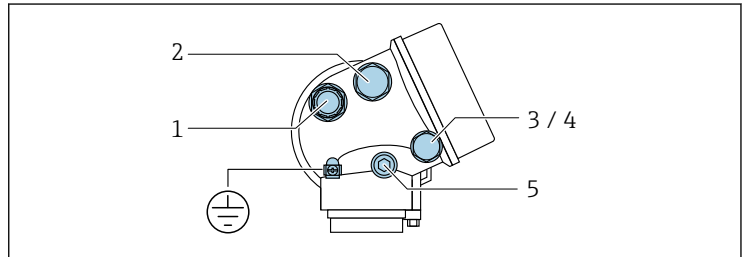
Cable specification for pressure measuring cell connecting cable

The cable connection between the transmitter and pressure component or between the sensor and pressure component has type of protection 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



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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 | MC | Ex db | <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 | MC | Ex db | <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 | MC | Ex ia | - |



| 4 | Optional order code ²⁾ : Cable entry of pressure measuring cell | MC | 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 →  6.

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 →  6.

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 MC | 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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