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Safety Instructions
Proline Prowirl 200

EAC: 0Ex ia IIC T6 ... T1 Ga
Ga/Gb Ex ia IIC T6 ... T1
1Ex ia IIC T6 ... T1 Gb
Ex tb IIIC T** °C Db

Endress+Hauser
People for Process Automation

Proline Prowirl 200

Table of contents

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 ▪ 0Ex ia IIC T6 Ga X ▪ Ex ia IIIC T100° C Db ▪ Ex ia IIIC T105° C Db	XA01601F
Overvoltage Protection (OVP)	Special documentation	SD01090F
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

ЕАЭС 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 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*...
(Device type)		*(Basic specifications)*		*(Optional specifications)*

* = Placeholder
At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

Device type

The device and the device design is defined in the "Device type" section (Product root).

Basic specifications

The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available.
The selected option of a feature can consist of several positions.

Optional specifications

The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = Test, Certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

Device type

Position	Order code for	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: ▪ 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	GA	0Ex ia IIC T6...T1 Ga
		GB	Ga/Gb Ex ia IIC T6...T1
		GJ	1Ex ia IIC T6...T1 Gb

Position	Order code for	Option selected	Description
		G4	Ga/Gb Ex ia IIC T6...T1 1Ex 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)

Position	Order code for	Selected option	Description
		DC	Mass steam; Alloy 718; 316L (integrated pressure/temperature measurement), −200 to +400 °C (−328 to +750 °F)
		DD	Mass gas/liquid; Alloy 718; 316L (integrated pressure/temperature measurement), −40 to +100 °C (−40 to +212 °F)
11	Pressure component Only available for sensors F, O, R, with 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
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. 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.
- 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 ГОСТ IEC 60079-14-2013.
- When the measuring device is connected, attention must be paid to the type of protection at the transmitter.

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. ГОСТ IEC 60079-14-2013 , 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 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 .
- 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 according to ГОСТ IEC 60079-14-2013 against atmospheric over voltages is required: no other circuits may leave the housing during normal operation without additional measures.
- The intrinsically safe input power circuit of the device is isolated from ground. If the device is only equipped with one input, the dielectric strength of the input is at least 290 V_{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) = GB, G4, IB, I4

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

Basic specification, position 1, 2 (Approval) = GA, IA

The sensor's coated aluminum AlSi10Mg transmitter or connector housing installed in Zone 0: Mechanical shock-proof installation.

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.
- If the transmitter is connected to the remote display FHX50, the circuit has type of protection Ex ia IIIC.
  Connection values → 🗎 31

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 °C
(Not permitted in conjunction with *optional specification, ID Nx (Accessory Mounted) = NA* → 📄 10)

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

T_a = −40 °C

Maximum ambient temperature:
- Compact version
  T_a = +70 °C depending on the medium temperature and temperature class
- Transmitter remote version
  T_a = +75 °C depending on the medium temperature and temperature class
- Sensor remote version
  T_a = +85 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °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

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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

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

1) T_a = 40 °C for pulse/frequency/switch output P_i = 0.85 W
2) T_a = 55 °C for pulse/frequency/switch output P_i = 0.85 W
3) T_a = 65 °C for pulse/frequency/switch output P_i = 0.7 W
4) 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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °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

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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °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 °C for pulse/frequency/switch output P_i = 0 W
2) T_a = 65 °C for pulse/frequency/switch output P_i = 0 W
3) T_a = 70 °C for pulse/frequency/switch output P_i = 0 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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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

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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

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

1) T_a = 40 °C for pulse/frequency/switch output P_i = 0.85 W
2) T_a = 55 °C for pulse/frequency/switch output P_i = 0.85 W
3) 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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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

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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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 °C for pulse/frequency/switch output P_i = 0 W
2) T_a = 70 °C for pulse/frequency/switch output P_i = 0 W

Remote version

Transmitter

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

1) The following applies for installations with overvoltage protection in conjunction with basic specification, position 1, 2 (approval) = GA, GB, GD, GH, GJ, G4, IA, IB, ID, IH, IJ, I4, C2: $T_a = T_a - 2$ K
2) $T_a = 40$ °C for pulse/frequency/switch output $P_i = 0.85$ W
3) $T_a = 60$ °C for pulse/frequency/switch output $P_i = 0.85$ W
4) $T_a = 75$ °C for pulse/frequency/switch output $P_i = 0.85$ W
5) $T_a = 75$ °C for pulse/frequency/switch output $P_i = 0$ W

Sensor

Version with max. T_m = 280 °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 °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 °C
(Not permitted in conjunction with *optional specification, ID Nx (Accessory Mounted) = NA* → 📄 10)

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

T_a = −40 °C

Maximum ambient temperature:
- Compact version
  T_a = +70 °C depending on the medium temperature and temperature class
- Transmitter remote version
  T_a = +75 °C depending on the medium temperature and temperature class
- Sensor remote version
  T_a = +85 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °C						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35 [1)]	80 [2)]	95 [2)]	130 [2)]	195 [2)]	280 [2)]	–
50 [3)]	–	95 [2)]	130 [2)]	195 [2)]	280 [2)]	–
60	–	–	130 [2)]	195 [2)]	280 [2)]	–

Version with max. T_m = 280 °C						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
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
5) 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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °C						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
40	80 [1]	95 [1]	130 [1]	195 [1]	280 [1]	–
55	–	95 [1]	130 [1]	195 [1]	280 [1]	–
60	–	–	130 [1]	195 [1]	280 [1]	–
65	–	–	130 [1]	195 [1]	280 [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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

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

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

Basic specification, position 3 (output; input) = E, G

NOTICE

The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6.

The following applies for basic specification, position 1, 2 (Approval) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 280 °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 [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 °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 °C for pulse/frequency/switch output P_i = 0 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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °C						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
35 [1]	80 [2]	95 [2]	130 [2]	195 [2]	290 [2]	440 [2]
50 [3]	–	95 [2]	130 [2]	195 [2]	290 [2]	440 [2]

Version with max. T_m = 440 °C						
T_a [°C]	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
65	–	–	130 [2]	195 [2]	290 [2]	440 [2]
70	–	–	130 [2]	195 [4) 2)]	290 [4) 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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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 °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) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

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

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

Basic specification, position 3 (output; input) = E, G

NOTICE

The ambient temperature changes for installations with overvoltage protection in conjunction with temperature classes T5 and T6.

The following applies for basic specification, position 1, 2 (Approval) =GA, GB, GJ, G4, IA, IB, IJ, I4:

▶ $T_a = T_a - 2$ K

Version with max. T_m = 440 °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 °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 [1]	Basic specification, position 1, 2 Approval	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]
A	All	40	60	75
B	All	35 [2]	50 [3]	70 [4]
C	All	40	55	70 [5]
D	All	35	50	65
E G	All	40	55	70 [5]

1) The following applies for installations with overvoltage protection in conjunction with basic specification, position 1, 2 (approval) = GA, GB, GJ, G4, IA, IB, IJ, I4, C2: $T_a = T_a - 2$ K
2) T_a = 40 °C for pulse/frequency/switch output P_i = 0.85 W
3) T_a = 60 °C for pulse/frequency/switch output P_i = 0.85 W
4) T_a = 75 °C for pulse/frequency/switch output P_i = 0.85 W
5) T_a = 75 °C for pulse/frequency/switch output P_i = 0 W

Sensor

Version with max. T_m = 280 °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 °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 °C for device versions with pressure component option DA, DB, DC, DD.

High-temperature version

Version with max. T_m = 440 °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 °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 °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 °C
- Measured maximum medium temperature: T_{mm} = 108 °C

3.

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	–

1. 2.

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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: 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.

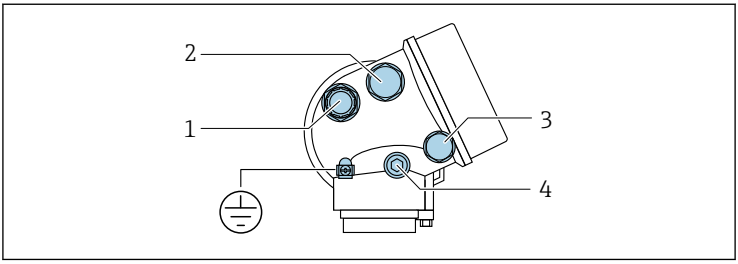
Cable specification: Connecting cable for remote version

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

Cable parameter: L/R ≤ 38.2 µH/Ω

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	GA, IA, GB, IB, GJ, IJ G4, I4	Ex ia Ex ia/Ex tb	The following applies for devices with basic specification, position 1, 2 (Approval) = G4: 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	GA, IA, GB, IB, GJ, IJ G4, I4	Ex ia Ex ia/Ex tb	The following applies for devices with basic specification, position 1, 2 (Approval) = G4: 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. 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 [1]: Cable entry of the remote display and operating module FHX50	GA, IA, GB, IB, GJ, IJ G4, I4	Ex ia Ex ia/Ex tb	The following applies for devices with basic specification, position 1, 2 (Approval) = G4: 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. 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.

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	GA, IA, GB, IB, GJ, IJ	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.

Intrinsically safe values

The order code is part of the extended order code. Detailed information on the features of the device and on the structure of the extended order code → 📄 5.

Type of protection Ex ia

Order code for "Output"	Output type	Intrinsically safe values	
Option A	4-20mA HART	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 5 nF	
Option B	4-20mA HART	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 5 nF	
	Pulse/frequency/switch output	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 6 nF	
Option C	4-20mA HART	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 30 nF	
	4-20mA analog		
Option D	4-20mA HART	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 5 nF	
	Pulse/frequency/switch output	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 6 nF	
	4 to 20 mA current input	U_i = DC 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 5 nF	
Option E	FOUNDATION Fieldbus	STANDARD U_i = 30 V I_i = 300 mA P_i = 1.2 W L_i = 10 µH C_i = 5 nF	FISCO U_i = 17.5 V I_i = 550 mA P_i = 5.5 W L_i = 10 µH C_i = 5 nF
	Pulse/frequency/switch output	U_i = 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 6 nF	

Order code for "Output"	Output type	Intrinsically safe values	
Option G	PROFIBUS PA	STANDARD U_i = 30 V I_i = 300 mA P_i = 1.2 W L_i = 10 µH C_i = 5 nF	FISCO U_i = 17.5 V I_i = 550 mA P_i = 5.5 W L_i = 10 µH C_i = 5 nF
	Pulse/frequency/switch output	U_i = 30 V I_i = 300 mA P_i = 1 W L_i = 0 µH C_i = 6 nF	

Remote display FHX50

Basic specification, position 1, 2 Approval	Cable specification	Basic specification, position 4 Display, Operation Option L, M
Option **GA, GB, GJ, G4, IA, IB, IJ, I4**	Max. cable length: 60 m (196.85 ft)	U_o = 7,3 V
		I_o = 327 mA
		P_o = 362 mW
		L_o = 149 µH
		C_o = 388 nF
		C_c ≤ 125 nF
		L_c ≤ 149 µH

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