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Safety Instructions
Proline Promass 300

JPN: Zone 1
Zone 0/1
Zone 21

Endress+Hauser
People for Process Automation

Proline Promass 300

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About this document

The document number of these Safety Instructions (XA) must match the information on the nameplate.

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 instrument	Documentation code			
	HART	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP
Promass A 300 (8A3B)	BA01482D	BA01515D	BA01504D	–
Promass E 300	BA01484D	BA01517D	BA01506D	BA01855D
Promass F 300	BA01485D	BA01518D	BA01507D	BA01850D
Promass H 300	BA01486D	BA01519D	BA01508D	BA01858D
Promass I 300	BA01487D	BA01520D	BA01509D	BA01859D
Promass O 300	BA01488D	BA01521D	BA01510D	BA01860D
Promass P 300	BA01489D	BA01522D	BA01511D	BA01861D
Promass Q 300	BA01490D	BA01523D	BA01512D	BA01862D
Promass S 300	BA01491D	BA01524D	BA01513D	BA01863D
Promass X 300	BA01492D	BA01525D	BA01514D	BA01864D

Measuring instrument	Documentation code				
	Modbus RS485	Modbus over Ethernet-APL	EtherNet/IP	PROFINET	PROFINET over Ethernet-APL
Promass A 300 (8A3B)	BA01493D	–	BA01699D	BA01736D	–
Promass E 300	BA01495D	BA02403D	BA01727D	BA01738D	BA02110D
Promass F 300	BA01496D	BA02404D	BA01728D	BA01739D	BA01739D
Promass H 300	BA01497D	BA02405D	BA01729D	BA01740D	BA02111D
Promass I 300	BA01498D	BA02406D	BA01730D	BA01741D	BA02112D
Promass O 300	BA01499D	BA02407D	BA01731D	BA01742D	BA02113D
Promass P 300	BA01500D	BA02408D	BA01732D	BA01743D	BA02114D
Promass Q 300	BA01501D	BA02409D	BA01733D	BA01744D	BA02116D

Measuring instrument	Documentation code				
	Modbus RS485	Modbus over Ethernet-APL	EtherNet/IP	PROFINET	PROFINET over Ethernet-APL
Promass S 300	BA01502D	BA02410D	BA01734D	BA01745D	BA02117D
Promass X 300	BA01503D	BA02411D	BA01735D	BA01746D	BA02118D

Additional documentation

Contents	Document type	Documentation code
Remote display and operating module DKX001	Special documentation	SD01763D
	Safety Instructions Ex ia, Ex tb	XA01781D
Explosion Protection	Brochure	CP00021Z/11
Ethernet-APL Installation Drawing	Installation Drawing	HE_01622

Please note the documentation associated with the device.

Certificates and declarations

JPN Type Examination Certificate

Certificate number:

CML 17JPN2346X

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

- JNIOSH-TR-46-1
- JNIOSH-TR-46-2
- JNIOSH-TR-46-6
- JNIOSH-TR-46-9
- IEC 60079-26

Manufacturer address

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

******	_	*****... *****	+	A*B*C*D*E*F*G*...
(Device type)		*(Basic specifications)*		*(Optional specifications)*

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

Device type

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

Basic specifications

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

Optional specifications

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

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

Device type

Position	Order code for	Selected option	Description
1	Instrument family	8	Coriolis flowmeter
2	Sensor	A, E, F, H, I, O, P, Q, S, X [1]	Sensor type
3	Transmitter	3	Transmitter type: 4-wire, compact version
4	Generation index	B, C	Platform generation
5, 6	Nominal diameter	Examples: 02, 04, 40, 50, 1H, 3E [2] [3]	Nominal diameter of sensor

1) For replacement transmitter only: X
2) For the exact specification of the nominal diameter, see nameplate
3) For replacement transmitter only: XX

Basic specifications

Position 1, 2 Order code for "Approval" Selected option	Position 4, 5 Order code for "Output, input 1" Selected option	Type of protection	
		Transmitter	Sensor
JC	BA, BB, GA, LA, MA, MB, NA, RA, RB, SA	Ex db ia IIB T6...T1 Ga/Gb [1] Ex tb IIIC T**°C Db [2]	Ex ia IIB T6...T1 Ga/Gb [1] Ex ia tb IIIC T**°C Db [2]
	CA, CC, HA, MC, RC, TA	Ex db ia [ia Ga] IIB T6...T1 Ga/Gb [1] Ex tb [ia Da] IIIC T**°C Db [2]	
JD	BA, BB, GA, LA, MA, MB, NA, RA, RB, SA	Ex db ia IIC T6...T1 Ga/Gb [1] Ex tb IIIC T**°C Db [2]	Ex ia IIC T6...T1 Ga/Gb [1] Ex ia tb IIIC T**°C Db [2]
	CA, CC, HA, MC, RC, TA	Ex db ia [ia Ga] IIC T6...T1 Ga/Gb [1] Ex tb [ia Da] IIIC T**°C Db [2]	

1) Sensors Promass A DN 1, Promass H DN 8 to 50, Promass I DN 8 to 80 are only suitable for equipment protection level EPL Gb.
2) The marking may be applied depending on users' applications.

Position	Order code for	Selected option	Description
4, 5	Output; input 1	BA	4-20mA HART
		CA	4-20mA HART Ex-i passive
		CC	4-20mA HART Ex-i active
		GA	PROFIBUS PA
		HA	PROFIBUS PA Ex-i
		LA	PROFIBUS DP
		MA	Modbus RS485
		MB	Modbus TCP over Ethernet-APL/SPE, 10Mbit/s
		MC	Modbus TCP over Ethernet-APL, Ex-i, 10Mbit/s
		NA	EtherNet/IP 2-port switch integrated
		RA	PROFINET IO 2-port switch integrated
		RB	PROFINET over Ethernet-APL/SPE, 10Mbit/s
		RC	PROFINET over Ethernet-APL, Ex-i, 10Mbit/s
		SA	FOUNDATION Fieldbus
		TA	FOUNDATION Fieldbus Ex-i
6	Output; input 2	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off

Position	Order code for	Selected option	Description
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		H	Relay
		I	4-20mA input
		J	Status input
7	Output; input 3	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		H	Relay
		I	4-20mA input
		J	Status input
8	Display; Operation	A	W/o; via communication
		F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
		M	Without; prepared for remote display DKX001 [1)]
		O	Separate, with remote display DKX001 [1)], 4-line, illuminated; 10 m / 30 ft cable; touch control
9	Housing	A	Alu, coated
		L	Cast, stainless
11, 12	Meas. Tube Mat., Wetted Parts Surface	LA	Stainl. steel, cryogenic -196°C/-320°F
17, 18	Device Model	A1	1
		A2	2

1) DKX001 is separately approved.

Optional specifications

ID	Order code for	Selected option	Description
Cx	Sensor option	CA	Rupture disk
Cx	Sensor option	CG	Extended neck for insulation
Cx	Sensor option	CH	Purge connection
Jx	Test, certificate	JP	Ambient temperature measuring device –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. JNIOSH-TR-NO.44)
- 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.
- Use the device only in media where the wetted materials are known to be suitable.
- 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.
- An additional assessment must be conducted to confirm that the device is suitable for installation in hybrid mixtures (explosive gas and dust occurring simultaneously).
- Only open the cover of the Ex db transmitter housing if one of the following conditions is met:
  - An explosive atmosphere is not present.
  - A waiting time of 10 minutes is observed after switching off the power supply.
    The following warning notice is on the device:
    WARNING – AFTER DE-ENERGIZING, DELAY 10 MINUTES BEFORE OPENING ENCLOSURE IN TYPE OF PROTECTION EX D

- 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).
- Avoid electrostatic charges which could result in electrostatic discharges while installing, operating, cleaning or maintaining:
  - For external non-metallic surfaces, e.g. housing, attached additional plates, RFID tag.
  - For attached external metallic parts that are not integrated into the local potential equalization system, e.g. nameplate tag, RFID tag.
  - Do not use in areas where the devices/electronic housing are exposed to highly charge-generating processes, pneumatically conveyed dusts and/or charge spraying in an electrostatic coating process.
  - Do no rub surfaces dry. Clean only with moist cloth.
  - Information on electrostatic hazards and how to minimize the generation of static electricity can be found in the technical specification IEC/TS 60079-32-1.

Safety instructions: Installation

General installation instructions

- Continuous service temperature of the connecting cable:
  −40 to +85 °C (−50 to +85 °C for optional specification, ID Jx (Test, certificate) = JP); but at least according to the operating temperature range of the application plus allowance for process conditions ($T_{a, min}$ and $T_{a, max}$ + 20 K).
- The following applies when installing the transmitter with an Ex db connection compartment:
  Only use separately certified cable glands, sealing plugs and thread adapters (Ex db IIC) that are suitable for operating temperatures from −40 to +85 °C and for IP 66/67.
  The mounted metal thread extensions and sealing plugs are tested and certified as part of the devices for the type of protection Ex db IIC. The thread extension or the sealing plug labeled as follows for identification purposes:
  - Md: M20 x 1.5
  - d or NPTd: NPT ½"
  - Gd: G ½"
- The following cable glands approved by an Ex certification body may be installed on the device (for details, contact our service center):
  - Ex d, Ex t approved cable glands, e.g. EXTC-16MG
  - Ex d approved cable glands, e.g. KXBF-20·16
- Yellow cap attached to the cable glands is a transportation measure only, and is to be removed when the delivered device is installed.
- If the third cable gland is not used, remove it and seal the thread hole with Ex d blind plug (M20 x 1.5).

- Information on our service center: Service Desk, 5-70-3 Nisshin-cho, Fuchu-shi, Tokyo-to
  Tel: 042-314-1911
  Fax: 042-314-1951
- When the measuring device is connected, attention must be paid to the type of protection at the transmitter.
- Turning the transmitter housing
  - Loosen both hexagon socket screws until the transmitter housing can be turned.
  - Turn transmitter housing to desired position (mechanically limited); if necessary turn 270° in other direction.
  - Tighten both hexagon socket screws with a maximum of 7 Nm.
- For the device with order code "Output; Input 1", option MC:
  - When using Port 1 (terminal 26/27) as a 2-WISE power load APL port with the SLAA profile, Port 2 (RJ45) must not be used for Modbus TCP.
  - Parallel operation of Port 1 (terminal 26/27) and Port 2 (RJ45) is not permitted.

Installation 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 the device is energized.

Use of cable glands, sealing plugs and thread adapters

- Only use Ex certified cable glands, sealing plugs and thread adapters that are suitable for the intended application (see nameplates).
- Plastic sealing plugs are mounted to cable entries and metallic thread extensions for temporary protection during transport and storage. These must be replaced with suitable Ex certified cable entry devices for permanent use.
- The mounted metallic thread extensions and sealing plugs are tested and certified as part of the device. These meet the device's specific requirements.
- Supplied Ex cable glands are separately certified and meet the device's specific requirements.
- All unused cable entries must be closed with suitable Ex certified sealing plugs.
- Observe selection criteria for Ex cable entry devices as per JNIOSH-TR-NO.44.

Intrinsic safety

- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. JNIOSH-TR-NO.44).
- The device's intrinsically safe input/output circuits are rated Ex ia IIC Ga. When connected to certified intrinsically safe apparatus with an Ex ib IIC Gb or Ex ib IIB Gb rating, the level of protection of the overall system becomes Ex ib IIC Gb or Ex ib IIB Gb , respectively.
- The device's intrinsically safe output circuit for remote display is rated Ex ia IIC Ga. When connected to the remote display and operating module DKX001, which is rated Ex ia IIC Gb the level of protection of the overall system becomes Ex ia IIC Gb.

Remote display and operating module DKX001

- When using the remote display and operating module DKX001 the internal display and operating module must be removed.
- When connected to a separately ordered remote display and operating module DKX001, use only the following variants: Basic specification of the remote display and operating module DKX001, order code "Approval", option JE, JF, JG
- Observe additional instructions in the Safety Instructions (XA) of the remote display and operating module DKX001.

Potential equalization

- The device must be connected to the potential equalization system using designated protective ground terminals.
- It is also possible to integrate the device into the potential equalization system through a pipe system, provided that the pipe system meets the grounding requirements of applicable national regulations.

Safety instructions: EPL Ga (Zone 0)

Install the transmitter electronics in Zone 1. For sensors with EPL Ga/Gb (Zone 0/1), the EPL Ga (Zone 0) is only permitted in the measuring tube.

Safety instructions: EPL Db (Zone 21)

- The enclosure may only be opened for brief maintenance or inspection activities where the area is confirmed to be free of combustible dust. Suitable precautions must be taken during this time to prevent dust entering the electronic compartment.
- Only use separately certified cable glands, sealing plugs and thread adapters (Ex tb IIIC) which are suitable for operating temperatures from −40 to +85 °C and for IP 66/67.
  The mounted metallic thread extensions and metallic sealing plugs are tested and certified as part of the devices for the type of protection Ex tb IIIC.
- The metal extensions and blind plugs supplied are tested and certified as part of the enclosure for explosion protection Ex tb IIIC. Plastic sealing plugs in extensions act as transport protection and have to be replaced by suitable, individually approved installation material. Supplied cable glands are separately certified and marked as components and meet device specification requirements.
- The device's intrinsically safe output circuit for remote display is rated Ex ia IIIC Da. When connected to the remote display and operating module DKX001, which is rated Ex ia IIIC Db, the level of protection of the overall system becomes Ex ia IIIC Db.
  Connection values: Signal circuits, DKX001→ 🖹 28

Temperature tables

Minimum ambient temperature

- $T_{a, min}$ = −40 °C
- *Optional specification, ID Jx (Test, Certificate) = JP*
  $T_{a, min}$ = −50 °C depending on the selected device variant (see nameplate)

Maximum ambient temperature

$T_{a, max}$ = +60 °C depending on temperature class, maximum medium temperature and device-specific features. See the corresponding temperature tables.

Minimum medium temperature

- Promass A, F, H, I, P, Q, S, X:
  $T_{m, min}$ = −50 °C
- Promass E, O:
  $T_{m, min}$ = −40 °C
- Promass F, Q with cryogenic temperature version (order code for "Measuring tube material", option LA):
  $T_{m, min}$ = −196 °C

Maximum medium temperature without thermal insulation

NOTICE

In case of heating, risk of overheating.

- ▶ On devices with Heating jacket the corresponding temperature tables for devices with thermal insulation, are to be observed.
- ▶ Make sure that the heating medium, may not exceeded the maximum specified medium temperature of the exact used temperature classes of the device.

( ) = The maximum permitted medium temperatures in brackets only apply if the sensor is installed in such a way that the transmitter is not mounted above the sensor and free convection can occur on all sides.

*Promass A (8A3B**-*..., 8A3C**-*...)*

DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
1 to 4	205	50	50	95	130	150	205	205
		60	–	95	130	150	205	205

Promass E

DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8 to 50	150	50	50	100	130	130	150	150
		55	–	80	100	130	150	150
		60	–	(80)	(100)	(130)	(150)	(150)
80	150	50	50	75	110	150	150	150
		55	–	75	110	150	150	150
		60	–	(75)	(110)	(150)	(150)	(150)

Promass F

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
08 to 15	150	50	50	95	130	150	150	150
		60	–	95	130	150	150	150
	150 [2]	50	50	95	100	150	150	150
		60	–	95	100	150	150	150

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
	240	50	50	95	130	160	240	240
		60	–	95	130	160	(240)	(240)
15 to 25	350	50	45	95	130	175	275	350
		60	–	95	130	175	275	350
25 to 50	150	50	50	95	130	150	150	150
		60	–	95	130	150	150	150
	150 [2]	50	50	95	100	150	150	150
		60	–	95	100	150	150	150
	240	50	50	95	130	160	240	240
		60	–	95	130	160	(240)	(240)
80 to 250	150	50	50	75	110	150	150	150
		60	–	75	110	150	150	150
	150 [2]	50	50	75	110	150	150	150
		60	–	75	110	150	150	150
	240	50	50	75	110	170	240	240
		60	–	75	110	170	(240)	(240)
50 to 250	350	50	45	85	120	175	275	350
		60	–	85	120	175	275	350

1) Maximum temperature range, see nameplate
2) Cryogenic temperature version: T_m = −196 to 150 °C

Promass H

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8	150	50	50	65	100	150	150	150
		60	–	65	100	150	150	150
8	205	50	50	65	100	160	205	205
		60	–	65	100	160	205	205
15 to 50	150	50	50	75	115	150	150	150
		60	–	75	115	150	150	150

DN	$T_{m, max range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
15 to 50	205	50	50	75	115	180	205	205
		60	–	75	115	180	205	205

1) Maximum temperature range, see nameplate

Promass I

DN	$T_{m, max range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8, 15, 15FB, 25	150	50	50	95	130	150	150	150
		60	–	95	120	(150)	(150)	(150)
25FB, 40, 40FB, 50	150	50	50	85	120	150	150	150
		60	–	85	120	(150)	(150)	(150)
50FB, 80	150	50	50	85	120	150	150	150
		60	–	85	120	(150)	(150)	(150)
FB = Full bore								

Promass O

DN	$T_{m, max range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
80 to 250	205	50	50	75	110	170	205	205
		55	–	75	110	170	205	205
		60	–	75	110	170	(205)	(205)

Promass P

DN	$T_{m, max range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8	150	45	45	65	100	150	150	150
		60	–	65	100	150	150	150
	205	45	45	65	100	160	205	205
		60	–	65	100	160	205	205

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
15 to 50	150	50	50	75	115	150	150	150
		60	–	75	115	150	150	150
	205	50	50	75	115	180	205	205
		60	–	75	115	180	205	205

1) Maximum temperature range, see nameplate

Promass Q

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
25 to 250	205	50	50	75	110	160	205	205
		60	–	75	110	160	205	205
25 to 250	150 [2]	50	50	75	110	150	150	150
		60	–	75	110	150	150	150

1) Maximum temperature range, see nameplate
2) Cryogenic temperature version: T_m = −196 to 150 °C

Promass S

DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8	150	45	45	65	100	150	150	150
		60	–	65	100	150	150	150
15 to 50	150	50	50	75	115	150	150	150
		60	–	75	115	150	150	150

Promass X

DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
350	180	50	50	90	120	170	180	180
		55	–	90	120	170	180	180
		60	–	(90)	(120)	(170)	(180)	(180)

Maximum medium temperature with thermal insulation according to Endress+Hauser specifications

NOTICE

In case of heating, risk of overheating.

- On devices with Heating jacket the corresponding temperature tables for devices with thermal insulation, are to be observed.
- Make sure that the heating medium, may not exceeded the maximum specified medium temperature of the exact used temperature classes of the device.

For information on the thermal insulation of the device, see the "Thermal insulation" section of the "Operating instructions" document .

( ) = The maximum permitted medium temperatures in brackets only apply if the sensor is installed in such a way that the transmitter is not mounted above the sensor and free convection can occur on all sides.

*Promass A (8A3B**-*..., 8A3C**-*...)*

DN	$T_{m,\ max\ range}$ [°C]	$T_{a,\ max}$ [°C]	$T_{m,\ max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
1 to 4	205	50	50	95	130	150	205	205
		55	–	(95)	(130)	(150)	(205)	(205)

Promass E

DN	$T_{m,\ max\ range}$ [°C]	$T_{a,\ max}$ [°C]	$T_{m,\ max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8 to 50	150	50	50	100	130	130	150	150
		55	–	(100)	(130)	(130)	(150)	(150)
80	150	45	50	75	110	150	150	150
		50	–	75	110	150	150	150
		55	–	(75)	(110)	(150)	(150)	(150)

Promass F

DN	$T_{m,\ max\ range}$ [1] [°C]	$T_{a,\ max}$ [°C]	$T_{m,\ max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
08 to 15	150	50	50	95	130	150	150	150
		60	–	95	110	(150)	(150)	(150)

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
	150 [2]	50	50	95	130	150	150	150
		55	–	95	(130)	(150)	(150)	(150)
		60	–	95	110	110	110	110
	240	50	50	95	130	160	240	240
		55	–	95	(130)	(160)	(240)	(240)
		60	–	95	110	110	110	110
15 to 25	350	50	45	95	130	175	275	350
		60	–	95	130	175	275	350
25 to 50	150	50	50	95	130	150	150	150
		60	–	95	110	(150)	(150)	(150)
	150 [2]	50	50	95	130	150	150	150
		55	–	95	(130)	(150)	(150)	(150)
		60	–	95	110	110	110	110
	240	50	50	95	130	160	240	240
		55	–	95	(130)	(160)	(240)	(240)
		60	–	95	110	110	110	110
80 to 250	150	50	50	75	110	150	150	150
		60	–	75	110	(150)	(150)	(150)
	150 [2]	50	50	75	110	150	150	150
		55	–	75	110	150	150	150
		60	–	75	110	110	110	110
	240	50	50	75	110	170	240	240
		55	–	75	110	(170)	(240)	(240)
		60	–	75	110	110	110	110
50 to 250	350	50	45	85	120	175	275	350
		60	–	85	120	175	275	350

1) Maximum temperature range, see nameplate
2) Cryogenic temperature version: T_m = −196 to 150 °C

Promass H

DN	$T_{m, max\ range}$ [1] [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8	150	50	50	65	100	150	150	150
		55	–	65	100	(150)	(150)	(150)
		60	–	65	100	100	100	100
8	205	50	50	65	100	160	205	205
		55	–	65	100	(160)	(205)	(205)
		60	–	65	100	100	100	100
15 to 50	150	50	50	75	115	150	150	150
		55	–	75	115	(150)	(150)	(150)
		60	–	75	115	115	115	115
15 to 50	205	50	50	75	115	180	205	205
		55	–	75	115	(180)	(205)	(205)
		60	–	75	115	115	115	115

1) Maximum temperature range, see nameplate

Promass I

DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8, 15, 15FB, 25	150	50	50	95	130	150	150	150
		60	–	95	120	(150)	(150)	(150)
25FB, 40, 40FB, 50	150	50	50	85	120	150	150	150
		60	–	85	120	(150)	(150)	(150)
50FB, 80	150	50	50	85	120	150	150	150
		60	–	85	120	(150)	(150)	(150)
FB = Full bore								

Promass O

DN	$T_{m, max range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
80 to 250	205	50	50	75	110	170	205	205
		55	–	(75)	(110)	(170)	(205)	(205)

Promass P

DN	$T_{m, max range}$ [°C] [1]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8	150	45	45	65	100	150	150	150
		50	–	65	100	150	150	150
		60	–	65	100	125	(150)	(150)
	205	45	45	65	100	160	205	205
		50	–	65	100	160	205	205
		60	–	65	100	115	(205)	(205)
15 to 50	150	50	50	75	115	150	150	150
		60	–	75	115	125	(150)	(150)
	205	50	50	75	115	180	205	205
		60	–	75	115	(150)	(150)	(150)

1) Maximum temperature range, see nameplate

Promass Q

DN	$T_{m, max range}$ [°C] [1]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
25 to 250	205	50	50	75	110	160	205	205
		55	–	(75)	(110)	(160)	(205)	(205)
25 to 250	150 [2]	50	50	75	110	150	150	150
		55	–	(75)	(110)	(150)	(150)	(150)

1) Maximum temperature range, see nameplate
2) Cryogenic temperature version: T_m = −196 to 150 °C

Promass S

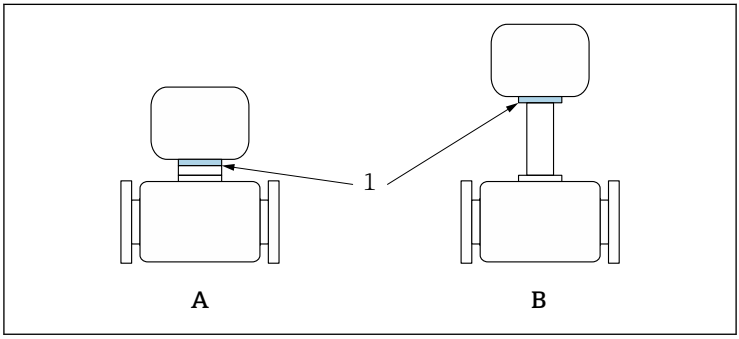
DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
8	150	45	45	65	100	150	150	150
		50	–	65	100	150	150	150
		60	–	65	100	125	(150)	(150)
15 to 50	150	50	50	75	115	150	150	150
		60	–	75	115	125	(150)	(150)

Promass X

DN	$T_{m, max\ range}$ [°C]	$T_{a, max}$ [°C]	$T_{m, max}$ [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
350	180	50	50	90	120	170	180	180
		55	–	(90)	(120)	(170)	(180)	(180)

Maximum medium temperature for devices with thermal insulation NOT in accordance with Endress+Hauser specifications

The specified reference temperature T_{ref} and the maximum medium temperature $T_{m, max}$ for each temperature class must not be exceeded.
→ 19



1 *Position of reference point for temperature measurement*

A Standard version
B Extended temperature version, cryogenic temperature version, high-temperature version
1 Reference point (T_{ref})

Reference temperature T_{ref}

T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
59	72	75	76	77	77

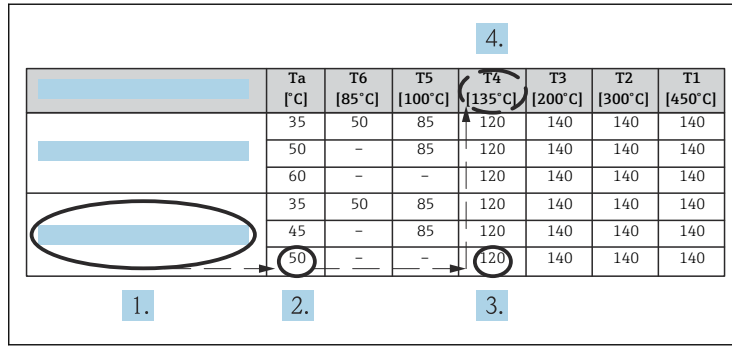
Explosion hazards arising from gas and dust

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 $T_{a, max}$ and the maximum medium temperature $T_{m, max}$.
- In the case of dust: Determine the maximum surface temperature as a function of the maximum ambient temperature $T_{a, max}$ and the maximum medium temperature $T_{m, max}$.

Example

- Measured maximum ambient temperature: $T_{a, max}$ = 47 °C
- Measured maximum medium temperature: $T_{m, max}$ = 108 °C



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2 *Procedure for determining the temperature class and surface temperature*

1. Select device (optional).
2. In the column for the maximum ambient temperature $T_{a, max}$ select the temperature that is immediately greater than or equal to the maximum ambient temperature $T_{a, max}$ that is present.
   ↳ $T_{a, max}$ = 50 °C.
   The row showing the maximum medium temperature is determined.
3. Select the maximum medium temperature $T_{m,max}$ of this row, which is immediately greater than or equal to the maximum medium temperature $T_{m, max}$ that is present.
   ↳ The column with the temperature class for gas is determined: 108 °C ≤ 120 °C → T4.
4. The maximum temperature of the temperature class determined corresponds to the maximum surface temperature for dust: T4 = 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.

Terminal assignment

Transmitter: supply voltage, input/outputs

HART

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Service interface (Port 2)
1 (+)	2 (–)	26 (+)	27 (-)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

FOUNDATION fieldbus

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Service interface (Port 2)
1 (+)	2 (–)	26 (A)	27 (B)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

PROFIBUS DP

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Service interface (Port 2)
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

PROFIBUS PA

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Service interface (Port 2)
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

Modbus RS485

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Service interface (Port 2)
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

Modbus TCP

Supply voltage		Input/output 1 1 (Port [1)])		Input/output 2		Input/output 3		Service interface (Port 2) [1)]
1 (+)	2 (–)	26 (+)	27 (-)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

1) For Modbus TCP communication, either port 1 OR port 2 can be used.

PROFINET

Supply voltage		Input/output 1 (Port 1) [1)]	Input/output 2		Input/output 3		Service interface (Port 2) [1)]
1 (+)	2 (–)	RJ45	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
			Device-specific terminal assignment: adhesive label in terminal cover.				

1) Port can be used for communication or as a service interface (CDI-RJ45).

PROFINET over Ethernet-APL

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Service interface (Port 2 [1)])
1 (+)	2 (–)	26 (+)	27 (-)	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
				Device-specific terminal assignment: adhesive label in terminal cover.				

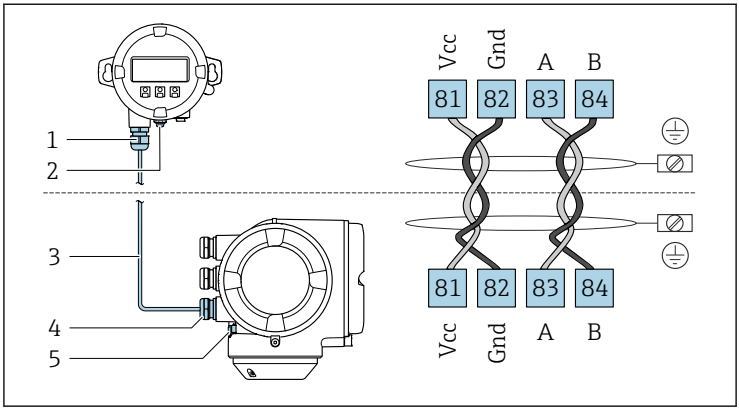
1) No PROFINET communication available on port 2

Ethernet/IP

Supply voltage		Input/output 1 (Port 1) [1]	Input/output 2		Input/output 3		Service interface (Port 2) [1]
1 (+)	2 (–)	RJ45	24 (+)	25 (–)	22 (+)	23 (–)	CDI-RJ45
			Device-specific terminal assignment: adhesive label in terminal cover.				

1) Port can be used for communication or as a service interface (CDI-RJ45).

Remote display and operating module DKX001



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1 Remote display and operating module DKX001
2 Protective earth (PE)
3 Connecting cable
4 Measuring device
5 Protective earth (PE)

Safety-related values

Order code for "Output; input 1"	Output type	Safety-related values	
		Output; input 1 (Port 1)	Service interface (Port 2)
Option **BA**	Current output 4-20 mA HART	U_N = 30 V_{DC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **GA**	PROFIBUS PA	U_N = 32 V_{DC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **LA**	PROFIBUS DP	U_N = 5 V U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}

Order code for "Output; input 1"	Output type	Safety-related values	
		Output; input 1 (Port 1)	Service interface (Port 2)
Option **MA**	Modbus RS485	U_N = 5 V U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **MB**	Modbus TCP over Ethernet-APL 10 Mbit/s, SPE 10 Mbit/s, Ethernet 100 Mbit/s	APL port profile SLAX SPE PoDL classes 10, 11, 12 U_N = 30 V_{DC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **NA**	EtherNet/IP	U_N = 3.3 V_{AC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **RA**	PROFINET	U_N = 3.3 V_{AC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **RB**	PROFINET over Ethernet-APL/SPE, 10Mbit/s	APL port profile SLAX SPE PoDL classes 10, 11, 12 U_N = 30 V_{DC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}
Option **SA**	FOUNDATION Fieldbus	U_N = 32 V_{DC} U_M = 250 V_{AC}	U_N = 3.3 V_{AC} U_M = 250 V_{AC}

Order code for "Output; input 2" "Output; input 3"	Output type	Safety-related values	
		Output; input 2	Output; input 3
Option **B**	Current output 4-20 mA	U_N = 30 V_{DC} U_M = 250 V_{AC}	
Option **D**	Configurable I/O initial setting off	U_N = 30 V_{DC} U_M = 250 V_{AC}	
Option **E**	Pulse/frequency/switch output	U_N = 30 V_{DC} U_M = 250 V_{AC}	
Option **F**	Double pulse output	U_N = 30 V_{DC} U_M = 250 V_{AC}	
Option **H**	Relay output	U_N = 30 V_{DC} I_N =100 mA_{DC}/500 mA_{AC} U_M = 250 V_{AC}	
Option **I**	Current input 4-20 mA	U_N = 30 V_{DC} U_M = 250 V_{AC}	
Option **J**	Status input	U_N = 30 V_{DC} U_M = 250 V_{AC}	

Intrinsically safe values

Order code for "Output; input 1"	Output type	Intrinsically safe values	
		Output; input 1 (Port 1)	Service interface (Port 2)
Option CA	Current output 4-20mA HART Ex-i passive	**Ex ia** U_i = 30 V I_i = 100 mA P_i = 1.25 W L_i = 0 µH C_i = 6 nF	**Ex ia** U_i = 10 V I_i = n. a. P_i = n. a. L_i = 0 µH C_i = 200 nF
Option CC	Current output 4-20mA HART Ex-i active	**Ex ia** U_0 = 21.8 V I_0 = 90 mA P_0 = 491 mW L_0 = 4.1 mH(IIC)/15 mH(IIB) C_0 = 160 nF(IIC)/1 160 nF(IIB) U_i = 30 V I_i = 10 mA P_i = 0.3 W L_i = 5 µH C_i = 6 nF	**Ex ia** U_i = 10 V I_i = n. a. P_i = n. a. L_i = 0 µH C_i = 200 nF
Option HA	PROFIBUS PA Ex i (STANDARD + FISCO)	**Ex ia** U_i = 30 V I_i = 570 mA P_i = 8.5 W L_i = 10 µH C_i = 5 nF	**Ex ia** U_i = 10 V I_i = n. a. P_i = n. a. L_i = 0 µH C_i = 200 nF

Order code for "Output; input 1"	Output type	Intrinsically safe values	
		Output; input 1 (Port 1)	Service interface (Port 2)
Option MC	Modbus TCP over Ethernet-APL, Ex-i, 10Mbit/s	**2-WISE power load, APL port profile SLAA** [1] **Ex ia** U_i = 17.5 V I_i = 380 mA P_i = 5.32 W L_i = 10 µH C_i = 5 nF **Cable specifications according to 2-WISE:** R_c = 15 to 150 Ω/km L_c = 0.4 to 1 mH/km C_c = 45 to 200 nF/km C_c = C_c line/line + 0,5 C_c line/screen, if both lines are floating, or C_c = C_c line/line + C_c line/screen, if the screen is connected to one line Length of cable (not including cable stubs): ≤ 200 m (656.2 ft) Length of cable stubs: ≤1 m (3.3 ft)	**Ex ia** U_i = 10 V I_i = n. a. P_i = n. a. L_i = 0 µH C_i = 200 nF
Option RC	PROFINET over Ethernet-APL, Ex-i, 10Mbit/s	**2-WISE power load, APL port profile SLAA** [1] **Ex ia** U_i = 17.5 V I_i = 380 mA P_i = 5.32 W L_i = 10 µH C_i = 5 nF **Cable specifications according to 2-WISE:** R_c = 15 to 150 Ω/km L_c = 0.4 to 1 mH/km C_c = 45 to 200 nF/km C_c = C_c line/line + 0,5 C_c line/screen, if both lines are floating, or C_c = C_c line/line + C_c line/screen, if the screen is connected to one line Length of cable (not including cable stubs): ≤ 200 m (656.2 ft) Length of cable stubs: ≤1 m (3.3 ft)	**Ex ia** U_i = 10 V I_i = n. a. P_i = n. a. L_i = 0 µH C_i = 200 nF
Option TA	FOUNDATION Fieldbus Ex i (STANDARD + FISCO)	**Ex ia** U_i = 30 V I_i = 570 mA P_i = 8.5 W L_i = 10 µH C_i = 5 nF	**Ex ia** U_i = 10 V I_i = n. a. P_i = n. a. L_i = 0 µH C_i = 200 nF

1) For further options see Ethernet-APL Installation Drawing HE_01622.

Order code for "Output; input 2" "Output; input 3"	Output type	Intrinsically safe values	
		Output; input 2	Output; input 3
Option C	Current output 4-20mA Ex-i passive	**Ex ia** U_i = 30 V I_i = 100 mA P_i = 1.25 W L_i = 0 C_i = 0	
Option G	Pulse/frequency/switch output Ex-i passive	**Ex ia** U_i = 30 V I_i = 100 mA P_i = 1.25 W L_i = 0 C_i = 0	

Remote display and operating module DKX001

A connecting cable with a ratio L_{cable}/R_{cable} = 0.024 mH/Ω and $C_{cable} \leq 600$ µF must be used when connecting the device with the remote display and operating module DKX001 or ODKX001. The connecting cable supplied by Endress+Hauser meets these requirements.

Basic specifications Position 1, 2 Order code for "Approval" Selected option	Terminal assignment	Basic specifications Position 8 Order code "Display; operation" Option O
Option [1] **JC, JD**	81, 82, 83, 84	U_0 = 3.9 V I_0 = 1.5 A P_0 = 600 mW L_0 = 0 C_0 = 670 µF

1) If the DKX001 is ordered separately: JE, JF, JG

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