

Safety Instructions

Proline Promag 500

JPN: Zone 1
Zone 21



Proline Promag 500

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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	Modbus RS485
Promag H 500	BA01398D	BA01479D	BA01404D	BA01866D	BA01401D
Promag P 500	BA01399D	BA01480D	BA01405D	BA01867D	BA01402D
Promag W 500	BA01400D	BA01481D	BA01406D	BA01868D	BA01403D

Measuring instrument	Documentation code			
	EtherNet/IP	PROFINET	PROFINET over Ethernet-APL	Modbus TCP over Ethernet-APL
Promag H 500	BA01720D	BA01723D	BA02106D	BA02394D
Promag P 500	BA01721D	BA01724D	BA02105D	BA02395D
Promag W 500	BA01722D	BA01725D	BA02104D	BA02396D

Additional documentation

Contents	Document type	Documentation code
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 17JPN2348X (Proline 500 – digital)
- CML 17JPN2347X (Proline 500)

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

- JNIO SH-TR-46-1
- JNIO SH-TR-46-2
- JNIO SH-TR-46-5
- JNIO SH-TR-46-6
- JNIO SH-TR-46-9

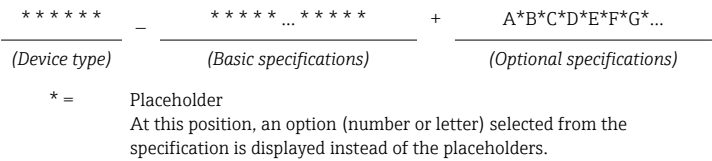
Manufacturer
address

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



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

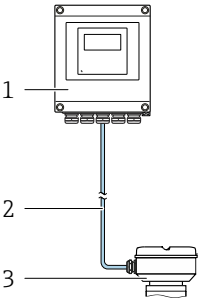
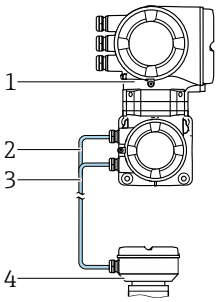
second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

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	5	Electromagnetic flowmeter
2	Sensor	H, P, W ¹⁾	Sensor type
3	Transmitter	5	Transmitter type: 4-wire, remote version
4	Generation index	B	Platform generation
5, 6	Nominal diameter	Examples: 02, 04, 40, 50, 1H, 1Z, T0, E4 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

Proline 500 – digital	Proline 500
Order code for "Integrated ISEM Electronic", option A "Sensor"	Order code for "Integrated ISEM Electronic", option B "Transmitter"
 1 Transmitter 2 Connecting cable 3 Sensor connection housing with integrated ISEM	 1 Transmitter with integrated ISEM 2 Coil current cable 3 Signal cable 4 Sensor connection housing

Basic specifications

Position 1, 2 Order code for "Approval" Selected option	Position 10 ¹⁾ Order code for "Integrated ISEM electronics" Selected option	Type of protection	
		Transmitter	Sensor
JD ²⁾	B	Ex db eb [ia Ga] IIC T6...T5 Gb Ex tb [ia Da] IIIC T85°C Db ³⁾	Ex eb ia IIC T6...T1 Gb (Sensor connection housing) Ex ia tb IIIC T**°C Db (Sensor connection housing) ³⁾ Ex eb ia IIC T6...T1 Gb (Sensor) Ex ia tb IIIC T**°C Db (Sensor) ³⁾
JJ	A	Non-Ex ⁴⁾	Ex db ia IIC T6...T1 Gb (Sensor connection housing) Ex ia tb IIIC T**°C Db (Sensor connection housing) ³⁾ Ex eb ia IIC T6...T1 Gb (Sensor) Ex ia tb IIIC T**°C Db (Sensor) ³⁾
J8 ²⁾	B	Ex db eb [ia Ga] IIC T6...T5 Gb	Ex eb ia IIC T6...T1 Gb (Sensor connection housing) Ex eb ia IIC T6...T1 Gb (Sensor)

- 1) Promag W 500: Position 11
 2) Connection compartment of the transmitter Ex db
 3) The marking may be applied depending on users' applications
 4) The transmitter is located in a non-hazardous area.

Position ¹⁾	Order code for	Selected option	Description
4, 5 (5,6) ²⁾	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

Position ¹⁾	Order code for	Selected option	Description
		TA	FOUNDATION Fieldbus Ex-i
6 (7) ³⁾	Output; input 2	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
7 (8) ³⁾	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 (9) ³⁾	Output; input 4 ⁴⁾	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		G	Pulse/frequency/switch output Ex-i passive
		H	Relay
		I	4-20mA input
		J	Status input
9 (10) ³⁾	Display; Operation	F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
10 (11) ³⁾	Integrated ISEM Electronic	A	Sensor

Position ¹⁾	Order code for	Selected option	Description
		B	Transmitter
11 (12) ³⁾	Transmitter Housing	A	Alu, coated
		D	Polycarbonate
		L	Cast, stainless
12 (13) ³⁾	Sensor junction Housing	A	Alu, coated
		B	Stainless
		L	Cast, stainless
14 (15)	Liner	A	PFA
		E	PTFE
		H	Hard rubber
		Q	PTFE 90°C
		U	Polyurethane
21, 22 (22, 23)	Device Model	A1	1
		A2	2

- 1) Position in brackets: Promag W 500
- 2) For sensor only, "XX" is described
- 3) For sensor only, "X" is described
- 4) The order code "Output; input 4" is only available for the Proline 500 – digital transmitter.

Optional specifications

ID	Order code for	Selected option	Description
Cx	Sensor option	CG	Extended neck for insulation ¹⁾
Cx	Sensor option	CI	Fluid Temperature Probe ²⁾
Jx	Test, certificate	JN	Ambient temperature transmitter –50 °C

- 1) Only for Promag W and Promag P available
- 2) Only for Promag H available

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. JNIOH-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).
- For the device with order code "Integrated ISEM Electronic", option A "Sensor", only open the cover of the Ex db sensor connection 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
- For devices with order code "Integrated ISEM electronics", Option B "Transmitter", only open the cover of the Ex db sensor connection 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 not 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) = JN); 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 devices with order code "Approval", option JD, J8 (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.
- For devices with order code "Sensor connection housing", option B:
To maintain the required degree of ingress protection, ensure that the cover seal of the sensor connection housing is flat and free of bends or distortions before securing the cover. Replace any damaged or non-flat seals prior to reassembly.
- 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 JN10SH-TR-NO.44.

Intrinsic safety

- Observe the guidelines for interconnecting intrinsically safe circuits (e.g. JNIOHS-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.
- Proline 500 (order code for "Integrated ISEM electronics", option B)
Connecting cables between the transmitter and sensor with a maximum length of 200 m must meet the following requirements:
 - Maximum cable capacitance C_{cable} : 0.42 nF/m
 - Maximum cable inductance L_{cable} : 1 $\mu\text{H/m}$
- The supplied connecting cable meets all the above requirements.

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 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.
- Cable routing shall be arranged so that the cables are not exposed to friction effects and static buildup due to the passage of dust. Precautions shall be taken to prevent the build-up of static on surfaces of cables.

Temperaturtabell en Proline 500 - digital

Order code for "Integrated ISEM electronics", option A

Minimum ambient temperature

- $T_{a, \min} = -40\text{ °C}$ depending on the selected device version (see nameplate!).
- *Optional specification, ID Jx (Test, Certificate) = JN*
 $T_{a, \min} = -50\text{ °C}$ depending on the selected device variant (see nameplate!)

Maximum ambient temperature

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

Transmitter: Non-hazardous area

Transmitter housing material	$T_{a, \max}\text{ [°C]}$			
	Non-hazardous area ¹⁾	T6 [85 °C]	T5 [100 °C]	T4 [135 °C]
Aluminum	60	–	45	60
Polycarbonate	60	–	–	–

1) The transmitter is located in the non-hazardous area

Minimum medium temperature

$T_{m, \min} = -40\text{ to }0\text{ °C}$ depending on the selected device version (see nameplate!)

Maximum medium temperature for devices without thermal insulation or with thermal insulation in accordance with Endress +Hauser specifications

Promag H

DN	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]
Without thermal insulation							
2....150	35	80 ¹⁾	95	130	150	150	150
	45	80 ¹⁾	95	135	135	135	135
	60 ²⁾	80 ¹⁾	95	115	115	115	115

- 1) $T_{m, \max} = 50\text{ °C}$ for optional specification, ID Cx (Sensor option) = CI (Fluid Temperature Probe)
2) $T_{a, \max} = 50\text{ °C}$ for optional specification, ID Cx (Sensor option) = CI (Fluid Temperature Probe)

Promag P

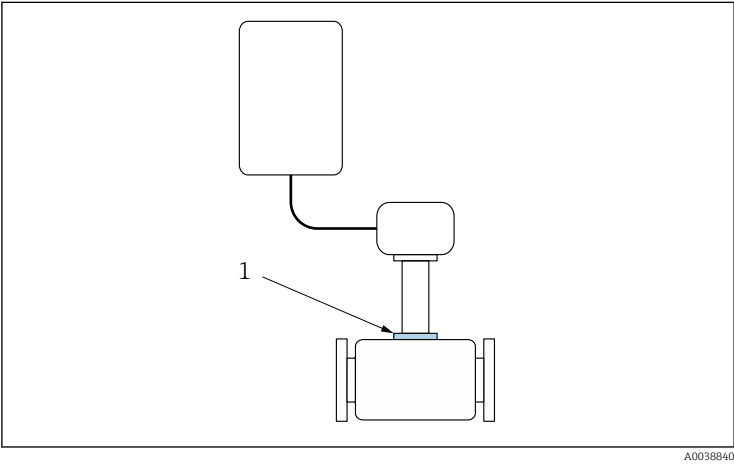
DN	Liner	T _{a, max} [°C]	T _{m, max} [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
Without thermal insulation								
15...600	PTFE	60	80	95	130	130	130	130
25...200	PFA	50	80	95	130	150	150	150
		60	80	95	130	130	130	130
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation								
15...300	PTFE	60	70	95	130	130	130	130
25...200	PFA	60	75	95	130	150	150	150

Promag W

DN	Liner	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]
Without thermal insulation								
15...300	PTFE	60	80	95	130	130	130	130
50...3000	Hard rubber	60	80	80	80	80	80	80
25...1000	PU	50	50	50	50	50	50	50
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation								
15...300	PTFE	60	70	95	130	130	130	130
50...300	Hard rubber	60	75	80	80	80	80	80
25...300	PU	50	50	50	50	50	50	50

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
→  14.



 1 for insulation: position of reference point for temperature measurement
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]
63.8	65.7	69.0	70.9	70.9	70.9

Temperaturtabellen Proline 500

Order code for "Integrated ISEM electronics", option B

Minimum ambient temperature

- $T_{a, \min} = -40\text{ °C}$ depending on the selected device version (see nameplate!).
- *Optional specification, ID Jx (Test, Certificate) = JN*
 $T_{a, \min} = -50\text{ °C}$ depending on the selected device variant (see nameplate)

Maximum ambient temperature

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

Transmitter:

$T_{a, \max}\text{ [°C]}$		
T6 [85 °C]	T5 [100 °C]	T4 [135 °C]
-	55	60

Minimum medium temperature

$T_{m, \min} = -40\text{ to }0\text{ °C}$ depending on the selected device version (see nameplate!)

Maximum medium temperature for devices without thermal insulation or with thermal insulation in accordance with Endress+Hauser specifications

Promag H

DN	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]
Without thermal insulation							
2....150	45	80 ¹⁾	95	130	150	150	150
	55 ²⁾	80 ¹⁾	95	130	130	130	130
	60 ²⁾	80 ¹⁾	95	110	110	110	110

- 1) $T_{m, \max} = 50\text{ °C}$ for optional specification, ID Cx (Sensor option) = CI (Fluid Temperature Probe)
2) $T_{a, \max} = 50\text{ °C}$ for optional specification, ID Cx (Sensor option) = CI (Fluid Temperature Probe)

Promag P

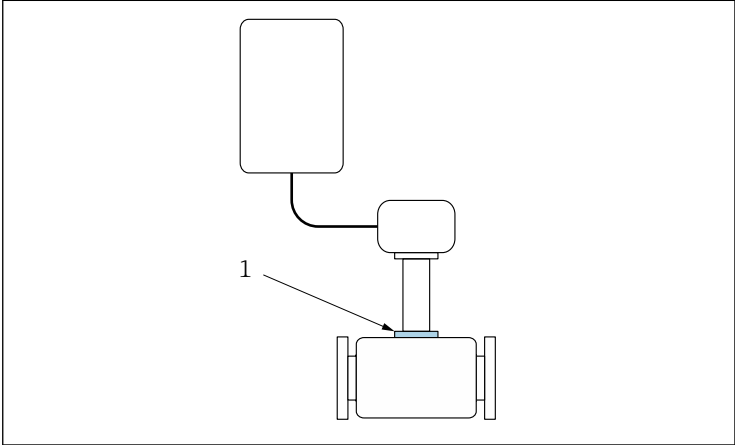
DN	Liner	T _{a, max} [°C]	T _{m, max} [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
Without thermal insulation								
15...600	PTFE	60	80	95	130	130	130	130
25...200	PFA	50	80	95	130	150	150	150
		60	80	95	130	130	130	130
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation								
15...300	PTFE	60	80	95	130	130	130	130
25...200	PFA	60	80	95	130	150	150	150

Promag W

DN	Liner	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]
Without thermal insulation								
15...300	PTFE	60	80	95	130	130	130	130
50...3000	Hard rubber	60	80	80	80	80	80	80
25...1000	PU	50	50	50	50	50	50	50
Extended neck for insulation (Optional specification, ID Cx (Sensor Option) = CG), with or without thermal insulation								
15...300	PTFE	60	75	95	130	130	130	130
50...300	Hard rubber	60	75	80	80	80	80	80
25...300	PU	50	50	50	50	50	50	50

**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.
→  17



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 2 for insulation: position of reference point for temperature measurement
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]
63.8	65.7	69.0	69.0	69.0	69.0

**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: $T_{a, max} = 63\text{ °C}$
- Measured maximum medium temperature: $T_{m, max} = 108\text{ °C}$

3.

T_a [°C]	T_6 [85 °C]	T_5 [100 °C]	T_4 [135 °C]	T_3 [200 °C]	T_2 [300 °C]	T_1 [450 °C]
40	80	95	130	150	150	150
55	-	95	130	150	150	150
60	-	95	130	150	150	150

1.2.

A0031267

 3 Procedure for determining the temperature class and surface temperature

- 1.**

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.

↳ $T_{a, \max} = 60\text{ °C}$.
The row showing the maximum medium temperature is determined.
- 2.**

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:
 $108\text{ °C} \leq 130\text{ °C} \rightarrow T_4$.
- 3.**

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

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		Input/output 4 ¹⁾		Service interface (Port 2)
1 (+)	2 (-)	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	CDI-RJ45
Device-specific terminal assignment: adhesive label in terminal cover.										

1) Input/output only available for Proline 500 - digital.

FOUNDATION fieldbus

Supply voltage		Input/output 1 (port 1)		Input/output 2		Input/output 3		Input/output 4 ¹⁾		Service interface (Port 2)
1 (+)	2 (-)	26 (A)	27 (B)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	CDI-RJ45
Device-specific terminal assignment: adhesive label in terminal cover.										

1) Input/output only available for Proline 500 - digital.

PROFIBUS DP

Supply voltage		Input/output 1 (port 1)		Input/output 2		Input/output 3		Input/output 4 ¹⁾		Service interface (Port 2)
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	CDI-RJ45
Device-specific terminal assignment: adhesive label in terminal cover.										

1) Input/output only available for Proline 500 - digital.

PROFIBUS PA

Supply voltage		Input/output 1 (port 1)		Input/output 2		Input/output 3		Input/output 4 ¹⁾		Service interface (Port 2)
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	
Device-specific terminal assignment: adhesive label in terminal cover.										

1) Input/output only available for Proline 500 - digital.

Modbus RS485

Supply voltage		Input/output 1 (port 1)		Input/output 2		Input/output 3		Input/output 4 ¹⁾		Service interface (Port 2)
1 (+)	2 (-)	26 (B)	27 (A)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	
Device-specific terminal assignment: adhesive label in terminal cover.										

1) Input/output only available for Proline 500 - digital.

Modbus TCP

Supply voltage		Input/output 1 (Port 1 ¹⁾)		Input/output 2		Input/output 3		Input/output 4 ²⁾		Service interface (Port 2) ¹⁾
1 (+)	2 (-)	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	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.
- 2) Input/output only available for Proline 500 - digital.

PROFINET

Supply voltage		Input/output 1 (Port 1) ¹⁾	Input/output 2		Input/output 3		Input/output 4 ²⁾		Service interface (Port 2) ¹⁾
1 (+)	2 (-)	RJ45	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	
			Device-specific terminal assignment: adhesive label in terminal cover.						

- 1) Port can be used for communication or as a service interface (CDI-RJ45).
- 2) Input/output only available for Proline 500 - digital.

PROFINET over Ethernet-APL

Supply voltage		Input/output 1 (Port 1)		Input/output 2		Input/output 3		Input/output 4 ¹⁾		Service interface (Port 2 ²⁾)
1 (+)	2 (-)	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	CDI-RJ45
Device-specific terminal assignment: adhesive label in terminal cover.										

1) Input/output only available for Proline 500 - digital.

2) No PROFINET communication available on port 2

Ethernet/IP

Supply voltage		Input/output 1 (Port 1) ¹⁾	Input/output 2		Input/output 3		Input/output 4 ²⁾		Service interface (Port 2) ¹⁾
1 (+)	2 (-)	RJ45	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)	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).

2) Input/output only available for Proline 500 - digital.

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	$U_N = 5 V$ $U_M = 250 V_{AC}$	$U_N = 3.3 V_{AC}$ $U_M = 250 V_{AC}$
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	$U_N = 3.3 V_{AC}$ $U_M = 250 V_{AC}$	$U_N = 3.3 V_{AC}$ $U_M = 250 V_{AC}$

Order code for "Output; input 1"	Output type	Safety-related values	
		Output; input 1 (Port 1)	Service interface (Port 2)
Option RB	PROFINET over Ethernet- APL/SPE, 10Mbit/s	APL port profile SLAX SPE PoDL classes 10, 11, 12 $U_N = 30\text{ V}_{DC}$ $U_M = 250\text{ V}_{AC}$	$U_N = 3.3\text{ V}_{AC}$ $U_M = 250\text{ V}_{AC}$
Option SA	FOUNDATION Fieldbus	$U_N = 32\text{ V}_{DC}$ $U_M = 250\text{ V}_{AC}$	$U_N = 3.3\text{ V}_{AC}$ $U_M = 250\text{ V}_{AC}$

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

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 ic Ex ia ¹⁾ $U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 6 \text{ nF}$	Ex ia ¹⁾ $U_i = 10 \text{ V}$ $I_i = n. a.$ $P_i = n. a.$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 200 \text{ nF}$
		$U_i = 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 1.25 \text{ W}$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 6 \text{ nF}$	Non-intrinsically safe ²⁾
Option CC	Current output 4-20mA HART Ex-i active	Ex ia ¹⁾ $U_0 = 21.8 \text{ V}$ $I_0 = 90 \text{ mA}$ $P_0 = 491 \text{ mW}$ $L_0 = 4.1 \text{ mH(IIC)}/15 \text{ mH(IIB)}$ $C_0 = 160 \text{ nF(IIC)}/1 160 \text{ nF(IIB)}$ $U_i = 30 \text{ V}$ $I_i = 10 \text{ mA}$ $P_i = 0.3 \text{ W}$ $L_i = 5 \text{ } \mu\text{H}$ $C_i = 6 \text{ nF}$	Ex ia ¹⁾ $U_i = 10 \text{ V}$ $I_i = n. a.$ $P_i = n. a.$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 200 \text{ nF}$
		$U_0 = 21.8 \text{ V}$ $I_0 = 90 \text{ mA}$ $P_i = 491 \text{ mW}$ $L_0 = 9 \text{ mH(IIC)}/39 \text{ mH(IIB)}$ $C_0 = 600 \text{ nF(IIC)}/4 000 \text{ nF(IIB)}$ $U_i = 30 \text{ V}$ $I_i = 10 \text{ mA}$ $P_i = 0.3 \text{ W}$ $C_i = 6 \text{ nF}$	Non-intrinsically safe ²⁾
Option HA	PROFIBUS PA Ex i (STANDARD + FISCO)	Ex ia ¹⁾ $U_i = 30 \text{ V}$ $I_i = 570 \text{ mA}$ $P_i = 8.5 \text{ W}$ $L_i = 10 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$	Ex ia ¹⁾ $U_i = 10 \text{ V}$ $I_i = n. a.$ $P_i = n. a.$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 200 \text{ nF}$
			Non-intrinsically safe ²⁾

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 SLAA³⁾ Ex ia¹⁾ $U_i = 17.5 \text{ V}$ $I_i = 380 \text{ mA}$ $P_i = 5.32 \text{ W}$ $L_i = 10 \text{ }\mu\text{H}$ $C_i = 5 \text{ nF}$ Cable specifications according to 2-WISE: $R_c = 15 \text{ to } 150 \text{ }\Omega/\text{km}$ $L_c = 0.4 \text{ to } 1 \text{ mH/km}$ $C_c = 45 \text{ to } 200 \text{ nF/km}$ $C_c = C_c \text{ line/line} + 0.5 C_c \text{ line/screen}$, if both lines are floating, or $C_c = C_c \text{ line/line} + C_c \text{ line/screen}$, if the screen is connected to one line Length of cable (not including cable stubs): $\leq 200 \text{ m (656.2 ft)}$ Length of cable stubs: $\leq 1 \text{ m (3.3 ft)}$	Ex ia¹⁾ $U_i = 10 \text{ V}$ $I_i = \text{n. a.}$ $P_i = \text{n. a.}$ $L_i = 0 \text{ }\mu\text{H}$ $C_i = 200 \text{ nF}$
		2-WISE power load, APL port profile SLAC³⁾ $U_i = 17.5 \text{ V}$ $I_i = 380 \text{ mA}$ $P_i = 5.32 \text{ W}$ $L_i = 10 \text{ }\mu\text{H}$ $C_i = 5 \text{ nF}$ Cable specifications according to 2-WISE: $R_c = 15 \text{ to } 150 \text{ }\Omega/\text{km}$ $L_c = 0.4 \text{ to } 1 \text{ mH/km}$ $C_c = 45 \text{ to } 200 \text{ nF/km}$ $C_c = C_c \text{ line/line} + 0.5 C_c \text{ line/screen}$, if both lines are floating, or $C_c = C_c \text{ line/line} + C_c \text{ line/screen}$, if the screen is connected to one line Length of cable (not including cable stubs): $\leq 200 \text{ m (656.2 ft)}$ Length of cable stubs: $\leq 1 \text{ m (3.3 ft)}$	Non-intrinsically safe ²⁾

Order code for "Output; input 1"	Output type	Intrinsically safe values	
		Output; input 1 (Port 1)	Service interface (Port 2)
Option RC	PROFINET over Ethernet-APL, Ex-i, 10Mbit/s	2-WISE power load, APL port profile SLAA ³⁾ Ex ia ¹⁾ $U_i = 17.5 \text{ V}$ $I_i = 380 \text{ mA}$ $P_i = 5.32 \text{ W}$ $L_i = 10 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$ Cable specifications according to 2-WISE: $R_c = 15 \text{ to } 150 \text{ } \Omega/\text{km}$ $L_c = 0.4 \text{ to } 1 \text{ mH/km}$ $C_c = 45 \text{ to } 200 \text{ nF/km}$ $C_c = C_c \text{ line/line} + 0.5 C_c \text{ line/screen}$, if both lines are floating, or $C_c = C_c \text{ line/line} + C_c \text{ line/screen}$, if the screen is connected to one line Length of cable (not including cable stubs): $\leq 200 \text{ m (656.2 ft)}$ Length of cable stubs: $\leq 1 \text{ m (3.3 ft)}$	Ex ia ¹⁾ $U_i = 10 \text{ V}$ $I_i = \text{n. a.}$ $P_i = \text{n. a.}$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 200 \text{ nF}$
		2-WISE power load, APL port profile SLAC ³⁾ $U_i = 17.5 \text{ V}$ $I_i = 380 \text{ mA}$ $P_i = 5.32 \text{ W}$ $L_i = 10 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$ Cable specifications according to 2-WISE: $R_c = 15 \text{ to } 150 \text{ } \Omega/\text{km}$ $L_c = 0.4 \text{ to } 1 \text{ mH/km}$ $C_c = 45 \text{ to } 200 \text{ nF/km}$ $C_c = C_c \text{ line/line} + 0.5 C_c \text{ line/screen}$, if both lines are floating, or $C_c = C_c \text{ line/line} + C_c \text{ line/screen}$, if the screen is connected to one line Length of cable (not including cable stubs): $\leq 200 \text{ m (656.2 ft)}$ Length of cable stubs: $\leq 1 \text{ m (3.3 ft)}$	Non-intrinsically safe ²⁾
Option TA	FOUNDATION Fieldbus Ex i (STANDARD + FISCO)	Ex ia ¹⁾ $U_i = 30 \text{ V}$ $I_i = 570 \text{ mA}$ $P_i = 8.5 \text{ W}$ $L_i = 10 \text{ } \mu\text{H}$ $C_i = 5 \text{ nF}$	Ex ia ¹⁾ $U_i = 10 \text{ V}$ $I_i = \text{n. a.}$ $P_i = \text{n. a.}$ $L_i = 0 \text{ } \mu\text{H}$ $C_i = 200 \text{ nF}$
			Non-intrinsically safe ²⁾

1) Only for the order code for "Approval", option JD

2) Connection to or operation with Service interface (Port 2) is not permitted in potentially explosive atmospheres.

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

Order code for "Output; input 2" "Output; input 3" "Output; input 4"	Output type	Intrinsically safe values		
		Output; input 2	Output; input 3	Output; input 4
Option C	Current output 4-20mA Ex-i passive	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	U _i = 30 V I _i = 100 mA P _i = 1.25 W L _i = 0 C _i = 0		



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