

Safety Instructions

Proline t-mass 150

EAC: Zone 2



Proline t-mass 150

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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 device	Documentation code
t-mass A 150	BA01042D
t-mass B 150	BA01043D
t-mass T 150	BA01260D

Additional documentation

Contents	Document type	Documentation code
t-mass A 150 OEM	Special documentation	SD01921D
Explosion Protection	Brochure	CP00021Z/11

Certificates and declarations

Measuring instruments meet the fundamental health and safety requirements for the design and construction of devices and protective systems intended for use in potentially explosive atmospheres in accordance with TR CU 012/2011.

Certification body

LLP "T-Standard"

Certificate number

EAЭC KZ 7500525.01.01.01793

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

- ГОСТ 31610.0-2019 (IEC 60079-0:2017)
- ГОСТ 31610.7-2017 (IEC 60079-7:2015)

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

$$\begin{array}{c} \text{*****} \quad - \quad \text{***** ... *****} \quad + \quad \text{A*B*C*D*E*F*G*...} \\ \hline \text{(Device type)} \quad \quad \quad \text{(Basic specifications)} \quad \quad \quad \text{(Optional specifications)} \end{array}$$

* = 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	6	Thermal mass flowmeter
2	Sensor	A, B, T	Sensor type
3	Transmitter	A	Transmitter type: 2-wire, compact version
4	Generation index	B	Platform generation
5, 6	Nominal diameter	A: DN 15 to 50 B: DN 80 to 1500 T: DN 40 to 1000	Nominal diameter of sensor

Basic specifications

Item	Order code	Option selected	Description
1, 2	Approval	BS, I5	2Ex ec IIC T4...T1 Gc X
3	Power supply	D	18-30VDC
4	Output, input	A	4-20mA HART
		B	4-20 mA HART, pulse/frequency/switch output
		K	Pulse/frequency/switch output
		Q	4-20 mA HART, pulse/frequency/switch output, status input
5	Display, Operation	A	W/o; via communication
		C	SD02 4-line; push buttons + data backup function
6	Housing	A	Compact, alu, coated
7	Electrical connection	A	Gland M20
		C	Thread G½
		D	Thread NPT½
		Q	2 × M12 plug × 1


Optional specifications

No options specific to hazardous locations are 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. ГOCT 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.
- Observe all the technical data of the device (see nameplate).

Safety instructions:
Installation

- Continuous service temperature of the connecting cable: -40 to $+80$ °C; however, at least in accordance with the range of service temperature taking into account additional influences of the process conditions ($T_{a,min}$ and $T_{a,max} + 20$ K).
- Only use certified cable entries and connection plugs M12×1 suitable for the application. Please comply with the selection criteria as defined in ГOCT IEC 60079-14-2013.
- When the measuring device is connected, attention must be paid to the type of protection at the transmitter. →  10
- To ensure dust-tightness, securely seal the transmitter housing and cable entries.
- Only open all housing briefly, ensuring that no dust or moisture enters the housing.

Connectors

- Only use M12 × 1 connectors that meet the requirements of the EN 61076-2-101 standard and that are suitable and certified for the particular application.
- Please comply with the relevant operating instructions and safety instructions for the connector.
- The temperature range of the measuring device can be limited by the temperature range of the connector. The lower temperature value applies.
- The use of approved connectors may require installation that provides impact protection. Please comply with the safety instructions of the connector.

- The degree of protection of the measuring device can be limited by the degree of protection of the connector.
- Close off any connections that are not used with sealing plugs that are both suitable and certified for the particular application. The plastic transport plug does not meet this requirement and must therefore be replaced at the time of installation.
- Please comply with the connection instructions for the connector to ensure protection of the housing. Tighten the connectors and/or sealing plugs.
- M12 connections may only be opened and closed in a sufficiently clean environment to prevent the infiltration of moisture and dirt. They may only remain open in the field for a short time to enable service operations.
- In an explosive atmosphere: Do not fit or remove the connectors under tension.


WARNING

Ex ec type of protection

- ▶ In potentially explosive atmosphere: Do not disconnect the electrical connection of the power supply circuit when energized.
- ▶ In potentially explosive atmospheres: Do not open the connection compartment cover when energized.
- ▶ In locations where extreme external air humidity and internal temperature fluctuations (e.g. frequent on/off cycles) may cause condensation inside the device, the interior should be inspected regularly.
- ▶ 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 or sealing plugs. The metal sealing plugs supplied meet this requirement.
- ▶ The M20 × 1.5 cable glands supplied are only suitable for permanently installed cables and connections. Ensure that strain relief is provided during installation.

The device can be connected to the Endress+Hauser service tool FXA291; pay attention to the Operating Instructions. Connection to the service connector is only permitted if the atmosphere is not a potentially explosive atmosphere.

Potential equalization

- Integrate the device into the potential equalization →  10.
- 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.

Temperature tables

Ambient temperature

Minimum ambient temperature

$$T_{a, \min} = -40 \text{ }^{\circ}\text{C}$$

Maximum ambient temperature

$T_{a, \max} = +60 \text{ }^{\circ}\text{C}$ depending on the medium temperature and temperature class.

Medium temperature

Minimum medium temperature

$$T_{m, \min \text{ range}} = -20 \text{ }^{\circ}\text{C}$$

Maximum medium temperature

$T_{m, \max}$ for T4...T1 depending on the maximum ambient temperature $T_{a, \max}$

Compact version

Sensor	$T_{m, \max}$ [$^{\circ}\text{C}$]				
	T_a [$^{\circ}\text{C}$]	T4 [135 $^{\circ}\text{C}$]	T3 [200 $^{\circ}\text{C}$]	T2 [300 $^{\circ}\text{C}$]	T1 [450 $^{\circ}\text{C}$]
t-mass A	60	100	100	100	100
t-mass B	60	100	100	100	100
t-mass T	60	100 ¹⁾	100 ¹⁾	100 ¹⁾	100 ¹⁾

- 1) For cleaning purposes (SIP) a temperature of 130 $^{\circ}\text{C}$ is permitted for a period of one hour.

Seal, clamping ferrule and sensor

Seal, clamping ferrule and sensor depending on the medium temperature T_m

Sensor	T_m [$^{\circ}\text{C}$]
t-mass A	-40 to +100

Sensor	Seal (G thread only)	T_m [$^{\circ}\text{C}$]
t-mass B	HNBR	-20 to +100
	EPDM	-40 to +100

Sensor	Seal (G thread only)	T _m [°C]
t-mass T	HNBR	-20 to 100 ¹⁾
	EPDM	-20 to 100

- 1) For cleaning purposes (SIP) a temperature of 130 °C is permitted for a period of one hour.

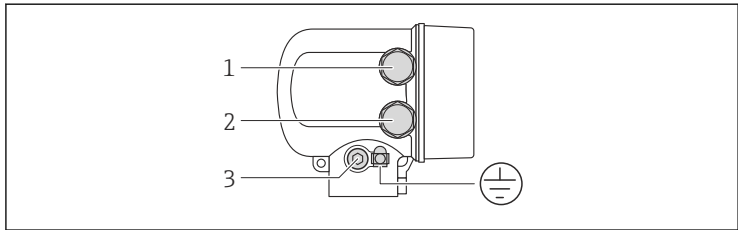
Sensor	Clamping ferrule	T _m [°C]
t-mass B	PEEK	-40 to +100
t-mass T	PEEK	-20 to 100 ¹⁾
	1.4404	-20 to 100 ¹⁾
	2.4602	-20 to 100 ¹⁾

- 1) For cleaning purposes (SIP) a temperature of 130 °C is permitted for a period of one hour.

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.

Connecting the transmitter



A0023990

Item		Basic specification, Item 1, 2 Approval:	Type of protection used for cable entry	Description
1	Cable entry for output 1	BS, I5	Ex ec	<p>The following applies to devices with basic specification, item 1, 2 (Approval) = BS, I5:</p> <p>For device versions with a plastic transport sealing plug, this plug does not meet the requirements of the type of protection and must be replaced during installation by a suitable entry that meets the approval specifications.</p> <p>In the case of device versions with metal extensions and sealing plugs, the latter are part of the device approval and meet the requirements of the explosion protection indicated on the nameplate.</p> <p>For device versions with a cable gland, this entry has a separate component approval and meets the requirements of the type of protection indicated on the nameplate.</p> <p>For device versions with a device plug, use a counterpart with a separate component approval that meets the requirements of the type of protection indicated on the nameplate.</p>
2	Cable entry for output 2	BS, I5	Ex ec	<p>The following applies to devices with basic specification, item 1, 2 (Approval) = BS, I5:</p> <p>For device versions with a plastic transport sealing plug, this plug does not meet the requirements of the type of protection and must be replaced during installation by a suitable entry that meets the approval specifications.</p> <p>In the case of device versions with metal extensions and sealing plugs, the latter are part of the device approval and meet the requirements of the explosion protection indicated on the nameplate.</p> <p>For device versions with a cable gland, this entry has a separate component approval and meets the requirements of the type of protection indicated on the nameplate.</p> <p>For device versions with a device plug, use a counterpart with a separate component approval that meets the requirements of the type of protection indicated on the nameplate.</p>
Item		Description		
3	Pressure compensation plug	<p>NOTICE</p> <p>Housing degree of protection voided due to insufficient sealing of the housing.</p> <ul style="list-style-type: none"> ▶ Do not open - not a cable entry. 		
⊕	Potential equalization	<p>NOTICE</p> <p>Terminal for connection to potential equalization.</p> <ul style="list-style-type: none"> ▶ Pay attention to the grounding concept of the facility. 		

Terminal assignment

Transmitter



The order code constitutes part of the extended order code. Detailed information on the codes for the device and on the structure of the extended order code → 5.

Connection version 4-20 mA HART, pulse/frequency/switch output, status input

Supply voltage

Order code for "Power supply"	Terminal numbers	
	1 (L+) ¹⁾	2 (L-) ¹⁾
Option D	DC 18 to 30 V ²⁾	

- 1) Securely tighten the screws of the terminal. Recommended torque: 0.5 Nm.
- 2) For connection to touch-safe circuits (e.g. SELV, PELV etc.)

Signal transmission

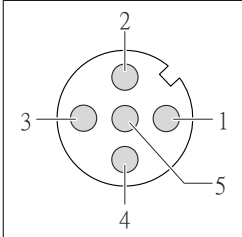
Order code for "Output, input"	Terminal numbers					
	Output 1		Output 2		Input	
	26 (+) ¹⁾	27 (-) ¹⁾	24 (+) ¹⁾	25 (-) ¹⁾	22 (+) ¹⁾	23 (-) ¹⁾
Option A	4-20 mA HART (active)		-		-	
Option B	4-20 mA HART (active)		Pulse/frequency/switch output (passive)		-	
Option K	-		Pulse/frequency/switch output (passive)		-	
Option Q	4-20 mA HART (active)		Pulse/frequency/switch output (passive)		Status input	

- 1) Securely tighten the screws of the terminal. Recommended torque: 0.5 Nm.

Pin assignment, device plug

Supply voltage

Supply voltage for all communication types (on the device side)



	Pin	Assignment		
	1	L+	DC 24 V	
	2	+	Status input	
	3	-	Status input	
	4	L-	DC 24 V	
	5		Grounding/shielding	
	Coding		Plug/socket	
	A		Plug	

4-20 mA HART with pulse/frequency/switch output

4-20 mA HART with pulse/frequency/switch output (on the device side)

<p style="text-align: right; font-size: small;">A0016810</p>	Pin	Assignment	
	1	+	4-20 mA HART (active)
	2	-	4-20 mA HART (active)
	3	+	Pulse/frequency/switch output (passive)
	4	-	Pulse/frequency/switch output (passive)
	5		Grounding/shielding
Coding		Plug/socket	
A		Socket	

Safety-related values

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

Ex ec type of protection

Order code for "Output"	Output type	Safety-related values
Option A	4-20mA HART	<ul style="list-style-type: none"> ▪ Galvanically isolated: ▪ Active: 4 to 20 mA $R_L < 750 \Omega$, $R_L \text{ HART} \geq 250 \Omega$
Option B	4-20mA HART	<ul style="list-style-type: none"> ▪ Galvanically isolated: ▪ Active: 4 to 20 mA $R_L < 750 \Omega$, $R_L \text{ HART} \geq 250 \Omega$
	Pulse/frequency/switch output	<ul style="list-style-type: none"> ▪ Galvanically isolated: ▪ Passive: 30 V DC/25 mA Open collector <p>Maximum frequency value 0 to 1000 Hz ($f_{\max} = 1250 \text{ Hz}$)</p>
Option K	Pulse/frequency/switch output	<ul style="list-style-type: none"> ▪ Galvanically isolated: ▪ Passive: 30 V DC/25 mA Open collector <p>Maximum frequency value 0 to 1000 Hz ($f_{\max} = 1250 \text{ Hz}$)</p>
Option Q	4-20mA HART	<ul style="list-style-type: none"> ▪ Galvanically isolated: ▪ Active: 4 to 20 mA $R_L < 750 \Omega$, $R_L \text{ HART} \geq 250 \Omega$

Order code for "Output"	Output type	Safety-related values
	Pulse/frequency/switch output	<ul style="list-style-type: none">▪ Galvanically isolated:▪ Passive: 30 V DC/25 mA Open collector Maximum frequency value 0 to 1 000 Hz ($f_{\max} = 1\,250$ Hz)
	Status input	Galvanically isolated <ul style="list-style-type: none">▪ -3 to +30 V DC▪ $R_i = 5\text{ k}\Omega$



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