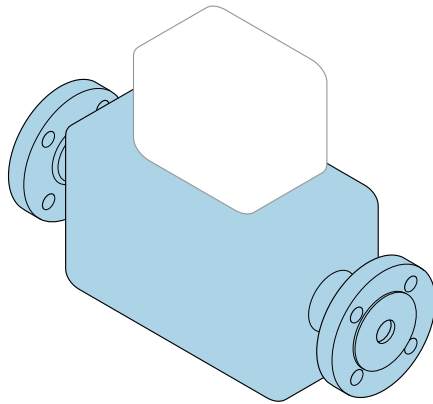


# Brief Operating Instructions Flowmeter Proline Prosonic Flow G

Ultrasonic time-of-flight sensor



These Brief Operating Instructions are **not** a substitute for the Operating Instructions pertaining to the device.

**Brief Operating Instructions Part 1 of 2: Sensor**  
Contain information about the sensor.

Brief Operating Instructions Part 2 of 2: Transmitter  
→  3.



A0023555

## Brief operating instructions Flowmeter

The device consists of a transmitter and a sensor.

The process of commissioning these two components is described in two separate manuals which together form the Brief Operating Instructions for the flowmeter:

- Brief Operating Instructions Part 1: Sensor
- Brief Operating Instructions Part 2: Transmitter

Please refer to both parts of the Brief Operating Instructions when commissioning the device, as the contents of the manuals complement one another:

### Brief Operating Instructions Part 1: Sensor

The Sensor Brief Operating Instructions are aimed at specialists with responsibility for installing the measuring device.

- Incoming acceptance and product identification
- Storage and transport
- Mounting procedure

### Brief Operating Instructions Part 2: Transmitter

The Transmitter Brief Operating Instructions are aimed at specialists with responsibility for commissioning, configuring and parameterizing the measuring device (until the first measured value).

- Product description
- Mounting procedure
- Electrical connection
- Operation options
- System integration
- Commissioning
- Diagnostic information

## Additional device documentation



These Brief Operating Instructions are the **Brief Operating Instructions part 1: Sensor**.

The "Brief Operating Instructions part 2: Transmitter" are available via:

- Internet: [www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)
- Smart phone/tablet: *Endress+Hauser Operations App*

Detailed information about the device can be found in the Operating Instructions and the other documentation:

- Internet: [www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)
- Smart phone/tablet: *Endress+Hauser Operations App*

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# 1 About this document

## 1.1 Symbols used

### 1.1.1 Safety symbols

#### **DANGER**

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

#### **WARNING**

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.










#### **CAUTION**

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.





#### **NOTICE**


This symbol contains information on procedures and other facts which do not result in personal injury.

### 1.1.2 Symbols for certain types of information






Symbol	Meaning	Symbol	Meaning
	<b>Permitted</b> Procedures, processes or actions that are permitted.		<b>Preferred</b> Procedures, processes or actions that are preferred.
	<b>Forbidden</b> Procedures, processes or actions that are forbidden.		<b>Tip</b> Indicates additional information.
	Reference to documentation		Reference to page
	Reference to graphic	<b>1, 2, 3...</b>	Series of steps
	Result of a step		Visual inspection

### 1.1.3 Electrical symbols






Symbol	Meaning	Symbol	Meaning
	Direct current		Alternating current
	Direct current and alternating current		<b>Ground connection</b> A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Symbol	Meaning
	<p><b>Potential equalization connection (PE: protective earth)</b>                      Ground terminals that must be connected to ground prior to establishing any other connections.</p> <p>The ground terminals are located on the interior and exterior of the device:</p> <ul style="list-style-type: none"> <li>▪ Interior ground terminal: potential equalization is connected to the supply network.</li> <li>▪ Exterior ground terminal: device is connected to the plant grounding system.</li> </ul>





### 1.1.4 Communication-specific symbols

Symbol	Meaning	Symbol	Meaning
	<p><b>Wireless Local Area Network (WLAN)</b>                      Communication via a wireless, local network.</p>		<p><b>Bluetooth</b>                      Wireless data transmission between devices over a short distance.</p>
	<p><b>LED</b>                      Light emitting diode is on.</p>		<p><b>LED</b>                      Light emitting diode is off.</p>
	<p><b>LED</b>                      Light emitting diode is flashing.</p>		

### 1.1.5 Tool symbols

Symbol	Meaning	Symbol	Meaning
	Torx screwdriver		Flat-blade screwdriver
	Phillips head screwdriver		Allen key
	Open-ended wrench		

### 1.1.6 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers		Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
	Hazardous area		Safe area (non-hazardous area)
	Flow direction		

## 2 Basic safety instructions

### 2.1 Requirements for the personnel

The personnel must fulfill the following requirements for its tasks:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

### 2.2 Intended use

#### Application and media

The measuring device described in these Operating Instructions is intended only for the flow measurement of gases.

Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

Measuring devices for use in explosive atmospheres, in hygienic applications or where there is a high risk of pressures, are labeled accordingly on the nameplate.

To ensure that the measuring device is in proper condition during the operation period:

- ▶ Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- ▶ Refer to the nameplate to check whether the ordered device can be operated for the intended application in areas requiring specific approvals (e.g. explosion protection, pressure equipment safety).
- ▶ Use the measuring device only for media to which the process-wetted materials are sufficiently resistant.
- ▶ Keep within the specified pressure and temperature range.
- ▶ Keep within the specified ambient temperature range.
- ▶ Protect the measuring device permanently against corrosion from environmental influences.

#### Incorrect use

Non-designated use can compromise safety. The manufacturer is not liable for damage caused by improper or non-designated use.

#### **WARNING**

#### **Danger of breakage due to corrosive or abrasive fluids and ambient conditions!**

- ▶ Verify the compatibility of the process fluid with the sensor material.
- ▶ Ensure the resistance of all fluid-wetted materials in the process.
- ▶ Keep within the specified pressure and temperature range.

**NOTICE****Verification for borderline cases:**

- ▶ For special fluids and fluids for cleaning, Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of fluid-wetted materials, but does not accept any warranty or liability as minute changes in the temperature, concentration or level of contamination in the process can alter the corrosion resistance properties.

**Residual risks****⚠ CAUTION****Risk of hot or cold burns! The use of media and electronics with high or low temperatures can produce hot or cold surfaces on the device.**

- ▶ Mount suitable touch protection.
- ▶ Use suitable protective equipment.

## 2.3 Workplace safety

When working on and with the device:

- ▶ Wear the required personal protective equipment as per national regulations.

## 2.4 Operational safety

Risk of injury!

- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

## 2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU Declaration of Conformity. The manufacturer confirms this by affixing the CE mark to the device..

## 2.6 IT security

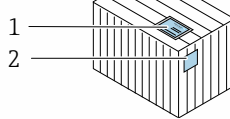
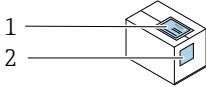
Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

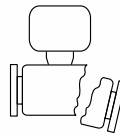
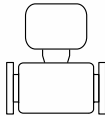
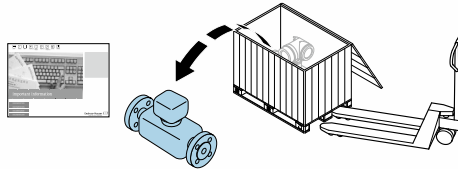


### 3 Incoming acceptance and product identification

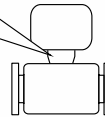
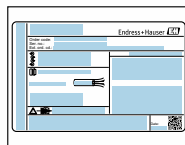
#### 3.1 Incoming acceptance



Are the order codes on the delivery note (1) and the product sticker (2) identical?



Are the goods undamaged?



Does the data on the nameplate match the order specifications on the delivery note?



Is the envelope present with accompanying documents?

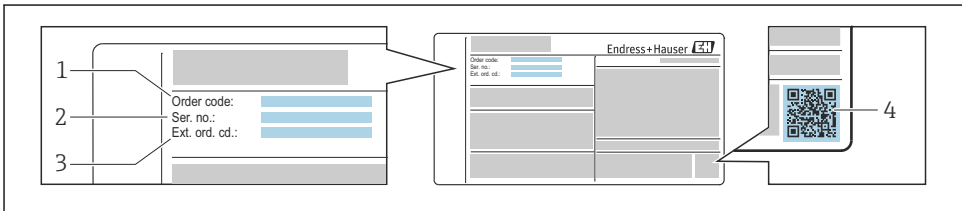


- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
- The Technical Documentation is available via the Internet or via the *Endress+Hauser Operations app*.

## 3.2 Product identification

The following options are available for identification of the device:


- Nameplate
- Order code with details of the device features on the delivery note
- Enter the serial numbers from the nameplates in the *Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): all the information about the device is displayed.
- Enter the serial numbers from the nameplates into the *Endress+Hauser Operations app* or scan the DataMatrix code on the nameplate with the *Endress+Hauser Operations app*: all the information about the device is displayed.



A0030196

### 1 Example of a nameplate

- 1 Order code
- 2 Serial number (Ser. no.)
- 3 Extended order code (Ext. ord. cd.)
- 4 2-D matrix code (QR code)

 For detailed information on the data on the nameplate, see the Operating Instructions for the device.

## 4 Storage and transport

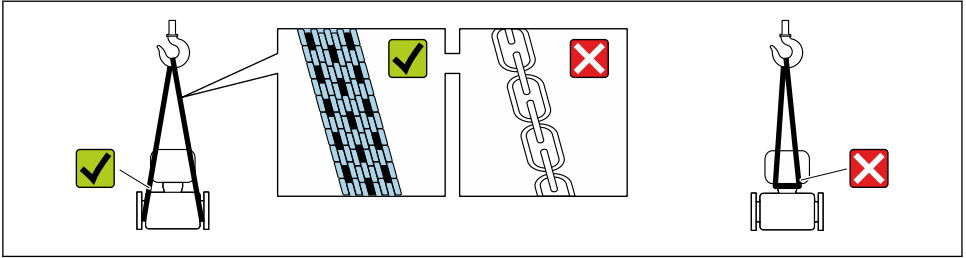
### 4.1 Storage conditions

Observe the following notes for storage:

- ▶ Store in the original packaging to ensure protection from shock.
- ▶ Do not remove protective covers or protective caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.
- ▶ Protect from direct sunlight. Avoid unacceptably high surface temperatures.
- ▶ Store in a dry and dust-free place.
- ▶ Do not store outdoors.

### 4.2 Transporting the product

Transport the measuring device to the measuring point in the original packaging.



A0029252

**i** Do not remove protective covers or caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.

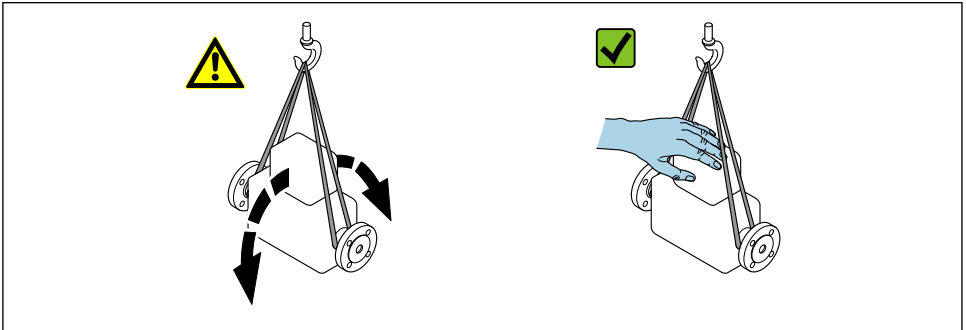
#### 4.2.1 Measuring devices without lifting lugs

**⚠ WARNING**

**Center of gravity of the measuring device is higher than the suspension points of the webbing slings.**

Risk of injury if the measuring device slips.

- ▶ Secure the measuring device against slipping or turning.
- ▶ Observe the weight specified on the packaging (stick-on label).



A0029214

#### 4.2.2 Measuring devices with lifting lugs

**⚠ CAUTION**

**Special transportation instructions for devices with lifting lugs**

- ▶ Only use the lifting lugs fitted on the device or flanges to transport the device.
- ▶ The device must always be secured at two lifting lugs at least.

#### 4.2.3 Transporting with a fork lift

If transporting in wood crates, the floor structure enables the crates to be lifted lengthwise or at both sides using a forklift.

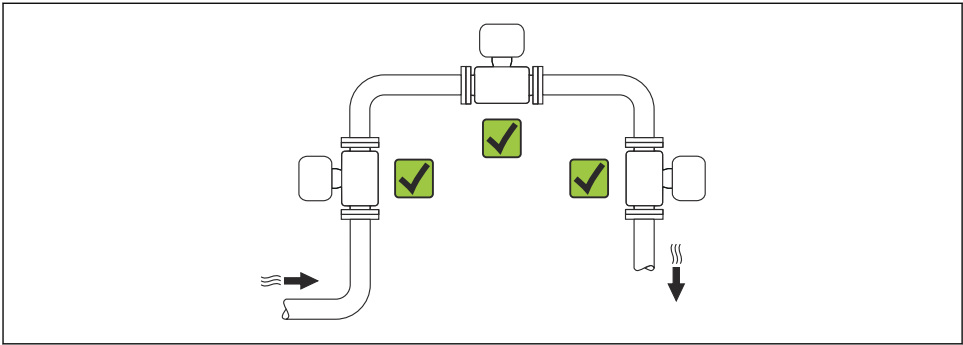
## 5 Mounting procedure

### 5.1 Mounting requirements

No special measures such as supports are necessary. External forces are absorbed by the construction of the device.

#### 5.1.1 Mounting position

##### Mounting location

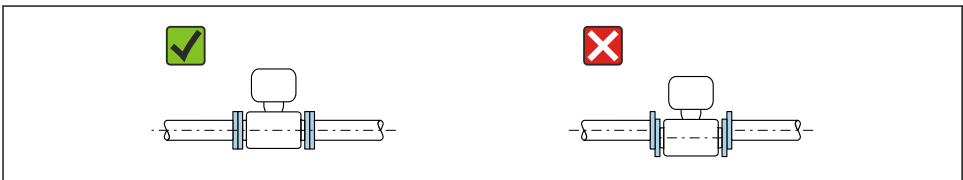


A0015543

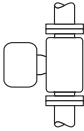
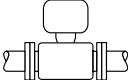
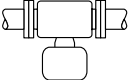

##### Orientation

The direction of the arrow on the sensor helps you to install the sensor according to the flow direction.

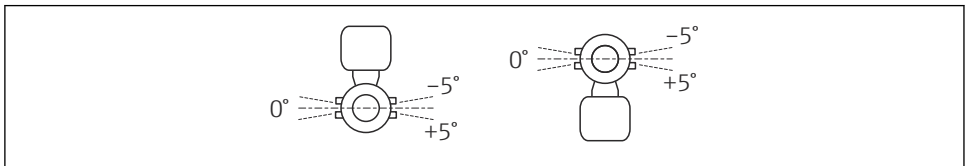
 Install the measuring device in a parallel plane free of external mechanical stress.



A0015895

Orientation		Compact version	
A	Vertical orientation	 A0015545	✓✓
B	Horizontal orientation, transmitter head up <sup>1)</sup>	 A0015589	✓✓
C	Horizontal orientation, transmitter head down <sup>1)</sup>	 A0015590	✓
D	Horizontal orientation, transmitter head at side	 A0015592	✗

1) The horizontal alignment of the transducers may only deviate by a maximum of  $\pm 5^\circ$ , particularly if a liquid is present in the medium (wet gas).



A0037650

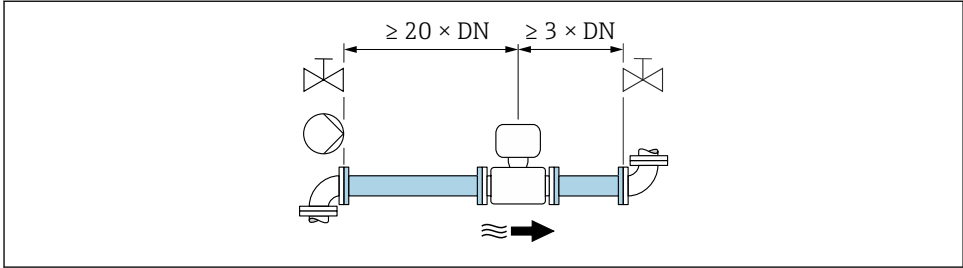
### Inlet and outlet runs

If possible, install the sensors upstream of assemblies such as valves, T-pieces, elbows, and pumps. If this is not possible, the specified measurement accuracy of the measuring device is achieved by observing the specified minimum inlet and outlet runs with optimum sensor configuration.



For the dimensions and installation lengths of the device, see the "Technical Information" document, "Mechanical construction" section .

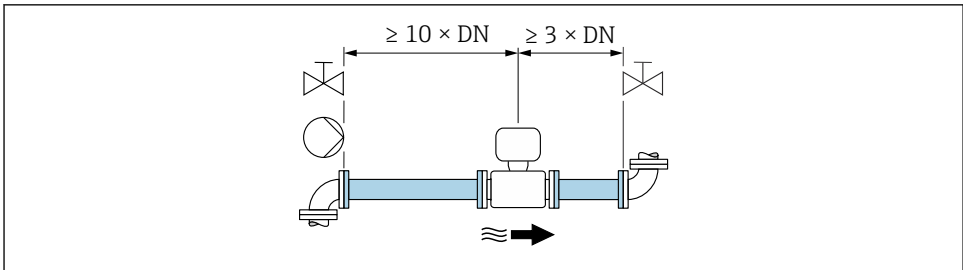
Single-path version: DN 25 (1")



A0052512

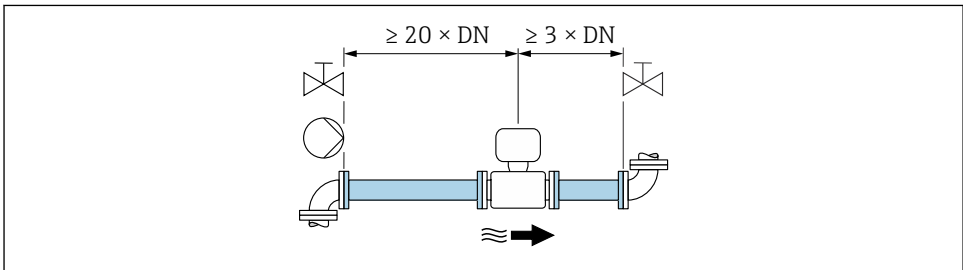
- 2 Single-path version: Minimum inlet and outlet runs with various flow obstructions. For order code for "Flow calibration", option A "1 %".

Two-path version: DN 50 to 300 (2 to 12")



A0052513

- 3 Two-path version: minimum inlet and outlet runs with various flow obstructions For order code for "Flow calibration", option A "1 %".



A0052512

- 4 Two-path version: minimum inlet and outlet runs with various flow obstructions For order code for "Flow calibration", option C "0.50%" and option D "0.50%, traceable to ISO/IEC17025".

### 5.1.2 Environmental and process requirements

#### Ambient temperature range



For detailed information on the ambient temperature range, see the Operating Instructions for the device.

If operating outdoors:

- Mount the measuring device in a shady location.
- Avoid direct sunlight, particularly in warm climatic regions.
- Avoid direct exposure to weather conditions.

#### Temperature tables



For detailed information on the temperature tables, see the separate document entitled "Safety Instructions" (XA) for the device.

#### Thermal insulation

For optimum measurement performance, make sure that no heat transfer (heat loss or heat supply) can take place at the sensor. This can be ensured by installing thermal insulation. The formation of condensation in the measuring device can also be limited in this way.

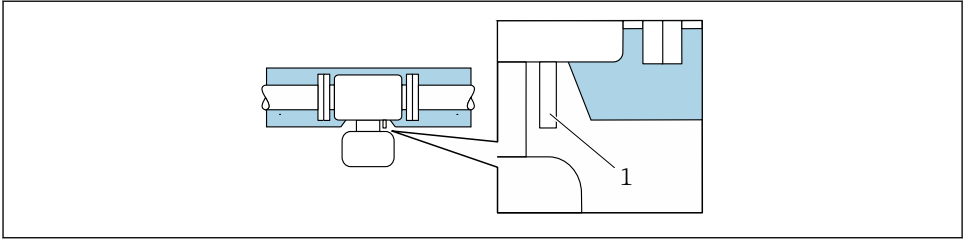
Thermal insulation is particularly recommended in situations in which the difference between the process temperature and ambient temperature is large. This difference leads to an error during temperature measurement that is caused by heat conduction (known as the "heat conduction error").



#### Electronics overheating on account of thermal insulation!

- ▶ Recommended orientation: horizontal orientation, transmitter housing sensor connection housing pointing downwards.
- ▶ Do not insulate the transmitter housing sensor connection housing.
- ▶ Maximum permissible temperature at the lower end of the transmitter housing sensor connection housing: 80 °C (176 °F)
- ▶ Thermal insulation with extended neck free: We recommend that you do not insulate the extended neck in order to ensure optimum dissipation of heat.

The thermal insulation should never cover the transmitter housing and the pressure measuring cell.



A0037676

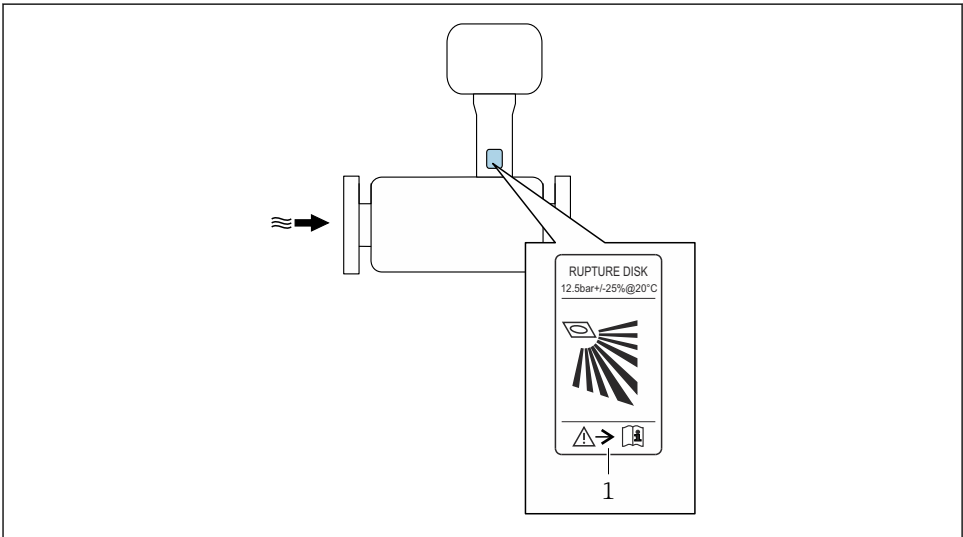
5 Thermal insulation with free extended neck and pressure measuring cell

1 Pressure measuring cell

### 5.1.3 Special mounting instructions

#### Rupture disk

The position of the rupture disk is indicated on a sticker applied over it. If the rupture disk is triggered, the sticker is destroyed. The disk can therefore be visually monitored.



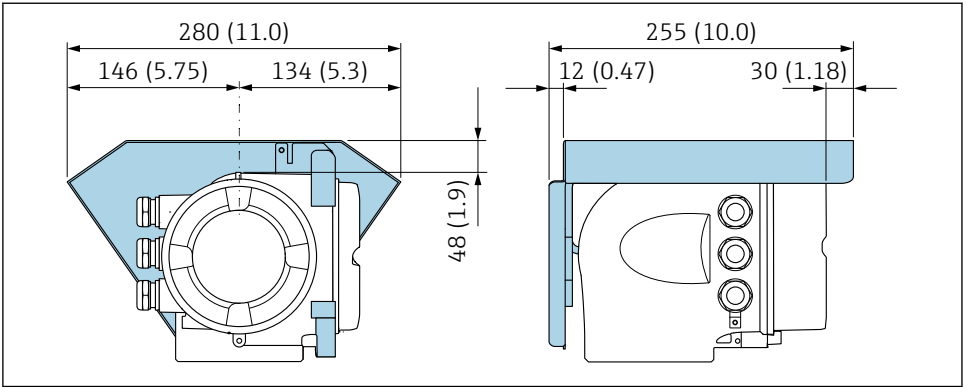
A0037501

1 Rupture disk label

 For detailed information on the use of a rupture disk: see the Operating Instructions for the device.



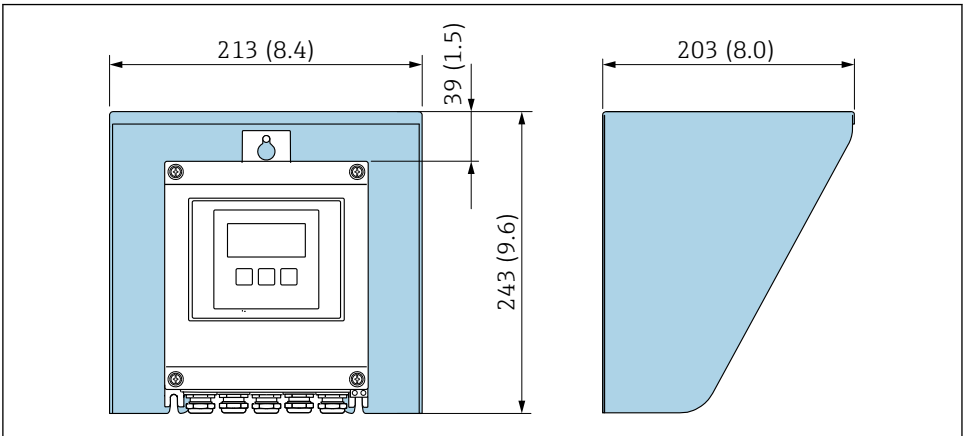
**Weather protection cover: Proline 300**



A0029553

6 Unit mm (in)

**Weather protection cover: Proline 500 – digital**



A0029552

7 Protective cover for Proline 500 – digital; unit mm (in)

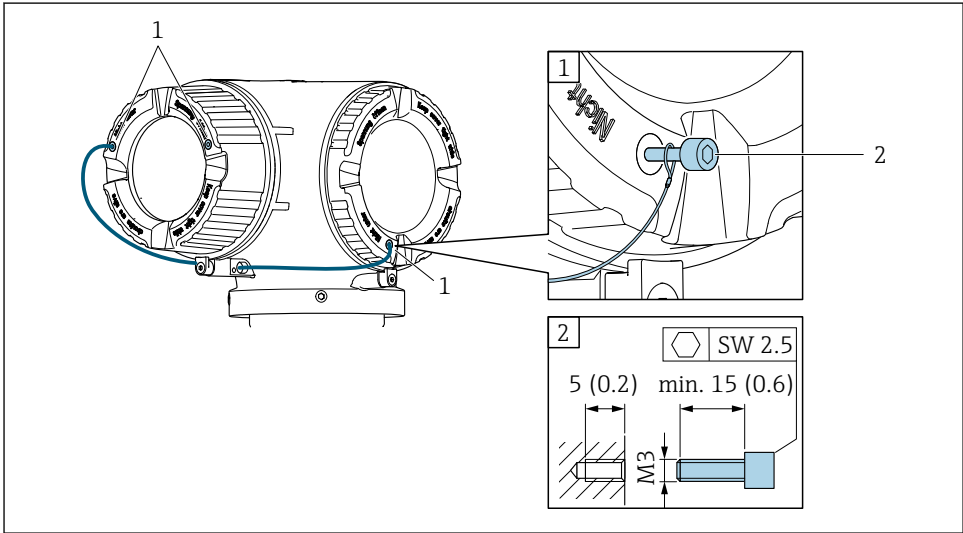
## Cover lock

### NOTICE

Order code "Housing", option L "Cast, stainless": The covers of the transmitter housing are provided with a borehole to lock the cover.

The cover can be locked using screws and a chain or cable provided by the customer on site.

- ▶ The use of stainless steel chains or cables is recommended.
- ▶ If a protective coating is applied, it is recommended to use a heat shrink tube to protect the housing paint.



A0029800

- 1 Cover borehole for the securing screw
- 2 Securing screw to lock the cover

## 5.2 Mounting the measuring device

### 5.2.1 Required tools

#### For transmitter

For mounting on a post:

Proline 500 – digital transmitter

- Open-ended wrench AF 10
- Torx screwdriver TX 25

For wall mounting:

Drill with drill bit  $\varnothing$  6.0 mm

#### For sensor

For flanges and other process connections: Use a suitable mounting tool.

### 5.2.2 Preparing the measuring device

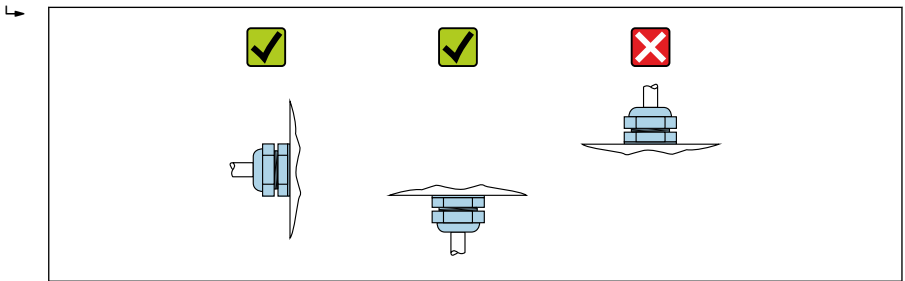
1. Remove all remaining transport packaging.
2. Remove stick-on label on the electronics compartment cover.

### 5.2.3 Mounting the measuring device

#### **⚠ WARNING**

#### **Danger due to improper process sealing!**

- ▶ Ensure that the inside diameters of the gaskets are greater than or equal to that of the process connections and piping.
  - ▶ Ensure that the seals are clean and undamaged.
  - ▶ Secure the seals correctly.
1. Ensure that the direction of the arrow on the nameplate of the sensor matches the flow direction of the medium.
  2. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.



A0029263

### 5.2.4 Mounting the transmitter housing: Proline 500 – digital

#### **⚠ CAUTION**

#### **Ambient temperature too high!**

Danger of electronics overheating and housing deformation.

- ▶ Do not exceed the permitted maximum ambient temperature .
- ▶ If operating outdoors: Avoid direct sunlight and exposure to weathering, particularly in warm climatic regions.

#### **⚠ CAUTION**

#### **Excessive force can damage the housing!**

- ▶ Avoid excessive mechanical stress.

The transmitter can be mounted in the following ways:

- Post mounting
- Wall mounting

## Pipe mounting

Required tools:

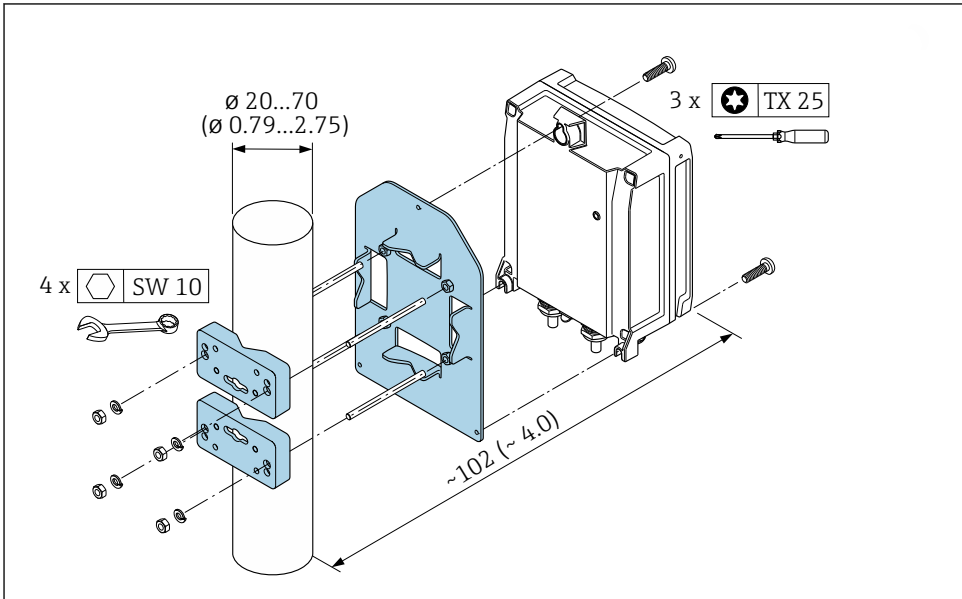
- Open-ended wrench AF 10
- Torx screwdriver TX 25

### NOTICE

**Excessive tightening torque applied to the fixing screws!**

Risk of damaging the plastic transmitter.

- ▶ Tighten the fixing screws as per the tightening torque: 2 Nm (1.5 lbf ft)
- ▶ Mount the antenna on the post using the antenna bracket.



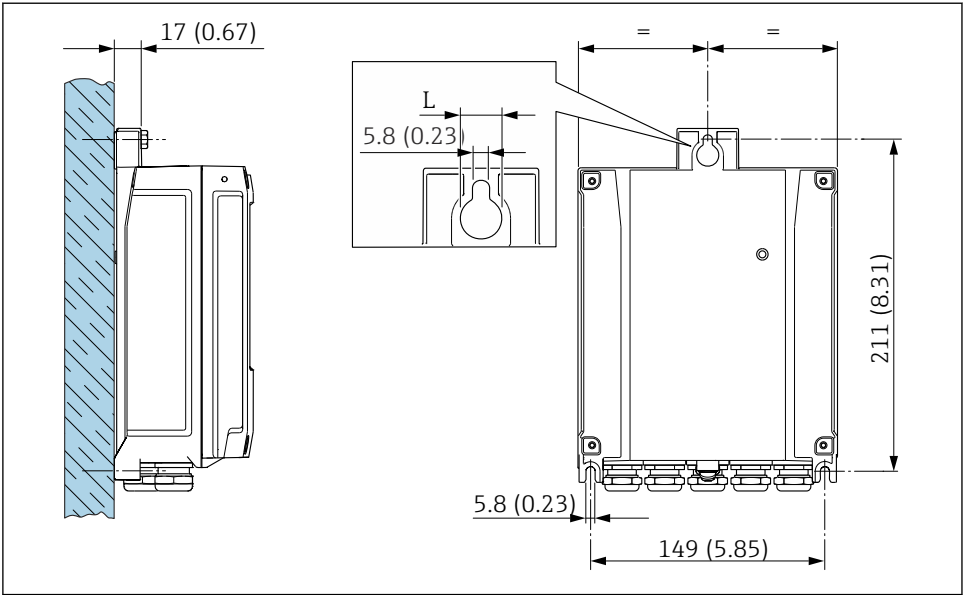
A0029051

8 Unit mm (in)

## Wall mounting

Required tools:

Drill with drill bit  $\varnothing 6.0$  mm



A0029054

9 Engineering unit mm (in)

L Depends on order code for "Transmitter housing"

Order code for "Transmitter housing"

- Option A, aluminum, coated: L = 14 mm (0.55 in)
- Option D, polycarbonate: L = 13 mm (0.51 in)

### 5.3 Post-mounting check

Is the measuring device undamaged (visual inspection)?	<input type="checkbox"/>
Does the measuring device correspond to the measuring point specifications? For example:	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>▪ Process temperature</li> <li>▪ Pressure (refer to the section on "Pressure-temperature ratings" in the "Technical Information" document on the CD-ROM provided)</li> <li>▪ Ambient temperature</li> <li>▪ Measuring range</li> </ul>	
Has the correct orientation for the sensor been selected → 12?	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>▪ According to sensor type</li> <li>▪ According to medium temperature</li> <li>▪ According to medium properties (outgassing, with entrained solids)</li> </ul>	
Does the arrow on the sensor match the actual direction of flow of the medium through the piping → 12?	<input type="checkbox"/>
Is the tag name and labeling correct (visual inspection)?	<input type="checkbox"/>

Is the device sufficiently protected from precipitation and direct sunlight?	<input type="checkbox"/>
Are the securing screw and securing clamp tightened securely?	<input type="checkbox"/>

## 6 Disposal



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

### 6.1 Removing the measuring device

1. Switch off the device.

#### **⚠ WARNING**

#### **Risk of personal injury due to process conditions!**

- ▶ Beware of hazardous process conditions such as pressure in the measuring device, high temperatures or aggressive media.
2. Carry out the mounting and connection steps from the "Mounting the measuring device" and "Connecting the measuring device" sections in reverse order.
  3. Observe the safety instructions.

### 6.2 Disposing of the measuring device

#### **⚠ WARNING**

#### **Danger to personnel and environment from fluids that are hazardous to health.**

- ▶ Ensure that the measuring device and all cavities are free of fluid residues that are hazardous to health or the environment, e.g. substances that have permeated into crevices or diffused through plastic.

Follow these instructions when disposing of the device:

- ▶ Comply with national regulations.
- ▶ Ensure proper separation and reuse of the device components.





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