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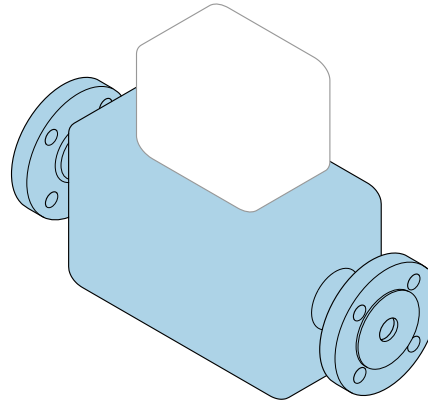
2026-03-02

Brief Operating Instructions
Flowmeter
Proline Prowirl D

Vortex flow 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.

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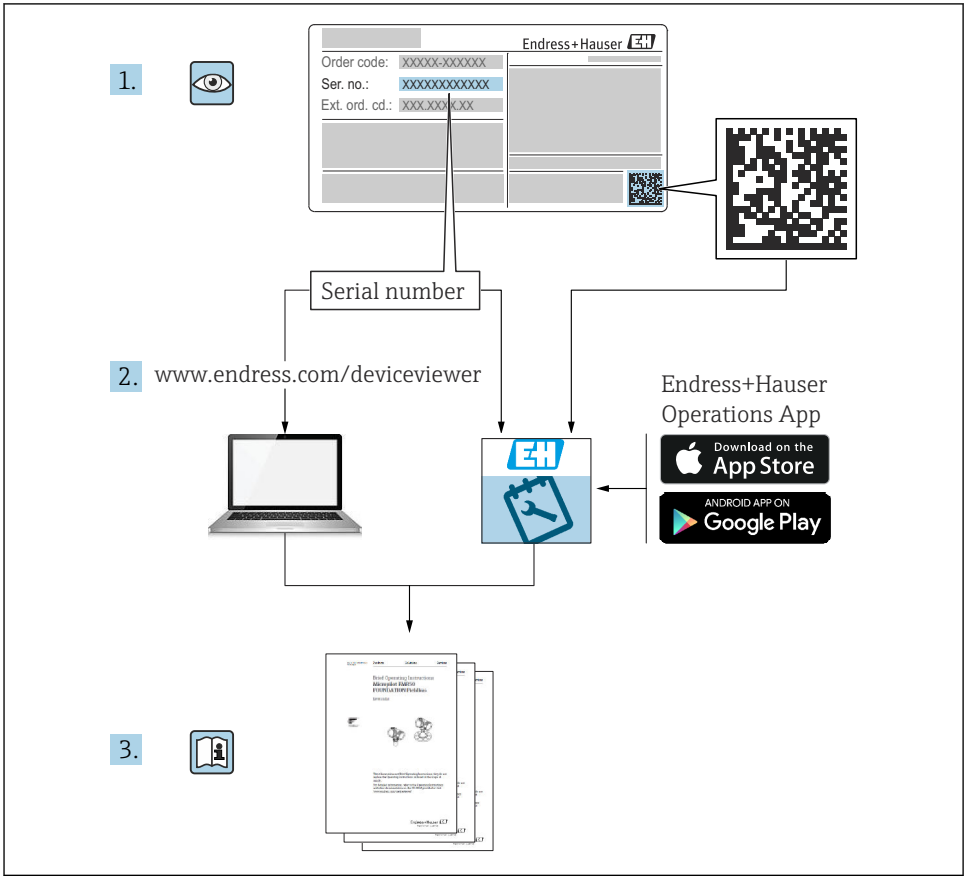
1.
Endress+Hauser
Order code: XXXXX-XXXXXX
Ser. no.: XXXXXXXXXXXX
Ext. ord. cd.: XXX.XXX-XXX
Serial number
2.
www.endress.com/deviceviewer
Endress+Hauser
Operations App
Download on the
App Store
ANDROID APP ON
Google Play
3.

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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 Instructionspart 1: Sensor**.

The "Brief Operating Instructions part 2: Transmitter" are available via:
- Internet: 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
- Smart phone/tablet: *Endress+Hauser Operations App*

Table of contents

1 About this document

1.1 Symbols

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 potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

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

NOTICE
This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.1.2 Symbols for certain types of information

Symbol	Meaning	Symbol	Meaning
	**Permitted** Procedures, processes or actions that are permitted.		**Preferred** Procedures, processes or actions that are preferred.
	**Forbidden** Procedures, processes or actions that are forbidden.		**Tip** Indicates additional information.
	Reference to documentation		Reference to page
	Reference to graphic	1., 2., 3...	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		**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Symbol	Meaning
	Potential equalization connection (PE: Protective earth) Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: ▪ Interior ground terminal: potential equalization connection is connected to the supply network. ▪ Exterior ground terminal: device is connected to the plant grounding system.

1.1.4 Communication-specific symbols

Symbol	Meaning	Symbol	Meaning
	LED LED is on.		**LED** LED is off.
	LED LED flashing.		

1.1.5 Tool symbols

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

1.1.6 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers	1., 2., 3...	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

Depending on the version ordered, the measuring instrument can also be used to measure potentially explosive [1], flammable, toxid and oxidizing media.

Measuring instruments for use in hazardous areas, in hygienic applications, or where there is an increased risk due to pressure, are specially labeled on the nameplate.

To ensure that the measuring instrument is in perfect condition during operation:
- Only use the measuring instrument in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- Using the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area (e.g. explosion protection, pressure vessel safety).
- Use the measuring instrument 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 instrument 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.

1) Not applicable for IO-Link measuring instruments

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.

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

The manufacturer 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

On receipt of the delivery:

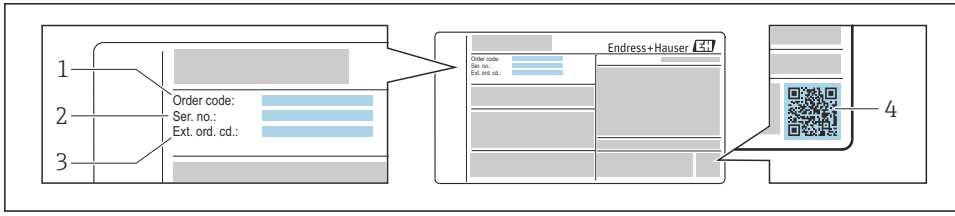
1. Check the packaging for damage.
   - ↳ Report all damage immediately to the manufacturer.
     Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.
4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.

If one of the conditions is not satisfied, contact the manufacturer.

3.2 Product identification

The device can be identified in the following ways:

- 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): 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.



1 *Example of a nameplate*

1 *Order code*
2 *Serial number*
3 *Extended order code*
4 *2-D matrix code (QR code)*

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

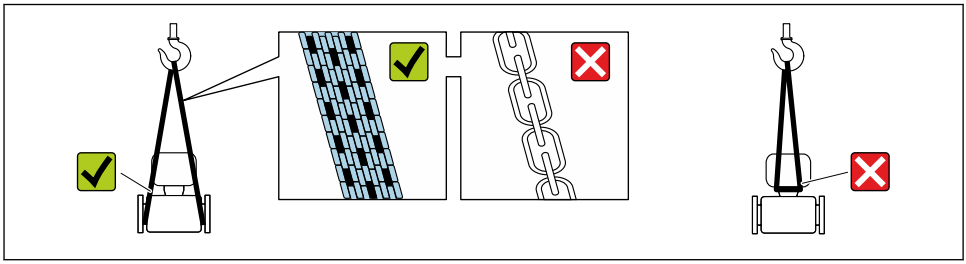
4 Storage and transport

4.1 Storage conditions

Observe the following notes for storage:
- ▶ Store in the original packaging to ensure protection from shock.
- ▶ 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.



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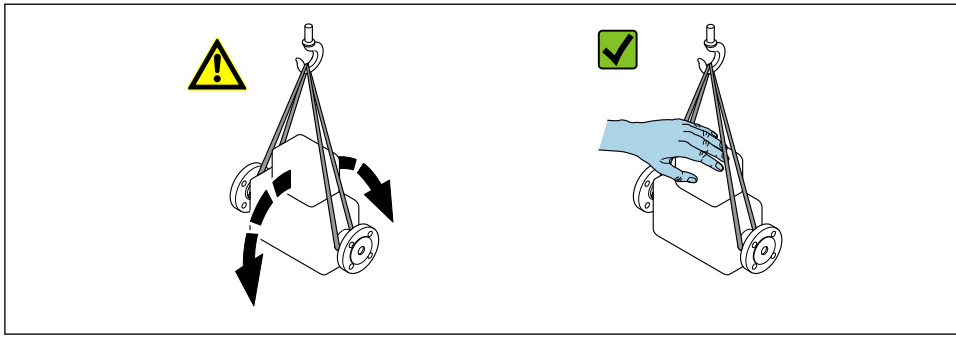
Do not remove protective covers or caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.

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).



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4.2.2 Measuring devices with lifting lugs

⚠ CAUTION

Special transportation instructions for devices with lifting lugs

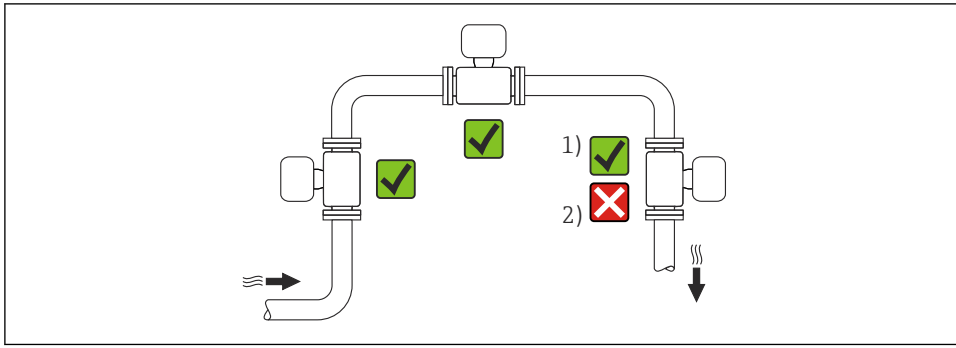
- ▶ Only use the lifting lugs fitted on the device or flanges to transport the device.
- ▶ The device must always be secured at two lifting lugs at least.

5 Installation

5.1 Installation requirements

5.1.1 Installation position

Mounting location



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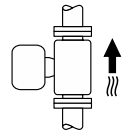
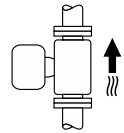
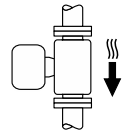
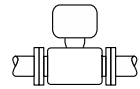
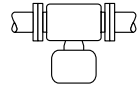
1 *Installation suitable for gases and steam*
2 *Installation not suitable for liquids*

Orientation

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

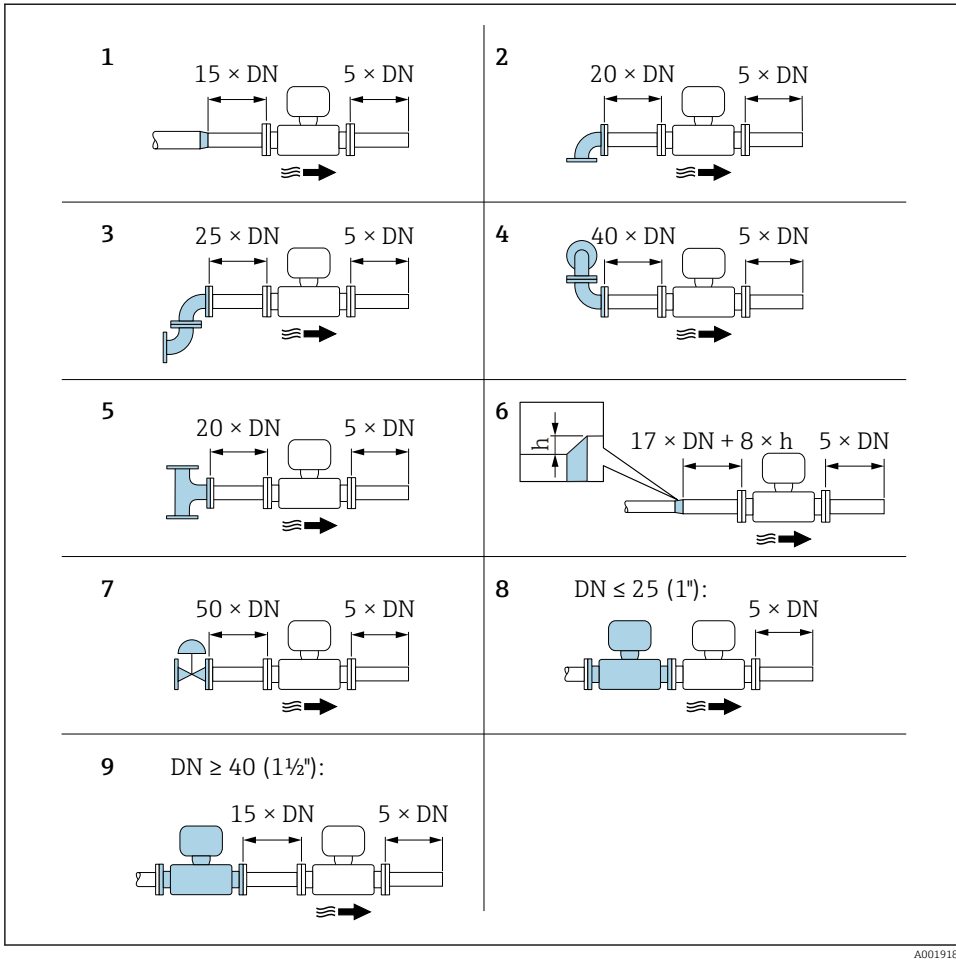
Vortex meters require a fully developed flow profile as a prerequisite for correct volume flow measurement. Therefore, please note the following:

Orientation			Recommendation	
			Compact version	Remote version
A	Vertical orientation (liquids)	 A0015591	✓✓ 1)	✓✓
A	Vertical orientation (dry gases)	 A0015591  A0041785	✓✓	✓✓
B	Horizontal orientation, transmitter head up	 A0015589	✓✓ 2)	✓✓
C	Horizontal orientation, transmitter head down	 A0015590	✓✓ 3)	✓✓
D	Horizontal orientation, transmitter head at side	 A0015592	✓✓	✓✓

1) In the case of liquids, there should be upward flow in vertical pipes to avoid partial pipe filling (Fig. A). Disruption in flow measurement!
2) In the case of hot media (e.g. steam or medium temperature (TM) ≥ 200 °C (392 °F): orientation C or D
3) In the case of very cold media (e.g. liquid nitrogen): orientation B or D

Inlet and outlet runs

To achieve the specified measurement accuracy of the measuring instrument, observe at least the inlet and outlet runs listed below.



2 *Minimum inlet and outlet runs with various flow obstructions*

h Difference in expansion
1 Reduction by one nominal diameter size
2 Single elbow (90° elbow)
3 Double elbow (2 × 90° elbows, opposite)
4 Double elbow 3D (2 × 90° elbows, opposite, not on one plane)
5 T-piece
6 Expansion

7 Control valve
8 Two measuring instruments in a row where DN ≤ 25 (1"): directly flange on flange
9 Two measuring instruments in a row where DN ≥ 40 (1½"): for spacing; see graphic

- If there are several flow disturbances present, the longest specified inlet run must be maintained.
- If the required inlet runs cannot be observed, it is possible to install a specially designed flow conditioner → 14.

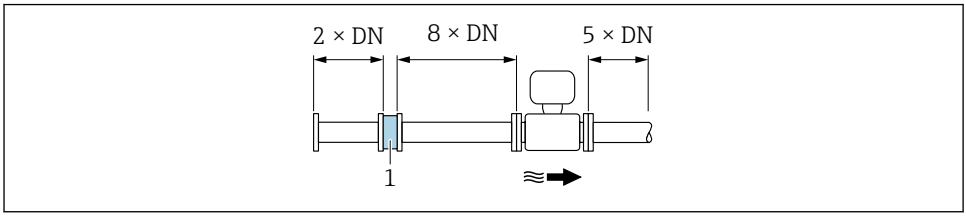
For detailed information about inlet run correction and wet steam detection, see the Special Documentation for the device

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

Flow conditioner

If the inlet runs cannot be observed, the use of a flow conditioner is recommended.

The flow conditioner is fitted between two pipe flanges and centered by the mounting bolts. Generally this reduces the inlet run needed to 10 × DN with full measurement accuracy.



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1 Flow conditioner

The pressure loss for flow conditioners is calculated as follows:

$\Delta p\ [mbar] = 0.0085 \cdot \rho\ [kg/m^3] \cdot v^2\ [m/s]$

Example for steam
p = 10 bar abs.
t = 240 °C → ρ = 4.39 kg/m³
v = 40 m/s
Δ p = 0.0085 · 4.39 · 40 ² = 59.7 mbar

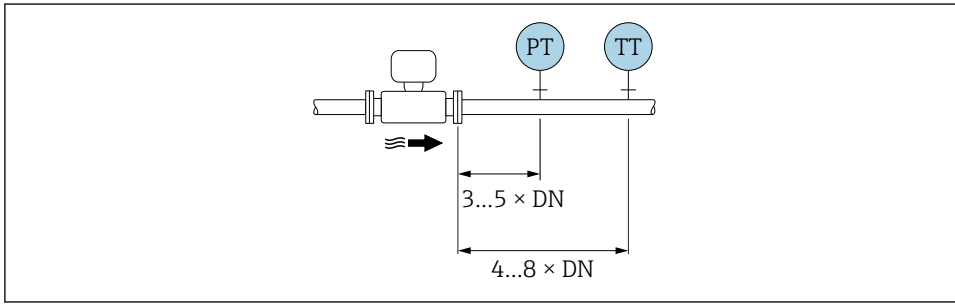
Example for H_2O condensate (80 °C)
ρ = 965 kg/m³
v = 2.5 m/s
Δ p = 0.0085 · 965 · 2.5 ² = 51.3 mbar

ρ : density of the process medium
v: average flow velocity
abs. = absolute

For the dimensions of the flow conditioner, see the "Technical Information" document, "Mechanical construction" section

Outlet runs when installing external devices

If installing an external device, observe the specified distance.



PT Pressure
TT Temperature device

5.1.2 Environmental and process requirements

Ambient temperature range

Compact version

Measuring instrument	Non-hazardous area:	−40 to +80 °C (−40 to +176 °F) [1] −40 to +80 °C (−40 to +176 °F)
	Ex i, Ex nA, Ex ec:	−40 to +70 °C (−40 to +158 °F) [1]
	Ex d, XP:	−40 to +60 °C (−40 to +140 °F) [1]
	Ex d, Ex ia:	−40 to +60 °C (−40 to +140 °F) [1]
Local display		−40 to +70 °C (−40 to +158 °F) [2] [1]

1) Additionally available as order code for "Test, certificate", option JN "Transmitter ambient temperature −50 °C (−58 °F)". This option is only available in combination with a "High-temperature sensor -200 to +400 °C(-328 to +750 °F)", see order code 060 for "Sensor version; DSC sensor; measuring tube" with options BA, BB, CA, CB.
2) At temperatures below −20 °C (−4 °F), depending on the physical characteristics involved, it may no longer be possible to read the liquid crystal display.

Remote version

Transmitter	Non-hazardous area:	−40 to +80 °C (−40 to +176 °F) [1] −40 to +80 °C (−40 to +176 °F)
	Ex i, Ex nA, Ex ec:	−40 to +80 °C (−40 to +176 °F) [1]
	Ex d:	−40 to +60 °C (−40 to +140 °F) [1]
	Ex d, Ex ia:	−40 to +60 °C (−40 to +140 °F) [1]
Sensor	Non-hazardous area:	−40 to +85 °C (−40 to +185 °F) [1]
	Ex i, Ex nA, Ex ec:	−40 to +85 °C (−40 to +185 °F) [1]
	Ex d:	−40 to +85 °C (−40 to +185 °F) [1]
	Ex d, Ex ia:	−40 to +85 °C (−40 to +185 °F) [1]
Local display		−40 to +70 °C (−40 to +158 °F) [2] [1]

1) Additionally available as order code for "Test, certificate", option JN "Transmitter ambient temperature −50 °C (−58 °F)". This option is only available in combination with a "High-temperature sensor -200 to +400 °C(-328 to +750 °F)", see order code 060 for "Sensor version; DSC sensor; measuring tube" with options BA, BB, CA, CB.
2) At temperatures < −20 °C (−4 °F), depending on the physical characteristics involved, it may no longer be possible to read the liquid crystal display.

▶ If operating outdoors:
Avoid direct sunlight, particularly in warm climatic regions.

Temperature tables

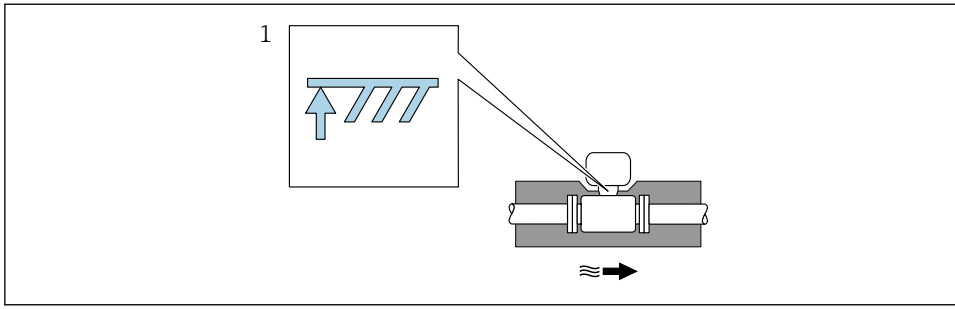
Observe the interdependencies between the permitted ambient and fluid temperatures when operating the device in hazardous areas.

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

Thermal insulation

For optimum temperature measurement and mass calculation, it is important for some media to ensure that no heat input or loss occurs in the area of the sensor. This can be ensured by installing thermal insulation. A wide range of materials can be used for the required insulation.

The maximum insulation height permitted is illustrated in the diagram:



1 Maximum insulation height

- When insulating, ensure that a sufficiently large area of the housing support remains exposed.

The uncovered part serves as a radiator and protects the electronics from overheating and excessive cooling.

NOTICE

Electronics overheating on account of thermal insulation!

- Observe the maximum permitted insulation height of the transmitter neck so that the transmitter head and/or the connection housing of the remote version is completely free.
- Observe information on the permissible temperature ranges .
- Note that a certain orientation might be required, depending on the fluid temperature .

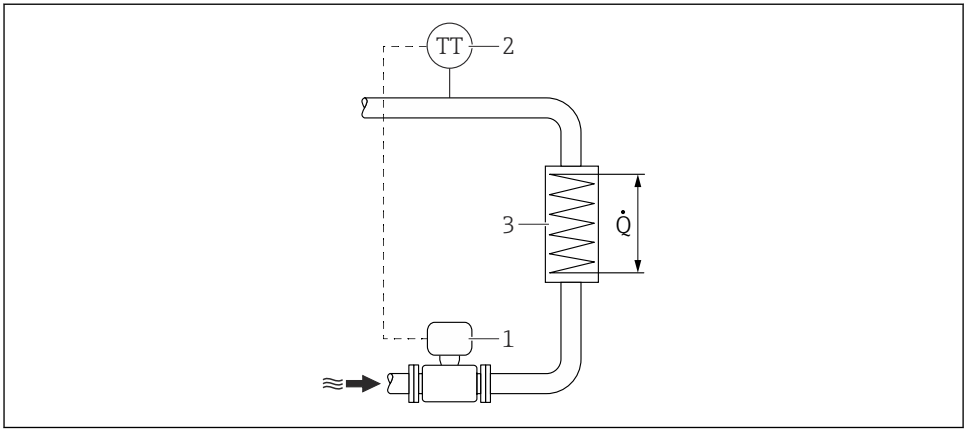
For detailed information about the fluid temperature, orientations and permitted temperature ranges, refer to the Operating Instructions for the device

5.1.3 Special mounting instructions

Installation for delta heat measurements

The second temperature measurement is taken using a separate temperature sensor. The measuring device reads in this value via a communication interface.

- In the case of saturated steam delta heat measurements, the measuring device must be installed on the steam side.
- In the case of water delta heat measurements, the device can be installed on the cold or warm side.



3 Layout for delta heat measurement of saturated steam and water

1 Measuring device
2 Temperature sensor
3 Heat exchanger
Q Heat flow

Protective cover

Observe the following minimum head clearance: 222 mm (8.74 in)

5.2 Installing the measuring instrument

For detailed information about turning the transmitter housing and display module, see the Brief Operating Instructions for the transmitter → 3

5.2.1 Required tools

For transmitter

- For turning the transmitter housing: Open-ended wrench8 mm
- For opening the securing clamps: Allen key3 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 any protective covers or protective caps present from the sensor.
3. Remove stick-on label on the electronics compartment cover.

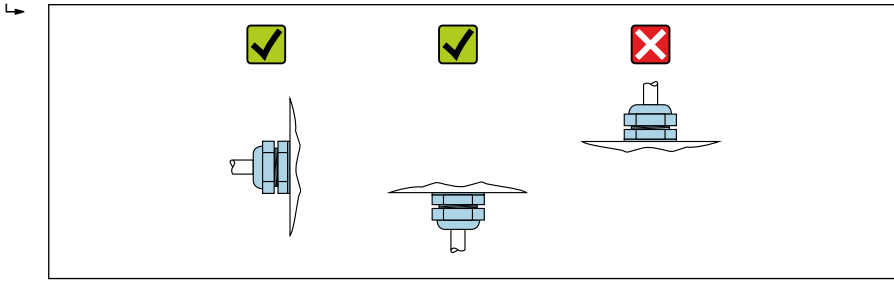
5.2.3 Installing the sensor

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 and sealing surfaces are clean and undamaged.
- ▶ Secure the seals correctly.

1. Ensure that the direction of the arrow on the sensor matches the flow direction of the medium.
2. Install the measuring instrument between the pipe flanges such that it is centered in the measurement section.
3. Install the measuring instrument or turn the transmitter housing so that the cable entries do not point upwards.



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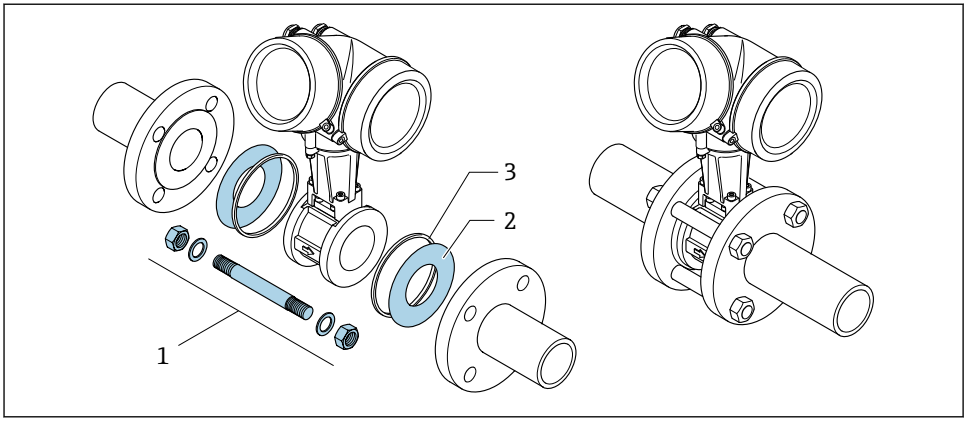
Mounting set for disc (wafer version)

The centering rings supplied are used to mount and center the wafer-style devices.

A mounting set comprises:

- Tie rods
- Seals
- Nuts
- Washers



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4 Mounting set for wafer version

1 Nut, washer, tie rod
2 Seal
3 Centering ring (is supplied with the measuring instrument)

A mounting set can be ordered separately as an accessory.

5.3 Post-mounting check

Is the device undamaged (visual inspection)?	❑
Does the measuring instrument correspond to the measuring point specifications? For example: ▪ Process temperature ▪ Process pressure (refer to the section on "Pressure/temperature ratings" in the "Technical Information" document) ▪ Ambient temperature ▪ Measuring range	❑
Has the correct orientation been selected for the sensor → 🖹 12? ▪ According to sensor type ▪ As per medium temperature ▪ As per medium properties (outgassing, with entrained solids)	❑
Does the arrow on the sensor match the direction of flow of the medium → 🖹 12?	❑
Is the tag name and labeling correct (visual inspection)?	❑
Is the device sufficiently protected from precipitation and direct sunlight?	❑
Are the securing screw and securing clamp tightened securely?	❑
Has the maximum permitted insulation height been observed?	❑

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.

www.addresses.endress.com

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