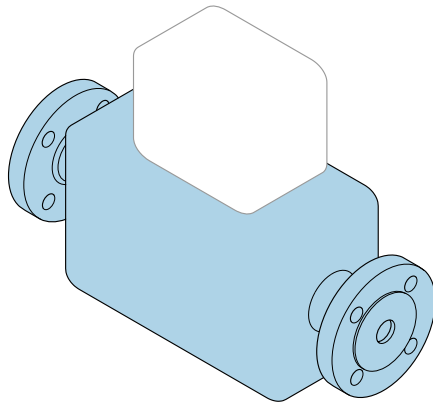


# Brief Operating Instructions

## Proline Promag E

Electromagnetic sensor



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

### **Sensor Brief Operating Instructions**

Contain information about the sensor.

Transmitter Brief Operating Instructions →  3.



A0023555

## Brief Operating Instructions for the device

The device consists of a transmitter and a sensor.

The process of commissioning these two components is described in two separate manuals:

- Sensor Brief Operating Instructions
- Transmitter Brief Operating Instructions

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

### Sensor Brief Operating Instructions

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

- Incoming acceptance and product identification
- Storage and transport
- Installation

### Transmitter Brief Operating Instructions

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
- Installation
- Electrical connection
- Operation options
- System integration
- Commissioning
- Diagnostic information

## Additional device documentation



These Brief Operating Instructions are the **Sensor Brief Operating Instructions**.

The "Transmitter Brief Operating Instructions" 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*





# Table of contents

<b>1</b>	<b>Document information</b> .....	<b>5</b>
1.1	Symbols used .....	5
<b>2</b>	<b>Basic safety instructions</b> .....	<b>8</b>
2.1	Requirements for the personnel .....	8
2.2	Designated use .....	8
2.3	Workplace safety .....	9
2.4	Operational safety .....	9
2.5	Product safety .....	9
2.6	IT security .....	10
<b>3</b>	<b>Incoming acceptance and product identification</b> .....	<b>11</b>
3.1	Incoming acceptance .....	11
3.2	Product identification .....	12
<b>4</b>	<b>Storage and transport</b> .....	<b>13</b>
4.1	Storage conditions .....	13
4.2	Transporting the product .....	13
<b>5</b>	<b>Installation</b> .....	<b>15</b>
5.1	Installation conditions .....	15
5.2	Mounting the measuring device .....	19
5.3	Post-installation check .....	22
<b>6</b>	<b>Disposal</b> .....	<b>23</b>
6.1	Removing the measuring device .....	23
6.2	Disposing of the measuring device .....	23
<b>7</b>	<b>Appendix</b> .....	<b>23</b>
7.1	Screw tightening torques .....	23











# 1 Document information

## 1.1 Symbols used





### 1.1.1 Safety symbols


Symbol	Meaning
	<b>DANGER!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
	<b>WARNING!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
	<b>CAUTION!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
	<b>NOTE!</b> 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		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>Protective Earth (PE)</b> A terminal which must be connected to ground prior to establishing any other connections.</p> <p>The ground terminals are situated inside and outside the device:</p> <ul style="list-style-type: none"> <li>▪ Inner ground terminal: Connects the protective earth to the mains supply.</li> <li>▪ Outer ground terminal: Connects the device to the plant grounding system.</li> </ul>

### 1.1.4 Communication 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 off.</p>		<p><b>LED</b> Light emitting diode is on.</p>
	<p><b>LED</b> Light emitting diode is flashing.</p>		




Symbol	Meaning	Symbol	Meaning
	<p><b>Wireless Local Area Network (WLAN)</b> Communication via a wireless, local network.</p>		<p><b>LED</b> Light emitting diode is off.</p>
	<p><b>LED</b> Light emitting diode is on.</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
	Cross-head screwdriver		Allen key
	Open-ended wrench		

### 1.1.6 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3, ...	Item numbers	<u>1</u> , <u>2</u> , <u>3</u> ...	Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections

Symbol	Meaning	Symbol	Meaning
	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 Designated use

#### Application and media

The measuring device is only suitable for flow measurement of liquids with a minimum conductivity of 5  $\mu\text{S}/\text{cm}$ .

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

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

To ensure that the measuring device remains in proper condition for the operation time:

- ▶ Keep within the specified pressure and temperature range.
- ▶ 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.
- ▶ Based on 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 device only for media to which the process-wetted materials are sufficiently resistant.
- ▶ If the measuring device is not operated at atmospheric temperature, compliance with the relevant basic conditions specified in the associated device documentation is absolutely essential: "Documentation" section.
- ▶ 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!

- ▶ 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****⚠ WARNING****The electronics and the medium may cause the surfaces to heat up. This presents a burn hazard!**

- ▶ For elevated fluid temperatures, ensure protection against contact to prevent burns.

## 2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

For welding work on the piping:

- ▶ Do not ground the welding unit via the measuring device.

If working on and with the device with wet hands:

- ▶ Due to the increased risk of electric shock, gloves must be worn.

## 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.

**Environmental requirements**

If a plastic transmitter housing is permanently exposed to certain steam and air mixtures, this can damage the housing.

- ▶ If you are unsure, please contact your Endress+Hauser Sales Center for clarification.
- ▶ If used in an approval-related area, observe the information on the nameplate.

## 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. Endress+Hauser confirms this by affixing the CE mark to the device.

## 2.6 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

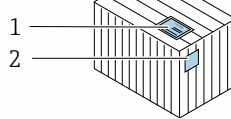
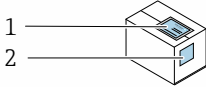
IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

### 3 Incoming acceptance and product identification

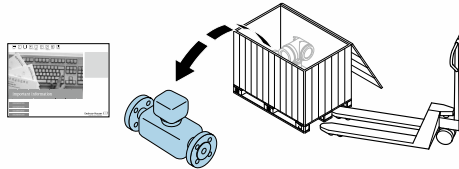
#### 3.1 Incoming acceptance



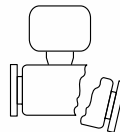
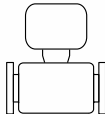
A0028673



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



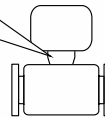
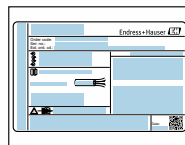
A0028673



Are the goods undamaged?



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Do the nameplate data match the ordering information on the delivery note?



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Is the CD-ROM with the Technical Documentation (depends on device version) and documents present?

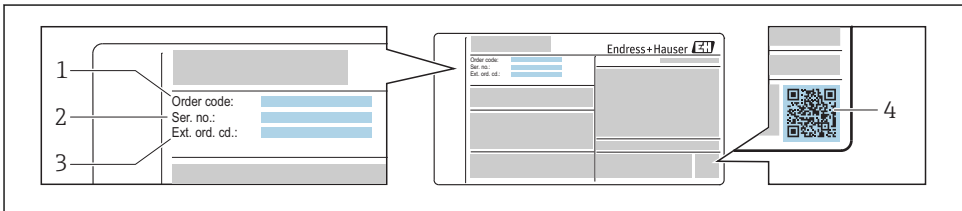


- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
- Depending on the device version, the CD-ROM might not be part of the delivery! The Technical Documentation is available via the Internet or via the *Endress+Hauser Operations App*.

## 3.2 Product identification

The following options are available for identification of the measuring device:

- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in *W@M Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): All information about the measuring device is displayed.
- Enter the serial number from the nameplates into the *Endress+Hauser Operations App* or scan the 2-D matrix code (QR code) on the nameplate with the *Endress+Hauser Operations App*: all the information for the measuring 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 breakdown of the specifications on the nameplate, see the Operating Instructions for the device .

## 4 Storage and transport

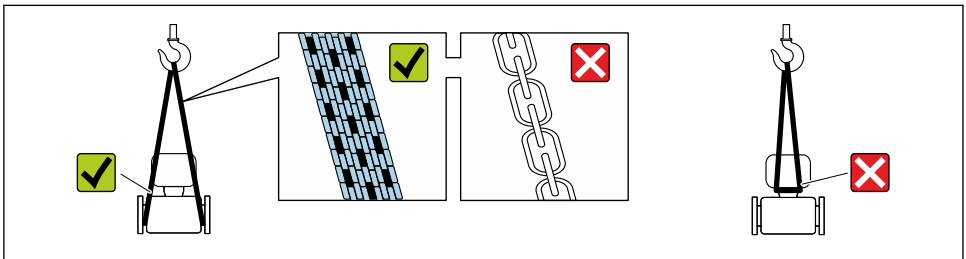
### 4.1 Storage conditions

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 to avoid unacceptably high surface temperatures.
- ▶ Select a storage location where moisture cannot collect in the measuring device as fungus and bacteria infestation can damage the lining.
- ▶ Store in a dry and dust-free place.
- ▶ Store in a dry 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.

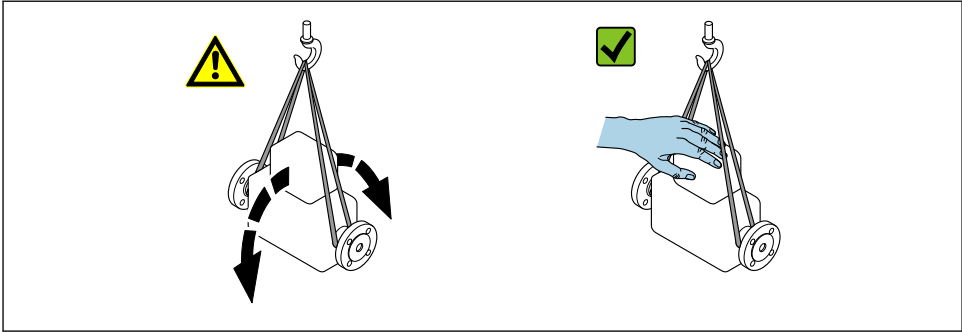
#### 4.2.1 Measuring devices without lifting lugs

##### **⚠ 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.

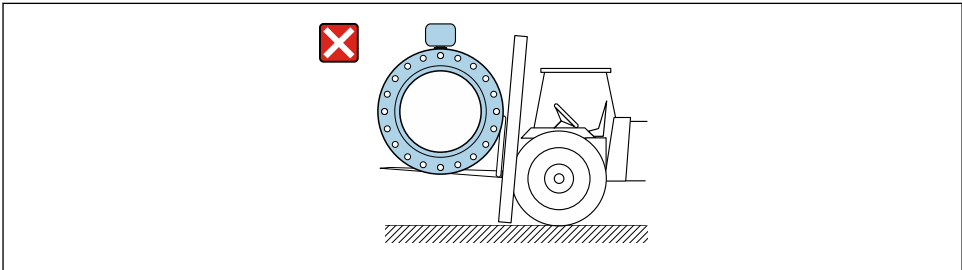
#### 4.2.3 Transporting with a fork lift

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

##### **CAUTION**

##### Risk of damaging the magnetic coil

- ▶ If transporting by forklift, do not lift the sensor by the metal casing.
- ▶ This would buckle the casing and damage the internal magnetic coils.



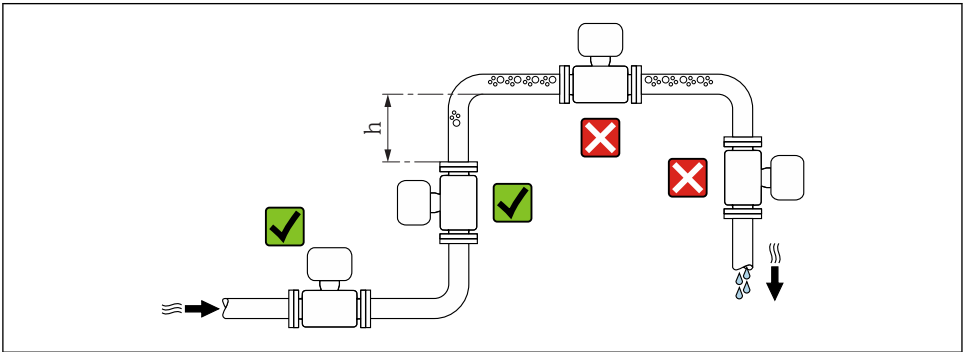
A0029219

## 5 Installation

### 5.1 Installation conditions

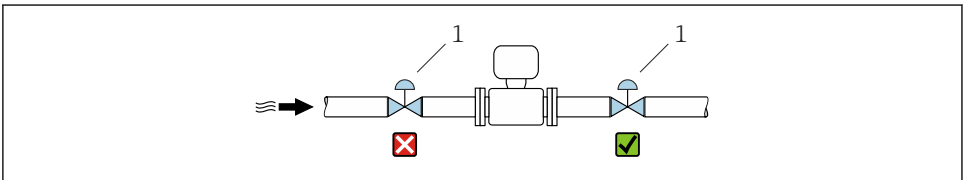
#### 5.1.1 Mounting position

##### Mounting location



A0029343

$$h \geq 2 \times DN$$



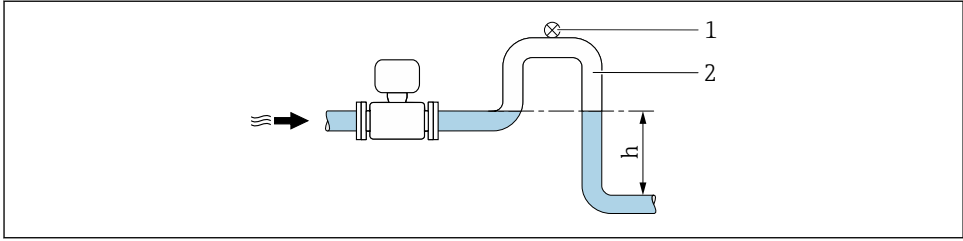
A0033017

❏ 2 Installation of the sensor after a control valve is not recommended

1 Control valve

##### Installation in down pipes

Install a siphon with a vent valve downstream of the sensor in down pipes whose length  $h \geq 5 \text{ m}$  (16.4 ft). This precaution is to avoid low pressure and the consequent risk of damage to the measuring tube. This measure also prevents the system losing prime.



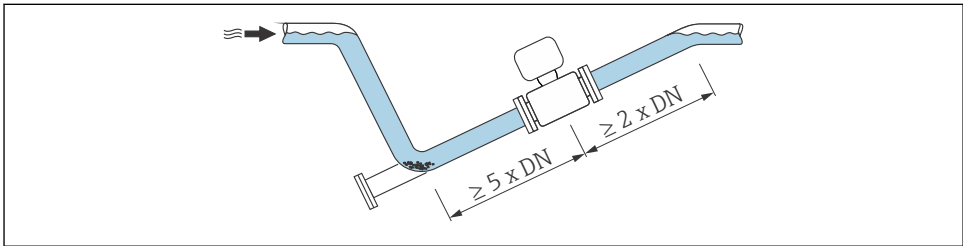
A0028981

3 Installation in a down pipe

- 1 Vent valve
- 2 Pipe siphon
- h Length of down pipe

Installation in partially filled pipes

A partially filled pipe with a gradient necessitates a drain-type configuration.



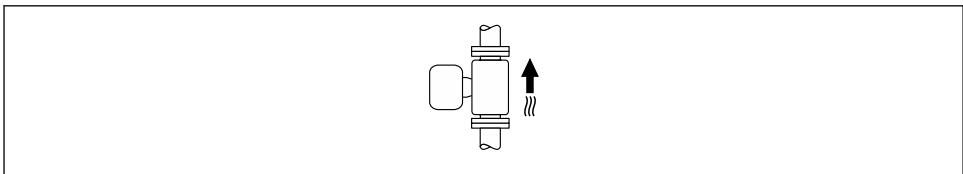
A0029257

**Orientation**

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

An optimum orientation position helps avoid gas and air accumulations and deposits in the measuring tube.

*Vertical*



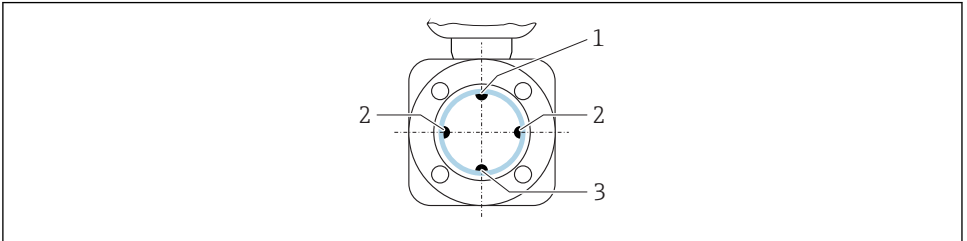
A0015591



Optimum for self-emptying pipe systems and for use in conjunction with empty pipe detection.

### Horizontal

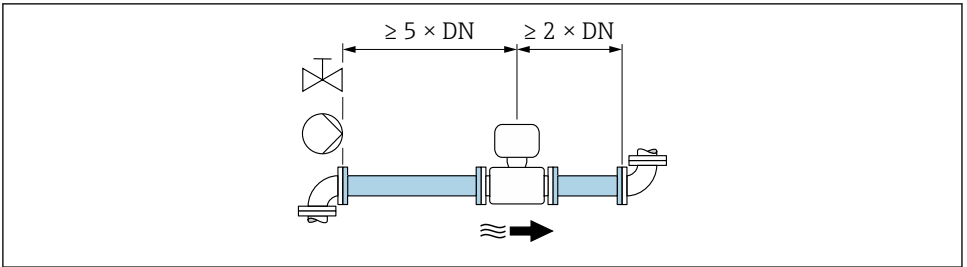
- Ideally, the measuring electrode plane should be horizontal. This prevents brief insulation of the two measuring electrodes by entrained air bubbles.
- Empty pipe detection only works if the transmitter housing is pointing upwards as otherwise there is no guarantee that the empty pipe detection function will actually respond to a partially filled or empty measuring tube.



A0029344

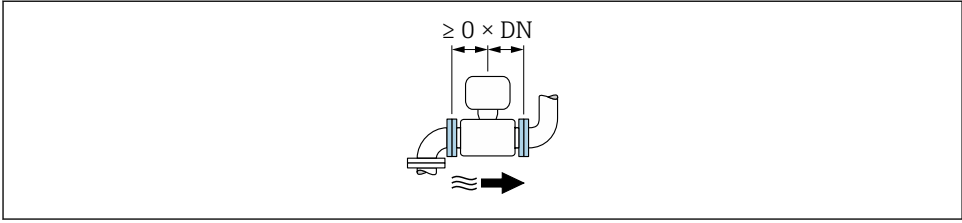
- 1 EPD electrode for empty pipe detection
- 2 Measuring electrodes for signal detection
- 3 Reference electrode for potential equalization

### Inlet and outlet runs




A0028997

- 4 Order code for "Design", option A "Insertion length short, ISO/DVGW until DN400, DN450-2000 1:1" and order code for "Design", option B "Insertion length long, ISO/DVGW until DN400, DN450-2000 1:1.3"




A0032859

- 5 Order code for "Design", option C "Insertion length short ISO/DVGW until DN300, w/o inlet and outlet runs, constricted meas.tube"

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

### 5.1.2 Requirements from environment and process


#### Ambient temperature range

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

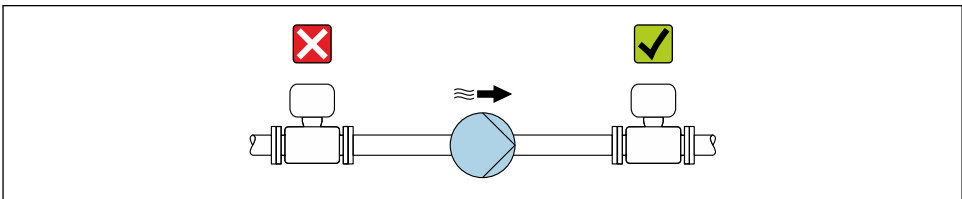
If operating outdoors:

- Install 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.

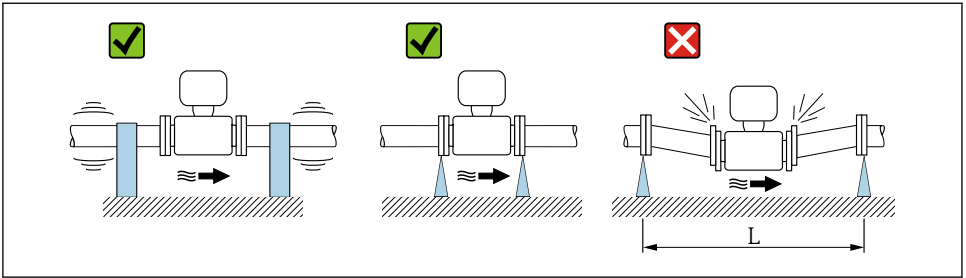
#### System pressure



A0028777

 Furthermore, install pulse dampers if reciprocating, diaphragm or peristaltic pumps are used.

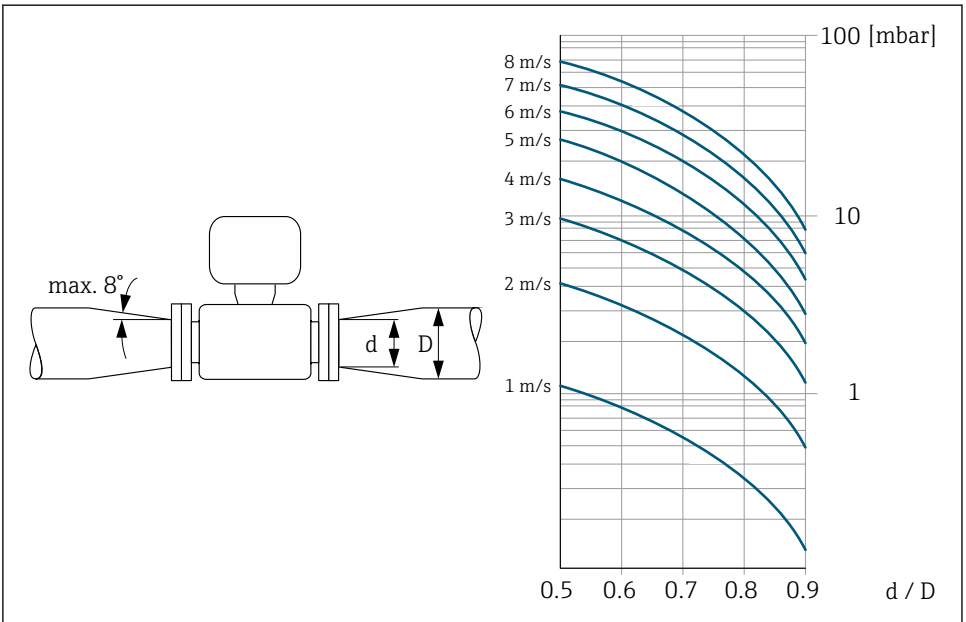
### Vibrations



A0029004

6 Measures to avoid device vibrations ( $L > 10\text{ m}$  (33 ft))

### Adapters



A0029002

## 5.2 Mounting the measuring device

### 5.2.1 Required tools

For flanges and other process connections, use an appropriate 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 Mounting the sensor

### **⚠ WARNING**

#### **An electrically conductive layer could form on the inside of the measuring tube!**

Risk of measuring signal short circuit.

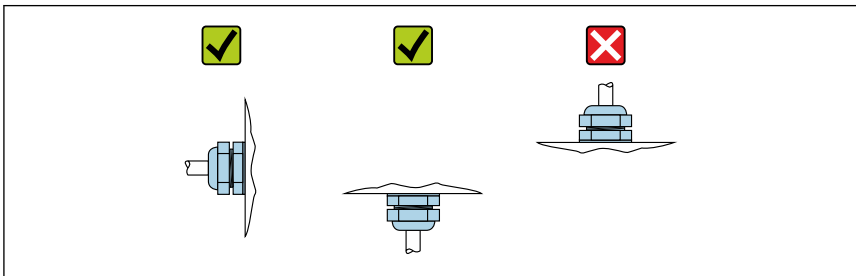
- ▶ Ensure that the inside diameters of the gaskets are greater than or equal to that of the process connections and piping.
- ▶ Ensure that the gaskets are clean and undamaged.
- ▶ Install the gaskets correctly.
- ▶ Do not use electrically conductive sealing compounds such as graphite.

### **⚠ 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 gaskets are clean and undamaged.
- ▶ Install the gaskets correctly.

1. Ensure that the direction of the arrow on the sensor matches the flow direction of the medium.
2. To ensure compliance with device specifications, install the measuring device between the pipe flanges in a way that it is centered in the measurement section.
3. If using ground disks, comply with the Installation Instructions provided.
4. Observe required screw tightening torques .
5. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.



A0029263

## Mounting the seals

### CAUTION

**An electrically conductive layer could form on the inside of the measuring tube!**

Risk of measuring signal short circuit.

- ▶ Do not use electrically conductive sealing compounds such as graphite.

Comply with the following instructions when installing seals:

- When mounting the process connections, make sure that the seals concerned are clean and centered correctly.
- For DIN flanges: only use seals according to DIN EN 1514-1.
- For "PTFE" lining: generally additional seals are **not** required.

## Mounting the ground cable/ground disks

For information on potential equalization and detailed mounting instructions for the use of ground cables/ground disks, see the Transmitter Brief Operating Instructions.

## Screw tightening torques

→  23

## 5.3 Post-installation check

Is the device undamaged (visual inspection)?	<input type="checkbox"/>
Does the measuring device conform to the measuring point specifications? For example: <ul style="list-style-type: none"> <li>▪ Process temperature</li> <li>▪ Process pressure (refer to the section on "Pressure-temperature ratings" in the "Technical Information" document)</li> <li>▪ Ambient temperature</li> <li>▪ Measuring range</li> </ul>	<input type="checkbox"/>
Has the correct orientation for the sensor been selected ? <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>	<input type="checkbox"/>
Does the arrow on the sensor nameplate match the direction of flow of the fluid through the piping ?	<input type="checkbox"/>
Are the measuring point identification and labeling correct (visual inspection)?	<input type="checkbox"/>
Is the device adequately protected from precipitation and direct sunlight?	<input type="checkbox"/>
Have the fixing screws been tightened with the correct tightening torque?	<input type="checkbox"/>

## 6 Disposal

### 6.1 Removing the measuring device

1. Switch off the device.

#### WARNING

#### **Danger to persons from process conditions.**

- ▶ Beware of hazardous process conditions such as pressure in the measuring device, high temperatures or aggressive fluids.

2. Carry out the mounting and connection steps from the "Mounting the measuring device" and "Connecting the measuring device" sections in reverse order. 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.

Observe the following notes during disposal:

- ▶ Observe valid federal/national regulations.
- ▶ Ensure proper separation and reuse of the device components.

## 7 Appendix

### 7.1 Screw tightening torques



For detailed information on the screw tightening torques, see the "Mounting the sensor" section of the Operating Instructions for the device

Please note the following:

- The torques listed only apply:
  - For lubricated threads.
  - For pipes that are free from tensile stress.
- Tighten the screws uniformly and in diagonally opposite sequence.
- Overtightening the screws will deform the sealing faces or damage the seals.

## EN 1092-1 (DIN 2501), PN 10/16/25/40

Nominal diameter [mm]	Pressure rating [bar]	Screws [mm]	Flange thickness [mm]	Max. screw tightening torque [Nm]	
				PTFE	PFA
15	PN 40	4 × M12	16	11	–
25	PN 40	4 × M12	18	26	20
32	PN 40	4 × M16	18	41	35
40	PN 40	4 × M16	18	52	47
50	PN 40	4 × M16	20	65	59
65 <sup>1)</sup>	PN 16	8 × M16	18	43	40
65	PN 40	8 × M16	22	43	40
80	PN 16	8 × M16	20	53	48
80	PN 40	8 × M16	24	53	48
100	PN 16	8 × M16	20	57	51
100	PN 40	8 × M20	24	78	70
125	PN 16	8 × M16	22	75	67
125	PN 40	8 × M24	26	111	99
150	PN 16	8 × M20	22	99	85
150	PN 40	8 × M24	28	136	120
200	PN 10	8 × M20	24	141	101
200	PN 16	12 × M20	24	94	67
200	PN 25	12 × M24	30	138	105
250	PN 10	12 × M20	26	110	–
250	PN 16	12 × M24	26	131	–
250	PN 25	12 × M27	32	200	–
300	PN 10	12 × M20	26	125	–
300	PN 16	12 × M24	28	179	–
300	PN 25	16 × M27	34	204	–
350	PN 10	16 × M20	26	188	–
350	PN 16	16 × M24	30	254	–
350	PN 25	16 × M30	38	380	–
400	PN 10	16 × M24	26	260	–
400	PN 16	16 × M27	32	330	–
400	PN 25	16 × M33	40	488	–



Nominal diameter [mm]	Pressure rating [bar]	Screws [mm]	Flange thickness [mm]	Max. screw tightening torque [Nm]	
				PTFE	PFA
450	PN 10	20 × M24	28	235	-
450	PN 16	20 × M27	40	300	-
450	PN 25	20 × M33	46	385	-
500	PN 10	20 × M24	28	265	-
500	PN 16	20 × M30	34	448	-
500	PN 25	20 × M33	48	533	-
600	PN 10	20 × M27	28	345	-
600 <sup>1)</sup>	PN 16	20 × M33	36	658	-
600	PN 25	20 × M36	58	731	-

1) Designed acc. to EN 1092-1 (not to DIN 2501)

*EN 1092-1 (DIN 2501), PN 10/16/25, P245GH/stainless; calculated according to EN 1591-1:2014 for flanges as per EN 1092-1:2013*

Nominal diameter [mm]	Pressure rating [bar]	Screws [mm]	Flange thickness [mm]	Nom. screw tightening torque [Nm]
				PTFE
350	PN 10	16 × M20	26	60
350	PN 16	16 × M24	30	115
350	PN 25	16 × M30	38	220
400	PN 10	16 × M24	26	90
400	PN 16	16 × M27	32	155
400	PN 25	16 × M33	40	290
450	PN 10	20 × M24	28	90
450	PN 16	20 × M27	34	155
450	PN 25	20 × M33	46	290
500	PN 10	20 × M24	28	100
500	PN 16	20 × M30	36	205
500	PN 25	20 × M33	48	345
600	PN 10	20 × M27	30	150
600	PN 16	20 × M33	40	310
600	PN 25	20 × M36	48	500

*ASME B16.5, Class 150/300*

Nominal diameter		Pressure rating	Screws	Max. screw tightening torque [Nm] ([lbf · ft])	
[mm]	[in]			[psi]	[in]
15	½	Class 150	4 × ½	6 (4)	- (-)
15	½	Class 300	4 × ½	6 (4)	- (-)
25	1	Class 150	4 × ½	11 (8)	10 (7)
25	1	Class 300	4 × 5/8	14 (10)	12 (9)
40	1 ½	Class 150	4 × ½	24 (18)	21 (15)
40	1 ½	Class 300	4 × ¾	34 (25)	31 (23)
50	2	Class 150	4 × 5/8	47 (35)	44 (32)
50	2	Class 300	8 × 5/8	23 (17)	22 (16)
80	3	Class 150	4 × 5/8	79 (58)	67 (49)
80	3	Class 300	8 × ¾	47 (35)	42 (31)
100	4	Class 150	8 × 5/8	56 (41)	50 (37)
100	4	Class 300	8 × ¾	67 (49)	59 (44)
150	6	Class 150	8 × ¾	106 (78)	86 (63)
150	6	Class 300	12 × ¾	73 (54)	67 (49)
200	8	Class 150	8 × ¾	143 (105)	109 (80)
250	10	Class 150	12 × 7/8	135 (100)	- (-)
300	12	Class 150	12 × 7/8	178 (131)	- (-)
350	14	Class 150	12 × 1	260 (192)	- (-)
400	16	Class 150	16 × 1	246 (181)	- (-)
450	18	Class 150	16 × 1 1/8	371 (274)	- (-)
500	20	Class 150	20 × 1 1/8	341 (252)	- (-)
600	24	Class 150	20 × 1 ¼	477 (352)	- (-)

*JIS B2220, 10/20K*

Nominal diameter	Pressure rating	Screws	Max. screw tightening torque [Nm]	
			PTFE	PFA
[mm]	[bar]	[mm]		
25	10K	4 × M16	32	27
25	20K	4 × M16	32	27
32	10K	4 × M16	38	-
32	20K	4 × M16	38	-

Nominal diameter [mm]	Pressure rating [bar]	Screws [mm]	Max. screw tightening torque [Nm]	
			PTFE	PFA
40	10K	4 × M16	41	37
40	20K	4 × M16	41	37
50	10K	4 × M16	54	46
50	20K	8 × M16	27	23
65	10K	4 × M16	74	63
65	20K	8 × M16	37	31
80	10K	8 × M16	38	32
80	20K	8 × M20	57	46
100	10K	8 × M16	47	38
100	20K	8 × M20	75	58
125	10K	8 × M20	80	66
125	20K	8 × M22	121	103
150	10K	8 × M20	99	81
150	20K	12 × M22	108	72
200	10K	12 × M20	82	54
200	20K	12 × M22	121	88
250	10K	12 × M22	133	–
250	20K	12 × M24	212	–
300	10K	16 × M22	99	–
300	20K	16 × M24	183	–

*JIS B2220, 10/20K*

Nominal diameter [mm]	Pressure rating [bar]	Screws [mm]	Nom. screw tightening torque [Nm]	
			PUR	HG
350	10K	16 × M22	109	109
350	20K	16 × M30×3	217	217
400	10K	16 × M24	163	163
400	20K	16 × M30×3	258	258
450	10K	16 × M24	155	155
450	20K	16 × M30×3	272	272
500	10K	16 × M24	183	183
500	20K	16 × M30×3	315	315

Nominal diameter [mm]	Pressure rating [bar]	Screws [mm]	Nom. screw tightening torque [Nm]	
			PUR	HG
600	10K	16 × M30	235	235
600	20K	16 × M36×3	381	381
700	10K	16 × M30	300	300
750	10K	16 × M30	339	339

AS 2129, Table E

Nominal diameter [mm]	Screws [mm]	Max. screw tightening torque [Nm]
		PTFE
25	4 × M12	21
50	4 × M16	42

AS 4087, PN 16

Nominal diameter [mm]	Screws [mm]	Max. screw tightening torque [Nm]
		PTFE
50	4 × M16	42







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