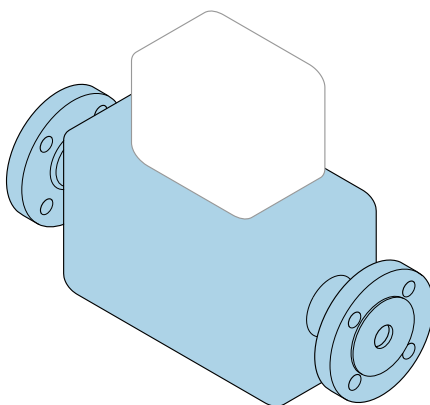


Brief Operating Instructions

Proline Prosonic Flow P

Ultrasonic time-of-flight sensor



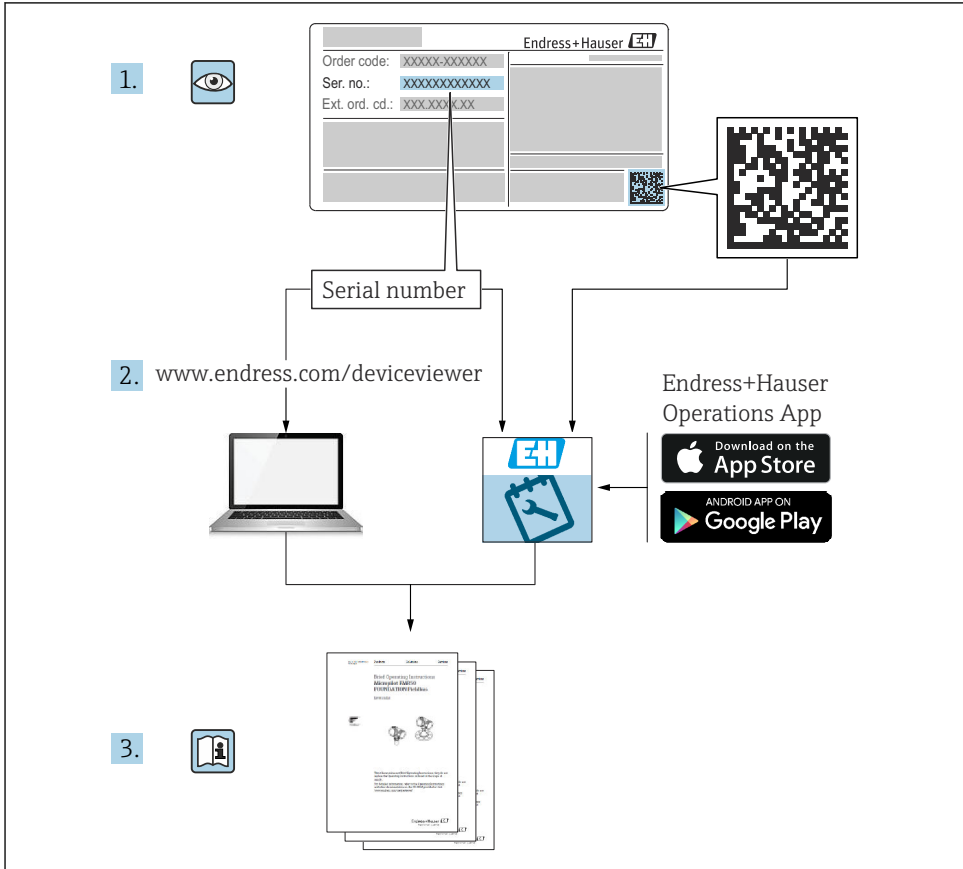
These instructions are Brief Operating Instructions; they are **not** a substitute for the Operating Instructions pertaining to the device.

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 for flowmeter

The device consists of a transmitter and a sensor.

The process of commissioning these two components is described in two separate manuals that 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
- Installation

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
- Installation
- 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
- 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*

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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
	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		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
	<p>Protective Earth (PE) 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">■ Inner ground terminal: Connects the protectiv earth to the mains supply.■ Outer ground terminal: Connects the device to the plant grounding system.

1.1.4 Tool symbols

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

1.1.5 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 Designated use

Application and media

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

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).
- ▶ If the ambient temperature of the measuring device is outside the atmospheric temperature, it is absolutely essential to comply with the relevant basic conditions as specified in the device documentation.
- ▶ 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.

Residual risks



The electronics and the medium may cause the surfaces to heat up or freeze. This presents a burn hazard!

- ▶ For elevated or low fluid temperatures, ensure protection against contact.

2.3 Workplace safety

For work on and with the device:

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

If mounting the sensors and tensioning bands:

- ▶ Due to the increased risk of cuts, gloves and goggles must be worn.

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.

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.

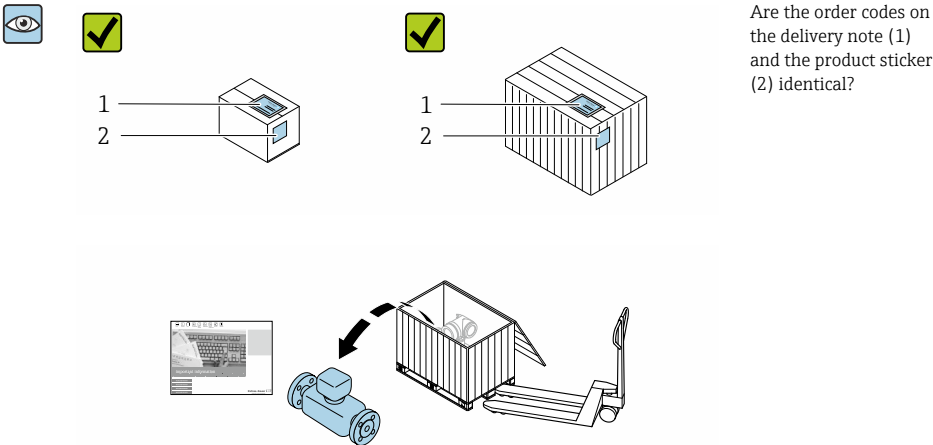
2.6 IT security

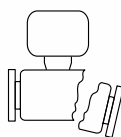
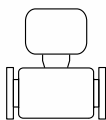
Our warranty is valid only if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

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

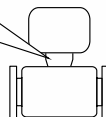
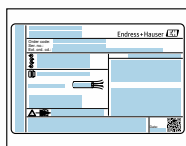
3 Incoming acceptance and product identification

3.1 Incoming acceptance





Are the goods undamaged?



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



Is the envelope present with accompanying documents?

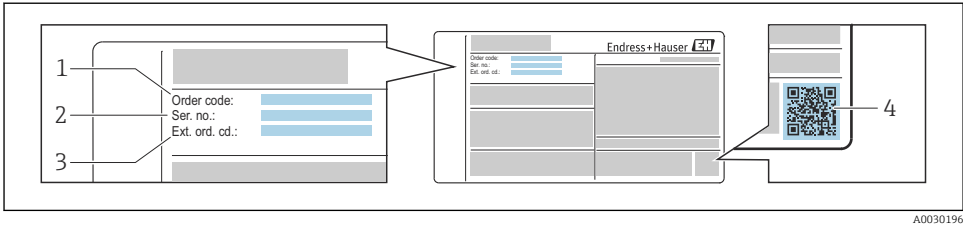


- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
- The Technical Documentation is available via the Internet or via the *Endress+Hauser Operations App*.

3.2 Product identification

The following options are available for identification of the device:


- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in the *W@M Device Viewer* (www.endress.com/deviceviewer): All information about the device is displayed.
- Enter the serial number from nameplates in the *Endress+Hauser Operations App* or scan the 2-D matrix code (QR code) on the nameplate using the *Endress+Hauser Operations App*: All 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 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.
- ▶ Protect from direct sunlight to 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.

4.2.1 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.

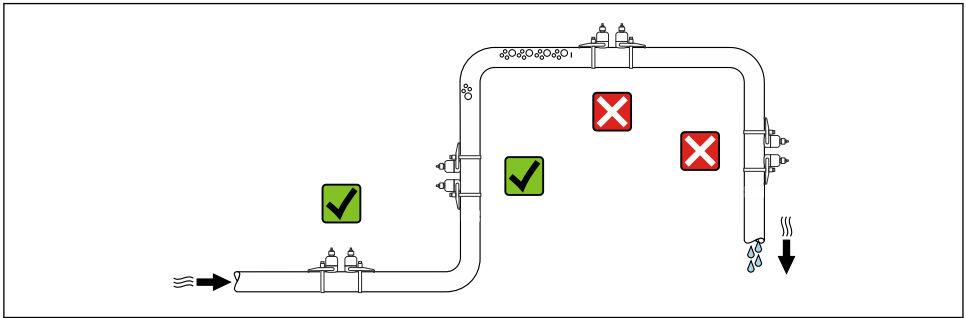
5 Installation

5.1 Mounting conditions

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

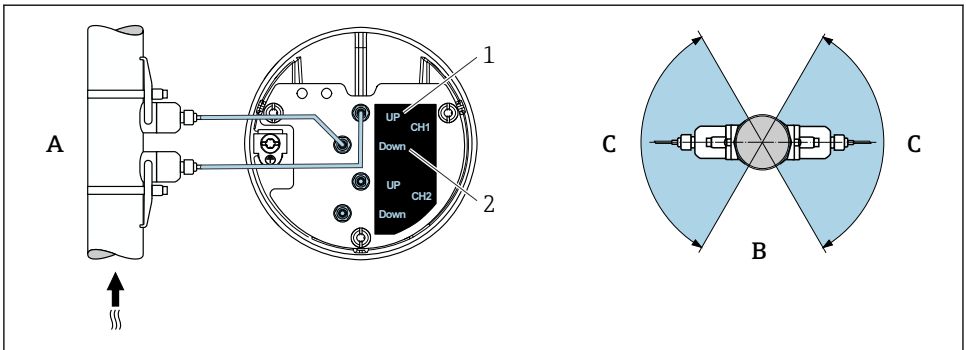
5.1.1 Mounting position

Mounting location



A0042039

Orientation



A0041970

2 Orientation views

- 1 Channel 1 upstream
- 2 Channel 1 downstream
- A Recommended orientation with upward direction of flow
- B Non-recommended installation range with horizontal orientation (30°)
- C Recommended installation range max. 120°

Vertical

Recommended orientation with upward direction of flow (View A). With this orientation, entrained solids will sink and gases will rise away from the sensor area when the medium is not flowing. Furthermore, the pipe can be completely drained and protected against the buildup of deposits.

Horizontal

In the recommended installation range with a horizontal orientation (View B), gas and air accumulations at the top of the pipe and interference from deposit buildup at the bottom of the pipe can influence the measurement to a lesser degree.

Inlet and outlet runs

If possible, the sensor should be installed upstream from valves, T-sections, pumps etc. If this is not possible, the inlet and outlet runs indicated below must be maintained at the very minimum in order to attain the specified level of accuracy of the measuring device. If there are several flow disturbances present, the longest specified inlet run must be maintained.



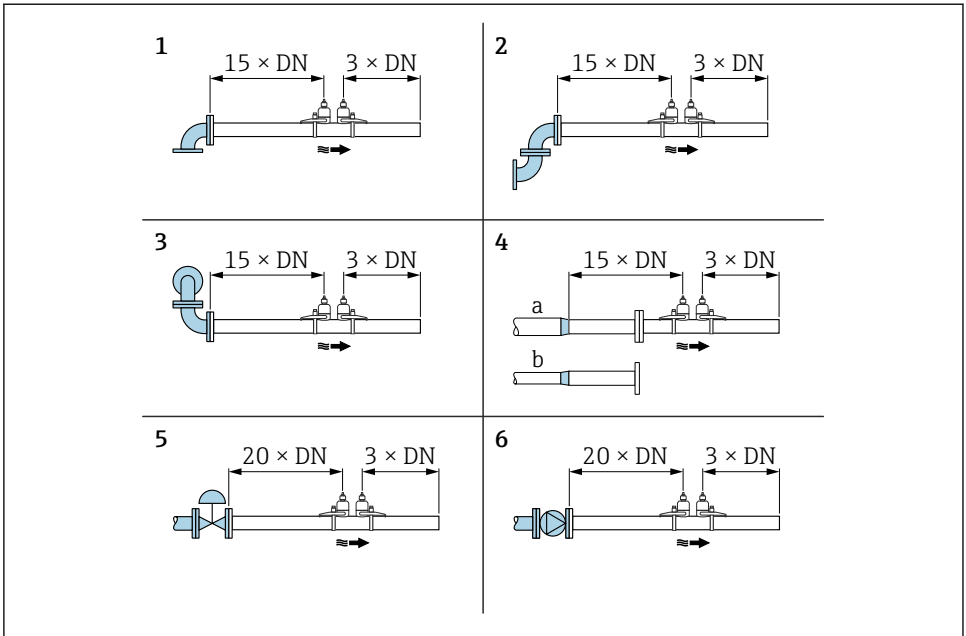
For the dimensions and installation lengths of the device, see the "Technical Information" document, "Mechanical construction" section .



Shorter inlet and outlet runs are possible with the following device versions:

Two-path measurement with 2 sensor sets ¹⁾ and FlowDC (for item numbers 1 to 4b):
Up to minimum $2 \times \text{DN}$ for inlet run, $2 \times \text{DN}$ for outlet run

1) Order code for "Mounting type", option A2 "Clamp-on, 2-channel, 2-sensor sets"



A0042041

3 Minimum inlet and outlet runs with various flow obstructions

- 1 Pipe bend
- 2 Two pipe bends (on one plane)
- 3 Two pipe bends (on two planes)
- 4a reduction
- 4b Expansion
- 5 Control valve (2/3 open)
- 6 Pump

5.1.2 Environment and process requirements

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.

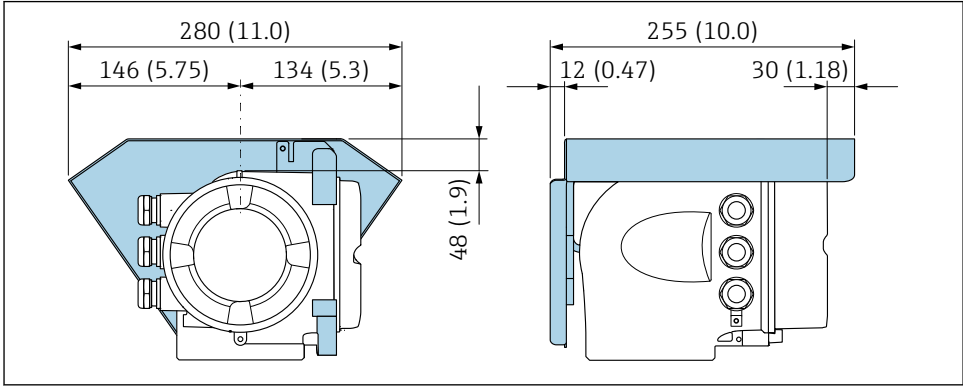
Temperature tables



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

5.1.3 Special mounting instructions

Weather protection cover: Proline 500



A0029553

4 Weather protection cover for Proline 500; engineering unit mm (in)

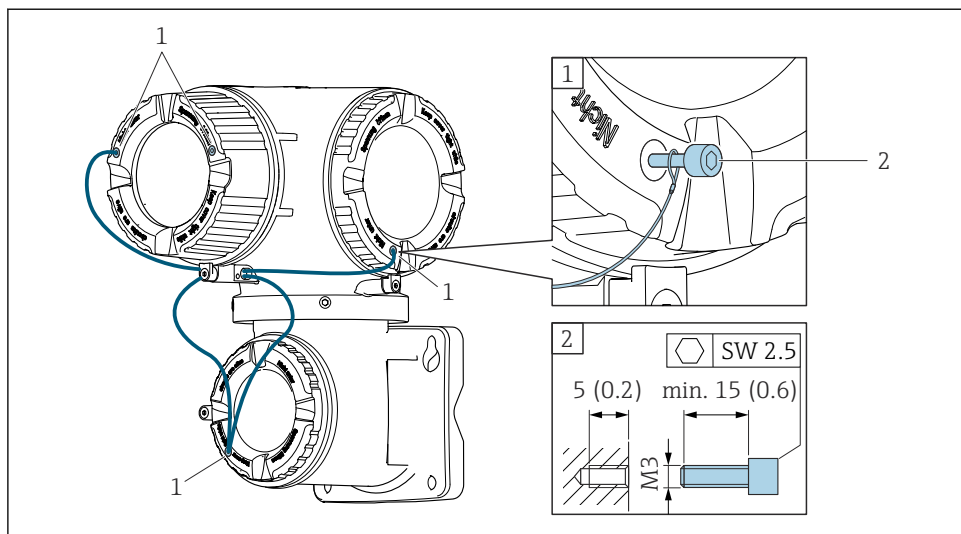
Cover locking

NOTICE

Order code for "Transmitter 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.

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



A0029799

- 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 Proline 500

For mounting on a post:
 Proline 500 transmitter
 Open-ended wrench AF 13

For wall mounting:
 Drill with drill bit \varnothing 6.0 mm

For sensor

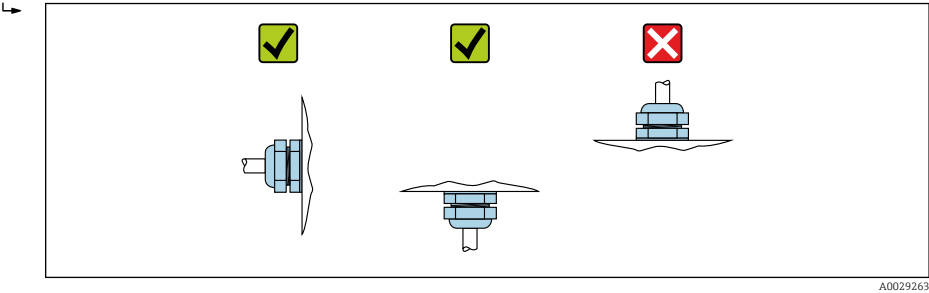
For installation on the measuring pipe: use a suitable mounting tool

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

- Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.



A0029263

5.2.4 Mounting the sensor

⚠ WARNING

Risk of injury when mounting the sensors and strapping bands!

- Due to the increased risk of cuts, wear suitable gloves and protective goggles.

Sensor configuration and settings

DN 15 to 65 (½ to 2½")	DN 50 to 4000 (2 to 160")			
	Strapping band		Welded bolt	
	2 traverses [mm (in)]	1 traverse [mm (in)]	2 traverses [mm (in)]	1 traverse [mm (in)]
Sensor distance ¹⁾	Sensor distance ¹⁾	Sensor distance ¹⁾	Sensor distance ¹⁾	Sensor distance ¹⁾
–	Wire length → 📄 27	Measuring rail ^{1) 2)}	Wire length	Measuring rail ^{1) 2)}

- 1) Depends on the conditions at the measuring point (measuring pipe, medium etc.). The dimension can be determined via FieldCare or Applicator. See also the **Result sensor distance / measuring aid** parameter in the **Measuring point** submenu
- 2) Only up to DN 600 (24")

Mounting types

Sensor holder with U-shaped screws

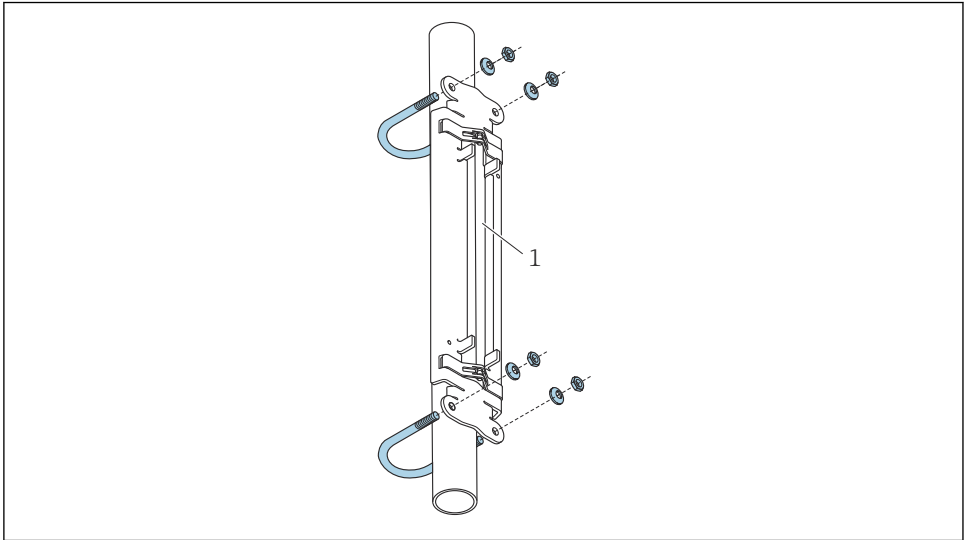


- Can be used for
 - Measuring devices with measuring range DN 15 to 65 (½ to 2½")
 - Mounting on pipes DN 15 to 32 (½ to 1¼")


Procedure:

1. Disconnect the sensor from the sensor holder.
2. Position the sensor holder on the measuring pipe.
3. Fit the U-shaped screws through the sensor holder and lightly grease the thread.

4. Screw the nuts onto the U-shaped screws.
5. Position the sensor holder correctly and tighten the nuts uniformly.



A0043369


 5 Holder with U-shaped screws

1 Sensor holder


CAUTION

Risk of damaging plastic or glass pipes if the nuts on the U-shaped screws are tightened too much!

- The use of a metal half-shell (on the opposite side of the sensor) is recommended for plastic or glass pipes.

 The visible measuring pipe surface must be clean (free from flaking paint and/or rust) to ensure good acoustic contact.

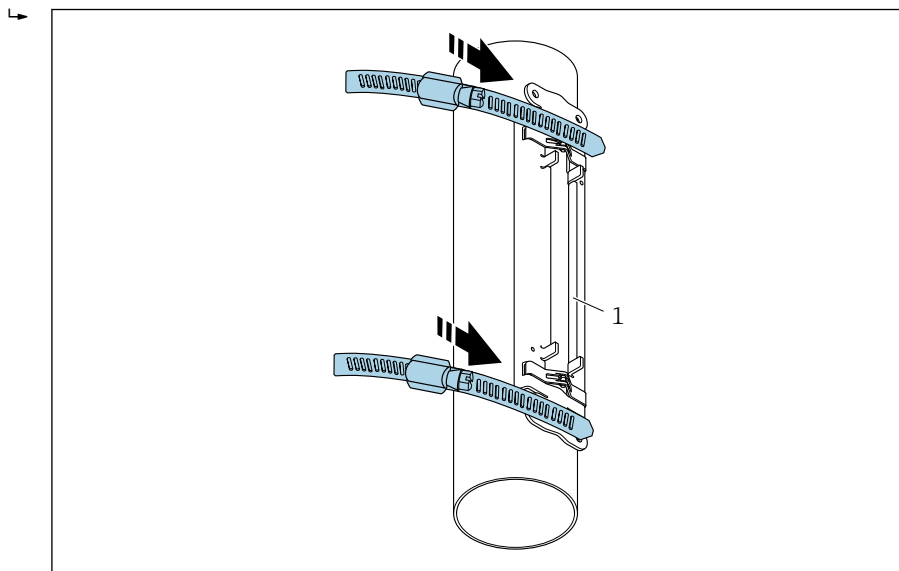
Sensor holder with strapping bands (small nominal diameters)

-  Can be used for
- Measuring devices with measuring range DN 15 to 65 ($\frac{1}{2}$ to $2\frac{1}{2}$ ")
 - Mounting on pipes DN > 32 ($1\frac{1}{4}$ ")

Procedure:

1. Disconnect the sensor from the sensor holder.
2. Position the sensor holder on the measuring pipe.

3. Wrap the strapping bands around the sensor holder and measuring pipe without twisting them.



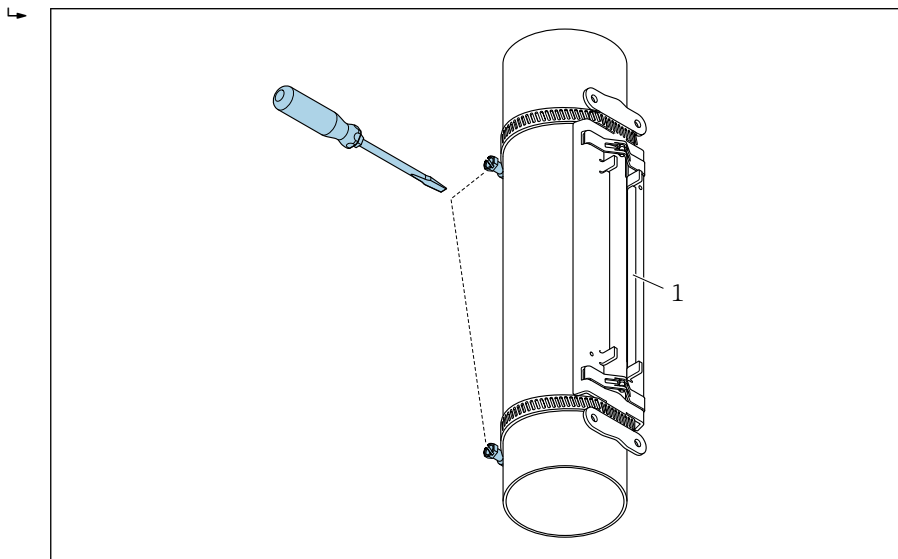
A0043371

 6 Positioning the sensor holder and mounting the strapping bands


1 Sensor holder

4. Guide the strapping bands through the strapping band locks.
5. Tighten the strapping bands as tightly as possible by hand.
6. Set the sensor holder to the desired position.

7. Push down the tensioning screw and tighten the strapping bands so they cannot slip.



A0043372

 7 Tightening the tensioning screws of the strapping bands


1 Sensor holder

8. If necessary, shorten the strapping bands and trim the cut edges.


WARNING

Risk of injury!

- To avoid sharp edges, trim the cut edges after shortening the strapping bands. Wear suitable gloves and protective goggles.

-  The visible measuring pipe surface must be clean (free from flaking paint and/or rust) to ensure good acoustic contact.

Sensor holder with strapping bands (medium nominal diameters)

-  Can be used for
 - Measuring devices with measuring range DN 50 to 4000 (2 to 160")
 - Mounting on pipes DN ≤ 600 (24")

Procedure:

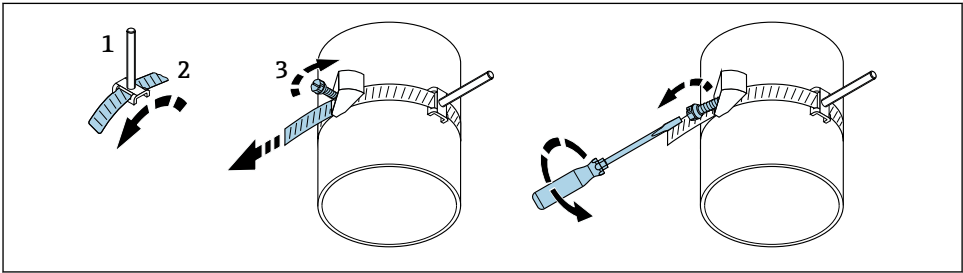
1. Fit the mounting bolt over strapping band 1.
2. Position strapping band 1 as perpendicular as possible to the measuring pipe axis without twisting it.
3. Guide the end of strapping band 1 through the strapping band lock.
4. Tighten strapping band 1 as tightly as possible by hand.

5. Set strapping band 1 to the desired position.
6. Push down the tensioning screw and tighten strapping band 1 so it cannot slip.
7. Strapping band 2: proceed as for strapping band 1 (steps 1 to 6).
8. Only slightly tighten strapping band 2 for final mounting. It must be possible to move strapping band 2 for final alignment.
9. If necessary, shorten both strapping bands and trim the cut edges.

⚠ WARNING

Risk of injury!

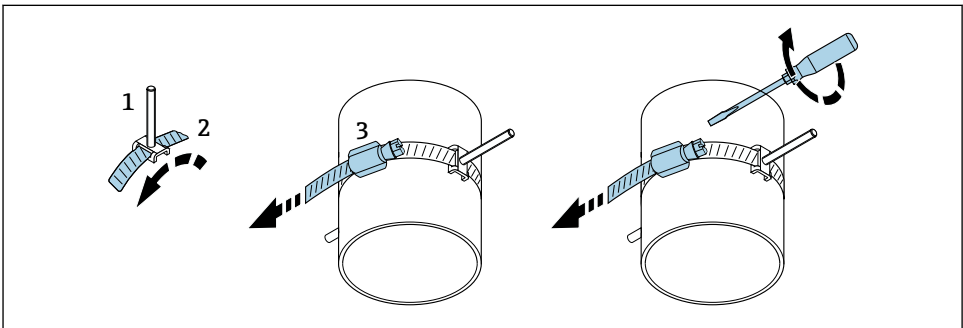
- To avoid sharp edges, trim the cut edges after shortening the strapping bands. Wear suitable gloves and protective goggles.



A0043373

8 Holder with strapping bands (medium nominal diameters), with hinged screw

- 1 Mounting bolts
- 2 Strapping band
- 3 Tensioning screw



A0044350

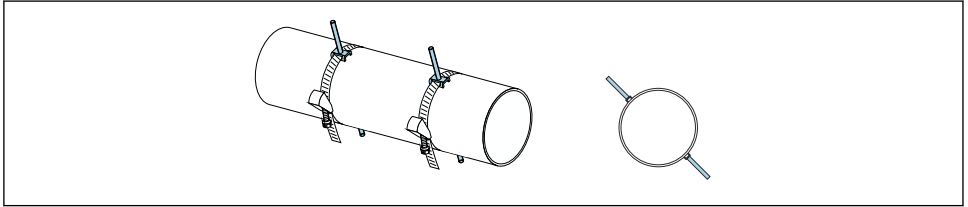
9 Holder with strapping bands (medium nominal diameters), without hinged screw

- 1 Mounting bolts
- 2 Strapping band
- 3 Tensioning screw

Sensor holder with strapping bands (large nominal diameters)

Can be used for

- Measuring devices with measuring range DN 50 to 4000 (2 to 160")
- Mounting on pipes DN > 600 (24")
- 1-traverse mounting or 2-traverse mounting with 180° arrangement
- 2-traverse mounting with two-path measurement and 90° arrangement (instead of 180°)



A0044648

Procedure:

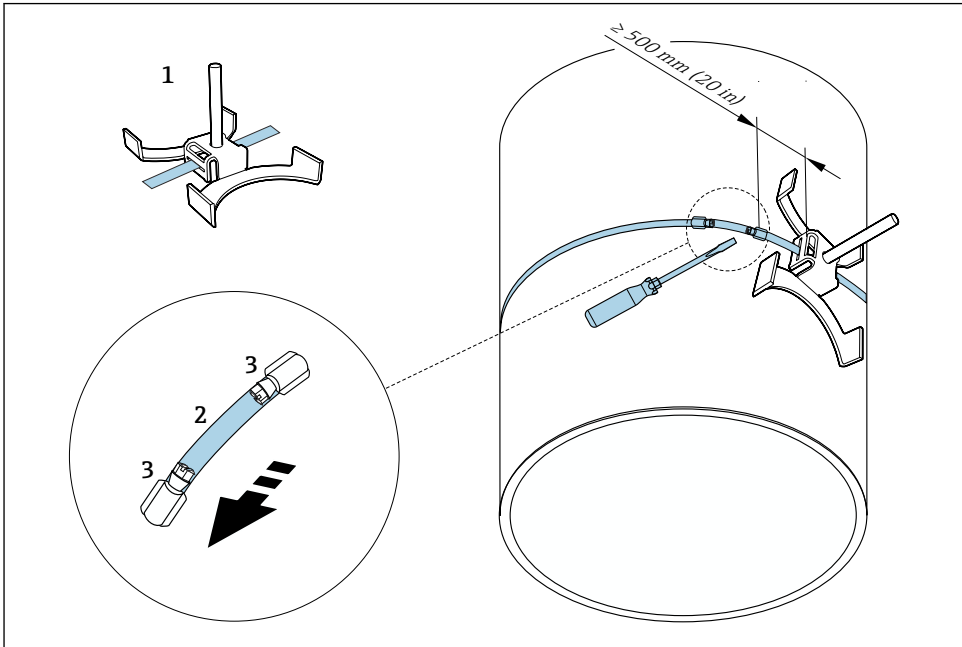
1. Measure the pipe circumference. Note down the full/half or quarter circumference.
2. Shorten the strapping bands to the required length (= pipe circumference) and trim the cut edges.
3. Select the mounting location of the sensors with the given sensor distance and optimum inlet run conditions, while ensuring there is nothing impeding sensor mounting over the entire circumference of the measuring pipe.
4. Fit two strap bolts over strapping band 1 and guide approx. 50 mm (2 in) of one of the strapping band ends through one of the two strapping band locks and into the buckle. Then guide the protective flap over this strapping band end and lock in place.
5. Position strapping band 1 as perpendicular as possible to the measuring pipe axis without twisting it.
6. Guide the second strapping band end through the strapping band lock that is still free and proceed in the same way as for the first strapping band end. Guide the protective flap over the second strapping band end and lock in place.
7. Tighten strapping band 1 as tightly as possible by hand.
8. Set strapping band 1 to the desired position, ensuring that it is as perpendicular as possible to the measuring pipe axis.
9. Position the two strap bolts on strapping band 1, arranging them at a half circumference in relation to one another (180° arrangement, e.g. 10 o'clock and 4 o'clock) or quarter circumference (90° arrangement, e.g. 10 o'clock and 7 o'clock).
10. Tighten strapping band 1 so that it cannot slip.
11. Strapping band 2: proceed as for strapping band 1 (steps 4 to 8).

12. Only slightly tighten strapping band 2 for final mounting so that it can still be adjusted. The distance/offset from the center of strapping band 2 to the center of strapping band 1 is indicated by the sensor distance of the device.
13. Align strapping band 2 so that it is perpendicular to the measuring pipe axis and parallel to strapping band 1.
14. Position the two strap bolts on tensioning strap 2 on the measuring pipe so they are parallel to one another and offset at the same height/clock position (e.g. 10 and 4 o'clock) in relation to the two strap bolts on tensioning strap 1. A line drawn on the measuring pipe wall that is parallel to the measuring pipe axis can be helpful here. Now set the distance between the center of the strap bolts at the same level so that it exactly matches the sensor distance. An alternative method is to use the wire length → 27.
15. Tighten strapping band 2 so that it cannot slip.

⚠ WARNING

Risk of injury!

- To avoid sharp edges, trim the cut edges after shortening the strapping bands. Wear suitable gloves and protective goggles.



A0043374

10 Holder with strapping bands (large nominal diameters)

- 1 Strap bolt with guide*
- 2 Strapping band*
- 3 Tensioning screw

*The distance between the strap bolt and strapping band lock must be at least 500 mm (20 in).



- For 1-traverse mounting with 180° (opposite) (single-path measurement, A0044304), (two-path measurement, A0043168)
- For 2-traverse mounting (single-path measurement, A0044305), (two-path measurement, A0043309)
- Electrical connection

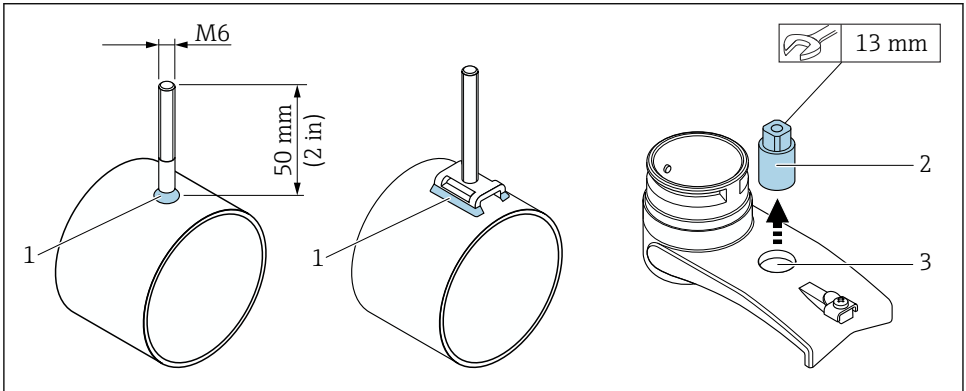
Sensor holder with welded bolts



- Can be used for
 - Measuring devices with measuring range DN 50 to 4000 (2 to 160")
 - Mounting on pipes DN 50 to 4000 (2 to 160")

Procedure:

- The welded bolts must be fixed at the same installation distances as the mounting bolts with strapping bands. The following sections explain how to align the mounting bolts, depending on the mounting method and measurement method:
 - Installation for measurement via 1 traverse → 26
 - Installation for measurement via 2 traverses → 30
- The sensor holder is secured as standard with a locking nut with a metric M6 ISO thread. If another thread should be used for fastening purposes, a sensor holder with a detachable locking nut must be used.



A0043375

11 *Holder with welded bolts*

- 1 Welding seam
- 2 Locking nut
- 3 Hole diameter max. 8.7 mm (0.34 in)

Sensor installation – small nominal diameters DN 15 to 65 ($\frac{1}{2}$ to $2\frac{1}{2}$ ")

Requirements

- The installation distance is known → 16
- The sensor holder is pre-assembled

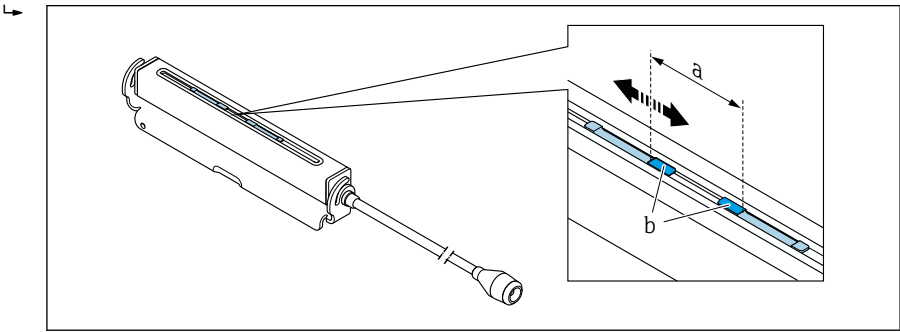
Material

The following material is required for mounting:

- Sensor incl. adapter cable
- Sensor cable for connecting to the transmitter
- Coupling medium (coupling pad or coupling gel) for an acoustic connection between the sensor and pipe

Procedure:

1. Set the distance between the sensors to the value determined for the sensor distance. Press the movable sensor down slightly to move it.



A0043376

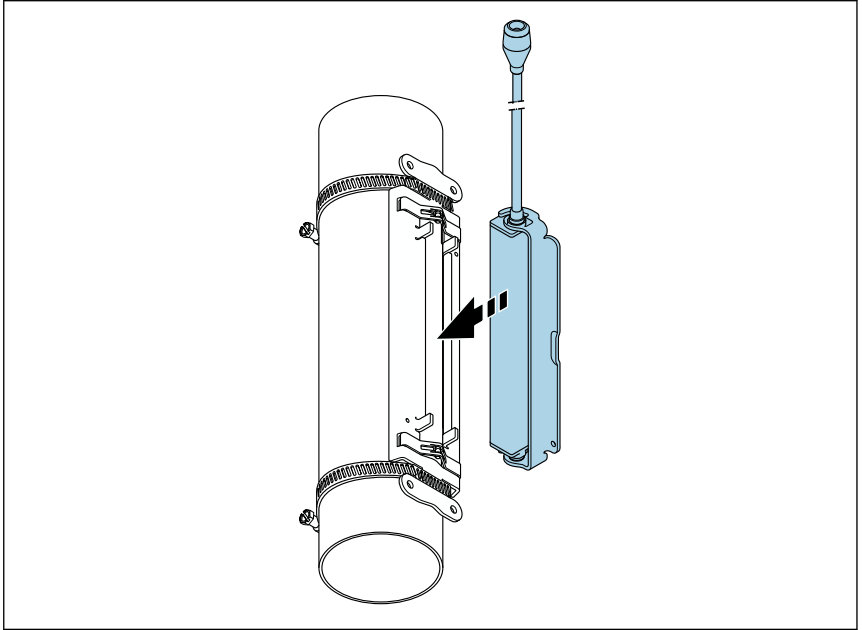
12 Distance between sensors as per the installation distance → 16

a Sensor distance (back of sensor must touch the surface)


b Sensor contact surfaces

2. Stick the coupling pad under the sensor to the measuring pipe or coat the contact surfaces of the sensor (b) with an even layer of coupling gel (approx. 0.5 to 1 mm (0.02 to 0.04 in)).

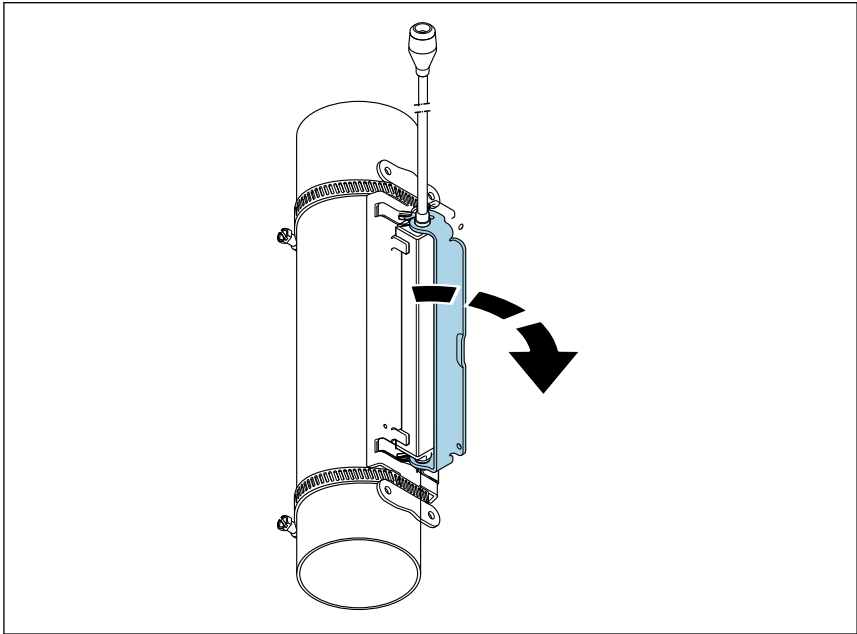
3. Fit the sensor housing on the sensor holder.



A0043377

 13 *Fitting the sensor housing*

4. Lock the bracket in place to fix the sensor housing on the sensor holder.



A0043378

14 Fixing the sensor housing

5. Connect the sensor cable to the adapter cable.

↳ This completes the mounting procedure. The sensors can now be connected to the transmitter via the connecting cables.



- The visible measuring pipe surface must be clean (free from flaking paint and/or rust) to ensure good acoustic contact.
- If necessary, the holder and sensor housing can be secured with a screw/nut or a lead seal (not supplied).
- The bracket can only be released using an auxiliary tool (e.g. screwdriver).

Sensor installation – medium/large nominal diameters DN 50 to 4000 (2 to 160")



Installation for measurement via 1 traverse

Requirements

- The installation distance and wire length are known → 16
- Strapping bands are pre-assembled

Material

The following material is required for mounting:

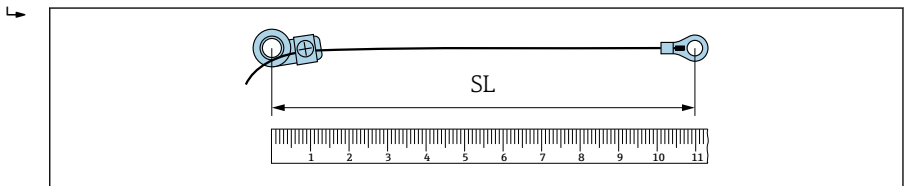
- Two strapping bands incl. mounting bolts and centering plates where necessary (already pre-assembled →  19, →  21)
- Two measuring wires, each with a cable lug and a fixer to fix the strapping bands
- Two sensor holders
- Coupling medium (coupling pad or coupling gel) for an acoustic connection between the sensor and pipe
- Two sensors incl. connecting cables




Installation is unproblematic up to DN 400 (16"), as of DN 400 (16") check the distance and angle (180°) diagonally with the wire length.

Procedure:

1. Prepare the two measuring wires: arrange the cable lugs and fixer such that the distance they are apart corresponds to the wire length (SL). Screw the fixer onto the measuring wire.

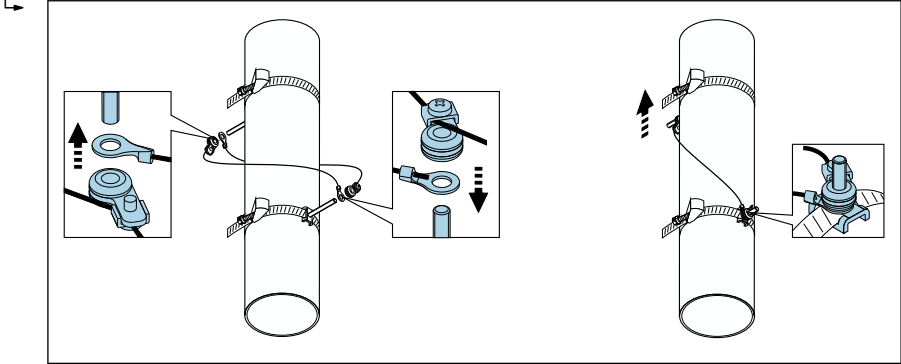


A0043379

 15 Fixer and cable lugs at a distance that corresponds to the wire length (SL)

2. With measuring wire 1: fit the fixer over the mounting bolt of strapping band 1 that is already securely mounted. Run measuring wire 1 clockwise around the measuring pipe. Fit the cable lug over the mounting bolt of strapping band 2 that can still be moved.
3. With measuring wire 2: fit the cable lug over the mounting bolt of strapping band 1 that is already securely mounted. Run measuring wire 2 counterclockwise around the measuring pipe. Fit the fixer over the mounting bolt of strapping band 2 that can still be moved.

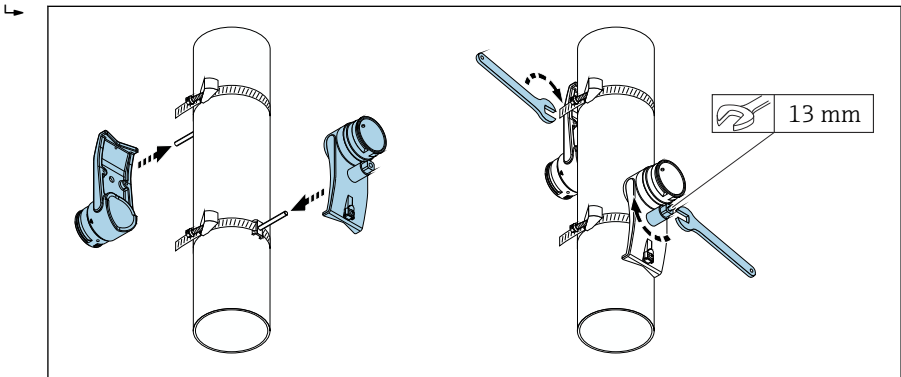
4. Take the still movable strapping band 2, incl. the mounting bolt, and move it until both measuring wires are evenly tensioned and then tighten strapping band 2 so that it cannot slip. Then check the sensor distance from the center of the strapping bands. If the distance is too small, release strapping band 2 again and position it better. Both strapping bands should be as perpendicular as possible to the measuring pipe axis and parallel to one another.



A0043380

16 Positioning the strapping bands (steps 2 to 4)

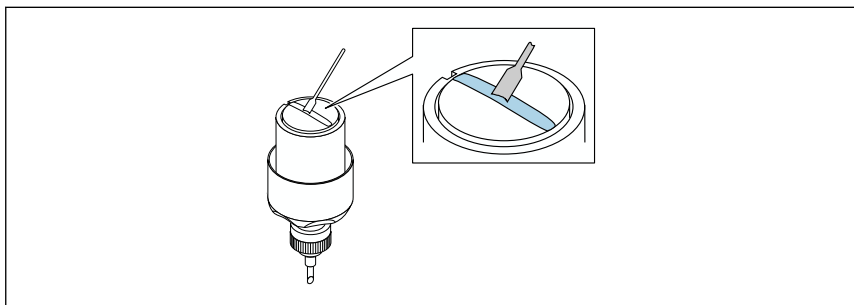
5. Loosen the screws of the fixers on the measuring wires and remove the measuring wires from the mounting bolt.
6. Fit the sensor holders over the individual mounting bolts and tighten securely with the locking nut.




A0043381

17 Mounting the sensor holders

7. Attach the coupling pad with the adhesive side facing down on the sensors. Alternatively coat the contact surfaces with an even layer of coupling gel (approx. 1 mm (0.04 in)), going from the groove through the center to the opposite edge.

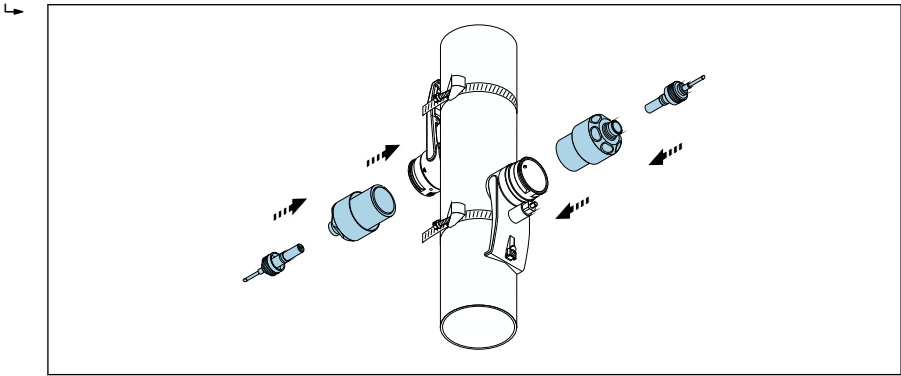


A0043382

-  18 Coating the contact surfaces of the sensor with coupling gel (if there is no coupling pad)

8. Insert the sensor into the sensor holder.
9. Fit the sensor cover on the sensor holder and turn until the sensor cover engages with a click and the arrows (▲ / ▼ "close") are pointing towards one another.

10. Insert the sensor cable into the sensor until the end stop.



A0043383

19 Mounting the sensor and connecting the sensor cable

The sensors can now be connected to the transmitter via the sensor cables and the error message can be checked in the sensor check function. This completes the mounting procedure.



- The visible measuring pipe surface must be clean (free from flaking paint and/or rust) to ensure good acoustic contact.
- If the sensor is removed from the measuring pipe, it must be cleaned and new coupling gel applied (if there is no coupling pad).
- On rough measuring pipe surfaces, the gaps in the rough surface must be filled with sufficient amounts of coupling gel if the use of the coupling pad does not suffice (installation quality check).

Installation for measurement via 2 traverses

Requirements

- The installation distance is known → 16
- Strapping bands are pre-assembled

Material

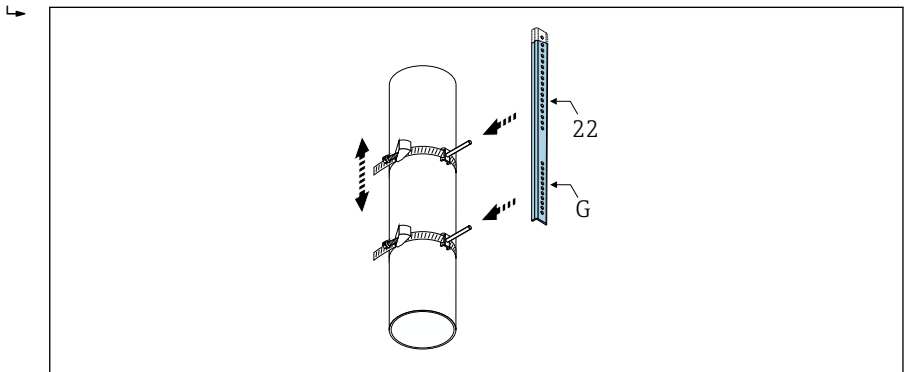
The following material is required for mounting:

- Two strapping bands incl. mounting bolts and centering plates where necessary (already pre-assembled → 19, → 21)
- A mounting rail to position the strapping bands:
 - Short rail up to DN 200 (8")
 - Long rail up to DN 600 (24")
 - No rail > DN 600 (24"), as distance measured by sensor distance between the mounting bolts
- Two mounting rail holders
- Two sensor holders
- Coupling medium (coupling pad or coupling gel) for an acoustic connection between the sensor and pipe

- Two sensors incl. connecting cables
- Open-ended wrench (13 mm)
- Screwdriver

Procedure:

1. Position the strapping bands using the mounting rail [only DN50 to 600 (2 to 24"), for larger nominal diameters, measure the distance between the center of the strap bolts directly]: Fit the mounting rail with the bore identified by the letter (from the **Result sensor distance / measuring aid** parameter) over the mounting bolt of strapping band 1 that is fixed in place. Position the adjustable strapping band 2 and fit the mounting rail with the bore identified by the numerical value over the mounting bolt.

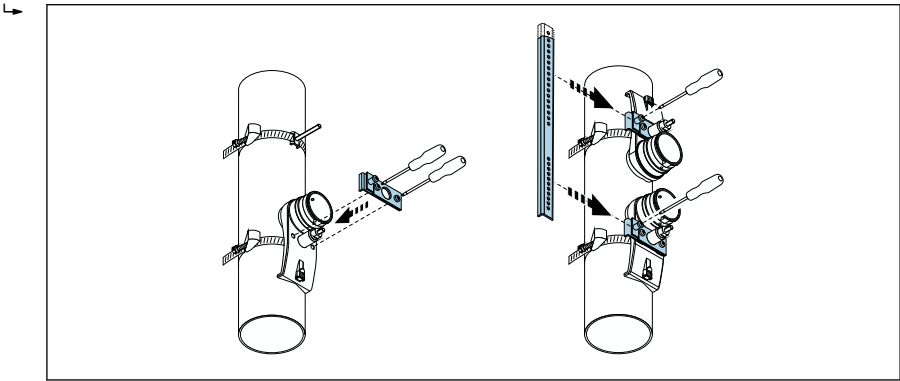


A0043384

 20 Determining the distance according to the mounting rail (e.g. G22)

2. Tighten strapping band 2 so that it cannot slip.
3. Remove the mounting rail from the mounting bolt.
4. Fit the sensor holders over the individual mounting bolts and tighten securely with the locking nut.
5. Screw the mounting rail holders onto the sensor holder.

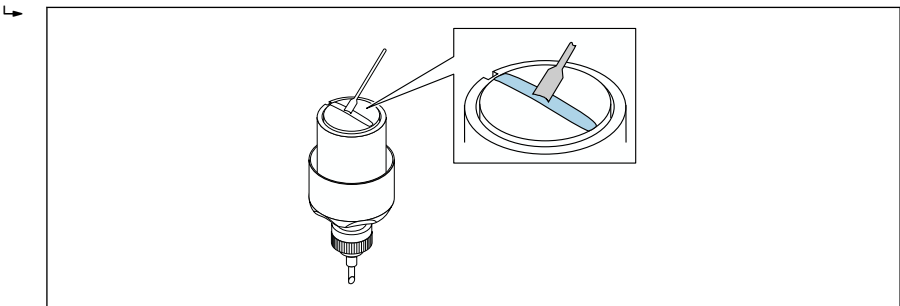
6. Screw the mounting rail onto the sensor holders.



A0043385

21 Mounting the sensor holders and mounting rail

7. Attach the coupling pad with the adhesive side facing down on the sensors (). Alternatively coat the contact surfaces with an even layer of coupling gel (approx. 1 mm (0.04 in)), going from the groove through the center to the opposite edge.

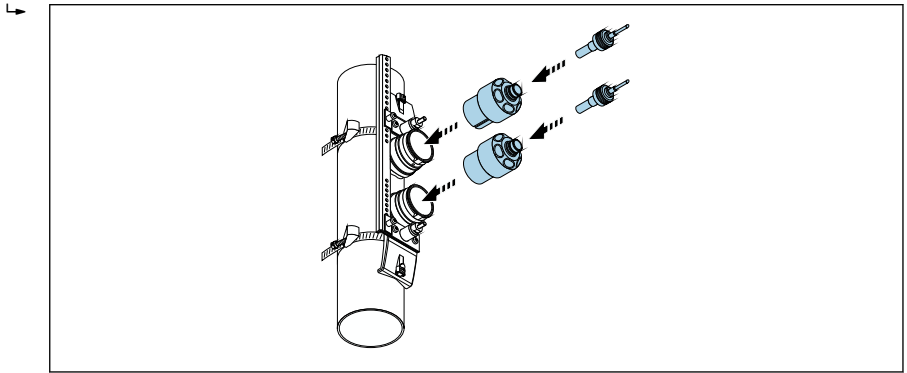


A0043382


22 Coating the contact surfaces of the sensor with coupling gel (if there is no coupling pad)

8. Insert the sensor into the sensor holder.
9. Fit the sensor cover on the sensor holder and turn until the sensor cover engages with a click and the arrows (▲ / ▼ "close") are pointing towards one another.

10. Insert the sensor cable into the sensor until the end stop.



A0043386

 23 Mounting the sensor and connecting the sensor cable

The sensors can now be connected to the transmitter via the sensor cables and the error message can be checked in the sensor check function. This completes the mounting procedure.



- The visible measuring pipe surface must be clean (free from flaking paint and/or rust) to ensure good acoustic contact.
- If the sensor is removed from the measuring pipe, it must be cleaned and new coupling gel applied (if there is no coupling pad).
- On rough measuring pipe surfaces, the gaps in the rough surface must be filled with sufficient amounts of coupling gel if the use of the coupling pad does not suffice (installation quality check).

5.2.5 Mounting the transmitter housing

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

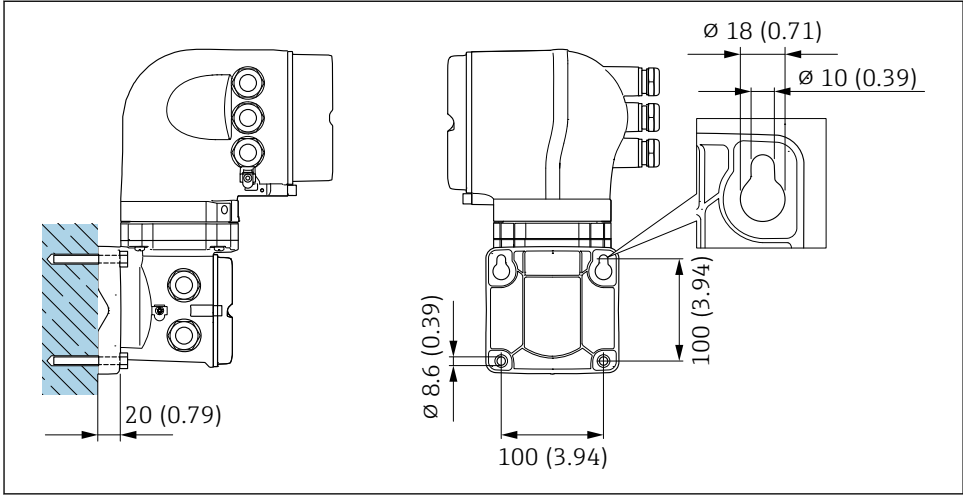
Excessive force can damage the housing!

- ▶ Avoid excessive mechanical stress.

The transmitter can be mounted in the following ways:

- Post mounting
- Wall mounting

Wall mounting



A0029068

24 Engineering unit mm (in)

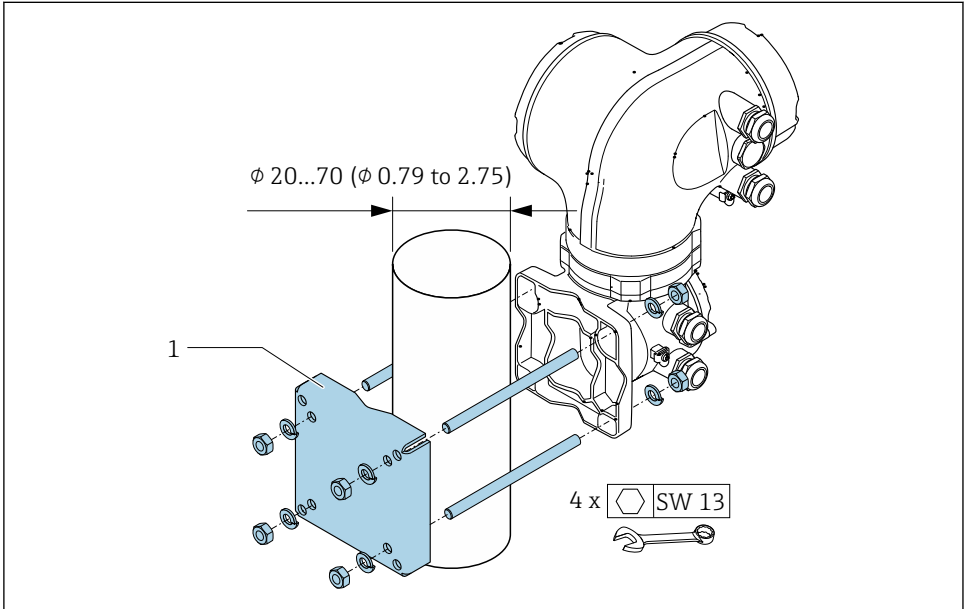
Post mounting

⚠ WARNING

Order code for "Transmitter housing", option L "Cast, stainless": cast transmitters are very heavy.

They are unstable if they are not mounted on a secure, fixed post.

- Only mount the transmitter on a secure, fixed post on a stable surface.

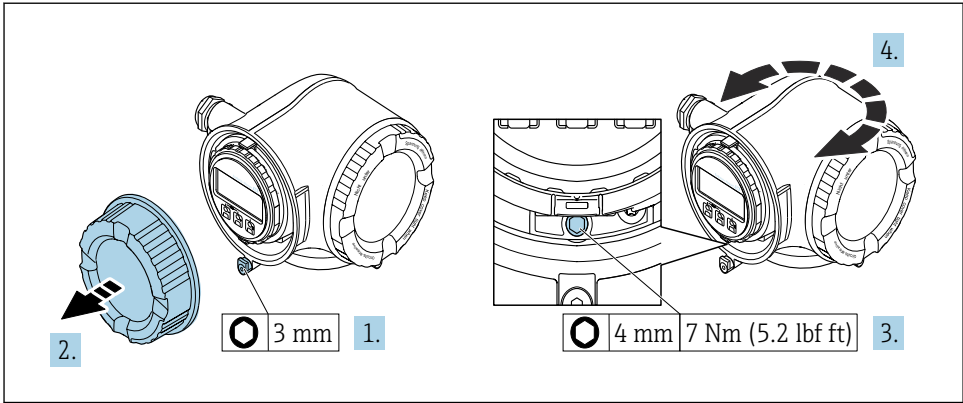


A0029057

25 Engineering unit mm (in)

5.2.6 Turning the transmitter housing

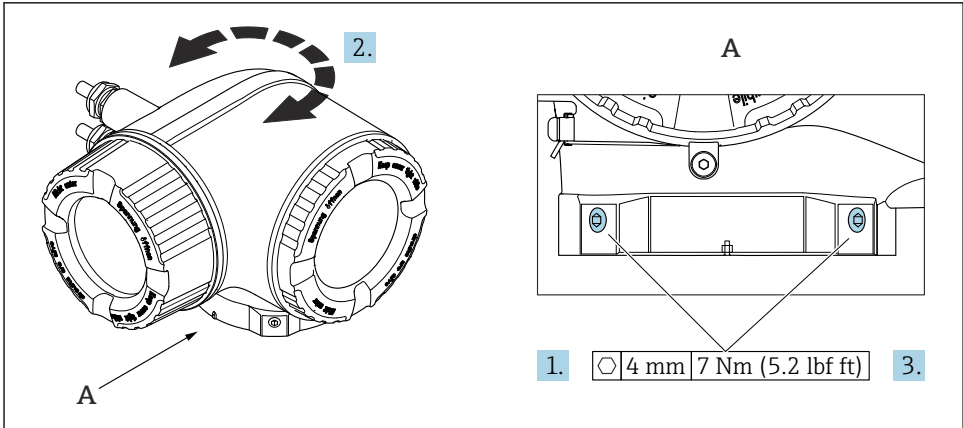
To provide easier access to the connection compartment or display module, the transmitter housing can be turned.



A0029993

26 Non Ex housing

1. Depending on the device version: Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Release the fixing screw.
4. Turn the housing to the desired position.
5. Tighten the fixing screw.
6. Screw on the connection compartment cover.
7. Depending on the device version: Attach the securing clamp of the connection compartment cover.



A0043150

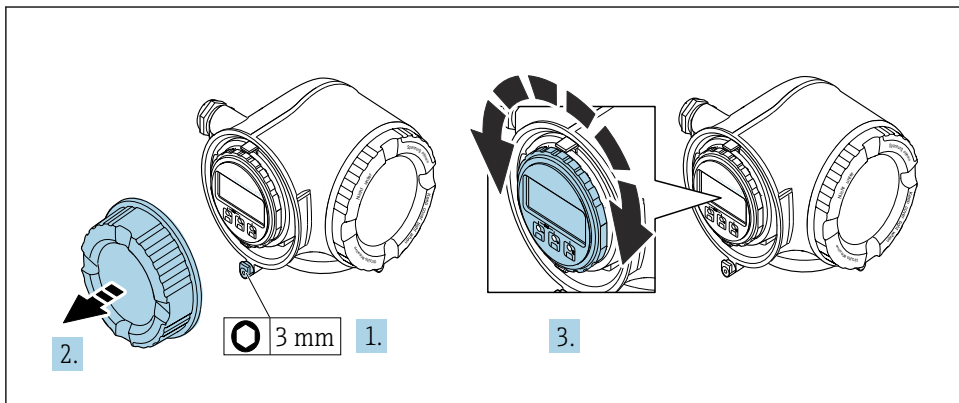
27 Ex housing

1. Loosen the securing screws.

2. Turn the housing to the desired position.
3. Tighten the securing screws.

5.2.7 Turning the display module

The display module can be turned to optimize display readability and operability.



A0030035

1. Depending on the device version: Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Turn the display module to the desired position: max. $8 \times 45^\circ$ in each direction.
4. Screw on the connection compartment cover.
5. Depending on the device version: Attach the securing clamp of the connection compartment cover.

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"> ■ Process temperature ■ Inlet run conditions ■ Ambient temperature ■ Measuring range 	<input type="checkbox"/>
Has the correct orientation for the sensor been selected → 11? <ul style="list-style-type: none"> ■ According to sensor type ■ According to medium temperature ■ According to medium properties (outgassing, with entrained solids) 	<input type="checkbox"/>
Are the sensors correctly connected to the transmitter (upstream/downstream) → 2, 11?	<input type="checkbox"/>
Are the sensors correctly mounted (distance, 1 traverse, 2 traverses) ?	<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"/>
Are the securing screw and securing clamp tightened securely?	<input type="checkbox"/>
Is the sensor holder properly grounded (in the event of different potential between the sensor holder and transmitter) ?	<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 Endress+Hauser for disposal under the applicable conditions.

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.



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