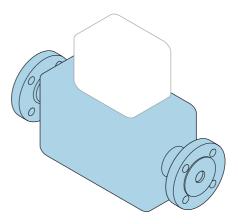
# Brief Operating Instructions **Flowmeter Proline Prosonic Flow P**

Ultrasonic time-of-flight sensor

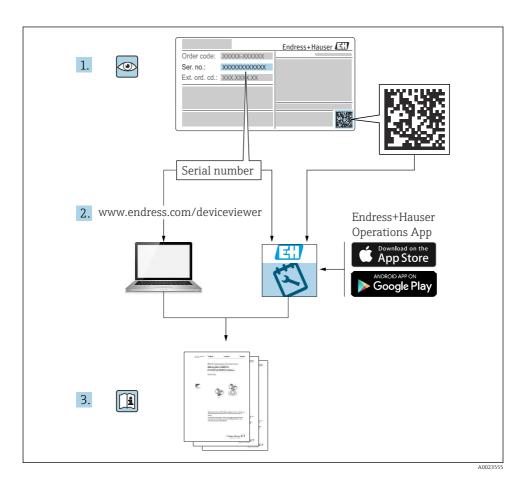


These Brief Operating Instructions are **not** a substitute for the Operating Instructions pertaining to the device.

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

Brief Operating Instructions Part 2 of 2: Transmitter  $\rightarrow \blacksquare 3$ .





# **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*

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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.

#### **A** CAUTION

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

#### NOTICE

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

#### 1.1.2 Symbols for certain types of information

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

# 1.1.3 Electrical symbols

Symbol	Meaning	Symbol	Meaning
	Direct current	~	Alternating current
≂	Direct current and alternating current	<u></u>	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 is connected to the supply network.  Exterior ground terminal: device is connected to the plant grounding system.

#### 1.1.4 Tool symbols

Symbol	Meaning	Symbol	Meaning
0	Torx screwdriver	0	Flat-blade screwdriver
06	Phillips head screwdriver	06	Allen key
A S	Open-ended wrench		

#### 1.1.5 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
EX	Hazardous area	×	Safe area (non-hazardous area)
≋ <b>→</b>	Flow direction		

# 2 Basic safety instructions

# 2.1 Requirements for the personnel

The personnel must fulfill the following requirements for its tasks:

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

► Follow instructions and comply with basic conditions.

## 2.2 Intended use

#### Application and media

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

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

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

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

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

#### Incorrect use

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

#### Residual risks

# **A** CAUTION

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

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

# 2.3 Workplace safety

When working on and with the device:

 $\,\blacktriangleright\,$  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.
- $\blacktriangleright\,$  The operator is responsible for interference-free operation of the device.

# 2.5 Product safety

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

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

# 2.6 IT security

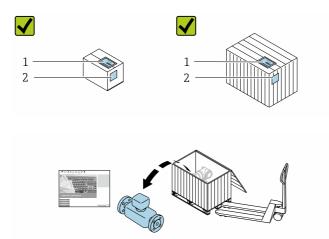
Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

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

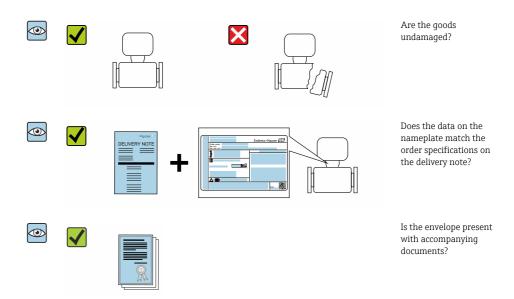
# 3 Incoming acceptance and product identification

# 3.1 Incoming acceptance





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



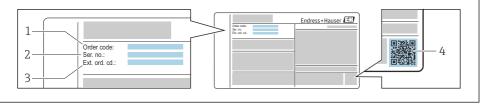


- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
- The Technical Documentation is available via the Internet or via the *Endress+Hauser Operations app*.

#### 3.2 Product identification

The following options are available for identification of the device:

- Nameplate
- Order code with details of the device features on the delivery note
- Enter the serial numbers from the nameplates in the *Device Viewer* (www.endress.com/deviceviewer): 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.



A003010

#### ■ 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 (OR 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.

# 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.

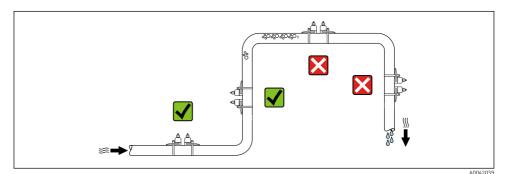
# 5 Mounting procedure

# 5.1 Mounting requirements

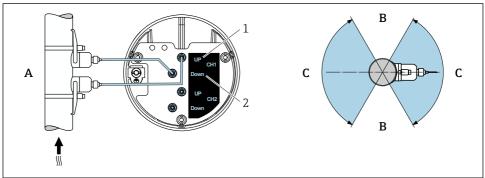
No special measures such as supports . are necessary. External forces are absorbed by the construction of the device.

#### 5.1.1 Mounting position

## Mounting location



#### Orientation



A0041970

#### ■ 2 Orientation views

- 1 Channel 1 upstream
- 2 Channel 1 downstream
- A Recommended orientation with upward flow direction
- B Non-recommended installation range with horizontal orientation (60°)
- C Recommended installation range max. 120°

#### Vertical

Recommended orientation with upward flow direction (view A) With this orientation, entrained solids sink and gases rise away from the sensor area when the medium is not flowing. In addition, 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 inteference from deposit buildup at the bottom of the pipe can influence the measurement to a lesser degree.

#### Inlet and outlet runs

If possible, install the sensors upstream of assemblies such as valves, T-pieces, elbows, and pumps. If this is not possible, the specified measurement accuracy of the measuring device is achieved by observing the specified minimum inlet and outlet runs with optimum sensor configuration. If there are several flow obstructions, the longest specified inlet run must be taken into account.



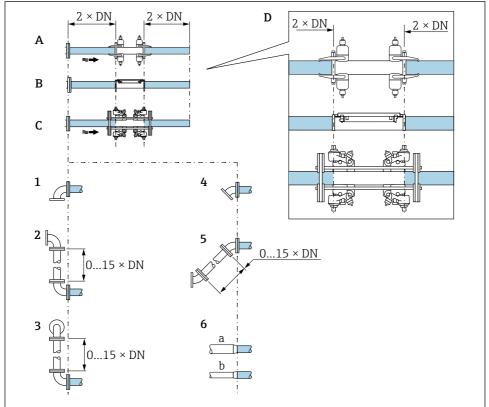
For the dimensions and installation lengths of the device, see the "Technical Information" document. "Mechanical construction" section.

Inlet and outlet runs with FlowDC

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

Two-path measurement with 2 sensor sets (order code for "Mounting type", option A2 "Clampon, 2-channel, 2-sensor sets") and FlowDC

For additional information on FlowDC, see the Special Documentation for the device



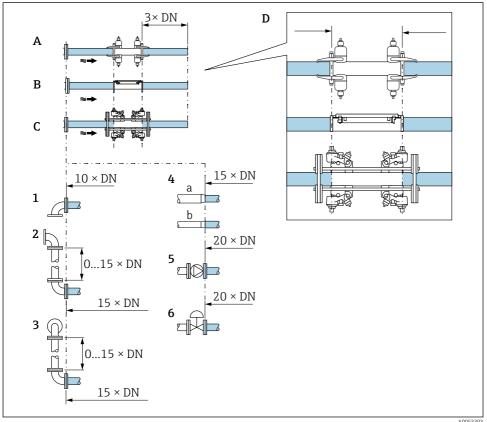
A005322

#### ₩ 3

- A Inlet and outlet runs DN 50 to 4000 (2 to 160")
- B Inlet and outlet runs DN 15 to 65 (½ to 2½")
- *C* Inlet and outlet runs for high-temperature sensors
- D Position of inlet and outlet runs on sensor
- 1 Single elbow
- 2 Double elbow( $2 \times 90^{\circ}$  in the same plane, with 0 to 15 x DN between the elbows)
- 3 Double elbow 3D (2  $\times$  90° in different planes, with 0 to 15 x DN between the elbows)
- 4 45° bend
- 5 "2 x 45° bend" option(2 × 45° in the same plane, with 0 to 15 x DN between the elbows)
- 6a Concentric diameter change (contraction)
- 6b Concentric diameter change (expansion)

#### *Inlet and outlet runs without FlowDC*

Minimum inlet and outlet runs without FlowDC with 1 or 2 sensor sets with different flow obstructions



A0053303

#### € 4

- Inlet and outlet runs DN 50 to 4000 (2 to 160") Α
- Inlet and outlet runs DN 15 to 65 ( $\frac{1}{2}$  to 2 $\frac{1}{2}$ ") В
- С *Inlet and outlet runs for high-temperature sensors*
- D Position of inlet and outlet runs on sensor
- Pipe elbow 90° or 45° 1
- 2 Two pipe elbows 90° or 45° (in one plane, with 0 to 15 x DN between the elbows)
- Two pipe elbows 90° or 45° (in two planes, with 0 to 15 x DN between the elbows) 3
- Reduction 4a
- Extension 4b
- 5 Control valve (2/3 open)
- 6 Pump

#### 5.1.2 Environmental and process requirements

#### Ambient temperature range

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

If operating outdoors:

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

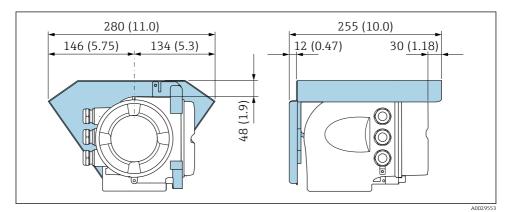
#### Temperature tables



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

#### 5.1.3 Special mounting instructions

#### Weather protection cover: Proline 500



**₽** 5 Protective cover for Proline 500; unit mm (in)

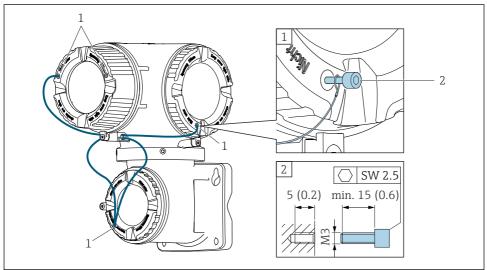
#### Cover locking

# NOTICE

Order code "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 on site.

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



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 Ø 6.0 mm

#### For sensor

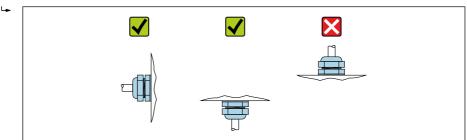
For mounting on the measuring tube: Use a suitable mounting tool.

# 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.



......

#### 5.2.4 Mounting the sensor

# **WARNING**

## Risk of injury when mounting sensors and strapping bands!

▶ Suitable gloves and goggles must be worn due to the increased risk of cuts.

## **▲** DANGER

#### Risk of burns from hot surfaces!

- ► Wear suitable protective equipment such as temperature-resistant protective gloves, clothing or protective visors.
- Before commencing work: allow the system and measuring device to cool to a touch-safe temperature.

# High-temperature applications (> 170°C)

- Order code for "Process temperature", options H, I, J
- Installation for high-temperature applications may only be performed by Endress +Hauser staff or by individuals authorized and trained by Endress+Hauser.

## Notes on mounting

# Mounting the high-temperature sensors CH-050/CH-100 $\,$



For detailed information on mounting the CH-050/CH-100 high-temperature sensors (order code for "Sensor version", options AG, AH), see Special Documentation on "High-temperature applications".

#### Sensor configuration and settings

DN 15 to 65 (½ to 2½")	DN 50 to 4000 (2 to 160")			
Strapping band	Strapping band		Welded bolt	
2 traverses [mm (in)]	1 traverse [mm (in)]	2 traverses [mm (in)]	1 traverse 2 traverse [mm (in)] [mm (in)	
Sensor distance 1)	Sensor distance 1)	Sensor distance 1)	Sensor distance 1)	Sensor distance 1)
-	Wire length → 🖺 30	Measuring rail 1) 2)	Wire length	Measuring rail 1) 2)

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

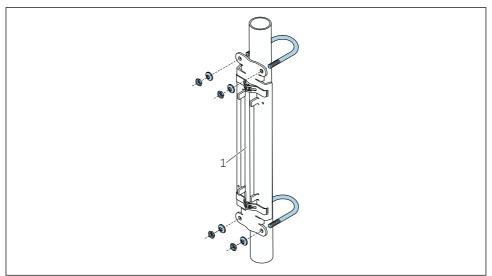
## Determining the mounting positions of the sensor

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. Insert the U-shaped screws through the sensor holder and lightly grease the threads.
- 4. Screw the nuts onto the U-shaped screws.
- 5. Position the sensor holder exactly and tighten the nuts evenly.



A0043369

- 6 Holder with U-shaped screws
- 1 Sensor holder

# **A** CAUTION

Damage to the plastic, copper or glass pipes due to overtightening the nuts of the U-shaped screws!

- ► The use of a metal half-shell (on the opposite side of the sensor) is recommended for plastic, copper or glass pipes.
- To ensure good acoustic contact, the visible measuring pipe surface must be clean and free from flaking paint and/or rust.

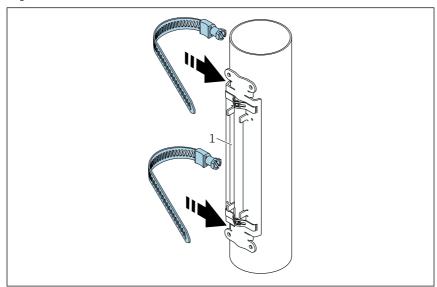
Sensor holder with strapping bands (small nominal diameters) )

- Can be used for
  - Measuring devices with measuring range DN 15 to 65 (½ to 2½")
  - Mounting on pipes DN > 32 (11/4")

#### Procedure:

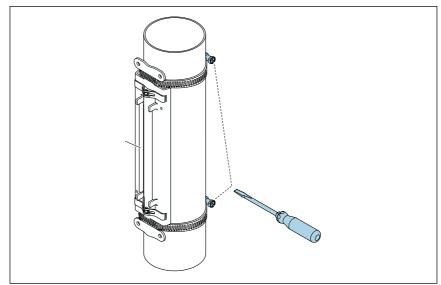
- 1. Disconnect the sensor from the sensor holder.
- 2. Position the sensor holder on the measuring pipe.

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



- **1** Position the sensor holder and fit 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. Align the sensor holder in the desired position.

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



■ 8 Tighten the tensioning screws of the strapping bands.

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

# **A** WARNING

# Risk of injury due to sharp edges!

- ► After shortening the strapping bands, trim the cut edges.
- ► Wear suitable protective goggles and safety gloves.
- To ensure good acoustic contact, the visible measuring pipe surface must be clean and free from flaking paint and/or rust.

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  $DN \le 600 (24")$

#### Procedure:

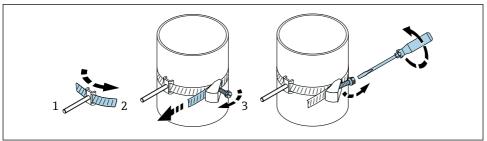
- 1. Fit the mounting bolt over strapping band 1.
- 2. Position strapping band 1 as perpendicular as possible to the measuring pipe axis without twisting it.
- 3. Guide the end of strapping band 1 through the strapping band lock.
- 4. Tighten strapping band 1 as tightly as possible by hand.
- 5. Align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

- Push down the tensioning screw and tighten strapping band 1 so it cannot slip.
- Strapping band 2: proceed as for strapping band 1 (steps 1 to 6).
- 8. Slightly tighten strapping band 2 for final assembly. It must be possible to move strapping band 2 for final alignment.
- If necessary, shorten the strapping bands and trim the cut edges.

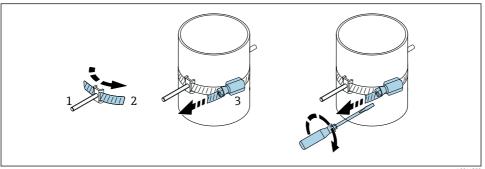
# **▲** WARNING

#### Risk of injury due to sharp edges!

- ▶ After shortening the strapping bands, trim the cut edges.
- Wear suitable protective goggles and safety gloves.



- ₩ 9 Holder with strapping bands (medium nominal diameters), with hinged screw
- 1 Mounting bolts
- 2 Strapping band
- 3 Tensioning screw



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

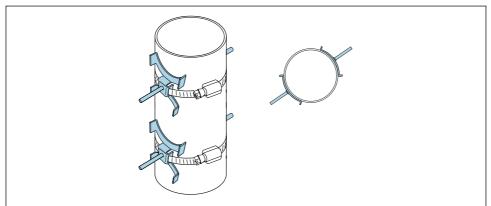
- 1 Mounting bolts
- 2 Strapping band
- Tensioning screw

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:

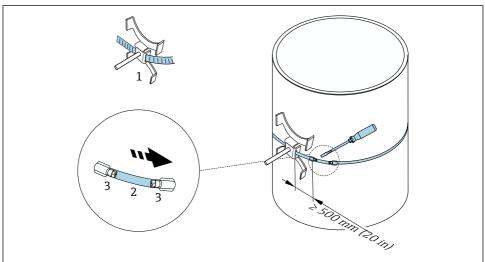
- 1. Measure the pipe circumference. Note down the full/half or quarter circumference.
- 2. Shorten the strapping bands to the required length (= measuring pipe circumference + 30 mm (1.18 in)) and trim the cut edges.
- 3. Select the mounting location of the sensors with the given sensor distance and optimum inlet run conditions,. In doing so, ensure 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 into one of the two strapping band locks and into the lock. 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. Align strapping band 1 in the desired position and place it 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. 7:30 o'clock and 1:30 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. Slightly tighten strapping band 2 for final assembly. It must be possible to move strapping band 2 for final alignment. 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 strapping band 2 on the measuring pipe so they are parallel to one another and offset at the same height/clock position (e. g. 10 o'clock and 4 o'clock) in relation to the two strap bolts on strapping band 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. Alternatively, you can use the wire length here → 🖺 30.
- 15. Tighten strapping band 2 so that it cannot slip.

## **WARNING**

#### Risk of injury due to sharp edges!

- ▶ After shortening the strapping bands, trim the cut edges.
- ► Wear suitable protective goggles and safety gloves.



Δ0043374

■ 11 Holder with strapping bands (large nominal diameters)

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

<sup>\*</sup>The distance between the strap bolts 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 )

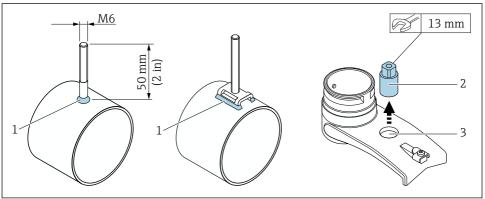


Can be used for

- 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 fastened with 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:
- The sensor holder is fastened as standard using a locking nut with a metric M6 ISO thread.
   If a different thread is to be used for fastening, a sensor holder with a detachable locking nut must be used.



A00/2275

■ 12 Holder with welded holts

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

# Installing sensor - small nominal diameters DN 15 to 65 (1/2 to 21/2")

#### Requirements

- The installation distance is known.  $\rightarrow \implies 17$
- Sensor holder is pre-assembled.

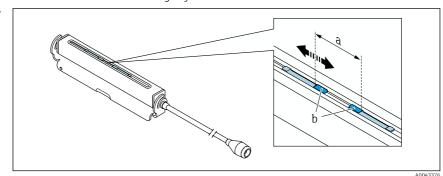
#### Material

The following material is required for mounting:

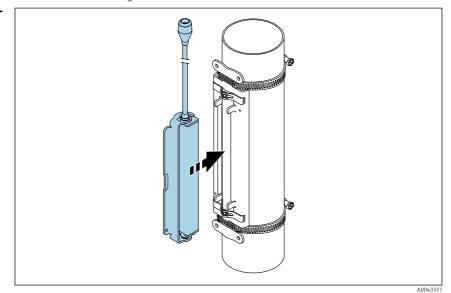
- Sensor incl. adapter cable
- Sensor cable for connection to the transmitter
- Coupling medium (coupling pad or coupling gel) for an acoustic connection between the sensor and pipe

#### 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.

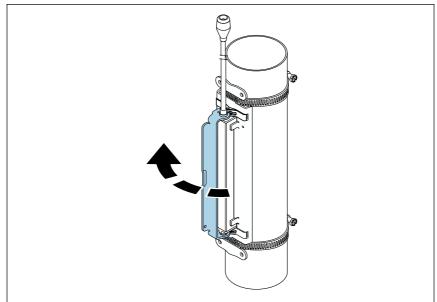


- 13 Distance between sensors as per the installation distance  $\rightarrow$   $\blacksquare$  17
- a Sensor distance (back of sensor must touch the surface)
- b Sensor contact surfaces
- 2. Stick the coupling pad under the sensor onto the measuring pipe. Alternatively, coat the contact surfaces of the sensor (b) evenly with coupling gel (approx. 0.5 to 1 mm (0.02 to 0.04 in)).
- 3. Position the sensor housing on the sensor holder.



■ 14 Positioning the sensor housing

4. Attach the sensor housing to the sensor holder by locking the bracket into place.



Δ0043378

Fastening the sensor housing

- 5. Connect the sensor cable to the adapter cable.
  - This completes the mounting procedure. The sensors can be connected to the transmitter via the connecting cables.
- To ensure good acoustic contact, the visible measuring pipe surface must be clean and free from flaking paint and/or rust.
  - 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).

# Installing sensors - 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  $\rightarrow$  🗎 17
- Strapping bands are pre-assembled

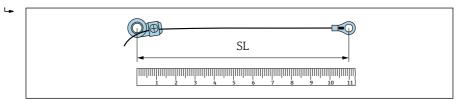
#### Material

The following material is required for mounting:

- 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 the 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  $(180^{\circ}, \pm 5^{\circ})$  diagonally with the wire length.

Procedure for using measuring wires:

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.

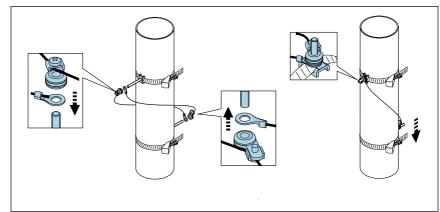


A004337

■ 16 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, which can still be moved.

4. Take the still movable strapping band 2, including 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 middle of the strapping bands. If the distance is too small, release strapping band 2 again and position it better. The two strapping bands should be as perpendicular as possible to the measuring pipe axis and parallel to one another.



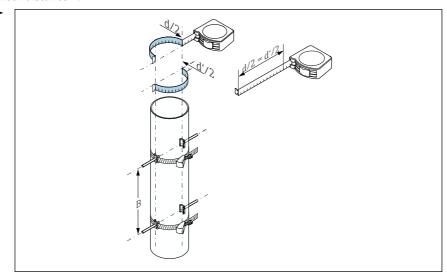
 $\blacksquare$  17 Positioning the strapping bands (steps 2 to 4)

5. Loosen the screws of the fixers on the measuring wires and remove the measuring wires from the mounting bolts.

#### Procedure with a tape measure:

- 1. Use a tape measure to determine the pipe diameter d.
- 2. Mount the opposite mounting bolt at d/2 from the front mounting bolt. The distance must be d/2 = d/2 on both sides

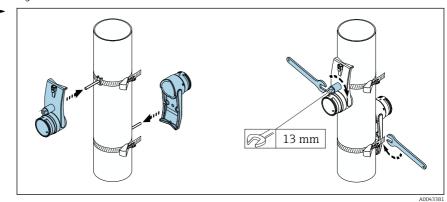
#### 3. Check distance B.



■ 18 Positioning the strapping bands and mounting bolts with a tape measure (steps 2 to 4)

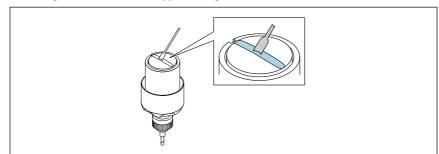
# Fastening the sensors:

1. Fit the sensor holders over the individual mounting bolts and tighten securely with the locking nut.



■ 19 Mounting the sensor holders

2. Stick the coupling pad under the sensor. Alternatively, coat the contact surfaces of the sensor evenly with coupling gel (approx. 1 mm (0.04 in)). In doing so, start from the groove through the center to the opposite edge.

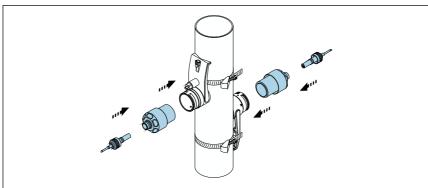


A0043382

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

- 3. Insert the sensor into the sensor holder.
- 4. 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.

Insert the sensor cable into each individual sensor until the end stop.



Δ0043383

Mounting the sensors and connecting the sensor cables

This completes the mounting procedure. 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.



- To ensure good acoustic contact, the visible measuring pipe surface must be clean and free from flaking paint and/or rust.
  - 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 use of the coupling pad does not suffice (installation quality check).

Installation for measurement via 2 traverses

#### Requirements

- The installation distance is known.  $\rightarrow \triangle 17$
- Strapping bands are pre-assembled

#### Material

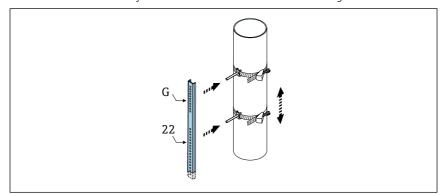
The following material is required for mounting:

- Two strapping bands incl. mounting bolts and centering plates where necessary (already pre-assembled  $\rightarrow \triangle 21, \rightarrow \triangle 23$
- 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)
- Screw driver

#### 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.

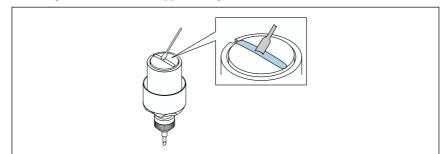


A0043384

■ 22 Determining the distance in accordance with 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. Place the coupling pad under the sensor. Alternatively, coat the contact surfaces of the sensor evenly with coupling gel (approx. 1 mm (0.04 in)). In doing so, start from the groove through the center to the opposite edge.

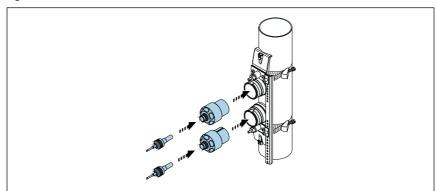


A0043382

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

- 6. Insert the sensor into the sensor holder.
- 7. 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.

8. Insert the sensor cable into each individual sensor until the end stop and tighten the locking nut.



Δ0043386

**2**4 *Mounting the sensors and connecting the sensor cables* 

This completes the mounting procedure. 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.

- To ensure good acoustic contact, the visible measuring pipe surface must be clean and free from flaking paint and/or rust.
  - 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 use of the coupling pad does not suffice (installation quality check).

# 5.2.5 Mounting the transmitter housing

# **A** 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.

# **A** CAUTION

# Excessive force can damage the housing!

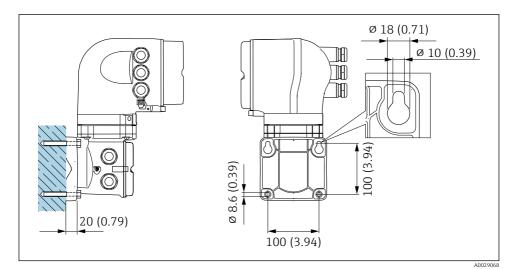
Avoid excessive mechanical stress.

The transmitter can be mounted in the following ways:

- Post mounting
- Wall mounting

# Wall mounting

Required tools Drill with drill bit  $\emptyset$  6.0 mm



■ 25 Engineering unit mm (in)

# Pipe mounting

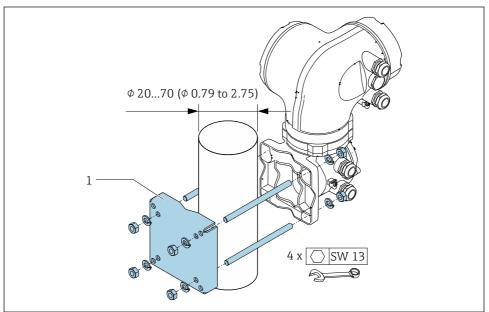
Required tools Open-ended wrench AF 13

# **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.

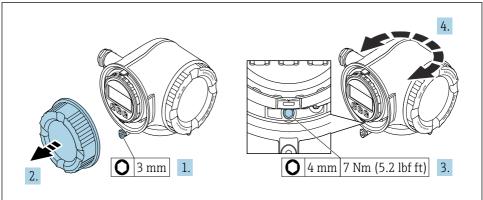


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■ 26 Engineering unit mm (in)

# 5.2.6 Turning the transmitter housing

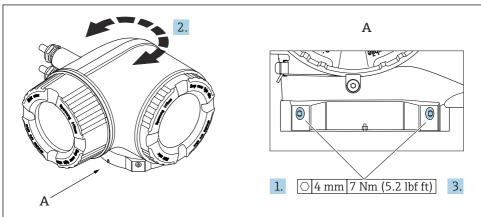
To provide easier access to the connection compartment or display module, the transmitter housing can be turned.



A0029993

#### ■ 27 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. Loosen the securing screw.
- 4. Turn the housing to the desired position.
- 5. Tighten the securing screw.
- 6. Screw on the connection compartment cover.
- 7. Depending on the device version: Attach the securing clamp of the connection compartment cover.



A0043150

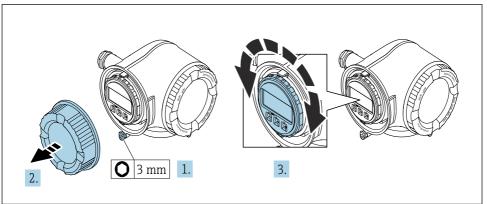
## ■ 28 Ex housing

1. Loosen the fixing 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-mounting check

Is the measuring device undamaged (visual inspection)?	
Does the measuring device correspond to the measuring point specifications?	
For example:  Process temperature  Inlet run conditions  Ambient temperature  Measuring range	
Has the correct orientation for the sensor been selected → 🗎 11?  • According to sensor type • According to medium temperature • According to medium properties (outgassing, with entrained solids)	
Are the sensors correctly connected to the transmitter (upstream/downstream) ?	
Are the sensors correctly mounted (distance, 1 traverse, 2 traverses) ?	

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?	
Is the sensor holder properly grounded (in the event of different potential between the sensor holder and transmitter)?	

# 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.

# **A** WARNING

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

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

# 6.2 Disposing of the measuring device

# **WARNING**

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

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

Follow these instructions when disposing of the device:

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





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