Brief Operating Instructions
Proline t-mass F

Thermal mass flow 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.
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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️</td>
<td>Permitted Procedures, processes or actions that are permitted.</td>
<td>✔️✔️</td>
<td>Preferred Procedures, processes or actions that are preferred.</td>
</tr>
<tr>
<td>❌</td>
<td>Forbidden Procedures, processes or actions that are forbidden.</td>
<td>⬇️</td>
<td>Result of a step</td>
</tr>
<tr>
<td>📖</td>
<td>Reference to documentation</td>
<td>📖</td>
<td>Reference to page</td>
</tr>
<tr>
<td>📦</td>
<td>Reference to graphic</td>
<td>📦</td>
<td>Series of steps</td>
</tr>
<tr>
<td>🕵️</td>
<td>Tip Indicates additional information.</td>
<td>🕵️</td>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

1.1.3  Electrical symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>−−−</td>
<td>Direct current</td>
<td>−−−</td>
<td>Alternating current</td>
</tr>
<tr>
<td>−−−</td>
<td>Direct current and alternating current</td>
<td>−−−</td>
<td>Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.</td>
</tr>
</tbody>
</table>
1. Protective Earth (PE)
A terminal which must be connected to ground prior to establishing any other connections.

The ground terminals are situated inside and outside the device:
- Inner ground terminal: Connects the protective earth to the mains supply.
- Outer ground terminal: Connects the device to the plant grounding system.

1.1.4 Communication symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![WiFi Symbol] | Wireless Local Area Network (WLAN)  
Communication via a wireless, local network. |
| ![Bluetooth Symbol] | Bluetooth  
Wireless data transmission between devices over a short distance. |
| ![Promag 800 Symbol] | Promag 800  
Cellular radio  
Bidirectional data exchange via cellular network. |
| ![LED Symbol] | LED  
Light emitting diode is on. |
| ![LED Symbol] | LED  
Light emitting diode is flashing. |

1.1.5 Tool symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Torx Screwdriver Symbol]</td>
<td>Torx screwdriver</td>
</tr>
<tr>
<td>![Flat Blade Screwdriver Symbol]</td>
<td>Flat blade screwdriver</td>
</tr>
<tr>
<td>![Cross-Head Screwdriver Symbol]</td>
<td>Cross-head screwdriver</td>
</tr>
<tr>
<td>![Allen Key Symbol]</td>
<td>Allen key</td>
</tr>
<tr>
<td>![Open-Ended Wrench Symbol]</td>
<td>Open-ended wrench</td>
</tr>
</tbody>
</table>

1.1.6 Symbols in graphics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3,...</td>
<td>Item numbers</td>
</tr>
<tr>
<td>A, B, C,...</td>
<td>Views</td>
</tr>
<tr>
<td>![Hazardous Area Symbol]</td>
<td>Hazardous area</td>
</tr>
<tr>
<td>![Safe Area Symbol]</td>
<td>Safe area (non-hazardous area)</td>
</tr>
<tr>
<td>![Flow Direction Symbol]</td>
<td>Flow direction</td>
</tr>
</tbody>
</table>
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 this manual is intended only for the flow measurement of gases.

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

Measuring devices for use in hazardous areas 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 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.

⚠️ WARNING
Danger of breakage due to corrosive or abrasive fluids and ambient conditions!
- Verify the compatibility of the process fluid with the sensor material.
- Ensure the resistance of all fluid-wetted materials in the process.
- Keep within the specified pressure and temperature range.
**NOTICE**

**Verification for borderline cases:**

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

**WARNING**

**Risk of injury if the process connection and gland of the sensing element are opened under pressure.**

- The process connection and sensor gland should be opened only when in an unpressurized state.

**NOTICE**

**Penetration of dust and moisture when the transmitter housing is opened.**

- Only open the transmitter housing briefly, ensuring that no dust or moisture enters the housing.

**Residual risks**

**WARNING**

**If the temperature of the media or electronics unit is high or low, this may cause the surfaces of the device to become hot or cold. This poses a risk of burns or frostbite!**

- In the case of hot or cold medium temperatures, install appropriate protection against contact.

**2.3  Occupational safety**

When working on and with the device:

- Wear the required personal protective equipment as per 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, wear suitable gloves.

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

Are the goods undamaged?
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](http://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.

#### 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 liner.
‣ 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.

[Diagram]

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).
4.2.2  Measuring devices with lifting lugs

**CAUTION**

Special transportation instructions for devices with lifting lugs
- Only use the lifting lugs fitted on the device or flanges to transport the device.
- The device must always be secured at two lifting lugs at least.

4.2.3  Transporting with a fork lift

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

5  Installation

5.1  Installation conditions

- The recommended inlet and outlet specifications must be observed.
- The piping system and the device must be installed according to good engineering practice.
- Ensure the correct alignment and orientation of the sensor.
- Take measures to avoid or prevent condensation (e.g. condensation trap, thermal insulation etc.).
- Observe the maximum permissible ambient temperatures and medium temperature range.
- Install the measuring device in a shady location or use a weather protection cover.
- For mechanical reasons and to protect the pipe, support is recommended for heavy sensors.

5.1.1  Mounting position

**Orientation**

The direction of flow must match the direction of the arrow on the sensor. In the case of the bidirectional sensor, the arrow points in the positive direction.
### Orientation Recommendation

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical orientation</td>
<td>☑️</td>
</tr>
<tr>
<td>Horizontal orientation, transmitter head up</td>
<td>☑️</td>
</tr>
<tr>
<td>Horizontal orientation, transmitter head down</td>
<td>☑️</td>
</tr>
<tr>
<td>Horizontal orientation, transmitter head at side</td>
<td>☑️</td>
</tr>
<tr>
<td>Inclined orientation, transmitter head down</td>
<td>☑️</td>
</tr>
</tbody>
</table>

1) In the case of saturated or impure gases, vertical orientation is preferred in order to minimize condensation or contamination. For bidirectional sensors, select horizontal orientation.

2) Select inclined orientation (\(\alpha = \text{approx. 135°}\)) for very wet or water-saturated gas (e.g. digester gas, undried compressed air), or if deposits or condensate are constantly present.

### Pipes

The measuring device must be professionally installed, and the following points must be observed:
- Weld pipes professionally.
- Use seals of the correct size.
- Align flanges and seals correctly.
Following installation, the pipe must be free from dirt and particles in order to avoid damage to the sensors.

For further information → ISO standard 14511.

**Internal diameter**

During the calibration, the device is adjusted with the following inlet pipes depending on the selected process connection. The corresponding internal diameters are listed in the following table:

### SI units

<table>
<thead>
<tr>
<th>DN [mm]</th>
<th>Inlet pipe internal diameter [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DIN 1)</td>
</tr>
<tr>
<td>15</td>
<td>17.3</td>
</tr>
<tr>
<td>25</td>
<td>28.5</td>
</tr>
<tr>
<td>40</td>
<td>43.1</td>
</tr>
<tr>
<td>50</td>
<td>54.5</td>
</tr>
<tr>
<td>65</td>
<td>70.3</td>
</tr>
<tr>
<td>80</td>
<td>83.7</td>
</tr>
<tr>
<td>100</td>
<td>107.1</td>
</tr>
</tbody>
</table>

1) Order code for 'Process connection', option RAA 'R thread EN10226-1 / ISO 7-1''

2) Order code for 'Process connection', option NPT 'MNPT thread, ASME''

### US units

<table>
<thead>
<tr>
<th>DN [in]</th>
<th>Inlet pipe internal diameter [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DIN 1)</td>
</tr>
<tr>
<td>½</td>
<td>0.68</td>
</tr>
<tr>
<td>1</td>
<td>1.12</td>
</tr>
<tr>
<td>1 ½</td>
<td>1.7</td>
</tr>
<tr>
<td>2</td>
<td>2.15</td>
</tr>
<tr>
<td>2 ½</td>
<td>2.77</td>
</tr>
</tbody>
</table>
To ensure maximum measuring performance, choose an inlet pipe with an almost identical internal diameter.

**Inlet and outlet runs**
A fully developed flow profile is a requirement for optimal thermal flow measurement.
To achieve the best possible measuring performance, observe the following inlet and outlet runs at the very minimum.
- In the case of bidirectional sensors, also observe the recommended inlet run in the opposite direction.
- If several flow disturbances are present, use flow conditioners.
- Use flow conditioners if it is not possible to observe the required inlet runs.
- In the case of control valves, the amount of disturbance depends on the valve type and opening degree. The recommended inlet run for control valves is $50 \times \text{DN}$.
- In the case of very light gases (helium, hydrogen), the recommended inlet run must be doubled.

---

<table>
<thead>
<tr>
<th>DN [in]</th>
<th>Inlet pipe internal diameter [in]</th>
<th>DIN 1)</th>
<th>Sch40 2)</th>
<th>Sch80</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3.30</td>
<td>3.07</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.22</td>
<td>4.03</td>
<td>3.82</td>
<td></td>
</tr>
</tbody>
</table>

1) Order code for “Process connection”, option RAA ‘R thread EN10226-1 / ISO 7-1’
2) Order code for “Process connection”, option NPT ‘MNPT thread, ASME’
2. Reduction

3. Expansion

4. 90° elbow

5. 2 × 90° elbow

6. Control valve

7. 2 × 90° elbow, 3-dimensional
The additional measured error to be expected without flow conditioners depending on the disturbance type and inlet run

A  Additional measured error (%)
B  Inlet run (DN)
1  2 × 90° elbow, 3-dimensional
2  Expansion
3  2 × 90° elbow
4  Reduction or 90° elbow

Flow conditioner

Use flow conditioners if it is not possible to observe the required inlet runs. Flow conditioners improve the flow profile and therefore reduce the necessary inlet runs.

The flow conditioner is permanently integrated in the flange and must be ordered with the device. It is not possible to retrofit a flow conditioner.
1 Flow conditioner for unidirectional, bidirectional version and reverse flow detection
2 Optional, additional flow conditioner for bidirectional version

9 Recommended inlet and outlet runs when using a flow conditioner

1 Flow conditioner

In the case of bidirectional sensors, also observe the inlet run in the opposite direction.
The additional measured error to be expected with flow conditioners depending on the disturbance type and inlet run

A  Additional measured error (%)  
B  Inlet runs (DN)  
1  2 × 90° elbow, 3-dimensional  
2  Expansion  
3  2 × 90° elbow  
4  Reduction or 90° elbow

Outlet runs with pressure measuring points
Install the pressure measuring point downstream of the measuring system. This prevents the pressure transmitter from potentially affecting the flow in the measuring point.

Installation of a pressure measuring point ($P = $ pressure transmitter)
5.1.2 Environment and process requirements

Ambient temperature range

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>–40 to +60 °C (–40 to +140 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order code for &quot;Test, certificate&quot;, option JP:</td>
<td>–50 to +60 °C (–58 to +140 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Readability of the local display</th>
<th>–20 to +60 °C (–4 to +140 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The readability of the display may be impaired at temperatures outside the temperature range.</td>
</tr>
</tbody>
</table>

NOTICE
Danger of overheating

- Ensure that the temperature at the lower end of the transmitter housing does not exceed 80 °C (176 °F).
- Ensure that sufficient convection takes place at the transmitter neck.
- When using in potentially explosive atmospheres, observe the information in the device-specific Ex documentation. For detailed information on the temperature tables, see the separate document entitled "Safety Instructions" (XA) for the device.
- Ensure that a sufficiently large area of the transmitter neck remains exposed. The uncovered part serves as a radiator and protects the electronics from overheating and excessive cooling.
- If operating outdoors:
  Avoid direct sunlight, particularly in warm climatic regions.

You can order a weather protection cover from Endress+Hauser.

System pressure

Pressure-reducing valves and some compressor systems can generate significant process pressure variations that can distort the flow profile. This can produce an additional measured error. Suitable measures must be taken to reduce these pressure pulses, such as:

- The use of expansion tanks
- The use of inlet diffusers
- Positioning the measuring device further downstream

To avoid pulsating flow and contamination from oil/dirt in compressed air applications, it is recommended to install the measuring device downstream of filter, drying and storage devices. Do not install the measuring device directly after the compressor.

Thermal insulation

In the case of some fluids, it is important to keep the heat radiated from the sensor to the transmitter to a low level. A wide range of materials can be used for the required insulation.

If the gas is very wet or saturated with water (e.g. digester gas), the pipe and the sensor housing should be insulated, and heated where necessary, to prevent water droplets condensing on the sensing element.
**NOTICE**

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

![Diagram](A0039419)

> 12 Thermal insulation with not isolated extended neck

**Heating**

**NOTICE**

**Electronics can overheat due to elevated ambient temperature!**
- Observe maximum permitted ambient temperature for the transmitter.
- Depending on the medium temperature, take the device orientation requirements into account.

**NOTICE**

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

**Danger of overheating when heating**
- Ensure that the temperature at the lower end of the transmitter housing does not exceed 80 °C (176 °F).
- Ensure that sufficient convection takes place at the transmitter neck.
- When using in potentially explosive atmospheres, observe the information in the device-specific Ex documentation. For detailed information on the temperature tables, see the separate document entitled "Safety Instructions" (XA) for the device.
- Ensure that a sufficiently large area of the transmitter neck remains exposed. The uncovered part serves as a radiator and protects the electronics from overheating and excessive cooling.

*Heating options*
If a fluid requires that no heat loss should occur at the sensor, users can avail of the following heating options:
- Electrical heating, e.g. with electric band heaters
- Via pipes carrying hot water or steam

**Vibrations**

**NOTICE**

**Strong vibrations can damage the measuring device.**
Can result in damage to the measuring device or the fastening units.
- Pay attention to information on the vibration and shock resistance

5.1.3 **Special mounting instructions**

**Zero point adjustment**
All measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions. Therefore, a zero point adjustment in the field is generally not required.

Experience shows that zero point adjustment is advisable only in special cases:
- If strict measuring accuracy requirements apply.
- Under extreme process or operating conditions (e.g. very high process temperatures or light gases (helium, hydrogen)).
Weather protection cover

<table>
<thead>
<tr>
<th>280 (11.0)</th>
<th>255 (10.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>146 (5.75)</td>
<td>12 (0.47)</td>
</tr>
<tr>
<td>134 (5.3)</td>
<td>30 (1.18)</td>
</tr>
<tr>
<td>48 (1.9)</td>
<td></td>
</tr>
</tbody>
</table>

13 Engineering unit mm (in)

Weather protection cover

<table>
<thead>
<tr>
<th>213 (8.4)</th>
<th>203 (8.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>39 (1.5)</td>
<td></td>
</tr>
<tr>
<td>243 (9.6)</td>
<td></td>
</tr>
</tbody>
</table>

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

5.2 Mounting the measuring device

5.2.1 Required tool

For sensor

For flanges and other process connections: use a suitable mounting tool
5.2.2 Preparing the measuring device

1. Remove all remaining transport packaging.
2. Remove any protective covers or protective caps present from the sensor.
3. Remove stick-on label on the electronics compartment cover.

5.2.3 Mounting the sensor

**WARNING**

Danger due to improper process sealing!
- Ensure that the inside diameters of the gaskets are greater than or equal to that of the process connections and piping.
- Ensure that the seals are clean and undamaged.
- Secure the seals correctly.

1. Ensure that the direction of the arrow on the sensor matches the flow direction of the medium.
2. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.

5.2.4 Mounting the transmitter housing: Proline 500 – digital

**CAUTION**

Ambient temperature too high!
Danger of electronics overheating and housing deformation.
- Do not exceed the permitted maximum ambient temperature.
- If operating outdoors: Avoid direct sunlight and exposure to weathering, particularly in warm climatic regions.

**CAUTION**

Excessive force can damage the housing!
- Avoid excessive mechanical stress.

The transmitter can be mounted in the following ways:
- Post mounting
- Wall mounting
Post mounting

**WARNING**

Excessive tightening torque applied to the fixing screws!
Risk of damaging the plastic transmitter.

- Tighten the fixing screws as per the tightening torque: 2 Nm (1.5 lbf ft)

![Diagram of post mounting](image)

| 15 | Engineering unit mm (in) |

A0029051
Wall mounting

16 Engineering unit mm (in)

L Depends on order code for "Transmitter housing"

Order code for "Transmitter housing"
- Option A, aluminum coated: L = 14 mm (0.55 in)
- Option D, polycarbonate: L = 13 mm (0.51 in)

5.3 Post-installation check

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the device undamaged (visual inspection)?</td>
<td>☑️</td>
</tr>
<tr>
<td>Does the measuring device conform to the measuring point specifications?</td>
<td>☑️</td>
</tr>
<tr>
<td>For example:</td>
<td></td>
</tr>
<tr>
<td>- Process temperature (refer to the 'Process' section of the 'Technical Information' document)</td>
<td></td>
</tr>
<tr>
<td>- Process pressure (refer to the 'Pressure-temperature ratings' section of the 'Technical Information' document)</td>
<td>☑️</td>
</tr>
<tr>
<td>- Ambient temperature → ☑️ 20</td>
<td></td>
</tr>
<tr>
<td>- Measuring range (refer to the 'Input' section of the 'Technical Information' document on the CD-ROM provided)</td>
<td></td>
</tr>
<tr>
<td>Has the correct orientation been selected for the sensor → ☑️ 12?</td>
<td></td>
</tr>
<tr>
<td>- According to sensor type</td>
<td></td>
</tr>
<tr>
<td>- According to medium properties</td>
<td></td>
</tr>
<tr>
<td>- According to medium temperature</td>
<td></td>
</tr>
<tr>
<td>- According to process pressure</td>
<td></td>
</tr>
</tbody>
</table>
Does the arrow on the sensor match the actual direction of flow of the medium through the piping?  
Have sufficient inlet and outlet runs been provided upstream and downstream of the measuring point → 15?  
Is the device adequately protected from precipitation and direct sunlight?  
Is the device protected against overheating?  
Is the device protected against excessive vibrations?  
Gas property checked (e.g. purity, dryness, cleanness)?  
Are the measuring point identification and labeling correct (visual inspection)?  
Are the securing screw and securing clamp tightened securely?  

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.