Brief Operating Instructions
Proline Prosonic Flow E

Ultrasonic time-of-flight sensor

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

Sensor Brief Operating Instructions
Contain information about the sensor.

Transmitter Brief Operating Instructions → .getPage(3).
Brief Operating Instructions for the device

The device consists of a transmitter and a sensor.

The process of commissioning these two components is described in two separate manuals:
- Sensor Brief Operating Instructions
- Transmitter Brief Operating Instructions

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

Sensor Brief Operating Instructions
The Sensor Brief Operating Instructions are aimed at specialists with responsibility for installing the measuring device.
- Incoming acceptance and product identification
- Storage and transport
- Installation

Transmitter Brief Operating Instructions
The Transmitter Brief Operating Instructions are aimed at specialists with responsibility for commissioning, configuring and parameterizing the measuring device (until the first measured value).
- Product description
- Installation
- Electrical connection
- Operation options
- System integration
- Commissioning
- Diagnostic information

Additional device documentation

These Brief Operating Instructions are the Sensor Brief Operating Instructions. The "Transmitter Brief Operating Instructions" are available via:
- Internet: www.endress.com/deviceviewer
- 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 Document information

1.1 Symbols used

1.1.1 Safety symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="DANGER" /></td>
<td><strong>DANGER!</strong> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING" /></td>
<td><strong>WARNING!</strong> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.</td>
</tr>
<tr>
<td><img src="image" alt="CAUTION" /></td>
<td><strong>CAUTION!</strong> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.</td>
</tr>
<tr>
<td><img src="image" alt="NOTICE" /></td>
<td><strong>NOTE!</strong> This symbol contains information on procedures and other facts which do not result in personal injury.</td>
</tr>
</tbody>
</table>

1.1.2 Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Permitted" /></td>
<td><strong>Permitted</strong> Procedures, processes or actions that are permitted.</td>
</tr>
<tr>
<td><img src="image" alt="Preferred" /></td>
<td><strong>Preferred</strong> Procedures, processes or actions that are preferred.</td>
</tr>
<tr>
<td><img src="image" alt="Forbidden" /></td>
<td><strong>Forbidden</strong> Procedures, processes or actions that are forbidden.</td>
</tr>
<tr>
<td><img src="image" alt="Tip" /></td>
<td><strong>Tip</strong> Indicates additional information.</td>
</tr>
<tr>
<td><img src="image" alt="Reference to documentation" /></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td><img src="image" alt="Reference to page" /></td>
<td>Reference to page</td>
</tr>
<tr>
<td><img src="image" alt="Reference to graphic" /></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td><img src="image" alt="Series of steps" /></td>
<td>Series of steps</td>
</tr>
<tr>
<td><img src="image" alt="Result of a step" /></td>
<td>Result of a step</td>
</tr>
<tr>
<td><img src="image" alt="Visual inspection" /></td>
<td>Visual inspection</td>
</tr>
</tbody>
</table>

1.1.3 Electrical symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Direct current" /></td>
<td>Direct current</td>
</tr>
<tr>
<td><img src="image" alt="Alternating current" /></td>
<td>Alternating current</td>
</tr>
<tr>
<td><img src="image" alt="Direct current and alternating current" /></td>
<td>Direct current and alternating current</td>
</tr>
<tr>
<td><img src="image" alt="Ground connection" /></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>
### 1.1.4 Tool symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗝️</td>
<td>Torx screwdriver</td>
<td>🛠️</td>
<td>Flat blade screwdriver</td>
</tr>
<tr>
<td>🛠️</td>
<td>Cross-head screwdriver</td>
<td>⚙️</td>
<td>Allen key</td>
</tr>
<tr>
<td>🔧</td>
<td>Open-ended wrench</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 1.1.5 Symbols in graphics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3,...</td>
<td>Item numbers</td>
<td>1, 2, 3,...</td>
<td>Series of steps</td>
</tr>
<tr>
<td>A, B, C,...</td>
<td>Views</td>
<td>A-A, B-B, C-C,...</td>
<td>Sections</td>
</tr>
<tr>
<td>🛡️</td>
<td>Hazardous area</td>
<td>🛡️</td>
<td>Safe area (non-hazardous area)</td>
</tr>
<tr>
<td>➡️</td>
<td>Flow direction</td>
<td>➡️</td>
<td></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 these Brief Operating Instructions is intended only for 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, in hygienic applications or where there is an increased risk due to process pressure, are labeled accordingly on the nameplate.

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

‣ Keep within the specified pressure and temperature range.
‣ Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
‣ Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area (e.g. explosion protection, pressure vessel safety).
‣ Use the measuring device only for media to which the process-wetted materials are sufficiently resistant.
‣ If the measuring device is not operated at atmospheric temperature, compliance with the relevant basic conditions specified in the associated device documentation is absolutely essential: "Documentation" section.
‣ Protect the measuring device permanently against corrosion from environmental influences.

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

⚠️ WARNING
Danger of breakage due to corrosive or abrasive fluids!

‣ Verify the compatibility of the process fluid with the sensor material.
‣ Ensure the resistance of all fluid-wetted materials in the process.
‣ Keep within the specified pressure and temperature range.

⚠️ NOTICE

Verification for borderline cases:

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

Residual risks

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

‣ For elevated fluid temperatures, ensure protection against contact to prevent burns.
2.3  Workplace safety

For work on and with the device:
‣ Wear the required personal protective equipment according to federal/national regulations.

For welding work on the piping:
‣ Do not ground the welding unit via the measuring device.

If working on and with the device with wet hands:
‣ Due to the increased risk of electric shock, gloves must be worn.

2.4  Operational safety

Risk of injury!
‣ Operate the device in proper technical condition and fail-safe condition only.
‣ The operator is responsible for interference-free operation of the device.

2.5  Product safety

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

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

2.6  IT security

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

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

3.1  Incoming acceptance

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

Are the goods undamaged?

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

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

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

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

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

Install the measuring device in a parallel plane free of external mechanical stress.
<table>
<thead>
<tr>
<th>Orientation</th>
<th>Compact version</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Vertical orientation</td>
</tr>
<tr>
<td>B</td>
<td>Horizontal orientation, transmitter head up</td>
</tr>
<tr>
<td>C</td>
<td>Horizontal orientation, transmitter head down</td>
</tr>
<tr>
<td>D</td>
<td>Horizontal orientation, transmitter head at side</td>
</tr>
</tbody>
</table>

### Inlet and outlet runs
If possible, the sensor should be installed upstream from valves, T-pieces, elbows etc. To attain the specified level of accuracy of the measuring device, the below mentioned inlet and outlet runs must be maintained at minimum. 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.
Installation

Proline Prosonic Flow E

2 Minimum inlet and outlet runs with various flow obstructions

1 90° elbow or T-section
2 Pump
3 2 × 90° elbow, 3-dimensional
4 Control valve

Outlet runs when installing external devices

If installing an external device, observe the specified distance.

PT Pressure

5.1.2 Requirements from environment and process

Ambient temperature range

<table>
<thead>
<tr>
<th>Component</th>
<th>Temp Range</th>
</tr>
</thead>
</table>
| Transmitter | Prosonic Flow E 100: –25 to +60 °C (–13 to +140 °F)  
Prosonic Flow E Heat: –25 to +55 °C (–13 to +131 °F) as per EN 1434 environmental class B |
| Local display | Prosonic Flow E 100: –20 to +60 °C (–4 to +140 °F), readability of the display may be impaired at temperatures outside the temperature range. |
| Sensor | Prosonic Flow E 100: –25 to +60 °C (–13 to +140 °F)  
Prosonic Flow E Heat: –25 to +55 °C (–13 to +131 °F) as per EN 1434 environmental class B |
If operating outdoors:
Avoid direct sunlight, particularly in warm climatic regions.

System pressure
It is important that cavitation does not occur, or that gases entrained in the liquids do not outgas. This is prevented by means of a sufficiently high system pressure.

For this reason, the following mounting locations are recommended:
- At the lowest point in a vertical pipe
- Downstream from pumps (no danger of vacuum)

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.

**NOTICE**
Electronics overheating on account of thermal insulation!
- Observe maximum permitted insulation height of the transmitter neck so that the transmitter head is completely free.

<table>
<thead>
<tr>
<th>t</th>
<th>Maximum insulation thickness 2 cm (0.79 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Minimum distance from transmitter to insulation</td>
</tr>
</tbody>
</table>
5.2 Mounting the measuring device

5.2.1 Required tools

For transmitter
- For turning the transmitter housing: Open-ended wrench 8 mm
- For opening the securing clamps: Allen key 3 mm
- For turning the transmitter housing: Open-ended wrench 8 mm
- For opening the securing clamps: Allen key 3 mm

For sensor
For flanges and other process connections: Corresponding mounting tools

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 measuring device

**WARNING**

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

1. Ensure that the direction of the arrow on the sensor matches the flow direction of the medium.
2. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.
5.3  Post-mounting 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</td>
<td></td>
</tr>
<tr>
<td>• Process pressure (refer to the section on 'Pressure-temperature ratings' in the 'Technical Information' document on the CD-ROM provided)</td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature range</td>
<td></td>
</tr>
<tr>
<td>• Measuring range</td>
<td></td>
</tr>
<tr>
<td>Has the correct orientation for the sensor been selected →  12?</td>
<td></td>
</tr>
<tr>
<td>• According to sensor type</td>
<td></td>
</tr>
<tr>
<td>• According to medium temperature</td>
<td></td>
</tr>
<tr>
<td>• According to medium properties (outgassing, with entrained solids)</td>
<td></td>
</tr>
<tr>
<td>Does the arrow on the sensor match the direction of flow of the medium through the piping →  12?</td>
<td></td>
</tr>
<tr>
<td>Are the measuring point identification and labeling correct (visual inspection)?</td>
<td></td>
</tr>
<tr>
<td>Is the device adequately protected from precipitation and direct sunlight?</td>
<td></td>
</tr>
<tr>
<td>Are the securing screw and securing clamp tightened securely?</td>
<td></td>
</tr>
</tbody>
</table>

6  Disposal

6.1  Removing the measuring device

1. Switch off the device.

**WARNING**

**Danger to persons from process conditions.**

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

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

6.2  Disposing of the measuring device

**WARNING**

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

- Ensure that the measuring device and all cavities are free of fluid residues that are hazardous to health or the environment, e.g. substances that have permeated into crevices or diffused through plastic.
Observe the following notes during disposal:

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