Brief Operating Instructions
Proline Prosonic Flow B 200

Ultrasonic time-of-flight flowmeter

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

Detailed information about the device can be found in the Operating Instructions and the other documentation:

- On the CD-ROM supplied (is not included in the delivery for all device versions).
- Available for all device versions via:
  - 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>![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>![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>![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>![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 Electrical symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![DC]</td>
<td>Direct current</td>
</tr>
<tr>
<td>![AC]</td>
<td>Alternating current</td>
</tr>
<tr>
<td>![DC AC]</td>
<td>Direct current and alternating current</td>
</tr>
<tr>
<td>![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>
<tr>
<td>![Equipotential connection]</td>
<td>Equipotential connection: A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.</td>
</tr>
</tbody>
</table>

1.1.3 Tool symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Torx screwdriver]</td>
<td>Torx screwdriver</td>
</tr>
<tr>
<td>![Flat blade screwdriver]</td>
<td>Flat blade screwdriver</td>
</tr>
<tr>
<td>![Phillips head screwdriver]</td>
<td>Phillips head screwdriver</td>
</tr>
<tr>
<td>![Allen key]</td>
<td>Allen key</td>
</tr>
<tr>
<td>![Open-ended wrench]</td>
<td>Open-ended wrench</td>
</tr>
</tbody>
</table>
1.1.4  Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![permit](image) | **Permitted**
Procedures, processes or actions that are permitted. | ![prefer](image) | **Preferred**
Procedures, processes or actions that are preferred. |
| ![forbid](image) | **Forbidden**
Procedures, processes or actions that are forbidden. | ![tip](image) | **Tip**
Indicates additional information. |
| ![doc](image) | Reference to documentation | ![page](image) | Reference to page |
| ![graphic](image) | Reference to graphic | ![step](image) | Series of steps |
| ![action](image) | Result of a sequence of actions | ![visual](image) | Visual inspection |

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><img src="image" alt="num" /></td>
<td>Item numbers</td>
<td><img src="image" alt="num" /></td>
<td>Series of steps</td>
</tr>
<tr>
<td><img src="image" alt="view" /></td>
<td>Views</td>
<td><img src="image" alt="view" /></td>
<td>Sections</td>
</tr>
<tr>
<td><img src="image" alt="hazard" /></td>
<td>Hazardous area</td>
<td><img src="image" alt="safe" /></td>
<td>Safe area (non-hazardous area)</td>
</tr>
<tr>
<td><img src="image" alt="flow" /></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 beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions
2.2 Designated use

Application and media
The measuring device described in these 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 in applications 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:

› 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.
› Check the nameplate to verify if the device ordered can be put to its intended use in the approval-related area (e.g. explosion protection, pressure vessel safety).
› Use the measuring device only for media against which the process-wetted materials are adequately 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.
› 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 of the sensor due to corrosive or abrasive fluids or from environmental 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.

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
The external surface temperature of the housing can increase by max. 20 K due to the power consumption of the electronic components. Hot process fluids passing through the measuring device will further increase the surface temperature of the housing. The surface of the sensor, in particular, can reach temperatures which are close to the fluid temperature.

Possible burn hazard due to fluid temperatures!

› For elevated fluid temperature, 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:
‣ It is recommended to wear gloves on account of the higher risk of electric shock.

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 EC directives listed in the device-specific EC 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 Product description
The device consists of a transmitter and a sensor.
The device is available as a compact version:
The transmitter and sensor form a mechanical unit.

For detailed information on the product description, see the Operating Instructions for the device.
3.1 Product design

1. Important components of a measuring device

1. Electronics compartment cover
2. Display module
3. Main electronics module
4. Cable glands
5. Transmitter housing
6. I/O electronics module
7. Terminals (spring loaded terminals, pluggable)
8. Connection compartment cover
9. Sensor
10. Transducer
4  Incoming acceptance and product identification

4.1  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.
4.2 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.

2 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.

5 Storage and transport

5.1 Storage conditions

Observe the following notes for storage:

- Store in original packaging.
- Do not remove protective covers or protective caps installed on process connections.
- Protect from direct sunlight.
- Store in a dry and dust-free place.
- Do not store outdoors.

Storage temperature: –40 to +80 °C (–40 to +176 °F),

5.2 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.

5.2.1 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).

5.2.2 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.

5.2.3 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.
6 Installation

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

6.1.1 Mounting position

Mounting location

Orientation
The direction of the arrow on the sensor 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>
</table>
| **A** Vertical orientation                      | ![Image](A0015545) | ✓   
| **B** Horizontal orientation, transmitter head up * | ![Image](A0015589) | ✓   
| **C** Horizontal orientation, transmitter head down * | ![Image](A0015590) | ✓   
| **D** Horizontal orientation, transmitter head at side | ![Image](A0015592) | ✗   

* A maximum deviation of only ±3° is permitted for the horizontal alignment of the converters.

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.
**Single-path version: DN 50 (2"), DN 80 (3")**

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

**Two-path version: DN 100 to 200 (4 to 8")**

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 transmitter

6.1.2 Requirements from environment and process

Ambient temperature range

<table>
<thead>
<tr>
<th>Component</th>
<th>Temperature Range</th>
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<tbody>
<tr>
<td>Transmitter</td>
<td>–40 to +60 °C (–40 to +140 °F)</td>
</tr>
<tr>
<td>Local display</td>
<td>–20 to +60 °C (–4 to +140 °F), the readability of the display may be impaired at temperatures outside the temperature range.</td>
</tr>
</tbody>
</table>
| Sensor            | • Flange material carbon steel: –10 to +60 °C (+14 to +140 °F)  
• Flange material stainless steel: –40 to +60 °C (–40 to +140 °F)  
• Version without flange: –40 to +60 °C (–40 to +140 °F) |

► If operating outdoors:
Avoid direct sunlight, particularly in warm climatic regions.

System pressure
Sensor
Max. 10 bar (145 psi)

Thermal insulation
For optimum temperature and methane fraction measurement (order characteristic for "Sensor version", option 2 "Volume flow + Biogas analysis"), make sure that heat is neither lost nor applied to the sensor. Thermal insulation can ensure that such heat transfer does not take place.

Thermal insulation is particularly recommended in situations where there is a large difference between the process temperature and the ambient temperature. This can result in heat convection errors during temperature measurement. A further factor which can lead to measurement errors due to heat convection is a low flow velocity.
6.2 Mounting the measuring device

6.2.1 Required tools

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

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

6.2.2 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.

6.2.3 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.

6.2.4 Turning the transmitter housing

To provide easier access to the connection compartment or display module, the transmitter housing can be turned.
6.2.5 Turning the display module
The display module can be turned to optimize display readability and operability.

6.3 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 &quot;Technical Information&quot; document on the CD-ROM provided)</td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature range → 15</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>Question</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</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>
7 Electrical connection

The measuring device does not have an internal circuit breaker. For this reason, assign the measuring device a switch or power-circuit breaker so that the power supply line can be easily disconnected from the mains.

7.1 Connection conditions

7.1.1 Required tools

- For cable entries: Use corresponding tools
- For securing clamp: Allen key 3 mm
- Wire stripper
- When using stranded cables: crimping tool for ferrule
- For removing cables from terminal: flat blade screwdriver ≤3 mm (0.12 in)

7.1.2 Connecting cable requirements

The connecting cables provided by the customer must fulfill the following requirements.

Electrical safety

In accordance with applicable federal/national regulations.

Permitted temperature range

- –40 °C (–40 °F) to +80 °C (+176 °F)
- Minimum requirement: cable temperature range ≥ ambient temperature +20 K

Signal cable

Current output

- For 4-20 mA: standard installation cable is sufficient.
- For 4-20 mA HART: Shielded cable recommended. Observe grounding concept of the plant.

Pulse/frequency/switch output

Standard installation cable is sufficient.

Current input

Standard installation cable is sufficient.

Cable diameter

- Cable glands supplied:
  M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in)
- Plug-in spring terminals for device version without integrated overvoltage protection: wire cross-sections 0.5 to 2.5 mm² (20 to 14 AWG)
- Screw terminals for device version with integrated overvoltage protection: wire cross-sections 0.2 to 2.5 mm² (24 to 14 AWG)
7.1.3 Terminal assignment

Transmitter

Connection versions

Maximum number of terminals
Terminals 1 to 6:
Without integrated overvoltage protection

1 Output 1 (passive): supply voltage and signal transmission
2 Output 2 (passive): supply voltage and signal transmission
3 Input (passive): supply voltage and signal transmission
4 Ground terminal for cable shield

Order code for “Output”          Terminal numbers

<table>
<thead>
<tr>
<th>Order code for “Output”</th>
<th>Output 1</th>
<th>Terminal numbers</th>
<th>Output 2</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 (+)</td>
<td>2 (-)</td>
<td>3 (+)</td>
<td>4 (-)</td>
</tr>
<tr>
<td>Option A</td>
<td>4-20 mA HART (passive)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Option B &lt;sup&gt;1)&lt;/sup&gt;</td>
<td>4-20 mA HART (passive)</td>
<td>Pulse/frequency/switch output (passive)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Option C &lt;sup&gt;1)&lt;/sup&gt;</td>
<td>4-20 mA HART (passive)</td>
<td>4-20 mA analog (passive)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Option D &lt;sup&gt;1) 2)&lt;/sup&gt;</td>
<td>4-20 mA HART (passive)</td>
<td>Pulse/frequency/switch output (passive)</td>
<td>4-20 mA current input (passive)</td>
<td></td>
</tr>
</tbody>
</table>

1) Output 1 must always be used; output 2 is optional.
2) The integrated overvoltage protection is not used with option D: Terminals 5 and 6 (current input) are not protected against overvoltage.
7.1.4 Requirements for the supply unit

Supply voltage

Transmitter

<table>
<thead>
<tr>
<th>Order code for &quot;Output&quot;</th>
<th>Minimum terminal voltage</th>
<th>Maximum terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A 1) 2): 4-20 mA HART</td>
<td>For 4 mA: ≥ DC 16 V For 20 mA: ≥ DC 12 V</td>
<td>DC 35 V</td>
</tr>
<tr>
<td>Option B: 4-20 mA HART, pulse/frequency/switch output</td>
<td>For 4 mA: ≥ DC 16 V For 20 mA: ≥ DC 12 V</td>
<td>DC 35 V</td>
</tr>
<tr>
<td>Option C: 4-20 mA HART + 4-20 mA analog</td>
<td>For 4 mA: ≥ DC 16 V For 20 mA: ≥ DC 12 V</td>
<td>DC 30 V</td>
</tr>
<tr>
<td>Option D: 4-20 mA HART, pulse/frequency/switch output, 4-20 mA current input 3)</td>
<td>≥ DC 12 V</td>
<td>DC 35 V</td>
</tr>
</tbody>
</table>

1) External supply voltage of the power supply unit with load.
2) For device versions with SD03 local display: The terminal voltage must be increased by DC 2 V if backlighting is used.
3) Voltage drop 2.2 to 3 V for 3.59 to 22 mA

Load

Load for current output: 0 to 500 Ω, depending on the external supply voltage of the power supply unit

Calculation of the maximum load

Depending on the supply voltage of the power supply unit (U_S), the maximum load (R_B) including line resistance must be observed to ensure adequate terminal voltage at the device. In doing so, observe the minimum terminal voltage

- For U_S = 16.0 to 16.8 V: R_B ≤ (U_S - 16.0 V): 0.0036 A
- For U_S = 16.8 to 23.0 V: R_B ≤ (U_S - 12.0 V): 0.022 A
- For U_S = 23.0 to 30.0 V: R_B ≤ 500 Ω
1 Operating range

1.1 For order code for "Output", option A "4-20 mA HART"/option B "4-20 mA HART, pulse/frequency/switch output" with Ex i and option C "4-20 mA HART + 4-20 mA analog"

1.2 For order code for "Output", option A "4-20 mA HART"/option B "4-20 mA HART, pulse/frequency/switch output" with non-Ex and Ex d

Sample calculation
Supply voltage of the power supply unit: $U_S = 17.5 \, \text{V}$
Maximum load: $R_B \leq (17.5 \, \text{V} - 12.0 \, \text{V}) \div 0.022 \, \text{A} = 250 \, \Omega$

7.1.5 Preparing the measuring device
1. Remove dummy plug if present.
2. **NOTICE**
   Insufficient sealing of the housing!
   Operational reliability of the measuring device could be compromised.
   ▶ Use suitable cable glands corresponding to the degree of protection.

   If measuring device is delivered without cable glands:
   Provide suitable cable gland for corresponding connecting cable.

   If measuring device is delivered with cable glands:
   Observe cable specification.

7.2 Connecting the measuring device
**NOTICE**
Limitation of electrical safety due to incorrect connection!
▶ For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.
7.2.1 Connecting the transmitter

Connection via terminals

- Connect the cable in accordance with the terminal assignment. For HART communication: when connecting the cable shielding to the ground terminal, observe the grounding concept of the facility.

7.2.2 Ensuring potential equalization

Requirements

No special measures for potential equalization are required.

For devices intended for use in hazardous locations, please observe the guidelines in the Ex documentation (XA).

7.3 Ensuring the degree of protection

The measuring device fulfills all the requirements for the IP66/67 degree of protection, Type 4X enclosure.

To guarantee IP66/67 degree of protection, Type 4X enclosure, carry out the following steps after the electrical connection:

1. Check that the housing seals are clean and fitted correctly. Dry, clean or replace the seals if necessary.

2. Tighten all housing screws and screw covers.
3. Firmly tighten the cable glands.

4. To ensure that moisture does not enter the cable entry, route the cable so that it loops down before the cable entry ("water trap").

5. Insert dummy plugs into unused cable entries.

7.4 Post-connection check

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are cables or the device undamaged (visual inspection)?</td>
</tr>
<tr>
<td>Do the cables comply with the requirements?</td>
</tr>
<tr>
<td>Do the cables have adequate strain relief?</td>
</tr>
<tr>
<td>Are all the cable glands installed, firmly tightened and leak-tight?</td>
</tr>
</tbody>
</table>
| Cable run with ‘water trap’ →  
| Depending on the device version: are all the device plugs firmly tightened? | □ |
| Does the supply voltage match the specifications on the transmitter nameplate? | □ |
| Is the terminal assignment correct?                                      | □ |
| If supply voltage is present, do values appear on the display module?    | □ |
| Are all housing covers installed and firmly tightened?                  | □ |
| Is the securing clamp tightened correctly?                              | □ |
8 Operation options

8.1 Structure and function of the operating menu

8.1.1 Structure of the operating menu

8.1.2 Operating philosophy

The individual parts of the operating menu are assigned to certain user roles (operator, maintenance etc.). Each user role contains typical tasks within the device lifecycle.

For detailed information on the operating philosophy, see the Operating Instructions for the device.
8.2 Access to the operating menu via the local display

1 Operational display with measured value shown as "1 value, max." (example)
   1.1 Device tag
   1.2 Display area for measured values (4-line)
   1.3 Explanatory symbols for measured value: Measured value type, measuring channel number, symbol for diagnostic behavior
   1.4 Status area
   1.5 Measured value
   1.6 Unit for the measured value
   1.7 Operating elements
2 Operational display with measured value shown as "1 bar graph + 1 value" (example)
   2.1 Bar graph display for measured value 1
   2.2 Measured value 1 with unit
   2.3 Explanatory symbols for measured value 1: measured value type, measuring channel number
   2.4 Measured value 2
   2.5 Unit for measured value 2
   2.6 Explanatory symbols for measured value 2: measured value type, measuring channel number
3 Navigation view: picklist of a parameter
   3.1 Navigation path and status area
   3.2 Display area for navigation: ✔ designates the current parameter value
4 Editing view: text editor with input mask
5 Editing view: numeric editor with input mask
8.2.1 Operational display

Status area

The following symbols appear in the status area of the operational display at the top right:

- Status signals
  - \( F \): Failure
  - \( C \): Function check
  - \( S \): Out of specification
  - \( M \): Maintenance required
- Diagnostic behavior
  - \( \times \): Alarm
  - \( \Delta \): Warning
- \( \text{🔒} \): Locking (the device is locked via the hardware)
- \( \leftrightarrow \): Communication (communication via remote operation is active)

Display area

- Measured variables (depending on the device version), e.g.:
  - \( \dot{V} \): Volume flow
  - \( \dot{m} \): Mass flow
  - \( \varrho \): Density
  - \( G \): Conductivity
  - \( \theta \): Temperature
- \( \Sigma \): Totalizer (the measurement channel number indicates which totalizer is displayed)
- \( \Theta \): Output (the measurement channel number indicates which output is displayed)
- \( \Theta \): Input
- \( \Theta, \Theta \): Measurement channel number (if more than one channel is present for the same measured variable type)
- Diagnostic behavior (for a diagnostic event that concerns the displayed measured variable)
  - \( \times \): Alarm
  - \( \Delta \): Warning

8.2.2 Navigation view

Status area

The following appears in the status area of the navigation view in the top right corner:

- Of the submenu
  - The direct access code for the parameter you are navigating to (e.g. 0022-1)
  - If a diagnostic event is present, the diagnostic behavior and status signal
- In the wizard
  If a diagnostic event is present, the diagnostic behavior and status signal
Display area

- Icons for menus
  - ☞: Operation
  - ⤵️: Setup
  - ⚒️: Diagnostics
  - ☙️: Expert
- ►: Submenus
- ➟: Wizards
- 🔹: Parameters within a wizard
- 🔪: Parameter locked

8.2.3 Editing view

Input mask

Operating symbols in the numeric editor

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Confirms selection.</td>
<td>←</td>
<td>Moves the input position one position to the left.</td>
</tr>
<tr>
<td>☒</td>
<td>Exits the input without applying the changes.</td>
<td>.</td>
<td>Inserts decimal separator at the input position.</td>
</tr>
<tr>
<td>−</td>
<td>Inserts minus sign at the input position.</td>
<td>C</td>
<td>Clears all entered characters.</td>
</tr>
</tbody>
</table>

Operating symbols in the text editor

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Confirms selection.</td>
<td>✖</td>
<td>Switches to the selection of the correction tools.</td>
</tr>
<tr>
<td>✖</td>
<td>Exits the input without applying the changes.</td>
<td>C</td>
<td>Clears all entered characters.</td>
</tr>
</tbody>
</table>

Aa1

Toggle
- Between upper-case and lower-case letters
- For entering numbers
- For entering special characters

Correction symbols under ☞️

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Clears all entered characters.</td>
<td>←</td>
<td>Moves the input position one position to the left.</td>
</tr>
<tr>
<td>←</td>
<td>Moves the input position one position to the right.</td>
<td>✖</td>
<td>Deletes one character immediately to the left of the input position.</td>
</tr>
</tbody>
</table>
### 8.2.4 Operating elements

#### Keys and meaning

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning and Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minus key</strong></td>
<td><em>In a menu, submenu:</em> Moves the selection bar upwards in a choose list.</td>
</tr>
<tr>
<td></td>
<td><em>With a wizard:</em> Confirms the parameter value and goes to the previous parameter.</td>
</tr>
<tr>
<td></td>
<td><em>With a text and numeric editor:</em> Moves the selection bar to the left (backwards) in an input screen.</td>
</tr>
<tr>
<td><strong>Plus key</strong></td>
<td><em>In a menu, submenu:</em> Moves the selection bar downwards in a choose list.</td>
</tr>
<tr>
<td></td>
<td><em>With a wizard:</em> Confirms the parameter value and goes to the next parameter.</td>
</tr>
<tr>
<td></td>
<td><em>With a text and numeric editor:</em> Moves the selection bar to the right (forwards) in an input screen.</td>
</tr>
<tr>
<td><strong>Enter key</strong></td>
<td>For operational display</td>
</tr>
<tr>
<td></td>
<td><em>Pressing the key briefly opens the operating menu.</em></td>
</tr>
<tr>
<td></td>
<td><em>Pressing the key for 2 s opens the context menu.</em></td>
</tr>
<tr>
<td></td>
<td><em>In a menu, submenu:</em></td>
</tr>
<tr>
<td></td>
<td><em>Pressing the key briefly:</em></td>
</tr>
<tr>
<td></td>
<td>– Opens the selected menu, submenu or parameter.</td>
</tr>
<tr>
<td></td>
<td>– Starts the wizard.</td>
</tr>
<tr>
<td></td>
<td>– If help text is open, closes the help text of the parameter.</td>
</tr>
<tr>
<td></td>
<td><em>Pressing the key for 2 s for parameter:</em> If present, opens the help text for the function of the parameter.</td>
</tr>
<tr>
<td><strong>Escape key combination</strong></td>
<td><em>In a menu, submenu:</em></td>
</tr>
<tr>
<td></td>
<td><em>Pressing the key briefly:</em></td>
</tr>
<tr>
<td></td>
<td>– Exits the current menu level and takes you to the next higher level.</td>
</tr>
<tr>
<td></td>
<td>– If help text is open, closes the help text of the parameter.</td>
</tr>
<tr>
<td></td>
<td><em>Pressing the key for 2 s for the parameter:</em> Returns you to the operational display (&quot;home position&quot;).</td>
</tr>
<tr>
<td><strong>Minus/Enter key combination</strong></td>
<td><em>Press the keys simultaneously.</em></td>
</tr>
<tr>
<td></td>
<td><em>Reduces the contrast (brighter setting).</em></td>
</tr>
<tr>
<td><strong>Plus/Enter key combination</strong></td>
<td><em>Press and hold down the keys simultaneously.</em></td>
</tr>
<tr>
<td></td>
<td><em>Increases the contrast (darker setting).</em></td>
</tr>
<tr>
<td><strong>Minus/Plus/Enter key combination</strong></td>
<td><em>Press the keys simultaneously.</em></td>
</tr>
<tr>
<td></td>
<td><em>For operational display:</em> Enables or disables the keypad lock (only SD02 display module).*</td>
</tr>
</tbody>
</table>
8.2.5 Further information

For further information on the following topics, see the Operating Instructions for the device:
- Calling up help text
- User roles and related access authorization
- Disabling write protection via access code
- Enabling and disabling the keypad lock

8.3 Access to the operating menu via the operating tool

For detailed information about access to the operating menu via operating tool, refer to the Operating Instructions for the device.

9 System integration

For detailed information on system integration, see the Operating Instructions for the device.

10 Commissioning

10.1 Function check

Before commissioning the measuring device:
- Make sure that the post-installation and post-connection checks have been performed.

- "Post-installation check" checklist → 17
- "Post-connection check" checklist → 24

10.2 Switching on the measuring device

- After a successful function check, switch on the measuring device.
  - After a successful startup, the local display switches automatically from the startup display to the operational display.

- If nothing appears on the local display or a diagnostic message is displayed, refer to the Operating Instructions for the device → 2

10.3 Setting the operating language

Factory setting: English or ordered local language
Taking the example of the local display

10.4 Configuring the measuring device

The Setup menu with its System units submenu and various guided wizards enable fast commissioning of the measuring device.

The desired units can be selected in the System units submenu. The wizards systematically guide the user through all the parameters required for configuration, such as parameters for measurement or outputs.

The wizards available in the particular device can vary on account of the device version (e.g. communication method).

<table>
<thead>
<tr>
<th>Wizard</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART input</td>
<td>Configure the HART input</td>
</tr>
<tr>
<td>Current output 1 to 2</td>
<td>Set current output 1-2</td>
</tr>
<tr>
<td>Pulse-Frequency-Switch output</td>
<td>Configure the selected output type</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>Configure the analog inputs</td>
</tr>
</tbody>
</table>
### 10.5 Defining the tag name

To enable fast identification of the measuring point within the system, you can enter a unique designation using the **Device tag** parameter and thus change the factory setting.

#### Navigation

"Setup" menu → Device tag

#### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag</td>
<td>Enter tag for measuring point.</td>
<td>Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).</td>
<td>Prosonic Flow</td>
</tr>
</tbody>
</table>

### 10.6 Protecting settings from unauthorized access

The following options exist for protecting the configuration of the measuring device from unintentional modification after commissioning:

- Write protection via access code
- Write protection via write protection switch
- Write protection via keypad lock

For detailed information on protecting the settings against unauthorized access, see the Operating Instructions for the device.

### 11 Diagnostic information

Faults detected by the self-monitoring system of the measuring device are displayed as a diagnostic message in alternation with the operational display. The message on remedial measures can be called up from the diagnostic messages, and contains important information on the fault.
7  Message for remedial measures

1  Diagnostic information
2  Short text
3  Service ID
4  Diagnostic behavior with diagnostic code
5  Operation time of occurrence
6  Remedial measures

The user is in the diagnostic message.

1. Press ⬅️ (⬇️ symbol).
   ← The Diagnostic list submenu opens.

2. Select the desired diagnostic event with ⬆️ or ⬇️ and press ⬐.
   ← The message for the remedial measures for the selected diagnostic event opens.

3. Press ⬇️ + ⬆️ simultaneously.
   ← The message for the remedial measures closes.