Operating Instructions
Proline Promass A 500
PROFINET

Coriolis flowmeter
• Make sure the document is stored in a safe place such that it is always available when working on or with the device.
• To avoid danger to individuals or the facility, read the “Basic safety instructions” section carefully, as well as all other safety instructions in the document that are specific to working procedures.
• The manufacturer reserves the right to modify technical data without prior notice. Your Endress+Hauser Sales Center will supply you with current information and updates to these instructions.
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1 About this document

1.1 Document function

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

1.2 Symbols

1.2.1 Safety symbols

\[\textbf{DANGER}\]
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

\[\textbf{WARNING}\]
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

\[\textbf{CAUTION}\]
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

\[\textbf{NOTICE}\]
This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Electrical symbols

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<th>Meaning</th>
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<td>———</td>
<td>Direct current</td>
</tr>
<tr>
<td>——</td>
<td>Alternating current</td>
</tr>
<tr>
<td>——</td>
<td>Direct current and alternating current</td>
</tr>
<tr>
<td>——</td>
<td>Ground connection</td>
</tr>
<tr>
<td>A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.</td>
<td></td>
</tr>
<tr>
<td>——</td>
<td>Protective Earth (PE)</td>
</tr>
<tr>
<td>A terminal which must be connected to ground prior to establishing any other connections.</td>
<td></td>
</tr>
<tr>
<td>The ground terminals are situated inside and outside the device:</td>
<td></td>
</tr>
<tr>
<td>• Inner ground terminal: Connects the protective earth to the mains supply.</td>
<td></td>
</tr>
<tr>
<td>• Outer ground terminal: Connects the device to the plant grounding system.</td>
<td></td>
</tr>
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1.2.3 Communication symbols

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<td></td>
<td>Wireless Local Area Network (WLAN)</td>
</tr>
<tr>
<td></td>
<td>Communication via a wireless, local network.</td>
</tr>
<tr>
<td></td>
<td>LED</td>
</tr>
<tr>
<td></td>
<td>Light emitting diode is off.</td>
</tr>
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### 1.2.4 Tool symbols

<table>
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<td>![Torx screwdriver]</td>
<td>Torx screwdriver</td>
</tr>
<tr>
<td>![Phillips head screwdriver]</td>
<td>Phillips head screwdriver</td>
</tr>
<tr>
<td>![Open-ended wrench]</td>
<td>Open-ended wrench</td>
</tr>
</tbody>
</table>

### 1.2.5 Symbols for certain types of information

<table>
<thead>
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<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Permitted]</td>
<td>Procedures, processes or actions that are permitted.</td>
</tr>
<tr>
<td>![Preferred]</td>
<td>Procedures, processes or actions that are preferred.</td>
</tr>
<tr>
<td>![Forbidden]</td>
<td>Procedures, processes or actions that are forbidden.</td>
</tr>
<tr>
<td>![Tip]</td>
<td>Indicates additional information.</td>
</tr>
<tr>
<td>![Reference to documentation]</td>
<td>Reference to documentation.</td>
</tr>
<tr>
<td>![Reference to page]</td>
<td>Reference to page.</td>
</tr>
<tr>
<td>![Reference to graphic]</td>
<td>Reference to graphic.</td>
</tr>
<tr>
<td>![Notice or individual step to be observed]</td>
<td>Notice or individual step to be observed.</td>
</tr>
<tr>
<td>![Series of steps]</td>
<td>Series of steps.</td>
</tr>
<tr>
<td>![Help in the event of a problem]</td>
<td>Help in the event of a problem.</td>
</tr>
<tr>
<td>![Visual inspection]</td>
<td>Visual inspection.</td>
</tr>
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### 1.2.6 Symbols in graphics

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</tr>
<tr>
<td>1, 2, 3, ...</td>
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</tr>
<tr>
<td>A, B, C, ...</td>
<td>Views</td>
</tr>
<tr>
<td>A-A, B-B, C-C, ...</td>
<td>Sections</td>
</tr>
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<td>Hazardous area</td>
</tr>
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### 1.3 Documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:

- **W@M Device Viewer** ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter the serial number from nameplate
- **Endress+Hauser Operations App**: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

Detailed list of the individual documents along with the documentation code → 279

#### 1.3.1 Standard documentation

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<th>Purpose and content of the document</th>
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</thead>
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<td><strong>Planning aid for your device</strong>&lt;br&gt;The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.</td>
</tr>
<tr>
<td>Sensor Brief Operating Instructions</td>
<td><strong>Guides you quickly to the 1st measured value - Part 1</strong>&lt;br&gt;The Sensor Brief Operating Instructions are aimed at specialists with responsibility for installing the measuring device.&lt;br&gt;- Incoming acceptance and product identification&lt;br&gt;- Storage and transport&lt;br&gt;- Installation</td>
</tr>
<tr>
<td>Transmitter Brief Operating Instructions</td>
<td><strong>Guides you quickly to the 1st measured value - Part 2</strong>&lt;br&gt;The Transmitter Brief Operating Instructions are aimed at specialists with responsibility for commissioning, configuring and parameterizing the measuring device (until the first measured value).&lt;br&gt;- Product description&lt;br&gt;- Installation&lt;br&gt;- Electrical connection&lt;br&gt;- Operation options&lt;br&gt;- System integration&lt;br&gt;- Commissioning&lt;br&gt;- Diagnostic information</td>
</tr>
<tr>
<td>Description of Device Parameters</td>
<td><strong>Reference for your parameters</strong>&lt;br&gt;The document provides a detailed explanation of each individual parameter in the Expert operating menu. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.</td>
</tr>
</tbody>
</table>

#### 1.3.2 Supplementary device-dependent documentation

Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

### 1.4 Registered trademarks

**PROFINET®**<br>Registered trademark of the PROFIBUS User Organization, Karlsruhe, Germany
TRI-CLAMP®
Registered trademark of Ladish & Co., Inc., Kenosha, USA
2 Safety instructions

2.1 Requirements for the personnel
The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

‣ 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.

The operating personnel must fulfill the following requirements:

‣ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
‣ Follow the instructions in this manual.

2.2 Designated use
Application and media
The measuring device described in this manual is intended only for the flow measurement of liquids and 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 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 → 8.
‣ 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.

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.

**WARNING**
Danger of housing breaking due to measuring tube breakage!
If a measuring tube ruptures, the pressure inside the sensor housing will rise according to the operating process pressure.
- Use a rupture disk.

**WARNING**
Danger from medium escaping!
For device versions with a rupture disk: medium escaping under pressure can cause injury or material damage.
- Take precautions to prevent injury and material damage if the rupture disk is actuated.

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.

Conversions to the device
Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers.
- If, despite this, modifications are required, consult with Endress+Hauser.

Repair
To ensure continued operational safety and reliability,
- Carry out repairs on the device only if they are expressly permitted.
- Observe federal/national regulations pertaining to repair of an electrical device.
- Use original spare parts and accessories from Endress+Hauser only.
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.

2.7  Device-specific IT security

The device offers a range of specific functions to support protective measures on the operator's side. These functions can be configured by the user and guarantee greater in-operation safety if used correctly. An overview of the most important functions is provided in the following section.

<table>
<thead>
<tr>
<th>Function/interface</th>
<th>Factory setting</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write protection via hardware write protection switch → 12</td>
<td>Not enabled.</td>
<td>On an individual basis following risk assessment.</td>
</tr>
<tr>
<td>Access code (also applies for Web server login or FieldCare connection) → 13</td>
<td>Not enabled (0000).</td>
<td>Assign a customized access code during commissioning.</td>
</tr>
<tr>
<td>WLAN (order option in display module)</td>
<td>Enabled.</td>
<td>On an individual basis following risk assessment.</td>
</tr>
<tr>
<td>WLAN security mode</td>
<td>Enabled (WPA2-PSK)</td>
<td>Do not change.</td>
</tr>
<tr>
<td>WLAN passphrase (password) → 13</td>
<td>Serial number</td>
<td>Assign an individual WLAN passphrase during commissioning.</td>
</tr>
<tr>
<td>WLAN mode</td>
<td>Access Point</td>
<td>On an individual basis following risk assessment.</td>
</tr>
<tr>
<td>Web server → 13</td>
<td>Enabled.</td>
<td>On an individual basis following risk assessment.</td>
</tr>
<tr>
<td>CDI-RJ45 service interface → 14</td>
<td>–</td>
<td>On an individual basis following risk assessment.</td>
</tr>
</tbody>
</table>

2.7.1  Protecting access via hardware write protection

Write access to the device parameters via the local display, Web browser or operating tool (e.g. FieldCare, DeviceCare) can be disabled via a write protection switch (DIP switch on the motherboard). When hardware write protection is enabled, only read access to the parameters is possible.

Hardware write protection is disabled when the device is delivered → 155.
2.7.2 Protecting access via a password

Different passwords are available to protect write access to the device parameters or access to the device via the WLAN interface.

- User-specific access code
  Protect write access to the device parameters via the local display, Web browser or operating tool (e.g. FieldCare, DeviceCare). Access authorization is clearly regulated through the use of a user-specific access code.

- WLAN passphrase
  The network key protects a connection between an operating unit (e.g. notebook or tablet) and the device via the WLAN interface which can be ordered as an option.

- Infrastructure mode
  When the device is operated in infrastructure mode, the WLAN passphrase corresponds to the WLAN passphrase configured on the operator side.

User-specific access code

Write access to the device parameters via the local display, Web browser or operating tool (e.g. FieldCare, DeviceCare) can be protected by the modifiable, user-specific access code (→ 154).

When the device is delivered, the device does not have an access code and is equivalent to 0000 (open).

WLAN passphrase: Operation as WLAN access point

A connection between an operating unit (e.g. notebook or tablet) and the device via the WLAN interface (→ 92), which can be ordered as an optional extra, is protected by the network key. The WLAN authentication of the network key complies with the IEEE 802.11 standard.

When the device is delivered, the network key is pre-defined depending on the device. It can be changed via the WLAN settings submenu in the WLAN passphrase parameter (→ 147).

Infrastructure mode

A connection between the device and WLAN access point is protected by means of an SSID and passphrase on the system side. Please contact the relevant system administrator for access.

General notes on the use of passwords

- The access code and network key supplied with the device should be changed during commissioning.
- Follow the general rules for generating a secure password when defining and managing the access code or network key.
- The user is responsible for the management and careful handling of the access code and network key.
- For information on configuring the access code or on what to do if you lose the password, see the "Write protection via access code" section → 154

2.7.3 Access via Web server

The device can be operated and configured via a Web browser with the integrated Web server (→ 83). The connection is via the service interface (CDI-RJ45), the connection for PROFINET signal transmission (RJ45 connector) or the WLAN interface.

The Web server is enabled when the device is delivered. The Web server can be disabled if necessary (e.g. after commissioning) via the Web server functionality parameter.
The device and status information can be hidden on the login page. This prevents unauthorized access to the information.

For detailed information on device parameters, see:
The "Description of Device Parameters" document → 279.

2.7.4 Access via service interface (CDI-RJ45)

The device can be connected to a network via the service interface (CDI-RJ45). Devicespecific functions guarantee the secure operation of the device in a network.

The use of relevant industrial standards and guidelines that have been defined by national and international safety committees, such as IEC/ISA62443 or the IEEE, is recommended. This includes organizational security measures such as the assignment of access authorization as well as technical measures such as network segmentation.

Transmitters with an Ex de approval may not be connected via the service interface (CDI-RJ45)!

Order code for 'Approval transmitter + sensor', options (Ex de): BA, BB, C1, C2, GA, GB, MA, MB, NA, NB

The device can be integrated in a ring topology. The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45) → 60 or → 52.
3 Product description

The measuring system consists of a transmitter and a sensor. The transmitter and sensor are mounted in physically separate locations. They are interconnected by connecting cables.

3.1 Product design

Two versions of the transmitter are available.

3.1.1 Proline 500 – digital

Signal transmission: digital

Order code for "Integrated ISEM electronics", option A "Sensor"

For use in applications not required to meet special requirements due to ambient or operating conditions.

As the electronics are located in the sensor, the device is ideal:

- For simple transmitter replacement.
- A standard cable can be used as the connecting cable.
- Not sensitive to external EMC interference.
3.1.2 Proline 500

Signal transmission: analog
Order code for "Integrated ISEM electronics", option B "Transmitter"

For use in applications required to meet special requirements due to ambient or operating conditions.

As the electronics are located in the transmitter, the device is ideal in the event of:
- Strong vibrations at the sensor.
- Sensor operation in underground installations.
- Permanent sensor immersion in water.

2 Important components of a measuring device

1 Connection compartment cover
2 Display module
3 Transmitter housing with integrated ISEM electronics
4 Electronics compartment cover
5 Sensor
6 Sensor connection housing: connecting cable connection
7 Connection compartment cover: connecting cable connection
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 envelope present with accompanying documents?

- 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, see the ‘Product identification’ section → 18.

4.2  Product identification

The following options are available for identification of the device:
- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in the W@M Device Viewer (www.endress.com/deviceviewer): All information about the device is displayed.
- Enter the serial number from nameplates in the Endress+Hauser Operations App or scan the 2-D matrix code (QR code) on the nameplate using the Endress+Hauser Operations App: All information about the device is displayed.
For an overview of the scope of the associated Technical Documentation, refer to the following:
- The "Additional standard documentation on the device" \(\rightarrow\) 8 and "Supplementary device-dependent documentation" \(\rightarrow\) 8 sections
- The W@M Device Viewer: enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The Endress+Hauser Operations App: Enter the serial number from the nameplate or scan the 2-D matrix code (QR code) on the nameplate.

### 4.2.1 Transmitter nameplate

Proline 500 – digital

![Example of a transmitter nameplate](image)

1. Name of the transmitter
2. Manufacturing location
3. Space for approvals: use in hazardous areas
4. Degree of protection
5. Electrical connection data: available inputs and outputs
6. Permitted ambient temperature \(T_a\)
7. 2-D matrix code
8. Space for approvals and certificates: e.g. CE mark, C-Tick
9. Permitted temperature range for cable
10. Manufacturing date: year-month
11. Firmware version (FW) and device revision (Dev.Rev.) from the factory
12. Document number of safety-related supplementary documentation
13. Space for additional information in the case of special products
14. Available inputs and outputs, supply voltage
15. Electrical connection data: supply voltage
16. Extended order code (ext. ord. cd.)
17. Serial number (ser. no.)
18. Order code
Proline 500

1. Manufacturing location
2. Name of the transmitter
3. Order code
4. Serial number (ser. no.)
5. Extended order code (ext. ord. cd.)
6. Degree of protection
7. Space for approvals: use in hazardous areas
8. Electrical connection data: available inputs and outputs
9. 2-D matrix code
10. Manufacturing date: year-month
11. Document number of safety-related supplementary documentation
12. Space for approvals and certificates: e.g. CE mark, C-Tick
13. Space for degree of protection of connection and electronics compartment when used in hazardous areas
14. Firmware version (FW) and device revision (Dev.Rev.) from the factory
15. Space for additional information in the case of special products
16. Permitted temperature range for cable
17. Permitted ambient temperature ($T_a$)
18. Information on cable gland
19. Available inputs and outputs, supply voltage
20. Electrical connection data: supply voltage
4.2.2 Sensor nameplate

5 Example of a sensor nameplate

1 Name of the sensor
2 Manufacturing location
3 Order code
4 Serial number (ser. no.)
5 Extended order code (Ext. ord. cd.)
6 Nominal diameter of the sensor; flange nominal diameter/nominal pressure; sensor test pressure; medium temperature range; material of measuring tube and manifold; sensor-specific information: e.g. pressure range of sensor housing, wide-range density specification (special density calibration)
7 Approval information for explosion protection, Pressure Equipment Directive and degree of protection
8 Flow direction
9 Manufacturing date: year-month
10 2-D matrix code
11 Document number of safety-related supplementary documentation
12 CE mark, C-Tick
13 Surface roughness
14 Permitted ambient temperature ($T_a$)

Order code
The measuring device is reordered using the order code.

Extended order code
- The device type (product root) and basic specifications (mandatory features) are always listed.
- Of the optional specifications (optional features), only the safety and approval-related specifications are listed (e.g. LA). If other optional specifications are also ordered, these are indicated collectively using the # placeholder symbol (e.g. #LA#).
- If the ordered optional specifications do not include any safety and approval-related specifications, they are indicated by the + placeholder symbol (e.g. XXXXX-ABCDE +).
### 4.2.3 Symbols on measuring device

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Symbol] | **WARNING!**  
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury. |
| ![Symbol] | Reference to documentation  
Refers to the corresponding device documentation. |
| ![Symbol] | Protective ground connection  
A terminal which must be connected to ground prior to establishing any other connections. |
5 Storage and transport

5.1 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.

Storage temperature $\geq 264$

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.

5.3 Packaging disposal

All packaging materials are environmentally friendly and 100 % recyclable:
- Outer packaging of device
  Polymer stretch wrap that complies with EU Directive 2002/95/EC (RoHS)
- Packaging
  - Wooden crate treated in accordance with ISPM 15 standard, confirmed by IPPC logo
  - Cardboard box in accordance with European packaging guideline 94/62EC, recyclability confirmed by Resy symbol
- Carrying and securing materials
  - Disposable plastic pallet
  - Plastic straps
  - Plastic adhesive strips
- Filler material
  - Paper pads

6 Installation

6.1 Installation conditions

6.1.1 Mounting position

Mounting location

To prevent measuring errors arising from accumulation of gas bubbles in the measuring tube, avoid the following mounting locations in the pipe:
- Highest point of a pipeline.
- Directly upstream of a free pipe outlet in a down pipe.
Installation

Proline Promass A 500 PROFINET

Installation in down pipes

However, the following installation suggestion allows for installation in an open vertical pipeline. Pipe restrictions or the use of an orifice with a smaller cross-section than the nominal diameter prevent the sensor running empty while measurement is in progress.

![Diagram of installation in a down pipe](image)

Diagram 6  Installation in a down pipe (e.g. for batching applications)

1 Supply tank
2 Sensor
3 Orifice plate, pipe restriction
4 Valve
5 Batching tank

<table>
<thead>
<tr>
<th>DN [mm]</th>
<th>Ø orifice plate, pipe restriction [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ¹⁄₂₄</td>
<td>0.8</td>
</tr>
<tr>
<td>2 ¹⁄₁₂</td>
<td>1.5</td>
</tr>
<tr>
<td>4 ¹⁄₈</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Orientation

The direction of the arrow on the sensor nameplate helps you to install the sensor according to the flow direction (direction of medium flow through the piping).

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Vertical orientation</td>
<td><img src="image" alt="Diagram of vertical orientation" /></td>
</tr>
<tr>
<td>B Horizontal orientation, transmitter at top</td>
<td><img src="image" alt="Diagram of horizontal orientation" /></td>
</tr>
</tbody>
</table>
### Orientation

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Horizontal orientation, transmitter at bottom</td>
</tr>
<tr>
<td>D</td>
<td>Horizontal orientation, transmitter at side</td>
</tr>
</tbody>
</table>

1) This orientation is recommended to ensure self-draining.
2) Applications with low process temperatures may decrease the ambient temperature. To maintain the minimum ambient temperature for the transmitter, this orientation is recommended.
3) Applications with high process temperatures may increase the ambient temperature. To maintain the maximum ambient temperature for the transmitter, this orientation is recommended.

If a sensor is installed horizontally with a curved measuring tube, match the position of the sensor to the fluid properties.

### Inlet and outlet runs

No special precautions need to be taken for fittings which create turbulence, such as valves, elbows or T-pieces, as long as no cavitation occurs → 25.

### Installation dimensions

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

### 6.1.2 Environmental and process requirements

#### Ambient temperature range

| Measuring device | –40 to +60 °C (–40 to +140 °F) |
| Readability of the local display | –20 to +60 °C (–4 to +140 °F) The readability of the display may be impaired at temperatures outside the temperature range. |

Dependency of ambient temperature on medium temperature → 265

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

You can order a weather protection cover from Endress+Hauser. → 246.

#### System pressure

It is important that cavitation does not occur, or that gases entrained in the liquids do not outgas.
Cavitation is caused if the pressure drops below the vapor pressure:
- In liquids that have a low boiling point (e.g. hydrocarbons, solvents, liquefied gases)
- In suction lines
  - Ensure the system pressure is sufficiently high to prevent cavitation and outgassing.

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!
- Recommended orientation: horizontal orientation, sensor connection housing pointing downwards.
- Do not insulate the sensor connection housing.
- Maximum permissible temperature at the lower end of the 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.

**Heating**

**NOTICE**

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

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
• Via heating jackets

Vibrations

The high oscillation frequency of the measuring tubes ensures that the correct operation of the measuring system is not influenced by plant vibrations.

6.1.3 Special mounting instructions

Drainability

When the device is installed in a vertical position, the measuring tube can be drained completely and protected against deposit buildup if the properties of the measured liquid allow this. Furthermore, as only one measuring tube is used the flow is not impeded and the risk of product being retained in the measuring device is reduced to a minimum. The larger internal diameter of the measuring tube 1) also reduces the risk of particles getting trapped in the measuring system. Due to the larger cross-section of the individual measuring tube, the tube is also generally less susceptible to clogging.

Sanitary compatibility

1) When installing in hygienic applications, please refer to the information in the "Certificates and approvals/hygienic compatibility" section → 275

Rupture disk

Information that is relevant to the process: → 267.

WARNING

Danger from medium escaping!

Medium escaping under pressure can cause injury or material damage.

▷ Take precautions to prevent danger to persons and damage if the rupture disk is actuated.
▷ Observe information on the rupture disk sticker.
▷ Make sure that the function and operation of the rupture disk is not impeded through the installation of the device.
▷ Do not remove or damage the rupture disk, drain connection and warning signs.

1) Compared with the double-tube design with a similar flow capacity and measuring tubes with a smaller internal diameter
The position of the rupture disk is indicated by an affixed sticker. In versions without a drain connection (order option CU), the sticker is destroyed if the rupture disk is triggered. The disk can therefore be visually monitored.

To allow any escaping medium to drain in a controlled manner, a drain connection is available for the rupture disk integrated in the sensor: order code for "Sensor option", option CU "Drain connection for rupture disk". This connection is intended for a pipe connection with a ¼" NPT thread and sealed with a grip plug for protection. To guarantee the function of the rupture disk with a drain connection, the drain connection must be connected to the drain system in a hermetically tight manner.

The drain connection is firmly mounted in place by the manufacturer and may not be removed.

It is not possible to use the holder with a measuring device with a drain connection for a rupture disk: order code for "Sensor option", option CU "Drain connection for rupture disk"

It is not possible to use a heating jacket if the drain connection is used: order code for "Sensor option", option CU "Drain connection for rupture disk"

For information on the dimensions: see the "Mechanical construction" section of the "Technical Information" document

Sensor holder

The sensor holder is used to secure the device to a wall, tabletop or pipe (order code for "Accessory enclosed", option PR).
If the holder is used with a measuring device fitted with a rupture disk, it is important to ensure that the rupture disk in the neck is not covered over and that the cover of the rupture disk is not damaged.

Lubricate all threaded joints prior to mounting. The screws for wall, tabletop or pipe mounting are not supplied with the device and must be chosen to suit the individual installation position.

**WARNING**

**Strain on pipes!**
Excessive strain on an unsupported pipe can cause the pipe to break.

- Install the sensor in a pipe that is adequately supported.

The following mounting versions are recommended for the installation:
Use of the sensor holder.

1 2 x Allen screw M8 x 50, washer and spring washer A4
2 1 x clamp (measuring device neck)
3 4 x securing screw for wall, tabletop or pipe mounting (not supplied)
4 1 x base profile
5 2 x clamp (pipe mounting)
A Measuring device central line

Sensor holder (order code for 'Accessory enclosed', option PR)
**Mounting on a wall**
Screw the sensor holder to the wall with four screws. Two of the four holes to secure the holder are designed to hook into the screws.

**Mounting on a table**
Screw the sensor holder onto the tabletop with four screws.

**Mounting on a pipe**
Secure the sensor holder to the pipe with two clamps.

**Zero point adjustment**
All measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions → 260. Therefore, a zero point adjustment in the field is generally not required.

Experience shows that zero point adjustment is advisable only in special cases:
- To achieve maximum measuring accuracy even with low flow rates.
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

**Protective cover**

![Diagram of protective cover](image1)

**Protective cover for Proline 500 – digital; engineering unit mm (in)**

![Diagram of protective cover](image2)

**Protective cover for Proline 500; engineering unit mm (in)**
6.2 Mounting the measuring device

6.2.1 Required tools

For transmitter
For mounting on a post:
- Proline 500 – digital transmitter
- Open-ended wrench AF 10
- Torx screwdriver TX 25
- Proline 500 transmitter
  Open-ended wrench AF 13
For wall mounting:
Drill with drill bit Ø 6.0 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 seals are clean and undamaged.
- Secure the seals correctly.

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

![Diagram showing correct and incorrect cable entry directions]

6.2.4 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](image-url)
Wall mounting

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

1. Drill the holes.
2. Insert wall plugs into the drilled holes.
3. Screw in the securing screws slightly at first.
4. Fit the transmitter housing over the securing screws and mount in place.
5. Tighten the securing screws.

6.2.5 Mounting the transmitter housing: Proline 500

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

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

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

1. Drill the holes.
2. Insert wall plugs into the drilled holes.
3. Screw in the securing screws slightly at first.
4. Fit the transmitter housing over the securing screws and mount in place.
5. Tighten the securing screws.
### Post mounting

#### 6.2.6 Turning the transmitter housing: Proline 500

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

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

#### 6.2.7 Turning the display module: Proline 500

The display module can be turned to optimize display readability and operability.
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 × 45° 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.

### 6.3 Post-installation check

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</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 →  265</td>
<td></td>
</tr>
<tr>
<td>• Process pressure (refer to the section on &quot;Pressure-temperature ratings&quot; in the &quot;Technical Information&quot; document)</td>
<td></td>
</tr>
<tr>
<td>• Ambient temperature</td>
<td></td>
</tr>
<tr>
<td>• Measuring range</td>
<td></td>
</tr>
<tr>
<td>Has the correct orientation for the sensor been selected?</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 nameplate match the direction of flow of the fluid through the piping → 24?</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

NOTICE
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.
- Although the measuring device is equipped with a fuse, additional overcurrent protection (maximum 10 A) should be integrated into the system installation.

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: crimper for wire end ferrule
- For removing cables from terminal: Flat blade screwdriver ≤ 3 mm (0.12 in)

7.1.2 Requirements for connecting cable
The connecting cables provided by the customer must fulfill the following requirements.

Electrical safety
In accordance with applicable federal/national regulations.

Protective ground cable
Cable ≥ 2.08 mm² (14 AWG)
The grounding impedance must be less than 1 Ω.

Permitted temperature range
- The installation guidelines that apply in the country of installation must be observed.
- The cables must be suitable for the minimum and maximum temperatures to be expected.

Power supply cable
Standard installation cable is sufficient.

Signal cable
PROFINET
Standard IEC 61156-6 specifies CAT 5 as the minimum category for a cable used for PROFINET. CAT 5e and CAT 6 are recommended.

For more information on planning and installing PROFINET networks, see: 'PROFINET Cabling and Interconnection Technology', Guideline for PROFINET

Current output 0/4 to 20 mA
Standard installation cable is sufficient.

Pulse/frequency/switch output
Standard installation cable is sufficient.
Relay output
Standard installation cable is sufficient.

Current input 0/4 to 20 mA
Standard installation cable is sufficient.

Status 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)
- Spring-loaded terminals: Suitable for strands and strands with ferrules.
  Conductor cross-section 0.2 to 2.5 mm² (24 to 12 AWG).

Choice of connecting cable between the transmitter and sensor
Depends on the type of transmitter and the installation zones

A Standard cable to 500 digital transmitter → 39
Transmitter installed in the non-hazardous area or hazardous area: Zone 2; Class I, Division 2 / sensor installed in the hazardous area: Zone 2; Class I, Division 2

B Standard cable to 500 digital transmitter → 39
Transmitter installed in the hazardous area: Zone 2; Class I, Division 2 / sensor installed in the hazardous area: Zone 1; Class I, Division 1

C Signal cable to 500 transmitter → 41
Transmitter and sensor installed in the hazardous area: Zone 2; Class I, Division 2 oder Zone 1; Class I, Division 1
A: Connecting cable between sensor and transmitter: Proline 500 – digital

Standard cable

A standard cable with the following specifications can be used as the connecting cable.

<table>
<thead>
<tr>
<th>Design</th>
<th>4 cores (2 pairs); uninsulated stranded CU wires; pair-stranded with common shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielding</td>
<td>Tin-plated copper-braid, optical cover ≥ 85 %</td>
</tr>
<tr>
<td>Loop resistance</td>
<td>Power supply line (+, −): maximum 10 Ω</td>
</tr>
<tr>
<td>Cable length</td>
<td>Maximum 300 m (1000 ft), see the following table.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cross-section</th>
<th>Cable length [max.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.34 mm² (AWG 22)</td>
<td>80 m (270 ft)</td>
</tr>
<tr>
<td>0.50 mm² (AWG 20)</td>
<td>120 m (400 ft)</td>
</tr>
<tr>
<td>0.75 mm² (AWG 18)</td>
<td>180 m (600 ft)</td>
</tr>
<tr>
<td>1.00 mm² (AWG 17)</td>
<td>240 m (800 ft)</td>
</tr>
<tr>
<td>1.50 mm² (AWG 15)</td>
<td>300 m (1000 ft)</td>
</tr>
</tbody>
</table>

Optionally available connecting cable

<table>
<thead>
<tr>
<th>Design</th>
<th>2 × 2 × 0.34 mm² (AWG 22) PVC cable with common shield (2 pairs, uninsulated stranded CU wires; pair-stranded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame resistance</td>
<td>According to DIN EN 60332-1-2</td>
</tr>
<tr>
<td>Oil-resistance</td>
<td>According to DIN EN 60811-2-1</td>
</tr>
<tr>
<td>Shielding</td>
<td>Tin-plated copper-braid, optical cover ≥ 85 %</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>When mounted in a fixed position: −50 to +105 °C (−58 to +221 °F); when cable can move freely: −25 to +105 °C (−13 to +221 °F)</td>
</tr>
<tr>
<td>Available cable length</td>
<td>Fixed: 20 m (65 ft); variable: up to maximum 50 m (165 ft)</td>
</tr>
</tbody>
</table>

1) UV radiation can impair the cable outer sheath. Protect the cable from direct sunshine where possible.

B: Connecting cable between sensor and transmitter: Proline 500 - digital

Standard cable

A standard cable with the following specifications can be used as the connecting cable.

<table>
<thead>
<tr>
<th>Design</th>
<th>4, 6, 8 cores (2, 3, 4 pairs); uninsulated stranded CU wires; pair-stranded with common shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielding</td>
<td>Tin-plated copper-braid, optical cover ≥ 85 %</td>
</tr>
<tr>
<td>Capacitance C</td>
<td>Maximum 760 nF IIC, maximum 4.2 µF IIB</td>
</tr>
<tr>
<td>Inductance L</td>
<td>Maximum 26 µH IIC, maximum 104 µH IIB</td>
</tr>
<tr>
<td>Inductance/resistance ratio (L/R)</td>
<td>Maximum 8.9 µH/Ω IIC, maximum 35.6 µH/Ω IIB (e.g. in accordance with IEC 60079-25)</td>
</tr>
<tr>
<td>Loop resistance</td>
<td>Power supply line (+, −): maximum 5 Ω</td>
</tr>
<tr>
<td>Cable length</td>
<td>Maximum 150 m (500 ft), see the following table.</td>
</tr>
</tbody>
</table>
### Electrical connection

#### Proline Promass A 500 PROFINET

<table>
<thead>
<tr>
<th>Cross-section</th>
<th>Cable length [max.]</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 2 x 0.50 mm² (AWG 20)</td>
<td>50 m (165 ft)</td>
<td>2 x 2 x 0.50 mm² (AWG 20)</td>
</tr>
<tr>
<td>3 x 2 x 0.50 mm² (AWG 20)</td>
<td>100 m (330 ft)</td>
<td>3 x 2 x 0.50 mm² (AWG 20)</td>
</tr>
<tr>
<td>4 x 2 x 0.50 mm² (AWG 20)</td>
<td>150 m (500 ft)</td>
<td>4 x 2 x 0.50 mm² (AWG 20)</td>
</tr>
</tbody>
</table>

- +, – = 0.5 mm²
- A, B = 0.5 mm²

### Optionally available connecting cable

<table>
<thead>
<tr>
<th>Connecting cable for</th>
<th>Zone 1; Class I, Division 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard cable</td>
<td>2 × 2 × 0.5 mm² (AWG 20) PVC cable ¹ with common shield (2 pairs, pair-stranded)</td>
</tr>
<tr>
<td>Flame resistance</td>
<td>According to DIN EN 60332-1-2</td>
</tr>
<tr>
<td>Oil-resistance</td>
<td>According to DIN EN 60811-2-1</td>
</tr>
<tr>
<td>Shielding</td>
<td>Tin-plated copper-braid, optical cover ≥ 85 %</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>When mounted in a fixed position: −50 to +105 °C (−58 to +221 °F); when cable can move freely: −25 to +105 °C (−13 to +221 °F)</td>
</tr>
<tr>
<td>Available cable length</td>
<td>Fixed: 20 m (65 ft); variable: up to maximum 50 m (165 ft)</td>
</tr>
</tbody>
</table>

¹) UV radiation can impair the cable outer sheath. Protect the cable from direct sunshine where possible.
**C: Connecting cable between sensor and transmitter: Proline 500**

<table>
<thead>
<tr>
<th>Standard cable</th>
<th>6 × 0.38 mm² PVC cable 1) with common shield and individually shielded cores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor resistance</td>
<td>≤50 Ω/km (0.015 Ω/ft)</td>
</tr>
<tr>
<td>Capacitance: core/shield</td>
<td>≤420 pF/m (128 pF/ft)</td>
</tr>
<tr>
<td>Cable length (max.)</td>
<td>20 m (65 ft)</td>
</tr>
<tr>
<td>Cable lengths (available for order)</td>
<td>5 m (15 ft), 10 m (32 ft), 20 m (65 ft)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>max. 105 °C (221 °F)</td>
</tr>
</tbody>
</table>

1) UV radiation can impair the cable outer sheath. Protect the cable from direct sunshine where possible.

### 7.1.3 Terminal assignment

**Transmitter: supply voltage, input/outputs**

The terminal assignment of the inputs and outputs depends on the individual order version of the device. The device-specific terminal assignment is documented on an adhesive label in the terminal cover.

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>Input/output 1</th>
<th>Input/output 2</th>
<th>Input/output 3</th>
<th>Input/output 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (+)</td>
<td>2 (–)</td>
<td>PROFINET (RJ45 connector)</td>
<td>24 (+)</td>
<td>25 (–)</td>
</tr>
<tr>
<td>24 (+)</td>
<td>25 (–)</td>
<td>22 (+)</td>
<td>23 (–)</td>
<td>20 (+)</td>
</tr>
</tbody>
</table>
| Device-specific terminal assignment: adhesive label in terminal cover.

**Transmitter and sensor connection housing: connecting cable**

The sensor and transmitter, which are mounted in separate locations, are interconnected by a connecting cable. The cable is connected via the sensor connection housing and the transmitter housing.

Terminal assignment and connection of the connecting cable:
- Proline 500 – digital → 43
- Proline 500 → 53

### 7.1.4 Device plugs available

Device plugs may not be used in hazardous areas!

**Order code for "Input; output 1", option RA "PROFINET"**

<table>
<thead>
<tr>
<th>Order code for &quot;Electrical connection&quot;</th>
<th>Cable entry/connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>L, N, P, U</td>
<td>Connector M12 × 1</td>
</tr>
<tr>
<td>R [1] [2]</td>
<td>Connector M12 × 1</td>
</tr>
<tr>
<td>Connector M12 × 1</td>
<td>Connector M12 × 1</td>
</tr>
</tbody>
</table>

1) Cannot be combined with an external WLAN antenna (order code for "Enclosed accessories", option P8) of an RJ45 M12 adapter for the service interface (order code for "Accessories mounted", option NB) or of the remote display and operating module DXK001.

2) Suitable for integrating the device in a ring topology.
7.1.5 Pin assignment of device plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+ TD +</td>
</tr>
<tr>
<td>2</td>
<td>+ RD +</td>
</tr>
<tr>
<td>3</td>
<td>- TD –</td>
</tr>
<tr>
<td>4</td>
<td>- RD –</td>
</tr>
</tbody>
</table>

**Coding**

<table>
<thead>
<tr>
<th>Coding</th>
<th>Plug/socket</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Socket</td>
</tr>
</tbody>
</table>

7.1.6 Preparing the measuring device

Carry out the steps in the following order:

1. Mount the sensor and transmitter.
2. Connection housing, sensor: Connect connecting cable.
3. Transmitter: Connect connecting cable.
4. Transmitter: Connect signal cable and cable for supply voltage.

**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.

1. Remove dummy plug if present.
2. If the measuring device is supplied without cable glands:
   Provide suitable cable gland for corresponding connecting cable.
3. If the measuring device is supplied with cable glands:
   Observe requirements for connecting cables →  37.
7.2 Connecting the measuring device: Proline 500 - digital

**NOTICE**
Limitation of electrical safety due to incorrect connection!

- Have electrical connection work carried out by appropriately trained specialists only.
- Observe applicable federal/national installation codes and regulations.
- Comply with local workplace safety regulations.
- Always connect the protective ground cable before connecting additional cables.
- For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

7.2.1 Connecting the connecting cable

**WARNING**
Risk of damaging the electronic components!

- Connect the sensor and transmitter to the same potential equalization.
- Only connect the sensor to a transmitter with the same serial number.
- Ground the connection housing of the sensor via the external screw terminal.

Connecting cable terminal assignment

| 1 | Cable entry for cable on transmitter housing |
| 2 | Protective earth (PE) |
| 3 | Connecting cable ISEM communication |
| 4 | Grounding via ground connection; on device plug versions grounding is through the plug itself |
| 5 | Cable entry for cable or connection of device plug on sensor connection housing |
| 6 | Protective earth (PE) |

Connecting the connecting cable to the sensor connection housing

- Connection via terminals with order code for "Sensor connection housing":
  - Option **A"Aluminum, coated"** → 44
  - Option **B "Stainless"** → 45
  - Option **L "Cast, stainless"** → 44
- Connection via connectors with order code for "Sensor connection housing":
  Option **C "Ultra-compact hygienic, stainless"** → 46

Connecting the connecting cable to the transmitter

The cable is connected to the transmitter via terminals → 47.
Connecting the sensor connection housing via terminals
For the device version with the order code for "Sensor connection housing":
- Option A "Aluminum coated"
- Option L "Cast, stainless"

1. Loosen the securing clamp of the housing cover.
2. Unscrew the housing cover.
3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
5. Connect the protective ground.
6. Connect the cable in accordance with the connecting cable terminal assignment.
7. Firmly tighten the cable glands.
   ➔ This concludes the process for connecting the connecting cable.

**WARNING**
Housing degree of protection voided due to insufficient sealing of the housing.
- Screw in the thread on the cover without using any lubricant. The thread on the cover is coated with a dry lubricant.

8. Screw on the housing cover.
9. Tighten the securing clamp of the housing cover.
Connecting the sensor connection housing via terminals

For the device version with the order code for ‘Sensor connection housing’: Option B "Stainless"

1. Release the securing screw of the housing cover.
2. Open the housing cover.
3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
5. Connect the protective ground.
6. Connect the cable in accordance with the connecting cable terminal assignment.
7. Firmly tighten the cable glands.
   - This concludes the process for connecting the connecting cable.
8. Close the housing cover.
9. Tighten the securing screw of the housing cover.
Connecting the sensor connection housing via the connector

For the device version with the order code for "Sensor connection housing":
Option C 'Ultra-compact hygienic, stainless'

1. Connect the protective ground.
2. Connect the connector.
Connecting the connecting cable to the transmitter

1. Loosen the 4 fixing screws on the housing cover.
2. Open the housing cover.
3. Fold open the terminal cover.
4. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
5. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
6. Connect the protective ground.
7. Connect the cable in accordance with the connecting cable terminal assignment → 43.
8. Firmly tighten the cable glands.
   - This concludes the process for connecting the connecting cable.
9. Close the housing cover.
10. Tighten the securing screw of the housing cover.
11. After connecting the connecting cable:
    Connect the signal cable and the supply voltage cable → 48.
7.2.2 Connecting the transmitter

1. Terminal connection for supply voltage
2. Terminal connection for signal transmission, input/output
3. Terminal connection for signal transmission, input/output
4. Terminal connection for connecting cable between sensor and transmitter
5. Terminal connection for signal transmission, input/output or terminal connection for network connection via service interface (CDI-RJ45); optional: connection for external WLAN antenna
6. Protective earth (PE)

In addition to connecting the device via PROFINET and the available inputs/outputs, additional connection options are also available:

- Integrate into a network via the service interface (CDI-RJ45) → 51.
- Integrate the device into a ring topology → 52.

Connecting the PROFINET connector

1. Loosen the 4 fixing screws on the housing cover.
2. Open the housing cover.
3. Fold open the terminal cover.
4. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
5. Strip the cable and cable ends and connect to the RJ45 connector.
6. Connect the protective ground.
7. Plug in the RJ45 connector.
8. Firmly tighten the cable glands.
   ⚠️ This concludes the PROFINET connection process.

Connecting the supply voltage and additional inputs/outputs

1. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
2. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
3. Connect the protective ground.
4. Connect the cable in accordance with the terminal assignment.
   ⚠️ Signal cable terminal assignment: The device-specific terminal assignment is documented on an adhesive label in the terminal cover.
   Supply voltage terminal assignment: Adhesive label in the terminal cover or → 41.
5. Firmly tighten the cable glands.
   ⚠️ This concludes the cable connection process.
6. Close the terminal cover.
7. Close the housing cover.

⚠️ WARNING
Housing degree of protection may be voided due to insufficient sealing of the housing.
► Screw in the screw without using any lubricant.

⚠️ 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)
8. Tighten the 4 fixing screws on the housing cover.
Removing a cable

1. To remove a cable from the terminal, use a flat-blade screwdriver to push the slot between the two terminal holes
2. while simultaneously pulling the cable end out of the terminal.
7.2.3 Integrating the transmitter into a network

This section only presents the basic options for integrating the device into a network.
For information on the procedure to follow to connect the transmitter correctly → 43.

Integrating via the service interface

The device is integrated via the connection to the service interface (CDI-RJ45).
Note the following when connecting:
- Recommended cable: CAT5e, CAT6 or CAT7, with shielded connector (e.g. brand: YAMAICHI; Part No Y-ConProfexPlug63 / Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of connector including bend protection: 42 mm
- Bending radius: 5 x cable thickness

An adapter for RJ45 and the M12 connector is optionally available:
Order code for "Accessories", option NB: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.
**Integrating into a ring topology**

The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45).

Note the following when connecting:
- Recommended cable: CAT5e, CAT6 or CAT7, with shielded connector (e.g. brand: YAMAICHI; Part No Y-ConProfixPlug63 / Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of connector including bend protection: 42 mm
- Bending radius: 2.5 x cable thickness

1-42 (1.6)

An adapter for RJ45 and the M12 connector is optionally available:
Order code for "Accessories", option NB: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.
7.3 Connecting the measuring device: Proline 500

**NOTICE**

Limitation of electrical safety due to incorrect connection!

- Have electrical connection work carried out by appropriately trained specialists only.
- Observe applicable federal/national installation codes and regulations.
- Comply with local workplace safety regulations.
- Always connect the protective ground cable before connecting additional cables.
- For use in potentially explosive atmospheres, observe the information in the device-specific Ex documentation.

7.3.1 Connecting the connecting cable

**WARNING**

Risk of damaging the electronic components!

- Connect the sensor and transmitter to the same potential equalization.
- Only connect the sensor to a transmitter with the same serial number.
- Ground the connection housing of the sensor via the external screw terminal.

Connecting cable terminal assignment

| 1 | Protective earth (PE) |
| 2 | Cable entry for connecting cable on transmitter connection housing |
| 3 | Connecting cable |
| 4 | Cable entry for connecting cable on sensor connection housing |
| 5 | Protective earth (PE) |

Connecting the connecting cable to the sensor connection housing

Connection via terminals with order code for "Housing":
Option B "Stainless" → 54

Connecting the connecting cable to the transmitter

The cable is connected to the transmitter via terminals → 55.
Connecting the sensor connection housing via terminals
For the device version with the order code for "Housing": Option B "Stainless"

1. Release the securing screw of the housing cover.
2. Open the housing cover.
3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
4. Strip the cable and cable ends. In the case of stranded cables, fit ferrules.
5. Connect the protective ground.
6. Connect the cable in accordance with the connecting cable terminal assignment.
7. Firmly tighten the cable glands.
   ‣ This concludes the process for connecting the connecting cable.
8. Close the housing cover.
9. Tighten the securing screw of the housing cover.
Connecting the connecting cable to the transmitter

1. Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.
4. Strip the cable and cable ends. In the case of stranded cables, also fit ferrules.
5. Connect the protective ground.
6. Connect the cable in accordance with the connecting cable terminal assignment → 53.
7. Firmly tighten the cable glands.  
   - This concludes the process for connecting the connecting cable.
8. Screw on the connection compartment cover.
9. Tighten the securing clamp of the connection compartment cover.
10. After connecting the connecting cable: After connecting the connecting cables: Connect the signal cable and the supply voltage cable.
7.3.2 Connecting the transmitter

1 Terminal connection for supply voltage
2 Terminal connection for signal transmission, input/output
3 Terminal connection for signal transmission, input/output or terminal connection for network connection via service interface (CDI-RJ45)
4 Protective earth (PE)

In addition to connecting the device via PROFINET and the available inputs/outputs, additional connection options are also available:
- Integrate into a network via the service interface (CDI-RJ45) → 59.
- Integrate the device into a ring topology → 60.

Connecting the PROFINET connector

1. Loosen the securing clamp of the connection compartment cover.
2. Unscrew the connection compartment cover.
3. Squeeze the tabs of the display module holder together.
4. Remove the display module holder.
5. Attach the holder to the edge of the electronics compartment.
6. Open the terminal cover.
7. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.

8. Strip the cable and cable ends and connect to the RJ45 connector.

9. Connect the protective ground.


11. Firmly tighten the cable glands.

This concludes the PROFINET connection process.

Connecting the supply voltage and additional inputs/outputs

1. Push the cable through the cable entry. To ensure tight sealing, do not remove the sealing ring from the cable entry.

2. Strip the cable and cable ends. In the case of stranded cables, also fit ferrules.

3. Connect the protective ground.
4. Connect the cable in accordance with the terminal assignment.
   - **Signal cable terminal assignment:** The device-specific terminal assignment is documented on an adhesive label in the terminal cover.
   - **Supply voltage terminal assignment:** Adhesive label in the terminal cover or → 41.

5. Firmly tighten the cable glands.
   - This concludes the cable connection process.

6. Close the terminal cover.
7. Fit the display module holder in the electronics compartment.
8. Screw on the connection compartment cover.
9. Secure the securing clamp of the connection compartment cover.

Removing a cable

1. To remove a cable from the terminal, use a flat-blade screwdriver to push the slot between the two terminal holes
2. while simultaneously pulling the cable end out of the terminal.
7.3.3 Integrating the transmitter into a network

This section only presents the basic options for integrating the device into a network. For information on the procedure to follow to connect the transmitter correctly → § 53.

Integrating via the service interface

The device is integrated via the connection to the service interface (CDI-RJ45).

Note the following when connecting:
- Recommended cable: CAT 5e, CAT 6 or CAT 7, with shielded connector (e.g. brand: YAMAICHI; Part No Y-ConProfiplug63 / Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of connector including bend protection: 42 mm
- Bending radius: 5 x cable thickness

An adapter for RJ45 and the M12 connector is optionally available:
Order code for "Accessories", option NB: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.
**Integrating into a ring topology**

The device is integrated via the terminal connection for signal transmission (output 1) and the connection to the service interface (CDI-RJ45).

Note the following when connecting:
- Recommended cable: CAT5e, CAT6 or CAT7, with shielded connector (e.g. brand: YAMAICHI; Part No Y-ConProfixPlug63 / Prod. ID: 82-006660)
- Maximum cable thickness: 6 mm
- Length of connector including bend protection: 42 mm
- Bending radius: 2.5 x cable thickness

---

An adapter for RJ45 and the M12 connector is optionally available:

Order code for "Accessories", option NB: "Adapter RJ45 M12 (service interface)"

The adapter connects the service interface (CDI-RJ45) to an M12 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.

### 7.4 Ensuring potential equalization

#### 7.4.1 Requirements

Please consider the following to ensure correct measurement:
- Same electrical potential for the fluid and sensor
- Company-internal grounding concepts
### 7.5 Special connection instructions

#### 7.5.1 Connection examples

**PROFINET**

![Connection example for PROFINET](image1)

1. Control system (e.g. PLC)
2. Ethernet switch
3. Observe cable specifications
4. Device plug
5. Transmitter

**PROFINET: MRP (Media Redundancy Protocol)**

![Connection example for PROFINET: MRP](image2)

1. Control system (e.g. PLC)
2. Ethernet switch
3. Observe cable specifications → [37]
4. Transmitter
5. Connecting cable between the two transmitters
PROFINET: system redundancy S2

17 Connection example for system redundancy S2
1 Control system 1 (e.g. PLC)
2 Synchronization of control systems
3 Control system 2 (e.g. PLC)
4 Industrial Ethernet Managed Switch
5 Transmitter

Current output 4–20 mA

18 Connection example for 4–20 mA current output (active)
1 Automation system with current input (e.g. PLC)
2 Analog display unit: observe maximum load
3 Transmitter

19 Connection example for 4–20 mA current output (passive)
1 Automation system with current input (e.g. PLC)
2 Active barrier for power supply (e.g. RN221N)
3 Analog display unit: observe maximum load
4 Transmitter
Pulse/frequency output

1. Automation system with pulse/frequency input (e.g. PLC)
2. Power supply
3. Transmitter: Observe input values → 254

Switch output

1. Automation system with switch input (e.g. PLC)
2. Power supply
3. Transmitter: Observe input values → 254

Relay output

1. Automation system with relay input (e.g. PLC)
2. Power supply
3. Transmitter: Observe input values → 256
Current input

![Connection example for 4 to 20 mA current input](image)

1. Power supply
2. Terminal box
3. External measuring device (to read in pressure or temperature, for instance)
4. Transmitter

Status input

![Connection example for status input](image)

1. Automation system with status output (e.g. PLC)
2. Power supply
3. Transmitter

7.6 Hardware settings

7.6.1 Setting the device name

A measuring point can be quickly identified within a plant on the basis of the tag name. The tag name is equivalent to the device name (name of station of the PROFINET specification). The factory-assigned device name can be changed using the DIP switches or the automation system.

Example of device name (factory setting): EH-Promass500-XXXX

<table>
<thead>
<tr>
<th>EH</th>
<th>Endress+Hauser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promass</td>
<td>Instrument family</td>
</tr>
<tr>
<td>500</td>
<td>Transmitter</td>
</tr>
<tr>
<td>XXXX</td>
<td>Serial number of the device</td>
</tr>
</tbody>
</table>

The device name currently used is displayed in Setup → Name of station is also displayed.
Setting the device name using the DIP switches

The last part of the device name can be set using DIP switches 1-8. The address range is between 1 and 254 (factory setting: serial number of the device)

Overview of the DIP switches

<table>
<thead>
<tr>
<th>DIP switch</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>128</td>
<td>Configurable part of the device name</td>
</tr>
<tr>
<td>2</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Example: Setting the device name EH-PROMASS500-065

<table>
<thead>
<tr>
<th>DIP switch</th>
<th>ON/OFF</th>
<th>Bit</th>
<th>Device name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ON</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>3…7</td>
<td>OFF</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>ON</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Serial number of the device: 065

EH-PROMASS500-065

Setting the device name: Proline 500 - digital

Risk of electric shock when opening the transmitter housing.

- Before opening the transmitter housing:
- Disconnect the device from the power supply.

The default IP address may **not** be activated → 67.
1. Loosen the 4 fixing screws on the housing cover.
2. Open the housing cover.
3. Fold open the terminal cover.
4. Set the desired device name using the corresponding DIP switches on the I/O electronics module.
5. Reverse the removal procedure to reassemble the transmitter.
6. Reconnect the device to the power supply.

The configured device address is used once the device is restarted.

Setting the device name: Proline 500

Risk of electric shock when opening the transmitter housing.
- Before opening the transmitter housing:
  - Disconnect the device from the power supply.

The default IP address may **not** be activated → 68.

1. Depending on the housing version, loosen the securing clamp or fixing screw of the housing cover.
2. Depending on the housing version, unscrew or open the housing cover and disconnect the local display from the main electronics module where necessary.
3. Set the desired device name using the corresponding DIP switches on the I/O electronics module.
4. Reverse the removal procedure to reassemble the transmitter.
5. Reconnect the device to the power supply.
   - The configured device address is used once the device is restarted.

Setting the device name via the automation system
DIP switches 1-8 must all be set to **OFF** (factory setting) or all be set to **ON** to be able to set the device name via the automation system.

The complete device name (name of station) can be changed individually via the automation system.

- The serial number used as part of the device name in the factory setting is not saved. It is not possible to reset the device name to the factory setting with the serial number. The value '0' is used instead of the serial number.
- When assigning the device name via the automation system:
  assign the device name in lower case letters.

7.6.2 Activating the default IP address
The default IP address 192.168.1.212 can be activated by DIP switch.

Activating the default IP address by DIP switch: Proline 500 - digital
Risk of electric shock when opening the transmitter housing.

- Before opening the transmitter housing:
- Disconnect the device from the power supply.

1. Loosen the 4 fixing screws on the housing cover.
2. Open the housing cover.
3. Fold open the terminal cover.
4. Set DIP switch No. 2 on the I/O electronics module from **OFF** → **ON**.
5. Reverse the removal procedure to reassemble the transmitter.
6. Reconnect the device to the power supply.
   - The default IP address is used once the device is restarted.
Activating the default IP address by DIP switch: Proline 500

Risk of electric shock when opening the transmitter housing.

Before opening the transmitter housing:

- Disconnect the device from the power supply.

1. Depending on the housing version, loosen the securing clamp or fixing screw of the housing cover.
2. Depending on the housing version, unscrew or open the housing cover and disconnect the local display from the main electronics module where necessary.
3. Set DIP switch No. 2 on the I/O electronics module from OFF → ON.
4. Reverse the removal procedure to reassemble the transmitter.
5. Reconnect the device to the power supply.

The default IP address is used once the device is restarted.

7.7 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.
2. Dry, clean or replace the seals if necessary.
3. Tighten all housing screws and screw covers.
4. Firmly tighten the cable glands.
5. To ensure that moisture does not enter the cable entry:
   Route the cable so that it loops down before the cable entry (‘water trap’).

6. Insert dummy plugs into unused cable entries.
## 7.8 Post-connection check

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are cables or the device undamaged (visual inspection)?</td>
<td>☐</td>
</tr>
<tr>
<td>Do the cables used meet the requirements?</td>
<td>☐</td>
</tr>
<tr>
<td>Do the cables have adequate strain relief?</td>
<td>☐</td>
</tr>
<tr>
<td>Are all the cable glands installed, firmly tightened and leak-tight?</td>
<td>☐ 68</td>
</tr>
<tr>
<td>Cable run with 'water trap'</td>
<td>☐</td>
</tr>
</tbody>
</table>
8 Operation options

8.1 Overview of operation options

1 Local operation via display module
2 Computer with Web browser (e.g. Internet Explorer) or with operating tool (e.g. FieldCare, DeviceCare, AMS Device Manager, SIMATIC PDM)
3 Field Xpert SFX350 or SFX370
4 Field Xpert SMT70
5 Mobile handheld terminal
6 Control system (e.g. PLC)
8.2 Structure and function of the operating menu

8.2.1 Structure of the operating menu

For an overview of the operating menu for experts: "Description of Device Parameters" document supplied with the device → 279
### 8.2.2 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.

<table>
<thead>
<tr>
<th>Menu/parameter</th>
<th>User role and tasks</th>
<th>Content/meaning</th>
</tr>
</thead>
</table>
| **Language**   | **Role “Operator”, “Maintenance”** | • Defining the operating language  
• Defining the Web server operating language  
• Resetting and controlling totalizers |
| **Operation**  | **Tasks during operation:** | • Configuring the operational display (e.g. display format, display contrast)  
• Resetting and controlling totalizers |
| **Setup**      | **“Maintenance” role** | Wizards for fast commissioning:  
• Setting the system units  
• Configuration of the communication interface  
• Defining the medium  
• Displaying the I/O/configuration  
• Configuring the inputs  
• Configuring the outputs  
• Configuration of the operational display  
• Setting the low flow cut off  
• Configuring partial and empty pipe detection  
Advanced setup  
• For more customized configuration of the measurement (adaptation to special measuring conditions)  
• Configuration of totalizers  
• Configuring the WLAN settings  
• Administration (define access code, reset measuring device) |
| **Diagnostics**| **“Maintenance” role** | Contains all parameters for error detection and analyzing process and device errors:  
• Diagnostic list  
Contains up to 5 currently pending diagnostic messages.  
• Event logbook  
Contains event messages that have occurred.  
• Device information  
Contains information for identifying the device.  
• Measured values  
Contains all current measured values.  
• **Data logging** submenu with “Extended HistoROM” order option  
Storage and visualization of measured values  
• Heartbeat  
The functionality of the device is checked on demand and the verification results are documented.  
• Simulation  
Is used to simulate measured values or output values. |
| **Expert**     | **function-oriented** | Contains all the parameters of the device and makes it possible to access these parameters directly using an access code. The structure of this menu is based on the function blocks of the device:  
• System  
Contains all higher-order device parameters which do not concern the measurement or the communication interface.  
• Sensor  
Configuration of the measurement.  
• Input  
Configuration of the status input.  
• Output  
Configuration of the analog current outputs as well as the pulse/frequency and switch output.  
• Communication  
Configuration of the digital communication interface and the Web server.  
• Application  
Configuration of the functions that go beyond the actual measurement (e.g. totalizer).  
• **Diagnostics**  
Error detection and analysis of process and device errors and for device simulation and Heartbeat Technology. |
8.3 Access to the operating menu via the local display

8.3.1 Operational display

![Operational display diagram]

1 Operational display
2 Device tag
3 Status area
4 Display area for measured values (4-line)
5 Operating elements

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
  - : Alarm
  - : Warning
  - : Locking (the device is locked via the hardware)
  - : Communication (communication via remote operation is active)

Display area
In the display area, each measured value is prefaced by certain symbol types for further description:

Measured values

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>Mass flow</td>
</tr>
<tr>
<td>V</td>
<td>Volume flow</td>
</tr>
<tr>
<td>C</td>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>D</td>
<td>Density</td>
</tr>
<tr>
<td>R</td>
<td>Reference density</td>
</tr>
<tr>
<td>T</td>
<td>Temperature</td>
</tr>
<tr>
<td>Σ</td>
<td>Totalizer</td>
</tr>
</tbody>
</table>

The measurement channel number indicates which of the three totalizers is displayed.

Status input
Measurement channel numbers

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ... 4</td>
<td>Measurement channel 1 to 4</td>
</tr>
</tbody>
</table>

The measurement channel number is displayed only if more than one channel is present for the same measured variable type (e.g. Totalizer 1 to 3).

Diagnostic behavior

The diagnostic behavior pertains to a diagnostic event that is relevant to the displayed measured variable. For information on the symbols → 178.

The number and display format of the measured values can be configured via the Format display parameter (→ 134).

8.3.2 Navigation view

<table>
<thead>
<tr>
<th>In the submenu</th>
<th>In the wizard</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Navigation view" /></td>
<td><img src="image2" alt="Navigation view" /></td>
</tr>
</tbody>
</table>

1. Navigation view  
2. Navigation path to current position  
3. Status area  
4. Display area for navigation  
5. Operating elements → 78

Navigation path

The navigation path - displayed at the top left in the navigation view - consists of the following elements:

- In the submenu: Display symbol for menu  
- In the wizard: Display symbol for wizard  
- Omission symbol for operating menu levels in between  
- Name of current  
  - Submenu  
  - Wizard  
  - Parameters

Examples

- Access stat.disp  
- Select medium  
- Display

For more information about the icons in the menu, refer to the "Display area" section → 75
### Status area

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

- For information on the diagnostic behavior and status signal → § 177
- For information on the function and entry of the direct access code → § 80

### Display area

#### Menus

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ❓ | Operation  
  Appears:  
  • In the menu next to the 'Operation' selection  
  • At the left in the navigation path in the Operation menu |
| 🛠️ | Setup  
  Appears:  
  • In the menu next to the 'Setup' selection  
  • At the left in the navigation path in the Setup menu |
| 🔍 | Diagnostics  
  Appears:  
  • In the menu next to the 'Diagnostics' selection  
  • At the left in the navigation path in the Diagnostics menu |
| ⚡️ | Expert  
  Appears:  
  • In the menu next to the 'Expert' selection  
  • At the left in the navigation path in the Expert menu |

#### Submenus, wizards, parameters

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶️</td>
<td>Submenu</td>
</tr>
<tr>
<td>🔍</td>
<td>Wizard</td>
</tr>
</tbody>
</table>
| 📝 | Parameters within a wizard  
  No display symbol exists for parameters in submenus. |

#### Locking

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| 🗝️ | Parameter locked  
  When displayed in front of a parameter name, indicates that the parameter is locked.  
  • By a user-specific access code  
  • By the hardware write protection switch |

#### Wizard operation

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔷️ ←</td>
<td>Switches to the previous parameter.</td>
</tr>
<tr>
<td>🔷️ ✔️</td>
<td>Confirms the parameter value and switches to the next parameter.</td>
</tr>
<tr>
<td>🔷️ E</td>
<td>Opens the editing view of the parameter.</td>
</tr>
</tbody>
</table>
8.3.3 Editing view

Numeric editor

<table>
<thead>
<tr>
<th>Operating key(s)</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| −                | Minus key  
Move the entry position to the left. |
| +                | Plus key  
Move the entry position to the right. |
## Operation options

### Operating key(s)

<table>
<thead>
<tr>
<th>Operating key(s)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter key</td>
<td>Press the key briefly: confirm your selection.&lt;br&gt;Press the key for 2 s: confirm the entry.</td>
</tr>
<tr>
<td>Escape key combination (press keys simultaneously)</td>
<td>Close the editing view without accepting the changes.</td>
</tr>
</tbody>
</table>

### Input screens

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper case</td>
<td>A..</td>
</tr>
<tr>
<td>Lower case</td>
<td>a..</td>
</tr>
<tr>
<td>Numbers</td>
<td>1..</td>
</tr>
<tr>
<td>Punctuation marks and special characters: = + – * / ² ³ ¼ ½ ¾ ( ) [ ] &lt; &gt; { }</td>
<td>8..</td>
</tr>
<tr>
<td>Punctuation marks and special characters: ' &quot; ` ^ . , ; : ? ! % µ ° € $ £ ¥ § @ # / \ I ~ &amp; _</td>
<td>9..</td>
</tr>
<tr>
<td>Umlauts and accents</td>
<td>ä..</td>
</tr>
</tbody>
</table>

### Controlling data entries

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move entry position</td>
<td>←→</td>
</tr>
<tr>
<td>Reject entry</td>
<td>X</td>
</tr>
<tr>
<td>Confirm entry</td>
<td>✓</td>
</tr>
<tr>
<td>Delete character immediately to the left of the entry position</td>
<td>X</td>
</tr>
<tr>
<td>Delete character immediately to the right of the entry position</td>
<td>del</td>
</tr>
<tr>
<td>Clear all the characters entered</td>
<td>C</td>
</tr>
</tbody>
</table>
## 8.3.4 Operating elements

<table>
<thead>
<tr>
<th>Operating key(s)</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Minus key              | **In a menu, submenu**<br>Moves the selection bar upwards in a picklist.  
                          | **With a Wizard**<br>Confirms the parameter value and goes to the previous parameter.  
                          | **With a text and numeric editor**<br>Move the entry position to the left. |
| Plus key               | **In a menu, submenu**<br>Moves the selection bar downwards in a picklist.  
                          | **With a Wizard**<br>Confirms the parameter value and goes to the next parameter.  
                          | **With a text and numeric editor**<br>Move the entry position to the right.    |
| Enter key              | **For operational display**<br>Pressing the key briefly opens the operating menu.  
                          | **In a menu, submenu**<br>• Pressing the key briefly:  
                          |  • Opens the selected menu, submenu or parameter.  
                          |  • Starts the wizard.  
                          |  • If help text is open, closes the help text of the parameter.  
                          |  • Pressing the key for 2 s for parameter:  
                          |  • If present, opens the help text for the function of the parameter.  
                          | **With a Wizard**<br>Opens the editing view of the parameter.  
                          | **With a text and numeric editor**<br>• Press the key briefly: confirm your selection.  
                          |  • Press the key for 2 s: confirm the entry. |
| Escape key combination (press keys simultaneously) | **In a menu, submenu**<br>• Pressing the key briefly:  
                          |  • Exits the current menu level and takes you to the next higher level.  
                          |  • If help text is open, closes the help text of the parameter.  
                          |  • Pressing the key for 2 s returns you to the operational display (“home position”).  
                          | **With a Wizard**<br>Exits the wizard and takes you to the next higher level.  
                          | **With a text and numeric editor**<br>Close the editing view without accepting the changes. |
| Minus/Enter key combination (press the keys simultaneously) | **If the keypad lock is active:**<br>Press the key for 3 s: deactivate the keypad lock.  
                          | **If the keypad lock is not active:**<br>Press the key for 3 s: the context menu opens along with the option for activating the keypad lock. |

### 8.3.5 Opening the context menu

Using the context menu, the user can call up the following menus quickly and directly from the operational display:
- Setup
- Data backup
- Simulation
Calling up and closing the context menu

The user is in the operational display.

1. Press the  and  keys for longer than 3 seconds.
   ➡️ The context menu opens.

2. Press  +  simultaneously.
   ➡️ The context menu is closed and the operational display appears.

Calling up the menu via the context menu

1. Open the context menu.
2. Press  to navigate to the desired menu.
3. Press  to confirm the selection.
   ➡️ The selected menu opens.
8.3.6 Navigating and selecting from list

Different operating elements are used to navigate through the operating menu. The navigation path is displayed on the left in the header. Icons are displayed in front of the individual menus. These icons are also shown in the header during navigation.

For an explanation of the navigation view with symbols and operating elements → 74

Example: Setting the number of displayed measured values to "2 values"

```
<table>
<thead>
<tr>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0104-1</td>
<td>0091-1</td>
<td>Operator</td>
<td>Operator</td>
<td>Operator</td>
<td>Operator</td>
<td>Operator</td>
<td>Operator</td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setup</td>
<td>Setup</td>
<td>Locking status</td>
<td>Locking status</td>
<td>Locking status</td>
<td>Locking status</td>
<td>Locking status</td>
<td>Locking status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Display</td>
<td>Display</td>
<td>Display</td>
<td>Display</td>
<td>Display</td>
<td>Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contrast display</td>
<td>Contrast display</td>
<td>Contrast display</td>
<td>Contrast display</td>
<td>Contrast display</td>
<td>Contrast display</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Display interval</td>
<td>Display interval</td>
<td>Display interval</td>
<td>Display interval</td>
<td>Display interval</td>
<td>Display interval</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
<td>0098-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
<td>1 value, max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bargr. + 1 value</td>
<td>Bargr. + 1 value</td>
<td>Bargr. + 1 value</td>
<td>Bargr. + 1 value</td>
<td>Bargr. + 1 value</td>
<td>Bargr. + 1 value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 values</td>
<td>2 values</td>
<td>2 values</td>
<td>2 values</td>
<td>2 values</td>
<td>2 values</td>
</tr>
</tbody>
</table>
```

8.3.7 Calling the parameter directly

A parameter number is assigned to every parameter to be able to access a parameter directly via the onsite display. Entering this access code in the Direct access parameter calls up the desired parameter directly.

Navigation path
Expert → Direct access
The direct access code consists of a 5-digit number (at maximum) and the channel number, which identifies the channel of a process variable: e.g. 00914-2. In the navigation view, this appears on the right-hand side in the header of the selected parameter.

1  Direct access code

Note the following when entering the direct access code:
- The leading zeros in the direct access code do not have to be entered.
  Example: Enter "914" instead of "00914"
- If no channel number is entered, channel 1 is accessed automatically.
  Example: Enter 00914  Assign process variable parameter
- If a different channel is accessed: Enter the direct access code with the corresponding channel number.
  Example: Enter 00914-2  Assign process variable parameter

For the direct access codes of the individual parameters, see the 'Description of Device Parameters' document for the device

8.3.8  Calling up help text

Help text is available for some parameters and can be called up from the navigation view. The help text provides a brief explanation of the parameter function and thereby supports swift and safe commissioning.

Calling up and closing the help text

The user is in the navigation view and the selection bar is on a parameter.

1. Press  for 2 s.
   The help text for the selected parameter opens.

2. Press + simultaneously.
   The help text is closed.

8.3.9  Changing the parameters

Parameters can be changed via the numeric editor or text editor.
- Numeric editor: Change values in a parameter, e.g. specifications for limit values.
- Text editor: Enter text in a parameter, e.g. tag name.

A message is displayed if the value entered is outside the permitted value range.
For a description of the editing view - consisting of the text editor and numeric editor - with symbols → 76, for a description of the operating elements → 78

8.3.10  User roles and related access authorization

The two user roles 'Operator' and 'Maintenance' have different write access to the parameters if the customer defines a user-specific access code. This protects the device configuration via the local display from unauthorized access → 154.

Defining access authorization for user roles

An access code is not yet defined when the device is delivered from the factory. Access authorization (read and write access) to the device is not restricted and corresponds to the "Maintenance" user role.

- Define the access code.

- The 'Operator' user role is redefined in addition to the 'Maintenance' user role. Access authorization differs for the two user roles.

Access authorization to parameters: "Maintenance" user role

<table>
<thead>
<tr>
<th>Access code status</th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>An access code has not yet been defined (factory setting).</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>After an access code has been defined.</td>
<td>✔</td>
<td>✔ ¹</td>
</tr>
</tbody>
</table>

¹) The user only has write access after entering the access code.

Access authorization to parameters: "Operator" user role

<table>
<thead>
<tr>
<th>Access code status</th>
<th>Read access</th>
<th>Write access</th>
</tr>
</thead>
<tbody>
<tr>
<td>After an access code has been defined.</td>
<td>✔</td>
<td>— ¹</td>
</tr>
</tbody>
</table>

¹) Despite the defined access code, certain parameters can always be modified and thus are excepted from the write protection, as they do not affect the measurement. Refer to the 'Write protection via access code' section

The user role with which the user is currently logged on is indicated by the Access status parameter. Navigation path: Operation → Access status

8.3.11  Disabling write protection via access code

If the ⬋-symbol appears on the local display in front of a parameter, the parameter is write-protected by a user-specific access code and its value cannot be changed at the moment using local operation → 154.

Parameter write protection via local operation can be disabled by entering the user-specific access code in the Enter access code parameter (→ 139) via the respective access option.

1. After you press ⬌, the input prompt for the access code appears.
2. Enter the access code.
   ⇨ The 保护-symol in front of the parameters disappears; all previously write-protected parameters are now re-enabled.

8.3.12 Enabling and disabling the keypad lock

The keypad lock makes it possible to block access to the entire operating menu via local operation. As a result, it is no longer possible to navigate through the operating menu or change the values of individual parameters. Users can only read the measured values on the operational display.

The keypad lock is switched on and off via the context menu.

Switching on the keypad lock

1. The keypad lock is switched on automatically:
   • If the device has not been operated via the display for > 1 minute.
   • Each time the device is restarted.

2. To activate the keylock manually:
   1. The device is in the measured value display.
      Press the  and  keys for 3 seconds.
      ⇨ A context menu appears.
   2. In the context menu select the Keylock on option.
      ⇨ The keypad lock is switched on.

If the user attempts to access the operating menu while the keypad lock is active, the Keylock on message appears.

Switching off the keypad lock

1. The keypad lock is switched on.
   Press the  and  keys for 3 seconds.
   ⇨ The keypad lock is switched off.

8.4 Access to the operating menu via the Web browser

8.4.1 Function range

Thanks to the integrated Web server, the device can be operated and configured via a Web browser and via a service interface (CDI-RJ45) or via a WLAN interface. The structure of the operating menu is the same as for the local display. In addition to the measured values, status information on the device is also displayed and allows the user to monitor the status of the device. Furthermore the device data can be managed and the network parameters can be configured.

A device that has a WLAN interface (can be ordered as an option) is required for the WLAN connection: order code for 'Display; operation', option G '4-line, illuminated; touch control + WLAN'. The device acts as an Access Point and enables communication by computer or a mobile handheld terminal.

For additional information on the Web server, refer to the Special Documentation for the device →  279
8.4.2 Prerequisites

Computer hardware

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Interface</th>
<th>CDI-RJ45</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>The computer must have an RJ45 interface.</td>
<td>The operating unit must have a WLAN interface.</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>Standard Ethernet cable with RJ45 connector.</td>
<td>Connection via Wireless LAN.</td>
<td></td>
</tr>
<tr>
<td>Screen</td>
<td>Recommended size: ≥12&quot; (depends on the screen resolution)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Computer software

<table>
<thead>
<tr>
<th>Software</th>
<th>Interface</th>
<th>CDI-RJ45</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended operating systems</td>
<td>Microsoft Windows 7 or higher.</td>
<td>Microsoft Windows XP is supported.</td>
<td></td>
</tr>
<tr>
<td>Mobile operating systems:</td>
<td>iOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Android</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web browsers supported</td>
<td>Microsoft Internet Explorer 8 or higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microsoft Edge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mozilla Firefox</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Google Chrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safari</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Computer settings

<table>
<thead>
<tr>
<th>Settings</th>
<th>Interface</th>
<th>CDI-RJ45</th>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>User rights</td>
<td>Appropriate user rights (e.g. administrator rights) for TCP/IP and proxy server settings are necessary (for adjusting the IP address, subnet mask etc.).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proxy server settings of the Web browser</td>
<td>The Web browser setting Use a Proxy Server for Your LAN must be deselected.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JavaScript</td>
<td>JavaScript must be enabled.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If JavaScript cannot be enabled: enter <a href="http://192.168.1.212/basic.html">http://192.168.1.212/basic.html</a> in the address line of the Web browser. A fully functional but simplified version of the operating menu structure starts in the Web browser.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When installing a new firmware version: To enable correct data display, clear the temporary memory (cache) of the Web browser under Internet options.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network connections</td>
<td>Only the active network connections to the measuring device should be used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switch off all other network connections such as WLAN.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switch off all other network connections.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the event of connection problems: → 171
**Measuring device: Via CDI-RJ45 service interface**

<table>
<thead>
<tr>
<th>Device</th>
<th>CDI-RJ45 service interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring device</td>
<td>The measuring device has an RJ45 interface.</td>
</tr>
</tbody>
</table>
| Web server            | Web server must be enabled; factory setting: ON  
  For information on enabling the Web server → 89 |

**Measuring device: via WLAN interface**

<table>
<thead>
<tr>
<th>Device</th>
<th>WLAN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring device</td>
<td>The measuring device has a WLAN antenna:</td>
</tr>
<tr>
<td></td>
<td>• Transmitter with integrated WLAN antenna</td>
</tr>
<tr>
<td></td>
<td>• Transmitter with external WLAN antenna</td>
</tr>
</tbody>
</table>
| Web server            | Web server and WLAN must be enabled; factory setting: ON  
  For information on enabling the Web server → 89 |

### 8.4.3 Establishing a connection

**Via service interface (CDI-RJ45)**

*Preparing the measuring device*

**Proline 500 – digital**

1. Loosen the 4 fixing screws on the housing cover.
2. Open the housing cover.
3. The location of the connection socket depends on the measuring device and the communication protocol:
   - Connect the computer to the RJ45 connector via the standard Ethernet connecting cable.

**Proline 500**

1. Depending on the housing version:
   - Release the securing clamp or securing screw of the housing cover.
2. Depending on the housing version:
   - Unscrew or open the housing cover.
3. The location of the connection socket depends on the measuring device and the communication protocol:
   - Connect the computer to the RJ45 connector via the standard Ethernet connecting cable.

**Configuring the Internet protocol of the computer**

The IP address can be assigned to the measuring device in a variety of ways:

- **Dynamic Configuration Protocol (DCP), factory setting:**
  The IP address is automatically assigned to the measuring device by the automation system (e.g. Siemens S7).
- **Hardware addressing:**
  The IP address is set via DIP switches → 64.
- **Software addressing:**
  The IP address is entered via the IP address parameter (→ 114).
- **DIP switch for "Default IP address":**
  To establish the network connection via the service interface (CDI-RJ45): the fixed IP address 192.168.1.212 is used → 67.
The measuring device works with the Dynamic Configuration Protocol (DCP), on leaving the factory, i.e. the IP address of the measuring device is automatically assigned by the automation system (e.g. Siemens S7).

To establish a network connection via the service interface (CDI-RJ45): set the 'Default IP address' DIP switch to ON. The measuring device then has the fixed IP address: 192.168.1.212. This address can now be used to establish the network connection.

1. Via DIP switch 2, activate the default IP address 192.168.1.212: → 67.
2. Switch on the measuring device.
3. Connect to the computer using a cable → 91.
4. If a 2nd network card is not used, close all the applications on the notebook.
   Applications requiring Internet or a network, such as e-mail, SAP applications, Internet or Windows Explorer.
5. Close any open Internet browsers.
6. Configure the properties of the Internet protocol (TCP/IP) as defined in the table:

<table>
<thead>
<tr>
<th>IP address</th>
<th>192.168.1.XXX; for XXX all numerical sequences except: 0, 212 and 255 → e.g. 192.168.1.213</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subnet mask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Default gateway</td>
<td>192.168.1.212 or leave cells empty</td>
</tr>
</tbody>
</table>

Via WLAN interface

*Configuring the Internet protocol of the mobile terminal*

**NOTICE**

If the WLAN connection is lost during the configuration, settings made may be lost.
▶ Make sure that the WLAN connection is not disconnected while configuring the device.

**NOTICE**

In principle, avoid simultaneous access to the measuring device via the service interface (CDI-RJ45) and the WLAN interface from the same mobile terminal. This could cause a network conflict.
▶ Only activate one service interface (CDI-RJ45 service interface or WLAN interface).
▶ If simultaneous communication is necessary: configure different IP address ranges, e.g. 192.168.0.1 (WLAN interface) and 192.168.1.212 (CDI-RJ45 service interface).

*Preparing the mobile terminal*

▶ Enable WLAN reception on the mobile terminal.

*Establishing a connection from the mobile terminal to the measuring device*

1. In the WLAN settings of the mobile terminal:
   Select the measuring device using the SSID (e.g. EH_Promass_500_A802000).
2. If necessary, select the WPA2 encryption method.
3. Enter the password: serial number of the measuring device ex-works (e.g. L100AB02000).
   ↪ LED on display module flashes: it is now possible to operate the measuring device
   with the Web browser, FieldCare or DeviceCare.

The serial number can be found on the nameplate.

To ensure the safe and swift assignment of the WLAN network to the measuring
point, it is advisable to change the SSID name. It should be possible to clearly assign
the new SSID name to the measuring point (e.g. tag name) because it is displayed as
the WLAN network.

**Disconnecting**

▸ After configuring the device:
   Terminate the WLAN connection between the operating unit and measuring device.

**Starting the Web browser**

1. Start the Web browser on the computer.

2. Enter the IP address of the Web server in the address line of the Web browser:
   192.168.1.212
   ↪ The login page appears.

   ![Diagram of Web browser interface]

   - Picture of device
   - Device name
   - Device tag
   - Status signal
   - Volume flow
   - Mass flow
   - Conductivity
   - Web server language
   - Operating language
   - User role
   - Access code
   - Login
   - Reset access code (→ 150)

If a login page does not appear, or if the page is incomplete → 171

**8.4.4 Logging on**

1. Select the preferred operating language for the Web browser.
2. Enter the user-specific access code.
3. Press OK to confirm your entry.

### Access code

<table>
<thead>
<tr>
<th>Function row</th>
<th>Local display language</th>
<th>Navigation area</th>
</tr>
</thead>
</table>

If no action is performed for 10 minutes, the Web browser automatically returns to the login page.

## 8.4.5 User interface

### Header

The following information appears in the header:
- Device name
- Device tag
- Device status with status signal → 180
- Current measured values

### Function row

<table>
<thead>
<tr>
<th>Functions</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured values</td>
<td>Displays the measured values of the measuring device</td>
</tr>
<tr>
<td>Menu</td>
<td>Access to the operating menu from the measuring device&lt;br&gt;The structure of the operating menu is the same as for the local display&lt;br&gt;For detailed information on the structure of the operating menu, see the Operating Instructions for the measuring device</td>
</tr>
<tr>
<td>Device status</td>
<td>Displays the diagnostic messages currently pending, listed in order of priority</td>
</tr>
<tr>
<td>Data management</td>
<td>Data exchange between PC and measuring device:&lt;br&gt;- Device configuration:&lt;br&gt;  - Load settings from the device&lt;br&gt;  - Save settings to the device&lt;br&gt;  - Load configuration (XML format, save configuration)&lt;br&gt;  - Save configuration (XML format, restore configuration)&lt;br&gt;  - Logbook - Export Event logbook (.csv file)&lt;br&gt;  - Documents - Export documents:&lt;br&gt;  - Export backup data record&lt;br&gt;  - Export verification report&lt;br&gt;  - Export firmware update&lt;br&gt;  - Export file for system integration&lt;br&gt;  - Export PROFINET: GSD file&lt;br&gt;  - Export firmware update - Flashing a firmware version</td>
</tr>
</tbody>
</table>

---

*Endress+Hauser*
Operation options

<table>
<thead>
<tr>
<th>Functions</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Network configuration | Configuration and checking of all the parameters required for establishing the connection to the measuring device:  
  - Network settings (e.g. IP address, MAC address)  
  - Device information (e.g. serial number, firmware version) |
| Logout | End the operation and call up the login page |

Navigation area

If a function is selected in the function bar, the submenus of the function open in the navigation area. The user can now navigate through the menu structure.

Working area

Depending on the selected function and the related submenus, various actions can be performed in this area:

- Configuring parameters
- Reading measured values
- Calling up help text
- Starting an upload/download

8.4.6  Disabling the Web server

The Web server of the measuring device can be switched on and off as required using the Web server functionality parameter.

Navigation

"Expert" menu → Communication → Web server

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Web server functionality | Switch the Web server on and off. | • Off  
  • HTML Off  
  • On | On |

Function scope of the "Web server functionality" parameter

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td></td>
</tr>
</tbody>
</table>
  - The web server is completely disabled.  
  - Port 80 is locked.  
| HTML Off | The HTML version of the web server is not available. |
| On     |  
  - The complete functionality of the web server is available.  
  - JavaScript is used.  
  - The password is transferred in an encrypted state.  
  - Any change to the password is also transferred in an encrypted state. |

Enabling the Web server

If the Web server is disabled it can only be re-enabled with the Web server functionality parameter via the following operating options:

- Via local display
- Via Bedientool 'FieldCare'
- Via 'DeviceCare' operating tool
8.4.7 Logging out

Before logging out, perform a data backup via the Data management function (upload configuration from device) if necessary.

1. Select the Logout entry in the function row.
   - The home page with the Login box appears.
2. Close the Web browser.
3. If no longer needed:
   - Reset modified properties of the Internet protocol (TCP/IP) → 85.

If communication with the Web server was established via the default IP address 192.168.1.212, DIP switch No. 10 must be reset (from ON → OFF). Afterwards, the IP address of the device is active again for network communication.

8.5 Access to the operating menu via the operating tool

The structure of the operating menu in the operating tools is the same as for operation via the local display.

8.5.1 Connecting the operating tool

Via PROFINET network

This communication interface is available in device versions with PROFINET.

**Star topology**

![Diagram of star topology](image)

1. Automation system, e.g. Simatic S7 (Siemens)
2. Computer with Web browser (e.g. Internet Explorer) for accessing the integrated device Web server or computer with operating tool (e.g. FieldCare, DeviceCare, SIMATIC PDM) with COM DTM “CDI Communication TCP/IP”
3. Switch, e.g. Scalance X204 (Siemens)
4. Measuring device

**Ring topology**

The device is integrated via the terminal connection for signal transmission (output 1) and the service interface (CDI-RJ45).
### Operation options

#### Options for remote operation via PROFINET network: ring topology

1. Automation system, e.g. Simatic S7 (Siemens)
2. Computer with Web browser (e.g. Internet Explorer) for accessing the integrated device Web server or computer with operating tool (e.g. FieldCare, DeviceCare, SIMATIC PDM) with COM DTM ‘CDI Communication TCP/IP’
3. Switch, e.g. Scalance X204 (Siemens)
4. Measuring device

### Service interface

**Via service interface (CDI-RJ45)**

A point-to-point connection can be established to configure the device onsite. With the housing open, the connection is established directly via the service interface (CDI-RJ45) of the device.

> An adapter for RJ45 and the M12 connector is optionally available:

Order code for ‘Accessories’, option **NB**: ‘Adapter RJ45 M12 (service interface)’

The adapter connects the service interface (CDI-RJ45) to an M12 connector mounted in the cable entry. Therefore the connection to the service interface can be established via an M12 connector without opening the device.

---

### Proline 500 – digital transmitter

**Connection via service interface (CDI-RJ45)**

1. Computer with Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or with “FieldCare”, “DeviceCare” operating tool with COM DTM ‘CDI Communication TCP/IP’
2. Standard Ethernet connecting cable with RJ45 connector
3. Service interface (CDI-RJ45) of the measuring device with access to the integrated Web server
Proline 500 transmitter

32 Connection via service interface (CDI-RJ45)
1 Computer with Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or with 'FieldCare', 'DeviceCare' operating tool with COM DTM "CDI Communication TCP/IP"
2 Standard Ethernet connecting cable with RJ45 connector
3 Service interface (CDI-RJ45) of the measuring device with access to the integrated Web server

Via WLAN interface
The optional WLAN interface is available on the following device version:
Order code for "Display; operation", option G "4-line, illuminated; touch control + WLAN"

1 Transmitter with integrated WLAN antenna
2 Transmitter with external WLAN antenna
3 LED lit constantly: WLAN reception is enabled on measuring device
4 LED flashing: WLAN connection established between operating unit and measuring device
5 Computer with WLAN interface and Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or with operating tool (e.g. FieldCare, DeviceCare)
6 Mobile handheld terminal with WLAN interface and Web browser (e.g. Microsoft Internet Explorer, Microsoft Edge) for accessing the integrated device Web server or operating tool (e.g. FieldCare, DeviceCare)
7 Smart phone or tablet (e.g. Field Xpert SMT70)
Function | WLAN: IEEE 802.11 b/g (2.4 GHz)
Encryption | WPA2-PSK AES-128 (in accordance with IEEE 802.11i)
Configurable WLAN channels | 1 to 11
Degree of protection | IP67
Available antennas | • Internal antenna
• External antenna (optional)
  In the event of poor transmission/reception conditions at the place of installation.
  Only one antenna active in each case!
Range | • Internal antenna: typically 10 m (32 ft)
• External antenna: typically 50 m (164 ft)
Materials (external antenna) | • Antenna: ASA plastic (acrylic ester-styrene-acrylonitrile) and nickel-plated brass
• Adapter: Stainless steel and nickel-plated brass
• Cable: Polyethylene
• Connector: Nickel-plated brass
• Angle bracket: Stainless steel

Configuring the Internet protocol of the mobile terminal

**NOTICE**
If the WLAN connection is lost during the configuration, settings made may be lost.
▶ Make sure that the WLAN connection is not disconnected while configuring the device.

**NOTICE**
In principle, avoid simultaneous access to the measuring device via the service interface (CDI-RJ45) and the WLAN interface from the same mobile terminal. This could cause a network conflict.
▶ Only activate one service interface (CDI-RJ45 service interface or WLAN interface).
▶ If simultaneous communication is necessary: configure different IP address ranges, e.g. 192.168.0.1 (WLAN interface) and 192.168.1.212 (CDI-RJ45 service interface).

Preparing the mobile terminal
▶ Enable WLAN reception on the mobile terminal.

Establishing a connection from the mobile terminal to the measuring device

1. In the WLAN settings of the mobile terminal:
   Select the measuring device using the SSID (e.g. EH_Promass_500_A802000).
2. If necessary, select the WPA2 encryption method.
3. Enter the password: serial number of the measuring device ex-works (e.g. L100A802000).
   - LED on display module flashes: it is now possible to operate the measuring device with the Web browser, FieldCare or DeviceCare.

The serial number can be found on the nameplate.

To ensure the safe and swift assignment of the WLAN network to the measuring point, it is advisable to change the SSID name. It should be possible to clearly assign the new SSID name to the measuring point (e.g. tag name) because it is displayed as the WLAN network.

Disconnecting
▶ After configuring the device:
   Terminate the WLAN connection between the operating unit and measuring device.
8.5.2 FieldCare

Function scope
FDT-based plant asset management tool from Endress+Hauser. It can configure all smart field devices in a system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition.

Access is via:
- CDI-RJ45 service interface → 91
- WLAN interface → 92

Typical functions:
- Configuring parameters of transmitters
- Loading and saving device data (upload/download)
- Documentation of the measuring point
- Visualization of the measured value memory (line recorder) and event logbook

For additional information about FieldCare, see Operating Instructions BA00027S and BA00059S

Source for device description files
See information → 96

Establishing a connection
1. Start FieldCare and launch the project.
2. In the network: Add a device.
   
   The Add device window opens.
3. Select the CDI Communication TCP/IP option from the list and press OK to confirm.
4. Right-click CDI Communication TCP/IP and select the Add device option in the context menu that opens.
5. Select the desired device from the list and press OK to confirm.
   
   The CDI Communication TCP/IP (Configuration) window opens.
6. Enter the device address in the IP address field: 192.168.1.212 and press Enter to confirm.
7. Establish the online connection to the device.

For additional information, see Operating Instructions BA00027S and BA00059S
User interface

8.5.3  DeviceCare

Function scope
Tool to connect and configure Endress+Hauser field devices.
The fastest way to configure Endress+Hauser field devices is with the dedicated "DeviceCare" tool. Together with the device type managers (DTMs) it presents a convenient, comprehensive solution.

For details, see Innovation Brochure IN01047S

Source for device description files
See information → 96
9 System integration

9.1 Overview of device description files

9.1.1 Current version data for the device

| Firmware version | 01.01.zz | • On the title page of the Operating instructions
| | | • On the transmitter nameplate
| | | • Firmware version
| | | Diagnostics → Device information → Firmware version
| Release date of firmware version | 07.2019 | –
| Manufacturer ID | 0x11 | Manufacturer ID
| | | Diagnostics → Device information → Manufacturer ID
| Device ID | 0x843B | Device ID
| | | Expert → Communication → PROFINET configuration → PROFINET info → Device ID
| Device type ID | Promass 500 | Device Type
| | | Expert → Communication → PROFINET configuration → PROFINET info → Device Type
| Device revision | 2 | Device revision
| | | Expert → Communication → PROFINET configuration → PROFINET info → Device revision
| PROFINET version | 2.3.x | –

For an overview of the different firmware versions for the device → 242

9.1.2 Operating tools

The suitable device description file for the individual operating tools is listed in the table below, along with information on where the file can be acquired.

<table>
<thead>
<tr>
<th>Operating tool via Service interface (CDI)</th>
<th>Sources for obtaining device descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FieldCare</td>
<td>• <a href="http://www.endress.com">www.endress.com</a> → Download Area</td>
</tr>
<tr>
<td></td>
<td>• CD-ROM (contact Endress+Hauser)</td>
</tr>
<tr>
<td></td>
<td>• DVD (contact Endress+Hauser)</td>
</tr>
<tr>
<td>DeviceCare</td>
<td>• <a href="http://www.endress.com">www.endress.com</a> → Download Area</td>
</tr>
<tr>
<td></td>
<td>• CD-ROM (contact Endress+Hauser)</td>
</tr>
<tr>
<td></td>
<td>• DVD (contact Endress+Hauser)</td>
</tr>
</tbody>
</table>
9.2 Device master file (GSD)

In order to integrate field devices into a bus system, the PROFINET system needs a description of the device parameters, such as output data, input data, data format and data volume.

These data are available in the device master file (GSD) which is provided to the automation system when the communication system is commissioned. In addition device bit maps, which appear as icons in the network structure, can also be integrated.

The device master file (GSD) is in XML format, and the file is created in the GSDML description markup language.

9.2.1 File name of the device master file (GSD)

Example of the name of a device master file:
GSDML-V2.3.x-EH-PROMASS 500-yyyymmdd.xml

<table>
<thead>
<tr>
<th>Description language</th>
<th>Version of the PROFINET specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2.3.x</td>
<td></td>
</tr>
<tr>
<td>EH</td>
<td>Endress+Hauser</td>
</tr>
<tr>
<td>PROMASS</td>
<td>Instrument family</td>
</tr>
<tr>
<td>500</td>
<td>Transmitter</td>
</tr>
<tr>
<td>yyyymmdd</td>
<td>Date of issue (yyyy: year, mm: month, dd: day)</td>
</tr>
<tr>
<td>.xml</td>
<td>File name extension (XML file)</td>
</tr>
</tbody>
</table>
### 9.3 Cyclic data transmission

#### 9.3.1 Overview of the modules

The following tables shows which modules are available to the measuring device for cyclic data exchange. Cyclic data exchange is performed with an automation system.

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Slot</th>
<th>Direction</th>
<th>Control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Input module</td>
<td>→ 98</td>
<td>1 to 14, 24 to 26, 27</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Application-specific Input module</td>
<td>→ 100</td>
<td>31, 32</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Digital Input module</td>
<td>→ 100</td>
<td>1 to 14</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Diagnose Input module</td>
<td>→ 101</td>
<td>1 to 14</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Analog Output module</td>
<td>→ 103</td>
<td>18, 19, 20, 29, 30</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Digital Output module</td>
<td>→ 104</td>
<td>21, 22, 24 to 26</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Totalizer 1 to 3</td>
<td>→ 102</td>
<td>15 to 17</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Heartbeat Verification module</td>
<td>→ 105</td>
<td>23</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Concentration</td>
<td>→ 105</td>
<td>28</td>
<td>PROFINET</td>
</tr>
</tbody>
</table>

#### 9.3.2 Description of the modules

- **Input data:** Are sent from the measuring device to the automation system.
- **Output data:** Are sent from the automation system to the measuring device.

**Analog Input module**

Transmit input variables from the measuring device to the automation system. Analog Input modules cyclically transmit the selected input variables, along with the status, from the measuring device to the automation system. The input variable is depicted in the first four bytes in the form of a floating point number as per the IEEE 754 standard. The fifth byte contains status information pertaining to the input variable.
### Selection: input variable

<table>
<thead>
<tr>
<th>Slot</th>
<th>Input variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 14</td>
<td>- Mass flow&lt;br&gt;- Volume flow&lt;br&gt;- Corrected volume flow&lt;br&gt;- Density&lt;br&gt;- Reference density&lt;br&gt;- Temperature&lt;br&gt;- Electronic temperature&lt;br&gt;- Oscillation frequency&lt;br&gt;- Frequency fluctuation&lt;br&gt;- Oscillation damping&lt;br&gt;- Tube damping fluctuation&lt;br&gt;- Signal asymmetry&lt;br&gt;- Exciter current&lt;br&gt;- Application-specific output 0&lt;br&gt;- Application-specific output 1&lt;br&gt;- Index inhomogeneous medium&lt;br&gt;- Index suspended bubbles</td>
</tr>
<tr>
<td>24 to 26</td>
<td>Current input value</td>
</tr>
</tbody>
</table>

**Additional input variables with the Heartbeat Verification application package**

- Carrier pipe temperature<br>- Oscillation damping 1<br>- Oscillation frequency 1<br>- Oscillation amplitude 0<br>- Oscillation amplitude 1<br>- Frequency fluctuation 1<br>- Tube damping fluctuation 1<br>- Exciter current 1<br>- HBSI

**Additional input variables with the Concentration Measurement application package**

- Concentration (slot 1 to 14)<br>- Target mass flow (slot 1 to 14)<br>- Carrier mass flow (slot 1 to 14)<br>- Concentration value (slot 27)

**Additional input variables with the Petroleum application package**

- Oil density<br>- Water density<br>- Water cut %<br>- Oil mass flow<br>- Water mass flow<br>- Oil volume flow<br>- Water volume flow<br>- Oil corrected volume flow<br>- Water corrected volume flow<br>- Replacement reference density<br>- Gross corrected volume flow<br>- Gross corrected volume flow, replacement<br>- Net corrected volume flow<br>- Net corrected volume flow, replacement<br>- Sediment and water volume flow

### Data structure

**Input data of Analog Input**

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
<th>Byte 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Measured value: floating point number (IEEE 754)

1) Status coding → 106
Application-specific Input module
Transmit compensation values from the automation system to the measuring device.
The Application-specific Input module cyclically transmits compensation values, including
the status, from the automation system to the measuring device. The compensation value
is depicted in the first four bytes in the form of a floating point number as per the IEEE
754 standard. The fifth byte contains standardized status information pertaining to the
compensation value.

Assigned compensation values
The configuration is performed via: Expert → Application → Application specific
calculations → Process variables

<table>
<thead>
<tr>
<th>Slot</th>
<th>Compensation value</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>Application-specific Input module</td>
</tr>
<tr>
<td>32</td>
<td>Application-specific Input module</td>
</tr>
</tbody>
</table>

Data structure
Input data of Application-specific Input module

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
<th>Byte 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value: floating point number (IEEE 754)</td>
<td></td>
<td></td>
<td></td>
<td>Status 1)</td>
</tr>
</tbody>
</table>

1) Status coding →  106

Failsafe mode
A failsafe mode can be defined for using the compensation values.
If the status is GOOD or UNCERTAIN, the compensation values transmitted by the
automation system are used. If the status is BAD, the failsafe mode is activated for the use
of the compensation values.
Parameters are available per compensation value to define the failsafe mode: Expert
→ Application → Application specific calculations → Process variables

Fail safe type parameter
- Fail-safe value option: The value defined in the Fail safe value parameter is used.
- Fallback value option: The last valid value is used.
- Off option: Failsafe mode is disabled.

Fail safe value parameter
Use this parameter to enter the compensation value which is used if the Fail safe value
option is selected in the Fail safe type parameter.

Digital Input module
Transmit digital input values from the measuring device to the automation system.
Digital input values are used by the measuring device to transmit the state of device
functions to the automation system.
Digital Input modules cyclically transmit discrete input values, including the status, from
the measuring device to the automation system. The discrete input value is depicted in the
first byte. The second byte contains standardized status information pertaining to the
input value.
Selection: device function

<table>
<thead>
<tr>
<th>Slot</th>
<th>Device function</th>
<th>Status (meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 14</td>
<td>Empty pipe detection</td>
<td>• 0 (device function not active)</td>
</tr>
<tr>
<td></td>
<td>Low flow cut off</td>
<td>• 1 (device function active)</td>
</tr>
</tbody>
</table>

Data structure

Input data of Digital Input

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Input</td>
<td>Status</td>
<td>1)</td>
</tr>
</tbody>
</table>

1) Status coding → 106

Diagnose Input module

Transmit discrete input values (diagnostic information) from the measuring device to the automation system.

Diagnostic information is used by the measuring device to transmit the device status to the automation system.

Diagnose Input modules transmit discrete input values from the measuring device to the automation system. The first two bytes contain the information regarding the diagnostic information number (→ 185). The third byte provides the status.

Selection: device function

<table>
<thead>
<tr>
<th>Slot</th>
<th>Device function</th>
<th>Status (meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 14</td>
<td>Last diagnostics</td>
<td>Diagnostic information number (→ 185) and status</td>
</tr>
<tr>
<td></td>
<td>Current diagnosis</td>
<td></td>
</tr>
</tbody>
</table>

Information about pending diagnostic information → 236.

Data structure

Input data of Diagnose Input

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic information number</td>
<td>Status</td>
<td>Value 0</td>
<td></td>
</tr>
</tbody>
</table>

Status

<table>
<thead>
<tr>
<th>Coding (hex)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>No device error is present.</td>
</tr>
<tr>
<td>0x01</td>
<td>Failure (F): A device error is present. The measured value is no longer valid.</td>
</tr>
<tr>
<td>0x02</td>
<td>Function check (C): The device is in service mode (e.g. during a simulation).</td>
</tr>
<tr>
<td>0x04</td>
<td>Maintenance required (M): Maintenance is required. The measured value is still valid.</td>
</tr>
<tr>
<td>0x08</td>
<td>Out of specification (S): The device is being operated outside its technical specification limits (e.g. process temperature range).</td>
</tr>
</tbody>
</table>
**Totalizer module**

The Totalizer module consists of the Totalizer Value, Totalizer Control and Totalizer Mode submodules.

**Totalizer Value submodule**

Transmit transmitter value from the device to the automation system.

Totalizer modules cyclically transmit a selected totalizer value, along with the status, from the measuring device to the automation system via the Totalizer Value submodule. The totalizer value is depicted in the first four bytes in the form of a floating point number as per the IEEE 754 standard. The fifth byte contains status information pertaining to the totalizer value.

**Selection: input variable**

<table>
<thead>
<tr>
<th>Slot</th>
<th>Sub-slot</th>
<th>Input variable</th>
</tr>
</thead>
</table>
| 15...17 | 1 | ● Mass flow  
● Volume flow  
● Corrected volume flow  
● Target mass flow 1)  
● Carrier mass flow 1) |

1) Only available with the Concentration application package

**Data structure of input data (Totalizer Value submodule)**

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
<th>Byte 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value: floating point number (IEEE 754)</td>
<td>Status 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Status coding → 106

**Totalizer Control submodule**

Control the totalizer via the automation system.

**Selection: control totalizer**

<table>
<thead>
<tr>
<th>Slot</th>
<th>Sub-slot</th>
<th>Value</th>
<th>Control totalizer</th>
</tr>
</thead>
</table>
| 15...17 | 2 | 0 | Totalize  
1 | Reset + hold  
2 | Preset + hold  
3 | Reset + totalize  
4 | Preset + totalize  
5 | Hold |

**Data structure of output data (Totalizer Control submodule)**

<table>
<thead>
<tr>
<th>Byte 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control variable</td>
</tr>
</tbody>
</table>

**Totalizer Mode submodule**

Configure the totalizer via the automation system.
**Selection: totalizer configuration**

<table>
<thead>
<tr>
<th>Slot</th>
<th>Sub-slot</th>
<th>Value</th>
<th>Control totalizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>15…17</td>
<td>3</td>
<td>0</td>
<td>Balancing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Balance the positive flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Balance the negative flow</td>
</tr>
</tbody>
</table>

**Data structure of output data (Totalizer Mode submodule)**

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Configuration variable</th>
</tr>
</thead>
</table>

**Analog Output module**

Transmit compensation values from the automation system to the measuring device. Analog Output modules cyclically transmit compensation values, along with the status and the associated unit, from the automation system to the measuring device. The compensation value is depicted in the first four bytes in the form of a floating point number as per the IEEE 754 standard. The fifth byte contains standardized status information pertaining to the compensation value. The unit is transmitted in the sixth and seventh byte.

**Assigned compensation values**

The configuration is performed via: Expert → Sensor → External compensation

<table>
<thead>
<tr>
<th>Slot</th>
<th>Compensation value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>External pressure</td>
</tr>
<tr>
<td>19</td>
<td>External temperature</td>
</tr>
<tr>
<td>20</td>
<td>External reference density</td>
</tr>
<tr>
<td>29</td>
<td>External value for % S&amp;W (sediment and water) ¹</td>
</tr>
<tr>
<td>30</td>
<td>External value for % Water cut ¹</td>
</tr>
</tbody>
</table>

¹) Only available with the Petroleum application package.

**Available units**

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Temperature</th>
<th>Density</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit code</td>
<td>Unit</td>
<td>Unit code</td>
<td>Unit</td>
</tr>
<tr>
<td>1610</td>
<td>Pa a</td>
<td>1001</td>
<td>°C</td>
</tr>
<tr>
<td>1616</td>
<td>kPa a</td>
<td>1002</td>
<td>°F</td>
</tr>
<tr>
<td>1614</td>
<td>MPa a</td>
<td>1000</td>
<td>K</td>
</tr>
<tr>
<td>1137</td>
<td>bar</td>
<td>1003</td>
<td>°R</td>
</tr>
<tr>
<td>1611</td>
<td>Pa g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1617</td>
<td>kPa g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1615</td>
<td>MPa g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32797</td>
<td>bar g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1142</td>
<td>psi a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1143</td>
<td>psi g</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data structure

Output data of Analog Output

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
<th>Byte 5</th>
<th>Byte 6</th>
<th>Byte 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value: floating point number (IEEE 754)</td>
<td>Status 1)</td>
<td></td>
<td></td>
<td></td>
<td>Unit code</td>
<td></td>
</tr>
</tbody>
</table>

1) Status coding $\mapsto$ 106

Failsafe mode

A failsafe mode can be defined for using the compensation values.

If the status is GOOD or UNCERTAIN, the compensation values transmitted by the automation system are used. If the status is BAD, the failsafe mode is activated for the use of the compensation values.

Parameters are available per compensation value to define the failsafe mode: Expert $\rightarrow$ Sensor $\rightarrow$ External compensation

Fail safe type parameter

- Fail safe value option: The value defined in the Fail safe value parameter is used.
- Fallback value option: The last valid value is used.
- Off option: The failsafe mode is disabled.

Fail safe value parameter

Use this parameter to enter the compensation value which is used if the Fail safe value option is selected in the Fail safe type parameter.

Digital Output module

Transmit digital output values from the automation system to the measuring device.

Digital output values are used by the automation system to enable and disable device functions.

Digital output values cyclically transmit discrete output values, including the status, from the automation system to the measuring device. The discrete output value is transmitted in the first byte. The second byte contains status information pertaining to the output value.

Assigned device functions

<table>
<thead>
<tr>
<th>Slot</th>
<th>Device function</th>
<th>Status (meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Flow override</td>
<td>0 (disable device function) 1 (enable device function)</td>
</tr>
<tr>
<td>22</td>
<td>Zero point adjustment</td>
<td></td>
</tr>
<tr>
<td>24 to 26</td>
<td>Relay output</td>
<td>Relay output value: 0 1</td>
</tr>
</tbody>
</table>

Data structure

Output data of Digital Output

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Output</td>
<td>Status 1) 2)</td>
</tr>
</tbody>
</table>

1) Status coding $\mapsto$ 106
2) If the status is BAD, the control variable is not adopted.
Heartbeat Verification module

Receive discrete output values from the automation system and transmit discrete input values from the measuring device to the automation system.

The Heartbeat Verification module receives discrete output data from the automation system and transmits discrete input data from the measuring device to the automation system.

The discrete output value is provided by the automation system in order to start Heartbeat Verification. The discrete input value is depicted in the first byte. The second byte contains status information pertaining to the input value.

The discrete input value is used by the measuring device to transmit the status of the Heartbeat Verification device functions to the automation system. The module cyclically transmits the discrete input value, along with the status, to the automation system. The discrete input value is depicted in the first byte. The second byte contains status information pertaining to the input value.

Only available with the Heartbeat Verification application package.

Assigned device functions

<table>
<thead>
<tr>
<th>Slot</th>
<th>Device function</th>
<th>Bit</th>
<th>Verification status</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Status verification (input data)</td>
<td>0</td>
<td>Verification has not been performed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>Verification has failed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Currently performing verification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Verification terminated</td>
</tr>
<tr>
<td></td>
<td>Verification result (input data)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Verification has failed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>Verification performed successfully</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>Verification has not been performed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>–</td>
</tr>
</tbody>
</table>

Start verification (output data)

<table>
<thead>
<tr>
<th>Verification control</th>
</tr>
</thead>
<tbody>
<tr>
<td>A change in the status from 0 to 1 starts the verification</td>
</tr>
</tbody>
</table>

Data structure

Output data of the Heartbeat Verification module

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Discrete Output</th>
</tr>
</thead>
</table>

Input data of the Heartbeat Verification module

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrete Input</td>
<td>Status 1)</td>
</tr>
</tbody>
</table>

1) Status coding →  106

Concentration module

Only available with the Concentration Measurement application package.
Assigned device functions

<table>
<thead>
<tr>
<th>Slot</th>
<th>Input variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2B</td>
<td>Selection of the liquid type</td>
</tr>
</tbody>
</table>

Data structure

Concentration output data

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Control variable</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Liquid type</th>
<th>Enum code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>0</td>
</tr>
<tr>
<td>Sucrose in water</td>
<td>5</td>
</tr>
<tr>
<td>Glucose in water</td>
<td>2</td>
</tr>
<tr>
<td>Fructose in water</td>
<td>1</td>
</tr>
<tr>
<td>Invert sugar in water</td>
<td>6</td>
</tr>
<tr>
<td>Corn syrup HFC542</td>
<td>15</td>
</tr>
<tr>
<td>Corn syrup HFC555</td>
<td>16</td>
</tr>
<tr>
<td>Corn syrup HFC590</td>
<td>17</td>
</tr>
<tr>
<td>Original wort</td>
<td>18</td>
</tr>
<tr>
<td>Ethanol in water</td>
<td>11</td>
</tr>
<tr>
<td>Methanol in water</td>
<td>12</td>
</tr>
<tr>
<td>Hydrogen peroxide in water</td>
<td>4</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>24</td>
</tr>
<tr>
<td>Sulfuric acid</td>
<td>25</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>7</td>
</tr>
<tr>
<td>Phosphoric acid</td>
<td>8</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>10</td>
</tr>
<tr>
<td>Potassium hydroxide</td>
<td>9</td>
</tr>
<tr>
<td>Ammonium nitrate in water</td>
<td>13</td>
</tr>
<tr>
<td>Iron(III) chloride in water</td>
<td>14</td>
</tr>
<tr>
<td>% mass / % volume</td>
<td>19</td>
</tr>
<tr>
<td>User Profile Coef Set No. 1</td>
<td>21</td>
</tr>
<tr>
<td>User Profile Coef Set No. 2</td>
<td>22</td>
</tr>
<tr>
<td>User Profile Coef Set No. 3</td>
<td>23</td>
</tr>
</tbody>
</table>

9.3.3 Status coding

<table>
<thead>
<tr>
<th>Status</th>
<th>Coding (hex)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAD - Maintenance alarm</td>
<td>0x24</td>
<td>A measured value is not available because a device error has occurred.</td>
</tr>
<tr>
<td>BAD - Process related</td>
<td>0x2B</td>
<td>A measured value is not available because the process conditions are not within the device's technical specification limits.</td>
</tr>
<tr>
<td>BAD - Function check</td>
<td>0x3C</td>
<td>A function check is active (e.g. cleaning or calibration)</td>
</tr>
</tbody>
</table>
9.3.4 Factory setting
The slots are already assigned in the automation system for initial commissioning.

Assigned slots

<table>
<thead>
<tr>
<th>Slot</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mass flow</td>
</tr>
<tr>
<td>2</td>
<td>Volume flow</td>
</tr>
<tr>
<td>3</td>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>4</td>
<td>Density</td>
</tr>
<tr>
<td>5</td>
<td>Reference density</td>
</tr>
<tr>
<td>6</td>
<td>Temperature</td>
</tr>
<tr>
<td>7-14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Totalizer 1</td>
</tr>
<tr>
<td>16</td>
<td>Totalizer 2</td>
</tr>
<tr>
<td>17</td>
<td>Totalizer 3</td>
</tr>
</tbody>
</table>
### 9.3.5 Startup configuration

If startup configuration is enabled, the configuration of the most important device parameters is taken from the automation system and used. The following configuration is taken from the automation system.

<table>
<thead>
<tr>
<th>Startup configuration (NSU)</th>
<th>Management:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Software revision</td>
</tr>
<tr>
<td></td>
<td>• Write protection</td>
</tr>
<tr>
<td></td>
<td>• Web server functionality</td>
</tr>
<tr>
<td></td>
<td>• WLAN functionality</td>
</tr>
<tr>
<td></td>
<td>System units:</td>
</tr>
<tr>
<td></td>
<td>• Mass flow</td>
</tr>
<tr>
<td></td>
<td>• Mass</td>
</tr>
<tr>
<td></td>
<td>• Volume flow</td>
</tr>
<tr>
<td></td>
<td>• Volume</td>
</tr>
<tr>
<td></td>
<td>• Corrected volume flow</td>
</tr>
<tr>
<td></td>
<td>• Corrected volume</td>
</tr>
<tr>
<td></td>
<td>• Density</td>
</tr>
<tr>
<td></td>
<td>• Reference density</td>
</tr>
<tr>
<td></td>
<td>• Temperature</td>
</tr>
<tr>
<td></td>
<td>• Pressure</td>
</tr>
<tr>
<td></td>
<td>Concentration application package:</td>
</tr>
<tr>
<td></td>
<td>• Coefficients A0 to A4</td>
</tr>
<tr>
<td></td>
<td>• Coefficients B1 to B3</td>
</tr>
<tr>
<td></td>
<td>• Medium type</td>
</tr>
<tr>
<td></td>
<td>Sensor adjustment</td>
</tr>
<tr>
<td></td>
<td>Process parameter:</td>
</tr>
<tr>
<td></td>
<td>• Damping (flow, density, temperature)</td>
</tr>
<tr>
<td></td>
<td>• Flow override</td>
</tr>
<tr>
<td></td>
<td>Low flow cut off:</td>
</tr>
<tr>
<td></td>
<td>• Assign process variable</td>
</tr>
<tr>
<td></td>
<td>• Switch-on/switch-off point</td>
</tr>
<tr>
<td></td>
<td>• Pressure shock suppression</td>
</tr>
<tr>
<td></td>
<td>Empty pipe detection:</td>
</tr>
<tr>
<td></td>
<td>• Assign process variable</td>
</tr>
<tr>
<td></td>
<td>• Limit values</td>
</tr>
<tr>
<td></td>
<td>• Response time</td>
</tr>
<tr>
<td></td>
<td>• Max. damping</td>
</tr>
<tr>
<td></td>
<td>Corrected volume flow calculation:</td>
</tr>
<tr>
<td></td>
<td>• External reference density</td>
</tr>
<tr>
<td></td>
<td>• Fixed reference density</td>
</tr>
<tr>
<td></td>
<td>• Reference temperature</td>
</tr>
<tr>
<td></td>
<td>• Linear expansion coefficient</td>
</tr>
<tr>
<td></td>
<td>• Square expansion coefficient</td>
</tr>
<tr>
<td></td>
<td>Measuring mode:</td>
</tr>
<tr>
<td></td>
<td>• Medium</td>
</tr>
<tr>
<td></td>
<td>• Gas type</td>
</tr>
<tr>
<td></td>
<td>• Reference sound velocity</td>
</tr>
<tr>
<td></td>
<td>• Temperature coefficient sound velocity</td>
</tr>
<tr>
<td></td>
<td>External compensation:</td>
</tr>
<tr>
<td></td>
<td>• Pressure compensation</td>
</tr>
<tr>
<td></td>
<td>• Pressure value</td>
</tr>
<tr>
<td></td>
<td>• External pressure</td>
</tr>
<tr>
<td></td>
<td>Alarm delay</td>
</tr>
<tr>
<td></td>
<td>Diagnostic settings</td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior for diverse diagnostic information</td>
</tr>
<tr>
<td></td>
<td>Petroleum application package:</td>
</tr>
<tr>
<td></td>
<td>• Petroleum mode</td>
</tr>
<tr>
<td></td>
<td>• Water density unit</td>
</tr>
<tr>
<td></td>
<td>• Water reference density unit</td>
</tr>
<tr>
<td></td>
<td>• Oil density unit</td>
</tr>
<tr>
<td></td>
<td>• Oil sample density</td>
</tr>
<tr>
<td></td>
<td>• Oil sample temperature</td>
</tr>
<tr>
<td></td>
<td>• Oil sample pressure</td>
</tr>
<tr>
<td></td>
<td>• Water sample density</td>
</tr>
<tr>
<td></td>
<td>• Water sample temperature</td>
</tr>
<tr>
<td></td>
<td>• API commodity group</td>
</tr>
<tr>
<td></td>
<td>• API table selection</td>
</tr>
<tr>
<td></td>
<td>• Thermal expansion coefficient</td>
</tr>
</tbody>
</table>
9.4 System redundancy S2

A redundant layout with two automation systems is necessary for processes that are in continuous operation. If one system fails the second system guarantees continued, uninterrupted operation. The measuring device supports S2 system redundancy and can communicate with both automation systems simultaneously.

All the devices in the network must support S2 system redundancy.
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 → 36
• “Post-connection check” checklist → 69

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 section on "Diagnostics and troubleshooting" → 170.

10.3 Connecting via FieldCare

• For FieldCare → 91 connection
• For connecting via FieldCare → 94
• For the FieldCare → 95 user interface

10.4 Setting the operating language
Factory setting: English or ordered local language
10.5 Configuring the measuring device

- The Setup menu with its guided wizards contains all the parameters needed for standard operation.
- Navigation to the Setup menu

The number of submenus and parameters can vary depending on the device version. Certain submenus and parameters in these submenus are not described in the Operation Instructions. Instead a description is provided in the Special Documentation for the device (→ "Supplementary documentation" section).
10.5.1 Defining the tag name

A measuring point can be quickly identified within a plant on the basis of the tag name. The tag name is equivalent to the device name (name of station) of the PROFINET specification (data length: 255 bytes).

The device name can be changed via DIP switches or the automation system. The device name currently used is displayed in the Name of station parameter.

Navigation
‘Setup’ menu → Name of station

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of station</td>
<td>Name of the measuring point.</td>
<td>Max. 32 characters such as letters and numbers.</td>
<td>EH-PROMASS500 serial number of the device</td>
</tr>
</tbody>
</table>

10.5.2 Setting the system units

In the System units submenu the units of all the measured values can be set.

The number of submenus and parameters can vary depending on the device version. Certain submenus and parameters in these submenus are not described in the Operation Instructions. Instead a description is provided in the Special Documentation for the device (→ "Supplementary documentation" section).

Navigation
‘Setup’ menu → System units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow unit</td>
<td></td>
<td>→ 113</td>
</tr>
<tr>
<td>Mass unit</td>
<td></td>
<td>→ 113</td>
</tr>
<tr>
<td>Volume flow unit</td>
<td></td>
<td>→ 113</td>
</tr>
<tr>
<td>Volume unit</td>
<td></td>
<td>→ 113</td>
</tr>
<tr>
<td>Corrected volume flow unit</td>
<td></td>
<td>→ 113</td>
</tr>
</tbody>
</table>
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow unit</td>
<td>Select mass flow unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td><em>Result</em></td>
<td></td>
<td>• kg/h</td>
</tr>
<tr>
<td></td>
<td>The selected unit applies for:</td>
<td></td>
<td>• lb/ min</td>
</tr>
<tr>
<td></td>
<td>• Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Low flow cut off</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Simulation process variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass unit</td>
<td>Select mass unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• lb</td>
</tr>
<tr>
<td>Volume flow unit</td>
<td>Select volume flow unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td><em>Result</em></td>
<td></td>
<td>• l/h</td>
</tr>
<tr>
<td></td>
<td>The selected unit applies for:</td>
<td></td>
<td>• gal/min (us)</td>
</tr>
<tr>
<td></td>
<td>• Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Low flow cut off</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Simulation process variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume unit</td>
<td>Select volume unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• l</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• gal (us)</td>
</tr>
<tr>
<td>Corrected volume flow unit</td>
<td>Select corrected volume flow unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td><em>Result</em></td>
<td></td>
<td>• Nl/h</td>
</tr>
<tr>
<td></td>
<td>The selected unit applies for:</td>
<td></td>
<td>• St³/min</td>
</tr>
<tr>
<td></td>
<td>Corrected volume flow parameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected volume unit</td>
<td>Select corrected volume unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Nl</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• St³</td>
</tr>
<tr>
<td>Density unit</td>
<td>Select density unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td><em>Result</em></td>
<td></td>
<td>• kg/l</td>
</tr>
<tr>
<td></td>
<td>The selected unit applies for:</td>
<td></td>
<td>• lb/ft³</td>
</tr>
<tr>
<td></td>
<td>• Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Simulation process variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Density adjustment (Expert menu)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference density unit</td>
<td>Select reference density unit.</td>
<td>Unit choose list</td>
<td>Country-dependent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• kg/Nl</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• lb/St³</td>
</tr>
</tbody>
</table>
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC address</td>
<td>Displays the MAC address of the measuring device.</td>
<td>Unique 12-digit character string comprising letters and numbers, e.g.: 00:07:05:10:01:5F</td>
<td>Each measuring device is given an individual address.</td>
</tr>
</tbody>
</table>

#### 10.5.3 Displaying the communication interface

The Communication submenu shows all the current parameter settings for selecting and configuring the communication interface.

**Navigation**

"Setup" menu → Communication

![Communication](#)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC address</td>
<td>Displays the MAC address of the measuring device.</td>
<td>Unique 12-digit character string comprising letters and numbers, e.g.: 00:07:05:10:01:5F</td>
<td>Each measuring device is given an individual address.</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address of the Web server integrated in the measuring device. If the DHCP client is switched off and write access is enabled, the IP address can also be entered.</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
<td>192.168.1.212</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td>User interface / User entry</td>
<td>Factory setting</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Subnet mask</td>
<td>Displays the subnet mask. If the DHCP client is switched off and write access is enabled, the Subnet mask can also be entered.</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Default gateway</td>
<td>Displays the default gateway. If the DHCP client is switched off and write access is enabled, the Default gateway can also be entered.</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
<td>0.0.0.0</td>
</tr>
</tbody>
</table>
10.5.4 Selecting and setting the medium

The Select medium wizard submenu contains parameters that must be configured in order to select and set the medium.

Navigation

"Setup" menu → Select medium

<table>
<thead>
<tr>
<th>Medium selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select medium</td>
</tr>
<tr>
<td>Select gas type</td>
</tr>
<tr>
<td>Reference sound velocity</td>
</tr>
<tr>
<td>Temperature coefficient sound velocity</td>
</tr>
<tr>
<td>Pressure compensation</td>
</tr>
<tr>
<td>Pressure value</td>
</tr>
<tr>
<td>External pressure</td>
</tr>
</tbody>
</table>
## Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select medium</td>
<td></td>
<td>Select medium type.</td>
<td>Liquid / Gas</td>
<td>Liquid</td>
</tr>
<tr>
<td>Reference sound velocity</td>
<td>In the <strong>Select gas type</strong> parameter, the <strong>Others</strong> option is selected.</td>
<td>Enter sound velocity of gas at 0 °C (32 °F).</td>
<td>1 to 99999.9999 m/s</td>
<td>415.0 m/s</td>
</tr>
<tr>
<td>Temperature coefficient sound velocity</td>
<td>The <strong>Others</strong> option is selected in the <strong>Select gas type</strong> parameter.</td>
<td>Enter temperature coefficient for the gas sound velocity.</td>
<td>Positive floating-point number</td>
<td>0 (m/s)/K</td>
</tr>
<tr>
<td>Pressure compensation</td>
<td></td>
<td>Select pressure compensation type.</td>
<td><strong>•</strong> Off / Fixed value / External value / Current input 1 * / Current input 2 * / Current input 3 *</td>
<td>Off</td>
</tr>
<tr>
<td>Pressure value</td>
<td>The <strong>Fixed value</strong> option or the <strong>Current input 1...n</strong> option is selected in the <strong>Pressure compensation</strong> parameter.</td>
<td>Enter process pressure to be used for pressure correction.</td>
<td>Positive floating-point number</td>
<td>1.01325 bar</td>
</tr>
<tr>
<td>External pressure</td>
<td>The <strong>Fixed value</strong> option or the <strong>Current input 1...n</strong> option is selected in the <strong>Pressure compensation</strong> parameter.</td>
<td>Shows the external process pressure value.</td>
<td>Positive floating-point number</td>
<td>1.01325 bar</td>
</tr>
</tbody>
</table>

* Visiblity depends on order options or device settings

### 10.5.5 Displaying the I/O configuration

The **I/O configuration** submenu guides the user systematically through all the parameters in which the configuration of the I/O modules is displayed.
Navigation

"Setup" menu → I/O configuration

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface / Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O module 1 to n terminal numbers</td>
<td>Shows the terminal numbers used by the I/O module.</td>
<td>• Not used</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 26-27 (I/O 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 24-25 (I/O 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 22-23 (I/O 3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 20-21 (I/O 4)</td>
<td></td>
</tr>
<tr>
<td>I/O module 1 to n information</td>
<td>Shows information of the plugged I/O module.</td>
<td>• Not plugged</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Invalid</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not configurable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Configurable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PROFINET</td>
<td></td>
</tr>
<tr>
<td>I/O module 1 to n type</td>
<td>Shows the I/O module type.</td>
<td>• Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current input</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Status input</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pulse/frequency/switch output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Double pulse output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Relay output</td>
<td></td>
</tr>
<tr>
<td>Apply I/O configuration</td>
<td>Apply parameterization of the freely configurable I/O module.</td>
<td>• No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Yes</td>
<td></td>
</tr>
<tr>
<td>I/O alteration code</td>
<td>Enter the code in order to change the I/O configuration.</td>
<td>Positive integer</td>
<td>0</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

10.5.6 Configuring the current input

The "Current input" wizard guides the user systematically through all the parameters that have to be set for configuring the current input.
**Navigation**

*Setup* menu → Current input

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface / Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal number</td>
<td>-</td>
<td>Shows the terminal numbers used by the current input module.</td>
<td>Not used, 24-25 (I/O 2), 22-23 (I/0 3), 20-21 (I/0 4)</td>
<td>-</td>
</tr>
<tr>
<td>Signal mode</td>
<td></td>
<td>Select the signal mode for the current input.</td>
<td>Passive, Active*</td>
<td>Active</td>
</tr>
<tr>
<td>0/4 mA value</td>
<td>-</td>
<td>Enter 4 mA value.</td>
<td>Signed floating-point number</td>
<td>0</td>
</tr>
<tr>
<td>20 mA value</td>
<td>-</td>
<td>Enter 20 mA value.</td>
<td>Signed floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Current span</td>
<td>-</td>
<td>Select current range for process value output and upper/lower level for alarm signal.</td>
<td>4...20 mA (4...20.5 mA), 4...20 mA NAMUR (3.8...20.5 mA), 4...20 mA US (3.9...20.8 mA), 0...20 mA (0...20.5 mA)</td>
<td>Country-specific: 4...20 mA NAMUR (3.8...20.5 mA), 4...20 mA US (3.9...20.8 mA)</td>
</tr>
<tr>
<td>Failure mode</td>
<td>-</td>
<td>Define input behavior in alarm condition.</td>
<td>Alarm, Last valid value, Defined value</td>
<td>Alarm</td>
</tr>
<tr>
<td>Failure value</td>
<td>In the Failure mode parameter, the Defined value option is selected.</td>
<td>Enter value to be used by the device if input value from external device is missing.</td>
<td>Signed floating-point number</td>
<td>0</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
10.5.7 Configuring the status input

The **Status input** submenu guides the user systematically through all the parameters that have to be set for configuring the status input.

**Navigation**
"Setup" menu → Status input

![Status input 1 to n](image)

- **Assign status input**
- **Terminal number**
- **Active level**
- **Terminal number**
- **Response time status input**
- **Terminal number**

**Parameter overview with brief description**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface / Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Terminal number         | Shows the terminal numbers used by the status input module.                 | • Not used  
• 24-25 (I/O 2)  
• 22-23 (I/O 3)  
• 20-21 (I/O 4) | – |
| Assign status input     | Select function for the status input.                                       | • Off  
• Reset totalizer 1  
• Reset totalizer 2  
• Reset totalizer 3  
• Reset all totalizers  
• Flow override  
• Zero point adjustment | Off |
| Active level            | Define input signal level at which the assigned function is triggered.      | • High  
• Low | High |
| Response time status input | Define the minimum amount of time the input signal level must be present before the selected function is triggered. | 5 to 200 ms | 50 ms |

10.5.8 Configuring the current output

The **Current output** wizard guides you systematically through all the parameters that have to be set for configuring the current output.
Navigation

‘Setup’ menu → Current output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface / Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Terminal number | – | Shows the terminal numbers used by the current output module. | • Not used  
• 24-25 (I/O 2)  
• 22-23 (I/O 3)  
• 20-21 (I/O 4) | – |
| Signal mode | – | Select the signal mode for the current output. | • Active *  
• Passive * | Active |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface / Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Assign current output 1 to n   | –            | Select process variable for current output.                                | • Off †  
• Mass flow  
• Volume flow  
• Corrected volume flow  
• Target mass flow †  
• Carrier mass flow †  
• Target volume flow †  
• Carrier volume flow †  
• Target corrected volume flow †  
• Carrier corrected volume flow †  
• Density  
• Reference density †  
• Concentration †  
• Temperature  
• Carrier pipe temperature †  
• Electronic temperature  
• Oscillation frequency 0  
• Oscillation amplitude 0 †  
• Frequency fluctuation 0 †  
• Oscillation damping 0 †  
• Oscillation damping fluctuation 0 †  
• Signal asymmetry †  
• Exciter current 0 †  
• HSSI †  
• Pressure †  
• Application specific output 0 †  
• Application specific output 1 †  
• Index inhomogeneous medium  
• Index suspended bubbles † | Mass flow |
| Current span                   | –            | Select current range for process value output and upper/lower level for alarm signal. | • 4...20 mA NAMUR (3.8...20.5 mA)  
• 4...20 mA US (3.9...20.8 mA)  
• 4...20 mA (4... 20.5 mA)  
• 0...20 mA (0... 20.5 mA)  
• Fixed current | Country-specific:  
• 4...20 mA NAMUR (3.8...20.5 mA)  
• 4...20 mA US (3.9...20.8 mA) |
| 0/4 mA value                   | In the Current span parameter  
(→ 122), one of the following options is selected:  
• 4...20 mA NAMUR (3.8...20.5 mA)  
• 4...20 mA US (3.9...20.8 mA)  
• 4...20 mA (4... 20.5 mA)  
• 0...20 mA (0... 20.5 mA) | Enter 4 mA value. | Signed floating-point number | Country-specific:  
• 0 kg/h  
• 0 lb/min |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface / Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 mA value</td>
<td>One of the following options is selected in the <strong>Current span</strong> parameter (→  122):</td>
<td>Enter 20 mA value.</td>
<td>Signed floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA NAMUR (3.8...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA US (3.9...20.8 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA (4...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0...20 mA (0...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed current</td>
<td>The <strong>Fixed current</strong> option is selected in the <strong>Current span</strong> parameter (→  122).</td>
<td>Defines the fixed output current.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damping output 1 to n</td>
<td>A process variable is selected in the <strong>Assign current output</strong> parameter (→  122) and one of the following options is selected in the <strong>Current span</strong> parameter (→  122):</td>
<td>Set reaction time for output signal to fluctuations in the measured value.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA NAMUR (3.8...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA US (3.9...20.8 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA (4...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0...20 mA (0...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure mode</td>
<td>A process variable is selected in the <strong>Assign current output</strong> parameter (→  122) and one of the following options is selected in the <strong>Current span</strong> parameter (→  122):</td>
<td>Define output behavior in alarm condition.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA NAMUR (3.8...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA US (3.9...20.8 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA (4...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0...20 mA (0...20.5 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure current</td>
<td>The <strong>Defined value</strong> option is selected in the <strong>Failure mode</strong> parameter.</td>
<td>Enter current output value in alarm condition.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Visibility depends on order options or device settings*
10.5.9 Configuring the pulse/frequency/switch output

The Pulse/frequency/switch output wizard guides you systematically through all the parameters that can be set for configuring the selected output type.

Navigation
"Setup" menu → Advanced setup → Pulse/frequency/switch output

![Pulse/frequency/switch output wizard](image)

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Operating mode     | Define the output as a pulse, frequency or switch output. | • Pulse  
• Frequency  
• Switch | Pulse |

Configuring the pulse output

Navigation
"Setup" menu → Pulse/frequency/switch output

![Pulse/frequency/switch output](image)
# Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User interface / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating mode</td>
<td>–</td>
<td>Define the output as a pulse, frequency or switch output.</td>
<td>• Pulse</td>
<td>Pulse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Frequency</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Switch</td>
<td></td>
</tr>
<tr>
<td>Terminal number</td>
<td>–</td>
<td>Shows the terminal numbers used by the PFS output module.</td>
<td>• Not used</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 24-25 (I/O 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 22-23 (I/O 3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 20-21 (I/O 4)</td>
<td></td>
</tr>
<tr>
<td>Signal mode</td>
<td>–</td>
<td>Select the signal mode for the PFS output.</td>
<td>• Passive</td>
<td>Passive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Active</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Passive NAMUR</td>
<td></td>
</tr>
<tr>
<td>Assign pulse output 1 to n</td>
<td>The Pulse option is selected in the Operating mode parameter.</td>
<td>Select process variable for pulse output.</td>
<td>• Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Corrected volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Target mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Carrier mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Target volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Carrier volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Target corrected volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Carrier corrected volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Target mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Carrier mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Carrier volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Carrier corrected volume flow</td>
<td></td>
</tr>
<tr>
<td>Pulse scaling</td>
<td>The Pulse option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign pulse output parameter (→ 125).</td>
<td>Enter quantity for measured value at which a pulse is output.</td>
<td>Positive floating point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Pulse width</td>
<td>The Pulse option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign pulse output parameter (→ 125).</td>
<td>Define time width of the output pulse.</td>
<td>0.05 to 2000 ms</td>
<td>100 ms</td>
</tr>
<tr>
<td>Failure mode</td>
<td>The Pulse option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign pulse output parameter (→ 125).</td>
<td>Define output behavior in alarm condition.</td>
<td>• Actual value</td>
<td>No pulses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• No pulses</td>
<td></td>
</tr>
<tr>
<td>Invert output signal</td>
<td>–</td>
<td>Invert the output signal.</td>
<td>• No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Yes</td>
<td></td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
Configuring the frequency output

Navigation

'Setup' menu → Pulse/frequency/switch output

Parameter overview with brief description

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</thead>
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<tr>
<td>Operating mode</td>
<td></td>
<td>Define the output as a pulse, frequency or switch output.</td>
<td>Pulse, Frequency, Switch</td>
<td>Pulse</td>
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<tr>
<td>Terminal number</td>
<td></td>
<td>Shows the terminal numbers used by the PFS output module.</td>
<td>Not used, 24-25 (I/O 2), 22-23 (I/O 3), 20-21 (I/O 4)</td>
<td>-</td>
</tr>
<tr>
<td>Signal mode</td>
<td></td>
<td>Select the signal mode for the PFS output.</td>
<td>Passive, Active, Passive NAMUR</td>
<td>Passive</td>
</tr>
</tbody>
</table>
### Assign frequency output

Parameter: Assign frequency output  
Prerequisite: The Frequency option is selected in the **Operating mode** parameter (→ § 124).  
Description: Select process variable for frequency output.  
Selection / User interface / User entry:  
- Off  
- Mass flow  
- Volume flow  
- Corrected volume flow  
- Target mass flow  
- Carrier mass flow  
- Target volume flow  
- Carrier volume flow  
- Target corrected volume flow  
- Carrier corrected volume flow  
- Density  
- Reference density  
- Concentration  
- Temperature  
- Carrier pipe temperature  
- Electronic temperature  
- Oscillation frequency 0  
- Oscillation amplitude 0*  
- Frequency fluctuation 0*  
- Oscillation damping 0  
- Oscillation damping fluctuation 0*  
- Signal asymmetry*  
- Exciter current 0*  
- HBSI  
- Pressure  
- Application specific output 0  
- Application specific output 1*  
- Index inhomogeneous medium  
- Index suspended bubbles*  
Factory setting: Off

Minimum frequency value

Parameter: Minimum frequency value  
Prerequisite: The Frequency option is selected in the **Operating mode** parameter (→ § 124) and a process variable is selected in the Assign frequency output parameter (→ § 127).  
Description: Enter minimum frequency.  
Selection / User interface / User entry:  
- 0.0 to 10000.0 Hz  
Factory setting: 0.0 Hz

Maximum frequency value

Parameter: Maximum frequency value  
Prerequisite: The Frequency option is selected in the **Operating mode** parameter (→ § 124) and a process variable is selected in the Assign frequency output parameter (→ § 127).  
Description: Enter maximum frequency.  
Selection / User interface / User entry:  
- 0.0 to 10000.0 Hz  
Factory setting: 10000.0 Hz
### Parameter | Prerequisite | Description | Selection / User interface / User entry | Factory setting
--- | --- | --- | --- | ---
Measuring value at minimum frequency | The Frequency option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign frequency output parameter (→ 127). | Enter measured value for minimum frequency. | Signed floating-point number | Depends on country and nominal diameter

Measuring value at maximum frequency | The Frequency option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign frequency output parameter (→ 127). | Enter measured value for maximum frequency. | Signed floating-point number | Depends on country and nominal diameter

Failure mode | The Frequency option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign frequency output parameter (→ 127). | Define output behavior in alarm condition. | • Actual value • Defined value • 0 Hz | 0 Hz

Failure frequency | The Frequency option is selected in the Operating mode parameter (→ 124) and a process variable is selected in the Assign frequency output parameter (→ 127). | Enter frequency output value in alarm condition. | 0.0 to 12 500.0 Hz | 0.0 Hz

Invert output signal | – | Invert the output signal. | • No • Yes | No

* Visibility depends on order options or device settings
Configuring the switch output

Navigation
'Setup' menu → Pulse/frequency/switch output

Parameter overview with brief description

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</thead>
<tbody>
<tr>
<td>Operating mode</td>
<td>–</td>
<td>Define the output as a pulse, frequency or switch output.</td>
<td>● Pulse</td>
<td>Pulse</td>
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<td></td>
<td></td>
<td></td>
<td>● Frequency</td>
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<td></td>
<td></td>
<td>● Switch</td>
<td></td>
</tr>
<tr>
<td>Terminal number</td>
<td>–</td>
<td>Shows the terminal numbers used by the PFS output module.</td>
<td>● Not used</td>
<td>–</td>
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<tr>
<td></td>
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<td></td>
<td>● 24-25 (I/O 2)</td>
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<td>● 22-23 (I/O 3)</td>
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<td></td>
<td>● 20-21 (I/O 4)</td>
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<tr>
<td>Signal mode</td>
<td>–</td>
<td>Select the signal mode for the PFS output.</td>
<td>● Passive</td>
<td>Passive</td>
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<td></td>
<td>● Active</td>
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<td>● Passive NAMUR</td>
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</tr>
<tr>
<td>Parameter</td>
<td>Prerequisite</td>
<td>Description</td>
<td>Selection / User interface / User entry</td>
<td>Factory setting</td>
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<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------</td>
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<td>-----------------</td>
</tr>
<tr>
<td>Switch output function</td>
<td>The <strong>Switch</strong> option is selected in the <strong>Operating mode</strong> parameter.</td>
<td>Select function for switch output.</td>
<td>• Off</td>
<td>Off</td>
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<td></td>
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<td>• On</td>
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<td></td>
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<td>• Diagnostic behavior</td>
<td></td>
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<td>• Limit</td>
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<td></td>
<td>• Flow direction check</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>• Status</td>
<td></td>
</tr>
<tr>
<td>Assign diagnostic behavior</td>
<td>• In the <strong>Operating mode</strong> parameter, the <strong>Switch</strong> option is selected.</td>
<td>Select diagnostic behavior for switch output.</td>
<td>• Alarm</td>
<td>Alarm</td>
</tr>
<tr>
<td></td>
<td>• In the <strong>Switch output function</strong> parameter, the <strong>Diagnostic behavior</strong> option is selected.</td>
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<td>• Alarm or warning</td>
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<td></td>
<td>• Warning</td>
<td></td>
</tr>
<tr>
<td>Assign limit</td>
<td>• The <strong>Switch</strong> option is selected in the <strong>Operating mode</strong> parameter.</td>
<td>Select process variable for limit function.</td>
<td>• Mass flow</td>
<td>Mass flow</td>
</tr>
<tr>
<td></td>
<td>• The <strong>Limit</strong> option is selected in the <strong>Switch output function</strong> parameter.</td>
<td></td>
<td>• Volume flow</td>
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<td>• Corrected volume flow</td>
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<td>• Target mass flow</td>
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<td>• Carrier mass flow</td>
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<td>• Carrier corrected volume flow</td>
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<td>• Density</td>
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<td>• Reference density</td>
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<td>• Concentration</td>
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<td>• Temperature</td>
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<td>• Totalizer 1</td>
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<td>• Totalizer 2</td>
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<td>• Totalizer 3</td>
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<td>• Oscillation damping</td>
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<td>• Pressure</td>
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<td>• Application specific output 0</td>
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<td>• Application specific output 1</td>
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<td></td>
<td></td>
<td></td>
<td>• Index inhomogeneous medium</td>
<td></td>
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<td></td>
<td></td>
<td>• Index suspended bubbles</td>
<td></td>
</tr>
<tr>
<td>Assign flow direction check</td>
<td>• The <strong>Switch</strong> option is selected in the <strong>Operating mode</strong> parameter.</td>
<td>Select process variable for flow direction monitoring.</td>
<td>• Off</td>
<td>Mass flow</td>
</tr>
<tr>
<td></td>
<td>• The <strong>Flow direction check</strong> option is selected in the <strong>Switch output function</strong> parameter.</td>
<td></td>
<td>• Volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Corrected volume flow</td>
<td></td>
</tr>
<tr>
<td>Assign status</td>
<td>• The <strong>Switch</strong> option is selected in the <strong>Operating mode</strong> parameter.</td>
<td>Select device status for switch output.</td>
<td>• Partially filled pipe detection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The <strong>Status</strong> option is selected in the <strong>Switch output function</strong> parameter.</td>
<td></td>
<td>• Low flow cut off</td>
<td></td>
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<td></td>
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<td></td>
<td>• Profinet Slot 24</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Profinet Slot 25</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Profinet Slot 26</td>
<td></td>
</tr>
</tbody>
</table>
## Parameter

### Switch-on value
- **Prerequisite**: The **Switch** option is selected in the **Operating mode** parameter. The **Limit** option is selected in the **Switch output function** parameter.
- **Description**: Enter measured value for the switch-on point.
- **Selection / User interface / User entry**: Signed floating-point number
- **Factory setting**: Country-specific: 0 kg/h, 0 lb/min

### Switch-off value
- **Prerequisite**: The **Switch** option is selected in the **Operating mode** parameter. The **Limit** option is selected in the **Switch output function** parameter.
- **Description**: Enter measured value for the switch-off point.
- **Selection / User interface / User entry**: Signed floating-point number
- **Factory setting**: Country-specific: 0 kg/h, 0 lb/min

### Switch-on delay
- **Prerequisite**: The **Switch** option is selected in the **Operating mode** parameter. The **Limit** option is selected in the **Switch output function** parameter.
- **Description**: Define delay for the switch-on of status output.
- **Selection / User interface / User entry**: 0.0 to 100.0 s
- **Factory setting**: 0.0 s

### Switch-off delay
- **Prerequisite**: The **Switch** option is selected in the **Operating mode** parameter. The **Limit** option is selected in the **Switch output function** parameter.
- **Description**: Define delay for the switch-off of status output.
- **Selection / User interface / User entry**: 0.0 to 100.0 s
- **Factory setting**: 0.0 s

### Failure mode
- **Description**: Define output behavior in alarm condition.
- **Selection / User interface / User entry**: Actual status, Open, Closed
- **Factory setting**: Open

### Invert output signal
- **Description**: Invert the output signal.
- **Selection / User interface / User entry**: No, Yes
- **Factory setting**: No

*Visibility depends on order options or device settings*

### 10.5.10 Configuring the relay output

The **Relay output** wizard guides the user systematically through all the parameters that have to be set for configuring the relay output.

**Navigation**

'**Setup** menu → Relay output 1 to n'

---

### RelaisOutput 1 to n

- **Switch output function**
- **Assign flow direction check**
- **Assign limit**
- **Assign diagnostic behavior**
- **Assign status**
- **Switch-off value**
### Parameter overview with brief description

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<td>Relay output function</td>
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<td>Select the function for the relay output.</td>
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<td>Closed</td>
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<td>• Open</td>
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<td>• Diagnostic behavior</td>
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<td>• Limit</td>
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<td>• Flow direction check</td>
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<td></td>
<td>• Digital Output</td>
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<tr>
<td>Terminal number</td>
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<td>Shows the terminal numbers used by the relay output module.</td>
<td>• Not used</td>
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<td></td>
<td>• 24-25 (I/O 2)</td>
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<td>• 20-21 (I/O 4)</td>
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<tr>
<td>Assign flow direction check</td>
<td>In the Relay output function parameter, the Flow direction check option is selected.</td>
<td>Select process variable for flow direction monitoring.</td>
<td>• Off</td>
<td>Mass flow</td>
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<td>• Volume flow</td>
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<td>• Mass flow</td>
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<td>• Corrected volume flow</td>
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<tr>
<td>Assign limit</td>
<td>The Limit option is selected in the Relay output function parameter.</td>
<td>Select process variable for limit function.</td>
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<td>Mass flow</td>
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<td>• Volume flow</td>
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<td>• Target mass flow</td>
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<td>• Carrier mass flow</td>
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<td>• Carrier corrected volume flow</td>
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<td>• Oscillation damping</td>
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<td>• Pressure</td>
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<td>• Application specific output 0</td>
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<td>• Application specific output 1</td>
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<td>• Index inhomogeneous medium</td>
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<td>• Index suspended bubbles</td>
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<tr>
<td>Assign diagnostic behavior</td>
<td>In the Relay output function parameter, the Diagnostic behavior option is selected.</td>
<td>Select diagnostic behavior for switch output.</td>
<td>• Alarm</td>
<td>Alarm</td>
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<td>• Alarm or warning</td>
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<tr>
<td>Assign status</td>
<td>In the <strong>Relay output function</strong> parameter, the <strong>Digital Output</strong> option is selected.</td>
<td>Select device status for switch output.</td>
<td>[ ] Partially filled pipe detection</td>
<td>Partially filled pipe detection</td>
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<td>[ ] Profinet Slot 26</td>
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<tr>
<td>Switch-off value</td>
<td>In the <strong>Relay output function</strong> parameter, the <strong>Limit</strong> option is selected.</td>
<td>Enter measured value for the switch-off point.</td>
<td>Signed floating-point number</td>
<td>Country-specific:</td>
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<td></td>
<td></td>
<td></td>
<td>[ ] 0 kg/h</td>
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<td>[ ] 0 lb/min</td>
<td></td>
</tr>
<tr>
<td>Switch-off delay</td>
<td>In the <strong>Relay output function</strong> parameter, the <strong>Limit</strong> option is selected.</td>
<td>Define delay for the switch-off of status output.</td>
<td>0.0 to 100.0 s</td>
<td>0.0 s</td>
</tr>
<tr>
<td>Switch-on value</td>
<td>The <strong>Limit</strong> option is selected in the <strong>Relay output function</strong> parameter.</td>
<td>Enter measured value for the switch-on point.</td>
<td>Signed floating-point number</td>
<td>Country-specific:</td>
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<td></td>
<td></td>
<td></td>
<td>[ ] 0 kg/h</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] 0 lb/min</td>
<td></td>
</tr>
<tr>
<td>Switch-on delay</td>
<td>In the <strong>Relay output function</strong> parameter, the <strong>Limit</strong> option is selected.</td>
<td>Define delay for the switch-on of status output.</td>
<td>0.0 to 100.0 s</td>
<td>0.0 s</td>
</tr>
<tr>
<td>Failure mode</td>
<td></td>
<td>Define output behavior in alarm condition.</td>
<td>[ ] Actual status</td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] Open</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] Closed</td>
<td></td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

### 10.5.11 Configuring the local display

The **Display** wizard guides you systematically through all the parameters that can configured for configuring the local display.

**Navigation**

```
"Setup" menu → Display
```

---

**Display**

```
Format display → 134
Value 1 display → 134
0% bargraph value 1 → 134
100% bargraph value 1 → 135
Value 2 display → 135
Value 3 display → 135
0% bargraph value 3 → 135
100% bargraph value 3 → 135
Value 4 display → 135
```
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format display</td>
<td>A local display is provided.</td>
<td>Select how measured values are shown on the display.</td>
<td>1 value, max. size, 1 bargraph + 1 value, 2 values, 1 value large + 2 values, 4 values</td>
<td>1 value, max. size</td>
</tr>
<tr>
<td>Value 1 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>Mass flow, Volume flow, Corrected volume flow, Target mass flow, Carrier mass flow, Target volume flow, Carrier volume flow, Target corrected volume flow, Carrier corrected volume flow, Density, Reference density, Concentration, Temperature, Carrier pipe temperature, Electronic temperature, Oscillation frequency 0, Oscillation amplitude 0, Frequency fluctuation 0, Oscillation damping 0, Oscillation damping fluctuation 0, Signal asymmetry, Exciter current 0, Totalizer 1, Totalizer 2, Totalizer 3, Current output 1, Current output 2, Current output 3, Current output 4, Pressure, Application specific output 1, Index inhomogeneous medium, Application specific output 0, Index suspended bubbles</td>
<td>Mass flow</td>
</tr>
<tr>
<td>0% bargraph value 1</td>
<td>A local display is provided.</td>
<td>Enter 0% value for bar graph display.</td>
<td>Signed floating-point number, Country-specific: 0 kg/h, 0 lb/min</td>
<td></td>
</tr>
<tr>
<td>Parameter</td>
<td>Prerequisite</td>
<td>Description</td>
<td>Selection / User entry</td>
<td>Factory setting</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------</td>
<td>-------------</td>
<td>-------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>100% bargraph value 1</td>
<td>A local display is provided.</td>
<td>Enter 100% value for bar graph display.</td>
<td>Signed floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Value 2 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>For the picklist, see the Value 2 display parameter (→ 135)</td>
<td>None</td>
</tr>
<tr>
<td>Value 3 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>For the picklist, see the Value 2 display parameter (→ 135)</td>
<td>None</td>
</tr>
<tr>
<td>0% bargraph value 3</td>
<td>A selection was made in the Value 3 display parameter.</td>
<td>Enter 0% value for bar graph display.</td>
<td>Signed floating-point number</td>
<td>Country-specific: • 0 kg/h • 0 lb/min</td>
</tr>
<tr>
<td>100% bargraph value 3</td>
<td>A selection was made in the Value 3 display parameter.</td>
<td>Enter 100% value for bar graph display.</td>
<td>Signed floating-point number</td>
<td>0</td>
</tr>
<tr>
<td>Value 4 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>For the picklist, see the Value 2 display parameter (→ 135)</td>
<td>None</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
10.5.12 Configuring the low flow cut off

The Low flow cut off wizard systematically guides the user through all the parameters that must be set to configure low flow cut off.

Navigation
*Setup* menu → Low flow cut off

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td>-</td>
<td>Select process variable for low flow cut off.</td>
<td>• Off  • Mass flow  • Volume flow  • Corrected volume flow*</td>
<td>Mass flow</td>
</tr>
<tr>
<td>On value low flow cutoff</td>
<td>A process variable is selected in the Assign process variable parameter (→ 136).</td>
<td>Enter on value for low flow cut off.</td>
<td>Positive floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Off value low flow cutoff</td>
<td>A process variable is selected in the Assign process variable parameter (→ 136).</td>
<td>Enter off value for low flow cut off.</td>
<td>0 to 100.0 %</td>
<td>50 %</td>
</tr>
<tr>
<td>Pressure shock suppression</td>
<td>A process variable is selected in the Assign process variable parameter (→ 136).</td>
<td>Enter time frame for signal suppression (= active pressure shock suppression).</td>
<td>0 to 100 s</td>
<td>0 s</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
10.5.13 Configuring the partial filled pipe detection

The Partial filled pipe detection wizard guides you systematically through all parameters that have to be set for configuring the monitoring of the pipe filling.

Navigation
"Setup" menu → Partially filled pipe detection

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td>~</td>
<td>Select process variable for partially filled pipe detection.</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Low value partial filled pipe</td>
<td>A process variable is selected in the Assign process variable parameter (→ 137).</td>
<td>Enter lower limit value for deactivating partially filled pipe detection.</td>
<td>Signed floating-point number</td>
<td>200</td>
</tr>
<tr>
<td>detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High value partial filled pipe</td>
<td>A process variable is selected in the Assign process variable parameter (→ 137).</td>
<td>Enter upper limit value for deactivating partially filled pipe detection.</td>
<td>Signed floating-point number</td>
<td>6000</td>
</tr>
<tr>
<td>detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time part. filled pipe</td>
<td>A process variable is selected in the Assign process variable parameter (→ 137).</td>
<td>Enter time before diagnostic message is displayed for partially filled pipe detection.</td>
<td>0 to 100 s</td>
<td>1 s</td>
</tr>
<tr>
<td>detect.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.6 Advanced settings

The Advanced setup submenu together with its submenus contains parameters for specific settings.

Navigation to the 'Advanced setup' submenu

The number of submenus can vary depending on the device version. Some submenus are not dealt with in the Operating Instructions. These submenus and the parameters they contain are explained in the Special Documentation for the device.

Navigation
'Setup' menu → Advanced setup
10.6.1 Using the parameter to enter the access code

Navigation
'Setup' menu → Advanced setup

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter access code</td>
<td>Enter access code to disable write protection of parameters.</td>
<td>Max. 16-digit character string comprising numbers, letters and special characters</td>
</tr>
</tbody>
</table>

10.6.2 Calculated values

The Calculated values submenu contains parameters for calculating the corrected volume flow.

Navigation
'Setup' menu → Advanced setup → Calculated values

<table>
<thead>
<tr>
<th>Corrected volume flow calculation</th>
<th>→ 140</th>
</tr>
</thead>
<tbody>
<tr>
<td>External reference density</td>
<td>→ 140</td>
</tr>
<tr>
<td>Fixed reference density</td>
<td>→ 140</td>
</tr>
<tr>
<td>Reference temperature</td>
<td>→ 140</td>
</tr>
<tr>
<td>Linear expansion coefficient</td>
<td>→ 140</td>
</tr>
<tr>
<td>Square expansion coefficient</td>
<td>→ 140</td>
</tr>
</tbody>
</table>
## Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User interface / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected volume flow calculation</td>
<td></td>
<td>Select reference density for calculating the corrected volume flow.</td>
<td>• Fixed reference density&lt;br&gt;• Calculated reference density&lt;br&gt;• External reference density&lt;br&gt;• Current input 1&lt;br&gt;• Current input 2&lt;br&gt;• Current input 3</td>
<td>Calculated reference density</td>
</tr>
<tr>
<td>External reference density</td>
<td>In the Corrected volume flow calculation parameter, the External reference density option is selected.</td>
<td>Shows external reference density.</td>
<td>Floating point number with sign</td>
<td></td>
</tr>
<tr>
<td>Fixed reference density</td>
<td>The Fixed reference density option is selected in the Corrected volume flow calculation parameter.</td>
<td>Enter fixed value for reference density.</td>
<td>Positive floating-point number</td>
<td>1 kg/Nl</td>
</tr>
</tbody>
</table>
| Reference temperature                        | The Calculated reference density option is selected in the Corrected volume flow calculation parameter. | Enter reference temperature for calculating the reference density.          | ~273.15 to 99999 °C                    | Country-specific:  
• +20 °C  
• +68 °F |
| Linear expansion coefficient                 | The Calculated reference density option is selected in the Corrected volume flow calculation parameter. | Enter linear, medium-specific expansion coefficient for calculating the reference density. | Signed floating-point number           | 0.0 1/K                         |
| Square expansion coefficient                 | The Calculated reference density option is selected in the Corrected volume flow calculation parameter. | For media with a non-linear expansion pattern: enter the quadratic, medium-specific expansion coefficient for calculating the reference density. | Signed floating-point number           | 0.0 1/K²                        |

* Visibility depends on order options or device settings

### 10.6.3 Carrying out a sensor adjustment

The **Sensor adjustment** submenu contains parameters that pertain to the functionality of the sensor.

**Navigation**

"Setup" menu → Advanced setup → Sensor adjustment
Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation direction</td>
<td>Set sign of flow direction to match the direction of the arrow on the sensor.</td>
<td>● Flow in arrow direction</td>
<td>Flow in arrow direction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Flow against arrow direction</td>
<td></td>
</tr>
</tbody>
</table>

Zero point adjustment

All measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions → 260. Therefore, a zero point adjustment in the field is generally not required.

Experience shows that zero point adjustment is advisable only in special cases:
- To achieve maximum measuring accuracy even with low flow rates.
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

Navigation
‘Setup’ menu → Advanced setup → Sensor adjustment → Zero point adjustment

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero point adjustment control</td>
<td>Start zero point adjustment.</td>
<td>● Cancel ● Start</td>
<td>Cancel</td>
</tr>
<tr>
<td>Progress</td>
<td>Shows the progress of the process.</td>
<td>0 to 100 %</td>
<td>~</td>
</tr>
</tbody>
</table>

10.6.4 Configuring the totalizer

In the "Totalizer 1 to n" submenu the individual totalizer can be configured.

Navigation
‘Setup’ menu → Advanced setup → Totalizer 1 to n

Totalizer 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td></td>
<td></td>
<td>→ 142</td>
</tr>
<tr>
<td>Unit totalizer</td>
<td></td>
<td></td>
<td>→ 142</td>
</tr>
<tr>
<td>Totalizer operation mode</td>
<td></td>
<td></td>
<td>→ 142</td>
</tr>
<tr>
<td>Failure mode</td>
<td></td>
<td></td>
<td>→ 142</td>
</tr>
</tbody>
</table>
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td>Select process variable for totalizer.</td>
<td>● Volume flow&lt;br&gt;● Mass flow&lt;br&gt;● Corrected volume flow&lt;br&gt;● Total mass flow&lt;br&gt;● Condensate mass flow&lt;br&gt;● Energy flow&lt;br&gt;● Heat flow difference</td>
<td>Volume flow</td>
</tr>
<tr>
<td>Unit totalizer</td>
<td>Select the unit for the process variable of the totalizer.</td>
<td>Unit choose list&lt;br&gt;Country-specific:&lt;br&gt;● kg&lt;br&gt;● lb</td>
<td></td>
</tr>
<tr>
<td>Totalizer operation mode</td>
<td>Select totalizer calculation mode.</td>
<td>● Net flow total&lt;br&gt;● Forward flow total&lt;br&gt;● Reverse flow total&lt;br&gt;● Last valid value</td>
<td>Net flow total</td>
</tr>
<tr>
<td>Failure mode</td>
<td>Define the totalizer behavior in the event of a device alarm.</td>
<td>● Stop&lt;br&gt;● Actual value&lt;br&gt;● Last valid value</td>
<td>Actual value</td>
</tr>
</tbody>
</table>
10.6.5  Carrying out additional display configurations

In the Display submenu you can set all the parameters associated with the configuration of the local display.

**Navigation**

“Setup” menu → Advanced setup → Display

![Display Configuration Settings](image_url)
## Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Format display                 | A local display is provided.        | Select how measured values are shown on the display.                      | • 1 value, max. size
  • 1 bargraph + 1 value
  • 2 values
  • 1 value large + 2 values
  • 4 values                                                                               | 1 value, max. size             |
| Value 1 display                | A local display is provided.        | Select the measured value that is shown on the local display.              | • Mass flow
  • Volume flow
  • Corrected volume flow
  • Target mass flow
  • Carrier mass flow
  • Target volume flow
  • Carrier volume flow
  • Target corrected volume flow
  • Carrier corrected volume flow
  • Density
  • Reference density
  • Concentration
  • Temperature
  • Carrier pipe temperature
  • Electronic temperature
  • Oscillation frequency
  • Oscillation amplitude
  • Frequency fluctuation
  • Oscillation damping
  • Oscillation damping fluctuation
  • Signal asymmetry
  • Exciter current
  • Totalizer 1
  • Totalizer 2
  • Totalizer 3
  • Current output 1
  • Current output 2
  • Current output 3
  • Current output 4
  • Pressure
  • Application specific output
  • Index inhomogeneous medium
  • Application specific output
  • Index suspended bubbles                                                                 | Mass flow                  |
| 0% bargraph value 1            | A local display is provided.        | Enter 0% value for bar graph display.                                      | Signed floating-point number                                                        | Country-specific:
  • 0 kg/h
  • 0 lb/min                                                      |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% bargraph value 1</td>
<td>A local display is provided.</td>
<td>Enter 100% value for bar graph display.</td>
<td>Signed floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Decimal places 1</td>
<td>A measured value is specified in the Value 1 display parameter.</td>
<td>Select the number of decimal places for the display value.</td>
<td>x, x.x, x.xx, x.xxx, x.xxxx</td>
<td>x.xx</td>
</tr>
<tr>
<td>Value 2 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>For the picklist, see the Value 2 display parameter (→ 135)</td>
<td>None</td>
</tr>
<tr>
<td>Decimal places 2</td>
<td>A measured value is specified in the Value 2 display parameter.</td>
<td>Select the number of decimal places for the display value.</td>
<td>x, x.x, x.xx, x.xxx, x.xxxx</td>
<td>x.xx</td>
</tr>
<tr>
<td>Value 3 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>For the picklist, see the Value 2 display parameter (→ 135)</td>
<td>None</td>
</tr>
<tr>
<td>0% bargraph value 3</td>
<td>A selection was made in the Value 3 display parameter.</td>
<td>Enter 0% value for bar graph display.</td>
<td>Signed floating-point number</td>
<td>Country-specific: 0 kg/h, 0 lb/min</td>
</tr>
<tr>
<td>100% bargraph value 3</td>
<td>A selection was made in the Value 3 display parameter.</td>
<td>Enter 100% value for bar graph display.</td>
<td>Signed floating-point number</td>
<td>0</td>
</tr>
<tr>
<td>Decimal places 3</td>
<td>A measured value is specified in the Value 3 display parameter.</td>
<td>Select the number of decimal places for the display value.</td>
<td>x, x.x, x.xx, x.xxx, x.xxxx</td>
<td>x.xx</td>
</tr>
<tr>
<td>Value 4 display</td>
<td>A local display is provided.</td>
<td>Select the measured value that is shown on the local display.</td>
<td>For the picklist, see the Value 2 display parameter (→ 135)</td>
<td>None</td>
</tr>
<tr>
<td>Decimal places 4</td>
<td>A measured value is specified in the Value 4 display parameter.</td>
<td>Select the number of decimal places for the display value.</td>
<td>x, x.x, x.xx, x.xxx, x.xxxx</td>
<td>x.xx</td>
</tr>
<tr>
<td>Display language</td>
<td>A local display is provided.</td>
<td>Set display language.</td>
<td></td>
<td>English (alternatively, the ordered language is preset in the device)</td>
</tr>
</tbody>
</table>

**Display language**

- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العربية (Arabic)
- Bahasa Indonesia
- ภาษาไทย (Thai)
- tiếng Việt (Vietnamese)
- čeština (Czech)
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display interval</td>
<td>A local display is provided.</td>
<td>Set time measured values are shown on display if display alternates between values.</td>
<td>1 to 10 s</td>
<td>5 s</td>
</tr>
<tr>
<td>Display damping</td>
<td>A local display is provided.</td>
<td>Set display reaction time to fluctuations in the measured value.</td>
<td>0.0 to 999.9 s</td>
<td>0.0 s</td>
</tr>
<tr>
<td>Header</td>
<td>A local display is provided.</td>
<td>Select header contents on local display.</td>
<td>• Device tag</td>
<td>Device tag</td>
</tr>
<tr>
<td>Header text</td>
<td>In the Header parameter, the Free text option is selected.</td>
<td>Enter display header text.</td>
<td>Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)</td>
<td>--------</td>
</tr>
<tr>
<td>Separator</td>
<td>A local display is provided.</td>
<td>Select decimal separator for displaying numerical values.</td>
<td>• . (point)</td>
<td>. (point)</td>
</tr>
<tr>
<td>Backlight</td>
<td>One of the following conditions is met: • Order code for 'Display; operation', option F'4-line, illum.; touch control' • Order code for 'Display; operation', option G'4-line, illum.; touch control +WLAN'</td>
<td>Switch the local display backlight on and off.</td>
<td>• Disable</td>
<td>Enable</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

## 10.6.6  WLAN configuration

The **WLAN Settings** submenu guides the user systematically through all the parameters that have to be set for the WLAN configuration.

**Navigation**

"Setup" menu → Advanced setup → WLAN settings

---

### WLAN settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>→ 147</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLAN</td>
<td></td>
</tr>
<tr>
<td>WLAN mode</td>
<td></td>
</tr>
<tr>
<td>SSID name</td>
<td></td>
</tr>
<tr>
<td>Network security</td>
<td></td>
</tr>
<tr>
<td>Security identification</td>
<td></td>
</tr>
<tr>
<td>User name</td>
<td></td>
</tr>
<tr>
<td>WLAN password</td>
<td></td>
</tr>
<tr>
<td>WLAN IP address</td>
<td></td>
</tr>
</tbody>
</table>
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLAN</td>
<td>–</td>
<td>Switch WLAN on and off.</td>
<td>• Disable</td>
<td>Enable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Enable</td>
<td></td>
</tr>
<tr>
<td>WLAN mode</td>
<td>–</td>
<td>Select WLAN mode.</td>
<td>• WLAN access point</td>
<td>WLAN access point</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• WLAN Client</td>
<td></td>
</tr>
<tr>
<td>SSID name</td>
<td>The client is activated.</td>
<td>Enter the user-defined SSID name (max. 32 characters).</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Network security</td>
<td>–</td>
<td>Select the security type of the WLAN network.</td>
<td>• Unsecured</td>
<td>WPA2-PSK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• WPA2-PSK</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• EAP-PEAP with MSCHAPv2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• EAP-PEAP MSCHAPv2 no server authentic. *</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• EAP-TLS *</td>
<td></td>
</tr>
<tr>
<td>Security identification</td>
<td>–</td>
<td>Select security settings and download these settings via menu Data management &gt; Security &gt; WLAN.</td>
<td>• Trusted issuer certificate</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Device certificate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Device private key</td>
<td></td>
</tr>
<tr>
<td>User name</td>
<td>–</td>
<td>Enter user name.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>WLAN password</td>
<td>–</td>
<td>Enter WLAN password.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>WLAN IP address</td>
<td>–</td>
<td>Enter IP address of the WLAN interface of the device.</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
<td>192.168.1.212</td>
</tr>
<tr>
<td>WLAN passphrase</td>
<td>The WPA2-PSK option is selected in the Security type parameter.</td>
<td>Enter the network key (8 to 32 characters).</td>
<td>8 to 32-digit character string compromising numbers, letters and special characters (without spaces)</td>
<td>Serial number of the measuring device (e.g. 1.100A6020000)</td>
</tr>
<tr>
<td>Assign SSID name</td>
<td>–</td>
<td>Select which name will be used for SSID: device tag or user-defined name.</td>
<td>• Device tag</td>
<td>User-defined</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• User-defined</td>
<td></td>
</tr>
</tbody>
</table>
### Configuration management

After commissioning, you can save the current device configuration or restore the previous device configuration.

You can do so using the **Configuration management** parameter and the related options found in the **Configuration backup** submenu.

**Navigation**

“Setup” menu → Advanced setup → Configuration backup

---

**Parameter overview with brief description**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface / Selection</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time</td>
<td>Indicates how long the device has been in operation.</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
<td>–</td>
</tr>
<tr>
<td>Last backup</td>
<td>Shows when the last data backup was saved to HistoROM backup.</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
<td>–</td>
</tr>
<tr>
<td>Configuration management</td>
<td>Select action for managing the device data in the HistoROM backup.</td>
<td>• Cancel&lt;br&gt;• Execute backup&lt;br&gt;• Restore&lt;br&gt;• Compare&lt;br&gt;• Clear backup data</td>
<td>Cancel</td>
</tr>
</tbody>
</table>
### Function scope of the "Configuration management" parameter

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Execute backup</td>
<td>A backup copy of the current device configuration is saved from the HistoROM backup to the memory of the device. The backup copy includes the transmitter data of the device.</td>
</tr>
<tr>
<td>Restore</td>
<td>The last backup copy of the device configuration is restored from the device memory to the device's HistoROM backup. The backup copy includes the transmitter data of the device.</td>
</tr>
<tr>
<td>Compare</td>
<td>The device configuration saved in the device memory is compared with the current device configuration of the HistoROM backup.</td>
</tr>
<tr>
<td>Clear backup data</td>
<td>The backup copy of the device configuration is deleted from the memory of the device.</td>
</tr>
</tbody>
</table>

*HistoROM backup*

A HistoROM is a "non-volatile" device memory in the form of an EEPROM.

While this action is in progress, the configuration cannot be edited via the local display and a message on the processing status appears on the display.

### 10.6.8 Using parameters for device administration

The **Administration** submenu systematically guides the user through all the parameters that can be used for device administration purposes.

**Navigation**

"Setup" menu → Advanced setup → Administration
Using the parameter to define the access code

Navigation
"Setup" menu → Advanced setup → Administration → Define access code

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define access code</td>
<td>Restrict write-access to parameters to protect the configuration of the device against unintentional changes.</td>
<td>Max. 16-digit character string comprising numbers, letters and special characters</td>
</tr>
<tr>
<td>Confirm access code</td>
<td>Confirm the entered access code.</td>
<td>Max. 16-digit character string comprising numbers, letters and special characters</td>
</tr>
</tbody>
</table>

Parameter overview with brief description

Using the parameter to reset the access code

Navigation
"Setup" menu → Advanced setup → Administration → Reset access code

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time</td>
<td>Indicates how long the device has been in operation.</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
<td>~</td>
</tr>
<tr>
<td>Reset access code</td>
<td>Reset access code to factory settings. For a reset code, contact your Endress+Hauser service organization. The reset code can only be entered via: Web browser, DeviceCare, FieldCare (via service interface CDI-RJ45), Fieldbus</td>
<td>Character string comprising numbers, letters and special characters</td>
<td>0x00</td>
</tr>
</tbody>
</table>

Using the parameter to reset the device

Navigation
"Setup" menu → Advanced setup → Administration
Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Selection</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device reset</td>
<td>Reset the device configuration - either entirely or in part - to a defined state.</td>
<td>• Cancel • To delivery settings • Restart device • Restore S-DAT backup</td>
<td>Cancel</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

## 10.7 Simulation

The **Simulation** submenu enables you to simulate, without a real flow situation, various process variables in the process and the device alarm mode and to verify downstream signal chains (switching valves or closed-control loops).

**Navigation**

"Diagnostics" menu → Simulation

```
<table>
<thead>
<tr>
<th>Simulation</th>
<th>Assign simulation process variable → 152</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Process variable value → 152</td>
</tr>
<tr>
<td></td>
<td>Status input simulation 1 to n → 152</td>
</tr>
<tr>
<td></td>
<td>Input signal level 1 to n → 152</td>
</tr>
<tr>
<td></td>
<td>Current input 1 to n simulation → 152</td>
</tr>
<tr>
<td></td>
<td>Value current input 1 to n → 152</td>
</tr>
<tr>
<td></td>
<td>Current output 1 to n simulation → 152</td>
</tr>
<tr>
<td></td>
<td>Value current output 1 to n → 152</td>
</tr>
<tr>
<td></td>
<td>Frequency output simulation 1 to n → 152</td>
</tr>
<tr>
<td></td>
<td>Frequency value 1 to n → 152</td>
</tr>
<tr>
<td></td>
<td>Pulse output simulation 1 to n → 153</td>
</tr>
<tr>
<td></td>
<td>Pulse value 1 to n → 153</td>
</tr>
<tr>
<td></td>
<td>Switch output simulation 1 to n → 153</td>
</tr>
<tr>
<td></td>
<td>Switch status 1 to n → 153</td>
</tr>
<tr>
<td></td>
<td>Relay output 1 to n simulation → 153</td>
</tr>
</tbody>
</table>
```
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign simulation process variable</td>
<td></td>
<td>Select a process variable for the simulation process that is activated.</td>
<td>● Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Corrected volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Target mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Carrier mass flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Target volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Carrier volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Target corrected volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Carrier corrected volume flow</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Density</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Reference density</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Concentration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enter the simulation value for the selected process variable.</td>
<td>Depends on the process variable selected</td>
<td></td>
</tr>
<tr>
<td>Process variable value</td>
<td>A process variable is selected in the Assign simulation process variable</td>
<td>Enter the simulation value for the selected process variable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>parameter (→ 152).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status input simulation 1 to n</td>
<td></td>
<td>Switch simulation of the status input on and off.</td>
<td>● Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● On</td>
<td></td>
</tr>
<tr>
<td>Input signal level 1 to n</td>
<td>In the Status input simulation parameter, the On option is selected.</td>
<td>Select the signal level for the simulation of the status input.</td>
<td>● High</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Low</td>
<td></td>
</tr>
<tr>
<td>Current input 1 to n simulation</td>
<td></td>
<td>Switch simulation of the current input on and off.</td>
<td>● Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● On</td>
<td></td>
</tr>
<tr>
<td>Value current input 1 to n simulation</td>
<td>In the Current input 1 to n simulation parameter, the On option is selected.</td>
<td>Enter the current value for simulation.</td>
<td>0 to 22.5 mA</td>
<td>0 mA</td>
</tr>
<tr>
<td>Current output 1 to n simulation</td>
<td></td>
<td>Switch the simulation of the current output on and off.</td>
<td>● Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● On</td>
<td></td>
</tr>
<tr>
<td>Value current output 1 to n</td>
<td>In the Current output 1 to n simulation parameter, the On option is selected.</td>
<td>Enter the current value for simulation.</td>
<td>3.59 to 22.5 mA</td>
<td>3.59 mA</td>
</tr>
<tr>
<td>Frequency output simulation 1 to n</td>
<td>In the Operating mode parameter, the Frequency option is selected.</td>
<td>Switch the simulation of the frequency output on and off.</td>
<td>● Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● On</td>
<td></td>
</tr>
<tr>
<td>Frequency value 1 to n</td>
<td>In the Frequency output simulation 1 to n parameter, the On option is selected.</td>
<td>Enter the frequency value for the simulation.</td>
<td>0.0 to 12 500.0 Hz</td>
<td>0.0 Hz</td>
</tr>
<tr>
<td>Parameter</td>
<td>Prerequisite</td>
<td>Description</td>
<td>Selection / User entry / User interface</td>
<td>Factory setting</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Pulse output simulation 1 to n</td>
<td>In the Operating mode parameter, the Pulse option is selected.</td>
<td>Set and switch off the pulse output simulation.</td>
<td>▪ Off ▪ Fixed value ▪ Down-counting value</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Fixed value option: Pulse width parameter (→ 125) defines the pulse width of the pulses output.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse value 1 to n</td>
<td>In the Pulse output simulation 1 to n parameter, the Down-counting value option is selected.</td>
<td>Enter the number of pulses for simulation.</td>
<td>0 to 65 535</td>
<td>0</td>
</tr>
<tr>
<td>Switch output simulation 1 to n</td>
<td>In the Operating mode parameter, the Switch option is selected.</td>
<td>Switch the simulation of the switch output on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td>Switch status 1 to n</td>
<td></td>
<td>Select the status of the status output for the simulation.</td>
<td>▪ Open ▪ Closed</td>
<td>Open</td>
</tr>
<tr>
<td>Relay output 1 to n simulation</td>
<td></td>
<td>Switch simulation of the relay output on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td>Switch status 1 to n</td>
<td>The On option is selected in the Switch output simulation 1 to n parameter parameter.</td>
<td>Select status of the relay output for the simulation.</td>
<td>▪ Open ▪ Closed</td>
<td>Open</td>
</tr>
<tr>
<td>Pulse output simulation</td>
<td></td>
<td>Set and switch off the pulse output simulation.</td>
<td>▪ Off ▪ Fixed value ▪ Down-counting value</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Fixed value option: Pulse width parameter defines the pulse width of the pulses output.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse value</td>
<td>In the Pulse output simulation parameter, the Down-counting value option is selected.</td>
<td>Set and switch off the pulse output simulation.</td>
<td>0 to 65 535</td>
<td>0</td>
</tr>
<tr>
<td>Device alarm simulation</td>
<td></td>
<td>Switch the device alarm on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td>Diagnostic event category</td>
<td></td>
<td>Select a diagnostic event category.</td>
<td>▪ Sensor ▪ Electronics ▪ Configuration ▪ Process</td>
<td>Process</td>
</tr>
<tr>
<td>Diagnostic event simulation</td>
<td></td>
<td>Select a diagnostic event to simulate this event.</td>
<td>▪ Off ▪ Diagnostic event picklist (depends on the category selected)</td>
<td>Off</td>
</tr>
<tr>
<td>Logging interval</td>
<td></td>
<td>Define the logging interval tlog for data logging. This value defines the time interval between the individual data points in the memory.</td>
<td>1.0 to 3 600.0 s</td>
<td>–</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
10.8  Protecting settings from unauthorized access

The following write protection options exist in order to protect the configuration of the measuring device from unintentional modification:

- Protect access to parameters via access code → 154
- Protect access to local operation via key locking → 83
- Protect access to measuring device via write protection switch → 155
- Protect access to parameters via startup configuration → 108

10.8.1  Write protection via access code

The effects of the user-specific access code are as follows:

- Via local operation, the parameters for the measuring device configuration are write-protected and their values can no longer be changed.
- Device access is protected via the Web browser, as are the parameters for the measuring device configuration.
- Device access is protected via FieldCare or DeviceCare (via CDI-RJ45 service interface), as are the parameters for the measuring device configuration.

Defining the access code via local display

1. Navigate to the Define access code parameter (→ 150).
2. Define a max. 16-digit character string comprising numbers, letters and special characters as the access code.
3. Enter the access code again in the Confirm access code parameter (→ 150) to confirm the code.
   - The ☐-symbol appears in front of all write-protected parameters.

The device automatically locks the write-protected parameters again if a key is not pressed for 10 minutes in the navigation and editing view. The device locks the write-protected parameters automatically after 60 s if the user skips back to the operational display mode from the navigation and editing view.

- If parameter write protection is activated via an access code, it can also only be deactivated via this access code → 82.
- The user role with which the user is currently logged on via the local display → 82 is indicated by the Access status parameter. Navigation path: Operation → Access status

Parameters which can always be modified via the local display

Certain parameters that do not affect the measurement are excepted from parameter write protection via the local display. Despite the user-specific access code, they can always be modified, even if the other parameters are locked.

<table>
<thead>
<tr>
<th>Parameters for configuring the local display</th>
<th>Parameters for configuring the totalizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Control Totalizer</td>
</tr>
<tr>
<td>Format display</td>
<td>Preset value</td>
</tr>
<tr>
<td>Contrast display</td>
<td>Reset all totalizers</td>
</tr>
<tr>
<td>Display interval</td>
<td></td>
</tr>
</tbody>
</table>

Defining the access code via the Web browser

1. Navigate to the Define access code parameter (→ 150).
2. Define a max. 16-digit numeric code as an access code.

3. Enter the access code again in the **Confirm access code** parameter (→ 150) to confirm the code.

   - The Web browser switches to the login page.

If no action is performed for 10 minutes, the Web browser automatically returns to the login page.

- If parameter write protection is activated via an access code, it can also only be deactivated via this access code → 82.
- The user role with which the user is currently logged on via Web browser is indicated by the **Access status** parameter. Navigation path: Operation → Access status

### Resetting the access code

If you misplace the user-specific access code, it is possible to reset the code to the factory setting. A reset code must be entered for this purpose. The user-specific access code can then be defined again afterwards.

**Via Web browser, FieldCare, DeviceCare (via CDI-RJ45 service interface), fieldbus**

For a reset code, contact your Endress+Hauser service organization.

1. Navigate to the **Reset access code** parameter (→ 150).
2. Enter the reset code.

   - The access code has been reset to the factory setting **0000**. It can be redefined → 154.

### 10.8.2 Write protection via write protection switch

Unlike parameter write protection via a user-specific access code, this allows write access to the entire operating menu - except for the **"Contrast display" parameter** - to be locked.

The parameter values are now read only and cannot be edited any more (exception "Contrast display" parameter):

- Via local display
- Via PROFINET protocol

### Proline 500 – digital

⚠️ **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)
1. Open the housing cover.
2. Remove the display module.
3. Fold open the terminal cover.
4. Setting the write protection (WP) switch on the main electronics module to the ON position enables hardware write protection.
   In the Locking status parameter the Hardware locked option is displayed → 158. In addition, on the local display the ≠-symbol appears in front of the parameters in the header of the operational display and in the navigation view.
5. Setting the write protection (WP) switch on the main electronics module to the OFF position (factory setting) disables hardware write protection.
   No option is displayed in the Locking status parameter → 158. On the local display, the ≠-symbol disappears from in front of the parameters in the header of the operational display and in the navigation view.
Proline 500

1. Setting the write protection (WP) switch on the main electronics module to the ON position enables hardware write protection.
   - In the Locking status parameter the Hardware locked option is displayed → 158. In addition, on the local display the -symbol appears in front of the parameters in the header of the operational display and in the navigation view.

2. Setting the write protection (WP) switch on the main electronics module to the OFF position (factory setting) disables hardware write protection.
   - No option is displayed in the Locking status parameter → 158. On the local display, the -symbol disappears from in front of the parameters in the header of the operational display and in the navigation view.
11 Operation

11.1 Reading the device locking status
Device active write protection: **Locking status** parameter

Operation → Locking status

Function scope of the 'Locking status' parameter

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The access status displayed in the Access status parameter applies → 82. Only appears on local display.</td>
</tr>
<tr>
<td>Hardware locked</td>
<td>The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) → 155.</td>
</tr>
<tr>
<td>Temporarily locked</td>
<td>Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.</td>
</tr>
</tbody>
</table>

11.2 Adjusting the operating language

Detailed information:

- To configure the operating language → 110
- For information on the operating languages supported by the measuring device → 271

11.3 Configuring the display

Detailed information:

- On the basic settings for the local display → 133
- On the advanced settings for the local display → 143

11.4 Reading measured values

With the **Measured values** submenu, it is possible to read all the measured values.

Navigation

'Diagnostics' menu → Measured values

<table>
<thead>
<tr>
<th>▶ Measured values</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Measured variables → 159</td>
</tr>
<tr>
<td>▶ Input values → 161</td>
</tr>
<tr>
<td>▶ Output values → 162</td>
</tr>
<tr>
<td>▶ Totalizer → 160</td>
</tr>
</tbody>
</table>
11.4.1 "Measured variables" submenu

The Measured variables submenu contains all the parameters needed to display the current measured values for each process variable.

Navigation
"Diagnostics" menu → Measured values → Measured variables

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow</td>
<td></td>
<td>Displays the mass flow that is currently measured.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Dependency</em> The unit is taken from the Mass flow unit parameter (→ 113).</td>
<td></td>
</tr>
<tr>
<td>Volume flow</td>
<td></td>
<td>Displays the volume flow currently calculated.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Dependency</em> The unit is taken from the Volume flow unit parameter (→ 113).</td>
<td></td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td></td>
<td>Displays the corrected volume flow that is currently calculated.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Dependency</em> The unit is taken from the Corrected volume flow unit parameter (→ 113).</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td></td>
<td>Shows the density currently measured.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Dependency</em> The unit is taken from the Density unit parameter (→ 113).</td>
<td></td>
</tr>
</tbody>
</table>
### Parameter | Prerequisite | Description | User interface
--- | --- | --- | ---
Reference density | – | Displays the reference density that is currently calculated.  
*Dependency*  
The unit is taken from the Reference density unit parameter (→ 113). | Signed floating-point number
Temperature | – | Shows the medium temperature currently measured.  
*Dependency*  
The unit is taken from the Temperature unit parameter (→ 114). | Signed floating-point number
Pressure value | – | Displays either a fixed or external pressure value.  
*Dependency*  
The unit is taken from the Pressure unit parameter (→ 114). | Signed floating-point number
Concentration | For the following order code: Order code for "Application package", option ED "Concentration"  
The software options currently enabled are displayed in the Software option overview parameter. | Displays the concentration that is currently calculated.  
*Dependency*  
The unit is taken from the Concentration unit parameter. | Signed floating-point number
Target mass flow | With the following conditions: Order code for "Application package", option ED "Concentration"  
The software options currently enabled are displayed in the Software option overview parameter. | Displays the mass flow that is currently measured for the target medium.  
*Dependency*  
The unit is taken from the Mass flow unit parameter (→ 113). | Signed floating-point number
Carrier mass flow | With the following conditions: Order code for "Application package", option ED "Concentration"  
The software options currently enabled are displayed in the Software option overview parameter. | Displays the mass flow that is currently measured for the carrier medium.  
*Dependency*  
The unit is taken from the Mass flow unit parameter (→ 113). | Signed floating-point number

### 11.4.2 Totalizer

The **Totalizer** submenu contains all the parameters needed to display the current measured values for every totalizer.

**Navigation**

"Diagnostics' menu → Measured values → Totalizer 1 to n

![Totalizer 1 to n](image)
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer value 1 to n</td>
<td>In the <strong>Assign process variable</strong> parameter one of the following options is selected: ▪ Volume flow ▪ Mass flow ▪ Corrected volume flow ▪ Total mass flow ▪ Condensate mass flow ▪ Energy flow ▪ Heat flow difference</td>
<td>Displays the current totalizer counter value.</td>
<td>Signed floating-point number</td>
<td>0 m³</td>
</tr>
<tr>
<td>Totalizer status 1 to n</td>
<td>–</td>
<td>Displays the current totalizer status.</td>
<td>▪ Good ▪ Uncertain ▪ Bad</td>
<td>–</td>
</tr>
<tr>
<td>Totalizer status (Hex) 1 to n</td>
<td>In <strong>Target mode</strong> parameter, the Auto option is selected.</td>
<td>Displays the current status value (hex) of the totalizer.</td>
<td>0 to 0xFF</td>
<td>–</td>
</tr>
</tbody>
</table>

#### 11.4.3 "Input values" submenu

The **Input values** submenu guides you systematically to the individual input values.

**Navigation**

'Diagnostics' menu → Measured values → Input values

Input values of current input

The **Current input 1 to n** submenu contains all the parameters needed to display the current measured values for every current input.
Navigation
"Diagnostics" menu → Measured values → Input values → Current input 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured values 1 to n</td>
<td>Displays the current input value.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Measured current 1 to n</td>
<td>Displays the current value of the current input.</td>
<td>0 to 22.5 mA</td>
</tr>
</tbody>
</table>

Input values of status input
The Status input 1 to n submenu contains all the parameters needed to display the current measured values for every status input.

Navigation
"Diagnostics" menu → Measured values → Input values → Status input 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
</table>
| Value status input        | Shows the current input signal level.             | • High
                                    |                                    | • Low |

11.4.4 Output values
The Output values submenu contains all the parameters needed to display the current measured values for every output.

Navigation
"Diagnostics" menu → Measured values → Output values

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output values</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Output values of current output

The Value current output submenu contains all the parameters needed to display the current measured values for every current output.

Navigation

'Diagnostics' menu → Measured values → Output values → Value current output 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output current 1</td>
<td>Displays the current value currently calculated for the current output.</td>
<td>3.59 to 22.5 mA</td>
</tr>
<tr>
<td>Measured current</td>
<td>Displays the current value currently measured for the current output.</td>
<td>0 to 30 mA</td>
</tr>
</tbody>
</table>

Output values for pulse/frequency/switch output

The Pulse/frequency/switch output 1 to n submenu contains all the parameters needed to display the current measured values for every pulse/frequency/switch output.

Navigation

'Diagnostics' menu → Measured values → Output values → Pulse/frequency/switch output 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output frequency 1 to n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse output 1 to n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch status 1 to n</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output frequency 1 to n</td>
<td>In the Operating mode parameter, the Frequency option is selected.</td>
<td>Displays the value currently measured for the frequency output.</td>
<td>0.0 to 12 500.0 Hz</td>
</tr>
<tr>
<td>Pulse output 1 to n</td>
<td>The Pulse option is selected in the Operating mode parameter parameter.</td>
<td>Displays the pulse frequency currently output.</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Switch status 1 to n</td>
<td>The Switch option is selected in the Operating mode parameter.</td>
<td>Displays the current switch output status.</td>
<td>• Open • Closed</td>
</tr>
</tbody>
</table>

Output values for relay output

The Relay output 1 to n submenu contains all the parameters needed to display the current measured values for every relay output.

Navigation

'Diagnostics' menu → Measured values → Output values → Relay output 1 to n

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch status</td>
<td>Shows the current relay switch status.</td>
<td>• Open • Closed</td>
</tr>
<tr>
<td>Switch cycles</td>
<td>Shows number of all performed switch cycles.</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Max. switch cycles number</td>
<td>Shows the maximal number of guaranteed switch cycles.</td>
<td>Positive integer</td>
</tr>
</tbody>
</table>

11.5 Adapting the measuring device to the process conditions

The following are available for this purpose:

- Basic settings using the Setup menu (→  111)
- Advanced settings using the Advanced setup submenu (→  138)

11.6 Performing a totalizer reset

The totalizers are reset in the Operation submenu:

- Control Totalizer
- Reset all totalizers
### Navigation

‘Operation’ menu → Totalizer handling

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Totalizer 1 to n</td>
<td>A process variable is selected in the Assign process variable parameter of the Totalizer 1 to n submenu.</td>
<td>Control totalizer value.</td>
<td>• Totalize</td>
<td>Totalize</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Reset + hold</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Preset + hold</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Reset + totalize</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Preset + totalize</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Hold</td>
<td></td>
</tr>
<tr>
<td>Preset value 1 to n</td>
<td>A process variable is selected in the Assign process variable parameter of the Totalizer 1 to n submenu.</td>
<td>Specify start value for totalizer.</td>
<td>Signed floating-point number</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dependecy</td>
<td>• 0 kg</td>
<td>0 lb</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 0 lb</td>
<td></td>
</tr>
<tr>
<td>Reset all totalizers</td>
<td>–</td>
<td>Reset all totalizers to 0 and start.</td>
<td>• Cancel</td>
<td>Cancel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Reset + totalize</td>
<td></td>
</tr>
</tbody>
</table>

### 11.6.1 Function scope of the "Control Totalizer" parameter

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalize</td>
<td>The totalizer is started or continues running.</td>
</tr>
<tr>
<td>Reset + hold</td>
<td>The totaling process is stopped and the totalizer is reset to 0.</td>
</tr>
<tr>
<td>Preset + hold</td>
<td>The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>The totalizer is reset to 0 and the totaling process is restarted.</td>
</tr>
<tr>
<td>Preset + totalize</td>
<td>The totalizer is set to the defined start value from the Preset value parameter and the totaling process is restarted.</td>
</tr>
<tr>
<td>Hold</td>
<td>Totalizing is stopped.</td>
</tr>
</tbody>
</table>

### 11.6.2 Function scope of the "Reset all totalizers" parameter

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.</td>
</tr>
</tbody>
</table>
11.7 Showing data logging

The Extended HistoROM application package must be enabled in the device (order option) for the Data logging submenu to appear. This contains all the parameters for the measured value history.

Data logging is also available via:
- Plant Asset Management Tool FieldCare → 94.
- Web browser

Function range
- A total of 1000 measured values can be stored
- 4 logging channels
- Adjustable logging interval for data logging
- Displays the measured value trend for each logging channel in the form of a chart

![Chart of a measured value trend](image)

- x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

If the length of the logging interval or the assignment of the process variables to the channels is changed, the content of the data logging is deleted.

Navigation
'Diagnostics' menu → Data logging

<table>
<thead>
<tr>
<th>Data logging</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign channel 1</td>
<td>→ 168</td>
</tr>
<tr>
<td>Assign channel 2</td>
<td>→ 168</td>
</tr>
<tr>
<td>Assign channel 3</td>
<td>→ 169</td>
</tr>
<tr>
<td>Assign channel 4</td>
<td>→ 169</td>
</tr>
<tr>
<td>Logging interval</td>
<td>→ 169</td>
</tr>
<tr>
<td>Clear logging data</td>
<td>→ 169</td>
</tr>
<tr>
<td>Data logging</td>
<td>→ 169</td>
</tr>
<tr>
<td>Logging delay</td>
<td>→ 169</td>
</tr>
<tr>
<td>Data logging control</td>
<td>→ 169</td>
</tr>
<tr>
<td>Data logging status</td>
<td>→ 169</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Entire logging duration</td>
<td>→ 169</td>
</tr>
<tr>
<td>▶ Display channel 1</td>
<td></td>
</tr>
<tr>
<td>▶ Display channel 2</td>
<td></td>
</tr>
<tr>
<td>▶ Display channel 3</td>
<td></td>
</tr>
<tr>
<td>▶ Display channel 4</td>
<td></td>
</tr>
</tbody>
</table>
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign channel 1</td>
<td>The <strong>Extended HistoROM</strong> application package is available.</td>
<td>Assign process variable to logging channel.</td>
<td>• Off&lt;br&gt;• Mass flow&lt;br&gt;• Volume flow&lt;br&gt;• Corrected volume flow&lt;br&gt;• Target mass flow&lt;br&gt;• Carrier mass flow&lt;br&gt;• Target volume flow&lt;br&gt;• Carrier volume flow&lt;br&gt;• Target corrected volume flow&lt;br&gt;• Carrier corrected volume flow&lt;br&gt;• Density&lt;br&gt;• Reference density&lt;br&gt;• Concentration&lt;br&gt;• Temperature&lt;br&gt;• Carrier pipe temperature&lt;br&gt;• Electronic temperature&lt;br&gt;• Oscillation frequency 0&lt;br&gt;• Oscillation amplitude&lt;br&gt;• Frequency fluctuation 0&lt;br&gt;• Oscillation damping 0&lt;br&gt;• Oscillation damping fluctuation 0&lt;br&gt;• Signal asymmetry&lt;br&gt;• Exciter current 0&lt;br&gt;• HSSI&lt;br&gt;• Current output 1&lt;br&gt;• Current output 2&lt;br&gt;• Current output 3&lt;br&gt;• Current output 4&lt;br&gt;• Pressure&lt;br&gt;• Application specific output 1&lt;br&gt;• Index inhomogeneous medium&lt;br&gt;• Application specific output 0&lt;br&gt;• Index suspended bubbles</td>
<td>Off</td>
</tr>
<tr>
<td>Assign channel 2</td>
<td>The <strong>Extended HistoROM</strong> application package is available.</td>
<td>Assign process variable to logging channel.</td>
<td>Picklist, see <strong>Assign channel 1</strong> parameter (→ 168)</td>
<td>Off</td>
</tr>
</tbody>
</table>

1 The software options currently enabled are displayed in the **Software option overview** parameter.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>Selection / User entry / User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign channel 3</td>
<td>The Extended HistoROM application package is available.</td>
<td>Assign process variable to logging channel.</td>
<td>Picklist, see Assign channel 1 parameter (→ 168)</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>[1] The software options currently enabled are displayed in the Software option overview parameter.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assign channel 4</td>
<td>The Extended HistoROM application package is available.</td>
<td>Assign process variable to logging channel.</td>
<td>Picklist, see Assign channel 1 parameter (→ 168)</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>[1] The software options currently enabled are displayed in the Software option overview parameter.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logging interval</td>
<td>The Extended HistoROM application package is available.</td>
<td>Define the logging interval for data logging. This value defines the time interval between the individual data points in the memory.</td>
<td>0.1 to 3 600.0 s</td>
<td>1.0 s</td>
</tr>
<tr>
<td>Clear logging data</td>
<td>The Extended HistoROM application package is available.</td>
<td>Clear the entire logging data.</td>
<td>• Cancel • Clear data</td>
<td>Cancel</td>
</tr>
<tr>
<td>Data logging</td>
<td>–</td>
<td>Select the data logging method.</td>
<td>• Overwriting • Not overwriting</td>
<td>Overwriting</td>
</tr>
<tr>
<td>Logging delay</td>
<td>In the Data logging parameter, the Not overwriting option is selected.</td>
<td>Enter the time delay for measured value logging.</td>
<td>0 to 999 h</td>
<td>0 h</td>
</tr>
<tr>
<td>Data logging control</td>
<td>In the Data logging parameter, the Not overwriting option is selected.</td>
<td>Start and stop measured value logging.</td>
<td>• None • Delete + start • Stop</td>
<td>None</td>
</tr>
<tr>
<td>Data logging status</td>
<td>In the Data logging parameter, the Not overwriting option is selected.</td>
<td>Displays the measured value logging status.</td>
<td>• Done • Delay active • Active • Stopped</td>
<td>Done</td>
</tr>
<tr>
<td>Entire logging duration</td>
<td>In the Data logging parameter, the Not overwriting option is selected.</td>
<td>Displays the total logging duration.</td>
<td>Positive floating-point number</td>
<td>0 s</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
# 12 Diagnostics and troubleshooting

## 12.1 General troubleshooting

*For local display*

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local display dark and no output signals</td>
<td>Supply voltage does not match the value indicated on the nameplate.</td>
<td>Apply the correct supply voltage.</td>
</tr>
<tr>
<td>Local display dark and no output signals</td>
<td>The polarity of the supply voltage is wrong.</td>
<td>Correct the polarity.</td>
</tr>
<tr>
<td>Local display dark and no output signals</td>
<td>No contact between connecting cables and terminals.</td>
<td>Check the connection of the cables and correct if necessary.</td>
</tr>
<tr>
<td>Local display dark and no output signals</td>
<td>Terminals are not plugged into the I/O electronics module correctly. Terminals are not plugged into the main electronics module correctly.</td>
<td>Check terminals.</td>
</tr>
<tr>
<td>Local display dark and no output signals</td>
<td>I/O electronics module is defective. Main electronics module is defective.</td>
<td>Order spare part → 244.</td>
</tr>
<tr>
<td>Local display dark and no output signals</td>
<td>The connector between the main electronics module and display module is not plugged in correctly.</td>
<td>Check the connection and correct if necessary.</td>
</tr>
<tr>
<td>Local display dark and no output signals</td>
<td>The connecting cable is not plugged in correctly.</td>
<td>1. Check the connection of the electrode cable and correct if necessary. 2. Check the connection of the coil current cable and correct if necessary.</td>
</tr>
<tr>
<td>Local display is dark, but signal output is within the valid range</td>
<td>Display is set too bright or too dark.</td>
<td>• Set the display brighter by simultaneously pressing ( \text{Home position} ) + ( \text{Display Brightness} ). • Set the display darker by simultaneously pressing ( \text{Home position} ) + ( \text{Display Brightness} ).</td>
</tr>
<tr>
<td>Local display is dark, but signal output is within the valid range</td>
<td>The cable of the display module is not plugged in correctly.</td>
<td>Insert the plug correctly into the main electronics module and display module.</td>
</tr>
<tr>
<td>Local display is dark, but signal output is within the valid range</td>
<td>Display module is defective.</td>
<td>Order spare part → 244.</td>
</tr>
<tr>
<td>Backlighting of local display is red</td>
<td>Diagnostic event with “Alarm” diagnostic behavior has occurred.</td>
<td>Take remedial measures → 185</td>
</tr>
<tr>
<td>Text on local display appears in a foreign language and cannot be understood.</td>
<td>Incorrect operating language is configured.</td>
<td>1. Press ( \text{Home position} ) + ( \text{Display Language} ) for 2 s. 2. Press ( \text{Display Language} ). 3. Set the desired language in the Display language parameter (→ 145).</td>
</tr>
<tr>
<td>Message on local display: “Communication Error” “Check Electronics”</td>
<td>Communication between the display module and the electronics is interrupted.</td>
<td>• Check the cable and the connector between the main electronics module and display module. • Order spare part → 244.</td>
</tr>
</tbody>
</table>
### For output signals

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal output outside the valid range</td>
<td>Main electronics module is defective.</td>
<td>Order spare part → 244.</td>
</tr>
<tr>
<td>Device shows correct value on local display, but signal output is incorrect, though in the valid range.</td>
<td>Configuration error</td>
<td>Check and correct the parameter configuration.</td>
</tr>
</tbody>
</table>
| Device measures incorrectly.                   | Configuration error or device is operated outside the application. | 1. Check and correct parameter configuration.  
|                                                |                                                     | 2. Observe limit values specified in the 'Technical Data'. |

### For access

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No write access to parameters</td>
<td>Hardware write protection enabled</td>
<td>Set the write protection switch on main electronics module to the OFF position → 155.</td>
</tr>
</tbody>
</table>
| No write access to parameters                   | Current user role has limited access authorization   | 1. Check user role → 82.                      
|                                                |                                                     | 2. Enter correct customer-specific access code → 82. |
| No connection via PROFINET                      | PROFINET bus cable connected incorrectly            | Check terminal assignment → 41.               |
| No connection via PROFINET                      | Device plug connected incorrectly                   | Check the pin assignment of the connector.    |
| Not connecting to Web server                    | Web server disabled                                  | Using the 'FieldCare' or 'DeviceCare' operating tool, check whether the Web server of the measuring device is enabled, and enable it if necessary → 89. |
|                                                | Incorrect setting for the Ethernet interface of the computer | 1. Check the properties of the Internet protocol (TCP/IP) → 85 → 85.  
|                                                |                                                     | 2. Check the network settings with the IT manager.  |
| Not connecting to Web server                    | • Incorrect IP address  
|                                                | • IP address is not known                           | 1. If addressing via hardware: open the transmitter and check the IP address configured (last octet).  
|                                                |                                                     | 2. Check the IP address of the measuring device with the network manager.  
|                                                |                                                     | 3. If the IP address is not known, set DIP switch no. 10 to ON, restart the device and enter the factory IP address 192.168.1.212. |
|                                                | Web browser setting "Use a Proxy Server for Your LAN" is enabled | Disable the use of the proxy server in the Web browser settings of the computer.  
|                                                |                                                     | Using the example of MS Internet Explorer:  
|                                                |                                                     | 1. Under Control Panel open Internet options.  
|                                                |                                                     | 2. Select the Connections tab and then double-click LAN settings.  
|                                                |                                                     | 3. In the LAN settings disable the use of the proxy server and select OK to confirm. |
### Error | Possible causes | Solution
--- | --- | ---
Apart from the active network connection to the measuring device, other network connections are also being used. | • Make sure that no other network connections are established by the computer (also no WLAN) and close other programs with network access to the computer. |  |
Not connecting to Web server | Incorrect WLAN access data | • Check WLAN network status.  
• Log on to the device again using WLAN access data.  
• Verify that WLAN is enabled on the measuring device and operating device → 85.  
WLAN communication disabled |  |
Not connecting to Web server, FieldCare or DeviceCare | No WLAN network available | • Check if WLAN reception is present: LED on display module is lit blue.  
• Check if WLAN connection is enabled: LED on display module flashes blue.  
• Switch on instrument function.  
|  |
Network connection not present or unstable | WLAN network is weak. | • Operating device is outside of reception range: Check network status on operating device.  
• To improve network performance, use an external WLAN antenna.  
|  |
Web browser frozen and operation no longer possible | Data transfer active | Wait until data transfer or current action is finished.  
| Connection lost | 1. Check cable connection and power supply.  
2. Refresh the Web browser and restart if necessary.  
|  |
Content of Web browser incomplete or difficult to read | Not using optimum version of Web server. | 1. Use the correct Web browser version → 84.  
2. Clear the Web browser cache and restart the Web browser.  
| Unsuitable view settings. | Change the font size/display ratio of the Web browser.  
|  |
No or incomplete display of contents in the Web browser | • JavaScript not enabled  
• JavaScript cannot be enabled | 1. Enable JavaScript.  
2. Enter http://XXX.XXX.X.XXX/basic.html as the IP address.  
|  |
Operation with FieldCare or DeviceCare via CDI-RJ45 service interface (port 8000) | Firewall of computer or network is preventing communication | Depending on the settings of the firewall used on the computer or in the network, the firewall must be adapted or disabled to allow FieldCare/DeviceCare access.  
|  |
Flashing of firmware with FieldCare or DeviceCare via CDI-RJ45 service interface (via port 8000 or TFTP ports) | Firewall of computer or network is preventing communication | Depending on the settings of the firewall used on the computer or in the network, the firewall must be adapted or disabled to allow FieldCare/DeviceCare access.  
|  |
For system integration

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The device name is not displayed correctly and contains coding.</td>
<td>A device name containing one or more underscores has been specified via the automation system.</td>
<td>Specify a correct device name (without underscores) via the automation system.</td>
</tr>
</tbody>
</table>

12.2 Diagnostic information via light emitting diodes

12.2.1 Transmitter

Proline 500 – digital

Different LEDs in the transmitter provide information on the device status.

1. Open the housing cover.
2. Remove the display module.
3. Fold open the terminal cover.

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Supply voltage</td>
<td>Off</td>
<td>Supply voltage is off or too low.</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>Supply voltage is ok.</td>
</tr>
<tr>
<td>2 Device status (normal operation)</td>
<td>Off</td>
<td>Firmware error</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>Device status is ok.</td>
</tr>
<tr>
<td></td>
<td>Flashing green</td>
<td>Device is not configured.</td>
</tr>
</tbody>
</table>
### Proline Promass A 500 PROFINET

#### Diagnostics and troubleshooting

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply voltage</td>
<td><strong>Off</strong> Supply voltage is off or too low.</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>Supply voltage is ok.</td>
</tr>
</tbody>
</table>
| 2   | Device status (normal operation) | **Off** Firmware error.  
**Green** Device status is ok. |
| 3   | Flashing/network status | **Green** Cyclic data exchange is active.  
**Flashing green** Following request from automation system: Flash frequency: 1 Hz (flash functionality: 500 ms on, 500 ms off)  
Cyclic data exchange is not active, no IP address is available: Flash frequency: 3 Hz  
**Red** IP address is available but there is no connection to the automation system.  
**Flashing red** Cyclic data exchange was active but the connection was disconnected: Flash frequency: 3 Hz |
| 4   | Port 1 active: PROFINET | **Off** Not connected or no connection established.  
**White** Connected and connection established.  
**Flashing white** Communication not active. |
| 5   | Port 2 active: PROFINET and service interface (CDI) | **Off** Not connected or no connection established.  
**Yellow** Connected and connection established.  
**Flashing yellow** Communication not active. |

Proline 500

Different LEDs in the transmitter provide information on the device status.

![Proline 500 LED diagram](image)
### Diagnostics and troubleshooting

#### LED

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flashing green</td>
<td>Device is not configured.</td>
</tr>
<tr>
<td></td>
<td>Flashing red</td>
<td>A diagnostic event with &quot;Warning&quot; diagnostic behavior has occurred.</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>A diagnostic event with &quot;Alarm&quot; diagnostic behavior has occurred.</td>
</tr>
<tr>
<td></td>
<td>Flashing red/green</td>
<td>The device restarts.</td>
</tr>
</tbody>
</table>

#### Device status (during start-up)

<table>
<thead>
<tr>
<th>2</th>
<th>Device status (during start-up)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flashes red slowly</td>
<td>If &gt; 30 seconds: problem with the boot loader.</td>
</tr>
<tr>
<td></td>
<td>Flashes red quickly</td>
<td>If &gt; 30 seconds: compatibility problem when reading the firmware.</td>
</tr>
</tbody>
</table>

#### Flashing/network status

<table>
<thead>
<tr>
<th>3</th>
<th>Flashing/network status</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green</td>
<td>Cyclic data exchange is active.</td>
</tr>
<tr>
<td></td>
<td>Flashing green</td>
<td>Following request from automation system:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flash frequency: 1 Hz (flash functionality: 500 ms on, 500 ms off)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cyclic data exchange is not active, no IP address is available:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flash frequency: 3 Hz</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>IP address is available but there is no connection to the automation system</td>
</tr>
<tr>
<td></td>
<td>Flashing red</td>
<td>Cyclic data exchange was active but the connection was disconnected:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flash frequency: 3 Hz</td>
</tr>
</tbody>
</table>

#### Port 1 active: PROFINET

<table>
<thead>
<tr>
<th>4</th>
<th>Port 1 active: PROFINET</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off</td>
<td>Not connected or no connection established.</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>Connected and connection established.</td>
</tr>
<tr>
<td></td>
<td>Flashing white</td>
<td>Communication not active.</td>
</tr>
</tbody>
</table>

#### Port 2 active: PROFINET and service interface (CDI)

<table>
<thead>
<tr>
<th>5</th>
<th>Port 2 active: PROFINET and service interface (CDI)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off</td>
<td>Not connected or no connection established.</td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td>Connected and connection established.</td>
</tr>
<tr>
<td></td>
<td>Flashing yellow</td>
<td>Communication not active.</td>
</tr>
</tbody>
</table>

### 12.2.2 Sensor connection housing

#### Proline 500 – digital

Various light emitting diodes (LED) on the ISEM electronics (Intelligent Sensor Electronic Module) in the sensor connection housing provide information on the device status.
<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication</td>
<td>White</td>
</tr>
<tr>
<td>2</td>
<td>Device status (normal operation)</td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing red</td>
</tr>
<tr>
<td>2</td>
<td>Device status (during start-up)</td>
<td>Flashes red slowly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashes red quickly</td>
</tr>
<tr>
<td>3</td>
<td>Supply voltage</td>
<td>Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
</tr>
</tbody>
</table>
12.3 Diagnostic information on local display

12.3.1 Diagnostic message

Faults detected by the self-monitoring system of the measuring device are displayed as a diagnostic message in alternation with the operational display.

If two or more diagnostic events are pending simultaneously, only the message of the diagnostic event with the highest priority is shown.

Other diagnostic events that have occurred can be displayed in the Diagnostics menu:

- Via parameter → 236
- Via submenus → 236

Status signals

The status signals provide information on the state and reliability of the device by categorizing the cause of the diagnostic information (diagnostic event).

The status signals are categorized according to VDI/VDE 2650 and NAMUR Recommendation NE 107: F = Failure, C = Function Check, S = Out of Specification, M = Maintenance Required

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Failure</td>
</tr>
<tr>
<td>C</td>
<td>Function check</td>
</tr>
<tr>
<td>S</td>
<td>Out of specification</td>
</tr>
<tr>
<td>M</td>
<td>Maintenance required</td>
</tr>
</tbody>
</table>
Diagnostics and troubleshooting

Proline Promass A 500 PROFINET

Diagnostic behavior

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Alarm](image) | **Alarm**  
  - Measurement is interrupted.  
  - Signal outputs and totalizers assume the defined alarm condition.  
  - A diagnostic message is generated. |

| ![Warning](image) | **Warning**  
 Measurement is resumed. The signal outputs and totalizers are not affected. A diagnostic message is generated. |

Diagnostic information

The fault can be identified using the diagnostic information. The short text helps you by providing information about the fault. In addition, the corresponding symbol for the diagnostic behavior is displayed in front of the diagnostic information on the local display.

Operating elements

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Plus key](image) | **Plus key**  
  *In a menu, submenu*  
  Opens the message about remedy information. |

| ![Enter key](image) | **Enter key**  
  *In a menu, submenu*  
  Opens the operating menu. |
12.3.2 Calling up remedial measures

1. The user is in the diagnostic message.
   Press ▼ (▼ symbol).
   The Diagnostic list submenu opens.
2. Select the desired diagnostic event with ▼ or ▲ and press ▼ .
   The message about the remedial measures opens.
3. Press ▼ + ▲ simultaneously.
   The message about the remedial measures closes.

The user is in the Diagnostics menu at an entry for a diagnostics event, e.g. in the Diagnostic list submenu or Previous diagnostics parameter.

1. Press ▼ .
   The message for the remedial measures for the selected diagnostic event opens.
2. Press ▼ + ▲ simultaneously.
   The message for the remedial measures closes.

12.4 Diagnostic information in the Web browser

12.4.1 Diagnostic options

Any faults detected by the measuring device are displayed in the Web browser on the home page once the user has logged on.
In addition, diagnostic events which have occurred can be shown in the Diagnostics menu:
- Via parameter → 236
- Via submenu → 236

Status signals
The status signals provide information on the state and reliability of the device by categorizing the cause of the diagnostic information (diagnostic event).

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>Failure</td>
</tr>
</tbody>
</table>
| │ Failure
A device error has occurred. The measured value is no longer valid. |
| ⚠️      | Function check |
| │ Function check
The device is in service mode (e.g. during a simulation). |
| 🚫      | Out of specification |
| │ Out of specification
The device is operated:
Outside its technical specification limits (e.g. outside the process temperature range) |
| ⚕️      | Maintenance required |
| │ Maintenance required
Maintenance is required. The measured value is still valid. |

The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107.

12.4.2 Calling up remedy information
Remedy information is provided for every diagnostic event to ensure that problems can be rectified quickly. These measures are displayed in red along with the diagnostic event and the related diagnostic information.

12.5 Diagnostic information in FieldCare or DeviceCare
12.5.1 Diagnostic options
Any faults detected by the measuring device are displayed on the home page of the operating tool once the connection has been established.
In addition, diagnostic events which have occurred can be shown in the Diagnostics menu:
- Via parameter → 236
- Via submenu → 236

Diagnostic information
The fault can be identified using the diagnostic information. The short text helps you by providing information about the fault. In addition, the corresponding symbol for the diagnostic behavior is displayed in front of the diagnostic information on the local display.

12.5.2 Calling up remedy information
Remedy information is provided for every diagnostic event to ensure that problems can be rectified quickly:
- On the home page
  Remedy information is displayed in a separate field below the diagnostics information.
- In the Diagnostics menu
  Remedy information can be called up in the working area of the user interface.

The user is in the Diagnostics menu.
1. Call up the desired parameter.
2. On the right in the working area, mouse over the parameter.
   ✶ A tool tip with remedy information for the diagnostic event appears.
12.6 Adapting the diagnostic information

12.6.1 Adapting the diagnostic behavior

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagnostic behavior** submenu.

Expert → System → Diagnostic handling → Diagnostic behavior

Available diagnostic behaviors

The following diagnostic behaviors can be assigned:

<table>
<thead>
<tr>
<th>Diagnostic behavior</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated.</td>
</tr>
<tr>
<td>Warning</td>
<td>The device continues to measure. The measured value output via PROFINET and the totalizers are not affected. A diagnostic message is generated.</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>The device continues to measure. The diagnostic message is displayed only in the <strong>Event logbook</strong> submenu (<strong>Event list</strong> submenu) and not in alternation with the operational display.</td>
</tr>
<tr>
<td>Off</td>
<td>The diagnostic event is ignored, and no diagnostic message is generated or entered.</td>
</tr>
</tbody>
</table>

Displaying the measured value status

If modules with input data (e.g. Analog Input module, Discrete Input module, Totalizer module, Heartbeat module) are configured for cyclic data transmission, the measured value status is coded as per PROFIBUS PA Profile 3.02 Specification and transmitted along with the measured value to the PROFINET Controller via the status byte. The status byte is split into three segments: Quality, Quality Substatus and Limits.

The content of the status byte depends on the configured failsafe mode in the particular function block. Depending on which failsafe mode has been configured, status information in accordance with PROFIBUS PA Profile Specification 3.02 is transmitted to the the PROFINET controller via the status byte. The two bits for the limits always have the value 0.
### Supported status information

<table>
<thead>
<tr>
<th>Status</th>
<th>Coding (hex)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAD - Maintenance alarm</td>
<td>0x24</td>
</tr>
<tr>
<td>BAD - Process related</td>
<td>0x28</td>
</tr>
<tr>
<td>BAD - Function check</td>
<td>0x3C</td>
</tr>
<tr>
<td>UNCERTAIN - Initial value</td>
<td>0x4F</td>
</tr>
<tr>
<td>UNCERTAIN - Maintenance demanded</td>
<td>0x68</td>
</tr>
<tr>
<td>UNCERTAIN - Process related</td>
<td>0x78</td>
</tr>
<tr>
<td>GOOD - OK</td>
<td>0x80</td>
</tr>
<tr>
<td>GOOD - Maintenance demanded</td>
<td>0xA8</td>
</tr>
<tr>
<td>GOOD - Function check</td>
<td>0xBC</td>
</tr>
</tbody>
</table>

### Determining the measured value status and device status via the diagnostic behavior

When the diagnostic behavior is assigned, this also changes the measured value status and device status for the diagnostic information. The measured value status and device status depend on the choice of diagnostic behavior and on the group in which the diagnostic information is located.

The diagnostic information is grouped as follows:
- Diagnostic information pertaining to the sensor: diagnostic number 000 to 199
  →  183
- Diagnostic information pertaining to the electronics: diagnostic number 200 to 399
  →  183
- Diagnostic information pertaining to the configuration: diagnostic number 400 to 599
  →  184
- Diagnostic information pertaining to the process: diagnostic number 800 to 999
  →  184

Depending on the group in which the diagnostic information is located, the following measured value status and device status are firmly assigned to the particular diagnostic behavior:

#### Diagnostic information pertaining to the sensor: diagnostic number 000 to 199

<table>
<thead>
<tr>
<th>Diagnostic behavior (configurable)</th>
<th>Quality</th>
<th>Measured value status (fixed assignment)</th>
<th>Coding (hex)</th>
<th>Category (NE107)</th>
<th>Device diagnosis (fixed assignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>BAD</td>
<td>Maintenance alarm</td>
<td>0x24</td>
<td>F (Failure)</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Warning</td>
<td>GOOD</td>
<td>Maintenance demanded</td>
<td>0xA8</td>
<td>M (Maintenance)</td>
<td>Maintenance demanded</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Off</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

#### Diagnostic information pertaining to the electronics: diagnostic number 200 to 399

<table>
<thead>
<tr>
<th>Diagnostic behavior (configurable)</th>
<th>Measured value status (fixed assignment)</th>
<th>Coding (hex)</th>
<th>Category (NE107)</th>
<th>Device diagnosis (fixed assignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>BAD</td>
<td>Maintenance alarm</td>
<td>0x24</td>
<td>F (Failure)</td>
</tr>
<tr>
<td>Warning</td>
<td>BAD</td>
<td>Maintenance alarm</td>
<td>0x24</td>
<td>F (Failure)</td>
</tr>
</tbody>
</table>
### Diagnostics and troubleshooting

#### Proline Promass A 500 PROFINET

#### Diagnostic behavior

<table>
<thead>
<tr>
<th>Quality</th>
<th>Substatus</th>
<th>Coding (hex)</th>
<th>Category (NE107)</th>
<th>Device diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logbook entry only</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80 to 0x8E</td>
<td>–</td>
</tr>
<tr>
<td>Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Diagnostic information 302

<table>
<thead>
<tr>
<th>Diagnostic behavior (configurable)</th>
<th>Quality</th>
<th>Substatus</th>
<th>Coding (hex)</th>
<th>Category (NE107)</th>
<th>Device diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>BAD</td>
<td>Function check, local override</td>
<td>0x24</td>
<td>C</td>
<td>Function check</td>
</tr>
<tr>
<td>Warning</td>
<td>GOOD</td>
<td>Function check</td>
<td>0xBC to 0xBF</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Diagnostic information 302 (device verification active) is output during internal or external Heartbeat verification.
- Signal status: Function check
- Choice of diagnostic behavior: alarm or warning (factory setting)

When Heartbeat verification starts, data logging is interrupted, the last valid measured value is output and the totalizers are stopped.

#### Diagnostic information pertaining to the configuration: diagnostic number 400 to 599

<table>
<thead>
<tr>
<th>Diagnostic behavior (configurable)</th>
<th>Quality</th>
<th>Substatus</th>
<th>Coding (hex)</th>
<th>Category (NE107)</th>
<th>Device diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>BAD</td>
<td>Process related</td>
<td>0x28</td>
<td>F (Failure)</td>
<td>Invalid process condition</td>
</tr>
<tr>
<td>Warning</td>
<td>UNCERTAIN</td>
<td>Process related</td>
<td>0x78</td>
<td>S (Out of specification)</td>
<td>Invalid process condition</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Diagnostic information pertaining to the process: diagnostic number 800 to 999

<table>
<thead>
<tr>
<th>Diagnostic behavior (configurable)</th>
<th>Quality</th>
<th>Substatus</th>
<th>Coding (hex)</th>
<th>Category (NE107)</th>
<th>Device diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>BAD</td>
<td>Process related</td>
<td>0x28</td>
<td>F (Failure)</td>
<td>Invalid process condition</td>
</tr>
<tr>
<td>Warning</td>
<td>UNCERTAIN</td>
<td>Process related</td>
<td>0x78</td>
<td>S (Out of specification)</td>
<td>Invalid process condition</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Off</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12.7 Overview of diagnostic information

- The amount of diagnostic information and the number of measured variables affected increase if the measuring device has one or more application packages.
- All of the measured variables affected in the entire Promass instrument family are always listed under 'Measured variables affected'. The measured variables available for the device in question depend on the device version. When assigning the measured variables to the device functions, for example to the individual outputs, all of the measured variables available for the device version in question are available for selection.

In the case of some items of diagnostic information, the diagnostic behavior can be changed. Change the diagnostic information → 182

12.7.1 Diagnostic of sensor

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>022</td>
<td>Temperature sensor defective</td>
<td>1. Check or replace sensor electronic module (ISEM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. If available: Check connection cable between sensor and transmitter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Replace sensor</td>
</tr>
</tbody>
</table>

**Measured variable status**

- Quality: Bad
- Quality substatus: Maintenance alarm
- Coding (hex): 0x24 to 0x27
- Status signal: F
- Diagnostic behavior: Alarm

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow

- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative

- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
### Diagnostics and troubleshooting

#### Proline Promass A 500 PROFINET

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>046</td>
<td>Sensor limit exceeded</td>
<td>1. Inspect sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Check process condition</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] 1)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
## No. 062

### Sensor connection faulty

**Short text**
- Quality: Bad
- Quality substatus: Maintenance alarm
- Coding (hex): 0x24 to 0x27
- Status signal: F
- Diagnostic behavior: Alarm

**Measured variable status**

- Measured variable: Oscillation amplitude 1
  - Quality: Bad
- Measured variable: Oscillation amplitude 2
  - Quality: Bad
- Measured variable: Application specific output
  - Quality: Bad
- Measured variable: Application specific output
  - Quality: Bad
- Measured variable: Signal asymmetry
  - Quality: Bad
- Measured variable: Carrier mass flow
  - Quality: Bad
- Measured variable: Carrier pipe temperature
  - Quality: Bad
- Measured variable: Target corrected volume flow
  - Quality: Bad
- Measured variable: Carrier corrected volume flow
  - Quality: Bad
- Measured variable: Concentration
  - Quality: Bad
- Measured variable: Oscillation damping 1
  - Quality: Bad
- Measured variable: Oscillation damping 2
  - Quality: Bad
- Measured variable: Density
  - Quality: Bad
- Measured variable: Oil density
  - Quality: Bad
- Measured variable: Water density
  - Quality: Bad
- Measured variable: Dynamic viscosity
  - Quality: Bad
- Measured variable: Sensor electronic temperature (ISEM)
  - Quality: Bad
- Measured variable: GSV flow
  - Quality: Bad

**Influenced measured variables**

- Measured variable: GSV flow alternative
- Measured variable: Kinematic viscosity
- Measured variable: Mass flow
- Measured variable: Oil mass flow
- Measured variable: Water mass flow
- Measured variable: Index inhomogeneous medium
- Measured variable: Index suspended bubbles
- Measured variable: HBSI
- Measured variable: NSV flow
- Measured variable: NSV flow alternative
- Measured variable: External pressure
- Measured variable: Exciter current 1
- Measured variable: Exciter current 2
- Measured variable: Oscillation frequency 1
- Measured variable: Oscillation frequency 2
- Measured variable: S&W volume flow
- Measured variable: Reference density
- Measured variable: Reference density alternative

**Remedy instructions**
1. Check or replace sensor electronic module (ISEM)
2. If available: Check connection cable between sensor and transmitter
3. Replace sensor

## No. 063

### Exciter current faulty

**Short text**
- Quality: Bad
- Quality substatus: Maintenance alarm
- Coding (hex): 0x24 to 0x27
- Status signal: S
- Diagnostic behavior: Alarm

**Measured variable status**

- Measured variable: Oscillation amplitude 1
  - Quality: Bad
- Measured variable: Oscillation amplitude 2
  - Quality: Bad
- Measured variable: Application specific output
  - Quality: Bad
- Measured variable: Application specific output
  - Quality: Bad
- Measured variable: Signal asymmetry
  - Quality: Bad
- Measured variable: Carrier mass flow
  - Quality: Bad
- Measured variable: Carrier pipe temperature
  - Quality: Bad
- Measured variable: Target corrected volume flow
  - Quality: Bad
- Measured variable: Carrier corrected volume flow
  - Quality: Bad
- Measured variable: Concentration
  - Quality: Bad
- Measured variable: Oscillation damping 1
  - Quality: Bad
- Measured variable: Oscillation damping 2
  - Quality: Bad
- Measured variable: Density
  - Quality: Bad
- Measured variable: Oil density
  - Quality: Bad
- Measured variable: Water density
  - Quality: Bad
- Measured variable: Dynamic viscosity
  - Quality: Bad
- Measured variable: Sensor electronic temperature (ISEM)
  - Quality: Bad
- Measured variable: GSV flow
  - Quality: Bad

**Influenced measured variables**

- Measured variable: GSV flow alternative
- Measured variable: Kinematic viscosity
- Measured variable: Mass flow
- Measured variable: Oil mass flow
- Measured variable: Water mass flow
- Measured variable: Index inhomogeneous medium
- Measured variable: Index suspended bubbles
- Measured variable: HBSI
- Measured variable: NSV flow
- Measured variable: NSV flow alternative
- Measured variable: External pressure
- Measured variable: Exciter current 1
- Measured variable: Exciter current 2
- Measured variable: Oscillation frequency 1
- Measured variable: Oscillation frequency 2
- Measured variable: S&W volume flow
- Measured variable: Reference density
- Measured variable: Reference density alternative
- Measured variable: Corrected volume flow
- Measured variable: Oil corrected volume flow
- Measured variable: Water corrected volume flow
- Measured variable: Oscillation damping fluctuation 1
- Measured variable: Oscillation damping fluctuation 2
- Measured variable: Frequency fluctuation 1
- Measured variable: Frequency fluctuation 2
- Measured variable: Target mass flow
- Measured variable: Carrier volume flow
- Measured variable: Target volume flow
- Measured variable: Temp. compensated dynamic viscosity
- Measured variable: Temp. compensated kinematic viscosity
- Measured variable: Temperature
- Measured variable: Status
- Measured variable: Volume flow
- Measured variable: Oil volume flow
- Measured variable: Water volume flow
- Measured variable: Water cut

**Remedy instructions**
1. Check or replace sensor electronic module (ISEM)
2. If available: Check connection cable between sensor and transmitter
3. Replace sensor
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>082</td>
<td>Data storage</td>
<td>1. Check module connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Contact service</td>
</tr>
</tbody>
</table>

#### Measured variable status

- **Quality**: Bad
- **Quality substatus**: Maintenance alarm
- **Coding (hex)**: Ox24 to Ox27
- **Status signal**: F
- **Diagnostic behavior**: Alarm

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity

- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>083</td>
<td>Memory content</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Restart device</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Restore HistoROM S-DAT backup ('Device reset' parameter)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Replace HistoROM S-DAT</td>
<td></td>
</tr>
</tbody>
</table>

**Measured variable status**

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Carrier corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity

- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
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- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density

- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>Sensor signal asymmetrical</td>
<td>1. Check or replace sensor electronic module (ISEM)</td>
<td>2. If available: Check connection cable between sensor and transmitter 3. Replace sensor</td>
</tr>
</tbody>
</table>

**Measured variable status [from the factory] 1)**

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 144 | Measurement error too high | 1. Check or change sensor  
2. Check process conditions |

### Measured variable status [from the factory] \(^1\)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
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- Reference density alternative
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- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

\(^1\) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### 12.7.2 Diagnostic of electronic

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Device failure</td>
<td>1. Restart device</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Contact service</td>
</tr>
</tbody>
</table>

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity

- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>242</td>
<td>Software incompatible</td>
<td>1. Check software 2. Flash or change main electronics module</td>
</tr>
</tbody>
</table>

**Measured variable status**
- Quality: Bad
- Quality substatus: Maintenance alarm
- Coding (hex): 0x24 to 0x27
- Status signal: F
- Diagnostic behavior: Alarm

**Influenced measured variables**
- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
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- Reference density alternative
- Corrected volume flow
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- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Module incompatible</th>
<th>Measured variable status</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>252</td>
<td>Modules incompatible</td>
<td></td>
<td>1. Check electronic modules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inflenced measured variables</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oscillation amplitude 1</td>
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### Remedy instructions

1. Check electronic modules
2. Check if correct modules are available (e.g. NEx, Ex)
3. Replace electronic modules

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### Diagnostic information

<table>
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<th>Measured variable status</th>
<th>Remedy instructions</th>
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### Diagnostic information

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<th>No.</th>
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</table>
| 262 | Sensor electronic connection faulty             | 1. Check or replace connection cable between sensor electronic module (ISEM) and main electronics  
|     |                                                | 2. Check or replace ISEM or main electronics                                           |

#### Measured variable status

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<tbody>
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#### Influenced measured variables

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- Application specific output
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- Carrier corrected volume flow
- Concentration
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- Measured values 2
- Measured values 3
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- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity

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- GSV flow alternative
- Kinematic viscosity
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- Oil mass flow
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- Index inhomogeneous medium
- Index suspended bubbles
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- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
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- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
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- Water volume flow
- Water cut
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

### Diagnostic information

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<th>No.</th>
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<tr>
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</table>
| 271 | Main electronic failure | 1. Restart device  
|    |                        | 2. Change main electronic module |

**Measured variable status**

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</table>
| 272 | Main electronic failure|            | 1. Restart device  
                  |            | 2. Contact service |

### Quality
- Bad

### Quality substatus
- Maintenance alarm

### Coding (hex)
- 0x24 to 0x27

### Status signal
- F

### Diagnostic behavior
- Alarm

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<td>-</td>
<td>Frequency fluctuation 2</td>
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</tr>
<tr>
<td>-</td>
<td>Target mass flow</td>
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<tr>
<td>-</td>
<td>Carrier volume flow</td>
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<tr>
<td>-</td>
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<td>-</td>
<td>Temperature</td>
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<td>-</td>
<td>Status</td>
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<td>283</td>
<td>Memory content</td>
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<td><strong>Measured variable status</strong></td>
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<td></td>
<td>Quality substatus</td>
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<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
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<tr>
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<td>Status signal</td>
<td>F</td>
</tr>
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<td>Diagnostic behavior</td>
<td>Alarm</td>
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<tr>
<td>-</td>
<td>Carrier pipe temperature</td>
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<tr>
<td>-</td>
<td>Target corrected volume flow</td>
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<tr>
<td>-</td>
<td>Carrier corrected volume flow</td>
<td></td>
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<td>Oscillation damping 1</td>
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<td>Oscillation damping 2</td>
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<td>Sensor electronic temperature (ISEM)</td>
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<td>-</td>
<td>Index suspended bubbles</td>
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<td>HBSI</td>
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<td>Exciter current 2</td>
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<td>S&amp;W volume flow</td>
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<tr>
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<td>Reference density</td>
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<td>Target volume flow</td>
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<tr>
<td>-</td>
<td>Status</td>
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</tr>
<tr>
<td>-</td>
<td>Water volume flow</td>
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</tr>
<tr>
<td>-</td>
<td>Water cut</td>
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</tr>
</tbody>
</table>
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>302</td>
<td>Device verification active</td>
<td>Device verification active, please wait.</td>
</tr>
</tbody>
</table>

#### Measured variable status

- **Quality**: Good
- **Quality status**: Function check
- **Coding (hex)**: 0xBC to 0xBF
- **Status signal**: C
- **Diagnostic behavior**: Warning

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>303</td>
<td>I/O 1 to n configuration changed</td>
<td>1. Apply I/O module configuration (parameter 'Apply I/O configuration')&lt;br&gt;2. Afterwards reload device description and check wiring</td>
</tr>
</tbody>
</table>

#### Measured variable status

- **Quality**: Good
- **Quality status**: Ok
- **Coding (hex)**: 0x80 to 0x83
- **Status signal**: M
- **Diagnostic behavior**: Warning

#### Influenced measured variables

-
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 311 | Electronic failure     | 1. Do not reset device  
|     |                        | 2. Contact service   |

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>M</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
## Proline Promass A 500 PROFINET

### Diagnostics and troubleshooting

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>332</td>
<td>Writing in HistoROM backup failed</td>
<td></td>
<td>Replace user interface board Ex d/XP: replace transmitter</td>
</tr>
</tbody>
</table>

#### Measured variable status

- **Quality**: Bad
- **Quality substatus**: Maintenance alarm
- **Coding (hex)**: 0x24 to 0x27
- **Status signal**: F
- **Diagnostic behavior**: Alarm

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow

**Remedy instructions**

- GSV flow alternative
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative

- Corrected volume flow
- Kinematic viscosity
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

<table>
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<tr>
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<th>Remedy instructions</th>
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<tr>
<td>361</td>
<td>I/O module 1 to n faulty</td>
<td></td>
<td>1. Restart device 2. Check electronic modules 3. Change I/O Modul or main electronics</td>
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</tbody>
</table>

#### Measured variable status

- **Quality**: Bad
- **Quality substatus**: Maintenance alarm
- **Coding (hex)**: 0x24 to 0x27
- **Status signal**: F
- **Diagnostic behavior**: Alarm

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Dynamic viscosity
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

### Diagnostic information

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<tr>
<td>372</td>
<td>Sensor electronic (ISEM) faulty</td>
<td>1. Restart device</td>
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<tr>
<td></td>
<td></td>
<td>2. Check if failure recurs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Replace sensor electronic module (ISEM)</td>
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### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
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</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
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<tr>
<td>Coding (hex)</td>
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<tr>
<td>Status signal</td>
<td>F</td>
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<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
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- Carrier corrected volume flow
- Concentration
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- Oil density
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- Index suspended bubbles
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- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
- S&W volume flow
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- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
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- Temperature
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- Volume flow
- Oil volume flow
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### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
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</table>
| 373 | Sensor electronic (ISEM) faulty | 1. Transfer data or reset device  
2. Contact service |

#### Measured variable status

<table>
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<tr>
<th>Quality</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 374 | Sensor electronic (ISEM) faulty | 1. Restart device  
2. Check if failure recurs  
3. Replace sensor electronic module (ISEM) |

#### Measured variable status [from the factory] 1)

<table>
<thead>
<tr>
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<tbody>
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<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
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<tr>
<td>Status signal</td>
<td>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
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- Temp. compensated kinematic viscosity
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- Status
- Volume flow

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1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 375 | 1/O- 1 to n communication failed | | 1. Restart device  
2. Check if failure recurs  
3. Replace module rack inclusive electronic modules |

### Measured variable status

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<tr>
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<th>Diagnostic information</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>378</td>
<td>Supply voltage ISEM faulty</td>
<td>Check supply voltage to the ISEM</td>
<td></td>
</tr>
</tbody>
</table>

### Measured variable status

<table>
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<th>Quality</th>
<th>Good</th>
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#### Influenced measured variables

-
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Measured variable status</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>382</td>
<td>Data storage</td>
<td>1. Insert T-DAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Replace T-DAT</td>
</tr>
<tr>
<td></td>
<td>Quality: Bad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality substatus:</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td></td>
<td>Coding (hex): 0x24 to 0x27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Status signal: F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior:</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Influenced measured variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscillation amplitude 1</td>
</tr>
<tr>
<td>Oscillation amplitude 2</td>
</tr>
<tr>
<td>Application specific output</td>
</tr>
<tr>
<td>Application specific output</td>
</tr>
<tr>
<td>Signal asymmetry</td>
</tr>
<tr>
<td>Carrier mass flow</td>
</tr>
<tr>
<td>Carrier pipe temperature</td>
</tr>
<tr>
<td>Target corrected volume flow</td>
</tr>
<tr>
<td>Carrier corrected volume flow</td>
</tr>
<tr>
<td>Concentration</td>
</tr>
<tr>
<td>Measured values 1</td>
</tr>
<tr>
<td>Measured values 2</td>
</tr>
<tr>
<td>Measured values 3</td>
</tr>
<tr>
<td>Oscillation damping 1</td>
</tr>
<tr>
<td>Oscillation damping 2</td>
</tr>
<tr>
<td>Density</td>
</tr>
<tr>
<td>Oil density</td>
</tr>
<tr>
<td>Water density</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
</tr>
<tr>
<td>Reference density alternative</td>
</tr>
<tr>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>Water corrected volume flow</td>
</tr>
<tr>
<td>Oscillation damping fluctuation 2</td>
</tr>
<tr>
<td>Frequency fluctuation 2</td>
</tr>
<tr>
<td>Target mass flow</td>
</tr>
<tr>
<td>Carrier volume flow</td>
</tr>
<tr>
<td>Temp. compensated dynamic viscosity</td>
</tr>
<tr>
<td>Temp. compensated kinematic viscosity</td>
</tr>
<tr>
<td>Status</td>
</tr>
<tr>
<td>Volume flow</td>
</tr>
<tr>
<td>Water volume flow</td>
</tr>
<tr>
<td>Water cut</td>
</tr>
<tr>
<td>No.</td>
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<td>-----</td>
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</table>

### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>387</td>
<td>HistoROM data faulty</td>
<td>Contact service organization</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
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- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
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- Water density
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- Kinematic viscosity
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- Water mass flow
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- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

---

### 12.7.3 Diagnostic of configuration

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 330 | Flash file invalid | 1. Update firmware of device  
2. Restart device |

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>M</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- Kinematic viscosity
- Mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- Reference density
- Corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
## No.

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Short text</th>
<th>Remedy instructions</th>
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</thead>
<tbody>
<tr>
<td>331</td>
<td>Firmware update failed</td>
<td></td>
<td>1. Update firmware of device</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Restart device</td>
</tr>
</tbody>
</table>

### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
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- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
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- Exciter current 2
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- Oscillation frequency 2
- S&W volume flow
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- Reference density alternative
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- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
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- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Data transfer</td>
<td>1. Check connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Retry data transfer</td>
</tr>
</tbody>
</table>

**Measured variable status**

<table>
<thead>
<tr>
<th>Quality</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
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- Water density
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- Exciter current 2
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- Oscillation frequency 2
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- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>412</td>
<td>Processing download</td>
<td>Download active, please wait</td>
</tr>
</tbody>
</table>

### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
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</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Initial value</td>
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<tr>
<td>Coding (hex)</td>
<td>0x4C to 0x4F</td>
</tr>
<tr>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
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- GSV flow
- GSV flow alternative
- Kinematic viscosity
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- Water mass flow
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- HBSI
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- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
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- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

### No. 431

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
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<tbody>
<tr>
<td>Trim 1 to n</td>
<td>Carry out trim</td>
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### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
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</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- -
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short text</td>
<td></td>
</tr>
<tr>
<td>437</td>
<td>Configuration incompatible</td>
<td>1. Restart device</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Contact service</td>
</tr>
</tbody>
</table>

**Measured variable status**

- Quality: Bad
- Quality substatus: Maintenance alarm
- Coding (hex): 0x24 to 0x27
- Status signal: F
- Diagnostic behavior: Alarm

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
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- Oscillation damping 2
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- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
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- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Measured variable status</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Check data set file</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Check device configuration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Up- and download new configuration</td>
</tr>
</tbody>
</table>

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance demanded</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x68 to 0x6B</td>
</tr>
<tr>
<td>Status signal</td>
<td>M</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
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- Carrier corrected volume flow
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- Dynamic viscosity

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- NSV flow alternative
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- Exciter current 2
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- Oscillation damping fluctuation 2
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- Frequency fluctuation 2
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- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

### Remedy instructions

<table>
<thead>
<tr>
<th>No.</th>
<th>Current output 1 to n</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>441</td>
<td></td>
<td></td>
<td>1. Check process</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check current output settings</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] ¹)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- ¹) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### Frequency output 1 to n

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 442 | **Measured variable status [from the factory]** 1) | 1. Check process  
2. Check frequency output settings |

| Quality | Good |
| Quality substatus | Ok |
| Coding (hex) | 0x80 to 0x83 |
| Status signal | S |
| Diagnostic behavior | Warning |

**Influenced measured variables**
- 

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

### Pulse output 1 to n

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 443 | **Measured variable status [from the factory]** 1) | 1. Check process  
2. Check pulse output settings |

| Quality | Good |
| Quality substatus | Ok |
| Coding (hex) | 0x80 to 0x83 |
| Status signal | S |
| Diagnostic behavior | Warning |

**Influenced measured variables**
- 

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

### Current input 1 to n

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 444 | **Measured variable status [from the factory]** 1) | 1. Check process  
2. Check current input settings |

| Quality | Good |
| Quality substatus | Ok |
| Coding (hex) | 0x80 to 0x83 |
| Status signal | S |
| Diagnostic behavior | Warning |

**Influenced measured variables**
- Measured values 1
- Measured values 2
- Measured values 3

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### No. 453: Flow override

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>453</td>
<td>Flow override</td>
<td>Deactivate flow override</td>
</tr>
</tbody>
</table>

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Function check</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0xBC to 0xBF</td>
</tr>
<tr>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow

- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>484</td>
<td>Failure mode simulation</td>
<td>Deactivate simulation</td>
</tr>
</tbody>
</table>

**Measured variable status**

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Function check</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x3C to 0x3F</td>
</tr>
<tr>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

**Influenced measured variables**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Measured variable</th>
<th>Measured variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscillation amplitude 1</td>
<td>GSV flow alternative</td>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>Oscillation amplitude 2</td>
<td>Kinematic viscosity</td>
<td>Oil corrected volume flow</td>
</tr>
<tr>
<td>Application specific output</td>
<td>Mass flow</td>
<td>Water corrected volume flow</td>
</tr>
<tr>
<td>Application specific output</td>
<td>Oil mass flow</td>
<td>Oscillation damping fluctuation 1</td>
</tr>
<tr>
<td>Signal asymmetry</td>
<td>Water mass flow</td>
<td>Oscillation damping fluctuation 2</td>
</tr>
<tr>
<td>Carrier mass flow</td>
<td>Index inhomogeneous medium</td>
<td>Frequency fluctuation 1</td>
</tr>
<tr>
<td>Carrier pipe temperature</td>
<td>Index suspended bubbles</td>
<td>Frequency fluctuation 2</td>
</tr>
<tr>
<td>Target corrected volume flow</td>
<td>HBSI</td>
<td>Target mass flow</td>
</tr>
<tr>
<td>Carrier corrected volume flow</td>
<td>NSV flow</td>
<td>Carrier volume flow</td>
</tr>
<tr>
<td>Concentration</td>
<td>NSV flow alternative</td>
<td>Target volume flow</td>
</tr>
<tr>
<td>Oscillation damping 1</td>
<td>External pressure</td>
<td>Temp. compensated dynamic viscosity</td>
</tr>
<tr>
<td>Oscillation damping 2</td>
<td>Exciter current 1</td>
<td>Temp. compensated kinematic viscosity</td>
</tr>
<tr>
<td>Density</td>
<td>Exciter current 2</td>
<td>Temperature</td>
</tr>
<tr>
<td>Oil density</td>
<td>Oscillation frequency 1</td>
<td>Status</td>
</tr>
<tr>
<td>Water density</td>
<td>Oscillation frequency 2</td>
<td>Volume flow</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>S&amp;W volume flow</td>
<td>Oil volume flow</td>
</tr>
<tr>
<td>Sensor electronic temperature (ISEM)</td>
<td>Reference density</td>
<td>Water volume flow</td>
</tr>
<tr>
<td>GSV flow</td>
<td>Reference density alternative</td>
<td>Water cut</td>
</tr>
</tbody>
</table>
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

#### Measured variable status

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>485</td>
<td>Measured variable simulation</td>
<td>Deactivate simulation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Quality</th>
<th>Quality substatus</th>
<th>Coding (hex)</th>
<th>Status signal</th>
<th>Diagnostic behavior</th>
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</thead>
<tbody>
<tr>
<td>485</td>
<td>Measured variable simulation</td>
<td>Good</td>
<td>Function check</td>
<td>0xBC to 0xBF</td>
<td>C</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
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- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
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- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

---

#### Current input 1 to n simulation

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
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</thead>
<tbody>
<tr>
<td>486</td>
<td>Current input 1 to n simulation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
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<th>Quality substatus</th>
<th>Coding (hex)</th>
<th>Status signal</th>
<th>Diagnostic behavior</th>
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<tbody>
<tr>
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<td>Good</td>
<td>Function check</td>
<td>0xBC to 0xBF</td>
<td>C</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Measured values 1
- Measured values 2
- Measured values 3
## Diagnostics and troubleshooting

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
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<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>491</strong></td>
<td>Current output 1 to n simulation</td>
<td>Deactivate simulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Measured variable status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality substatus</td>
<td>Ok</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Warning</td>
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</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

| **492** | Simulation frequency output 1 to n | Deactivate simulation frequency output |
| | **Measured variable status** | | |
| | Quality | Good | |
| | Quality substatus | Ok | |
| | Coding (hex) | 0x80 to 0x83 | |
| | Status signal | C | |
| | Diagnostic behavior | Warning | |
| | **Influenced measured variables** | | - |

| **493** | Simulation pulse output 1 to n | Deactivate simulation pulse output |
| | **Measured variable status** | | |
| | Quality | Good | |
| | Quality substatus | Ok | |
| | Coding (hex) | 0x80 to 0x83 | |
| | Status signal | C | |
| | Diagnostic behavior | Warning | |
| | **Influenced measured variables** | | - |
### Diagnostics and troubleshooting

#### Proline Promass A 500 PROFINET

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
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<td>Switch output simulation 1 to n</td>
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<td>Quality</td>
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<tr>
<td></td>
<td>Quality substatus</td>
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</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>C</td>
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<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Warning</td>
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<td><strong>Influenced measured variables</strong></td>
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</table>

<table>
<thead>
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<th>Diagnostic information</th>
<th>Remedy instructions</th>
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</thead>
<tbody>
<tr>
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<td>Diagnostic event simulation</td>
<td>Deactivate simulation</td>
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<td></td>
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<td></td>
<td>Quality</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
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<td></td>
<td>–</td>
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</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>496</td>
<td>Status input simulation</td>
<td>Deactivate simulation status input</td>
</tr>
<tr>
<td></td>
<td><strong>Measured variable status</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 520 | I/O 1 to n hardware configuration invalid | 1. Check I/O hardware configuration  
2. Replace wrong I/O module  
3. Plug the module of double pulse output on correct slot |

**Measured variable status**

| Quality | Good  
| Quality substatus | Ok  
| Coding (hex) | 0x80 to 0x83  
| Status signal | F  
| Diagnostic behavior | Alarm  

**Influenced measured variables**

- 

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 528 | Concentration calculation not possible | Out of range of the selected calculation algorithm  
1. Check concentration settings  
2. Check measured values, e.g. density or temperature |

**Measured variable status**

| Quality | Bad  
| Quality substatus | Function check  
| Coding (hex) | 0x3C to 0x3F  
| Status signal | S  
| Diagnostic behavior | Alarm  

**Influenced measured variables**

- Carrier mass flow  
- Target corrected volume flow  
- Carrier corrected volume flow  
- Concentration  
- Density  
- Mass flow  
- Target mass flow  
- Carrier volume flow  
- Density  
- Mass flow  
- Target mass flow  
- Carrier volume flow  
- Target volume flow  
- Volume flow  
- Volume flow  

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 529 | Concentration calculation not accurate | Out of range of the selected calculation algorithm  
1. Check concentration settings  
2. Check measured values, e.g. density or temperature |

**Measured variable status**

| Quality | Bad  
| Quality substatus | Function check  
| Coding (hex) | 0x3C to 0x3F  
| Status signal | S  
| Diagnostic behavior | Warning  

**Influenced measured variables**

- Carrier mass flow  
- Target corrected volume flow  
- Carrier corrected volume flow  
- Concentration  
- Density  
- Mass flow  
- Target mass flow  
- Carrier volume flow  
- Target volume flow  
- Volume flow  
- Volume flow
### 12.7.4 Diagnostic of process

<table>
<thead>
<tr>
<th>No.</th>
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<th>Remedy instructions</th>
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</thead>
<tbody>
<tr>
<td>803</td>
<td><strong>Current loop</strong></td>
<td>1. Check wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Change I/O module</td>
</tr>
</tbody>
</table>

**Measured variable status**

- Quality: Good
- Quality substatus: Ok
- Coding (hex): 0x80 to 0x83
- Status signal: F
- Diagnostic behavior: Alarm

---

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>537</td>
<td><strong>Configuration</strong></td>
<td>1. Check IP addresses in network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Change IP address</td>
</tr>
</tbody>
</table>

**Measured variable status**

- Quality: Good
- Quality substatus: Ok
- Coding (hex): 0x80 to 0x83
- Status signal: F
- Diagnostic behavior: Warning

---

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>594</td>
<td><strong>Relay output simulation</strong></td>
<td>Deactivate simulation switch output</td>
</tr>
</tbody>
</table>

**Measured variable status**

- Quality: Good
- Quality substatus: Ok
- Coding (hex): 0x80 to 0x83
- Status signal: C
- Diagnostic behavior: Warning

---

**Influenced measured variables**

- No.
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>830</td>
<td>Sensor temperature too high</td>
<td>Reduce ambient temp. around the sensor housing</td>
</tr>
</tbody>
</table>

**Measured variable status [from the factory]**

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
</tr>
</tbody>
</table>

**Diagnostic behavior** Warning

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow

- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative

- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>831</td>
<td>Sensor temperature too low</td>
<td>Increase ambient temp. around the sensor housing</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] 1)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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<tr>
<td>Coding (hex)</td>
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<tr>
<td>Status signal</td>
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</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
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- Oscillation damping 1
- Oscillation damping 2
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- Oil density
- Water density
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- GSV flow alternative
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- Water corrected volume flow
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- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
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- Carrier volume flow
- Target volume flow
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- Temp. compensated kinematic viscosity
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- Water volume flow
- Water cut

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
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<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>832</td>
<td>Electronic temperature too high</td>
<td>Reduce ambient temperature</td>
</tr>
</tbody>
</table>

**Measured variable status [from the factory] 1)**

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
</tr>
</tbody>
</table>

**Diagnostic behavior** | Warning |

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
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- External pressure
- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
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- Reference density
- Reference density alternative
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- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

---

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFINET

**Electronic temperature too low**

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>833</td>
<td>Electronic temperature too low</td>
<td>Increase ambient temperature</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] 1)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
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</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x80 to 0x83</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Application specific output
- Application specific output
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Oil mass flow
- Water mass flow
- Index inhomogeneous medium
- Index suspended bubbles
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- Target mass flow
- Carrier volume flow
- Target volume flow
- Temp. compensated dynamic viscosity
- Temp. compensated kinematic viscosity
- Temperature
- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>834</td>
<td>Process temperature too high</td>
<td>Reduce process temperature</td>
</tr>
</tbody>
</table>

**Measured variable status [from the factory]**

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Ok</td>
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<td>Status signal</td>
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<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>835</td>
<td>Process temperature too low</td>
<td>Increase process temperature</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] 1)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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</tr>
<tr>
<td>Status signal</td>
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</table>

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1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### Diagnostic information

#### Measured variable status [from the factory] 1)

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<thead>
<tr>
<th>No.</th>
<th>Short text</th>
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</tr>
</thead>
<tbody>
<tr>
<td>842</td>
<td>Process limit</td>
<td>Low flow cut off active!</td>
</tr>
</tbody>
</table>

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

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- Oscillation amplitude 2
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- Application specific output
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### Diagnostic information

#### Measured variable status [from the factory] 1)

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>862</td>
<td>Partly filled pipe</td>
<td>1. Check for gas in process</td>
</tr>
</tbody>
</table>

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

#### Influenced measured variables

- Application specific output
- Application specific output
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### Diagnostics and troubleshooting

#### Proline Promass A 500 PROFINET

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>882</td>
<td>Input signal</td>
<td>1. Check input configuration 2. Check external device or process conditions</td>
</tr>
</tbody>
</table>

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>910</td>
<td>Tubes not oscillating</td>
<td>1. Check electronic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Inspect sensor</td>
</tr>
</tbody>
</table>

**Measured variable status**

<table>
<thead>
<tr>
<th>Quality</th>
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</thead>
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## Diagnostics and troubleshooting

**Proline Promass A 500 PROFINET**

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>912</td>
<td>Medium inhomogeneous</td>
<td>1. Check process cond.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Increase system pressure</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] 1)

<table>
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</thead>
<tbody>
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1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
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**Influenced measured variables**

- Oil density
- Water density
- GSV flow
- GSV flow alternative
- Mass flow
- Oil mass flow
- Water mass flow
- NSV flow
- NSV flow alternative
- External pressure
- S&W volume flow
- Reference density alternative
- Corrected volume flow
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1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
## Diagnostic information

### Measured variable status [from the factory]

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 942  | API density out of specification | 1. Check process density with selected API commodity group  
2. Check API related parameters |

**Quality**  
Bad

**Quality substatus**  
Maintenance alarm

**Coding (hex)**  
0x24 to 0x27

**Status signal**  
S

**Diagnostic behavior**  
Warning

### Influenced measured variables

- Mass flow

---

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

## Diagnostic information

### Measured variable status [from the factory]

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 943  | API pressure out of specification | 1. Check process pressure with selected API commodity group  
2. Check API related parameters |

**Quality**  
Bad

**Quality substatus**  
Maintenance alarm

**Coding (hex)**  
0x24 to 0x27

**Status signal**  
S

**Diagnostic behavior**  
Warning

### Influenced measured variables

- Oil density
- Water density
- GSV flow
- GSV flow alternative
- Mass flow
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</tr>
</thead>
<tbody>
<tr>
<td>944</td>
<td>Monitoring failed</td>
<td>Check process conditions for Heartbeat Monitoring</td>
</tr>
</tbody>
</table>

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- Oscillation amplitude 1
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- Oscillation frequency 1
- Oscillation frequency 2
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>948</td>
<td>Oscillation damping too high</td>
<td>Check process conditions</td>
</tr>
</tbody>
</table>

#### Measured variable status [from the factory] 1)

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1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
12.8 Pending diagnostic events

The **Diagnostics** menu allows the user to view the current diagnostic event and the previous diagnostic event separately.

To call up the measures to rectify a diagnostic event:
- Via local display → 236
- Via Web browser → 180
- Via "FieldCare" operating tool → 181
- Via "DeviceCare" operating tool → 181

Other pending diagnostic events can be displayed in the **Diagnostic list** submenu → 236

Navigation

"Diagnostics" menu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual diagnostics</td>
<td>A diagnostic event has occurred.</td>
<td>Shows the current occurred diagnostic event along with its diagnostic information.</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td>Previous diagnostics</td>
<td>Two diagnostic events have already occurred.</td>
<td>Shows the diagnostic event that occurred prior to the current diagnostic event along with its diagnostic information.</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td>Operating time from restart</td>
<td>−</td>
<td>Shows the time the device has been in operation since the last device restart.</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
<tr>
<td>Operating time</td>
<td>−</td>
<td>Indicates how long the device has been in operation.</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
</tbody>
</table>

12.9 Diagnostic list

Up to 5 currently pending diagnostic events can be displayed in the **Diagnostic list** submenu along with the associated diagnostic information. If more than 5 diagnostic events are pending, the events with the highest priority are shown on the display.

Navigation path

Diagnostics → Diagnostic list
To call up the measures to rectify a diagnostic event:
- Via local display → § 179
- Via Web browser → § 180
- Via "FieldCare" operating tool → § 181
- Via "DeviceCare" operating tool → § 181

12.10 Event logbook

12.10.1 Reading out the event logbook

A chronological overview of the event messages that have occurred is provided in the Events list submenu.

Navigation path
Diagnostics menu → Event logbook submenu → Event list

A maximum of 20 event messages can be displayed in chronological order.
If the Extended HistoROM application package (order option) is enabled in the device, the event list can contain up to 100 entries.

The event history includes entries for:
- Diagnostic events → § 185
- Information events → § 238

In addition to the operation time of its occurrence, each event is also assigned a symbol that indicates whether the event has occurred or is ended:
- Diagnostic event
  - Ø: Occurrence of the event
  - Ø: End of the event
- Information event
  - Ø: Occurrence of the event

To call up the measures to rectify a diagnostic event:
- Via local display → § 179
- Via Web browser → § 180
- Via "FieldCare" operating tool → § 181
- Via "DeviceCare" operating tool → § 181

For filtering the displayed event messages → § 238
12.10.2 Filtering the event logbook

Using the Filter options parameter you can define which category of event message is displayed in the Events list submenu.

**Navigation path**
Diagnostics → Event logbook → Filter options

**Filter categories**
- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

12.10.3 Overview of information events

Unlike a diagnostic event, an information event is displayed in the event logbook only and not in the diagnostic list.

<table>
<thead>
<tr>
<th>Info number</th>
<th>Info name</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1000</td>
<td>-------- (Device ok)</td>
</tr>
<tr>
<td>I1079</td>
<td>Sensor changed</td>
</tr>
<tr>
<td>I1089</td>
<td>Power on</td>
</tr>
<tr>
<td>I1090</td>
<td>Configuration reset</td>
</tr>
<tr>
<td>I1091</td>
<td>Configuration changed</td>
</tr>
<tr>
<td>I1092</td>
<td>HistorOM backup deleted</td>
</tr>
<tr>
<td>I1111</td>
<td>Density adjust failure</td>
</tr>
<tr>
<td>I1137</td>
<td>Electronic changed</td>
</tr>
<tr>
<td>I1151</td>
<td>History reset</td>
</tr>
<tr>
<td>I1155</td>
<td>Reset electronic temperature</td>
</tr>
<tr>
<td>I1156</td>
<td>Memory error trend</td>
</tr>
<tr>
<td>I1157</td>
<td>Memory error event list</td>
</tr>
<tr>
<td>I1209</td>
<td>Density adjustment ok</td>
</tr>
<tr>
<td>I1221</td>
<td>Zero point adjust failure</td>
</tr>
<tr>
<td>I1222</td>
<td>Zero point adjustment ok</td>
</tr>
<tr>
<td>I1256</td>
<td>Display: access status changed</td>
</tr>
<tr>
<td>I1278</td>
<td>I/O module restarted</td>
</tr>
<tr>
<td>I1335</td>
<td>Firmware changed</td>
</tr>
<tr>
<td>I1361</td>
<td>Web server: login failed</td>
</tr>
<tr>
<td>I1397</td>
<td>Fieldbus: access status changed</td>
</tr>
<tr>
<td>I1398</td>
<td>CDI: access status changed</td>
</tr>
<tr>
<td>I1444</td>
<td>Device verification passed</td>
</tr>
<tr>
<td>I1445</td>
<td>Device verification failed</td>
</tr>
<tr>
<td>I1447</td>
<td>Record application reference data</td>
</tr>
<tr>
<td>I1448</td>
<td>Application reference data recorded</td>
</tr>
<tr>
<td>I1449</td>
<td>Recording application ref. data failed</td>
</tr>
<tr>
<td>I1450</td>
<td>Monitoring off</td>
</tr>
<tr>
<td>I1451</td>
<td>Monitoring on</td>
</tr>
</tbody>
</table>
### Info number | Info name
--- | ---
I1457 | Measurement error verification failed
I1459 | I/O module verification failed
I1460 | HBSI verification failed
I1461 | Sensor verification failed
I1462 | Sensor electronic module verification failed
I1512 | Download started
I1513 | Download finished
I1514 | Upload started
I1515 | Upload finished
I1618 | I/O module 2 replaced
I1619 | I/O module 3 replaced
I1621 | I/O module 4 replaced
I1622 | Calibration changed
I1624 | Reset all totalizers
I1625 | Write protection activated
I1626 | Write protection deactivated
I1627 | Web server: login successful
I1628 | Display: login successful
I1629 | CDI: login successful
I1631 | Web server access changed
I1632 | Display: login failed
I1633 | CDI: login failed
I1634 | Reset to factory settings
I1635 | Reset to delivery settings
I1639 | Max. switch cycles number reached
I1649 | Hardware write protection activated
I1650 | Hardware write protection deactivated
I1712 | New flash file received
I1725 | Sensor electronic module (ISEM) changed
I1726 | Configuration backup failed

### 12.11 Resetting the measuring device

Using the **Device reset** parameter (→ 151) it is possible to reset the entire device configuration or some of the configuration to a defined state.

#### 12.11.1 Function scope of the "Device reset" parameter

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>To delivery settings</td>
<td>Every parameter for which a customer-specific default setting was ordered is reset to this customer-specific value. All other parameters are reset to the factory setting.</td>
</tr>
</tbody>
</table>
Diagnostics and troubleshooting

Proline Promass A 500 PROFINET

Options | Description
---|---
Restart device | The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.

Restore S-DAT backup | Restore the data that are saved on the S-DAT. The data record is restored from the electronics memory to the S-DAT.

This option is displayed only in an alarm condition.

12.12 Device information

The **Device information** submenu contains all parameters that display different information for device identification.

**Navigation**

'Diagnostics' menu → Device information

### Device information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag</td>
<td>Shows name of measuring point.</td>
<td>Max. 32 characters such as lower-case letters or numbers.</td>
<td>Promass</td>
</tr>
<tr>
<td>Serial number</td>
<td>Shows the serial number of the measuring device.</td>
<td>Max. 11-digit character string comprising letters and numbers.</td>
<td>–</td>
</tr>
<tr>
<td>Firmware version</td>
<td>Shows the device firmware version installed.</td>
<td>Character string in the format xx.yy.zz</td>
<td>–</td>
</tr>
</tbody>
</table>
## Parameter Description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device name</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shows the name of the transmitter. The name can be found on the nameplate of the transmitter.</td>
<td>Promass 300/500</td>
<td></td>
</tr>
<tr>
<td><strong>Order code</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shows the device order code. The order code can be found on the nameplate of the sensor and transmitter in the &quot;Order code&quot; field.</td>
<td>Character string composed of letters, numbers and certain punctuation marks (e.g. /).</td>
<td>–</td>
</tr>
<tr>
<td><strong>Extended order code 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shows the 1st part of the extended order code. The extended order code can also be found on the nameplate of the sensor and transmitter in the &quot;Ext. ord. cd.&quot; field.</td>
<td>Character string</td>
<td>–</td>
</tr>
<tr>
<td><strong>Extended order code 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shows the 2nd part of the extended order code. The extended order code can also be found on the nameplate of the sensor and transmitter in the &quot;Ext. ord. cd.&quot; field.</td>
<td>Character string</td>
<td>–</td>
</tr>
<tr>
<td><strong>Extended order code 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shows the 3rd part of the extended order code. The extended order code can also be found on the nameplate of the sensor and transmitter in the &quot;Ext. ord. cd.&quot; field.</td>
<td>Character string</td>
<td>–</td>
</tr>
<tr>
<td><strong>ENP version</strong></td>
<td></td>
<td>2.02.00</td>
</tr>
</tbody>
</table>

---

Proline Promass A 500 PROFINET Diagnostics and troubleshooting

Endress+Hauser
12.13 Firmware history

<table>
<thead>
<tr>
<th>Release date</th>
<th>Firmware version</th>
<th>Order code for &quot;Firmware version&quot;</th>
<th>Firmware changes</th>
<th>Documentation type</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.2019</td>
<td>01.01.zz</td>
<td>Option 67</td>
<td>• System redundancy S2</td>
<td>Operating Instructions</td>
<td>BA01886D/06/EN/03.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Gas fraction handler: smart filtering, entrainment index</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Application-specific Input module</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Upgrading of the Petroleum application package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.2017</td>
<td>01.00.zz</td>
<td>Option 73</td>
<td>Original firmware</td>
<td>Operating Instructions</td>
<td>BA01886D/06/EN/01.17</td>
</tr>
</tbody>
</table>

It is possible to flash the firmware to the current version using the service interface.

For the compatibility of the firmware version with the installed device description files and operating tools, observe the information about the device in the "Manufacturer's information" document.

The manufacturer's information is available:
- In the Download Area of the Endress+Hauser web site: www.endress.com → Downloads
- Specify the following details:
  - Product root: e.g. 8A5B
    The product root is the first part of the order code: see the nameplate on the device.
  - Text search: Manufacturer's information
  - Media type: Documentation – Technical Documentation
13 Maintenance

13.1 Maintenance tasks
No special maintenance work is required.

13.1.1 Exterior cleaning
When cleaning the exterior of measuring devices, always use cleaning agents that do not attack the surface of the housing or the seals.

13.1.2 Interior cleaning
Observe the following points for CIP and SIP cleaning:
- Use only cleaning agents to which the process-wetted materials are adequately resistant.
- Observe the maximum permitted medium temperature for the measuring device → 265.

13.2 Measuring and test equipment
Endress+Hauser offers a wide variety of measuring and test equipment, such as W@M or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

List of some of the measuring and testing equipment: → 246 → 248

13.3 Endress+Hauser services
Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.
14 Repair

14.1 General notes

14.1.1 Repair and conversion concept
The Endress+Hauser repair and conversion concept provides for the following:
- The measuring devices have a modular design.
- Spare parts are grouped into logical kits with the associated Installation Instructions.
- Repairs are carried out by Endress+Hauser Service or by appropriately trained customers.
- Certified devices can only be converted to other certified devices by Endress+Hauser Service or at the factory.

14.1.2 Notes for repair and conversion
For repair and modification of a measuring device, observe the following notes:
- Use only original Endress+Hauser spare parts.
- Carry out the repair according to the Installation Instructions.
- Observe the applicable standards, federal/national regulations, Ex documentation (XA) and certificates.
- Document every repair and each conversion and enter them into the W@M life cycle management database.

14.2 Spare parts

W@M Device Viewer (www.endress.com/deviceviewer):
All the spare parts for the measuring device, along with the order code, are listed here and can be ordered. If available, users can also download the associated Installation Instructions.

Measuring device serial number:
- Is located on the nameplate of the device.
- Can be read out via the Serial number parameter (→ 240) in the Device information submenu.

14.3 Endress+Hauser services
Endress+Hauser offers a wide range of services.
Your Endress+Hauser Sales Center can provide detailed information on the services.

14.4 Return
The requirements for safe device return can vary depending on the device type and national legislation.
1. Refer to the website for more information:
http://www.endress.com/support/return-material
2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.
14.5 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.

14.5.1 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.

14.5.2 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.
## 15 Accessories

Various accessories, which can be ordered with the device or subsequently from Endress + Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: [www.endress.com](http://www.endress.com).

### 15.1 Device-specific accessories

#### 15.1.1 For the transmitter

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter</td>
<td>Transmitter for replacement or storage. Use the order code to define the following specifications:</td>
</tr>
<tr>
<td>• Proline 500 – digital</td>
<td>Approvals</td>
</tr>
<tr>
<td>• Proline 500</td>
<td>Output</td>
</tr>
<tr>
<td>• Proline 500</td>
<td>Input</td>
</tr>
<tr>
<td>• Proline 500 – digital</td>
<td>Display/operation</td>
</tr>
<tr>
<td>• Housing</td>
<td>Software</td>
</tr>
<tr>
<td>• Proline 500 – digital</td>
<td>Proline 500 – digital transmitter: Order number: 8X5BXX-*********A</td>
</tr>
<tr>
<td>• Proline 500</td>
<td>Proline 500 transmitter: Order number: 8X5BXX-*********B</td>
</tr>
<tr>
<td>• Proline 500 transmitter</td>
<td>Proline 500 transmitter for replacement: It is essential to specify the serial number of the current</td>
</tr>
<tr>
<td></td>
<td>transmitter when ordering. Based on the serial number, the device-specific data (e.g., calibration</td>
</tr>
<tr>
<td></td>
<td>factors) of the replacement device can be used for the new transmitter.</td>
</tr>
<tr>
<td>• Proline 500 – digital</td>
<td>Proline 500 – digital transmitter: Installation Instructions EA01151D</td>
</tr>
<tr>
<td>• Proline 500</td>
<td>Proline 500 transmitter: Installation Instructions EA01152D</td>
</tr>
<tr>
<td>External WLAN antenna</td>
<td>External WLAN antenna with 1.5 m (59.1 in) connecting cable and two angle brackets. Order code for</td>
</tr>
<tr>
<td></td>
<td>'Accessory enclosed', option P8 'Wireless antenna wide area'.</td>
</tr>
<tr>
<td></td>
<td>The external WLAN antenna is not suitable for use in hygienic applications.</td>
</tr>
<tr>
<td></td>
<td>Further information on the WLAN interface → 92.</td>
</tr>
<tr>
<td></td>
<td>Order number: 71351317</td>
</tr>
<tr>
<td></td>
<td>Installation Instructions EA01238D</td>
</tr>
<tr>
<td>Pipe mounting set</td>
<td>Pipe mounting set for transmitter.</td>
</tr>
<tr>
<td>• Proline 500 – digital</td>
<td>Proline 500 – digital transmitter: Order number: 71346427</td>
</tr>
<tr>
<td></td>
<td>Proline 500 – digital transmitter: Installation Instructions EA01195D</td>
</tr>
<tr>
<td>• Proline 500</td>
<td>Proline 500 transmitter: Order number: 71346428</td>
</tr>
<tr>
<td>Protective cover Transmitter</td>
<td>Protective cover is used to protect the measuring device from the effects of the weather: e.g.</td>
</tr>
<tr>
<td>• Proline 500 – digital</td>
<td>rainwater, excess heating from direct sunlight.</td>
</tr>
<tr>
<td>• Proline 500</td>
<td>Proline 500 – digital transmitter: Order number: 71343504</td>
</tr>
<tr>
<td></td>
<td>Proline 500 – digital transmitter: Order number: 71343505</td>
</tr>
<tr>
<td></td>
<td>Installation Instructions EA01191D</td>
</tr>
</tbody>
</table>
### Display guard
**Proline 500 – digital**

Is used to protect the display against impact or scoring from sand in desert areas.

- Order number: 71228792
- Installation Instructions EA01093D

#### Connecting cable
**Proline 500 – digital**
**Sensor – Transmitter**

The connecting cable can be ordered directly with the measuring device (order code for 'Cable, sensor connection') or as an accessory (order number DK8012).

The following cable lengths are available: order code for 'Cable, sensor connection'

- Option B: 20 m (65 ft)
- Option E: User configurable up to max. 50 m
- Option F: User configurable up to max. 165 ft

- Maximum possible cable length for a Proline 500 – digital connecting cable: 300 m (1 000 ft)

### 15.1.2 For the sensor

#### Accessories
<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating jacket</td>
<td>Is used to stabilize the temperature of the fluids in the sensor. Water, water vapor and other non-corrosive liquids are permitted for use as fluids.</td>
</tr>
</tbody>
</table>

- If using oil as a heating medium, please consult with Endress+Hauser.

- If ordered together with the measuring device: order code for 'Enclosed accessories'
  - Option RB "heating jacket, G 1/2" internal thread"
  - Option RD "heating jacket, NPT 1/2" internal thread"

- If ordered subsequently: Use the order code with the product root DK8003.
  - Special Documentation SD02173D

<table>
<thead>
<tr>
<th>Sensor holder</th>
<th>For wall, tabletop and pipe mounting.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order number:</td>
<td>71392563</td>
</tr>
</tbody>
</table>

### 15.2 Communication-specific accessories

#### Accessories
<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fieldgate FXA42</td>
<td>Is used to transmit the measured values of connected 4 to 20 mA analog measuring devices, as well as digital measuring devices</td>
</tr>
</tbody>
</table>

- Technical Information TI01297S
- Operating Instructions BA01778S
- Product page: www.endress.com/fxa42
The Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in hazardous and non-hazardous areas. It is suitable for commissioning and maintenance staff to manage field instruments with a digital communication interface and to record progress. This tablet PC is designed as an all-in-one solution with a preinstalled driver library and is an easy-to-use, touch-sensitive tool which can be used to manage field instruments throughout their entire life cycle.

- Technical Information TI01342S
- Operating Instructions BA01709S
- Product page: www.endress.com/smt70

The Field Xpert SMT77 tablet PC for device configuration enables mobile plant asset management in areas categorized as Ex Zone 1.

- Technical Information TI01418S
- Operating Instructions BA01923S
- Product page: www.endress.com/smt77

## 15.3 Service-specific accessories

### Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Applicator** | Software for selecting and sizing Endress+Hauser measuring devices:  
  - Choice of measuring devices for industrial requirements  
  - Calculation of all the necessary data for identifying the optimum flowmeter:  
    e.g. nominal diameter, pressure loss, flow velocity and accuracy.  
  - Graphic illustration of the calculation results  
  - Determination of the partial order code, administration, documentation and access to all project-related data and parameters over the entire life cycle of a project.  
  Applicator is available:  
  - Via the Internet: https://portal.endress.com/webapp/applicator  
  - As a downloadable DVD for local PC installation. |
| **W@M** | W@M Life Cycle Management  
Improved productivity with information at your fingertips. Data relevant to a plant and its components is generated from the first stages of planning and during the asset’s complete life cycle.  
W@M Life Cycle Management is an open and flexible information platform with online and on-site tools. Instant access for your staff to current, in-depth data shortens your plant’s engineering time, speeds up procurement processes and increases plant uptime.  
Combined with the right services, W@M Life Cycle Management boosts productivity in every phase. For more information, visit www.endress.com/lifecyclemanagement |
| **FieldCare** | FDT-based plant asset management tool from Endress+Hauser.  
It can configure all smart field units in your system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition.  
  Operating Instructions BA00027S and BA00059S |
| **DeviceCare** | Tool to connect and configure Endress+Hauser field devices.  
  Innovation brochure IN01047S |
## 15.4 System components

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
<th>Technical Information</th>
<th>Operating Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memograph M graphic data manager</td>
<td>The Memograph M graphic data manager provides information on all the relevant measured variables. Measured values are recorded correctly, limit values are monitored and measuring points analyzed. The data are stored in the 256 MB internal memory and also on a SD card or USB stick.</td>
<td>TI00133R</td>
<td>BA00247R</td>
</tr>
<tr>
<td>Cerabar M</td>
<td>The pressure transmitter for measuring the absolute and gauge pressure of gases, steam and liquids. It can be used to read in the operating pressure value.</td>
<td>TI00426P and TI00436P</td>
<td>BA00200P and BA00382P</td>
</tr>
<tr>
<td>Cerabar S</td>
<td>The pressure transmitter for measuring the absolute and gauge pressure of gases, steam and liquids. It can be used to read in the operating pressure value.</td>
<td>TI00383P</td>
<td>BA00271P</td>
</tr>
<tr>
<td>iTEMP</td>
<td>The temperature transmitters can be used in all applications and are suitable for the measurement of gases, steam and liquids. They can be used to read in the medium temperature.</td>
<td>FA00006T</td>
<td></td>
</tr>
</tbody>
</table>
16 Technical data

16.1 Application
The measuring device is intended only for the flow measurement of liquids and gases. Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

To ensure that the device remains in proper operating condition for its service life, use the measuring device only for media against which the process-wetted materials are sufficiently resistant.

16.2 Function and system design

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Mass flow measurement based on the Coriolis measuring principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring system</td>
<td>The measuring system consists of a transmitter and a sensor. The transmitter and sensor are mounted in physically separate locations. They are interconnected by connecting cables. For information on the structure of the device → 15</td>
</tr>
</tbody>
</table>
16.3 Input

Measured variable

**Direct measured variables**
- Mass flow
- Density
- Temperature

**Calculated measured variables**
- Volume flow
- Corrected volume flow
- Reference density

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Measuring range for liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN</td>
<td>Measuring range full scale values $\dot{m}<em>{\text{min}(F)}$ to $\dot{m}</em>{\text{max}(F)}$</td>
</tr>
<tr>
<td>[mm]</td>
<td>[in]</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>$\frac{3}{8}$</td>
</tr>
<tr>
<td>2</td>
<td>$\frac{1}{4}$</td>
</tr>
<tr>
<td>4</td>
<td>$\frac{1}{8}$</td>
</tr>
</tbody>
</table>

### Measuring range for gases

The full scale value depends on the density and the sound velocity of the gas used and can be calculated with the formula below:

$$\dot{m}_{\text{max}(G)} = \text{minimum} \ (\dot{m}_{\text{max}(F)} \cdot \rho_G \cdot x \cdot \rho_G \cdot \pi / 2 \cdot (d_i)^2 \cdot 3600)$$

| $\dot{m}_{\text{max}(G)}$ | Maximum full scale value for gas [kg/h] |
| $\dot{m}_{\text{max}(F)}$ | Maximum full scale value for liquid [kg/h] |
| $\dot{m}_{\text{max}(G)} < \dot{m}_{\text{max}(F)}$ | $\dot{m}_{\text{max}(G)}$ can never be greater than $\dot{m}_{\text{max}(F)}$ |
| $\rho_G$ | Gas density in [kg/m³] at operating conditions |
| $x$ | Constant dependent on nominal diameter |
| $c_G$ | Sound velocity (gas) [m/s] |
| $d_i$ | Measuring tube internal diameter [m] |

### Calculation example for gas

- **Sensor:** Promass A, DN 2
- **Gas:** Air with a density of 11.9 kg/m³ (at 20 °C and 10 bar)
- **Measuring range (liquid):** 100 kg/h
- **$x = 32$ kg/m³ (for Promass A DN 2)**

Maximum possible full scale value:

$$\dot{m}_{\text{max}(G)} = \dot{m}_{\text{max}(F)} \cdot \rho_G \cdot x = 100 \text{ kg/h} \cdot 11.9 \text{ kg/m}^3 : 32 \text{ kg/m}^3 = 37.2 \text{ kg/h}$$
Recommended measuring range

Flow limit → 267

Operable flow range

Over 1000 : 1.

Flow rates above the preset full scale value do not override the electronics unit, with the result that the totalizer values are registered correctly.

Input signal

External measured values

To increase the accuracy of certain measured variables or to calculate the corrected volume flow for gases, the automation system can continuously write different measured values to the measuring device:

- Operating pressure to increase accuracy (Endress+Hauser recommends the use of a pressure measuring device for absolute pressure, e.g. Cerabar M or Cerabar S)
- Medium temperature to increase accuracy (e.g. iTEMP)
- Reference density for calculating the corrected volume flow for gases

Various pressure and temperature measuring devices can be ordered from Endress+Hauser: see "Accessories" section → 249

It is recommended to read in external measured values to calculate the corrected volume flow.

Current input

The measured values are written from the automation system to the measuring device via the current input → 252.

Digital communication

The measured values are written from the automation system to the measuring device via PROFINET.

Current input 0/4 to 20 mA

<table>
<thead>
<tr>
<th>Current input</th>
<th>0/4 to 20 mA (active/passive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current span</td>
<td>4 to 20 mA (active)</td>
</tr>
<tr>
<td></td>
<td>0/4 to 20 mA (passive)</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 µA</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>Typically: 0.6 to 2 V for 3.6 to 22 mA (passive)</td>
</tr>
<tr>
<td>Maximum input voltage</td>
<td>≤ 30 V (passive)</td>
</tr>
<tr>
<td>Open-circuit voltage</td>
<td>≤ 28.8 V (active)</td>
</tr>
<tr>
<td>Possible input variables</td>
<td>Pressure</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>Density</td>
</tr>
</tbody>
</table>

Status input

| Maximum input values | DC –3 to 30 V               |
|                      | If status input is active (ON): R_i > 3 kΩ |
| Response time        | Configurable: 5 to 200 ms   |
### Technical data

| Input signal level                      | • Low signal: DC -3 to +5 V  
|                                         | • High signal: DC 12 to 30 V  |
| Assignable functions                    | • Off                        
|                                         | • Reset the individual totalizers separately |
|                                         | • Reset all totalizers        
|                                         | • Flow override               |
## 16.4 Output

### Output signal | PROFINET
---|---
**Standards** | In accordance with IEEE 802.3

### Current output 4 to 20 mA

<table>
<thead>
<tr>
<th>Signal mode</th>
<th>Can be set to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td></td>
</tr>
<tr>
<td>Passive</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current span</th>
<th>Can be set to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 20 mA NAMUR</td>
<td></td>
</tr>
<tr>
<td>4 to 20 mA US</td>
<td></td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td></td>
</tr>
<tr>
<td>0 to 20 mA (only if the signal mode is active)</td>
<td></td>
</tr>
<tr>
<td>Fixed current</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum output values</th>
<th>22.5 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-circuit voltage</td>
<td>DC 28.8 V (active)</td>
</tr>
<tr>
<td>Maximum input voltage</td>
<td>DC 30 V (passive)</td>
</tr>
<tr>
<td>Load</td>
<td>0 to 700 Ω</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.38 µA</td>
</tr>
</tbody>
</table>

| Damping | Configurable: 0 to 999.9 s |

<table>
<thead>
<tr>
<th>Assignable measured variables</th>
<th>Mass flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td></td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td></td>
</tr>
<tr>
<td>Reference density</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
</tr>
<tr>
<td>Electronics temperature</td>
<td></td>
</tr>
<tr>
<td>Oscillation frequency 0</td>
<td></td>
</tr>
<tr>
<td>Oscillation damping 0</td>
<td></td>
</tr>
<tr>
<td>Signal asymmetry</td>
<td></td>
</tr>
<tr>
<td>Exciter current 0</td>
<td></td>
</tr>
</tbody>
</table>

The range of options increases if the measuring device has one or more application packages.

### Pulse/frequency/switch output

<table>
<thead>
<tr>
<th>Function</th>
<th>Can be set to pulse, frequency or switch output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>Open collector</td>
</tr>
<tr>
<td></td>
<td>Can be set to:</td>
</tr>
<tr>
<td></td>
<td>Active</td>
</tr>
<tr>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td></td>
<td>Passive NAMUR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum input values</th>
<th>DC 30 V, 250 mA (passive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-circuit voltage</td>
<td>DC 28.8 V (active)</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>For 22.5 mA: ≤ DC 2 V</td>
</tr>
<tr>
<td>Pulse output</td>
<td></td>
</tr>
<tr>
<td>Maximum input values</td>
<td>DC 30 V, 250 mA (passive)</td>
</tr>
<tr>
<td>Maximum output current</td>
<td>22.5 mA (active)</td>
</tr>
</tbody>
</table>
## Technical data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-circuit voltage</td>
<td>DC 28.8 V (active)</td>
</tr>
<tr>
<td>Pulse width</td>
<td>Configurable: 0.05 to 2 000 ms</td>
</tr>
<tr>
<td>Maximum pulse rate</td>
<td>10 000 Impulse/s</td>
</tr>
<tr>
<td>Pulse value</td>
<td>Adjustable</td>
</tr>
<tr>
<td>Assignable measured variables</td>
<td>• Mass flow</td>
</tr>
<tr>
<td></td>
<td>• Volume flow</td>
</tr>
<tr>
<td></td>
<td>• Corrected volume flow</td>
</tr>
<tr>
<td>Frequency output</td>
<td></td>
</tr>
<tr>
<td>Maximum input values</td>
<td>DC 30 V, 250 mA (passive)</td>
</tr>
<tr>
<td>Maximum output current</td>
<td>22.5 mA (active)</td>
</tr>
<tr>
<td>Open-circuit voltage</td>
<td>DC 28.8 V (active)</td>
</tr>
<tr>
<td>Output frequency</td>
<td>Adjustable: end value frequency 2 to 10 000 Hz ($f_{\text{max}} = 12 500$ Hz)</td>
</tr>
<tr>
<td>Damping</td>
<td>Configurable: 0 to 999.9 s</td>
</tr>
<tr>
<td>Pulse/pause ratio</td>
<td>1:1</td>
</tr>
<tr>
<td>Assignable measured variables</td>
<td>• Mass flow</td>
</tr>
<tr>
<td></td>
<td>• Volume flow</td>
</tr>
<tr>
<td></td>
<td>• Corrected volume flow</td>
</tr>
<tr>
<td></td>
<td>• Density</td>
</tr>
<tr>
<td></td>
<td>• Reference density</td>
</tr>
<tr>
<td></td>
<td>• Temperature</td>
</tr>
<tr>
<td></td>
<td>• Electronics temperature</td>
</tr>
<tr>
<td></td>
<td>• Oscillation frequency 0</td>
</tr>
<tr>
<td></td>
<td>• Oscillation damping 0</td>
</tr>
<tr>
<td></td>
<td>• Signal asymmetry</td>
</tr>
<tr>
<td></td>
<td>• Exciter current 0</td>
</tr>
<tr>
<td></td>
<td>The range of options increases if the measuring device has one or more application packages.</td>
</tr>
<tr>
<td>Switch output</td>
<td></td>
</tr>
<tr>
<td>Maximum input values</td>
<td>DC 30 V, 250 mA (passive)</td>
</tr>
<tr>
<td>Open-circuit voltage</td>
<td>DC 28.8 V (active)</td>
</tr>
<tr>
<td>Switching behavior</td>
<td>Binary, conductive or non-conductive</td>
</tr>
<tr>
<td>Switching delay</td>
<td>Configurable: 0 to 100 s</td>
</tr>
<tr>
<td>Number of switching cycles</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Assignable functions</td>
<td>• Off</td>
</tr>
<tr>
<td></td>
<td>• On</td>
</tr>
<tr>
<td></td>
<td>• Diagnostic behavior</td>
</tr>
<tr>
<td></td>
<td>• Limit value</td>
</tr>
<tr>
<td></td>
<td>• Mass flow</td>
</tr>
<tr>
<td></td>
<td>• Volume flow</td>
</tr>
<tr>
<td></td>
<td>• Corrected volume flow</td>
</tr>
<tr>
<td></td>
<td>• Density</td>
</tr>
<tr>
<td></td>
<td>• Reference density</td>
</tr>
<tr>
<td></td>
<td>• Temperature</td>
</tr>
<tr>
<td></td>
<td>• Totalizer 1-3</td>
</tr>
<tr>
<td></td>
<td>• Flow direction monitoring</td>
</tr>
<tr>
<td></td>
<td>• Status</td>
</tr>
<tr>
<td></td>
<td>• Partially filled pipe detection</td>
</tr>
<tr>
<td></td>
<td>• Low flow cut off</td>
</tr>
<tr>
<td></td>
<td>The range of options increases if the measuring device has one or more application packages.</td>
</tr>
</tbody>
</table>
### Relay output

<table>
<thead>
<tr>
<th>Function</th>
<th>Switch output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>Relay output, galvanically isolated</td>
</tr>
</tbody>
</table>
| Switching behavior | Can be set to:  
|                    | • NO (normally open), factory setting  
|                    | • NC (normally closed) |
| Maximum switching capacity (passive) | DC 30 V, 0.1 A  
|                    | AC 30 V, 0.5 A |
| Assignable functions | Off  
|                    | On  
|                    | Diagnostic behavior  
|                    | Limit value  
|                    | • Mass flow  
|                    | • Volume flow  
|                    | • Corrected volume flow  
|                    | • Density  
|                    | • Reference density  
|                    | • Temperature  
|                    | • Totalizer 1-3  
|                    | • Flow direction monitoring  
|                    | • Status  
|                    | • Partially filled pipe detection  
|                    | • Low flow cut off |

*The range of options increases if the measuring device has one or more application packages.*

### User-configurable input/output

**One** specific input or output is assigned to a user-configurable input/output (configurable I/O) during device commissioning.

The following inputs and outputs are available for assignment:
- Choice of current output: 4 to 20 mA (active), 0/4 to 20 mA (passive)
- Pulse/frequency switch output
- Choice of current input: 4 to 20 mA (active), 0/4 to 20 mA (passive)
- Status input

### Signal on alarm

Depending on the interface, failure information is displayed as follows:

**PROFINET**

| Device diagnostics | According to "Application Layer protocol for decentralized periphery", Version 2.3 |

### Current output 0/4 to 20 mA

**4 to 20 mA**

| Failure mode | Choose from:  
|--------------|---------------|
|              | 4 to 20 mA in accordance with NAMUR recommendation NE 43  
|              | 4 to 20 mA in accordance with US  
|              | Min. value: 3.59 mA  
|              | Max. value: 22.5 mA  
|              | Freely definable value between: 3.59 to 22.5 mA  
|              | Actual value  
|              | Last valid value |
### 0 to 20 mA

<table>
<thead>
<tr>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Maximum alarm: 22 mA</td>
</tr>
<tr>
<td></td>
<td>• Freely definable value between: 0 to 20.5 mA</td>
</tr>
</tbody>
</table>

### Pulse/frequency/switch output

#### Pulse output

<table>
<thead>
<tr>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Actual value</td>
</tr>
<tr>
<td></td>
<td>• No pulses</td>
</tr>
</tbody>
</table>

#### Frequency output

<table>
<thead>
<tr>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Actual value</td>
</tr>
<tr>
<td></td>
<td>• 0 Hz</td>
</tr>
<tr>
<td></td>
<td>• Defined value ($f_{\text{max}}$ 2 to 12 500 Hz)</td>
</tr>
</tbody>
</table>

#### Switch output

<table>
<thead>
<tr>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Current status</td>
</tr>
<tr>
<td></td>
<td>• Open</td>
</tr>
<tr>
<td></td>
<td>• Closed</td>
</tr>
</tbody>
</table>

### Relay output

<table>
<thead>
<tr>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Current status</td>
</tr>
<tr>
<td></td>
<td>• Open</td>
</tr>
<tr>
<td></td>
<td>• Closed</td>
</tr>
</tbody>
</table>

### Local display

<table>
<thead>
<tr>
<th>Plain text display</th>
<th>With information on cause and remedial measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backlight</td>
<td>Red backlighting indicates a device error.</td>
</tr>
</tbody>
</table>

⚠️ Status signal as per NAMUR recommendation NE 107

#### Interface/protocol

- Via digital communication: PROFINET
- Via service interface
  - CDI-RJ45 service interface
  - WLAN interface

<table>
<thead>
<tr>
<th>Plain text display</th>
<th>With information on cause and remedial measures</th>
</tr>
</thead>
</table>

### Web browser

<table>
<thead>
<tr>
<th>Plain text display</th>
<th>With information on cause and remedial measures</th>
</tr>
</thead>
</table>
### Technical data

#### Light emitting diodes (LED)

**Status information**

Status indicated by various light emitting diodes

The following information is displayed depending on the device version:
- Supply voltage active
- Data transmission active
- Device alarm/error has occurred
- PROFINET network available
- PROFINET connection established
- PROFINET blinking feature

[Diagnostic information via light emitting diodes → 173](#)

#### Low flow cut off

The switch points for low flow cut off are user-selectable.

#### Galvanic isolation

The outputs are galvanically isolated from one another and from earth (PE).

#### Protocol-specific data

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Application layer protocol for decentral device periphery and distributed automation, Version 2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication type</td>
<td>100 MBit/s</td>
</tr>
<tr>
<td>Conformity class</td>
<td>Conformance Class B</td>
</tr>
<tr>
<td>Netload Class</td>
<td>Netload Class II</td>
</tr>
<tr>
<td>Baud rates</td>
<td>Automatic 100 Mbit/s with full-duplex detection</td>
</tr>
<tr>
<td>Cycle times</td>
<td>From 8 ms</td>
</tr>
<tr>
<td>Polarity</td>
<td>Auto-polarity for automatic correction of crossed TxD and RxD pairs</td>
</tr>
<tr>
<td>Media Redundancy Protocol (MRP)</td>
<td>Yes</td>
</tr>
<tr>
<td>System redundancy support</td>
<td>System redundancy S2 (2 AR with 1 NAP)</td>
</tr>
</tbody>
</table>
| Device profile | Application interface identifier 0xF600
 Generic device |
| Manufacturer ID | 0x11 |
| Device type ID | 0x843B |
| Device description files (GSD, DTM, DD) | Information and files under:
- [www.endress.com](http://www.endress.com)
- On the product page for the device: Documents/Software → Device drivers
- [www.profibus.org](http://www.profibus.org) |
| Supported connections | 2 x AR (I/O Controller AR)
 1 x AR (I/O-Supervisor Device AR connection allowed)
 1 x Input CR (Communication Relation)
 1 x Output CR (Communication Relation)
 1 x Alarm CR (Communication Relation) |
| Configuration options for measuring device | DIP switches on the electronics module, for device name assignment (last part)
 Manufacturer-specific software (FieldCare, DeviceCare)
 Web browser
 Device master file (GSD), can be read out via the integrated Web server of the measuring device |
| Configuration of the device name | DIP switches on the electronics module, for device name assignment (last part)
 DCP protocol
 Process Device Manager (PDM)
 Integrated Web server |
### Supported functions
- Identification & Maintenance
  - Simple device identification via:
  - Control system
  - Nameplate
  - Measured value status
  - The process variables are communicated with a measured value status
- Blinking feature via the onsite display for simple device identification and assignment
- Device operation via operating tools (e.g. FieldCare, DeviceCare, SIMATIC PDM)

### System integration
- Information on system integration → 98.
  - Cyclic data transmission
  - Overview and description of the modules
  - Status coding
  - Startup configuration
  - Factory setting

### 16.5 Power supply

**Terminal assignment** → 41

**Device plugs available** → 41

### Supply voltage

<table>
<thead>
<tr>
<th>Order code for &quot;Power supply&quot;</th>
<th>Terminal voltage</th>
<th>Frequency range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option D</td>
<td>DC 24 V ±20%</td>
<td>–</td>
</tr>
<tr>
<td>Option E</td>
<td>AC 100 to 240 V ±15 to +10%</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Option I</td>
<td>DC 24 V ±20%</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>AC 100 to 240 V ±15 to +10%</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

### Power consumption

**Transmitter**
- Max. 10 W (active power)

**Switch-on current**
- Max. 36 A (<5 ms) as per NAMUR Recommendation NE 21

### Current consumption

**Transmitter**
- Max. 400 mA (24 V)
- Max. 200 mA (110 V, 50/60 Hz; 230 V, 50/60 Hz)

### Power supply failure
- Totalizers stop at the last value measured.
- Depending on the device version, the configuration is retained in the device memory or in the pluggable data memory (HistoROM DAT).
- Error messages (incl. total operated hours) are stored.

### Electrical connection
- → 53

### Potential equalization
- → 60
Technical data

Terminals
Spring-loaded terminals: Suitable for strands and strands with ferrules. Conductor cross-section 0.2 to 2.5 mm² (24 to 12 AWG).

Cable entries
- Cable gland: M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in)
- Thread for cable entry:
  - NPT ½"
  - G ½"
  - M20

Cable specification
→ 37

16.6 Performance characteristics

Reference operating conditions
- Error limits based on ISO 11631
- Water with +15 to +45 °C (+59 to +113 °F) at 2 to 6 bar (29 to 87 psi)
- Specifications as per calibration protocol
- Accuracy based on accredited calibration rigs that are traced to ISO 17025.

To obtain measured errors, use the Applicator sizing tool → 248

Maximum measured error
o.r. = of reading; 1 g/cm³ = 1 kg/l; T = medium temperature

Base accuracy

Design fundamentals → 263

Mass flow and volume flow (liquids)
±0.10 % o.r.

Mass flow (gases)
±0.35 % o.r.

Density (liquids)

<table>
<thead>
<tr>
<th>Under reference conditions</th>
<th>Standard density calibration 1)</th>
<th>Wide-range density specification 2) 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[g/cm³]</td>
<td>[g/cm³]</td>
<td>[g/cm³]</td>
</tr>
<tr>
<td>±0.0005</td>
<td>±0.02</td>
<td>±0.002</td>
</tr>
</tbody>
</table>

1) Valid over the entire temperature and density range
2) Valid range for special density calibration: 0 to 2 g/cm³, +5 to +80 °C (+41 to +176 °F)
3) Order code for 'Application package', option EE 'Special density'

Temperature
±0.5 °C ± 0.005 · T °C (±0.9 °F ± 0.003 · (T – 32) °F)
Zero point stability

*Standard version: order code for 'Measuring tube mat., wetted surface', option BB, BF, HA, SA*

<table>
<thead>
<tr>
<th>DN</th>
<th>Zero point stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[in]</td>
</tr>
<tr>
<td>1</td>
<td>½₄</td>
</tr>
<tr>
<td>2</td>
<td>⅛</td>
</tr>
<tr>
<td>4</td>
<td>⅛</td>
</tr>
</tbody>
</table>

*High-pressure version: order code for 'Measuring tube mat., wetted surface', option HB*

<table>
<thead>
<tr>
<th>DN</th>
<th>Zero point stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[in]</td>
</tr>
<tr>
<td>1</td>
<td>½₄</td>
</tr>
<tr>
<td>2</td>
<td>⅛</td>
</tr>
<tr>
<td>4</td>
<td>⅛</td>
</tr>
</tbody>
</table>

Flow values

Flow values as turndown parameter depending on nominal diameter.

**SI units**

<table>
<thead>
<tr>
<th>DN</th>
<th>1:1</th>
<th>1:10</th>
<th>1:20</th>
<th>1:50</th>
<th>1:100</th>
<th>1:500</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[kg/h]</td>
<td>[kg/h]</td>
<td>[kg/h]</td>
<td>[kg/h]</td>
<td>[kg/h]</td>
<td>[kg/h]</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>2</td>
<td>1</td>
<td>0.4</td>
<td>0.2</td>
<td>0.04</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>4</td>
<td>450</td>
<td>45</td>
<td>22.5</td>
<td>9</td>
<td>4.5</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**US units**

<table>
<thead>
<tr>
<th>DN</th>
<th>1:1</th>
<th>1:10</th>
<th>1:20</th>
<th>1:50</th>
<th>1:100</th>
<th>1:500</th>
</tr>
</thead>
<tbody>
<tr>
<td>[inch]</td>
<td>[lb/min]</td>
<td>[lb/min]</td>
<td>[lb/min]</td>
<td>[lb/min]</td>
<td>[lb/min]</td>
<td>[lb/min]</td>
</tr>
<tr>
<td>½₄</td>
<td>0.735</td>
<td>0.074</td>
<td>0.037</td>
<td>0.015</td>
<td>0.007</td>
<td>0.001</td>
</tr>
<tr>
<td>⅛</td>
<td>3.675</td>
<td>0.368</td>
<td>0.184</td>
<td>0.074</td>
<td>0.037</td>
<td>0.007</td>
</tr>
<tr>
<td>⅛</td>
<td>16.54</td>
<td>1.654</td>
<td>0.827</td>
<td>0.331</td>
<td>0.165</td>
<td>0.033</td>
</tr>
</tbody>
</table>

Accuracy of outputs

The outputs have the following base accuracy specifications.

**Current output**

| Accuracy | ±5 µA |

**Pulse/frequency output**

o.r. = of reading
### Technical data

<table>
<thead>
<tr>
<th><strong>Accuracy</strong></th>
<th>Max. ±50 ppm o.r. (over the entire ambient temperature range)</th>
</tr>
</thead>
</table>

### Repeatability

- **O.r. = of reading; 1 g/cm³ = 1 kg/l; T = medium temperature**

**Base repeatability**

Design fundamentals → 263

**Mass flow and volume flow (liquids)**

±0.05 % o.r.

**Mass flow (gases)**

±0.15 % o.r.

**Density (liquids)**

±0.00025 g/cm³

**Temperature**

±0.25 °C ± 0.0025 · T °C (±0.45 °F ± 0.0015 · (T–32) °F)

### Response time

The response time depends on the configuration (damping).

### Influence of ambient temperature

**Current output**

<table>
<thead>
<tr>
<th>Temperature coefficient</th>
<th>Max. 1 µA/°C</th>
</tr>
</thead>
</table>

**Pulse/frequency output**

<table>
<thead>
<tr>
<th>Temperature coefficient</th>
<th>No additional effect. Included in accuracy.</th>
</tr>
</thead>
</table>

### Influence of medium temperature

**Mass flow and volume flow**

o.f.s. = of full scale value

When there is a difference between the temperature for zero point adjustment and the process temperature, the additional measured error of the sensor is typically ±0.0002 % o.f.s./°C (±0.0001 % o. f.s./°F).

The effect is reduced if zero point adjustment is performed at process temperature.

**Density**

When there is a difference between the density calibration temperature and the process temperature, the typical measured error of the sensor is ±0.00005 g/cm³/°C (±0.000025 g/cm³/°F). Field density calibration is possible.

**Wide-range density specification (special density calibration)**

If the process temperature is outside the valid range (→ 260) the measured error is ±0.00005 g/cm³/°C (±0.000025 g/cm³/°F)
1  Field density calibration, for example at +20 °C (+68 °F)
2  Special density calibration

Influence of medium pressure
A difference between the calibration pressure and process pressure does not affect accuracy.

Design fundamentals
o.r. = of reading, o.f.s. = of full scale value
BaseAccu = base accuracy in % o.r., BaseRepeat = base repeatability in % o.r.
MeasValue = measured value; ZeroPoint = zero point stability

**Calculation of the maximum measured error as a function of the flow rate**

<table>
<thead>
<tr>
<th>Flow rate</th>
<th>Maximum measured error in % o.r.</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ ( \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100 )</td>
<td>± BaseAccu</td>
</tr>
<tr>
<td>&lt; ( \frac{\text{ZeroPoint}}{\text{BaseAccu}} \cdot 100 )</td>
<td>± ( \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100 )</td>
</tr>
</tbody>
</table>

**Calculation of the maximum repeatability as a function of the flow rate**

<table>
<thead>
<tr>
<th>Flow rate</th>
<th>Maximum repeatability in % o.r.</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ ( \frac{1}{2} \cdot \frac{\text{ZeroPoint}}{\text{BaseRepeat}} \cdot 100 )</td>
<td>± BaseRepeat</td>
</tr>
<tr>
<td>&lt; ( \frac{1}{2} \cdot \frac{\text{ZeroPoint}}{\text{BaseRepeat}} \cdot 100 )</td>
<td>± ( \frac{1}{2} \cdot \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100 )</td>
</tr>
</tbody>
</table>
Example for maximum measured error

$$E \quad \text{Maximum measured error in \% o.r. (example)}$$

$$Q \quad \text{Flow rate in \% of maximum full scale value}$$

16.7 Installation

Installation conditions → § 23

16.8 Environment

Ambient temperature range → § 25 → § 25

Temperature tables

Observe the interdependencies between the permitted ambient and fluid temperatures when operating the device in hazardous areas.

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

Storage temperature

-50 to +80 °C (−58 to +176 °F)

Climate class

DIN EN 60068-2-38 (test Z/AD)

Degree of protection

**Transmitter**

- As standard: IP66/67, type 4X enclosure
- When housing is open: IP20, type 1 enclosure
- Display module: IP20, type 1 enclosure

**Sensor**

- As standard: IP66/67, type 4X enclosure
- With the order code for ‘Sensor options’, option CM: IP69 can also be ordered

**External WLAN antenna**

IP67

Vibration- and shock-resistance

Vibration sinusoidal, in accordance with IEC 60068-2-6

Sensor

- 2 to 8.4 Hz, 3.5 mm peak
- 8.4 to 2000 Hz, 1 g peak
Transmitter
- 2 to 8.4 Hz, 7.5 mm peak
- 8.4 to 2,000 Hz, 2 g peak

**Vibration broad-band random, according to IEC 60068-2-64**

Sensor
- 10 to 200 Hz, 0.003 g²/Hz
- 200 to 2,000 Hz, 0.001 g²/Hz
- Total: 1.54 g rms

Transmitter
- 10 to 200 Hz, 0.01 g²/Hz
- 200 to 2,000 Hz, 0.003 g²/Hz
- Total: 2.70 g rms

**Shock half-sine, according to IEC 60068-2-27**

- Sensor
  - 6 ms 30 g
- Transmitter
  - 6 ms 50 g

**Rough handling shocks, according to IEC 60068-2-31**

---

**Mechanical load**

Never use the transmitter housing as a ladder or climbing aid.

**Electromagnetic compatibility (EMC)**

As per IEC/EN 61326 and NAMUR Recommendation 21 (NE 21)

Details are provided in the Declaration of Conformity.

---

**16.9 Process**

**Medium temperature range**
-50 to +205 °C (−58 to +401 °F)
# Dependency of ambient temperature on medium temperature

![Diagram of ambient temperature vs. medium temperature](image)

42 Exemplary representation, values in the table below.

- **$T_a$**: Ambient temperature range
- **$T_m$**: Medium temperature

<table>
<thead>
<tr>
<th>Version</th>
<th>Not insulated</th>
<th>Insulated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$T_a$</td>
<td>$T_m$</td>
</tr>
<tr>
<td>Promass A 500 – digital</td>
<td>60 °C (140 °F)</td>
<td>205 °C (401 °F)</td>
</tr>
<tr>
<td>Promass A 500</td>
<td>60 °C (140 °F)</td>
<td>205 °C (401 °F)</td>
</tr>
</tbody>
</table>

Values for devices used in the hazardous area: Separate Ex documentation (XA) for the device → 279.

- **Density**: 0 to 5000 kg/m³ (0 to 312 lb/cf)

- **Pressure-temperature ratings** An overview of the pressure-temperature ratings for the process connections is provided in the "Technical Information" document

- **Sensor housing** The sensor housing is filled with dry nitrogen gas and protects the electronics and mechanics inside.

  - If a measuring tube fails (e.g. due to process characteristics like corrosive or abrasive fluids), the fluid will initially be contained by the sensor housing.

  In the event of a tube failure, the pressure level inside the sensor housing will rise according to the operating process pressure. If the user judges that the sensor housing burst pressure does not provide an adequate safety margin, the device can be fitted with a rupture disk. This prevents excessively high pressure from forming inside the sensor housing. Therefore, the use of a rupture disk is strongly recommended in applications involving high gas pressures, and particularly in applications in which the process pressure is greater than 2/3 of the sensor housing burst pressure.

  - High-pressure devices are always fitted with a rupture disk: order code for "Measuring tube mat., wetted surface", option HB
Burst pressure of the sensor housing

If the device is fitted with a rupture disk (order code for "Sensor option", option CA "Rupture disk"), the rupture disk trigger pressure is decisive.

The sensor housing burst pressure refers to a typical internal pressure which is reached prior to mechanical failure of the sensor housing and which was determined during type testing. The corresponding type test declaration can be ordered with the device (order code for "Additional approval", option LN "Sensor housing burst pressure, type test").

<table>
<thead>
<tr>
<th>DN [mm]</th>
<th>Sensor housing burst pressure [bar] [psi]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ¹⁄₂₄</td>
<td>220 3 190</td>
</tr>
<tr>
<td>2 ¹⁄₁₂</td>
<td>140 2 030</td>
</tr>
<tr>
<td>4 ¹⁄₈</td>
<td>105 1 520</td>
</tr>
</tbody>
</table>

For information on the dimensions: see the "Mechanical construction" section of the 'Technical Information' document

Rupture disk

To increase the level of safety, a device version with a rupture disk with a trigger pressure of 10 to 15 bar (145 to 217.5 psi) can be used (order code for "Sensor option", option CA "rupture disk").

Drain connection for rupture disk

To allow any escaping medium to drain in a controlled manner in the event of an error, an optional drain connection can be ordered in addition to the rupture disk.

The function of the rupture disk is not compromised in any way.

Flow limit

Select the nominal diameter by optimizing between the required flow range and permissible pressure loss.

For an overview of the full scale values for the measuring range, see the "Measuring range" section → 251

- The minimum recommended full scale value is approx. 1/20 of the maximum full scale value
- In most applications, 20 to 50% of the maximum full scale value can be considered ideal
- A low full scale value must be selected for abrasive media (such as liquids with entrained solids): flow velocity < 1 m/s (< 3 ft/s).
- For gas measurement the following rules apply:
  - The flow velocity in the measuring tubes should not exceed half the sound velocity (0.5 Mach).
  - The maximum mass flow depends on the density of the gas: formula → 251

To calculate the flow limit, use the Applicator sizing tool → 248

Pressure loss

To calculate the pressure loss, use the Applicator sizing tool → 248

System pressure → 25
16.10  Mechanical construction

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

**Weight**
All values (weight exclusive of packaging material) refer to devices with VCO couplings.

- **Transmitter**
  - Proline 500 – digital polycarbonate: 1.4 kg (3.1 lbs)
  - Proline 500 – digital aluminum: 2.4 kg (5.3 lbs)
  - Proline 500 aluminum: 6.5 kg (14.3 lbs)
  - Proline 500 cast, stainless: 15.6 kg (34.4 lbs)

- **Sensor**
  Sensor with aluminum connection housing version: see the information in the following table

<table>
<thead>
<tr>
<th>Weight in SI units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN [mm]</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight in US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN [in]</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1/24</td>
</tr>
<tr>
<td>1/12</td>
</tr>
<tr>
<td>1/8</td>
</tr>
</tbody>
</table>

**Materials**

- **Transmitter housing**
  *Housing of Proline 500 – digital transmitter*
  Order code for 'Transmitter housing':
  - Option A 'Aluminum coated': aluminum, AlSi10Mg, coated
  - Option D 'Polycarbonate': polycarbonate

- **Transmitter housing**
  *Housing of Proline 500 transmitter*
  Order code for 'Transmitter housing':
  - Option A 'Aluminum coated': aluminum, AlSi10Mg, coated
  - Option L 'Cast, stainless': cast, stainless steel, 1.4409 (CF3M) similar to 316L

- **Window material**
  Order code for 'Transmitter housing':
  - Option A 'Aluminum, coated': glass
  - Option D 'Polycarbonate': plastic
  - Option L 'Cast, stainless': glass

- **Fastening components for mounting on a post**
  - Screws, threaded bolts, washers, nuts: stainless A2 (chrome-nickel steel)
  - Metal plates: stainless steel, 1.4301 (304)
Sensor connection housing
Order code for "Sensor connection housing":
- Option A "Aluminum coated": aluminum, AlSi10Mg, coated
- Option B "Stainless":
  Stainless steel 1.4301 (304)
- Option C "Ultra-compact, stainless":
  Stainless steel 1.4301 (304)
- Option L "Cast, stainless": 1.4409 (CF3M) similar to 316L

Cable entries/cable glands

<table>
<thead>
<tr>
<th>Cable entries and adapters</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable gland M20 × 1.5</td>
<td>Plastic</td>
</tr>
<tr>
<td>Adapter for cable entry with female thread G ½&quot;</td>
<td>Nickel-plated brass</td>
</tr>
<tr>
<td>Adapter for cable entry with female thread NPT ½&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Connecting cable
UV rays can impair the cable outer sheath. Protect the cable from exposure to sun as much as possible.

Connecting cable for sensor - Proline 500 - digital transmitter
PVC cable with copper shield

Connecting cable for sensor - Proline 500 transmitter
- Standard cable: PVC cable with copper shield
- Armored cable: PVC cable with copper shield and additional steel wire braided jacket

Sensor housing
- Acid and alkali-resistant outer surface
- Stainless steel, 1.4404 (316L)

Measuring tubes
Order code for "Measuring tube mat., wetted surface", option BB, BF, SA
Stainless steel, 1.4435 (316/316L)
Order code for "Measuring tube mat., wetted surface", option HA, HB, HC, HD
Alloy C22, 2.4602 (UNS N06022)

Process connections
Order code for "Measuring tube mat., wetted surface", option SA
## Technical data

### Proline Promass A 500 PROFINET

<table>
<thead>
<tr>
<th>NPT(\frac{1}{4})^“, NPT(\frac{1}{2})^“ female thread</th>
<th>Stainless steel, 1.4404 (316/316L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tri-Clamp(\frac{1}{2})^“</td>
<td>Stainless steel, 1.4435 (316L)</td>
</tr>
<tr>
<td>Fixed flange EN 1092-1, ASME B16.5, JIS B2220</td>
<td>Stainless steel, 1.4404 (316/316L)</td>
</tr>
</tbody>
</table>

Order code for 'Measuring tube mat., wetted surface', option BB, BF

<table>
<thead>
<tr>
<th>VCO coupling</th>
<th>Stainless steel, 1.4404 (316/316L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tri-Clamp(\frac{1}{2})^“</td>
<td>Stainless steel, 1.4435 (316L)</td>
</tr>
</tbody>
</table>

Order code for 'Measuring tube mat., wetted surface', option HC, HD

<table>
<thead>
<tr>
<th>VCO coupling</th>
<th>Alloy C22, 2.4602 (UNS N06022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tri-Clamp(\frac{1}{2})^“</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
</tbody>
</table>

Order code for 'Measuring tube mat., wetted surface', option HA

<table>
<thead>
<tr>
<th>VCO coupling</th>
<th>Alloy C22, 2.4602 (UNS N06022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G(\frac{1}{4})^“, G(\frac{1}{2})^“ female thread</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>NPT(\frac{1}{4})^“, NPT(\frac{1}{2})^“ female thread</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>Fixed flange EN 1092-1, ASME B16.5, JIS B2220</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>Lap joint flange EN 1092-1, ASME B16.5, JIS B2220</td>
<td>Stainless steel, 1.4301 (F304), wetted parts Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
</tbody>
</table>

Order code for 'Measuring tube mat., wetted surface', option HB (high-pressure option)

<table>
<thead>
<tr>
<th>VCO coupling</th>
<th>Alloy C22, 2.4602 (UNS N06022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G(\frac{1}{4})^“, G(\frac{1}{2})^“ female thread</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>NPT(\frac{1}{4})^“, NPT(\frac{1}{2})^“ female thread</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>Fixed flange EN 1092-1, ASME B16.5, JIS B2220</td>
<td>Stainless steel, 1.4404 (316/316L); Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
</tbody>
</table>

### Available process connections

| Available process connections | 271 |

### Seals

Welded process connections without internal seals

### Accessories

*Sensor holder*

Stainless steel, 1.4404 (316L)
### Heating jacket
- Heating jacket housing: stainless steel, 1.4571 (316Ti)
- NPT adapter ½": stainless steel, 1.4404 (316)
- G½" adapter: stainless steel, 1.4404

### Protective cover
Stainless steel, 1.4404 (316L)

### External WLAN antenna
- Antenna: ASA plastic (acrylic ester-styrene-acrylonitrile) and nickel-plated brass
- Adapter: Stainless steel and nickel-plated brass
- Cable: Polyethylene
- Plug: Nickel-plated brass
- Angle bracket: Stainless steel

### Process connections
- Fixed flange connections:
  - EN 1092-1 (DIN 2501) flange
  - EN 1092-1 (DIN 2512N) flange
  - ASME B16.5 flange
  - JIS B2220 flange
- Clamp connections:
  - Tri-Clamp (OD tubes), DIN 11866 series C
- VCO connections:
  - 4-VCO-4
- Female thread:
  - Cylindrical female thread BSPP (G) in accordance with ISO 228-1
  - NPT

<table>
<thead>
<tr>
<th>Process connection materials</th>
<th>269</th>
</tr>
</thead>
</table>

### Surface roughness
All data relate to parts in contact with fluid. The following surface roughness quality can be ordered.
- Not polished
- $R_{a_{\text{max}}} = 0.76 \, \mu\text{m} \, (30 \, \mu\text{in})$ mechanically polished
- $R_{a_{\text{max}}} = 0.38 \, \mu\text{m} \, (15 \, \mu\text{in})$ mechanically polished

### 16.11 Human interface

### Languages
Can be operated in the following languages:
- Via local operation
  - English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Korean, Bahasa (Indonesian), Vietnamese, Czech, Swedish
- Via Web browser
  - English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Korean, Bahasa (Indonesian), Vietnamese, Czech, Swedish
- Via "FieldCare", "DeviceCare" operating tool: English, German, French, Spanish, Italian, Chinese, Japanese
Local operation

Via display module

Equipment:
- Order code for "Display; operation", option F "4-line, illuminated, graphic display; touch control"
- Order code for "Display; operation", option G "4-line, illuminated, graphic display; touch control + WLAN"

Information about WLAN interface →  92

Display elements
- 4-line, illuminated, graphic display
- White background lighting; switches to red in event of device errors
- Format for displaying measured variables and status variables can be individually configured
- Permitted ambient temperature for the display: –20 to +60 °C (–4 to +140 °F)

The readability of the display may be impaired at temperatures outside the temperature range.

Operating elements
- External operation via touch control (3 optical keys) without opening the housing: 1, 2, 3
- Operating elements also accessible in the various zones of the hazardous area

Remote operation →  90

Service interface →  91

Supported operating tools
Different operating tools can be used for local or remote access to the measuring device. Depending on the operating tool used, access is possible with different operating units and via a variety of interfaces.
### Supported operating tools

<table>
<thead>
<tr>
<th>Supported operating tools</th>
<th>Operating unit</th>
<th>Interface</th>
<th>Additional information</th>
</tr>
</thead>
</table>
| Web browser               | Notebook, PC or tablet with Web browser | • CDI-RJ45 service interface  
  • WLAN interface  
  • Ethernet-based fieldbus (EtherNet/IP, PROFINET) | Special Documentation for device →   279 |
| DeviceCare SFE100         | Notebook, PC or tablet with Microsoft Windows system | • CDI-RJ45 service interface  
  • WLAN interface  
  • Fieldbus protocol | →   248 |
| FieldCare SFE500          | Notebook, PC or tablet with Microsoft Windows system | • CDI-RJ45 service interface  
  • WLAN interface  
  • Fieldbus protocol | →   248 |

Other operating tools based on FDT technology with a device driver such as DTM/iDTM or DD/EDD can be used for device operation. These operating tools are available from the individual manufacturers. Integration into the following operating tools, among others, is supported:

- **Field Device Manager (FDM)** by Honeywell → [www.honeywellprocess.com](http://www.honeywellprocess.com)
- **FieldMate** by Yokogawa → [www.yokogawa.com](http://www.yokogawa.com)
- **PACTWare** → [www.pactware.com](http://www.pactware.com)

The associated device description files are available at: [www.endress.com → Downloads](http://www.endress.com)  

### Web server

Thanks to the integrated Web server, the device can be operated and configured via a Web browser and via a service interface (CDI-RJ45) or via a WLAN interface. The structure of the operating menu is the same as for the local display. In addition to the measured values, status information on the device is also displayed and allows the user to monitor the status of the device. Furthermore the device data can be managed and the network parameters can be configured.

A device that has a WLAN interface (can be ordered as an option) is required for the WLAN connection: order code for "Display; operation", option G "4-line, illuminated; touch control + WLAN". The device acts as an Access Point and enables communication by computer or a mobile handheld terminal.

### Supported functions

Data exchange between the operating unit (such as a notebook for example) and the measuring device:

- Upload the configuration from the measuring device (XML format, configuration backup)
- Save the configuration to the measuring device (XML format, restore configuration)
- Export event list (.csv file)
- Export parameter settings (.csv file or PDF file, document the measuring point configuration)
- Export the Heartbeat verification log (PDF file, only available with the "Heartbeat Verification" application package)
- Flash firmware version for device firmware upgrade, for instance
- Download driver for system integration
- Visualize up to 1000 saved measured values (only available with the [Extended HistoroM](#) application package →   278)

Web server special documentation →   279
HistoROM data management

The measuring device features HistoROM data management. HistoROM data management comprises both the storage and import/export of key device and process data, making operation and servicing far more reliable, secure and efficient.

When the device is delivered, the factory settings of the configuration data are stored as a backup in the device memory. This memory can be overwritten with an updated data record, for example after commissioning.

Additional information on the data storage concept

There are different types of data storage units in which device data are stored and used by the device:

<table>
<thead>
<tr>
<th>Available data</th>
<th>Device memory</th>
<th>T-DAT</th>
<th>S-DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event logbook such as diagnostic events for example</td>
<td>Measured value logging (&quot;Extended HistoROM&quot; order option)</td>
<td>Sensor data: nominal diameter etc.</td>
<td></td>
</tr>
<tr>
<td>Parameter data record backup</td>
<td>Current parameter data record (used by firmware at run time)</td>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>Device firmware package</td>
<td>Peakhold indicator (min/max values)</td>
<td>Calibration data</td>
<td></td>
</tr>
<tr>
<td>Driver for system integration for exporting via Web server, e.g.: GSDML for PROFINET</td>
<td>Totalizer values</td>
<td>Device configuration (e.g. SW options, fixed I/O or multi I/O)</td>
<td></td>
</tr>
</tbody>
</table>

Storage location

<table>
<thead>
<tr>
<th>Device memory</th>
<th>T-DAT</th>
<th>S-DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed on the user interface board in the connection compartment</td>
<td>Attachable to the user interface board in the connection compartment</td>
<td>In the sensor plug in the transmitter neck part</td>
</tr>
</tbody>
</table>

Data backup

Automatic
- The most important device data (sensor and transmitter) are automatically saved in the DAT modules
- If the transmitter or measuring device is replaced: once the T-DAT containing the previous device data has been exchanged, the new measuring device is ready for operation again immediately without any errors
- If the sensor is replaced: once the sensor has been replaced, new sensor data are transferred from the S-DAT in the measuring device and the measuring device is ready for operation again immediately without any errors
- If exchanging the electronics module (e.g. I/O electronics module): Once the electronics module has been replaced, the software of the module is compared against the current device firmware. The module software is upgraded or downgraded where necessary. The electronics module is available for use immediately afterwards and no compatibility problems occur.

Manual

Additional parameter data record (complete parameter settings) in the integrated device memory HistoROM backup for:
- Data backup function
  Backup and subsequent restoration of a device configuration in the device memory HistoROM backup
- Data comparison function
  Comparison of the current device configuration with the device configuration saved in the device memory HistoROM backup

Data transfer

Manual
- Transfer of a device configuration to another device using the export function of the specific operating tool, e.g. with FieldCare, DeviceCare or Web server: to duplicate the configuration or to store in an archive (e.g. for backup purposes)
- Transmission of the drivers for system integration via Web server, e.g.: GSDML for PROFINET
**Event list**

**Automatic**
- Chronological display of up to 20 event messages in the events list
- If the Extended HistoROM application package (order option) is enabled: up to 100 event messages are displayed in the events list along with a time stamp, plain text description and remedial measures
- The events list can be exported and displayed via a variety of interfaces and operating tools e.g. DeviceCare, FieldCare or Web server

**Data logging**

**Manual**
If the Extended HistoROM application package (order option) is enabled:
- Record up to 1000 measured values via 1 to 4 channels
- User configurable recording interval
- Record up to 250 measured values via each of the 4 memory channels
- Export the measured value log via a variety of interfaces and operating tools e.g. FieldCare, DeviceCare or web server

---

### 16.12 Certificates and approvals

Currently available certificates and approvals can be called up via the product configurator.

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CE mark</strong></td>
<td>The device meets the legal requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.</td>
</tr>
<tr>
<td><strong>Ex approval</strong></td>
<td>The devices are certified for use in hazardous areas and the relevant safety instructions are provided in the separate &quot;Safety Instructions&quot; (XA) document. Reference is made to this document on the nameplate.</td>
</tr>
</tbody>
</table>
| **Sanitary compatibility** | - 3-A approval
  - Only measuring devices with the order code for "Additional approval", option LP "3A" have 3-A approval.
  - The 3-A approval refers to the measuring device.
  - When installing the measuring device, ensure that no liquid can accumulate on the outside of the measuring device. Remote transmitters must be installed in accordance with the 3-A Standard.
  - Accessories (e.g. heating jacket, weather protection cover, wall holder unit) must be installed in accordance with the 3-A Standard.
  - Each accessory can be cleaned. Disassembly may be necessary under certain circumstances.
  - FDA
  - Food Contact Materials Regulation (EC) 1935/2004 |

---

Endress+Hauser
Technical data

Pharmaceutical compatibility
- FDA 21 CFR 177
- USP <87>
- USP <88> Class VI 121 °C
- TSE/BSE Certificate of Suitability
- cGMP

Devices with order code for “Test, certificate”, option JG “Compliance with requirements derived from cGMP, declaration” are in accordance with cGMP requirements relating to the surfaces of wetted parts, design, FDA 21 CFR material conformity, USP Class VI tests and TSE/BSE-compliance.

A manufacturer's declaration specific to the serial number is supplied with the device.

Certification PROFINET

PROFINET interface
The measuring device is certified and registered by the PNO (PROFIBUS User Organization). The measuring system meets all the requirements of the following specifications:
- Certified according to:
  - Test specification for PROFINET devices
  - PROFINET Security Level 2 – Netload Class
- The device can also be operated with certified devices of other manufacturers (interoperability)
- The device supports PROFINET S2 system redundancy.

Radio approval
The measuring device has radio approval.

For detailed information regarding radio approval, see Special Documentation → 279

Additional certification
CRN approval
Some device versions have CRN approval. A CRN-approved process connection with a CSA approval must be ordered for a CRN-approved device.

Tests and certificates
- EN10204-3.1 material certificate, parts and sensor housing in contact with medium
- Pressure testing, internal procedure, inspection certificate
- PMI test (XRF), internal procedure, wetted parts, test report
- Compliance with requirements derived from cGMP, Declaration
- NACE MR0175 / ISO 15156
- NACE MR0103 / ISO 17945

Testing of welded connections

<table>
<thead>
<tr>
<th>Option</th>
<th>Test standard</th>
<th>Process connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ISO 10675-1 AL1</td>
<td>ASME B31.3 NFS</td>
</tr>
<tr>
<td>KE</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>K1</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>KN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option</td>
<td>Test standard</td>
<td>Process connection</td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>ISO 10675-1 AL1</td>
<td>ASME B31.3 NFS</td>
<td>x</td>
</tr>
<tr>
<td>ASME VIII Div.1</td>
<td>NORSOK M-601</td>
<td></td>
</tr>
</tbody>
</table>

RT = Radiographic testing, DR = Digital radiography
All options with test report

Other standards and guidelines

- EN 60529
  Degrees of protection provided by enclosures (IP code)
- IEC/EN 60068-2-6
  Environmental influences: Test procedure - Test Fc: vibrate (sinusoidal).
- IEC/EN 60068-2-31
  Environmental influences: Test procedure - Test Ec: shocks due to rough handling, primarily for devices.
- EN 61010-1
  Safety requirements for electrical equipment for measurement, control and laboratory use - general requirements
- IEC/EN 61326
  Emission in accordance with Class A requirements. Electromagnetic compatibility (EMC) requirements.
- NAMUR NE 21
  Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment
- NAMUR NE 32
  Data retention in the event of a power failure in field and control instruments with microprocessors
- NAMUR NE 43
  Standardization of the signal level for the breakdown information of digital transmitters with analog output signal.
- NAMUR NE 53
  Software of field devices and signal-processing devices with digital electronics
- NAMUR NE 105
  Specifications for integrating fieldbus devices in engineering tools for field devices
- NAMUR NE 107
  Self-monitoring and diagnosis of field devices
- NAMUR NE 131
  Requirements for field devices for standard applications
- NAMUR NE 132
  Coriolis mass meter

16.13 Application packages

Many different application packages are available to enhance the functionality of the device. Such packages might be needed to address safety aspects or specific application requirements.

The application packages can be ordered with the device or subsequently from Endress+Hauser. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Detailed information on the application packages:
Special Documentation for the device → 279
## Diagnostics functions

<table>
<thead>
<tr>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended HistoROM</td>
<td>Comprises extended functions concerning the event log and the activation of the measured value memory.</td>
</tr>
<tr>
<td></td>
<td>Event log: Memory volume is extended from 20 message entries (standard version) to up to 100 entries.</td>
</tr>
<tr>
<td></td>
<td>Data logging (line recorder):</td>
</tr>
<tr>
<td></td>
<td>• Memory capacity for up to 1000 measured values is activated.</td>
</tr>
<tr>
<td></td>
<td>• 250 measured values can be output via each of the 4 memory channels. The recording interval can be defined and configured by the user.</td>
</tr>
<tr>
<td></td>
<td>• Measured value logs can be accessed via the local display or operating tool e.g. FieldCare, DeviceCare or Web server.</td>
</tr>
</tbody>
</table>

## Heartbeat Technology

<table>
<thead>
<tr>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartbeat Verification +Monitoring</td>
<td><strong>Heartbeat Verification</strong></td>
</tr>
<tr>
<td></td>
<td>Meets the requirement for traceable verification to DIN ISO 9001:2008 Chapter 7.6 a) 'Control of monitoring and measuring equipment'.</td>
</tr>
<tr>
<td></td>
<td>• Functional testing in the installed state without interrupting the process.</td>
</tr>
<tr>
<td></td>
<td>• Traceable verification results on request, including a report.</td>
</tr>
<tr>
<td></td>
<td>• Simple testing process via local operation or other operating interfaces.</td>
</tr>
<tr>
<td></td>
<td>• Clear measuring point assessment (pass/fail) with high test coverage within the framework of manufacturer specifications.</td>
</tr>
<tr>
<td></td>
<td>• Extension of calibration intervals according to operator's risk assessment.</td>
</tr>
<tr>
<td><strong>Heartbeat Monitoring</strong></td>
<td>Continuously supplies data, which are characteristic of the measuring principle, to an external condition monitoring system for the purpose of preventive maintenance or process analysis. These data enable the operator to:</td>
</tr>
<tr>
<td></td>
<td>• Draw conclusions - using these data and other information - about the impact process influences (such as corrosion, abrasion, buildup etc.) have on the measuring performance over time.</td>
</tr>
<tr>
<td></td>
<td>• Schedule servicing in time.</td>
</tr>
<tr>
<td></td>
<td>• Monitor the process or product quality, e.g. gas pockets.</td>
</tr>
</tbody>
</table>

## Concentration

<table>
<thead>
<tr>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>Calculation and outputing of fluid concentrations</td>
</tr>
<tr>
<td></td>
<td>The measured density is converted to the concentration of a substance of a binary mixture using the 'Concentration' application package:</td>
</tr>
<tr>
<td></td>
<td>• Choice of predefined fluids (e.g. various sugar solutions, acids, alkalis, salts, ethanol etc.)</td>
</tr>
<tr>
<td></td>
<td>• Common or user-defined units ('Brix, 'Plato, % mass, % volume, mol/l etc.) for standard applications.</td>
</tr>
<tr>
<td></td>
<td>• Concentration calculation from user-defined tables.</td>
</tr>
</tbody>
</table>

## Special density

<table>
<thead>
<tr>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special density</td>
<td>Many applications use density as a key measured value for monitoring quality or controlling processes. The device measures the density of the fluid as standard and makes this value available to the control system. The 'Special Density' application package offers high-precision density measurement over a wide density and temperature range particularly for applications subject to varying process conditions.</td>
</tr>
</tbody>
</table>

## 16.14 Accessories

Overview of accessories available for order ➔ 246
### 16.15 Supplementary documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:
- **W@M Device Viewer** ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter the serial number from nameplate
- **Endress+Hauser Operations App**: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

<table>
<thead>
<tr>
<th>Standard documentation</th>
<th>Brief Operating Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brief Operating Instructions for the sensor</strong></td>
<td></td>
</tr>
<tr>
<td>Measuring device</td>
<td>Documentation code</td>
</tr>
<tr>
<td>Proline Promass A</td>
<td>KA01282D</td>
</tr>
<tr>
<td><strong>Brief Operating Instructions for transmitter</strong></td>
<td></td>
</tr>
<tr>
<td>Measuring device</td>
<td>Documentation code</td>
</tr>
<tr>
<td>Proline 500 - digital</td>
<td>KA01351D</td>
</tr>
<tr>
<td>Proline 500</td>
<td>KA01350D</td>
</tr>
</tbody>
</table>

### Technical Information

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promass A 500</td>
<td>TI01375D</td>
</tr>
</tbody>
</table>

### Description of Device Parameters

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promass 500</td>
<td>GP01121D</td>
</tr>
</tbody>
</table>

### Device-dependent additional documentation

#### Safety instructions
Safety instructions for electrical equipment for hazardous areas.

### Special Documentation

<table>
<thead>
<tr>
<th>Contents</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on the Pressure Equipment Directive</td>
<td>SD01614D</td>
</tr>
<tr>
<td>Radio approvals for WLAN interface for A309/A310 display module</td>
<td>SD01793D</td>
</tr>
<tr>
<td>Web server</td>
<td>SD01971D</td>
</tr>
<tr>
<td>Heartbeat Technology</td>
<td>SD01989D</td>
</tr>
<tr>
<td>Concentration measurement</td>
<td>SD02007D</td>
</tr>
</tbody>
</table>

### Installation Instructions

<table>
<thead>
<tr>
<th>Contents</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Installation instructions for spare part sets and accessories | - Access the overview of all the available spare part sets via W@M Device Viewer → 244
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Endress+Hauser

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Proline Promass A 500 PROFINET

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