Operating Instructions
Proline Promass A 500
PROFIBUS DP
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.
# Table of contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>About this document</td>
<td>6</td>
</tr>
<tr>
<td>1.1</td>
<td>Document function</td>
<td>6</td>
</tr>
<tr>
<td>1.2</td>
<td>Symbols</td>
<td>6</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Safety symbols</td>
<td>6</td>
</tr>
<tr>
<td>1.2.2</td>
<td>Electrical symbols</td>
<td>6</td>
</tr>
<tr>
<td>1.2.3</td>
<td>Communication symbols</td>
<td>6</td>
</tr>
<tr>
<td>1.2.4</td>
<td>Tool symbols</td>
<td>7</td>
</tr>
<tr>
<td>1.2.5</td>
<td>Symbols for certain types of information</td>
<td>7</td>
</tr>
<tr>
<td>1.2.6</td>
<td>Symbols in graphics</td>
<td>7</td>
</tr>
<tr>
<td>1.3</td>
<td>Documentation</td>
<td>8</td>
</tr>
<tr>
<td>1.3.1</td>
<td>Standard documentation</td>
<td>8</td>
</tr>
<tr>
<td>1.3.2</td>
<td>Supplementary device-dependent documentation</td>
<td>8</td>
</tr>
<tr>
<td>1.4</td>
<td>Registered trademarks</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Safety instructions</td>
<td>10</td>
</tr>
<tr>
<td>2.1</td>
<td>Requirements for the personnel</td>
<td>10</td>
</tr>
<tr>
<td>2.2</td>
<td>Designated use</td>
<td>10</td>
</tr>
<tr>
<td>2.3</td>
<td>Workplace safety</td>
<td>11</td>
</tr>
<tr>
<td>2.4</td>
<td>Operational safety</td>
<td>11</td>
</tr>
<tr>
<td>2.5</td>
<td>Product safety</td>
<td>12</td>
</tr>
<tr>
<td>2.6</td>
<td>IT security</td>
<td>12</td>
</tr>
<tr>
<td>2.7</td>
<td>Device-specific IT security</td>
<td>12</td>
</tr>
<tr>
<td>2.7.1</td>
<td>Protecting access via hardware write protection</td>
<td>12</td>
</tr>
<tr>
<td>2.7.2</td>
<td>Protecting access via a password</td>
<td>13</td>
</tr>
<tr>
<td>2.7.3</td>
<td>Access via Web server</td>
<td>13</td>
</tr>
<tr>
<td>2.7.4</td>
<td>Access via service interface (CDI-RJ45)</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Product description</td>
<td>15</td>
</tr>
<tr>
<td>3.1</td>
<td>Product design</td>
<td>15</td>
</tr>
<tr>
<td>3.1.1</td>
<td>Proline 500 – digital</td>
<td>15</td>
</tr>
<tr>
<td>3.1.2</td>
<td>Proline 500</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Incoming acceptance and product identification</td>
<td>17</td>
</tr>
<tr>
<td>4.1</td>
<td>Incoming acceptance</td>
<td>17</td>
</tr>
<tr>
<td>4.2</td>
<td>Product identification</td>
<td>17</td>
</tr>
<tr>
<td>4.2.1</td>
<td>Transmitter nameplate</td>
<td>18</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Sensor nameplate</td>
<td>20</td>
</tr>
<tr>
<td>4.2.3</td>
<td>Symbols on measuring device</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>Storage and transport</td>
<td>22</td>
</tr>
<tr>
<td>5.1</td>
<td>Storage conditions</td>
<td>22</td>
</tr>
<tr>
<td>5.2</td>
<td>Transporting the product</td>
<td>22</td>
</tr>
<tr>
<td>5.2.1</td>
<td>Measuring devices without lifting lugs</td>
<td>22</td>
</tr>
<tr>
<td>5.2.2</td>
<td>Measuring devices with lifting lugs</td>
<td>23</td>
</tr>
<tr>
<td>5.2.3</td>
<td>Transporting with a fork lift</td>
<td>23</td>
</tr>
<tr>
<td>5.3</td>
<td>Packaging disposal</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Installation</td>
<td>23</td>
</tr>
<tr>
<td>6.1</td>
<td>Installation conditions</td>
<td>23</td>
</tr>
<tr>
<td>6.1.1</td>
<td>Mounting position</td>
<td>23</td>
</tr>
<tr>
<td>6.1.2</td>
<td>Environmental and process requirements</td>
<td>25</td>
</tr>
<tr>
<td>6.1.3</td>
<td>Special mounting instructions</td>
<td>27</td>
</tr>
<tr>
<td>6.2</td>
<td>Mounting the measuring device</td>
<td>31</td>
</tr>
<tr>
<td>6.2.1</td>
<td>Required tools</td>
<td>31</td>
</tr>
<tr>
<td>6.2.2</td>
<td>Preparing the measuring device</td>
<td>31</td>
</tr>
<tr>
<td>6.2.3</td>
<td>Mounting the measuring device</td>
<td>31</td>
</tr>
<tr>
<td>6.2.4</td>
<td>Mounting the transmitter housing: Proline 500 – digital</td>
<td>31</td>
</tr>
<tr>
<td>6.2.5</td>
<td>Mounting the transmitter housing: Proline 500</td>
<td>33</td>
</tr>
<tr>
<td>6.2.6</td>
<td>Turning the transmitter housing: Proline 500</td>
<td>35</td>
</tr>
<tr>
<td>6.2.7</td>
<td>Turning the display module: Proline 500</td>
<td>35</td>
</tr>
<tr>
<td>6.3</td>
<td>Post-installation check</td>
<td>36</td>
</tr>
<tr>
<td>7</td>
<td>Electrical connection</td>
<td>37</td>
</tr>
<tr>
<td>7.1</td>
<td>Connection conditions</td>
<td>37</td>
</tr>
<tr>
<td>7.1.1</td>
<td>Required tools</td>
<td>37</td>
</tr>
<tr>
<td>7.1.2</td>
<td>Requirements for connecting cable</td>
<td>37</td>
</tr>
<tr>
<td>7.1.3</td>
<td>Terminal assignment</td>
<td>42</td>
</tr>
<tr>
<td>7.1.4</td>
<td>Shielding and grounding</td>
<td>42</td>
</tr>
<tr>
<td>7.1.5</td>
<td>Preparing the measuring device</td>
<td>43</td>
</tr>
<tr>
<td>7.2</td>
<td>Connecting the measuring device: Proline 500 – digital</td>
<td>45</td>
</tr>
<tr>
<td>7.2.1</td>
<td>Connecting the connecting cable</td>
<td>45</td>
</tr>
<tr>
<td>7.2.2</td>
<td>Connecting the signal cable and the supply voltage cable</td>
<td>50</td>
</tr>
<tr>
<td>7.3</td>
<td>Connecting the measuring device: Proline 500</td>
<td>52</td>
</tr>
<tr>
<td>7.3.1</td>
<td>Connecting the connecting cable</td>
<td>52</td>
</tr>
<tr>
<td>7.4</td>
<td>Ensuring potential equalization</td>
<td>54</td>
</tr>
<tr>
<td>7.4.1</td>
<td>Requirements</td>
<td>54</td>
</tr>
<tr>
<td>7.5</td>
<td>Special connection instructions</td>
<td>55</td>
</tr>
<tr>
<td>7.5.1</td>
<td>Connection examples</td>
<td>55</td>
</tr>
<tr>
<td>7.6</td>
<td>Hardware settings</td>
<td>58</td>
</tr>
<tr>
<td>7.6.1</td>
<td>Setting the device address</td>
<td>58</td>
</tr>
<tr>
<td>7.6.2</td>
<td>Enabling the terminating resistor</td>
<td>59</td>
</tr>
<tr>
<td>7.6.3</td>
<td>Activating the default IP address</td>
<td>60</td>
</tr>
<tr>
<td>7.7</td>
<td>Ensuring the degree of protection</td>
<td>62</td>
</tr>
<tr>
<td>7.8</td>
<td>Post-connection check</td>
<td>62</td>
</tr>
<tr>
<td>8</td>
<td>Operation options</td>
<td>63</td>
</tr>
<tr>
<td>8.1</td>
<td>Overview of operation options</td>
<td>63</td>
</tr>
<tr>
<td>8.2</td>
<td>Structure and function of the operating menu</td>
<td>64</td>
</tr>
<tr>
<td>8.2.1</td>
<td>Structure of the operating menu</td>
<td>64</td>
</tr>
<tr>
<td>8.2.2</td>
<td>Operating philosophy</td>
<td>65</td>
</tr>
</tbody>
</table>
8.3 Access to the operating menu via the local display ............................................. 66
  8.3.1 Operational display ................................................. 66
  8.3.2 Navigation view .................................................. 68
  8.3.3 Editing view ..................................................... 70
  8.3.4 Operating elements ............................................. 72
  8.3.5 Opening the context menu .................................... 72
  8.3.6 Navigating and selecting from list .............................................. 74
  8.3.7 Calling the parameter directly .............................................. 74
  8.3.8 Calling up help text ............................................. 75
  8.3.9 Changing the parameters .......................................... 75
  8.3.10 User roles and related access .............................................. 76
  8.3.11 Disabling write protection via access code .............................................. 76
  8.3.12 Enabling and disabling the keypad lock .............................................. 77
8.4 Access to the operating menu via the Web browser ............................................. 77
  8.4.1 Function range ..................................................... 77
  8.4.2 Prerequisites ..................................................... 78
  8.4.3 Establishing a connection .............................................. 79
  8.4.4 Logging on ......................................................... 81
  8.4.5 User interface ..................................................... 82
  8.4.6 Disabling the Web server .............................................. 83
  8.4.7 Logging out ......................................................... 83
8.5 Access to the operating menu via the operating tool ............................................. 84
  8.5.1 Connecting the operating tool .............................................. 84
  8.5.2 FieldCare ......................................................... 87
  8.5.3 DeviceCare ........................................................ 88
9 System integration .................................................... 90
  9.1 Overview of device description files .............................................. 90
  9.1.1 Current version data for the device .............................................. 90
  9.1.2 Operating tools .................................................. 90
  9.2 Device master file (GSD) ............................................. 90
  9.2.1 Manufacturer-specific GSD ........................................ 91
  9.2.2 Profile GSD ....................................................... 91
  9.3 Compatibility with earlier model .............................................. 91
  9.3.1 Automatic identification (factory setting) .............................................. 91
  9.3.2 Manual setting ..................................................... 92
  9.3.3 Replacing the measuring devices without changing the GSD file or restarting the controller .............................................. 92
8.4 Using the GSD modules of the previous model .............................................. 92
  8.4.1 Using the CONTROL BLOCK module in the previous model .............................................. 93
8.5 Cyclic data transmission .................................................. 94
  8.5.1 Block model ......................................................... 94
  8.5.2 Description of the modules .............................................. 94
8.6 Address shifting configuration .................................................. 101
  8.6.1 Function description .............................................. 101
  8.6.2 Structure ......................................................... 101
  8.6.3 Configuring address shifting .............................................. 102
  8.6.4 Accessing data via PROFIBUS DP .............................................. 102

10 Commissioning ........................................................ 104
  10.1 Function check ...................................................... 104
  10.2 Switching on the measuring device .............................................. 104
  10.3 Connecting via FieldCare .............................................. 104
  10.4 Configuring the device address via software .............................................. 104
  10.4.1 PROFIBUS network .............................................. 104
  10.5 Setting the operating language .............................................. 104
  10.6 Configuring the measuring device .............................................. 105
  10.6.1 Defining the tag name .............................................. 106
  10.6.2 Setting the system units .............................................. 107
  10.6.3 Selecting and setting the medium .............................................. 110
  10.6.4 Configuring communication interface .............................................. 111
  10.6.5 Configuring the analog inputs .............................................. 113
  10.6.6 Displaying the I/O configuration .............................................. 115
  10.6.7 Configuring the current input .............................................. 116
  10.6.8 Configuring the status input .............................................. 117
  10.6.9 Configuring the current output .............................................. 118
  10.6.10 Configuring the pulse/frequency/switch output .............................................. 121
  10.6.11 Configuring the relay output .............................................. 128
  10.6.12 Configuring the local display .............................................. 130
  10.6.13 Configuring the low flow cut off .............................................. 133
  10.6.14 Configuring the partial filled pipe detection .............................................. 134
  10.7 Advanced settings ..................................................... 135
  10.7.1 Calculated values .................................................. 136
  10.7.2 Carrying out a sensor adjustment .............................................. 137
  10.7.3 Configuring the totalizer .............................................. 138
  10.7.4 Configuring out additional display configurations .............................................. 140
  10.7.5 WLAN configuration .............................................. 143
  10.7.6 Configuration management .............................................. 144
  10.7.7 Using parameters for device administration .............................................. 145
  10.8 Simulation ........................................................... 147
  10.9 Protecting settings from unauthorized access .............................................. 150
  10.9.1 Write protection via access code .............................................. 150
  10.9.2 Write protection via write protection switch .............................................. 151

11 Operation .......................................................... 154
  11.1 Reading the device locking status .............................................. 154
  11.2 Adjusting the operating language .............................................. 154
  11.3 Configuring the display .............................................. 154
  11.4 Reading measured values .............................................. 154
  11.4.1 "Measured variables" submenu .............................................. 155
  11.4.2 Totalizer ......................................................... 156
  11.4.3 "Input values" submenu .............................................. 157
  11.4.4 Output values ..................................................... 159
  11.5 Adapting the measuring device to the process conditions .............................................. 161
  11.6 Performing a totalizer reset .............................................. 161
  11.7 Showing data logging .............................................. 161
# Table of contents

## 12 Diagnostics and troubleshooting

- 12.1 General troubleshooting ........................................ 165
- 12.2 Diagnostic information via light emitting diodes .......... 168
  - 12.2.1 Transmitter ........................................... 168
  - 12.2.2 Sensor connection housing .................. 170
- 12.3 Diagnostic information on local display .................. 171
  - 12.3.1 Diagnostic message ................................... 171
  - 12.3.2 Calling up remedial measures .................... 173
- 12.4 Diagnostic information in the Web browser ............ 173
  - 12.4.1 Diagnostic options ............................... 173
  - 12.4.2 Calling up remedy information .................. 174
- 12.5 Diagnostic information in FieldCare or DeviceCare .......... 174
  - 12.5.1 Diagnostic options ............................... 174
  - 12.5.2 Calling up remedy information .................. 175
- 12.6 Adapting the diagnostic information .................. 176
  - 12.6.1 Adapting the diagnostic behavior .................. 176
- 12.7 Overview of diagnostic information .................. 179
  - 12.7.1 Diagnostic of sensor ............................ 179
  - 12.7.2 Diagnostic of electronic ..................... 186
  - 12.7.3 Diagnostic of configuration .................. 203
  - 12.7.4 Diagnostic of process .......................... 217
- 12.8 Pending diagnostic events ............................. 230
- 12.9 Diagnostic list ........................................ 230
- 12.10 Event logbook ....................................... 231
  - 12.10.1 Reading out the event logbook ............... 231
  - 12.10.2 Filtering the event logbook .................. 232
  - 12.10.3 Overview of information events ............ 232
- 12.11 Resetting the measuring device .................. 233
  - 12.11.1 Function scope of the "Device reset" parameter .......... 234
- 12.12 Device information .................................. 234
- 12.13 Firmware history ................................... 236

## 13 Maintenance

- 13.1 Maintenance tasks .................................... 237
  - 13.1.1 Exterior cleaning .................................. 237
  - 13.1.2 Interior cleaning .................................. 237
- 13.2 Measuring and test equipment .......................... 237
- 13.3 Endress+Hauser services .................................. 237

## 14 Repair

- 14.1 General notes ........................................ 238
  - 14.1.1 Repair and conversion concept .................. 238
  - 14.1.2 Notes for repair and conversion .............. 238
- 14.2 Spare parts ........................................ 238
- 14.3 Endress+Hauser services .................................. 238
- 14.4 Return ........................................ 238
- 14.5 Disposal ........................................ 239
  - 14.5.1 Removing the measuring device .................. 239
  - 14.5.2 Disposing of the measuring device ............ 239

## 15 Accessories

- 15.1 Device-specific accessories .......................... 240
  - 15.1.1 For the transmitter .................................. 240

## 16 Technical data

- 16.1 Application ........................................ 243
- 16.2 Function and system design .................................. 243
- 16.3 Input ........................................ 244
- 16.4 Output ........................................ 247
- 16.5 Power supply ...................................... 252
- 16.6 Performance characteristics .......................... 253
- 16.7 Installation ........................................ 257
- 16.8 Environment ........................................ 257
- 16.9 Process ........................................ 258
- 16.10 Mechanical construction .................................. 261
- 16.11 Human interface ...................................... 265
- 16.12 Certificates and approvals .................................. 268
- 16.13 Application packages .................................. 270
- 16.14 Accessories ........................................ 272
- 16.15 Supplementary documentation .................................. 272

## Index

- 15.1.2 For the sensor ........................................ 241
- 15.2 Service-specific accessories .................................. 242
- 15.3 System components ...................................... 242

- 16.1 Application ........................................ 243
- 16.2 Function and system design .................................. 243
- 16.3 Input ........................................ 244
- 16.4 Output ........................................ 247
- 16.5 Power supply ...................................... 252
- 16.6 Performance characteristics .......................... 253
- 16.7 Installation ........................................ 257
- 16.8 Environment ........................................ 257
- 16.9 Process ........................................ 258
- 16.10 Mechanical construction .................................. 261
- 16.11 Human interface ...................................... 265
- 16.12 Certificates and approvals .................................. 268
- 16.13 Application packages .................................. 270
- 16.14 Accessories ........................................ 272
- 16.15 Supplementary documentation .................................. 272

- 15.1.2 For the sensor ........................................ 241
- 15.2 Service-specific accessories .................................. 242
- 15.3 System components ...................................... 242

- 16.1 Application ........................................ 243
- 16.2 Function and system design .................................. 243
- 16.3 Input ........................................ 244
- 16.4 Output ........................................ 247
- 16.5 Power supply ...................................... 252
- 16.6 Performance characteristics .......................... 253
- 16.7 Installation ........................................ 257
- 16.8 Environment ........................................ 257
- 16.9 Process ........................................ 258
- 16.10 Mechanical construction .................................. 261
- 16.11 Human interface ...................................... 265
- 16.12 Certificates and approvals .................................. 268
- 16.13 Application packages .................................. 270
- 16.14 Accessories ........................................ 272
- 16.15 Supplementary documentation .................................. 272

*Endress+Hauser*
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

⚠️ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠️ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

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

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

1.2.2 Electrical symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<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. 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>
</tbody>
</table>

1.2.3 Communication symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>⦿</td>
<td>Wireless Local Area Network (WLAN) Communication via a wireless, local network.</td>
</tr>
<tr>
<td>⦿</td>
<td>LED</td>
</tr>
<tr>
<td>Light emitting diode is off.</td>
<td></td>
</tr>
</tbody>
</table>
1.2.4 Tool symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>⦅</td>
<td>Torx screwdriver</td>
</tr>
<tr>
<td>⦆</td>
<td>Phillips head screwdriver</td>
</tr>
<tr>
<td>⦈</td>
<td>Open-ended wrench</td>
</tr>
</tbody>
</table>

1.2.5 Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ✔️     | Permitted  
Procedures, processes or actions that are permitted. |
| ✔️ ✔️ | Preferred  
Procedures, processes or actions that are preferred. |
| ✗     | Forbidden  
Procedures, processes or actions that are forbidden. |
| 🧵     | Tip  
Indicates additional information. |
| 📚     | Reference to documentation. |
| 📚     | Reference to page. |
| 📚     | Reference to graphic. |
| 🔄     | Notice or individual step to be observed. |
| 1, 2, 3... | Series of steps. |
| 🔄     | Result of a step. |
| 🤔     | Help in the event of a problem. |
| 🔍     | Visual inspection. |

1.2.6 Symbols in graphics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3...</td>
<td>Item numbers</td>
</tr>
<tr>
<td>1, 2, 3...</td>
<td>Series of steps</td>
</tr>
<tr>
<td>A, B, C, ...</td>
<td>Views</td>
</tr>
<tr>
<td>A-A, B-B, C-C, ...</td>
<td>Sections</td>
</tr>
<tr>
<td>🟢</td>
<td>Hazardous area</td>
</tr>
</tbody>
</table>
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 → 272

1.3.1 Standard documentation

<table>
<thead>
<tr>
<th>Document type</th>
<th>Purpose and content of the document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Information</td>
<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

PROFIBUS®
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 → ⚙ 151.
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 (→ 150).

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 (→ 85), 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 (→ 144).

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 → 150

2.7.3 Access via Web server

The device can be operated and configured via a Web browser with the integrated Web server (→ 77). The connection is via the service interface (CDI-RJ45) 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 → 272.

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
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.

1  Important components of a measuring device

1  Electronics compartment cover
2  Display module
3  Transmitter housing
4  Sensor connection housing with integrated ISEM electronics: connecting cable connection
5  Sensor
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.

### 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" → 8 and "Supplementary device-dependent documentation" → 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

3 Example of a transmitter nameplate

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

Example of a transmitter nameplate

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. XXXXXX-ABCDE+).
### 4.2.3 Symbols on measuring device

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Warning Symbol] | **WARNING!**  
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury. |
| ![Reference Symbol] | **Reference to documentation**  
Refers to the corresponding device documentation. |
| ![Protective Ground 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 → 257

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 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)

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

### DN | Ø orifice plate, pipe restriction [mm] | [in] |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.8</td>
<td>0.03</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>0.06</td>
</tr>
<tr>
<td>4</td>
<td>3.0</td>
<td>0.12</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</td>
<td>Vertical orientation</td>
</tr>
<tr>
<td>B</td>
<td>Horizontal orientation, transmitter at top</td>
</tr>
</tbody>
</table>
### Orientation and Recommendation

<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 → 页 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

<table>
<thead>
<tr>
<th>Measuring Device</th>
<th><del>-40 to +60 °C (</del>-40 to +140 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readability of the Local Display</td>
<td><del>-20 to +60 °C (</del>-4 to +140 °F)</td>
</tr>
</tbody>
</table>

Dependency of ambient temperature on medium temperature → 页 258

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

You can order a weather protection cover from Endress+Hauser. → 页 240.

#### 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

When installing in hygienic applications, please refer to the information in the "Certificates and approvals/hygienic compatibility" section → 269

Rupture disk

Information that is relevant to the process: → 260.

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  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→ 253. 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 for Proline 500 – digital](image1)

![Diagram of Protective cover for Proline 500](image2)
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.

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)
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.

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. $8 \times 45^\circ$ in each direction.

4. Screw on the connection compartment cover.

5. Depending on the device version: Attach the securing clamp of the connection compartment cover.

### 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 → 258</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**
PROFIBUS DP
The IEC 61158 standard specifies two types of cable (A and B) for the bus line which can be used for every transmission rate. Cable type A is recommended.

<table>
<thead>
<tr>
<th>Cable type</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic impedance</td>
<td>135 to 165 Ω at a measuring frequency of 3 to 20 MHz</td>
</tr>
<tr>
<td>Cable capacitance</td>
<td>&lt; 30 pF/m</td>
</tr>
<tr>
<td>Wire cross-section</td>
<td>&gt; 0.34 mm² (22 AWG)</td>
</tr>
<tr>
<td>Cable type</td>
<td>Twisted pairs</td>
</tr>
<tr>
<td>Loop resistance</td>
<td>≤ 110 Ω/km</td>
</tr>
</tbody>
</table>
**Electrical connection**

### Signal damping
Max. 9 dB over the entire length of the cable cross-section

### Shield
Copper braided shielding or braided shielding with foil shield. When grounding the cable shield, observe the grounding concept of the plant.

---

**For further information on planning and installing PROFIBUS networks see:**

Operating Instructions "PROFIBUS DP/PA: Guidelines for planning and commissioning" (BA00034S)

**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: 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>$2 \times 2 \times 0.34 \text{ mm}^2$ (AWG 22) PVC cable $^1$ 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 $+105 , ^\circ \text{C}$ ($-58$ to $+221 , ^\circ \text{F}$); when cable can move freely: $-25$ to $+105 , ^\circ \text{C}$ ($-13$ to $+221 , ^\circ \text{F}$)</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>
<tr>
<td>Cross-section</td>
<td>Cable length [max.]</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>2 x 2 x 0.50 mm² (AWG 20)</td>
<td>50 m (165 ft)</td>
</tr>
<tr>
<td>3 x 2 x 0.50 mm² (AWG 20)</td>
<td>100 m (330 ft)</td>
</tr>
<tr>
<td>4 x 2 x 0.50 mm² (AWG 20)</td>
<td>150 m (500 ft)</td>
</tr>
</tbody>
</table>

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 x 2 x 0.50 mm² (AWG 20) PVC cable 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>26 (B)</td>
<td>24 (+)</td>
<td>22 (+)</td>
</tr>
<tr>
<td>26 (A)</td>
<td>27 (A)</td>
<td>25 (−)</td>
<td>23 (−)</td>
<td>20 (+)</td>
</tr>
<tr>
<td>21 (−)</td>
<td></td>
<td></td>
<td></td>
<td></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 → 45
- Proline 500 → 52

7.1.4 Shielding and grounding

Optimum electromagnetic compatibility (EMC) of the fieldbus system can only be guaranteed if the system components and, in particular, the lines are shielded and the shield forms as complete a cover as possible. A shield coverage of 90% is ideal.

- To ensure an optimum EMC protective effect, connect the shield as often as possible to the reference ground.
- For reasons of explosion protection, you should refrain from grounding however.

To comply with both requirements, the fieldbus system allows three different types of shielding:
- Shielding at both ends.
- Shielding at one end on the feed side with capacitance termination at the field device.
- Shielding at one end on the feed side.

Experience shows that the best results with regard to EMC are achieved in most cases in installations with one-sided shielding on the feed side (without capacitance termination at the field device). Appropriate measures with regard to input wiring must be taken to allow unrestricted operation when EMC interference is present. These measures have been taken into account for this device. Operation in the event of disturbance variables as per NAMUR NE21 is thus guaranteed.
Where applicable, national installation regulations and guidelines must be observed during the installation!

Where there are large differences in potential between the individual grounding points, only one point of the shielding is connected directly with the reference ground. In systems without potential equalization, therefore, cable shielding of fieldbus systems should only be grounded on one side, for example at the fieldbus supply unit or at safety barriers.

**NOTICE**

In systems without potential matching, the multiple grounding of the cable shield causes mains frequency equalizing currents!

Damage to the bus cable shield.

➤ Only ground the bus cable shield to either the local ground or the protective ground at one end. Insulate the shield that is not connected.

---

**Diagram:**

1. Controller (e.g. PLC)
2. Cable shield
3. T-box
4. Measuring device
5. Local grounding
6. Bus terminator
7. Potential matching line

---

### 7.1.5 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" → 46
  - Option B "Stainless" → 47
  - Option L "Cast, stainless" → 46
- Connection via connectors with order code for "Sensor connection housing":
  Option C "Ultra-compact hygienic, stainless" → 48

Connecting the connecting cable to the transmitter

The cable is connected to the transmitter via terminals → 49.
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 → 45.
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 → 50.
7.2.2 Connecting the signal cable and the supply voltage cable

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 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 → 42.
8. Firmly tighten the cable glands.
   - This concludes the cable connection process.
9. Close the terminal cover.
10. 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)

11. 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.
7.3 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

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Protective earth (PE)</td>
</tr>
<tr>
<td>2</td>
<td>Cable entry for connecting cable on transmitter connection housing</td>
</tr>
<tr>
<td>3</td>
<td>Connecting cable</td>
</tr>
<tr>
<td>4</td>
<td>Cable entry for connecting cable on sensor connection housing</td>
</tr>
<tr>
<td>5</td>
<td>Protective earth (PE)</td>
</tr>
</tbody>
</table>

Connecting the connecting cable to the sensor connection housing
Connection via terminals with order code for “Housing”:
Option B "Stainless" → 53

Connecting the connecting cable to the transmitter
The cable is connected to the transmitter via terminals → 54.
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 → 52.
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.

### 7.4 Ensuring potential equalization

#### 7.4.1 Requirements

No special measures for potential equalization are required.
7.5  Special connection instructions

7.5.1  Connection examples

PROFIBUS DP

[Diagram showing connection example for PROFIBUS DP, non-hazardous area and Zone 2/Div. 2]

15  Connection example for PROFIBUS DP, non-hazardous area and Zone 2/Div. 2
1  Control system (e.g. PLC)
2  Cable shield provided at one end. The cable shield must be grounded at both ends to comply with EMC requirements; observe cable specifications
3  Distribution box
4  Transmitter

If baud rates > 1.5 MBaud an EMC cable entry must be used and the cable shield must continue as far as the terminal wherever possible.

Current output 4-20 mA

[Diagram showing connection example for 4-20 mA current output (active)]

16  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
17 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

18 Connection example for pulse/frequency output (passive)
1 Automation system with pulse/frequency input (e.g. PLC)
2 Power supply
3 Transmitter: Observe input values → 248

Switch output

19 Connection example for switch output (passive)
1 Automation system with switch input (e.g. PLC)
2 Power supply
3 Transmitter: Observe input values → 248
Relay output

![Connection example for relay output (passive)](image)

1. Automation system with relay input (e.g. PLC)
2. Power supply
3. Transmitter: Observe input values \(\rightarrow\) \#249

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 address

The address must always be configured for a PROFIBUS DP/PA device. The valid address range is between 1 and 126. In a PROFIBUS DP/PA network, each address can only be assigned once. If an address is not configured correctly, the device is not recognized by the master. All measuring devices are delivered from the factory with the device address 126 and with the software addressing method.

Proline 500 – digital transmitter

Hardware addressing

1. Open the housing cover.
2. Remove the display module.
3. Fold open the terminal cover.
4. Set the desired device address using the DIP switches.
5. To switch addressing from software addressing to hardware addressing: set the DIP switch to On.
   ➤ The change of device address takes effect after 10 seconds. The device is restarted.

Software addressing

➤ To switch addressing from hardware addressing to software addressing: set DIP switch No. 4 to Off.
   ➤ The device address configured in the Device address parameter (→ 112) takes effect after 10 seconds. The device is restarted.
**Proline 500 transmitter**

*Hardware addressing*

1. Set the desired device address using the DIP switches in the connection compartment.

2. To switch addressing from software addressing to hardware addressing: set the DIP switch to **On**.
   - The change of device address takes effect after 10 seconds. The device is restarted.

   **Software addressing**

   - To switch addressing from hardware addressing to software addressing: set DIP switch No. 4 to **Off**.
   - The device address configured in the **Device address** parameter (→ 112) takes effect after 10 seconds. The device is restarted.

**7.6.2 Enabling the terminating resistor**

To avoid incorrect communication transmission caused by impedance mismatch, terminate the PROFIBUS DP cable correctly at the start and end of the bus segment.

- If the device is operated with a baud rate of 1.5 MBaud and under:
  For the last transmitter on the bus, terminate by setting DIP switch 3 (bus termination) to **ON**.
- For baud rates > 1.5 MBaud:
  Due to the capacitance load of the user and the line reflections generated as a result, ensure that an external bus terminator is used.

It is generally advisable to use an external bus terminator as the entire segment can fail if a device that is terminated internally is defective.
1. Open the housing cover.
2. Remove the display module.
3. Fold open the terminal cover.
4. Set DIP switch No. 3 to **ON**.

### Proline 500 transmitter

Set DIP switch No. 3 to **ON**.

### 7.6.3 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>☐</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>☐</td>
</tr>
<tr>
<td>Cable run with 'water trap' → 62?</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 → 272

23 Schematic structure of the operating menu
### 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>
<tbody>
<tr>
<td>Language</td>
<td>&quot;Operator&quot;, &quot;Maintenance&quot;</td>
<td>Role-oriented</td>
</tr>
<tr>
<td></td>
<td>Tasks during operation:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Configuring the operational display</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reading measured values</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Defining the operating language</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Defining the Web server operating language</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Resetting and controlling totalizers</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>&quot;Maintenance&quot; role</td>
<td>Wizards for fast commissioning:</td>
</tr>
<tr>
<td></td>
<td>Commissioning:</td>
<td>- Setting the system units</td>
</tr>
<tr>
<td></td>
<td>- Configuration of the measurement</td>
<td>- Configuration of the communication interface</td>
</tr>
<tr>
<td></td>
<td>- Configuration of the inputs and outputs</td>
<td>- Defining the medium</td>
</tr>
<tr>
<td></td>
<td>- Configuration of the communication interface</td>
<td>- Displaying the I/O/configuration</td>
</tr>
<tr>
<td></td>
<td>- Configuration of the operational display</td>
<td>- Configuring the inputs</td>
</tr>
<tr>
<td></td>
<td>- Setting the low flow cut off</td>
<td>- Configuring the outputs</td>
</tr>
<tr>
<td></td>
<td>- Configuring partial and empty pipe detection</td>
<td>- Configuration of the operational display</td>
</tr>
<tr>
<td></td>
<td>Advanced setup</td>
<td>- Setting the low flow cut off</td>
</tr>
<tr>
<td>Setup</td>
<td>&quot;Maintenance&quot; role</td>
<td>Contains all parameters for error detection and analyzing process and device errors:</td>
</tr>
<tr>
<td></td>
<td>Fault elimination:</td>
<td>- Diagnostic list contains up to 5 currently pending diagnostic messages.</td>
</tr>
<tr>
<td></td>
<td>- Diagnostics and elimination of process and device errors</td>
<td>- Event logbook contains event messages that have occurred.</td>
</tr>
<tr>
<td></td>
<td>- Measured value simulation</td>
<td>- Device information contains information for identifying the device.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Measured values contains all current measured values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Analog inputs is used to display the analog input.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Data logging submenu with 'Extended HistoROM' order option</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storage and visualization of measured values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heartbeat the functionality of the device is checked on demand and the verification results are documented.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Simulation is used to simulate measured values or output values.</td>
</tr>
</tbody>
</table>
### Operation options

<table>
<thead>
<tr>
<th>Menu/parameter</th>
<th>User role and tasks</th>
<th>Content/meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert</td>
<td>function-oriented</td>
<td></td>
</tr>
</tbody>
</table>

- Tasks that require detailed knowledge of the function of the device:
  - Commissioning measurements under difficult conditions
  - Optimal adaptation of the measurement to difficult conditions
  - Detailed configuration of the communication interface
  - Error diagnostics in difficult cases

- 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.
  - Submenus for function blocks (e.g. "Analog Inputs")
    - Configuration of function blocks.
  - 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.

### 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
- **Diagnoistic behavior**
  - **批次**: Alarm
  - **批次**: Warning
  - **批次**: Locking (the device is locked via the hardware )
  - **批次**: 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:

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Measurement channel number</th>
<th>Diagnostic behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓</td>
<td>↓</td>
<td>↓</td>
</tr>
</tbody>
</table>

Example

- \( \dot{m} \)
- \( 1 \)
- !

Appears only if a diagnostics event is present for this measured variable.

Measured values

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \dot{m} )</td>
<td>Mass flow</td>
</tr>
<tr>
<td>( \dot{V} )</td>
<td>Volume flow</td>
</tr>
<tr>
<td>( \dot{V}_C )</td>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>( \rho )</td>
<td>Density</td>
</tr>
<tr>
<td>( \rho_0 )</td>
<td>Reference density</td>
</tr>
<tr>
<td>( T )</td>
<td>Temperature</td>
</tr>
<tr>
<td>( \Sigma )</td>
<td>Totalizer</td>
</tr>
<tr>
<td>( \rightarrow )</td>
<td>Status input</td>
</tr>
</tbody>
</table>

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

Measurement channel numbers

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 1 ) ( \ldots ) ( 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 \( \rightarrow 172 \)

\( \rightarrow \) The number and display format of the measured values can be configured via the **Format display** parameter (\( \rightarrow 131 \)).
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.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

1. Navigation view
2. Navigation path to current position
3. Status area
4. Display area for navigation
5. Operating elements → 72

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

For more information about the icons in the menu, refer to the "Display area" section → 69

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 → 171
For information on the function and entry of the direct access code → 74
### Display area

#### Menus

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Operation.png" alt="Operation Symbol" /></td>
<td><strong>Operation</strong>&lt;br&gt;Appears:&lt;br&gt;• In the menu next to the 'Operation' selection&lt;br&gt;• At the left in the navigation path in the <strong>Operation</strong> menu</td>
</tr>
<tr>
<td><img src="Setup.png" alt="Setup Symbol" /></td>
<td><strong>Setup</strong>&lt;br&gt;Appears:&lt;br&gt;• In the menu next to the 'Setup' selection&lt;br&gt;• At the left in the navigation path in the <strong>Setup</strong> menu</td>
</tr>
<tr>
<td><img src="Diagnostics.png" alt="Diagnostics Symbol" /></td>
<td><strong>Diagnostics</strong>&lt;br&gt;Appears:&lt;br&gt;• In the menu next to the 'Diagnostics' selection&lt;br&gt;• At the left in the navigation path in the <strong>Diagnostics</strong> menu</td>
</tr>
<tr>
<td><img src="Expert.png" alt="Expert Symbol" /></td>
<td><strong>Expert</strong>&lt;br&gt;Appears:&lt;br&gt;• In the menu next to the 'Expert' selection&lt;br&gt;• At the left in the navigation path in the <strong>Expert</strong> menu</td>
</tr>
</tbody>
</table>

#### Submenus, wizards, parameters

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Submenu.png" alt="Submenu Symbol" /></td>
<td><strong>Submenu</strong></td>
</tr>
<tr>
<td><img src="Wizard.png" alt="Wizard Symbol" /></td>
<td><strong>Wizard</strong></td>
</tr>
<tr>
<td><img src="Parameters.png" alt="Parameters in Wizard" /></td>
<td><strong>Parameters within a wizard</strong>&lt;br&gt;No display symbol exists for parameters in submenus.</td>
</tr>
</tbody>
</table>

#### Locking

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Locked.png" alt="Locked Symbol" /></td>
<td><strong>Parameter locked</strong>&lt;br&gt;When displayed in front of a parameter name, indicates that the parameter is locked.&lt;br&gt;• By a user-specific access code&lt;br&gt;• By the hardware write protection switch</td>
</tr>
</tbody>
</table>

#### Wizard operation

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Previous.png" alt="Previous Parameter Symbol" /></td>
<td><strong>Switches to the previous parameter.</strong></td>
</tr>
<tr>
<td><img src="Confirm.png" alt="Confirm Parameter Symbol" /></td>
<td><strong>Confirms the parameter value and switches to the next parameter.</strong></td>
</tr>
<tr>
<td><img src="Edit.png" alt="Edit Parameter Symbol" /></td>
<td><strong>Opens the editing view of the parameter.</strong></td>
</tr>
</tbody>
</table>
8.3.3 Editing view

Numeric editor

Text editor

Using the operating elements in the editing view

<table>
<thead>
<tr>
<th>Operating key(s)</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 For entering values in parameters (e.g. limit values)</td>
</tr>
<tr>
<td></td>
<td>1 Entry display area</td>
</tr>
<tr>
<td></td>
<td>2 Input screen</td>
</tr>
<tr>
<td></td>
<td>3 Confirm, delete or reject entry</td>
</tr>
<tr>
<td></td>
<td>4 Operating elements</td>
</tr>
<tr>
<td></td>
<td>25 For entering text in parameters (e.g. tag name)</td>
</tr>
<tr>
<td></td>
<td>1 Entry display area</td>
</tr>
<tr>
<td></td>
<td>2 Current input screen</td>
</tr>
<tr>
<td></td>
<td>3 Change input screen</td>
</tr>
<tr>
<td></td>
<td>4 Operating elements</td>
</tr>
<tr>
<td></td>
<td>5 Move entry position</td>
</tr>
<tr>
<td></td>
<td>6 Delete entry</td>
</tr>
<tr>
<td></td>
<td>7 Reject or confirm entry</td>
</tr>
</tbody>
</table>

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

### Operating key(s)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Enter key | **Press the key briefly: confirm your selection.**  
**Press the key for 2 s: confirm the entry.** |
| Escape key combination (press keys simultaneously) | Close the editing view without accepting the changes. |

### Input screens

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

### Controlling data entries

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

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

### 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
→ 68

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

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.
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 → 150.

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>— ²</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 → 150.

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

1. After you press , the input prompt for the access code appears.
2. Enter the access code.
   ✅  The  ₀-symbol 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.

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 →  272
8.4.2 Prerequisites

Computer hardware

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI-RJ45</td>
<td>The computer must have an RJ45 interface.</td>
</tr>
<tr>
<td>WLAN</td>
<td>The operating unit must have a WLAN interface.</td>
</tr>
</tbody>
</table>

Connection

- Standard Ethernet cable with RJ45 connector.
- Connection via Wireless LAN.

Screen

Recommended size: ≥12′ (depends on the screen resolution)

Computer software

<table>
<thead>
<tr>
<th>Software</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI-RJ45</td>
<td>Microsoft Windows 7 or higher.</td>
</tr>
<tr>
<td>WLAN</td>
<td>Mobile operating systems:</td>
</tr>
<tr>
<td></td>
<td>• iOS</td>
</tr>
<tr>
<td></td>
<td>• Android</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows XP is supported.</td>
</tr>
</tbody>
</table>

Web browsers supported

- Microsoft Internet Explorer 8 or higher
- Microsoft Edge
- Mozilla Firefox
- Google Chrome
- Safari

Computer settings

<table>
<thead>
<tr>
<th>Settings</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI-RJ45</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>
</tr>
<tr>
<td>WLAN</td>
<td>The Web browser setting Use a Proxy Server for Your LAN must be deselected.</td>
</tr>
</tbody>
</table>

JavaScript

JavaScript must be enabled.

- If JavaScript cannot be enabled:
  - enter http://192.168.1.212/basic.html in the address line of the Web browser. A fully functional but simplified version of the operating menu structure starts in the Web browser.
  - When installing a new firmware version: To enable correct data display, clear the temporary memory (cache) of the Web browser under Internet options.

Network connections

Only the active network connections to the measuring device should be used.

- Switch off all other network connections such as WLAN.
- Switch off all other network connections.

In the event of connection problems: → 166
### 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>
<tr>
<td>Web server</td>
<td>Web server must be enabled; factory setting: ON</td>
</tr>
<tr>
<td></td>
<td>For information on enabling the Web server → 83</td>
</tr>
</tbody>
</table>

### 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>
<tr>
<td>Web server</td>
<td>Web server and WLAN must be enabled; factory setting: ON</td>
</tr>
<tr>
<td></td>
<td>For information on enabling the Web server → 83</td>
</tr>
</tbody>
</table>

### 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 following information refers to the default Ethernet settings of the device.

IP address of the device: 192.168.1.212 (factory setting)

1. Switch on the measuring device.
2. Connect to the computer using a cable → 84.
3. 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.
4. Close any open Internet browsers.
5. Configure the properties of the Internet protocol (TCP/IP) as defined in the table:
### Operation options

<table>
<thead>
<tr>
<th>IP address</th>
<th>192.168.1.XXX; for XXX all numerical sequences except: 0, 212 and 255 → e.g. 192.168.1.123</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. L100A802000).
   ▪ LED on display module flashes: it is now possible to operate the measuring device with the Web browser, FieldCare or DeviceCare.

**Disconnected**

▸ 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.

If a login page does not appear, or if the page is incomplete → 166

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 0000 (factory setting); can be changed by customer

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

![User interface diagram]

1 Function row
2 Local display language
3 Navigation area

Header

The following information appears in the header:
- Device name
- Device tag
- Device status with status signal → ➔ 174
- 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</td>
</tr>
<tr>
<td></td>
<td>- The structure of the operating menu is the same as for the local display</td>
</tr>
<tr>
<td></td>
<td>[i] 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:</td>
</tr>
<tr>
<td></td>
<td>- Device configuration:</td>
</tr>
<tr>
<td></td>
<td>- Load settings from the device</td>
</tr>
<tr>
<td></td>
<td>(XML format, save configuration)</td>
</tr>
<tr>
<td></td>
<td>- Save settings to the device</td>
</tr>
<tr>
<td></td>
<td>(XML format, restore configuration)</td>
</tr>
<tr>
<td></td>
<td>- Logbook - Export Event logbook (.csv file)</td>
</tr>
<tr>
<td></td>
<td>- Documents - Export documents:</td>
</tr>
<tr>
<td></td>
<td>- Export backup data record</td>
</tr>
<tr>
<td></td>
<td>(.csv file, create documentation of the measuring point configuration)</td>
</tr>
<tr>
<td></td>
<td>- Verification report</td>
</tr>
<tr>
<td></td>
<td>(PDF file, only available with the &quot;Heartbeat Verification&quot; application package)</td>
</tr>
<tr>
<td></td>
<td>- File for system integration - If using fieldbuses, upload device drivers for system integration</td>
</tr>
<tr>
<td></td>
<td>from the measuring device:</td>
</tr>
<tr>
<td></td>
<td>- PROFIBUS DP: GSD file</td>
</tr>
<tr>
<td></td>
<td>- Firmware update - Flashing a firmware version</td>
</tr>
<tr>
<td>Network configuration</td>
<td>Configuration and checking of all the parameters required for establishing the connection to the measuring device:</td>
</tr>
<tr>
<td></td>
<td>- Network settings (e.g. IP address, MAC address)</td>
</tr>
<tr>
<td></td>
<td>- Device information (e.g. serial number, firmware version)</td>
</tr>
<tr>
<td>Logout</td>
<td>End the operation and call up the login page</td>
</tr>
</tbody>
</table>
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>
<tbody>
<tr>
<td>Web server functionality</td>
<td>Switch the Web server on and off.</td>
<td>• Off</td>
<td>On</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• HTML Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On</td>
<td></td>
</tr>
</tbody>
</table>

Function scope of the "Web server functionality" parameter

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| Off    | • The web server is completely disabled.  
        | • Port 80 is locked.                    |
| 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) → 79.
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 PROFIBUS DP network

This communication interface is available in device versions with PROFIBUS DP.

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

28 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

29 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"
Operation options

Proline Promass A 500 PROFIBUS DP

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)

Encryption

<table>
<thead>
<tr>
<th>Available antennas</th>
<th>Configurable WLAN channels</th>
<th>Degree of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPA2-PSK AES-128 (in accordance with IEEE 802.11i)</td>
<td>1 to 11</td>
<td>IP67</td>
</tr>
</tbody>
</table>

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 → 84
  - WLAN interface→ 85

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 → 90

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

![User interface diagram](image)

1. **Header**
2. **Picture of device**
3. **Device name**
4. **Device tag**
5. **Status area with status signal**
6. **Display area for current measured values**
7. **Edit toolbar with additional functions such as save/restore, event list and create documentation**
8. **Navigation area with operating menu structure**
9. **Working area**
10. **Range of action**
11. **Status area**

### 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 →  90
9 System integration

9.1 Overview of device description files

9.1.1 Current version data for the device

<table>
<thead>
<tr>
<th>Firmware version</th>
<th>01.00.zz</th>
</tr>
</thead>
</table>
| Description      | ● On the title page of the Operating instructions  
|                  | ● On the transmitter nameplate  
|                  | ● Firmware version  
|                  | Diagnostics → Device information → Firmware version |
| Release date of firmware version | 06.2018 |
| Manufacturer ID  | 0x11 |
| Description      | Manufacturer ID  
|                  | Diagnostics → Device information → Manufacturer ID |
| Device type ID   | 0x156F |
| Description      | Device type  
|                  | Diagnostics → Device information → Device type |
| Profile version  | 3.02 |
| Description      | --- |

For an overview of the different firmware versions for the device → 236

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 PROFIBUS protocol</th>
<th>Sources for obtaining device descriptions</th>
</tr>
</thead>
</table>
| FieldCare                            | ● [www.endress.com](http://www.endress.com) → Download Area  
|                                      | ● CD-ROM (contact Endress+Hauser)  
|                                      | ● DVD (contact Endress+Hauser) |
| DeviceCare                           | ● [www.endress.com](http://www.endress.com) → Download Area  
|                                      | ● CD-ROM (contact Endress+Hauser)  
|                                      | ● DVD (contact Endress+Hauser) |

9.2 Device master file (GSD)

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

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

With the Profile 3.02 device master file (GSD) it is possible to exchange field devices made by different manufacturers without having to reconfigure.

Generally speaking, it is possible to use two different GSDs with Profile 3.02 and higher: the manufacturer-specific GSD and the Profile GSD.

- Before configuring, the user must decide which GSD should be used to operate the system.
- The setting can be changed via a Class 2 master.
9.2.1 Manufacturer-specific GSD
This GSD guarantees the unrestricted functionality of the measuring device. Device-specific process parameters and functions are therefore available.

<table>
<thead>
<tr>
<th>Manufacturer-specific GSD</th>
<th>ID number</th>
<th>File name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS DP</td>
<td>0x156F</td>
<td>EH3x156F.gsd</td>
</tr>
</tbody>
</table>

The fact that the manufacturer-specific GSD should be used is specified in the Ident number selector parameter by selecting the Manufacturer option.

Where to acquire the manufacturer-specific GSD:
www.endress.com → Downloads area

9.2.2 Profile GSD
Differs in terms of the number of Analog Input blocks (AI) and the measured values. If a system is configured with a Profile GSD, it is possible to exchange devices made by different manufacturers. However, it is essential to ensure that the order of the cyclic process values is correct.

<table>
<thead>
<tr>
<th>ID number</th>
<th>Supported blocks</th>
<th>Supported channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x9740</td>
<td>• 1 Analog Input</td>
<td>• Channel Analog Input: volume flow</td>
</tr>
<tr>
<td></td>
<td>• 1 Totalizer</td>
<td>• Channel totalizer: volume flow</td>
</tr>
<tr>
<td>0x9741</td>
<td>• 2 Analog Input</td>
<td>• Channel Analog Input 1: volume flow</td>
</tr>
<tr>
<td></td>
<td>• 1 Totalizer</td>
<td>• Channel Analog Input 2: mass flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Channel totalizer: volume flow</td>
</tr>
<tr>
<td>0x9742</td>
<td>• 3 Analog Input</td>
<td>• Channel Analog Input 1: volume flow</td>
</tr>
<tr>
<td></td>
<td>• 1 Totalizer</td>
<td>• Channel Analog Input 2: mass flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Channel Analog Input 3: corrected volume flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Channel totalizer: volume flow</td>
</tr>
</tbody>
</table>

The Profile GSD that is to be used is specified in the Ident number selector parameter by selecting the Profile 0x9740 option, Profile 0x9741 option or Profile 0x9742 option.

9.3 Compatibility with earlier model
If the device is replaced, the Promass 500 measuring device supports the compatibility of the cyclic data with previous models. It is not necessary to adjust the engineering parameters of the PROFIBUS network with the Promass 500 GSD file.

Previous model:
Promass 83 PROFIBUS DP
- ID No.: 1529 (hex)
- Extended GSD file: EH3x1529.gsd
- Standard GSD file: EH3_1529.gsd

9.3.1 Automatic identification (factory setting)
The Promass 500 PROFIBUS DP automatically recognizes the measuring device configured in the automation system (Promass 83 PROFIBUS DP) and makes the same input and output data and measured value status information available for cyclic data exchange.

Automatic identification is set in the Ident number selector parameter using the Automatic mode option (factory setting).
9.3.2 Manual setting

The manual setting is made in the **Ident number selector** parameter via the **Promass 83 (0x1529)** option.

Afterwards the Promass 500 PROFIBUS DP makes the same input and output data and measured value status information → 176 available for cyclic data exchange.

- If the Promass 500 PROFIBUS DP is acyclically configured via an operating program (Class 2 master), access is directly via the block structure or the parameters of the measuring device.
- If parameters have been changed in the device to be replaced (Promass 83 PROFIBUS DP) (parameter setting no longer corresponds to the original factory setting), these parameters must be changed accordingly in the new Promass 500 PROFIBUS DP being used via an operating program (Class 2 master).

**Example**

The assignment setting for low flow cut off has been changed from mass flow (factory setting) to corrected volume flow in a Promass 83 PROFIBUS DP currently in operation. This device is now replaced by a Promass 500 PROFIBUS DP.

After replacing the device, the assignment for the low flow cut off must also be changed manually in the Promass 500 PROFIBUS DP, i.e. to corrected volume flow, to ensure the measuring device behaves identically.

9.3.3 Replacing the measuring devices without changing the GSD file or restarting the controller

In the procedure described below, the device can be replaced without interrupting ongoing operation or restarting the controller. However with this procedure the measuring device is not fully integrated!

1. Replace the measuring device Promass 83 PROFIBUS DP by the Promass 500 PROFIBUS DP.
2. Set the device address: The same device address that was set for Promass 83 PROFIBUS DP and is configured in the automation system must be used.
3. Connect the measuring device Promass 500 PROFIBUS DP.

If the factory setting had been changed on the replaced device (Promass 83 PROFIBUS DP), the following settings may need to be changed:

1. Configuration of the application-specific parameters.
2. Choice of process variables to be transmitted via the **Channel** parameter in the Analog Input or Totalizer function block.
3. Setting of the units for the process variables.

9.4 Using the GSD modules of the previous model

In the compatibility mode, all the modules already configured in the automation system are generally supported during cyclic data transmission. However, Promass 500 does not perform further processing for the following modules, i.e. the function is not executed:

- **DISPLAY_VALUE**
- **BATCHING_QUANTITY**
- **BATCHING_FIX_COMP_QUANTITY**

If the device is replaced, the measuring device Promass 500 supports the compatibility of the cyclic data with previous models. It is not necessary to adjust the engineering parameters of the PROFIBUS network with the Promass 500 GSD file.
9.4.1 Using the CONTROL_BLOCK module in the previous model

If the CONTROL_BLOCK module is used in the previous model, the control variables are processed further if relevant functionalities can be assigned for the Promass 500.

The functions are supported as follows depending on the previous model:

*Previous model: Promass 83 PROFIBUS DP*

<table>
<thead>
<tr>
<th>Control variable</th>
<th>Function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 → 2</td>
<td>Positive zero return: ON</td>
<td>Yes</td>
</tr>
<tr>
<td>0 → 3</td>
<td>Positive zero return: OFF</td>
<td>Yes</td>
</tr>
<tr>
<td>0 → 4</td>
<td>Zero point adjustment: START</td>
<td>Yes</td>
</tr>
<tr>
<td>0 → 8</td>
<td>Measuring mode: UNIDIRECTIONAL</td>
<td>No</td>
</tr>
<tr>
<td>0 → 9</td>
<td>Measuring mode: BIDIRECTIONAL</td>
<td>No</td>
</tr>
<tr>
<td>0 → 24</td>
<td>UNIT TO BUS</td>
<td>No</td>
</tr>
<tr>
<td>0 → 25</td>
<td>Advanced diagnostics – Warning mode: ON</td>
<td>No</td>
</tr>
<tr>
<td>0 → 26</td>
<td>Advanced diagnostics – Warning mode: OFF</td>
<td>No</td>
</tr>
<tr>
<td>0 → 30 to 43</td>
<td>Additional functions: Batching</td>
<td>No</td>
</tr>
<tr>
<td>0 → 50</td>
<td>Relay output 1: ON</td>
<td>Yes, terminals 24/25 (I/O 2)</td>
</tr>
<tr>
<td>0 → 51</td>
<td>Relay output 1: OFF</td>
<td></td>
</tr>
<tr>
<td>0 → 55</td>
<td>Relay output 2: ON</td>
<td>Yes, terminals 22/23 (I/O 3)</td>
</tr>
<tr>
<td>0 → 56</td>
<td>Relay output 2: OFF</td>
<td></td>
</tr>
<tr>
<td>0 → 70 to 78</td>
<td>Additional functions: Advanced diagnostics</td>
<td>No</td>
</tr>
</tbody>
</table>

*Cause:*
The Profile Transducer Block Flow is no longer supported.

*To continue to use the functionality:*
Use the Totalizer operation mode parameter in the Totalizer function block.

*Cause:*
Functionality is no longer required as the unit is adopted automatically.

*To continue to use the functionality:*
The functionalities are offered in the "Heartbeat Technology" application package.

*To continue to use the functionality:*
The functionalities are offered in the "Heartbeat Technology" application package.
9.5  Cyclic data transmission

Cyclic data transmission when using the device master file (GSD).

9.5.1  Block model

The block model shows which input and output data the measuring device makes available for cyclic data exchange. Cyclic data exchange takes place with a PROFIBUS master (Class 1), e.g. a control system.

![Block model diagram]

**Defined order of modules**

The measuring device works as a modular PROFIBUS slave. In contrast to a compact slave, a modular slave has a variable design and consists of several individual modules. The device master file (GSD) contains a description of the individual modules (input and output data) along with their individual properties.

The modules are permanently assigned to the slots, i.e. when configuring the modules, the order and the arrangement of the modules must be respected.

<table>
<thead>
<tr>
<th>Slot</th>
<th>Module</th>
<th>Function block</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 8</td>
<td>AI</td>
<td>Analog Input block 1 to 8</td>
</tr>
<tr>
<td>9</td>
<td>TOTAL or SETTOT_TOTAL</td>
<td>Totalizer block 1</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Totalizer block 2</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Totalizer block 3</td>
</tr>
<tr>
<td>12 to 16</td>
<td>AO or SETTOT_TOTAL</td>
<td>Analog Output block 1 to 5</td>
</tr>
<tr>
<td>17 to 18</td>
<td>DI</td>
<td>Discrete Input block 1 to 2</td>
</tr>
<tr>
<td>19 to 25</td>
<td>DO</td>
<td>Discrete Output block 1 to 7</td>
</tr>
</tbody>
</table>

To optimize the data throughput rate of the PROFIBUS network, it is advisable to only configure modules that are processed in the PROFIBUS master system. If this results in gaps between the configured modules, these gaps must be assigned to the EMPTY_MODULE.

9.5.2  Description of the modules

The data structure is described from the perspective of the PROFIBUS master:

- **Input data:** Are sent from the measuring device to the PROFIBUS master.
- **Output data:** Are sent from the PROFIBUS master to the measuring device.
AI module (Analog Input)
Transmit an input variable from the measuring device to the PROFIBUS master (Class 1). The selected input variable, along with the status, is cyclically transmitted to the PROFIBUS Master (Class 1) via the AI module. 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 standardized status information pertaining to the input variable.

Eight Analog Input blocks are available (slot 1 to 8).

Selection: input variable

<table>
<thead>
<tr>
<th>Input variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow</td>
</tr>
<tr>
<td>Volume flow</td>
</tr>
<tr>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>Density</td>
</tr>
<tr>
<td>Reference density</td>
</tr>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>Electronic temperature</td>
</tr>
<tr>
<td>Oscillation frequency 0</td>
</tr>
<tr>
<td>Frequency fluctuation 0</td>
</tr>
<tr>
<td>Oscillation damping 0</td>
</tr>
<tr>
<td>Tube damping fluctuation 0</td>
</tr>
<tr>
<td>Signal asymmetry</td>
</tr>
<tr>
<td>Exciter current 0</td>
</tr>
<tr>
<td>Concentration 1)</td>
</tr>
<tr>
<td>Target mass flow 1)</td>
</tr>
<tr>
<td>Carrier mass flow 1)</td>
</tr>
<tr>
<td>Target volume flow 1)</td>
</tr>
<tr>
<td>Carrier volume flow 1)</td>
</tr>
<tr>
<td>Target corrected volume flow 1)</td>
</tr>
<tr>
<td>Carrier corrected volume flow 1)</td>
</tr>
<tr>
<td>Carrier tube temperature 2)</td>
</tr>
<tr>
<td>Oscillation frequency 1 2)</td>
</tr>
<tr>
<td>Oscillation amplitude 0 2)</td>
</tr>
<tr>
<td>Oscillation amplitude 1 2)</td>
</tr>
<tr>
<td>Frequency fluctuation 1 2)</td>
</tr>
<tr>
<td>Oscillation damping 1 2)</td>
</tr>
<tr>
<td>Tube damping fluctuation 1 2)</td>
</tr>
<tr>
<td>Excitation current 1 2)</td>
</tr>
<tr>
<td>HBSI 2)</td>
</tr>
<tr>
<td>Current input 1</td>
</tr>
<tr>
<td>Current input 2</td>
</tr>
<tr>
<td>Current input 3</td>
</tr>
</tbody>
</table>

1) Only available with the Concentration application package
2) Only available with the Heartbeat Verification application package
Factory setting

<table>
<thead>
<tr>
<th>Function block</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI 1</td>
<td>Mass flow</td>
</tr>
<tr>
<td>AI 2</td>
<td>Volume flow</td>
</tr>
<tr>
<td>AI 3</td>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>AI 4</td>
<td>Density</td>
</tr>
<tr>
<td>AI 5</td>
<td>Mass flow</td>
</tr>
<tr>
<td>AI 6</td>
<td>Temperature</td>
</tr>
<tr>
<td>AI 7</td>
<td>Mass flow</td>
</tr>
<tr>
<td>AI 8</td>
<td>Mass flow</td>
</tr>
</tbody>
</table>

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>Measured value: floating point number (IEEE 754)</td>
<td>Status</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL module

Transmit a totalizer value from the measuring device to the PROFIBUS master (Class 1).

A selected totalizer value, along with the status, is cyclically transmitted to a PROFIBUS Master (Class 1) via the TOTAL module. 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 standardized status information pertaining to the totalizer value.

Three Totalizer blocks are available (slot 9 to 11).

Selection: totalizer value

<table>
<thead>
<tr>
<th>Input variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass flow</td>
</tr>
<tr>
<td>Volume flow</td>
</tr>
<tr>
<td>Corrected volume flow</td>
</tr>
<tr>
<td>Target fluid mass flow</td>
</tr>
<tr>
<td>Carrier mass flow</td>
</tr>
</tbody>
</table>

1) Only available with the 'Concentration' application package

Factory setting

<table>
<thead>
<tr>
<th>Function block</th>
<th>Factory setting: TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer 1, 2 and 3</td>
<td>Mass flow</td>
</tr>
</tbody>
</table>

Data structure

Input data of TOTAL

<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</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**SETTOT_TOTAL module**

The module combination consists of the SETTOT and TOTAL functions:
- SETTOT: Control the totalizers via the PROFIBUS master.
- TOTAL: Transmit totalizer value, along with the status, to the PROFIBUS master.

Three Totalizer blocks are available (slot 9 to 11).

**Selection: control totalizer**

<table>
<thead>
<tr>
<th>Value SETTOT</th>
<th>Control totalizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Totalize</td>
</tr>
<tr>
<td>1</td>
<td>Resetting</td>
</tr>
<tr>
<td>2</td>
<td>Adopt totalizer initial setting</td>
</tr>
</tbody>
</table>

**Factory setting**

<table>
<thead>
<tr>
<th>Function block</th>
<th>Factory setting: Value SETTOT (meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer 1, 2 and 3</td>
<td>0 (totalizing)</td>
</tr>
</tbody>
</table>

**Data structure**

**Output data of SETTOT**

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

**Input data of TOTAL**

<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</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**SETTOT_MODETOT_TOTAL module**

The module combination consists of the SETTOT, MODETOT and TOTAL functions:
- SETTOT: Control the totalizers via the PROFIBUS master.
- MODETOT: Configure the totalizers via the PROFIBUS master.
- TOTAL: Transmit totalizer value, along with the status, to the PROFIBUS master.

Three Totalizer blocks are available (slot 9 to 11).

**Selection: totalizer configuration**

<table>
<thead>
<tr>
<th>MODETOT value</th>
<th>Totalizer configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Balancing</td>
</tr>
<tr>
<td>1</td>
<td>Balance the positive flow</td>
</tr>
<tr>
<td>2</td>
<td>Balance the negative flow</td>
</tr>
<tr>
<td>3</td>
<td>Stop totalizing</td>
</tr>
</tbody>
</table>

**Factory setting**

<table>
<thead>
<tr>
<th>Function block</th>
<th>Factory setting: Value MODETOT (meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer 1, 2 and 3</td>
<td>0 (balancing)</td>
</tr>
</tbody>
</table>
Data structure

Output data of SETTOT and MODETOT

<table>
<thead>
<tr>
<th>Byte 1</th>
<th>Byte 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control variable 1: SETTOT</td>
<td>Control variable 2: MODETOT</td>
</tr>
</tbody>
</table>

Input data of TOTAL

<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</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AO module (Analog Output)

Transmit a compensation value from the PROFIBUS master (Class 1) to the measuring device.

A compensation value, along with the status, is cyclically transmitted from the PROFIBUS Master (Class 1) to the measuring device via the AO module. 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.

Five Analog Output blocks are available (slot 12 to 16).

Assigned compensation values

A compensation value is permanently assigned to the individual Analog Output blocks.

<table>
<thead>
<tr>
<th>Function block</th>
<th>Compensation value</th>
</tr>
</thead>
</table>
| AO 1           | External pressure  
| AO 2           | External temperature |
| AO 3           | External reference density |
| AO 4           | – |
| AO 5           | – |

1) The compensation values must be transmitted to the device in the SI basic unit

The selection is made via: Expert → Sensor → External compensation

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>
</tr>
</thead>
<tbody>
<tr>
<td>Measured value: floating point number (IEEE 754)</td>
<td>Status</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DI module (Discrete Input)

Transmit discrete input values from the measuring device to the PROFIBUS master (Class 1). Discrete input values are used by the measuring device to transmit the state of device functions to the PROFIBUS master (Class 1).

The DI module cyclically transmits the discrete input value, along with the status, to the PROFIBUS Master (Class 1). The discrete input value is depicted in the first byte. The second byte contains standardized status information pertaining to the input value.

Two Discrete Input blocks are available (slot 17 to 18).
Selection: device function

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

<table>
<thead>
<tr>
<th>Status verification ¹)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit 0: Verification status - Check not done</td>
<td>Bit 1: Verification status - Failed</td>
</tr>
<tr>
<td>Bit 2: Verification status - Busy</td>
<td>Bit 3: Verification status - Ready</td>
</tr>
<tr>
<td>Bit 4: Verification overall result - Failed</td>
<td>Bit 5: Verification overall result - Passed</td>
</tr>
<tr>
<td>Bit 6: Verification overall result - Check not done</td>
<td>Bit 7: Not used</td>
</tr>
</tbody>
</table>

¹) Only available with the Heartbeat Verification application package

Factory setting

<table>
<thead>
<tr>
<th>Function block</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI 1</td>
<td>Empty pipe detection</td>
</tr>
<tr>
<td>DI 2</td>
<td>Low flow cut off</td>
</tr>
</tbody>
</table>

Data structure

Input data of Discrete Input

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

DO module (Discrete Output)

Transmit discrete output values from the PROFIBUS master (Class 1) to the measuring device. Discrete output values are used by the PROFIBUS master (Class 1) to enable and disable device functions.

The DO module cyclically transmits the discrete output value, along with the status, to the measuring device. The discrete output value is depicted in the first byte. The second byte contains standardized status information pertaining to the output value.

Seven Discrete Output blocks are available (slot 19 to 25).

Assigned device functions

A device function is permanently assigned to the individual Discrete Output blocks.

<table>
<thead>
<tr>
<th>Function block</th>
<th>Device function</th>
<th>Values: control (meaning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO 1</td>
<td>Flow override</td>
<td>• 0 (disable device function)</td>
</tr>
<tr>
<td>DO 2</td>
<td>Zero point adjustment</td>
<td>• 1 (enable device function)</td>
</tr>
<tr>
<td>DO 3</td>
<td>Start verification ¹)</td>
<td></td>
</tr>
<tr>
<td>DO 4 (I/O 2)</td>
<td>Relay output or switch output of the pulse/frequency/switch output</td>
<td>• 0 (non-conductive)</td>
</tr>
<tr>
<td>DO 5 (I/O 3)</td>
<td>Assignment of medium type (see the following table)</td>
<td></td>
</tr>
<tr>
<td>DO 6 (I/O 4)</td>
<td>Concentration ²)</td>
<td>• 1 (conductive)</td>
</tr>
<tr>
<td>DO 7</td>
<td>Concentration ²)</td>
<td></td>
</tr>
</tbody>
</table>

¹) Only available with the Heartbeat Verification application package

²) Only available with the Concentration application package
### Assignment of medium type: function block DO 7

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Fructose in water</td>
</tr>
<tr>
<td>102</td>
<td>Glucose in water</td>
</tr>
<tr>
<td>104</td>
<td>Hydrogen peroxide in water</td>
</tr>
<tr>
<td>105</td>
<td>Sucrose in water</td>
</tr>
<tr>
<td>106</td>
<td>Invert sugar in water</td>
</tr>
<tr>
<td>107</td>
<td>Nitric acid</td>
</tr>
<tr>
<td>108</td>
<td>Phosphoric acid</td>
</tr>
<tr>
<td>109</td>
<td>Potassium hydroxide</td>
</tr>
<tr>
<td>110</td>
<td>Off</td>
</tr>
<tr>
<td>111</td>
<td>Sodium hydroxide</td>
</tr>
<tr>
<td>112</td>
<td>Ethanol in water</td>
</tr>
<tr>
<td>113</td>
<td>Methanol in water</td>
</tr>
<tr>
<td>114</td>
<td>Ammonium nitrate in water</td>
</tr>
<tr>
<td>115</td>
<td>Iron(III) chloride in water</td>
</tr>
<tr>
<td>116</td>
<td>HFCS42</td>
</tr>
<tr>
<td>117</td>
<td>HFCS55</td>
</tr>
<tr>
<td>118</td>
<td>HFCS90</td>
</tr>
<tr>
<td>119</td>
<td>Original wort</td>
</tr>
<tr>
<td>121</td>
<td>% mass / % volume</td>
</tr>
<tr>
<td>122</td>
<td>Coef Set No. 1</td>
</tr>
<tr>
<td>123</td>
<td>Coef Set No. 2</td>
</tr>
<tr>
<td>124</td>
<td>Coef Set No. 3</td>
</tr>
<tr>
<td>125</td>
<td>Hydrochloric acid</td>
</tr>
</tbody>
</table>

### Data structure

**Output data of Discrete Output**

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

**EMPTY_MODULE module**

This module is used to assign empty spaces arising from modules not being used in the slots.

The measuring device works as a modular PROFIBUS slave. In contrast to a compact slave, a modular PROFIBUS slave has a variable design and consists of several individual modules. The GSD file contains a description of the individual modules along with their individual properties.

The modules are permanently assigned to the slots. When configuring the modules, it is absolutely essential to observe the sequence/arrangement of the modules. Any gaps between the configured modules must be filled with the EMPTY_MODULE.
9.6 Address shifting configuration

9.6.1 Function description

The field device also makes acyclic communication services available in addition to cyclic communication. This enables automation systems (PLCs), central engineering stations and asset management systems to exchange data acyclically with the field device. This mode of communication is typically used to configure the field device. Here, addressing at the communication level is implemented by PROFIBUS for slot and index value pairs. The field device makes process and configuration parameters available over a wide range of slot and index values. Currently not all control systems are able to handle communication with such a large address area. Therefore, the field device provides the option of mirroring parameters to slot 0 with the "Address shifting configuration" function. All common masters allow access to slot 0. In the PLC, slot 0 of the field device is generally on the diagnostic address of the relevant field device.

9.6.2 Structure

With the "Address shifting configuration" function, 2 address areas are defined in slot 0, the configuration area (index 190 to 221) and the assigned data area (index 230 to 245). The configuration area defines which parameters should be managed.

The configuration area contains the indexes 190 to 221 with which up to 16 parameters can be managed. Two indexes are used per parameter:
- The first index is for the slot value of the parameter
- The second index is for the index value of the parameter

The data area contains the indexes 230 to 245 in slot 0 and is permanently assigned to the configuration area.

<table>
<thead>
<tr>
<th>Slot 0, Index</th>
<th>Configuration area</th>
<th>Fixed assignment</th>
<th>Slot 0, Index</th>
<th>Data area</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>Slot value for parameter 1</td>
<td>→</td>
<td>230</td>
<td>Value for parameter-specific selection</td>
</tr>
<tr>
<td>191</td>
<td>Index value for parameter 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>192</td>
<td>Slot value for parameter 2</td>
<td>→</td>
<td>231</td>
<td>Value for parameter-specific selection</td>
</tr>
<tr>
<td>193</td>
<td>Index value for parameter 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>194 to 219</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>Slot value for parameter 16</td>
<td>→</td>
<td>245</td>
<td>Value for parameter-specific selection</td>
</tr>
<tr>
<td>221</td>
<td>Index value for parameter 16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.6.3 Configuring address shifting

When configuring, the specific slot and index values of the parameters must be entered in the configuration area. This area can contain up to 32 entries for 16 parameters. Address shifting configuration supports float- and integer-type parameters with read and write access.

Address shifting can be configured via:
- Local display
- Configuration tool (e.g. FieldCare/DeviceCare)
- PROFIBUS master

Address shifting is configured in the menu Expert → Communication → Address shifting configuration:

Example

<table>
<thead>
<tr>
<th>Slot 0, Index</th>
<th>Configuration area</th>
<th>Fixed assignment</th>
<th>Data area</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>Slot shifting 1 parameter: 48</td>
<td>→ 230 1349 = m³/h</td>
<td></td>
</tr>
<tr>
<td>191</td>
<td>Index shifting 1 parameter: 24</td>
<td>→ 231 1001 = °C</td>
<td></td>
</tr>
<tr>
<td>192</td>
<td>Slot shifting 2 parameter: 48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>193</td>
<td>Index shifting 2 parameter: 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>194 to 219</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>Slot shifting 16 parameter: 54</td>
<td>→ 245 9 = On</td>
<td></td>
</tr>
<tr>
<td>221</td>
<td>Index shifting 16 parameter: 30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The entry values are taken from the device-specific slot/index table. The following excerpt shows the values for the volume flow unit and the temperature unit in the example above.

<table>
<thead>
<tr>
<th>Description</th>
<th>Slot</th>
<th>Index</th>
<th>Data type</th>
<th>Size [bytes]</th>
<th>Range</th>
</tr>
</thead>
</table>
| Volume flow unit  | 48   | 24    | Enum16    | 2            | 1348 : m³/min 1349 : m³/h 1350 : m³/d ...
| Temperature unit  | 48   | 7     | Enum16    | 2            | 1001 : °C 1002 : °F 1000 : K 1003 : °R |

For more information on the 'slot/index table', please contact the Endress+Hauser Sales Center.

9.6.4 Accessing data via PROFIBUS DP

The PROFIBUS master uses the indexes 230 to 245 in slot 0 to access the address shifting data area. If, for example, slot 48, index 24 has been entered for the volume flow
parameter via address shifting, the master can read out the current volume flow measured value in slot 0 and index 230.

The data type (integer/float) and data access (read/write) depend on the parameter entered in the configuration area. If the parameter entered supports read and write access, the parameter can also be read- and write-accessed via the data area.
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 \( \rightarrow \) 36
• “Post-connection check” checklist \( \rightarrow \) 62

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" \( \rightarrow \) 165.

10.3 Connecting via FieldCare

• For FieldCare \( \rightarrow \) 84 connection
• For connecting via FieldCare \( \rightarrow \) 87
• For the FieldCare \( \rightarrow \) 88 user interface

10.4 Configuring the device address via software

In the "Communication" submenu the device address can be set.

Navigation
"Setup" menu \( \rightarrow \) Communication \( \rightarrow \) Device address

10.4.1 PROFIBUS network

At time of delivery, the measuring device has the following factory setting:

| Device address | 126 |

• To display the current device address: Device address parameter \( \rightarrow \) 111
• If hardware addressing is active, software addressing is blocked \( \rightarrow \) 58

10.5 Setting the operating language

Factory setting: English or ordered local language
10.6 Configuring the measuring device

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

Depending on the device version, not all submenus and parameters are available in every device. The selection can vary depending on the order code.


**Navigation**

'Setup' menu

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag</td>
<td>107</td>
</tr>
<tr>
<td>System units</td>
<td>107</td>
</tr>
<tr>
<td>Medium selection</td>
<td>110</td>
</tr>
<tr>
<td>Communication</td>
<td>111</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>113</td>
</tr>
<tr>
<td>I/O configuration</td>
<td>115</td>
</tr>
<tr>
<td>Current input 1 to n</td>
<td>116</td>
</tr>
<tr>
<td>Status input 1 to n</td>
<td>117</td>
</tr>
<tr>
<td>Current output 1 to n</td>
<td>118</td>
</tr>
<tr>
<td>Pulse/frequency/switch output 1 to n</td>
<td>121</td>
</tr>
<tr>
<td>Relay output 1 to n</td>
<td>128</td>
</tr>
<tr>
<td>Display</td>
<td>130</td>
</tr>
<tr>
<td>Low flow cut off</td>
<td>133</td>
</tr>
<tr>
<td>Partially filled pipe detection</td>
<td>134</td>
</tr>
<tr>
<td>Advanced setup</td>
<td>135</td>
</tr>
</tbody>
</table>

### 10.6.1 Defining the tag name

To enable fast identification of the measuring point within the system, you can enter a unique designation using the **Device tag** parameter and thus change the factory setting.
Enter the tag name in the 'FieldCare' operating tool → 88

**Navigation**

'Setup' menu → Device tag

---

### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag</td>
<td>Enter the name for the measuring point.</td>
<td>Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).</td>
<td>Promass 500 DP</td>
</tr>
</tbody>
</table>

---

### 10.6.2 Setting the system units

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

Depending on the device version, not all submenus and parameters are available in every device. The selection can vary depending on the order code.

**Navigation**

'Setup' menu → System units
Temperature unit

Pressure unit

### 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><strong>Result</strong></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><strong>Result</strong></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>Corrected volume unit</td>
<td></td>
<td></td>
<td>- Nl/h</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>Density unit</td>
<td>Select density unit.</td>
<td>Unit choose list</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td><strong>Result</strong></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 (<a href="#">Expert menu</a>)</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/NI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- lb/ft³</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td>Selection</td>
<td>Factory setting</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Temperature unit</td>
<td>Select temperature unit. Result The selected unit applies for: • Electronic temperature parameter (6053) • Maximum value parameter (6051) • Minimum value parameter (6052) • Maximum value parameter (6108) • Minimum value parameter (6109) • Maximum value parameter (6029) • Minimum value parameter (6030) • Reference temperature parameter (1816) • Temperature parameter</td>
<td>Unit choose list</td>
<td>Country-specific: • °C • °F</td>
</tr>
<tr>
<td>Pressure unit</td>
<td>Select process pressure unit. Result The unit is taken from: • Pressure value parameter (→ 111) • External pressure parameter (→ 111) • Pressure value</td>
<td>Unit choose list</td>
<td>Country-specific: • bar a • psi a</td>
</tr>
</tbody>
</table>
10.6.3 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><strong>Medium selection</strong></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>
</table>
| Select medium              | –            | Select medium type. | • Liquid  
  • Gas  | Liquid         |
| Select gas type            | The **Gas** option is selected in the **Select medium** parameter. | Select measured gas type.  | • Air  
  • Ammonia NH3  
  • Argon Ar  
  • Sulfur hexafluoride SF6  
  • Oxygen O2  
  • Ozone O3  
  • Nitrogen oxide NOx  
  • Nitrogen N2  
  • Nitrous oxide N2O  
  • Methane CH4  
  • Hydrogen H2  
  • Helium He  
  • Hydrogen chloride HCl  
  • Hydrogen sulfide H2S  
  • Ethylene C2H4  
  • Carbon dioxide CO2  
  • Carbon monoxide CO  
  • Chlorine Cl2  
  • Butane C4H10  
  • Propane C3H8  
  • Propylene C3H6  
  • Ethane C2H6  
  • Others | Methane CH4 |
| Reference sound velocity   | In the **Select gas type** parameter, the **Others** option is selected. | Enter sound velocity of gas at 0 °C (32 °F). | 1 to 99999.9999 m/s  
  415.0 m/s |
| Temperature coefficient sound velocity | The **Others** option is selected in the **Select gas type** parameter. | Enter temperature coefficient for the gas sound velocity. | Positive floating-point number 0 (m/s)/K |
| Pressure compensation     | –            | Select pressure compensation type.  | • Off  
  • Fixed value  
  • External value  
  • Current input 1 *  
  • Current input 2 *  
  • Current input 3 *  | Off         |
| Pressure value             | The **Fixed value** option or the **Current input 1...n** option is selected in the **Pressure compensation** parameter. | Enter process pressure to be used for pressure correction. | Positive floating-point number 0 bar |
| External pressure          | The **Fixed value** option or the **Current input 1...n** option is selected in the **Pressure compensation** parameter. | Shows the external process pressure value. | Positive floating-point number 0 bar |

* Visibility depends on order options or device settings

### 10.6.4 Configuring communication interface

The **Communication** submenu guides you systematically through all the parameters that have to be configured for selecting and setting the communication interface.
Navigation
‘Setup’ menu → Communication

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device address</td>
<td>Enter device address.</td>
<td>0 to 126</td>
<td>126</td>
</tr>
</tbody>
</table>
10.6.5 Configuring the analog inputs

The Analog inputs submenu guides the user systematically to the individual Analog input 1 to n submenu. From here you get to the parameters of the individual analog input.

Navigation
"Setup" menu → Analog inputs

| Analog inputs          |   |
|-----------------------|--|--|---|
| Analog input 1 to n   |   |   |   |
| Channel               |   |   | 114|
| PV filter time        |   |   | 114|
| Fail safe type        |   |   | 115|
| Fail-safe value       |   |   | 115|
### 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>
| Channel         |              | Select the process variable.                                                | • Mass flow  
• Volume flow  
• Corrected volume flow  
• Density  
• Reference density  
• Target mass flow  
• Carrier mass flow  
• Concentration  
• Target volume flow  
• Carrier volume flow  
• Target corrected volume flow  
• Carrier corrected volume flow  
• Temperature  
• Carrier pipe temperature  
• Electronic temperature  
• Oscillation frequency  
• Frequency fluctuation  
• Oscillation damping  
• Oscillation damping fluctuation  
• Oscillation damping fluctuation 1  
• Signal asymmetry  
• Exciter current  
• Current input 1  
• Current input 2  
• Current input 3  
• Reference density alternative  
• GSV flow  
• GSV flow alternative  
• NSV flow  
• NSV flow alternative  
• S&W volume flow  
• Oil density  
• Water density  
• Water cut  
• Oil mass flow  
• Water mass flow  
• Oil volume flow  
• Water volume flow  
• Oil corrected volume flow  
• Water corrected volume flow | Mass flow |
<p>| PV filter time  |              | Specify the time to suppress signal peaks. During the specified time the analog input does not respond to an erratic increase in the process variable. | Positive floating-point number | 0 |</p>
<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>Fail safe type</td>
<td></td>
<td>Select the failure mode.</td>
<td>• Fail-safe value</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Fallback value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Off</td>
<td></td>
</tr>
<tr>
<td>Fail-safe value</td>
<td>In Fail safe type parameter, the Fail-safe value option is selected.</td>
<td>Specify the values to be output when an error occurs.</td>
<td>Signed floating-point number</td>
<td>0</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

### 10.6.6 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>• Profibus DP</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>
</tbody>
</table>
### 10.6.7 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

#### Parameter overview with brief description

<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</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>The measuring device is not approved for use in the hazardous area with type of protection Ex-i.</td>
<td>Select the signal mode for the current input.</td>
<td>• Passive</td>
<td>Active</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Active</td>
<td></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>Parameter</td>
<td>Prerequisite</td>
<td>Description</td>
<td>User interface / Selection / User entry</td>
<td>Factory setting</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>-----------------</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</td>
<td>Country-specific: • 4...20 mA NAMUR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 4...20 mA NAMUR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 4...20 mA US</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 0...20 mA</td>
<td></td>
</tr>
<tr>
<td>Failure mode</td>
<td>–</td>
<td>Define input behavior in alarm condition.</td>
<td>• Alarm</td>
<td>Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Last valid value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Defined value</td>
<td></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>

### 10.6.8 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

---

**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>Terminal number</td>
<td>Shows the terminal numbers used by the status input module.</td>
<td>• Not used</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>Assign status input</td>
<td>Select function for the status input.</td>
<td>• Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reset totalizer 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reset totalizer 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reset totalizer 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reset all totalizers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flow override</td>
<td></td>
</tr>
</tbody>
</table>
### Active level
Define input signal level at which the assigned function is triggered.
- **High**
- **Low**

### 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**

---

### 10.6.9 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

#### 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>Terminal number</td>
<td>Shows the terminal numbers used by the current output module.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Signal mode</td>
<td>Select the signal mode for the current output.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Assign current output 1 to n</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Current span</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>0/4 mA value</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>20 mA value</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Fixed current</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Damping output 1 to n</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Failure mode</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Failure current</td>
<td></td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

---
<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>Assign current output 1 to n</td>
<td></td>
<td>Select process variable for current output.</td>
<td>• Off</td>
<td>Mass flow</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>• Concentration “*”</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>• Carrier pipe temperature “*”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Electronic temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation frequency 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation amplitude 0 ”*”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Frequency fluctuation 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation damping 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation damping fluctuation 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Signal asymmetry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Exciter current 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• HBSI “*”</td>
<td></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 NAMUR</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 4...20 mA US</td>
<td>• 4...20 mA NAMUR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 4...20 mA</td>
<td>• 4...20 mA US</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 0...20 mA</td>
<td></td>
</tr>
<tr>
<td>0/4 mA value</td>
<td>One of the following options is selected in the Current span parameter (→ 119):</td>
<td>Enter 4 mA value.</td>
<td>Signed floating-point number</td>
<td>Country-specific:</td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA NAMUR</td>
<td></td>
<td></td>
<td>• 0 kg/h</td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA US</td>
<td></td>
<td></td>
<td>• 0 lb/min</td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0...20 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 mA value</td>
<td>One of the following options is selected in the Current span parameter (→ 119):</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</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA US</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 4...20 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 0...20 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed current</td>
<td>The Fixed current option is selected in the Current span parameter (→ 119).</td>
<td>Defines the fixed output current.</td>
<td>0 to 22.5 mA</td>
<td>22.5 mA</td>
</tr>
</tbody>
</table>

**User interface / Selection / 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 “*”

**Factory setting:**
- Mass flow
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA
- Fixed current

**Current span parameter (→ 119):**
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

**0/4 mA value:**
- Enter 4 mA value.
- Signed floating-point number

**20 mA value:**
- Enter 20 mA value.
- Signed floating-point number

**Fixed current:**
- Defines the fixed output current.
<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>Damping output 1 to n</td>
<td>A process variable is selected in the Assign current output parameter (→ 119) and one of the following options is selected in the Current span parameter (→ 119): • 4...20 mA NAMUR • 4...20 mA US • 4...20 mA • 0...20 mA</td>
<td>Set reaction time for output signal to fluctuations in the measured value.</td>
<td>0.0 to 999.9 s</td>
<td>1.0 s</td>
</tr>
<tr>
<td>Failure mode</td>
<td>A process variable is selected in the Assign current output parameter (→ 119) and one of the following options is selected in the Current span parameter (→ 119): • 4...20 mA NAMUR • 4...20 mA US • 4...20 mA • 0...20 mA</td>
<td>Define output behavior in alarm condition.</td>
<td>Min. Max. Last valid value Actual value Defined value</td>
<td>Max.</td>
</tr>
<tr>
<td>Failure current</td>
<td>The Defined value option is selected in the Failure mode parameter.</td>
<td>Enter current output value in alarm condition.</td>
<td>0 to 22.5 mA</td>
<td>22.5 mA</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
10.6.10 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

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Operating mode</td>
<td></td>
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<tr>
<td>Terminal number</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assign pulse output</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Value per pulse</td>
<td></td>
<td></td>
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<tr>
<td>Pulse width</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Failure mode</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Invert output signal</td>
<td></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>Selection / User interface / User entry</th>
<th>Factory setting</th>
</tr>
</thead>
</table>
| Operating mode                   | –            | Define the output as a pulse, frequency or switch output.                    | • Pulse  
• Frequency  
• Switch                                           | Pulse                                       |
| Terminal number                  | –            | Shows the terminal numbers used by the PFS 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 PFS output.                                  | • Passive  
• Active                                                | Passive                                       |
| Assign pulse output 1 to n       | The Pulse option is selected in the Operating mode parameter.                | Select process variable for pulse 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  | Off                                          |
| Value per pulse                  | The Pulse option is selected in the Operating mode parameter (→ 121) and a process variable is selected in the Assign pulse output parameter (→ 122). | Enter measured value at which a pulse is output.  | Signed floating-point number  | Depends on country and nominal diameter |
| Pulse width                      | The Pulse option is selected in the Operating mode parameter (→ 121) and a process variable is selected in the Assign pulse output parameter (→ 122). | Define time width of the output pulse.                                  | 0.05 to 2 000 ms  | 100 ms                                       |
| Failure mode                     | The Pulse option is selected in the Operating mode parameter (→ 121) and a process variable is selected in the Assign pulse output parameter (→ 122). | Define output behavior in alarm condition.                                | • Actual value  
• No pulses                                           | No pulses                                           |
| Invert output signal             | –            | Invert the output signal.                                                   | • No  
• Yes                                                 | No                                           |

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

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

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>
</table>
| Operating mode          | –            | Define the output as a pulse, frequency or switch output. | • Pulse  
                          |              | • Frequency  
                          |                          | • Switch         | Pulse            |
| Terminal number         | –            | Shows the terminal numbers used by the PFS 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 PFS output.           | • Passive  
<pre><code>                      |              | • Active     | Passive            |
</code></pre>
<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>Assign frequency output</td>
<td>The <strong>Frequency</strong> option is selected in the <strong>Operating mode</strong> parameter ([→ 121]) parameter.</td>
<td>Select process variable for frequency output.</td>
<td>• Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Mass flow</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Volume flow</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Corrected volume flow</td>
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<td></td>
<td></td>
<td></td>
<td>• Target mass flow *</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Carrier mass flow *</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Target volume flow *</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Carrier volume flow *</td>
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<td></td>
<td>• Target corrected volume flow *</td>
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<td></td>
<td></td>
<td>• Carrier corrected volume flow *</td>
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<td></td>
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<td></td>
<td>• Density</td>
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<td></td>
<td>• Reference density</td>
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<td></td>
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<td></td>
<td>• Concentration *</td>
<td></td>
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<td></td>
<td>• Temperature</td>
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<td></td>
<td></td>
<td>• Carrier pipe temperature *</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Electronic temperature</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation frequency 0</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation amplitude 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Frequency fluctuation 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation damping 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oscillation damping fluctuation 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Signal asymmetry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Exciter current 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• HSSI</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Pressure</td>
<td></td>
</tr>
<tr>
<td>Minimum frequency value</td>
<td>The <strong>Frequency</strong> option is selected in the <strong>Operating mode</strong> parameter ([→ 121]) and a process variable is selected in the <strong>Assign frequency output</strong> parameter ([→ 124]).</td>
<td>Enter minimum frequency.</td>
<td>0.0 to 10 000.0 Hz</td>
<td>0.0 Hz</td>
</tr>
<tr>
<td>Maximum frequency value</td>
<td>The <strong>Frequency</strong> option is selected in the <strong>Operating mode</strong> parameter ([→ 121]) and a process variable is selected in the <strong>Assign frequency output</strong> parameter ([→ 124]).</td>
<td>Enter maximum frequency.</td>
<td>0.0 to 10 000.0 Hz</td>
<td>10 000.0 Hz</td>
</tr>
<tr>
<td>Measuring value at minimum frequency</td>
<td>The <strong>Frequency</strong> option is selected in the <strong>Operating mode</strong> parameter ([→ 121]) and a process variable is selected in the <strong>Assign frequency output</strong> parameter ([→ 124]).</td>
<td>Enter measured value for minimum frequency.</td>
<td>Signed floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Parameter</td>
<td>Prerequisite</td>
<td>Description</td>
<td>Selection / User interface / User entry</td>
<td>Factory setting</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Measuring value at maximum frequency</td>
<td>The Frequency option is selected in the Operating mode parameter (→ 121) and a process variable is selected in the Assign frequency output parameter (→ 124).</td>
<td>Enter measured value for maximum frequency.</td>
<td>Signed floating-point number</td>
<td>Depends on country and nominal diameter</td>
</tr>
<tr>
<td>Failure mode</td>
<td>The Frequency option is selected in the Operating mode parameter (→ 121) and a process variable is selected in the Assign frequency output parameter (→ 124).</td>
<td>Define output behavior in alarm condition.</td>
<td>■ Actual value</td>
<td>0 Hz</td>
</tr>
<tr>
<td>Failure frequency</td>
<td>The Frequency option is selected in the Operating mode parameter (→ 121) and a process variable is selected in the Assign frequency output parameter (→ 124).</td>
<td>Enter frequency output value in alarm condition.</td>
<td>0.0 to 12500.0 Hz</td>
<td>0.0 Hz</td>
</tr>
<tr>
<td>Invert output signal</td>
<td>–</td>
<td>Invert the output signal.</td>
<td>■ No</td>
<td>No</td>
</tr>
</tbody>
</table>

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

Navigation
‘Setup’ menu → Pulse/frequency/switch output

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>
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<tr>
<td></td>
<td></td>
<td></td>
<td>● 22-23 (I/O 3)</td>
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<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>Parameter</td>
<td>Prerequisite</td>
<td>Description</td>
<td>Selection / User interface / User entry</td>
<td>Factory setting</td>
</tr>
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<td>--------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
<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>
</tr>
<tr>
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<td>On</td>
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<td></td>
<td></td>
<td>Diagnostic behavior</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Limit</td>
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<td></td>
<td>Flow direction check</td>
<td></td>
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<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 Diagnostic behavior option is selected.</td>
<td></td>
<td>Alarm or warning</td>
<td></td>
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<tr>
<td></td>
<td></td>
<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 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>
<td></td>
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<td></td>
<td>Corrected volume flow</td>
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<td></td>
<td>Target mass flow</td>
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<td></td>
<td>Carrier mass flow</td>
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<td></td>
<td>Target volume flow</td>
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<td></td>
<td>Carrier volume flow</td>
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<td></td>
<td>Target corrected volume flow</td>
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<td></td>
<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></td>
<td>Oscillation damping</td>
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<td></td>
<td>Pressure</td>
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<td></td>
<td>Totalizer 1</td>
<td></td>
</tr>
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<td></td>
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<td></td>
<td>Totalizer 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Totalizer 3</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>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Mass flow</td>
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<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>Partially filled pipe detection</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>Digital output 4</td>
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<td>Digital output 5</td>
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<td></td>
<td>Digital output 6</td>
<td></td>
</tr>
<tr>
<td>Switch-on value</td>
<td>In the <strong>Operating mode</strong> parameter, the <strong>Switch</strong> option is selected.</td>
<td>Enter measured value for the switch-on point.</td>
<td>Signed floating-point number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In the <strong>Switch output function</strong> parameter, the <strong>Limit</strong> option is selected.</td>
<td></td>
<td>Country-specific:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>0 kg/h</td>
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<td></td>
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<td></td>
<td>0 lb/min</td>
<td></td>
</tr>
</tbody>
</table>
### Table: Parameter Settings for Relay Output

<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>Switch-off value</td>
<td>• In the Operating mode parameter, the Switch option is selected.</td>
<td>Enter measured value for the switch-off point.</td>
<td>Signed floating-point number</td>
<td>Country-specific: • 0 kg/h • 0 lb/min</td>
</tr>
<tr>
<td></td>
<td>• In the Switch output function parameter, the Limit option is selected.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-on delay</td>
<td>• The Switch option is selected in the Operating mode parameter.</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></td>
<td>• The Limit option is selected in the Switch output function parameter.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch-off delay</td>
<td>• The Switch option is selected in the Operating mode parameter.</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></td>
<td>• The Limit option is selected in the Switch output function parameter.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure mode</td>
<td>~</td>
<td>Define output behavior in alarm condition.</td>
<td>• Actual status • Open • Closed</td>
<td>Open</td>
</tr>
<tr>
<td>Invert output signal</td>
<td>~</td>
<td>Invert the output signal.</td>
<td>• No • Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Visibility depends on order options or device settings*

## 10.6.11 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
<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>Relay output function</td>
<td>–</td>
<td>Select the function for the relay output.</td>
<td>Closed / Open / Diagnostic behavior / Limit / Flow direction check / Digital Output</td>
<td>Closed</td>
</tr>
<tr>
<td>Terminal number</td>
<td>–</td>
<td>Shows the terminal numbers used by the relay output module.</td>
<td>–</td>
<td>–</td>
</tr>
<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 / Volume flow / Mass flow / Corrected volume flow</td>
<td>Mass flow</td>
</tr>
<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 / Alarm or warning / Warning</td>
<td>Alarm</td>
</tr>
<tr>
<td>Assign status</td>
<td>In the Relay output function parameter, the Digital Output option is selected.</td>
<td>Select device status for switch output.</td>
<td>Partially filled pipe detection / Low flow cut off / Digital output 4 / Digital output 5 / Digital output 6</td>
<td>Partially filled pipe detection</td>
</tr>
<tr>
<td>Switch-off value</td>
<td>In the Relay output function parameter, the Limit option is selected.</td>
<td>Enter measured value for the switch-off point.</td>
<td>Signed floating-point number</td>
<td>Country-specific: 0 kg/h / 0 lb/min</td>
</tr>
<tr>
<td>Switch-off delay</td>
<td>In the Relay output function parameter, the Limit 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>In the Relay output function parameter, the Limit option is selected.</td>
<td>Enter measured value for the switch-on point.</td>
<td>Signed floating-point number</td>
<td>Country-specific: 0 kg/h / 0 lb/min</td>
</tr>
</tbody>
</table>
### 10.6.12 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

<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>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>-</td>
<td>Open</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

- **Format display**:   131
- **Value 1 display**:   131
- **0% bargraph value 1**:   131
- **100% bargraph value 1**:   131
- **Value 2 display**:   131
- **Value 3 display**:   132
- **0% bargraph value 3**:   132
- **100% bargraph value 3**:   132
- **Value 4 display**:   132
## 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&lt;br&gt;• 1 bargraph + 1 value&lt;br&gt;• 2 values&lt;br&gt;• 1 value large + 2 values&lt;br&gt;• 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&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 0&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;• Totalizer 1&lt;br&gt;• Totalizer 2&lt;br&gt;• Totalizer 3&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</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 bargraph display.</td>
<td>Signed floating-point number</td>
<td>Country-specific: 0 kg/h 0 lb/min</td>
</tr>
<tr>
<td>100% bargraph value 1</td>
<td>A local display is provided.</td>
<td>Enter 100% value for bargraph 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 1 display parameter (+ → 131)</td>
<td>None</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>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 1 display parameter (→ 131)</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 1 display parameter (→ 131)</td>
<td>None</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
10.6.13 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</td>
<td>Mass flow</td>
</tr>
<tr>
<td>On value low flow cutoff</td>
<td>A process variable is selected in the <strong>Assign process variable</strong> parameter (→ 133).</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 <strong>Assign process variable</strong> parameter (→ 133).</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 <strong>Assign process variable</strong> parameter (→ 133).</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>
10.6.14 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></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>Low value partial filled pipe</td>
<td>A process variable is selected in the</td>
<td>Enter lower limit value for deactivating partially filled pipe detection.</td>
<td>Signed floating-point</td>
<td>200</td>
</tr>
<tr>
<td>detection</td>
<td>Assign process variable parameter (→</td>
<td></td>
<td>number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>134)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High value partial filled pipe</td>
<td>A process variable is selected in the</td>
<td>Enter upper limit value for deactivating partially filled pipe detection.</td>
<td>Signed floating-point</td>
<td>6000</td>
</tr>
<tr>
<td>detection</td>
<td>Assign process variable parameter (→</td>
<td></td>
<td>number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>134)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time part. filled pipe</td>
<td>A process variable is selected in the</td>
<td>Enter time before diagnostic message is displayed for partially filled pipe</td>
<td>0 to 100 s</td>
<td>1 s</td>
</tr>
<tr>
<td>detect.</td>
<td>Assign process variable parameter (→</td>
<td>detection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>134)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.7 Advanced settings

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

Navigation to the ‘Advanced setup’ submenu

![Diagram of the Advanced setup navigation process]

- 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

- Advanced setup
  - Enter access code
  - Calculated values → 136
  - Sensor adjustment → 137
  - Totalizer 1 to n → 138
  - Display → 140
10.7.1 Calculated values

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

**Navigation**

'Setup' menu → Advanced setup → Calculated values

---

### Calculated values

- **Corrected volume flow calculation**
  - Corrected volume flow calculation
  - External reference density
  - Fixed reference density
  - Reference temperature
  - Linear expansion coefficient
  - Square expansion coefficient

---

**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>
</table>
| Corrected volume flow calculation      | -            | Select reference density for calculating the corrected volume flow.          | • Fixed reference density
                                             |                                          | • Calculated reference density
                                             |                                          | • External reference density
                                             |                                          | • Current input 1
                                             |                                          | • Current input 2
                                             |                                          | • Current input 3                        | Calculated reference density            |
| External reference density            | In the Corrected volume flow calculation parameter, the External reference density option is selected. | Shows external reference density. | Floating point number with sign | - |
10.7.2 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  • Flow against arrow direction</td>
<td>Flow in arrow direction</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. 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

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

**10.7.3 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
## 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>• 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;• GSV flow&lt;br&gt;• GSV flow alternative&lt;br&gt;• NSV flow&lt;br&gt;• NSV flow alternative&lt;br&gt;• S&amp;W volume flow&lt;br&gt;• Oil mass flow&lt;br&gt;• Water mass flow&lt;br&gt;• Oil volume flow&lt;br&gt;• Water volume flow&lt;br&gt;• Oil corrected volume flow&lt;br&gt;• Water corrected volume flow</td>
<td>Mass 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>
10.7.4 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

```
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Format display</td>
<td>➔ 141</td>
</tr>
<tr>
<td>Value 1 display</td>
<td>➔ 141</td>
</tr>
<tr>
<td>0% bargraph value 1</td>
<td>➔ 141</td>
</tr>
<tr>
<td>100% bargraph value 1</td>
<td>➔ 141</td>
</tr>
<tr>
<td>Decimal places 1</td>
<td>➔ 141</td>
</tr>
<tr>
<td>Value 2 display</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Decimal places 2</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Value 3 display</td>
<td>➔ 142</td>
</tr>
<tr>
<td>0% bargraph value 3</td>
<td>➔ 142</td>
</tr>
<tr>
<td>100% bargraph value 3</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Decimal places 3</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Value 4 display</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Decimal places 4</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Display language</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Display interval</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Display damping</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Header</td>
<td>➔ 142</td>
</tr>
<tr>
<td>Header text</td>
<td>➔ 143</td>
</tr>
<tr>
<td>Separator</td>
<td>➔ 143</td>
</tr>
<tr>
<td>Backlight</td>
<td>➔ 143</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</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</td>
<td>1 value, max. size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 bargraph + 1 value</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2 values</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 value large + 2 values</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 4 values</td>
<td></td>
<td></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</td>
<td>Mass flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Volume flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Corrected volume flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Target mass flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carrier mass flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Target volume flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carrier volume flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Target corrected volume flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carrier corrected volume flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Density</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reference density</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carrier pipe temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Electronic temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oscillation frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oscillation amplitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oscillation frequency fluctuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oscillation damping</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oscillation damping fluctuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Signal asymmetry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exciter current</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Totalizer 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Totalizer 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Totalizer 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current output 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current output 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current output 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current output 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pressure</td>
<td></td>
<td></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</td>
<td>Country-specific: 0 kg/h 0 lb/min</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>Decimal places 1</td>
<td>A measured value is specified in the <strong>Value 1 display</strong> parameter.</td>
<td>Select the number of decimal places for the display value.</td>
<td>• x</td>
<td>x.xx</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• x.x</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• x.xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• x.xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• x.xxxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• x.xxxx</td>
<td></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>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 1 display parameter (→ 131)</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.xx</td>
<td></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 1 display parameter (→ 131)</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></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.xx</td>
<td></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 1 display parameter (→ 131)</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.xx</td>
<td></td>
</tr>
<tr>
<td>Display language</td>
<td>A local display is provided.</td>
<td>Set display language.</td>
<td>English (alternatively, the ordered language is preset in the device)</td>
<td>English</td>
</tr>
<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, Free text</td>
<td>Device tag</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>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) • , (comma)</td>
<td>. (point)</td>
</tr>
<tr>
<td>Backlight</td>
<td>One of the following conditions is met:</td>
<td>Switch the local display backlight on and off.</td>
<td>• Disable • Enable</td>
<td>Enable</td>
</tr>
<tr>
<td></td>
<td>• Order code for &quot;Display; operation&quot;, option F&quot;4-line, illum.; touch control&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Order code for &quot;Display; operation&quot;, option G&quot;4-line, illum.; touch control +WLAN&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

### 10.7.5 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

```plaintext
> WLAN settings

- WLAN IP address
- Security type
- WLAN passphrase
- Assign SSID name
- SSID name
- Apply changes
```
### Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User entry / Selection</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLAN IP address</td>
<td>–</td>
<td>Enter IP address of the device WLAN interface.</td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
<td>192.168.1.212</td>
</tr>
<tr>
<td>Network security</td>
<td>–</td>
<td>Select the security type of the WLAN network.</td>
<td></td>
<td>WPA2-PSK</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>Serial number of the measuring device (e.g. L100A802000)</td>
<td></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></td>
<td>User-defined</td>
</tr>
<tr>
<td>SSID name</td>
<td>The User-defined option is selected in the Assign SSID name parameter parameter. The WLAN access point option is selected in the WLAN mode parameter.</td>
<td>Enter the user-defined SSID name (max. 32 characters). Max. 32-digit character string comprising numbers, letters and special characters</td>
<td>EH_device designation_last 7 digits of the serial number (e.g. EH_Promass_500_A802000)</td>
<td></td>
</tr>
<tr>
<td>Apply changes</td>
<td>–</td>
<td>Use changed WLAN settings.</td>
<td></td>
<td>Cancel</td>
</tr>
</tbody>
</table>

### 10.7.6 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></td>
<td>Cancel</td>
</tr>
<tr>
<td>Backup state</td>
<td>Shows the current status of data saving or restoring.</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Comparison result</td>
<td>Comparison of current device data with HistoROM backup.</td>
<td></td>
<td>Check not done</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.

10.7.7 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

Parameter overview with brief description

<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>

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>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time</td>
<td></td>
</tr>
<tr>
<td>Reset access code</td>
<td></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>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.</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</td>
<td>Cancel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• To delivery settings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Restart device</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Restore S-DAT backup</td>
<td></td>
</tr>
</tbody>
</table>

### 10.8 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

```markdown
- Assign simulation process variable → 148
- Process variable value → 148
- Status input simulation → 148
- Input signal level → 149
- Current input 1 to n simulation → 149
- Value current input 1 to n → 149
- Current output 1 to n simulation → 149
```
### 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>
</table>
| **Assign simulation process variable** | – | Select a process variable for the simulation process that is activated. | • 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  
• Temperature  
• Concentration * | Off |
| **Process variable value** | A process variable is selected in the Assign simulation process variable parameter (→ 148). | Enter the simulation value for the selected process variable. | Depends on the process variable selected | 0 |
| **Status input simulation** | – | Switch simulation of the status input on and off. | • Off  
• On | Off |
<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><strong>Input signal level</strong></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 ▪ Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>Current input 1 to n simulation</strong></td>
<td>-</td>
<td>Switch simulation of the current input on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td><strong>Value current input 1 to n</strong></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><strong>Current output 1 to n simulation</strong></td>
<td>-</td>
<td>Switch the simulation of the current output on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td><strong>Value current output 1 to n</strong></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><strong>Frequency output simulation 1 to n</strong></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 ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td><strong>Frequency value 1 to n</strong></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><strong>Pulse output simulation 1 to n</strong></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><strong>Pulse value 1 to n</strong></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><strong>Switch output simulation 1 to n</strong></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><strong>Switch status 1 to n</strong></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><strong>Relay output 1 to n simulation</strong></td>
<td>-</td>
<td>Switch simulation of the relay output on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td><strong>Switch status 1 to n</strong></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><strong>Pulse output simulation</strong></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><strong>Pulse value</strong></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><strong>Device alarm simulation</strong></td>
<td>-</td>
<td>Switch the device alarm on and off.</td>
<td>▪ Off ▪ On</td>
<td>Off</td>
</tr>
<tr>
<td><strong>Diagnostic event category</strong></td>
<td>-</td>
<td>Select a diagnostic event category.</td>
<td>▪ Sensor ▪ Electronics ▪ Configuration ▪ Process</td>
<td>Process</td>
</tr>
</tbody>
</table>
### 10.9 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 → 📡 150
- Protect access to local operation via key locking → 📡 77
- Protect access to measuring device via write protection switch → 📡 151

#### 10.9.1 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 (→ 📡 146).
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 (→ 📡 146) to confirm the code.
   - The 🇮=set 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 → 📡 76.
- The user role with which the user is currently logged on via the local display is indicated by the → 📡 76 **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.
Defining the access code via the Web browser

1. Navigate to the Define access code parameter (→ 146).
2. Define a max. 16-digit numeric code as an access code.
3. Enter the access code again in the Confirm access code parameter (→ 146) 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 → 76.
• 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 (→ 147).
2. Enter the reset code.
   - The access code has been reset to the factory setting 0000. It can be redefined → 150.

10.9.2 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 PROFIBUS DP 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 → 154. In addition, on the local display the lock-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 → 154. On the local display, the lock-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 → 154. 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 → 154. 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 → 76. 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).</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 → 104
- For information on the operating languages supported by the measuring device → 265

11.3  Configuring the display

Detailed information:
- On the basic settings for the local display → 130
- On the advanced settings for the local display → 140

11.4  Reading measured values

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

Navigation
'Diagnostics' menu → Measured values
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

<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 currently measured.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dependancy: The unit is taken from the Mass flow unit parameter (→ 108).</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>Dependancy: The unit is taken from the Volume flow unit parameter (→ 108).</td>
<td></td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td></td>
<td>Displays the corrected volume flow currently calculated.</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dependancy: The unit is taken from the Corrected volume flow unit parameter (→ 108).</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>Dependancy: The unit is taken from the Density unit parameter (→ 108).</td>
<td></td>
</tr>
<tr>
<td>Reference density</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target mass flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrier mass flow</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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

---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Prerequisite</th>
<th>Description</th>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference density</td>
<td>–</td>
<td>Displays the reference density currently calculated. <strong>Dependency</strong> The unit is taken from the <strong>Reference density unit</strong> parameter (→ 108).</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Temperature</td>
<td>–</td>
<td>Shows the medium temperature currently measured. <strong>Dependency</strong> The unit is taken from the <strong>Temperature unit</strong> parameter (→ 109).</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Pressure value</td>
<td>–</td>
<td>Displays either a fixed or external pressure value. <strong>Dependency</strong> The unit is taken from the <strong>Pressure unit</strong> parameter (→ 109).</td>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>
| Concentration      | For the following order code: Order code for "Application package", option ED "Concentration"  

   ![Software option overview parameter](image)  

   The software options currently enabled are displayed in the **Software option overview** parameter.  

|                    | Displays the concentration 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"  

   ![Software option overview parameter](image)  

   The software options currently enabled are displayed in the **Software option overview** parameter.  

|                    | Displays the mass flow currently measured for the target medium. **Dependency** The unit is taken from the **Mass flow unit** parameter (→ 108).                                                                 | Signed floating-point number        |
| Carrier mass flow  | With the following conditions: Order code for "Application package", option ED "Concentration"  

   ![Software option overview parameter](image)  

   The software options currently enabled are displayed in the **Software option overview** parameter.  

|                    | Displays the mass flow currently measured for the carrier medium. **Dependency** The unit is taken from the **Mass flow unit** parameter (→ 108).                                                                 | Signed floating-point number        |

---

**Totalizer 1 to n**

- Assign process variable → 157
- Totalizer value 1 to n → 157
- Totalizer status 1 to n → 157
- Totalizer status (Hex) 1 to n → 157
### 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 process variable</td>
<td>–</td>
<td>Select process variable for totalizer.</td>
<td>• 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;• GSV flow&lt;br&gt;• GSV flow alternative&lt;br&gt;• NSV flow&lt;br&gt;• NSV flow alternative&lt;br&gt;• S&amp;W volume flow&lt;br&gt;• Oil mass flow&lt;br&gt;• Water mass flow&lt;br&gt;• Oil volume flow&lt;br&gt;• Water volume flow&lt;br&gt;• Oil corrected volume flow&lt;br&gt;• Water corrected volume flow</td>
<td>Mass flow</td>
</tr>
<tr>
<td>Totalizer value 1 to n</td>
<td>In the Assign process variable parameter one of the following options is selected: &lt;br&gt;• 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>Displays the current totalizer counter value.</td>
<td>Signed floating-point number</td>
<td>0 kg</td>
</tr>
<tr>
<td>Totalizer status 1 to n</td>
<td>–</td>
<td>Displays the current totalizer status.</td>
<td>• Good&lt;br&gt;• Uncertain&lt;br&gt;• Bad</td>
<td>–</td>
</tr>
<tr>
<td>Totalizer status (Hex) 1 to n</td>
<td>In Target mode 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

<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 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

Parameter overview with brief description

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

Parameter overview with brief description

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

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

Parameter overview with brief description

<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

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

Parameter overview with brief description

<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 (→ 105)
- Advanced settings using the Advanced setup submenu (→ 135)

11.6 Performing a totalizer reset

The totalizers are reset in the Operation submenu: Control Totalizer 1 to n

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.</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 1 to n parameter.</td>
</tr>
</tbody>
</table>

Navigation
"Operation" menu → Totalizer handling

Parameter overview with brief description

<table>
<thead>
<tr>
<th>Parameter</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>Control totalizer value.</td>
<td>Totalize, Reset + hold, Preset + hold</td>
<td>Totalize</td>
</tr>
<tr>
<td>Preset value 1 to n</td>
<td>Specify start value for totalizer.</td>
<td>Signed floating-point number</td>
<td>0 kg</td>
</tr>
<tr>
<td>Reset all totalizers</td>
<td>Reset all totalizers to 0 and start.</td>
<td>Cancel, Reset + totalize</td>
<td>Cancel</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 → 87.
- Web browser
Function range
- A total of 1000 measured values can be stored
- 4 logging channels
- Adjustable logging interval for data logging
- Display of 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>
</tr>
</thead>
<tbody>
<tr>
<td>Assign channel 1</td>
</tr>
<tr>
<td>Assign channel 2</td>
</tr>
<tr>
<td>Assign channel 3</td>
</tr>
<tr>
<td>Assign channel 4</td>
</tr>
<tr>
<td>Logging interval</td>
</tr>
<tr>
<td>Clear logging data</td>
</tr>
<tr>
<td>Data logging</td>
</tr>
<tr>
<td>Logging delay</td>
</tr>
<tr>
<td>Data logging control</td>
</tr>
<tr>
<td>Data logging status</td>
</tr>
<tr>
<td>Entire logging duration</td>
</tr>
<tr>
<td><strong>Display channel 1</strong></td>
</tr>
<tr>
<td><strong>Display channel 2</strong></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;• HBSI&lt;sup&gt;*&lt;/sup&gt;&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</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 (→ 163)</td>
<td>Off</td>
</tr>
</tbody>
</table>

<sup>*</sup> 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 (→ 163)</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 (→ 163)</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 → 238.</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 + . • Set the display darker by simultaneously pressing + .</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 → 238.</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 → 179.</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 for 2 s (‘home position’). 2. Press . 3. Set the desired language in the Display language parameter (→ 142).</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 → 238.</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 ( \rightarrow ) 238.</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>
<tr>
<td>Device measures incorrectly.</td>
<td>Configuration error or device is operated outside the application.</td>
<td>1. Check and correct parameter configuration. 2. Observe limit values specified in the 'Technical Data'.</td>
</tr>
</tbody>
</table>

## 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 <strong>OFF</strong> position ( \rightarrow ) 151.</td>
</tr>
<tr>
<td>No write access to parameters</td>
<td>Current user role has limited access authorization</td>
<td>1. Check user role ( \rightarrow ) 76. 2. Enter correct customer-specific access code ( \rightarrow ) 76.</td>
</tr>
<tr>
<td>No connection via PROFIBUS DP</td>
<td>PROFIBUS DP bus cable connected incorrectly</td>
<td>Check terminal assignment ( \rightarrow ) 42.</td>
</tr>
<tr>
<td>No connection via PROFIBUS DP</td>
<td>PROFIBUS DP cable incorrectly terminated</td>
<td>Check terminating resistor .</td>
</tr>
<tr>
<td>Not connecting to Web server</td>
<td>Web server disabled</td>
<td>Using the 'FieldCare' or 'DeviceCare' operating tool, check whether the Web server of the measuring device is enabled, and enable it if necessary ( \rightarrow ) 83. 1. Check the properties of the Internet protocol (TCP/IP) ( \rightarrow ) 79 ( \rightarrow ) 79. 2. Check the network settings with the IT manager.</td>
</tr>
<tr>
<td>Not connecting to Web server</td>
<td>Incorrect IP address</td>
<td>Check the IP address: 192.168.1.212 ( \rightarrow ) 79 ( \rightarrow ) 79.</td>
</tr>
<tr>
<td>Not connecting to Web server</td>
<td>Incorrect WLAN access data</td>
<td>1. Check WLAN network status. 2. Log on to the device again using WLAN access data. 3. Verify that WLAN is enabled on the measuring device and operating device ( \rightarrow ) 79. 1. Check if WLAN reception is present: LED on display module is lit blue 2. Check if WLAN connection is enabled: LED on display module flashes blue 3. Switch on instrument function.</td>
</tr>
<tr>
<td>Not connecting to Web server, FieldCare or DeviceCare</td>
<td>No WLAN network available</td>
<td>1. Check if WLAN reception is present: LED on display module is lit blue 2. Check if WLAN connection is enabled: LED on display module flashes blue 3. Switch on instrument function.</td>
</tr>
<tr>
<td>Network connection not present or unstable</td>
<td>WLAN network is weak.</td>
<td>1. Operating device is outside of reception range: Check network status on operating device. 2. To improve network performance, use an external WLAN antenna.</td>
</tr>
<tr>
<td>Error</td>
<td>Possible causes</td>
<td>Solution</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Parallel WLAN and Ethernet communication</td>
<td>• Check network settings.</td>
<td>• Check network settings. • Temporarily enable only the WLAN as an interface.</td>
</tr>
<tr>
<td>Web browser frozen and operation no longer possible</td>
<td>Data transfer active</td>
<td>Wait until data transfer or current action is finished.</td>
</tr>
<tr>
<td>Connection lost</td>
<td></td>
<td>1. Check cable connection and power supply. 2. Refresh the Web browser and restart if necessary.</td>
</tr>
<tr>
<td>Content of Web browser incomplete or difficult to read</td>
<td>Not using optimum version of Web server.</td>
<td>1. Use the correct Web browser version → 78. 2. Clear the Web browser cache and restart the Web browser.</td>
</tr>
<tr>
<td>No or incomplete display of contents in the Web browser</td>
<td>• JavaScript not enabled</td>
<td>1. Enable JavaScript. 2. Enter <a href="http://XXX.XXX.X.XXX/basic.html">http://XXX.XXX.X.XXX/basic.html</a> as the IP address.</td>
</tr>
<tr>
<td>Operation with FieldCare or DeviceCare via CDI-RJ45 service interface (port 8000)</td>
<td>Firewall of computer or network is preventing communication</td>
<td>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.</td>
</tr>
<tr>
<td>Flashing of firmware with FieldCare or DeviceCare via CDI-RJ45 service interface (via port 8000 or TFTP ports)</td>
<td>Firewall of computer or network is preventing communication</td>
<td>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.</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.

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply voltage</td>
<td>Off: Supply voltage is off or too low.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green: Supply voltage is ok.</td>
</tr>
<tr>
<td>2</td>
<td>Device status (normal operation)</td>
<td>Off: Firmware error.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green: Device status is ok.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing green: Device is not configured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing red: A diagnostic event with &quot;Warning&quot; diagnostic behavior has occurred.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red: A diagnostic event with &quot;Alarm&quot; diagnostic behavior has occurred.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing red/green: The device restarts.</td>
</tr>
<tr>
<td>3</td>
<td>Device status (during start-up)</td>
<td>Flashes red slowly: If &gt; 30 seconds: problem with the boot loader.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashes red quickly: If &gt; 30 seconds: compatibility problem when reading the firmware.</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
<td>–</td>
</tr>
</tbody>
</table>

1. Open the housing cover.
2. Remove the display module.
3. Fold open the terminal cover.
### Proline 500

Different LEDs in the transmitter 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>Supply voltage</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>Device status (normal operation)</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing red/green</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>Not used</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Communication</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>White</td>
</tr>
<tr>
<td>5</td>
<td>Service interface (CDI), Ethernet Link/Activity</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing yellow</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.

<table>
<thead>
<tr>
<th>Operational display in alarm condition</th>
<th>Diagnostic message</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Operational display" /></td>
<td><img src="image" alt="Diagnostic message" /></td>
</tr>
</tbody>
</table>

- **Status signal**
- **Diagnostic behavior**
- **Diagnostic behavior with diagnostic code**
- **Short text**
- **Operating elements**

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 → 230
- Via submenus → 230

#### 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>
</table>
| **F**  | Failure
A device error has occurred. The measured value is no longer valid. |
| **C**  | Function check
The device is in service mode (e.g. during a simulation). |
| **S**  | Out of specification
The device is operated:
Outside its technical specification limits (e.g. outside the process temperature range) |
| **M**  | Maintenance required
Maintenance is required. The measured value remains valid. |
Diagnostics and troubleshooting

Proline Promass A 500 PROFIBUS DP

Diagnostic behavior

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>☢️</td>
<td><strong>Alarm</strong>&lt;br&gt;• Measurement is interrupted.&lt;br&gt;• Signal outputs and totalizers assume the defined alarm condition.&lt;br&gt;• A diagnostic message is generated.</td>
</tr>
<tr>
<td>🎯</td>
<td><strong>Warning</strong>&lt;br&gt;Measurement is resumed. The signal outputs and totalizers are not affected. A diagnostic message is generated.</td>
</tr>
</tbody>
</table>

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.

Example

<table>
<thead>
<tr>
<th>Diagnostic behavior</th>
<th>Status signal</th>
<th>Diagnostic number</th>
<th>Short text</th>
</tr>
</thead>
<tbody>
<tr>
<td>☢️</td>
<td>☢️</td>
<td>842</td>
<td>Process limit</td>
</tr>
</tbody>
</table>

NAMUR NE 107 3-digit number

Operating elements

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>🆕</td>
<td><strong>Plus key</strong>&lt;br&gt;<strong>In a menu, submenu</strong>&lt;br&gt;Opens the message about remedy information.</td>
</tr>
<tr>
<td>⚡</td>
<td><strong>Enter key</strong>&lt;br&gt;<strong>In a menu, submenu</strong>&lt;br&gt;Opens the operating menu.</td>
</tr>
</tbody>
</table>
12.3.2 Calling up remedial measures

The user is in the diagnostic message.

1. Press \( \uparrow \) (symbol).
   \( \Rightarrow \) The Diagnostic list submenu opens.

2. Select the desired diagnostic event with \( \uparrow \) or \( \downarrow \) and press \( \rightarrow \).
   \( \Rightarrow \) The message about the remedial measures opens.

3. Press \( \uparrow + \downarrow \) simultaneously.
   \( \Rightarrow \) 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 \( \leftarrow \).
   \( \Rightarrow \) The message for the remedial measures for the selected diagnostic event opens.

2. Press \( \uparrow + \downarrow \) simultaneously.
   \( \Rightarrow \) 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.
Diagnostics and troubleshooting

Proline Promass A 500 PROFIBUS DP

In addition, diagnostic events which have occurred can be shown in the Diagnostics menu:
- Via parameter → 230
- Via submenu → 230

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>
<tr>
<td></td>
<td>A device error has occurred. The measured value is no longer valid.</td>
</tr>
<tr>
<td>♂️</td>
<td>Function check</td>
</tr>
<tr>
<td></td>
<td>The device is in service mode (e.g. during a simulation).</td>
</tr>
<tr>
<td>☹️</td>
<td>Out of specification</td>
</tr>
<tr>
<td></td>
<td>The device is operated: Outside its technical specification limits (e.g. outside the process temperature range)</td>
</tr>
<tr>
<td>☧️</td>
<td>Maintenance required</td>
</tr>
<tr>
<td></td>
<td>Maintenance is required. The measured value is still valid.</td>
</tr>
</tbody>
</table>

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.
Diagnostics and troubleshooting

1. Status area with status signal → 171
2. Diagnostic information → 172
3. Remedy information with Service ID

In addition, diagnostic events which have occurred can be shown in the Diagnostics menu:
- Via parameter → 230
- Via submenu → 230

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.

![Diagnostic information table]

<table>
<thead>
<tr>
<th>Diagnostic code</th>
<th>Diagnostic behavior</th>
<th>Status signal</th>
<th>Diagnostic number</th>
<th>Short text</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0013962</td>
<td>Process limit</td>
<td></td>
<td>842</td>
<td></td>
</tr>
</tbody>
</table>

NAMUR NE 107 3-digit number

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 PROFIBUS 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 the Analog Input, Digital Input and Totalizer function blocks are configured for cyclic data transmission, the device status is coded as per PROFIBUS PA Profile 3.02 Specification and transmitted along with the measured value to the PROFIBUS Master (Class 1) via the coding byte (byte 5). The coding byte is split into three segments: Quality, Quality Substatus and Limits.
The content of the coding 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 PROFIBUS Master (Class 1) via the coding byte.

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
  → 177
- Diagnostic information pertaining to the electronics: diagnostic number 200 to 399
  → 178
- Diagnostic information pertaining to the configuration: diagnostic number 400 to 599
  → 178
- Diagnostic information pertaining to the process: diagnostic number 800 to 999
  → 178

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>Quality Substatus</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 to 0x27</td>
<td>F (Failure)</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Warning</td>
<td>GOOD</td>
<td>Maintenance demanded</td>
<td>0x8A to 0x8B</td>
<td>M (Maintenance)</td>
<td>Maintenance demanded</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80 to 0x8E</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Off</td>
<td>GOOD</td>
<td>ok</td>
<td>0x80 to 0x8E</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
### Diagnostic information pertaining to the electronics: diagnostic number 200 to 399

#### Diagnostic number 200 to 301, 303 to 399

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Diagnostic behavior (configurable)</th>
<th>Measured value status (fixed assignment)</th>
<th>Device diagnosis (fixed assignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alarm</td>
<td>BAD</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td></td>
<td>Warning</td>
<td>GOOD, Maintenance alarm, ok</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Logbook entry only</td>
<td>GOOD, Function check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>GOOD, ok</td>
<td></td>
</tr>
</tbody>
</table>

#### Diagnostic information 302

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Diagnostic behavior (configurable)</th>
<th>Measured value status (fixed assignment)</th>
<th>Device diagnosis (fixed assignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alarm</td>
<td>BAD</td>
<td>Function check</td>
</tr>
<tr>
<td></td>
<td>Warning</td>
<td>GOOD, Function check, local override</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Logbook entry only</td>
<td>GOOD, Function check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>GOOD, ok</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Diagnostic behavior (configurable)</th>
<th>Measured value status (fixed assignment)</th>
<th>Device diagnosis (fixed assignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alarm</td>
<td>BAD</td>
<td>Function check</td>
</tr>
<tr>
<td></td>
<td>Logbook entry only</td>
<td>GOOD, Function check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>GOOD, ok</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Diagnostic behavior (configurable)</th>
<th>Measured value status (fixed assignment)</th>
<th>Device diagnosis (fixed assignment)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alarm</td>
<td>BAD</td>
<td>Invalid process condition</td>
</tr>
<tr>
<td></td>
<td>Warning</td>
<td>UNCERTA IN, Process related</td>
<td>Invalid process condition</td>
</tr>
<tr>
<td></td>
<td>Logbook entry only</td>
<td>GOOD, ok</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>GOOD, ok</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 → 176

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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
  - Kinematic viscosity
  - Low flow cut off
  - Mass flow
  - Oil mass flow
  - Water mass flow
  - HSI
  - 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
  - Oil cut
  - Water cut
<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>Maintenance demanded</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x8A to 0xAB</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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.
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 062 | Sensor connection faulty | 1. Check or replace sensor electronic module (ISEM)  
2. If available: Check connection cable between sensor and transmitter  
3. Replace sensor |

#### 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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 063 | Exciter current faulty | 1. Check or replace sensor electronic module (ISEM)  
2. If available: Check connection cable between sensor and transmitter  
3. Replace sensor |

#### 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>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative

- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 082 | Data storage           |            | 1. Check module connections  
|     |                        |            | 2. Contact service       |

**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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- SRW 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><strong>Memory content</strong></td>
<td>1. Restart device</td>
</tr>
<tr>
<td></td>
<td><strong>Measured variable status</strong></td>
<td>2. Restore HistoROM S-DAT backup ('Device reset' parameter)</td>
</tr>
<tr>
<td></td>
<td>Short text</td>
<td>3. Replace HistoROM S-DAT</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target corrected volume flow
- Carrier corrected volume flow
- Concentration
- Measured values 1
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- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
- Density
- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- Empty pipe detection

- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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 PROFIBUS DP

<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></td>
<td>1. Check or replace sensor electronic module (ISEM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measured variable status [from the factory] ¹</td>
<td>2. If available: Check connection cable between sensor and transmitter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality</td>
<td>3. Replace sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bad</td>
<td></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>
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<tr>
<td></td>
<td></td>
<td>Status signal</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Alarm</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
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- 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)
- Empty pipe detection

- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Excitation frequency 1
- Oscillation frequency 2
- S&VW 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>1/4</td>
<td>Measuring error too high</td>
<td>1. Check or change sensor 2. Check process conditions</td>
</tr>
</tbody>
</table>

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

<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
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- GSV flow
- GSV flow alternative
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- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
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- 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.
## 12.7.2 Diagnostic of electronic

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 201 | Device failure | 1. Restart 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>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Signal asymmetry
- Carrier mass flow
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- Carrier corrected volume flow
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- Measured values 2
- Measured values 3
- Oscillation damping 1
- Oscillation damping 2
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- Oil density
- Water density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
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- GSV flow
- GSV flow alternative
- Kinematic viscosity
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- Mass flow
- Oil mass flow
- Water mass flow
- 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
- 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
<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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Flash or change main electronics module</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>
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<td>0x24 to 0x27</td>
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<td>Status signal</td>
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<tr>
<td>Diagnostic behavior</td>
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</tr>
</tbody>
</table>

**Influenced measured variables**

- Oscillation amplitude 1
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- Exciter current 2
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- Oscillation frequency 2
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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
### No. 252 Modules incompatible

#### Short text
- Modules incompatible

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

### 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>
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<td>Status signal</td>
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</tr>
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</table>

#### Influenced measured variables

- Oscillation amplitude 1
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- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
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- Oscillation damping fluctuation 1
- 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
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- Volume flow
- Oil volume flow
- Water volume flow
- Water cut

---

### No. 252 Modules incompatible

#### Short text
- Modules incompatible

#### Remedy instructions
1. Check if correct electronic module is plugged
2. Replace electronic module

### 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>
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</table>

#### Influenced measured variables

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- Oscillation amplitude 2
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- Measured values 2
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- Exciter current 2
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- 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
## Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Measured variable status</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>262</td>
<td>Sensor electronic connection faulty</td>
<td>1. Check or replace connection cable between sensor electronic module (ISEM) and main electronics 2. Check or replace ISEM or main electronics</td>
</tr>
</tbody>
</table>

### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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<tr>
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<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
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- Carrier corrected volume flow
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- Volume flow
- Oil volume flow
- Water volume flow
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## Diagnostic Information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic Information</th>
<th>Remedy Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>270</td>
<td>Main electronic failure</td>
<td>Change main electronic module</td>
</tr>
</tbody>
</table>

### Measured Variable Status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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### Influenced Measured Variables

- Oscillation amplitude 1
- Oscillation amplitude 2
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- Carrier mass flow
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- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 271 | Main electronic failure | 1. Restart device  
2. Change main electronic module |

### 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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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 PROFIBUS DP

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 272 | Main electronic failure | 1. Restart 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>F</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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></td>
<td>Diagnostic information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short text</td>
<td></td>
</tr>
<tr>
<td>273</td>
<td>Main electronic failure</td>
<td>Change electronic</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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></td>
<td>Diagnostic information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Short text</td>
<td></td>
</tr>
<tr>
<td>275</td>
<td>I/O module 1 to n defective</td>
<td>Change I/O 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
- 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)
- Empty pipe detection
- Kinematic viscosity
- Low flow cut off
- Mass flow
- HBSI
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&W volume flow
- Reference density
- 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
### Diagnostics and troubleshooting

#### Proline Promass A 500 PROFIBUS DP

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Short text</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 276 | I/O module 1 to n faulty | 1. Restart device  
2. Change I/O module |

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Quality substatus</th>
<th>Coding (hex)</th>
<th>Status signal</th>
<th>Diagnostic behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bad</td>
<td>Ox24 to 0x27</td>
<td>F</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Short text</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 283 | Memory content         | 1. Reset device  
2. Contact service |

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Quality substatus</th>
<th>Coding (hex)</th>
<th>Status signal</th>
<th>Diagnostic behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bad</td>
<td>Ox24 to 0x27</td>
<td>F</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Oscillation frequency 1
- Oscillation frequency 2
- Exciter current 1
- Exciter current 2
- Reference density
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
### No. 302

**Diagnostic information**

<table>
<thead>
<tr>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device verification active</td>
<td>Device verification active, please wait.</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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

### No. 303

**Diagnostic information**

<table>
<thead>
<tr>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| I/O 1 to n configuration changed | 1. Apply I/O module configuration (parameter 'Apply I/O configuration')  
|                              | 2. Afterwards reload device description and check wiring |

**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**

-
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFIBUS DP

#### 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>311</td>
<td>Electronic failure</td>
<td></td>
<td>1. Do not reset device</td>
</tr>
<tr>
<td></td>
<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>M</td>
</tr>
</tbody>
</table>

#### Diagnostic behavior

| Diagnostic behavior | Warning |

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- SRW 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>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>332</td>
<td>Writing in HistROm backup failed</td>
<td>Replace user interface board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ex d/XP: replace transmitter</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>
</tbody>
</table>

#### Influneced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>361</td>
<td>I/O module 1 to n faulty</td>
<td>1. Restart device</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Check electronic modules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Change I/O Modul or main electronics</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>
</tbody>
</table>

#### Influneced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- Kinematic viscosity
- Low flow cut off
- Mass flow
- 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
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFIBUS DP

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>372</td>
<td>Sensor electronic (ISEM) faulty</td>
<td>1. Restart device</td>
</tr>
<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>
</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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>Measured variable status</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 373 | Sensor electronic (ISEM) faulty | **Measured variable status**<br>
Quality | Bad<br>
Quality substatus | Maintenance alarm<br>
Coding (hex) | 0x24 to 0x27<br>
Status signal | F<br>
Diagnostic behavior | Alarm |
| | **Influenced measured variables**<br>
• Oscillation amplitude 1 | GSV flow<br>
• Oscillation amplitude 2 | GSV flow alternative<br>
• Signal asymmetry | Kinematic viscosity<br>
• Carrier mass flow | Mass flow<br>
• Carrier pipe temperature | Low flow cut off<br>
• Target corrected volume flow | Oil mass flow<br>
• Carrier corrected volume flow | Water mass flow<br>
• Concentration | HBSI<br>
• Measured values 1 | NSV flow<br>
• Measured values 2 | NSV flow alternative<br>
• Measured values 3 | External pressure<br>
• Oscillation damping 1 | Exciter current 1<br>
• Oscillation damping 2 | Exciter current 2<br>
• Density | Oscillation frequency 1<br>
• Oil density | Oscillation frequency 2<br>
• Water density | S&W volume flow<br>
• Dynamic viscosity | Reference density<br>
• Sensor electronic temperature (ISEM) | Reference density alternative<br>
• Empty pipe detection | Corrected volume flow<br>
| | **Oil corrected volume flow**<br>
| | **Water corrected volume flow**<br>
| | **Oscillation damping fluctuation 1**<br>
| | **Oscillation damping fluctuation 2**<br>
| | **Frequency fluctuation 1**<br>
| | **Frequency fluctuation 2**<br>
| | **Target mass flow**<br>
| | **Carrier volume flow**<br>
| | **Target volume flow**<br>
| | **Temp. compensated dynamic viscosity**<br>
| | **Temp. compensated kinematic viscosity**<br>
| | **Temperature**<br>
| | **Status**<br>
| | **Volume flow**<br>
| | **Oil volume flow**<br>
| | **Water volume flow**<br>
| | **Water cut**

### 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>Measured variable status [from the factory]</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 374 | Sensor electronic (ISEM) faulty | **Measured variable status**<br>
Quality | Bad<br>
Quality substatus | Maintenance alarm<br>
Coding (hex) | 0x24 to 0x27<br>
Status signal | S<br>
Diagnostic behavior | Warning |
| | **Influenced measured variables**<br>
• Oscillation amplitude 1 | Empty pipe detection<br>
• Oscillation amplitude 2 | Kinematic viscosity<br>
• Signal asymmetry | Low flow cut off<br>
• Carrier mass flow | Mass flow<br>
• Carrier pipe temperature | HBSI<br>
• Concentration | External pressure<br>
• Oscillation damping 1 | Exciter current 1<br>
• Oscillation damping 2 | Exciter current 2<br>
• Density | Oscillation frequency 1<br>
• Dynamic viscosity | Oscillation frequency 2<br>
• Sensor electronic temperature (ISEM) | Reference density<br>
| | **Corrected volume flow**<br>
| | **Oscillation damping fluctuation 1**<br>
| | **Oscillation damping fluctuation 2**<br>
| | **Frequency fluctuation 1**<br>
| | **Frequency fluctuation 2**<br>
| | **Target mass flow**<br>
| | **Temp. compensated dynamic viscosity**<br>
| | **Temp. compensated kinematic viscosity**<br>
| | **Temperature**<br>
| | **Status**<br>
| | **Volume flow**

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### No. 375

**Diagnostic information**

<table>
<thead>
<tr>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| I/O-1 to n communication failed | 1. Restart device  
2. Check if failure recurs  
3. Replace module rack inclusive electronic modules |

**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
- 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)

- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- Reference density alternative
- Reference density
- 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>
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</thead>
<tbody>
<tr>
<td>382</td>
<td>Data storage</td>
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</table>

#### Measured variable status

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Quality substatus</td>
<td>Maintenance alarm</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x24 to 0x27</td>
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<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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Mass flow
- Low flow cut off
- Oil mass flow
- Water mass flow
- 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. Insert T-DAT
2. Replace T-DAT
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 383 | Memory content | 1. Restart device  
2. Delete T-DAT via 'Reset device' parameter  
3. Replace T-DAT |

#### 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
- 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)

- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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
### 12.7.3 Diagnostic of configuration

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 330 | Flash file invalid     | 1. Update firmware of device  
|     |                        | 2. Restart device      |

#### 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
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Target 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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 PROFIBUS DP

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>331</td>
<td>Firmware update failed</td>
<td>1. Update firmware of device</td>
</tr>
<tr>
<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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- SRW 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

## No.

<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>
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</table>

### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
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</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
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- 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
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- Volume flow
- Oil volume flow
- Water volume flow
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- Water mass flow
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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
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- Temp. compensated kinematic viscosity
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- Oil volume flow
- Water volume flow
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- NSV flow alternative
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- Exciter current 2
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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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- NSV flow alternative
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- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
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- 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
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- Oil volume flow
- Water volume flow
- Oil mass flow
- Water mass flow
- 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
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- Target volume flow
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- Temp. compensated kinematic viscosity
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- HBSI
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- NSV flow alternative
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- Exciter current 2
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- Oscillation frequency 2
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- NSV flow alternative
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- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
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- Reference density alternative
- Corrected volume flow
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- Water corrected volume flow
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- 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
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- Volume flow
- Oil volume flow
- Water volume flow
- Oil mass flow
- Water mass flow
- 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
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- Temp. compensated kinematic viscosity
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- Status
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- Oil volume flow
- Water volume flow
- Oil mass flow
- Water mass flow
- 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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- 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
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- Temp. compensated kinematic viscosity
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- Status
- Volume flow
- Oil volume flow
- Water volume flow
- Oil mass flow
- Water mass flow
- 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
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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
- Oil mass flow
### 412 Processing download

**Short text**: Download active, please wait

<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></td>
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</tbody>
</table>

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Initial value</td>
</tr>
<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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NVS flow
- NVS 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

### 431 Trim 1 to n

**Short text**: Carry out trim

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>431</td>
<td>Trim 1 to n</td>
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</tbody>
</table>

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
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</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

-
### Configuration incompatible

#### Measured variable status

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
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<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
- 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)
- Empty pipe detection

- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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 PROFIBUS DP

#### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 438 | Dataset | 1. Check data set file  
2. Check device configuration  
3. Up- and download new configuration |

### 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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- S&IW 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

#### No. Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 441 | Current output 1 to n | 1. Check process  
2. Check current output settings |

### 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>Function check</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0xBC to 0xBF</td>
</tr>
<tr>
<td>Status signal</td>
<td>$</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.
### No. 442 Frequency output 1 to n

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| **Measured variable status [from the factory]**<sup>1)</sup> | 1. Check process  
2. Check frequency output settings |
| Quality | Good |
| Quality substatus | Function check |
| Coding (hex) | 0xBC to 0xBF |
| Status signal | S |
| Diagnostic behavior | Warning |

**Influenced measured variables**  
-  

<sup>1)</sup> Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

---

### No. 443 Pulse output 1 to n

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| **Measured variable status [from the factory]**<sup>1)</sup> | 1. Check process  
2. Check pulse output settings |
| Quality | Good |
| Quality substatus | Function check |
| Coding (hex) | 0xBC to 0xBF |
| Status signal | S |
| Diagnostic behavior | Warning |

**Influenced measured variables**  
-  

<sup>1)</sup> Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

---

### No. 444 Current input 1 to n

<table>
<thead>
<tr>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| **Measured variable status [from the factory]**<sup>1)</sup> | 1. Check process  
2. Check current input settings |
| Quality | Good |
| Quality substatus | Function check |
| Coding (hex) | 0xBC to 0xBF |
| Status signal | S |
| Diagnostic behavior | Warning |

**Influenced measured variables**  
- Measured values 1  
- Measured values 2  
- Measured values 3  

<sup>1)</sup> Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
## Diagnostics and troubleshooting

### Proline Promass A 500 PROFIBUS DP

#### 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

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

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Target mass flow
- Carrier volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
- Frequency fluctuation 1
- Frequency fluctuation 2
- 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>Short text</th>
</tr>
</thead>
<tbody>
<tr>
<td>463</td>
<td>Analog input 1 to n selection invalid</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

- Measured values 1
- Measured values 2
- Measured values 3
### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>482</td>
<td>FB not Auto/Cas</td>
<td>Set Block in AUTO mode</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>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

- 

---

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</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

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV Flow
- GSV Flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- 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 PROFIBUS DP**

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>485</td>
<td>Measured variable simulation</td>
<td>Deactivate simulation</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
- 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>Short text</th>
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</tr>
</thead>
<tbody>
<tr>
<td>486</td>
<td>Current input 1 to n simulation</td>
<td>Deactivate simulation</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

- Measured values 1
- Measured values 2
- Measured values 3
<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>491</td>
<td>Current output 1 to n simulation</td>
<td>Deactivate simulation</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>Function check</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0xBC to 0xBF</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>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>492</td>
<td>Simulation frequency output 1 to n</td>
<td>Deactivate simulation frequency output</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>Function check</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0xBC to 0xBF</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>C</td>
</tr>
<tr>
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<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
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<td><strong>Influenced measured variables</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>493</td>
<td>Simulation pulse output 1 to n</td>
<td>Deactivate simulation pulse output</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>Function check</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0xBC to 0xBF</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>
<tr>
<td>No.</td>
<td>Short text</td>
<td>Diagnostic information</td>
</tr>
<tr>
<td>-----</td>
<td>------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>494</td>
<td>Switch output simulation 1 to n</td>
<td>Measured variable status</td>
</tr>
<tr>
<td></td>
<td>Quality: Good</td>
<td>Coding (hex): 0xBC to 0xBF</td>
</tr>
<tr>
<td></td>
<td>Quality substatus: Function check</td>
<td>Status signal: C</td>
</tr>
<tr>
<td>495</td>
<td>Diagnostic event simulation</td>
<td>Measured variable status</td>
</tr>
<tr>
<td></td>
<td>Quality: Good</td>
<td>Coding (hex): 0x80 to 0x83</td>
</tr>
<tr>
<td></td>
<td>Quality substatus: Ok</td>
<td>Diagnostic behavior: Warning</td>
</tr>
<tr>
<td>496</td>
<td>Status input simulation</td>
<td>Measured variable status</td>
</tr>
<tr>
<td></td>
<td>Quality: Good</td>
<td>Coding (hex): 0xBC to 0xBF</td>
</tr>
<tr>
<td></td>
<td>Quality substatus: Function check</td>
<td>Status signal: C</td>
</tr>
<tr>
<td>No.</td>
<td>Diagnostic information</td>
<td>Remedy instructions</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>497</td>
<td>Simulation block output</td>
<td>Deactivate simulation</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>
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<td>Status signal</td>
<td>C</td>
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<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>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>520</td>
<td>I/O 1 to n hardware configuration invalid</td>
<td>1. Check I/O hardware configuration 2. Replace wrong I/O module 3. Plug the module of double pulse output on correct slot</td>
</tr>
<tr>
<td></td>
<td><strong>Measured variable status</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td>Quality substatus</td>
<td>Function check</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x3C to 0x3F</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
</tr>
<tr>
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<td>–</td>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>528</td>
<td>Concentration settings faulty</td>
<td>1. Check concentration settings 2. Check input values e.g. pressure, temperature</td>
</tr>
<tr>
<td></td>
<td><strong>Measured variable status</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td>Quality substatus</td>
<td>Function check</td>
</tr>
<tr>
<td></td>
<td>Coding (hex)</td>
<td>0x3C to 0x3F</td>
</tr>
<tr>
<td></td>
<td>Status signal</td>
<td>S</td>
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<tr>
<td></td>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Carrier mass flow</td>
<td>• Density</td>
</tr>
<tr>
<td></td>
<td>• Target corrected volume flow</td>
<td>• Mass flow</td>
</tr>
<tr>
<td></td>
<td>• Carrier corrected volume flow</td>
<td>• Target mass flow</td>
</tr>
<tr>
<td></td>
<td>• Concentration</td>
<td>• Carrier volume flow</td>
</tr>
<tr>
<td>No.</td>
<td>Diagnostic information</td>
<td>Remedy instructions</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| 529 | Concentration settings faulty | 1. Check concentration settings  
2. Check input values e.g. pressure, 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 | • Density | • Target volume flow |
|     | • Target corrected volume flow | • Mass flow | • Volume flow |
|     | • Carrier corrected volume flow | • Target mass flow | |
|     | • Concentration | • Carrier volume flow | |

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 537 | Configuration | 1. Check IP addresses in network  
2. Change IP address |
|     | **Measured variable status** | |
|     | Quality: Good | |
|     | Quality substatus: Function check | |
|     | Coding (hex): 0xBC to 0xBF | |
|     | Status signal: F | |
|     | Diagnostic behavior: Warning | |
|     | **Influenced measured variables** | |
|     |  | |

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>594</td>
<td>Relay output simulation</td>
<td>Deactivate simulation switch output</td>
</tr>
<tr>
<td></td>
<td><strong>Measured variable status</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality: Good</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality substatus: Function check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coding (hex): 0xBC to 0xBF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Status signal: C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior: Warning</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### 12.7.4 Diagnostic of process

<table>
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<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Short text</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 803 | **Measured variable status** | 1. Check wiring  
2. Change I/O module |
|     |                         |                     |
|     | Quality: Bad            |                     |
|     | Quality substatus: Process related |                     |
|     | Coding (hex): 0x28 to 0x2B |                     |
|     | Status signal: F        |                     |
|     | Diagnostic behavior: Alarm |                     |
|     | **Influenced measured variables** | – |

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Short text</strong></td>
<td></td>
</tr>
<tr>
<td>830</td>
<td><strong>Measured variable status [from the factory]</strong></td>
<td>Reduce ambient temp. around the sensor housing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality: Uncertain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality substatus: Process related</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coding (hex): 0x78 to 0x7B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Status signal: S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagnostic behavior: Warning</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Influenced measured variables</strong></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Oscillation amplitude 1</td>
<td>Kinematic viscosity</td>
</tr>
<tr>
<td></td>
<td>Oscillation amplitude 2</td>
<td>Low flow cut off</td>
</tr>
<tr>
<td></td>
<td>Signal asymmetry</td>
<td>Mass flow</td>
</tr>
<tr>
<td></td>
<td>Carrier mass flow</td>
<td>Oil mass flow</td>
</tr>
<tr>
<td></td>
<td>Carrier pipe temperature</td>
<td>Water mass flow</td>
</tr>
<tr>
<td></td>
<td>Target corrected volume flow</td>
<td>HBSI</td>
</tr>
<tr>
<td></td>
<td>Carrier corrected volume flow</td>
<td>NSV flow</td>
</tr>
<tr>
<td></td>
<td>Concentration</td>
<td>NSV flow alternative</td>
</tr>
<tr>
<td></td>
<td>Oscillation damping 1</td>
<td>External pressure</td>
</tr>
<tr>
<td></td>
<td>Oscillation damping 2</td>
<td>Exciter current 1</td>
</tr>
<tr>
<td></td>
<td>Density</td>
<td>Exciter current 2</td>
</tr>
<tr>
<td></td>
<td>Oil density</td>
<td>Oscillation frequency 1</td>
</tr>
<tr>
<td></td>
<td>Water density</td>
<td>Oscillation frequency 2</td>
</tr>
<tr>
<td></td>
<td>Dynamic viscosity</td>
<td>S&amp;W volume flow</td>
</tr>
<tr>
<td></td>
<td>Sensor electronic temperature (ISEM)</td>
<td>Reference density</td>
</tr>
<tr>
<td></td>
<td>Empty pipe detection</td>
<td>Reference density alternative</td>
</tr>
<tr>
<td></td>
<td>GSV flow</td>
<td>Corrected volume flow</td>
</tr>
<tr>
<td></td>
<td>GSV flow alternative</td>
<td>Oil corrected volume flow</td>
</tr>
</tbody>
</table>

1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### Diagnostics and troubleshooting

#### Proline Promass A 500 PROFIBUS DP

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</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>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Process related</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x78 to 0x7B</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
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Oscillation frequency 1
- Oscillation frequency 2
- Exciter current 1
- Exciter current 2
- 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

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<th>No.</th>
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</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]**

<table>
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<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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</tr>
<tr>
<td>Coding (hex)</td>
<td>0x28 to 0x2B</td>
</tr>
<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
- Signal asymmetry
- Carrier mass flow
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- Measured values 2
- Measured values 3
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- Oscillation damping 2
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- Oil density
- Water density
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- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
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- Exciter current 1
- Exciter current 2
- Oscillation frequency 1
- Oscillation frequency 2
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- Reference density
- Reference density alternative
- Corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
- Oil mass flow
- Oil mass flow
- Oil corrected volume flow
- Oil corrected volume flow
- Water corrected volume flow
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Diagnostics and troubleshooting

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<tbody>
<tr>
<td>833</td>
<td>Electronic temperature too low</td>
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</tr>
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</table>

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<td>Ox28 to 0x2B</td>
</tr>
<tr>
<td>Status signal</td>
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- Water corrected volume flow
- Oscillation damping fluctuation 1
- Oscillation damping fluctuation 2
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- Frequency fluctuation 2
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- Temperature
- Status
- Volume flow
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- Water cut

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<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>
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</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Process related</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x78 to 0x7B</td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
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<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
</tr>
</tbody>
</table>

**Influenced measured variables**

- Oscillation amplitude 1
- Oscillation amplitude 2
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- Exciter current 2
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- Oscillation frequency 2
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- Oil corrected volume flow
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- Oscillation damping fluctuation 2
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- Frequency fluctuation 2
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1) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.
### Diagnostics and troubleshooting

**Proline Promass A 500 PROFIBUS DP**

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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>
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<tr>
<th>Quality</th>
<th>Uncertain</th>
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<tbody>
<tr>
<td>Quality substatus</td>
<td>Process related</td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x7B to 0x7B</td>
</tr>
<tr>
<td>Status signal</td>
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<tr>
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<td>Warning</td>
</tr>
</tbody>
</table>

### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Signal asymmetry
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- Carrier corrected volume flow
- Concentration
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- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- External pressure
- Oscillation frequency 1
- Oscillation frequency 2
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- 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
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- 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.
# Proline Promass A 500 PROFIBUS DP

## Diagnostics and troubleshooting

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>842</td>
<td>Process limit</td>
<td>Low flow cut off active! 1. Check low flow cut off configuration</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Quality</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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</tr>
<tr>
<td>Coding (hex)</td>
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</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
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
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- Carrier corrected volume flow
- Concentration
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- Water density
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- NSV flow
- NSV flow alternative
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- Exciter current 1
- Exciter current 2
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- Oscillation frequency 2
- Reference density
- Reference density alternative
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- Water corrected volume flow
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- Oscillation damping fluctuation 2
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- Frequency fluctuation 2
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### Diagnostic information

<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 2. Adjust detection limits</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Quality</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
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</tr>
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<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

- Carrier mass flow
- Target corrected volume flow
- Carrier corrected volume flow
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## Diagnostics and troubleshooting

### Proline Promass A 500 PROFIBUS DP

**Diagnostic information**

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 882 | Input signal | 1. Check input configuration  
2. Check external device or process conditions |

### 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
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- Carrier pipe temperature
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- Measured values 1
- Measured values 2
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- Oscillation frequency 2
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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**

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

**Influenced measured variables**

- Oscillation amplitude 1
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## Diagnostics and troubleshooting

**Proline Promass A 500 PROFIBUS DP**

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<thead>
<tr>
<th>No.</th>
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</thead>
</table>
| 912 | Medium inhomogeneous   | 1. Check process cond.  
2. Increase system pressure |

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

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<th>Quality</th>
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### Diagnostic Information

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<th>Measured variable status [from the factory]</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 913 | Medium unsuitable                          | 1. Check process conditions  
|     | Short text                                 | 2. Check electronic modules or sensor |
|     | Quality: Uncertain                         |                     |
|     | Quality substatus: Process related         |                     |
|     | Coding (hex): 0x78 to 0x7B                  |                     |
|     | Status signal: S                           |                     |
|     | Diagnostic behavior: Warning               |                     |

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- Water volume flow
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### Remedy Instructions

- 1. Check process temperature with selected API commodity group  
- 2. Check API related parameters

### Diagnostic Information

<table>
<thead>
<tr>
<th>No.</th>
<th>Short text</th>
<th>Remedy instructions</th>
</tr>
</thead>
</table>
| 941 | API temperature out of specification | 1. Check process temperature with selected API commodity group  
|     |            | 2. Check API related parameters |

### 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
- Oil corrected volume flow
- Water corrected volume flow
- Oil volume flow
- Water volume flow
- Water cut
### Diagnostic information

#### No. 942

**Short text**

API density out of specification

**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>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

**Influenced measured variables**

- Mass flow

#### Remedy instructions

1. Check process density with selected API commodity group
2. Check API related parameters

### Diagnostic information

#### No. 943

**Short text**

API pressure out of specification

**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>S</td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

**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
- Corrected volume flow
- Oil corrected volume flow
- Water corrected 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>944</td>
<td>Monitoring failed</td>
<td>Check process conditions for Heartbeat Monitoring</td>
</tr>
</tbody>
</table>

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

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

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- Signal asymmetry
- Carrier mass flow
- Carrier pipe temperature
- Concentration
- Oscillation damping 1
- Oscillation damping 2
- Density
- Dynamic viscosity
- Sensor electronic temperature (ISEM)
- Empty pipe detection
- Low flow cut off
- Mass flow
- Oil mass flow
- Mass flow
- Oil mass flow
- Exciter current 1
- Exciter current 2
- External pressure
- Oscillation frequency 1
- Oscillation frequency 2
- Reference density
- 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

¹) Diagnostic behavior can be changed. This causes the overall status of the measured variable to change.

---

### Diagnostic information

<table>
<thead>
<tr>
<th>No.</th>
<th>Diagnostic information</th>
<th>Remedy instructions</th>
</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)

<table>
<thead>
<tr>
<th>Quality</th>
<th>Uncertain</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality substatus</td>
<td>Process related</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coding (hex)</td>
<td>0x7B to 0x7B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status signal</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic behavior</td>
<td>Warning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Influenced measured variables

- Oscillation amplitude 1
- Oscillation amplitude 2
- 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)
- Empty pipe detection
- GSV flow
- GSV flow alternative
- Kinematic viscosity
- Low flow cut off
- Mass flow
- Oil mass flow
- Water mass flow
- HBSI
- NSV flow
- NSV flow alternative
- Exciter current 1
- Exciter current 2
- External pressure
- Oscillation frequency 1
- Oscillation frequency 2
- Reference density
- 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
- Water volume flow
- Oil volume flow

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 → 230
- Via Web browser → 230
- Via "FieldCare" operating tool → 230
- Via "DeviceCare" operating tool → 230

Other pending diagnostic events can be displayed in the Diagnostic list submenu → 230

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 info.</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If two or more messages occur simultaneously, the message with the highest priority is shown on the display.</td>
<td></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 info.</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 → 173
- Via Web browser → 174
- Via 'FieldCare' operating tool → 175
- Via 'DeviceCare' operating tool → 175

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 → 179
- Information events → 232

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
  - ⊗: Occurrence of the event
  - ⊘: End of the event
- Information event
  - ⊗: Occurrence of the event

To call up the measures to rectify a diagnostic event:
- Via local display → 173
- Via Web browser → 174
- Via 'FieldCare' operating tool → 175
- Via 'DeviceCare' operating tool → 175

For filtering the displayed event messages → 232
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>I1184</td>
<td>Display connected</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 reset detected</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>
</tbody>
</table>
## 12.11 Resetting the measuring device

Using the **Device reset** parameter (→ 147) it is possible to reset the entire device configuration or some of the configuration to a defined state.

<table>
<thead>
<tr>
<th>Info number</th>
<th>Info name</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1451</td>
<td>Monitoring on</td>
</tr>
<tr>
<td>I1457</td>
<td>Measured error verification failed</td>
</tr>
<tr>
<td>I1459</td>
<td>I/O module verification failed</td>
</tr>
<tr>
<td>I1460</td>
<td>HBSI verification failed</td>
</tr>
<tr>
<td>I1461</td>
<td>Sensor verification failed</td>
</tr>
<tr>
<td>I1462</td>
<td>Sensor electronic module verification failed</td>
</tr>
<tr>
<td>I1512</td>
<td>Download started</td>
</tr>
<tr>
<td>I1513</td>
<td>Download finished</td>
</tr>
<tr>
<td>I1514</td>
<td>Upload started</td>
</tr>
<tr>
<td>I1515</td>
<td>Upload finished</td>
</tr>
<tr>
<td>I1618</td>
<td>I/O module 2 replaced</td>
</tr>
<tr>
<td>I1619</td>
<td>I/O module 3 replaced</td>
</tr>
<tr>
<td>I1621</td>
<td>I/O module 4 replaced</td>
</tr>
<tr>
<td>I1622</td>
<td>Calibration changed</td>
</tr>
<tr>
<td>I1624</td>
<td>Reset all totalizers</td>
</tr>
<tr>
<td>I1625</td>
<td>Write protection activated</td>
</tr>
<tr>
<td>I1626</td>
<td>Write protection deactivated</td>
</tr>
<tr>
<td>I1627</td>
<td>Web server: login successful</td>
</tr>
<tr>
<td>I1628</td>
<td>Display: login successful</td>
</tr>
<tr>
<td>I1629</td>
<td>CDI: login successful</td>
</tr>
<tr>
<td>I1631</td>
<td>Web server access changed</td>
</tr>
<tr>
<td>I1632</td>
<td>Display: login failed</td>
</tr>
<tr>
<td>I1633</td>
<td>CDI: login failed</td>
</tr>
<tr>
<td>I1634</td>
<td>Reset to factory settings</td>
</tr>
<tr>
<td>I1635</td>
<td>Reset to delivery settings</td>
</tr>
<tr>
<td>I1636</td>
<td>Fieldbus address reset</td>
</tr>
<tr>
<td>I1639</td>
<td>Max. switch cycles number reached</td>
</tr>
<tr>
<td>I1649</td>
<td>Hardware write protection activated</td>
</tr>
<tr>
<td>I1650</td>
<td>Hardware write protection deactivated</td>
</tr>
<tr>
<td>I1712</td>
<td>New flash file received</td>
</tr>
<tr>
<td>I1725</td>
<td>Sensor electronic module (ISEM) changed</td>
</tr>
<tr>
<td>I1726</td>
<td>Configuration backup failed</td>
</tr>
</tbody>
</table>

12.11 Resetting the measuring device

Using the **Device reset** parameter (→ 147) it is possible to reset the entire device configuration or some of the configuration to a defined state.
Diagnostics and troubleshooting

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>
<tr>
<td>Restart device</td>
<td>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.</td>
</tr>
<tr>
<td>Restore S-DAT backup</td>
<td>Restore the data that are saved on the S-DAT. The data record is restored from the electronics memory to the S-DAT.</td>
</tr>
</tbody>
</table>

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

- Device tag
- Serial number
- Firmware version
- Device name
- Order code
- Extended order code 1
- Extended order code 2
- Extended order code 3
- ENP version
- PROFIBUS ident number
- Status PROFIBUS Master Config
## 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>Device tag</td>
<td>Shows name of measuring point.</td>
<td>Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).</td>
<td>Promass 500 DP</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>
<tr>
<td>Device name</td>
<td>Shows the name of the transmitter.</td>
<td>Promass 300/500</td>
<td>–</td>
</tr>
<tr>
<td>Order code</td>
<td>Shows the device order code.</td>
<td>Character string composed of letters, numbers and certain punctuation marks (e.g. /).</td>
<td>–</td>
</tr>
<tr>
<td>Extended order code 1</td>
<td>Shows the 1st part of the extended order code.</td>
<td>Character string</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>The extended order code can also be found on the nameplate of the sensor and transmitter in the 'Ext. ord. cd.' field.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended order code 2</td>
<td>Shows the 2nd part of the extended order code.</td>
<td>Character string</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>The extended order code can also be found on the nameplate of the sensor and transmitter in the 'Ext. ord. cd.' field.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended order code 3</td>
<td>Shows the 3rd part of the extended order code.</td>
<td>Character string</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>The extended order code can also be found on the nameplate of the sensor and transmitter in the 'Ext. ord. cd.' field.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENP version</td>
<td>Shows the version of the electronic nameplate (ENP).</td>
<td>Character string</td>
<td>2.02.00</td>
</tr>
<tr>
<td>PROFIBUS ident number</td>
<td>Displays the PROFIBUS identification number.</td>
<td>0 to FFFF</td>
<td>0x156D</td>
</tr>
<tr>
<td>Status PROFIBUS Master Config</td>
<td>Displays the status of the PROFIBUS Master configuration.</td>
<td>• Active</td>
<td>Not active</td>
</tr>
</tbody>
</table>
12.13  **Firmware history**

<table>
<thead>
<tr>
<th>Release date</th>
<th>Firmware version</th>
<th>Order code</th>
<th>Firmware changes</th>
<th>Documentation type</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>06.2018</td>
<td>01.00.zz</td>
<td>Option 75</td>
<td>Original firmware</td>
<td>Operating Instructions</td>
<td></td>
</tr>
</tbody>
</table>

It is possible to flash the firmware to the current version or the previous version using the service interface.

For the compatibility of the firmware version with the previous version, 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 → 258.

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: → 240 → 242

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 (→ 235) 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.

15.1 Device-specific accessories

15.1.1 For the transmitter

<table>
<thead>
<tr>
<th>Accessories</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: Approvals, Output, Input, Display/operation, Housing, Software</td>
</tr>
<tr>
<td>Proline 500 – digital transmitter</td>
<td>Order number: 8X5BXX-*********A</td>
</tr>
<tr>
<td>Proline 500 transmitter</td>
<td>Order number: 8X5BXX-*********B</td>
</tr>
<tr>
<td>Proline 500 transmitter for replacement</td>
<td>It is essential to specify the serial number of the current transmitter when ordering. Based on the serial number, the device-specific data (e.g., calibration factors) of the replacement device can be used for the new transmitter.</td>
</tr>
<tr>
<td>Proline 500 – digital transmitter</td>
<td>Installation Instructions EA01151D</td>
</tr>
<tr>
<td>Proline 500 transmitter</td>
<td>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 'Accessory enclosed', option P8 'Wireless antenna wide area'. The external WLAN antenna is not suitable for use in hygienic applications. Further information on the WLAN interface → 85.</td>
</tr>
<tr>
<td>Order number: 71351317</td>
<td></td>
</tr>
<tr>
<td>Installation Instructions EA01238D</td>
<td></td>
</tr>
<tr>
<td>Pipe mounting set</td>
<td>Pipe mounting set for transmitter.</td>
</tr>
<tr>
<td>Proline 500 – digital transmitter</td>
<td>Order number: 71346427</td>
</tr>
<tr>
<td>Installation Instructions EA01195D</td>
<td></td>
</tr>
<tr>
<td>Proline 500 transmitter</td>
<td>Order number: 71346428</td>
</tr>
<tr>
<td>Protective cover</td>
<td>Is used to protect the measuring device from the effects of the weather: e.g. rainwater, excess heating from direct sunlight.</td>
</tr>
<tr>
<td>Proline 500 – digital transmitter</td>
<td>Order number: 71343504</td>
</tr>
<tr>
<td>Proline 500 transmitter</td>
<td>Order number: 71343505</td>
</tr>
<tr>
<td>Installation Instructions EA01191D</td>
<td></td>
</tr>
</tbody>
</table>
### 15.1.2 For the sensor

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</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>
<tr>
<td></td>
<td>If using oil as a heating medium, please consult with Endress+Hauser.</td>
</tr>
<tr>
<td></td>
<td>• If ordered together with the measuring device:</td>
</tr>
<tr>
<td></td>
<td>order code for &quot;Enclosed accessories&quot;</td>
</tr>
<tr>
<td></td>
<td>• Option RB &quot;heating jacket, G 1/2&quot; internal thread&quot;</td>
</tr>
<tr>
<td></td>
<td>• Option RD &quot;heating jacket, NPT 1/2&quot; internal thread&quot;</td>
</tr>
<tr>
<td></td>
<td>• If ordered subsequently:</td>
</tr>
<tr>
<td></td>
<td>Use the order code with the product root DK8003.</td>
</tr>
<tr>
<td></td>
<td>Special Documentation SD02173D</td>
</tr>
<tr>
<td>Sensor holder</td>
<td>For wall, tabletop and pipe mounting.</td>
</tr>
<tr>
<td></td>
<td>Order number: 71392563</td>
</tr>
</tbody>
</table>
15.2 Service-specific 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](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](http://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 |

15.3 System components

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
</tr>
</thead>
</table>
| Memograph M graphic data manager | 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.  
  • Technical Information TI00133R  
  • Operating Instructions BA00247R |
| Cerabar M            | 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.  
  • Technical Information TI00426P and TI00436P  
  • Operating Instructions BA00200P and BA00382P |
| Cerabar S            | 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.  
  • Technical Information TI00383P  
  • Operating Instructions BA00271P |
| iTEMP                | 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.  
  ‘Fields of Activity’ document FA00006T |
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.</td>
</tr>
<tr>
<td></td>
<td>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

Measuring range

**Measuring range for liquids**

<table>
<thead>
<tr>
<th>DN</th>
<th>Measuring range full scale values ( \dot{m}<em>{\text{min}(F)} ) to ( \dot{m}</em>{\text{max}(F)} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[in]</td>
</tr>
<tr>
<td>1</td>
<td>( \frac{1}{24} )</td>
</tr>
<tr>
<td>2</td>
<td>( \frac{1}{12} )</td>
</tr>
<tr>
<td>4</td>
<td>( \frac{1}{6} )</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:

\[
\dot{m}_{\text{max}(G)} = \text{minimum} \left( \dot{m}_{\text{max}(F)} \cdot \rho_G \cdot x \cdot \rho_G \cdot c_G \cdot \pi/2 \cdot (d_i)^2 \cdot 3600 \right)
\]

- \( \dot{m}_{\text{max}(G)} \) 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]

<table>
<thead>
<tr>
<th>DN</th>
<th>Measuring range for gases [( \dot{m}_{\text{max}(G)} )]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[in]</td>
</tr>
<tr>
<td>1</td>
<td>( \frac{1}{24} )</td>
</tr>
<tr>
<td>2</td>
<td>( \frac{1}{12} )</td>
</tr>
<tr>
<td>4</td>
<td>( \frac{1}{6} )</td>
</tr>
</tbody>
</table>

**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
- \( x = 32 \text{ kg/m}^3 \) (for Promass A DN 2)

Maximum possible full scale value:

\[
\dot{m}_{\text{max}(G)} = \dot{m}_{\text{max}(F)} \cdot \rho_G \cdot x = 100 \text{ kg/h} \cdot 11.9 \text{ kg/m}^3 \cdot 32 \text{ kg/m}^3 = 37.2 \text{ kg/h}
\]
Recommended measuring range

Flow limit → 260

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 → 242

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 → 245.

Digital communication
The measured values are written from the automation system to the measuring device via PROFIBUS DP.

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): Rᵢ > 3 kΩ |
| Response time        | Configurable: 5 to 200 ms |
## Technical data

**Proline Promass A 500 PROFIBUS DP**

| 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 PROFIBUS DP

<table>
<thead>
<tr>
<th>Signal encoding</th>
<th>NRZ code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data transfer</td>
<td>9.6 kBaud…12 MBaud</td>
</tr>
</tbody>
</table>

Current output 4 to 20 mA

<table>
<thead>
<tr>
<th>Signal mode</th>
<th>Can be set to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Active</td>
</tr>
<tr>
<td></td>
<td>• Passive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current span</th>
<th>Can be set to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 4 to 20 mA NAMUR</td>
</tr>
<tr>
<td></td>
<td>• 4 to 20 mA US</td>
</tr>
<tr>
<td></td>
<td>• 4 to 20 mA</td>
</tr>
<tr>
<td></td>
<td>• 0 to 20 mA (only if the signal mode is active)</td>
</tr>
<tr>
<td></td>
<td>• Fixed current</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>
<tr>
<td>Damping</td>
<td>Configurable: 0 to 999.9 s</td>
</tr>
</tbody>
</table>

Assignable measured variables

- Mass flow
- Volume flow
- Corrected volume flow
- Density
- Reference density
- Temperature
- Electronics temperature
- Oscillation frequency 0
- Oscillation damping 0
- Signal asymmetry
- Exciter current 0

The range of options increases if the measuring device has one or more application packages.

Current output 4 to 20 mA Ex i passive

<table>
<thead>
<tr>
<th>Order code</th>
<th>&quot;Output; input 2&quot; (21), &quot;Output; input 3&quot; (022): Option C: current output 4 to 20 mA Ex i passive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal mode</td>
<td>Passive</td>
</tr>
<tr>
<td>Current span</td>
<td>Can be set to:</td>
</tr>
<tr>
<td></td>
<td>• 4 to 20 mA NAMUR</td>
</tr>
<tr>
<td></td>
<td>• 4 to 20 mA US</td>
</tr>
<tr>
<td></td>
<td>• 4 to 20 mA</td>
</tr>
<tr>
<td></td>
<td>• Fixed current</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum output values</th>
<th>22.5 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum input voltage</td>
<td>DC 30 V</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

<table>
<thead>
<tr>
<th>Assignment measured variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mass flow</td>
</tr>
<tr>
<td>• Volume flow</td>
</tr>
<tr>
<td>• Corrected volume flow</td>
</tr>
<tr>
<td>• Density</td>
</tr>
<tr>
<td>• Reference density</td>
</tr>
<tr>
<td>• Temperature</td>
</tr>
<tr>
<td>• Electronics temperature</td>
</tr>
<tr>
<td>• Oscillation frequency 0</td>
</tr>
<tr>
<td>• Oscillation damping 0</td>
</tr>
<tr>
<td>• Signal asymmetry</td>
</tr>
<tr>
<td>• Exciter current 0</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>
<tr>
<td></td>
<td>• Ex-i, passive</td>
</tr>
</tbody>
</table>

### Maximum input values

<table>
<thead>
<tr>
<th>DC 30 V, 250 mA (passive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 28.8 V (active)</td>
</tr>
<tr>
<td>For 22.5 mA: ≤ DC 2 V</td>
</tr>
</tbody>
</table>

### Pulse output

<table>
<thead>
<tr>
<th>Maximum input values</th>
<th>DC 30 V, 250 mA (passive)</th>
</tr>
</thead>
<tbody>
<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>Pulse width</td>
<td>Configurable: 0.05 to 2000 ms</td>
</tr>
<tr>
<td>Maximum pulse rate</td>
<td>10000 Impulse/s</td>
</tr>
<tr>
<td>Pulse value</td>
<td>Adjustable</td>
</tr>
</tbody>
</table>

### Assignable measured variables

| • Mass flow |
| • Volume flow |
| • Corrected volume flow |

### Frequency output

<table>
<thead>
<tr>
<th>Maximum input values</th>
<th>DC 30 V, 250 mA (passive)</th>
</tr>
</thead>
<tbody>
<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 10000 Hz ($f_{max} = 12.500$ 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>
</tbody>
</table>
### Assignable measured variables
- Mass flow
- Volume flow
- Corrected volume flow
- Density
- Reference density
- Temperature
- Electronics temperature
- Oscillation frequency 0
- Oscillation damping 0
- Signal asymmetry
- Exciter current 0

The range of options increases if the measuring device has one or more application packages.

### Switch output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</table>

### 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.

### Relay output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Switch output</td>
</tr>
<tr>
<td>Version</td>
<td>Relay output, galvanically isolated</td>
</tr>
<tr>
<td>Switching behavior</td>
<td>Can be set to:</td>
</tr>
</tbody>
</table>
  - NO (normally open), factory setting
  - NC (normally closed)
**Technical data**

### Proline Promass A 500 PROFIBUS DP

| 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:

**PROFIBUS DP**

<table>
<thead>
<tr>
<th>Status and alarm messages</th>
<th>Diagnostics in accordance with PROFIBUS PA Profile 3.02</th>
</tr>
</thead>
</table>

### 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

| Failure mode | Choose from:  
|--------------|---------------  
|              | Maximum alarm: 22 mA  
|              | Freely definable value between: 0 to 20.5 mA  

---

250
Pulse/frequency/switch output

<table>
<thead>
<tr>
<th>Pulse output</th>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Actual value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No pulses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency output</th>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Actual value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Defined value (f_max 2 to 12 500 Hz)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch output</th>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Current status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Closed</td>
</tr>
</tbody>
</table>

Relay output

<table>
<thead>
<tr>
<th>Relay output</th>
<th>Failure mode</th>
<th>Choose from:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Current status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Closed</td>
</tr>
</tbody>
</table>

Local display

<table>
<thead>
<tr>
<th>Local display</th>
<th>Plain text display</th>
<th>With information on cause and remedial measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<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: PROFIBUS DP
- Via service interface
  - CDI-RJ45 service interface
  - WLAN interface

<table>
<thead>
<tr>
<th>Interface/protocol</th>
<th>Plain text display</th>
<th>With information on cause and remedial measures</th>
</tr>
</thead>
</table>

Web browser

<table>
<thead>
<tr>
<th>Web browser</th>
<th>Plain text display</th>
<th>With information on cause and remedial measures</th>
</tr>
</thead>
</table>

Light emitting diodes (LED)

<table>
<thead>
<tr>
<th>Light emitting diodes (LED)</th>
<th>Status information</th>
<th>The following information is displayed depending on the device version:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Status indicated by various light emitting diodes</td>
<td>Supply voltage active</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data transmission active</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Device alarm/error has occurred</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diagnostic information via light emitting diodes → 168</td>
</tr>
</tbody>
</table>
### Technical data

**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>Manufacturer ID</th>
<th>0x11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident number</td>
<td>0x156F</td>
</tr>
<tr>
<td>Profile version</td>
<td>3.02</td>
</tr>
</tbody>
</table>

**Device description files (GSD, DTM, DD)**

Information and files under:
- [www.endress.com](http://www.endress.com)
- [www.profibus.org](http://www.profibus.org)

**Supported functions**
- Identification & Maintenance
  - Simplest device identification on the part of the control system and nameplate
- PROFIBUS upload/download
  - Reading and writing parameters is up to ten times faster with PROFIBUS upload/download
- Condensed status
  - Simplest and self-explanatory diagnostic information by categorizing diagnostic messages that occur

**Configuration of the device address**
- DIP switches on the I/O electronics module
- Via operating tools (e.g. FieldCare)

**Compatibility with earlier model**
If the device is replaced, the measuring device Promass 500 supports the compatibility of the cyclic data with previous models. It is not necessary to adjust the engineering parameters of the PROFIBUS network with the Promass 500 GSD file.

Previous model:
- Promass 83 PROFIBUS DP
- ID No.: 1529 (hex)
- Extended GSD file: EH3x1529.gsd
- Standard GSD file: EH3_1529.gsd

**System integration**
Information regarding system integration:
- Cyclic data transmission
- Block model
- Description of the modules

### 16.5 Power supply

**Terminal assignment** → 42

**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</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>−15 to +10%</td>
<td></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</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>−15 to +10%</td>
<td></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
- 52

Potential equalization
- 54

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
- Device plug for digital communication: M12

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 → 242

**Maximum measured error**
- o.r. = of reading; 1 g/cm³ = 1 kg/l; T = medium temperature

**Base accuracy**

- Design fundamentals → 256

*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</th>
<th>Wide-range Density specification</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>1/8</td>
</tr>
<tr>
<td>2</td>
<td>1/4</td>
</tr>
<tr>
<td>4</td>
<td>1/8</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>1/8</td>
</tr>
<tr>
<td>2</td>
<td>1/4</td>
</tr>
<tr>
<td>4</td>
<td>1/8</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></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[inch]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/16</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>1/8</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>1/4</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

| Accuracy | Max. ±50 ppm o.r. (over the entire ambient temperature range) |

Repeatability

o.r. = of reading; 1 g/cm³ = 1 kg/l; T = medium temperature

Base repeatability

Design fundamentals → △ 256

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

| Temperature coefficient | Max. 1 µA/°C |

Pulse/frequency output

| Temperature coefficient | No additional effect. Included in accuracy. |
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 (→ 253) the measured error is ±0.00005 g/cm³ /°C (±0.000025 g/cm³ /°F).

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>≥ ZeroPoint ⋅ BaseAccu ⋅ 100</td>
<td>± BaseAccu</td>
</tr>
<tr>
<td>&lt; ZeroPoint BaseAccu ⋅ 100</td>
<td>± ZeroPoint MeasValue ⋅ 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>
</table>
| ≥ \(
\frac{1}{2} \cdot \text{ZeroPoint} \cdot \frac{100}{\text{BaseRepeat}}\) | ± \(\text{BaseRepeat}\) |
| < \(
\frac{1}{2} \cdot \text{ZeroPoint} \cdot \frac{100}{\text{BaseRepeat}}\) | ± \(\frac{1}{2} \cdot \frac{\text{ZeroPoint}}{\text{MeasValue}} \cdot 100\) |

### Example for maximum measured error

\[ E = \text{Maximum measured error in % o.r. (example)} \]
\[ Q = \text{Flow rate in % of maximum full scale value} \]

#### 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 2,000 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)
- Device version with PROFIBUS DP: Complies with emission limits for industry as per EN 50170 Volume 2, IEC 61784

The following applies for PROFIBUS DP: If baud rates > 1.5 MBaud, an EMC cable entry must be used and the cable shield must continue as far as the terminal wherever possible.

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

- **Ambient temperature range** (\(T_a\))
- **Medium temperature** (\(T_m\))

**A** Maximum permitted medium temperature \(T_m\) at \(T_{a \text{ max}} = 60 \, ^\circ\text{C} (140 \, ^\circ\text{F})\); higher medium temperatures \(T_m\) require a reduced ambient temperature \(T_a\)

**B** Maximum permitted ambient temperature \(T_a\) for the maximum specified medium temperature \(T_m\) of the sensor

### Values for devices used in the hazardous area:
Separate Ex documentation (XA) for the device → 272.

<table>
<thead>
<tr>
<th>Version</th>
<th>Not insulated</th>
<th>Insulated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td></td>
<td>(T_a)</td>
<td>(T_m)</td>
</tr>
<tr>
<td>Promass A 500 – digital</td>
<td>60 , ^\circ\text{C} (140 , ^\circ\text{F})</td>
<td>205 , ^\circ\text{C} (401 , ^\circ\text{F})</td>
</tr>
<tr>
<td>Promass A 500</td>
<td>60 , ^\circ\text{C} (140 , ^\circ\text{F})</td>
<td>205 , ^\circ\text{C} (401 , ^\circ\text{F})</td>
</tr>
</tbody>
</table>

### Density
0 to 5000 kg/m\(^3\) (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</th>
<th>Sensor housing burst pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[in]</td>
</tr>
<tr>
<td>1</td>
<td>½₄₄</td>
</tr>
<tr>
<td>2</td>
<td>½₁₂</td>
</tr>
<tr>
<td>4</td>
<td>¼</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 →  244

- 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 →  244

To calculate the flow limit, use the Applicator sizing tool →  242

Pressure loss

To calculate the pressure loss, use the Applicator sizing tool →  242

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

**Weight in SI units**

<table>
<thead>
<tr>
<th>DN [mm]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.75</td>
</tr>
<tr>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>4</td>
<td>6.15</td>
</tr>
</tbody>
</table>

**Weight in US units**

<table>
<thead>
<tr>
<th>DN [in]</th>
<th>Weight [lbs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/24</td>
<td>6</td>
</tr>
<tr>
<td>1/12</td>
<td>9</td>
</tr>
<tr>
<td>1/8</td>
<td>14</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

*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

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female thread M20 × 1.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cable gland M20 × 1.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Adapter for cable entry with female thread G ½&quot; or NPT ½&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Cable entries and adapters

<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></td>
<td>Adapter for cable entry with female thread G ½&quot;</td>
</tr>
<tr>
<td></td>
<td>Adapter for cable entry with female thread NPT ½&quot;</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

<table>
<thead>
<tr>
<th>VCO coupling</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel, 1.4404 (316/316L)</td>
<td>Stainless steel, 1.4404 (316/316L)</td>
</tr>
<tr>
<td>VCO coupling</td>
<td>Stainless steel, 1.4404 (316/316L)</td>
</tr>
<tr>
<td>NPT1/4&quot;, NPT1/2&quot; female thread</td>
<td>Stainless steel, 1.4404 (316/316L)</td>
</tr>
<tr>
<td>Tri-Clamp1/4&quot;</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>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel, 1.4404 (316/316L)</td>
<td>Stainless steel, 1.4404 (316/316L)</td>
</tr>
<tr>
<td>Tri-Clamp1/4&quot;</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>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>Tri-Clamp1/4&quot;</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>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>G1/4&quot;, G3/4&quot; female thread</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>NPT1/4&quot;, NPT1/2&quot; 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>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
<tr>
<td>G1/4&quot;, G3/4&quot; female thread</td>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
</tr>
</tbody>
</table>
Technical data

### NPT ¾", NPT ½" female thread

<table>
<thead>
<tr>
<th>Material</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy C22, 2.4602 (UNS N06022)</td>
<td></td>
</tr>
</tbody>
</table>

### Fixed flange EN 1092-1, ASME B16.5, JIS B2220

<table>
<thead>
<tr>
<th>Material</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel, 1.4404 (316/316L); Alloy C22, 2.4602 (UNS N06022)</td>
<td></td>
</tr>
</tbody>
</table>

Available process connections ➔ 264

### 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

Process connection materials ➔ 263

### Surface roughness

All data relate to parts in contact with fluid. The following surface roughness quality can be ordered.

- Not polished
- $\text{Ra}_{\max} = 0.76 \, \mu\text{m} \ (30 \, \mu\text{in})$ mechanically polished
- $\text{Ra}_{\max} = 0.38 \, \mu\text{m} \ (15 \, \mu\text{in})$ 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 → 85

![Diagram of the display module](image)

Operation with touch control

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 → 84
Technical data

Service interface → 84

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.

<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          | Special Documentation for device → 272 |
| DeviceCare SFE100         | Notebook, PC or tablet with Microsoft Windows system| ● CDI-RJ45 service interface
                        |                                                      | ● WLAN interface          | → 242                             |
| FieldCare SFE500          | Notebook, PC or tablet with Microsoft Windows system| ● CDI-RJ45 service interface
                        |                                                      | ● WLAN interface          | → 242                             |

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
- FieldMate by Yokogawa → www.yokogawa.com
- PACTWare → www.pactware.com

The associated device description files are available at: www.endress.com → Downloads

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)
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></th>
<th>Device memory</th>
<th>T-DAT</th>
<th>S-DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available data</td>
<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>
</tr>
<tr>
<td></td>
<td>Parameter data record backup</td>
<td>Current parameter data record (used by firmware at run time)</td>
<td>Serial number</td>
</tr>
<tr>
<td></td>
<td>Device firmware package</td>
<td>Peakhold indicator (min/max values)</td>
<td>Calibration data</td>
</tr>
<tr>
<td></td>
<td>Driver for system integration for exporting via Web server, e.g:</td>
<td>Totalizer values</td>
<td>Device configuration (e.g. SW options, fixed I/O or multi I/O)</td>
</tr>
<tr>
<td></td>
<td>GSD for PROFIBUS DP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage location</td>
<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.: GSD for PROFIBUS DP

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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE mark</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>RCM-tick symbol</td>
<td>The measuring system meets the EMC requirements of the &quot;Australian Communications and Media Authority (ACMA)&quot;.</td>
</tr>
<tr>
<td>Ex approval</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

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 PROFIBUS

PROFIBUS interface
The measuring device is certified and registered by the PNO (PROFIBUS User Organization Organization). The measuring system meets all the requirements of the following specifications:
- Certified in accordance with PROFIBUS PA Profile 3.02
- The device can also be operated with certified devices of other manufacturers (interoperability)

Radio approval
The measuring device has radio approval.

For detailed information regarding radio approval, see Special Documentation → 272

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>KL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KS</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>K5</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>K6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K8</td>
<td></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 → 272

### 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:</td>
</tr>
<tr>
<td></td>
<td>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>Heartbeat Verification</td>
</tr>
<tr>
<td></td>
<td>Meets the requirement for traceable verification to DIN ISO 9001:2008 Chapter 7.6 a) &quot;Control of monitoring and measuring equipment&quot;.</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>Heartbeat Monitoring</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 outputting 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 →  240

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

### Standard documentation

**Brief Operating Instructions**

**Brief Operating Instructions for the sensor**

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promine Promass A</td>
<td>KA01282D</td>
</tr>
</tbody>
</table>

**Brief Operating Instructions for transmitter**

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proline 500 – digital</td>
<td>KA01390D</td>
</tr>
<tr>
<td>Proline 500</td>
<td>KA01389D</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>GP01137D</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>SD02232D</td>
</tr>
<tr>
<td>Heartbeat Technology</td>
<td>SD02203D</td>
</tr>
<tr>
<td>Concentration measurement</td>
<td>SD02213D</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 →  238  
- Accessories available for order with Installation Instructions →  240 |
Index

0 ... 9
3-A approval .................................. 269

A
Access authorization to parameters
   Read access .................................. 76
   Write access .................................. 76
Access code .................................. 76
   Incorrect input ................................ 76
Accuracy ...................................... 253
   Influence ..................................... 255
Adapting the diagnostic behavior ............... 176
Additional certification ....................... 269
Ambient temperature
   Influence ..................................... 255
Analog Input module .......................... 95
Analog Output module ......................... 98
Application .................................... 243
   Application packages ......................... 270
   Applicator ................................... 244
   Approvals .................................... 268

C
Cable entries
   Technical data ................................ 253
   Degree of protection ......................... 62
   CE mark ....................................... 12, 268
   Certificates ................................... 268
   Certification PROFIBUS ........................ 269
   cGMP .......................................... 269
   Check
      Installation .................................. 36
   Checklist
      Post-connection check ..................... 62
      Post-installation check .................... 36
   Cleaning
      Cleaning in place (CIP) ...................... 237
      Exterior cleaning ............................ 237
      Interior cleaning ............................ 237
      Sterilization in place (SIP) .................. 237
   Climate class .................................. 257
   Commissioning ................................ 104
      Advanced settings ......................... 135
      Configuring the measuring device ........... 105
   Compatibility with earlier model ............. 90
   Connecting cable
      Proline 500 – digital transmitter ............ 49
      Proline 500 terminal assignment .............. 52
      Proline 500 transmitter ....................... 54
      Sensor connection housing, Proline 500 ....... 52
      Sensor connection housing, Proline 500 – digital .. 45
      Terminal assignment of Proline 500 – digital .. 45
   Connecting the measuring device
      Proline 500 .................................. 52
      Proline 500 – digital ......................... 45

Connecting the signal cable/supply voltage cable
   Proline 500 – digital transmitter .............. 50

Connection
   see Electrical connection
   Connection preparations ...................... 43
   Connection tools ................................ 37
   Context menu
      Calling up ..................................... 72
      Closing ....................................... 72
      Explanation ................................... 72
   Current consumption .......................... 253
   Cyclic data transmission ...................... 94

D
Declaration of Conformity ....................... 12
   Define access code ................................ 150, 151
   Degree of protection .......................... 62, 257
   Density ....................................... 259
   Design fundamentals
      Maximum measured error ....................... 256
      Repeatability .................................. 256
   Designated use ................................ 10
   Device components ............................. 15
   Device description files ....................... 90
   Device documentation
      Supplementary documentation .................. 8
   Device locking, status ......................... 154
   Device master file
      GSD .......................................... 90
   Device name
      Sensor ......................................... 20
      Transmitter ................................... 18
   Device repair ................................... 238
   Device revision ................................ 90
   Device type ID .................................. 90
   DeviceCare ..................................... 88
   Device description file ....................... 90
   Diagnostic behavior
      Explanation .................................... 172
      Symbols ....................................... 172
   Diagnostic information
      Design, description ............................ 172, 175
      DeviceCare ................................... 174
      FieldCare ..................................... 174
      Light emitting diodes ......................... 168
      Local display ................................. 171
      Overview ...................................... 179
      Remedial measures ............................ 179
      Web browser ................................... 173
   Diagnostic list ................................ 230
   Diagnostic message ............................ 171
   Diagnostics
      Symbols ....................................... 171
   DIP switch
      see Write protection switch
   Direct access ................................... 74
Direct access code .................................. 68
Disabling write protection ........................... 150
Discrete Input module ................................. 98
Discrete Output module ............................... 99
Display
  see Onsite display
Display area
  For operational display ........................... 67
  In the navigation view ......................... 69
Display values
  For locking status ................................ 154
Disposal ................................................. 239
Document
  Function .............................................. 6
  Symbols .............................................. 6
  Document function ................................ 6
  Down pipe .............................................. 24
E
  Editing view .......................................... 70
  Input screen .......................................... 71
  Using operating elements ......................... 70, 71
EHDEG-certified ....................................... 269
Electrical connection
  Degree of protection ................................ 62
  Measuring device ..................................... 37
  Operating tools
    Via PROFIBUS DP network ......................... 84
    Via service interface (CDI-RJ45) ................ 84
    Via WLAN interface ................................. 85
  Web server ........................................... 84
  WLAN interface ....................................... 85
Electromagnetic compatibility ...................... 258
Electronics module .................................... 15
EMPTY_MODULE module ............................... 100
Enabling write protection ............................ 150
Enabling/disabling the keypad lock ................... 77
Endress+Hauser services
  Maintenance ......................................... 237
  Repair ................................................ 238
Environment
  Mechanical load ...................................... 258
  Storage temperature ................................ 257
  Vibration- and shock-resistance .................... 258
Error messages
  see Diagnostic messages
Event list .............................................. 231
Event logbook ......................................... 231
Ex approval ............................................ 268
Extended order code
  Sensor ............................................... 20
  Transmitter ......................................... 18
Exterior cleaning ..................................... 237
F
  FDA .................................................. 269
Field of application
  Residual risks ...................................... 11
  FieldCare ............................................ 87
  Device description file ............................ 90
  Establishing a connection ......................... 87
  Function ............................................. 87
  User interface ...................................... 88
Filtering the event logbook ......................... 232
Firmware
  Release date ......................................... 90
  Version .............................................. 90
Firmware history .................................. 236
Flow direction ........................................ 24, 31
Flow limit ............................................ 260
Food Contact Materials Regulation .................. 269
Function check ........................................ 104
Functions
  see Parameters
G
  Galvanic isolation .................................. 252
H
  Hardware write protection ......................... 151
Help text
  Calling up .......................................... 75
  Closing .............................................. 75
  Explanation .......................................... 75
HistoROM ............................................. 144
I
  Identifying the measuring device ................. 17
  Incoming acceptance ............................... 17
Influence
  Ambient temperature ................................ 255
  Medium pressure .................................... 256
  Medium temperature ................................ 256
Information on the document .......................... 6
Inlet runs ............................................. 25
Input ................................................... 244
Inspection
  Received goods ...................................... 17
  Inspection check
    Connection ......................................... 62
Installation ............................................ 23
Installation conditions
  Down pipe ............................................ 24
  Inlet and outlet runs ............................... 25
  Installation dimensions ............................ 25
  Mounting location ................................... 23
  Orientation .......................................... 24
  Rupture disk ......................................... 27
  Sensor heating ....................................... 26
  System pressure ..................................... 25
  Thermal insulation .................................. 26
  Vibrations ......................................... 27
Installation dimensions ............................. 25
Interior cleaning .................................... 237
L
  Languages, operation options ...................... 265
  Line recorder ....................................... 161
Index

Local display ........................................ 265
   Navigation view .................................. 68
see Diagnostic message
see In alarm condition
see Operational display
Low flow cut off ...................................... 252

M
Main electronics module .............................. 15
Maintenance tasks ................................. 237
Managing the device configuration ............. 144
Manufacturer ID ..................................... 90
Manufacturing date .................................. 18, 20
Materials ............................................. 261
Maximum measured error ............................ 253
Measured values
   see Process variables
Measuring and test equipment ..................... 237
Measuring device
   Configuration ..................................... 105
   Conversion ....................................... 238
   Disposal ......................................... 239
   Mounting the sensor ............................. 31
   Preparing for electrical connection ......... 43
   Preparing for mounting .......................................................... 31
   Removing .......................................... 239
   Repairs .......................................... 238
   Structure ........................................ 15
   Switch-on ........................................ 104
Measuring principle .................................... 243
Measuring range
   Calculation example for gas .................... 244
   For gases ........................................ 244
   For liquids ....................................... 244
Measuring range, recommended .................... 260
Measuring system ...................................... 243
Mechanical load ....................................... 258
Medium pressure
   Influence ......................................... 256
Medium temperature
   Influence ......................................... 256
Menu
   Diagnostics ....................................... 230
   Setup ........................................... 105, 106
Menus
   For measuring device configuration .......... 105
   For specific settings ............................ 135
Module
   Analog input ..................................... 95
   Analog output ................................... 98
   Discrete Input ................................... 98
   Discrete Output ................................ 99
   EMPTY_MODULE .................................. 100
Totalizer
   SETTOT_MODETOT_TOTAL ....................... 97
   SETTOT_TOTAL ................................ 97
   TOTAL .......................................... 96
Mounting dimensions
   see Installation dimensions

N
Nameplate
   Sensor ............................................. 20
   Transmitter ..................................... 18
Navigation path (navigation view) ............ 68
Navigation view
   In the submenu .................................. 68
   In the wizard .................................... 68
Numeric editor ......................................... 70
Onsite display
   Numeric editor ................................... 70
   Text editor ....................................... 70
Operable flow range ................................ 245
Operating elements ................................. 72, 172
Operating keys
   see Operating elements
Operating menu
   Menus, submenus ................................ 64
   Structure ........................................ 64
   Submenus and user roles ....................... 65
Operating philosophy ................................ 65
Operation ............................................. 154
Operation options ................................... 63
Operational display ................................... 66
Operational safety .................................... 11
Order code ........................................... 18, 20
Orientation (vertical, horizontal) ............... 24
Outlet runs .......................................... 24
Output .............................................. 247
Output signal ......................................... 247

P
Packaging disposal .................................... 23
Parameter
   Changing .......................................... 75
   Entering values or text .......................... 75
Parameter settings
   Administration (Submenu) ...................... 147
   Analog inputs (Submenu) ...................... 113
   Calculated values (Submenu) ................. 136
   Communication (Submenu) ..................... 111
   Configuration backup (Submenu) ............. 144
   Current input .................................... 116
   Current input (Wizard) ....................... 116
   Current input 1 to n (Submenu) ............. 158
   Current output .................................. 118
   Current output (Wizard) ...................... 118
   Data logging (Submenu) ....................... 161
   Define access code (Wizard) ................. 146
   Device information (Submenu) ............... 234
   Diagnostics (Menu) .............................. 230
   Display (Submenu) .............................. 140
   Display (Wizard) ................................ 130
### Index

<table>
<thead>
<tr>
<th>Category</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spare part</td>
<td>238</td>
</tr>
<tr>
<td>Spare parts</td>
<td>238</td>
</tr>
<tr>
<td>Special connection instructions</td>
<td>55</td>
</tr>
<tr>
<td>Special mounting instructions</td>
<td></td>
</tr>
<tr>
<td>Sanitary compatibility</td>
<td>27</td>
</tr>
<tr>
<td>Standards and guidelines</td>
<td>270</td>
</tr>
<tr>
<td>Status area</td>
<td></td>
</tr>
<tr>
<td>For operational display</td>
<td>66</td>
</tr>
<tr>
<td>In the navigation view</td>
<td>68</td>
</tr>
<tr>
<td>Status signals</td>
<td>171, 174</td>
</tr>
<tr>
<td>Storage concept</td>
<td>267</td>
</tr>
<tr>
<td>Storage conditions</td>
<td>22</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>22</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>257</td>
</tr>
<tr>
<td>Structure</td>
<td></td>
</tr>
<tr>
<td>Measuring device</td>
<td>15</td>
</tr>
<tr>
<td>Operating menu</td>
<td>64</td>
</tr>
<tr>
<td>Submenu</td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>145, 147</td>
</tr>
<tr>
<td>Advanced setup</td>
<td>135</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>113</td>
</tr>
<tr>
<td>Calculated values</td>
<td>136</td>
</tr>
<tr>
<td>Communication</td>
<td>104, 111</td>
</tr>
<tr>
<td>Configuration backup</td>
<td>144</td>
</tr>
<tr>
<td>Current input 1 to n</td>
<td>158</td>
</tr>
<tr>
<td>Data logging</td>
<td>161</td>
</tr>
<tr>
<td>Device information</td>
<td>234</td>
</tr>
<tr>
<td>Display</td>
<td>140</td>
</tr>
<tr>
<td>Event list</td>
<td>231</td>
</tr>
<tr>
<td>I/O configuration</td>
<td>115</td>
</tr>
<tr>
<td>Input values</td>
<td>157</td>
</tr>
<tr>
<td>Measured values</td>
<td>154</td>
</tr>
<tr>
<td>Measured variables</td>
<td>155</td>
</tr>
<tr>
<td>Output values</td>
<td>159</td>
</tr>
<tr>
<td>Overview</td>
<td>65</td>
</tr>
<tr>
<td>Process variables</td>
<td>136</td>
</tr>
<tr>
<td>Pulse/frequency/switch output 1 to n</td>
<td>159</td>
</tr>
<tr>
<td>Relay output 1 to n</td>
<td>160</td>
</tr>
<tr>
<td>Reset access code</td>
<td>146</td>
</tr>
<tr>
<td>Sensor adjustment</td>
<td>137</td>
</tr>
<tr>
<td>Simulation</td>
<td>147</td>
</tr>
<tr>
<td>Status input</td>
<td>117</td>
</tr>
<tr>
<td>Status input 1 to n</td>
<td>158</td>
</tr>
<tr>
<td>System units</td>
<td>107</td>
</tr>
<tr>
<td>Totalizer 1 to n</td>
<td>138, 156</td>
</tr>
<tr>
<td>Totalizer handling</td>
<td>161</td>
</tr>
<tr>
<td>Value current output 1 to n</td>
<td>159</td>
</tr>
<tr>
<td>Web server</td>
<td>83</td>
</tr>
<tr>
<td>WLAN Settings</td>
<td>143</td>
</tr>
<tr>
<td>Zero point adjustment</td>
<td>137</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>252</td>
</tr>
<tr>
<td>Surface roughness</td>
<td>264</td>
</tr>
<tr>
<td>Switch output</td>
<td>249</td>
</tr>
<tr>
<td>Symbols</td>
<td></td>
</tr>
<tr>
<td>Controlling data entries</td>
<td>71</td>
</tr>
<tr>
<td>For communication</td>
<td>66</td>
</tr>
<tr>
<td>For diagnostic behavior</td>
<td>66</td>
</tr>
<tr>
<td>For locking</td>
<td>66</td>
</tr>
<tr>
<td>For measured variable</td>
<td>67</td>
</tr>
<tr>
<td>For measurement channel number</td>
<td>67</td>
</tr>
<tr>
<td>For menus</td>
<td>69</td>
</tr>
<tr>
<td>For parameters</td>
<td>69</td>
</tr>
<tr>
<td>For status signal</td>
<td>66</td>
</tr>
<tr>
<td>For submenu</td>
<td>69</td>
</tr>
<tr>
<td>For wizard</td>
<td>69</td>
</tr>
<tr>
<td>In the status area of the local display</td>
<td>66</td>
</tr>
<tr>
<td>Input screen</td>
<td>71</td>
</tr>
<tr>
<td>Operating elements</td>
<td>70</td>
</tr>
<tr>
<td>System design</td>
<td></td>
</tr>
<tr>
<td>Measuring system</td>
<td>243</td>
</tr>
<tr>
<td>Terminal assignment</td>
<td>42</td>
</tr>
<tr>
<td>Terminal assignment of connecting cable for Proline 500- digital</td>
<td>45</td>
</tr>
<tr>
<td>Sensor connection housing</td>
<td>45</td>
</tr>
<tr>
<td>Terminals</td>
<td>253</td>
</tr>
<tr>
<td>Tests and certificates</td>
<td>269</td>
</tr>
<tr>
<td>Text editor</td>
<td>70</td>
</tr>
<tr>
<td>Thermal insulation</td>
<td>26</td>
</tr>
<tr>
<td>Tool tip</td>
<td></td>
</tr>
<tr>
<td>see Help text</td>
<td></td>
</tr>
<tr>
<td>Tools</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td>37</td>
</tr>
<tr>
<td>For mounting</td>
<td>31</td>
</tr>
<tr>
<td>Transport</td>
<td>22</td>
</tr>
<tr>
<td>TOTAL module</td>
<td>96</td>
</tr>
<tr>
<td>Totalizer</td>
<td></td>
</tr>
<tr>
<td>Assign process variable</td>
<td>156</td>
</tr>
<tr>
<td>Configuration</td>
<td>138</td>
</tr>
<tr>
<td>Operation</td>
<td>161</td>
</tr>
<tr>
<td>Reset</td>
<td>161</td>
</tr>
<tr>
<td>Transmitter</td>
<td></td>
</tr>
<tr>
<td>Turning the display module</td>
<td>35</td>
</tr>
<tr>
<td>Turning the housing</td>
<td>35</td>
</tr>
<tr>
<td>Transporting the measuring device</td>
<td>22</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>165</td>
</tr>
<tr>
<td>TSE/BSE Certificate of Suitability</td>
<td>269</td>
</tr>
<tr>
<td>Turning the display module</td>
<td>35</td>
</tr>
<tr>
<td>Turning the electronics housing</td>
<td></td>
</tr>
<tr>
<td>see Turning the transmitter housing</td>
<td></td>
</tr>
<tr>
<td>Turning the transmitter housing</td>
<td>35</td>
</tr>
<tr>
<td>Use of the measuring device</td>
<td></td>
</tr>
<tr>
<td>Borderline cases</td>
<td>10</td>
</tr>
<tr>
<td>Incorrect use</td>
<td>10</td>
</tr>
<tr>
<td>see Designated use</td>
<td></td>
</tr>
</tbody>
</table>

T

Technical data, overview ........................................ 243

Temperature range
  Ambient temperature range for display ..................... 265
  Medium temperature ......................................... 258
  Storage temperature ....................................... 22

Terminal assignment ............................................ 42

TOTAL module ................................................................ 96

Totalizer
  Assign process variable ..................................... 156
  Configuration .................................................. 138
  Operation ....................................................... 161
  Reset ............................................................ 161

Transmitter
  Turning the display module ................................ 35
  Turning the housing ......................................... 35

Transporting the measuring device ......................... 22

Troubleshooting
  General ......................................................... 165

TSE/BSE Certificate of Suitability ......................... 269

Turning the display module ................................ 35

Turning the electronics housing ............................. 35

Turning the transmitter housing ............................ 35

U

Use of the measuring device
  Borderline cases ............................................ 10
  Incorrect use ............................................... 10
  see Designated use ...........................................
User interface
  Current diagnostic event ..................... 230
  Previous diagnostic event .................... 230
User roles .................................. 65
USP Class VI ................................ 269

V
Version data for the device ...................... 90
Vibration- and shock-resistance .................... 258
Vibrations .................................. 27

W
W@M ............................................. 237, 238
W@M Device Viewer ................................ 17, 238
Weight
  SI units ...................................... 261
  Transport (notes) ............................ 22
  US units ................................. 261
Wizard
  Current input ............................... 116
  Current output ............................ 118
  Define access code .......................... 146
  Display ................................... 130
  Low flow cut off ........................... 133
  Partially filled pipe detection .............. 134
  Pulse/frequency/switch output ............... 121, 123, 126
  Relay output 1 to n ........................ 128
  Select medium ............................. 110
WLAN settings ................................ 143
Workplace safety ................................ 11
Write access .................................. 76
Write protection
  Via access code ............................. 150
  Via write protection switch ................. 151
Write protection switch ........................ 151