Description of Device Parameters

Proline Promag 100
Modbus RS485

Electromagnetic flowmeter
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1 Document information

1.1 Document function
The document is part of the Operating Instructions and serves as a reference for parameters, providing a detailed explanation of each individual parameter of the Expert operating menu.

1.2 Target group
The document is aimed at specialists who work with the device over the entire life cycle and perform specific configurations.

1.3 Using this document

1.3.1 Information on the document structure
This document lists the submenus and their parameters according to the structure of the Expert menu (→ 7) that are available once the "Operator" user role or the "Maintenance" user role is enabled.

For information on the arrangement of the parameters according to the structure of the Operation menu, Setup menu, Diagnostics menu (→ 66), along with a brief description, see the Operating Instructions for the device.
For information about the operating philosophy, see the "Operating philosophy" chapter in the device's Operating Instructions.
1.3.2 Structure of a parameter description

The individual parts of a parameter description are described in the following section:

<table>
<thead>
<tr>
<th>Complete parameter name</th>
<th>Write-protected parameter = </th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation</td>
<td>Navigation path to the parameter via the operating tool</td>
</tr>
<tr>
<td></td>
<td>The names of the menus, submenus and parameters are displayed in abbreviated format.</td>
</tr>
<tr>
<td>Prerequisite</td>
<td>The parameter is only available under these specific conditions</td>
</tr>
<tr>
<td>Description</td>
<td>Description of the parameter function</td>
</tr>
<tr>
<td>Selection</td>
<td>List of the individual options for the parameter</td>
</tr>
<tr>
<td></td>
<td>• Option 1</td>
</tr>
<tr>
<td></td>
<td>• Option 2</td>
</tr>
<tr>
<td>User entry</td>
<td>Input range for the parameter</td>
</tr>
<tr>
<td>User interface</td>
<td>Display value/data for the parameter</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Default setting ex works</td>
</tr>
<tr>
<td>Additional information</td>
<td>Additional explanations (e.g. in examples):</td>
</tr>
<tr>
<td></td>
<td>• On individual options</td>
</tr>
<tr>
<td></td>
<td>• On display values/data</td>
</tr>
<tr>
<td></td>
<td>• On the input range</td>
</tr>
<tr>
<td></td>
<td>• On the factory setting</td>
</tr>
<tr>
<td></td>
<td>• On the parameter function</td>
</tr>
</tbody>
</table>

1.4 Symbols used

1.4.1 Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="tip.png" alt="Tip" /></td>
<td>Indicates additional information.</td>
</tr>
<tr>
<td><img src="reference.png" alt="Reference to documentation" /></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td><img src="page.png" alt="Reference to page" /></td>
<td>Reference to page</td>
</tr>
<tr>
<td><img src="graphic.png" alt="Reference to graphic" /></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td><img src="operating_tool.png" alt="Operation via operating tool" /></td>
<td>Operation via operating tool</td>
</tr>
<tr>
<td><img src="write_protected.png" alt="Write-protected parameter" /></td>
<td>Write-protected parameter</td>
</tr>
</tbody>
</table>

1.4.2 Symbols in graphics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3 ...</td>
<td>Item numbers</td>
</tr>
<tr>
<td>A-A, B-B, C-C, ...</td>
<td>Sections</td>
</tr>
<tr>
<td>A, B, C, ...</td>
<td>Views</td>
</tr>
</tbody>
</table>
2 Overview of the Expert operating menu

The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.

<table>
<thead>
<tr>
<th>Expert</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Locking status → 9</td>
</tr>
<tr>
<td></td>
<td>Access status tooling → 10</td>
</tr>
<tr>
<td></td>
<td>Enter access code → 10</td>
</tr>
<tr>
<td></td>
<td>System → 11</td>
</tr>
<tr>
<td></td>
<td>Diagnostic handling → 11</td>
</tr>
<tr>
<td></td>
<td>Administration → 15</td>
</tr>
<tr>
<td></td>
<td>Sensor → 18</td>
</tr>
<tr>
<td></td>
<td>Measured values → 19</td>
</tr>
<tr>
<td></td>
<td>System units → 23</td>
</tr>
<tr>
<td></td>
<td>Process parameters → 33</td>
</tr>
<tr>
<td></td>
<td>External compensation → 45</td>
</tr>
<tr>
<td></td>
<td>Sensor adjustment → 48</td>
</tr>
<tr>
<td></td>
<td>Calibration → 53</td>
</tr>
<tr>
<td></td>
<td>Communication → 54</td>
</tr>
<tr>
<td></td>
<td>Modbus configuration → 54</td>
</tr>
<tr>
<td></td>
<td>Modbus information → 58</td>
</tr>
<tr>
<td></td>
<td>Modbus data map → 59</td>
</tr>
<tr>
<td>Menu</td>
<td>Page</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>60</td>
</tr>
<tr>
<td>Reset all totalizers</td>
<td>60</td>
</tr>
<tr>
<td><strong>Totalizer 1 to 3</strong></td>
<td>61</td>
</tr>
<tr>
<td><strong>Diagnostics</strong></td>
<td>66</td>
</tr>
<tr>
<td>Actual diagnostics</td>
<td>67</td>
</tr>
<tr>
<td>Timestamp</td>
<td>67</td>
</tr>
<tr>
<td>Previous diagnostics</td>
<td>67</td>
</tr>
<tr>
<td>Timestamp</td>
<td>68</td>
</tr>
<tr>
<td>Operating time from restart</td>
<td>68</td>
</tr>
<tr>
<td>Operating time</td>
<td>68</td>
</tr>
<tr>
<td><strong>Diagnostic list</strong></td>
<td>69</td>
</tr>
<tr>
<td><strong>Event logbook</strong></td>
<td>73</td>
</tr>
<tr>
<td><strong>Device information</strong></td>
<td>73</td>
</tr>
<tr>
<td><strong>Min/max values</strong></td>
<td>77</td>
</tr>
<tr>
<td><strong>Heartbeat</strong></td>
<td>79</td>
</tr>
<tr>
<td><strong>Simulation</strong></td>
<td>80</td>
</tr>
</tbody>
</table>
3 Description of device parameters

In the following section, the parameters are listed according to the menu structure of the operating tool.

<table>
<thead>
<tr>
<th>Expert</th>
<th>Locking status</th>
<th>→ 9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Access status tooling</td>
<td>→ 10</td>
</tr>
<tr>
<td></td>
<td>Enter access code</td>
<td>→ 10</td>
</tr>
<tr>
<td>• System</td>
<td>→ 11</td>
<td></td>
</tr>
<tr>
<td>• Sensor</td>
<td>→ 18</td>
<td></td>
</tr>
<tr>
<td>• Communication</td>
<td>→ 54</td>
<td></td>
</tr>
<tr>
<td>• Application</td>
<td>→ 60</td>
<td></td>
</tr>
<tr>
<td>• Diagnostics</td>
<td>→ 66</td>
<td></td>
</tr>
</tbody>
</table>

### Locking status

**Navigation**

Expert → Locking status

**Description**

Displays the active write protection.

**User interface**

- Hardware locked
- Temporarily locked
Description of device parameters

**Additional information**

**Display**

If two or more types of write protection are active, all the active types of write protection are displayed in the operating tool.

If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 9).

*"Hardware locked" option (priority 1)*

The DIP switch for hardware locking is activated on the main electronics module. This locks write access to the parameters (e.g. via local display or operating tool).

Information on access authorization is provided in the 'User roles and associated access authorization' and 'Operating concept' sections of the Operations Instructions for the device.

*"Temporarily locked" option (priority 2)*

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.

---

**Access status tooling**

**Navigation**

Expert → Access stat.tool

**Description**

Displays the access authorization to the parameters via the operating tool.

**User interface**

- Operator
- Maintenance

**Factory setting**

Maintenance

**Additional information**

**Description**

Access authorization can be modified via the **Enter access code** parameter (→ 10).

If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 9).

**Display**

Information on access authorization is provided in the 'User roles and associated access authorization' and 'Operating concept' sections of the Operations Instructions for the device.

---

**Enter access code**

**Navigation**

Expert → Ent. access code

**Description**

Use this function to enter the user-specific release code to remove parameter write protection.
3.1 "System" submenu

**Navigation**

Expert → System

- System
  - Diagnostic handling
  - Administration

3.1.1 "Diagnostic handling" submenu

**Navigation**

Expert → System → Diagn. handling

- Diagnostic handling
  - Alarm delay
  - Diagnostic behavior

### Alarm delay

**Description**

Use this function to enter the time interval until the device generates a diagnostic message.

> The diagnostic message is reset without a time delay.

**User entry**

0 to 60 s

**Factory setting**

0 s

**Additional information**

This setting affects the following diagnostic messages:

- 832 Electronic temperature too high
- 833 Electronic temperature too low
- 834 Process temperature too high
- 835 Process temperature too low
- 862 Partly filled pipe
“Diagnostic behavior” submenu

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 (→ 12).

The following options are available in the **Assign behavior of diagnostic no. xxx** parameters:

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>The device stops measurement. The measured value output via Modbus RS485 and 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 Modbus RS485 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 entered only in the Event logbook submenu (→ 73).</td>
</tr>
<tr>
<td>Off</td>
<td>The diagnostic event is ignored, and no diagnostic message is generated or entered.</td>
</tr>
</tbody>
</table>

For a list of all the diagnostic events, see the Operating Instructions for the device.

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior

---

**Assign behavior of diagnostic no. 531 (Empty pipe detection)**

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531

**Description**

Use this function to change the diagnostic behavior of the diagnostic message **531 Empty pipe detection**.
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available, see →  12

Assign behavior of diagnostic no. 832 (Electronic temperature too high)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832

Description
Use this function to change the diagnostic behavior of the diagnostic message 832 Electronic temperature too high.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available, see →  12

Assign behavior of diagnostic no. 833 (Electronic temperature too low)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833

Description
Use this function to change the diagnostic behavior of the diagnostic message 833 Electronic temperature too low.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available, see →  12
Assign behavior of diagnostic no. 834 (Process temperature too high)

**Navigation**
- Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834

**Description**
Use this function to change the diagnostic behavior of the diagnostic message **834 Process temperature too high**.

**Selection**
- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**
Warning

**Additional information**
For a detailed description of the options available, see → 12

---

Assign behavior of diagnostic no. 835 (Process temperature too low)

**Navigation**
- Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835

**Description**
Use this function to change the diagnostic behavior of the diagnostic message **835 Process temperature too low**.

**Selection**
- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**
Warning

**Additional information**
For a detailed description of the options available, see → 12

---

Assign behavior of diagnostic no. 862 (Empty pipe)

**Navigation**
- Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 862

**Description**
Use this function to change the diagnostic behavior of the diagnostic message **862 Empty pipe**.

**Selection**
- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**
Warning

**Additional information**
For a detailed description of the options available, see → 12
Assign behavior of diagnostic no. 937 (EMC interference)

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937

**Description**

Use this function to change the diagnostic behavior of the diagnostic message 937 EMC interference.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

For a detailed description of the options available, see → 12

Assign behavior of diagnostic no. 302 (Device verification active)

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302

**Description**

Use this function to change the diagnostic behavior of the diagnostic message 302 Device verification active.

**Selection**

- Alarm
- Warning

**Factory setting**

Warning

**Additional information**

For a detailed description of the options available, see → 12

3.1.2 "Administration" submenu

**Navigation**

Expert → System → Administration

- Administration

  Device reset → 16

  Activate SW option → 16

  Software option overview → 17
Device reset

Navigation

Expert → System → Administration → Device reset

Description

Use this function to choose whether to reset the device configuration - either entirely or in part - to a defined state.

Selection

- Cancel
- To fieldbus defaults *
- To delivery settings
- Restart device

Factory setting

Cancel

Additional information

"Cancel" option

No action is executed and the user exits the parameter.

"To fieldbus defaults" option

Every parameter is reset to fieldbus default values.

"To delivery settings" option

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.

This option is not visible if no customer-specific settings have been ordered.

"Restart device" option

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.

Activate SW option

Navigation

Expert → System → Administration → Activate SW opt.

Description

Use this function to enter an activation code to enable an additional, ordered software option.

User entry

Max. 10-digit string consisting of numbers.

Factory setting

0

* Visibility depends on communication
Additional information

Endress+Hauser provides the corresponding activation code for the software option with the order.

**NOTICE!** This activation code varies depending on the measuring device and the software option. If an incorrect or invalid code is entered, this can result in the loss of software options that are already been activated. After commissioning the measuring device: in this parameter only enter activation codes which Endress+Hauser has provided (e.g. when a new software option was ordered). If an incorrect or invalid activation code is entered, enter the activation code from the parameter protocol again and contact your Endress+Hauser sales organization, quoting the serial number of your device.

*Example for a software option*

Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

---

**Software option overview**

**Navigation**

- [ ] Expert → System → Administration → SW option overv.

**Description**

Displays all the software options that are enabled in the device.

**User interface**

- Electrode cleaning circuit
- Heartbeat Verification
- Heartbeat Monitoring

**Additional information**

*Description*

Displays all the options that are available if ordered by the customer.

*Electrode cleaning circuit* option

Order code for "Application package", option EC "ECC electrode cleaning"

*Heartbeat Verification* option and *Heartbeat Monitoring* option

Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

---

**Permanent storage**

**Navigation**

- [ ] Expert → System → Administration → Perm. storage

**Description**

Use this function to switch permanent storage on and off.

**Selection**

- Off
- On

**Factory setting**

On

**Additional information**

*Description*

**NOTE!**
If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device. The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

### Device tag

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → Device tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the name for the measuring point.</td>
</tr>
<tr>
<td>User entry</td>
<td>Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Promag</td>
</tr>
</tbody>
</table>

### 3.2 "Sensor" submenu

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td></td>
</tr>
<tr>
<td>Measured values</td>
<td>→ 19</td>
</tr>
<tr>
<td>System units</td>
<td>→ 23</td>
</tr>
<tr>
<td>Process parameters</td>
<td>→ 33</td>
</tr>
<tr>
<td>External compensation</td>
<td>→ 45</td>
</tr>
<tr>
<td>Sensor adjustment</td>
<td>→ 48</td>
</tr>
<tr>
<td>Calibration</td>
<td>→ 53</td>
</tr>
</tbody>
</table>
3.2.1 "Measured values" submenu


<table>
<thead>
<tr>
<th>Submenu</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured values</td>
<td>19</td>
</tr>
<tr>
<td>Process variables</td>
<td>19</td>
</tr>
<tr>
<td>Totalizer</td>
<td>21</td>
</tr>
</tbody>
</table>

"Process variables" submenu


<table>
<thead>
<tr>
<th>Submenu</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process variables</td>
<td>19</td>
</tr>
<tr>
<td>Volume flow</td>
<td>19</td>
</tr>
<tr>
<td>Mass flow</td>
<td>19</td>
</tr>
<tr>
<td>Conductivity</td>
<td>20</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>20</td>
</tr>
<tr>
<td>Temperature</td>
<td>20</td>
</tr>
<tr>
<td>Corrected conductivity</td>
<td>21</td>
</tr>
</tbody>
</table>

**Volume flow**


**Description**: Displays the volume flow currently measured.

**User interface**: Signed floating-point number

**Additional information**

*Dependency*

- The unit is taken from the Volume flow unit parameter (→ 24)

**Mass flow**


**Description**: Displays the mass flow currently calculated.
### User interface
- **Signed floating-point number**

### Additional information
- **Dependency**

  - The unit is taken from the **Mass flow unit** parameter (→ 27)

### Conductivity

#### Navigation

#### Prerequisite
- In the **Conductivity measurement** parameter (→ 37), the **On** option is selected.

#### Description
- Displays the conductivity currently measured.

#### User interface
- **Signed floating-point number**

#### Additional information
- **Dependency**

  - The unit is taken from the **Conductivity unit** parameter (→ 25)

### Corrected volume flow

#### Navigation

#### Description
- Displays the corrected volume flow currently measured.

#### User interface
- **Signed floating-point number**

#### Additional information
- **Dependency**

  - The unit is taken from the **Corrected volume flow unit** parameter (→ 29)

### Temperature

#### Navigation

#### Prerequisite
- For the following order code: "Sensor Option", option CI "Fluid temperature probe"

#### Description
- Displays the temperature currently calculated.

#### User interface
- **Positive floating-point number**

#### Additional information
- **Dependency**

  - The unit is taken from the **Temperature unit** parameter (→ 26)
Corrected conductivity

**Navigation**


**Prerequisite**

One of the following conditions is satisfied:
- Order code for "Sensor Option", option CI "Fluid temperature probe"
- The temperature is read into the flowmeter from an external device.

**Description**

Displays the conductivity currently corrected.

**User interface**

Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Conductivity unit** parameter (→ 25)

"Totalizer" submenu

**Navigation**

Expert → Sensor → Measured val. → Totalizer

**Totalizer value 1 to 3**

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 61) of the **Totalizer 1 to 3** submenu:
- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Displays the current totalizer reading.

**User interface**

Signed floating-point number
As it is only possible to display a maximum of 7 digits in the operating tool, the current counter value is the sum of the totalizer value and the overflow value from the **Totalizer overflow 1 to 3** parameter if the display range is exceeded.

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 65).

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→ 63).

The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign process variable** parameter (→ 61):

- **Volume flow** option: **Volume flow unit** parameter (→ 24)
- **Mass flow** option: **Mass flow unit** parameter (→ 27)
- **Corrected volume flow** option: **Corrected volume unit** parameter (→ 63)

**Example**

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:

- Value in the **Totalizer value 1** parameter: 1968457 m³
- Value in the **Totalizer overflow 1** parameter: 1 ⋅ 10⁷ (1 overflow) = 10,000,000 [m³]
- Current totalizer reading: 11,968,457 m³

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to 3

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 61) of the **Totalizer 1 to 3** submenu:

- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Displays the current totalizer overflow.

**User interface**

Integer with sign

**Additional information**

If the current totalizer reading has more than 7 digits, which is the maximum value range of the operating tool that can be displayed, the value above this range is output as an
overflow. The current totalizer value is therefore the sum of the overflow value and the
totalizer value from the **Totalizer value 1 to 3** parameter

**Display**

The unit of the selected process variable is specified for the totalizer depending on the
selection made in the **Assign process variable** parameter (→ 61):

- **Volume flow** option: **Volume flow unit** parameter (→ 24)
- **Mass flow** option: **Mass flow unit** parameter (→ 27)
- **Corrected volume flow** option: **Corrected volume unit** parameter (→ 63)

**Example**

Calculation of the current totalizer reading when the value exceeds the 7-digit display
range of the operating tool:

- Value in the **Totalizer value 1** parameter: 1968457 m³
- Value in the **Totalizer overflow 1** parameter: 2 ⋅ 10⁷ (2 overflows) = 20000000 [m³]
- Current totalizer reading: 21968457 m³

### 3.2.2 "System units" submenu

**Navigation**

- Expert → Sensor → System units

<table>
<thead>
<tr>
<th><strong>System units</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow unit</td>
</tr>
<tr>
<td>→ 24</td>
</tr>
<tr>
<td>Volume unit</td>
</tr>
<tr>
<td>→ 25</td>
</tr>
<tr>
<td>Conductivity unit</td>
</tr>
<tr>
<td>→ 25</td>
</tr>
<tr>
<td>Temperature unit</td>
</tr>
<tr>
<td>→ 26</td>
</tr>
<tr>
<td>Mass flow unit</td>
</tr>
<tr>
<td>→ 27</td>
</tr>
<tr>
<td>Mass unit</td>
</tr>
<tr>
<td>→ 27</td>
</tr>
<tr>
<td>Density unit</td>
</tr>
<tr>
<td>→ 28</td>
</tr>
<tr>
<td>Corrected volume flow unit</td>
</tr>
<tr>
<td>→ 29</td>
</tr>
<tr>
<td>Corrected volume unit</td>
</tr>
<tr>
<td>→ 30</td>
</tr>
<tr>
<td>Date/time format</td>
</tr>
<tr>
<td>→ 30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>User-specific units</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>→ 31</td>
</tr>
</tbody>
</table>
Volume flow unit

Navigation

Use this function to select the unit for the volume flow.

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm³/s</td>
<td>af/s</td>
<td>gal/s (imp)</td>
</tr>
<tr>
<td>cm³/min</td>
<td>af/min</td>
<td>gal/min (imp)</td>
</tr>
<tr>
<td>cm³/h</td>
<td>af/h</td>
<td>gal/h (imp)</td>
</tr>
<tr>
<td>cm³/d</td>
<td>af/d</td>
<td>gal/d (imp)</td>
</tr>
<tr>
<td>dm³/s</td>
<td>ft³/s</td>
<td>Mgal/s (imp)</td>
</tr>
<tr>
<td>dm³/min</td>
<td>ft³/min</td>
<td>Mgal/min (imp)</td>
</tr>
<tr>
<td>dm³/h</td>
<td>ft³/h</td>
<td>Mgal/h (imp)</td>
</tr>
<tr>
<td>dm³/d</td>
<td>ft³/d</td>
<td>Mgal/d (imp)</td>
</tr>
<tr>
<td>m³/s</td>
<td>fl oz/s (us)</td>
<td>bbl/s (imp;beer)</td>
</tr>
<tr>
<td>m³/min</td>
<td>fl oz/min (us)</td>
<td>bbl/min (imp;beer)</td>
</tr>
<tr>
<td>m³/h</td>
<td>fl oz/h (us)</td>
<td>bbl/h (imp;beer)</td>
</tr>
<tr>
<td>m³/d</td>
<td>fl oz/d (us)</td>
<td>bbl/d (imp;beer)</td>
</tr>
<tr>
<td>ml/s</td>
<td>gal/s (us)</td>
<td>bbl/s (imp;oil)</td>
</tr>
<tr>
<td>ml/min</td>
<td>gal/min (us)</td>
<td>bbl/min (imp;oil)</td>
</tr>
<tr>
<td>ml/h</td>
<td>gal/h (us)</td>
<td>bbl/h (imp;oil)</td>
</tr>
<tr>
<td>ml/d</td>
<td>gal/d (us)</td>
<td>bbl/d (imp;oil)</td>
</tr>
<tr>
<td>l/s</td>
<td>kgal/s (us)</td>
<td>bbl/s (us;liq.)</td>
</tr>
<tr>
<td>l/min</td>
<td>kgal/min (us)</td>
<td>bbl/min (us;liq.)</td>
</tr>
<tr>
<td>l/h</td>
<td>kgal/h (us)</td>
<td>bbl/h (us;liq.)</td>
</tr>
<tr>
<td>l/d</td>
<td>kgal/d (us)</td>
<td>bbl/d (us;liq.)</td>
</tr>
<tr>
<td>hl/s</td>
<td>Mgal/s (us)</td>
<td>bbl/s (us;beer)</td>
</tr>
<tr>
<td>hl/min</td>
<td>Mgal/min (us)</td>
<td>bbl/min (us;beer)</td>
</tr>
<tr>
<td>hl/h</td>
<td>Mgal/h (us)</td>
<td>bbl/h (us;beer)</td>
</tr>
<tr>
<td>hl/d</td>
<td>Mgal/d (us)</td>
<td>bbl/d (us;beer)</td>
</tr>
<tr>
<td>Ml/s</td>
<td>bbl/s (us;oil)</td>
<td>bbl/s (us;oil)</td>
</tr>
<tr>
<td>Ml/min</td>
<td>bbl/min (us;oil)</td>
<td>bbl/min (us;oil)</td>
</tr>
<tr>
<td>Ml/h</td>
<td>bbl/h (us;oil)</td>
<td>bbl/h (us;oil)</td>
</tr>
<tr>
<td>Ml/d</td>
<td>bbl/d (us;oil)</td>
<td>bbl/d (us;oil)</td>
</tr>
</tbody>
</table>

Custom-specific units

- User vol./s
- User vol./min
- User vol./h
- User vol./d

Factory setting

Country-specific:
- l/h
- gal/min (us)
Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 19)

Selection

For an explanation of the abbreviated units: → 84

Customer-specific units

The unit for the customer-specific volume is specified in the User volume text parameter (→ 31).

Volume unit

Navigation

Expert → Sensor → System units → Volume unit

Description

Use this function to select the unit for the volume.

Selection

SI units
- cm³
- dm³
- m³
- ml
- l
- hl
- Ml Mega

US units
- af
- ft³
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;liq.)
- bbl (us;beer)
- bbl (us;tank)

Imperial units
- gal (imp)
- Mgal (imp)
- bbl (imp;beer)
- bbl (imp;oil)

Custom-specific units

User vol.

Factory setting

Country-specific:
- m³
- gal (us)

Additional information

Selection

For an explanation of the abbreviated units: → 84

Customer-specific units

The unit for the customer-specific volume is specified in the User volume text parameter (→ 31).

Conductivity unit

Navigation

Expert → Sensor → System units → Conductiv. unit

Prerequisite

In the Conductivity measurement parameter (→ 37), the On option is selected.
### Description
Use this function to select the unit for the conductivity.

### Selection
**SI units**
- nS/cm
- µS/cm
- µS/m
- µS/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

### Factory setting
µS/cm

### Additional information
**Result**
The selected unit applies for:
- **Conductivity** parameter (→ 20)
- **Corrected conductivity** parameter (→ 21)

**Selection**

For an explanation of the abbreviated units: → 84

### Temperature unit

#### Navigation
Expert → Sensor → System units → Temperature unit

#### Description
Use this function to select the unit for the temperature.

#### Selection
**SI units**
- °C
- K

**US units**
- °F
- °R

### Factory setting
Country-specific:
- °C
- °F

### Additional information
**Result**
The selected unit applies for:
- **Temperature** parameter (→ 20)
- **Maximum value** parameter (→ 78)
- **Minimum value** parameter (→ 78)
- **External temperature** parameter (→ 46)
- **Maximum value** parameter (→ 79)
- **Minimum value** parameter (→ 78)

**Selection**

For an explanation of the abbreviated units: → 84
Mass flow unit

Navigation

Expert → Sensor → System units → Mass flow unit

Description

Use this function to select the unit for the mass flow.

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>g/s</td>
<td>oz/s</td>
</tr>
<tr>
<td>g/min</td>
<td>oz/min</td>
</tr>
<tr>
<td>g/h</td>
<td>oz/h</td>
</tr>
<tr>
<td>g/d</td>
<td>oz/d</td>
</tr>
<tr>
<td>kg/s</td>
<td>lb/s</td>
</tr>
<tr>
<td>kg/min</td>
<td>lb/min</td>
</tr>
<tr>
<td>kg/h</td>
<td>lb/h</td>
</tr>
<tr>
<td>kg/d</td>
<td>lb/d</td>
</tr>
<tr>
<td>t/s</td>
<td>STon/s</td>
</tr>
<tr>
<td>t/min</td>
<td>STon/min</td>
</tr>
<tr>
<td>t/h</td>
<td>STon/h</td>
</tr>
<tr>
<td>t/d</td>
<td>STon/d</td>
</tr>
</tbody>
</table>

Custom-specific units

- User mass/s
- User mass/min
- User mass/h
- User mass/d

Factory setting

Country-specific:

- kg/h
- lb/min

Additional information

Result

The selected unit applies for:

Mass flow parameter (→ 19)

Selection

For an explanation of the abbreviated units: → 84

Customer-specific units

The unit for the customer-specific mass is specified in the User mass text parameter (→ 32).

Mass unit

Navigation

Expert → Sensor → System units → Mass unit

Description

Use this function to select the unit for the mass.
### Description of device parameters

**Selection**

**SI units**
- g
- kg
- t

**US units**
- oz
- lb
- STon

**Custom-specific units**

**User mass**

**Factory setting**

Country-specific:
- kg
- lb

**Additional information**

For an explanation of the abbreviated units: → 84

**Customer-specific units**

The unit for the customer-specific mass is specified in the User mass text parameter (→ 32).

---

### Density unit

**Navigation**

Expert → Sensor → System units → Density unit

**Description**

Use this function to select the unit for the density.

**Selection**

**SI units**
- g/cm³
- g/m³
- kg/dm³
- kg/l
- kg/m³
- SD4°C
- SD15°C
- SD20°C
- SG4°C
- SG15°C
- SG20°C

**US units**
- lb/ft³
- lb/gal (us)
- lb/bbl (us;liq.)
- lb/bbl (us;beer)
- lb/bbl (us;oil)
- lb/bbl (us;tank)

**Imperial units**
- lb/gal (imp)
- lb/bbl (imp;beer)
- lb/bbl (imp;oil)

**Factory setting**

Country-specific:
- kg/l
- lb/ft³
Additional information

Result

The selected unit applies for:
- **External density** parameter (→ 47)
- **Fixed density** parameter (→ 47)

Selection

- **SD** = specific density
  The specific density is the ratio of the density of the fluid to the density of water at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).
- **SG** = specific gravity
  The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of +4 °C (+39 °F), +15 °C (+59 °F), +20 °C (+68 °F).

For an explanation of the abbreviated units: → 84

Corrected volume flow unit

Navigation

Expert → Sensor → System units → Cor.volflow unit

Description

Use this function to select the unit for the corrected volume flow.

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nl/s</td>
<td>Sft³/s</td>
</tr>
<tr>
<td>Nl/min</td>
<td>Sft³/min</td>
</tr>
<tr>
<td>Nl/h</td>
<td>Sft³/h</td>
</tr>
<tr>
<td>Nl/d</td>
<td>Sft³/d</td>
</tr>
<tr>
<td>Nm³/s</td>
<td>Sgal/s (us)</td>
</tr>
<tr>
<td>Nm³/min</td>
<td>Sgal/min (us)</td>
</tr>
<tr>
<td>Nm³/h</td>
<td>Sgal/h (us)</td>
</tr>
<tr>
<td>Nm³/d</td>
<td>Sgal/d (us)</td>
</tr>
<tr>
<td>Sm³/s</td>
<td>Sbbl/s (us;liq.)</td>
</tr>
<tr>
<td>Sm³/min</td>
<td>Sbbl/min (us;liq.)</td>
</tr>
<tr>
<td>Sm³/h</td>
<td>Sbbl/h (us;liq.)</td>
</tr>
<tr>
<td>Sm³/d</td>
<td>Sbbl/d (us;liq.)</td>
</tr>
<tr>
<td></td>
<td>Sgal/s (imp)</td>
</tr>
<tr>
<td></td>
<td>Sgal/min (imp)</td>
</tr>
<tr>
<td></td>
<td>Sgal/h (imp)</td>
</tr>
<tr>
<td></td>
<td>Sgal/d (imp)</td>
</tr>
</tbody>
</table>

Custom-specific units

- UserCrVol./s
- UserCrVol./min
- UserCrVol./h
- UserCrVol./d

Factory setting

Country-specific:
- Nl/h
- Sft³/h
Additional information

Result
The selected unit applies for:
Corrected volume flow parameter (→ 20)

Selection

For an explanation of the abbreviated units: → 84

Customer-specific units

The unit for the customer-specific corrected volume is defined in the User corrected volume text parameter (→ 33).

Corrected volume unit

Navigation

Expert → Sensor → System units → Corr. vol. unit

Description
Use this function to select the unit for the corrected volume.

Selection

Selection

SI units

• Nl
• Nm³
• Sm³

US units

• Sft³
• Sgal (us)

Imperial units

Sgal (imp)

Custom-specific units

UserCrVol.

Factory setting

Country-specific:

• Nm³
• Sft³

Additional information

Selection

For an explanation of the abbreviated units: → 84

Customer-specific units

The unit for the customer-specific corrected volume is defined in the User corrected volume text parameter (→ 33).

Date/time format

Navigation

Expert → Sensor → System units → Date/time format

Description
Use this function to select the desired time format for calibration history.

Selection

• dd.mm.yy hh:mm
• dd.mm.yy hh:mm am/pm
• mm/dd/yy hh:mm
• mm/dd/yy hh:mm am/pm

Factory setting

dd.mm.yy hh:mm
Additional information

For an explanation of the abbreviated units: → 84

"User-specific units" submenu

Navigation
Expert → Sensor → System units → User-spec. units

<table>
<thead>
<tr>
<th>User-specific units</th>
</tr>
</thead>
<tbody>
<tr>
<td>User volume text →  31</td>
</tr>
<tr>
<td>User volume factor →  32</td>
</tr>
<tr>
<td>User mass text →  32</td>
</tr>
<tr>
<td>User mass factor →  32</td>
</tr>
<tr>
<td>User corrected volume text →  33</td>
</tr>
<tr>
<td>User corrected volume factor →  33</td>
</tr>
</tbody>
</table>

User volume text

Navigation
Expert → Sensor → System units → User-spec. units → Volume text

Description
Use this function to enter a text for the user-specific unit of volume and volume flow. The corresponding time units (s, min, h, d) for volume flow are generated automatically.

User entry
Max. 10 characters such as letters, numbers or special characters (@, %, /)

Factory setting
User vol.

Additional information
The defined unit is shown as an option in the choose list of the following parameters:
- Volume flow unit parameter (→ 24)
- Volume unit parameter (→ 25)

Example
If the text GLAS is entered, the choose list of the Volume flow unit parameter (→ 24) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d
User volume factor

Navigation
Expert → Sensor → System units → User-spec. units → Volume factor

Description
Use this function to enter a quantity factor (without time) for the user-specific volume and volume flow unit.

User entry
Signed floating-point number

Factory setting
1.0

User mass text

Navigation
Expert → Sensor → System units → User-spec. units → Mass text

Description
Use this function to enter a text for the user-specific unit of mass and mass flow. The corresponding time units (s, min, h, d) for mass flow are generated automatically.

User entry
Max. 10 characters such as letters, numbers or special characters (@, %, /)

Factory setting
User mass

Additional information
Result
The defined unit is shown as an option in the choose list of the following parameters:
- Mass flow unit parameter (→ 27)
- Mass unit parameter (→ 27)

Example
If the text GLAS is entered, the following options are displayed in the picklist for the Mass flow unit parameter (→ 27):
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

User mass factor

Navigation
Expert → Sensor → System units → User-spec. units → Mass factor

Description
Use this function to enter a quantity factor (without time) for the user-specific mass and mass flow unit.

User entry
Signed floating-point number

Factory setting
1.0
**User corrected volume text**

**Navigation**
- Expert → Sensor → System units → User-spec. units → Corr. vol. text

**Description**
Use this function to enter a text for the user-specific unit of the corrected volume and corrected volume flow. The corresponding time units (s, min, h, d) for mass flow are generated automatically.

**User entry**
Max. 10 characters such as letters, numbers or special characters (@, %, /)

**Factory setting**
UserCrVol.

**Additional information**

**Result**
The defined unit is shown as an option in the choose list of the following parameters:
- Corrected volume flow unit parameter (→ 29)
- Corrected volume unit parameter (→ 30)

**Example**
If the text GLAS is entered, the choose list of the Corrected volume flow unit parameter (→ 29) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

---

**User corrected volume factor**

**Navigation**
- Expert → Sensor → System units → User-spec. units → Corr. vol. factor

**Description**
Use this function to enter a quantity factor (without time) for the user-specific corrected volume unit and corrected volume flow unit.

**User entry**
Signed floating-point number

**Factory setting**
1.0

---

### 3.2.3 "Process parameters" submenu

**Navigation**

- Filter options → 34
- Flow damping → 36
Filter options

Navigation
Expert → Sensor → Process param. → Filter options

Description
Use this function to select a filter option.

Selection
- Standard CIP off
- Standard CIP on
- Dynamic CIP off
- Dynamic CIP on
- Binomial filter

Factory setting
Standard CIP off

Additional information
Description
The user can choose from a range of filter combinations which can optimize the measurement result depending on the application. Each change in the filter setting affects
the output signal of the measuring device. The response time of the output signal increases as the filter depth increases.

**Selection**

- **Standard**
  - Strong flow damping with a short output signal response time.
  - Some time is needed before a stable output signal can be generated.
  - Not suitable for pulsating flow as the average flow can be different here.

- **Dynamic**
  - Average flow damping with a delayed output signal response time.
  - The average flow is displayed correctly over a measuring interval determined over a long period.

- **Binominal**
  - Weak flow damping with a short output signal response time.
  - The average flow is displayed correctly over a measuring interval determined over a long period.

- **CIP**
  - This filter is also available for the **Standard** and **Dynamic** filter options.
  - If the CIP filter has detected a change in the medium (abrupt increase in the noise level, e.g. quickly changing medium conductivity values during CIP cleaning), flow damping is greatly increased and the raw value (before flow damping) is limited by the mean value (delimiter). This eliminates extremely high measured errors (up to several 100 m/s).
  - If the CIP filter is enabled, the response time of the entire measuring system increases and the output signal is delayed accordingly.

**Examples**

*Possible applications for the filters*

<table>
<thead>
<tr>
<th>Application</th>
<th>Standard</th>
<th>Standard CIP</th>
<th>Dynamic</th>
<th>Dynamic CIP</th>
<th>Binominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulsating flow (flow is negative intermittently)</td>
<td>--</td>
<td>--</td>
<td>++</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>Flow changes frequently (flow is dynamic)</td>
<td>--</td>
<td>--</td>
<td>++</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>Clear signal, quick control loop (&lt; 1 s)</td>
<td>--</td>
<td>--</td>
<td>+(^1)</td>
<td>--</td>
<td>++</td>
</tr>
<tr>
<td>Poor signal, slow control loop (response time of a few seconds)</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Permanently bad signal</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Short and severe signal distortion after a while</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Promag 50/53 replacement: Promag 100 system damping = 0.5 * Promag 50/53</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Promag 10 replacement: Promag 100 system damping = Promag 10 + 2</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>For a stable flow signal (no other requirements)</td>
<td>+++</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

\(^1\) Flow damping value < 6
Flow damping

**Navigation**

**Description**
Use this function to enter flow damping. Reduction of the variability of the flow measured value (in relation to interference). For this purpose, the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.

**User entry**
0 to 15

**Factory setting**
7

**Additional information**
- **User entry**
  - Value = 0: no damping
  - Value > 0: damping is increased
  - 0 is a weak damping and 15 a strong one.
  - A damping of 0 is not recommended, as the measuring signal is then so noisy that it is almost impossible to carry out a measurement.
  - The damping depends on the measuring period and the filter type selected.
  - An increase or decrease in the damping depends on the application.

**Effect**
The damping affects the following variables of the device:
- Outputs
- Low flow cut off → Flow override
- Totalizers

Flow override

**Navigation**

**Description**
Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning processes of a pipeline, for example.

**Selection**
- Off
- On

**Factory setting**
Off

**Additional information**
- **Result**
  - This setting affects all the functions and outputs of the measuring device.

**Description**
- **Flow override is active**
  - The diagnostic message diagnostic message C453 Flow override is displayed.
  - Output values
    - Output: Value at zero flow
    - Temperature: proceeding output
    - Totalizers 1-3: Stop being totalized
Conductivity damping

Navigation


Prerequisite
In the Conductivity measurement parameter (→ 37), the On option is selected.

Description
Use this function to enter the time constant for conductivity damping.

User entry
0 to 999.9 s

Factory setting
0 s

Temperature damping

Navigation


Prerequisite
For the following order code:
"Sensor Option", option CI 'Fluid temperature probe'

Description
Use this function to enter the time constant for temperature damping.

User entry
0 to 999.9 s

Factory setting
0 s

Conductivity measurement

Navigation


Description
Use this function to enable and disable conductivity measurement.

Selection
- Off
- On

Factory setting
Off

Additional information

- Description
  For conductivity measurement to work, the medium must have a minimum conductivity of 5 μS/cm.
"Low flow cut off" submenu

**Navigation**  
Expert → Sensor → Process param. → Low flow cut off

<table>
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<tr>
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<th>Page</th>
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</thead>
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<td>38</td>
</tr>
<tr>
<td>On value low flow cutoff</td>
<td>38</td>
</tr>
<tr>
<td>Off value low flow cutoff</td>
<td>39</td>
</tr>
<tr>
<td>Pressure shock suppression</td>
<td>39</td>
</tr>
</tbody>
</table>

**Assign process variable**

**Navigation**  
Expert → Sensor → Process param. → Low flow cut off → Assign variable

**Description**  
Use this function to select the process variable for low flow cutoff detection.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**  
Volume flow

**On value low flow cutoff**

**Navigation**  
Expert → Sensor → Process param. → Low flow cut off → On value

**Prerequisite**

One of the following options is selected in the Assign process variable parameter (→ 38):

- Volume flow
- Mass flow
- Corrected volume flow

**Description**  
Use this function to enter a switch-on value for low flow cut off. Low flow cut off is activated if the value entered is not equal to 0 → 39.

**User entry**  
Signed floating-point number

**Factory setting**  
Depends on country and nominal diameter → 82

**Additional information**  
*Dependency*

The unit depends on the process variable selected in the Assign process variable parameter (→ 38).
Off value low flow cutoff

Navigation
Expert → Sensor → Process param. → Low flow cut off → Off value

Prerequisite
One of the following options is selected in the Assign process variable parameter (→ 38):  
- Volume flow
- Mass flow
- Corrected volume flow

Description
Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value → 38.

User entry
0 to 100.0 %

Factory setting
50 %

Additional information
Example

Pressure shock suppression

Navigation

Prerequisite
One of the following options is selected in the Assign process variable parameter (→ 38):  
- Volume flow
- Mass flow
- Corrected volume flow

Description
Use this function to enter the time interval for signal suppression (= active pressure shock suppression).

User entry
0 to 100 s

Factory setting
0 s
Additional information

Description

Pressure shock suppression is enabled
- Prerequisite:
  Flow rate < on-value of low flow cut off
- Output values
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value

Pressure shock suppression is disabled
- Prerequisite: the time interval set in this function has elapsed.
- If the flow also exceeds the switch-off value for low flow cut off, the device starts
  processing the current flow value again and displays it.

Example

When closing a valve, momentarily strong fluid movements may occur in the pipeline,
which are registered by the measuring system. These totalized flow values lead to a false
totalizer status, particularly during batching processes.

<table>
<thead>
<tr>
<th>Q</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>Time</td>
</tr>
<tr>
<td>A</td>
<td>Drip</td>
</tr>
<tr>
<td>B</td>
<td>Pressure shock</td>
</tr>
<tr>
<td>C</td>
<td>Pressure shock suppression active as specified by the time entered</td>
</tr>
<tr>
<td>D</td>
<td>Pressure shock suppression inactive</td>
</tr>
<tr>
<td>1</td>
<td>Valve closes</td>
</tr>
<tr>
<td>2</td>
<td>Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated</td>
</tr>
<tr>
<td>3</td>
<td>The time entered has elapsed: pressure shock suppression is deactivated</td>
</tr>
<tr>
<td>4</td>
<td>The actual flow value is now displayed and output</td>
</tr>
<tr>
<td>5</td>
<td>On value for low flow cut off</td>
</tr>
<tr>
<td>6</td>
<td>Off value for low flow cut off</td>
</tr>
</tbody>
</table>
"Empty pipe detection" submenu

**Navigation**

| Empty pipe detection
---|---
| Empty pipe detection
| Switch point empty pipe detection
| Response time empty pipe detection
| New adjustment
| Progress
| Empty pipe adjust value
| Full pipe adjust value
| Measured value EPD

**Empty pipe detection**

**Navigation**

**Description**
Use this function to switch empty pipe detection on and off.

**Selection**
- Off
- On

**Factory setting**
Off

**Switch point empty pipe detection**

**Navigation**
Expert → Sensor → Process param. → Empty pipe det. → Switch point EPD

**Prerequisite**
The On option is selected in the Empty pipe detection parameter (→ 41).

**Description**
Use this function to enter the percentage threshold value of the resistance in relation to the adjustment values.

**User entry**
0 to 100 %

**Factory setting**
10 %
Response time empty pipe detection

**Navigation**

**Prerequisite**
In the **Empty pipe detection** parameter (→ 41), the **On** option is selected.

**Description**
Enter the minimum length of time (debouncing time) the signal must be present for the diagnostic message **S862 Empty pipe** to be triggered if the measuring pipe is empty or partially full.

**User entry**
0 to 100 s

**Factory setting**
1 s

New adjustment

**Navigation**

**Prerequisite**
The **On** option is selected in the **Empty pipe detection** parameter (→ 41).

**Description**
For selecting whether to perform an empty pipe or full pipe adjustment.

**Selection**
- Cancel
- Empty pipe adjust
- Full pipe adjust

**Factory setting**
Cancel

Progress

**Navigation**

**Prerequisite**
The **On** option is selected in the **Empty pipe detection** parameter (→ 41).

**Description**
Use this function to view the progress.

**User interface**
- Ok
- Busy
- Not ok
**Empty pipe adjust value**

**Navigation**

**Prerequisite**
- In the Empty pipe detection parameter (→ 41), the On option is selected.
- Adjustment value > full pipe value.

**Description**
Displays the adjustment value when the measuring pipe is empty.

**User interface**
Positive floating-point number

---

**Full pipe adjust value**

**Navigation**

**Prerequisite**
- In the Empty pipe detection parameter (→ 41), the On option is selected.
- Adjustment value < empty pipe value.

**Description**
Displays the adjustment value when the measuring pipe is full.

**User interface**
Positive floating-point number

---

**Measured value EPD**

**Navigation**

**Prerequisite**
In the Empty pipe detection parameter (→ 41), the On option is selected.

**Description**
Displays the current measured value.

**User interface**
Positive floating-point number

---

"Electrode cleaning circuit" submenu

**Navigation**
- Expert → Sensor → Process param. → ECC

---

**Electrode cleaning circuit**

- Electrode cleaning circuit

- ECC duration

- ECC recovery time
Electrode cleaning circuit

Navigation
- Expert → Sensor → Process param. → ECC → ECC

Prerequisite
For the following order code:
"Application package", option EC "ECC electrode cleaning"

Description
Use this function to enable and disable cyclic electrode cleaning.

Selection
- Off
- On

Factory setting
Off

ECC duration

Navigation
- Expert → Sensor → Process param. → ECC → ECC duration

Prerequisite
For the following order code:
"Application package", option EC "ECC electrode cleaning"

Description
Use this function to enter the duration of electrode cleaning in seconds.

User entry
0.01 to 30 s

Factory setting
2 s

ECC recovery time

Navigation
- Expert → Sensor → Process param. → ECC → ECC recov. time

Prerequisite
For the following order code:
"Application package", option EC "ECC electrode cleaning"

Description
Use this function to enter the recovery time after electrode cleaning to prevent signal output interference. The current output values are frozen in the meanwhile.

User entry
1 to 600 s

Factory setting
60 s
### ECC cleaning cycle

**Navigation**

- Expert → Sensor → Process param. → ECC → ECC clean. cycle

**Prerequisite**

For the following order code:
"Application package", option EC "ECC electrode cleaning"

**Description**

Use this function to enter the pause duration until the next electrode cleaning.

**User entry**

0.5 to 168 h

**Factory setting**

0.5 h

### ECC Polarity

**Navigation**

- Expert → Sensor → Process param. → ECC → ECC Polarity

**Prerequisite**

For the following order code:
"Application package", option EC "ECC electrode cleaning"

**Description**

Displays the polarity of the electrode cleaning circuit.

**User interface**

- Positive
- Negative

**Factory setting**

Depends on the electrode material:
- Platinum: **Negative** option
- Tantalum, Alloy C22, stainless steel: **Positive** option

### 3.2.4 "External compensation" submenu

**Navigation**


![External compensation](#)

- Temperature source
- External temperature
- Density source
- External density
Description of device parameters

Proline Promag 100 Modbus RS485

| Fixed density | → 47 |
| Reference density | → 47 |

**Temperature source**

**Navigation**

Expert → Sensor → External comp. → Temp. source

**Description**

Use this function to select the temperature source.

**Selection**

- Internal temperature sensor
- External value

**Factory setting**

External value

**External temperature**

**Navigation**


**Prerequisite**

The External value option is selected in the Temperature source parameter (→ 46).

**Description**

Use this function to enter the temperature read in by the external device.

**User entry**

Floating point number with sign

**Factory setting**

–273.15 °C

**Additional information**

Dependency

The unit is taken from the Temperature unit parameter (→ 26)

**Density source**

**Navigation**

Expert → Sensor → External comp. → Density source

**Description**

Use this function to select the density source.

**Selection**

- Fixed density
- External density

**Factory setting**

Fixed density
External density

**Navigation**
Expert → Sensor → External comp. → External density

**Prerequisite**
In the **Density source** parameter (→ 46), the **External density** option is selected.

**Description**
Use this function to enter the density read in from the external device.

**User entry**
Positive floating-point number

**Factory setting**
0 kg/l

**Additional information**
*Dependency*

The unit is taken from the **Density unit** parameter (→ 28)

Fixed density

**Navigation**
Expert → Sensor → External comp. → Fixed density

**Description**
Use this function to enter a fixed value for the density.

**User entry**
Positive floating-point number

**Factory setting**
Country-specific:
- 1 000 kg/l
- 1 000 lb/ft³

**Additional information**
*Dependency*

The unit is taken from the **Density unit** parameter (→ 28)

Reference density

**Navigation**
Expert → Sensor → External comp. → Ref.density

**Description**
Use this function to enter a fixed value for the reference density.

**User entry**
Positive floating-point number

**Factory setting**
Country-specific:
- 1 kg/l
- 1 lb/ft³

**Additional information**
*Dependency*

The unit is taken from the **Density unit** parameter (→ 28)
3.2.5 "Sensor adjustment" submenu

**Installation direction**

**Navigation**

**Description**
Use this function to change the sign of the medium flow direction.

**Selection**
- Flow in arrow direction
- Flow against arrow direction

**Factory setting**
Flow in arrow direction

**Additional information**

*Description*

Before changing the sign: ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor nameplate.

**Integration time**

**Navigation**
- Expert → Sensor → Sensor adjustm. → Integration time

**Description**
Display the duration of an integration cycle.

**User interface**
1 to 65 ms

**Measuring period**

**Navigation**
- Expert → Sensor → Sensor adjustm. → Measuring period

**Description**
Display the time of a full measuring period.
Proline Promag 100 Modbus RS485

Description of device parameters

User interface

50 to 1000 ms

"Process variable adjustment" submenu

Navigation

Expert → Sensor → Sensor adjustm. → Variable adjust

<table>
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<th>Process variable adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow offset</td>
</tr>
<tr>
<td>Volume flow factor</td>
</tr>
<tr>
<td>Mass flow offset</td>
</tr>
<tr>
<td>Mass flow factor</td>
</tr>
<tr>
<td>Conductivity offset</td>
</tr>
<tr>
<td>Conductivity factor</td>
</tr>
<tr>
<td>Corrected volume flow offset</td>
</tr>
<tr>
<td>Corrected volume flow factor</td>
</tr>
<tr>
<td>Temperature offset</td>
</tr>
<tr>
<td>Temperature factor</td>
</tr>
</tbody>
</table>

Volume flow offset

Navigation


Description

Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m³/s.

User entry

Signed floating-point number

Factory setting

0 m³/s

Additional information

Description

Corrected value = (factor × value) + offset
### Volume flow factor

**Navigation**

**Description**
Use this function to enter a quantity factor (without time) for the volume flow. This multiplication factor is applied over the volume flow range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
- *Description*
  
  Corrected value = (factor × value) + offset

### Mass flow offset

**Navigation**

**Description**
Use this function to enter the zero point shift for the mass flow trim. The mass flow unit on which the shift is based is kg/s.

**User entry**
Signed floating-point number

**Factory setting**
0 kg/s

**Additional information**
- *Description*
  
  Corrected value = (factor × value) + offset

### Mass flow factor

**Navigation**

**Description**
Use this function to enter a quantity factor (without time) for the mass flow. This multiplication factor is applied over the mass flow range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
- *Description*
  
  Corrected value = (factor × value) + offset
**Conductivity offset**

**Navigation**
- Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset

**Prerequisite**
In the **Conductivity measurement** parameter (→ 37), the **On** option is selected.

**Description**
Use this function to enter the zero point shift for the conductivity trim. The conductivity unit on which the shift is based is S/m

**User entry**
Signed floating-point number

**Factory setting**
0 S/m

**Additional information**
- **Description**
  Corrected value = (factor × value) + offset

**Conductivity factor**

**Navigation**
- Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor

**Prerequisite**
In the **Conductivity measurement** parameter (→ 37), the **On** option is selected.

**Description**
Use this function to enter a quantity factor for the conductivity. This multiplication factor is applied over the conductivity range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
- **Description**
  Corrected value = (factor × value) + offset

**Corrected volume flow offset**

**Navigation**

**Description**
Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm³/s.

**User entry**
Signed floating-point number

**Factory setting**
0 Nm³/s

**Additional information**
- **Description**
  Corrected value = (factor × value) + offset
Corrected volume flow factor

**Navigation**

**Description**
Use this function to enter a quantity factor (without time) for the corrected volume flow. This multiplication factor is applied over the corrected volume flow range.

**User entry**
Positive floating-point number

**Factory setting**
1

**Additional information**
Description
- Corrected value = (factor × value) + offset

Temperature offset

**Navigation**

**Prerequisite**
For the following order code:
"Sensor Option", option CI "Fluid temperature probe"

**Description**
Use this function to enter the zero point shift for the temperature trim. The temperature unit on which the shift is based is 1 K.

**User entry**
Signed floating-point number

**Factory setting**
0 K

**Additional information**
Description
- Corrected value = (factor × value) + offset

Temperature factor

**Navigation**

**Prerequisite**
For the following order code:
"Sensor Option", option CI "Fluid temperature probe"

**Description**
Use this function to enter a quantity factor (without time) for the temperature. This multiplication factor is applied over the temperature range.

**User entry**
Positive floating-point number

**Factory setting**
1
### Additional information

**Description**

Corrected value = (factor × value) + offset

---

### 3.2.6 "Calibration" submenu

**Navigation**

Expert → Sensor → Calibration

**Nominal diameter**

**Navigation**

Expert → Sensor → Calibration → Nominal diameter

**Description**

Displays the nominal diameter of the sensor.

**User interface**

DNxx / x'

**Factory setting**

Depends on the size of the sensor

**Additional information**

**Description**

The value is also specified on the sensor nameplate.

### Calibration factor

**Navigation**

Expert → Sensor → Calibration → Cal. factor

**Description**

Displays the current calibration factor for the sensor.

**User interface**

Positive floating-point number

**Factory setting**

Depends on nominal diameter and calibration.
### Zero point

**Navigation**
- Expert → Sensor → Calibration → Zero point

**Description**
This function shows the zero point correction value for the sensor.

**User interface**
Signed floating-point number

**Factory setting**
Depends on nominal diameter and calibration

### Conductivity calibration factor

**Navigation**
- Expert → Sensor → Calibration → Cond. cal. fact.

**Prerequisite**
In the Conductivity measurement parameter (→ 37), the On option is selected.

**Description**
Displays the calibration factor for the conductivity measurement.

**User interface**
0 to 10000

### 3.3 "Communication" submenu

**Navigation**
- Expert → Communication

#### 3.3.1 "Modbus configuration" submenu

**Navigation**
- Expert → Communication → Modbus config.

- **Bus address**
- **Baudrate**
- **Data transfer mode**
## Description of device parameters

<table>
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<th>Parameter</th>
<th>Description</th>
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<tr>
<td>Byte order</td>
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<td>→  58</td>
</tr>
</tbody>
</table>

### Bus address

**Navigation**
- Expert → Communication → Modbus config. → Bus address

**Description**
For entering the device address.

**User entry**
1 to 247

**Factory setting**
247

### Baudrate

**Navigation**
- Expert → Communication → Modbus config. → Baudrate

**Description**
Use this function to select a transmission rate.

**Selection**
- 1200 BAUD
- 2400 BAUD
- 4800 BAUD
- 9600 BAUD
- 19200 BAUD
- 38400 BAUD
- 57600 BAUD
- 115200 BAUD

**Factory setting**
19200 BAUD

### Data transfer mode

**Navigation**
- Expert → Communication → Modbus config. → Data trans. mode

**Description**
Use this function to select the data transmission mode.
Description of device parameters

Proline Promag 100 Modbus RS485

Selection

- ASCII
- RTU

Factory setting

RTU

Additional information

Options

- ASCII
  Transmission of data in the form of readable ASCII characters. Error protection via LRC.
- RTU
  Transmission of data in binary form. Error protection via CRC16.

Parity

Navigation

Expert → Communication → Modbus config. → Parity

Description

Use this function to select the parity bit.

Selection

- Odd
- Even
- None / 1 stop bit
- None / 2 stop bits

Factory setting

Even

Additional information

Options

Picklist ASCII option:
- 0 = Even option
- 1 = Odd option

Picklist RTU option:
- 0 = Even option
- 1 = Odd option
- 2 = None / 1 stop bit option
- 3 = None / 2 stop bits option

Byte order

Navigation

Expert → Communication → Modbus config. → Byte order

Description

Use this function to select the sequence in which the bytes are transmitted. The transmission sequence must be coordinated with the Modbus master.

Selection

- 0-1-2-3
- 3-2-1-0
- 1-0-3-2
- 2-3-0-1

Factory setting

1-0-3-2
### Telegram delay

**Navigation**  
Expert → Communication → Modbus config. → Telegram delay

**Description**  
Use this function to enter a delay time after which the measuring device replies to the request telegram of the Modbus master. This allows communication to be adapted to slow Modbus RS485 masters.

**User entry**  
0 to 100 ms

**Factory setting**  
6 ms

### Assign diagnostic behavior

**Navigation**  
Expert → Communication → Modbus config. → Assign diag. beh

**Description**  
Use this function to select the diagnostic behavior for Modbus communication.

**Selection**
- Off
- Alarm or warning
- Warning
- Alarm

**Factory setting**  
Alarm

**Additional information**  
*Description*
Defines the category of messages to which data transmission responds:
- Off  
The device continues to measure. The diagnostic event is ignored, and no diagnostic message is generated.
- Alarm or warning  
The device continues to measure. A diagnostic message is generated. In the event of an alarm, the signal outputs assume the specified alarm condition.
- Warning  
The device continues to measure. A diagnostic message is generated.
- Alarm  
The device continues to measure. The signal outputs assume the specified alarm condition. A diagnostic message is generated.

### Failure mode

**Navigation**  
Expert → Communication → Modbus config. → Failure mode

**Description**  
Use this function to select the measured value output in the event of a diagnostic message via Modbus communication.

**Selection**
- NaN value
- Last valid value
**Factory setting**  NaN value

**Additional information**  
*Options*
- NaN value
  The device outputs the NaN value 1).
- Last valid value
  The device outputs the last valid measured value before the fault occurred.

This effect of this parameter depends on the option selected in the Assign diagnostic behavior parameter (→ 57).

---

**Interpreter mode**

**Navigation**  
Expert → Communication → Modbus config. → Interpreter mode

**Description**  
Use this function to select the interpreter mode. This mode defines the behavior of the telegram reception interpreter.

**Selection**  
- Standard
- Ignore surplus bytes

**Factory setting**  
Standard

**Additional information**  
*Standard* option
Behaves according to the Modbus standard, i.e. the last two bytes received are the checksum CRC16.

**NOTE!**  
The selection is only relevant in the RTU mode. In the ASCII mode, the device always behaves according to the Modbus standard.

*Ignore surplus bytes* option
If supported by the function code, the two bytes for the checksum CRC16 are determined from the anticipated telegram length. Surplus bytes at the end of the actual telegram are ignored. This is not the standard Modbus behavior.

---

### 3.3.2 "Modbus information" submenu

**Navigation**  
Expert → Communication → Modbus info

---

1)  Not a Number
Device ID

**Navigation**
- Expert → Communication → Modbus info → Device ID

**Description**
Displays the device ID for identifying the measuring device.

**User interface**
4-digit hexadecimal number

Device revision

**Navigation**
- Expert → Communication → Modbus info → Device revision

**Description**
Displays the device revision.

**User interface**
4-digit hexadecimal number

### 3.3.3 "Modbus data map" submenu

**Navigation**
- Expert → Communication → Modbus data map

---

Scan list register 0 to 15

**Navigation**
- Expert → Communication → Modbus data map → Scan list reg.0 to 15

**Description**
Use this function to enter the scan list register. By entering the register address (1-based), up to 16 device parameters can be grouped in the auto-scan buffer by assigning them to the scan list registers 0 to 15. The data of the device parameters assigned here are read out via the register addresses 5051 to 5081.

**User entry**
1 to 65535

**Factory setting**
1
Additional information  

**Description**

- **Scan list: Configuration area**
  The device parameters to be grouped are defined in a list in that their Modbus RS485 register addresses are entered in the list.
- **Data area**
  The measuring device reads out the register addresses entered in the scan list cyclically and writes the associated device data (values) to the data area.

### 3.4 "Application" submenu

**Navigation**  
Expert → Application

<table>
<thead>
<tr>
<th>Application</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset all totalizers</td>
<td>→ 60</td>
</tr>
<tr>
<td>Totalizer 1 to 3</td>
<td>→ 61</td>
</tr>
</tbody>
</table>

**Reset all totalizers**

**Navigation**  
Expert → Application → Reset all tot.

**Description**
Use this function to reset all totalizers to the value 0 and restart the totaling process. This deletes all the flow values previously totalized.

**Selection**
- Cancel
- Reset + totalize

**Factory setting**
Cancel

**Additional information**  

**Selection**
- Cancel
  No action is executed and the user exits the parameter.
- Reset + totalize
  All totalizers are reset to 0 and the totaling process is restarted.
## 3.4.1 "Totalizer 1 to 3" submenu

**Navigation**
Expert → Application → Totalizer 1 to 3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td>61</td>
</tr>
<tr>
<td>Mass unit</td>
<td>62</td>
</tr>
<tr>
<td>Volume unit</td>
<td>62</td>
</tr>
<tr>
<td>Corrected volume unit</td>
<td>63</td>
</tr>
<tr>
<td>Totalizer operation mode</td>
<td>63</td>
</tr>
<tr>
<td>Control Totalizer 1 to 3</td>
<td>64</td>
</tr>
<tr>
<td>Preset value 1 to 3</td>
<td>65</td>
</tr>
<tr>
<td>Failure mode</td>
<td>65</td>
</tr>
</tbody>
</table>

### Assign process variable

**Navigation**
Expert → Application → Totalizer 1 to 3 → Assign variable

**Description**
Use this function to select a process variable for the Totalizer 1 to 3.

**Selection**
- Off
- Volume flow
- Mass flow
- Corrected volume flow

**Factory setting**
Mass flow

**Additional information**

*Description*
If the option selected is changed, the device resets the totalizer to 0.

*Selection*
If the **Off** option is selected, only **Assign process variable** parameter (→ 61) is still displayed in the **Totalizer 1 to 3** submenu. All other parameters in the submenu are hidden.
Mass unit

**Navigation**

- Expert → Application → Totalizer 1 to 3 → Mass unit

**Prerequisite**

The Mass flow option is selected in the Assign process variable parameter (→ 61) of the Totalizer 1 to 3 submenu.

**Description**

Use this function to select the unit for the mass.

**Selection**

- **SI units**
  - g
  - kg
  - t

- **US units**
  - oz
  - lb

**Custom-specific units**

User mass

**Factory setting**

Country-specific:

- kg
- lb

**Additional information**

Selection

For an explanation of the abbreviated units: → 84

Volume unit

**Navigation**

- Expert → Application → Totalizer 1 to 3 → Volume unit

**Prerequisite**

The Volume flow option is selected in the Assign process variable parameter (→ 61) of the Totalizer 1 to 3 submenu.

**Description**

Use this function to select the unit for the volume.

**Selection**

- **SI units**
  - cm³
  - dm³
  - m³
  - l
  - hl
  - Ml Mega

- **US units**
  - af
  - ft³
  - fl oz (us)
  - gal (us)
  - kgal (us)
  - Mgal (us)
  - bbl (us;oil)
  - bbl (us;liq.)
  - bbl (us;beer)
  - bbl (us;tank)

- **Imperial units**
  - gal (imp)
  - Mgal (imp)
  - bbl (imp;beer)
  - bbl (imp;oil)

**Custom-specific units**

User vol.

**Factory setting**

Country-specific:

- m³
- gal (us)
Proline Promag 100 Modbus RS485

**Additional information**

*Selection*

For an explanation of the abbreviated units: → 84

---

**Corrected volume unit**

**Navigation**

Expert → Application → Totalizer 1 to 3 → Corr. vol. unit

**Prerequisite**

The **Corrected volume flow** option is selected in the **Assign process variable** parameter (→ 61) of the **Totalizer 1 to 3** submenu.

**Description**

Use this function to select the unit for the corrected volume.

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nl</td>
<td>Sft³</td>
<td>Sgal (imp)</td>
</tr>
<tr>
<td>Nm³</td>
<td>Sgal (us)</td>
<td></td>
</tr>
<tr>
<td>Sm³</td>
<td>Sbbl (us;liq.)</td>
<td></td>
</tr>
</tbody>
</table>

*Custom-specific units*

UserCrVol.

**Factory setting**

Country-specific:

- Nm³
- Sft³

**Additional information**

*Selection*

For an explanation of the abbreviated units: → 84

---

**Totalizer operation mode**

**Navigation**

Expert → Application → Totalizer 1 to 3 → Operation mode

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 61)**Totalizer 1 to 3** submenu:

- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Use this function to select how the totalizer summates the flow.

**Selection**

- Net flow total
- Forward flow total
- Reverse flow total

**Factory setting**

Net flow total
Additional information

Selection

- Net flow total
  Positive and negative flow values are totalized and balanced against one another. Net
  flow is registered in the flow direction.
- Forward flow total
  Only the flow in the forward flow direction is totalized.
- Reverse flow total
  Only the flow against the forward flow direction is totalized (= reverse flow total).

Control Totalizer 1 to 3

Navigation

Expert → Application → Totalizer 1 to 3 → Control Tot. 1 to 3

Prerequisite

One of the following options is selected in the Assign process variable parameter
(→ 61) of the Totalizer 1 to 3 submenu:
- Volume flow
- Mass flow
- Corrected volume flow

Description

Use this function to select the control of totalizer value 1-3.

Selection

- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset + totalize

Factory setting

Totalize

Additional information

Selection

- Totalize
  The totalizer is started or continues totalizing with the current counter reading.
- Reset + hold
  The totaling process is stopped and the totalizer is reset to 0.
- Preset + hold
  The totaling process is stopped and the totalizer is set to its defined start value from the
  Preset value parameter (→ 65).
- Reset + totalize
  The totalizer is reset to 0 and the totaling process is restarted.
- Preset + totalize
  The totalizer is set to the defined start value from the Preset value parameter
  (→ 65) and the totaling process is restarted.
### Preset value 1 to 3

**Navigation**

Expert → Application → Totalizer 1 to 3 → Preset value 1 to 3

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 61) of the **Totalizer 1 to 3** submenu:

- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Use this function to enter a start value for the Totalizer 1 to 3.

**User entry**

Signed floating-point number

**Factory setting**

0 kg

**Additional information**

*User entry*

The unit of the selected process variable is specified for the totalizer depending on the selection made in the **Assign process variable** parameter (→ 61):

- **Volume flow** option: **Volume flow unit** parameter (→ 24)
- **Mass flow** option: **Mass flow unit** parameter (→ 27)
- **Corrected volume flow** option: **Corrected volume unit** parameter (→ 63)

**Example**

This configuration is suitable for applications such as iterative filling processes with a fixed batch quantity.

### Failure mode

**Navigation**

Expert → Application → Totalizer 1 to 3 → Failure mode

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 61) of the **Totalizer 1 to 3** submenu:

- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Use this function to select how a totalizer behaves in the event of a device alarm.

**Selection**

- Stop
- Actual value
- Last valid value

**Factory setting**

Stop
Description of device parameters  

Proline Promag 100 Modbus RS485

Additional information  

Description

This setting does not affect the failsafe mode of other totalizers and the outputs. This is specified in separate parameters.

Selection

- Stop
  Totalizing is stopped when a device alarm occurs.
- Actual value
  The totalizer continues to count based on the actual measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

3.5 "Diagnostics" submenu

Navigation  

Expert → Diagnostics

- Actual diagnostics
- Timestamp
- Previous diagnostics
- Timestamp
- Operating time from restart
- Operating time
- Diagnostic list
- Event logbook
- Device information
- Min/max values
- Heartbeat
- Simulation
Actual diagnostics

**Navigation**  
Expert → Diagnostics → Actual diagnos.

**Prerequisite**  
A diagnostic event has occurred.

**Description**  
Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

**User interface**  
Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

*Display*  
Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→ 69).

*Example*  
For the display format:  
F271 Main electronic failure

Timestamp

**Navigation**  
Expert → Diagnostics → Timestamp

**Description**  
Displays the operating time when the current diagnostic message occurred.

**User interface**  
Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

*Display*  
The diagnostic message can be viewed via the Actual diagnostics parameter (→ 67).

*Example*  
For the display format:  
24d12h13m00s

Previous diagnostics

**Navigation**  
Expert → Diagnostics → Prev.diagnostics

**Prerequisite**  
Two diagnostic events have already occurred.

**Description**  
Displays the diagnostic message that occurred before the current message.

**User interface**  
Symbol for diagnostic behavior, diagnostic code and short message.
### Additional information

*Example*

For the display format:

- **F271 Main electronic failure**

---

### Timestamp

**Navigation**

- Expert → Diagnostics → Timestamp

**Description**

Displays the operating time when the last diagnostic message before the current message occurred.

**User interface**

- Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

*Display*

The diagnostic message can be viewed via the **Previous diagnostics** parameter (→ 67).

*Example*

For the display format:

- 24d12h13m00s

---

### Operating time from restart

**Navigation**

- Expert → Diagnostics → Time fr. restart

**Description**

Use this function to display the time the device has been in operation since the last device restart.

**User interface**

- Days (d), hours (h), minutes (m) and seconds (s)

---

### Operating time

**Navigation**

- Expert → Diagnostics → Operating time

**Description**

Use this function to display the length of time the device has been in operation.

**User interface**

- Days (d), hours (h), minutes (m) and seconds (s)

**Additional information**

*User interface*

The maximum number of days is 9999, which is equivalent to 27 years.
3.5.1 "Diagnostic list" submenu

**Navigation**

Expert → Diagnostics → Diagnostic list

<table>
<thead>
<tr>
<th>Diagnostic list</th>
</tr>
</thead>
<tbody>
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<td>Diagnostics 1  →  69</td>
</tr>
<tr>
<td>Timestamp      →  69</td>
</tr>
<tr>
<td>Diagnostics 2  →  70</td>
</tr>
<tr>
<td>Timestamp      →  70</td>
</tr>
<tr>
<td>Diagnostics 3  →  70</td>
</tr>
<tr>
<td>Timestamp      →  71</td>
</tr>
<tr>
<td>Diagnostics 4  →  71</td>
</tr>
<tr>
<td>Timestamp      →  71</td>
</tr>
<tr>
<td>Diagnostics 5  →  72</td>
</tr>
<tr>
<td>Timestamp      →  72</td>
</tr>
</tbody>
</table>

**Diagnostics 1**

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 1

**Description**
Displays the current diagnostics message with the highest priority.

**User interface**
Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

For the display format:
- F271 Main electronic failure
- F276 I/O module failure

**Timestamp**

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**
Displays the operating time when the diagnostic message with the highest priority occurred.
Description of device parameters

Proline Promag 100 Modbus RS485

User interface

Days (d), hours (h), minutes (m) and seconds (s)

Additional information

Display

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 69).

Example

For the display format:
24d12h13m00s

---

Diagnostics 2

Navigation

Expert → Diagnostics → Diagnostic list → Diagnostics 2

Description

Displays the current diagnostics message with the second-highest priority.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Examples

For the display format:
- F271 Main electronic failure
- F276 I/O module failure

---

Timestamp

Navigation

Expert → Diagnostics → Diagnostic list → Timestamp

Description

Displays the operating time when the diagnostic message with the second-highest priority occurred.

User interface

Days (d), hours (h), minutes (m) and seconds (s)

Additional information

Display

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 70).

Example

For the display format:
24d12h13m00s

---

Diagnostics 3

Navigation

Expert → Diagnostics → Diagnostic list → Diagnostics 3

Description

Displays the current diagnostics message with the third-highest priority.
### User interface
Symbol for diagnostic behavior, diagnostic code and short message.

### Additional information
*Examples*
For the display format:
- F271 Main electronic failure
- F276 I/O module failure

### Timestamp

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Diagnostic list → Timestamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the operating time when the diagnostic message with the third-highest priority occurred.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
<tr>
<td>Additional information</td>
<td>Display</td>
</tr>
<tr>
<td></td>
<td>The diagnostic message can be viewed via the <strong>Diagnostics 3</strong> parameter (→  70).</td>
</tr>
</tbody>
</table>

*Example*
For the display format:
24d12h13m00s

### Diagnostics 4

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Diagnostic list → Diagnostics 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the current diagnostics message with the fourth-highest priority.</td>
</tr>
<tr>
<td>User interface</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td>Additional information</td>
<td><em>Examples</em></td>
</tr>
<tr>
<td></td>
<td>For the display format:</td>
</tr>
<tr>
<td></td>
<td>F271 Main electronic failure</td>
</tr>
<tr>
<td></td>
<td>F276 I/O module failure</td>
</tr>
</tbody>
</table>

### Timestamp

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Diagnostic list → Timestamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the operating time when the diagnostic message with the fourth-highest priority occurred.</td>
</tr>
<tr>
<td>User interface</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
</tbody>
</table>
Additional information

Display

The diagnostic message can be viewed via the Diagnostics 4 parameter (→ 71).

Example

For the display format:
24d12h13m00s

Diagnostics 5

Navigation

Expert → Diagnostics → Diagnostic list → Diagnostics 5

Description

Displays the current diagnostics message with the fifth-highest priority.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Examples

For the display format:
- F271 Main electronic failure
- F276 I/O module failure

Timestamp

Navigation

Expert → Diagnostics → Diagnostic list → Timestamp

Description

Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

User interface

Days (d), hours (h), minutes (m) and seconds (s)

Additional information

Display

The diagnostic message can be viewed via the Diagnostics 5 parameter (→ 72).

Example

For the display format:
24d12h13m00s
3.5.2 "Event logbook" submenu

**Navigation**

Expert → Diagnostics → Event logbook

**Filter options**

**Description**
Use this function to select the category whose event messages are displayed in the event list of the operating tool.

**Selection**
- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

**Factory setting**
All

**Additional information**

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

3.5.3 "Device information" submenu

**Navigation**

Expert → Diagnostics → Device info

**Device tag**

**Serial number**

**Firmware version**

**Device name**
### Device tag

**Navigation**

Expert → Diagnostics → Device info → Device tag

**Description**

Displays a unique name for the measuring point so it can be identified quickly within the plant.

**User interface**

Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).

**Factory setting**

Promag 100

### Serial number

**Navigation**

Expert → Diagnostics → Device info → Serial number

**Description**

Displays the serial number of the measuring device.

The number can be found on the nameplate of the sensor and transmitter.

**User interface**

A maximum of 11-digit character string comprising letters and numbers.

**Additional information**

**Uses of the serial number**

- To identify the measuring device quickly, e.g. when contacting Endress+Hauser.
- To obtain specific information on the measuring device using the Device Viewer: www.endress.com/deviceviewer

### Firmware version

**Navigation**

Expert → Diagnostics → Device info → Firmware version

**Description**

Displays the device firmware version installed.
### Device name

**Navigation**  
Expert → Diagnostics → Device info → Device name

**Description**  
Displays the name of the transmitter. It can also be found on the nameplate of the transmitter.

**User interface**  
Max. 32 characters such as letters or numbers.

**Factory setting**  
Promag 100

### Order code

**Navigation**  
Expert → Diagnostics → Device info → Order code

**Description**  
Displays the device order code.

**User interface**  
Character string composed of letters, numbers and certain punctuation marks (e.g. `/`).

**Additional information**  
*Description*

The order code can be found on the nameplate of the sensor and transmitter in the 'Order code' field.

The order code is generated from the extended order code through a process of reversible transformation. The extended order code indicates the attributes for all the device features in the product structure. The device features are not directly readable from the order code.

**Uses of the order code**

- To order an identical spare device.
- To identify the device quickly and easily, e.g. when contacting Endress+Hauser.

### Extended order code 1

**Navigation**  
Expert → Diagnostics → Device info → Ext. order cd. 1

**Description**  
Displays the first part of the extended order code.

On account of length restrictions, the extended order code is split into a maximum of 3 parameters.

**User interface**  
Character string
Description of device parameters

Additional information

*Description*
The extended order code indicates the version of all the features of the product structure for the measuring device and thus uniquely identifies the measuring device.

The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Extended order code 2

**Navigation**

Expert → Diagnostics → Device info → Ext. order cd. 2

**Description**
Displays the second part of the extended order code.

**User interface**
Character string

**Additional information**
For additional information, see *Extended order code 1* parameter (→ 75)

Extended order code 3

**Navigation**

Expert → Diagnostics → Device info → Ext. order cd. 3

**Description**
Displays the third part of the extended order code.

**User interface**
Character string

**Additional information**
For additional information, see *Extended order code 1* parameter (→ 75)

ENP version

**Navigation**

Expert → Diagnostics → Device info → ENP version

**Description**
Displays the version of the electronic nameplate.

**User interface**
Character string

**Factory setting**
2.02.00

**Additional information**
*Description*
This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.
### Configuration counter

**Navigation**

Expert → Diagnostics → Device info → Config. counter

**Description**

Displays the number of parameter modifications for the device. When the user changes a parameter setting, this counter is incremented.

**User interface**

0 to 65535

### 3.5.4 "Min/max values" submenu

**Navigation**

Expert → Diagnostics → Min/max val.

**Reset min/max values**

**Navigation**

Expert → Diagnostics → Min/max val. → Reset min/max

**Description**

Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.

**Selection**

Cancel

**Factory setting**

Cancel

### "Main electronic temperature" submenu

**Navigation**

Expert → Diagnostics → Min/max val. → Main elect.temp.

**Minimum value**

→ 78

**Maximum value**

→ 78
Minimum value

Navigation
Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value

Description
Displays the lowest previously measured temperature value of the main electronics module.

User interface
Signed floating-point number

Additional information
Dependency
The unit is taken from the Temperature unit parameter (→ 26)

Maximum value

Navigation
Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value

Description
Displays the highest previously measured temperature value of the main electronics module.

User interface
Signed floating-point number

Additional information
Dependency
The unit is taken from the Temperature unit parameter (→ 26)

"Temperature" submenu

Navigation
Expert → Diagnostics → Min/max val. → Temperature

Prerequisite
For the following order code:
"Sensor Option", option CI "Fluid temperature probe"
### Description
Displays the lowest previously measured medium temperature value.

### User interface
Signed floating-point number

### Additional information
**Dependency**
- The unit is taken from the *Temperature unit* parameter (→ 26)

### Maximum value

<table>
<thead>
<tr>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert → Diagnostics → Min/max val. → Temperature → Maximum value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the following order code: 'Sensor Option', option CI 'Fluid temperature probe'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the highest previously measured medium temperature value.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependency</strong></td>
</tr>
<tr>
<td>- The unit is taken from the <em>Temperature unit</em> parameter (→ 26)</td>
</tr>
</tbody>
</table>

### 3.5.5 "Heartbeat" submenu

For detailed information on the parameter descriptions of the *Heartbeat Verification* application package, see the Special Documentation for the device

<table>
<thead>
<tr>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert → Diagnostics → Heartbeat</td>
</tr>
</tbody>
</table>

#### "Heartbeat" submenu

- **Heartbeat**
  - Heartbeat base settings
  - Performing verification
  - Verification results
  - Monitoring results
3.5.6 "Simulation" submenu

Navigation  

Expert → Diagnostics → Simulation

Assign simulation process variable

Value process variable

Simulation device alarm

Assign simulation process variable

Value process variable

Simulation device alarm

Additional information

The simulation value of the process variable selected is defined in the Value process variable parameter (→ 80).

Value process variable

Prerequisite

One of the following options is selected in the Assign simulation process variable parameter (→ 80):
- Volume flow
- Mass flow
- Corrected volume flow
- Conductivity **
- Corrected conductivity **
- Temperature **

** Visibility depends on order options or device settings
Description

Use this function to enter a simulation value for the selected process variable. Subsequent measured value processing and the signal output use this simulation value. In this way, users can verify whether the measuring device has been configured correctly.

User entry

Depends on the process variable selected

Factory setting

0

Additional information

User entry

The unit of the displayed measured value is taken from the System units submenu (→ 23).

Simulation device alarm

Navigation

Expert → Diagnostics → Simulation → Sim. alarm

Description

Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting

Off
4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

<table>
<thead>
<tr>
<th>Volume flow</th>
<th>l/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>m³</td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/cm</td>
</tr>
<tr>
<td>Temperature</td>
<td>ºC</td>
</tr>
<tr>
<td>Mass flow</td>
<td>kg/h</td>
</tr>
<tr>
<td>Mass</td>
<td>kg</td>
</tr>
<tr>
<td>Density</td>
<td>kg/l</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>Nl/h</td>
</tr>
<tr>
<td>Corrected volume</td>
<td>Nm³</td>
</tr>
</tbody>
</table>

4.1.2 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ~ 0.04 m/s) [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.01</td>
</tr>
<tr>
<td>4</td>
<td>0.05</td>
</tr>
<tr>
<td>8</td>
<td>0.1</td>
</tr>
<tr>
<td>15</td>
<td>0.5</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>65</td>
<td>8</td>
</tr>
<tr>
<td>80</td>
<td>12</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>125</td>
<td>30</td>
</tr>
<tr>
<td>150</td>
<td>2.5</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
</tr>
<tr>
<td>250</td>
<td>7.5</td>
</tr>
<tr>
<td>300</td>
<td>10</td>
</tr>
<tr>
<td>350</td>
<td>15</td>
</tr>
<tr>
<td>400</td>
<td>20</td>
</tr>
<tr>
<td>450</td>
<td>25</td>
</tr>
<tr>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>40</td>
</tr>
</tbody>
</table>
4.2 US units

Only valid for USA and Canada.

4.2.1 System units

<table>
<thead>
<tr>
<th></th>
<th>unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>gal/min (us)</td>
</tr>
<tr>
<td>Volume</td>
<td>gal (us)</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F</td>
</tr>
<tr>
<td>Mass flow</td>
<td>lb/min</td>
</tr>
<tr>
<td>Mass</td>
<td>lb</td>
</tr>
<tr>
<td>Density</td>
<td>lb/ft³</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>ft³/h</td>
</tr>
<tr>
<td>Corrected volume</td>
<td>ft³</td>
</tr>
</tbody>
</table>

4.2.2 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 0.04 m/s) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>¹/₁₂</td>
<td>0.002</td>
</tr>
<tr>
<td>¹/₈</td>
<td>0.008</td>
</tr>
<tr>
<td>³/₈</td>
<td>0.025</td>
</tr>
<tr>
<td>½</td>
<td>0.15</td>
</tr>
<tr>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>1½</td>
<td>0.75</td>
</tr>
<tr>
<td>2</td>
<td>1.25</td>
</tr>
<tr>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>14</td>
<td>60</td>
</tr>
<tr>
<td>16</td>
<td>60</td>
</tr>
<tr>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>24</td>
<td>180</td>
</tr>
</tbody>
</table>
5  Explanation of abbreviated units

5.1  SI units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>g/cm³, g/m³</td>
<td>Gram/volume unit</td>
</tr>
<tr>
<td></td>
<td>kg/dm³, kg/l, kg/m³</td>
<td>Kilogram/volume unit</td>
</tr>
<tr>
<td>SD4°C, SD15°C, SD20°C</td>
<td>Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
<td></td>
</tr>
<tr>
<td>SGA4°C, SG15°C, SG20°C</td>
<td>Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
<td></td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/mm</td>
<td>Microsiemens/length unit</td>
</tr>
<tr>
<td></td>
<td>nS/cm, µS/cm, mS/cm, S/cm</td>
<td>Nano-, Micro-, Milli-, Siemens/length unit</td>
</tr>
<tr>
<td></td>
<td>µS/m, mS/m, S/m, kS/m, MS/m</td>
<td>Micro-, Milli-, Siemens, Kilo-, Megasiemens/length unit</td>
</tr>
<tr>
<td>Mass</td>
<td>g, kg, t</td>
<td>Gram, kilogram, metric ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>g/s, g/min, g/h, g/d</td>
<td>Gram/time unit</td>
</tr>
<tr>
<td></td>
<td>kg/s, kg/min, kg/h, kg/d</td>
<td>Kilogram/time unit</td>
</tr>
<tr>
<td></td>
<td>t/s, t/min, t/h, t/d</td>
<td>Metric ton/time unit</td>
</tr>
<tr>
<td>Corrected volume</td>
<td>Nl, Nm³, Sm³</td>
<td>Normal liter, normal cubic meter, standard cubic meter</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>Nl/s, Nl/min, Nl/h, Nl/d</td>
<td>Normal liter/time unit</td>
</tr>
<tr>
<td></td>
<td>Nm³/s, Nm³/min, Nm³/h, Nm³/d</td>
<td>Normal cubic meter/time unit</td>
</tr>
<tr>
<td></td>
<td>Sm³/s, Sm³/min, Sm³/h, Sm³/d</td>
<td>Standard cubic meter/time unit</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C, K</td>
<td>Celsius, Kelvin</td>
</tr>
<tr>
<td>Volume</td>
<td>cm³, dm³, m³</td>
<td>Cubic centimeter, cubic decimeter, cubic meter</td>
</tr>
<tr>
<td></td>
<td>ml, l, hl, ML Mega</td>
<td>Milliliter, liter, hectoliter, megaliter</td>
</tr>
<tr>
<td>Volume flow</td>
<td>cm³/s, cm³/min, cm³/h, cm³/d</td>
<td>Cubic centimeter/time unit</td>
</tr>
<tr>
<td></td>
<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
<td>Cubic decimeter/time unit</td>
</tr>
<tr>
<td></td>
<td>m³/s, m³/min, m³/h, m³/d</td>
<td>Cubic meter/time unit</td>
</tr>
<tr>
<td></td>
<td>ml/s, ml/min, ml/h, ml/d</td>
<td>Milliliter/time unit</td>
</tr>
<tr>
<td></td>
<td>l/s, l/min, l/h, l/d</td>
<td>Liter/time unit</td>
</tr>
<tr>
<td></td>
<td>hl/s, hl/min, hl/h, hl/d</td>
<td>Hectoliter/time unit</td>
</tr>
<tr>
<td></td>
<td>ML/s, ML/min, ML/h, ML/d</td>
<td>Megaliter/time unit</td>
</tr>
<tr>
<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
</tr>
</tbody>
</table>

5.2  US units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>lb/ft³, lb/gal (us)</td>
<td>Pound/cubic foot, pound/gallon</td>
</tr>
<tr>
<td></td>
<td>lb/bbl (us:liq.), lb/bbl (us:beer), lb/bbl (us:oil), lb/bbl (us:tank)</td>
<td>Pound/volume unit</td>
</tr>
<tr>
<td>Mass</td>
<td>oz, lb, STon</td>
<td>Ounce, pound, standard ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>oz/s, oz/min, oz/h, oz/d</td>
<td>Ounce/time unit</td>
</tr>
</tbody>
</table>
## Explanation of abbreviated units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process variable</strong></td>
<td><strong>Units</strong></td>
<td><strong>Explanation</strong></td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)</td>
<td>Pound/volume unit</td>
</tr>
<tr>
<td><strong>Corrected volume</strong></td>
<td>Sgal (imp)</td>
<td>Standard gallon</td>
</tr>
<tr>
<td><strong>Corrected volume flow</strong></td>
<td>Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)</td>
<td>Standard gallon/time unit</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>gal (imp), Mgal (imp)</td>
<td>Gallon, mega gallon</td>
</tr>
<tr>
<td><strong>Volume flow</strong></td>
<td>bbl (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)</td>
<td>Barrel/time unit (beer)</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>°F, °R</td>
<td>Fahrenheit, Rankine</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
</tr>
</tbody>
</table>

### 5.3 Imperial units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Density</strong></td>
<td>lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)</td>
<td>Pound/volume unit</td>
</tr>
<tr>
<td><strong>Corrected volume</strong></td>
<td>Sgal (imp)</td>
<td>Standard gallon</td>
</tr>
<tr>
<td><strong>Corrected volume flow</strong></td>
<td>Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)</td>
<td>Standard gallon/time unit</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>gal (imp), Mgal (imp)</td>
<td>Gallon, mega gallon</td>
</tr>
<tr>
<td><strong>Volume flow</strong></td>
<td>bbl (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)</td>
<td>Barrel/time unit (beer)</td>
</tr>
</tbody>
</table>

Normal liquids: 31.5 gal/bbl

Beer: 31.0 gal/bbl

Petrochemicals: 42.0 gal/bbl

Filling tanks: 55.0 gal/bbl

Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)

Million gallon/time unit

Barrel/time unit (filling tank)

Kilogram/time unit

Normal liquids: 31.5 gal/bbl

Beer: 31.0 gal/bbl

Petrochemicals: 42.0 gal/bbl

Filling tanks: 55.0 gal/bbl

Ante meridiem (before midday), post meridiem (after midday)
<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)</td>
<td>Gallon/time unit</td>
</tr>
<tr>
<td></td>
<td>Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)</td>
<td>Mega gallon/time unit</td>
</tr>
<tr>
<td></td>
<td>bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)</td>
<td>Barrel/time unit (beer) Beer: 36.0 gal/bbl</td>
</tr>
<tr>
<td></td>
<td>bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)</td>
<td>Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl</td>
</tr>
<tr>
<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
</tr>
<tr>
<td></td>
<td>am, pm</td>
<td>Ante meridiem (before midday), post meridiem (after midday)</td>
</tr>
</tbody>
</table>
6 Modbus RS485 Register Information

6.1 Notes

6.1.1 Structure of the register information

The individual parts of a parameter description are described in the following section:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access type</th>
<th>Selection/input</th>
<th>User entry</th>
<th>Notice</th>
</tr>
</thead>
</table>
| Name of parameter | Indicated in decimal numerical format | • Float length = 4 byte
• Integer length = 2 byte
• String length, depending on parameter | Possible type of access to parameter:
• Read access via function codes 03, 04 or 23
• Write access via function codes 06, 16 or 23 | Selection
List of the individual options for the parameter
• Option 1
• Option 2
• Option 3 (+)

(+) Factory setting highlighted in bold
(+*) Factory setting depends on country, order options or device settings
User entry
Input range for the parameter | Specified number of pages and cross-reference to standard parameter description |

**NOTICE**

If non-volatile device parameters are modified via the MODBUS RS485 function codes 06, 16 or 23, the change is saved in the EEPROM of the measuring device. The number of writes to the EEPROM is technically restricted to a maximum of 1 million.

- Make sure to comply with this limit since, if it is exceeded, data loss and measuring device failure will result.
- Avoid constantly writing non-volatile device parameters via the MODBUS RS485.

6.1.2 Address model

The Modbus RS485 register addresses of the measuring device are implemented in accordance with the "Modbus Applications Protocol Specification V1.1".

In addition, systems are used that work with the register address model "Modicon Modbus Protocol Reference Guide (PI-MBUS-300 Rev. J)".

Depending on the function code used, a number is added at the start of the register address with this specification:
- "3" → 'Read' access
- "4" → 'Write' access
### Function code

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>03 04 23</td>
<td>Read</td>
<td>XXXX Example: mass flow = 2007</td>
<td>3XXXX Example: mass flow = 32007</td>
</tr>
<tr>
<td>06 16 23</td>
<td>Write</td>
<td>XXXX Example: reset totalizer = 6401</td>
<td>4XXXX Example: reset totalizer = 46401</td>
</tr>
</tbody>
</table>

### 6.2 Overview of the Expert operating menu

The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.

```
<table>
<thead>
<tr>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking status</td>
</tr>
<tr>
<td>Access status tooling</td>
</tr>
<tr>
<td>Enter access code</td>
</tr>
<tr>
<td>➤ System</td>
</tr>
<tr>
<td>➤ Diagnostic handling</td>
</tr>
<tr>
<td>Alarm delay</td>
</tr>
<tr>
<td>➤ Diagnostic behavior</td>
</tr>
<tr>
<td>➤ Administration</td>
</tr>
<tr>
<td>Device reset</td>
</tr>
<tr>
<td>Activate SW option</td>
</tr>
<tr>
<td>Software option overview</td>
</tr>
<tr>
<td>Permanent storage</td>
</tr>
<tr>
<td>Device tag</td>
</tr>
<tr>
<td>➤ Sensor</td>
</tr>
<tr>
<td>➤ Measured values</td>
</tr>
<tr>
<td>➤ Process variables</td>
</tr>
<tr>
<td>➤ Totalizer</td>
</tr>
</tbody>
</table>
```
Proline Promag 100 Modbus RS485

Modbus RS485 Register Information

- **System units** (→ § 96)
  - Volume flow unit (→ § 97)
  - Volume unit (→ § 98)
  - Conductivity unit (→ § 98)
  - Temperature unit (→ § 98)
  - Mass flow unit (→ § 99)
  - Mass unit (→ § 99)
  - Density unit (→ § 99)
  - Corrected volume flow unit (→ § 100)
  - Corrected volume unit (→ § 100)
  - Date/time format (→ § 100)

- **User-specific units** (→ § 100)

- **Process parameters** (→ § 101)
  - Filter options (→ § 101)
  - Flow damping (→ § 101)
  - Flow override (→ § 101)
  - Conductivity damping (→ § 101)
  - Temperature damping (→ § 101)
  - Conductivity measurement (→ § 101)
  - Low flow cut off (→ § 101)
  - Empty pipe detection (→ § 101)
  - Electrode cleaning circuit (→ § 102)

- **External compensation** (→ § 102)
  - Temperature source (→ § 102)
  - External temperature (→ § 102)
<table>
<thead>
<tr>
<th>Modbus RS485 Register Information</th>
<th>Proline Promag 100 Modbus RS485</th>
</tr>
</thead>
</table>

| Density source                  | → § 102                          |
| External density                | → § 102                          |
| Fixed density                   | → § 102                          |
| Reference density               | → § 102                          |

**Sensor adjustment**

| Installation direction          | → § 102                          |
| Integration time                | → § 102                          |
| Measuring period                | → § 102                          |

**Process variable adjustment**

**Calibration**

| Nominal diameter                | → § 103                          |
| Calibration factor              | → § 103                          |
| Zero point                      | → § 103                          |
| Conductivity calibration factor | → § 103                          |

**Communication**

**Modbus configuration**

| Bus address                     | → § 103                          |
| Baudrate                         | → § 103                          |
| Data transfer mode              | → § 103                          |
| Parity                          | → § 103                          |
| Byte order                      | → § 103                          |
| Telegram delay                  | → § 103                          |
| Assign diagnostic behavior      | → § 103                          |
| Failure mode                    | → § 103                          |
| Interpreter mode                | → § 103                          |
Modbus RS485 Register Information

**Modbus information**
- Device ID
- Device revision

**Modbus data map**
- Scan list register 0 to 15

**Application**
- Reset all totalizers

**Totalizer 1 to 3**
- Assign process variable
- Mass unit
- Volume unit
- Corrected volume unit
- Totalizer operation mode
- Control Totalizer 1 to 3
- Preset value 1 to 3
- Failure mode

**Diagnostics**
- Actual diagnostics
- Timestamp
- Previous diagnostics
- Operating time from restart
- Operating time

**Diagnostic list**
- Diagnostics 1
### Modbus RS485 Register Information

#### Proline Promag 100 Modbus RS485

<table>
<thead>
<tr>
<th>Timestamp</th>
<th>→  106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 2</td>
<td>→  106</td>
</tr>
<tr>
<td>Timestamp</td>
<td>→  106</td>
</tr>
<tr>
<td>Diagnostics 3</td>
<td>→  106</td>
</tr>
<tr>
<td>Timestamp</td>
<td>→  106</td>
</tr>
<tr>
<td>Diagnostics 4</td>
<td>→  106</td>
</tr>
<tr>
<td>Timestamp</td>
<td>→  106</td>
</tr>
<tr>
<td>Diagnostics 5</td>
<td>→  106</td>
</tr>
<tr>
<td>Timestamp</td>
<td>→  106</td>
</tr>
</tbody>
</table>

**Event logbook**  →  106

- Filter options  →  106

**Device information**  →  106

- Device tag  →  106
- Serial number  →  106
- Firmware version  →  107
- Device name  →  107
- Order code  →  107
- Extended order code 1  →  107
- Extended order code 2  →  107
- Extended order code 3  →  107
- ENP version  →  107
- Configuration counter  →  107

**Min/max values**  →  107

- Reset min/max values  →  107
6.3 Register information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking status</td>
<td>4918</td>
<td>Integer</td>
<td>Read</td>
<td>256 = Hardware locked 512 = Temporarily locked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Access status tooling</td>
<td>2178</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Operator 1 = Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Enter access code</td>
<td>2177</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 to 9999</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>10</td>
</tr>
</tbody>
</table>

6.3.1 "System" submenu

"Diagnostic handling" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm delay</td>
<td>6808</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 60 s</td>
</tr>
<tr>
<td></td>
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</table>

"Diagnostic behavior" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign behavior of diagnostic no. 531</td>
<td>2397</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 832</td>
<td>2759</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 833</td>
<td>2762</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 834</td>
<td>2761</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>
### Modbus RS485 Register Information

#### Proline Promag 100 Modbus RS485

**Navigation: Expert → System → Diagnostic handling → Diagnostic behavior**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign behavior of diagnostic no. 835</td>
<td>2760</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 862</td>
<td>2097</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 937</td>
<td>2396</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = Logbook entry only 2 = Warning 3 = Alarm</td>
</tr>
<tr>
<td>Assign behavior of diagnostic no. 302</td>
<td>2312</td>
<td>Integer</td>
<td>Read / Write</td>
<td>2 = Warning 3 = Alarm</td>
</tr>
</tbody>
</table>

#### "Administration" submenu

**Navigation: Expert → System → Administration**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device reset</td>
<td>6817</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Cancel 1 = Restart device 2 = To delivery settings 14 = To fieldbus defaults *</td>
</tr>
<tr>
<td>Activate SW option</td>
<td>2795</td>
<td>Integer</td>
<td>Read / Write</td>
<td>Max. 10-digit string consisting of numbers.</td>
</tr>
<tr>
<td>Software option overview</td>
<td>2902</td>
<td>Integer</td>
<td>Read</td>
<td>32 = Electrode cleaning circuit 16384 = Heartbeat Monitoring 32768 = Heartbeat Verification</td>
</tr>
<tr>
<td>Permanent storage</td>
<td>6907</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off 1 = On</td>
</tr>
<tr>
<td>Device tag</td>
<td>4901</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).</td>
</tr>
</tbody>
</table>

* Visibility depends on communication

#### 6.3.2 "Sensor" submenu

**"Measured values" submenu**

**"Process variables" submenu**

**Navigation: Expert → Sensor → Measured values → Process variables**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>2007</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Mass flow</td>
<td>2009</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Conductivity</td>
<td>2013</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>2011</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Temperature</td>
<td>2015</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Corrected conductivity</td>
<td>2017</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
</tbody>
</table>
**"Totalizer" submenu**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th>→</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalizer value 1 to 3</td>
<td>1: 2610</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>2: 2810</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: 3010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totalizer overflow 1 to 3</td>
<td>1: 2612</td>
<td>Float</td>
<td>Read</td>
<td>Integer with sign</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>2: 2812</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: 3012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
"System units" submenu
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Volume flow unit       | 2103     | Integer   | Read / Write | 0 = cm³/s  
1 = cm³/min  
2 = cm³/h  
3 = cm³/d  
4 = dm³/s  
5 = dm³/min  
6 = dm³/h  
7 = dm³/d  
8 = m³/s  
9 = m³/min  
10 = m³/h  
11 = m³/d  
12 = ml/s  
13 = ml/min  
14 = ml/h  
15 = ml/d  
16 = l/s  
17 = l/min  
18 = l/h  
19 = l/d  
20 = hl/s  
21 = hl/min  
22 = hl/h  
23 = hl/d  
24 = Ml/s  
25 = Ml/min  
26 = Ml/h  
27 = Ml/d  
32 = af/s  
33 = af/min  
34 = af/h  
35 = af/d  
36 = ft³/s  
37 = ft³/min  
38 = ft³/h  
39 = ft³/d  
40 = fl oz/s (us)  
41 = fl oz/min (us)  
42 = fl oz/h (us)  
43 = fl oz/d (us)  
44 = gal/s (us)  
45 = gal/min (us)  
46 = gal/h (us)  
47 = gal/d (us)  
48 = Mgal/s (us)  
49 = Mgal/min (us)  
50 = Mgal/h (us)  
51 = Mgal/d (us)  
52 = bbl/s (us;liq.)  
53 = bbl/min (us;liq.)  
54 = bbl/h (us;liq.)  
55 = bbl/d (us;liq.)  
56 = bbl/s (us;beer)  
57 = bbl/min (us;beer)  
58 = bbl/h (us;beer)  
59 = bbl/d (us;beer)  
60 = bbl/s (us;oil)  
61 = bbl/min (us;oil)  
62 = bbl/h (us;oil)  
63 = bbl/d (us;oil)  
64 = bbl/s (us;tank)  
65 = bbl/min (us;tank)  
66 = bbl/h (us;tank)  
67 = bbl/d (us;tank)  
68 = gal/s (imp)  
69 = gal/min (imp)  
70 = gal/h (imp) |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
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<tbody>
<tr>
<td></td>
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<td></td>
<td>→</td>
</tr>
<tr>
<td><strong>Volume unit</strong></td>
<td>2104</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = cm$^3$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = dm$^3$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = m$^3$ (*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = l</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = hl</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = m Mega</td>
</tr>
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<td></td>
<td></td>
<td>8 = af</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>9 = ft$^3$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 = fl oz (us)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11 = qal (us)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12 = Mqal (us)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13 = bbl (us;liq.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14 = bbl (us;beer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 = bbl (us;oil)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16 = bbl (us;tank)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17 = qal (imp)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18 = Mqal (imp)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19 = bbl (imp;beer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 = bbl (imp;oil)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21 = User vol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22 = kqal (us)</td>
</tr>
<tr>
<td><strong>Conductivity unit</strong></td>
<td>2121</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = MS/m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = kS/m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = S/m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = S/cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = mS/m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = mS/cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 = µS/m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 = µS/cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = µS/mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 = nS/cm</td>
</tr>
<tr>
<td><strong>Temperature unit</strong></td>
<td>2109</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = °C (*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = K</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = °F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = °R</td>
</tr>
</tbody>
</table>
### Navigation: Expert → Sensor → System units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Mass flow unit     | 2101     | Integer   | Read / Write | 0 = g/s  
1 = g/min  
2 = g/h  
3 = g/d  
4 = kg/s  
5 = kg/min  
6 = kg/h  
7 = kg/d  
8 = t/s  
9 = t/min  
10 = t/h  
11 = t/d  
12 = oz/s  
13 = oz/min  
14 = oz/h  
15 = oz/d  
16 = lb/s  
17 = lb/min  
18 = lb/h  
19 = lb/d  
20 = STon/s  
21 = STon/min  
22 = STon/h  
23 = STon/d  
24 = User mass/s  
25 = User mass/min  
26 = User mass/h  
27 = User mass/d |
| Mass unit          | 2102     | Integer   | Read / Write | 0 = g  
1 = kg  
2 = t  
3 = oz  
4 = lb  
5 = STon  
6 = User mass |
| Density unit       | 2107     | Integer   | Read / Write | 0 = g/cm³  
2 = kg/dm³  
3 = kg/l  
4 = kg/m³  
5 = SD4°C  
6 = SD15°C  
7 = SD20°C  
8 = SG4°C  
9 = SG15°C  
10 = SG20°C  
11 = lb/ft³  
12 = lb/gal (us)  
13 = lb/bbl (us;liq.)  
14 = lb/bbl (us;beer)  
15 = lb/bbl (us;oil)  
16 = lb/bbl (us;tank)  
17 = lb/gal (imp)  
18 = lb/bbl (imp;beer)  
19 = lb/bbl (imp;oil)  
21 = g/m³ |
Modbus RS485 Register Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
</table>
| Corrected volume flow unit       | 2105     | Integer   | Read / Write | 0 = Nl/s  
1 = Nl/min  
2 = Nl/h (*)  
3 = Nl/d  
4 = Nm³/s  
5 = Nm³/min  
6 = Nm³/h  
7 = Nm³/d  
8 = Sm³/s  
9 = Sm³/min  
10 = Sm³/h  
11 = Sm³/d  
12 = Sft³/s  
13 = Sft³/min  
14 = Sft³/h  
15 = Sft³/d  
16 = Sgal/s (us)  
17 = Sgal/min (us)  
18 = Sgal/h (us)  
19 = Sgal/d (us)  
20 = Sbbl/s (us;liq.)  
21 = Sbbl/min (us;liq.)  
22 = Sbbl/h (us;liq.)  
23 = Sbbl/d (us;liq.)  
24 = Sgal/s (imp)  
25 = Sgal/min (imp)  
26 = Sgal/h (imp)  
27 = Sgal/d (imp)  
28 = UserCrVol/s  
29 = UserCrVol./min  
30 = UserCrVol./h  
31 = UserCrVol./d |
| Corrected volume unit            | 2106     | Integer   | Read / Write | 0 = Nl  
1 = Nm³ (*)  
2 = Sm³  
3 = Sft³  
5 = Sgal (us)  
6 = Sbbl (us;liq.)  
7 = Sgal (imp)  
8 = UserCrVol. |
| Date/time format                 | 2150     | Integer   | Read / Write | 0 = dd.mm.yy hh:mm  
1 = mm/dd/yy hh:mm:am/pm  
2 = dd.mm.yy hh:mm am/pm  
3 = mm/dd/yy hh:mm |

"User-specific units" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>User volume text</td>
<td>2542</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 10 characters such as letters, numbers or special characters [@, %, /]</td>
</tr>
<tr>
<td>User volume factor</td>
<td>2119</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>User mass text</td>
<td>2531</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 10 characters such as letters, numbers or special characters [@, %, /]</td>
</tr>
<tr>
<td>User mass factor</td>
<td>2115</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>User corrected volume text</td>
<td>2568</td>
<td>String</td>
<td>Read / Write</td>
<td>Max. 10 characters such as letters, numbers or special characters [@, %, /]</td>
</tr>
<tr>
<td>User corrected volume factor</td>
<td>2573</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>
"Process parameters" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter options</td>
<td>2273</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 = Standard CIP off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Standard CIP on</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Dynamic CIP off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = Dynamic CIP on</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = Binomial filter</td>
</tr>
<tr>
<td>Flow damping</td>
<td>2274</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 to 15</td>
</tr>
<tr>
<td>Flow override</td>
<td>5503</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = On</td>
</tr>
<tr>
<td>Conductivity damping</td>
<td>5508</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 999.9 s</td>
</tr>
<tr>
<td>Temperature damping</td>
<td>2483</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 999.9 s</td>
</tr>
<tr>
<td>Conductivity measurement</td>
<td>2268</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td>1 = On</td>
</tr>
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</table>

'Low flow cut off' submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td>5101</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Volume flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Mass flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Corrected volume flow</td>
</tr>
<tr>
<td>On value low flow cutoff</td>
<td>5138</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Off value low flow cutoff</td>
<td>5104</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100.0 %</td>
</tr>
<tr>
<td>Pressure shock suppression</td>
<td>5140</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100 s</td>
</tr>
</tbody>
</table>

'Empty pipe detection' submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty pipe detection</td>
<td>5106</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
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<td>1 = On</td>
</tr>
<tr>
<td>Switch point empty pipe detection</td>
<td>2890</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100 %</td>
</tr>
<tr>
<td>Response time empty pipe detection</td>
<td>5108</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100 s</td>
</tr>
<tr>
<td>New adjustment</td>
<td>2335</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Cancel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Empty pipe adjust</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Full pipe adjust</td>
</tr>
<tr>
<td>Progress</td>
<td>2336</td>
<td>Integer</td>
<td>Read</td>
<td>0 = Not ok</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = Ok</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8 = Busy</td>
</tr>
<tr>
<td>Empty pipe adjust value</td>
<td>2181</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Full pipe adjust value</td>
<td>2832</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Measured value EPD</td>
<td>2298</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
</tbody>
</table>
### "Electrode cleaning circuit" submenu

<table>
<thead>
<tr>
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<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th></th>
</tr>
</thead>
</table>
| Electrode cleaning circuit | 2280     | Integer   | Read / Write| 0 = Off  
1 = On                                   | 44|
| ECC duration           | 2330     | Float     | Read / Write| 0.01 to 30 s                             | 44|
| ECC recovery time      | 2332     | Float     | Read / Write| 1 to 600 s                              | 44|
| ECC cleaning cycle     | 2328     | Float     | Read / Write| 0.5 to 168 h                            | 45|
| ECC Polarity           | 2334     | Integer   | Read        | 0 = Positive  
1 = Negative                            | 45|

### "External compensation" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th></th>
</tr>
</thead>
</table>
| Temperature source     | 2114     | Integer   | Read / Write| 0 = Internal temperature sensor  
1 = External value                | 46|
| External temperature   | 2125     | Float     | Read / Write| Floating point number with sign        | 46|
| Density source         | 2497     | Integer   | Read / Write| 0 = Fixed density  
1 = External density             | 46|
| External density       | 2117     | Float     | Read / Write| Positive floating-point number          | 47|
| Fixed density          | 2830     | Float     | Read / Write| Positive floating-point number          | 47|
| Reference density      | 2536     | Float     | Read / Write| Positive floating-point number          | 47|

### "Sensor adjustment" submenu

<table>
<thead>
<tr>
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<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
<th></th>
</tr>
</thead>
</table>
| Installation direction | 5501     | Integer   | Read / Write| 0 = Flow in arrow direction  
1 = Flow against arrow direction | 48|
| Integration time       | 2260     | Float     | Read        | 1 to 65 ms                             | 48|
| Measuring period       | 2852     | Float     | Read        | 50 to 1000 ms                          | 48|

### "Process variable adjustment" submenu

<table>
<thead>
<tr>
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<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Volume flow offset</td>
<td>5521</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
<td>49</td>
</tr>
<tr>
<td>Volume flow factor</td>
<td>5519</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
<td>50</td>
</tr>
<tr>
<td>Mass flow offset</td>
<td>5525</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
<td>50</td>
</tr>
<tr>
<td>Mass flow factor</td>
<td>5523</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
<td>50</td>
</tr>
<tr>
<td>Conductivity offset</td>
<td>5529</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
<td>51</td>
</tr>
<tr>
<td>Conductivity factor</td>
<td>5527</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
<td>51</td>
</tr>
<tr>
<td>Corrected volume flow offset</td>
<td>2044</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
<td>51</td>
</tr>
<tr>
<td>Corrected volume flow factor</td>
<td>2076</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
<td>52</td>
</tr>
</tbody>
</table>
### Modbus RS485 Register Information


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature offset</td>
<td>2046</td>
<td>Float</td>
<td>Read / Write</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Temperature factor</td>
<td>2042</td>
<td>Float</td>
<td>Read / Write</td>
<td>Positive floating-point number</td>
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</tbody>
</table>

#### "Calibration" submenu

<table>
<thead>
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<th>Register</th>
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<th>Selection / User entry / User interface</th>
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</thead>
<tbody>
<tr>
<td>Nominal diameter</td>
<td>2048</td>
<td>String</td>
<td>Read</td>
<td>DNxx / x’</td>
</tr>
<tr>
<td>Calibration factor</td>
<td>2313</td>
<td>Float</td>
<td>Read</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Zero point</td>
<td>2870</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Conductivity calibration factor</td>
<td>19806</td>
<td>Float</td>
<td>Read</td>
<td>0 to 10000</td>
</tr>
</tbody>
</table>

#### 6.3.3 "Communication" submenu

#### "Modbus configuration" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus address</td>
<td>4910</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 247</td>
</tr>
<tr>
<td>Baudrate</td>
<td>4912</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 1200 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 2400 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 4800 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 9600 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = 19200 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = 38400 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = 57600 BAUD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 = 115200 BAUD</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>4913</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = RTU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = ASCII</td>
</tr>
<tr>
<td>Parity</td>
<td>4914</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Even</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Odd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = None / 2 stop bits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = None / 1 stop bit</td>
</tr>
<tr>
<td>Byte order</td>
<td>4915</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = 0-1-2-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = 3-2-1-0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = 2-3-0-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = 1-0-3-2</td>
</tr>
<tr>
<td>Telegram delay</td>
<td>4916</td>
<td>Float</td>
<td>Read / Write</td>
<td>0 to 100 ms</td>
</tr>
<tr>
<td>Assign diagnostic behavior</td>
<td>4921</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Warning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 = Alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Alarm or warning</td>
</tr>
<tr>
<td>Failure mode</td>
<td>4920</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = NaN value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Last valid value</td>
</tr>
<tr>
<td>Interpreter mode</td>
<td>4925</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Ignore surplus bytes</td>
</tr>
</tbody>
</table>
### "Modbus information" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device ID</td>
<td>2547</td>
<td>Integer</td>
<td>Read</td>
<td>4-digit hexadecimal number</td>
</tr>
<tr>
<td>Device revision</td>
<td>4481</td>
<td>Integer</td>
<td>Read</td>
<td>4-digit hexadecimal number</td>
</tr>
</tbody>
</table>

### "Modbus data map" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan list register 0 to 15</td>
<td>0: 5001</td>
<td>Integer</td>
<td>Read / Write</td>
<td>1 to 65535</td>
</tr>
<tr>
<td></td>
<td>1: 5002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: 5003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: 5004</td>
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<tr>
<td></td>
<td>4: 5005</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>5: 5006</td>
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<td>6: 5007</td>
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<td></td>
<td>7: 5008</td>
<td></td>
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<tr>
<td></td>
<td>8: 5009</td>
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<tr>
<td></td>
<td>9: 5010</td>
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<tr>
<td></td>
<td>10: 5011</td>
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<tr>
<td></td>
<td>11: 5012</td>
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<td>12: 5013</td>
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<td></td>
<td>13: 5014</td>
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<td>14: 5015</td>
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</tr>
<tr>
<td></td>
<td>15: 5016</td>
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</tbody>
</table>

### 6.3.4 "Application" submenu

<table>
<thead>
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<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset all totalizers</td>
<td>2609</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Cancel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Reset + totalize</td>
</tr>
</tbody>
</table>

### "Totalizer 1 to 3" submenu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Register</th>
<th>Data type</th>
<th>Access</th>
<th>Selection / User entry / User interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable</td>
<td>1: 2601</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Off</td>
</tr>
<tr>
<td></td>
<td>2: 2601</td>
<td></td>
<td></td>
<td>1 = Volume flow</td>
</tr>
<tr>
<td></td>
<td>3: 3001</td>
<td></td>
<td></td>
<td>2 = Mass flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = Corrected volume flow</td>
</tr>
<tr>
<td>Mass unit</td>
<td>1: 2602</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = g</td>
</tr>
<tr>
<td></td>
<td>2: 2802</td>
<td></td>
<td></td>
<td>1 = kg (+)</td>
</tr>
<tr>
<td></td>
<td>3: 3002</td>
<td></td>
<td></td>
<td>2 = t</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = oz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 = lb</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = STon</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = User mass</td>
</tr>
<tr>
<td>Parameter</td>
<td>Register</td>
<td>Data type</td>
<td>Access</td>
<td>Selection / User entry / User interface</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>--------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Volume unit</td>
<td>1: 2603</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = cm³</td>
</tr>
<tr>
<td></td>
<td>2: 2803</td>
<td></td>
<td></td>
<td>1 = dm³</td>
</tr>
<tr>
<td></td>
<td>3: 3003</td>
<td></td>
<td></td>
<td>2 = m³ (**)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 = ml</td>
</tr>
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<td></td>
<td>4 = l</td>
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<td></td>
<td></td>
<td></td>
<td>5 = hl</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>6 = Ml Mega</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>8 = af</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9 = ft³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10 = fl oz (us)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>11 = gal (us)</td>
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<tr>
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<td></td>
<td>12 = Mgal (us)</td>
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<td></td>
<td></td>
<td>13 = bbl (us;liq.)</td>
</tr>
<tr>
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<td></td>
<td>14 = bbl (us;beer)</td>
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<tr>
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<td></td>
<td></td>
<td>15 = bbl (us;oil)</td>
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<td></td>
<td>16 = bbl (us;tank)</td>
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<td>17 = gal (imp)</td>
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<td></td>
<td>18 = Mgal (imp)</td>
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<td>19 = bbl (imp;beer)</td>
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<td></td>
<td>20 = bbl (imp;oil)</td>
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<td>21 = User vol.</td>
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<td>22 = kgal (us)</td>
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<tr>
<td>Corrected volume unit</td>
<td>1: 2604</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Nl</td>
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<td></td>
<td>2: 2804</td>
<td></td>
<td></td>
<td>1 = Nm³ (**)</td>
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<td></td>
<td>3: 3004</td>
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<td>2 = Sm³</td>
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<td>3 = Sft³</td>
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<td>5 = Sgal (us)</td>
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<td>6 = Sbbl (us;liq.)</td>
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<td>7 = Sgal (imp)</td>
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<td></td>
<td></td>
<td>8 = UserCrVol.</td>
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<td>1: 2605</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Net flow total</td>
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<tr>
<td></td>
<td>2: 2805</td>
<td></td>
<td></td>
<td>1 = Forward flow total</td>
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<tr>
<td></td>
<td>3: 3005</td>
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<td></td>
<td>2 = Reverse flow total</td>
</tr>
<tr>
<td>Control Totalizer 1 to 3</td>
<td>1: 2608</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Totalize</td>
</tr>
<tr>
<td></td>
<td>2: 2808</td>
<td></td>
<td></td>
<td>1 = Reset + totalize</td>
</tr>
<tr>
<td></td>
<td>3: 3008</td>
<td></td>
<td></td>
<td>2 = Preset + hold</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>3 = Reset + hold</td>
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<td></td>
<td></td>
<td></td>
<td>4 = Preset + totalize</td>
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<td>Preset value 1 to 3</td>
<td>1: 2590</td>
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<td>Read / Write</td>
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<td>2: 2592</td>
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<td></td>
<td>3: 2594</td>
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<td></td>
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<tr>
<td>Failure mode</td>
<td>1: 2606</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Stop</td>
</tr>
<tr>
<td></td>
<td>2: 2806</td>
<td></td>
<td></td>
<td>1 = Actual value</td>
</tr>
<tr>
<td></td>
<td>3: 3006</td>
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<td>2 = Last valid value</td>
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### 6.3.5 "Diagnostics" submenu

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<tr>
<td>Actual diagnostics</td>
<td>2732</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
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<tr>
<td>Timestamp</td>
<td>2719</td>
<td>Integer</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
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<tr>
<td>Previous diagnostics</td>
<td>2734</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td>Timestamp</td>
<td>2068</td>
<td>Integer</td>
<td>Read</td>
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<td>Integer</td>
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<tr>
<td>Operating time</td>
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<td>Integer</td>
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<td>2736</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
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<tr>
<td>Timestamp</td>
<td>2710</td>
<td>Integer</td>
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<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
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<tr>
<td>Diagnostics 2</td>
<td>2738</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
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<td>Timestamp</td>
<td>2701</td>
<td>Integer</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
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<tr>
<td>Diagnostics 3</td>
<td>2740</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
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<tr>
<td>Timestamp</td>
<td>2692</td>
<td>Integer</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
</tr>
<tr>
<td>Diagnostics 4</td>
<td>2742</td>
<td>Integer</td>
<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
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<tr>
<td>Timestamp</td>
<td>2683</td>
<td>Integer</td>
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<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
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<tr>
<td>Diagnostics 5</td>
<td>2744</td>
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<td>Read</td>
<td>Symbol for diagnostic behavior, diagnostic code and short message.</td>
</tr>
<tr>
<td>Timestamp</td>
<td>2675</td>
<td>Integer</td>
<td>Read</td>
<td>Days (d), hours (h), minutes (m) and seconds (s)</td>
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<tbody>
<tr>
<td>Filter options</td>
<td>2639</td>
<td>Integer</td>
<td>Read/Write</td>
<td>0 = Failure (F) 4 = Maintenance required (M) 8 = Function check (C) 12 = Out of specification (S) 16 = Information (I) 255 = All</td>
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"Device information" submenu

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</thead>
<tbody>
<tr>
<td>Device tag</td>
<td>2026</td>
<td>String</td>
<td>Read</td>
<td>Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).</td>
</tr>
<tr>
<td>Serial number</td>
<td>7003</td>
<td>String</td>
<td>Read</td>
<td>A maximum of 11-digit character string comprising letters and numbers.</td>
</tr>
</tbody>
</table>
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<th>Selection / User entry / User interface</th>
<th>→</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version</td>
<td>7277</td>
<td>String</td>
<td>Read</td>
<td>Character string in the format xx.yy.zz</td>
<td>74</td>
</tr>
<tr>
<td>Device name</td>
<td>7263</td>
<td>String</td>
<td>Read</td>
<td>Max. 32 characters such as letters or numbers.</td>
<td>75</td>
</tr>
<tr>
<td>Order code</td>
<td>2058</td>
<td>String</td>
<td>Read</td>
<td>Character string composed of letters, numbers and certain punctuation marks (e.g. /).</td>
<td>75</td>
</tr>
<tr>
<td>Extended order code 1</td>
<td>2212</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
<td>75</td>
</tr>
<tr>
<td>Extended order code 2</td>
<td>2222</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
<td>76</td>
</tr>
<tr>
<td>Extended order code 3</td>
<td>2232</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
<td>76</td>
</tr>
<tr>
<td>ENP version</td>
<td>4003</td>
<td>String</td>
<td>Read</td>
<td>Character string</td>
<td>76</td>
</tr>
<tr>
<td>Configuration counter</td>
<td>3100</td>
<td>Integer</td>
<td>Read</td>
<td>0 to 65535</td>
<td>77</td>
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</table>

### "Min/max values" submenu

<table>
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<th>Access</th>
<th>Selection / User entry / User interface</th>
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</thead>
<tbody>
<tr>
<td>Reset min/max values</td>
<td>2269</td>
<td>Integer</td>
<td>Read / Write</td>
<td>0 = Cancel</td>
<td>77</td>
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### "Main electronic temperature" submenu

<table>
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<th>Selection / User entry / User interface</th>
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<tbody>
<tr>
<td>Minimum value</td>
<td>2292</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>78</td>
</tr>
<tr>
<td>Maximum value</td>
<td>2294</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
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### "Temperature" submenu

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<tr>
<td>Minimum value</td>
<td>2339</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>78</td>
</tr>
<tr>
<td>Maximum value</td>
<td>2337</td>
<td>Float</td>
<td>Read</td>
<td>Signed floating-point number</td>
<td>79</td>
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### "Simulation" submenu

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<th>→</th>
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</table>
| Assign simulation process variable | 6813     | Integer   | Read / Write | 0 = Off  
1 = Volume flow  
2 = Mass flow  
3 = Corrected volume flow  
3 = Conductivity  
4 = Corrected conductivity  
5 = Temperature  | 80|
| Value process variable     | 6814     | Float     | Read / Write | Depends on the process variable selected | 80|
| Simulation device alarm    | 6812     | Integer   | Read / Write | 0 = Off  
1 = On  | 81|

* Visibility depends on order options or device settings
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<td>Assign behavior of diagnostic no. 302 (Parameter)</td>
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<tr>
<td>Assign behavior of diagnostic no. 832 (Parameter)</td>
<td>13</td>
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<td>Assign behavior of diagnostic no. 833 (Parameter)</td>
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<td>Assign behavior of diagnostic no. 834 (Parameter)</td>
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<td>Assign behavior of diagnostic no. 835 (Parameter)</td>
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<td>Assign behavior of diagnostic no. 862 (Parameter)</td>
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<td>Assign behavior of diagnostic no. 937 (Parameter)</td>
<td>15</td>
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