Description of Device Parameters

**Proline Promag 400**

EtherNet/IP

Electromagnetic flowmeter
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1 About this document

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.

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

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
The document lists the submenus and their parameters according to the structure from the Expert menu (→ 8), which is displayed when the "Maintenance" user role is enabled.
Additional information regarding:
- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions → 7
- Operating concept of the operating menus: Operating Instructions → 7
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>
</table>

**Navigation**
- Navigation path to the parameter via the local display (direct access code) or web browser
- Navigation path to the parameter via the operating tool
  The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.

**Prerequisite**
The parameter is only available under these specific conditions

**Description**
Description of the parameter function

**Selection**
List of the individual options for the parameter
- Option 1
- Option 2

**User entry**
Input range for the parameter

**User interface**
Display value/data for the parameter

**Factory setting**
Default setting ex works

**Additional information**
Additional explanations (e.g. in examples):
- On individual options
- On display values/data
- On the input range
- On the factory setting
- On the parameter function

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>Tip</td>
<td>Indicates additional information.</td>
</tr>
<tr>
<td></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td></td>
<td>Reference to page</td>
</tr>
<tr>
<td></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td></td>
<td>Operation via local display</td>
</tr>
<tr>
<td></td>
<td>Operation via operating tool</td>
</tr>
<tr>
<td></td>
<td>Write-protected parameter</td>
</tr>
</tbody>
</table>
1.4.2  Symbols in graphics

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

1.5  Documentation

1.5.1  Standard documentation

Operating Instructions

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promag D 400</td>
<td>BA01212D</td>
</tr>
<tr>
<td>Promag L 400</td>
<td>BA01213D</td>
</tr>
<tr>
<td>Promag W 400</td>
<td>BA01214D</td>
</tr>
</tbody>
</table>

1.5.2  Supplementary device-dependent documentation

Special Documentation

<table>
<thead>
<tr>
<th>Content</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartbeat Verification + Monitoring application package</td>
<td>SD02570D</td>
</tr>
<tr>
<td>Display modules A309/A310</td>
<td>SD01793D</td>
</tr>
</tbody>
</table>
## 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><strong>Expert</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
<td>→ 10</td>
</tr>
<tr>
<td>Locking status (0004)</td>
<td>→ 11</td>
</tr>
<tr>
<td>User role (0005)</td>
<td>→ 12</td>
</tr>
<tr>
<td>Enter access code (0003)</td>
<td>→ 12</td>
</tr>
<tr>
<td><strong>System</strong></td>
<td>→ 13</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>→ 13</td>
</tr>
<tr>
<td><strong>Diagnostic handling</strong></td>
<td>→ 26</td>
</tr>
<tr>
<td><strong>Administration</strong></td>
<td>→ 33</td>
</tr>
<tr>
<td><strong>Sensor</strong></td>
<td>→ 38</td>
</tr>
<tr>
<td><strong>Measured values</strong></td>
<td>→ 39</td>
</tr>
<tr>
<td><strong>System units</strong></td>
<td>→ 43</td>
</tr>
<tr>
<td><strong>Process parameters</strong></td>
<td>→ 51</td>
</tr>
<tr>
<td><strong>External compensation</strong></td>
<td>→ 67</td>
</tr>
<tr>
<td><strong>Sensor adjustment</strong></td>
<td>→ 69</td>
</tr>
<tr>
<td><strong>Calibration</strong></td>
<td>→ 76</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>→ 78</td>
</tr>
<tr>
<td><strong>Configuration</strong></td>
<td>→ 78</td>
</tr>
<tr>
<td><strong>WLAN settings</strong></td>
<td>→ 97</td>
</tr>
</tbody>
</table>
Overview of the Expert operating menu

**Application**

- Reset all totalizers (2806) → 104

**Totalizer 1 to n** → 105

**Diagnostics** → 109

- Actual diagnostics (0691) → 110
- Previous diagnostics (0690) → 110
- Operating time from restart (0653) → 111
- Operating time (0652) → 111

**Diagnostic list** → 112

**Event logbook** → 116

**Device information** → 118

**Main electronic module** → 122

**Sensor electronic module (ISEM)** → 123

**Display module** → 124

**Data logging** → 125

**Min/max values** → 133

**Heartbeat Technology** → 135

**Simulation** → 135
3 Description of the device parameters

In the following section, the parameters are listed according to the menu structure of the local display. Specific parameters for the operating tools are included at the appropriate points in the menu structure.

**Direct access**

**Navigation**  
Expert → Direct access (0106)

**Description**  
Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.

**User entry**  
0 to 65 535

**Additional information**  
*User entry*

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

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

### Locking status

**Navigation**  
Routes to Locking status (0004)

**Description**  
Displays the active write protection.

**User interface**  
- Hardware locked
- Temporarily locked

**Additional information**  

If two or more types of write protection are active, the write protection with the highest priority is shown on the local display. In the operating tool all active types of write protection are displayed.

Detailed 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 →  7

**Selection**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The access status displayed in the Access status display parameter (→  11) applies. Only appears on local display.</td>
</tr>
<tr>
<td>Hardware locked (priority 1)</td>
<td>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).</td>
</tr>
<tr>
<td>Temporarily locked (priority 2)</td>
<td>Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.</td>
</tr>
</tbody>
</table>

**Access status display**

**Navigation**  
Routes to Access stat.disp (0091)

**Prerequisite**  
A local display is provided.

**Description**  
Displays the access authorization to the parameters via the local display.

**User interface**  
- Operator
- Maintenance
Description of the device parameters

**Factory setting**
Operator

**Additional information**

*Description*
If the ⬕-symbol appears in front of a parameter, it cannot be modified via the local display with the current access authorization.

1. **Access authorization can be modified via the Enter access code parameter** (→  12).
2. **For information about the Enter access code parameter:** see the "Disabling write protection via the access code" section of the Operating Instructions for the device →  7
3. **If additional write protection is active, this restricts the current access authorization even further.**

**User interface**

*Detailed 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 →  7*

<table>
<thead>
<tr>
<th>User role</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User interface</strong></td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
</tbody>
</table>
| **Additional information** | **Description**

1. **Access authorization can be modified via the Enter access code parameter** (→  12).
2. **If additional write protection is active, this restricts the current access authorization even further.**

**User interface**

*Detailed 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 →  7*

<table>
<thead>
<tr>
<th>Enter access code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
User entry

Max. 16-digit character string comprising numbers, letters and special characters

3.1 "System" submenu

Navigation  

Expert → System

3.1.1 "Display" submenu

Navigation  

Expert → System → Display
### Display language

**Navigation**

Expert → System → Display → Display language (0104)

**Prerequisite**

A local display is provided.

**Description**

Use this function to select the configured language on the local display.

**Selection**

- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العربية (Arabic)*
- Bahasa Indonesia
- ภาษาไทย (Thai)*
- tiếng Việt (Vietnamese)
- čeština (Czech)

**Factory setting**

English (alternatively, the ordered language is preset in the device)

---

* Visibility depends on order options or device settings
Format display

Navigation

Expert → System → Display → Format display (0098)

Prerequisite

A local display is provided.

Description

Use this function to select how the measured value is shown on the local display.

Selection

- 1 value, max. size
- 1 bargraph + 1 value
- 2 values
- 1 value large + 2 values
- 4 values

Factory setting

1 value, max. size

Additional information

The display format (size, bar graph etc.) and number of measured values displayed simultaneously (1 to 4) can be configured. This setting only applies to normal operation.

- The **Value 1 display** parameter (→ 17) to **Value 4 display** parameter (→ 21) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the **Display interval** parameter (→ 22).
Possible measured values shown on the local display:

*1 value, max. size option

```
x x x x x x x x
900.00 l/h
```

*1 bargraph + 1 value option

```
x x x x x x x x
900.00 kg/h
900.00 l/h
```

*2 values option

```
x x x x x x x x
900.00 kg/h
900.00 l/h
```

*1 value large + 2 values option

```
x x x x x x x x
900.00 kg/h
900.00 l/h
1.00 kg/l
```

*4 values option

```
x x x x x x x x
900.00 kg/h
900.00 l/h
1.00 kg/l
213.94 kg
```
**Value 1 display**

**Navigation**
Expert → System → Display → Value 1 display (0107)

**Prerequisite**
A local display is provided.

**Description**
Use this function to select one of the measured values shown on the local display.

**Selection**
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up index
- Test point 1
- Test point 2
- Test point 3

**Factory setting**
Volume flow

**Additional information**

*Description*
If several measured values are displayed at once, the measured value selected here will be the first value to be displayed. The value is only displayed during normal operation.

*The Format display parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.*

*Dependency*

*The unit of the displayed measured value is taken from the System units submenu (→ 43).*

**0% bargraph value 1**

**Navigation**
Expert → System → Display → 0% bargraph 1 (0123)

**Prerequisite**
A local display is provided.

**Description**
Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.

**User entry**
Signed floating-point number

*Visibility depends on order options or device settings*
### 100% bargraph value 1

**Navigation**

Expert → System → Display → 100% bargraph 1 (0125)

**Prerequisite**

A local display is provided.

**Description**

Use this function to enter the 100% bar graph value to be shown on the display for the measured value 1.

**User entry**

Signed floating-point number

**Factory setting**

Depends on country and nominal diameter → 138

**Additional information**

The *Format display* parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

**User entry**

The unit of the displayed measured value is taken from the *System units* submenu (→ 43).

### Decimal places 1

**Navigation**

Expert → System → Display → Decimal places 1 (0095)

**Prerequisite**

A measured value is defined in the *Value 1 display* parameter (→ 17).

**Description**

Use this function to select the number of decimal places for measured value 1.

**Selection**

- x
- x.x
- x.xx
- x.xxx
- x.xxxx

**Factory setting**

x.xx
Additional information  

Description  

This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

Value 2 display  

**Navigation**  

Expert → System → Display → Value 2 display (0108)

**Prerequisite**  

A local display is provided.

**Description**  

Use this function to select one of the measured values shown on the local display.

**Selection**  

For the picklist, see the Value 1 display parameter (→ 17)

**Factory setting**  

None

**Additional information**  

Description  

If several measured values are displayed at once, the measured value selected here will be the second value to be displayed. The value is only displayed during normal operation. The Format display parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

**Dependency**  

The unit of the displayed measured value is taken from the System units submenu (→ 43).

Decimal places 2  

**Navigation**  

Expert → System → Display → Decimal places 2 (0117)

**Prerequisite**  

A measured value is specified in the Value 2 display parameter (→ 19).

**Description**  

Use this function to select the number of decimal places for measured value 2.

**Selection**  

- x  
- x.x  
- x.xx  
- x.xxx  
- x.xxxx

**Factory setting**  

x.xx

**Additional information**  

Description  

This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.
Value 3 display

Navigation
- Expert → System → Display → Value 3 display (0110)

Prerequisite
A local display is provided.

Description
Use this function to select one of the measured values shown on the local display.

Selection
For the picklist, see the Value 1 display parameter (→ 17)

Factory setting
None

Additional information
Description
If several measured values are displayed at once, the measured value selected here will be the third value to be displayed. The value is only displayed during normal operation.

The Format display parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

Selection
The unit of the displayed measured value is taken from the System units submenu (→ 43).

0% bargraph value 3

Navigation
- Expert → System → Display → 0% bargraph 3 (0124)

Prerequisite
A selection was made in the Value 3 display parameter (→ 20).

Description
Use this function to enter the 0% bar graph value to be shown on the display for the measured value 3.

User entry
Signed floating-point number

Factory setting
Country-specific:
- 0 l/h
- 0 gal/min (us)

Additional information
Description
The Format display parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

User entry
The unit of the displayed measured value is taken from the System units submenu (→ 43).
**100% bargraph value 3**

**Navigation**
- Expert → System → Display → 100% bargraph 3 (0126)

**Prerequisite**
A selection was made in the **Value 3 display** parameter (→ 20).

**Description**
Use this function to enter the 100% bar graph value to be shown on the display for the measured value 3.

**User entry**
Signed floating-point number

**Factory setting**
0

**Additional information**
- **Description**
  The **Format display** parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.

  **User entry**
  The unit of the displayed measured value is taken from the **System units** submenu (→ 43).

---

**Decimal places 3**

**Navigation**
- Expert → System → Display → Decimal places 3 (0118)

**Prerequisite**
A measured value is specified in the **Value 3 display** parameter (→ 20).

**Description**
Use this function to select the number of decimal places for measured value 3.

**Selection**
- x
- x.x
- x.xx
- x.xxx
- x.xxxx

**Factory setting**
x.xx

**Additional information**
- **Description**
  This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

---

**Value 4 display**

**Navigation**
- Expert → System → Display → Value 4 display (0109)

**Prerequisite**
A local display is provided.
Description of the device parameters

Proline Promag 400 EtherNet/IP

Description
Use this function to select one of the measured values shown on the local display.

Selection
For the picklist, see the Value 1 display parameter (→ 17)

Factory setting
None

Additional information

Description
If several measured values are displayed at once, the measured value selected here will be the fourth value to be displayed. The value is only displayed during normal operation.

The Format display parameter (→ 15) is used to specify how many measured values are displayed simultaneously and how.

Selection
The unit of the displayed measured value is taken from the System units submenu (→ 43).

Decimal places 4

Navigation
Expert → System → Display → Decimal places 4 (0119)

Prerequisite
A measured value is specified in the Value 4 display parameter (→ 21).

Description
Use this function to select the number of decimal places for measured value 4.

Selection
• x
• x.x
• x.xx
• x.xxx
• x.xxxx

Factory setting
x.xx

Additional information

Description
This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

Display interval

Navigation
Expert → System → Display → Display interval (0096)

Prerequisite
A local display is provided.

Description
Use this function to enter the length of time the measured values are displayed if the values alternate on the display.

User entry
1 to 10 s
Factory setting
5 s

Additional information
Description
This type of alternating display only occurs automatically if the number of measured values defined exceeds the number of values the selected display format can display simultaneously.

- The **Value 1 display** parameter (→ 17) to **Value 4 display** parameter (→ 21) are used to specify which measured values are shown on the local display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 15).

Display damping

Navigation
Expert → System → Display → Display damping (0094)

Prerequisite
A local display is provided.

Description
Use this function to enter a time constant for the reaction time of the local display to fluctuations in the measured value caused by process conditions.

User entry
0.0 to 999.9 s

Factory setting
0.0 s

Additional information
User entry
Use this function to enter a time constant (PT1 element 1) for display damping:
- If a low time constant is entered, the display reacts particularly quickly to fluctuating measured variables.
- On the other hand, the display reacts more slowly if a high time constant is entered.

Damping is switched off if 0 is entered (factory setting).

Header

Navigation
Expert → System → Display → Header (0097)

Prerequisite
A local display is provided.

Description
Use this function to select the contents of the header of the local display.

Selection
- Device tag
- Free text

Factory setting
Device tag

1) proportional transmission behavior with first order delay
Description of the device parameters

Proline Promag 400 EtherNet/IP

Additional information

Description
The header text only appears during normal operation.

1  

Position of the header text on the display

Selection

- Device tag
  Is defined in the Device tag parameter (→ 119).
- Free text
  Is defined in the Header text parameter (→ 24).

Header text

Navigation

Expert → System → Display → Header text (0112)

Prerequisite
In the Header parameter (→ 23), the Free text option is selected.

Description
Use this function to enter a customer-specific text for the header of the local display.

User entry
Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)

Factory setting

Additional information

Description
The header text only appears during normal operation.

1  

Position of the header text on the display

User entry
The number of characters displayed depends on the characters used.
## Separator

**Navigation**  
Expert → System → Display → Separator (0101)

**Prerequisite**  
A local display is provided.

**Description**  
Use this function to select the decimal separator.

**Selection**  
- . (point)
- , (comma)

**Factory setting**  
. (point)

## Contrast display

**Navigation**  
Expert → System → Display → Contrast display (0105)

**Prerequisite**  
A local display is provided.

**Description**  
Use this function to enter a value to adapt the display contrast to the ambient conditions (e.g. the lighting or viewing angle).

**User entry**  
20 to 80 %

**Factory setting**  
50 %

## Backlight

**Navigation**  
Expert → System → Display → Backlight (0111)

**Prerequisite**  
A local display is provided.

**Description**  
Use this function to switch the backlight of the local display on and off.

**Selection**  
- Disable
- Enable

**Factory setting**  
Enable

## Access status display

**Navigation**  
Expert → System → Display → Access stat.disp (0091)

**Prerequisite**  
A local display is provided.
**Description**
Displays the access authorization to the parameters via the local display.

**User interface**
- Operator
- Maintenance

**Factory setting**
Operator

**Additional information**

*Description*
If the ⚖-symbol appears in front of a parameter, it cannot be modified via the local display with the current access authorization.

Access authorization can be modified via the **Enter access code** parameter (→ 12).

For information about the **Enter access code** parameter: see the "Disabling write protection via the access code" section of the Operating Instructions for the device → 7

If additional write protection is active, this restricts the current access authorization even further.

**User interface**
Detailed 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 → 7

### 3.1.2 "Diagnostic handling" submenu

**Navigation**

Expert → System → Diagn. handling

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</tbody>
</table>

→ 26

<table>
<thead>
<tr>
<th>Diagnostic behavior</th>
</tr>
</thead>
</table>

→ 27

**Alarm delay**

**Navigation**

Expert → System → Diagn. handling → Alarm delay (0651)

**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

Result

This setting affects the following diagnostic messages:
- 190 Special event 1
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- 862 Pipe empty

"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 (→ 27).

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 totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.</td>
</tr>
<tr>
<td>Warning</td>
<td>The device continues to measure. The totalizers are not affected. A diagnostic message is generated.</td>
</tr>
<tr>
<td>Logbook entry only</td>
<td>The device continues to measure. The diagnostic message is displayed only in the Event logbook submenu (→ 116) (Event list submenu (→ 117)) and is not displayed in alternation with the operational display.</td>
</tr>
<tr>
<td>Off</td>
<td>The diagnostic event is ignored, and no diagnostic message is generated or entered.</td>
</tr>
</tbody>
</table>

For a list of all the diagnostic events, see the Operating Instructions for the device → 7

Navigation

Expert → System → Diagn. handling → Diagn. behavior

![Diagnostic behavior]

Assign behavior of diagnostic no. 043 (0650) → 28
Assign behavior of diagnostic no. 302 (0739) → 28
Assign behavior of diagnostic no. 376 (0645) → 29
Assign behavior of diagnostic no. 377 (0777) → 29
Assign behavior of diagnostic no. 531 (0741) → 29
Assign behavior of diagnostic no. 832 (0681) → 30
Assign behavior of diagnostic no. 043 (Sensor short circuit)

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 043 (0650)

**Description**

Use this function to change the diagnostic behavior of the **043 Sensor short circuit** diagnostic message.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

---

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

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302 (0739)

**Description**

Use this function to change the diagnostic behavior of the **302 Device verification active** diagnostic message.
Selection
- Alarm
- Warning

Factory setting
Warning

Additional information

Assign behavior of diagnostic no. 376 (Sensor electronics (ISEM) faulty)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 376 (0645)

Description
Use this function to change the diagnostic behavior of the
376 Sensor electronics (ISEM) faulty diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information

Assign behavior of diagnostic no. 377 (Sensor electronics (ISEM) faulty)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 377 (0777)

Description
Use this function to change the diagnostic behavior of the
377 Sensor electronics (ISEM) faulty diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information

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

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531 (0741)

Description
Use this function to change the diagnostic behavior of the
531 Empty pipe detection diagnostic message.
Description of the device parameters

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

Detailed description of the options available for selection:

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

Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)

Description

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

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Logbook entry only

Additional information

Detailed description of the options available for selection:

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

Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)

Description

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

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Logbook entry only

Additional information

Detailed description of the options available for selection:
Assign behavior of diagnostic no. 834 (Process temperature too high)

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)

**Description**

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

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

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

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)

**Description**

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

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection:

Assign behavior of diagnostic no. 842

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 842 (0638)

**Description**

Change behavior of diagnostic event with diagnostic number 842 'Process limit'.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Off
Assign behavior of diagnostic no. 962 (Pipe empty)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 962 (0745)

Description
Use this function to change the diagnostic behavior of the 862 Pipe empty diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 937 (EMC interference)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937 (0743)

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
Detailed description of the options available for selection:

Assign behavior of diagnostic no. 938 (EMC interference)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 938 (0642)

Description
Use this function to change the diagnostic behavior of the 938 EMC interference diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Alarm

Additional information
Detailed description of the options available for selection:
## Assign behavior of diagnostic no. 961

### Description
Select diagnostic behavior for the selected diagnostic number.

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

### Factory setting
Alarm

### 3.1.3 "Administration" submenu

**Navigation**

Expert → System → Administration

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<th>Page</th>
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</thead>
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<tr>
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<td>33</td>
</tr>
<tr>
<td>▶ Define access code</td>
<td></td>
</tr>
<tr>
<td>▶ Reset access code</td>
<td></td>
</tr>
<tr>
<td>Device reset (0000)</td>
<td>36</td>
</tr>
<tr>
<td>Activate SW option (0029)</td>
<td>37</td>
</tr>
<tr>
<td>Software option overview (0015)</td>
<td>38</td>
</tr>
</tbody>
</table>
```

**"Define access code" wizard**

The **Define access code** wizard (→ 33) is only available when operating via the local display or Web browser.

If operating via the operating tool, the **Define access code** parameter (→ 36) can be found directly in the Administration submenu. There is no **Confirm access code** parameter if the device is operated via the operating tool.

**Navigation**

Expert → System → Administration → Def. access code

```
<table>
<thead>
<tr>
<th>Submenu</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Define access code</td>
<td>34</td>
</tr>
<tr>
<td>Define access code</td>
<td></td>
</tr>
<tr>
<td>Confirm access code</td>
<td>34</td>
</tr>
</tbody>
</table>
```
Description of the device parameters

Proline Promag 400 EtherNet/IP

Define access code

Navigation
Expert → System → Administration → Def. access code → Def. access code

Description
Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the configuration of the device against any inadvertent changes via the local display or Web browser.

User entry
0 to 9999

Factory setting
0

Additional information
Description
The write protection affects all parameters in the document marked with the symbol. On the local display, the symbol in front of a parameter indicates that the parameter is write-protected.

The parameters that cannot be write-accessed are grayed out in the Web browser.

Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the Enter access code parameter (→ 12).

If you lose the access code, please contact your Endress+Hauser sales organization.

User entry
A message is displayed if the access code is not in the input range.

Factory setting
If the factory setting is not changed or 0 is defined as the access code, the parameters are not write-protected and the device configuration data can be modified. The user is logged on in the "Maintenance" role.

Confirm access code

Navigation
Expert → System → Administration → Def. access code → Confirm code

Description
Enter the defined release code a second time to confirm the release code.

User entry
0 to 9999

Factory setting
0

"Reset access code" submenu

Navigation
Expert → System → Administration → Reset acc. code
Operating time

**Navigation**

Expert → System → Administration → Reset acc. code → Operating time (0652)

**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.

Reset access code

**Navigation**

Expert → System → Administration → Reset acc. code → Reset acc. code (0024)

**Description**

Use this function to enter a reset code to reset the user-specific access codes to the factory setting.

**User entry**

Character string comprising numbers, letters and special characters

**Factory setting**

0x00

**Additional information**

*Description*

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

*User entry*

The reset code can only be entered via:

- Web browser
- DeviceCare, FieldCare (via CDI RJ45 interface)
- Fieldbus
Additional parameters in the "Administration" submenu

Define access code

Navigation  
Expert → System → Administration → Def. access code

Description  
Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the configuration of the device against any inadvertent changes via the operating tool.

User entry  
0 to 9999

Factory setting  
0

Additional information  
Description  
The write protection affects all parameters in the document marked with the symbol.

Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the Enter access code parameter (→ 12).

If you lose the access code, please contact your Endress+Hauser sales organization.

User entry  
A message is displayed if the access code is not in the input range.

Factory setting  
If the factory setting is not changed or 0 is defined as the access code, the parameters are not write-protected and the device configuration data can be modified. The user is logged on in the "Maintenance" role.

Device reset

Navigation  
Expert → System → Administration → Device reset (0000)

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

Selection  
- Cancel  
- To delivery settings  
- Restart device  
- Restore S-DAT backup *

Factory setting  
Cancel

* Visibility depends on order options or device settings
Activate SW option

Navigation

Expert → System → Administration → Activate SW opt. (0029)

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

Depends on the software option ordered

Additional information

Description

If a measuring device was ordered with an additional software option, the activation code is programmed in the device at the factory.

User entry

To activate a software option subsequently, please contact your Endress+Hauser sales organization.

NOTE!

The activation code is linked to the serial number of the measuring device and varies according to the device and software option.

If an incorrect or invalid code is entered, this results in the loss of software options that have already been activated.
  ▶ Before you enter a new activation code, make a note of the current activation code.
  ▶ Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
  ▶ Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter (→ 38).
  ▶ The new software option is active if it is displayed.
  ▶ If the new software option is not displayed or all software options have been deleted, the code entered was either incorrect or invalid.
  ▶ If the code entered is incorrect or invalid, enter the old activation code.
  ▶ Have your Endress+Hauser sales organization check the new activation code remembering to specify the serial number or ask for the code again.

Example for a software option

Order code for "Application package", option EA "Extended HistoROM"

The software options currently enabled are displayed in the Software option overview parameter (→ 38).

Web browser

Once a software option has been activated, the page must be loaded again in the Web browser.
Software option overview

Navigation

Expert → System → Administration → SW option overv. (0015)

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

User interface
- Extended HistoROM
- Electrode cleaning circuit
- Heartbeat Verification
- Build-up index
- Heartbeat Monitoring

Additional information

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

"Extended HistoROM" option
Order code for 'Application package', option EA "Extended HistoROM"

"Electrode cleaning circuit" option
Only available for Promag L and W.
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"

3.2 "Sensor" submenu

Navigation
Expert → Sensor

Measured values → 39
System units → 43
Process parameters → 51
External compensation → 67
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Calibration → 76
3.2.1 "Measured values" submenu

**Navigation**
Expert → Sensor → Measured val.

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

"Process variables" submenu

**Navigation**

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<td>Mass flow (1847)</td>
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<tr>
<td>Corrected volume flow (1851)</td>
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<tr>
<td>Flow velocity (1854)</td>
</tr>
<tr>
<td>Conductivity (1850)</td>
</tr>
<tr>
<td>Corrected conductivity (1853)</td>
</tr>
<tr>
<td>Temperature (1852)</td>
</tr>
<tr>
<td>Density (1857)</td>
</tr>
</tbody>
</table>

---

**Volume flow**

**Navigation**

**Description**
Displays the volume flow that is currently measured.

**User interface**
Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Volume flow unit parameter (→ 44)
### Mass flow

**Navigation**


**Description**

Displays the mass flow that is currently calculated.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Mass flow unit parameter (→ 48)

### Corrected volume flow

**Navigation**


**Description**

Displays the corrected volume flow that is currently measured.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Corrected volume flow unit parameter (→ 50)

### Flow velocity

**Navigation**


**Description**

Displays the flow velocity that is currently calculated.

**User interface**

Signed floating-point number

### Conductivity

**Navigation**


**Prerequisite**

The On option is selected in the Conductivity measurement parameter (→ 55).

**Description**

Displays the conductivity that is currently measured.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the Conductivity unit parameter (→ 46)
Corrected conductivity

**Navigation**


**Prerequisite**

The following conditions are met:
- The **On** option is selected in the **Conductivity measurement** parameter (→ 55).
- The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 68).

**Description**

Displays the conductivity that is currently corrected.

**User interface**

Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Conductivity unit** parameter (→ 46)

Temperature

**Navigation**


**Prerequisite**

The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 68).

**Description**

Displays the temperature that is currently calculated.

**User interface**

Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 47)

Density

**Navigation**


**Description**

Displays the current fixed density or density read in from an external device.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Density unit** parameter (→ 49)
"Totalizer" submenu

Navigation

Expert → Sensor → Measured val. → Totalizer

- Totalizer value 1 to n (0911–1 to n) → 42
- Totalizer overflow 1 to n (0910–1 to n) → 43

**Totalizer value 1 to n**

Navigation

Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to n (0911–1 to n)

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 105) of the Totalizer 1 to n submenu:
- Volume flow
- Mass flow
- Corrected volume flow

Description

Displays the current totalizer counter reading.

User interface

Signed floating-point number

Additional information

Description

As the operating tool can only display a maximum of 7 digits, if the display range is exceeded the current counter reading is the sum of the totalizer value and the overflow value from the Totalizer overflow 1 to n parameter.

In the event of an error, the totalizer adopts the mode defined in the Failure mode parameter (→ 108).

User interface

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 (→ 107).

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 105).

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 m$^3$
- Value in the Totalizer overflow 1 parameter: 1 ⋅ 10$^7$ (1 overflow) = 10000000 m$^3$
- Current totalizer reading: 11968457 m$^3$
**Totalizer overflow 1 to n**

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to n (0910–1 to n)

**Prerequisite**

One of the following options is selected in the Assign process variable parameter (→ 105) of the Totalizer 1 to n submenu:

- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Displays the current totalizer overflow.

**User interface**

Integer with sign

**Additional information**

**Description**

If the current totalizer reading exceeds 7 digits, which is the maximum value range that can be displayed by the operating tool, 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 n parameter.

**User interface**

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 105).

**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: 1 968 457 m³
- Value in the Totalizer overflow 1 parameter: 2 ⋅ 10⁷ (2 overflows) = 20 000 000 [m³]
- Current totalizer reading: 21 968 457 m³

### 3.2.2 "System units" submenu

**Navigation**

Expert → Sensor → System units

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<th>System units</th>
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<td>Volume unit (0563) → 46</td>
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<tr>
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<tr>
<td>Temperature unit (0557) → 47</td>
</tr>
<tr>
<td>Mass flow unit (0554) → 48</td>
</tr>
<tr>
<td>Mass unit (0574) → 48</td>
</tr>
</tbody>
</table>
Description of the device parameters

Volume flow unit

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density unit (0555)</td>
<td>49</td>
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<tr>
<td>Corrected volume flow unit (0558)</td>
<td>50</td>
</tr>
<tr>
<td>Corrected volume unit (0575)</td>
<td>50</td>
</tr>
<tr>
<td>Date/time format (2812)</td>
<td>51</td>
</tr>
</tbody>
</table>

Navigation

Expert → Sensor → System units → Volume flow unit (0553)

Description
Use this function to select the unit for the volume flow.
**Selection**

- **SI units**
  - cm³/s
  - cm³/min
  - cm³/h
  - cm³/d
  - dm³/s
  - dm³/min
  - dm³/h
  - dm³/d
  - m³/s
  - m³/min
  - m³/h
  - m³/d
  - ml/s
  - ml/min
  - ml/h
  - ml/d
  - l/s
  - l/min
  - l/h
  - l/d
  - hl/s
  - hl/min
  - hl/h
  - hl/d
  - Ml/s
  - Ml/min
  - Ml/h
  - Ml/d

- **US units**
  - af/s
  - af/min
  - af/h
  - af/d
  - ft³/s
  - ft³/min
  - ft³/h
  - ft³/d
  - MMft³/s
  - MMft³/min
  - MMft³/h
  - MMft³/d
  - fl oz/s (us)
  - fl oz/min (us)
  - fl oz/h (us)
  - fl oz/d (us)
  - gal/s (us)
  - gal/min (us)
  - gal/h (us)
  - gal/d (us)
  - Mgal/s (us)
  - Mgal/min (us)
  - Mgal/h (us)
  - Mgal/d (us)

- **Imperial units**
  - gal/s (imp)
  - gal/min (imp)
  - gal/h (imp)
  - gal/d (imp)
  - Mgal/s (imp)
  - Mgal/min (imp)
  - Mgal/h (imp)
  - Mgal/d (imp)
  - bbl/s (imp;beer)
  - bbl/min (imp;beer)
  - bbl/h (imp;beer)
  - bbl/d (imp;beer)
  - bbl/s (imp;oil)
  - bbl/min (imp;oil)
  - bbl/h (imp;oil)
  - bbl/d (imp;oil)

**Factory setting**

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

Effect
The selected unit applies for:
Volume flow parameter (→ 39)

Selection
For an explanation of the abbreviated units: → 143

Customer-specific units
The unit for the customer-specific volume is specified in the User volume text parameter.

Volume unit

Navigation
Expert → Sensor → System units → Volume unit (0563)

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

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm³</td>
<td>af</td>
<td>gal (imp)</td>
</tr>
<tr>
<td>dm³</td>
<td>ft³</td>
<td>Mgal (imp)</td>
</tr>
<tr>
<td>m³</td>
<td>Mft³</td>
<td>bbl (imp;beer)</td>
</tr>
<tr>
<td>ml</td>
<td>gal (us)</td>
<td>bbl (imp;oil)</td>
</tr>
<tr>
<td>l</td>
<td>kgal (us)</td>
<td></td>
</tr>
<tr>
<td>hl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ml Mega</td>
<td>Mgal (us)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bbl (us;oil)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bbl (us;liq.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bbl (us;beer)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bbl (us;tank)</td>
<td></td>
</tr>
</tbody>
</table>

Factory setting
Country-specific:
- m³
- gal (us)

Additional information
Selection
For an explanation of the abbreviated units: → 143

Customer-specific units
The unit for the customer-specific volume is specified in the User volume text parameter.

Conductivity unit

Navigation
Expert → Sensor → System units → Conductiv. unit (0582)

Prerequisite
The On option is selected in the Conductivity measurement parameter (→ 55) parameter.
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
Effect
The selected unit applies for:
Conductivity parameter (→ 40)

Selection
For an explanation of the abbreviated units: → 143

Temperature unit

Navigation
Expert → Sensor → System units → Temperature unit (0557)

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
Effect
The selected unit applies for:
- Maximum value parameter (→ 133)
- Minimum value parameter (→ 133)

Selection
For an explanation of the abbreviated units: → 143
## Mass flow unit

**Navigation**  
[Expert → Sensor → System units → Mass flow unit (0554)]

**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>

**Factory setting**  
Country-specific:  
- kg/h
- lb/min

**Additional information**  
**Effect**  
The selected unit applies for:  
**Mass flow parameter (→ 40)**

**Selection**  
[For an explanation of the abbreviated units: → 143]

**Customer-specific units**  
[The unit for the customer-specific mass is specified in the User mass text parameter.]

## Mass unit

**Navigation**  
[Expert → Sensor → System units → Mass unit (0574)]

**Description**  
Use this function to select the unit for the mass.

**Selection**  

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

**Factory setting**  
Country-specific:  
- kg
- lb
Additional information

Selection

For an explanation of the abbreviated units: → 143

Customer-specific units

The unit for the customer-specific mass is specified in the User mass text parameter.

Density unit

Navigation

Expert → Sensor → System units → Density unit (0555)

Description

Use this function to select the unit for the density.

Selection

SI units
- g/cm³
- g/m³
- kg/l
- kg/dm³
- 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

Effect

The selected unit applies for:
- External density parameter (→ 67)
- Fixed density parameter (→ 68)

Selection

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

For an explanation of the abbreviated units: → 143
Corrected volume flow unit

Navigation
Expert → Sensor → System units → Corr. volflow unit (0558)

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>Nhl/s</td>
<td>MMSft³/s</td>
</tr>
<tr>
<td>Nhl/min</td>
<td>MMSft³/min</td>
</tr>
<tr>
<td>Nhl/h</td>
<td>MMSft³/h</td>
</tr>
<tr>
<td>Nhl/d</td>
<td>MMSft³/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>Sl/s</td>
<td>Sbbl/s (us;liq.)</td>
</tr>
<tr>
<td>Sl/min</td>
<td>Sbbl/min (us;liq.)</td>
</tr>
<tr>
<td>Sl/h</td>
<td>Sbbl/h (us;liq.)</td>
</tr>
<tr>
<td>Sl/d</td>
<td>Sbbl/d (us;liq.)</td>
</tr>
<tr>
<td>Sm³/s</td>
<td>Sgal/s (imp)</td>
</tr>
<tr>
<td>Sm³/min</td>
<td>Sgal/min (imp)</td>
</tr>
<tr>
<td>Sm³/h</td>
<td>Sgal/h (imp)</td>
</tr>
<tr>
<td>Sm³/d</td>
<td>Sgal/d (imp)</td>
</tr>
</tbody>
</table>

Country-specific:

- Nl/h
- Sft³/h

Factory setting

Additional information
Selection
For an explanation of the abbreviated units: → 143

Corrected volume unit

Navigation
Expert → Sensor → System units → Corr. vol (0575)

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>Nhl</td>
<td>MMSft³</td>
<td></td>
</tr>
<tr>
<td>Nm³</td>
<td>Sgal (us)</td>
<td></td>
</tr>
<tr>
<td>Sl</td>
<td>Sbbl (us;liq.)</td>
<td></td>
</tr>
<tr>
<td>Sm³</td>
<td>Sbbl (us;oil)</td>
<td></td>
</tr>
</tbody>
</table>
**Factory setting**  
Country-specific:
- Nm³
- Sft³

**Additional information**  
*Selection*

ℹ️ For an explanation of the abbreviated units: → 143

---

**Date/time format**

**Navigation**  
.FixedSingle  Expert → Sensor → System units → Date/time format (2812)

**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**  
*Selection*

ℹ️ For an explanation of the abbreviated units: → 143

---

### 3.2.3 "Process parameters" submenu

**Navigation**  

<table>
<thead>
<tr>
<th>➤ Process parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter options (6710) → 52</td>
</tr>
<tr>
<td>Flow damping (6661) → 54</td>
</tr>
<tr>
<td>Flow override (1839) → 54</td>
</tr>
<tr>
<td>Conductivity measurement (6514) → 55</td>
</tr>
<tr>
<td>Conductivity damping (1803) → 55</td>
</tr>
<tr>
<td>Conductivity temperature coefficient (1891) → 56</td>
</tr>
<tr>
<td>Temperature damping (1886) → 56</td>
</tr>
</tbody>
</table>
Filter options

Navigation
Expert → Sensor → Process param. → Filter options (6710)

Description
Use this function to select a filter option.

Selection
- Adaptive
- Adaptive CIP on
- Dynamic
- Dynamic CIP on
- Binomial
- Binomial CIP on

Factory setting
Binomial

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.
- **Binomial**
  - 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 makes the **Standard** and **Dynamic** filter options additionally available.
  - 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</th>
<th>Dynamic</th>
<th>Dynamic</th>
<th>Binomial</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, fast 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>Replacement of a Promag 50/53: system damping Promag 400 = 0.5 * system damping Promag 50/53</td>
<td></td>
<td></td>
<td>+++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replacement of a Promag 10: system damping Promag 400 = 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) Value of flow damping < 6
Flow damping

Navigation  
Expert → Sensor → Process param. → Flow damping (6661)

Description  
Use this function to enter a value for 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  
4

Additional information  
Input range 0 to 15
- Value = 0: no damping
- Value = 1: minor damping
- Value = 15: strong damping

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 → 57
- Totalizers → 105

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  
This setting affects all the functions and outputs of the measuring device.

Description  
Flow override is active
- The 453 Flow override diagnostic message is output.
- Output values
  - Output: value at zero flow
  - Temperature: continues to be output
  - Totalizers 1-3: stop being totalized

The Flow override option can also be activated in the Status input submenu: Assign status input parameter.
### Conductivity measurement

**Navigation**


**Prerequisite**
The **On** option is selected in the **Conductivity measurement** parameter (→ 55) parameter.

**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.

### Conductivity damping

**Navigation**


**Prerequisite**
The **On** option is selected in the **Conductivity measurement** parameter (→ 55).

**Description**
Use this function to enter a time constant for conductivity damping (PT1 element).

**User entry**
0 to 999.9 s

**Factory setting**
0 s

**Additional information**

**Description**
The damping is performed by a PT1 element.

**User entry**
- Value = 0: no damping
- Value > 0: damping is increased

Damping is switched off if 0 is entered (factory setting).

---

2) Proportional behavior with first-order lag
**Conductivity temperature coefficient**

**Navigation**

**Prerequisite**
The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 68).

**Description**
Use this function to enter the temperature coefficient for the conductivity.

**User entry**
Signed floating-point number

**Factory setting**
2.1 %/K

---

**Temperature damping**

**Navigation**

**Prerequisite**
The **Internal temperature sensor** option or the **External value** option is selected in the **Temperature source** parameter (→ 68).

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

**User entry**
0 to 999.9 s

**Factory setting**
0 s

---

**Reference density**

**Navigation**
Expert → Sensor → Process param. → Ref. density (1885)

**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 (→ 49)
"Low flow cut off" submenu

**Navigation**

![icon](Expert → Sensor → Process param. → Low flow cut off)

---

### Assign process variable

**Navigation**

![icon](Expert → Sensor → Process param. → Low flow cut off → Assign variable (1837))

**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**

![icon](Expert → Sensor → Process param. → Low flow cut off → On value (1805))

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 57).

**Description**

Use this function to enter a switch-on value for low flow cutoff. Low flow cutoff is activated if the value entered is not equal to 0 → 58.

**User entry**

Positive floating-point number

**Factory setting**

Depends on country and nominal diameter → 139

**Additional information**

**Dependency**

The unit depends on the process variable selected in the Assign process variable parameter (→ 57).
**Off value low flow cutoff**

**Navigation**

Expert → Sensor → Process param. → Low flow cut off → Off value (1804)

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 57).

**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→ 57.

**User entry**

0 to 100.0 %

**Factory setting**

50 %

**Additional information**

**Example**

![Diagram showing the flow rate, time, hysteresis, low flow cut off active, low flow cut off is activated, low flow cut off is deactivated, and on value entered.](image)

Q: Flow  
T: Time  
H: Hysteresis  
A: Low flow cut off active  
1: Low flow cut off is activated  
2: Low flow cut off is deactivated  
3: On value entered  
4: Off value entered

**Pressure shock suppression**

**Navigation**


**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 57).

**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.

**"Empty pipe detection" submenu**

**Navigation**


---

**Assign process variable (1860)**

**Switch point empty pipe detection (6562)**
### Description of the device parameters

<table>
<thead>
<tr>
<th>Description of the device parameters</th>
<th>Proline Promag 400 EtherNet/IP</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Assign process variable</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **Selection** | • Off  
• On |
| **Factory setting** | Off |

<table>
<thead>
<tr>
<th><strong>Switch point empty pipe detection</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Prerequisite</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Response time empty pipe detection</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
</tr>
</tbody>
</table>
**Description**
Use this function to enter the minimum length of time (debouncing time) the signal must be present for the **Pipe empty** diagnostic message 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 (→ 60).

**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 (→ 60).

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

**User interface**
- Ok
- Busy
- Not ok

**Empty pipe adjust value**

**Navigation**
Expert → Sensor → Process param. → Empty pipe det. → Empty pipe value (6527)

**Prerequisite**
- In the **Empty pipe detection** parameter (→ 60), 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 (→ 60), 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 (→ 60), 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

<table>
<thead>
<tr>
<th>Electrode cleaning circuit</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrode cleaning cycle (6528)</td>
<td>63</td>
</tr>
<tr>
<td>ECC duration (6555)</td>
<td>63</td>
</tr>
<tr>
<td>ECC recovery time (6556)</td>
<td>63</td>
</tr>
<tr>
<td>ECC interval (6557)</td>
<td>64</td>
</tr>
<tr>
<td>ECC polarity (6631)</td>
<td>64</td>
</tr>
</tbody>
</table>
## Electrode cleaning cycle

**Navigation**

Expert → Sensor → Process param. → ECC → Elec. clean cycl (6528)

**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

**Additional information**

Conductive deposits on the electrodes and on the walls of the measuring tube (e.g. magnetite) can falsify measurement values. The Electrode Cleaning Circuitry (ECC) was developed to prevent such conductive deposits developing in the vicinity of the electrodes. ECC functions as described above for all available electrode materials except tantalum. If tantalum is used as the electrode material, the ECC protects the electrode surface only against oxidation.

## ECC duration

**Navigation**

Expert → Sensor → Process param. → ECC → ECC duration (6555)

**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 (6556)

**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**

5 s
**ECC interval**

**Navigation**

- Expert → Sensor → Process param. → ECC → ECC interval (6557)

**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**

0.7 h

---

**ECC polarity**

**Navigation**

- Expert → Sensor → Process param. → ECC → ECC polarity (6631)

**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:

- Tantalum: **Negative** option
- Platinum, Alloy C22, stainless steel: **Positive** option

---

"Coating detection" submenu

Build-up detection is only available:

- In conjunction with the Promag W sensor
- In the compact device version (transmitter and sensor form a mechanical unit)
- For detailed information on build-up detection: see the Special Documentation for the **Heartbeat Verification + Monitoring** application package → 7

**Navigation**


<table>
<thead>
<tr>
<th>Build-up index</th>
</tr>
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<tbody>
<tr>
<td>Build-up index</td>
</tr>
<tr>
<td>Build-up index damping</td>
</tr>
<tr>
<td>Build-up index value</td>
</tr>
</tbody>
</table>
Build-up index

**Navigation**
[Expert → Sensor → Process param. → Build-up index → Build-up index (6734)]

**Description**
Select mode for build-up index.

**Selection**
- Off
- Slow
- Standard
- Fast

**Factory setting**
Off

Build-up index damping

**Navigation**
[Expert → Sensor → Process param. → Build-up index → Build-UpIndexDamp (6840)]

**Description**
Enter damping value for build-up index.

**Damping value:**
- 0 = minimum damping
- 15 = maximum damping

The damping value should only be increased if the measured value is unstable.

**User entry**
0 to 15

**Factory setting**
0

Build-up index value

**Navigation**
[Expert → Sensor → Process param. → Build-up index → Build-up value (12111)]

**Description**
Shows current build-up index value.

**User interface**
0.0 to 100.0 %

**Factory setting**
0.0 %

**Additional information**
The formation of build-up is output as a percentage in the Build-up index value (→ 65) parameter. The higher the percentage, the thicker the build-up.
Build-up index value (→ 65) = 0%
- No build-up present
- Measuring tube as-delivered state (initial value)
- Measuring tube was cleaned thoroughly after formation of build-up

Build-up index value (→ 65) = 100%
- Value for the maximum measurable build-up thickness
- The thickness of the build-up at 100% varies depending on the process
- A value of 100% should not be equated with a blocked measuring tube

The percentage indicated in the Build-up index value (→ 65) parameter does not provide direct information about the absolute thickness or the composition of the build-up. Therefore, to make optimum use of the build-up detection function, it is necessary to first compare the formation of build-up in the process, as known from experience, with the associated Build-up index value (→ 65). The aim is to determine the Build-up index value (→ 65) at the time the cleaning is usually performed.

On the basis of the Build-up index value (→ 65) during cleaning, it is possible to make a valid assessment of the condition inside the measuring tube and to plan the cleaning using the build-up limit and build-up detection hysteresis parameters.

In addition, conclusions about possible effects on neighboring processes can be drawn from the Build-up index value (→ 65).

### Build-up limit

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Description</td>
<td>Enter limit value for the build-up index.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 100 %</td>
</tr>
<tr>
<td>Factory setting</td>
<td>50 %</td>
</tr>
</tbody>
</table>

### Build-up limit hysteresis

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>Enter hysteresis for build-up limit value.</td>
</tr>
<tr>
<td></td>
<td>If the value for build-up detection hysteresis is higher than the Build-up limit (→ 66), the &quot;Build-up detected&quot; diagnostic information is not reset until the measuring tube has been cleaned and a restart has been performed.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 100 %</td>
</tr>
<tr>
<td>Factory setting</td>
<td>20 %</td>
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</table>
3.2.4 "External compensation" submenu

**Navigation**

expert → sensor → external comp.

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<td><strong>Navigation</strong></td>
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<tr>
<td><strong>Description</strong></td>
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</table>
| **Selection** | • Fixed density  
• External density |
| **Factory setting** | Fixed density |

<table>
<thead>
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<th><strong>External density</strong></th>
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<td><strong>Navigation</strong></td>
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<td><strong>User entry</strong></td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
### Fixed density

**Navigation**
Expert → Sensor → External comp. → Fixed density (6623)

**Prerequisite**
The Fixed density option is selected in the Density source parameter (→ 67).

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

**User entry**
Positive floating-point number

**Factory setting**
Depends on country:
- 1000 kg/m³
- 62 lb/ft³

**Additional information**
Dependency

The unit is taken from the Density unit parameter (→ 49)

### Temperature source

**Navigation**
Expert → Sensor → External comp. → Temp. source (6712)

**Description**
Use this function to select the temperature source.

**Selection**
- Internal temperature sensor *
- Off
- External value

**Factory setting**
Off

### External temperature

**Navigation**

**Prerequisite**
The External value option is selected in the Temperature source parameter (→ 68).

**Description**
Displays the temperature read in from the external device.

**User entry**
Floating point number with sign

**Additional information**
Dependency

The unit is taken from the Temperature unit parameter (→ 47)

* Visibility depends on order options or device settings
Reference temperature

**Navigation**

Expert → Sensor → External comp. → Ref. temperature (1816)

**Prerequisite**

The **Fixed density** option or **External density** option are selected in the **Density source** parameter (→  67).

**Description**

Use this function to enter a reference temperature for calculating the reference density.

**User interface**

-273.15 to 99 999 °C

**Factory setting**

Country-specific:
- +20 °C
- +68 °F

**Additional information**

**Dependency**

The unit is taken from the **Temperature unit** parameter (→  47)

**Reference density calculation**

\[ \rho_n = \rho \cdot (1 + \alpha \cdot \Delta t + \beta \cdot \Delta t^2) \]

- \( \rho_n \): reference density
- \( \rho \): fluid density currently measured
- \( t \): fluid temperature currently measured
- \( t_N \): reference temperature at which the reference density is calculated (e.g. 20 °C)
- \( \Delta t \): \( t - t_N \)
- \( \alpha \): linear expansion coefficient of the fluid, unit = [1/K]; K = Kelvin
- \( \beta \): square expansion coefficient of the fluid, unit = [1/K²]

### 3.2.5 "Sensor adjustment" submenu

**Navigation**


- **Sensor adjustment**
  - Installation direction (1809) →  70
  - Integration time (6533) →  70
  - Measuring period (6536) →  70
- **Process variable adjustment** →  70
**Installation direction**

**Navigation**

Expert → Sensor → Sensor adjustm. → Install. direct. (1809)

**Description**

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

**Selection**

- Forward flow
- Reverse flow

**Factory setting**

Forward flow

**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 (6533)

**Description**

Displays the duration of the integration time.

*Description*

The duration of the measuring period should always be longer than the duration of the integration time.

**User interface**

1 to 65 ms

**Measuring period**

**Navigation**

Expert → Sensor → Sensor adjustm. → Measuring period (6536)

**Description**

Display the time of a full measuring period.

*Description*

The duration of the measuring period should always be longer than the duration of the integration time.

**User interface**

2 to 1000 ms

**"Process variable adjustment" submenu**

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust

- **Volume flow offset (1831)**
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
**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

**Mass flow factor**

**Navigation**
Expert → Sensor → Sensor adjustm. → Variable adjust → Mass flow factor (1846)

**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

**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
### Conductivity offset

**Navigation**
- Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset (1848)

**Prerequisite**
The **On** option is selected in the **Conductivity measurement** parameter (→ 55).

**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*

\[ \text{Corrected value} = (\text{factor} \times \text{value}) + \text{offset} \]

### Conductivity factor

**Navigation**
- Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor (1849)

**Prerequisite**
The **On** option is selected in the **Conductivity measurement** parameter (→ 55).

**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*

\[ \text{Corrected value} = (\text{factor} \times \text{value}) + \text{offset} \]

### 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*

\[ \text{Corrected value} = (\text{factor} \times \text{value}) + \text{offset} \]
## 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**

The temperature is read into the flowmeter from an external device.

**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**

The temperature is read into the flowmeter from an external device.

**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
**Corrected conductivity offset**

**Navigation**


**Prerequisite**

The On option is selected in the Conductivity measurement parameter (→ 55) parameter.

**Description**

Use this function to enter the zero point shift to trim the corrected conductivity. The conductivity unit on which the shift is based is μS/cm.

**User entry**

Signed floating-point number

**Factory setting**

0 S/m

**Additional information**

Description

Corrected value = (factor × value) + offset

**Corrected conductivity factor**

**Navigation**


**Prerequisite**

The On option is selected in the Conductivity measurement parameter (→ 55) parameter.

**Description**

Use this function to enter a quantity factor for the corrected conductivity. In each case, this factor refers to the conductivity in μS/cm.

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset

**Flow velocity offset**

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Flow vel. offset (1879)

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 m/s
Description of the device parameters

Additional information

Description
Corrected value = (factor × value) + offset

Flow velocity factor

Navigation

Description
Use this function to enter a quantity factor (without time) for the flow velocity. This multiplication factor is applied over the flow velocity 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 (2807)

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 (6522)

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 (6546)

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. (6718)

Prerequisite

The On option is selected in the Conductivity measurement parameter (→ 55) parameter.

Description

Displays the calibration factor for the conductivity measurement.

User interface

0.01 to 10000
3.3  "Communication" submenu

**Navigation**  
Expert → Communication

- ➤ Communication
  - ➤ Configuration
    - ➤ Configurable input assembly 101
    - ➤ Configurable input assembly 121
  - ➤ WLAN settings
    → 78
  → 78

3.3.1  "Configuration" submenu

**Navigation**  
Expert → Communication → Configuration

- ➤ Configuration
  - ➤ Configurable input assembly 101
    → 82
  - ➤ Configurable input assembly 121
    → 89
  - Web server language (7221)
    → 78
  - MAC address (7214)
    → 79
  - Hardware address mode (7401)
    → 79
  - DHCP client (7212)
    → 80
  - IP address (7209)
    → 80
  - Subnet mask (7211)
    → 81
  - Default gateway (7210)
    → 81
  - Web server functionality (7222)
    → 81
  - Login page (7273)
    → 82

**Web server language**

**Navigation**  
Expert → Communication → Configuration → Webserv.language (7221)

**Description**  
Use this function to select the Web server language setting.
Selection

- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العربية (Arabic)
- Bahasa Indonesia
- ภาษาไทย (Thai)
- tiếng Việt (Vietnamese)
- čeština (Czech)

Factory setting

English

MAC address

Navigation

Expert → Communication → Configuration → MAC Address (7214)

Description

Displays the MAC address of the measuring device.

User interface

Unique 12-digit character string comprising letters and numbers

Factory setting

Each measuring device is given an individual address.

Additional information

Example

For the display format

00:07:05:10:01:5F

Hardware address mode

Navigation

Expert → Communication → Configuration → HardwareAddrMode (7401)

Description

Displays the use of default network settings.

User interface

- Off
- On

Factory setting

Off

* Visibility depends on order options or device settings
3) Media Access Control
Description of the device parameters

Additional information  

User interface

The On option is displayed as soon as the last octet of the IP address is set via DIP switches.

DHCP client

Navigation

Expert → Communication → Configuration → DHCP client (7212)

Description

Use this function to activate and deactivate the DHCP client functionality.

Selection

- Off
- On

Factory setting

On

Additional information

Effect

If the DHCP client functionality of the web server is selected, the IP address (→ 80), Subnet mask (→ 81) and Default gateway (→ 81) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (→ 80) in the IP address parameter (→ 80) is ignored as long as the DHCP client parameter (→ 80) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 80) in the parameter of the same name is only used if the DHCP client parameter (→ 80) is inactive.

IP address

Navigation

Expert → Communication → Configuration → IP address (7209)

Description

Display or enter the IP address of the Web server integrated in the measuring device.

User entry

4 octet: 0 to 255 (in the particular octet)

Factory setting

192.168.1.212

Additional information

User entry

The IP address can be write-accessed only if the DHCP client (→ 80) is disabled. If one of the 8 DIP switches for setting the last octet is not equal to 0, its value is used for the last octet and also displayed. The IP address cannot then be write-accessed. If an IP address was set using the DIP switches, the last address to be set is retained even after the DIP switches have been disabled. However, it can be changed again in this parameter.
### Subnet mask

**Navigation**  
Expert → Communication → Configuration → Subnet mask (7211)

**Description**  
Display or enter the subnet mask.

**User entry**  
4 octet: 0 to 255 (in the particular octet)

**Factory setting**  
255.255.255.0

### Default gateway

**Navigation**  
Expert → Communication → Configuration → Default gateway (7210)

**Description**  
Display or enter the Default gateway (→ 81).

**User entry**  
4 octet: 0 to 255 (in the particular octet)

**Factory setting**  
0.0.0.0

### Web server functionality

**Navigation**  
Expert → Communication → Configuration → Webserver funct. (7222)

**Description**  
Use this function to switch the Web server on and off.

**Selection**  
- Off
- On

**Factory setting**  
On

**Additional information**  

**Description**  
Once disabled, the Web server functionality can only be re-enabled via or the operating tool FieldCare.

**Selection**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| Off    | - The web server is completely disabled.  
         - Port 80 is locked. |
| On     | - The complete functionality of the web server is available.  
         - JavaScript is used.  
         - The password is transferred in an encrypted state.  
         - Any change to the password is also transferred in an encrypted state. |
### Login page

**Navigation**

🔗🔗 Expert → Communication → Configuration → Login page (7273)

**Description**

Use this function to select the format of the login page.

**Selection**

- Without header
- With header

**Factory setting**

With header

---

### Capability flags

**Navigation**

🔗🔗 Expert → Communication → Configuration → Capability flags (7439)

**Description**

Displays the DLR (Device Level Ring) properties of the device.

**User interface**

- Announce-based ring node
- Beacon-based ring node
- Supervisor capable
- Redundant gateway capable
- Flush table frame capable

**Factory setting**

Beacon-based ring node

---

### User description

**Navigation**

🔗🔗 Expert → Communication → Configuration → User description (7432)

**Description**

Use this function to enter the user-defined device name and location (separated by a semicolon).

**User entry**

Character string comprising numbers, letters and special characters (128)

**Factory setting**

description;location

---

"Configurable input assembly" submenu

**Navigation**

🔗🔗 Expert → Communication → Configuration → Input assembly

- Configurable input assembly 101

  **Input assembly position 1 (7402)**
Input assembly position 1

Navigation

Expert → Communication → Configuration → InputAssemb.101 → Position 1 (7402)

Description

Use this function to select a process variable for input value 1.

Selection

- Off
- Mass flow
- Volume flow
Description of the device parameters

- Conductivity *
- Velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature

**Factory setting**

Volume flow

**Input assembly position 2**

**Navigation**

Expert → Communication → Configuration → InputAssemb.101 → Position 2 (7413)

**Description**

Use this function to select a process variable for input value 2.

**Selection**

Picklist, see Input assembly position 1 parameter (→ 83)

**Factory setting**

Mass flow

**Input assembly position 3**

**Navigation**

Expert → Communication → Configuration → InputAssemb.101 → Position 3 (7415)

**Description**

Use this function to select a process variable for input value 3.

**Selection**

Picklist, see Input assembly position 1 parameter (→ 83)

**Factory setting**

Velocity

**Input assembly position 4**

**Navigation**

Expert → Communication → Configuration → InputAssemb.101 → Position 4 (7416)

**Description**

Use this function to select a process variable for input value 4.

**Selection**

Picklist, see Input assembly position 1 parameter (→ 83)

**Factory setting**

Totalizer 1

* Visibility depends on order options or device settings
<table>
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<th>Input assembly position 5</th>
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<tr>
<td><strong>Navigation</strong></td>
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<td><strong>Description</strong></td>
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<tr>
<td><strong>Selection</strong></td>
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<tr>
<td><strong>Factory setting</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Input assembly position 6</th>
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</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
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<tr>
<td><strong>Description</strong></td>
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<tr>
<td><strong>Selection</strong></td>
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<tr>
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<table>
<thead>
<tr>
<th>Input assembly position 7</th>
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<tbody>
<tr>
<td><strong>Navigation</strong></td>
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<tr>
<td><strong>Selection</strong></td>
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<tr>
<th>Input assembly position 8</th>
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<tr>
<td><strong>Navigation</strong></td>
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<td><strong>Description</strong></td>
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<tr>
<td><strong>Selection</strong></td>
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<td><strong>Factory setting</strong></td>
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</tbody>
</table>
Description of the device parameters

Proline Promag 400 EtherNet/IP

Input assembly position 9

Navigation

Expert → Communication → Configuration → InputAssemb.101 → Position 9 (7421)

Description

Use this function to select a process variable for input value 9.

Selection

Picklist, see Input assembly position 1 parameter (→  83)

Factory setting

Off

Input assembly position 10

Navigation

Expert → Communication → Configuration → InputAssemb.101 → Position 10 (7403)

Description

Use this function to select a process variable for input value 10.

Selection

Picklist, see Input assembly position 1 parameter (→  83)

Factory setting

Off

Input assembly position 11

Navigation

Expert → Communication → Configuration → InputAssemb.101 → Position 11 (7404)

Description

Use this function to select a process variable for input value 11.

Selection

- Off
- Actual diagnostics
- Previous diagnostics
- Mass flow unit
- Volume flow unit
- Temperature unit *
- Conductivity unit *
- Unit totalizer 1
- Unit totalizer 2
- Unit totalizer 3
- Velocity unit
- Verification results *
- Verification status *

Factory setting

Volume flow unit

* Visibility depends on order options or device settings
<table>
<thead>
<tr>
<th>Input assembly position 12</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → Configuration → InputAssemb.101 → Position 12 (7405)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to select a process variable for input value 12.</td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td>Picklist, see Input assembly position 11 parameter (→ 86)</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>Mass flow unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input assembly position 13</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → Configuration → InputAssemb.101 → Position 13 (7406)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to select a process variable for input value 13.</td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td>Picklist, see Input assembly position 11 parameter (→ 86)</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>Velocity unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input assembly position 14</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → Configuration → InputAssemb.101 → Position 14 (7407)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to select a process variable for input value 14.</td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td>Picklist, see Input assembly position 11 parameter (→ 86)</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>Unit totalizer 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input assembly position 15</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → Configuration → InputAssemb.101 → Position 15 (7408)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to select a process variable for input value 15.</td>
</tr>
<tr>
<td><strong>Selection</strong></td>
<td>Picklist, see Input assembly position 11 parameter (→ 86)</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>Unit totalizer 2</td>
</tr>
</tbody>
</table>
Input assembly position 16

Navigation
Expert → Communication → Configuration → InputAssemb.101 → Position 16

(7409)

Description
Use this function to select a process variable for input value 16.

Selection
Picklist, see Input assembly position 11 parameter (→ 86)

Factory setting
Unit totalizer 3

Input assembly position 17

Navigation
Expert → Communication → Configuration → InputAssemb.101 → Position 17

(7410)

Description
Use this function to select a process variable for input value 17.

Selection
Picklist, see Input assembly position 11 parameter (→ 86)

Factory setting
Temperature unit

Input assembly position 18

Navigation
Expert → Communication → Configuration → InputAssemb.101 → Position 18

(7411)

Description
Use this function to select a process variable for input value 18.

Selection
Picklist, see Input assembly position 11 parameter (→ 86)

Factory setting
Off

Input assembly position 19

Navigation
Expert → Communication → Configuration → InputAssemb.101 → Position 19

(7412)

Description
Use this function to select a process variable for input value 19.

Selection
Picklist, see Input assembly position 11 parameter (→ 86)

Factory setting
Off
Input assembly position 20

Navigation

Description
Use this function to select a process variable for input value 20.

Selection
Picklist, see Input assembly position 11 parameter (→ 86)

Factory setting
Off

"Configurable input assembly 121" submenu

Navigation
[Diagram] Expert → Communication → Configuration → InputAssemb.121

| Input assembly position 1 (7434) | → 90 |
| Input assembly position 2 (7435) | → 90 |
| Input assembly position 3 (7436) | → 91 |
| Input assembly position 4 (7437) | → 91 |
| Input assembly position 5 (7438) | → 92 |
| Input assembly position 6 (7440) | → 92 |
| Input assembly position 7 (7441) | → 93 |
| Input assembly position 8 (7442) | → 94 |
| Input assembly position 9 (7443) | → 94 |
| Input assembly position 10 (7444) | → 95 |
| Input assembly position 11 (7445) | → 95 |
| Input assembly position 12 (7446) | → 96 |
| Input assembly position 13 (7447) | → 96 |
| Input assembly position 14 (7448) | → 97 |
| Input assembly position 15 (7449) | → 97 |
Description of the device parameters

Proline Promag 400 EtherNet/IP

Input assembly position 1

Navigation

Expert → Communication → Configuration → InputAssemb.121 → Position 1 (7434)

Description

Select process variable for input value.

Selection

• Off
• Mass flow
• Volume flow
• Corrected volume flow
• Conductivity
• Corrected conductivity *
• Flow velocity
• Totalizer 1
• Totalizer 2
• Totalizer 3
• Electronics temperature
• Temperature *
• Build-up index *
• Reference electrode potential against PE *
• Coil current shot time *
• Noise *
• Test point 1
• Test point 2
• Test point 3

Factory setting

Volume flow

Input assembly position 2

Navigation

Expert → Communication → Configuration → InputAssemb.121 → Position 2 (7435)

Description

Select process variable for input value.

Selection

• Off
• Mass flow
• Volume flow
• Corrected volume flow
• Conductivity
• Corrected conductivity *
• Flow velocity
• Totalizer 1
• Totalizer 2
• Totalizer 3
• Electronics temperature
• Temperature *
• Build-up index *
• Reference electrode potential against PE *
• Coil current shot time *
• Noise *

* Visibility depends on order options or device settings
Proline Promag 400 EtherNet/IP

Description of the device parameters

- Test point 1
- Test point 2
- Test point 3

**Factory setting**
Mass flow

### Input assembly position 3

**Navigation**
Expert → Communication → Configuration → InputAssemb.121 → Position 3 (7436)

**Description**
Select process variable for input value.

**Selection**
- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity
- Corrected conductivity
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature
- Build-up index
- Reference electrode potential against PE
- Coil current shot time
- Noise
- Test point 1
- Test point 2
- Test point 3

**Factory setting**
Flow velocity

### Input assembly position 4

**Navigation**
Expert → Communication → Configuration → InputAssemb.121 → Position 4 (7437)

**Description**
Select process variable for input value.

**Selection**
- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity
- Corrected conductivity
- Flow velocity
- Totalizer 1

*Visibility depends on order options or device settings*
Description of the device parameters

- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature *
- Build-up index *
- Reference electrode potential against PE *
- Coil current shot time *
- Noise *
- Test point 1
- Test point 2
- Test point 3

Factory setting

Totalizer 1

Input assembly position 5

Navigation

Expert → Communication → Configuration → InputAssemb.121 → Position 5 (7438)

Description

Select process variable for input value.

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity *
- Corrected conductivity *
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature *
- Build-up index *
- Reference electrode potential against PE *
- Coil current shot time *
- Noise *
- Test point 1
- Test point 2
- Test point 3

Factory setting

Totalizer 2

Input assembly position 6

Navigation

Expert → Communication → Configuration → InputAssemb.121 → Position 6 (7440)

Description

Select process variable for input value.

* Visibility depends on order options or device settings
### Selection
- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity
- Corrected conductivity
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature
- Build-up index
- Reference electrode potential against PE
- Coil current shot time
- Noise
- Test point 1
- Test point 2
- Test point 3

**Factory setting**: Totalizer 3

### Input assembly position 7

#### Navigation
Expert → Communication → Configuration → InputAssemb.121 → Position 7 (7441)

#### Description
Select process variable for input value.

#### Selection
- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity
- Corrected conductivity
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature
- Build-up index
- Reference electrode potential against PE
- Coil current shot time
- Noise
- Test point 1
- Test point 2
- Test point 3

**Factory setting**: Electronics temperature

*Visibility depends on order options or device settings*
Description of the device parameters

Proline Promag 400 EtherNet/IP

---

**Input assembly position 8**

**Navigation**

Expert → Communication → Configuration → InputAssemb.121 → Position 8 (7442)

**Description**

Select process variable for input value.

**Selection**

- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity
- Corrected conductivity *
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature *
- Build-up index *
- Reference electrode potential against PE *
- Coil current shot time *
- Noise *
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Corrected volume flow

---

**Input assembly position 9**

**Navigation**

Expert → Communication → Configuration → InputAssemb.121 → Position 9 (7443)

**Description**

Select process variable for input value.

**Selection**

- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity
- Corrected conductivity *
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature *
- Build-up index *
- Reference electrode potential against PE *
- Coil current shot time *
- Noise *

* Visibility depends on order options or device settings
- Test point 1
- Test point 2
- Test point 3

Factory setting: Off

Input assembly position 10

**Navigation**

Expert → Communication → Configuration → InputAssemb.121 → Position 10

(7444)

**Description**

Select process variable for input value.

**Selection**

- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Conductivity *
- Corrected conductivity *
- Flow velocity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronics temperature
- Temperature *
- Build-up index *
- Reference electrode potential against PE *
- Coil current shot time *
- Noise *
- Test point 1
- Test point 2
- Test point 3

Factory setting: Off

Input assembly position 11

**Navigation**

Expert → Communication → Configuration → InputAssemb.121 → Position 11

(7445)

**Description**

Select process variable for input value.

**Selection**

- Off
- Actual diagnostics
- Previous diagnostics
- Low flow cut off
- Verification results *

* Visibility depends on order options or device settings
Description of the device parameters

Proline Promag 400 EtherNet/IP

- Verification status
- Build-up index
- Empty pipe detection

Factory setting: Actual diagnostics

Input assembly position 12

Navigation: Expert → Communication → Configuration → InputAssemb.121 → Position 12

(7446)

Description: Select process variable for input value.

Selection:
- Off
- Actual diagnostics
- Previous diagnostics
- Low flow cut off
- Verification results
- Verification status
- Build-up index
- Empty pipe detection

Factory setting: Previous diagnostics

Input assembly position 13

Navigation: Expert → Communication → Configuration → InputAssemb.121 → Position 13

(7447)

Description: Select process variable for input value.

Selection:
- Off
- Actual diagnostics
- Previous diagnostics
- Low flow cut off
- Verification results
- Verification status
- Build-up index
- Empty pipe detection

Factory setting: Verification status

* Visibility depends on order options or device settings
Input assembly position 14

Navigation

Expert → Communication → Configuration → InputAssemb.121 → Position 14

Description

Select process variable for input value.

Selection

- Off
- Actual diagnostics
- Previous diagnostics
- Low flow cut off
- Verification results *
- Verification status *
- Build-up index *
- Empty pipe detection

Factory setting

Verification results

Input assembly position 15

Navigation

Expert → Communication → Configuration → InputAssemb.121 → Position 15

Description

Select process variable for input value.

Selection

- Off
- Actual diagnostics
- Previous diagnostics
- Low flow cut off
- Verification results *
- Verification status *
- Build-up index *
- Empty pipe detection

Factory setting

Off

3.3.2 "WLAN settings" wizard

Navigation

Expert → Communication → WLAN settings

WLAN settings

WLAN (2702) → 98
WLAN mode (2717) → 99

* Visibility depends on order options or device settings
### WLAN

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<th>Description</th>
<th>Page</th>
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</tr>
<tr>
<td>Network security (2705)</td>
<td>99</td>
</tr>
<tr>
<td>Security identification (2718)</td>
<td>100</td>
</tr>
<tr>
<td>User name (2715)</td>
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<tr>
<td>WLAN password (2716)</td>
<td>100</td>
</tr>
<tr>
<td>WLAN IP address (2711)</td>
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</tr>
<tr>
<td>WLAN MAC address (2703)</td>
<td>101</td>
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<tr>
<td>WLAN subnet mask (2709)</td>
<td>101</td>
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<tr>
<td>WLAN MAC address (2703)</td>
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<td>WLAN passphrase (2706)</td>
<td>101</td>
</tr>
<tr>
<td>WLAN MAC address (2703)</td>
<td>101</td>
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<tr>
<td>Assign SSID name (2708)</td>
<td>102</td>
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<td>102</td>
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<tr>
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<td>Connection state (2722)</td>
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<td>Received signal strength (2721)</td>
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<tr>
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<td>Gateway IP address (2719)</td>
<td>103</td>
</tr>
<tr>
<td>IP address domain name server (2720)</td>
<td>104</td>
</tr>
</tbody>
</table>

### Navigation

Expert → Communication → WLAN settings → WLAN (2702)

### Description

Use this function to enable and disable the WLAN connection.
Selection
- Disable
- Enable

Factory setting
Enable

WLAN mode

Navigation
Expert → Communication → WLAN settings → WLAN mode (2717)

Description
Use this function to select the WLAN mode.

Selection
WLAN access point

Factory setting
WLAN access point

SSID name

Navigation
Expert → Communication → WLAN settings → SSID name (2714)

Prerequisite
The client is activated.

Description
Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.

User entry
-

Factory setting
-

Network security

Navigation
Expert → Communication → WLAN settings → Network security (2705)

Description
Use this function to select the type of security for the WLAN interface.

Selection
- Unsecured
- WPA2-PSK
- EAP-PEAP with MSCHAPv2 *
- EAP-PEAP MSCHAPv2 no server authentic. *
- EAP-TLS *

Factory setting
WPA2-PSK

* Visibility depends on order options or device settings
### Additional information

**Selection**
- **Unsecured**
  Access the WLAN connection without identification.
- **WPA2-PSK**
  Access the WLAN connection with a network key.

### Security identification

- **Navigation**
  - Expert → Communication → WLAN settings → Sec. identific. (2718)
- **Description**
  Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).
- **User interface**
  - Trusted issuer certificate
  - Device certificate
  - Device private key

### User name

- **Navigation**
  - Expert → Communication → WLAN settings → User name (2715)
- **Description**
  Use this function to enter the username of the WLAN network.
- **User entry**
  -
- **Factory setting**
  -

### WLAN password

- **Navigation**
  - Expert → Communication → WLAN settings → WLAN password (2716)
- **Description**
  Use this function to enter the WLAN password for the WLAN network.
- **User entry**
  -
- **Factory setting**
  -

### WLAN IP address

- **Navigation**
  - Expert → Communication → WLAN settings → WLAN IP address (2711)
- **Description**
  Use this function to enter the IP address of the measuring device's WLAN connection.
### WLAN MAC address

**Navigation**  
Expert → Communication → WLAN settings → WLAN MAC address (2703)

**Description**  
Displays the MAC address of the measuring device.

**User interface**  
Unique 12-digit character string comprising letters and numbers

**Factory setting**  
Each measuring device is given an individual address.

**Additional information**  
*Example*  
For the display format  
00:07:05:10:01:5F

### WLAN subnet mask

**Navigation**  
Expert → Communication → WLAN settings → WLAN subnet mask (2709)

**Description**  
Use this function to enter the subnet mask.

**User entry**  
4 octet: 0 to 255 (in the particular octet)

**Factory setting**  
255.255.255.0

### WLAN passphrase

**Navigation**  
Expert → Communication → WLAN settings → WLAN passphrase (2706)

**Prerequisite**  
The **WPA2-PSK** option is selected in the **Security type** parameter (→ 99).

**Description**  
Use this function to enter the network key.

**User entry**  
8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

**Factory setting**  
Serial number of the measuring device (e.g. L100A802000)

---

4) Media Access Control
**Assign SSID name**

**Navigation**
Expert → Communication → WLAN settings → Assign SSID name (2708)

**Description**
Use this function to select which name is used for the SSID.

**Selection**
- Device tag
- User-defined

**Factory setting**
User-defined

**Additional information**

- **Selection**
  - Device tag
  The device tag name is used as the SSID.
  - User-defined
  A user-defined name is used as the SSID.

**SSID name**

**Navigation**
Expert → Communication → WLAN settings → SSID name (2707)

**Prerequisite**
- The User-defined option is selected in the Assign SSID name parameter (→ 102).
- The WLAN access point option is selected in the WLAN mode parameter (→ 99).

**Description**
Use this function to enter a user-defined SSID name.

**User entry**
Max. 32-digit character string comprising numbers, letters and special characters

**Factory setting**

**2.4 GHz WLAN channel**

**Navigation**
Expert → Communication → WLAN settings → WLAN channel (2704)

**Description**
Use this function to enter the 2.4 GHz WLAN channel.

**User entry**
1 to 11

**Factory setting**
6

**Additional information**

- It is only necessary to enter a 2.4 GHz WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

---

5) Service Set Identifier
Select antenna

**Navigation**  
Expert → Communication → WLAN settings → Select antenna (2713)

**Description**  
Use this function to select whether the external or internal antenna is used for reception.

**Selection**  
- External antenna
- Internal antenna

**Factory setting**  
Internal antenna

Connection state

**Navigation**  
Expert → Communication → WLAN settings → Connection state (2722)

**Description**  
The connection status is displayed.

**User interface**  
- Connected
- Not connected

**Factory setting**  
Not connected

Received signal strength

**Navigation**  
Expert → Communication → WLAN settings → Rec.sig.strength (2721)

**Description**  
Displays the signal strength received.

**User interface**  
- Low
- Medium
- High

**Factory setting**  
High

Gateway IP address

**Navigation**  
Expert → Communication → WLAN settings → Gateway IP addr. (2719)

**Description**  
Use this function to enter the IP address of the gateway.

**User interface**  
Character string comprising numbers, letters and special characters

**Factory setting**  
192.168.1.212
**IP address domain name server**

**Navigation**

Expert → Communication → WLAN settings → IP address DNS (2720)

**Description**

Use this function to enter the IP address of the domain name server.

**User interface**

Character string comprising numbers, letters and special characters

**Factory setting**

192.168.1.212

---

### 3.4 "Application" submenu

**Navigation**

Expert → Application

![Application menu](image)

- Reset all totalizers (2806) → 104
- Totalizer 1 to n → 105

---

**Reset all totalizers**

**Navigation**

Expert → Application → Reset all tot. (2806)

**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**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.</td>
</tr>
</tbody>
</table>
3.4.1 "Totalizer 1 to n" submenu

Navigation:  
Expert → Application → Totalizer 1 to n

Assign process variable (0914–1 to n) → 105
Unit totalizer 1 to n (0915–1 to n) → 105
Totalizer operation mode (0908–1 to n) → 107
Control Totalizer 1 to n (0912–1 to n) → 107
Preset value 1 to n (0913–1 to n) → 108
Failure mode (0901–1 to n) → 108

Assign process variable

Description: Use this function to select a process variable for the Totalizer 1 to n.

Selection

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

Factory setting: Volume 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 the Assign process variable parameter (→ 105) is still displayed in the Totalizer 1 to n submenu. All other parameters in the submenu are hidden.

Unit totalizer 1 to n

Navigation:  
Expert → Application → Totalizer 1 to n → Unit totalizer 1 to n (0915–1 to n)

Prerequisite: A process variable is selected in the Assign process variable parameter (→ 105) of the Totalizer 1 to n submenu.
**Description**

Use this function to select the process variable unit for the Totalizer 1 to n (→ 105).

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• g</td>
<td>• oz</td>
<td>• gal (imp)</td>
</tr>
<tr>
<td>• kg</td>
<td>• lb</td>
<td>• Mgal (imp)</td>
</tr>
<tr>
<td>• t</td>
<td>• STon</td>
<td>• bbl (imp:beer)</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• cm³</td>
<td>• af</td>
<td>• gal (imp)</td>
</tr>
<tr>
<td>• dm³</td>
<td>• ft³</td>
<td>• Mgal (imp)</td>
</tr>
<tr>
<td>• m³</td>
<td>• Mft³</td>
<td>• bbl (imp:beer)</td>
</tr>
<tr>
<td>• ml</td>
<td>• fl oz (us)</td>
<td>• bbl (imp:oil)</td>
</tr>
<tr>
<td>• l</td>
<td>• gal (us)</td>
<td></td>
</tr>
<tr>
<td>• hl</td>
<td>• kgal (us)</td>
<td></td>
</tr>
<tr>
<td>• Ml Mega</td>
<td>• Mgal (us)</td>
<td></td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or

<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>• Nhl</td>
<td>• MMSft³</td>
<td></td>
</tr>
<tr>
<td>• Nm³</td>
<td>• Sgal (us)</td>
<td></td>
</tr>
<tr>
<td>• Sl</td>
<td>• Sbbl (us:liq.)</td>
<td></td>
</tr>
<tr>
<td>• Sm³</td>
<td>• Sbbl (us:oil)</td>
<td></td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings

or

**Other units**

None

* Visibility depends on order options or device settings

**Factory setting**

Country-specific:

- • l
- • gal (us)

**Additional information**

* Description

The unit is selected separately for each totalizer. It is independent of the selection made in the System units submenu (→ 43).

* Selection

The selection is dependent on the process variable selected in the Assign process variable parameter (→ 105).
Totalizer operation mode

Navigation

Expert → Application → Totalizer 1 to n → Operation mode (0908–1 to n)

Prerequisite

A process variable is selected in the Assign process variable parameter (→ 105) of the Totalizer 1 to n submenu.

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
  Flow values in the forward and reverse flow direction 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 in the reverse flow direction is totalized (= reverse flow quantity).

Control Totalizer 1 to n

Navigation

Expert → Application → Totalizer 1 to n → Control Tot. 1 to n (0912–1 to n)

Prerequisite

A process variable is selected in the Assign process variable parameter (→ 105) of the Totalizer 1 to n submenu.

Description

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

Selection

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

Factory setting

Totalize

Additional information Selection

<table>
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<th>Description</th>
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</tr>
<tr>
<td>Reset + hold</td>
<td>The totaling process is stopped and the totalizer is reset to 0.</td>
</tr>
<tr>
<td>Preset + hold</td>
<td>The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter.</td>
</tr>
<tr>
<td>Preset + totalize</td>
<td>The totalizer is reset to 0 and the totaling process is restarted.</td>
</tr>
</tbody>
</table>
### Preset value 1 to n

**Navigation**

Expert → Application → Totalizer 1 to n → Preset value 1 to n (0913–1 to n)

**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→ 105) of the **Totalizer 1 to n** submenu.

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 l

**Additional information**

*User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 105).

*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 n → Failure mode (0901–1 to n)

**Prerequisite**

A process variable is selected in the **Assign process variable** parameter (→ 105) of the **Totalizer 1 to n** submenu.

**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
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**
The totalizer is stopped in the event of a device alarm.
- **Actual value**
The totalizer continues to count based on the actual (current) 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

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</table>
Actual diagnostics

**Navigation**

Expert → Diagnostics → Actual diagnos. (0691)

**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 (→ 112).

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

*Example*

For the display format:

F271 Main electronics 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 (→ 110).

*Example*

For the display format:

24d12h13m00s

Previous diagnostics

**Navigation**

Expert → Diagnostics → Prev.diagnostics (0690)

**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.
Proline Promag 400 EtherNet/IP

Description of the device parameters

Additional information

**Display**

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

*Example*
For the display format:

F271 Main electronics 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 (→ 110).

*Example*
For the display format:

24d12h13m00s

**Operating time from restart**

**Navigation**

[ ] [ ] Expert → Diagnostics → Time fr. restart (0653)

**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 (0652)

**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)
Description of the device parameters

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

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<tr>
<td>Diagnostics 4 (0695) → 114</td>
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<td>Diagnostics 5 (0696) → 115</td>
</tr>
</tbody>
</table>

**Diagnostics 1**

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)

**Description**

Displays the current diagnostics message with the highest priority.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

*Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

**Examples**

For the display format:

- ΔS442 Frequency output
- ☒F276 I/O module failure

**Timestamp 1**

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

Displays the operating time when the diagnostic message with the 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 1 parameter (→ 112).

Example
For the display format:
24d12h13m00s

Diagnostics 2

Navigation  Expert → Diagnostics → Diagnostic list → Diagnostics 2 (0693)

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

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

Additional information  Display

   Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

Examples
For the display format:
- △S442 Frequency output
- ☧F276 I/O module failure

Timestamp 2

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 (→ 113).

Example
For the display format:
24d12h13m00s
### Diagnostics 3

**Navigation**  
Expert → Diagnostics → Diagnostic list → Diagnostics 3 (0694)

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

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

**Additional information**  
Display

* Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the key.

*Examples*

For the display format:
- ΔS442 Frequency output
- ⊕F276 I/O module failure

---

### Timestamp 3

**Navigation**  
Expert → Diagnostics → Diagnostic list → Timestamp

**Description**  
Displays the operating time when the diagnostic message with the third-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 3 parameter (→ 114).

*Example*

For the display format:
24d12h13m00s

---

### Diagnostics 4

**Navigation**  
Expert → Diagnostics → Diagnostic list → Diagnostics 4 (0695)

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

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

**Display**

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the ° key.

**Examples**

For the display format:
- △S442 Frequency output
- ✗F276 I/O module failure

---

### Timestamp 4

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

Displays the operating time when the diagnostic message with the fourth-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 4 parameter (→  114).

**Example**

For the display format:
24d12h13m00s

---

### Diagnostics 5

**Navigation**

Expert → Diagnostics → Diagnostic list → Diagnostics 5 (0696)

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

**Display**

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the ° key.

**Examples**

For the display format:
- △S442 Frequency output
- ✗F276 I/O module failure
**Timestamp 5**

**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 (→ 115).

*Example*

For the display format:

24d12h13m00s

---

### 3.5.2 "Event logbook" submenu

**Viewing event messages**

Event messages are displayed in chronological order. The event history includes both diagnostic events and information events. The symbol in front of the timestamp indicates whether the event has started or ended.

**Navigation**

Expert → Diagnostics → Event logbook

**Filter options**

Expert → Diagnostics → Event logbook → Filter options (0705)

**Description**

Use this function to select the category whose event messages are displayed in the event list of the local display.

**Selection**

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

Additional information  
Description

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

"Event list" submenu

The Event list submenu is only displayed if operating via the local display. If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module. If operating via the Web browser, the event messages can be found directly in the Event logbook submenu.

Navigation  
Expert → Diagnostics → Event logbook → Event list

Event list

Navigation  
Expert → Diagnostics → Event logbook → Event list

Description  
Displays the history of event messages of the category selected in the Filter options parameter (→ 116).

User interface  
- For a 'Category F' event message:
  Information event, short message, symbol for event recording and operating time when error occurred
- For a 'Category F, C, S, M' event message (status signal):
  Diagnostics code, short message, symbol for event recording and operating time when error occurred

Additional information  
Description

A maximum of 20 event messages are displayed in chronological order.
The following symbols indicate whether an event has occurred or has ended:

- •: Occurrence of the event
- •: End of the event

**Examples**

For the display format:

- I1091 Configuration modified
  • 24d12h13m00s
- ΔS442 Frequency output
  • 01d04h12min30s

Additional information, such as remedial measures, can be retrieved via the ⌁ key.

**HistoROM**

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

To order the **Extended HistoROM** application package, see the "Application packages" section of the "Technical Information" document.

### 3.5.3 "Device information" submenu

**Navigation**

Expert → Diagnostics → Device info

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<td>Configuration counter (2751)</td>
<td>121</td>
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<tr>
<td>ENP version (0012)</td>
<td>121</td>
</tr>
</tbody>
</table>
Device tag

**Navigation**

![Expert → Diagnostics → Device info → Device tag (0011)](image)

**Description**

Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

**User interface**

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

**Factory setting**

Promag

**Additional information**

*User interface*

![Position of the header text on the display](image)

1. Position of the header text on the display

The number of characters displayed depends on the characters used.

Serial number

**Navigation**

![Expert → Diagnostics → Device info → Serial number (0009)](image)

**Description**

Displays the serial number of the measuring device.

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

**User interface**

Max. 11-digit character string comprising letters and numbers.

**Additional information**

*Description*

*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 (0010)](image)

**Description**

Displays the device firmware version installed.

**User interface**

Character string in the format xx.yy.zz
Additional information

Display

The Firmware version is also located:
- On the title page of the Operating instructions
- On the transmitter nameplate

Device name

Navigation

Expert → Diagnostics → Device info → Device name (0013)

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 400 EIP

Order code

Navigation

Expert → Diagnostics → Device info → Order code (0008)

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 (0023)

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
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.

*Extended order code 1 parameter (→ 120)*

Extended order code 2

**Navigation**

Expert → Diagnostics → Device info → Ext. order cd. 2 (0021)

**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* (→ 120)

Extended order code 3

**Navigation**

Expert → Diagnostics → Device info → Ext. order cd. 3 (0022)

**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* (→ 120)

Configuration counter

**Navigation**

Expert → Diagnostics → Device info → Config. counter (2751)

**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

ENP version

**Navigation**

Expert → Diagnostics → Device info → ENP version (0012)

**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.

### 3.5.4 "Main electronic module + I/O module 1" submenu

#### Navigation

Expert → Diagnostics → Mainboard module

#### Firmware version

**Navigation**  
Expert → Diagnostics → Main elec. mod. → Firmware version (0072)

**Description**  
Use this function to display the software revision of the module.

**User interface**  
Positive integer

#### Build no. software

**Navigation**  
Expert → Diagnostics → Main elec. mod. → Build no. softw. (0079)

**Description**  
Use this function to display the software build number of the module.

**User interface**  
Positive integer

#### Bootloader revision

**Navigation**  
Expert → Diagnostics → Main elec. mod. → Bootloader rev. (0073)

**Description**  
Use this function to display the bootloader revision of the software.
Proline Promag 400 EtherNet/IP  
Description of the device parameters

User interface  Positive integer

3.5.5 "Sensor electronic module (ISEM)" submenu

Navigation  ▶ Expert → Diagnostics → Sens. electronic

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</thead>
<tbody>
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<td>Build no. software</td>
<td>→ 123</td>
</tr>
<tr>
<td>Bootloader revision</td>
<td>→ 123</td>
</tr>
</tbody>
</table>

Firmware version

Navigation  ▶ Expert → Diagnostics → Sens. electronic → Firmware version (0072)

Description  Use this function to display the software revision of the module.

User interface  Positive integer

Build no. software

Navigation  ▶ Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description  Use this function to display the software build number of the module.

User interface  Positive integer

Bootloader revision


Description  Use this function to display the bootloader revision of the software.

User interface  Positive integer
### 3.5.6 "Display module" submenu

**Navigation**

Expert → Diagnostics → Display module

**Display module**

- **Firmware version (0072)**
- **Build no. software (0079)**
- **Bootloader revision (0073)**

**Firmware version**

**Navigation**

Expert → Diagnostics → Display module → Firmware version (0072)

**Description**

Use this function to display the software revision of the module.

**User interface**

Positive integer

**Build no. software**

**Navigation**

Expert → Diagnostics → Display module → Build no. softw. (0079)

**Description**

Use this function to display the software build number of the module.

**User interface**

Positive integer

**Bootloader revision**

**Navigation**

Expert → Diagnostics → Display module → Bootloader rev. (0073)

**Description**

Use this function to display the bootloader revision of the software.

**User interface**

Positive integer
3.5.7 "Data logging" submenu

Navigation  

Expert → Diagnostics → Data logging

Prerequisite  
The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 38).

Description  
Use this function to assign a process variable to the logging channel.
Description of the device parameters  Proline Promag 400 EtherNet/IP

Selection
- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature
- Noise
- Coil current shot time
- Reference electrode potential against PE
- Build-up index
- Test point 1
- Test point 2
- Test point 3

Factory setting  Off

Additional information  Description
A total of 1000 measured values can be logged. This means:
- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).

The log contents are cleared if the option selected is changed.

Assign channel 2

Navigation  Expert → Diagnostics → Data logging → Assign chan. 2 (0852)

Prerequisite  The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 38).

Description  Use this function to assign a process variable to the logging channel.

Selection  For the picklist, see Assign channel 1 parameter (→ 125)

Factory setting  Off

* Visibility depends on order options or device settings
Assign channel 3

Navigation
Expert → Diagnostics → Data logging → Assign chan. 3 (0853)

Prerequisite
The Extended HistOROM application package is available.

Description
Use this function to assign a process variable to the logging channel.

Selection
For the picklist, see Assign channel 1 parameter (→ 38)

Factory setting
Off

Assign channel 4

Navigation
Expert → Diagnostics → Data logging → Assign chan. 4 (0854)

Prerequisite
The Extended HistOROM application package is available.

Description
Use this function to assign a process variable to the logging channel.

Selection
For the picklist, see Assign channel 1 parameter (→ 38)

Factory setting
Off

Logging interval

Navigation
Expert → Diagnostics → Data logging → Logging interval (0856)

Prerequisite
The Extended HistOROM application package is available.

Description
Use this function to enter the logging interval $T_{log}$ for data logging.

User entry
0.1 to 3 600.0 s

Factory setting
1.0 s
Additional information

**Description**
This defines the interval between the individual data points in the data log, and thus the maximum loggable process time \( T_{\text{log}} \):
- If 1 logging channel is used: \( T_{\text{log}} = 1000 \times t_{\text{log}} \)
- If 2 logging channels are used: \( T_{\text{log}} = 500 \times t_{\text{log}} \)
- If 3 logging channels are used: \( T_{\text{log}} = 333 \times t_{\text{log}} \)
- If 4 logging channels are used: \( T_{\text{log}} = 250 \times t_{\text{log}} \)

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of \( T_{\text{log}} \) always remains in the memory (ring memory principle).

> The log contents are cleared if the length of the logging interval is changed.

**Example**
If 1 logging channel is used:
- \( T_{\text{log}} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min} \)
- \( T_{\text{log}} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h} \)
- \( T_{\text{log}} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d} \)
- \( T_{\text{log}} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d} \)
Factory setting: Overwriting

Additional information: Options
- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation: Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite: In the Data logging parameter (→ 128), the Not overwriting option is selected.

Description: Use this function to enter the time delay for measured value logging.

User entry: 0 to 999 h

Factory setting: 0 h

Additional information: Description
Once measured value logging has been started with the Data logging control parameter (→ 129), the device does not log any data for the duration of the time delay entered.

Data logging control

Navigation: Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite: In the Data logging parameter (→ 128), the Not overwriting option is selected.

Description: Use this function to start and stop measured value logging.

Selection
- None
- Delete + start
- Stop

Factory setting: None

Additional information: Options
- None
  Initial measured value logging status.
- Delete + start
  All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
  Measured value logging is stopped.
Data logging status

**Navigation**
[Diagram]
Expert → Diagnostics → Data logging → Data log. status (0858)

**Prerequisite**
In the [Data logging](#) parameter (→ 128), the [Not overwriting](#) option is selected.

**Description**
Displays the measured value logging status.

**User interface**
- Done
- Delay active
- Active
- Stopped

**Factory setting**
Done

**Additional information**
*Options*
- Done
  Measured value logging has been performed and completed successfully.
- Delay active
  Measured value logging has been started but the logging interval has not yet elapsed.
- Active
  The logging interval has elapsed and measured value logging is active.
- Stopped
  Measured value logging is stopped.

Entire logging duration

**Navigation**
[Diagram]
Expert → Diagnostics → Data logging → Logging duration (0861)

**Prerequisite**
In the [Data logging](#) parameter (→ 128), the [Not overwriting](#) option is selected.

**Description**
Displays the total logging duration.

**User interface**
Positive floating-point number

**Factory setting**
0 s

"Display channel 1" submenu

**Navigation**
[Diagram]
Expert → Diagnostics → Data logging → Displ.channel 1
Display channel 1

Navigation

Expert → Diagnostics → Data logging → Displ.channel 1

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 38).

In the Assign channel 1 parameter (→ 125), one of the following options is selected:

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronics temperature

Description

Displays the measured value history for the logging channel in the form of a diagram.

Additional information

Description

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

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

"Display channel 2" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 2

Visibility depends on order options or device settings
Display channel 2

Navigation ➔ Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite A process variable is determined in the Assign channel 2 parameter.

Description See the Display channel 1 parameter

"Display channel 3" submenu

Navigation ➔ Expert → Diagnostics → Data logging → Displ.channel 3

Display channel 3

Display channel 3

Navigation ➔ Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is determined in the Assign channel 3 parameter.

Description See the Display channel 1 parameter

"Display channel 4" submenu

Navigation ➔ Expert → Diagnostics → Data logging → Displ.channel 4

Display channel 4

Display channel 4

Navigation ➔ Expert → Diagnostics → Data logging → Displ.channel 4

Prerequisite A process variable is determined in the Assign channel 4 parameter.
Description

See the **Display channel 1** parameter

### 3.5.8 "Min/max values" submenu

**Navigation**

* Expert → Diagnostics → Min/max val.

#### "Main electronics temperature" submenu

**Navigation**

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

<table>
<thead>
<tr>
<th><strong>Min/max values</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main electronics temperature</strong></td>
</tr>
<tr>
<td><strong>Medium temperature</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Main electronics temperature</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value</td>
</tr>
<tr>
<td>Maximum value</td>
</tr>
</tbody>
</table>

#### Minimum value

**Navigation**

* Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (6547)

**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 (→ 47)

#### Maximum value

**Navigation**

* Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (6545)

**Description**

Displays the highest previously measured temperature value of the main electronics module.
**Proline Promag 400 EtherNet/IP**

**User interface**
Signed floating-point number

**Additional information**

*Dependency*

![The unit is taken from the Temperature unit parameter (→ 47)](image)

"Medium temperature" submenu

**Navigation**

Expert → Diagnostics → Min/max val. → Medium temp.

**Minimum value**

**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 (→ 47)](image)

**Maximum value**

**Description**
Displays the highest previously measured medium temperature value.

**User interface**
Signed floating-point number

**Additional information**

*Dependency*

![The unit is taken from the Temperature unit parameter (→ 47)](image)
3.5.9 "Heartbeat" submenu

For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring** application package, refer to the Special Documentation for the device → 7

**Navigation**  
Expert → Diagnostics → HBT

![Heartbeat Technology]

3.5.10 "Simulation" submenu

**Navigation**  
Expert → Diagnostics → Simulation

![Simulation]

<table>
<thead>
<tr>
<th>Function</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign simulation process variable</td>
<td>135</td>
</tr>
<tr>
<td>Process variable value (1811)</td>
<td>136</td>
</tr>
<tr>
<td>Device alarm simulation (0654)</td>
<td>136</td>
</tr>
<tr>
<td>Diagnostic event category (0738)</td>
<td>136</td>
</tr>
<tr>
<td>Diagnostic event simulation (0737)</td>
<td>137</td>
</tr>
</tbody>
</table>

**Assign simulation process variable**

**Navigation**  
Expert → Diagnostics → Simulation → Assign proc.var. (1810)

**Description**

Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the “Function check” category (C) while simulation is in progress.

**Selection**

- Off
- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature

**Factory setting**  
Off

* Visibility depends on order options or device settings
**Description of the device parameters**

---

### Additional information

**Description**

The simulation value of the process variable selected is defined in the **Process variable value** parameter (→ 136).

---

### Process variable value

**Navigation**

Expert → Diagnostics → Simulation → Proc. var. value (1811)

**Prerequisite**

A process variable is selected in the **Assign simulation process variable** parameter (→ 135).

**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 (→ 43).

---

### Device alarm simulation

**Navigation**

Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

**Description**

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

**Selection**

- Off
- On

**Factory setting**

Off

---

**Additional information**

**Description**

The display alternates between the measured value and a diagnostic message of the 'Function check' category (C) while simulation is in progress.

---

### Diagnostic event category

**Navigation**

Expert → Diagnostics → Simulation → Event category (0738)

**Description**

Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Diagnostic event simulation** parameter (→ 137).
Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting
Process

Diagnostic event simulation

Navigation
Expert → Diagnostics → Simulation → Diag. event sim. (0737)

Description
Use this function to select a diagnostic event for the simulation process that is activated.

Selection
- Off
  - Diagnostic event picklist (depends on the category selected)

Factory setting
Off

Additional information
Description
For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter (→ 136).
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 option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>m³ option</td>
</tr>
<tr>
<td>Conductivity</td>
<td>µS/cm</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C option</td>
</tr>
<tr>
<td>Mass flow</td>
<td>kg/h option</td>
</tr>
<tr>
<td>Mass</td>
<td>kg option</td>
</tr>
<tr>
<td>Density</td>
<td>kg/l option</td>
</tr>
</tbody>
</table>

4.1.2 Full scale values

The factory settings apply to the following parameters:

100% bar graph value 1

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ≈ 2.5 m/s) [dm³/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>32</td>
<td>125</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
</tr>
<tr>
<td>50</td>
<td>300</td>
</tr>
<tr>
<td>65</td>
<td>500</td>
</tr>
<tr>
<td>80</td>
<td>750</td>
</tr>
<tr>
<td>100</td>
<td>1200</td>
</tr>
<tr>
<td>125</td>
<td>1850</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ≈ 2.5 m/s) [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>300</td>
<td>750</td>
</tr>
<tr>
<td>350</td>
<td>1000</td>
</tr>
<tr>
<td>375</td>
<td>1200</td>
</tr>
<tr>
<td>400</td>
<td>1200</td>
</tr>
<tr>
<td>500</td>
<td>2000</td>
</tr>
<tr>
<td>600</td>
<td>2500</td>
</tr>
<tr>
<td>700</td>
<td>3500</td>
</tr>
<tr>
<td>750</td>
<td>4000</td>
</tr>
<tr>
<td>800</td>
<td>4500</td>
</tr>
</tbody>
</table>
### 4.1.3 Switch-on point 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 \sim 0.04 \text{ m/s}) ) [dm³/min]</th>
</tr>
</thead>
<tbody>
<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>375</td>
<td>20</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>
<tr>
<td>700</td>
<td>50</td>
</tr>
<tr>
<td>750</td>
<td>60</td>
</tr>
<tr>
<td>800</td>
<td>75</td>
</tr>
</tbody>
</table>
Country-specific factory settings

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>(v ~ 0.04 m/s) [m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>125</td>
</tr>
<tr>
<td>1200</td>
<td>150</td>
</tr>
<tr>
<td>1400</td>
<td>225</td>
</tr>
<tr>
<td>1600</td>
<td>300</td>
</tr>
<tr>
<td>1800</td>
<td>350</td>
</tr>
<tr>
<td>2000</td>
<td>450</td>
</tr>
<tr>
<td>2200</td>
<td>540</td>
</tr>
<tr>
<td>2400</td>
<td>650</td>
</tr>
<tr>
<td>2600</td>
<td>775</td>
</tr>
<tr>
<td>2800</td>
<td>875</td>
</tr>
<tr>
<td>3000</td>
<td>1025</td>
</tr>
</tbody>
</table>

4.2    US units

Only valid for USA and Canada.

4.2.1    System units

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

4.2.2    Full scale values

The factory settings apply to the following parameters: 100% bar graph value 1

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v ~ 2.5 m/s) [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>1½</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>300</td>
</tr>
<tr>
<td>6</td>
<td>600</td>
</tr>
<tr>
<td>8</td>
<td>1200</td>
</tr>
<tr>
<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>12</td>
<td>2400</td>
</tr>
<tr>
<td>14</td>
<td>3600</td>
</tr>
<tr>
<td>15</td>
<td>4800</td>
</tr>
</tbody>
</table>
### Nominal Diameter (in) vs. Flow Rate (gal/min) for $v \approx 2.5 \text{ m/s}$

<table>
<thead>
<tr>
<th>Nominal Diameter [in]</th>
<th>$v \approx 2.5 \text{ m/s}$ [gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4800</td>
</tr>
<tr>
<td>18</td>
<td>6000</td>
</tr>
<tr>
<td>20</td>
<td>7500</td>
</tr>
<tr>
<td>24</td>
<td>10500</td>
</tr>
<tr>
<td>28</td>
<td>13500</td>
</tr>
<tr>
<td>30</td>
<td>16500</td>
</tr>
<tr>
<td>32</td>
<td>19500</td>
</tr>
<tr>
<td>36</td>
<td>24000</td>
</tr>
<tr>
<td>40</td>
<td>30000</td>
</tr>
<tr>
<td>42</td>
<td>33000</td>
</tr>
<tr>
<td>48</td>
<td>42000</td>
</tr>
</tbody>
</table>

### Nominal Diameter (in) vs. Flow Rate (Mgal/d) for $v \approx 2.5 \text{ m/s}$

<table>
<thead>
<tr>
<th>Nominal Diameter [in]</th>
<th>$v \approx 2.5 \text{ m/s}$ [Mgal/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>75</td>
</tr>
<tr>
<td>60</td>
<td>95</td>
</tr>
<tr>
<td>66</td>
<td>120</td>
</tr>
<tr>
<td>72</td>
<td>140</td>
</tr>
<tr>
<td>78</td>
<td>175</td>
</tr>
<tr>
<td>84</td>
<td>190</td>
</tr>
<tr>
<td>90</td>
<td>220</td>
</tr>
<tr>
<td>96</td>
<td>265</td>
</tr>
<tr>
<td>102</td>
<td>300</td>
</tr>
<tr>
<td>108</td>
<td>340</td>
</tr>
<tr>
<td>114</td>
<td>375</td>
</tr>
<tr>
<td>120</td>
<td>415</td>
</tr>
</tbody>
</table>

### 4.2.3 Switch-on Point 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>$(v = 0.04 \text{ m/s})$ [gal/min]</th>
</tr>
</thead>
<tbody>
<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>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>Nominal diameter [in]</td>
<td>(v \sim 0.04 \text{ m/s} ) [gal/min]</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>15</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>
<tr>
<td>28</td>
<td>210</td>
</tr>
<tr>
<td>30</td>
<td>270</td>
</tr>
<tr>
<td>32</td>
<td>300</td>
</tr>
<tr>
<td>36</td>
<td>360</td>
</tr>
<tr>
<td>40</td>
<td>480</td>
</tr>
<tr>
<td>42</td>
<td>600</td>
</tr>
<tr>
<td>48</td>
<td>600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v \sim 0.04 \text{ m/s} ) [Mgal/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>1.3</td>
</tr>
<tr>
<td>60</td>
<td>1.3</td>
</tr>
<tr>
<td>66</td>
<td>2.2</td>
</tr>
<tr>
<td>72</td>
<td>2.6</td>
</tr>
<tr>
<td>78</td>
<td>3.0</td>
</tr>
<tr>
<td>84</td>
<td>3.2</td>
</tr>
<tr>
<td>90</td>
<td>3.6</td>
</tr>
<tr>
<td>96</td>
<td>4.0</td>
</tr>
<tr>
<td>102</td>
<td>5.0</td>
</tr>
<tr>
<td>108</td>
<td>5.0</td>
</tr>
<tr>
<td>114</td>
<td>6.0</td>
</tr>
<tr>
<td>120</td>
<td>7.0</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></td>
<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>
</tr>
<tr>
<td></td>
<td>SG4°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>
</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>
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<td>Micro-, Milli-, Siemens, Kilo-, Mega siemens/length unit</td>
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<td>Mass</td>
<td>g, kg, t</td>
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<td>t/s, t/min, t/h, t/d</td>
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<td>Temperature</td>
<td>°C, K</td>
<td>Celsius, Kelvin</td>
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<tr>
<td>Volume</td>
<td>cm³, dm³, m³</td>
<td>Cubic centimeter, cubic decimeter, cubic meter</td>
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<td>ml, l, hl, ML Mega</td>
<td>Milliliter, liter, hectoliter, megaliter</td>
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<td>Volume flow</td>
<td>cm³/s, cm³/min, cm³/h, cm³/d</td>
<td>Cubic centimeter/time unit</td>
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<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
<td>Cubic decimeter/time unit</td>
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<td>ml/s, ml/min, ml/h, ml/d</td>
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<td>ML/s, ML/min, ML/h, ML/d</td>
<td>Megaliter/time unit</td>
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### 5.2 US units

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<th>Units</th>
<th>Explanation</th>
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<td>lb/ft³, lb/gal (us)</td>
<td>Pound/cubic foot, pound/gallon</td>
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<tr>
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<td>lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)</td>
<td>Pound/volume unit</td>
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<td>Mass</td>
<td>oz, lb, STon</td>
<td>Ounce, pound, standard ton</td>
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<td>Volume</td>
<td>af</td>
<td>Acre foot</td>
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<td>Process variable</td>
<td>Units</td>
<td>Explanation</td>
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<td>ft³</td>
<td>Cubic foot</td>
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<td>fl oz (us), gal (us), kgal (us), Mgal (us)</td>
<td>Fluid ounce, gallon, kilogallon, million gallon</td>
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<td></td>
<td>bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)</td>
<td>Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)</td>
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<td>Kilogallon/time unit</td>
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<td>Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)</td>
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<td>bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)</td>
<td>Barrel/time unit (beer) Beer: 31.0 gal/bbl</td>
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<td>bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)</td>
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<td>bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)</td>
<td>Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl</td>
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<td>am, pm</td>
<td>Ante meridiem (before midday), post meridiem (after midday)</td>
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### 5.3 Imperial units

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<td>Volume</td>
<td>gal (imp), Mgal (imp)</td>
<td>Gallon, mega gallon</td>
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<td>bbl (imp;beer), bbl (imp;oil)</td>
<td>Barrel (beer), barrel (petrochemicals)</td>
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<td>Volume flow</td>
<td>gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)</td>
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<td>Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)</td>
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<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>
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<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>
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<tr>
<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
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<td></td>
<td>am, pm</td>
<td>Ante meridiem (before midday), post meridiem (after midday)</td>
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