Description of Device Parameters

Proline Promag 100
EtherNet/IP

Electromagnetic flowmeter
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1 Document information

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

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

1.3 Using this document

1.3.1 Information on the document structure
This document lists the submenus and their parameters according to the structure of the Expert menu (→ 8) menu that are available once the "Operator" user role or the "Maintenance" user role is enabled.

For information on the arrangement of the parameters according to the structure of the Operation menu, Setup menu, Diagnostics menu (→ 86), along with a brief description, see the Operating Instructions for the device.
For information about the operating philosophy, see the "Operating philosophy" chapter in the device's Operating Instructions.
1.3.2 Structure of a parameter description

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

<table>
<thead>
<tr>
<th>Complete parameter name</th>
<th>Write-protected parameter = ✂</th>
</tr>
</thead>
</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>📌</td>
<td>Tip</td>
</tr>
<tr>
<td>📌</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>
# 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.

| ➔ Expert | Direct access | ➔ 10 |
| ➔ Expert | Locking status | ➔ 11 |
| ➔ Expert | Access status display | ➔ 11 |
| ➔ Expert | Access status tooling | ➔ 12 |
| ➔ Expert | Enter access code | ➔ 13 |
| ➔ System | ➔ Display | ➔ 13 |
| ➔ System | ➔ Diagnostic handling | ➔ 26 |
| ➔ System | ➔ Administration | ➔ 30 |
| ➔ Sensor | ➔ Measured values | ➔ 35 |
| ➔ Sensor | ➔ System units | ➔ 39 |
| ➔ Sensor | ➔ Process parameters | ➔ 51 |
| ➔ Sensor | ➔ External compensation | ➔ 62 |
| ➔ Sensor | ➔ Sensor adjustment | ➔ 65 |
| ➔ Sensor | ➔ Calibration | ➔ 70 |
| ➔ Communication | ➔ Configuration | ➔ 71 |
### Overview of the Expert operating menu

<table>
<thead>
<tr>
<th>Menu</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td></td>
</tr>
<tr>
<td>Reset all totalizers</td>
<td>81</td>
</tr>
<tr>
<td><strong>Totalizer 1 to 3</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Diagnostics</strong></td>
<td></td>
</tr>
<tr>
<td>Actual diagnostics</td>
<td>87</td>
</tr>
<tr>
<td>Previous diagnostics</td>
<td>88</td>
</tr>
<tr>
<td>Operating time from restart</td>
<td>88</td>
</tr>
<tr>
<td>Operating time</td>
<td>89</td>
</tr>
<tr>
<td><strong>Diagnostic list</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Event logbook</strong></td>
<td>93</td>
</tr>
<tr>
<td><strong>Device information</strong></td>
<td>95</td>
</tr>
<tr>
<td><strong>Min/max values</strong></td>
<td>98</td>
</tr>
<tr>
<td><strong>Heartbeat</strong></td>
<td>100</td>
</tr>
<tr>
<td><strong>Simulation</strong></td>
<td>101</td>
</tr>
</tbody>
</table>
3 Description of 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.

<table>
<thead>
<tr>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access</td>
</tr>
<tr>
<td>Locking status</td>
</tr>
<tr>
<td>Access status display</td>
</tr>
<tr>
<td>Access status tooling</td>
</tr>
<tr>
<td>Enter access code</td>
</tr>
<tr>
<td>System</td>
</tr>
<tr>
<td>Sensor</td>
</tr>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>Application</td>
</tr>
<tr>
<td>Diagnostics</td>
</tr>
</tbody>
</table>

Direct access

Navigation  ☝️  Expert → Direct access

Prerequisite

There is a local display with operating elements.

Description

Input of the access code to enable direct access to the desired parameter via the local display. For this reason, each parameter is assigned a parameter number that appears in the navigation view on the right in the header of the selected parameter.

User entry  0 to 65535
Additional information

User entry

The direct access code consists of a 4-digit number and the channel number, which identifies the channel of a process variable: e.g. 0914-1

- The leading zeros in the direct access code do not have to be entered.
  Example: Input of "914" instead of "0914"
- If no channel number is entered, channel 1 is jumped to automatically.
  Example: Enter 0914 → Assign process variable parameter
- If a different channel is jumped to: Enter the direct access code with the corresponding channel number.
  Example: Enter 0914-3 → Assign process variable parameter

Locking status

Navigation

Expert → Locking status

Description

Displays the active write protection.

User interface

- Hardware locked
- Temporarily locked

Additional information

Display

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.

- If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the Locking status parameter (→ 11).

"Hardware locked" option (priority 1)

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

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

"Temporarily locked" option (priority 2)

Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

Access status display

Navigation

Expert → Access stat.disp

Prerequisite

A local display is provided.

Description

Displays the access authorization to the parameters via the local display.
Description of device parameters

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 (→ 13).
- For information on the **Enter access code** parameter, see the "Disabling write protection via access code" section of the Operating Instructions for the device.
- If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 11).

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

---

**Access status tooling**

**Navigation**
Expert → Access stat.tool

**Description**
Displays the access authorization to the parameters via the operating tool or Web browser.

**User interface**
- Operator
- Maintenance

**Factory setting**
Maintenance

**Additional information**
**Description**
Access authorization can be modified via the **Enter access code** parameter (→ 13).

- If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 11).

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

**Navigation**  
Expert → Ent. access code

**Description**  
Use this function to enter the user-specific release code to remove parameter write protection.

**User entry**  
0 to 9999

---

### 3.1 "System" submenu

**Navigation**  
Expert → System

---

#### "Display" submenu

**Navigation**  
Expert → System → Display

---

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Display language</td>
<td>→ 14</td>
</tr>
<tr>
<td>Format display</td>
<td>→ 15</td>
</tr>
<tr>
<td>Value 1 display</td>
<td>→ 17</td>
</tr>
<tr>
<td>0% bargraph value 1</td>
<td>→ 17</td>
</tr>
<tr>
<td>100% bargraph value 1</td>
<td>→ 18</td>
</tr>
<tr>
<td>Decimal places 1</td>
<td>→ 18</td>
</tr>
<tr>
<td>Value 2 display</td>
<td>→ 19</td>
</tr>
<tr>
<td>Decimal places 2</td>
<td>→ 19</td>
</tr>
<tr>
<td>Value 3 display</td>
<td>→ 20</td>
</tr>
</tbody>
</table>
Description of device parameters

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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% bargraph value 3</td>
<td>20</td>
</tr>
<tr>
<td>100% bargraph value 3</td>
<td>21</td>
</tr>
<tr>
<td>Decimal places 3</td>
<td>21</td>
</tr>
<tr>
<td>Value 4 display</td>
<td>21</td>
</tr>
<tr>
<td>Decimal places 4</td>
<td>22</td>
</tr>
<tr>
<td>Display interval</td>
<td>22</td>
</tr>
<tr>
<td>Display damping</td>
<td>23</td>
</tr>
<tr>
<td>Header</td>
<td>23</td>
</tr>
<tr>
<td>Header text</td>
<td>24</td>
</tr>
<tr>
<td>Separator</td>
<td>24</td>
</tr>
<tr>
<td>Contrast display</td>
<td>25</td>
</tr>
<tr>
<td>Backlight</td>
<td>25</td>
</tr>
<tr>
<td>Access status display</td>
<td>25</td>
</tr>
</tbody>
</table>

Display language

**Navigation**  
Expert → System → Display → Display language

**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) *

* Visibility depends on order options or device settings
**Format display**

**Navigation**
Expert → System → Display → Format display

**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**

*Description*
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).

* Visibility depends on order options or device settings
Possible measured values shown on the local display:

*1 value, max. size* option

```
 XXXXXXXXXX
  900.00
 l/h
```

*1 bargraph + 1 value* option

```
 XXXXXXXXXX
  l/h
  900.00
  60.00
 %
```

*2 values* option

```
 XXXXXXXXXX
  l/h
  900.00
  60.00
 %
```

*1 value large + 2 values* option

```
 XXXXXXXXXX
  l/h
  900.00
  60.00%
  5.98 kWh/Nm³
```

*4 values* option

```
 XXXXXXXXXX
  l/h
  900.00
  60.00%
  5.98 kWh/Nm³
  213.94 l
```
**Value 1 display**

**Navigation**

[ ] Expert → System → Display → Value 1 display

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Conductivity
- Corrected conductivity
- Temperature
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- None

**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.

Selection

The unit of the displayed measured value is taken from the System units submenu (→ 39).

---

**0% bargraph value 1**

**Navigation**

[ ] Expert → System → Display → 0% bargraph 1

**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

**Factory setting**

Country-specific:

- 0 l/h
- 0 gal/min (us)

* Visibility depends on order options or device settings
### 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 (→ 39).

### 100% bargraph value 1

**Navigation**

Expert → System → Display → 100% bargraph 1

**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 → 104

**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 (→ 39).

### Decimal places 1

**Navigation**

Expert → System → Display → Decimal places 1

**Prerequisite**

A measured value is specified 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
Description of device parameters

Additional information

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

Prerequisite

A local display is provided.

Description

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

Selection

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

Factory setting

None

Additional information

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.

Selection

The unit of the displayed measured value is taken from the System units submenu (→ 39).

Decimal places 2

Navigation

Expert → System → Display → Decimal places 2

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

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

**Prerequisite**
A local display is provided.

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

**Selection**
Picklist, see 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 (→ 39).

### 0% bargraph value 3

**Navigation**
Expert → System → Display → 0% bargraph 3

**Prerequisite**
A selection has been 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 (→ 39).
**100% bargraph value 3**

**Navigation**
Expert → System → Display → 100% bargraph 3

**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 (→ 39).

---

**Decimal places 3**

**Navigation**
Expert → System → Display → Decimal places 3

**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

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

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Description

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

Selection

Picklist, see 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 (→  39).

Decimal places 4

Navigation

Expert → System → Display → Decimal places 4

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

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

Prerequisite

A local display is provided.

Description

Use this function to enter 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

A time constant is entered:
- 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.

Header

Navigation

Expert → System → Display → Header

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

Additional information

Description

The header text only appears during normal operation.
1  Position of the header text on the display

Selection
Free text
Is defined in the **Header text** parameter (→  24).

## Header text

**Navigation**

[  ]  Expert → System → Display → Header text

**Prerequisite**

The **Free text** option is selected in the **Header** parameter (→  23).

**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

**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

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

Depends on the display

Backlight

Navigation

Expert → System → Display → Backlight

Prerequisite

Order code for "Display; operation", option E'SD03 4-line, illum.; touch control + data backup function"

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

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 (→ 13).
- For information on the **Enter access code** parameter, see the "Disabling write protection via access code" section of the Operating Instructions for the device.
- If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 11).

Display

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

3.1.2 "Diagnostic handling" submenu

Navigation

mouseenter="true" tooltip="true">Expert → System → Diagn. handling

- Diagnostic handling

  - Alarm delay (→ 26)

  - Diagnostic behavior (→ 27)

Alarm delay

Navigation

mouseenter="true" tooltip="true">Expert → System → Diagn. handling → Alarm delay

Description

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

- The diagnostic message is reset without a time delay.

User entry

- 0 to 60 s

Factory setting

- 0 s

Additional information

**Effect**

This setting affects the following diagnostic messages:

- 190 Special event 1
- 832 Electronic temperature too high
- 833 Electronic temperature too low
- 834 Process temperature too high
• 835 Process temperature too low
• 862 Partly filled pipe
• 990 Special event 4

"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.</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 entered only in the Event logbook submenu (→ 93) (Event list submenu (→ 94)) and is not displayed in alternation with the measured value 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.

Navigation  
Expert → System → Diagn. handling → Diagn. behavior

Assign behavior of diagnostic no. 531  → 28
Assign behavior of diagnostic no. 832  → 28
Assign behavior of diagnostic no. 833  → 28
Assign behavior of diagnostic no. 834  → 29
Assign behavior of diagnostic no. 835  → 29
Assign behavior of diagnostic no. 862  → 29
Assign behavior of diagnostic no. 937  → 30
Assign behavior of diagnostic no. 302  → 30
Assign behavior of diagnostic no. 531 (Empty pipe detection)

Navigation

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

Description

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

Selection

• Off
• Alarm
• Warning
• Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available, see → 27

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

Navigation

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

Description

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

Selection

• Off
• Alarm
• Warning
• Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available, see → 27

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

Navigation

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

Description

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

Selection

• Off
• Alarm
• Warning
• Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available, see → 27
Assign behavior of diagnostic no. 834 (Process temperature too high)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available, see →  27

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available, see →  27

Assign behavior of diagnostic no. 862 (Empty pipe)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available, see →  27
Assign behavior of diagnostic no. 937 (EMC interference)

**Navigation**

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

**Description**

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

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Warning

**Additional information**

For a detailed description of the options available, see →  27

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

**Navigation**

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

**Description**

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

**Selection**

- Alarm
- Warning

**Factory setting**

Warning

**Additional information**

For a detailed description of the options available, see →  27

3.1.3 "Administration" submenu

**Navigation**

Expert → System → Administration

- Define access code
- Device reset
- Activate SW option
- Software option overview
"Define access code" wizard

The Define access code wizard (→ 31) is only available when operating via the local display or Web browser.

If operating via the operating tool, the Define access code parameter (→ 32) 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>Define access code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define access code</td>
</tr>
<tr>
<td>Confirm access code</td>
</tr>
</tbody>
</table>

**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 9 999

**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 (→ 13).

- If you lose the access code, please contact your Endress+Hauser Sales Center.

**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

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 (→ 13).
- If you lose the access code, please contact your Endress+Hauser Sales Center.

**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

**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

**Factory setting**

Cancel

**Additional information**

‘Cancel’ option

No action is executed and the user exits the parameter.

‘To delivery settings’ option

Every parameter for which a customer-specific default setting was ordered is reset to this customer-specific value. All other parameters are reset to the factory setting.

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

‘Restart device’ option

The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.

---

**Activate SW option**

**Navigation**

Expert → System → Administration → Activate SW opt.

**Description**

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

**User entry**

Max. 10-digit string consisting of numbers.

**Factory setting**

0

**Additional information**

User entry

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

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

*Example for a software option*

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

*Web browser*

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

---

### Software option overview

<table>
<thead>
<tr>
<th><strong>Navigation</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expert → System → Administration → SW option overv.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**User interface**
- Electrode cleaning circuit
- Heartbeat Verification
- Heartbeat Monitoring

**Additional information**

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

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

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

---

### 3.2 "Sensor" submenu

**Navigation**
Expert → Sensor

<table>
<thead>
<tr>
<th>Sensor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured values</td>
<td>35</td>
</tr>
<tr>
<td>System units</td>
<td>39</td>
</tr>
<tr>
<td>Process parameters</td>
<td>51</td>
</tr>
<tr>
<td>External compensation</td>
<td>62</td>
</tr>
</tbody>
</table>
3.2.1 “Measured values” submenu

**Navigation**

Expert → Sensor → Measured val.

- **Measured values**
  - **Process variables** → 35
  - **Totalizer** → 37

"Process variables" submenu

**Navigation**


- **Process variables**
  - **Volume flow** → 35
  - **Mass flow** → 36
  - **Conductivity** → 36
  - **Corrected volume flow** → 36
  - **Temperature** → 36
  - **Corrected conductivity** → 37

**Volume flow**

**Navigation**


**Description**

Displays the volume flow currently measured.

**User interface**

Signed floating-point number

**Additional information**

**Dependency**

The unit is taken from the **Volume flow unit** parameter (→ 40)
**Mass flow**

**Navigation**


**Description**

Displays the mass flow currently calculated.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

![i] The unit is taken from the **Mass flow unit** parameter (→  43)

**Conductivity**

**Navigation**


**Prerequisite**

In the **Conductivity measurement** parameter (→  54), the **On** option is selected.

**Description**

Displays the conductivity currently measured.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

![i] The unit is taken from the **Conductivity unit** parameter (→  41)

**Corrected volume flow**

**Navigation**


**Description**

Displays the corrected volume flow currently measured.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

![i] The unit is taken from the **Corrected volume flow unit** parameter (→  45)

**Temperature**

**Navigation**


**Prerequisite**

For the following order code:
'Sensor Option', option CI 'Fluid temperature probe'
**Description**
Displays the temperature currently calculated.

**User interface**
Positive floating-point number

**Additional information**
*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 42)

---

**Corrected conductivity**

**Navigation**

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

**Description**
Displays the conductivity currently corrected.

**User interface**
Positive floating-point number

**Additional information**
*Dependency*

The unit is taken from the **Conductivity unit** parameter (→ 41)

---

### "Totalizer" submenu

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

**Totalizer value 1 to 3**

**Totalizer overflow 1 to 3**

---

**Navigation**
> Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3

**Prerequisite**
One of the following options is selected in the **Assign process variable** parameter (→ 82) of the **Totalizer 1 to 3** submenu:
- Volume flow
- Mass flow
- Corrected volume flow
Description
Displays the current totalizer reading.

User interface
Signed floating-point number

Additional information
Description
As it is only possible to display a maximum of 7 digits in the operating tool, the current counter value is the sum of the totalizer value and the overflow value from the Totalizer overflow 1 to 3 parameter if the display range is exceeded.

In the event of an error, the totalizer adopts the mode defined in the Failure mode parameter (→ 86).

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 (→ 84).

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 83).

Example
Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
• Value in the Totalizer value 1 parameter: 1968457 m³
• Value in the Totalizer overflow 1 parameter: 1 ⋅ 10⁷ (1 overflow) = 10000000 [m³]
• Current totalizer reading: 11968457 m³

Totalizer overflow 1 to 3

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

Prerequisite
One of the following options is selected in the Assign process variable parameter (→ 82) of the Totalizer 1 to 3 submenu:
• Volume flow
• Mass flow
• Corrected volume flow

Description
Displays the current totalizer overflow.

User interface
Integer with sign

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

**Display**

Display

- The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 83).

**Example**

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

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

3.2.2 "System units" submenu

**Navigation**

Expert → Sensor → System units

![System units](image)
### Volume flow unit

**Navigation**

[Diagram: Expert → Sensor → System units → Volume flow unit]

**Description**

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

**Selection**

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

**Custom-specific units**

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

**Factory setting**

Country-specific:

- l/h
- gal/min (us)
Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 35)

Selection

For an explanation of the abbreviated units: → 108

Customer-specific units

The unit for the customer-specific volume is specified in the User volume text parameter (→ 47).

Volume unit

Navigation

Expert → Sensor → System units → Volume unit

Description

Use this function to select the unit for the volume.

Selection

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

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

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

Custom-specific units
User vol.

Factory setting

Country-specific:
- m³
- gal (us)

Additional information

Selection

For an explanation of the abbreviated units: → 108

Customer-specific units

The unit for the customer-specific volume is specified in the User volume text parameter (→ 47).

Conductivity unit

Navigation

Expert → Sensor → System units → Conductiv. unit

Prerequisite

In the Conductivity measurement parameter (→ 54), the On option is selected.
Description of device parameters

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

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

**Factory setting**
µS/cm

**Additional information**
*Result*
The selected unit applies for:
- Conductivity parameter (→ 36)
- Corrected conductivity parameter (→ 37)

**Selection**
For an explanation of the abbreviated units: → 108

---

**Temperature unit**

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

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

**Selection**
*SI units*
- °C
- K
*US units*
- °F
- °R

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

**Additional information**
*Result*
The selected unit applies for:
- Temperature parameter (→ 36)
- Maximum value parameter (→ 99)
- Minimum value parameter (→ 99)
- External temperature parameter (→ 63)
- Maximum value parameter (→ 100)
- Minimum value parameter (→ 100)

**Selection**
For an explanation of the abbreviated units: → 108
**Mass flow unit**

**Navigation**

Expert → Sensor → System units → Mass flow unit

**Description**

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

**Selection**

SI units
- g/s
- g/min
- g/h
- kg/s
- kg/min
- kg/h
- t/s
- t/min
- t/h
- t/d

US units
- oz/s
- oz/min
- oz/h
- lb/s
- lb/min
- lb/h
- STon/s
- STon/min
- STon/h
- STon/d

Custom-specific units
- User mass/s
- User mass/min
- User mass/h
- User mass/d

**Factory setting**

Country-specific:
- kg/h
- lb/min

**Additional information**

Result

The selected unit applies for:
Mass flow parameter (→ 36)

Selection

For an explanation of the abbreviated units: → 108

Customer-specific units

The unit for the customer-specific mass is specified in the User mass text parameter (→ 48).

---

**Mass unit**

**Navigation**

Expert → Sensor → System units → Mass unit

**Description**

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

**Proline Promag 100 EtherNet/IP**

#### 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>

**Custom-specific units**

- User mass

#### Factory setting

Country-specific:

- • kg
- • lb

#### Additional information

**Selection**

For an explanation of the abbreviated units: → 108

**Customer-specific units**

The unit for the customer-specific mass is specified in the **User mass text** parameter (→ 48).

### Density unit

#### Navigation

Expert → Sensor → System units → Density unit

#### Description

Use this function to select the unit for the density.

#### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• g/cm³</td>
<td>• lb/ft³</td>
<td>• lb/gal (imp)</td>
</tr>
<tr>
<td>• g/m³</td>
<td>• lb/gal (us)</td>
<td>• lb/bbl (imp;beer)</td>
</tr>
<tr>
<td>• kg/dm³</td>
<td>• lb/bbl (us;liq.)</td>
<td>• lb/bbl (imp;oil)</td>
</tr>
<tr>
<td>• kg/l</td>
<td>• lb/bbl (us;beer)</td>
<td></td>
</tr>
<tr>
<td>• kg/m³</td>
<td>• lb/bbl (us;oil)</td>
<td></td>
</tr>
<tr>
<td>• SD4°C</td>
<td>• lb/bbl (us;tank)</td>
<td></td>
</tr>
<tr>
<td>• SD15°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• SD20°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• SG4°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• SG15°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• SG20°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Factory setting

Country-specific:

- • kg/l
- • lb/ft³
**Additional information**

*Result*

The selected unit applies for:

- **External density** parameter (→ 64)
- **Fixed density** parameter (→ 64)

**Selection**

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

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

ℹ For an explanation of the abbreviated units: → 108

---

**Corrected volume flow unit**

**Navigation**

[Expert] → [Sensor] → [System units] → [Cor.volflow unit]

**Description**

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

**Selection**

- **SI units**
  
  - Nl/s
  - Nl/min
  - Nl/h
  - Nl/d
  - Nm³/s
  - Nm³/min
  - Nm³/h
  - Nm³/d
  - Sm³/s
  - Sm³/min
  - Sm³/h
  - Sm³/d

- **US units**
  
  - Sft³/s
  - Sft³/min
  - Sft³/h
  - Sft³/d
  - Sgal/s (us)
  - Sgal/min (us)
  - Sgal/h (us)
  - Sgal/d (us)
  - Sbbl/s (us;liq.)
  - Sbbl/min (us;liq.)
  - Sbbl/h (us;liq.)
  - Sbbl/d (us;liq.)
  - Sgal/s (imp)
  - Sgal/min (imp)
  - Sgal/h (imp)
  - Sgal/d (imp)

- **Custom-specific units**
  
  - UserCrVol./s
  - UserCrVol./min
  - UserCrVol./h
  - UserCrVol./d

**Factory setting**

Country-specific:

- Nl/h
- Sft³/h
**Additional information**

*Result*

The selected unit applies for:  
**Corrected volume flow** parameter (→ 36)

*Selection*

For an explanation of the abbreviated units: → 108

**Customer-specific units**

The unit for the customer-specific corrected volume is defined in the **User corrected volume text** parameter (→ 50).

---

**Corrected volume unit**

**Navigation**

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

**Description**

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

**Selection**

*SI units*  
- Nl  
- Nm³  
- Sm³

*US units*  
- Sft³  
- Ggal (us)  
- Sbbl (us,liq.)

*Imperial units*  
- Sgal (imp)

*Custom-specific units*  
UserCrVol.

**Factory setting**

Country-specific:  
- Nm³  
- Sft³

**Additional information**

*Selection*

For an explanation of the abbreviated units: → 108

**Customer-specific units**

The unit for the customer-specific corrected volume is defined in the **User corrected volume text** parameter (→ 50).

---

**Date/time format**

**Navigation**

Expert → Sensor → System units → Date/time format

**Description**

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

**Selection**

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

**Factory setting**

dd.mm.yy hh:mm
Additional information  

Selection

For an explanation of the abbreviated units: → 108

"User-specific units" submenu

Navigation   

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

<table>
<thead>
<tr>
<th>User-specific units</th>
</tr>
</thead>
<tbody>
<tr>
<td>User volume text    → 47</td>
</tr>
<tr>
<td>User volume offset  → 48</td>
</tr>
<tr>
<td>User volume factor  → 48</td>
</tr>
<tr>
<td>User mass text      → 48</td>
</tr>
<tr>
<td>User mass offset    → 49</td>
</tr>
<tr>
<td>User mass factor    → 49</td>
</tr>
<tr>
<td>User corrected volume text → 50</td>
</tr>
<tr>
<td>User corrected volume offset → 50</td>
</tr>
<tr>
<td>User corrected volume factor → 50</td>
</tr>
</tbody>
</table>

User volume text

Navigation   

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

Description  

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

User entry  

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

Factory setting  

User vol.
Additional information

Result

The defined unit is shown as an option in the choose list of the following parameters:

- Volume flow unit parameter (→ 40)
- Volume unit parameter (→ 41)

Example

If the text GLAS is entered, the choose list of the Volume flow unit parameter (→ 40) shows the following options:

- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

User volume offset

Navigation

Expert → Sensor → System units → User-spec. units → Volume offset

Description

Use this function to enter the offset for adapting the user-specific volume unit and volume flow unit (without time).

User entry

Signed floating-point number

Factory setting

0

Additional information

Description

Value in user-specific unit = (factor × value in base unit) + offset

User volume factor

Navigation

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

Description

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

User entry

Signed floating-point number

Factory setting

1.0

User mass text

Navigation

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

Description

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

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

### Factory setting

User mass

### Additional information

**Result**

The defined unit is shown as an option in the choose list of the following parameters:

- Mass flow unit parameter (→ 43)
- Mass unit parameter (→ 43)

**Example**

If the text GLAS is entered, the following options are displayed in the picklist for the Mass flow unit parameter (→ 43):

- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

---

### User mass offset

**Navigation**

Expert → Sensor → System units → User-spec. units → Mass offset

**Description**

Use this function to enter the offset for adapting the user-specific mass unit and mass flow unit (without time).

**User entry**

Signed floating-point number

**Factory setting**

0

**Additional information**

**Description**

Value in user-specific unit = (factor × value in base unit) + offset

---

### User mass factor

**Navigation**

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

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

1.0
User corrected volume text

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

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

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

Factory setting  
UserCrVol.

Additional information  
Result

The defined unit is shown as an option in the choose list of the following parameters:
- Corrected volume flow unit parameter (→ 45)
- Corrected volume unit parameter (→ 46)

Example

If the text GLAS is entered, the choose list of the Corrected volume flow unit parameter (→ 45) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

User corrected volume offset

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

Description  
Use this function to enter the offset for adapting the user-specific corrected volume unit and corrected volume flow unit (without time).

Value in user-specific unit = (factor × value in base unit) + offset

User entry  
Signed floating-point number

Factory setting  
0

User corrected volume factor

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

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

User entry  
Signed floating-point number
Factory setting 1.0

3.2.3 "Process parameters" submenu


<table>
<thead>
<tr>
<th>Process parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter options →  51</td>
</tr>
<tr>
<td>Flow damping →  53</td>
</tr>
<tr>
<td>Flow override →  53</td>
</tr>
<tr>
<td>Conductivity damping →  54</td>
</tr>
<tr>
<td>Temperature damping →  54</td>
</tr>
<tr>
<td>Conductivity measurement →  54</td>
</tr>
<tr>
<td>Low flow cut off →  55</td>
</tr>
<tr>
<td>Empty pipe detection →  58</td>
</tr>
<tr>
<td>Electrode cleaning circuit →  60</td>
</tr>
</tbody>
</table>

Filter options


Description Use this function to select a filter option.

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

Factory setting Standard CIP off

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

Selection

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

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

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

Examples

Possible applications for the filters

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

1) Flow damping value < 6
Flow damping

Navigation  
Expert → Sensor → Process param. → Flow damping

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

User entry  
0 to 15

Factory setting  
7

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

Effect  
The damping affects the following variables of the device:
- Outputs
  - Low flow cut off → 55
- Totalizers → 82

Flow override

Navigation  

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

Selection  
- Off
- On

Factory setting  
Off

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

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

**Navigation**

Expert → Sensor → Process param. → Conduct. damping

**Prerequisite**

In the **Conductivity measurement** parameter (→ 54), the **On** option is selected.

**Description**

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

**User entry**

0 to 999.9 s

**Factory setting**

0 s

### Temperature damping

**Navigation**

Expert → Sensor → Process param. → Temp. damping

**Prerequisite**

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

**Description**

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

**User entry**

0 to 999.9 s

**Factory setting**

0 s

### Conductivity measurement

**Navigation**


**Description**

Use this function to enable and disable conductivity measurement.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

Description

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

**Navigation**

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

**Assign process variable**

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

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

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

- **Factory setting**
  
  Volume flow

**On value low flow cutoff**

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

- **Prerequisite**
  
  One of the following options is selected in the Assign process variable parameter (→ 55):
  
  - Volume flow
  - Mass flow
  - Corrected volume flow

- **Description**
  
  Use this function to enter a switch-on value for low flow cut off. Low flow cut off is activated if the value entered is not equal to 0 → 56.

- **User entry**
  
  Signed floating-point number

- **Factory setting**
  
  Depends on country and nominal diameter → 105

- **Additional information**
  
  *Dependency*
  
  The unit depends on the process variable selected in the Assign process variable parameter (→ 55).
Description of device parameters

Proline Promag 100 EtherNet/IP

Off value low flow cutoff

Navigation

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

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 55):

- Volume flow
- Mass flow
- Corrected volume flow

Description

Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→ 55.

User entry

0 to 100.0 %

Factory setting

50 %

Additional information

Example

<table>
<thead>
<tr>
<th>Q</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>Time</td>
</tr>
<tr>
<td>H</td>
<td>Hysteresis</td>
</tr>
<tr>
<td>A</td>
<td>Low flow cut off active</td>
</tr>
<tr>
<td>1</td>
<td>Low flow cut off is activated</td>
</tr>
<tr>
<td>2</td>
<td>Low flow cut off is deactivated</td>
</tr>
<tr>
<td>3</td>
<td>On value entered</td>
</tr>
<tr>
<td>4</td>
<td>Off value entered</td>
</tr>
</tbody>
</table>

Pressure shock suppression

Navigation


Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 55):

- Volume flow
- Mass flow
- Corrected volume flow

Description

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

User entry

0 to 100 s

Factory setting

0 s
Additional information

Description

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

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

**Example**

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

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

**Navigation**

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

**Selection**
- Off
- On

**Factory setting**
Off

### Switch point empty pipe detection

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

**Prerequisite**
The On option is selected in the Empty pipe detection parameter (→ 58).

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

**User entry**
0 to 100 %

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

**Navigation**


**Prerequisite**

In the **Empty pipe detection** parameter (→ 58), the **On** option is selected.

**Description**

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

**User entry**

0 to 100 s

**Factory setting**

1 s

New adjustment

**Navigation**


**Prerequisite**

The **On** option is selected in the **Empty pipe detection** parameter (→ 58).

**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 (→ 58).

**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

**Prerequisite**

- In the **Empty pipe detection** parameter (→ 58), 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**

Expert → Sensor → Process param. → Empty pipe det. → Full pipe value

**Prerequisite**

- In the **Empty pipe detection** parameter (→ 58), 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 (→ 58), the **On** option is selected.

**Description**

Displays the current measured value.

**User interface**

Positive floating-point number

---

### “Electrode cleaning circuit” submenu

**Navigation**

Expert → Sensor → Process param. → ECC

- **Electrode cleaning circuit**
  → 61
  
  **ECC duration**
  → 61
  
  **ECC recovery time**
  → 61
**Electrode cleaning circuit**

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

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

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

**Selection**
- Off
- On

**Factory setting**
Off

**ECC duration**

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

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

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

**User entry**
0.01 to 30 s

**Factory setting**
2 s

**ECC recovery time**

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

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

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

**User entry**
Positive floating-point number

**Factory setting**
60 s
**ECC cleaning cycle**

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

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

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

**User entry**
0.5 to 168 h

**Factory setting**
0.5 h

---

**ECC Polarity**

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

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

**Description**
Displays the polarity of the electrode cleaning circuit.

**User interface**
- Positive
- Negative

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

---

### 3.2.4 "External compensation" submenu

**Navigation**

<table>
<thead>
<tr>
<th>External compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature source</td>
</tr>
<tr>
<td>External temperature</td>
</tr>
<tr>
<td>Density source</td>
</tr>
<tr>
<td>External density</td>
</tr>
</tbody>
</table>
Fixed density → 64
Reference density → 64

**Temperature source**

**Navigation**
- Expert → Sensor → External comp. → Temp. source

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

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

**Factory setting**
External value

**External temperature**

**Navigation**

**Prerequisite**
The External value option is selected in the Temperature source parameter (→ 63).

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

**User interface**
Floating point number with sign

**Additional information**
*Dependency*
The unit is taken from the Temperature unit parameter (→ 42)

**Density source**

**Navigation**
- Expert → Sensor → External comp. → Density source

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

**Selection**
- Fixed density
- External density

**Factory setting**
Fixed density
### External density

**Navigation**

Expert → Sensor → External comp. → External density

**Prerequisite**

In the **Density source** parameter (→ 63), the **External density** option is selected.

**Description**

Displays the density read in from the external device.

**User interface**

Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the **Density unit** parameter (→ 44)

### Fixed density

**Navigation**

Expert → Sensor → External comp. → Fixed density

**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

Country-specific:

- 1000 kg/l
- 1000 lb/ft³

**Additional information**

*Dependency*

The unit is taken from the **Density unit** parameter (→ 44)

### Reference density

**Navigation**

Expert → Sensor → External comp. → Ref.density

**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

Country-specific:

- 1 kg/l
- 1 lb/ft³

**Additional information**

*Dependency*

The unit is taken from the **Density unit** parameter (→ 44)
3.2.5 "Sensor adjustment" submenu

**Navigation**

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

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

**Factory setting**
Flow in arrow direction

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

**Installation direction**

**Navigation**

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

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

**Factory setting**
Flow in arrow direction

**Integration time**

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

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

**User interface**
1 to 65 ms

**Measuring period**

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

**Description**
Display the time of a full measuring period.
**Description of device parameters**

**Proline Promag 100 EtherNet/IP**

**User interface**

50 to 1000 ms

---

**“Process variable adjustment” submenu**

*Navigation*  

expert → sensor → sensor adjustm. → variable adjust

---

**Volume flow offset**

*Navigation*  

expert → sensor → sensor adjustm. → variable adjust → vol. flow offset

*Description*  

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

*User entry*  

Signed floating-point number

*Factory setting*  

0 m³/s

*Additional information*  

Description

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

**Navigation**


**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset

### Mass flow offset

**Navigation**


**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 kg/s

**Additional information**

Description

Corrected value = (factor × value) + offset

### Mass flow factor

**Navigation**


**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset
Description of device parameters

**Conductivity offset**

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. offset

**Prerequisite**

In the Conductivity measurement parameter (→ 54), the On option is selected.

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 S/m

**Additional information**

*Description*

Corrected value = (factor × value) + offset

**Conductivity factor**

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Conduct. factor

**Prerequisite**

In the Conductivity measurement parameter (→ 54), the On option is selected.

**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

*Description*

Corrected value = (factor × value) + offset

**Corrected volume flow offset**

**Navigation**


**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 Nm³/s

**Additional information**

*Description*

Corrected value = (factor × value) + offset
Corrected volume flow factor

Navigation  

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

User entry  
Positive floating-point number

Factory setting  
1

Additional information

Description

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

Temperature offset

Navigation  
Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset

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

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

User entry  
Signed floating-point number

Factory setting  
0 K

Additional information

Description

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

Temperature factor

Navigation  
Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor

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

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

User entry  
Positive floating-point number

Factory setting  
1
### 3.2.6 "Calibration" submenu

#### Navigation
- Expert → Sensor → Calibration

#### Nominal diameter

<table>
<thead>
<tr>
<th>Description</th>
<th>Displays the nominal diameter of the sensor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>DNxx / x”</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Depends on the size of the sensor</td>
</tr>
<tr>
<td>Additional information</td>
<td>The value is also specified on the sensor nameplate.</td>
</tr>
</tbody>
</table>

#### Calibration factor

<table>
<thead>
<tr>
<th>Description</th>
<th>Displays the current calibration factor for the sensor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Depends on nominal diameter and calibration.</td>
</tr>
</tbody>
</table>
Zero point

**Navigation**

Expert → Sensor → Calibration → Zero point

**Description**

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

**User interface**

Signed floating-point number

**Factory setting**

Depends on nominal diameter and calibration

Conductivity calibration factor

**Navigation**

Expert → Sensor → Calibration → Cond. cal. fact.

**Prerequisite**

In the Conductivity measurement parameter (→ 54), the On option is selected.

**Description**

Displays the calibration factor for the conductivity measurement.

**User interface**

0 to 10000

### 3.3 "Communication" submenu

**Navigation**

Expert → Communication

**3.3.1 "Configuration" submenu**

**Navigation**

Expert → Communication → Configuration

- Web server language
- MAC address
- Default network settings
- DHCP client
- IP address
Description of device parameters

---

**Proline Promag 100 EtherNet/IP**

**Subnet mask**

**Default gateway**

**Web server functionality**

**Configurable input assembly**

---

### Web server language

**Navigation**

* Expert → Communication → Configuration → Webserv.language

**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

**Description**

Displays the MAC ¹ 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.

---

* Visibility depends on order options or device settings

¹ Media Access Control
Additional information  
*Example*  
For the display format  
00:07:05:10:01:5F

## Default network settings

**Navigation**  
Expert → Communication → Configuration → Default netw.set

**Description**  
Displays the use of default network settings.

**User interface**  
- Off  
- On

**Factory setting**  
Off

**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

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

**Selection**  
- Off  
- On

**Factory setting**  
On

**Additional information**  
*Result*  
If the DHCP client functionality of the Web server is activated, the IP address (→ 73), Subnet mask (→ 74) and Default gateway (→ 74) are set automatically.  
Identification is via the MAC address of the measuring device.

## IP address

**Navigation**  
Expert → Communication → Configuration → IP address

**Description**  
Use this function to enter the IP address of the device's web server.

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

**Factory setting**  
192.168.1.212
Description of device parameters

### Subnet mask

**Navigation**

Expert → Communication → Configuration → Subnet mask

**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

### Default gateway

**Navigation**

Expert → Communication → Configuration → Default gateway

**Description**

Use this function to enter the default gateway.

**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.

**Description**

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

**Selection**

- Off
- On

**Factory setting**

On

**Additional information**

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

**Selection**

- 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.
"Configurable input assembly" submenu

**Navigation**

Expert → Communication → Configuration → Input assembly

<table>
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<tr>
<th>Configurable input assembly</th>
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<td>Input assembly position 12</td>
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<td>→ 80</td>
</tr>
<tr>
<td>Input assembly position 17</td>
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<td>Input assembly position 18</td>
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<td>Input assembly position 19</td>
<td>→ 81</td>
</tr>
<tr>
<td>Input assembly position 20</td>
<td>→ 81</td>
</tr>
</tbody>
</table>
**Input assembly position 1**

**Navigation**
- Expert → Communication → Configuration → Input assembly → Position 1

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

**Selection**
- Off
- Mass flow
- Volume flow
- Corrected volume flow
- Temperature
- Conductivity
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Electronic temperature
- Velocity

**Factory setting**
Volume flow

**Input assembly position 2**

**Navigation**
- Expert → Communication → Configuration → Input assembly → Position 2

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

**Selection**
Picklist, see *Input assembly position 1* parameter (→ 76)

**Factory setting**
Conductivity

**Input assembly position 3**

**Navigation**
- Expert → Communication → Configuration → Input assembly → Position 3

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

**Selection**
Picklist, see *Input assembly position 1* parameter (→ 76)

**Factory setting**
Temperature

* Visibility depends on order options or device settings
Input assembly position 4

Navigation  
Expert → Communication → Configuration → Input assembly → Position 4

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

Selection  
Picklist, see Input assembly position 1 parameter (→ 76)

Factory setting  
Corrected volume flow

Input assembly position 5

Navigation  
Expert → Communication → Configuration → Input assembly → Position 5

Description  
Use this function to select a process variable for input value 5.

Selection  
Picklist, see Input assembly position 1 parameter (→ 76)

Factory setting  
Mass flow

Input assembly position 6

Navigation  
Expert → Communication → Configuration → Input assembly → Position 6

Description  
Use this function to select a process variable for input value 6.

Selection  
Picklist, see Input assembly position 1 parameter (→ 76)

Factory setting  
Totalizer 1

Input assembly position 7

Navigation  
Expert → Communication → Configuration → Input assembly → Position 7

Description  
Use this function to select a process variable for input value 7.

Selection  
Picklist, see Input assembly position 1 parameter (→ 76)

Factory setting  
Totalizer 2
**Input assembly position 8**

**Navigation**
Expert → Communication → Configuration → Input assembly → Position 8

**Description**
Use this function to select a process variable for input value 8.

**Selection**
Picklist, see Input assembly position 1 parameter (→ 76)

**Factory setting**
Totalizer 3

**Input assembly position 9**

**Navigation**
Expert → Communication → Configuration → Input assembly → Position 9

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

**Selection**
Picklist, see Input assembly position 1 parameter (→ 76)

**Factory setting**
Velocity

**Input assembly position 10**

**Navigation**
Expert → Communication → Configuration → Input assembly → Position 10

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

**Selection**
Picklist, see Input assembly position 1 parameter (→ 76)

**Factory setting**
Off

**Input assembly position 11**

**Navigation**
Expert → Communication → Configuration → Input assembly → Position 11

**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 *

* Visibility depends on order options or device settings
- Unit totalizer 1
- Unit totalizer 2
- Unit totalizer 3
- Velocity unit
- Verification results *
- Verification status *

**Factory setting**

| Volume flow unit |

---

**Input assembly position 12**

**Navigation**  
Expert → Communication → Configuration → Input assembly → Position 12

**Description**
Use this function to select a process variable for input value 12.

**Selection**
Picklist, see **Input assembly position 11** parameter (→ 78)

**Factory setting**
Conductivity unit

---

**Input assembly position 13**

**Navigation**  
Expert → Communication → Configuration → Input assembly → Position 13

**Description**
Use this function to select a process variable for input value 13.

**Selection**
Picklist, see **Input assembly position 11** parameter (→ 78)

**Factory setting**
Temperature unit

---

**Input assembly position 14**

**Navigation**  
Expert → Communication → Configuration → Input assembly → Position 14

**Description**
Use this function to select a process variable for input value 14.

**Selection**
Picklist, see **Input assembly position 11** parameter (→ 78)

**Factory setting**
Corrected volume flow unit

* Visibility depends on order options or device settings
**Input assembly position 15**

**Navigation**

Expert → Communication → Configuration → Input assembly → Position 15

**Description**

Use this function to select a process variable for input value 15.

**Selection**

Picklist, see *Input assembly position 11* parameter (→ § 78)

**Factory setting**

Mass flow unit

---

**Input assembly position 16**

**Navigation**

Expert → Communication → Configuration → Input assembly → Position 16

**Description**

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

**Selection**

Picklist, see *Input assembly position 11* parameter (→ § 78)

**Factory setting**

Unit totalizer 1

---

**Input assembly position 17**

**Navigation**

Expert → Communication → Configuration → Input assembly → Position 17

**Description**

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

**Selection**

Picklist, see *Input assembly position 11* parameter (→ § 78)

**Factory setting**

Unit totalizer 2

---

**Input assembly position 18**

**Navigation**

Expert → Communication → Configuration → Input assembly → Position 18

**Description**

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

**Selection**

Picklist, see *Input assembly position 11* parameter (→ § 78)

**Factory setting**

Unit totalizer 3
### Input assembly position 19

**Navigation**

Expert → Communication → Configuration → Input assembly → Position 19

**Description**

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

**Selection**

Picklist, see Input assembly position 11 parameter (→ 78)

**Factory setting**

Velocity unit

### Input assembly position 20

**Navigation**

Expert → Communication → Configuration → Input assembly → Position 20

**Description**

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

**Selection**

Picklist, see Input assembly position 11 parameter (→ 78)

**Factory setting**

Off

---

### 3.4 "Application" submenu

**Navigation**

Expert → Application

```
[Application]

Reset all totalizers  →  81

[Totalizer 1 to 3]  →  82
```

---

### Reset all totalizers

**Navigation**

Expert → Application → Reset all tot.

**Description**

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

**Selection**

- Cancel
- Reset + totalize

**Factory setting**

Cancel
3.4.1 "Totalizer 1 to 3" submenu

Assign process variable

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

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

Factory setting
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 Assign process variable parameter (→ 82) is still displayed in the Totalizer 1 to 3 submenu. All other parameters in the submenu are hidden.
**Navigation**

Expert → Application → Totalizer 1 to 3 → Unit totalizer

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 82) of the **Totalizer 1 to 3** submenu:
- Volume flow
- Mass flow
- Corrected volume flow

**Description**

Use this function to select the unit for the process variable of totalizer 1-3.

**Selection**

*SI units*
- g
- kg
- t

*US units*
- oz
- lb
- STon

*Custom-specific units*
- User mass

or

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

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

*Custom-specific units*
- User vol.

or

*SI units*
- Nl
- Nm³
- Sm³

*US units*
- Sft³
- Sgal (us)
- Sbbl (us;liq.)

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

*Custom-specific units*
- UserCrVol.

**Factory setting**

Country-specific:
- l
- gal (us)
Description of device parameters

### Additional information

**Description**

The unit is selected separately for each totalizer. The unit is independent of the option selected in the **System units** submenu (→ 39).

**Selection**

The selection depends on the process variable selected in the **Assign process variable** parameter (→ 82).

---

### Totalizer operation mode

#### Navigation

Expert → Application → Totalizer 1 to 3 → Operation mode

#### Prerequisite

One of the following options is selected in the **Assign process variable** parameter (→ 82) of the **Totalizer 1 to 3** submenu:

- Volume flow
- Mass flow
- Corrected volume flow

#### Description

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

#### Selection

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

#### Factory setting

Net flow total

#### Additional information

**Selection**

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

---

### Control Totalizer 1 to 3

#### Navigation

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

#### Prerequisite

One of the following options is selected in the **Assign process variable** parameter (→ 82) of the **Totalizer 1 to 3** submenu:

- Volume flow
- Mass flow
- Corrected volume flow

#### Description

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

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

Factory setting

Totalize

Additional information

Selection

- Totalize
  The totalizer is started or continues totalizing with the current counter reading.
- Reset + hold
  The totaling process is stopped and the totalizer is reset to 0.
- Preset + hold
  The totaling process is stopped and the totalizer is set to its defined start value from the Preset value parameter (→ 85).
- Reset + totalize
  The totalizer is reset to 0 and the totaling process is restarted.
- Preset + totalize
  The totalizer is set to the defined start value in the Preset value parameter (→ 85) and the totaling process is restarted.

Preset value 1 to 3

Navigation

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

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 82) of the Totalizer 1 to 3 submenu:

- Volume flow
- Mass flow
- Corrected volume flow

Description

Use this function to enter a start value for totalizer 1-3.

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 (→ 83).

Example

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

**Navigation**

Expert → Application → Totalizer 1 to 3 → Failure mode

**Prerequisite**

One of the following options is selected in the Assign process variable parameter (→ 82) of the Totalizer 1 to 3 submenu:
- Volume flow
- Mass flow
- Corrected volume flow

**Description**

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

**Selection**

- Stop
- Actual value
- Last valid value

**Factory setting**

Stop

**Additional information**

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

**Selection**

- Stop
  Totalizing is stopped when a device alarm occurs.
- Actual value
  The totalizer continues to count based on the 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

<table>
<thead>
<tr>
<th>Diagnostics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual diagnostics</td>
</tr>
<tr>
<td>Previous diagnostics</td>
</tr>
<tr>
<td>Operating time from restart</td>
</tr>
<tr>
<td>Operating time</td>
</tr>
<tr>
<td>Diagnostic list</td>
</tr>
</tbody>
</table>
Actual diagnostics

**Navigation**

Expert → Diagnostics → Actual diagnos.

**Prerequisite**

A diagnostic event has occurred.

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

**Display**

Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→ 93).

**Example**

For the display format:

Example format: $F271$ Main electronic failure

---

**Timestamp**

**Navigation**

Expert → Diagnostics → Timestamp

**Description**

Displays the operating time when the current diagnostic message occurred.

**User interface**

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

**Additional information**

**Display**

The diagnostic message can be viewed via the Actual diagnostics parameter (→ 87).

**Example**

For the display format:

Example format: 24d12h13m00s
Description of device parameters

Proline Promag 100 EtherNet/IP

Previous diagnostics

Navigation

Expert → Diagnostics → Prev.diagnostics

Prerequisite

Two diagnostic events have already occurred.

Description

Displays the diagnostic message that occurred before the current message.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Example

For the display format:

F271 Main electronic failure

Timestamp

Navigation

Expert → Diagnostics → Timestamp

Description

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

User interface

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

Additional information

Display

The diagnostic message can be viewed via the Previous diagnostics parameter (→ 88).

Example

For the display format:

24d12h13m00s

Operating time from restart

Navigation

Expert → Diagnostics → Time fr. restart

Description

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

User interface

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

Navigation

Expert → Diagnostics → Operating time

Description

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

User interface

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

Additional information

User interface

The maximum number of days is 9999, which is equivalent to 27 years.

3.5.1 "Diagnostic list" submenu

Navigation

Expert → Diagnostics → Diagnostic list

<table>
<thead>
<tr>
<th>Diagnostic list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 1</td>
</tr>
<tr>
<td>Diagnostics 2</td>
</tr>
<tr>
<td>Diagnostics 3</td>
</tr>
<tr>
<td>Diagnostics 4</td>
</tr>
<tr>
<td>Diagnostics 5</td>
</tr>
</tbody>
</table>

Diagnostics 1

Navigation

Expert → Diagnostics → Diagnostic list → Diagnostics 1

Description

Displays the current diagnostics message with the highest priority.

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Examples

For the display format:
- ☘ F271 Main electronic failure
- ☘ F276 I/O module failure
Description of device parameters

Proline Promag 100 EtherNet/IP

Timestamp

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

Example
The diagnostic message can be viewed via the Diagnostics 1 parameter (→ 89).

Diagnostics 2

Navigation
Expert → Diagnostics → Diagnostic list → Diagnostics 2

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

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

Additional information
Examples

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

Timestamp

Navigation
Expert → Diagnostics → Diagnostic list → Timestamp

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

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

Additional information
Display

Example
The diagnostic message can be viewed via the Diagnostics 2 parameter (→ 90).

For the display format:
24d12h13m00s
Diagnostics 3

Navigation  
Diagram: 

Expert → Diagnostics → Diagnostic list → Diagnostics 3

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

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

Additional information  
Examples

For the display format:

- F271 Main electronic failure
- F276 I/O module failure

Timestamp

Navigation  
Diagram: 

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 (→ 91).

Example

For the display format:

24d12h13m00s

Diagnostics 4

Navigation  
Diagram: 

Expert → Diagnostics → Diagnostic list → Diagnostics 4

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

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

Additional information  
Examples

For the display format:

- F271 Main electronic failure
- F276 I/O module failure
**Timestamp**

**Navigation**
- Open the Expert menu, then Diagnostics, Diagnostic list, and finally 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

  ![Info icon](image)

  The diagnostic message can be viewed via the Diagnostics 4 parameter (→ 91).

**Example**
- For the display format: 24d12h13m00s

---

**Diagnostics 5**

**Navigation**
- Open the Expert menu, then Diagnostics, Diagnostic list, and finally Diagnostics 5.

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

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

**Additional information**
- **Examples**

  - ![Main electronic failure icon](image)
    - F271 Main electronic failure
  - ![I/O module failure icon](image)
    - F276 I/O module failure

---

**Timestamp**

**Navigation**
- Open the Expert menu, then Diagnostics, Diagnostic list, and finally 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

  ![Info icon](image)

  The diagnostic message can be viewed via the Diagnostics 5 parameter (→ 92).

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

**Navigation**

Expert → Diagnostics → Event logbook

**Filter options**

Filter options

**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**

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

**Navigation**

Expert → Diagnostics → Event logbook → Filter options

**Description**

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

**Selection**

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

All

Additional information

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 (→ 93).

User interface

- For a 'Category I' 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.

If the advanced HistoROM function is enabled in the device, the event list can contain up to 100 entries.
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
- F271 Main electronic failure
  • 01d04h12min30s

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

3.5.3 "Device information" submenu

Navigation: Expert → Diagnostics → Device info

<table>
<thead>
<tr>
<th>Device information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device tag</td>
</tr>
<tr>
<td>Serial number</td>
</tr>
<tr>
<td>Firmware version</td>
</tr>
<tr>
<td>Device name</td>
</tr>
<tr>
<td>Order code</td>
</tr>
<tr>
<td>Extended order code 1</td>
</tr>
<tr>
<td>Extended order code 2</td>
</tr>
<tr>
<td>Extended order code 3</td>
</tr>
<tr>
<td>ENP version</td>
</tr>
</tbody>
</table>

**Device tag**

**Navigation**
Expert → Diagnostics → Device info → Device tag

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

**User interface**
Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /)
### Description of device parameters

**Promag 100 EtherNet/IP**

<table>
<thead>
<tr>
<th><strong>Factory setting</strong></th>
<th>Promag 100</th>
</tr>
</thead>
</table>

### Serial number

**Navigation**
- Expert → Diagnostics → Device info → Serial number

**Description**
Displays the serial number of the measuring device.
- The number can be found on the nameplate of the sensor and transmitter.

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

**Additional information**

- **Description**

### Firmware version

**Navigation**
- Expert → Diagnostics → Device info → Firmware version

**Description**
Displays the device firmware version installed.

**User interface**
Character string in the format xx.yy.zz

**Additional information**

- **Display**

### Device name

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

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

**User interface**
Promag 100
**Order code**

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

**Description**
Displays the device order code.

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

**Additional information**

---

**Extended order code 1**

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

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

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

**User interface**
Character string

**Additional information**

---

**Extended order code 2**

**Navigation**
- Expert → Diagnostics → Device info → Ext. order cd. 2

**Description**
For displaying the second part of the extended order code.

**User interface**
Character string

**Additional information**
For additional information, see Extended order code 1 parameter (→ 97)
Extended order code 3

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

Description  
For displaying the third part of the extended order code.

User interface  
Character string

Additional information  
For additional information, see Extended order code 1 parameter (→ 97)

ENP version

Navigation  
Expert → Diagnostics → Device info → ENP version

Description  
Displays the version of the electronic nameplate.

User interface  
Character string

Factory setting  
2.02.00

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

3.5.4 "Min/max values" submenu

Navigation  
Expert → Diagnostics → Min/max val.

Reset min/max values  
→ 98

Main electronic temperature  
→ 99

Temperature  
→ 100

Reset min/max values

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

Description  
Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.
"Main electronic temperature" submenu

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

Minimum value

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

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

User interface  
Signed floating-point number

Additional information  
Dependency  

The unit is taken from the Temperature unit parameter (→ 42)

Maximum value

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

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

User interface  
Signed floating-point number

Additional information  
Dependency  

The unit is taken from the Temperature unit parameter (→ 42)
**“Temperature” submenu**

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value</td>
<td>100</td>
</tr>
<tr>
<td>Maximum value</td>
<td>100</td>
</tr>
</tbody>
</table>

**Minimum value**

**Navigation**
- Expert → Diagnostics → Min/max val. → Temperature → Minimum value

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

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

**User interface**
Signed floating-point number

**Additional information**
**Dependency**
- The unit is taken from the **Temperature unit** parameter (→ 42)

**Maximum value**

**Navigation**
- Expert → Diagnostics → Min/max val. → Temperature → Maximum value

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

**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 (→ 42)

---

**3.5.5 "Heartbeat" submenu**

For detailed information on the parameter descriptions of the **Heartbeat Verification** application package, see the Special Documentation for the device.
3.5.6 "Simulation" submenu

**Navigation**

Expert → Diagnostics → Simulation

---

**Assign simulation process variable**

**Navigation**

Expert → Diagnostics → Simulation → Assign proc.var.

**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
- Conductivity *
- Corrected conductivity *
- Temperature *

**Factory setting**

Off

* Visibility depends on order options or device settings
Additional information

Description

The simulation value of the process variable selected is defined in the Value process variable parameter (→ 102).

Value process variable

Navigation

Expert → Diagnostics → Simulation → Value proc. var.

Prerequisite

One of the following options is selected in the Assign simulation process variable parameter (→ 101):

- Volume flow
- Mass flow
- Corrected volume flow
- Conductivity
- Corrected conductivity*
- Temperature*

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 (→ 39).

Simulation device alarm

Navigation

Expert → Diagnostics → Simulation → Sim. alarm

Description

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

Selection

- Off
- On

Factory setting

Off

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.

* Visibility depends on order options or device settings
### Diagnostic event category

**Navigation**

Expert → Diagnostics → Simulation → Event category

**Description**

Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Simulation diagnostic event** parameter (→ 103).

**Selection**

- Sensor
- Electronics
- Configuration
- Process

**Factory setting**

Process

---

### Simulation diagnostic event

**Navigation**

Expert → Diagnostics → Simulation → Sim. diag. event

**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 (→ 103).
4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

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

4.1.2 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>2</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>15</td>
<td>25</td>
</tr>
<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>
<tr>
<td>150</td>
<td>150 m³/h</td>
</tr>
<tr>
<td>200</td>
<td>300 m³/h</td>
</tr>
<tr>
<td>250</td>
<td>500 m³/h</td>
</tr>
<tr>
<td>300</td>
<td>750 m³/h</td>
</tr>
<tr>
<td>350</td>
<td>1000 m³/h</td>
</tr>
<tr>
<td>400</td>
<td>1200 m³/h</td>
</tr>
<tr>
<td>450</td>
<td>1500 m³/h</td>
</tr>
</tbody>
</table>
4.1.3 On value low flow cut off

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

<table>
<thead>
<tr>
<th>Nominal diameter [mm]</th>
<th>((v \sim 2.5 \text{ m/s})) [(\text{dm}^3/\text{min})]</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>2 000 m(^3)/h</td>
</tr>
<tr>
<td>600</td>
<td>2 500 m(^3)/h</td>
</tr>
</tbody>
</table>

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>gal/min (us)</td>
</tr>
<tr>
<td>Volume</td>
<td>gal (us)</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F</td>
</tr>
<tr>
<td>Mass flow</td>
<td>lb/min</td>
</tr>
<tr>
<td>Mass</td>
<td>lb</td>
</tr>
<tr>
<td>Density</td>
<td>lb/ft(^3)</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 \sim 2.5 \text{ m/s})</th>
<th>[gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/12</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>1/8</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>3/8</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>11/2</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>2400</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3600</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>4800</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>6000</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>7500</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>10500</td>
<td></td>
</tr>
</tbody>
</table>

4.2.3 On value low flow cut off

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

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>(v \sim 0.04 \text{ m/s})</th>
<th>[gal/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/12</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>1/8</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>3/8</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>11/2</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
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<td>Nominal diameter [in]</td>
<td>(v \sim 0.04 \text{ m/s} ) [gal/min]</td>
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## 5 Explanation of abbreviated units

### 5.1 SI units

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<th>Units</th>
<th>Explanation</th>
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<td>Density</td>
<td>g/cm³, g/m³</td>
<td>Gram/volume unit</td>
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<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>SGA4°C, SG15°C, SG20°C</td>
<td>Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).</td>
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<tr>
<td>Conductivity</td>
<td>µS/mm</td>
<td>Microsiemens/length unit</td>
</tr>
<tr>
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<td>nS/cm, µS/cm, mS/cm, S/cm</td>
<td>Nano-, Micro-, Milli-, Siemens/length unit</td>
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<tr>
<td></td>
<td>µS/m, mS/m, S/m, kS/m, MS/m</td>
<td>Micro-, Milli-, Siemens, Kilo-, Megasiemens/length unit</td>
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<td>Mass</td>
<td>g, kg, t</td>
<td>Gram, kilogram, metric ton</td>
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<td>Mass flow</td>
<td>g/s, g/min, g/h, g/d</td>
<td>Gram/time unit</td>
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<td></td>
<td>kg/s, kg/min, kg/h, kg/d</td>
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<td>t/s, t/min, t/h, t/d</td>
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<tr>
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<td>Normal liter/time unit</td>
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<td>Nm³/s, Nm³/min, Nm³/h, Nm³/d</td>
<td>Normal cubic meter/time unit</td>
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<td>Sm³/s, Sm³/min, Sm³/h, Sm³/d</td>
<td>Standard cubic meter/time unit</td>
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<td>Temperature</td>
<td>°C, K</td>
<td>Celsius, Kelvin</td>
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<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>cm³/s, cm³/min, cm³/h, cm³/d</td>
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<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
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<td>l/s, l/min, l/h, l/d</td>
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<td>Hectoliter/time unit</td>
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<td>ML/s, ML/min, ML/h, ML/d</td>
<td>Megaliter/time unit</td>
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<td>Time</td>
<td>s, m, h, d, y</td>
<td>Second, minute, hour, day, year</td>
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### 5.2 US units

<table>
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<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Density</td>
<td>lb/ft³, lb/gal (us)</td>
<td>Pound/cubic foot, pound/gallon</td>
</tr>
<tr>
<td></td>
<td>lb/bbl (us:liq.), lb/bbl (us:beer), lb/bbl (us:oil), lb/bbl (us:tank)</td>
<td>Pound/volume unit</td>
</tr>
<tr>
<td>Mass</td>
<td>oz, lb, STon</td>
<td>Ounce, pound, standard ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>oz/s, oz/min, oz/h, oz/d</td>
<td>Ounce/time unit</td>
</tr>
</tbody>
</table>
### Process variable | Units | Explanation
--- | --- | ---
Density | lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil) | Pound/volume unit
Corrected volume | Sgal (imp) | Standard gallon
Corrected volume flow | Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp) | Standard gallon/time unit
Volume | gal (imp), Mgal (imp) | Gallon, mega gallon

### 5.3 Imperial units

| Process variable | Units | Explanation |
--- | --- | ---
Density | lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil) | Pound/volume unit
Corrected volume | Sgal (imp) | Standard gallon
Corrected volume flow | Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp) | Standard gallon/time unit
Volume | gal (imp), Mgal (imp) | Gallon, mega gallon

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