Description of Device Parameters

Proline Prowirl 200

PROFIBUS PA

Vortex 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
The document lists the submenus and their parameters according to the structure from the Expert menu (→ 8).

For information on the arrangement of the parameters according to the structure of the Operation menu, Setup menu, Diagnostics menu (→ 202), 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:

| Complete parameter name | Write-protected parameter =  |

**Navigation**
- Navigation path to the parameter via the local display (direct access code)
- 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.

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

**User entry**
Input range for the parameter.

**User interface**
User interface value/data for parameter.

**Factory setting**
Default setting ex works.

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

1.4 Symbols used

### 1.4.1 Symbols for certain types of information

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>📰 Tip</td>
<td>Indicates additional information.</td>
</tr>
<tr>
<td>📗 Reference to documentation</td>
<td></td>
</tr>
<tr>
<td>📖 Reference to page</td>
<td></td>
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<tr>
<td>📖 Reference to graphic</td>
<td></td>
</tr>
<tr>
<td>📜 Operation via local display</td>
<td></td>
</tr>
<tr>
<td>📜 Operation via operating tool</td>
<td></td>
</tr>
<tr>
<td> Write-protected parameter</td>
<td></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>
## 2 Overview of the Expert operating menu

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

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Expert</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct access (0106)</td>
<td></td>
<td>10</td>
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<tr>
<td>Locking status (0004)</td>
<td></td>
<td>11</td>
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<tr>
<td>Access status display (0091)</td>
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<td>11</td>
</tr>
<tr>
<td>Enter access code (0092)</td>
<td></td>
<td>13</td>
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<tr>
<td><strong>System</strong></td>
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<td>13</td>
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<tr>
<td><strong>Display</strong></td>
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<td><strong>Sensor</strong></td>
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<td>Measured values</td>
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<td>System units</td>
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<td>61</td>
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<td>Process parameters</td>
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<tr>
<td>Measurement mode</td>
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<td>External compensation</td>
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<tr>
<td>Pulse/frequency/switch output</td>
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<td><strong>Communication</strong></td>
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<td>PROFIBUS PA configuration</td>
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## Overview of the Expert operating menu

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
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<td>PROFIBUS PA info</td>
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<td>Physical block</td>
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<td>Analog inputs</td>
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<td>Analog input 1 to 4</td>
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<td>Discrete input 1 to 2</td>
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<tr>
<td>Analog outputs</td>
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<td>Analog output 1</td>
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<td>Discrete outputs</td>
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<td>Application</td>
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<td>Actual diagnostics (0691)</td>
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<td>Previous diagnostics (0690)</td>
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<td>Operating time from restart (0653)</td>
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<td>Operating time (0652)</td>
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<td>Diagnostic list</td>
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<td>Event logbook</td>
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<td>Heartbeat</td>
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</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.

### Direct access

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<thead>
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<th>Parameter</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
<td>→ 10</td>
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<tr>
<td>Locking status (0004)</td>
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<tr>
<td>Access status display (0091)</td>
<td>→ 11</td>
</tr>
<tr>
<td>Enter access code (0092)</td>
<td>→ 13</td>
</tr>
<tr>
<td>➤ System</td>
<td>→ 13</td>
</tr>
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<td>➤ Sensor</td>
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<td>➤ Output</td>
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<td>➤ Communication</td>
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<td>➤ Analog inputs</td>
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<td>➤ Discrete inputs</td>
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<td>➤ Analog outputs</td>
<td>→ 166</td>
</tr>
<tr>
<td>➤ Discrete outputs</td>
<td>→ 178</td>
</tr>
<tr>
<td>➤ Application</td>
<td>→ 188</td>
</tr>
<tr>
<td>➤ Diagnostics</td>
<td>→ 202</td>
</tr>
</tbody>
</table>

### Navigation

Expert → Direct access (0106)

### 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 (0004)

**Description**

Use this function to view the active write protection.

**User interface**

- Hardware locked
- Temporarily locked

**Additional information**

**User interface**

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 selected.

- 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 (0091)

**Prerequisite**

A local display is provided.

**Description**

Use this function to view 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.

1. The access authorization can be modified via the Enter access code parameter (→ 13).
2. For information on the Enter access code parameter (→ 13), see the "Disabling write protection via access code" section of the Operating Instructions for the device.
3. 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).

User interface
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 (0005)

Description
Use this function to view the access authorization to the parameters via the operating tool.

User interface
- Operator
- Maintenance

Factory setting
Maintenance

Additional information
Description
1. The access authorization can be modified via the Enter access code parameter (→ 13).
2. 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 (0092)

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

User entry  
0 to 9999

Enter access code

Navigation  

Expert → Ent. access code (0003)

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

User entry  
0 to 9999

3.1  "System" submenu

Navigation  

Expert → System

3.1.1  "Display" submenu

Navigation  

Expert → System → Display
**Language**

**Navigation**

Expert → System → Display → Language (0104)

**Prerequisite**

A local display is provided.

**Description**

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

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

Factory setting

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

Format display

Navigation

Expert → System → Display → Format display (0098)

Prerequisite

A local display is provided.

Description

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

Selection

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

Factory setting

1 value, max. size

Additional information

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)...Value 4 display parameter (→ 22) parameters are used to specify which measured values are shown on the display and in which 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 using the Display interval parameter (→ 23) parameter.

Possible measured values shown on the local display:

* Visibility depends on order options or device settings
"1 value, max. size" option

"1 bargraph + 1 value" option

"2 values" option

"1 value large + 2 values" option

"4 values" option
Value 1 display

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

**Prerequisite**
A local display is provided.

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

**Selection**
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *
- Pressure *
- Specific volume *
- Degrees of superheat *
- Totalizer 1
- Totalizer 2
- Totalizer 3

**Factory setting**
Volume flow

**Additional information**

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

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

* **Selection**
The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

0% bargraph value 1

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

**Prerequisite**
A local display is provided.

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

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

**User entry**
Signed floating-point number

**Factory setting**
Country-specific:
- 0 m³/h
- 0 ft³/h

**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 (→ 61).

### 100% bargraph value 1

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

**Prerequisite**
A local display is provided.

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

**User entry**
Signed floating-point number

**Factory setting**
Depends on country and nominal diameter → 234

**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 (→ 61).

### Decimal places 1

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

**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
- xxxxx
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Description of device parameters

**Factory setting**

x.xx

**Additional information**

*Description*

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

**Value 2 display**

**Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

Use this function to select one of the measured values 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 second value to be displayed. The value is only displayed during normal operation.

*Selection*

The unit of the displayed measured value is taken from the **System units** submenu (→ 61).

**Decimal places 2**

**Navigation**

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

**Prerequisite**

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

**Description**

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

**Selection**

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

**Factory setting**

x.xx
Description of device parameters

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Additional information

Description

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

Value 3 display

Navigation

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

Prerequisite

A local display is provided.

Description

Use this function to select one of the measured values 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 (→ 61).

0% bargraph value 3

Navigation

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

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 m³/h
- 0 ft³/h

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 (→ 61).

100% bargraph value 3

Navigation

Expert → System → Display → 100% bargraph 3 (0126)

Prerequisite

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

Description

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

User entry

Signed floating-point number

Factory setting

0

Additional information

Description

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

User entry

The unit of the displayed measured value is taken from the System units submenu (→ 61).

Decimal places 3

Navigation

Expert → System → Display → Decimal places 3 (0118)

Prerequisite

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

Description

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

Selection

• x
• x.x
• x.xx
• x.xxx
• x.xxxx

Factory setting

x.xx

Additional information

Description

This setting does not affect the measuring or computational accuracy of the device. The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.
**Value 4 display**

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

**Prerequisite**
A local display is provided.

**Description**
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 (→ 61).

**Decimal places 4**

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

**Prerequisite**
A measured value is specified in the Value 4 display parameter (→ 22).

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

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

**Factory setting**
x.xx

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

**Navigation**

Expert → System → Display → Display interval (0096)

**Prerequisite**

A local display is provided.

**Description**

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

**User entry**

1 to 10 s

**Factory setting**

5 s

**Additional information**

*Description*

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

- The Value 1 display parameter (→ 17) and Value 4 display parameter (→ 22) are used to specify which measured values are shown on the display.
- The display format of the displayed measured values is specified using the Format display parameter (→ 15).

Display damping

**Navigation**

Expert → System → Display → Display damping (0094)

**Prerequisite**

A local display is provided.

**Description**

Use this function to enter 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**

5.0 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 (0097)

**Prerequisite**

A local display is provided.

**Description**

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

- Device tag
- Free text

Factory setting

Device tag

Additional information

Description

The header text only appears during normal operation.

![Header text on the display](image)

1 Position of the header text on the display

Selection

- Device tag
  Is defined in the Device tag parameter (→ 212).
- Free text
  Is defined in the Header text parameter (→ 24).

Header text

Navigation

Expert → System → Display → Header text (0112)

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.

![Header text on the display](image)

1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.
Separator

Navigation  

Expert → System → Display → Separator (0101)

Prerequisite  

A local display is provided.

Description  

Use this function to select the decimal separator.

Selection  

• . (point)
• , (comma)

Factory setting  

. (point)

Contrast display

Navigation  

Expert → System → Display → Contrast display (0105)

Prerequisite  

A local display is provided.

Description  

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

User entry  

20 to 80 %

Factory setting  

Depends on the display

Additional information  

Set the contrast via the push-buttons:

• Brighter: Press and hold down the keys simultaneously.
• Darker: Press and hold down the keys simultaneously.

Backlight

Navigation  

Expert → System → Display → Backlight (0111)

Prerequisite  

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

Description  

Option for switching the backlight of the local display on and off.

Selection  

• Disable
• Enable

Factory setting  

Disable
**Access status display**

**Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

Use this function to view 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.

- The access authorization can be modified via the **Enter access code** parameter (→ 13).
- For information on the **Enter access code** parameter (→ 13), 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).

*User interface*

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 "Configuration backup display" submenu

**Navigation**

Expert → System → Conf.backup disp

<table>
<thead>
<tr>
<th>Configuration backup display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating time (0652)</td>
</tr>
<tr>
<td>Last backup (0102)</td>
</tr>
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<td>Configuration management (0100)</td>
</tr>
<tr>
<td>Comparison result (0103)</td>
</tr>
</tbody>
</table>
### Operating time

**Navigation**  
Expert → System → Conf.backup disp → Operating time (0652)

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

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

**Additional information**  
*User interface*

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

### Last backup

**Navigation**  
Expert → System → Conf.backup disp → Last backup (0102)

**Prerequisite**  
A local display is provided.

**Description**  
Use this function to display the time since a backup copy of the data was last saved to the display module.

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

### Configuration management

**Navigation**  
Expert → System → Conf.backup disp → Config. managem. (0100)

**Prerequisite**  
A local display is provided.

**Description**  
Use this function to select an action to save the data to the display module.

**Selection**  
- Cancel
- Execute backup
- Restore
- Duplicate
- Compare
- Clear backup data

**Factory setting**  
Cancel

**Additional information**  
*Description*

Configuration via the local display is disabled while the action is performed.

*For information about the status message in the operating tool: Backup state parameter (→ 28)*
### Selection

- **Cancel**
  
  No action is executed and the user exits the parameter.

- **Execute backup**
  
  - A backup copy of the current device configuration in the HistoROM is saved to the display module of the device. The backup copy includes the transmitter data of the device.
  
  - The following message appears on local display: Backup active, please wait!

- **Restore**
  
  - The last backup copy of the device configuration is copied from the display module to the HistoROM of the device. The backup copy comprises the transmitter data of the device.
  
  - The following message appears on local display: Restore active! Do not interrupt power supply!

- **Duplicate**
  
  - The transmitter configuration from another device is duplicated to the device using the display module.
  
  - The following message appears on local display: Copy active! Do not interrupt power supply!

- **Compare**
  
  - The device configuration saved in the display module is compared to the current device configuration of the HistoROM.
  
  - The following message appears on local display: Comparing files
  
  - The result can be viewed in the **Comparison result** parameter (→ 29).

- **Clear backup data**
  
  - The backup copy of the device configuration is deleted from the display module of the device.
  
  - The following message appears on local display: Deleting file

### HistoROM

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

---

**Backup state**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Conf.backup disp → Backup state (0121)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>A local display is provided.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to view the status of the data backup process.</td>
</tr>
</tbody>
</table>
| User interface  | • None  
  • Store in progress  
  • Restore in progress  
  • Import in progress  
  • Delete in progress  
  • Compare in progress |
| Factory setting | None                                                      |
### Comparison result

**Navigation**

![Folder Icon] Expert → System → Conf.backup disp → Compar. result (0103)

**Prerequisite**

A local display is provided.

**Description**

Use this function to view the last result of comparing the current device configuration to the backup copy in the display module.

**User interface**

- Settings identical
- Settings not identical
- No backup available
- Backup settings corrupt
- Check not done
- Dataset incompatible

**Factory setting**

Check not done

**Additional information**

*Description*

The comparison is started via the **Compare** option in the **Configuration management** parameter (→ 27).

*Selection*

- Settings identical
  - The current device configuration of the HistoROM is identical to the backup copy in the display module.
  - If the transmitter configuration of another device has been copied to the device via the display module and the **Duplicate** option in the **Configuration management** parameter (→ 27), the current device configuration of the HistoROM only partly matches the backup copy in the display module: The settings for the transmitter are not identical.

- Settings not identical
  - The current device configuration of the HistoROM is not identical to the backup copy in the display module.

- No backup available
  - There is no backup copy of the device configuration of the HistoROM in the display module.

- Backup settings corrupt
  - The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the display module.

- Check not done
  - The device configuration of the HistoROM has not yet been compared to the backup copy in the display module.

- Dataset incompatible
  - The backup copy in the display module is not compatible with the device.

**HistoROM**

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

**Navigation**

Expert → System → Diagn. handling

---

**Alarm delay**

**Navigation**

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

**Description**

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

The diagnostic message is reset without a time delay.

**User entry**

0 to 60 s

**Factory setting**

0 s

**Additional information**

This setting affects the following diagnostic messages:

- 046 Sensor limit exceeded
- 828 Ambient temperature too low
- 829 Ambient temperature too high
- 832 Electronic temperature too high
- 833 Electronic temperature too low
- 834 Process temperature too high
- 835 Process temperature too low
- 841 Flow velocity too high
- 841 Sensor range
- 844 Sensor range exceeded
- 870 Measuring inaccuracy increased
- 871 Near steam saturation limit
- 872 Wet steam detected
- 873 Water detected
- 874 X% spec invalid
- 945 Sensor range exceeded
- 946 Vibration detected
- 947 Vibration exceeded
- 972 Degrees of superheat limit exceeded
"Diagnostic behavior" submenu

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

Modifying the diagnostic behavior of a diagnostic event. Each diagnostic event is assigned a certain diagnostic behavior at the factory. The user can change this assignment for certain diagnostics events.

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

- **Off** option
  The diagnostic event is ignored; it is neither entered into the Event logbook, nor is a diagnostic message generated.

- **Alarm** option
  The device continues to measure. The signal outputs assume the defined alarm condition. A diagnostic message is generated.

- **Warning** option
  The device continues to measure. A diagnostic message is generated.

- **Logbook entry only** option
  The device continues to measure. The diagnostic message is entered in the Event logbook submenu (→ 209) (Event list submenu (→ 210)) only and is not displayed in alternation with the measured value display.

Navigation  
Expert → System → Diagn. handling → Diagn. behavior
### Assign behavior of diagnostic no. 022 (Temperature sensor defective)

**Navigation**

- **Expert** → **System** → **Diagn. handling** → **Diagn. behavior** → **Diagnostic no. 022 (0751)**

**Prerequisite**

For the following order code:
- 'Sensor version', option 'Mass flow'

**Description**

Use this function to change the diagnostic behavior of the diagnostic message **022 Temperature sensor defective**.

**Selection**

- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**

Alarm
Assign behavior of diagnostic no. 122 (Temperature sensor defective)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 122 (0752)

Prerequisite
For the following order code:
'Sensor version', option 'Mass flow'

Description
Use this function to change the diagnostic behavior of the diagnostic message 122 Temperature sensor defective.

Selection
• Off
• Alarm
• Warning
• Logbook entry only

Factory setting
Warning

Assign behavior of diagnostic no. 350 (Pre-amplifier defective)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 350 (0756)

Description
Use this function to change the diagnostic behavior of the diagnostic message 350 Pre-amplifier defective.

Selection
• Off
• Alarm
• Warning
• Logbook entry only

Factory setting
Alarm

Assign behavior of diagnostic no. 371 (Temperature sensor defective)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 371 (0757)

Description
Use this function to change the diagnostic behavior of the diagnostic message 371 Temperature sensor defective.
### Selection
- Off
- Alarm
- Warning
- Logbook entry only

### Factory setting
Warning

### Additional information
For a detailed description of the options available for selection: →  31

### Assign behavior of diagnostic no. 442 (Frequency output)

#### Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 442 (0658)

#### Prerequisite
The measuring device has a pulse/frequency/switch output.

#### Description
Use this function to change the diagnostic behavior of the diagnostic message **442 Frequency output**.

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

#### Factory setting
Warning

### Additional information
For a detailed description of the options available for selection: →  31

### Assign behavior of diagnostic no. 443 (Pulse output)

#### Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 443 (0659)

#### Prerequisite
The measuring device has a pulse/frequency/switch output.

#### Description
Use this function to change the diagnostic behavior of the diagnostic message **443 Pulse output**.

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

#### Factory setting
Warning

### Additional information
For a detailed description of the options available for selection: →  31
Assign behavior of diagnostic no. 828 (Ambient temperature too low)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 828 (0755)

Description
Use this function to change the diagnostic behavior of the diagnostic message 828 Ambient temperature too low.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available for selection: →  31

Assign behavior of diagnostic no. 829 (Ambient temperature too high)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 829 (0754)

Description
Use this function to change the diagnostic behavior of the diagnostic message 829 Ambient temperature too high.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available for selection: →  31

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

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0675)

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 for selection: →  31
Assign behavior of diagnostic no. 833 (Electronic temperature too low)

Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0676)

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 for selection: →  31

Assign behavior of diagnostic no. 834 (Process temperature too high)

Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0677)

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 for selection: →  31

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

Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0678)

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 for selection: →  31
<table>
<thead>
<tr>
<th>Assign behavior of diagnostic no. 841 (Flow velocity too high)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **Selection** | • Off  
• Alarm  
• Warning  
• Logbook entry only |
| **Factory setting** | Warning |
| **Additional information** | For a detailed description of the options available for selection: → 31 |

<table>
<thead>
<tr>
<th>Assign behavior of diagnostic no. 844 (Sensor range exceeded)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **Selection** | • Off  
• Alarm  
• Warning  
• Logbook entry only |
| **Factory setting** | Warning |
| **Additional information** | For a detailed description of the options available for selection: → 31 |

<table>
<thead>
<tr>
<th>Assign behavior of diagnostic no. 870 (Measuring inaccuracy increased)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
</tbody>
</table>
| **Selection** | • Off  
• Alarm  
• Warning  
• Logbook entry only |
| **Factory setting** | Warning |
| **Additional information** | For a detailed description of the options available for selection: → 31 |
Assign behavior of diagnostic no. 871 (Near steam saturation limit)

Navigation
ением− система → Рек. обработка → Рек. поведение → Диагн. no. 871 (0748)

Prerequisite
In the Select medium parameter (→ 78), the Steam option is selected.

Description
Use this function to change the diagnostic behavior of the diagnostic message 871 Near steam saturation limit.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Off

Additional information
For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 872 (Wet steam detected)

Navigation
нием− система → Рек. обработка → Рек. поведение → Диагн. no. 872 (0746)

Prerequisite
The Wet steam detection application package has been enabled.

The software options currently enabled are displayed in the Software option overview parameter (→ 45).

Description
Use this function to change the diagnostic behavior of the diagnostic message 872 Wet steam detected.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available for selection: → 31

Assign behavior of diagnostic no. 873 (Water detected)

Navigation
нием− система → Рек. обработка → Рек. поведение → Диагн. no. 873 (0749)

Prerequisite
In the Select medium parameter (→ 78), the Steam option is selected.

Description
Use this function to change the diagnostic behavior of the diagnostic message 873 Water detected.
**Selection**
- Off
- Alarm
- Warning
- Logbook entry only

**Factory setting**
Off

**Additional information**
For a detailed description of the options available for selection: → 31

**Assign behavior of diagnostic no. 874 (X% spec invalid)**

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 874 (0772)

**Prerequisite**
In the Select medium parameter (→ 78), the Steam option is selected.

**Description**
Use this function to change the diagnostic behavior of the diagnostic message 874 X% spec invalid.

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

**Factory setting**
Off

**Additional information**
For a detailed description of the options available for selection: → 31

**Assign behavior of diagnostic no. 945 (Sensor range exceeded)**

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 945 (0750)

**Prerequisite**
For the following order code: 'Sensor version', option 'Mass flow'

**Description**
Use this function to change the diagnostic behavior of the diagnostic message 945 Sensor range exceeded.

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

**Factory setting**
Warning

**Additional information**
For a detailed description of the options available for selection: → 31
Assign behavior of diagnostic no. 947 (Vibration exceeded)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 947 (0753)

**Description**
Use this function to change the diagnostic behavior of the diagnostic message 947 Vibration exceeded.

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

**Factory setting**
Alarm

**Additional information**
For a detailed description of the options available for selection: →  31

Assign behavior of diagnostic no. 972 (Degrees of superheat limit exceeded)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 972 (0758)

**Prerequisite**
If the **Steam** option is selected in the **Select medium** parameter (→  78).

**Description**
Use this function to change the diagnostic behavior of the diagnostic message 972 Degrees of superheat limit exceeded.

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

**Factory setting**
Off

**Additional information**
For a detailed description of the options available for selection: →  31

"Diagnostic limits" submenu

**Navigation**
Expert → System → Diagn. handling → Diagn. limits

- Reynolds number limit (7646)
- Steam quality limit (7717)
- Degrees of superheat limit (7737)
### Reynolds number limit

**Navigation**  
Expert → System → Diagn. handling → Diagn. limits → Re number limit (7646)

**Prerequisite**  
For the following order code:  
"Sensor version", option "Mass flow (integrated temperature measurement)"

**Description**  
Use this function to enter the lower limit value for the Reynolds number. If the Reynolds number falls short of this limit value, the diagnostic message **870 Measuring inaccuracy increased** is triggered.

**User entry**  
4 000 to 100 000

**Factory setting**  
5 000

**Additional information**  
**Limit value**  
If the Reynolds number falls short of the limit value configured here, the diagnostic behavior selected in the **Assign behavior of diagnostic no. 870** parameter (→ 37) is triggered.

### Steam quality limit

**Navigation**  
Expert → System → Diagn. handling → Diagn. limits → SteamQualLimit (7717)

**Prerequisite**  
The following conditions are met:  
• In the **Select medium** parameter (→ 78), the Steam option is selected.  
• In the **Steam quality** parameter (→ 108), the Calculated value option is selected.

**Description**  
Use this function to enter the threshold value for the steam quality which, if undershot, triggers the diagnostic message **S872 Wet steam detected**.

**User entry**  
80 to 100 %

**Factory setting**  
80 %

**Additional information**  
**Limit value**  
This limit value has a hysteresis of 5 %, i.e. the diagnostic message is reset at a threshold value of +5 % or if 100 % is reached (for factory setting of 80 % at 85 %).

If the steam quality has dropped below the limit value configured here, the diagnostic behavior selected in the **Assign behavior of diagnostic no. 872** parameter (0746) (→ 38) is triggered.

### Degrees of superheat limit

**Navigation**  
Expert → System → Diagn. handling → Diagn. limits → Degr.superh.lim. (7737)

**Prerequisite**  
In the **Select medium** parameter (→ 78), the Steam option is selected.
Description
Use this function to enter the threshold value for the degree of superheat which, if exceeded, triggers the diagnostic message 972 Degrees of superheat limit exceeded.

User entry
0 to 500 K

Factory setting
5 K

Additional information
Limit value
This limit value has a hysteresis of 1 K, i.e. the diagnostic message is triggered if the threshold value +1 K is reached and is reset again when the value drops below the threshold value.

If the degree of superheat has exceeded the limit value configured here, the diagnostic behavior selected in the Assign behavior of diagnostic no. 972 parameter (→ 40) is triggered.

3.1.4 "Administration" submenu

Navigation
Expert → System → Administration

"Define access code" wizard

The Define access code wizard is only available if operating using the local display. If you are operating using the operating tool, the Define access code parameter (→ 44) is directly in the Administration submenu. The Confirm access code parameter is not available if you are operating using the operating tool.

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

**Navigation**

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

**Description**

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

**User entry**

0 to 9999

**Factory setting**

0

**Additional information**

*Description*

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

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 (0093)

**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 9 999

**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 (0000)

**Description**  

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

**Selection**  

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

**Factory setting**  

Cancel

**Additional information**  

*"Cancel" option*  

No action is executed and the user exits the parameter.

**Visibility depends on communication**
"To fieldbus defaults" option
Every parameter is reset to fieldbus default values.

"To factory defaults" option
Every parameter is reset to its factory setting.

"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

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → Activate SW opt. (0029)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter an activation code to enable an additional, ordered software option.</td>
</tr>
<tr>
<td>User entry</td>
<td>Max. 10-digit string consisting of numbers.</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
<tr>
<td>Additional information</td>
<td>User entry</td>
</tr>
</tbody>
</table>

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 EA "Extended HistoROM"

### Software option overview

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → System → Administration → SW option overv. (0015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays all the software options that are enabled in the device.</td>
</tr>
</tbody>
</table>
User interface

- Extended HistoROM
- Mass flow
- Natural gas
- Air + industrial gas
- Wet steam detection
- Wet steam measurement
- Heartbeat Verification

Additional information

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

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

"Mass flow" option
Order code for "Sensor version"
- For Prowirl D, F, R: option 3 "Mass flow (integrated temperature measurement)"
- For Prowirl C, O: option 6 "Mass flow Alloy 718"

"Natural gas" option
Order code for "Application package", option EN "Natural gas"

"Air + industrial gas" option
Order code for "Application package", option ET "Air+industrial gases (single gas+gas mixtures)"

"Wet steam detection" option
Only available for Prowirl F.
Order code for "Application package", option ES "Wet steam detection"

"Wet steam measurement" option
Only available for Prowirl F.
Order code for "Application package", option EU "Wet steam measurement"

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

Activate sensor emergency mode

Navigation
Expert → System → Administration → Sens. emerg.mode (7712)

Prerequisite
The device has identified an error during verification of the characteristics in the sensor data storage or electronics module. A diagnostic message of status type F is output.

Description
Use this function to switch on the emergency mode of the sensor to use the backup of the sensor characteristics or main electronics characteristics stored in the HistoROM.

Selection
- Cancel
- Ok
Additional information

Description

This parameter becomes visible if the data in the S-DAT or on-board memory cannot be read on account of a defect or error. There is a copy of the data on the HistoROM (FT10). If the emergency mode is activated, this copy is used and the device measure correctly again at least up until the next device switch-off/switch-on. After switch-on/switch-off, the emergency mode would have to be reactivated again. This ensures that the client can operate the device until a new spare part arrives.

The status signal of the output diagnostic message changes from \textbf{F} (failure) to \textbf{M} (maintenance required), the diagnostic behavior changes from Alarm to Warning: \textit{\textDelta}M. The diagnostic message is output until the characteristics in the sensor data storage are again correct.

Information on what is causing the diagnostic message, and remedy measures, can be viewed by pressing the \textit{\textbslash}-button.

Information on status signals and diagnostic behavior: Operating Instructions about the device, 'Diagnostic message' chapter

3.2 "Sensor" submenu

Navigation \quad \textbullet\textbullet\ Expert \rightarrow Sensor

\begin{itemize}
  \item [\textbullet Sensor]
    \begin{itemize}
      \item [\textbullet Measured values] \rightarrow \textbullet 47
      \item [\textbullet System units] \rightarrow \textbullet 61
      \item [\textbullet Process parameters] \rightarrow \textbullet 74
      \item [\textbullet Measurement mode] \rightarrow \textbullet 78
      \item [\textbullet External compensation] \rightarrow \textbullet 104
      \item [\textbullet Sensor adjustment] \rightarrow \textbullet 109
      \item [\textbullet Calibration] \rightarrow \textbullet 111
    \end{itemize}
\end{itemize}

3.2.1 "Measured values" submenu

Navigation \quad \textbullet\textbullet\ Expert \rightarrow Sensor \rightarrow Measured val.

\begin{itemize}
  \item [\textbullet Measured values]
    \begin{itemize}
      \item [\textbullet Process variables] \rightarrow \textbullet 48
    \end{itemize}
\end{itemize}
### Description of device parameters

Proline Prowirl 200 PROFIBUS PA

#### "Process variables" submenu

**Navigation**


<table>
<thead>
<tr>
<th>Process variables</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow (1838)</td>
<td>49</td>
</tr>
<tr>
<td>Corrected volume flow (1850)</td>
<td>49</td>
</tr>
<tr>
<td>Mass flow (1847)</td>
<td>50</td>
</tr>
<tr>
<td>Flow velocity (1865)</td>
<td>50</td>
</tr>
<tr>
<td>Temperature (1851)</td>
<td>51</td>
</tr>
<tr>
<td>Calculated saturated steam pressure (1852)</td>
<td>51</td>
</tr>
<tr>
<td>Steam quality (1853)</td>
<td>52</td>
</tr>
<tr>
<td>Total mass flow (1854)</td>
<td>52</td>
</tr>
<tr>
<td>Condensate mass flow (1857)</td>
<td>52</td>
</tr>
<tr>
<td>Energy flow (1872)</td>
<td>53</td>
</tr>
<tr>
<td>Heat flow difference (1863)</td>
<td>53</td>
</tr>
<tr>
<td>Reynolds number (1864)</td>
<td>53</td>
</tr>
<tr>
<td>Density (7607)</td>
<td>54</td>
</tr>
<tr>
<td>Specific volume (7739)</td>
<td>54</td>
</tr>
<tr>
<td>Pressure (7696)</td>
<td>55</td>
</tr>
<tr>
<td>Saturation temperature (7709)</td>
<td>55</td>
</tr>
<tr>
<td>Degrees of superheat (7738)</td>
<td>56</td>
</tr>
<tr>
<td>Compressibility factor (7729)</td>
<td>56</td>
</tr>
<tr>
<td>Vortex frequency (7722)</td>
<td>56</td>
</tr>
</tbody>
</table>
Volume flow

**Navigation**

**Description**
Use this function to view the volume flow currently measured.

**User interface**
Signed floating-point number

**Additional information**
*Dependency*
- The unit is taken from the **Volume flow unit** parameter (→ 62)

Corrected volume flow

**Navigation**

**Description**
Displays the corrected volume flow currently calculated.

**User interface**
Signed floating-point number

**Additional information**
*Description*
To calculate the corrected volume flow, the measured volume flow is multiplied by the ratio of the density (Density parameter (→ 54)) to the reference density. The density and reference density here depend on the sensor version and the selected medium (see table). Outputting the corrected volume flow cannot be used for gases that condense (e.g. steam).

<table>
<thead>
<tr>
<th>Sensor version</th>
<th>Medium</th>
<th>Medium type</th>
<th>Density</th>
<th>Reference density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>All</td>
<td>-</td>
<td>$\rho$</td>
<td>$\rho_{ref}$</td>
</tr>
<tr>
<td>Mass flow</td>
<td>Steam</td>
<td>-</td>
<td>$f(p, T)$</td>
<td>~</td>
</tr>
<tr>
<td></td>
<td>Gas</td>
<td>All except</td>
<td>$f(p, T)$</td>
<td>$f(p_{ref}, T_{ref})$</td>
</tr>
<tr>
<td></td>
<td>Liquid</td>
<td>All except</td>
<td>$f(T)$</td>
<td>$f(T_{ref})$</td>
</tr>
<tr>
<td></td>
<td>Gas</td>
<td>2)</td>
<td>$f(p, T, z, p_{ref}, T_{ref}, z_{ref}, \rho_{ref})$</td>
<td>$\rho_{ref}$</td>
</tr>
<tr>
<td></td>
<td>Liquid</td>
<td>2)</td>
<td>$f(T, a_{lin}, T_{ref}, \rho_{ref})$</td>
<td>$\rho_{ref}$</td>
</tr>
</tbody>
</table>

- $\rho_{ref}$: Reference density (→ 106)
- $p_{ref}$: Reference pressure (→ 87)
- $T_{ref}$: Reference temperature (→ 88)
- $z_{ref}$: Reference Z-factor (→ 88)
- $a_{lin}$: Linear expansion coefficient (→ 82)

1) Outputting the corrected volume flow cannot be used for gases that condense.
2) User-specific gas or liquid

*Dependency*
- The unit is taken from the **Corrected volume flow unit** parameter (→ 65)
Mass flow

**Navigation**

**Description**
Displays the mass flow currently calculated.

**User interface**
Signed floating-point number

**Additional information**

To calculate the mass flow, the measured volume flow is multiplied by the density (Density parameter (→ 54)). The density depends on the sensor version and the selected medium (see table).

<table>
<thead>
<tr>
<th>Sensor version</th>
<th>Medium</th>
<th>Medium type</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>All</td>
<td>–</td>
<td>ρ</td>
</tr>
<tr>
<td>Mass flow</td>
<td>Steam</td>
<td>–</td>
<td>f(p, T)</td>
</tr>
<tr>
<td></td>
<td>Gas</td>
<td>All except 1</td>
<td>f(p, T)</td>
</tr>
<tr>
<td></td>
<td>Liquid</td>
<td>All except 1</td>
<td>f(T)</td>
</tr>
<tr>
<td></td>
<td>Gas</td>
<td>1)</td>
<td>f(p, T, z, p_{Ref}, T_{Ref}, z_{Ref}, ρ_{Ref})</td>
</tr>
<tr>
<td></td>
<td>Liquid</td>
<td>1)</td>
<td>f(T, a_{lin}, T_{Ref}, ρ_{Ref})</td>
</tr>
</tbody>
</table>

ρ, ρ_{Ref}, p, p_{Ref}, T, T_{Ref}, z, z_{Ref}, a_{lin}, f(…)

1) User-specific gas or liquid

**Dependency**

The unit is taken from the Mass flow unit parameter (→ 64)

Flow velocity

**Navigation**

**Description**
Displays the flow velocity currently calculated.

**User interface**
Signed floating-point number

**Additional information**

The flow velocity is calculated based on the aspect ratio of the vortex measuring tube (DS) to the process connection of the sensor (DI), or to the Mating pipe diameter parameter (→ 110) (DM) if this has been entered by the customer; the DS and DI are production data that are defined by the shape and size of the meter body.
Temperature

Navigation  

Description  
Displays the temperature currently measured.

User interface  
Signed floating-point number

Additional information

Dependency  
The unit is taken from the Temperature unit parameter (→  67).

Calculated saturated steam pressure

Navigation  

Prerequisite  
The following conditions are met:
- Order code for "Sensor version", option "Mass flow"
- In the Select medium parameter (→  78), the Steam option is selected.

Description  
Displays the saturated steam pressure currently calculated.

User interface  
Signed floating-point number

Additional information

Dependency  
The unit is taken from the Pressure unit parameter (→  66)
Steam quality

Navigation


Prerequisite

The following conditions are met:
1. Order code for "Sensor version", option "Mass flow"
2. In the Select medium parameter (→ 78), the Steam option is selected.

Description

Displays the current steam quality. Depends on the compensation mode of the steam quality (Steam quality parameter (→ 108)).

User interface

Signed floating-point number

Total mass flow

Navigation


Prerequisite

The following conditions are met:
1. Order code for "Application package", option EU "Wet steam measurement"
2. In the Select medium parameter (→ 78), the Steam option is selected.

Description

Displays the total mass flow (steam and condensate) currently calculated.

User interface

Signed floating-point number

Additional information

Dependency

The unit is taken from the Mass flow unit parameter (→ 64)

Condensate mass flow

Navigation


Prerequisite

The following conditions are met:
1. Order code for "Application package", option EU "Wet steam measurement"
2. In the Select medium parameter (→ 78), the Steam option is selected.

Description

Displays the condensate mass flow currently calculated.

User interface

Signed floating-point number

Additional information

Dependency

The unit is taken from the Mass flow unit parameter (→ 64)
Energy flow

Navigation


Prerequisite

For the following order code:
"Sensor version", option 'Mass flow'

Description

Displays the energy flow currently calculated.

User interface

Signed floating-point number

Additional information

Dependency

The unit is taken from the Energy flow unit parameter (→ 68)

Heat flow difference

Navigation


Prerequisite

The following conditions are met:
Order code for "Sensor version", option 'Mass flow'

One of the following options is selected in the Select gas type parameter (→ 78):

- Single gas
- Gas mixture
- Natural gas
- User-specific gas

Description

Displays the heat flow difference currently calculated.

User interface

Signed floating-point number

Additional information

Description

The measuring device requires the following to calculate the heat flow difference correctly:

1. Select the type of calculation in the Delta heat calculation parameter (→ 106).
2. Enter the value in the 2nd temperature delta heat parameter (→ 107).

Dependency

The unit is taken from the Energy flow unit parameter (→ 68)

Reynolds number

Navigation


Prerequisite

For the following order code:
"Sensor version", option 'Mass flow'
**Description**
Displays the Reynolds number currently calculated.

**User interface**
Signed floating-point number

**Additional information**
\[ Re = \frac{\rho \cdot v \cdot d}{\eta} \]

Where:
- \( \rho \) is the density of the medium (Density parameter \( \rightarrow \) 54)
- \( v \) is the flow velocity of the fluid in relation to the body (Flow velocity parameter \( \rightarrow \) 50)
- \( d \) is the characteristic length of the body
- \( \eta \) is the viscosity of the medium
  - For gases: Dynamic viscosity parameter \( \rightarrow \) 85
  - For liquids: Dynamic viscosity parameter \( \rightarrow \) 84
- The mating pipe diameter is taken as the characteristic length (Mating pipe diameter parameter \( \rightarrow \) 110)

### Density

**Navigation**
Expert \( \rightarrow \) Sensor \( \rightarrow \) Measured val. \( \rightarrow \) Process variab. \( \rightarrow \) Density (7607)

**Prerequisite**
For the following order code:
'Sensor version', option 'Mass flow'

**Description**
Displays the density currently calculated.

**User interface**
Positive floating-point number

**Additional information**
Depending on the selected medium the density is calculated with pressure and temperature and the corresponding method (e.g. IAPWS, NEL40...).

*User interface*
The unit is taken from the Density unit parameter \( \rightarrow \) 71

### Specific volume

**Navigation**
Expert \( \rightarrow \) Sensor \( \rightarrow \) Measured val. \( \rightarrow \) Process variab. \( \rightarrow \) Specific volume (7739)

**Prerequisite**
For the following order code:
'Sensor version', option 'Mass flow'

**Description**
Displays the current value for the specific volume.

**User interface**
Positive floating-point number
**Additional information**

*Description*

The specific volume is a process variable that is common in steam applications.

For the calculation: reciprocal value of the density (*Density* parameter → 54)

*Dependency*

The unit is taken from the *Specific volume unit* parameter (→ 72)

---

**Pressure**

*Navigation*


*Prerequisite*

For the following order code:
- "Sensor version", option "Mass flow"
- In the *External value* parameter (→ 105), the *Pressure* option is selected.

*Description*

Displays the current process pressure.

*User interface*

0 to 250 bar

*Additional information*

The value of the pressure which is read in (e.g. via the current input module) is displayed.

If the *Pressure* option is not selected as the external value in the *External value* parameter (→ 105), the input value for the fixed process pressure (*Fixed process pressure* parameter (→ 108)) is displayed.

*Dependency*

The unit is taken from the *Pressure unit* parameter (→ 66)

---

**Saturation temperature**

*Navigation*


*Prerequisite*

In the *Select medium* parameter (→ 78), the *Steam* option is selected.

*Description*

Displays the saturation temperature currently calculated.

*User interface*

Country-specific:
- °C
- °F

*Additional information*

The saturation temperature describes the temperature limit at which steam begins to condense. This value is calculated using the current process pressure (*Pressure* parameter (→ 55)) according to IAPWS-IF97.
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Dependency

The unit is taken from the Temperature unit parameter (→ 67).

Degrees of superheat

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In the Select medium parameter (→ 78), the Steam option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the degree of superheating currently calculated.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 500 K</td>
</tr>
</tbody>
</table>

Additional information

Description

The degree of superheating describes the difference between the temperature (Temperature parameter (→ 51)) and the saturation temperature (Saturation temperature parameter (→ 55)). If the temperature is below the current saturation temperature, the degree of superheating has the value 0.

Compressibility factor

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The following conditions are met:</td>
</tr>
<tr>
<td></td>
<td>Order code for &quot;Sensor version&quot;, option &quot;Mass flow&quot;</td>
</tr>
<tr>
<td></td>
<td>In the Select medium parameter (→ 78), the Gas option or Steam option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the compressibility factor currently calculated.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 2</td>
</tr>
</tbody>
</table>

Additional information

Description

The compressibility factor describes the deviation of the medium from the ideal behavior under the current process conditions. If the medium is a user-specific gas/liquid, the compressibility factor is entered as the Z-factor (Z-factor parameter (→ 86)).

Vortex frequency

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the measured variable for the flow in the measuring tube which is recorded directly with the DSC sensor.</td>
</tr>
</tbody>
</table>
### Measuring range depending on the nominal diameter:
0.1 to 3 100 Hz

### Description of device parameters

#### Filter settings for liquids

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Minimum vortex frequency</th>
<th>Maximum vortex frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_{min}$ [Hz]</td>
<td>$f_{max}$ [Hz]</td>
</tr>
<tr>
<td>DN 15 (½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25 (1&quot;) &gt; DN 15 (½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 40 (1½&quot;) &gt;&gt; DN 15 (½&quot;)</td>
<td>11.5</td>
<td>666.5</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 40 (1½&quot;) &gt; DN 25 (1&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50 (2&quot;) &gt;&gt; DN 25 (1&quot;)</td>
<td>6.7</td>
<td>388.8</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50 (2&quot;) &gt; DN 40 (1½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 80 (3&quot;) &gt;&gt; DN 40 (1½&quot;)</td>
<td>3.9</td>
<td>224.3</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 80 (3&quot;) &gt; DN 50 (2&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 100 (4&quot;) &gt;&gt; DN 50 (2&quot;)</td>
<td>3.0</td>
<td>172.8</td>
</tr>
<tr>
<td>DN 80 (3&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 100 (4&quot;) &gt; DN 80 (3&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN150 (6&quot;) &gt;&gt; DN 80 (3&quot;)</td>
<td>2.1</td>
<td>122.8</td>
</tr>
<tr>
<td>DN 100 (4&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN150 (6&quot;) &gt; DN 100 (4&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 200 (8&quot;) &gt;&gt; DN 100 (4&quot;)</td>
<td>1.7</td>
<td>101.4</td>
</tr>
<tr>
<td>DN150 (6&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 200 (8&quot;) &gt; DN 150 (6&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 250 (10&quot;) &gt;&gt; DN 150 (6&quot;)</td>
<td>1.1</td>
<td>66.6</td>
</tr>
<tr>
<td>DN 200 (8&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 200 (8&quot;) &gt; DN 300 (12&quot;)</td>
<td>0.7</td>
<td>41.7</td>
</tr>
<tr>
<td>DN 250 (10&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 300 (12&quot;)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Filter settings for gases/steam

<table>
<thead>
<tr>
<th>DN [mm (in)]</th>
<th>Minimum vortex frequency</th>
<th>Maximum vortex frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_{min}$ [Hz]</td>
<td>$f_{max}$ [Hz]</td>
</tr>
<tr>
<td>DN 15 (½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 25 (1&quot;) &gt; DN 15 (½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 40 (1½&quot;) &gt;&gt; DN 15 (½&quot;)</td>
<td>209.9</td>
<td>3 100</td>
</tr>
<tr>
<td>DN 25 (1&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 40 (1½&quot;) &gt; DN 25 (1&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50 (2&quot;) &gt;&gt; DN 25 (1&quot;)</td>
<td>67.1</td>
<td>3 100</td>
</tr>
<tr>
<td>DN 40 (1½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50 (2&quot;) &gt; DN 40 (1½&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 80 (3&quot;) &gt;&gt; DN 40 (1½&quot;)</td>
<td>13.7</td>
<td>1869.1</td>
</tr>
<tr>
<td>DN 50 (2&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 80 (3&quot;) &gt; DN 50 (2&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 100 (4&quot;) &gt;&gt; DN 50 (2&quot;)</td>
<td>10.5</td>
<td>2 303.8</td>
</tr>
</tbody>
</table>
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

### Totalizer

**Navigation**

Expert → Sensor → Measured val. → Totalizer

<table>
<thead>
<tr>
<th>DN [mm (in)]</th>
<th>Minimum vortex frequency ( f_{\text{min}} ) [Hz]</th>
<th>Maximum vortex frequency ( f_{\text{max}} ) [Hz]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 80 (3”)</td>
<td>7.5</td>
<td>1636.9</td>
</tr>
<tr>
<td>DN 100 (4”)</td>
<td>6.2</td>
<td>1352.3</td>
</tr>
<tr>
<td>DN 150 (6”)</td>
<td>4.1</td>
<td>888.6</td>
</tr>
<tr>
<td>DN 200 (8”)</td>
<td>2.5</td>
<td>555.4</td>
</tr>
<tr>
<td>DN 250 (10”)</td>
<td>2.1</td>
<td>457.3</td>
</tr>
<tr>
<td>DN 300 (12”)</td>
<td>1.8</td>
<td>385.3</td>
</tr>
</tbody>
</table>

**Totalizer value 1 to 3**

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3 (3827–1 to 3)

**Prerequisite**

In **Target mode** parameter (→ 195), the **Auto** option is selected.

**Description**

Displays the current reading for totalizer 1-3.

**User interface**

Signed floating-point number

**Additional information**

As it is only possible to display a maximum of 7 digits, 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.
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.

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

### Totalizer status (Hex) 1 to 3

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Status (Hex) 1 to 3 (3825–1 to 3)

**Prerequisite**

In **Target mode** parameter (→ 195), the **Auto** option is selected.

**Description**

Displays the status value (hex) of the particular totalizer.

**User interface**

0 to 0xFF

### Totalizer status 1 to 3

**Navigation**

Expert → Sensor → Measured val. → Totalizer → Tot. status 1 to 3 (3826–1 to 3)

**Description**

Displays the status of the particular totalizer.

**User interface**

- Good
- Uncertain
- Bad

"Output values" submenu

**Navigation**

Expert → Sensor → Measured val. → Output values

- **Output values**
  - Terminal voltage 1 (0662) → 60
  - Pulse output (0456) → 60
  - Output frequency (0471) → 61
  - Switch status (0461) → 61
Terminal voltage 1

**Navigation**  
Expert → Sensor → Measured val. → Output values → Terminal volt. 1 (0662)

**Description**  
Use this function to view the actual terminal voltage that is present at the current output.

**User interface**  
0.0 to 50.0 V

Pulse output

**Navigation**  
Expert → Sensor → Measured val. → Output values → Pulse output (0456)

**Prerequisite**  
The Pulse option is selected in the Operating mode parameter (→ 114).

**Description**  
Displays the pulse frequency currently output.

**User interface**  
Positive floating-point number

**Additional information**  
* The pulse output is an open collector output.
* This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
* The Value per pulse parameter (→ 116) and the Pulse width parameter (→ 116) can be used to define the value (i.e. the amount of the measured value that corresponds to a pulse) and the duration of the pulse.

![Pulse Output Diagram](image_url)

0  Non-conductive  
1  Conductive  
NC  NC contact (normally closed)  
NO  NO contact (normally open)

The output behavior can be reversed via the Invert output signal parameter (→ 131), i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of an error (Failure mode parameter (→ 117)) can be configured.
Output frequency

**Navigation**  
Expert → Sensor → Measured val. → Output values → Output freq. (0471)

**Prerequisite**  
In the **Operating mode** parameter (→ 114), the **Frequency** option is selected.

**Description**  
Displays the actual value of the output frequency which is currently measured.

**User interface**  
0 to 1,250 Hz

Switch status

**Navigation**  
Expert → Sensor → Measured val. → Output values → Switch status (0461)

**Prerequisite**  
The **Switch** option is selected in the **Operating mode** parameter (→ 114).

**Description**  
Displays the current switch status of the status output.

**User interface**  
- Open
- Closed

**Additional information**  
**User interface**
- Open  
The switch output is not conductive.
- Closed  
The switch output is conductive.

3.2.2 "System units" submenu

**Navigation**  
Expert → Sensor → System units

<table>
<thead>
<tr>
<th>System units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow unit (0553)</td>
</tr>
<tr>
<td>Volume unit (0563)</td>
</tr>
<tr>
<td>Mass flow unit (0554)</td>
</tr>
<tr>
<td>Mass unit (0574)</td>
</tr>
<tr>
<td>Corrected volume flow unit (0558)</td>
</tr>
<tr>
<td>Corrected volume unit (0575)</td>
</tr>
</tbody>
</table>
Volume flow unit

**Navigation**

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

**Description**

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

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

**US units**
- af/s
- af/min
- af/h
- af/d
- ft³/s
- ft³/min
- ft³/h
- ft³/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)
- bbl/s (us;liq.)
- bbl/min (us;liq.)
- bbl/h (us;liq.)
- bbl/d (us;liq.)
- bbl/s (us;beer)
- bbl/min (us;beer)
- bbl/h (us;beer)
- bbl/d (us;beer)
- bbl/s (us;oil)
- bbl/min (us;oil)
- bbl/h (us;oil)
- bbl/d (us;oil)
- bbl/s (us;tank)
- bbl/min (us;tank)
- bbl/h (us;tank)
- bbl/d (us;tank)

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

### Factory setting

Country-specific:
- m³/h
- ft³/min

### Additional information

**Result**

The selected unit applies for:

**Volume flow** parameter (→  49)

**Selection**

For an explanation of the abbreviated units: →  238
## Volume unit

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

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

**Selection**

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

**Factory setting**
Country-specific:
- m³
- ft³

**Additional information**
Selection
For an explanation of the abbreviated units: → 238

## Mass flow unit

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

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

**Selection**

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

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

The selected unit applies for:
- Mass flow parameter (→ 50)
- Total mass flow parameter (→ 52)
- Condensate mass flow parameter (→ 52)

Selection

For an explanation of the abbreviated units: → 238

Mass unit

Navigation

Expert → Sensor → System units → Mass unit (0574)

Description

Use this function to select the unit for the mass.

Selection

SI units  
- g  
- kg  
- t

US units
- oz  
- lb  
- STon

Factory setting

Country-specific:
- kg  
- lb

Additional information  
Selection

For an explanation of the abbreviated units: → 238

Corrected volume flow unit

Navigation

Expert → Sensor → System units → Cor.volflow unit (0558)

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
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Factory setting  
Country-specific:
- Nm³/h
- Sft³/h

Additional information  
Result  
The selected unit applies for:
Corrected volume flow parameter (→ 49)

Selection  
For an explanation of the abbreviated units: → 238

Corrected volume unit

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

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

Selection  
SI units  
- Nl
- Nm³
- Sm³

US units  
- Sft³

Factory setting  
Country-specific:
- Nm³
- Sft³

Additional information  
Selection  
For an explanation of the abbreviated units: → 238

Pressure unit

Navigation  
Expert → Sensor → System units → Pressure unit (0564)

Prerequisite  
For the following order code:
"Sensor version", option 'Mass flow"

Description  
Use this function to select the unit for the pipe pressure.
### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Other units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• GPa</td>
<td>• psi</td>
<td>• inH20 (4°C)</td>
</tr>
<tr>
<td>• MPa</td>
<td></td>
<td>• inH20 (68°F)</td>
</tr>
<tr>
<td>• kPa</td>
<td></td>
<td>• mmH20 (4°C)</td>
</tr>
<tr>
<td>• Pa</td>
<td></td>
<td>• mmH20 (68°F)</td>
</tr>
<tr>
<td>• mPa</td>
<td></td>
<td>• ftH20 (68°F)</td>
</tr>
<tr>
<td>• µPa</td>
<td></td>
<td>• inHg (0°C)</td>
</tr>
<tr>
<td>• bar</td>
<td></td>
<td>• mmHg (0°C)</td>
</tr>
<tr>
<td>• mbar a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• torr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• atm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• kgf/cm²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• gf/cm²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Factory setting

<table>
<thead>
<tr>
<th>Country-specific:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• bar</td>
</tr>
<tr>
<td>• psi</td>
</tr>
</tbody>
</table>

### Additional information

**Result**

The unit is taken from:

- **Calculated saturated steam pressure** parameter (→ 51)
- **Atmospheric pressure** parameter (→ 106)
- **Maximum value** parameter (→ 227)
- **Fixed process pressure** parameter (→ 108)
- **Pressure** parameter (→ 55)
- **Reference pressure** parameter (→ 87)

### Temperature unit

### Navigation

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

### Description

Use this function to select the unit for the temperature.

### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• °C</td>
<td>• °F</td>
</tr>
<tr>
<td>• K</td>
<td>• °R</td>
</tr>
</tbody>
</table>

### Factory setting

<table>
<thead>
<tr>
<th>Country-specific:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• °C</td>
</tr>
<tr>
<td>• °F</td>
</tr>
</tbody>
</table>

### Additional information

<table>
<thead>
<tr>
<th>Result</th>
</tr>
</thead>
</table>

The selected unit applies for:

- **Temperature** parameter (→ 51)
- **Maximum value** parameter (→ 224)
- **Minimum value** parameter (→ 224)
- **Average value** parameter (→ 224)
- **Maximum value** parameter (→ 225)
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

- **Minimum value** parameter (→ 225)
- **Maximum value** parameter (→ 226)
- **Minimum value** parameter (→ 226)
- **2nd temperature delta heat** parameter (→ 107)
- **Fixed temperature** parameter (→ 107)
- **Reference combustion temperature** parameter (→ 86)
- **Reference temperature** parameter (→ 88)
- **Saturation temperature** parameter (→ 55)

**Selection**

For an explanation of the abbreviated units: → 238

---

### Energy flow unit

**Navigation**

Expert → Sensor → System units → Energy flow unit (0565)

**Prerequisite**

For the following order code:

"Sensor version", option "Mass flow"

**Description**

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

**Selection**

**SI units**

- kW
- MW
- GW
- kJ/s
- kJ/min
- kJ/h
- kJ/d
- MJ/s
- MJ/h
- MJ/min
- MJ/d
- GJ/s
- GJ/min
- GJ/h
- GJ/d
- kcal/s
- kcal/min
- kcal/h
- kcal/d
- Mcal/s
- Mcal/min
- Mcal/h
- Mcal/d
- Gcal/s
- Gcal/min
- Gcal/h
- Gcal/d

**Imperial units**

- Btu/s
- Btu/min
- Btu/h
- Btu/day
- MBtu/s
- MBtu/min
- MBtu/h
- MBtu/d
- MMBtu/s
- MMBtu/min
- MMBtu/h
- MMBtu/d

**Factory setting**

Country-specific:

- kW
- Btu/h
Additional information

Result

The selected unit applies for:

- **Heat flow difference** parameter (→ 53)
- **Energy flow** parameter (→ 53)

Selection

For an explanation of the abbreviated units: → 238

---

**Energy unit**

Navigation

[Expert → Sensor → System units → Energy unit (0559)]

Prerequisite

For the following order code:

'Sensor version', option 'Mass flow'

Description

Use this function to select the unit for energy.

Selection

**SI units**

- kWh
- MWh
- GWh
- kJ
- MJ
- GJ
- kcal
- Mcal
- Gcal

**Imperial units**

- Btu
- MBtu
- MMBtu

Factory setting

Country-specific:

- kWh
- Btu

Additional information

Selection

For an explanation of the abbreviated units: → 238

---

**Calorific value unit**

Navigation

[Expert → Sensor → System units → Cal. value unit (0552)]

Prerequisite

The following conditions are met:

- Order code for 'Sensor version', option 'Mass flow'
- The **Gross calorific value volume** option or the **Net calorific value volume** option is selected in the **Calorific value type** parameter (→ 82).

Description

Use this function to select the unit for the calorific value.
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• kJ/Nm³</td>
<td>• Btu/Sm³</td>
</tr>
<tr>
<td>• MJ/Nm³</td>
<td>• MBtu/Sm³</td>
</tr>
<tr>
<td>• kWh/Nm³</td>
<td>• Btu/Sft³</td>
</tr>
<tr>
<td>• MWh/Sm³</td>
<td>• MBtu/Sft³</td>
</tr>
<tr>
<td>• kJ/Sm³</td>
<td></td>
</tr>
<tr>
<td>• MJ/Sm³</td>
<td></td>
</tr>
<tr>
<td>• kWh/Sm³</td>
<td></td>
</tr>
<tr>
<td>• MWh/Nm³</td>
<td></td>
</tr>
</tbody>
</table>

Factory setting

Country-specific:

• kJ/Nm³
• Btu/Sft³

Additional information

Result

The selected unit applies for:

Reference gross calorific value parameter (→ 87)

Selection

For an explanation of the abbreviated units: → 238

Calorific value unit (Mass)

Navigation

 Jenner  Expert → Sensor → System units → Cal. value unit (0606)

Prerequisite

The following conditions are met:

• Order code for "Sensor version", option "Mass flow"
• The Gross calorific value mass option or the Net calorific value mass option is selected in the Calorific value type parameter (→ 82).

Description

Use this function to select the unit for the calorific value (mass).

Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
<th>Imperial units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• kJ/kg</td>
<td>• kJ/lb</td>
<td>• Btu/lb</td>
</tr>
<tr>
<td>• MJ/kg</td>
<td>• MJ/lb</td>
<td>• MBtu/lb</td>
</tr>
<tr>
<td>• kWh/kg</td>
<td>• kWh/lb</td>
<td></td>
</tr>
<tr>
<td>• MWh/kg</td>
<td>• MWh/lb</td>
<td></td>
</tr>
</tbody>
</table>

Factory setting

Country-specific:

• kJ/kg
• Btu/lb

Additional information

Selection

For an explanation of the abbreviated units: → 238
**Velocity unit**

**Navigation**

Expert → Sensor → System units → Velocity unit (0566)

**Description**

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

**Selection**

- **SI units**
  - m/s
- **US units**
  - ft/s

**Factory setting**

Country-specific:
- m/s
- ft/s

**Additional information**

Result

The selected unit applies for:
- **Flow velocity** parameter (→ 50)
- **Maximum value** parameter (→ 227)

**Selection**

For an explanation of the abbreviated units: → 238

**Density unit**

**Navigation**

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

**Description**

Use this function to select the unit for the density.

**Selection**

- **SI units**
  - g/cm³
  - kg/dm³
  - kg/l
  - kg/m³
  - SD4°C
  - SD15°C
  - SD20°C
  - SG4°C
  - SG15°C
  - SG20°C
- **US units**
  - lb/ft³
  - lb/gal (us)
  - lb/bbl (us;liq.)
  - lb/bbl (us;beer)
  - lb/bbl (us;oil)
- **Imperial units**
  - lb/gal (imp)
  - lb/bbl (imp;beer)
  - lb/bbl (imp;oil)

**Factory setting**

Country-specific:
- kg/m³
- lb/ft³

**Additional information**

Result

The selected unit applies for:
- **Density** parameter (→ 54)
- **Fixed density** parameter (→ 106)
- **Reference density** parameter (→ 86)
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

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

For an explanation of the abbreviated units: → 238

Specific volume unit

Navigation
Expert → Sensor → System units → Spec. vol. unit (0610)

Prerequisite
For the following order code:
'Sensor version', option 'Mass flow'

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

Selection
Other units
- m³/kg
- ft³/lb

Factory setting
Country-specific:
- m³/kg
- ft³/lb

Additional information
Result
The selected unit applies for:
Specific volume parameter (→ 54)

Dynamic viscosity unit

Navigation
Expert → Sensor → System units → Dyn. visc. unit (0577)

Description
Use this function to select the unit for dynamic viscosity.

Selection
SI units
- Pa s
- cP
- P

Factory setting
Pa s
Additional information  Result

The selected unit applies for:
- Dynamic viscosity parameter (→ 85) (gases)
- Dynamic viscosity parameter (→ 84) (liquids)

Additional information  Selection

For an explanation of the abbreviated units: → 238

Specific heat capacity unit

Navigation  Expert → Sensor → System units → SpecHeatCapaUnit (0604)

Prerequisite  The following conditions are met:
- Selected medium:
  - The User-specific gas option is selected in the Select gas type parameter (→ 78).
  Or
  - The User-specific liquid option is selected in the Select liquid type parameter (→ 79).
- The Heat option is selected in the Enthalpy type parameter (→ 82).

Description  Use this function to select the unit for the specific heat capacity.

Selection  SI units  Imperial units
- kJ/(kgK)  Btu/(lb°R)
- MJ/(kgK)
- kWh/(kgK)
- kcal/(kgK)

Factory setting  kJ/(kgK)

Additional information  Result

The selected unit applies for:
Specific heat capacity parameter (→ 89)

Additional information  Selection

For an explanation of the abbreviated units: → 238

Length unit

Navigation  Expert → Sensor → System units → Length unit (0551)

Description  Use this function to select the unit of length for the nominal diameter.
### Description of device parameters

**Proline Prowirl 200 PROFIBUS PA**

#### Selection

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>• mm</td>
<td>• in</td>
</tr>
<tr>
<td>• m</td>
<td>• ft</td>
</tr>
</tbody>
</table>

#### Factory setting

Country-specific:
- • mm
- • in

#### Additional information

**Result**
The selected unit applies for:
- **Inlet run** parameter (→ 110)
- **Mating pipe diameter** parameter (→ 110)

**Selection**

For an explanation of the abbreviated units: → 238

---

#### Date/time format

**Navigation**

Expert → Sensor → System units → Date/time format (2812)

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

**Selection**

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

**Factory setting**

dd.mm.yy hh:mm

**Additional information**

Selection

For an explanation of the abbreviated units: → 238

---

#### 3.2.3 "Process parameters" submenu

**Navigation**


- **Process parameters**

  - Flow override (1839) → 75
  - Flow damping (1802) → 75
  - Low flow cut off → 76
Flow override

**Navigation**


**Description**

Use this function to select whether to interrupt the evaluation of measured values. This is useful for the cleaning process 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 \( \text{C453 Flow override} \) is displayed.
- Output values
  - Output: Value at zero flow
  - Temperature: Proceeding output
  - Totalizers 1-3: Stop being totalized

Flow damping

**Navigation**

Expert → Sensor → Process param. → Flow damping (1802)

**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 999.9 s

**Factory setting**

5 s

**Additional information**

Result

The damping has an effect on the following variables of the device:

- Outputs
- Low flow cut off → 76
- Totalizer

User entry

- Value = 0: no damping
- Value > 0: damping is increased
"Low flow cut off" submenu

**Navigation**

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

<table>
<thead>
<tr>
<th>Assign process variable (1837)</th>
<th>76</th>
</tr>
</thead>
<tbody>
<tr>
<td>On value low flow cutoff (1805)</td>
<td>76</td>
</tr>
<tr>
<td>Off value low flow cutoff (1804)</td>
<td>77</td>
</tr>
</tbody>
</table>

**Assign process variable**

**Navigation**

Expert → Sensor → Process param. → Low flow cut off → Assign variable (1837)

**Description**

Use this function to select a process variable for low flow cut off.

**Selection**

- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Reynolds number

**Factory setting**

Off

**On value low flow cutoff**

**Navigation**

Expert → Sensor → Process param. → Low flow cut off → On value (1805)

**Prerequisite**

One of the following options is selected in the Assign process variable parameter (→ 76):

- Volume flow
- Corrected volume flow
- Mass flow
- Reynolds number

**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 → 77.

**User entry**

Positive floating-point number

**Factory setting**

0

* Visibility depends on order options or device settings
Additional information

Dependency

The unit depends on the process variable selected in the Assign process variable parameter (→ 76).

Off value low flow cutoff

Navigation

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

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 76):

• Volume flow
• Corrected volume flow
• Mass flow
• Reynolds number *

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 → 76.

User entry

0 to 100.0%

Factory setting

50%

Additional information

Example

1 A

Q

2

1

H

3

4

A

A0012887

Q Flow

Q

H Hysteresis

H

A Low flow cut off active

A

1 Low flow cut off is activated

1

2 Low flow cut off is deactivated

2

3 On value entered

3

4 Off value entered

4

* Visibility depends on order options or device settings
3.2.4 "Measurement mode" submenu

Navigation  
Expert → Sensor → Measurement mode

<table>
<thead>
<tr>
<th>Measurement mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select medium (7653) → 78</td>
</tr>
<tr>
<td>Select gas type (7635) → 78</td>
</tr>
<tr>
<td>Select liquid type (7636) → 79</td>
</tr>
<tr>
<td>Density calculation (7608) → 80</td>
</tr>
<tr>
<td>Enthalpy calculation (7619) → 80</td>
</tr>
<tr>
<td>Medium properties → 81</td>
</tr>
</tbody>
</table>

Select medium

Navigation  
Expert → Sensor → Measurement mode → Select medium (7653)

Description  
Use this function to select the type of medium for the measuring application.

Selection  
- Gas
- Liquid
- Steam

Factory setting  
Steam

Select gas type

Navigation  
Expert → Sensor → Measurement mode → Select gas type (7635)

Prerequisite  
The following conditions are met:
- Order code
  - "Sensor version", option "Mass flow"
  - "Application package", option "Air + Industrial gases" or option "Natural gas"
- The Gas option is selected in the Select medium parameter → 78.

Description  
Use this function to select the type of gas for the measuring application.

Selection  
- Single gas
- Gas mixture
- Air
- Natural gas
- User-specific gas
Factory setting
User-specific gas

Additional information
"User-specific gas" option
Applications: calculation of the mass flow of a user-specific gas
Calculated variables: the mass flow, the density, the corrected volume flow and the heat quantity are calculated from the measured volume flow and the measured temperature. Either the specific thermal capacity or the calorific value must be entered for calculating the heat quantity.

Formulae for calculation:
- Mass flow: \( m = q \cdot \rho (T) \)
- Density: \( \rho = \rho_1 (T_1) / (1 + \beta_p \cdot (T - T_1)) \)
- Corrected volume flow: \( v_n = q \cdot \rho (T) / \rho_{ref} \)
- Heat quantity in the case of delta heat: \( E = q \cdot \rho (T) \cdot c_p \cdot \Delta T \)
- Heat quantity in the case of combustion: \( E = q \cdot \rho (T) \cdot h \)

\( m \) = Mass flow
\( q \) = Volume flow (measured)
\( v_n \) = Corrected volume flow
\( T \) = Process temperature (measured)
\( T_1 \) = Temperature (→ 51) at which the value for \( \rho_1 \) applies.
\( \rho \) = Density
\( \rho_{ref} \) = Reference density
\( \rho_{ref} = \text{Density (→ 54) at which the value for } T_1 \text{ applies.} \)
\( \beta_p \) = Linear expansion coefficient (→ 82) of the liquid at \( T_1 \)

Possible combinations of these values: Linear expansion coefficient parameter (→ 82)

Select liquid type

Navigation
Expert → Sensor → Measurement mode → Sel. liquid type (7636)

Prerequisite
The following conditions are met:
- Order code for "Sensor version", option 'Mass flow'
- The Liquid option is selected in the Select medium parameter (→ 78) parameter.

Description
Use this function to select the type of liquid for the measuring application.

Selection
- Water
- LPG (Liquefied Petroleum Gas)
- User-specific liquid

Factory setting
Water

Additional information
"User-specific liquid" option
Applications: calculation of the mass flow of a user-specific liquid, such as thermal oil.
Calculated variables: the mass flow, the density, the corrected volume flow and the heat quantity are calculated from the measured volume flow and the measured temperature. Either the specific thermal capacity or the calorific value must be entered for calculating the heat quantity.
Formulae for calculation:
- Mass flow: \( m = q \cdot \rho(T) \)
- Density: \( \rho = \rho_1(T_1) / (1 + \beta_p \cdot |T - T_1|) \)
- Corrected volume flow: \( v_n = q \cdot \rho(T) / \rho_{ref} \)
- Heat quantity in the case of delta heat: \( E = q \cdot \rho(T) \cdot c_p \cdot \Delta T \)
- Heat quantity in the case of combustion: \( E = q \cdot \rho(T) \cdot h \)

- \( m \) = Mass flow
- \( q \) = Volume flow (measured)
- \( v_n \) = Corrected volume flow
- \( T \) = Process temperature (measured)
- \( T_1 \) = Temperature (→ 51) at which the value for \( \rho_1 \) applies.
- \( \rho \) = Density
- \( \rho_{ref} \) = Reference density
- \( \rho \) = Density (→ 54) at which the value for \( T_1 \) applies.
- \( \beta_p \) = Linear expansion coefficient (→ 82) of the liquid at \( T_1 \)

Possible combinations of these values: Linear expansion coefficient parameter (→ 82)

Density calculation

**Navigation**

Expert → Sensor → Measurement mode → Density calc. (7608)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.

**Description**

Use this function to select the standard on the basis of which the density is calculated.

**Selection**

- AGA Nx19
- ISO 12213-2
- ISO 12213-3

**Factory setting**

AGA Nx19

Enthalpy calculation

**Navigation**

Expert → Sensor → Measurement mode → Enthalpy calc. (7619)

**Prerequisite**

The following conditions are met:
- Order code
  - "Sensor version", option 'Mass flow (integrated temperature measurement)"
  - "Application package", option 'Natural gas'
- In the Select medium parameter (→ 78), the Gas option is selected and in the Select gas type parameter (→ 78), the Natural gas option is selected.

**Description**

Use this function to select the standard on the basis of which the enthalpy is calculated.
Selection

- AGA5
- ISO 6976

Factory setting
AGA5

"Medium properties" submenu

Navigation

Expert → Sensor → Measurement mode → Medium property

<table>
<thead>
<tr>
<th>Medium properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enthalpy type (7620)</td>
<td>→ 82</td>
</tr>
<tr>
<td>Calorific value type (7698)</td>
<td>→ 82</td>
</tr>
<tr>
<td>Reference combustion temperature (7699)</td>
<td>→ 86</td>
</tr>
<tr>
<td>Reference density (7700)</td>
<td>→ 86</td>
</tr>
<tr>
<td>Reference gross calorific value (7701)</td>
<td>→ 87</td>
</tr>
<tr>
<td>Reference pressure (7702)</td>
<td>→ 87</td>
</tr>
<tr>
<td>Reference temperature (7703)</td>
<td>→ 88</td>
</tr>
<tr>
<td>Reference Z-factor (7704)</td>
<td>→ 88</td>
</tr>
<tr>
<td>Linear expansion coefficient (7621)</td>
<td>→ 82</td>
</tr>
<tr>
<td>Relative density (7705)</td>
<td>→ 88</td>
</tr>
<tr>
<td>Specific heat capacity (7716)</td>
<td>→ 89</td>
</tr>
<tr>
<td>Calorific value (7626)</td>
<td>→ 84</td>
</tr>
<tr>
<td>Z-factor (7631)</td>
<td>→ 86</td>
</tr>
<tr>
<td>Dynamic viscosity (7733)</td>
<td>→ 84</td>
</tr>
<tr>
<td>Dynamic viscosity (7732)</td>
<td>→ 85</td>
</tr>
</tbody>
</table>

| Gas composition | → 89 |
**Calorific value type**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Cal. value type (7698)

**Prerequisite**

The **Calorific value type** parameter (→ 82) is visible.

**Description**

Use this function to select whether the net calorific value or the gross calorific value is used as the basis for calculation.

**Selection**

- Gross calorific value volume
- Net calorific value volume
- Gross calorific value mass
- Net calorific value mass

**Factory setting**

Gross calorific value mass

---

**Enthalpy type**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Enthalpy type (7620)

**Prerequisite**

The following conditions are met:

- In the **Select gas type** parameter (→ 78), the **User-specific gas** option is selected. Or
- In the **Select liquid type** parameter (→ 79), the **User-specific liquid** option is selected.

**Description**

Use this function to select the type of enthalpy.

**Selection**

- Heat
- Calorific value

**Factory setting**

Heat

---

**Linear expansion coefficient**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Linear exp coeff (7621)

**Prerequisite**

The following conditions are met:

- The **Liquid** option is selected in the **Select medium** parameter (→ 78).
- The **User-specific liquid** option is selected in the **Select liquid type** parameter (→ 79).

**Description**

Use this function to enter the linear, medium-specific expansion coefficient for calculating the reference density for user-specific liquids.

**User entry**

$1.0 \times 10^{-6}$ to $2.0 \times 10^{-3}$
Factory setting

2.06×10⁻⁴

Additional information

User entry

- If the value in this parameter is changed, it is advisable to reset the totalizer.
- The expansion coefficient can be determined using the Applicator.
- If two density and temperature value pairs are known (density \( \rho_1 \) at temperature \( T_1 \) and density \( \rho_2 \) at temperature \( T_2 \)), the expansion coefficient can be calculated according to the following formula:
  \[ \beta_p = \frac{(\rho_1 / \rho_2 - 1)}{(T_1 - +T_2)} \]

Sample values

The closer the process temperature is to the specific temperature value, the better the calculation of the density for application-specific liquids. If the process temperature deviates greatly from the value indicated, the expansion coefficient should be calculated according to the formula (see above).

<table>
<thead>
<tr>
<th>Medium (liquid)</th>
<th>Temperature value [K]</th>
<th>Density value [kg/m³]</th>
<th>Expansion coefficient ([10^{-4} \ 1/K])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>123.15</td>
<td>594</td>
<td>18.76</td>
</tr>
<tr>
<td>Ammonia</td>
<td>298.15</td>
<td>602</td>
<td>25</td>
</tr>
<tr>
<td>Argon</td>
<td>133.15</td>
<td>1028</td>
<td>111.3</td>
</tr>
<tr>
<td>n-butane</td>
<td>298.15</td>
<td>573</td>
<td>20.7</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>298.15</td>
<td>713</td>
<td>106.6</td>
</tr>
<tr>
<td>Chlorine</td>
<td>298.15</td>
<td>1398</td>
<td>21.9</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>298.15</td>
<td>773</td>
<td>11.6</td>
</tr>
<tr>
<td>n-decane</td>
<td>298.15</td>
<td>728</td>
<td>10.2</td>
</tr>
<tr>
<td>Ethane</td>
<td>298.15</td>
<td>315</td>
<td>175.3</td>
</tr>
<tr>
<td>Ethylene</td>
<td>298.15</td>
<td>386</td>
<td>87.7</td>
</tr>
<tr>
<td>n-heptane</td>
<td>298.15</td>
<td>351</td>
<td>12.4</td>
</tr>
<tr>
<td>n-hexane</td>
<td>298.15</td>
<td>656</td>
<td>13.8</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>298.15</td>
<td>796</td>
<td>70.9</td>
</tr>
<tr>
<td>l-butane</td>
<td>298.15</td>
<td>552</td>
<td>22.5</td>
</tr>
<tr>
<td>Methane</td>
<td>163.15</td>
<td>331</td>
<td>73.5</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>93.15</td>
<td>729</td>
<td>75.3</td>
</tr>
<tr>
<td>n-octane</td>
<td>298.15</td>
<td>699</td>
<td>11.1</td>
</tr>
<tr>
<td>Oxygen</td>
<td>133.15</td>
<td>876</td>
<td>95.4</td>
</tr>
<tr>
<td>n-pentane</td>
<td>298.15</td>
<td>621</td>
<td>16.2</td>
</tr>
<tr>
<td>Propane</td>
<td>298.15</td>
<td>493</td>
<td>32.1</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>298.15</td>
<td>903</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Table values according to Carl L. Yaws (2001): Matheson Gas Data Book, 7th edition
**Calorific value**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Calorific value (7626)

**Prerequisite**

The following conditions are met:
- Selected medium:
  - In the Select gas type parameter (→ 78), the User-specific gas option is selected.
  - Or
  - In the Select liquid type parameter (→ 79), the User-specific liquid option is selected.
- In the Enthalpy type parameter (→ 82), the Calorific value option is selected.
- In the Calorific value type parameter (→ 82), the Gross calorific value volume option or Gross calorific value mass option is selected.

**Description**

Use this function to enter the calorific value for calculating the energy flow.

**User entry**

Positive floating-point number

**Factory setting**

50 000 kJ/kg

**Dynamic viscosity (Liquids)**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Dynam. viscosity (7733)

**Prerequisite**

The following conditions are met:
- Order code for "Sensor version", option "Volume flow"
- The Liquid option is selected in the Select medium parameter (→ 78) parameter.
  - Or
  - The User-specific liquid option is selected in the Select liquid type parameter (→ 79).

**Description**

Use this function to enter a fixed value for the dynamic viscosity for a liquid.

**User entry**

Positive floating-point number

**Factory setting**

1 cP

**Additional information**

The viscosity entered is used to linearize the measured error in the lower Reynolds number range if the calculated viscosity is not available e.g. "Volume flow" sensor version or the fluid is a user-specific liquid (see table).

**Dependencies**

<table>
<thead>
<tr>
<th>Sensor version</th>
<th>Medium</th>
<th>Dyn. viscosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>All</td>
<td>x</td>
</tr>
<tr>
<td>Mass flow</td>
<td>All except 1)</td>
<td>–</td>
</tr>
</tbody>
</table>
**Dynamic viscosity (Gases)**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Dynam. viscosity (7732)

**Prerequisite**

The following conditions are met:
- Order code for "Sensor version", option "Volume flow"
- The Gas option or the Steam option is selected in the Select medium parameter (→ 78).
- Or
  - The User-specific gas option is selected in the Select gas type parameter (→ 78).

**Description**

Use this function to enter a fixed value for the dynamic viscosity for a gas or steam.

**User entry**

Positive floating-point number

**Factory setting**

0.015 cP

**Additional information**

*Description*

The viscosity entered is used to linearize the measured error in the lower Reynolds number range if the calculated viscosity is not available e.g. "Volume flow" sensor version or the fluid is a user-specific gas (see table).

**Dependencies**

<table>
<thead>
<tr>
<th>Sensor version</th>
<th>Medium</th>
<th>Dyn. viscosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>All</td>
<td>x</td>
</tr>
<tr>
<td>Mass flow</td>
<td>All except 1)</td>
<td>- x</td>
</tr>
<tr>
<td>1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x</td>
<td>Dynamic viscosity as the input value</td>
<td></td>
</tr>
</tbody>
</table>

1) User-specific gas

**Dependency**

The unit is taken from the Dynamic viscosity unit parameter (→ 72)
**Z-factor**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Z-factor (7631)

**Prerequisite**

In the Select gas type parameter (→ 78), the User-specific gas option is selected.

**Description**

Use this function to enter the real gas constant Z for gas under operating conditions.

**User entry**

0.1 to 2.0

**Factory setting**

1

---

**Reference combustion temperature**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Ref. comb. temp. (7699)

**Prerequisite**

The Reference combustion temperature parameter (→ 86) is visible.

**Description**

Use this function to enter the reference combustion temperature for calculating the natural gas energy value.

**User entry**

–200 to 450 °C

**Factory setting**

20 °C

**Additional information**

*Dependency*

The unit is taken from the Temperature unit parameter (→ 67)

---

**Reference density**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Ref. density (7700)

**Prerequisite**

The following conditions are met:

- In the Select gas type parameter (→ 78), the User-specific gas option is selected.
- Or
- In the Select liquid type parameter (→ 79), the Water option or User-specific liquid option is selected.

**Description**

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

**User entry**

0.01 to 15 000 kg/m³

**Factory setting**

1 000 kg/m³
Reference gross calorific value

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Ref. Gross Cal Val (7701)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-3 option is selected.

**Description**

Use this function to enter the reference gross calorific value of the natural gas.

**User entry**

Positive floating-point number

**Factory setting**

50000 kJ/Nm³

**Additional information**

Dependency

The unit is taken from the Calorific value unit parameter (→ 69)

Reference pressure

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Ref. pressure (7702)

**Prerequisite**

The following conditions are met:
- Order code for "Sensor version", option 'Mass flow (integrated temperature measurement)"
- The Gas option is selected in the Select medium parameter (→ 78).

**Description**

Use this function to enter the reference pressure for calculating the reference density.

**User entry**

0 to 250 bar

**Factory setting**

1.01325 bar

**Additional information**

Dependency

The unit is taken from the Pressure unit parameter (→ 66)
Reference temperature

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Ref. temperature (7703)

**Prerequisite**

The following conditions are met:
- The *Gas* option is selected in the Select medium parameter (→ 78).
- Or
- The *Liquid* option is selected in the Select medium parameter (→ 78).

**Description**

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

**User entry**

-200 to 450 °C

**Factory setting**

20 °C

**Additional information**

*Dependency*

The unit is taken from the Temperature unit parameter (→ 67)

Reference Z-factor

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Ref. Z-factor (7704)

**Prerequisite**

In the Select gas type parameter (→ 78), the User-specific gas option is selected.

**Description**

Use this function to enter the real gas constant Z for gas under reference conditions.

**User entry**

0.1 to 2

**Factory setting**

1

Relative density

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Relative density (7705)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the *Gas* option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-3 option is selected.

**Description**

Use this function to enter the relative density of the natural gas.

**User entry**

0.55 to 0.9

**Factory setting**

0.664
Specific heat capacity

Navigation

Expert → Sensor → Measurement mode → Medium property → Spec. heat cap. (7716)

Prerequisite

The following conditions are met:

- In the Select gas type parameter (→ 78), the User-specific gas option is selected.
  Or
- In the Select liquid type parameter (→ 79), the User-specific liquid option is selected.
- In the Enthalpy type parameter (→ 82), the Heat option is selected.

Description

Use this function to enter the specific heat capacity of the medium.

User entry

0 to 50 kJ/(kgK)

Factory setting

4.187 kJ/(kgK)

Additional information

Dependency

The unit is taken from the Specific heat capacity unit parameter (→ 73)

'Gas composition' submenu

Navigation

Expert → Sensor → Measurement mode → Medium property → Gas composition

Gas type (7714) → 91
Gas mixture (7640) → 91
Mol% Ar (7663) → 92
Mol% C2H3Cl (7664) → 92
Mol% C2H4 (7665) → 93
Mol% C2H6 (7666) → 93
Mol% C3H8 (7667) → 94
Mol% CH4 (7668) → 94
Mol% Cl2 (7707) → 94
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<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mol% CO (7669)</td>
<td>95</td>
</tr>
<tr>
<td>Mol% CO2 (7670)</td>
<td>95</td>
</tr>
<tr>
<td>Mol% H2 (7671)</td>
<td>96</td>
</tr>
<tr>
<td>Mol% H2O (7672)</td>
<td>96</td>
</tr>
<tr>
<td>Mol% H2S (7673)</td>
<td>96</td>
</tr>
<tr>
<td>Mol% HCl (7674)</td>
<td>97</td>
</tr>
<tr>
<td>Mol% He (7675)</td>
<td>97</td>
</tr>
<tr>
<td>Mol% i-C4H10 (7676)</td>
<td>98</td>
</tr>
<tr>
<td>Mol% i-C5H12 (7677)</td>
<td>98</td>
</tr>
<tr>
<td>Mol% Kr (7678)</td>
<td>98</td>
</tr>
<tr>
<td>Mol% N2 (7679)</td>
<td>99</td>
</tr>
<tr>
<td>Mol% n-C10H22 (7680)</td>
<td>99</td>
</tr>
<tr>
<td>Mol% n-C4H10 (7681)</td>
<td>100</td>
</tr>
<tr>
<td>Mol% n-C5H12 (7682)</td>
<td>100</td>
</tr>
<tr>
<td>Mol% n-C6H14 (7683)</td>
<td>100</td>
</tr>
<tr>
<td>Mol% n-C7H16 (7684)</td>
<td>101</td>
</tr>
<tr>
<td>Mol% n-C8H18 (7685)</td>
<td>101</td>
</tr>
<tr>
<td>Mol% n-C9H20 (7686)</td>
<td>101</td>
</tr>
<tr>
<td>Mol% Ne (7687)</td>
<td>102</td>
</tr>
<tr>
<td>Mol% NH3 (7688)</td>
<td>102</td>
</tr>
<tr>
<td>Mol% O2 (7689)</td>
<td>103</td>
</tr>
<tr>
<td>Mol% SO2 (7691)</td>
<td>103</td>
</tr>
<tr>
<td>Mol% Xe (7692)</td>
<td>103</td>
</tr>
<tr>
<td>Mol% other gas (7690)</td>
<td>104</td>
</tr>
<tr>
<td>Relative humidity (7731)</td>
<td>104</td>
</tr>
</tbody>
</table>
Endress+Hauser

Gas type

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Gas type (7714)

**Prerequisite**

The following conditions are met:

- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Single gas option is selected.

**Description**

Use this function to select the type of gas for the measuring application.

**Selection**

- Hydrogen H2
- Helium He
- Neon Ne
- Argon Ar
- Krypton Kr
- Xenon Xe
- Nitrogen N2
- Oxygen O2
- Chlorine Cl2
- Ammonia NH3
- Carbon monoxide CO
- Carbon dioxide CO2
- Sulfur dioxide SO2
- Hydrogen sulfide H2S
- Hydrogen chloride HCl
- Methane CH4
- Ethane C2H6
- Propane C3H8
- Butane C4H10
- Ethylene C2H4
- Vinyl Chloride C2H3Cl

**Factory setting**

Methane CH4

Gas mixture

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Gas mixture (7640)

**Prerequisite**

The following conditions are met:

- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.

**Description**

Use this function to select the gas mixture for the measuring application.

**Selection**

- Hydrogen H2
- Helium He
- Neon Ne
- Argon Ar
- Krypton Kr
- Xenon Xe
- Nitrogen N2
Description of device parameters

- Oxygen O2
- Chlorine Cl2
- Ammonia NH3
- Carbon monoxide CO
- Carbon dioxide CO2
- Sulfur dioxide SO2
- Hydrogen sulfide H2S
- Hydrogen chloride HCl
- Methane CH4
- Ethane C2H6
- Propane C3H8
- Butane C4H10
- Ethylene C2H4
- Vinyl Chloride C2H3Cl
- Others

Factory setting

Methane CH4

Mol% Ar

Navigation

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Ar (7663)

Prerequisite

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Argon Ar option is selected.

Or
- In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

Description

Use this function to enter the amount of the gas constituent in the gas mixture.

User entry

0 to 100 %

Factory setting

0 %

Mol% C2H3Cl

Navigation

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C2H3Cl (7664)

Prerequisite

The following conditions are met:

- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Vinyl Chloride C2H3Cl option is selected.

Description

Use this function to enter the amount of the gas constituent in the gas mixture.

User entry

0 to 100 %
Description of device parameters

**Factory setting**
0 %

---

**Mol% C2H4**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C2H4 (7665)

**Prerequisite**
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Ethylene C2H4 option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %

---

**Mol% C2H6**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C2H6 (7666)

**Prerequisite**
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
  - In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Ethane C2H6 option is selected.
  - Or
  - In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %
**Description of device parameters**

<table>
<thead>
<tr>
<th>Mol% C3H8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% C3H8 (7667)</td>
</tr>
<tr>
<td><strong>Prerequisite</strong></td>
</tr>
<tr>
<td>The following conditions are met:</td>
</tr>
<tr>
<td>In the Select medium parameter (→ 78), the Gas option is selected.</td>
</tr>
<tr>
<td>- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Propane C3H8 option is selected.</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the amount of the gas constituent in the gas mixture.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td>0 to 100 %</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
<tr>
<td>0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mol% CH4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% CH4 (7668)</td>
</tr>
<tr>
<td><strong>Prerequisite</strong></td>
</tr>
<tr>
<td>The following conditions are met:</td>
</tr>
<tr>
<td>In the Select medium parameter (→ 78), the Gas option is selected.</td>
</tr>
<tr>
<td>- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Methane CH4 option is selected.</td>
</tr>
<tr>
<td>Or</td>
</tr>
<tr>
<td>- In the Select gas type parameter (→ 78), the Natural gas option is selected.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the amount of the gas constituent in the gas mixture.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td>0 to 100 %</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
<tr>
<td>100 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mol% Cl2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Cl2 (7707)</td>
</tr>
<tr>
<td><strong>Prerequisite</strong></td>
</tr>
<tr>
<td>The following conditions are met:</td>
</tr>
<tr>
<td>- In the Select medium parameter (→ 78), the Gas option is selected.</td>
</tr>
<tr>
<td>- In the Select gas type parameter (→ 78), the Gas mixture option is selected.</td>
</tr>
<tr>
<td>- In the Gas mixture parameter (→ 91), the Chlorine Cl2 option is selected.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the amount of the gas constituent in the gas mixture.</td>
</tr>
</tbody>
</table>
## Mol% CO

### Navigation

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% CO (7669)

### Prerequisite

The following conditions are met:

- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Carbon monoxide CO** option is selected.
- Or
  - In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected and in the **Density calculation** parameter (→ 80), the **ISO 12213-2** option is selected.

### Description

Use this function to enter the amount of the gas constituent in the gas mixture.

### User entry

0 to 100 %

### Factory setting

0 %

---

## Mol% CO2

### Navigation

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% CO2 (7670)

### Prerequisite

The following conditions are met:

- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected and in the **Gas mixture** parameter (→ 91), the **Carbon dioxide CO2** option is selected.
- Or
  - In the **Select gas type** parameter (→ 78), the **Natural gas** option is selected.

### Description

Use this function to enter the amount of the gas constituent in the gas mixture.

### User entry

0 to 100 %

### Factory setting

0 %
Mol% H2

Navigation
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% H2 (7671)

Prerequisite
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Hydrogen H2 option is selected.

Or
- In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the AGA Nx19 option is not selected.

Description
Use this function to enter the amount of the gas constituent in the gas mixture.

User entry
0 to 100 %

Factory setting
0 %

Mol% H2O

Navigation
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% H2O (7672)

Prerequisite
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

Description
Use this function to enter the amount of the gas constituent in the gas mixture.

User entry
0 to 100 %

Factory setting
0 %

Mol% H2S

Navigation
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% H2S (7673)

Prerequisite
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Hydrogen sulfide H2S option is selected.

Or
- In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

Description
Use this function to enter the amount of the gas constituent in the gas mixture.
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User entry
0 to 100 %

Factory setting
0 %

**Mol% HCl**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% HCl (7674)

**Prerequisite**
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Hydrogen chloride HCl option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %

**Mol% He**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% He (7675)

**Prerequisite**
The following conditions are met:
In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Helium He option is selected.
- Or
- In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %
**Mol% i-C4H10**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% i-C4H10 (7676)

**Prerequisite**
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %

---

**Mol% i-C5H12**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% i-C5H12 (7677)

**Prerequisite**
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %

---

**Mol% Kr**

**Navigation**
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Kr (7678)

**Prerequisite**
The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Krypton Kr option is selected.

**Description**
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**
0 to 100 %

**Factory setting**
0 %
### Mol% N2

**Navigation**  
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% N2 (7679)

**Prerequisite**  
The following conditions are met:  
- In the Select medium parameter (→ 7679), the Gas option is selected.  
  - In the Select gas type parameter (→ 7679), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Nitrogen N2 option is selected.  
  - Or, In the Select gas type parameter (→ 7679), the Natural gas option is selected and in the Density calculation parameter (→ 80), the AGA Nx19 option or the ISO 12213-2 option is selected.

**Description**  
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**  
0 to 100 %

**Factory setting**  
0 %

---

### Mol% n-C10H22

**Navigation**  
Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C10H22 (7680)

**Prerequisite**  
The following conditions are met:  
- In the Select medium parameter (→ 7679), the Gas option is selected.  
  - In the Select gas type parameter (→ 7679), the Natural gas option is selected.  
  - In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**  
Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**  
0 to 100 %

**Factory setting**  
0 %
**Mol% n-C4H10**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C4H10 (7681)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Butane C4H10 option is selected.
- Or
  - In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.
- Or
  - In the Select medium parameter (→ 78), the Liquid option is selected and in the Select liquid type parameter (→ 79), the LPG option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %

---

**Mol% n-C5H12**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C5H12 (7682)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %

---

**Mol% n-C6H14**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C6H14 (7683)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.
User entry | 0 to 100 %
---|---
Factory setting | 0 %

Mol% n-C7H16

Navigation | Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C7H16 (7684)
Prerequisite | The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.
Description | Use this function to enter the amount of the gas constituent in the gas mixture.
User entry | 0 to 100 %
Factory setting | 0 %

Mol% n-C8H18

Navigation | Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C8H18 (7685)
Prerequisite | The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.
Description | Use this function to enter the amount of the gas constituent in the gas mixture.
User entry | 0 to 100 %
Factory setting | 0 %

Mol% n-C9H20

Navigation | Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% n-C9H20 (7686)
Prerequisite | The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Natural gas option is selected.
- In the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.
Description | Use this function to enter the amount of the gas constituent in the gas mixture.
### Mol% Ne

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Ne (7687)

**Prerequisite**

The following conditions are met:

- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Neon Ne** option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %

---

### Mol% NH3

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% NH3 (7688)

**Prerequisite**

The following conditions are met:

- In the **Select medium** parameter (→ 78), the **Gas** option is selected.
- In the **Select gas type** parameter (→ 78), the **Gas mixture** option is selected.
- In the **Gas mixture** parameter (→ 91), the **Ammonia NH3** option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %
**Mol% O₂**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% O₂ (7689)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected and in the Gas mixture parameter (→ 91), the Oxygen O₂ option is selected.
- Or
- In the Select gas type parameter (→ 78), the Natural gas option is selected and in the Density calculation parameter (→ 80), the ISO 12213-2 option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %

---

**Mol% SO₂**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% SO₂ (7691)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Sulfur dioxide SO₂ option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %

---

**Mol% Xe**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% Xe (7692)

**Prerequisite**

The following conditions are met:
- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Xenon Xe option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %
Description of device parameters

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**Factory setting**

0 %

**Mol% other gas**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Mol% other gas (7690)

**Prerequisite**
The following conditions are met:

- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Gas mixture option is selected.
- In the Gas mixture parameter (→ 91), the Others option is selected.

**Description**

Use this function to enter the amount of the gas constituent in the gas mixture.

**User entry**

0 to 100 %

**Factory setting**

0 %

**Relative humidity**

**Navigation**

Expert → Sensor → Measurement mode → Medium property → Gas composition → Rel. humidity (7731)

**Prerequisite**
The following conditions are met:

- In the Select medium parameter (→ 78), the Gas option is selected.
- In the Select gas type parameter (→ 78), the Air option is selected.

**Description**

Use this function to enter the humidity content of the air in %.

**User entry**

0 to 100 %

**Factory setting**

0 %

3.2.5 "External compensation" submenu

**Navigation**


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Proline Prowirl 200 PROFIBUS PA

Description of device parameters

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**External value**

**Navigation**

Expert → Sensor → External comp. → External value (7622)

**Prerequisite**

For the following order code:

"Sensor version", option "Mass flow"

**Description**

Use this function to select the process variable which is taken from an external device.

For detailed information on setting the parameter in steam applications, see the Special Documentation for the Wet Steam Detection and Wet Steam Measurement application package.

**Selection**

- Off
- Pressure
- Relative pressure
- Density
- Temperature
- 2nd temperature delta heat

**Factory setting**

Off

**Additional information**

The Fixed process pressure parameter (→ 108) is set to the value 0 bar abs. (ex works). In this case, the measuring device ignores the pressure read in via PROFIBUS PA. For the measuring device to use the external (read-in) pressure, a value > 0 bar abs. must be entered in the Fixed process pressure parameter (→ 108).

**NOTE!**

If pressure is the selected option, the pressure is read in externally by means of a pressure transmitter.

The pressure must be read in the unit Pascal so that pressure compensation can be read in correctly.

- Select the Pa option in the Pressure unit parameter (→ 66).
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Atmospheric pressure

Navigation


Prerequisite

In the External value parameter (→ 105), the Relative pressure option is selected.

Description

Use this function to enter the value for the ambient pressure to be used for pressure correction.

User entry

0 to 250 bar

Factory setting

1.01325 bar

Additional information

Dependency

The unit is taken from the Pressure unit parameter (→ 66)

Delta heat calculation

Navigation


Prerequisite

The Delta heat calculation parameter (→ 106) is visible.

Description

Use this function to select the option for calculating the heat transferred via a heat exchanger (=delta heat).

Selection

• Off
• Device on cold side
• Device on warm side

Factory setting

Device on warm side

Fixed density

Navigation

Expert → Sensor → External comp. → Fixed density (7627)

Prerequisite

For the following order code:
"Sensor version", option "Volume flow"

Description

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

User entry

0.01 to 15000 kg/m³

Factory setting

1000 kg/m³
Additional information

Description
The density entered is used to linearize the measured error in the lower Reynolds number range if the calculated density is not available e.g. "Volume flow" sensor version or the fluid is a user-specific gas (see table).

Dependency

The unit is taken from the Density unit parameter (→ 71)

Fixed temperature

Navigation

Expert → Sensor → External comp. → Fixed temp. (7628)

Description
Use this function to enter a fixed value for the process temperature.

User entry

–200 to 450 °C

Factory setting

20 °C

Additional information

Dependency

The unit is taken from the Temperature unit parameter (→ 67)

2nd temperature delta heat

Navigation

Expert → Sensor → External comp. → 2ndTempDeltaHeat (7625)

Prerequisite

The 2nd temperature delta heat parameter (→ 107) is visible.

Description
Use this function to enter the second temperature value for calculating the delta heat.

User entry

–200 to 450 °C

Factory setting

20 °C

Additional information

Dependency

The unit is taken from the Temperature unit parameter (→ 67)
**Description of device parameters**

**Proline Prowirl 200 PROFIBUS PA**

---

### Fixed process pressure

**Navigation**


**Prerequisite**

The following conditions are met:
- Order code for "Sensor version", option "Mass flow (integrated temperature measurement)"
- In the External value parameter (→ 105) the Pressure option is not selected.

**Description**

Use this function to enter a fixed value for the process pressure.

**User entry**

0 to 250 bar abs.

**Factory setting**

0 bar abs.

**Additional information**

**User entry**

For detailed information on setting the parameter in steam applications, see the Special Documentation for the Wet Steam Detection and Wet Steam Measurement application package.

**Dependency**

The unit is taken from the Pressure unit parameter (→ 66)

---

### Steam quality

**Navigation**

Expert → Sensor → External comp. → Steam quality (7605)

**Prerequisite**

The following conditions are met:
- Order code for "Application package":
  - Option ES "Wet steam detection"
  - Option EU "Wet steam measurement"
- In the Select medium parameter (→ 78) the Steam option is selected.
- The software options currently enabled are displayed in the Software option overview parameter (→ 45).

**Description**

Use this function to select the compensation mode for the steam quality.

**Selection**

- Fixed value
- Calculated value

**Factory setting**

Fixed value

**Additional information**

**Selection**

For detailed information on setting the parameter in steam applications, see the Special Documentation for the Wet Steam Detection and Wet Steam Measurement application package.
Steam quality value

Navigation

Expert → Sensor → External comp. → Steam qual. val. (7630)

Prerequisite

The following conditions are met:
- In the Select medium parameter (→ 78) the Steam option is selected.
- In the Steam quality parameter (→ 108) the Fixed value option is selected.

Description

Use this function to enter a fixed value for the steam quality.

User entry

0 to 100 %

Factory setting

100 %

Additional information

User entry

For detailed information on setting the parameter in steam applications, see the Special Documentation for the Wet Steam Detection and Wet Steam Measurement application package.

3.2.6 "Sensor adjustment" submenu

Navigation


Sensor adjustment

Inlet configuration (7641) → 109
Inlet run (7642) → 110
Mating pipe diameter (7648) → 110
Installation factor (7616) → 111

Inlet configuration

Navigation

Expert → Sensor → Sensor adjustm. → Inlet config. (7641)

Prerequisite

The inlet run correction feature:
- Is a standard feature and can only be used in Prowirl F 200.
- Can be used for the following pressure ratings and nominal diameters:
  DN 15 to 150 (1 to 6”)
  - EN (DIN)
  - ASME B16.5, Sch. 40/80

Description

Use this function to select the inlet configuration.
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Selection

- Off
- Single elbow
- Double elbow
- Double elbow 3D
- Reduction

Factory setting

Off

Inlet run

Navigation

Expert → Sensor → Sensor adjustm. → Inlet run

Prerequisite

The inlet run correction feature:
- Is a standard feature and can only be used in Prowirl F 200.
- Can be used for the following pressure ratings and nominal diameters:
  - DN 15 to 150 (1 to 6"
    - EN (DIN)
    - ASME B16.5, Sch. 40/80

Description

Use this function to enter the length of the straight inlet run.

User entry

0 to 20 m

Factory setting

0 m

Additional information

Dependency

The unit is taken from the Length unit parameter (→ 73)

Mating pipe diameter

Navigation

Expert → Sensor → Sensor adjustm. → D mating pipe

Description

Use this function to enter the diameter of the mating pipe to enable diameter mismatch correction.

User entry

0 to 1 m (0 to 3 ft)

Factory setting

Country-specific:
- 0 m
- 0 ft

Additional information

The device has diameter mismatch correction. This can be enabled by entering the actual internal diameter of the mating pipe in the Mating pipe diameter parameter.

User entry

If the value entered is 0, diameter mismatch correction is disabled. If the standard internal diameter of the ordered process connection differs from the internal diameter of the
mating pipe, an additional measuring uncertainty of up to 2 % must be expected if diameter mismatch correction is disabled.

Limit values
Diameter mismatch correction should be enabled only within the following limit values:

Flange connection:
- DN 15 (½\"): ±20 % of the internal diameter
- DN 25 (1\") : ±15 % of the internal diameter
- DN 40 (1½\") : ±12 % of the internal diameter
- DN ≥ 50 (2\") : ±10 % of the internal diameter

Disc (wafer version):
- DN 15 (¼\") : ±15 % of the internal diameter
- DN 25 (1\") : ±12 % of the internal diameter
- DN 40 (1½\") : ±9 % of the internal diameter
- DN ≥ 50 (2\") : ±8 % of the internal diameter

Dependency

The unit is taken from the **Length unit** parameter (→ 112)

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</table>

The calculated volume flow and all measured variables derived from this are multiplied by the installation factor.

### 3.2.7 "Calibration" submenu

**Navigation** ▼▼ Expert → Sensor → Calibration

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</tbody>
</table>
### Calibration factor

**Navigation**

Expert → Sensor → Calibration → Cal. factor (7604)

**Description**
Displays the calibration factor. The calibration factor is determined during device calibration.

**User interface**
Positive floating-point number

**Factory setting**
This value is always > 0 when the device is delivered from the factory.

**Additional information**

*Description*
Factor by which the measured vortex frequency must be divided in order to calculate the volume flow.

*Unit*
In 1/m³, or vortex pulses per cubic meter

### Meter body properties

**Navigation**

Expert → Sensor → Calibration → Meter body prop. (7658)

**Description**
Displays informative text about the measuring tube.

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

**Factory setting**
--------------

**Additional information**

*Description*
Summarized information about the meter body.

*Example*
DN25F-PN40: nominal diameter DN25, flange type, pressure rating 40 bar

### 3.3 "Output" submenu

**Navigation**

Expert → Output

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→ 113
### 3.3.1 "Pulse/frequency/switch output" submenu

**Navigation**

Expert → Output → PFS output

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</table>
Operating mode

Navigation

Expert → Output → PFS output → Operating mode (0469)

Description

Use this function to select the operating mode of the output as a pulse, frequency or switch output.

Selection

- Pulse
- Frequency
- Switch

Factory setting

Pulse

Additional information

"Pulse" option

Quantity-dependent pulse with configurable pulse width
- Whenever a specific volume, corrected volume, mass, total mass, energy or heat is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width).
- The pulses are never shorter than the set duration.

Example

- Total flow approx. 100 g/s
- Pulse value 0.1 g
- Pulse width 0.05 ms
- Pulse rate 1 000 Impuls/s
"Frequency" option
Flow-proportional frequency output with 1:1 on/off ratio
An output frequency is output that is proportional to the value of a process variable, such as volume flow, corrected volume flow, mass flow, flow velocity, temperature, calculated saturated steam pressure, steam quality, total mass flow, energy flow or heat flow difference.
Example
- Total flow approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1000 g/s
- Output frequency approx. 1000 Hz

![Flow-proportional frequency output](image)

5 Flow-proportional frequency output

"Switch" option
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)
Example
Alarm response without alarm

![No alarm, high level](image)

6 No alarm, high level

Example
Alarm response in case of alarm

![Alarm, low level](image)

7 Alarm, low level

Assign pulse output

Navigation
Expert → Output → PFS output → Assign pulse (0460)

Prerequisite
The Pulse option is selected in the Operating mode parameter (→ 114).
Description
Use this function to select the process variable for the pulse output.

Selection
- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Total mass flow
- Energy flow
- Heat flow difference

Factory setting
Volume flow

Value per pulse

Navigation
Expert → Output → PFS output → Value per pulse (0455)

Prerequisite
The Pulse option is selected in the Operating mode parameter (→ 114), and one of the following options is selected in the Assign pulse output parameter (→ 115):
- Volume flow
- Corrected volume flow
- Mass flow
- Total mass flow
- Energy flow
- Heat flow difference

Description
Use this function to enter the value for the measured value that a pulse is equivalent to.

User entry
Positive floating-point number

Factory setting
Depends on country and nominal diameter → 235

Additional information
User entry
Weighting of the pulse output with a quantity.
The lower the pulse value, the
- better the resolution.
- the higher the frequency of the pulse response.

Pulse width

Navigation
Expert → Output → PFS output → Pulse width (0452)

Prerequisite
In the Operating mode parameter (→ 114), the Pulse option is selected and one of the following options is selected in the Assign pulse output parameter (→ 115):
- Volume flow
- Corrected volume flow
- Mass flow

* Visibility depends on order options or device settings
• Total mass flow *
• Energy flow *
• Heat flow difference *

Description
Use this function to enter the duration of the output pulse.

User entry
5 to 2000 ms

Factory setting
100 ms

Additional information

Description

• Define how long a pulse is (duration).
• The maximum pulse rate is defined by \( f_{\text{max}} = \frac{1}{2 \times \text{pulse width}} \).
• The interval between two pulses lasts at least as long as the set pulse width.
• The maximum flow is defined by \( Q_{\text{max}} = f_{\text{max}} \times \text{pulse value} \).
• If the flow exceeds these limit values, the measuring device displays the diagnostic message \( \Delta S443 \text{ Pulse output 1 to 2} \).

Example

• Pulse value: 0.1 g
• Pulse width: 0.1 ms
• \( f_{\text{max}} = \frac{1}{2 \times 0.1 \text{ ms}} = 5 \text{ kHz} \)
• \( Q_{\text{max}} = 5 \text{ kHz} \times 0.1 \text{ g} = 0.5 \text{ kg/s} \)

The pulse width is not relevant for Automatic pulse option.

Failure mode

Navigation

Expert → Output → PFS output → Failure mode (0480)

Prerequisite

In the Operating mode parameter (→ 114), the Pulse option is selected and one of the following options is selected in the Assign pulse output parameter (→ 115):

• Volume flow
• Corrected volume flow
• Mass flow
• Total mass flow *
• Energy flow *
• Heat flow difference *

* Visibility depends on order options or device settings
Description
Use this function to select the failure mode of the pulse output in the event of a device alarm.

Selection
- Actual value
- No pulses

Factory setting
No pulses

Additional information
Description
The dictates of safety render it advisable to ensure that the pulse output shows a predefined behavior in the event of a fault.

Options
- Actual value
  In the event of a device alarm, the pulse output continues on the basis of the current flow measurement. The fault is ignored.
- No pulses
  In the event of a device alarm, the pulse output is "switched off".

NOTICE! A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The Actual value option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement quality.

Pulse output

Navigation
Expert → Output → PFS output → Pulse output (0456)

Prerequisite
The Pulse option is selected in the Operating mode parameter (→ 114).

Description
Displays the pulse frequency currently output.

User interface
Positive floating-point number

Additional information
- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.
- The Value per pulse parameter (→ 116) and the Pulse width parameter (→ 116) can be used to define the value (i.e. the amount of the measured value that corresponds to a pulse) and the duration of the pulse.
The output behavior can be reversed via the Invert output signal parameter (→ 131), i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of an error (Failure mode parameter (→ 117)) can be configured.

### Assign frequency output

**Navigation**

Expert → Output → PFS output → Assign freq. (0478)

**Prerequisite**

The Frequency option is selected in the Operating mode parameter (→ 114).

**Description**

Use this function to select the process variable for the frequency output.

**Selection**

- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

**Factory setting**

Off

* Visibility depends on order options or device settings
## Minimum frequency value

**Navigation**

Expert → Output → PFS output → Min. freq. value (0453)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

**Description**

Use this function to enter the start value frequency.

**User entry**

0 to 1 000 Hz

**Factory setting**

0 Hz

## Maximum frequency value

**Navigation**

Expert → Output → PFS output → Max. freq. value (0454)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

**Description**

Use this function to enter the end value frequency.

**User entry**

0 to 1 000 Hz

**Factory setting**

1 000 Hz

* Visibility depends on order options or device settings
Measuring value at minimum frequency

**Navigation**

Expert → Output → PFS output → Val. at min.freq (0476)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

**Description**

Use this function to enter the measured value for the start value frequency.

**User entry**

Signed floating-point number

**Factory setting**

Depends on country and nominal diameter

**Additional information**

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

**Proline Prowirl 200 PROFIBUS PA**

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

**Additional information**

*Description*
- Use this function to enter the maximum measured value at the maximum frequency. The selected process variable is output as a proportional frequency.

*Dependency*
- The entry depends on the process variable selected in the **Assign frequency output** parameter (→ p. 119).

**Damping output**

**Navigation**
- Expert → Output → PFS output → Damping out. (0477)

**Prerequisite**
- The **Frequency** option is selected in the **Operating mode** parameter (→ p. 114), and one of the following options is selected in the **Assign frequency output** parameter (→ p. 119):
  - Volume flow
  - Corrected volume flow
  - Mass flow
  - Flow velocity
  - Temperature
  - Calculated saturated steam pressure *
  - Steam quality *
  - Total mass flow *
  - Energy flow *
  - Heat flow difference *

*Visibility depends on order options or device settings

**Description**
- Use this function to enter the reaction time of the output signal to fluctuations in the measured value.

**User entry**
- 0 to 999.9 s

**Factory setting**
- 5.0 s

**Additional information**

*Description*
- Use this function to enter a time constant (PT1 element) for frequency output damping. The frequency output is subject to separate damping that is independent of all preceding time constants.
Response time

**Navigation**

Expert → Output → PFS output → Response time (0491)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure
- Steam quality
- Total mass flow
- Energy flow
- Heat flow difference

**Description**

Displays the response time. This specifies how quickly the pulse/frequency/switch output reaches the measured value change of 63 % of 100 % of the measured value change.

**User interface**

Positive floating-point number

**Additional information**

* Description

The response time is made up of the time specified for the following dampings:

- Damping of pulse/frequency/switch output
  - Depending on the measured variable assigned to the output.
  - Flow damping

Failure mode

**Navigation**

Expert → Output → PFS output → Failure mode (0451)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 114), and one of the following options is selected in the **Assign frequency output** parameter (→ 119):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure
- Steam quality
- Total mass flow
- Energy flow
- Heat flow difference

**Description**

Use this function to select the failure mode of the frequency output in the event of a device alarm.

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

Proline Prowirl 200 PROFIBUS PA

Selection

- Actual value
- Defined value
- 0 Hz

Factory setting

0 Hz

Additional information

Selection

- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The fault is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. This Failure frequency (→ 124) replaces the current measured value and the alarm can be bypassed in this way. The actual measurement is switched off for the duration of the alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

NOTICE! A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The Actual value option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement quality.

Failure frequency

Navigation

Expert → Output → PFS output → Failure freq. (0474)

Prerequisite

The Frequency option is selected in the Operating mode parameter (→ 114), and one of the following options is selected in the Assign frequency output parameter (→ 119):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *

Description

Use this function to enter the value for the frequency output in the event of a device alarm in order to bypass the alarm.

User entry

0.0 to 1250.0 Hz

Factory setting

0.0 Hz

* Visibility depends on order options or device settings
### Output frequency

**Navigation**

Expert → Output → PFS output → Output freq. (0471)

**Prerequisite**

In the Operating mode parameter (→ 114), the Frequency option is selected.

**Description**

Displays the actual value of the output frequency which is currently measured.

**User interface**

0 to 1 250 Hz

### Switch output function

**Navigation**

Expert → Output → PFS output → Switch out funct (0481)

**Prerequisite**

The Switch option is selected in the Operating mode parameter (→ 114).

**Description**

Use this function to select a function for the switch output.

**Selection**

- Off
- On
- Diagnostic behavior
- Limit
- Status

**Factory setting**

Off

**Additional information**

**Options**

- Off
  The switch output is permanently switched off (open, non-conductive).
- On
  The switch output is permanently switched on (closed, conductive).
- Diagnostic behavior
  Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level.
- Limit
  Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level.
- Flow direction check
  Indicates the flow direction (forward or reverse flow).
- Status
  Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.
### Assign diagnostic behavior

**Navigation**

![Navigation]

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→  114).
- The **Diagnostic behavior** option is selected in the **Switch output function** parameter (→  125).

**Description**

Use this function to select the diagnostic event category that is displayed for the switch output.

**Selection**

- Alarm
- Alarm or warning
- Warning

**Factory setting**

Alarm

**Additional information**

**Description**

If no diagnostic event is pending, the switch output is closed and conductive.

**Options**

- **Alarm**
  The switch output signals only diagnostic events in the alarm category.
- **Alarm or warning**
  The switch output signals diagnostic events in the alarm and warning category.
- **Warning**
  The switch output signals only diagnostic events in the warning category.

### Assign limit

**Navigation**

![Navigation]

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→  114).
- The **Limit** option is selected in the **Switch output function** parameter (→  125).

**Description**

Use this function to select a process variable for the limit function.

**Selection**

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *

* Visibility depends on order options or device settings
Factory setting

Volume flow

Additional information

Description

Behavior of status output when Switch-on value > Switch-off value:
- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive

Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive

Behavior of status output when Switch-on value = Switch-off value:
- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive

Totalizer 1
Totalizer 2
Totalizer 3
### Switch-on value

**Navigation**

Expert → Output → PFS output → Switch-on value (0466)

**Prerequisite**

- The **Switch** option is selected in the Operating mode parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).

**Description**

Use this function to enter the measured value for the switch-on point.

**User entry**

Signed floating-point number

**Factory setting**

Country-specific:

- 0 m³/h
- 0 ft³/h

**Additional information**

**Description**

Use this function to enter the limit value for the switch-on value (process variable > switch-on value = closed, conductive).

When using a hysteresis: Switch-on value > Switch-off value.

**Dependency**

The unit depends on the process variable selected in the **Assign limit** parameter (→ 126).

### Switch-off value

**Navigation**

Expert → Output → PFS output → Switch-off value (0464)

**Prerequisite**

- The **Switch** option is selected in the Operating mode parameter (→ 114).
- The **Limit** option is selected in the **Switch output function** parameter (→ 125).
### Description
Use this function to enter the measured value for the switch-off point.

### User entry
Signed floating-point number

### Factory setting
Country-specific:
- 0 m³/h
- 0 ft³/h

### Additional information
**Description**
Use this function to enter the limit value for the switch-off value (process variable < switch-off value = open, non-conductive).

When using a hysteresis: Switch-on value > Switch-off value.

**Dependency**
The unit depends on the process variable selected in the Assign limit parameter (→ 126).

---

### Assign flow direction check

#### Navigation
Expert → Output → PFS output → Assign dir.check (0484)

#### Prerequisite
- The Switch option is selected in the Operating mode parameter (→ 114).
- The Flow direction check option is selected in the Switch output function parameter (→ 125).

#### Description
Use this function to select a process variable for monitoring the flow direction.

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

#### Factory setting
Volume flow

---

### Assign status

#### Navigation
Expert → Output → PFS output → Assign status (0485)

#### Prerequisite
- The Switch option is selected in the Operating mode parameter (→ 114).
- The Status option is selected in the Switch output function parameter (→ 125).

#### Description
Use this function to select a device status for the switch output.

#### Selection
- Low flow cut off
- Digital output 2

#### Factory setting
Low flow cut off
Additional information

Options

If empty pipe detection or low flow cut off are enabled, the output is conductive. Otherwise, the switch output is non-conductive.

Switch-on delay

Navigation

Expert → Output → PFS output → Switch-on delay (0467)

Prerequisite

- The Switch option is selected in the Operating mode parameter (→ 114).
- The Limit option is selected in the Switch output function parameter (→ 125).

Description

Use this function to enter a delay time for switching on the switch output.

User entry

0.0 to 100.0 s

Factory setting

0.0 s

Switch-off delay

Navigation

Expert → Output → PFS output → Switch-off delay (0465)

Prerequisite

- The Switch option is selected in the Operating mode parameter (→ 114).
- The Limit option is selected in the Switch output function parameter (→ 125).

Description

Use this function to enter a delay time for switching off the switch output.

User entry

0.0 to 100.0 s

Factory setting

0.0 s

Failure mode

Navigation

Expert → Output → PFS output → Failure mode (0486)

Description

Use this function to select a failsafe mode for the switch output in the event of a device alarm.

Selection

- Actual status
- Open
- Closed

Factory setting

Open
Additional information

Options

- **Actual status**
  
  In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the switch output. The **Actual status** option behaves in the same way as the current input value.

- **Open**
  
  In the event of a device alarm, the switch output's transistor is set to **non-conductive**.

- **Closed**
  
  In the event of a device alarm, the switch output's transistor is set to **conductive**.

---

**Switch status**

**Navigation**

Expert → Output → PFS output → Switch status (0461)

**Prerequisite**

The **Switch** option is selected in the **Operating mode** parameter (→ 114).

**Description**

Displays the current switch status of the status output.

**User interface**

- Open
- Closed

**Additional information**

- **Open**
  
  The switch output is not conductive.

- **Closed**
  
  The switch output is conductive.

---

**Invert output signal**

**Navigation**

Expert → Output → PFS output → Invert outp.sig. (0470)

**Description**

Use this function to select whether to invert the output signal.

**Selection**

- No
- Yes

**Factory setting**

No

**Additional information**

- **No** option (passive - negative)

![Diagram](image.png)

**Yes** option (passive - positive)
3.4 "Communication" submenu

Navigation  ⚙️ Expert → Communication

- Communication
  - PROFIBUS PA configuration  → 132
  - PROFIBUS PA info  → 134
  - Physical block  → 135

3.4.1 "PROFIBUS PA configuration" submenu

Navigation  ⚙️ Expert → Communication → PROFIBUS PA conf

- PROFIBUS PA configuration
  - Address mode (1468)  → 132
  - Device address (1462)  → 133
  - Ident number selector (1461)  → 133

Address mode

Navigation  ⚙️ Expert → Communication → PROFIBUS PA conf → Address mode (1468)

Description Displays the configured address mode.

User interface
  - Hardware
  - Software

Factory setting  Software

Additional information  

- For detailed information, see the "Setting the device address" section of the Operating Instructions.
Device address

**Navigation**
Expert → Communication → PROFIBUS PA conf → Device address (1462)

**Description**
Use this function to enter the device address.

**User entry**
0 to 126

**Factory setting**
126

**Additional information**

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

[Displays the configured address mode: Address mode parameter (→ ☰ 132)]

Ident number selector

**Navigation**
Expert → Communication → PROFIBUS PA conf → Ident num select (1461)

**Description**
Use this function to select the device master file (GSD).

**Selection**
- Automatic mode
- Prowirl 200 (0x1564)
- Prowirl 73 (0x153C)
- Prowirl 72 (0x153B)
- 3 AI, 1 Totalizer (0x9742)
- 2 AI, 1 Totalizer (0x9741)
- 1 AI, 1 Totalizer (0x9740)

**Factory setting**
Automatic mode

**Additional information**

*Description*
In order to integrate the field devices into the bus system, the PROFIBUS system needs a description of the device parameters, such as output data, input data, data format, data volume and supported transmission rate. These data are available in the device master file (GSD) which is provided to the PROFIBUS Master when the communication system is commissioned.
### 3.4.2 "PROFIBUS PA info" submenu

**Navigation**

Expert → Communication → PROFIBUS PA info

#### Status PROFIBUS Master Config

**Navigation**

Expert → Communication → PROFIBUS PA info → Stat Master Conf (1465)

**Description**

For displaying the status of the PROFIBUS Master configuration.

**User interface**

- Active
- Not active

**Factory setting**

Not active

#### PROFIBUS ident number

**Navigation**

Expert → Communication → PROFIBUS PA info → Ident number (1464)

**Description**

For displaying the PROFIBUS identification number.

**User interface**

0 to FFFF

**Factory setting**

0x1564

#### Profile version

**Navigation**

Expert → Communication → PROFIBUS PA info → Profile version (1463)

**Description**

Displays the profile version.

**User interface**

Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).
**Factory setting**  
3.02

## Base current

**Navigation**  
Expert → Communication → PROFIBUS PA info → Base current (1466)

**Description**  
Displays the basic current: Every PA measuring device taps a constant basic current from the MBP cable. This base current must be at least 10 mA. The base current enables power to be supplied to the measuring device.

**User interface**  
15 mA

## Terminal voltage 1

**Navigation**  
Expert → Communication → PROFIBUS PA info → Terminal volt. 1 (0662)

**Description**  
Use this function to view the actual terminal voltage that is present at the current output.

**User interface**  
0.0 to 50.0 V

### 3.4.3 "Physical block" submenu

**Navigation**  
Expert → Communication → Physical block

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### Description of device parameters

The table below lists the parameters for the Proline Prowirl 200 PROFIBUS PA device:

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### Device tag

**Navigation**

- Expert → Communication → Physical block → Device tag (1496)

**Description**

Use this function to enter the name for the measuring point.

**User entry**

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

**Factory setting**

Prowirl 200 PA
### Static revision

**Navigation**
> Expert → Communication → Physical block → Static revision (1495)

**Description**
Displays the event counter: every write access to a static block parameter is counted.

**User interface**
0 to FFFF

**Additional information**
(description)

---

### Strategy

**Navigation**
> Expert → Communication → Physical block → Strategy (1494)

**Description**
Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**
0 to FFFF

**Factory setting**
0

---

### Alert key

**Navigation**
> Expert → Communication → Physical block → Alert key (1473)

**Description**
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**
0 to 0xFF

**Factory setting**
0

---

### Target mode

**Navigation**
> Expert → Communication → Physical block → Target mode (1497)

**Description**
Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**
- Auto
- Out of service
### Mode block actual

#### Navigation

[Expert] → Communication → Physical block → Mode block act (1472)

#### Description

Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ [137]).

#### User interface

- Auto
- Out of service

#### Additional information

A comparison of the current mode with the target mode ([Target mode](#)) parameter (→ [137]) indicates whether it was possible to reach the target mode.

### Mode block permitted

#### Navigation

[Expert] → Communication → Physical block → Mode block perm (1493)

#### Description

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ [137]) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

#### User interface

0 to 255

### Mode block normal

#### Navigation

[Expert] → Communication → Physical block → Mode blk norm (1492)

#### Description

Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

#### User interface

- Auto
- Out of service

### Alarm summary

#### Navigation

[Expert] → Communication → Physical block → Alarm summary (1474)

#### Description

Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.
User interface
- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

Additional information

Description
Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Physical Block function block.

User interface
- Discrete alarm
  Alarm or warning message with a discrete value.
- Alarm state HiHi limit
  Upper alarm limit
- Alarm state Hi limit
  Upper warning limit
- Alarm state LoLo limit
  Lower alarm limit
- Alarm state Lo limit
  Lower warning limit
- Update Event
  This option constitutes a special alarm that is triggered if a static parameter is changed. If such a parameter is modified, the associated bit is set in the Alarm summary parameter (→ 138), the output of the block switches to “GOOD (NC) Active Update Event” (if the current status has a lower priority than this), and the block remains in this state for a duration of 10 s. The block then reverts to the normal state (the output has the last status and the Update Event option bit in the Alarm summary parameter (→ 138) is deleted again).

Software revision

Navigation
- Expert → Communication → Physical block → Software rev. (1478)

Description
Displays the firmware version of the measuring device.

User interface
Max. 16 characters such as letters, numbers or special characters (e.g. @, %, /).

Hardware revision

Navigation
- Expert → Communication → Physical block → Hardware rev. (1479)

Description
Displays the hardware revision of the measuring device.

User interface
Max. 16 characters such as letters, numbers or special characters (e.g. @, %, /).
### Manufacturer ID

**Navigation**  
Expert → Communication → Physical block → Manufacturer ID (1502)

**Description**  
Displays the manufacturer ID with which the measuring device has been registered with the PNO (PROFIBUS User Organization).

**User interface**  
0 to FFFF

**Factory setting**  
0x11

### Device ID

**Navigation**  
Expert → Communication → Physical block → Device ID (1480)

**Description**  
Displays the device ID for identifying the measuring device in a PROFIBUS network.

**User interface**  
Max. 16 characters such as letters, numbers or special characters (e.g. @, %, /).

**Factory setting**  
Prowirl 200 PA

### Serial number

**Navigation**  
Expert → Communication → Physical block → Serial number (1481)

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

**User interface**  
Max. 11-digit character string comprising letters and numbers.

**Additional information**  

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

### Diagnostics

**Navigation**  
Expert → Communication → Physical block → Diagnostics (1482)

**Description**  
Displays the diagnostic messages.

**User interface**  
- Hardware failure electronics
- Hardware failure mechanics
- Temperature motor
- Electronic temperature
- Memory checksum error
- Measurement error
- Device not initialized
- Initialization error
- Zero point error
- Power supply
- Configuration invalid
- On warmstart
- On coldstart
- Maintenance required
- Characterization invalid
- Ident number violation
- More information available
- Maintenance alarm
- Maintenance demanded
- Function check or simulation
- Invalid process condition

### Diagnostics mask

#### Navigation

Expert → Communication → Physical block → Diagnostics mask (1484)

#### Description

Displays the diagnostic messages supported by the measuring device.

#### User interface

- Hardware failure electronics
- Hardware failure mechanics
- Temperature motor
- Electronic temperature
- Memory checksum error
- Measurement error
- Device not initialized
- Initialization error
- Zero point error
- Power supply
- Configuration invalid
- On warmstart
- On coldstart
- Maintenance required
- Characterization invalid
- Ident number violation
- More information available
- Maintenance alarm
- Maintenance demanded
- Function check or simulation
- Invalid process condition
Device certification

**Navigation**  
Expert → Communication → Physical block → Dev certificate (1486)

**Description**  
Displays certificates of the measuring device, e.g. Ex certificate.

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

Factory reset

**Navigation**  
Expert → Communication → Physical block → Factory reset (1488)

**Description**  
Use this function to reset a certain set of parameters in a block.

**Selection**  
- to defaults
- warmstart device
- reset bus address
- Cancel

**Factory setting**  
Cancel

Descriptor

**Navigation**  
Expert → Communication → Physical block → Descriptor (1489)

**Description**  
Use this function to enter a user-specific string to describe the device within the application.

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

Device message

**Navigation**  
Expert → Communication → Physical block → Device message (1490)

**Description**  
Use this function to enter a user-definable message (a string) to describe the device within the application or in the plant.

**User entry**  
Max. 32 Zeichen wie Buchstaben, Zahlen oder Sonderzeichen (Z.B. @, %, /).
### Device install date

**Navigation**

Expert → Communication → Physical block → Device inst.date (1491)

**Description**

Use this function to enter the date of installation of the device.

**User entry**

Max. 16 Zeichen wie Buchstaben, Zahlen oder Sonderzeichen (z.B. @, %, /).

---

### Ident number selector

**Navigation**

Expert → Communication → Physical block → Ident num select (1461)

**Description**

Use this function to select the device master file (GSD).

**Selection**

- Automatic mode
- Prowirl 200 (0x1564)
- Prowirl 73 (0x153C)
- Prowirl 72 (0x153B)
- 3 AI, 1 Totalizer (0x9742)
- 2 AI, 1 Totalizer (0x9741)
- 1 AI, 1 Totalizer (0x9740)

**Factory setting**

Automatic mode

**Additional information**

Description

In order to integrate the field devices into the bus system, the PROFIBUS system needs a description of the device parameters, such as output data, input data, data format, data volume and supported transmission rate. These data are available in the device master file (GSD) which is provided to the PROFIBUS Master when the communication system is commissioned.

---

### Hardware lock

**Navigation**

Expert → Communication → Physical block → Hardware lock (1499)

**Description**

Displays the hardware write protection.

**User interface**

- Unprotected
- Protected

**Additional information**

Description

Indicates whether it is possible to write-access the measuring device via PROFIBUS (acyclic data transmission, e.g. via the “FieldCare” operating program).

For detailed information on hardware write protection, see the "Write protection via write protection switch" section of the Operating Instructions.
### Feature supported

**Navigation**
- **Expert → Communication → Physical block → Feature support (1477)**

**Description**
Displays the PROFIBUS features that are supported by the measuring device.

**User interface**
- **Condensed status**
- **Classic status diagnosis**
- **Data exchange broadcast**
- **MS1 application relationship**
- **PROFIsafe communication**

### Feature enabled

**Navigation**
- **Expert → Communication → Physical block → Feature enabled (1476)**

**Description**
Displays the PROFIBUS features that are enabled in the measuring device.

**User interface**
- **Condensed status**
- **Classic status diagnosis**
- **Data exchange broadcast**
- **MS1 application relationship**
- **PROFIsafe communication**

### Condensed status diagnostic

**Navigation**
- **Expert → Communication → Physical block → Condensed status (1500)**

**Description**
Use this function to switch the condensed status diagnostic on and off.

**Selection**
- **Off**
- **On**

**Factory setting**
- **On**
3.5  "Analog inputs" submenu

Navigation  Expert → Analog inputs

3.5.1  "Analog input 1 to 4" submenu

Navigation  Expert → Analog inputs → Analog input 1 to 4

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

Channel

Navigation  Expert → Analog inputs → Analog input 1 to 4 → Channel (1561–1 to 4)

Description  For selecting the process variable.

Selection

- Volume flow
- Mass flow
- Corrected volume flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *

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

Proline Prowirl 200 PROFIBUS PA

- Pressure *
- Specific volume *
- Degrees of superheat *

Factory setting

Volume flow

**PV filter time**

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → PV filter time (1524–1 to 4)

**Description**

Use this function to enter a time to suppress signal peaks. During the specified time the Analog input does not respond to an erratic increase in the process variable.

**User entry**

Positive floating-point number

**Factory setting**

0

**Fail safe type**

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Fail safe type (1525–1 to 4)

**Description**

Use this function to select the failure mode.

**Selection**

- Fail safe value
- Fallback value
- Off

**Factory setting**

Off

**Additional information**

*Selection*

If an input or simulation value has the status BAD, the function block uses this predefined failure value:

- Fail safe value
  A substitute value is used. This is specified in the Fail safe value parameter (→ 146).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

**Fail safe value**

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Fail safe value (1526–1 to 4)

**Prerequisite**

In Fail safe type parameter (→ 146), the Fail safe value option is selected.

* Visibility depends on order options or device settings
Description

Use this function to enter a failure value. The value entered is displayed as the output value (Out value parameter (→ 147)) in the event of an error.

User entry

Signed floating-point number

Factory setting

0

Out value

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Out value (1552–1 to 4)

Prerequisite

In Target mode parameter (→ 148), the Auto option is selected.

Description

Displays the analog value which is calculated when the function is executed.

User interface

Signed floating-point number

Out status

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Out status (1564–1 to 4)

Description

Displays the current output status (Good, Bad, Uncertain).

User interface

• Good
• Uncertain
• Bad

Out status

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Out status (1549–1 to 4)

Prerequisite

In Target mode parameter (→ 148), the Auto option is selected.

Description

Displays the current output status (hex value).

User interface

0 to 0xFF

Tag description

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Tag description (1562–1 to 4)

Description

Use this function to enter a string to identify the block.
### User entry
Max. 32 characters such as letters, numbers or special characters (e.g. @, %, /).

<table>
<thead>
<tr>
<th><strong>Static revision</strong></th>
</tr>
</thead>
</table>

#### Navigation
Expert → Analog inputs → Analog input 1 to 4 → Static revision (1560–1 to 4)

#### Description
Displays the event counter: every write access to a static block parameter is counted.

#### User interface
0 to FFFF

#### Additional information
*Description*
Static parameters are parameters that are not changed by the process.

### Strategy

#### Navigation
Expert → Analog inputs → Analog input 1 to 4 → Strategy (1559–1 to 4)

#### Description
Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

#### User entry
0 to FFFF

#### Factory setting
0

### Alert key

#### Navigation
Expert → Analog inputs → Analog input 1 to 4 → Alert key (1522–1 to 4)

#### Description
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

#### User entry
0 to 0xFF

#### Factory setting
0

### Target mode

#### Navigation
Expert → Analog inputs → Analog input 1 to 4 → Target mode (1563–1 to 4)

#### Description
Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.
User interface

- Auto
- Man
- Out of service

Mode block actual

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Mode block act (1521–1 to 4)

Description
Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 148).

User interface

- Auto
- Man
- Out of service

Additional information

Description
A comparison of the current mode with the target mode (Target mode parameter (→ 148)) indicates whether it was possible to reach the target mode.

Mode block permitted

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Mode block perm (1553–1 to 4)

Description
Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 148) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface

0 to 255

Mode block normal

Navigation

Expert → Analog inputs → Analog input 1 to 4 → Mode blk norm (1546–1 to 4)

Description
Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface

- Auto
- Man
- Out of service
**Alarm summary**

**Navigation**

- Expert → Analog inputs → Analog input 1 to 4 → Alarm summary (1537–1 to 4)

**Description**

Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

**User interface**

- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

**Additional information**

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Analog Inputs function block.

**Batch ID**

**Navigation**

- Expert → Analog inputs → Analog input 1 to 4 → Batch ID (1533–1 to 4)

**Description**

Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

**User entry**

Positive integer

**Batch operation**

**Navigation**

- Expert → Analog inputs → Analog input 1 to 4 → Batch operation (1534–1 to 4)

**Description**

Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

**User entry**

0 to 65535

**Factory setting**

0

**Batch phase**

**Navigation**

- Expert → Analog inputs → Analog input 1 to 4 → Batch phase (1535–1 to 4)

**Description**

Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.
### Batch Recipe Unit Procedure

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Batch Recipe (1536–1 to 4)

**Description**

Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**

0 to 65535

**Factory setting**

0

**Additional information**

*Description*

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

### PV scale lower range

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → PVscale lo range (1554–1 to 4)

**Description**

Use this function to enter the lower value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

**User entry**

Signed floating-point number

**Factory setting**

0

### PV scale upper range

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → PVscale up range (1555–1 to 4)

**Description**

Use this function to enter the upper value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

**User entry**

Signed floating-point number

**Factory setting**

100.0
### Out scale lower range

**Navigation**
- Expert → Analog inputs → Analog input 1 to 4 → Out scale low (1548–1 to 4)

**Description**
Use this function to enter the lower value range for the output value in system units.

**User entry**
Signed floating-point number

**Factory setting**
0

**Out scale upper range**

**Navigation**
- Expert → Analog inputs → Analog input 1 to 4 → Out scale up (1551–1 to 4)

**Description**
Use this function to enter the upper value range for the output value in system units.

**User entry**
Signed floating-point number

**Factory setting**
100.0

### Lin type

**Navigation**
- Expert → Analog inputs → Analog input 1 to 4 → Lin type (1523–1 to 4)

**Description**
Use this function to switch off the linearization type for the input value.

**Selection**
Off

**Factory setting**
Off

### Out unit

**Navigation**
- Expert → Analog inputs → Analog input 1 to 4 → Out unit (1550–1 to 4)

**Description**
Use this function to enter a numerical code (hex) for the system unit.

**User entry**
0 to 65535

**Factory setting**
1997
**Out decimal point**

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Out dec_ point (1547–1 to 4)

**Description**

Use this function to enter the maximum number of decimal places that are displayed for the output value.

**User entry**

0 to 7

**Factory setting**

0

**Alarm hysteresis**

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Alarm hysteresis (1527–1 to 4)

**Description**

Use this function to enter the hysteresis value for the upper and lower warning or alarm limit values.

**User entry**

Signed floating-point number

**Factory setting**

0

**Hi Hi Lim**

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Hi Hi Lim (1528–1 to 4)

**Description**

Use this function to enter the value for the upper alarm limit (*Hi Hi alarm value* parameter → 155).

**User entry**

Signed floating-point number

**Factory setting**

Positive floating-point number

**Additional information**

*Description*

If the output value Out value (→ 147) exceeds this limit value, the **Hi Hi alarm state** parameter (→ 155) is output.

*User entry*

The value is entered in the defined units (*Out unit* parameter → 152) and must be in the range defined in the **Out scale lower range** parameter (→ 152) and **Out scale upper range** parameter (→ 152).
**Hi Lim**

**Navigation**  
Expert → Analog inputs → Analog input 1 to 4 → Hi Lim (1529–1 to 4)

**Description**  
Use this function to enter the value for the upper warning limit (Hi alarm value parameter (→ 155)).

**User entry**  
Signed floating-point number

**Factory setting**  
Positive floating-point number

**Additional information**  
*Description*  
If the output value Out value (→ 147) exceeds this limit value, the Hi alarm state parameter (→ 156) is output.

*User entry*  
The value is entered in the defined units (Out unit parameter (→ 152)) and must be in the range defined in the Out scale lower range parameter (→ 152) and Out scale upper range parameter (→ 152).

---

**Lo Lim**

**Navigation**  
Expert → Analog inputs → Analog input 1 to 4 → Lo Lim (1530–1 to 4)

**Description**  
Use this function to enter the value for the lower warning limit (Lo alarm value parameter (→ 156)).

**User entry**  
Signed floating-point number

**Factory setting**  
Negative floating-point number

**Additional information**  
*Description*  
If the output value Out value (→ 147) exceeds this limit value, the Lo alarm state parameter (→ 156) is output.

*User entry*  
The value is entered in the defined units (Out unit parameter (→ 152)) and must be in the range defined in the Out scale lower range parameter (→ 152) and Out scale upper range parameter (→ 152).

---

**Lo Lo Lim**

**Navigation**  
Expert → Analog inputs → Analog input 1 to 4 → Lo Lo Lim (1531–1 to 4)

**Description**  
Use this function to enter the value for the lower alarm limit (Lo Lo alarm value parameter (→ 156)).
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User entry
Signed floating-point number

Factory setting
Negative floating-point number

Additional information

Description
If the output value Out value (→ 147) exceeds this limit value, the Lo Lo alarm state parameter (→ 157) is output.

User entry
The value is entered in the defined units (Out unit parameter (→ 152)) and must be in the range defined in the Out scale lower range parameter (→ 152) and Out scale upper range parameter (→ 152).

Hi Hi alarm value

Navigation
Expert → Analog inputs → Analog input 1 to 4 → HiHi alarm value (1541–1 to 4)

Description
Displays the alarm value for the upper alarm limit value (Hi Hi Lim parameter (→ 153)).

User interface
Signed floating-point number

Hi Hi alarm state

Navigation
Expert → Analog inputs → Analog input 1 to 4 → HiHi alarm state (1540–1 to 4)

Description
Displays the status for the upper alarm limit value (Hi Hi Lim parameter (→ 153)).

User interface
- No alarm
- Alarm state HiHi limit

Additional information
User interface
The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

Hi alarm value

Navigation
Expert → Analog inputs → Analog input 1 to 4 → Hi alarm value (1539–1 to 4)

Description
Displays the alarm value for the upper warning limit value (Hi Lim parameter (→ 154)).

User interface
Signed floating-point number
Hi alarm state

Navigation  
Expert → Analog inputs → Analog input 1 to 4 → Hi alarm state (1538–1 to 4)

Description  
Displays the status for the upper warning limit value (Hi Lim parameter (→ 154)).

User interface  
- No warning
- Alarm state Hi limit

Additional information  
User interface
The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

Lo alarm value

Navigation  
Expert → Analog inputs → Analog input 1 to 4 → Lo alarm value (1543–1 to 4)

Description  
Displays the alarm value for the lower warning limit value (Lo Lim parameter (→ 154)).

User interface  
Signed floating-point number

Lo alarm state

Navigation  
Expert → Analog inputs → Analog input 1 to 4 → Lo alarm state (1542–1 to 4)

Description  
Displays the status for the lower warning limit value (Lo Lim parameter (→ 154)).

User interface  
- No warning
- Alarm state Lo limit

Additional information  
User interface
The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

Lo Lo alarm value

Navigation  
Expert → Analog inputs → Analog input 1 to 4 → LoLo alarm value (1545–1 to 4)

Description  
Displays the alarm value for the lower alarm limit value (Lo Lo Lim parameter (→ 154)).

User interface  
Signed floating-point number
Lo Lo alarm state

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → LoLo alarm state (1544–1 to 4)

**Description**

Displays the status for the lower alarm limit value (Lo Lo Lim parameter → 154).

**User interface**

- No alarm
- Alarm state LoLo limit

**Additional information**

*User interface*

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

Simulate enabled

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Simulate enabled (1556–1 to 4)

**Description**

Use this function to enable or disable block simulation.

**Selection**

- Disable
- Enable

**Factory setting**

Disable

**Additional information**

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Simulate value (1558–1 to 4)

**Description**

Use this function to enter a simulation value for the block.

**User entry**

Signed floating-point number

**Factory setting**

0

**Additional information**

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.
### Simulate status

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Simulate status (1557–1 to 4)

**Description**

Use this function to enter a simulation status for the block.

**User entry**

0 to 255

**Factory setting**

0

**Additional information**

**Description**

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

### Out unit text

**Navigation**

Expert → Analog inputs → Analog input 1 to 4 → Out unit text (1532–1 to 4)

**Description**

Use this function to enter the out unit text: if a specific out unit does not appear in the code list, the user can enter the specific text. The unit code is then equivalent to the definition provided here.

**User entry**

Max. 16 characters such as letters, numbers or special characters (e.g. @, %, /).

**Factory setting**

NoUnit

---

### 3.6 "Discrete inputs" submenu

**Navigation**

Expert → Discrete inputs

### 3.6.1 "Discrete input 1 to 2" submenu

**Navigation**

Expert → Discrete inputs → Discrete input 1 to 2

- Channel (2187–1 to 2)
- Invert (2188–1 to 2)
Fail safe type (2189–1 to 2)  →  159
Fail safe value (2190–1 to 2)  →  160
Out value (2194–1 to 2)  →  160
Out status (2203–1 to 2)  →  160
Out status (2193–1 to 2)  →  161

Channel

Navigation  
Expert → Discrete inputs → Discrete input 1 to 2 → Channel (2187–1 to 2)

Description  Use this function to assign a measured variable to the particular function block.

Selection
• Low flow cut off
• Switch output status
• Verification status *

Factory setting  Switch output status

Invert

Navigation  
Expert → Discrete inputs → Discrete input 1 to 2 → Invert (2188–1 to 2)

Description  Use this function to invert the input signal.

Selection
• Off
• On

Factory setting  Off

Fail safe type

Navigation  
Expert → Discrete inputs → Discrete input 1 to 2 → Fail safe type (2189–1 to 2)

Description  Use this function to select the failure mode.

Selection
• Fail safe value
• Fallback value
• Off

* Visibility depends on order options or device settings
## Factory setting
- **Off**

## Additional information
- **Selection**

If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- **Fail safe value**
  - A substitute value is used. This is specified in the **Fail safe value** parameter (→ 160).
- **Fallback value**
  - If the value was good at one point, then this last valid value is used.
- **Off**
  - The system continues to use the bad value.

### Fail safe value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete inputs → Discrete input 1 to 2 → Fail safe value (2190–1 to 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In <strong>Fail safe type</strong> parameter (→ 159), the <strong>Fail safe value</strong> option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter a failure value. The value entered is displayed as the output value (<strong>Out value</strong> parameter (→ 160)) in the event of an error.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### Out value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete inputs → Discrete input 1 to 2 → Out value (2194–1 to 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>In <strong>Target mode</strong> parameter (→ 162), the <strong>Auto</strong> option is selected.</td>
</tr>
<tr>
<td>Description</td>
<td>Displays the analog value which is calculated when the function is executed.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 255</td>
</tr>
</tbody>
</table>

### Out status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete inputs → Discrete input 1 to 2 → Out status (2203–1 to 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the current output status (Good, Bad, Uncertain).</td>
</tr>
</tbody>
</table>
| User interface | • Good  
  • Uncertain  
  • Bad |
Out status

**Navigation**

Expert → Discrete inputs → Discrete input 1 to 2 → Out status (2193–1 to 2)

**Prerequisite**

In **Target mode** parameter (→ 162), the **Auto** option is selected.

**Description**

Displays the current output status (hex value).

**User interface**

0 to 0xFF

Tag description

**Navigation**

Expert → Discrete inputs → Discrete input 1 to 2 → Tag description (2201–1 to 2)

**Description**

Use this function to enter a string to identify the block.

**User entry**

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

Static revision

**Navigation**

Expert → Discrete inputs → Discrete input 1 to 2 → Static revision (2200–1 to 2)

**Description**

Displays the event counter: every write access to a static block parameter is counted.

**User interface**

0 to FFFF

**Additional information**

*Description*

Static parameters are parameters that are not changed by the process.

Strategy

**Navigation**

Expert → Discrete inputs → Discrete input 1 to 2 → Strategy (2199–1 to 2)

**Description**

Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**

0 to FFFF

**Factory setting**

0
### Alert key

**Navigation**
Expert → Discrete inputs → Discrete input 1 to 2 → Alert key (2182–1 to 2)

**Description**
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**
0 to 0xFF

**Factory setting**
0

### Target mode

**Navigation**
Expert → Discrete inputs → Discrete input 1 to 2 → Target mode (2202–1 to 2)

**Description**
Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**
- Auto
- Man
- Out of service

### Mode block actual

**Navigation**
Expert → Discrete inputs → Discrete input 1 to 2 → Mode block act (2181–1 to 2)

**Description**
Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 162).

**User interface**
- Auto
- Man
- Out of service

**Additional information**

Description
A comparison of the current mode with the target mode (Target mode parameter (→ 162)) indicates whether it was possible to reach the target mode.
Mode block permitted

Navigation
Expert → Discrete inputs → Discrete input 1 to 2 → Mode block perm (2195–1 to 2)

Description
Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ 162) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface
0 to 255

Mode block normal

Navigation
Expert → Discrete inputs → Discrete input 1 to 2 → Mode blk norm (2192–1 to 2)

Description
Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Auto
- Man
- Out of service

Alarm summary

Navigation
Expert → Discrete inputs → Discrete input 1 to 2 → Alarm summary (2191–1 to 2)

Description
Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

Additional information
Description
Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Discrete Inputs function block.
### Batch ID

**Navigation**
- Expert → Discrete inputs → Discrete input 1 to 2 → Batch ID (2183–1 to 2)

**Description**
Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

**User entry**
Positive integer

### Batch operation

**Navigation**
- Expert → Discrete inputs → Discrete input 1 to 2 → Batch operation (2184–1 to 2)

**Description**
Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

**User entry**
0 to 65535

**Factory setting**
0

### Batch phase

**Navigation**
- Expert → Discrete inputs → Discrete input 1 to 2 → Batch phase (2185–1 to 2)

**Description**
Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

**User entry**
0 to 65535

**Factory setting**
0

### Batch Recipe Unit Procedure

**Navigation**
- Expert → Discrete inputs → Discrete input 1 to 2 → Batch Recipe (2186–1 to 2)

**Description**
Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**
0 to 65535

**Factory setting**
0
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Description of device parameters

Additional information

Description

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

Simulate enabled

Navigation

Expert → Discrete inputs → Discrete input 1 to 2 → Simulate enabled (2196–1 to 2)

Description

Use this function to enable or disable block simulation.

Selection

- Disable
- Enable

Factory setting

Disable

Additional information

Description

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate status

Navigation

Expert → Discrete inputs → Discrete input 1 to 2 → Simulate status (2197–1 to 2)

Description

Use this function to enter a simulation status for the block.

User entry

0 to 255

Factory setting

0

Additional information

Description

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

Simulate value

Navigation

Expert → Discrete inputs → Discrete input 1 to 2 → Simulate value (2198–1 to 2)

Description

Use this function to enter a simulation value for the block.

User entry

0 to 255

Factory setting

0
Additional information

Description
The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

3.7 "Analog outputs" submenu

Navigation

Expert → Analog outputs

3.7.1 "Analog output 1" submenu

Navigation

Expert → Analog outputs → Analog output 1

Set point value

Navigation

Expert → Analog outputs → Analog output 1 → Set point val (1661–1)

Description
Use this function to enter an analog set point.

User entry
Signed floating-point number

Factory setting
0
### Set point status

**Navigation**

Expert → Analog outputs → Analog output 1 → Set point status (1660–1)

**Description**

Use this function to enter a status for the analog set point.

**User entry**

0 to 255

**Factory setting**

0

### Fail safe time

**Navigation**

Expert → Analog outputs → Analog output 1 → Fail safe time (1635–1)

**Description**

Use this function to enter a time span within which the criteria for an error must be met continuously before an error message or notice message is generated.

**User entry**

0 to 999.0

**Factory setting**

0

**Additional information**

*User entry*

**NOTE!**

If this parameter is used, error messages and notice messages are delayed by the set time before being relayed to the higher-level controller (DCS, etc.).

- Check in advance to ensure that the safety-specific requirements of the process would permit this.
- If the error and notice messages may not be suppressed, a value of 0 seconds must be configured here.

### Fail safe type

**Navigation**

Expert → Analog outputs → Analog output 1 → Fail safe type (1636–1)

**Description**

Use this function to select the failure mode.

**Selection**

- Fail safe value
- Fallback value
- Off

**Factory setting**

Fallback value
Additional information

Selection

If an input or simulation value has the status BAD, the function block uses this predefined failure value:

- Fail safe value
  A substitute value is used. This is specified in the **Fail safe value** parameter (→ 168).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

Fail safe value

Navigation

Expert → Analog outputs → Analog output 1 → Fail safe value (1637–1)

Prerequisite

In **Fail safe type** parameter (→ 167), the **Fallback value** option is selected.

Description

Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 168)) in the event of an error.

User entry

Signed floating-point number

Factory setting

0

Out value

Navigation

Expert → Analog outputs → Analog output 1 → Out value (1647–1)

Prerequisite

In **Target mode** parameter (→ 170), the **Auto** option is selected.

Description

Displays the analog value which is calculated when the function is executed.

User interface

Signed floating-point number

Out status

Navigation

Expert → Analog outputs → Analog output 1 → Out status (1669–1)

Description

Displays the current output status (Good, Bad, Uncertain).

User interface

- Good
- Uncertain
- Bad
Out status

Navigation

Expert → Analog outputs → Analog output 1 → Out status (1645–1)

Prerequisite

In Target mode parameter (→ 170), the Auto option is selected.

Description

Displays the current output status (hex value).

User interface

0 to 0xFF

Tag description

Navigation

Expert → Analog outputs → Analog output 1 → Tag description (1667–1)

Description

Use this function to enter a string to identify the block.

User entry

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

Static revision

Navigation

Expert → Analog outputs → Analog output 1 → Static revision (1666–1)

Description

Displays the event counter: every write access to a static block parameter is counted.

User interface

0 to FFFF

Additional information

Description

Static parameters are parameters that are not changed by the process.

Strategy

Navigation

Expert → Analog outputs → Analog output 1 → Strategy (1665–1)

Description

Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry

0 to FFFF

Factory setting

0
Alert key

**Navigation**
- Expert → Analog outputs → Analog output 1 → Alert key (1632–1)

**Description**
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**
0 to 0xFF

**Factory setting**
0

Target mode

**Navigation**
- Expert → Analog outputs → Analog output 1 → Target mode (1668–1)

**Description**
Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**
- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Mode block actual

**Navigation**
- Expert → Analog outputs → Analog output 1 → Mode block act (1631–1)

**Description**
Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 170).

**User interface**
- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

**Additional information**

A comparison of the current mode with the target mode (Target mode parameter (→ 170)) indicates whether it was possible to reach the target mode.
Mode block permitted

**Navigation**

- Expert → Analog outputs → Analog output 1 → Mode block perm (1648–1)

**Description**

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→  170) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

**User interface**

- 0 to 255

Mode block normal

**Navigation**

- Expert → Analog outputs → Analog output 1 → Mode blk norm (1643–1)

**Description**

Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

**User interface**

- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Alarm summary

**Navigation**

- Expert → Analog outputs → Analog output 1 → Alarm summary (1642–1)

**Description**

Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

**User interface**

- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

**Additional information**

*Description*

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Analog Outputs function block.
### Description of device parameters

<table>
<thead>
<tr>
<th>Batch ID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Analog outputs → Analog output 1 → Batch ID (1633–1)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td>Positive integer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Batch operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Analog outputs → Analog output 1 → Batch operation (1639–1)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td>0 to 65535</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Batch phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Analog outputs → Analog output 1 → Batch phase (1640–1)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td>0 to 65535</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Batch Recipe Unit Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
</tr>
<tr>
<td>Expert → Analog outputs → Analog output 1 → Batch Recipe (1641–1)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
</tr>
<tr>
<td>0 to 65535</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>
Additional information

Description

The unit is defined in IEC 61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

PV scale lower range

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → PVscale lo range (1651–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the lower value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

PV scale upper range

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → PVscale up range (1652–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the upper value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Readback value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → Readback value (1659–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the readback value. The readback value indicates the current position of the control element within the travel range (between the open and close position) in PV scale units.</td>
</tr>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
</tr>
</tbody>
</table>
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Readback status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → Readback status (1658–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the readback status. The readback status contains the status information of the slave.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 255</td>
</tr>
</tbody>
</table>

RCAS in value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → RCAS in value (1655–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the RCAS (Remote Cascade) in value. The block set point is set by a control application via the remote cascade RCAS in value parameter (→ 174). The normal algorithm calculates the output value of the block on the basis of this set point.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

RCAS in status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → RCAS in status (1654–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the RCAS in value (→ 174).</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
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</table>

Input channel

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → Input channel (1670–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to select the input channel. The number of logical hardware channels from the converter that is connected to this I/O block.</td>
</tr>
<tr>
<td>Selection</td>
<td>None</td>
</tr>
<tr>
<td>Factory setting</td>
<td>None</td>
</tr>
</tbody>
</table>
### Output channel

**Navigation**  
Expert → Analog outputs → Analog output 1 → Output channel (1671–1)

**Description**  
Use this function to select the output channel. The number of logical hardware channels to the converter that is connected to this I/O block.

**Selection**  
External compensation

**Factory setting**  
External compensation

### RCAS out value

**Navigation**  
Expert → Analog outputs → Analog output 1 → RCAS out value (1657–1)

**Description**  
Displays the RCAS out value. Displays the set point of the block which is made available to the higher-level host for monitoring/back calculation and which makes it possible to take action under certain conditions or in a different mode.

**User interface**  
Signed floating-point number

### RCAS out status

**Navigation**  
Expert → Analog outputs → Analog output 1 → RCAS out status (1656–1)

**Description**  
Displays the RCAS out status. Displays the status of the set point.

**User interface**  
0 to 0xFF

### Position value

**Navigation**  
Expert → Analog outputs → Analog output 1 → Pos value (1650–1)

**Description**  
Displays the current value of the positioner.

**User interface**  
0 to 255

### Position status

**Navigation**  
Expert → Analog outputs → Analog output 1 → Position status (1649–1)

**Description**  
Displays the current status of the positioner.
<table>
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<th>Description of device parameters</th>
<th>Proline Prowirl 200 PROFIBUS PA</th>
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### User interface

| 0 to 255 |

### Setpoint deviation

<table>
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<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → Setp. deviation (1653–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the deviation between the set point (Set point value parameter (→ 166)) and the actual value (Readback value parameter (→ 173)).</td>
</tr>
<tr>
<td>User interface</td>
<td>Signed floating-point number</td>
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</table>

### Simulate enabled

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → Simulate enabled (1662–1)</th>
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</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enable or disable block simulation.</td>
</tr>
<tr>
<td>Selection</td>
<td>▪ Disable ▪ Enable</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Disable</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.</td>
</tr>
</tbody>
</table>

### Simulate value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Analog outputs → Analog output 1 → Simulate value (1664–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a simulation value.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.</td>
</tr>
</tbody>
</table>
Simulate status

**Navigation**
- Expert → Analog outputs → Analog output 1 → Simulate status (1663–1)

**Description**
Use this function to enter a simulation status for the block.

**User entry**
0 to 255

**Factory setting**
0

**Additional information**
*Description*
The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

Increase close

**Navigation**
- Expert → Analog outputs → Analog output 1 → Increase close (1638–1)

**Description**
Use this function to enter the effective direction of the positioner in automatic mode.

**User entry**
0 to 255

**Factory setting**
0

Out scale upper range

**Navigation**
- Expert → Analog outputs → Analog output 1 → Out scale up (1646–1)

**Description**
Use this function to enter the upper value range for the output value in system units.

**User entry**
Signed floating-point number

**Factory setting**
100.0

Out scale lower range

**Navigation**
- Expert → Analog outputs → Analog output 1 → Out scale low (1644–1)

**Description**
Use this function to enter the lower value range for the output value in system units.

**User entry**
Signed floating-point number

**Factory setting**
0
3.8 "Discrete outputs" submenu

**Navigation**

Expert → Discrete outputs

---

3.8.1 "Discrete output 1 to 3" submenu

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3

---

### Set point value

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Set point val (1715–1 to 3)

**Description**

Use this function to enter an analog set point.

**User entry**

0 to 255

**Factory setting**

0
### Set point status

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Set point status (1714–1 to 3)

**Description**

Use this function to enter a status for the analog set point.

**User entry**

0 to 255

**Factory setting**

0

### Invert

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Invert (1692–1 to 3)

**Description**

Use this function to switch inversion on and off. Specifies whether the set point should be inverted before the value is set as the output value or the RCAS value (in the automatic mode).

**Selection**

- Off
- On

**Factory setting**

Off

### Fail safe time

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Fail safe time (1697–1 to 3)

**Description**

Use this function to enter a time span within which the criteria for an error must be met continuously before an error message or notice message is generated.

**User entry**

Signed floating-point number

**Factory setting**

0

**Additional information**

*User entry*

**NOTE!**

If this parameter is used, error messages and notice messages are delayed by the set time before being relayed to the higher-level controller (DCS, etc.).

- Check in advance to ensure that the safety-specific requirements of the process would permit this.
- If the error and notice messages may not be suppressed, a value of 0 seconds must be configured here.
Fail safe type

Description
Use this function to select the failure mode.

Selection
- Fail safe value
- Fallback value
- Off

Factory setting
Fallback value

Additional information
Selection
If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail safe value
  A substitute value is used. This is specified in the Fail safe value parameter (→ 180).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

Fail safe value

Description
Use this function to enter a failure value. The value entered is displayed as the output value (Out value parameter (→ 180)) in the event of an error.

User entry
0 to 255

Factory setting
0

Out value

Description
Displays the analog value which is calculated when the function is executed.

User interface
0 to 255
### Out status

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Out status (1723–1 to 3)

**Description**

Displays the current output status (Good, Bad, Uncertain).

**User interface**

- Good
- Uncertain
- Bad

---

### Tag description

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Tag description (1721–1 to 3)

**Description**

Use this function to enter a string to identify the block.

**User entry**

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

---

### Static revision

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Static revision (1720–1 to 3)

**Description**

Displays the event counter: every write access to a static block parameter is counted.

**User interface**

0 to FFFF

**Additional information**

*Description*

Static parameters are parameters that are not changed by the process.
### Strategy

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → Strategy (1719–1 to 3)

**Description**
Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**
0 to FFFF

**Factory setting**
0

### Alert key

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → Alert key (1694–1 to 3)

**Description**
Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**
0 to 0xFF

**Factory setting**
0

### Target mode

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → Target mode (1722–1 to 3)

**Description**
Displays the Target mode: The target mode specifies which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**
- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

### Mode block actual

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → Mode block act (1691–1 to 3)

**Description**
Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ 182).
User interface

- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

Additional information

Description

_A comparison of the current mode with the target mode (Target mode parameter (→ \( \text{182} \)) indicates whether it was possible to reach the target mode._

### Mode block permitted

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Mode block perm (1705–1 to 3)

**Description**

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ \( \text{182} \)) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

**User interface**

0 to 255

### Mode block normal

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Mode blk norm (1702–1 to 3)

**Description**

Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

**User interface**

- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

### Alarm summary

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Alarm summary (1701–1 to 3)

**Description**

Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

**User interface**

- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Additional information

Description

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Discrete Outputs function block.

Batch ID

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to 3 → Batch ID (1695–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.</td>
</tr>
<tr>
<td>User entry</td>
<td>Positive integer</td>
</tr>
</tbody>
</table>

Batch operation

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to 3 → Batch operation (1698–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

Batch phase

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to 3 → Batch phase (1699–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>
**Batch Recipe Unit Procedure**

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to 3 → Batch Recipe (1700–1 to 3)

**Description**  
Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

**User entry**  
0 to 65535

**Factory setting**  
0

**Additional information**  
*Description*  
The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

**Readback value**

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to 3 → Readback value (1713–1 to 3)

**Description**  
Displays the readback value. The readback value indicates the current position of the control element and the element's sensors.

**User interface**  
0 to 255

**Readback status**

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to 3 → Readback status (1712–1 to 3)

**Description**  
Displays the readback status. Displays the status of the readback value.

**User interface**  
0 to 255

**RCAS in value**

**Navigation**  
Expert → Discrete outputs → Discr. out. 1 to 3 → RCAS in value (1707–1 to 3)

**Description**  
Use this function to enter the RCAS (Remote Cascade) in value. The block set point is set by a control application via the remote cascade RCAS in value parameter (→ 185). The normal algorithm calculates the output value of the block on the basis of this set point.

**User entry**  
0 to 255

**Factory setting**  
0
### RCAS in status

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → RCAS in status (1706–1 to 3)

**Description**
Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the RCAS in value (→ 185).

**User entry**
0 to 255

**Factory setting**
0

### Input channel

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → Input channel (1724–1 to 3)

**Description**
Use this function to select the input channel. The number of logical hardware channels from the converter that is connected to this I/O block.

**Selection**
None

**Factory setting**
None

### Output channel

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → Output channel (1725–1 to 3)

**Description**
Use this function to select the output channel. The number of logical hardware channels to the converter that is connected to this I/O block.

**Selection**
- Pulse/frequency/switch output *
- Flow override
- Start verification *

**Factory setting**
Flow override

### RCAS out value

**Navigation**
- Expert → Discrete outputs → Discr. out. 1 to 3 → RCAS out value (1711–1 to 3)

**Description**
Displays the RCAS out value. Displays the set point of the block which is made available to the higher-level host for monitoring/back calculation and which makes it possible to take action under certain conditions or in a different mode.

* Visibility depends on order options or device settings
### User interface

0 to 255

### RCAS out status

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to 3 → RCAS out status (1708–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the RCAS out status. Displays the status of the set point.</td>
</tr>
<tr>
<td>User interface</td>
<td>0 to 255</td>
</tr>
</tbody>
</table>

### Simulate enabled

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to 3 → Simulate enabled (1716–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enable or disable block simulation.</td>
</tr>
<tr>
<td>Selection</td>
<td>• Disable</td>
</tr>
<tr>
<td></td>
<td>• Enable</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Disable</td>
</tr>
</tbody>
</table>

### Additional information

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

### Simulate value

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Discrete outputs → Discr. out. 1 to 3 → Simulate value (1718–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter a simulation value.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

### Additional information

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.
Description of device parameters

Simulate status

**Navigation**

Expert → Discrete outputs → Discr. out. 1 to 3 → Simulate status (1717–1 to 3)

**Description**

Use this function to enter a simulation status for the block.

**User entry**

0 to 255

**Factory setting**

0

**Additional information**

*Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

---

3.9 "Application" submenu

**Navigation**

Expert → Application

![Application](image)

3.9.1 "Totalizer 1 to 3" submenu

**Navigation**

Expert → Application → Totalizer 1 to 3

![Totalizer 1 to 3](image)

- Assign process variable (3808–1 to 3) → 189
- Unit totalizer (3835–1 to 3) → 189
- Control Totalizer 1 to 3 (3830–1 to 3) → 191
- Preset value 1 to 3 (3829–1 to 3) → 191
- Totalizer operation mode (3823–1 to 3) → 192
- Failure mode (3810–1 to 3) → 193
- Totalizer value 1 to 3 (3827–1 to 3) → 193
Assign process variable

Navigation

Expert → Application → Totalizer 1 to 3 → Assign variable (3808–1 to 3)

Description

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

Selection

- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

Factory setting

- Totalizer 1: Volume flow
- Totalizer 2: Mass flow
- Totalizer 3: Corrected volume flow

Additional information

Description

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

Unit totalizer

Navigation

Expert → Application → Totalizer 1 to 3 → Unit totalizer (3835–1 to 3)

Prerequisite

One of the following options is selected in the Assign process variable parameter (→ 189):

- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

Description

Use this function to select the process variable of a totalizer.

The unit is selected separately for each totalizer. It is independent of the selection made in the System units submenu (→ 61).

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

**Selection**

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

**SI units**

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

**US units**

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

**Imperial units**

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

**SI units**

- NI
- Nm³
- SI
- Sm³

**US units**

- Sft³
- Sgal (us)
- Sbbl (us; liq.)

**Imperial units**

- Sgal (imp)

**SI units**

- kWh
- MWh
- GWh
- kJ
- MJ
- GJ
- kcal
- Mcal
- Gcal

**Factory setting**

m³

**Additional information**

**Selection**

The selection is independent of the process variable selected in the Assign process variable parameter (→ 189).

**Dependency**

The following parameters depend on the option selected:

- Alarm hysteresis parameter (→ 198)
- Hi Hi Lim parameter (→ 198)
- Hi Lim parameter (→ 199)
- Lo Lim parameter (→ 199)
- **Lo Lo Lim** parameter (→ 200)
- **Totalizer value** parameter (→ 58)
- **Preset value** parameter (→ 191)

### Control Totalizer 1 to 3

**Navigation**

Expert → Application → Totalizer 1 to 3 → Control Tot. 1 to 3 (3830–1 to 3)

**Prerequisite**

In the **Assign process variable** parameter (→ 189), one of the following options is selected:

- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

**Description**

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

**Selection**

- Totalize
- Reset + hold
- Preset + hold

**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.

### Preset value 1 to 3

**Navigation**

Expert → Application → Totalizer 1 to 3 → Preset value 1 to 3 (3829–1 to 3)

**Prerequisite**

One of the following options is selected in the **Assign process variable** parameter (→ 189):

- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *

* Visibility depends on order options or device settings
**Description**
Use this function to enter an initial value for the specific totalizer.

**User entry**
Signed floating-point number

**Factory setting**
Country-specific:
- m³
- ft³

**Additional information**
- **User entry**

  The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

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

---

**Totalizer operation mode**

**Navigation**
Expert → Application → Totalizer 1 to 3 → Operation mode (3823–1 to 3)

**Prerequisite**
In the **Assign process variable** parameter (→ 189), one of the following options is selected:
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow
- Condensate mass flow
- Energy flow
- Heat flow difference

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

**Selection**
- Net flow total
- Forward flow total
- Reverse flow total
- Last valid value

**Factory setting**
Net flow total

**Additional information**
- **Selection**

  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).
  - Last valid value
    The value is frozen. Totaling is stopped.

* Visibility depends on order options or device settings
Failure mode

Navigation

Expert → Application → Totalizer 1 to 3 → Failure mode (3810–1 to 3)

Prerequisite

In the Assign process variable parameter (→ 189), one of the following options is selected:
- Volume flow
- Mass flow
- Corrected volume flow
- Total mass flow
- Condensate mass flow
- Energy flow
- Heat flow difference

Description

Use this function to select how a totalizer behaves in an alarm condition.

Selection

- Stop
- Actual value
- Last valid value

Factory setting

Actual value

Additional information

Description

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

Selection

- Stop
  Totalizing is stopped in an alarm condition.
- Actual value
  The totalizer continues to count based on the actual measured value; the error is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the error occurred.

Totalizer value 1 to 3

Navigation

Expert → Application → Totalizer 1 to 3 → Totalizer val. 1 to 3 (3827–1 to 3)

Prerequisite

In Target mode parameter (→ 195), the Auto option is selected.

Description

Displays the current reading for totalizer 1-3.

User interface

Signed floating-point number

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

Proline Prowirl 200 PROFIBUS PA

Additional information

**Description**

As it is only possible to display a maximum of 7 digits, 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.

**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.

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

### Totalizer status 1 to 3

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Tot. status 1 to 3 (3826–1 to 3)]

**Description**

Displays the status of the particular totalizer.

**User interface**

- Good
- Uncertain
- Bad

### Totalizer status (Hex) 1 to 3

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Status (Hex) 1 to 3 (3825–1 to 3)]

**Prerequisite**

In **Target mode** parameter (→ 195), the **Auto** option is selected.

**Description**

Displays the status value (hex) of the particular totalizer.

**User interface**

0 to 0xFF

### Tag description

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Tag description (3833–1 to 3)]

**Description**

Use this function to enter a string to identify the block.

**User entry**

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

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Static revision (3832–1 to 3)]

**Description**

Displays the event counter: every write access to a static block parameter is counted.

**User interface**

0 to FFFF

**Additional information**

*Description*

Static parameters are parameters that are not changed by the process.

### Strategy

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Strategy (3831–1 to 3)]

**Description**

Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

**User entry**

0 to FFFF

**Factory setting**

0

### Alert key

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Alert key (3803–1 to 3)]

**Description**

Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

**User entry**

0 to 0xFF

**Factory setting**

0

### Target mode

**Navigation**

[Expert → Application → Totalizer 1 to 3 → Target mode (3834–1 to 3)]

**Description**

Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

**User interface**

- Auto
- Man
- Out of service
### Mode block actual

**Navigation**

Expert → Application → Totalizer 1 to 3 → Mode block act (3801–1 to 3)

**Description**

Displays the Mode block actual: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block actual shows the actual mode in which the function block is currently operating. A comparison of the Mode block actual with the Target mode indicates whether it was possible to reach the Target mode (→ [195]).

**User interface**

- Auto
- Man
- Out of service

**Additional information**

Description

A comparison of the current mode with the target mode ([Target mode](#)) parameter (→ [195]) indicates whether it was possible to reach the target mode.

### Mode block permitted

**Navigation**

Expert → Application → Totalizer 1 to 3 → Mode block perm (3828–1 to 3)

**Description**

Displays the Mode block permitted: This defines which modes of operation in the Target mode (→ [195]) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

**User interface**

0 to 255

### Mode block normal

**Navigation**

Expert → Application → Totalizer 1 to 3 → Mode blk norm (3824–1 to 3)

**Description**

Displays the Mode block normal: This is available to allow the operator to select the Mode block normal from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

**User interface**

- Auto
- Man
- Out of service

### Alarm summary

**Navigation**

Expert → Application → Totalizer 1 to 3 → Alarm summary (3809–1 to 3)

**Description**

Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.
User interface
- Discrete alarm
- Alarm state HiHi limit
- Alarm state Hi limit
- Alarm state LoLo limit
- Alarm state Lo limit
- Update Event

Additional information
Description
Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Totalizer function block.

Batch ID

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Batch ID (3804–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.</td>
</tr>
<tr>
<td>User entry</td>
<td>Positive integer</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

Batch operation

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Batch operation (3805–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>

Batch phase

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Batch phase (3806–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
</tbody>
</table>
Description of device parameters

**Batch Recipe Unit Procedure**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Batch Recipe (3807–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 65535</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
</tbody>
</table>

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

**Alarm hysteresis**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Alarm hysteresis (3802–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the hysteresis value for the upper and lower warning or alarm limit values.</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 m³</td>
</tr>
<tr>
<td>Additional information</td>
<td>User entry</td>
</tr>
</tbody>
</table>

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 189).

**Hi Hi Lim**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Hi Hi Lim (3815–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the value for the upper alarm limit of the totalizer (<strong>Hi Hi alarm value</strong> parameter (→ 200)).</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
</tbody>
</table>

If the output value Out value (→ 147) exceeds this limit value, the **Hi Hi alarm state** parameter (→ 200) is output.
**User entry**

The value is entered in the defined units (Out unit parameter (→ 152)) and must be in the range defined in the Out scale lower range parameter (→ 152) and Out scale upper range parameter (→ 152).

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 189).

**Hi Lim**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Hi Lim (3816–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the value for the upper warning limit of the totalizer (Hi alarm value parameter (→ 201)).</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>If the output value Out value (→ 147) exceeds this limit value, the Hi alarm state parameter (→ 201) is output.</td>
</tr>
</tbody>
</table>

**Lo Lim**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Application → Totalizer 1 to 3 → Lo Lim (3819–1 to 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to enter the value for the lower warning limit of the totalizer (Lo alarm value parameter (→ 201)).</td>
</tr>
<tr>
<td>User entry</td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Negative floating-point number</td>
</tr>
<tr>
<td>Additional information</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>If the output value Out value (→ 147) exceeds this limit value, the Lo alarm state parameter (→ 201) is output.</td>
</tr>
</tbody>
</table>
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Lo Lo Lim

Navigation

Expert → Application → Totalizer 1 to 3 → Lo Lo Lim (3822–1 to 3)

Description

Use this function to enter the value for the lower alarm limit of the totalizer (Lo Lo alarm value parameter → 152).

User entry

Signed floating-point number

Factory setting

Negative floating-point number

Additional information

Description

If the output value Out value (→ 147) exceeds this limit value, the Lo Lo alarm state parameter (→ 202) is output.

User entry

The value is entered in the defined units (Out unit parameter → 152) and must be in the range defined in the Out scale lower range parameter (→ 152) and Out scale upper range parameter (→ 152).

The unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter (→ 189).

Hi Hi alarm value

Navigation

Expert → Application → Totalizer 1 to 3 → HiHi alarm value (3814–1 to 3)

Description

Displays the alarm value for the upper alarm limit value (Hi Hi Lim parameter (→ 198)).

User interface

Signed floating-point number

Hi Hi alarm state

Navigation

Expert → Application → Totalizer 1 to 3 → HiHi alarm state (3813–1 to 3)

Description

Displays the status for the upper alarm limit value (Hi Hi Lim parameter (→ 198)).
User interface

- No alarm
- Alarm state HiHi limit

Additional information

**User interface**

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

**Hi alarm value**

**Navigation**

Expert → Application → Totalizer 1 to 3 → Hi alarm value (3812–1 to 3)

**Description**

Displays the warning value for the upper warning limit value (Hi Lim parameter (→ 199)).

**User interface**

Signed floating-point number

**Hi alarm state**

**Navigation**

Expert → Application → Totalizer 1 to 3 → Hi alarm state (3811–1 to 3)

**Description**

Displays the status for the upper warning limit value (Hi Lim parameter (→ 199)).

**User interface**

- No warning
- Alarm state Hi limit

**Additional information**

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

**Lo alarm value**

**Navigation**

Expert → Application → Totalizer 1 to 3 → Lo alarm value (3818–1 to 3)

**Description**

Displays the warning value for the lower warning limit value (Lo Lim parameter (→ 199)).

**User interface**

Signed floating-point number

**Lo alarm state**

**Navigation**

Expert → Application → Totalizer 1 to 3 → Lo alarm state (3817–1 to 3)

**Description**

Displays the status for the lower warning limit value (Lo Lim parameter (→ 199)).
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

User interface

- No warning
- Alarm state Lo limit

Additional information

* User interface

  The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

---

**Lo Lo alarm value**

**Navigation**

Expert → Application → Totalizer 1 to 3 → LoLo alarm value (3821–1 to 3)

**Description**

Displays the alarm value for the lower alarm limit value (Lo Lo Lim parameter → 200).

**User interface**

Signed floating-point number

---

**Lo Lo alarm state**

**Navigation**

Expert → Application → Totalizer 1 to 3 → LoLo alarm state (3820–1 to 3)

**Description**

Displays the status for the lower alarm limit value (Lo Lo Lim parameter → 200).

**User interface**

- No alarm
- Alarm state LoLo limit

**Additional information**

* User interface

  The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

---

### 3.10 "Diagnostics" submenu

**Navigation**

Expert → Diagnostics

<table>
<thead>
<tr>
<th>Diagnostics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual diagnostics (0691)</td>
</tr>
<tr>
<td>Previous diagnostics (0690)</td>
</tr>
<tr>
<td>Operating time from restart (0653)</td>
</tr>
<tr>
<td>Operating time (0652)</td>
</tr>
</tbody>
</table>
Actual diagnostics

Navigation

Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite

A diagnostic event has occurred.

Description

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

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

User interface

Additional pending diagnostic messages can be displayed in the Diagnostic list submenu (→ 205).

Information on what is causing the diagnostic message, and remedy measures, can be viewed by pressing the -button.

Example

For the display format:

• F271 Main electronic failure

Timestamp

Navigation

Expert → Diagnostics → Timestamp (0667)

Description

Displays the operating time when the current diagnostic message occurred.

User interface

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

*User interface*

> The diagnostic message can be displayed via the **Actual diagnostics** parameter (→ 203).

*Example*

For the display format:
24d12h13m00s

---

**Previous diagnostics**

**Navigation**

> Expert → Diagnostics → Prev.diagnostics (0690)

**Prerequisite**

Two diagnostic events have already occurred.

**Description**

Displays the diagnostic message that occurred before the current message.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**  

*User interface*

> Information on what is causing the diagnostic message, and remedy measures, can be viewed by pressing the -button.

*Example*

For the display format:
F271 Main electronic failure

---

**Timestamp**

**Navigation**

> Expert → Diagnostics → Timestamp (0672)

**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**  

*User interface*

> The diagnostic message can be displayed via the **Previous diagnostics** parameter (→ 204).

*Example*

For the display format:
24d12h13m00s
### Operating time from restart

**Navigation**

Expert → Diagnostics → Time fr. restart (0653)

**Description**

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

**User interface**

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

---

### Operating time

**Navigation**

Expert → Diagnostics → Operating time (0652)

**Description**

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

**User interface**

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

**Additional information**

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

---

### 3.10.1 "Diagnostic list" submenu

**Navigation**

Expert → Diagnostics → Diagnostic list

[Diagnosis list]

- **Diagnostics 1 (0692)** → 205
- **Diagnostics 2 (0693)** → 206
- **Diagnostics 3 (0694)** → 207
- **Diagnostics 4 (0695)** → 208
- **Diagnostics 5 (0696)** → 208

---

### Diagnostics 1

**Navigation**

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

**Description**

Use this function to display the current diagnostics message with the highest priority.
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

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

Additional information
Examples
For the display format:
- $\Delta$S442 Frequency output
- $\otimes$F276 I/O module failure

Timestamp

Navigation
Expert → Diagnostics → Diagnostic list → Timestamp (0683)

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
User interface

Example
The diagnostic message can be displayed via the **Diagnostics 1** parameter
($\Rightarrow$ ? 205).

For the display format:
24d12h13m00s

Diagnostics 2

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

Description
Use this function to display 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:
- $\Delta$S442 Frequency output
- $\otimes$F276 I/O module failure

Timestamp

Navigation
Expert → Diagnostics → Diagnostic list → Timestamp (0684)

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

*User interface*

The diagnostic message can be displayed via the **Diagnostics 2** parameter (→ 206).

**Example**

For the display format:
24d12h13m00s

---

#### Diagnostics 3

### Navigation

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

### Description

Use this function to display the current diagnostics message with the third-highest priority.

### User interface

Symbol for diagnostic behavior, diagnostic code and short message.

### Additional information

*Examples*

- △S442 Frequency output
- ✗F276 I/O module failure

---

#### Timestamp

### Navigation

Expert → Diagnostics → Diagnostic list → Timestamp (0685)

### 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

*User interface*

The diagnostic message can be displayed via the **Diagnostics 3** parameter (→ 207).

**Example**

For the display format:
24d12h13m00s
Diagnostics 4

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

Description
Use this function to display 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:
- $\triangle S442$ Frequency output
- $\otimes F276$ I/O module failure

Timestamp

Navigation
Expert → Diagnostics → Diagnostic list → Timestamp (0686)

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
User interface

\[ \text{The diagnostic message can be displayed via the Diagnostics 4 parameter (} \rightarrow \text{ 208).} \]

Example
For the display format:
24d12h13m00s

Diagnostics 5

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

Description
Use this function to display the current diagnostics message with the fifth-highest priority.

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

Additional information
Examples
For the display format:
- $\triangle S442$ Frequency output
- $\otimes F276$ I/O module failure
**Timestamp**

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp (0687)

**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**

User interface

- The diagnostic message can be displayed via the Diagnostics 5 parameter (→ 208).

**Example**

For the display format:

24d12h13m00s

---

### 3.10.2 "Event logbook" submenu

**Navigation**

Expert → Diagnostics → Event logbook

**Filter options**

Filter options (0705) → 209

**Event list** → 210

---

**Filter options**

**Navigation**

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

**Description**

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

**Selection**

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

**Factory setting**

All
Additional information

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

Filter options

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

Selection

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

Factory setting

All

Additional information

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

"Event list" submenu

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
Event list

Navigation

Expert → Diagnostics → Event logbook → Event list

Description

Use this function to display the history of event messages of the category selected in the Filter options parameter (→  209).

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
- ΔS442 Frequency output
  ⊕ 01d04h12min30s

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

HistoROM

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

To order the HistoROM advanced capabilities application package, see the 'Accessories' section of the 'Technical Information' document.

3.10.3 "Device information" submenu

Navigation

Expert → Diagnostics → Device info

Device information

- Device tag (0011) →  212
- Serial number (0009) →  212
- Firmware version (0010) →  213
- Device name (0013) →  213
### Device tag

**Navigation**
- Expert → Diagnostics → Device info → Device tag (0011)

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

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

**Factory setting**
Prowirl 200 PA

**Additional information**
*User interface*

---

The number of characters displayed depends on the characters used.

### Serial number

**Navigation**
- Expert → Diagnostics → Device info → Serial number (0009)

**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.
Addition information  

*Description*

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

---

**Firmware version**

**Navigation**

Expert → Diagnostics → Device info → Firmware version (0010)

**Description**

Displays the device firmware version installed.

**User interface**

Character string in the format xx.yy

**Factory setting**

01.01

---

**Device name**

**Navigation**

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

**Description**

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

**User interface**

Prowirl

---

**Order code**

**Navigation**

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

**Description**

Displays the device order code.

**User interface**

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

**Additional information**

*Description*

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

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

**Uses of the order code**
- To order an identical spare device.
- To identify the device quickly and easily, e.g. when contacting Endress+Hauser.
## Extended order code 1

**Navigation**  
Expert → Diagnostics → Device info → Ext. order cd. 1 (0023)

**Description**  
Displays the first part of the extended order code.  
On account of length restrictions, the extended order code is split into a maximum of 3 parameters.

**User interface**  
Character string

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

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

---

## Extended order code 2

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

**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 (→ 214)

---

## Extended order code 3

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

**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 (→ 214)

---

## ENP version

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

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

**User interface**  
Character string
Proline Prowirl 200 PROFIBUS PA

**Description of device parameters**

**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.

---

### 3.10.4 "Sensor information" submenu

**Navigation**  
Expert → Diagnostics → Sensor info

**Sensor information**

- **DSC sensor serial number (7728)**  
  
  
  ➤ 215

**DSC sensor serial number**

**Navigation**  
Expert → Diagnostics → Sensor info → DSC serial no. (7728)

**Description**

Displays the serial number of the DSC sensor that is used in the measuring tube.

**User interface**

Character string

**Additional information**

*Description*

The serial number and other individual values of the DSC sensor, such as temperature range and reference values, are stored on the S-DAT.

*Info*

If the DSC sensor is replaced, the S-DAT must also always be replaced.

---

### 3.10.5 "Data logging" submenu

**Navigation**  
Expert → Diagnostics → Data logging

**Data logging**

- **Assign channel 1 (0851)**  
  ➤ 216

- **Assign channel 2 (0852)**  
  ➤ 217

- **Assign channel 3 (0853)**  
  ➤ 217

- **Assign channel 4 (0854)**  
  ➤ 218
Assign channel 1

Navigation

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 45).

Description

Use this function to select a process variable for the data logging channel.

Selection

- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure *
- Steam quality *
- Total mass flow *
- Condensate mass flow *
- Energy flow *
- Heat flow difference *
- Reynolds number *
- Density *
- Pressure *
- Specific volume *
- Degrees of superheat *
- Vortex frequency
- Electronic temperature

Factory setting

Off

* Visibility depends on order options or device settings
Additional information

*Description*

A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

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

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

---

### Assign channel 2

**Navigation**

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

**Prerequisite**

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 45).

**Description**

Options for the assignment of a process variable to the data logging channel.

**Selection**

Picklist, see Assign channel 1 parameter (→ 216)

**Factory setting**

Off

---

### Assign channel 3

**Navigation**

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

**Prerequisite**

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (→ 45).

**Description**

Options for the assignment of a process variable to the data logging channel.

**Selection**

Picklist, see Assign channel 1 parameter (→ 216)

**Factory setting**

Off
Assignment channel 4

**Navigation**

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

**Prerequisite**

The **Extended HistoROM** application package is available.

- The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

**Description**

Options for the assignment of a process variable to the data logging channel.

**Selection**

Picklist, see **Assign channel 1** parameter (→ 216)

**Factory setting**

Off

Logging interval

**Navigation**

[Expert → Diagnostics → Data logging → Logging interval (0856)]

**Prerequisite**

The **Extended HistoROM** application package is available.

- The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

**Description**

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

**User entry**

1.0 to 3600.0 s

**Factory setting**

10.0 s

**Additional information**

*Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time $T_{log}$:

- If 1 logging channel is used: $T_{log} = 1000 \times t_{log}$
- If 2 logging channels are used: $T_{log} = 500 \times t_{log}$
- If 3 logging channels are used: $T_{log} = 333 \times t_{log}$
- If 4 logging channels are used: $T_{log} = 250 \times t_{log}$

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

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

*Example*

If 1 logging channel is used:

- $T_{log} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min}$
- $T_{log} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h}$
- $T_{log} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d}$
- $T_{log} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d}$
Clear logging data

Navigation

Expert → Diagnostics → Data logging → Clear logging (0855)

Prerequisite

The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

Description

Option to clear the entire logging data.

Selection

- Cancel
- Clear data

Factory setting

Cancel

Additional information

Selection

- Cancel
  The data is not cleared. All the data is retained.
- Clear data
  The logging data is cleared. The logging process starts from the beginning.

"Display channel 1" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 1

Display channel 1

Display channel 1

→ 219

Display channel 1

Navigation

Expert → Diagnostics → Data logging → Displ.channel 1

Prerequisite

The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 45).

One of the following options is selected in the **Assign channel 1** parameter (→ 216):

- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
- Calculated saturated steam pressure*
- Steam quality*

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

Proline Prowirl 200 PROFIBUS PA

- Total mass flow *
- Condensate mass flow *
- Energy flow
- Heat flow difference *
- Reynolds number *
- Density *
- Pressure *
- Specific volume *
- Degrees of superheat *
- Vortex frequency
- Electronic temperature

Description
Displays the measured value trend for the logging channel in the form of a chart.

Additional information

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

"Display channel 2" submenu

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

Display channel 2

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

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

Description
See the Display channel 1 parameter → 219

* Visibility depends on order options or device settings
"Display channel 3" submenu

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

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

Description
See the Display channel 1 parameter → 219

"Display channel 4" submenu

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

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

Description
See the Display channel 1 parameter → 219

3.10.6 "Min/max values" submenu

Navigation  ➔  Expert → Diagnostics → Min/max val.

Prerequisite

Description

Reset min/max values (7706) → 222
Reset min/max values

Navigation  
Expert → Diagnostics → Min/max val. → Reset min/max (7706)

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

Selection  
- Cancel
- Terminal voltage
- Temperature
- Flow velocity
- Pressure

Factory setting  
Cancel

"Terminal voltage" submenu

Navigation  
Expert → Diagnostics → Min/max val. → Terminal volt.

<table>
<thead>
<tr>
<th>Terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value (0689)</td>
</tr>
<tr>
<td>Maximum value (0663)</td>
</tr>
<tr>
<td>Average value (0698)</td>
</tr>
</tbody>
</table>
**Minimum value**

**Navigation**
Expert → Diagnostics → Min/max val. → Terminal volt. → Minimum value (0689)

**Description**
Use this function to display the smallest previously measured terminal voltage value in Volts.

**User interface**
0.0 to 50.0 V

**Maximum value**

**Navigation**
Expert → Diagnostics → Min/max val. → Terminal volt. → Maximum value (0663)

**Description**
Use this function to view the largest previously measured terminal voltage value in Volts.

**User interface**
0.0 to 50.0 V

**Average value**

**Navigation**
Expert → Diagnostics → Min/max val. → Terminal volt. → Average value (0698)

**Description**
Use this function to view the average of all previously measured terminal voltage values in Volts.

**User interface**
Signed floating-point number

"IO module temperature" submenu

**Navigation**
Expert → Diagnostics → Min/max val. → IO module temp.

<table>
<thead>
<tr>
<th>▶ IO module temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value (0688)</td>
</tr>
<tr>
<td>Maximum value (0665)</td>
</tr>
<tr>
<td>Average value (0697)</td>
</tr>
</tbody>
</table>
### Minimum value

**Navigation**
> Expert → Diagnostics → Min/max val. → IO module temp. → Minimum value (0688)

**Description**
Displays the lowest previously measured temperature value of the I/O electronics module.

**User interface**
Signed floating-point number

**Additional information**
*Dependency*
> The unit is taken from the **Temperature unit** parameter (→ 67)

### Maximum value

**Navigation**
> Expert → Diagnostics → Min/max val. → IO module temp. → Maximum value (0665)

**Description**
Displays the highest previously measured temperature value of the I/O electronics module.

**User interface**
Signed floating-point number

**Additional information**
*Dependency*
> The unit is taken from the **Temperature unit** parameter (→ 67)

### Average value

**Navigation**
> Expert → Diagnostics → Min/max val. → IO module temp. → Average value (0697)

**Description**
Displays the average value of all previously measured temperature values of the I/O electronics module.

**User interface**
-1273.15 to 726.85 °C

**Additional information**
*Dependency*
> The unit is taken from the **Temperature unit** parameter (→ 67)
## Pre-amplifier temperature submenu

**Navigation**

Expert → Diagnostics → Min/max val. → Pre-amplif. temp

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value (7724)</td>
<td>→ 225</td>
</tr>
<tr>
<td>Maximum value (7723)</td>
<td>→ 225</td>
</tr>
</tbody>
</table>

### Minimum value

**Navigation**

Expert → Diagnostics → Min/max val. → Pre-amplif. temp → Minimum value (7724)

**Description**

Displays the lowest previously measured temperature value of the pre-amplifier module.

**User interface**

0 to 1 000 °C

**Additional information**

*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 67).

### Maximum value

**Navigation**

Expert → Diagnostics → Min/max val. → Pre-amplif. temp → Maximum value (7723)

**Description**

Displays the highest previously measured temperature value of the pre-amplifier module.

**User interface**

0 to 1 000 °C

**Additional information**

*Dependency*

The unit is taken from the **Temperature unit** parameter (→ 67).
"Medium temperature" submenu

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

<table>
<thead>
<tr>
<th>Medium temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum value (7655)</td>
</tr>
<tr>
<td>Maximum value (7654)</td>
</tr>
</tbody>
</table>

Minimum value

Navigation  
Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (7655)

Description  
Displays the lowest previously medium temperature.

User interface  
0 to 1000 °C

Additional information  
Dependency  
The unit is taken from the Temperature unit parameter (→ 67).

Maximum value

Navigation  
Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (7654)

Description  
Displays the highest previously medium temperature.

User interface  
0 to 1000 °C

Additional information  
Dependency  
The unit is taken from the Temperature unit parameter (→ 67).

"Flow velocity" submenu

Navigation  
Expert → Diagnostics → Min/max val. → Flow velocity

<table>
<thead>
<tr>
<th>Flow velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum value (7633)</td>
</tr>
</tbody>
</table>
Maximum value

**Navigation**

Expand

**Description**
Displays the highest previously measured flow velocity.

**User interface**
Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the Velocity unit parameter (→ 71)

"External pressure" submenu

**Navigation**

Expand

**Description**
Displays the highest previously measured external pressure.

**User interface**
Positive floating-point number

**Additional information**

*Dependency*

The unit is taken from the Pressure unit parameter (→ 66)

3.10.7 "Heartbeat" submenu

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

**Navigation**

Expand
### 3.10.8 "Simulation" submenu

**Navigation**

Expert → Diagnostics → Simulation

---

#### Assign simulation process variable

**Navigation**

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

**Description**

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

**Selection**

- Off
- Volume flow
- Corrected volume flow
- Mass flow
- Flow velocity
- Temperature
• Calculated saturated steam pressure *
• Steam quality *
• Total mass flow *
• Condensate mass flow *
• Energy flow
• Heat flow difference *
• Reynolds number

Factory setting
Off

Additional information

Description

The simulation value of the selected process variable is specified in the Value process variable parameter (→ 229).

Value process variable

Navigation

Expert → Diagnostics → Simulation → Value proc. var. (1811)

Prerequisite

One of the following options is selected in the Assign simulation process variable parameter (→ 228):
• Volume flow
• Corrected volume flow
• Mass flow
• Flow velocity
• Temperature *
• Calculated saturated steam pressure *
• Steam quality *
• Total mass flow *
• Condensate mass flow *
• Energy flow *
• Heat flow difference *
• Reynolds number *

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 (→ 61).

* Visibility depends on order options or device settings
Frequency simulation

**Navigation**

Expert → Diagnostics → Simulation → Frequency sim. (0472)

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 114).

**Description**

Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

*Description*

The desired simulation value is defined in the **Frequency value** parameter (→ 230).

**Selection**

- Off
  Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Frequency simulation is active.

Frequency value

**Navigation**

Expert → Diagnostics → Simulation → Freq. value (0473)

**Prerequisite**

The **On** option is selected in the **Frequency simulation** parameter (→ 230).

**Description**

Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.

**User entry**

0.0 to 1250.0 Hz

**Factory setting**

0.0 Hz

Pulse simulation

**Navigation**

Expert → Diagnostics → Simulation → Pulse sim. (0458)

**Prerequisite**

The **Pulse** option is selected in the **Operating mode** parameter (→ 114).
**Description**

Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the 'Function check' category (C) while simulation is in progress.

**Selection**

- Off
- Fixed value
- Down-counting value

**Factory setting**

Off

**Additional information**

*Description*

The desired simulation value is specified in the **Pulse value** parameter (→ 231).

*Selection*

- Off
  
  Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  
  Pulses with the pulse width specified in the **Pulse width** parameter (→ 116) are output continuously.
- Down-counting value
  
  The pulses specified in the **Pulse value** parameter (→ 231) are output.

---

**Pulse value**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Simulation → Pulse value (0459)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>In the <strong>Pulse simulation</strong> parameter (→ 230), the <strong>Down-counting value</strong> option is selected.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter a pulse value for the simulation. In this way, users can verify the correct adjustment of the pulse output and the correct function of downstream switching units.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>0 to 65535</td>
</tr>
</tbody>
</table>
Description of device parameters

Proline Prowirl 200 PROFIBUS PA

Factory setting

- Off

Additional information

- Description
  - The desired simulation value is specified in the Switch status parameter (→ 232).

- Selection
  - Off
    - Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
  - On
    - Switch simulation is active.

Switch status

Navigation

- Expert → Diagnostics → Simulation → Switch status (0463)

Prerequisite

- The On option is selected in the Switch output simulation parameter (→ 231).

Description

- Use this function to select a switch value for the simulation. In this way, users can verify the correct adjustment of the switch output and the correct function of downstream switching units.

- Selection
  - Open
  - Closed

Factory setting

- Open

Additional information

- Options
  - Open
    - Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
  - Closed
    - Switch simulation is active.

Simulation device alarm

Navigation

- Expert → Diagnostics → Simulation → Sim. alarm (0654)

Description

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

Selection

- Off
  - On

Factory setting

- Off

Additional information

- Description
  - In this way, users can verify the correct function of downstream switching units.
The display alternates between the measured value and a diagnostic message of the “Function check” category (C) while simulation is in progress.

### Diagnostic event category

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Simulation → Event category (0738)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to select the category of the diagnostic events that are displayed for the simulation in the Simulation diagnostic event parameter (→ 233).</td>
</tr>
</tbody>
</table>
| Selection | Sensor
- Electronics
- Configuration
- Process |
| Factory setting | Process |

### Simulation diagnostic event

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Simulation → Sim. diag. event (0737)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to select a diagnostic event for the simulation process that is activated.</td>
</tr>
</tbody>
</table>
| Selection | Off
- Diagnostic event picklist (depends on the category selected) |
| Factory setting | Off |
| Additional information | For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter (→ 233). |
4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

<table>
<thead>
<tr>
<th>System units</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>m³/h</td>
</tr>
<tr>
<td>Volume</td>
<td>m³</td>
</tr>
<tr>
<td>Mass flow</td>
<td>kg/h</td>
</tr>
<tr>
<td>Mass</td>
<td>kg</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>Nm³/h</td>
</tr>
<tr>
<td>Corrected volume</td>
<td>Nm³</td>
</tr>
<tr>
<td>Pressure</td>
<td>bar</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Energy flow</td>
<td>kW</td>
</tr>
<tr>
<td>Energy</td>
<td>kWh</td>
</tr>
<tr>
<td>Calorific value (volume)</td>
<td>kJ/Nm³</td>
</tr>
<tr>
<td>Calorific value (mass)</td>
<td>kJ/kg</td>
</tr>
<tr>
<td>Velocity</td>
<td>m/s</td>
</tr>
<tr>
<td>Density</td>
<td>kg/m³</td>
</tr>
<tr>
<td>Specific volume</td>
<td>m³/kg</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>Pa s</td>
</tr>
<tr>
<td>Specific heat capacity</td>
<td>kJ/(kgK)</td>
</tr>
<tr>
<td>Length</td>
<td>mm</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>[m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>25 &gt; 15</td>
<td></td>
</tr>
<tr>
<td>40 &gt;&gt; 15</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>125</td>
</tr>
<tr>
<td>40 &gt; 25</td>
<td></td>
</tr>
<tr>
<td>50 &gt;&gt; 25</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>308</td>
</tr>
<tr>
<td>50 &gt; 40</td>
<td></td>
</tr>
<tr>
<td>80 &gt;&gt; 40</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>513</td>
</tr>
<tr>
<td>80 &gt; 50</td>
<td></td>
</tr>
<tr>
<td>100 &gt;&gt; 50</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>1152</td>
</tr>
<tr>
<td>100 &gt; 80</td>
<td></td>
</tr>
<tr>
<td>150 &gt;&gt; 80</td>
<td></td>
</tr>
</tbody>
</table>
### Nominal diameter

<table>
<thead>
<tr>
<th>[mm]</th>
<th>[m³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1995</td>
</tr>
<tr>
<td>150</td>
<td>4539</td>
</tr>
<tr>
<td>200</td>
<td>8713</td>
</tr>
<tr>
<td>250</td>
<td>13735</td>
</tr>
<tr>
<td>300</td>
<td>19701</td>
</tr>
</tbody>
</table>

### 4.1.3 Pulse value

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Volume flow (~ 2 pulse/s) [m³/pulse]</th>
<th>Mass flow (~ 2 pulse/s) [kg/pulse]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[mm]</td>
<td>[m³/h]</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0.00067</td>
<td>0.0034</td>
</tr>
<tr>
<td>25</td>
<td>0.0035</td>
<td>0.018</td>
</tr>
<tr>
<td>40</td>
<td>0.0085</td>
<td>0.044</td>
</tr>
<tr>
<td>50</td>
<td>0.023</td>
<td>0.12</td>
</tr>
<tr>
<td>80</td>
<td>0.051</td>
<td>0.26</td>
</tr>
<tr>
<td>100</td>
<td>0.089</td>
<td>0.46</td>
</tr>
<tr>
<td>150</td>
<td>0.20</td>
<td>1.04</td>
</tr>
<tr>
<td>200</td>
<td>0.39</td>
<td>1.99</td>
</tr>
<tr>
<td>250</td>
<td>0.61</td>
<td>3.14</td>
</tr>
<tr>
<td>300</td>
<td>0.88</td>
<td>4.51</td>
</tr>
</tbody>
</table>
4.2 US units

Only valid for USA and Canada.

4.2.1 System units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume flow</td>
<td>ft³/min</td>
</tr>
<tr>
<td>Volume</td>
<td>ft³</td>
</tr>
<tr>
<td>Mass flow</td>
<td>lb/min</td>
</tr>
<tr>
<td>Mass</td>
<td>lb</td>
</tr>
<tr>
<td>Corrected volume flow</td>
<td>Sft³/min</td>
</tr>
<tr>
<td>Corrected volume</td>
<td>Sft³</td>
</tr>
<tr>
<td>Pressure</td>
<td>psi</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F</td>
</tr>
<tr>
<td>Energy flow</td>
<td>Btu/h</td>
</tr>
<tr>
<td>Energy</td>
<td>Btu</td>
</tr>
<tr>
<td>Calorific value (volume)</td>
<td>Btu/Sft³</td>
</tr>
<tr>
<td>Calorific value (mass)</td>
<td>Btu/lb</td>
</tr>
<tr>
<td>Velocity</td>
<td>ft/s</td>
</tr>
<tr>
<td>Density</td>
<td>lb/ft³</td>
</tr>
<tr>
<td>Specific volume</td>
<td>ft³/lb</td>
</tr>
<tr>
<td>Length</td>
<td>in</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>[ft³/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>882</td>
</tr>
<tr>
<td>1 &gt; ½</td>
<td></td>
</tr>
<tr>
<td>1½ &gt;&gt; ½</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4414</td>
</tr>
<tr>
<td>1½ &gt; 1</td>
<td></td>
</tr>
<tr>
<td>2 &gt;&gt; 1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10876</td>
</tr>
<tr>
<td>2 &gt; 1½</td>
<td></td>
</tr>
<tr>
<td>3 &gt;&gt; 1½</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>18116</td>
</tr>
<tr>
<td>3 &gt; 2</td>
<td></td>
</tr>
<tr>
<td>4 &gt;&gt; 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>40682</td>
</tr>
<tr>
<td>4 &gt; 3</td>
<td></td>
</tr>
<tr>
<td>6 &gt;&gt; 3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>70452</td>
</tr>
<tr>
<td>6 &gt; 4</td>
<td></td>
</tr>
<tr>
<td>8 &gt;&gt; 4</td>
<td></td>
</tr>
<tr>
<td>6 &gt; 8</td>
<td>160293</td>
</tr>
<tr>
<td>8 &gt; 6</td>
<td></td>
</tr>
<tr>
<td>10 &gt;&gt; 6</td>
<td></td>
</tr>
<tr>
<td>Nominal diameter [in]</td>
<td>[ft³/h]</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------</td>
</tr>
<tr>
<td>8</td>
<td>307696</td>
</tr>
<tr>
<td>10</td>
<td>485046</td>
</tr>
<tr>
<td>12</td>
<td>695734</td>
</tr>
</tbody>
</table>

### 4.2.3 Pulse value

<table>
<thead>
<tr>
<th>Nominal diameter [in]</th>
<th>Volume flow (~ 2) pulse/s ([\text{gal/pulse}])</th>
<th>Volume flow (~ 2) pulse/s ([\text{lb/pulse}])</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>0.18</td>
<td>0.0076</td>
</tr>
<tr>
<td>1</td>
<td>0.92</td>
<td>0.039</td>
</tr>
<tr>
<td>1½</td>
<td>2.25</td>
<td>0.097</td>
</tr>
<tr>
<td>2</td>
<td>6.02</td>
<td>0.26</td>
</tr>
<tr>
<td>3</td>
<td>13.50</td>
<td>0.58</td>
</tr>
<tr>
<td>4</td>
<td>23.42</td>
<td>1.01</td>
</tr>
<tr>
<td>6</td>
<td>53.29</td>
<td>2.29</td>
</tr>
<tr>
<td>8</td>
<td>102.29</td>
<td>4.40</td>
</tr>
<tr>
<td>10</td>
<td>161.26</td>
<td>6.93</td>
</tr>
<tr>
<td>12</td>
<td>231.30</td>
<td>9.94</td>
</tr>
</tbody>
</table>
# 5 Explanation of abbreviated units

## 5.1 SI units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calorific value</strong> (volume)</td>
<td>kWh/Nm³, MWh/Nm³, kJ/Nm³, MJ/Nm³</td>
<td>Kilowatt hour, megawatt hour, kilojoule, megajoule/standard cubic meter</td>
</tr>
<tr>
<td></td>
<td>kWh/Sm³, MWh/Sm³, kJ/Sm³, MJ/Sm³</td>
<td>Kilowatt hour, megawatt hour, kilojoule, megajoule/standard cubic meter</td>
</tr>
<tr>
<td><strong>Calorific value</strong> (mass)</td>
<td>kWh/kg, MWh/kg, kJ/kg, MJ/kg</td>
<td>Kilowatt hour, megawatt hour, kilojoule, megajoule/kilogram</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>g/cm³</td>
<td>Gram/volume unit</td>
</tr>
<tr>
<td></td>
<td>kg/dm³, kg/l, kg/m³</td>
<td>Kilogram/volume unit</td>
</tr>
<tr>
<td></td>
<td>SD4°C, SD15°C, SD20°C</td>
<td>Specific density: The specific density is the ratio of the fluid density to the water density at a water temperature of 4°C (39°F), 15°C (59°F), 20°C (68°F).</td>
</tr>
<tr>
<td></td>
<td>SG4°C, SG15°C, SG20°C</td>
<td>Specific gravity: The specific gravity is the ratio of the fluid density to the water density at a water temperature of 4°C (39°F), 15°C (59°F), 20°C (68°F).</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td>Pa, kPa, MPa</td>
<td>Pascal, kilopascal, megapascal</td>
</tr>
<tr>
<td></td>
<td>mbar a</td>
<td>Millibar (absolute)</td>
</tr>
<tr>
<td></td>
<td>bar, torr, atm</td>
<td>Bar, torr, physical atmosphere</td>
</tr>
<tr>
<td></td>
<td>gf/cm², kgf/cm²</td>
<td>Gram force, kilogram force/square centimeter</td>
</tr>
<tr>
<td><strong>Dynamic viscosity</strong></td>
<td>Pa s</td>
<td>Pascal second</td>
</tr>
<tr>
<td></td>
<td>cP, P</td>
<td>Centipoise, poise</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>kWh, MWh, GWh</td>
<td>Kilowatt hour, megawatt hour, gigawatt hour</td>
</tr>
<tr>
<td></td>
<td>kJ, MJ, GJ</td>
<td>Kilojoule, megajoule, gigajoule</td>
</tr>
<tr>
<td></td>
<td>kcal, Mcal, Gcal</td>
<td>Kilocalories, megacalories, gigacalories</td>
</tr>
<tr>
<td><strong>Energy flow</strong></td>
<td>kW, MW, GW</td>
<td>Kilowatt, megawatt</td>
</tr>
<tr>
<td></td>
<td>kJ/s, kJ/min, kJ/h, kJ/d</td>
<td>Kilojoule/time unit</td>
</tr>
<tr>
<td></td>
<td>MJ/s, MJ/min, MJ/h, MJ/d</td>
<td>Megajoule/time unit</td>
</tr>
<tr>
<td></td>
<td>GJ/s, GJ/min, GJ/h, GJ/d</td>
<td>Gigajoule/time unit</td>
</tr>
<tr>
<td></td>
<td>kcal/s, kcal/min, kcal/h, kcal/d</td>
<td>Kilocalories/time unit</td>
</tr>
<tr>
<td></td>
<td>Mcal/s, Mcal/min, Mcal/h, Mcal/d</td>
<td>Megacalories/time unit</td>
</tr>
<tr>
<td></td>
<td>Gcal/s, Gcal/min, Gcal/h, Gcal/d</td>
<td>Gigacalories/time unit</td>
</tr>
<tr>
<td><strong>Velocity</strong></td>
<td>m/s</td>
<td>Meter/time unit</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>mm, m</td>
<td>Millimeter, meter</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>g, kg, t</td>
<td>Gram, kilogram, metric ton</td>
</tr>
<tr>
<td><strong>Mass flow</strong></td>
<td>g/s, g/min, g/h, g/d</td>
<td>Gram/time unit</td>
</tr>
<tr>
<td></td>
<td>kg/s, kg/min, kg/h, kg/d</td>
<td>Kilogram/time unit</td>
</tr>
<tr>
<td></td>
<td>t/s, t/min, t/h, t/d</td>
<td>Metric ton/time unit</td>
</tr>
<tr>
<td><strong>Corrected volume</strong></td>
<td>Nl, Nm³, Sm³</td>
<td>Normal liter, normal cubic meter, standard cubic meter</td>
</tr>
<tr>
<td><strong>Corrected volume flow</strong></td>
<td>Nl/s, Nl/min, Nl/h, Nl/d</td>
<td>Normal liter/time unit</td>
</tr>
<tr>
<td></td>
<td>Nm³/s, Nm³/min, Nm³/h, Nm³/d</td>
<td>Normal cubic meter/time unit</td>
</tr>
<tr>
<td></td>
<td>Sm³/s, Sm³/min, Sm³/h, Sm³/d</td>
<td>Standard cubic meter/time unit</td>
</tr>
</tbody>
</table>
### Process variable

<table>
<thead>
<tr>
<th>Specific heat capacity</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kJ/(kgK), MJ/(kgK)</td>
<td>Kilojoule, megajoule/kilogram Kelvin</td>
</tr>
<tr>
<td></td>
<td>kWh/(kgK)</td>
<td>Kilowatt hour/kilogram Kelvin</td>
</tr>
<tr>
<td></td>
<td>kcal/(kgK)</td>
<td>Kilocalories/kilogram Kelvin</td>
</tr>
</tbody>
</table>

| Temperature | °C, K | Celsius, Kelvin |

<table>
<thead>
<tr>
<th>Volume</th>
<th>Units</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm³, dm³, m³</td>
<td>Cubic centimeter, cubic decimeter, cubic meter</td>
</tr>
<tr>
<td></td>
<td>ml, l</td>
<td>Milliliter, liter</td>
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<tr>
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<th>Units</th>
<th>Explanation</th>
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<tbody>
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<td></td>
<td>cm³/s, cm³/min, cm³/h, cm³/d</td>
<td>Cubic centimeter/time unit</td>
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<tr>
<td></td>
<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
<td>Cubic decimeter/time unit</td>
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<tr>
<td></td>
<td>m³/s, m³/min, m³/h, m³/d</td>
<td>Cubic meter/time unit</td>
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<tr>
<td></td>
<td>ml/s, ml/min, ml/h, ml/d</td>
<td>Millilitre/time unit</td>
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<tr>
<td></td>
<td>l/s, l/min, l/h, l/d</td>
<td>Litre/time unit</td>
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<th>Explanation</th>
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<td>Kilowatt hour, kilojoule, British thermal unit, thousand British thermal units/pound</td>
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<th>Explanation</th>
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<td>Pound/cubic foot, pound/gallon</td>
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<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>
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<th>Explanation</th>
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<td>in, ft</td>
<td>Inch, foot</td>
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<td>Ounce, pound, standard ton</td>
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<th>Explanation</th>
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<td>oz/s, oz/min, oz/h, oz/d</td>
<td>Ounce/time unit</td>
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<td></td>
<td>lb/s, lb/min, lb/h, lb/d</td>
<td>Pound/time unit</td>
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<tr>
<td></td>
<td>STon/s, STon/min, STon/h, STon/d</td>
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<td>Standard cubic foot</td>
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<th>Explanation</th>
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<th>Units</th>
<th>Explanation</th>
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<td></td>
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<tr>
<td></td>
<td>ft³</td>
<td>Cubic foot</td>
</tr>
<tr>
<td></td>
<td>fl oz (us), gal (us), kgal (us), Mgal (us)</td>
<td>Fluid ounce, gallon, kilogallon, million gallon</td>
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<td></td>
<td>bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)</td>
<td>Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)</td>
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</tr>
<tr>
<td></td>
<td>ft³/s, ft³/min, ft³/h, ft³/d</td>
<td>Cubic foot/time unit</td>
</tr>
<tr>
<td></td>
<td>fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)</td>
<td>Fluid ounce/time unit</td>
</tr>
<tr>
<td></td>
<td>gal/s (us), gal/min (us), gal/h (us), gal/d (us)</td>
<td>Gallon/time unit</td>
</tr>
</tbody>
</table>
### Process variable | Units | Explanation
--- | --- | ---
| | kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us) | Kilogallon/time unit
| | Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us) | Million gallon/time unit
| | bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.) | Barrel/time unit (normal liquids)
| | | Normal liquids: 3.15 gal/bbl
| | bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer) | Barrel/time unit (beer)
| | | Beer: 31.0 gal/bbl
| | bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil) | Barrel/time unit (petrochemicals)
| | | Petrochemicals: 42.0 gal/bbl
| | bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank) | Barrel/time unit (filling tank)
| | | Filling tanks: 55.0 gal/bbl

### Time
- m, h, d, y: Minute, hour, day, year
- am, pm: Ante meridiem (before midday), post meridiem (after midday)

### 5.3 Imperial units

| Process variable | Units | Explanation
--- | --- | ---
| Calorific value (volume) | Btu/Sm³, MBtu/Sm³ | British thermal unit, thousand British thermal units/standard cubic meter
| | Btu/Scf³, MBtu/Scf³ | British thermal unit, thousand British thermal units/standard cubic foot
| Calorific value (mass) | Btu/lb, MBtu/lb | British thermal unit, thousand British thermal units/pound
| Density | lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil) | Pound/volume unit
| Energy | Btu, MBtu, MMBtu | British thermal unit, thousand British thermal units, million British thermal units
| Energy flow | Btu/s, Btu/min, Btu/h, Btu/day | British thermal unit/time unit
| | MBtu/s, MBtu/min, MBtu/h, MBtu/d | Thousand British thermal units/time unit
| | MMBtu/s, MMBtu/min, MMBtu/h, MMBtu/d | Million British thermal units/time unit
| Specific heat capacity | Btu/(lb °R) | British thermal unit/pound degree Rankine
| Volume | gal (imp), Mgal (imp) | Gallon, mega gallon
| | bbl (imp;beer), bbl (imp;oil) | Barrel (beer), barrel (petrochemicals)
| Volume flow | gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp) | Gallon/time unit
| | Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp) | Mega gallon/time unit
| | 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 | m, h, d, y | Minute, hour, day, year
| | am, pm | Ante meridiem (before midday), post meridiem (after midday)
### 5.4 Other units

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<th>Explanation</th>
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</thead>
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<td>mmH2O (4°C)</td>
<td>Millimeter of water column (4 °C)</td>
</tr>
<tr>
<td></td>
<td>mmH2O (68°F)</td>
<td>Millimeter of water column (68 °F)</td>
</tr>
<tr>
<td></td>
<td>mmHg (0°C)</td>
<td>Millimeter of mercury column (0 °C)</td>
</tr>
<tr>
<td></td>
<td>inH2O (4°C)</td>
<td>Inch of water column (4 °C)</td>
</tr>
<tr>
<td></td>
<td>inH2O (68°F)</td>
<td>Inch of water column (68 °F)</td>
</tr>
<tr>
<td></td>
<td>ftH2O (68°F)</td>
<td>Foot of water column (68 °F)</td>
</tr>
<tr>
<td></td>
<td>inHg (0°C)</td>
<td>Inch of mercury (0 °C)</td>
</tr>
<tr>
<td>Specific volume</td>
<td>m³/kg</td>
<td>Cubic meter/kilogram</td>
</tr>
<tr>
<td></td>
<td>ft³/lb</td>
<td>Cubic foot/pound</td>
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