Description of Device Parameters
Proline Prosonic Flow P 500

Ultrasonic time-of-flight flowmeter
HART
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1 About this document

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

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

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

1.3 Using this document

1.3.1 Information on the document structure
The document lists the submenus and their parameters according to the structure from the Expert menu (→ 8), which is displayed when the "Maintenance" user role is enabled.
Additional information regarding:
- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions → 7
- Operating concept of the operating menus: Operating Instructions → 7
1.3.2 Structure of a parameter description
The individual parts of a parameter description are described in the following section:

Complete parameter name

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tip</td>
</tr>
<tr>
<td></td>
<td>Indicates additional information.</td>
</tr>
</tbody>
</table>

Navigation

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

Prerequisite

The parameter is only available under these specific conditions

Description

Description of the parameter function

Options

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

User entry

Parameter entry range

Display

Display value/data of the parameter

Factory setting

Default setting ex works

Additional information

Additional explanations (e.g. in examples):
- On individual options
- On display value/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><img src="image.png" alt="Tip" /></td>
<td>Tip</td>
</tr>
<tr>
<td><img src="image.png" alt="Reference to documentation" /></td>
<td>Reference to documentation</td>
</tr>
<tr>
<td><img src="image.png" alt="Reference to page" /></td>
<td>Reference to page</td>
</tr>
<tr>
<td><img src="image.png" alt="Reference to graphic" /></td>
<td>Reference to graphic</td>
</tr>
<tr>
<td><img src="image.png" alt="Operation via local display" /></td>
<td>Operation via local display</td>
</tr>
<tr>
<td><img src="image.png" alt="Operation via operating tool" /></td>
<td>Operation via operating tool</td>
</tr>
<tr>
<td><img src="image.png" alt="Write-protected parameter" /></td>
<td>Write-protected parameter</td>
</tr>
</tbody>
</table>
1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

<table>
<thead>
<tr>
<th>Measuring device</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosonic Flow P 500</td>
<td>BA02025D</td>
</tr>
</tbody>
</table>

1.5.2 Supplementary device-dependent documentation

Special Documentation

<table>
<thead>
<tr>
<th>Contents</th>
<th>Documentation code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio approvals for WLAN interface for A309/A310 display module</td>
<td>SD01793D</td>
</tr>
<tr>
<td>FlowDC</td>
<td>SD02660D</td>
</tr>
<tr>
<td>Heartbeat Technology</td>
<td>SD02593D</td>
</tr>
<tr>
<td>High-temperature sensors</td>
<td>SD03088D</td>
</tr>
<tr>
<td>Petroleum &amp; product identification</td>
<td>SD03081D</td>
</tr>
<tr>
<td>Web server</td>
<td>SD02603D</td>
</tr>
</tbody>
</table>
# 2 Overview of the Expert operating menu

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

<table>
<thead>
<tr>
<th>Expert</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
<td>→ 11</td>
</tr>
<tr>
<td>Locking status (0004)</td>
<td>→ 12</td>
</tr>
<tr>
<td>User role (0005)</td>
<td>→ 13</td>
</tr>
<tr>
<td>Enter access code (0003)</td>
<td>→ 13</td>
</tr>
<tr>
<td>System</td>
<td>→ 13</td>
</tr>
<tr>
<td>Display</td>
<td>→ 14</td>
</tr>
<tr>
<td>Configuration backup</td>
<td>→ 26</td>
</tr>
<tr>
<td>Diagnostic handling</td>
<td>→ 29</td>
</tr>
<tr>
<td>Administration</td>
<td>→ 38</td>
</tr>
<tr>
<td>Sensor</td>
<td>→ 43</td>
</tr>
<tr>
<td>Measured values</td>
<td>→ 44</td>
</tr>
<tr>
<td>System units</td>
<td>→ 61</td>
</tr>
<tr>
<td>Measuring point 1</td>
<td>→ 69</td>
</tr>
<tr>
<td>Installation status</td>
<td>→ 84</td>
</tr>
<tr>
<td>Process parameters</td>
<td>→ 86</td>
</tr>
<tr>
<td>External compensation</td>
<td>→ 90</td>
</tr>
<tr>
<td>Sensor adjustment</td>
<td>→ 94</td>
</tr>
<tr>
<td>Calibration</td>
<td>→ 98</td>
</tr>
<tr>
<td>I/O configuration</td>
<td>→ 100</td>
</tr>
<tr>
<td>I/O module 1 to n terminal numbers (3902−1 to n)</td>
<td>→ 100</td>
</tr>
<tr>
<td>I/O module 1 to n information (3906–1 to n)</td>
<td>→ 100</td>
</tr>
<tr>
<td>I/O module 1 to n type (3901–1 to n)</td>
<td>→ 101</td>
</tr>
<tr>
<td>Apply I/O configuration (3907)</td>
<td>→ 101</td>
</tr>
<tr>
<td>I/O alteration code (2762)</td>
<td>→ 102</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td>→ 102</td>
</tr>
<tr>
<td>Current input 1 to n</td>
<td>→ 102</td>
</tr>
<tr>
<td>Status input 1 to n</td>
<td>→ 105</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>→ 107</td>
</tr>
<tr>
<td>Current output 1 to n</td>
<td>→ 107</td>
</tr>
<tr>
<td>Pulse/frequency/switch output 1 to n</td>
<td>→ 120</td>
</tr>
<tr>
<td>Relay output 1 to n</td>
<td>→ 140</td>
</tr>
<tr>
<td>Double pulse output</td>
<td>→ 147</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>→ 153</td>
</tr>
<tr>
<td>HART input</td>
<td>→ 153</td>
</tr>
<tr>
<td>HART output</td>
<td>→ 159</td>
</tr>
<tr>
<td>Diagnostic configuration</td>
<td>→ 179</td>
</tr>
<tr>
<td>Web server</td>
<td>→ 176</td>
</tr>
<tr>
<td>WLAN settings</td>
<td>→ 188</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>→ 195</td>
</tr>
<tr>
<td>Reset all totalizers (2806)</td>
<td>→ 195</td>
</tr>
<tr>
<td>Totalizer 1 to n</td>
<td>→ 195</td>
</tr>
<tr>
<td>Topic</td>
<td>Page</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Petroleum</td>
<td>200</td>
</tr>
<tr>
<td>Product identification</td>
<td>200</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>200</td>
</tr>
<tr>
<td>Actual diagnostics (0691)</td>
<td>201</td>
</tr>
<tr>
<td>Previous diagnostics (0690)</td>
<td>202</td>
</tr>
<tr>
<td>Operating time from restart (0653)</td>
<td>203</td>
</tr>
<tr>
<td>Operating time (0652)</td>
<td>203</td>
</tr>
<tr>
<td>Diagnostic list</td>
<td>203</td>
</tr>
<tr>
<td>Event logbook</td>
<td>208</td>
</tr>
<tr>
<td>Device information</td>
<td>209</td>
</tr>
<tr>
<td>Main electronic module + I/O module 1</td>
<td>213</td>
</tr>
<tr>
<td>Sensor electronic module (ISEM)</td>
<td>214</td>
</tr>
<tr>
<td>I/O module 2</td>
<td>215</td>
</tr>
<tr>
<td>I/O module 3</td>
<td>216</td>
</tr>
<tr>
<td>Display module</td>
<td>218</td>
</tr>
<tr>
<td>Data logging</td>
<td>219</td>
</tr>
<tr>
<td>Heartbeat Technology</td>
<td>227</td>
</tr>
<tr>
<td>Simulation</td>
<td>237</td>
</tr>
</tbody>
</table>
Description of device parameters

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

<table>
<thead>
<tr>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct access (0106)</td>
</tr>
<tr>
<td>Locking status (0004)</td>
</tr>
<tr>
<td>User role (0005)</td>
</tr>
<tr>
<td>Enter access code (0003)</td>
</tr>
<tr>
<td>System</td>
</tr>
<tr>
<td>Sensor</td>
</tr>
<tr>
<td>I/O configuration</td>
</tr>
<tr>
<td>Input</td>
</tr>
<tr>
<td>Output</td>
</tr>
<tr>
<td>Communication</td>
</tr>
<tr>
<td>Application</td>
</tr>
<tr>
<td>Diagnostics</td>
</tr>
</tbody>
</table>

---

**Navigation**

Expert → Direct access (0106)

**Description**

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

**User entry**

0 to 65535

**Additional information**

*User entry*

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

Note the following when entering the direct access code:
- The leading zeros in the direct access code do not have to be entered.
  Example: Enter "914" instead of "00914"
- If no channel number is entered, channel 1 is opened automatically.
  Example: Enter 00914 → Assign process variable parameter (0914)
- If a different channel is opened: Enter the direct access code with the corresponding channel number.
  Example: Enter 00914-2 → Assign process variable parameter (0914)

Locking status

Navigation
Expert → Locking status (0004)

Description
Displays the active write protection.

User interface
- Hardware locked
- SIL locked
- Temporarily locked

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

Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>The access authorization displayed in the Access status parameter (0005) (→ 13) applies. Only appears on local display.</td>
</tr>
<tr>
<td>Hardware locked</td>
<td>The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool).</td>
</tr>
<tr>
<td>(priority 1)</td>
<td></td>
</tr>
<tr>
<td>SIL locked</td>
<td>The SIL mode is enabled. This locks write access to the parameters (e.g. via local display or operating tool).</td>
</tr>
<tr>
<td>(priority 2)</td>
<td></td>
</tr>
<tr>
<td>Temporarily locked</td>
<td>Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset, etc.). Once the internal processing has been completed, the parameters can be changed once again.</td>
</tr>
</tbody>
</table>
User role

Navigation

Expert → User role (0005)

Description
Displays the access authorization to the parameters via the local display, Web browser or operating tool.

User interface
• Maintenance
• Service

Factory setting
Maintenance

Additional information
Description
Access authorization can be modified via the Enter access code parameter (0003) (→ 13).
If additional write protection is active, this restricts the current access authorization even further.

User interface
Detailed information on access authorization is provided in the "User roles and associated access authorization" and "Operating concept" sections of the Operations Instructions for the device → 7

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.

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

3.1 "System" submenu

Navigation
Expert → System

System
Display
Configuration backup
Diagnostic handling
Administration
3.1.1 "Display" submenu

Navigation  

¶ ¶ Expert → System → Display

Display language (0104)  
Format display (0098)  
Value 1 display (0107)  
0% bargraph value 1 (0123)  
100% bargraph value 1 (0125)  
Decimal places 1 (0095)  
Value 2 display (0108)  
Decimal places 2 (0117)  
Value 3 display (0110)  
0% bargraph value 3 (0124)  
100% bargraph value 3 (0126)  
Decimal places 3 (0118)  
Value 4 display (0109)  
Decimal places 4 (0119)  
Display interval (0096)  
Display damping (0094)  
Header (0097)  
Header text (0112)  
Separator (0101)  
Contrast display (0105)  
Backlight (0111)
Display language

**Navigation**  
Expert → System → Display → Display language (0104)

**Prerequisite**  
A local display is provided.

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

**Selection**  
- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (Russian)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- 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 8) can be configured. This setting only applies to normal operation.

- The **Value 1 display** parameter (0107) (→ 17)...**Value 8 display** parameter (0148) are used to specify which measured values are shown on the local display and in what order.

- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured using the **Display interval** parameter (0096) (→ 23).
Possible measured values shown on the local display:

* "1 value, max. size" option

```
XXXXXX
  900.00 l/h
```

* "1 bargraph + 1 value" option

```
XXXXXX
  900.00 l/h
  60.00 %
```

* "2 values" option

```
XXXXXX
  900.00 l/h
  60.00 %
```

* "1 value large + 2 values" option

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

* "4 values" option

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

**Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- Mass flow
- Flow velocity
- Sound velocity
- Volume flow
- Density *
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Temperature *
- Pressure *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current output 1
- Current output 2 *
- Current output 3 *
- Profile factor *
- Cross flow factor *

**Factory setting**

Volume flow

**Additional information**

*Visibility depends on order options or device settings*

**Description**

If there are several measured values one below the other, this appears in the first position. The value is only displayed during normal operation.

The **Format display** parameter (0098) (→ 15) is used to specify how many measured values are displayed simultaneously and how.

**Dependency**

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

**0% bargraph value 1**

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

**Prerequisite**  
A local display is provided.

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

**User entry**  
Signed floating-point number

**Factory setting**  
Country-specific

**Additional information**  
*Description*

The [Format display](#) parameter (0098) (→ 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

**Additional information**  
*Description*

The [Format display](#) parameter (0098) (→ 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 (0107) (→ 17).
**Decimal places 2**

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

**Prerequisite**
A measured value is specified in the **Value 2 display** parameter (0108) (→ 19).

**Description**
Use this function to select the number of decimal places for measured value 2.
### Description of device parameters

**Selection**

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

**Factory setting**

x.xx

**Additional information**

*Description*

This setting does not affect the accuracy of the device for measuring or calculating the value.

---

### Value 3 display

**Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

For the picklist, see Value 1 display parameter (0107) (→ 17)

**Factory setting**

None

**Additional information**

*Description*

If several measured values are displayed one below the other, 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 (0098) (→ 15) is used to specify how many measured values are displayed simultaneously and how.

*Options*

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

---

### 0% bargraph value 3

**Navigation**

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

**Prerequisite**

A selection was made in the Value 3 display parameter (0110) (→ 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
Additional information

**Description**

The **Format display** parameter (0098) (→ 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 (0110) (→ 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 (0098) (→ 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 (0110) (→ 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 accuracy of the device for measuring or calculating the value.
Value 4 display

Navigation

Prerequisite
A local display is provided.

Description
Use this function to select a measured value that is shown on the local display.

Selection
For the picklist, see Value 1 display parameter (0107) (→ 17)

Factory setting
None

Additional information

If several measured values are displayed one below the other, 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 (0098) (→ 15) is used to specify how many measured values are displayed simultaneously and how.

Options

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

Decimal places 4

Navigation

Prerequisite
A measured value is specified in the Value 4 display parameter (0109) (→ 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

This setting does not affect the accuracy of the device for measuring or calculating the value.
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**

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 (0107) ... **Value 8 display** parameter (0148) are used to specify which measured values are shown on the local display.
- The display format for the measured values displayed is defined in the **Format display** parameter (0098) ... **Format display** parameter (0098) (→ 15).

Display damping

**Navigation**

Expert → System → Display → Display damping (0094)

**Prerequisite**

A local display is provided.

**Description**

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

**User entry**

0.0 to 999.9 s

**Factory setting**

0.0 s

**Additional information**

Use this function to enter a time constant (PT1 element 1) for display damping:
- At a low time constant, the display reacts quickly to fluctuating measured variables.
- If a high time constant is entered, the display reacts more slowly.

- The damping is not active if the value 0 (factory setting) is entered.

---

1) proportional transmission behavior with first order delay
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.

1  Position of the header text on the display

Selection
- Device tag
  Is defined in the Device tag parameter (0011) (→ 210).
- Free text
  Is defined in the Header text parameter (0112) (→ 24).

Header text

Navigation
Expert → System → Display → Header text (0112)

Prerequisite
The Free text option is selected in the Header parameter (0097) (→ 24).

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.
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

Backlight

**Navigation**

Expert → System → Display → Backlight (0111)

**Prerequisite**
One of the following conditions is met:
- Order code for "Display; operation", option F "4-line, illum.; touch control"
- Order code for "Display; operation", option G "4-line, illum.; touch control +WLAN"
Description

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

Selection

- Disable
- Enable

Factory setting

Enable

3.1.2 "Configuration backup" submenu

Navigation

專家 → 系統 → 配置備份

### Operating time

**Navigation**

專家 → 系統 → 配置備份 → 操作時間 (0652)

**Description**

顯示設備已運行的時間。

**User interface**

天數 (d), 小時 (h), 分鐘 (m) 和 秒 (s)

**Additional information**

顯示

最大天數: 9999（約27年5個月）

### Last backup

**Navigation**

專家 → 系統 → 配置備份 → 最後備份 (2757)

**Description**

顯示數據最後備份到設備記憶中的時間。

**User interface**

天數 (d), 小時 (h), 分鐘 (m) 和 秒 (s)
Configuration management

Navigation

Expert → System → Config. backup → Config. managem. (2758)

Description
Use this function to select an action to save the data to the device memory.

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

Factory setting
Cancel

Additional information

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Execute backup</td>
<td>A backup copy of the current device configuration is saved from the HistoROM backup to the memory of the device. The backup copy includes the transmitter data of the device. The following message appears on local display: Backup active, please wait!</td>
</tr>
<tr>
<td>Restore</td>
<td>The last backup copy of the device configuration is restored from the device memory to the device's HistoROM backup. The backup copy includes the transmitter data of the device. The following message appears on local display: Restore active! Do not interrupt power supply!</td>
</tr>
<tr>
<td>Compare</td>
<td>The device configuration saved in the device memory is compared with the current device configuration of the HistoROM backup. The following message appears on local display: Comparing files. The result can be viewed in Comparison result parameter (0103).</td>
</tr>
<tr>
<td>Clear backup data</td>
<td>The backup copy of the device configuration is deleted from the memory of the device. The following message appears on local display: Deleting file</td>
</tr>
</tbody>
</table>

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

Backup state

Navigation
Expert → System → Config. backup → Backup state (2759)

Description
Displays the status of the data backup process.

User interface
- None
- Backup in progress
- Restoring in progress
- Delete in progress

* Visibility depends on order options or device settings
• Compare in progress
• Restoring failed
• Backup failed

Factory setting
None

Comparison result

Navigation
Expert ➔ System ➔ Config. backup ➔ Compar. result (2760)

Description
Displays the last result of the comparison of the data records in the device memory and in the HistoROM.

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 (2758) (➔ 27).

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Settings identical</td>
<td>The current device configuration of the HistoROM is not identical to the backup copy in the device memory.</td>
</tr>
<tr>
<td></td>
<td>If the transformer configuration of another device has been transmitted to the device via HistoROM in Configuration management parameter (0100), the current device configuration of the HistoROM is only partially identical to the backup copy in the device memory. The settings for the transmitter are not identical.</td>
</tr>
<tr>
<td>Settings not identical</td>
<td>The current device configuration of the HistoROM is not identical to the backup copy in the device memory.</td>
</tr>
<tr>
<td>No backup available</td>
<td>There is no backup copy of the device configuration of the HistoROM in the device memory.</td>
</tr>
<tr>
<td>Backup settings corrupt</td>
<td>The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the device memory.</td>
</tr>
<tr>
<td>Check not done</td>
<td>The device configuration of the HistoROM has not yet been compared to the backup copy in the device memory.</td>
</tr>
<tr>
<td>Dataset incompatible</td>
<td>The backup copy in the device memory is not compatible with the device.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Diagnostic handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm delay (0651)</td>
</tr>
</tbody>
</table>

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

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  Effect

This setting affects the following diagnostic messages:
- 832 Electronics temperature too high
- 833 Electronics temperature too low
- S841 Flow velocity too high
- S870 Measuring inaccuracy increased

"Diagnostic behavior" submenu

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the Diagnostic behavior submenu ( ➔ 29).

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

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>The device stops measurement. The signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.</td>
</tr>
<tr>
<td>Warning</td>
<td>The device continues to measure. The signal outputs and totalizers are not affected. A diagnostic message is generated.</td>
</tr>
</tbody>
</table>
### Options | Description
---|---
Logbook entry only | The device continues to measure. The diagnostic message is only displayed in the Event logbook submenu (→ 208) (Event list submenu (→ 208)) and is not displayed in alternating sequence with the operational display.
Off | The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

**Navigation**

Expert → System → Diagn. handling → Diagn. behavior

---

**Diagnostic behavior**

Assign behavior of diagnostic no. 019 (0635) → 31

Assign behavior of diagnostic no. 160 (0776) → 31

Assign behavior of diagnostic no. 302 (0742) → 32

Assign behavior of diagnostic no. 441 (0657) → 32

Assign behavior of diagnostic no. 442 (0658) → 32

Assign behavior of diagnostic no. 443 (0659) → 33

Assign behavior of diagnostic no. 444 (0740) → 34

Assign behavior of diagnostic no. 543 (0643) → 34

Assign behavior of diagnostic no. 832 (0675) → 35

Assign behavior of diagnostic no. 833 (0676) → 35

Assign behavior of diagnostic no. 841 (0680) → 36

Assign behavior of diagnostic no. 842 (0638) → 36

Assign behavior of diagnostic no. 930 (0639) → 37
Assign behavior of diagnostic no. 019 (Device initialization active)

Navigation

Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 019 (0635)

Description

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

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

For a detailed description of the options available: → 39
Assign behavior of diagnostic no. 302 (Device verification active)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 302 (0742)

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

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

**Factory setting**
Warning

**Additional information**
For a detailed description of the options available: →  29

Assign behavior of diagnostic no. 441 (Current output 1 to n)

**Navigation**
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 441 (0657)

**Description**
Use this function to change the diagnostic behavior of the **441 Current output 1 to n** diagnostic message.

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

**Factory setting**
Warning

**Additional information**
Selection
For a detailed description of the options available: →  29

Assign behavior of diagnostic no. 442 (Frequency output 1 to n)

**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 **442 Frequency output 1 to n** diagnostic message.

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

**Factory setting**
Warning
Additional information

For a detailed description of the options available: \( \rightarrow \ 29 \)

Assign behavior of diagnostic no. 443 (Pulse output)

Navigation

\( \rightarrow \rightarrow \) Expert \( \rightarrow \) System \( \rightarrow \) Diagn. handling \( \rightarrow \) Diagn. behavior \( \rightarrow \) 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 \textbf{443 Pulse output} diagnostic message.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Additional information

Selection

For a detailed description of the options available: \( \rightarrow \ 29 \)

Assign behavior of diagnostic no. 941

Navigation

\( \rightarrow \rightarrow \) Expert \( \rightarrow \) System \( \rightarrow \) Diagn. handling \( \rightarrow \) Diagn. behavior \( \rightarrow \) Diagnostic no. 941 (0783)

Description

Change behavior of diagnostic event with diagnostic number 941 'API/ASTM temperature out of specificat.'.

Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting

Warning

Assign behavior of diagnostic no. 942

Navigation

\( \rightarrow \rightarrow \) Expert \( \rightarrow \) System \( \rightarrow \) Diagn. handling \( \rightarrow \) Diagn. behavior \( \rightarrow \) Diagnostic no. 942 (0780)

Description

Change behavior of diagnostic event with diagnostic number 942 'API/ASTM density out of specification'.
Assignment of Device Parameters

### Proline Prosonic Flow P 500 HART

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

#### Factory setting
Warning

---

### Assign behavior of diagnostic no. 943

**Navigation**

Expert \rightarrow System \rightarrow Diagn. handling \rightarrow Diagn. behavior \rightarrow Diagnostic no. 943 (0781)

**Description**
Change behavior of diagnostic event with diagnostic number 943 'API pressure out of specification'.

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

**Factory setting**
Warning

---

### Assign behavior of diagnostic no. 444 (Current input 1 to n)

**Navigation**

Expert \rightarrow System \rightarrow Diagn. handling \rightarrow Diagn. behavior \rightarrow Diagnostic no. 444 (0740)

**Prerequisite**
The device has one current input.

**Description**
Use this function to change the diagnostic behavior of the 444 Current input 1 to n diagnostic message.

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

**Factory setting**
Warning

**Additional information**
For a detailed description of the options available: \rightarrow 29

---

### Assign behavior of diagnostic no. 543 (Double pulse output)

**Navigation**

Expert \rightarrow System \rightarrow Diagn. handling \rightarrow Diagn. behavior \rightarrow Diagnostic no. 543 (0643)

**Description**
Use this function to change the diagnostic behavior of the 543 Double pulse output diagnostic message.

---

For a detailed description of the options available: \rightarrow 29
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available: → 29

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available: → 29

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
Selection
For a detailed description of the options available: → 29
Assign behavior of diagnostic no. 841

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 841 (0680)

Description
Use this function to change the diagnostic behavior of the **841 Flow velocity too high** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Warning

Additional information
For a detailed description of the options available: → 29

Assign behavior of diagnostic no. 842 (Process limit)

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

Description
Use this function to change the diagnostic behavior of the **842 Process limit** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Off

Additional information
For a detailed description of the options available: → 29

Assign behavior of diagnostic no. 870 (Measuring inaccuracy increased)

Navigation
Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 870 (0726)

Description
Use this function to change the diagnostic behavior of the **870 Measuring inaccuracy increased** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Off
### Assign behavior of diagnostic no. 930 (Process fluid)

**Description**
Use this function to change the diagnostic behavior of the \(\Delta S930\) Process fluid diagnostic message.

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

**Factory setting**
Alarm

**Additional information**
For a detailed description of the options available: → 29

---

### Assign behavior of diagnostic no. 931 (Process fluid)

**Description**
Use this function to change the diagnostic behavior of the \(\Delta S931\) Process fluid diagnostic message.

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

**Factory setting**
Alarm

**Additional information**
For a detailed description of the options available: → 29

---

### Assign behavior of diagnostic no. 953 (Asymmetry noise signal too high path 1 to n)

**Description**
Use this function to change the diagnostic behavior of the \(\Delta M953\) Asymmetry noise signal too high path 1 to n diagnostic message.


Selection

- Off
- Alarm
- Warning
- Logbook entry only

Factory setting
Alarm

Additional information
For a detailed description of the options available: → 29

3.1.4 "Administration" submenu

Navigation

Expert → System → Administration

"Define access code" wizard

The Define access code wizard (→ 38) is only available when operating via the local display or Web browser.

If operating via the operating tool, the Define access code parameter (0093) can be found directly in the Administration submenu. There is no Confirm access code parameter if the device is operated via the operating tool.

Navigation
Expert → System → Administration → Def. access code
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 device configuration against any inadvertent modifications via the local display, Web browser, FieldCare or DeviceCare (via CDI-RJ45 service interface).

User entry

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

Additional information

Description

The write protection affects all parameters in the document marked with the symbol. On the local display, the symbol in front of a parameter indicates that the parameter is write-protected. The parameters that cannot be write-accessed are grayed out in the Web browser.

Information

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 (0003) (→ 13).

Information

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

User entry

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

Factory setting

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

Confirm access code

Navigation

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

Description

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

User entry

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

"Reset access code" submenu

Navigation

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

Navigation
   专家 → 系统 → 管理 → 重置密码 → 操作时间 (0652)

Description
Displays the length of time the device has been in operation.

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

Additional information
   Indication
   Maximum number of days: 9999 (corresponds to approx. 27 years and 5 months)

Reset access code

Navigation
   专家 → 系统 → 管理 → 重置密码 → 重置密码 (0024)

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

User entry
Character string comprising numbers, letters and special characters

Factory setting
0x00

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

   User entry
   The reset code can only be entered via:
   - Web browser
   - DeviceCare, FieldCare (via CDI RJ45 interface)
   - Fieldbus
Additional parameters in the "Administration" submenu

### Device reset

**Navigation**

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

**Description**
Reset the device configuration - either entirely or in part - to a defined state.

**Selection**

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

**Factory setting**
Cancel

**Additional information**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>To delivery settings</td>
<td>Every parameter for which a customer-specific default setting was ordered is reset to the customer-specific value. All other parameters are reset to the factory setting.</td>
</tr>
<tr>
<td>Restart device</td>
<td>The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.</td>
</tr>
<tr>
<td>Restore S-DAT backup</td>
<td>Restores the data that is saved on the S-DAT. Additional information: This function can be used to resolve the memory issue &quot;083 Memory content inconsistent&quot; or to restore the S-DAT data when a new S-DAT has been installed.</td>
</tr>
</tbody>
</table>

* This option is displayed only in an alarm condition.

### Transmitter identifier

**Navigation**

- Expert → System → Administration → Transm. identif. (2765)

**Description**
Select transmitter identifier.

**User interface**

- Unknown
- 500
- 300

**Factory setting**
500

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

Navigation
Endress+Hauser

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

User entry
Max. 10-digit string of numbers.

Factory setting
Depends on the software option ordered

Additional information

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

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

Entering the activation code

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

If an incorrect or invalid code is entered, this results in the loss of software options that have already been activated.

Before you enter a new activation code, make a note of the current activation code.

Enter the new activation code provided by Endress+Hauser when the new software option was ordered.

Once the activation code has been entered, check if the new software option is displayed in the Software option overview parameter (0015) (→ 42).

If the new software option is active if it is displayed.

If the new software option is not displayed or all software options have been deleted, the code entered was either incorrect or invalid.

If the code entered is incorrect or invalid, enter the old activation code.

Have your Endress+Hauser sales organization check the new activation code remembering to specify the serial number or ask for the code again.

Example for a software option

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

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

Web browser

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

Software option overview

Navigation
Endress+Hauser

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

- Extended HistoROM
- SIL
- Flow disturbance compensation *
- Heartbeat Monitoring
- Heartbeat Verification
- Petroleum *
- Product identification *

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"

'SIL' option
Order code for "Additional approval", option LA "SIL"

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

'Petroleum' option
Order code for "Application package", option EJ "Petroleum"
or
Order code for "Application package", option EQ "Petroleum & Product identification"

'Product identification' option
Order code for "Application package", option EQ "Petroleum & Product identification"

'Flow disturbance compensation' option
This option is available by default if 2 sensor pairs have been ordered.

3.2 "Sensor" submenu

Navigation

Expert → Sensor

- Measured values → 44
- System units → 61
- Measuring point 1 → 69
- Installation status → 84

* Visibility depends on order options or device settings
### "Measured values" submenu

**Navigation**


---

#### Measured values

- **Process variables**
  - Volume flow (1838) → 45
  - Mass flow (1847) → 45
  - Flow velocity (1852) → 45
  - Sound velocity (1850) → 46
  - Pressure (1872) → 46
  - Energy flow (1851) → 46
  - CPL (4192) → 47
  - CTL (4191) → 47
  - CTPL (4193) → 48

- **System values** → 51
- **Totalizer** → 53
- **Input values** → 55
- **Output values** → 57
### Volume flow

**Navigation**


**Description**

Displays the volume flow that is currently measured.

**User interface**

Signed floating-point number

**Additional information**

- *Dependency*
  - The unit is taken from the **Volume flow unit** parameter (0553) → 62

---

### Mass flow

**Navigation**


**Description**

Displays the mass flow that is currently calculated.

**User interface**

Signed floating-point number

**Additional information**

- *Dependency*
  - The unit is taken from the **Mass flow unit** parameter (0554) → 65

---

### Flow velocity

**Navigation**


**Description**

Displays the average flow velocity that is currently calculated.
### Sound velocity

**Navigation**


**Description**

Displays the sound velocity that is currently measured.

**User interface**

Signed floating-point number

**Additional information**

- The unit is taken from the **Velocity unit** parameter (0566) (→ 66)

---

### Pressure

**Navigation**


**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- The **API referenced correction** option is selected in the **Petroleum mode** parameter (4187).

The software options currently enabled are displayed in the **Software option overview** parameter (0015) (→ 42).

**Description**

Shows depending on the setting the external, entered or measured pressure value.

**User interface**

Signed floating-point number

**Additional information**

---

### Energy flow

**Navigation**


**Description**

Shows the energy flow currently calculated.

**User interface**

Signed floating-point number

**Additional information**
CPL

**Navigation**  
Expert → Sensor → Measured val. → Process variab. → CPL (4192)

**Prerequisite**  
For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**  
Displays the calibration factor which represents the effect of pressure on the fluid. This is used to convert the measured volume flow and the measured density to values at reference pressure.

**User interface**  
Positive floating-point number

**Factory setting**  
-

CTL

**Navigation**  

**Prerequisite**  
For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**  
Displays the calibration factor which represents the effect of temperature on the fluid. This is used to convert the measured volume flow and the measured density to values at reference temperature.

**User interface**  
Positive floating-point number

**Factory setting**  
-
CTPL

**Navigation**  

**Prerequisite**  
For the following order code:  
- "Application package", option EJ "Petroleum"  
- "Application package", option EQ "Petroleum & Product identification"  
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**  
Displays the combined calibration factor which represents the effect of temperature and pressure on the fluid. This is used to convert the measured volume flow and the measured density to values at reference temperature and reference pressure.

**User interface**  
Positive floating-point number

**Factory setting**  
–

GSV flow

**Navigation**  

**Prerequisite**  
For the following order code:  
- "Application package", option EJ "Petroleum"  
- "Application package", option EQ "Petroleum & Product identification"  
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**  
Displays the measured total volume flow, corrected to the reference temperature and the reference pressure.

**Dependency**  
The unit is taken from: Corrected volume flow unit parameter (0558)

**User interface**  
Signed floating-point number

**Factory setting**  
–

**Additional information**  
The unit is taken from the Corrected volume flow unit parameter (0558)
### NSV flow

**Navigation**

 апп Expert → Sensor → Process variab. → NSV flow (4159)

**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→  42).

**Description**

Displays the net volume flow which is calculated from the measured total volume flow minus the value for sediment & water and minus the shrinkage.

*Dependency*

The unit is taken from: Corrected volume flow unit parameter (0558)

**User interface**

Signed floating-point number

**Factory setting**

–

**Additional information**

пп The unit is taken from the Corrected volume flow unit parameter (0558)

### S&W correction value

**Navigation**

 апп Expert → Sensor → Process variab. → S&W correction (4194)

**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The External value option or Current input 1...n option is selected in the S&W input mode parameter (4189).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→  42).

**Description**

Shows the correction value for sediment and water.

**User interface**

Positive floating-point number

**Factory setting**

–
**S&W volume flow**

**Navigation**


**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**

Displays the S&W volume flow which is calculated from the measured total volume flow minus the net volume flow.

**Dependency**

The unit is taken from: Volume flow unit parameter (0553) (→ 62)

**User interface**

Signed floating-point number

**Factory setting**

–

**Additional information**

The unit is taken from the Volume flow unit parameter (0553) (→ 62)

---

**API gravity**

**Navigation**


**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The API referenced correction option is selected in Petroleum mode parameter (4187).

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**

Displays the reference density in API degrees (specified depending on the option, or read in by an external device).

**User interface**

0.0 to 100.0 °API

**Factory setting**

–
API slope

**Navigation**


**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The **API referenced correction** option is selected in **Petroleum mode** parameter (4187).

> The software options currently enabled are displayed in the Software option overview parameter (0015) (→  42).

**Description**

Shows the API slope (change of API over time). Can be used e.g. to detect different products.

**User interface**

−10 to 100 °API/s

**Factory setting**

−

Reference density

**Navigation**


**Prerequisite**

For the following order code:
- "Application package", option EJ "Petroleum"
- "Application package", option EQ "Petroleum & Product identification"
- The **API referenced correction** option is selected in **Petroleum mode** parameter (4187).

> The software options currently enabled are displayed in the Software option overview parameter (0015) (→  42).

**Description**

Shows the reference density at the API reference conditions specified for temperature and pressure.

**User interface**

0 to 30 kg/Nm³

**Factory setting**

−

"System values" submenu

**Navigation**

Expert → Sensor → Measured val. → System values

Signal strength (2914) ➔  52
Description of device parameters

Proline Prosonic Flow P 500 HART

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>User interface</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal to noise ratio</td>
<td>Displays the current signal to noise ratio.</td>
<td>Signed floating-point number</td>
<td>A low value or a drop in the signal to noise ratio over time is an indicator of poor signal quality.</td>
</tr>
<tr>
<td>Acceptance rate</td>
<td>Displays the ratio of the number of ultrasonic signals accepted for flow calculation and the total number of ultrasonic signals emitted. Multipath measuring devices only: Displays the minimum of all acceptance rates measured.</td>
<td>0 to 100 %</td>
<td></td>
</tr>
<tr>
<td>Turbulence</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Navigation

- Expert → Sensor → Measured val. → System values → Signal strength (2914)
- Expert → Sensor → Measured val. → System values → SNR (2917)
- Expert → Sensor → Measured val. → System values → Acceptance rate (2912)
Turbulence

**Navigation**  
Expert → Sensor → Measured val. → System values → Turbulence (2907)

**Description**  
Displays the current turbulence.

**User interface**  
Signed floating-point number

**Additional information**  
*Description*
A high turbulence value indicates a disturbance in the flow profile.

"Totalizer" submenu

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

**Prerequisite**  
One of the following options is selected in the **Assign process variable** parameter (0914) → (196) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

**Totalizer 1 to n value**

**Navigation**  
Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n value (0911–1 to n)

**Description**  
Displays the current totalizer reading.

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

As it is only possible to display a maximum of 7 digits in the operating tool, the current counter value is the sum of the totalizer value and the overflow value from the **Totalizer overflow 1 to n** parameter (0910–1 to n) if the display range is exceeded.

- In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (0901) (→ 199).

**Display**

The value of the process variable aggregated since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (0908) (→ 198).

- The unit of the selected process variable is defined in the **Unit totalizer** parameter (0915) (→ 197) for the totalizer.

**Example**

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

- Value in the **Totalizer value 1** parameter (0911): 1968457 m³
- Value in the **Totalizer overflow 1** parameter (0910): 107 (1 overflow) = 10000000 m³
- Current totalizer value: 11968457 m³
Totalizer 1 to n value

Navigation

Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n value

Description
Shows the totalizer value reported to the controller for further processing.

User interface
Signed floating-point number

Factory setting
0 m³

Totalizer 1 to n status

Navigation

Expert → Sensor → Measured val. → Totalizer → Tot. 1 to n status

Description
Shows the status of the totalizer value reported to the controller for further processing ('Good', 'Uncertain', 'Bad').

User interface
- Good
- Uncertain
- Bad

Factory setting
Good

Totalizer 1 to n status (Hex)

Navigation

Expert → Sensor → Measured val. → Totalizer → Status 1 to n (Hex)

Description
Shows the status of the totalizer value reported to the controller for further processing (Hex).

User interface
0 to 255

Factory setting
128

"Input values" submenu

Navigation

Expert → Sensor → Measured val. → Input values

- Input values
- Current input 1 to n
- Value status input 1 to n
"Current input 1 to n" submenu

**Navigation**

Expert → Sensor → Measured val. → Input values → Current input 1 to n

---

**Measured values 1 to n**

**Navigation**

Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measured val. 1 to n

**Description**

Displays the current input value.

**User interface**

Signed floating-point number

**Additional information**

**Dependency**

The unit is taken from the **Pressure unit** parameter (0564)

---

**Measured current 1 to n**

**Navigation**

Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n

**Description**

Displays the current value of the current input.

**User interface**

0 to 22.5 mA

---

"Value status input 1 to n" submenu

**Navigation**

Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n

---
Value status input

Navigation

Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n → Val.stat.inp. (1353–1 to n)

Description
Displays the current input signal level.

User interface
• High
• Low

"Output values" submenu

Navigation
Expert → Sensor → Measured val. → Output values

"Value current output 1 to n" submenu

Navigation
Expert → Sensor → Measured val. → Output values → Current output 1 to n

Output current

Navigation
Expert → Sensor → Measured val. → Output values → Current output 1 to n → Output curr. (0361–1 to n)

Description
Displays the current value currently calculated for the current output.

User interface
0 to 22.5 mA
**Measured current**

**Navigation**

Expert → Sensor → Measured val. → Output values → Current output 1 to n → Measur. curr. (0366–1 to n)

**Description**

Displays the actual measured value of the output current.

**User interface**

0 to 30 mA

---

**'Pulse/frequency/switch output 1 to n' submenu**

**Navigation**

Expert → Sensor → Measured val. → Output values → PFS output 1 to n

**Output frequency**

**Navigation**

Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Output freq. (0471–1 to n)

**Prerequisite**

In the Operating mode parameter (0469) (→ 122), the Frequency option is selected.

**Description**

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

**User interface**

0.0 to 12 500.0 Hz

**Pulse output**

**Navigation**

Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Pulse output (0456–1 to n)

**Prerequisite**

The Pulse option is selected in the Operating mode parameter (0469) (→ 122) parameter.

**Description**

Displays the pulse frequency currently output.
**User interface**

Positive floating-point number

**Additional information**

*Description*

- 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.

![Diagram](image)

The output behavior can be reversed via the **Invert output signal** parameter (0470) (→ 140) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (0480) (→ 126)) can be configured.

**Switch state**

**Navigation**

Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Switch state (0461–1 to n)

**Prerequisite**

The **Switch** option is selected in the **Operating mode** parameter (0469) (→ 122).

**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.
"Relay output 1 to n’ submenu

Navigation ➕ Expert ➔ Sensor ➔ Measured val. ➔ Output values ➔ Relay output 1 to n

<table>
<thead>
<tr>
<th>Switch state (0801–1 to n)</th>
<th>➔ 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch cycles (0815–1 to n)</td>
<td>➔ 60</td>
</tr>
<tr>
<td>Max. switch cycles number (0817–1 to n)</td>
<td>➔ 60</td>
</tr>
</tbody>
</table>

Switch state

Navigation ➕ Expert ➔ Sensor ➔ Measured val. ➔ Output values ➔ Relay output 1 to n ➔ Switch state (0801–1 to n)

Description Displays the current status of the relay output.

User interface

- Open
- Closed

Additional information

User interface

- Open
  The relay output is not conductive.
- Closed
  The relay output is conductive.

Switch cycles

Navigation ➕ Expert ➔ Sensor ➔ Measured val. ➔ Output values ➔ Relay output 1 to n ➔ Switch cycles (0815–1 to n)

Description Displays all the switch cycles performed.

User interface Positive integer

Max. switch cycles number

Navigation ➕ Expert ➔ Sensor ➔ Measured val. ➔ Output values ➔ Relay output 1 to n ➔ Max. cycles no. (0817–1 to n)

Description Displays the maximum number of guaranteed switch cycles.
User interface
Positive integer

"Double pulse output" submenu

Navigation
Expert → Sensor → Measured val. → Output values → Double pulse out

<table>
<thead>
<tr>
<th>Double pulse output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse output (0987)</td>
</tr>
</tbody>
</table>

Pulse output

Navigation
Expert → Sensor → Measured val. → Output values → Double pulse out → Pulse output (0987)

Description
Displays the pulse frequency of the double pulse output which is currently output.

User interface
Positive floating-point number

Additional information
For a detailed description and example: Pulse output parameter (0456–1 to n) (→ 61)

3.2.2 "System units" submenu

Navigation
Expert → Sensor → System units

<table>
<thead>
<tr>
<th>System units</th>
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</thead>
<tbody>
<tr>
<td>Volume flow unit (0553)</td>
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<tr>
<td>Volume unit (0563)</td>
</tr>
<tr>
<td>Mass flow unit (0554)</td>
</tr>
<tr>
<td>Mass unit (0574)</td>
</tr>
<tr>
<td>Velocity unit (0566)</td>
</tr>
<tr>
<td>Temperature unit (0557)</td>
</tr>
</tbody>
</table>
Description of device parameters

### 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**

- cm³/s
- cm³/min
- cm³/h
- cm³/d
- dm³/s
- dm³/min
- dm³/h
- dm³/d
- m³/s
- m³/min
- m³/h
- m³/d
- ml/s
- ml/min
- ml/h
- ml/d
- l/s
- l/min
- l/h
- l/d
- hl/s
- hl/min
- hl/h
- hl/d
- Ml/s
- Ml/min
- Ml/h
- Ml/d
- af/s
- af/min
- af/h
- af/d
- ft³/s
- ft³/min
- ft³/h
- ft³/d
Description of device parameters

- Mft³/s
- Mft³/min
- Mft³/h
- Mft³/d
- MMft³/s
- MMft³/min
- MMft³/h
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- 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)
- 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)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)

Factory setting

- Depends on country:
  - m³/h
  - ft³/min
Additional information

Effect
The selected unit applies to:
Volume flow parameter (1838) (→ 45)

Options
For an explanation of the abbreviated units: → 249

Customer-specific units
The unit for the customer-specific volume is specified in the User volume text parameter (0567).

Volume unit

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

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

Selection
- cm³
- dm³
- m³
- ml
- l
- hl
- Ml
- af
- ft³
- Mft³
- MMft³
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us; oil)
- bbl (us; liq.)
- bbl (us; beer)
- bbl (us; tank)
- gal (imp)
- Mgal (imp)
- bbl (imp; beer)
- bbl (imp; oil)

Factory setting
Depends on country:
- m³
- ft³

Additional information
Options
For an explanation of the abbreviated units: → 249
**Mass flow unit**

**Navigation**

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

**Description**

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

**Selection**

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

**Factory setting**

Depends on country:
- kg/h
- lb/min

**Additional information**

Result

The selected unit applies to:

**Mass flow parameter (1872)** (→ 46)

**Selection**

For an explanation of the abbreviated units: → 249

---

**Mass unit**

**Navigation**

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

**Description**

Use this function to select the unit for the mass.

**Selection**

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

**Factory setting**

Country-specific:
- kg
- lb

**Additional information**

**Selection**

For an explanation of the abbreviated units: → 249
Velocity unit

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

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

**Selection**

<table>
<thead>
<tr>
<th>SI units</th>
<th>US units</th>
</tr>
</thead>
<tbody>
<tr>
<td>m/s</td>
<td>ft/s</td>
</tr>
</tbody>
</table>

**Factory setting**
Country-specific:
- m/s
- ft/s

**Additional information**

- **Effect**
The selected unit applies for:
  - Flow velocity (1852) (→ 45)
  - Sound velocity (1850) (→ 46)

For an explanation of the abbreviated units: → 249

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**
Country-specific:
- °C
- °F

**Additional information**

- **Effect**
The selected unit applies for:
  - Temperature (1853)
  - Electronic temperature (6053)
  - External temperature (6080)
  - Reference temperature (1816)

For an explanation of the abbreviated units: → 249
Density unit

**Navigation**

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

**Description**

Use this function to select the unit for the density.

**Selection**

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

- **US units**
  - SG60°F
  - 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/dm³
- lb/ft³

**Additional information**

For an explanation of the abbreviated units: →  249

Reference density unit

**Navigation**

Expert → Sensor → System units → Ref. dens. unit (0556)

**Description**

Use this function to select the unit for the reference density.

**Selection**

- **SI units**
  - kg/Nm³
  - kg/Nl
  - g/Scm³
  - kg/Sm³
  - RD15°C
  - RD20°C

**Factory setting**

kg/Nm³

**Additional information**

The selected unit applies for:
- External reference density parameter (6198)
- Fixed reference density parameter (1814)
- Reference density parameter (1852) →  45

For an explanation of the abbreviated units: →  249
### Kinematic viscosity unit

**Navigation**  
Expert → Sensor → System units → Kin. visc. unit (0578)

**Description**  
Use this function to select the unit for the kinematic viscosity.

**Selection**  
*SI units*  
- cSt  
- St  
- mm²/s  
- m²/s

**Factory setting**  
Country-specific:  
- m²/s  
- cSt

---

### Length unit

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

**Description**  
Use this function to select the unit of length for the.

**Selection**  
*SI units*  
- m  
- mm  

*US units*  
- ft  
- in

**Factory setting**  
Country-specific:  
- mm  
- in

**Additional information**  
*Selection*  
For an explanation of the abbreviated units: →  249

---

### 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: → 249

3.2.3 "Measuring point " submenu

Navigation

Expert → Sensor → Meas. point

Measuring point configuration (5675–1) → 71
Medium (2926–1) → 71
Medium temperature (3053–1) → 71
Sound velocity calculation mode (4202–1) → 72
Sound velocity (2929–1) → 72
API gravity (4203–1) → 72
Density (4204–1) → 73
Reference density (4205–1) → 73
Pressure (4206–1) → 73
API commodity group (4214–1) → 74
API table selection (4209–1) → 74
Alternative pressure value (4207–1) → 74
Alternative temperature value (4208–1) → 75
Viscosity (2932–1) → 75
Pipe material (2927–1) → 75
Pipe sound velocity (2933–1) → 76
Pipe dimensions (2943–1) → 76
Description of device parameters

- Pipe circumference (2934–1) → 76
- Pipe outer diameter (2910–1) → 77
- Pipe wall thickness (2916–1) → 77
- Liner material (2928–1) → 77
- Liner sound velocity (2936–1) → 77
- Liner thickness (2935–1) → 78
- Sensor type (2924–1) → 78
- Signal filter (3011–1) → 78
- Sensor coupling (2957–1) → 79
- Mounting type (2938–1) → 79
- Cable length (2939–1) → 79
- FlowDC inlet configuration (3049–1) → 80
- Intermediate pipe length (2945–1) → 80
- Inlet diameter (3054–1) → 81
- Transition length (3065–1) → 81
- Inlet run (3050–1) → 81
- Relative sensor position (2985–1) → 82
- Result sensor type / mounting type (2946–1) → 82
- Result sensor distance / measuring aid (2947–1) → 82
- Result sensor type / sensor distance (3066–1) → 82
- Result path length / arc length (3067–1) → 83

Mounting deviations signal path 1 to n → 83
Measuring point configuration

**Navigation**

Expert → Sensor → Meas. point 1 → Meas. pt config. (5675–1)

**Description**

Use this function to enter the measuring point configuration.

**Selection**

- 1 measuring point - signal path 1
- 1 measuring point - signal path 2
- 1 measuring point - 2 signal paths

**Factory setting**

Depending on the sensor version

Medium

**Navigation**

Expert → Sensor → Meas. point 1 → Medium (2926–1)

**Description**

Select the medium.

**Selection**

- Water
- Sea water
- Distilled water
- Ammonia NH3
- Benzene
- Ethanol
- Glycol
- Kerosene
- Milk
- Methanol
- User-specific liquid
- Air
- Liquid hydrocarbons

**Factory setting**

Water

Medium temperature

**Navigation**

Expert → Sensor → Meas. point 1 → Medium temp. (3053–1)

**Description**

Enter the medium temperature for the installation.

**User entry**

-200 to 550 °C

**Factory setting**

20 °C

* Visibility depends on order options or device settings
**Sound velocity calculation mode**

**Navigation**

Expert → Sensor → Meas. point 1 → SoundVelocCalc. (4202–1)

**Prerequisite**

The **Liquid hydrocarbons** option is selected in **Medium** parameter (2926) (→ 71).

**Description**

Select the process variable to use to calculate the sound velocity at installation.

**Selection**

- Fixed value
- API gravity
- Density
- Reference density

**Factory setting**

API gravity

---

**Sound velocity**

**Navigation**

Expert → Sensor → Meas. point 1 → Sound velocity (2929–1)

**Prerequisite**

The **User-specific liquid** option is selected in **Medium** parameter (2926) (→ 71).

**Description**

Enter the sound velocity of the medium.

- If the sound velocity is not known, it can be determined with the following tools:
  - Endress+Hauser sound velocity sensor sets
  - Prosonic Flow 93T with sound velocity sensors
  - Iterative measurement of sound velocity and distance adjustment of sensor distance using flow sensors

**User entry**

200 to 3000 m/s

**Factory setting**

1482.4 m/s

---

**API gravity**

**Navigation**

Expert → Sensor → Meas. point 1 → API gravity (4203–1)

**Prerequisite**

The **Liquid hydrocarbons** option is selected in the **Medium** parameter (2926) (→ 71) and the **API gravity** option is selected in the **Sound velocity calculation mode** parameter (4202) (→ 72).

**Description**

Enter the medium's API gravity for the installation.

**User entry**

0.0 to 100.0 °API

**Factory setting**

10.0 °API
### Density

**Navigation**

```
Expert → Sensor → Meas. point 1 → Density (4204–1)
```

**Prerequisite**

The **Liquid hydrocarbons** option is selected in the **Medium** parameter (2926) and the **Density** option is selected in the **Sound velocity calculation mode** parameter (4202).

**Description**

Enter the medium’s density for the installation.

**User entry**

Signed floating-point number

**Factory setting**

1 000 kg/m³

---

### Reference density

**Navigation**

```
Expert → Sensor → Meas. point 1 → Ref. density (4205–1)
```

**Prerequisite**

The **Liquid hydrocarbons** option is selected in the **Medium** parameter (2926) and the **Reference density** option is selected in the **Sound velocity calculation mode** parameter (4202).

**Description**

Enter the medium's reference density for the installation.

**User entry**

Signed floating-point number

**Factory setting**

1 000 kg/m³

---

### Pressure

**Navigation**

```
Expert → Sensor → Meas. point 1 → Pressure (4206–1)
```

**Prerequisite**

The **Liquid hydrocarbons** option is selected in the **Medium** parameter (2926) and the **API gravity**, **Density** option or **Reference density** option is selected in the **Sound velocity calculation mode** parameter (4202).

**Description**

Enter the process pressure for the installation.

**User entry**

0.8 to 110 bar

**Factory setting**

1.01325 bar
**API commodity group**

**Navigation**

Expert → Sensor → Meas. point 1 → API comm. group (4214–1)

**Prerequisite**

The **Liquid hydrocarbons** option is selected in the **Medium** parameter (2926) and the **API gravity** option or **Density** option or **Reference density** option is selected in the **Sound velocity calculation mode** parameter (4202).

**Description**

Select the medium's API commodity group.

**Selection**

- A - crude oil
- B - refined products
- D - lubricating oils

**Factory setting**

A - crude oil

---

**API table selection**

**Navigation**

Expert → Sensor → Meas. point 1 → API tab. select. (4209–1)

**Prerequisite**

The **Liquid hydrocarbons** option is selected in the **Medium** parameter (2926) and the **API gravity** option, **Density** option or **Reference density** option is selected in the **Sound velocity calculation mode** parameter (4202).

**Description**

Select the API reference conditions (temperature and pressure) that apply for the reference density specified.

**Selection**

- API table 5/6
- API table 23/24
- API table 53/54
- API table 59/60
- Other

**Factory setting**

API table 23/24

---

**Alternative pressure value**

**Navigation**

Expert → Sensor → Meas. point 1 → Alternat. press. (4207–1)

**Description**

Enter an alternative user-defined reference value for the pressure.

**User entry**

0.8 to 110 bar

**Factory setting**

1.01325 bar
Alternative temperature value

**Navigation**
Expert → Sensor → Meas. point 1 → Alternativ.temp. (4208–1)

**Description**
Enter an alternative user-defined reference value for the temperature.

**User entry**
−10 to 110 °C

**Factory setting**
29.5 °C

Viscosity

**Navigation**
Expert → Sensor → Meas. point 1 → Viscosity (2932–1)

**Prerequisite**
The **User-specific liquid** option is selected in **Medium** parameter (2926) (→  71).

**Description**
Enter medium viscosity at installation temperature.

**User entry**
0.01 to 10 000 mm²/s

**Factory setting**
1 mm²/s

Pipe material

**Navigation**
Expert → Sensor → Meas. point 1 → Pipe material (2927–1)

**Description**
Select pipe material.

**Selection**
- Carbon steel
- Ductile cast iron
- Stainless steel
- 1.4301 (UNS S30400)
- 1.4401 (UNS S31600)
- 1.4550 (UNS S34700)
- Hastelloy C
- PVC
- PE
- LDPE
- HDPE
- GRP
- PVDF
- PA
- PP
- PTFE
- Pyrex glass
- Asbestos cement
- Copper
- Unknown pipe material
**Factory setting**

Stainless steel

---

**Pipe sound velocity**

**Navigation**

Expert → Sensor → Meas. point 1 → Pipe sound vel. (2933–1)

**Prerequisite**

The Unknown pipe material option is selected in the Pipe material parameter (2927) (→ 75).

**Description**

Enter sound velocity of pipe material.

**User entry**

800.0 to 3800.0 m/s

**Factory setting**

3120.0 m/s

---

**Pipe dimensions**

**Navigation**

Expert → Sensor → Meas. point 1 → Pipe dimensions (2943–1)

**Description**

Select if pipe dimensions are defined by diameter or circumference.

**Selection**

- Diameter
- Pipe circumference

**Factory setting**

Diameter

---

**Pipe circumference**

**Navigation**

Expert → Sensor → Meas. point 1 → Pipe circumfer. (2934–1)

**Prerequisite**

The Pipe circumference option is selected in the Pipe dimensions parameter (2943) (→ 76).

**Description**

Define the pipe circumference.

**User entry**

30 to 62800 mm

**Factory setting**

314.159 mm
Pipe outer diameter

Navigation  
Expert → Sensor → Meas. point 1 → Pipe outer diam. (2910–1)

Prerequisite  
The Diameter option is selected in Pipe dimensions parameter (2943) (→ 76).

Description  
Define the outer diameter of the pipe.

User entry  
0 to 20 000 mm

Factory setting  
100 mm

Pipe wall thickness

Navigation  
Expert → Sensor → Meas. point 1 → Wall thickness (2916–1)

Description  
Enter the pipe wall thickness.

User entry  
Positive floating point number

Factory setting  
3 mm

Liner material

Navigation  
Expert → Sensor → Meas. point 1 → Liner material (2928–1)

Description  
Select liner material.

Selection  
• None  
• Cement  
• Rubber  
• Epoxy resin  
• Unknown liner material

Factory setting  
None

Liner sound velocity

Navigation  
Expert → Sensor → Meas. point 1 → Liner sound vel. (2936–1)

Prerequisite  
The Unknown liner material option is selected in the Liner material parameter (2928) (→ 77).

Description  
Define the sound velocity of liner material.
User entry 800.0 to 3800.0 m/s  
Factory setting 2400.0 m/s  

**Liner thickness**  

**Navigation**  
Expert → Sensor → Meas. point 1 → Liner thickness (2935–1)  

**Description**  
Define the thickness of liner.  

**User entry**  
0 to 100 mm  

**Factory setting**  
0 mm  

**Sensor type**  

**Navigation**  
Expert → Sensor → Meas. point 1 → Sensor type (2924–1)  

**Description**  
Select sensor type.  

**Selection**  
- C-030-A  
- C-050-A  
- C-100-A  
- C-100-B  
- C-100-C  
- C-200-A  
- C-200-B  
- C-200-C  
- C-500-A *  
- CH-050-A *  
- CH-100-A *  

**Factory setting**  
As per order  

**Signal filter**  

**Navigation**  
Expert → Sensor → Meas. point 1 → Signal filter (3011–1)  

**Description**  
Switch the signal filter on or off. The signal filter is an adaptive filter that is applied to the raw flow signal.  

**Selection**  
- Off  
- On  

* Visibility depends on order options or device settings
**Factory setting**  
On

**Sensor coupling**

**Navigation**  
Expert → Sensor → Meas. point 1 → Sensor coupling (2957–1)

**Prerequisite**  
The following option is selected in Sensor type parameter (2924) (→ 78):

- C-030-A
- C-050-A
- C-100-A
- C-100-B
- C-100-C
- C-200-A
- C-200-B
- C-200-C
- C-500-A

**Description**  
Select coupling medium.

**Selection**  
- Coupling pad
- Coupling paste

**Factory setting**  
Coupling pad

**Mounting type**

**Navigation**  
Expert → Sensor → Meas. point 1 → Mounting type (2938–1)

**Description**  
- (1) direct option: sensor arrangement with 1 traverse
- (2) V-mounting option: sensor arrangement with 2 traverses
- (3) Z-Mounting option: sensor arrangement with 3 traverses
- (4) W-mounting option: sensor arrangement with 4 traverses

**Selection**  
- (1) direct
- (2) V-mounting
- (3) Z-Mounting
- (4) W-mounting
- Automatic

**Factory setting**  
Automatic

**Cable length**

**Navigation**  
Expert → Sensor → Meas. point 1 → Cable length (2939–1)

**Description**  
Enter length of sensor cables.
Description of device parameters

Proline Prosonic Flow P 500 HART

User entry
0 to 200 000 mm

Factory setting
As per order

FlowDC inlet configuration

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Meas. point 1 → FlowDC inl. conf (3049–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The 1 measuring point - 2 signal paths option is selected in the Measuring point configuration parameter (5675) (→ 71).</td>
</tr>
<tr>
<td>Description</td>
<td>Select FlowDC inlet configuration.</td>
</tr>
<tr>
<td>Selection</td>
<td>Off, Single elbow, Double elbow, Double elbow 3D, 45° bend, 2 x 45° bend, Concentric diameter change, Other*</td>
</tr>
<tr>
<td>Factory setting</td>
<td>Off</td>
</tr>
</tbody>
</table>

Intermediate pipe length

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Sensor → Meas. point 1 → Interm. pipe l. (2945–1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The 1 measuring point - 2 signal paths option is selected in Measuring point configuration parameter (5675) (→ 71).</td>
</tr>
<tr>
<td>Description</td>
<td>Enter the length of the intermediate pipe between the two bends.</td>
</tr>
<tr>
<td>User entry</td>
<td>Positive floating-point number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0 mm</td>
</tr>
</tbody>
</table>

* Visibility depends on order options or device settings
### Inlet diameter

**Navigation**

- **Expert → Sensor → Meas. point 1 → Inlet diameter (3054–1)**

**Prerequisite**

- The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (5675) (→ 71).
- The **Concentric diameter change** option is selected in the **Inlet configuration** parameter (→ 80).

**Description**

Enter the outer diameter of the pipe before the cross-section change. For convenience, the same measuring pipe wall thickness as for the clamp-on system is applied.

**User entry**

1 to 10000 mm

**Factory setting**

88.9 mm

### Transition length

**Navigation**

- **Expert → Sensor → Meas. point 1 → Transit. length (3065–1)**

**Prerequisite**

- In the **Measuring point configuration** parameter (5675) (→  71), the **1 measuring point - 2 signal paths** option is selected.
- In the **Inlet configuration** parameter (→  80), the **Concentric diameter change** option is selected.

**Description**

Enter the length of the concentric change in diameter.

**User entry**

0 to 20000 mm

**Factory setting**

0 mm

### Inlet run

**Navigation**

- **Expert → Sensor → Meas. point 1 → Inlet run (3050–1)**

**Prerequisite**

The **1 measuring point - 2 signal paths** option is selected in **Measuring point configuration** parameter (5675) (→  71).

**Description**

Enter length of the available straight inlet run.

**User entry**

0 to 300000 mm

**Factory setting**

0 mm
### Relative sensor position

**Navigation**

Expert → Sensor → Meas. point 1 → Rel. sensor pos. (2985–1)

**Prerequisite**

The **1 measuring point - 2 signal paths** option is selected in the **Measuring point configuration** parameter (5675) (→ 71) and the **Off** option is not selected in **FlowDC inlet configuration** parameter (3049) (→ 80).

**Description**

Shows the correct position for the sensor.

**User interface**

- 90°
- 180°

### Result sensor type / mounting type

**Navigation**

Expert → Sensor → Meas. point 1 → Sensor/mounting (2946–1)

**Description**

Shows the selected sensor type and (if applicable automatically) selected mounting type.

**User interface**

e.g. C-100-A option / (2) V-mounting option

### Result sensor distance / measuring aid

**Navigation**

Expert → Sensor → Meas. point 1 → Dist./meas. aid (2947–1)

**Description**

Shows the calculated sensor distance and vernier or wire length (if applicable) required for installation.

**User interface**

e.g. 201.3 mm / B 21

### Result sensor type / sensor distance

**Navigation**

Expert → Sensor → Meas. point 1 → Sens. type/dist. (3066–1)

**Description**

Shows the sensor type and sensor distance calculated for installation.

**User interface**

e.g. I-100-A / 500 mm

**Factory setting**

-
### Result path length / arc length

**Navigation**

- Expert → Sensor → Meas. point 1 → Path/arc length (3067–1)

**Description**

Shows the path length calculated and (if applicable) the calculated arc length.

**User interface**

e.g. 1,085 mm / 257.56 mm

**Factory setting**

-

---

**"Mounting deviations signal path 1 to n" submenu**

**Navigation**

- Expert → Sensor → Meas. point 1 → Deviat. path 1 to n

---

#### Sensor distance deviation

**Navigation**

- Expert → Sensor → Meas. point 1 → Deviat. path 1 to n → Sens. dist. dev. (5822–1 to n)

**Description**

Enter the deviation between the nominal sensor distance and the welded position.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

*Description*

If the welded position is greater than the nominal sensor distance, enter a positive deviation (e.g. 5 mm (0.20 in)). If the welded position is smaller than the nominal sensor distance, enter a negative deviation (e.g. −5 mm (−0.20 in)).
**Arc length deviation**

**Navigation**

Expert → Sensor → Meas. point 1 → Deviat. path 1 to n → Arc length dev. (5876–1 to n)

**Description**
Enter the radial deviation between given radial distance and the real mounting position of the sensor.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

Description

If the actual radial distance is greater than the nominal value, enter a positive deviation (e.g. 5 mm (0.20 in)). If the actual radial distance is smaller than the nominal value, enter a negative deviation (e.g. −5 mm (−0.20 in)).

---

**Signal path length deviation**

**Navigation**

Expert → Sensor → Meas. point 1 → Deviat. path 1 to n → Path length dev. (5821–1 to n)

**Description**
Enter the deviation between the nominal signal path length and the welded position.

**User entry**

Signed floating-point number

**Factory setting**

0 mm

**Additional information**

Description

If the actual signal path length is greater than the nominal value, enter a positive deviation (e.g. 5 mm (0.20 in)). If the actual signal path length is smaller than the nominal value, enter a negative deviation (e.g. −5 mm (−0.20 in)).

---

**3.2.4 "Installation status" submenu**

**Navigation**

Expert → Sensor → Install. status

<table>
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<tr>
<th>Installation status (2958)</th>
<th>→ 85</th>
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</thead>
<tbody>
<tr>
<td>Signal strength (2914)</td>
<td>→ 85</td>
</tr>
<tr>
<td>Signal to noise ratio (2917)</td>
<td>→ 86</td>
</tr>
</tbody>
</table>
### Installation status

**Navigation**

- Expert → Sensor → Install. status → Install. status (2958)

**Description**

Displays the device status after installation according to the displayed measured values.

- **Good** option: No further optimization required
  - Signal strength > 40 dB, SNR > 35, sound velocity deviation (measured to expected) < 2%

- **Acceptable** option: Measuring performance ok, optimize if possible. You should always aim for the status **Good** option.
  - Signal strength > 25 dB, SNR > 35, sound velocity deviation (measured to expected) < 3%

- **Bad** option: Optimization is required. Poor and unstable measuring performance.

**User interface**

- Good
- Acceptable
- Bad

**Factory setting**

Good

### Signal strength

**Navigation**

- Expert → Sensor → Install. status → Signal strength (2914)

**Description**

Displays the current signal strength.

**User interface**

Signed floating-point number

**Additional information**

*Description*

A drop in the signal strength over time can be an indicator of process changes, such as the development of deposits in the measuring pipe at the measuring point. This can only be quantified by performing a direct process comparison with different deposit layer thicknesses and associated signal strengths.
Signal to noise ratio

**Navigation**

Expert → Sensor → Install. status → SNR (2917)

**Description**
Displays the current signal to noise ratio.

**User interface**
Signed floating-point number

**Additional information**
*Description*
A low value or a drop in the signal to noise ratio over time is an indicator of poor signal quality.

Sound velocity

**Navigation**

Expert → Sensor → Install. status → Sound velocity (2915)

**Description**
Displays the sound velocity that is currently measured.
The difference between the configured sound velocity and the measured sound velocity should not be > 2%.

**User interface**
Signed floating-point number

Sound velocity deviation

**Navigation**

Expert → Sensor → Install. status → SoundVelocDeviat (2986)

**Description**
Shows the deviation of the installation sound velocity from the measured sound velocity.

**User interface**
Signed floating-point number

**Factory setting**
0 %

3.2.5 "Process parameters" submenu

**Navigation**


<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Flow override (1839)</td>
</tr>
</tbody>
</table>

→ 87
Flow override

**Navigation**


**Description**

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

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

*Description*

**Flow override is active**

- The 453 Flow override diagnostic message is output.
- Output values
  - Temperature: continues to be output
  - Sound velocity: continues to be output
  - Totalizer 1...3: stop being totalized

The Flow override option can also be activated in the Status input submenu: Assign status input parameter (1352) (→ 106).

Flow damping

**Navigation**

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

**Description**

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

1 s
Additional information

Description

The damping is performed by a PT1 element.\(^2\)

User entry

- Value = 0: no damping
- Value > 0: damping is increased

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

Effect

The damping affects the following variables of the device:

- Outputs → 107
- Low flow cut off → 88
- Totalizers → 195

"Low flow cut off" submenu

Navigation

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

Assign process variable (1837) → 88
On value low flow cutoff (1805) → 89
Off value low flow cutoff (1804) → 89

Assign process variable

Navigation

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

Description

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

Selection

- Off
- Volume flow
- Mass flow
- Flow velocity

Factory setting

Flow velocity

---

2) Proportional behavior with first-order lag
**On value low flow cutoff**

**Navigation**

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

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 88).

**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 → 89.

**User entry**

Positive floating-point number

**Factory setting**

Depends on country and nominal diameter

**Additional information**

Dependency

The unit depends on the process variable selected in the Assign process variable parameter (→ 88).

---

**Off value low flow cutoff**

**Navigation**

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

**Prerequisite**

A process variable is selected in the Assign process variable parameter (→ 88).

**Description**

Use this function to enter a switch-off value for low flow cut off. The switch-off value is entered as a positive hysteresis from the switch-on value → 89.

**User entry**

0 to 100.0 %

**Factory setting**

50 %

**Additional information**

Example

```
Q  Flow
 t  Time
H  Hysteresis
A  Low flow cut off active
1  Low flow cut off is activated
2  Low flow cut off is deactivated
3  On value entered
4  Off value entered
```
3.2.6 "External compensation" submenu

**Navigation**

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**Pressure compensation**

**Navigation**
Expert → Sensor → External comp. → Pressure compen. (3023)

**Prerequisite**
The Off option is not selected in Petroleum mode parameter (4187).

**Description**
Select pressure compensation type.

**Selection**
- Fixed value
- External value *
- Current input 1 *
- Current input 2 *

**Factory setting**
Fixed value

* Visibility depends on order options or device settings
Temperature compensation

**Navigation**


**Prerequisite**

The Calculated value option is selected in the Density source parameter (3048) (→ 92).

**Description**

Select temperature mode for temperature compensation.

**Selection**

- Fixed value
- External value *
- Current input 1 *
- Current input 2 *

**Factory setting**

Fixed value

---

**Fixed value**

**Navigation**

Expert → Sensor → External comp. → Fixed value (2925)

**Prerequisite**

The Fixed value option is selected in Temperature compensation parameter (3025) (→ 91).

**Description**

Enter a fixed value for the process temperature.

**User entry**

–50 to 550 °C

**Factory setting**

20 °C

---

**External value**

**Navigation**

Expert → Sensor → External comp. → External value (3058)

**Prerequisite**

The External value option or the Current input 1...n option is selected in the Temperature compensation parameter (3025) (→ 91).

**Description**

Shows the process temperature read from the external device.

**User interface**

–273.15 to 99999 °C

**Factory setting**

–

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

**Density source**

**Navigation**
Expert → Sensor → External comp. → Density source (3048)

**Description**
Select the source of the density.

**Selection**
- Fixed value
- External value *
- Calculated value *
- Current input 1 *
- Current input 2 *

**Factory setting**
Fixed value

**External value**

**Navigation**
Expert → Sensor → External comp. → External value (3060)

**Prerequisite**
The External value option or the Current input 1...n option is selected in the Density source parameter (3048) (→ 92).

**Description**
Shows the density read from the external device.

**User interface**
Positive floating-point number

**Factory setting**
0 kg/m³

**Fixed value**

**Navigation**
Expert → Sensor → External comp. → Fixed value (3171)

**Prerequisite**
The Fixed value parameter (3171) (→ 92) is selected in the Density source parameter (3048) (→ 92).

**Description**
Enter fixed value for medium density.

**User entry**
0.01 to 15 000 kg/m³

**Factory setting**
1 000 kg/m³

* Visibility depends on order options or device settings
Linear expansion coefficient

Navigation  
Expert → Sensor → External comp. → Linear exp coeff (3153)

Description  
Use this function to enter a linear, medium-specific expansion coefficient for calculating the density.

User entry  
1.0 \cdot 10^{-6} to 2.0 \cdot 10^{-3}

Factory setting  
2.06 \cdot 10^{-4}

Square expansion coefficient

Navigation  
Expert → Sensor → External comp. → Square exp coeff (3172)

Description  
For media with a non-linear expansion pattern: use this function to enter a quadratic, medium-specific expansion coefficient for calculating the density.

User entry  
1.0 \cdot 10^{-8} to 2.0 \cdot 10^{-3}

Factory setting  
3.8436 \cdot 10^{-6}

Fixed reference density

Navigation  
Expert → Sensor → External comp. → Fix ref. density (3178)

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

User entry  
0.01 to 15000 kg/m³

Factory setting  
1000 kg/m³

Additional information  
Reference density calculation

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

- \(\rho\): currently used density for mass flow calculation
- \(\rho_N\): reference density
- \(t\): currently read-in or fixed temperature according to the setting in the Temperature compensation parameter (3025) (→ 91)
- \(t_N\): reference temperature at which the reference density applies (e.g. 20 °C)
- \(\Delta t\): \(t\) - \(t_N\)
- \(\alpha\): linear expansion coefficient of the medium, unit = \([1/K]\); \(K\) = Kelvin
- \(\beta\): square expansion coefficient of the medium, unit = \([1/K^2]\)
**Reference temperature**

**Navigation**

Expert → Sensor → External comp. → Ref. temperature (3147)

**Description**

Use this function to enter the reference temperature for which the Fixed reference density (3178) (→ 93) applies.

**User entry**

-200 to 450 °C

**Factory setting**

0 °C

---

**3.2.7 "Sensor adjustment" submenu**

**Navigation**


**Installation direction**

**Navigation**

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

**Description**

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

**Selection**

- Forward flow
- Reverse flow

**Factory setting**

Forward flow

**Additional information**

*Before changing the sign: ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor nameplate.*
"Process variable adjustment" submenu

**Navigation**
Expert → Sensor → Sensor adjustm. → Variable adjust

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<tr>
<td>Density factor (1878)</td>
<td>98</td>
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</tbody>
</table>

**Volume flow offset**

**Navigation**

**Description**
Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m³/s. The value is entered in the selected volume flow unit.

**User entry**
Signed floating-point number

**Factory setting**
0 m³/h

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

**Navigation**

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

**User entry**
Positive floating-point number

**Factory setting**
1

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

Mass flow offset

**Navigation**

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

**User entry**
Signed floating-point number

**Factory setting**
0 kg/h

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

Mass flow factor

**Navigation**

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

**User entry**
Positive floating-point number

**Factory setting**
1

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

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → S. veloc. offset (1848)

**Description**

Use this function to enter the zero point shift for the sound velocity trim. The sound velocity unit on which the shift is based is m/s. The value is entered in the selected velocity unit.

**User entry**

Signed floating-point number

**Factory setting**

0 m/s

**Additional information**

Description

Corrected value = (factor × value) + offset

### Sound velocity factor

**Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → S. veloc. factor (1849)

**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information**

Description

Corrected value = (factor × value) + offset

### Temperature offset

**Navigation**


**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 K

**Additional information**

Description

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

Temperature factor

Navigation  

Description  
Use this function to enter a quantity factor for the temperature. In each case, this factor refers to the temperature in K.

User entry  
Positive floating-point number

Factory setting  
1

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

Density offset

Navigation  
Expert → Sensor → Sensor adjustm. → Variable adjust → Density offset (1877)

Description  
Use this function to enter the zero point shift for the density trim. The value is entered in the selected density unit.

User entry  
Signed floating-point number

Factory setting  
0 kg/m³

Density factor

Navigation  
Expert → Sensor → Sensor adjustm. → Variable adjust → Density factor (1878)

Description  
Use this function to enter a quantity factor for the density.

User entry  
Positive floating-point number

Factory setting  
1

3.2.8  "Calibration" submenu

Navigation  
Expert → Sensor → Calibration
### Calibration factor

**Navigation**

Expert → Sensor → Calibration → Cal. factor (2920)

**Description**

Displays the current calibration factor for the sensor.

**User interface**

Signed floating-point number

**Factory setting**

1

### Zero point

**Navigation**

Expert → Sensor → Calibration → Zero point (2921)

**Description**

Displays the current zero point correction value for the sensor.

**User interface**

Signed floating-point number

**Factory setting**

0

### Nominal diameter

**Navigation**

Expert → Sensor → Calibration → Nominal diameter (2807)

**Description**

Displays the nominal diameter of the sensor.

**User interface**

-------------------

**Factory setting**

-------------------
3.3 "I/O configuration" submenu

Navigation

Expert → I/O config.

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</table>

I/O module 1 to n terminal numbers

Navigation

Expert → I/O config. → I/O 1 to n terminals (3902–1 to n)

Description
Displays the terminal numbers used by the I/O module.

User interface
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)

I/O module 1 to n information

Navigation

Expert → I/O config. → I/O 1 to n info (3906–1 to n)

Description
Displays information about the plugged in I/O module.

User interface
- Not plugged
- Invalid
- Not configurable
- Configurable
- HART
Additional information

"Not plugged" option
The I/O module is not plugged in.

"Invalid" option
The I/O module is not plugged correctly.

"Not configurable" option
The I/O module is not configurable.

"Configurable" option
The I/O module is configurable.

"Fieldbus" option
The I/O module is configured for HART.

I/O module 1 to n type

<table>
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<tr>
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<td></td>
<td>&quot;Output; input 2&quot;, option D &quot;Configurable I/O initial setting off&quot;</td>
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<td></td>
<td>&quot;Output; input 3&quot;, option D &quot;Configurable I/O initial setting off&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;Output; input 4&quot;, option D &quot;Configurable I/O initial setting off&quot;</td>
</tr>
</tbody>
</table>

Description
Use this function to select the I/O module type for the configuration of the I/O module.

Selection
- Off
- Current output *
- Current input *
- Status input
- Pulse/frequency/switch output *
- Double pulse output *
- Relay output *

Factory setting
Off

Apply I/O configuration

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → I/O config. → Apply I/O config (3907)</th>
</tr>
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</table>

Description
Use this function to activate the newly configured I/O module type.

Selection
- No
- Yes

Factory setting
No

* Visibility depends on order options or device settings
I/O alteration code

Navigation

Expert → I/O config. → I/O alterat.code (2762)

Description

Use this function to enter the ordered activation code to activate the I/O configuration change.

User entry

Positive integer

Factory setting

0

Additional information

Description

The I/O configuration is changed in the I/O module type parameter (3901–1 to n) (→ 101).

3.4  "Input" submenu

Navigation

Expert → Input

3.4.1  "Current input 1 to n" submenu

Navigation

Expert → Input → Current input 1 to n

Current input 1 to n

Terminal number (1611–1 to n) → 103

Signal mode (1610–1 to n) → 103

Current span (1605–1 to n) → 103

0/4 mA value (1606–1 to n) → 104

20 mA value (1607–1 to n) → 104

Failure mode (1601–1 to n) → 104

Failure value (1602–1 to n) → 105
Terminal number

**Navigation**

Expert → Input → Current input 1 to n → Terminal no. (1611–1 to n)

**Description**

Displays the terminal numbers used by the current input module.

**User interface**

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

**Additional information**

"Not used" option

The current input module does not use any terminal numbers.

Signal mode

**Navigation**

Expert → Input → Current input 1 to n → Signal mode (1610–1 to n)

**Description**

Use this function to select the signal mode for the current input.

**Selection**

- Passive
- Active *

**Factory setting**

Passive

Current span

**Navigation**

Expert → Input → Current input 1 to n → Current span (1605–1 to n)

**Description**

Use this function to select the current range for the process value output and the upper and lower level for signal on alarm.

**Selection**

- 4...20 mA (4...20.5 mA)
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 0...20 mA (0...20.5 mA)

**Factory setting**

Country-specific:

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)

**Additional information**

*Visibility depends on order options or device settings

Samples values for the current range: Current span parameter (0353) (→ 109)
### 0/4 mA value

**Navigation**  
Expert → Input → Current input 1 to n → 0/4 mA value (1606–1 to n)

**Description**  
Use this function to enter a value for the 4 mA current.

**User entry**  
Signed floating-point number

**Factory setting**  
0

**Additional information**  
*Current input behavior*

The current input behaves differently depending on the settings configured in the following parameters:
- Current span (1605) (→ 103)
- Failure mode (1601) (→ 104)

*Configuration examples*

Pay attention to the configuration examples for 4 mA value parameter (0367) (→ 111).

### 20 mA value

**Navigation**  
Expert → Input → Current input 1 to n → 20 mA value (1607–1 to n)

**Description**  
Use this function to enter a value for the 20 mA current.

**User entry**  
Signed floating-point number

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

**Additional information**  
*Configuration examples*

Pay attention to the configuration examples for 4 mA value parameter (0367) (→ 111).

### Failure mode

**Navigation**  
Expert → Input → Current input 1 to n → Failure mode (1601–1 to n)

**Description**  
Use this function to select the input behavior when measuring a current outside the configured Current span parameter (1605) (→ 103).

**Selection**  
- Alarm
- Last valid value
- Defined value

**Factory setting**  
Alarm
Additional information

Options

- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used (Failure value parameter (1602) → 105).

Failure value

Navigation

Expert → Input → Current input 1 to n → Failure value (1602–1 to n)

Prerequisite

In the Failure mode parameter (1601) → 104, the Defined value option is selected.

Description

Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.

User entry

Signed floating-point number

Factory setting

0

3.4.2 "Status input 1 to n" submenu

Navigation

Expert → Input → Status input 1 to n

Terminal number

Navigation

Expert → Input → Status input 1 to n → Terminal no. (1358–1 to n)

Description

Displays the terminal numbers used by the status input module.
User interface

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

Additional information

'Not used' option
The status input module does not use any terminal numbers.

Assign status input

Navigation

Expert → Input → Status input 1 to n → Assign stat.inp. (1352–1 to n)

Description
Use this function to select the function for the status input.

Selection

- Off
- Reset totalizer 1
- Reset totalizer 2
- Reset totalizer 3
- Reset all totalizers
- Flow override

Factory setting

Off

Additional information

Options

- Off
  The status input is switched off.
- Reset totalizer 1...3
  The individual totalizers are reset.
- Reset all totalizers
  All totalizers are reset.
- Flow override
  The Flow override (→ 87) is activated.

Note on the Flow override (→ 87):

- The Flow override (→ 87) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

Value status input

Navigation

Expert → Input → Status input 1 to n → Val.stat.inp. (1353–1 to n)

Description
Displays the current input signal level.

User interface

- High
- Low
Active level

Navigation  
Expert → Input → Status input 1 to n → Active level (1351–1 to n)

Description  
Use this function to determine the input signal level at which the assigned function is activated.

Selection
- High
- Low

Factory setting  
High

Response time status input

Navigation  
Expert → Input → Status input 1 to n → Response time (1354–1 to n)

Description  
Use this function to enter the minimum time period for which the input signal level must be present before the selected function is activated.

User entry  
5 to 200 ms

Factory setting  
50 ms

3.5  "Output" submenu

Navigation  
Expert → Output

3.5.1  "Current output 1 to n" submenu

Navigation  
Expert → Output → Curr.output 1 to n
### Terminal number

**Navigation**

Expert → Output → Curr.output 1 to n → Terminal no. (0379–1 to n)

**Description**

Displays the terminal numbers used by the current output module.

**User interface**

- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)

**Additional information**

"Not used" option

The current output module does not use any terminal numbers.

---

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## Signal mode

**Navigation**

Expert → Output → Curr.output 1 to n → Signal mode (0377–1 to n)

**Description**

Use this function to select the signal mode for the current output.

**Selection**

- Active *
- Passive *

**Factory setting**

Active

## Process variable current output

**Navigation**

Expert → Output → Curr.output 1 to n → Proc.var. outp (0359–1 to n)

**Description**

Use this function to select a process variable for the current output.

**Selection**

- Off *
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Pressure *
- Density *
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Profile factor *
- Cross flow factor *

**Factory setting**

Volume flow

## Current range output

**Navigation**

Expert → Output → Curr.output 1 to n → Curr.range out (0353–1 to n)

**Description**

Select current range for process value output and upper/lower level for alarm signal.

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

Proline Prosonic Flow P 500 HART

Selection

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4...20.5 mA)
- 0...20 mA (0...20.5 mA)
- Fixed value

Factory setting

Depends on country:

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)

Additional information

Description

- In the event of a device alarm, the current output adopts the value specified in the Failure mode parameter (0364) (∨ 118).
- If the measured value is outside the measuring range, the \( S441 \) Current output 1 to n diagnostic message is displayed.
- The measuring range is specified via the Lower range value output parameter (0367) (∨ 111) and Upper range value output parameter (0372) (∨ 113).

*Fixed current* option

- This option is used for a HART Multidrop network.
- It can only be used for the 4...20 mA HART current output (current output 1).
- The current value is set via the Fixed current parameter (0365) (∨ 111).

Example

Shows the relationship between the current range for the output of the process value and the two signal on alarm levels:

<table>
<thead>
<tr>
<th>Selection</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4...20 mA NE (3.8...20.5 mA)</td>
<td>3.8 to 20.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>4...20 mA US (3.9...20.8 mA)</td>
<td>3.9 to 20.8 mA US</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>4...20 mA (4...20.5 mA)</td>
<td>4 to 20.5 mA</td>
<td>&lt; 3.6 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
<tr>
<td>0...20 mA (0...20.5 mA)</td>
<td>0 to 20.5 mA</td>
<td>0 mA</td>
<td>&gt; 21.95 mA</td>
</tr>
</tbody>
</table>

If the flow exceeds or falls below the upper or lower signal on alarm level, the \( S441 \) Current output 1 to n diagnostic message is displayed.
Fixed current

**Navigation**
Expert → Output → Curr.output 1 to n → Fixed current (0365–1 to n)

**Prerequisite**
The Fixed current option is selected in the Current span parameter (0353) (→ 109).

**Description**
Use this function to enter a constant current value for the current output.

**User entry**
0 to 22.5 mA

**Factory setting**
22.5 mA

Lower range value output

**Navigation**
Expert → Output → Curr.output 1 to n → Low.range outp (0367–1 to n)

**Prerequisite**
In Current span parameter (0353) (→ 109), one of the following options is selected:
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4...20.5 mA)
- 0...20 mA (0...20.5 mA)

**Description**
Use this function to enter a value for the start of measuring range.

**User entry**
Signed floating-point number

**Factory setting**
Depends on country:
- m³/h
- ft³/h

**Additional information**

**Description**
Positive and negative values are permitted depending on the process variable assigned in the Assign current output parameter (0359) (→ 109). In addition, the value can be greater than or smaller than the value assigned for the 20 mA current in the Upper range value output parameter (0372) (→ 113).

**Dependency**
The unit depends on the process variable selected in the Assign current output parameter (0359) (→ 109).

**Current output behavior**
The current output behaves differently depending on the settings configured in the following parameters:
- Current span (0353) (→ 109)
- Failure mode (0364) (→ 118)

**Configuration examples**
Some examples of parameter settings and their effect on the current output are given in the following section.
Configuration example A
Measurement mode with Forward flow option

- **Lower range value output** parameter (0367) (→ 111) = not equal to zero flow (e.g. -250 m³/h)
- **Upper range value output** parameter (0372) (→ 113) = not equal to zero flow (e.g. +750 m³/h)
- Calculated current value = 8 mA at zero flow

![Graph showing current vs. flow](image)

Q  Flow
I  Current
1  Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **Lower range value output** parameter (0367) (→ 111) and **Upper range value output** parameter (0372) (→ 113). If the effective flow exceeds or falls below this operational range, the **S441 Current output 1 to n** diagnostic message is output.

Configuration example B
Measurement mode with Forward/Reverse flow option

![Graph showing current vs. flow](image)

I  Current
Q  Flow
1  Start of measuring range output (0/4 mA)
2  Forward flow
3  Reverse flow

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (0367) (→ 111) and **20 mA value** parameter (0372) (→ 113) must have the same algebraic sign. The value for the **20 mA value** parameter (0372) (→ 113) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (0372) (→ 113) (e.g. flow).

Configuration example C
Measurement mode with Reverse flow compensation option

If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s → 113.
Upper range value output

Navigation  
Expert → Output → Curr.output 1 to n → Upp.range outp (0372–1 to n)

Prerequisite  
In Current span parameter (0353) (→ 109), one of the following options is selected:

- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4...20.5 mA)
- 0...20 mA (0...20.5 mA)

Description  
Use this function to enter a value for the end of measuring range.

User entry  
Signed floating-point number

Factory setting  
Depends on country and nominal diameter

Additional information  
Description

Positive and negative values are permitted depending on the process variable assigned in the Assign current output parameter (0359) (→ 109). In addition, the value can be greater than or smaller than the value assigned for the 0/4 mA current in the Lower range value output parameter (0367) (→ 111).

Dependency

The unit depends on the process variable selected in the Assign current output parameter (0359) (→ 109).

Example

- Value assigned to 0/4 mA = –250 m³/h
- Value assigned to 20 mA = +750 m³/h
- Calculated current value = 8 mA (at zero flow)

If the Forward/Reverse flow option is selected in the Measuring mode parameter (0351) (→ 113), different algebraic signs cannot be entered for the values for the Lower range value output parameter (0367) (→ 111) and Upper range value output parameter (0372) (→ 113). The ΔS441 Current output 1 to n diagnostic message is displayed.

Configuration examples

Pay attention to the configuration examples for the Lower range value output parameter (0367) (→ 111).

Measuring mode current output

Navigation  
Expert → Output → Curr.output 1 to n → Output mode (0351–1 to n)

Prerequisite  
One of the following options is selected in the Assign current output parameter (0359) (→ 109):

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
Description of device parameters

Proline Prosonic Flow P 500 HART

- Temperature
- Pressure
- Density
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Electronics temperature

One of the following options is selected in the Current span parameter (0353) (→ 109):
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4...20.5 mA)
- 0...20 mA (0...20.5 mA)

Description

Use this function to select the measuring mode for the current output.

Selection

- Forward flow
- Forward/Reverse flow
- Reverse flow compensation

Factory setting

Forward flow

Additional information

Description

The process variable that is assigned to the current output via the Assign current output parameter (0359) (→ 109) is displayed below the parameter.

"Forward flow" option

The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the Lower range value output parameter (0367) (→ 111) and the Upper range value output parameter (0372) (→ 113).

The flow components outside the scaled measuring range are taken into account for signal output as follows:

Both values are defined such that they are not equal to zero flow e.g.:
- start of measuring range = –5 m³/h
- end of measuring range = 10 m³/h

"Forward/Reverse flow" option

![Diagram of current and flow relationship](A0013758)

1  Current
Q  Flow
1  Start of measuring range output (0/4 mA)
2  Forward flow
3  Reverse flow

* Visibility depends on order options or device settings
• The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the Lower range value output parameter (0367) (→ 111) and Upper range value output parameter (0372) (→ 113) must have the same sign.

• The value for the Upper range value output parameter (0372) (→ 113) (e.g. reverse flow) corresponds to the mirrored value for the Upper range value output parameter (0372) (→ 113) (e.g. forward flow).

'Reverse flow compensation' option

The Reverse flow compensation option is primarily used to compensate for intermittent reverse flow that can arise with displacement pumps due to wear or high-viscosity medium. The reverse flow is recorded in a buffer memory and offset against the next forward flow.

In the event of prolonged and undesired reverse flow, flow values can accumulate in the buffer memory. Due to the configuration of the current output, these values are not factored in, however, i.e. there is no compensation for the reverse flow.

If this option is set, the measuring device does not smoothen the flow signal. The flow signal is not attenuated.

Examples of how the current output behaves

Example 1

Defined measuring range: lower range value and upper range value with the same sign

With the following flow response:

With Forward flow option

The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output.
With **Forward/Reverse flow** option

The current output signal is independent of the direction of flow.

With **Reverse flow compensation** option

Flow components outside the measuring span are buffered, balanced and output after a maximum delay of 60 s.

**Example 2**

Defined measuring range: lower range value and upper range value with **different** signs
With flow a (—) outside, b (- -) inside the measuring range

![Diagram of flow parameters](image)

- **Q** Flow
- **t** Time
- 1 Lower range value (Start of measuring range output)
- 2 Upper range value (end of measuring range output)

With **Forward flow** option

- a (—): The flow components outside the scaled measuring range cannot be taken into account for signal output. The Δ.S441 Current output 1 to n diagnostic message is output.
- b (- -): The current output signal is proportional to the process variable assigned.

![Diagram of current output](image)

- **I** Current
- **t** Time

With **Forward/Reverse flow** option

This option cannot be selected here since the values for the Lower range value output parameter (0367) (→ 111) and Upper range value output parameter (0372) (→ 113) have different signs.

With **Reverse flow compensation** option

Flow components outside the measuring span are buffered, balanced and output after a maximum delay of 60 s.

![Diagram of reverse flow compensation](image)

- **I** Current
- **t** Time
- **S** Flow components saved
- **A** Balancing of saved flow components
Damping current output

**Navigation**

[Expert → Output → Curr.output 1 to n → Damp.curr.outp (0363–1 to n)]

**Prerequisite**

A process variable is selected in the Assign current output parameter (0359) (→ 109) and one of the following options is selected in the Current span parameter (0353) (→ 109):
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4...20.5 mA)
- 0...20 mA (0...20.5 mA)

**Description**

Use this function to enter a time constant for the reaction time of the current output signal to fluctuations in the measured value caused by process conditions.

**User entry**

0.0 to 999.9 s

**Factory setting**

1.0 s

**Additional information**

*User entry*

Use this function to enter a time constant (PT1 element 3) for current output damping:
- If a low time constant is entered, the current output reacts quickly to fluctuating measured variables.
- If a high time constant is entered, the current output reacts more slowly.

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

---

Failure behavior current output

**Navigation**

[Expert → Output → Curr.output 1 to n → Failure behav. (0364–1 to n)]

**Prerequisite**

A process variable is selected in the Assign current output parameter (0359) (→ 109) and one of the following options is selected in the Current span parameter (0353) (→ 109):
- 4...20 mA NE (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4...20.5 mA)
- 0...20 mA (0...20.5 mA)

**Description**

Use this function to select the value of the current output in the event of a device alarm.

**Selection**

- Min.
- Max.
- Last valid value
- Actual value
- Fixed value

**Factory setting**

Max.

---

3) proportional transmission behavior with first order delay
Additional information  

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

'Min.' option  
The current output adopts the value of the lower level for signal on alarm.

The signal on alarm level is defined via the Current span parameter (0353) (→ 109).

'Max.' option  
The current output adopts the value of the upper level for signal on alarm.

The signal on alarm level is defined via the Current span parameter (0353) (→ 109).

'Last valid value' option  
The current output adopts the last measured value that was valid before the device alarm occurred.

'Actual value' option  
The current output adopts the measured value on the basis of the current flow measurement; the device alarm is ignored.

'Defined value' option  
The current output adopts a defined measured value.

The measured value is defined via the Failure current parameter (0352) (→ 119).

### Failure current

<table>
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<tr>
<th>Navigation</th>
<th>Expert → Output → Curr.output 1 to n → Fail. current (0352–1 to n)</th>
</tr>
</thead>
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<tr>
<td>Prerequisite</td>
<td>The Defined value option is selected in the Failure mode parameter (0364) (→ 118).</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to enter a fixed value that the current output adopts in the event of a device alarm.</td>
</tr>
<tr>
<td>User entry</td>
<td>0 to 22.5 mA</td>
</tr>
<tr>
<td>Factory setting</td>
<td>22.5 mA</td>
</tr>
</tbody>
</table>

### Output current

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Output → Curr.output 1 to n → Output curr. (0361–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the current value currently calculated for the current output.</td>
</tr>
<tr>
<td>User interface</td>
<td>3.59 to 22.5 mA</td>
</tr>
</tbody>
</table>
Measured current

Navigation  
 Expert → Output → Curr.output 1 to n → Measur. curr. (0366–1 to n)

Description  
Displays the actual measured value of the output current.

User interface  
0 to 30 mA

3.5.2  "Pulse/frequency/switch output 1 to n" submenu

Navigation  
 Expert → Output → PFS output 1 to n

<p>| Terminal number (0492–1 to n) | →  121 |
| Signal mode (0490–1 to n) | →  122 |
| Operating mode (0469–1 to n) | →  122 |
| Assign pulse output (0460–1 to n) | →  124 |
| Pulse scaling (0455–1 to n) | →  124 |
| Pulse width (0452–1 to n) | →  125 |
| Measuring mode (0457–1 to n) | →  126 |
| Failure mode (0480–1 to n) | →  126 |
| Pulse output (0456–1 to n) | →  127 |
| Assign frequency output (0478–1 to n) | →  128 |
| Minimum frequency value (0453–1 to n) | →  128 |
| Maximum frequency value (0454–1 to n) | →  129 |
| Measuring value at minimum frequency (0476–1 to n) | →  129 |
| Measuring value at maximum frequency (0475–1 to n) | →  129 |</p>
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<thead>
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<th>Measuring mode (0479–1 to n)</th>
<th>→ 130</th>
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</thead>
<tbody>
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<td>Damping output (0477–1 to n)</td>
<td>→ 131</td>
</tr>
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<tr>
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<tr>
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<td>Switch output function (0481–1 to n)</td>
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<tr>
<td>Switch-on value (0466–1 to n)</td>
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<tr>
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<tr>
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<td>→ 138</td>
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<tr>
<td>Switch-on delay (0467–1 to n)</td>
<td>→ 138</td>
</tr>
<tr>
<td>Switch-off delay (0465–1 to n)</td>
<td>→ 139</td>
</tr>
<tr>
<td>Failure mode (0486–1 to n)</td>
<td>→ 139</td>
</tr>
<tr>
<td>Switch state (0461–1 to n)</td>
<td>→ 139</td>
</tr>
<tr>
<td>Invert output signal (0470–1 to n)</td>
<td>→ 140</td>
</tr>
</tbody>
</table>

### Terminal number

**Navigation**

Expert → Output → PFS output 1 to n → Terminal no. (0492–1 to n)

**Description**

Displays the terminal numbers used by the pulse/frequency/switch output module.

**User interface**

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
### Additional information

*'Not used' option

The pulse/frequency/switch output module does not use any terminal numbers.

### Signal mode

**Navigation**

Expert → Output → PFS output 1 to n → Signal mode (0490–1 to n)

**Description**

Use this function to select the signal mode for the pulse/frequency/switch output.

**Selection**

- Passive
- Active *
- Passive NE

**Factory setting**

Passive

### Operating mode

**Navigation**

Expert → Output → PFS output 1 to n → Operating mode (0469–1 to n)

**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 mass or volume 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**

- Flow rate approx. 100 g/s
- Pulse value 0.1 g
- Pulse width 0.05 ms
- Pulse rate 1 000 Impuls/s

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

6 Quantity-proportional pulse (pulse value) with pulse width to be configured

- B Pulse width entered
- P Pauses between the individual pulses

"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, mass flow, temperature, sound velocity, flow velocity, acceptance rate, flow asymmetry, turbulence, signal strength or signal to noise ratio.
Example
- Flow rate approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1000 g/s
- Output frequency approx. 1000 Hz

7 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

8 No alarm, high level
Example
Alarm response in case of alarm
Assign pulse output

**Navigation**

Expert → Output → PFS output 1 to n → Assign pulse (0460–1 to n)

**Prerequisite**

The Pulse option is selected in Operating mode parameter (0469) (→  122).

**Description**

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

**Selection**

- Off
- Volume flow
- Mass flow
- GSV flow *
- NSV flow *
- S&W volume flow *
- Product 1 volume flow *
- Product 2 volume flow *
- Product 3 volume flow *
- Product 4 volume flow *
- Product 5 volume flow *
- Product 1 mass flow *
- Product 2 mass flow *
- Product 3 mass flow *
- Product 4 mass flow *
- Product 5 mass flow *
- Product 1 NSV flow *
- Product 2 NSV flow *
- Product 3 NSV flow *
- Product 4 NSV flow *
- Product 5 NSV flow *

**Factory setting**

Off

**Pulse scaling**

**Navigation**

Expert → Output → PFS output 1 to n → Pulse scaling (0455–1 to n)

**Prerequisite**

The Pulse option is selected in the Operating mode parameter (0469) (→  122) and a process variable is selected in the Assign pulse output parameter (0460) (→  124).

**Description**

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

* Visibility depends on order options or device settings
User entry: Positive floating point number

Factory setting: Depends on country and nominal diameter

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 1 to n → Pulse width (0452–1 to n)

**Prerequisite**: The Pulse option is selected in the Operating mode parameter (0469) (→ 122) and a process variable is selected in the Assign pulse output parameter (0460) (→ 124).

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

**User entry**: 0.05 to 2 000 ms

**Factory setting**: 100 ms

**Additional information**: Define how long a pulse is (duration).
- The maximum pulse rate is defined by \(f_{\text{max}} = 1 / (2 \times \text{pulse width})\).
- 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 443 Pulse output 1 to n diagnostic message.

**Example**
- Pulse value: 0.1 g
- Pulse width: 0.1 ms
- \(f_{\text{max}} = 1 / (2 \times 0.1 \text{ ms}) = 5 \text{ kHz}\)
- \(Q_{\text{max}} = 5 \text{ kHz} \times 0.1 \text{ g} = 0.5 \text{ kg/s}\)
### Measuring mode

**Navigation**

Expert → Output → PFS output 1 to n → Measuring mode (0457–1 to n)

**Prerequisite**

The 'Pulse' option is selected in the 'Operating mode' parameter (0469) and one of the following options is selected in the 'Assign pulse output' parameter (0460):
- Volume flow
- Mass flow

**Description**

Use this function to select the measuring mode for the pulse output.

**Selection**

- Forward flow
- Forward/Reverse flow
- Reverse flow
- Reverse flow compensation

**Factory setting**

Forward flow

**Additional information**

*Options*

- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse flow
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
  Negative flow is output, positive flow is not output.
- Reverse flow compensation
  The flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s.

For a detailed description of the options available, see the Measuring mode parameter (0351) (→ 113)

*Examples*

For a detailed description of the configuration examples, see the Measuring mode parameter (0351) (→ 113)

### Failure mode

**Navigation**

Expert → Output → PFS output 1 to n → Failure mode (0480–1 to n)

**Prerequisite**

The Pulse option is selected in the Operating mode parameter (0469) (→ 122) and a process variable is selected in the Assign pulse output parameter (0460) (→ 124).

**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 device alarm.

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 indicates a serious fault with the measuring device. The measurement quality may possibly be influenced and may no longer be guaranteed. The Actual value option is only recommended if it is ensured that all possible alarm conditions do not influence the measurement quality.

Pulse output

Navigation

Expert → Output → PFS output 1 to n → Pulse output (0456–1 to n)

Prerequisite

The Pulse option is selected in the Operating mode parameter (0469) (→ 122) parameter.

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 output behavior can be reversed via the Invert output signal parameter (0470) (→ 140) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (Failure mode parameter (0480) (→ 126)) can be configured.
## Assign frequency output

### Navigation

Expert → Output → PFS output 1 to n → Assign freq. (0478–1 to n)

### Prerequisite

The **Frequency** option is selected in Operating mode parameter (0469) (→ 122).

### Description

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

### Selection

- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density
- Reference density
- S&W volume flow
- GSV flow
- NSV flow
- API gravity
- API slope
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Electronics temperature
- Profile factor
- Cross flow factor

### Factory setting

Off

## Minimum frequency value

### Navigation

Expert → Output → PFS output 1 to n → Min. freq. value (0453–1 to n)

### Prerequisite

The **Frequency** option is selected in the Operating mode parameter (0469) (→ 122) and a process variable is selected in the Assign frequency output parameter (0478) (→ 128).

### Description

Use this function to enter the minimum frequency.

### User entry

0.0 to 10000.0 Hz

### Factory setting

0.0 Hz

---

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

**Navigation**

Expert → Output → PFS output 1 to n → Max. freq. value (0454–1 to n)

**Prerequisite**

The Frequency option is selected in the Operating mode parameter (0469) (→ 122) and a process variable is selected in the Assign frequency output parameter (0478) (→ 128).

**Description**

Use this function to enter the end value frequency.

**User entry**

0.0 to 10 000.0 Hz

**Factory setting**

10 000.0 Hz

---

### Measuring value at minimum frequency

**Navigation**

Expert → Output → PFS output 1 to n → Val. at min.freq (0476–1 to n)

**Prerequisite**

The Frequency option is selected in the Operating mode parameter (0469) (→ 122) and a process variable is selected in the Assign frequency output parameter (0478) (→ 128).

**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**

Dependency

The entry depends on the process variable selected in the Assign frequency output parameter (0478) (→ 128).

---

### Measuring value at maximum frequency

**Navigation**

Expert → Output → PFS output 1 to n → Val. at max.freq (0475–1 to n)

**Prerequisite**

The Frequency option is selected in the Operating mode parameter (0469) (→ 122) and a process variable is selected in the Assign frequency output parameter (0478) (→ 128).

**Description**

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

**User entry**

Signed floating-point number

**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 (0478) (→ 128).

Measuring mode

Navigation
Expert → Output → PFS output 1 to n → Measuring mode (0479–1 to n)

Prerequisite
The Frequency option is selected in the Operating mode parameter (0469) (→ 122) and one of the following options is selected in the Assign frequency output parameter (0478) (→ 128):
• Off
• Volume flow
• Mass flow
• Flow velocity
• Sound velocity
• Temperature
• Pressure
• Density
• Signal strength
• Signal to noise ratio
• Acceptance rate
• Turbulence
• Electronics temperature

Description
Use this function to select the measuring mode for the frequency output.

Selection
• Forward flow
• Forward/Reverse flow
• Reverse flow compensation

Factory setting
Forward flow

Additional information

Options
For a detailed description of the options available, see the Measuring mode parameter (0351) (→ 113)

Examples
For a detailed description of the configuration examples, see the Measuring mode parameter (0351) (→ 113)

* Visibility depends on order options or device settings
### Damping output

**Navigation**

Expert → Output → PFS output 1 to n → Damping out. (0477–1 to n)

**Prerequisite**

The 'Frequency' option is selected in the 'Operating mode' parameter (0469) and one of the following options is selected in the 'Assign frequency output' parameter (0478):

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Electronics temperature

**Description**

Use this function to enter a time constant for the reaction time of the output signal to fluctuations in the measured value.

**User entry**

0 to 999.9 s

**Factory setting**

0.0 s

**Additional information**

Use this function to enter a time constant (PT1 element) for frequency output damping:

- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

The frequency output is subject to separate damping that is independent of all preceding time constants.

### Response time

**Navigation**

Expert → Output → PFS output 1 to n → Response time (0491–1 to n)

**Prerequisite**

The 'Frequency' option is selected in the 'Operating mode' parameter (0469) and one of the following options is selected in the 'Assign frequency output' parameter (0478):

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature

* Visibility depends on order options or device settings
4) Proportional transmission behavior with first order delay
Description of device parameters

Endress+Hauser

- Pressure
- Density
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Electronics temperature

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

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
  - Temperature damping

Failure mode

Navigation
Expert → Output → PFS output 1 to n → Failure mode (0451–1 to n)

Prerequisite
The Frequency option is selected in the Operating mode parameter (0469) and a process variable is selected in the Assign frequency output parameter (0478).

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

Selection
- Actual value
- Defined value
- 0 Hz

Factory setting
0 Hz

Additional information
Options
- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure frequency (0474) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

* Visibility depends on order options or device settings
NOTICE! A device alarm indicates a serious fault with the measuring device. The measurement quality may possibly be influenced and may no longer be guaranteed. The Actual value option is only recommended if it is ensured that all possible alarm conditions do not influence the measurement quality.

### Failure frequency

**Navigation**

Expert → Output → PFS output 1 to n → Failure freq. (0474–1 to n)

**Prerequisite**

In the Operating mode parameter (0469) (→ 122), the Frequency option is selected, in the Assign frequency output parameter (0478) (→ 128) a process variable is selected, and in the Failure mode parameter (0451) (→ 132), the Defined value option is selected.

**Description**

Enter frequency output value in alarm condition.

**User entry**

0.0 to 12 500.0 Hz

**Factory setting**

0.0 Hz

### Output frequency

**Navigation**

Expert → Output → PFS output 1 to n → Output freq. (0471–1 to n)

**Prerequisite**

In the Operating mode parameter (0469) (→ 122), the Frequency option is selected.

**Description**

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

**User interface**

0.0 to 12 500.0 Hz

### Switch output function

**Navigation**

Expert → Output → PFS output 1 to n → Switch out funct (0481–1 to n)

**Prerequisite**

The Switch option is selected in the Operating mode parameter (0469) (→ 122).

**Description**

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

**Selection**

- Off
- On
- Diagnostic behavior
- Limit
- Flow direction check
- 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.
- Status
  Displays the device status depending on whether empty pipe detection or low flow cut off is selected.

Assign diagnostic behavior

Navigation

Expert → Output → PFS output 1 to n → Assign diag. beh (0482–1 to n)

Prerequisite

- In the Operating mode parameter (0469) (→ 122), the Switch option is selected.
- In the Switch output function parameter (0481) (→ 133), the Diagnostic behavior option is selected.

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.

Selection

- 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

Expert → Output → PFS output 1 to n → Assign limit (0483–1 to n)

Prerequisite

- The Switch option is selected in the Operating mode parameter (0469) (→ 122).
- The Limit option is selected in the Switch output function parameter (0481) (→ 133).

Description

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

Selection

- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure *
- Density *
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Profile factor *
- Cross flow factor *

Factory setting

Volume flow

Additional information

Description

Behavior of status output when Switch-on value (0466) > Switch-off value (0464):
- Process variable > Switch-on value (0466): transistor is conductive
- Process variable < Switch-off value (0464): transistor is non-conductive

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

Proline Prosonic Flow P 500 HART

1. Switch-on value (0466)
2. Switch-off value (0464)
3. Conductive
4. Non-conductive
A. Process variable
B. Status output

Behavior of status output when Switch-on value (0466) < Switch-off value (0464):
- Process variable < Switch-on value (0466): transistor is conductive
- Process variable > Switch-off value (0464): transistor is non-conductive

Behavior of status output when Switch-on value (0466) = Switch-off value (0464):
- Process variable > Switch-on value (0466): transistor is conductive
- Process variable < Switch-off value (0464): transistor is non-conductive
**Switch-on value**

**Navigation**

Expert → Output → PFS output 1 to n → Switch-on value (0466–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (0469) (→ 122).
- The **Limit** option is selected in the **Switch output function** parameter (0481) (→ 133).

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

Depends on country

**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 (0466) > Switch-off value (0464).

**Dependency**

- The unit depends on the process variable selected in the **Assign limit** parameter (0483) (→ 135).

**Switch-off value**

**Navigation**

Expert → Output → PFS output 1 to n → Switch-off value (0464–1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (0469) (→ 122).
- The **Limit** option is selected in the **Switch output function** parameter (0481) (→ 133).

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

Depends on country

**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 (0466) > Switch-off value (0464).

**Dependency**

- The unit depends on the process variable selected in the **Assign limit** parameter (0483) (→ 135).
Assign flow direction check

Navigation
Expert → Output → PFS output 1 to n → Assign dir.check (0484–1 to n)

Prerequisite
- The Switch option is selected in the Operating mode parameter (0469) (→ 122).
- The Flow direction check option is selected in the Switch output function parameter (0481) (→ 133).

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

Selection
- Off
- Volume flow
- Mass flow
- Flow velocity

Factory setting
Volume flow

Assign status

Navigation
Expert → Output → PFS output 1 to n → Assign status (0485–1 to n)

Prerequisite
- The Switch option is selected in the Operating mode parameter (0469) (→ 122).
- The Status option is selected in the Switch output function parameter (0481) (→ 133).

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

Selection
- Off
- Low flow cut off
- Product identification *

Factory setting
Low flow cut off

Additional information
Options
If empty pipe detection or low flow cut off are active, the output is conductive. Otherwise, the switch output is non-conductive.

Switch-on delay

Navigation
Expert → Output → PFS output 1 to n → Switch-on delay (0467–1 to n)

Prerequisite
- The Switch option is selected in the Operating mode parameter (0469) (→ 122).
- The Limit option is selected in the Switch output function parameter (0481) (→ 133).

Description
Use this function to enter a delay time for switching on the switch output.

* Visibility depends on order options or device settings
**User entry**
0.0 to 100.0 s

**Factory setting**
0.0 s

---

### Switch-off delay

**Navigation**
Expert → Output → PFS output 1 to n → Switch-off delay (0465–1 to n)

**Prerequisite**
- The Switch option is selected in the Operating mode parameter (0469) (→ 122).
- The Limit option is selected in the Switch output function parameter (0481) (→ 133).

**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 1 to n → Failure mode (0486–1 to n)

**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 state

**Navigation**
Expert → Output → PFS output 1 to n → Switch state (0461–1 to n)

**Prerequisite**
The Switch option is selected in the Operating mode parameter (0469) (→ 122).
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.

Invert output signal

Description
Use this function to select whether to invert the output signal.

Selection
- No
- Yes

Factory setting
No

Additional information
Selection
No option (passive - negative)

Yes option (passive - positive)

3.5.3 "Relay output 1 to n" submenu

Navigation
Expert → Output → Relay output 1 to n

Terminal number (0812–1 to n)
### Terminal number

**Navigation**  
 Expert → Output → Relay output 1 to n → Terminal no. (0812–1 to n)

**Description**  
Displays the terminal numbers used by the relay output module.

**User interface**  
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

**Additional information**  
*Not used* option  
The relay output module does not use any terminal numbers.

---

### Relay output function

**Navigation**  
Expert → Output → Relay output 1 to n → Relay outp.func. (0804–1 to n)

**Description**  
Use this function to select an output function for the relay output.
Selection

- Closed
- Open
- Diagnostic behavior
- Limit
- Flow direction check
- Status

Factory setting
Closed

Additional information
Selection
- Closed
  The relay output is permanently switched on (closed, conductive).
- Open
  The relay output is permanently switched off (open, non-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).
- Digital Output
  Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.

Assign flow direction check

Navigation

Expert → Output → Relay output 1 to n → Assign dir.check (0808–1 to n)

Prerequisite

The Flow direction check option is selected in the Relay output function parameter (0804) (→ 141).

Description

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

Selection

- Off
- Volume flow
- Mass flow
- Flow velocity

Factory setting
Volume flow

Assign limit

Navigation

Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)

Prerequisite

The Limit option is selected in the Relay output function parameter (0804) (→ 141).

Description

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

- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure *
- Density *
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Profile factor *
- Cross flow factor *

Factory setting

Volume flow

Assign diagnostic behavior

Navigation

Expert → Output → Relay output 1 to n → Assign diag. beh (0806–1 to n)

Prerequisite

In the Relay output function parameter (0804) (→ 141), the Diagnostic behavior option is selected.

Description

Use this function to select the category of the diagnostic events that are displayed for the relay output.

Selection

- Alarm
- Alarm or warning
- Warning

Factory setting

Alarm

* Visibility depends on order options or device settings
Additional information

Description

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

Selection

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

Assign status

Navigation

Expert → Output → Relay output 1 to n → Assign status (0805–1 to n)

Prerequisite

In the Relay output function parameter (0804) (→ 141), the Digital Output option is selected.

Description

Use this function to select the device status for the relay output.

Selection

- Off
- Low flow cut off
- Product identification *

Factory setting

Off

Switch-off value

Navigation

Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)

Prerequisite

The Limit option is selected in the Relay output function parameter (0804) (→ 141).

Description

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

User entry

Signed floating-point number

Factory setting

0 m³/h

* Visibility depends on order options or device settings
### 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 (0466) > Switch-off value (0464).

**Dependency**

- The unit is dependent on the process variable selected in the **Assign limit** parameter (0807) (→ 142).

### Switch-off delay

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<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>In the <strong>Relay output function</strong> parameter (0804) (→ 141), the <strong>Limit</strong> option is selected.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter a delay time for switching off the switch output.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>0.0 to 100.0 s</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0.0 s</td>
</tr>
</tbody>
</table>

### Switch-on value

<table>
<thead>
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<th>Navigation</th>
<th>Expert → Output → Relay output 1 to n → Switch-on value (0810–1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>The <strong>Limit</strong> option is selected in the <strong>Relay output function</strong> parameter (0804) (→ 141).</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the measured value for the switch-on point.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>Signed floating-point number</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0 m³/h</td>
</tr>
</tbody>
</table>

### 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 (0466) > Switch-off value (0464).

**Dependency**

- The unit is dependent on the process variable selected in the **Assign limit** parameter (0807) (→ 142).
### Switch-on delay

**Navigation**  
Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)

**Prerequisite**  
In the **Relay output function** parameter (0804) (→ 141), the **Limit** option is selected.

**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

### Failure mode

**Navigation**  
Expert → Output → Relay output 1 to n → Failure mode (0811–1 to n)

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

**Selection**
- Actual status
- Open
- Closed

**Factory setting**  
Open

**Additional information**  
**Selection**
- Actual status  
  In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the relay output. The **Actual status** option behaves in the same way as the current input value.
- Open  
  In the event of a device alarm, the relay output's transistor is set to **non-conductive**.
- Closed  
  In the event of a device alarm, the relay output's transistor is set to **conductive**.

### Switch state

**Navigation**  
Expert → Output → Relay output 1 to n → Switch state (0801–1 to n)

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

**User interface**
- Open
- Closed
Additional information  

**User interface**

- **Open**
  The relay output is not conductive.
- **Closed**
  The relay output is conductive.

**Powerless relay status**

**Navigation**

Press Expert → Output → Relay output 1 to n → Powerless relay (0816–1 to n)

**Description**

Use this function to select the quiescent state for the relay output.

**Selection**

- **Open**
- **Closed**

**Factory setting**

Open

**Additional information**

**Selection**

- **Open**
  The relay output is not conductive.
- **Closed**
  The relay output is conductive.

### 3.5.4 "Double pulse output" submenu

**Navigation**

Press Expert → Output → Double pulse out

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</table>
Description of device parameters

### Master terminal number

**Navigation**

Expert → Output → Double pulse out → Master term. no. (0981)

**Description**

Displays the master terminal number for the double pulse output.

**User interface**

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

**Additional information**

"Not used" option

The double pulse output does not use any terminal numbers.

### Slave terminal number

**Navigation**

Expert → Output → Double pulse out → Slave term. no. (0990)

**Description**

Displays the slave terminal number for the double pulse output.

**User interface**

- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)

**Additional information**

"Not used" option

The double pulse output does not use any terminal numbers.

### Signal mode

**Navigation**

Expert → Output → Double pulse out → Signal mode (0991)

**Description**

Use this function to select the signal mode for the double pulse output.

**Selection**

- Passive
- Active *
- Passive NE

* Visibility depends on order options or device settings
### Factory setting

Passive

### Assign pulse output

**Navigation**  
Expert → Output → Double pulse out → Assign pulse (0982)

**Description**  
Use this function to select a process variable for the double pulse output.

**Selection**

- Off
- Volume flow
- Mass flow
- GSV flow*
- NSV flow*
- S&W volume flow*
- Product 1 volume flow*
- Product 2 volume flow*
- Product 3 volume flow*
- Product 4 volume flow*
- Product 5 volume flow*
- Product 1 mass flow*
- Product 2 mass flow*
- Product 3 mass flow*
- Product 4 mass flow*
- Product 5 mass flow*
- Product 1 NSV flow*
- Product 2 NSV flow*
- Product 3 NSV flow*
- Product 4 NSV flow*
- Product 5 NSV flow*

**Factory setting**  
Off

### Value per pulse

**Navigation**  
Expert → Output → Double pulse out → Value per pulse (0983)

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

**User entry**  
Signed floating-point number

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

**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.

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

Pulse width

**Navigation**

> Expert → Output → Double pulse out → Pulse width (0986)

**Description**

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

**User entry**

0.5 to 2,000 ms

**Factory setting**

0.5 ms

**Additional information**

For a detailed description and example: **Pulse width** parameter (0452) (→  125)

Phase shift

**Navigation**

> Expert → Output → Double pulse out → Phase shift (0992)

**Description**

Use this function to select the degree of phase shift.

**Selection**

- 90°
- 180°

**Factory setting**

90°

**Additional information**

*Selection*

- 90°
  Phase shift by a quarter period.
- 180°
  Phase shift by a half period, which is equivalent to a phase reversal.

Measuring mode

**Navigation**

> Expert → Output → Double pulse out → Measuring mode (0984)

**Description**

Use this function to select the measuring mode for the double pulse output.

**Selection**

- Forward flow
- Forward/Reverse flow
- Reverse flow
- Reverse flow compensation

**Factory setting**

Forward flow
Additional information

Selection
- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse flow
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
  Negative flow is output, positive flow is not output.
- Reverse flow compensation
  The flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.

For a detailed description of the options available, see the Measuring mode parameter (0351) (→ 113)

Examples
For a detailed description of the configuration examples, see the Measuring mode parameter (0351) (→ 113)

Failure mode

Navigation
Expert → Output → Double pulse out → Failure mode (0985)

Description
Use this function to select the failure mode of the double 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 double pulse output shows a predefined behavior in the event of a device alarm.

Options
- Actual value
  In the event of a device alarm, the double pulse output continues on the basis of the current flow measurement. The fault is ignored.
- No pulses
  In the case of the double pulse output, if a device alarm occurs one pulse output is stopped and the other pulse output runs at the maximum pulse frequency.

NOTICE! A device alarm indicates a serious fault with the measuring device. The measurement quality may possibly be influenced and may no longer be guaranteed. The Actual value option is only recommended if it is ensured that all possible alarm conditions do not influence the measurement quality.
### Pulse output

**Navigation**

Expert → Output → Double pulse out → Pulse output (0987)

**Description**

Displays the pulse frequency of the double pulse output which is currently output.

**User interface**

Positive floating-point number

**Additional information**

For a detailed description and example: **Pulse output** parameter (0456–1 to n) (→ 58)

### Invert output signal

**Navigation**

Expert → Output → Double pulse out → Invert outp.sig. (0993)

**Description**

Use this function to select whether to invert the output signal.

**Selection**

- No
- Yes

**Factory setting**

No

**Additional information**

Selection

**No** option (passive - negative)

![Diagram of No option (passive - negative)]

**Yes** option (passive - positive)

![Diagram of Yes option (passive - positive)]
3.6 "Communication" submenu

**Navigation**

Professor → Communication

![Diagram](image)

3.6.1 "HART input" submenu

**Navigation**

Professor → Communication → HART input

![Diagram](image)

"Configuration" submenu

**Navigation**

Professor → Communication → HART input → Configuration

![Diagram](image)
Capture mode

Navigation

Expert → Communication → HART input → Configuration → Capture mode (7001)

Description

Use this function to select the capture mode via burst or master communication.

Selection

- Off
- Burst network
- Master network

Factory setting

Off

Additional information

*Burst network* option

The device records data transmitted via burst in the network.

An external pressure sensor must be in the burst mode.

*Master network* option

In this case, the device must be located in a HART network in which a HART master (control) queries the measured values of the up to 64 network participants. The device reacts only to the responses of a specific device in the network. Device ID, device type, manufacturer ID and the HART commands used by the master must be defined.

Device ID

Navigation

Expert → Communication → HART input → Configuration → Device ID (7007)

Prerequisite

The **Master network** option is selected in the **Capture mode** parameter (7001) (→ 154).

Description

Use this function to enter the device ID of the HART slave device whose data are to be recorded.

User entry

6-digit value:
- Via local operation: enter as hexadecimal or decimal number
- Via operating tool: enter as decimal number

Factory setting

0

Additional information

In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.
### Device type

**Navigation**

- Expert → Communication → HART input → Configuration → Device type (7008)

**Prerequisite**

In the **Capture mode** parameter (7001) (→ 154), the **Master network** option is selected.

**Description**

Use this function to enter the device type of the HART slave device whose data are to be recorded.

**User entry**

2-digit hexadecimal number

**Factory setting**

0x00

**Additional information**

In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

### Manufacturer ID

**Navigation**

- Expert → Communication → HART input → Configuration → Manufacturer ID (7009)

**Prerequisite**

The **Master network** option is selected in the **Capture mode** parameter (7001) (→ 154).

**Description**

Use this function to enter the manufacturer ID of the HART slave device whose data are to be recorded.

**User entry**

2-digit value:
- Via local operation: enter as hexadecimal or decimal number
- Via operating tool: enter as decimal number

**Factory setting**

0

**Additional information**

In addition to the device ID and manufacturer ID, the device type is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

### Burst command

**Navigation**

- Expert → Communication → HART input → Configuration → Burst command (7006)

**Prerequisite**

The **Burst network** option or the **Master network** option are selected in the **Capture mode** parameter (7001) (→ 154).

**Description**

Use this function to select the burst command to be recorded.
Description of device parameters

Proline Prosonic Flow P 500 HART

Selection

- Command 1
- Command 3
- Command 9
- Command 33

Factory setting

Command 1

Additional information

Selection

- Command 1
  Use this function to capture the primary variable.
- Command 3
  Use this function to capture the dynamic HART variables and the current.
- Command 9
  Use this function to capture the dynamic HART variables including the associated status.
- Command 33
  Use this function to capture the dynamic HART variables including the associated unit.

Slot number

<table>
<thead>
<tr>
<th>Slot</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PV</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
</tr>
</tbody>
</table>

Navigation

Expert → Communication → HART input → Configuration → Slot number (7010)

Prerequisite

The Burst network option or the Master network option is selected in the Capture mode parameter (7001) (→ 154).

Description

Use this function to enter the position of the process variable to be recorded in the burst command.

User entry

1 to 8

Factory setting

1

Additional information

User entry
### Timeout

**Navigation**

Expert → Communication → HART input → Configuration → Timeout (7005)

**Prerequisite**

The Burst network option or the Master network option is selected in the Capture mode parameter (7001) (→ 154).

**Description**

Use this function to enter the maximum permitted interval between two HART frames.

**User entry**

1 to 120 s

**Factory setting**

5 s

**Additional information**

If the interval is exceeded, the measuring device displays the F882 Input signal diagnostic message.

### Failure mode

**Navigation**

Expert → Communication → HART input → Configuration → Failure mode (7011)

**Prerequisite**

In the Capture mode parameter (7001) (→ 154), the Burst network option or Master network option is selected.

**Description**

Use this function to select the device behavior if no data are recorded within the maximum permitted interval.

**Selection**

- Alarm
- Last valid value
- Defined value

**Factory setting**

Alarm

**Additional information**

**Options**

- Alarm
  - An error message is set.
- Last valid value
  - The last valid measured value is used.
- Defined value
  - A user-defined measured value is used: (Failure value parameter (7012) (→ 158)).
Description of device parameters

**Failure value**

**Navigation**
- Expert → Communication → HART input → Configuration → Failure value (7012)

**Prerequisite**
The following conditions are met:
- In the **Capture mode** parameter (7001) (→ 154), the **Burst network** option or **Master network** option is selected.
- In the **Failure mode** parameter (7011) (→ 157), the **Defined value** option is selected.

**Description**
Use this function to enter the measured value to be used if no data are recorded within the maximum permitted interval.

**User entry**
Signed floating-point number

**Factory setting**
0

**Additional information**

**Dependency**
The unit is taken from the **Pressure unit** parameter (0564)

"Input" submenu

**Navigation**
- Expert → Communication → HART input → Input

<table>
<thead>
<tr>
<th>Input</th>
<th>Value (7003)</th>
<th>→ 158</th>
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<tbody>
<tr>
<td></td>
<td>Status (7004)</td>
<td>→ 159</td>
</tr>
</tbody>
</table>

**Value**

**Navigation**
- Expert → Communication → HART input → Input → Value (7003)

**Description**
Displays the value of the device variable recorded by the HART input.

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

**Navigation**

Expert → Communication → HART input → Input → Status (7004)

**Description**
Displays the value of the device variable recorded by the HART input in accordance with the HART specification.

**User interface**
- Manual/Fixed
- Good
- Poor accuracy
- Bad

**Additional information**

*Description*
If the measuring device reads in an invalid pressure measured value, the F882 Input signal diagnostic message is output.

### 3.6.2 "HART output" submenu

**Navigation**

Expert → Communication → HART output

- **Configuration** → F159
- **Burst configuration** → F161
- **Information** → F168
- **Output** → F171

### "Configuration" submenu

**Navigation**

Expert → Communication → HART output → Configuration

- **Configuration** → F160
  - HART short tag (0220)
  - Device tag (0215)
  - HART address (0219)
  - No. of preambles (0217)
  - Fieldbus writing access (0273)
### HART short tag

**Navigation**
Expert → Communication → HART output → Configuration → HART short tag (0220)

**Description**
Use this function to enter a brief description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

**User entry**
Max. 8 characters: A to Z, 0 to 9 and certain special characters (e.g. punctuation marks, @, %).

**Factory setting**
PROSONIC

### Device tag

**Navigation**
Expert → Communication → HART output → Configuration → Device tag (0215)

**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**
Prosonic Flow

### HART address

**Navigation**
Expert → Communication → HART output → Configuration → HART address (0219)

**Description**
Use this function to enter the address via which the data exchange takes place via HART protocol.

**User entry**
0 to 63

**Factory setting**
0

**Additional information**
Description
For addressing in a HART Multidrop network, the **Fixed current** option must be set in the **Current span** parameter (0353) (→ 109) (current output 1).

### No. of preambles

**Navigation**
Expert → Communication → HART output → Configuration → No. of preambles (0217)

**Description**
Use this function to enter the number of preambles in the HART protocol.
User entry: 2 to 20

Factory setting: 5

Additional information: User entry
As every modem component can "swallow" a byte, 2-byte preambles at least must be defined.

Fieldbus writing access

Navigation: Expert → Communication → HART output → Configuration → Fieldb.writ.acc. (0273)

Description: Use this function to restrict access to the measuring device via fieldbus (HART interface).

Selection:
- Read + write
- Read only

Factory setting: Read + write

Additional information: Description
If read and/or write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools.

Selection:
- Read + write
  The parameters are readable and writable.
- Read only
  The parameters are only readable.

"Burst configuration 1 to n" submenu

Navigation: Expert → Communication → HART output → Burst config. → Burst config. 1 to n

<table>
<thead>
<tr>
<th>Burst mode 1 to n (2032–1 to n)</th>
<th>➞ 162</th>
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</thead>
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<td>Burst command 1 to n (2031–1 to n)</td>
<td>➞ 162</td>
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<tr>
<td>Burst variable 0 (2033)</td>
<td>➞ 163</td>
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<tr>
<td>Burst variable 1 (2034)</td>
<td>➞ 164</td>
</tr>
<tr>
<td>Burst variable 2 (2035)</td>
<td>➞ 165</td>
</tr>
</tbody>
</table>
### Burst mode 1 to n

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst mode 1 to n (2032–1 to n)

**Description**

Use this function to select whether to activate the HART burst mode for burst message X.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information**

*Options*

- Off
  
  The measuring device transmits data only when requested by the HART master.

- On
  
  The measuring device transmits data regularly without being requested.

### Burst command 1 to n

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst command 1 to n (2031–1 to n)

**Description**

Use this function to select the HART command that is sent to the HART master.

**Selection**

- Command 1
- Command 2
- Command 3
Description of device parameters

- Command 9
- Command 33
- Command 48

Factory setting

Command 2

Additional information

Selection
- Command 1
  Read out the primary variable.
- Command 2
  Read out the current and the main measured value as a percentage.
- Command 3
  Read out the dynamic HART variables and the current.
- Command 9
  Read out the dynamic HART variables including the related status.
- Command 33
  Read out the dynamic HART variables including the related unit.
- Command 48
  Read out the complete device diagnostics.

"Command 33" option

The HART device variables are defined via Command 107.
The following measured variables (HART device variables) can be read out:
- Volume flow
- Mass flow
- Temperature
- Totalizer 1...3
- Sound velocity
- Flow velocity
- Acceptance rate
- Turbulence
- Signal strength
- Signal to noise ratio
- Percent of range
- Measured current
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)

Commands

- Information about the defined details of the command: HART specifications
- The measured variables (HART device variables) are assigned to the dynamic variables in the Output submenu (→ 107).

Burst variable 0

Navigation

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 0 (2033)

Description

For HART command 9 and 33: select the HART device variable or the process variable.

* Visibility depends on order options or device settings

Endress+Hauser
Selection

- Not used
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density
- Reference density
- S&W volume flow
- GSV flow
- NSV flow
- API gravity
- API slope
- Electronics temperature
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Cross flow factor
- Profile factor
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)
- HART input
- Percent of range
- Measured current
- Current input 1
- Current input 2
- Current input 3

Factory setting

Volume flow

Additional information

*Options*

If a burst message is not configured, the Not used option is set.

---

**Burst variable 1**

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 1 (2034)

**Description**

For HART command 9 and 33: select the HART device variable or the process variable.

**Selection**

See the Burst variable 0 parameter (2033) (→ 163).

**Factory setting**

Not used

*Visibility depends on order options or device settings*
### Burst variable 2

**Navigation**

> Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 2 (2035)

**Description**

For HART command 9 and 33: select the HART device variable or the process variable.

**Selection**

See the Burst variable 0 parameter (2033) (→ 163).

**Factory setting**

Not used

---

### Burst variable 3

**Navigation**

> Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 3 (2036)

**Description**

For HART command 9 and 33: select the HART device variable or the process variable.

**Selection**

See the Burst variable 0 parameter (2033) (→ 163).

**Factory setting**

Not used

---

### Burst variable 4

**Navigation**

> Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 4 (2037)

**Description**

For HART command 9: select the HART device variable or the process variable.

**Selection**

See the Burst variable 0 parameter (2033) (→ 163).

**Factory setting**

Not used

---

### Burst variable 5

**Navigation**

> Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 5 (2038)

**Description**

For HART command 9: select the HART device variable or the process variable.

**Selection**

See the Burst variable 0 parameter (2033) (→ 163).

**Factory setting**

Not used
## Burst variable 6

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 6 (2039)

**Description**

For HART command 9: select the HART device variable or the process variable.

**Selection**

See the **Burst variable 0** parameter (2033) (→ 163).

**Factory setting**

Not used

## Burst variable 7

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 7 (2040)

**Description**

For HART command 9: select the HART device variable or the process variable.

**Selection**

See the **Burst variable 0** parameter (2033) (→ 163).

**Factory setting**

Not used

## Burst trigger mode

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Trigger mode (2044–1 to n)

**Description**

Use this function to select the event that triggers burst message X.

**Selection**

- Continuous
- Window
- Rising
- Falling
- On change

**Factory setting**

Continuous
Additional information  

Selection

- Continuous
  The message is sent continuously, at least at intervals corresponding to the time frame specified in the **Burst min period** parameter (2042) (→ 167).
- Window
  The message is sent if the specified measured value has changed by the value in the **Burst trigger level** parameter (2043) (→ 167).
- Rising
  The message is sent if the specified measured value exceeds the value in the **Burst trigger level** parameter (2043) (→ 167).
- Falling
  The message is sent if the specified measured value drops below the value in the **Burst trigger level** parameter (2043) (→ 167).
- On change
  The message is sent if a measured value changes in the burst message.

### Burst trigger level

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Trigger level (2043–1 to n)

**Description**

For entering the burst trigger value.

**User entry**

Signed floating-point number

**Additional information**

Description

Together with the option selected in the **Burst trigger mode** parameter (2044) (→ 166) the burst trigger value determines the time of burst message X.

### Min. update period

**Navigation**

Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Min. upd. per. (2042–1 to n)

**Description**

Use this function to enter the minimum time span between two burst commands of burst message X.

**User entry**

Positive integer

**Factory setting**

1000 ms
Max. update period

Navigation  
Expert → Communication → HART output → Burst config. → Burst config. 1 to n  
→ Max. upd. per. (2041–1 to n)

Description  
Use this function to enter the maximum time span between two burst commands of burst message X.

User entry  
Positive integer

Factory setting  
2 000 ms

"Information" submenu

Navigation  
Expert → Communication → HART output → Information

Device revision (0204)  
→ 168

Device ID (0221)  
→ 169

Device type (0209)  
→ 169

Manufacturer ID (0259)  
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HART descriptor (0212)  
→ 170

HART message (0216)  
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Hardware revision (0206)  
→ 170

Software revision (0224)  
→ 171

HART date code (0202)  
→ 171

Device revision

Navigation  
Expert → Communication → HART output → Information → Device revision (0204)

Description  
Displays the device revision with which the device is registered with the HART Communication Foundation.
### Device ID

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<tr>
<th>Navigation</th>
<th>Expert → Communication → HART output → Information → Device ID (0221)</th>
</tr>
</thead>
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<td>Description</td>
<td>Use this function to view the device ID for identifying the measuring device in a HART network.</td>
</tr>
<tr>
<td>User interface</td>
<td>6-digit hexadecimal number</td>
</tr>
<tr>
<td>Additional information</td>
<td>In addition to the device type and manufacturer ID, the device ID is part of the unique ID. Each HART device is uniquely identified by the unique device ID.</td>
</tr>
</tbody>
</table>

### Device type

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → HART output → Information → Device type (0209)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Displays the device type with which the measuring device is registered with the HART Communication Foundation.</td>
</tr>
<tr>
<td>User interface</td>
<td>2-digit hexadecimal number</td>
</tr>
<tr>
<td>Factory setting</td>
<td>0x5D (for Prosonic Flow P 500)</td>
</tr>
<tr>
<td>Additional information</td>
<td>The device type is specified by the manufacturer. It is needed to assign the appropriate device description file (DD) to the device.</td>
</tr>
</tbody>
</table>

### Manufacturer ID

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Communication → HART output → Information → Manufacturer ID (0259)</th>
</tr>
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<tbody>
<tr>
<td>Description</td>
<td>Use this function to view the manufacturer ID with which the measuring device is registered with the HART Communication Foundation.</td>
</tr>
<tr>
<td>User interface</td>
<td>2-digit hexadecimal number</td>
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</tbody>
</table>
### Description of device parameters

**Factory setting**
- **0x11** (for Endress+Hauser)

**HART revision**

<table>
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<tr>
<th>Navigation</th>
<th>Description</th>
<th>User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use this function to display the HART protocol revision of the measuring device.</td>
<td>5 to 7</td>
<td>7</td>
</tr>
</tbody>
</table>

**HART descriptor**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use this function to enter a description for the measuring point. This can be edited and displayed via HART protocol or using the local display.</td>
<td>Max. 16 characters, such as letters, numbers or special characters (e.g. @, %, /)</td>
<td>Pros.Flow300/500</td>
</tr>
</tbody>
</table>

**HART message**

<table>
<thead>
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<th>Navigation</th>
<th>Description</th>
<th>User entry</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use this function to enter a HART message which is sent via the HART protocol when requested by the master.</td>
<td>Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /)</td>
<td>Pros.Flow300/500</td>
</tr>
</tbody>
</table>

**Hardware revision**

<table>
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<th>Navigation</th>
<th>Description</th>
<th>User interface</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Displays the hardware revision of the measuring device.</td>
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<td>1</td>
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</tbody>
</table>
Software revision

Navigation
Expert → Communication → HART output → Information → Software rev. (0224)

Description
Displays the software revision of the measuring device.

User interface
0 to 255

Factory setting
3

HART date code

Navigation
Expert → Communication → HART output → Information → HART date code (0202)

Description
Use this function to enter the date information for individual use.

User entry
Date entry format: yyyy-mm-dd

Factory setting
2009-07-20

Additional information
Example
Device installation date

"Output" submenu

Navigation
Expert → Communication → HART output → Output

<table>
<thead>
<tr>
<th>▶ Output</th>
<th>→</th>
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<tbody>
<tr>
<td>Assign PV (0234)</td>
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<td>172</td>
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<tr>
<td>Primary variable (PV) (0201)</td>
<td>→</td>
<td>172</td>
</tr>
<tr>
<td>Assign SV (0235)</td>
<td>→</td>
<td>173</td>
</tr>
<tr>
<td>Secondary variable (SV) (0226)</td>
<td>→</td>
<td>173</td>
</tr>
<tr>
<td>Assign TV (0236)</td>
<td>→</td>
<td>174</td>
</tr>
<tr>
<td>Tertiary variable (TV) (0228)</td>
<td>→</td>
<td>175</td>
</tr>
<tr>
<td>Assign QV (0237)</td>
<td>→</td>
<td>175</td>
</tr>
<tr>
<td>Quaternary variable (QV) (0203)</td>
<td>→</td>
<td>176</td>
</tr>
</tbody>
</table>
Assign PV

Navigation

Expert → Communication → HART output → Output → Assign PV (0234)

Description

Use this function to select a measured variable (HART device variable) for the primary dynamic variable (PV).

Selection

- Off *
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure *
- Density *
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Profile factor *
- Cross flow factor *

Factory setting

Volume flow

Primary variable (PV)

Navigation

Expert → Communication → HART output → Output → Primary var (PV) (0201)

Description

Displays the current measured value of the primary dynamic variable (PV).

User interface

Signed floating-point number

Additional information

Display

The measured value displayed depends on the process variable selected in the Assign PV parameter (0234) (→ 172).

Dependency

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

* Visibility depends on order options or device settings
Assign SV

Navigation

Expert → Communication → HART output → Output → Assign SV (0235)

Description

Use this function to select a measured variable (HART device variable) for the secondary dynamic variable (SV).

Selection

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- Profile factor *
- Cross flow factor *
- HART input

Factory setting

Totalizer 1

Secondary variable (SV)

Navigation

Expert → Communication → HART output → Output → Second.var(SV) (0226)

Description

Displays the current measured value of the secondary dynamic variable (SV).

User interface

Signed floating-point number

* Visibility depends on order options or device settings
Additional information

**Display**

The measured value displayed depends on the process variable selected in the **Assign SV** parameter (0235) (→ 173).

**Dependency**

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

**Assign TV**

**Navigation**

[Expert → Communication → HART output → Output → Assign TV (0236)]

**Description**

Use this function to select a measured variable (HART device variable) for the tertiary (third) dynamic variable (TV).

**Selection**

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density
- Reference density
- S&W volume flow
- GSV flow
- NSV flow
- API gravity
- API slope
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1
- Current input 2
- Current input 3
- Profile factor
- Cross flow factor
- HART input

**Factory setting**

Totalizer 2

* Visibility depends on order options or device settings
Tertiary variable (TV)

**Navigation**
Expert → Communication → HART output → Output → Tertiary var (TV) (0228)

**Description**
Displays the current measured value of the tertiary dynamic variable (TV).

**User interface**
Signed floating-point number

**Additional information**
*Display*
The measured value displayed depends on the process variable selected in the Assign TV parameter (0236) (→ 174).

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

Assign QV

**Navigation**
Expert → Communication → HART output → Output → Assign QV (0237)

**Description**
Use this function to select a measured variable (HART device variable) for the quaternary (fourth) dynamic variable (QV).

**Selection**
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure *
- Density
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- Profile factor *
- Cross flow factor *
- HART input

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

**Proline Prosonic Flow P 500 HART**

**Factory setting**

Totalizer 3

---

**Quaternary variable (QV)**

**Navigation**

Expert → Communication → HART output → Output → Quaterna.var(QV) (0203)

**Description**

Displays the current measured value of the quaternary dynamic variable (QV).

**User interface**

Signed floating-point number

**Additional information**

*Display*

The measured value displayed depends on the process variable selected in the Assign QV parameter (0237) (→ 175).

*Dependency*

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

---

**3.6.3 "Web server" submenu**

**Navigation**

Expert → Communication → Web server

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<td>MAC address (7214)</td>
<td>→ 177</td>
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<tr>
<td>DHCP client (7212)</td>
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<tr>
<td>IP address (7209)</td>
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<td>Subnet mask (7211)</td>
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<tr>
<td>Default gateway (7210)</td>
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<tr>
<td>Web server functionality (7222)</td>
<td>→ 179</td>
</tr>
<tr>
<td>Login page (7273)</td>
<td>→ 179</td>
</tr>
</tbody>
</table>
Web server language

**Navigation**

Expert → Communication → Web server → Webserv.language (7221)

**Description**

Use this function to select the language configured for the Web server.

**Selection**

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

**Factory setting**

English

MAC address

**Navigation**

Expert → Communication → Web server → MAC Address (7214)

**Description**

Displays the MAC address of the measuring device.

**User interface**

Unique 12-digit character string comprising letters and numbers

**Factory setting**

Each measuring device is given an individual address.

**Additional information**

*Example*

For the display format

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

DHCP client

**Navigation**

Expert → Communication → Web server → DHCP client (7212)

**Description**

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

5) Media Access Control
**Description of device parameters**

**Proline Prosonic Flow P 500 HART**

### Selection

- Off
- On

**Factory setting**

On

### Additional information

**Effect**

If the DHCP client functionality of the web server is selected, the IP address (7209) (→ 178), Subnet mask (7211) (→ 178) and Default gateway (7210) (→ 178) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (7209) (→ 178) in the **IP address** parameter (7209) (→ 178) is ignored as long as the **DHCP client** parameter (7212) (→ 177) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (7209) (→ 178) in the parameter of the same name is only used if the **DHCP client** parameter (7212) (→ 177) is inactive.

### IP address

**Navigation**

Expert → Communication → Web server → IP address (7209)

**Description**

Display or enter the IP address (7209) of the Web server integrated in the measuring device.

**User entry**

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

**Factory setting**

192.168.1.212

### Subnet mask

**Navigation**

Expert → Communication → Web server → Subnet mask (7211)

**Description**

Display or enter the subnet mask.

**User entry**

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

**Factory setting**

255.255.255.0

### Default gateway

**Navigation**

Expert → Communication → Web server → Default gateway (7210)

**Description**

Display or enter the Default gateway (7210) (→ 178).

**User entry**

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

**Factory setting**

0.0.0.0
Web server functionality

Navigation

Expert → Communication → Web server → Webserver funct. (7222)

Description

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

Selection

- Off
- HTML Off
- On

Factory setting

On

Additional information

Description

Once disabled, the Web server functionality (7222) can only be enabled again via the local display, the FieldCare operating tool or the DeviceCare operating tool.

Selection

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>The Web server is completely disabled.</td>
</tr>
<tr>
<td></td>
<td>Port 80 is locked.</td>
</tr>
<tr>
<td>HTML Off</td>
<td>The HTML version of the Web server is not available.</td>
</tr>
<tr>
<td>On</td>
<td>The complete Web server functionality is available.</td>
</tr>
<tr>
<td></td>
<td>JavaScript is used.</td>
</tr>
<tr>
<td></td>
<td>The password is transferred in an encrypted state.</td>
</tr>
<tr>
<td></td>
<td>Any change to the password is also transferred in an encrypted state.</td>
</tr>
</tbody>
</table>

Login page

Navigation

Expert → Communication → Web server → Login page (7273)

Description

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

Selection

- Without header
- With header

Factory setting

With header

3.6.4 "Diagnostic configuration" submenu

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

Assign a category to the particular diagnostic event:

<table>
<thead>
<tr>
<th>Category</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure (F)</td>
<td>A device error has occurred. The measured value is no longer valid.</td>
</tr>
<tr>
<td>Function check (C)</td>
<td>The device is in the service mode (e.g. during a simulation).</td>
</tr>
<tr>
<td>Category</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Out of specification (S)</td>
<td>The device is being operated:</td>
</tr>
<tr>
<td></td>
<td>• Outside its technical specification limits (e.g. outside the process temperature range)</td>
</tr>
<tr>
<td></td>
<td>• Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)</td>
</tr>
<tr>
<td>Maintenance required (M)</td>
<td>Maintenance is required. The measured value remains valid.</td>
</tr>
<tr>
<td>No effect (N)</td>
<td>Has no effect on the condensed status (^1).</td>
</tr>
</tbody>
</table>

\(^1\) Condensed status according to NAMUR recommendation NE 107

**Navigation**

Expert → Communication → Diag. config.

<table>
<thead>
<tr>
<th>Diagnostic configuration</th>
<th></th>
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</thead>
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<td>→ 181</td>
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<tr>
<td>Event category 441 (0210)</td>
<td>→ 181</td>
</tr>
<tr>
<td>Event category 444 (0211)</td>
<td>→ 182</td>
</tr>
<tr>
<td>Event category 442 (0230)</td>
<td>→ 181</td>
</tr>
<tr>
<td>Event category 443 (0231)</td>
<td>→ 182</td>
</tr>
<tr>
<td>Event category 543 (0276)</td>
<td>→ 183</td>
</tr>
<tr>
<td>Event category 832 (0218)</td>
<td>→ 183</td>
</tr>
<tr>
<td>Event category 833 (0225)</td>
<td>→ 183</td>
</tr>
<tr>
<td>Event category 841 (0267)</td>
<td>→ 184</td>
</tr>
<tr>
<td>Event category 842 (0295)</td>
<td>→ 184</td>
</tr>
<tr>
<td>Event category 870 (0250)</td>
<td>→ 185</td>
</tr>
<tr>
<td>Event category 930 (0296)</td>
<td>→ 185</td>
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<tr>
<td>Event category 931 (0297)</td>
<td>→ 186</td>
</tr>
<tr>
<td>Event category 941 (0294)</td>
<td>→ 187</td>
</tr>
<tr>
<td>Event category 942 (0302)</td>
<td>→ 187</td>
</tr>
<tr>
<td>Event category 943 (0301)</td>
<td>→ 187</td>
</tr>
</tbody>
</table>
Event category 160 (Signal path switched off)

Navigation
Expert → Communication → Diag. config. → Event category 160 (0272)

Description
Use this function to select a category for the 160 Signal path switched off diagnostic message.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting
Maintenance required (M)

Additional information
For a detailed description of the event categories available for selection: →  179

Event category 441 (Current output 1 to n)

Navigation
Expert → Communication → Diag. config. → Event category 441 (0210)

Description
Use this function to select a category for the 441 Current output 1 to n diagnostic message.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting
Out of specification (S)

Additional information
For a detailed description of the event categories available for selection: →  179

Event category 442 (Frequency output 1 to n)

Navigation
Expert → Communication → Diag. config. → Event category 442 (0230)

Prerequisite
The pulse/frequency/switch output is available.

Description
Use this function to select a category for the 442 Frequency output 1 to n diagnostic message.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)
**Factory setting**

Out of specification (S)

**Additional information**

ℹ️ For a detailed description of the event categories available for selection: → 179

---

### Event category 443 (Pulse output 1 to n)

**Navigation**

خدام Expert → Communication → Diag. config. → Event category 443 (0231)

**Prerequisite**

The pulse/frequency/switch output is available.

**Description**

Use this function to select a category for the **443 Pulse output 1 to n** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**

Out of specification (S)

**Additional information**

ℹ️ For a detailed description of the event categories available for selection: → 179

---

### Event category 444 (Current input 1 to n)

**Navigation**

خدام Expert → Communication → Diag. config. → Event category 444 (0211)

**Prerequisite**

The current input is available.

**Description**

Use this function to select a category for the **444 Current input 1 to n** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**

Out of specification (S)

**Additional information**

ℹ️ For a detailed description of the event categories available for selection: → 179
**Event category 543 (Double pulse output)**

**Navigation**

- Expert → Communication → Diag. config. → Event category 543 (0276)

**Description**

Use this option to select a category for the **543 Double pulse output** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**

Out of specification (S)

**Additional information**

For a detailed description of the event categories available for selection: → 179

---

**Event category 832 (Electronics temperature too high)**

**Navigation**

- Expert → Communication → Diag. config. → Event category 832 (0218)

**Description**

Use this function to select a category for the **832 Electronics temperature too high** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**

Out of specification (S)

**Additional information**

Selection

For a detailed description of the event categories available for selection: → 179

---

**Event category 833 (Electronics temperature too low)**

**Navigation**

- Expert → Communication → Diag. config. → Event category 833 (0225)

**Description**

Use this option to select a category for the **833 Electronics temperature too low** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)
### Factory setting
Out of specification (S)

### Additional information
Selection

For a detailed description of the event categories available for selection: → 179

---

#### Event category 841 (Flow velocity too high)

**Navigation**

Expert ➔ Communication ➔ Diag. config. ➔ Event category 841 (0267)

**Description**

Use this function to assign a category to the **S841 Flow velocity too high** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**
Out of specification (S)

**Additional information**

For a detailed description of the event categories available for selection: → 179

---

#### Event category 842 (Process limit)

**Navigation**

Expert ➔ Communication ➔ Diag. config. ➔ Event category 842 (0295)

**Description**

Use this function to assign a category to the **842 Process limit** diagnostic message.

**Selection**

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**
Out of specification (S)

**Additional information**

Selection

For a detailed description of the event categories available for selection: → 179
Event category 870 (Measuring inaccuracy increased)

Navigation

Expert → Communication → Diag. config. → Event category 870 (0250)

Description

Use this function to select a category for the 870 Measuring inaccuracy increased diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting

No effect (N)

Additional information

For a detailed description of the event categories available for selection: → 179

Event category 881 (Sensor signal path 1 to n)

Navigation

Expert → Communication → Diag. config. → Event category 881 (0268)

Description

Use this function to select a category for the 881 Sensor signal path 1 to n diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting

Failure (F)

Additional information

For a detailed description of the event categories available for selection: → 179

Event category 930 (Process fluid)

Navigation

Expert → Communication → Diag. config. → Event category 930 (0296)

Description

Use this function to select a category for the S930 Process fluid diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)
Description of device parameters

Proline Prosonic Flow P 500 HART

---

**Factory setting**
Out of specification (S)

**Additional information**
*Selection*

ℹ️ For a detailed description of the event categories available for selection: → 179

---

**Event category 931 (Process fluid)**

**Navigation**
Expert → Communication → Diag. config. → Event category 931 (0297)

**Description**
Use this function to select a category for the **S931 Process fluid** diagnostic message.

**Selection**
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**
Out of specification (S)

**Additional information**
*Selection*

ℹ️ For a detailed description of the event categories available for selection: → 179

---

**Event category 953 (Asymmetry noise signal too high path 1 to n)**

**Navigation**
Expert → Communication → Diag. config. → Event category 953 (0292)

**Description**
Use this function to select a category for the **M953 Asymmetry noise signal too high path 1 to n** diagnostic message.

**Selection**
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

**Factory setting**
Failure (F)

**Additional information**
*Selection*

ℹ️ For a detailed description of the event categories available for selection: → 179
Event category 941 (API/ASTM temperature out of specification)

Navigation

Expert → Communication → Diag. config. → Event category 941 (0294)

Description

Select category for diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting

Out of specification (S)

Additional information

For a detailed description of the event categories available for selection: → 179

Event category 942 (API/ASTM density out of specification)

Navigation

Expert → Communication → Diag. config. → Event category 942 (0302)

Description

Select category for diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting

Out of specification (S)

Additional information

For a detailed description of the event categories available for selection: → 179

Event category 943 (API pressure out of specification)

Navigation

Expert → Communication → Diag. config. → Event category 943 (0301)

Description

Select category for diagnostic message.

Selection

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting

Out of specification (S)
Additional information

For a detailed description of the event categories available for selection: →  179

3.6.5  "WLAN settings" wizard

Navigation  Expert → Communication → WLAN settings

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<td>WLAN mode (2717)</td>
<td>→  189</td>
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<tr>
<td>SSID name (2714)</td>
<td>→  189</td>
</tr>
<tr>
<td>Network security (2705)</td>
<td>→  190</td>
</tr>
<tr>
<td>Security identification (2718)</td>
<td>→  190</td>
</tr>
<tr>
<td>User name (2715)</td>
<td>→  190</td>
</tr>
<tr>
<td>WLAN password (2716)</td>
<td>→  191</td>
</tr>
<tr>
<td>WLAN IP address (2711)</td>
<td>→  191</td>
</tr>
<tr>
<td>WLAN MAC address (2703)</td>
<td>→  191</td>
</tr>
<tr>
<td>WLAN subnet mask (2709)</td>
<td>→  192</td>
</tr>
<tr>
<td>WLAN MAC address (2703)</td>
<td>→  191</td>
</tr>
<tr>
<td>WLAN passphrase (2706)</td>
<td>→  192</td>
</tr>
<tr>
<td>WLAN MAC address (2703)</td>
<td>→  191</td>
</tr>
<tr>
<td>Assign SSID name (2708)</td>
<td>→  192</td>
</tr>
<tr>
<td>SSID name (2707)</td>
<td>→  193</td>
</tr>
<tr>
<td>2.4 GHz WLAN channel (2704)</td>
<td>→  193</td>
</tr>
<tr>
<td>Select antenna (2713)</td>
<td>→  193</td>
</tr>
<tr>
<td>Connection state (2722)</td>
<td>→  194</td>
</tr>
<tr>
<td>Received signal strength (2721)</td>
<td>→  194</td>
</tr>
</tbody>
</table>
### WLAN

**Navigation**

Expert → Communication → WLAN settings → WLAN (2702)

**Description**

Use this function to enable and disable the WLAN connection.

**Selection**

- Disable
- Enable

**Factory setting**

Enable

### WLAN mode

**Navigation**

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

**Description**

Use this function to select the WLAN mode.

**Selection**

- WLAN access point
- WLAN Client

**Factory setting**

WLAN access point

### SSID name

**Navigation**

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

**Prerequisite**

The client is activated.

**Description**

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

**User entry**

–

**Factory setting**

–
Network security

**Navigation**

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

**Description**

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

**Selection**

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

**Factory setting**

WPA2-PSK

**Additional information**

*Selection*

- Unsecured
  Access the WLAN connection without identification.
- WPA2-PSK
  Access the WLAN connection with a network key.
- EAP-PEAP with MSCHAPv2
  Access the WLAN connection with a password-based authentication protocol.
- EAP-PEAP MSCHAPv2 no server authentic.
  Access the WLAN connection with a password-based protocol without server authentication.
- EAP-TLS
  Access the WLAN connection with a certificate-based, two-way authentication of the client and network.

Security identification

**Navigation**

Expert → Communication → WLAN settings → Sec. identific. (2718)

**Description**

Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).

**User interface**

- Trusted issuer certificate
- Device certificate
- Device private key

**User name**

**Navigation**

Expert → Communication → WLAN settings → User name (2715)

**Description**

Use this function to enter the username of the WLAN network.

**User entry**

–

* Visibility depends on order options or device settings
<table>
<thead>
<tr>
<th><strong>WLAN password</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → WLAN settings → WLAN password (2716)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the WLAN password for the WLAN network.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>–</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>WLAN IP address</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → WLAN settings → WLAN IP address (2711)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Use this function to enter the IP address of the measuring device's WLAN connection.</td>
</tr>
<tr>
<td><strong>User entry</strong></td>
<td>4 octet: 0 to 255 (in the particular octet)</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>192.168.1.212</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>WLAN MAC address</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigation</strong></td>
<td>Expert → Communication → WLAN settings → WLAN MAC address (2703)</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Displays the MAC address of the measuring device.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>Unique 12-digit character string comprising letters and numbers</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>Each measuring device is given an individual address.</td>
</tr>
<tr>
<td><strong>Additional information</strong></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td>For the display format</td>
</tr>
<tr>
<td></td>
<td>00:07:05:10:01:5F</td>
</tr>
</tbody>
</table>

6) Media Access Control
**WLAN subnet mask**

**Navigation**

- Expert → Communication → WLAN settings → WLAN subnet mask (2709)
- Expert → Communication → WLAN settings → WLAN subnet mask (2709)

**Description**

Use this function to enter the subnet mask.

**User entry**

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

**Factory setting**

255.255.255.0

---

**WLAN passphrase**

**Navigation**

- Expert → Communication → WLAN settings → WLAN passphrase (2706)

**Prerequisite**

The **WPA2-PSK** option is selected in the **Security type** parameter (2705) (→ 190).

**Description**

Use this function to enter the network key.

**User entry**

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

**Factory setting**

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

---

**Assign SSID name**

**Navigation**

- Expert → Communication → WLAN settings → Assign SSID name (2708)

**Description**

Use this function to select which name is used for the SSID 7).

**Selection**

- Device tag
- User-defined

**Factory setting**

User-defined

**Additional information**

*Selection*

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

---

7) **Service Set Identifier**
SSID name

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

**Prerequisite**
- The User-defined option is selected in the Assign SSID name parameter (2708) (→ 192).
- The WLAN access point option is selected in the WLAN mode parameter (2717) (→ 189).

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

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

**Factory setting**
EH_device designation_last 7 digits of the serial number (e.g. EH_Prosonic_Flow_500_A802000)

2.4 GHz WLAN channel

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

**Description**
Use this function to enter the 2.4 GHz WLAN channel (2704).

**User entry**
1 to 11

**Factory setting**
6

**Additional information**
- It is only necessary to enter a 2.4 GHz WLAN channel (2704) if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

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

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

**Selection**
- External antenna
- Internal antenna

**Factory setting**
Internal antenna
### Connection state

**Navigation**

[Expert → Communication → WLAN settings → Connection state (2722)]

**Description**

The connection status is displayed.

**User interface**

- Connected
- Not connected

**Factory setting**

Not connected

### Received signal strength

**Navigation**

[Expert → Communication → WLAN settings → Rec.sig.strength (2721)]

**Description**

Displays the signal strength received.

**User interface**

- Low
- Medium
- High

**Factory setting**

High

### Gateway IP address

**Navigation**

[Expert → Communication → WLAN settings → Gateway IP addr. (2719)]

**Description**

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

**User interface**

Character string comprising numbers, letters and special characters

**Factory setting**

192.168.1.212

### IP address domain name server

**Navigation**

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

**Description**

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

**User interface**

Character string comprising numbers, letters and special characters

**Factory setting**

192.168.1.212
3.7 "Application" submenu

Description

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

Selection

- Cancel
- Reset + totalize

Factory setting

Cancel

Additional information

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>No action is executed and the user exits the parameter.</td>
</tr>
<tr>
<td>Reset + totalize</td>
<td>Resets all totalizers to 0 and restarts the totaling process. This deletes all the previously aggregated flow values.</td>
</tr>
</tbody>
</table>

3.7.1 "Totalizer 1 to n" submenu

Navigation

Expert → Application → Totalizer 1 to n

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign process variable 1 to n (0914–1 to n)</td>
<td>→ 196</td>
</tr>
<tr>
<td>Process variable unit 1 to n (0915–1 to n)</td>
<td>→ 197</td>
</tr>
</tbody>
</table>
### Description of device parameters

**Proline Prosonic Flow P 500 HART**

#### Totalizer 1 to n operation mode
(0908–1 to n)

#### Control Totalizer 1 to n (0912–1 to n)

#### Preset value 1 to n (0913–1 to n)

#### Totalizer 1 to n failure behavior
(0901–1 to n)

---

### Assign process variable 1 to n

**Navigation**

Experts → Application → Totalizer 1 to n → Assign Variab. 1 to n (0914–1 to n)

**Description**

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

**Selection**

- Off
- Volume flow
- Mass flow
- S&W volume flow *
- GSV flow *
- NSV flow *
- Product 1 volume flow *
- Product 2 volume flow *
- Product 3 volume flow *
- Product 4 volume flow *
- Product 5 volume flow *
- Product 1 mass flow *
- Product 2 mass flow *
- Product 3 mass flow *
- Product 4 mass flow *
- Product 5 mass flow *
- Product 1 NSV flow *
- Product 2 NSV flow *
- Product 3 NSV flow *
- Product 4 NSV flow *
- Product 5 NSV flow *

**Factory setting**

Volume flow

**Additional information**

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

- **Options**

  If the Off option is selected, only the Assign process variable parameter (0914) (→ 196) is still displayed in the Totalizer 1 to n submenu. All other parameters in the submenu are hidden.

* Visibility depends on order options or device settings
Process variable unit 1 to n

Navigation

Expert → Application → Totalizer 1 to n → VariableUnit 1 to n (0915–1 to n)

Prerequisite

A process variable is selected in the Assign process variable parameter (0914) (→ 196) of the Totalizer 1 to n submenu.

Description

Use this function to select the process variable unit for the Totalizer 1 to n (→ 195).

Selection

- g*
- kg*
- t*
- oz*
- lb*
- STon*
- cm³*
- dm³*
- m³*
- ml*
- l*
- hl*
- Ml Mega *
- af*
- ft³*
- Mft³*
- Mft³*
- fl oz (us) *
- gal (us)*
- kgal (us)*
- Mgal (us)*
- bbl (us;liq.)*
- bbl (us;beer)*
- bbl (us;oil)*
- bbl (us;tank)*
- gal (imp)*
- Mgal (imp)*
- bbl (imp;beer)*
- bbl (imp;oil)*
- MScf³*
- None*

Factory setting

Depends on country:

- m³
- ft³

Additional information

Description

The unit is selected separately for each totalizer. It is independent of the selection made in the System units submenu (→ 61).

Options

The selection is dependent on the process variable selected in the Assign process variable parameter (0914) (→ 196).

* Visibility depends on order options or device settings
**Totalizer 1 to n operation mode**

**Navigation**  
Expert → Application → Totalizer 1 to n → Operat. mode 1 to n (0908–1 to n)

**Prerequisite**  
A process variable is selected in the Assign process variable parameter (0914) (→ 196) of the Totalizer 1 to n submenu.

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

**Selection**  
- Net  
- Forward  
- Reverse

**Factory setting**  
Net flow total

**Additional information**  
Selection
- Net flow total  
  Flow values in the forward and reverse flow direction are totalized and balanced against one another. Net flow is registered in the flow direction.
- Forward flow total  
  Only the flow in the forward flow direction is totalized.
- Reverse flow total  
  Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

---

**Control Totalizer 1 to n**

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

**Prerequisite**  
A process variable is selected in the Assign process variable parameter (0914) (→ 196) of the Totalizer 1 to n submenu.

**Description**  
Use this function to select the control of totalizer value 1–3.

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

**Factory setting**  
Totalize

**Additional information**  
Selection

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totalize</td>
<td>The totalizer is started or continues running.</td>
</tr>
<tr>
<td>Reset + hold</td>
<td>The totalizing process is stopped and the totalizer is reset to 0.</td>
</tr>
<tr>
<td>Preset + hold</td>
<td>The totalizing process is stopped and the totalizer is set to its defined start value from the Preset value parameter.</td>
</tr>
<tr>
<td>Preset + totalize</td>
<td>The totalizer is reset to 0 and the totalizing process is restarted.</td>
</tr>
</tbody>
</table>
### Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preset + totalize ¹</td>
<td>The totalizer is set to the defined start value in the Preset value parameter and the totaling process is restarted.</td>
</tr>
<tr>
<td>Hold</td>
<td>Totalizing is stopped.</td>
</tr>
</tbody>
</table>

¹ Visible depending on the order options or device settings.

---

**Preset value 1 to n**

**Navigation**

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

**Prerequisite**

A process variable is selected in the Assign process variable parameter (0914) (→ 196) of the Totalizer 1 to n submenu.

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

Depends on country:
- 0 m³
- 0 ft³

**Additional information**

User entry

The unit of the selected process variable is defined in the Unit totalizer parameter (0915) (→ 197) for the totalizer.

**Example**

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

---

**Totalizer 1 to n failure behavior**

**Navigation**

Expert → Application → Totalizer 1 to n → FailureBehav. 1 to n (0901–1 to n)

**Prerequisite**

A process variable is selected in the Assign process variable parameter (0914) (→ 196) of the Totalizer 1 to n submenu.

**Description**

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

**Selection**

- Hold
- Continue
- Last valid value + continue

**Factory setting**

Stop
Additional information

Description

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

Selection

- Stop
  The totalizer is stopped in the event of a device alarm.
- Actual value
  The totalizer continues to count based on the actual (current) measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

3.7.2 "Petroleum" submenu

For detailed information on the parameter descriptions for the Petroleum application package, refer to the Special Documentation for the device.

Navigation

Expert → Application → Petroleum

3.7.3 "Product identification" submenu

For detailed information on the parameter descriptions for the Petroleum application package, refer to the Special Documentation for the device.

Navigation

Expert → Application → Product identif.

3.8 "Diagnostics" submenu

Navigation

Expert → Diagnostics

- Actual diagnostics (0691)
  → 201
- Previous diagnostics (0690)
  → 202
- Operating time from restart (0653)
  → 203
- Operating time (0652)
  → 203
- Diagnostic list
  → 203
Actual diagnostics

Navigation
Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite
A diagnostic event has occurred.

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

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

Additional information
Display
Additional pending diagnostic messages can be viewed in the Diagnostic list submenu (→ 203).

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

Example
For the display format:
F271 Main electronic failure
### Timestamp

**Navigation**  
专家 → 诊断 → 时间戳 (0667)

**Description**  
显示当前诊断信息发生时的运行时间。

**User interface**  
天 (d), 小时 (h), 分钟 (m) 和 秒 (s)

**Additional information**  
显示

- **显示**

  诊断消息可以查看通过实例诊断参数 (0691) (→ 201)

  **示例**

  显示格式：
  24d12h13m00s

### Previous diagnostics

**Navigation**  
专家 → 诊断 → 历史诊断 (0690)

**Prerequisite**  
两个诊断事件已经发生。

**Description**  
显示当前信息之前发生的诊断信息。

**User interface**  
诊断行为符号，诊断代码和简短信息。

**Additional information**  
显示

- **显示**

  通过本地显示：时间戳和修正措施根据诊断信息的原因可以通过键进行访问。

  **示例**

  显示格式：
  #F271 主电子故障

### Timestamp

**Navigation**  
专家 → 诊断 → 时间戳 (0672)

**Description**  
显示当前信息之前发生的诊断信息。

**User interface**  
天 (d), 小时 (h), 分钟 (m) 和 秒 (s)
**Additional information**

*Display*

The diagnostic message can be viewed via the **Previous diagnostics** parameter (0690) (→ 202).

*Example*

For the display format:
24d12h13m00s

---

### Operating time from restart

**Navigation**

 dhe 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**

 dhe Expert → Diagnostics → Operating time (0652)

**Description**

Displays the length of time the device has been in operation.

**User interface**

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

**Additional information**

*Indication*

Maximum number of days: 9999 (corresponds to approx. 27 years and 5 months)

---

### 3.8.1 "Diagnostic list" submenu

**Navigation**

 dhe Expert → Diagnostics → Diagnostic list

<table>
<thead>
<tr>
<th>Diagnostic list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics 1 (0692) → 204</td>
</tr>
<tr>
<td>Diagnostics 2 (0693) → 204</td>
</tr>
<tr>
<td>Diagnostics 3 (0694) → 205</td>
</tr>
<tr>
<td>Diagnostics 4 (0695) → 206</td>
</tr>
<tr>
<td>Diagnostics 5 (0696) → 207</td>
</tr>
</tbody>
</table>
**Description of device parameters**

**Diagnostics 1**

**Navigation**

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

**Description**

Displays the current diagnostics message with the highest priority.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

Display

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

*Examples*

For the display format:

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

---

**Timestamp 1**

**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**

Display

The diagnostic message can be viewed via the [Diagnostics 1] parameter (0692) (→ [204]).

*Example*

For the display format:

24d12h13m00s

---

**Diagnostics 2**

**Navigation**

[Expert] → [Diagnostics] → [Diagnostic list] → [Diagnostics 2 (0693)]

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.


Additional information

Display

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the \( \text{key} \) key.

Examples

For the display format:
- \( \text{F271 Main electronic failure} \)
- \( \text{F276 I/O module failure} \)

Timestamp 2

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

Display

The diagnostic message can be viewed via the Diagnostics 2 parameter (0693) (→ 204).

Example

For the display format:
24d12h13m00s

Diagnostics 3

Navigation

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

Description

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

User interface

Symbol for diagnostic behavior, diagnostic code and short message.

Additional information

Display

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the \( \text{key} \) key.

Examples

For the display format:
- \( \text{F271 Main electronic failure} \)
- \( \text{F276 I/O module failure} \)
**Description of device parameters**

**Proline Prosonic Flow P 500 HART**

---

**Timestamp 3**

**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**

Display

The diagnostic message can be viewed via the **Diagnostics 3** parameter (0694) (→ 205).

Exemple

For the display format:
24d12h13m00s

---

**Diagnostics 4**

**Navigation**

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

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

Display

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

Examples

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

---

**Timestamp 4**

**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)
Proline Prosonic Flow P 500 HART

Description of device parameters

**Additional information**

`Display`

The diagnostic message can be viewed via the **Diagnostics 4** parameter (0695) → 206).

*Example*

For the display format:
24d12h13m00s

---

**Diagnostics 5**

**Navigation**

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

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information**

`Display`

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

*Examples*

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

---

**Timestamp 5**

**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**

`Display`

The diagnostic message can be viewed via the **Diagnostics 5** parameter (0696) → 207).

*Example*

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

Viewing event messages

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

Navigation  
▷▷ Expert → Diagnostics → Event logbook

---

Filter options

---

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

"Event list" submenu

The Event list submenu is only displayed if operating via the local display.

If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.

If operating via the Web browser, the event messages can be found directly in the Event logbook submenu.
Event list

Navigation

Displays the history of event messages of the category selected in the Filter options parameter (0705) (→ 208).

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

A maximum of 20 event messages are displayed in chronological order.

If the Extended HistoROM application package (order option) is enabled in the device, the event list can contain up to 100 entries.

The following symbols indicate whether an event has occurred or has ended:
- ○: Occurrence of the event
- ☐: End of the event

Examples

- I1091 Configuration modified
  ○ 01d04h12min30s
- X F271 Main electronic failure
  ○ 01d04h12min30s

HistoROM

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

3.8.3 "Device information" submenu

Navigation

A maximum of 20 event messages are displayed in chronological order.

If the Extended HistoROM application package (order option) is enabled in the device, the event list can contain up to 100 entries.

The following symbols indicate whether an event has occurred or has ended:
- ○: Occurrence of the event
- ☐: End of the event

Examples

- I1091 Configuration modified
  ○ 01d04h12min30s
- X F271 Main electronic failure
  ○ 01d04h12min30s

HistoROM

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

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

Factory setting
Prosonic Flow

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**

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

**Additional information**

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

Firmware version

**Navigation**

Expert → Diagnostics → Device info → Firmware version (0010)

**Description**

Displays the device firmware version installed.

**User interface**

Character string in the format xx.yy.zz

**Additional information**

Display

- The Firmware version (0010) is also located:
  - On the title page of the Operating instructions
  - On the transmitter nameplate

Device name

**Navigation**

Expert → Diagnostics → Device info → Device name (0020)

**Description**

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

**User interface**

Prosonic Flow 500

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. /).
## Description of device parameters

**Proline Prosonic Flow P 500 HART**

### 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.

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**

Displays the second part of the extended order code.

**User interface**

Character string

**Additional information**

For additional information, see [Extended order code 1 parameter (0023)](→ 212)

### Extended order code 3

**Navigation**

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

**Description**

Displays the third part of the extended order code.

**User interface**

Character string
Additional information
For additional information, see Extended order code 1 parameter (0023) (→ 212)

Configuration counter

Navigation
Expert → Diagnostics → Device info → Config. counter (0233)

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

User interface
0 to 65535

ENP version

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

Description
Displays the version of the electronic nameplate.

User interface
Character string

Factory setting
2.02.00

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

3.8.4 "Main electronic module + I/O module 1" submenu

Navigation
Expert → Diagnostics → Main elec.+I/O1

- Firmware version (0072) (→ 214)
- Build no. software (0079) (→ 214)
- Bootloader revision (0073) (→ 214)
**Firmware version**

**Navigation**

Expert → Diagnostics → Main elec.+I/O1 → Firmware version (0072)

**Description**

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

**User interface**

Positive integer

---

**Build no. software**

**Navigation**

Expert → Diagnostics → Main elec.+I/O1 → Build no. softw. (0079)

**Description**

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

**User interface**

Positive integer

---

**Bootloader revision**

**Navigation**

Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)

**Description**

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

**User interface**

Positive integer

---

### 3.8.5 "Sensor electronic module (ISEM)" submenu

**Navigation**

Expert → Diagnostics → Sens. electronic

```
Sensor electronic module (ISEM)

Firmware version (0072) → 215
Build no. software (0079) → 215
Bootloader revision (0073) → 215
```
### Firmware version

**Navigation**

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

**Description**

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

**User interface**

Positive integer

---

### Build no. software

**Navigation**

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

**Description**

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

**User interface**

Positive integer

---

### Bootloader revision

**Navigation**

Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

**Description**

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

**User interface**

Positive integer

---

3.8.6 "I/O module 2" submenu

**Navigation**

Expert → Diagnostics → I/O module 2

| I/O module 2 terminal numbers (3902–2) | → 216 |
| Firmware version (0072) | → 216 |
| Build no. software (0079) | → 216 |
| Bootloader revision (0073) | → 216 |
Description of device parameters

I/O module 2 terminal numbers

Navigation

鸸鸸 Expert → Diagnostics → I/O module 2 → I/O 2 terminals (3902–2)

Description
Displays the terminal numbers used by the I/O module.

User interface
● Not used
● 26-27 (I/O 1)
● 24-25 (I/O 2)
● 22-23 (I/O 3)

Firmware version

Navigation

鸸鸸 Expert → Diagnostics → I/O module 2 → Firmware version (0072)

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

User interface
Positive integer

Build no. software

Navigation

鸸鸸 Expert → Diagnostics → I/O module 2 → Build no. softw. (0079)

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

User interface
Positive integer

Bootloader revision

Navigation

鸸鸸 Expert → Diagnostics → I/O module 2 → Bootloader rev. (0073)

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

User interface
Positive integer

3.8.7 "I/O module 3" submenu

Navigation

鸸鸸 Expert → Diagnostics → I/O module 3
### Description of device parameters

<table>
<thead>
<tr>
<th>I/O module 3 terminal numbers</th>
</tr>
</thead>
</table>

**Navigation**

Expert → Diagnostics → I/O module 3 → I/O 3 terminals (3902–3)

**Description**
Displays the terminal numbers used by the I/O module.

**User interface**
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)

<table>
<thead>
<tr>
<th>Firmware version</th>
</tr>
</thead>
</table>

**Navigation**

Expert → Diagnostics → I/O module 3 → Firmware version (0072)

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

**User interface**
Positive integer

<table>
<thead>
<tr>
<th>Build no. software</th>
</tr>
</thead>
</table>

**Navigation**

Expert → Diagnostics → I/O module 3 → Build no. softw. (0079)

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

**User interface**
Positive integer

<table>
<thead>
<tr>
<th>Bootloader revision</th>
</tr>
</thead>
</table>

**Navigation**

Expert → Diagnostics → I/O module 3 → Bootloader rev. (0073)

**Description**
Use this function to display the bootloader revision of the software.
3.8.8 "Display module" submenu

**Navigation**

Expert → Diagnostics → Display module

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firmware version (0072)</td>
<td>Use this function to display the software revision of the module.</td>
</tr>
<tr>
<td>Build no. software (0079)</td>
<td>Use this function to display the software build number of the module.</td>
</tr>
<tr>
<td>Bootloader revision (0073)</td>
<td>Use this function to display the bootloader revision of the software.</td>
</tr>
</tbody>
</table>

**User interface**

Positive integer
3.8.9  "Data logging" submenu

**Navigation**
Expert → Diagnostics → Data logging

**Assign channel 1 (0851)**
- Data logging
- Logging interval (0856)
- Clear logging data (0855)
- Data logging (0860)
- Logging delay (0859)
- Data logging control (0857)
- Data logging status (0858)
- Entire logging duration (0861)

**Assign channel 2 (0852)**

**Assign channel 3 (0853)**

**Assign channel 4 (0854)**

**Logging interval (0856)**

**Clear logging data (0855)**

**Data logging (0860)**

**Logging delay (0859)**

**Data logging control (0857)**

**Data logging status (0858)**

**Entire logging duration (0861)**

---

**Assign channel 1**

**Navigation**
Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

**Prerequisite**
The **Extended HistroROM** application package is available.

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

**Selection**
- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density

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

Proline Prosonic Flow P 500 HART

- Current output 2 *
- Current output 3 *
- Reference density *
- S&W volume flow *
- GSV flow *
- NSV flow *
- API gravity *
- API slope *
- Signal strength *
- Signal to noise ratio *
- Acceptance rate *
- Turbulence *
- Electronics temperature
- Current output 1
- Profile factor *
- Cross flow factor *

Factory setting

Off

Additional information

Description

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

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

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

Assign channel 2

Navigation

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

Prerequisite

The Extended HistoROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

Description

Use this function to select a process variable for the data logging channel.

Selection

For the picklist, see Assign channel 1 parameter (0851) (→ 219)

Factory setting

Off

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

**Navigation**

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

**Prerequisite**

The Extended HistOROM application package is available.

The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**

Use this function to select a process variable for the data logging channel.

**Selection**

For the picklist, see Assign channel 1 parameter (0851) (→ 219)

**Factory setting**

Off

### Assign 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 (0015) (→ 42).

**Description**

Use this function to select a process variable for the data logging channel.

**Selection**

For the picklist, see Assign channel 1 parameter (0851) (→ 219)

**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 (0015) (→ 42).

**Description**

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

**User entry**

0.1 to 3 600.0 s

**Factory setting**

1.0 s
Description of device parameters

Additional information

**Description**

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time $T_{\text{log}}$:

- If 1 logging channel is used: $T_{\text{log}} = 1000 \times t_{\text{log}}$
- If 2 logging channels are used: $T_{\text{log}} = 500 \times t_{\text{log}}$
- If 3 logging channels are used: $T_{\text{log}} = 333 \times t_{\text{log}}$
- If 4 logging channels are used: $T_{\text{log}} = 250 \times t_{\text{log}}$

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

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

**Example**

If 1 logging channel is used:

- $T_{\text{log}} = 1000 \times 1 \, s = 1000 \, s \approx 15 \, \text{min}$
- $T_{\text{log}} = 1000 \times 10 \, s = 10000 \, s \approx 3 \, \text{h}$
- $T_{\text{log}} = 1000 \times 80 \, s = 80000 \, s \approx 1 \, \text{d}$
- $T_{\text{log}} = 1000 \times 3600 \, s = 3600000 \, s \approx 41 \, \text{d}$

Clear logging data

**Navigation**

- 🌐 Expert → Diagnostics → Data logging → Clear logging (0855)

**Prerequisite**

The [Extended HistoROM](#) application package is available.

ℹ️ The software options currently enabled are displayed in the Software option overview parameter (0015) (→ 42).

**Description**

Use this function 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.

Data logging

**Navigation**

- 🌐 Expert → Diagnostics → Data logging → Data logging (0860)

**Description**

Use this function to select the data logging method.

**Selection**

- Overwriting
- Not overwriting
### Factory setting
- Overwriting

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

### Logging delay

**Navigation**
- Expert → Diagnostics → Data logging → Logging delay (0859)

**Prerequisite**
In the **Data logging** parameter (0860) (→ 222), the **Not overwriting** option is selected.

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

**User entry**
- 0 to 999 h

**Factory setting**
- 0 h

**Additional information**
**Description**
Once data logging has been started with the **Data logging control** parameter (0857) (→ 223), the device does not save any data for the duration of the delay time entered.

### Data logging control

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

**Prerequisite**
In the **Data logging** parameter (0860) (→ 222), the **Not overwriting** option is selected.

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

**Selection**
- None
- Delete + start
- Stop

**Factory setting**
- None

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

**Navigation**

Expert → Diagnostics → Data logging → Data log. status (0858)

**Prerequisite**

In the **Data logging** parameter (0860) (→ 222), the **Not overwriting** option is selected.

**Description**

Displays the measured value logging status.

**User interface**

- Done
- Delay active
- Active
- Stopped

**Factory setting**

Done

**Additional information**

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

**Entire logging duration**

**Navigation**

Expert → Diagnostics → Data logging → Logging duration (0861)

**Prerequisite**

In the **Data logging** parameter (0860) (→ 222), the **Not overwriting** option is selected.

**Description**

Displays the total logging duration.

**User interface**

Positive floating-point number

**Factory setting**

0 s

**"Display channel 1" submenu**

**Navigation**

Expert → Diagnostics → Data logging → Displ.channel 1

```
Display channel 1
```

→ 225
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 (0015) (→ 42).

One of the following options is selected in the Assign channel 1 parameter (0851) (→ 219):

- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure
- Density
- Current output 2
- Current output 3
- Signal strength
- Signal to noise ratio
- Acceptance rate
- Turbulence
- Electronics temperature
- Current output 1

Description

Displays the measured value trend for the logging channel in the form of a chart.

Additional information

Description

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

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

* Visibility depends on order options or device settings
"Display channel 2" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite

A process variable is specified in the Assign channel 2 parameter (0851).

Description

See the Display channel 1 parameter →  225

"Display channel 3" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite

A process variable is specified in the Assign channel 3 parameter (0851).

Description

See the Display channel 1 parameter →  225

"Display channel 4" submenu

Navigation

Expert → Diagnostics → Data logging → Displ.channel 4

Prerequisite

A process variable is specified in the Assign channel 4 parameter (0851).

Description

See the Display channel 1 parameter →  225
Display channel 4

Navigation

Expert → Diagnostics → Data logging → Displ. channel 4

Prerequisite

A process variable is specified in the Assign channel 4 parameter (0851).

Description

See the Display channel 1 parameter →  225

3.8.10  "Heartbeat Technology" submenu

For detailed information on the parameter descriptions for the Heartbeat
Verification+Monitoring: Special Documentation for the device →  7

Navigation

Expert → Diagnostics → Heartbeat Techn.

"Heartbeat base settings" submenu

Navigation

Expert → Diagnostics → Heartbeat Techn. → Base settings

Plant operator

Navigation

Expert → Diagnostics → Heartbeat Techn. → Base settings → Plant operator (2754)

Description

Use this function to enter the plant operator.

User entry

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

Location

Navigation

Expert → Diagnostics → Heartbeat Techn. → Base settings → Location (2755)

Description

Use this function to enter the location.
**User entry**

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

---

**“Performing verification” wizard**

**Navigation**


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<th>Description</th>
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</thead>
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<td>→ 228</td>
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<td>Day (2842)</td>
<td>→ 229</td>
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<td>Measured values (12102)</td>
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<td>Output values (12103)</td>
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<td>→ 233</td>
</tr>
<tr>
<td>Verification result (12149)</td>
<td>→ 233</td>
</tr>
</tbody>
</table>

---

**Year**

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Year (2846)

**Prerequisite**

Can be edited if Heartbeat Verification is not active.

**Description**

Use this function to enter the year of recalibration.
User entry: 9 to 99  
Factory setting: 10

**Month**

**Navigation:** Expert → Diagnostics → Heartbeat Techn. → Perform.verif. → Month (2845)

**Prerequisite:** Can be edited if Heartbeat Verification is not active.

**Description:** Use this function to select the month of recalibration.

**Selection:**
- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

**Factory setting:** January

**Day**

**Navigation:** Expert → Diagnostics → Heartbeat Techn. → Perform.verif. → Day (2842)

**Prerequisite:** Can be edited if Heartbeat Verification is not active.

**Description:** Use this function to enter the day of the month of recalibration.

**User entry:** 1 to 31 d

**Factory setting:** 1 d

**Hour**

**Navigation:** Expert → Diagnostics → Heartbeat Techn. → Perform.verif. → Hour (2843)

**Prerequisite:** Can be edited if Heartbeat Verification is not active.
### Description of device parameters

**Proline Prosonic Flow P 500 HART**

<table>
<thead>
<tr>
<th><strong>Description</strong></th>
<th>Use this function to enter the hour of recalibration.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User entry</strong></td>
<td>0 to 23 h</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>12 h</td>
</tr>
</tbody>
</table>

#### AM/PM

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → AM/PM (2813)

**Prerequisite**

Can be edited if Heartbeat Verification is not active.

The *dd.mm.yy hh:mm am/pm* option or the *mm/dd/yy hh:mm am/pm* option is selected in the **Date/time format** parameter (2812) → [68].

**Description**

Use this function to select the time entry in the morning (AM option) or afternoon (PM option) in the case of 12-hour notation.

**Selection**

- AM
- PM

**Factory setting**

AM

---

#### Minute

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Minute (2844)

**Prerequisite**

Can be edited if Heartbeat Verification is not active.

**Description**

Use this function to enter the minutes of recalibration.

**User entry**

0 to 59 min

**Factory setting**

0 min

---

#### Verification mode

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Verificat. mode (12105)

**Prerequisite**

Can be edited if verification status is not active.

**Description**

Select verification mode.

Standard verification: Verification is performed automatically by the device and without manual checking of external measured variables.
Extended verification: Similar to internal verification but with the entry of external measured variables (see also 'Measured values' parameter).

Selection
- Standard verification
- Extended verification

Factory setting
Standard verification

External device information

Navigation
Expert → Diagnostics → Heartbeat Techn. → Perform. verific. → Ext. device info
(12101)

Prerequisite
With the following conditions:
- The **Extended verification** option is selected in the **Verification mode** parameter (12105) (→ 230).
- Can be edited if Heartbeat Verification is not active.

Description
Record measuring equipment for extended verification.

User entry
Free text entry

Factory setting
-

Start verification

Navigation
(12127)

Prerequisite
If using a test kit:
It is necessary to first remove the sensors from the measuring point and mount them on the test kits.

Description
Start the verification.
To carry out a complete verification, select the selection parameters individually. Once the external measured values have been recorded, verification is started using the **Start** option.

Selection
- Cancel
- Output 1 low value *
- Output 1 high value *
- Output 2 low value *
- Output 2 high value *
- Output 3 low value *
- Output 3 high value *
- Output 4 low value *
- Output 4 high value *
- Frequency output 1 *

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

**Proline Prosonic Flow P 500 HART**

- Pulse output 1 *
- Frequency output 2 *
- Pulse output 2 *
- Frequency output 3 *
- Double pulse output *
- Start
- Start with testkit *

**Factory setting**

Cancel

---

**Progress**

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Progress (2808)

**Description**

The progress of the process is indicated.

**User interface**

0 to 100 %

---

**Measured values**

**Navigation**


**Prerequisite**

One of the following options is selected in the **Start verification** parameter (12127) (→ 231):

- Output 1 low value
- Output 1 high value
- Output 2 low value
- Output 2 high value
- Output 3 low value
- Output 3 high value
- Output 4 low value
- Output 4 high value
- Frequency output 1
- Pulse output 1
- Frequency output 2
- Pulse output 2
- Frequency output 3
- Double pulse output

**Description**

Use this function to enter the measured values (actual values) for the external measured variables:

- Current output: Output current in [mA]
- Pulse/frequency output: Output frequency in [Hz]
- Double pulse output: Output frequency in [Hz]

**User entry**

Signed floating-point number

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

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Output values (12103)

**Description**
Displays the simulated output values (target values) for the external measured variables:
- Current output: Output current in [mA].
- Pulse/frequency output: Output frequency in [Hz].

**User interface**
Signed floating-point number

**Factory setting**
0

### Status

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Status (12153)

**Description**
Displays the current status of the verification.

**User interface**
- Done
- Busy
- Failed
- Not done

**Factory setting**
Not done

### Verification result

**Navigation**

Expert → Diagnostics → Heartbeat Techn. → Perform.verific. → Verific. result (12149)

**Description**
Displays the overall result of the verification.

- Not supported
- Passed
- Not done
- Failed

**Factory setting**
Not done
"Verification results" submenu

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Heartbeat Techn. → Verific. results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date/time (manually entered)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Prerequisite</strong></td>
<td>The verification has been performed.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Date and time.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>dd.mm.mmmm; hh:mm</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>1 January 2010; 12:00</td>
</tr>
</tbody>
</table>

**Verification ID**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Heartbeat Techn. → Verific. results → Verification ID (12141)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite</strong></td>
<td>The verification has been performed.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Displays consecutive numbering of the verification results in the measuring device.</td>
</tr>
<tr>
<td><strong>User interface</strong></td>
<td>0 to 65535</td>
</tr>
<tr>
<td><strong>Factory setting</strong></td>
<td>0</td>
</tr>
</tbody>
</table>
Operating time

**Navigation**

[Expert → Diagnostics → Heartbeat Techn. → Verific. results → Operating time](12126)

**Prerequisite**

The verification has been performed.

**Description**

Indicates how long the device has been in operation up to the verification.

**User interface**

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

**Factory setting**

–

Verification result

**Navigation**

[Expert → Diagnostics → Heartbeat Techn. → Verific. results → Verific. result](12149)

**Description**

Displays the overall result of the verification.

Detailed description of results classification:

- Not supported
- Passed
- Not done
- Failed

**Factory setting**

Not done

Sensor

**Navigation**

[Expert → Diagnostics → Heartbeat Techn. → Verific. results → Sensor](12152)

**Prerequisite**

The Failed option is shown in the Overall result parameter (12149) (→ 233).

**Description**

Displays the result for the sensor.

Detailed description of results classification:

- Not supported
- Passed
- Not done
- Failed

**Factory setting**

Not done
### Sensor electronic module (ISEM)

**Navigation**

[Expert → Diagnostics → Heartbeat Techn. → Verific. results → Sens. electronic (12151)]

**Prerequisite**

The **Failed** option is shown in the **Overall result** parameter (12149) (→ 233).

**Description**

Displays the result for the sensor electronics module (ISEM).

- Detailed description of results classification:

**User interface**

- Not supported
- Passed
- Not done
- Failed

**Factory setting**

Not done

---

### I/O module

**Navigation**

[Expert → Diagnostics → Heartbeat Techn. → Verific. results → I/O module (12145)]

**Prerequisite**

The **Failed** option is shown in the **Overall result** parameter (12149) (→ 233).

**Description**

Displays the result for I/O module monitoring of the I/O module.

- For current output: Accuracy of the current
- For pulse output: Accuracy of pulses
- For frequency output: Accuracy of frequency
- Current input: Accuracy of the current
- Double pulse output: Accuracy of the pulses
- Relay output: Number of switching cycles

- Detailed description of results classification:

**User interface**

- Not supported
- Passed
- Not done
- Not plugged
- Failed

**Factory setting**

Not done

---

### System status

**Navigation**

[Expert → Diagnostics → Heartbeat Techn. → Verific. results → System status (12109)]

**Prerequisite**

The **Failed** option is shown in the **Overall result** parameter (12149) (→ 233).
### Description
Displays the system condition. Tests the measuring device for active errors.

- Detailed description of results classification:

  - Not supported
  - Passed
  - Not done
  - Failed

### User interface

#### Factory setting
Not done

---

### "Monitoring results" submenu

**Navigation**

- Expert → Diagnostics → Heartbeat Techn. → Monitor. results

---

### 3.8.11 "Simulation" submenu

**Navigation**

- Expert → Diagnostics → Simulation

---

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign simulation process variable</td>
<td>238</td>
</tr>
<tr>
<td>Process variable value</td>
<td>239</td>
</tr>
<tr>
<td>Current input 1 to n simulation</td>
<td>239</td>
</tr>
<tr>
<td>Value current input 1 to n</td>
<td>240</td>
</tr>
<tr>
<td>Status input 1 to n simulation</td>
<td>240</td>
</tr>
<tr>
<td>Input signal level 1 to n</td>
<td>241</td>
</tr>
<tr>
<td>Current output 1 to n simulation</td>
<td>241</td>
</tr>
<tr>
<td>Current output value</td>
<td>241</td>
</tr>
<tr>
<td>Frequency output 1 to n simulation</td>
<td>242</td>
</tr>
</tbody>
</table>
### Assign simulation process variable

#### Navigation

![Diagram](Expert → Diagnostics → Simulation → Assign proc.var. (1810))

#### Description

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

#### Selection

- Off
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature
- Pressure *
- Density *
- Reference density *
- S&W volume flow *
- GSV flow *

* Visibility depends on order options or device settings
• NSV flow *
• API gravity *
• API slope

Factory setting
Off

Additional information  
Description
The simulation value of the process variable selected is defined in the Process variable value parameter (1811) (→ 239).

Process variable value

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

Prerequisite
A process variable is selected in the Assign simulation process variable parameter (1810) (→ 238).

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).

Current input 1 to n simulation

Navigation
Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)

Description
Option for switching simulation of the current input 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.

The desired simulation value is defined in the Value current input 1 to n parameter (1609–1 to n).

Selection
• Off
• On

Factory setting
Off

* Visibility depends on order options or device settings
Additional information  

_{Selection}_  

- Off  
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.  
- On  
  Current simulation is active.

**Value current input 1 to n**

**Navigation**  

[Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)]

**Prerequisite**  

In the **Current input 1 to n simulation** parameter (1608–1 to n), the **On** option is selected.

**Description**  

Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.

**User entry**  

0 to 22.5 mA

**Status input 1 to n simulation**

**Navigation**  

[Expert → Diagnostics → Simulation → Status inp 1 to n sim (1355–1 to n)]

**Description**  

Use this function to switch simulation of the status input 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 **Input signal level** parameter (1356) (→ 241).

_{Selection}_  

- Off  
  Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.  
- On  
  Simulation for the status input is active.
**Input signal level 1 to n**

**Navigation**  
Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)

**Prerequisite**  
In the **Status input simulation** parameter (1355) (→ 240), the **On** option is selected.

**Description**  
Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

**Selection**  
- High
- Low

**Current output 1 to n simulation**

**Navigation**  
Expert → Diagnostics → Simulation → Curr.outp 1 to n sim. (0354–1 to n)

**Description**  
Use this function to switch simulation of the current 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 **Value current output 1 to n** parameter (0355–1 to n).

**Selection**  
- Off  
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On  
  Current simulation is active.

**Current output value**

**Navigation**  
Expert → Diagnostics → Simulation → Curr.outp val. (0355)

**Prerequisite**  
In the **Current output 1 to n simulation** parameter (0354–1 to n), the **On** option is selected.

**Description**  
Use this function to enter a current value for the simulation. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units.
Description of device parameters

Proline Prosonic Flow P 500 HART

User entry  
3.59 to 22.5 mA

Additional information  
Dependency

The input range is dependent on the option selected in the Current span parameter (0353) (→ 109).

Frequency output 1 to n simulation

Navigation  
Expert → Diagnostics → Simulation → Freq.outp 1 to n sim. (0472–1 to n)

Prerequisite

In the Operating mode parameter (0469) (→ 122), the Frequency option is selected.

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 1 to n parameter (0473–1 to n).

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 output 1 to n value

Navigation  
Expert → Diagnostics → Simulation → Freq.outp 1 to n val. (0473–1 to n)

Prerequisite

In the Frequency simulation 1 to n parameter (0472–1 to n), the On option is selected.

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 12 500.0 Hz
**Pulse output simulation 1 to n**

**Navigation**

Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458–1 to n)

**Prerequisite**

In the **Operating mode** parameter (0469) (→ 122), the **Pulse** option is selected.

**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 defined in the **Pulse value 1 to n** parameter (0459–1 to n).

*Selection*

- Off
  - Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  - Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (0452) (→ 125).
- Down-counting value
  - The pulses specified in the **Pulse value** parameter (0459) (→ 243) are output.

**Pulse value 1 to n**

**Navigation**

Expert → Diagnostics → Simulation → Pulse value 1 to n (0459–1 to n)

**Prerequisite**

In the **Pulse output simulation 1 to n** parameter (0458–1 to n), the **Down-counting value** option is selected.

**Description**

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.

**User entry**

0 to 65535

**Switch output simulation 1 to n**

**Navigation**

Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462–1 to n)

**Prerequisite**

In the **Operating mode** parameter (0469) (→ 122), the **Switch** option is selected.
Description of device parameters

Proline Prosonic Flow P 500 HART

**Description**

Use this function to switch simulation of the switch 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 **Switch state 1 to n** parameter (0463–1 to n).

*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 state 1 to n**

**Navigation**

Expert → Diagnostics → Simulation → Switch state 1 to n (0463–1 to n)

**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

**Additional information**

*Selection*

- 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.

---

**Relay output 1 to n simulation**

**Navigation**

Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

**Description**

Use this function to switch simulation of the relay 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 **Switch state 1 to n** parameter (0803-1 to n).

*Selection*
- Off
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Relay simulation is active.

**Switch state 1 to n**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Simulation → Switch state 1 to n (0803-1 to n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite</td>
<td>The <strong>On</strong> option is selected in the <strong>Switch output simulation 1 to n</strong> parameter (0802-1 to n) parameter.</td>
</tr>
<tr>
<td>Description</td>
<td>Use this function to select a relay value for the simulation. In this way, users can verify the correct adjustment of the relay output and the correct function of downstream switching units.</td>
</tr>
</tbody>
</table>
| Selection | Open
Closed |
| Additional information | **Selection**
- Open
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Relay simulation is active. |

**Pulse output simulation**

<table>
<thead>
<tr>
<th>Navigation</th>
<th>Expert → Diagnostics → Simulation → Puls.outp.sim. (0988)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Use this function to switch simulation of the double pulse output on and off. The display alternates between the measured value and a diagnostic message of the &quot;Function check&quot; category (C) while simulation is in progress.</td>
</tr>
</tbody>
</table>
| Selection | Off
Fixed value
Down-counting value |
| Factory setting | Off |
**Additional information**

*Description*

The desired simulation value is defined in the **Pulse value** parameter (0989) (→ § 246).

*Selection*

- **Off**
  Simulation of the double pulse output is switched off. The device is in normal measuring mode or another process variable is being simulated.
- **Fixed value**
  Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (0986) (→ § 150).
- **Down-counting value**
  The pulses specified in the **Pulse value** parameter (0989) (→ § 246) are output.

---

### Pulse value

**Navigation**

[Expert → Diagnostics → Simulation → Pulse value (0989)]

**Prerequisite**

In the **Pulse output simulation** parameter (0988) (→ § 245), the **Down-counting value** option is selected.

**Description**

Use this function to enter a pulse value for simulation of the double pulse output. In this way, users can verify the correct adjustment of the double pulse output and the correct function of downstream switching units.

**User entry**

0 to 65535

---

### Device alarm simulation

**Navigation**

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

**Description**

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

**Selection**

- **Off**
- **On**

**Factory setting**

Off

**Additional information**

*Description*

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

### Description
Use this function to select the category of the diagnostic events that are displayed for the simulation in the Diagnostic event simulation parameter (0737) (→ 247).

### Selection
- Sensor
- Electronics
- Configuration
- Process

### Factory setting
Process

Diagnostic event simulation

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

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

### Factory setting
Off

### Additional information
For the simulation, you can choose from the diagnostic events of the category selected in the Diagnostic event category parameter (0738) (→ 247).
4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>kg</td>
</tr>
<tr>
<td>Mass flow</td>
<td>kg/h</td>
</tr>
<tr>
<td>Volume</td>
<td>m³</td>
</tr>
<tr>
<td>Volume flow</td>
<td>m³/h</td>
</tr>
<tr>
<td>Density</td>
<td>kg/dm³</td>
</tr>
<tr>
<td>Velocity</td>
<td>m/s</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>m²/s</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Length</td>
<td>mm</td>
</tr>
</tbody>
</table>

4.1.2 Output current span

<table>
<thead>
<tr>
<th>Output</th>
<th>Current range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output 1...n</td>
<td>4 to 20 mA NAMUR</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>Mass</td>
<td>lb</td>
</tr>
<tr>
<td>Mass flow</td>
<td>lb/min</td>
</tr>
<tr>
<td>Volume</td>
<td>ft³</td>
</tr>
<tr>
<td>Volume flow</td>
<td>ft³/min</td>
</tr>
<tr>
<td>Density</td>
<td>lb/ft³</td>
</tr>
<tr>
<td>Velocity</td>
<td>ft/s</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>cSt</td>
</tr>
<tr>
<td>Temperature</td>
<td>°F</td>
</tr>
<tr>
<td>Length</td>
<td>in</td>
</tr>
</tbody>
</table>

4.2.2 Output current span

<table>
<thead>
<tr>
<th>Output</th>
<th>Current range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output 1...n</td>
<td>4 to 20 mA US</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>Volume</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>
</tr>
<tr>
<td>Volume flow</td>
<td>dm³/s, dm³/min, dm³/h, dm³/d</td>
<td>Cubic decimeter/time unit</td>
</tr>
<tr>
<td></td>
<td>m³/s, m³/min, m³/h, m³/d</td>
<td>Cubic meter/time unit</td>
</tr>
<tr>
<td></td>
<td>l/s, l/min, l/h, l/d</td>
<td>Liter/time unit</td>
</tr>
<tr>
<td>Mass</td>
<td>g, kg, t</td>
<td>Gram, kilogram, metric ton</td>
</tr>
<tr>
<td>Mass flow</td>
<td>g/s, g/min</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/h, t/d</td>
<td>Metric ton/time unit</td>
</tr>
<tr>
<td>Density</td>
<td>kg/l</td>
<td>Kilogram/liter</td>
</tr>
<tr>
<td>Velocity</td>
<td>m/s</td>
<td>Meter/time unit</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>m²/s</td>
<td>Square meter/second</td>
</tr>
<tr>
<td>Temperature</td>
<td>°C, K</td>
<td>Celsius, Kelvin</td>
</tr>
<tr>
<td>Length</td>
<td>mm</td>
<td>Millimeters</td>
</tr>
<tr>
<td>Time</td>
<td>m, h, d, y</td>
<td>Minute, hour, day, year</td>
</tr>
</tbody>
</table>

### 5.2 US units

<table>
<thead>
<tr>
<th>Process variable</th>
<th>Units</th>
<th>Explanation</th>
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<td>Mass</td>
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<td>Ounce, pound, standard ton</td>
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<tr>
<td>Mass flow</td>
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<td></td>
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<td>Barrel (beer)</td>
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Beer: 36.0 gal/bbl |
| Time              | m, h, d, y                   | Minute, hour, day, year                                                    |
|                   | am, pm                       | Ante meridiem (before midday), post meridiem (after midday)                |
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