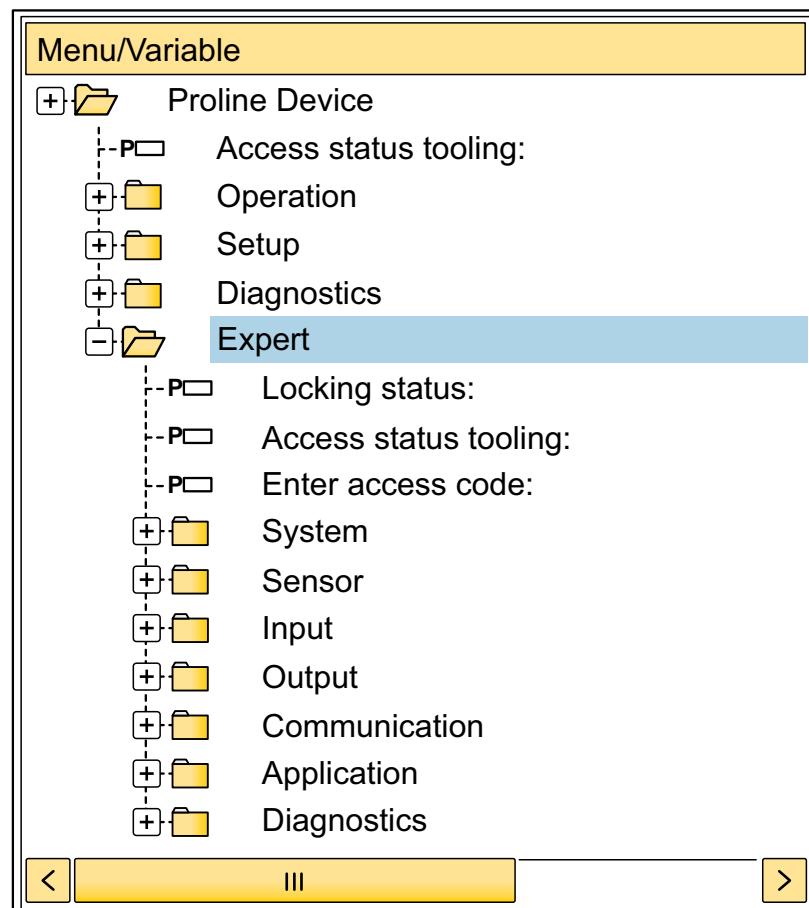


# Description of Device Parameters

## Proline Promag 500

## PROFINET

Electromagnetic flowmeter





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# 1      About this document

## 1.1    Document function

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

It is used to perform tasks that require detailed knowledge of the function of the device:

- Commissioning measurements under difficult conditions
- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

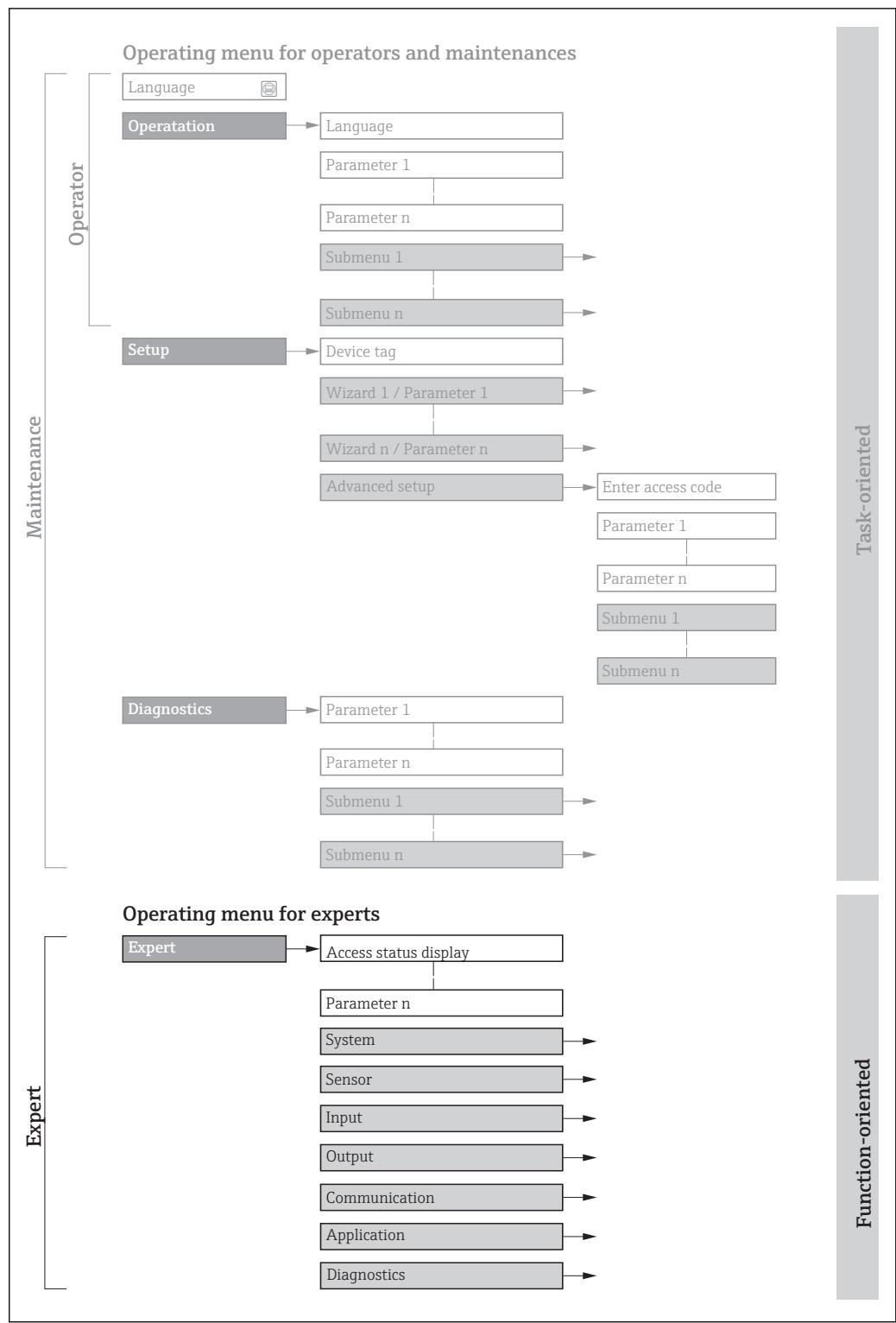
## 1.2    Target group

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

## 1.3    Using this document

### 1.3.1    Information on the document structure

The document lists the submenus and their parameters according to the structure from the **Expert** menu (→ 8), which is displayed when the "**Maintenance**" user role is enabled.



1 Sample graphic for the schematic layout of the operating menu



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

Write-protected parameter = 

**Navigation**



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

**Prerequisite**

The parameter is only available under these specific conditions

**Description**

Description of the parameter function

**Selection**

List of the individual options for the parameter

- Option 1
- Option 2

**User entry**

Input range for the parameter

**User interface**

Display value/data for the parameter

**Factory setting**

Default setting ex works

**Additional information**

Additional explanations (e.g. in examples):

- On individual options
- On display values/data
- On the input range
- On the factory setting
- On the parameter function

## 1.4 Symbols used

### 1.4.1 Symbols for certain types of information

Symbol	Meaning
	<b>Tip</b> Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Operation via local display
	Operation via operating tool
	Write-protected parameter

### 1.4.2 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3 ...	Item numbers	A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections		

## 1.5 Documentation

### 1.5.1 Standard documentation

#### Operating Instructions

Measuring device	Documentation code
Promag H 500	BA01723D
Promag P 500	BA01724D
Promag W 500	BA01725D

### 1.5.2 Supplementary device-dependent documentation

#### Special Documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D

Contents	Documentation code
Heartbeat Technology	SD01987D
Web server	SD01979D

## 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.

<b>Expert</b>	
Direct access (0106)	→ <a href="#">11</a>
Locking status (0004)	→ <a href="#">12</a>
Access status (0005)	→ <a href="#">13</a>
Ent. access code (0003)	→ <a href="#">13</a>
<b>System</b>	→ <a href="#">13</a>
► Display	→ <a href="#">14</a>
► Config. backup	→ <a href="#">28</a>
► Diagn. handling	→ <a href="#">31</a>
► Administration	→ <a href="#">40</a>
<b>Sensor</b>	→ <a href="#">44</a>
► Measured val.	→ <a href="#">45</a>
► System units	→ <a href="#">55</a>
► Process param.	→ <a href="#">70</a>
► External comp.	→ <a href="#">85</a>
► Sensor adjustm.	→ <a href="#">92</a>
► Calibration	→ <a href="#">98</a>
<b>I/O config.</b>	→ <a href="#">100</a>
I/O 1 to n terminals (3902–1 to n)	→ <a href="#">100</a>
I/O 1 to n info (3906–1 to n)	→ <a href="#">101</a>
I/O 1 to n type (3901–1 to n)	→ <a href="#">101</a>

Apply I/O config (3907)	→  102
Conversion code (2762)	→  102
▶ Input	→  102
▶ Current input 1 to n	→  102
▶ Status input 1 to n	→  106
▶ Output	→  108
▶ Curr.output 1 to n	→  108
▶ PFS output 1 to n	→  121
▶ Relay output 1 to n	→  140
▶ Communication	→  147
▶ PROFINET config.	→  147
▶ PROFINET info	→  148
▶ Web server	→  152
▶ WLAN settings	→  155
▶ Application	→  166
Reset all tot. (2806)	→  166
▶ Totalizer 1 to n	→  167
▶ Diagnostics	→  171
Actual diagnos. (0691)	→  172
Prev.diagnostics (0690)	→  173
Time fr. restart (0653)	→  174
Operating time (0652)	→  174
▶ Diagnostic list	→  174
▶ Event logbook	→  178
▶ Device info	→  181

► Main elec.+I/O1	→ 184
► Sens. electronic	→ 185
► I/O module 2	→ 188
► I/O module 3	→ 189
► I/O module 4	→ 190
► Display module	→ 191
► Min/max val.	→ 200
► Data logging	→ 192
► Heartbeat	→ 212
► Simulation	→ 212

### 3 Description of device parameters

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

Expert	
Direct access (0106)	→ 11
Locking status (0004)	→ 12
Access status (0005)	→ 13
Ent. access code (0003)	→ 13
▶ System	→ 13
▶ Sensor	→ 44
▶ I/O config.	→ 100
▶ Input	→ 102
▶ Output	→ 108
▶ Communication	→ 147
▶ Application	→ 166
▶ Diagnostics	→ 171

#### Direct access



##### Navigation

Expert → Direct access (0106)

##### Description

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

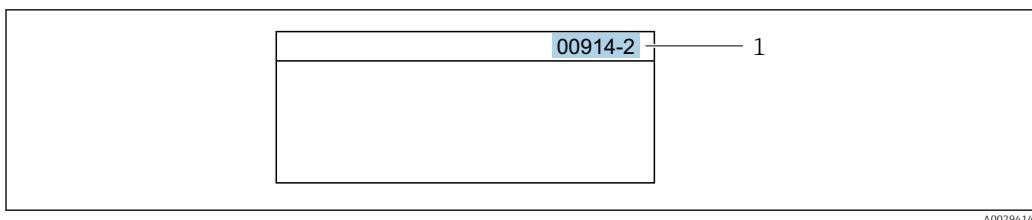
##### User entry

0 to 65 535

##### Additional information

*User entry*

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



1 Direct access code

Note the following when entering the direct access code:

- The leading zeros in the direct access code do not have to be entered.  
Example: Enter "914" instead of "00914"
- If no channel number is entered, channel 1 is accessed automatically.  
Example: Enter 00914 → **Assign variable** parameter
- If a different channel is accessed: Enter the direct access code with the corresponding channel number.  
Example: Enter 00914-2 → **Assign variable** parameter

## Locking status

### Navigation

  Expert → Locking status (0004)

### Description

Displays the active write protection.

### User interface

- Hardware locked
- Temp. 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

#### Selection

Options	Description
None	The access status displayed in the <b>Access status</b> parameter (→  13) applies . Only appears on local display.
Hardware locked (priority 1)	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) .
Temp. locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

---

**Access status**

---

<b>Navigation</b>	  Expert → Access status (0005)
<b>Description</b>	Displays the access authorization to the parameters via the local display, Web browser or operating tool.
<b>User interface</b>	<ul style="list-style-type: none"> <li>▪ Operator</li> <li>▪ Maintenance</li> </ul>
<b>Factory setting</b>	Maintenance
<b>Additional information</b>	<p><i>Description</i></p> <p> Access authorization can be modified via the <b>Ent. access code</b> parameter (→  13).</p> <p> If additional write protection is active, this restricts the current access authorization even further.</p> <p><i>Display</i></p> <p> 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</p>

---

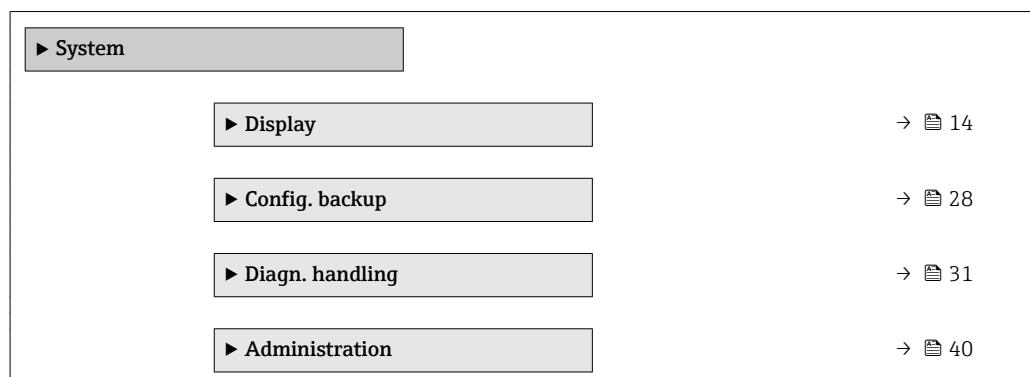
**Ent. access code**

---

<b>Navigation</b>	  Expert → Ent. access code (0003)
<b>Description</b>	Use this function to enter the user-specific release code to remove parameter write protection.
<b>User entry</b>	Max. 16-digit character string comprising numbers, letters and special characters

### 3.1 "System" submenu

*Navigation*   Expert → System



### 3.1.1 "Display" submenu

Navigation

Expert → System → Display

Item	Page
► Display	
Display language (0104)	→ 15
Format display (0098)	→ 15
Value 1 display (0107)	→ 18
0% bargraph 1 (0123)	→ 18
100% bargraph 1 (0125)	→ 19
Decimal places 1 (0095)	→ 19
Value 2 display (0108)	→ 20
Decimal places 2 (0117)	→ 21
Value 3 display (0110)	→ 21
0% bargraph 3 (0124)	→ 22
100% bargraph 3 (0126)	→ 23
Decimal places 3 (0118)	→ 23
Value 4 display (0109)	→ 24
Decimal places 4 (0119)	→ 25
Display interval (0096)	→ 25
Display damping (0094)	→ 25
Header (0097)	→ 26
Header text (0112)	→ 27
Separator (0101)	→ 27
Contrast display (0105)	→ 27
Backlight (0111)	→ 28

---

**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(Ru)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- العربية(Ara) \*
- Bahasa Indonesia
- ภาษาไทย (Thai) \*
- tiếng Việt (Vit)
- 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.
- Bagr. + 1 value
- 2 values
- Val. large+2val.
- 4 values

**Factory setting** 1 value, max.

---

\* Visibility depends on order options or device settings

**Additional information***Description*

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



- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 24) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the **Display interval** parameter (→ 25).

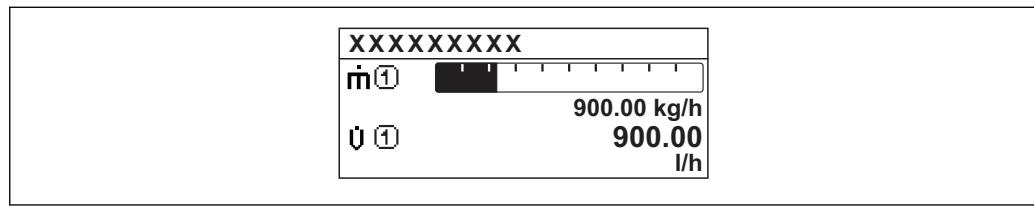
Possible measured values shown on the local display:

"1 value, max." option



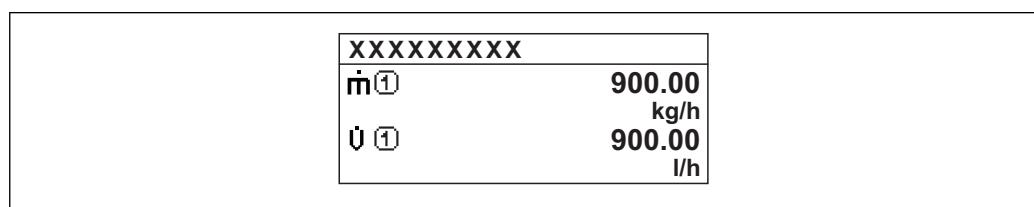
A0016529

"Bagr. + 1 value" option



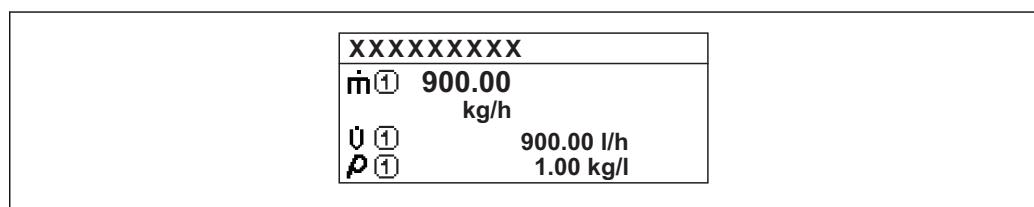
A0013098

"2 values" option



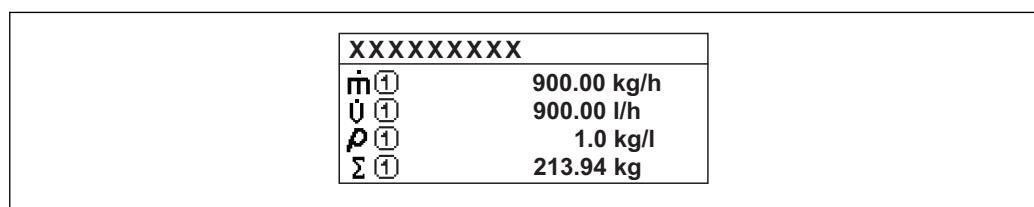
A0013100

"Val. large+2val." option



A0013102

"4 values" option



A0013103

**Value 1 display****Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity \*
- Conductivity \*
- CorrConductivity \*
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 \*
- Curr.output 2 \*
- Curr.output 3 \*
- Curr.output 4 \*
- Temperature \*
- Electronic temp.
- Noise \*
- CoilCurrShotTime \*
- Ref Electr. Pot. \*
- Coating meas.val \*
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Volume flow

**Additional information***Description*

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

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

*Dependency*

The unit of the displayed measured value is taken from the **System units** submenu (→ 55).

**0% bargraph 1****Navigation**

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

**Prerequisite**

A local display is provided.

\* Visibility depends on order options or device settings

<b>Description</b>	Use this function to enter the 0% bar graph value to be shown on the display for the measured value 1.
<b>User entry</b>	Signed floating-point number
<b>Factory setting</b>	Country-specific: ■ 0 l/h ■ 0 gal/min (us)
<b>Additional information</b>	<p><i>Description</i></p> <p> The <b>Format display</b> parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.</p> <p><i>User entry</i></p> <p> The unit of the displayed measured value is taken from the <b>System units</b> submenu (→ 55).</p>

## 100% bargraph 1



<b>Navigation</b>	  Expert → System → Display → 100% bargraph 1 (0125)
<b>Prerequisite</b>	A local display is provided.
<b>Description</b>	Use this function to enter the 100% bar graph value to be shown on the display for the measured value 1.
<b>User entry</b>	Signed floating-point number
<b>Factory setting</b>	Depends on country and nominal diameter → 222
<b>Additional information</b>	<p><i>Description</i></p> <p> The <b>Format display</b> parameter (→ 15) is used to specify that the measured value is to be displayed as a bar graph.</p> <p><i>User entry</i></p> <p> The unit of the displayed measured value is taken from the <b>System units</b> submenu (→ 55).</p>

## Decimal places 1



<b>Navigation</b>	  Expert → System → Display → Decimal places 1 (0095)
<b>Prerequisite</b>	A measured value is specified in the <b>Value 1 display</b> parameter (→ 18).
<b>Description</b>	Use this function to select the number of decimal places for measured value 1.

**Selection**

- X
- X.X
- X.XX
- X.XXX
- X.XXXX

**Factory setting**

X.XX

**Additional information***Description*

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

**Value 2 display****Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- None
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity \*
- CorrConductivity \*
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 \*
- Curr.output 2 \*
- Curr.output 3 \*
- Curr.output 4 \*
- Temperature
- Electronic temp.
- Noise \*
- CoilCurrShotTime \*
- Ref Electr. Pot. \*
- Coating meas.val \*
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

None

\* Visibility depends on order options or device settings

**Additional information***Description*

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



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

*Dependency*

The unit of the displayed measured value is taken from the **System units** submenu (→ 55).

**Decimal places 2****Navigation**

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

**Prerequisite**

A measured value is specified in the **Value 2 display** parameter (→ 20).

**Description**

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

**Selection**

- X
- X.X
- X.XX
- X.XXX
- X.XXXX

**Factory setting**

X.XX

**Additional information***Description*

This setting does not affect the measuring or computational accuracy of the device.

The arrow displayed between the measured value and the unit indicates that the device computes with more digits than are shown on the local display.

**Value 3 display****Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- None
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*

\* Visibility depends on order options or device settings

- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 \*
- Curr.output 2 \*
- Curr.output 3 \*
- Curr.output 4 \*
- Temperature
- Electronic temp.
- Noise \*
- CoilCurrShotTime \*
- Ref Electr. Pot. \*
- Coating meas.val \*
- Test point 1
- Test point 2
- Test point 3

**Factory setting** None

**Additional information** *Description*

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

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

*Selection*

 The unit of the displayed measured value is taken from the **System units** submenu (→ 55).

## 0% bargraph 3



**Navigation**

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

**Prerequisite**

A selection was made in the **Value 3 display** parameter (→ 21).

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

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

\* Visibility depends on order options or device settings

**Additional information***Description*

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

*User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 55).

**100% bargraph 3****Navigation**

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

**Prerequisite**

A selection was made in the **Value 3 display** parameter (→ 21).

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0

**Additional information***Description*

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

*User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 55).

**Decimal places 3****Navigation**

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

**Prerequisite**

A measured value is specified in the **Value 3 display** parameter (→ 21).

**Description**

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

**Selection**

- X
- X.X
- X.XX
- X.XXX
- X.XXXX

**Factory setting**

X.XX

**Additional information***Description*

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

**Value 4 display****Navigation**

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

**Prerequisite**

A local display is provided.

**Description**

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

**Selection**

- None
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity \*
- Conductivity \*
- CorrConductivity \*
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 \*
- Curr.output 2 \*
- Curr.output 3 \*
- Curr.output 4 \*
- Temperature
- Electronic temp.
- Noise \*
- CoilCurrShotTime \*
- Ref Electr. Pot. \*
- Coating meas.val \*
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

None

**Additional information***Description*

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



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

*Selection*

The unit of the displayed measured value is taken from the **System units** submenu (→ 55).

\* Visibility depends on order options or device settings

---

**Decimal places 4**

---

**Navigation**

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

**Prerequisite**

A measured value is specified in the **Value 4 display** parameter (→ [24](#)).

**Description**

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

**Selection**

- X
- X.X
- X.XX
- X.XXX
- X.XXXX

**Factory setting**

X.XX

**Additional information***Description*

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

---

**Display interval**

---

**Navigation**

Expert → System → Display → Display interval (0096)

**Prerequisite**

A local display is provided.

**Description**

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

**User entry**

1 to 10 s

**Factory setting**

5 s

**Additional information***Description*

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

- The **Value 1 display** parameter (→ [18](#)) to **Value 4 display** parameter (→ [24](#)) are used to specify which measured values are shown on the local display.  
■ The display format of the displayed measured values is specified using the **Format display** parameter (→ [15](#)).

---

**Display damping**

---

**Navigation**

Expert → System → Display → Display damping (0094)

**Prerequisite**

A local display is provided.

<b>Description</b>	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.
<b>User entry</b>	0.0 to 999.9 s
<b>Factory setting</b>	0.0 s
<b>Additional information</b>	<p><i>User entry</i></p> <p>Use this function to enter a time constant (PT1 element<sup>1)</sup>) for display damping:</p> <ul style="list-style-type: none"> <li>▪ If a low time constant is entered, the display reacts particularly quickly to fluctuating measured variables.</li> <li>▪ On the other hand, the display reacts more slowly if a high time constant is entered.</li> </ul> <p> Damping is switched off if <b>0</b> is entered (factory setting).</p>

**Header**

**Navigation**  Expert → System → Display → Header (0097)

**Prerequisite** A local display is provided.

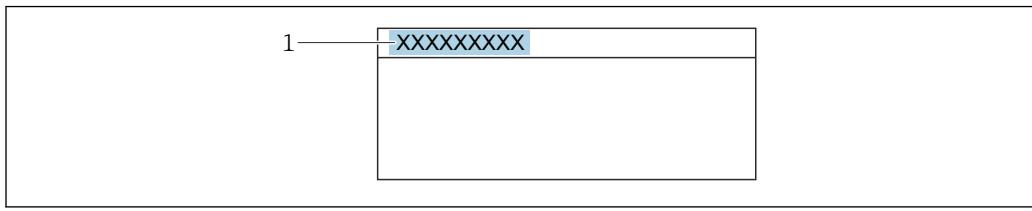
**Description** Use this function to select the contents of the header of the local display.

**Selection**

- Device tag
- Free text

**Factory setting** Device tag

**Additional information** *Description*  
The header text only appears during normal operation.



A0029422

1 Position of the header text on the display

*Selection*

- Device tag  
Is defined in the **Device tag** parameter (→  181).
- Free text  
Is defined in the **Header text** parameter (→  27).

1) proportional transmission behavior with first order delay

**Header text****Navigation**

Expert → System → Display → Header text (0112)

**Prerequisite**

In the **Header** parameter (→ 26), the **Free text** option is selected.

**Description**

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

**User entry**

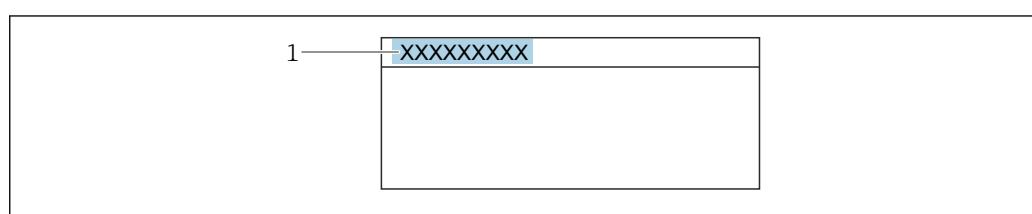
Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)

**Factory setting**

-----

**Additional information***Description*

The header text only appears during normal operation.



A0029422

1 Position of the header text on the display

**User entry**

The number of characters displayed depends on the characters used.

**Separator****Navigation**

Expert → System → Display → Separator (0101)

**Prerequisite**

A local display is provided.

**Description**

Use this function to select the decimal separator.

**Selection**

- . (point)
- , (comma)

**Factory setting**

. (point)

**Contrast display****Navigation**

Expert → System → Display → Contrast display (0105)

**Prerequisite**

A local display is provided.

<b>Description</b>	Use this function to enter a value to adapt the display contrast to the ambient conditions (e.g. the lighting or viewing angle).
<b>User entry</b>	20 to 80 %
<b>Factory setting</b>	Depends on the display

---

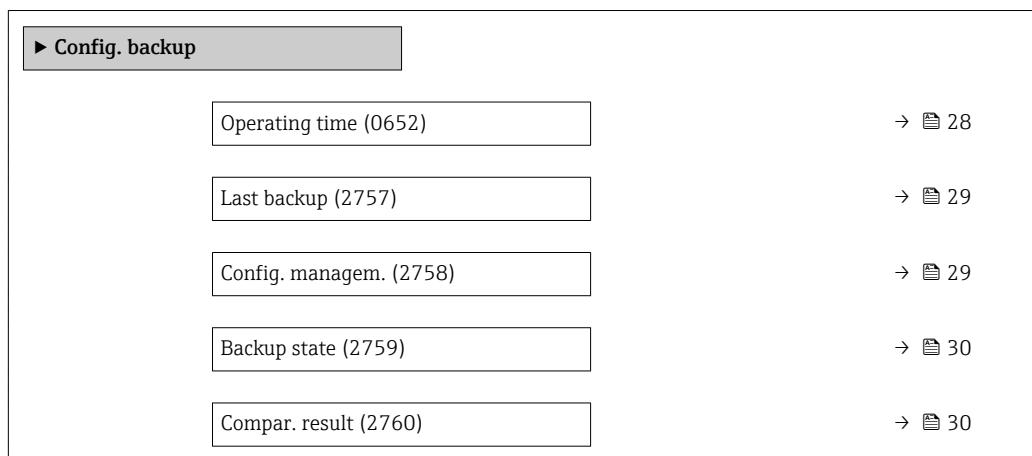
## Backlight

---

<b>Navigation</b>	Expert → System → Display → Backlight (0111)
<b>Prerequisite</b>	One of the following conditions is met: <ul style="list-style-type: none"> <li>▪ Order code for "Display; operation", option <b>F</b> "4-line, illum.; touch control"</li> <li>▪ Order code for "Display; operation", option <b>G</b> "4-line, illum.; touch control +WLAN"</li> </ul>
<b>Description</b>	Use this function to switch the backlight of the local display on and off.
<b>Selection</b>	<ul style="list-style-type: none"> <li>▪ Disable</li> <li>▪ Enable</li> </ul>
<b>Factory setting</b>	Enable

### 3.1.2 "Configuration backup" submenu

*Navigation* Expert → System → Config. backup




---

## Operating time

---

<b>Navigation</b>	Expert → System → Config. backup → Operating time (0652)
<b>Description</b>	Use this function to display the length of time the device has been in operation.

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

**Additional information** *User interface*

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

## Last backup

**Navigation**  Expert → System → Config. backup → Last backup (2757)

**Description** Displays the time since a backup copy of the data was last saved to the device memory.

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

## Config. managem.



**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

**Factory setting** Cancel

**Additional information** *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Execute backup	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!
Restore	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!

\* Visibility depends on order options or device settings

Options	Description
Compare	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 <b>Compar. result</b> parameter.
Clear backup	The backup copy of the device configuration is deleted from the memory of the device. The following message appears on local display: Deleting file

*HistoROM*

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

---

**Backup state**

---

**Navigation**

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

**Description**

Displays the status of the data backup process.

**User interface**

- None
- Backup in progr.
- Restore in progr.
- Delete in progr.
- Comp. in progr.
- Restoring failed
- Backup failed

**Factory setting**

None

---

**Compar. 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**

- Set. identical
- Set. not ident.
- No backup
- Backup corrupt
- Check not done
- Dataset incompl.

**Factory setting**

Check not done

**Additional information***Description*

The comparison is started via the **Compare** option in the **Config. managem.** parameter (→ 29).

*Selection*

Options	Description
Set. identical	The current device configuration of the HistoROM is identical to the backup copy in the device memory. If the transmitter configuration of another device has been transmitted to the device via HistoROM in the <b>Config. managem.</b> parameter, 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.
Set. not ident.	The current device configuration of the HistoROM is not identical to the backup copy in the device memory.
No backup	There is no backup copy of the device configuration of the HistoROM in the device memory.
Backup corrupt	The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the device memory.
Check not done	The device configuration of the HistoROM has not yet been compared to the backup copy in the device memory.
Dataset incompl.	The backup copy in the device memory is not compatible with the device.

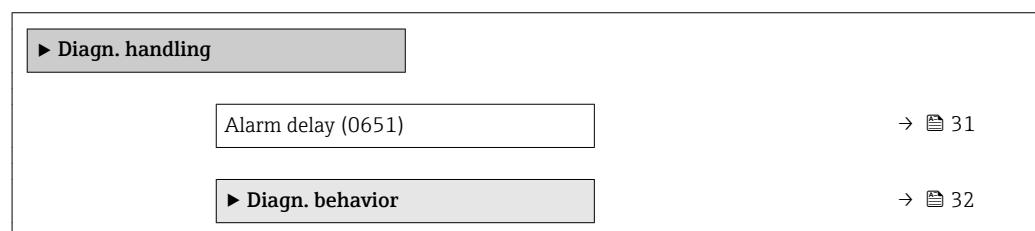
*HistoROM*

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

### 3.1.3 "Diagn. handling" submenu

*Navigation*

Expert → System → Diagn. handling

**Alarm delay****Navigation**

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

**Description**

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



The diagnostic message is reset without a time delay.

**User entry**

0 to 60 s

**Factory setting** 0 s

**Additional information** *Result*

This setting affects the following diagnostic messages:

- 170 coil resistance
- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.

#### "Diagn. 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 **Diagn. behavior** submenu (→ 32).

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

Options	Description
Alarm	The background lighting changes to red.
Warning	
Logbook only	The device continues to measure. The diagnostic message is displayed only in the <b>Event logbook</b> submenu (→ 178) ( <b>Event list</b> submenu (→ 180)) and is not displayed in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

Diagnostic behavior	Description
Alarm	The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated.
Warning	The device continues to measure. The measured value output via PROFINET and the totalizers are not affected. A diagnostic message is generated.
Logbook only	The device continues to measure. The diagnostic message is displayed only in the <b>Event logbook</b> submenu (→ 178) ( <b>Event list</b> submenu (→ 180)) and not in alternation 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

 <b>► Diagn. behavior</b>	
Diagnostic no. 043 (0650)	→ 33

Diagnostic no. 302 (0739)	→  34
Diagnostic no. 376 (0645)	→  34
Diagnostic no. 377 (0777)	→  34
Diagnostic no. 441 (0657)	→  35
Diagnostic no. 442 (0658)	→  35
Diagnostic no. 443 (0659)	→  35
Diagnostic no. 444 (0740)	→  36
Diagnostic no. 531 (0741)	→  36
Diagnostic no. 832 (0681)	→  37
Diagnostic no. 833 (0682)	→  37
Diagnostic no. 834 (0700)	→  37
Diagnostic no. 835 (0702)	→  38
Diagnostic no. 842 (0638)	→  38
Diagnostic no. 962 (0745)	→  39
Diagnostic no. 937 (0743)	→  38
Diagnostic no. 938 (0642)	→  39
Diagnostic no. 961 (0736)	→  39

**Diagnostic no. 043 (Sens.short circ.)****Navigation**

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

**Description**

Option for changing the diagnostic behavior of the diagnostic message **043 Sens.short circ.**.

**Selection**

- Off
- Alarm
- Warning
- Logbook only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection: → 32

**Diagnostic no. 302 (Verific. active)****Navigation**

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

**Description**

Option for changing the diagnostic behavior of the diagnostic message **302 Verific. active.**

**Selection**

- Alarm
- Warning

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection: → 32

**Diagnostic no. 376 (Sensor electron.)****Navigation**

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

**Description**

Option for changing the diagnostic behavior of the diagnostic message **376 Sensor electron..**

**Selection**

- Off
- Alarm
- Warning
- Logbook only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection: → 32

**Diagnostic no. 377 (Sensor electron.)****Navigation**

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

**Description**

Option for changing the diagnostic behavior of the diagnostic message **377 Sensor electron..**

**Selection**

- Off
- Alarm
- Warning
- Logbook only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection: → [32](#)

**Diagnostic no. 441 (Curr.output 1 to n)****Navigation**

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

**Description**

Option for changing the diagnostic behavior of the diagnostic message **441 Curr.output 1 to n**.

**Selection**

- Off
- Alarm
- Warning
- Logbook only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection: → [32](#)

**Diagnostic no. 442 (Freq. 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**

Option for changing the diagnostic behavior of the diagnostic message **442 Freq. output 1 to n**.

**Selection**

- Off
- Alarm
- Warning
- Logbook only

**Factory setting**

Warning

**Additional information**

Detailed description of the options available for selection: → [32](#)

**Diagnostic no. 443 (Pulse output 1 to n)****Navigation**

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

**Prerequisite**

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

**Description**

Option for changing the diagnostic behavior of the diagnostic message **443 Pulse output 1 to n**.

<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	 Detailed description of the options available for selection: → <a href="#">32</a>

---

**Diagnostic no. 444 (Current input 1 to n)**

---



<b>Navigation</b>	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 444 (0740)
<b>Prerequisite</b>	The device has one current input.
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>444 Current input 1 to n</b> .
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	 Detailed description of the options available for selection: → <a href="#">32</a>

---

**Diagnostic no. 531 (Empty pipe det.)**

---



<b>Navigation</b>	  Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531 (0741)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>531 Empty pipe det.</b> .
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	 Detailed description of the options available for selection: → <a href="#">32</a>

---

**Diagnostic no. 832 (Electronic temp.)**

---



<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>832 Electronic temp..</b>
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Logbook only
<b>Additional information</b>	Detailed description of the options available for selection: →  32

---

**Diagnostic no. 833 (Electronic temp.)**

---



<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>833 Electronic temp..</b>
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Logbook only
<b>Additional information</b>	Detailed description of the options available for selection: →  32

---

**Diagnostic no. 834 (Process temp.)**

---



<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>834 Process temp..</b>
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	Detailed description of the options available for selection: →  32

**Diagnostic no. 835 (Process temp.)**

<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>835 Process temp..</b>
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	Detailed description of the options available for selection: → <a href="#">32</a>

**Diagnostic no. 842 (Process limit)**

<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 842 (0638)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>△S842 Process limit.</b>
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Off
<b>Additional information</b>	Detailed description of the options available for selection: → <a href="#">32</a>

**Diagnostic no. 937 (EMC interference)**

<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937 (0743)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>937 EMC interference.</b>
<b>Selection</b>	<ul style="list-style-type: none"><li>▪ Off</li><li>▪ Alarm</li><li>▪ Warning</li><li>▪ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	Detailed description of the options available for selection: → <a href="#">32</a>

---

**Diagnostic no. 938 (EMC interference)**

<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 938 (0642)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>938 EMC interference</b> .
<b>Selection</b>	<ul style="list-style-type: none"><li>■ Off</li><li>■ Alarm</li><li>■ Warning</li><li>■ Logbook only</li></ul>
<b>Factory setting</b>	Alarm
<b>Additional information</b>	Detailed description of the options available for selection: →  32

---

**Diagnostic no. 961**

<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 961 (0736)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>861 Process fluid</b> .
<b>Selection</b>	<ul style="list-style-type: none"><li>■ Off</li><li>■ Alarm</li><li>■ Warning</li><li>■ Logbook only</li></ul>
<b>Factory setting</b>	Alarm
<b>Additional information</b>	Detailed description of the options available for selection: →  32

---

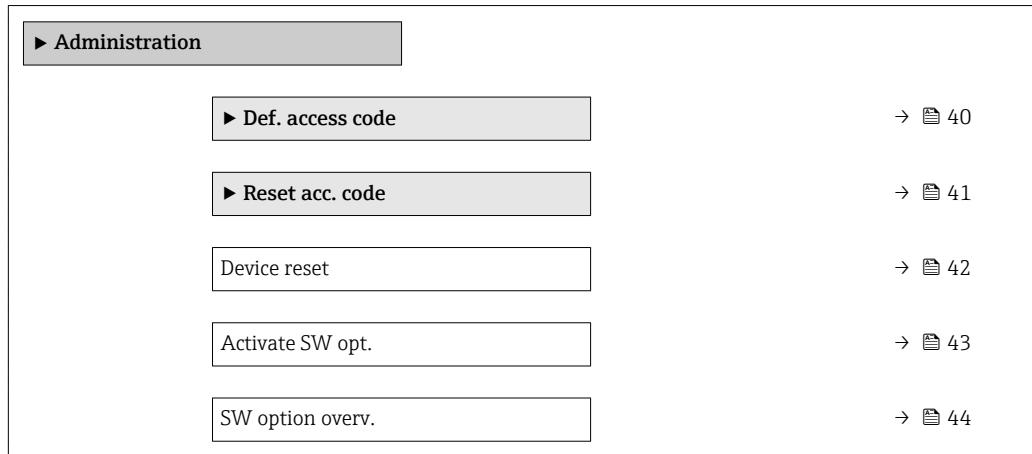
**Diagnostic no. 962 (Pipe empty)**

<b>Navigation</b>	Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 962 (0745)
<b>Description</b>	Option for changing the diagnostic behavior of the diagnostic message <b>862 Pipe empty</b> .
<b>Selection</b>	<ul style="list-style-type: none"><li>■ Off</li><li>■ Alarm</li><li>■ Warning</li><li>■ Logbook only</li></ul>
<b>Factory setting</b>	Warning
<b>Additional information</b>	Detailed description of the options available for selection: →  32

### 3.1.4 "Administration" submenu

Navigation

Expert → System → Administration



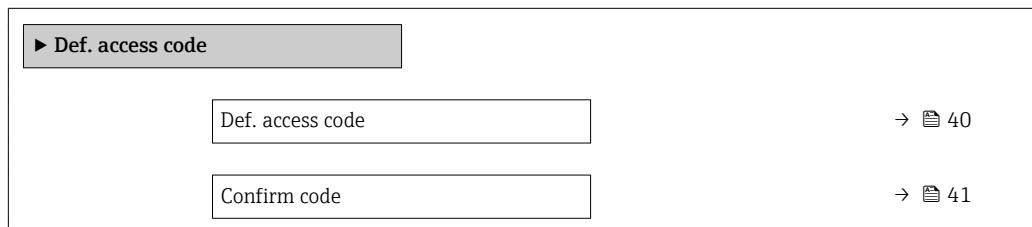
#### "Def. access code" wizard

**i** The **Def. access code** wizard (→ 40) is only available when operating via the local display or Web browser.

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

Navigation

Expert → System → Administration → Def. access code



## Def. 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.

**i** Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the **Ent. access code** parameter (→ 13).

**i** 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 code



#### Navigation

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

#### Description

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

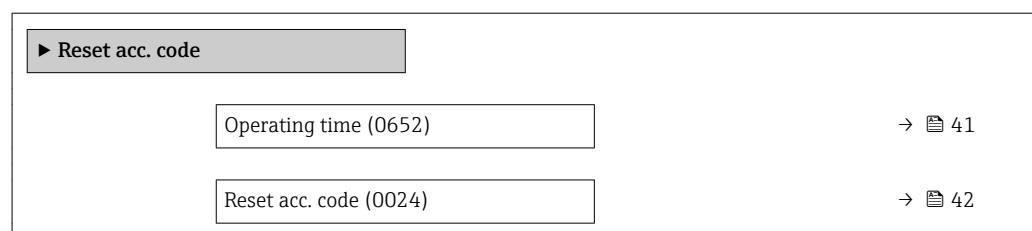
#### User entry

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

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

#### Description

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

#### User interface

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

#### Additional information

*User interface*

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

**Reset acc. code**

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

**Description** Use this function to enter a reset code to reset the user-specific release code 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 interface CDI RJ45)
- Fieldbus

**Additional parameters in the "Administration" submenu****Device reset** 

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

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

**Selection**

- Cancel
- To delivery set.
- Restart device
- Rest.S-DATBackup \*

**Factory setting** Cancel

**Additional information** *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery set.	Every parameter for which a customer-specific default setting was ordered is reset to this customer-specific value. All other parameters are reset to the factory setting.

\* Visibility depends on order options or device settings

Options	Description
Restart device	The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
Rest.S-DATBackup	Restore the data that are saved on the S-DAT. The data record is restored from the electronics memory to the S-DAT.  This option is displayed only in an alarm condition.

**Activate SW opt.****Navigation**

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

**Description**

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

**User entry**

Max. 10-digit string consisting of numbers.

**Factory setting**

Depends on the software option ordered

**Additional information***Description*

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

*User entry*

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

**NOTE!**

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

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

- ▶ Before you enter a new activation code, make a note of the current activation code .
- ▶ Enter the new activation code provided by Endress+Hauser when the new software option was ordered.
- ▶ Once the activation code has been entered, check if the new software option is displayed in the **SW option overv.** parameter (→  44).
- ↳ 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"

- i** The software options currently enabled are displayed in the **SW option overv.** parameter (→ 44).

*Web browser*

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

---

## SW option overv.

---

### Navigation

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

### Description

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

### User interface

- Extend. HistoROM \*
- ECC \*
- HBT Monitoring \*
- HBT Verification \*
- Coating detect.

### Additional information

#### Description

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

*"Extend. HistoROM" option*

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

*"ECC" option*

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

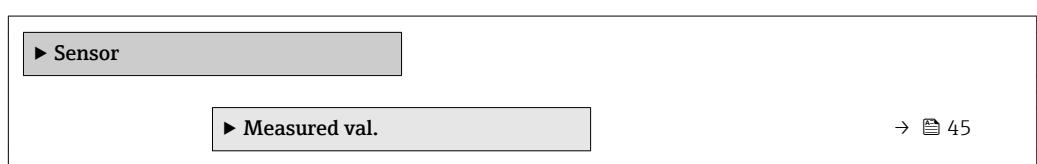
*"HBT Verification" option and "HBT Monitoring" option*

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

## 3.2 "Sensor" submenu

### Navigation

Expert → Sensor




---

\* Visibility depends on order options or device settings

▶ System units	→ 55
▶ Process param.	→ 70
▶ External comp.	→ 85
▶ Sensor adjustm.	→ 92
▶ Calibration	→ 98

### 3.2.1 "Measured val." submenu

*Navigation*

Expert → Sensor → Measured val.

▶ Measured val.	
▶ Process variab.	→ 45
▶ Totalizer	→ 48
▶ Input values	→ 50
▶ Output values	→ 51

#### "Process variables" submenu

*Navigation*

Expert → Sensor → Measured val. → Process variab.

▶ Process variab.	
Volume flow (1838)	→ 46
Mass flow (1847)	→ 46
Correct.vol.flow (1851)	→ 46
Flow velocity (1854)	→ 46
Conductivity (1850)	→ 47
CorrConductivity (1853)	→ 47
Temperature (1852)	→ 47
Density (1857)	→ 48

**Volume flow**

---

**Navigation**   Expert → Sensor → Measured val. → Process variab. → Volume flow (1838)

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

**User interface** Signed floating-point number

**Additional information**

---

**Mass flow**

---

**Navigation**   Expert → Sensor → Measured val. → Process variab. → Mass flow (1847)

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

**User interface** Signed floating-point number

**Additional information** *Dependency*

 The unit is taken from the **Mass flow unit** parameter (→  58)

---

**Correct.vol.flow**

---

**Navigation**   Expert → Sensor → Measured val. → Process variab. → Correct.vol.flow (1851)

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

**User interface** Signed floating-point number

**Additional information** *Dependency*

 The unit is taken from the **Cor.volflow unit** parameter (→  60)

---

**Flow velocity**

---

**Navigation**   Expert → Sensor → Measured val. → Process variab. → Flow velocity (1854)

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

**User interface** Signed floating-point number

---

## Conductivity

---

<b>Navigation</b>	  Expert → Sensor → Measured val. → Process variab. → Conductivity (1850)
<b>Description</b>	Displays the conductivity that is currently measured.
<b>User interface</b>	Signed floating-point number
<b>Additional information</b>	<i>Dependency</i>  The unit is taken from the <b>Conductiv. unit</b> parameter (→  57)

---

## CorrConductivity

---

<b>Navigation</b>	  Expert → Sensor → Measured val. → Process variab. → CorrConductivity (1853)
<b>Prerequisite</b>	One of the following conditions is met: <ul style="list-style-type: none"><li>■ Order code for "Sensor option", option <b>CI</b> "Medium temperature measurement" or</li><li>■ The temperature is read into the flowmeter from an external device.</li></ul>
<b>Description</b>	Displays the conductivity that is currently corrected.
<b>User interface</b>	Positive floating-point number
<b>Additional information</b>	<i>Dependency</i>  The unit is taken from the <b>Conductiv. unit</b> parameter (→  57)

---

## Temperature

---

<b>Navigation</b>	  Expert → Sensor → Measured val. → Process variab. → Temperature (1852)
<b>Prerequisite</b>	One of the following conditions is met: <ul style="list-style-type: none"><li>■ Order code for "Sensor option", option <b>CI</b> "Medium temperature measurement" or</li><li>■ The temperature is read into the flowmeter from an external device.</li></ul>
<b>Description</b>	Displays the temperature that is currently calculated.
<b>User interface</b>	Positive floating-point number
<b>Additional information</b>	<i>Dependency</i>  The unit is taken from the <b>Temperature unit</b> parameter (→  58)

## Density

---

**Navigation**  Expert → Sensor → Measured val. → Process variab. → Density (1857)

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

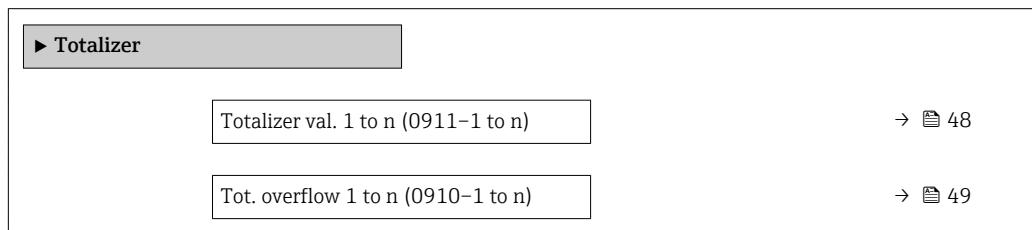
**User interface** Signed floating-point number

**Additional information** *Dependency*

 The unit is taken from the **Density unit** parameter (→  59)

## "Totalizer" submenu

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



## Totalizer val. 1 to n



**Navigation**  Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to n (0911-1 to n)

**Prerequisite** A process variable is selected in the **Assign variable** parameter (→  167) of the **Totalizer 1 to n** submenu.

**Description** Displays the current totalizer reading.

**User interface** Signed floating-point number

**Additional information***Description*

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



In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 170).

*User interface*

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Operation mode** parameter (→ 169).



The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 168).

*Example*

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

- Value in the **Totalizer val. 1** parameter: 1 968 457 m<sup>3</sup>
- Value in the **Tot. overflow 1** parameter:  $1 \cdot 10^7$  (1 overflow) = 10 000 000 [m<sup>3</sup>]
- Current totalizer reading: 11 968 457 m<sup>3</sup>

**Tot. overflow 1 to n****Navigation**

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

**Prerequisite**

A process variable is selected in the **Assign variable** parameter (→ 167) of the **Totalizer 1 to n** submenu.

**Description**

Displays the current totalizer overflow.

**User interface**

Integer with sign

**Additional information***Description*

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

*User interface*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 168).

*Example*

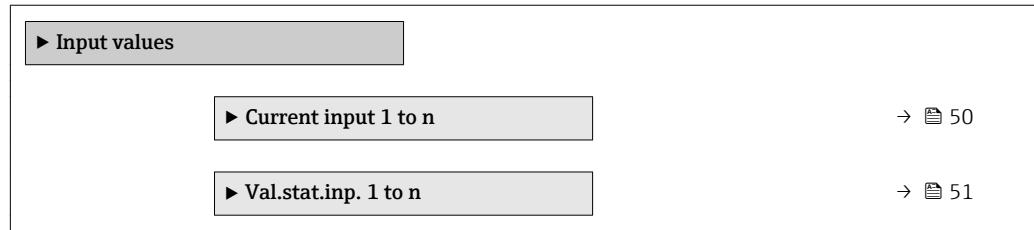
Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:

- Value in the **Totalizer val. 1** parameter: 1 968 457 m<sup>3</sup>
- Value in the **Tot. overflow 1** parameter:  $2 \cdot 10^7$  (2 overflows) = 20 000 000 [m<sup>3</sup>]
- Current totalizer reading: 21 968 457 m<sup>3</sup>

**"Input values" submenu**

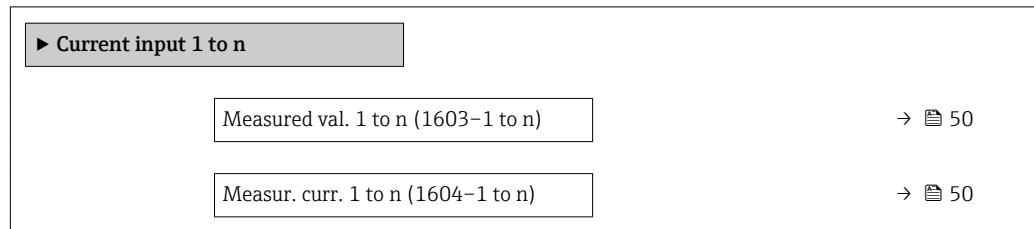
Navigation

Expert → Sensor → Measured val. → Input values

**"Current input 1 to n" submenu**

Navigation

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



---

**Measured val. 1 to n****Navigation**Expert → Sensor → Measured val. → Input values → Current input 1 to n  
→ Measured val. 1 to n (1603-1 to n)**Description**

Displays the current input value.

**User interface**

Signed floating-point number

---

**Measur. curr. 1 to n****Navigation**Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur.  
curr. 1 to n (1604-1 to n)**Description**

Displays the current value of the current input.

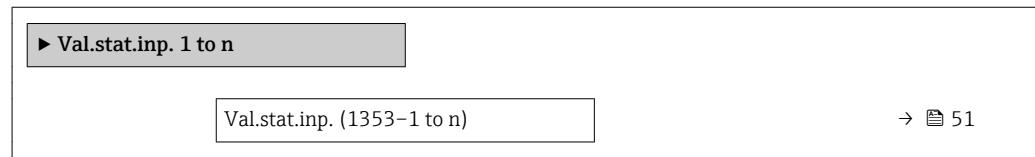
**User interface**

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



## Val.stat.inp.

### 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.

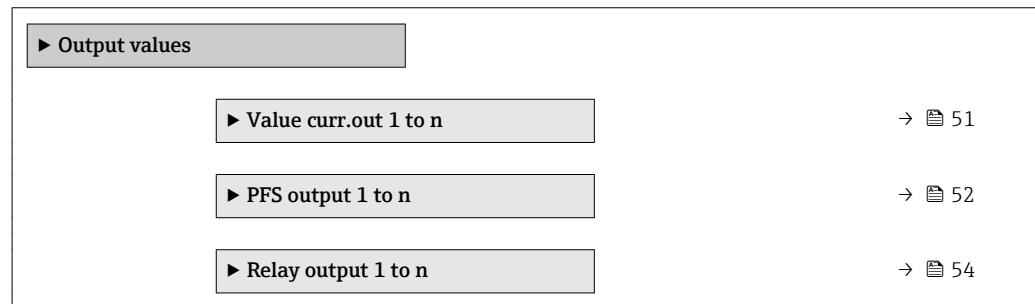
### User interface

- High
- Low

*"Output values" submenu*

*Navigation*

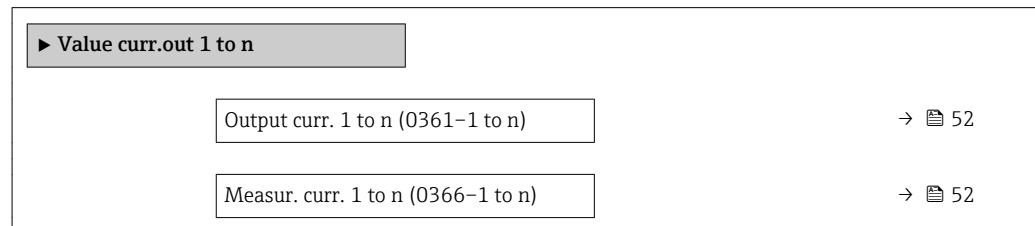
Expert → Sensor → Measured val. → Output values



*"Value current output 1 to n" submenu*

*Navigation*

Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n



**Output curr. 1 to n**

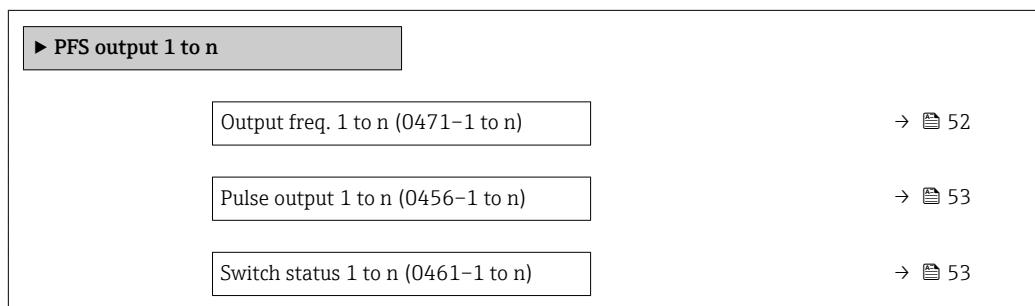
<b>Navigation</b>	  Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Output curr. 1 to n (0361–1 to n)
<b>Description</b>	Displays the current value currently calculated for the current output.
<b>User interface</b>	0 to 22.5 mA

**Measur. curr. 1 to n**

<b>Navigation</b>	  Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Measur. curr. 1 to n (0366–1 to n)
<b>Description</b>	Use this function to display the actual measured value of the output current.
<b>User interface</b>	0 to 30 mA

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

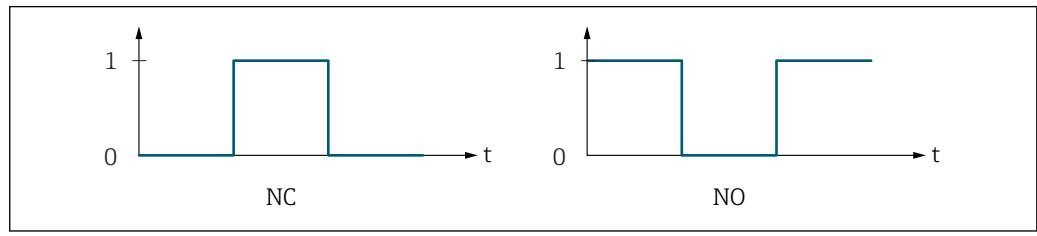
*Navigation*        Expert → Sensor → Measured val. → Output values → PFS output 1 to n

**Output freq. 1 to n**

<b>Navigation</b>	  Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Output freq. 1 to n (0471–1 to n)
<b>Prerequisite</b>	In the <b>Operating mode</b> parameter (→ 123), the <b>Frequency</b> option is selected.
<b>Description</b>	Displays the actual value of the output frequency which is currently measured.
<b>User interface</b>	0.0 to 12 500.0 Hz

## Pulse output 1 to n

<b>Navigation</b>	Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Pulse output 1 to n (0456–1 to n)
<b>Prerequisite</b>	The <b>Pulse</b> option is selected in the <b>Operating mode</b> parameter (→ 123) parameter.
<b>Description</b>	Displays the pulse frequency currently output.
<b>User interface</b>	Positive floating-point number
<b>Additional information</b>	<p><i>Description</i></p> <ul style="list-style-type: none"> <li>■ The pulse output is an open collector output.</li> <li>■ 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.</li> </ul>



A0028726

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

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

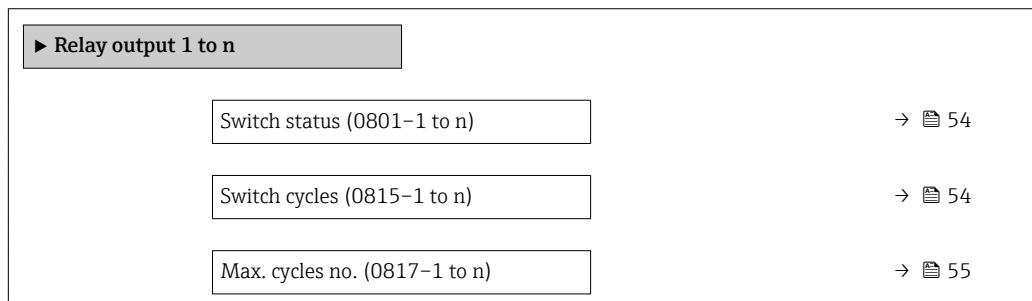
In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 127)) can be configured.

## Switch status 1 to n

<b>Navigation</b>	Expert → Sensor → Measured val. → Output values → PFS output 1 to n → Switch status 1 to n (0461–1 to n)
<b>Prerequisite</b>	The <b>Switch</b> option is selected in the <b>Operating mode</b> parameter (→ 123).
<b>Description</b>	Displays the current switch status of the status output.
<b>User interface</b>	<ul style="list-style-type: none"> <li>■ Open</li> <li>■ Closed</li> </ul>

**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

---

**Switch status****Navigation** Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Switch status (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. cycles no.**

<b>Navigation</b>	 Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no. (0817–1 to n)
<b>Description</b>	Displays the maximum number of guaranteed switch cycles.
<b>User interface</b>	Positive integer

**3.2.2 "System units" submenu***Navigation* Expert → Sensor → System units

 System units	
Volume flow unit (0553)	→  55
Volume unit (0563)	→  57
Conductiv. unit (0582)	→  57
Temperature unit (0557)	→  58
Mass flow unit (0554)	→  58
Mass unit (0574)	→  59
Density unit (0555)	→  59
Cor.volflow unit (0558)	→  60
Corr. vol. unit (0575)	→  61
Date/time format (2812)	→  62

**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**

	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ cm <sup>3</sup> /s	■ af/s	■ gal/s (imp)
	■ cm <sup>3</sup> /min	■ af/min	■ gal/min (imp)
	■ cm <sup>3</sup> /h	■ af/h	■ gal/h (imp)
	■ cm <sup>3</sup> /d	■ af/d	■ gal/d (imp)
	■ dm <sup>3</sup> /s	■ ft <sup>3</sup> /s	■ Mgal/s (imp)
	■ dm <sup>3</sup> /min	■ ft <sup>3</sup> /min	■ Mgal/min (imp)
	■ dm <sup>3</sup> /h	■ ft <sup>3</sup> /h	■ Mgal/h (imp)
	■ dm <sup>3</sup> /d	■ ft <sup>3</sup> /d	■ Mgal/d (imp)
	■ m <sup>3</sup> /s	■ MMft <sup>3</sup> /s	■ bbl/s (imp;beer)
	■ m <sup>3</sup> /min	■ MMft <sup>3</sup> /min	■ bbl/min (imp;beer)
	■ m <sup>3</sup> /h	■ MMft <sup>3</sup> /h	■ bbl/h (imp;beer)
	■ m <sup>3</sup> /d	■ Mft <sup>3</sup> /d	■ bbl/d (imp;beer)
	■ ml/s	■ fl oz/s (us)	■ bbl/s (imp;oil)
	■ ml/min	■ fl oz/min (us)	■ bbl/min (imp;oil)
	■ ml/h	■ fl oz/h (us)	■ bbl/h (imp;oil)
	■ ml/d	■ fl oz/d (us)	■ bbl/d (imp;oil)
	■ l/s	■ gal/s (us)	
	■ l/min	■ gal/min (us)	
	■ l/h	■ gal/h (us)	
	■ l/d	■ gal/d (us)	
	■ hl/s	■ Mgal/s (us)	
	■ hl/min	■ Mgal/min (us)	
	■ hl/h	■ Mgal/h (us)	
	■ hl/d	■ Mgal/d (us)	
	■ Ml/s	■ bbl/s (us;liq.)	
	■ Ml/min	■ bbl/min (us;liq.)	
	■ Ml/h	■ bbl/h (us;liq.)	
	■ Ml/d	■ 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)	
		■ kgal/s (us)	
		■ kgal/min (us)	
		■ kgal/h (us)	
		■ kgal/d (us)	

**Factory setting**

Country-specific:

- l/h
- gal/min (us)

**Additional information***Result*

The selected unit applies for:

Volume flow parameter (→  46)*Selection*

 For an explanation of the abbreviated units: →  229

**Volume unit****Navigation**

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

**Description**

Use this function to select the unit for the volume.

**Selection***SI units*

- cm<sup>3</sup>
- dm<sup>3</sup>
- m<sup>3</sup>
- ml
- l
- hl
- Ml Mega

*US units*

- af
- ft<sup>3</sup>
- Mft<sup>3</sup>
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;oil)
- bbl (us;liq.)
- bbl (us;beer)
- bbl (us;tank)

*Imperial units*

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

**Factory setting**

Country-specific:

- m<sup>3</sup>
- gal (us)

**Additional information***Selection*

For an explanation of the abbreviated units: → 229

**Conductiv. unit****Navigation**

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

**Prerequisite**

The **On** option is selected in the **Conduct. measur.** parameter (→ 74) parameter.

**Description**

Use this function to select the unit for the conductivity.

**Selection***SI units*

- nS/cm
- µS/cm
- µS/m
- µS/mm
- mS/m
- mS/cm
- S/cm
- S/m
- kS/m
- MS/m

**Factory setting**

µS/cm

**Additional information***Effect*

The selected unit applies for:

- **Conductivity** parameter (→ [47](#))
- **CorrConductivity** parameter (→ [47](#))

*Selection*

 For an explanation of the abbreviated units: → [229](#)

**Temperature unit****Navigation**

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

**Description**

Use this function to select the unit for the temperature.

**Selection***SI units*

- °C
- K

*US units*

- °F
- °R

**Factory setting**

Country-specific:

- °C
- °F

**Additional information***Result*

The selected unit applies for:

- **Temperature** parameter (→ [47](#))
- **Maximum value** parameter (→ [203](#))
- **Minimum value** parameter (→ [202](#))
- **External temp.** parameter (→ [90](#))
- **Maximum value** parameter (→ [204](#))
- **Minimum value** parameter (→ [203](#))
- **FailSafeValExtT** parameter (→ [91](#))

*Selection*

 For an explanation of the abbreviated units: → [229](#)

**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	<i>SI units</i>	<i>US units</i>
	▪ g/s	▪ oz/s
	▪ g/min	▪ oz/min
	▪ g/h	▪ oz/h
	▪ g/d	▪ oz/d
	▪ kg/s	▪ lb/s
	▪ kg/min	▪ lb/min
	▪ kg/h	▪ lb/h
	▪ kg/d	▪ lb/d
	▪ t/s	▪ STon/s
	▪ t/min	▪ STon/min
	▪ t/h	▪ STon/h
	▪ t/d	▪ STon/d
Factory setting	Country-specific:	
	▪ kg/h	
	▪ lb/min	
Additional information	<i>Result</i>	
	The selected unit applies for:	
	<b>Mass flow parameter</b> (→  46)	
	<i>Selection</i>	
	 For an explanation of the abbreviated units: →  229	

## Mass unit



Navigation	  Expert → Sensor → System units → Mass unit (0574)								
Description	Use this function to select the unit for the mass.								
Selection	<table border="1"> <thead> <tr> <th><i>SI units</i></th> <th><i>US units</i></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>	<i>SI units</i>	<i>US units</i>	▪ g	▪ oz	▪ kg	▪ lb	▪ t	▪ STon
<i>SI units</i>	<i>US units</i>								
▪ g	▪ oz								
▪ kg	▪ lb								
▪ t	▪ STon								
Factory setting	Country-specific: ▪ kg ▪ lb								
Additional information	<i>Selection</i>								
	 For an explanation of the abbreviated units: →  229								

## 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/cm<sup>3</sup>
- g/m<sup>3</sup>
- kg/l
- kg/dm<sup>3</sup>
- kg/m<sup>3</sup>
- SD4°C
- SD15°C
- SD20°C
- SG4°C
- SG15°C
- SG20°C

*US units*

- lb/ft<sup>3</sup>
- lb/gal (us)
- lb/bbl (us;liq.)
- lb/bbl (us;beer)
- lb/bbl (us;oil)
- lb/bbl (us;tank)

*Imperial units*

- lb/gal (imp)
- lb/bbl (imp;beer)
- lb/bbl (imp;oil)

**Factory setting**

## Country-specific:

- kg/l
- lb/ft<sup>3</sup>

**Additional information***Result*

The selected unit applies for:

- **External density** parameter (→  86)
- **Fixed density** parameter (→  86)

*Selection*

- SD = specific density

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

- SG = specific gravity

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

 For an explanation of the abbreviated units: →  229

**Cor.volflow unit****Navigation**

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

**Description**

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

<b>Selection</b>	<i>SI units</i>	<i>US units</i>	<i>Imperial units</i>
	■ Nl/s	■ Sft <sup>3</sup> /s	■ Sgal/s (imp)
	■ Nl/min	■ Sft <sup>3</sup> /min	■ Sgal/min (imp)
	■ Nl/h	■ Sft <sup>3</sup> /h	■ Sgal/h (imp)
	■ Nl/d	■ Sft <sup>3</sup> /d	■ Sgal/d (imp)
	■ Nhl/s	■ Sgal/s (us)	
	■ Nhl/min	■ Sgal/min (us)	
	■ Nhl/h	■ Sgal/h (us)	
	■ Nhl/d	■ Sgal/d (us)	
	■ Nm <sup>3</sup> /s	■ Sbbl/s (us;liq.)	
	■ Nm <sup>3</sup> /min	■ Sbbl/min (us;liq.)	
	■ Nm <sup>3</sup> /h	■ Sbbl/h (us;liq.)	
	■ Nm <sup>3</sup> /d	■ Sbbl/d (us;liq.)	
	■ Sl/s	■ MMSft <sup>3</sup> /s	
	■ Sl/min	■ MMSft <sup>3</sup> /min	
	■ Sl/h	■ Sbbl/s (us;oil)	
	■ Sl/d	■ Sbbl/min (us;oil)	
	■ Sm <sup>3</sup> /s	■ Sbbl/h (us;oil)	
	■ Sm <sup>3</sup> /min	■ Sbbl/d (us;oil)	
	■ Sm <sup>3</sup> /h		
	■ Sm <sup>3</sup> /d		
	■ MSft <sup>3</sup> /d		

**Factory setting** Country-specific:

- Nl/h
- Sft<sup>3</sup>/h

**Additional information**

*Result*

The selected unit applies for:

**Correct.vol.flow** parameter (→  46)

*Selection*

 For an explanation of the abbreviated units: →  229

## Corr. vol. unit



**Navigation**

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

**Description**

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

**Selection**

*SI units*

- Nl
- Nhl
- Nm<sup>3</sup>
- Sl
- Sm<sup>3</sup>

*US units*

- Sft<sup>3</sup>
- MMSft<sup>3</sup>
- Sgal (us)
- Sbbl (us;liq.)
- Sbbl (us;oil)

*Imperial units*

- Sgal (imp)

**Factory setting**

Country-specific:

- Nm<sup>3</sup>
- Sft<sup>3</sup>

**Additional information***Selection*For an explanation of the abbreviated units: → [229](#)**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 am/pm
- mm/dd/yy hh:mm
- mm/dd/yy am/pm

**Factory setting**

dd.mm.yy hh:mm

**Additional information***Selection*For an explanation of the abbreviated units: → [229](#)**"User-spec. units" submenu***Navigation*

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

► User-spec. units	
Volume text (0567)	→ <a href="#">63</a>
Volume offset (0569)	→ <a href="#">64</a>
Volume factor (0568)	→ <a href="#">64</a>
Mass text (0560)	→ <a href="#">64</a>
Mass offset (0562)	→ <a href="#">65</a>
Mass factor (0561)	→ <a href="#">65</a>
Corr. vol. text (0592)	→ <a href="#">65</a>
Corr vol. offset (0602)	→ <a href="#">66</a>
Cor.vol. factor (0590)	→ <a href="#">66</a>
Density text (0570)	→ <a href="#">66</a>

Density offset (0571)	→  67
Density factor (0572)	→  67
Spec. enth. text (0585)	→  67
Spec. enth. off. (0584)	→  68
Spec. enth. fac. (0583)	→  68
Energy text (0600)	→  68
Energy offset (0599)	→  69
Energy factor (0586)	→  69
Pressure text (0581)	→  69
Pressure offset (0580)	→  70
Pressure factor (0579)	→  70

## Volume text



### Navigation

Expert → Sensor → System units → User-spec. units → Volume text (0567)

### Description

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

### User entry

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

### Factory setting

User vol.

### Additional information

*Result*

- The defined unit is shown as an option in the choose list of the following parameters:
- **Volume flow unit** parameter (→ 55)
  - **Volume unit** parameter (→ 57)

*Example*

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 55) shows the following options:

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

**Volume offset**

**Navigation** Expert → Sensor → System units → User-spec. units → Volume offset (0569)

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

**User entry** Signed floating-point number

**Factory setting** 0

**Additional information** *Description*



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

**Volume factor**

**Navigation** Expert → Sensor → System units → User-spec. units → Volume factor (0568)

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

**User entry** Signed floating-point number

**Factory setting** 1.0

**Mass text**

**Navigation** Expert → Sensor → System units → User-spec. units → Mass text (0560)

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

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

**Factory setting** User mass

**Additional information***Result*

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

- **Mass flow unit** parameter (→ 58)
- **Mass unit** parameter (→ 59)

*Example*

If the text GLAS is entered, the following options are displayed in the picklist for the **Mass flow unit** parameter (→ 58):

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

**Mass offset****Navigation**

Expert → Sensor → System units → User-spec. units → Mass offset (0562)

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0

**Additional information***Description*

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

**Mass factor****Navigation**

Expert → Sensor → System units → User-spec. units → Mass factor (0561)

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

1.0

**Corr. vol. text****Navigation**

Expert → Sensor → System units → User-spec. units → Corr. vol. text (0592)

**Description**

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

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

**Factory setting** UserCrVol.

#### Additional information

##### *Result*

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

- **Cor.volflow unit** parameter (→  60)
- **Corr. vol. unit** parameter (→  61)

##### *Example*

If the text GLAS is entered, the choose list of the **Cor.volflow unit** parameter (→  60) shows the following options:

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

---

## Corr vol. offset



**Navigation**  Expert → Sensor → System units → User-spec. units → Corr vol. offset (0602)

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

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

**User entry** Signed floating-point number

**Factory setting** 0

---

## Cor.vol. factor



**Navigation**  Expert → Sensor → System units → User-spec. units → Cor.vol. factor (0590)

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

**User entry** Signed floating-point number

**Factory setting** 1.0

---

## Density text



**Navigation**  Expert → Sensor → System units → User-spec. units → Density text (0570)

**Description** Use this function to enter a text or the user-specific unit of density.

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

**Factory setting** User dens.

**Additional information** *Result*

 The defined unit is shown as an option in the choose list of the **Density unit** parameter (→ 59).

*Example*

Enter text "CE\_L" for centners per liter

---

## Density offset



**Navigation**   Expert → Sensor → System units → User-spec. units → Density offset (0571)

**Description** Use this function to enter the zero point shift for the user-specific density unit.

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

**User entry** Signed floating-point number

**Factory setting** 0

---

## Density factor



**Navigation**   Expert → Sensor → System units → User-spec. units → Density factor (0572)

**Description** Use this function to enter a quantity factor for the user-specific density unit.

**User entry** Signed floating-point number

**Factory setting** 1.0

---

## Spec. enth. text



**Navigation**   Expert → Sensor → System units → User-spec. units → Spec. enth. text (0585)

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

**Factory setting** User enth.

**Additional information***Result**Example*

If the text CAL is entered, the choose list of the **Cal. value unit** parameter shows the following options:

- CAL/Nm<sup>3</sup>
- CAL/m<sup>3</sup>
- CAL/ft<sup>3</sup>
- CAL/Sft<sup>3</sup>

**Spec. enth. off.****Navigation**

Expert → Sensor → System units → User-spec. units → Spec. enth. off. (0584)

**Description**

Use this function to enter the offset for adapting the user-specific calorific value unit (without volume).

**User entry**

Signed floating-point number

**Factory setting**

0

**Spec. enth. fac.****Navigation**

Expert → Sensor → System units → User-spec. units → Spec. enth. fac. (0583)

**Description**

Use this function to enter a quantity factor (without volume) for the user-specific calorific value unit.

**User entry**

Signed floating-point number

**Factory setting**

1.0

**Additional information***Example*

$1 \text{ W} \times \text{min} = 60 \text{ J} \rightarrow 0.166 \text{ W} \times \text{min} = 1 \text{ J} \rightarrow \text{user entry: } 0.0166$

**Energy text****Navigation**

Expert → Sensor → System units → User-spec. units → Energy text (0600)

**Description**

Use this function to enter a text for the user-specific energy unit.

**User entry**

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

**Factory setting**

User en.

**Additional information****Result**

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

- **Energy unit** parameter
- **Energy flow unit** parameter

*Example*

If the text W is entered, the choose list of the **Energy flow unit** parameter shows the following options:

- W/s
- W/min
- W/h
- W/d

---

**Energy offset****Navigation**

Expert → Sensor → System units → User-spec. units → Energy offset (0599)

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0

---

**Energy factor****Navigation**

Expert → Sensor → System units → User-spec. units → Energy factor (0586)

**Description**

Use this function to enter a quantity factor for the user-specific energy unit.

**User entry**

Signed floating-point number

**Factory setting**

1.0

---

**Pressure text****Navigation**

Expert → Sensor → System units → User-spec. units → Pressure text (0581)

**Description**

Use this function to enter a text for the user-specific pressure unit.

**User entry**

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

**Factory setting**

User pres.

**Additional information***Result*

The defined unit is shown as an option in the choose list of the **Pressure unit** parameter.

**Pressure offset****Navigation**

Expert → Sensor → System units → User-spec. units → Pressure offset (0580)

**Description**

Use this function to enter the offset for adapting the user-specific pressure unit.

**User entry**

Signed floating-point number

**Factory setting**

0

**Pressure factor****Navigation**

Expert → Sensor → System units → User-spec. units → Pressure factor (0579)

**Description**

Use this function to enter a quantity factor for the user-specific pressure unit.

**User entry**

Signed floating-point number

**Factory setting**

1.0

**Additional information***Example*

1 Dyn/cm<sup>2</sup> = 0.1 Pa → 10 Dyn/cm<sup>2</sup> = 1 Pa → user entry: 10

### 3.2.3 "Process param." submenu

**Navigation**

Expert → Sensor → Process param.

▶ Process param.	
Filter options (6710)	→  71
Flow damping (6661)	→  73
Flow override (1839)	→  73
Conduct. measur. (6514)	→  74
Conduct. damping (1803)	→  74

Cond. temp.coeff (1891)	→  75
Temp. damping (1886)	→  75
Ref.density (1885)	→  75
► Low flow cut off	→  76
► Empty pipe det.	→  78
► ECC	→  81
► Coating detect.	→  83

## Filter options



### Navigation

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

### Description

Use this function to select a filter option.

### Selection

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

### Factory setting

Binomial

### Additional information

#### *Description*

The user can choose from a range of filter combinations which can optimize the measurement result depending on the application. Each change in the filter setting affects

the output signal of the measuring device. The response time of the output signal increases as the filter depth increases.

#### *Selection*

##### ■ **Adaptive**

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

##### ■ **Dynamic**

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

##### ■ **Binomial**

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

##### ■ **CIP**

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

#### *Examples*

#### *Possible applications for the filters*

Application	Adaptive	Adaptive CIP	Dynamic	Dynamic CIP	Binomial	Binomial CP
Pulsating flow (flow is negative intermittently)	---	---	++	--	++	
Flow changes frequently (flow is dynamic)	-	--	++	-	++	
Clear signal, quick control loop (< 1 s)	--	--	+ <sup>1)</sup>		++	
Poor signal, slow control loop (response time of a few seconds)	++	-	--	---	---	
Permanently bad signal	++	--	-	---	-	
Short and severe signal distortion after a while		++		++		
Replacement of a Promag 50/53: system damping Promag 100 = 0.5 * Promag 50/53					+++	
Replacement of a Promag 10: system damping Promag 100 = Promag 10 + 2			+++			
For a stable flow signal (no other requirements)	+++					

1) Flow damping value < 6

**Flow damping****Navigation**

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

**Description**

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

**User entry** 0 to 15

**Factory setting** 4

**Additional information** *User entry*

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



- 0 is a weak damping and 15 a strong one.
- A damping of 0 is not recommended, as the measuring signal is then so noisy that it is almost impossible to carry out a measurement.
- The damping depends on the measuring period and the filter type selected.
- An increase or decrease in the damping depends on the application.

*Effect*

The damping affects the following variables of the device:

- Outputs → [108](#)
- Low flow cut off → [76](#)
- Totalizers → [167](#)

**Flow override****Navigation**

Expert → Sensor → Process param. → Flow override (1839)

**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 diagnostic message **△C453 Flow override** is output.
- Output values
  - Temperature: continues to be output
  - Totalizers 1-3: stop being totalized



The **Flow override** option can also be activated in the **Status input** submenu: **Assign stat.inp.** parameter (→ [106](#)).

**Conduct. measur.****Navigation**

Expert → Sensor → Process param. → Conduct. measur. (6514)

**Prerequisite**

The **On** option is selected in the **Conduct. measur.** parameter (→ 74) parameter.

**Description**

Use this function to enable and disable conductivity measurement.

**Selection**

- Off
- On

**Factory setting**

Off

**Additional information***Description*

For conductivity measurement to work, the medium must have a minimum conductivity of 5 µS/cm.

**Conduct. damping****Navigation**

Expert → Sensor → Process param. → Conduct. damping (1803)

**Prerequisite**

The **On** option is selected in the **Conduct. measur.** parameter (→ 74) parameter.

**Description**

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

**User entry**

0 to 999.9 s

**Factory setting**

0 s

**Additional information***Description*

The damping is performed by a PT1 element<sup>2)</sup>.

*User entry*

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

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

2) Proportional behavior with first-order lag

**Cond. temp.coeff**

<b>Navigation</b>	Expert → Sensor → Process param. → Cond. temp.coeff (1891)
<b>Prerequisite</b>	One of the following conditions is met: <ul style="list-style-type: none"><li>■ Order code for "Sensor option", option <b>CI</b> "Medium temperature measurement" or</li><li>■ The temperature is read into the flowmeter from an external device.</li></ul>
<b>Description</b>	Use this function to enter the temperature coefficient for the conductivity.
<b>User entry</b>	Signed floating-point number
<b>Factory setting</b>	2.1 %/K

**Temp. damping**

<b>Navigation</b>	Expert → Sensor → Process param. → Temp. damping (1886)
<b>Prerequisite</b>	One of the following conditions is met: <ul style="list-style-type: none"><li>■ Order code for "Sensor option", option <b>CI</b> "Medium temperature measurement" or</li><li>■ The temperature is read into the flowmeter from an external device.</li></ul>
<b>Description</b>	Use this function to enter the time constant for temperature damping.
<b>User entry</b>	0 to 999.9 s
<b>Factory setting</b>	0 s

**Ref.density**

<b>Navigation</b>	Expert → Sensor → Process param. → Ref.density (1885)
<b>Description</b>	Use this function to enter a fixed value for the reference density.
<b>User entry</b>	Positive floating-point number
<b>Factory setting</b>	Country-specific: <ul style="list-style-type: none"><li>■ 1 kg/l</li><li>■ 1 lb/ft<sup>3</sup></li></ul>
<b>Additional information</b>	<i>Dependency</i> The unit is taken from the <b>Density unit</b> parameter (→  59)

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

 <b>Low flow cut off</b>	
Assign variable (1837)	→  76
On value (1805)	→  76
Off value (1804)	→  77
Pres. shock sup. (1806)	→  77

**Assign 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
- Correct.vol.flow

**Factory setting**

Volume flow

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

A process variable is selected in the **Assign variable** parameter (→  76).

**Description**

Use this function to enter a switch-on value for low flow cut off. Low flow cut off is activated if the value entered is not equal to 0 →  77.

**User entry**

Positive floating-point number

**Factory setting**

Depends on country and nominal diameter →  224

**Additional information***Dependency*

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

**Off value****Navigation**

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

**Prerequisite**

A process variable is selected in the **Assign variable** parameter (→ 76).

**Description**

Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value (→ 76).

**User entry**

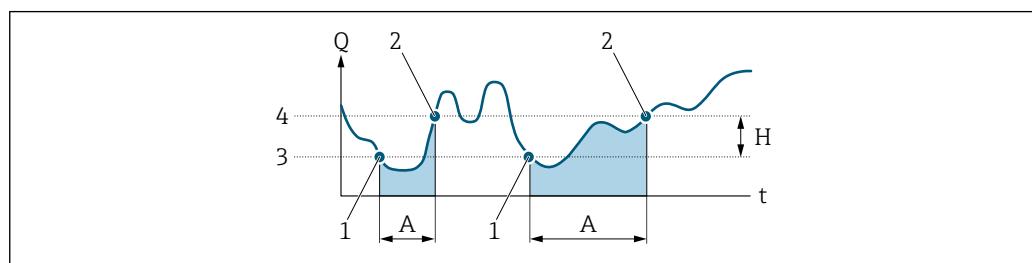
0 to 100.0 %

**Factory setting**

50 %

**Additional information**

*Example*



A0012887

- 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

**Pres. shock sup.****Navigation**

Expert → Sensor → Process param. → Low flow cut off → Pres. shock sup. (1806)

**Prerequisite**

A process variable is selected in the **Assign variable** parameter (→ 76).

**Description**

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

**User entry**

0 to 100 s

**Factory setting**

0 s

**Additional information**

*Description*

**Pressure shock suppression is enabled**

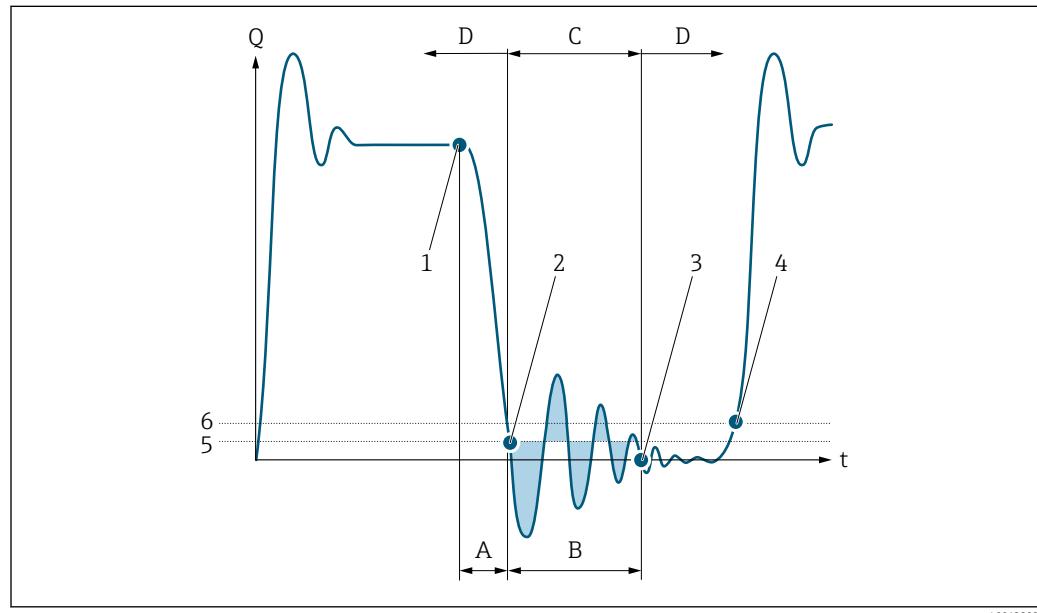
- Prerequisite:  
Flow rate < on-value of low flow cut off
- Output values
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value

**Pressure shock suppression is disabled**

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

*Example*

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

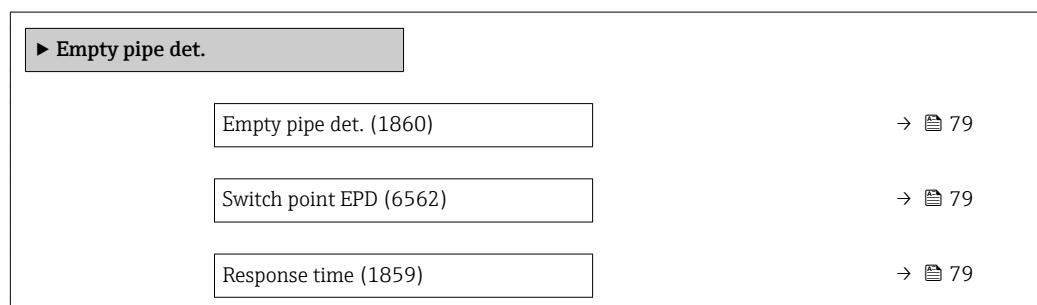


A0012888

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

**"Empty pipe det." submenu***Navigation*

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



New adjustment (6560)	→  80
Progress (6571)	→  80
Empty pipe value (6527)	→  80
Full pipe value (6548)	→  81
Meas. value EPD (6559)	→  81

## Empty pipe det.



<b>Navigation</b>	Expert → Sensor → Process param. → Empty pipe det. → Empty pipe det. (1860)
<b>Description</b>	Use this function to switch empty pipe detection on and off.
<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Off</li> <li>■ On</li> </ul>
<b>Factory setting</b>	Off

## Switch point EPD



<b>Navigation</b>	Expert → Sensor → Process param. → Empty pipe det. → Switch point EPD (6562)
<b>Prerequisite</b>	The <b>On</b> option is selected in the <b>Empty pipe det.</b> parameter (→  79).
<b>Description</b>	Use this function to enter the percentage threshold value of the resistance in relation to the adjustment values.
<b>User entry</b>	0 to 100 %
<b>Factory setting</b>	10 %

## Response time



<b>Navigation</b>	Expert → Sensor → Process param. → Empty pipe det. → Response time (1859)
<b>Prerequisite</b>	A process variable is selected in the <b>Assign variable</b> parameter (→  79).
<b>Description</b>	Use this function to enter the minimum length of time (debouncing time) the signal must be present for the diagnostic message <b>△S862 Pipe empty</b> to be triggered if the measuring pipe is empty or partially full.

**User entry** 0 to 100 s

**Factory setting** 1 s

---

### New adjustment



**Navigation** Expert → Sensor → Process param. → Empty pipe det. → New adjustment (6560)

**Prerequisite** The **On** option is selected in the **Empty pipe det.** parameter (→ [79](#)).

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

**Selection**

- Cancel
- Empty pipe adj.
- Full pipe adjust

**Factory setting** Cancel

---

### Progress

**Navigation** Expert → Sensor → Process param. → Empty pipe det. → Progress (6571)

**Prerequisite** The **On** option is selected in the **Empty pipe det.** parameter (→ [79](#)).

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

**User interface**

- Ok
- Busy
- Not ok

---

### Empty pipe value



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

**Prerequisite**

- In the **Empty pipe det.** parameter (→ [79](#)), the **On** option is selected.
- Adjustment value > full pipe value.

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

**User interface** Positive floating-point number

**Full pipe value**

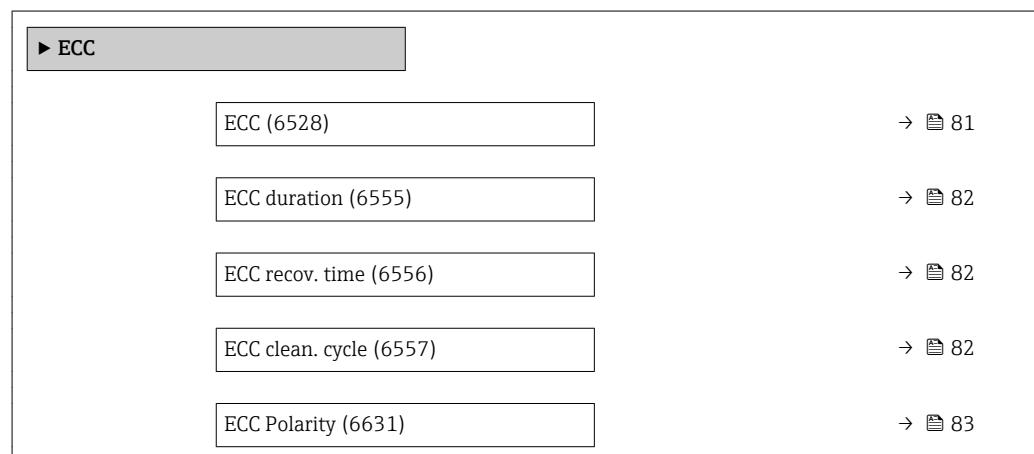
<b>Navigation</b>	④ ⑤ Expert → Sensor → Process param. → Empty pipe det. → Full pipe value (6548)
<b>Prerequisite</b>	<ul style="list-style-type: none"> <li>■ In the <b>Empty pipe det.</b> parameter (→ 79), the <b>On</b> option is selected.</li> <li>■ Adjustment value &lt; empty pipe value.</li> </ul>
<b>Description</b>	Displays the adjustment value when the measuring pipe is full.
<b>User interface</b>	Positive floating-point number

**Meas. value EPD**

<b>Navigation</b>	④ ⑤ Expert → Sensor → Process param. → Empty pipe det. → Meas. value EPD (6559)
<b>Prerequisite</b>	In the <b>Empty pipe det.</b> parameter (→ 79), the <b>On</b> option is selected.
<b>Description</b>	Displays the current measured value.
<b>User interface</b>	Positive floating-point number

**"ECC" submenu***Navigation*

④ ⑤ Expert → Sensor → Process param. → ECC

**ECC**

<b>Navigation</b>	④ ⑤ Expert → Sensor → Process param. → ECC → ECC (6528)
<b>Prerequisite</b>	For the following order code: "Application package", option <b>EC "ECC electrode cleaning"</b>

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

**Selection**

- Off
- On

**Factory setting** Off

---

## ECC duration



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

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

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

**User entry** 0.01 to 30 s

**Factory setting** 2 s

---

## ECC recov. time



**Navigation** Expert → Sensor → Process param. → ECC → ECC recov. time (6556)

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

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

**User entry** 1 to 600 s

**Factory setting** 60 s

---

## ECC clean. cycle



**Navigation** Expert → Sensor → Process param. → ECC → ECC clean. cycle (6557)

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

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

**User entry** 0.5 to 168 h

**Factory setting** 0.5 h

## ECC Polarity

**Navigation**  Expert → Sensor → Process param. → ECC → ECC Polarity (6631)

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

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

**User interface**

- Positive
- Negative

**Factory setting** Depends on the electrode material:
 

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

### "Coating detect." submenu

*Navigation*  Expert → Sensor → Process param. → Coating detect.

 Coating detect.	
Coating detect.	→  83
Coating damping	→  84
Coating meas.val	→  84
Coating limit	→  84
Coat.lim.hyster.	→  84

## Coating detect.



**Navigation**  Expert → Sensor → Process param. → Coating detect. → Coating detect. (6734)

**Description** Select mode for coating detection.

**Selection**

- Off
- Slow
- Standard
- Fast

**Factory setting** Off

**Coating damping**

---

<b>Navigation</b>	 Expert → Sensor → Process param. → Coating detect. → Coating damping (6840)
<b>Description</b>	Enter damping value for coating detection.
<b>User entry</b>	0 to 15
<b>Factory setting</b>	0

---

**Coating meas.val**

---

<b>Navigation</b>	 Expert → Sensor → Process param. → Coating detect. → Coating meas.val (12111)
<b>Description</b>	Shows current coating measured value.
<b>User interface</b>	0.0 to 1.0
<b>Factory setting</b>	1.0

---

**Coating limit**

---

<b>Navigation</b>	 Expert → Sensor → Process param. → Coating detect. → Coating limit (6451)
<b>Description</b>	Enter limit value for the coating measured value.
<b>User entry</b>	0 to 1
<b>Factory setting</b>	0.5

---

**Coat.lim.hyster.**

---

<b>Navigation</b>	 Expert → Sensor → Process param. → Coating detect. → Coat.lim.hyster. (6452)
<b>Description</b>	Enter hysteresis for coating detection.
<b>User entry</b>	0 to 1
<b>Factory setting</b>	0.05

### 3.2.4 "External comp." submenu

*Navigation*

Expert → Sensor → External comp.

► External comp.	
Density source (6615)	→ 85
Fixed density (6623)	→ 86
External density (6630)	→ 86
FailSaTypRefDens (2081)	→ 86
FailSaValRefDens (2082)	→ 87
Linear exp coeff (1817)	→ 87
Square exp coeff (1818)	→ 88
Ref. density (1892)	→ 88
Temp. source (6712)	→ 89
External temp. (6673)	→ 90
FailSafeTypExtT (2075)	→ 90
FailSafeValExtT (2076)	→ 91
Ref. temperature (1816)	→ 91

#### Density source



**Navigation**

Expert → Sensor → External comp. → Density source (6615)

**Description**

Use this function to select the density source.

**Selection**

- Fixed density
- External density
- Current input 1\*
- Current input 2\*
- Current input 3\*
- Calculated value

**Factory setting**

Fixed density

\* Visibility depends on order options or device settings

**Additional information***Selection*

Use this function to select the type of density compensation. When selecting the **External density** option, the density value of the cyclical PROFINET communication is used. In addition, the "External density" compensation value must be incorporated into the analog output module.

 Additional information: Operating Instructions, "Cyclical data transmission" section

---

**Fixed density****Navigation**

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

**Prerequisite**

The **Fixed density** option is selected in the **Density source** parameter (→  85).

**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

Country-specific:

- 1000 kg/l
- 1000 lb/ft<sup>3</sup>

**Additional information***Dependency*

 The unit is taken from the **Density unit** parameter (→  59)

---

**External density****Navigation**

  Expert → Sensor → External comp. → External density (6630)

**Prerequisite**

The **External density** option is selected in the **Density source** parameter (→  85).

**Description**

Displays the density read in from the external device.

**User entry**

Positive floating-point number

**Additional information***Dependency*

 The unit is taken from the **Density unit** parameter (→  59)

---

**FailSaTypRefDens****Navigation**

  Expert → Sensor → External comp. → FailSaTypRefDens (2081)

**Description**

Use this function to select the failsafe mode for the external reference density value.

<b>Selection</b>	<ul style="list-style-type: none"> <li>▪ Fail-safe value</li> <li>▪ Fallback value</li> <li>▪ Off</li> </ul>
<b>Factory setting</b>	Off
<b>Additional information</b>	<p><i>Description</i></p> <p>If the status of the input or simulation value is BAD, the failsafe mode defined here is used.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> <li>▪ Fail-safe value A substitute value is used. The substitute value is defined in the <b>FailSaValRefDens</b> parameter (→ 87).</li> <li>▪ Fallback value The last valid value is used.</li> <li>▪ Off The invalid value continues to be used.</li> </ul>

---

**FailSaValRefDens**

<b>Navigation</b>	Expert → Sensor → External comp. → FailSaValRefDens (2082)
<b>Prerequisite</b>	The <b>Fail-safe value</b> option is selected in the <b>FailSaTypRefDens</b> parameter (→ 86).
<b>Description</b>	Use this function to enter a fixed density value that is used for the external density in the event of a device alarm.
<b>User entry</b>	Signed floating-point number
<b>Factory setting</b>	0 kg/l
<b>Additional information</b>	<p><i>Description</i></p> <p>In the event of a device alarm, the density value is displayed as an output value in the <b>Density</b> parameter (→ 47).</p>

---

**Linear exp coeff**

<b>Navigation</b>	Expert → Sensor → External comp. → Linear exp coeff (1817)
<b>Prerequisite</b>	The <b>Calculated value</b> option is selected in the <b>Density source</b> parameter (→ 85) parameter.
<b>Description</b>	Use this function to enter a linear, fluid-specific expansion coefficient for calculating the reference density.
<b>User interface</b>	Signed floating-point number
<b>Factory setting</b>	$-2.0295 \cdot 10^{-4}$ 1/K

**Square exp coeff****Navigation**

Expert → Sensor → External comp. → Square exp coeff (1818)

**Prerequisite**

The **Calculated value** option is selected in the **Density source** parameter (→ 85) parameter.

**Description**

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

**User interface**

Signed floating-point number

**Factory setting**

$-3.8436 \cdot 10^{-6} \text{ 1/K}^2$

**Ref. density****Navigation**

Expert → Sensor → External comp. → Ref. density (1892)

**Prerequisite**

The **Calculated value** option is selected in the **Density source** parameter (→ 85) parameter.

**Description**

Displays the reference density.

**User interface**

Positive floating-point number

**Additional information***Description*

The reference density is required for density calculation.

*Deviation of the process temperature from the reference temperature:*

$\Delta T = T - T_{\text{ref}}$

$\Delta T$ : *Deviation*

$T$ : *Process temperature*

$T_{\text{ref}}$ : *Ref. temperature* (→ 91)

*Temperature-compensated density:*

$\rho_{\text{comp}} = \rho_{\text{ref}}(1 + a\Delta T + b\Delta T^2)$

$\rho_{\text{comp}}$ : *Calculated density*

$\rho_{\text{ref}}$ : *Reference density*

$\Delta T$ : *Deviation of the process temperature from the reference temperature*

$a$ : *Linear exp coeff* (→ 87)

$b$ : *Square exp coeff* (→ 88)

*Example for water (factory setting)*

For a reference temperature of  $T_{\text{ref}} = 20^\circ\text{C}$

A quadratic fit of a number of density values results in the following coefficients:

- $\alpha = -2.0295 \cdot 10^{-4} \text{ 1/K}$
- $\beta = -3.8436 \cdot 10^{-6} \text{ 1/K}^2$
- $\rho_{\text{ref}} = 997.82 \text{ kg/m}^3$

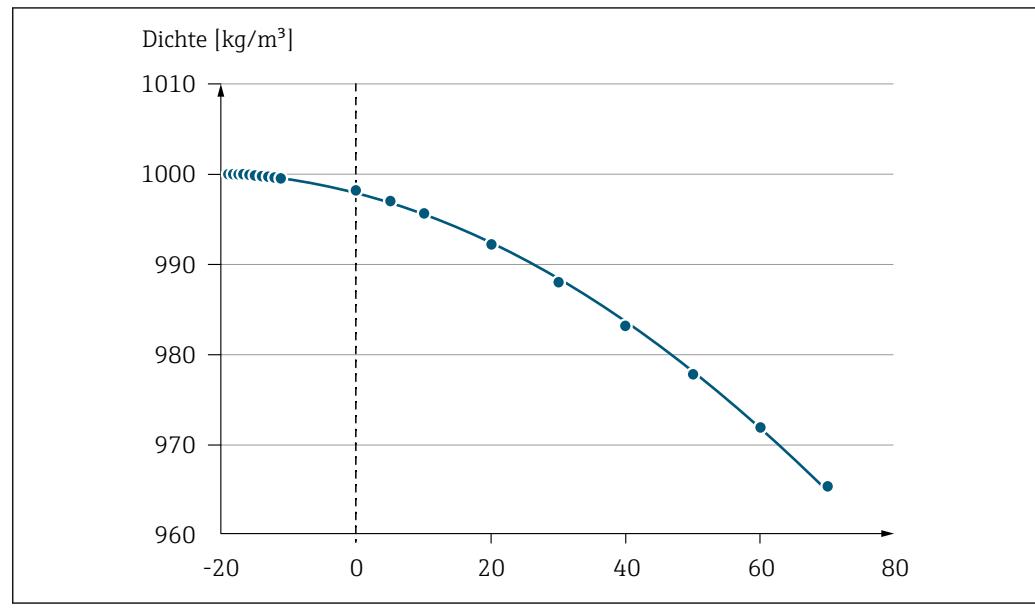


Fig 2    Quadratic fit

A0031441

### Dependency

**i** The unit is taken from the **Density unit** parameter (→ Fig 59)

## Temp. source



### Navigation

Fig Fig Expert → Sensor → External comp. → Temp. source (6712)

### Description

Use this function to select the temperature source.

### Selection

- Int.temp. sensor \*
- Off
- External value
- Current input 1 \*
- Current input 2 \*
- Current input 3 \*

### Factory setting

Off

### Additional information

#### Selection

Use this function to select the type of temperature compensation. When selecting the **External value** option, the temperature value of the cyclical PROFINET communication is

\* Visibility depends on order options or device settings

used. In addition, the "External temperature" compensation value must be incorporated into the analog output module.



For additional information, see the Operating Instructions, "Cyclical data transmission" section

---

## External temp.

---

**Navigation** Expert → Sensor → External comp. → External temp. (6673)

**Prerequisite** The **External value** option is selected in the **Temp. source** parameter (→ [89](#)).

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

**User entry** Floating point number with sign

**Additional information** *Dependency*



The unit is taken from the **Temperature unit** parameter (→ [58](#))

---

## FailSafeTypExtT

---

**Navigation** Expert → Sensor → External comp. → FailSafeTypExtT (2075)

**Description** Use this function to select the failsafe mode for the external temperature value.

**Selection**

- Fail-safe value
- Fallback value
- Off

**Factory setting** Off

**Additional information** *Description*

If the status of the input or simulation value is BAD, the failsafe mode defined here is used.

*Selection*

- Fail-safe value  
A substitute value is used. The substitute value is defined in the **FailSafeValExtT** parameter (→ [91](#)).
- Fallback value  
The last valid value is used.
- Off  
The invalid value continues to be used.

**FailSafeValExtT****Navigation**

Expert → Sensor → External comp. → FailSafeValExtT (2076)

**Prerequisite**

The **Fail-safe value** option is selected in the **FailSafeTypExtT** parameter (→ [90](#)).

**Description**

Use this function to enter a fixed temperature value that is used for the external pressure in the event of a device alarm.

**User entry**

Signed floating-point number

**Factory setting**

0 °C

**Additional information***Description*

In the event of a device alarm, the temperature value is displayed as an output value in the **Temperature** parameter (→ [47](#)).

**Ref. temperature****Navigation**

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

**Prerequisite**

The **Fixed density** option or **External density** option are selected in the **Density source** parameter (→ [85](#)).

**Description**

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

**User interface**

-273.15 to 99 999 °C

**Factory setting**

Country-specific:

- +20 °C
- +68 °F

**Additional information***Dependency*

The unit is taken from the **Temperature unit** parameter (→ [58](#))

*Reference density calculation*

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

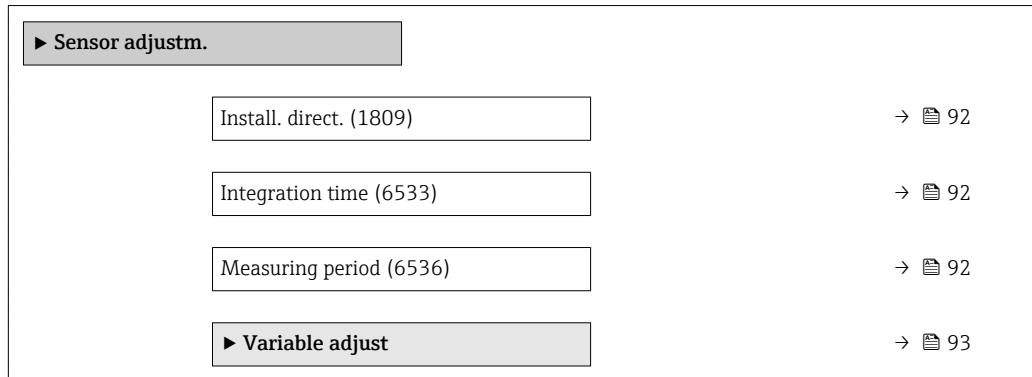
A0023403

- $\rho_N$ : reference density
- $\rho$ : fluid density currently measured
- $t$ : fluid temperature currently measured
- $t_N$ : reference temperature at which the reference density is calculated (e.g. 20 °C)
- $\Delta t$ :  $t - t_N$
- $\alpha$ : linear expansion coefficient of the fluid, unit = [1/K]; K = Kelvin
- $\beta$ : square expansion coefficient of the fluid, unit = [1/K<sup>2</sup>]

### 3.2.5 "Sensor adjustment" submenu

*Navigation*

Expert → Sensor → Sensor adjustm.



#### Install. direct.



**Navigation**

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

**Description**

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

**Selection**

- In arrow direct.
- Against arrow

**Factory setting**

In arrow direct.

**Additional information**

*Description*

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

#### Integration time



**Navigation**

Expert → Sensor → Sensor adjustm. → Integration time (6533)

**Description**

Display the duration of an integration cycle.

**User interface**

1 to 65 ms

#### Measuring period



**Navigation**

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

**Description**

Display the time of a full measuring period.

User interface	0 to 1 000 ms
----------------	---------------

### "Variable adjust" submenu

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

Variable adjust	
Vol. flow offset (1831)	→  93
Vol. flow factor (1832)	→  94
Mass flow offset (1841)	→  94
Mass flow factor (1846)	→  94
Conduct. offset (1848)	→  95
Conduct. factor (1849)	→  95
Corr. vol offset (1866)	→  95
Corr. vol factor (1867)	→  96
Temp. offset (1868)	→  96
Temp. factor (1869)	→  97
Corr.cond.offset (1870)	→  97
Corr.cond.factor (1871)	→  97
Flow vel. offset (1879)	→  98
Flow vel. factor (1880)	→  98

### Vol. flow offset



*Navigation*      Expert → Sensor → Sensor adjustm. → Variable adjust → Vol. flow offset (1831)

**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 m<sup>3</sup>/s.

**User entry**      Signed floating-point number

**Factory setting** 0 m<sup>3</sup>/s

**Additional information** *Description*

 Corrected value = (factor × value) + offset

---

## Vol. flow factor



**Navigation**  Expert → Sensor → Sensor adjustm. → Variable adjust → Vol. flow factor (1832)

**Description** Enter quantity factor for the volume flow value.

**User entry** Positive floating-point number

**Factory setting** 1

**Additional information** *Description*

 Corrected value = (factor × value) + offset

---

## Mass flow offset



**Navigation**  Expert → Sensor → Sensor adjustm. → Variable adjust → Mass flow offset (1841)

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

**User entry** Signed floating-point number

**Factory setting** 0 kg/s

**Additional information** *Description*

 Corrected value = (factor × value) + offset

---

## Mass flow factor



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

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

**User entry** Positive floating-point number

**Factory setting** 1

**Additional information***Description*

Corrected value = (factor × value) + offset

**Conduct. offset****Navigation**

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

**Prerequisite**The **On** option is selected in the **Conduct. measur.** parameter (→ 74).**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 S/m

**Additional information***Description*

Corrected value = (factor × value) + offset

**Conduct. factor****Navigation**

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

**Prerequisite**The **On** option is selected in the **Conduct. measur.** parameter (→ 74).**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information***Description*

Corrected value = (factor × value) + offset

**Corr. vol offset****Navigation**

Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol offset (1866)

**Description**Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm<sup>3</sup>/s.**User entry**

Signed floating-point number

**Factory setting** 0 Nm<sup>3</sup>/s

**Additional information** *Description*

 Corrected value = (factor × value) + offset

---

## Corr. vol factor



**Navigation**  Expert → Sensor → Sensor adjustm. → Variable adjust → Corr. vol factor (1867)

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

**User entry** Positive floating-point number

**Factory setting** 1

**Additional information** *Description*

 Corrected value = (factor × value) + offset

---

## Temp. offset



**Navigation**  Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset (1868)

**Prerequisite**

One of the following conditions is met:

- Order code for "Sensor option", option **CI** "Medium temperature measurement" or
- The temperature is read into the flowmeter from an external device.

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

**User entry** Signed floating-point number

**Factory setting** 0 K

**Additional information** *Description*

 Corrected value = (factor × value) + offset

**Temp. factor**

**Navigation** Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor (1869)

**Prerequisite**

One of the following conditions is met:

- Order code for "Sensor option", option **CI** "Medium temperature measurement"  
or
- The temperature is read into the flowmeter from an external device.

**Description**

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

**User entry**

Positive floating-point number

**Factory setting**

1

**Additional information***Description*

Corrected value = (factor × value) + offset

**Corr.cond.offset**

**Navigation** Expert → Sensor → Sensor adjustm. → Variable adjust → Corr.cond.offset (1870)

**Prerequisite**

The **On** option is selected in the **Conduct. measur.** parameter (→ 74) parameter.

**Description**

Use this function to enter the zero point shift to trim the corrected conductivity. The conductivity unit on which the shift is based is  $\mu\text{S}/\text{cm}$ .

**User entry**

Signed floating-point number

**Factory setting**

0 S/m

**Additional information***Description*

Corrected value = (factor × value) + offset

**Corr.cond.factor**

**Navigation** Expert → Sensor → Sensor adjustm. → Variable adjust → Corr.cond.factor (1871)

**Prerequisite**

The **On** option is selected in the **Conduct. measur.** parameter (→ 74) parameter.

**Description**

Use this function to enter a quantity factor for the corrected conductivity. In each case, this factor refers to the conductivity in  $\mu\text{S}/\text{cm}$ .

**User entry**

Positive floating-point number

**Factory setting** 1

**Additional information** *Description*

 Corrected value = (factor × value) + offset

## Flow vel. offset



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

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

**User entry** Signed floating-point number

**Factory setting** 0 m/s

**Additional information** *Description*

 Corrected value = (factor × value) + offset

## Flow vel. factor



**Navigation**  Expert → Sensor → Sensor adjustm. → Variable adjust → Flow vel. factor (1880)

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

**User entry** Positive floating-point number

**Factory setting** 1

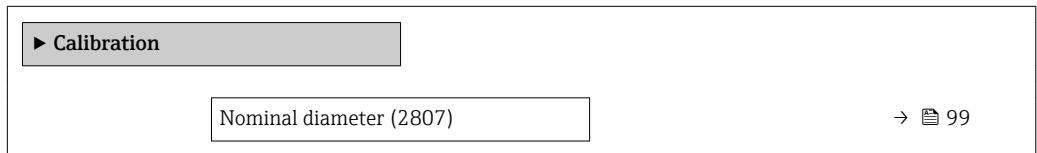
**Additional information** *Description*

 Corrected value = (factor × value) + offset

### 3.2.6 "Calibration" submenu

**Navigation**

 Expert → Sensor → Calibration



Cal. factor (6522)	→  99
Zero point (6546)	→  99
Cond. cal. fact. (6718)	→  100

---

## Nominal diameter

---

<b>Navigation</b>	Expert → Sensor → Calibration → Nominal diameter (2807)
<b>Description</b>	Displays the nominal diameter of the sensor.
<b>User interface</b>	DNxx / x"
<b>Factory setting</b>	Depends on the size of the sensor
<b>Additional information</b>	<i>Description</i> The value is also specified on the sensor nameplate.

---

## Cal. factor

---

<b>Navigation</b>	Expert → Sensor → Calibration → Cal. factor (6522)
<b>Description</b>	Displays the current calibration factor for the sensor.
<b>User interface</b>	Positive floating-point number
<b>Factory setting</b>	Depends on nominal diameter and calibration.

---

## Zero point

---

<b>Navigation</b>	Expert → Sensor → Calibration → Zero point (6546)
<b>Description</b>	This function shows the zero point correction value for the sensor.
<b>User interface</b>	Signed floating-point number
<b>Factory setting</b>	Depends on nominal diameter and calibration

**Cond. cal. fact.****Navigation**

Expert → Sensor → Calibration → Cond. cal. fact. (6718)

**Prerequisite**

The **On** option is selected in the **Conduct. measur.** parameter (→ [74](#)) parameter.

**Description**

Displays the calibration factor for the conductivity measurement.

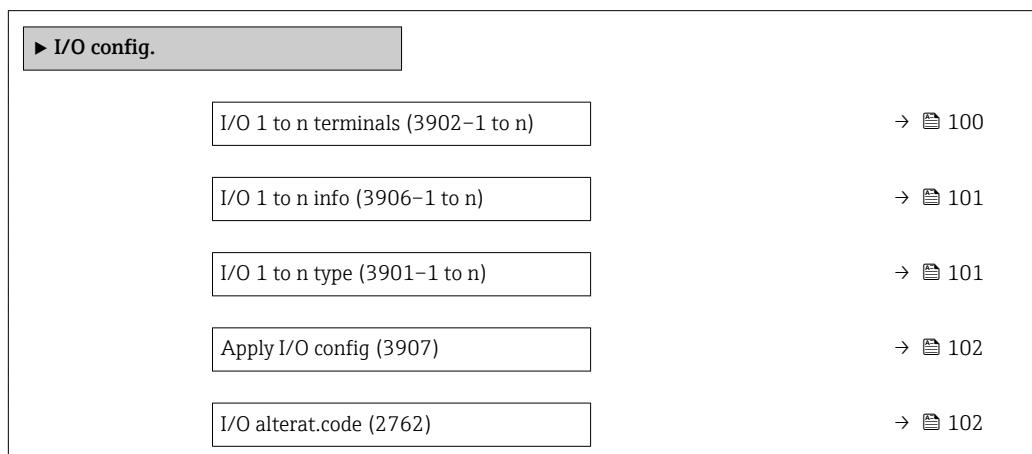
**User interface**

0.01 to 10 000

### 3.3 "I/O configuration" submenu

**Navigation**

Expert → I/O config.




---

#### I/O 1 to n terminals

---

**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)
- 20-21 (I/O 4) \*

\* Visibility depends on order options or device settings

**I/O 1 to n info**

**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
  - PROFINET

**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.

*"PROFINET" option*

The I/O module is configured for PROFINET.

**I/O 1 to n type**

**Navigation**  Expert → I/O config. → I/O 1 to n type (3901-1 to n)

**Prerequisite** For the following order code:  
"Output; input 2", option **D** "Configurable I/O initial setting off"

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

- Selection**
- Off
  - Curr.output \*
  - Current input \*
  - Status input \*
  - PFS output \*
  - Double pulse out \*
  - Relay output

**Factory setting** Off

\* Visibility depends on order options or device settings

**Apply I/O config**

**Navigation** Expert → I/O config. → Apply I/O config (3907)

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

**Selection**

- No
- Yes

**Factory setting** No

**I/O alterat.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

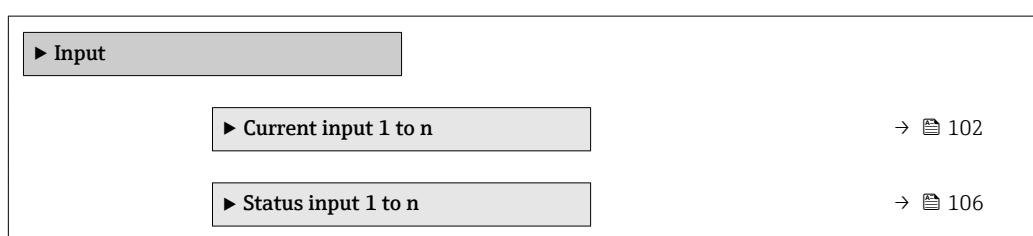
**Factory setting** 0

**Additional information** *Description*

The I/O configuration is changed in the **I/O type** parameter (→ 101).

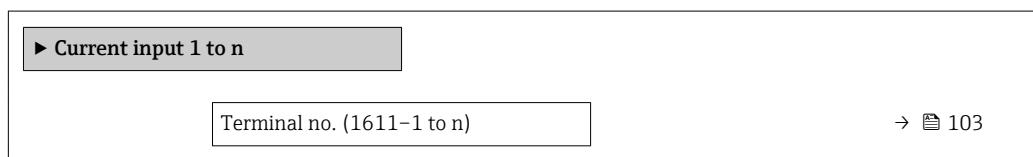
## 3.4 "Input" submenu

*Navigation* Expert → Input



### 3.4.1 "Current input 1 to n" submenu

*Navigation* Expert → Input → Current input 1 to n



Signal mode (1610-1 to n)	→  103
Current span (1605-1 to n)	→  104
0/4 mA value (1606-1 to n)	→  104
20 mA value (1607-1 to n)	→  104
Failure mode (1601-1 to n)	→  105
Failure value (1602-1 to n)	→  105

---

**Terminal no.**

---

**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)
- 20-21 (I/O 4)

**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)

**Prerequisite** The measuring device is **not** approved for use in the hazardous area with type of protection Ex-i.

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

**Selection**

- Passive
- Active \*

**Factory setting** Active

\* Visibility depends on order options or device settings

**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 mA NAMUR
- 4...20 mA US
- 0...20 mA

**Factory setting**

Country-specific:

- 4...20 mA NAMUR
- 4...20 mA US

**Additional information***Examples*

Sample values for the current range: **Current span** parameter (→ 110)

**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 (→ 104)
- Failure mode (→ 105)

*Configuration examples*

Pay attention to the configuration examples for **4 mA value** parameter (→ 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 (→ 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 (→ 104).

**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 (→ 105)).

## Failure value



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

**Prerequisite** In the **Failure mode** parameter (→ 105), 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.

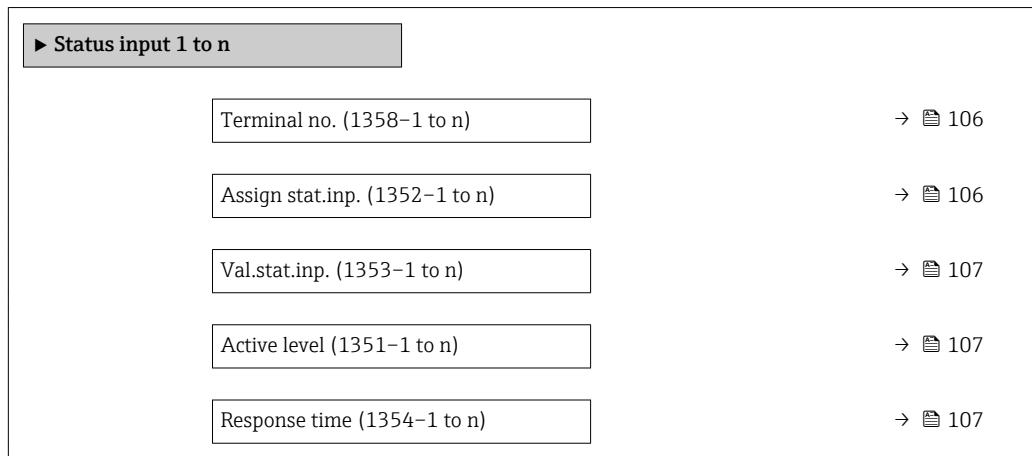
**User entry** Signed floating-point number

**Factory setting** 0

### 3.4.2 "Status input 1 to n" submenu

Navigation

Expert → Input → Status input 1 to n



#### Terminal no.

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)
- 20-21 (I/O 4)

Additional information

*"Not used" option*

The status input module does not use any terminal numbers.

#### Assign stat.inp.



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 totaliz. 1
- Reset totaliz. 2
- Reset totaliz. 3
- Reset all tot.
- Flow override

Factory setting

Off

**Additional information***Selection*

- Off  
The status input is switched off.
- Reset totaliz. 1...3  
The individual totalizers are reset.
- Reset all tot.  
All totalizers are reset.
- Flow override  
The Flow override (→ 73) is activated.



Note on the Flow override (→ 73):

- The Flow override (→ 73) 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.

**Val.stat.inp.****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****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

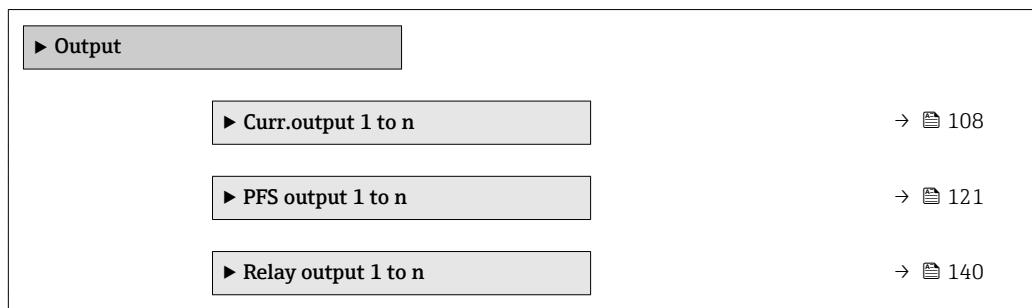
**Factory setting**

50 ms

## 3.5 "Output" submenu

Navigation

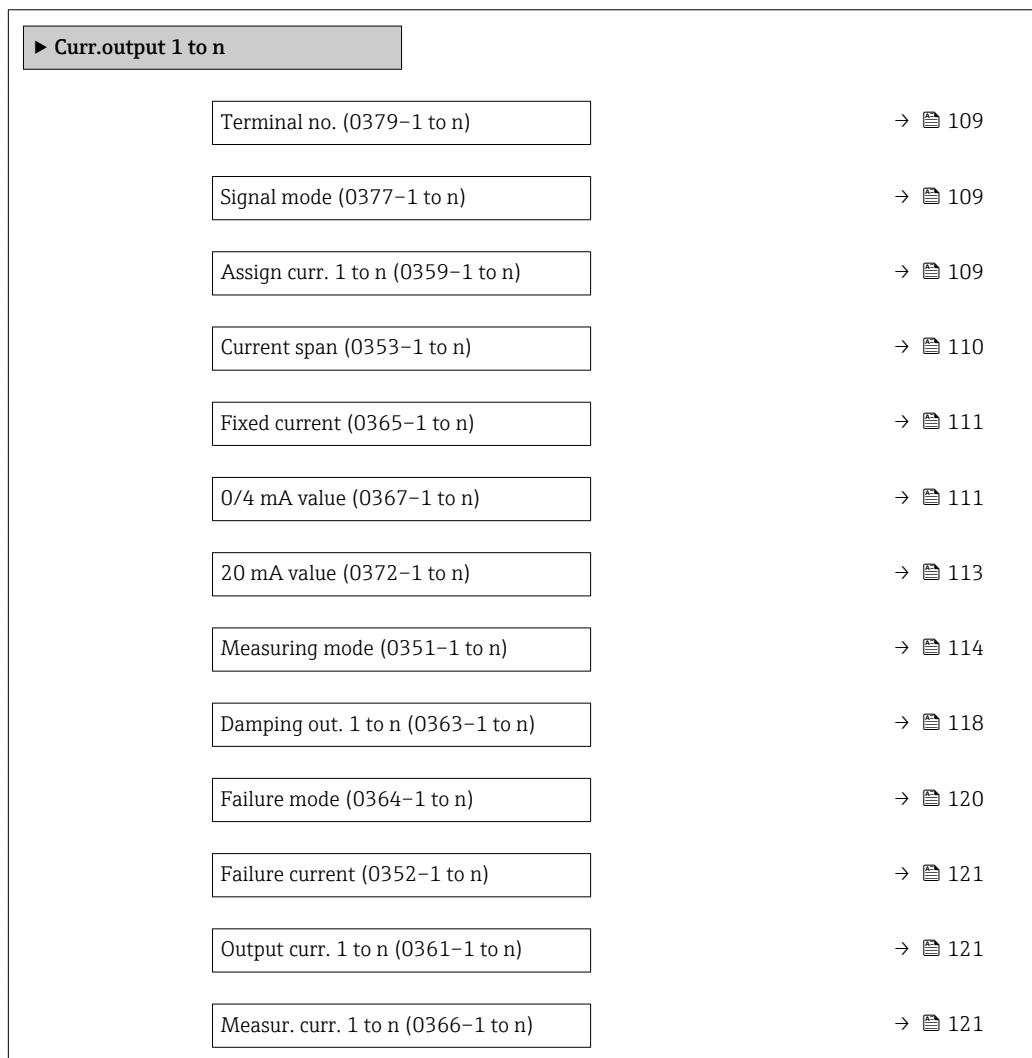
Expert → Output



### 3.5.1 "Current output 1 to n" submenu

Navigation

Expert → Output → Curr.output 1 to n



---

**Terminal no.**

---

**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
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

**Additional information** "Not used" option

The current output module does not use any terminal numbers.

---

**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

---

**Assign curr. 1 to n**

---



**Navigation**   Expert → Output → Curr.output 1 to n → Assign curr. 1 to n (0359–1 to n)

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

**Selection**

- Off \*
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity \*
- Conductivity \*
- CorrConductivity \*
- Temperature \*
- Electronic temp.
- Ref Electr. Pot.
- CoilCurrShotTime \*
- Noise \*
- Coating meas.val \*
- Test point 1
- Test point 2
- Test point 3

\* Visibility depends on order options or device settings

**Factory setting** Volume flow

## Current span



**Navigation** Expert → Output → Curr.output 1 to n → Current span (0353-1 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 NAMUR
  - 4...20 mA US
  - 4...20 mA
  - 0...20 mA
  - Fixed current

**Factory setting** Country-specific:  
 ▪ 4...20 mA NAMUR (3.8...20.5 mA)  
 ▪ 4...20 mA US (3.9...20.8 mA)

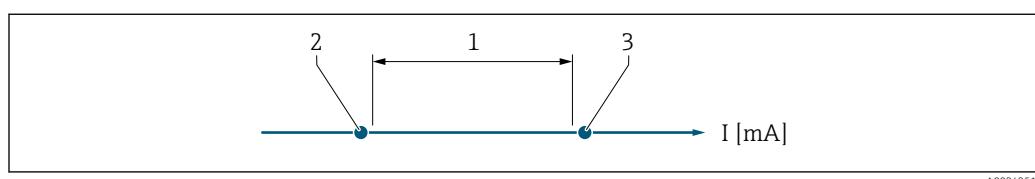
- Additional information** *Description*
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 120).  
 ▪ If the measured value is outside the measuring range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.  
 ▪ The measuring range is specified via the **0/4 mA value** parameter (→ 111) and **20 mA value** parameter (→ 113).

### "Fixed current" option

The current value is set via the **Fixed current** parameter (→ 111).

### Example

Shows the relationship between the current span for the output of the process variable and the lower and upper alarm levels:



- 1 Current span for process value  
 2 Lower level for signal on alarm  
 3 Upper level for signal on alarm

### Selection

Selection	1	2	3
4...20 mA NAMUR	3.8 to 20.5 mA	< 3.6 mA	> 21.95 mA
4...20 mA US	3.9 to 20.8 mA US	< 3.6 mA	> 21.95 mA

Selection	1	2	3
4...20 mA	4 to 20.5 mA	< 3.6 mA	> 21.95 mA
0...20 mA	0 to 20.5 mA	< 0 mA	> 21.95 mA

 If the flow exceeds or falls below the upper or lower signal on alarm level, the diagnostic message **△S441 Curr.output 1 to n** 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 (→ 110).

**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

## 0/4 mA value



**Navigation**   Expert → Output → Curr.output 1 to n → 0/4 mA value (0367–1 to n)

**Prerequisite** In the **Current span** parameter (→ 110), one of the following options is selected:

- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

**Description** Use this function to enter a value for the 0/4 mA current.

**User entry** Signed floating-point number

**Factory setting** Country-specific:

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

**Additional information** *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 109). In addition, the value can be greater than or

smaller than the value assigned for the 20 mA current in the **20 mA value** parameter (→ 113).

#### Dependency

**i** The unit depends on the process variable selected in the **Assign curr.** parameter (→ 109).

#### Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:

- Current span (→ 110)
- Failure mode (→ 120)

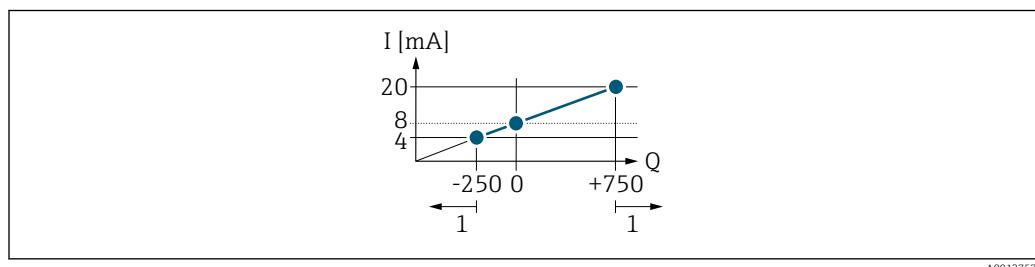
#### Configuration examples

Some examples of parameter settings and their effect on the current output are given in the following section.

##### Configuration example A

Measuring mode with **Forward flow** option

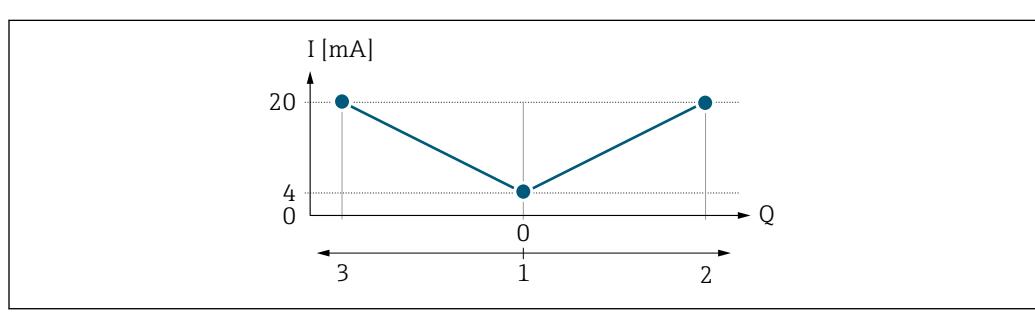
- **0/4 mA value** parameter (→ 111) = not equal to zero flow (e.g. -250 m<sup>3</sup>/h)
- **20 mA value** parameter (→ 113) = not equal to zero flow (e.g. +750 m<sup>3</sup>/h)
- Calculated current value = 8 mA at zero flow



The operational range of the measuring device is defined by the values entered for the **0/4 mA value** parameter (→ 111) and **20 mA value** parameter (→ 113). If the effective flow exceeds or falls below this operational range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

##### Configuration example B

Measuring mode with **Forward/Reverse** option



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 (→ 111) and **20 mA value** parameter (→ 113) must have the same sign. The value for the **20 mA value** parameter (→ 113) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 113) (e.g. forward flow).

### Configuration example C

Measuring mode with **Rev. flow comp.** 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 → 114.

## 20 mA value



**Navigation** Expert → Output → Curr.output 1 to n → 20 mA value (0372–1 to n)

**Prerequisite** One of the following options is selected in the **Current span** parameter (→ 110):

- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

**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 → 222

### Additional information

#### Description

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

#### Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 109).

#### Example

- Value assigned to 0/4 mA = -250 m<sup>3</sup>/h
- Value assigned to 20 mA = +750 m<sup>3</sup>/h
- Calculated current value = 8 mA (at zero flow)

If the **Forward/Reverse** option is selected in the **Measuring mode** parameter (→ 114), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 111) and **20 mA value** parameter (→ 113). The diagnostic message **△S441 Curr.output 1 to n** is displayed.

#### Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 111).

## Measuring mode



### Navigation

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

### Prerequisite

In the **Assign curr.** parameter (→ 109), one of the following options is selected:

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity \*
- CorrConductivity \*
- Temperature \*
- Electronic temp.

In the **Current span** parameter (→ 110), one of the following options is selected:

- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

### Description

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

### Selection

- Forward flow
- Forward/Reverse \*
- Rev. flow comp.

### Factory setting

Forward flow

### Additional information

#### Description

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

#### "Forward flow" option

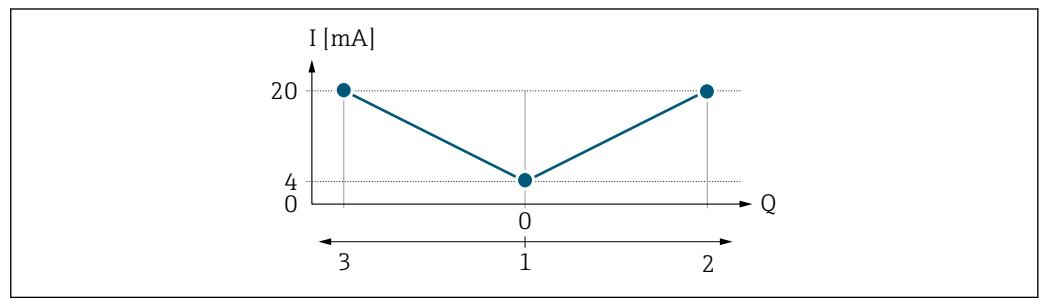
The current output signal is proportional to the process variable assigned. The measuring range is defined by the values that are assigned to the 0/4 mA and 20 mA current value.

\* Visibility depends on order options or device settings

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.:
  - 0/4 mA current value =  $-5 \text{ m}^3/\text{h}$
  - 20 mA current value =  $10 \text{ m}^3/\text{h}$
- If the effective flow exceeds or falls below this measuring range, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

#### *"Forward/Reverse" option*



- |   |                                      |
|---|--------------------------------------|
| I | Current                              |
| Q | Flow                                 |
| 1 | Value assigned to the 0/4 mA current |
| 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 (→ 111) and **20 mA value** parameter (→ 113) must have the same sign.
- The value for the **20 mA value** parameter (→ 113) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 113) (e.g. forward flow).

#### *"Rev. flow comp." option*

The **Rev. flow comp.** option is primarily used to compensate for abrupt reverse flow which can occur in connection with positive displacement pumps as a result of wear or high viscosity. The reverse flows are recorded in a buffer and balanced against forward flow the next time flow is in the forward direction.

If buffering cannot be processed within approx. 60 s, the diagnostic message **△S441 Curr.output 1 to n** is displayed.

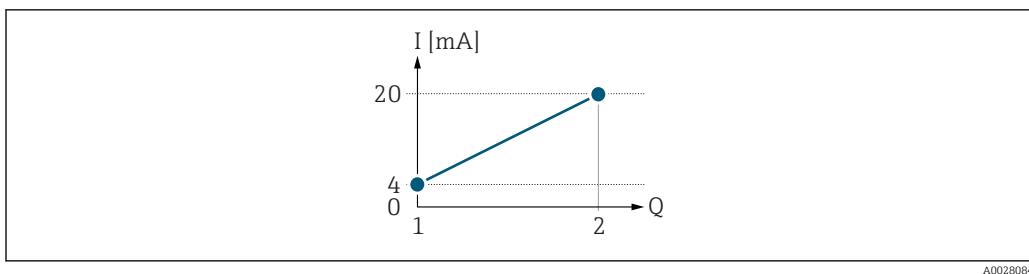
Flow values can aggregate in the buffer in the event of prolonged and unwanted fluid reverse flow. However, these flows are not taken into consideration by the current output configuration, i.e. the reverse flow is not compensated.

If this option is set, the measuring device does not attenuate 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



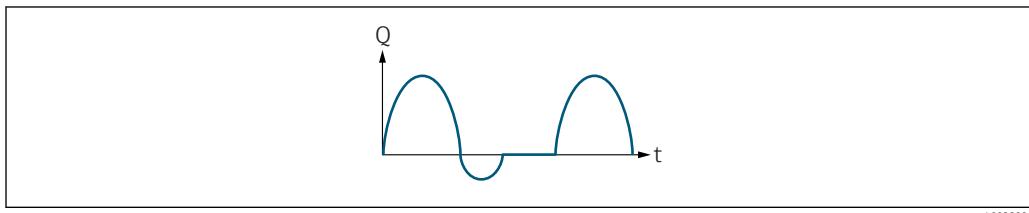
A0028084

**Fig. 3 Measuring range** $I$  Current $Q$  Flow

1 Lower range value (value assigned to 0/4 mA current)

2 Upper range value (value assigned to 20 mA current)

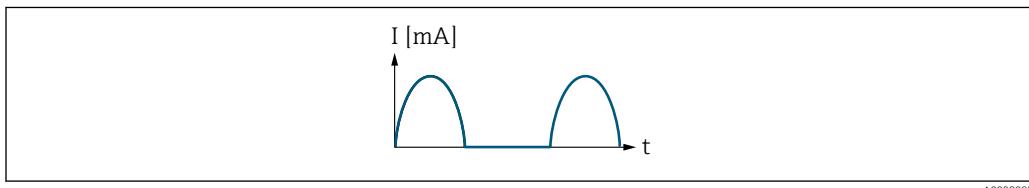
With the following flow response:



A0028091

**Fig. 4 Flow response** $Q$  Flow $t$  TimeWith **Forward flow** option

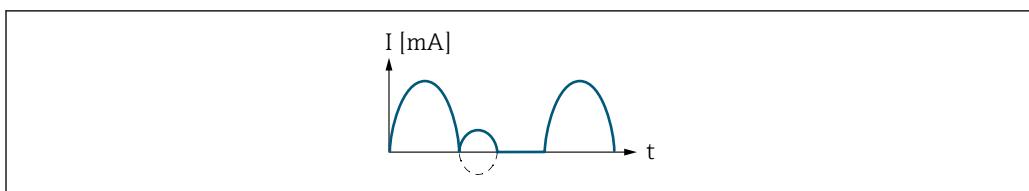
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:



A0028092

 $I$  Current $t$  TimeWith **Forward/Reverse** option

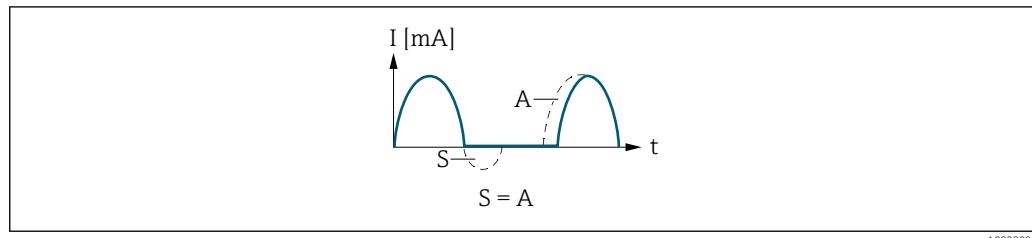
The current output signal is independent of the direction of flow.



A0028093

 $I$  Current $t$  TimeWith **Rev. flow comp.** option

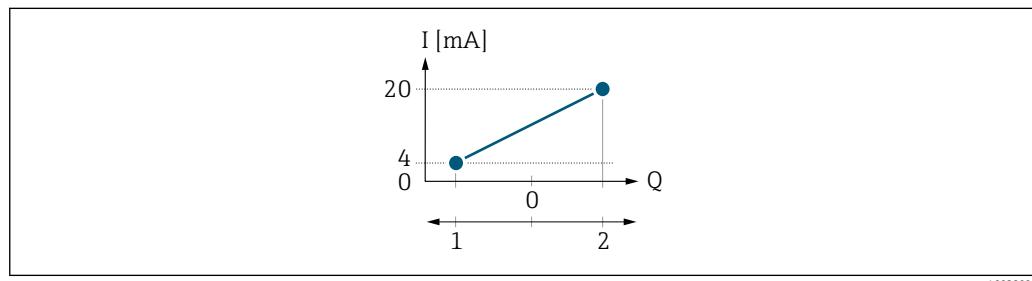
Flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.



$I$  Current  
 $t$  Time  
 $S$  Flow components saved  
 $A$  Balancing of saved flow components

### Example 2

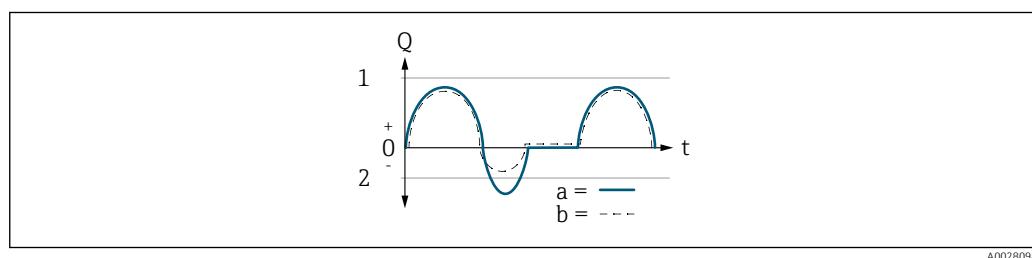
Defined measuring range: lower range value and upper range value with **different** signs



5 Measuring range

$I$  Current  
 $Q$  Flow  
 1 Lower range value (value assigned to 0/4 mA current)  
 2 Upper range value (value assigned to 20 mA current)

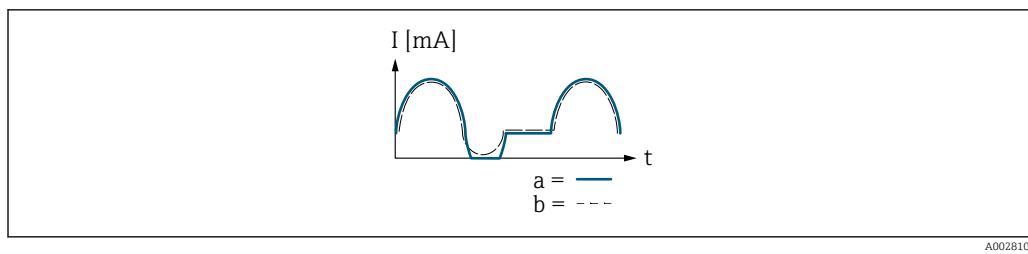
With flow a (-) outside, b (- -) inside the measuring range



$Q$  Flow  
 $t$  Time  
 1 Lower range value (value assigned to 0/4 mA current)  
 2 Upper range value (value assigned to 20 mA current)

With **Forward flow** option

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



$I$  Current  
 $t$  Time

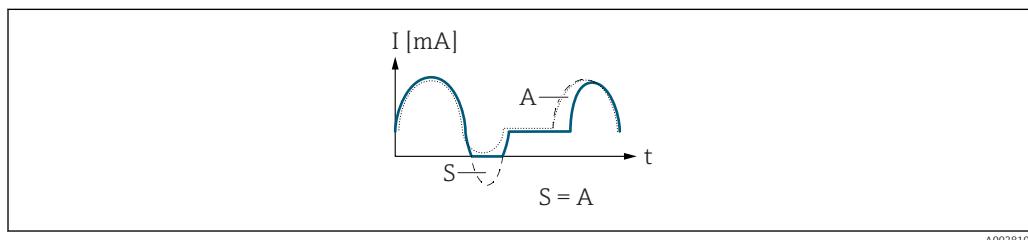
A0028100

### With Forward/Reverse option

This option is not possible in this case as the values for the **0/4 mA value** parameter ( $\rightarrow$  111) and **20 mA value** parameter ( $\rightarrow$  113) have different signs.

### With Rev. flow comp. option

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



$I$  Current  
 $t$  Time  
 $S$  Flow components saved  
 $A$  Balancing of saved flow components

A0028101

## Damping out. 1 to n



### Navigation

Expert → Output → Curr.output 1 to n → Damping out. 1 to n (0363-1 to n)

### Prerequisite

A process variable is selected in the **Assign curr.** parameter ( $\rightarrow$  109) and one of the following options is selected in the **Current span** parameter ( $\rightarrow$  110):

- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 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<sup>3)</sup>) for current 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).

**Response time****Navigation**

Diagram: Expert → Output → Curr.output 2 → Response time (0378)

**Prerequisite**

One of the following options is selected in the **Assign curr.** parameter (→ [109](#)):

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity\*
- CorrConductivity\*
- Temperature\*
- Electronic temp.

One of the following options is selected in the **Current span** parameter (→ [110](#)):

- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

**Description**

Displays the response time. This specifies how quickly the current output reaches the measured value change of 63 % of 100 % of the measured value change.

**User interface**

Positive floating-point number

**Additional information***Description*

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

- Current output damping → [118](#)  
and
- Depending on the measured variable assigned to the output.  
Flow damping

<sup>3)</sup> proportional transmission behavior with first order delay  
 \* Visibility depends on order options or device settings

**Failure mode****Navigation**

Expert → Output → Curr.output 1 to n → Failure mode (0364–1 to n)

**Prerequisite**

A process variable is selected in the **Assign curr.** parameter (→ [109](#)) and one of the following options is selected in the **Current span** parameter (→ [110](#)):

- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 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
- Defined value

**Factory setting**

Max.

**Additional information***Description*

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 (→ [110](#)).

*"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 (→ [110](#)).

*"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 (→ [121](#)).

**Failure current**

**Navigation** Expert → Output → Curr.output 1 to n → Failure current (0352-1 to n)

**Prerequisite** The **Defined value** option is selected in the **Failure mode** parameter (→ [120](#)).

**Description** Use this function to enter a fixed value that the current output adopts in the event of a device alarm.

**User entry** 0 to 22.5 mA

**Factory setting** 22.5 mA

**Output curr. 1 to n**

**Navigation** Expert → Output → Curr.output 1 to n → Output curr. 1 to n (0361-1 to n)

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

**User interface** 3.59 to 22.5 mA

**Measur. curr. 1 to n**

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

**Description** Use this function to display 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

▶ PFS output 1 to n

Terminal no. (0492-1 to n)

→ [123](#)

Signal mode (0490-1 to n)

→ [123](#)

Operating mode (0469-1 to n)

→ [123](#)

Assign pulse 1 to n (0460-1 to n)

→ [125](#)

Pulse scaling (0455-1 to n)	→  125
Pulse width (0452-1 to n)	→  126
Measuring mode (0457-1 to n)	→  127
Failure mode (0480-1 to n)	→  127
Pulse output 1 to n (0456-1 to n)	→  128
Assign freq. (0478-1 to n)	→  129
Min. freq. value (0453-1 to n)	→  129
Max. freq. value (0454-1 to n)	→  129
Val. at min.freq (0476-1 to n)	→  130
Val. at max.freq (0475-1 to n)	→  130
Measuring mode (0479-1 to n)	→  131
Damping out. 1 to n (0477-1 to n)	→  131
Response time (0491-1 to n)	→  132
Failure mode (0451-1 to n)	→  132
Failure freq. (0474-1 to n)	→  133
Output freq. 1 to n (0471-1 to n)	→  133
Switch out funct (0481-1 to n)	→  134
Assign diag. beh (0482-1 to n)	→  134
Assign limit (0483-1 to n)	→  135
Switch-on value (0466-1 to n)	→  137
Switch-off value (0464-1 to n)	→  137
Assign dir.check (0484-1 to n)	→  138
Assign status (0485-1 to n)	→  138
Switch-on delay (0467-1 to n)	→  138
Switch-off delay (0465-1 to n)	→  139

Failure mode (0486-1 to n)	→  139
Switch status 1 to n (0461-1 to n)	→  139
Invert outp.sig. (0470-1 to n)	→  140

**Terminal no.**

**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)
- 20-21 (I/O 4)

**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 NAMUR

**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

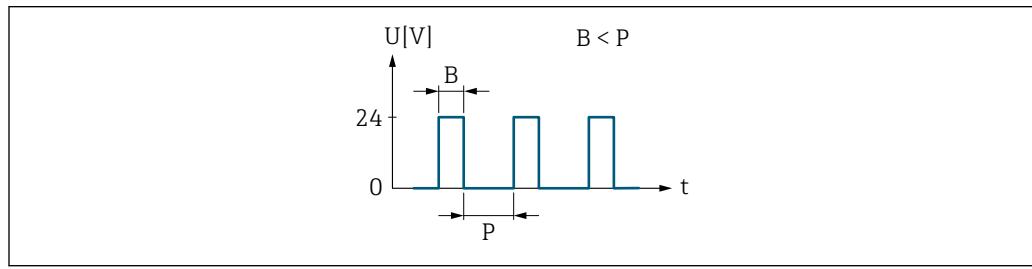
**Additional information***"Pulse" option*

Quantity-dependent pulse with configurable pulse width

- Whenever a specific mass, volume or corrected 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



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

B Pulse width entered

P Pauses between the individual pulses

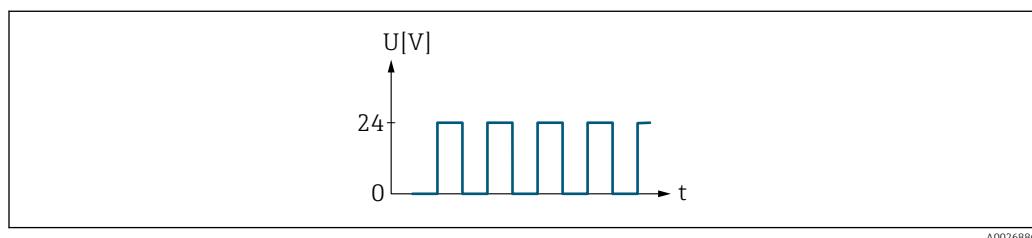
*"Frequency" option*

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, corrected volume flow, flow velocity, conductivity, corrected conductivity, temperature or electronic temperature.

Example

- Flow rate approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1000 g/s
- Output frequency approx. 1 000 Hz



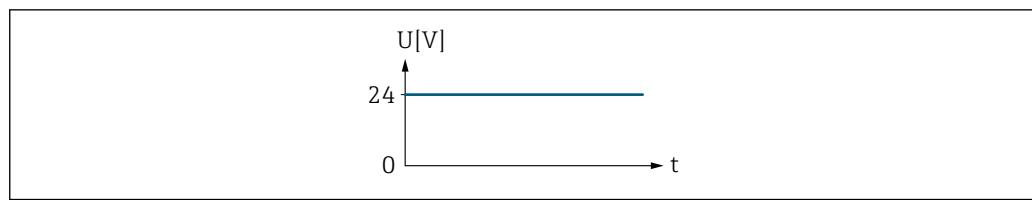
**Fig. 7** Flow-proportional frequency output

*"Switch" option*

Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example

Alarm response without alarm

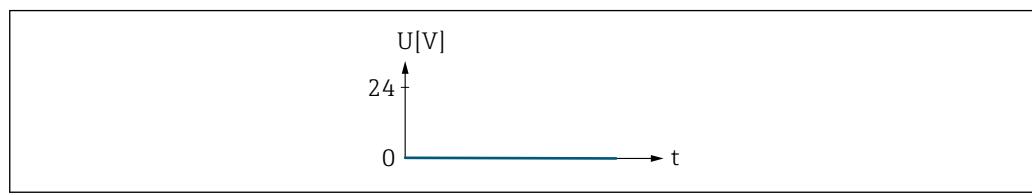


A0026884

8 No alarm, high level

**Example**

Alarm response in case of alarm



A0026885

9 Alarm, low level

**Assign pulse 1 to n****Navigation**

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

**Prerequisite**The **Pulse** option is selected in the **Operating mode** parameter (→ 123) parameter.**Description**

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

**Selection**

- Off
- Volume flow
- Mass flow
- Correct.vol.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 (→ 123) and a process variable is selected in the **Assign pulse** parameter (→ 125).**Description**

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

**User entry**

Positive floating point number

**Factory setting**

Depends on country and nominal diameter → 223

**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 (→ 123) and a process variable is selected in the **Assign pulse** parameter (→ 125).

**Description**

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

**User entry**

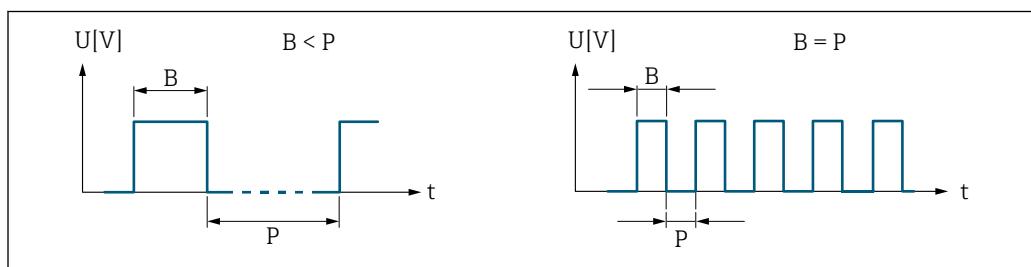
0.05 to 2 000 ms

**Factory setting**

100 ms

**Additional information***Description*

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



B Pulse width entered

P Pauses between the individual pulses

*Example*

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

**Measuring mode**

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

**Prerequisite** In the **Operating mode** parameter (→ 123), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 125):

- Mass flow
- Volume flow
- Correct.vol.flow

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

**Selection**

- Forward flow
- Forward/Reverse
- Reverse flow
- Rev. flow comp.

**Factory setting** Forward flow

**Additional information** *Selection*

- Forward flow  
Positive flow is output, negative flow is not output.
- Forward/Reverse  
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.
- Rev. flow comp.  
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 (→ 114)

*Examples*

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 114)

**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 (→ 123) and a process variable is selected in the **Assign pulse** parameter (→ 125).

**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.

*Selection***■ Actual value**

In the event of a device alarm, the pulse output continues on the basis of the current flow measurement. The fault is ignored.

**■ No pulses**

In the event of a device alarm, the pulse output is "switched off".

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

**Pulse output 1 to n****Navigation**

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

**Prerequisite**

The **Pulse** option is selected in the **Operating mode** parameter (→ 123) parameter.

**Description**

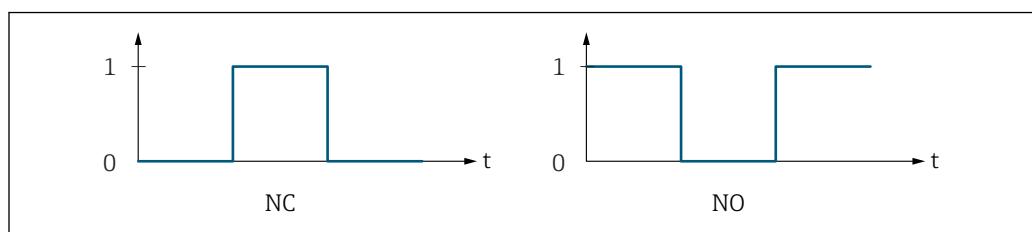
Displays the pulse frequency currently output.

**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.



0 Non-conductive

1 Conductive

NC NC contact (normally closed)

NO NO contact (normally open)

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 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 (→ 127)) can be configured.

**Assign freq.****Navigation**

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

**Prerequisite**

The **Frequency** option is selected in the **Operating mode** parameter (→ 123).

**Description**

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

**Selection**

- Off
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*
- Temperature
- Electronic temp.
- Noise\*
- CoilCurrShotTime\*
- Ref Electr. Pot.\*
- Coating meas.val\*
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Off

**Min. freq. 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 (→ 123) and a process variable is selected in the **Assign freq.** parameter (→ 129).

**Description**

Use this function to enter the minimum frequency.

**User entry**

0.0 to 10 000.0 Hz

**Factory setting**

0.0 Hz

**Max. freq. 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 (→ 123) and a process variable is selected in the **Assign freq.** parameter (→ 129).

\* Visibility depends on order options or device settings

**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

---

## Val. at min.freq



**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 (→ 123) and a process variable is selected in the **Assign freq.** parameter (→ 129).

**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 freq.** parameter (→ 129).

---

## Val. at max.freq



**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 (→ 123) and a process variable is selected in the **Assign freq.** parameter (→ 129).

**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 freq.** parameter (→ 129).

**Measuring mode**

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

**Prerequisite** In the **Assign curr.** parameter (→ 109), one of the following options is selected:

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*
- Temperature\*
- Electronic temp.

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

**Selection**

- Forward flow
- Forward/Reverse
- Rev. flow comp.

**Factory setting** Forward flow

**Additional information** *Selection*

For a detailed description of the options available, see the **Measuring mode** parameter (→ 114)

*Examples*

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 114)

**Damping out. 1 to n**

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

**Prerequisite** In the **Assign curr.** parameter (→ 109), one of the following options is selected:

- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*
- Temperature\*
- Electronic temp.

**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

\* Visibility depends on order options or device settings

<b>Factory setting</b>	0.0 s
<b>Additional information</b>	<p><i>User entry</i></p> <p>Use this function to enter a time constant (PT1 element<sup>4)</sup>) for frequency output damping:</p> <ul style="list-style-type: none"> <li>▪ If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.</li> <li>▪ On the other hand, the current output reacts more slowly if a high time constant is entered.</li> </ul> <p> Damping is switched off if <b>0</b> is entered (factory setting).</p> <p>The frequency output is subject to separate damping that is independent of all preceding time constants.</p>

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## Response time

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<b>Navigation</b>	  Expert → Output → PFS output 1 to n → Response time (0491–1 to n)
<b>Prerequisite</b>	In the <b>Assign curr.</b> parameter (→ <a href="#">109</a> ), one of the following options is selected: <ul style="list-style-type: none"> <li>▪ Volume flow</li> <li>▪ Mass flow</li> <li>▪ Correct.vol.flow</li> <li>▪ Flow velocity</li> <li>▪ Conductivity*</li> <li>▪ CorrConductivity*</li> <li>▪ Temperature*</li> <li>▪ Electronic temp.</li> </ul>
<b>Description</b>	Displays the response time. This specifies how quickly the pulse/frequency/switch output reaches the measured value change of 63 % of 100 % of the measured value change.
<b>User interface</b>	Positive floating-point number
<b>Additional information</b>	<p><i>Description</i></p> <p> The response time is made up of the time specified for the following dampings:</p> <ul style="list-style-type: none"> <li>▪ Damping of pulse/frequency/switch output → <a href="#">118</a> and</li> <li>▪ Depending on the measured variable assigned to the output. Flow damping</li> </ul>

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## Failure mode

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<b>Navigation</b>	  Expert → Output → PFS output 1 to n → Failure mode (0451–1 to n)
<b>Prerequisite</b>	The <b>Frequency</b> option is selected in the <b>Operating mode</b> parameter (→ <a href="#">123</a> ) and a process variable is selected in the <b>Assign freq.</b> parameter (→ <a href="#">129</a> ).

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<sup>4)</sup> proportional transmission behavior with first order delay  
 \* Visibility depends on order options or device settings

<b>Description</b>	Use this function to select the failure mode of the frequency output in the event of a device alarm.
<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Actual value</li> <li>■ Defined value</li> <li>■ 0 Hz</li> </ul>
<b>Factory setting</b>	0 Hz
<b>Additional information</b>	<p><i>Selection</i></p> <ul style="list-style-type: none"> <li>■ 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.</li> <li>■ Defined value In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure freq. (→ 133) 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.</li> <li>■ 0 Hz In the event of a device alarm, the frequency output is "switched off".</li> </ul> <p><b>NOTICE!</b> A device alarm is a measuring device error that must be taken seriously. It can affect the measurement quality such that the quality can no longer be guaranteed. The <b>Actual value</b> option is only recommended if it can be guaranteed that all possible alarm conditions will not affect the measurement quality.</p>

**Failure freq.**

<b>Navigation</b>	Expert → Output → PFS output 1 to n → Failure freq. (0474-1 to n)
<b>Prerequisite</b>	The <b>Frequency</b> option is selected in the <b>Operating mode</b> parameter (→ 123) and a process variable is selected in the <b>Assign freq.</b> parameter (→ 129).
<b>Description</b>	Use this function to enter the value for the frequency output in the event of a device alarm in order to bypass the alarm.
<b>User entry</b>	0.0 to 12 500.0 Hz
<b>Factory setting</b>	0.0 Hz

**Output freq. 1 to n**

<b>Navigation</b>	Expert → Output → PFS output 1 to n → Output freq. 1 to n (0471-1 to n)
<b>Prerequisite</b>	In the <b>Operating mode</b> parameter (→ 123), the <b>Frequency</b> option is selected.
<b>Description</b>	Displays the actual value of the output frequency which is currently measured.
<b>User interface</b>	0.0 to 12 500.0 Hz

## Switch out funct



**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 (→ [123](#)).

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

**Selection**

- Off
- On
- Diag. behavior
- Limit
- Fl. direct.check
- Status

**Factory setting** Off

**Additional information** *Selection*

- Off  
The switch output is permanently switched off (open, non-conductive).
- On  
The switch output is permanently switched on (closed, conductive).
- Diag. 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.
- Fl. direct.check  
Indicates the flow direction (forward or reverse flow).
- Status  
Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.

## Assign diag. beh



**Navigation** Expert → Output → PFS output 1 to n → Assign diag. beh (0482–1 to n)

**Prerequisite**

- In the **Operating mode** parameter (→ [123](#)), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ [134](#)), the **Diag. 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 (→ 123).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 134).

**Description**

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

**Selection**

- Off
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Temperature\*
- Electronic temp.

**Factory setting**

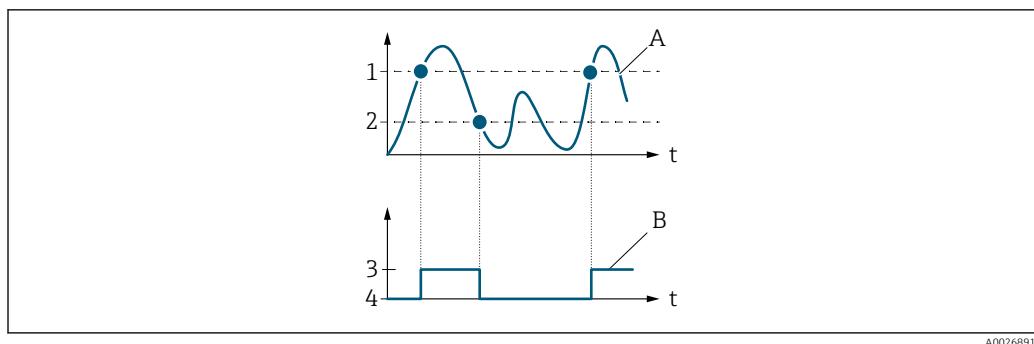
Volume flow

**Additional information***Description*

Behavior of status output when Switch-on value > Switch-off value:

- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive

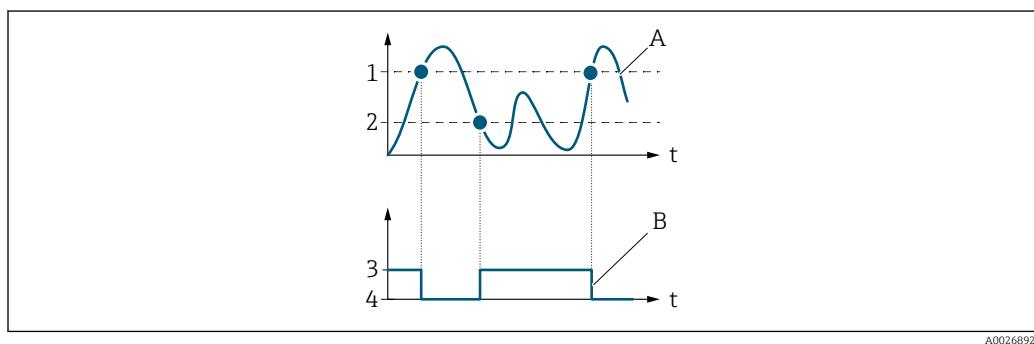
\* Visibility depends on order options or device settings



- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

Behavior of status output when Switch-on value < Switch-off value:

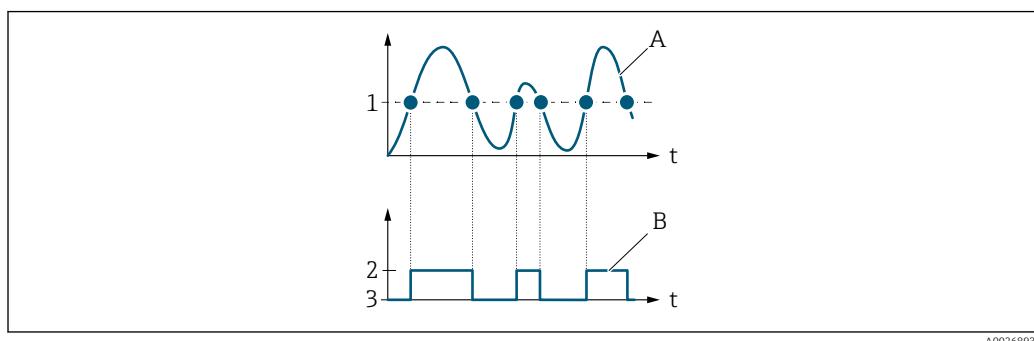
- Process variable < Switch-on value: transistor is non-conductive
- Process variable > Switch-off value: transistor is conductive



- 1 Switch-off value
- 2 Switch-on value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

Behavior of status output when Switch-on value = Switch-off value:

- Process variable > Switch-on value: transistor is conductive
- Process variable < Switch-off value: transistor is non-conductive



- 1 Switch-on value = Switch-off value
- 2 Conductive
- 3 Non-conductive
- A Process variable
- B Status output

**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 (→ 123).  
■ The **Limit** option is selected in the **Switch out funct** parameter (→ 134).

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

**User entry** Signed floating-point number

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

**Additional information** *Description*

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

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

*Dependency*

The unit depends on the process variable selected in the **Assign limit** parameter (→ 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 (→ 123).  
■ The **Limit** option is selected in the **Switch out funct** parameter (→ 134).

**Description** Use this function to enter the measured value for the switch-off point.

**User entry** Signed floating-point number

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

**Additional information** *Description*

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

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

*Dependency*

The unit depends on the process variable selected in the **Assign limit** parameter (→ 135).

**Assign dir.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 (→ [123](#)).
- The **Fl. direct.check** option is selected in the **Switch out funct** parameter (→ [134](#)).

**Description**

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

**Selection**

- Off
- Volume flow
- Mass flow
- Correct.vol.flow

**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 (→ [123](#)).
- The **Status** option is selected in the **Switch out funct** parameter (→ [134](#)).

**Description**

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

**Selection**

- Empty pipe det.
- Low flow cut off
- Digital outp. 1 \*
- Digital outp. 2 \*
- Digital outp. 3 \*

**Factory setting**

Empty pipe det.

**Additional information***Options*

If empty pipe detection or low flow cut off are enabled, the output is conductive. Otherwise, the switch output is non-conductive.

**Switch-on delay****Navigation**

Expert → Output → PFS output 1 to n → Switch-on delay (0467-1 to n)

**Prerequisite**

- The **Switch** option is selected in the **Operating mode** parameter (→ [123](#)).
- The **Limit** option is selected in the **Switch out funct** parameter (→ [134](#)).

**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 (→ [123](#)).
- The **Limit** option is selected in the **Switch out funct** parameter (→ [134](#)).

**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 status 1 to n

**Navigation** Expert → Output → PFS output 1 to n → Switch status 1 to n (0461-1 to n)

**Prerequisite** The **Switch** option is selected in the **Operating mode** parameter (→ [123](#)).

**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 outp.sig.



**Navigation** Expert → Output → PFS output 1 to n → Invert outp.sig. (0470-1 to n)

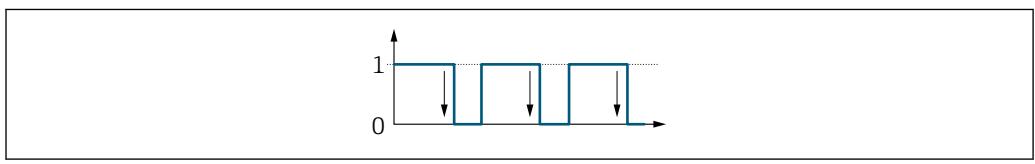
**Description** Use this function to select whether to invert the output signal.

**Selection**

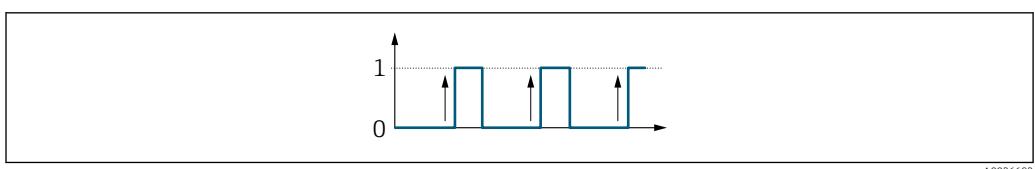
- No
- Yes

**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

► Relay output 1 to n

Terminal no.

→ 141

Relay outp.func.	→  141
Assign dir.check	→  142
Assign limit	→  142
Assign diag. beh	→  143
Assign status	→  143
Switch-off value	→  144
Switch-off delay	→  144
Switch-on value	→  145
Switch-on delay	→  145
Failure mode	→  145
Switch status	→  146
Powerless relay	→  146

---

**Terminal no.****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)
- 20-21 (I/O 4)

**Additional information***"Not used" option*

The relay output module does not use any terminal numbers.

---

**Relay outp.func.****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.

<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Closed</li> <li>■ Open</li> <li>■ Diag. behavior</li> <li>■ Limit</li> <li>■ Fl. direct.check</li> <li>■ Digital Output</li> </ul>
<b>Factory setting</b>	Closed
<b>Additional information</b>	<p><i>Selection</i></p> <ul style="list-style-type: none"> <li>■ Closed The relay output is permanently switched on (closed, conductive).</li> <li>■ Open The relay output is permanently switched off (open, non-conductive).</li> <li>■ Diag. 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.</li> <li>■ 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.</li> <li>■ Fl. direct.check Indicates the flow direction (forward or reverse flow).</li> <li>■ Digital Output Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.</li> </ul>

## Assign dir.check



<b>Navigation</b>	Expert → Output → Relay output 1 to n → Assign dir.check (0808-1 to n)
<b>Prerequisite</b>	In the <b>Relay outp.func.</b> parameter (→ 141), the <b>Fl. direct.check</b> option is selected.
<b>Description</b>	Use this function to select a process variable for monitoring the flow direction.
<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Off</li> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Correct.vol.flow</li> </ul>
<b>Factory setting</b>	Volume flow

## Assign limit



<b>Navigation</b>	Expert → Output → Relay output 1 to n → Assign limit (0807-1 to n)
<b>Prerequisite</b>	The <b>Limit</b> option is selected in the <b>Relay outp.func.</b> parameter (→ 141).
<b>Description</b>	Use this function to select a process variable for the limit value function.

<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Off</li> <li>■ Volume flow</li> <li>■ Mass flow</li> <li>■ Correct.vol.flow</li> <li>■ Flow velocity*</li> <li>■ Conductivity*</li> <li>■ CorrConductivity*</li> <li>■ Totalizer 1</li> <li>■ Totalizer 2</li> <li>■ Totalizer 3</li> <li>■ Temperature*</li> <li>■ Electronic temp.</li> </ul>
<b>Factory setting</b>	Volume flow

---

## Assign diag. beh

<b>Navigation</b>	  Expert → Output → Relay output 1 to n → Assign diag. beh (0806-1 to n)
<b>Prerequisite</b>	In the <b>Relay outp.func.</b> parameter (→ <a href="#">141</a> ), the <b>Diag. behavior</b> option is selected.
<b>Description</b>	Use this function to select the category of the diagnostic events that are displayed for the relay output.
<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Alarm</li> <li>■ Alarm or warning</li> <li>■ Warning</li> </ul>
<b>Factory setting</b>	Alarm
<b>Additional information</b>	<p><i>Description</i></p> <p> If no diagnostic event is pending, the relay output is closed and conductive.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> <li>■ Alarm The relay output signals only diagnostic events in the alarm category.</li> <li>■ Alarm or warning The relay output signals diagnostic events in the alarm and warning category.</li> <li>■ Warning The relay output signals only diagnostic events in the warning category.</li> </ul>

---

## Assign status

<b>Navigation</b>	  Expert → Output → Relay output 1 to n → Assign status (0805-1 to n)
<b>Prerequisite</b>	In the <b>Relay outp.func.</b> parameter (→ <a href="#">141</a> ), the <b>Digital Output</b> option is selected.

\* Visibility depends on order options or device settings

**Description** Use this function to select the device status for the relay output.

**Selection**

- Partial pipe det
- Low flow cut off
- Profinet Slot 18 \*
- Profinet Slot 19 \*
- Profinet Slot 20 \*

**Factory setting** Partial pipe det

## Switch-off value



**Navigation** Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)

**Prerequisite** In the **Relay outp.func.** parameter (→ 141), the **Limit** option is selected.

**Description** Use this function to enter the measured value for the switch-off point.

**User entry** Signed floating-point number

**Factory setting** Country-specific:  

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

**Additional information** *Description*

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

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

*Dependency*

The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 142).

## Switch-off delay



**Navigation** Expert → Output → Relay output 1 to n → Switch-off delay (0813–1 to n)

**Prerequisite** In the **Relay outp.func.** parameter (→ 141), the **Limit** option is selected.

**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

\* Visibility depends on order options or device settings

---

**Switch-on value**

**Navigation** Expert → Output → Relay output 1 to n → Switch-on value (0810-1 to n)

**Prerequisite** The **Limit** option is selected in the **Relay outp.func.** parameter (→ [141](#)).

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

**User entry** Signed floating-point number

**Factory setting** Country-specific:

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

**Additional information** *Description*

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

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

*Dependency*

The unit is dependent on the process variable selected in the **Assign limit** parameter (→ [142](#)).

---

**Switch-on delay**

**Navigation** Expert → Output → Relay output 1 to n → Switch-on delay (0814-1 to n)

**Prerequisite** In the **Relay outp.func.** parameter (→ [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 status**

---

**Navigation** Expert → Output → Relay output 1 to n → Switch status (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**

---

**Navigation** 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.

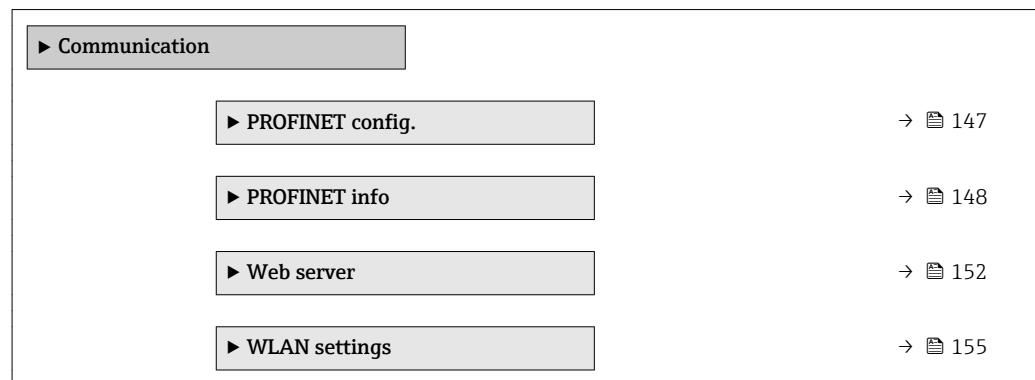
## ■ Closed

The relay output is conductive.

## 3.6 "Communication" submenu

*Navigation*

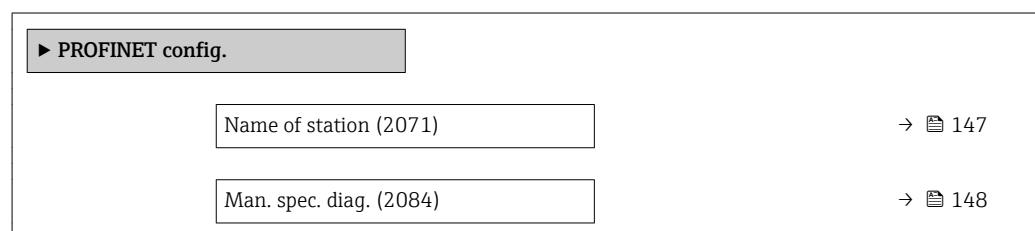
Expert → Communication



### 3.6.1 "PROFINET config." submenu

*Navigation*

Expert → Communication → PROFINET config.




---

#### Name of station

---

**Navigation**

Expert → Communication → PROFINET config. → Name of station (2071)

**Description**

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

**User entry**

Max. 240 characters such as lower-case letters or numbers

**Factory setting**

eh-promag500-xxxxx

**Additional information**

*Description*

The device tag corresponds to the device name ("Name Of Station" of PROFINET specification) The device name can be adjusted via DIP switch or the automation system.

*Factory setting*

Structure of the device tag:

- eh-promag500-xxxxx
- eh: Endress+Hauser
- promag: Instrument family
- 500: Transmitter
- xxxx: Serial number of the device

**Man. spec. diag.**

**Navigation** Expert → Communication → PROFINET config. → Man. spec. diag. (2084)

**Description** Use this function to enable the transfer of manufacturer-specific diagnostic events.

**Selection**

- Not active
- Active

**Factory setting** Active

**Additional information** *Description*

- Active  
In addition to the PROFINET standard alarms, active manufacturing-specific diagnostic events are also transferred to the automation system. The diagnostic number and the error text of the respective diagnostic event are displayed.
- Not active  
Only the PROFINET standard alarms are transferred to the automation system.

*Selection*

This selection affects PROFINET communication only.

Diagnostic events are displayed in the DTM or web server regardless of the selection made in this parameter. The PROFINET standard alarms (diagnosis and process) for the stack are also unaffected by the selected mode.

### 3.6.2 "PROFINET info" submenu

**Navigation** Expert → Communication → PROFINET info

► PROFINET info	
Device type (2083)	→  149
Device ID (2073)	→  149
Device revision (2072)	→  149
AR state (2088)	→  149
MAC IO contr. (2093)	→  151
IP IO controller (2094)	→  151
MAC backup IO c. (2095)	→  151
IP backup IO c. (2096)	→  151

MRP role (2085)	→  150
State MRP port 1 (2086)	→  150
State MRP port 2 (2087)	→  150

---

**Device type**

---

**Navigation** Expert → Communication → PROFINET info → Device type (2083)

**Description** Displays the device type (device type code).

**User interface** Max. 16 characters, such as letters, numbers or special characters (e.g. @, %, /).

**Factory setting** Promag 500

---

**Device ID**

---

**Navigation** Expert → Communication → PROFINET info → Device ID (2073)

**Description** Use this function to display the device ID.

**User interface** 0 to 65 535

---

**Device revision**

---

**Navigation** Expert → Communication → PROFINET info → Device revision (2072)

**Description** Use this function to display the device revision.

**User interface** 0 to 65 535

**Additional information** *Description*

The device revision enables the correct assignment of device drivers to the device.

---

**AR state**

---

**Navigation** Expert → Communication → PROFINET info → AR state (2088)

**Description** Displays whether an active AR (Application Relation) connection has been established.

<b>User interface</b>	<ul style="list-style-type: none"><li>■ Active</li><li>■ Not active</li><li>■ Redund. 1AR act.</li><li>■ Redund. 2AR act.</li></ul>
-----------------------	---

<b>Factory setting</b>	Not active
------------------------	------------

---

## MRP role

---

<b>Navigation</b>	  Expert → Communication → PROFINET info → MRP role (2085)
-------------------	--

<b>Description</b>	Displays the current status of the MRP (Media Redundancy Protocol) role. When a connection is established, an MRP role is assigned to the measuring device if MRP was enabled in the controller.
--------------------	---

<b>User interface</b>	<ul style="list-style-type: none"><li>■ MRP deactivated</li><li>■ Client activated</li><li>■ Manager active</li></ul>
-----------------------	---

<b>Factory setting</b>	MRP deactivated
------------------------	-----------------

---

## State MRP port 1

---

<b>Navigation</b>	  Expert → Communication → PROFINET info → State MRP port 1 (2086)
-------------------	--

<b>Description</b>	Displays the status of MRP port 1 if an MRP connection has been established.
--------------------	--

<b>User interface</b>	<ul style="list-style-type: none"><li>■ Port deactivated</li><li>■ Port blocking</li><li>■ Port forwarding</li></ul>
-----------------------	--

<b>Factory setting</b>	Port deactivated
------------------------	------------------

<b>Additional information</b>	<i>Selection</i> <ul style="list-style-type: none"><li>■ Port forwarding The ring is closed.</li><li>■ Port blocking The ring is open.</li></ul>
-------------------------------	--

---

## State MRP port 2

---

<b>Navigation</b>	  Expert → Communication → PROFINET info → State MRP port 2 (2087)
-------------------	--

<b>Description</b>	Displays the status of MRP port 2 if an MRP connection has been established.
--------------------	--

---

<b>User interface</b>	<ul style="list-style-type: none"><li>■ Port deactivated</li><li>■ Port blocking</li><li>■ Port forwarding</li></ul>
-----------------------	--

<b>Factory setting</b>	Port deactivated
------------------------	------------------

<b>Additional information</b>	<i>Selection</i> <ul style="list-style-type: none"><li>■ Port forwarding The ring is closed.</li><li>■ Port blocking The ring is open.</li></ul>
-------------------------------	--

---

### MAC IO contr.

<b>Navigation</b>	 Expert → Communication → PROFINET info → MAC IO contr. (2093)
-------------------	---

<b>Description</b>	Shows MAC of the only or of the primary controller.
--------------------	---

<b>Factory setting</b>	0x00
------------------------	------

---

### IP IO controller

<b>Navigation</b>	 Expert → Communication → PROFINET info → IP IO controller (2094)
-------------------	--

<b>Description</b>	Shows IP of the only or of the primary controller.
--------------------	--

<b>Factory setting</b>	0x00
------------------------	------

---

### MAC backup IO c.

<b>Navigation</b>	 Expert → Communication → PROFINET info → MAC backup IO c. (2095)
-------------------	--

<b>Description</b>	Shows the MAC address of the backup IO controller.
--------------------	--

<b>Factory setting</b>	0x00
------------------------	------

---

### IP backup IO c.

<b>Navigation</b>	 Expert → Communication → PROFINET info → IP backup IO c. (2096)
-------------------	---

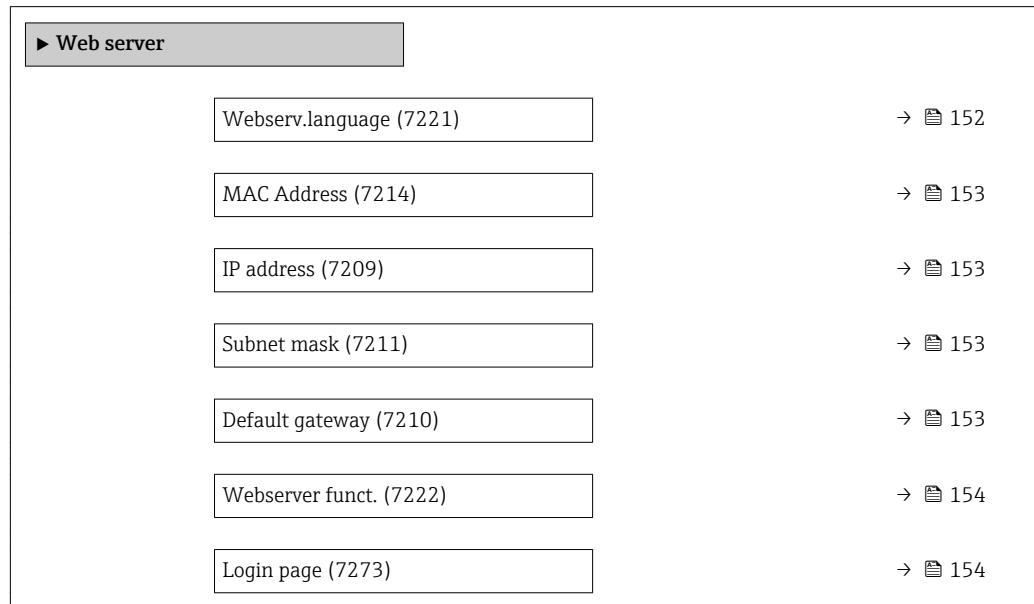
<b>Description</b>	Shows the IP address of the backup IO controller.
--------------------	---

**Factory setting** 0x00

### 3.6.3 "Web server" submenu

*Navigation*

Expert → Communication → Web server



#### Wesbserv.language

**Navigation**

Expert → Communication → Web server → Wesbserv.language (7221)

**Description**

Use this function to select the Web server language setting.

**Selection**

- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык(Ru)
- Svenska
- Türkçe
- 中文 (Chinese)
- 日本語 (Japanese)
- 한국어 (Korean)
- Bahasa Indonesia
- tiéng Việt (Vit)
- čeština (Czech)

**Factory setting**

English

---

## MAC Address

---

<b>Navigation</b>	  Expert → Communication → Web server → MAC Address (7214)
<b>Description</b>	Displays the MAC <sup>5)</sup> address of the measuring device.
<b>User interface</b>	Unique 12-digit character string comprising letters and numbers
<b>Factory setting</b>	Each measuring device is given an individual address.
<b>Additional information</b>	<i>Example</i> For the display format 00:07:05:10:01:5F

---

## IP address

---

<b>Navigation</b>	  Expert → Communication → Web server → IP address (7209)
<b>Description</b>	Display or enter the IP address of the Web server integrated in the measuring device.
<b>User entry</b>	4 octet: 0 to 255 (in the particular octet)
<b>Factory setting</b>	192.168.1.212

---

## Subnet mask

---

<b>Navigation</b>	  Expert → Communication → Web server → Subnet mask (7211)
<b>Description</b>	Display or enter the subnet mask.
<b>User entry</b>	4 octet: 0 to 255 (in the particular octet)
<b>Factory setting</b>	255.255.255.0

---

## Default gateway

---

<b>Navigation</b>	  Expert → Communication → Web server → Default gateway (7210)
<b>Description</b>	Display or enter the Default gateway (→  153).
<b>User entry</b>	4 octet: 0 to 255 (in the particular octet)

---

5) Media Access Control

**Factory setting** 0.0.0.0**Webserver funct.****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 Webserver funct. can only be re-enabled via or the operating tool FieldCare.

*Selection*

Option	Description
Off	<ul style="list-style-type: none"><li>▪ The web server is completely disabled.</li><li>▪ Port 80 is locked.</li></ul>
HTML Off	The HTML version of the web server is not available.
On	<ul style="list-style-type: none"><li>▪ The complete functionality of the web server is available.</li><li>▪ JavaScript is used.</li><li>▪ The password is transferred in an encrypted state.</li><li>▪ Any change to the password is also transferred in an encrypted state.</li></ul>

**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 "WLAN settings" submenu

Navigation

Expert → Communication → WLAN settings

▶ WLAN settings	
WLAN (2702)	→ 156
WLAN mode (2717)	→ 156
SSID name (2714)	→ 156
Network security (2705)	→ 156
Sec. identific. (2718)	→ 157
User name (2715)	→ 157
WLAN password (2716)	→ 157
WLAN IP address (2711)	→ 158
WLAN MAC address (2703)	→ 158
WLAN subnet mask (2709)	→ 158
WLAN MAC address (2703)	→ 158
WLAN passphrase (2706)	→ 158
WLAN MAC address (2703)	→ 158
Assign SSID name (2708)	→ 159
SSID name (2707)	→ 159
WLAN channel (2704)	→ 159
Select antenna (2713)	→ 160
Connection state (2722)	→ 160
Rec.sig.strength (2721)	→ 160
WLAN IP address (2711)	→ 158
Gateway IP addr. (2719)	→ 161
IP address DNS (2720)	→ 161

**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**

- Access point
- WLAN Client

**Factory setting**

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.

---

<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Unsecured</li> <li>■ WPA2-PSK</li> <li>■ EAP-PEAP MSCHAP2 *</li> <li>■ EAP-PEAP NoAuth.*</li> <li>■ EAP-TLS</li> </ul>
------------------	---

<b>Factory setting</b>	WPA2-PSK
------------------------	----------

<b>Additional information</b>	<p><i>Selection</i></p> <ul style="list-style-type: none"> <li>■ Unsecured Access the WLAN connection without identification.</li> <li>■ WPA2-PSK Access the WLAN connection with a network key.</li> </ul>
-------------------------------	---

---

### Sec. identific.

<b>Navigation</b>	 Expert → Communication → WLAN settings → Sec. identific. (2718)
-------------------	---

<b>Description</b>	Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).
--------------------	--

<b>User interface</b>	<ul style="list-style-type: none"> <li>■ Trust. iss.cert.</li> <li>■ Device certific.</li> <li>■ Dev. private key</li> </ul>
-----------------------	--

---

### User name



<b>Navigation</b>	 Expert → Communication → WLAN settings → User name (2715)
-------------------	---

<b>Description</b>	Use this function to enter the username of the WLAN network.
--------------------	--

<b>User entry</b>	–
-------------------	---

<b>Factory setting</b>	–
------------------------	---

---

### WLAN password



<b>Navigation</b>	 Expert → Communication → WLAN settings → WLAN password (2716)
-------------------	---

<b>Description</b>	Use this function to enter the WLAN password for the WLAN network.
--------------------	--

<b>User entry</b>	–
-------------------	---

<b>Factory setting</b>	–
------------------------	---

---

\* Visibility depends on order options or device settings

---

**WLAN IP address**

<b>Navigation</b>	Expert → Communication → WLAN settings → WLAN IP address (2711)
<b>Description</b>	Use this function to enter the IP address of the measuring device's WLAN connection.
<b>User entry</b>	4 octet: 0 to 255 (in the particular octet)
<b>Factory setting</b>	192.168.1.212

---

**WLAN MAC address**

<b>Navigation</b>	Expert → Communication → WLAN settings → WLAN MAC address (2703)
<b>Description</b>	Displays the MAC <sup>6)</sup> address of the measuring device.
<b>User interface</b>	Unique 12-digit character string comprising letters and numbers
<b>Factory setting</b>	Each measuring device is given an individual address.
<b>Additional information</b>	<i>Example</i> For the display format 00:07:05:10:01:5F

---

**WLAN subnet mask**

<b>Navigation</b>	Expert → Communication → WLAN settings → WLAN subnet mask (2709)
<b>Description</b>	Use this function to enter the subnet mask.
<b>User entry</b>	4 octet: 0 to 255 (in the particular octet)
<b>Factory setting</b>	255.255.255.0

---

**WLAN passphrase**

<b>Navigation</b>	Expert → Communication → WLAN settings → WLAN passphrase (2706)
<b>Prerequisite</b>	The <b>WPA2-PSK</b> option is selected in the <b>Security type</b> parameter (→  156).
<b>Description</b>	Use this function to enter the network key.

---

6) Media Access Control

<b>User entry</b>	8 to 32-digit character string comprising numbers, letters and special characters (without spaces)
<b>Factory setting</b>	Serial number of the measuring device (e.g. L100A802000)

**Assign SSID name**

<b>Navigation</b>	Expert → Communication → WLAN settings → Assign SSID name (2708)
<b>Description</b>	Use this function to select which name is used for the SSID <sup>7)</sup> .
<b>Selection</b>	<ul style="list-style-type: none"> <li>■ Device tag</li> <li>■ User-defined</li> </ul>
<b>Factory setting</b>	User-defined
<b>Additional information</b>	<p><i>Selection</i></p> <ul style="list-style-type: none"> <li>■ Device tag The device tag name is used as the SSID.</li> <li>■ User-defined A user-defined name is used as the SSID.</li> </ul>

**SSID name**

<b>Navigation</b>	Expert → Communication → WLAN settings → SSID name (2707)
<b>Prerequisite</b>	<ul style="list-style-type: none"> <li>■ The <b>User-defined</b> option is selected in the <b>Assign SSID name</b> parameter (→  159).</li> <li>■ The <b>Access point</b> option is selected in the <b>WLAN mode</b> parameter (→  156).</li> </ul>
<b>Description</b>	Use this function to enter a user-defined SSID name.
<b>User entry</b>	Max. 32-digit character string comprising numbers, letters and special characters
<b>Factory setting</b>	EH_device designation_last 7 digits of the serial number (e.g. EH_Promag_500_A802000)

**WLAN channel**

<b>Navigation</b>	Expert → Communication → WLAN settings → WLAN channel (2704)
<b>Description</b>	Use this function to enter the WLAN channel.
<b>User entry</b>	1 to 11

7) Service Set Identifier

**Factory setting** 6**Additional information** *Description*

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

---

**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

---

**Rec.sig.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 addr.**

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

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

**Factory setting** 192.168.1.212

**IP address DNS**

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

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

**Factory setting** 192.168.1.212

**3.6.5 "Diag. config." 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:*

Category	Meaning
Failure (F)	A device error is present. The measured value is no longer valid.
Funct. check (C)	The device is in service mode (e.g. during a simulation).
Out of spec. (S)	The device is being operated: <ul style="list-style-type: none"> <li>▪ Outside its technical specification limits (e.g. outside the process temperature range)</li> <li>▪ Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)</li> </ul>
Mainten. req.(M)	Maintenance is required. The measured value is still valid.
No effect (N)	Has no effect on the condensed status <sup>1)</sup> .

1) Condensed status according to NAMUR recommendation NE107

*Navigation*

 Expert → Communication → Diag. config.

▶ Diag. config.	
Event category 004 (0238)	→  162
Event category 441 (0210)	→  162
Event category 442 (0230)	→  163

Event category 443 (0231)	→  163
Event category 531 (0262)	→  163
Event category 832 (0218)	→  164
Event category 833 (0225)	→  164
Event category 834 (0227)	→  165
Event category 835 (0229)	→  165
Event category 862 (0214)	→  165
Event category 937 (0260)	→  166

## Event category 004 (Sensor)



### Navigation

Expert → Communication → Diag. config. → Event category 004 (0238)

### Description

Use this option to select a category for the diagnostic message **004 Sensor**.

### Selection

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

### Factory setting

Out of spec. (S)

### Additional information

For a detailed description of the event categories available for selection: → 161

## Event category 441 (Curr.output 1 to n)



### Navigation

Expert → Communication → Diag. config. → Event category 441 (0210)

### Description

Use this function to select a category for the diagnostic message **441 Curr.output 1 to n**.

### Selection

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

### Factory setting

Out of spec. (S)

**Additional information**For a detailed description of the event categories available for selection: → [161](#)**Event category 442 (Freq. 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 diagnostic message **442 Freq. output 1 to n**.**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting**

Out of spec. (S)

**Additional information**For a detailed description of the event categories available for selection: → [161](#)**Event category 443 (Pulse output 1 to n)****Navigation**

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 diagnostic message **443 Pulse output 1 to n**.**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting**

Out of spec. (S)

**Additional information**For a detailed description of the event categories available for selection: → [161](#)**Event category 531 (Empty pipe det.)****Navigation**

Expert → Communication → Diag. config. → Event category 531 (0262)

**Description**Use this option to select a category for the diagnostic message **531 Empty pipe det..**

**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting**

Out of spec. (S)

**Additional information** For a detailed description of the event categories available for selection: → [161](#)

---

**Event category 832 (Electronic temp.)****Navigation** Expert → Communication → Diag. config. → Event category 832 (0218)**Description**Use this function to select a category for the diagnostic message **832 Electronic temp..****Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting**

Out of spec. (S)

**Additional information***Selection* For a detailed description of the event categories available for selection: → [161](#)

---

**Event category 833 (Electronic temp.)****Navigation** Expert → Communication → Diag. config. → Event category 833 (0225)**Description**Use this option to select a category for the diagnostic message **833 Electronic temp..****Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting**

Out of spec. (S)

**Additional information***Selection* For a detailed description of the event categories available for selection: → [161](#)

---

**Event category 834 (Process temp.)**

---



**Navigation** Expert → Communication → Diag. config. → Event category 834 (0227)

**Description** Use this option to select a category for the diagnostic message **834 Process temp..**

**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting** Out of spec. (S)

**Additional information** *Selection*



For a detailed description of the event categories available for selection: → 161

---

**Event category 835 (Process temp.)**

---



**Navigation** Expert → Communication → Diag. config. → Event category 835 (0229)

**Description** Use this option to select a category for the diagnostic message **835 Process temp..**

**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting** Out of spec. (S)

**Additional information** *Selection*



For a detailed description of the event categories available for selection: → 161

---

**Event category 862 (Pipe empty)**

---



**Navigation** Expert → Communication → Diag. config. → Event category 862 (0214)

**Description** Use this option to select a category for the diagnostic message **862 Pipe empty.**

**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting** Out of spec. (S)

**Additional information**For a detailed description of the event categories available for selection: → [161](#)**Event category 937 (EMC interference)****Navigation**

Expert → Communication → Diag. config. → Event category 937 (0260)

**Description**Use this option to select a category for the diagnostic message **937 EMC interference**.**Selection**

- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

**Factory setting**

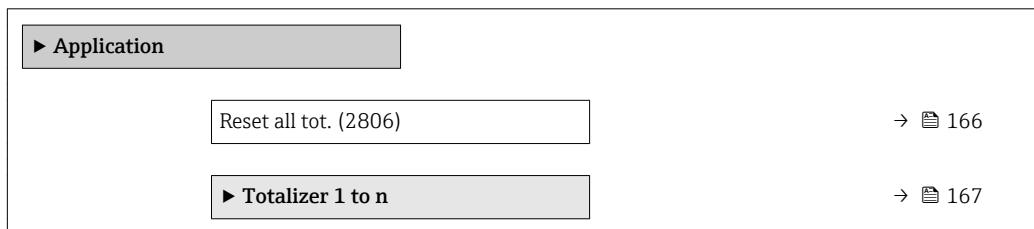
Out of spec. (S)

**Additional information**For a detailed description of the event categories available for selection: → [161](#)

### 3.7 "Application" submenu

**Navigation**

Expert → Application

**Reset all tot.****Navigation**

Expert → Application → Reset all tot. (2806)

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

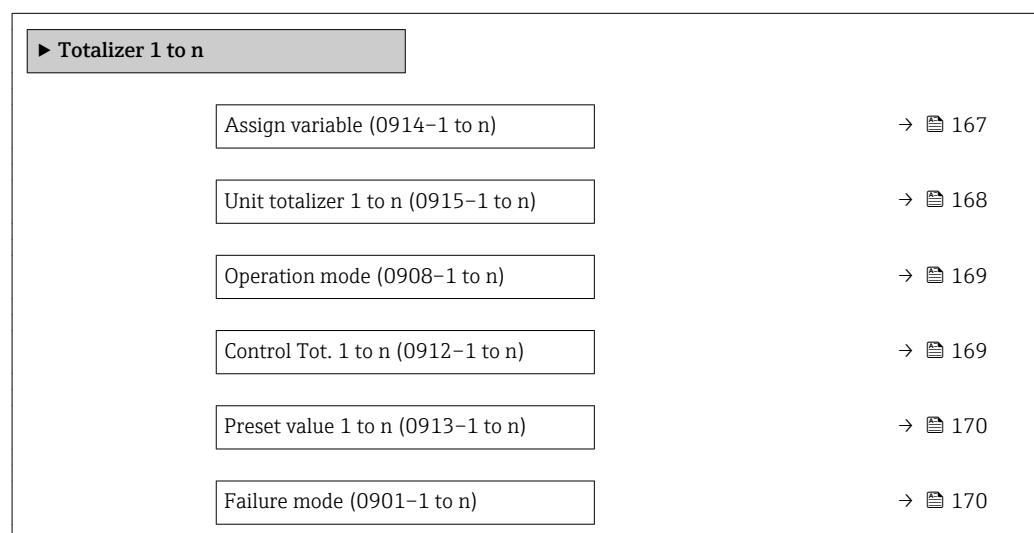
- Cancel
- Reset + totalize

**Factory setting**

Cancel

**Additional information***Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totaled.

**3.7.1 "Totalizer 1 to n" submenu***Navigation*
 Expert → Application → Totalizer 1 to n
**Assign variable****Navigation**
 Expert → Application → Totalizer 1 to n → Assign variable (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
- Correct.vol.flow

**Factory setting**

Volume flow

**Additional information***Description*

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

*Selection*

If the **Off** option is selected, only **Assign variable** parameter (→ 167) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

**Unit totalizer 1 to n****Navigation**

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

**Prerequisite**

A process variable is selected in the **Assign variable** parameter (→ 167) of the **Totalizer 1 to n** submenu.

**Description**

Use this function to select the process variable unit for the Totalizer 1 to n (→ 167).

**Selection***SI units*

- g \*
- kg \*
- t

*US units*

- oz \*
- lb \*
- STon \*

\* Visibility depends on order options or device settings

or

*SI units*

- cm<sup>3</sup> \*
- dm<sup>3</sup> \*
- m<sup>3</sup> \*
- ml \*
- l \*
- hl \*
- Ml Mega \*

*US units*

- af \*
- ft<sup>3</sup> \*
- Mft<sup>3</sup> \*
- fl oz (us) \*
- gal (us) \*
- kgal (us) \*
- Mgal (us) \*
- bbl (us;liq.) \*
- bbl (us;beer) \*
- bbl (us;oil) \*
- bbl (us;tank) \*

*Imperial units*

- gal (imp) \*
- Mgal (imp) \*
- bbl (imp;beer) \*
- bbl (imp;oil) \*

\* Visibility depends on order options or device settings

or

*SI units*

- NL \*
- Nhl \*
- Nm<sup>3</sup> \*
- Sl \*
- Sm<sup>3</sup> \*

*US units*

- Sft<sup>3</sup> \*
- MMSft<sup>3</sup> \*
- Sgal (us) \*
- Sbbl (us;liq.) \*
- Sbbl (us;oil) \*

*Imperial units*

- Sgal (imp) \*

\* Visibility depends on order options or device settings

or

*Other units*

None \*

\* Visibility depends on order options or device settings

**Factory setting**

1

**Additional information***Description*

The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 55).

*Selection*

The selection is dependent on the process variable selected in the **Assign variable** parameter (→ 167).

**Operation mode****Navigation**

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

**Prerequisite**

A process variable is selected in the **Assign variable** parameter (→ 167) of the **Totalizer 1 to n** submenu.

**Description**

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

**Selection**

- Net flow total
- Forward total
- Reverse total

**Factory setting**

Net flow total

**Additional information***Selection*

- Net flow total

Flow values in the forward and reverse flow direction are totalized and balanced against one another. Net flow is registered in the flow direction.

- Forward total

Only the flow in the forward flow direction is totalized.

- Reverse total

Only the flow in the reverse flow direction is totalized (= reverse flow quantity).

**Control Tot. 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 variable** parameter (→ 167) 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*

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold	The totaling process is stopped and the totalizer is set to its defined start value from the <b>Preset value</b> parameter.
Reset + totalize	The totalizer is reset to 0 and the totaling process is restarted.
Preset+totalize	The totalizer is set to the defined start value from the <b>Preset value</b> parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

**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 variable** parameter (→ 167) of the **Totalizer 1 to n** submenu.

**Description**

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

**User entry**

Signed floating-point number

**Factory setting**

0 1

**Additional information**

*User entry*

 The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 168).

*Example*

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

**Failure mode****Navigation**

Expert → Application → Totalizer 1 to n → Failure mode (0901–1 to n)

**Prerequisite**

A process variable is selected in the **Assign variable** parameter (→ 167) of the **Totalizer 1 to n** submenu.

**Description**

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

**Selection**

- Stop
- Actual value
- Last valid value

**Factory setting**

Stop

**Additional information***Description*

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

*Selection*

## ■ Stop

The totalizer is stopped in the event of a device alarm.

## ■ Actual value

The totalizer continues to count based on the actual 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 "Custody transfer" submenu**

Only available for Promag H.



For detailed information on the parameter descriptions for custody transfer measurement, see the Special Documentation for the device → [7](#)

*Navigation*

Expert → Application → Custody transfer

► Custody transfer

**3.8 "Diagnostics" submenu***Navigation*

Expert → Diagnostics

► Diagnostics

Actual diagnos. (0691)

→ [172](#)

Prev.diagnostics (0690)

→ [173](#)

Time fr. restart (0653)

→ [174](#)

Operating time (0652)

→ [174](#)

► Diagnostic list

→ [174](#)

► Event logbook

→ [178](#)

► Device info

→ [181](#)

► Main elec.+I/O1

→ [184](#)

► Sens. electronic	→  185
► I/O module 2	→  188
► I/O module 3	→  189
► I/O module 4	→  190
► Display module	→  191
► Min/max val.	→  200
► Data logging	→  192
► Heartbeat	→  212
► Simulation	→  212

---

## Actual diagnos.

---

<b>Navigation</b>	Expert → Diagnostics → Actual diagnos. (0691)
<b>Prerequisite</b>	A diagnostic event has occurred.
<b>Description</b>	Displays the current diagnostic message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.
<b>User interface</b>	Symbol for diagnostic behavior, diagnostic code and short message.
<b>Additional information</b>	<p><i>Display</i></p> <p> Additional pending diagnostic messages can be viewed in the <b>Diagnostic list</b> submenu (→  174).</p> <p> Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.</p> <p><i>Example</i></p> <p>For the display format: ☒ F271 Main electronics</p>

---

## Timestamp

---

<b>Navigation</b>	Expert → Diagnostics → Timestamp
<b>Description</b>	Displays the operating time when the current diagnostic message occurred.
<b>User interface</b>	Days (d), hours (h), minutes (m) and seconds (s)

**Additional information***Display*

The diagnostic message can be viewed via the **Actual diagnos.** parameter  
(→ 172).

*Example*

For the display format:

24d12h13m00s

---

**Prev.diagnostics****Navigation**

Expert → Diagnostics → Prev.diagnostics (0690)

**Prerequisite**

Two diagnostic events have already occurred.

**Description**

Displays the diagnostic message that occurred before the current message.

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information***Display*

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

*Example*

For the display format:

☒F271 Main electronics

---

**Timestamp****Navigation**

Expert → Diagnostics → Timestamp

**Description**

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

**User interface**

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

**Additional information***Display*

The diagnostic message can be viewed via the **Prev.diagnostics** parameter  
(→ 173).

*Example*

For the display format:

24d12h13m00s

---

**Time fr. restart**

---

**Navigation**  Expert → Diagnostics → Time fr. restart (0653)

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

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

---

**Operating time**

---

**Navigation**  Expert → Diagnostics → Operating time (0652)

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

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

**Additional information** *User interface*

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

### 3.8.1 "Diagnostic list" submenu

*Navigation*  Expert → Diagnostics → Diagnostic list

 Diagnostic list	
Diagnostics 1 (0692)	→  174
Diagnostics 2 (0693)	→  175
Diagnostics 3 (0694)	→  176
Diagnostics 4 (0695)	→  177
Diagnostics 5 (0696)	→  178

---

**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 electronics
-  F276 I/O module

---

**Timestamp****Navigation**

 Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

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

**User interface**

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

**Additional information***Display*

 The diagnostic message can be viewed via the **Diagnostics 1** parameter (→  174).

*Example*

For the display format:

24d12h13m00s

---

**Diagnostics 2****Navigation**

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

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information***Display*

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

*Examples*

For the display format:

-  F271 Main electronics
-  F276 I/O module

---

**Timestamp**

<b>Navigation</b>	 Expert → Diagnostics → Diagnostic list → Timestamp
<b>Description</b>	Displays the operating time when the diagnostic message with the second-highest priority occurred.
<b>User interface</b>	Days (d), hours (h), minutes (m) and seconds (s)
<b>Additional information</b>	<i>Display</i>  The diagnostic message can be viewed via the <b>Diagnostics 2</b> parameter (→  175).  <i>Example</i> For the display format: 24d12h13m00s

---

**Diagnostics 3**

<b>Navigation</b>	  Expert → Diagnostics → Diagnostic list → Diagnostics 3 (0694)
<b>Description</b>	Displays the current diagnostics message with the third-highest priority.
<b>User interface</b>	Symbol for diagnostic behavior, diagnostic code and short message.
<b>Additional information</b>	<i>Display</i>  Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the  key.  <i>Examples</i> For the display format: <ul style="list-style-type: none"><li>▪  F271 Main electronics</li><li>▪  F276 I/O module</li></ul>

---

**Timestamp**

<b>Navigation</b>	 Expert → Diagnostics → Diagnostic list → Timestamp
<b>Description</b>	Displays the operating time when the diagnostic message with the third-highest priority occurred.
<b>User interface</b>	Days (d), hours (h), minutes (m) and seconds (s)

**Additional information***Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 176).

*Example*

For the display format:  
24d12h13m00s

---

**Diagnostics 4**

---

**Navigation**

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

**Description**

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

**User interface**

Symbol for diagnostic behavior, diagnostic code and short message.

**Additional information***Display*

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

*Examples*

For the display format:

- F271 Main electronics
- F276 I/O module

---

**Timestamp**

---

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

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

**User interface**

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

**Additional information***Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 177).

*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 electronics
-  F276 I/O module

---

## Timestamp

---

**Navigation**

Expert → Diagnostics → Diagnostic list → Timestamp

**Description**

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

**User interface**

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

**Additional information***Display*

 The diagnostic message can be viewed via the **Diagnostics 5** parameter (→  178).

*Example*

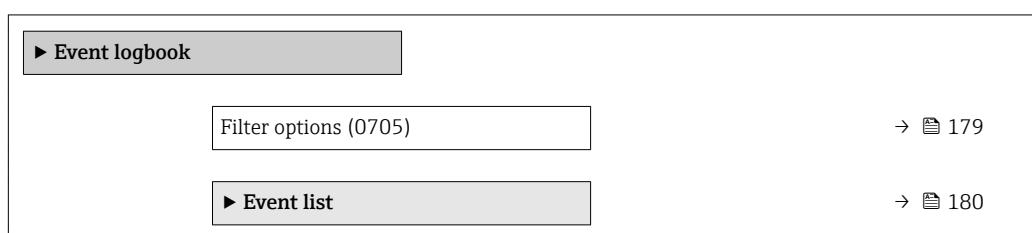
For the display format:

24d12h13m00s

### 3.8.2 "Event logbook" submenu

**Navigation**

Expert → Diagnostics → Event logbook



**Filter options****Navigation**

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

**Description**

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

**Selection**

- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

**Factory setting**

All

**Additional information***Description*

The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:

- F = Failure
- C = Function Check
- S = Out of Specification
- M = Maintenance Required

**Filter options****Navigation**

Expert → Diagnostics → Event logbook → Filter options

**Description**

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

**Selection**

- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

**Factory setting**

All

**Additional information***Description*

The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:

- F = Failure
- C = Function Check
- S = Out of Specification
- M = Maintenance Required

### "Event list" submenu

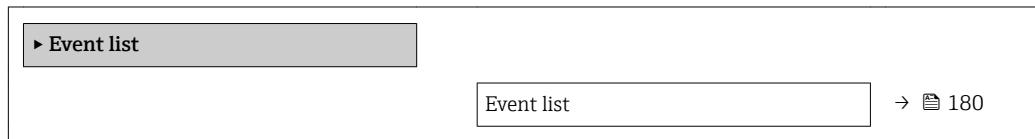
**i** The **Event list** submenu is only displayed if operating via the local display.

If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.

If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

#### *Navigation*

Expert → Diagnostics → Event logbook → Event list



---

## Event list

---

#### **Navigation**

Expert → Diagnostics → Event logbook → Event list

#### **Description**

Displays the history of event messages of the category selected in the **Filter options** parameter (→ [179](#)).

#### **User interface**

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

#### **Additional information**

##### *Description*

A maximum of 20 event messages are displayed in chronological order.

If the **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*

For the display format:

- I1091 Configuration modified
- ⊖ 24d12h13m00s
- ⊖ F271 Main electronics
- ⊖ 01d04h12min30s

##### *HistoROM*

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

### 3.8.3 "Device info" submenu

*Navigation*

Expert → Diagnostics → Device info

► Device info	
Device tag (0011)	→ 181
Serial number (0009)	→ 182
Firmware version (0010)	→ 182
Device name (0020)	→ 182
Order code (0008)	→ 182
Ext. order cd. 1 (0023)	→ 183
Ext. order cd. 2 (0021)	→ 183
Ext. order cd. 3 (0022)	→ 183
Config. counter (2751)	→ 184
ENP version (0012)	→ 184

#### Device tag

**Navigation**

Expert → Diagnostics → Device info → Device tag (0011)

**Description**

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

**User interface**

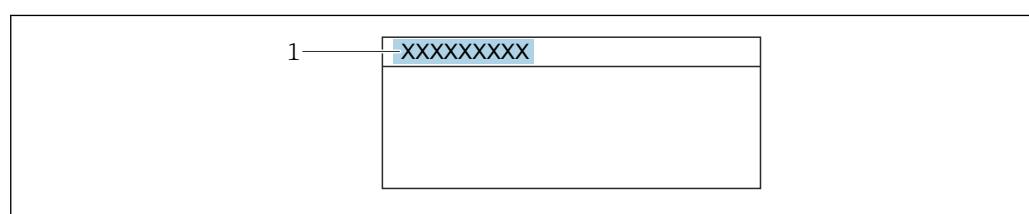
Max. 32 characters such as lower-case letters or numbers.

**Factory setting**

Promag

**Additional information**

*User interface*



1 Position of the header text on the display

The number of characters displayed depends on the characters used.

**Serial number**

**Navigation**   Expert → Diagnostics → Device info → Serial number (0009)

**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](http://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 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** Promag 300/500

---

**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. /).

**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.

**Ext. order cd. 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.

**Ext. order cd. 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 **Ext. order cd. 1** parameter (→ 183)

**Ext. order cd. 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 **Ext. order cd. 1** parameter (→ 183)

---

### Config. counter

---

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

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

**User interface** 0 to 65 535

---

### ENP version

---

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

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

**User interface** Character string

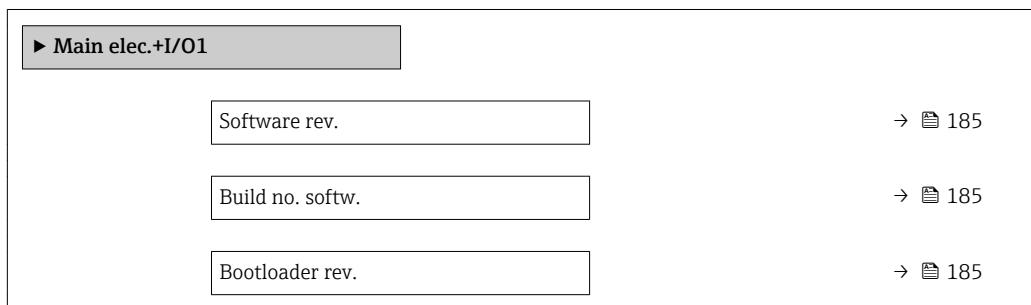
**Factory setting** 2.02.00

**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 elec.+I/O1" submenu

**Navigation**  Expert → Diagnostics → Main elec.+I/O1



---

**Software rev.**

---

**Navigation**        Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)

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

**User interface**      Positive integer

---

**Build no. softw.**

---

**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 rev.**

---

**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 "Sens. electronic" submenu

*Navigation*

  Expert → Diagnostics → Sens. electronic

 **Sens. electronic**

Software rev. (0072)

→  186

Build no. softw. (0079)

→  186

Bootloader rev. (0073)

→  186

**Software rev.**

**Navigation**        Expert → Diagnostics → Sens. electronic → Software rev. (0072)

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

**User interface**      Positive integer

---

**Build no. softw.**

**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 rev.**

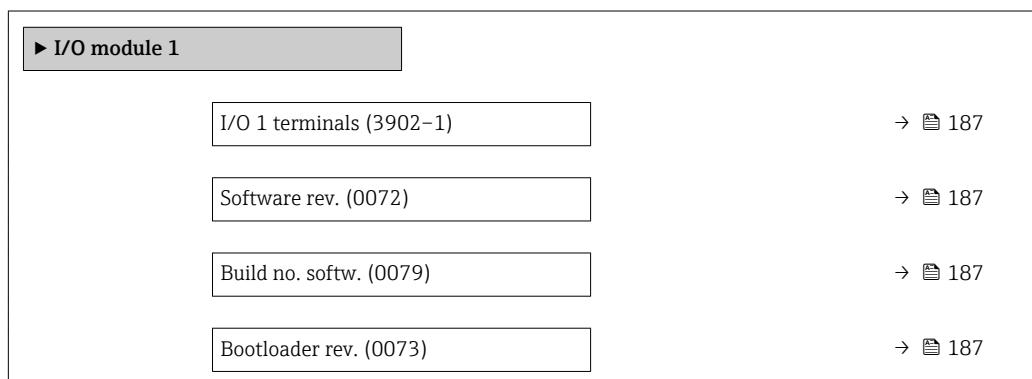
**Navigation**        Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

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

**User interface**      Positive integer

### 3.8.6 "I/O module 1" submenu

*Navigation*        Expert → Diagnostics → I/O module 1



---

**I/O 1 terminals**

---

<b>Navigation</b>	  Expert → Diagnostics → I/O module 1 → I/O 1 terminals (3902-1)
<b>Description</b>	Displays the terminal numbers used by the I/O module.
<b>User interface</b>	<ul style="list-style-type: none"><li>■ Not used</li><li>■ 26-27 (I/O 1)</li><li>■ 24-25 (I/O 2)</li><li>■ 22-23 (I/O 3)</li><li>■ 20-21 (I/O 4) *</li></ul>

---

**Software rev.**

---

<b>Navigation</b>	  Expert → Diagnostics → I/O module → Software rev. (0072)
<b>Description</b>	Use this function to display the software revision of the module.
<b>User interface</b>	Positive integer

---

**Build no. softw.**

---

<b>Navigation</b>	  Expert → Diagnostics → I/O module → Build no. softw. (0079)
<b>Description</b>	Use this function to display the software build number of the module.
<b>User interface</b>	Positive integer

---

**Bootloader rev.**

---

<b>Navigation</b>	  Expert → Diagnostics → I/O module → Bootloader rev. (0073)
<b>Description</b>	Use this function to display the bootloader revision of the software.
<b>User interface</b>	Positive integer

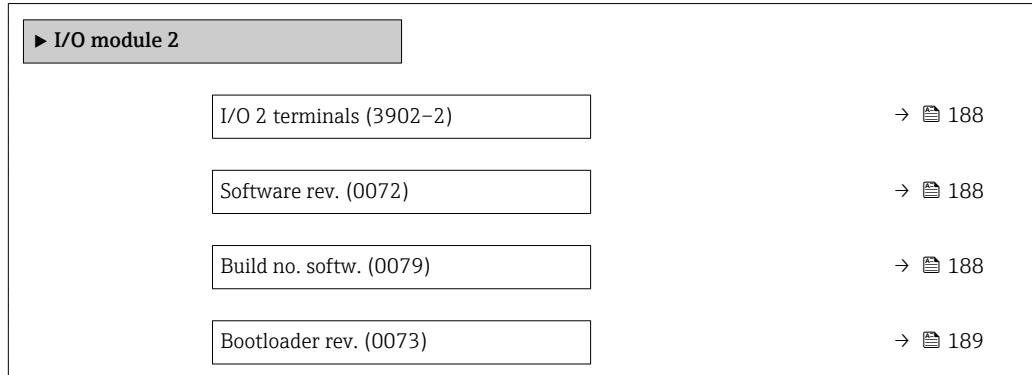
---

\* Visibility depends on order options or device settings

### 3.8.7 "I/O module 2" submenu

Navigation

Expert → Diagnostics → I/O module 2



---

#### I/O 2 terminals

---

Navigation

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)
- 20-21 (I/O 4) \*

---

#### Software rev.

---

Navigation

Expert → Diagnostics → I/O module → Software rev. (0072)

Description

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

User interface

Positive integer

---

#### Build no. softw.

---

Navigation

Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description

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

User interface

Positive integer

---

\* Visibility depends on order options or device settings

---

**Bootloader rev.**

---

**Navigation**

Expert → Diagnostics → I/O module → Bootloader rev. (0073)

**Description**

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

**User interface**

Positive integer

---

**3.8.8 "I/O module 3" submenu***Navigation*

Expert → Diagnostics → I/O module 3

► I/O module 3	
I/O 3 terminals (3902-3)	→ 189
Software rev. (0072)	→ 189
Build no. softw. (0079)	→ 190
Bootloader rev. (0073)	→ 190

---

**I/O 3 terminals**

---

**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)
- 20-21 (I/O 4) \*

---

**Software rev.**

---

**Navigation**

Expert → Diagnostics → I/O module → Software rev. (0072)

**Description**

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

---

\* Visibility depends on order options or device settings

**User interface** Positive integer

---

**Build no. softw.**

---

**Navigation**  Expert → Diagnostics → I/O module → Build no. softw. (0079)

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

**User interface** Positive integer

---

**Bootloader rev.**

---

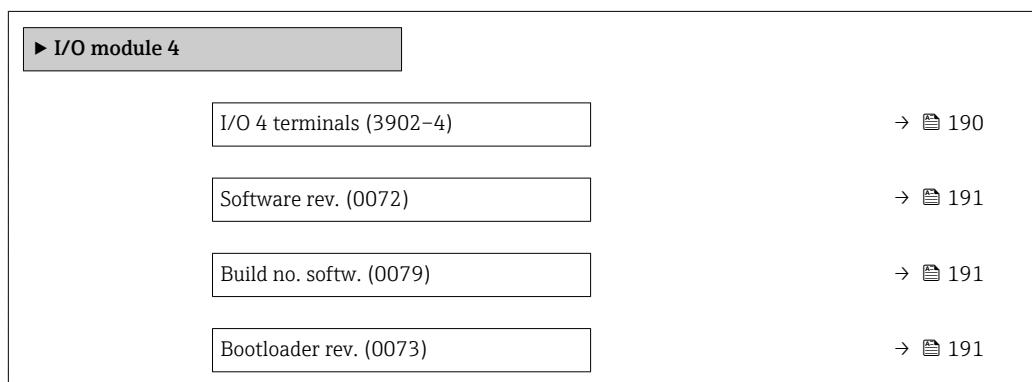
**Navigation**  Expert → Diagnostics → I/O module → Bootloader rev. (0073)

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

**User interface** Positive integer

### 3.8.9 "I/O module 4" submenu

**Navigation**  Expert → Diagnostics → I/O module 4



---

**I/O 4 terminals**

---

**Navigation**  Expert → Diagnostics → I/O module 4 → I/O 4 terminals (3902-4)

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

<b>User interface</b>	<ul style="list-style-type: none"> <li>■ Not used</li> <li>■ 26-27 (I/O 1)</li> <li>■ 24-25 (I/O 2)</li> <li>■ 22-23 (I/O 3)</li> <li>■ 20-21 (I/O 4) *</li> </ul>
-----------------------	--

---

**Software rev.**

---

**Navigation**        Expert → Diagnostics → I/O module → Software rev. (0072)

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

**User interface**      Positive integer

---

**Build no. softw.**

---

**Navigation**        Expert → Diagnostics → I/O module → Build no. softw. (0079)

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

**User interface**      Positive integer

---

**Bootloader rev.**

---

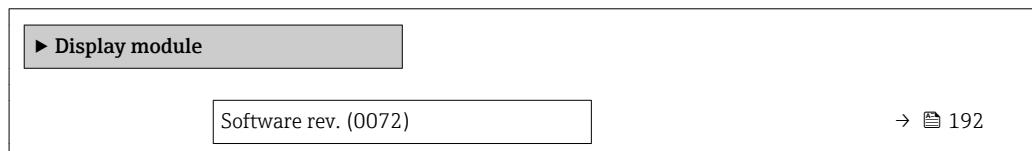
**Navigation**        Expert → Diagnostics → I/O module → Bootloader rev. (0073)

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

**User interface**      Positive integer

### 3.8.10 "Display module" submenu

*Navigation*        Expert → Diagnostics → Display module



\*      Visibility depends on order options or device settings

Build no. softw. (0079)	→  192
Bootloader rev. (0073)	→  192

---

**Software rev.**

---

**Navigation** Expert → Diagnostics → Display module → Software rev. (0072)

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

**User interface** Positive integer

---

**Build no. softw.**

---

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

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

**User interface** Positive integer

---

**Bootloader rev.**

---

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

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

**User interface** Positive integer

### 3.8.11 "Data logging" submenu

*Navigation* Expert → Diagnostics → Data logging

<b>Data logging</b>	
Assign chan. 1 (0851)	→  193
Assign chan. 2 (0852)	→  194
Assign chan. 3 (0853)	→  194

Assign chan. 4 (0854)	→ <a href="#">195</a>
Logging interval (0856)	→ <a href="#">195</a>
Clear logging (0855)	→ <a href="#">196</a>
Data logging (0860)	→ <a href="#">196</a>
Logging delay (0859)	→ <a href="#">197</a>
Data log.control (0857)	→ <a href="#">197</a>
Data log. status (0858)	→ <a href="#">197</a>
Logging duration (0861)	→ <a href="#">198</a>
► Displ.channel 1	→ <a href="#">198</a>
► Displ.channel 2	→ <a href="#">199</a>
► Displ.channel 3	→ <a href="#">200</a>
► Displ.channel 4	→ <a href="#">200</a>

## Assign chan. 1



### Navigation

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

### Prerequisite

The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ [44](#)).

### Description

Use this function to select a process variable for the data logging channel.

### Selection

- Off
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*
- Temperature
- Electronic temp.
- Curr.output 1\*
- Curr.output 2\*
- Curr.output 3\*
- Curr.output 4\*

\* Visibility depends on order options or device settings

- Noise \*
- CoilCurrShotTime \*
- Ref Electr. Pot. \*
- Coating meas.val \*
- Test point 1
- Test point 2
- Test point 3

**Factory setting** Off

**Additional information** *Description*

A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

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

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

## Assign chan. 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 **SW option overv.** parameter (→  44).

**Description** Options for the assignment of a process variable to the data logging channel.

**Selection** Picklist, see **Assign channel 1** parameter (→  193)

**Factory setting** Off

## Assign chan. 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 **SW option overv.** parameter (→  44).

**Description** Options for the assignment of a process variable to the data logging channel.

\* Visibility depends on order options or device settings

**Selection** Picklist, see **Assign channel 1** parameter (→ 193)

**Factory setting** Off

---

#### Assign chan. 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 **SW option overv.** parameter (→ 44).

**Description** Options for the assignment of a process variable to the data logging channel.

**Selection** Picklist, see **Assign channel 1** parameter (→ 193)

**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 **SW option overv.** parameter (→ 44).

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

**User entry** 0.1 to 3 600.0 s

**Factory setting** 1.0 s

**Additional information** *Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time  $T_{log}$ :

- If 1 logging channel is used:  $T_{log} = 1000 \times t_{log}$
- If 2 logging channels are used:  $T_{log} = 500 \times t_{log}$
- If 3 logging channels are used:  $T_{log} = 333 \times t_{log}$
- If 4 logging channels are used:  $T_{log} = 250 \times t_{log}$

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

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

#### *Example*

If 1 logging channel is used:

- $T_{\log} = 1000 \times 1 \text{ s} = 1 \text{ 000 s} \approx 15 \text{ min}$
- $T_{\log} = 1000 \times 10 \text{ s} = 10 \text{ 000 s} \approx 3 \text{ h}$
- $T_{\log} = 1000 \times 80 \text{ s} = 80 \text{ 000 s} \approx 1 \text{ d}$
- $T_{\log} = 1000 \times 3 \text{ 600 s} = 3 \text{ 600 000 s} \approx 41 \text{ d}$

## Clear logging



### Navigation

  Expert → Diagnostics → Data logging → Clear logging (0855)

### Prerequisite

The **Extended HistoROM** application package is available.

 The software options currently enabled are displayed in the **SW option overv.** parameter (→  44).

### 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



<b>Navigation</b>	Expert → Diagnostics → Data logging → Logging delay (0859)
<b>Prerequisite</b>	In the <b>Data logging</b> parameter (→ 196), the <b>Not overwriting</b> option is selected.
<b>Description</b>	Use this function to enter the time delay for measured value logging.
<b>User entry</b>	0 to 999 h
<b>Factory setting</b>	0 h
<b>Additional information</b>	<i>Description</i> Once measured value logging has been started with the <b>Data log.control</b> parameter (→ 197), the device does not save any data for the duration of the time delay entered.

## Data log.control



<b>Navigation</b>	Expert → Diagnostics → Data logging → Data log.control (0857)
<b>Prerequisite</b>	In the <b>Data logging</b> parameter (→ 196), the <b>Not overwriting</b> option is selected.
<b>Description</b>	Use this function to start and stop measured value logging.
<b>Selection</b>	<ul style="list-style-type: none"><li>■ None</li><li>■ Delete + start</li><li>■ Stop</li></ul>
<b>Factory setting</b>	None
<b>Additional information</b>	<i>Selection</i> <ul style="list-style-type: none"><li>■ None Initial measured value logging status.</li><li>■ Delete + start All the measured values recorded for all the channels are deleted and measured value logging starts again.</li><li>■ Stop Measured value logging is stopped.</li></ul>

## Data log. status

<b>Navigation</b>	Expert → Diagnostics → Data logging → Data log. status (0858)
<b>Prerequisite</b>	In the <b>Data logging</b> parameter (→ 196), the <b>Not overwriting</b> option is selected.
<b>Description</b>	Displays the measured value logging status.

<b>User interface</b>	<ul style="list-style-type: none"> <li>■ Done</li> <li>■ Delay active</li> <li>■ Active</li> <li>■ Stopped</li> </ul>
<b>Factory setting</b>	Done
<b>Additional information</b>	<p><i>Selection</i></p> <ul style="list-style-type: none"> <li>■ Done Measured value logging has been performed and completed successfully.</li> <li>■ Delay active Measured value logging has been started but the logging interval has not yet elapsed.</li> <li>■ Active The logging interval has elapsed and measured value logging is active.</li> <li>■ Stopped Measured value logging is stopped.</li> </ul>

---

## Logging duration

---

<b>Navigation</b>	 Expert → Diagnostics → Data logging → Logging duration (0861)
<b>Prerequisite</b>	In the <b>Data logging</b> parameter (→ 196), the <b>Not overwriting</b> option is selected.
<b>Description</b>	Displays the total logging duration.
<b>User interface</b>	Positive floating-point number
<b>Factory setting</b>	0 s

### "Displ.channel 1" submenu

*Navigation*  Expert → Diagnostics → Data logging → Displ.channel 1




---

## Display channel 1

---

<b>Navigation</b>	 Expert → Diagnostics → Data logging → Displ.channel 1
<b>Prerequisite</b>	<p>The <b>Extended HistoROM</b> application package is available.</p> <p> The software options currently enabled are displayed in the <b>SW option overv.</b> parameter (→ 44).</p>

In the **Assign chan. 1** parameter (→ 193), one of the following options is selected:

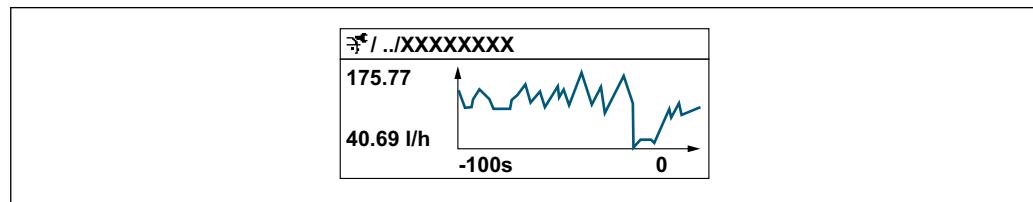
- Conductivity \*
- CorrConductivity \*
- Temperature

#### Description

Displays the measured value trend for the logging channel in the form of a chart.

#### Additional information

#### Description



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10 Chart of a measured value trend

- 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.

#### "Displ.channel 2" submenu

##### Navigation



Expert → Diagnostics → Data logging → Displ.channel 2



## Display channel 2

#### Navigation

Expert → Diagnostics → Data logging → Displ.channel 2

#### Prerequisite

A process variable is defined in the **Assign chan. 2** parameter.

#### Description

See the **Display channel 1** parameter → 198

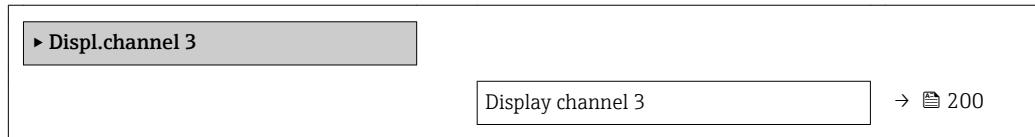
\* Visibility depends on order options or device settings

### "Displ.channel 3" submenu

*Navigation*



Expert → Diagnostics → Data logging → Displ.channel 3



---

## Display channel 3

---

**Navigation**



Expert → Diagnostics → Data logging → Displ.channel 3

**Prerequisite**

A process variable is defined in the **Assign chan. 3** parameter.

**Description**

See the **Display channel 1** parameter → 198

### "Displ.channel 4" submenu

*Navigation*



Expert → Diagnostics → Data logging → Displ.channel 4



---

## Display channel 4

---

**Navigation**



Expert → Diagnostics → Data logging → Displ.channel 4

**Prerequisite**

A process variable is defined in the **Assign chan. 4** parameter.

**Description**

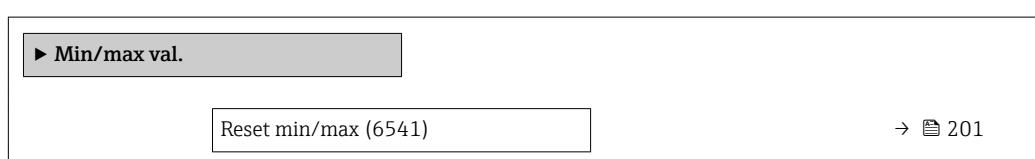
See the **Display channel 1** parameter → 198

### 3.8.12 "Min/max val." submenu

*Navigation*



Expert → Diagnostics → Min/max val.



► Main elect.temp.	→  201
► Sensor elec.temp	→  202
► Temperature	→  203

**Reset min/max****Navigation**

Expert → Diagnostics → Min/max val. → Reset min/max (6541)

**Description**

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

**Selection**

- Cancel
- Terminal volt.
- IO module temp.

**Factory setting**

Cancel

**"Main electronic temperature" submenu***Navigation*

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

► Main elect.temp.	
Minimum value (0688)	→  201
Maximum value (0665)	→  202

**Minimum value****Navigation**

Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (0688)

**Description**

Displays the lowest previously measured temperature value of the electronics module in the transmitter.

**User interface**

Signed floating-point number

**Additional information***Dependency*

The unit is taken from the **Temperature unit** parameter (→ 58)

**Maximum value**

---

**Navigation**   Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (0665)

**Description** Displays the highest previously measured temperature value of the electronics module in the transmitter.

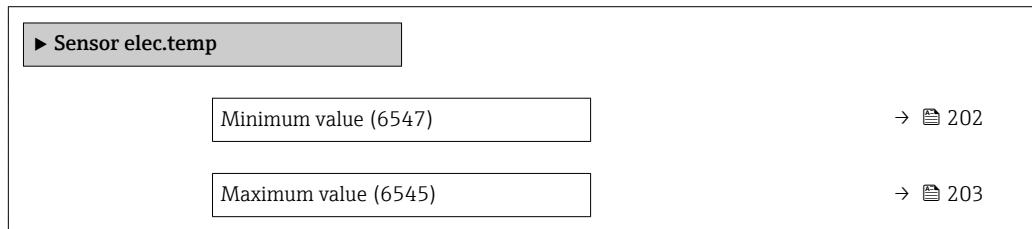
**User interface** Signed floating-point number

**Additional information** *Dependency*

 The unit is taken from the **Temperature unit** parameter (→ [58](#))

**"Sensor electronic temperature (ISEM)" submenu**

*Navigation*   Expert → Diagnostics → Min/max val. → Sensor elec.temp



---

**Minimum value**

---

**Navigation**   Expert → Diagnostics → Min/max val. → Sensor elec.temp → Minimum value (6547)

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

**User interface** Signed floating-point number

**Additional information** *Dependency*

 The unit is taken from the **Temperature unit** parameter (→ [58](#))

---

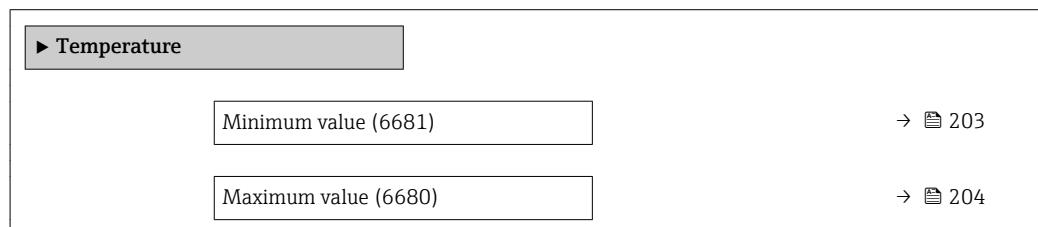
## Maximum value

---

<b>Navigation</b>	  Expert → Diagnostics → Min/max val. → Sensor elec.temp → Maximum value (6545)
<b>Description</b>	Displays the highest previously measured temperature value of the main electronics module.
<b>User interface</b>	Signed floating-point number
<b>Additional information</b>	<p><i>Dependency</i></p>  The unit is taken from the <b>Temperature unit</b> parameter (→  58)

### "Temperature" submenu

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




---

## Minimum value

---

<b>Navigation</b>	  Expert → Diagnostics → Min/max val. → Temperature → Minimum value (6681)
<b>Prerequisite</b>	One of the following conditions is met: <ul style="list-style-type: none"> <li>▪ Order code for "Sensor option", option <b>CI</b> "Medium temperature measurement" or</li> <li>▪ The temperature is read into the flowmeter from an external device.</li> </ul>
<b>Description</b>	Displays the lowest previously measured medium temperature value.
<b>User interface</b>	Signed floating-point number
<b>Additional information</b>	<p><i>Dependency</i></p>  The unit is taken from the <b>Temperature unit</b> parameter (→  58)

**Maximum value**

**Navigation**   Expert → Diagnostics → Min/max val. → Temperature → Maximum value (6680)

**Prerequisite**

One of the following conditions is met:

- Order code for "Sensor option", option **CI** "Medium temperature measurement"  
or
- The temperature is read into the flowmeter from an external device.

**Description**

Displays the highest previously measured medium temperature value.

**User interface**

Signed floating-point number

**Additional information**

*Dependency*

 The unit is taken from the **Temperature unit** parameter (→ [58](#))

### 3.8.13 "Data logging" submenu

*Navigation*   Expert → Diagnostics → Data logging

<b>► Data logging</b>	
Assign chan. 1 (0851)	→ <a href="#">193</a>
Assign chan. 2 (0852)	→ <a href="#">194</a>
Assign chan. 3 (0853)	→ <a href="#">194</a>
Assign chan. 4 (0854)	→ <a href="#">195</a>
Logging interval (0856)	→ <a href="#">195</a>
Clear logging (0855)	→ <a href="#">196</a>
Data logging (0860)	→ <a href="#">196</a>
Logging delay (0859)	→ <a href="#">197</a>
Data log.control (0857)	→ <a href="#">197</a>
Data log. status (0858)	→ <a href="#">197</a>
Logging duration (0861)	→ <a href="#">198</a>
<b>► Displ.channel 1</b>	

► Displ.channel 2	→  199
► Displ.channel 3	→  200
► Displ.channel 4	→  200

**Assign chan. 1****Navigation**

Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

**Prerequisite**

The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 44).

**Description**

Use this function to select a process variable for the data logging channel.

**Selection**

- Off
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity\*
- Conductivity\*
- CorrConductivity\*
- Temperature\*
- Electronic temp.
- Curr.output 1\*
- Curr.output 2\*
- Curr.output 3\*
- Curr.output 4\*
- Noise\*
- CoilCurrShotTime\*
- Ref Electr. Pot.\*
- Coating meas.val\*
- Test point 1
- Test point 2
- Test point 3

**Factory setting**

Off

**Additional information***Description*

A total of 1000 measured values can be logged. This means:

- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

\* Visibility depends on order options or device settings

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 chan. 2



Navigation	 Expert → Diagnostics → Data logging → Assign chan. 2 (0852)
Prerequisite	The <b>Extended HistoROM</b> application package is available.  The software options currently enabled are displayed in the <b>SW option overv.</b> parameter (→  44).
Description	Options for the assignment of a process variable to the data logging channel.
Selection	Picklist, see <b>Assign channel 1</b> parameter (→  193)
Factory setting	Off

## Assign chan. 3



Navigation	 Expert → Diagnostics → Data logging → Assign chan. 3 (0853)
Prerequisite	The <b>Extended HistoROM</b> application package is available.  The software options currently enabled are displayed in the <b>SW option overv.</b> parameter (→  44).
Description	Options for the assignment of a process variable to the data logging channel.
Selection	Picklist, see <b>Assign channel 1</b> parameter (→  193)
Factory setting	Off

## Assign chan. 4



Navigation	 Expert → Diagnostics → Data logging → Assign chan. 4 (0854)
Prerequisite	The <b>Extended HistoROM</b> application package is available.  The software options currently enabled are displayed in the <b>SW option overv.</b> parameter (→  44).
Description	Options for the assignment of a process variable to the data logging channel.
Selection	Picklist, see <b>Assign channel 1</b> parameter (→  193)

<b>Factory setting</b>	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 **SW option overv.** parameter (→ 44).

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

**User entry** 0.1 to 3 600.0 s

**Factory setting** 1.0 s

**Additional information** *Description*

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time  $T_{\log}$ :

- If 1 logging channel is used:  $T_{\log} = 1000 \times t_{\log}$
- If 2 logging channels are used:  $T_{\log} = 500 \times t_{\log}$
- If 3 logging channels are used:  $T_{\log} = 333 \times t_{\log}$
- If 4 logging channels are used:  $T_{\log} = 250 \times t_{\log}$

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

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

*Example*

If 1 logging channel is used:

- $T_{\log} = 1000 \times 1 \text{ s} = 1000 \text{ s} \approx 15 \text{ min}$
- $T_{\log} = 1000 \times 10 \text{ s} = 10000 \text{ s} \approx 3 \text{ h}$
- $T_{\log} = 1000 \times 80 \text{ s} = 80000 \text{ s} \approx 1 \text{ d}$
- $T_{\log} = 1000 \times 3600 \text{ s} = 3600000 \text{ s} \approx 41 \text{ d}$

**Clear logging**

**Navigation** Expert → Diagnostics → Data logging → Clear logging (0855)

**Prerequisite** The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 44).

**Description** Use this function to clear the entire logging data.

**Selection**

- Cancel
- Clear data

---

<b>Factory setting</b>	Cancel
<b>Additional information</b>	<i>Selection</i>
	<ul style="list-style-type: none"><li>▪ Cancel The data is not cleared. All the data is retained.</li><li>▪ Clear data The logging data is cleared. The logging process starts from the beginning.</li></ul>

---

## 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 (→ 196), the **Not overwriting** option is selected.

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

**User entry** 0 to 999 h

**Factory setting** 0 h

**Additional information** *Description*  
Once measured value logging has been started with the **Data log.control** parameter (→ 197), the device does not save any data for the duration of the time delay entered.

---

**Data log.control**

<b>Navigation</b>	Expert → Diagnostics → Data logging → Data log.control (0857)
<b>Prerequisite</b>	In the <b>Data logging</b> parameter (→ 196), the <b>Not overwriting</b> option is selected.
<b>Description</b>	Use this function to start and stop measured value logging.
<b>Selection</b>	<ul style="list-style-type: none"><li>■ None</li><li>■ Delete + start</li><li>■ Stop</li></ul>
<b>Factory setting</b>	None
<b>Additional information</b>	<i>Selection</i> <ul style="list-style-type: none"><li>■ None Initial measured value logging status.</li><li>■ Delete + start All the measured values recorded for all the channels are deleted and measured value logging starts again.</li><li>■ Stop Measured value logging is stopped.</li></ul>

---

**Data log. status**

<b>Navigation</b>	Expert → Diagnostics → Data logging → Data log. status (0858)
<b>Prerequisite</b>	In the <b>Data logging</b> parameter (→ 196), the <b>Not overwriting</b> option is selected.
<b>Description</b>	Displays the measured value logging status.
<b>User interface</b>	<ul style="list-style-type: none"><li>■ Done</li><li>■ Delay active</li><li>■ Active</li><li>■ Stopped</li></ul>
<b>Factory setting</b>	Done
<b>Additional information</b>	<i>Selection</i> <ul style="list-style-type: none"><li>■ Done Measured value logging has been performed and completed successfully.</li><li>■ Delay active Measured value logging has been started but the logging interval has not yet elapsed.</li><li>■ Active The logging interval has elapsed and measured value logging is active.</li><li>■ Stopped Measured value logging is stopped.</li></ul>

## Logging duration

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

**Prerequisite** In the **Data logging** parameter (→ 196), the **Not overwriting** option is selected.

**Description** Displays the total logging duration.

**User interface** Positive floating-point number

**Factory setting** 0 s

### "Displ.channel 1" submenu

**Navigation** Expert → Diagnostics → Data logging → Displ.channel 1



## Display channel 1

**Navigation** Expert → Diagnostics → Data logging → Displ.channel 1

**Prerequisite** The **Extended HistoROM** application package is available.

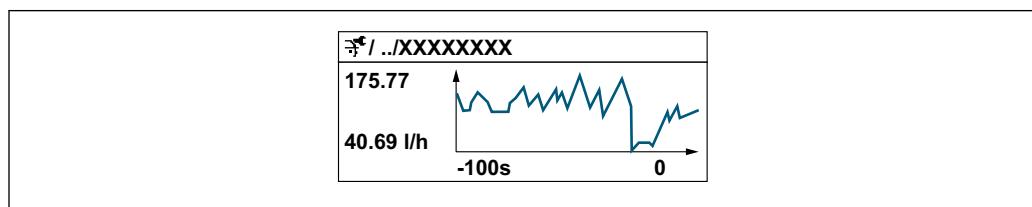
The software options currently enabled are displayed in the **SW option overv.** parameter (→ 44).

In the **Assign chan. 1** parameter (→ 193), one of the following options is selected:

- Conductivity\*
- CorrConductivity\*
- Temperature\*

**Description** Displays the measured value trend for the logging channel in the form of a chart.

**Additional information** *Description*



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11 Chart of a measured value trend

\* Visibility depends on order options or device settings

- 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.

#### "Displ.channel 2" submenu

*Navigation*



Expert → Diagnostics → Data logging → Displ.channel 2



---

#### Display channel 2

---

**Navigation**



Expert → Diagnostics → Data logging → Displ.channel 2

**Prerequisite**

A process variable is defined in the **Assign chan. 2** parameter.

**Description**

See the **Display channel 1** parameter → 198

#### "Displ.channel 3" submenu

*Navigation*



Expert → Diagnostics → Data logging → Displ.channel 3



---

#### Display channel 3

---

**Navigation**



Expert → Diagnostics → Data logging → Displ.channel 3

**Prerequisite**

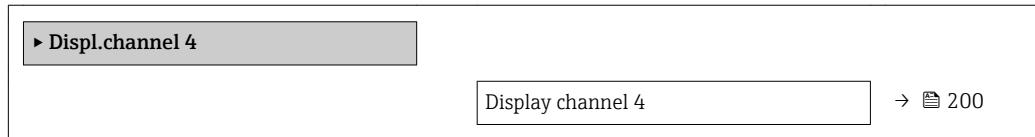
A process variable is defined in the **Assign chan. 3** parameter.

**Description**

See the **Display channel 1** parameter → 198

**"Displ.channel 4" submenu**

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

**Display channel 4**

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

**Prerequisite** A process variable is defined in the **Assign chan. 4** parameter.

**Description** See the **Display channel 1** parameter → 198

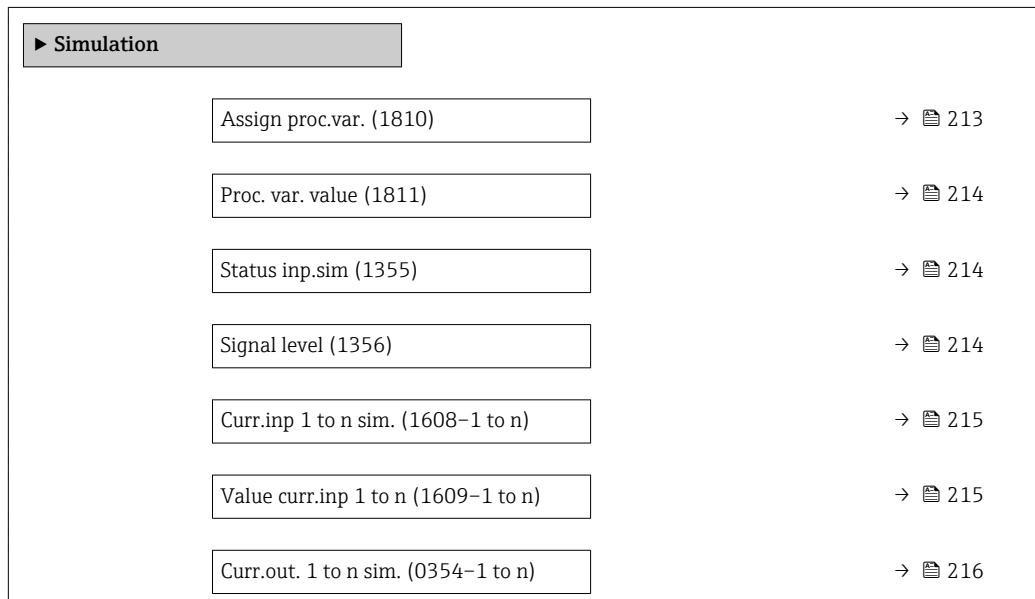
**3.8.14 "Heartbeat" submenu**

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

**Navigation**      Expert → Diagnostics → Heartbeat

**3.8.15 "Simulation" submenu**

**Navigation**      Expert → Diagnostics → Simulation



Value curr.out 1 to n (0355-1 to n)	→ <a href="#">216</a>
FreqOutputSim 1 to n (0472-1 to n)	→ <a href="#">216</a>
Freq value 1 to n (0473-1 to n)	→ <a href="#">217</a>
Puls.outp.sim. 1 to n (0458-1 to n)	→ <a href="#">217</a>
Pulse value 1 to n (0459-1 to n)	→ <a href="#">218</a>
Switch sim. 1 to n (0462-1 to n)	→ <a href="#">218</a>
Switch status 1 to n (0463-1 to n)	→ <a href="#">219</a>
Relay out. 1 to n sim (0802-1 to n)	→ <a href="#">219</a>
Switch status 1 to n (0803-1 to n)	→ <a href="#">220</a>
Dev. alarm sim. (0654)	→ <a href="#">220</a>
Event category (0738)	→ <a href="#">221</a>
Diag. event sim. (0737)	→ <a href="#">221</a>

## Assign proc.var.



### Navigation

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

### Description

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

### Selection

- Off
- Volume flow
- Mass flow
- Correct.vol.flow
- Flow velocity
- Conductivity\*
- CorrConductivity\*
- Temperature\*

### Factory setting

Off

### Additional information

#### Description

The simulation value of the process variable selected is defined in the **Proc. var. value** parameter (→ [214](#)).

\* Visibility depends on order options or device settings

**Proc. var. value****Navigation**

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

**Prerequisite**

A process variable is selected in the **Assign proc.var.** parameter (→ [213](#)).

**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 (→ [55](#)).

**Status inp.sim 1 to n****Navigation**

Expert → Diagnostics → Simulation → Status inp.sim 1 to n (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 **Signal level** parameter (→ [214](#)).

*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.

**Signal level 1 to n****Navigation**

Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)

**Prerequisite**

In the **Status inp.sim** parameter (→ [214](#)), 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

---

**Curr.inp 1 to n sim.**

**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 curr.inp 1 to n** parameter.

**Selection**

- Off
- On

**Factory setting** Off

**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 curr.inp 1 to n**

**Navigation** Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609-1 to n)

**Prerequisite** In the **Curr.inp 1 to n sim.** parameter, 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

**Curr.out. 1 to n sim.****Navigation**

Expert → Diagnostics → Simulation → Curr.out. 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 curr.out 1 to n** parameter.

*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 curr.out 1 to n****Navigation**

Expert → Diagnostics → Simulation → Value curr.out 1 to n (0355–1 to n)

**Prerequisite**

In the **Curr.out. 1 to n sim.** parameter, 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.

**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 (→ 110).

**FreqOutputSim 1 to n****Navigation**

Expert → Diagnostics → Simulation → FreqOutputSim 1 to n (0472–1 to n)

**Prerequisite**

In the **Operating mode** parameter (→ 123), the **Frequency** option is selected.

<b>Description</b>	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.
<b>Selection</b>	<ul style="list-style-type: none"> <li>▪ Off</li> <li>▪ On</li> </ul>
<b>Factory setting</b>	Off
<b>Additional information</b>	<p><i>Description</i></p> <p> The desired simulation value is defined in the <b>Freq value 1 to n</b> parameter.</p> <p><i>Selection</i></p> <ul style="list-style-type: none"> <li>▪ Off Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.</li> <li>▪ On Frequency simulation is active.</li> </ul>

---

**Freq value 1 to n**

<b>Navigation</b>	 Expert → Diagnostics → Simulation → Freq value 1 to n (0473-1 to n)
<b>Prerequisite</b>	In the <b>FreqOutputSim 1 to n</b> parameter, the <b>On</b> option is selected.
<b>Description</b>	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.
<b>User entry</b>	0.0 to 12 500.0 Hz

---

**Puls.outp.sim. 1 to n**

<b>Navigation</b>	 Expert → Diagnostics → Simulation → Puls.outp.sim. 1 to n (0458-1 to n)
<b>Prerequisite</b>	In the <b>Operating mode</b> parameter (→  123), the <b>Pulse</b> option is selected.
<b>Description</b>	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.
<b>Selection</b>	<ul style="list-style-type: none"> <li>▪ Off</li> <li>▪ Fixed value</li> <li>▪ Down-count. val.</li> </ul>
<b>Factory setting</b>	Off

**Additional information****Description**

The desired simulation value is defined in the **Pulse value 1 to n** parameter.

**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 (→ 126).

**▪ Down-count. val.**

The pulses specified in the **Pulse value** parameter (→ 218) are output.

**Pulse value 1 to n****Navigation**

Expert → Diagnostics → Simulation → Pulse value 1 to n (0459-1 to n)

**Prerequisite**

In the **Puls.outp.sim. 1 to n** parameter, the **Down-count. val.** 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 65 535

**Switch sim. 1 to n****Navigation**

Expert → Diagnostics → Simulation → Switch sim. 1 to n (0462-1 to n)

**Prerequisite**

In the **Operating mode** parameter (→ 123), the **Switch** option is selected.

**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 status 1 to n** parameter.

*Selection*

- Off

Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.

- On

Switch simulation is active.

---

**Switch status 1 to n****Navigation**

Expert → Diagnostics → Simulation → Switch status 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 out. 1 to n sim****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 status 1 to n** parameter.

*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 status 1 to n****Navigation**

Expert → Diagnostics → Simulation → Switch status 1 to n (0803–1 to n)

**Prerequisite**

The **On** option is selected in the **Switch sim. 1 to n** parameter parameter.

**Description**

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.

**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.

---

**Dev. alarm sim.****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.

---

**Event category**

<b>Navigation</b>	Expert → Diagnostics → Simulation → Event category (0738)
<b>Description</b>	Use this function to select the category of the diagnostic events that are displayed for the simulation in the <b>Diag. event sim.</b> parameter (→ 221).
<b>Selection</b>	<ul style="list-style-type: none"><li>■ Sensor</li><li>■ Electronics</li><li>■ Configuration</li><li>■ Process</li></ul>
<b>Factory setting</b>	Process

---

**Diag. event sim.**

<b>Navigation</b>	Expert → Diagnostics → Simulation → Diag. event sim. (0737)
<b>Description</b>	Use this function to select a diagnostic event for the simulation process that is activated.
<b>Selection</b>	<ul style="list-style-type: none"><li>■ Off</li><li>■ Diagnostic event picklist (depends on the category selected)</li></ul>
<b>Factory setting</b>	Off
<b>Additional information</b>	<i>Description</i> For the simulation, you can choose from the diagnostic events of the category selected in the <b>Event category</b> parameter (→ 221).

## 4 Country-specific factory settings

### 4.1 SI units

 Not valid for USA and Canada.

#### 4.1.1 System units

Volume flow	l/h
Volume	m <sup>3</sup>
Conductivity	µS/cm
Temperature	°C
Mass flow	kg/h
Mass	kg
Density	kg/l
Corrected volume flow	Nl/h
Corrected volume	Nm <sup>3</sup>

#### 4.1.2 Full scale values

 The factory settings apply to the following parameters:

- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

Nominal diameter [mm]	(v ~ 2.5 m/s) [dm <sup>3</sup> /min]
2	0.5
4	2
8	8
15	25
25	75
32	125
40	200
50	300
65	500
80	750
100	1200
125	1850
150	150 m <sup>3</sup> /h
200	300 m <sup>3</sup> /h
250	500 m <sup>3</sup> /h
300	750 m <sup>3</sup> /h
350	1000 m <sup>3</sup> /h
400	1200 m <sup>3</sup> /h
450	1500 m <sup>3</sup> /h
500	2000 m <sup>3</sup> /h

Nominal diameter [mm]	( $v \sim 2.5 \text{ m/s}$ ) [dm $^3$ /min]
600	2500 m $^3$ /h
700	3500 m $^3$ /h
750	4000 m $^3$ /h
800	4500 m $^3$ /h
900	6000 m $^3$ /h
1000	7000 m $^3$ /h
1200	10000 m $^3$ /h
1400	14000 m $^3$ /h
1600	18000 m $^3$ /h
1800	23000 m $^3$ /h
2000	28500 m $^3$ /h

#### 4.1.3 Output current span

Current output 1 to n	4 to 20 mA NAMUR
-----------------------	------------------

#### 4.1.4 Pulse value

Nominal diameter [mm]	(~ 2 pulse/s) [dm $^3$ ]
2	0.005
4	0.025
8	0.1
15	0.2
25	0.5
32	1
40	1.5
50	2.5
65	5
80	5
100	10
125	15
150	0.03 m $^3$
200	0.05 m $^3$
250	0.05 m $^3$
300	0.1 m $^3$
350	0.1 m $^3$
400	0.15 m $^3$
450	0.25 m $^3$
500	0.25 m $^3$
600	0.3 m $^3$
700	0.5 m $^3$
750	0.5 m $^3$

Nominal diameter [mm]	(~ 2 pulse/s) [dm <sup>3</sup> ]
800	0.75 m <sup>3</sup>
900	0.75 m <sup>3</sup>
1000	1 m <sup>3</sup>
1200	1.5 m <sup>3</sup>
1400	2 m <sup>3</sup>
1600	2.5 m <sup>3</sup>
1800	3 m <sup>3</sup>
2000	3.5 m <sup>3</sup>

#### 4.1.5 On value low flow cut off

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

Nominal diameter [mm]	(v ~ 0.04 m/s) [m <sup>3</sup> /h]
2	0.01
4	0.05
8	0.1
15	0.5
25	1
32	2
40	3
50	5
65	8
80	12
100	20
125	30
150	2.5
200	5
250	7.5
300	10
350	15
400	20
450	25
500	30
600	40
700	50
750	60
800	75
900	100
1000	125
1200	150
1400	225

Nominal diameter [mm]	(v ~ 0.04 m/s) [m³/h]
1600	300
1800	350
2 000	450

## 4.2 US units

 Only valid for USA and Canada.

### 4.2.1 System units

Volume flow	gal/min (us)
Volume	gal (us)
Temperature	°F
Mass flow	lb/min
Mass	lb
Density	lb/ft³
Corrected volume flow	Sft³/h
Corrected volume	Sft³

### 4.2.2 Full scale values

 The factory settings apply to the following parameters:

- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

Nominal diameter [in]	(v ~ 2.5 m/s) [gal/min]
1/12	0.1
1/8	0.5
3/8	2
1/2	6
1	18
1½	50
2	75
3	200
4	300
5	450
6	600
8	1200
10	1500
12	2400
14	3600
15	4800
16	4800

Nominal diameter [in]	(v ~ 2.5 m/s) [gal/min]
18	6 000
20	7 500
24	10 500
28	13 500
30	16 500
32	19 500
36	24 000
40	30 000
42	33 000
48	42 000
54	75 Mgal/d
60	95 Mgal/d
66	120 Mgal/d
72	140 Mgal/d
78	175 Mgal/d

#### 4.2.3 Output current span

Current output 1 to n	4 to 20 mA US
-----------------------	---------------

#### 4.2.4 Pulse value

Nominal diameter [in]	(~ 2 pulse/s) [gal]
1/12	0.001
1/8	0.005
3/8	0.02
1/2	0.1
1	0.2
1½	0.5
2	0.5
3	2
4	2
5	5
6	5
8	10
10	15
12	25
14	30
15	50
16	50
18	50
20	75

Nominal diameter [in]	(~ 2 pulse/s) [gal]
24	100
28	125
30	150
32	200
36	225
40	250
42	250
48	400
54	0.0005 Mgal
60	0.0005 Mgal
66	0.0008 Mgal
72	0.0008 Mgal
78	0.001 Mgal

#### 4.2.5 On value low flow cut off

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

Nominal diameter [in]	(v ~ 0.04 m/s) [gal/min]
1/12	0.002
1/8	0.008
3/8	0.025
1/2	0.15
1	0.25
1½	0.75
2	1.25
3	2.5
4	4
5	7
6	12
8	15
10	30
12	45
14	60
15	60
16	60
18	90
20	120
24	180
28	210
30	270
32	300

Nominal diameter [in]	(v ~ 0.04 m/s) [gal/min]
36	360
40	480
42	600
48	600
54	1.3 Mgal/d
60	1.3 Mgal/d
66	2.2 Mgal/d
72	2.6 Mgal/d
78	3.0 Mgal/d

## 5 Explanation of abbreviated units

### 5.1 SI units

Process variable	Units	Explanation
Density	g/cm <sup>3</sup> , g/m <sup>3</sup>	Gram/volume unit
	kg/dm <sup>3</sup> , kg/l, kg/m <sup>3</sup>	Kilogram/volume unit
	SD4°C, SD15°C, SD20°C	Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
	SG4°C, SG15°C, SG20°C	Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
Conductivity	µS/mm	Microsiemens/length unit
	nS/cm, µS/cm, mS/cm, S/cm	Nano-, Micro-, Milli-, Siemens/length unit
	µS/m, mS/m, S/m, kS/m, MS/m	Micro-, Milli-, Siemens, Kilo-, Megasiemens/length unit
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min, g/h, g/d	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/s, t/min, t/h, t/d	Metric ton/time unit
Temperature	°C , K	Celsius, Kelvin
Volume	cm <sup>3</sup> , dm <sup>3</sup> , m <sup>3</sup>	Cubic centimeter, cubic decimeter, cubic meter
	ml, l, hl, Ml Mega	Milliliter, liter, hectoliter, megaliter
Time	s, m, h, d, y	Second, minute, hour, day, year

### 5.2 US units

Process variable	Units	Explanation
Density	lb/ft <sup>3</sup> , lb/gal (us)	Pound/cubic foot, pound/gallon
	lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)	Pound/volume unit
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min, oz/h, oz/d	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/s, STon/min, STon/h, STon/d	Standard ton/time unit
Corrected volume	Sft <sup>3</sup> , Sgal (us), Sbbl (us;liq.)	Standard cubic foot, standard gallon, standard barrel
Correct.vol.flow	Sft <sup>3</sup> /s, Sft <sup>3</sup> /min, Sft <sup>3</sup> /h, Sft <sup>3</sup> /d	Standard cubic foot/time unit
	Sgal/s (us), Sgal/min (us), Sgal/h (us), Sgal/d (us)	Standard gallon/time unit
	Sbbl/s (us;liq.), Sbbl/min (us;liq.), Sbbl/h (us;liq.), Sbbl/d (us;liq.)	Barrel/time unit (normal liquids)
Temperature	°F, °R	Fahrenheit, Rankine
Volume	af	Acre foot
	ft <sup>3</sup>	Cubic foot

Process variable	Units	Explanation
	fl oz (us), gal (us), kgal (us), Mgal (us)	Fluid ounce, gallon, kilogallon, million gallon
	bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)	Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)
Volume flow	af/s, af/min, af/h, af/d	Acre foot/time unit
	ft <sup>3</sup> /s, ft <sup>3</sup> /min, ft <sup>3</sup> /h, ft <sup>3</sup> /d	Cubic foot/time unit
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us), gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) Beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
Time	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem ( before midday), post meridiem (after midday)

### 5.3 Imperial units

Process variable	Units	Explanation
Density	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Corrected volume	Sgal (imp)	Standard gallon
Correct.vol.flow	Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)	Standard gallon/time unit
Volume	gal (imp), Mgal (imp)	Gallon, mega gallon
	bbl (imp;beer), bbl (imp;oil)	Barrel (beer), barrel (petrochemicals)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit
	bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Barrel /time unit (beer) Beer: 36.0 gal/bbl
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem ( before midday), post meridiem (after midday)

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