GP01124D/06/EN/01.17
71382748

Valid as of version
01.00.zz (Device firmware)

Description of Device Parameters
Proline Prosonic Flow 100
HART

Ultrasonic time-of-flight flowmeter

HART COMMUNICATION PROTOCOL

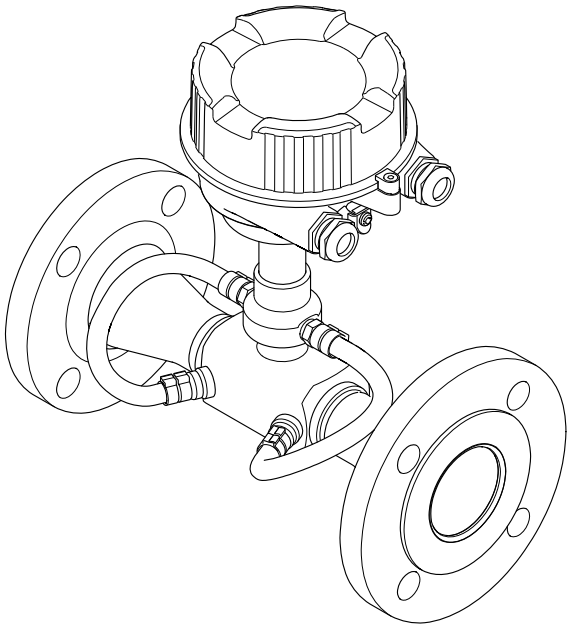

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Table of contents

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

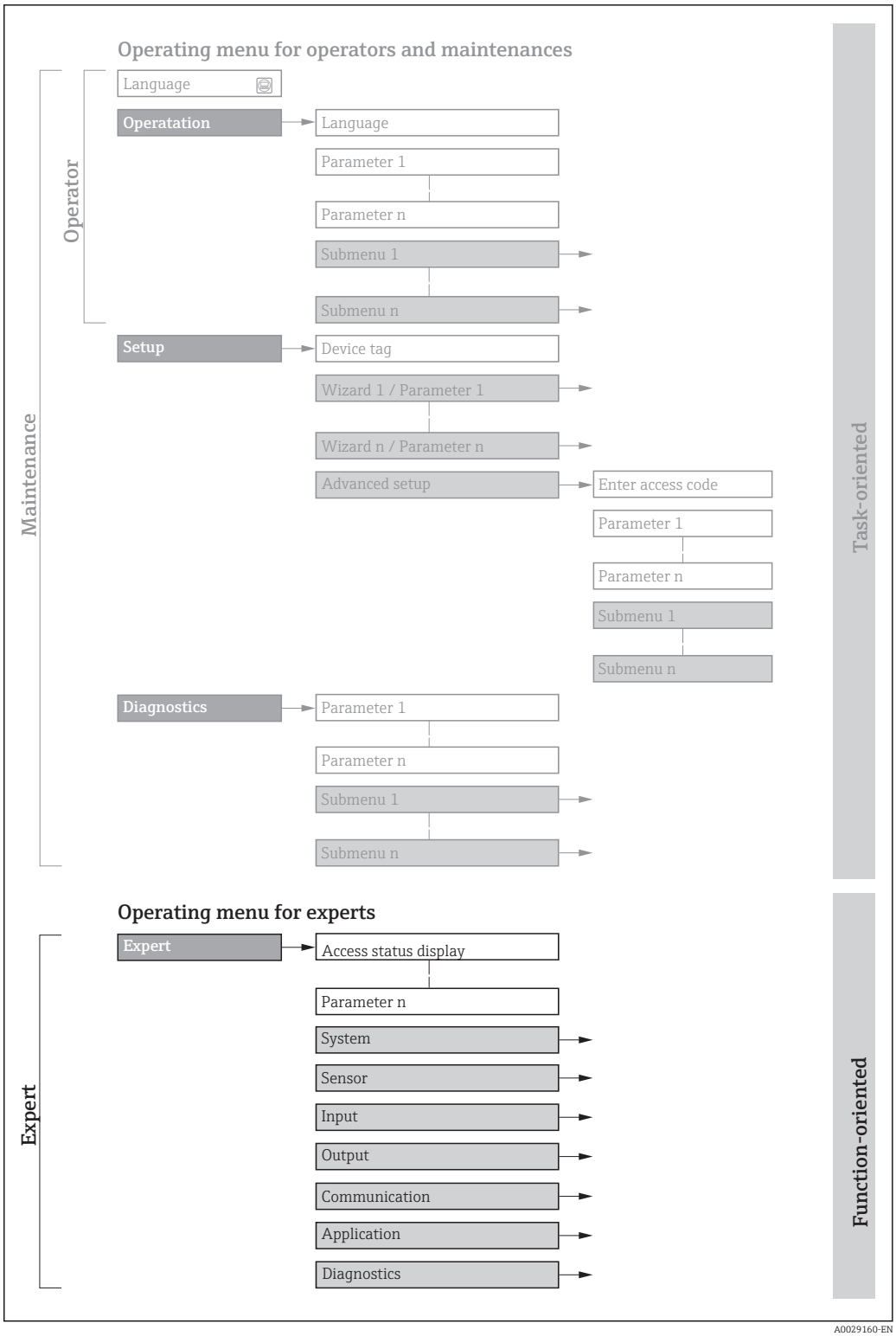
1.2 Target group

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

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
	Tip 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
Prosonic Flow E 100	BA01769D

1.5.2 Supplementary device-dependent documentation

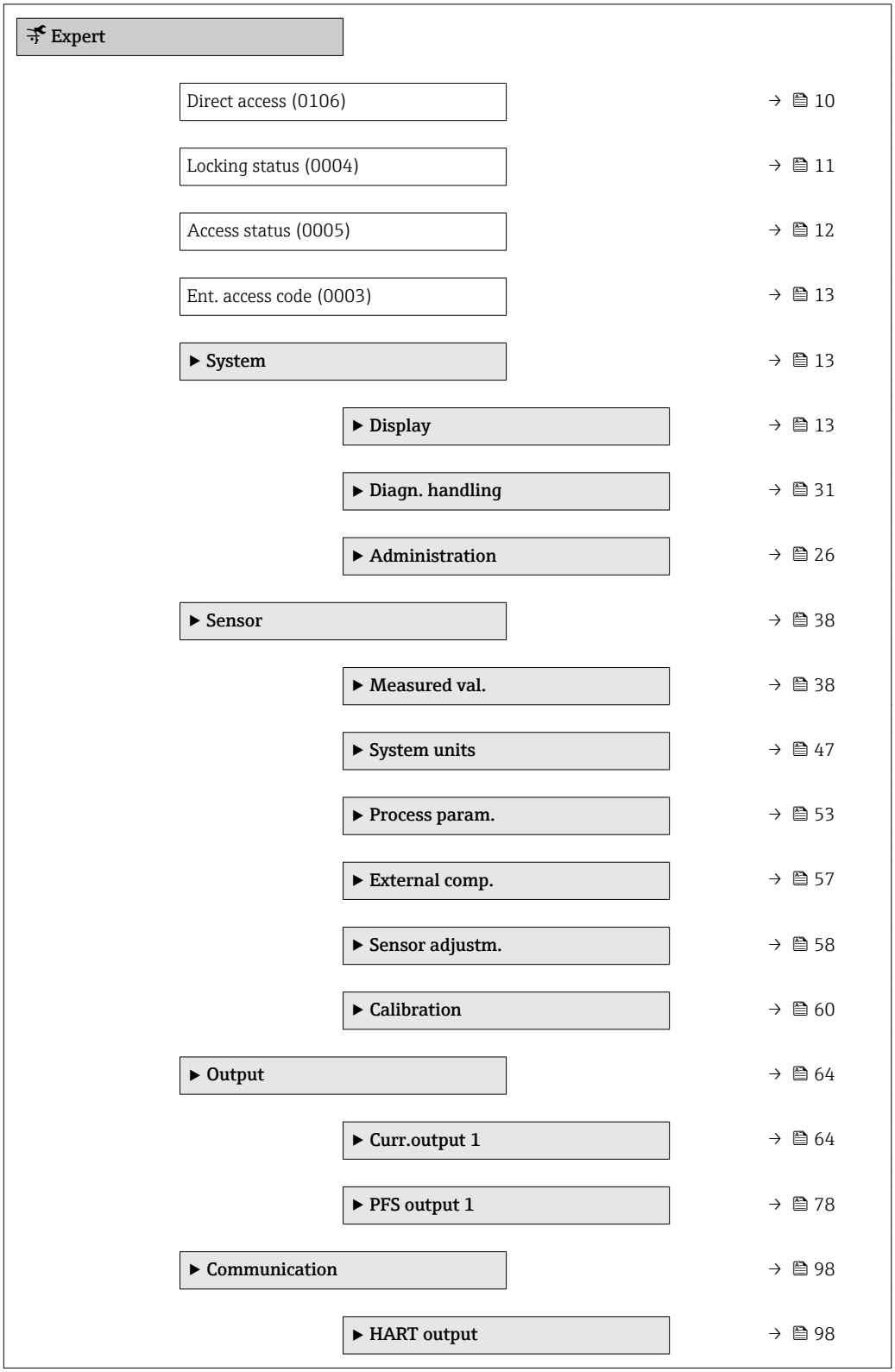
Special documentation

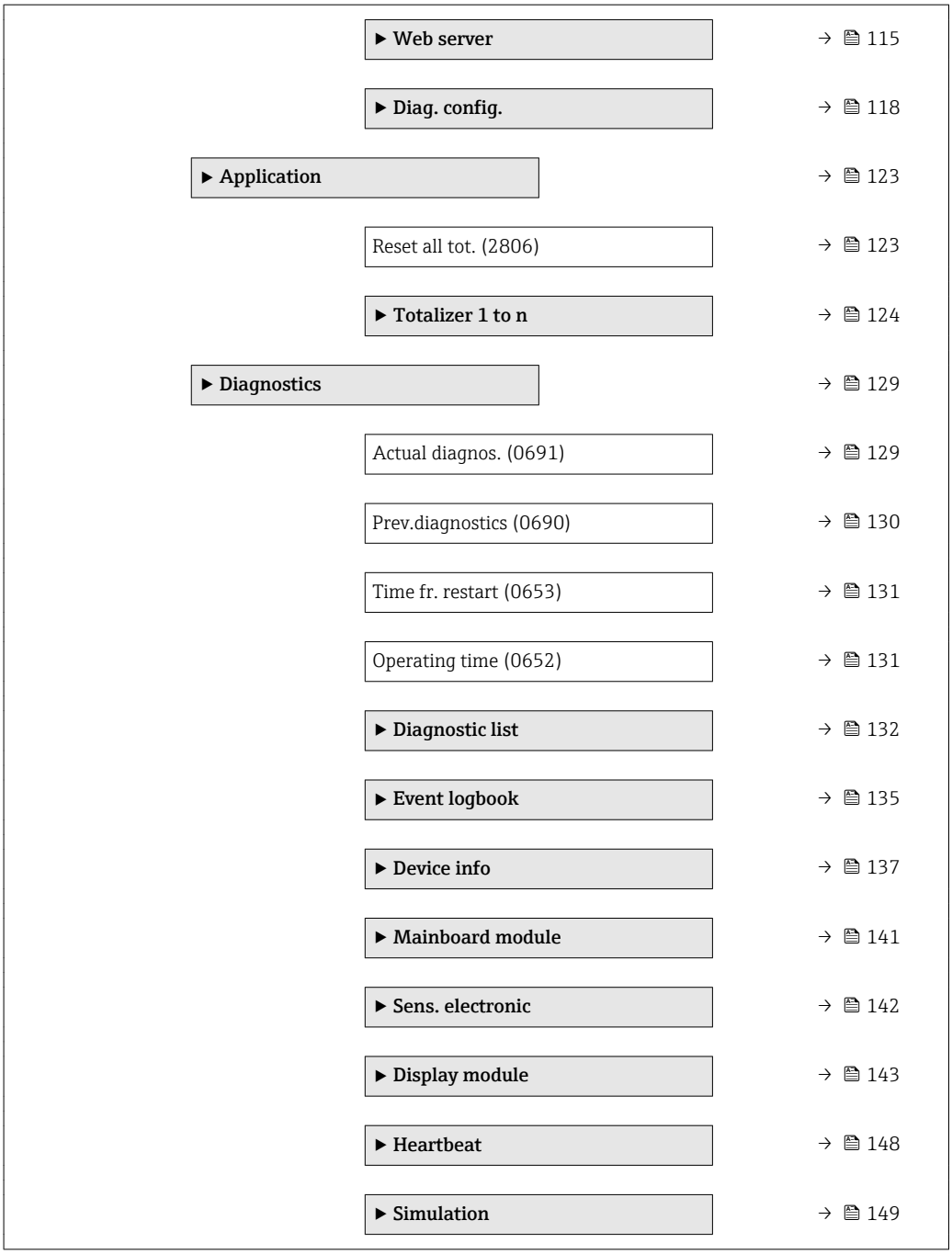
Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
RFID TAG	SD01565D

Contents	Documentation code
Heartbeat Technology	SD02079D

2 Overview of the Expert operating menu

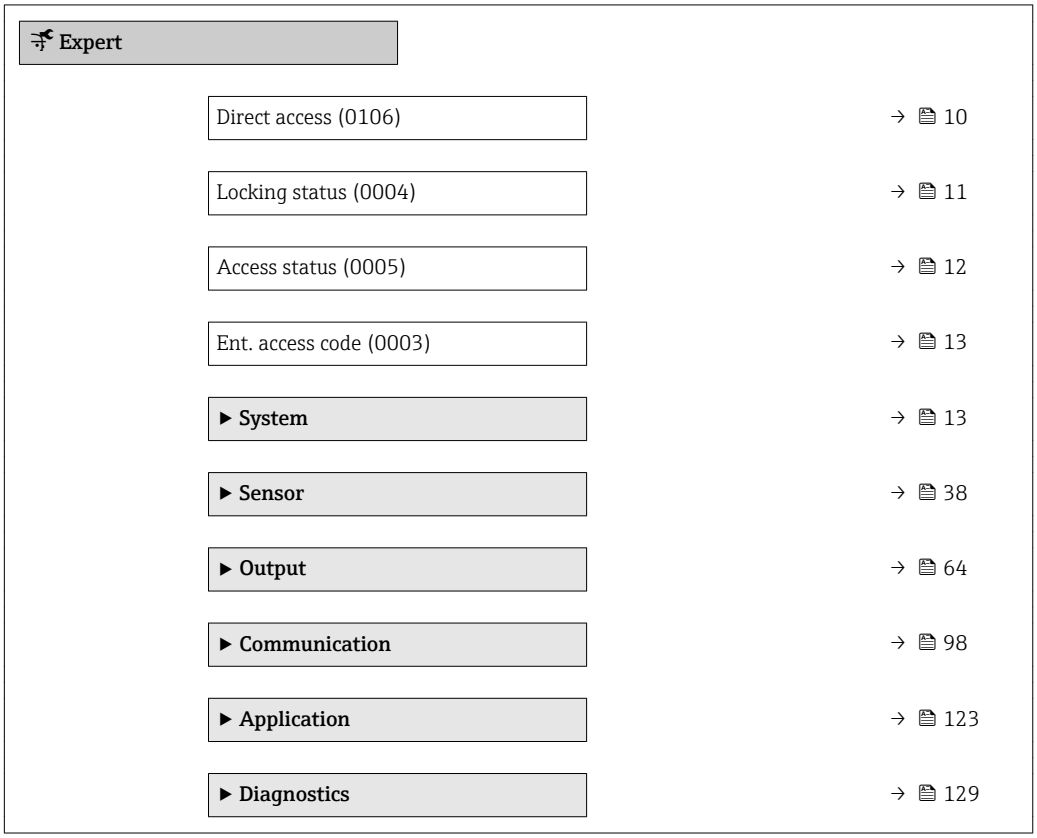
The following table provides an overview of the menu structure of the expert operating menu and its parameters. The page reference indicates where the associated description of the submenu or parameter can be found.




▶ Web server → 115
▶ Diag. config. → 118
▶ Application → 123
Reset all tot. (2806) → 123
▶ Totalizer 1 to n → 124
▶ Diagnostics → 129
Actual diagnos. (0691) → 129
Prev.diagnostics (0690) → 130
Time fr. restart (0653) → 131
Operating time (0652) → 131
▶ Diagnostic list → 132
▶ Event logbook → 135
▶ Device info → 137
▶ Mainboard module → 141
▶ Sens. electronic → 142
▶ Display module → 143
▶ Heartbeat → 148
▶ Simulation → 149

3 Description of device parameters

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



Direct access

Navigation Expert → Direct access (0106)

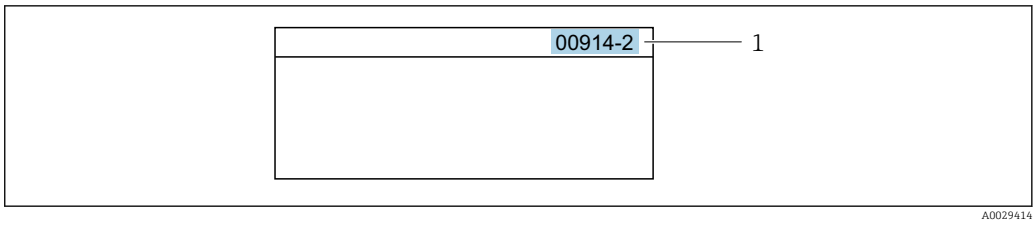
Prerequisite There is a local display with operating elements.

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
Hardware locked (priority 1)	The write protection switch (DIP switch) for locking the hardware is activated on the main electronic module. This locks write access to the parameters .
Temp. locked (priority 2)	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

Access stat.disp

Navigation Expert → Access stat.disp (0091)

Prerequisite A local display is provided.

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

User interface
- Operator
- Maintenance

Factory setting Operator

Additional information

Description

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

Access authorization can be modified via the **Ent. access code** parameter (→ 13).

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

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

Display

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

Access status

Navigation Expert → Access status (0005)

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

User interface
- Operator
- Maintenance

Factory setting Maintenance

Additional information

Description

Access authorization can be modified via the **Ent. access code** parameter (→ 13).

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

Display

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

Ent. access code

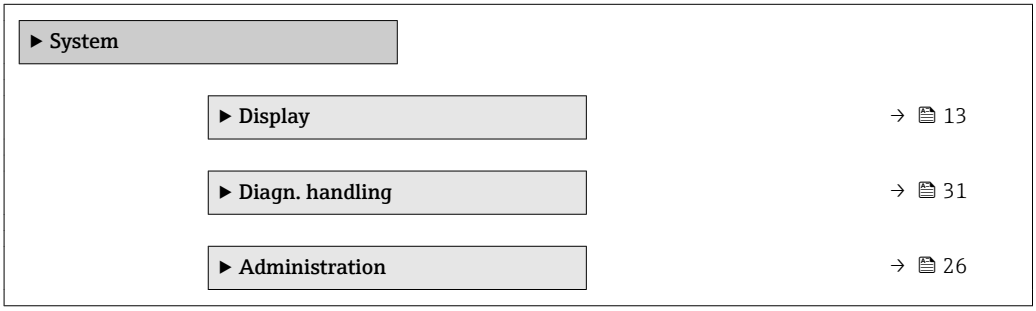
Navigation Expert → Ent. access code (0003)

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

User entry 0 to 9 999

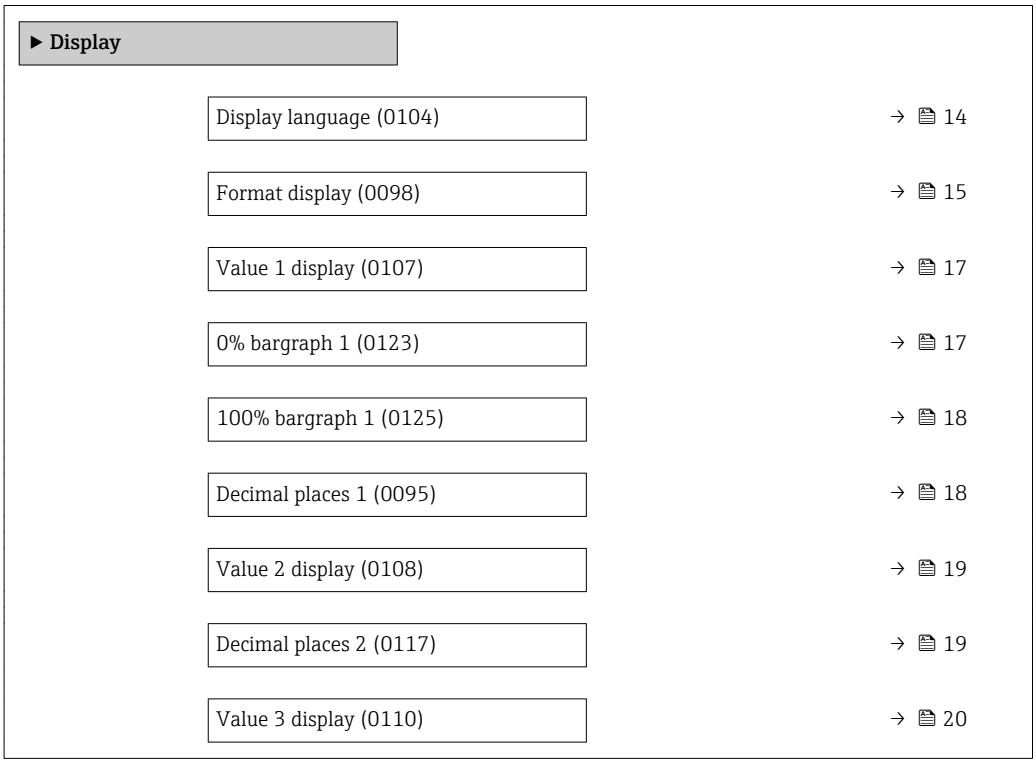
3.1 "System" submenu

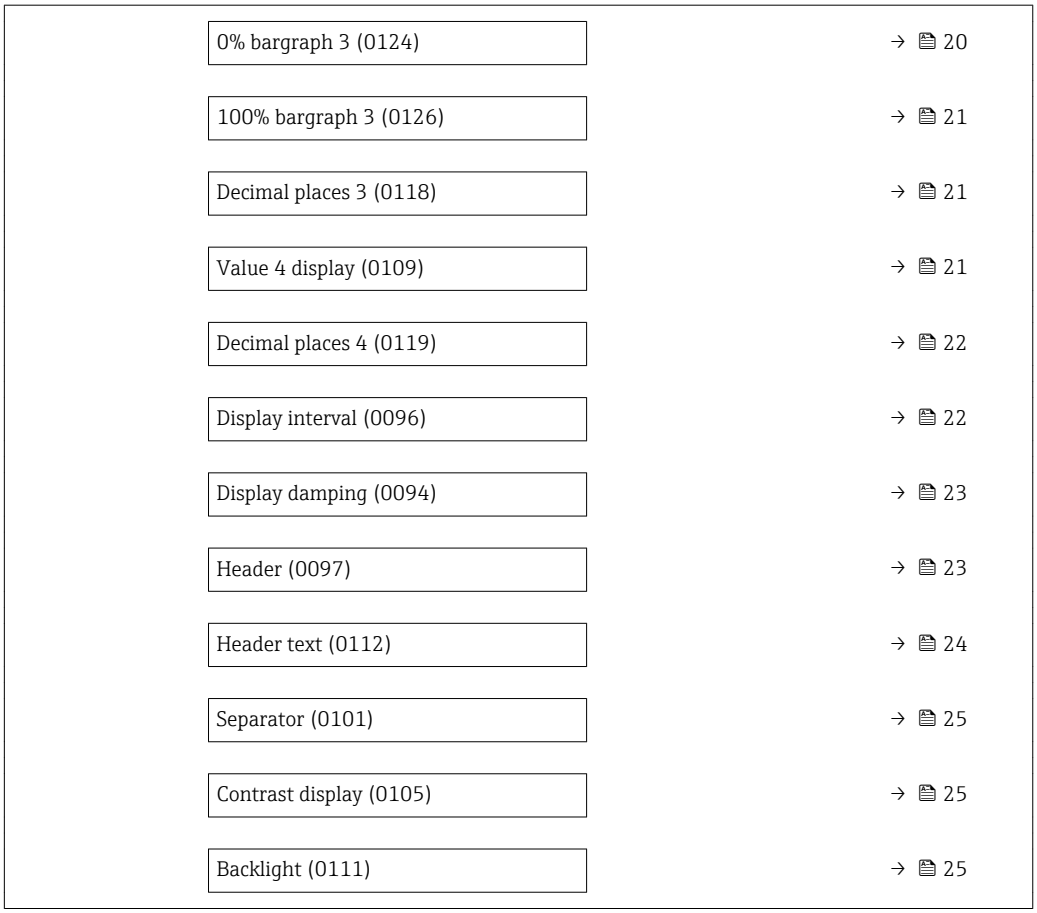
Navigation Expert → System



3.1.1 "Display" submenu

Navigation Expert → System → Display





Display language

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

Prerequisite A local display is provided.

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

Selection
- English
- Deutsch *
- Français *
- Español *
- Italiano *
- Nederlands *
- Portuguesa *
- Polski *
- русский язык(Ru) *
- Svenska *
- Türkçe *
- 中文 (Chinese) *
- 日本語 (Japanese) *
- 한국어 (Korean) *
- العَرَبيّة(Ara) *

* Visibility depends on order options or device settings

- 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.
- Bargr. + 1 value
- 2 values
- Val. large+2val.
- 4 values

Factory setting 1 value, max.

Additional information *Description*

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

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

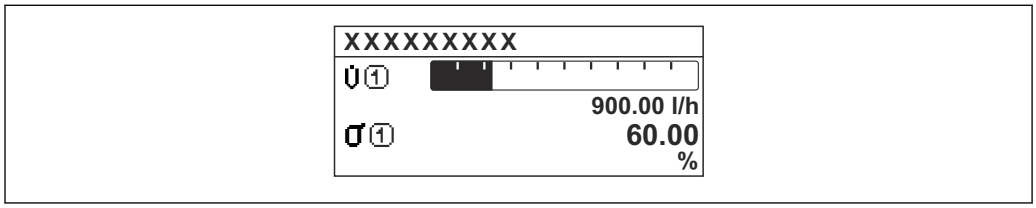
* Visibility depends on order options or device settings

Possible measured values shown on the local display:

"1 value, max." option

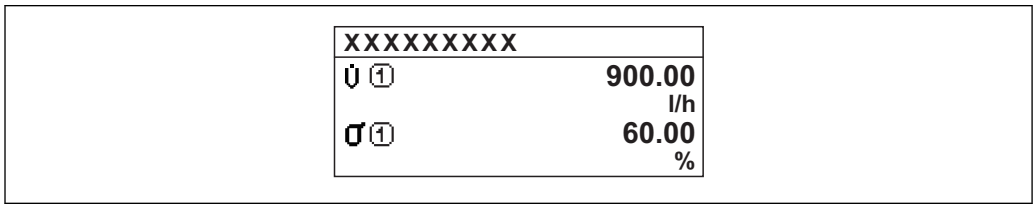
A0016529

"Bargr. + 1 value" option



A0016530

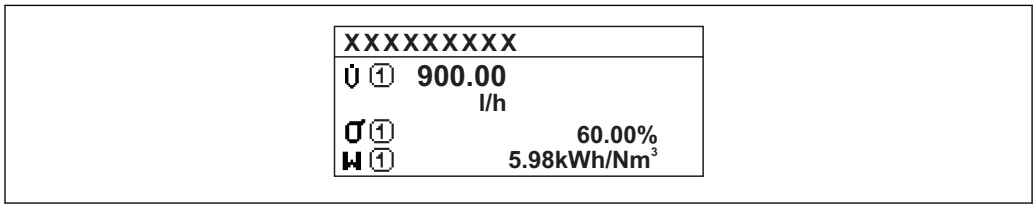
"2 values" option



A0016531

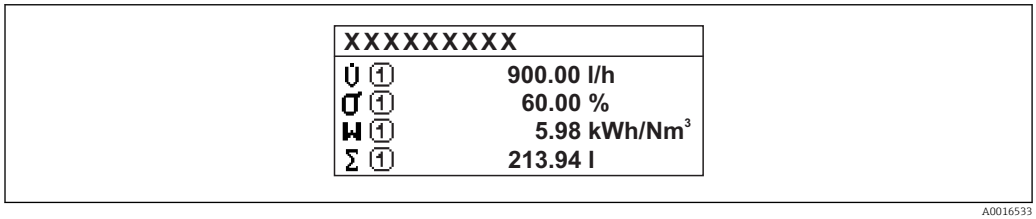
2

"Val. large+2val." option



A0016532

"4 values" option



A0016533

Value 1 display

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

Prerequisite A local display is provided.

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

Selection
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Volume flow
- Curr.output 1
- Acceptance rate *
- Signal asymmetry *
- Turbulence *
- Signal strength *
- Curr.output 1
- SNR *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Volume flow

Additional information

Description

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

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

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

0% bargraph 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

* Visibility depends on order options or device settings

Factory setting

Country-specific:
- 0 m^3/h
- 0 ft^3/h

Additional information

Description

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

100% bargraph 1

Navigation

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

Prerequisite

A local display is provided.

Description

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

User entry

Signed floating-point number

Factory setting

Depends on country and nominal diameter → 156

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 (→ 47).

Decimal places 1

Navigation

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

Prerequisite

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

Description

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

Selection

- x
- x.x
- x.xx
- x.xxx
- 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 to be shown on the local display.

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

Factory setting None

Additional information *Description*

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

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

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

Decimal places 2

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

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

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

Selection

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

Factory setting x.xx

Additional information *Description*

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

Value 3 display

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

Prerequisite A local display is provided.

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

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

Factory setting None

Additional information

Description

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

0% bargraph 3

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

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

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 m^3/h
- 0 ft^3/h

Additional information

Description

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

100% bargraph 3

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

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

Decimal places 3

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Value 4 display

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

Prerequisite A local display is provided.

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

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

Factory setting None

Additional information *Description*

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

Decimal places 4

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Display interval

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

Prerequisite A local display is provided.

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

User entry 1 to 10 s

Factory setting 5 s

Additional information *Description*

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

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

Display damping

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

Prerequisite A local display is provided.

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

User entry 0.0 to 999.9 s

Factory setting 0.0 s

Additional information *User entry*

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

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

Header

Navigation Expert → System → Display → Header (0097)

Prerequisite A local display is provided.

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

Selection
- Device tag
- Free text

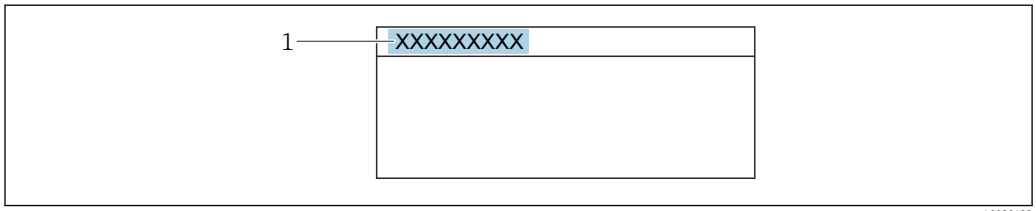
Factory setting Device tag

1) proportional transmission behavior with first order delay

Additional information

Description

The header text only appears during normal operation.



1 Position of the header text on the display

Selection

- Device tag
  Is defined in the **Device tag** parameter (→ 138).
- Free text
  Is defined in the **Header text** parameter (→ 24).

Header text

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

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

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

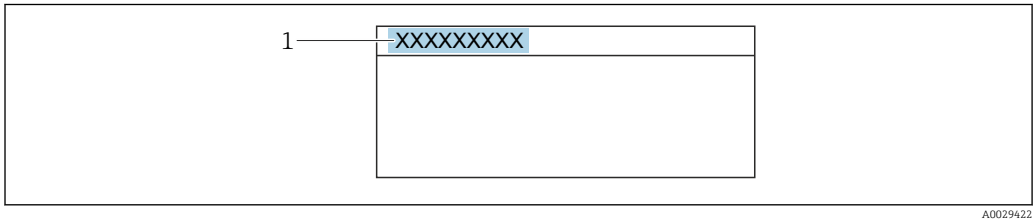
User entry Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)

Factory setting ----------

Additional information

Description

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

Prerequisite A local display is provided.

Description Use this function to select the decimal separator.

Selection
- . (point)
- , (comma)

Factory setting . (point)

Contrast display

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

Prerequisite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Backlight

Navigation Expert → System → Display → Backlight (0111)

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

Selection
- Disable
- Enable

Factory setting Enable

Access stat.disp

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

Prerequisite A local display is provided.

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

User interface
- Operator
- Maintenance

Factory setting
Operator

Additional information

Description

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

Access authorization can be modified via the **Ent. access code** parameter (→ 🖹 13).

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

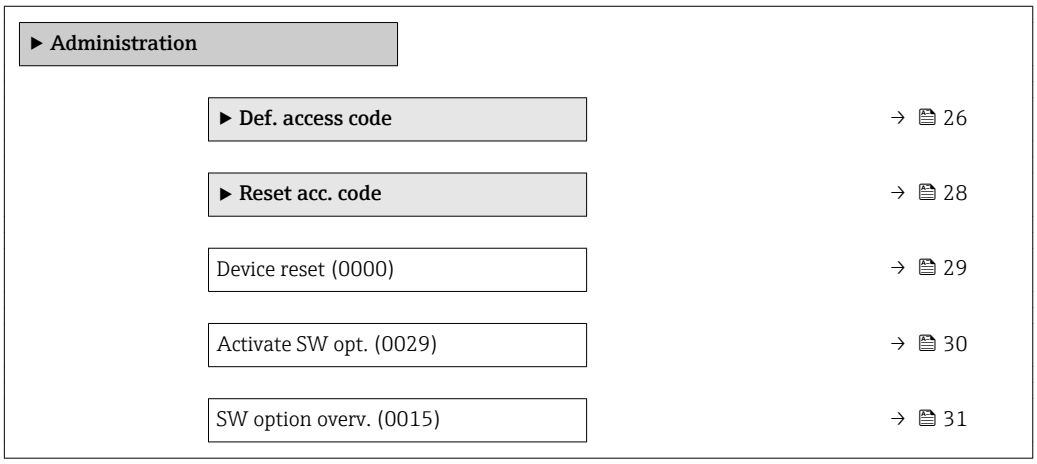
If additional write protection is active, this restricts the current access authorization even further.

Display

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

3.1.2 "Administration" submenu

Navigation Expert → System → Administration

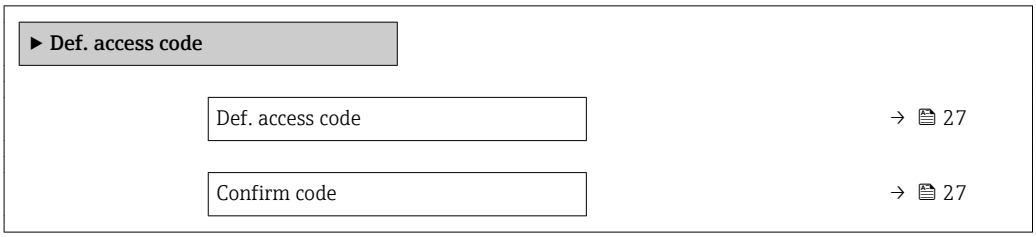


"Def. access code" wizard

The **Def. access code** wizard (→ 🖹 26) is only available when operating via the local display or Web browser.

If operating via the operating tool, the **Def. access code** parameter (→ 🖹 29) 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 configuration of the device against any inadvertent changes via the local display or Web browser.

User entry 0 to 9 999

Factory setting 0

Additional information

Description

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

On the local display, the symbol in front of a parameter indicates that the parameter is write-protected.

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

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

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

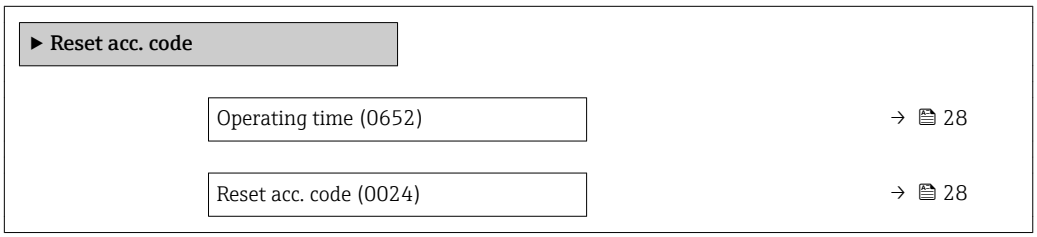
Description Enter the defined release code a second time to confirm the release code.

User entry 0 to 9 999

Factory setting 0

"Reset access code" submenu

Navigation Expert → System → Administration → Reset acc. code



Operating time

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

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

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

Additional information *User interface*

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

Reset 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

Def. access code

Navigation Expert → System → Administration → Def. access code

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

User entry 0 to 9 999

Factory setting 0

Additional information

Description

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

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

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

User entry

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

Factory setting

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

Device reset

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

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

Selection

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

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 (→ 31).

↳ 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 **EB** "Heartbeat Verification + Monitoring"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 31).

Web browser

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
- HBT Monitoring
- HBT Verification

Additional information *Description*

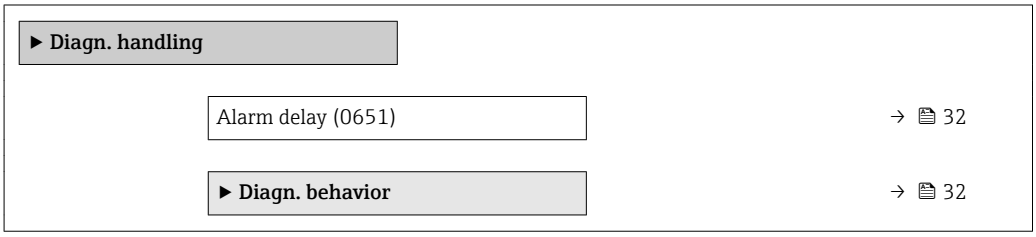
Displays all the options that are available if ordered by the customer.

"HBT Verification" option and "HBT Monitoring" option

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

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:
- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.

"Diagn. behavior" submenu

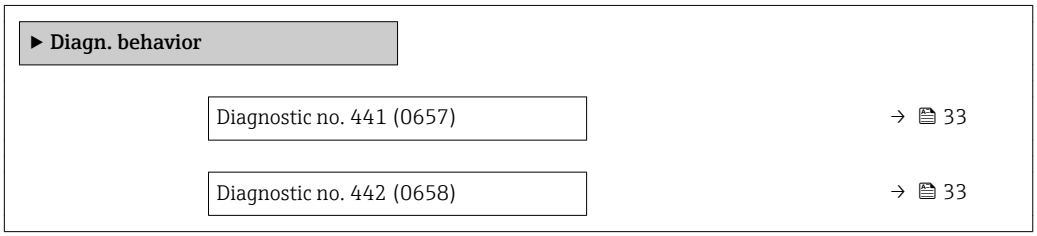
Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagn. behavior** submenu (→ 32).

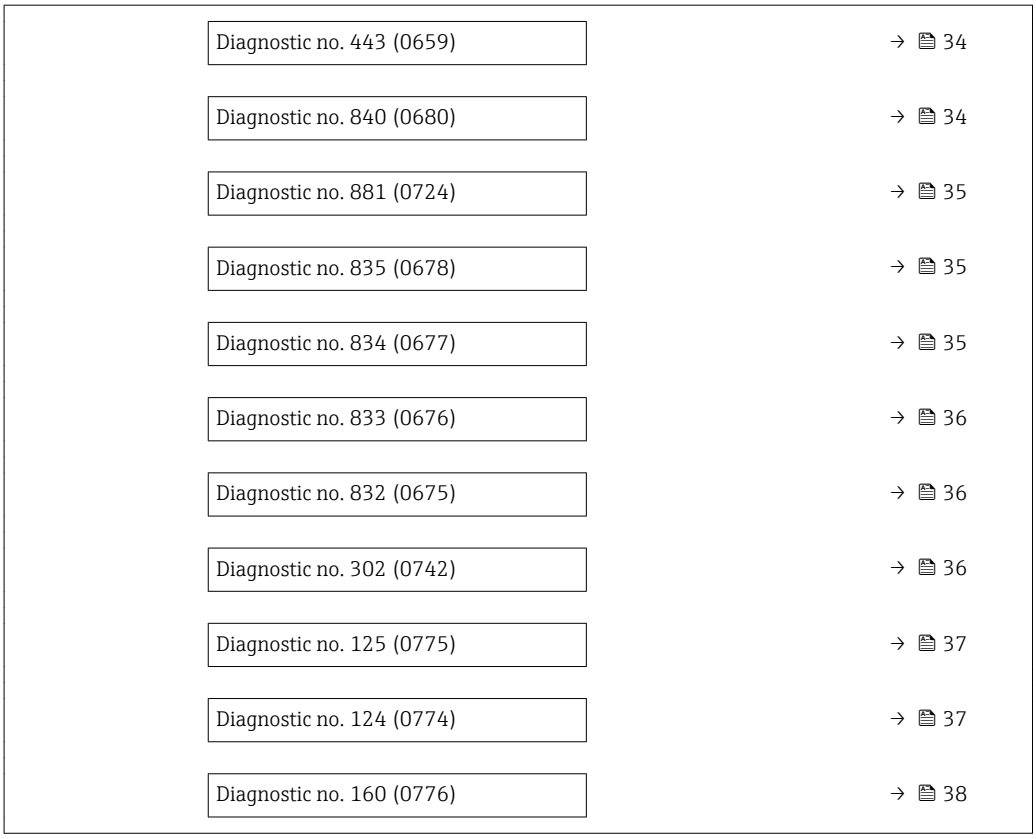
The following options are available in the **Assign behavior of diagnostic no. xxx** parameters:

Options	Description
Alarm	The device stops measurement. The signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated.
Warning	The device continues to measure. The signal outputs and totalizers are not affected. A diagnostic message is generated.
Logbook only	The device continues to measure. The diagnostic message is entered only in the **Event logbook** submenu (→ 135) (**Event list** submenu (→ 136)) and is not displayed in alternation with the measured value 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→ 7

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





Diagnostic no. 441 (Curr.output 1)

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**.

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)

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**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 32

Diagnostic no. 443 (Pulse output)

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

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

Description Option for changing the diagnostic behavior of the diagnostic message **443 Pulse output**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 32

Diagnostic no. 841 (Sensor range)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 840 (0680)

Description Option for changing the diagnostic behavior of the diagnostic message **841 Sensor range**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 32

Diagnostic no. 881 (Sen.sig. path 1 to n)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 881 (0724)

Description Option for changing the diagnostic behavior of the diagnostic message **881 Sen.sig. path 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. 835 (Process temp.)

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

Description Option for changing the diagnostic behavior of the diagnostic message **835 Process temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 32

Diagnostic no. 834 (Process temp.)

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

Description Option for changing the diagnostic behavior of the diagnostic message **834 Process temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 32

Diagnostic no. 833 (Electronic temp.)

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

Description Option for changing the diagnostic behavior of the diagnostic message **833 Electronic temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 32

Diagnostic no. 832 (Electronic temp.)

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

Description Option for changing the diagnostic behavior of the diagnostic message **832 Electronic temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information *Selection*

Detailed description of the options available for selection: → 32

Diagnostic no. 302 (Verific. active)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 32

Diagnostic no. 125 (Rel. sound vel.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 125 (0775)

Description Option for changing the diagnostic behavior of the diagnostic message **125 Rel. sound vel.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 32

Diagnostic no. 124 (Rel.sig.strength)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 124 (0774)

Description Option for changing the diagnostic behavior of the diagnostic message **124 Rel.sig.strength**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 32

Diagnostic no. 160 (Signal path off)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 160 (0776)

Description Option for changing the diagnostic behavior of the diagnostic message **160 Signal path off**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 32

3.2 "Sensor" submenu

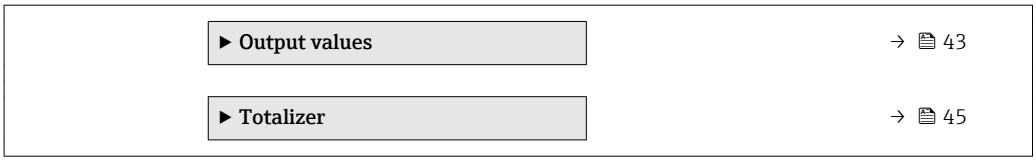
Navigation Expert → Sensor

▶ Sensor	
▶ Measured val.	→ 38
▶ System units	→ 47
▶ Process param.	→ 53
▶ External comp.	→ 57
▶ Sensor adjustm.	→ 58
▶ Calibration	→ 60

3.2.1 "Measured val." submenu

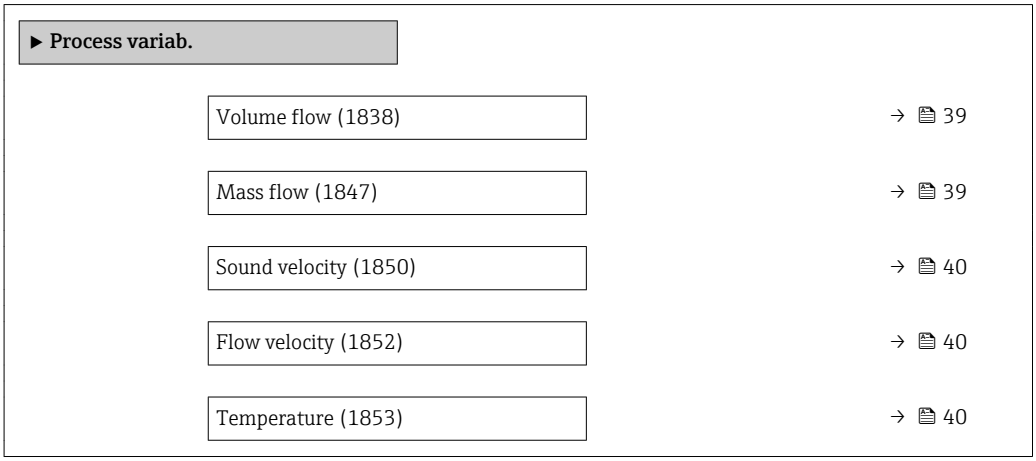
Navigation Expert → Sensor → Measured val.

▶ Measured val.	
▶ Process variab.	→ 39
▶ System values	→ 40



"Process variab." submenu

Navigation Expert → Sensor → Measured val. → Process variab.



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 *Dependency*

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

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 (→ 49)

Sound velocity

Navigation Expert → Sensor → Measured val. → Process variab. → Sound velocity (1850)

Description Displays the sound velocity currently measured.

User interface Signed floating-point number

Flow velocity

Navigation Expert → Sensor → Measured val. → Process variab. → Flow velocity (1852)

Description Displays the flow velocity currently measured.

User interface Signed floating-point number

Temperature

Navigation Expert → Sensor → Measured val. → Process variab. → Temperature (1853)

Description Displays the medium temperature currently measured.

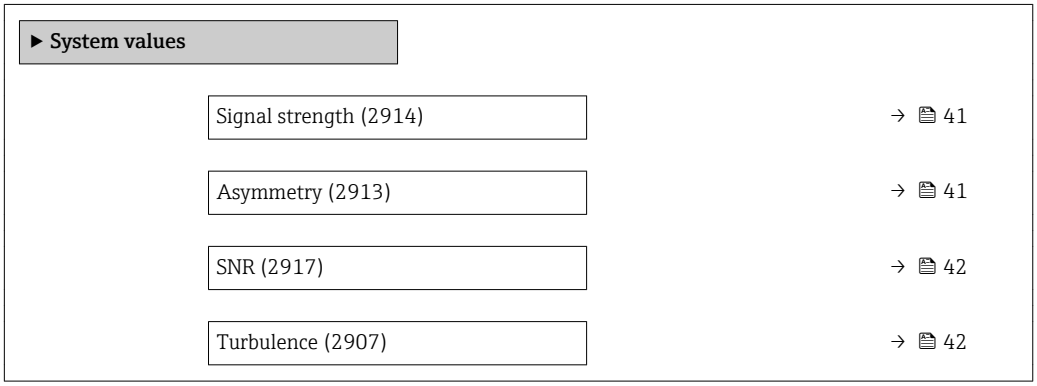
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 50)

"System values" submenu

Navigation Expert → Sensor → Measured val. → System values



Signal strength

Navigation Expert → Sensor → Measured val. → System values → Signal strength (2914)

Description Use this function to display the current signal strength.

User interface Signed floating-point number

Additional information *Description*

A drop in the signal strength over time can be an indicator of deposit buildup on the converter or high ultrasonic damping in the gas. A very fast drop is an indication of a high concentration of CO_2.

Acceptance rate

Navigation Expert → Sensor → Measured val. → System values → Acceptance rate (2912)

Description Displays the ratio of the number of ultrasonic signals accepted for flow calculation and the total number of ultrasonic signals emitted.

Multipath measuring devices only: Displays the minimum of all acceptance rates measured.

User interface 0 to 100 %

Asymmetry

Navigation Expert → Sensor → Measured val. → System values → Asymmetry (2913)

Prerequisite The **Dual path sensor** option is selected in the **Path conf.** parameter parameter.

Description Use this function to display the asymmetry of the measured values between signal path 1 and signal path 2.

User interface Signed floating-point number

Factory setting 0 %

Additional information *Limit values*

If the value 0 is displayed, both measured values are the same. The higher the displayed value, the greater the difference between the two measured values of the signal paths.

SNR

Navigation Expert → Sensor → Measured val. → System values → SNR (2917)

Description Use this function to display the current signal-to-noise ratio.

User interface Signed floating-point number

Additional information *Description*

A low value or a drop in the signal to noise ratio over time is an indicator of poor signal quality. A very fast drop is an indication of a high concentration of CO_2.

Turbulence

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

Description Use this function to display the current turbulence.

User interface Signed floating-point number

Reynolds number

Navigation Expert → Sensor → Measured val. → System values → Reynolds number (2908)

Description Displays the Reynolds number.

User interface Signed floating-point number

Profile factor

Navigation Expert → Sensor → Measured val. → System values → Profile factor (2909)

Description Displays the profile factor.

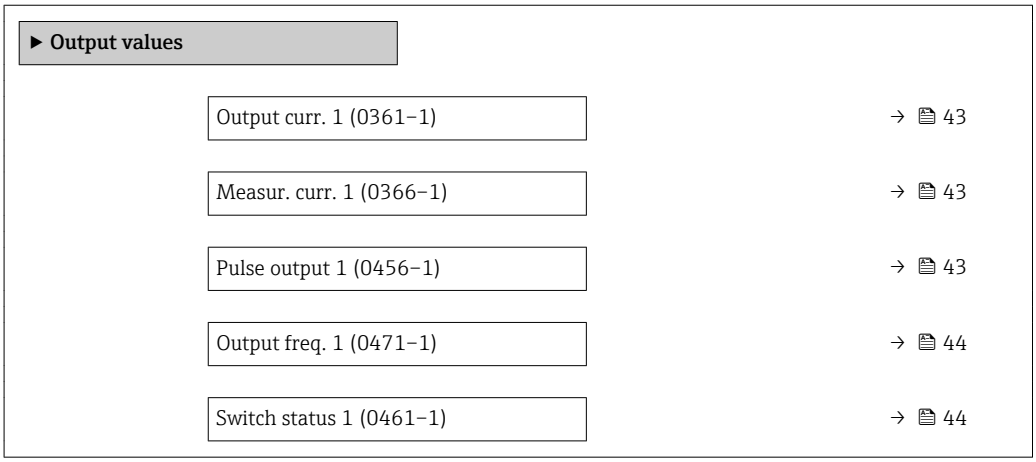
The profile factor describes the correction factor applied based on the flow profile present. The more the profile deviates from even distribution, the smaller the factor.

The profile factor is used to calculate the flow rate.

User interface Signed floating-point number

"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values



Output curr. 1

Navigation Expert → Sensor → Measured val. → Output values → Output curr. 1 (0361–1)

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

User interface 0 to 22.5 mA

Measur. curr. 1

Navigation Expert → Sensor → Measured val. → Output values → Measur. curr. 1 (0366–1)

Description Use this function to display the actual measured value of the output current.

User interface 0 to 30 mA

Pulse output 1

Navigation Expert → Sensor → Measured val. → Output values → Pulse output 1 (0456–1)

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 80) parameter.

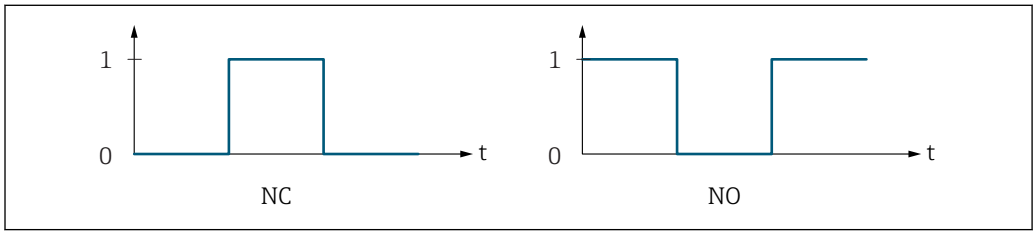
Description Displays the pulse frequency currently output.

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.
- The **Value per pulse** parameter (→ 82) and **Pulse width** parameter (→ 82) can be used to define the value (i.e. the measured value amount that corresponds to a pulse) and the duration of the pulse.



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 (→ 97) 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 (→ 84)) can be configured.

Output freq. 1

Navigation Expert → Sensor → Measured val. → Output values → Output freq. 1 (0471–1)

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Switch status 1

Navigation Expert → Sensor → Measured val. → Output values → Switch status 1 (0461–1)

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 80).

Description Displays the current switch status of the status output.

User interface

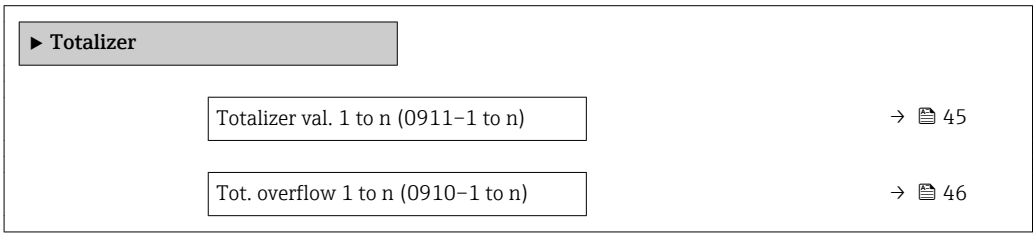
- Open
- Closed

Additional information *User interface*

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

"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 One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

Description Displays the current totalizer reading.

User interface Signed floating-point number

Additional information

Description

As it is only possible to display a maximum of 7 digits in the operating tool, the current counter value is the sum of the totalizer value and the overflow value from the **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 (→ 127).

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 (→ 125).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 125).

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

Tot. overflow 1 to n

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

Description Displays the current totalizer overflow.

User interface Integer with sign

Additional information

Description

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

User interface

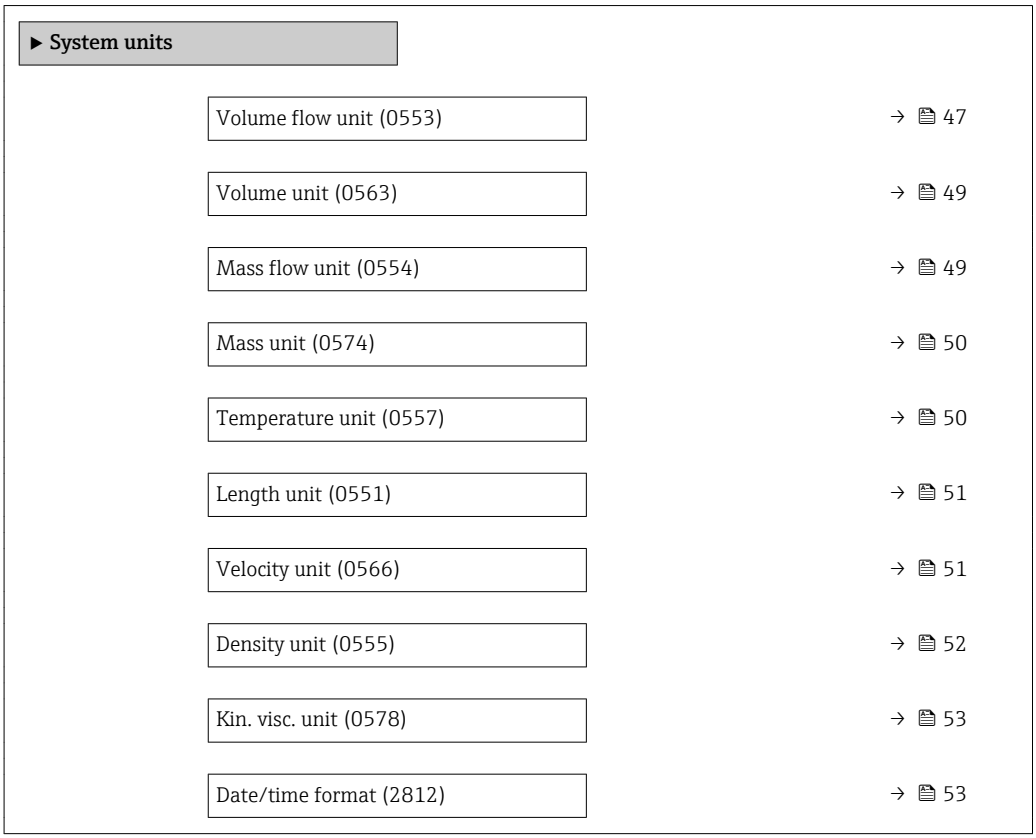
The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 125).

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

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units



Volume flow unit

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

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

Selection

SI units
- cm^3/s
- cm^3/min
- cm^3/h
- cm^3/d
- dm^3/s
- dm^3/min
- dm^3/h
- dm^3/d
- m^3/s
- m^3/min
- m^3/h
- m^3/d
- ml/s
- ml/min
- ml/h
- ml/d
- l/s
- l/min
- l/h
- l/d
- hl/s
- hl/min
- hl/h
- hl/d
- Ml/s
- Ml/min
- Ml/h
- Ml/d

US units
- af/s
- af/min
- af/h
- af/d
- ft^3/s
- ft^3/min
- ft^3/h
- ft^3/d
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- bbl/s (us;liq.)
- bbl/min (us;liq.)
- bbl/h (us;liq.)
- bbl/d (us;liq.)
- bbl/s (us;beer)
- bbl/min (us;beer)
- bbl/h (us;beer)
- bbl/d (us;beer)
- bbl/s (us;oil)
- bbl/min (us;oil)
- bbl/h (us;oil)
- bbl/d (us;oil)
- bbl/s (us;tank)
- bbl/min (us;tank)
- bbl/h (us;tank)
- bbl/d (us;tank)

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

Factory setting

Country-specific:
- m^3/h
- ft^3/min

Additional information

Result

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

Selection

For an explanation of the abbreviated units: → 159

Customer-specific units

The unit for the customer-specific volume is specified in the **Volume text** parameter.

Volume unit

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

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

Selection

SI units
- cm^3
- dm^3
- m^3
- ml
- l
- hl
- Ml Mega

US units
- af
- ft^3
- 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:
- dm^3
- ft^3

Additional information

Selection

For an explanation of the abbreviated units: → 159

Customer-specific units

The unit for the customer-specific volume is specified in the **Volume text** parameter.

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

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

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

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

Additional information

Result

The selected unit applies for:
Mass flow parameter

Selection

For an explanation of the abbreviated units: → 159

Customer-specific units

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

Mass unit

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

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

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Factory setting

Country-specific:
- kg
- lb

Additional information

Selection

For an explanation of the abbreviated units: → 159

Customer-specific units

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

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 (→ 40)
- Maximum value (→ 148)
- Minimum value (→ 148)
- Maximum value (→ 146)
- Minimum value (→ 146)

Selection

For an explanation of the abbreviated units: → 159

Length unit

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

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

Selection

SI units	*US units*
▪ m	▪ ft
▪ mm	▪ in
▪ µm	

Factory setting

Country-specific:
- mm
- in

Additional information

Selection

For an explanation of the abbreviated units: → 159

Velocity unit

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

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

Selection

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

Factory setting

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

Additional information

Result

The selected unit applies for:
- Flow velocity (→ 40)
- Sound velocity (→ 40)
- Maximum value (→ 147)
- Minimum value (→ 147)
- Maximum value (→ 145)
- Minimum value (→ 145)

Selection

For an explanation of the abbreviated units: → 159

Density unit

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

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

Selection

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

US units
- lb/ft³
- lb/gal (us)
- lb/bbl (us;liq.)
- lb/bbl (us;beer)
- lb/bbl (us;oil)
- lb/bbl (us;tank)

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

Factory setting

Country-specific:
- kg/l
- lb/ft³

Additional information

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: → 159

Customer-specific units

The unit for the customer-specific density is specified in the **Density text** parameter.

Kin. visc. unit

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

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

Selection
SI units
- cSt
- m^2/s
- St

Factory setting
Country-specific:
- m^2/s
- cSt

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

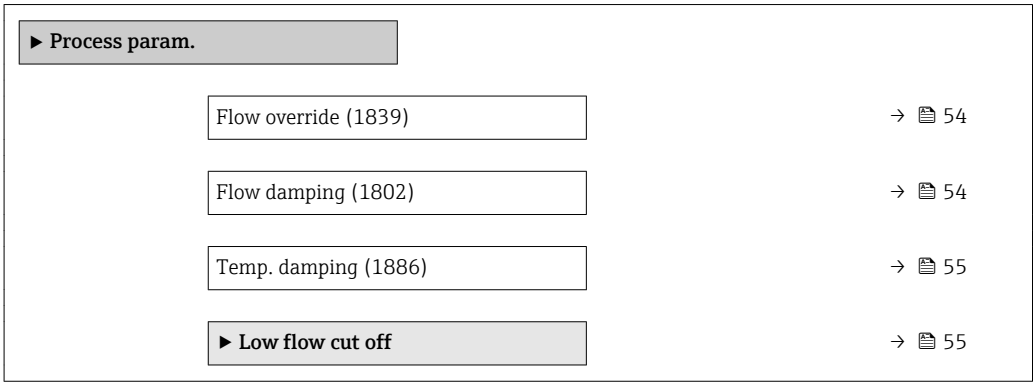
Factory setting dd.mm.yy hh:mm

Additional information
Selection

For an explanation of the abbreviated units: → 159

3.2.3 "Process param." submenu

Navigation Expert → Sensor → Process param.



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 *Result*

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

Description

Flow override is active
- The diagnostic message diagnostic message ⚠**C453 Flow override** is displayed.
- Output values
  - Output: Value at zero flow
  - Temperature: proceeding output
  - Totalizers 1-3: Stop being totalized

Positive zero return can also be enabled via the Status input: **Assign stat.inp.** parameter.

Flow damping

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

Description Use this function to enter a time constant for flow damping (PT1 element). Reduction of the variability of the flow measured value (in relation to interference). For this purpose, the depth of the flow filter is adjusted: when the filter setting increases, the reaction time of the device also increases.

User entry 0 to 999.9 s

Factory setting 0 s

Additional information

Description

The damping is performed by a PT1 element [2].

User entry

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

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

Result

The damping affects the following variables of the device:
- Outputs → 64
- Low flow cut off → 55
- Totalizers → 124

Temp. damping

Navigation Expert → Sensor → Process param. → Temp. damping (1886)

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

User entry 0 to 999.9 s

Factory setting 10 s

"Low flow cut off" submenu

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

▶ Low flow cut off		
	Assign variable (1837)	→ 56
	On value (1805)	→ 56
	Off value (1804)	→ 56

2) Proportional behavior with first-order lag

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

Factory setting Off

On value

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

Prerequisite In the **Assign variable** parameter (→ 56), one of the following options is selected:
- Volume flow
- Mass flow

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

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter→ 156

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign variable** parameter (→ 56).

Off value

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

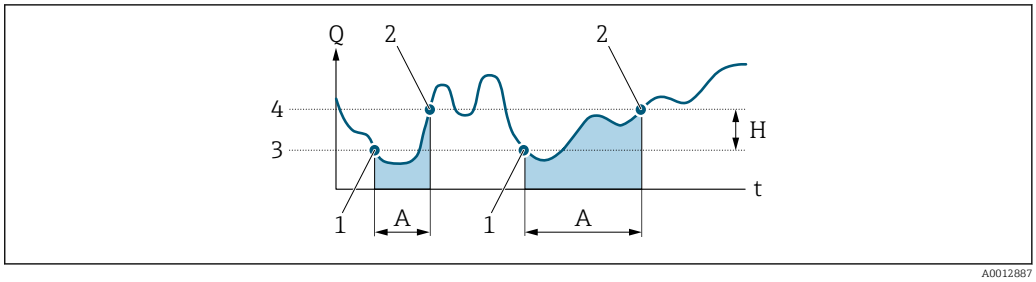
Prerequisite In the **Assign variable** parameter (→ 56), one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to enter a switch-off value for low flow cut off. The off value is entered as a positive hysteresis from the on value→ 56.

User entry 0 to 100.0 %

Factory setting 50 %

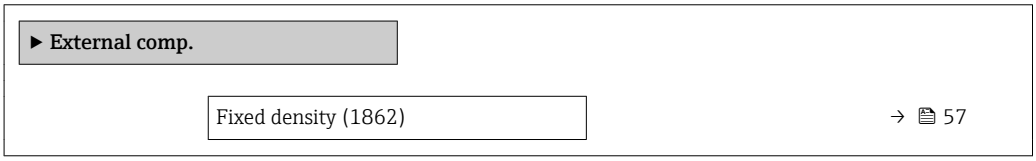
Additional information *Example*



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

3.2.4 "External comp." submenu

Navigation Expert → Sensor → External comp.



Fixed density

Navigation Expert → Sensor → External comp. → Fixed density (1862)

Prerequisite The **Mass flow** option is selected in the **Assign curr.** parameter (→ 65).

Description Use this function to enter a fixed value for the density. The density is used to calculate the mass flow.

User entry Positive floating-point number

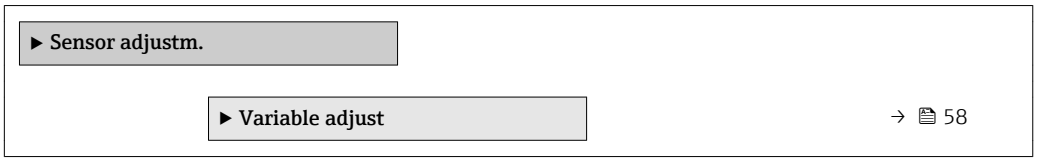
Factory setting 1 000 kg/l

Additional information *User entry*

The unit is taken from the **Density unit** parameter (→ 52).

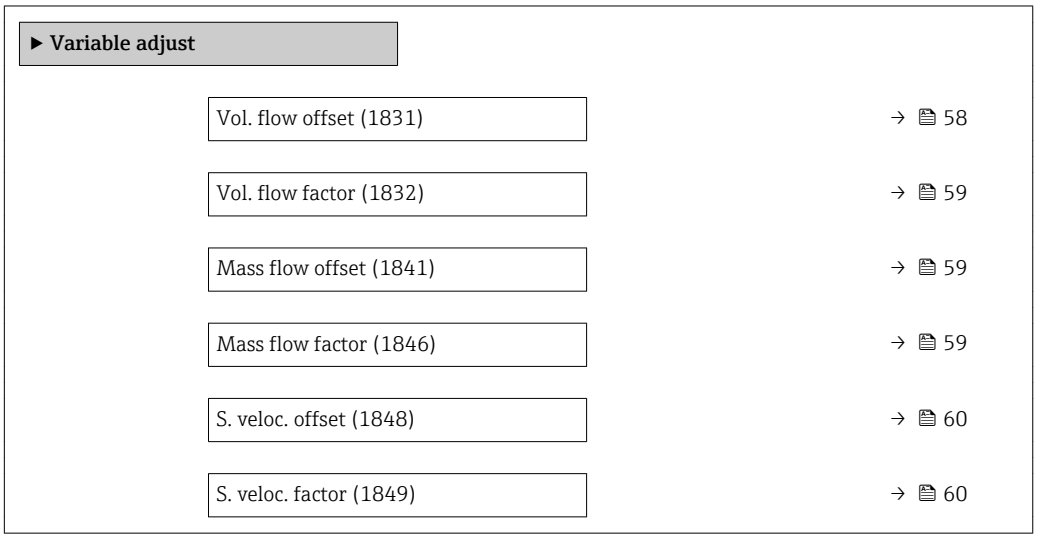
3.2.5 "Sensor adjustm." submenu

Navigation Expert → Sensor → Sensor adjustm.



"Process variable adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust



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^3/s.

User entry Signed floating-point number

Factory setting 0 l/h

Additional information *Description*

Corrected value = (factor × value) + offset

Vol. flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Mass flow offset

Navigation 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/h.

User entry Signed floating-point number

Factory setting 0 kg/h

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

S. veloc. offset

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

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

User entry Signed floating-point number

Factory setting 0 m/s

Additional information *Description*

Corrected value = (factor × value) + offset

S. veloc. factor

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

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

User entry Positive floating-point number

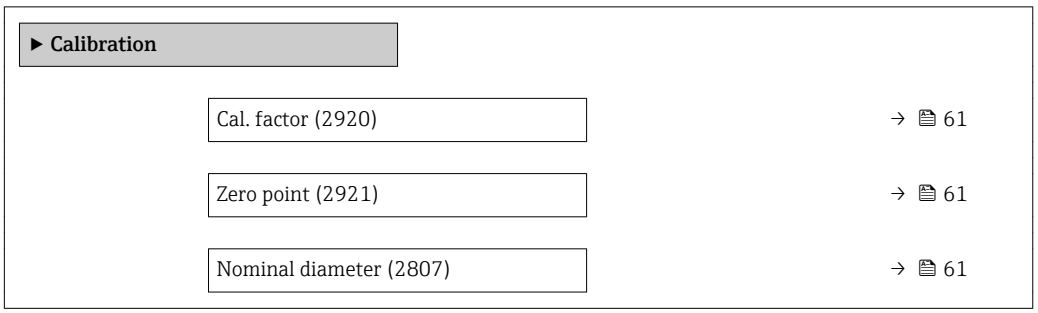
Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

3.2.6 "Calibration" submenu

Navigation Expert → Sensor → Calibration



Cal. factor

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

Description Displays the current calibration factor for the sensor.

User interface Signed floating-point number

Factory setting 1

Zero point

Navigation Expert → Sensor → Calibration → Zero point (2921)

Description Displays the current zero point correction value for the sensor.

User interface Signed floating-point number

Factory setting 0

Nominal diameter

Navigation Expert → Sensor → Calibration → Nominal diameter (2807)

Description Displays the nominal diameter of the sensor.

User interface DNxx / x"

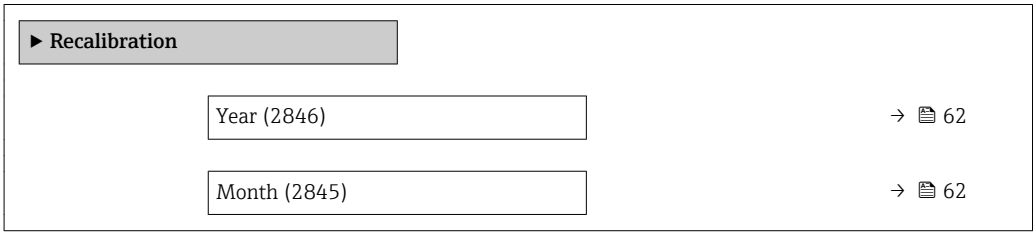
Factory setting Depends on the size of the sensor

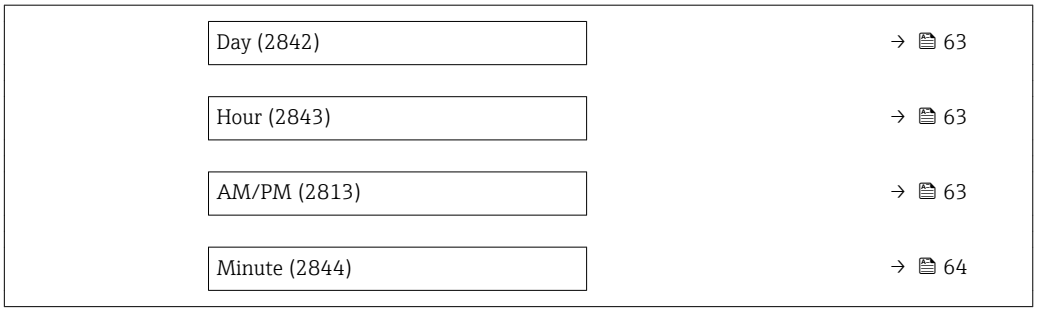
Additional information *Description*

The value is also specified on the sensor nameplate.

"Recalibration" submenu

Navigation Expert → Sensor → Calibration → Recalibration





Year

Navigation Expert → Sensor → Calibration → Recalibration → Year (2846)

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the year of recalibration.

User entry 9 to 99

Factory setting 10

Month

Navigation Expert → Sensor → Calibration → Recalibration → Month (2845)

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to select the month of recalibration.

Selection
- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

Factory setting January

Day

Navigation Expert → Sensor → Calibration → Recalibration → Day (2842)

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the day of the month of recalibration.

User entry 1 to 31 d

Factory setting 1 d

Hour

Navigation Expert → Sensor → Calibration → Recalibration → Hour (2843)

Prerequisite Can be edited if Heartbeat Verification is not active.

Description Use this function to enter the hour of recalibration.

User entry 0 to 23 h

Factory setting 12 h

AM/PM

Navigation Expert → Sensor → Calibration → Recalibration → AM/PM (2813)

Prerequisite Can be edited if Heartbeat Verification is not active.

In the **Date/time format** parameter (2812) (→ 53), the **dd.mm.yy am/pm** option or the **mm/dd/yy am/pm** option is selected.

Description Use this function to enter the morning (**AM** option) or afternoon (**PM** option) time format for counting based on the 12-hour clock.

Selection
- AM
- PM

Factory setting AM

Minute

Navigation Expert → Sensor → Calibration → Recalibration → Minute (2844)

Prerequisite Can be edited if Heartbeat Verification is not active.

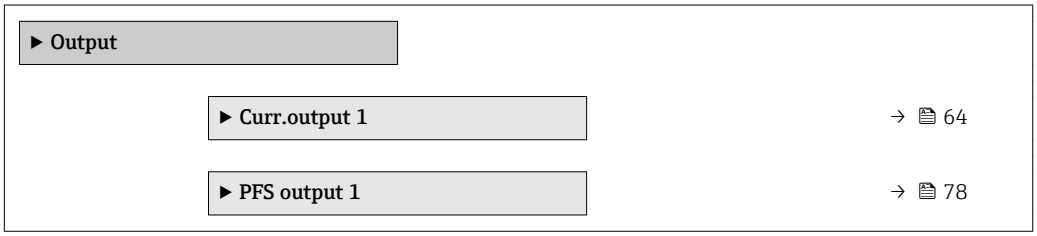
Description Use this function to enter the minutes of recalibration.

User entry 0 to 59 min

Factory setting 0 min

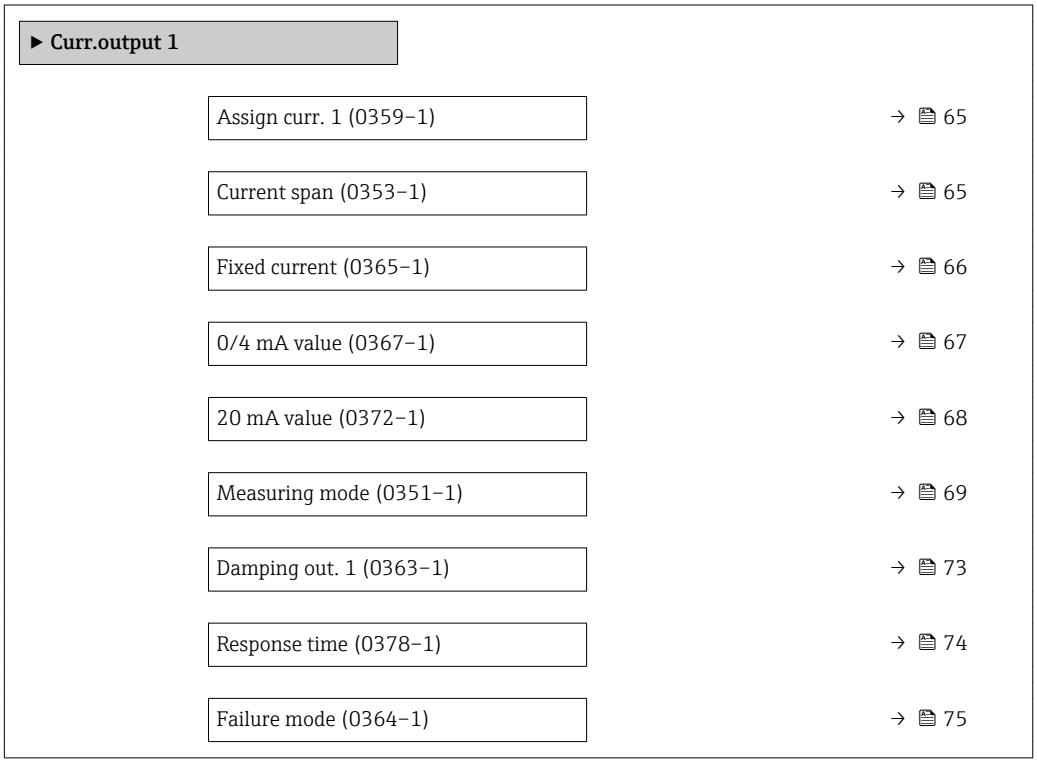
3.3 "Output" submenu

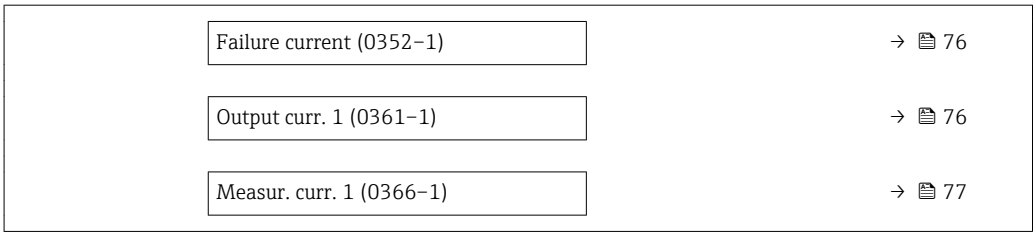
Navigation Expert → Output



3.3.1 "Current output 1" submenu

Navigation Expert → Output → Curr.output 1





Assign curr. 1

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

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

Selection
- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

Factory setting Volume flow

Current span

Navigation Expert → Output → Curr.output 1 → Current span (0353–1)

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
- 4...20 mA US

* Visibility depends on order options or device settings

Additional information

Description

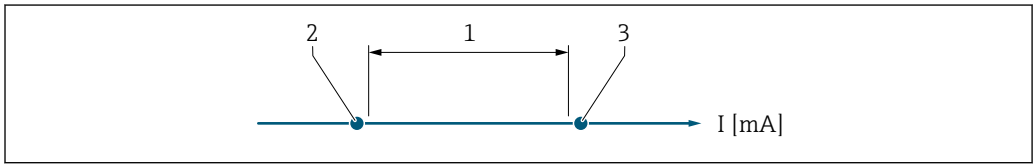
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 75).
- The measuring range is specified via the **0/4 mA value** parameter (→ 67) and **20 mA value** parameter (→ 68).

"Fixed current" option

- This option is used for a HART Multidrop network.
- It can only be used for the 4...20 mA HART current output (current output 1).
- The current value is set via the **Fixed current** parameter (→ 66).

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

Options	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
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

Fixed current

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

Prerequisite The **Fixed current** option is selected in the **Current span** parameter (→ 65).

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 → 0/4 mA value (0367–1)

Prerequisite One of the following options is selected in the **Current span** parameter (→ 65):
- 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 0 l/h

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 65). 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 (→ 68).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 65).

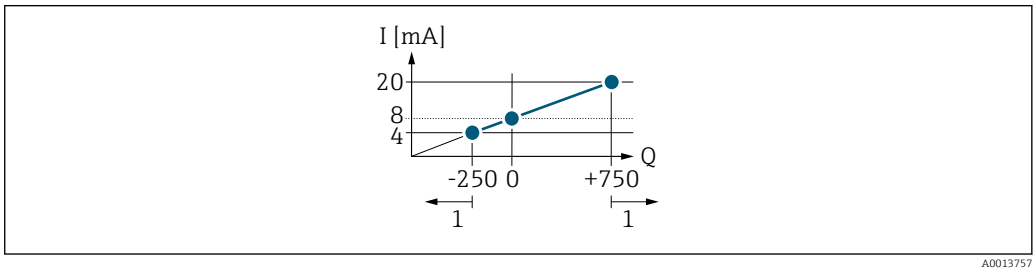
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 65)
- Measuring mode (→ 69)
- Failure mode (→ 75)

Configuration examples

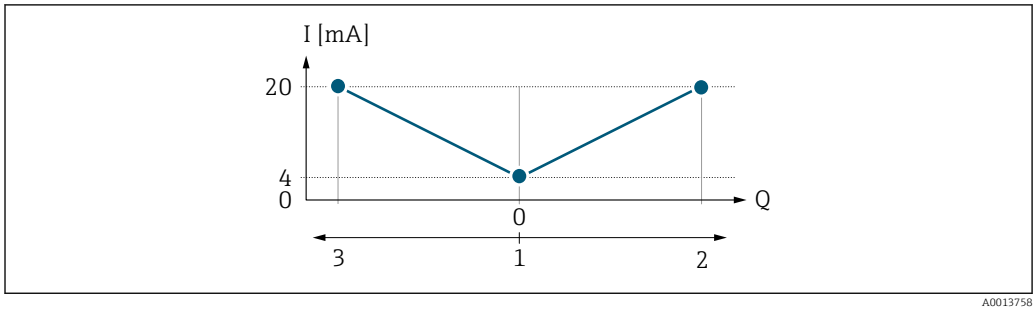
Some examples of parameter settings and their effect on the current output are given in the following section.

Configuration example A
Measuring mode with **Forward flow** option
- **0/4 mA value** parameter (→ 67) = not equal to zero flow (e.g. −250 m^3/h)
- **20 mA value** parameter (→ 68) = not equal to zero flow (e.g. +750 m^3/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

Configuration example B
Measuring mode with **Forward/Reverse** option



I Current
Q Flow
1 Value assigned to the 0/4 mA current
2 Forward flow
3 Reverse 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 → 69.

20 mA value

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

Prerequisite One of the following options is selected in the **Current span** parameter (→ 65):
- 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

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 65). 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 (→ 67).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 65).

Example

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

If the **Forward/Reverse** option is selected in the **Measuring mode** parameter (→ 69), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 67) and **20 mA value** parameter (→ 68). The diagnostic message ⚠**S441 Curr.output 1** is displayed.

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 67).

Measuring mode

Navigation Expert → Output → Curr.output 1 → Measuring mode (0351−1)

Prerequisite

One of the following options is selected in the **Assign curr.** parameter (→ 65):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

One of the following options is selected in the **Current span** parameter (→ 65):
- 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

* Visibility depends on order options or device settings

Additional information

Description

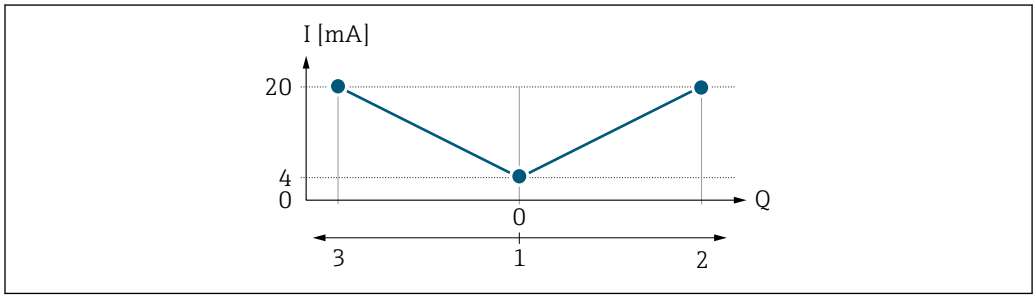
The process variable that is assigned to the current output via the **Assign curr.** parameter (→ 65) is displayed below the parameter.

"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.

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 m^3/h
– 20 mA current value = 10 m^3/h

"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 (→ 67) and **20 mA value** parameter (→ 68) must have the same sign.
- The value for the **20 mA value** parameter (→ 68) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 68) (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.

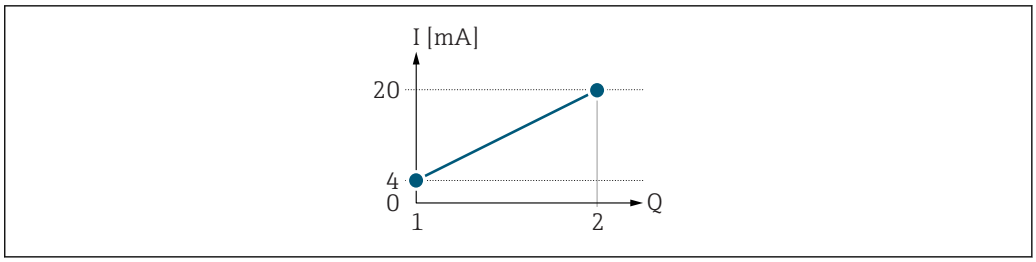
Flow values can aggregate in the buffer in the event of prolonged and unwanted fluid reverse flow. However, these flows are not taken into consideration by the current output configuration, i.e. the reverse flow is not compensated.

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

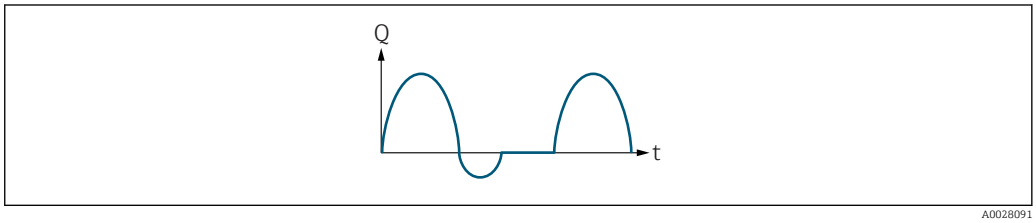
Defined measuring range: lower range value and upper range value with the **same** sign



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:

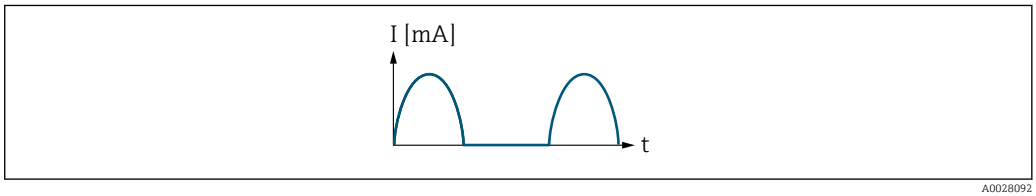


4 Flow response

Q Flow
t Time

With **Forward flow** option

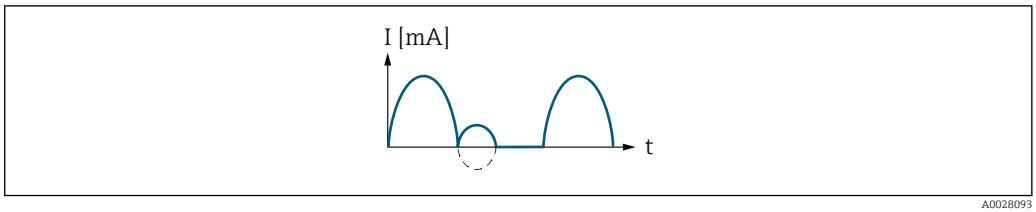
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



I Current
t Time

With **Forward/Reverse** option

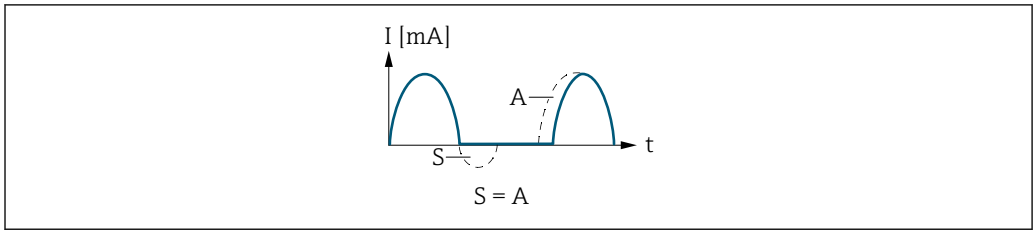
The current output signal is independent of the direction of flow.



I Current
t Time

With **Rev. flow comp.** option

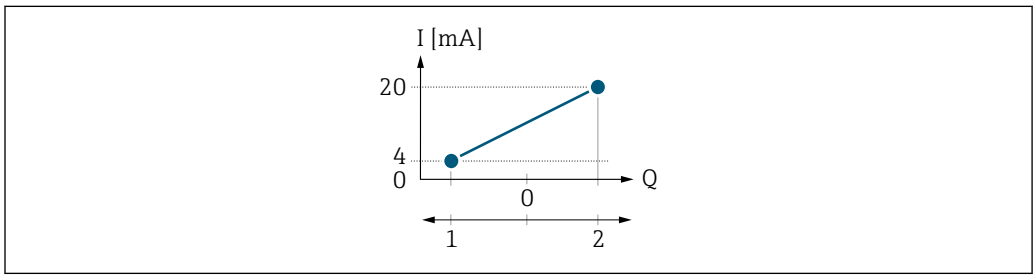
Flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.



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

Example 2

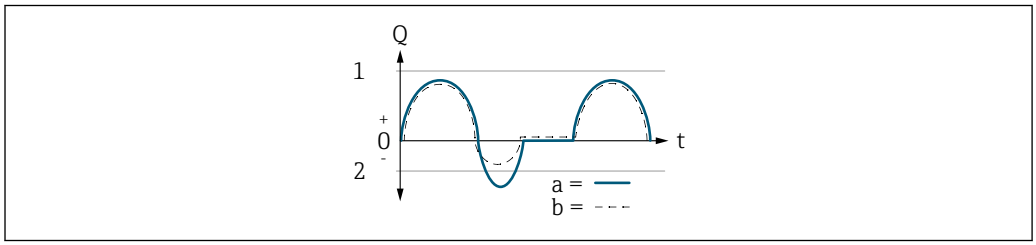
Defined measuring range: lower range value and upper range value with **different** signs



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)*

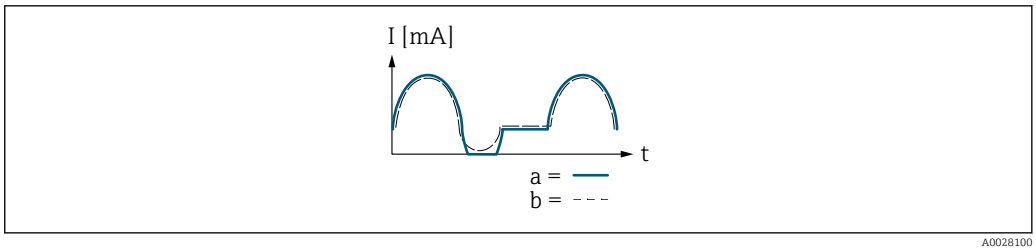
With flow a (—) outside, b (- -) inside the measuring range



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.
- b (- -): The current output signal is proportional to the process variable assigned.



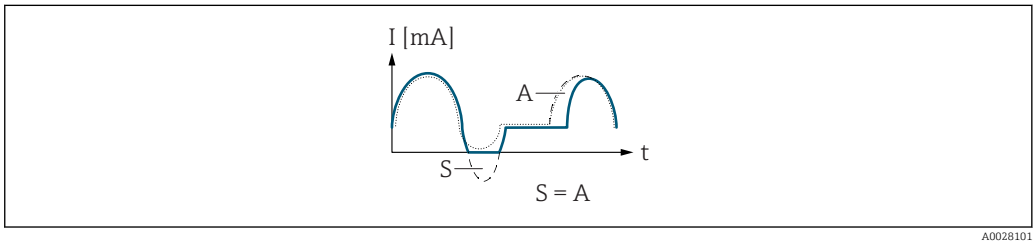
I *Current*
t *Time*

With **Forward/Reverse** option

This option is not possible in this case as the values for the **0/4 mA value** parameter (→ 67) and **20 mA value** parameter (→ 68) 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*

Damping out. 1

Navigation Expert → Output → Curr.output 1 → Damping out. 1 (0363–1)

Prerequisite

One of the following options is selected in the **Assign curr.** parameter (→ 65):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

One of the following options is selected in the **Current span** parameter (→ 65):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

* Visibility depends on order options or device settings

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 *Entry*

Use this function to enter a time constant (PT1 element [3]) for current output damping:
- If a low time constant is entered, the current output reacts 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 Expert → Output → Curr.output 1 → Response time (0378–1)

Prerequisite One of the following options is selected in the **Assign curr.** parameter (→ 65):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

One of the following options is selected in the **Current span** parameter (→ 65):
- 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 → 73
  and
- Depending on the measured variable assigned to the output.
  Flow damping

3) proportional transmission behavior with first order delay
* Visibility depends on order options or device settings

Failure mode

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

Prerequisite One of the following options is selected in the **Assign curr.** parameter (→ 65):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

One of the following options is selected in the **Current span** parameter (→ 65):
- 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.

* Visibility depends on order options or device settings

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 (→ 65).

"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 (→ 65).

"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 (→ 76).

Failure current

Navigation Expert → Output → Curr.output 1 → Failure current (0352–1)

Prerequisite The **Defined value** option is selected in the **Failure mode** parameter (→ 75).

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

Navigation Expert → Output → Curr.output 1 → Output curr. 1 (0361–1)

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

User interface 0 to 22.5 mA

Measur. curr. 1

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

Description Use this function to display the actual measured value of the output current.

User interface 0 to 30 mA

Trim

Navigation Expert → Output → Curr.output 1 → Trim (0362–1)

Description Use this function to select the calibration mode for process-specific recalibration.

Selection
- Off
- 4 mA
- 20 mA
- Calculate
- Reset

Factory setting Off

Additional information *Description*

For a detailed description of current output trimming, see

Trim value high

Navigation Expert → Output → Curr.output 1 → Trim value high (0356–1)

Prerequisite If the sensor output adjustment is 20 mA.

Description Use this function to enter the upper value for the trim (approx. 20 mA).

User entry 18 to 22 mA

Factory setting 20 mA

Additional information *Description*

For a detailed description of current output trimming, see

Trim value low

Navigation Expert → Output → Curr.output 1 → Trim value low (0357–1)

Prerequisite If the sensor output adjustment is 4 mA.

Description Use this function to enter the lower value for the trim (approx. 4 mA).

User entry 3 to 5 mA

Factory setting 4 mA

Additional information *Description*

For a detailed description of current output trimming, see

Status

Navigation Expert → Output → Curr.output 1 → Status (0360–1)

Description Displays the status of the last output current (OutValue).

User interface 0 to 255

Factory setting 0

Additional information *Description*

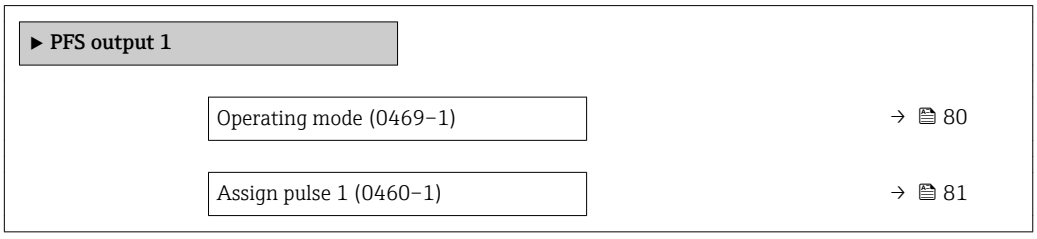
A combination of bits in one byte: **76543210**
- The first two bits **7** and **6** describe the overall status.
- The middle bits **5 to 2** describe a substatus which, in turn, depends on the overall status.
- The last two bits **1** and **0** describe whether a limit has been reached.

User interface

For detailed information on interpreting display values, see the "Status of output current" section

3.3.2 "PFS output" submenu

Navigation Expert → Output → PFS output



Value per pulse (0455–1)	→ 82
Pulse width (0452–1)	→ 82
Measuring mode (0457–1)	→ 83
Failure mode (0480–1)	→ 84
Pulse output 1 (0456–1)	→ 84
Assign freq. (0478–1)	→ 85
Min. freq. value (0453–1)	→ 85
Max. freq. value (0454–1)	→ 86
Val. at min.freq (0476–1)	→ 86
Val. at max.freq (0475–1)	→ 87
Measuring mode (0479–1)	→ 88
Damping out. 1 (0477–1)	→ 88
Response time (0491–1)	→ 89
Failure mode (0451–1)	→ 90
Failure freq. (0474–1)	→ 90
Output freq. 1 (0471–1)	→ 91
Switch out funct (0481–1)	→ 91
Assign diag. beh (0482–1)	→ 92
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Switch-on value (0466–1)	→ 94
Switch-off value (0464–1)	→ 95
Assign dir.check (0484–1)	→ 95
Assign status (0485–1)	→ 96
Switch-on delay (0467–1)	→ 96
Switch-off delay (0465–1)	→ 96

Failure mode (0486–1)	→ 97
Switch status 1 (0461–1)	→ 97
Invert outp.sig. (0470–1)	→ 97

Operating mode

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

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

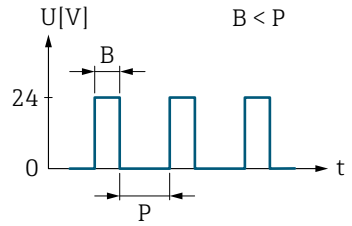
Selection
- Pulse
- Frequency
- Switch

Factory setting Pulse

Additional information *"Pulse" option*

Quantity-dependent pulse with configurable pulse width
- Whenever a specific volume or mass 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



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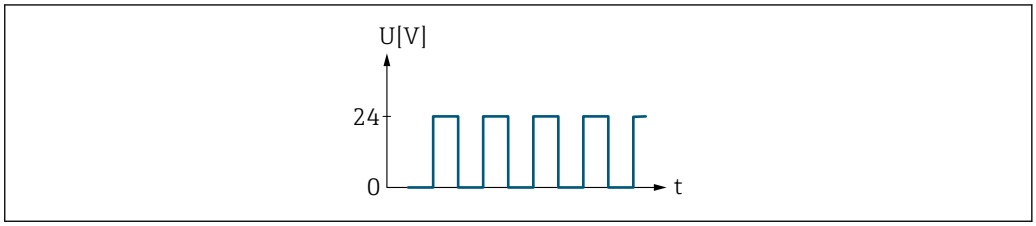
6 Quantity-proportional pulse (pulse value) with pulse width to be configured

B Pulse width entered
P Pauses between the individual pulses

"Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio
An output frequency is output that is proportional to the value of a process variable, such as volume flow, mass flow, temperature, sound velocity, flow velocity, acceptance rate, signal asymmetry, turbulence, signal strength or signal-to-noise ratio.

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

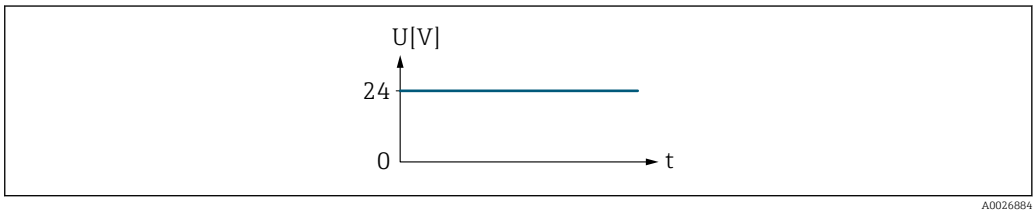


7 *Flow-proportional frequency output*

"Switch" option

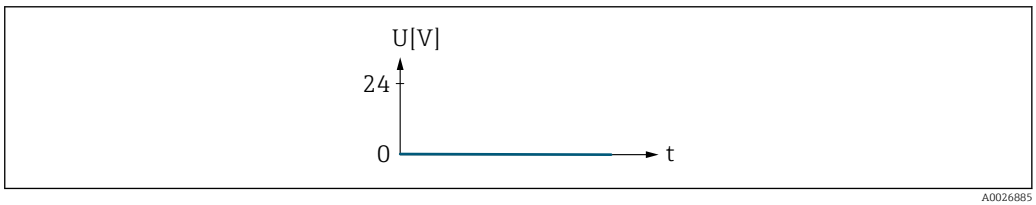
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



8 *No alarm, high level*

Example
Alarm response in case of alarm



9 *Alarm, low level*

Assign pulse 1

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 80) parameter.

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

Selection
- Off
- Volume flow
- Mass flow

Factory setting Off

Value per pulse

Navigation Expert → Output → PFS output 1 → Value per pulse (0455–1)

Prerequisite In the **Operating mode** parameter (→ 80), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 81):
- Volume flow
- Mass flow

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter→ 156

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 → Pulse width (0452–1)

Prerequisite In the **Operating mode** parameter (→ 80), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 81):
- Volume flow
- Mass flow

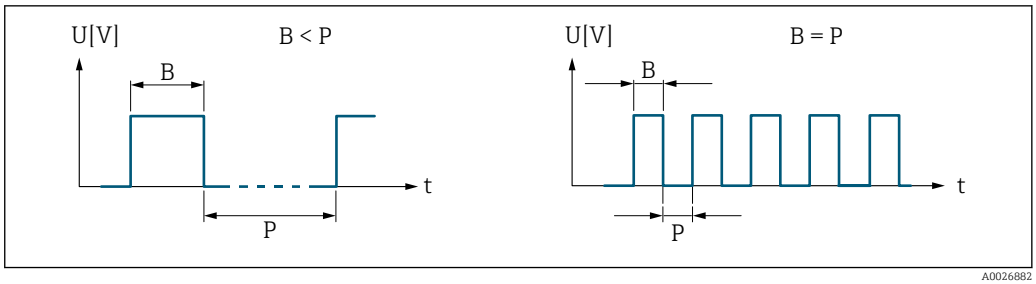
Description Use this function to enter the duration of the output pulse.

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 × 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} × pulse value.
- If the flow exceeds these limit values, the measuring device displays the diagnostic message ⚠**S443 Pulse output 1**.



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 × 0.1 ms) = 5 kHz
- Q_{max}: 5 kHz × 0.1 g = 0.5 kg/s

Measuring mode

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 81):
- Volume flow
- Mass 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 (→ 69)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 69)

Failure mode

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 81):
- Volume flow
- Mass flow

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

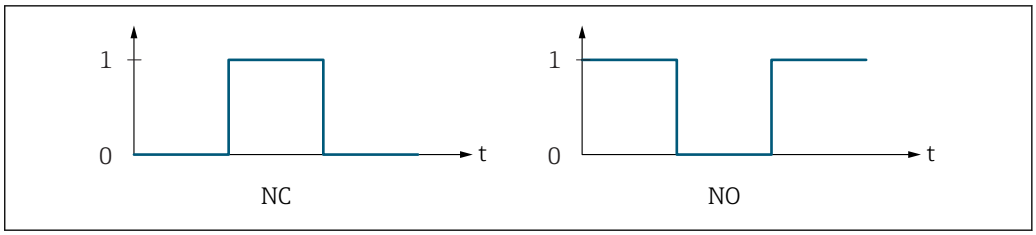
Navigation Expert → Output → PFS output 1 → Pulse output 1 (0456–1)

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 80) 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.
- The **Value per pulse** parameter (→ 82) and **Pulse width** parameter (→ 82) can be used to define the value (i.e. the measured value amount that corresponds to a pulse) and the duration of the pulse.



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 (→ 🖹 97) 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 (→ 🖹 84)) can be configured.

Assign freq.

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 🖹 80) parameter.

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

Selection
- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature
- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

Factory setting Off

Min. freq. value

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

Prerequisite In the **Operating mode** parameter (→ 🖹 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 🖹 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature

- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

Description Use this function to enter the start value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

Max. freq. value

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature
- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

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 → Val. at min.freq (0476–1)

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature
- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

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 (→ 85).

Val. at max.freq

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature
- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

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 (→ 85).

Measuring mode

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

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 (→ 69)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 69)

Damping out. 1

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

* Visibility depends on order options or device settings

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

User entry 0 to 999.9 s

Factory setting 0.0 s

Additional information *User entry*

Use this function to enter a time constant (PT1 element [4]) for frequency output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

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

Response time

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal strength *
- SNR *
- Turbulence *
- Signal asymmetry *

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

User interface Positive floating-point number

Additional information *Description*

The response time is made up of the time specified for the following dampings:
- Damping of pulse/frequency/switch output → 73
  and
- Depending on the measured variable assigned to the output.
  – Flow damping
    or
  – Temperature damping

4) proportional transmission behavior with first order delay
* Visibility depends on order options or device settings

Failure mode

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature
- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

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

Selection
- Actual value
- Defined value
- 0 Hz

Factory setting 0 Hz

Additional information *Selection*
- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure freq. (→ 90) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure freq.

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 85):
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity

- Temperature
- Acceptance rate
- Signal strength
- SNR
- Turbulence
- Signal asymmetry

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

User entry 0.0 to 12 500.0 Hz

Factory setting 0.0 Hz

Output freq. 1

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

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Switch out funct

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 80).

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.
- 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 → Assign diag. beh (0482–1)

Prerequisite
- In the **Operating mode** parameter (→ 80), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 91), 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 → Assign limit (0483–1)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 80) parameter.
- The **Limit** option is selected in the **Switch out funct** parameter (→ 91) parameter.

Description

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

Selection

- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature
- Signal strength
- SNR
- Turbulence
- Signal asymmetry
- Acceptance rate
- Totalizer 1
- Totalizer 2
- Totalizer 3

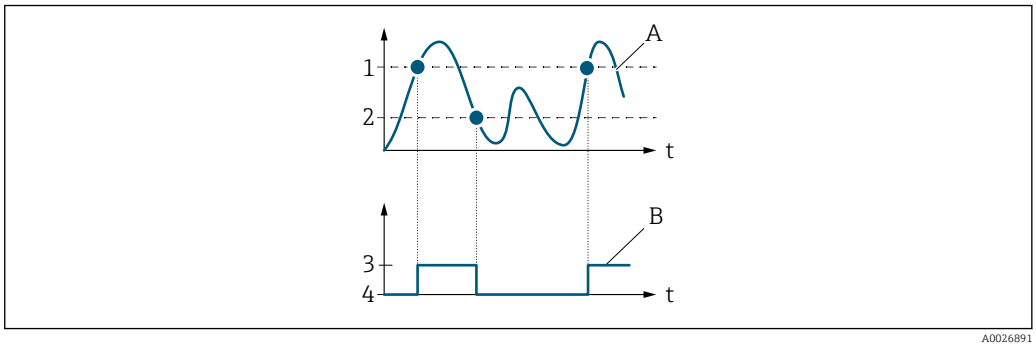
Factory setting

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



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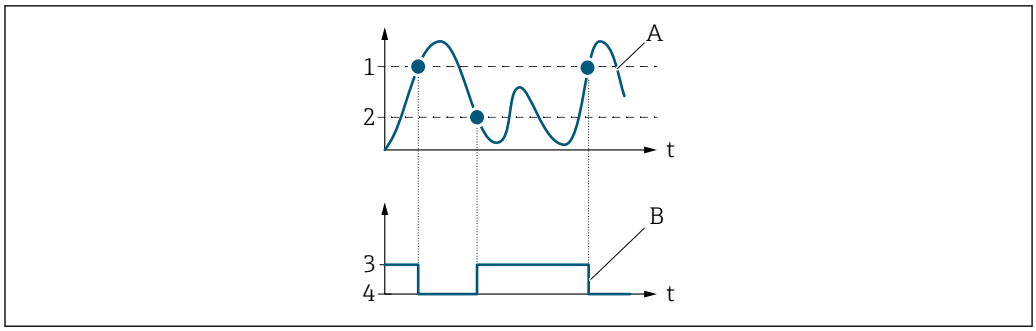
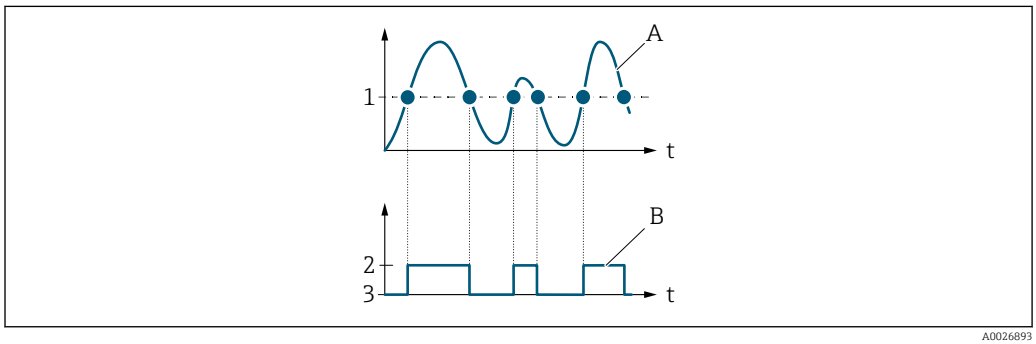
1 Switch-on value
2 Switch-off value
3 Conductive
4 Non-conductive
A Process variable
B Status output

Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-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 → Switch-on value (0466–1)

Prerequisite
- In the **Operating mode** parameter (→ 80), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 91), the **Limit** option is selected.

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 m^3/h
- 0 ft^3/h

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 92).

Switch-off value

Navigation Expert → Output → PFS output 1 → Switch-off value (0464–1)

Prerequisite

- In the **Operating mode** parameter (→ 80), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 91), 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 m^3/h
- 0 ft^3/h

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 92).

Assign dir.check

Navigation Expert → Output → PFS output 1 → Assign dir.check (0484–1)

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 80).
- The **Fl. direct.check** option is selected in the **Switch out funct** parameter (→ 91).

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

Selection

- Off
- Volume flow
- Mass flow
- Flow velocity

Factory setting Volume flow

Assign status

Navigation Expert → Output → PFS output 1 → Assign status (0485–1)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 80).
- The **Status** option is selected in the **Switch out funct** parameter (→ 91).

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

Selection
- Off
- Low flow cut off

Factory setting Low flow cut off

Additional information *Options*

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

Switch-on delay

Navigation Expert → Output → PFS output 1 → Switch-on delay (0467–1)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 80).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 91).

Description Use this function to enter a delay time for switching on the switch output.

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay

Navigation Expert → Output → PFS output 1 → Switch-off delay (0465–1)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 80).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 91).

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 → Failure mode (0486–1)

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

Navigation Expert → Output → PFS output 1 → Switch status 1 (0461–1)

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 80).

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 → Invert outp.sig. (0470–1)

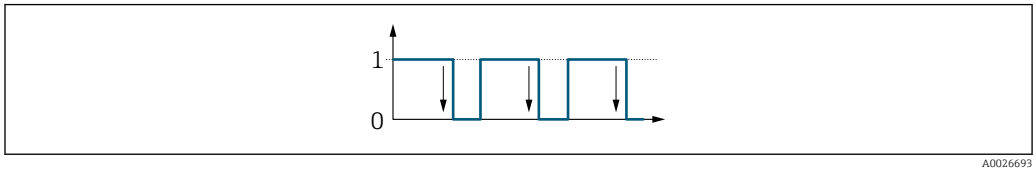
Description Use this function to select whether to invert the output signal.

Selection
- No
- Yes

Factory setting No

Additional information *Selection*

No option (passive - negative)



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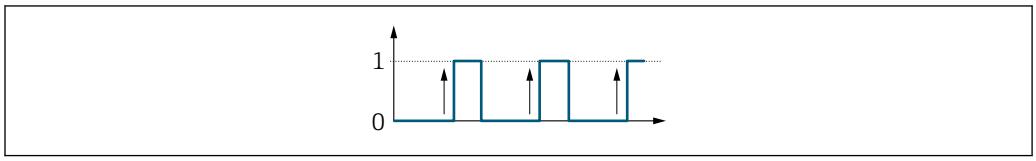
Yes option (passive - positive)



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3.4 "Communication" submenu

Navigation Expert → Communication

▶ Communication	
▶ HART output	→ 98
▶ Web server	→ 115
▶ Diag. config.	→ 118

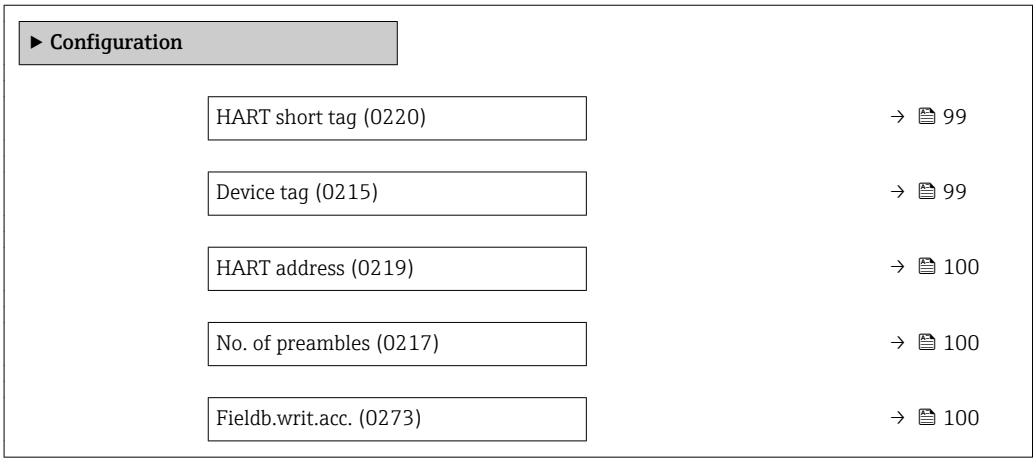
3.4.1 "HART output" submenu

Navigation Expert → Communication → HART output

▶ HART output	
▶ Configuration	→ 99
▶ Burst config.	→ 101
▶ Information	→ 107
▶ Output	→ 111

"Configuration" submenu

Navigation Expert → Communication → HART output → Configuration



HART short tag

Navigation Expert → Communication → HART output → Configuration → HART short tag (0220)

Description Use this function to enter a brief description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

User entry Max. 8 characters: A to Z, 0 to 9 and certain special characters (e.g. punctuation marks, @, %).

Factory setting PROSONIC

Device tag

Navigation Expert → Communication → HART output → Configuration → Device tag (0215)

Description Use this function to enter the name for the measuring point.

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

Factory setting Prosonic Flow E 100

HART address

Navigation Expert → Communication → HART output → Configuration → HART address (0219)

Description Use this function to enter the address via which the data exchange takes place via HART protocol.

User entry 0 to 63

Factory setting 0

Additional information *Description*

For addressing in a HART Multidrop network, the **Fixed current** option must be set in the **Current span** parameter (→ 65) (current output 1).

No. of preambles

Navigation Expert → Communication → HART output → Configuration → No. of preambles (0217)

Description Use this function to enter the number of preambles in the HART protocol.

User entry 2 to 20

Factory setting 5

Additional information *User entry*

As every modem component can "swallow" a byte, 2-byte preambles at least must be defined.

Fieldb.writ.acc.

Navigation Expert → Communication → HART output → Configuration → Fieldb.writ.acc. (0273)

Description Use this function to restrict access to the measuring device via fieldbus (HART interface).

Selection
- Read + write
- Read only

Factory setting Read + write

Additional information

Description

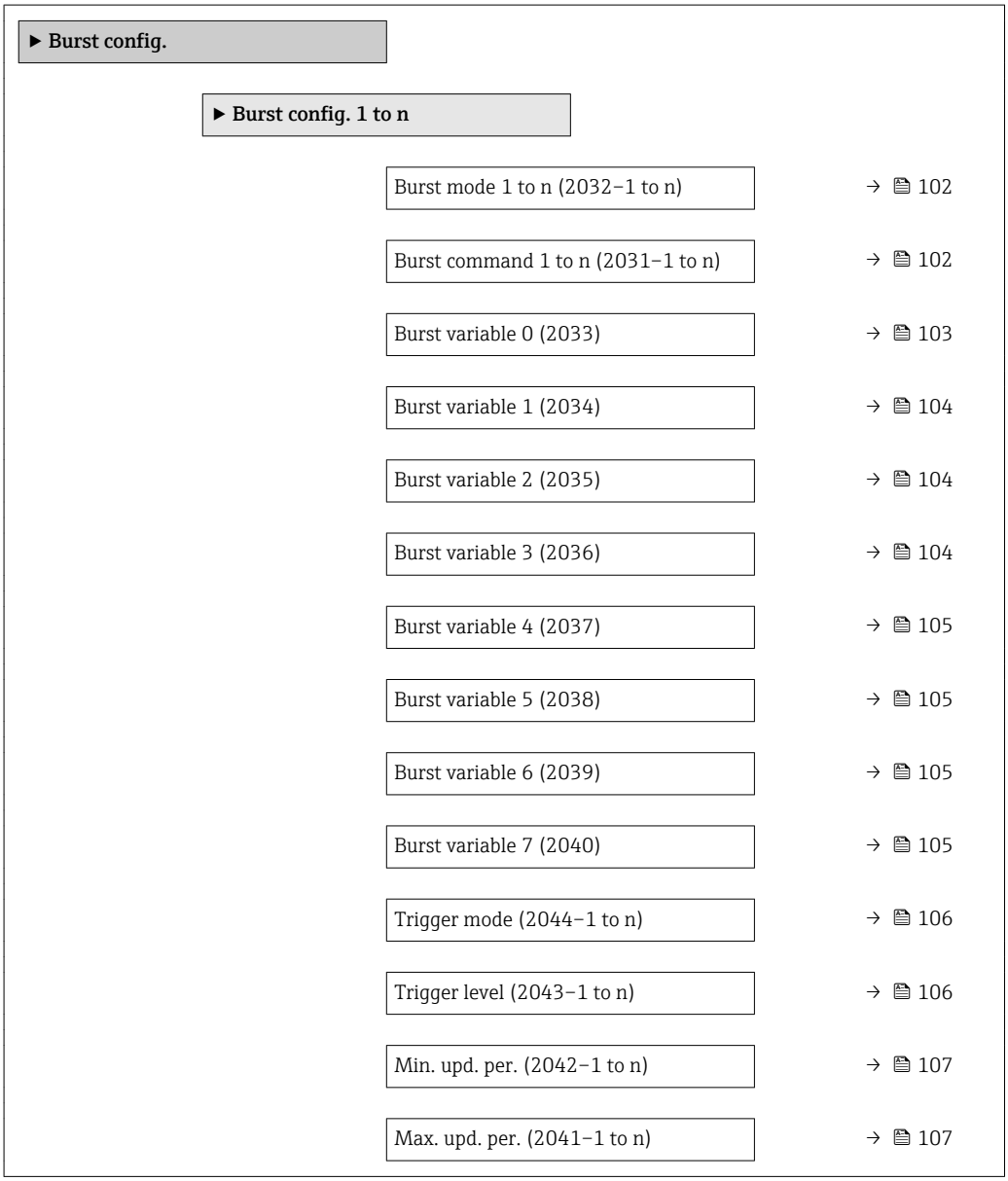
If read and/or write protection is enabled, the parameter can only be controlled and reset via local operation. Access is no longer possible via operating tools.

Selection

- Read + write
  The parameters are readable and writable.
- Read only
  The parameters are only readable.

"Burst configuration 1 to n" submenu

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n



Burst mode 1 to n

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst mode 1 to n (2032–1 to n)

Description Use this function to select whether to activate the HART burst mode for burst message X.

Selection
- Off
- On

Factory setting Off

Additional information *Options*
- Off
  The measuring device transmits data only when requested by the HART master.
- On
  The measuring device transmits data regularly without being requested.

Burst command 1 to n

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst command 1 to n (2031–1 to n)

Description Use this function to select the HART command that is sent to the HART master.

Selection
- Command 1
- Command 2
- Command 3
- Command 9
- Command 33
- Command 48

Factory setting Command 2

Additional information *Selection*
- Command 1
  Read out the primary variable.
- Command 2
  Read out the current and the main measured value as a percentage.
- Command 3
  Read out the dynamic HART variables and the current.
- Command 9
  Read out the dynamic HART variables including the related status.
- Command 33
  Read out the dynamic HART variables including the related unit.
- Command 48
  Read out the complete device diagnostics.

"Command 33" option

The HART device variables are defined via Command 107.

The following measured variables (HART device variables) can be read out:
- Volume flow
- Mass flow
- Temperature
- Totalizer 1…3
- Sound velocity
- Flow velocity
- Signal asymmetry *
- Acceptance rate *
- Turbulence *
- Signal strength *
- SNR *
- Percent of range
- Measur. curr.
- Primary var (PV)
- Second.var(SV)
- Tertiary var(TV)
- Quaterna.var(QV)

Commands

- Information about the defined details of the command: HART specifications
- The measured variables (HART device variables) are assigned to the dynamic variables in the **Output** submenu (→ 64).

Burst variable 0

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 0 (2033)

Description For HART command 9 and 33: select the HART device variable or the process variable.

Selection
- Volume flow
- Mass flow
- Flow velocity
- Temperature
- Sound velocity
- Signal asymmetry *
- Acceptance rate *
- Turbulence *
- Signal strength *
- SNR *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Percent of range
- Measur. curr.
- Primary var (PV)
- Second.var(SV)
- Tertiary var(TV)
- Quaterna.var(QV)
- Not used

* Visibility depends on order options or device settings

Factory setting Volume flow

Additional information *Selection*

The **Not used** option is set if a burst message is not configured.

Burst variable 1

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 1 (2034)

Description For HART command 9 and 33: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Burst variable 2

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 2 (2035)

Description For HART command 9 and 33: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Burst variable 3

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 3 (2036)

Description For HART command 9 and 33: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Burst variable 4

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 4 (2037)

Description For HART command 9: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Burst variable 5

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 5 (2038)

Description For HART command 9: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Burst variable 6

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 6 (2039)

Description For HART command 9: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Burst variable 7

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Burst variable 7 (2040)

Description For HART command 9: select the HART device variable or the process variable.

Selection See the **Burst variable 0** parameter (→ 103).

Factory setting Not used

Trigger mode

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Trigger mode (2044–1 to n)

Description Use this function to select the event that triggers burst message X.

Selection
- Continuous
- Window
- Rising
- Falling
- On change

Factory setting Continuous

Additional information *Options*
- Continuous
  The message is sent continuously, at least at intervals corresponding to the time frame specified in the **Burst min per** parameter (→ 107).
- Window
  The message is sent if the specified measured value has changed by the value in the **Trigger level** parameter (→ 106).
- Rising
  The message is sent if the specified measured value exceeds the value in the **Trigger level** parameter (→ 106).
- Falling
  The message is sent if the specified measured value drops below the value in the **Trigger level** parameter (→ 106).
- On change
  The message is sent if a measured value changes in the burst message.

Trigger level

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Trigger level (2043–1 to n)

Description For entering the burst trigger value.

User entry Signed floating-point number

Additional information *Description*

Together with the option selected in the **Trigger mode** parameter (→ 106) the burst trigger value determines the time of burst message X.

Min. upd. per.

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Min. upd. per. (2042–1 to n)

Description Use this function to enter the minimum time span between two burst commands of burst message X.

User entry Positive integer

Factory setting 1 000 ms

Max. upd. per.

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Max. upd. per. (2041–1 to n)

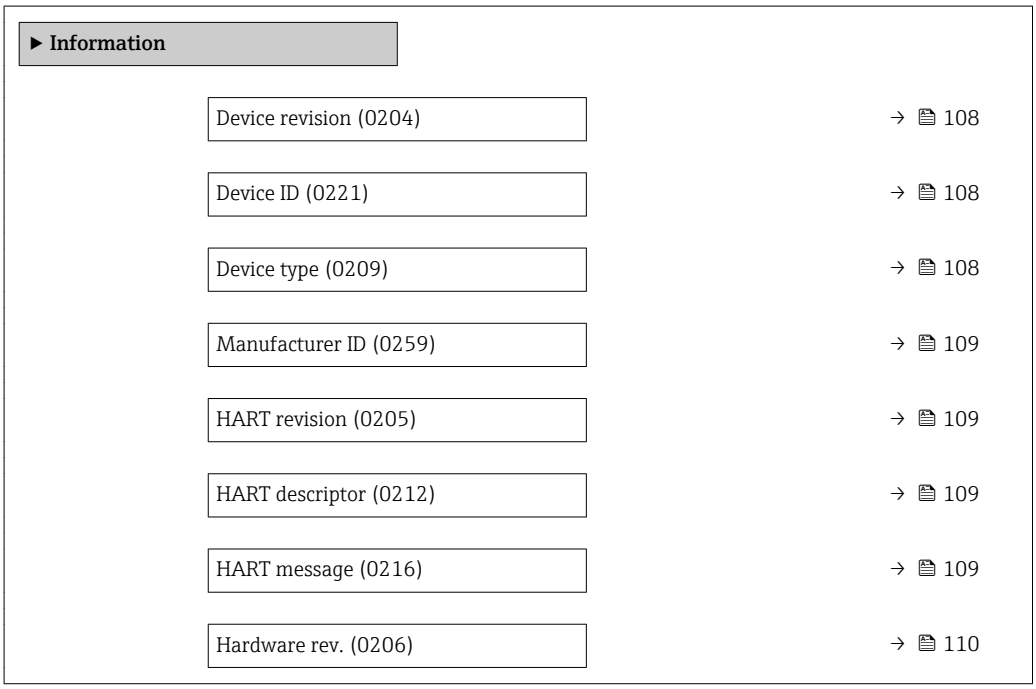
Description Use this function to enter the maximum time span between two burst commands of burst message X.

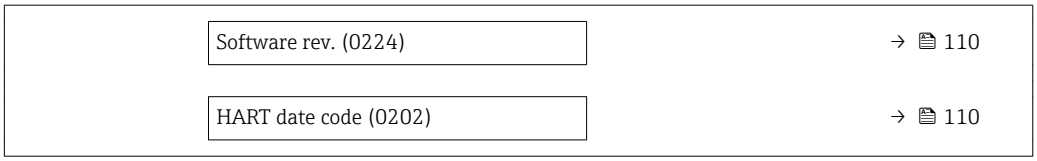
User entry Positive integer

Factory setting 2 000 ms

"Information" submenu

Navigation Expert → Communication → HART output → Information





Device revision

Navigation Expert → Communication → HART output → Information → Device revision (0204)

Description Displays the device revision with which the device is registered with the HART Communication Foundation.

User interface 2-digit hexadecimal number

Factory setting 0x01

Additional information *Description*

The device revision is needed to assign the appropriate device description file (DD) to the device.

Device ID

Navigation Expert → Communication → HART output → Information → Device ID (0221)

Description Use this function to view the device ID for identifying the measuring device in a HART network.

User interface 6-digit hexadecimal number

Additional information *Description*

In addition to the device type and manufacturer ID, the device ID is part of the unique ID. Each HART device is uniquely identified by the unique device ID.

Device type

Navigation Expert → Communication → HART output → Information → Device type (0209)

Description Displays the device type with which the measuring device is registered with the HART Communication Foundation.

User interface 2-digit hexadecimal number

Factory setting 0x5c (for Prosonic Flow E 100)

Additional information *Description*

The device type is specified by the manufacturer. It is needed to assign the appropriate device description file (DD) to the device.

Manufacturer ID

Navigation Expert → Communication → HART output → Information → Manufacturer ID (0259)

Description Use this function to view the manufacturer ID with which the measuring device is registered with the HART Communication Foundation.

User interface 2-digit hexadecimal number

Factory setting 0x11 (for Endress+Hauser)

HART revision

Navigation Expert → Communication → HART output → Information → HART revision (0205)

Description Use this function to display the HART protocol revision of the measuring device.

User interface 5 to 7

Factory setting 7

HART descriptor

Navigation Expert → Communication → HART output → Information → HART descriptor (0212)

Description Use this function to enter a description for the measuring point. This can be edited and displayed via HART protocol or using the local display.

User entry Max. 16 characters such as letters, numbers or special characters (e.g. @, %, /)

Factory setting Pros.Flow E 100

HART message

Navigation Expert → Communication → HART output → Information → HART message (0216)

Description Use this function to enter a HART message which is sent via the HART protocol when requested by the master.

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

Factory setting Pros.Flow E 100

Hardware rev.

Navigation Expert → Communication → HART output → Information → Hardware rev. (0206)

Description Displays the hardware revision of the measuring device.

User interface 0 to 30

Factory setting 1

Software rev.

Navigation Expert → Communication → HART output → Information → Software rev. (0224)

Description Displays the software revision of the measuring device.

User interface 0 to 255

Factory setting 1

HART date code

Navigation Expert → Communication → HART output → Information → HART date code (0202)

Description Use this function to enter the date information for individual use.

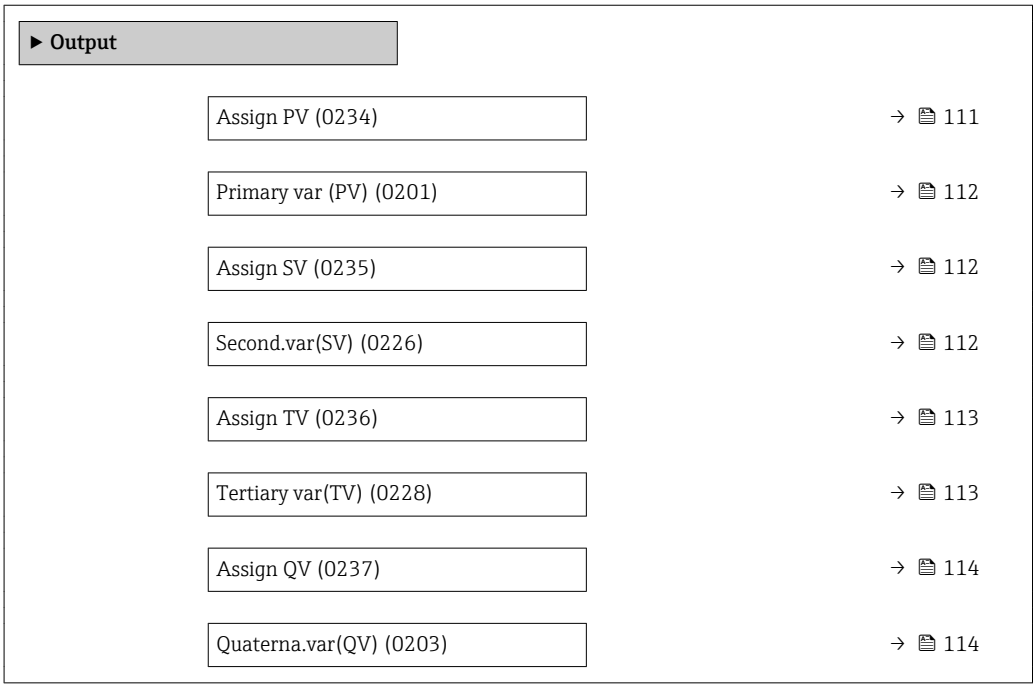
User entry Date entry format: yyyy-mm-dd

Factory setting 2009-07-20

Additional information *Example*
Device installation date

"Output" submenu

Navigation Expert → Communication → HART output → Output



Assign PV

Navigation Expert → Communication → HART output → Output → Assign PV (0234)

Description Use this function to select a measured variable (HART device variable) for the primary dynamic variable (PV).

Selection
- Off
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *
- Acceptance rate *
- Signal asymmetry *
- Turbulence *
- Signal strength *
- SNR *

Factory setting Volume flow

* Visibility depends on order options or device settings

Primary var (PV)

Navigation Expert → Communication → HART output → Output → Primary var (PV) (0201)

Description Displays the current measured value of the primary dynamic variable (PV).

User interface Signed floating-point number

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign PV** parameter (→ 111).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

Assign SV

Navigation Expert → Communication → HART output → Output → Assign SV (0235)

Description Use this function to select a measured variable (HART device variable) for the secondary dynamic variable (SV).

Selection

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Acceptance rate *
- Signal asymmetry *
- Turbulence *
- Signal strength *
- SNR *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Totalizer 1

Second.var(SV)

Navigation Expert → Communication → HART output → Output → Second.var(SV) (0226)

Description Displays the current measured value of the secondary dynamic variable (SV).

User interface Signed floating-point number

* Visibility depends on order options or device settings

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign SV** parameter (→ 112).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

Assign TV

Navigation Expert → Communication → HART output → Output → Assign TV (0236)

Description Use this function to select a measured variable (HART device variable) for the tertiary (third) dynamic variable (TV).

Selection

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Acceptance rate *
- Signal asymmetry *
- Turbulence *
- Signal strength *
- SNR *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Totalizer 2

Tertiary var(TV)

Navigation Expert → Communication → HART output → Output → Tertiary var(TV) (0228)

Description Displays the current measured value of the tertiary dynamic variable (TV).

User interface Signed floating-point number

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign TV** parameter (→ 113).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

* Visibility depends on order options or device settings

Assign QV

Navigation Expert → Communication → HART output → Output → Assign QV (0237)

Description Use this function to select a measured variable (HART device variable) for the quaternary (fourth) dynamic variable (QV).

Selection
- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Temperature *
- Acceptance rate *
- Signal asymmetry *
- Turbulence *
- Signal strength *
- SNR *
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Totalizer 3

Quaterna.var(QV)

Navigation Expert → Communication → HART output → Output → Quaterna.var(QV) (0203)

Description Displays the current measured value of the quaternary dynamic variable (QV).

User interface Signed floating-point number

Additional information

User interface

The measured value displayed depends on the process variable selected in the **Assign QV** parameter (→ 114).

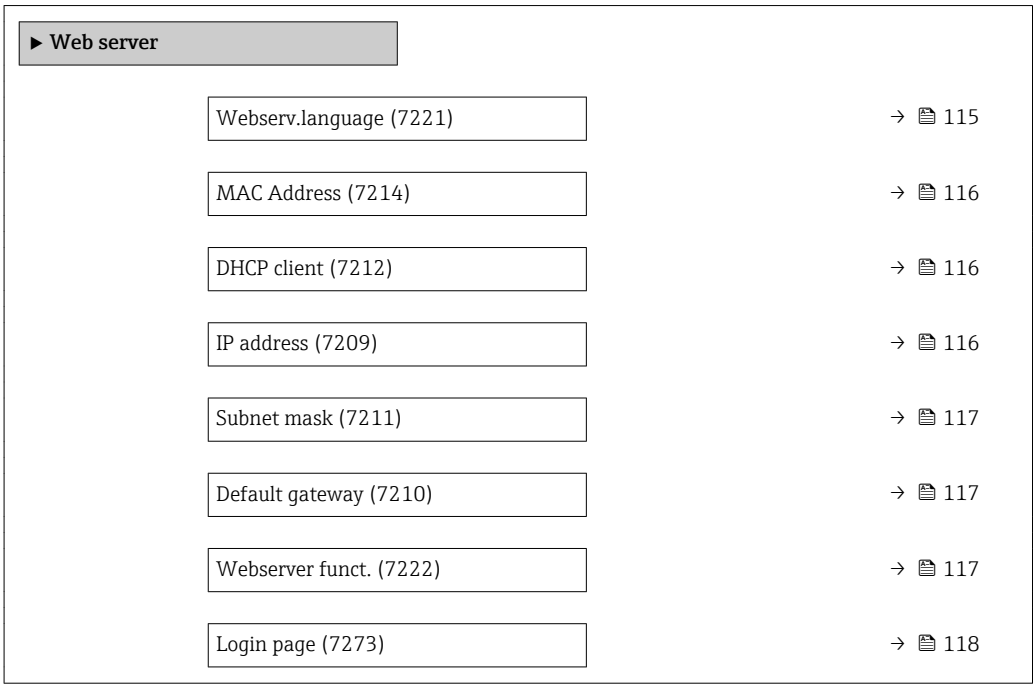
Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

* Visibility depends on order options or device settings

3.4.2 "Web server" submenu

Navigation Expert → Communication → Web server



Webserv.language

Navigation Expert → Communication → Web server → Webserv.language (7221)

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

Selection
- English
- Deutsch *
- Français *
- Español *
- Italiano *
- Nederlands *
- Portuguesa *
- Polski *
- русский язык(Ru) *
- Svenska *
- Türkçe *
- 中文 (Chinese) *
- 日本語 (Japanese) *
- 한국어 (Korean) *
- العَرَبيّة(Ara) *
- Bahasa Indonesia *
- ภาษาไทย (Thai) *
- tiếng Việt (Vit) *
- čeština (Czech) *

* Visibility depends on order options or device settings

Factory setting English

MAC Address

Navigation Expert → Communication → Web server → MAC Address (7214)

Description Displays the MAC [5] address of the measuring device.

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

Factory setting Each measuring device is given an individual address.

Additional information *Example*

For the display format
00:07:05:10:01:5F

DHCP client

Navigation Expert → Communication → Web server → DHCP client (7212)

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

Selection
- Off
- On

Factory setting Off

Additional information *Result*

If the DHCP client functionality of the Web server is activated, the IP address (→ 116), Subnet mask (→ 117) and Default gateway (→ 117) are set automatically.

Identification is via the MAC address of the measuring device.

IP address

Navigation Expert → Communication → Web server → IP address (7209)

Description Displays the IP address of the device's web server.

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

Factory setting 192.168.1.212

5) Media Access Control

Subnet mask

Navigation Expert → Communication → Web server → Subnet mask (7211)

Description Displays the subnet mask.

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

Factory setting 255.255.255.0

Default gateway

Navigation Expert → Communication → Web server → Default gateway (7210)

Description Displays the default gateway.

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

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 the local display or the operating tool FieldCare.

Options

Option	Description
Off	▪ The web server is completely disabled. ▪ Port 80 is locked.
HTML Off	The HTML version of the web server is not available.
On	▪ The complete functionality of the web server is available. ▪ JavaScript is used. ▪ The password is transferred in an encrypted state. ▪ Any change to the password is also transferred in an encrypted state.

Login page	

Navigation Expert → Communication → 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

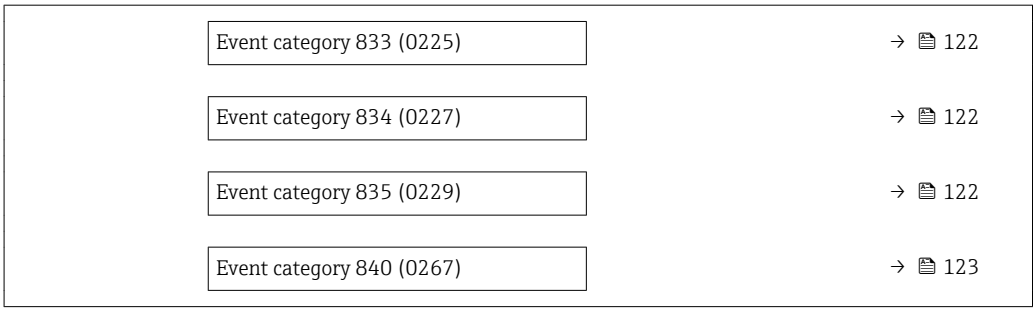
3.4.3 "Diag. config." submenu

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

Assign a category to the particular diagnostic event:
- **Failure (F)** option
  A device error has occurred. The measured value is no longer valid.
- **Funct. check (C)** option
  The device is in service mode (e.g. during a simulation).
- **Out of spec. (S)** option
  The device is being operated:
  – Outside its technical specification limits (e.g. outside the process temperature range)
  – Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)
- **Mainten. req.(M)** option
  Maintenance is required. The measured value is still valid.
- **No effect (N)** option
  Has no effect on the condensed status.

Navigation Expert → Communication → Diag. config.

▶ Diag. config.	
Event category 124 (0270)	→ 119
Event category 125 (0271)	→ 119
Event category 160 (0272)	→ 120
Event category 441 (0210)	→ 120
Event category 442 (0230)	→ 120
Event category 443 (0231)	→ 121
Event category 832 (0218)	→ 121



Event category 124 (Rel.sig.strength)

Navigation Expert → Communication → Diag. config. → Event category 124 (0270)

Description Use this function to select a category for the diagnostic message **124 Rel.sig.strength**.

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:

Event category 125 (Rel. sound vel.)

Navigation Expert → Communication → Diag. config. → Event category 125 (0271)

Description Use this function to select a category for the diagnostic message **125 Rel. sound vel.**.

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:

Event category 160 (Signal path off)

Navigation Expert → Communication → Diag. config. → Event category 160 (0272)

Description Use this function to select a category for the diagnostic message **160 Signal path off**.

Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Mainten. req.(M)

Additional information For a detailed description of the event categories available for selection:

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 *Selection*

For a detailed description of the event categories available for selection:

Event category 442 (Freq. output)

Navigation Expert → Communication → Diag. config. → Event category 442 (0230)

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select the category assigned to diagnostic message **442 Freq. output**.

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:

Event category 443 (Pulse output)

Navigation Expert → Communication → Diag. config. → Event category 443 (0231)

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select the category assigned to diagnostic message **443 Pulse output**.

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:

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:

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:

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:

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:

Event category 841 (Sensor range)

Navigation Expert → Communication → Diag. config. → Event category 840 (0267)

Description Use this function to select a category for the diagnostic message **841 Sensor range**.

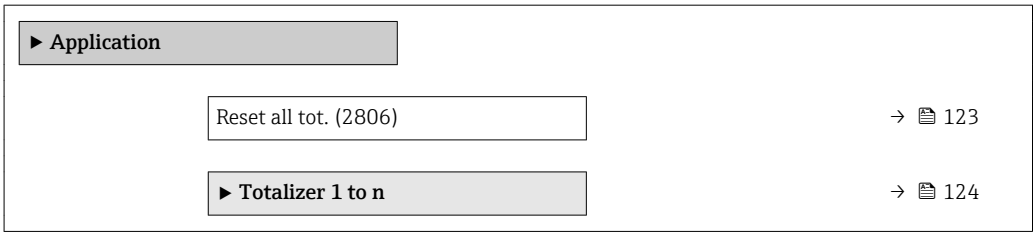
Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection:

3.5 "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

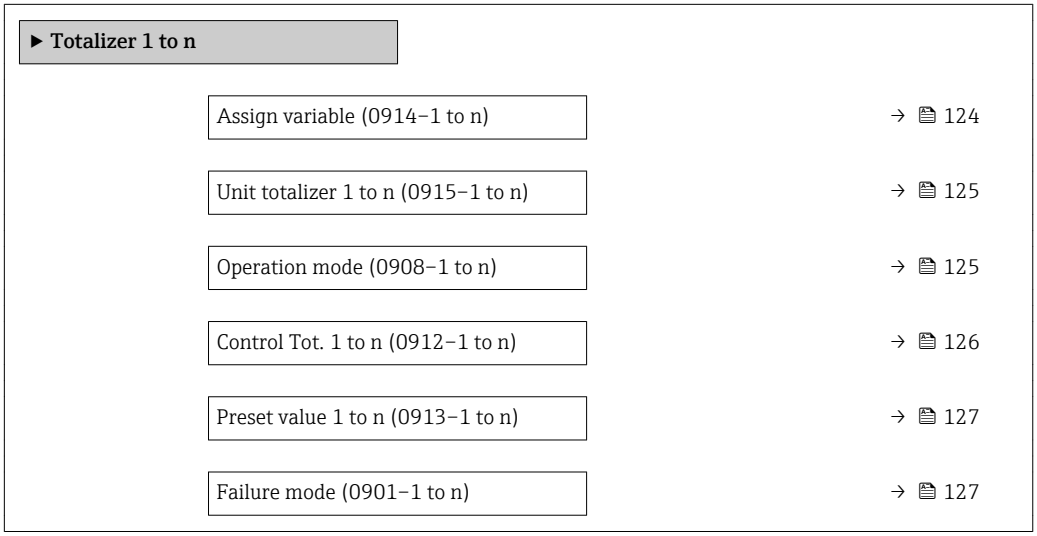
Factory setting Cancel

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 totalized.

3.5.1 "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

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 (→ 124) 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 One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

Description Use this function to select the process variable unit for the Totalizer 1 to n (→ 124).

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

or

SI units
- cm^3
- dm^3
- m^3
- ml
- l
- hl
- Ml Mega

US units
- af
- ft^3
- 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)

Factory setting Country-specific:
- m^3
- ft^3

Additional information

Description

The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 47).

Selection

The selection is dependent on the process variable selected in the **Assign variable** parameter (→ 124).

Operation mode

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

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 One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

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 **Preset value** 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 **Preset value** parameter and the totaling process is restarted.

Preset value 1 to n

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

Prerequisite One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 m^3
- 0 ft^3

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 125).

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 One of the following options is selected in the **Assign variable** parameter (→ 124) of the **Totalizer 1 to n** submenu:
- Volume flow
- Mass flow

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

Selection
- Stop
- Actual value
- Last valid value

Factory setting Stop

Additional information

Description

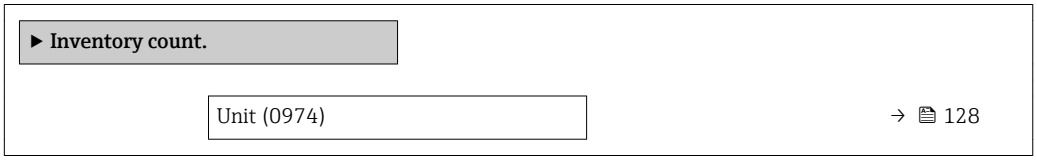
This setting does not affect the failsafe mode of other totalizers and the outputs. This is specified in separate parameters.

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.

3.5.2 "Inventory count." submenu

Navigation Expert → Application → Inventory count.



Unit

Navigation Expert → Application → Inventory count. → Unit (0974)

Description Displays the unit of the inventory counter.

User interface

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

or

SI units
- cm^3
- dm^3
- m^3
- ml
- l
- hl
- Ml Mega

US units
- af
- ft^3
- fl oz (us)
- gal (us)
- kgal (us)
- Mgal (us)
- bbl (us;liq.)
- bbl (us;beer)
- bbl (us;oil)
- bbl (us;tank)

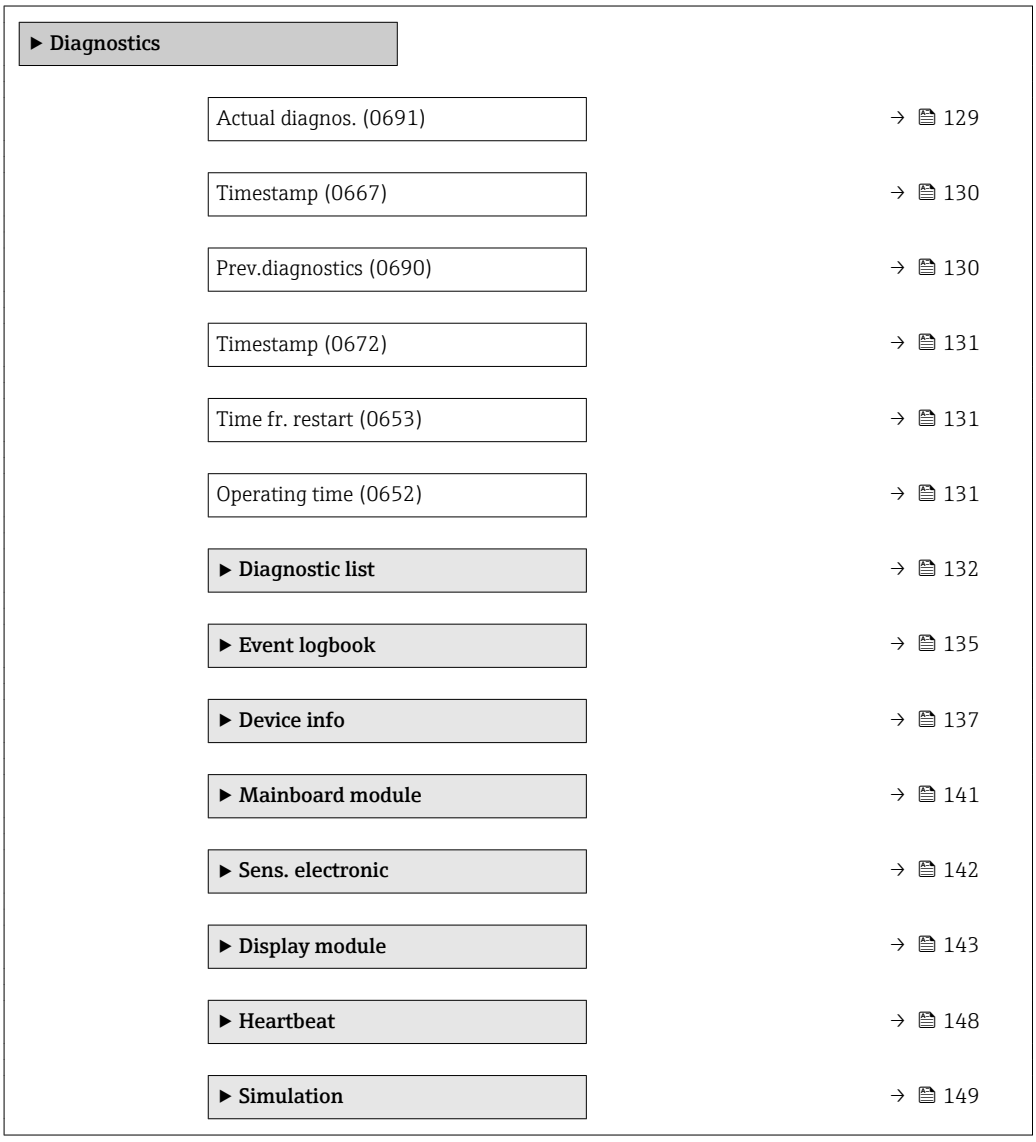
Imperial units
- gal (imp)
- Mgal (imp)
- bbl (imp;beer)
- bbl (imp;oil)

Additional information *Description*

The parameter cannot be configured or reset.

3.6 "Diagnostics" submenu

Navigation Expert → Diagnostics



Actual diagnos.

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

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

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

Additional information *Display*

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 132).

Example

For the display format:
⊗F271 Main electronics

Timestamp

Navigation Expert → Diagnostics → Timestamp

Description Displays the operating time when the current diagnostic message occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Actual diagnos.** parameter (→ 129).

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 *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 (→ 130).

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.

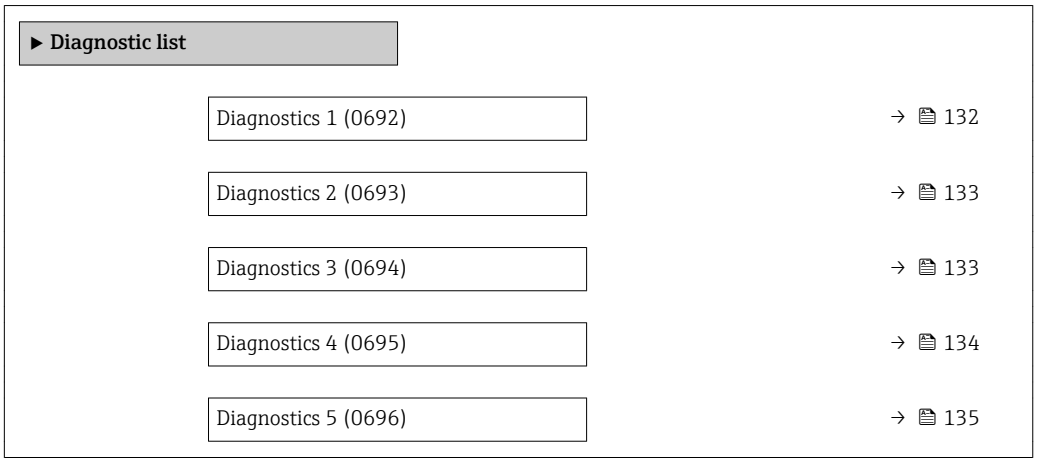
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

3.6.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list



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 *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 (→ 132).

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 *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 second-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 133).

Example

For the display format:
24d12h13m00s

Diagnostics 3

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

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

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

Additional information *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 third-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 133).

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 *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 (→ 134).

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 *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*

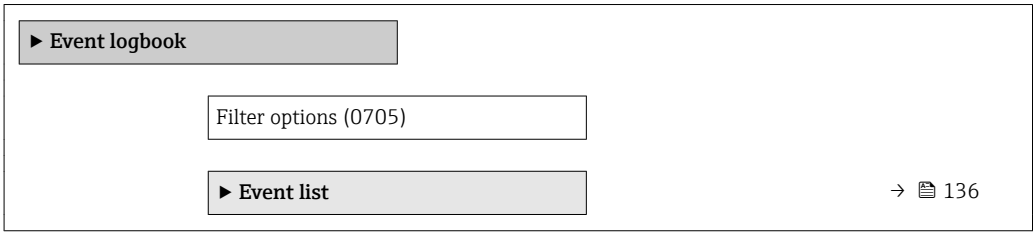
The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 135).

Example

For the display format:
24d12h13m00s

3.6.2 "Event logbook" submenu

Navigation Expert → Diagnostics → Event logbook



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

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.

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.

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.

3.6.3 "Device info" submenu

Navigation Expert → Diagnostics → Device info

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.

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

Factory setting Prosonic Flow E 100

Serial number

Navigation Expert → Diagnostics → Device info → Serial number (0009)

Description Displays the serial number of the measuring device.

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

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

Additional information *Description*

Uses of the serial number
- To identify the measuring device quickly, e.g. when contacting Endress+Hauser.
- To obtain specific information on the measuring device using the Device Viewer: www.endress.com/deviceviewer

Firmware version

Navigation Expert → Diagnostics → Device info → Firmware version (0010)

Description Displays the device firmware version installed.

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

Additional information *Display*

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

Device name

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

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

User interface Max. 32 characters such as letters or numbers.

Factory setting Pros.Flow E 100

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 (→ 139)

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 (→ 139)

Config. counter

Navigation Expert → Diagnostics → Device info → Config. counter (0233)

Description Displays the number of parameter modifications for the device. When the user changes a parameter setting, this counter is incremented.

User interface 0 to 65 535

ENP version

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

Description Displays the version of the electronic nameplate.

User interface Character string

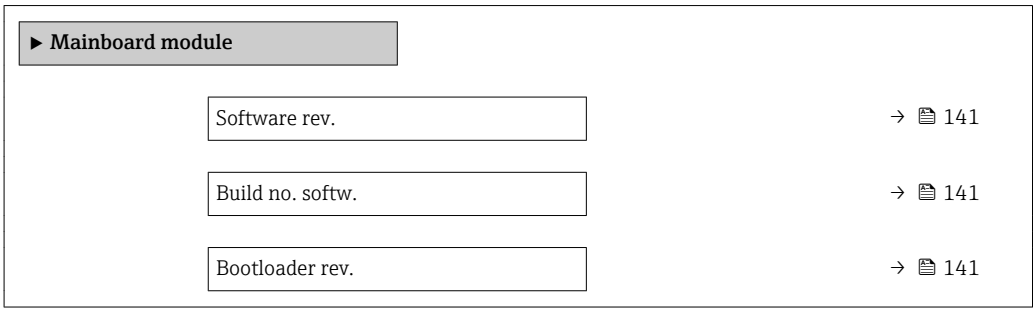
Factory setting 2.02.00

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.

3.6.4 "Mainboard module" submenu

Navigation Expert → Diagnostics → Mainboard module



Software rev.

Navigation Expert → Diagnostics → Mainboard 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 → Mainboard module → Build no. softw. (0079)

Description Displays the software build number of the module.

User interface Positive integer

Bootloader rev.

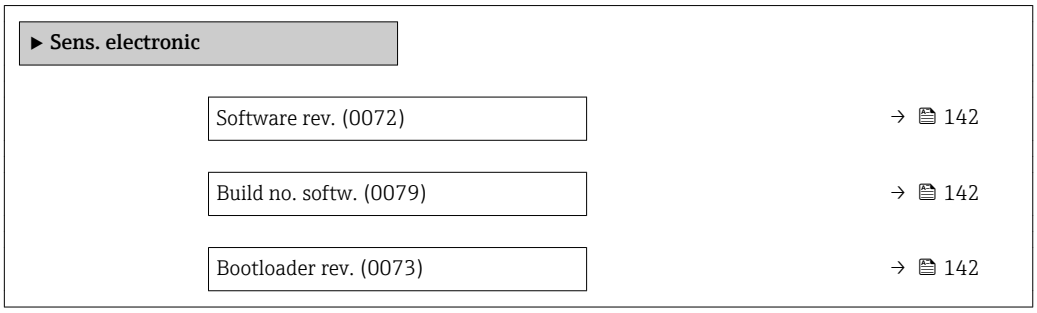
Navigation Expert → Diagnostics → Mainboard module → Bootloader rev. (0073)

Description Displays the bootloader revision of the software.

User interface Positive integer

3.6.5 "Sens. electronic" submenu

Navigation Expert → Diagnostics → Sens. electronic



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 Displays the software build number of the module.

User interface Positive integer

Bootloader rev.

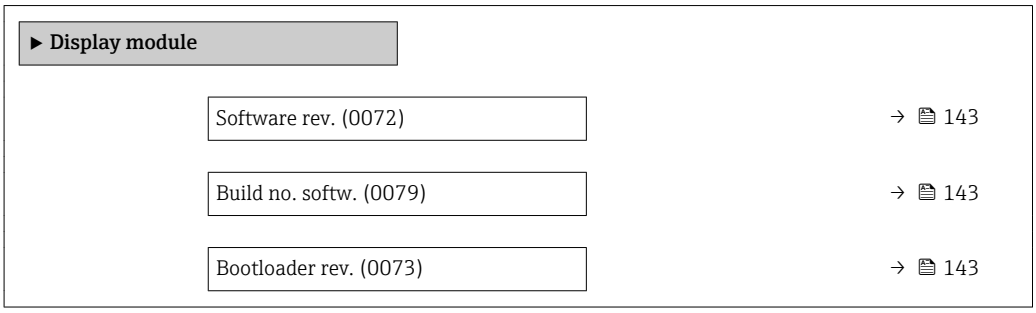
Navigation Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description Displays the bootloader revision of the software.

User interface Positive integer

3.6.6 "Display module" submenu

Navigation Expert → Diagnostics → Display module



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 Displays the software build number of the module.

User interface Positive integer

Bootloader rev.

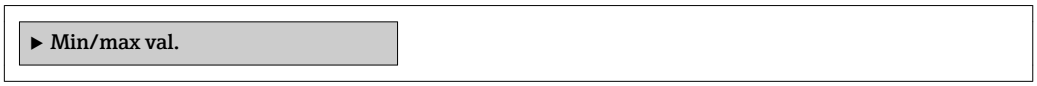
Navigation Expert → Diagnostics → Display module → Bootloader rev. (0073)

Description Displays the bootloader revision of the software.

User interface Positive integer

3.6.7 "Min/max val." submenu

Navigation Expert → Diagnostics → Min/max val.



Reset min/max

Navigation Expert → Diagnostics → Min/max val. → Reset min/max (5647)

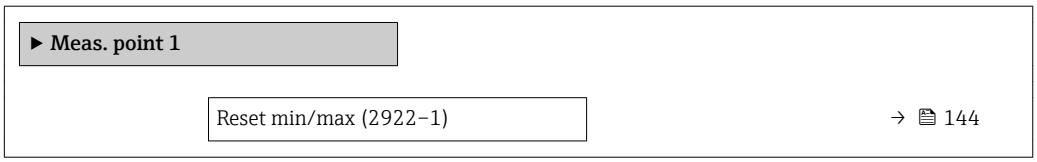
Description Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.

Selection Cancel

Factory setting Cancel

"Meas. point 1" submenu

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1



Reset min/max

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Reset min/max (2922–1)

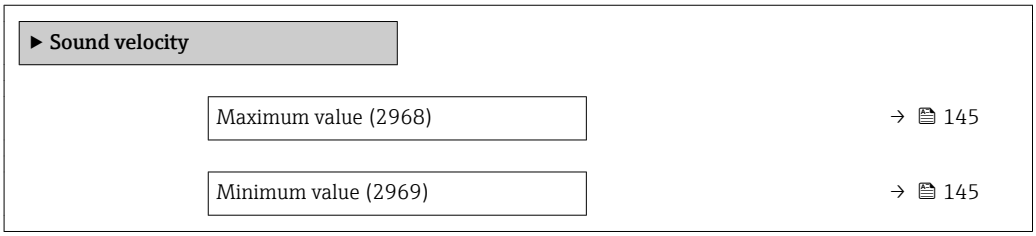
Description Use this function to select the peakhold indicators that are to be reset.

Selection
- Cancel
- Flow velocity
- Sound velocity
- Signal strength
- SNR
- Turbulence
- Acceptance rate
- Asymmetry

Factory setting Cancel

"Sound velocity" submenu

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Sound velocity



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Sound velocity → Maximum value (2968)

Description Maximum value of sound velocity since the last reset.

User interface Signed floating-point number

Factory setting 0 m/s

Minimum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Sound velocity → Minimum value (2969)

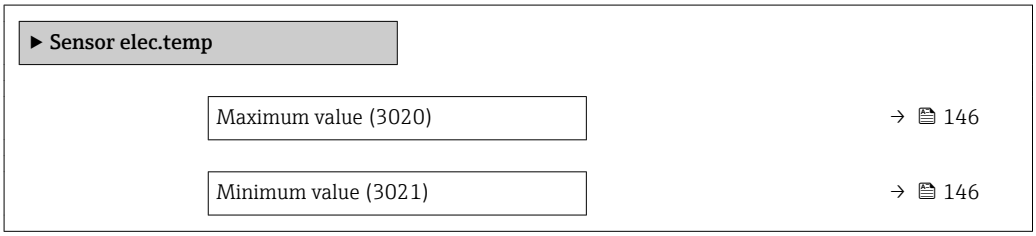
Description Minimum value of sound velocity since the last reset.

User interface Signed floating-point number

Factory setting 0 m/s

"Sensor elec.temp" submenu

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Sensor elec.temp



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Sensor elec.temp → Maximum value (3020)

Description Maximum value of sensor electronic temperature since the last reset.

User interface Signed floating-point number

Factory setting Positive floating-point number

Minimum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Sensor elec.temp → Minimum value (3021)

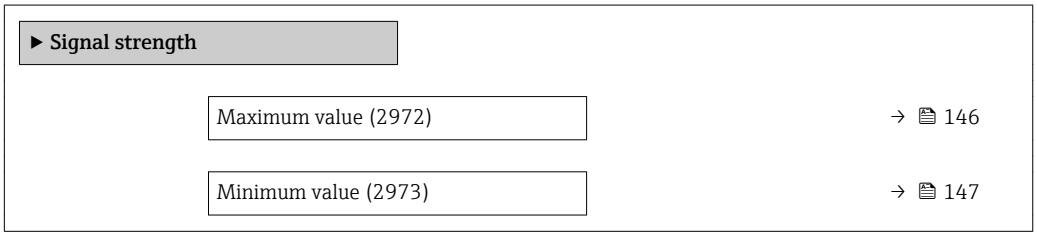
Description Minimum value of sensor electronic temperature since the last reset.

User interface Signed floating-point number

Factory setting Negative floating-point number

"Signal strength" submenu

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Signal strength



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Signal strength → Maximum value (2972)

Description Maximum value of signal strength since the last reset.

User interface Signed floating-point number

Factory setting 0 dB

Minimum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Signal strength → Minimum value (2973)

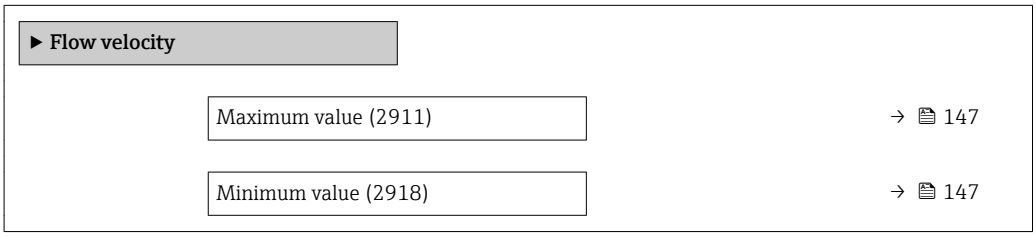
Description Minimum value of signal strength since the last reset.

User interface Signed floating-point number

Factory setting 0 dB

"Flow velocity" submenu

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Flow velocity



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Flow velocity → Maximum value (2911)

Description Maximum value of flow velocity since the last reset.

User interface Signed floating-point number

Factory setting 0 m/s

Minimum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Flow velocity → Minimum value (2918)

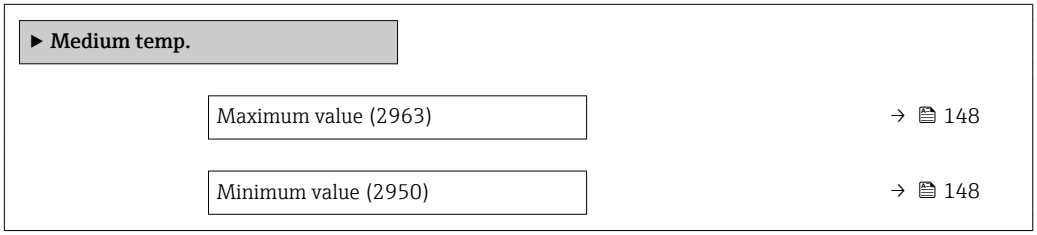
Description Minimum value of flow velocity since the last reset.

User interface Signed floating-point number

Factory setting 0 m/s

"Medium temp." submenu

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Medium temp.



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Medium temp. → Maximum value (2963)

Description Maximum value of medium temperature since the last reset.

User interface Signed floating-point number

Factory setting Positive floating-point number

Minimum value

Navigation Expert → Diagnostics → Min/max val. → Meas. point 1 → Medium temp. → Minimum value (2950)

Description Minimum value of medium temperature since the last reset.

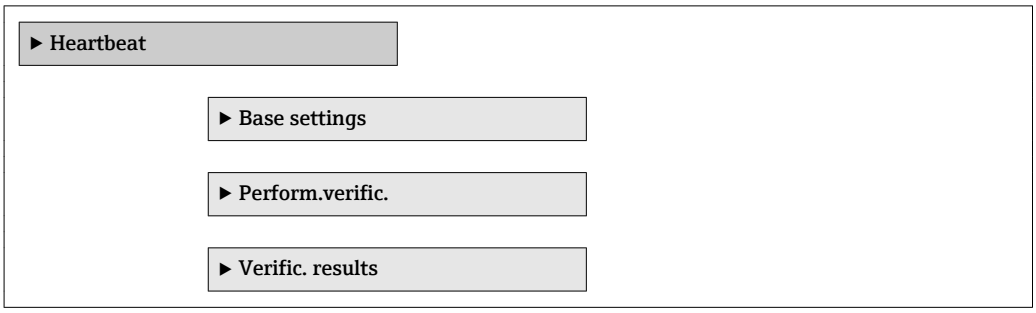
User interface Signed floating-point number

Factory setting Negative floating-point number

3.6.8 "Heartbeat" submenu

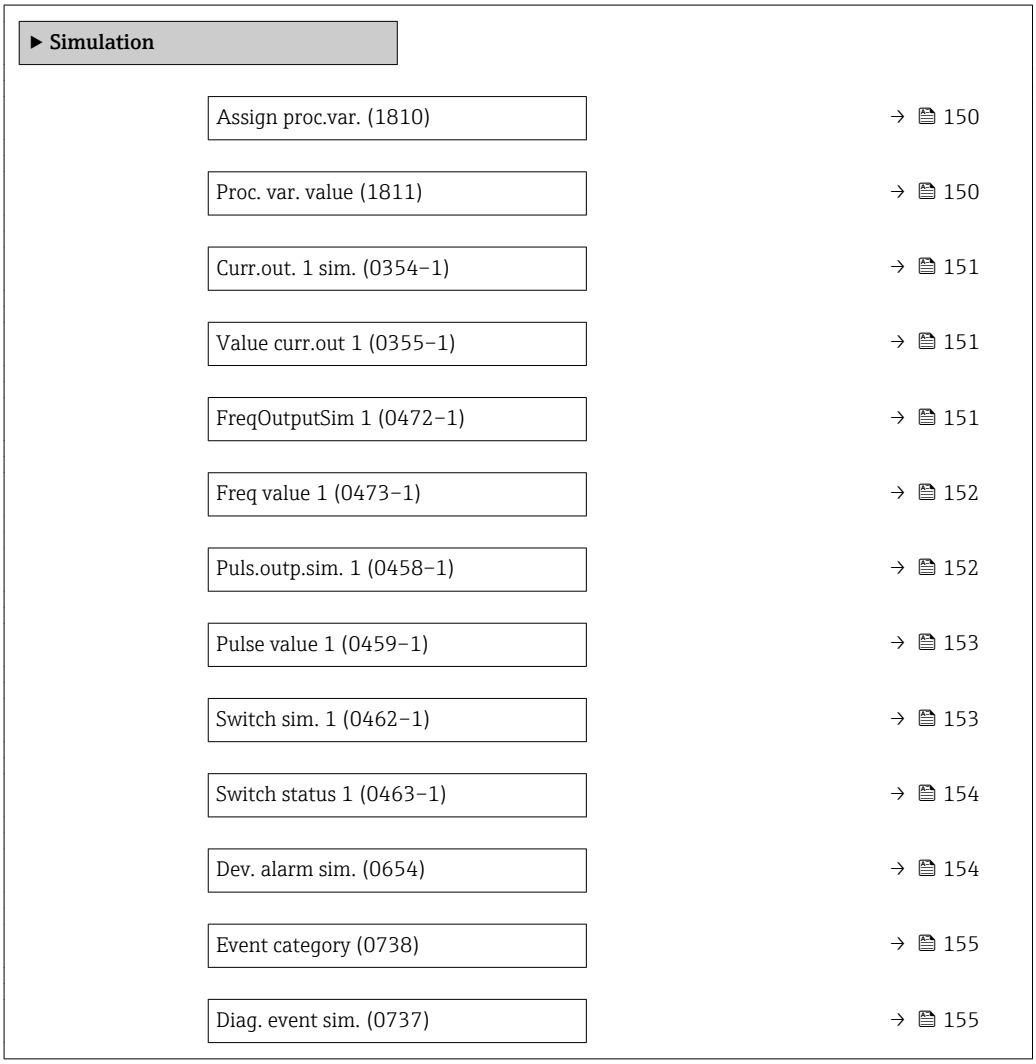
For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**application package, refer to the Special Documentation for the device

Navigation Expert → Diagnostics → Heartbeat



3.6.9 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation



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
- Sound velocity
- Flow velocity
- Temperature

Factory setting Off

Additional information *Description*

The simulation value of the process variable selected is defined in the **Proc. var. value** parameter (→ 150).

Proc. var. value

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

Prerequisite In the **Assign proc.var.** parameter (→ 150), one of the following options is selected:
- Volume flow
- Mass flow
- Sound velocity
- Flow velocity
- Temperature *

Description Use this function to enter a simulation value for the selected process variable. Subsequent measured value processing and the signal output use this simulation value. In this way, users can verify whether the measuring device has been configured correctly.

User entry Depends on the process variable selected

Factory setting 0

Additional information *User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 47).

* Visibility depends on order options or device settings

Curr.out. 1 sim.

Navigation Expert → Diagnostics → Simulation → Curr.out. 1 sim. (0354–1)

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 specified in the **Value curr.out 1** parameter (→ 151).

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

Navigation Expert → Diagnostics → Simulation → Value curr.out 1 (0355–1)

Prerequisite In the **Curr.out. 1 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 0 to 22.5 mA

FreqOutputSim 1

Navigation Expert → Diagnostics → Simulation → FreqOutputSim 1 (0472–1)

Prerequisite In the **Operating mode** parameter (→ 80), the **Frequency** option is selected.

Description Use this function to switch simulation of the frequency output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Freq value** parameter (→ 152).

Selection

- Off
  Frequency simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Frequency simulation is active.

Freq value 1

Navigation Expert → Diagnostics → Simulation → Freq value 1 (0473–1)

Prerequisite In the **FreqOutputSim** parameter (→ 151), the **On** option is selected.

Description Use this function to enter a frequency value for the simulation. In this way, users can verify the correct adjustment of the frequency output and the correct function of downstream switching units.

User entry 0.0 to 12 500.0 Hz

Puls.outp.sim. 1

Navigation Expert → Diagnostics → Simulation → Puls.outp.sim. 1 (0458–1)

Prerequisite In the **Operating mode** parameter (→ 80), the **Pulse** option is selected.

Description Use this function to switch simulation of the pulse output on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection

- Off
- Fixed value
- Down-count. val.

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Pulse value** parameter (→ 153).

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 (→ 82).
- Down-count. val.
  The pulses specified in the **Pulse value** parameter (→ 153) are output.

Pulse value 1

Navigation Expert → Diagnostics → Simulation → Pulse value 1 (0459–1)

Prerequisite In the **Puls.outp.sim.** parameter (→ 152), 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

Navigation Expert → Diagnostics → Simulation → Switch sim. 1 (0462–1)

Prerequisite In the **Operating mode** parameter (→ 80), 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** parameter (→ 154).

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

Navigation Expert → Diagnostics → Simulation → Switch status 1 (0463–1)

Prerequisite In the **Switch sim.** parameter (→ 153) **Switch sim. 1 to n** parameter **Switch sim. 1 to n** parameter, the **On** option is selected.

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.

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

Navigation Expert → Diagnostics → Simulation → Event category (0738)

Description Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Diag. event sim.** parameter (→ 155).

Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting Process

Diag. event sim.

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

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

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

Factory setting Off

Additional information *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Event category** parameter (→ 155).

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Mass	kg
Mass flow	kg/h
Volume	m^3
Volume flow	m^3/h
Velocity	m/s
Temperature	°C
Length	mm

4.1.2 Full scale values

The factory settings applie to the following parameters:
- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

Nominal diameter [mm]	[dm^3/min]
50	720
65	1 200
80	1 680
100	2 880
150	6 360

4.1.3 Output current span

Current output 1	4 to 20 mA NAMUR

4.1.4 Pulse value

Nominal diameter [mm]	[dm^3/pulse]
50	3
65	4
80	6
100	10
150	25

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]	Switch-on point (v ~ 0.1 m/s) [dm³/min]
50	14.4
65	24.0
80	33.6
100	57.6
150	127.2

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Mass	lb
Mass flow	lb/min
Volume	ft³
Volume flow	ft³/min
Velocity	ft/s
Temperature	°F
Length	in

4.2.2 Full scale values

The factory settings applie to the following parameters:
- 20 mA value (full scale value of the current output)
- 100% bar graph value 1

Nominal diameter [in]	[gal/min]
2	190
2 ½	317
3	444
4	761
6	1 680

4.2.3 Output current span

Current output 1	4 to 20 mA US

4.2.4 Pulse value

Nominal diameter [in]	[gal/pulse]
2	0.8
2 ½	1.1
3	1.6

Nominal diameter [in]	[gal/pulse]
4	2.6
6	6.6

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]	Switch-on point (v ~ 0.1 m/s) [dm^3/min]
2	3.8
2 ½	6.3
3	8.9
4	15.2
6	33.6

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Velocity	m/s	Meter/time unit
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/h, t/d	Metric ton/time unit
Temperature	°C , K	Celsius, Kelvin
Volume	cm^3, dm^3, m^3	Cubic centimeter, cubic decimeter, cubic meter
	ml, l	Milliliter, liter
Volume flow	dm^3/s, dm^3/min, dm^3/h, dm^3/d	Cubic decimeter/time unit
	m^3/s, m^3/min, m^3/h, m^3/d	Cubic meter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
Time	m, h, d, y	Minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Velocity	ft/s	Foot/time unit
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/h, STon/d	Standard ton/time unit
Temperature	°F, °R	Fahrenheit, Rankine
Volume	ft^3	Cubic foot
Volume flow	ft^3/s, ft^3/min, ft^3/h, ft^3/d	Cubic foot/time unit
Time	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Volume	bbl (imp;beer)	Barrel (beer)
Volume flow	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
Time	m, h, d, y	Minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

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Endress+Hauser

People for Process Automation