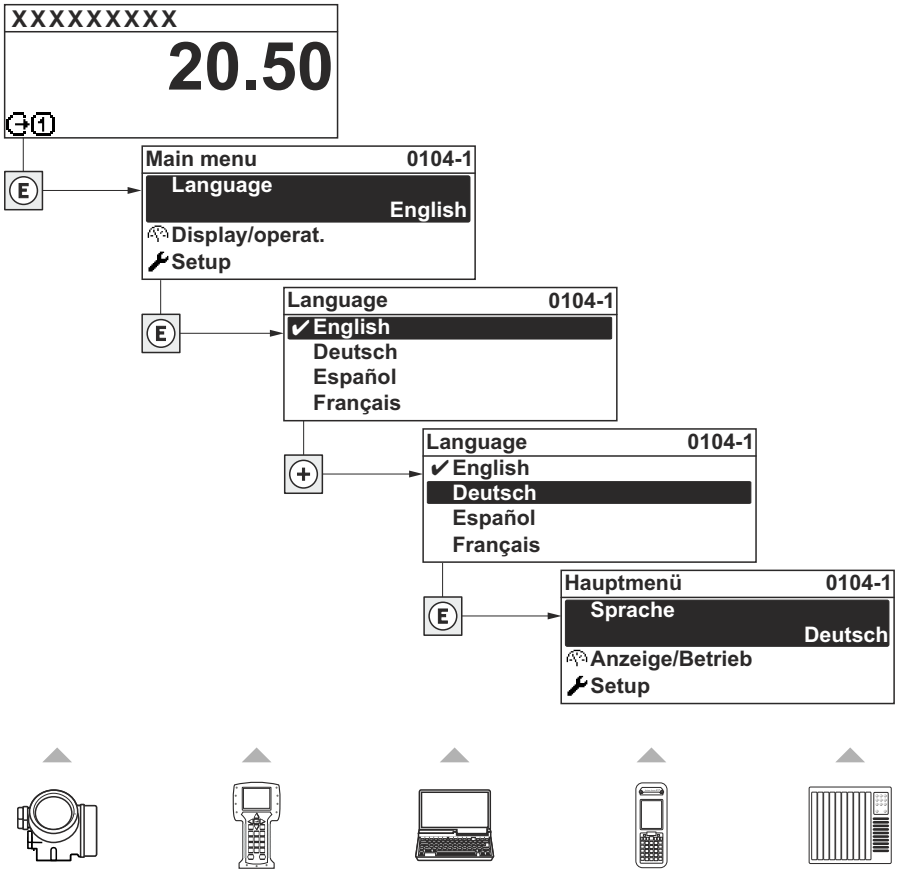
GP01026D/06/EN/01.15
71280342

Valid as of version
01.01.zz (Device firmware)

Description of Device Parameters
Proline Promag 200
HART

Electromagnetic flowmeter



Endress+Hauser
People for Process Automation

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1 Document information

1.1 Document function

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

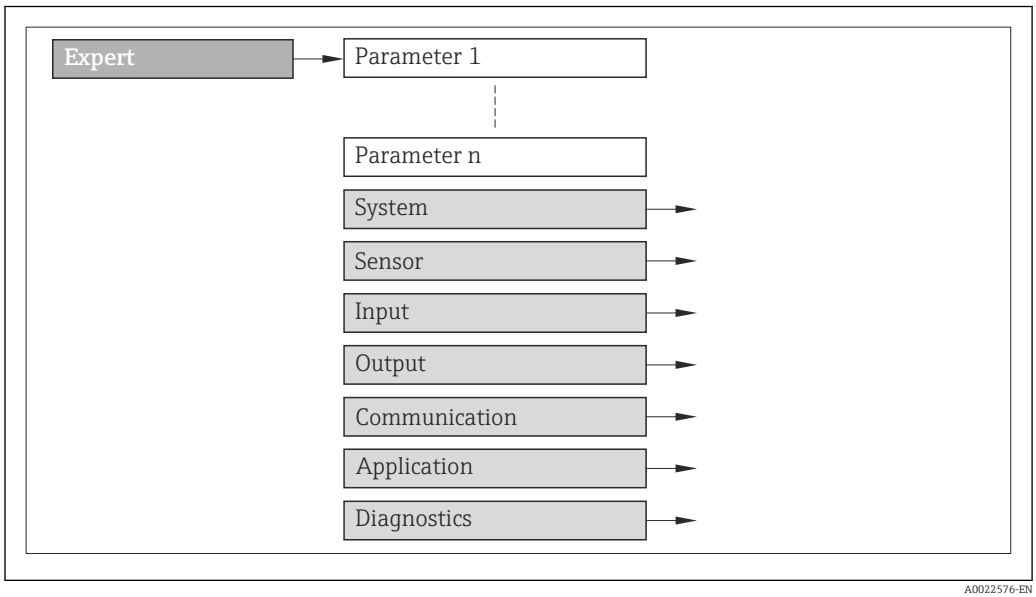
1.2 Target group

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

1.3 Using this document

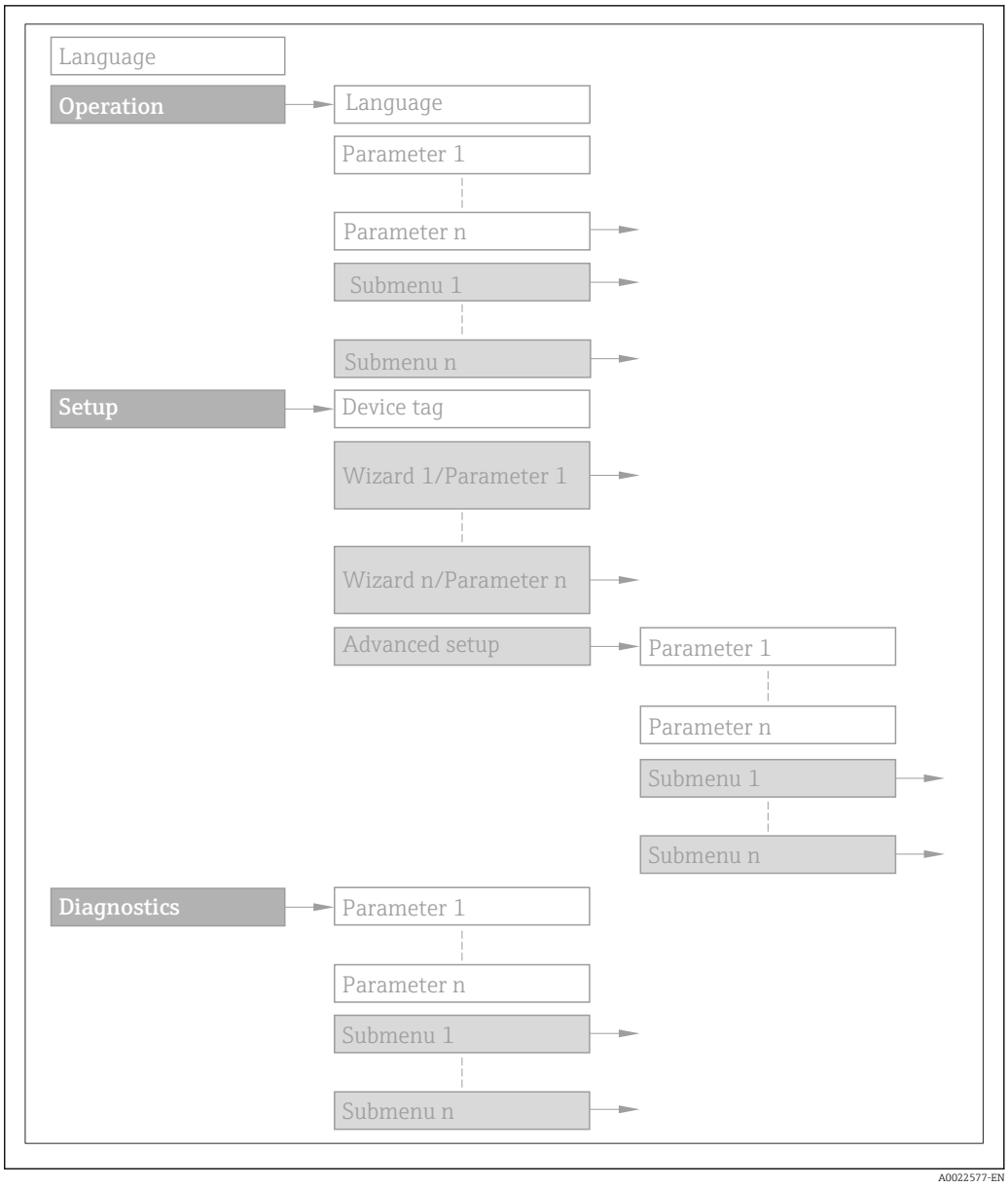
1.3.1 Information on the document structure

This document lists the submenus and their parameters according to the structure of the **Expert** menu (→ 8).



1 Sample graphic

For the arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu (→ 113), along with short descriptions, see the Operating Instructions for the device.



2 *Sample graphic*

For information about the operating philosophy, see the "Operating philosophy" chapter in the device's Operating Instructions

1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter =

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

Prerequisite
The parameter is only available under these specific conditions

Description
Description of the parameter function

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

User entry
Input range for the parameter

User interface
User interface value/data for 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

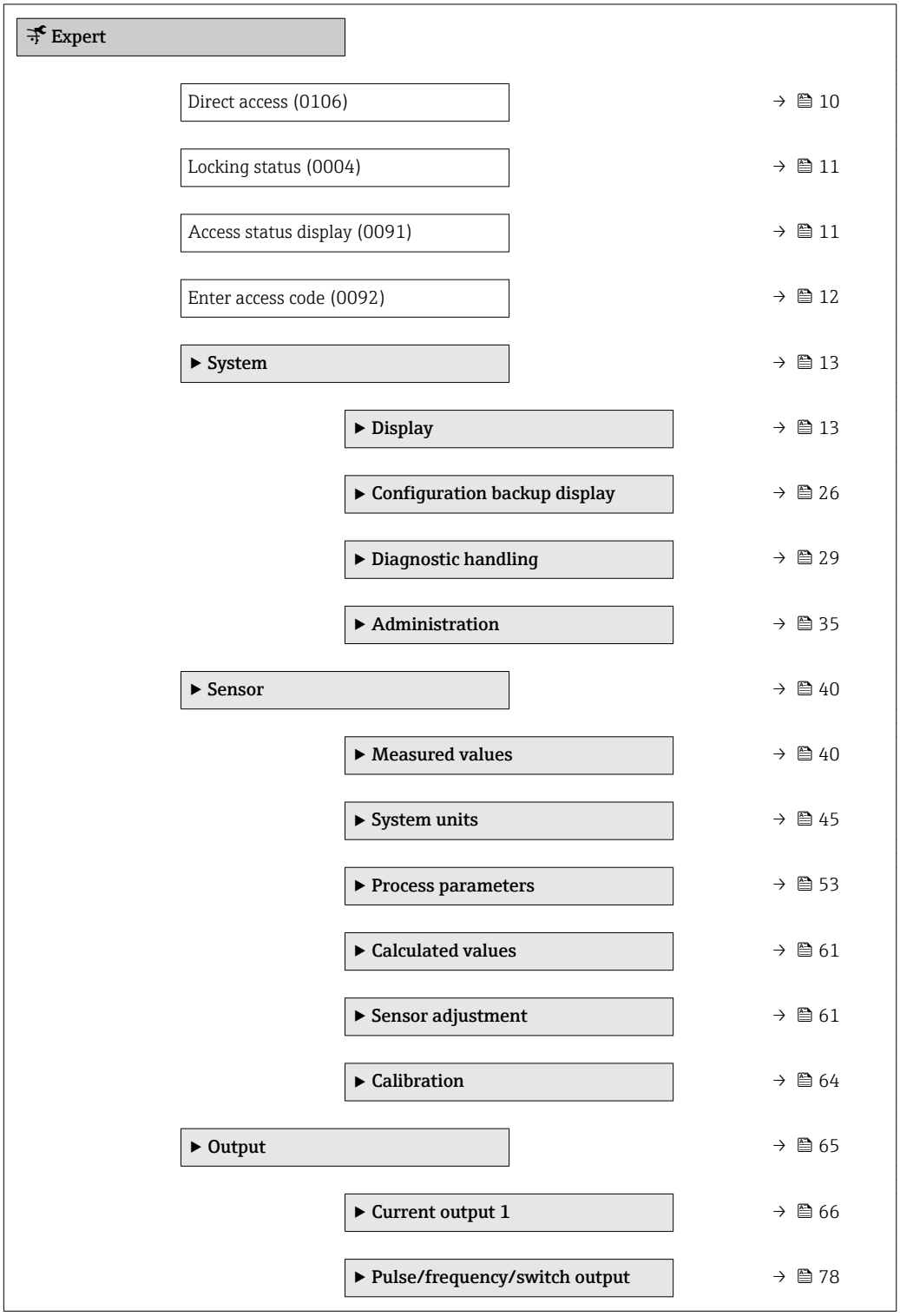
Symbol	Meaning
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Operation via local display
	Operation via operating tool
	Write-protected parameter

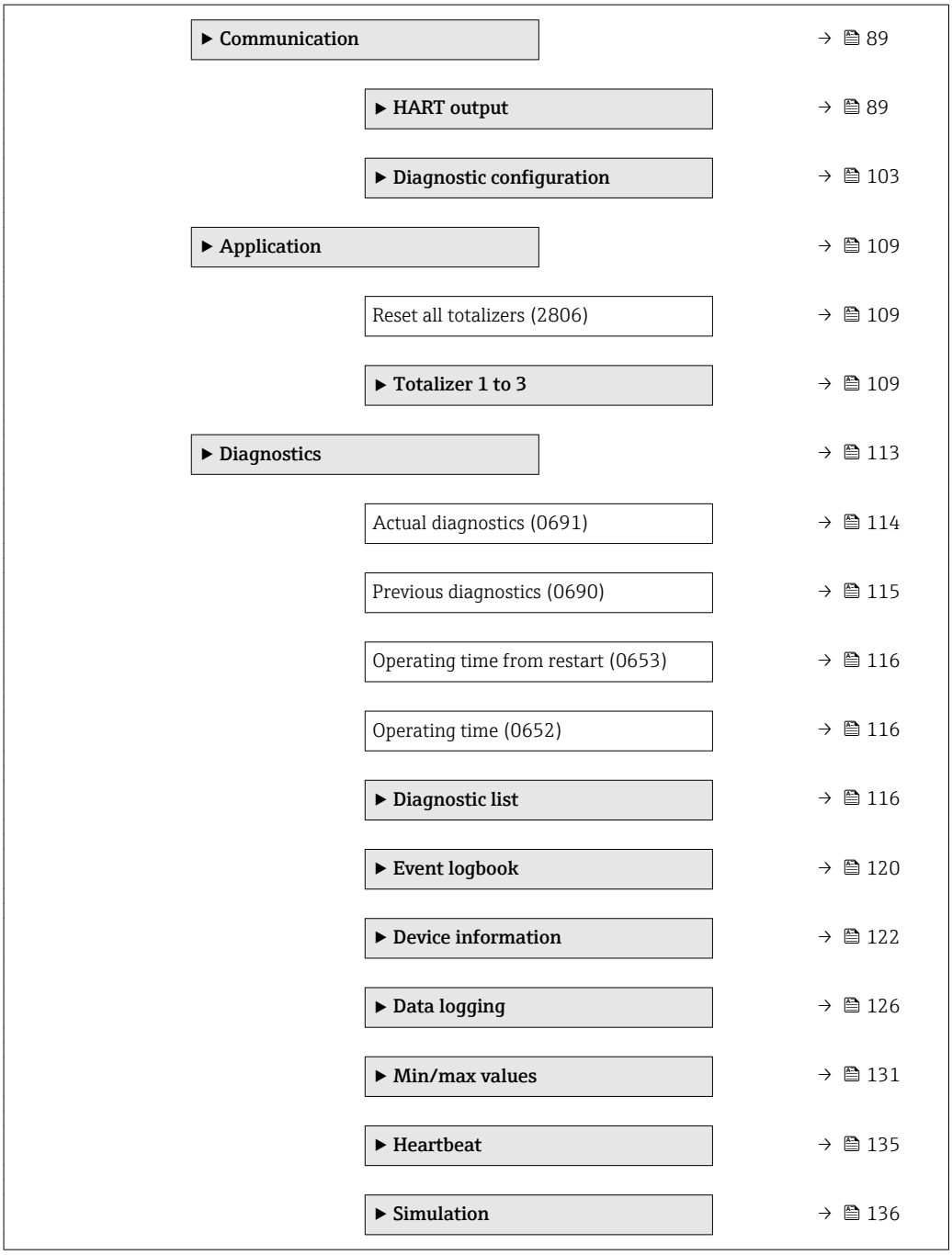
1.4.2 Symbols in graphics

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

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.




▶ Communication → 89
▶ HART output → 89
▶ Diagnostic configuration → 103
▶ Application → 109
Reset all totalizers (2806) → 109
▶ Totalizer 1 to 3 → 109
▶ Diagnostics → 113
Actual diagnostics (0691) → 114
Previous diagnostics (0690) → 115
Operating time from restart (0653) → 116
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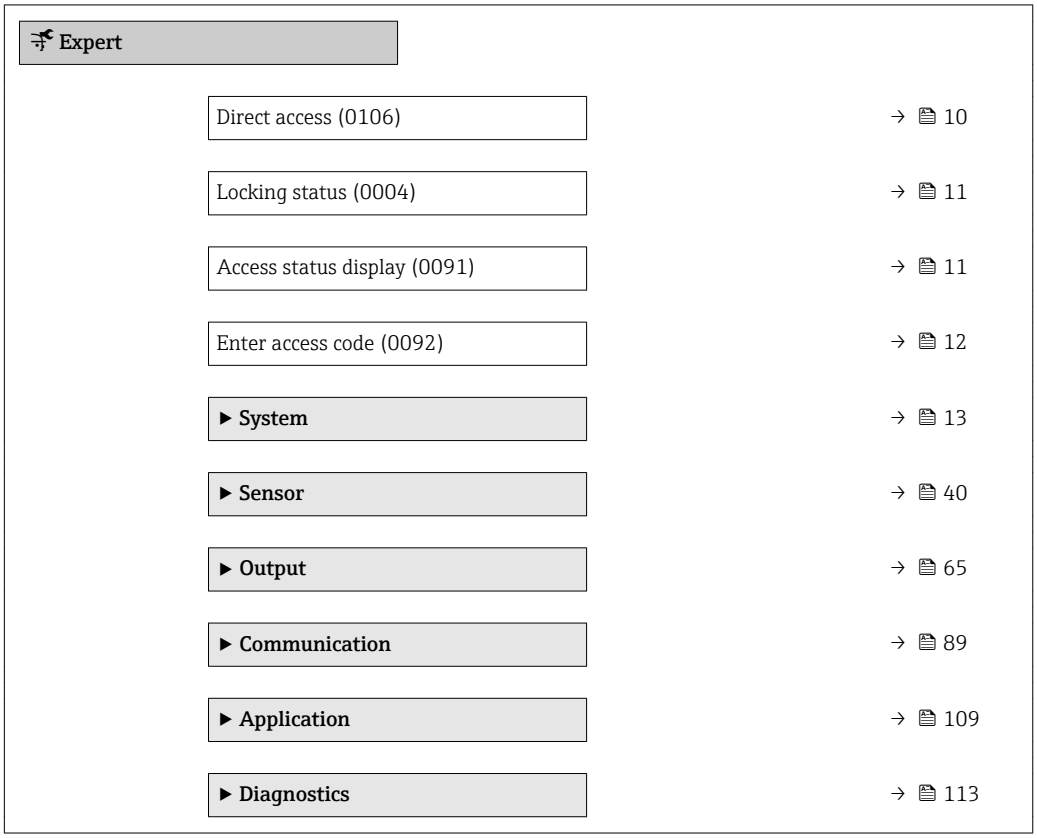
▶ Diagnostic list → 116
▶ Event logbook → 120
▶ Device information → 122
▶ Data logging → 126
▶ Min/max values → 131
▶ Heartbeat → 135
▶ Simulation → 136

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)

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

User entry 0 to 65 535

Additional information *User entry*

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

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

Locking status

Navigation Expert → Locking status (0004)

Description Use this function to view the active write protection.

User interface
- Hardware locked
- SIL locked
- Temporarily locked

Additional information

User interface

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

The -symbol appears in front of parameters that cannot be modified due to write protection.

"Hardware locked" option (priority 1)

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

Information on disabling hardware write protection is provided in the "Write protection via the locking DIP switch" section of the Operations Instructions for the device.

"SIL locked" option (priority 2)

The SIL mode is enabled. This locks write access to the parameters (e.g. via local display or operating tool).

"Temporarily locked" option (priority 3)

Write access to the parameters is temporarily lock due to device-internal processing (e.g. data upload/download, reset). Once the internal processing has been completed, the parameters can be changed once again.

Access status display

Navigation Expert → Access stat.disp (0091)

Prerequsite A local display is provided.

Description Use this function to view the access authorization to the parameters via the local display.

User interface
- Operator
- Maintenance

Factory setting Operator

Additional information

Description

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

The access authorization can be modified via the **Enter access code** parameter (→ 🖹 12).

For information on the **Enter access code** parameter (→ 🖹 12), see the "Disabling write protection via access code" section of the Operating Instructions for the device

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

User interface

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

Access status tooling

Navigation Expert → Access stat.tool (0005)

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

User interface
- Operator
- Maintenance

Factory setting Maintenance

Additional information

Description

The access authorization can be modified via the **Enter access code** parameter (→ 🖹 12).

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

User interface

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

Enter access code

Navigation Expert → Ent. access code (0092)

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

User entry 0 to 9 999

Enter access code

Navigation Expert → Ent. access code (0003)

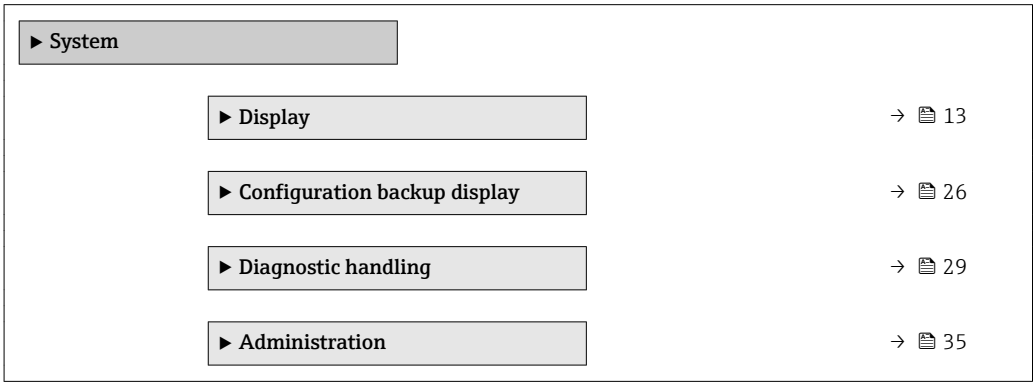
Description Use this function to enter the user-specific release code to remove parameter write protection in the operating tool.

User entry 0 to 9 999

Factory setting 0

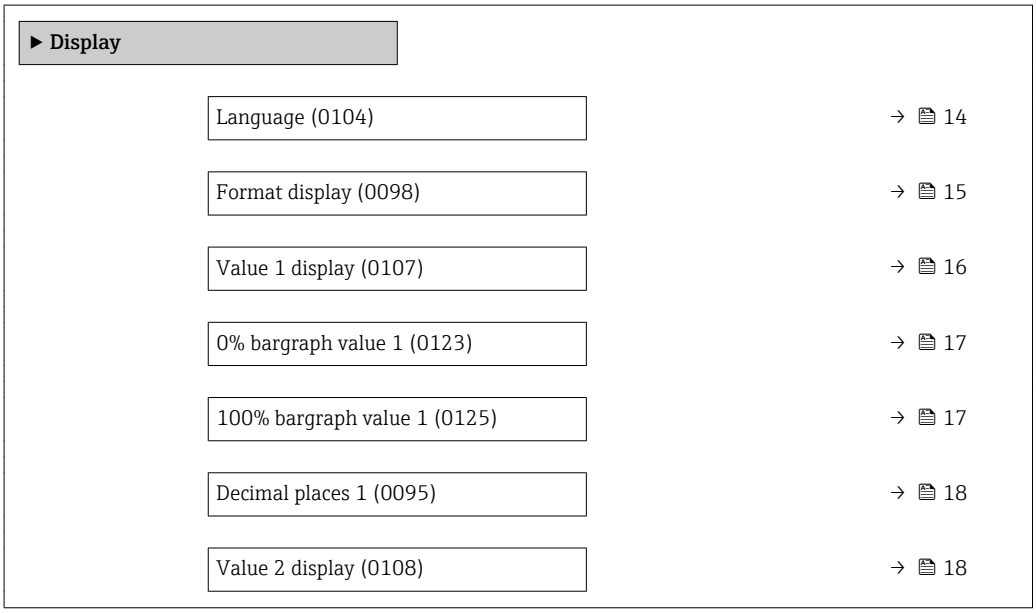
3.1 "System" submenu

Navigation Expert → System



3.1.1 "Display" submenu

Navigation Expert → System → Display



Language

Navigation Expert → System → Display → Language (0104)

Prerequisite A local display is provided.

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

Selection
- English
- Deutsch *
- Français *
- Español *
- Italiano *
- Nederlands *
- Portuguesa *
- Polski *

* Visibility depends on order options or device settings

- русский язык (Russian) *
- Svenska *
- Türkçe *
- 中文 (Chinese) *
- 日本語 (Japanese) *
- 한국어 (Korean) *
- العَرَبيّة (Arabic) *
- Bahasa Indonesia *
- ภาษาไทย (Thai) *
- tiếng Việt (Vietnamese) *
- čeština (Czech) *

Factory setting **English** option (alternatively, the ordered language is preset in the device)

Format display

Navigation Expert → System → Display → Format display (0098)

Prerequsite A local display is provided.

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

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

Factory setting 1 value, max. size

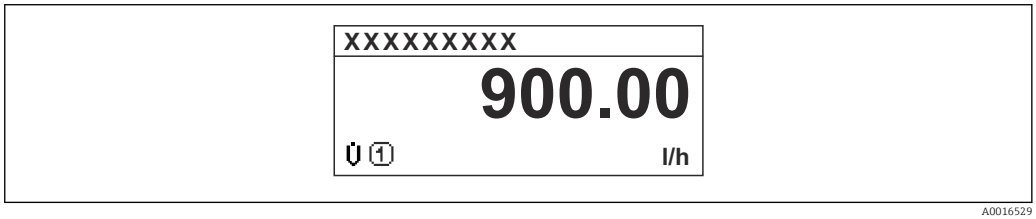
Additional information *Description*

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

- The **Value 1 display** parameter (→ 16)...**Value 4 display** parameter (→ 21) parameters are used to specify which measured values are shown on the display and in which order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured using the **Display interval** parameter (→ 22) parameter.

Possible measured values shown on the local display:

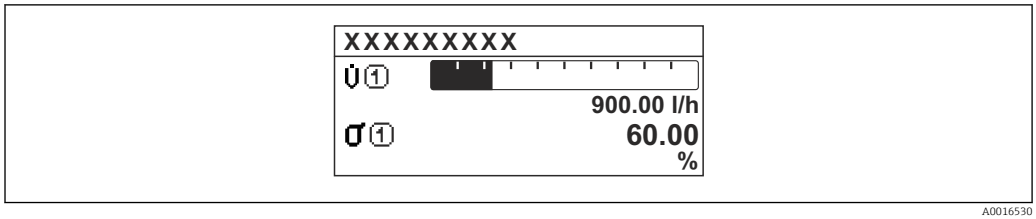
"1 value, max. size" option



A0016529

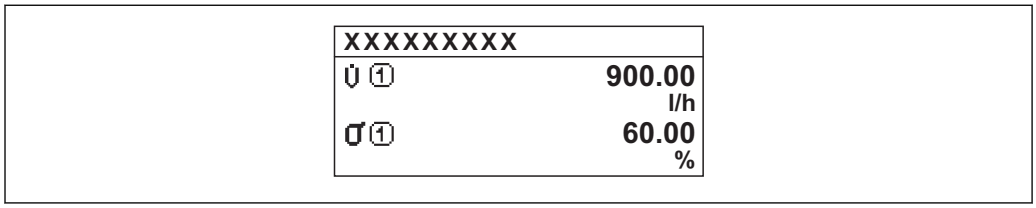
* Visibility depends on order options or device settings

"1 bargraph + 1 value" option



A0016530

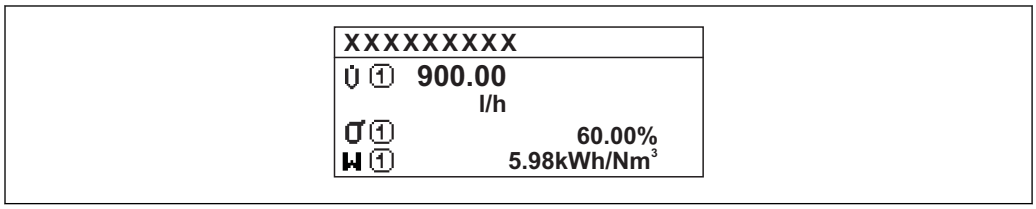
"2 values" option



A0016531

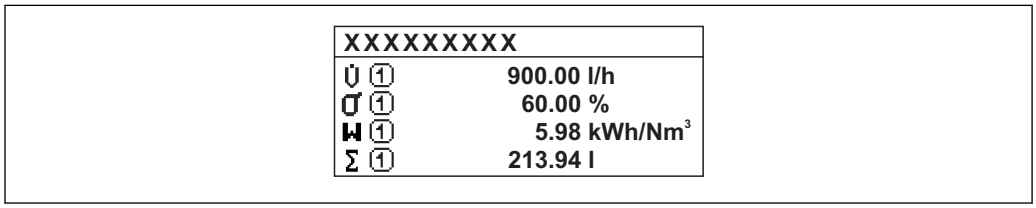
3

"1 value large + 2 values" option



A0016532

"4 values" option



A0016533

Value 1 display

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

Prerequsite A local display is provided.

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

Selection
- Volume flow
- Mass flow
- Totalizer 1

- Totalizer 2
- Totalizer 3
- Current output 1

Factory setting Volume flow

Additional information *Description*

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 45).

0% bargraph value 1

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

Prerequsite A local display is provided.

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

User entry Signed floating-point number

Factory setting 0 l/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 (→ 45).

100% bargraph value 1

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

Prerequsite 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 → 142

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 (→ 45).

Decimal places 1

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

Prerequisite A measured value is specified in the **Value 1 display** parameter (→ 16).

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 Picklist see **Value 1 display** parameter (→ 16)

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.

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 45).

Decimal places 2

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

Prerequsite A measured value is specified in the **Value 2 display** parameter (→ 18).

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)

Prerequsite A local display is provided.

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

Selection Picklist see **Value 1 display** parameter (→ 16)

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 (→ 45).

0% bargraph value 3

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

Prerequisite An option was selected in the **Value 3 display** parameter (→ 19).

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 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 (→ 45).

100% bargraph value 3

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

Prerequisite An option was selected in the **Value 3 display** parameter (→ 19).

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 Depends on country and nominal diameter → 142

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 (→ 45).

Decimal places 3

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

Prerequisite A measured value is specified in the **Value 3 display** parameter (→ 19).

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

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

Factory setting x.xx

Additional information *Description*

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

Value 4 display

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

Prerequisite A local display is provided.

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

Selection Picklist see **Value 1 display** parameter (→ 16)

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 (→ 45).

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)

Prerequsite 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 (→ 16)...**Value 4 display** parameter (→ 21) are used to specify which measured values are shown on the display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 15).

Display damping

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

Prerequsite A local display is provided.

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

User entry 0.0 to 999.9 s

Factory setting 0.0 s

Additional information *User entry*

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

Header

Navigation Expert → System → Display → Header (0097)

Prerequsite A local display is provided.

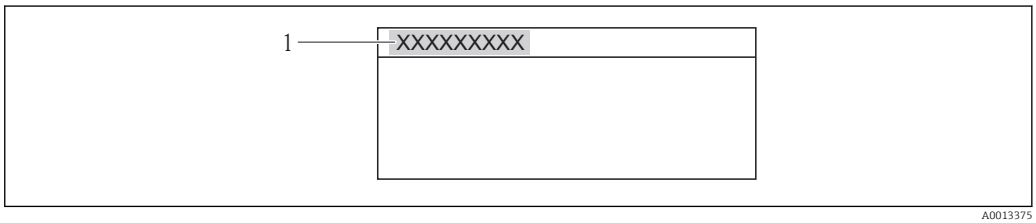
Description Use this function to select the contents of the header of the local display.

Selection
- Device tag
- Free text

Factory setting Device tag

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

Selection
- Device tag
  Is defined in the **Device tag** parameter (→ 122).
- Free text
  Is defined in the **Header text** parameter (→ 23).

Header text

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

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

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

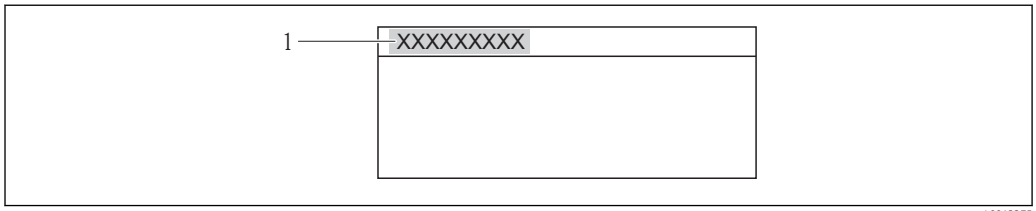
User entry Max. 12 characters such as letters, numbers or special characters (e.g. @, %, /)

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

Additional information

Description

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

Prerequsite A local display is provided.

Description Use this function to select the decimal separator.

Selection
- .
- ,

Factory setting .

Contrast display

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

Prerequsite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Additional information *Set the contrast via the push-buttons:*
- Brighter: Press and hold down the − E keys simultaneously.
- Darker: Press and hold down the + E keys simultaneously.

Backlight

Navigation Expert → System → Display → Backlight (0111)

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

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

Selection
- Disable
- Enable

Factory setting Disable

Access status display

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

Prerequisite A local display is provided.

Description Use this function to view the access authorization to the parameters via the local display.

User interface
- Operator
- Maintenance

Factory setting Operator

Additional information

Description

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

The access authorization can be modified via the **Enter access code** parameter (→ 12).

For information on the **Enter access code** parameter (→ 12), see the "Disabling write protection via access code" section of the Operating Instructions for the device

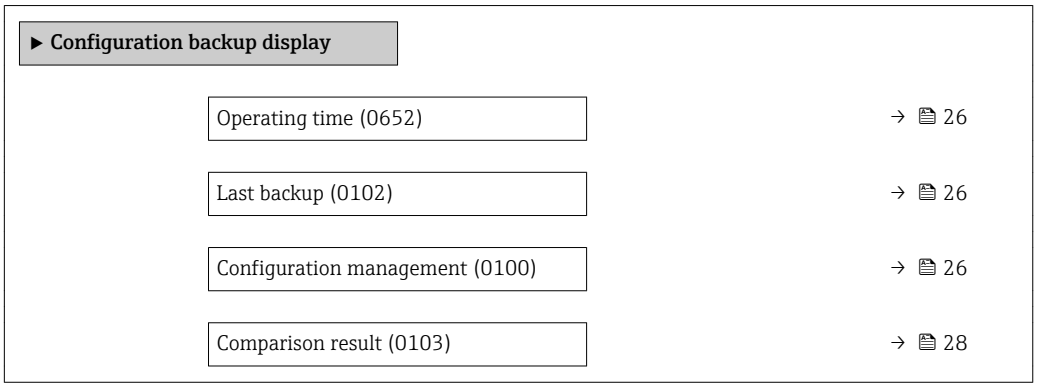
If additional write protection is active, this restricts the current access authorization even further. The write protection status can be viewed via the **Locking status** parameter (→ 11).

User interface

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

3.1.2 "Configuration backup display" submenu

Navigation Expert → System → Conf.backup disp



Operating time

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

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

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

Additional information *User interface*

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

Last backup

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

Prerequsite A local display is provided.

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

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

Configuration management

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

Prerequsite A local display is provided.

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

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

Factory setting
Cancel

Additional information

Description

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

For information on the status message in the operating tool, see the **Backup state** parameter (→ 27)

Selection

- Cancel
  No action is executed and the user exits the parameter.
- Execute backup
  - A backup copy of the current device configuration in the HistoROM is saved to the display module of the device. The backup copy includes the transmitter data of the device.
  - The following message appears on local display: Backup active, please wait!
- Restore
  - The last backup copy of the device configuration is copied from the display module to the HistoROM of the device. The backup copy comprises the transmitter data of the device.
  - The following message appears on local display: Restore active! Do not interrupt power supply!
- Duplicate
  - The transmitter configuration from another device is duplicated to the device using the display module.
  - The following message appears on local display: Copy active! Do not interrupt power supply!
- Compare
  - The device configuration saved in the display module is compared to the current device configuration of the HistoROM.
  - The following message appears on local display: Comparing files
  - The result can be viewed in the **Comparison result** parameter (→ 28).
- Clear backup data
  - The backup copy of the device configuration is deleted from the display module of the device.
  - The following message appears on local display: Deleting file

HistoROM

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

Backup state

Navigation
Expert → System → Conf.backup disp → Backup state (0121)

Prerequsite
A local display is provided.

Description
Use this function to view the status of the data backup process.

User interface
- None
- Store in progress
- Restore in progress
- Import in progress
- Delete in progress
- Compare in progress

Factory setting None

Comparison result

Navigation Expert → System → Conf.backup disp → Compar. result (0103)

Prerequisite A local display is provided.

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

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

Factory setting Check not done

Additional information

Description

The comparison is started via the **Compare** option in the **Configuration management** parameter (→ 26).

Selection

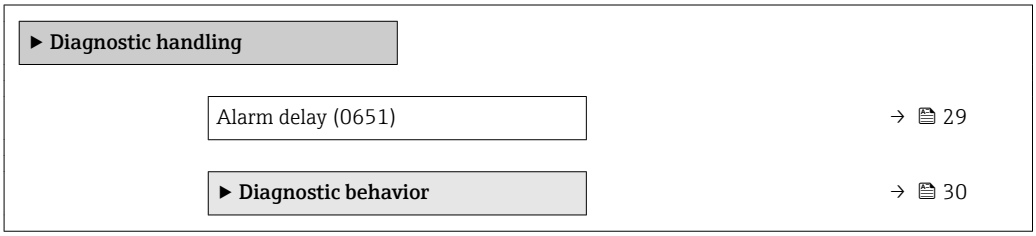
- Settings identical
  - The current device configuration of the HistoROM is identical to the backup copy in the display module.
  - If the transmitter configuration of another device has been copied to the device via the display module and the **Duplicate** option in the **Configuration management** parameter (→ 26), the current device configuration of the HistoROM only partly matches the backup copy in the display module: The settings for the transmitter are not identical.
- Settings not identical
  The current device configuration of the HistoROM is not identical to the backup copy in the display module.
- No backup available
  There is no backup copy of the device configuration of the HistoROM in the display module.
- Backup settings corrupt
  The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the display module.
- Check not done
  The device configuration of the HistoROM has not yet been compared to the backup copy in the display module.
- Dataset incompatible
  The backup copy in the display module is not compatible with the device.

HistoROM

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

3.1.3 "Diagnostic handling" submenu

Navigation Expert → System → Diagn. handling



Alarm delay

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

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

User entry 0 to 60 s

Factory setting 0 s

Additional information *Description*

This setting affects the following diagnostic messages:
- 832 Electronic temperature too high
- 833 Electronic temperature too low

"Diagnostic behavior" submenu

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

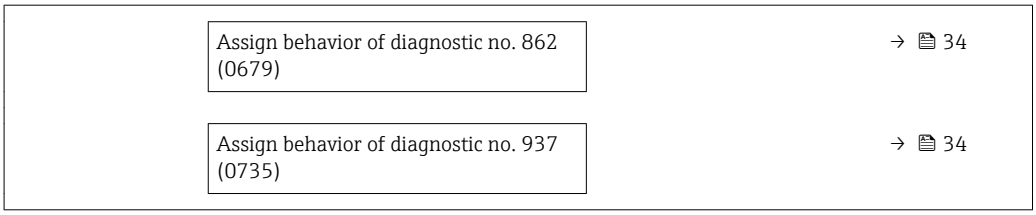
Modifying the diagnostic behavior of a diagnostic event. Each diagnostic event is assigned a certain diagnostic behavior at the factory. The user can change this assignment for certain diagnostics events.

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

- **Off** option
  The diagnostic event is ignored; it is neither entered into the Event logbook, nor is a diagnostic message generated.
- **Alarm** option
  The device continues to measure. The signal outputs assume the defined alarm condition. A diagnostic message is generated.
- **Warning** option
  The device continues to measure. A diagnostic message is generated.
- **Logbook entry only** option
  The device continues to measure. The diagnostic message is entered in the **Event logbook** submenu (→ 120) (**Event list** submenu (→ 121)) only and is not displayed in alternation with the measured value display.

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

▶ **Diagnostic behavior**	
Assign behavior of diagnostic no. 004 (0734)	→ 31
Assign behavior of diagnostic no. 441 (0657)	→ 31
Assign behavior of diagnostic no. 442 (0658)	→ 31
Assign behavior of diagnostic no. 443 (0659)	→ 32
Assign behavior of diagnostic no. 531 (0733)	→ 32
Assign behavior of diagnostic no. 801 (0660)	→ 33
Assign behavior of diagnostic no. 832 (0675)	→ 33
Assign behavior of diagnostic no. 833 (0676)	→ 33
Assign behavior of diagnostic no. 861 (0736)	→ 34



Assign behavior of diagnostic no. 004 (Sensor)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 004 (0734)

Description Use this function to change the diagnostic behavior of the diagnostic message **004 Sensor**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 442 (Frequency output)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 443 (Pulse output)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 531 (Empty pipe detection)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 531 (0733)

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 801 (Supply voltage too low)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 801 (0660)

Description Use this function to change the diagnostic behavior of the diagnostic message **801 Supply voltage too low**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 861 (Process fluid)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 861 (0736)

Description Use this function to change the diagnostic behavior of the diagnostic message **861 Process fluid**.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Alarm

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 862 (Empty pipe)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 862 (0679)

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 937 (EMC interference)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 937 (0735)

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

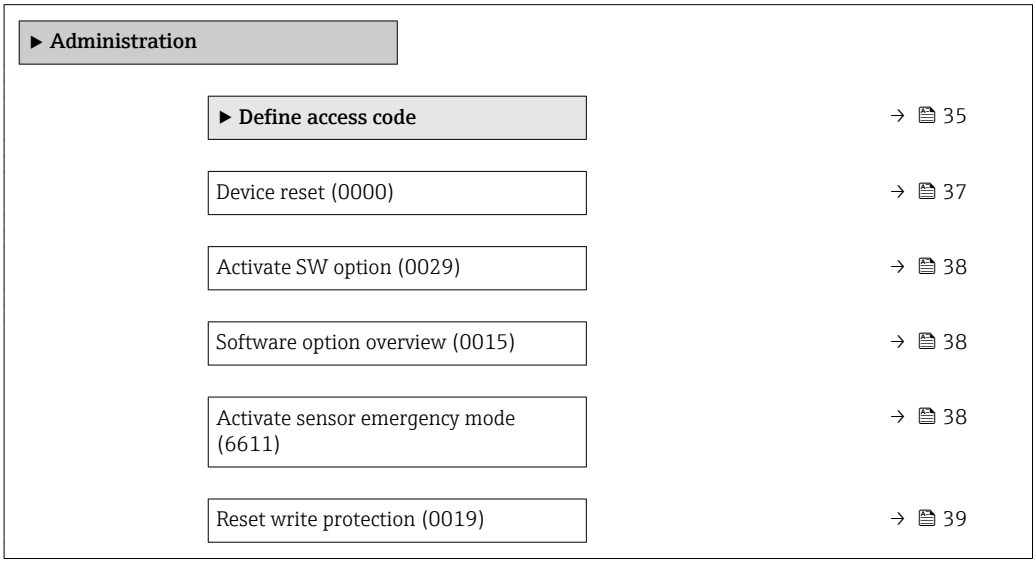
Selection
- Off
- Alarm
- Warning
- Logbook entry only

Factory setting Warning

Additional information For a detailed description of the options available for selection: → 30

3.1.4 "Administration" submenu

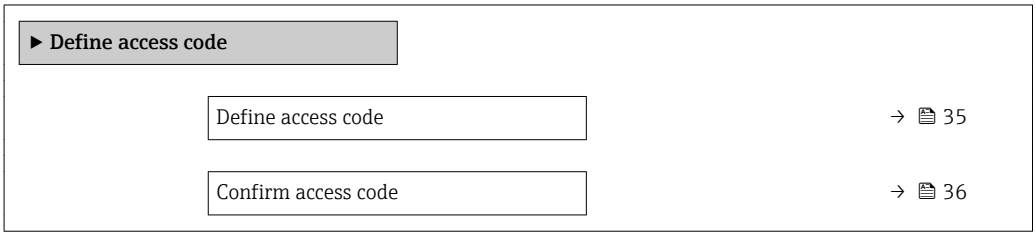
Navigation Expert → System → Administration



"Define access code" wizard

The **Define access code** wizard is only available if you are operating via the local display. If you are operating via the operating tool, the **Define access code** parameter (→ 36) is directly in the **Administration** submenu. The **Confirm access code** parameter is not available if you are operating via the operating tool.

Navigation Expert → System → Administration → Def. access code



Define access code

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

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

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.

Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the **Enter access code** parameter (→ 12).

Please contact your Endress+Hauser Sales Center if you lose your access code.

User entry

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

Factory setting

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

Confirm access code

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

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

User entry 0 to 9 999

Factory setting 0

Additional parameters in the "Administration" submenu

Define access code

Navigation Expert → System → Administration → Def. access code (0093)

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

User entry 0 to 9 999

Factory setting 0

Additional information

Description

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

Once the access code has been defined, write-protected parameters can only be modified if the access code is entered in the **Enter access code** parameter (→ 12).

Please contact your Endress+Hauser Sales Center if you lose your access code.

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 factory defaults
- To delivery settings
- Restart device

Factory setting Cancel

Additional information

"Cancel" option

No action is executed and the user exits the parameter.

"To factory defaults" option

Every parameter is reset to its factory setting.

"To delivery settings" option

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

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

"Restart device" option

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

Activate SW option

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 Positive integer

Factory setting 0

Additional information *User entry*

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

Example

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

Software option overview

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

Description Use this function to display all the software options that are enabled in the device.

User interface
- Extended HistoROM
- SIL
- Heartbeat Verification

Additional information *Description*

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

"Extended HistoROM" option

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

"SIL" option

Order code for "Additional Approval", option LA "SIL"

"Heartbeat Verification" option

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

Activate sensor emergency mode

Navigation Expert → System → Administration → Sens. emerg.mode (6611)

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

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

Selection
- Cancel
- Ok

Factory setting Cancel

Additional information

Description

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

Information on what is causing the diagnostic message, and remedy measures, can be viewed by pressing the E-button.

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

Reset write protection

Navigation Expert → System → Administration → Res. write prot. (0019)

Prerequsite The SIL mode has been enabled.

Description Use this function to enter the SIL locking code to disable write protection in the SIL mode.

User entry 0 to 65 535

Factory setting 0

Additional information

Prerequisite

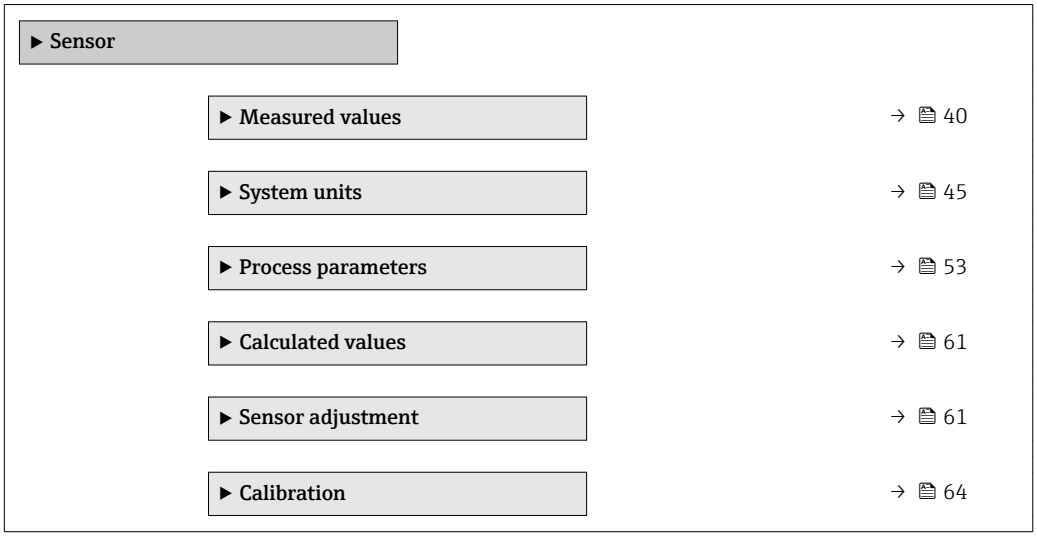
For detailed information about enabling and disabling the SIL mode, see the Special Documentation for the device

Description

Once the SIL mode has been activated, the process-related parameters are write protected, and thereby locked, for security reasons. It is still possible to read the parameters. When SIL locking is enabled, restrictions apply on all communication options, such as the service interface, the HART protocol and the onsite display.

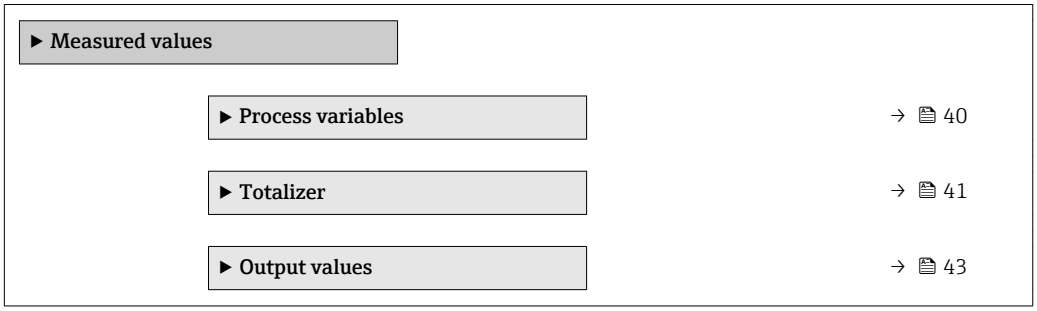
3.2 "Sensor" submenu

Navigation Expert → Sensor



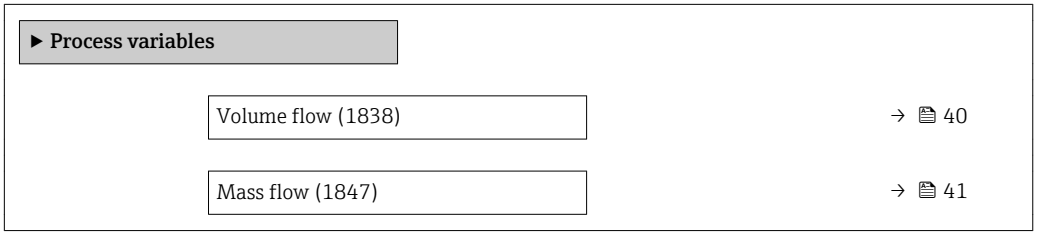
3.2.1 "Measured values" submenu

Navigation Expert → Sensor → Measured val.



"Process variables" submenu

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



Volume flow

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

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

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Volume flow unit** parameter (→ 46)

Mass flow

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

Description Use this function to view the mass flow currently calculated.

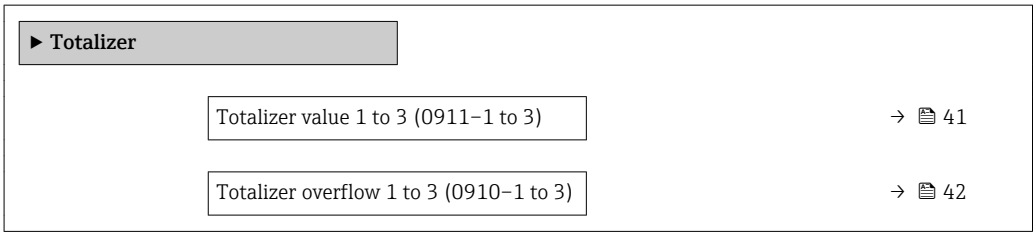
User interface Signed floating-point number

Additional information *Dependency*

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

Totalizer

Navigation Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3 (0911–1 to 3)



Totalizer value 1 to 3

Navigation Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to 3 (0911–1 to 3)

Prerequsite In the **Assign process variable** parameter (→ 110) in the **Totalizer 1 to 3** submenu, one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to check the current totalizer reading.

User interface Signed floating-point number

Factory setting 0 l

Additional information

Description

As it is only possible to display a maximum of 7 digits, the current counter value is the sum of the totalizer value and the overflow value from the **Totalizer overflow 1 to 3** parameterif the display range is exceeded.

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 113).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Totalizer operation mode** parameter (→ 111).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 110).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range:
- Value in the **Totalizer value 1** parameter: 196 845.7 m^3
- Value in the **Totalizer overflow 1** parameter: 1 10^7 (1 overflow) = 10 000 000 [m^3]
- Current totalizer reading:10 196 845.7 m^3

Totalizer overflow 1 to 3

Navigation Expert → Sensor → Measured val. → Totalizer → Tot. overflow 1 to 3 (0910–1 to 3)

Prerequsite In the **Assign process variable** parameter (→ 110) in the **Totalizer 1 to 3** submenu, one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to display the current totalizer overflow.

User interface Integer with sign

Factory setting 0

Additional information

Description

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

User interface

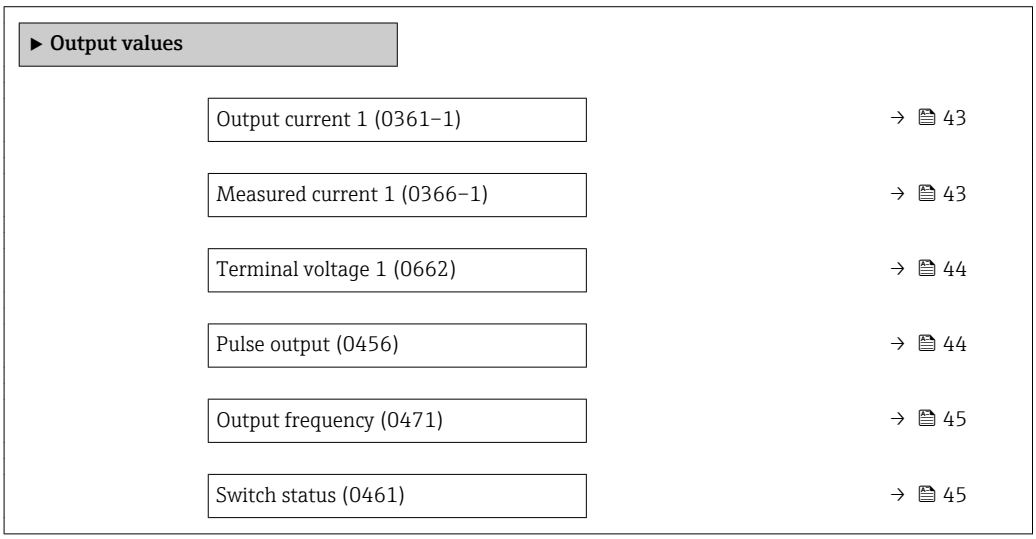
The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 110).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range:
- Value in the **Totalizer value 1** parameter: 196 845.7 m^3
- Value in the **Totalizer overflow 1** parameter: 2 10^7 (2 overflows) = 20 000 000 [m^3]
- Current totalizer reading: 20 196 845.7 m^3

"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values



Output current 1

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

Description Use this function to view the actual calculated value of the output current.

User interface 3.59 to 22.5 mA

Measured current 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

Terminal voltage 1

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

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

User interface 0.0 to 50.0 V

Pulse output

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

Prerequsite The **Pulse** option is selected in the **Operating mode** parameter (→ 79).

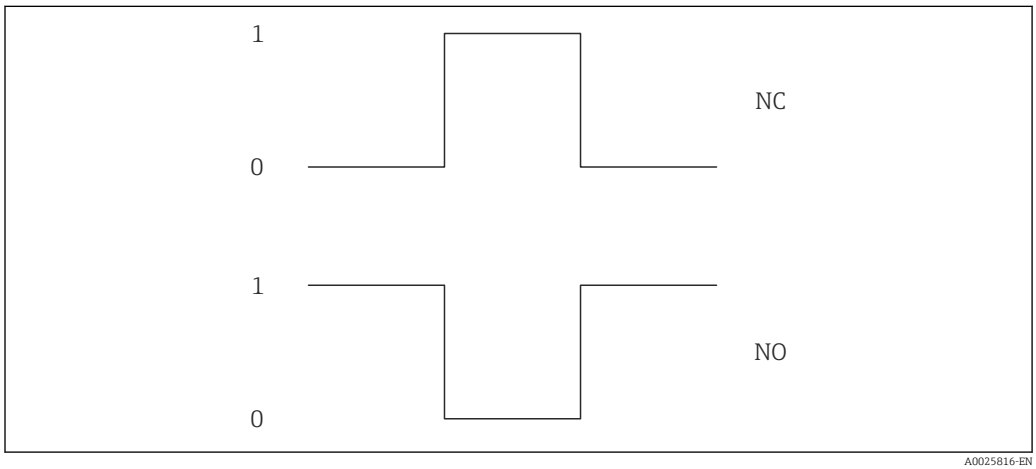
Description Use this function to display the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

The pulse output is an open collector output. This is configured at the factory so that the transistor is conductive for the duration of the pulse (NO contact).

With the **Value per pulse** parameter (→ 80) and **Pulse width** parameter (→ 80) it is possible to define the value - i.e. the measured value amount that is equivalent to a pulse, and the duration of the pulse.



0 Non-conductive
1 Conductive
NC Normally closed
NO Normally opened

The output behavior can be inverted via the **Invert output signal** parameter (→ 89), i.e. the transistor is not conductive for the duration of the pulse.

In addition, the behavior of the output in the event of an error (**Failure mode** parameter (→ 81)) can be configured.

Output frequency

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

Prerequsite The **Frequency** option is selected in the **Operating mode** parameter (→ 79).

Description Use this function to view the actual value of the output frequency which is currently measured.

User interface 0 to 1 250 Hz

Switch status

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

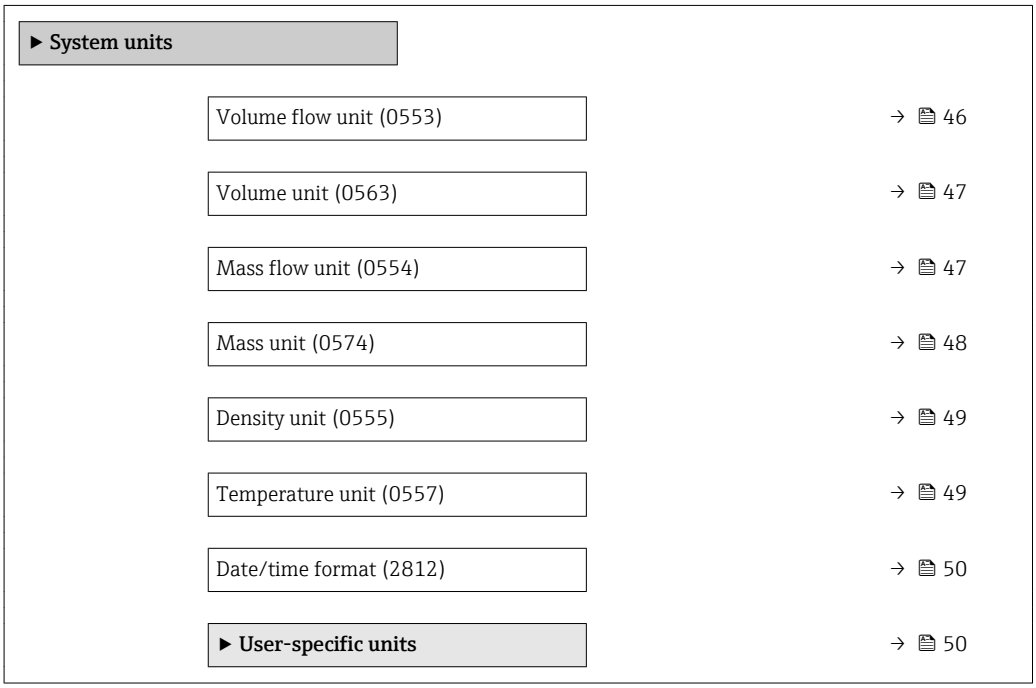
Prerequsite The **Switch** option is selected in the **Operating mode** parameter (→ 79).

Description Use this function to view the current switch status of the status output.

User interface
- Open
- Closed

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)

Custom-specific units
- User vol./s
- User vol./min
- User vol./h
- User vol./d

Factory setting

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

Additional information

Result

The selected unit applies for:
Volume flow (→ 40)

Selection

For an explanation of the abbreviated units: → 145

Customer-specific units

The unit for the customer-specific volume is specified in the **User volume text** parameter (→ 51).

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)

Custom-specific units
User vol.

Factory setting

Country-specific:
- m^3
- gal (us)

Additional information

Selection

For an explanation of the abbreviated units: → 145

Customer-specific units

The unit for the customer-specific volume is specified in the **User volume text** parameter (→ 51).

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

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

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

Factory setting

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

Additional information

Result

The selected unit applies for:
Mass flow (→ 41)

Selection

For an explanation of the abbreviated units: → 145

Customer-specific units

The unit for the customer-specific mass is specified in the **User mass text** parameter (→ 52).

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

Custom-specific units
User mass

Factory setting

Country-specific:
- kg
- lb

Additional information

Selection

For an explanation of the abbreviated units: → 145

Customer-specific units

The unit for the customer-specific mass is specified in the **User mass text** parameter (→ 52).

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/dm³
- kg/l
- kg/m³
- SD4°C
- SD15°C
- SD20°C
- SG4°C
- SG15°C
- SG20°C

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

Result

The selected unit applies for:
Fixed density (→ 61)

Selection

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

For an explanation of the abbreviated units: → 145

Temperature unit

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

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

Selection

SI units
- ℃
- K

US units
- ℉
- ℉R

Factory setting

Country-specific:
- ℃
- ℉

Additional information

Result

The selected unit applies for:
- Maximum value (→ 🖹 134)
- Minimum value (→ 🖹 133)
- Maximum value (→ 🖹 135)
- Minimum value (→ 🖹 134)
- Average value (→ 🖹 135)

Selection

For an explanation of the abbreviated units: → 🖹 145

Date/time format

Navigation

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

Description

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

Selection

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

Factory setting

dd.mm.yy hh:mm

Additional information

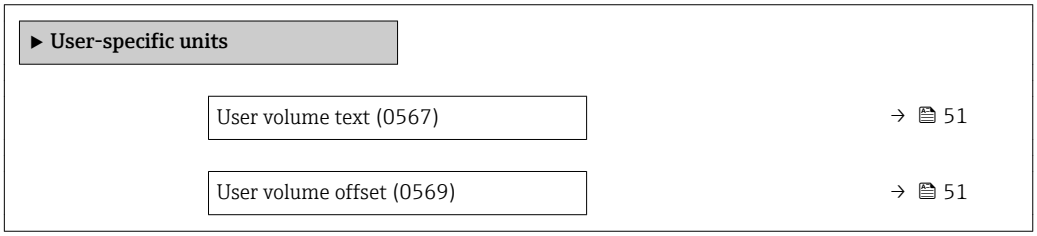
Selection

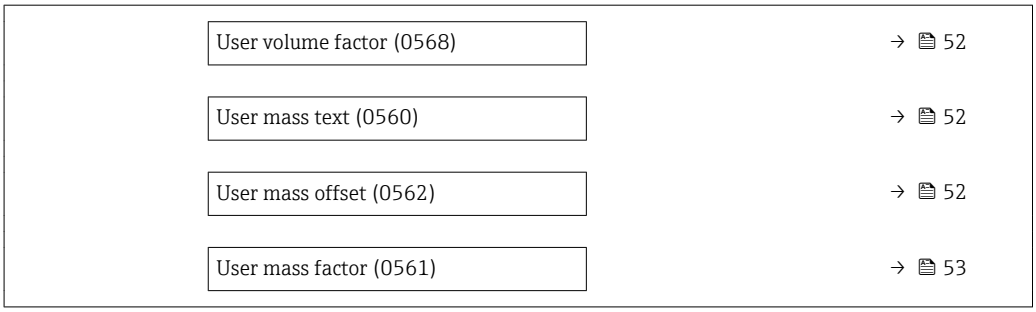
For an explanation of the abbreviated units: → 🖹 145

"User-specific units" submenu

Navigation

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





User volume text

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

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

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

Factory setting User vol.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Volume flow unit** parameter (→ 46)
- **Volume unit** parameter (→ 47)

Example

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 46) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

User volume offset

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

User volume factor

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

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

User entry Signed floating-point number

Factory setting 1.0

User mass text

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

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

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

Factory setting User mass

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Mass flow unit** parameter (→ 47)
- **Mass unit** parameter (→ 48)

Example

If the text GLAS is entered, the choose list of the **Mass flow unit** parameter (→ 47) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

User mass offset

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

User mass factor

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

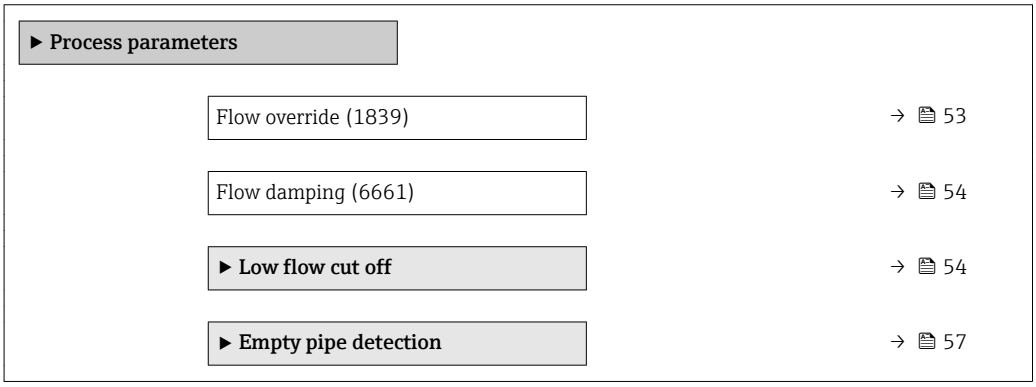
Description Use this function to enter a quantity factor (without time) for the user-specific mass and mass flow unit.

User entry Signed floating-point number

Factory setting 1.0

3.2.3 "Process parameters" 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 process of a pipeline, for example.

Selection
- Off
- On

Factory setting Off

Additional information *Result*

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

Description

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

Flow damping

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

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

User entry 0 to 15

Factory setting 7

Additional information *Result*

The damping has an effect on the following variables of the device:
- Outputs → 65
- Low flow cut off → 54
- Totalizer → 109

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

"Low flow cut off" submenu

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

▶ Low flow cut off		
	Assign process variable (1837)	→ 55
	On value low flow cutoff (1805)	→ 55
	Off value low flow cutoff (1804)	→ 55
	Pressure shock suppression (1806)	→ 56

Assign process variable

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

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

Selection
- Off
- Volume flow
- Mass flow

Factory setting Volume flow

On value low flow cutoff

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

Prerequsite In the **Assign process variable** parameter (→ 55), 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 → 55.

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 142

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign process variable** parameter (→ 55).

Off value low flow cutoff

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

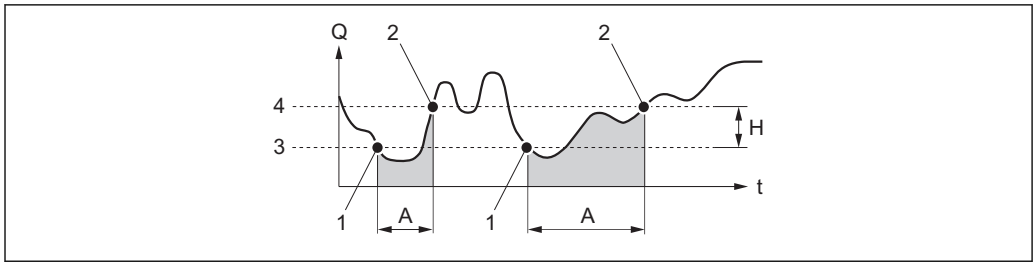
Prerequsite In the **Assign process variable** parameter (→ 55), one of the following options is selected:
- Volume flow
- Mass flow

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→ 55.

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

Pressure shock suppression

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

Prerequsite In the **Assign process variable** parameter (→ 55), one of the following options is selected:
- Volume flow
- Mass flow

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

User entry 0 to 100 s

Factory setting 0 s

Additional information *Example*

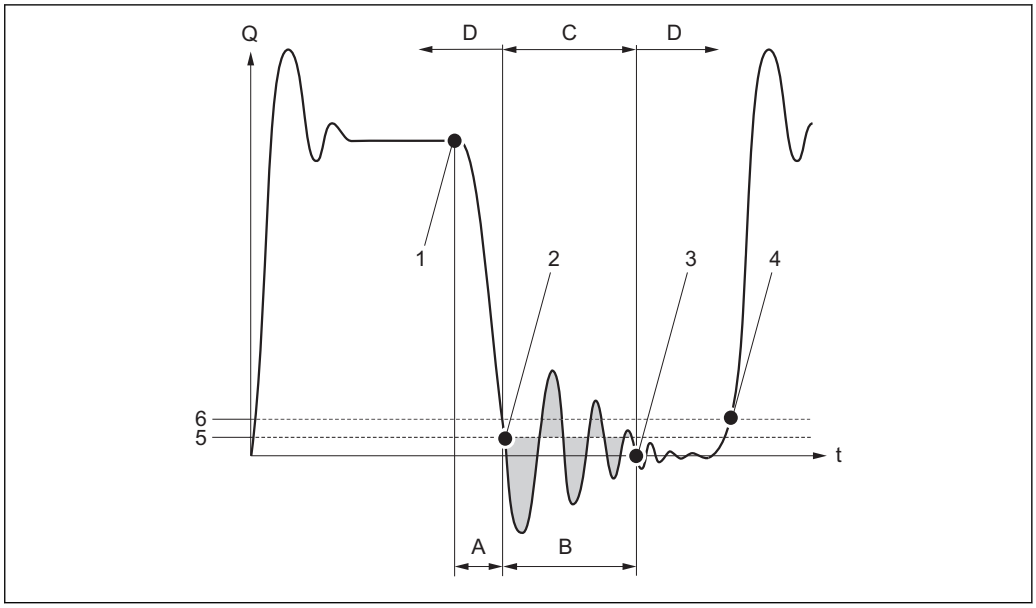
While closing a valve, there can be brief but severe movements of the piping system's fluid that are registered by the measuring system. The pulses totaled in this way result in a totalizer reading error, particularly in the case of batching processes.

Description

Activation of the surge suppression
- Prerequisite: the flow rate is less than the switching-on-point for low flow cut off
- Output values
  - Current output: outputs the current corresponding to zero flow.
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value

Deactivation of the surge suppression
- Prerequisite: the time interval set in this function has elapsed.
- If the flow exceeds the switch-off value of the low flow cut off, the actual flow value is then used and displayed.

Example



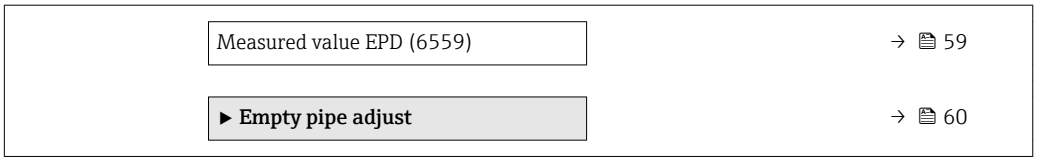
Q Flow
t Time
A After run
B Surge
C Pressure shock suppression active as specified by the time entered
D Pressure shock suppression inactive
1 Valve closes
2 Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated
3 The time entered has elapsed: pressure shock suppression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

"Empty pipe detection" submenu

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

► **Empty pipe detection**

Empty pipe detection (1860)	→ 58
Switch point empty pipe detection (6562)	→ 58
Response time empty pipe detection (1859)	→ 58
Empty pipe adjust value (6527)	→ 59
Full pipe adjust value (6548)	→ 59



Empty pipe detection

Navigation Expert → Sensor → Process param. → Empty pipe det. → Empty pipe det. (1860)

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

Selection
- Off
- On

Factory setting Off

Switch point empty pipe detection

Navigation Expert → Sensor → Process param. → Empty pipe det. → Switch point EPD (6562)

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

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

User entry 1 to 99 %

Factory setting 10 %

Response time empty pipe detection

Navigation Expert → Sensor → Process param. → Empty pipe det. → Response time (1859)

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

Description Use this function to enter the time until the diagnostic message ⚠**S862 Empty pipe** is displayed for an empty measuring pipe.

User entry 0 to 100 s

Factory setting 1 s

Empty pipe adjust value

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

Prerequsite
- The **On** option is selected in the **Empty pipe detection** parameter (→ 58).
- Adjustment value > full pipe value.

Description Use this function to display the adjustment value when the measuring pipe is empty.

User interface Positive floating-point number

Factory setting 0 Ohm

Full pipe adjust value

Navigation Expert → Sensor → Process param. → Empty pipe det. → Full pipe value (6548)

Prerequsite
- The **On** option is selected in the **Empty pipe detection** parameter (→ 58).
- Adjustment value < empty pipe value.

Description Use this function to display the adjustment value when the measuring pipe is full.

User interface Positive floating-point number

Factory setting 0 Ohm

Measured value EPD

Navigation Expert → Sensor → Process param. → Empty pipe det. → Meas. value EPD (6559)

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

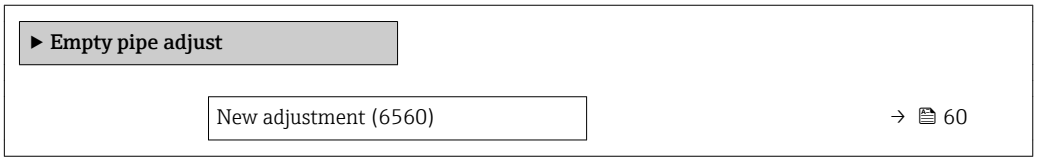
Description Displays the current measured value.

User interface Positive floating-point number

Factory setting 0 Ohm

"Empty pipe adjust" wizard

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



New adjustment

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

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

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

Selection
- Cancel
- Empty pipe adjust
- Full pipe adjust

Factory setting Cancel

Progress

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

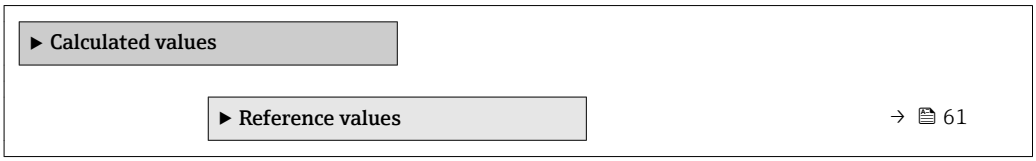
Prerequsite The **On** option is selected in the **Empty pipe detection** parameter (→ 58).

Description Use this function to view the progress.

User interface
- Ok
- Busy
- Not ok

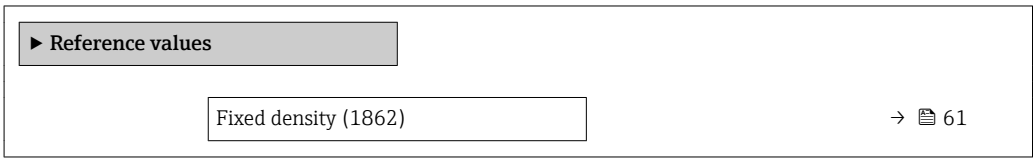
3.2.4 "Calculated values" submenu

Navigation Expert → Sensor → Calculated value



"Reference values" submenu

Navigation Expert → Sensor → Calculated value → Reference values



Fixed density

Navigation Expert → Sensor → Calculated value → Reference values → Fixed density (1862)

Prerequsite The **Mass flow** option is selected in the **Assign current output** parameter (→ 66).

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

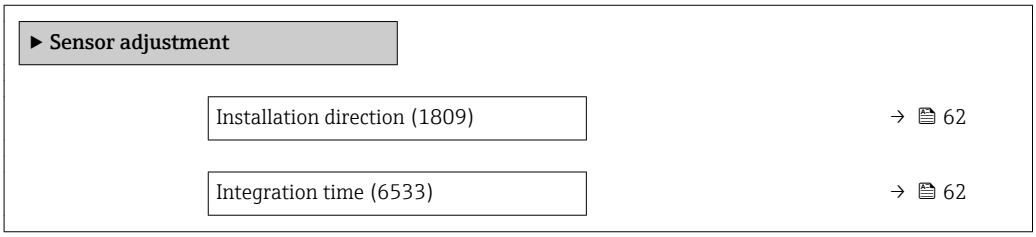
Factory setting 1 000 kg/l

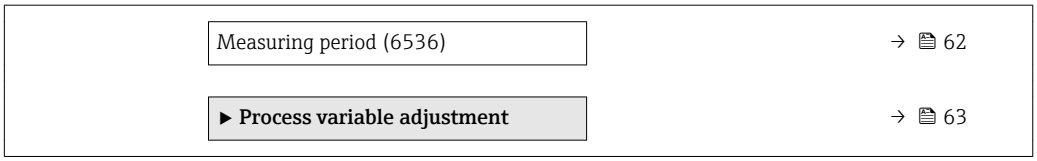
Additional information *User entry*

The unit is taken from the **Density unit** parameter (→ 49).

3.2.5 "Sensor adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm.





Installation direction

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

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

Selection
- Flow in arrow direction
- Flow against arrow direction

Factory setting Flow in arrow direction

Additional information *Description*

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

Integration time

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

Description Display the duration of an integration cycle.

User interface 5 to 100 ms

Factory setting 20 ms

Measuring period

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

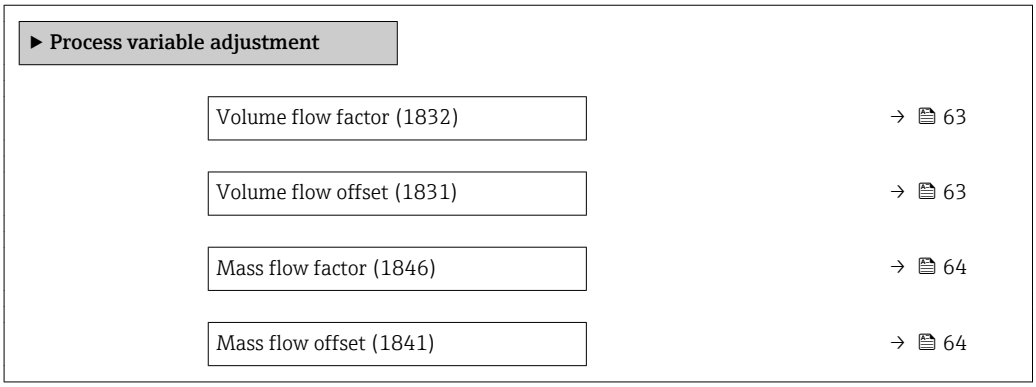
Description Display the time of a full measuring period.

User interface 40 to 1 000 ms

Factory setting 100 ms

"Process variable adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust



Volume 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

Volume 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 1 m^3/s.

User entry Signed floating-point number

Factory setting 0 m^3/s

Additional information *Description*

Corrected value = (factor × value) + offset

Mass flow factor

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

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

User entry Positive floating-point number

Factory setting 1

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 1 kg/s.

User entry Signed floating-point number

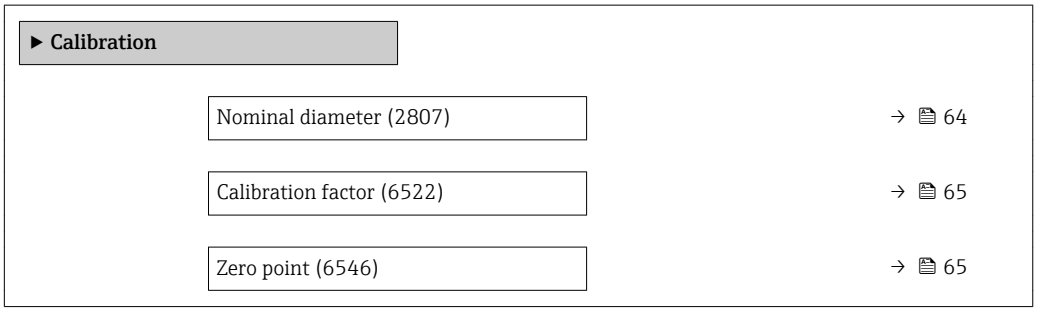
Factory setting 0 kg/s

Additional information *Description*

Corrected value = (factor × value) + offset

3.2.6 "Calibration" submenu

Navigation Expert → Sensor → Calibration



Nominal diameter

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

Description Use this function to view 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.

Calibration factor

Navigation Expert → Sensor → Calibration → Cal. factor (6522)

Description This function is for entering the current calibration factor for the sensor.

User interface Signed floating-point number

Factory setting Depends on nominal diameter and calibration.

Zero point

Navigation Expert → Sensor → Calibration → Zero point (6546)

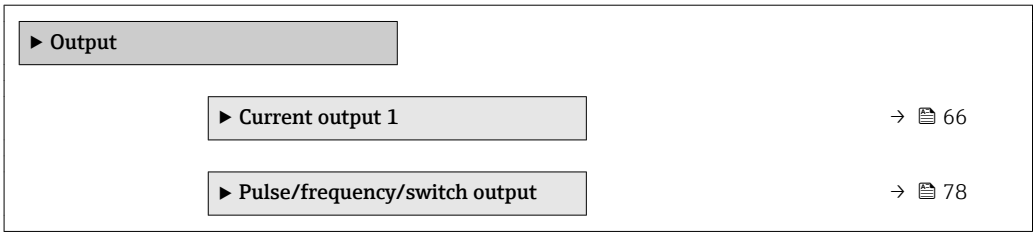
Description This function shows the zero point correction value for the sensor.

User interface Signed floating-point number

Factory setting Depends on nominal diameter and calibration

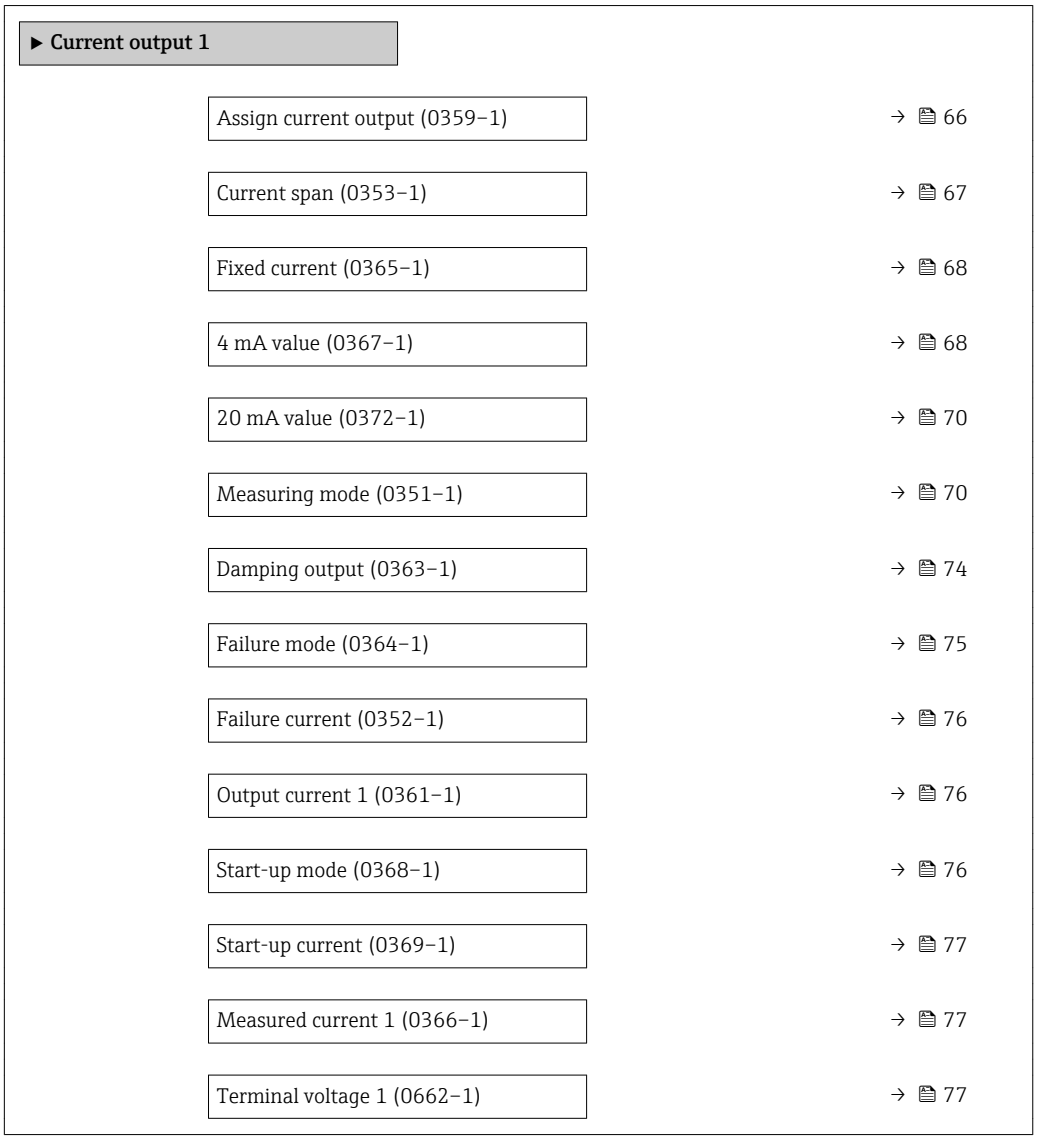
3.3 "Output" submenu

Navigation Expert → Output



3.3.1 "Current output 1" submenu

Navigation Expert → Output → Curr.output 1



Assign current output

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

Description Options for the assignment of a process variable to the current output.

Selection
- Off
- Volume flow
- Mass flow

Factory setting Volume flow

Current span

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

Description The selection specifies the operational range for the process value and the upper and lower level for signal on alarm.

Selection
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- Fixed current

Factory setting Country-specific:
- 4...20 mA NAMUR
- 4...20 mA US

Additional information *Description*

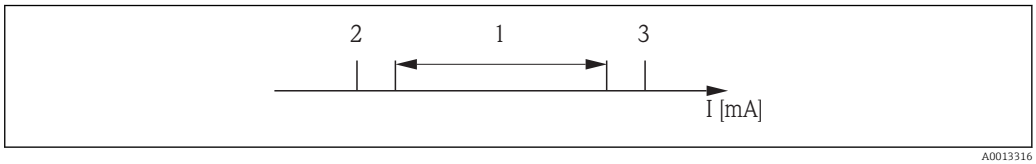
- If an error occurs, the current output adopts the value defined in the **Failure mode** parameter (→ 75).
- If the measured value is outside the measuring range, the diagnostic message ⚠**S441 Current output 1** is displayed.
- The measuring range is specified by the **4 mA value** parameter (→ 68) and **20 mA value** parameter (→ 70).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 68).

Example

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



A0013316

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

Options	1	2	3
4 to 20 mA NAMUR	3.8 to 20.5 mA	< 3.6 mA	> 21.95 mA
4 to 20 mA US	3.9 to 20.8 mA US	< 3.6 mA	> 21.95 mA
4 to 20 mA	4 to 20.5 mA	< 3.6 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 (→ 67).

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

User entry 3.59 to 22.5 mA

Factory setting 4 mA

Additional information *Example*

This setting can be used for HART multidrop, for example.

4 mA value

Navigation Expert → Output → Curr.output 1 → 4 mA value (0367–1)

Prerequisite In the **Current span** parameter (→ 67), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA

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

User entry Signed floating-point number

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

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 66). In addition, the value can be greater or smaller than the value assigned for the 20mA current in the **20 mA value** parameter (→ 70).

User entry

The unit depends on the process variable selected in the **Assign current output** parameter (→ 66).

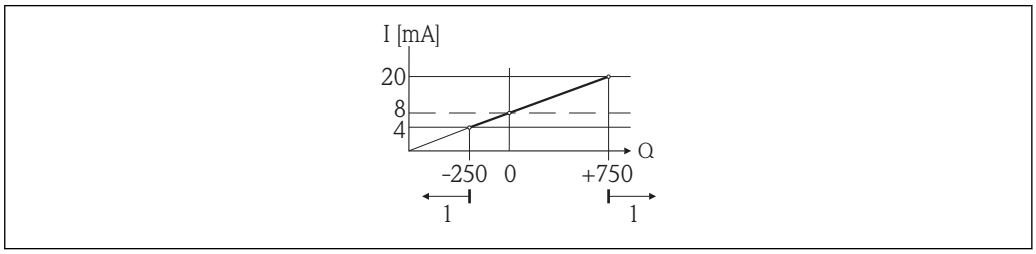
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 67)
- Measuring mode (→ 70)
- Failure mode (→ 75)

Configuration examples

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

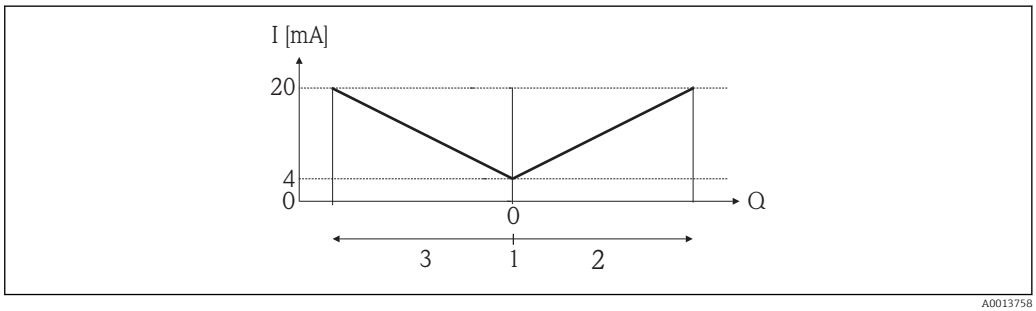
Configuration example A
Measuring mode with the **Forward flow** option
- **4 mA value** parameter (→ 🖹 68) = not equal to zero flow (e.g. −250 m^3/h)
- **20 mA value** parameter (→ 🖹 70) = not equal to zero flow (e.g. +750 m^3/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **4 mA value** parameter (→ 🖹 68) and **20 mA value** parameter (→ 🖹 70). If the effective flow falls outside this operational range, the diagnostic message ⚠**S441 Current output 1** is displayed.

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



I Current
Q Flow
1 Value assigned to 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 **4 mA value** parameter (→ 🖹 68) and **20 mA value** parameter (→ 🖹 70) must have the same sign. The value for the **20 mA value** parameter (→ 🖹 70) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 🖹 70) (e.g. forward flow).

Configuration example C
Measuring mode with **Reverse flow compensation** option
If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside of the measuring range are buffered, balanced and output after a maximum delay of 60 s → 🖹 70.

20 mA value

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

Prerequisite In the **Current span** parameter (→ 67), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA

Description Enter a value for the 20 mA current.

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 142

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 66). In addition, the value can be greater or smaller than the value assigned for the 4 mA current in the **4 mA value** parameter (→ 68).

User entry

The unit depends on the process variable selected in the **Assign current output** parameter (→ 66).

Example

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

If the **Forward/Reverse flow** option is selected in the **Measuring mode** parameter (→ 70), different signs cannot be entered for the values of the **4 mA value** parameter (→ 68) and **20 mA value** parameter (→ 70). The diagnostic message ⚠**S441 Current output 1** is displayed.

Pay attention to the configuration examples for the **4 mA value** parameter (→ 68).

Measuring mode

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

Prerequisite In the **Assign current output** parameter (→ 66), one of the following options is selected:
- Volume flow
- Mass flow

In the **Current span** parameter (→ 67), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA

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

Selection

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

Factory setting

Forward flow

Additional information

Description

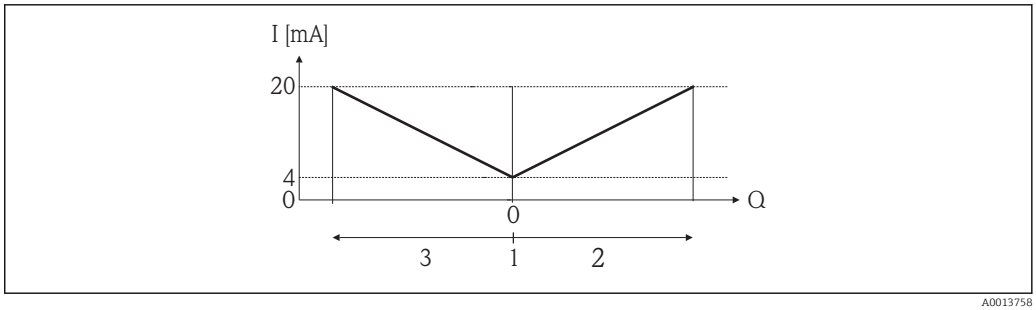
The process variable that is assigned to the current output via the **Assign current output** parameter (→ 66) is displayed below the parameter.

"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 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. 4 mA current value = −5 m^3/h, 20 mA current value = 10 m^3/h): if the effective flow falls outside this measuring range, the diagnostic message ⚠**S441 Current output 1** is displayed.

"Forward/Reverse flow" option



I *Current*
Q *Flow*
1 *Value assigned to 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 **4 mA value** parameter (→ 68) and **20 mA value** parameter (→ 70) must have the same sign. The value for the **20 mA value** parameter (→ 70) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 70) (e.g. forward flow).

"Reverse flow compensation" option

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

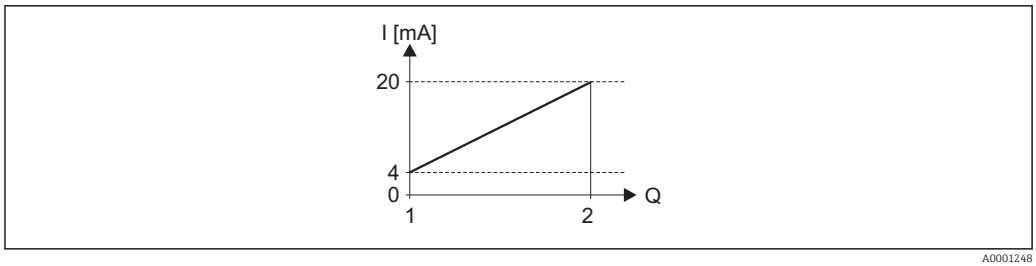
If buffering is not processed within approx. 60 s, the diagnostic message ⚠**S441 Current output 1** is displayed.

Under certain plant conditions, flow values can aggregate in the buffer, for example in the case of prolonged and unwanted fluid reverse flow. However, this buffer is reset in all relevant programming adjustments which affect the current output.

Examples of how the current output behaves

Example 1

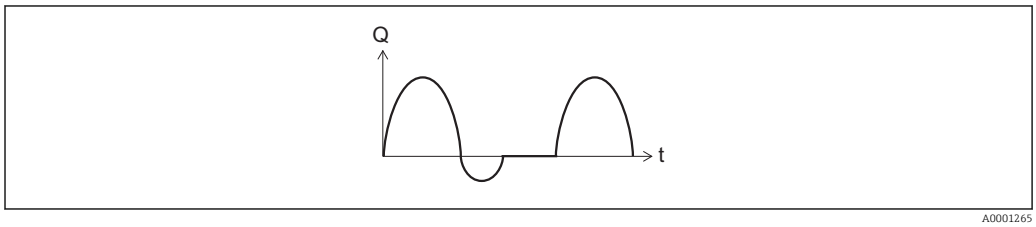
Defined measuring range: lower range value and upper range value with the **same** sign



4 Measuring range

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

With the following flow response:

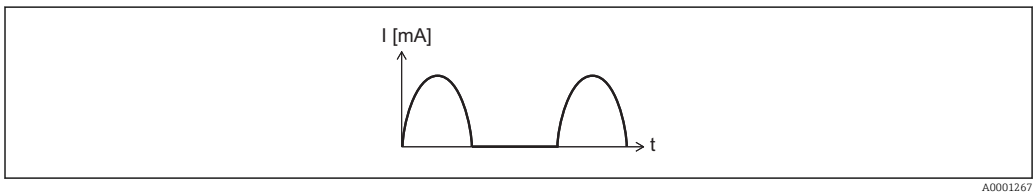


5 Flow response

Q Flow
t Time

With the **Forward flow** option

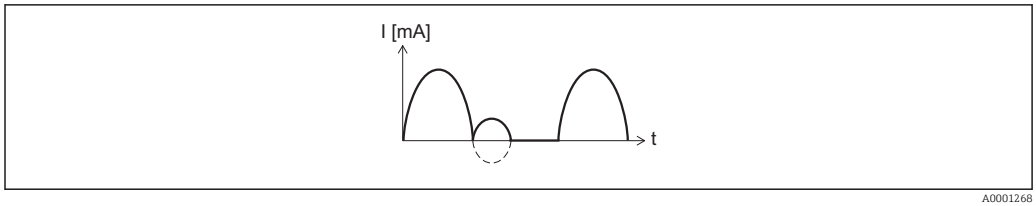
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



I Current
t Time

With the **Forward/Reverse flow** option

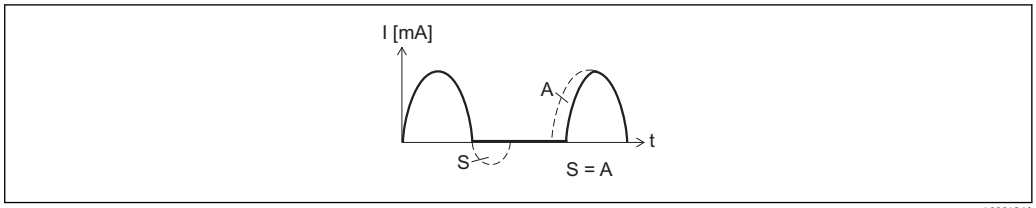
The current output signal is independent of the direction of flow.



I Current
t Time

With the **Reverse flow compensation** option

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

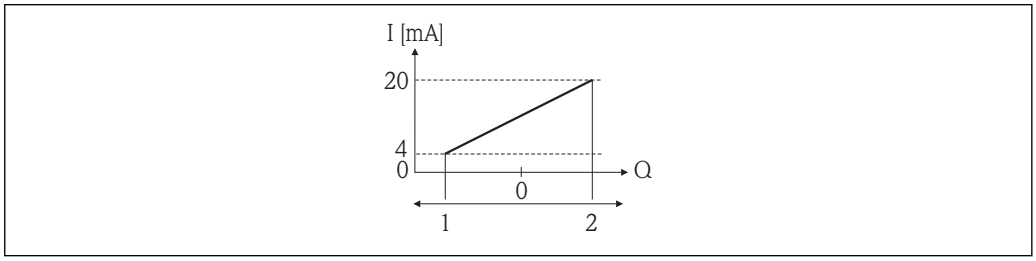


A0001269

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

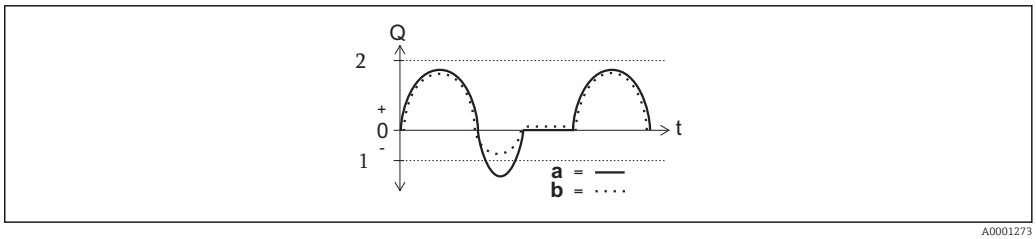


A0001272

6 *Measuring range*

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

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

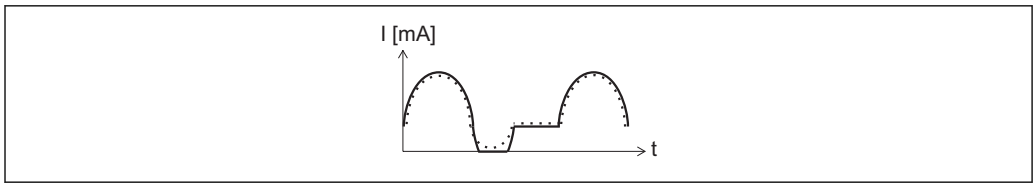


A0001273

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

With the **Forward flow** option

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



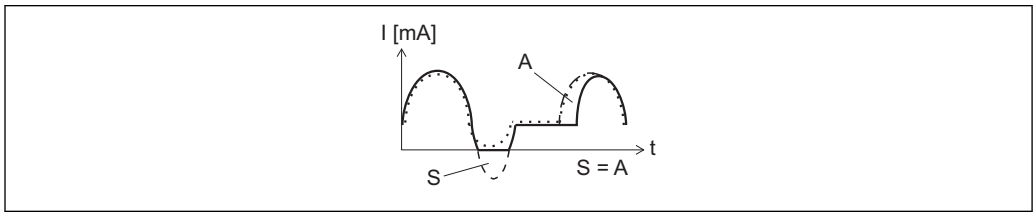
I Current
t Time

With the **Forward/Reverse flow** option

This option is not possible in this case because the values for the **4 mA value** parameter (→ 68) and **20 mA value** parameter (→ 70) have different signs.

With the **Reverse flow compensation** 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 output

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

Prerequsite

In the **Assign current output** parameter (→ 66), one of the following options is selected:
- Volume flow
- Mass flow

In the **Current span** parameter (→ 67), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA

Description Use this function to enter 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 *Description*

Entry of a time constant:
- 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.

Failure mode

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

Prerequisite In the **Assign current output** parameter (→ 66), one of the following options is selected:
- Volume flow
- Mass flow

In the **Current span** parameter (→ 67), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA

Description Use this function to select the value of the current output in the event of an alarm condition.

Selection
- Min.
- Max.
- Last valid value
- Actual value
- Defined value

Factory setting Max.

Additional information *Description*

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

"Min." option

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

The signal on alarm level is defined via the **Current span** parameter (→ 67).

"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 (→ 67).

"Last valid value" option

The current output is based on the last measured value that was valid before the error occurred.

"Actual value" option

The current output is based on the actual measured value on the basis of the current flow measurement; the error 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)

Prerequsite 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 an alarm condition.

User entry 3.59 to 22.5 mA

Factory setting 22.5 mA

Output current 1

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

Description Use this function to view the actual calculated value of the output current.

User interface 3.59 to 22.5 mA

Factory setting 3.59 mA

Start-up mode

Navigation Expert → Output → Curr.output 1 → Start-up mode (0368–1)

Prerequsite In the **Current span** parameter (→ 67), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA

Description Use this function to select the current value that the current output adopts during the device start-up phase as long as no measured value is present.

Selection
- Min.
- Max.
- Defined value

Factory setting Min.

Additional information

"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 (→ 67).

"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 (→ 67).

"Defined value" option

The current output outputs a defined current value.

The current value is defined via the **Start-up current** parameter (→ 77).

Start-up current

Navigation Expert → Output → Curr.output 1 → Start-up current (0369–1)

Prerequsite The **Defined value** option is selected in the **Start-up mode** parameter (→ 76).

Description Use this function to enter a fixed current value that the current output adopts during the device start-up phase as long as no measured value is present.

User entry 3.59 to 22.5 mA

Factory setting 3.6 mA

Measured current 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

Terminal voltage 1

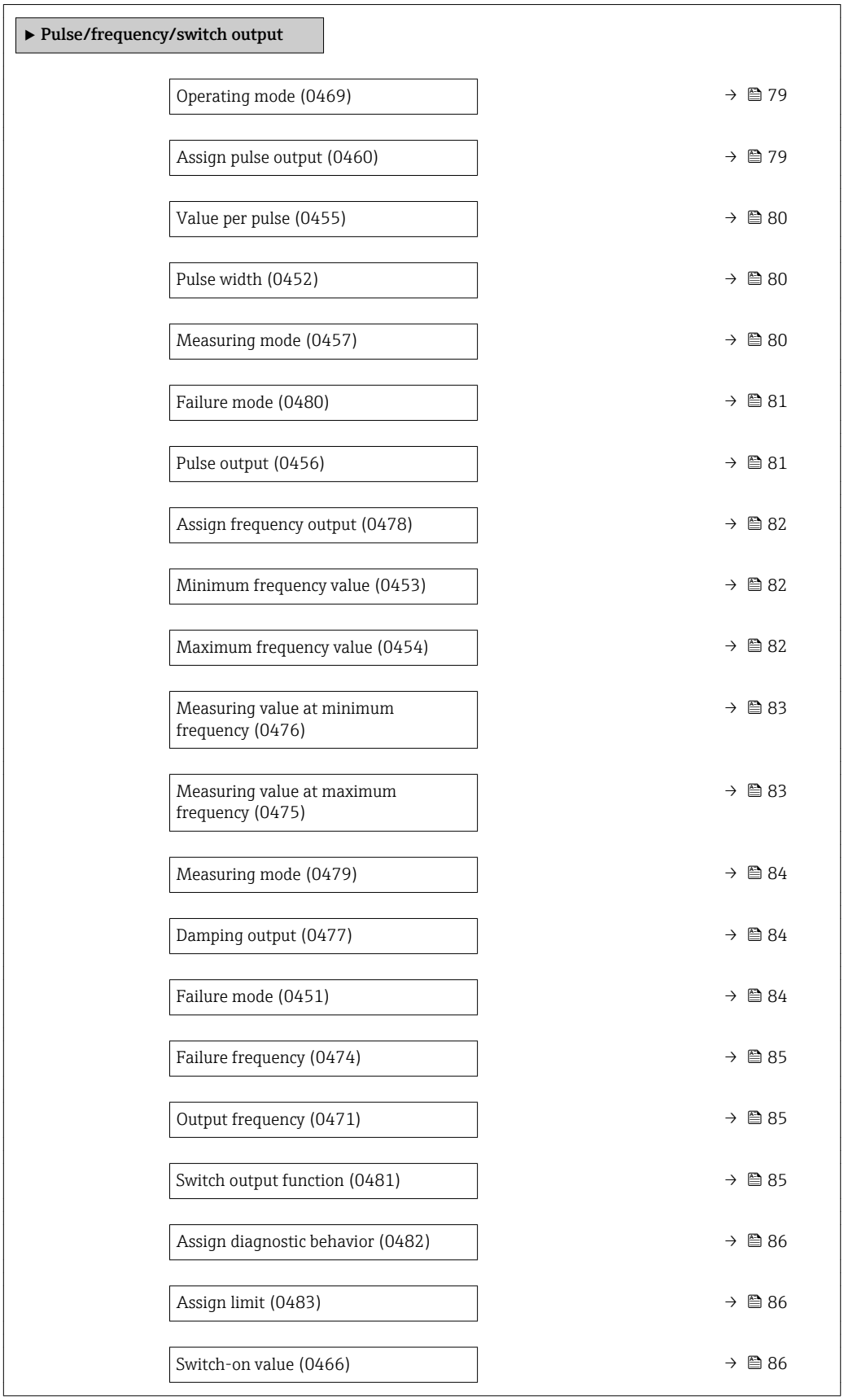
Navigation Expert → Output → Curr.output 1 → Terminal volt. 1 (0662–1)

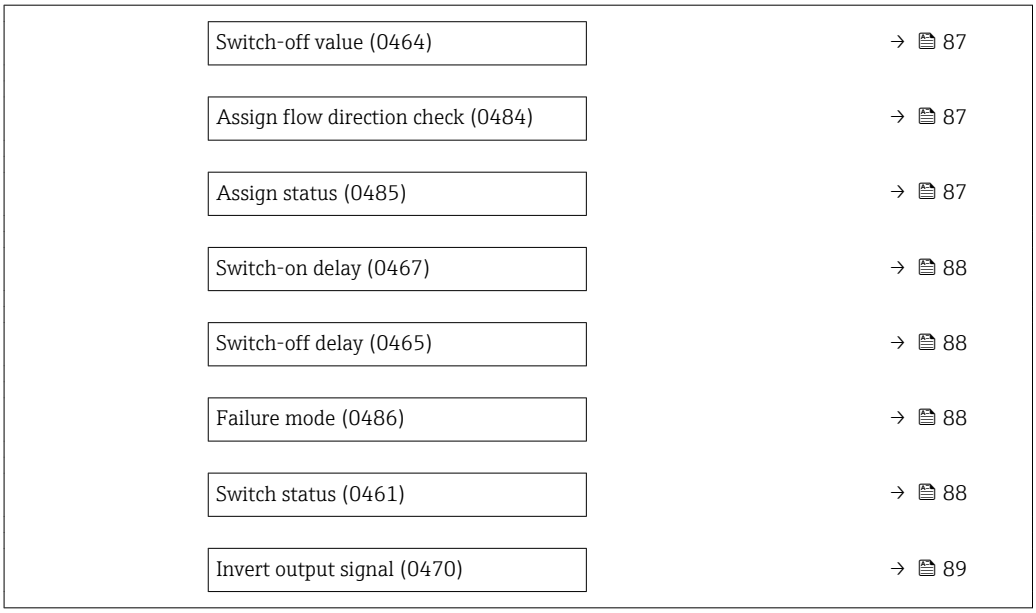
Description Use this function to view the actual terminal voltage that is present at the current output.

User interface 0.0 to 50.0 V

3.3.2 "Pulse/frequency/switch output" submenu

Navigation Expert → Output → PFS output





Operating mode

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

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

Selection
- Pulse
- Frequency
- Switch

Factory setting Pulse

Assign pulse output

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

Prerequsite The **Pulse** option is selected in the **Operating mode** parameter (→ 79).

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

Selection
- Off
- Mass flow
- Volume flow

Factory setting Off

Value per pulse

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

Prerequisite In the **Assign pulse output** parameter (→ 79), one of the following options is selected:
- Mass flow
- Volume flow

Description Use this function to enter the measured value for the pulse output.

User entry Signed floating-point number

Factory setting 0

Pulse width

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

Prerequisite In the **Assign pulse output** parameter (→ 79), one of the following options is selected:
- Mass flow
- Volume flow

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

User entry 5 to 2 000 ms

Factory setting 100 ms

Measuring mode

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

Prerequisite In the **Assign pulse output** parameter (→ 79), one of the following options is selected:
- Mass flow
- Volume flow

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

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

Factory setting Forward flow

Failure mode

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

Prerequisite In the **Assign pulse output** parameter (→ 79), one of the following options is selected:
- Mass flow
- Volume flow

Description Use this function to select an output behavior in the event of a device alarm.

Selection
- Actual value
- No pulses

Factory setting No pulses

Pulse output

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 79).

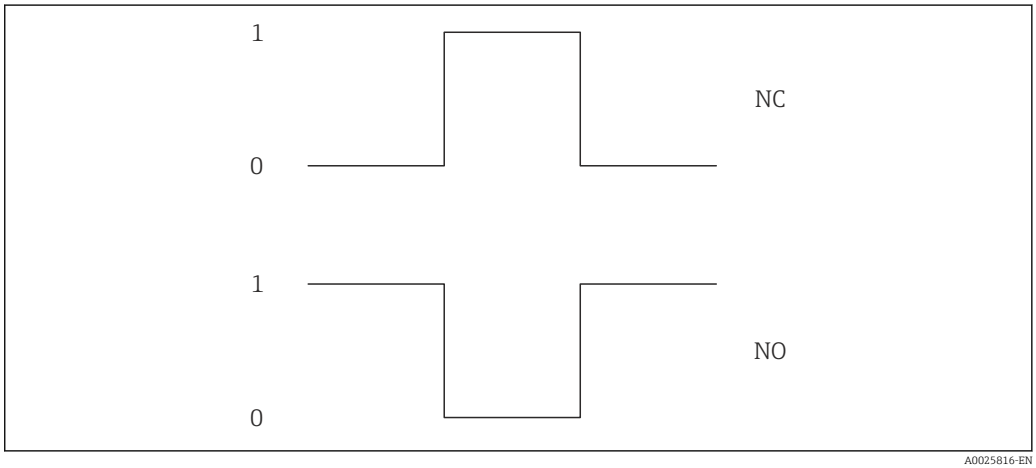
Description Use this function to display the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

The pulse output is an open collector output. This is configured at the factory so that the transistor is conductive for the duration of the pulse (NO contact).

With the **Value per pulse** parameter (→ 80) and **Pulse width** parameter (→ 80) it is possible to define the value - i.e. the measured value amount that is equivalent to a pulse, and the duration of the pulse.



0 Non-conductive
1 Conductive
NC Normally closed
NO Normally opened

The output behavior can be inverted via the **Invert output signal** parameter (→ 89), i.e. the transistor is not conductive for the duration of the pulse.

In addition, the behavior of the output in the event of an error (**Failure mode** parameter (→ 81)) can be configured.

Assign frequency output

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

Prerequsite The **Frequency** option is selected in the **Operating mode** parameter (→ 79).

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

Selection
- Off
- Volume flow
- Mass flow

Factory setting Off

Minimum frequency value

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to enter the start value frequency.

User entry 0 to 1 000 Hz

Factory setting 0 Hz

Maximum frequency value

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to enter the end value frequency.

User entry 0 to 1 000 Hz

Factory setting 1 000 Hz

Measuring value at minimum frequency

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

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 unit depends on the process variable selected in the **Assign frequency output** parameter (→ 82).

Measuring value at maximum frequency

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

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 *Dependency*

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

Measuring mode

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

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

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

Factory setting Forward flow

Damping output

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

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

User entry 0 to 999.9 s

Factory setting 0.0 s

Failure mode

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to select an output behavior in the event of a device alarm.

Selection
- Actual value
- Defined value
- 0 Hz

Factory setting 0 Hz

Failure frequency

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

Prerequsite In the **Assign frequency output** parameter (→ 82), one of the following options is selected:
- Volume flow
- Mass flow

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

User entry 0.0 to 1 250.0 Hz

Factory setting 0.0 Hz

Output frequency

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

Prerequsite The **Frequency** option is selected in the **Operating mode** parameter (→ 79).

Description Use this function to view the actual value of the output frequency which is currently measured.

User interface 0 to 1 250 Hz

Switch output function

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

Prerequsite The **Switch** option is selected in the **Operating mode** parameter (→ 79).

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

Selection
- Off
- On
- Diagnostic behavior
- Limit
- Flow direction check
- Status

Factory setting Off

Assign diagnostic behavior

Navigation Expert → Output → PFS output → Assign diag. beh (0482)

Prerequsite The **Diagnostic behavior** option is selected in the **Switch output function** parameter (→ 85).

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

Selection
- Alarm
- Alarm or warning
- Warning

Factory setting Alarm

Assign limit

Navigation Expert → Output → PFS output → Assign limit (0483)

Prerequsite The **Limit** option is selected in the **Switch output function** parameter (→ 85).

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

Selection
- Volume flow
- Mass flow
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Volume flow

Switch-on value

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

Prerequsite The **Limit** option is selected in the **Switch output function** parameter (→ 85).

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

User entry Signed floating-point number

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

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign limit** parameter (→ 86).

Switch-off value

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

Prerequsite The **Limit** option is selected in the **Switch output function** parameter (→ 85).

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

User entry Signed floating-point number

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

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign limit** parameter (→ 86).

Assign flow direction check

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

Prerequsite The **Flow direction check** option is selected in the **Switch output function** parameter (→ 85).

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

Selection
- Volume flow
- Mass flow

Factory setting Volume flow

Assign status

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

Prerequsite The **Status** option is selected in the **Switch output function** parameter (→ 85).

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

Selection
- Empty pipe detection
- Low flow cut off

Factory setting Empty pipe detection

Switch-on delay

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

Prerequsite The **Limit** option is selected in the **Switch output function** parameter (→ 85).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay

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

Prerequsite The **Limit** option is selected in the **Switch output function** parameter (→ 85).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

Navigation Expert → Output → PFS output → Failure mode (0486)

Description Use this function to select an output behavior in the event of a device alarm.

Selection
- Actual status
- Open
- Closed

Factory setting Open

Switch status

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

Prerequsite The **Switch** option is selected in the **Operating mode** parameter (→ 79).

Description Use this function to view the current switch status of the status output.

User interface
- Open
- Closed

Invert output signal

Navigation Expert → Output → PFS output → Invert outp.sig. (0470)

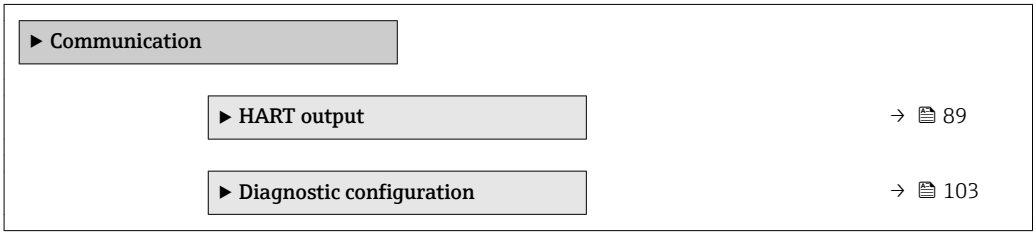
Description Use this function to select whether to invert the output signal.

Selection
- No
- Yes

Factory setting No

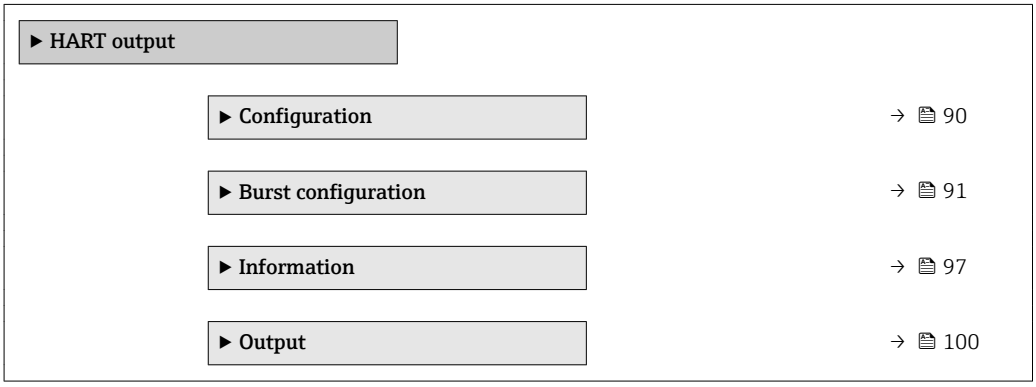
3.4 "Communication" submenu

Navigation Expert → Communication



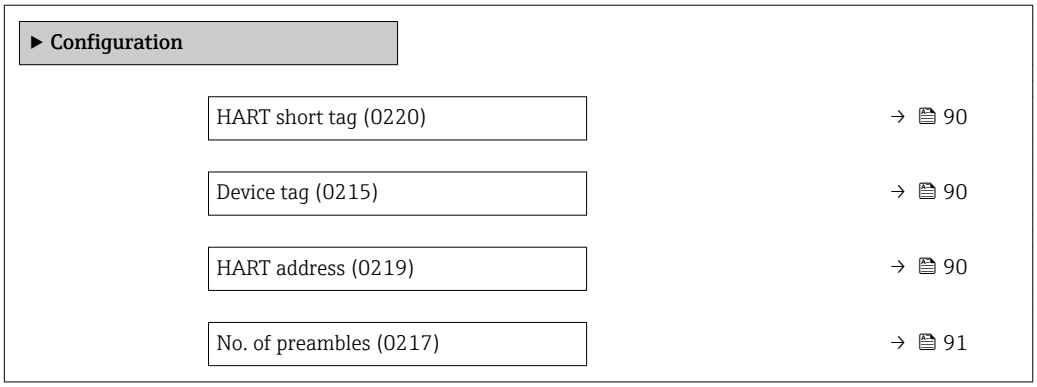
3.4.1 "HART output" submenu

Navigation Expert → Communication → HART output



"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-Z, 0-9 and certain special characters (e.g. punctuation marks, @, %).

Factory setting PROMAG

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 Promag

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

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

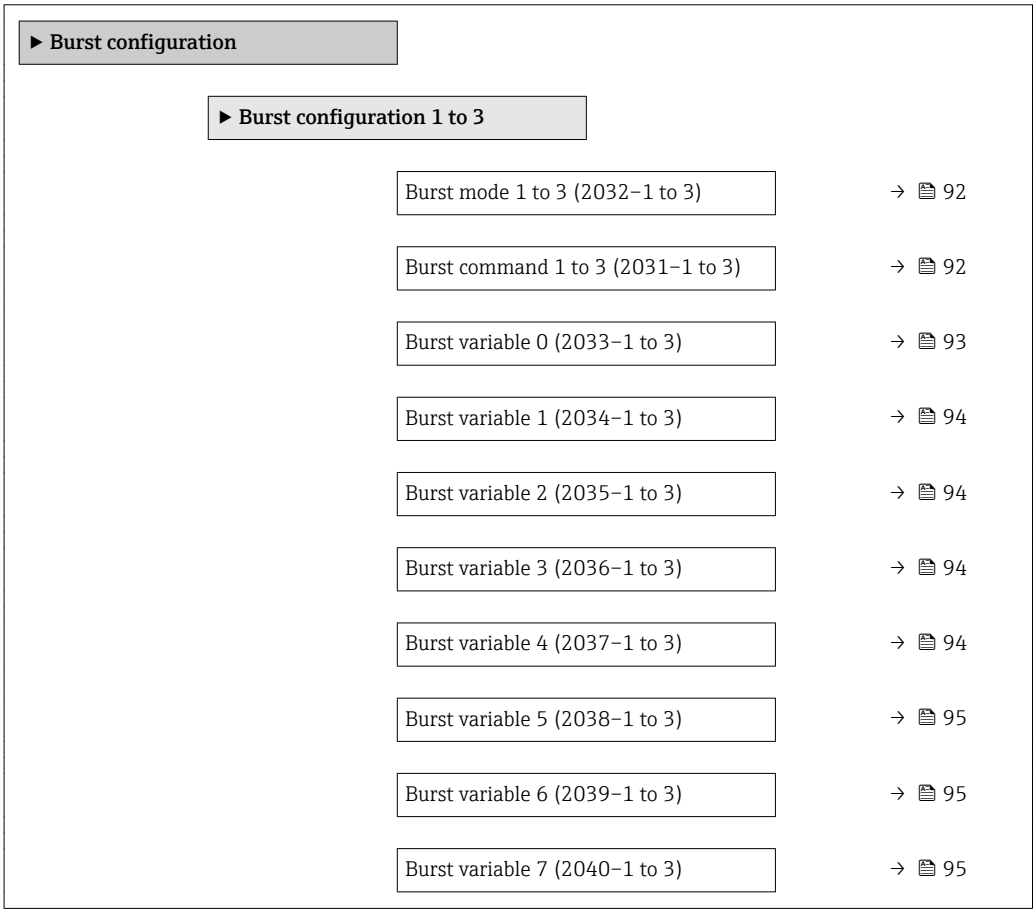
Factory setting 5

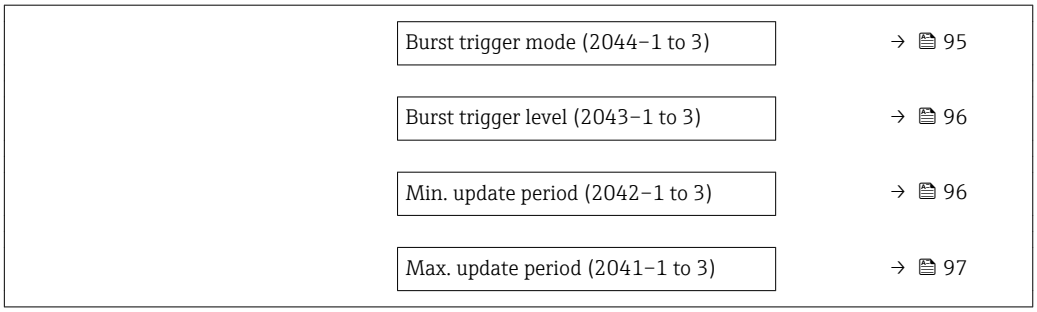
Additional information *User entry*

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

"Burst configuration" submenu

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3





Burst mode 1 to 3

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst mode 1 to 3 (2032–1 to 3)

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 *Selection*
- 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 3

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst command 1 to 3 (2031–1 to 3)

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.
  The HART device variables are defined via Command 107.
  The following measured variables (HART device variables) can be read out:
  – Volume flow
  – Mass flow
  – Totalizer 1…3
  – Percent Of Range
  – Measured current
  – Primary variable (PV)
  – Secondary variable (SV)
  – Tertiary variable (TV)
  – Quaternary variable (QV)
- Command 48
  Read out the complete device diagnostics.

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 (→ 65).

Burst variable 0

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 0 (2033-1 to 3)

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

Selection

- Volume flow
- Mass flow
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Percent Of Range
- Measured current
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)
- Not used

Factory setting Volume flow

Burst variable 1

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 1 (2034–1 to 3)

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst variable 2

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 2 (2035–1 to 3)

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst variable 3

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

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst variable 4

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 4 (2037–1 to 3)

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst variable 5

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 5 (2038–1 to 3)

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst variable 6

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 6 (2039–1 to 3)

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst variable 7

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Burst variable 7 (2040–1 to 3)

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

Selection See **Burst variable 0** parameter (→ 93).

Factory setting Not used

Burst trigger mode

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Trigger mode (2044–1 to 3)

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

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

Factory setting Continuous

Additional information *Selection*

- Continuous
  The message is triggered in a time-controlled manner, at least observing the time interval defined in the **Burst min period** parameter (→ 96).
- Window
  The message is triggered if the specified measured value has changed by the value in the **Burst trigger level** parameter (→ 96).
- Rising
  The message is triggered if the specified measured value exceeds the value in the **Burst trigger level** parameter (→ 96).
- Falling
  The message is triggered if the specified measured value drops below the value in the **Burst trigger level** parameter (→ 96).
- On change
  The message is triggered if the measured value changes.

Burst trigger level

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Trigger level (2043–1 to 3)

Description For entering the burst trigger value.

User entry Positive floating-point number

Additional information *Description*

Together with the option selected in the **Burst trigger mode** parameter (→ 95) the burst trigger value determines the time of burst message X.

Min. update period

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Min. upd. per. (2042–1 to 3)

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. update period

Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to 3 → Max. upd. per. (2041–1 to 3)

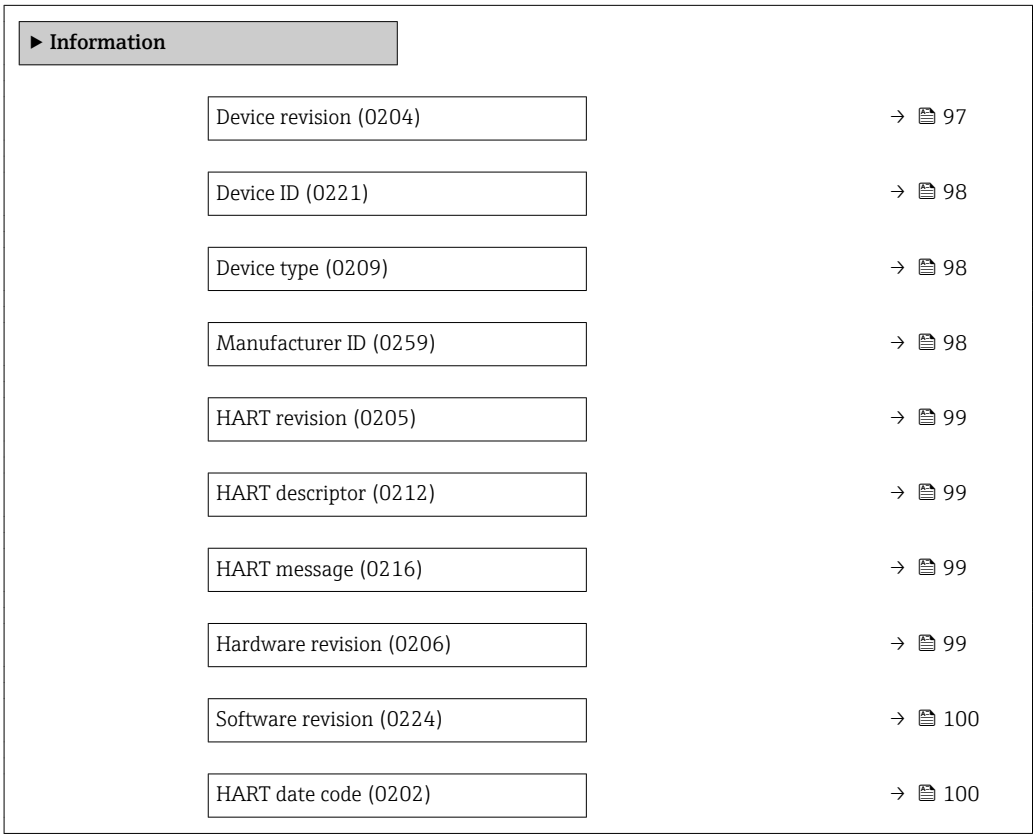
Description Use this function to enter the maximum time span between two burst commands of burst message X.

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 Use this function to view the device revision with which the device is registered with the HART Communication Foundation.

User interface 2-digit hexadecimal number

Factory setting 2

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

User interface 2-digit hexadecimal number

Factory setting 0x48 (for Promag 200)

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 Promag

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 Promag

Hardware revision

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

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

User interface 0 to 255

Factory setting 1

Software revision

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

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

User interface 0 to 255

Factory setting 2

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.

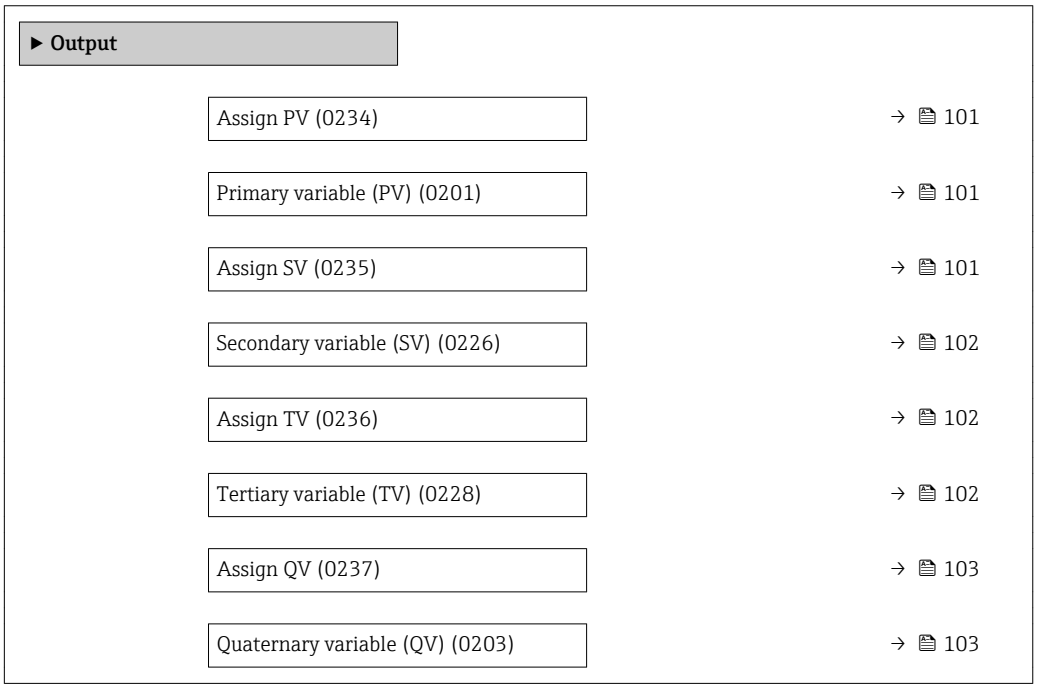
User entry Date entry format: yyyy-mm-dd

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 the assignment of a measured variable (HART device variable) to the primary dynamic variable (PV).

Selection
- Off
- Volume flow
- Mass flow

Factory setting Volume flow

Primary variable (PV)

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

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

User interface Signed floating-point number

Additional information *User interface*

The displayed measured value depends on the option selected in the **Assign PV** parameter (→ 101).

The unit of the value is taken from the **System units** submenu (→ 45).

Assign SV

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

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

Selection
- Volume flow
- Mass flow
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Totalizer 1

Secondary variable (SV)

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

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

User interface Signed floating-point number

Additional information *User interface*

The displayed measured value depends on the option selected in the **Assign SV** parameter (→ 101).

The unit of the value is taken from the **System units** submenu (→ 45).

Assign TV

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

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

Selection
- Volume flow
- Mass flow
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Totalizer 2

Tertiary variable (TV)

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

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

User interface Signed floating-point number

Additional information *User interface*

The displayed measured value depends on the option selected in the **Assign TV** parameter (→ 102).

The unit of the value is taken from the **System units** submenu (→ 45).

Assign QV

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

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

Selection
- Volume flow
- Mass flow
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Totalizer 3

Quaternary variable (QV)

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

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

User interface Signed floating-point number

Additional information *User interface*

The displayed measured value depends on the option selected in the **Assign QV** parameter (→ 103).

The unit of the value is taken from the **System units** submenu (→ 45).

3.4.2 "Diagnostic configuration" 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.
- **Function check (C)** option
  The device is in service mode (e.g. during a simulation).
- **Out of specification (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)
- **Maintenance required (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.

Event category 004 (Sensor)

Navigation Expert → Communication → Diag. config. → Event category 004 (0238)

Description Use this function to select the category assigned to diagnostic message **004 Sensor**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 441 (Current output 1)

Navigation Expert → Communication → Diag. config. → Event category 441 (0210)

Description Use this function to select the category assigned to diagnostic message **441 Current output 1**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 442 (Frequency output)

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

Prerequsite The pulse/frequency/switch output is available.

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

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 443 (Pulse output)

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

Prerequsite 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)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 531 (Empty pipe detection)

Navigation Expert → Communication → Diag. config. → Event category 531 (0262)

Description Use this function to select the category assigned to diagnostic message **531 Empty pipe detection**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 801 (Supply voltage too low)

Navigation Expert → Communication → Diag. config. → Event category 801 (0232)

Description Use this function to select the category assigned to diagnostic message **801 Supply voltage too low**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 832 (Electronic temperature too high)

Navigation Expert → Communication → Diag. config. → Event category 832 (0218)

Description Use this function to select the category assigned to diagnostic message **832 Electronic temperature too high**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 833 (Electronic temperature too low)

Navigation Expert → Communication → Diag. config. → Event category 833 (0225)

Description Use this function to select the category assigned to diagnostic message **833 Electronic temperature too low**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 861 (Process fluid)

Navigation Expert → Communication → Diag. config. → Event category 861 (0261)

Description Use this function to select the category assigned to diagnostic message **861 Process fluid**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 862 (Empty pipe)

Navigation Expert → Communication → Diag. config. → Event category 862 (0214)

Description Use this function to select the category assigned to diagnostic message **862 Empty pipe**.

Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

Event category 937 (EMC interference)

Navigation Expert → Communication → Diag. config. → Event category 937 (0260)

Description Use this function to select the category assigned to diagnostic message **937 EMC interference**.

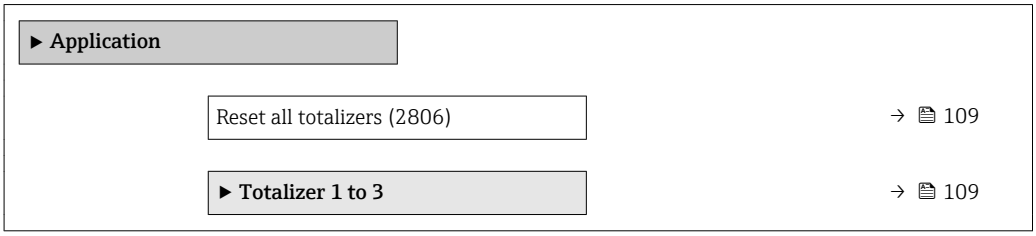
Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

Factory setting Out of specification (S)

Additional information For a detailed description of the options available for selection: → 103

3.5 "Application" submenu

Navigation Expert → Application



Reset all totalizers

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.

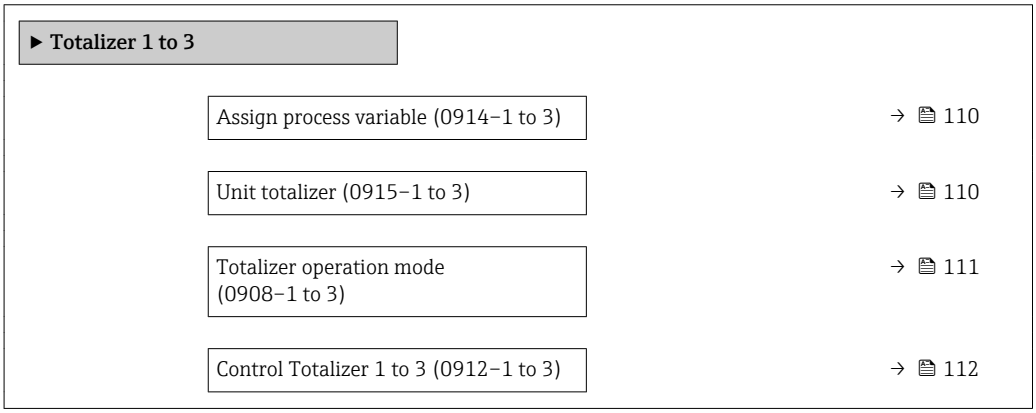
Selection
- Cancel
- Reset + totalize

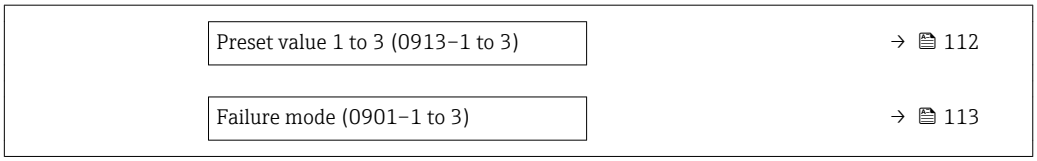
Factory setting Cancel

Additional information *Selection*
- Cancel
  No action is executed and the user exits the parameter.
- Reset + totalize
  All totalizers are reset to 0 and the totaling process is restarted.

3.5.1 "Totalizer 1 to 3" submenu

Navigation Expert → Application → Totalizer 1 to 3





Assign process variable

Navigation Expert → Application → Totalizer 1 to 3 → Assign variable (0914–1 to 3)

Description Use this function to select a process variable for totalizer 1-3.

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 the **Assign process variable** parameter (→ 110) is displayed in the **Totalizer 1 to 3** submenu. All other parameters in the submenu are hidden.

Unit totalizer

Navigation Expert → Application → Totalizer 1 to 3 → Unit totalizer (0915–1 to 3)

Prerequsite In the **Assign process variable** parameter (→ 110), one of the following options is selected:
- Volume flow
- Mass flow

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

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Custom-specific units
User mass

or

SI units
- 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)

Custom-specific units
User vol.

Factory setting

Country-specific:
- l
- gal (us)

Additional information

Description

The unit is selected separately for each totalizer. It is independent of the option selected in the **System units** submenu (→ 45).

Selection

The selection depends on the process variable selected in the **Assign process variable** parameter (→ 110).

Totalizer operation mode

Navigation

Expert → Application → Totalizer 1 to 3 → Operation mode (0908–1 to 3)

Prerequsite

In the **Assign process variable** parameter (→ 110), one of the following options is selected:
- Volume flow
- Mass flow

Description

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

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

Factory setting

Net flow total

Additional information

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

Control Totalizer 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Control Tot. 1 to 3 (0912–1 to 3)

Prerequsite In the **Assign process variable** parameter (→ 110), one of the following options is selected:
- 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

Factory setting Totalize

Additional information *Selection*
- Totalize
  The totalizer is started or continues totalizing with the current counter reading.
- Reset + hold
  The totaling process is stopped and the totalizer is reset to 0.
- Preset + hold
  The totaling process is stopped and the totalizer is set to its defined start value from the **Preset value** parameter (→ 112).
- Reset + totalize
  The totalizer is reset to 0 and the totaling process is restarted.
- Preset + totalize
  The totalizer is set to the defined start value in the **Preset value** parameter (→ 112)and the totaling process is restarted.

Preset value 1 to 3

Navigation Expert → Application → Totalizer 1 to 3 → Preset value 1 to 3 (0913–1 to 3)

Prerequsite In the **Assign process variable** parameter (→ 110), one of the following options is selected:
- Volume flow
- Mass flow

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 l
- 0 gal (us)

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 110).

Example

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

Failure mode

Navigation Expert → Application → Totalizer 1 to 3 → Failure mode (0901–1 to 3)

Prerequsite In the **Assign process variable** parameter (→ 110), one of the following options is selected:
- Volume flow
- Mass flow

Description Use this function to select how a totalizer behaves in an alarm condition.

Selection
- Stop
- Actual value
- Last valid value

Factory setting Stop

Additional information *Description*

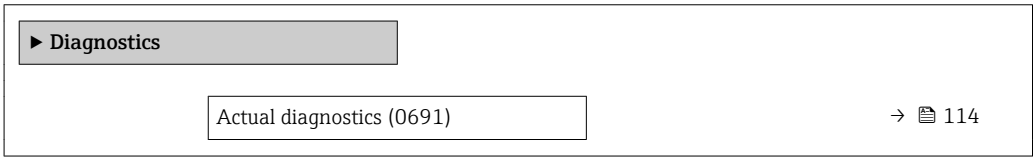
This setting does not affect the error response mode of other totalizers and the outputs. This is specified in separate parameters.

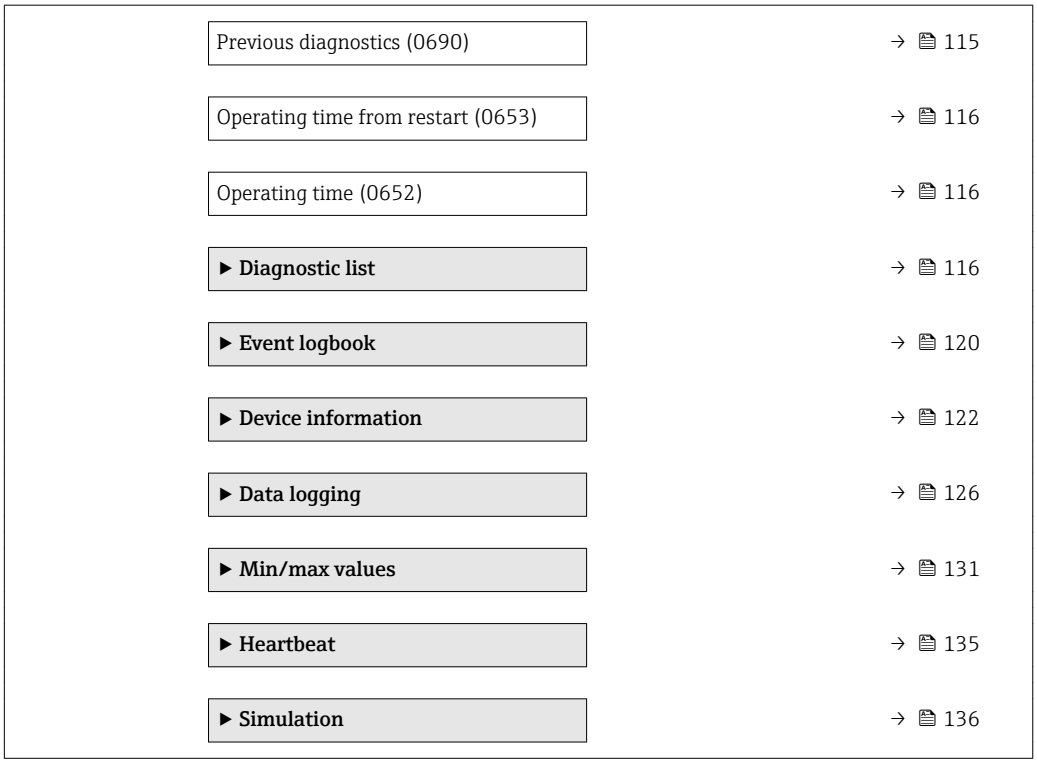
Selection

- Stop
  Totalizing is stopped in an alarm condition.
- Actual value
  The totalizer continues to count based on the actual measured value; the error is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the error occurred.

3.6 "Diagnostics" submenu

Navigation Expert → Diagnostics





Actual diagnostics

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

Description Use this function to display the current diagnostics message. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.

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

Additional information

User interface

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 116).

Information on what is causing the diagnostic message, and remedy measures, can be viewed by pressing the E-button.

Example

For the display format:
⚠S442 Frequency output

Timestamp

Navigation Expert → Diagnostics → Timestamp (0667)

Description Displays the operating time at which the current diagnostic message occurred.

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

Additional information *User interface*

The diagnostic message can be viewed via the **Actual diagnostics** parameter (→ 114).

Example

For the display format:
24d12h13m00s

Previous diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics (0690)

Prerequsite Two diagnostic events have already occurred.

Description Use this function to display the diagnostic message last displayed before the current message.

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

Additional information *User interface*

Information on what is causing the diagnostic message, and remedy measures, can be viewed by pressing the E-button.

Example

For the display format:
⚠S442 Frequency output

Timestamp

Navigation Expert → Diagnostics → Timestamp (0672)

Description Displays the operating time of the last diagnostic message that occurred before the current message.

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

Additional information *User interface*

The diagnostic message can be viewed via the **Previous diagnostics** parameter (→ 115).

Example

For the display format:
24d12h13m00s

Operating time from restart

Navigation Expert → Diagnostics → Time fr. restart (0653)

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

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

Operating time

Navigation Expert → Diagnostics → Operating time (0652)

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

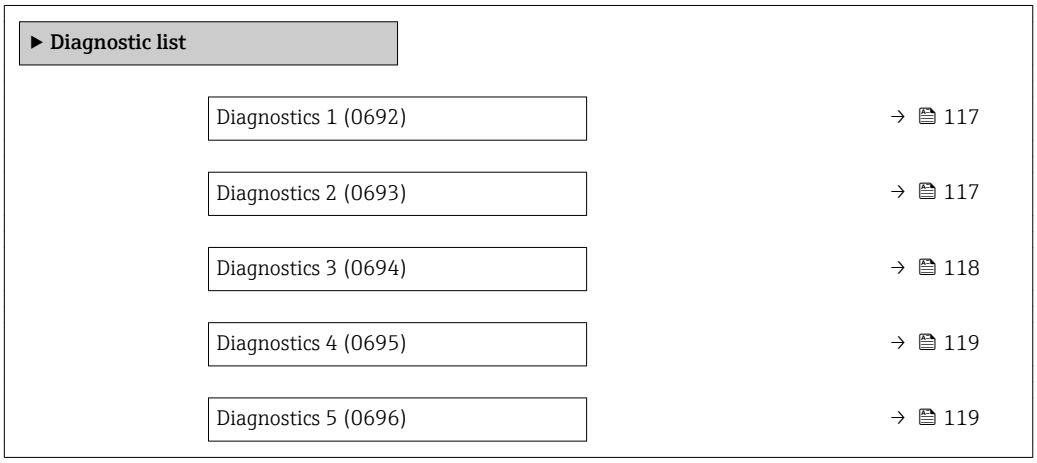
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *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 Use this function to display 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:
- ⚠S442 Frequency output
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp (0683)

Description Displays the operating time at which the diagnostic message occurred.

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

Additional information *User interface*

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 117).

Example

For the display format:
24d12h13m00s

Diagnostics 2

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 2 (0693)

Description Use this function to display the current diagnostics message with the second-highest priority.

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

Additional information *Examples*

For the display format:
- ⚠S442 Frequency output
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp (0684)

Description Displays the operating time at which the diagnostic message occurred.

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

Additional information *User interface*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 117).

Example

For the display format:
24d12h13m00s

Diagnostics 3

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

Description Use this function to display the current diagnostics message with the third-highest priority.

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

Additional information *Examples*

For the display format:
- ⚠S442 Frequency output
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp (0685)

Description Displays the operating time at which the diagnostic message occurred.

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

Additional information *User interface*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 118).

Example

For the display format:
24d12h13m00s

Diagnostics 4

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 4 (0695)

Description Use this function to display the current diagnostics message with the fourth-highest priority.

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

Additional information *Examples*

For the display format:
- ⚠S442 Frequency output
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp (0686)

Description Displays the operating time at which the diagnostic message occurred.

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

Additional information *User interface*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 119).

Example

For the display format:
24d12h13m00s

Diagnostics 5

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 5 (0696)

Description Use this function to display the current diagnostics message with the fifth-highest priority.

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

Additional information *Examples*

For the display format:
- ⚠S442 Frequency output
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp (0687)

Description Displays the operating time at which the diagnostic message occurred.

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

Additional information *User interface*

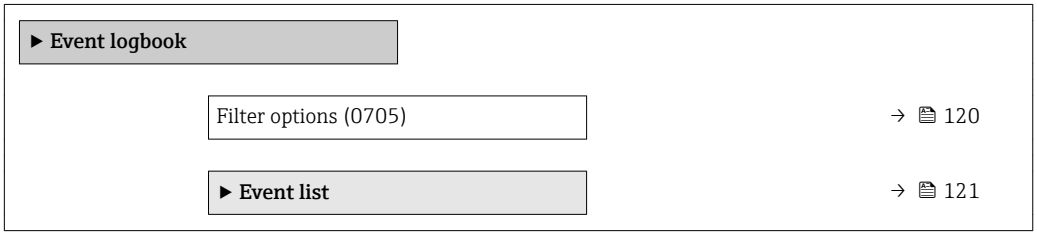
The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 119).

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 (0705)

Description Use this function to select the category whose event messages are displayed in the events list.

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

Factory setting All

Additional information *Description*

The status signals are categorized in accordance with VDI/VDE 2650 and NAMUR Recommendation NE 107:
- F = Failure
- C = Function Check
- S = Out of Specification
- M = Maintenance Required

"Event list" submenu

Navigation Expert → Diagnostics → Event logbook → Event list

Event list

Navigation Expert → Diagnostics → Event logbook → Event list

Description Use this function to display the history of event messages that have occurred in the category selected in the **Filter options** parameter (→ 120).

User interface
- For a "Category I" event message
  Information event, short message, symbol for event recording and operating time when error occurred
- For a "Category F, C, S, M" event message (status signal)
  Diagnostics code, short message, symbol for event recording and operating time when error occurred

Additional information *Description*

A maximum of 20 event messages are displayed in chronological order. If the advanced HistoROM function is enabled in the device, the event list can contain up to 100 entries.

The following symbols indicate whether an event has occurred or has ended:
- ⊖: Occurrence of the event
- ⊕: End of the event

Examples

For the display format:
- I1091 Configuration modified
  ⊖ 24d12h13m00s
- ⚠S442 Frequency output
  ⊖ 01d04h12min30s

Additional information, such as remedial measures, can be called up via the E key.

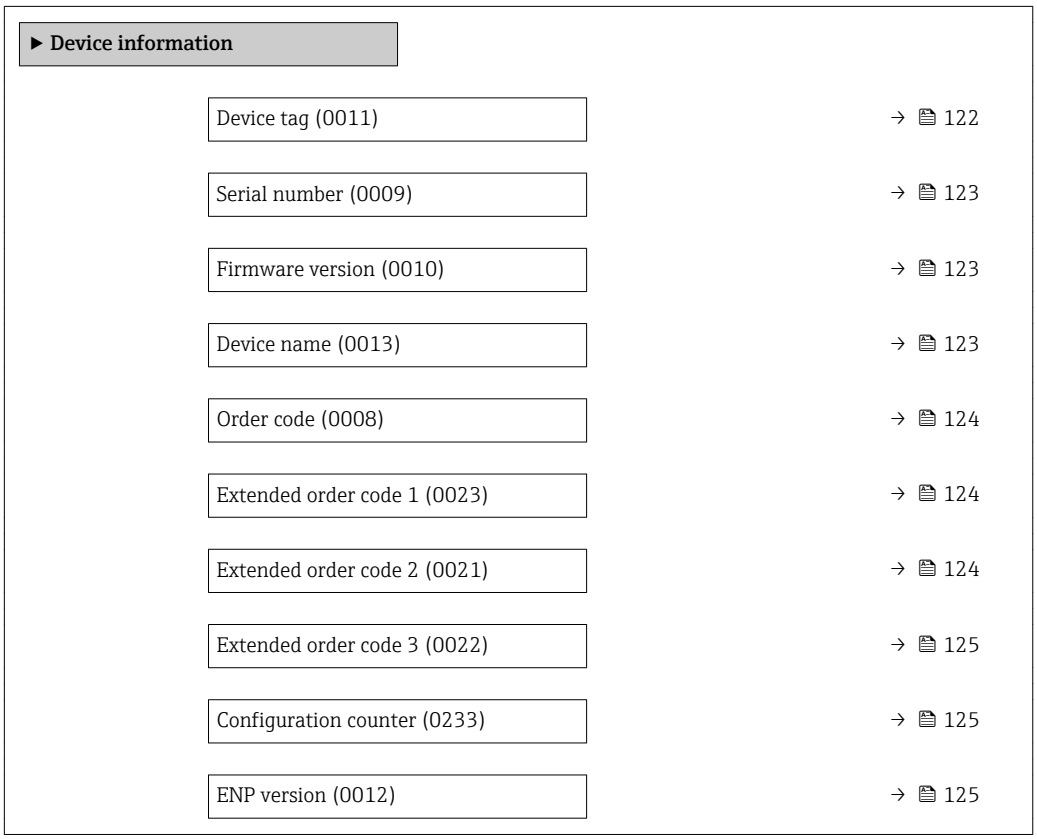
HistoROM

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

To order the **HistoROM advanced capabilities** application package, see the "Accessories" section of the "Technical Information" document.

3.6.3 "Device information" submenu

Navigation Expert → Diagnostics → Device info



Device tag

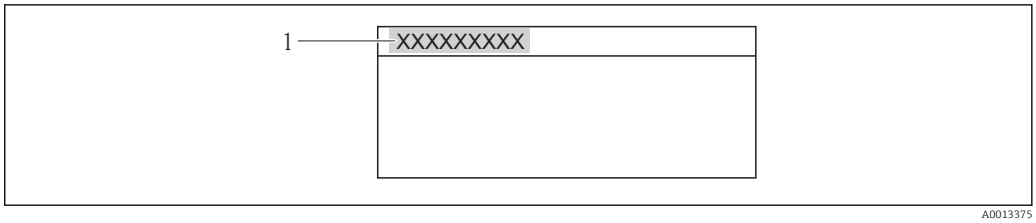
Navigation Expert → Diagnostics → Device info → Device tag (0011)

Description Use this function to display a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

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

Factory setting Promag

Additional information *User interface*



7 *Header text*

The number of characters displayed depends on the characters used.

Serial number

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

Description Use this function to view the serial number of the measuring device. It can also be found on the nameplate of the sensor and transmitter.

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

Additional information *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 Use this function to view the device firmware version installed.

User interface Character string with the following format:
xx.yy.zz

Factory setting 01.01.zz

Device name

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

Description Use this function to view the name of the transmitter. It can also be found on the nameplate of the transmitter.

User interface Character string composed of letters, numbers and certain punctuation marks.

Factory setting Promag

Order code

Navigation Expert → Diagnostics → Device info → Order code (0008)

Description Use this function to display the device order code.

User interface Character string composed of letters, numbers and certain punctuation marks

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, which defines all the device features of the product structure. In contrast, the device features cannot be read directly from the order code.

Uses of the order code
- To order an identical spare device.
- To identify the device quickly and easily, e.g. when contacting Endress+Hauser.

Extended order code 1

Navigation Expert → Diagnostics → Device info → Ext. order cd. 1 (0023)

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

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

User interface Character string

Additional information *Description*

The extended order code indicates the version of all the features of the product structure for the measuring device and thus uniquely identifies the measuring device.

The extended order code can also be found on the nameplate of the sensor and transmitter in the "Ext. ord. cd." field.

Extended order code 2

Navigation Expert → Diagnostics → Device info → Ext. order cd. 2 (0021)

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

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 124)

Extended order code 3

Navigation Expert → Diagnostics → Device info → Ext. order cd. 3 (0022)

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

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 124)

Configuration counter

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

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

User interface 0 to 65 535

Factory setting 0

ENP version

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

Description Displays the version of the electronic nameplate.

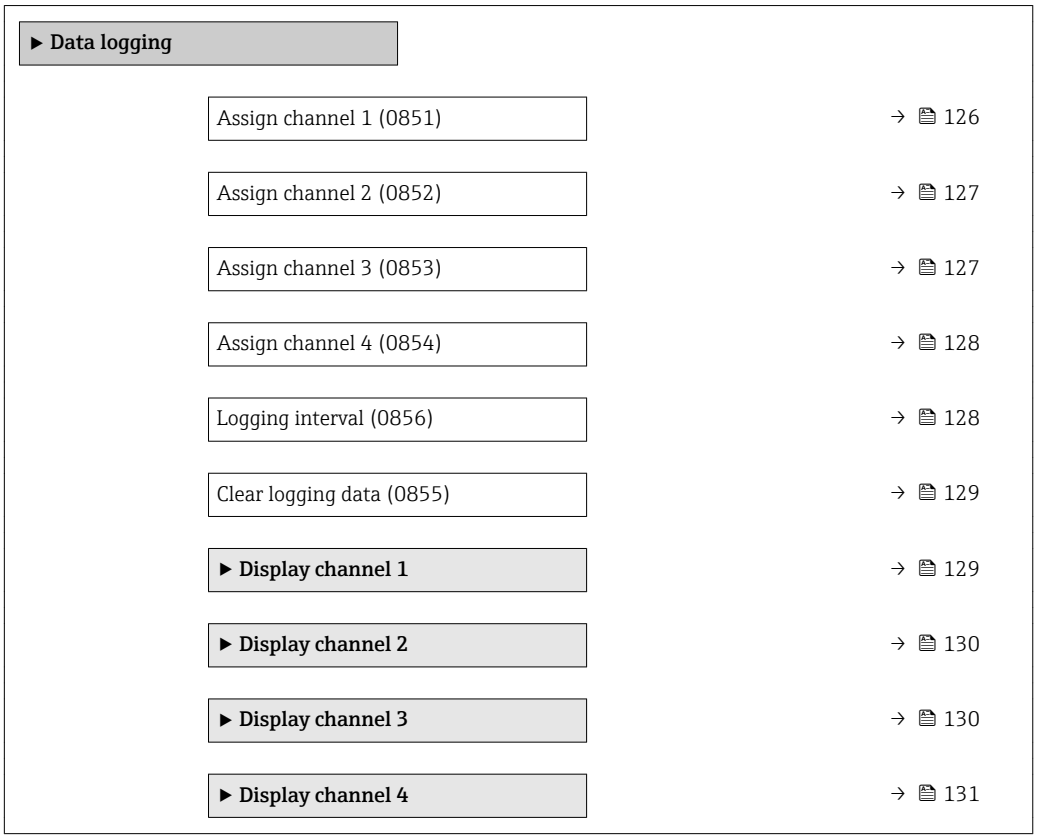
Factory setting 2.02.00

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 "Data logging" submenu

Navigation Expert → Diagnostics → Data logging



Assign channel 1

Navigation
Expert → Diagnostics → Data logging → Assign chan. 1 (0851)
Expert → Diagnostics → Data logging → Assign chan. 1 (0851)

Prerequisite
The **Extended HistoROM** application package is available.
The software options currently enabled are displayed in the **Software option overview** parameter (→ 38).

Description
Options for the assignment of a process variable to the data logging channel.

Selection
- Off
- Volume flow
- Mass flow
- Electronic temperature
- Current output 1
- Current difference potential

Factory setting
Off

Additional information *Description*

A total of 1000 measured values can be logged. This means:
- 1000 data points if 1 logging channel is used
- 500 data points if 2 logging channels are used
- 333 data points if 3 logging channels are used
- 250 data points if 4 logging channels are used

Once the maximum number of data points is reached, the oldest data points in the data log are cyclically overwritten in such a way that the last 1000, 500, 333 or 250 measured values are always in the log (ring memory principle).

The log contents are cleared if the option selected is changed.

Assign channel 2

Navigation
Expert → Diagnostics → Data logging → Assign chan. 2 (0852)
Expert → Diagnostics → Data logging → Assign chan. 2 (0852)

Prerequsite
The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 38).

Description
Options for the assignment of a process variable to the data logging channel.

Selection
Picklist, see **Assign channel 1** parameter (→ 126)

Factory setting
Off

Assign channel 3

Navigation
Expert → Diagnostics → Data logging → Assign chan. 3 (0853)
Expert → Diagnostics → Data logging → Assign chan. 3 (0853)

Prerequsite
The **Extended HistoROM** application package is available.

The software options currently enabled are displayed in the **Software option overview** parameter (→ 38).

Description
Options for the assignment of a process variable to the data logging channel.

Selection
Picklist, see **Assign channel 1** parameter (→ 126)

Factory setting
Off

Assign channel 4

Navigation
Expert → Diagnostics → Data logging → Assign chan. 4 (0854)
Expert → Diagnostics → Data logging → Assign chan. 4 (0854)

Prerequisite
The **Extended HistoROM** application package is available.
The software options currently enabled are displayed in the **Software option overview** parameter (→ 38).

Description
Options for the assignment of a process variable to the data logging channel.

Selection
Picklist, see **Assign channel 1** parameter (→ 126)

Factory setting
Off

Logging interval

Navigation
Expert → Diagnostics → Data logging → Logging interval (0856)
Expert → Diagnostics → Data logging → Logging interval (0856)

Prerequisite
The **Extended HistoROM** application package is available.
The software options currently enabled are displayed in the **Software option overview** parameter (→ 38).

Description
Use this function to enter the logging interval t_{log} for data logging.

User entry
1.0 to 3 600.0 s

Factory setting
10.0 s

Additional information
Description

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time T_{log}:
- If 1 logging channel is used: $T_{log} = 1000 \times t_{log}$
- If 2 logging channels are used: $T_{log} = 500 \times t_{log}$
- If 3 logging channels are used: $T_{log} = 333 \times t_{log}$
- If 4 logging channels are used: $T_{log} = 250 \times t_{log}$

Once this time elapses, the oldest data points in the data log are cyclically overwritten such that a time of Tlog always remains in the memory (ring memory principle).

The log contents are cleared if the length of the logging interval is changed.

Example

If 1 logging channel is used:
- $T_{log} = 1000 \times 1$ s = 1 000 s ≈15 min
- $T_{log} = 1000 \times 10$ s = 10 000 s ≈ 3 h
- $T_{log} = 1000 \times 80$ s = 80 000 s ≈ 1 d
- $T_{log} = 1000 \times 3\,600$ s = 3 600 000 s ≈ 41 d

Clear logging data

Navigation
Expert → Diagnostics → Data logging → Clear logging (0855)
Expert → Diagnostics → Data logging → Clear logging (0855)

Prerequisite
The **Extended HistoROM** application package is available.
The software options currently enabled are displayed in the **Software option overview** parameter (→ 38).

Description
Option to clear the entire logging data.

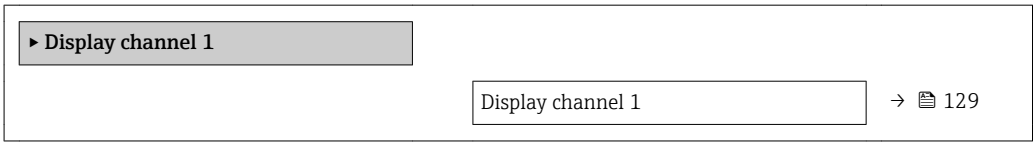
Selection
- Cancel
- Clear data

Factory setting
Cancel

Additional information
Selection
- Cancel
  The data is not cleared. All the data is retained.
- Clear data
  The logging data is cleared. The logging process starts from the beginning.

"Display channel 1" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 1



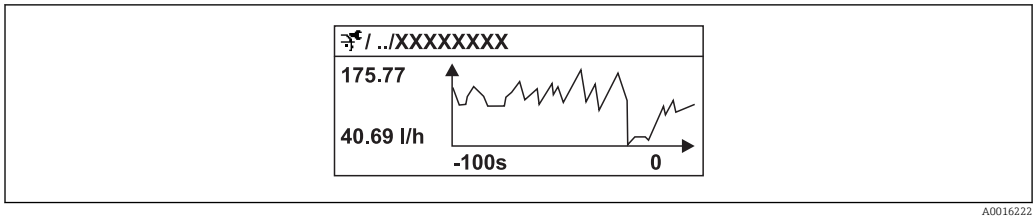
Display channel 1

Navigation
Expert → Diagnostics → Data logging → Displ.channel 1

Prerequisite
In the **Assign channel 1** parameter (→ 126), one of the following options is selected:
- Volume flow
- Mass flow
- Electronic temperature
- Current output 1
- Current difference potential

Description
Use this function to view the measured value trend for the logging channel in the form of a chart.

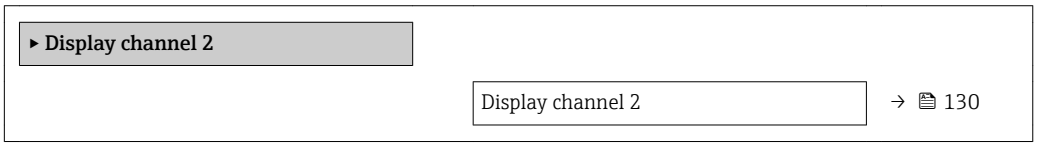
Additional information *Description*



- x-axis: depending on the number of channels selected displays 250 to 1000 measured values of a process variable.
- y-axis: displays the approximate measured value span and constantly adapts this to the ongoing measurement.

"Display channel 2" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 2



Display channel 2

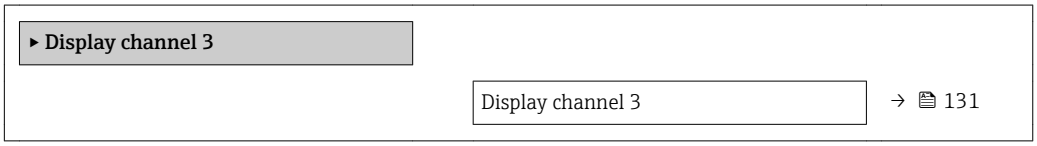
Navigation Expert → Diagnostics → Data logging → Displ.channel 2

Prerequsite In the **Assign channel 2** parameter, one of the following options is selected:
- Volume flow
- Mass flow
- Electronic temperature
- Current output 1
- Current difference potential

Description See the **Display channel 1** parameter → 129

"Display channel 3" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 3



Display channel 3

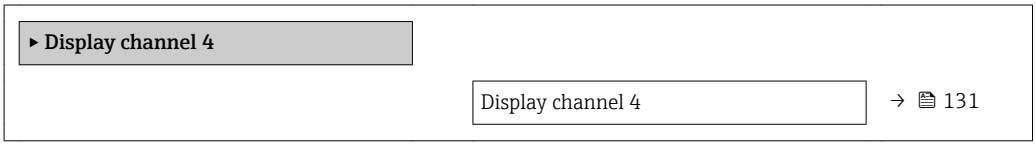
Navigation Expert → Diagnostics → Data logging → Displ.channel 3

Prerequsite In the **Assign channel 3** parameter, one of the following options is selected:
- Volume flow
- Mass flow
- Electronic temperature
- Current output 1
- Current difference potential

Description See the **Display channel 1** parameter → 129

"Display channel 4" submenu

Navigation Expert → Diagnostics → Data logging → Displ.channel 4



Display channel 4

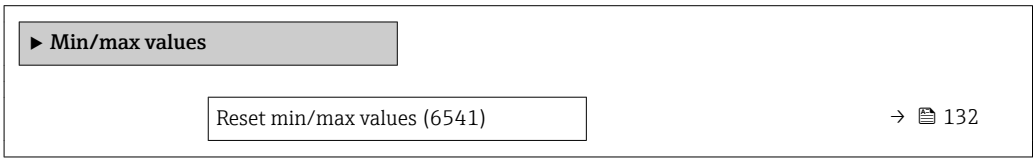
Navigation Expert → Diagnostics → Data logging → Displ.channel 4

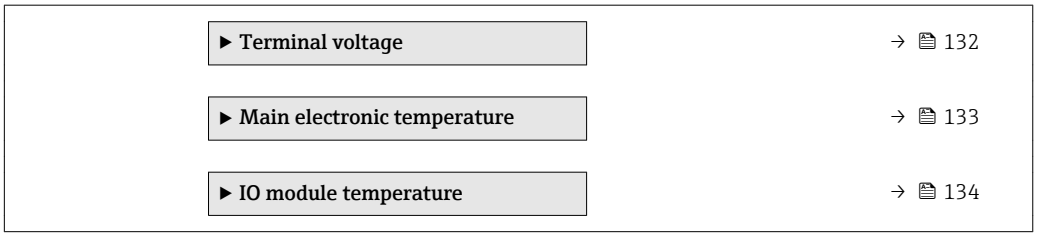
Prerequsite In the **Assign channel 4** parameter, one of the following options is selected:
- Volume flow
- Mass flow
- Electronic temperature
- Current output 1
- Current difference potential

Description See the **Display channel 1** parameter → 129

3.6.5 "Min/max values" submenu

Navigation Expert → Diagnostics → Min/max val.





Reset min/max values

Navigation Expert → Diagnostics → Min/max val. → Reset min/max (6541)

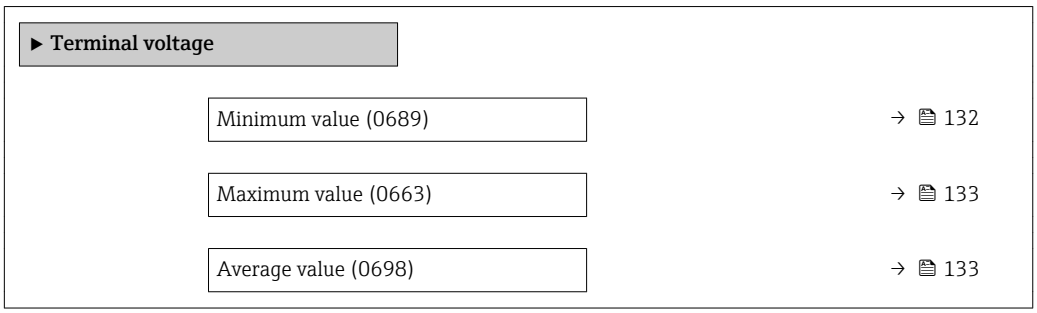
Description Use this function to select measured variables whose minimum, maximum and average measured values are to be reset.

Selection
- Cancel
- Terminal voltage
- IO module temperature

Factory setting Cancel

"Terminal voltage" submenu

Navigation Expert → Diagnostics → Min/max val. → Terminal volt.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Terminal volt. → Minimum value (0689)

Description Use this function to display the smallest previously measured terminal voltage value in Volts.

User interface 0.0 to 50.0 V

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Terminal volt. → Maximum value (0663)

Description Use this function to view the largest previously measured terminal voltage value in Volts.

User interface 0.0 to 50.0 V

Average value

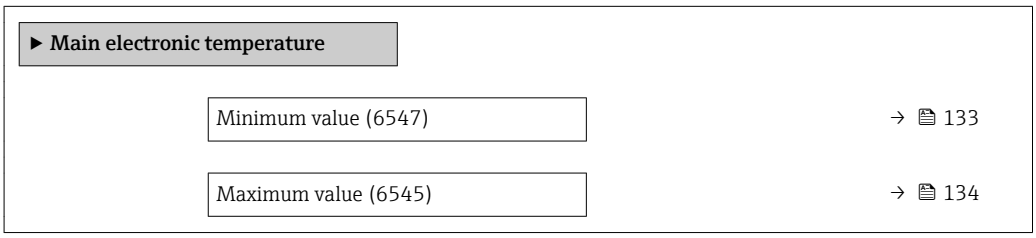
Navigation Expert → Diagnostics → Min/max val. → Terminal volt. → Average value (0698)

Description Use this function to view the average of all previously measured terminal voltage values in Volts.

User interface Signed floating-point number

"Main electronic temperature" submenu

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



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (6547)

Description Use this function to view the lowest previously measured temperature value of the main electronics module.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 49).

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (6545)

Description Use this function to view the highest previously measured temperature value of the main electronics module.

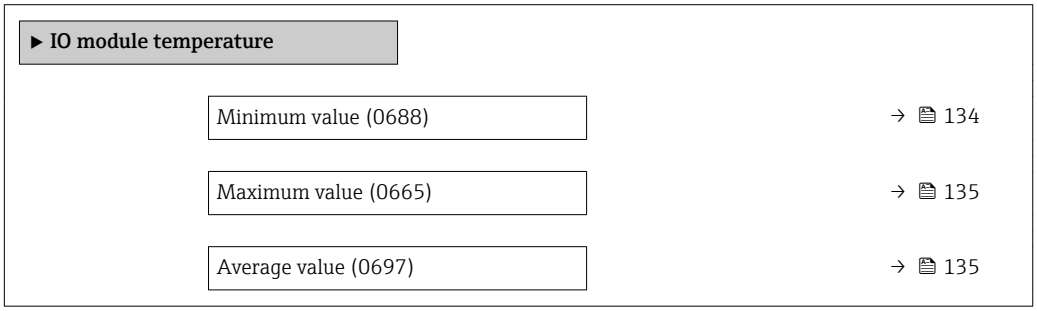
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 49).

"IO module temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → IO module temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → IO module temp. → Minimum value (0688)

Description Use this function to view the lowest previously measured temperature value of the I/O electronics module.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 49).

Maximum value

Navigation Expert → Diagnostics → Min/max val. → IO module temp. → Maximum value (0665)

Description Use this function to view the highest previously measured temperature value of the I/O electronics module.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 49).

Average value

Navigation Expert → Diagnostics → Min/max val. → IO module temp. → Average value (0697)

Description Use this function to view the average value of all previously measured temperature values of the I/O electronics module.

User interface −1 273.15 to 726.85 °C

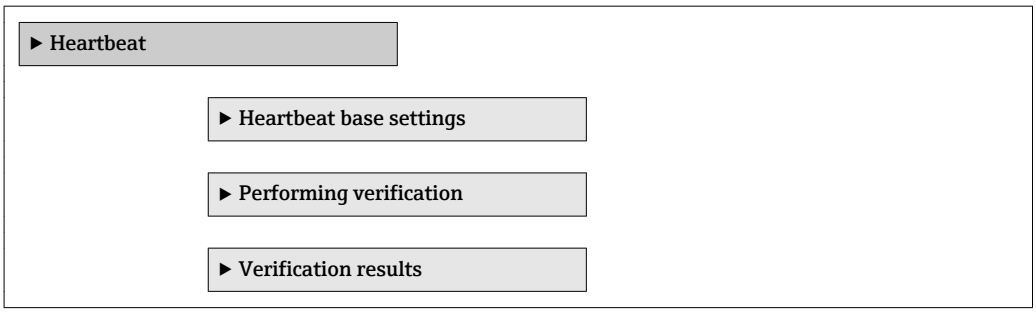
Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 49).

3.6.6 "Heartbeat" submenu

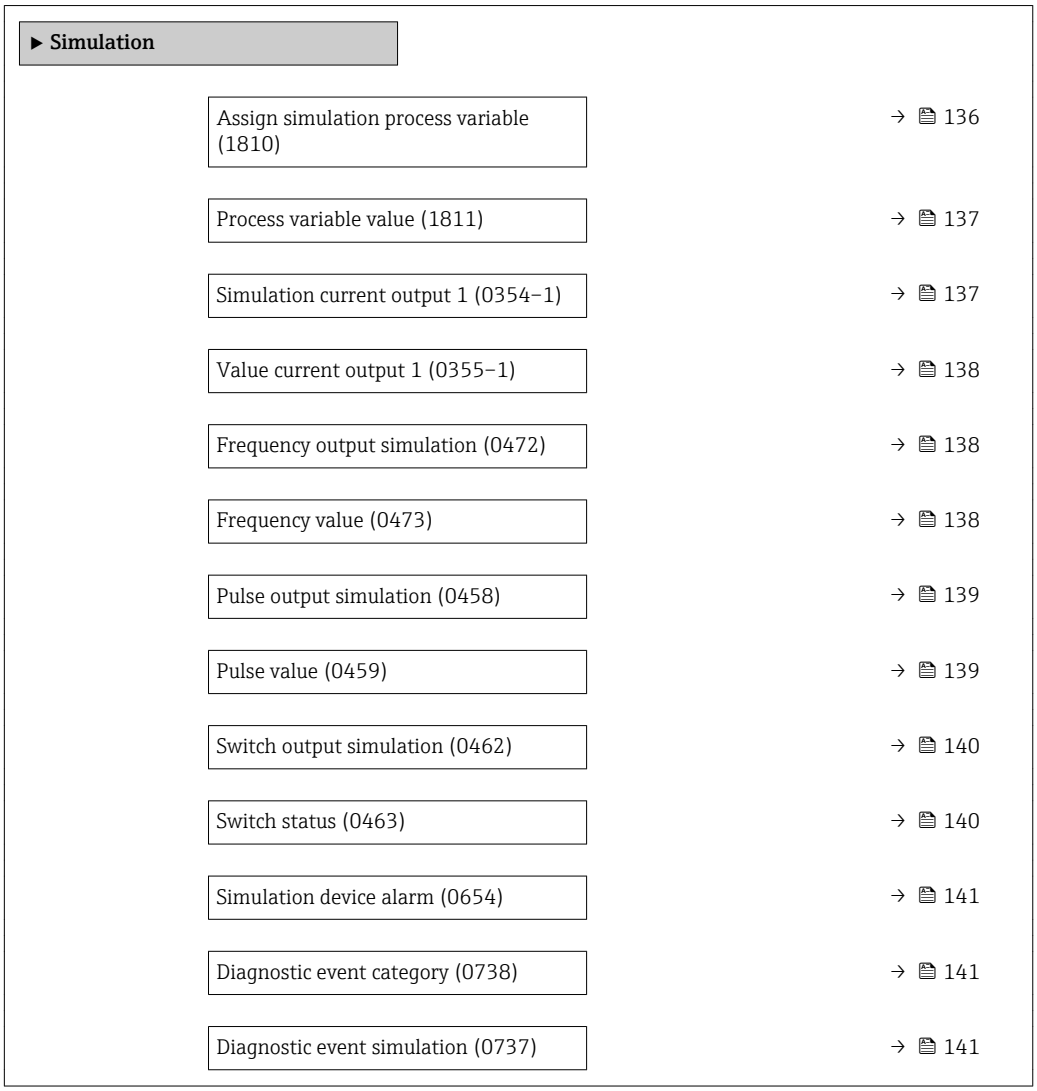
For detailed information on the parameter descriptions of the **Heartbeat Verification** application package, see the Special Documentation for the device

Navigation Expert → Diagnostics → Heartbeat



3.6.7 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation



Assign simulation process variable

Navigation Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- Volume flow
- Mass flow

Factory setting Off

Additional information *Description*

The simulation value of the selected process variable is defined in the **Process variable value** parameter (→ 137).

Process variable value

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

Prerequsite In the **Assign simulation process variable** parameter (→ 136), one of the following options is selected:
- Volume flow
- Mass flow

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 (→ 45).

Simulation current output 1

Navigation Expert → Diagnostics → Simulation → Sim.curr.out. 1 (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 defined in the **Value current output 1** parameter (→ 138).

Selection

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

Value current output 1

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

Prerequisite The **On** option is selected in the **Simulation current output 1** parameter (→ 137).

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

User entry 3.59 to 22.5 mA

Frequency output simulation

Navigation Expert → Diagnostics → Simulation → Freq.outp.sim. (0472)

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 79).

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

Selection
- Off
- On

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Frequency value** parameter (→ 138).

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.

Frequency value

Navigation Expert → Diagnostics → Simulation → Freq. value (0473)

Prerequisite The **On** option is selected in the **Frequency output simulation** parameter (→ 138).

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

User entry 0.0 to 1250.0 Hz

Factory setting 0.0 Hz

Pulse output simulation

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

Prerequsite The **Pulse** option is selected in the **Operating mode** parameter (→ 79).

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

Selection
- Off
- Fixed value
- Down-counting value

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Pulse value** parameter (→ 139).

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 (→ 80).
- Down-counting value
  The pulses specified in the **Pulse value** parameter (→ 139) are output.

Pulse value

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

Prerequsite The **Down-counting value** option is selected in the **Pulse output simulation** parameter (→ 139).

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

Factory setting 0

Switch output simulation

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 79).

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 (→ 140).

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

Switch status

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

Prerequisite The **On** option is selected in the **Switch output simulation** parameter (→ 140).

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

Selection
- Open
- Closed

Factory setting Open

Additional information *Options*
- Open
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Switch simulation is active.

Simulation device alarm

Navigation Expert → Diagnostics → Simulation → Sim. alarm (0654)

Description Use this function to switch the device alarm on and off. In this way, users can verify the correct adjustment of the current output and the correct function of downstream switching units. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- On

Factory setting Off

Diagnostic 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 **Diagnostic event simulation** parameter (→ 141).

Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting Process

Diagnostic event simulation

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 **Diagnostic event category** parameter (→ 141).

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	l/h
Density	kg/l
Temperature	°C

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
- 100% bar graph value 3

Nominal diameter [mm]	Full scale value current output (v ~ 2.5 m/s) [dm^3/min]
2	0.5
4	2
8	8
15	25
25	75
32	125
40	200
50	300
65	500
80	750
100	1200
125	1850
150	150 m^3/h
200	300 m^3/h

4.1.3 Output current span

Current output 1	4 to 20 mA NAMUR

4.1.4 On value low flow cut off

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

Nominal diameter [mm]	On value low flow cut off (v ~ 0.04 m/s) [m³/h]
2	0.01
4	0.05
8	0.1
15	0.5
25	1
32	2
40	3
50	5
65	8
80	12
100	20
125	30
150	2.5
200	5

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Mass	lb
Mass flow	lb/min
Volume	gal (us)
Volume flow	gal/min (us)
Density	lb/ft³
Temperature	°F

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
- 100% bar graph value 3

Nominal diameter [in]	Full scale value current output (v ~ 2.5 m/s) [gal/min]
1/12	0.1
1/8	0.5
3/8	2
½	6
1	18
1½	50

Nominal diameter [in]	Full scale value current output (v ~ 2.5 m/s) [gal/min]
2	75
3	200
4	300
6	600
8	1200

4.2.3 Output current span

Current output 1	4 to 20 mA US

4.2.4 On value low flow cut off

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

Nominal diameter [in]	On value low flow cut off (v ~ 0.04 m/s) [gal/min]
$^{1}/_{12}$	0.002
$^{1}/_{8}$	0.008
$^{3}/_{8}$	0.025
½	0.1
1	0.25
1½	0.75
2	1.25
3	2.5
4	4
6	12
8	15

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Density	g/cm³, g/m³	Gram/volume unit
	kg/dm³, kg/l, kg/m³	Kilogram/volume unit
	SD4°C, SD15°C, SD20°C	Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
	SG4°C, SG15°C, SG20°C	Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
Mass	g, kg, t	Gram, kilogram, metric ton
Mass flow	g/s, g/min, g/h, g/d	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/s, t/min, t/h, t/d	Metric ton/time unit
Temperature	°C , °F, K, °R	Celsius, Fahrenheit, Kelvin, Rankine
Volume	cm³, dm³, m³	Cubic centimeter, cubic decimeter, cubic meter,
	ml, l, hl, Ml	Milliliter, liter, hectoliter, megaliter
Volume flow	cm³/s, cm³/min, cm³/h, cm³/d	Cubic centimeter/time unit
	dm³/s, dm³/min, dm³/h, dm³/d	Cubic decimeter/time unit
	m³/s, m³/min, m³/h, m³/d	Cubic meter/time unit
	ml/s, ml/min, ml/h, ml/d	Milliliter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
Time	s, min, h, d	Second, minute, hour, day

5.2 US units

Process variable	Units	Explanation
Density	lb/ft³, lb/gal (us)	Pound/cubic foot, pound/gallon
	lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)	Pound/volume unit
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min, oz/h, oz/d	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/s, STon/min, STon/h, STon/d	Standard ton/time unit
Temperature	°C , °F, K, °R	Celsius, Fahrenheit, Kelvin, Rankine
Volume	af, ft³	Acre foot, cubic foot
	fl oz (us), gal (us), kgal (us), Mgal (us)	Fluid ounce, gallon, kilogallon, million gallon
	bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)	Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)
Volume flow	af/s, af/min, af/h, af/d	Acre foot/time unit
	ft³/s, ft³/min, ft³/h, ft³/d	Cubic foot/time unit

Process variable	Units	Explanation
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us,) gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us,) kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel /time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
Time	s, min, h, d	Second, minute, hour, day

5.3 Imperial units

Process variable	Units	Explanation
Density	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Temperature	°C , °F, K, °R	Celsius, Fahrenheit, Kelvin, Rankine
Volume	gal (imp), Mgal (imp), bbl (imp;oil)	Gallon, mega gallon, barrel (petrochemicals), barrel (beer)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	s, min, h, d	Second, minute, hour, day

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