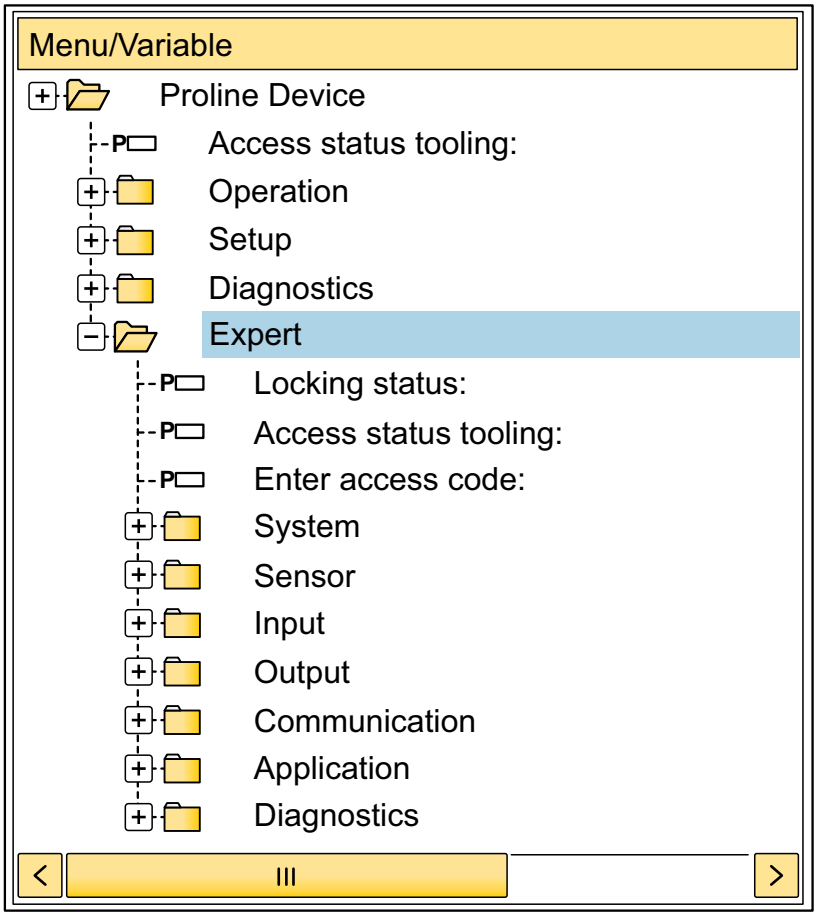
GP01145D/06/EN/02.21
71530645
2021-07-01

Valid as of version
01.00.zz (Device firmware)

Description of Device Parameters
Proline t-mass 500
HART

Thermal mass flowmeter



Endress+Hauser
People for Process Automation

Table of contents

1 About this document

1.1 Document function

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

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

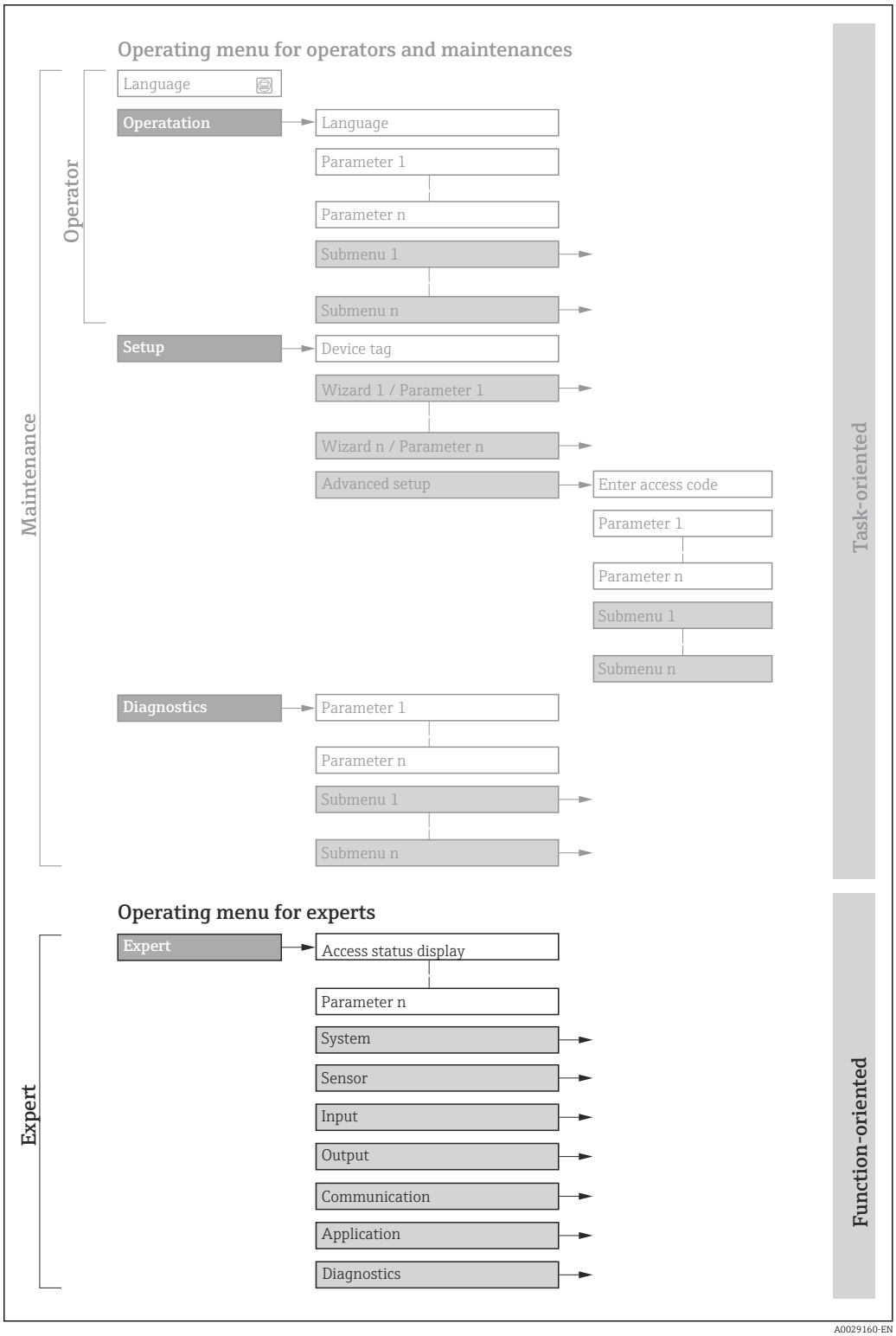
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



1 *Sample graphic for the schematic layout of the operating menu*

Additional information regarding:
- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions
- Operating concept of the operating menus: Operating Instructions

1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter

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

Prerequisite
The parameter is only available under these specific conditions

Description
Description of the parameter function

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

User entry
Input range for the parameter

User interface
Display value/data for the parameter

Factory setting
Default setting ex works

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

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

1.4.2 Symbols in graphics

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

1.5 Documentation

1.5.1 Standard documentation

Operating Instructions

Measuring device	Documentation code
t-mass F 500	BA01996D
t-mass I 500	BA01997D

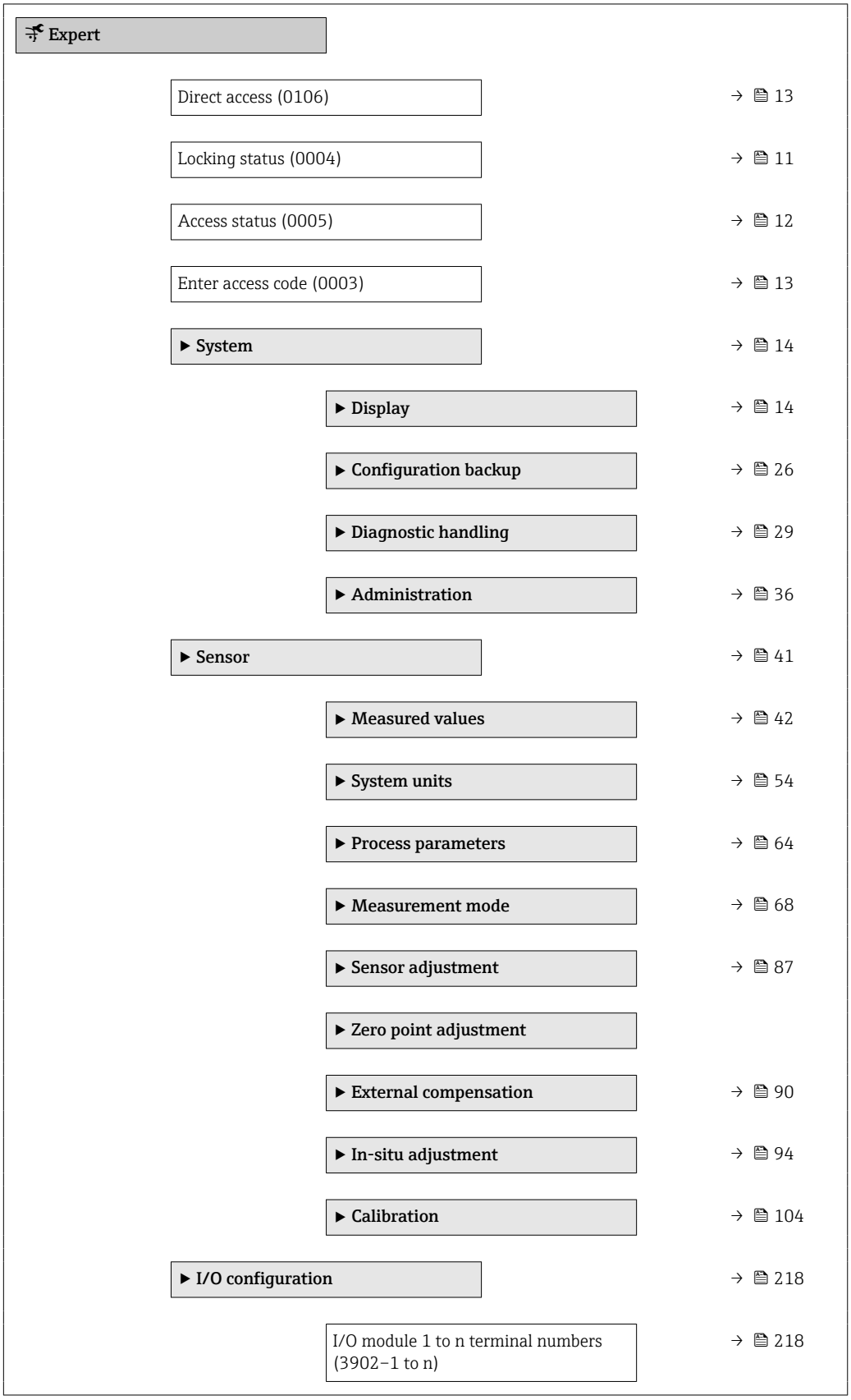
1.5.2 Supplementary device-dependent documentation

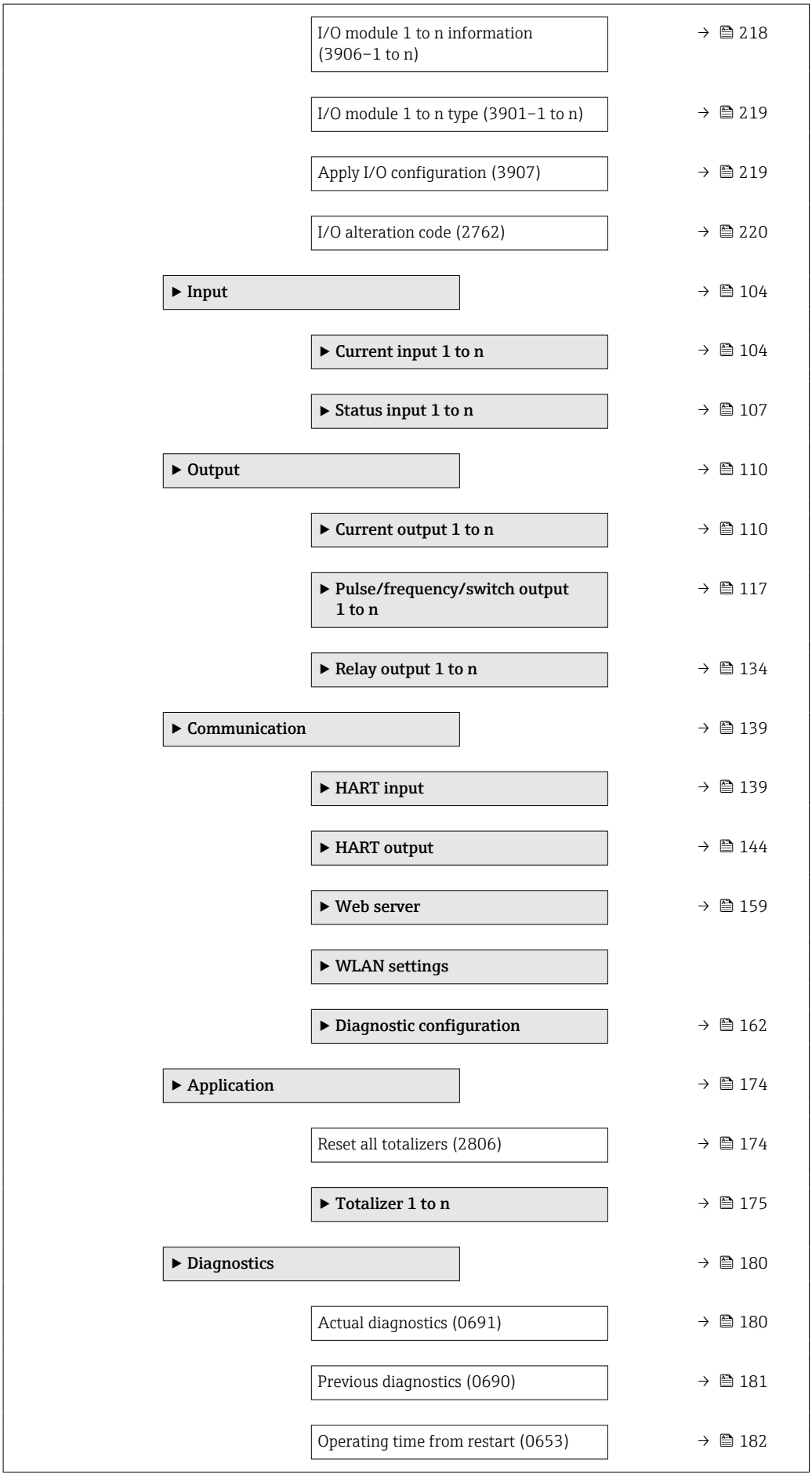
Special Documentation

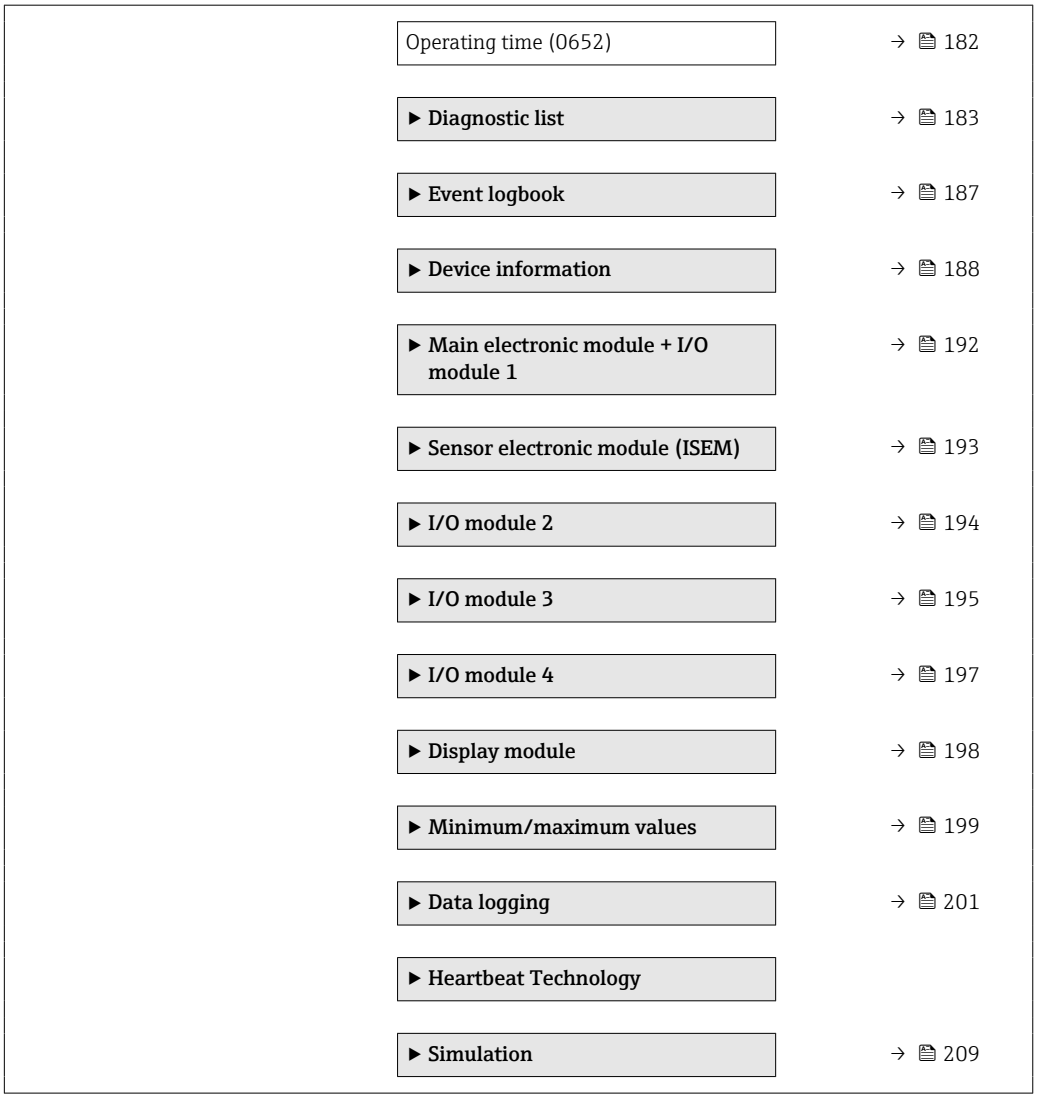
Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Functional Safety Manual	SD02484D
Remote display and operating module DKX001	SD01763D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD02487D
Heartbeat Technology	SD02479D

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.

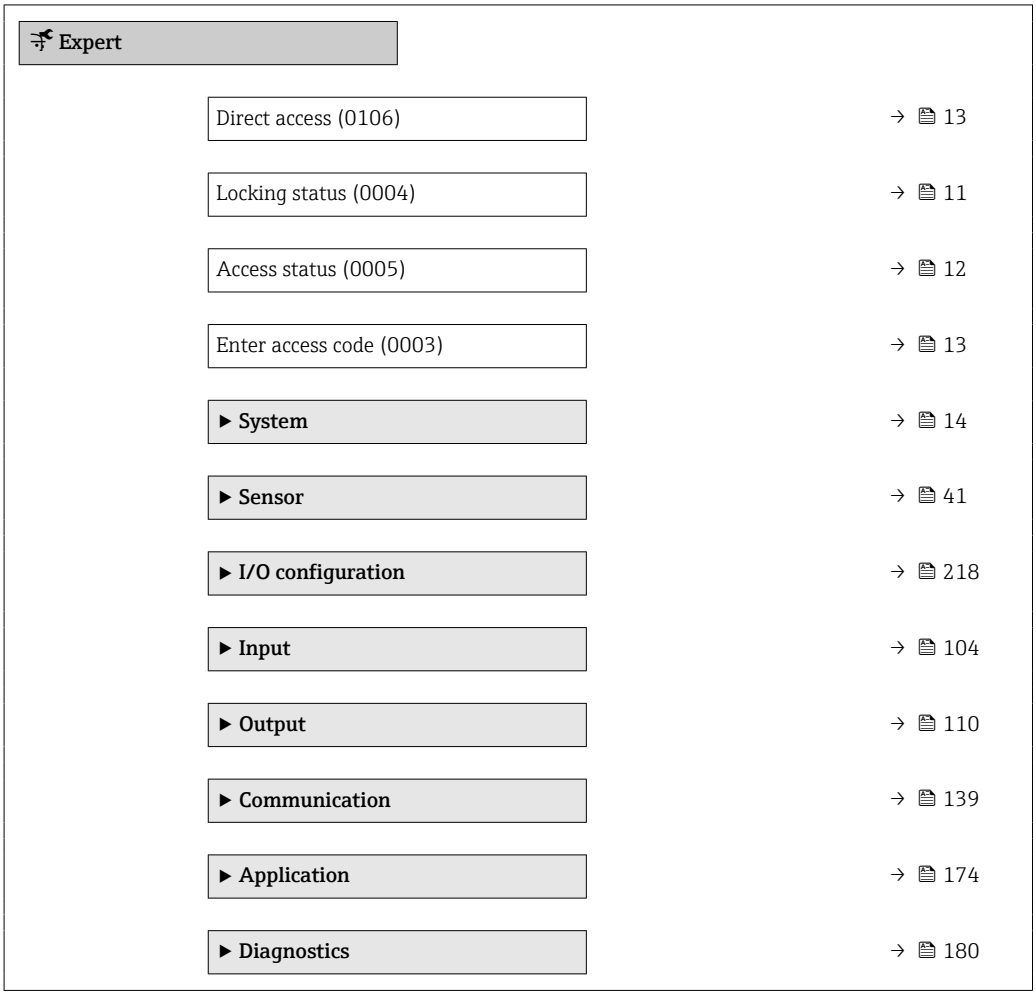



I/O module 1 to n information (3906–1 to n) → 218
I/O module 1 to n type (3901–1 to n) → 219
Apply I/O configuration (3907) → 219
I/O alteration code (2762) → 220
▶ Input → 104
▶ Current input 1 to n → 104
▶ Status input 1 to n → 107
▶ Output → 110
▶ Current output 1 to n → 110
▶ Pulse/frequency/switch output 1 to n → 117
▶ Relay output 1 to n → 134
▶ Communication → 139
▶ HART input → 139
▶ HART output → 144
▶ Web server → 159
▶ WLAN settings
▶ Diagnostic configuration → 162
▶ Application → 174
Reset all totalizers (2806) → 174
▶ Totalizer 1 to n → 175
▶ Diagnostics → 180
Actual diagnostics (0691) → 180
Previous diagnostics (0690) → 181
Operating time from restart (0653) → 182


Operating time (0652)
→ 182
▶ Diagnostic list
→ 183
▶ Event logbook
→ 187
▶ Device information
→ 188
▶ Main electronic module + I/O module 1
→ 192
▶ Sensor electronic module (ISEM)
→ 193
▶ I/O module 2
→ 194
▶ I/O module 3
→ 195
▶ I/O module 4
→ 197
▶ Display module
→ 198
▶ Minimum/maximum values
→ 199
▶ Data logging
→ 201
▶ Heartbeat Technology
▶ Simulation
→ 209

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.



Locking status

Navigation Expert → Locking status (0004)

Description Displays 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 displayed.

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

Selection

Options	Description
None	The access status displayed in the **Access status** parameter (→ 12) applies . Only appears on local display.
Hardware locked (priority 1)	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) .
SIL locked (priority 2)	The SIL mode is enabled. This locks write access to the parameters (e.g. via local display or operating tool).
Temporarily locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

Access status

Navigation Expert → Access status (0005)

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

User interface

- Operator
- Maintenance

Additional information

Description

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

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

Display

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

Enter access code

Navigation Expert → Ent. access code (0003)

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

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

Direct access

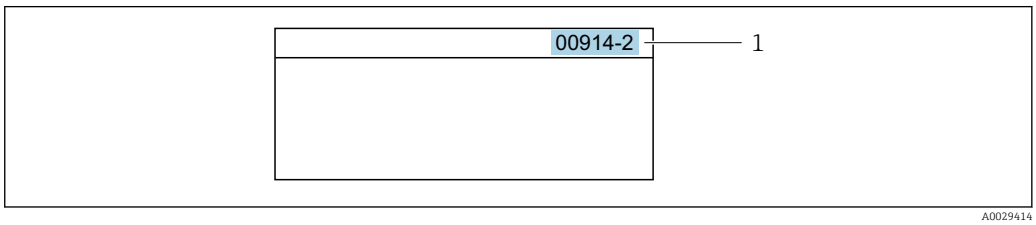
Navigation Expert → Direct access (0106)

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

User entry 0 to 65 535

Additional information *User entry*

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

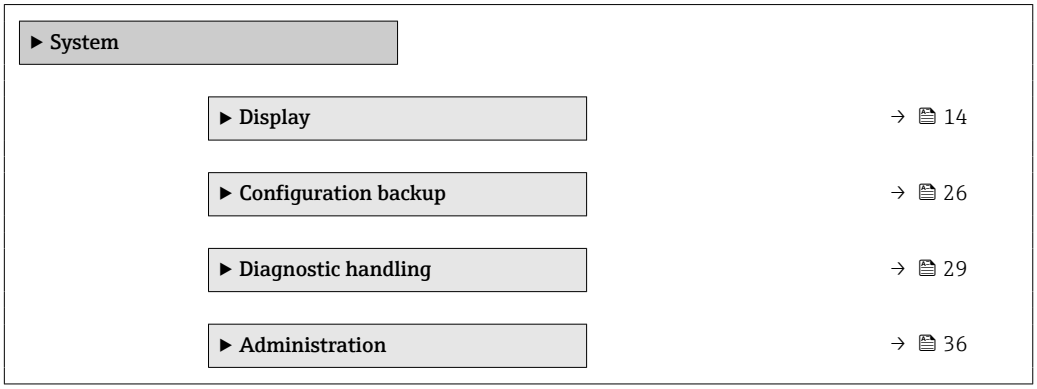


1 Direct access code

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

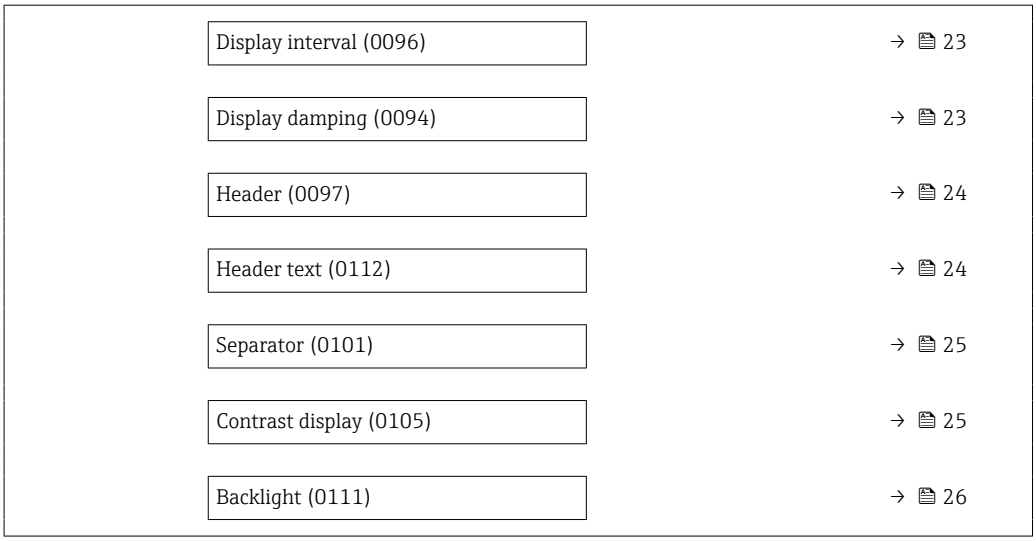
3.1 "System" submenu

Navigation Expert → System



3.1.1 "Display" submenu

Navigation Expert → System → Display



Display language

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

Prerequisite A local display is provided.

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

Selection
- English
- Deutsch
- Français
- Español
- Italiano
- Nederlands
- Portuguesa
- Polski
- русский язык (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 (alternatively, the ordered language is preset in the device)

* Visibility depends on order options or device settings

Format display

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

Prerequisite A local display is provided.

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

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

Additional information *Description*

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

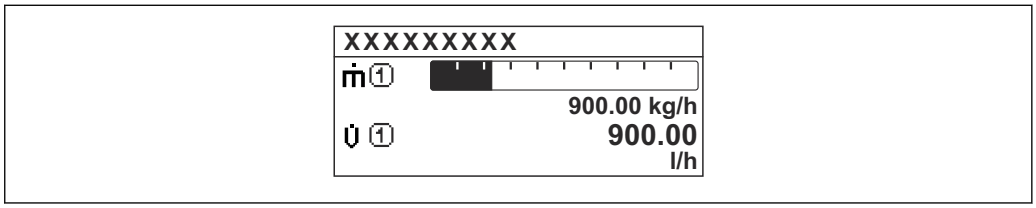
- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 22) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the **Display interval** parameter (→ 23).

Possible measured values shown on the local display:

"1 value, max. size" option

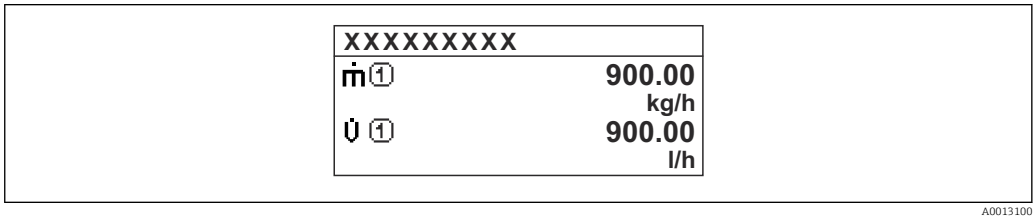
A0016529

"1 bargraph + 1 value" option



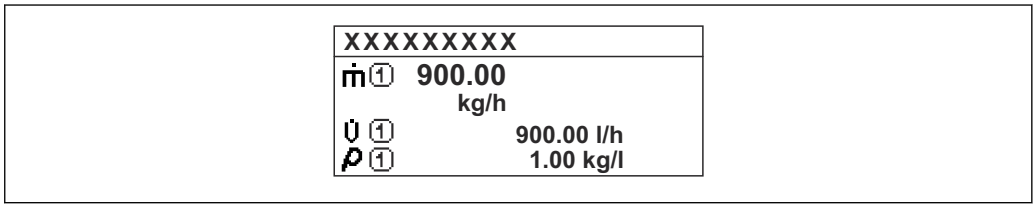
A0013098

"2 values" option



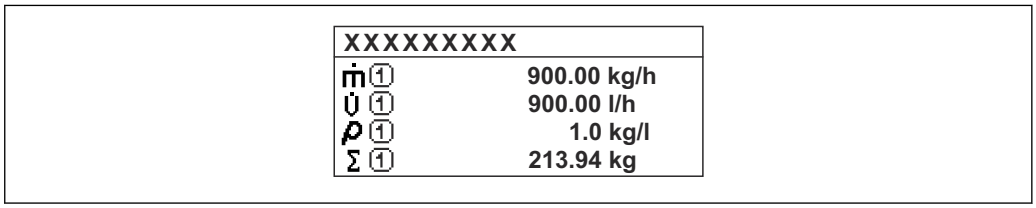
A0013100

"1 value large + 2 values" option



A0013102

"4 values" option



A0013103

Value 1 display

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

Prerequisite A local display is provided.

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

Selection
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- Pressure
- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current output 1 *
- Current output 2 *
- Current output 3 *
- Current output 4 *

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 (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

0% bargraph value 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

* Visibility depends on order options or device settings

Additional information *Description*

The **Format display** parameter (→ 16) 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 (→ 54).

100% bargraph value 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 221

Additional information *Description*

The **Format display** parameter (→ 16) 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 (→ 54).

Decimal places 1

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

Prerequisite A measured value is specified in the **Value 1 display** parameter (→ 18).

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

Additional information *Description*

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

Value 2 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 1 display** parameter (→ 18)

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 (→ 16) is used to specify how many measured values are displayed simultaneously and how.

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

Decimal places 2

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

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

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

Selection

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

Additional information

Description

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

Value 3 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 1 display** parameter (→ 18)

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 (→ 16) 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 (→ 54).

0% bargraph value 3

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

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

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

User entry Signed floating-point number

Additional information *Description*

The **Format display** parameter (→ 16) 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 (→ 54).

100% bargraph value 3

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

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

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

User entry Signed floating-point number

Additional information

Description

The **Format display** parameter (→ 16) 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 (→ 54).

Decimal places 3

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

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

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

Selection

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

Additional information

Description

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

Value 4 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 1 display** parameter (→ 18)

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 (→ 16) 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 (→ 54).

Decimal places 4

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

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

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

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

Additional information *Description*

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

Display interval

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

Prerequisite A local display is provided.

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

User entry 1 to 10 s

Additional information *Description*

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

- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 22) are used to specify which measured values are shown on the local display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 16).

Display damping

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

Prerequisite A local display is provided.

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

User entry 0.0 to 999.9 s

Additional information *User entry*

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

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

Header

Navigation Expert → System → Display → Header (0097)

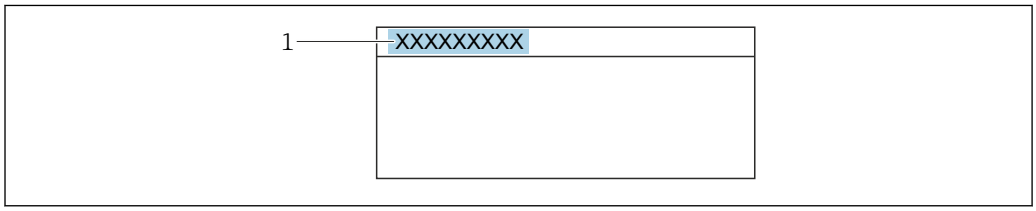
Prerequisite A local display is provided.

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

Selection
- Device tag
- Free text

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 (→ 188).
- Free text
  Is defined in the **Header text** parameter (→ 24).

Header text

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

Prerequisite In the **Header** parameter (→ 24), the **Free text** option is selected.

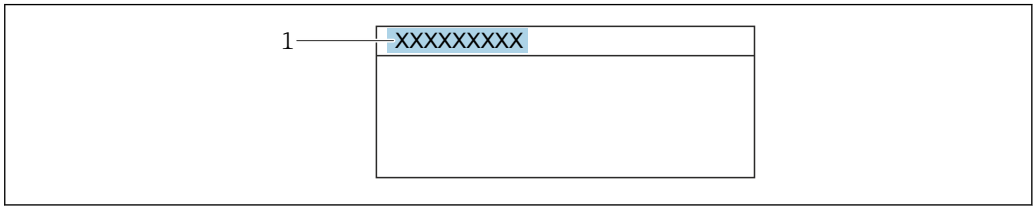
Description Use this function to enter a customer-specific text for the header of the local display.

1) proportional transmission behavior with first order delay

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

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

Prerequisite A local display is provided.

Description Use this function to select the decimal separator.

Selection
- . (point)
- , (comma)

Factory setting . (point)

Contrast display

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

Prerequisite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Backlight

Navigation Expert → System → Display → Backlight (0111)

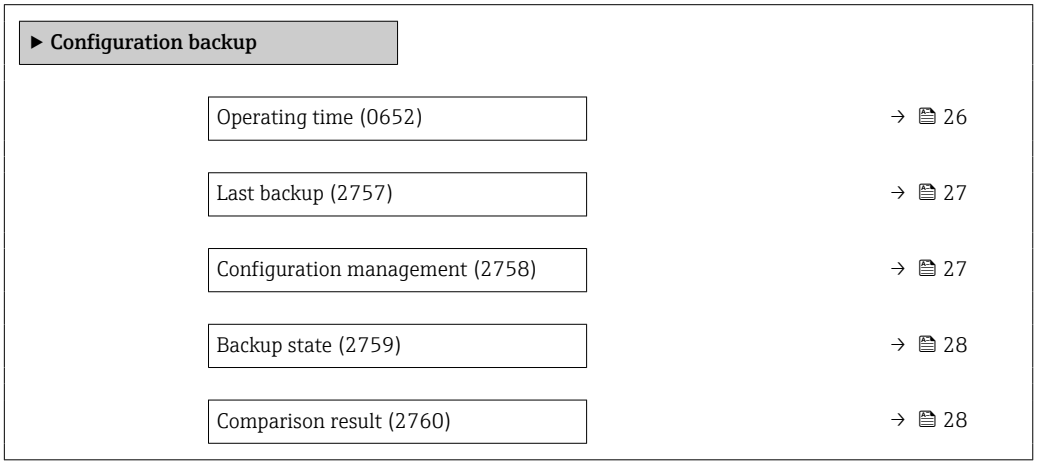
Prerequisite One of the following conditions is met:
- Order code for "Display; operation", option **F** "4-line, illum.; touch control"
- Order code for "Display; operation", option **G** "4-line, illum.; touch control +WLAN"

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

Selection
- Disable
- Enable

3.1.2 "Configuration backup" submenu

Navigation Expert → System → Config. backup



Operating time

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

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

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

Configuration management

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

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

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

Additional information *Selection*

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

HistoROM

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

* Visibility depends on order options or device settings

Backup state

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

Description Displays the status of the data backup process.

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

Comparison result

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

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

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

Additional information *Description*

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

Selection

Options	Description
Settings identical	The current device configuration of the HistoROM is identical to the backup copy in the device memory. If the transmitter configuration of another device has been transmitted to the device via HistoROM in the **Configuration management** parameter, the current device configuration of the HistoROM is only partially identical to the backup copy in the device memory: The settings for the transmitter are not identical.
Settings not identical	The current device configuration of the HistoROM is not identical to the backup copy in the device memory.
No backup available	There is no backup copy of the device configuration of the HistoROM in the device memory.
Backup settings corrupt	The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the device memory.

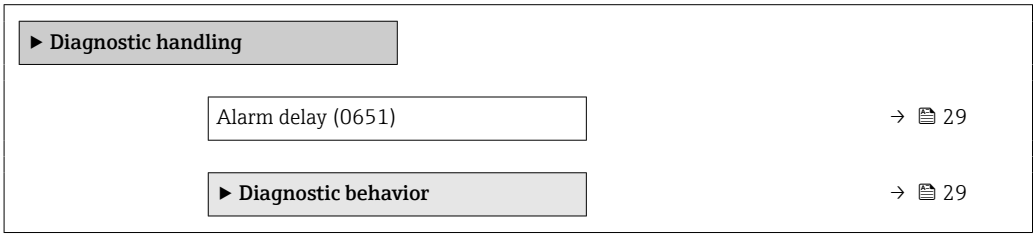
Options	Description
Check not done	The device configuration of the HistoROM has not yet been compared to the backup copy in the device memory.
Dataset incompatible	The backup copy in the device memory is not compatible with the device.

HistoROM

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

3.1.3 "Diagnostic handling" submenu

Navigation Expert → System → Diagn. handling



Alarm delay

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

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

The diagnostic message is reset without a time delay.

User entry 0 to 60 s

Additional information *Result*

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

"Diagnostic behavior" submenu

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

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

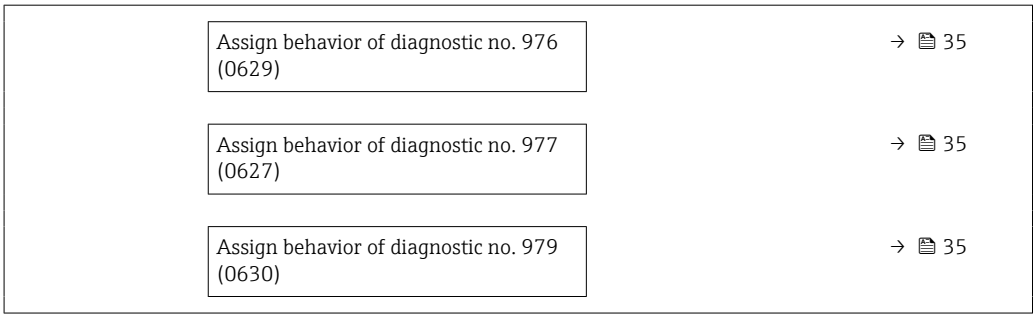
Options	Description
Alarm	The device stops measurement. The signal outputs and totalizers assume the defined alarm condition. A diagnostic message is generated. The background lighting changes to red.
Warning	The device continues to measure. The signal outputs and totalizers are not affected. A diagnostic message is generated.
Logbook entry only	The device continues to measure. The diagnostic message is displayed only in the **Event logbook** submenu (→ 187) (**Event list** submenu) and is not displayed in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

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

▶ **Diagnostic behavior**

Assign behavior of diagnostic no. 144 (0631)	→ 31
Assign behavior of diagnostic no. 302 (0742)	→ 31
Assign behavior of diagnostic no. 441 (0657)	→ 31
Assign behavior of diagnostic no. 442 (0658)	→ 32
Assign behavior of diagnostic no. 443 (0659)	→ 32
Assign behavior of diagnostic no. 444 (0740)	→ 33
Assign behavior of diagnostic no. 832 (0675)	→ 33
Assign behavior of diagnostic no. 833 (0676)	→ 33
Assign behavior of diagnostic no. 834 (0677)	→ 34
Assign behavior of diagnostic no. 835 (0678)	→ 34
Assign behavior of diagnostic no. 842 (0638)	→ 34



Assign behavior of diagnostic no. 144 (Sensor drift)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144 (0631)

Description Use this function to change the diagnostic behavior of the **144 Sensor drift** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 302 (Device verification active)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information Detailed description of the options available for selection: → 30

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

Detailed description of the options available for selection: → 30

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

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

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

Description Use this function to change the diagnostic behavior of the **442 Frequency output 1 to n** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information

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 **443 Pulse output** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

Detailed description of the options available for selection: → 30

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

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 444 (0740)

Prerequisite The device has one current input.

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information 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 **832 Electronic temperature too high** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information 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 **833 Electronic temperature too low** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

Detailed description of the options available for selection: → 30

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

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

Description Use this function to change the diagnostic behavior of the **834 Process temperature too high** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

Detailed description of the options available for selection: → 30

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

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

Description Use this function to change the diagnostic behavior of the **835 Process temperature too low** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information *Selection*

Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 842 (Process limit)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 976 (Mass flow out of calibrated range)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 976 (0629)

Description Use this function to change the diagnostic behavior of the **976 Mass flow out of calibrated range** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 977 (Reverse flow detected)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 977 (0627)

Description Use this function to change the diagnostic behavior of the **977 Reverse flow detected** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information Detailed description of the options available for selection: → 30

Assign behavior of diagnostic no. 979 (Unstable process conditions)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 979 (0630)

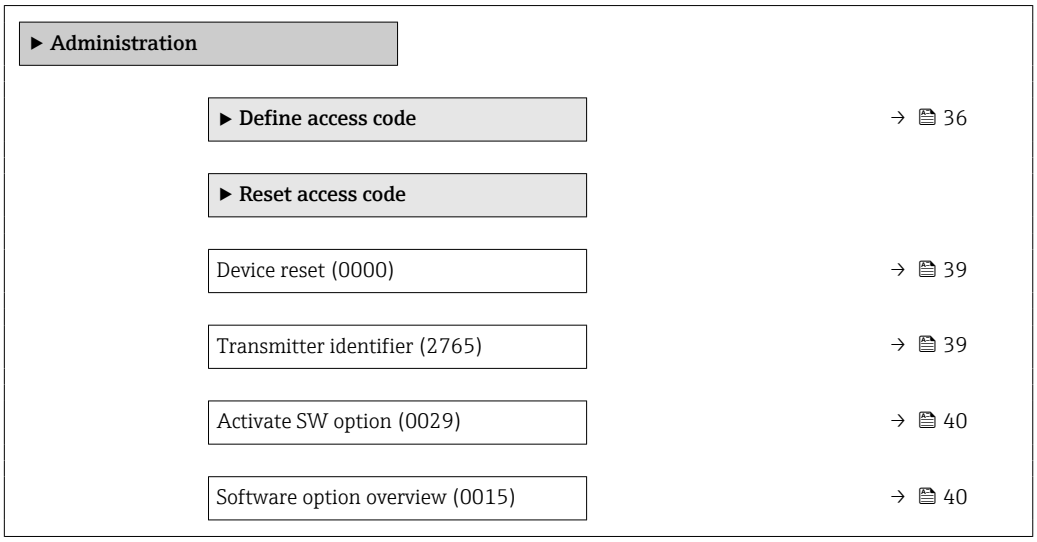
Description Use this function to change the diagnostic behavior of the **979 Unstable process conditions** diagnostic message.

Selection
- Off
- Alarm
- Warning
- Logbook entry only

Additional information Detailed description of the options available for selection: → 30

3.1.4 "Administration" submenu

Navigation Expert → System → Administration

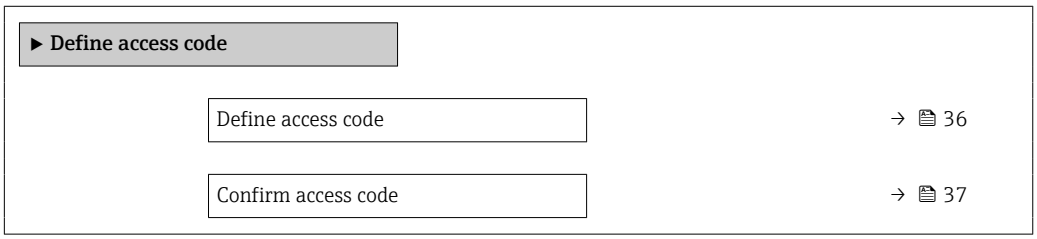


"Define access code" wizard

The **Define access code** wizard (→ 36) is only available when operating via the local display or Web browser.

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

Navigation Expert → System → Administration → Def. access code



Define access code

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

Description Use this function to enter a user-specific release code to restrict write-access to the parameters. This protects the device configuration against any inadvertent modifications via the local display, Web browser, FieldCare or DeviceCare (via CDI-RJ45 service interface).

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

Additional information *Description*

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

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

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

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

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

User entry

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

Factory setting

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

Confirm access code

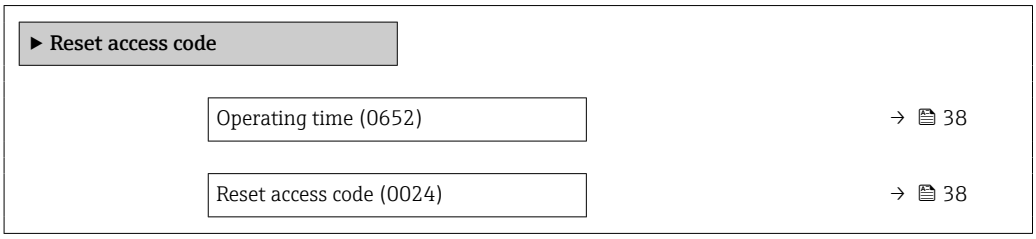
Navigation Expert → System → Administration → Def. access code → Confirm code

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

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

"Reset access code" submenu

Navigation Expert → System → Administration → Reset acc. code



Operating time

Navigation

- Diagnostics → Operating time (0652)
- Expert → Diagnostics → Operating time (0652)
- Expert → System → Config. backup → Operating time (0652)
- Expert → System → Administration → Reset acc. code → Operating time (0652)
- Setup → Advanced setup → Administration → Reset acc. code → Operating time (0652)
- Setup → Advanced setup → Config. backup → Operating time (0652)

Description

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

User interface

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

Additional information

User interface

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

Reset access code

Navigation

- Expert → System → Administration → Reset acc. code → Reset acc. code (0024)
- Setup → Advanced setup → Administration → Reset acc. code → Reset acc. code (0024)

Description

Use this function to enter a reset code to reset the user-specific release code to the factory setting.

User entry

Character string comprising numbers, letters and special characters

Additional information

Description

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

User entry

The reset code can only be entered via:
- Web browser
- DeviceCare, FieldCare (via interface CDI RJ45)
- Fieldbus

Additional parameters in the "Administration" submenu

Device reset

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

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

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

Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery settings	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.
Restart device	The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
Restore S-DAT backup	Restore the data that are saved on the S-DAT. The data record is restored from the electronics memory to the S-DAT. This option is displayed only in an alarm condition.

Transmitter identifier

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

Description Select transmitter identifier.

User interface
- Unknown
- 500
- 300

Factory setting 500

* Visibility depends on order options or device settings

Activate SW option

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

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

User entry Max. 10-digit string consisting of numbers.

Factory setting Depends on the software option ordered

Additional information

Description

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

User entry

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

NOTE!

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

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

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

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

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

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

Example for a software option

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

Web browser

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

Software option overview

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

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

User interface

- Extended HistoROM *
- SIL *
- Second gas
- Heartbeat Monitoring *
- 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 and "Heartbeat Monitoring" option

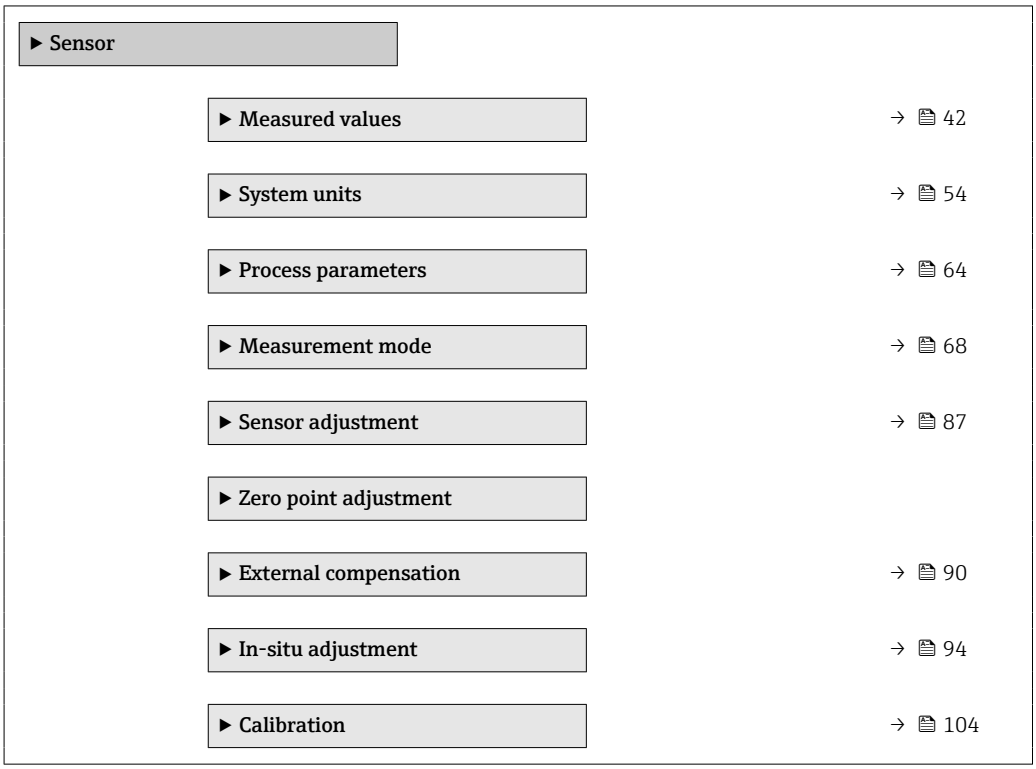
Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

"Second gas" option

Order code for "Application package", option EV "Second gas group"

3.2 "Sensor" submenu

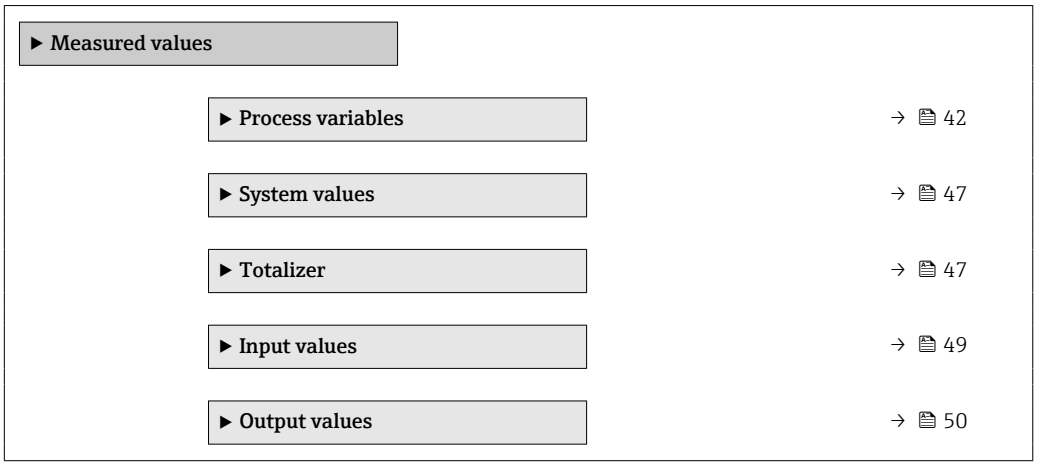
Navigation Expert → Sensor



* Visibility depends on order options or device settings

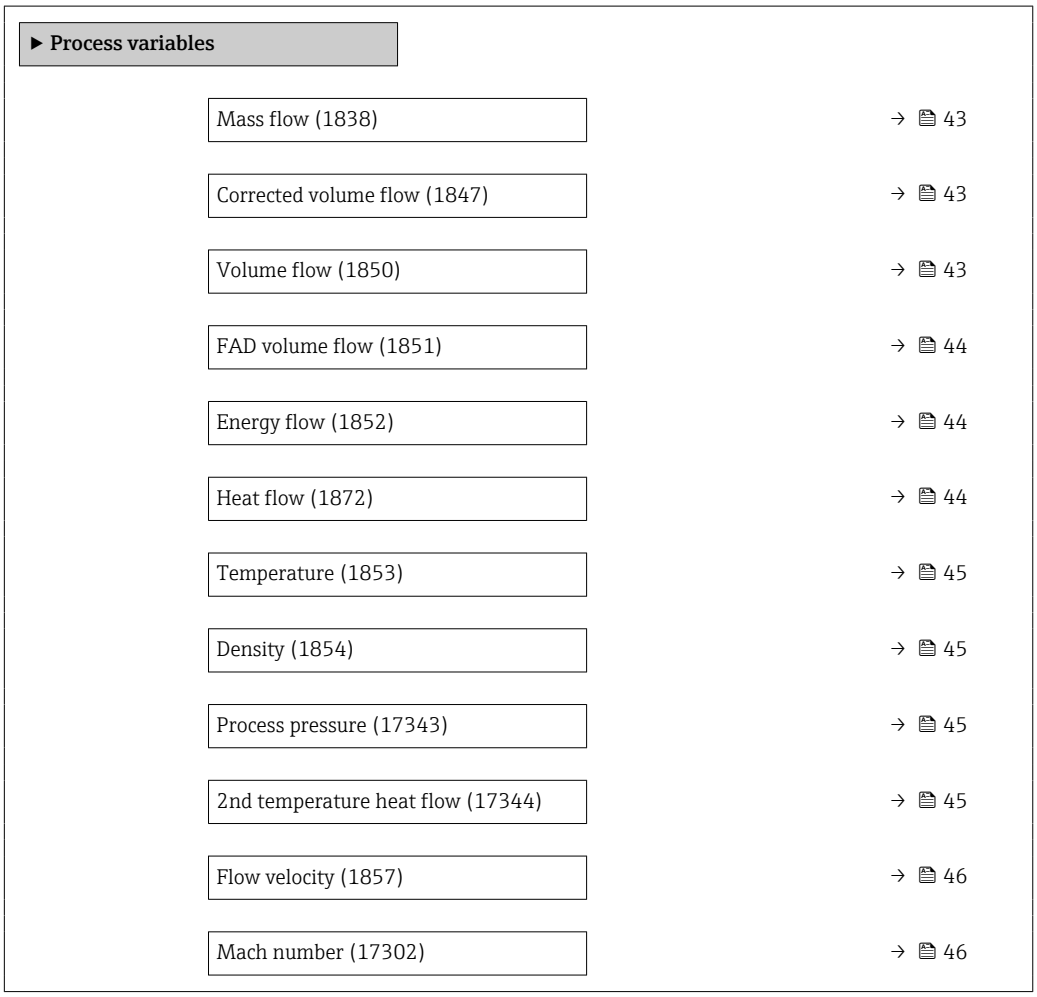
3.2.1 "Measured values" submenu

Navigation Expert → Sensor → Measured val.



"Process variables" submenu

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



Power coefficient fluctuation (12112)	→ 46
Level of flow fluctuation (12113)	→ 47

Mass flow

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

Description Displays the mass flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 55)

Corrected volume flow

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

Description Displays the corrected volume flow that is currently calculated.

User interface Signed floating-point number

Additional information *Description*

The corrected volume flow is derived from the measured volume flow corrected to the selected reference conditions.

Dependency

The unit is taken from the **Corrected volume flow unit** parameter (→ 56)

Volume flow

Navigation Expert → Sensor → Measured val. → Process variab. → Volume flow (1850)

Description Displays the volume flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Volume flow unit** parameter (→ 57)

FAD volume flow

Navigation Expert → Sensor → Measured val. → Process variab. → FAD volume flow (1851)

Prerequisite The **Air or compressed air** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Displays the FAD [2)] volume flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **FAD volume flow unit** parameter (→ 58).

Energy flow

Navigation Expert → Sensor → Measured val. → Process variab. → Energy flow (1852)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Shows the energy flow currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

Heat flow

Navigation Expert → Sensor → Measured val. → Process variab. → Heat flow (1872)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Shows the heat flow currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

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

2) Free Air Delivery

Temperature

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

Description Displays the temperature that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 62)

Density

Navigation Expert → Sensor → Measured val. → Process variab. → Density (1854)

Description Shows the density currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Density unit** parameter (→ 61)

Process pressure

Navigation Expert → Sensor → Measured val. → Process variab. → Process pressure (17343)

Description Shows depending on the setting the entered or external process pressure.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Pressure unit** parameter (→ 62)

2nd temperature heat flow

Navigation Expert → Sensor → Measured val. → Process variab. → 2nd temp.heat fl (17344)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Displays the 2nd temperature for heat flow calculation. The temperature can be an external value or a fixed, entered value.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 62)

Flow velocity

Navigation Expert → Sensor → Measured val. → Process variab. → Flow velocity (1857)

Description Shows the flow velocity currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Velocity unit** parameter (→ 63)

Mach number

Navigation Expert → Sensor → Measured val. → Process variab. → Mach number (17302)

Description Shows the Mach number currently calculated. For the calculation the density and the pressure are required.

User interface Signed floating-point number

Power coefficient fluctuation

Navigation Expert → Sensor → Measured val. → Process variab. → Powercoeff.fluct (12112)

Description Indicates the standard deviation of the unprocessed sensor signal.

User interface Signed floating-point number

Factory setting 0 to 1

Additional information Unit: normalized value.

Level of flow fluctuation

Navigation Expert → Sensor → Measured val. → Process variab. → Fluctuat. level (12113)

Description Indicates the process stability via peak value determination.

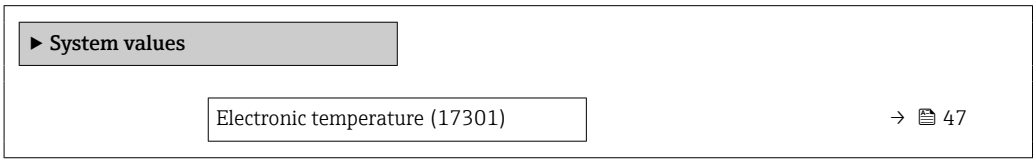
User interface Signed floating-point number

Factory setting 0 to 1

Additional information U: normalized value.

"System values" submenu

Navigation Expert → Sensor → Measured val. → System values



Electronic temperature

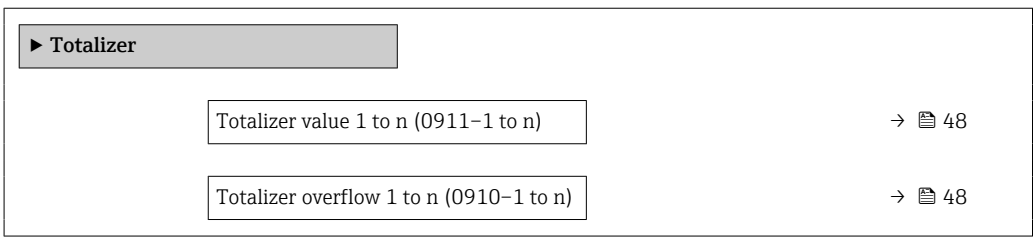
Navigation Expert → Sensor → Measured val. → System values → Electronic temp. (17301)

Description Indication of the current temperature of the electronics.

User interface Signed floating-point number

"Totalizer" submenu

Navigation Expert → Sensor → Measured val. → Totalizer



Totalizer value 1 to n

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

Description Displays the current totalizer reading.

User interface Signed floating-point number

Additional information

Description

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

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 179).

User interface

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 176).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer value 1** parameter: 1 968 457 kg
- Value in **Totalizer overflow 1** parameter: $1 \cdot 10^7$ (1 overflow) = 10 000 000 [kg]
- Current totalizer reading: 11 968 457 kg

Totalizer overflow 1 to n

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

Description Displays the current totalizer overflow.

User interface Integer with sign

Additional information

Description

If the current totalizer reading exceeds 7 digits, which is the maximum value range that can be displayed by the operating tool, the value above this range is output as an overflow.

The current totalizer value is therefore the sum of the overflow value and the totalizer value from the **Totalizer value 1 to n** parameter.

User interface

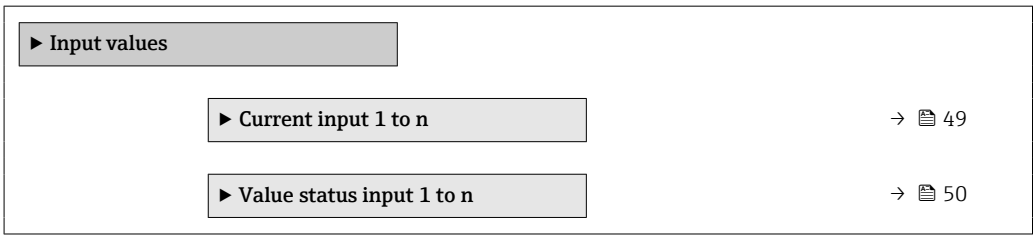
The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 176).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer value 1** parameter: 1 968 457 kg
- Value in **Totalizer overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [kg]
- Current totalizer reading: 21 968 457 kg

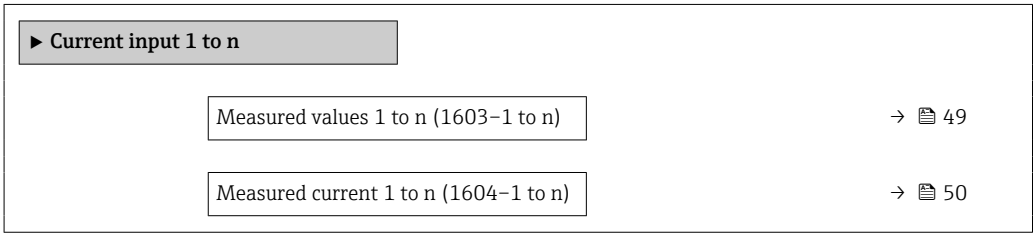
"Input values" submenu

Navigation Expert → Sensor → Measured val. → Input values



"Current input 1 to n" submenu

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



Measured values 1 to n

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

Description Displays the current input value.

User interface Signed floating-point number

Measured current 1 to n

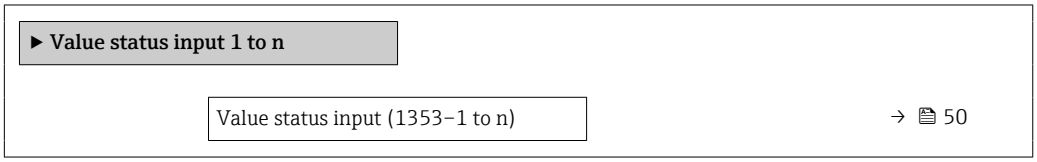
Navigation Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n (1604–1 to n)

Description Displays the current value of the current input.

User interface 0 to 22.5 mA

"Value status input 1 to n" submenu

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



Value status input

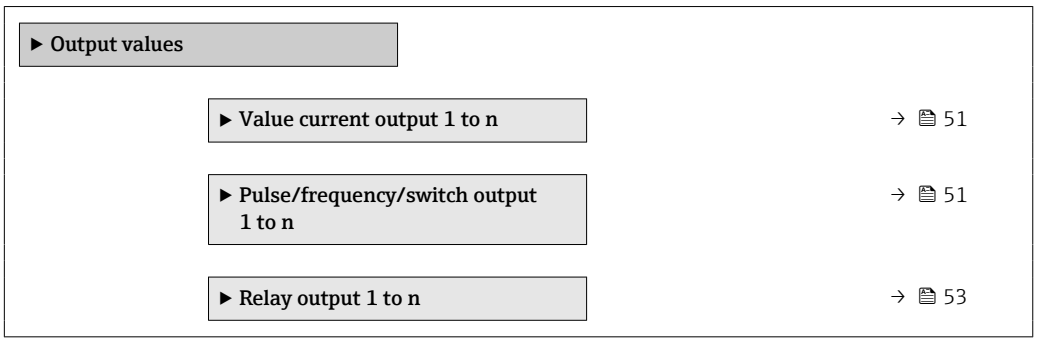
Navigation Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n → Val.stat.inp. (1353–1 to n)

Description Displays the current input signal level.

User interface
- High
- Low

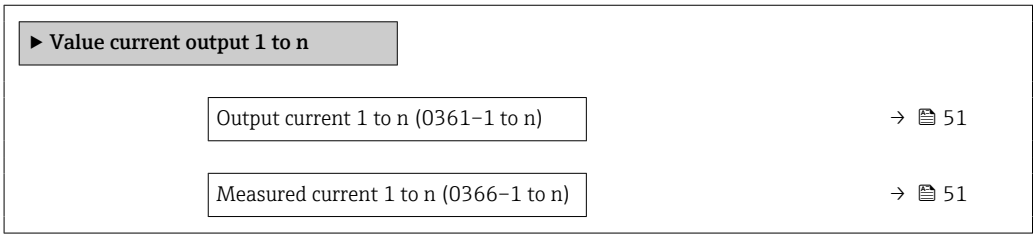
"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values



"Value current output 1 to n" submenu

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



Output current 1 to n

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

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

User interface 0 to 22.5 mA

Measured current 1 to n

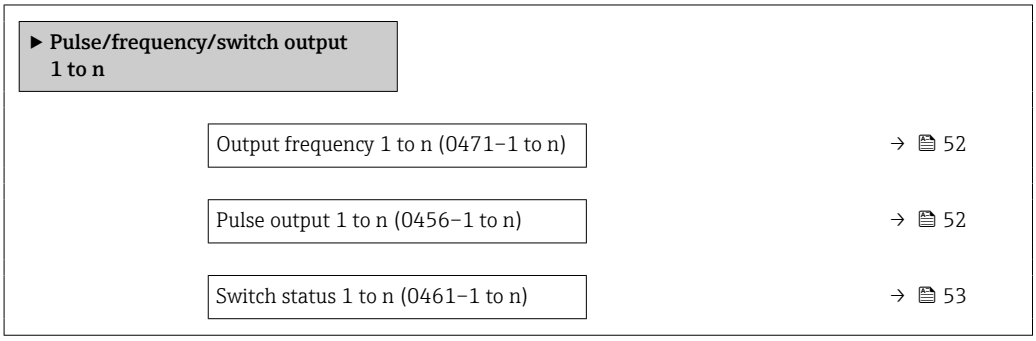
Navigation Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Measur. curr. 1 to n (0366–1 to n)

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

User interface 0 to 30 mA

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

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



Output frequency 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 119), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Pulse output 1 to n

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

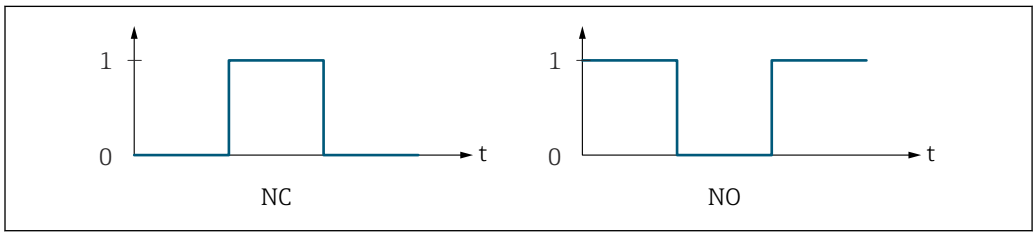
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 119) parameter.

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 133) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 122)) can be configured.

Switch status 1 to n

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 119).

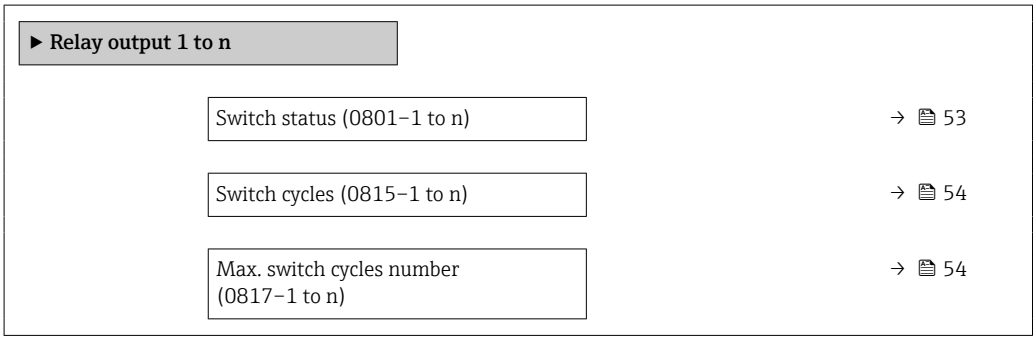
Description Displays the current switch status of the status output.

User interface
- Open
- Closed

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

"Relay output 1 to n" submenu

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



Switch status

Navigation Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Switch status (0801–1 to n)

Description Displays the current status of the relay output.

User interface
- Open
- Closed

Additional information *User interface*

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

Switch cycles

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

Description Displays all the switch cycles performed.

User interface Positive integer

Max. switch cycles number

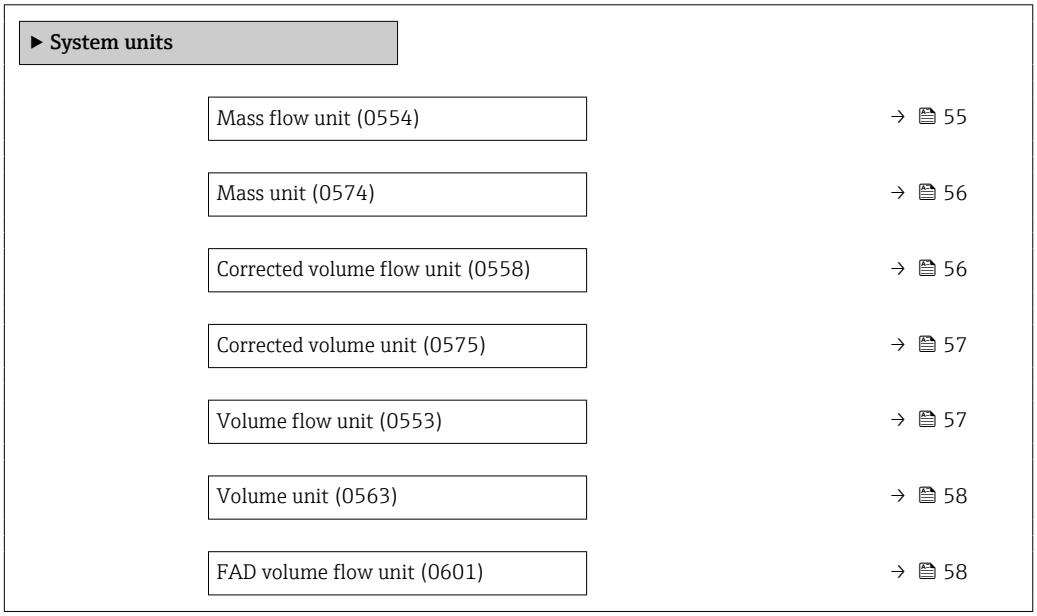
Navigation Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no. (0817–1 to n)

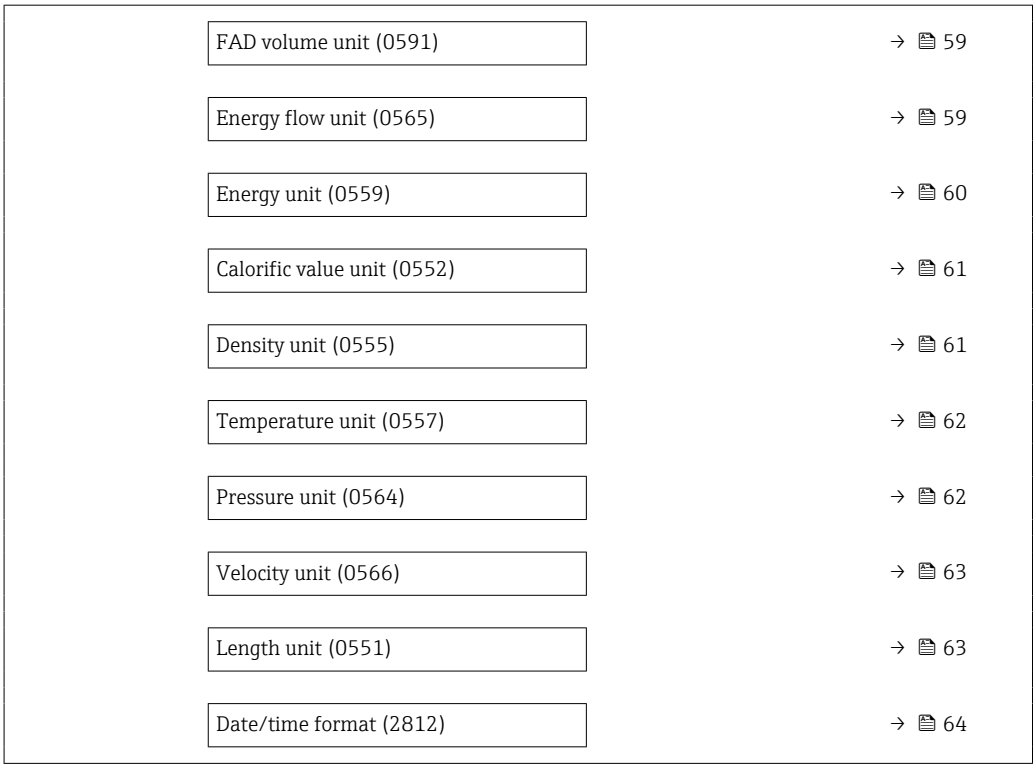
Description Displays the maximum number of guaranteed switch cycles.

User interface Positive integer

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units





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
- lb/s
- lb/min
- lb/h
- lb/d
- STon/s
- STon/min
- STon/h
- STon/d

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

Additional information

Result

The selected unit applies for:
Mass flow parameter (→ 43)

Selection

For an explanation of the abbreviated units: → 223

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
- lb
- STon

Factory setting

Country-specific:
- kg
- lb

Additional information

Selection

For an explanation of the abbreviated units: → 223

Corrected volume flow unit

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

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

Selection

SI units
- Nl/s
- Nl/min
- Nl/h
- Nl/d
- Nm^3/s
- Nm^3/min
- Nm^3/h
- Nm^3/d
- Sl/s
- Sl/min
- Sl/h
- Sl/d
- Sm^3/s
- Sm^3/min
- Sm^3/h
- Sm^3/d

US units
- Sft^3/s
- Sft^3/min
- Sft^3/h
- Sft^3/d

Factory setting

Country-specific:
- Nm^3/h
- Sft^3/h

Additional information

Selection

For an explanation of the abbreviated units: → 223

Corrected volume unit

Navigation

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

Description

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

Selection

SI units
- Nl
- Nm^3
- Sl
- Sm^3

US units
- Sft^3

Factory setting

Country-specific:
- Nm^3
- Sft^3

Additional information

Selection

For an explanation of the abbreviated units: → 223

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
- m^3/s
- m^3/min
- m^3/h
- m^3/d
- l/s
- l/min
- l/h
- l/d

US units
- ft^3/s
- ft^3/min
- ft^3/h
- ft^3/d

Factory setting

Country-specific:
- l/h
- ft^3/h

Volume unit

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

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

Selection

SI units
- m^3
- l

US units
- ft^3

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

Additional information *Selection*

For an explanation of the abbreviated units: → 223

FAD volume flow unit

Navigation Expert → Sensor → System units → FAD vol.fl. unit (0601)

Description Use this function to select the unit for the FAD [3] volume flow.

Selection

SI units
- l FAD/s
- l FAD/min
- l FAD/h
- l FAD/d
- m^3 FAD/s
- m^3 FAD/min
- m^3 FAD/h
- m^3 FAD/d

US units
- cf FAD/s
- cf FAD/min
- cf FAD/h
- cf FAD/d

Factory setting Country-specific:
- m^3 FAD/h
- cf FAD/min

Additional information *Result*

The selected unit applies for:
FAD volume flow parameter (→ 44)

Selection

For an explanation of the abbreviated units: → 223

3) Free air delivery

FAD volume unit

Navigation Expert → Sensor → System units → FAD volume unit (0591)

Description Use this function to select the unit for the FAD [4] volume.

Selection

SI units	*US units*
▪ l FAD ▪ m³ FAD	cf FAD

Factory setting Country-specific:
- m³ FAD
- cf FAD

Additional information *Selection*

For an explanation of the abbreviated units: → 223

Energy flow unit

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

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

4) Free air delivery

Selection

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

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

Factory setting

Country-specific:
- kW
- Btu/h

Additional information

Selection

For an explanation of the abbreviated units: → 223

Energy unit

Navigation

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

Description

Use this function to select the unit for energy.

Selection

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

Imperial units
- Btu
- MBtu
- MMBtu

Factory setting
Country-specific:
- kWh
- Btu

Additional information
Selection

For an explanation of the abbreviated units: → 223

Calorific value unit

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

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

Selection

SI units
- kJ/Nm³
- kWh/Nm³
- kWh/Sm³
- kJ/Sm³

Imperial units
- Btu/Sm³
- MBtu/Sm³
- Btu/Sft³
- MBtu/Sft³

Factory setting
Country-specific:
- kWh/Nm³
- Btu/Sft³

Additional information

Density unit

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

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

Selection

SI units
- g/cm³
- kg/dm³
- kg/l
- kg/m³

US units
lb/ft³

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

Additional information
Selection

For an explanation of the abbreviated units: → 223

Temperature unit

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

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

Selection

SI units
- °C
- K

US units
- °F
- °R

Factory setting Country-specific:
- °C
- °F

Additional information

Result

The selected unit applies for:
- **Temperature** parameter (→ 45)
- **FAD temperature** parameter
- **Reference combustion temperature** parameter
- **Reference temperature** parameter
- **Maximum value** parameter
- **Minimum value** parameter
- **Maximum value** parameter
- **Minimum value** parameter

Selection

For an explanation of the abbreviated units: → 223

Pressure unit

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

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

Selection

SI units
- MPa a
- kPa a
- bar a
- mbar a

US units
- psi a

Factory setting Country-specific:
- bar a
- psi a

Additional information *Result*

The unit is taken from:
- **FAD pressure** parameter
- **Reference pressure** parameter

Selection

For an explanation of the abbreviated units: → 223

Velocity unit

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

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

Selection

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

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

Length unit

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

Description Use this function to select the unit of length.

Selection

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

Factory setting Country-specific:
- mm
- in

Additional information *Result*

The selected unit applies for:
- **Duct internal height** parameter
- **Insertion depth** parameter
- **Pipe inner diameter** parameter
- **Mounting set height** parameter
- **Pipe wall thickness** parameter
- **Duct internal width** parameter

Selection

For an explanation of the abbreviated units: → 223

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.

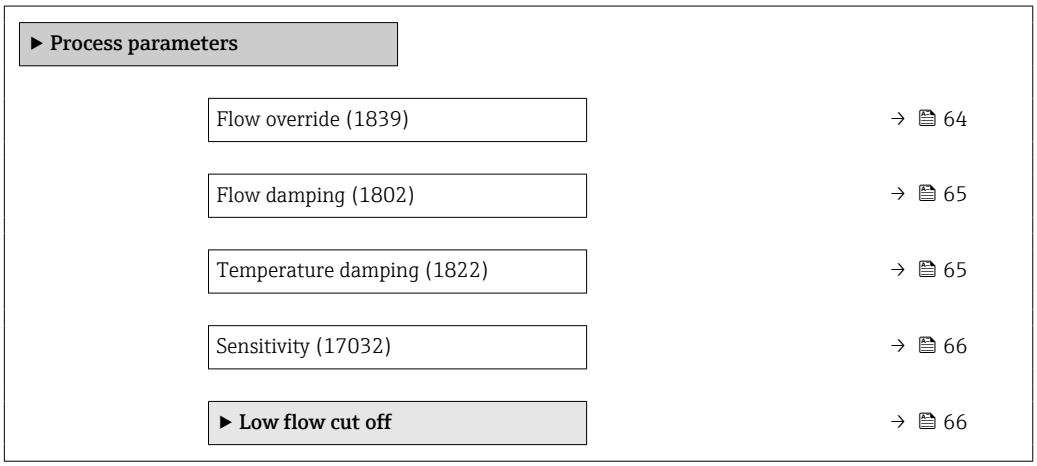
Selection
- dd.mm.yy hh:mm
- dd.mm.yy hh:mm am/pm
- mm/dd/yy hh:mm
- mm/dd/yy hh:mm am/pm

Additional information *Selection*

For an explanation of the abbreviated units: → 223

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 processes of a pipeline, for example.

Selection
- Off
- On

Additional information *Description*

Flow override is active
- The **453 Flow override** diagnostic message is output.
- Output values
  - Temperature: continues to be output
  - Totalizers 1-3: stop being totalized

The **Flow override** option can also be activated in the **Status input** submenu: **Assign status input** parameter (→ 108).

Flow damping

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

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

User entry 0 to 999.9 s

Additional information *Description*

The damping is performed by a PT1 element [5].

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

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

Result

The damping affects the following variables of the device:
- Outputs → 110
- Low flow cut off → 66
- Totalizers → 175

Temperature damping

Navigation Expert → Sensor → Process param. → Temp. damping (1822)

Description Use this function to enter a time constant for the damping (PT1 element) of the temperature measured value.

User entry 0 to 999.9 s

5) Proportional behavior with first-order lag

Additional information

Description

The damping is performed by a PT1 element [6].

User entry

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

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

Sensitivity

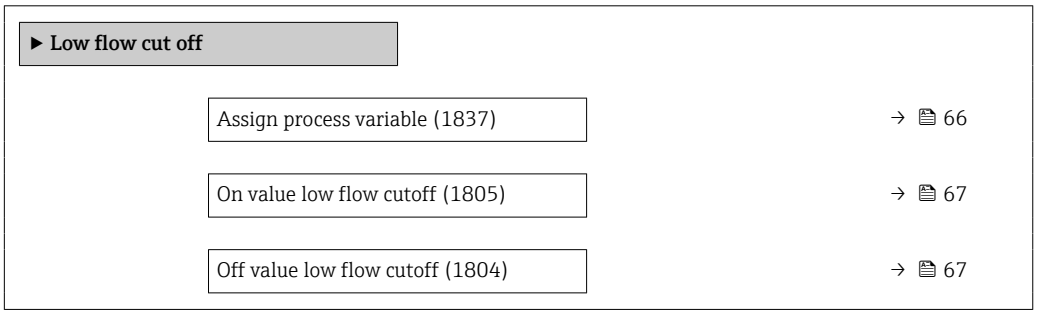
Navigation Expert → Sensor → Process param. → Sensitivity (17032)

Description Enter the threshold value for process stability. The higher the value, the better disturbances are detected.

User entry 1 to 9

"Low flow cut off" submenu

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



Assign process variable

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

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

6) Proportional behavior with first-order lag

Selection

- Off
- Mass flow
- Volume flow
- Corrected volume flow
- FAD volume flow *

On value low flow cutoff

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 66).

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 → 67.

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter→ 221

Additional information *Dependency*

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

Off value low flow cutoff

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

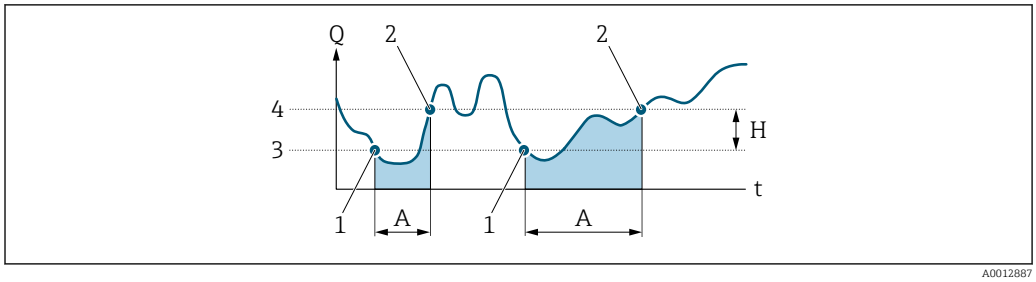
Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 66).

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→ 67.

User entry 0 to 100.0 %

* Visibility depends on order options or device settings

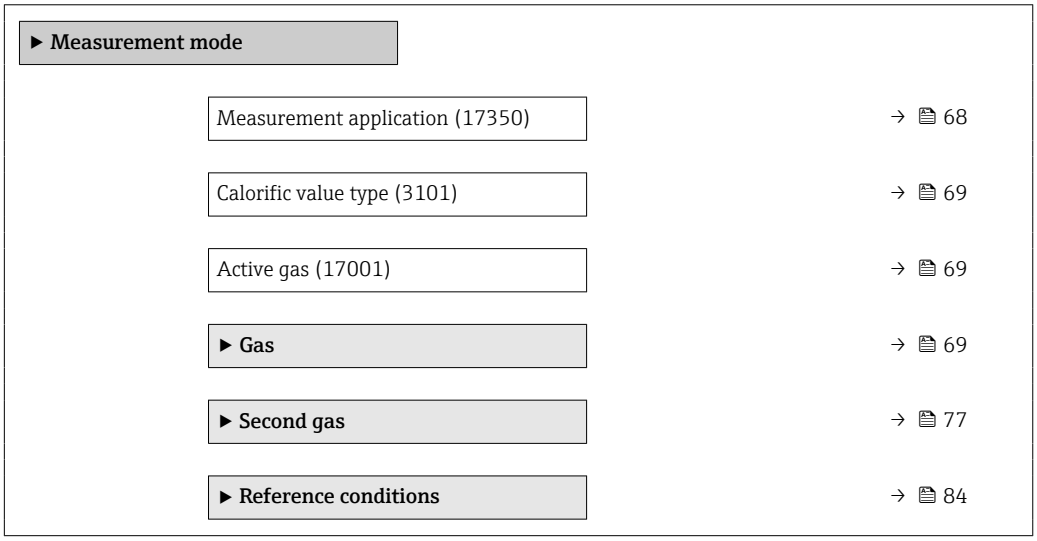
Additional information *Example*



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

3.2.4 "Measurement mode" submenu

Navigation Expert → Sensor → Measurement mode



Measurement application

Navigation Expert → Sensor → Measurement mode → Measurem. appl. (17350)

Description Select measurement application.

Selection
- Air or compressed air
- Gas or gas mixture
- Energy

Calorific value type

Navigation Expert → Sensor → Measurement mode → Calorif.val.type (3101)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Select calculation based on gross calorific value or net calorific value.

Selection
- Gross calorific value mass
- Net calorific value mass

Active gas

Navigation Expert → Sensor → Measurement mode → Active gas (17001)

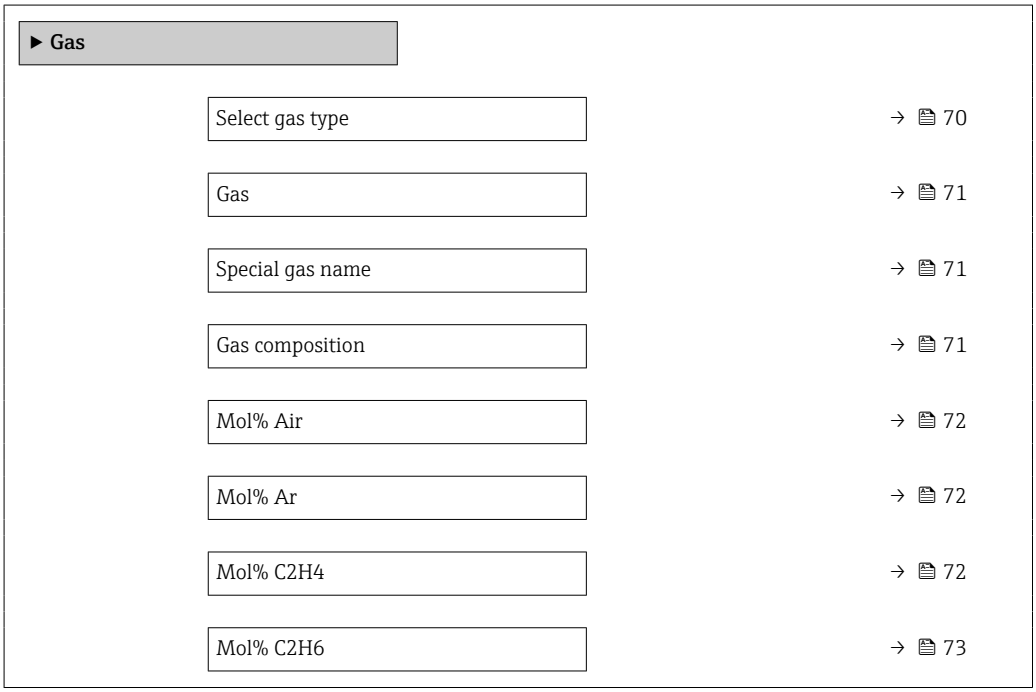
Prerequisite **Second gas** option application package is available.

Description Select the gas that the device is currently using for the measurement.

Selection
- Gas
- Second gas

"Gas" submenu

Navigation Expert → Sensor → Measurement mode → Gas



Mol% C3H8	→ 73
Mol% CH4	→ 73
Mol% Cl2	→ 73
Mol% CO	→ 73
Mol% CO2	→ 74
Mol% H2	→ 74
Mol% H2O	→ 74
Mol% H2S	→ 74
Mol% HCl	→ 74
Mol% He	→ 75
Mol% i-C4H10	→ 75
Mol% Kr	→ 75
Mol% N2	→ 75
Mol% Ne	→ 75
Mol% NH3	→ 76
Mol% O2	→ 76
Mol% O3	→ 76
Mol% Xe	→ 76

Select gas type

Navigation Expert → Sensor → Measurement mode → Gas → Select gas type (3109)

Description Select measured gas type.

Selection
- Single gas
- Gas mixture
- Special gas *

* Visibility depends on order options or device settings

Gas

Navigation Expert → Sensor → Measurement mode → Gas → Gas (3151)

Prerequisite The **Single gas** option is selected in the **Select gas type** parameter parameter.

Description Select measured gas.

Selection
- Air
- Ammonia NH3
- Argon Ar
- Butane C4H10
- Carbon dioxide CO2
- Carbon monoxide CO
- Chlorine Cl2
- Ethane C2H6
- Ethylene C2H4
- Helium He
- Hydrogen H2
- Hydrogen chloride HCl
- Hydrogen sulfide H2S
- Krypton Kr
- Methane CH4
- Neon Ne
- Nitrogen N2
- Oxygen O2
- Ozone O3
- Propane C3H8
- Xenon Xe

Special gas name

Navigation Expert → Sensor → Measurement mode → Gas → Special gas name (3177)

Prerequisite **Special gas** option application package is available.

Description Shows the description of the gas ordered by the customer, e.g. gas name or gas composition.

User interface -

Factory setting -

Gas composition

Navigation Expert → Sensor → Measurement mode → Gas → Gas composition (3110)

Prerequisite The **Gas mixture** option is selected in the **Select gas type** parameter parameter.

Description Select measured gas mixture.

Selection
- Air
- Hydrogen H2
- Helium He
- Neon Ne
- Argon Ar
- Krypton Kr
- Xenon Xe
- Nitrogen N2
- Oxygen O2
- Chlorine Cl2
- Ammonia NH3
- Carbon monoxide CO
- Carbon dioxide CO2
- Hydrogen sulfide H2S
- Hydrogen chloride HCl
- Methane CH4
- Propane C3H8
- Ethane C2H6
- Butane C4H10
- Ethylene C2H4
- Water
- Ozone O3

Mol% Air

Navigation Expert → Sensor → Measurement mode → Gas → Mol% Air (3170)

Description Air

User entry 0 to 100 %

Mol% Ar

Navigation Expert → Sensor → Measurement mode → Gas → Mol% Ar (3112)

Description Ar = Argon

User entry 0 to 100 %

Mol% C2H4

Navigation Expert → Sensor → Measurement mode → Gas → Mol% C2H4 (3114)

Description C_2H_4 = ethylene

User entry 0 to 100 %

Mol% C2H6

Navigation Expert → Sensor → Measurement mode → Gas → Mol% C2H6 (3115)

Description C_2H_6 = ethane

User entry 0 to 100 %

Mol% C3H8

Navigation Expert → Sensor → Measurement mode → Gas → Mol% C3H8 (3116)

Description C_3H_8 = propane

User entry 0 to 100 %

Mol% CH4

Navigation Expert → Sensor → Measurement mode → Gas → Mol% CH4 (3117)

Description CH_4 = methane

User entry 0 to 100 %

Mol% Cl2

Navigation Expert → Sensor → Measurement mode → Gas → Mol% Cl2 (3118)

Description Cl_2 = chlorine

User entry 0 to 100 %

Mol% CO

Navigation Expert → Sensor → Measurement mode → Gas → Mol% CO (3119)

Description CO = carbon monoxide

User entry 0 to 100 %

Mol% CO2

Navigation Expert → Sensor → Measurement mode → Gas → Mol% CO2 (3120)

Description CO_2 = carbon dioxide

User entry 0 to 100 %

Mol% H2

Navigation Expert → Sensor → Measurement mode → Gas → Mol% H2 (3121)

Description H_2 = hydrogen

User entry 0 to 100 %

Mol% H2O

Navigation Expert → Sensor → Measurement mode → Gas → Mol% H2O (3122)

Description H_2O = water

User entry 0 to 20 %

Mol% H2S

Navigation Expert → Sensor → Measurement mode → Gas → Mol% H2S (3123)

Description H_2S = hydrogen sulfide

User entry 0 to 100 %

Mol% HCl

Navigation Expert → Sensor → Measurement mode → Gas → Mol% HCl (3124)

Description HCl = hydrogen chloride

User entry 0 to 100 %

Mol% He

Navigation Expert → Sensor → Measurement mode → Gas → Mol% He (3125)

Description He = helium

User entry 0 to 100 %

Mol% i-C4H10

Navigation Expert → Sensor → Measurement mode → Gas → Mol% i-C4H10 (3126)

Description i-C_4H_{10} = isobutane

User entry 0 to 100 %

Mol% Kr

Navigation Expert → Sensor → Measurement mode → Gas → Mol% Kr (3128)

Description Kr = krypton

User entry 0 to 100 %

Mol% N2

Navigation Expert → Sensor → Measurement mode → Gas → Mol% N2 (3129)

Description N_2 = nitrogen

User entry 0 to 100 %

Mol% Ne

Navigation Expert → Sensor → Measurement mode → Gas → Mol% Ne (3137)

Description Ne = neon

User entry 0 to 100 %

Mol% NH3

Navigation Expert → Sensor → Measurement mode → Gas → Mol% NH3 (3138)

Description NH_3 = ammonia

User entry 0 to 100 %

Mol% O2

Navigation Expert → Sensor → Measurement mode → Gas → Mol% O2 (3139)

Description O_2 = oxygen

User entry 0 to 100 %

Mol% O3

Navigation Expert → Sensor → Measurement mode → Gas → Mol% O3 (3174)

Prerequisite Mixture only possible with O2.

- O3: 65 to 100 %
- O2: 0 to 35 %

Description Enter amount of substance for the gas mixture.

User entry 65 to 100 %

Mol% Xe

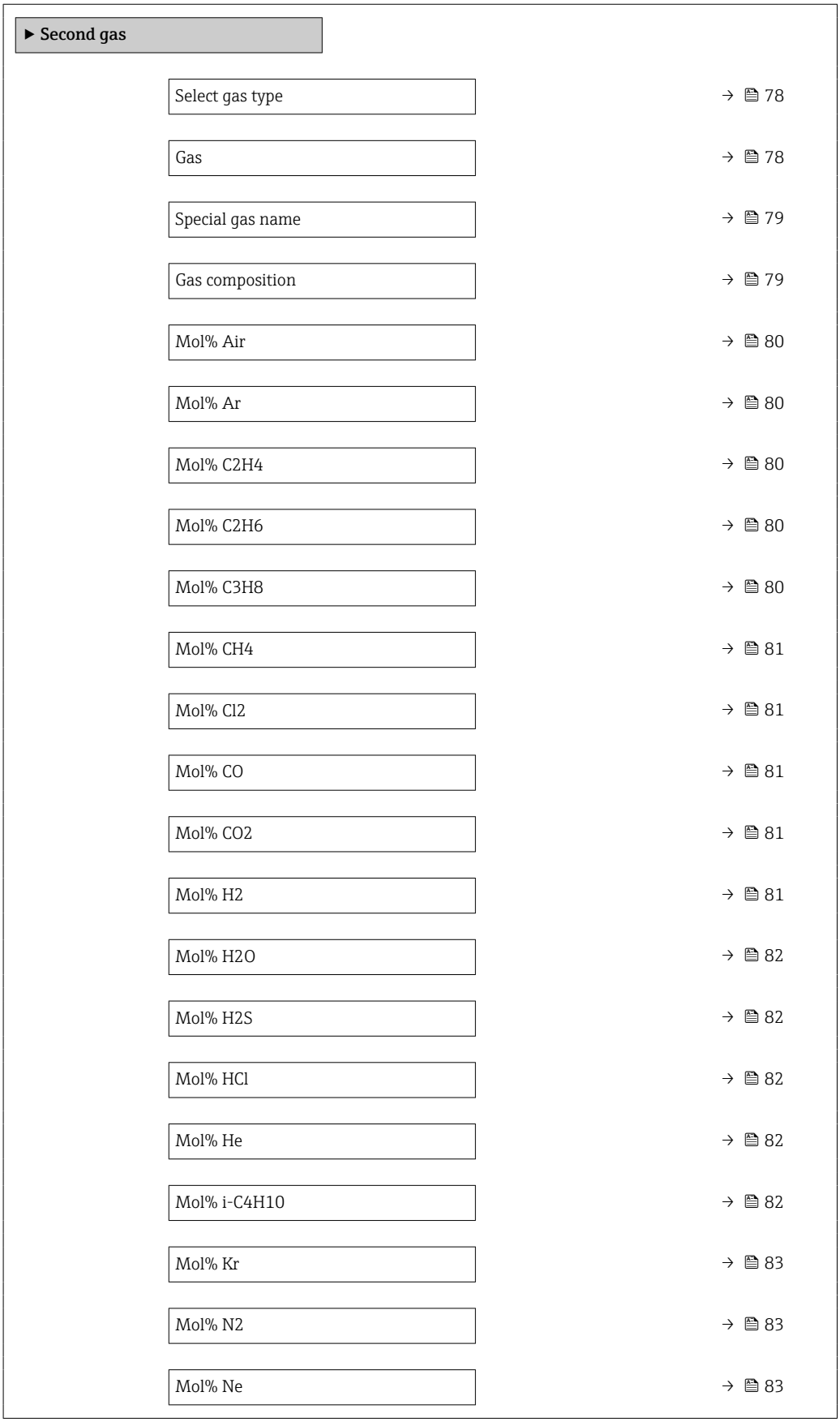
Navigation Expert → Sensor → Measurement mode → Gas → Mol% Xe (3142)

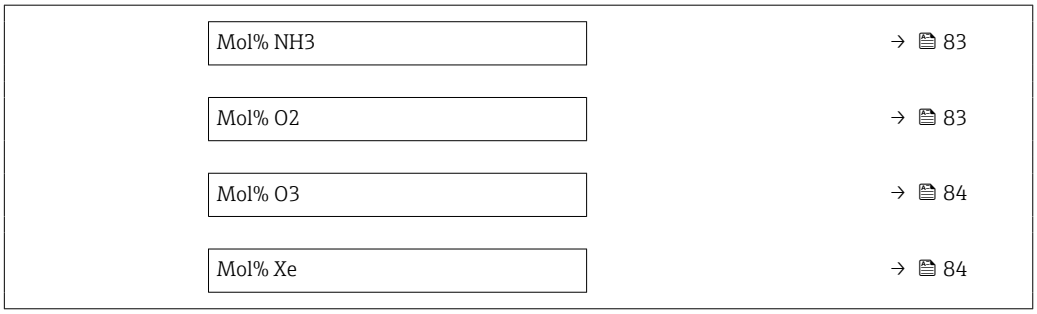
Description Xe = xenon

User entry 0 to 100 %

"Second gas" submenu

Navigation Expert → Sensor → Measurement mode → Second gas → Special gas name (3177)





Select gas type

Navigation Expert → Sensor → Measurement mode → Second gas → Select gas type (3109)

Description Select measured gas type.

Selection
- Single gas
- Gas mixture
- Special gas *

Gas

Navigation Expert → Sensor → Measurement mode → Second gas → Gas (3151)

Prerequisite The **Single gas** option is selected in the **Select gas type** parameter parameter.

Description Select measured gas.

Selection
- Air
- Ammonia NH3
- Argon Ar
- Butane C4H10
- Carbon dioxide CO2
- Carbon monoxide CO
- Chlorine Cl2
- Ethane C2H6
- Ethylene C2H4
- Helium He
- Hydrogen H2
- Hydrogen chloride HCl
- Hydrogen sulfide H2S
- Krypton Kr
- Methane CH4
- Neon Ne
- Nitrogen N2
- Oxygen O2

* Visibility depends on order options or device settings

- Ozone O3
- Propane C3H8
- Xenon Xe

Special gas name

Navigation Expert → Sensor → Measurement mode → Second gas → Special gas name (3177)

Prerequisite **Special gas** option application package is available.

Description Shows the description of the gas ordered by the customer, e.g. gas name or gas composition.

User interface -

Factory setting -

Gas composition

Navigation Expert → Sensor → Measurement mode → Second gas → Gas composition (3110)

Prerequisite The **Gas mixture** option is selected in the **Select gas type** parameter parameter.

Description Select measured gas mixture.

Selection
- Air
- Hydrogen H2
- Helium He
- Neon Ne
- Argon Ar
- Krypton Kr
- Xenon Xe
- Nitrogen N2
- Oxygen O2
- Chlorine Cl2
- Ammonia NH3
- Carbon monoxide CO
- Carbon dioxide CO2
- Hydrogen sulfide H2S
- Hydrogen chloride HCl
- Methane CH4
- Propane C3H8
- Ethane C2H6
- Butane C4H10
- Ethylene C2H4
- Water
- Ozone O3

Mol% Air

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% Air (3170)

Description Air

User entry 0 to 100 %

Mol% Ar

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% Ar (3112)

Description Ar = Argon

User entry 0 to 100 %

Mol% C2H4

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% C2H4 (3114)

Description C_2H_4 = ethylene

User entry 0 to 100 %

Mol% C2H6

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% C2H6 (3115)

Description C_2H_6 = ethane

User entry 0 to 100 %

Mol% C3H8

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% C3H8 (3116)

Description C_3H_8 = propane

User entry 0 to 100 %

Mol% CH4

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% CH4 (3117)

Description CH_4 = methane

User entry 0 to 100 %

Mol% Cl2

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% Cl2 (3118)

Description Cl_2 = chlorine

User entry 0 to 100 %

Mol% CO

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% CO (3119)

Description CO = carbon monoxide

User entry 0 to 100 %

Mol% CO2

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% CO2 (3120)

Description CO_2 = carbon dioxide

User entry 0 to 100 %

Mol% H2

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% H2 (3121)

Description H_2 = hydrogen

User entry 0 to 100 %

Mol% H2O

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% H2O (3122)

Description H_2O = water

User entry 0 to 20 %

Mol% H2S

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% H2S (3123)

Description H_2S = hydrogen sulfide

User entry 0 to 100 %

Mol% HCl

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% HCl (3124)

Description HCl = hydrogen chloride

User entry 0 to 100 %

Mol% He

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% He (3125)

Description He = helium

User entry 0 to 100 %

Mol% i-C4H10

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% i-C4H10 (3126)

Description i-C_4H_{10} = isobutane

User entry 0 to 100 %

Mol% Kr

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% Kr (3128)

Description Kr = krypton

User entry 0 to 100 %

Mol% N2

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% N2 (3129)

Description N_2 = nitrogen

User entry 0 to 100 %

Mol% Ne

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% Ne (3137)

Description Ne = neon

User entry 0 to 100 %

Mol% NH3

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% NH3 (3138)

Description NH_3 = ammonia

User entry 0 to 100 %

Mol% O2

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% O2 (3139)

Description O_2 = oxygen

User entry 0 to 100 %

Mol% O3

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% O3 (3174)

Prerequisite Mixture only possible with O2.
- O3: 65 to 100 %
- O2: 0 to 35 %

Description Enter amount of substance for the gas mixture.

User entry 65 to 100 %

Mol% Xe

Navigation Expert → Sensor → Measurement mode → Second gas → Mol% Xe (3142)

Description Xe = xenon

User entry 0 to 100 %

"Reference conditions" submenu

Navigation Expert → Sensor → Measurement mode → Ref. conditions

▶ **Reference conditions**

Reference conditions (3155)	→ 85
Reference pressure (3146)	→ 85
Reference temperature (3147)	→ 85
FAD conditions (3173)	→ 85
FAD pressure (3175)	→ 86
FAD temperature (3176)	→ 86
Reference combustion temperature (3165)	
Reference combustion temperature (3143)	→ 86

Reference conditions

Navigation Expert → Sensor → Measurement mode → Ref. conditions → Ref. conditions (3155)

Description Select reference conditions for calculation of the corrected volume flow.

Selection
- 1013.25 mbara, 0 °C
- 1013.25 mbara, 15 °C
- 1013.25 mbara, 20 °C
- 1013.25 mbara, 25 °C
- 1000 mbara, 0 °C
- 1000 mbara, 15 °C
- 1000 mbara, 20 °C
- 1000 mbara, 25 °C
- 14.696 psia, 59 °F
- 14.696 psia, 60 °F
- User-defined

Reference pressure

Navigation Expert → Sensor → Measurement mode → Ref. conditions → Ref. pressure (3146)

Prerequisite The **Others** option is selected in the **Reference conditions** parameter (→ 85).

Description Select reference conditions for the corrected volume flow.

User entry 0 to 250 bar a

Reference temperature

Navigation Expert → Sensor → Measurement mode → Ref. conditions → Ref. temperature (3147)

Prerequisite The **Others** option is selected in the **Reference conditions** parameter (→ 85).

Description Select reference conditions for the corrected volume flow.

User entry −200 to 450 °C

FAD conditions

Navigation Expert → Sensor → Measurement mode → Ref. conditions → FAD conditions (3173)

Prerequisite The **Air or compressed air** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Select reference conditions for the calculation of the FAD density (FAD = free air delivery).

Selection
- 1000 mbara, 20 °C
- 14.504 psia, 68 °F
- User-defined

FAD pressure

Navigation Expert → Sensor → Measurement mode → Ref. conditions → FAD pressure (3175)

Prerequisite
- The **Air or compressed air** option is selected in the **Measurement application** parameter (→ 68) parameter.
- The **User-defined** option is selected in the **FAD conditions** parameter parameter.

Description Enter reference pressure for the calulation of the FAD density (FAD = free air delivery).

User entry 0 to 250 bar a

FAD temperature

Navigation Expert → Sensor → Measurement mode → Ref. conditions → FAD temperature (3176)

Prerequisite
- The **Air or compressed air** option is selected in the **Measurement application** parameter (→ 68) parameter.
- The **User-defined** option is selected in the **FAD conditions** parameter parameter.

Description Enter reference temperature for the calulation of the FAD density (FAD = free air delivery).

User entry −200 to 450 °C

Reference combustion temperature

Navigation Expert → Sensor → Measurement mode → Ref. conditions → Ref. comb. temp. (3143)

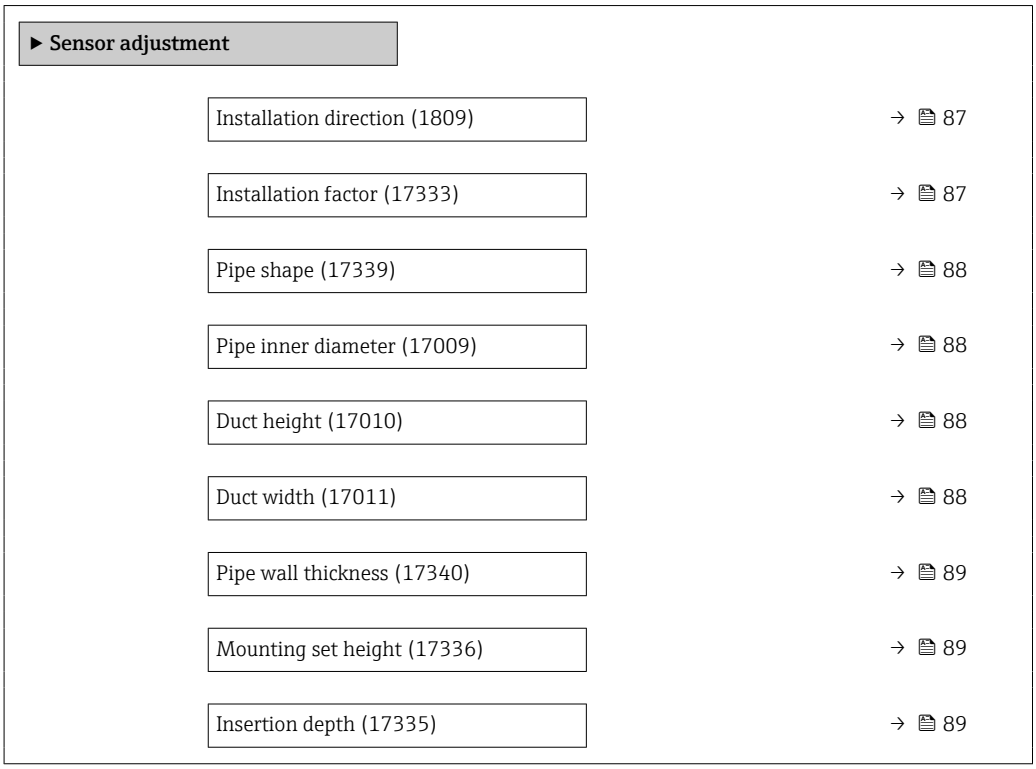
Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Enter reference combustion temperature to calculate the natural gas energy value.

User entry −200 to 450 °C

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

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 device.

Installation factor

Navigation Expert → Sensor → Sensor adjustm. → Install. factor (17333)

Description Enter factor to compensate the mounting-related measurement error.

User entry 0.01 to 100.0

Pipe shape

Navigation Expert → Sensor → Sensor adjustm. → Pipe shape (17339)

Prerequisite Only available with t-mass I.

Description Select the shape of the pipe.

Selection
- Circular
- Rectangular

Pipe inner diameter

Navigation Expert → Sensor → Sensor adjustm. → Pipe inner diam. (17009)

Prerequisite Only available with t-mass I.

Description Enter the internal diameter of a circular pipe.

User entry 0.050 to 5 m

Duct height

Navigation Expert → Sensor → Sensor adjustm. → Duct height (17010)

Prerequisite Only available with t-mass I.

Description Enter inner duct height. Duct height and sensor shaft are parallel.

User entry 0.050 to 5 m

Duct width

Navigation Expert → Sensor → Sensor adjustm. → Duct width (17011)

Prerequisite Only available with t-mass I.

Description Enter inner duct width. The duct width is vertical to the sensor shaft.

User entry 0.050 to 5 m

Pipe wall thickness

Navigation Expert → Sensor → Sensor adjustm. → Wall thickness (17340)

Description Enter the pipe wall thickness.

User entry 0 to 1 m

Mounting set height

Navigation Expert → Sensor → Sensor adjustm. → Mounting set ht. (17336)

Description Enter mounting set height.

User entry 0 to 1 m

Insertion depth

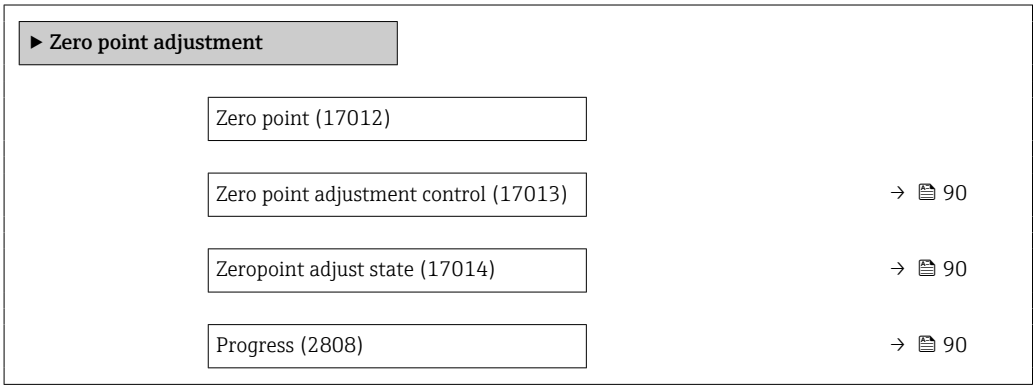
Navigation Expert → Sensor → Sensor adjustm. → Insertion depth (17335)

Description Shows calculated insertion depth of the sensor.

User interface Positive floating-point number

3.2.6 "Zero point adjustment" submenu

Navigation Expert → Sensor → Zero point adj.



Zero point adjustment control

Navigation Expert → Sensor → Zero point adj. → Zero point adj. (17013)

Description Start zero point adjustment.

Selection
- Cancel
- Start

Zeropoint adjust state

Navigation Expert → Sensor → Zero point adj. → Zero adj. state (17014)

User interface
- Busy
- Zero point adjust failure
- Ok

Progress

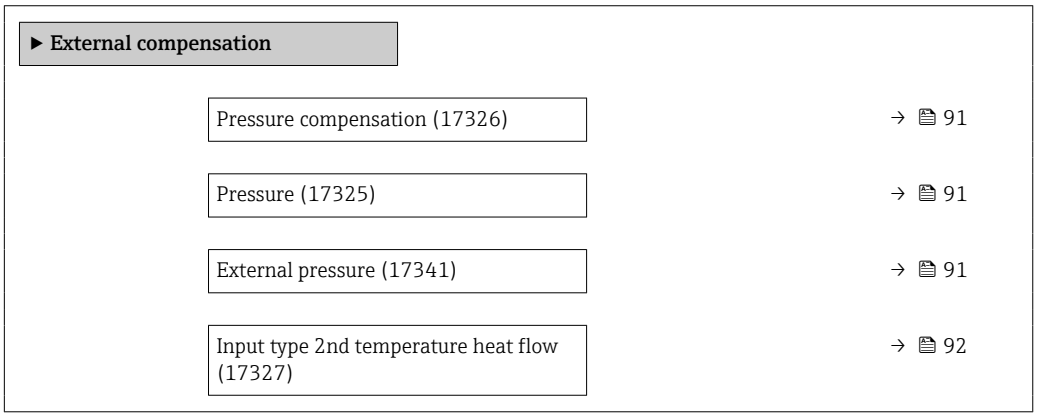
Navigation
Diagnostics → HBT → Perform.verific. → Progress (2808)
Expert → Diagnostics → HBT → Perform.verific. → Progress (2808)
Expert → Sensor → Sensor adjustm. → Zero point adj. → Progress (2808)
Expert → Sensor → Zero point adj. → Progress (2808)

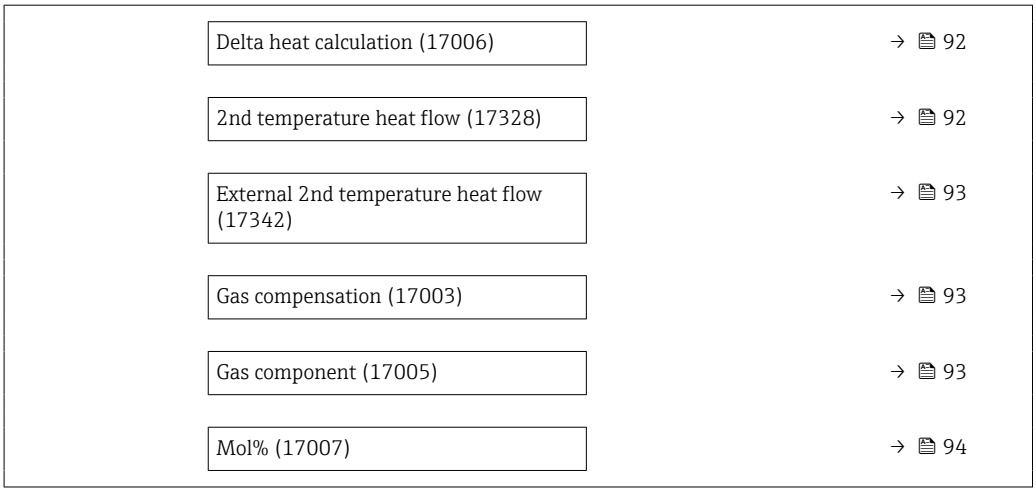
Description The progress of the process is indicated.

User interface 0 to 100 %

3.2.7 "External compensation" submenu

Navigation Expert → Sensor → External comp.





Pressure compensation

Navigation Expert → Sensor → External comp. → Pressure compen. (17326)

Description Select pressure compensation type.

Selection
- Fixed value
- External value *
- Current input 1 *
- Current input 2 *
- Current input 3 *

Pressure

Navigation Expert → Sensor → External comp. → Pressure (17325)

Description Enter fixed value for the process pressure.

User entry 0.1 to 40 bar a

External pressure

Navigation Expert → Sensor → External comp. → External press. (17341)

Description Shows the external process pressure value.

User interface 0.1 to 40 bar a

* Visibility depends on order options or device settings

Input type 2nd temperature heat flow

Navigation Expert → Sensor → External comp. → Input 2nd temp. (17327)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Select input type for the 2nd temperature for the heat flow calculation.

Selection
- Off
- Fixed value
- External value *
- Current input 1 *
- Current input 2 *
- Current input 3 *

Delta heat calculation

Navigation Expert → Sensor → External comp. → Delta heat calc. (17006)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Select the position of the measuring device in relation to the external temperature sensor.

Selection
- Off
- Upstream
- Downstream

2nd temperature heat flow

Navigation Expert → Sensor → External comp. → 2nd temp.heat fl (17328)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Enter fixed value for the 2nd temperature for the heat flow calculation.

User entry 233.15 to 453.15 °C

Factory setting 293.15 °C

* Visibility depends on order options or device settings

External 2nd temperature heat flow

Navigation Expert → Sensor → External comp. → Ext. 2nd temp. (17342)

Prerequisite The **Energy** option is selected in the **Measurement application** parameter (→ 68) parameter.

Description Shows the value for the external 2nd temperature for heat flow calculation.

User interface Signed floating-point number

Gas compensation

Navigation Expert → Sensor → External comp. → Gas compensation (17003)

Description Select the input type for gas compensation. The selected gas component is measured by an external gas analyzer.

Selection
- Off
- External value *
- Current input 1 *
- Current input 2 *
- Current input 3 *

Gas component

Navigation Expert → Sensor → External comp. → Gas component (17005)

Description Select the gas component that is measured by an external gas analyzer.

Selection
- Air
- Oxygen O2
- Ozone O3
- Nitrogen N2
- Methane CH4
- Hydrogen H2
- Helium He
- Hydrogen chloride HCl
- Hydrogen sulfide H2S
- Ethylene C2H4
- Carbon dioxide CO2
- Carbon monoxide CO
- Chlorine Cl2
- Butane C4H10
- Propane C3H8
- Ethane C2H6

* Visibility depends on order options or device settings

- Argon Ar
- Ammonia NH3
- Water

Mol%

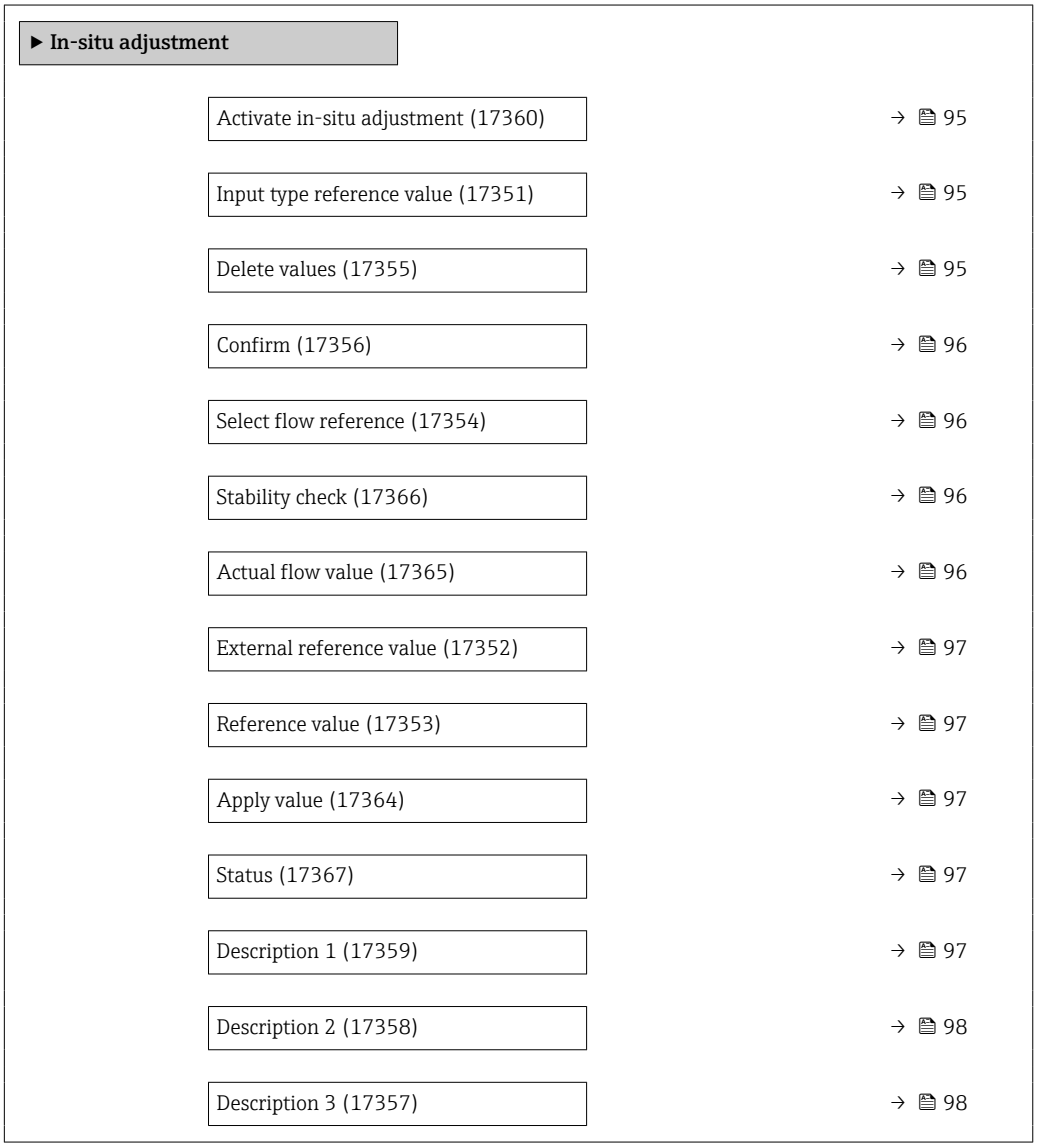
Navigation Expert → Sensor → External comp. → Mol% (17007)

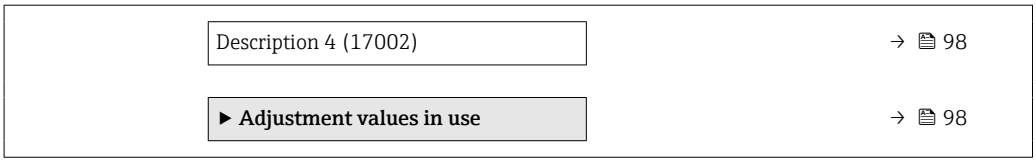
Description Enter amount of substance for the gas mixture.

User interface 0 to 100 %

3.2.8 "In-situ adjustment" submenu

Navigation Expert → Sensor → In-situ adjust.





Activate in-situ adjustment

Navigation Expert → Sensor → In-situ adjust. → In-situ adjustm. (17360)

Description Activate the in-situ adjustment. The points stored by the user are used for the in-situ adjustment.

Selection
- No
- Yes

Input type reference value

Navigation Expert → Sensor → In-situ adjust. → Input ref. value (17351)

Description Select input type for the reference value.

Selection
- Off
- Manual
- Current input 1 *
- Current input 2 *
- Current input 3 *
- External value *

Delete values

Navigation Expert → Sensor → In-situ adjust. → Delete values (17355)

Description Delete previous adjustment values and descriptions.

Selection
- No
- Yes

* Visibility depends on order options or device settings

Confirm

Navigation Expert → Sensor → In-situ adjust. → Confirm (17356)

Description Confirm deletion.

Selection
- No
- Yes

Select flow reference

Navigation Expert → Sensor → In-situ adjust. → Select flow ref. (17354)

Description Select process variable. This process variable is used as reference value for the in situ adjustment.

Selection
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow

Stability check

Navigation Expert → Sensor → In-situ adjust. → Stability check (17366)

Description Activate stability check. New adjustment value is only accepted when the measurement is stable.

Selection
- No
- Yes

Actual flow value

Navigation Expert → Sensor → In-situ adjust. → Act. flow value (17365)

Description Shows the actual flow in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

* Visibility depends on order options or device settings

External reference value

Navigation Expert → Sensor → In-situ adjust. → Ext. ref. value (17352)

Description Shows the external reference value for the in situ adjustment.

User interface Signed floating-point number

Reference value

Navigation Expert → Sensor → In-situ adjust. → Reference value (17353)

Description Enter fixed value as reference value used for the in situ adjustment.

User entry Signed floating-point number

Apply value

Navigation Expert → Sensor → In-situ adjust. → Apply value (17364)

Description Apply the actual value.

Selection
- No
- Yes

Status

Navigation Expert → Sensor → In-situ adjust. → Status (17367)

Description Shows the validity of the actual reference value.

User interface
- Passed
- Replaced
- Unstable
- Invalid

Description 1

Navigation Expert → Sensor → In-situ adjust. → Description 1 (17359)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

Description 2

Navigation Expert → Sensor → In-situ adjust. → Description 2 (17358)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

Description 3

Navigation Expert → Sensor → In-situ adjust. → Description 3 (17357)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

Description 4

Navigation Expert → Sensor → In-situ adjust. → Description 4 (17002)

Description Description for in-situ adjustment: e.g. facility, operator, date.

User entry -

Factory setting -

"Adjustment values in use" submenu

Navigation Expert → Sensor → In-situ adjust. → Values in use

▶ Adjustment values in use		
	Gas description 1/2 (17361)	→ 99

Gas description 2/2 (17362)	→ 100
Flow value 1 (17368)	→ 100
Flow value 2 (17369)	→ 100
Flow value 3 (17370)	→ 100
Flow value 4 (17371)	→ 101
Flow value 5 (17372)	→ 101
Flow value 6 (17373)	→ 101
Flow value 7 (17374)	→ 101
Flow value 8 (17375)	→ 101
Flow value 9 (17376)	→ 102
Flow value 10 (17377)	→ 102
Flow value 11 (17378)	→ 102
Flow value 12 (17379)	→ 102
Flow value 13 (17380)	→ 103
Flow value 14 (17381)	→ 103
Flow value 15 (17382)	→ 103
Flow value 16 (17383)	→ 103

Gas description 1/2

Navigation Expert → Sensor → In-situ adjust. → Values in use → Gas descrip. 1/2 (17361)

Description Shows the 1st part of the description of the set gas used in the in-situ adjustment.

User interface -

Factory setting -

Gas description 2/2

Navigation Expert → Sensor → In-situ adjust. → Values in use → Gas descrip. 2/2 (17362)

Description Shows the 2nd part of the description of the set gas used in the in-situ adjustment.

User interface -

Factory setting -

Flow value 1

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 1 (17368)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 2

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 2 (17369)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 3

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 3 (17370)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 4

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 4 (17371)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 5

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 5 (17372)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 6

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 6 (17373)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 7

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 7 (17374)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 8

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 8 (17375)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 9

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 9 (17376)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 10

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 10 (17377)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 11

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 11 (17378)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 12

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 12 (17379)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 13

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 13 (17380)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 14

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 14 (17381)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 15

Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 15 (17382)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

Flow value 16

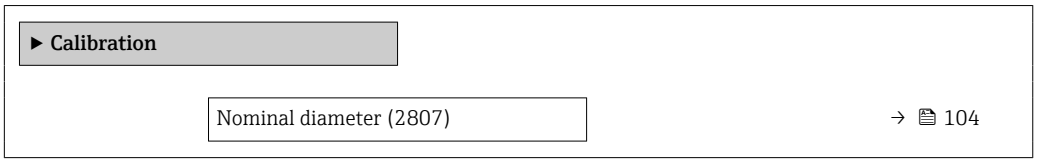
Navigation Expert → Sensor → In-situ adjust. → Values in use → Flow value 16 (17383)

Description Shows the stored flow value in relation to the maximum, factory-measured value that is adapted to the actual process conditions.

User interface −2 000 to 2 000 %

3.2.9 "Calibration" submenu

Navigation Expert → Sensor → Calibration



Nominal diameter

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

Prerequisite Only available with t-mass F.

Description Displays the nominal diameter of the sensor.

User interface DNxx / x"

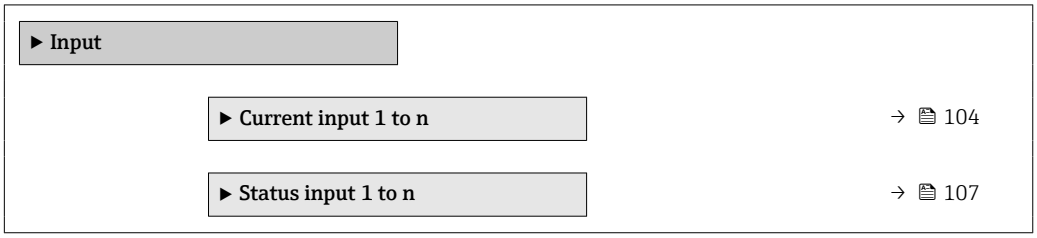
Factory setting Depends on the size of the sensor

Additional information *Description*

The value is also specified on the sensor nameplate.

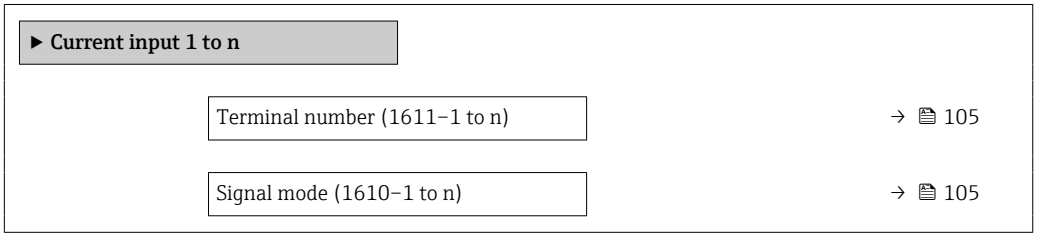
3.3 "Input" submenu

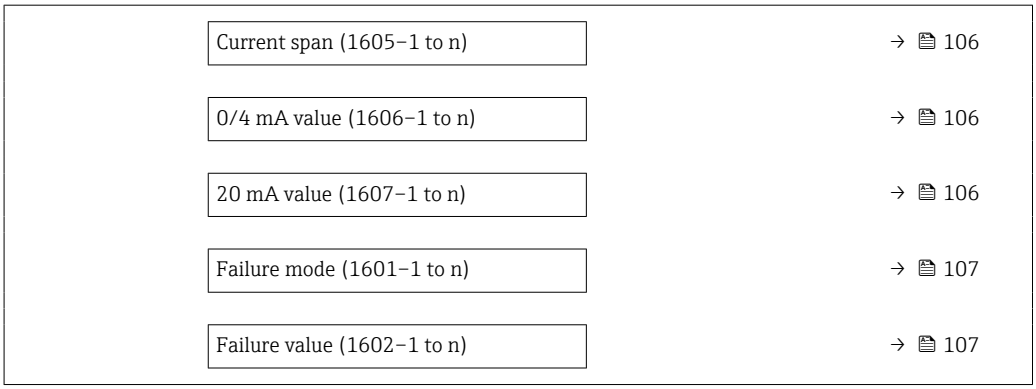
Navigation Expert → Input



3.3.1 "Current input 1 to n" submenu

Navigation Expert → Input → Current input 1 to n





Terminal number

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

Description Displays the terminal numbers used by the current input module.

User interface
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Additional information *"Not used" option*

The current input module does not use any terminal numbers.

Signal mode

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

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

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

Selection
- Passive
- Active *

Factory setting Active

* Visibility depends on order options or device settings

Current span

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

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

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

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

Additional information *Examples*

Sample values for the current range: **Current span** parameter (→ 112)

0/4 mA value

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

Description Enter 4 mA value.

User entry Signed floating-point number

Additional information *Current input behavior*

The current input behaves differently depending on the settings configured in the following parameters:
- Current span (→ 106)
- Failure mode (→ 107)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 113).

20 mA value

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

Description Enter 20 mA value.

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Configuration examples*

Pay attention to the configuration examples for **4 mA value** parameter (→ 113).

Failure mode

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

Description Use this function to select the input behavior when measuring a current outside the configured **Current span** parameter (→ 106).

Selection
- Alarm
- Last valid value
- Defined value

Additional information *Options*
- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used (**Failure value** parameter (→ 107)).

Failure value

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

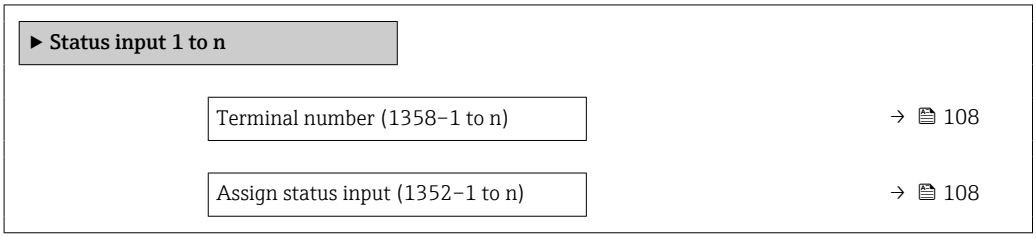
Prerequisite In the **Failure mode** parameter (→ 107), the **Defined value** option is selected.

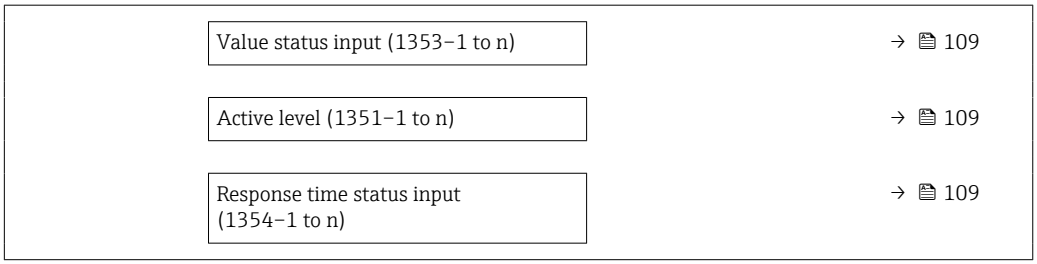
Description Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.

User entry Signed floating-point number

3.3.2 "Status input 1 to n" submenu

Navigation Expert → Input → Status input 1 to n





Terminal number

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

Description Displays the terminal numbers used by the status input module.

User interface
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Additional information *"Not used" option*

The status input module does not use any terminal numbers.

Assign status input

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

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

Selection
- Off
- Reset totalizer 1
- Reset totalizer 2
- Reset totalizer 3
- Reset all totalizers
- Flow override
- Gas group *
- Zero point adjustment

* Visibility depends on order options or device settings

Additional information *Selection*

- Off
  The status input is switched off.
- Reset totalizer 1...3
  The individual totalizers are reset.
- Reset all totalizers
  All totalizers are reset.
- Flow override
  The Flow override (→ 64) is activated.

Note on the Flow override (→ 64):
- The Flow override (→ 64) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

Value status input

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

Description Displays the current input signal level.

User interface
- High
- Low

Active level

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

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

Selection
- High
- Low

Response time status input

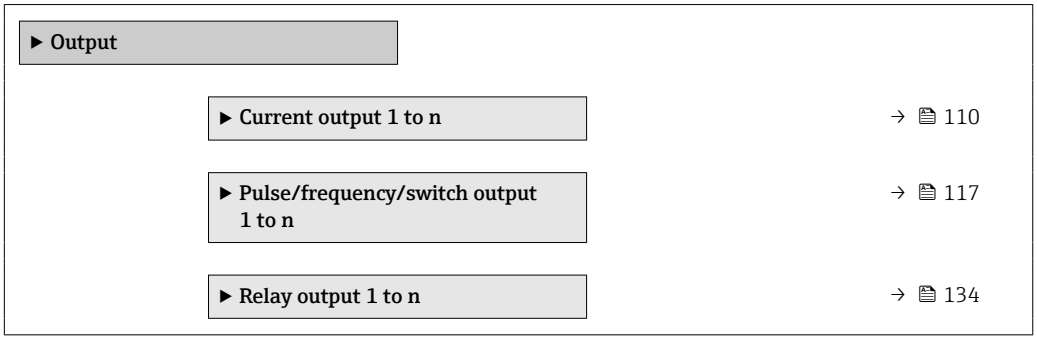
Navigation Expert → Input → Status input 1 to n → Response time (1354–1 to n)

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

User entry 5 to 200 ms

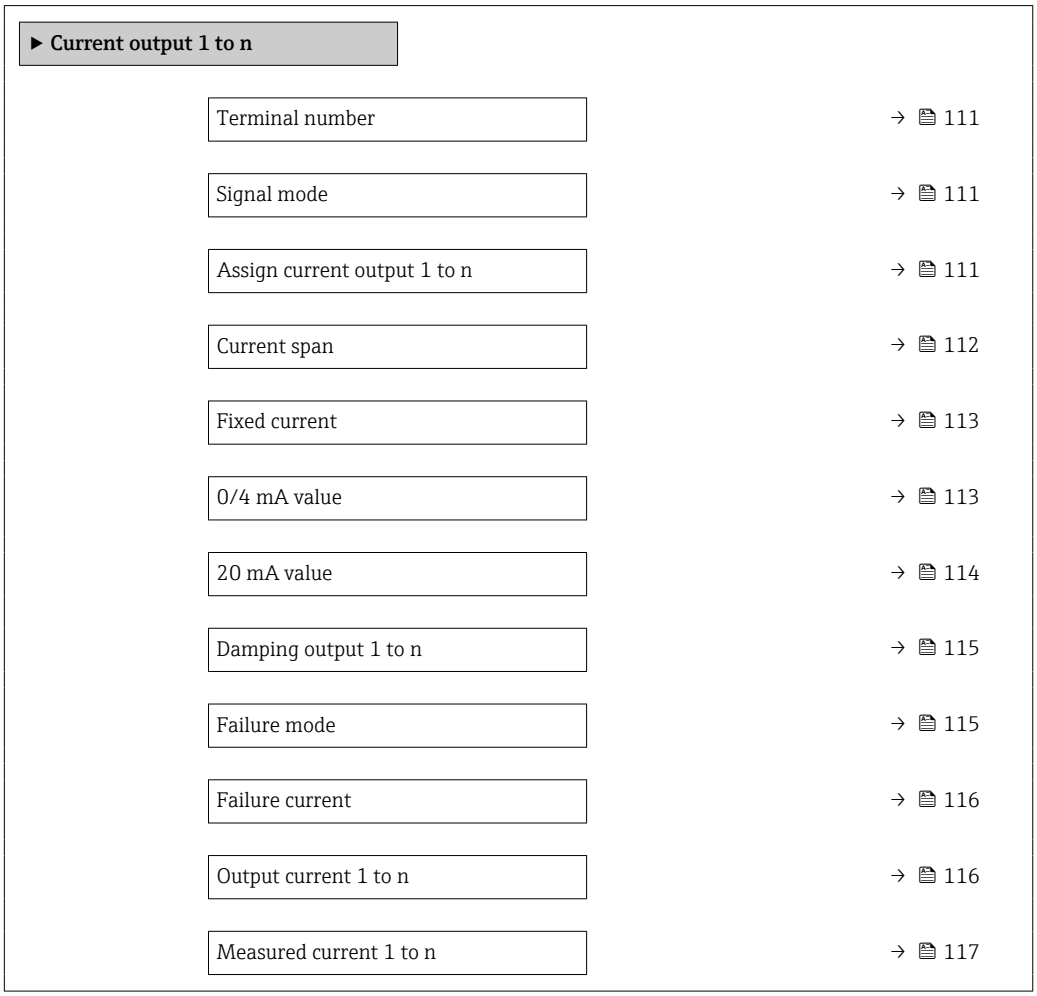
3.4 "Output" submenu

Navigation Expert → Output



3.4.1 "Current output 1 to n" submenu

Navigation Expert → Output → Curr.output 1 to n



Terminal number

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

Description Displays the terminal numbers used by the current output module.

User interface
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Additional information *"Not used" option*

The current output module does not use any terminal numbers.

Signal mode

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

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

Selection
- Active *
- Passive *

Factory setting Active

Assign current output 1 to n

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

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

Selection
- Off *
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- Pressure
- 2nd temperature delta heat *
- Electronic temperature

* Visibility depends on order options or device settings

Current span

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

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

Selection
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)
- Fixed current

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

Additional information

Description

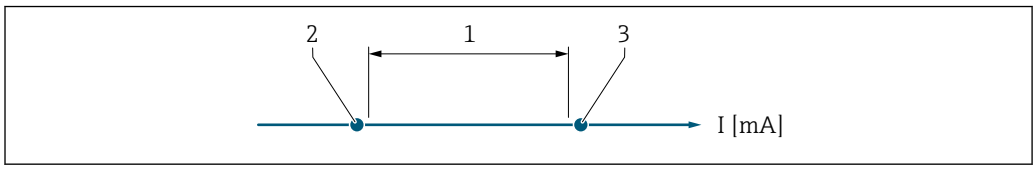
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 115).
- The measuring range is specified via the **0/4 mA value** parameter (→ 113) and **20 mA value** parameter (→ 114).

"Fixed current" option

- This option is used for a HART Multidrop network.
- It can only be used for the 4...20 mA HART current output (current output 1).
- The current value is set via the **Fixed current** parameter (→ 113).

Example

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



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

Selection

Selection	1	2	3
4...20 mA NAMUR (3.8...20.5 mA)	3.8 to 20.5 mA	< 3.6 mA	> 21.95 mA
4...20 mA US (3.9...20.8 mA)	3.9 to 20.8 mA US	< 3.6 mA	> 21.95 mA
4...20 mA (4... 20.5 mA)	4 to 20.5 mA	< 3.6 mA	> 21.95 mA
0...20 mA (0... 20.5 mA)	0 to 20.5 mA	< 0 mA	> 21.95 mA

Fixed current

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

Prerequisite The **Fixed current** option is selected in the **Current span** parameter (→ 112).

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

User entry 0 to 22.5 mA

Factory setting 22.5 mA

0/4 mA value

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

Prerequisite In the **Current span** parameter (→ 112), one of the following options is selected:
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry Signed floating-point number

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 111). In addition, the value can be greater than or smaller than the value assigned for the 20 mA current in the **20 mA value** parameter (→ 114).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 111).

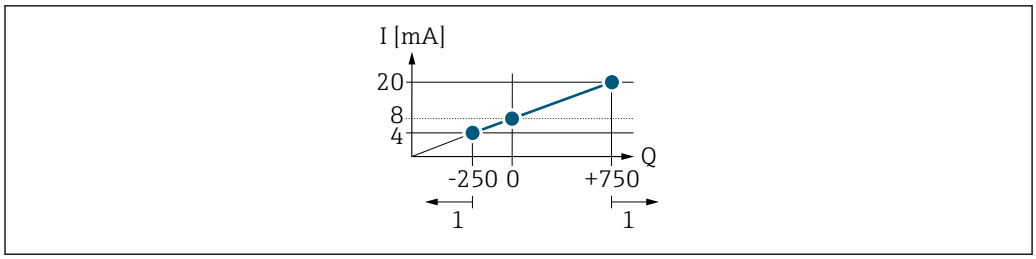
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 112)
- Failure mode (→ 115)

Configuration examples

A configuration example and its effect on the current output is explained in the following section.

Configuration example
In theForward flow
- **0/4 mA value** parameter (→ 113) = not equal to zero flow (e.g. −250 kg/h)
- **20 mA value** parameter (→ 114) = not equal to zero flow (e.g. +750 kg/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

20 mA value

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

Prerequisite In the **Current span** parameter (→ 112), one of the following options is selected:
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter→ 221

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign current output** parameter (→ 111). In addition, the value can be greater than or smaller than the value assigned for the 0/4 mA current in the **0/4 mA value** parameter (→ 113).

Dependency

The unit depends on the process variable selected in the **Assign current output** parameter (→ 111).

Example

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

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 113).

Damping output 1 to n

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

Prerequisite A process variable is selected in the **Assign current output** parameter (→ 111) and one of the following options is selected in the **Current span** parameter (→ 112):
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

User entry 0.0 to 999.9 s

Additional information *User entry*

Use this function to enter a time constant (PT1 element [7]) for current output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

Failure mode

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

Prerequisite A process variable is selected in the **Assign current output** parameter (→ 111) and one of the following options is selected in the **Current span** parameter (→ 112):
- 4...20 mA NAMUR (3.8...20.5 mA)
- 4...20 mA US (3.9...20.8 mA)
- 4...20 mA (4... 20.5 mA)
- 0...20 mA (0... 20.5 mA)

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

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

7) proportional transmission behavior with first order delay

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 (→ 112).

"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 (→ 112).

"Last valid value" option

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

"Actual value" option

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

"Defined value" option

The current output adopts a defined measured value.

The measured value is defined via the **Failure current** parameter (→ 116).

Failure current

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

Prerequisite The **Defined value** option is selected in the **Failure mode** parameter (→ 115).

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

User entry 0 to 22.5 mA

Factory setting 22.5 mA

Output current 1 to n

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

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

User interface 3.59 to 22.5 mA

Measured current 1 to n

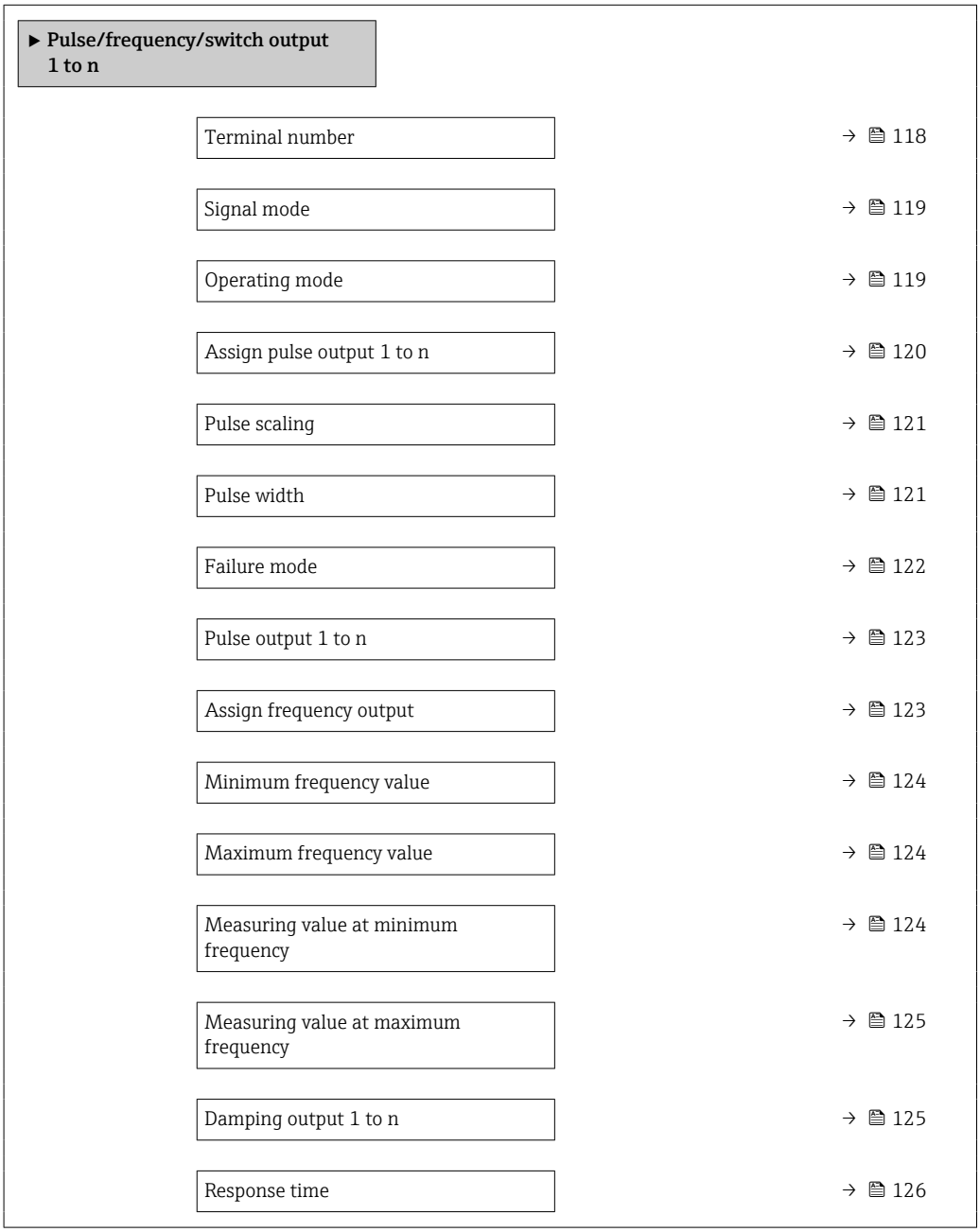
Navigation Expert → Output → Curr.output 1 to n → Measur. curr. 1 to n (0366–1 to n)

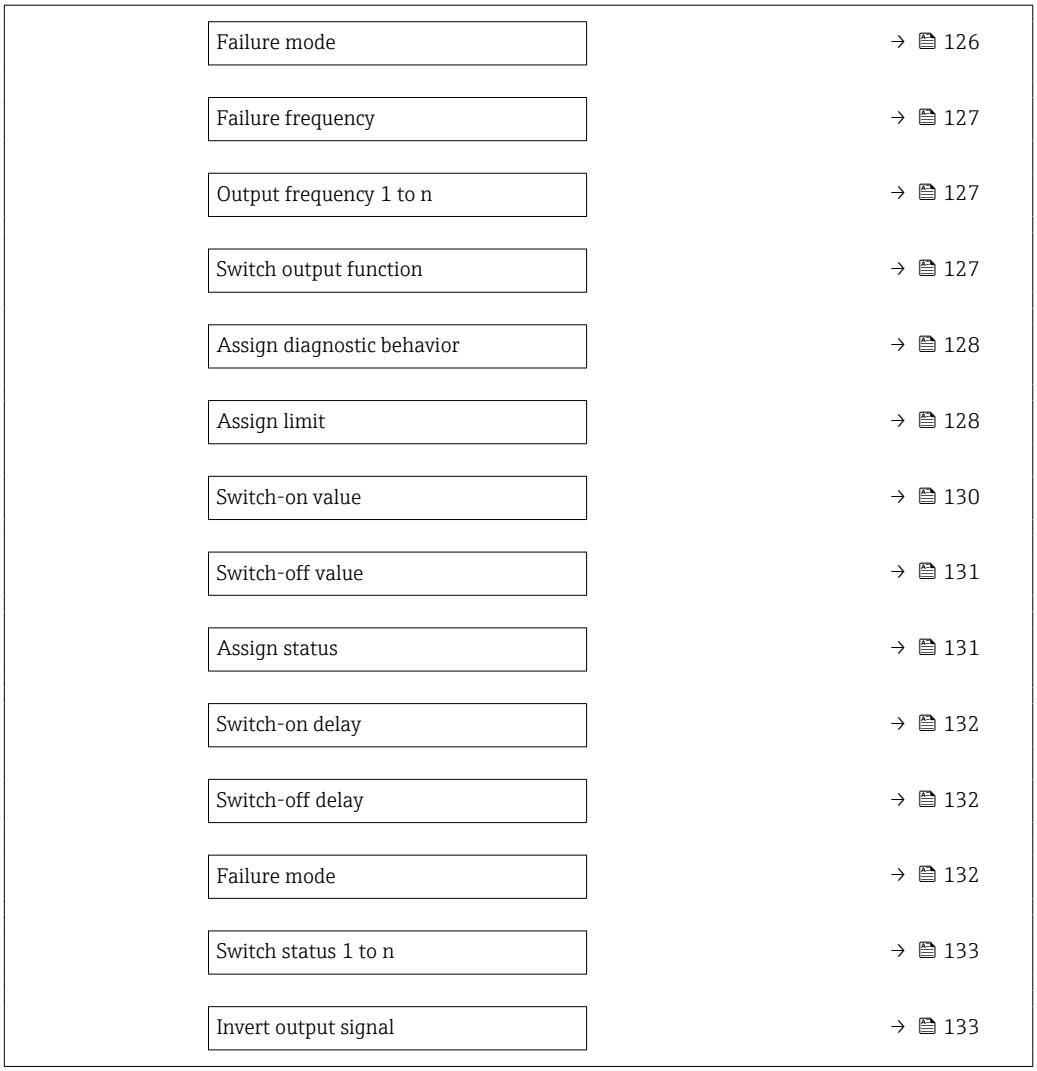
Description Use this function to display the actual measured value of the output current.

User interface 0 to 30 mA

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

Navigation Expert → Output → PFS output 1 to n





Terminal number

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

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

User interface
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Additional information *"Not used" option*

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

* Visibility depends on order options or device settings

Signal mode

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

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

Selection
- Passive
- Active *
- Passive NAMUR

Operating mode

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

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

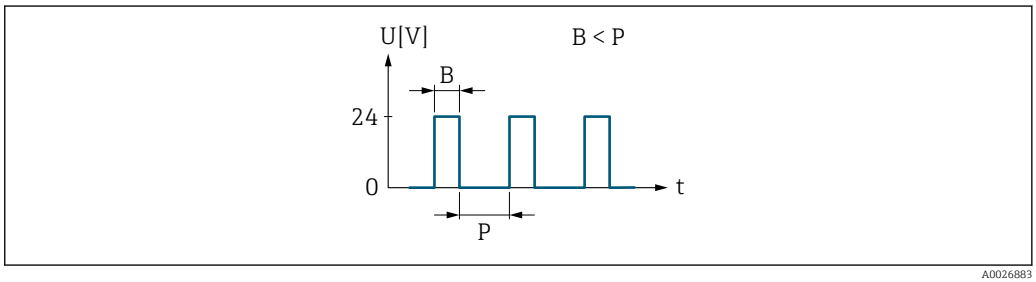
Selection
- Pulse
- Frequency
- Switch

Additional information

"Pulse" option

Quantity-dependent pulse with configurable pulse width
The pulses are never shorter than the set duration.

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



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

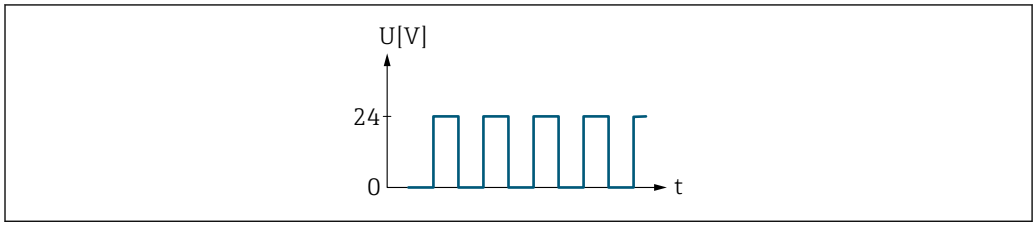
B Pulse width entered
P Pauses between the individual pulses

"Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio

* Visibility depends on order options or device settings

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

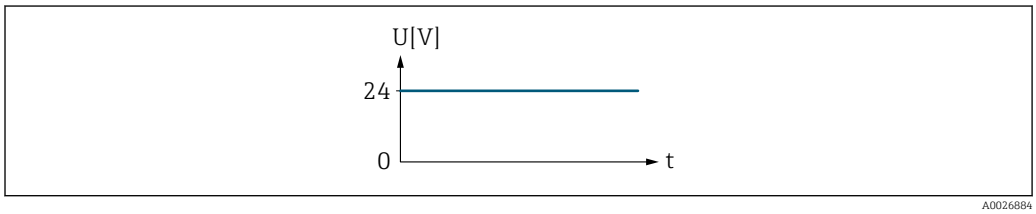


3 *Flow-proportional frequency output*

"Switch" option

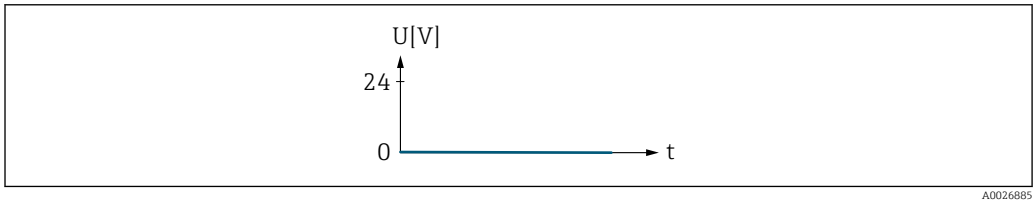
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



4 *No alarm, high level*

Example
Alarm response in case of alarm



5 *Alarm, low level*

Assign pulse output 1 to n

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 119) parameter.

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

Selection
- Off
- Mass flow
- Corrected volume flow

- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *

Pulse scaling

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign pulse output** parameter (→ 120).

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

User entry Positive floating point number

Factory setting Depends on country and nominal diameter

Additional information *User entry*

Weighting of the pulse output with a quantity.

The lower the pulse value, the
- better the resolution.
- the higher the frequency of the pulse response.

Pulse width

Navigation Expert → Output → PFS output 1 to n → Pulse width (0452–1 to n)

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign pulse output** parameter (→ 120).

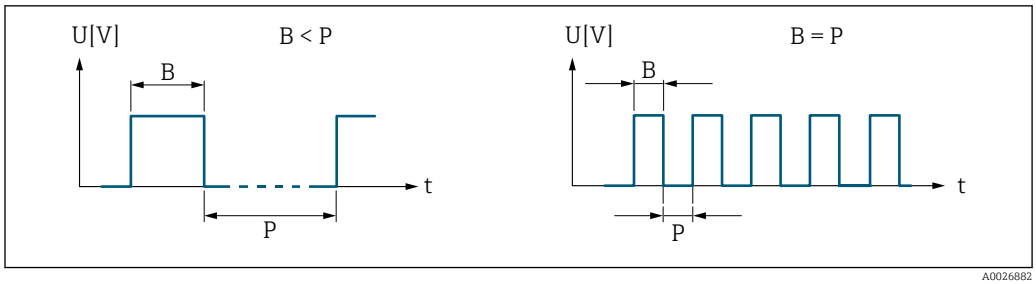
Description Use this function to enter the duration of the output pulse.

User entry 0.05 to 2 000 ms

Additional information *Description*

- Define how long a pulse is (duration).
- The maximum pulse rate is defined by f_{max} = 1 / (2 × pulse width).
- The interval between two pulses lasts at least as long as the set pulse width.
- The maximum flow is defined by $Q_{max} = f_{max} \times$ pulse value.
- If the flow exceeds these limit values, the measuring device displays the **443 Pulse output 1 to n** diagnostic message.

* Visibility depends on order options or device settings



B Pulse width entered
P Pauses between the individual pulses

Example

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

Failure mode

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign pulse output** parameter (→ 120).

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

Selection
- Actual value
- No pulses

Additional information

Description

The dictates of safety render it advisable to ensure that the pulse output shows a predefined behavior in the event of a device alarm.

Selection

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

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

Pulse output 1 to n

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

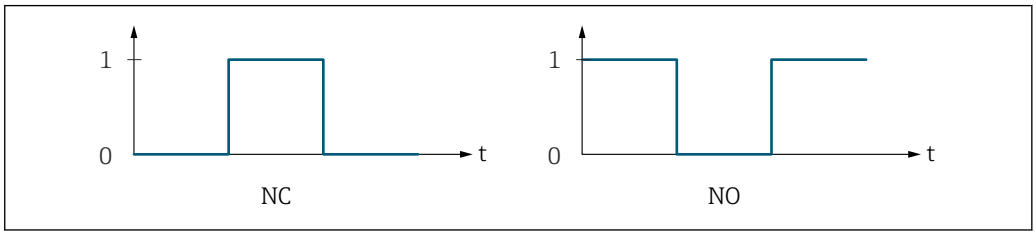
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 119) parameter.

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

- The pulse output is an open collector output.
- This is configured at the factory in such a way that the transistor is conductive for the duration of the pulse (NO contact) and is safety-oriented.



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

The output behavior can be reversed via the **Invert output signal** parameter (→ 133) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 122)) can be configured.

Assign frequency output

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119).

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

Selection

- Off
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density

* Visibility depends on order options or device settings

- Flow velocity
- Pressure
- 2nd temperature delta heat *
- Electronic temperature

Minimum frequency value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign frequency output** parameter (→ 123).

Description Use this function to enter the minimum frequency.

User entry 0.0 to 10 000.0 Hz

Maximum frequency value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign frequency output** parameter (→ 123).

Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

Measuring value at minimum frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign frequency output** parameter (→ 123).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 123).

* Visibility depends on order options or device settings

Measuring value at maximum frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign frequency output** parameter (→ 123).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

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

Dependency

The entry depends on the process variable selected in the **Assign frequency output** parameter (→ 123).

Damping output 1 to n

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

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

User entry 0 to 999.9 s

Additional information

User entry

Use this function to enter a time constant (PT1 element [8]) for frequency output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

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

8) proportional transmission behavior with first order delay

Response time

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

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

User interface Positive floating-point number

Additional information *Description*

The response time is made up of the time specified for the following dampings:
- Damping of pulse/frequency/switch output → 115
  and
- Depending on the measured variable assigned to the output.
  Flow damping

Failure mode

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign frequency output** parameter (→ 123).

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

Selection
- Actual value
- Defined value
- 0 Hz

Additional information *Selection*

- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure frequency (→ 127) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure frequency

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 119) and a process variable is selected in the **Assign frequency output** parameter (→ 123).

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

User entry 0.0 to 12 500.0 Hz

Output frequency 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 119), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Switch output function

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 119) parameter.

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

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

* Visibility depends on order options or device settings

Additional information *Selection*

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

Assign diagnostic behavior

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

Prerequisite
- In the **Operating mode** parameter (→ 119), the **Switch** option is selected.
- In the **Switch output function** parameter (→ 127), the **Diagnostic behavior** option is selected.

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

Selection
- Alarm
- Alarm or warning
- Warning

Additional information *Description*

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

Selection

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

Assign limit

Navigation Expert → Output → PFS output 1 to n → Assign limit (0483–1 to n)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 119).
- The **Limit** option is selected in the **Switch output function** parameter (→ 127).

Description

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

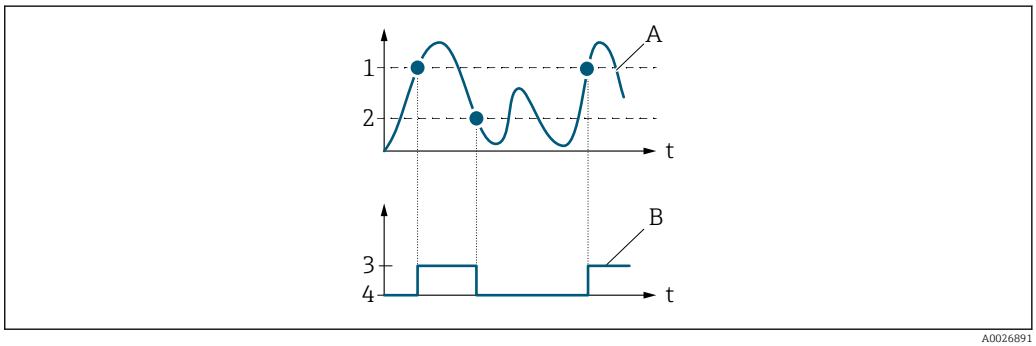
Selection

- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3

Additional information

Description

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

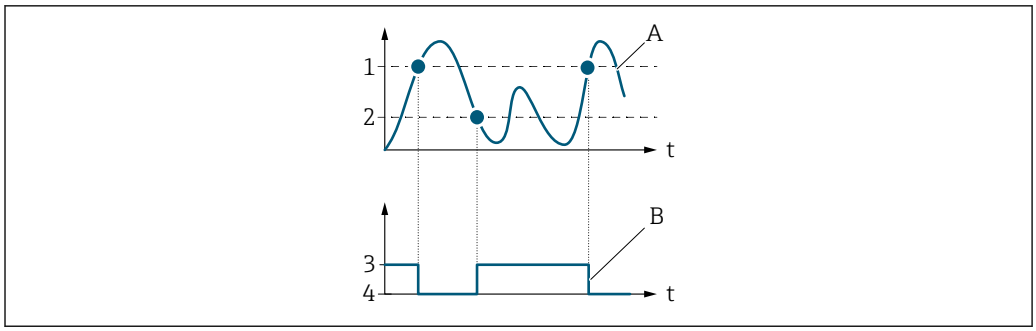


A0026891

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

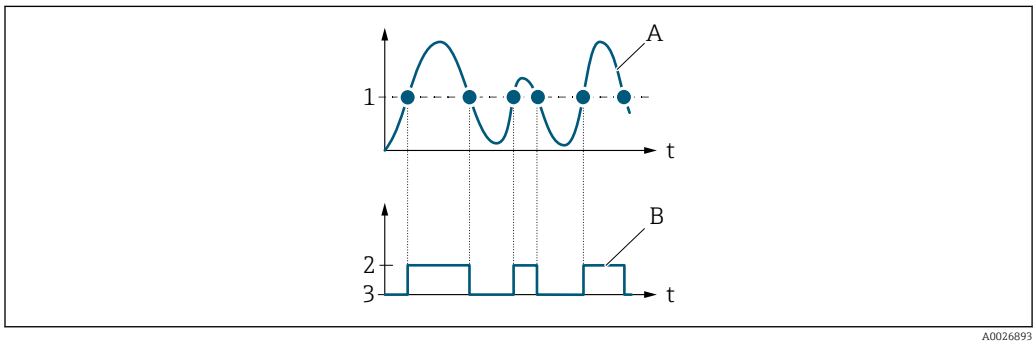
Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive

* Visibility depends on order options or device settings



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

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



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

Switch-on value

Navigation Expert → Output → PFS output 1 to n → Switch-on value (0466–1 to n)

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 119) parameter.
- The **Limit** option is selected in the **Switch output function** parameter (→ 127) parameter.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 128).

Switch-off value

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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 119).
- The **Limit** option is selected in the **Switch output function** parameter (→ 127).

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

User entry Signed floating-point number

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 128).

Assign status

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

Prerequisite

- The **Switch** option is selected in the **Operating mode** parameter (→ 119).
- The **Status** option is selected in the **Switch output function** parameter (→ 127).

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

Selection

- Off
- Low flow cut off

Additional information

Options

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

Switch-on delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 119).
- The **Limit** option is selected in the **Switch output function** parameter (→ 127).

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

User entry 0.0 to 100.0 s

Switch-off delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 119).
- The **Limit** option is selected in the **Switch output function** parameter (→ 127).

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

User entry 0.0 to 100.0 s

Failure mode

Navigation Expert → Output → PFS output 1 to n → Failure mode (0486–1 to n)

Description Use this function to select a failsafe mode for the switch output in the event of a device alarm.

Selection
- Actual status
- Open
- Closed

Additional information *Options*
- Actual status
  In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the switch output. The **Actual status** option behaves in the same way as the current input value.
- Open
  In the event of a device alarm, the switch output's transistor is set to **non-conductive**.
- Closed
  In the event of a device alarm, the switch output's transistor is set to **conductive**.

Switch status 1 to n

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 119).

Description Displays the current switch status of the status output.

User interface
- Open
- Closed

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

Invert output signal

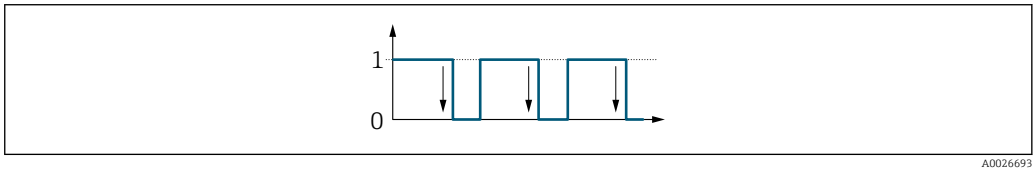
Navigation Expert → Output → PFS output 1 to n → Invert outp.sig. (0470–1 to n)

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

Selection
- No
- Yes

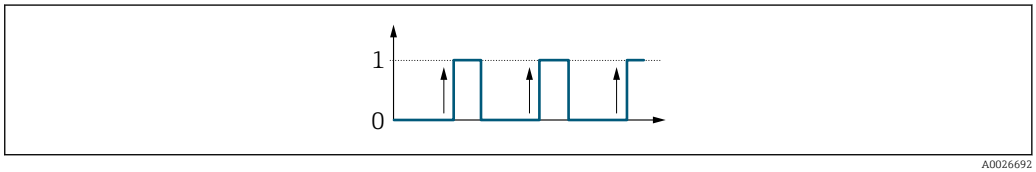
Additional information *Selection*

No option (passive - negative)



A0026693

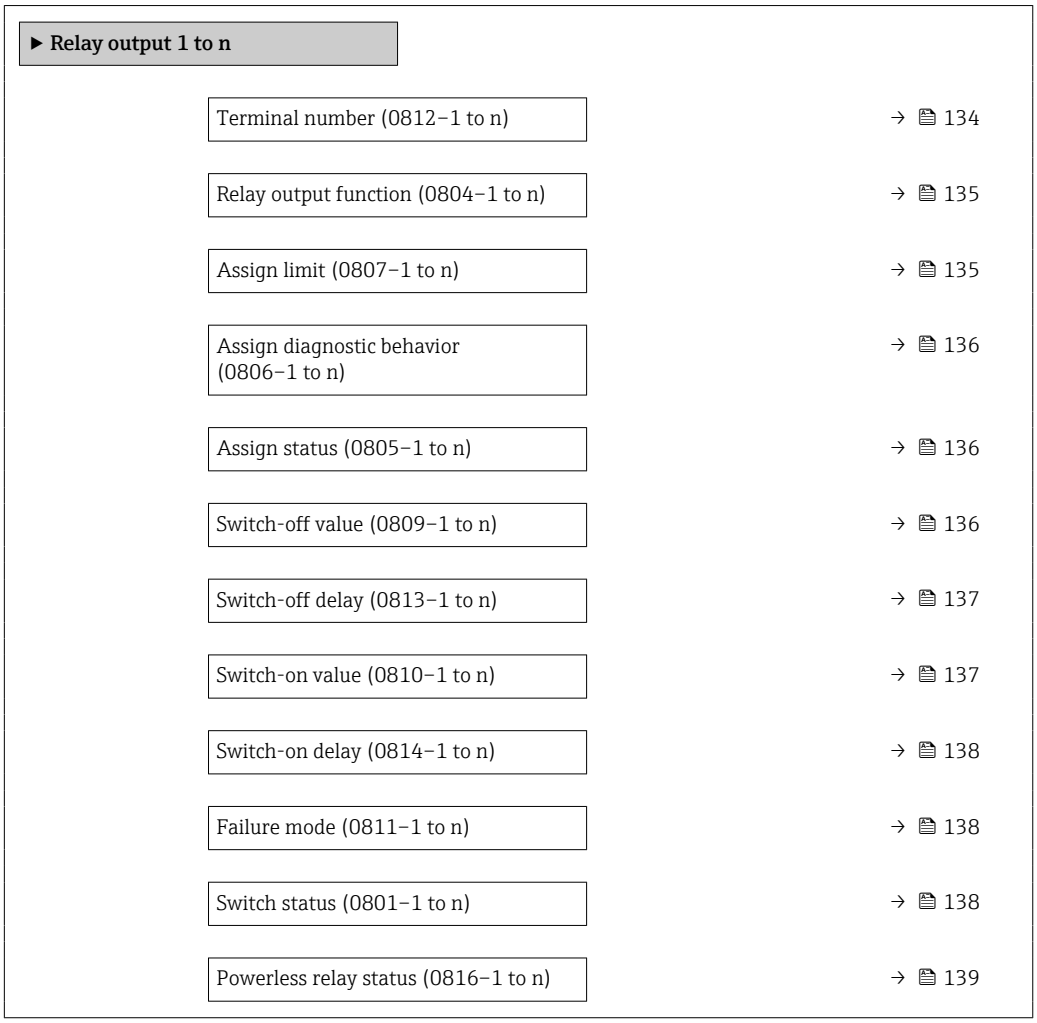
Yes option (passive - positive)



A0026692

3.4.3 "Relay output 1 to n" submenu

Navigation Expert → Output → Relay output 1 to n



Terminal number

Navigation Expert → Output → Relay output 1 to n → Terminal no. (0812–1 to n)

Description Displays the terminal numbers used by the relay output module.

User interface
- Not used
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4)

Additional information *"Not used" option*

The relay output module does not use any terminal numbers.

Relay output function

Navigation Expert → Output → Relay output 1 to n → Relay outp.func. (0804–1 to n)

Description Use this function to select an output function for the relay output.

Selection
- Closed
- Open
- Diagnostic behavior
- Limit
- Flow direction check
- Digital Output

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

Assign limit

Navigation Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)

Prerequisite The **Limit** option is selected in the **Relay output function** parameter (→ 135).

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

Selection
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- 2nd temperature delta heat *
- Electronic temperature

* Visibility depends on order options or device settings

- Totalizer 1
- Totalizer 2
- Totalizer 3

Assign diagnostic behavior

Navigation Expert → Output → Relay output 1 to n → Assign diag. beh (0806–1 to n)

Prerequisite In the **Relay output function** parameter (→ 135), the **Diagnostic behavior** option is selected.

Description Use this function to select the category of the diagnostic events that are displayed for the relay output.

Selection
- Alarm
- Alarm or warning
- Warning

Additional information

Description

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

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

Assign status

Navigation Expert → Output → Relay output 1 to n → Assign status (0805–1 to n)

Prerequisite In the **Relay output function** parameter (→ 135), the **Digital Output** option is selected.

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

Selection
- Off
- Low flow cut off

Switch-off value

Navigation Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)

Prerequisite In the **Relay output function** parameter (→ 135), the **Limit** option is selected.

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

User entry Signed floating-point number

Additional information *Description*

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

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

Dependency

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

Switch-off delay

Navigation Expert → Output → Relay output 1 to n → Switch-off delay (0813–1 to n)

Prerequisite In the **Relay output function** parameter (→ 135), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Switch-on value

Navigation Expert → Output → Relay output 1 to n → Switch-on value (0810–1 to n)

Prerequisite The **Limit** option is selected in the **Relay output function** parameter (→ 135) parameter.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Description*

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

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

Dependency

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

Switch-on delay

Navigation Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)

Prerequisite In the **Relay output function** parameter (→ 135), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Failure mode

Navigation Expert → Output → Relay output 1 to n → Failure mode (0811–1 to n)

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

Selection
- Actual status
- Open
- Closed

Additional information *Selection*
- Actual status
  In the event of a device alarm, faults are ignored and the current behavior of the input value is output by the relay output. The **Actual status** option behaves in the same way as the current input value.
- Open
  In the event of a device alarm, the relay output's transistor is set to **non-conductive**.
- Closed
  In the event of a device alarm, the relay output's transistor is set to **conductive**.

Switch status

Navigation Expert → Output → Relay output 1 to n → Switch status (0801–1 to n)

Description Displays the current status of the relay output.

User interface
- Open
- Closed

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

Powerless relay status

Navigation Expert → Output → Relay output 1 to n → Powerless relay (0816–1 to n)

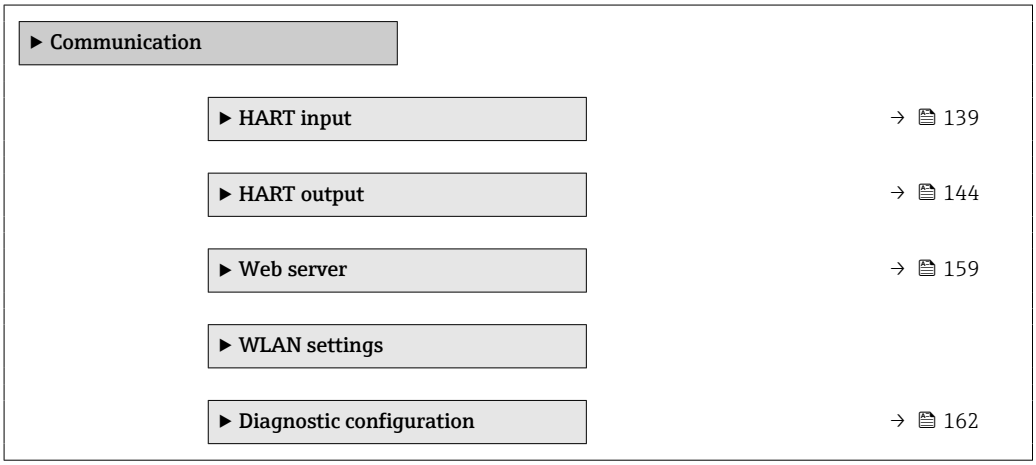
Description Use this function to select the quiescent state for the relay output.

Selection
- Open
- Closed

Additional information *Selection*
- Open
  The relay output is not conductive.
- Closed
  The relay output is conductive.

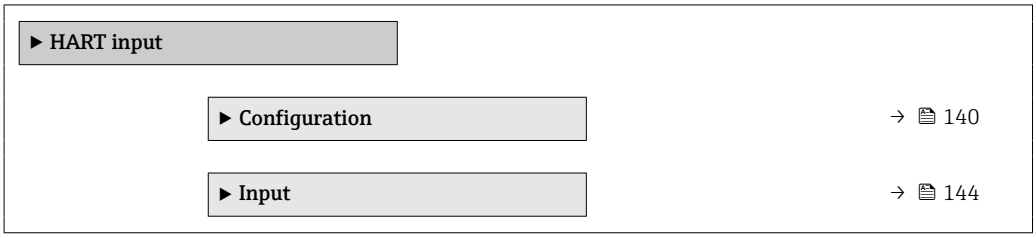
3.5 "Communication" submenu

Navigation Expert → Communication



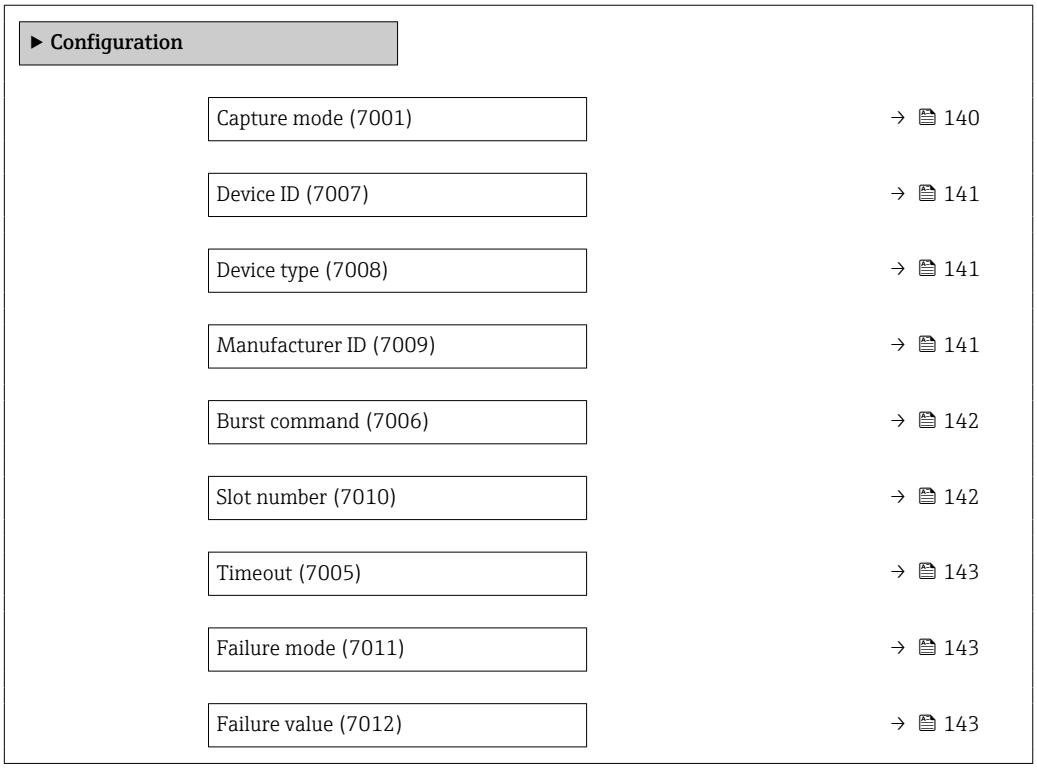
3.5.1 "HART input" submenu

Navigation Expert → Communication → HART input



"Configuration" submenu

Navigation Expert → Communication → HART input → Configuration



Capture mode

Navigation Expert → Communication → HART input → Configuration → Capture mode (7001)

Description Use this function to select the capture mode via burst or master communication.

Selection
- Off
- Burst network
- Master network

Additional information

"Burst network" option

The device records data transmitted via burst in the network.

"Master network" option

In this case, the device must be located in a HART network in which a HART master (control) queries the measured values of the up to 64 network participants. The device reacts only to the responses of a specific device in the network. Device ID,device type, manufacturer ID and the HART commands used by the master must be defined.

Device ID

Navigation Expert → Communication → HART input → Configuration → Device ID (7007)

Prerequisite The **Master network** option is selected in the **Capture mode** parameter (→ 140).

Description Use this function to enter the device ID of the HART slave device whose data are to be recorded.

User entry 6-digit value:
- Via local operation: enter as hexadecimal or decimal number
- Via operating tool: enter as decimal number

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

Device type

Navigation Expert → Communication → HART input → Configuration → Device type (7008)

Prerequisite In the **Capture mode** parameter (→ 140), the **Master network** option is selected.

Description Use this function to enter the device type of the HART slave device whose data are to be recorded.

User entry 2-digit hexadecimal number

Factory setting 0x00

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

Manufacturer ID

Navigation Expert → Communication → HART input → Configuration → Manufacturer ID (7009)

Prerequisite The **Master network** option is selected in the **Capture mode** parameter (→ 140).

Description Use this function to enter the manufacturer ID of the HART slave device whose data are to be recorded.

User entry 2-digit value:
- Via local operation: enter as hexadecimal or decimal number
- Via operating tool: enter as decimal number

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

Burst command

Navigation Expert → Communication → HART input → Configuration → Burst command (7006)

Prerequisite The **Burst network** option or the **Master network** option are selected in the **Capture mode** parameter (→ 140).

Description Use this function to select the burst command to be recorded.

Selection
- Command 1
- Command 3
- Command 9
- Command 33

Additional information *Selection*
- Command 1
  Use this function to capture the primary variable.
- Command 3
  Use this function to capture the dynamic HART variables and the current.
- Command 9
  Use this function to capture the dynamic HART variables including the associated status.
- Command 33
  Use this function to capture the dynamic HART variables including the associated unit.

Slot number

Navigation Expert → Communication → HART input → Configuration → Slot number (7010)

Prerequisite The **Burst network** option or the **Master network** option is selected in the **Capture mode** parameter (→ 140).

Description Use this function to enter the position of the process variable to be recorded in the burst command.

User entry 1 to 8

Additional information *User entry*

Slot	Command			
	1	3	9	33
1	PV	PV	HART variable (slot 1)	HART variable (slot 1)
2	–	SV	HART variable (slot 2)	HART variable (slot 2)
3	–	TV	HART variable (slot 3)	HART variable (slot 3)
4	–	QV	HART variable (slot 4)	HART variable (slot 4)

Timeout

Navigation Expert → Communication → HART input → Configuration → Timeout (7005)

Prerequisite The **Burst network** option or the **Master network** option is selected in the **Capture mode** parameter (→ 140).

Description Use this function to enter the maximum permitted interval between two HART frames.

User entry 1 to 120 s

Additional information *Description*

If the interval is exceeded, the measuring device displays the **F882 Input signal** diagnostic message.

Failure mode

Navigation Expert → Communication → HART input → Configuration → Failure mode (7011)

Prerequisite In the **Capture mode** parameter (→ 140), the **Burst network** option or **Master network** option is selected.

Description Use this function to select the device behavior if no data are recorded within the maximum permitted interval.

Selection
- Alarm
- Last valid value
- Defined value

Additional information *Options*
- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used: (**Failure value** parameter (→ 143)).

Failure value

Navigation Expert → Communication → HART input → Configuration → Failure value (7012)

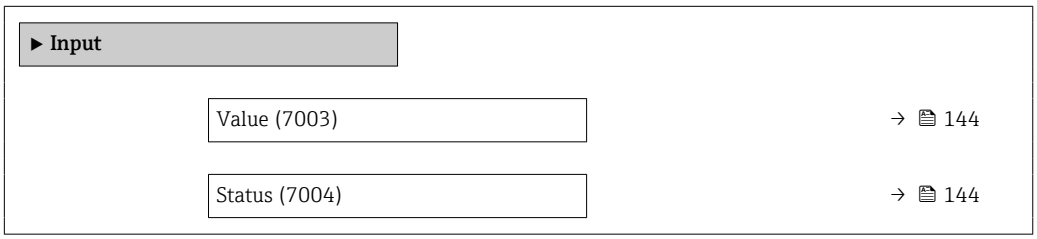
Prerequisite The following conditions are met:
- In the **Capture mode** parameter (→ 140), the **Burst network** option or **Master network** option is selected.
- In the **Failure mode** parameter (→ 143), the **Defined value** option is selected.

Description Use this function to enter the measured value to be used if no data are recorded within the maximum permitted interval.

User entry Signed floating-point number

"Input" submenu

Navigation Expert → Communication → HART input → Input



Value

Navigation Expert → Communication → HART input → Input → Value (7003)

Description Displays the value of the device variable recorded by the HART input.

User interface Signed floating-point number

Status

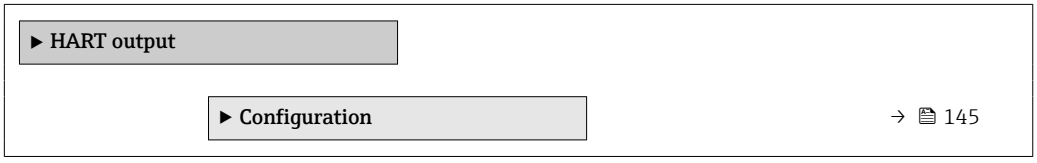
Navigation Expert → Communication → HART input → Input → Status (7004)

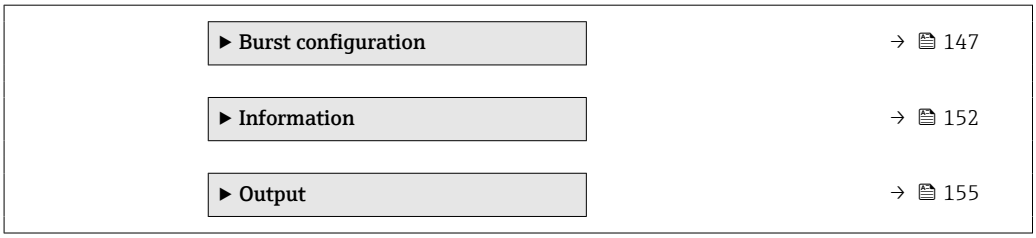
Description Displays the value of the device variable recorded by the HART input in accordance with the HART specification.

User interface
- Manual/Fixed
- Good
- Poor accuracy
- Bad

3.5.2 "HART output" submenu

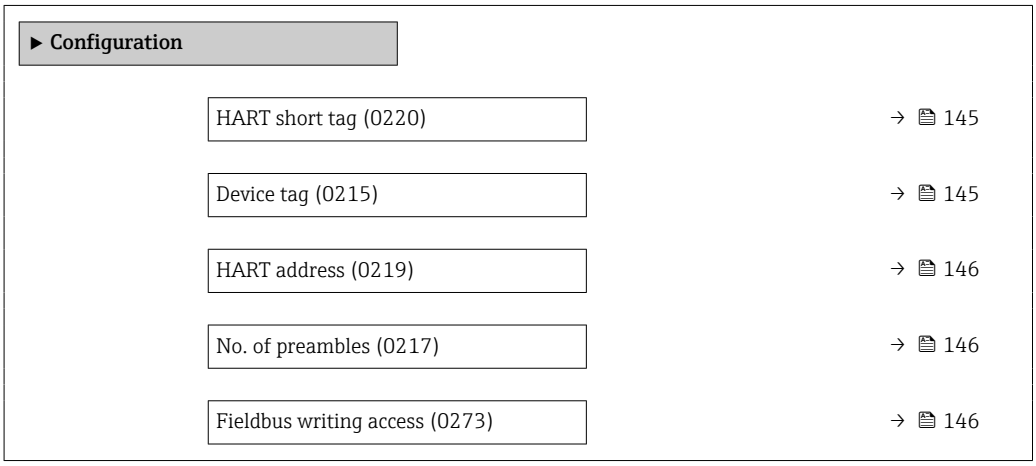
Navigation Expert → Communication → HART output





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

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. @, %, /).

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

Additional information *Description*

For addressing in a HART Multidrop network, the **Fixed current** option must be set in the **Current span** parameter (→ 112) (current output 1).

No. of preambles

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

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

User entry 2 to 20

Additional information *User entry*

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

Fieldbus writing access

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

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

Selection
- Read + write
- Read only

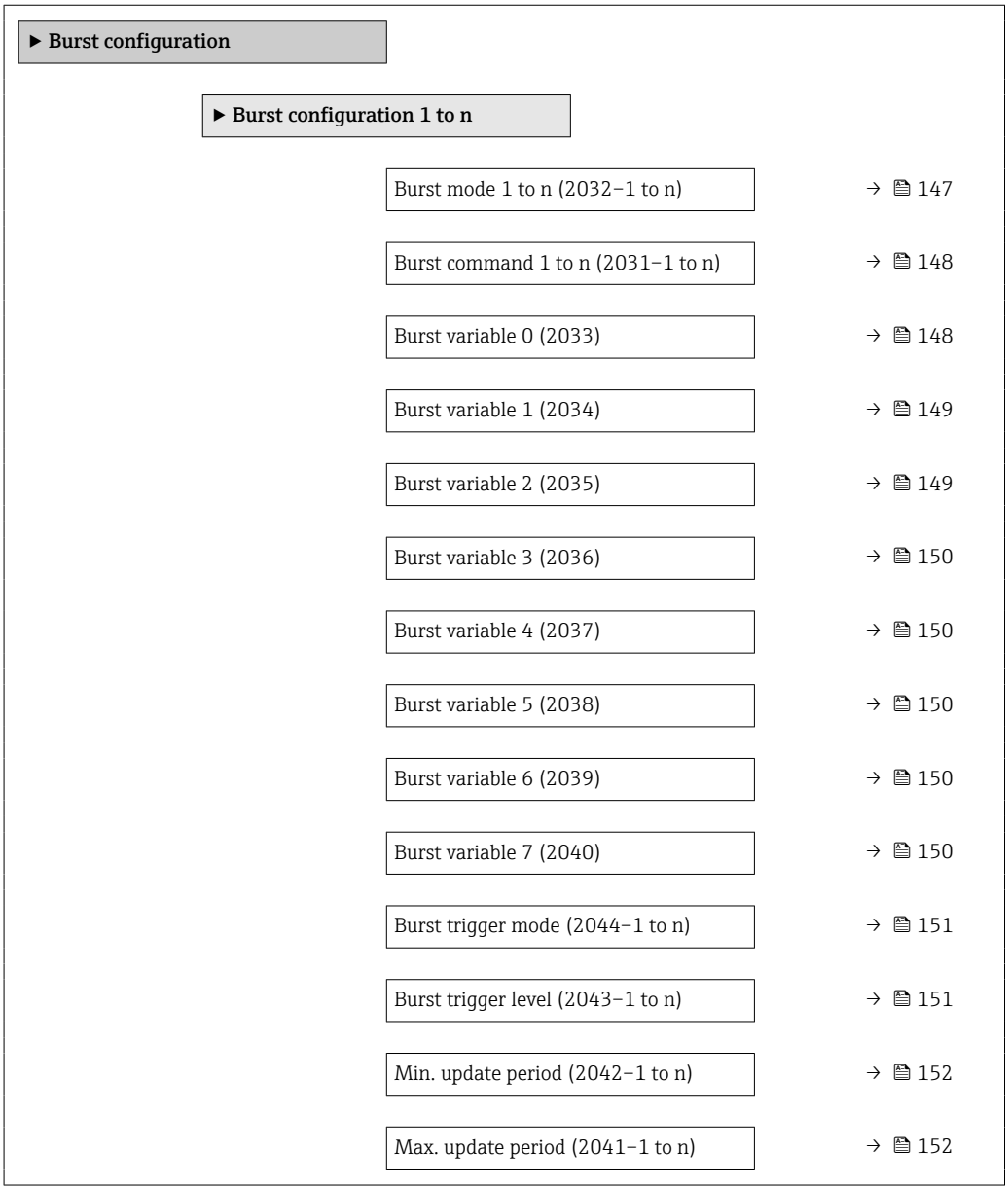
Additional information *Description*

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

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

"Burst configuration 1 to n" submenu

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



Burst mode 1 to n

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

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

Selection
- Off
- On

Additional information *Options*

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

Burst command 1 to n

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

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

Selection

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

Additional information *Selection*

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

"Command 33" option

The HART device variables are defined via Command 107.

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 (→ 110).

Burst variable 0

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

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

Selection

- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Temperature
- Density
- Flow velocity
- Pressure
- Energy flow *
- Heat flow *
- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Percent of range
- Measured current
- Current input 1 *
- Current input 2 *
- Current input 3 *
- Primary variable (PV)
- Secondary variable (SV)
- Tertiary variable (TV)
- Quaternary variable (QV)
- HART input
- Not used

Additional information

Selection

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

Burst variable 1

Navigation

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

Description

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

Selection

See the **Burst variable 0** parameter (→ 148).

Burst variable 2

Navigation

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

Description

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

Selection

See the **Burst variable 0** parameter (→ 148).

* Visibility depends on order options or device settings

Burst variable 3

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

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

Selection See the **Burst variable 0** parameter (→ 148).

Burst variable 4

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

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

Selection See the **Burst variable 0** parameter (→ 148).

Burst variable 5

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

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

Selection See the **Burst variable 0** parameter (→ 148).

Burst variable 6

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

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

Selection See the **Burst variable 0** parameter (→ 148).

Burst variable 7

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

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

Selection See the **Burst variable 0** parameter (→ 148).

Burst trigger mode

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

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

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

Additional information *Selection*
- Continuous
  The message is sent continuously, at least at intervals corresponding to the time frame specified in the **Burst min period** parameter (→ 152).
- Window
  The message is sent if the specified measured value has changed by the value in the **Burst trigger level** parameter (→ 151).
- Rising
  The message is sent if the specified measured value exceeds the value in the **Burst trigger level** parameter (→ 151).
- Falling
  The message is sent if the specified measured value drops below the value in the **Burst trigger level** parameter (→ 151).
- On change
  The message is sent if a measured value changes in the burst message.

Burst trigger level

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

Description For entering the burst trigger value.

User entry Signed floating-point number

Additional information *Description*

Together with the option selected in the **Burst trigger mode** parameter (→ 151) the burst trigger value determines the time of burst message X.

* Visibility depends on order options or device settings

Min. update period

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

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

User entry Positive integer

Max. update period

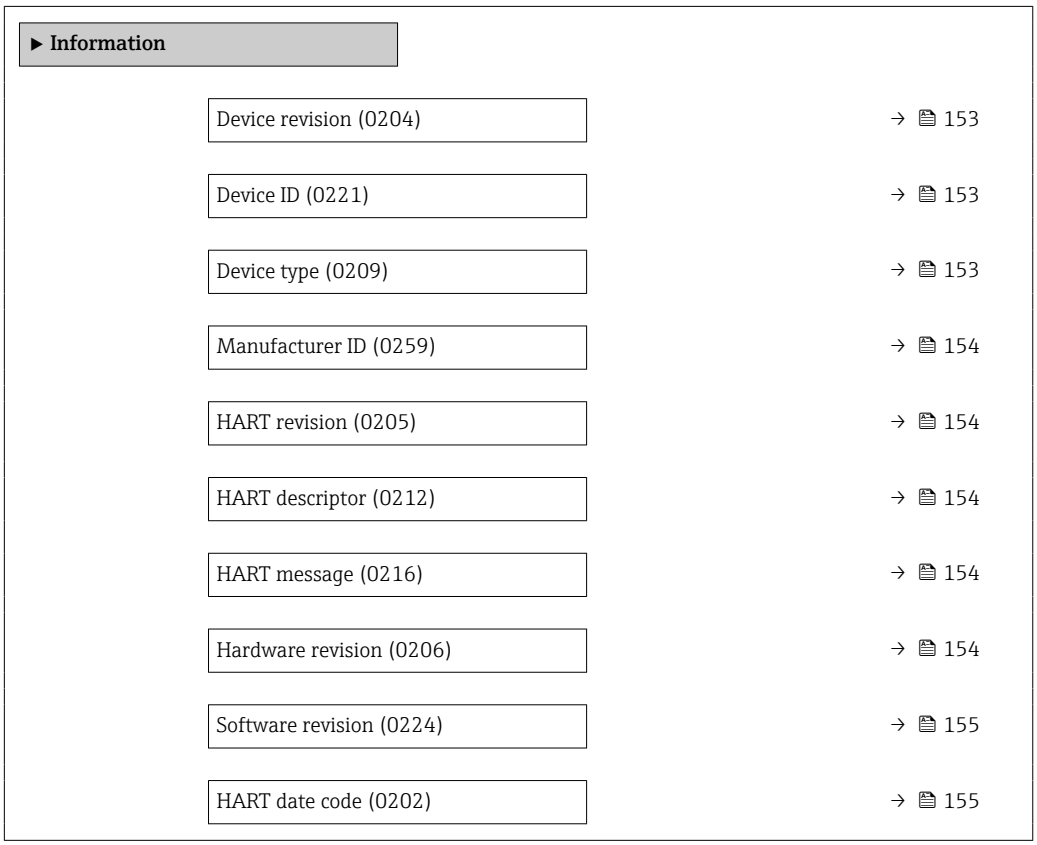
Navigation Expert → Communication → HART output → Burst config. → Burst config. 1 to n → Max. upd. per. (2041–1 to n)

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

User entry Positive integer

"Information" submenu

Navigation Expert → Communication → HART output → Information



Device revision

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

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

User interface 2-digit hexadecimal number

Factory setting 0x1

Additional information *Description*

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

Device ID

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

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

User interface 6-digit hexadecimal number

Additional information *Description*

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

Device type

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

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

User interface 2-digit hexadecimal number

Factory setting 0x1160 (for t-mass 300/500)

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

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. @, %, /)

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. @, %, /)

Hardware revision

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

Description Displays the hardware revision of the measuring device.

User interface 0 to 255

Software revision

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

Description Displays the software revision of the measuring device.

User interface 0 to 255

HART date code

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

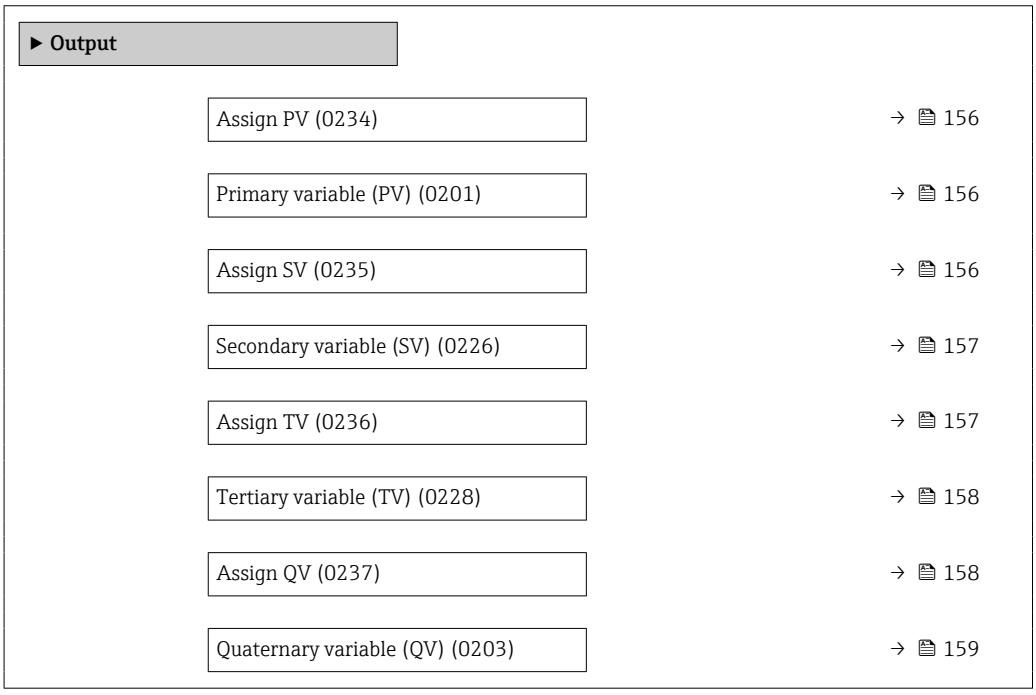
Description Use this function to enter the date information for individual use.

User entry Date entry format: yyyy-mm-dd

Additional information *Example*
Device installation date

"Output" submenu

Navigation Expert → Communication → HART output → Output



Assign PV

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

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

Selection
- Off *
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- Pressure
- 2nd temperature delta heat *
- Electronic temperature

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 measured value displayed depends on the process variable selected in the **Assign PV** parameter (→ 156).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

Assign SV

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

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

* Visibility depends on order options or device settings

Selection

- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Temperature
- Density
- Flow velocity
- Pressure
- Energy flow *
- Heat flow *
- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

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 measured value displayed depends on the process variable selected in the **Assign SV** parameter (→ 156).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

Assign TV

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

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

Selection

- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Temperature

* Visibility depends on order options or device settings

- Density
- Flow velocity
- Pressure
- Energy flow *
- Heat flow *
- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

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 measured value displayed depends on the process variable selected in the **Assign TV** parameter (→ 157).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

Assign QV

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

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

Selection

- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Temperature
- Density
- Flow velocity
- Pressure
- Energy flow *
- Heat flow *

* Visibility depends on order options or device settings

- 2nd temperature delta heat *
- Electronic temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Current input 1 *
- Current input 2 *
- Current input 3 *
- HART input

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 measured value displayed depends on the process variable selected in the **Assign QV** parameter (→ 158).

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

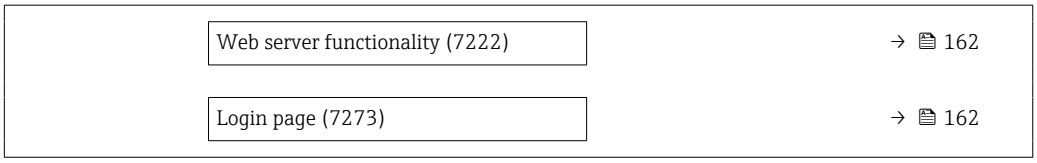
3.5.3 "Web server" submenu

Navigation Expert → Communication → Web server

▶ **Web server**

Web server language (7221)	→ 160
MAC address (7214)	→ 160
DHCP client (7212)	→ 161
IP address (7209)	→ 161
Subnet mask (7211)	→ 161
Default gateway (7210)	→ 161

* Visibility depends on order options or device settings



Web server language

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

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

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

MAC address

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

Description Displays the MAC [9] address of the measuring device.

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

Factory setting Each measuring device is given an individual address.

Additional information *Example*

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

* Visibility depends on order options or device settings
9) Media Access Control

DHCP client

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

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

Selection
- Off
- On

Additional information *Result*

If the DHCP client functionality of the Web server is activated, the IP address (→ 161), Subnet mask (→ 161) and Default gateway (→ 161) are set automatically.

- Identification is via the MAC address of the measuring device.
- The IP address (→ 161) in the **IP address** parameter (→ 161) is ignored as long as the **DHCP client** parameter (→ 161) is active. This is also the case, in particular, if the DHCP server cannot be reached. The IP address (→ 161) in the parameter of the same name is only used if the **DHCP client** parameter (→ 161) is inactive.

IP address

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

Description Display or enter the IP address of the Web server integrated in the measuring device.

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

Subnet mask

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

Description Display or enter the subnet mask.

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

Default gateway

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

Description Display or enter the Default gateway (→ 161).

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

Web server functionality

Navigation Expert → Communication → Web server → Webserver funct. (7222)

Description Use this function to switch the Web server on and off.

Selection
- Off
- HTML Off
- On

Additional information

Description

Once disabled, the Web server functionality can only be re-enabled via or the operating tool FieldCare.

Selection

Option	Description
Off	▪ The web server is completely disabled. ▪ Port 80 is locked.
On	▪ The complete functionality of the web server is available. ▪ JavaScript is used. ▪ The password is transferred in an encrypted state. ▪ Any change to the password is also transferred in an encrypted state.

Login page

Navigation Expert → Communication → Web server → Login page (7273)

Description Use this function to select the format of the login page.

Selection
- Without header
- With header

3.5.4 "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:

Category	Meaning
Failure (F)	A device error is present. The measured value is no longer valid.
Function check (C)	The device is in service mode (e.g. during a simulation).
Out of specification (S)	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)

Category	Meaning
Maintenance required (M)	Maintenance is required. The measured value is still valid.
No effect (N)	Has no effect on the condensed status [1].

1) Condensed status according to NAMUR recommendation NE107

Navigation Expert → Communication → Diag. config.

▶ **Diagnostic configuration**

Event category 144 (0300)	→ 163
Event category 441 (0210)	→ 164
Event category 442 (0230)	→ 164
Event category 443 (0231)	→ 164
Event category 832 (0218)	→ 165
Event category 833 (0225)	→ 165
Event category 834 (0227)	→ 165
Event category 835 (0229)	→ 166
Event category 842 (0295)	→ 166
Event category 979 (0299)	→ 166
Event category 976 (0298)	→ 167

Event category 144 (Sensor drift)

Navigation Expert → Communication → Diag. config. → Event category 144 (0300)

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

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

Additional information For a detailed description of the event categories available for selection: → 162

Event category 441 (Current output 1 to n)

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

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

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

Additional information For a detailed description of the event categories available for selection: → 162

Event category 442 (Frequency output 1 to n)

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

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the **442 Frequency output 1 to n** diagnostic message.

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

Additional information For a detailed description of the event categories available for selection: → 162

Event category 443 (Pulse output 1 to n)

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

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the **443 Pulse output 1 to n** diagnostic message.

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

Additional information For a detailed description of the event categories available for selection: → 162

Event category 832 (Electronic temperature too high)

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

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

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

Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

Event category 833 (Electronic temperature too low)

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

Description Use this option to select a category for the **833 Electronic temperature too low** diagnostic message.

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

Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

Event category 834 (Process temperature too high)

Navigation Expert → Communication → Diag. config. → Event category 834 (0227)

Description Use this option to select a category for the **834 Process temperature too high** diagnostic message.

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

Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

Event category 835 (Process temperature too low)

Navigation Expert → Communication → Diag. config. → Event category 835 (0229)

Description Use this option to select a category for the **835 Process temperature too low** diagnostic message.

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

Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

Event category 842 (Process limit)

Navigation Expert → Communication → Diag. config. → Event category 842 (0295)

Description Use this function to select a category for the **842 Process limit** diagnostic message.

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

Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

Event category 979 (Unstable process conditions)

Navigation Expert → Communication → Diag. config. → Event category 979 (0299)

Description Use this function to select a category for the **Unstable process conditions** diagnostic message.

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

Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

Event category 976 (Mass flow out of calibrated range)

Navigation Expert → Communication → Diag. config. → Event category 976 (0298)

Description Use this function to select a category for the **Mass flow out of calibrated range** diagnostic message.

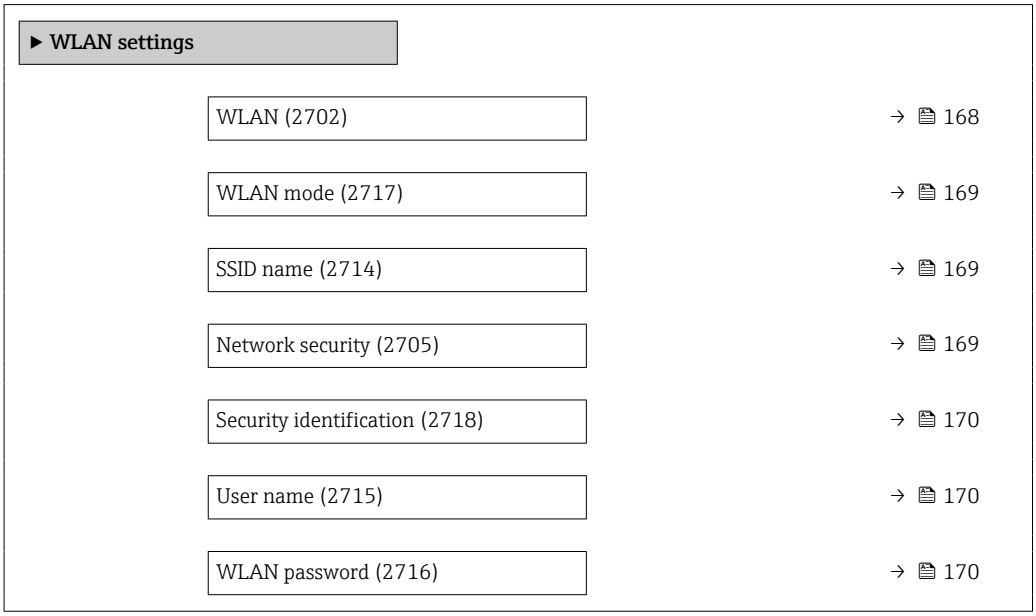
Selection
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- No effect (N)

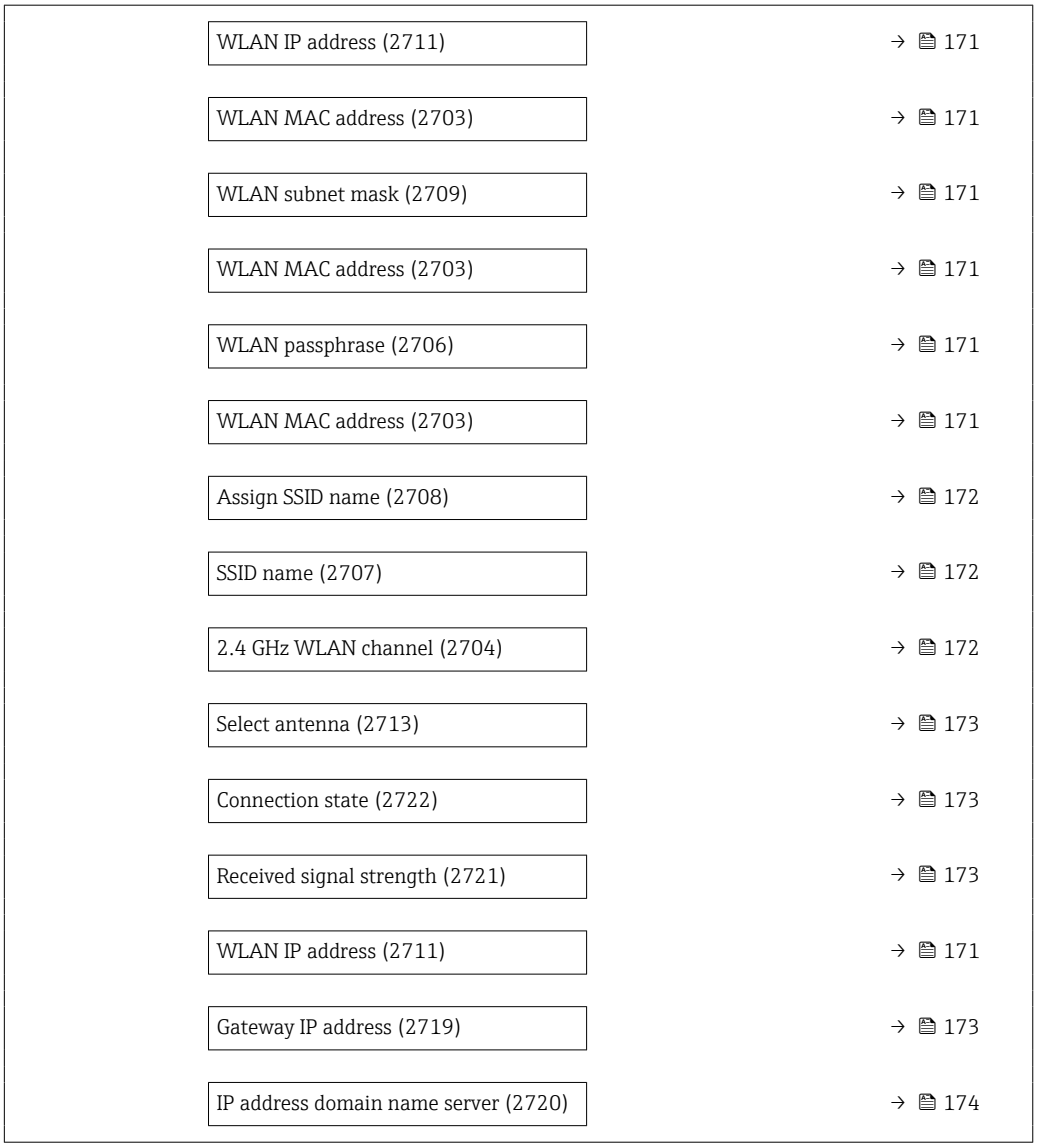
Additional information *Selection*

For a detailed description of the event categories available for selection: → 162

3.5.5 "WLAN settings" submenu

Navigation Expert → Communication → WLAN settings





WLAN

Navigation Expert → Communication → WLAN settings → WLAN (2702)

Description Use this function to enable and disable the WLAN connection.

Selection
- Disable
- Enable

WLAN mode

Navigation

Expert → Communication → WLAN settings → WLAN mode (2717)
Setup → Advanced setup → WLAN settings → WLAN mode (2717)
Setup → Advanced setup → WLAN settings → WLAN mode (2717)

Description

Use this function to select the WLAN mode.

Selection

- WLAN access point
- WLAN Client

SSID name

Navigation

Expert → Communication → WLAN settings → SSID name (2714)
Setup → Advanced setup → WLAN settings → SSID name (2714)
Setup → Advanced setup → WLAN settings → SSID name (2714)

Prerequisite

The client is activated.

Description

Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.

User entry

–

Factory setting

–

Network security

Navigation

Expert → Communication → WLAN settings → Network security (2705)

Description

Use this function to select the type of security for the WLAN interface.

Selection

- Unsecured
- WPA2-PSK
- EAP-PEAP with MSCHAPv2 *
- EAP-PEAP MSCHAPv2 no server authentic. *
- EAP-TLS *

Additional information

Selection

- Unsecured
  Access the WLAN connection without identification.
- WPA2-PSK
  Access the WLAN connection with a network key.

* Visibility depends on order options or device settings

Security identification

Navigation
Expert → Communication → WLAN settings → Sec. identific. (2718)
Setup → Advanced setup → WLAN settings → Sec. identific. (2718)
Setup → Advanced setup → WLAN settings → Sec. identific. (2718)

Description
Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).

User interface
- Trusted issuer certificate
- Device certificate
- Device private key

User name

Navigation
Expert → Communication → WLAN settings → User name (2715)
Setup → Advanced setup → WLAN settings → User name (2715)
Setup → Advanced setup → WLAN settings → User name (2715)

Description
Use this function to enter the username of the WLAN network.

User entry
–

Factory setting
–

WLAN password

Navigation
Expert → Communication → WLAN settings → WLAN password (2716)
Setup → Advanced setup → WLAN settings → WLAN password (2716)
Setup → Advanced setup → WLAN settings → WLAN password (2716)

Description
Use this function to enter the WLAN password for the WLAN network.

User entry
–

Factory setting
–

WLAN IP address

Navigation
Expert → Communication → WLAN settings → WLAN IP address (2711)
Setup → Advanced setup → WLAN settings → WLAN IP address (2711)
Setup → Advanced setup → WLAN settings → WLAN IP address (2711)

Description
Use this function to enter the IP address of the measuring device's WLAN connection.

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

WLAN MAC address

Navigation
Expert → Communication → WLAN settings → WLAN MAC address (2703)
Setup → Advanced setup → WLAN settings → WLAN MAC address (2703)

Description
Displays the MAC [10] address of the measuring device.

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

Factory setting
Each measuring device is given an individual address.

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

WLAN subnet mask

Navigation
Expert → Communication → WLAN settings → WLAN subnet mask (2709)

Description
Use this function to enter the subnet mask.

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

WLAN passphrase

Navigation
Expert → Communication → WLAN settings → WLAN passphrase (2706)
Setup → Advanced setup → WLAN settings → WLAN passphrase (2706)
Setup → Advanced setup → WLAN settings → WLAN passphrase (2706)

Prerequisite
The **WPA2-PSK** option is selected in the **Security type** parameter (→ 169).

10) Media Access Control

Description Use this function to enter the network key.

User entry 8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

Factory setting Serial number of the measuring device (e.g. L100A802000)

Assign SSID name

Navigation
Expert → Communication → WLAN settings → Assign SSID name (2708)
Setup → Advanced setup → WLAN settings → Assign SSID name (2708)
Setup → Advanced setup → WLAN settings → Assign SSID name (2708)

Description Use this function to select which name is used for the SSID [11].

Selection
- Device tag
- User-defined

Additional information *Selection*
- Device tag
  The device tag name is used as the SSID.
- User-defined
  A user-defined name is used as the SSID.

SSID name

Navigation Expert → Communication → WLAN settings → SSID name (2707)

Prerequisite
- The **User-defined** option is selected in the **Assign SSID name** parameter (→ 172).
- The **WLAN access point** option is selected in the **WLAN mode** parameter (→ 169).

Description Use this function to enter a user-defined SSID name.

User entry Max. 32-digit character string comprising numbers, letters and special characters

2.4 GHz WLAN channel

Navigation Expert → Communication → WLAN settings → WLAN channel (2704)

Description Use this function to enter the 2.4 GHz WLAN channel.

User entry 1 to 11

11) Service Set Identifier

Additional information *Description*

- It is only necessary to enter a 2.4 GHz WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

Navigation Expert → Communication → WLAN settings → Select antenna (2713)

Description Use this function to select whether the external or internal antenna is used for reception.

Selection
- External antenna
- Internal antenna

Connection state

Navigation
Expert → Communication → WLAN settings → Connection state (2722)
Setup → Advanced setup → WLAN settings → Connection state (2722)
Setup → Advanced setup → WLAN settings → Connection state (2722)

Description The connection status is displayed.

User interface
- Connected
- Not connected

Received signal strength

Navigation
Expert → Communication → WLAN settings → Rec.sig.strength (2721)
Setup → Advanced setup → WLAN settings → Rec.sig.strength (2721)
Setup → Advanced setup → WLAN settings → Rec.sig.strength (2721)

Description Displays the signal strength received.

User interface
- Low
- Medium
- High

Gateway IP address

Navigation Expert → Communication → WLAN settings → Gateway IP addr. (2719)

Description Use this function to enter the IP address of the gateway.

User interface Character string comprising numbers, letters and special characters (#15)

IP address domain name server

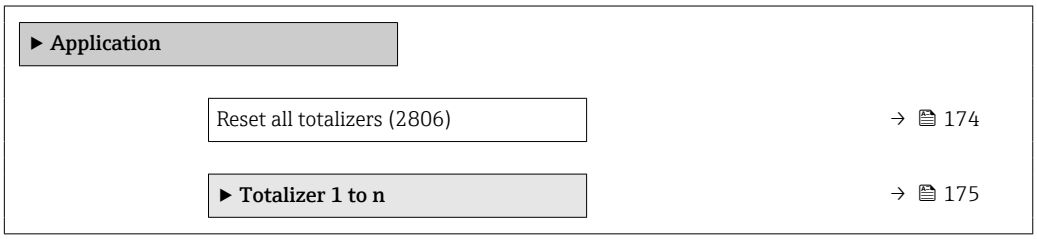
Navigation Expert → Communication → WLAN settings → IP address DNS (2720)

Description Use this function to enter the IP address of the domain name server.

User interface Character string comprising numbers, letters and special characters (#15)

3.6 "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.

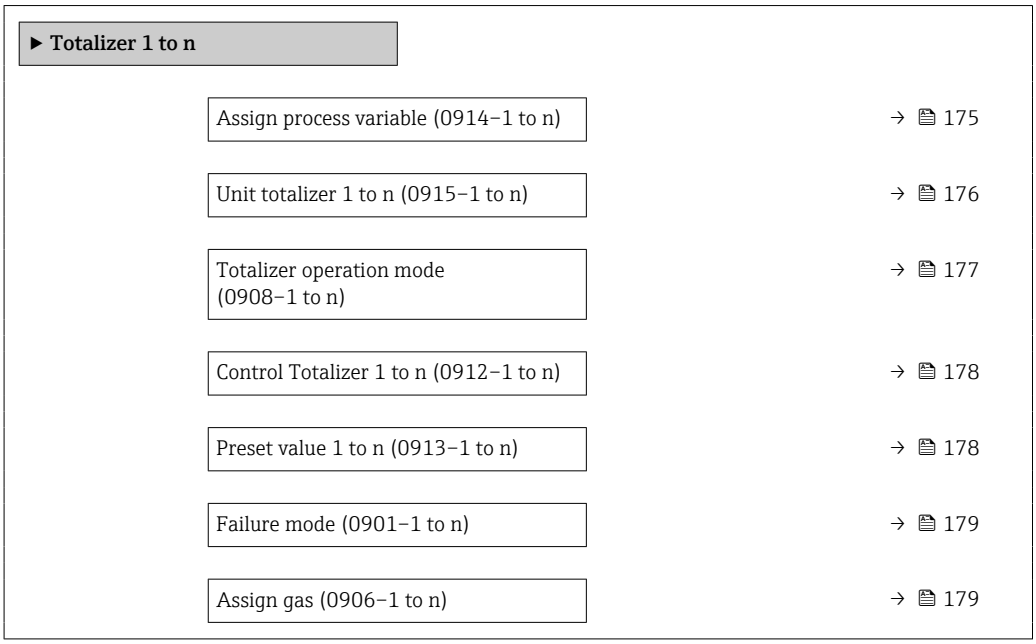
Selection
- Cancel
- Reset + totalize

Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.

3.6.1 "Totalizer 1 to n" submenu

Navigation Expert → Application → Totalizer 1 to n



Assign process variable

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

Description Use this function to select a process variable for the Totalizer 1 to n.

Selection
- Off
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *

Additional information *Description*

If the option selected is changed, the device resets the totalizer to 0.

Selection

If the **Off** option is selected, only **Assign process variable** parameter (→ 175) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

* Visibility depends on order options or device settings

Unit totalizer 1 to n

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 175) of the **Totalizer 1 to n** submenu.

Description Use this function to select the process variable unit for the Totalizer 1 to n (→ 175).

Selection

SI units
- g *
- kg *
- t *

US units
- oz *
- lb *
- STon *

* Visibility depends on order options or device settings

or

SI units
- m^3 *
- l *

US units
- ft^3 *
- Mft^3 *

* Visibility depends on order options or device settings

or

SI units
- Nl *
- Nm^3 *
- Sl *
- Sm^3 *

US units
Sft^3 *

* Visibility depends on order options or device settings

or

SI units
- m^3 FAD *
- l FAD *

US units
cf FAD *

* Visibility depends on order options or device settings

or

SI units
- kWh *
- MWh *
- GWh *
- kJ *
- MJ *
- GJ *
- kcal *
- Mcal *
- Gcal *

Imperial units
- Btu *
- MBtu *
- MMBtu *

* Visibility depends on order options or device settings

or

Other units
None *

* Visibility depends on order options or device settings

Additional information

Description

The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 54).

Selection

The selection is dependent on the process variable selected in the **Assign process variable** parameter (→ 175).

Totalizer operation mode

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 175) of the **Totalizer 1 to n** submenu.

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

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

Additional information

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

Control Totalizer 1 to n

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 175) of the **Totalizer 1 to n** submenu.

Description Use this function to select the control of totalizer value 1-3.

Selection
- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset + totalize
- Hold

Additional information *Selection*

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold	The totaling process is stopped and the totalizer is set to its defined start value from the **Preset value** parameter.
Reset + totalize	The totalizer is reset to 0 and the totaling process is restarted.
Preset + totalize	The totalizer is set to the defined start value from the **Preset value** parameter and the totaling process is restarted.
Hold	Totalizing is stopped.

Preset value 1 to n

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 175) of the **Totalizer 1 to n** submenu.

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

User entry Signed floating-point number

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 176).

Example

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

Failure mode

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

Prerequisite A process variable is selected in the **Assign process variable** parameter (→ 175) of the **Totalizer 1 to n** submenu.

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

Selection
- Stop
- Actual value
- Last valid value

Additional information

Description

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

Selection
- Stop
  The totalizer is stopped in the event of a device alarm.
- Actual value
  The totalizer continues to count based on the actual measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

Assign gas (Only with order code for "Application package", option EV "Second gas group")

Navigation Expert → Application → Totalizer 1 to n → Assign gas (0906–1 to n)

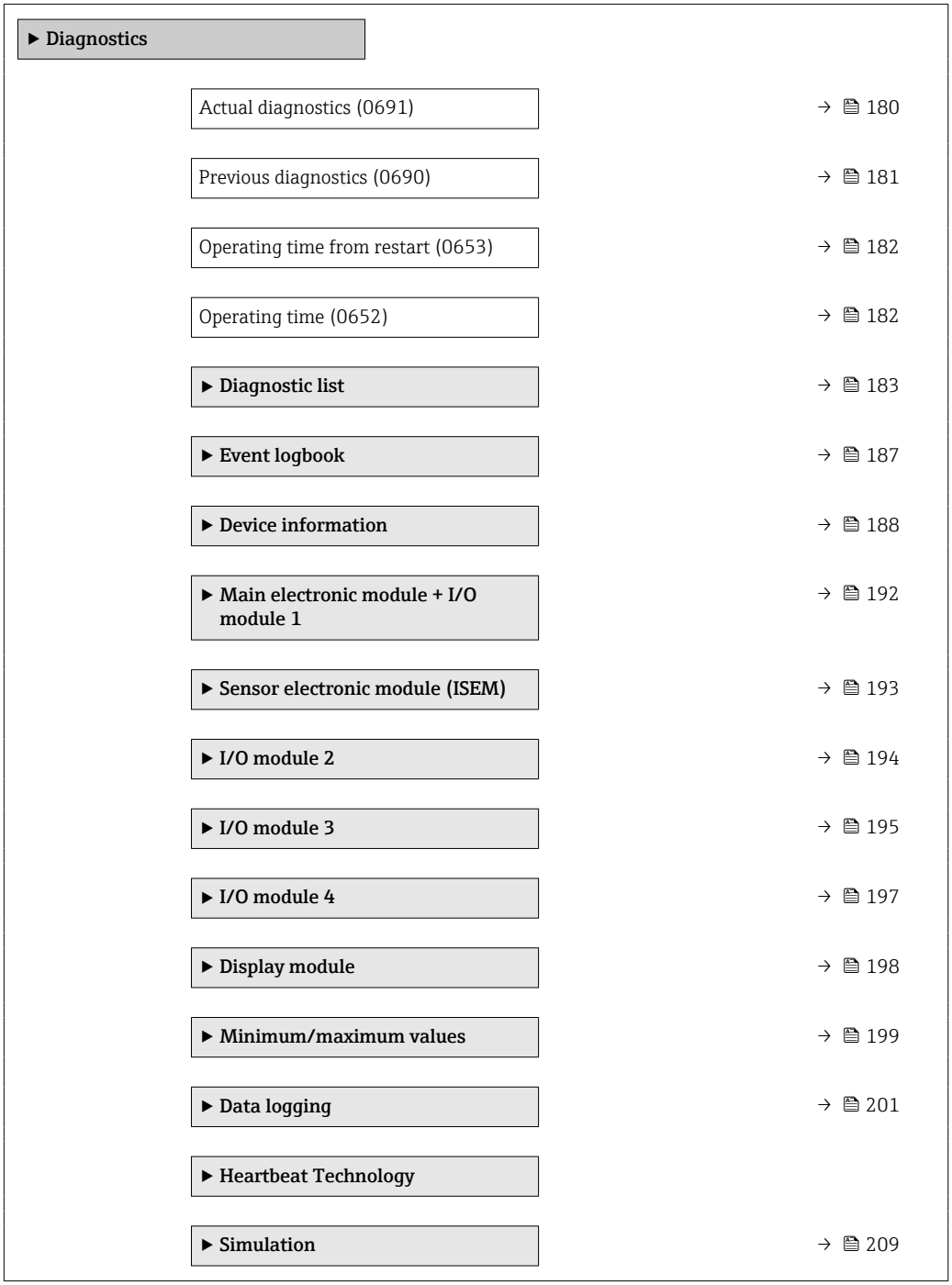
Description Select the gas that the totalizer uses. This gas is only totalized when it is currently active (‘Active gas’ parameter).

Selection
- Both gases
- Gas
- Second gas

Factory setting
- **Both gases** option (only with order code for "Application package", option EV "Second gas group")
- Gas

3.7 "Diagnostics" submenu

Navigation Expert → Diagnostics



Actual diagnostics

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

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

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

Additional information *Display*

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 183).

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Example

For the display format:
⊗F271 Main electronic failure

Timestamp

Navigation Expert → Diagnostics → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Actual diagnostics** parameter (→ 180).

Example

For the display format:
24d12h13m00s

Previous diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite Two diagnostic events have already occurred.

Description Displays the diagnostic message that occurred before the current message.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Example

For the display format:
⊗F271 Main electronic failure

Timestamp

Navigation Expert → Diagnostics → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Previous diagnostics** parameter (→ 181).

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.

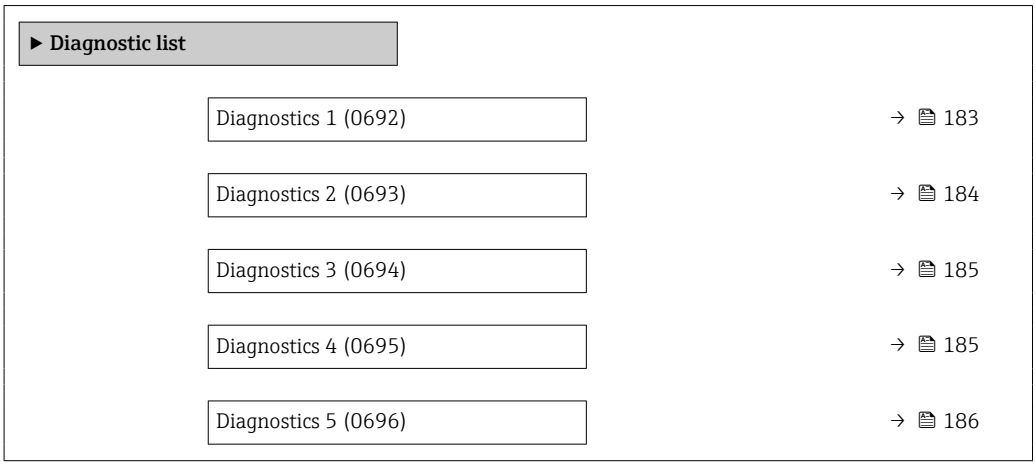
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

3.7.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list



Diagnostics 1

Navigation Expert → Diagnostics → Diagnostic list → Diagnostics 1 (0692)

Description Displays the current diagnostics message with the highest priority.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronic failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 183).

Example

For the display format:
24d12h13m00s

Diagnostics 2

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

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

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronic failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 184).

Example

For the display format:
24d12h13m00s

Diagnostics 3

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

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

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

Additional information

Display

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronic failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the third-highest priority occurred.

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

Additional information

Display

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 185).

Example

For the display format:
24d12h13m00s

Diagnostics 4

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

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

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronic failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 185).

Example

For the display format:
24d12h13m00s

Diagnostics 5

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

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

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Examples

For the display format:
- ⊗F271 Main electronic failure
- ⊗F276 I/O module failure

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

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

Additional information *Display*

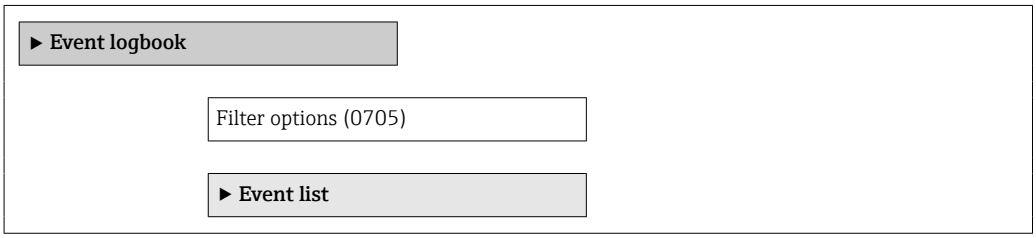
The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 186).

Example

For the display format:
24d12h13m00s

3.7.2 "Event logbook" submenu

Navigation Expert → Diagnostics → Event logbook



Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options

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

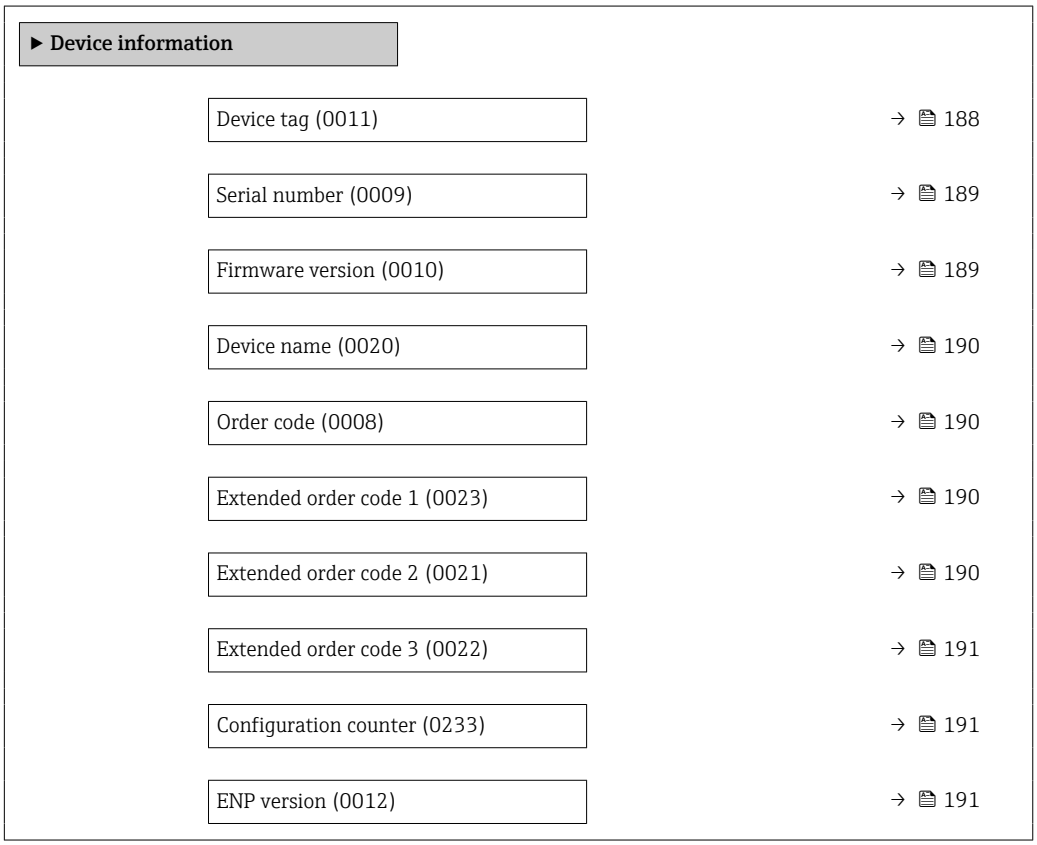
Selection
- All
- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)
- Information (I)

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

3.7.3 "Device information" submenu

Navigation Expert → Diagnostics → Device info



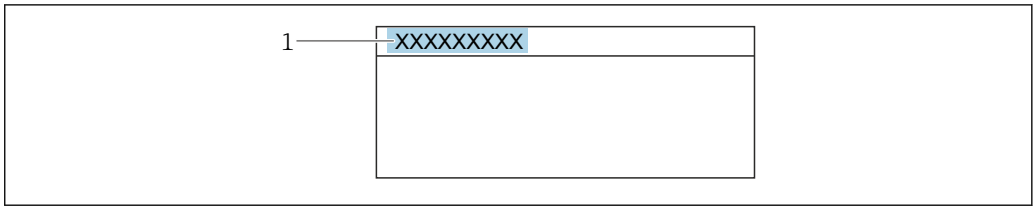
Device tag

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

Description Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

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

Additional information *User interface*



1 Position of the header text on the display

The number of characters displayed depends on the characters used.

Serial number

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

Description Displays the serial number of the measuring device.

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

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

Additional information *Description*

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

Firmware version

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

Description Displays the device firmware version installed.

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

Additional information *Display*

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

Device name

Navigation Expert → Diagnostics → Device info → Device name (0020)

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

User interface Character string comprising numbers, letters and special characters (#16)

Order code

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

Description Displays the device order code.

User interface Character string composed of letters, numbers and certain punctuation marks (e.g. /).

Additional information *Description*

The order code is generated from the extended order code through a process of reversible transformation. The extended order code indicates the attributes for all the device features in the product structure. The device features are not directly readable from the order code.

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

Extended order code 1

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

Description Displays the first part of the extended order code.

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

User interface Character string

Additional information *Description*

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

Extended order code 2

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

Description Displays the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 190)

Extended order code 3

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

Description Displays the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Extended order code 1** parameter (→ 190)

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

ENP version

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

Description Displays the version of the electronic nameplate.

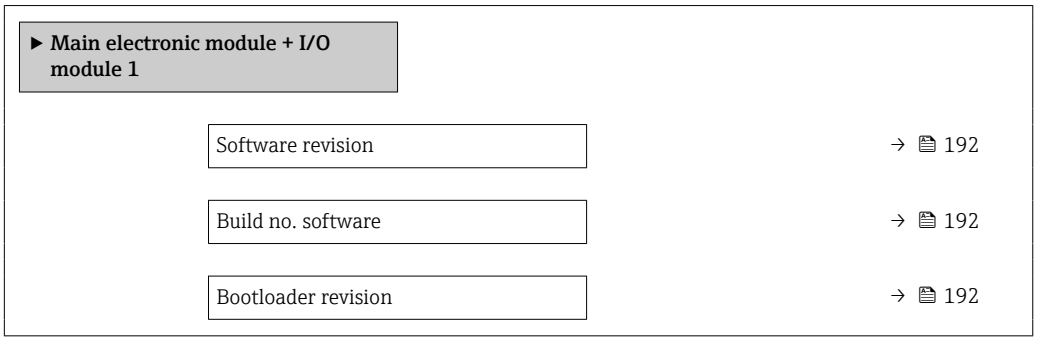
User interface Character string

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.

3.7.4 "Main electronic module + I/O module 1" submenu

Navigation Expert → Diagnostics → Mainboard I/O1



Software revision

Navigation Expert → Diagnostics → Mainboard I/O1 → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Mainboard I/O1 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

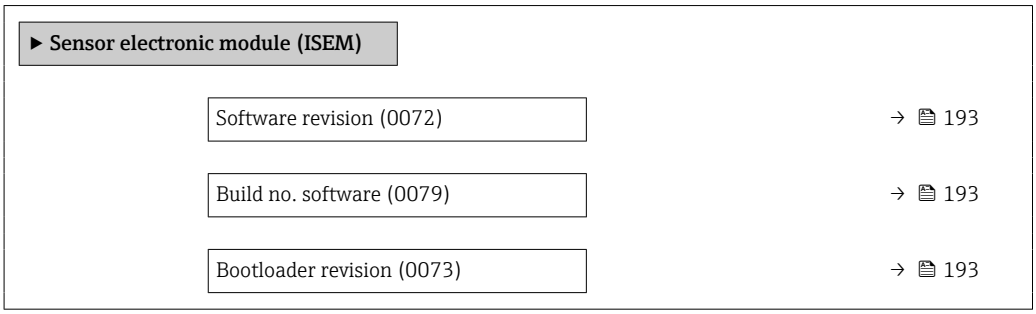
Navigation Expert → Diagnostics → Mainboard I/O1 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.7.5 "Sensor electronic module (ISEM)" submenu

Navigation Expert → Diagnostics → Sens. electronic



Software revision

Navigation Expert → Diagnostics → Sens. electronic → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

Navigation Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

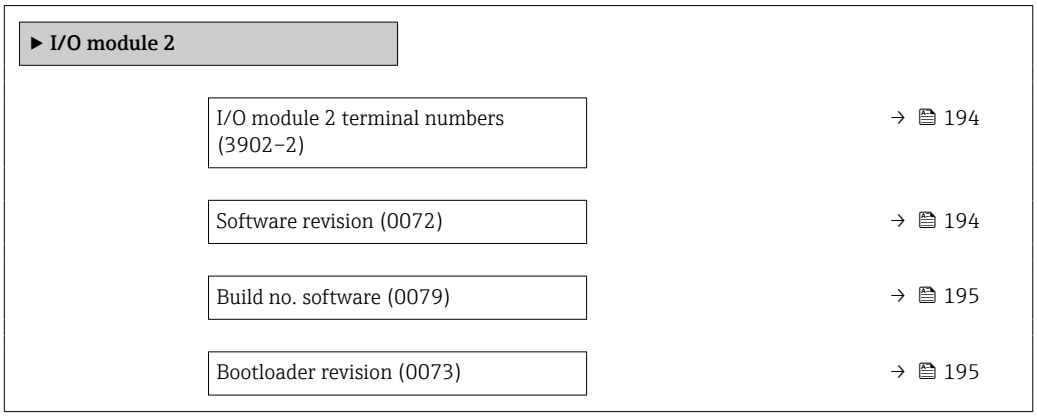
Navigation Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.7.6 "I/O module 2" submenu

Navigation Expert → Diagnostics → I/O module 2



I/O module 2 terminal numbers

Navigation Expert → Diagnostics → I/O module 2 → I/O 2 terminals (3902–2)

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

User interface
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Software revision

Navigation
Expert → Diagnostics → Display module → Software rev. (0072)
Expert → Diagnostics → I/O module → Software rev. (0072)
Expert → Diagnostics → Sens. electronic → Software rev. (0072)
Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)
Expert → Diagnostics → Mainboard I/O1 → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

* Visibility depends on order options or device settings

Build no. software

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

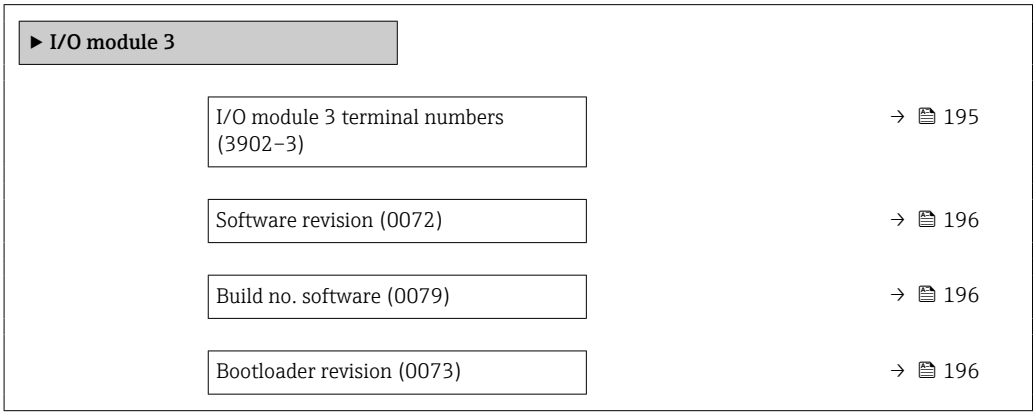
Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.7.7 "I/O module 3" submenu

Navigation Expert → Diagnostics → I/O module 3



I/O module 3 terminal numbers

Navigation Expert → Diagnostics → I/O module 3 → I/O 3 terminals (3902–3)

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

User interface

- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Software revision

Navigation

Expert → Diagnostics → Display module → Software rev. (0072)
Expert → Diagnostics → I/O module → Software rev. (0072)
Expert → Diagnostics → Sens. electronic → Software rev. (0072)
Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)
Expert → Diagnostics → Mainboard I/O1 → Software rev. (0072)

Description

Use this function to display the software revision of the module.

User interface

Positive integer

Build no. software

Navigation

Expert → Diagnostics → Display module → Build no. softw. (0079)
Expert → Diagnostics → I/O module → Build no. softw. (0079)
Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
Expert → Diagnostics → Main elec.+I/O1 → Build no. softw. (0079)
Expert → Diagnostics → Mainboard I/O1 → Build no. softw. (0079)

Description

Use this function to display the software build number of the module.

User interface

Positive integer

Bootloader revision

Navigation

Expert → Diagnostics → Display module → Bootloader rev. (0073)
Expert → Diagnostics → I/O module → Bootloader rev. (0073)
Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)
Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)
Expert → Diagnostics → Mainboard I/O1 → Bootloader rev. (0073)

Description

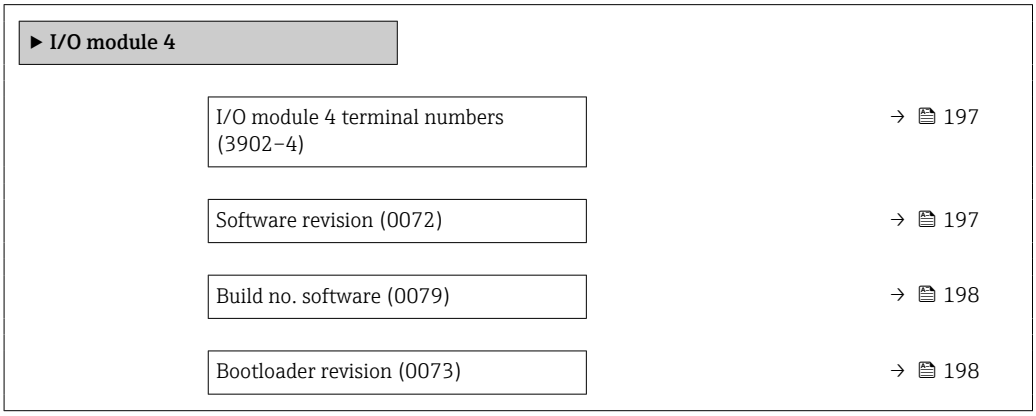
Use this function to display the bootloader revision of the software.

* Visibility depends on order options or device settings

User interface Positive integer

3.7.8 "I/O module 4" submenu

Navigation Expert → Diagnostics → I/O module 4



I/O module 4 terminal numbers

Navigation Expert → Diagnostics → I/O module 4 → I/O 4 terminals (3902–4)

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

User interface
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

Software revision

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

* Visibility depends on order options or device settings

Build no. software

Navigation
Expert → Diagnostics → Display module → Build no. softw. (0079)
Expert → Diagnostics → I/O module → Build no. softw. (0079)
Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)
Expert → Diagnostics → Main elec.+I/O1 → Build no. softw. (0079)
Expert → Diagnostics → Mainboard I/O1 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

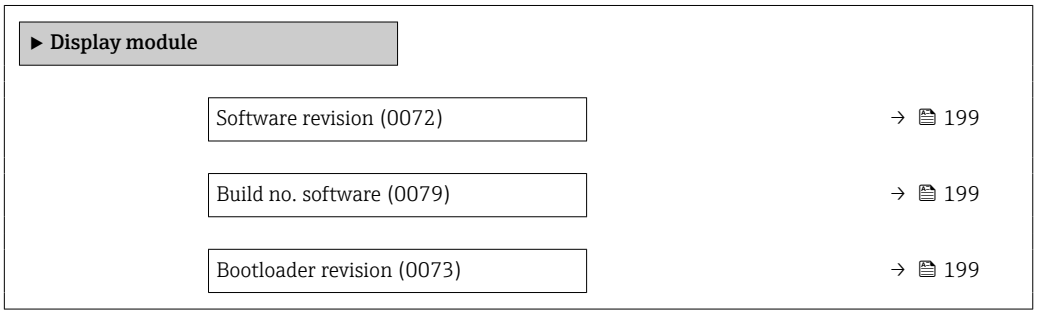
Navigation
Expert → Diagnostics → Display module → Bootloader rev. (0073)
Expert → Diagnostics → I/O module → Bootloader rev. (0073)
Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)
Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)
Expert → Diagnostics → Mainboard I/O1 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.7.9 "Display module" submenu

Navigation Expert → Diagnostics → Display module



Software revision

Navigation Expert → Diagnostics → Display module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. software

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

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader revision

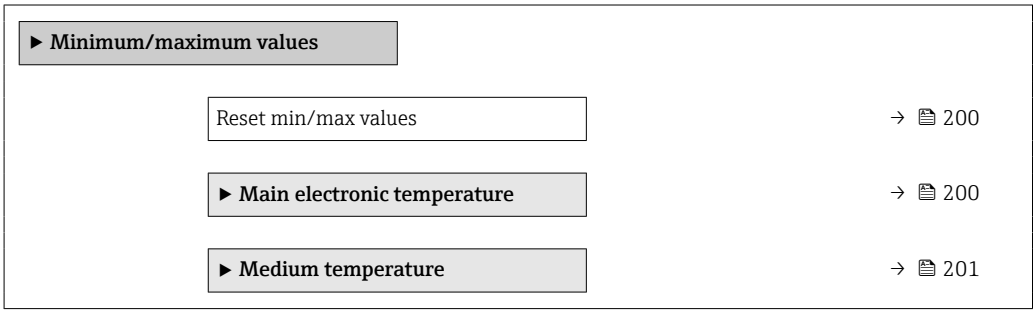
Navigation Expert → Diagnostics → Display module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.7.10 "Minimum/maximum values" submenu

Navigation Expert → Diagnostics → Min/max val.



Reset min/max values

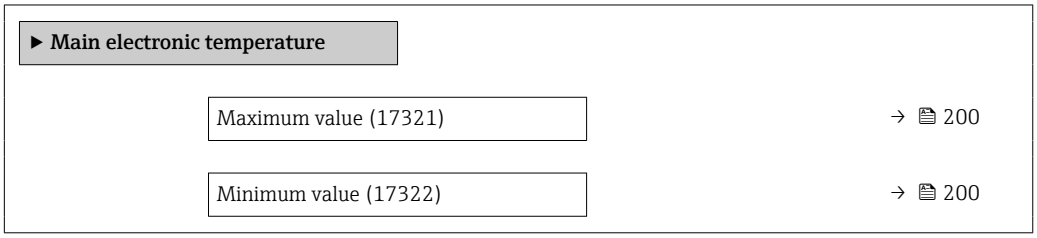
Navigation Expert → Diagnostics → Min/max val. → Reset min/max (17015)

Description Select measured variable whose minimum value and maximum value are to be reset.

Selection
- Main electronic temperature (→ 200)
- Medium temperature (→ 201)

"Main electronic temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp.



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (17321)

Description Shows the highest previously measured temperature for the main electronic module in the transmitter.

User interface Signed floating-point number

Minimum value

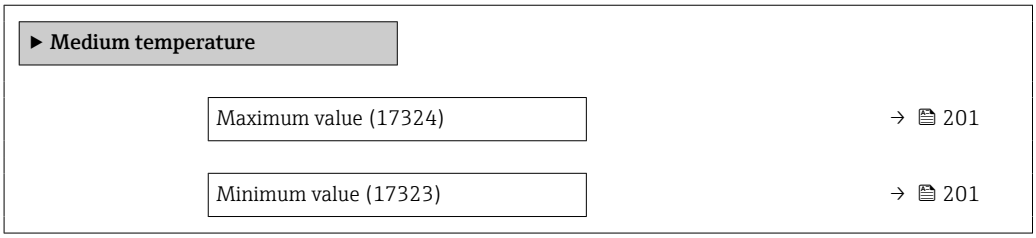
Navigation Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (17322)

Description Shows the lowest previously measured temperature for the main electronic module in the transmitter.

User interface Signed floating-point number

"Medium temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → Medium temp.



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (17324)

Description Shows the highest previously measured medium temperature.

User interface Signed floating-point number

Minimum value

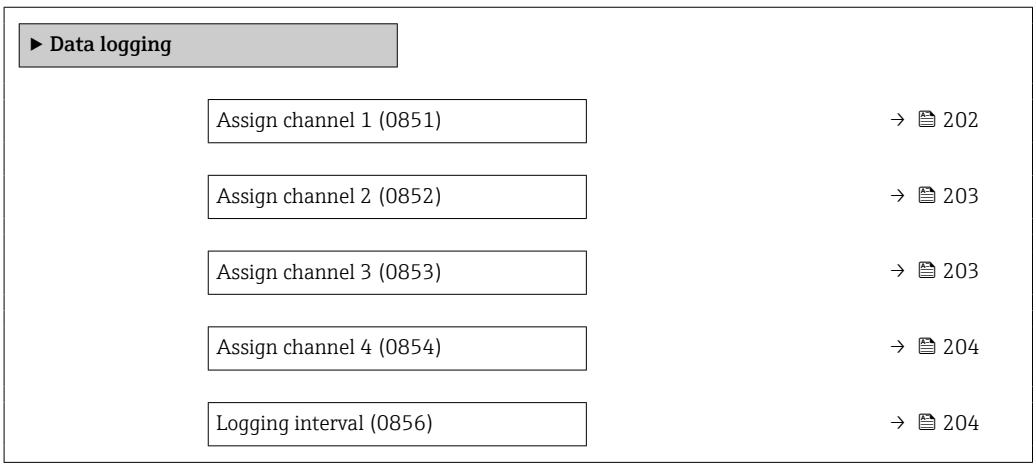
Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (17323)

Description Shows the lowest previously measured medium temperature.

User interface Signed floating-point number

3.7.11 "Data logging" submenu

Navigation Expert → Diagnostics → Data logging



Clear logging data (0855)	→ 205
Data logging (0860)	→ 205
Logging delay (0859)	→ 205
Data logging control (0857)	→ 206
Data logging status (0858)	→ 206
Entire logging duration (0861)	→ 207
▶ **Display channel 1**	→ 207
▶ **Display channel 2**	→ 207
▶ **Display channel 3**	→ 208
▶ **Display channel 4**	→ 208

Assign channel 1

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

Description Use this function to select a process variable for the data logging channel.

Selection
- Off
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity
- Pressure
- 2nd temperature delta heat *
- Electronic temperature
- Current output 1 *
- Current output 2 *
- Current output 3 *
- Current output 4 *

* Visibility depends on order options or device settings

Additional information *Description*

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

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

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

Assign channel 2

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

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

Selection Picklist, see **Assign channel 1** parameter (→ 202)

Assign channel 3

Navigation

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

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

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

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

Selection Picklist, see **Assign channel 1** parameter (→ 202)

Assign channel 4

Navigation

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

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 (→ 40).

Description

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

Selection

Picklist, see **Assign channel 1** parameter (→ 202)

Logging interval

Navigation

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

Prerequisite

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

Description

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

User entry

0.1 to 3 600.0 s

Additional information

Description

This defines the interval between the individual data points in the data log, and thus the maximum loggable process time T_{log}:

- If 1 logging channel is used: $T_{log} = 1000 \times t_{log}$
- If 2 logging channels are used: $T_{log} = 500 \times t_{log}$
- If 3 logging channels are used: $T_{log} = 333 \times t_{log}$
- If 4 logging channels are used: $T_{log} = 250 \times t_{log}$

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

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

Example

If 1 logging channel is used:

- $T_{log} = 1000 \times 1$ 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)

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

Description Use this function to clear the entire logging data.

Selection
- Cancel
- Clear data

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

Data logging

Navigation Expert → Diagnostics → Data logging → Data logging (0860)

Description Use this function to select the data logging method.

Selection
- Overwriting
- Not overwriting

Additional information *Selection*
- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite In the **Data logging** parameter (→ 205), the **Not overwriting** option is selected.

Description Use this function to enter the time delay for measured value logging.

User entry 0 to 999 h

Additional information *Description*

Once measured value logging has been started with the **Data logging control** parameter (→ 206), the device does not save any data for the duration of the time delay entered.

Data logging control

Navigation Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite In the **Data logging** parameter (→ 205), the **Not overwriting** option is selected.

Description Use this function to start and stop measured value logging.

Selection
- None
- Delete + start
- Stop

Additional information *Selection*
- None
  Initial measured value logging status.
- Delete + start
  All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
  Measured value logging is stopped.

Data logging status

Navigation Expert → Diagnostics → Data logging → Data log. status (0858)

Prerequisite In the **Data logging** parameter (→ 205), the **Not overwriting** option is selected.

Description Displays the measured value logging status.

User interface
- Done
- Delay active
- Active
- Stopped

Additional information *Selection*
- Done
  Measured value logging has been performed and completed successfully.
- Delay active
  Measured value logging has been started but the logging interval has not yet elapsed.
- Active
  The logging interval has elapsed and measured value logging is active.
- Stopped
  Measured value logging is stopped.

Entire logging duration

Navigation Expert → Diagnostics → Data logging → Logging duration (0861)

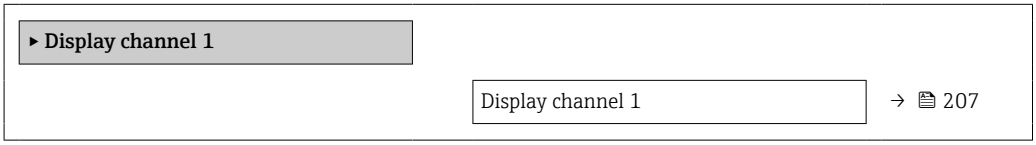
Prerequisite In the **Data logging** parameter (→ 205), the **Not overwriting** option is selected.

Description Displays the total logging duration.

User interface Positive floating-point number

"Display channel 1" submenu

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



Display channel 1

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

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

The software options currently enabled are displayed in the **Software option overview** parameter (→ 40).

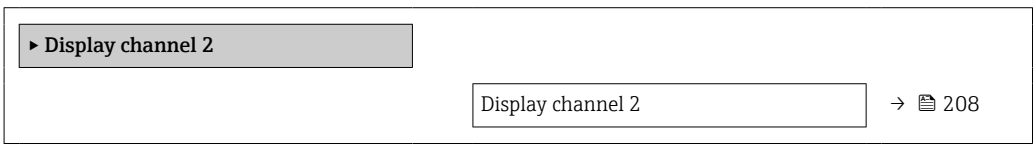
Description Displays the measured value trend for the logging channel in the form of a chart.

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

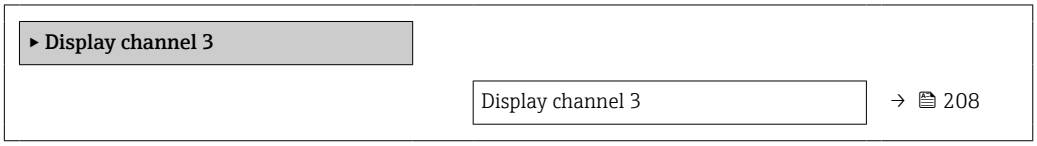
Navigation Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite A process variable is defined in the **Assign channel 2** parameter.

Description See the **Display channel 1** parameter → 207

"Display channel 3" submenu

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



Display channel 3

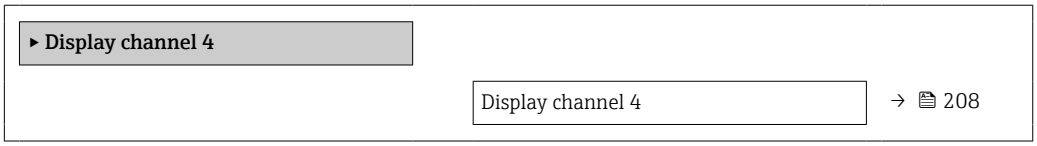
Navigation Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is defined in the **Assign channel 3** parameter.

Description See the **Display channel 1** parameter → 207

"Display channel 4" submenu

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



Display channel 4

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

Prerequisite A process variable is defined in the **Assign channel 4** parameter.

Description See the **Display channel 1** parameter → 207

3.7.12 "Heartbeat" submenu

For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**refer to the Special Documentation for the device → 7

Navigation Expert → Diagnostics → Heartbeat

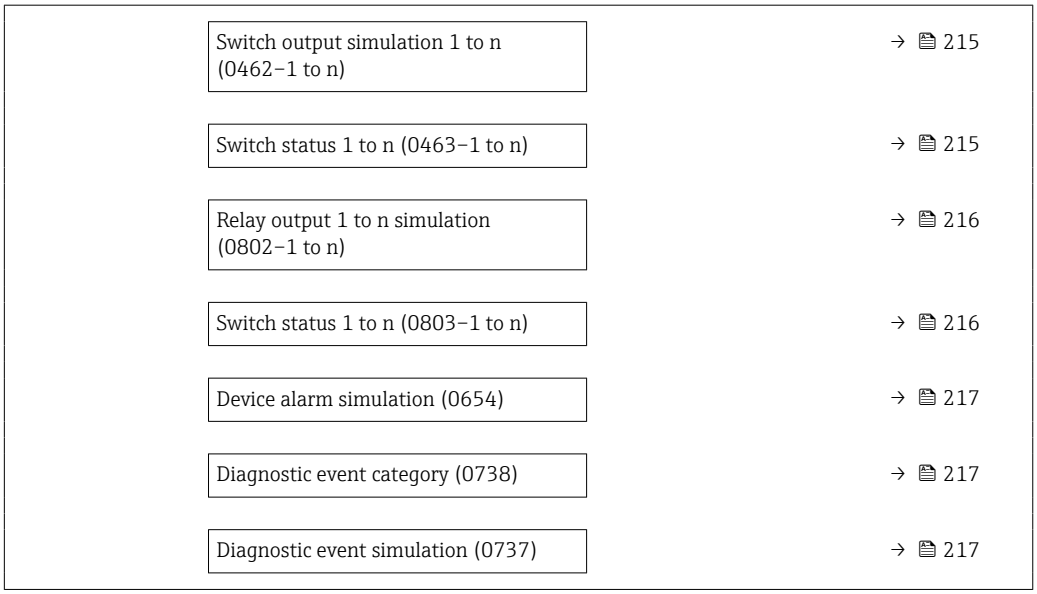
▶ **Heartbeat Technology**

3.7.13 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation

▶ **Simulation**

Assign simulation process variable (1810)	→ 210
Process variable value (1811)	→ 210
Current input 1 to n simulation (1608–1 to n)	→ 211
Value current input 1 to n (1609–1 to n)	→ 211
Status input simulation 1 to n (1355–1 to n)	→ 212
Input signal level 1 to n (1356–1 to n)	→ 212
Current output 1 to n simulation (0354–1 to n)	→ 212
Value current output 1 to n (0355–1 to n)	→ 213
Frequency output simulation 1 to n (0472–1 to n)	→ 213
Frequency value 1 to n (0473–1 to n)	→ 214
Pulse output simulation 1 to n (0458–1 to n)	→ 214
Pulse value 1 to n (0459–1 to n)	→ 215



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
- Temperature
- Mass flow
- Corrected volume flow
- FAD volume flow *
- Volume flow
- Energy flow *
- Heat flow *
- Density
- Flow velocity

Additional information *Description*

The simulation value of the process variable selected is defined in the **Process variable value** parameter (→ 210).

Process variable value

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

Prerequisite A process variable is selected in the **Assign simulation process variable** parameter (→ 210).

* Visibility depends on order options or device settings

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

Additional information *User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 54).

Current input 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)

Description Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

The desired simulation value is defined in the **Value current input 1 to n** parameter.

Selection
- Off
- On

Additional information *Selection*
- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Value current input 1 to n

Navigation Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)

Prerequisite In the **Current input 1 to n simulation** parameter, the **On** option is selected.

Description Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.

User entry 0 to 22.5 mA

Status input simulation 1 to n

Navigation Expert → Diagnostics → Simulation → Status inp.sim 1 to n (1355–1 to n)

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

Selection
- Off
- On

Additional information

Description

The desired simulation value is defined in the **Input signal level** parameter (→ 212).

Selection
- Off
  Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Simulation for the status input is active.

Input signal level 1 to n

Navigation Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)

Prerequisite In the **Status input simulation** parameter (→ 212), the **On** option is selected.

Description Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection
- High
- Low

Current output 1 to n simulation

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

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

Selection
- Off
- On

Additional information *Description*

The desired simulation value is defined in the **Value current output 1 to n** parameter.

Selection

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

Value current output 1 to n

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

Prerequisite In the **Current output 1 to n simulation** parameter, the **On** option is selected.

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

User entry 3.59 to 22.5 mA

Additional information *Dependency*

The input range is dependent on the option selected in the **Current span** parameter (→ 112).

Frequency output simulation 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 119), the **Frequency** option is selected.

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

Selection

- Off
- On

Additional information *Description*

The desired simulation value is defined in the **Frequency value 1 to n** parameter.

Selection

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

Frequency value 1 to n

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

Prerequisite In the **Frequency output simulation 1 to n** parameter, the **On** option is selected.

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

User entry 0.0 to 12 500.0 Hz

Pulse output simulation 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 119), the **Pulse** option is selected.

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

Selection

- Off
- Fixed value
- Down-counting value

Additional information *Description*

The desired simulation value is defined in the **Pulse value 1 to n** parameter.

Selection

- Off
  Pulse simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Fixed value
  Pulses are continuously output with the pulse width specified in the **Pulse width** parameter (→ 121).
- Down-counting value
  The pulses specified in the **Pulse value** parameter (→ 215) are output.

Pulse value 1 to n

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

Prerequisite In the **Pulse output simulation 1 to n** parameter, the **Down-counting value** option is selected.

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

User entry 0 to 65 535

Switch output simulation 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 119), the **Switch** option is selected.

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

Selection
- Off
- On

Additional information

Description

The desired simulation value is defined in the **Switch status 1 to n** parameter.

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

Switch status 1 to n

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

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

Selection
- Open
- Closed

Additional information *Selection*

- Open
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Switch simulation is active.

Relay output 1 to n simulation

Navigation Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

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

Selection

- Off
- On

Additional information *Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

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

Switch status 1 to n

Navigation Expert → Diagnostics → Simulation → Switch status 1 to n (0803–1 to n)

Prerequisite The **On** option is selected in the **Switch output simulation 1 to n** parameter parameter.

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

Selection

- Open
- Closed

Additional information *Selection*

- Open
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Relay simulation is active.

Device alarm simulation

Navigation Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description Use this function to switch the device alarm on and off.

Selection
- Off
- On

Additional information *Description*

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Diagnostic event category

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 (→ 217).

Selection
- Sensor
- Electronics
- Configuration
- 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.

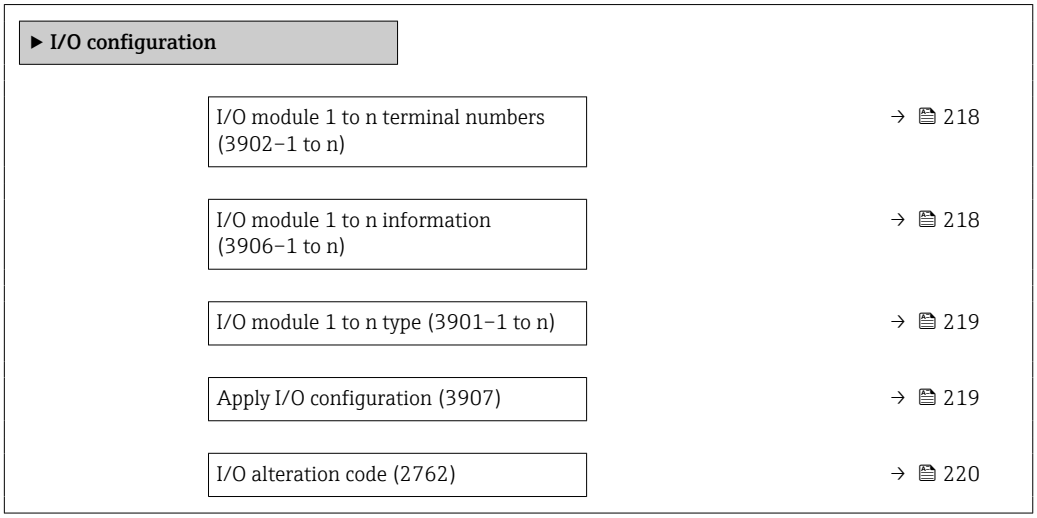
Selection
- Off
- Diagnostic event picklist (depends on the category selected)

Additional information *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Diagnostic event category** parameter (→ 217).

3.8 "I/O configuration" submenu

Navigation Expert → I/O config.



I/O module 1 to n terminal numbers

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

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

User interface
- Not used
- 26-27 (I/O 1)
- 24-25 (I/O 2)
- 22-23 (I/O 3)
- 20-21 (I/O 4) *

I/O module 1 to n information

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

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

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

* Visibility depends on order options or device settings

Additional information

"Not plugged" option

The I/O module is not plugged in.

"Invalid" option

The I/O module is not plugged correctly.

"Not configurable" option

The I/O module is not configurable.

"Configurable" option

The I/O module is configurable.

"Fieldbus" option

The I/O module is configured for HART.

I/O module 1 to n type

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

Prerequisite

For the following order code:
- "Output; input 2", option **D** "Configurable I/O initial setting off"
- "Output; input 3", option **D** "Configurable I/O initial setting off"
- "Output; input 4", option **D** "Configurable I/O initial setting off"

Description

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

Selection

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

Apply I/O configuration

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

Description

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

Selection

- No
- Yes

* Visibility depends on order options or device settings

I/O alteration code

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

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

User entry Positive integer

Additional information *Description*

The I/O configuration is changed in the **I/O module type** parameter (→ 219).

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Volume flow	**m³/h** option
Volume	**m³** option
Mass flow	**kg/h** option
Mass	**kg** option
Corrected volume flow	**Nm³/h** option
Corrected volume	**Nm³** option
FAD volume flow	**m³ FAD/h** option
FAD volume	**m³ FAD** option
Density	**kg/m³** option
Reference density	kg/Nm³
Temperature	**°C** option
Length	**mm** option
Pressure	**bar a** option

4.1.2 Full scale values

The full scale values depend on the medium type, nominal diameter and rectifier.

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

4.1.3 Output current span

Current output 1 to n	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.

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Volume flow	**ft³/h** option
Volume	**ft³** option
Mass flow	**lb/h** option

Mass	**lb** option
Corrected volume flow	**Sft³/min** option
Corrected volume	**Sft³** option
FAD volume flow	ft³ FAD/h
FAD volume	ft³ FAD
Density	**lb/ft³** option
Reference density	lb/Sft³
Temperature	**°F** option
Length	**in** option
Pressure	**psi a** option

4.2.2 Full scale values

The full scale values depend on the medium type, nominal diameter and rectifier.

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

4.2.3 Output current span

Current output 1 to n	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.

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Density	g/cm³	Gram/volume unit
	kg/l, kg/dm³, kg/m³	Kilogram/volume unit
Pressure	kPa a, MPa a	Kilopascal, megapascal (absolute)
	bar	Bar
	mbar a	Millibar (absolute)
FAD volume	l FAD, m³ FAD	FAD liter, FAD cubic meter
FAD volume flow	l FAD/s, l FAD/min, l FAD/h, l FAD/d	FAD liter/time unit
	m³ FAD/s, m³ FAD/min, m³ FAD/h, m³ FAD/d	FAD cubic meter/time unit
Length	mm, m	Millimeter, meter
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
Corrected volume	Nl, Nm³, Sl, Sm³	Normal liter, normal cubic meter, standard liter, standard cubic meter
Corrected volume flow	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm³/s, Nm³/min, Nm³/h, Nm³/d	Normal cubic meter/time unit
	Sl/s, Sl/min, Sl/h, Sl/d	Standard liter/time unit
	Sm³/s, Sm³/min, Sm³/h, Sm³/d	Standard cubic meter/time unit
Temperature	°C, K	Celsius, Kelvin
Volume	m³	Cubic meters
Volume flow	m³/s, m³/min, m³/h, m³/d	Cubic meter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Density	lb/ft³	Pound/cubic foot
FAD volume	ft³ FAD	FAD cubic foot
FAD volume flow	cf FAD/s, cf FAD/min, cf FAD/h, cf FAD/d	FAD cubic foot/time unit
FAD volume flow	ft³ FAD/s, ft³ FAD/min, ft³ FAD/h, ft³ FAD/d,	FAD cubic foot/time unit
Length	in, ft	Inch, foot
Mass	lb, ton	Pound, standard ton
lb/s, lb/min, lb/h, lb/d	Pound/time unit	

Process variable	Units	Explanation
STon/s, STon/min, STon/h, STon/d	Standard ton/time unit	
Mass flow	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	ton/s, ton/min, ton/h, ton/d	Standard ton/time unit
Corrected volume	Sft^3	Standard cubic foot
Corrected volume flow	Sft^3/s, Sft^3/min, Sft^3/h, Sft^3/d	Standard cubic foot/time unit
Temperature	°F, °R	Fahrenheit, Rankine
Volume	ft^3	Cubic foot
Volume flow	ft^3/s, ft^3/min, ft^3/h, ft^3/d	Cubic foot/time unit
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

Index

E

N

O

P

Q

R

S

T

U

V

W

Z

www.addresses.endress.com

Endress+Hauser

People for Process Automation