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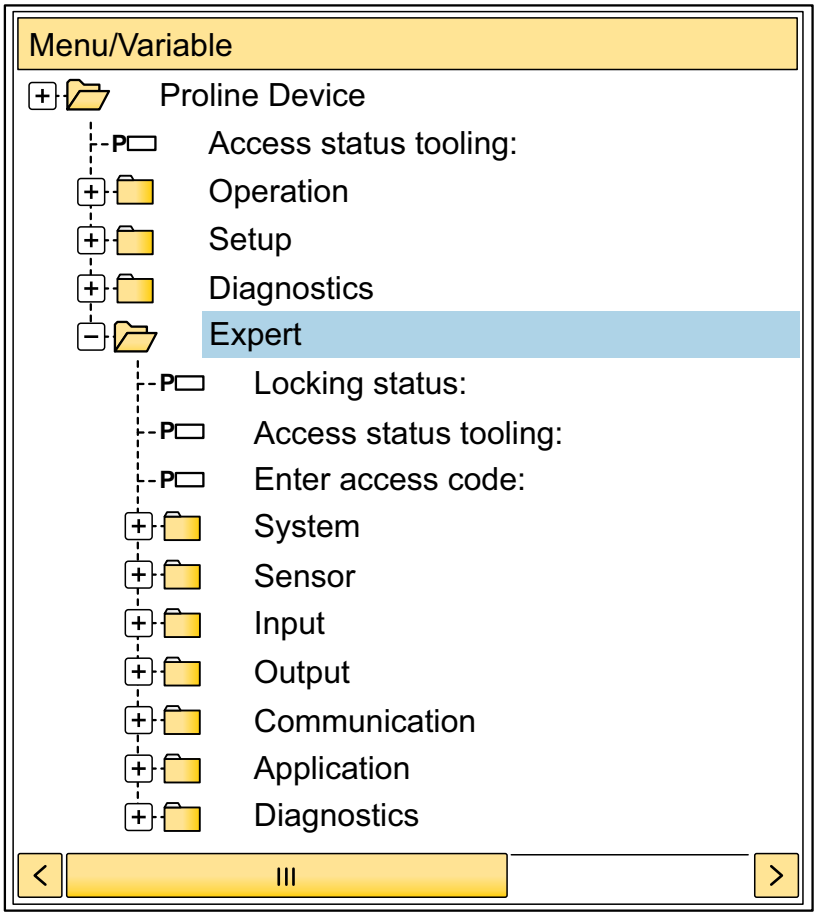
Valid as of version
01.01.zz (Device firmware)

Description of Device Parameters
Proline Cubemass 300
PROFINET

Coriolis flowmeter



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1 About this document

1.1 Document function

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

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

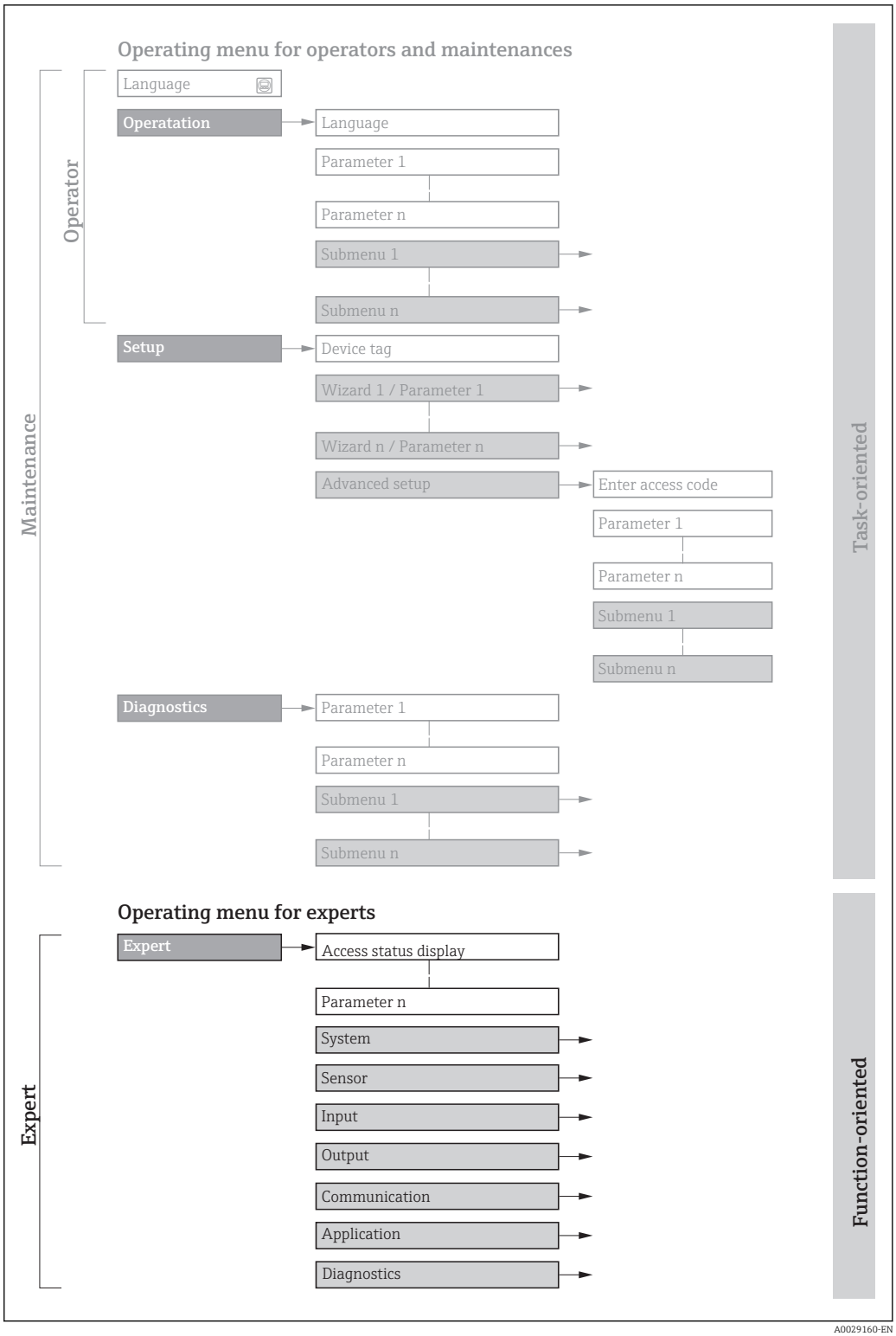
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



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

Additional information regarding:
- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions → 7
- Operating concept of the operating menus: Operating Instructions → 7

1.3.2 Structure of a parameter description

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

Complete parameter name	Write-protected parameter

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

Prerequisite
The parameter is only available under these specific conditions

Description
Description of the parameter function

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

User entry
Input range for the parameter

User interface
Display value/data for the parameter

Factory setting
Default setting ex works

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

1.4 Symbols used

1.4.1 Symbols for certain types of information

Symbol	Meaning
	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
Cubemass C 300	BA01737D

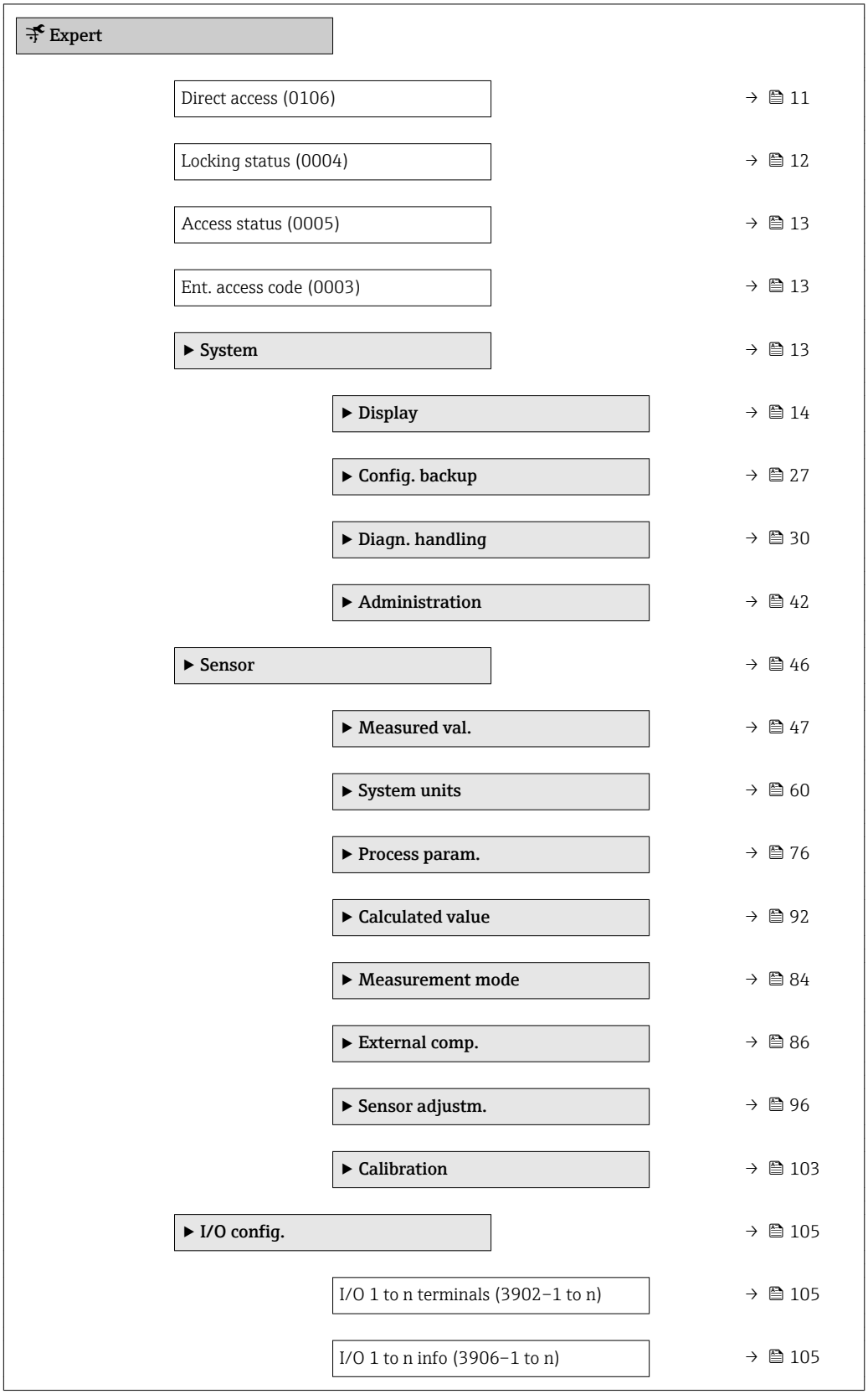
1.5.2 Supplementary device-dependent documentation

Special documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Remote display and operating module DKX001	SD01763D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD01973D
Heartbeat Technology	SD01990D
Concentration measurement	SD02009

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 1 to n type (3901–1 to n) → 106

Apply I/O config (3907) → 106

I/O alterat.code (2762) → 107

▶ Input → 107

▶ Current input 1 to n → 107

▶ Status input 1 to n → 110

▶ Output → 112

▶ Curr.output 1 to n → 112

▶ PFS output 1 to n → 127

▶ Relay output 1 to n → 148

▶ Communication → 155

▶ PROFINET config. → 156

▶ PROFINET info → 157

▶ Web server → 161

▶ WLAN settings → 164

▶ Application → 178

Reset all tot. (2806) → 178

▶ Totalizer 1 to n → 179

▶ Concentration → 183

▶ Petroleum → 184

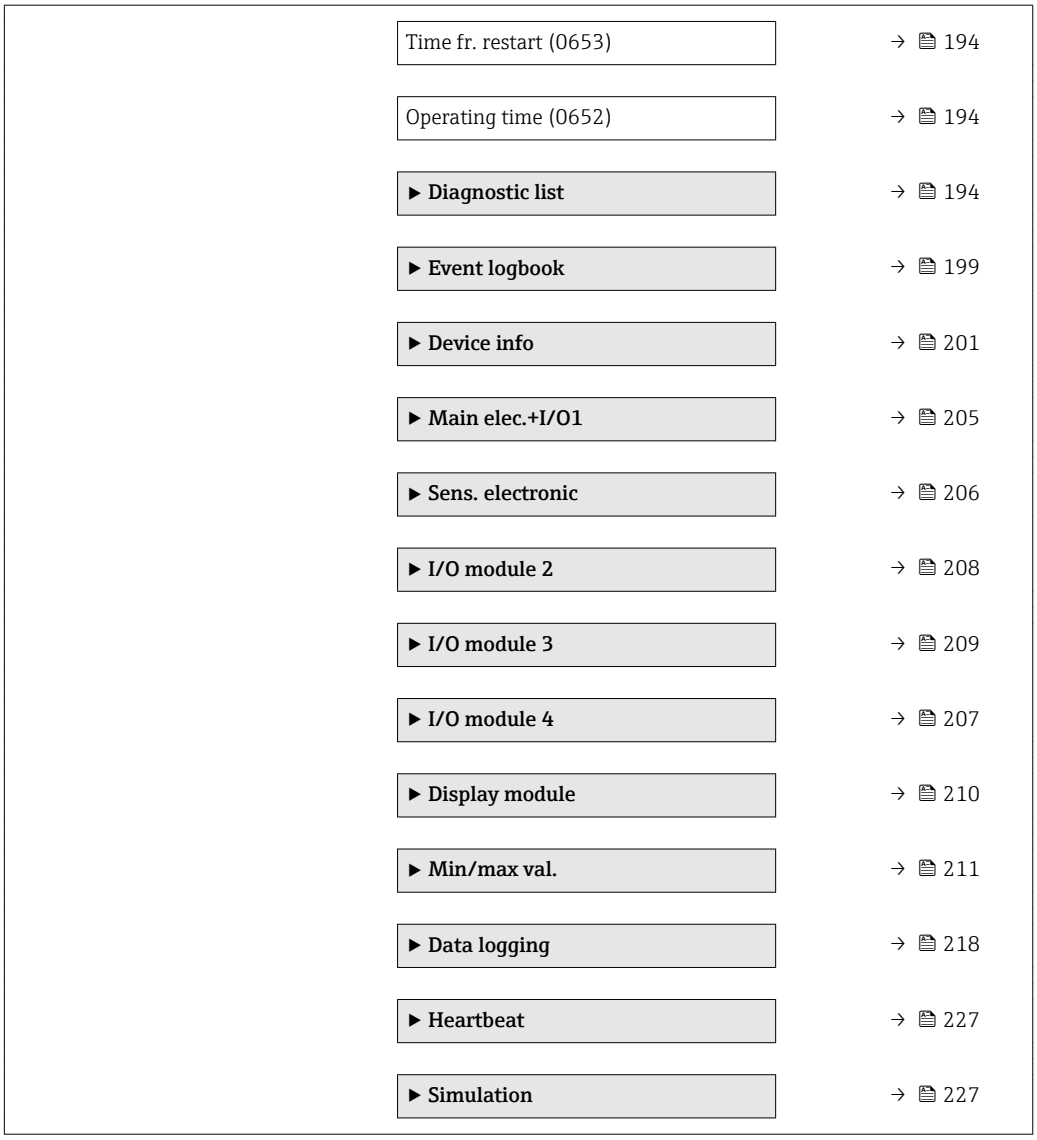
▶ Appl.spec. calc. → 184

▶ Medium index → 190

▶ Diagnostics → 191

Actual diagnos. (0691) → 192

Prev.diagnostics (0690) → 193


Time fr. restart (0653)
→ 194
Operating time (0652)
→ 194
▶ Diagnostic list
→ 194
▶ Event logbook
→ 199
▶ Device info
→ 201
▶ Main elec.+I/O1
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▶ Sens. electronic
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▶ I/O module 3
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▶ I/O module 4
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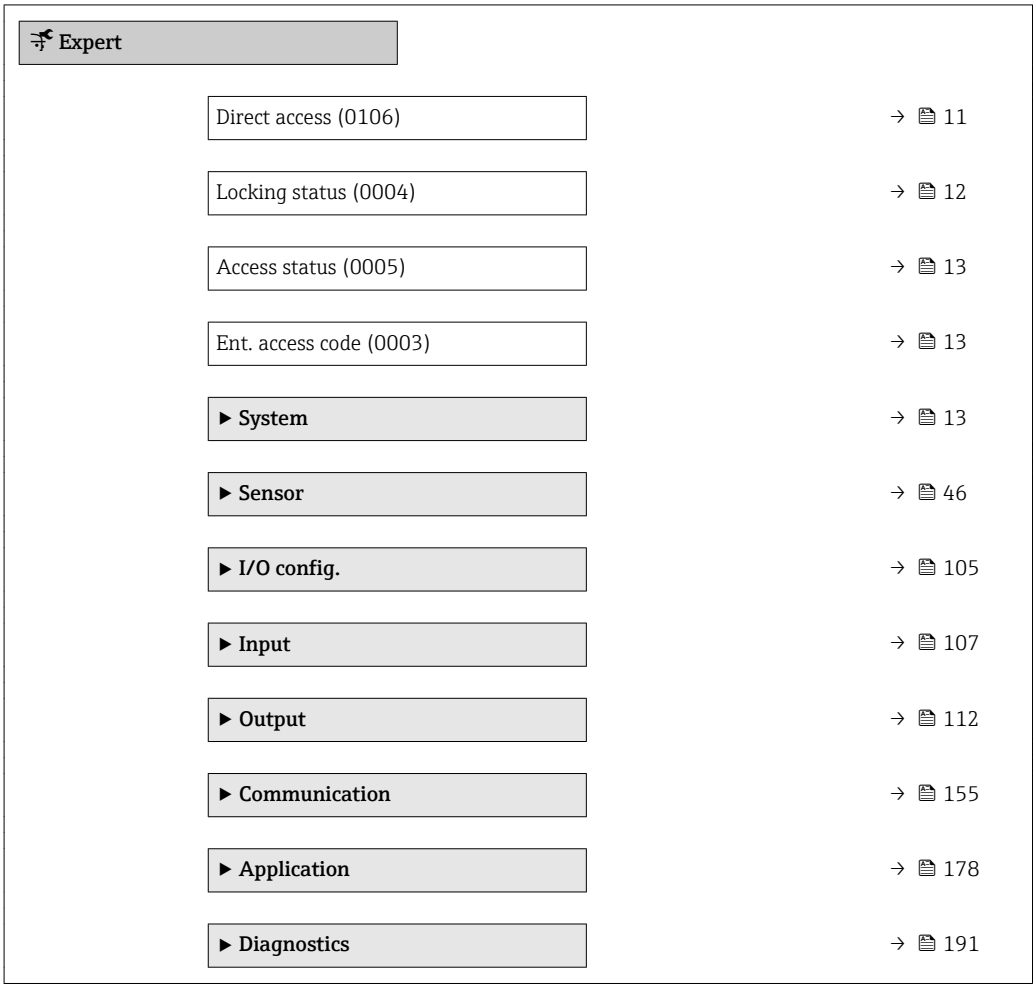
▶ Display module
→ 210
▶ Min/max val.
→ 211
▶ Data logging
→ 218
▶ Heartbeat
→ 227
▶ Simulation
→ 227

3 Description of Device Parameters

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



Direct access

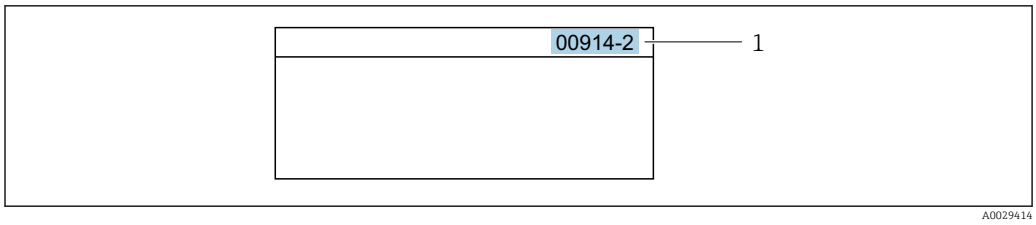
Navigation Expert → Direct access (0106)

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

User entry 0 to 65 535

Additional information *User entry*

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



1 Direct access code

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

Locking status

Navigation Expert → Locking status (0004)

Description Displays the active write protection.

User interface
- Hardware locked
- Temp. locked

Additional information

Display

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

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

Selection

Options	Description
None	The access status displayed in the **Access status** parameter (→ 13) applies . Only appears on local display.
Hardware locked (priority 1)	The DIP switch for hardware locking is activated on the PCB board. This locks write access to the parameters (e.g. via local display or operating tool) .
Temp. locked	Write access to the parameters is temporarily locked on account of internal processes running in the device (e.g. data upload/download, reset etc.). Once the internal processing has been completed, the parameters can be changed once again.

Access status

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

Factory setting Maintenance

Additional information *Description*

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

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

Display

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

Ent. access code

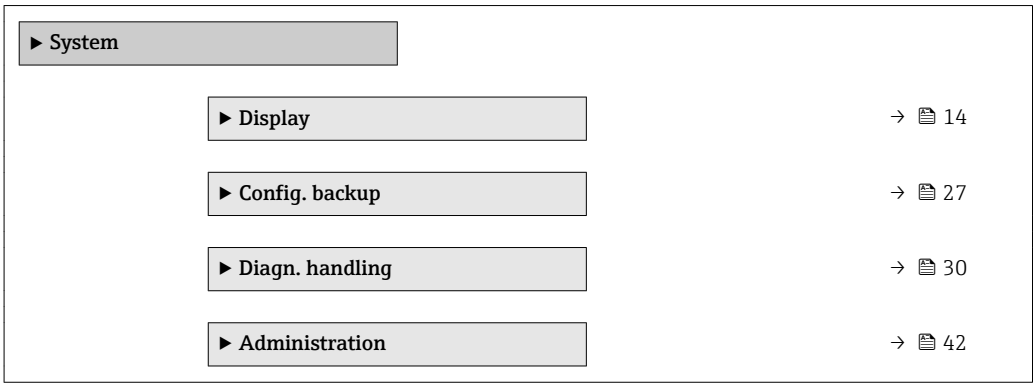
Navigation Expert → Ent. access code (0003)

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

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

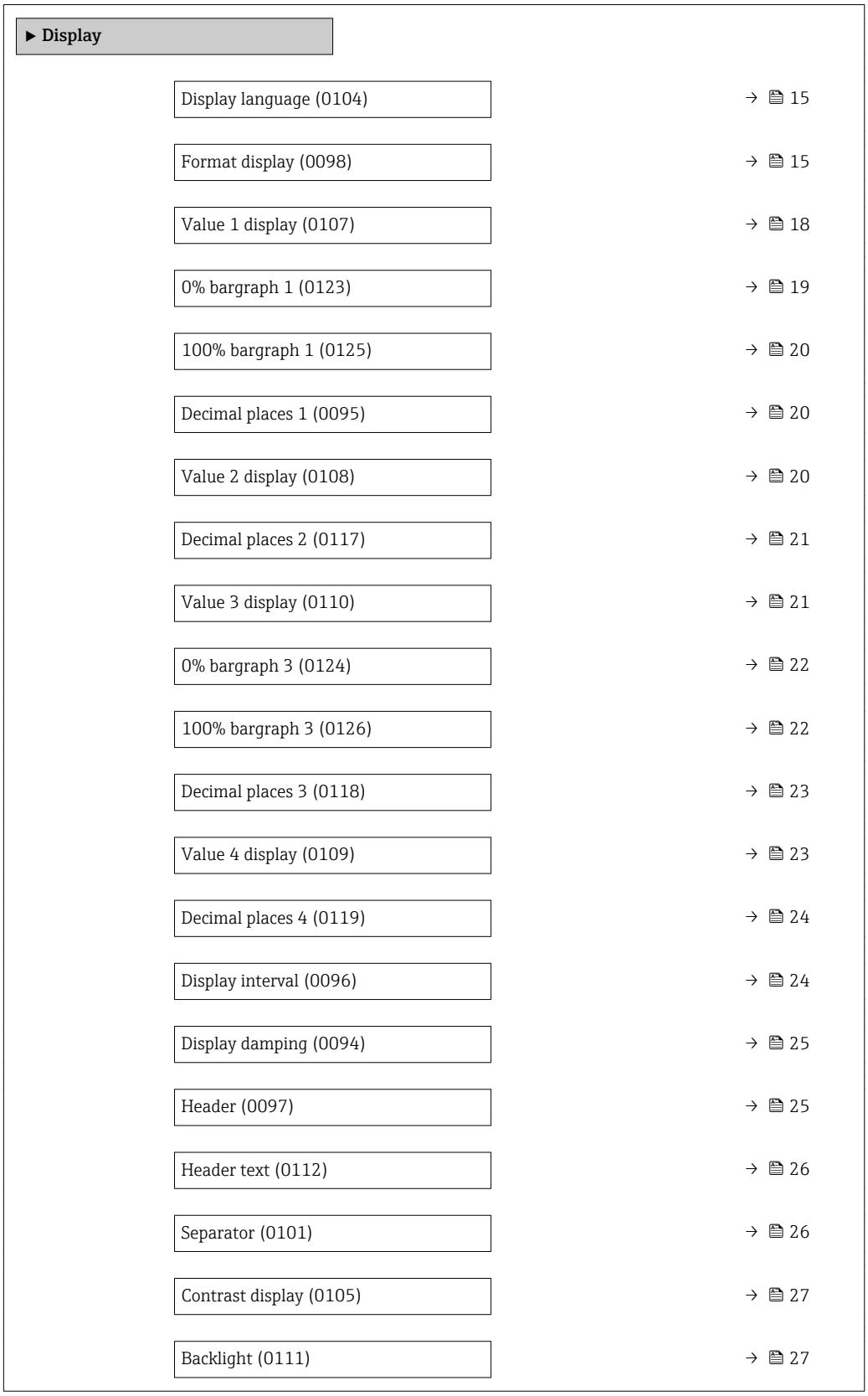
3.1 "System" submenu

Navigation Expert → System



3.1.1 "Display" submenu

Navigation Expert → System → Display



Display language

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

Prerequisite A local display is provided.

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

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

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

Format display

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

Prerequisite A local display is provided.

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

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

Factory setting 1 value, max.

* Visibility depends on order options or device settings

Additional information

Description

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

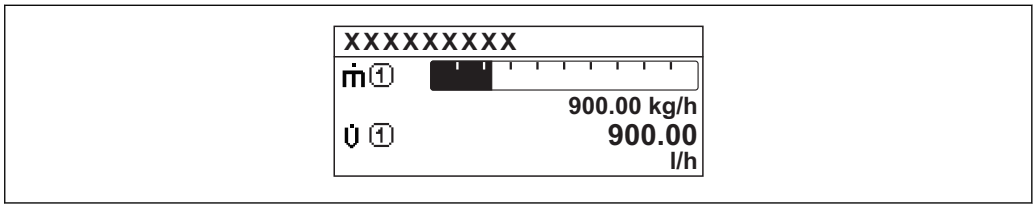
- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 23) are used to specify which measured values are shown on the local display and in what order.
- If more measured values are specified than the display mode selected permits, then the values alternate on the device display. The display time until the next change is configured via the **Display interval** parameter (→ 24).

Possible measured values shown on the local display:

"1 value, max." option

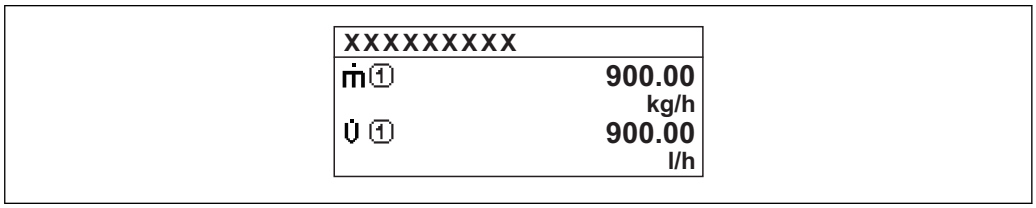
A0013099

"Bargr. + 1 value" option



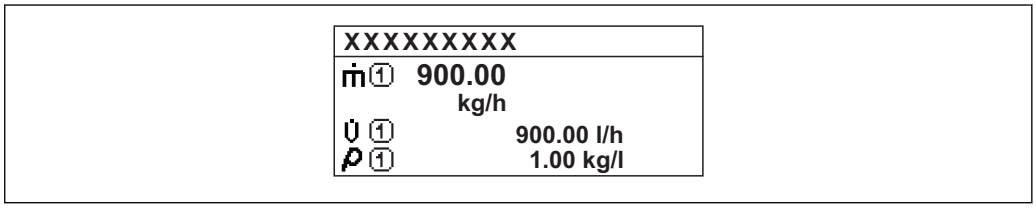
A0013098

"2 values" option



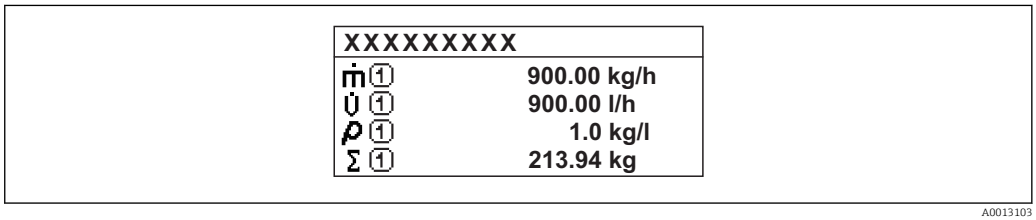
A0013100

"Val. large+2val." option



A0013102

"4 values" option



A0013103

Value 1 display

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

Prerequisite A local display is provided.

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

Selection
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density *
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0 *
- Osc. damping 0 *
- Osc.damp.fluct 0 *
- Signal asymmetry *
- Exc. current 0 *
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Curr.output 1 *
- Curr.output 2 *
- Curr.output 3 *
- Pressure
- Spec. output 1 *
- Index inh.medium
- Spec. output 0 *
- Index sus.bubble *

Factory setting Mass flow

* Visibility depends on order options or device settings

Additional information

Description

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

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

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

Selection

- **Oscil. frequency** option
  Displays the current oscillation frequency of the measuring tubes. This frequency depends on the density of the medium.
- **Oscil. amplitude** option
  Displays the relative oscillation amplitude of the measuring tubes in relation to the preset value. This value is 100 % under optimum conditions.
- **Oscil. damping** option
  Displays the current oscillation damping. Oscillation damping is an indicator of the sensor's current need for excitation power.
- **Signal asymmetry** option
  Displays the relative difference between the oscillation amplitude at the inlet and outlet of the sensor. The measured value is the result of production tolerances of the sensor coils and should remain constant over the life time of a sensor.

0% bargraph 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

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

Additional information

Description

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

100% bargraph 1

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

Prerequisite A local display is provided.

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter → 237

Additional information

Description

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

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

Factory setting x.xx

Additional information

Description

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

Value 2 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 2 display** parameter (→ 20)

Factory setting None

Additional information *Description*

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

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

Dependency

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

Decimal places 2

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Value 3 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 2 display** parameter (→ 20)

Factory setting None

Additional information

Description

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

0% bargraph 3

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

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

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

User entry Signed floating-point number

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

Additional information

Description

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

100% bargraph 3

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

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

User entry

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

Decimal places 3

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

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

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

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

Factory setting x.xx

Additional information *Description*

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

Value 4 display

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

Prerequisite A local display is provided.

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

Selection For the picklist, see the **Value 2 display** parameter (→ 20)

Factory setting None

Additional information *Description*

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

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

Selection

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

Decimal places 4

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

Prerequisite A measured value is specified in the **Value 4 display** parameter (→ 23).

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

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

Factory setting x.xx

Additional information *Description*

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

Display interval

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

Prerequisite A local display is provided.

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

User entry 1 to 10 s

Factory setting 5 s

Additional information *Description*

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

- The **Value 1 display** parameter (→ 18) to **Value 4 display** parameter (→ 23) are used to specify which measured values are shown on the local display.
- The display format of the displayed measured values is specified using the **Format display** parameter (→ 15).

Display damping

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

Prerequisite A local display is provided.

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

User entry 0.0 to 999.9 s

Factory setting 0.0 s

Additional information *User entry*

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

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

Header

Navigation Expert → System → Display → Header (0097)

Prerequisite A local display is provided.

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

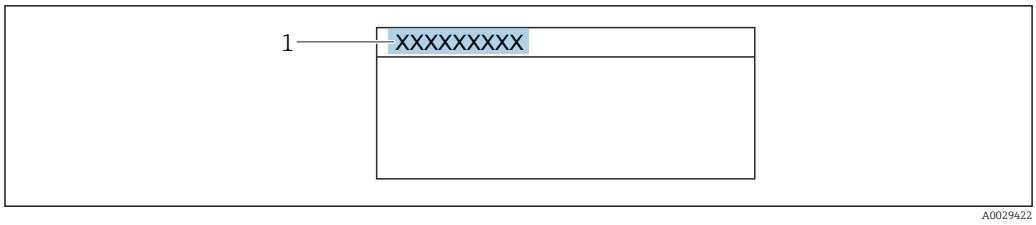
Selection
- Device tag
- Free text

Factory setting Device tag

Additional information *Description*

The header text only appears during normal operation.

1) proportional transmission behavior with first order delay



1 Position of the header text on the display

Selection

- Device tag
  Is defined in the **Device tag** parameter (→ 202).
- Free text
  Is defined in the **Header text** parameter (→ 26).

Header text

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

Prerequisite In the **Header** parameter (→ 25), the **Free text** option is selected.

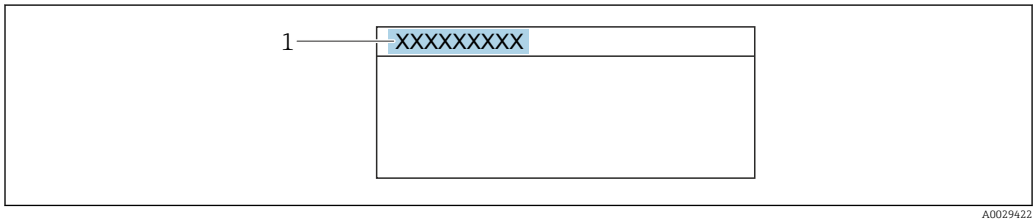
Description Use this function to enter a customer-specific text for the header of the local display.

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

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

Additional information *Description*

The header text only appears during normal operation.



1 Position of the header text on the display

User entry

The number of characters displayed depends on the characters used.

Separator

Navigation Expert → System → Display → Separator (0101)

Prerequisite A local display is provided.

Description Use this function to select the decimal separator.

Selection
- . (point)
- , (comma)

Factory setting . (point)

Contrast display

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

Prerequisite A local display is provided.

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

User entry 20 to 80 %

Factory setting Depends on the display

Backlight

Navigation Expert → System → Display → Backlight (0111)

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"
- Order code for "Display; operation", option **O** "Separate 4-line display, illum.; 10m/30ft cable; touch control"

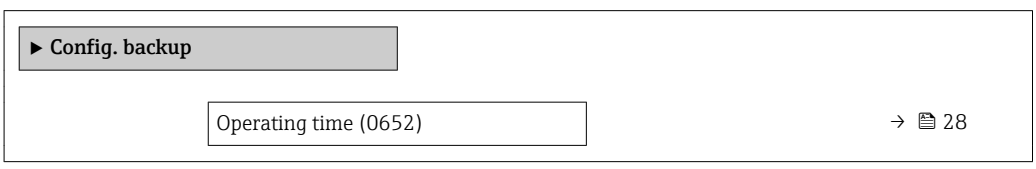
Description Use this function to switch the backlight of the local display on and off.

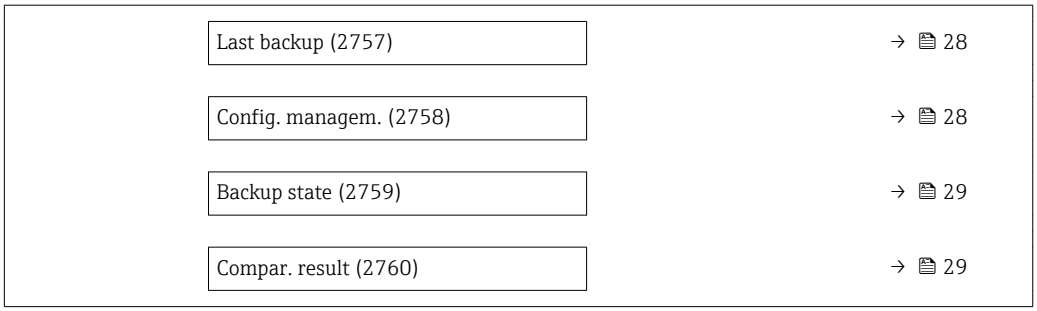
Selection
- Disable
- Enable

Factory setting Enable

3.1.2 "Configuration backup" submenu

Navigation 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)

Config. managem.

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

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

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

Factory setting Cancel

* Visibility depends on order options or device settings

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 **Compar. result** parameter.
Clear backup	The backup copy of the device configuration is deleted from the memory of the device. The following message appears on local display: Deleting file

HistoROM

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

Backup state

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

Description Displays the status of the data backup process.

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

Factory setting None

Compar. result

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

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

User interface
- Set. identical
- Set. not ident.
- No backup

- Backup corrupt
- Check not done
- Dataset incomp.

Factory setting Check not done

Additional information *Description*

The comparison is started via the **Compare** option in the **Config. managem.** parameter (→ 28).

Selection

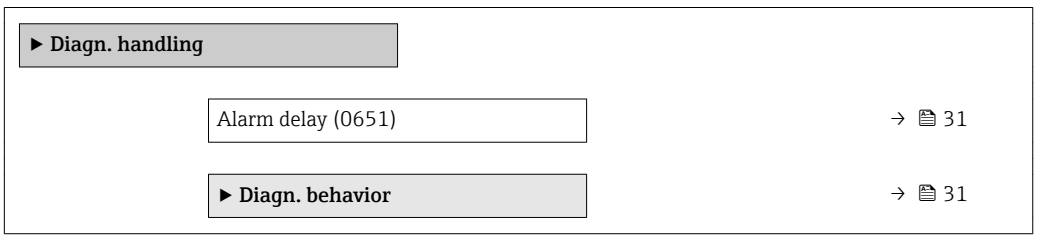
Options	Description
Set. identical	The current device configuration of the HistoROM is identical to the backup copy in the device memory. If the transmitter configuration of another device has been transmitted to the device via HistoROM in the **Config. managem.** parameter, the current device configuration of the HistoROM is only partially identical to the backup copy in the device memory: The settings for the transmitter are not identical.
Set. not ident.	The current device configuration of the HistoROM is not identical to the backup copy in the device memory.
No backup	There is no backup copy of the device configuration of the HistoROM in the device memory.
Backup corrupt	The current device configuration of the HistoROM is corrupt or not compatible with the backup copy in the device memory.
Check not done	The device configuration of the HistoROM has not yet been compared to the backup copy in the device memory.
Dataset incomp.	The backup copy in the device memory is not compatible with the device.

HistoROM

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

3.1.3 "Diagn. handling" submenu

Navigation Expert → System → Diagn. handling



Alarm delay

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

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

The diagnostic message is reset without a time delay.

User entry 0 to 60 s

Factory setting 0 s

Additional information *Result*

This setting affects the following diagnostic messages:
- 046 Sensor limit
- 140 Sensor sig.asym.
- 144 MeasErrorTooHigh
- 830 Sensor temp.
- 831 Sensor temp.
- 832 Electronic temp.
- 833 Electronic temp.
- 834 Process temp.
- 835 Process temp.
- 843 Process limit
- 862 Partly filled
- 912 Medium inhomog.
- 913 Medium unsuitab.
- 944 MonitoringFailed

"Diagn. behavior" submenu

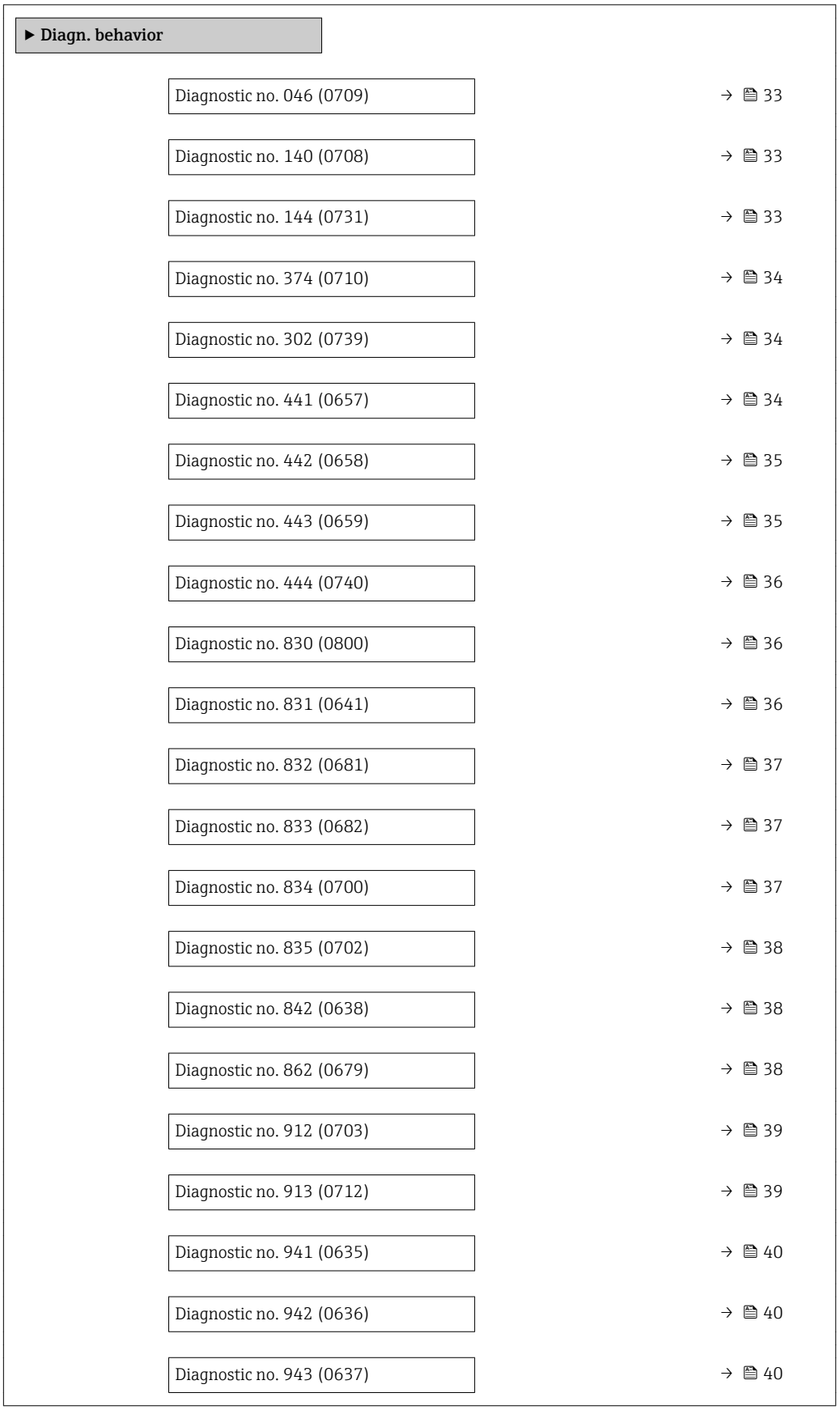
Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagn. behavior** submenu (→ 31).

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

Diagnostic behavior	Description
Alarm	The device stops measurement. The totalizers assume the defined alarm condition. A diagnostic message is generated.
Warning	The device continues to measure. The measured value output via PROFINET and the totalizers are not affected. A diagnostic message is generated.
Logbook only	The device continues to measure. The diagnostic message is displayed only in the **Event logbook** submenu (→ 199) (**Event list** submenu (→ 200)) and not in alternation with the operational display.
Off	The diagnostic event is ignored, and no diagnostic message is generated or entered.

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

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



Diagnostic no. 944 (0732)	→ 41
Diagnostic no. 948 (0744)	→ 41

Diagnostic no. 046 (Sensor limit)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 046 (0709)

Description Use this function to change the diagnostic behavior of the diagnostic message **046 Sensor limit**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Alarm

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 140 (Sensor sig.asym.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 140 (0708)

Description Use this function to change the diagnostic behavior of the diagnostic message **140 Sensor sig.asym.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Alarm

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 144 (MeasErrorTooHigh)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 144 (0731)

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Alarm

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 374 (Sensor electron.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 374 (0710)

Description Use this function to change the diagnostic behavior of the diagnostic message **374 Sensor electron.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 302 (Verific. active)

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

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

Selection
- Alarm
- Warning

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 442 (Freq. output 1 to n)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 443 (Pulse output 1 to n)

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

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

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 Option for changing the diagnostic behavior of the diagnostic message **444 Current input 1 to n**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 830 (Sensor temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 830 (0800)

Description Use this function to change the diagnostic behavior of the diagnostic message **830 Sensor temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 831 (Sensor temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 831 (0641)

Description Use this function to change the diagnostic behavior of the diagnostic message **831 Sensor temp.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 832 (Electronic temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 832 (0681)

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Logbook only

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 833 (Electronic temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 833 (0682)

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Logbook only

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 834 (Process temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 834 (0700)

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 835 (Process temp.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 835 (0702)

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 842 (Process limit)

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

Description Option for changing the diagnostic behavior of the diagnostic message ⚠**S842 Process limit**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Off

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 862 (Empty pipe)

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

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

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 912 (Medium inhomog.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 912 (0703)

Description Use this function to change the diagnostic behavior of the diagnostic message **912 Medium inhomog.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 913 (Medium unsuitab.)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 913 (0712)

Description Use this function to change the diagnostic behavior of the diagnostic message **913 Medium unsuitab.**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 941 (API temperature)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 941 (0635)

Prerequisite For the following order code:
"Application package", option EJ "Petroleum"

Description Use this function to change the diagnostic behavior of the diagnostic message **API temperature**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 942 (API density)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 942 (0636)

Prerequisite For the following order code:
"Application package", option EJ "Petroleum"

Description Use this function to change the diagnostic behavior of the diagnostic message **API density**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 943 (API pressure)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 943 (0637)

Prerequisite For the following order code:
"Application package", option EJ "Petroleum"

Description Use this function to change the diagnostic behavior of the diagnostic message **API pressure**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 944 (MonitoringFailed)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 944 (0732)

Description Use this function to change the diagnostic behavior of the diagnostic message **944 MonitoringFailed**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

Diagnostic no. 948 (Oscill. damping)

Navigation Expert → System → Diagn. handling → Diagn. behavior → Diagnostic no. 948 (0744)

Description Use this function to change the diagnostic behavior of the diagnostic message **948 Oscill. damping**.

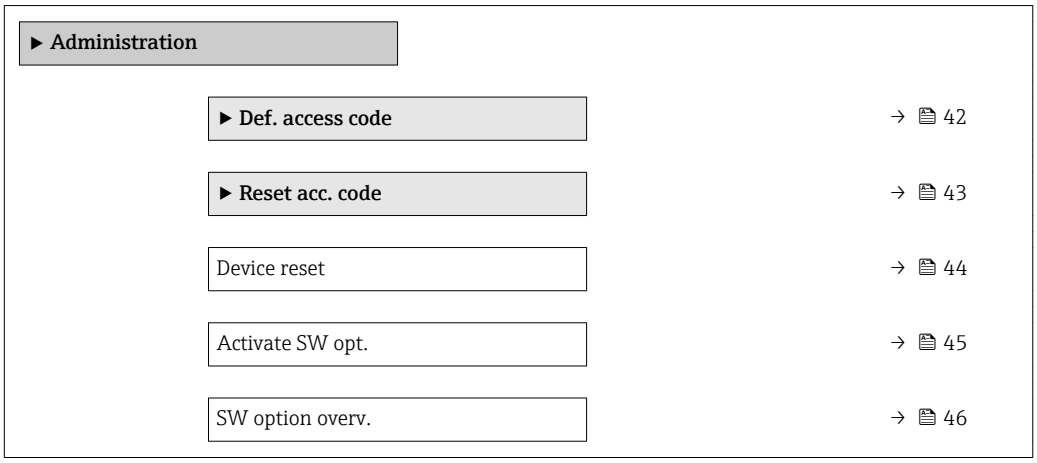
Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection: → 31

3.1.4 "Administration" submenu

Navigation Expert → System → Administration

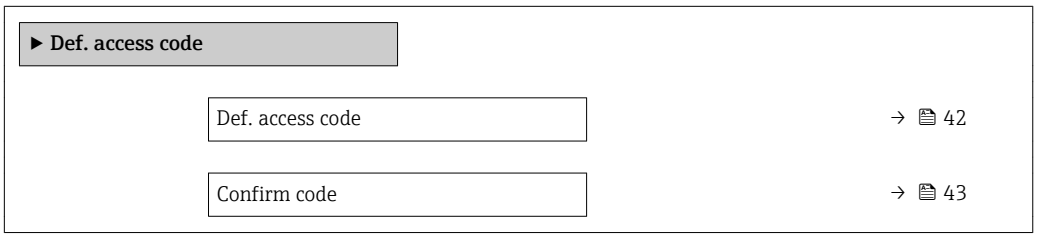


"Def. access code" wizard

The **Def. access code** wizard (→ 42) is only available when operating via the local display or Web browser.

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

Navigation Expert → System → Administration → Def. access code



Def. access code

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

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

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

Additional information *Description*

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

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

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

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

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

User entry

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

Factory setting

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

Confirm code

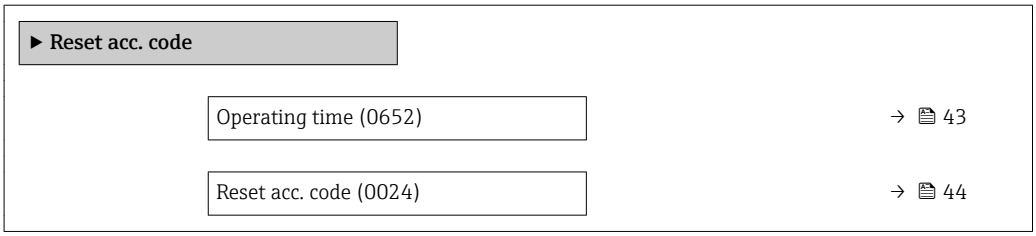
Navigation Expert → System → Administration → Def. access code → Confirm code

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

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

"Reset access code" submenu

Navigation Expert → System → Administration → Reset acc. code



Operating time

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

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

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

Additional information *User interface*

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

Reset acc. code

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

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

User entry Character string comprising numbers, letters and special characters

Factory setting 0x00

Additional information *Description*

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

User entry

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

Additional parameters in the "Administration" submenu

Device reset

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

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

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

Factory setting Cancel

Additional information *Selection*

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

* Visibility depends on order options or device settings

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

Activate SW opt.

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

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

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

Factory setting Depends on the software option ordered

Additional information

Description

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

User entry

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

NOTE!

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

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

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

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

▸ Once the activation code has been entered, check if the new software option is displayed in the **SW option overv.** parameter (→ 46).

↳ The new software option is active if it is displayed.

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

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

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

Example for a software option

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Web browser

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

SW option overv.

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

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

User interface
- Extend. HistoROM *
- HBT Monitoring *
- Appl.spec. calc.
- HBT Verification *
- Concentration *

Additional information

Description

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

"Extend. HistoROM" option

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

"HBT Verification" option and "HBT Monitoring" option

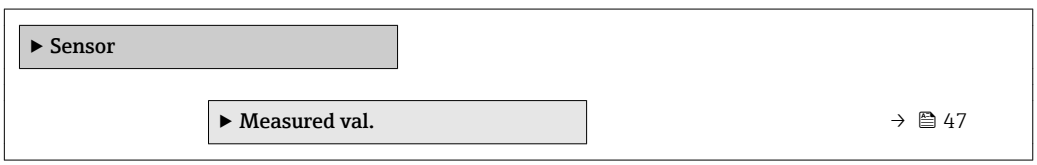
Order code for "Application package", option EB "Heartbeat Verification + Monitoring"

"Concentration" option

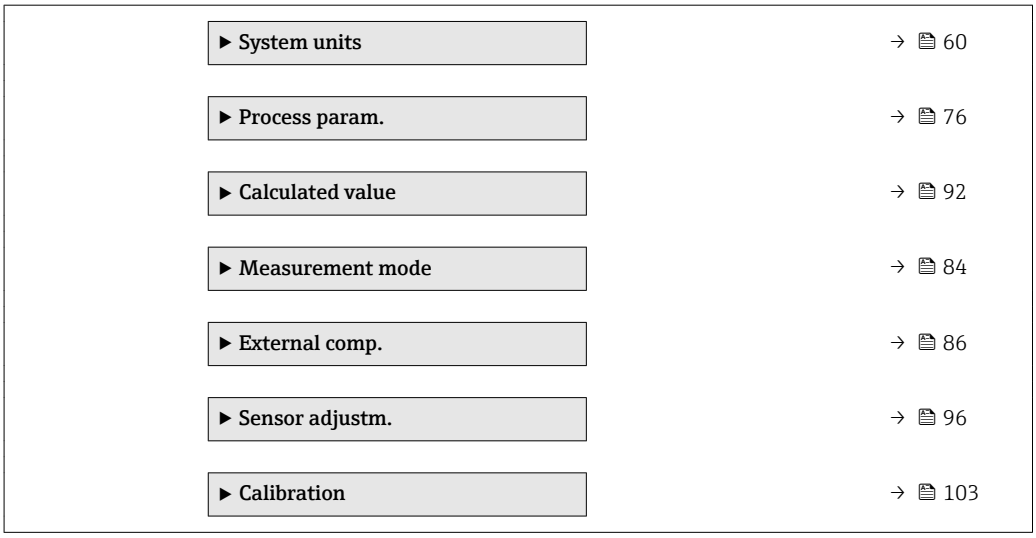
Order code for "Application package", option ED "Concentration"

3.2 "Sensor" submenu

Navigation Expert → Sensor

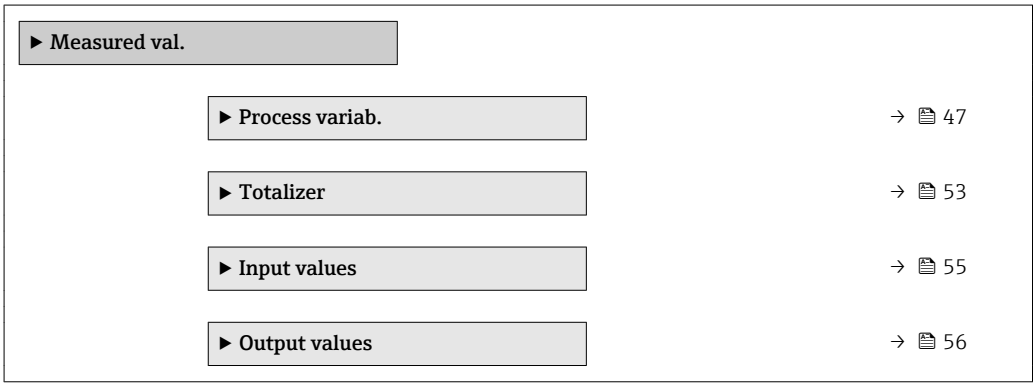


* Visibility depends on order options or device settings



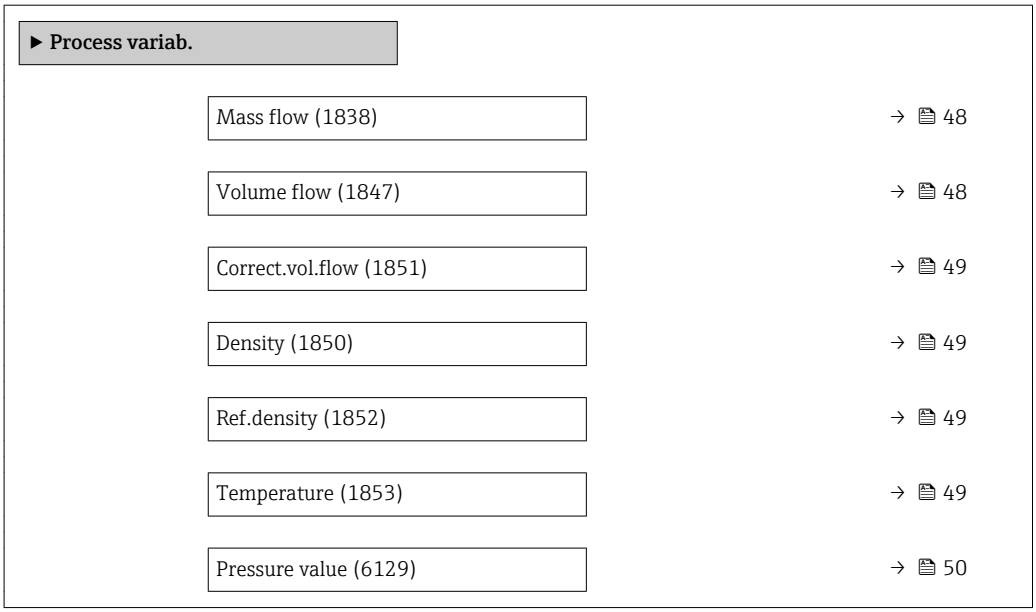
3.2.1 "Measured values" submenu

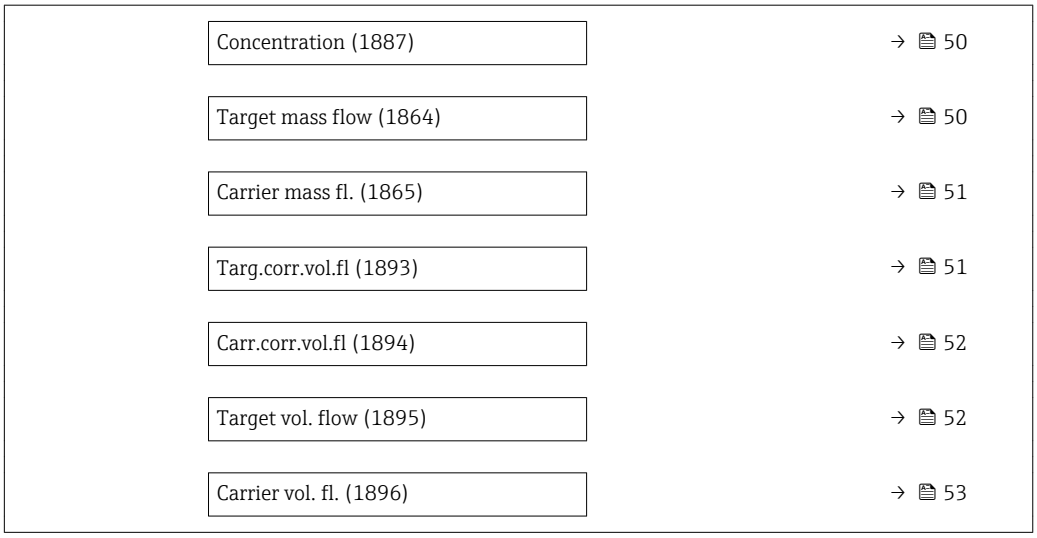
Navigation Expert → Sensor → Measured val.



"Process variab." submenu

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





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 (→ 60)

Volume flow

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

Description Displays the volume flow currently calculated.

User interface Signed floating-point number

Additional information *Description*

The volume flow is calculated from the mass flow currently measured and the density currently measured.

Dependency

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

Correct.vol.flow

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

Description Displays the corrected volume flow that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Cor.volflow unit** parameter (→ 64)

Density

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

Description Displays the density that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Density unit** parameter (→ 65)

Ref.density

Navigation Expert → Sensor → Measured val. → Process variab. → Ref.density (1852)

Description Displays the reference density that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 66)

Temperature

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

Description Displays the medium temperature that is currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

Pressure value

Navigation Expert → Sensor → Measured val. → Process variab. → Pressure value (6129)

Description Displays the fixed or external pressure value.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Pressure unit** parameter (→ 67)

Concentration

Navigation Expert → Sensor → Measured val. → Process variab. → Concentration (1887)

Prerequisite For the following order code:
Order code for "Application package", option **ED** "Concentration"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Displays the concentration that is currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Concentr. unit** parameter (0613).

Target mass flow

Navigation Expert → Sensor → Measured val. → Process variab. → Target mass flow (1864)

Prerequisite With the following conditions:
Order code for "Application package", option **ED** "Concentration"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Displays the mass flow that is currently measured for the target medium.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 60)

Carrier mass fl.

Navigation Expert → Sensor → Measured val. → Process variab. → Carrier mass fl. (1865)

Prerequisite With the following conditions:
Order code for "Application package", option **ED** "Concentration"

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Displays the mass flow that is currently measured for the carrier medium.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Mass flow unit** parameter (→ 60)

Targ.corr.vol.fl

Navigation Expert → Sensor → Measured val. → Process variab. → Targ.corr.vol.fl (1893)

Prerequisite With the following conditions:
- Order code for "Application package", option **ED** "Concentration"
- The **Ethanol in water** option or **%mass / %volume** option is selected in the **Liquid type** parameter.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Displays the corrected volume flow that is currently measured for the target fluid.

User interface Signed floating-point number

Additional information *Dependency*

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

Carr.corr.vol.fl

Navigation Expert → Sensor → Measured val. → Process variab. → Carr.corr.vol.fl (1894)

Prerequisite

With the following conditions:
- Order code for "Application package", option **ED** "Concentration"
- In the **Liquid type** parameter, the **Ethanol in water** option or **%mass / %volume** option is selected.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Displays the corrected volume flow currently measured for the carrier fluid.

User interface Signed floating-point number

Additional information

Dependency

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

Target vol. flow

Navigation Expert → Sensor → Measured val. → Process variab. → Target vol. flow (1895)

Prerequisite

With the following conditions:
- Order code for "Application package", option **ED** "Concentration"
- The **Ethanol in water** option or **%mass / %volume** option is selected in the **Liquid type** parameter.
- The **%vol** option is selected in the **Concentr. unit** parameter.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Displays the volume flow currently measured for the target medium.

User interface Signed floating-point number

Additional information

Dependency

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

Carrier vol. fl.

Navigation Expert → Sensor → Measured val. → Process variab. → Carrier vol. fl. (1896)

Prerequisite

With the following conditions:
- Order code for "Application package", option **ED** "Concentration"
- The **Ethanol in water** option or **%mass / %volume** option is selected in the **Liquid type** parameter.
- The **%vol** option is selected in the **Concentr. unit** parameter.

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Use this function to display the volume flow currently measured for the carrier medium.

User interface Signed floating-point number

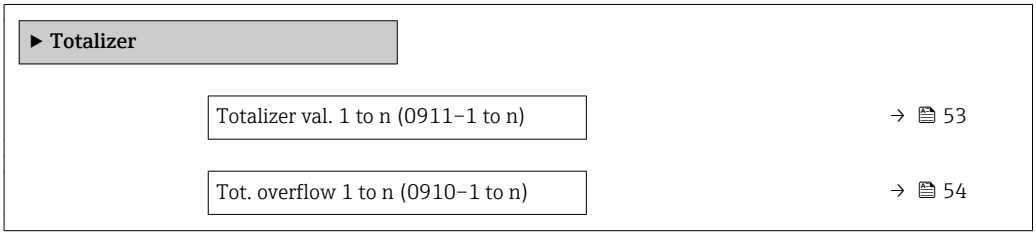
Additional information

Dependency

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

"Totalizer" submenu

Navigation Expert → Sensor → Measured val. → Totalizer



Totalizer val. 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

Description Displays the current totalizer reading.

User interface Signed floating-point number

Additional information

Description

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

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 183).

User interface

The value of the process variable totalized since measuring began can be positive or negative. This depends on the settings in the **Operation mode** parameter (→ 181).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 180).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer val. 1** parameter: 1 968 457 m^3
- Value in the **Tot. overflow 1** parameter: $1 \cdot 10^7$ (1 overflow) = 10 000 000 [m^3]
- Current totalizer reading: 11 968 457 m^3

Tot. overflow 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

Description Displays the current totalizer overflow.

User interface Integer with sign

Additional information

Description

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

User interface

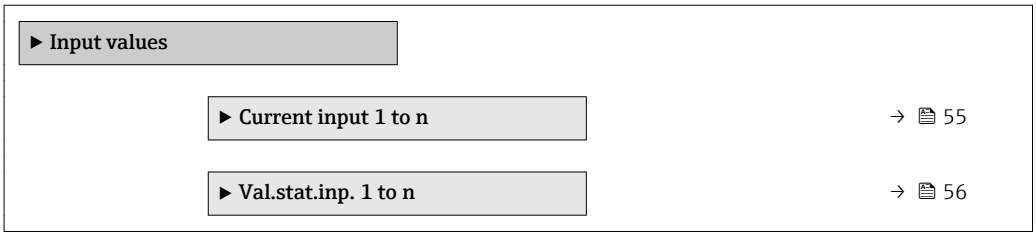
The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 180).

Example

Calculation of the current totalizer reading when the value exceeds the 7-digit display range of the operating tool:
- Value in the **Totalizer val. 1** parameter: 1 968 457 m^3
- Value in the **Tot. overflow 1** parameter: $2 \cdot 10^7$ (2 overflows) = 20 000 000 [m^3]
- Current totalizer reading: 21 968 457 m^3

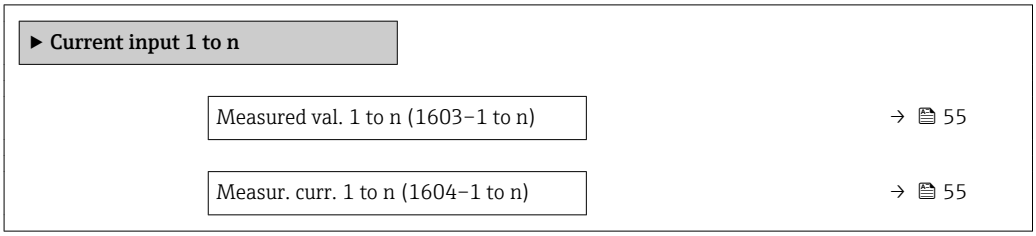
"Input values" submenu

Navigation Expert → Sensor → Measured val. → Input values



"Current input 1 to n" submenu

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



Measured val. 1 to n

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

Description Displays the current input value.

User interface Signed floating-point number

Measur. curr. 1 to n

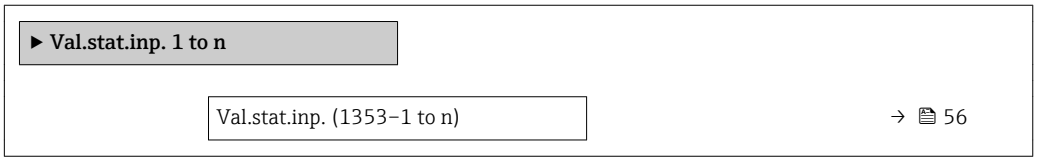
Navigation Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n (1604–1 to n)

Description Displays the current value of the current input.

User interface 0 to 22.5 mA

"Value status input 1 to n" submenu

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



Val.stat.inp.

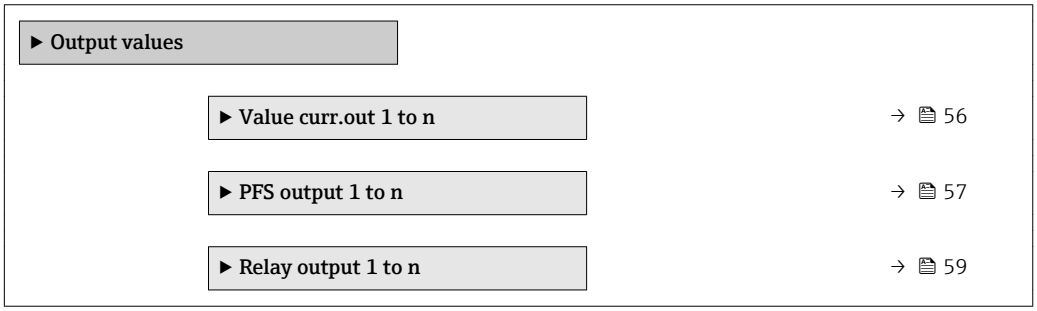
Navigation Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n → Val.stat.inp. (1353–1 to n)

Description Displays the current input signal level.

User interface
- High
- Low

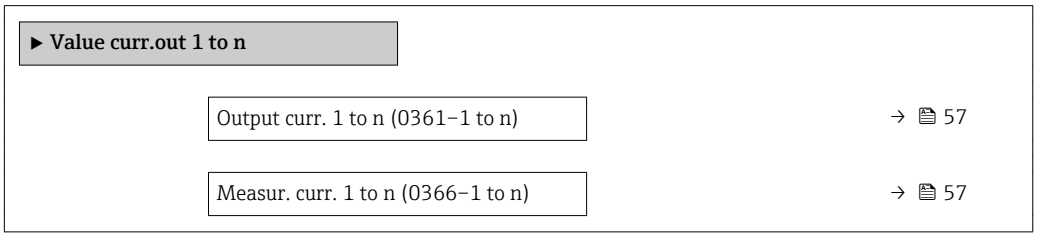
"Output values" submenu

Navigation Expert → Sensor → Measured val. → Output values



"Value current output 1 to n" submenu

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



Output curr. 1 to n

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

Measur. curr. 1 to n

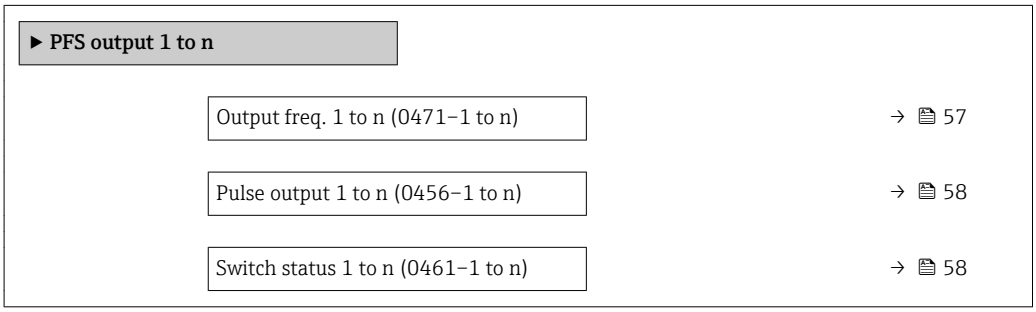
Navigation Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Measur. curr. 1 to n (0366–1 to n)

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 freq. 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 (→ 129), 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)

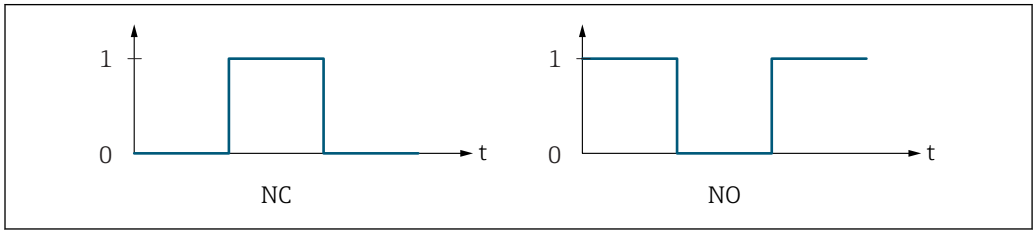
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 129) parameter.

Description Displays the pulse frequency currently output.

User interface Positive floating-point number

Additional information *Description*

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



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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 148) 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 (→ 133)) 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 (→ 129).

Description Displays the current switch status of the status output.

User interface

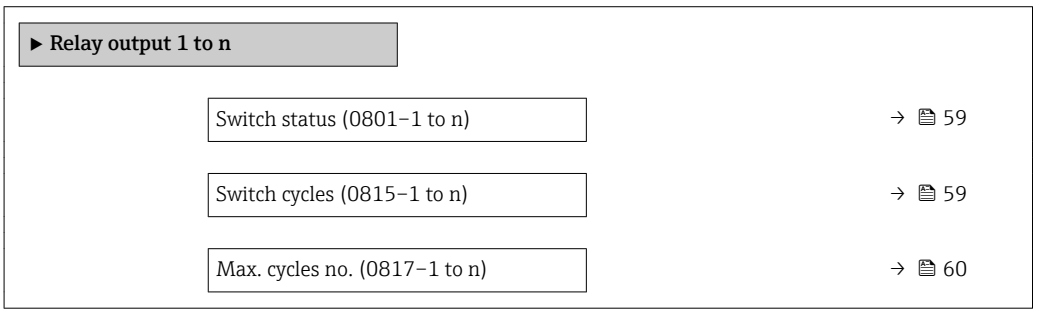
- Open
- Closed

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. cycles no.

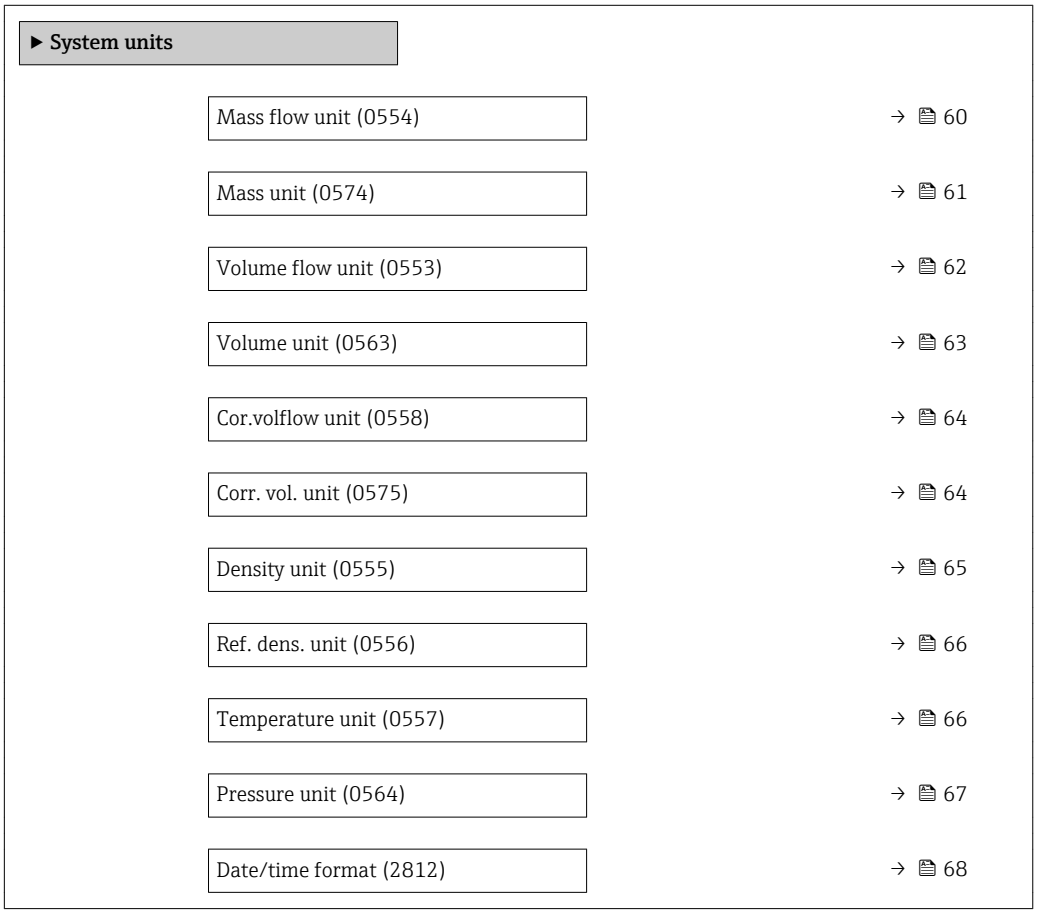
Navigation Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no. (0817–1 to n)

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

Factory setting

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

Additional information

Result

The selected unit applies for:
- **Target mass flow** parameter (→ 50)
- **Carrier mass fl.** parameter (→ 51)
- **Mass flow** parameter (→ 48)

Selection

For an explanation of the abbreviated units: → 240

Mass unit

Navigation

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

Description

Use this function to select the unit for the mass.

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

Factory setting

Country-specific:
- kg
- lb

Additional information

Selection

For an explanation of the abbreviated units: → 240

Volume flow unit

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

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

Selection

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

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

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

or

US units
- bbl/s (us;liq.) *
- bbl/min (us;liq.) *
- bbl/h (us;liq.) *
- bbl/d (us;liq.) *
- bbl/s (us;beer) *
- bbl/min (us;beer) *
- bbl/h (us;beer) *
- bbl/d (us;beer) *

Imperial units
- bbl/s (imp;beer) *
- bbl/min (imp;beer) *
- bbl/h (imp;beer) *
- bbl/d (imp;beer) *

* Visibility depends on order options or device settings

Factory setting

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

Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 48)

Selection

For an explanation of the abbreviated units: → 240

Volume unit

Navigation

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

Description

Use this function to select the unit for the volume.

Selection

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

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

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

or

US units
- bbl (us;liq.) *
- /bbl (us;liq.) *
- bbl (us;beer) *
- /bbl (us;beer) *

Imperial units
- bbl (imp;beer) *
- /bbl (imp;beer) *

* Visibility depends on order options or device settings

Factory setting

Country-specific:
- l
- gal (us)

Additional information

Selection

For an explanation of the abbreviated units: → 240

Cor.volflow unit

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

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

Selection

SI units
- Nl/s
- Nl/min
- Nl/h
- Nl/d
- Nhl/s
- Nhl/min
- Nhl/h
- Nhl/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
- $MSft^3/d$

US units
- Sft^3/s
- Sft^3/min
- Sft^3/h
- Sft^3/d
- Sgal/s (us)
- Sgal/min (us)
- Sgal/h (us)
- Sgal/d (us)
- Sbbl/s (us;liq.)
- Sbbl/min (us;liq.)
- Sbbl/h (us;liq.)
- Sbbl/d (us;liq.)
- $MMSft^3/s$
- $MMSft^3/min$
- $MMSft^3/h$
- Sbbl/s (us;oil)
- Sbbl/min (us;oil)
- Sbbl/h (us;oil)
- Sbbl/d (us;oil)

Imperial units
- Sgal/s (imp)
- Sgal/min (imp)
- Sgal/h (imp)
- Sgal/d (imp)

Factory setting Country-specific:
- Nl/h
- Sft^3/min

Additional information

Result

The selected unit applies for:
Correct.vol.flow parameter (→ 49)

Selection

For an explanation of the abbreviated units: → 240

Corr. vol. unit

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

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

Selection

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

US units
- Sft^3
- $MMSft^3$
- Sgal (us)
- Sbbl (us;liq.)
- Sbbl (us;oil)

Imperial units
Sgal (imp)

Factory setting

Country-specific:
- Nl
- Sft³

Additional information

Selection

For an explanation of the abbreviated units: → 240

Density unit

Navigation

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

Description

Use this function to select the unit for the density.

Selection

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

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

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

or

US units
SG60°F *

Other units
°API *

* Visibility depends on order options or device settings

or

US units
- lb/bbl (us;liq.) *
- lb/bbl (us;beer) *

Imperial units
lb/bbl (imp;beer) *

* Visibility depends on order options or device settings

Factory setting

Country-specific:
- kg/l
- lb/ft³

Additional information

Result

The selected unit applies for:
- **Density setpt 1** parameter
- **Density setpt 2** parameter
- **Density** parameter (→ 49)

Selection

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

For an explanation of the abbreviated units: → 240

Ref. dens. unit

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

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

Selection

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

US units
- lb/Sft³
- RD60°F

Other units
- °APIbase

Factory setting

Country-dependent
- kg/Nl
- lb/Sft³

Additional information

Result

The selected unit applies for:
- **Ext. ref.density** parameter (→ 93)
- **Fix ref.density** parameter (→ 94)
- **Ref.density** parameter (→ 49)

Selection

For an explanation of the abbreviated units: → 240

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:
- **Maximum value** parameter (→ 213)
- **Minimum value** parameter (→ 212)
- **Maximum value** parameter (→ 214)
- **Minimum value** parameter (→ 213)
- **Maximum value** parameter (→ 214)
- **Minimum value** parameter (→ 214)
- **External temp.** parameter (→ 90)
- **Temperature** parameter (→ 49)
- **Ref. temperature** parameter (→ 95)

Selection

For an explanation of the abbreviated units: → 240

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
- Pa a
- kPa a
- MPa a
- bar
- Pa g
- kPa g
- MPa g
- bar g

US units
- psi a
- psi g

Factory setting

Country-specific:
- bar a
- psi a

Additional information

Result

The unit is taken from:
- **Pressure value** parameter (→ 88)
- **External press.** parameter (→ 88)
- **Pressure value** parameter (→ 50)

Selection

For an explanation of the abbreviated units: → 240

Date/time format

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

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

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

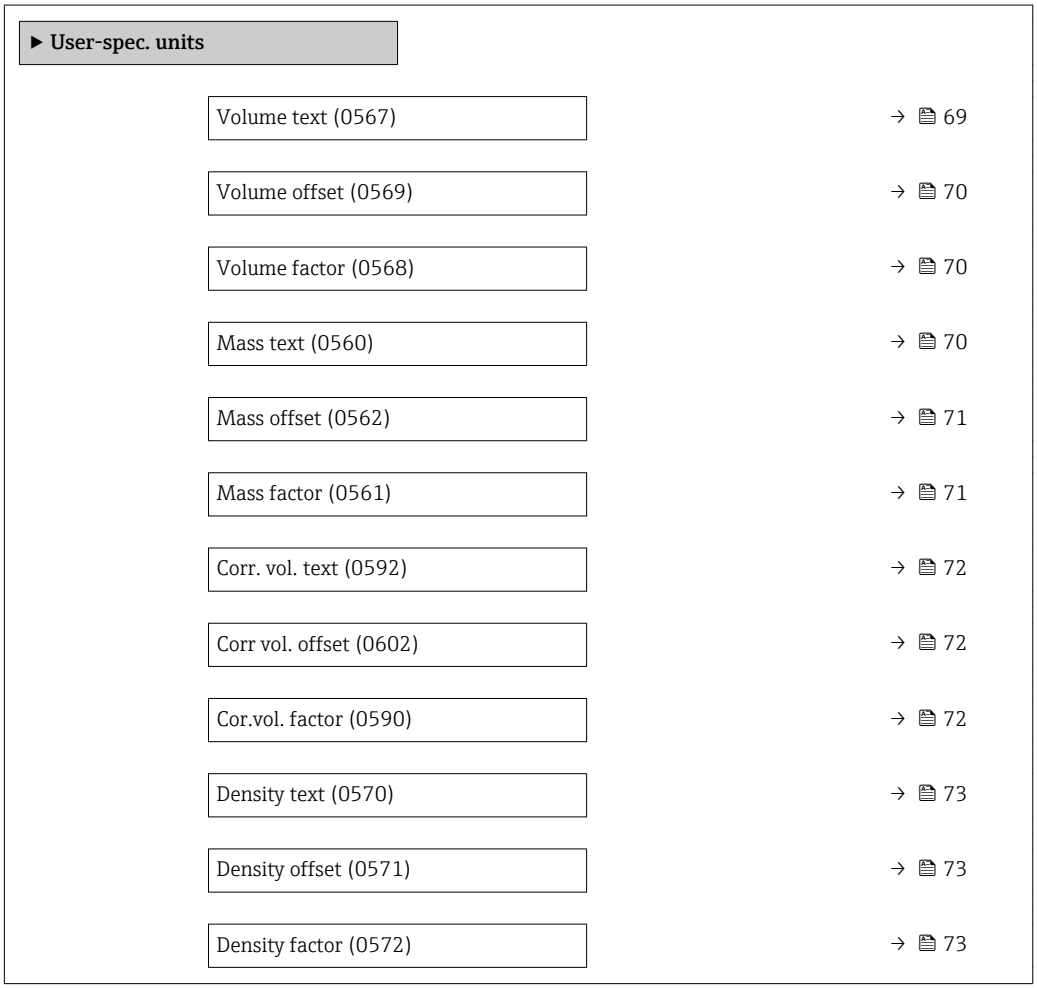
Factory setting dd.mm.yy hh:mm

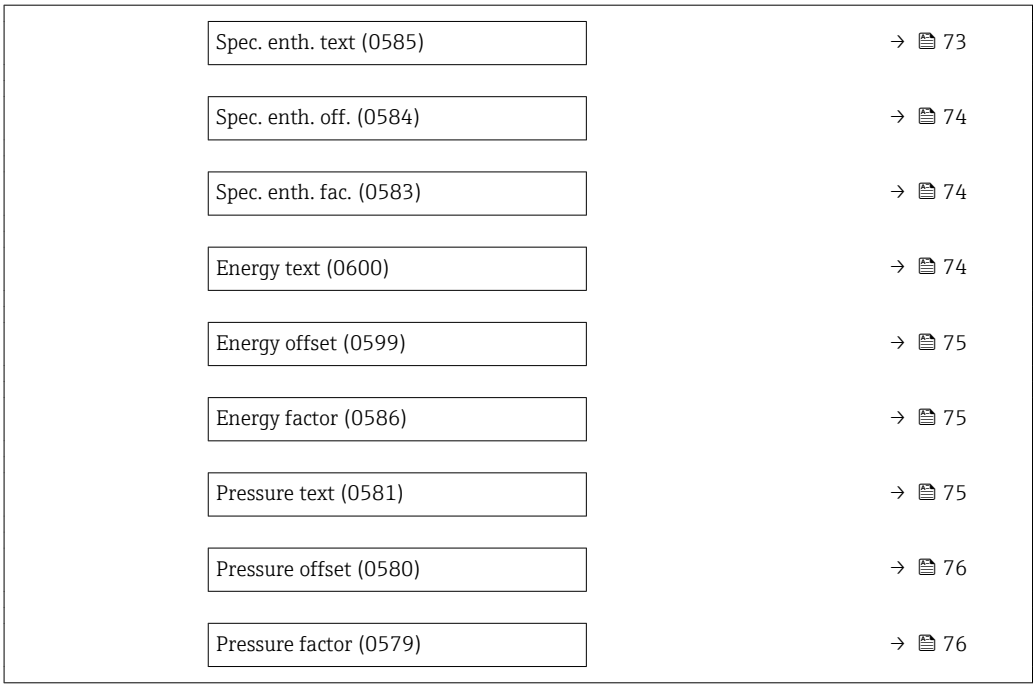
Additional information *Selection*

For an explanation of the abbreviated units: → 240

"User-spec. units" submenu

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





Volume text

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

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

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

Factory setting User vol.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Volume flow unit** parameter (→ 62)
- **Volume unit** parameter (→ 63)

Example

If the text GLAS is entered, the choose list of the **Volume flow unit** parameter (→ 62) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

Volume offset

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

Volume factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Mass text

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

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

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

Factory setting User mass

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Mass flow unit** parameter (→ 60)
- **Mass unit** parameter (→ 61)

Example

If the text CENT for "centner" is entered, the following options are displayed in the picklist for the **Mass flow unit** parameter (→ 60):
- CENT/s
- CENT/min
- CENT/h
- CENT/d

Mass offset

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

Description Use this function to enter the zero point shift for the user-specific mass and mass flow unit.

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

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

Mass factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Additional information *Example*

Mass of 1 Zentner = 50 kg → 0.02 Zentner = 1 kg → entry: 0.02

Corr. vol. text

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

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

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

Factory setting UserCrVol.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Cor.volflow unit** parameter (→ 64)
- **Corr. vol. unit** parameter (→ 64)

Example

If the text GLAS is entered, the choose list of the **Cor.volflow unit** parameter (→ 64) shows the following options:
- GLAS/s
- GLAS/min
- GLAS/h
- GLAS/d

Corr vol. offset

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

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

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

User entry Signed floating-point number

Factory setting 0

Cor.vol. factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Density text

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

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

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

Factory setting User dens.

Additional information *Result*

The defined unit is shown as an option in the choose list of the **Density unit** parameter (→ 65).

Example

Enter text “CE_L” for centners per liter

Density offset

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

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

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

User entry Signed floating-point number

Factory setting 0

Density factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Spec. enth. text

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

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

Factory setting User enth.

Additional information *Result*

Example

If the text CAL is entered, the choose list of the **Cal. value unit** parameter shows the following options:
- CAL/Nm3
- CAL/m3
- CAL/ft3
- CAL/Sft3

Spec. enth. off.

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

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

User entry Signed floating-point number

Factory setting 0

Spec. enth. fac.

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

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

User entry Signed floating-point number

Factory setting 1.0

Additional information *Example*

1 W × min = 60 J → 0.166 W × min = 1 J → user entry: 0.0166

Energy text

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

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

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

Factory setting User en.

Additional information *Result*

The defined unit is shown as an option in the choose list of the following parameters:
- **Energy unit** parameter
- **Energy flow unit** parameter

Example

If the text W is entered, the choose list of the **Energy flow unit** parameter shows the following options:
- W/s
- W/min
- W/h
- W/d

Energy offset

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

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

User entry Signed floating-point number

Factory setting 0

Energy factor

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

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

User entry Signed floating-point number

Factory setting 1.0

Pressure text

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

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

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

Factory setting User pres.

Additional information *Result*

The defined unit is shown as an option in the choose list of the **Pressure unit** parameter (→ 67).

Pressure offset

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

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

User entry Signed floating-point number

Factory setting 0

Pressure factor

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

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

User entry Signed floating-point number

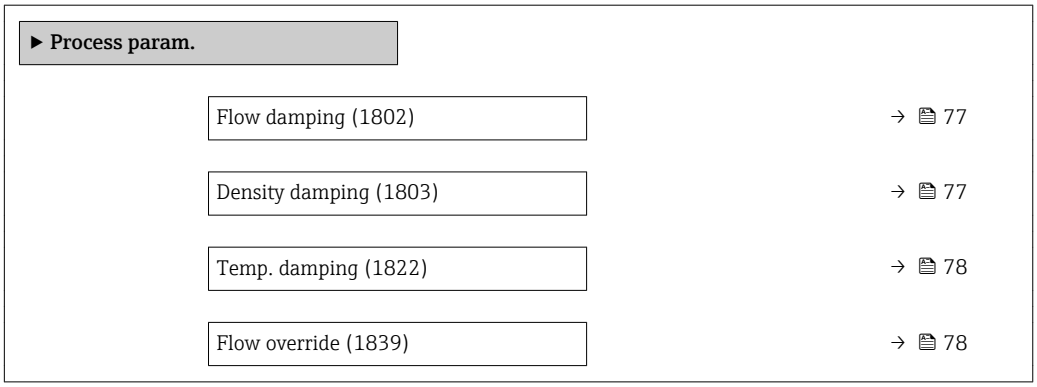
Factory setting 1.0

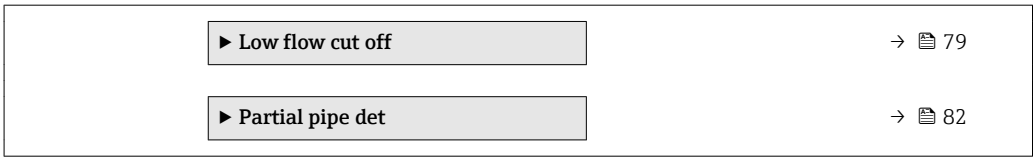
Additional information *Example*

1 Dyn/cm² = 0.1 Pa → 10 Dyn/cm² = 1 Pa → user entry: 10

3.2.3 "Process param." submenu

Navigation Expert → Sensor → Process param.





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 100.0 s

Factory setting 0 s

Additional information

Description

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

User entry

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

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

Result

The damping affects the following variables of the device:
- Outputs → 112
- Low flow cut off → 79
- Totalizers → 179

Density damping

Navigation Expert → Sensor → Process param. → Density damping (1803)

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

User entry 0 to 999.9 s

Factory setting 0 s

2) Proportional behavior with first-order lag

Additional information

Description

The damping is performed by a PT1 element [3].

User entry

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

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

Temp. 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

Factory setting 0 s

Additional information

Description

The damping is performed by a PT1 element [4].

User entry

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

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

Flow override

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

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

Selection

- Off
- On

Factory setting Off

3) Proportional behavior with first-order lag
4) Proportional behavior with first-order lag

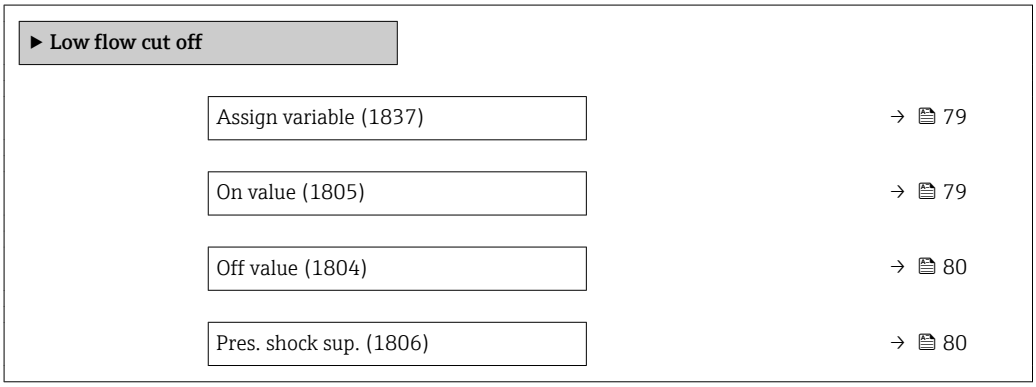
Additional information *Description*

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

The **Flow override** option can also be activated in the **Status input** submenu: **Assign stat.inp.** parameter (→ 🖹 111).

"Low flow cut off" submenu

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



Assign variable

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

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

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

Factory setting Mass flow

On value

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 🖹 79).

* Visibility depends on order options or device settings

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 → 80.

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter→ 238

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign variable** parameter (→ 79).

Off value

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

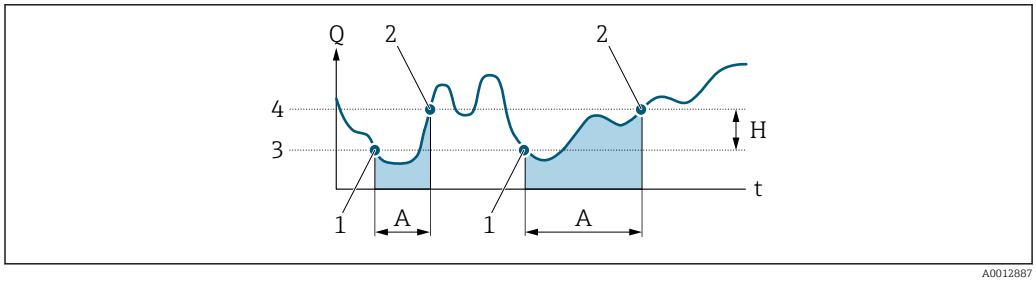
Prerequisite A process variable is selected in the **Assign variable** parameter (→ 79).

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→ 79.

User entry 0 to 100.0 %

Factory setting 50 %

Additional information *Example*



A0012887

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

Pres. shock sup.

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 79).

Description

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

User entry

0 to 100 s

Factory setting

0 s

Additional information

Description

Pressure shock suppression is enabled

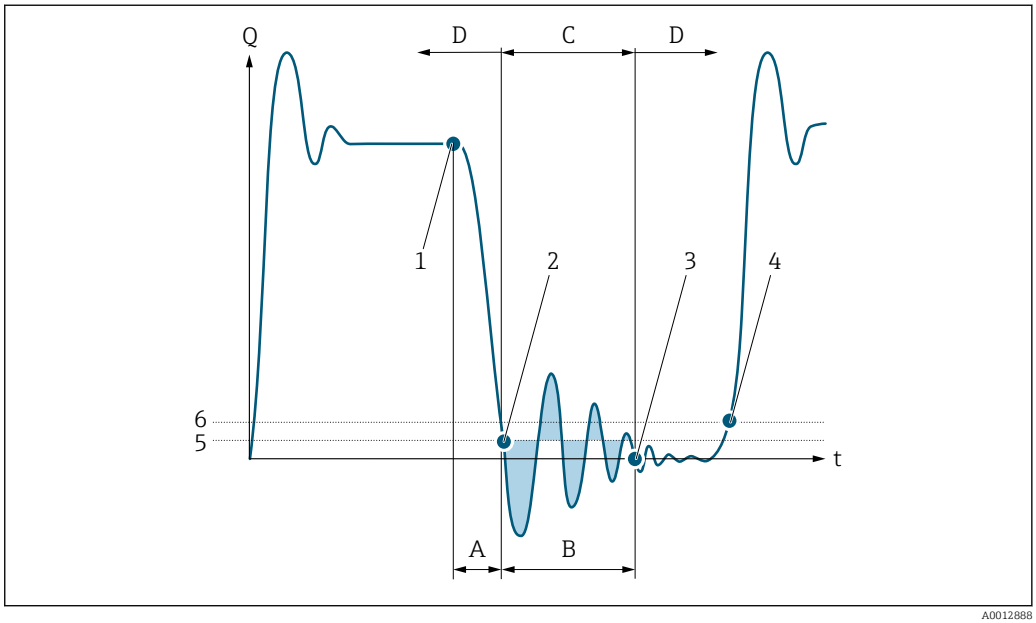
- Prerequisite:
  - Flow rate < on-value of low flow cut off
    or
  - Changing the flow direction
- Output values
  - Flow displayed: 0
  - Totalizer: the totalizers are pegged at the last correct value

Pressure shock suppression is disabled

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

Example

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

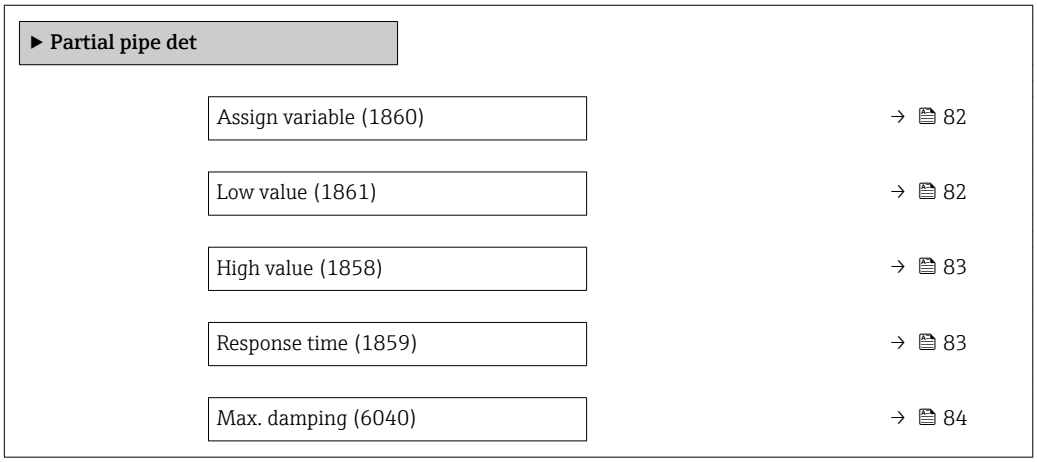


A0012888

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

"Partial pipe det" submenu

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



Assign variable

Navigation Expert → Sensor → Process param. → Partial pipe det → Assign variable (1860)

Description Use this function to select a process variable to detect empty or partially filled measuring tubes.

For gas measurement: Deactivate monitoring due to low gas density.

Selection
- Off
- Density
- Ref.density

Factory setting Off

Low value

Navigation Expert → Sensor → Process param. → Partial pipe det → Low value (1861)

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 82).

Description Use this function to enter a lower limit value to enable detection of empty or partially filled measuring tubes. If the measured density falls below this value, monitoring is enabled.

User entry Signed floating-point number

Factory setting 200

Additional information

User entry

The lower limit value must be less than the upper limit value defined in the **High value** parameter (→ 83).

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

Limit value

If the displayed value is outside the limit value, the measuring device displays the diagnostic message ⚠**S862 Partly filled**.

High value

Navigation Expert → Sensor → Process param. → Partial pipe det → High value (1858)

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 82).

Description Use this function to enter an upper limit value to enable detection of empty or partially filled measuring tubes. If the measured density exceeds this value, detection is enabled.

User entry Signed floating-point number

Factory setting 6 000

Additional information

User entry

The upper limit value must be greater than the lower limit value defined in the **Low value** parameter (→ 82).

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

Limit value

If the displayed value is outside the limit value, the measuring device displays the diagnostic message ⚠**S862 Partly filled**.

Response time

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 82).

Description Use this function to enter the minimum length of time (debouncing time) the signal must be present for the diagnostic message ⚠**S862 Partly filled** to be triggered if the measuring pipe is empty or partially full.

User entry 0 to 100 s

Factory setting 1 s

Max. damping

Navigation Expert → Sensor → Process param. → Partial pipe det → Max. damping (6040)

Description Use this function to enter a damping value to enable detection of empty or partially filled measuring tubes.

User entry Positive floating-point number

Factory setting 0

Additional information

Description

If oscillation damping exceeds the specified value, the measuring device presumes that the pipe is partially filled and the flow signal is set to **0**. The measuring device displays the diagnostic message ⚠**S862 Partly filled**. In the case of non-homogeneous media or air pockets, the damping of the measuring tubes increases.

User entry

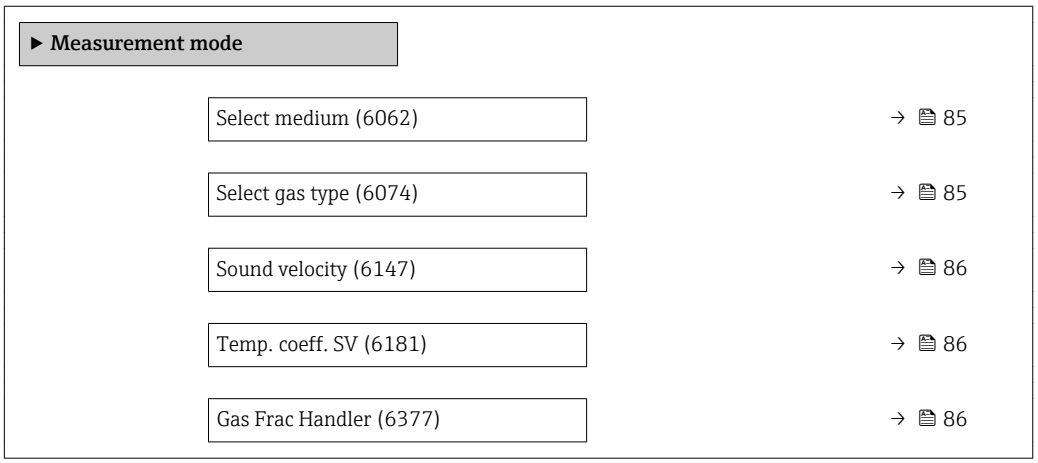
- Damping is disabled if **0** is entered (factory setting).
- Damping is enabled if the value entered is greater than **0**.
- The value entered depends on application-specific influence variables, such as the medium, nominal diameter, sensor etc.

Example

- If the pipe is filled normally the value of the oscillation damping is 500.
- If the pipe is partially filled the value of the oscillation damping is > 5000.
- A practical damping value would then be 2000: enter 2000 as the value.

3.2.4 "Measurement mode" submenu

Navigation Expert → Sensor → Measurement mode



Select medium

Navigation Expert → Sensor → Measurement mode → Select medium (6062)

Description Use this function to select the type of medium.

Selection
- Liquid
- Gas

Factory setting Liquid

Select gas type

Navigation Expert → Sensor → Measurement mode → Select gas type (6074)

Prerequisite The **Gas** option is selected in the **Select medium** parameter (→ 85).

Description Use this function to select the type of gas for the measuring application.

Selection
- Air
- Ammonia NH3
- Argon Ar
- Sulf. hex.fl.SF6
- Oxygen O2
- Ozone O3
- Nitrog. ox. NOx
- Nitrogen N2
- Nitrous ox. N2O
- Methane CH4
- Hydrogen H2
- Helium He
- Hydrog.chlor.HCl
- Hydrog.sulf. H2S
- Ethylene C2H4
- Carbon diox. CO2
- Carbon monox. CO
- Chlorine Cl2
- Butane C4H10
- Propane C3H8
- Propylene C3H6
- Ethane C2H6
- Others

Factory setting Methane CH4

Additional information *Description*

The gas type needs to be selected so that it is possible to comply with accuracy specifications in gas applications.

Sound velocity

Navigation Expert → Sensor → Measurement mode → Sound velocity (6147)

Prerequisite In the **Select gas type** parameter (→ 85), the **Others** option is selected.

Description Use this function to enter the sound velocity of the gas at 0 °C (+32 °F).

User entry 1 to 99 999.9999 m/s

Factory setting 415.0 m/s

Temp. coeff. SV

Navigation Expert → Sensor → Measurement mode → Temp. coeff. SV (6181)

Prerequisite The **Others** option is selected in the **Select gas type** parameter (→ 85).

Description Use this function to enter a temperature coefficient for the sound velocity of the gas.

User entry Positive floating-point number

Factory setting 0 (m/s)/K

Gas Frac Handler

Navigation Expert → Sensor → Measurement mode → Gas Frac Handler (6377)

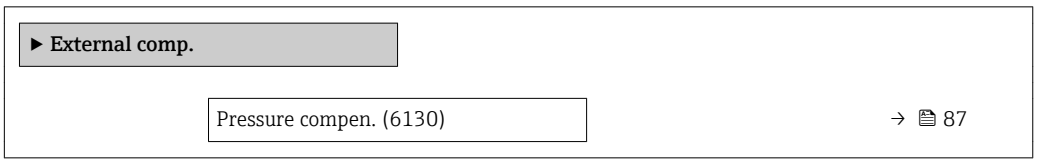
Description Activates the Gas Fraction Handler function for two phase media.

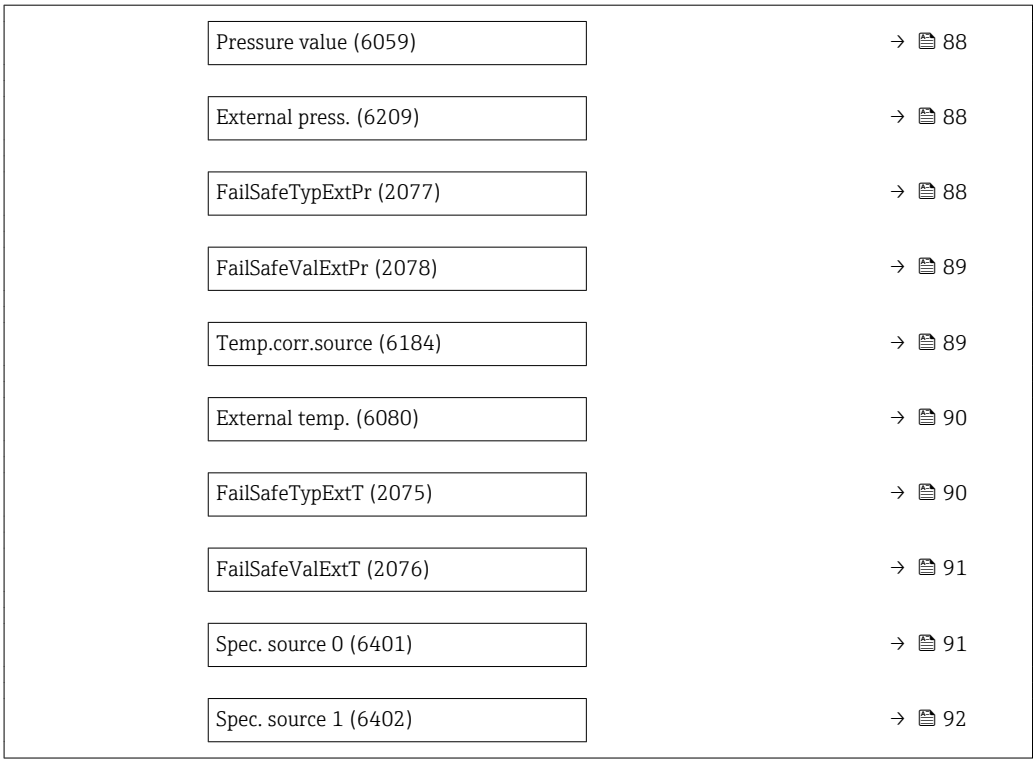
Selection
- Off
- Moderate
- Powerful

Factory setting Off

3.2.5 "External comp." submenu

Navigation Expert → Sensor → External comp.





Pressure compen.

Navigation Expert → Sensor → External comp. → Pressure compen. (6130)

Description Use this function to select the type of pressure compensation.

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

Factory setting Off

Additional information *Selection*
- Fixed value
  A fixed pressure value is used for compensation: **Pressure value** parameter (→ 88)
- External value
  The pressure value read in via is used for compensation.
  The pressure value of cyclic PROFINET communication is accepted. For this, the "External pressure " compensation value must be incorporated into the analog output module.
- Current input 1
  The pressure value read in via the current input is used for compensation.

For more information, see the "Cyclic data transmission" section of the Operating Instructions

* Visibility depends on order options or device settings

Pressure value

Navigation Expert → Sensor → External comp. → Pressure value (6059)

Prerequisite The **Fixed value** option or the **Current input 1...n** option is selected in the **Pressure compen.** parameter (→ 87).

Description Use this function to enter a value for the process pressure that is used for pressure correction.

User entry Positive floating-point number

Factory setting 1.01325 bar

Additional information *User entry*

The unit is taken from the **Pressure unit** parameter (→ 67)

External press.

Navigation Expert → Sensor → External comp. → External press. (6209)

Prerequisite The **Fixed value** option or the **Current input 1...n** option is selected in the **Pressure compen.** parameter (→ 87).

Description Use this function to enter an external pressure value.

User interface Positive floating-point number

Factory setting 1.01325 bar

Additional information *User entry*

The unit is taken from the **Pressure unit** parameter (→ 67)

FailSafeTypExtPr

Navigation Expert → Sensor → External comp. → FailSafeTypExtPr (2077)

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

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

Additional information

Description

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

Selection

- Fail-safe value
  A substitute value is used. The substitute value is defined in the **FailSafeValExtPr** parameter (→ 89).
- Fallback value
  The last valid value is used.
- **Off** option: The invalid value continues to be used.

FailSafeValExtPr

Navigation Expert → Sensor → External comp. → FailSafeValExtPr (2078)

Prerequisite The **Fail-safe value** option is selected in the **FailSafeTypExtPr** parameter (→ 88).

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

User entry Signed floating-point number

Factory setting 0 bar

Additional information

Description

In the event of a device alarm, the pressure value is displayed as an output value in the **Pressure value** parameter (→ 50).

Temp.corr.source

Navigation Expert → Sensor → External comp. → Temp.corr.source (6184)

Description Use this function to select the temperature mode.

Selection

- Internal value
- External value
- Current input 1 *
- Current input 2 *
- Current input 3 *

Factory setting Internal value

* Visibility depends on order options or device settings

Additional information

Description

Use this function to select the type of temperature compensation.

Selection

All the options available for selection are used for measured value compensation.

- Internal value
  The temperature value measured internally (temperature sensor of the measuring sensor) is used for compensation.
- External value
  The temperature value of cyclic PROFINET communication is accepted. For this, the "External temperature" compensation value must be incorporated into the Analog Output module.
- **Current input 1** optionVisibility depends on order options or device settings
  The temperature value read in via the current input is used for compensation.

For more information, see the "Cyclic data transmission" section of the Operating Instructions

External temp.

Navigation Expert → Sensor → External comp. → External temp. (6080)

Prerequisite The **External value** option or the **Current input 1...n** option is selected in the **Temperature mode** parameter (→ 89).

Description Use this function to enter the external temperature.

User interface −273.15 to 99 999 °C

Factory setting Country-specific:
- 0 °C
- +32 °F

Additional information

Description

The unit is taken from the **Temperature unit** parameter (→ 66)

FailSafeTypExtT

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

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

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

Additional information

Description

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

Selection

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

FailSafeValExtT

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

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

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

User entry Signed floating-point number

Factory setting 0 °C

Additional information

Description

In the event of a device alarm, the temperature value is displayed as an output value in the **Temperature** parameter (→ 49).

Temperature mode

Navigation Expert → Sensor → External comp. → Temperature mode (6341)

Description Select temperature mode for temperature compensation.

Selection

- Internal value
- External value

Factory setting Internal value

Spec. source 0

Navigation Expert → Sensor → External comp. → Spec. source 0 (6401)

Description Select source for input value 0 used for the application specific calculation.

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

Factory setting Off

Spec. source 1

Navigation Expert → Sensor → External comp. → Spec. source 1 (6402)

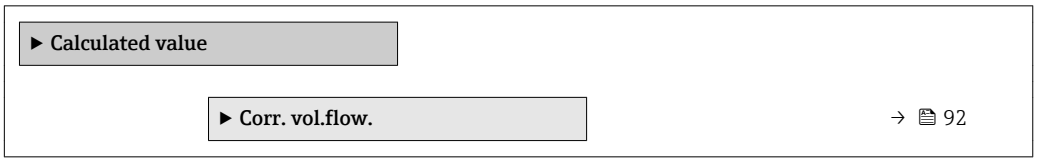
Description Select source for the input value 1 used for the application specific calculation.

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

Factory setting Off

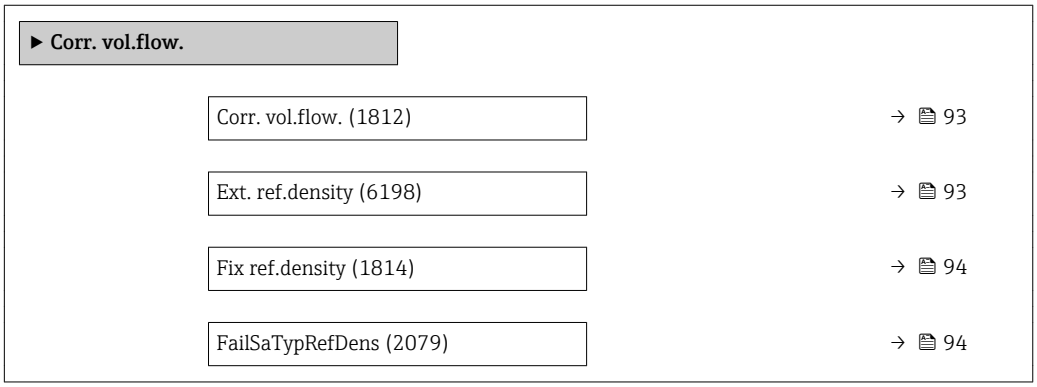
3.2.6 "Calculated value" submenu

Navigation Expert → Sensor → Calculated value

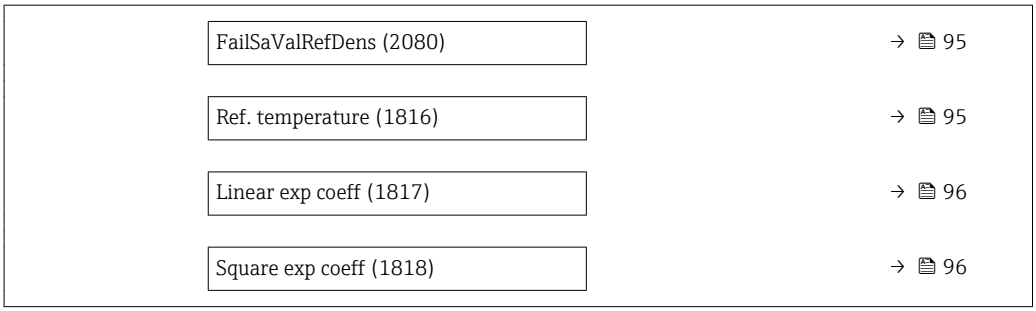


"Corr. vol.flow." submenu

Navigation Expert → Sensor → Calculated value → Corr. vol.flow.



* Visibility depends on order options or device settings



Corr. vol.flow.

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Corr. vol.flow. (1812)

Description Use this function to select the reference density for calculating the corrected volume flow.

Selection
- Fix ref.density
- Calc ref density
- Ext. ref.density
- Current input 1 *
- Current input 2 *

Factory setting Calc ref density

Additional information *Selection*

The **Ref. dens API 53** option is suitable only for applications involving LPG [5], where the flow rate is measured on the basis of the corrected volume flow.

Selecting this option means that the reference density is used, taking into account the values in table 53 E of API MPMS section 11.2. Temperature measurement (measured internally or read into the device from an external source→ 86→ 86) and density measurement take place during operation while the medium is flowing. The mass flow is divided by the reference density to give the corrected volume flow and is issued as an output signal.

Ext. ref.density
The reference density value of cyclic PROFINET communication is accepted. In addition, the "External reference density" compensation value must be incorporated into the Analog Output module.

For more information, see the "Cyclic data transmission" section of the Operating Instructions

Ext. ref.density

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Ext. ref.density (6198)

Prerequisite In the **Corr. vol.flow.** parameter (→ 93), the **Ext. ref.density** option is selected.

* Visibility depends on order options or device settings
5) liquefied petroleum gas

Description Displays the reference density which is read in externally, e.g. via the current input.

User interface Floating point number with sign

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 66)

Fix ref.density

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Fix ref.density (1814)

Prerequisite The **Fix ref.density** option is selected in the **Corr. vol.flow.** parameter (→ 93) parameter.

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

User entry Positive floating-point number

Factory setting 1 kg/Nl

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 66)

FailSaTypRefDens

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → FailSaTypRefDens (2079)

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

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

Additional information *Description*

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

Selection
- Fail-safe value
  A substitute value is used. The substitute value is defined in the **FailSaValRefDens** parameter (→ 95).
- Fallback value
  The last valid value is used.
- Off
  The invalid value continues to be used.

FailSaValRefDens

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → FailSaValRefDens (2080)

Prerequisite The **Fail-safe value** option is selected in the **FailSaTypRefDens** parameter (→ 94).

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

User entry Signed floating-point number

Factory setting 0 kg/Nl

Additional information *Description*

In the event of a device alarm, the reference density value is displayed as an output value in the **Ref.density** parameter (→ 49).

Ref. temperature

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Ref. temperature (1816)

Prerequisite The **Calc ref density** option is selected in the **Corr. vol.flow.** parameter (→ 93) parameter.

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

User entry −273.15 to 99 999 °C

Factory setting Country-specific:
- +20 °C
- +68 °F

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

Reference density calculation

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

A0023403

- ρ_N: reference density
- ρ: fluid density currently measured
- t: fluid temperature currently measured
- t_N: reference temperature at which the reference density is calculated (e.g. 20 °C)
- Δt: $t - t_N$
- α: linear expansion coefficient of the fluid, unit = [1/K]; K = Kelvin
- β: square expansion coefficient of the fluid, unit = [1/K²]

Linear exp coeff

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Linear exp coeff (1817)

Prerequisite The **Calc ref density** option is selected in the **Corr. vol.flow.** parameter (→ 93) parameter.

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

User entry Signed floating-point number

Factory setting 0.0 1/K

Square exp coeff

Navigation Expert → Sensor → Calculated value → Corr. vol.flow. → Square exp coeff (1818)

Prerequisite The **Calc ref density** option is selected in the **Corr. vol.flow.** parameter (→ 93) parameter.

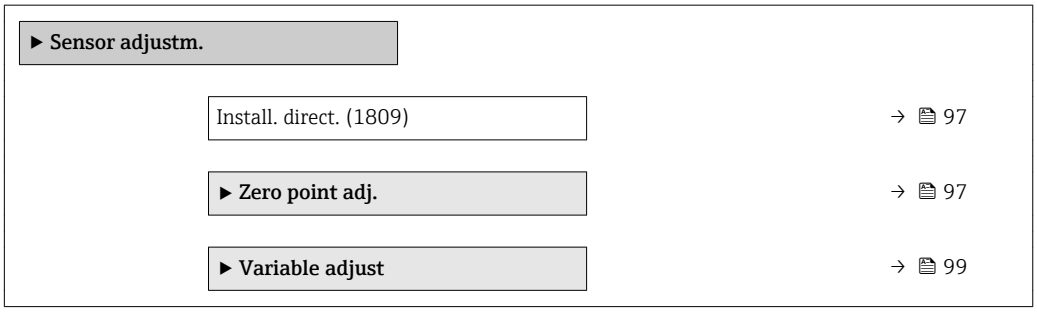
Description For fluid with a non-linear expansion pattern: use this function to enter a quadratic, fluid-specific expansion coefficient for calculating the reference density.

User entry Signed floating-point number

Factory setting 0.0 1/K²

3.2.7 "Sensor adjustment" submenu

Navigation Expert → Sensor → Sensor adjustm.



Install. direct.

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

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

Selection
- In arrow direct.
- Against arrow

Factory setting In arrow direct.

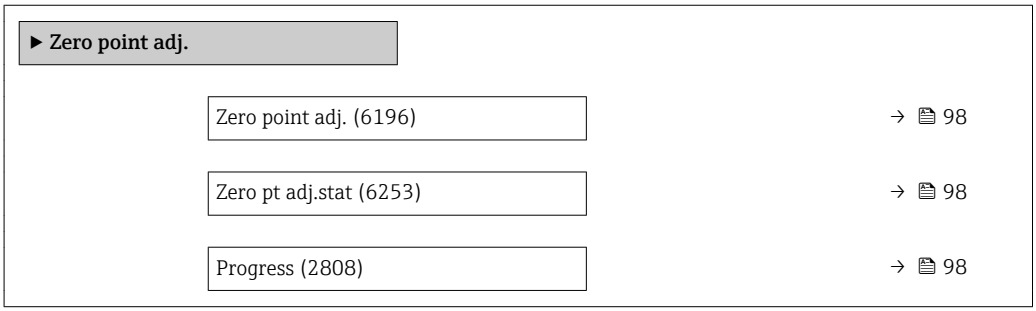
Additional information *Description*

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

"Zero point adj." submenu

- It is generally not necessary to perform zero point adjustment.
- However, this function may be needed in some applications with low flow and strict accuracy requirements.
- A zero point adjustment cannot increase repeatability.
- The following conditions should be met to perform a zero point adjustment successfully without the adjustment finishing in an error:
  - The real flow must be **0**.
  - The pressure must be at least 15 psi g.
- The adjustment takes a maximum of 60 s. The more stable the conditions, the faster the adjustment is completed.
- This function can also be used to check the health of the measuring device. A healthy measuring device has a maximum zero point deviation of ±100 compared to the factory setting of the measuring device (calibration report).

Navigation Expert → Sensor → Sensor adjustm. → Zero point adj.



Zero point adj.

Navigation Expert → Sensor → Sensor adjustm. → Zero point adj. → Zero point adj. (6196)

Description Use this function to select the start of the zero point adjustment.

Observe conditions → 97.

Selection
- Cancel
- Start

Factory setting Cancel

Additional information *Description*
- Cancel
  If zero point adjustment has failed, select this option to cancel zero point adjustment.
- Busy
  Is displayed during zero point adjustment.
- Zero adjust fail
  Is displayed if zero point adjustment has failed.
- Start
  Select this option to start zero point adjustment.

Zero pt adj.stat

Navigation Expert → Sensor → Sensor adjustm. → Zero point adj. → Zero pt adj.stat (6253)

Expert → Sensor → Sensor adjustm. → Zero point adj. → Zero pt adj.stat (6253)

Description Shows the status of the zero point adjustment.

User interface
- Busy
- Zero adjust fail
- Ok

Factory setting Ok

Progress

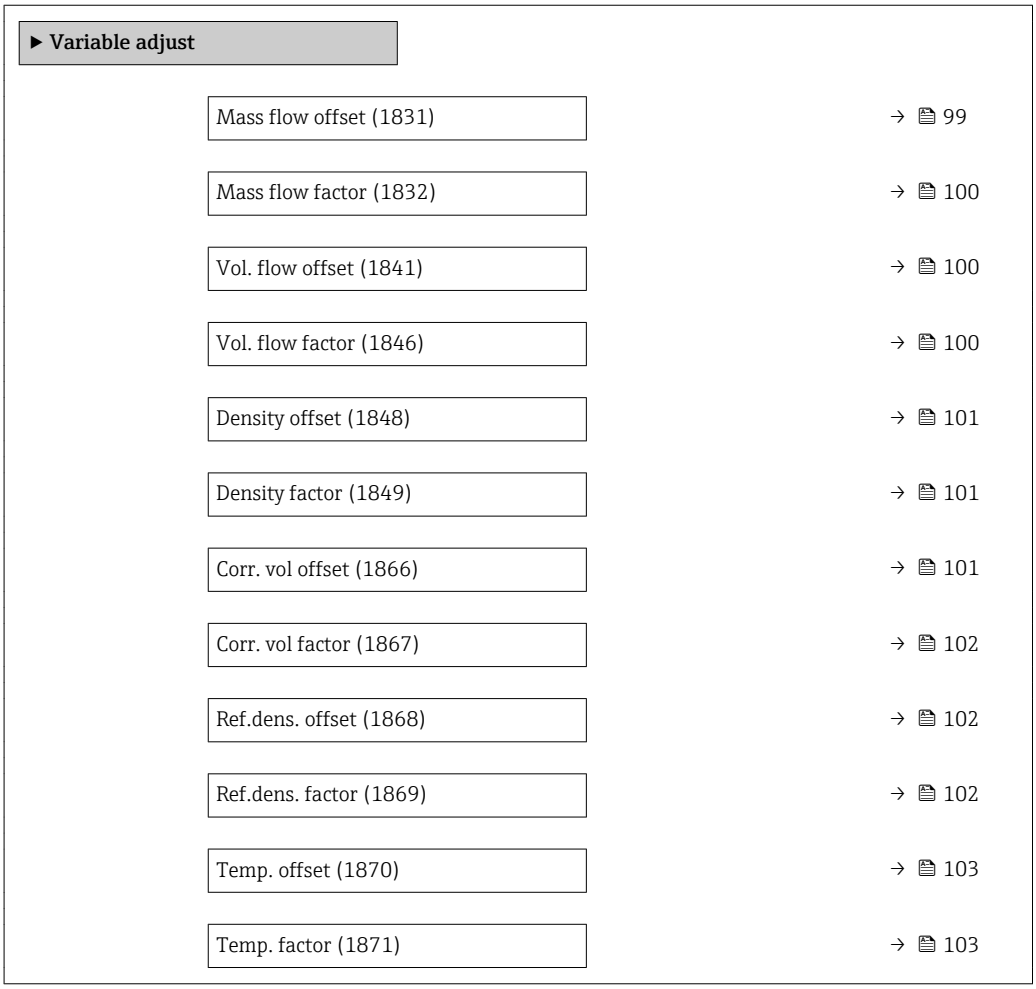
Navigation Expert → Sensor → Sensor adjustm. → Zero point adj. → Progress (2808)

Description The progress of the process is indicated.

User interface 0 to 100 %

"Variable adjust" submenu

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust



Mass flow offset

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

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

User entry Signed floating-point number

Factory setting 0 kg/s

Additional information *Description*

Corrected value = (factor × value) + offset

Mass flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Vol. flow offset

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

Description Use this function to enter the zero point shift for the volume flow trim. The volume flow unit on which the shift is based is m^3/s.

User entry Signed floating-point number

Factory setting 0 m^3/s

Additional information *Description*

Corrected value = (factor × value) + offset

Vol. flow factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Density offset

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

Description Use this function to enter the zero point shift for the density trim. The density unit on which the shift is based is kg/m³.

User entry Signed floating-point number

Factory setting 0 kg/m³

Additional information *Description*

Corrected value = (factor × value) + offset

Density factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Corr. vol offset

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

Description Use this function to enter the zero point shift for the corrected volume flow trim. The corrected volume flow unit on which the shift is based is 1 Nm³/s.

User entry Signed floating-point number

Factory setting 0 Nm³/s

Additional information *Description*

Corrected value = (factor × value) + offset

Corr. vol factor

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

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Ref.dens. offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. offset (1868)

Description Use this parameter to enter the zero point shift for the reference density trim. The reference density unit on which the shift is based is 1 kg/Nm³.

User entry Signed floating-point number

Factory setting 0 kg/Nm³

Additional information *Description*

Corrected value = (factor × value) + offset

Ref.dens. factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Ref.dens. factor (1869)

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

User entry Positive floating-point number

Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

Temp. offset

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. offset (1870)

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

User entry Signed floating-point number

Factory setting 0 K

Additional information *Description*

Corrected value = (factor × value) + offset

Temp. factor

Navigation Expert → Sensor → Sensor adjustm. → Variable adjust → Temp. factor (1871)

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

User entry Positive floating-point number

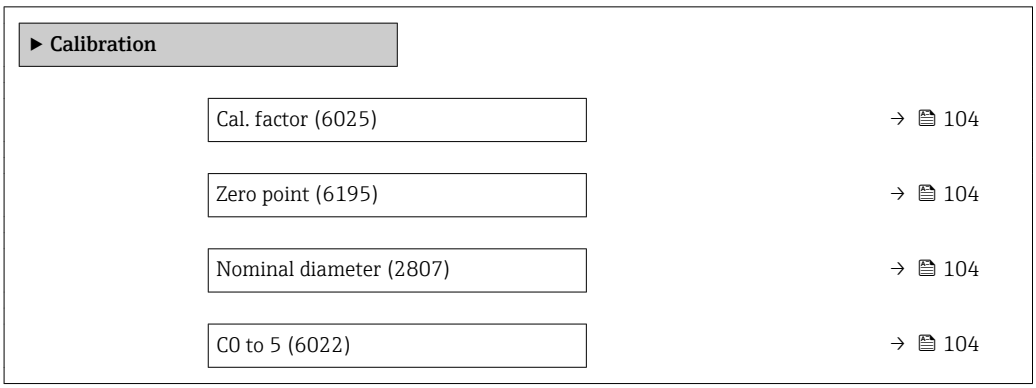
Factory setting 1

Additional information *Description*

Corrected value = (factor × value) + offset

3.2.8 "Calibration" submenu

Navigation Expert → Sensor → Calibration



Cal. factor

Navigation Expert → Sensor → Calibration → Cal. factor (6025)

Description Displays the current calibration factor for the sensor.

User interface Signed floating-point number

Factory setting Depends on nominal diameter and calibration.

Zero point

Navigation Expert → Sensor → Calibration → Zero point (6195)

Description Use this function to enter the zero point correction value for the sensor.

User entry Signed floating-point number

Factory setting Depends on nominal diameter and calibration.

Nominal diameter

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

Description Displays the nominal diameter of the sensor.

User interface DNxx / x"

Factory setting Depends on the size of the sensor

Additional information *Description*

The value is also specified on the sensor nameplate.

C0 to 5

Navigation Expert → Sensor → Calibration → C0 to 5 (6022)

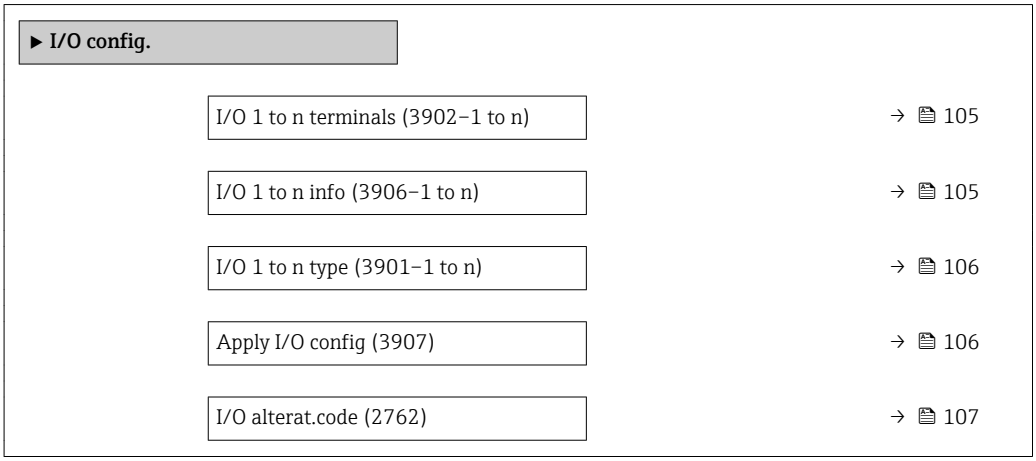
Description Displays the current density coefficients C0 to 5 of the sensor.

User interface Signed floating-point number

Factory setting 0

3.3 "I/O configuration" submenu

Navigation Expert → I/O config.



I/O 1 to n terminals

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

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

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

I/O 1 to n info

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

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

User interface
- Not plugged
- Invalid
- Not configurable
- Configurable
- PROFINET

Additional information

"Not plugged" option

The I/O module is not plugged in.

"Invalid" option

The I/O module is not plugged correctly.

"Not configurable" option

The I/O module is not configurable.

"Configurable" option

The I/O module is configurable.

"PROFINET" option

The I/O module is configured for PROFINET.

I/O 1 to n type

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

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

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

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

Factory setting Off

Apply I/O config

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

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

Selection
- No
- Yes

Factory setting No

* Visibility depends on order options or device settings

I/O alterat.code

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

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

User entry Positive integer

Factory setting 0

Additional information *Description*

The I/O configuration is changed in the **I/O type** parameter (→ 106).

3.4 "Input" submenu

Navigation Expert → Input

▶ **Input**	
▶ **Current input 1 to n**	→ 107
▶ **Status input 1 to n**	→ 110

3.4.1 "Current input 1 to n" submenu

Navigation Expert → Input → Current input 1 to n

▶ **Current input 1 to n**	
Terminal no. (1611–1 to n)	→ 108
Signal mode (1610–1 to n)	→ 108
Current span (1605–1 to n)	→ 108
0/4 mA value (1606–1 to n)	→ 109
20 mA value (1607–1 to n)	→ 109
Failure mode (1601–1 to n)	→ 109
Failure value (1602–1 to n)	→ 110

Terminal no.

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

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

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

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

Current span

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

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

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

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

Additional information *Examples*

Sample values for the current range: **Current span** parameter (→ 115)

* Visibility depends on order options or device settings

0/4 mA value

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

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

User entry Signed floating-point number

Factory setting 0

Additional information *Current input behavior*

The current input behaves differently depending on the settings configured in the following parameters:
- Current span (→ 108)
- Failure mode (→ 109)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 116).

20 mA value

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

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Configuration examples*

Pay attention to the configuration examples for **4 mA value** parameter (→ 116).

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 (→ 108).

Selection
- Alarm
- Last valid value
- Defined value

Factory setting Alarm

Additional information *Options*

- Alarm
  An error message is set.
- Last valid value
  The last valid measured value is used.
- Defined value
  A user-defined measured value is used (**Failure value** parameter (→ 110)).

Failure value

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

Prerequisite In the **Failure mode** parameter (→ 109), the **Defined value** option is selected.

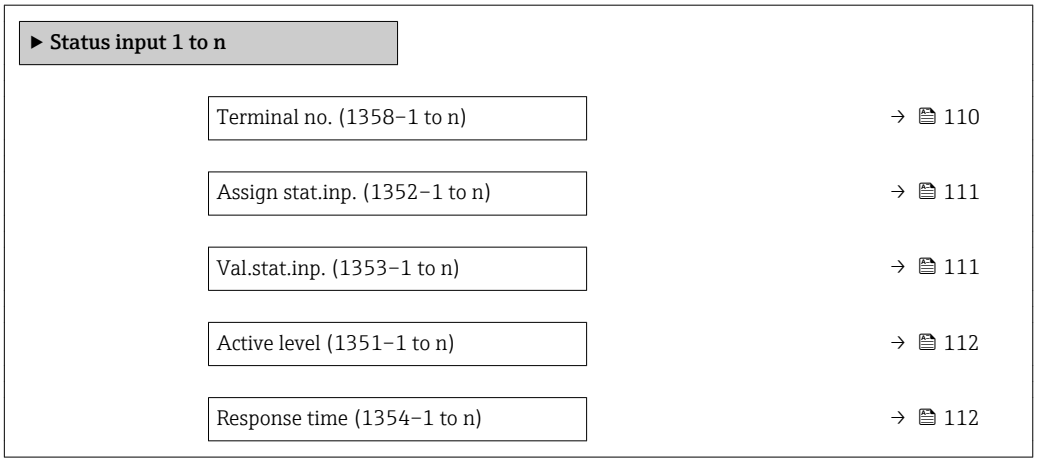
Description Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.

User entry Signed floating-point number

Factory setting 0

3.4.2 "Status input 1 to n" submenu

Navigation Expert → Input → Status input 1 to n



Terminal no.

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

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

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

Additional information *"Not used" option*

The status input module does not use any terminal numbers.

Assign stat.inp.

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

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

Selection
- Off
- Reset totaliz. 1
- Reset totaliz. 2
- Reset totaliz. 3
- Reset all tot.
- Flow override
- Zero point adj.

Factory setting Off

Additional information *Selection*
- Off
  The status input is switched off.
- Reset totaliz. 1…3
  The individual totalizers are reset.
- Reset all tot.
  All totalizers are reset.
- Flow override
  The Flow override (→ 78) is activated.

Note on the Flow override (→ 78):
- The Flow override (→ 78) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

Val.stat.inp.

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

Description Displays the current input signal level.

User interface
- High
- Low

Active level

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

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

Selection
- High
- Low

Factory setting High

Response time

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

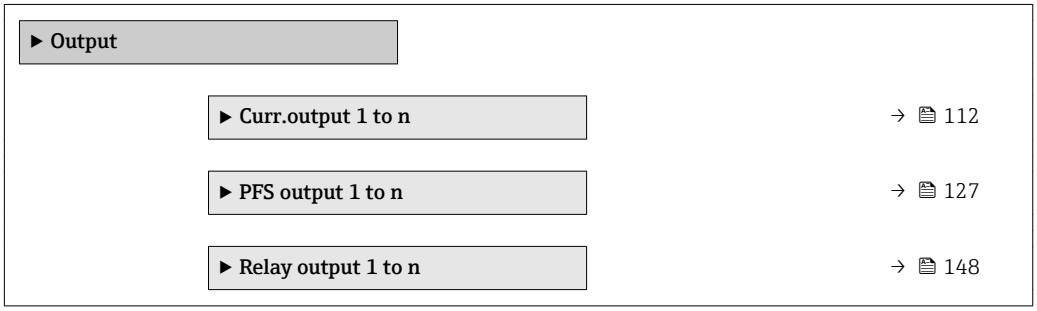
Description Use this function to enter the minimum time period for which the input signal level must be present before the selected function is activated.

User entry 5 to 200 ms

Factory setting 50 ms

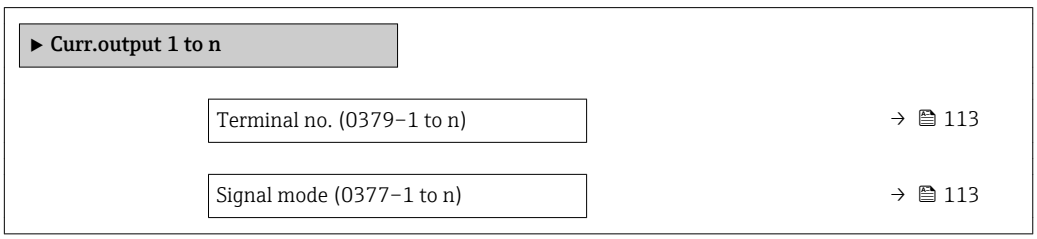
3.5 "Output" submenu

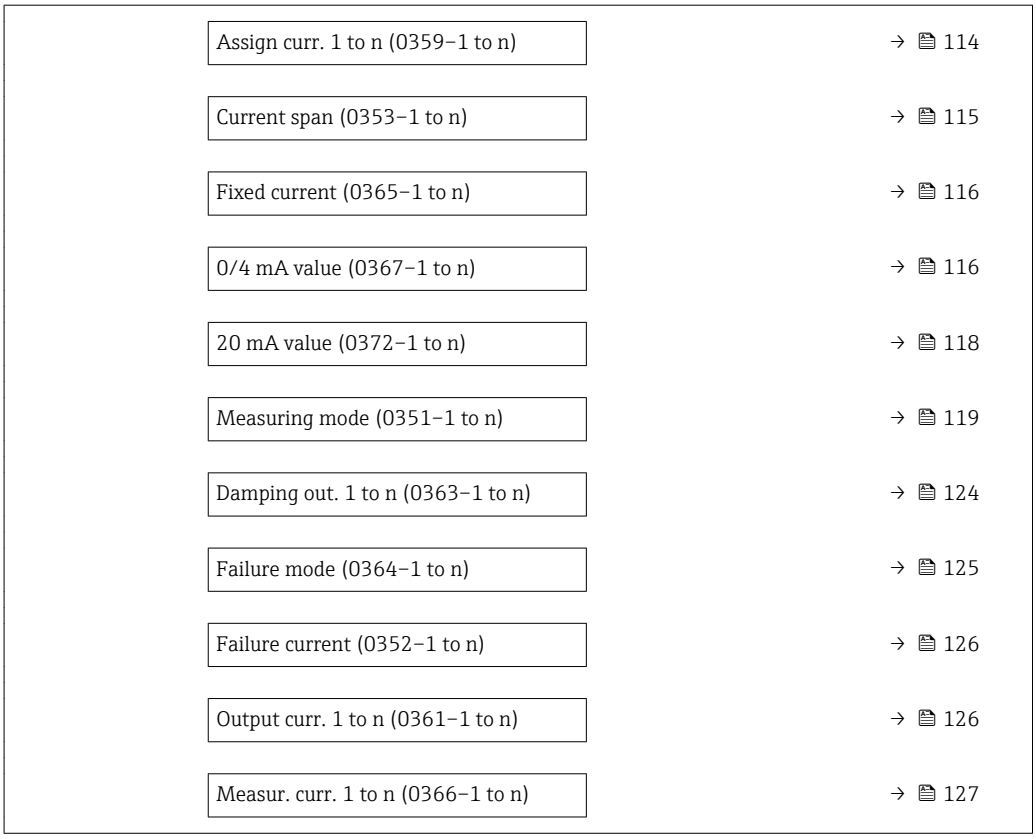
Navigation Expert → Output



3.5.1 "Current output 1 to n" submenu

Navigation Expert → Output → Curr.output 1 to n





Terminal no.

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

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

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

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 *

* Visibility depends on order options or device settings

Factory setting Active

Assign curr. 1 to n

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

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

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

Selection

- Off *
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density *
- Ref.dens.altern. *
- GSV flow *
- GSVa *
- NSV flow *
- NSVa *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water vol. flow *
- Oil corr.vol.fl. *
- Water corr.v.fl. *
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0 *
- Osc. damping 0 *
- Osc.damp.fluct 0 *
- Signal asymmetry *
- Exc. current 0 *
- Pressure
- Spec. output 0 *

* Visibility depends on order options or device settings

- Spec. output 1 *
- Index inh.medium
- Index sus.bubble *

Factory setting Mass flow

Current span

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

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

Selection
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA
- Fixed current

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

Additional information

Description

- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 125).
- If the measured value is outside the measuring range, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.
- The measuring range is specified via the **0/4 mA value** parameter (→ 116) and **20 mA value** parameter (→ 118).

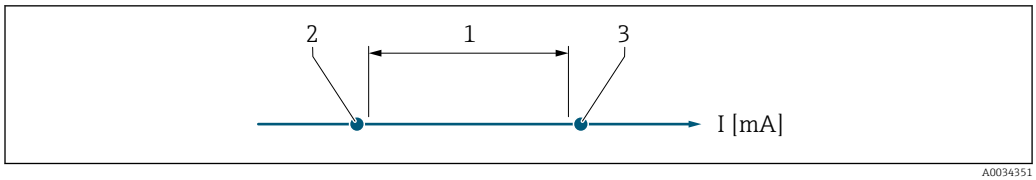
"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 116).

Example

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

* Visibility depends on order options or device settings



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

Selection

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

If the flow exceeds or falls below the upper or lower signal on alarm level, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

Fixed current

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

Prerequisite The **Fixed current** option is selected in the **Current span** parameter (→ 115).

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 (→ 115), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User entry Signed floating-point number

Factory setting

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

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 114). 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 (→ 118).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 114).

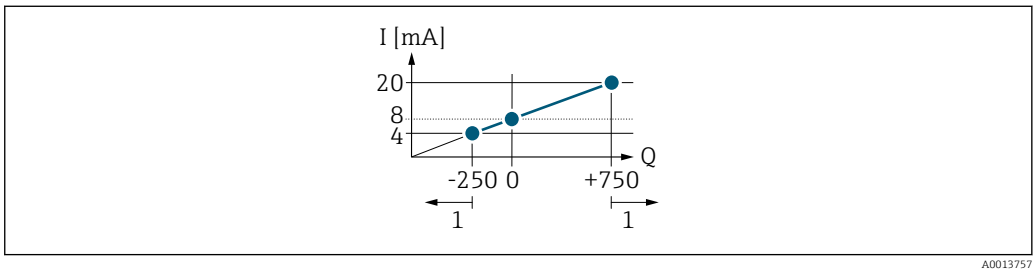
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 115)
- Failure mode (→ 125)

Configuration examples

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

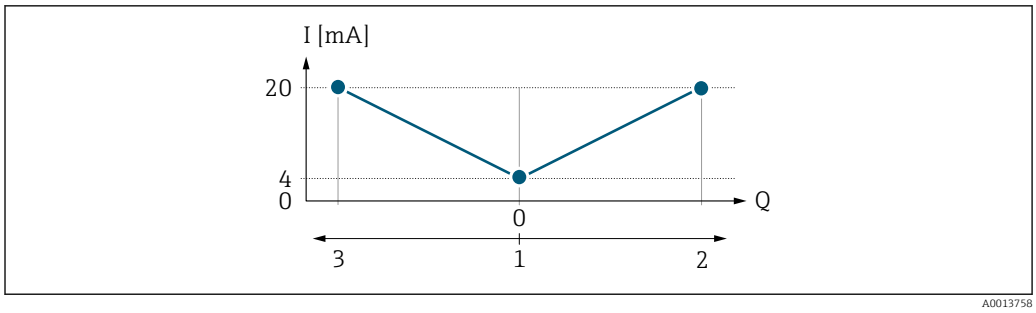
Configuration example A
Measuring mode with **Forward flow** option
- **0/4 mA value** parameter (→ 116) = not equal to zero flow (e.g. −250 m^3/h)
- **20 mA value** parameter (→ 118) = not equal to zero flow (e.g. +750 m^3/h)
- Calculated current value = 8 mA at zero flow



Q Flow
I Current
1 Measuring range is exceeded or undershot

The operational range of the measuring device is defined by the values entered for the **0/4 mA value** parameter (→ 116) and **20 mA value** parameter (→ 118). If the effective flow exceeds or falls below this operational range, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

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



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

The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (→ 116) and **20 mA value** parameter (→ 118) must have the same sign. The value for the **20 mA value** parameter (→ 118) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 118) (e.g. forward flow).

Configuration example C
Measuring mode with **Rev. flow comp.** option
If flow is characterized by severe fluctuations (e.g. when using reciprocating pumps), flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 s → 119.

20 mA value

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

Prerequisite One of the following options is selected in the **Current span** parameter (→ 115):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter→ 237

Additional information *Description*

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 114). 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 (→ 116).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 114).

Example

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

If the **Forward/Reverse** option is selected in the **Measuring mode** parameter (→ 119), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 116) and **20 mA value** parameter (→ 118). The diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 116).

Measuring mode

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

Prerequisite In the **Assign curr.** parameter (→ 114), one of the following options is selected:
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

In the **Current span** parameter (→ 115), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

* Visibility depends on order options or device settings

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

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

Factory setting Forward flow

Additional information *Description*

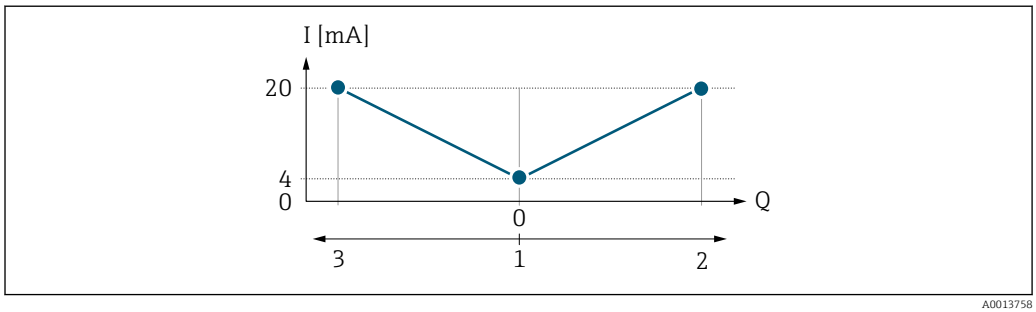
The process variable that is assigned to the current output via the **Assign curr.** parameter (→ 114) is displayed below the parameter.

"Forward flow" option

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

The flow components outside the scaled measuring range are taken into account for signal output as follows:
- Both values are defined such that they are not equal to zero flow e.g.:
  - 0/4 mA current value = −5 m^3/h
  - 20 mA current value = 10 m^3/h
- If the effective flow exceeds or falls below this measuring range, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

"Forward/Reverse" option



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

- The current output signal is independent of the direction of flow (absolute amount of the measured variable). The values for the **0/4 mA value** parameter (→ 116) and **20 mA value** parameter (→ 118) must have the same sign.
- The value for the **20 mA value** parameter (→ 118) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 118) (e.g. forward flow).

"Rev. flow comp." option

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

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

* Visibility depends on order options or device settings

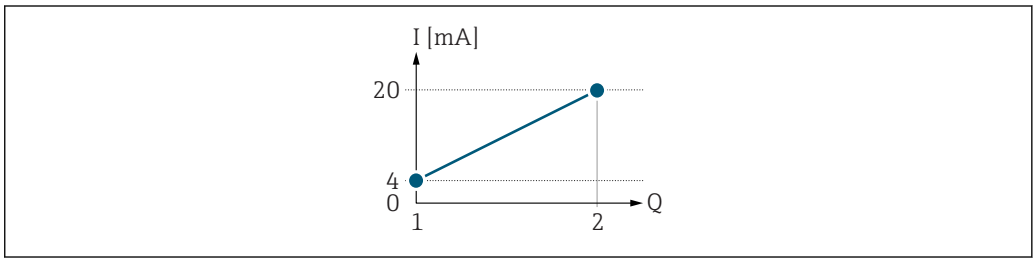
Flow values can aggregate in the buffer in the event of prolonged and unwanted fluid reverse flow. However, these flows are not taken into consideration by the current output configuration, i.e. the reverse flow is not compensated.

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

Examples of how the current output behaves

Example 1

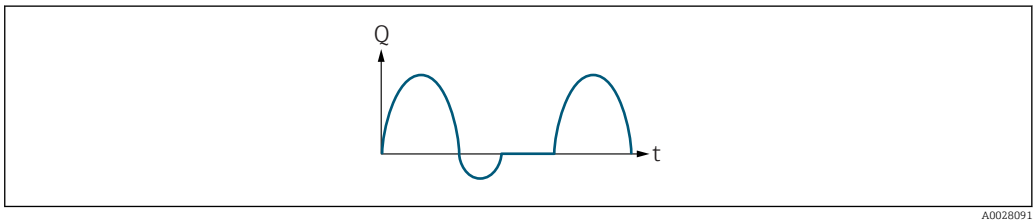
Defined measuring range: lower range value and upper range value with the **same** sign



2 *Measuring range*

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

With the following flow response:

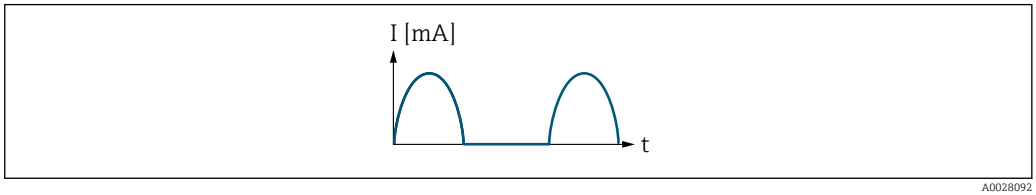


3 *Flow response*

Q Flow
t Time

With **Forward flow** option

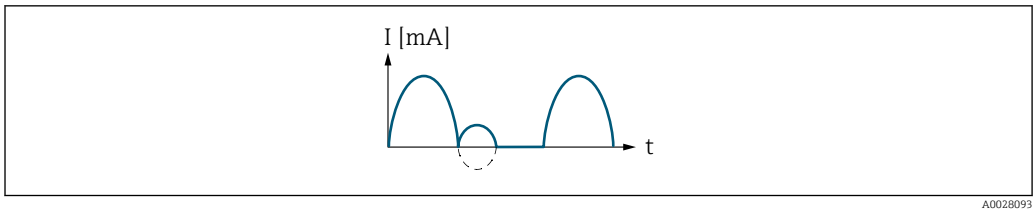
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



I Current
t Time

With **Forward/Reverse** option

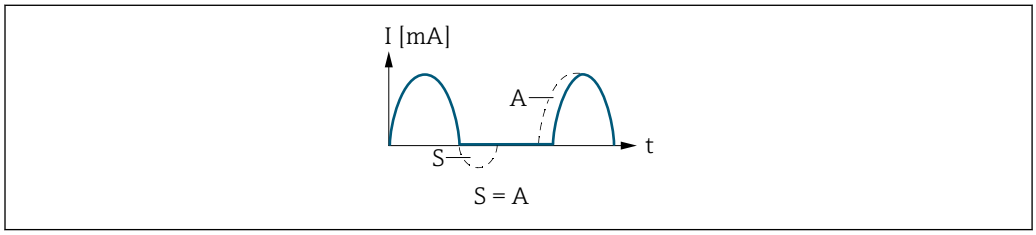
The current output signal is independent of the direction of flow.



I Current
t Time

With **Rev. flow comp.** option

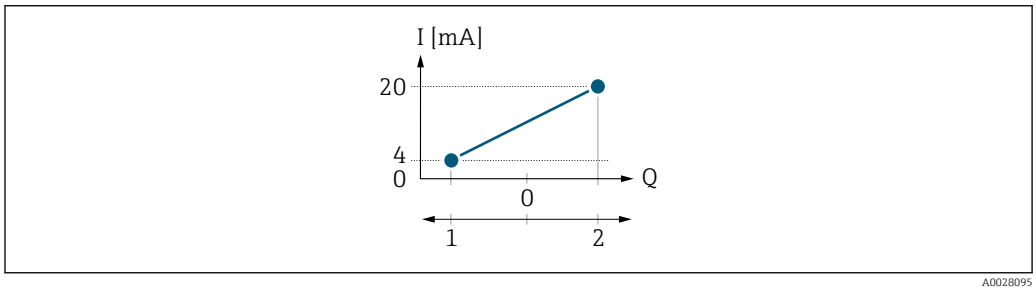
Flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.



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

Example 2

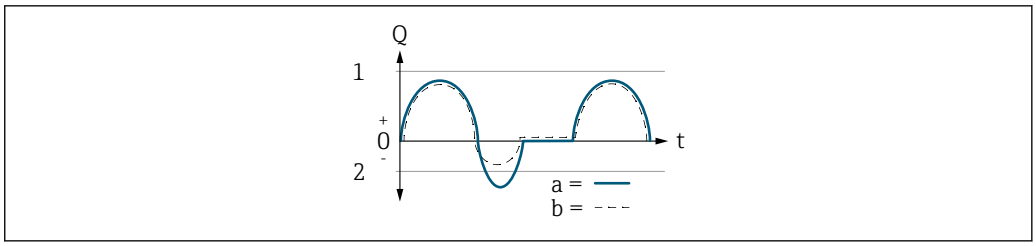
Defined measuring range: lower range value and upper range value with **different** signs



4 *Measuring range*

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

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



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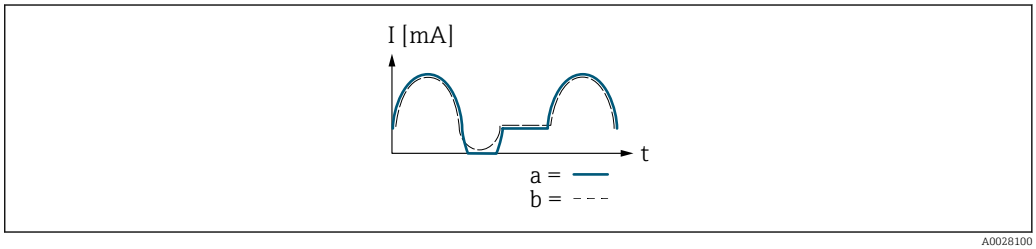
Q Flow
t Time
1 Lower range value (value assigned to 0/4 mA current)
2 Upper range value (value assigned to 20 mA current)

With **Forward flow** option

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



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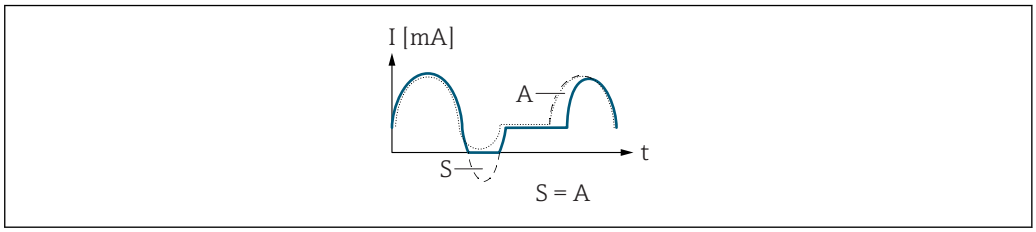
I Current
t Time

With **Forward/Reverse** option

This option is not possible in this case as the values for the **0/4 mA value** parameter (→ 116) and **20 mA value** parameter (→ 118) have different signs.

With **Rev. flow comp.** option

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



A0028101

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

Damping out. 1 to n

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

Prerequisite A process variable is selected in the **Assign curr.** parameter (→ 114) and one of the following options is selected in the **Current span** parameter (→ 115):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

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

User entry 0.0 to 999.9 s

Factory setting 1.0 s

Additional information *User entry*

Use this function to enter a time constant (PT1 element [6]) for current output damping:
- If a low time constant is entered, the current output reacts particularly quickly to fluctuating measured variables.
- On the other hand, the current output reacts more slowly if a high time constant is entered.

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

Response time

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

Prerequisite One of the following options is selected in the **Assign curr.** parameter (→ 114):
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0
- Osc. damping 0

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

- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

One of the following options is selected in the **Current span** parameter (→ 115):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

Description

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

User interface

Positive floating-point number

Additional information

Description

The response time is made up of the time specified for the following dampings:
- Current output damping → 124
  and
- Depending on the measured variable assigned to the output.
  - Flow damping
    or
  - Density damping
    or
  - Temperature damping

Failure mode

Navigation

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

Prerequisite

A process variable is selected in the **Assign curr.** parameter (→ 114) and one of the following options is selected in the **Current span** parameter (→ 115):
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

Description

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

Selection

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

Factory setting

Max.

Additional information

Description

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

"Min." option

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

The signal on alarm level is defined via the **Current span** parameter (→ 115).

"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 (→ 115).

"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 (→ 126).

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 (→ 125).

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

User entry 0 to 22.5 mA

Factory setting 22.5 mA

Output curr. 1 to n

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

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

User interface 3.59 to 22.5 mA

Measur. curr. 1 to n

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

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

User interface 0 to 30 mA

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

Navigation Expert → Output → PFS output 1 to n

Response time (0491–1 to n)	→ 139
Failure mode (0451–1 to n)	→ 140
Failure freq. (0474–1 to n)	→ 140
Output freq. 1 to n (0471–1 to n)	→ 141
Switch out funct (0481–1 to n)	→ 141
Assign diag. beh (0482–1 to n)	→ 142
Assign limit (0483–1 to n)	→ 142
Switch-on value (0466–1 to n)	→ 145
Switch-off value (0464–1 to n)	→ 145
Assign dir.check (0484–1 to n)	→ 146
Assign status (0485–1 to n)	→ 146
Switch-on delay (0467–1 to n)	→ 146
Switch-off delay (0465–1 to n)	→ 147
Failure mode (0486–1 to n)	→ 147
Switch status 1 to n (0461–1 to n)	→ 147
Invert outp.sig. (0470–1 to n)	→ 148

Terminal no.

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

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

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

Additional information *"Not used" option*

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

Signal mode

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

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

Selection
- Passive
- Active
- Passive NAMUR

Factory setting Passive

Operating mode

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

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

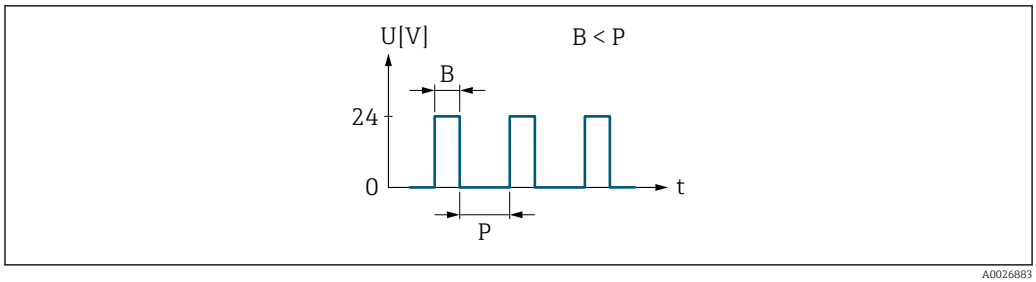
Selection
- Pulse
- Frequency
- Switch

Factory setting Pulse

Additional information *"Pulse" option*

Quantity-dependent pulse with configurable pulse width
- Whenever a specific mass, volume, corrected volume, target mass or carrier mass is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width).
- The pulses are never shorter than the set duration.

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



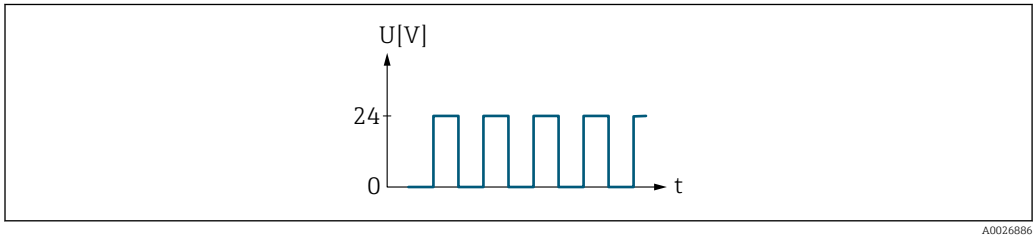
5 Quantity-proportional pulse (pulse value) with pulse width to be configured

B Pulse width entered
P Pauses between the individual pulses

"Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio
An output frequency is output that is proportional to the value of a process variable, such as mass flow, volume flow, corrected volume flow, target mass flow, carrier mass flow, density, reference density, concentration, temperature, carrier tube temperature, electronic temperature, vibration frequency, frequency fluctuation, oscillation amplitude, oscillation damping, oscillation damping fluctuation, signal asymmetry or excitation current.

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

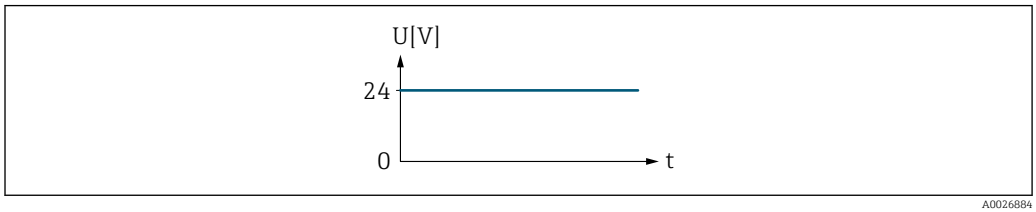


6 Flow-proportional frequency output

"Switch" option

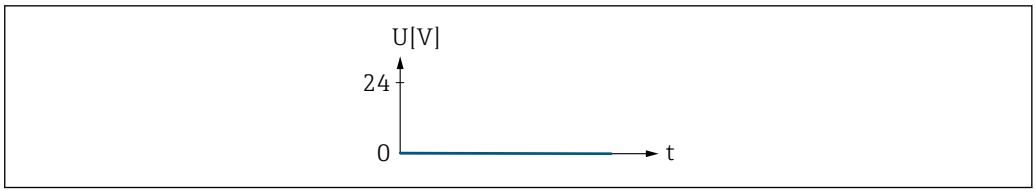
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

Example
Alarm response without alarm



7 No alarm, high level

Example
Alarm response in case of alarm



8 *Alarm, low level*

Assign pulse 1 to n

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 129) parameter.

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

Selection
- Off
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *

Factory setting Off

Pulse scaling

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign pulse** parameter (→ 131).

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→ 237

Additional information *User entry*

Weighting of the pulse output with a quantity.

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

* Visibility depends on order options or device settings

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 (→ 129) and a process variable is selected in the **Assign pulse** parameter (→ 131).

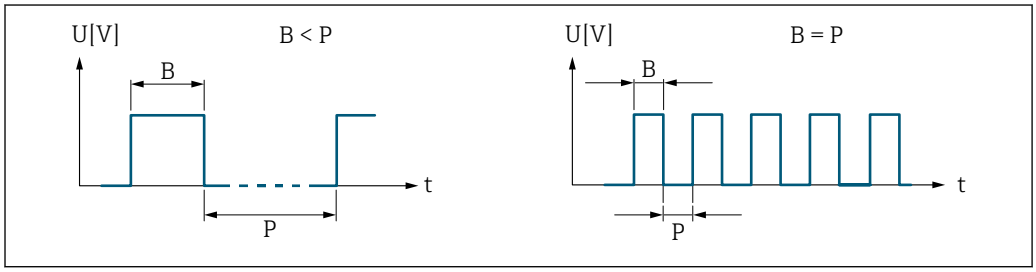
Description Use this function to enter the duration of the output pulse.

User entry 0.05 to 2 000 ms

Factory setting 100 ms

Additional information *Description*

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



B Pulse width entered
P Pauses between the individual pulses

Example

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

Measuring mode

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

Prerequisite In the **Operating mode** parameter (→ 129), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 131):

- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *

* Visibility depends on order options or device settings

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

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

Factory setting Forward flow

Additional information *Selection*
- Forward flow
  Positive flow is output, negative flow is not output.
- Forward/Reverse
  Positive and negative flow are output (absolute value), but a distinction is not made between positive and negative flow.
- Reverse flow
  Negative flow is output, positive flow is not output.
- Rev. flow comp.
  The flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.

For a detailed description of the options available, see the **Measuring mode** parameter (→ 119)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 119)

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 (→ 129) and a process variable is selected in the **Assign pulse** parameter (→ 131).

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

Selection
- Actual value
- No pulses

Factory setting No pulses

Additional information *Description*

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

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

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

Pulse output 1 to n

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

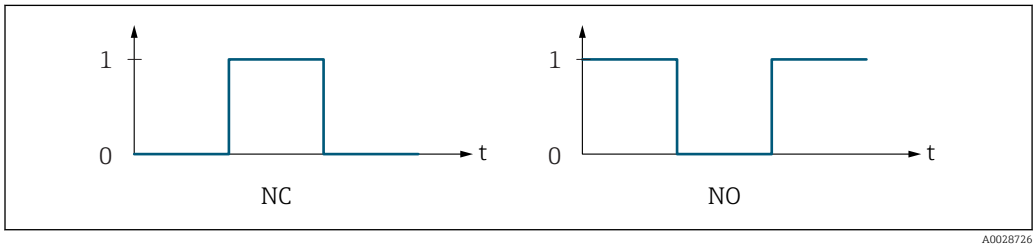
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 129) parameter.

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.



A0028726

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

The output behavior can be reversed via the **Invert outp.sig.** parameter (→ 148) 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 (→ 133)) can be configured.

Assign freq.

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 129).

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

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

Selection

- Off
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density
- Ref.dens.altern. *
- GSV flow *
- GSVa *
- NSV flow *
- NSVa *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water vol. flow *
- Oil corr.vol.fl. *
- Water corr.v.fl. *
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Osc. ampl. 0 *
- Freq. fluct. 0 *
- Osc. damping 0 *
- Osc.damp.fluct 0 *
- Signal asymmetry *
- Exc. current 0 *
- HBSI *
- Pressure
- Spec. output 0 *
- Spec. output 1 *
- Index inh.medium
- Index sus.bubble *

Factory setting

Off

Min. freq. value

Navigation

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

Prerequisite

The **Frequency** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign freq.** parameter (→ 134).

* Visibility depends on order options or device settings

Description Use this function to enter the minimum frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 0.0 Hz

Max. freq. value

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign freq.** parameter (→ 134).

Description Use this function to enter the end value frequency.

User entry 0.0 to 10 000.0 Hz

Factory setting 10 000.0 Hz

Val. at min.freq

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign freq.** parameter (→ 134).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information *Dependency*

The entry depends on the process variable selected in the **Assign freq.** parameter (→ 134).

Val. at max.freq

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign freq.** parameter (→ 134).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter

Additional information

Description

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

Dependency

The entry depends on the process variable selected in the **Assign freq.** parameter (→ 134).

Measuring mode

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

Prerequisite In the **Operating mode** parameter (→ 129), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 134):
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

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

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

Factory setting Forward flow

* Visibility depends on order options or device settings

Additional information

Selection

For a detailed description of the options available, see the **Measuring mode** parameter (→ 119)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 119)

Damping out. 1 to n

Navigation

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

Prerequisite

In the **Operating mode** parameter (→ 129), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 134):
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

Description

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

User entry

0 to 999.9 s

Factory setting

0.0 s

* Visibility depends on order options or device settings

Additional information *User entry*

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

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

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

Response time

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

Prerequisite In the **Operating mode** parameter (→ 129), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 134):
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. ampl. 0 *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

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

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

Additional information *Description*

The response time is made up of the time specified for the following dampings:
- Damping of pulse/frequency/switch output → 124
  and
- Depending on the measured variable assigned to the output.
  - Flow damping
    or
  - Density damping
    or
  - Temperature damping

Failure mode

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign freq.** parameter (→ 134).

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

Selection
- Actual value
- Defined value
- 0 Hz

Factory setting 0 Hz

Additional information *Selection*

- Actual value
  In the event of a device alarm, the frequency output continues on the basis of the current flow measurement. The device alarm is ignored.
- Defined value
  In the event of a device alarm, the frequency output continues on the basis of a predefined value. The Failure freq. (→ 140) replaces the current measured value, making it possible to bypass the device alarm. The actual measurement is switched off for the duration of the device alarm.
- 0 Hz
  In the event of a device alarm, the frequency output is "switched off".

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

Failure freq.

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

Prerequisite The **Frequency** option is selected in the **Operating mode** parameter (→ 129) and a process variable is selected in the **Assign freq.** parameter (→ 134).

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

User entry 0.0 to 12 500.0 Hz

Factory setting 0.0 Hz

Output freq. 1 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 (→ 129), the **Frequency** option is selected.

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

User interface 0.0 to 12 500.0 Hz

Switch out funct

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 129).

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

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

Factory setting Off

Additional information *Selection*
- Off
  The switch output is permanently switched off (open, non-conductive).
- On
  The switch output is permanently switched on (closed, conductive).
- Diag. behavior
  Indicates if the diagnostic event is present or not. Is used to output diagnostic information and to react to it appropriately at the system level.

- Limit
  Indicates if a specified limit value has been reached for the process variable. Is used to output diagnostic information relating to the process and to react to it appropriately at the system level.
- Fl. direct.check
  Indicates the flow direction (forward or reverse flow).
- Status
  Indicates the device status depending on whether empty pipe detection or low flow cut off is selected.

Assign diag. beh

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

Prerequisite
- In the **Operating mode** parameter (→ 129), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 141), the **Diag. behavior** option is selected.

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

Selection
- Alarm
- Alarm or warning
- Warning

Factory setting Alarm

Additional information

Description

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

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

Assign limit

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 129).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 141).

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

Selection

- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density *
- Ref.dens.altern. *
- GSV flow *
- GSVa *
- NSV flow *
- NSVa *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water vol. flow *
- Oil corr.vol.fl. *
- Water corr.v.fl. *
- Concentration *
- Temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Oscil. damping
- Pressure
- Spec. output 0 *
- Spec. output 1 *
- Index inh.medium
- Index sus.bubble *

Factory setting

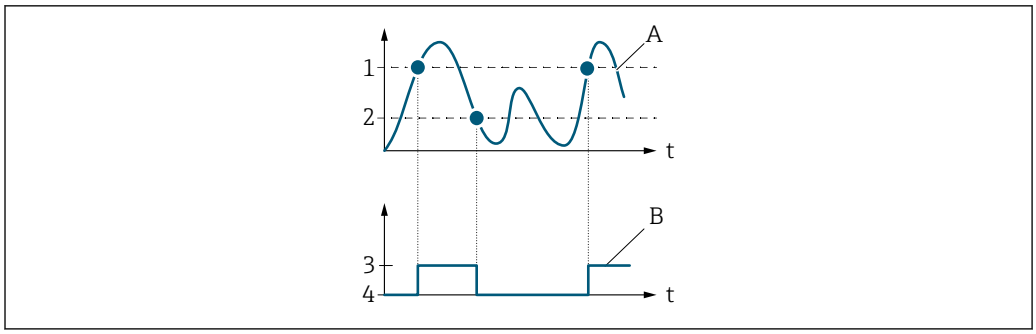
Mass flow

Additional information

Description

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

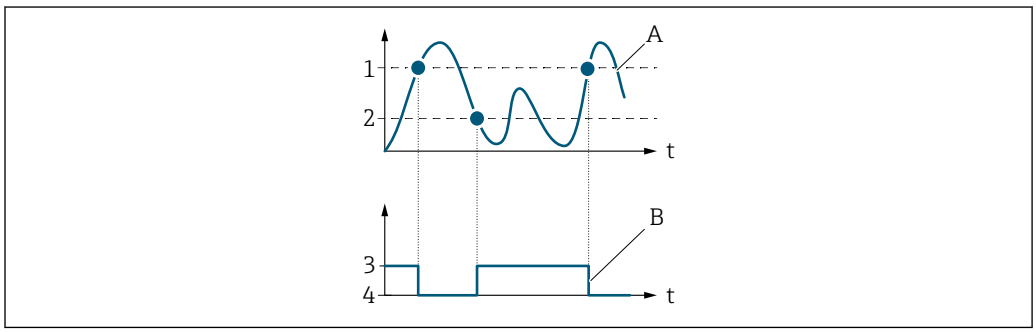
* Visibility depends on order options or device settings



A0026891

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

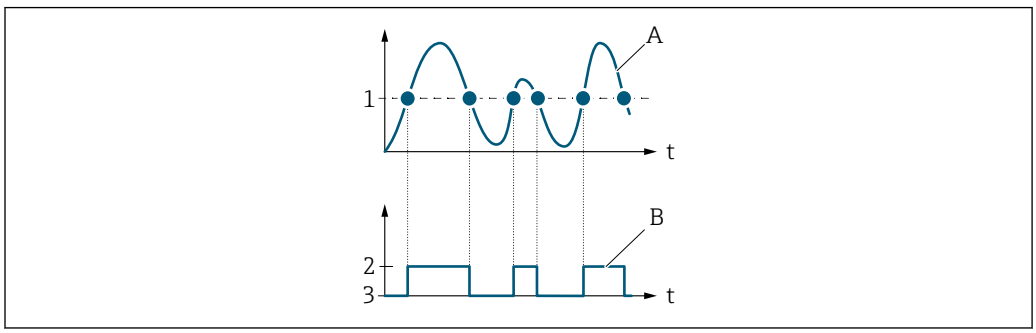
Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive



A0026892

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



A0026893

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 (→ 129).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 141).

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

User entry Signed floating-point number

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

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 142).

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 (→ 129).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 141).

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

User entry Signed floating-point number

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

Additional information

Description

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

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

Dependency

The unit depends on the process variable selected in the **Assign limit** parameter (→ 142).

Assign dir.check

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 129).
- The **Fl. direct.check** option is selected in the **Switch out funct** parameter (→ 141).

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

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

Factory setting Mass flow

Assign status

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 129).
- The **Status** option is selected in the **Switch out funct** parameter (→ 141).

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

Selection
- Partial pipe det
- Low flow cut off
- Profinet Slot 24 *
- Profinet Slot 25 *
- Profinet Slot 26 *

Factory setting Partial pipe det

Additional information *Options*

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

Switch-on delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 129).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 141).

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

* Visibility depends on order options or device settings

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-off delay

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

Prerequisite
- The **Switch** option is selected in the **Operating mode** parameter (→ 129).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 141).

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

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

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

Selection
- Actual status
- Open
- Closed

Factory setting Open

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

Switch status 1 to n

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

Prerequisite The **Switch** option is selected in the **Operating mode** parameter (→ 129).

Description Displays the current switch status of the status output.

User interface
- Open
- Closed

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

Invert outp.sig.

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

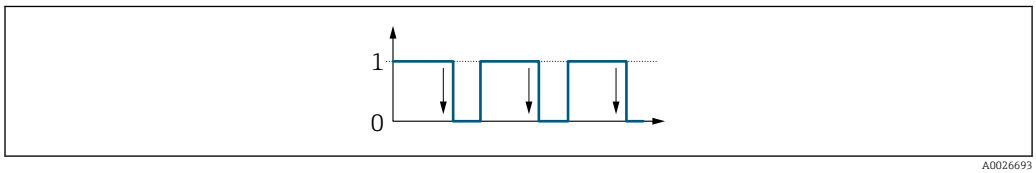
Description Use this function to select whether to invert the output signal.

Selection
- No
- Yes

Factory setting No

Additional information *Selection*

No option (passive - negative)



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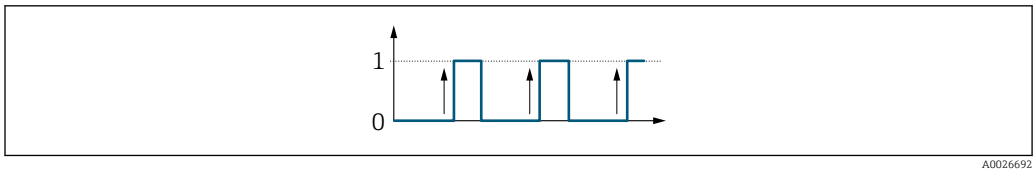
Yes option (passive - positive)



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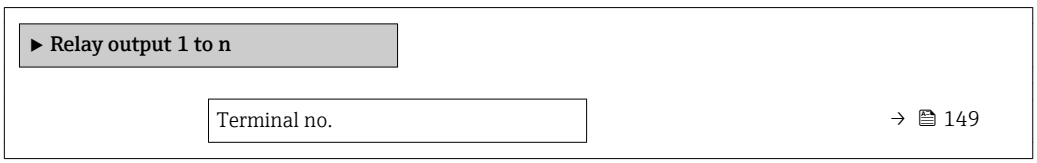
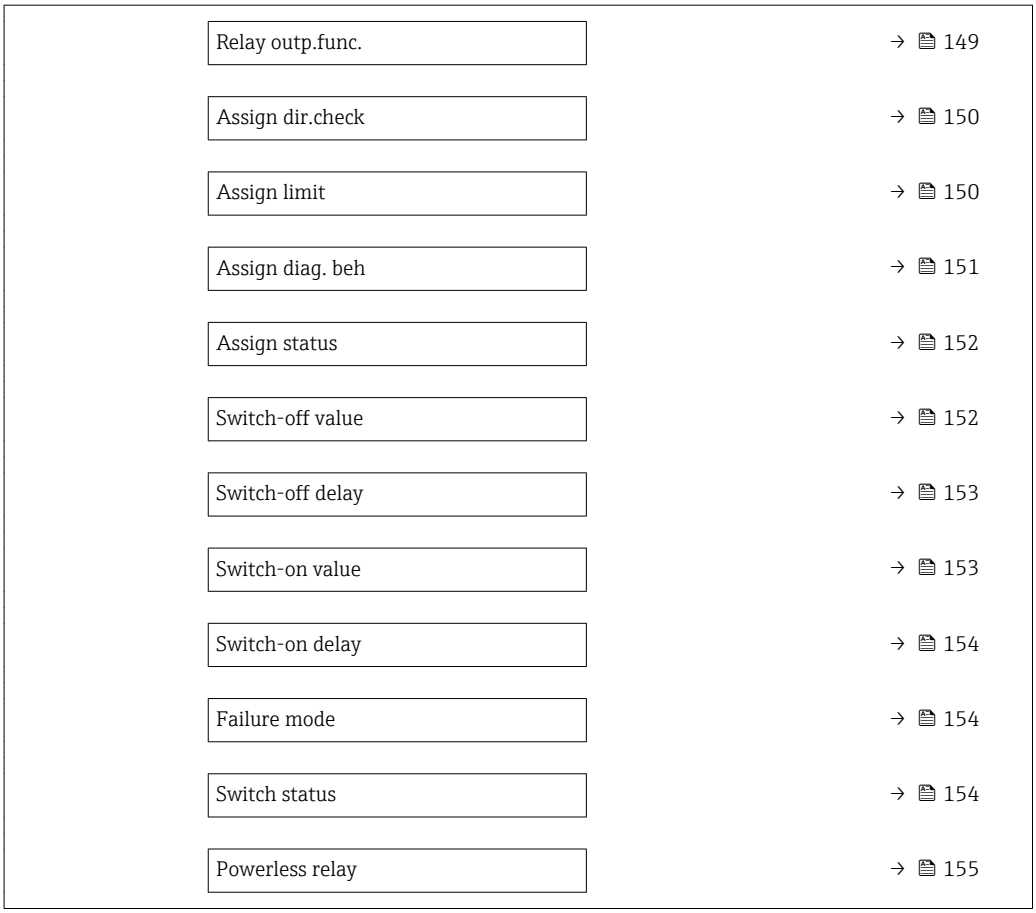
3.5.3 "Relay output 1 to n" submenu

Navigation Expert → Output → Relay output 1 to n





Terminal no.

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

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

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

Additional information *"Not used" option*

The relay output module does not use any terminal numbers.

Relay outp.func.

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

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

Selection
- Closed
- Open
- Diag. behavior

- Limit
- Fl. direct.check
- Digital Output

Factory setting Closed

Additional information *Selection*

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

Assign dir.check

Navigation Expert → Output → Relay output 1 to n → Assign dir.check (0808–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 149), the **Fl. direct.check** option is selected.

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

Selection

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

Factory setting Mass flow

Assign limit

Navigation Expert → Output → Relay output 1 to n → Assign limit (0807–1 to n)

Prerequisite The **Limit** option is selected in the **Relay outp.func.** parameter (→ 149).

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

* Visibility depends on order options or device settings

Selection
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density *
- Ref.dens.altern. *
- GSV flow *
- GSVa *
- NSV flow *
- NSVa *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water vol. flow *
- Oil corr.vol.fl. *
- Water corr.v.fl. *
- Concentration *
- Temperature
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Oscil. damping
- Pressure
- Spec. output 0 *
- Spec. output 1 *
- Index inh.medium
- Index sus.bubble *

Factory setting Mass flow

Assign diag. beh

Navigation Expert → Output → Relay output 1 to n → Assign diag. beh (0806–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 149), the **Diag. 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

* Visibility depends on order options or device settings

Factory setting Alarm

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 outp.func.** parameter (→ 149), the **Digital Output** option is selected.

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

Selection

- Partial pipe det
- Low flow cut off
- Profinet Slot 24 *
- Profinet Slot 25 *
- Profinet Slot 26 *

Factory setting Partial pipe det

Switch-off value

Navigation Expert → Output → Relay output 1 to n → Switch-off value (0809–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 149), the **Limit** option is selected.

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

User entry Signed floating-point number

Factory setting Country-specific:

- 0 kg/h
- 0 lb/min

* Visibility depends on order options or device settings

Additional information

Description

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

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

Dependency

The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 150).

Switch-off delay

Navigation Expert → Output → Relay output 1 to n → Switch-off delay (0813–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 149), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-on value

Navigation Expert → Output → Relay output 1 to n → Switch-on value (0810–1 to n)

Prerequisite The **Limit** option is selected in the **Relay outp.func.** parameter (→ 149).

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

User entry Signed floating-point number

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

Additional information

Description

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

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

Dependency

The unit is dependent on the process variable selected in the **Assign limit** parameter (→ 150).

Switch-on delay

Navigation Expert → Output → Relay output 1 to n → Switch-on delay (0814–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 149), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Failure mode

Navigation Expert → Output → Relay output 1 to n → Failure mode (0811–1 to n)

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

Selection
- Actual status
- Open
- Closed

Factory setting Open

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

Switch status

Navigation Expert → Output → Relay output 1 to n → Switch status (0801–1 to n)

Description Displays the current status of the relay output.

User interface
- Open
- Closed

Additional information *User interface*

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

Powerless relay

Navigation Expert → Output → Relay output 1 to n → Powerless relay (0816–1 to n)

Description Use this function to select the quiescent state for the relay output.

Selection
- Open
- Closed

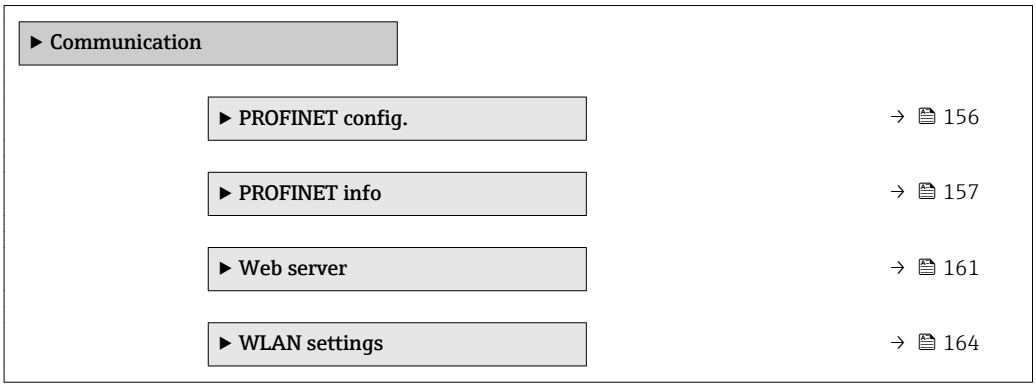
Factory setting Open

Additional information *Selection*

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

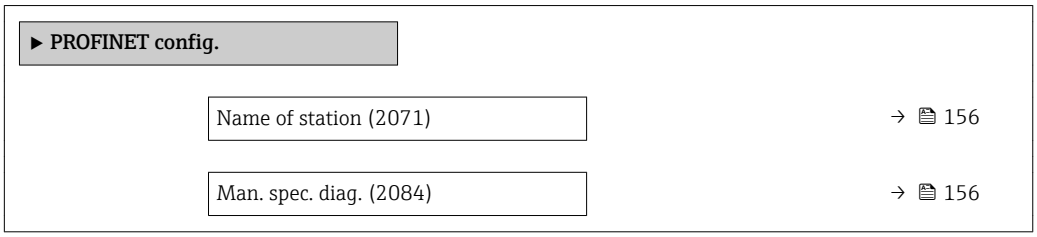
3.6 "Communication" submenu

Navigation Expert → Communication



3.6.1 "PROFINET config." submenu

Navigation Expert → Communication → PROFINET config.



Name of station

Navigation Expert → Communication → PROFINET config. → Name of station (2071)

Description Displays a unique name for the measuring point so it can be identified quickly within the plant.

User entry Max. 240 characters such as lower-case letters or numbers

Factory setting eh-cubemass300-xxxxx

Additional information *Description*

The device tag corresponds to the device name ("Name Of Station" of PROFINET specification) The device name can be adjusted via DIP switch or the automation system.

Factory setting

Structure of the device tag:
eh-cubemass300-xxxxx
- eh: Endress+Hauser
- cubemass: Instrument family
- 300: Transmitter
- xxxxx: Serial number of the device

Man. spec. diag.

Navigation Expert → Communication → PROFINET config. → Man. spec. diag. (2084)

Description Use this function to enable the transfer of manufacturer-specific diagnostic events.

Selection
- Not active
- Active

Factory setting Active

Additional information

Description

- Active
  In addition to the PROFINET standard alarms, active manufacturing-specific diagnostic events are also transferred to the automation system. The diagnostic number and the error text of the respective diagnostic event are displayed.
- Not active
  Only the PROFINET standard alarms are transferred to the automation system.

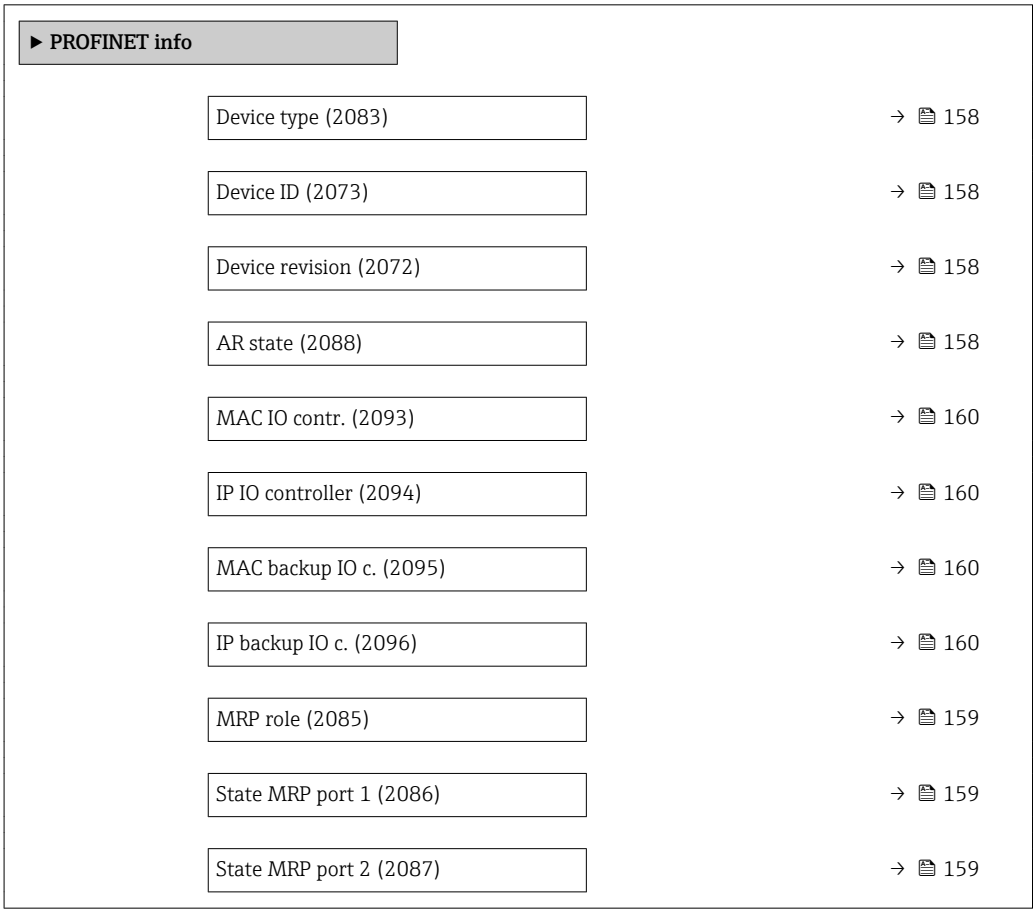
Selection

This selection affects PROFINET communication only.

Diagnostic events are displayed in the DTM or web server regardless of the selection made in this parameter. The PROFINET standard alarms (diagnosis and process) for the stack are also unaffected by the selected made.

3.6.2 "PROFINET info" submenu

Navigation Expert → Communication → PROFINET info



Device type

Navigation Expert → Communication → PROFINET info → Device type (2083)

Description Displays the device type (device type code).

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

Factory setting Cubemass 300

Device ID

Navigation Expert → Communication → PROFINET info → Device ID (2073)

Description Use this function to display the device ID.

User interface 0 to 65 535

Device revision

Navigation Expert → Communication → PROFINET info → Device revision (2072)

Description Use this function to display the device revision.

User interface 0 to 65 535

Additional information *Description*
The device revision enables the correct assignment of device drivers to the device.

AR state

Navigation Expert → Communication → PROFINET info → AR state (2088)

Description Displays whether an active AR (Application Relation) connection has been established.

User interface
- Active
- Not active
- Redund. 1AR act.
- Redund. 2AR act.

Factory setting Not active

MRP role

Navigation Expert → Communication → PROFINET info → MRP role (2085)

Description Displays the current status of the MRP (Media Redundancy Protocol) role.

When a connection is established, an MRP role is assigned to the measuring device if MRP was enabled in the controller.

User interface
- MRP deactivated
- Client activated
- Manager active

Factory setting MRP deactivated

State MRP port 1

Navigation Expert → Communication → PROFINET info → State MRP port 1 (2086)

Description Displays the status of MRP port 1 if an MRP connection has been established.

User interface
- Port deactivated
- Port blocking
- Port forwarding

Factory setting Port deactivated

Additional information *Selection*
- Port forwarding
  The ring is closed.
- Port blocking
  The ring is open.

State MRP port 2

Navigation Expert → Communication → PROFINET info → State MRP port 2 (2087)

Description Displays the status of MRP port 2 if an MRP connection has been established.

User interface
- Port deactivated
- Port blocking
- Port forwarding

Factory setting Port deactivated

Additional information *Selection*

- Port forwarding
  The ring is closed.
- Port blocking
  The ring is open.

MAC IO contr.

Navigation Expert → Communication → PROFINET info → MAC IO contr. (2093)

Description Shows the MAC address of the only or of the primary IO controller.

Factory setting 0x00

IP IO controller

Navigation Expert → Communication → PROFINET info → IP IO controller (2094)

Description Shows the IP address of the only or of the primary IO controller.

Factory setting 0x00

MAC backup IO c.

Navigation Expert → Communication → PROFINET info → MAC backup IO c. (2095)

Description Shows the MAC adress of the backup IO controller.

Factory setting 0x00

IP backup IO c.

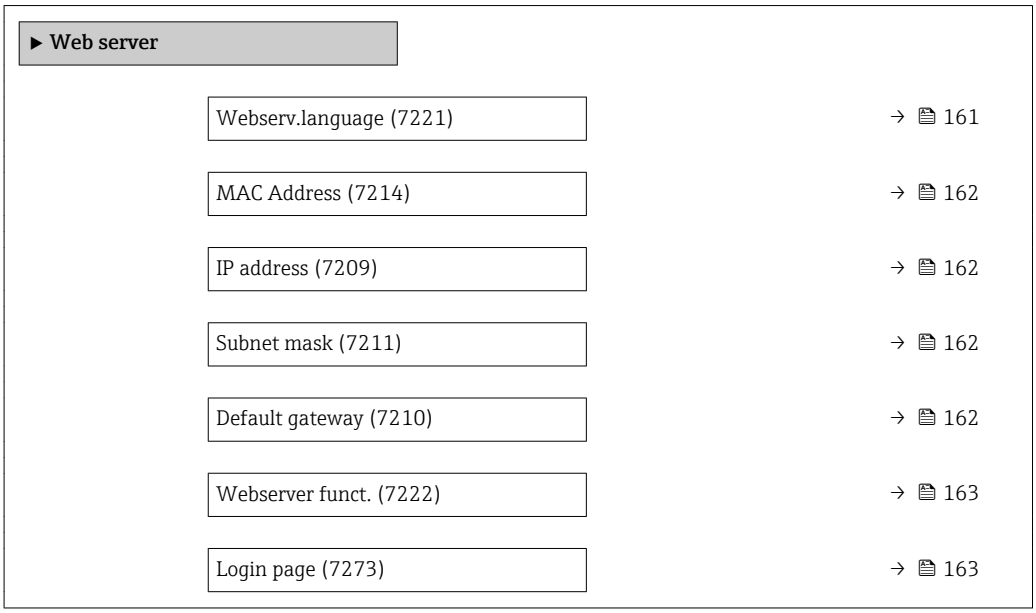
Navigation Expert → Communication → PROFINET info → IP backup IO c. (2096)

Description Shows the IP adress of the backup IO controller.

Factory setting 0x00

3.6.3 "Web server" submenu

Navigation Expert → Communication → Web server



Webserv.language

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

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

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

Factory setting English

MAC Address

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

Description Displays the MAC [8] 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

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)

Factory setting 192.168.1.212

Subnet mask

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

Description Display or enter the subnet mask.

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

Factory setting 255.255.255.0

Default gateway

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

Description Display or enter the Default gateway (→ 162).

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

8) Media Access Control

Factory setting 0.0.0.0

Webserver funct.

Navigation Expert → Communication → Web server → Webserver funct. (7222)

Description Use this function to switch the Web server on and off.

Selection
- Off
- HTML Off
- On

Factory setting On

Additional information

Description

Once disabled, the Webserver funct. can only be re-enabled via or the operating tool FieldCare.

Selection

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

Login page

Navigation Expert → Communication → Web server → Login page (7273)

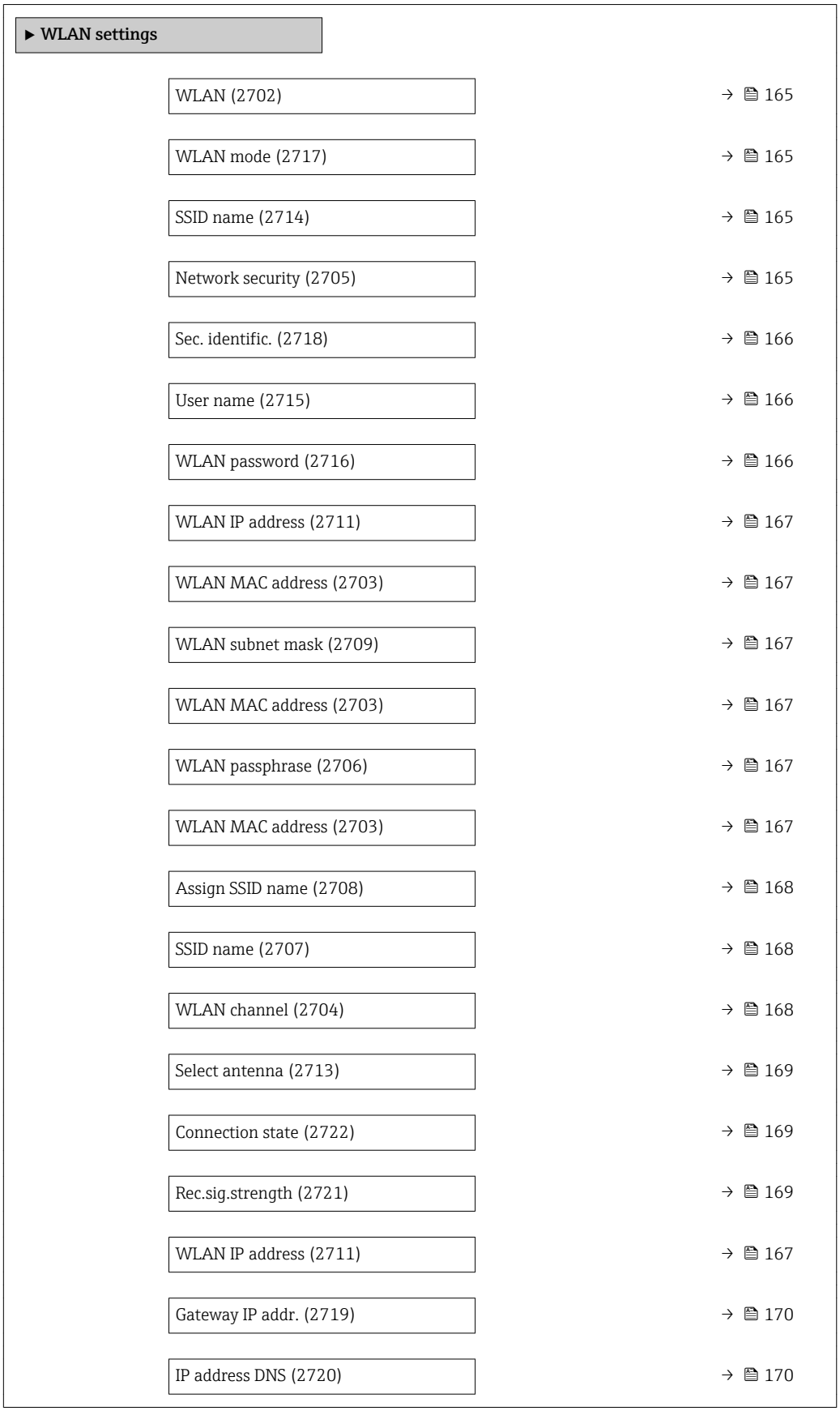
Description Use this function to select the format of the login page.

Selection
- Without header
- With header

Factory setting With header

3.6.4 "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

Factory setting Enable

WLAN mode

Navigation Expert → Communication → WLAN settings → WLAN mode (2717)

Description Use this function to select the WLAN mode.

Selection
- Access point
- WLAN Client

Factory setting Access point

SSID name

Navigation Expert → Communication → WLAN settings → SSID name (2714)

Prerequisite The client is activated.

Description Use this function to enter the user-defined SSID name (max. 32 characters) of the WLAN network.

User entry –

Factory setting –

Network security

Navigation Expert → Communication → WLAN settings → Network security (2705)

Description Use this function to select the type of security for the WLAN interface.

Selection
- Unsecured
- WPA2-PSK
- EAP-PEAP MSCHAP2 *
- EAP-PEAP NoAuth. *
- EAP-TLS *

Factory setting WPA2-PSK

Additional information *Selection*
- Unsecured
  Access the WLAN connection without identification.
- WPA2-PSK
  Access the WLAN connection with a network key.

Sec. identific.

Navigation Expert → Communication → WLAN settings → Sec. identific. (2718)

Description Use this function to select the security settings (download via the menu: Data Management > Security > Download WLAN).

User interface
- Trust. iss.cert.
- Device certific.
- Dev. private key

User name

Navigation Expert → Communication → WLAN settings → User name (2715)

Description Use this function to enter the username of the WLAN network.

User entry –

Factory setting –

WLAN password

Navigation Expert → Communication → WLAN settings → WLAN password (2716)

Description Use this function to enter the WLAN password for the WLAN network.

User entry –

Factory setting –

* Visibility depends on order options or device settings

WLAN IP address

Navigation Expert → Communication → 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)

Factory setting 192.168.1.212

WLAN MAC address

Navigation Expert → Communication → WLAN settings → WLAN MAC address (2703)

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

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)

Factory setting 255.255.255.0

WLAN passphrase

Navigation Expert → Communication → WLAN settings → WLAN passphrase (2706)

Prerequisite The **WPA2-PSK** option is selected in the **Security type** parameter (→ 165).

Description Use this function to enter the network key.

9) Media Access Control

User entry 8 to 32-digit character string comprising numbers, letters and special characters (without spaces)

Factory setting Serial number of the measuring device (e.g. L100A802000)

Assign SSID name

Navigation Expert → Communication → WLAN settings → Assign SSID name (2708)

Description Use this function to select which name is used for the SSID [10].

Selection
- Device tag
- User-defined

Factory setting User-defined

Additional information *Selection*
- Device tag
  The device tag name is used as the SSID.
- User-defined
  A user-defined name is used as the SSID.

SSID name

Navigation Expert → Communication → WLAN settings → SSID name (2707)

Prerequisite
- The **User-defined** option is selected in the **Assign SSID name** parameter (→ 168).
- The **Access point** option is selected in the **WLAN mode** parameter (→ 165).

Description Use this function to enter a user-defined SSID name.

User entry Max. 32-digit character string comprising numbers, letters and special characters

Factory setting EH_device designation_last 7 digits of the serial number (e.g. EH_Cubemass_300_A802000)

WLAN channel

Navigation Expert → Communication → WLAN settings → WLAN channel (2704)

Description Use this function to enter the WLAN channel.

User entry 1 to 11

10) Service Set Identifier

Factory setting 6

Additional information *Description*

- It is only necessary to enter a WLAN channel if multiple WLAN devices are in use.
- If just one measuring device is in use, it is recommended to keep the factory setting.

Select antenna

Navigation Expert → Communication → WLAN settings → Select antenna (2713)

Description Use this function to select whether the external or internal antenna is used for reception.

Selection
- External antenna
- Internal antenna

Factory setting Internal antenna

Connection state

Navigation Expert → Communication → WLAN settings → Connection state (2722)

Description The connection status is displayed.

User interface
- Connected
- Not connected

Factory setting Not connected

Rec.sig.strength

Navigation Expert → Communication → WLAN settings → Rec.sig.strength (2721)

Description Displays the signal strength received.

User interface
- Low
- Medium
- High

Factory setting High

Gateway IP addr.

Navigation Expert → Communication → WLAN settings → Gateway IP addr. (2719)

Description Use this function to enter the IP address of the gateway.

Factory setting 192.168.1.212

IP address DNS

Navigation Expert → Communication → WLAN settings → IP address DNS (2720)
Expert → Communication → WLAN settings → IP address DNS (2720)

Description Use this function to enter the IP address of the domain name server.

Factory setting 192.168.1.212

3.6.5 "Diag. config." submenu

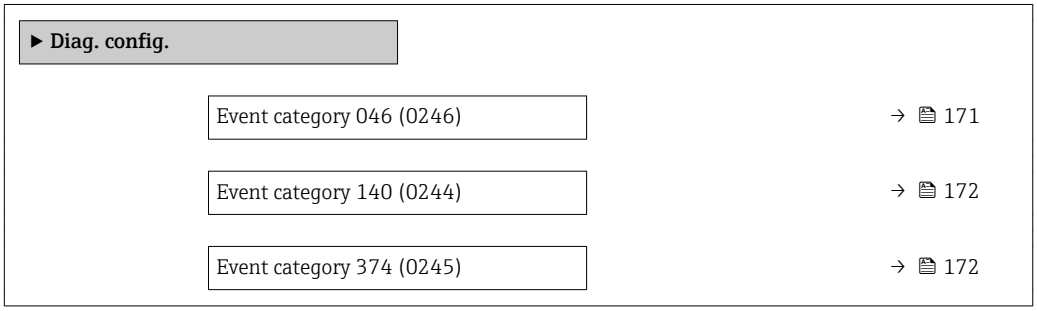
For a list of all the diagnostic events, see the Operating Instructions for the device → 7

Assign a category to the particular diagnostic event:

Category	Meaning
Failure (F)	A device error is present. The measured value is no longer valid.
Funct. check (C)	The device is in service mode (e.g. during a simulation).
Out of spec. (S)	The device is being operated: ▪ Outside its technical specification limits (e.g. outside the process temperature range) ▪ Outside of the configuration carried out by the user (e.g. maximum flow in parameter 20 mA value)
Mainten. req.(M)	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.



Event category 441 (0210) → 172
Event category 442 (0230) → 173
Event category 443 (0231) → 173
Event category 444 (0211) → 173
Event category 543 (0276) → 174
Event category 830 (0240) → 174
Event category 831 (0241) → 175
Event category 832 (0218) → 175
Event category 833 (0225) → 175
Event category 834 (0227) → 176
Event category 835 (0229) → 176
Event category 862 (0214) → 176
Event category 912 (0243) → 177
Event category 913 (0242) → 177
Event category 948 (0275) → 178

Event category 046 (Sensor limit)

Navigation Expert → Communication → Diag. config. → Event category 046 (0246)

Description Use this function to select a category for the diagnostic message **046 Sensor limit**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 140 (Sensor sig.asym.)

Navigation Expert → Communication → Diag. config. → Event category 140 (0244)

Description Use this function to select a category for the diagnostic message **140 Sensor sig.asym.**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 274 (Main electronics)

Navigation Expert → Communication → Diag. config. → Event category 274 (0245)

Description Use this function to select a category for the diagnostic message **274 Main electronics**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 441 (Curr.output 1 to n)

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

Description Use this function to select a category for the diagnostic message **441 Curr.output 1 to n**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 442 (Freq. output 1 to n)

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

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the diagnostic message **442 Freq. output 1 to n**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 443 (Pulse output 1 to n)

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

Prerequisite The pulse/frequency/switch output is available.

Description Use this function to select a category for the diagnostic message **443 Pulse output 1 to n**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 444 (Current input 1 to n)

Navigation Expert → Communication → Diag. config. → Event category 444 (0211)

Prerequisite The current input is available.

Description Use this function to select a category for the diagnostic message **444 Current input 1 to n**.

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

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 170

Event category 543 (Double pulse out)

Navigation Expert → Communication → Diag. config. → Event category 543 (0276)

Description Use this option to select a category for the diagnostic message **543 Double pulse out**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 830 (Sensor temp.)

Navigation Expert → Communication → Diag. config. → Event category 830 (0240)

Description Use this function to select a category for the diagnostic message **830 Sensor temp.**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 831 (Sensor temp.)

Navigation Expert → Communication → Diag. config. → Event category 831 (0241)

Description Use this function to select a category for the diagnostic message **831 Sensor temp.**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 832 (Electronic temp.)

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

Description Use this function to select a category for the diagnostic message **832 Electronic temp.**.

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

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 170

Event category 833 (Electronic temp.)

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

Description Use this option to select a category for the diagnostic message **833 Electronic temp.**.

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

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 170

Event category 834 (Process temp.)

Navigation Expert → Communication → Diag. config. → Event category 834 (0227)

Description Use this option to select a category for the diagnostic message **834 Process temp.**.

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

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 170

Event category 835 (Process temp.)

Navigation Expert → Communication → Diag. config. → Event category 835 (0229)

Description Use this option to select a category for the diagnostic message **835 Process temp.**.

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

Factory setting Out of spec. (S)

Additional information *Selection*

For a detailed description of the event categories available for selection: → 170

Event category 862 (Empty pipe)

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

Description Use this option to select a category for the diagnostic message **862 Empty pipe**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 912 (Medium inhomog.)

Navigation Expert → Communication → Diag. config. → Event category 912 (0243)

Description Use this function to select a category for the diagnostic message **912 Medium inhomog.**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 913 (Medium unsuitab.)

Navigation Expert → Communication → Diag. config. → Event category 913 (0242)

Description Use this function to select a category for the diagnostic message **913 Medium unsuitab.**.

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

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

Event category 948 (Tube damp. high)

Navigation Expert → Communication → Diag. config. → Event category 948 (0275)

Description Use this function to assign a category to the diagnostic message **948 Tube damp. high**.

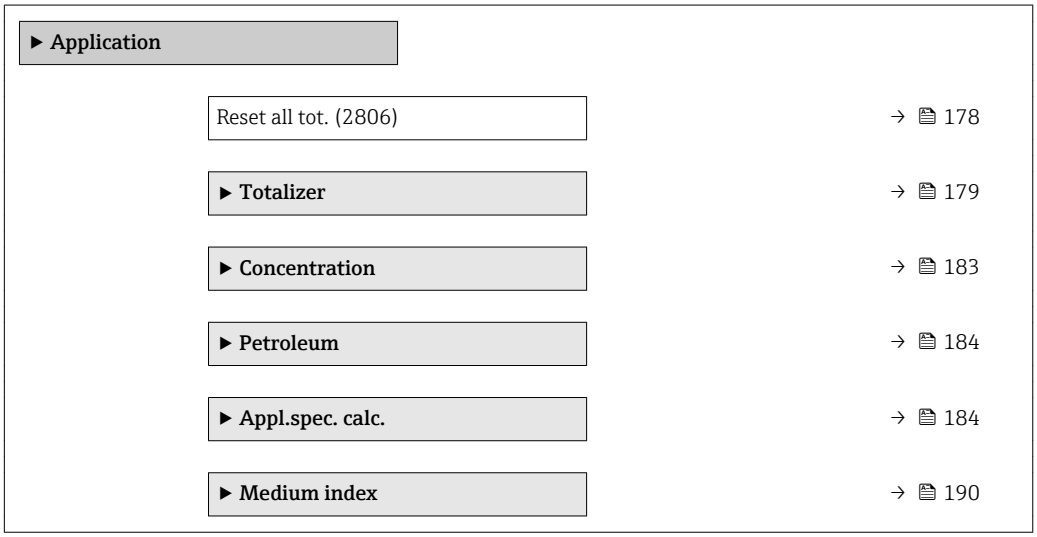
Selection
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- No effect (N)

Factory setting Out of spec. (S)

Additional information For a detailed description of the event categories available for selection: → 170

3.7 "Application" submenu

Navigation Expert → Application



Reset all tot.

Navigation Expert → Application → Reset all tot. (2806)

Description Use this function to reset all totalizers to the value **0** and restart the totaling process. This deletes all the flow values previously totalized.

Selection
- Cancel
- Reset + totalize

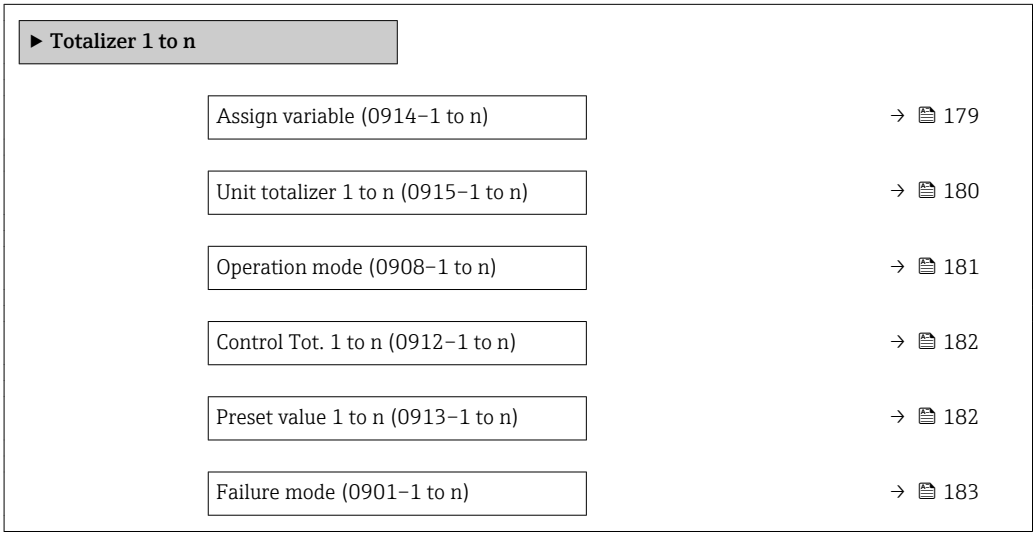
Factory setting Cancel

Additional information *Selection*

Options	Description
Cancel	No action is executed and the user exits the parameter.
Reset + totalize	Resets all totalizers to 0 and restarts the totaling process. This deletes all the flow values previously totalized.

3.7.1 "Totalizer 1 to n" submenu

Navigation Expert → Application → Totalizer 1 to n



Assign variable

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

Description Use this function to select a process variable for the Totalizer 1 to n.

Selection
- Off
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *

Factory setting Mass flow

* Visibility depends on order options or device settings

Additional information

Description

If the option selected is changed, the device resets the totalizer to 0.

Selection

If the **Off** option is selected, only **Assign variable** parameter (→ 179) is still displayed in the **Totalizer 1 to n** submenu. All other parameters in the submenu are hidden.

Unit totalizer 1 to n

Navigation

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

Prerequisite

A process variable is selected in the **Assign variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

Description

Use this function to select the process variable unit for the Totalizer 1 to n (→ 179).

Selection

SI units
- g *
- kg *
- t *

US units
- oz *
- lb *
- STon *

* Visibility depends on order options or device settings

or

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

US units
- af *
- ft^3 *
- Mft^3 *
- fl oz (us) *
- gal (us) *
- kgal (us) *
- Mgal (us) *
- bbl (us;oil) *
- bbl (us;tank) *

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

* Visibility depends on order options or device settings

or

US units
- bbl (us;liq.) *
- bbl (us;beer) *

Imperial units
bbl (imp;beer) *

* Visibility depends on order options or device settings

or

SI units
- Nl *
- Nhl *
- Nm³ *
- Sl *
- Sm³ *

US units
- Sft³ *
- MMSft³ *
- Sgal (us) *
- Sbbl (us;liq.) *
- Sbbl (us;oil) *

Imperial units
Sgal (imp) *

* Visibility depends on order options or device settings

or

Other units
None *

* Visibility depends on order options or device settings

Factory setting

Country-specific:
- kg
- lb

Additional information

Description

The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 60).

Selection

The selection is dependent on the process variable selected in the **Assign variable** parameter (→ 179).

Operation mode

Navigation

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

Prerequisite

A process variable is selected in the **Assign variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

Description

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

Selection
- Net flow total
- Forward total
- Reverse total

Factory setting

Net flow total

Additional information

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

Control Tot. 1 to n

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

Description Use this function to select the control of totalizer value 1-3.

Selection
- Totalize
- Reset + hold
- Preset + hold
- Reset + totalize
- Preset+totalize
- Hold

Factory setting Totalize

Additional information *Selection*

Options	Description
Totalize	The totalizer is started or continues running.
Reset + hold	The totaling process is stopped and the totalizer is reset to 0.
Preset + hold	The totaling process is stopped and the totalizer is set to its defined start value from the **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 variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 kg
- 0 lb

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 180).

Example

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

Failure mode

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

Prerequisite A process variable is selected in the **Assign variable** parameter (→ 179) of the **Totalizer 1 to n** submenu.

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

Selection
- Stop
- Actual value
- Last valid value

Factory setting Stop

Additional information *Description*

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

Selection
- Stop
  The totalizer is stopped in the event of a device alarm.
- Actual value
  The totalizer continues to count based on the actual measured value; the device alarm is ignored.
- Last valid value
  The totalizer continues to count based on the last valid measured value before the device alarm occurred.

3.7.2 "Concentration" submenu

For detailed information on the parameter descriptions for the **Concentration** application package,refer to the Special Documentation for the device → 7

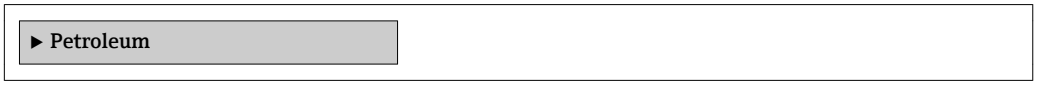
Navigation Expert → Application → Concentration

▶ **Concentration**

3.7.3 "Petroleum" submenu

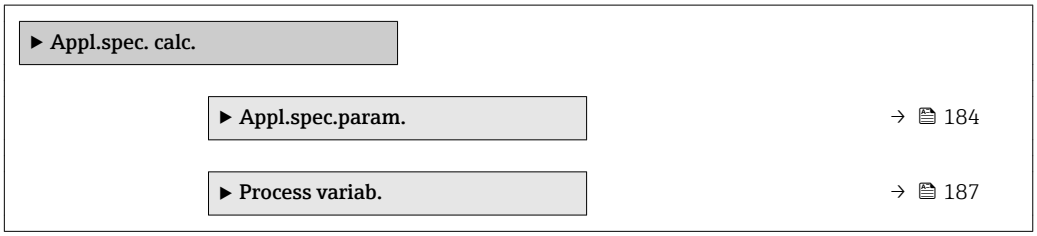
For detailed information on the parameter descriptions for the **Petroleum** application package,refer to the Special Documentation for the device → 7

Navigation Expert → Application → Petroleum



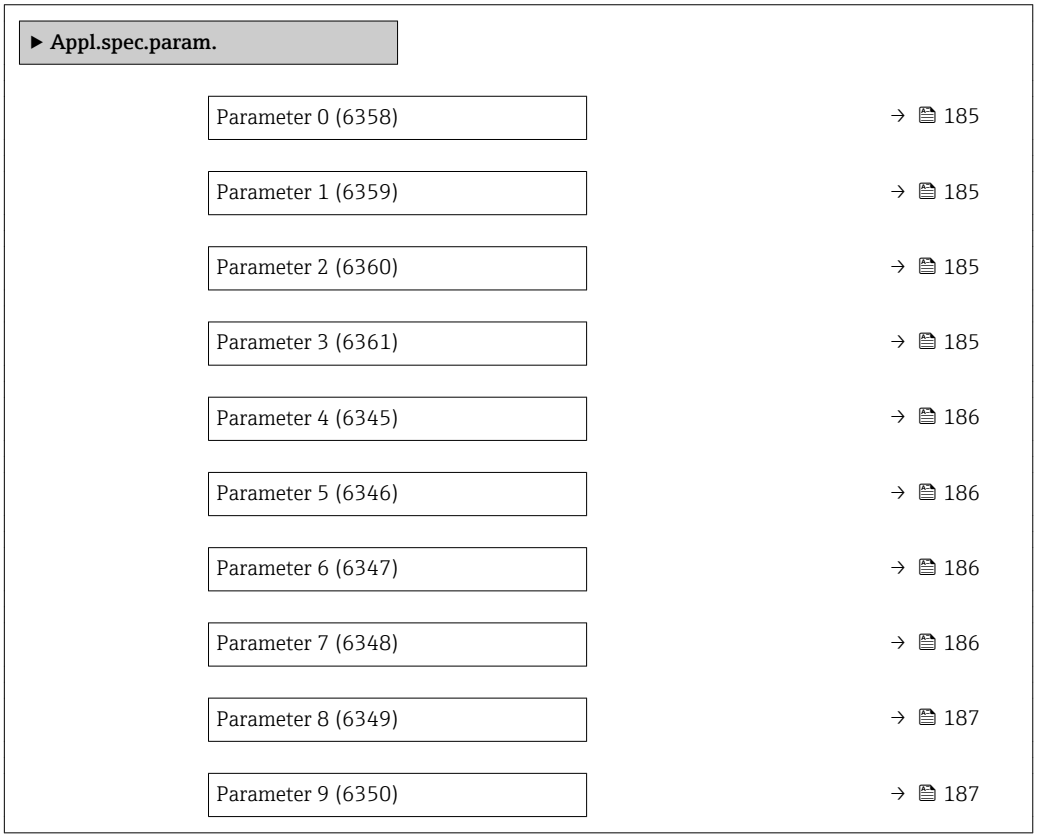
3.7.4 "Appl.spec. calc." submenu

Navigation Expert → Application → Appl.spec. calc.



"Appl.spec.param." submenu

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param.



Parameter 0

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 0 (6358)

Description Enter application specific value 0 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 1

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 1 (6359)

Description Enter application specific value 1 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 2

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 2 (6360)

Description nter application specific value 2 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 3

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 3 (6361)

Description Enter application specific value 3 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 4

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 4 (6345)

Description Enter application specific value 4 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 5

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 5 (6346)

Description Enter application specific value 5 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 6

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 6 (6347)

Description Enter application specific value 6 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 7

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 7 (6348)

Description Enter application specific value 7 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 8

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 8 (6349)

Description Enter application specific value 8 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

Parameter 9

Navigation Expert → Application → Appl.spec. calc. → Appl.spec.param. → Parameter 9 (6350)

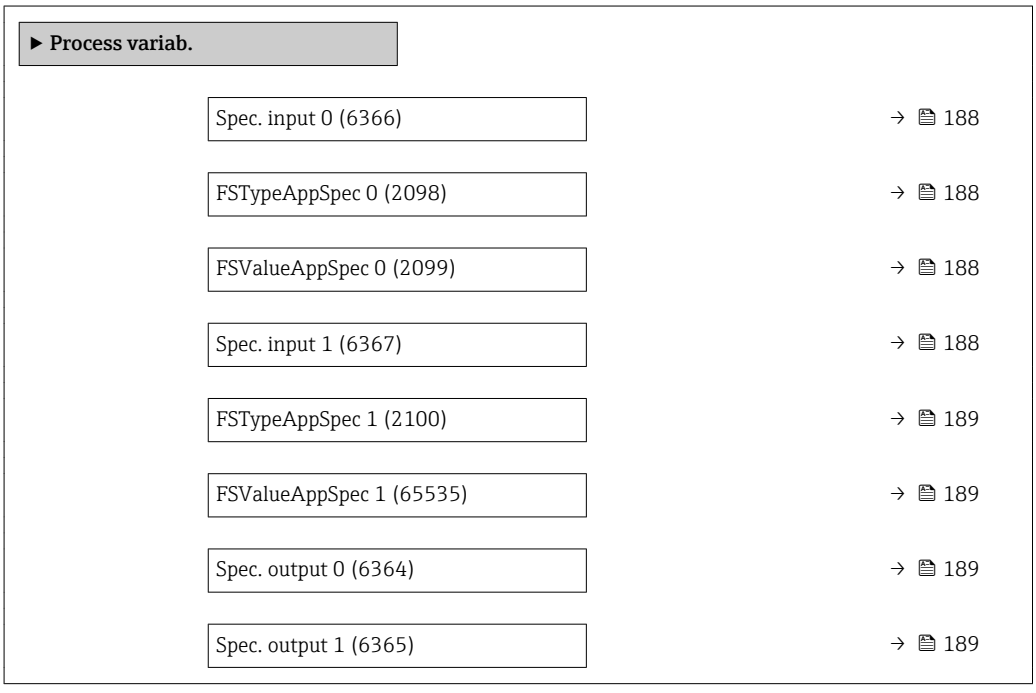
Description Enter application specific value 9 for application specific calculation.

User entry Signed floating-point number

Factory setting 0

"Process variab." submenu

Navigation Expert → Application → Appl.spec. calc. → Process variab.



Spec. input 0

Navigation Expert → Application → Appl.spec. calc. → Process variab. → Spec. input 0 (6366)

Description Shows the application specific input value 0 used for the application specific calculation.

User interface Signed floating-point number

Factory setting 0

FSTypeAppSpec 0

Navigation Expert → Application → Appl.spec. calc. → Process variab. → FSTypeAppSpec 0 (2098)

Description Use this function to select the failsafe mode for the application-specific input value 0.

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

FSValueAppSpec 0

Navigation Expert → Application → Appl.spec. calc. → Process variab. → FSValueAppSpec 0 (2099)

Description Use this function to enter the failsafe value for the application-specific input value 0.

User entry Signed floating-point number

Factory setting 0

Spec. input 1

Navigation Expert → Application → Appl.spec. calc. → Process variab. → Spec. input 1 (6367)

Description Shows the application specific input value 1 used for the application specific calculation.

User interface Signed floating-point number

Factory setting 0

FSTypeAppSpec 1

Navigation Expert → Application → Appl.spec. calc. → Process variab. → FSTypeAppSpec 1 (2100)

Description Use this function to select the failsafe mode for the application-specific input value 1.

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

FSValueAppSpec 1

Navigation Expert → Application → Appl.spec. calc. → Process variab. → FSValueAppSpec 1 (65535)

Description Use this function to enter the failsafe value for the application-specific input value 1.

User entry Signed floating-point number

Factory setting 0

Spec. output 0

Navigation Expert → Application → Appl.spec. calc. → Process variab. → Spec. output 0 (6364)

Description Shows the calculated application specific output value 0.

User interface Signed floating-point number

Factory setting 0

Spec. output 1

Navigation Expert → Application → Appl.spec. calc. → Process variab. → Spec. output 1 (6365)

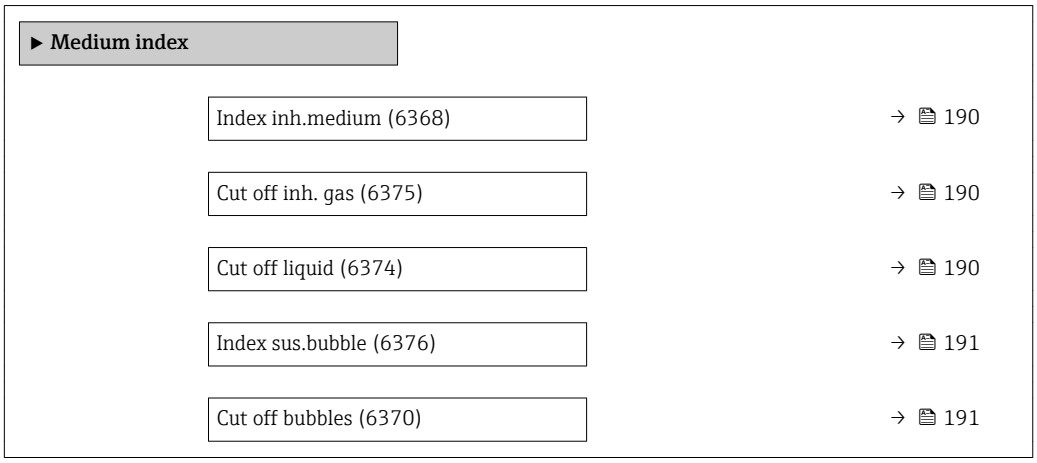
Description Shows the calculated specific output value 1.

User interface Signed floating-point number

Factory setting 0

3.7.5 "Medium index" submenu

Navigation Expert → Application → Medium index



Cut off inh. gas

Navigation Expert → Application → Medium index → Cut off inh. gas (6375)

Description Enter cut off value for wet gas applications. Below this value the Index inhomogeneous medium is set to 0.

User entry Positive floating-point number

Factory setting 0.25

Cut off liquid

Navigation Expert → Application → Medium index → Cut off liquid (6374)

Description Enter cut off value for liquid applications. Below this value the Index inhomogeneous medium is set to 0.

User entry Positive floating-point number

Factory setting 0.05

Index inh.medium

Navigation Expert → Application → Medium index → Index inh.medium (6368)

Description Shows the degree of inhomogeneity of the medium.

User interface Signed floating-point number

Factory setting 2

Cut off bubbles

Navigation Expert → Application → Medium index → Cut off bubbles (6370)

Description Enter cut off value for suspended bubbles. Below this value the Index suspended bubbles is set to 0.

User entry Positive floating-point number

Factory setting 0.05

Index sus.bubble

Navigation Expert → Application → Medium index → Index sus.bubble (6376)

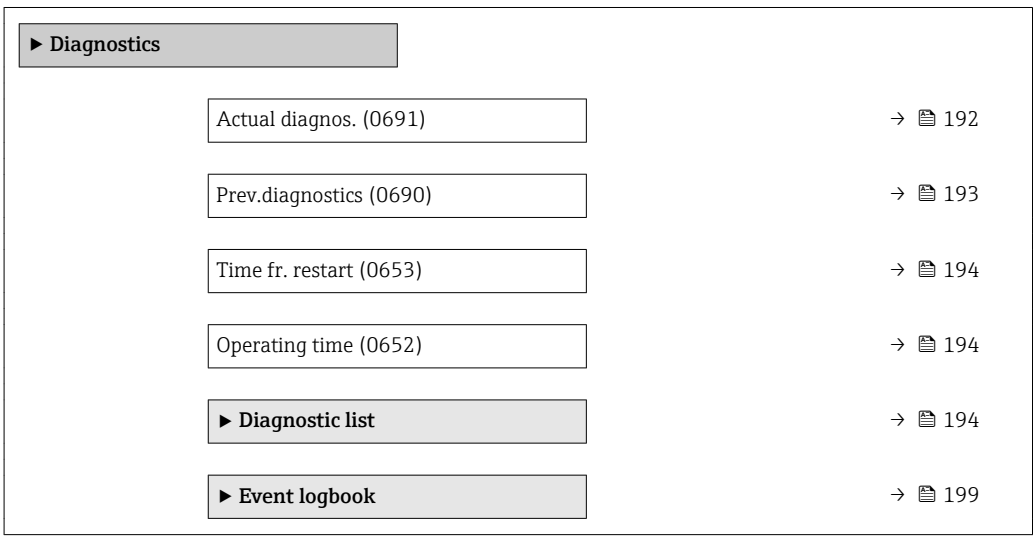
Description Shows the relative amount of suspended bubbles in the medium.

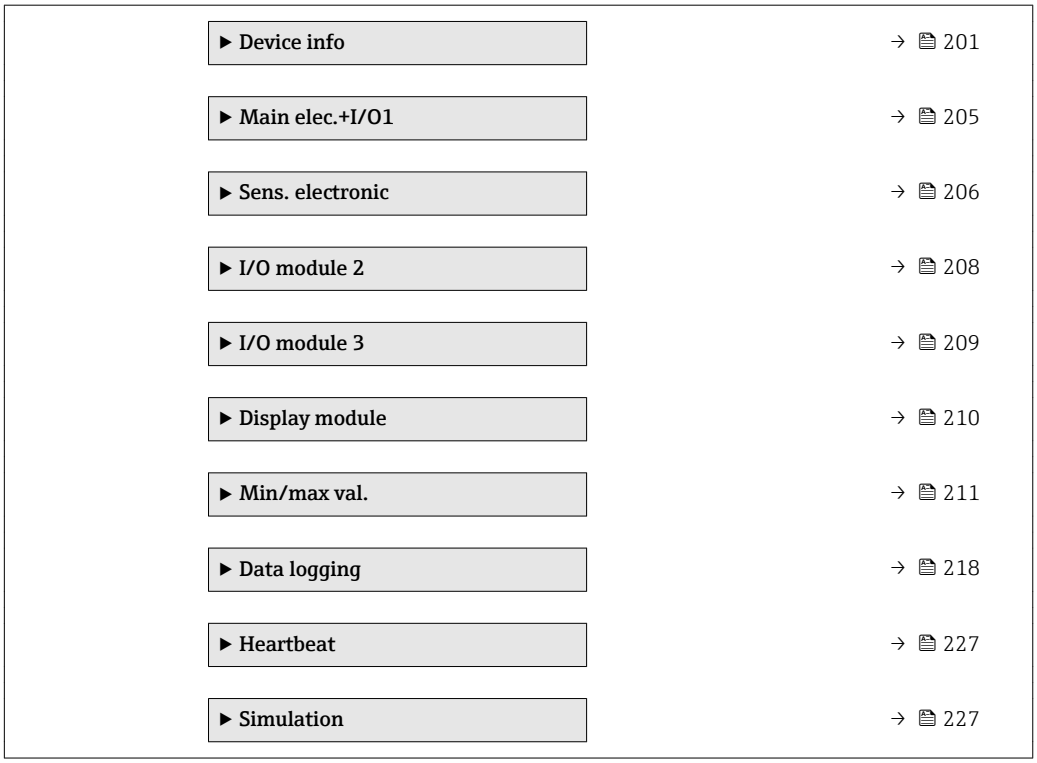
User interface Signed floating-point number

Factory setting 0

3.8 "Diagnostics" submenu

Navigation Expert → Diagnostics





Actual diagnos.

Navigation Expert → Diagnostics → Actual diagnos. (0691)

Prerequisite A diagnostic event has occurred.

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

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

Additional information *Display*

Additional pending diagnostic messages can be viewed in the **Diagnostic list** submenu (→ 194).

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 electronics

Timestamp

Navigation Expert → Diagnostics → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Actual diagnos.** parameter (→ 192).

Example

For the display format:
24d12h13m00s

Prev.diagnostics

Navigation Expert → Diagnostics → Prev.diagnostics (0690)

Prerequisite Two diagnostic events have already occurred.

Description Displays the diagnostic message that occurred before the current message.

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

Additional information *Display*

Via the local display: the time stamp and corrective measures referring to the cause of the diagnostic message can be accessed via the E key.

Example

For the display format:
⊗F271 Main electronics

Timestamp

Navigation Expert → Diagnostics → Timestamp

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

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

Additional information *Display*

The diagnostic message can be viewed via the **Prev.diagnostics** parameter (→ 193).

Example

For the display format:
24d12h13m00s

Time fr. restart

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

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

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

Operating time

Navigation Expert → Diagnostics → Operating time (0652)

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

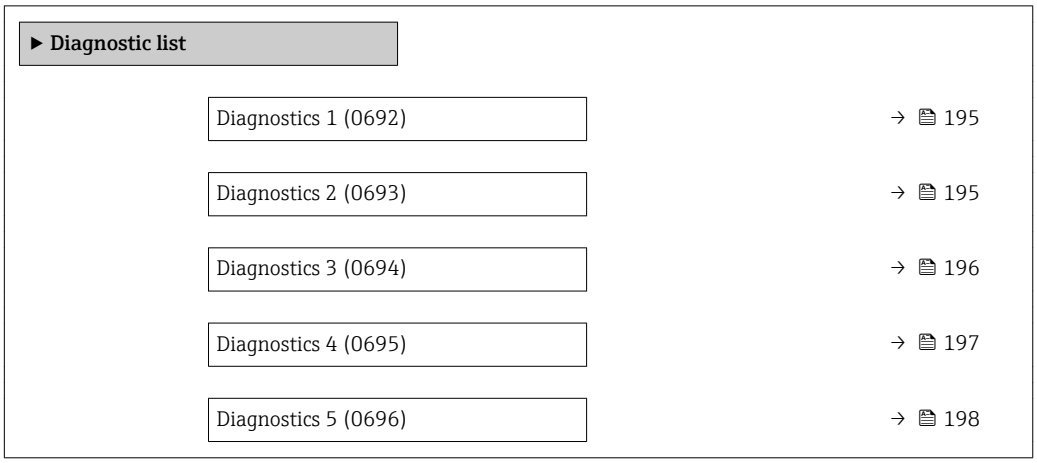
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

3.8.1 "Diagnostic list" submenu

Navigation Expert → Diagnostics → Diagnostic list



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 electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the highest priority occurred.

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

Additional information

Display

The diagnostic message can be viewed via the **Diagnostics 1** parameter (→ 195).

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 electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the second-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 2** parameter (→ 195).

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 electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the third-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 3** parameter (→ 196).

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 electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fourth-highest priority occurred.

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

Additional information *Display*

The diagnostic message can be viewed via the **Diagnostics 4** parameter (→ 197).

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 electronics
- ⊗F276 I/O module

Timestamp

Navigation Expert → Diagnostics → Diagnostic list → Timestamp

Description Displays the operating time when the diagnostic message with the fifth-highest priority occurred.

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

Additional information *Display*

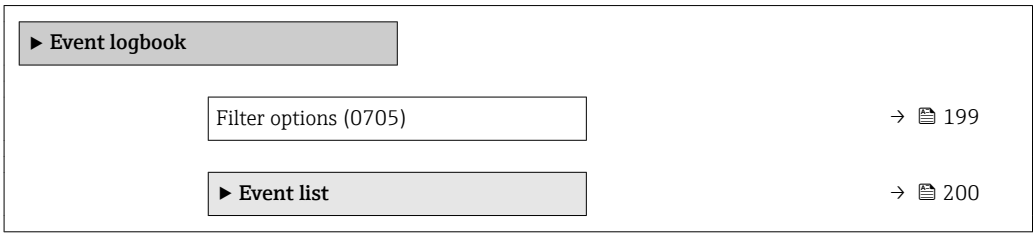
The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 198).

Example

For the display format:
24d12h13m00s

3.8.2 "Event logbook" submenu

Navigation Expert → Diagnostics → Event logbook



Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options (0705)

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

Selection
- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

Factory setting All

Additional information *Description*

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

Filter options

Navigation Expert → Diagnostics → Event logbook → Filter options

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

Selection
- All
- Failure (F)
- Funct. check (C)
- Out of spec. (S)
- Mainten. req.(M)
- Information (I)

Factory setting All

Additional information *Description*

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

"Event list" submenu

The **Event list** submenu is only displayed if operating via the local display.

If operating via the FieldCare operating tool, the event list can be read out with a separate FieldCare module.

If operating via the Web browser, the event messages can be found directly in the **Event logbook** submenu.

Navigation Expert → Diagnostics → Event logbook → Event list

Event list

Navigation Expert → Diagnostics → Event logbook → Event list

Description Displays the history of event messages of the category selected in the **Filter options** parameter (→ 199).

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

Additional information *Description*

A maximum of 20 event messages are displayed in chronological order.

If the **Extended HistoROM** application package (order option) is enabled in the device, the event list can contain up to 100 entries .

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

Examples

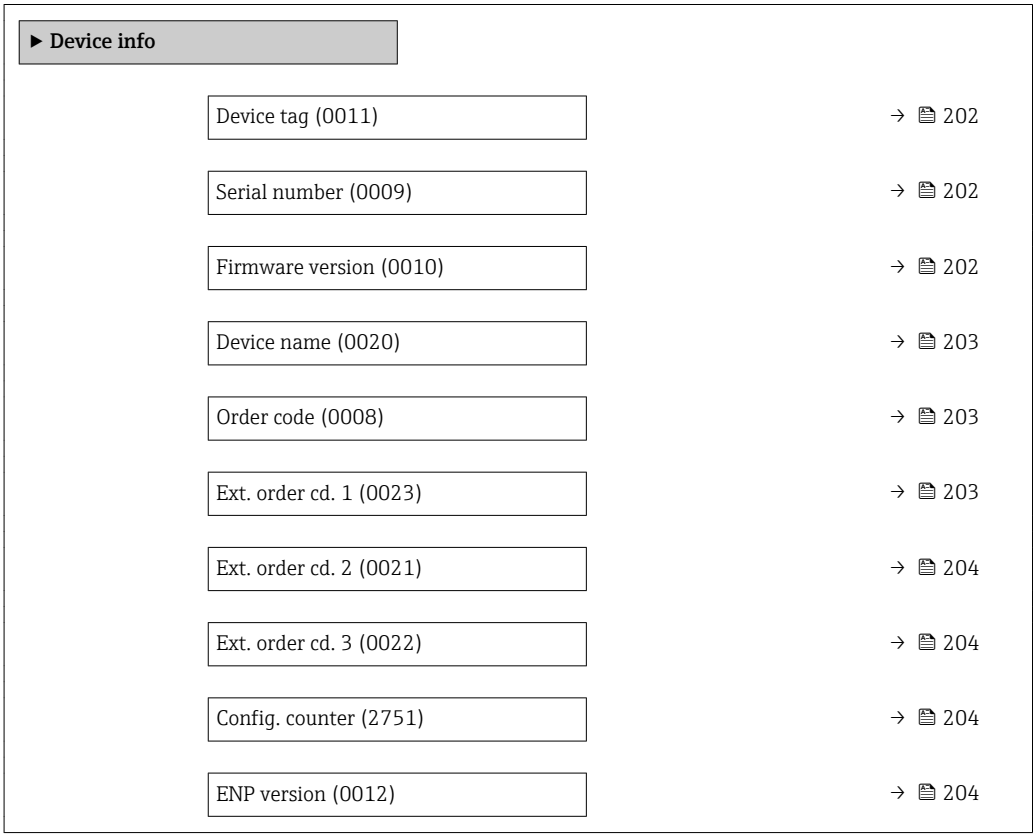
For the display format:
- I1091 Configuration modified
  ⊕ 24d12h13m00s
- ⊗F271 Main electronics
  ⊕ 01d04h12min30s

HistoROM

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

3.8.3 "Device info" submenu

Navigation Expert → Diagnostics → Device info



Device tag

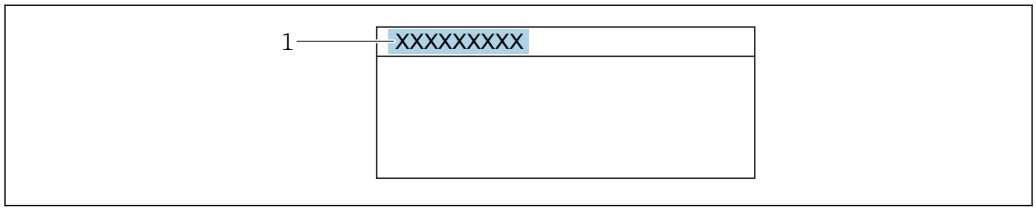
Navigation Expert → Diagnostics → Device info → Device tag (0011)

Description Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

User interface Max. 32 characters such as lower-case letters or numbers.

Factory setting Promass

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 Cubemass 300/500

Order code

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

Description Displays the device order code.

User interface Character string composed of letters, numbers and certain punctuation marks (e.g. /).

Additional information *Description*

The order code can be found on the nameplate of the sensor and transmitter in the "Order code" field.

The order code is generated from the extended order code through a process of reversible transformation. The extended order code indicates the attributes for all the device features in the product structure. The device features are not directly readable from the order code.

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

Ext. order cd. 1

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

Description Displays the first part of the extended order code.

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

User interface Character string

Additional information *Description*

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

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

Ext. order cd. 2

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

Description Displays the second part of the extended order code.

User interface Character string

Additional information For additional information, see **Ext. order cd. 1** parameter (→ 203)

Ext. order cd. 3

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

Description Displays the third part of the extended order code.

User interface Character string

Additional information For additional information, see **Ext. order cd. 1** parameter (→ 203)

Config. counter

Navigation Expert → Diagnostics → Device info → Config. counter (2751)

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

User interface 0 to 65 535

ENP version

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

Description Displays the version of the electronic nameplate.

User interface Character string

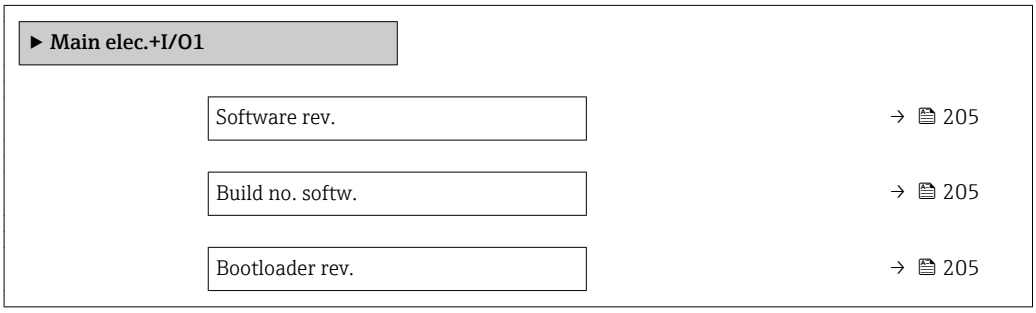
Factory setting 2.02.00

Additional information *Description*

This electronic nameplate stores a data record for device identification that includes more data than the nameplates attached to the outside of the device.

3.8.4 "Main elec.+I/O1" submenu

Navigation Expert → Diagnostics → Main elec.+I/O1



Software rev.

Navigation Expert → Diagnostics → Main elec.+I/O1 → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → Main elec.+I/O1 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

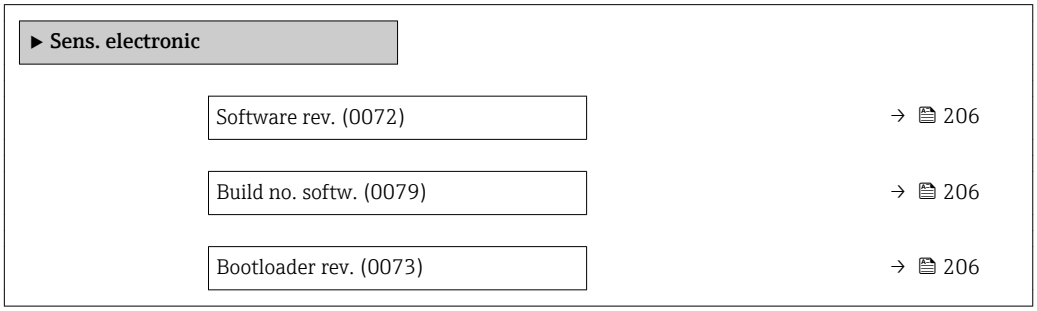
Navigation Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.5 "Sens. electronic" submenu

Navigation Expert → Diagnostics → Sens. electronic



Software rev.

Navigation Expert → Diagnostics → Sens. electronic → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → Sens. electronic → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

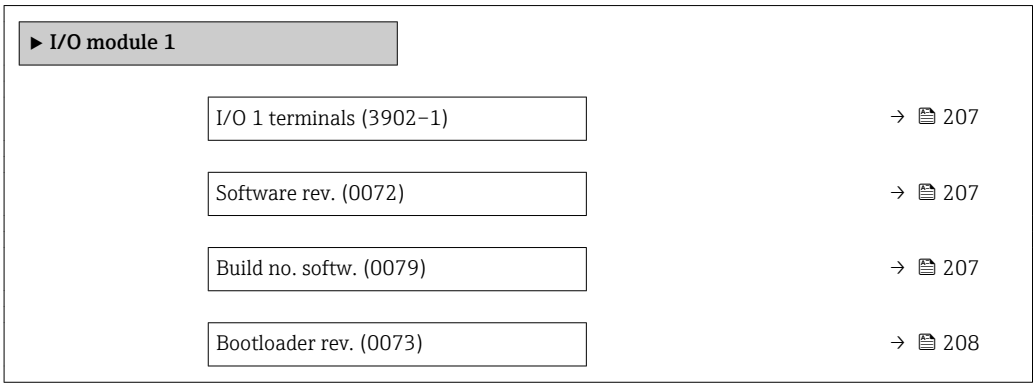
Navigation Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.6 "I/O module 1" submenu

Navigation Expert → Diagnostics → I/O module 1



I/O 1 terminals

Navigation Expert → Diagnostics → I/O module 1 → I/O 1 terminals (3902–1)

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)

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

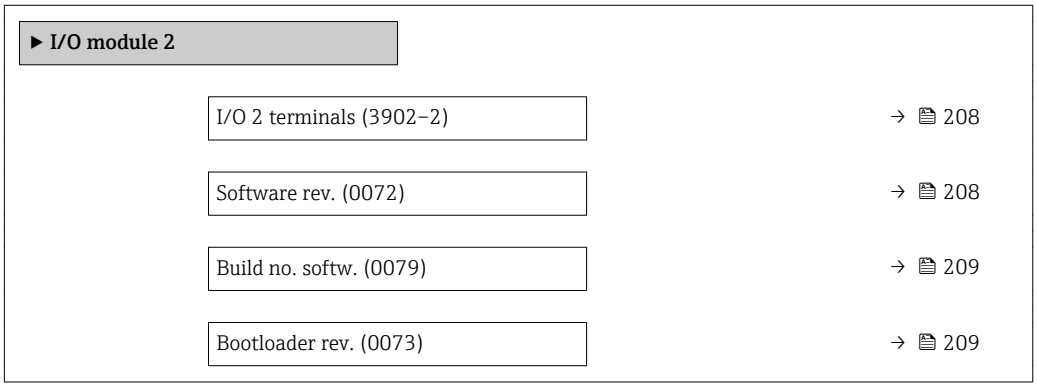
Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.7 "I/O module 2" submenu

Navigation Expert → Diagnostics → I/O module 2



I/O 2 terminals

Navigation Expert → Diagnostics → I/O module 2 → I/O 2 terminals (3902–2)

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

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

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

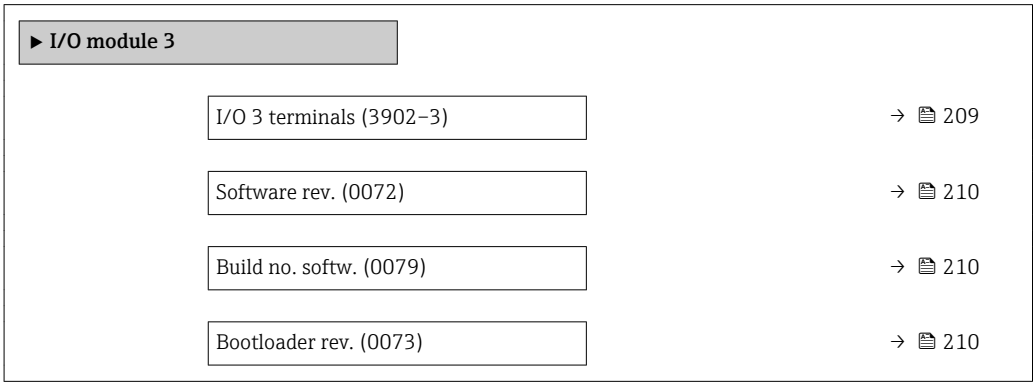
Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.8 "I/O module 3" submenu

Navigation Expert → Diagnostics → I/O module 3



I/O 3 terminals

Navigation Expert → Diagnostics → I/O module 3 → I/O 3 terminals (3902–3)

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

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

Software rev.

Navigation Expert → Diagnostics → I/O module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

Navigation Expert → Diagnostics → I/O module → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

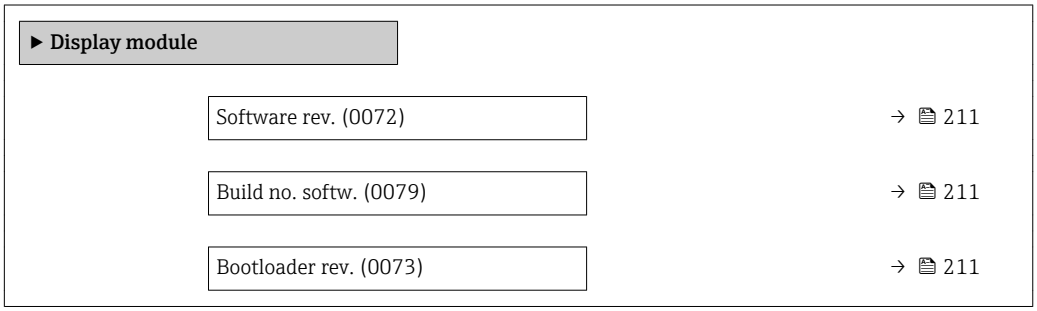
Navigation Expert → Diagnostics → I/O module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.9 "Display module" submenu

Navigation Expert → Diagnostics → Display module



Software rev.

Navigation Expert → Diagnostics → Display module → Software rev. (0072)

Description Use this function to display the software revision of the module.

User interface Positive integer

Build no. softw.

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

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

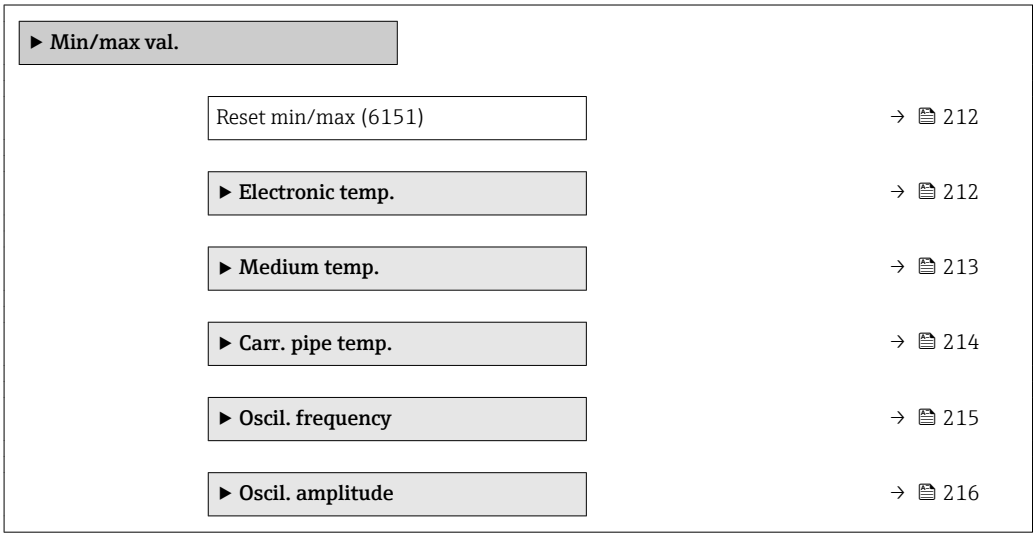
Navigation Expert → Diagnostics → Display module → Bootloader rev. (0073)

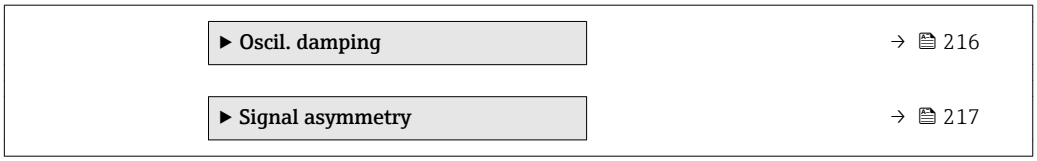
Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.8.10 "Min/max val." submenu

Navigation Expert → Diagnostics → Min/max val.





Reset min/max

Navigation Expert → Diagnostics → Min/max val. → Reset min/max (6151)

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

Selection
- Cancel
- Oscil. amplitude *
- Oscil. damping
- Oscil. frequency
- Signal asymmetry

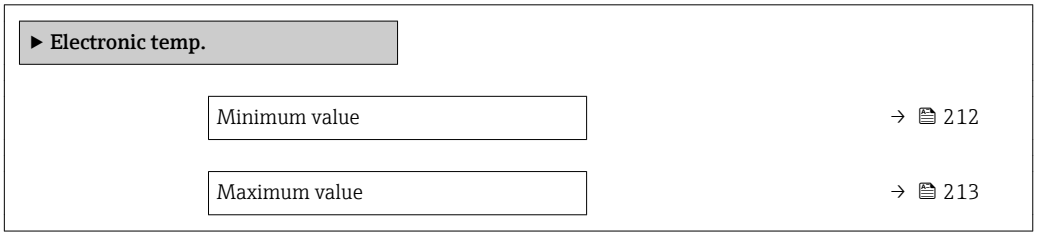
Factory setting Cancel

Additional information *Selection*

Detailed description of the options **Oscil. frequency, Oscil. amplitude, Oscil. damping** and **Signal asymmetry**: **Value 1 display** parameter (→ 18)

"Electronic temp." submenu

Navigation Expert → Diagnostics → Min/max val. → Electronic temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Electronic temp. → Minimum value (6052)

Description Displays the lowest previously measured temperature value of the main electronics module.

* Visibility depends on order options or device settings

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Electronic temp. → Maximum value (6051)

Description Displays the highest previously measured temperature value of the main electronics module.

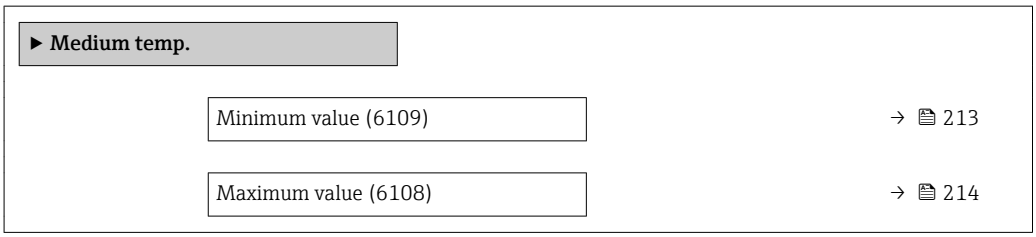
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

"Medium temp." submenu

Navigation Expert → Diagnostics → Min/max val. → Medium temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Minimum value (6109)

Description Displays the lowest previously measured medium temperature value.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (6108)

Description Displays the highest previously measured medium temperature value.

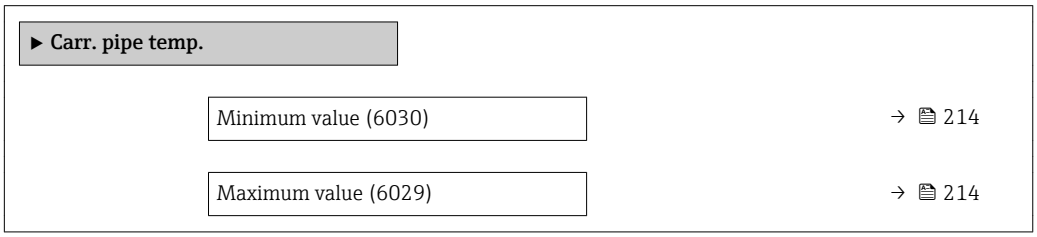
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

"Carr. pipe temp." submenu

Navigation Expert → Diagnostics → Min/max val. → Carr. pipe temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Carr. pipe temp. → Minimum value (6030)

Prerequisite For the following order code
"Application package", option **EB** "Heartbeat Verification + Monitoring"

Description Displays the lowest previously measured temperature value of the carrier pipe.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Carr. pipe temp. → Maximum value (6029)

Prerequisite For the following order code
"Application package", option **EB** "Heartbeat Verification + Monitoring"

Description Displays the highest previously measured temperature value of the carrier pipe.

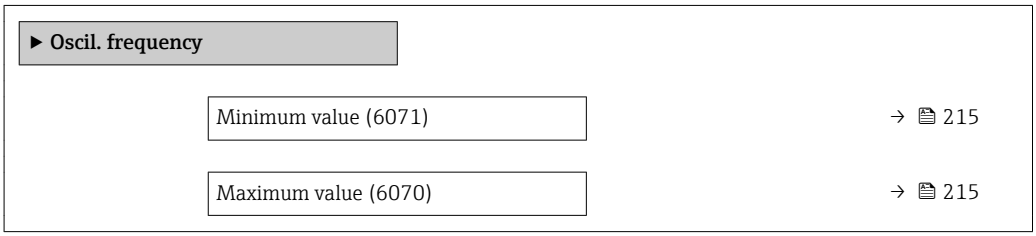
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 66)

"Oscil. frequency" submenu

Navigation Expert → Diagnostics → Min/max val. → Oscil. frequency



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Oscil. frequency → Minimum value (6071)

Description Displays the lowest previously measured oscillation frequency.

User interface Signed floating-point number

Maximum value

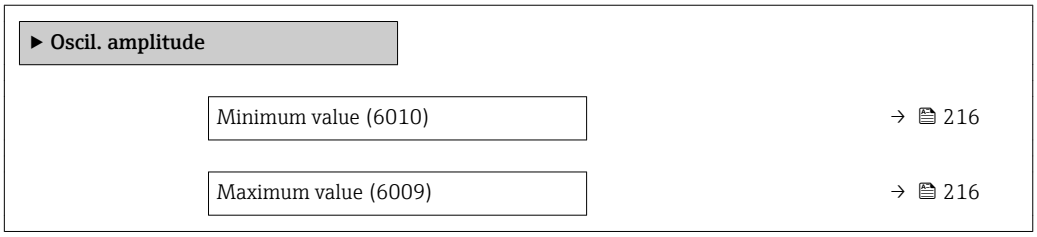
Navigation Expert → Diagnostics → Min/max val. → Oscil. frequency → Maximum value (6070)

Description Displays the highest previously measured oscillation frequency.

User interface Signed floating-point number

"Oscil. amplitude" submenu

Navigation Expert → Diagnostics → Min/max val. → Oscil. amplitude



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Oscil. amplitude → Minimum value (6010)

Description Displays the lowest previously measured oscillation amplitude.

User interface Signed floating-point number

Maximum value

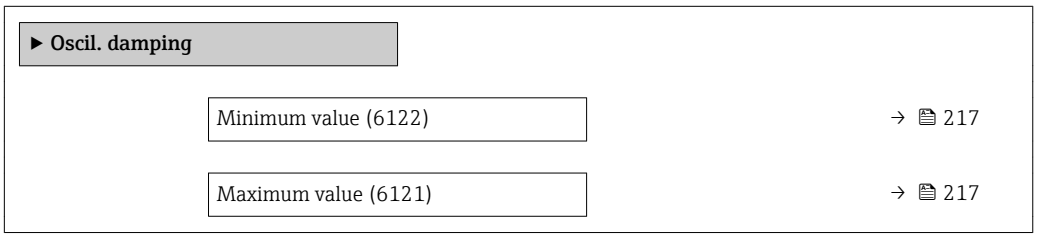
Navigation Expert → Diagnostics → Min/max val. → Oscil. amplitude → Maximum value (6009)

Description Displays the highest previously measured oscillation amplitude.

User interface Signed floating-point number

"Oscil. damping" submenu

Navigation Expert → Diagnostics → Min/max val. → Oscil. damping



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Oscil. damping → Minimum value (6122)

Description Displays the lowest previously measured oscillation damping.

User interface Signed floating-point number

Maximum value

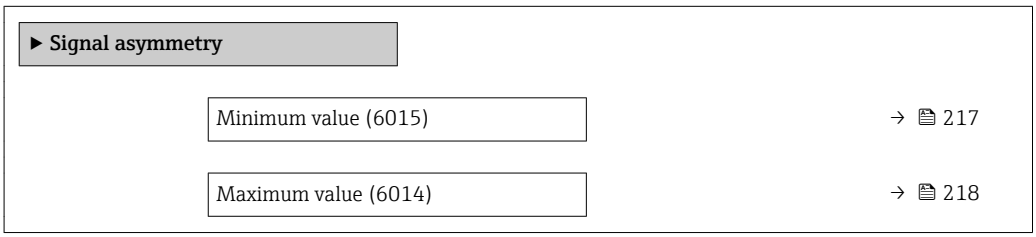
Navigation Expert → Diagnostics → Min/max val. → Oscil. damping → Maximum value (6121)

Description Displays the highest previously measured oscillation damping.

User interface Signed floating-point number

"Signal asymmetry" submenu

Navigation Expert → Diagnostics → Min/max val. → Signal asymmetry



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Signal asymmetry → Minimum value (6015)

Description Displays the lowest previously measured signal asymmetry.

User interface Signed floating-point number

Maximum value

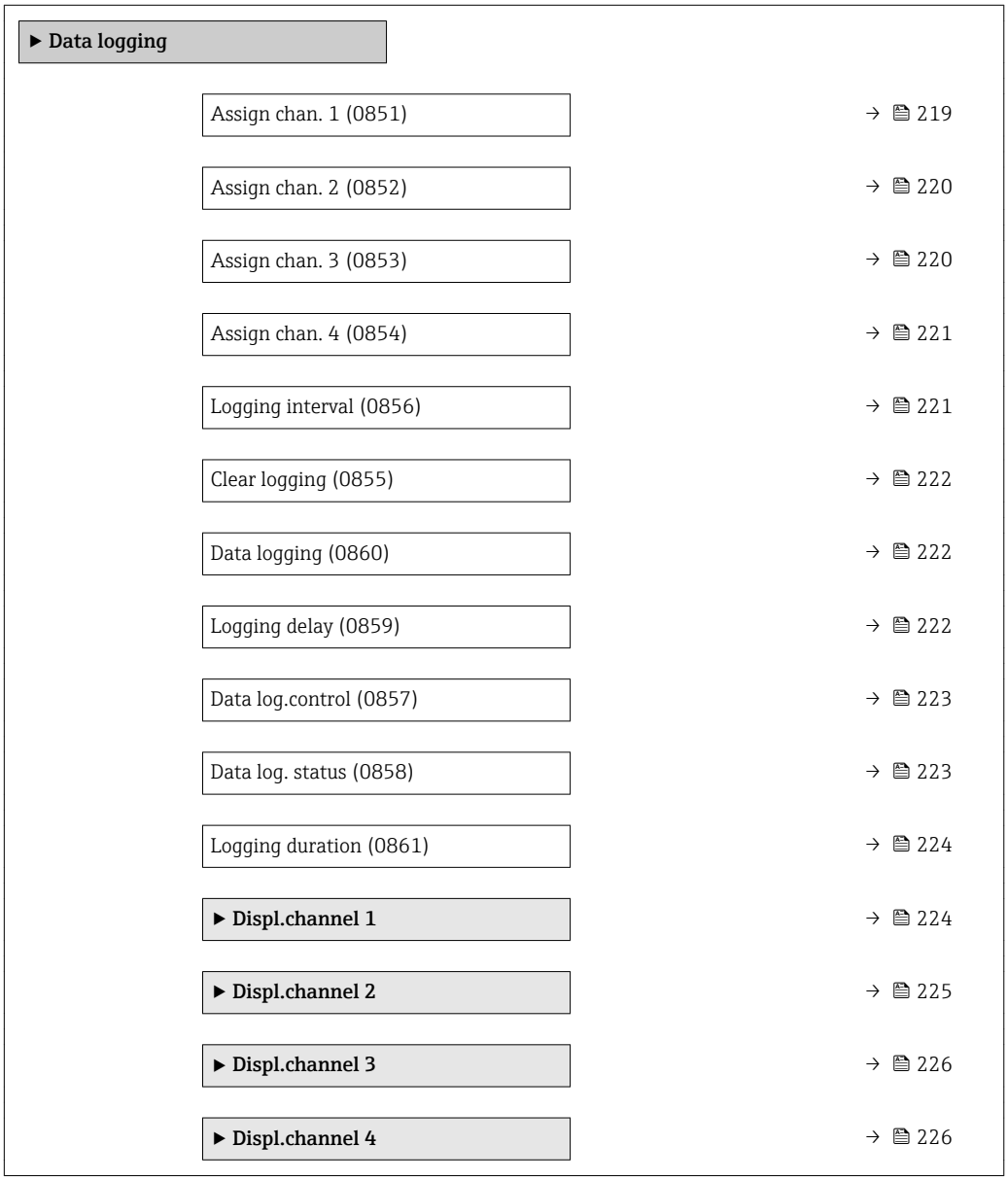
Navigation Expert → Diagnostics → Min/max val. → Signal asymmetry → Maximum value (6014)

Description Displays the highest previously measured signal asymmetry.

User interface Signed floating-point number

3.8.11 "Data logging" submenu

Navigation Expert → Diagnostics → Data logging



Assign chan. 1

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Use this function to select a process variable for the data logging channel.

Selection

- Off
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target mass flow *
- Carrier mass fl. *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density *
- Ref.dens.altern. *
- GSV flow *
- GSVa *
- NSV flow *
- NSVa *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water vol. flow *
- Oil corr.vol.fl. *
- Water corr.v.fl. *
- Concentration *
- Temperature
- Carr. pipe temp. *
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0 *
- Oscil. amplitude *
- Freq. fluct. 0 *
- Osc. damping 0 *
- Osc.damp.fluct 0 *
- Signal asymmetry *
- Exc. current 0 *
- HBSI *
- Curr.output 1 *
- Curr.output 2 *
- Curr.output 3 *
- Pressure

* Visibility depends on order options or device settings

- Spec. output 1 *
- Index inh.medium
- Spec. output 0 *
- Index sus.bubble *

Factory setting Off

Additional information *Description*

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

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

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

Assign chan. 2

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

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

Selection Picklist, see **Assign channel 1** parameter (→ 219)

Factory setting Off

Assign chan. 3

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

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

Selection Picklist, see **Assign channel 1** parameter (→ 219)

Factory setting Off

* Visibility depends on order options or device settings

Assign chan. 4

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

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

Selection Picklist, see **Assign channel 1** parameter (→ 219)

Factory setting Off

Logging interval

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

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

User entry 0.1 to 3 600.0 s

Factory setting 1.0 s

Additional information

Description

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

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

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

Example

If 1 logging channel is used:
- $T_{log} = 1000 \times 1$ 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

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

Description Use this function to clear the entire logging data.

Selection
- Cancel
- Clear data

Factory setting Cancel

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

Data logging

Navigation Expert → Diagnostics → Data logging → Data logging (0860)

Description Use this function to select the data logging method.

Selection
- Overwriting
- Not overwriting

Factory setting Overwriting

Additional information *Selection*
- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite In the **Data logging** parameter (→ 222), the **Not overwriting** option is selected.

Description Use this function to enter the time delay for measured value logging.

User entry 0 to 999 h

Factory setting 0 h

Additional information *Description*

Once measured value logging has been started with the **Data log.control** parameter (→ 223), the device does not save any data for the duration of the time delay entered.

Data log.control

Navigation Expert → Diagnostics → Data logging → Data log.control (0857)

Prerequisite In the **Data logging** parameter (→ 222), the **Not overwriting** option is selected.

Description Use this function to start and stop measured value logging.

Selection
- None
- Delete + start
- Stop

Factory setting None

Additional information *Selection*
- None
  Initial measured value logging status.
- Delete + start
  All the measured values recorded for all the channels are deleted and measured value logging starts again.
- Stop
  Measured value logging is stopped.

Data log. status

Navigation Expert → Diagnostics → Data logging → Data log. status (0858)

Prerequisite In the **Data logging** parameter (→ 222), the **Not overwriting** option is selected.

Description Displays the measured value logging status.

User interface
- Done
- Delay active
- Active
- Stopped

Factory setting Done

Additional information *Selection*

- Done
  Measured value logging has been performed and completed successfully.
- Delay active
  Measured value logging has been started but the logging interval has not yet elapsed.
- Active
  The logging interval has elapsed and measured value logging is active.
- Stopped
  Measured value logging is stopped.

Logging duration

Navigation Expert → Diagnostics → Data logging → Logging duration (0861)

Prerequisite In the **Data logging** parameter (→ 222), the **Not overwriting** option is selected.

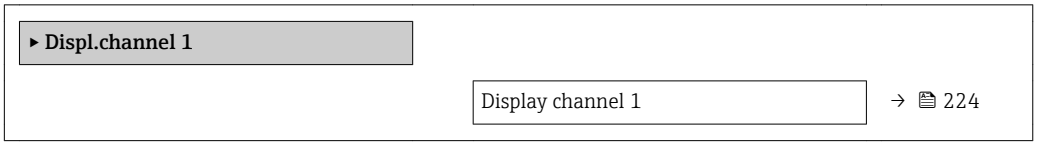
Description Displays the total logging duration.

User interface Positive floating-point number

Factory setting 0 s

"Displ.channel 1" submenu

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



Display channel 1

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

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

The software options currently enabled are displayed in the **SW option overv.** parameter (→ 46).

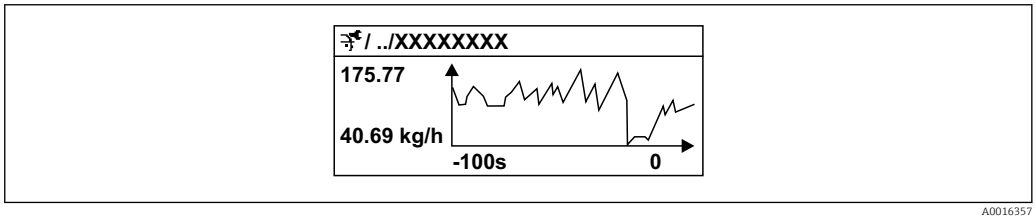
In the **Assign chan. 1** parameter (→ 219), one of the following options is selected:
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *

* Visibility depends on order options or device settings

- Carrier mass fl. *
- Density
- Ref.density
- Concentration *
- Carr. pipe temp. *
- Electronic temp.
- Curr.output 1
- Osc. freq. 0
- Freq. fluct. 0
- Oscil. amplitude *
- Osc. damping 0
- Osc.damp.fluct 0
- Signal asymmetry
- Exc. current 0

Description Displays the measured value trend for the logging channel in the form of a chart.

Additional information *Description*



9 *Chart of a measured value trend*

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

"Displ.channel 2" submenu

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

Display channel 2

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

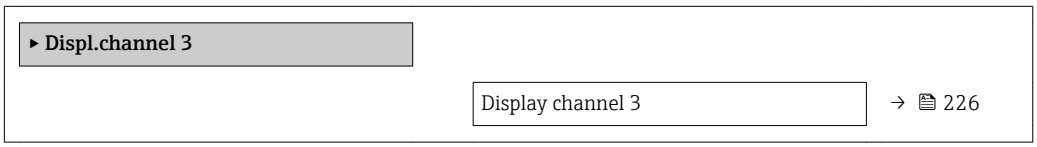
Prerequisite A process variable is defined in the **Assign chan. 2** parameter.

* Visibility depends on order options or device settings

Description See the **Display channel 1** parameter → 224

"Displ.channel 3" submenu

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



Display channel 3

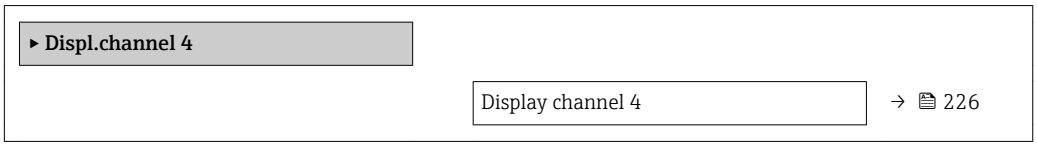
Navigation Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is defined in the **Assign chan. 3** parameter.

Description See the **Display channel 1** parameter → 224

"Displ.channel 4" submenu

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



Display channel 4

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

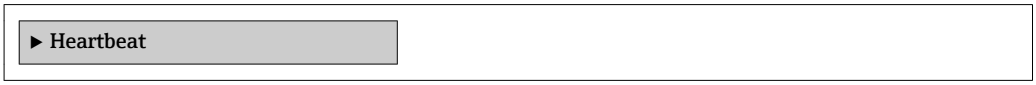
Prerequisite A process variable is defined in the **Assign chan. 4** parameter.

Description See the **Display channel 1** parameter → 224

3.8.12 "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



3.8.13 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation

Event category (0738)	→ 236
Diag. event sim. (0737)	→ 236

Assign proc.var.

Navigation Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- Mass flow
- Volume flow
- Correct.vol.flow *
- Target vol. flow *
- Carrier vol. fl. *
- Targ.corr.vol.fl *
- Carr.corr.vol.fl *
- Density
- Ref.density *
- Ref.dens.altern. *
- GSV flow *
- GSVa *
- NSV flow *
- NSVa *
- S&W volume flow *
- Water cut *
- Oil density *
- Water density *
- Oil mass flow *
- Water mass flow *
- Oil volume flow *
- Water vol. flow *
- Oil corr.vol.fl. *
- Water corr.v.fl. *
- Temperature
- Concentration *
- Target mass flow *
- Carrier mass fl. *

Factory setting Off

Additional information *Description*

The simulation value of the process variable selected is defined in the **Proc. var. value** parameter (→ 229).

* Visibility depends on order options or device settings

Proc. var. value

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

Prerequisite A process variable is selected in the **Assign proc.var.** parameter (→ 228).

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

User entry Depends on the process variable selected

Factory setting 0

Additional information *User entry*

The unit of the displayed measured value is taken from the **System units** submenu (→ 60).

Status inp.sim 1 to n

Navigation Expert → Diagnostics → Simulation → Status inp.sim 1 to n (1355–1 to n)

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

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Signal level** parameter (→ 229).

Selection
- Off
  Simulation for the status input is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Simulation for the status input is active.

Signal level 1 to n

Navigation Expert → Diagnostics → Simulation → Signal level 1 to n (1356–1 to n)

Prerequisite In the **Status inp.sim** parameter (→ 229), the **On** option is selected.

Description Use this function to select the signal level for the simulation of the status input. In this way, users can verify the correct configuration of the status input and the correct function of upstream feed-in units.

Selection
- High
- Low

Curr.inp 1 to n sim.

Navigation Expert → Diagnostics → Simulation → Curr.inp 1 to n sim. (1608–1 to n)

Description Option for switching simulation of the current input on and off. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

The desired simulation value is defined in the **Value curr.inp 1 to n** parameter.

Selection
- Off
- On

Factory setting Off

Additional information *Selection*
- Off
  Current simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- On
  Current simulation is active.

Value curr.inp 1 to n

Navigation Expert → Diagnostics → Simulation → Value curr.inp 1 to n (1609–1 to n)

Prerequisite In the **Curr.inp 1 to n sim.** parameter, the **On** option is selected.

Description Use this function to enter the current value for the simulation. In this way, users can verify the correct configuration of the current input and the correct function of upstream feed-in units.

User entry 0 to 22.5 mA

Curr.out. 1 to n sim.

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

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

Selection
- Off
- On

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Value curr.out 1 to n** parameter.

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

Value curr.out 1 to n

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

Prerequisite In the **Curr.out. 1 to n sim.** parameter, the **On** option is selected.

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

User entry 3.59 to 22.5 mA

Additional information

Dependency

The input range is dependent on the option selected in the **Current span** parameter (→ 115).

FreqOutputSim 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 129), the **Frequency** option is selected.

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

Selection
- Off
- On

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Freq value 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.

Freq value 1 to n

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

Prerequisite In the **FreqOutputSim 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

Puls.outp.sim. 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 129), the **Pulse** option is selected.

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

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

Factory setting Off

Additional information

Description

The desired simulation value is defined in the **Pulse value 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 (→ 132).
- Down-count. val.
  The pulses specified in the **Pulse value** parameter (→ 233) are output.

Pulse value 1 to n

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

Prerequisite In the **Puls.outp.sim. 1 to n** parameter, the **Down-count. val.** option is selected.

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

User entry 0 to 65 535

Switch sim. 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 129), the **Switch** option is selected.

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

Selection

- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

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

Switch status 1 to n

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

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

Selection
- Open
- Closed

Additional information *Selection*

- Open
  Switch simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Switch simulation is active.

Relay out. 1 to n sim

Navigation Expert → Diagnostics → Simulation → Relay out. 1 to n sim (0802–1 to n)

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

Selection
- Off
- On

Factory setting Off

Additional information *Description*

The desired simulation value is defined in the **Switch status 1 to n** parameter.

Selection

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

Switch status 1 to n

Navigation Expert → Diagnostics → Simulation → Switch status 1 to n (0803–1 to n)

Prerequisite The **On** option is selected in the **Switch sim. 1 to n** parameter parameter.

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

Selection

- Open
- Closed

Additional information *Selection*

- Open
  Relay simulation is switched off. The device is in normal measuring mode or another process variable is being simulated.
- Closed
  Relay simulation is active.

Dev. alarm sim.

Navigation Expert → Diagnostics → Simulation → Dev. alarm sim. (0654)

Description Use this function to switch the device alarm on and off.

Selection

- Off
- On

Factory setting Off

Additional information *Description*

The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Event category

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

Description Use this function to select the category of the diagnostic events that are displayed for the simulation in the **Diag. event sim.** parameter (→ 236).

Selection
- Sensor
- Electronics
- Configuration
- Process

Factory setting Process

Diag. event sim.

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

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

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

Factory setting Off

Additional information *Description*

For the simulation, you can choose from the diagnostic events of the category selected in the **Event category** parameter (→ 236).

4 Country-specific factory settings

4.1 SI units

Not valid for USA and Canada.

4.1.1 System units

Mass	kg
Mass flow	kg/h
Volume	l
Volume flow	l/h
Corrected volume	Nl
Corrected volume flow	Nl/h
Density	kg/l
Reference density	kg/Nl
Temperature	°C
Pressure	bar a

4.1.2 Full scale values

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

Nominal diameter [mm]	[kg/h]
1	4
2	20
4	90
6	200

4.1.3 Output current span

Current output 1 to n	4 to 20 mA NAMUR

4.1.4 Pulse value

Nominal diameter [mm]	[kg/p]
1	0.001
2	0.01
4	0.01
6	0.1

4.1.5 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [mm]	On-value for liquid [kg/h]
1	0.08
2	0.4
4	1.8
6	4

Nominal diameter [mm]	Switch-on value for gas [kg/h]
1	0.02
2	0.1
4	0.45
6	1

4.2 US units

Only valid for USA and Canada.

4.2.1 System units

Mass	lb
Mass flow	lb/min
Volume	gal (us)
Volume flow	gal/min (us)
Corrected volume	Sft^3
Corrected volume flow	Sft^3/min
Density	lb/ft^3
Reference density	lb/Sft^3
Temperature	°F
Pressure	psi a

4.2.2 Full scale values

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

Nominal diameter [in]	[lb/min]
$^1/_{24}$	0.15
$^1/_{12}$	0.75
$^1/_8$	3.3
$^1/_4$	7.4

4.2.3 Output current span

Current output 1 to n	4 to 20 mA US

4.2.4 Pulse value

Nominal diameter [in]	[lb/p]
1/24	0.002
1/12	0.02
1/8	0.02
1/4	0.2

4.2.5 On value low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [in]	On-value for liquid [lb/min]
1/24	0.003
1/12	0.015
1/8	0.066
1/4	0.15

Nominal diameter [in]	Switch-on value for gas [lb/min]
1/24	0.001
1/12	0.004
1/8	0.016
1/4	0.0375

5 Explanation of abbreviated units

5.1 SI units

Process variable	Units	Explanation
Density	g/cm³, g/m³	Gram/volume unit
	kg/dm³, kg/l, kg/m³	Kilogram/volume unit
	SD4°C, SD15°C, SD20°C	Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
	SG4°C, SG15°C, SG20°C	Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 °C (39 °F), 15 °C (59 °F), 20 °C (68 °F).
Pressure	Pa a, kPa a, MPa a	Pascal, kilopascal, megapascal (absolute)
	bar	Bar
	Pa g, kPa g, MPa g	Pascal, kilopascal, megapascal (relative/gauge)
	bar g	Bar (relative/gauge)
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
Ref.density	kg/Nm³, kg/Nl, g/Scm³, kg/Sm³	Kilogram, gram/standard volume unit
Corrected volume	Nl, Nm³, Sm³	Normal liter, normal cubic meter, standard cubic meter
Correct.vol.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
	Sm³/s, Sm³/min, Sm³/h, Sm³/d	Standard cubic meter/time unit
Temperature	°C , K	Celsius, Kelvin
Volume	cm³, dm³, m³	Cubic centimeter, cubic decimeter, cubic meter
	ml, l, hl, Ml Mega	Milliliter, liter, hectoliter, megaliter
Volume flow	cm³/s, cm³/min, cm³/h, cm³/d	Cubic centimeter/time unit
	dm³/s, dm³/min, dm³/h, dm³/d	Cubic decimeter/time unit
	m³/s, m³/min, m³/h, m³/d	Cubic meter/time unit
	ml/s, ml/min, ml/h, ml/d	Milliliter/time unit
	l/s, l/min, l/h, l/d	Liter/time unit
	hl/s, hl/min, hl/h, hl/d	Hectoliter/time unit
	Ml/s, Ml/min, Ml/h, Ml/d	Megaliter/time unit
Time	s, m, h, d, y	Second, minute, hour, day, year

5.2 US units

Process variable	Units	Explanation
Density	lb/ft³, lb/gal (us)	Pound/cubic foot, pound/gallon
	lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)	Pound/volume unit

Process variable	Units	Explanation
Pressure	psi a	Pounds per square inch (absolute)
	psi g	Pounds per square inch (gauge)
Mass	oz, lb, STon	Ounce, pound, standard ton
Mass flow	oz/s, oz/min, oz/h, oz/d	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/s, STon/min, STon/h, STon/d	Standard ton/time unit
Ref.density	lb/Sft³	Weight unit/standard volume unit
Corrected volume	Sft³, Sgal (us), Sbbl (us;liq.)	Standard cubic foot, standard gallon, standard barrel
Correct.vol.flow	Sft³/s, Sft³/min, Sft³/h, Sft³/d	Standard cubic foot/time unit
	Sgal/s (us), Sgal/min (us), Sgal/h (us), Sgal/d (us)	Standard gallon/time unit
	Sbbl/s (us;liq.), Sbbl/min (us;liq.), Sbbl/h (us;liq.), Sbbl/d (us;liq.)	Barrel/time unit (normal liquids)
Temperature	°F, °R	Fahrenheit, Rankine
Volume	af	Acre foot
	ft³	Cubic foot
	fl oz (us), gal (us), kgal (us), Mgal (us)	Fluid ounce, gallon, kilogallon, million gallon
	bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)	Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)
Volume flow	af/s, af/min, af/h, af/d	Acre foot/time unit
	ft³/s, ft³/min, ft³/h, ft³/d	Cubic foot/time unit
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us), gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) Beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

5.3 Imperial units

Process variable	Units	Explanation
Density	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Corrected volume	Sgal (imp)	Standard gallon
Correct.vol.flow	Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)	Standard gallon/time unit
Volume	gal (imp), Mgal (imp)	Gallon, mega gallon
	bbl (imp;beer), bbl (imp;oil)	Barrel (beer), barrel (petrochemicals)
Volume flow	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit
	bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Barrel /time unit (beer) Beer: 36.0 gal/bbl
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem (before midday), post meridiem (after midday)

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