GP01139D/06/EN/01.18
71402579

Valid as of version
01.00.zz (Device firmware)

Description of Device Parameters
Proline Cubemass 500
PROFIBUS DP

Coriolis flowmeter

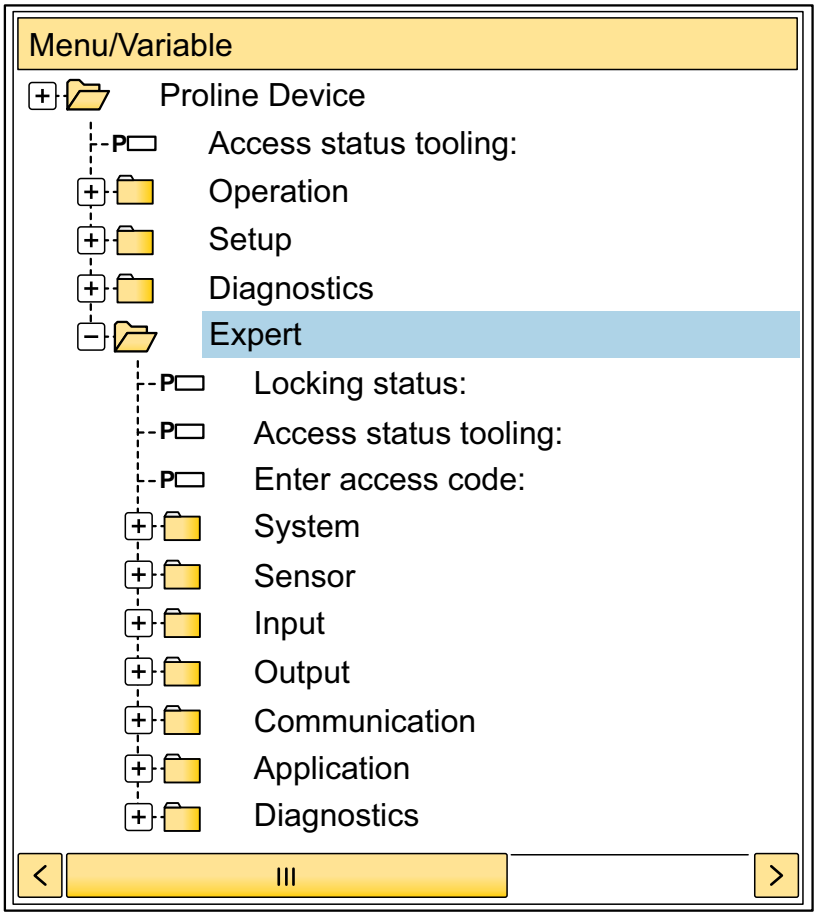

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Table of contents

1 About this document

1.1 Document function

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

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

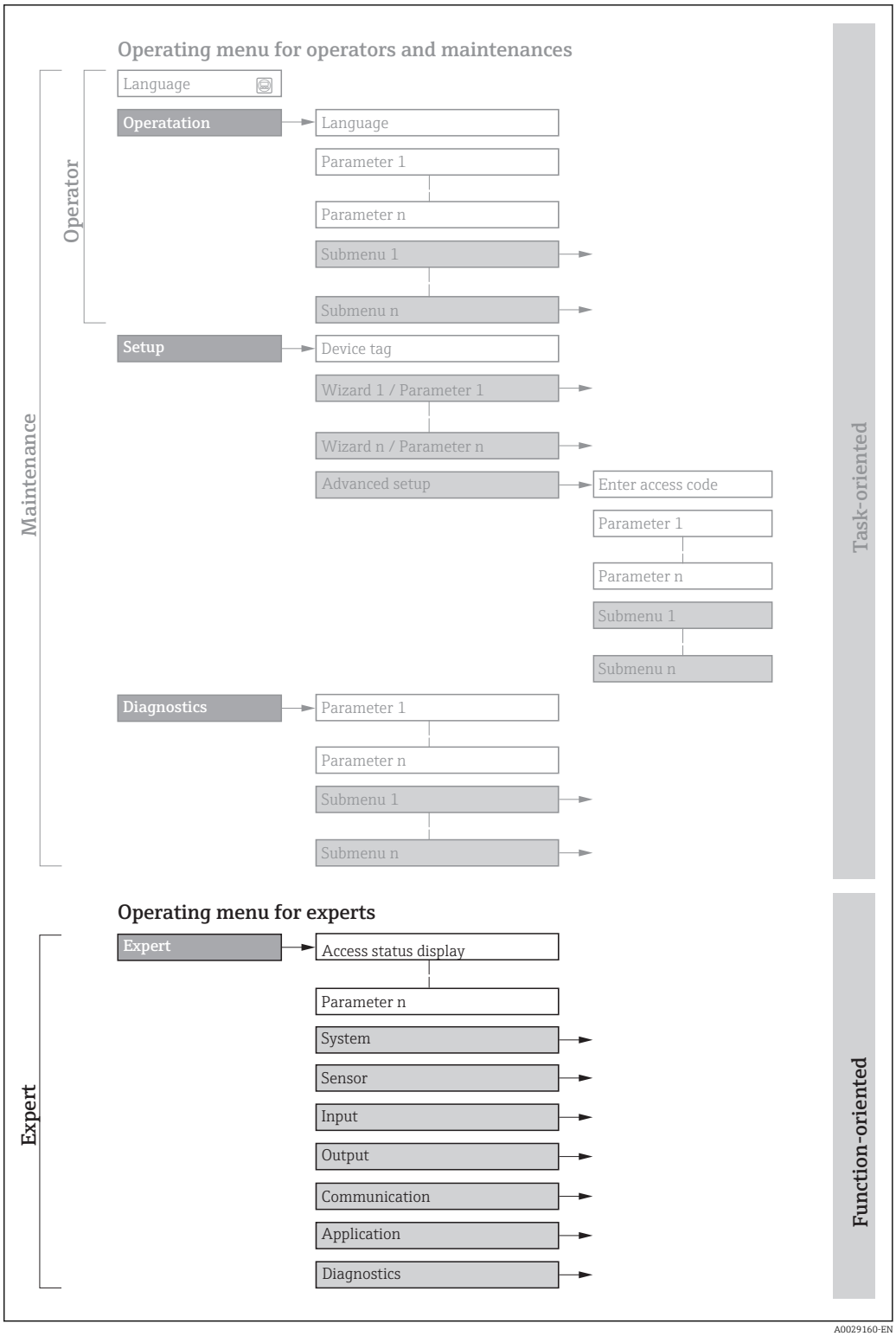
1.2 Target group

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

1.3 Using this document

1.3.1 Information on the document structure

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



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

Additional information regarding:
- The arrangement of the parameters according to the menu structure of the **Operation** menu, **Setup** menu, **Diagnostics** menu with a brief description: Operating Instructions → 7
- Operating concept of the operating menus: Operating Instructions → 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 500	BA01871D

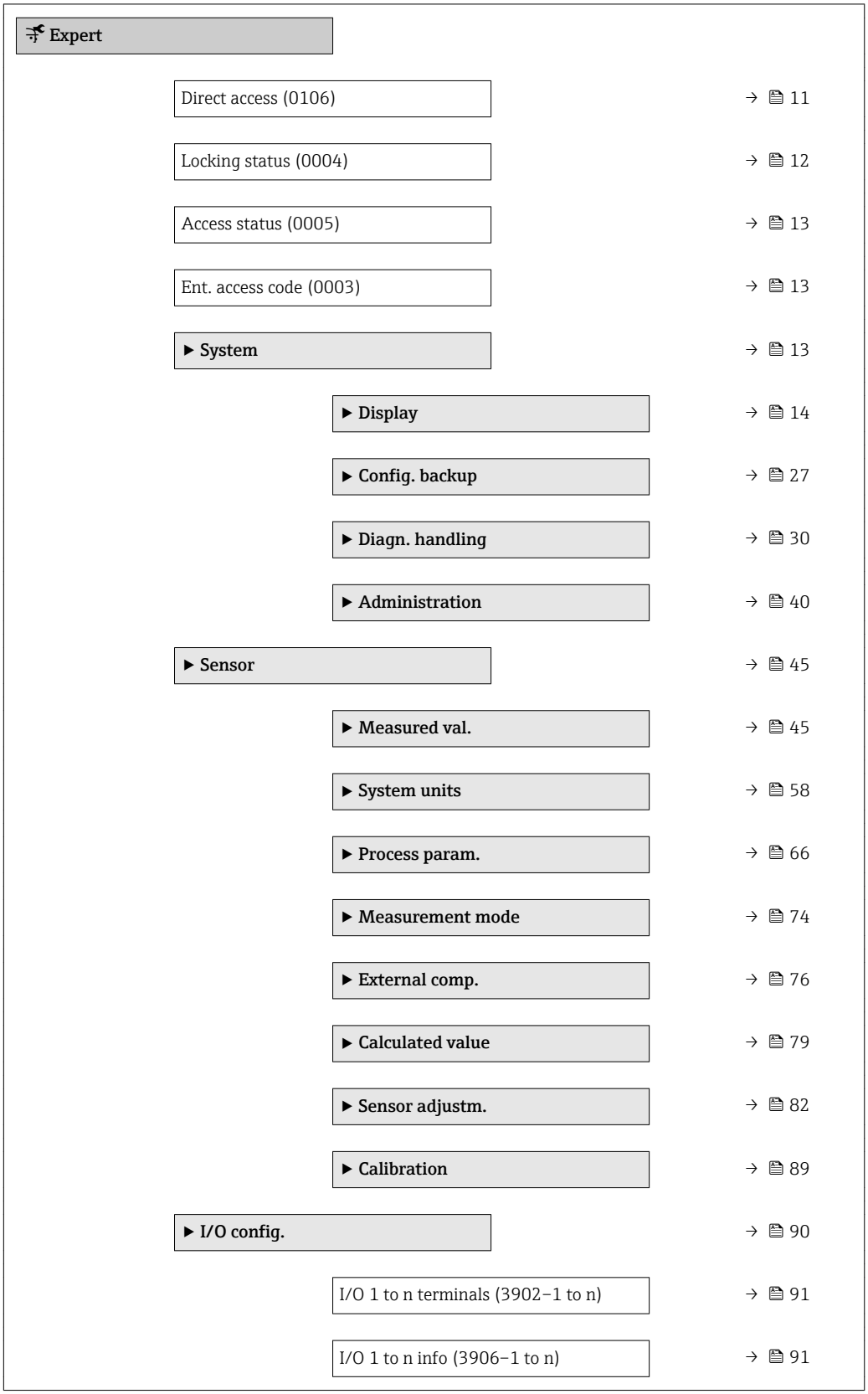
1.5.2 Supplementary device-dependent documentation

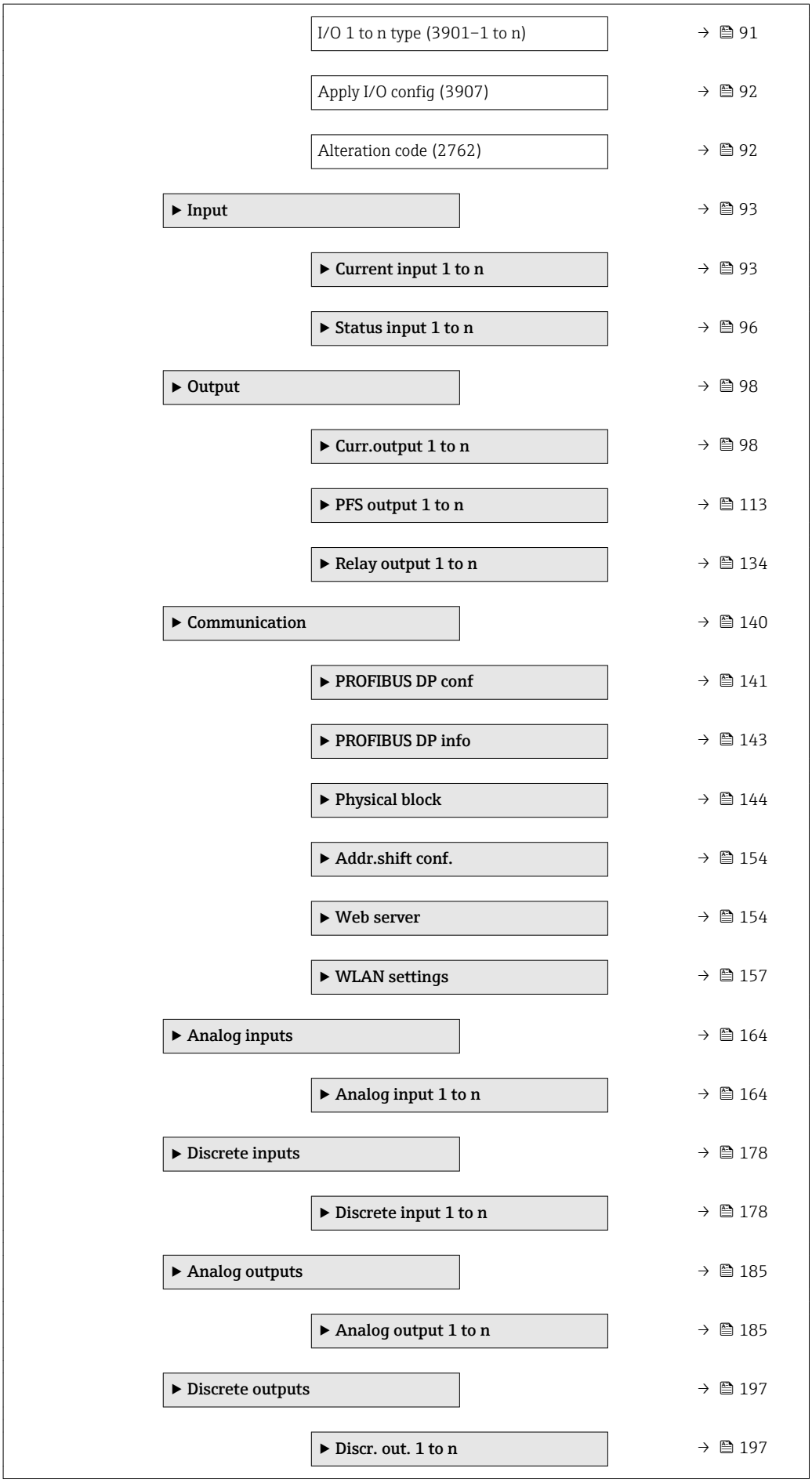
Special Documentation

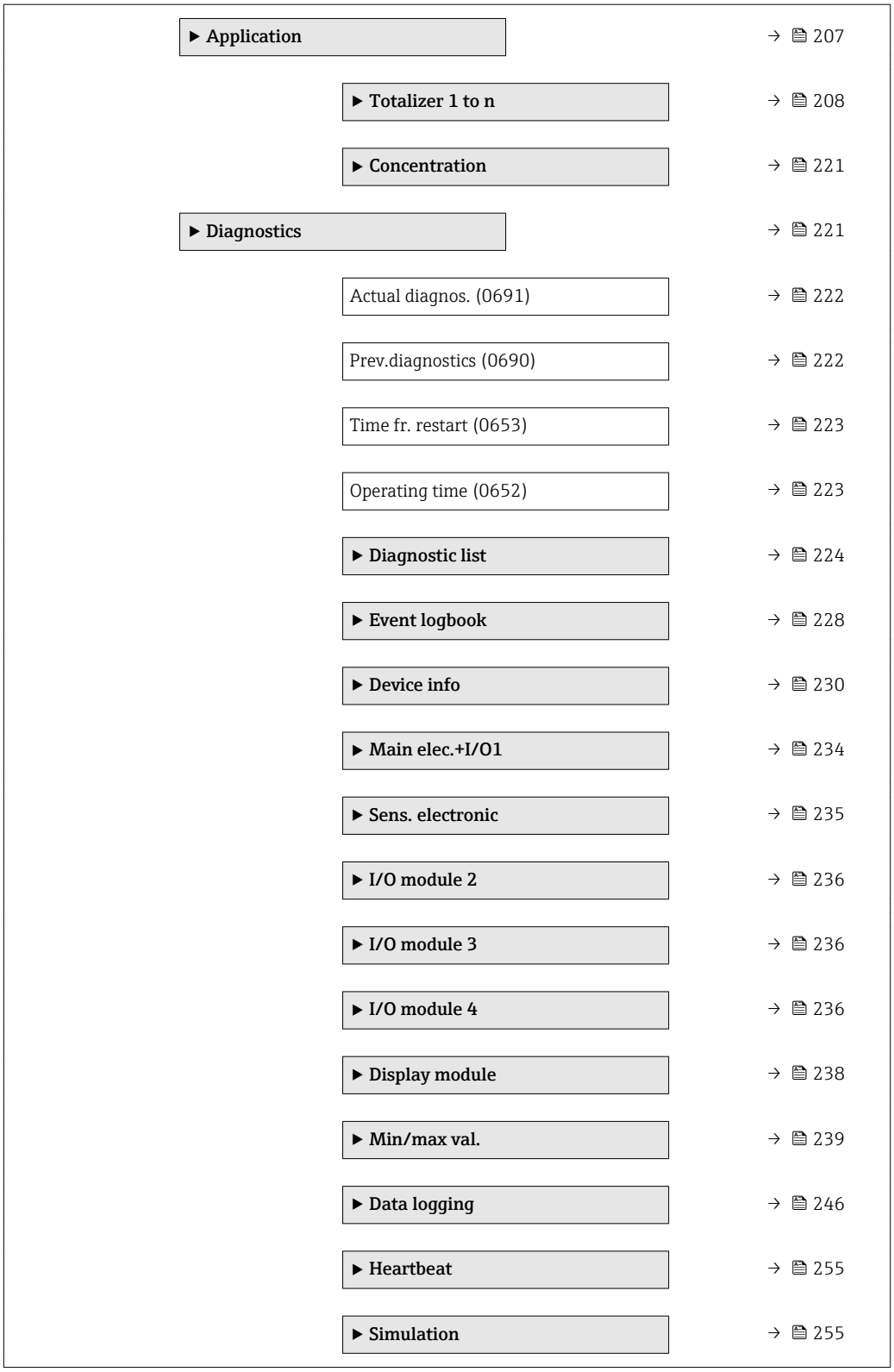
Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
Radio approvals for WLAN interface for A309/A310 display module	SD01793D
Web server	SD02234D
Heartbeat Technology	SD02205D
Concentration measurement	SD02215D

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) → 91
Apply I/O config (3907) → 92
Alteration code (2762) → 92
▶ Input → 93
▶ Current input 1 to n → 93
▶ Status input 1 to n → 96
▶ Output → 98
▶ Curr.output 1 to n → 98
▶ PFS output 1 to n → 113
▶ Relay output 1 to n → 134
▶ Communication → 140
▶ PROFIBUS DP conf → 141
▶ PROFIBUS DP info → 143
▶ Physical block → 144
▶ Addr.shift conf. → 154
▶ Web server → 154
▶ WLAN settings → 157
▶ Analog inputs → 164
▶ Analog input 1 to n → 164
▶ Discrete inputs → 178
▶ Discrete input 1 to n → 178
▶ Analog outputs → 185
▶ Analog output 1 to n → 185
▶ Discrete outputs → 197
▶ Discr. out. 1 to n → 197


▶ Application → 207
▶ Totalizer 1 to n → 208
▶ Concentration → 221
▶ Diagnostics → 221
Actual diagnos. (0691) → 222
Prev.diagnostics (0690) → 222
Time fr. restart (0653) → 223
Operating time (0652) → 223
▶ Diagnostic list → 224
▶ Event logbook → 228
▶ Device info → 230
▶ Main elec.+I/O1 → 234
▶ Sens. electronic → 235
▶ I/O module 2 → 236
▶ I/O module 3 → 236
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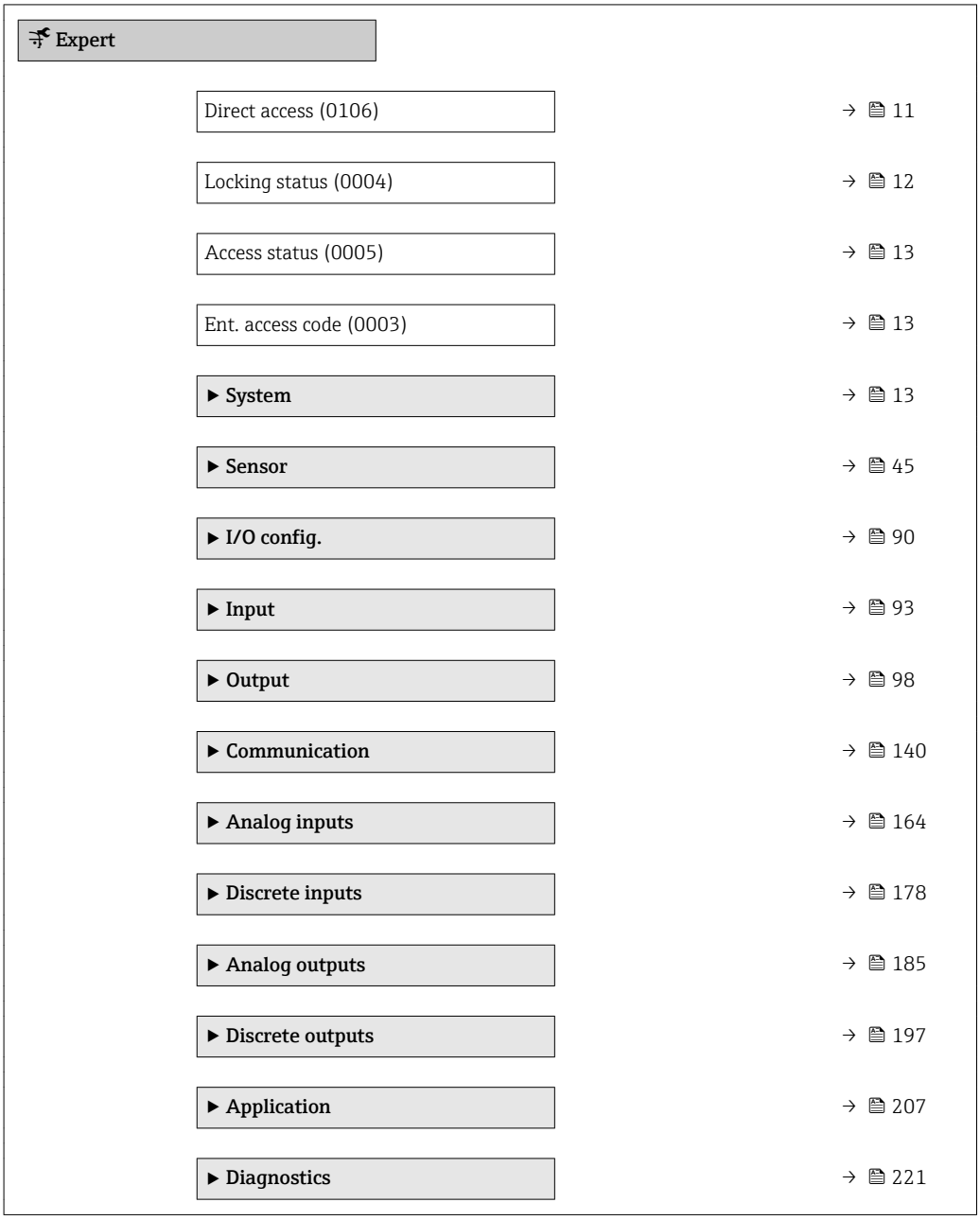
▶ Display module → 238
▶ Min/max val. → 239
▶ Data logging → 246
▶ Heartbeat → 255
▶ Simulation → 255

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)

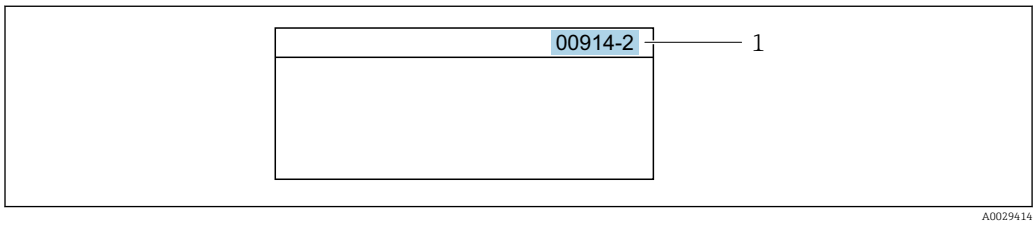
Description Use this function to enter the access code to enable direct access to the desired parameter via the local display. A parameter number is assigned to each parameter for this purpose.

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

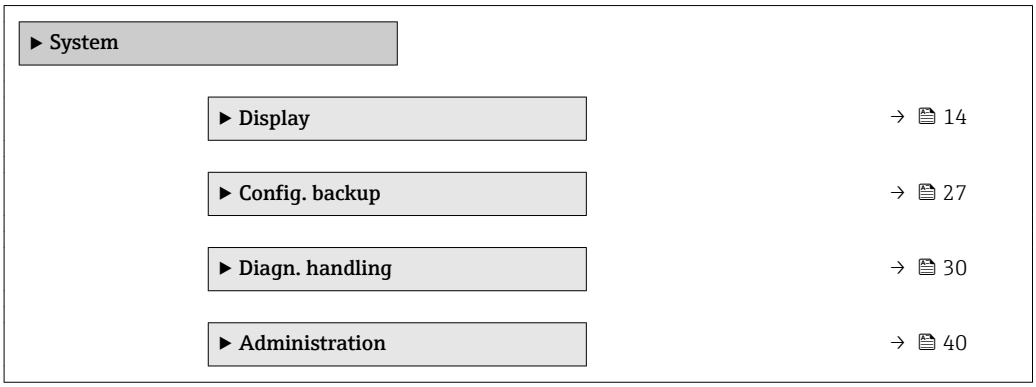
Navigation Expert → Ent. access code (0003)

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

User entry 0 to 9 999

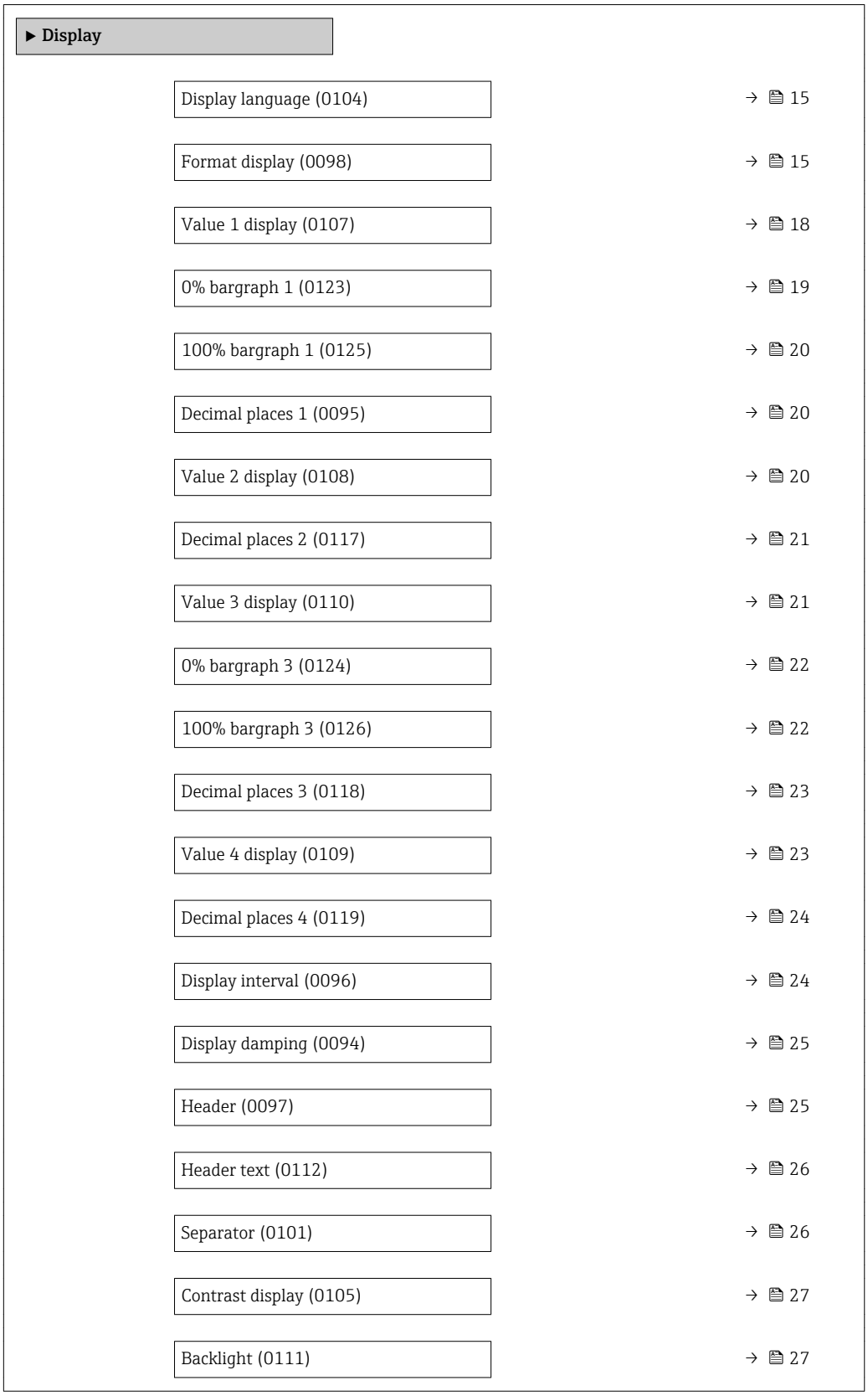
3.1 "System" submenu

Navigation Expert → System



3.1.1 "Display" submenu

Navigation Expert → System → Display



Display language

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

Prerequisite A local display is provided.

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

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

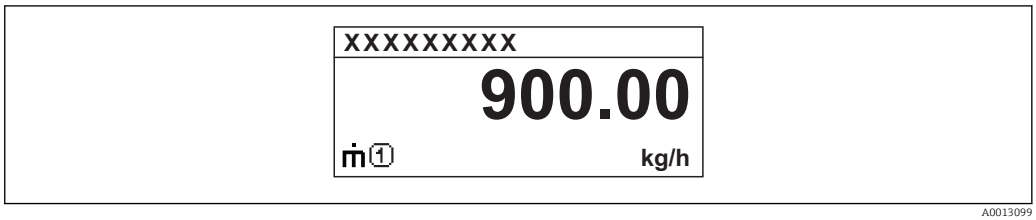
Description

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).

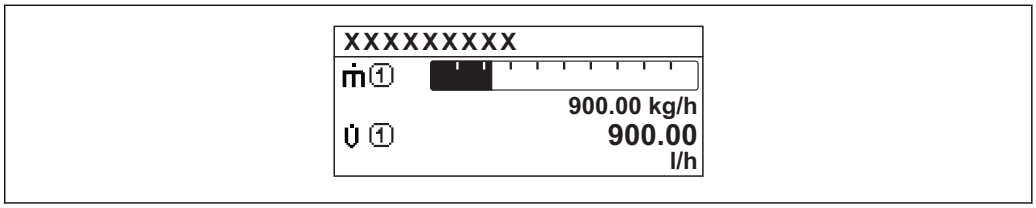
Possible measured values shown on the local display:

"1 value, max." option



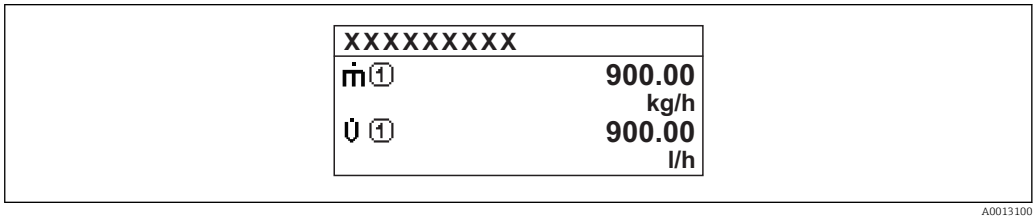
A0013099

"Bargr. + 1 value" option



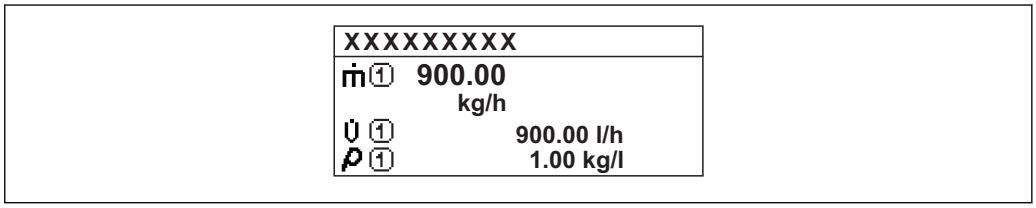
A0013098

"2 values" option



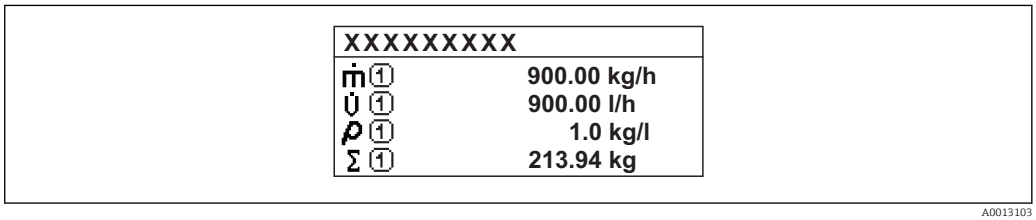
A0013100

"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 to be 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 *
- Curr.output 4 *
- Pressure

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 (→ 58).

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 (→ 58).

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 → 265

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 (→ 58).

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 to be shown on the local display.

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

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 (→ 58).

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 to be shown on the local display.

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

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 (→ 58).

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 (→ 58).

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 (→ 58).

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 to be shown on the local display.

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

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 (→ 58).

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.

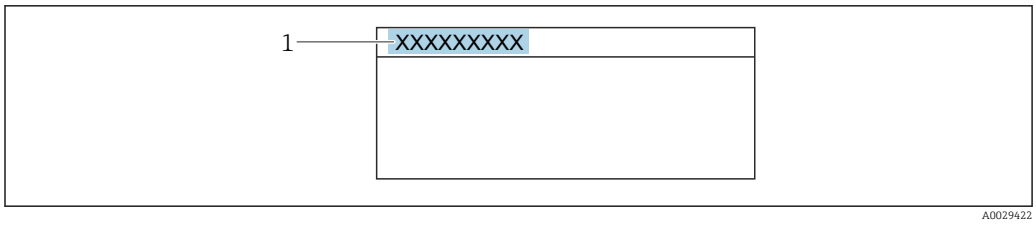
Selection
- Device tag
- Free text

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 (→ 231).
- 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.

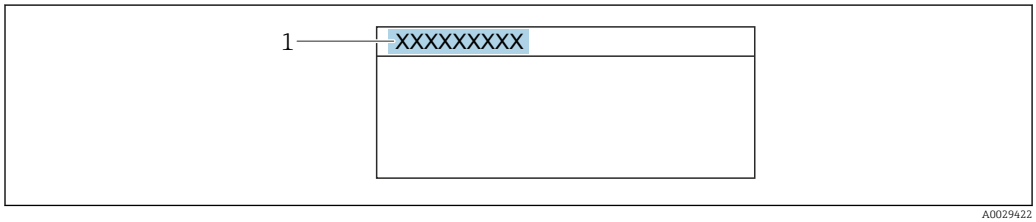
Description Use this function to enter a customer-specific text for the header of the local display.

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"

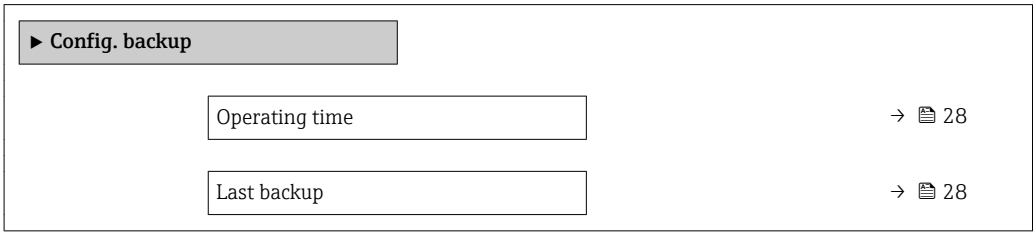
Description Use this function to switch the backlight of the local display on and off.

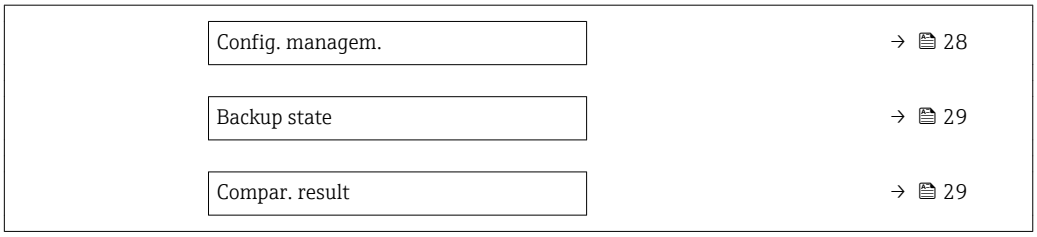
Selection
- Disable
- Enable

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

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

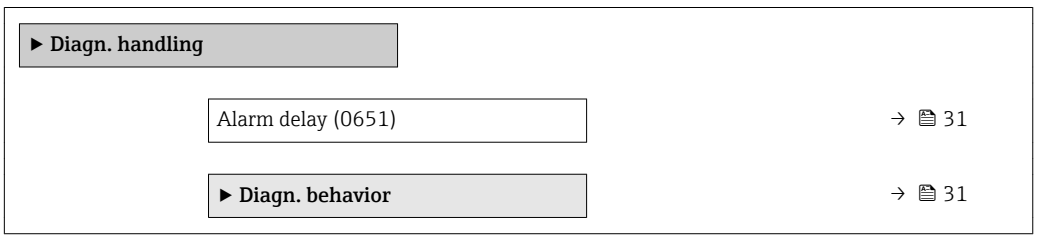
Options	Description
Set. identical	The current device configuration of the HistoROM is identical to the backup copy in the device memory. If the transmitter configuration of another device has been transmitted to the device via HistoROM in the **Config. managem.** parameter, the current device configuration 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

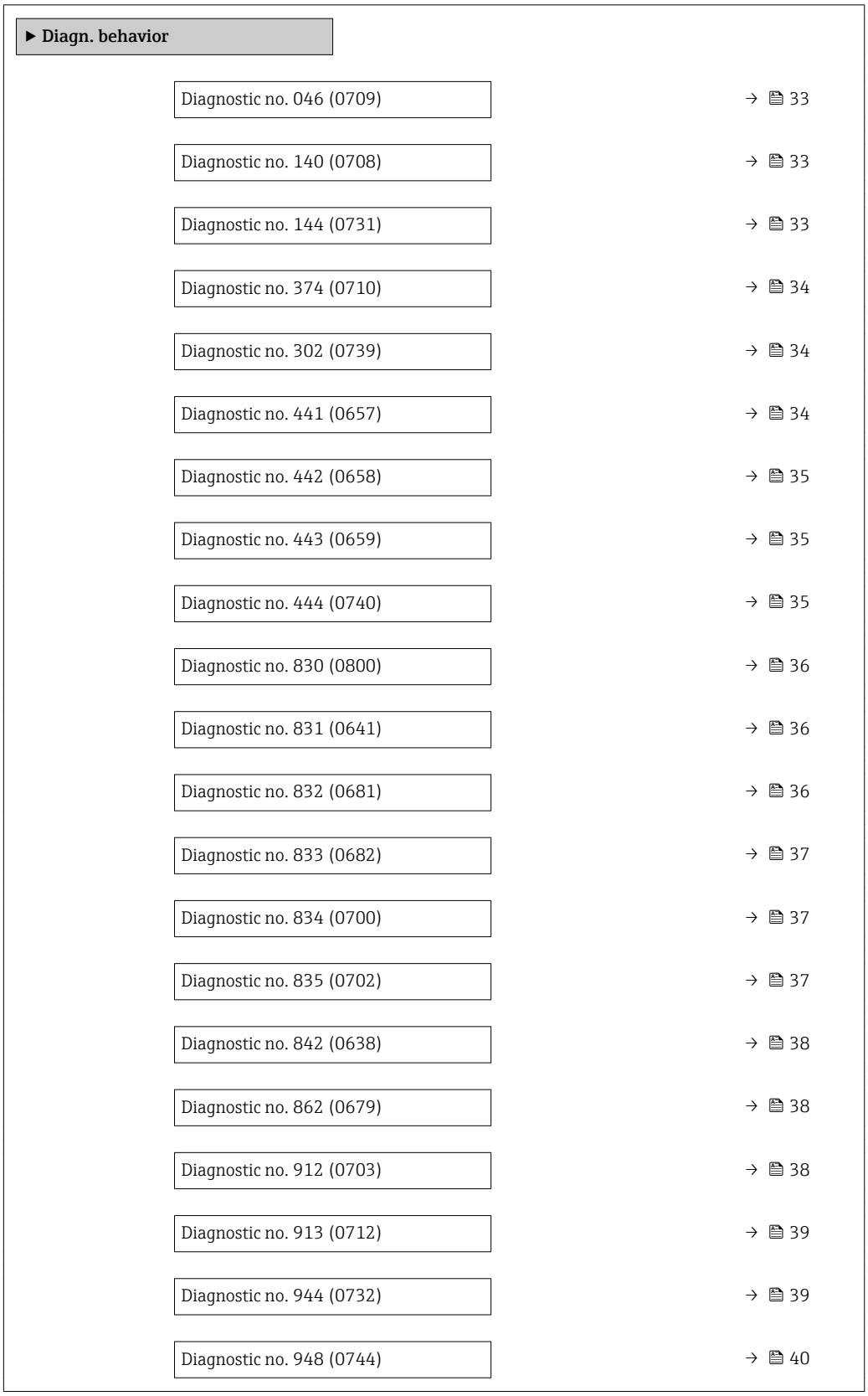
Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for specific diagnostic information in the **Diagn. behavior** submenu (→ 31).

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 PROFIBUS 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 (→ 228) (**Event list** submenu (→ 229)) 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. 046 (Sensor limit)

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

Description Option for changing 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:

Diagnostic no. 140 (Sensor sig.asym.)

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

Description Option for changing 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:

Diagnostic no. 144 (MeasErrorTooHigh)

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

Description Option for changing 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:

Diagnostic no. 374 (Sensor electron.)

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

Description Option for changing 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:

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:

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:

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:

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:

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:

Diagnostic no. 830 (Sensor temp.)

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

Description Option for changing 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:

Diagnostic no. 831 (Sensor temp.)

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

Description Option for changing 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:

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:

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:

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:

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:

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 **Process limit**.

Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Off

Diagnostic no. 862 (Empty pipe)

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

Description Option for changing 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:

Diagnostic no. 912 (Medium inhomog.)

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

Description Option for changing 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:

Diagnostic no. 913 (Medium unsuitab.)

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

Description Option for changing 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:

Diagnostic no. 944 (MonitoringFailed)

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

Description Option for changing 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:

Diagnostic no. 948 (Oscill. damping)

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

Description Option for changing the diagnostic behavior of the diagnostic message **948 Oscill. damping**.

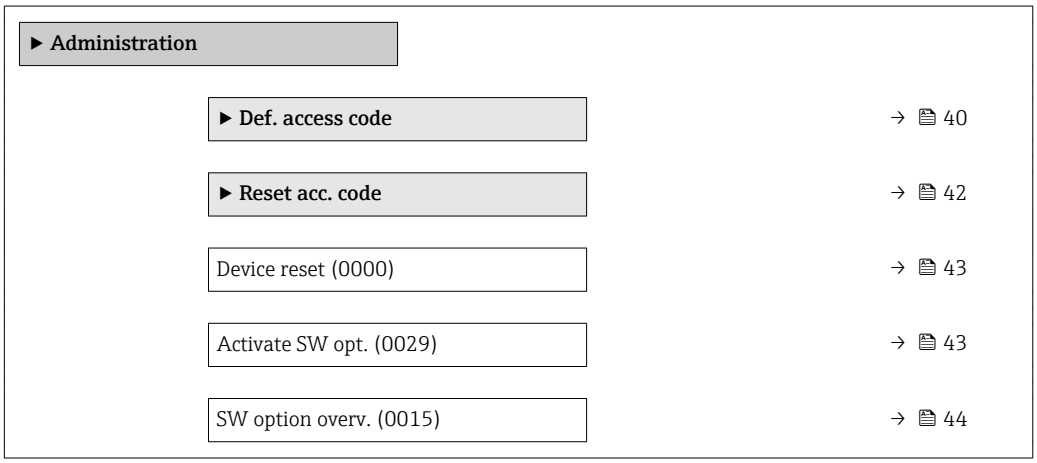
Selection
- Off
- Alarm
- Warning
- Logbook only

Factory setting Warning

Additional information Detailed description of the options available for selection:

3.1.4 "Administration" submenu

Navigation Expert → System → Administration

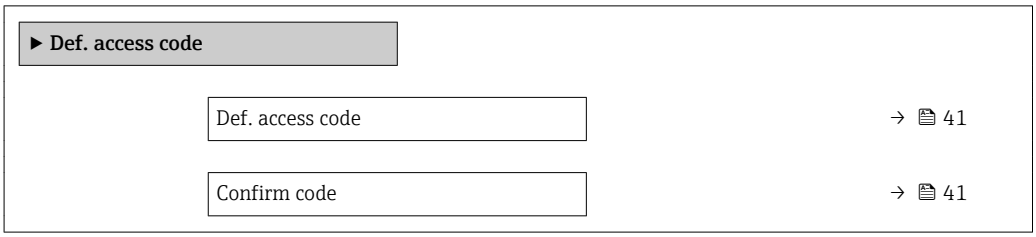


"Def. access code" wizard

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

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

Navigation Expert → System → Administration → Def. access code



Def. access code

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

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

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

Additional information

Description

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

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

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

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

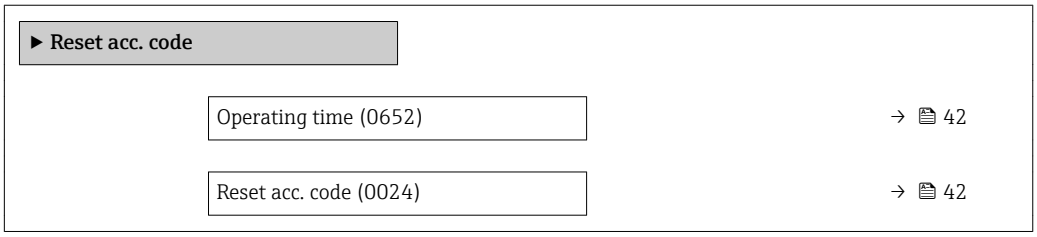
Navigation Expert → System → Administration → Def. access code → Confirm code

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.
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.

Activate SW opt.

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

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

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

Factory setting Depends on the software option ordered

Additional information *Description*

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

User entry

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

NOTE!

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

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

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

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

▸ Once the activation code has been entered, check if the new software option is displayed in the **SW option overv.** parameter (→ 44).

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

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

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

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

Example for a software option

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

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

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 *
- HBT Verification *
- Concentration *

* Visibility depends on order options or device settings

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

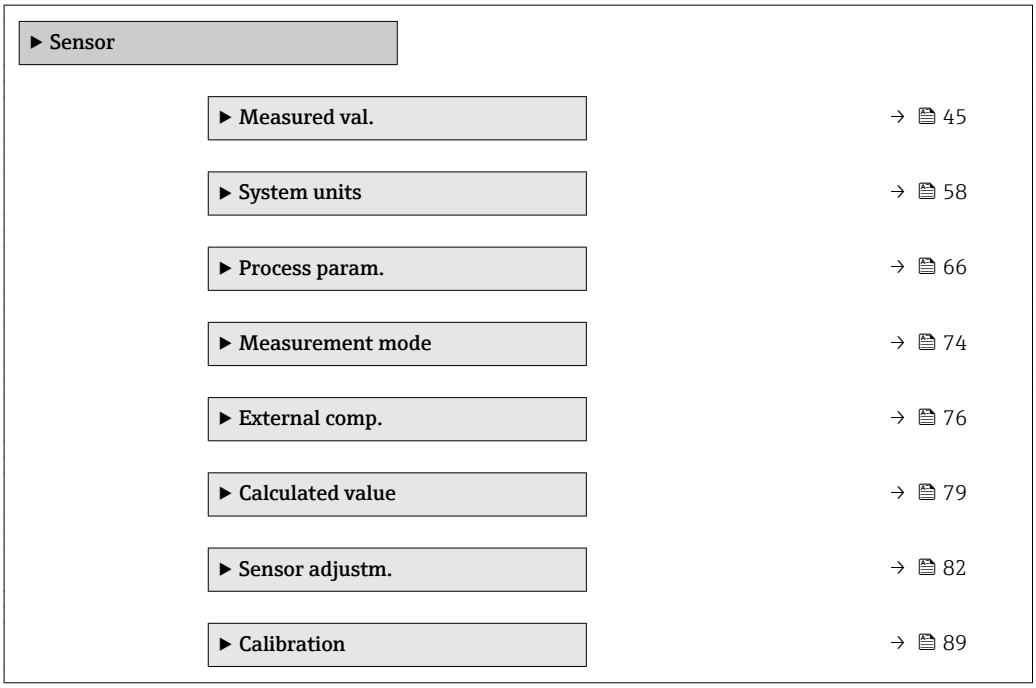
Order code for "Application package", option **EB** "Heartbeat Verification + Monitoring"

"Concentration" option

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

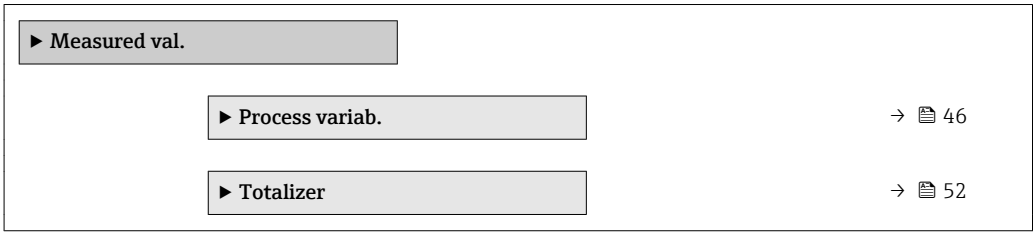
3.2 "Sensor" submenu

Navigation Expert → Sensor



3.2.1 "Measured val." submenu

Navigation Expert → Sensor → Measured val.



▶ **Input values**	→ 53
▶ **Output values**	→ 54

"Process variab." submenu

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

▶ **Process variab.**	
Mass flow (1838)	→ 46
Volume flow (1847)	→ 47
Correct.vol.flow (1851)	→ 47
Density (1850)	→ 47
Ref.density (1852)	→ 48
Temperature (1853)	→ 48
Pressure value (6129)	→ 48
Concentration (1887)	→ 48
Target mass flow (1864)	→ 49
Carrier mass fl. (1865)	→ 49
Targ.corr.vol.fl (1893)	→ 50
Carr.corr.vol.fl (1894)	→ 50
Target vol. flow (1895)	→ 51
Carrier vol. fl. (1896)	→ 51

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 (→ 59)

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 (→ 60)

Correct.vol.flow

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

Description Displays the corrected volume flow currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Cor.volflow unit** parameter (→ 62)

Density

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

Description Displays the density currently measured.

User interface Signed floating-point number

Additional information *Dependency*

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

Ref.density

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

Description Displays the reference density currently calculated.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Ref. dens. unit** parameter (→ 64)

Temperature

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

Description Displays the medium temperature currently measured.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

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 (→ 65)

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 (→ 44).

Description Displays the concentration 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 (→ 44).

Description Displays the mass flow 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 (→ 59)

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 (→ 44).

Description Displays the mass flow 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 (→ 59)

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"
- 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 (→ 44).

Description Displays the corrected volume flow 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 (→ 60)

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 (→ 44).

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 (→ 60)

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 (→ 44).

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 (→ 60)

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 (→ 44).

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

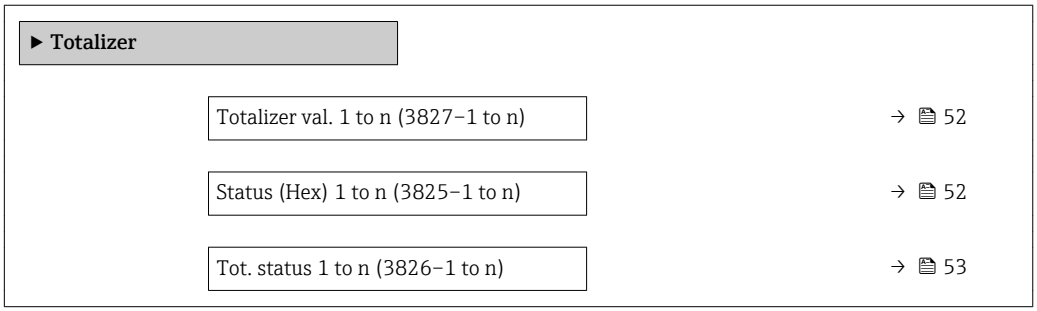
User interface Signed floating-point number

Additional information *Dependency*

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

"Totalizer" submenu

Navigation Expert → Sensor → Measured val. → Totalizer



Totalizer val. 1 to n

Navigation Expert → Sensor → Measured val. → Totalizer → Totalizer val. 1 to n (3827–1 to n)

Prerequisite In the **Target mode** parameter (→ 214), the **Auto** option is selected.

Description Displays the current reading for totalizer 1-3.

User interface Signed floating-point number

Additional information *Description*

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 211).

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 (→ 211).

Dependency

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Status (Hex) 1 to n

Navigation Expert → Sensor → Measured val. → Totalizer → Status (Hex) 1 to n (3825–1 to n)

Prerequisite In **Target mode** parameter (→ 214), the **Auto** option is selected.

Description Displays the status value (hex) of the particular totalizer.

User interface 0 to 0xFF

Tot. status 1 to n

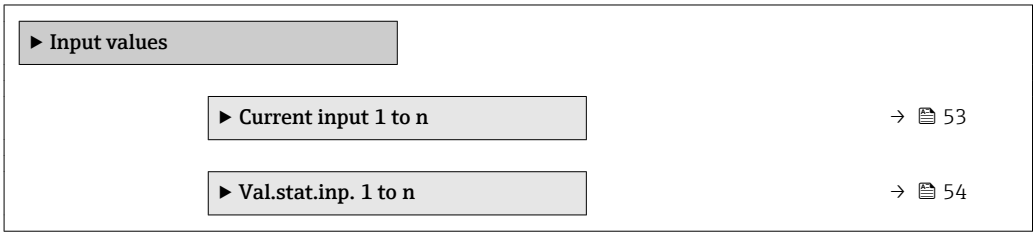
Navigation Expert → Sensor → Measured val. → Totalizer → Tot. status 1 to n (3826–1 to n)

Description Displays the status of the particular totalizer.

User interface
- Good
- Uncertain
- Bad

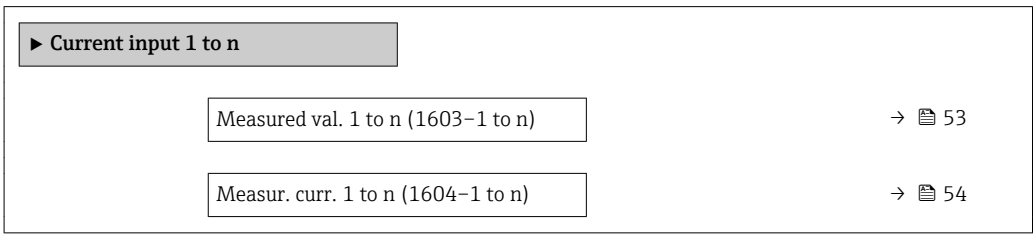
"Input values" submenu

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

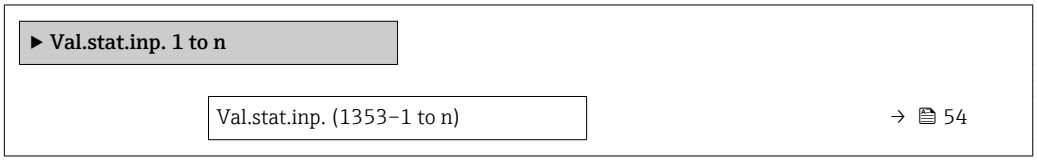
Navigation Expert → Sensor → Measured val. → Input values → Current input 1 to n → Measur. curr. 1 to n (1604–1 to n)

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.

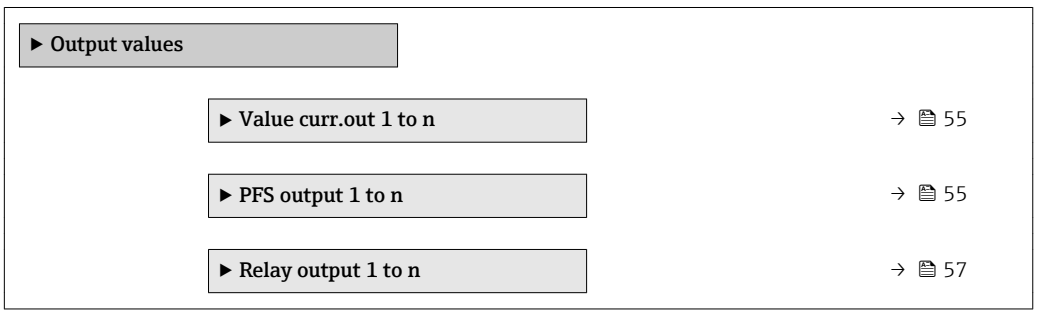
Navigation Expert → Sensor → Measured val. → Input values → Val.stat.inp. 1 to n → Val.stat.inp. (1353–1 to n)

Description Displays the current input signal level.

User interface
- High
- Low

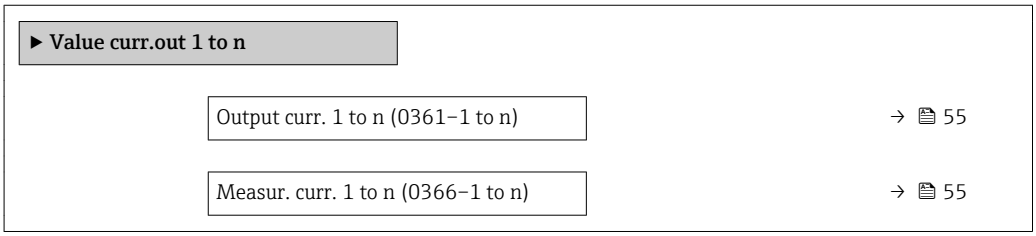
"Output values" submenu

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

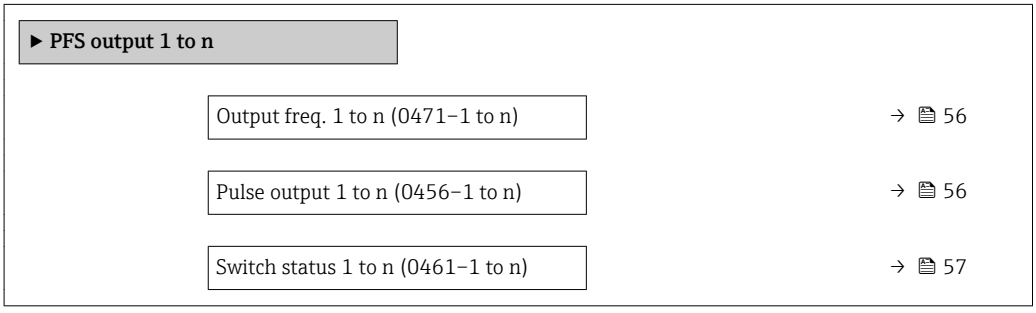
Navigation Expert → Sensor → Measured val. → Output values → Value curr.out 1 to n → Measur. curr. 1 to n (0366–1 to n)

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 (→ 115), 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)

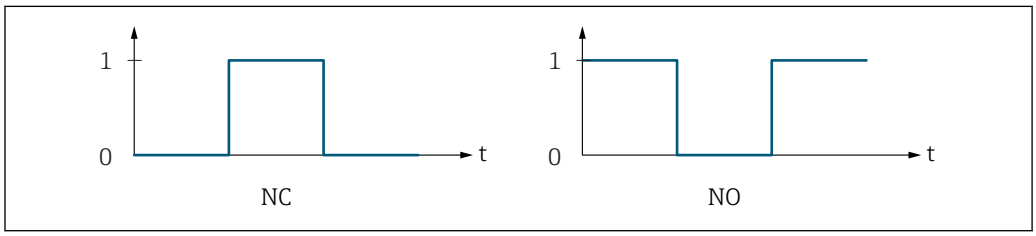
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 115) parameter.

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 (→ 133) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 119)) 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 (→ 115).

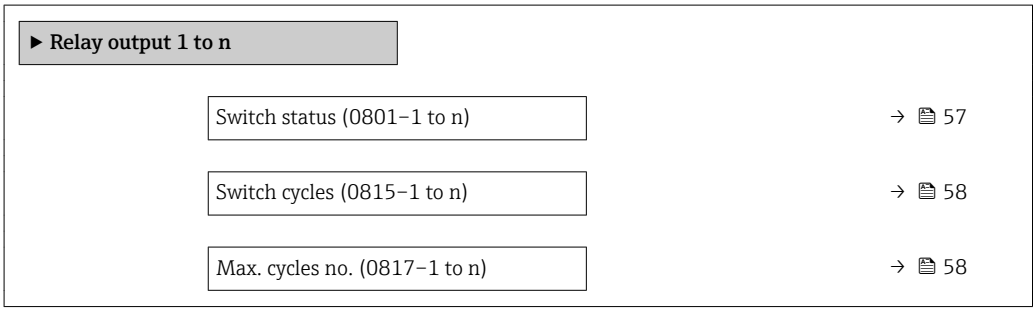
Description Displays the current switch status of the status output.

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.

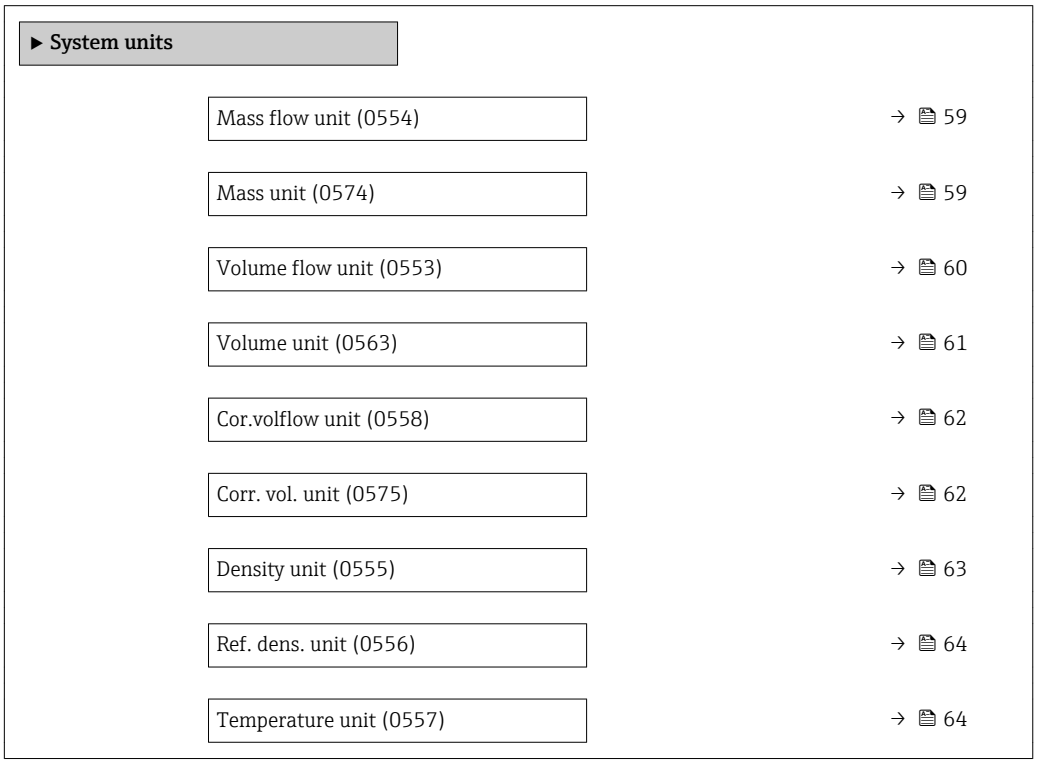
Navigation Expert → Sensor → Measured val. → Output values → Relay output 1 to n → Max. cycles no. (0817–1 to n)

Description Displays the maximum number of guaranteed switch cycles.

User interface Positive integer

3.2.2 "System units" submenu

Navigation Expert → Sensor → System units



Pressure unit (0564)	→ 65
Date/time format (2812)	→ 66

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 (→ 49)
- **Carrier mass fl.** parameter (→ 49)
- **Mass flow** parameter (→ 46)

Selection

For an explanation of the abbreviated units: → 268

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: → 268

Volume flow unit

Navigation

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

Description

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

Selection

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

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

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

Factory setting

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

Additional information

Result

The selected unit applies for:
Volume flow parameter (→ 47)

Selection

For an explanation of the abbreviated units: → 268

Volume unit

Navigation

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

Description

Use this function to select the unit for the volume.

Selection

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

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

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

or

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

Imperial units
bbl (imp;beer)

Factory setting

Country-specific:
- l
- gal (us)

Additional information *Selection*

For an explanation of the abbreviated units: → 268

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
- Nm^3/s
- Nm^3/min
- Nm^3/h
- Nm^3/d
- Sm^3/s
- Sm^3/min
- Sm^3/h
- Sm^3/d

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

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 (→ 47)

Selection

For an explanation of the abbreviated units: → 268

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
- Nm^3
- Sm^3

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

Imperial units
Sgal (imp)

Factory setting

Country-specific:
- Nl
- Sft³

Additional information

Selection

For an explanation of the abbreviated units: → 268

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

or

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

Imperial units
lb/bbl (imp;beer)

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 (→ 47)

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: → 268

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 (→ 80)
- **Fix ref.density** parameter (→ 80)
- **Ref.density** parameter (→ 48)

Selection

For an explanation of the abbreviated units: → 268

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 (→ 241)
- **Minimum value** parameter (→ 241)
- **Maximum value** parameter (→ 242)
- **Minimum value** parameter (→ 242)
- **Maximum value** parameter (→ 243)
- **Minimum value** parameter (→ 243)
- **External temp.** parameter (→ 79)
- **Temperature** parameter (→ 48)
- **Ref. temperature** parameter (→ 81)

Selection

For an explanation of the abbreviated units: → 268

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 (→ 77)
- **External press.** parameter (→ 78)
- **Pressure value** parameter (→ 48)

Selection

For an explanation of the abbreviated units: → 268

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: → 268

3.2.3 "Process param." submenu

Navigation Expert → Sensor → Process param.

▶ **Process param.**	
Flow damping (1802)	→ 67
Density damping (1803)	→ 67
Temp. damping (1822)	→ 68
Flow override (1839)	→ 68
▶ **Low flow cut off**	→ 69
▶ **Partial pipe det**	→ 72

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
- Low flow cut off → 69
- Totalizers → 208

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

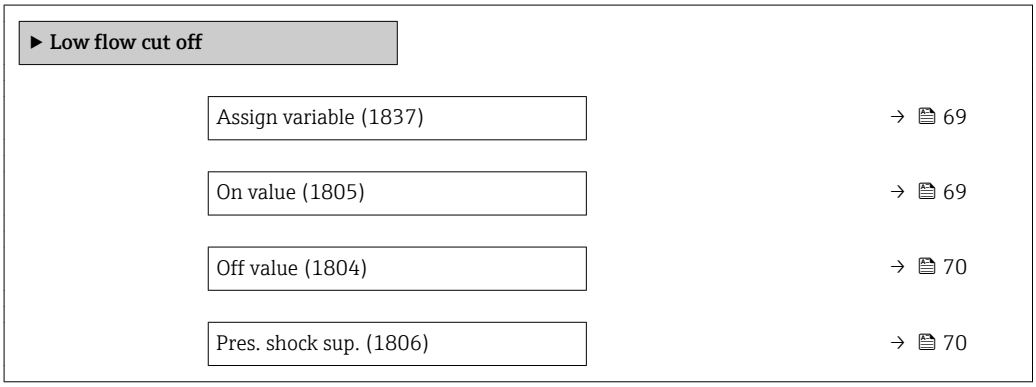
Additional information *Description*

Flow override is active
- The diagnostic message diagnostic message ⚠**C453 Flow override** is displayed.
- 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 (→ 97).

"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 (→ 69).

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 → 70.

User entry Positive floating-point number

Factory setting Depends on country and nominal diameter→ 266

Additional information *Dependency*

The unit depends on the process variable selected in the **Assign variable** parameter (→ 69).

Off value

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

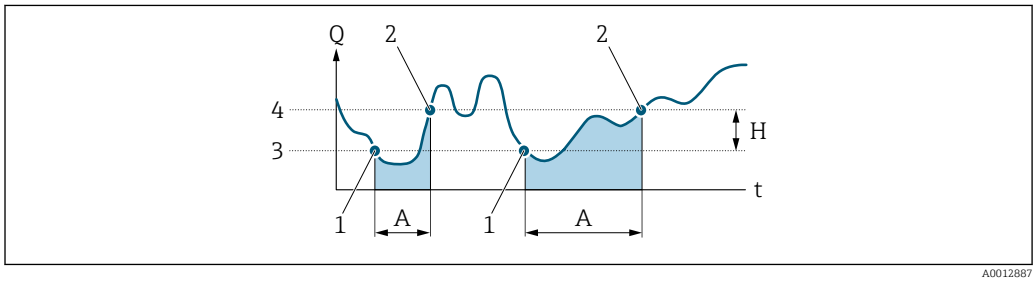
Prerequisite A process variable is selected in the **Assign variable** parameter (→ 69).

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→ 69.

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 (→ 69).

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

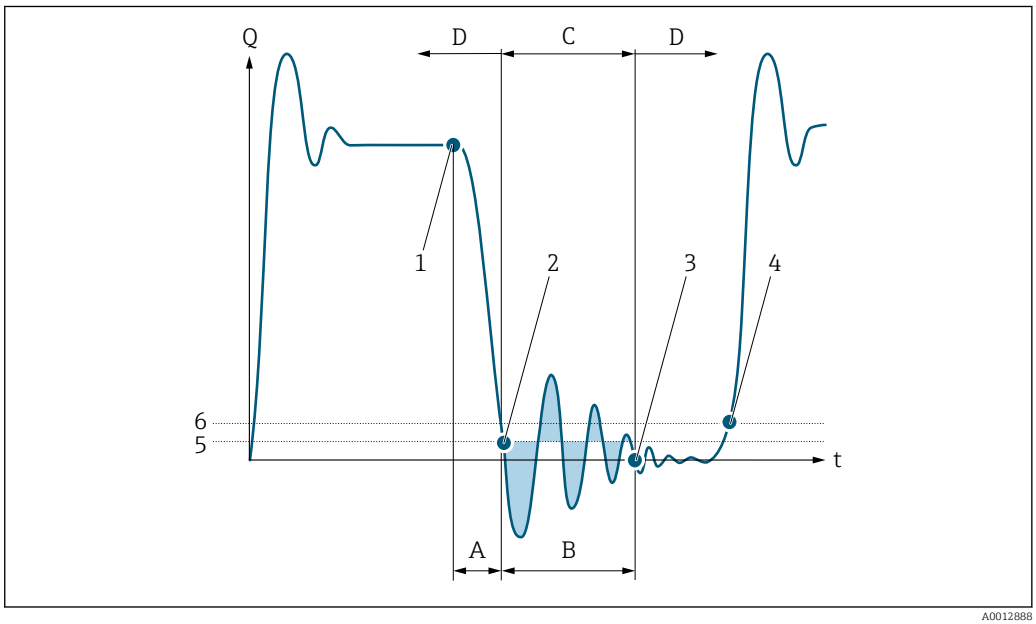
Additional information *Description*

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

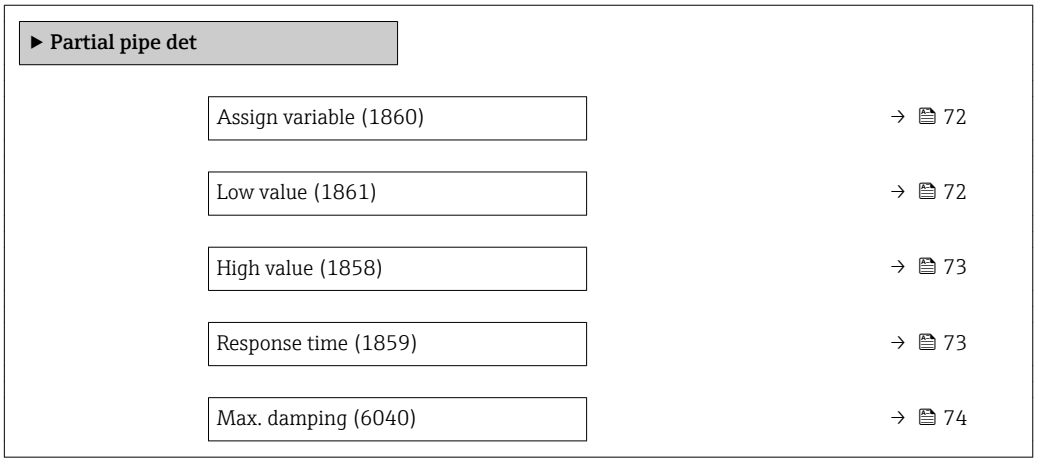
When closing a valve, momentarily strong fluid movements may occur in the pipeline, which are registered by the measuring system. These totalized flow values lead to a false totalizer status, particularly during batching processes.



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 (→ 72).

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 (→ 73).

The unit depends on the process variable selected in the **Assign variable** parameter (→ 72).

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 (→ 72).

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 (→ 72).

The unit depends on the process variable selected in the **Assign variable** parameter (→ 72).

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 (→ 72).

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

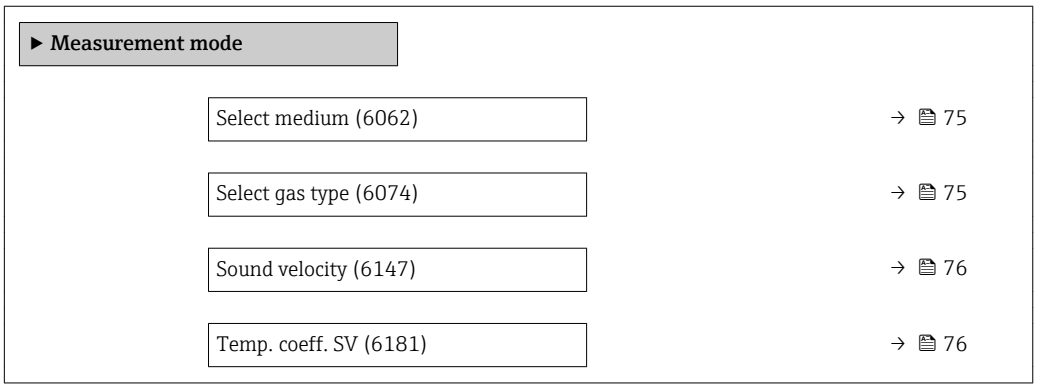
- Damping is disabled if **0** is entered (factory setting).
- Damping is enabled if the value entered is greater than **0**.
- The value entered depends on application-specific influence variables, such as the medium, nominal diameter, sensor etc.

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 (→ 75).

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 (→ 75), 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 (→ 75).

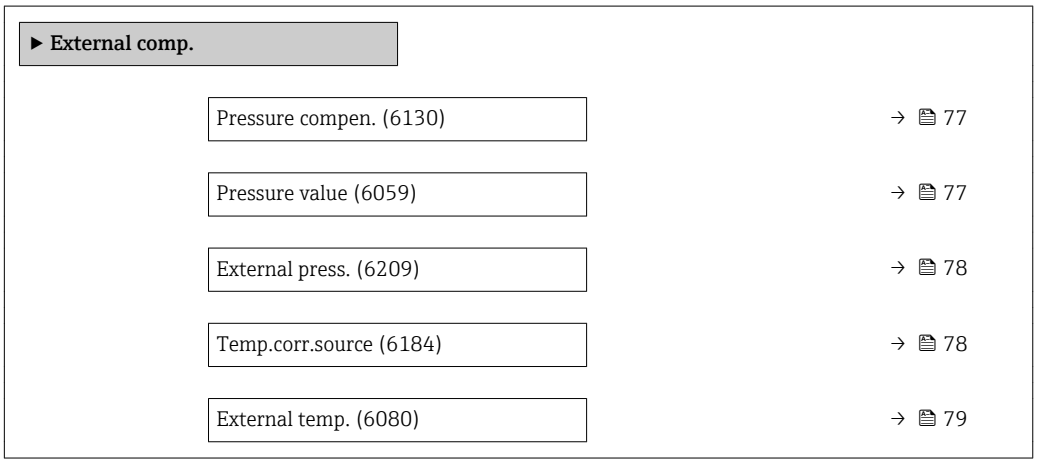
Description Use this function to enter a temperature coefficient for the sound velocity of the gas.

User entry Positive floating-point number

Factory setting 0 (m/s)/K

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 *
- Current input 3 *

Factory setting Off

Additional information *Selection*
- Fixed value
  A fixed pressure value is used for compensation: **Pressure value** parameter (→ 77)
- External value
  The pressure value read in via PROFIBUS DP is used for compensation.
- **Current input 1** option, **Current input 3** option
  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

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 (→ 77).

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 0 bar

Additional information *User entry*

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

* Visibility depends on order options or device settings

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 (→ 77).

Description Use this function to enter an external pressure value.

User interface Positive floating-point number

Factory setting 0 bar

Additional information *User entry*

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

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

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 read in via PROFIBUS DP is used for compensation.
- **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

* Visibility depends on order options or device settings

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 (→ 78).

Description Use this function to enter the external temperature.

User interface –273.15 to 99 999 °C

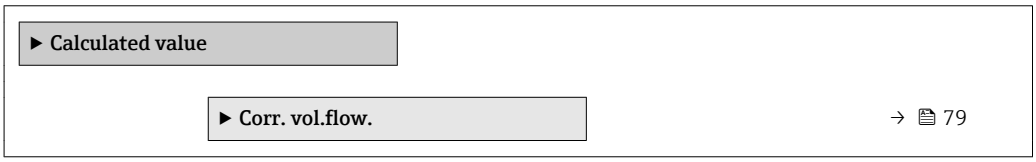
Factory setting Country-specific:
- 0 °C
- +32 °F

Additional information *Description*

The unit is taken from the **Temperature unit** parameter (→ 64)

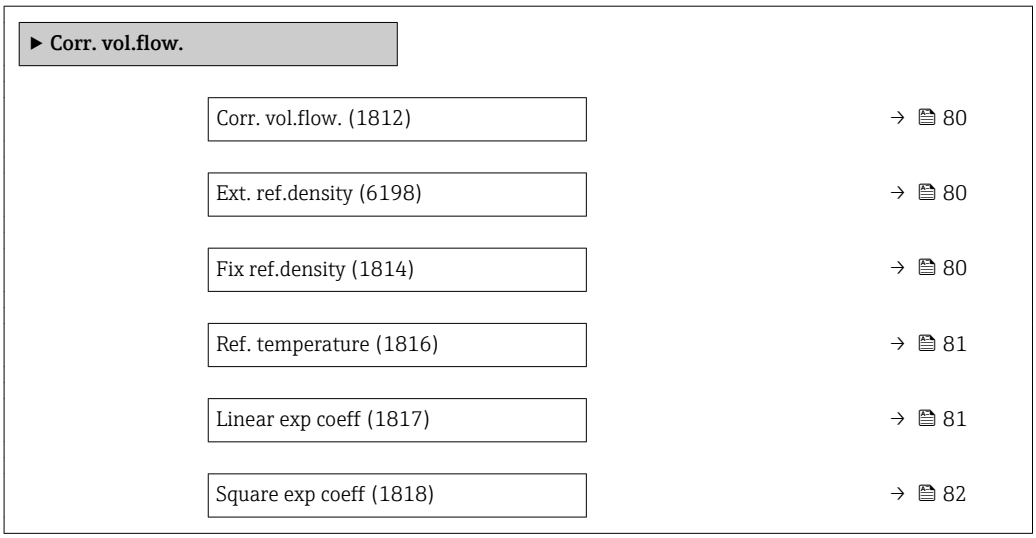
3.2.6 "Calculated value" submenu

Navigation Expert → Sensor → Calculated value



"Corr. vol.flow." submenu

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



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 *
- Current input 3 *

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→ 76→ 76) 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

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

Prerequisite In the **Corr. vol.flow.** parameter (→ 80), the **Ext. ref.density** option is selected.

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 (→ 64)

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 (→ 80) parameter.

* Visibility depends on order options or device settings

5) liquefied petroleum gas

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 (→ 64)

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 (→ 80) 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 (→ 64)

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/K^2]

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 (→ 80) 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 (→ 80) parameter.

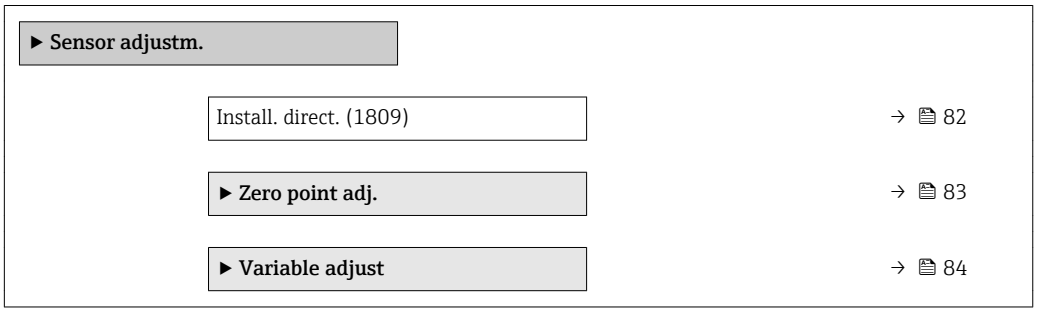
Description For fluid with a non-linear expansion pattern: use this function to enter a quadratic, fluid-specific expansion coefficient for calculating the reference density.

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.

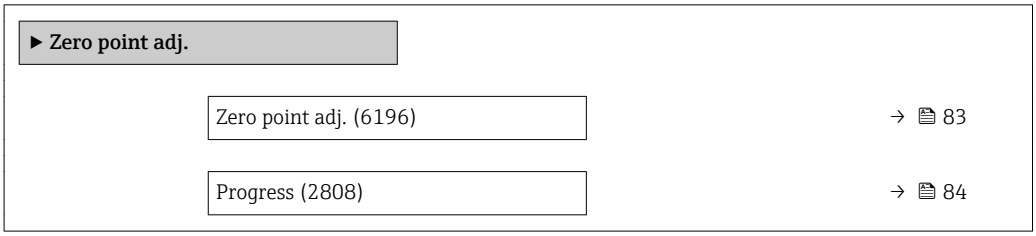
Additional information *Description*

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 → 83.

Selection
- Cancel
- Busy
- Zero adjust fail
- 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.

Progress

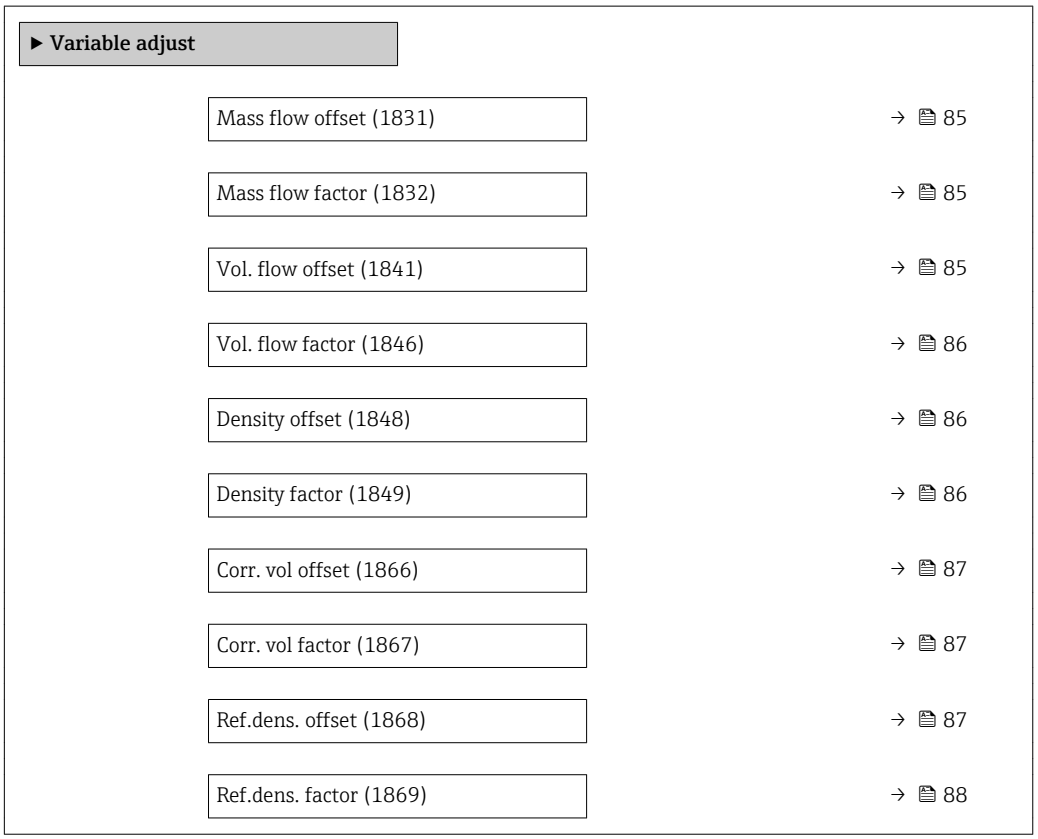
Navigation Expert → Sensor → Sensor adjustm. → Zero point adj. → Progress (2808)

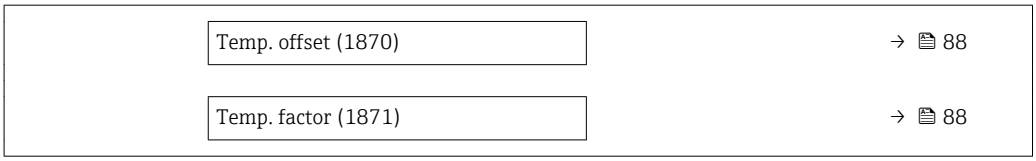
Description The progress of the process is indicated.

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/m^3.

User entry Signed floating-point number

Factory setting 0 kg/m^3

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 Nm^3/s.

User entry Signed floating-point number

Factory setting 0 Nm^3/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/Nm^3.

User entry Signed floating-point number

Factory setting 0 kg/Nm^3

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

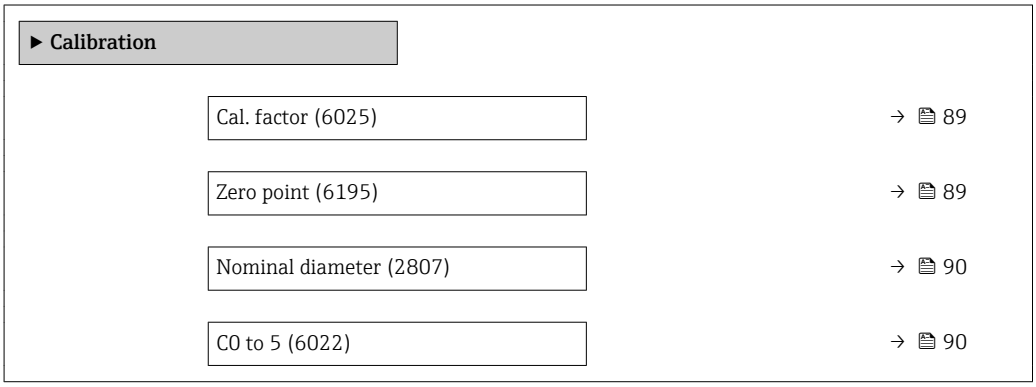
Factory setting 1

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)

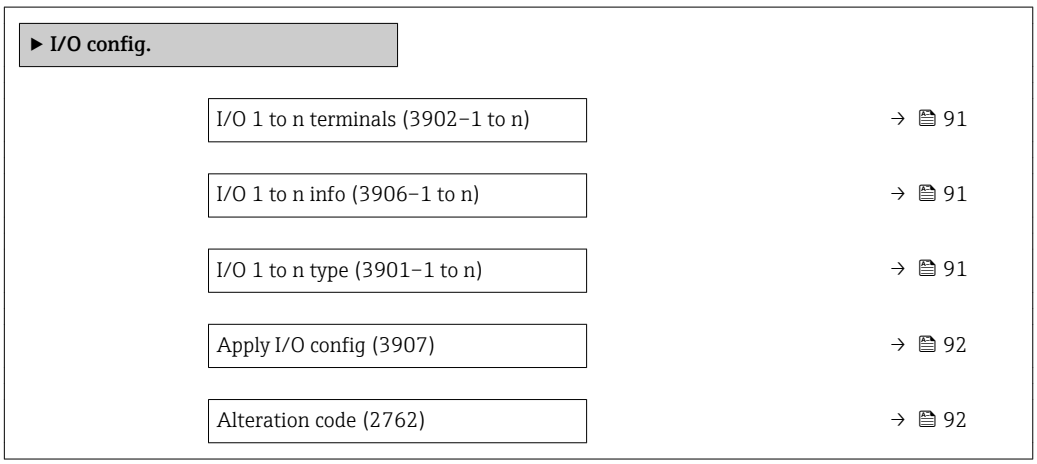
Description Displays the current density coefficients C0 to 5 of the sensor.

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)
- 20-21 (I/O 4)

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
- Profibus DP

Additional information

"Not plugged" option

The I/O module is not plugged in.

"Invalid" option

The I/O module is not plugged correctly.

"Not configurable" option

The I/O module is not configurable.

"Configurable" option

The I/O module is configurable.

"Fieldbus" option

The I/O module is configured for the fieldbus.

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 *

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

Alteration code

Navigation Expert → I/O config. → Alteration 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

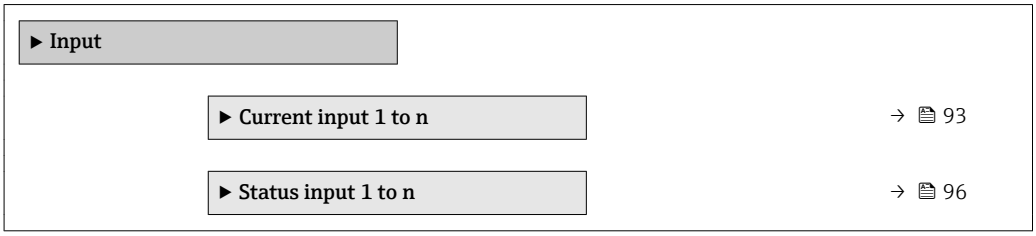
Additional information *Description*

The I/O configuration is changed in the **I/O type** parameter (→ 91).

* Visibility depends on order options or device settings

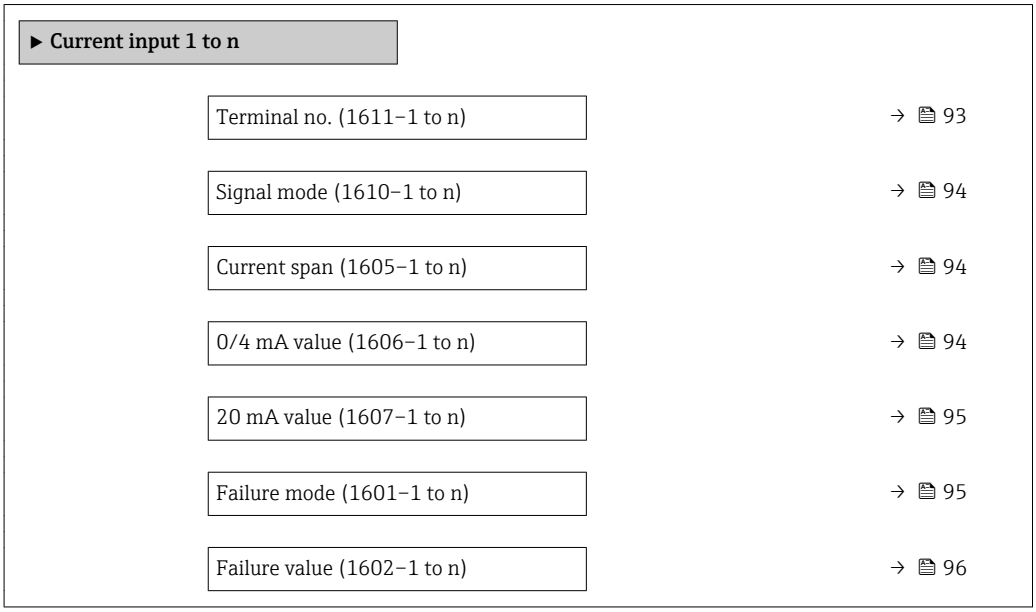
3.4 "Input" submenu

Navigation Expert → Input



3.4.1 "Current input 1 to n" submenu

Navigation Expert → Input → Current input 1 to n



Terminal no.

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

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

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

Additional information *"Not used" option*

The current input module does not use any terminal numbers.

Signal mode

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

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

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

Selection
- Passive
- Active

Factory setting Active

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 (→ 101)

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 (→ 94)
- Failure mode (→ 95)

Configuration examples

Pay attention to the configuration examples for **4 mA value** parameter (→ 102).

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 (→ 102).

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 (→ 94).

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 (→ 96)).

Failure value

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

Prerequisite In the **Failure mode** parameter (→ 95), the **Defined value** option is selected.

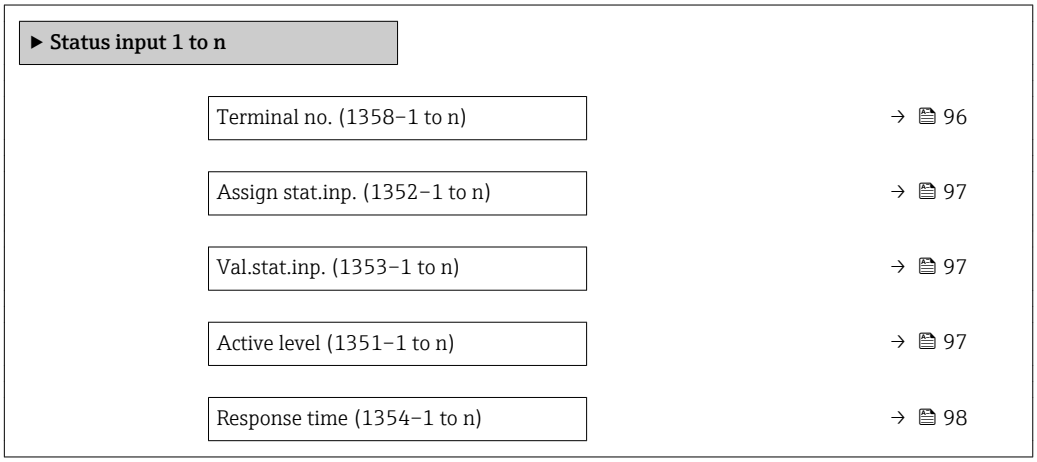
Description Use this function to enter the value that the device uses if it does not receive an input signal from the external device, or if the input signal is invalid.

User entry Signed floating-point number

Factory setting 0

3.4.2 "Status input 1 to n" submenu

Navigation Expert → Input → Status input 1 to n



Terminal no.

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

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

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

Additional information *"Not used" option*

The status input module does not use any terminal numbers.

Assign stat.inp.

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

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

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

Factory setting Off

Additional information *Selection*
- Off
  The status input is switched off.
- Reset totaliz. 1…3
  The individual totalizers are reset.
- Reset all tot.
  All totalizers are reset.
- Flow override
  The Flow override (→ 68) is activated.

Note on the Flow override (→ 68):
- The Flow override (→ 68) is enabled as long as the level is at the status input (continuous signal).
- All other assignments react to a change in level (pulse) at the status input.

Val.stat.inp.

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

Description Displays the current input signal level.

User interface
- High
- Low

Active level

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

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

Selection
- High
- Low

Factory setting High

Response time

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

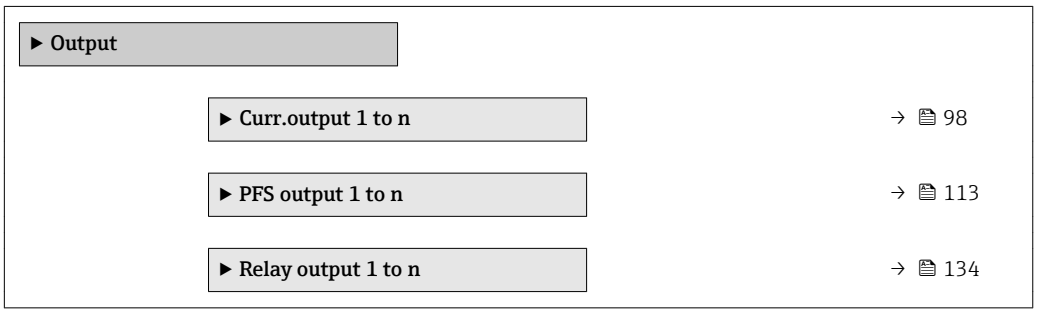
Description Use this function to enter the minimum time period for which the input signal level must be present before the selected function is activated.

User entry 5 to 200 ms

Factory setting 50 ms

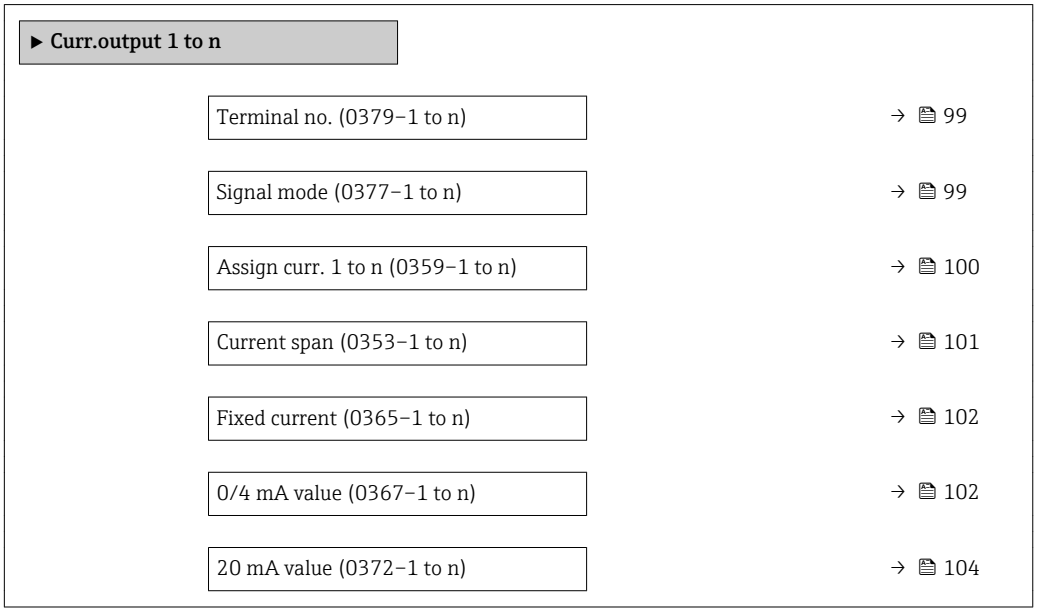
3.5 "Output" submenu

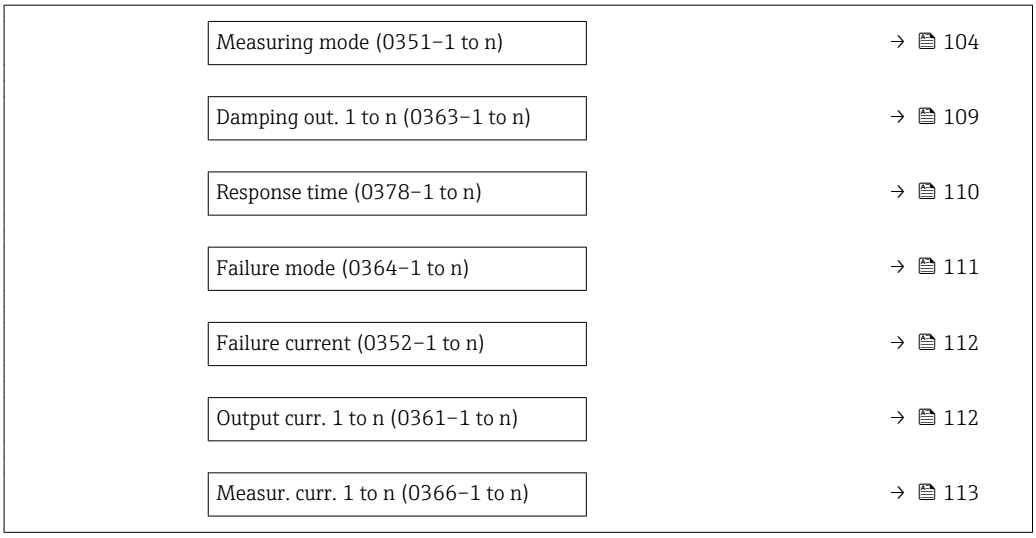
Navigation Expert → Output



3.5.1 "Current output 1 to n" submenu

Navigation Expert → Output → Curr.output 1 to n





Terminal no.

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

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

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

Additional information *"Not used" option*

The current output module does not use any terminal numbers.

Signal mode

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

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

Selection
- Passive
- Active

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

Factory setting Mass flow

* Visibility depends on order options or device settings

Current span

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

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

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

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

Additional information *Description*

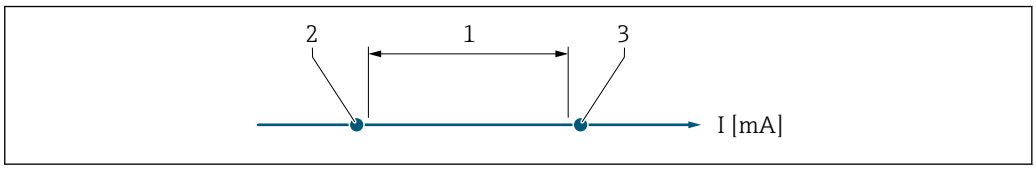
- In the event of a device alarm, the current output adopts the value specified in the **Failure mode** parameter (→ 111).
- If the measured value is outside the measuring range, the diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.
- The measuring range is specified via the **0/4 mA value** parameter (→ 102) and **20 mA value** parameter (→ 104).

"Fixed current" option

The current value is set via the **Fixed current** parameter (→ 102).

Example

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



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

Selection

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

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 (→ 101).

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 One of the following options is selected in the **Current span** parameter (→ 101):
- 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 (→ 100). 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 (→ 104).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 100).

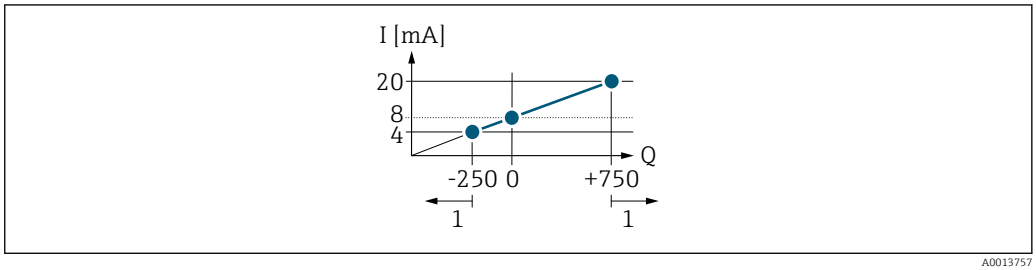
Current output behavior

The current output behaves differently depending on the settings configured in the following parameters:
- Current span (→ 101)
- Failure mode (→ 111)

Configuration examples

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

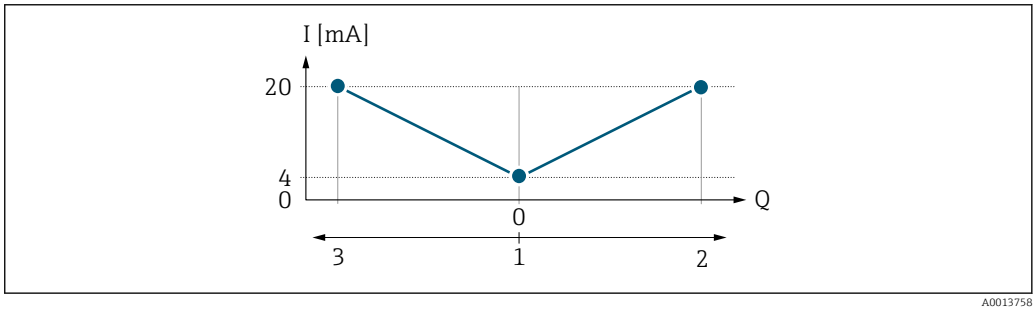
Configuration example A
Measuring mode with **Forward flow** option
- **0/4 mA value** parameter (→ 🖹 102) = not equal to zero flow (e.g. −250 m^3/h)
- **20 mA value** parameter (→ 🖹 104) = not equal to zero flow (e.g. +750 m^3/h)
- Calculated current value = 8 mA at zero flow



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 (→ 🖹 102) and **20 mA value** parameter (→ 🖹 104). 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 (→ 🖹 102) and **20 mA value** parameter (→ 🖹 104) must have the same sign. The value for the **20 mA value** parameter (→ 🖹 104) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 🖹 104) (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 → 🖹 104.

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 (→ 101):
- 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→ 265

Additional information

Description

Positive and negative values are permitted depending on the process variable assigned in the **Assign curr.** parameter (→ 100). 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 (→ 102).

Dependency

The unit depends on the process variable selected in the **Assign curr.** parameter (→ 100).

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 (→ 104), different signs cannot be entered for the values of the **0/4 mA value** parameter (→ 102) and **20 mA value** parameter (→ 104). The diagnostic message ⚠**S441 Curr.output 1 to n** is displayed.

Configuration examples

Observe the configuration examples for the **0/4 mA value** parameter (→ 102).

Measuring mode

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

Prerequisite In the **Assign curr.** parameter (→ 100), one of the following options is selected:
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- Carrier mass fl. *

* Visibility depends on order options or device settings

- 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 (→ 101), one of the following options is selected:
- 4...20 mA NAMUR
- 4...20 mA US
- 4...20 mA
- 0...20 mA

Description

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

Selection

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

Factory setting

Forward flow

Additional information

Description

The process variable that is assigned to the current output via the **Assign curr.** parameter (→ 100) is displayed below the parameter.

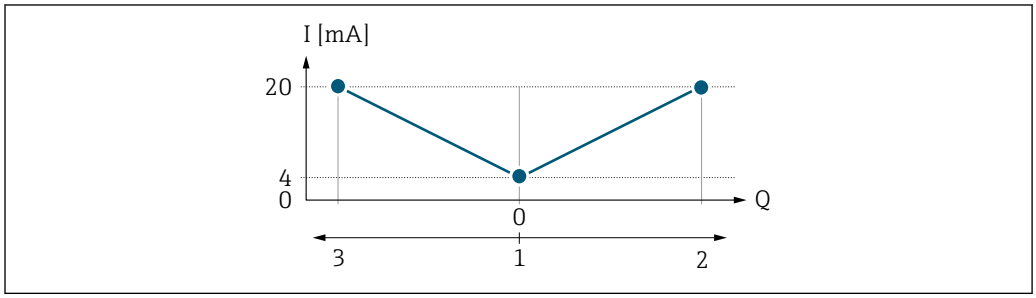
"Forward flow" option

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

* Visibility depends on order options or device settings

The flow components outside the scaled measuring range are taken into account for signal output as follows:
- Both values are defined such that they are not equal to zero flow e.g.:
  – 0/4 mA current value = −5 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



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 (→ 🖹 102) and **20 mA value** parameter (→ 🖹 104) must have the same sign.
- The value for the **20 mA value** parameter (→ 🖹 104) (e.g. reverse flow) corresponds to the mirrored value for the **20 mA value** parameter (→ 🖹 104) (e.g. forward flow).

"Rev. flow comp." option

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

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

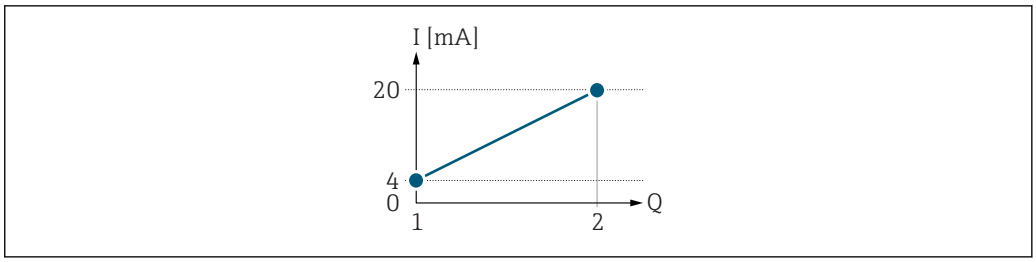
Flow values can aggregate in the buffer in the event of prolonged and unwanted fluid reverse flow. However, these flows are not taken into consideration by the current output configuration, i.e. the reverse flow is not compensated.

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

Examples of how the current output behaves

Example 1

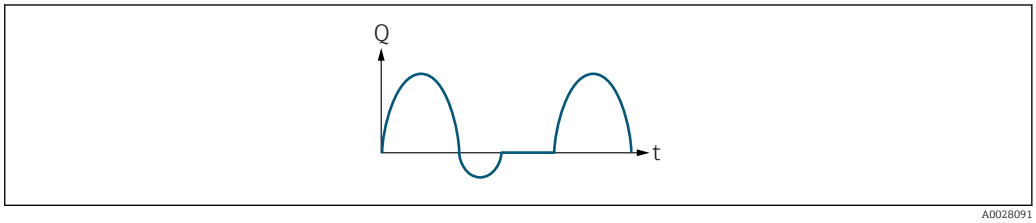
Defined measuring range: lower range value and upper range value with the **same** sign



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:

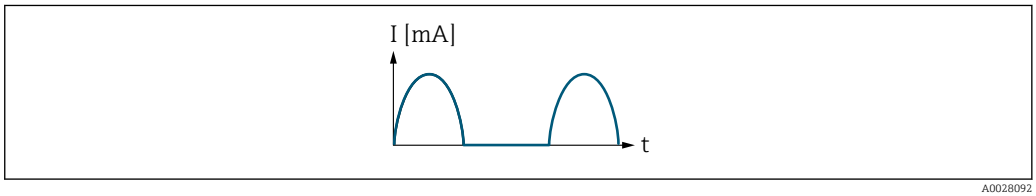


3 *Flow response*

Q Flow
t Time

With **Forward flow** option

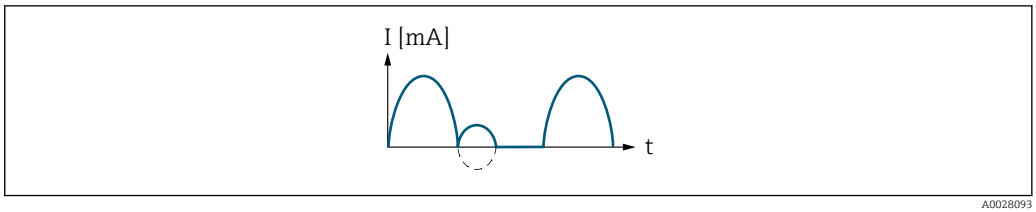
The current output signal is proportional to the process variable assigned. The flow components outside the scaled measuring range are not taken into account for signal output:.



I Current
t Time

With **Forward/Reverse** option

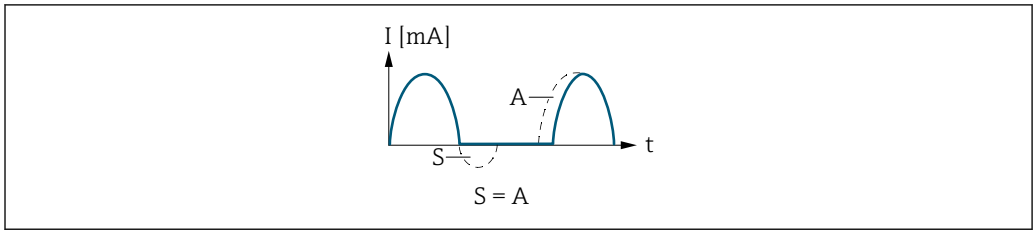
The current output signal is independent of the direction of flow.



I Current
t Time

With **Rev. flow comp.** option

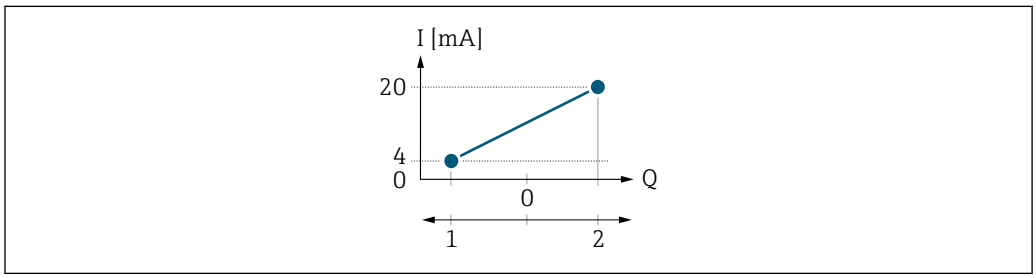
Flow components outside the span are buffered, balanced and output after a maximum delay of 60 s.



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

Example 2

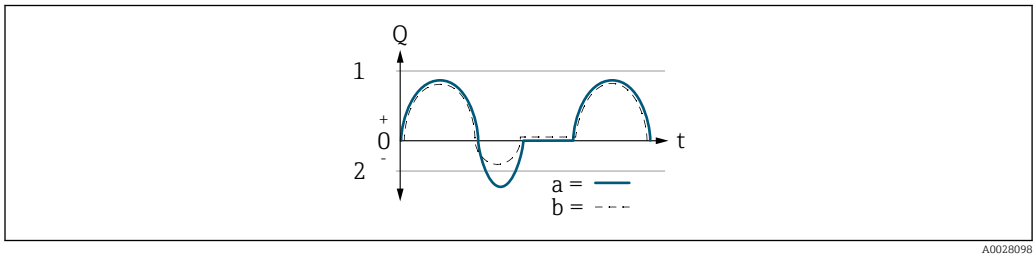
Defined measuring range: lower range value and upper range value with **different** signs



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)

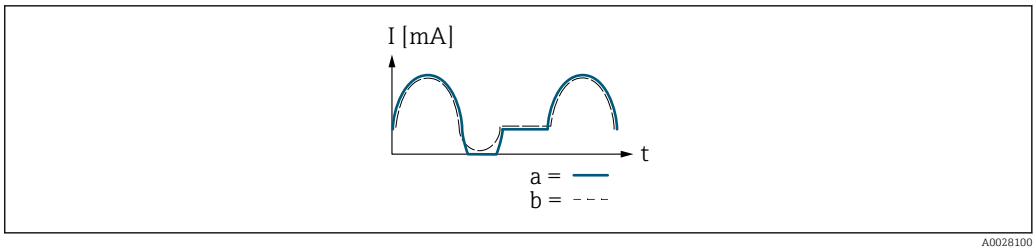
With flow a (—) outside, b (- -) inside the measuring range



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

With **Forward flow** option

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



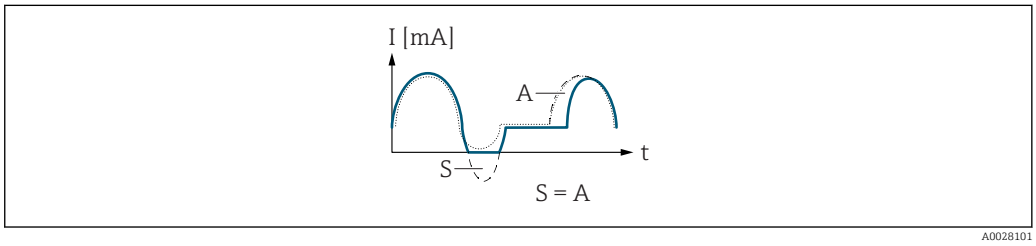
I Current
t Time

With **Forward/Reverse** option

This option is not possible in this case as the values for the **0/4 mA value** parameter (→ 102) and **20 mA value** parameter (→ 104) have different signs.

With **Rev. flow comp.** option

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



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

Damping out. 1 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 (→ 100) and one of the following options is selected in the **Current span** parameter (→ 101):
- 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 1 to n → Response time (0378–1 to n)

Prerequisite One of the following options is selected in the **Assign curr.** parameter (→ 100):
- 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)

One of the following options is selected in the **Current span** parameter (→ 101):
- 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

6) 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:
- Current output damping → 109
  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 (→ 100) and one of the following options is selected in the **Current span** parameter (→ 101):
- 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 (→ 101).

"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 (→ 101).

"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 (→ 112).

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 (→ 111).

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

Terminal no.

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

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

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

Additional information *"Not used" option*

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

Signal mode

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

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

Selection
- Passive
- Active

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.

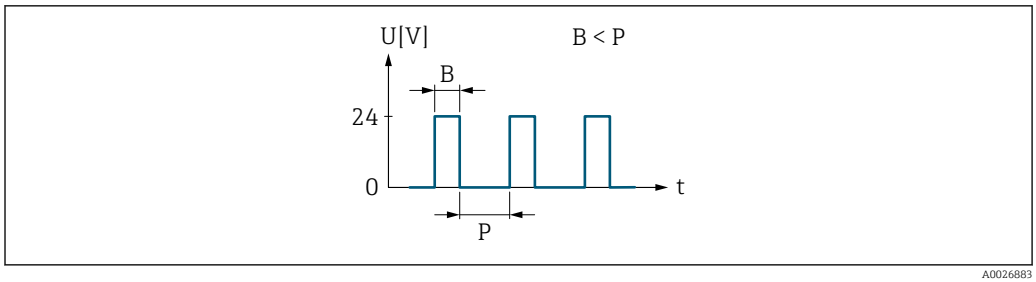
Selection
- Pulse
- Frequency
- Switch

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



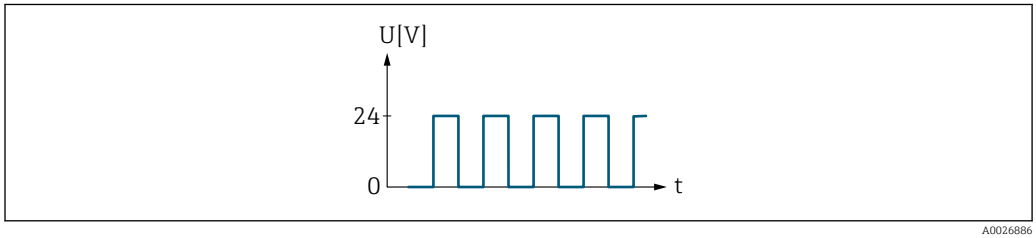
5 Quantity-proportional pulse (pulse value) with pulse width to be configured

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

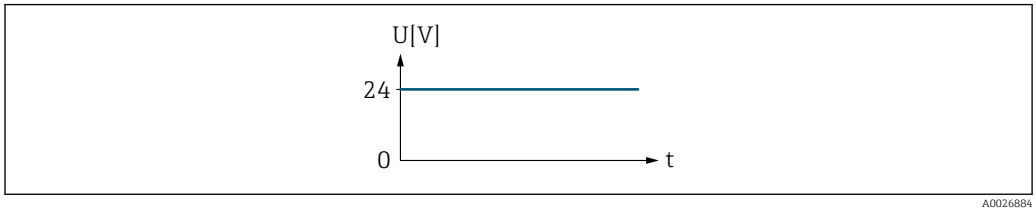


6 Flow-proportional frequency output

"Switch" option

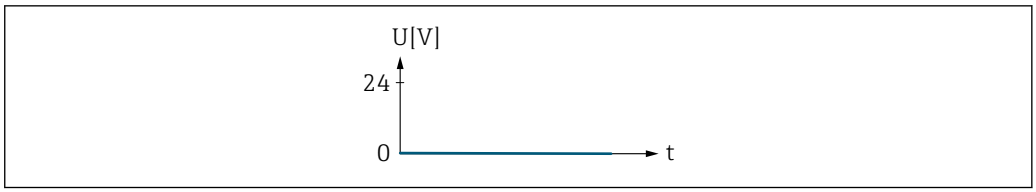
Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

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 (→ 115) 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

Value per pulse

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

Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 115) and a process variable is selected in the **Assign pulse** parameter (→ 117).

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

User entry Signed floating-point number

Factory setting Depends on country and nominal diameter→ 265

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 (→ 115) and a process variable is selected in the **Assign pulse** parameter (→ 117).

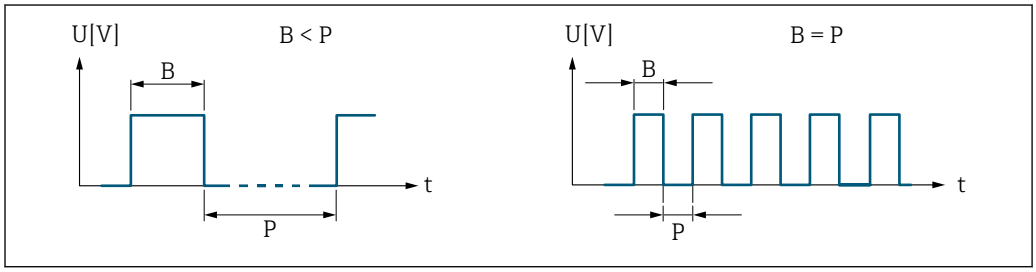
Description Use this function to enter the duration of the output pulse.

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 (→ 115), the **Pulse** option is selected, and one of the following options is selected in the **Assign pulse** parameter (→ 117):

- 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 (→ 104)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 104)

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 (→ 115) and a process variable is selected in the **Assign pulse** parameter (→ 117).

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)

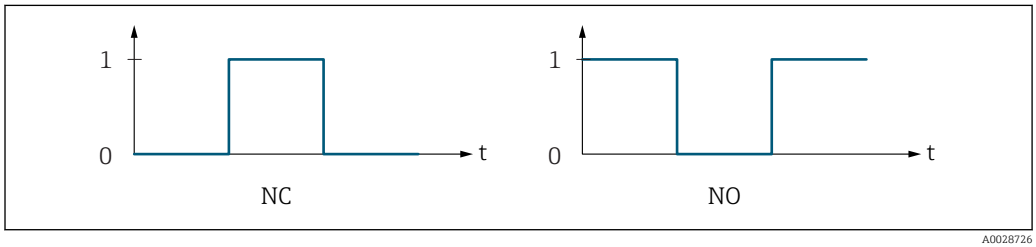
Prerequisite The **Pulse** option is selected in the **Operating mode** parameter (→ 115) parameter.

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 (→ 133) i.e. the transistor does not conduct for the duration of the pulse.

In addition, the behavior of the output in the event of a device alarm (**Failure mode** parameter (→ 119)) 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 (→ 115) parameter.

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

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 (→ 115) and a process variable is selected in the **Assign freq.** parameter (→ 120).

Description Use this function to enter the start value frequency.

* Visibility depends on order options or device settings

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 (→ 115) and a process variable is selected in the **Assign freq.** parameter (→ 120).

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 (→ 115) and a process variable is selected in the **Assign freq.** parameter (→ 120).

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 (→ 120).

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 (→ 115) and a process variable is selected in the **Assign freq.** parameter (→ 120).

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 (→ 120).

Measuring mode

Navigation

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

Prerequisite

In the **Operating mode** parameter (→ 115), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 120):
- 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

Additional information

Selection

For a detailed description of the options available, see the **Measuring mode** parameter (→ 104)

Examples

For a detailed description of the configuration examples, see the **Measuring mode** parameter (→ 104)

* Visibility depends on order options or device settings

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 (→ 115), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 120):
- 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

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.

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

Response time

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

Prerequisite In the **Operating mode** parameter (→ 115), the **Frequency** option is selected, and one of the following options is selected in the **Assign freq.** parameter (→ 120):
- 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

Additional information *Description*

The response time is made up of the time specified for the following dampings:
- Damping of pulse/frequency/switch output → 109
  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 (→ 115) and a process variable is selected in the **Assign freq.** parameter (→ 120).

* Visibility depends on order options or device settings

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. (→ 126) 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 (→ 115) and a process variable is selected in the **Assign freq.** parameter (→ 120).

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 (→ 115), 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 (→ 115).

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 (→ 115), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 127), 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 (→ 115) parameter.
- The **Limit** option is selected in the **Switch out funct** parameter (→ 127) parameter.

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
- Oscil. damping
- Pressure

* Visibility depends on order options or device settings

- Totalizer 1
- Totalizer 2
- Totalizer 3

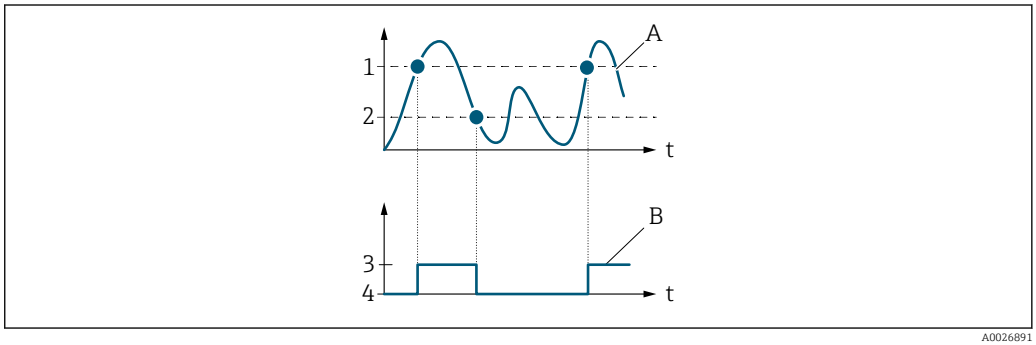
Factory setting

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



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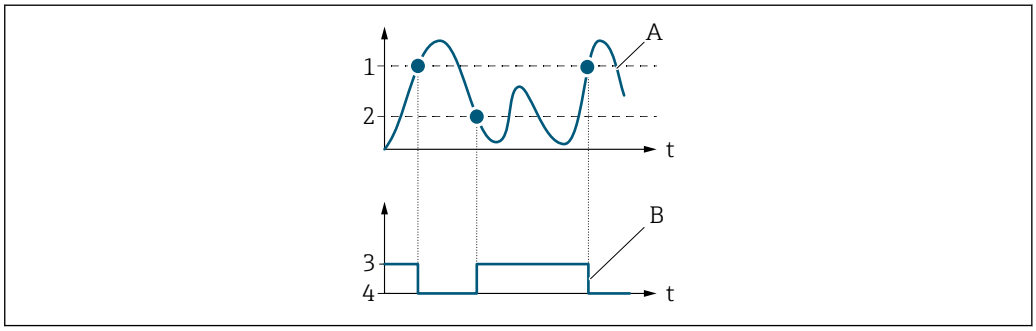
1 Switch-on value
2 Switch-off value
3 Conductive
4 Non-conductive
A Process variable
B Status output

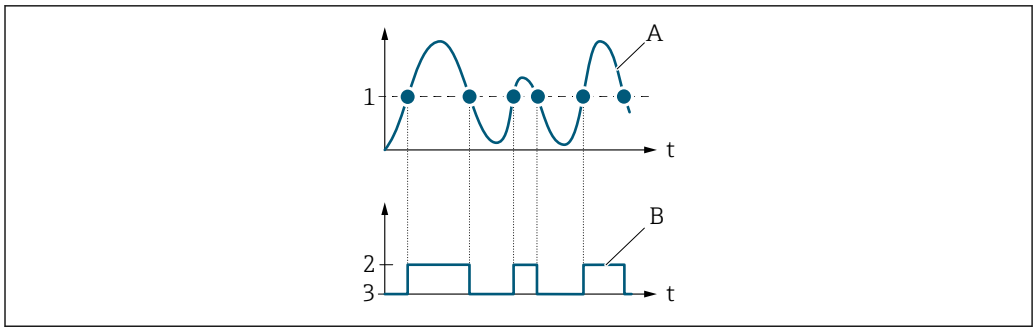
Behavior of status output when Switch-on value < Switch-off value:
- Process variable < Switch-on value: transistor is conductive
- Process variable > Switch-off value: transistor is non-conductive



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



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
- In the **Operating mode** parameter (→ 115), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 127), the **Limit** option is selected.

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 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 (→ 128).

Switch-off value

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

Prerequisite
- In the **Operating mode** parameter (→ 115), the **Switch** option is selected.
- In the **Switch out funct** parameter (→ 127), 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

Additional information *Description*

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

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

Dependency

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

Assign 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 (→ 115).
- The **Fl. direct.check** option is selected in the **Switch out funct** parameter (→ 127).

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 (→ 115).
- The **Status** option is selected in the **Switch out funct** parameter (→ 127).

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

Selection
- Partial pipe det
- Low flow cut off
- Digital outp. 4
- Digital outp. 5
- Digital outp. 6

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 (→ 115).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 127).

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

User entry 0.0 to 100.0 s

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 (→ 115).
- The **Limit** option is selected in the **Switch out funct** parameter (→ 127).

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

User entry 0.0 to 100.0 s

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 (→ 115).

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.

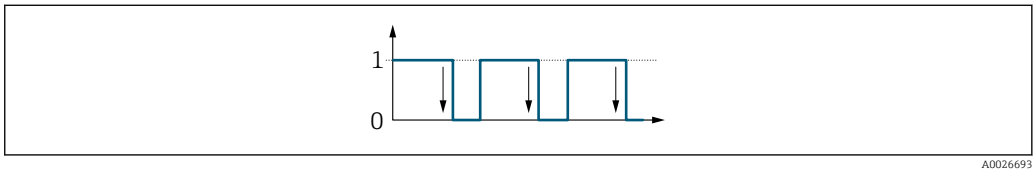
Selection

- No
- Yes

Factory setting No

Additional information *Selection*

No option (passive - negative)



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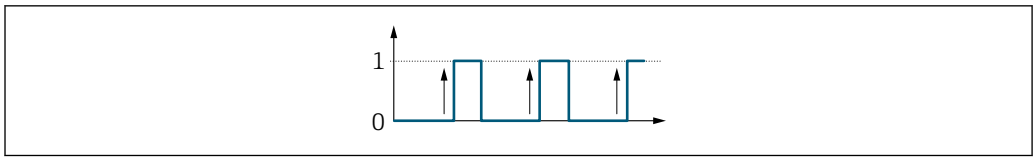
Yes option (passive - positive)



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3.5.3 "Relay output 1 to n" submenu

Navigation Expert → Output → Relay output 1 to n

▶ **Relay output 1 to n**

Terminal no.	→ 134
Relay outp.func.	→ 135
Assign dir.check	→ 135
Assign limit	→ 136
Assign diag. beh	→ 137
Assign status	→ 137
Switch-off value	→ 137
Switch-off delay	→ 138
Switch-on value	→ 138
Switch-on delay	→ 139
Failure mode	→ 139
Switch status	→ 140
Powerless relay	→ 140

Terminal no.

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

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

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

Additional information *"Not used" option*

The relay output module does not use any terminal numbers.

Relay outp.func.

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

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

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 (→ 135), 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 (→ 135) parameter.

Description Use this function to select a process variable for the limit value 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
- Oscil. damping
- Pressure
- Totalizer 1
- Totalizer 2
- Totalizer 3

Factory setting Mass flow

* Visibility depends on order options or device settings

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 (→ 135), 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

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 (→ 135), 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
- Digital outp. 4
- Digital outp. 5
- Digital outp. 6

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 (→ 135), the **Limit** option is selected.

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

User entry Signed floating-point number

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 is dependent on the process variable selected in the **Assign limit** parameter (→ 136).

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 (→ 135), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

Factory setting 0.0 s

Switch-on value

Navigation Expert → Output → Relay output 1 to n → Switch-on value (0810–1 to n)

Prerequisite In the **Relay outp.func.** parameter (→ 135), the **Limit** option is selected.

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

User entry Signed floating-point number

Factory setting Country-specific:
- 0 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 (→ 136).

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 (→ 135), the **Limit** option is selected.

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

User entry 0.0 to 100.0 s

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.

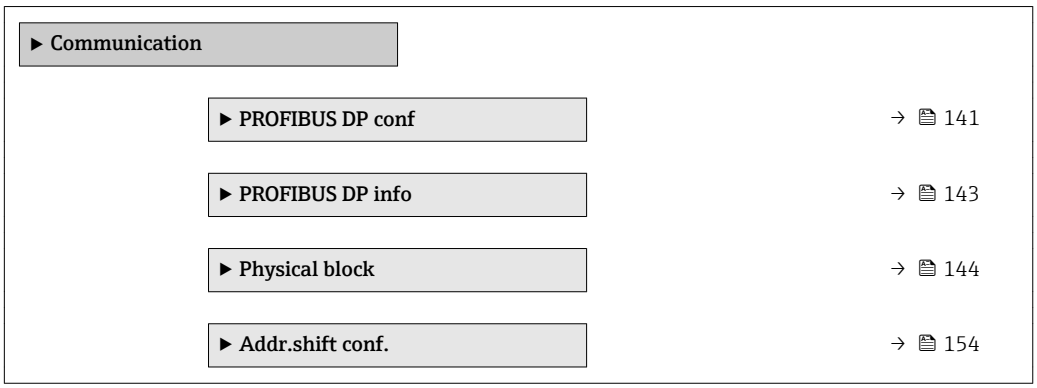
Selection
- Open
- Closed

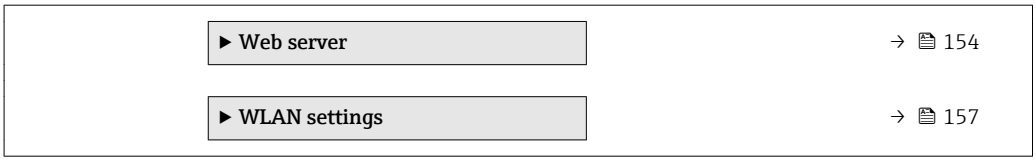
Factory setting Open

Additional information *Selection*
- Open
  The relay output is not conductive.
- Closed
  The relay output is conductive.

3.6 "Communication" submenu

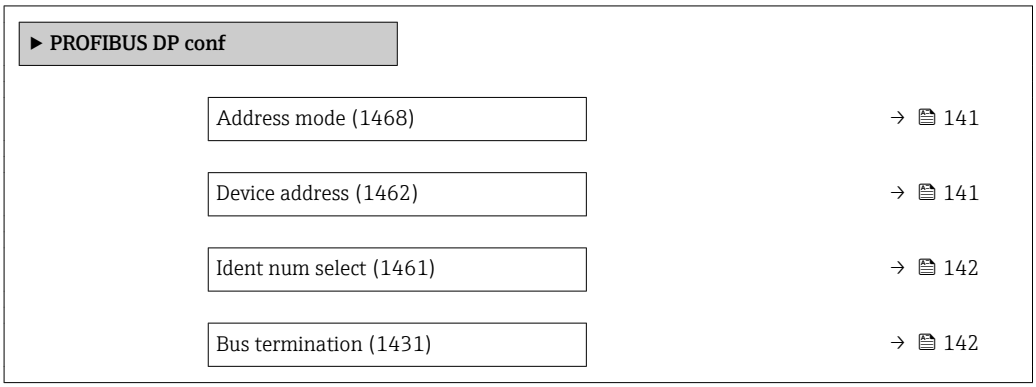
Navigation Expert → Communication





3.6.1 "PROFIBUS DP conf" submenu

Navigation Expert → Communication → PROFIBUS DP conf



Address mode

Navigation Expert → Communication → PROFIBUS DP conf → Address mode (1468)

Description Displays the configured address mode.

User interface
- Hardware
- Software

Factory setting Software

Additional information *Description*

For detailed information, see the "Setting the device address" section of the Operating Instructions.

Device address

Navigation Expert → Communication → PROFIBUS DP conf → Device address (1462)

Description Use this function to enter the device address.

User entry 0 to 126

Factory setting 126

Additional information *Description*

The address must always be configured for a PROFIBUS device. The valid address range is between 1 and 126. In a PROFIBUS network, each address can only be assigned once. If an address is not configured correctly, the device is not recognized by the master. All measuring devices are delivered from the factory with the device address 126 and with the software addressing method.

Displays the configured address mode: **Address mode** parameter (→ 141)

Ident num select

Navigation Expert → Communication → PROFIBUS DP conf → Ident num select (1461)

Description Use this function to select the device master file (GSD).

Selection
- Automatic mode
- Manufacturer
- Profile
- 1AI,1Tot(0x9740)
- 2AI,1Tot(0x9741)
- Promass 83

Factory setting Automatic mode

Additional information *Description*

In order to integrate the field devices into the bus system, the PROFIBUS system needs a description of the device parameters, such as output data, input data, data format, data volume and supported transmission rate. These data are available in the device master file (GSD) which is provided to the PROFIBUS Master when the communication system is commissioned.

Bus termination

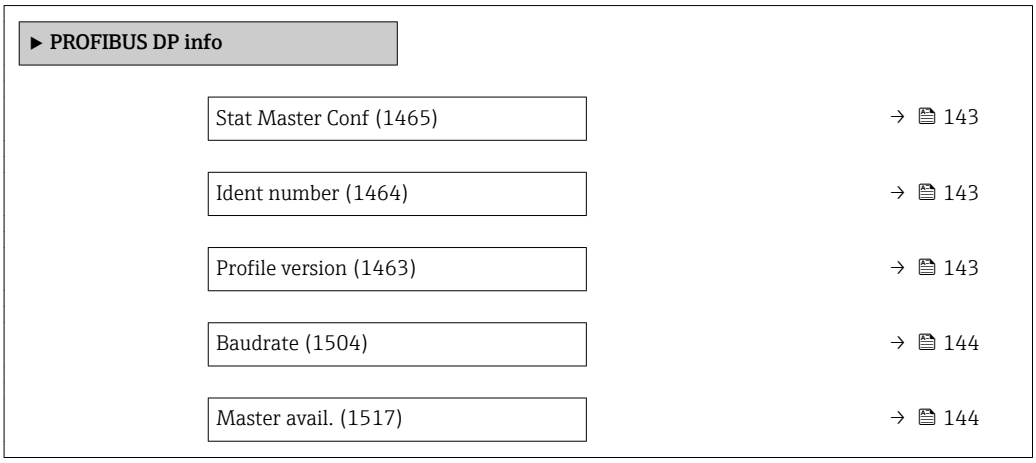
Navigation Expert → Communication → PROFIBUS DP conf → Bus termination (1431)

User interface
- Off
- On

Factory setting Off

3.6.2 "PROFIBUS DP info" submenu

Navigation Expert → Communication → PROFIBUS DP info



Stat Master Conf

Navigation Expert → Communication → PROFIBUS DP info → Stat Master Conf (1465)

Description For displaying the status of the PROFIBUS Master configuration.

User interface
- Active
- Not active

Factory setting Not active

Ident number

Navigation Expert → Communication → PROFIBUS DP info → Ident number (1464)

Description For displaying the PROFIBUS identification number.

User interface 0 to FFFF

Factory setting 0x156D

Profile version

Navigation Expert → Communication → PROFIBUS DP info → Profile version (1463)

Description Displays the profile version.

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

Factory setting 3.02

Baudrate

Navigation Expert → Communication → PROFIBUS DP info → Baudrate (1504)

Description Displays the transmission rate.

User interface
- Not available
- 9.6 kBaud
- 19.2 kBaud
- 45.45 kBaud
- 93.75 kBaud
- 187.5 kBaud
- 500 kBaud
- 1.5 MBaud
- 3 MBaud
- 6 MBaud
- 12 MBaud

Factory setting 9.6 kBaud

Master avail.

Navigation Expert → Communication → PROFIBUS DP info → Master avail. (1517)

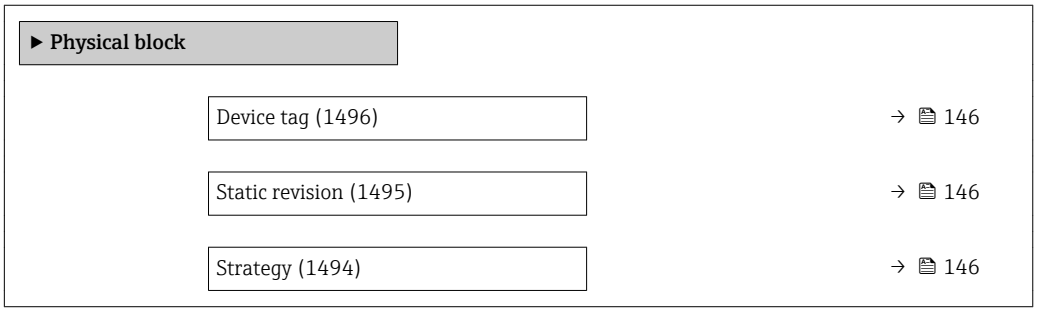
Description Displays whether or not a PROFIBUS master is present in the network.

User interface
- No
- Yes

Factory setting No

3.6.3 "Physical block" submenu

Navigation Expert → Communication → Physical block



Device tag

Navigation Expert → Communication → Physical block → Device tag (1496)

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

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

Factory setting Cubemass 500 DP

Static revision

Navigation Expert → Communication → Physical block → Static revision (1495)

Description Displays the event counter: every write access to a static block parameter is counted.

User interface 0 to FFFF

Additional information *Description*

Static parameters are parameters that are not changed by the process.

Strategy

Navigation Expert → Communication → Physical block → Strategy (1494)

Description Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry 0 to FFFF

Factory setting 0

Alert key

Navigation Expert → Communication → Physical block → Alert key (1473)

Description Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

User entry 0 to 0xFF

Factory setting 0

Target mode

Navigation Expert → Communication → Physical block → Target mode (1497)

Description Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

User interface
- Auto
- Out of service

Mode block act

Navigation Expert → Communication → Physical block → Mode block act (1472)

Description Displays the Mode block act: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block act shows the actual mode in which the function block is currently operating. A comparison of the Mode block act with the Target mode indicates whether it was possible to reach the Target mode (→ 147).

User interface
- Auto
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 147)) indicates whether it was possible to reach the target mode.

Mode block perm

Navigation Expert → Communication → Physical block → Mode block perm (1493)

Description Displays the Mode block perm: This defines which modes of operation in the Target mode (→ 147) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface 0 to 255

Mode blk norm

Navigation Expert → Communication → Physical block → Mode blk norm (1492)

Description Displays the Mode blk norm: This is available to allow the operator to select the Mode blk norm from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Auto
- Out of service

Alarm summary

Navigation Expert → Communication → Physical block → Alarm summary (1474)

Description Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alm statHiHi lim
- Alrm stat Hi lim
- Alm statLoLo lim
- Alrm stat Lo lim
- Update Event

Additional information

Description

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Physical Block function block.

User interface
- Discrete alarm
  Alarm or warning message with a discrete value.
- Alm statHiHi lim
  Upper alarm limit
- Alrm stat Hi lim
  Upper warning limit
- Alm statLoLo lim
  Lower alarm limit
- Alrm stat Lo lim
  Lower warning limit
- Update Event
  This option constitutes a special alarm that is triggered if a static parameter is changed. If such a parameter is modified, the associated bit is set in the **Alarm summary** parameter (→ 148), the output of the block switches to "GOOD (NC) Active Update Event" (if the current status has a lower priority than this), and the block remains in this state for a duration of 10 s. The block then reverts to the normal state (the output has the last status and the **Update Event** option bit in the **Alarm summary** parameter (→ 148) is deleted again).

Software rev.

Navigation Expert → Communication → Physical block → Software rev. (1478)

Description Displays the firmware version of the measuring device.

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

Hardware rev.

Navigation Expert → Communication → Physical block → Hardware rev. (1479)

Description Displays the hardware revision of the measuring device.

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

Manufacturer ID

Navigation Expert → Communication → Physical block → Manufacturer ID (1502)

Description Displays the manufacturer ID with which the measuring device has been registered with the PNO (PROFIBUS User Organization).

User interface 0 to FFFF

Factory setting 0x11

Device ID

Navigation Expert → Communication → Physical block → Device ID (1480)

Description Displays the device ID for identifying the measuring device in a PROFIBUS network.

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

Factory setting Promass300/500DP

Serial number

Navigation Expert → Communication → Physical block → Serial number (1481)

Description Displays the serial number of the measuring device. It can also be found on the nameplate of the sensor and transmitter.

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

Additional information *Description*

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

Diagnostics

Navigation Expert → Communication → Physical block → Diagnostics (1482)

Description Displays the diagnostic messages.

User interface
- HW Error
- HW Error
- Temp motor
- Electronic temp
- Checksum error
- Measuremnt error
- Not initialized
- Init. error
- Zero point error
- Power supply
- Conf invalid
- On warmstart
- On coldstart
- Maintenance req.
- Char.invalid
- Ident num Error
- More info avlble
- Mainten. alarm
- Mainten.demanded
- Fct.chk or sim.
- Inval.proc.cond.

Diagnostics mask

Navigation Expert → Communication → Physical block → Diagnostics mask (1484)

Description Displays the diagnostic messages supported by the measuring device.

User interface
- HW Error
- HW Error
- Temp motor
- Electronic temp
- Checksum error
- Measuremnt error
- Not initialized
- Init. error
- Zero point error
- Power supply
- Conf invalid
- On warmstart
- On coldstart
- Maintenance req.
- Char.invalid
- Ident num Error
- More info avlble
- Mainten. alarm

- Mainten.demanded
- Fct.chk or sim.
- Inval.proc.cond.

Device certific.

Navigation Expert → Communication → Physical block → Device certific. (1486)

Description Displays certificates of the measuring device, e.g. Ex certificate.

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

Factory reset

Navigation Expert → Communication → Physical block → Factory reset (1488)

Description Use this function to reset a certain set of parameters in a block.

Selection
- to defaults
- warmstart device
- reset bus addr
- Cancel

Factory setting Cancel

Descriptor

Navigation Expert → Communication → Physical block → Descriptor (1489)

Description Use this function to enter a user-specific string to describe the device within the application.

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

Device message

Navigation Expert → Communication → Physical block → Device message (1490)

Description Use this funtion to enter a user-definable message (a string) to describe the device within the application or in the plant.

User entry Max. 32 Zeichen wie Buchstaben, Zahlen oder Sonderzeichen (z.B. @, %, /).

Device inst.date

Navigation Expert → Communication → Physical block → Device inst.date (1491)

Description Use this function to enter the date of installation of the device.

User entry Max. 16 Zeichen wie Buchstaben, Zahlen oder Sonderzeichen (z.B. @, %, /).

Ident num select

Navigation Expert → Communication → Physical block → Ident num select (1461)

Description Use this function to select the device master file (GSD).

Selection
- Automatic mode
- Manufacturer
- Profile
- 1AI,1Tot(0x9740)
- 2AI,1Tot(0x9741)
- Promass 83

Factory setting Automatic mode

Additional information *Description*

In order to integrate the field devices into the bus system, the PROFIBUS system needs a description of the device parameters, such as output data, input data, data format, data volume and supported transmission rate. These data are available in the device master file (GSD) which is provided to the PROFIBUS Master when the communication system is commissioned.

Hardware lock

Navigation Expert → Communication → Physical block → Hardware lock (1499)

Description Displays the hardware write protection.

User interface
- Unprotected
- Protected

Additional information

Description

Indicates whether it is possible to write-access the measuring device via PROFIBUS (acyclic data transmission, e.g. via the “FieldCare” operating program).

For detailed information on hardware write protection, see the "Write protection via write protection switch" section of the Operating Instructions.

User interface

- Unprotected
  Write access via PROFIBUS is possible (acyclic data transmission).
- Protected
  Write access via PROFIBUS is locked (acyclic data transmission).

Feature support

Navigation Expert → Communication → Physical block → Feature support (1477)

Description Displays the PROFIBUS features that are supported by the measuring device.

User interface

- Condensed status
- Classic diag
- Data ex.broad.
- MS1 app.relation
- PROFIsafe comm.

Feature enabled

Navigation Expert → Communication → Physical block → Feature enabled (1476)

Description Displays the PROFIBUS features that are enabled in the measuring device.

User interface

- Condensed status
- Classic diag
- Data ex.broad.
- MS1 app.relation
- PROFIsafe comm.

Condensed status

Navigation Expert → Communication → Physical block → Condensed status (1500)

Description Use this function to switch the condensed status diagnostic on and off.

Selection

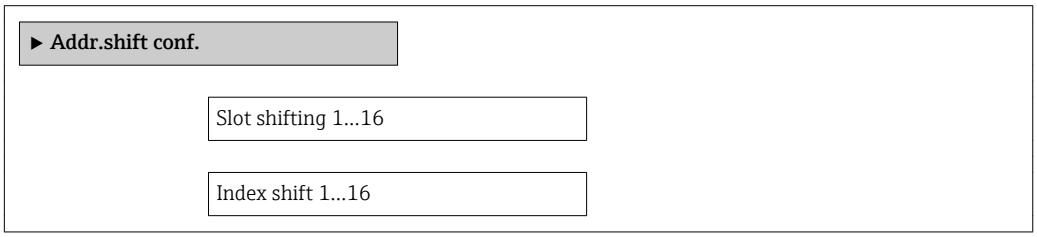
- Off
- On

Factory setting On

3.6.4 "Addr.shift conf." submenu

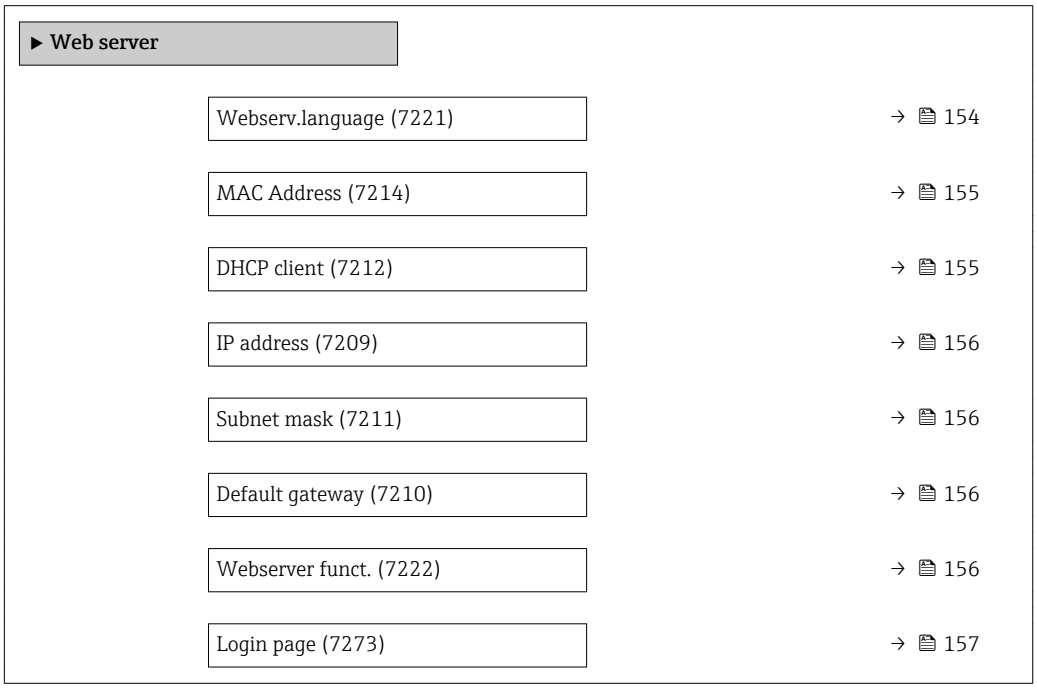
For detailed information on acyclic communication, see the "System integration" – "Address shifting configuration" section of the Operating Instructions for the device → 7

Navigation Expert → Communication → Addr.shift conf.



3.6.5 "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

DHCP client

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

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

Selection
- Off
- On

Factory setting Off

* Visibility depends on order options or device settings
8) Media Access Control

Additional information *Result*

If the DHCP client functionality of the Web server is activated, the IP address (→ 156), Subnet mask (→ 156) and Default gateway (→ 156) are set automatically.

Identification is via the MAC address of the measuring device.

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

Additional information

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 (→ 156).

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

Factory setting 0.0.0.0

Webserver funct.

Navigation Expert → Communication → Web server → Webserver funct. (7222)

Description Use this function to switch the Web server on and off.

Selection
- Off
- HTML Off
- On

Factory setting
On

Additional information
Description

Once disabled, the Webserver funct. can only be re-enabled via or the operating tool FieldCare.

Options

Option	Description
Off	▪ The web server is completely disabled. ▪ Port 80 is locked.
On	▪ The complete functionality of the web server is available. ▪ JavaScript is used. ▪ The password is transferred in an encrypted state. ▪ Any change to the password is also transferred in an encrypted state.

Login page

Navigation
Expert → Communication → Web server → Login page (7273)

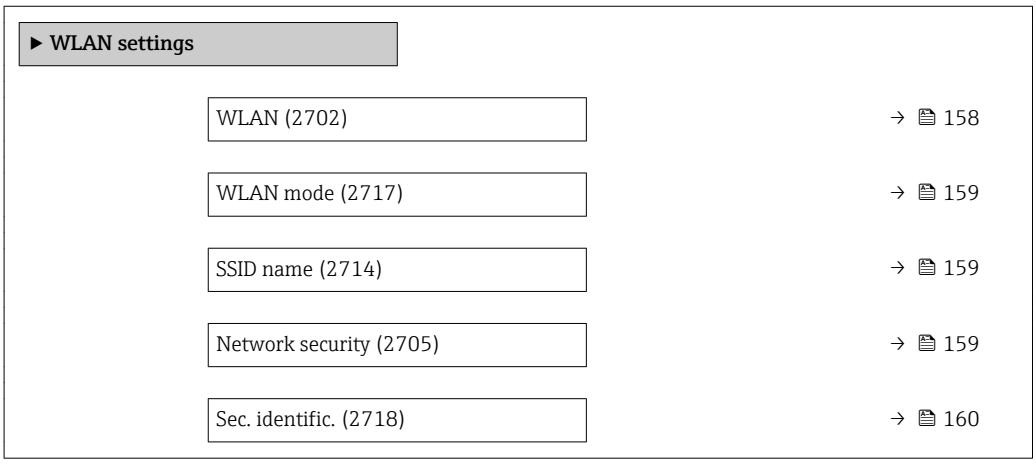
Description
Use this function to select the format of the login page.

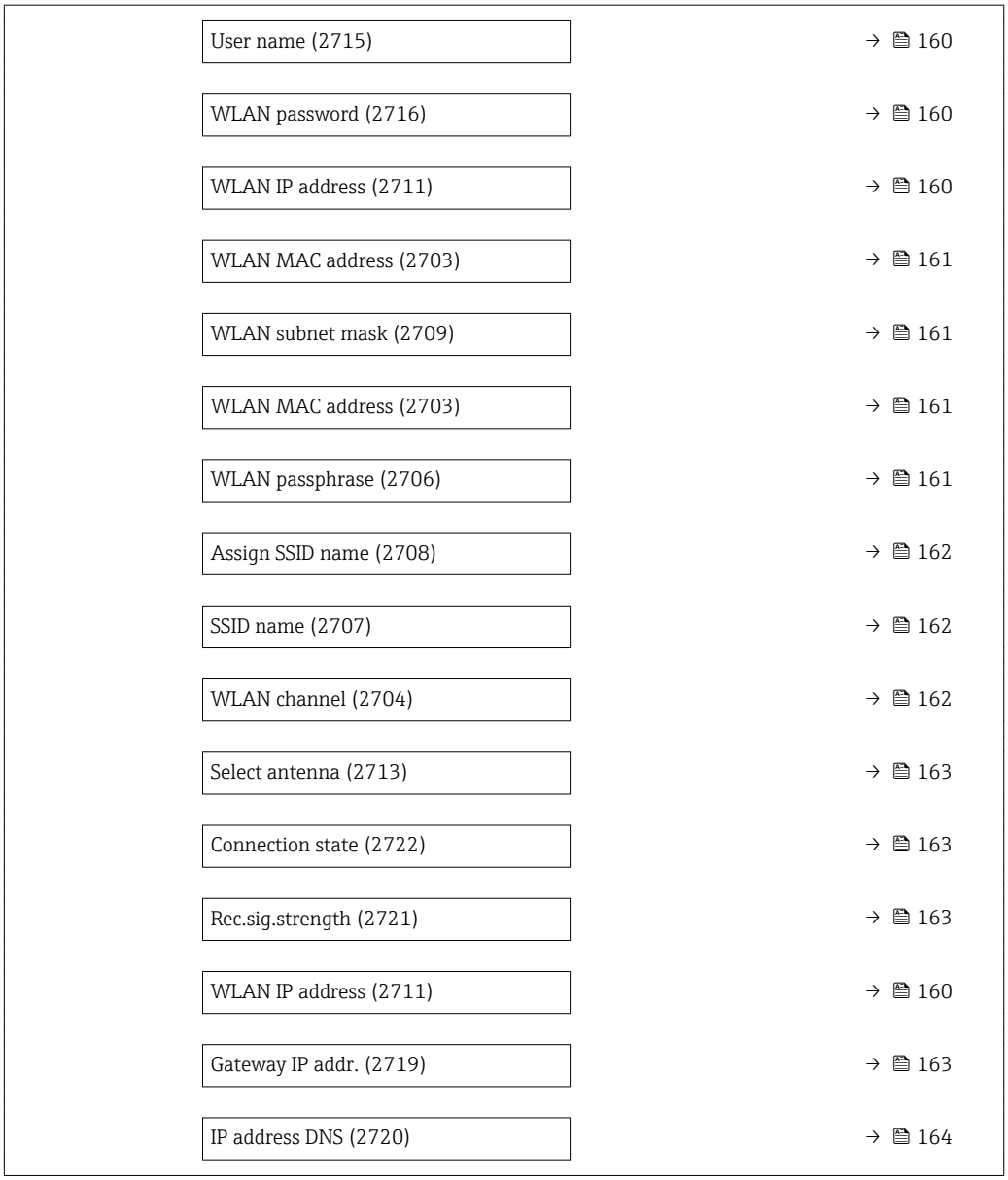
Selection
- Without header
- With header

Factory setting
With header

3.6.6 "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).

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 user name.

User entry –

Factory setting –

WLAN password

Navigation Expert → Communication → WLAN settings → WLAN password (2716)

Description Use this function to enter the WLAN password.

User entry –

Factory setting –

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)
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 (→ 159).

Description
Use this function to enter the network key.

User entry
8 to 32-digit character string comprising numbers, letters and special characters

Factory setting
Serial number of the measuring device (e.g. L100A802000)

9) Media Access Control

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 (→ 162) parameter.
- The **Access point** option is selected in the **WLAN mode** parameter (→ 159) parameter.

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_500_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

Factory setting 6

10) Service Set Identifier

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

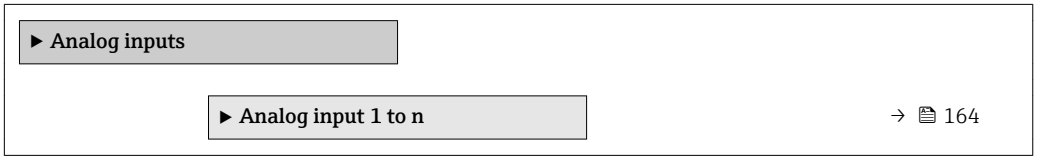
Navigation Expert → Communication → WLAN settings → IP address DNS (2720)
Expert → Communication → WLAN settings → IP address DNS (2720)

Description Use this function to enter the IP address of the domain name server.

Factory setting 192.168.1.212

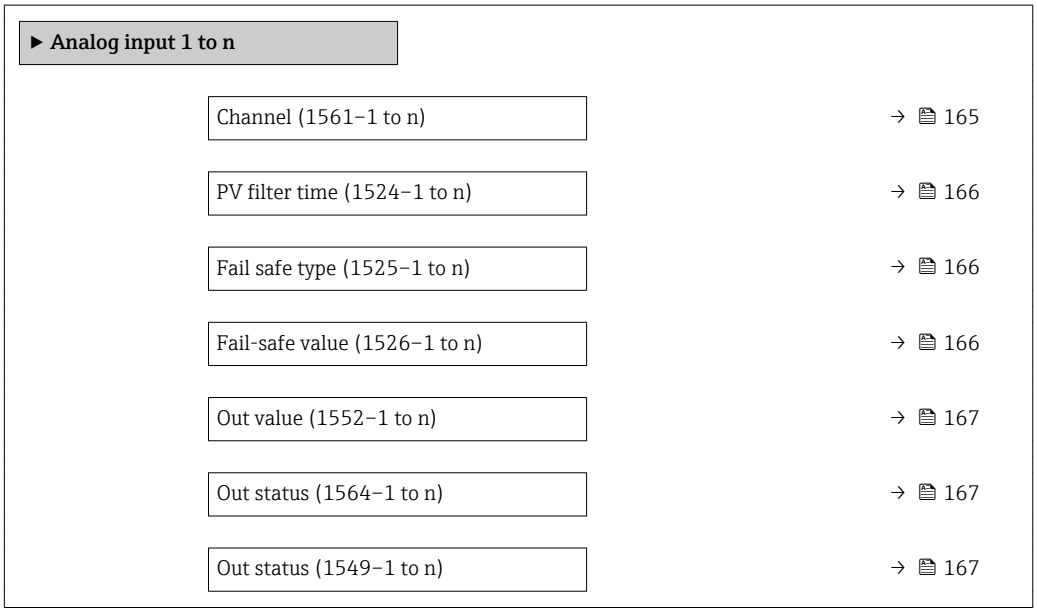
3.7 "Analog inputs" submenu

Navigation Expert → Analog inputs



3.7.1 "Analog input 1 to n" submenu

Navigation Expert → Analog inputs → Analog input 1 to n



Channel

Navigation Expert → Analog inputs → Analog input 1 to n → Channel (1561–1 to n)

Description For selecting the process variable.

Selection
- Mass flow
- Volume flow
- Correct.vol.flow
- Density
- Ref.density
- Target mass flow *
- Carrier mass fl. *
- Concentration *
- Target vol. flow
- Carrier vol. fl.
- Targ.corr.vol.fl
- Carr.corr.vol.fl
- Temperature
- Carr. pipe temp.
- Electronic temp.
- Osc. freq. 0
- Freq. fluct. 0
- Osc. damping 0
- Osc.damp.fluct 0
- Osc.damp.fluct 1
- Signal asymmetry
- Exc. current 0
- Current input 1 *
- Current input 2 *
- Current input 3 *
- Ref.dens.altern.
- GSV flow
- GSVa
- NSV flow
- NSVa
- S&W volume flow
- Oil density
- Water density
- Water cut
- Oil mass flow
- Water mass flow
- Oil volume flow
- Water vol. flow
- Oil corr.vol.fl.
- Water corr.v.fl.

Factory setting Mass flow

* Visibility depends on order options or device settings

PV filter time

Navigation Expert → Analog inputs → Analog input 1 to n → PV filter time (1524–1 to n)

Description Use this function to enter a time to suppress signal peaks. During the specified time the Analog input does not respond to an erratic increase in the process variable.

User entry Positive floating-point number

Factory setting 0

Fail safe type

Navigation Expert → Analog inputs → Analog input 1 to n → Fail safe type (1525–1 to n)

Description Use this function to select the failure mode.

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

Additional information *Selection*

If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail-safe value
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 166).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

Fail-safe value

Navigation Expert → Analog inputs → Analog input 1 to n → Fail-safe value (1526–1 to n)

Prerequisite In **Fail safe type** parameter (→ 166), the **Fail-safe value** option is selected.

Description Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 167)) in the event of an error.

User entry Signed floating-point number

Factory setting 0

Out value

Navigation Expert → Analog inputs → Analog input 1 to n → Out value (1552–1 to n)

Prerequisite In **Target mode** parameter (→ 168), the **Auto** option is selected.

Description Displays the analog value which is calculated when the function is executed.

User interface Signed floating-point number

Out status

Navigation Expert → Analog inputs → Analog input 1 to n → Out status (1564–1 to n)

Description Displays the current output status (Good, Bad, Uncertain).

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Analog inputs → Analog input 1 to n → Out status (1549–1 to n)

Prerequisite In **Target mode** parameter (→ 168), the **Auto** option is selected.

Description Displays the current output status (hex value).

User interface 0 to 0xFF

Tag description

Navigation Expert → Analog inputs → Analog input 1 to n → Tag description (1562–1 to n)

Description Use this function to enter a string to identify the block.

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

Static revision

Navigation Expert → Analog inputs → Analog input 1 to n → Static revision (1560–1 to n)

Description Displays the event counter: every write access to a static block parameter is counted.

User interface 0 to FFFF

Additional information *Description*

Static parameters are parameters that are not changed by the process.

Strategy

Navigation Expert → Analog inputs → Analog input 1 to n → Strategy (1559–1 to n)

Description Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry 0 to FFFF

Factory setting 0

Alert key

Navigation Expert → Analog inputs → Analog input 1 to n → Alert key (1522–1 to n)

Description Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

User entry 0 to 0xFF

Factory setting 0

Target mode

Navigation Expert → Analog inputs → Analog input 1 to n → Target mode (1563–1 to n)

Description Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

User interface

- Auto
- Man
- Out of service

Mode block act

Navigation Expert → Analog inputs → Analog input 1 to n → Mode block act (1521–1 to n)

Description Displays the Mode block act: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block act shows the actual mode in which the function block is currently operating. A comparison of the Mode block act with the Target mode indicates whether it was possible to reach the Target mode (→ 168).

User interface
- Auto
- Man
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 168)) indicates whether it was possible to reach the target mode.

Mode block perm

Navigation Expert → Analog inputs → Analog input 1 to n → Mode block perm (1553–1 to n)

Description Displays the Mode block perm: This defines which modes of operation in the Target mode (→ 168) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface 0 to 255

Mode blk norm

Navigation Expert → Analog inputs → Analog input 1 to n → Mode blk norm (1546–1 to n)

Description Displays the Mode blk norm: This is available to allow the operator to select the Mode blk norm from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Auto
- Man
- Out of service

Alarm summary

Navigation Expert → Analog inputs → Analog input 1 to n → Alarm summary (1537–1 to n)

Description Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alm statHiHi lim
- Alrm stat Hi lim
- Alm statLoLo lim
- Alrm stat Lo lim
- Update Event

Additional information *Description*

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Analog Inputs function block.

Batch ID

Navigation Expert → Analog inputs → Analog input 1 to n → Batch ID (1533–1 to n)

Description Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry Positive integer

Batch operation

Navigation Expert → Analog inputs → Analog input 1 to n → Batch operation (1534–1 to n)

Description Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch phase

Navigation Expert → Analog inputs → Analog input 1 to n → Batch phase (1535–1 to n)

Description Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch Recipe

Navigation Expert → Analog inputs → Analog input 1 to n → Batch Recipe (1536–1 to n)

Description Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

User entry 0 to 65 535

Factory setting 0

Additional information *Description*

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

PVscale lo range

Navigation Expert → Analog inputs → Analog input 1 to n → PVscale lo range (1554–1 to n)

Description Use this function to enter the lower value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

User entry Signed floating-point number

Factory setting 0

PVscale up range

Navigation Expert → Analog inputs → Analog input 1 to n → PVscale up range (1555–1 to n)

Description Use this function to enter the upper value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

User entry Signed floating-point number

Factory setting 100.0

Out scale low

Navigation Expert → Analog inputs → Analog input 1 to n → Out scale low (1548–1 to n)

Description Use this function to enter the lower value range for the output value in system units.

User entry Signed floating-point number

Factory setting 0

Out scale up

Navigation Expert → Analog inputs → Analog input 1 to n → Out scale up (1551–1 to n)

Description Use this function to enter the upper value range for the output value in system units.

User entry Signed floating-point number

Factory setting 100.0

Lin type

Navigation Expert → Analog inputs → Analog input 1 to n → Lin type (1523–1 to n)

Description Use this function to switch off the linearization type for the input value.

Selection Off

Factory setting Off

Out unit

Navigation Expert → Analog inputs → Analog input 1 to n → Out unit (1550–1 to n)

Description Use this function to enter a numerical code (hex) for the system unit.

User entry 0 to 65 535

Factory setting 1 997

Out dec_ point

Navigation Expert → Analog inputs → Analog input 1 to n → Out dec_ point (1547–1 to n)

Description Use this function to enter the maximum number of decimal places that are displayed for the output value.

User entry 0 to 7

Factory setting 0

Alarm hysteresis

Navigation Expert → Analog inputs → Analog input 1 to n → Alarm hysteresis (1527–1 to n)

Description Use this function to enter the hysteresis value for the upper and lower warning or alarm limit values.

User entry Signed floating-point number

Factory setting 0

Hi Hi Lim

Navigation Expert → Analog inputs → Analog input 1 to n → Hi Hi Lim (1528–1 to n)

Description Use this function to enter the value for the upper alarm limit (**HiHi alarm value** parameter (→ 175)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information

Description

If the output value Out value (→ 167) exceeds this limit value, the **HiHi alarm state** parameter (→ 175) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

Hi Lim

Navigation Expert → Analog inputs → Analog input 1 to n → Hi Lim (1529–1 to n)

Description Use this function to enter the value for the upper warning limit (**Hi alarm value** parameter (→ 175)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information *Description*

If the output value Out value (→ 167) exceeds this limit value, the **Hi alarm state** parameter (→ 175) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

Lo Lim

Navigation Expert → Analog inputs → Analog input 1 to n → Lo Lim (1530–1 to n)

Description Use this function to enter the value for the lower warning limit (**Lo alarm value** parameter (→ 176)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information *Description*

If the output value Out value (→ 167) exceeds this limit value, the **Lo alarm state** parameter (→ 176) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

Lo Lo Lim

Navigation Expert → Analog inputs → Analog input 1 to n → Lo Lo Lim (1531–1 to n)

Description Use this function to enter the value for the lower alarm limit (**LoLo alarm value** parameter (→ 176)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information *Description*

If the output value Out value (→ 167) exceeds this limit value, the **LoLo alarm state** parameter (→ 176) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

HiHi alarm value

Navigation Expert → Analog inputs → Analog input 1 to n → HiHi alarm value (1541–1 to n)

Description Displays the alarm value for the upper alarm limit value (**Hi Hi Lim** parameter (→ 173)).

User interface Signed floating-point number

HiHi alarm state

Navigation Expert → Analog inputs → Analog input 1 to n → HiHi alarm state (1540–1 to n)

Description Displays the status for the upper alarm limit value (**Hi Hi Lim** parameter (→ 173)).

User interface
- No alarm
- Alm statHiHi lim

Additional information *User interface*

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

Hi alarm value

Navigation Expert → Analog inputs → Analog input 1 to n → Hi alarm value (1539–1 to n)

Description Displays the alarm value for the upper warning limit value (**Hi Lim** parameter (→ 173)).

User interface Signed floating-point number

Hi alarm state

Navigation Expert → Analog inputs → Analog input 1 to n → Hi alarm state (1538–1 to n)

Description Displays the status for the upper warning limit value (**Hi Lim** parameter (→ 173)).

User interface
- No warning
- Alrm stat Hi lim

Additional information *User interface*

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

Lo alarm value

Navigation Expert → Analog inputs → Analog input 1 to n → Lo alarm value (1543–1 to n)

Description Displays the alarm value for the lower warning limit value (**Lo Lim** parameter (→ 174)).

User interface Signed floating-point number

Lo alarm state

Navigation Expert → Analog inputs → Analog input 1 to n → Lo alarm state (1542–1 to n)

Description Displays the status for the lower warning limit value (**Lo Lim** parameter (→ 174)).

User interface
- No warning
- Alrm stat Lo lim

Additional information *User interface*

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

LoLo alarm value

Navigation Expert → Analog inputs → Analog input 1 to n → LoLo alarm value (1545–1 to n)

Description Displays the alarm value for the lower alarm limit value (**Lo Lo Lim** parameter (→ 174)).

User interface Signed floating-point number

LoLo alarm state

Navigation Expert → Analog inputs → Analog input 1 to n → LoLo alarm state (1544–1 to n)

Description Displays the status for the lower alarm limit value (**Lo Lo Lim** parameter (→ 174)).

User interface
- No alarm
- Alm statLoLo lim

Additional information *User interface*

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

Simulate enabled

Navigation Expert → Analog inputs → Analog input 1 to n → Simulate enabled (1556–1 to n)

Description Use this function to enable or disable block simulation.

Selection
- Disable
- Enable

Factory setting Disable

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value

Navigation Expert → Analog inputs → Analog input 1 to n → Simulate value (1558–1 to n)

Description Use this function to enter a simulation value for the block.

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

Simulate status

Navigation Expert → Analog inputs → Analog input 1 to n → Simulate status (1557–1 to n)

Description Use this function to enter a simulation status for the block.

User entry 0 to 255

Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

Out unit text

Navigation Expert → Analog inputs → Analog input 1 to n → Out unit text (1532–1 to n)

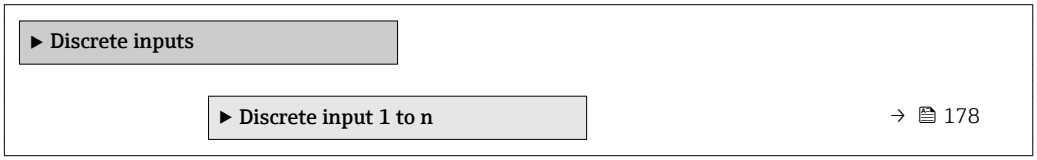
Description Use this function to enter the out unit text: if a specific out unit does not appear in the code list, the user can enter the specific text. The unit code is then equivalent to the definition provided here.

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

Factory setting NoUnit

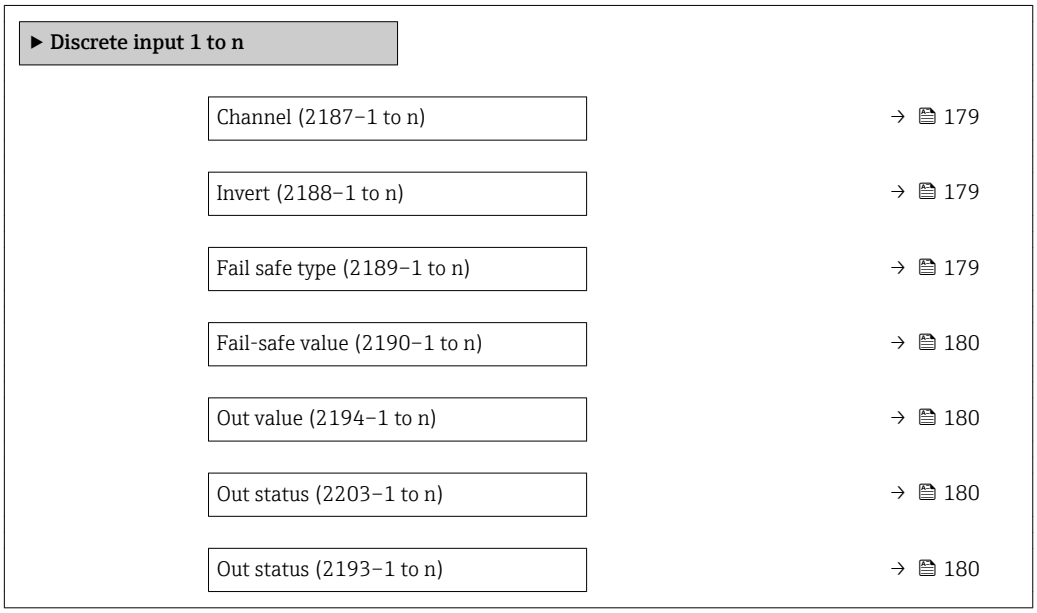
3.8 "Discrete inputs" submenu

Navigation Expert → Discrete inputs



3.8.1 "Discrete input 1 to n" submenu

Navigation Expert → Discrete inputs → Discrete input 1 to n



Channel

Navigation Expert → Discrete inputs → Discrete input 1 to n → Channel (2187–1 to n)

Description Use this function to assign a measured variable to the particular function block.

Selection
- Empty pipe det.
- Low flow cut off
- Verific. status *

Factory setting Empty pipe det.

Invert

Navigation Expert → Discrete inputs → Discrete input 1 to n → Invert (2188–1 to n)

Description Use this function to invert the input signal.

Selection
- Off
- On

Factory setting Off

Fail safe type

Navigation Expert → Discrete inputs → Discrete input 1 to n → Fail safe type (2189–1 to n)

Description Use this function to select the failure mode.

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Off

Additional information *Selection*

If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail-safe value
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 180).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

* Visibility depends on order options or device settings

Fail-safe value

Navigation Expert → Discrete inputs → Discrete input 1 to n → Fail-safe value (2190–1 to n)

Prerequisite In **Fail safe type** parameter (→ 179), the **Fail-safe value** option is selected.

Description Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 180)) in the event of an error.

User entry 0 to 255

Factory setting 0

Out value

Navigation Expert → Discrete inputs → Discrete input 1 to n → Out value (2194–1 to n)

Prerequisite In **Target mode** parameter (→ 182), the **Auto** option is selected.

Description Displays the analog value which is calculated when the function is executed.

User interface 0 to 255

Out status

Navigation Expert → Discrete inputs → Discrete input 1 to n → Out status (2203–1 to n)

Description Displays the current output status (Good, Bad, Uncertain).

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Discrete inputs → Discrete input 1 to n → Out status (2193–1 to n)

Prerequisite In **Target mode** parameter (→ 182), the **Auto** option is selected.

Description Displays the current output status (hex value).

User interface 0 to 0xFF

Tag description

Navigation Expert → Discrete inputs → Discrete input 1 to n → Tag description (2201–1 to n)

Description Use this function to enter a string to identify the block.

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

Static revision

Navigation Expert → Discrete inputs → Discrete input 1 to n → Static revision (2200–1 to n)

Description Displays the event counter: every write access to a static block parameter is counted.

User interface 0 to FFFF

Additional information *Description*

Static parameters are parameters that are not changed by the process.

Strategy

Navigation Expert → Discrete inputs → Discrete input 1 to n → Strategy (2199–1 to n)

Description Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry 0 to FFFF

Factory setting 0

Alert key

Navigation Expert → Discrete inputs → Discrete input 1 to n → Alert key (2182–1 to n)

Description Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

User entry 0 to 0xFF

Factory setting 0

Target mode

Navigation Expert → Discrete inputs → Discrete input 1 to n → Target mode (2202–1 to n)

Description Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

User interface
- Auto
- Man
- Out of service

Mode block act

Navigation Expert → Discrete inputs → Discrete input 1 to n → Mode block act (2181–1 to n)

Description Displays the Mode block act: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block act shows the actual mode in which the function block is currently operating. A comparison of the Mode block act with the Target mode indicates whether it was possible to reach the Target mode (→ 182).

User interface
- Auto
- Man
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 182)) indicates whether it was possible to reach the target mode.

Mode block perm

Navigation Expert → Discrete inputs → Discrete input 1 to n → Mode block perm (2195–1 to n)

Description Displays the Mode block perm: This defines which modes of operation in the Target mode (→ 182) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface 0 to 255

Mode blk norm

Navigation Expert → Discrete inputs → Discrete input 1 to n → Mode blk norm (2192–1 to n)

Description Displays the Mode blk norm: This is available to allow the operator to select the Mode blk norm from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Auto
- Man
- Out of service

Alarm summary

Navigation Expert → Discrete inputs → Discrete input 1 to n → Alarm summary (2191–1 to n)

Description Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alm statHiHi lim
- Alrm stat Hi lim
- Alm statLoLo lim
- Alrm stat Lo lim
- Update Event

Additional information *Description*

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Discrete Inputs function block.

Batch ID

Navigation Expert → Discrete inputs → Discrete input 1 to n → Batch ID (2183–1 to n)

Description Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry Positive integer

Batch operation

Navigation Expert → Discrete inputs → Discrete input 1 to n → Batch operation (2184–1 to n)

Description Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch phase

Navigation Expert → Discrete inputs → Discrete input 1 to n → Batch phase (2185–1 to n)

Description Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch Recipe

Navigation Expert → Discrete inputs → Discrete input 1 to n → Batch Recipe (2186–1 to n)

Description Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

User entry 0 to 65 535

Factory setting 0

Additional information *Description*

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

Simulate enabled

Navigation Expert → Discrete inputs → Discrete input 1 to n → Simulate enabled (2196–1 to n)

Description Use this function to enable or disable block simulation.

Selection
- Disable
- Enable

Factory setting Disable

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value	

Navigation Expert → Discrete inputs → Discrete input 1 to n → Simulate value (2198–1 to n)

Description Use this function to enter a simulation value for the block.

User entry 0 to 255

Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

Simulate status	

Navigation Expert → Discrete inputs → Discrete input 1 to n → Simulate status (2197–1 to n)

Description Use this function to enter a simulation status for the block.

User entry 0 to 255

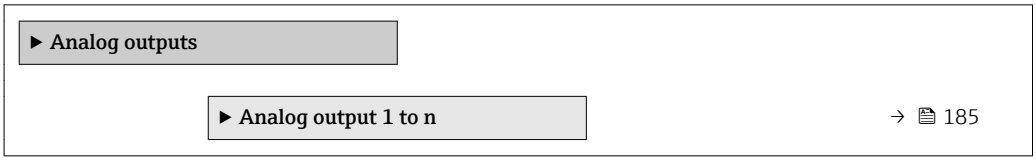
Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

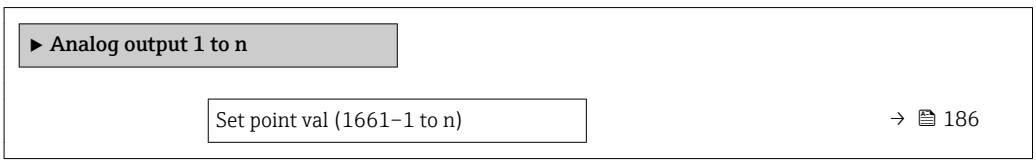
3.9 "Analog outputs" submenu

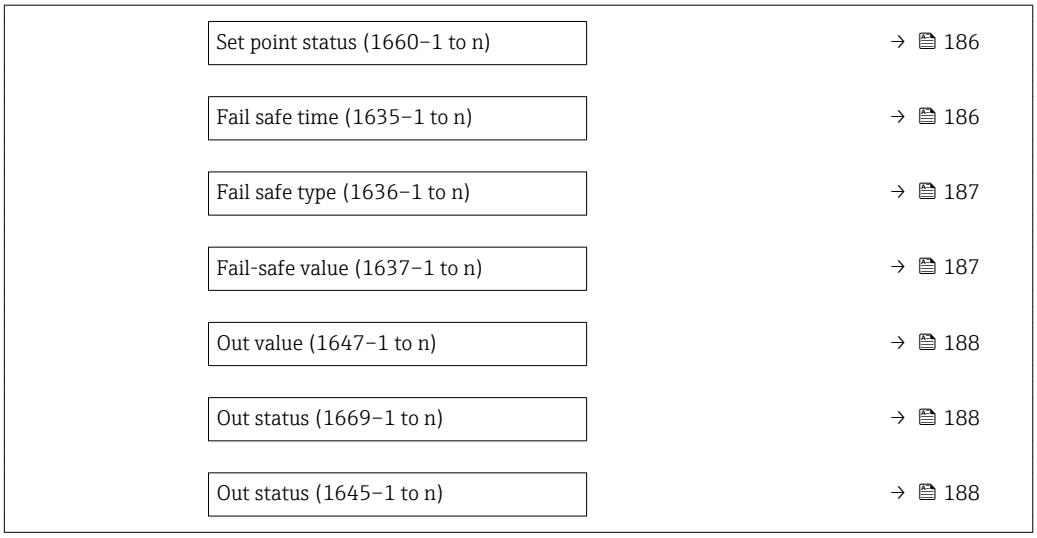
Navigation Expert → Analog outputs



3.9.1 "Analog output 1 to n" submenu

Navigation Expert → Analog outputs → Analog output 1 to n





Set point val

Navigation Expert → Analog outputs → Analog output 1 to n → Set point val (1661–1 to n)

Description Use this function to enter an analog set point.

User entry Signed floating-point number

Factory setting 0

Set point status

Navigation Expert → Analog outputs → Analog output 1 to n → Set point status (1660–1 to n)

Description Use this function to enter a status for the analog set point.

User entry 0 to 255

Factory setting 0

Fail safe time

Navigation Expert → Analog outputs → Analog output 1 to n → Fail safe time (1635–1 to n)

Description Use this function to enter a time span within which the criteria for an error must be met continuously before an error message or notice message is generated.

User entry 0 to 999.0

Factory setting 0

Additional information *User entry*

NOTE!

If this parameter is used, error messages and notice messages are delayed by the set time before being relayed to the higher-level controller (DCS, etc.).

▸ Check in advance to ensure that the safety-specific requirements of the process would permit this.

▸ If the error and notice messages may not be suppressed, a value of 0 seconds must be configured here.

Fail safe type

Navigation Expert → Analog outputs → Analog output 1 to n → Fail safe type (1636–1 to n)

Description Use this function to select the failure mode.

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Fallback value

Additional information *Selection*

If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail-safe value
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 187).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

Fail-safe value

Navigation Expert → Analog outputs → Analog output 1 to n → Fail-safe value (1637–1 to n)

Prerequisite In **Fail safe type** parameter (→ 187), the **Fallback value** option is selected.

Description Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 188)) in the event of an error.

User entry Signed floating-point number

Factory setting 0

Out value

Navigation Expert → Analog outputs → Analog output 1 to n → Out value (1647–1 to n)

Prerequisite In **Target mode** parameter (→ 189), the **Auto** option is selected.

Description Displays the analog value which is calculated when the function is executed.

User interface Signed floating-point number

Out status

Navigation Expert → Analog outputs → Analog output 1 to n → Out status (1669–1 to n)

Description Displays the current output status (Good, Bad, Uncertain).

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Analog outputs → Analog output 1 to n → Out status (1645–1 to n)

Prerequisite In **Target mode** parameter (→ 189), the **Auto** option is selected.

Description Displays the current output status (hex value).

User interface 0 to 0xFF

Tag description

Navigation Expert → Analog outputs → Analog output 1 to n → Tag description (1667–1 to n)

Description Use this function to enter a string to identify the block.

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

Static revision

Navigation Expert → Analog outputs → Analog output 1 to n → Static revision (1666–1 to n)

Description Displays the event counter: every write access to a static block parameter is counted.

User interface 0 to FFFF

Additional information *Description*

Static parameters are parameters that are not changed by the process.

Strategy

Navigation Expert → Analog outputs → Analog output 1 to n → Strategy (1665–1 to n)

Description Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry 0 to FFFF

Factory setting 0

Alert key

Navigation Expert → Analog outputs → Analog output 1 to n → Alert key (1632–1 to n)

Description Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

User entry 0 to 0xFF

Factory setting 0

Target mode

Navigation Expert → Analog outputs → Analog output 1 to n → Target mode (1668–1 to n)

Description Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

User interface
- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Mode block act

Navigation Expert → Analog outputs → Analog output 1 to n → Mode block act (1631–1 to n)

Description Displays the Mode block act: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block act shows the actual mode in which the function block is currently operating. A comparison of the Mode block act with the Target mode indicates whether it was possible to reach the Target mode (→ 189).

User interface
- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 189)) indicates whether it was possible to reach the target mode.

Mode block perm

Navigation Expert → Analog outputs → Analog output 1 to n → Mode block perm (1648–1 to n)

Description Displays the Mode block perm: This defines which modes of operation in the Target mode (→ 189) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface 0 to 255

Mode blk norm

Navigation Expert → Analog outputs → Analog output 1 to n → Mode blk norm (1643–1 to n)

Description Displays the Mode blk norm: This is available to allow the operator to select the Mode blk norm from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Auto
- Local override
- Man
- Out of service
- Remote Cascaded

Alarm summary

Navigation Expert → Analog outputs → Analog output 1 to n → Alarm summary (1642–1 to n)

Description Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alm statHiHi lim
- Alrm stat Hi lim
- Alm statLoLo lim
- Alrm stat Lo lim
- Update Event

Additional information *Description*

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Analog Outputs function block.

Batch ID

Navigation Expert → Analog outputs → Analog output 1 to n → Batch ID (1633–1 to n)

Description Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry Positive integer

Batch operation

Navigation Expert → Analog outputs → Analog output 1 to n → Batch operation (1639–1 to n)

Description Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch phase

Navigation Expert → Analog outputs → Analog output 1 to n → Batch phase (1640–1 to n)

Description Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch Recipe

Navigation Expert → Analog outputs → Analog output 1 to n → Batch Recipe (1641–1 to n)

Description Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

User entry 0 to 65 535

Factory setting 0

Additional information *Description*

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

PVscale lo range

Navigation Expert → Analog outputs → Analog output 1 to n → PVscale lo range (1651–1 to n)

Description Use this function to enter the lower value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

User entry Signed floating-point number

Factory setting 0

PVscale up range

Navigation Expert → Analog outputs → Analog output 1 to n → PVscale up range (1652–1 to n)

Description Use this function to enter the upper value range for the input value (Process Value Scale) in system units. The process value scale normalizes the input value to a user-specific range.

User entry Signed floating-point number

Factory setting 100.0

Readback value

Navigation Expert → Analog outputs → Analog output 1 to n → Readback value (1659–1 to n)

Description Displays the readback value. The readback value indicates the current position of the control element within the travel range (between the open and close position) in PV scale units.

User interface Signed floating-point number

Readback status

Navigation Expert → Analog outputs → Analog output 1 to n → Readback status (1658–1 to n)

Description Displays the readback status. The readback status contains the status information of the slave.

User interface 0 to 255

RCAS in value

Navigation Expert → Analog outputs → Analog output 1 to n → RCAS in value (1655–1 to n)

Description Use this function to enter the RCAS (Remote Cascade) in value. The block set point is set by a control application via the remote cascade **RCAS in value** parameter (→ 193). The normal algorithm calculates the output value of the block on the basis of this set point.

User entry Signed floating-point number

Factory setting 0

RCAS in status

Navigation Expert → Analog outputs → Analog output 1 to n → RCAS in status (1654–1 to n)

Description Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the RCAS in value (→ 193).

User entry 0 to 255

Factory setting 0

Input channel

Navigation Expert → Analog outputs → Analog output 1 to n → Input channel (1670–1 to n)

Description Use this function to select the input channel. The number of logical hardware channels from the converter that is connected to this I/O block.

Selection None

Factory setting None

Output channel

Navigation Expert → Analog outputs → Analog output 1 to n → Output channel (1671–1 to n)

Description Use this function to select the output channel. The number of logical hardware channels to the converter that is connected to this I/O block.

Selection
- External temp.
- Ext. ref.density
- External press.
- S&W
- Water cut

Factory setting External press.

RCAS out value

Navigation Expert → Analog outputs → Analog output 1 to n → RCAS out value (1657–1 to n)

Description Displays the RCAS out value. Displays the set point of the block which is made available to the higher-level host for monitoring/back calculation and which makes it possible to take action under certain conditions or in a different mode.

User interface Signed floating-point number

RCAS out status

Navigation Expert → Analog outputs → Analog output 1 to n → RCAS out status (1656–1 to n)

Description Displays the RCAS out status. Displays the status of the set point.

User interface 0 to 0xFF

Pos value

Navigation Expert → Analog outputs → Analog output 1 to n → Pos value (1650–1 to n)

Description Displays the current value of the positioner.

User interface 0 to 255

Position status

Navigation Expert → Analog outputs → Analog output 1 to n → Position status (1649–1 to n)

Description Displays the current status of the positioner.

User interface 0 to 255

Setp. deviation

Navigation Expert → Analog outputs → Analog output 1 to n → Setp. deviation (1653–1 to n)

Description Displays the deviation between the set point (**Set point val** parameter (→ 186)) and the actual value (**Readback value** parameter (→ 193)).

User interface Signed floating-point number

Simulate enabled

Navigation Expert → Analog outputs → Analog output 1 to n → Simulate enabled (1662–1 to n)

Description Use this function to enable or disable block simulation.

Selection
- Disable
- Enable

Factory setting Disable

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value

Navigation Expert → Analog outputs → Analog output 1 to n → Simulate value (1664–1 to n)

Description Use this function to enter a simulation value.

User entry Signed floating-point number

Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

Simulate status

Navigation Expert → Analog outputs → Analog output 1 to n → Simulate status (1663–1 to n)

Description Use this function to enter a simulation status for the block.

User entry 0 to 255

Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

Increase close

Navigation Expert → Analog outputs → Analog output 1 to n → Increase close (1638–1 to n)

Description Use this function to enter the effective direction of the positioner in automatic mode.

User entry 0 to 255

Factory setting 0

Out scale up

Navigation Expert → Analog outputs → Analog output 1 to n → Out scale up (1646–1 to n)

Description Use this function to enter the upper value range for the output value in system units.

User entry Signed floating-point number

Factory setting 100.0

Out scale low

Navigation Expert → Analog outputs → Analog output 1 to n → Out scale low (1644–1 to n)

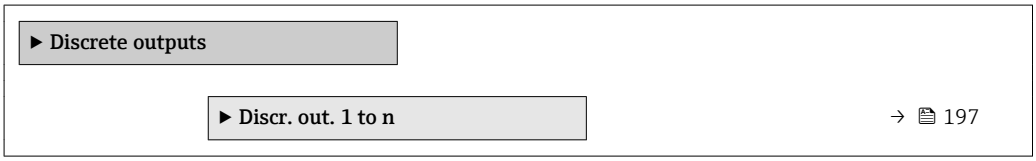
Description Use this function to enter the lower value range for the output value in system units.

User entry Signed floating-point number

Factory setting 0

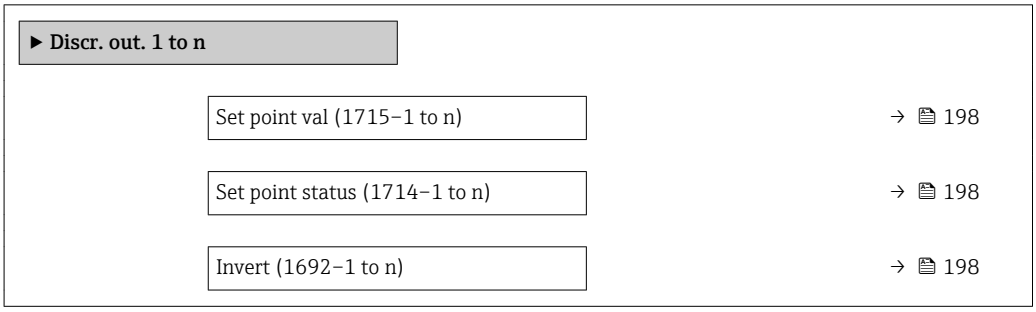
3.10 "Discrete outputs" submenu

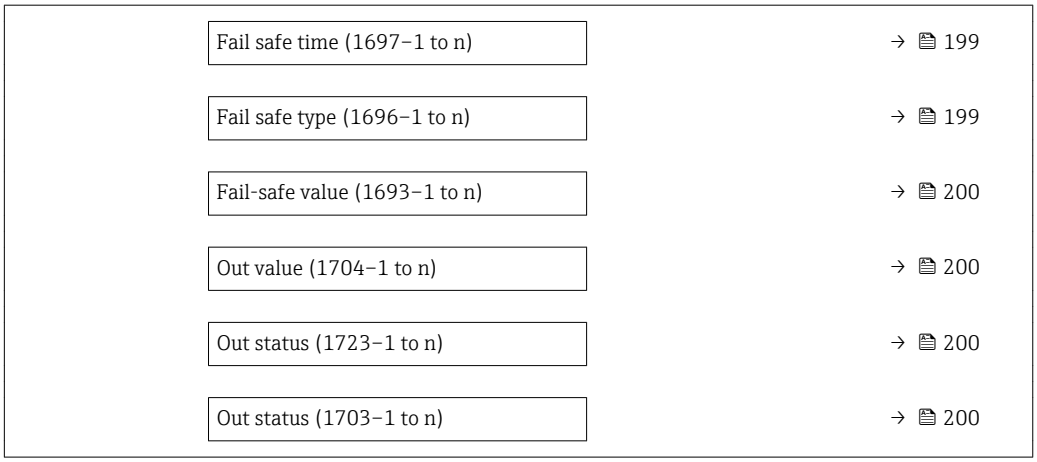
Navigation Expert → Discrete outputs



3.10.1 "Discrete output 1 to n" submenu

Navigation Expert → Discrete outputs → Discr. out. 1 to n





Set point val

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Set point val (1715–1 to n)

Description Use this function to enter an analog set point.

User entry 0 to 255

Factory setting 0

Set point status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Set point status (1714–1 to n)

Description Use this function to enter a status for the analog set point.

User entry 0 to 255

Factory setting 0

Invert

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Invert (1692–1 to n)

Description Use this function to switch inversion on and off. Specifies whether the set point should be inverted before the value is set as the output value or the RCAS value (in the automatic mode).

Selection
- Off
- On

Factory setting Off

Fail safe time

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Fail safe time (1697–1 to n)

Description Use this function to enter a time span within which the criteria for an error must be met continuously before an error message or notice message is generated.

User entry Signed floating-point number

Factory setting 0

Additional information *User entry*

NOTE!

If this parameter is used, error messages and notice messages are delayed by the set time before being relayed to the higher-level controller (DCS, etc.).

▸ Check in advance to ensure that the safety-specific requirements of the process would permit this.

▸ If the error and notice messages may not be suppressed, a value of 0 seconds must be configured here.

Fail safe type

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Fail safe type (1696–1 to n)

Description Use this function to select the failure mode.

Selection
- Fail-safe value
- Fallback value
- Off

Factory setting Fallback value

Additional information *Selection*

If an input or simulation value has the status BAD, the function block uses this predefined failure value:
- Fail-safe value
  A substitute value is used. This is specified in the **Fail-safe value** parameter (→ 200).
- Fallback value
  If the value was good at one point, then this last valid value is used.
- Off
  The system continues to use the bad value.

Fail-safe value

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Fail-safe value (1693–1 to n)

Prerequisite In **Fail safe type** parameter (→ 199), the **Fail-safe value** option is selected.

Description Use this function to enter a failure value. The value entered is displayed as the output value (**Out value** parameter (→ 200)) in the event of an error.

User entry 0 to 255

Factory setting 0

Out value

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Out value (1704–1 to n)

Prerequisite In **Target mode** parameter (→ 202), the **Auto** option is selected.

Description Displays the analog value which is calculated when the function is executed.

User interface 0 to 255

Out status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Out status (1723–1 to n)

Description Displays the current output status (Good, Bad, Uncertain).

User interface
- Good
- Uncertain
- Bad

Out status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Out status (1703–1 to n)

Prerequisite In **Target mode** parameter (→ 202), the **Auto** option is selected.

Description Displays the current output status (hex value).

User interface 0 to 0xFF

Tag description

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Tag description (1721–1 to n)

Description Use this function to enter a string to identify the block.

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

Static revision

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Static revision (1720–1 to n)

Description Displays the event counter: every write access to a static block parameter is counted.

User interface 0 to FFFF

Additional information *Description*

Static parameters are parameters that are not changed by the process.

Strategy

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Strategy (1719–1 to n)

Description Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry 0 to FFFF

Factory setting 0

Alert key

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Alert key (1694–1 to n)

Description Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

User entry 0 to 0xFF

Factory setting 0

Target mode

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Target mode (1722–1 to n)

Description Displays the Target mode: The target mode specifies which mode of operation is used for this function block. This mode is generally set by a control application.

User interface
- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

Mode block act

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Mode block act (1691–1 to n)

Description Displays the Mode block act: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block act shows the actual mode in which the function block is currently operating. A comparison of the Mode block act with the Target mode indicates whether it was possible to reach the Target mode (→ 202).

User interface
- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 202)) indicates whether it was possible to reach the target mode.

Mode block perm

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Mode block perm (1705–1 to n)

Description Displays the Mode block perm: This defines which modes of operation in the Target mode (→ 202) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface 0 to 255

Mode blk norm

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Mode blk norm (1702–1 to n)

Description Displays the Mode blk norm: This is available to allow the operator to select the Mode blk norm from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Local override
- Remote Cascaded
- Man
- Out of service
- Auto

Alarm summary

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Alarm summary (1701–1 to n)

Description Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alm statHiHi lim
- Alrm stat Hi lim
- Alm statLoLo lim
- Alrm stat Lo lim
- Update Event

Additional information *Description*

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Discrete Outputs function block.

Batch ID

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Batch ID (1695–1 to n)

Description Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry Positive integer

Batch operation

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Batch operation (1698–1 to n)

Description Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch phase

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Batch phase (1699–1 to n)

Description Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch Recipe

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Batch Recipe (1700–1 to n)

Description Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

User entry 0 to 65 535

Factory setting 0

Additional information *Description*

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

Readback value

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Readback value (1713–1 to n)

Description Displays the readback value. The readback value indicates the current position of the control element and the element's sensors.

User interface 0 to 255

Readback status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Readback status (1712–1 to n)

Description Displays the readback status. Displays the status of the readback value.

User interface 0 to 255

RCAS in value

Navigation Expert → Discrete outputs → Discr. out. 1 to n → RCAS in value (1707–1 to n)

Description Use this function to enter the RCAS (Remote Cascade) in value. The block set point is set by a control application via the remote cascade **RCAS in value** parameter (→ 205). The normal algorithm calculates the output value of the block on the basis of this set point.

User entry 0 to 255

Factory setting 0

RCAS in status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → RCAS in status (1706–1 to n)

Description Use this function to enter the RCAS (Remote Cascade) in status. Defines the status for the RCAS in value (→ 205).

User entry 0 to 255

Factory setting 0

Input channel

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Input channel (1724–1 to n)

Description Use this function to select the input channel. The number of logical hardware channels from the converter that is connected to this I/O block.

Selection None

Factory setting None

Output channel

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Output channel (1725–1 to n)

Description Use this function to select the output channel. The number of logical hardware channels to the converter that is connected to this I/O block.

Selection
- Start verificat. *
- Zero point adj.
- Flow override
- I/O module 2
- I/O module 3
- I/O module 4
- Liqu. type conc.

Factory setting Flow override

RCAS out value

Navigation Expert → Discrete outputs → Discr. out. 1 to n → RCAS out value (1711–1 to n)

Description Displays the RCAS out value. Displays the set point of the block which is made available to the higher-level host for monitoring/back calculation and which makes it possible to take action under certain conditions or in a different mode.

User interface 0 to 255

RCAS out status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → RCAS out status (1708–1 to n)

Description Displays the RCAS out status. Displays the status of the set point.

User interface 0 to 255

Simulate enabled

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Simulate enabled (1716–1 to n)

Description Use this function to enable or disable block simulation.

Selection
- Disable
- Enable

* Visibility depends on order options or device settings

Factory setting Disable

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated discrete I/O channel during operation.

Simulate value

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Simulate value (1718–1 to n)

Description Use this function to enter a simulation value.

User entry 0 to 255

Factory setting 0

Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated value during operation.

Simulate status

Navigation Expert → Discrete outputs → Discr. out. 1 to n → Simulate status (1717–1 to n)

Description Use this function to enter a simulation status for the block.

User entry 0 to 255

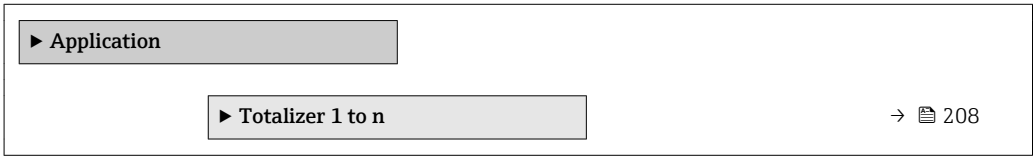
Factory setting 0

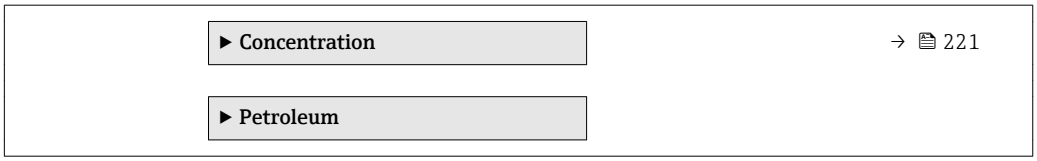
Additional information *Description*

The simulation is used to bypass the physical I/O channel. In this way, the block remains in the normal mode and uses the simulated status during operation.

3.11 "Application" submenu

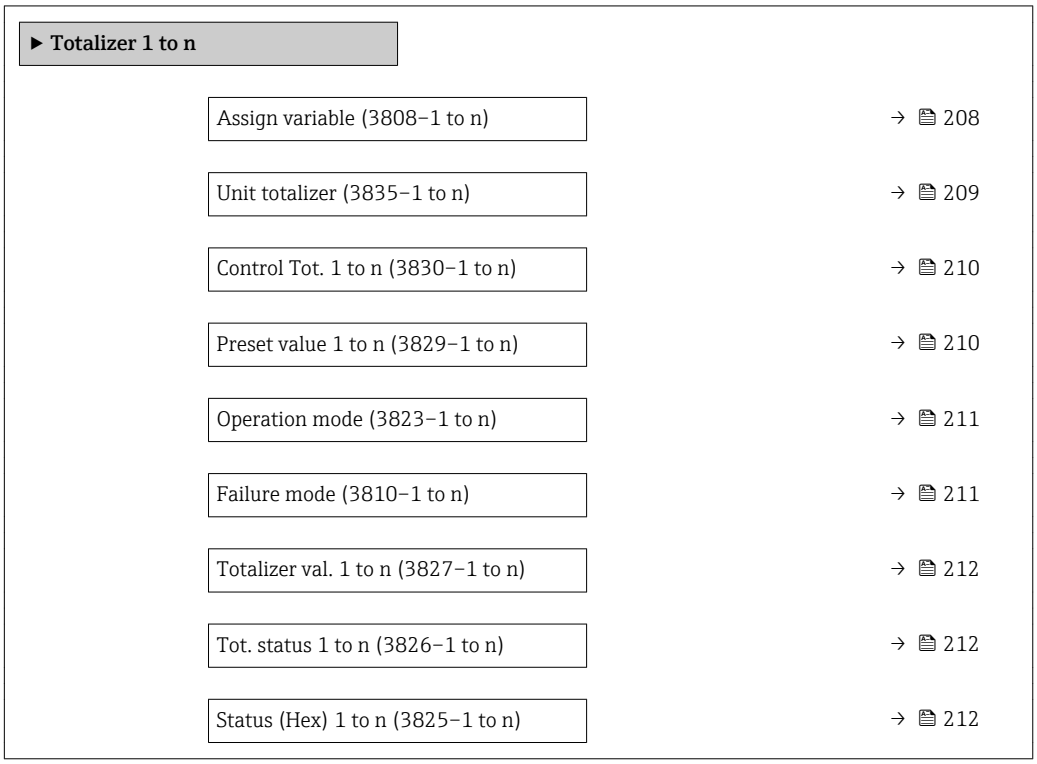
Navigation Expert → Application





3.11.1 "Totalizer 1 to n" submenu

Navigation Expert → Application → Totalizer 1 to n



Assign variable

Navigation Expert → Application → Totalizer 1 to n → Assign variable (3808–1 to n)

Description Use this function to select a process variable for the Totalizer 1 to n.

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

Factory setting Mass flow

Additional information *Description*

If the option selected is changed, the device resets the totalizer to 0.

Unit totalizer

Navigation Expert → Application → Totalizer 1 to n → Unit totalizer (3835–1 to n)

Description Use this function to select the process variable of a totalizer.

The unit is selected separately for each totalizer. It is independent of the selection made in the **System units** submenu (→ 58).

Selection

SI units
- g
- kg
- t

US units
- oz
- lb
- STon

or

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

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

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

or

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

Imperial units
bbl (imp;beer)

or

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

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

Imperial units
Sgal (imp)

Factory setting Country-specific:
- kg
- lb

Additional information

Selection

The selection is independent of the process variable selected in the **Assign variable** parameter (→ 208).

Dependency

The following parameters depend on the option selected:
- **Alarm hysteresis** parameter (→ 216)
- **Hi Hi Lim** parameter (→ 217)
- **Hi Lim** parameter (→ 217)

- **Lo Lim** parameter (→ 218)
- **Lo Lo Lim** parameter (→ 218)
- **Totalizer val.** parameter (→ 52)
- **Preset value** parameter (→ 210)

Control Tot. 1 to n

Navigation Expert → Application → Totalizer 1 to n → Control Tot. 1 to n (3830–1 to n)

Description Use this function to select the control of totalizer value 1-3.

Selection
- Totalize
- Reset + hold
- Preset + hold

Factory setting Totalize

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

Preset value 1 to n

Navigation Expert → Application → Totalizer 1 to n → Preset value 1 to n (3829–1 to n)

Description Use this function to enter an initial value for the specific totalizer.

User entry Signed floating-point number

Factory setting Country-specific:
- kg
- lb

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Example

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

Operation mode

Navigation Expert → Application → Totalizer 1 to n → Operation mode (3823–1 to n)

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

Selection
- Net flow total
- Forward total
- Reverse total
- Last valid value

Factory setting Net flow total

Additional information *Selection*
- Net flow total
  Positive and negative flow values are totalized and balanced against one another. Net flow is registered in the flow direction.
- Forward total
  Only the flow in the forward flow direction is totalized.
- Reverse total
  Only the flow against the forward flow direction is totalized (= reverse flow total).
- Last valid value
  The value is frozen. Totaling is stopped.

Failure mode

Navigation Expert → Application → Totalizer 1 to n → Failure mode (3810–1 to n)

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 Actual value

Additional information *Description*

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

Selection
- Stop
  Totalizing is stopped when a device alarm occurs.
- Actual value
  The totalizer continues to count based on the current 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.

Totalizer val. 1 to n

Navigation Expert → Application → Totalizer 1 to n → Totalizer val. 1 to n (3827–1 to n)

Prerequisite In the **Target mode** parameter (→ 214), the **Auto** option is selected.

Description Displays the current reading for totalizer 1-3.

User interface Signed floating-point number

Additional information

Description

In the event of an error, the totalizer adopts the mode defined in the **Failure mode** parameter (→ 211).

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 (→ 211).

Dependency

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Tot. status 1 to n

Navigation Expert → Application → Totalizer 1 to n → Tot. status 1 to n (3826–1 to n)

Description Displays the status of the particular totalizer.

User interface

- Good
- Uncertain
- Bad

Status (Hex) 1 to n

Navigation Expert → Application → Totalizer 1 to n → Status (Hex) 1 to n (3825–1 to n)

Prerequisite In **Target mode** parameter (→ 214), the **Auto** option is selected.

Description Displays the status value (hex) of the particular totalizer.

User interface 0 to 0xFF

Tag description

Navigation Expert → Application → Totalizer 1 to n → Tag description (3833–1 to n)

Description Use this function to enter a string to identify the block.

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

Static revision

Navigation Expert → Application → Totalizer 1 to n → Static revision (3832–1 to n)

Description Displays the event counter: every write access to a static block parameter is counted.

User interface 0 to FFFF

Additional information *Description*

Static parameters are parameters that are not changed by the process.

Strategy

Navigation Expert → Application → Totalizer 1 to n → Strategy (3831–1 to n)

Description Use this function to enter the strategy: makes it possible to group blocks by entering identical numbers.

User entry 0 to FFFF

Factory setting 0

Alert key

Navigation Expert → Application → Totalizer 1 to n → Alert key (3803–1 to n)

Description Use this function to enter the alert key: identifies the section of the plant where the transmitter is located. This helps in pinpointing events.

User entry 0 to 0xFF

Factory setting 0

Target mode

Navigation Expert → Application → Totalizer 1 to n → Target mode (3834–1 to n)

Description Displays the Target mode: The target mode indicates which mode of operation is used for this function block. This mode is generally set by a control application.

User interface
- Auto
- Man
- Out of service

Mode block act

Navigation Expert → Application → Totalizer 1 to n → Mode block act (3801–1 to n)

Description Displays the Mode block act: Under certain conditions, it is possible that a function block will not operate in the required mode. In this case, the Mode block act shows the actual mode in which the function block is currently operating. A comparison of the Mode block act with the Target mode indicates whether it was possible to reach the Target mode (→ 214).

User interface
- Auto
- Man
- Out of service

Additional information *Description*

A comparison of the current mode with the target mode (**Target mode** parameter (→ 214)) indicates whether it was possible to reach the target mode.

Mode block perm

Navigation Expert → Application → Totalizer 1 to n → Mode block perm (3828–1 to n)

Description Displays the Mode block perm: This defines which modes of operation in the Target mode (→ 214) are available for the function block. The operating modes that are supported vary depending on the type and function of the block.

User interface 0 to 255

Mode blk norm

Navigation Expert → Application → Totalizer 1 to n → Mode blk norm (3824–1 to n)

Description Displays the Mode blk norm: This is available to allow the operator to select the Mode blk norm from the available modes of operation. This can be set using an operating tool in order to help the user configure the operating mode of a function block.

User interface
- Auto
- Man
- Out of service

Alarm summary

Navigation Expert → Application → Totalizer 1 to n → Alarm summary (3809–1 to n)

Description Displays the alarm summary: the current status of the block alarms is displayed. A summary of up to 16 statuses can be displayed.

User interface
- Discrete alarm
- Alm statHiHi lim
- Alrm stat Hi lim
- Alm statLoLo lim
- Alrm stat Lo lim
- Update Event

Additional information *Description*

Currently, the system only displays a change in a static parameter for 10 seconds, and violations of the early warning and alarm limits in the Totalizer function block.

Batch ID

Navigation Expert → Application → Totalizer 1 to n → Batch ID (3804–1 to n)

Description Use this function to enter the batch ID: identification of a specific batch to make it possible to assign device-specific information (e.g. errors, alarm conditions etc.) to the batching process.

User entry Positive integer

Factory setting 0

Batch operation

Navigation Expert → Application → Totalizer 1 to n → Batch operation (3805–1 to n)

Description Use this function to enter the batch operation: control recipe operation number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch phase

Navigation Expert → Application → Totalizer 1 to n → Batch phase (3806–1 to n)

Description Use this function to enter the batch phase: control recipe phase number to identify the active control recipe operation.

User entry 0 to 65 535

Factory setting 0

Batch Recipe

Navigation Expert → Application → Totalizer 1 to n → Batch Recipe (3807–1 to n)

Description Use this function to enter the batch recipe unit procedure (RUP): identification of the active control recipe unit procedure or the associated unit (e.g. inductor, centrifuge, drying agent).

User entry 0 to 65 535

Factory setting 0

Additional information *Description*

The unit is defined in IEC61512 Part1/ISA S88 but its meaning is different to that of the parameter unit, such as system units.

Alarm hysteresis

Navigation Expert → Application → Totalizer 1 to n → Alarm hysteresis (3802–1 to n)

Description Use this function to enter the hysteresis value for the upper and lower warning or alarm limit values.

User entry Signed floating-point number

Factory setting 0 kg

Additional information *User entry*

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Hi Hi Lim

Navigation Expert → Application → Totalizer 1 to n → Hi Hi Lim (3815–1 to n)

Description Use this function to enter the value for the upper alarm limit of the totalizer (**HiHi alarm value** parameter (→ 219)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information

Description

If the output value Out value (→ 167) exceeds this limit value, the **HiHi alarm state** parameter (→ 219) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Hi Lim

Navigation Expert → Application → Totalizer 1 to n → Hi Lim (3816–1 to n)

Description Use this function to enter the value for the upper warning limit of the totalizer (**Hi alarm value** parameter (→ 219)).

User entry Signed floating-point number

Factory setting Positive floating-point number

Additional information

Description

If the output value Out value (→ 167) exceeds this limit value, the **Hi alarm state** parameter (→ 219) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Lo Lim

Navigation Expert → Application → Totalizer 1 to n → Lo Lim (3819–1 to n)

Description Use this function to enter the value for the lower warning limit of the totalizer (**Lo alarm value** parameter (→ 220)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information

Description

If the output value Out value (→ 167) exceeds this limit value, the **Lo alarm state** parameter (→ 220) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

Lo Lo Lim

Navigation Expert → Application → Totalizer 1 to n → Lo Lo Lim (3822–1 to n)

Description Use this function to enter the value for the lower alarm limit of the totalizer (**LoLo alarm value** parameter (→ 220)).

User entry Signed floating-point number

Factory setting Negative floating-point number

Additional information

Description

If the output value Out value (→ 167) exceeds this limit value, the **LoLo alarm state** parameter (→ 220) is output.

User entry

The value is entered in the defined units (**Out unit** parameter (→ 172)) and must be in the range defined in the **Out scale low** parameter (→ 171) and **Out scale up** parameter (→ 172).

The unit of the selected process variable is specified for the totalizer in the **Unit totalizer** parameter (→ 209).

HiHi alarm value

Navigation Expert → Application → Totalizer 1 to n → HiHi alarm value (3814–1 to n)

Description Displays the alarm value for the upper alarm limit value (**Hi Hi Lim** parameter (→ 217)).

User interface Signed floating-point number

HiHi alarm state

Navigation Expert → Application → Totalizer 1 to n → HiHi alarm state (3813–1 to n)

Description Displays the status for the upper alarm limit value (**Hi Hi Lim** parameter (→ 217)).

User interface
- No alarm
- Alm statHiHi lim

Additional information *User interface*

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

Hi alarm value

Navigation Expert → Application → Totalizer 1 to n → Hi alarm value (3812–1 to n)

Description Displays the warning value for the upper warning limit value (**Hi Lim** parameter (→ 217)).

User interface Signed floating-point number

Hi alarm state

Navigation Expert → Application → Totalizer 1 to n → Hi alarm state (3811–1 to n)

Description Displays the status for the upper warning limit value (**Hi Lim** parameter (→ 217)).

User interface
- No warning
- Alrm stat Hi lim

Additional information *User interface*

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

Lo alarm value

Navigation Expert → Application → Totalizer 1 to n → Lo alarm value (3818–1 to n)

Description Displays the warning value for the lower warning limit value (**Lo Lim** parameter (→ 218)).

User interface Signed floating-point number

Lo alarm state

Navigation Expert → Application → Totalizer 1 to n → Lo alarm state (3817–1 to n)

Description Displays the status for the lower warning limit value (**Lo Lim** parameter (→ 218)).

User interface
- No warning
- Alrm stat Lo lim

Additional information *User interface*

The display contains information such as the time of the warning (date and time) and the value that triggered the alarm.

LoLo alarm value

Navigation Expert → Application → Totalizer 1 to n → LoLo alarm value (3821–1 to n)

Description Displays the alarm value for the lower alarm limit value (**Lo Lo Lim** parameter (→ 218)).

User interface Signed floating-point number

LoLo alarm state

Navigation Expert → Application → Totalizer 1 to n → LoLo alarm state (3820–1 to n)

Description Displays the status for the lower alarm limit value (**Lo Lo Lim** parameter (→ 218)).

User interface
- No alarm
- Alm statLoLo lim

Additional information *User interface*

The display contains information such as the time of the alarm (date and time) and the value that triggered the alarm.

3.11.2 "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**

3.12 "Diagnostics" submenu

Navigation Expert → Diagnostics

▶ **Diagnostics**

Actual diagnos. (0691)	→ 222
Prev.diagnostics (0690)	→ 222
Time fr. restart (0653)	→ 223
Operating time (0652)	→ 223
▶ **Diagnostic list**	→ 224
▶ **Event logbook**	→ 228
▶ **Device info**	→ 230
▶ **Main elec.+I/O1**	→ 234
▶ **Sens. electronic**	→ 235
▶ **I/O module 1**	→ 236
▶ **I/O module 2**	→ 236
▶ **Display module**	→ 238
▶ **Min/max val.**	→ 239
▶ **Data logging**	→ 246
▶ **Heartbeat**	→ 255
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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 (→ 224).

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 (→ 222).

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 (→ 222).

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.

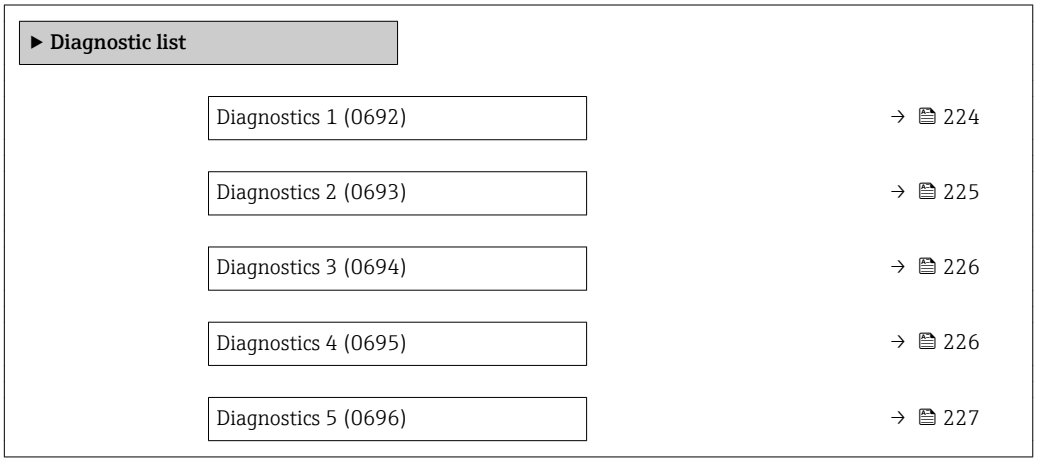
User interface Days (d), hours (h), minutes (m) and seconds (s)

Additional information *User interface*

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

3.12.1 "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 (→ 224).

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 (→ 225).

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 (→ 226).

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 (→ 226).

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*

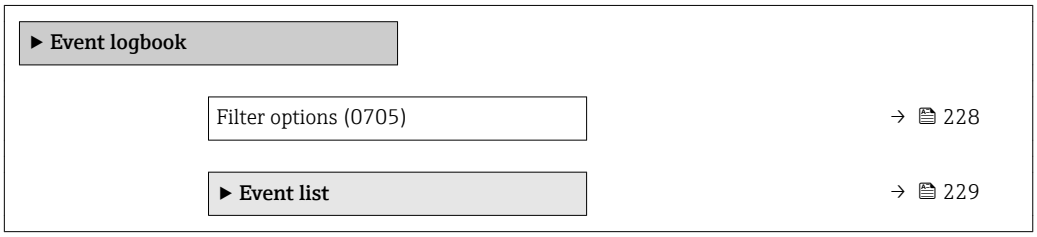
The diagnostic message can be viewed via the **Diagnostics 5** parameter (→ 227).

Example

For the display format:
24d12h13m00s

3.12.2 "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 (→ 228).

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

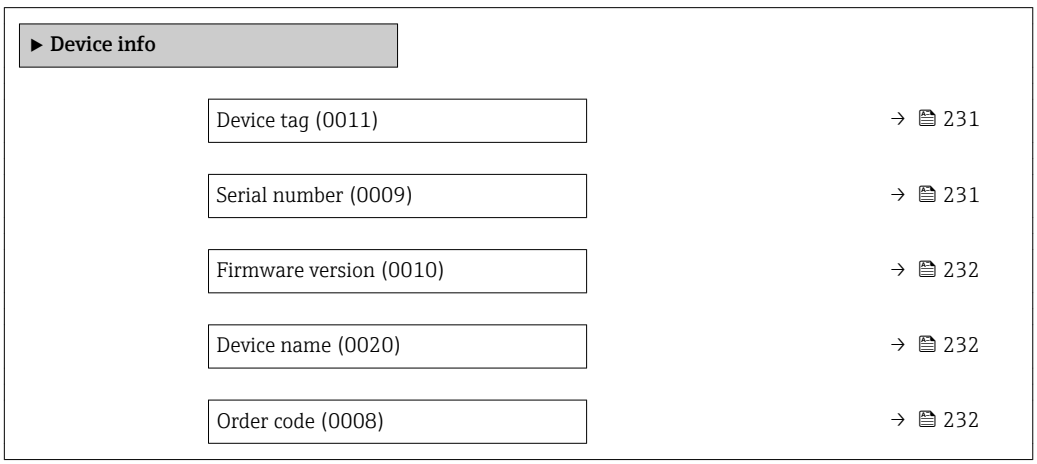
For the display format:
- I1091 Configuration modified
  ⊕ 24d12h13m00s
- ⊗F271 Main electronics
  ⊕ 01d04h12min30s

HistoROM

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

3.12.3 "Device info" submenu

Navigation Expert → Diagnostics → Device info



Ext. order cd. 1 (0023)	→ 233
Ext. order cd. 2 (0021)	→ 233
Ext. order cd. 3 (0022)	→ 233
ENP version (0012)	→ 233

Device tag

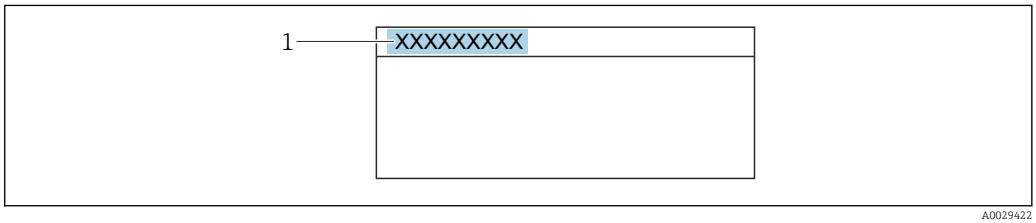
Navigation Expert → Diagnostics → Device info → Device tag (0011)

Description Displays a unique name for the measuring point so it can be identified quickly within the plant. The name is displayed in the header.

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

Factory setting Cubemass_500

Additional information *Display*



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 (→ 233)

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 (→ 233)

ENP version

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

Description Displays the version of the electronic nameplate.

User interface Character string

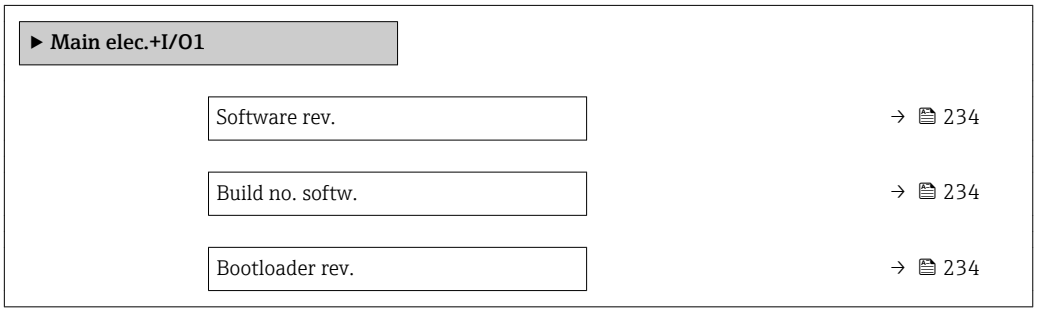
Factory setting 2.02.00

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.

3.12.4 "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.

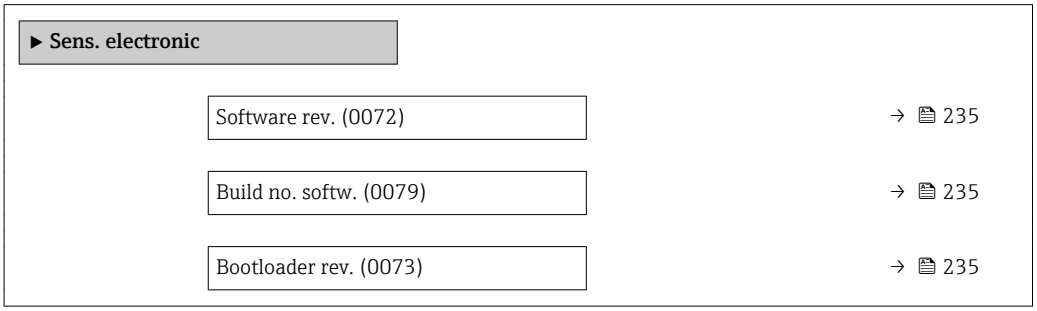
Navigation Expert → Diagnostics → Main elec.+I/O1 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.12.5 "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.

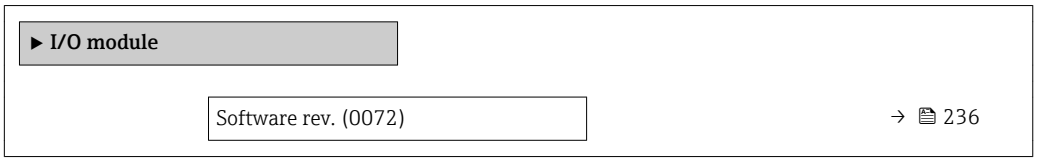
Navigation Expert → Diagnostics → Sens. electronic → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.12.6 "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)
- 20-21 (I/O 4)

Software rev.

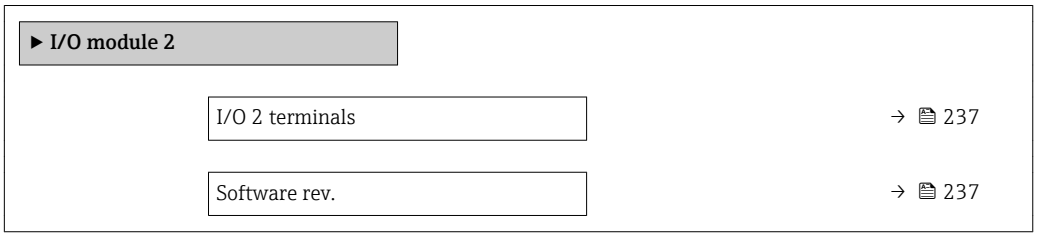
Navigation
Expert → Diagnostics → I/O module 2 → Software rev. (0072)
Expert → Diagnostics → I/O module 3 → Software rev. (0072)
Expert → Diagnostics → I/O module 4 → Software rev. (0072)

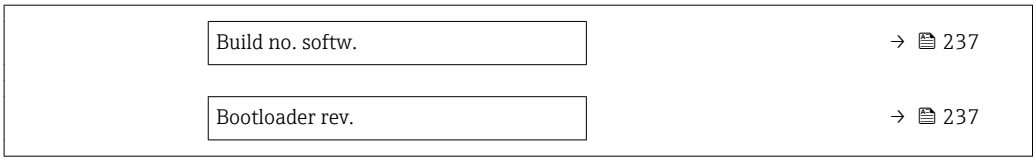
Description Use this function to display the software revision of the module.

User interface Positive integer

3.12.7 "I/O module 2" submenu

Navigation Expert → Diagnostics → I/O module 2





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)
- 20-21 (I/O 4)

Software rev.

Navigation Expert → Diagnostics → I/O module 2 → 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 2 → Build no. softw. (0079)

Description Use this function to display the software build number of the module.

User interface Positive integer

Bootloader rev.

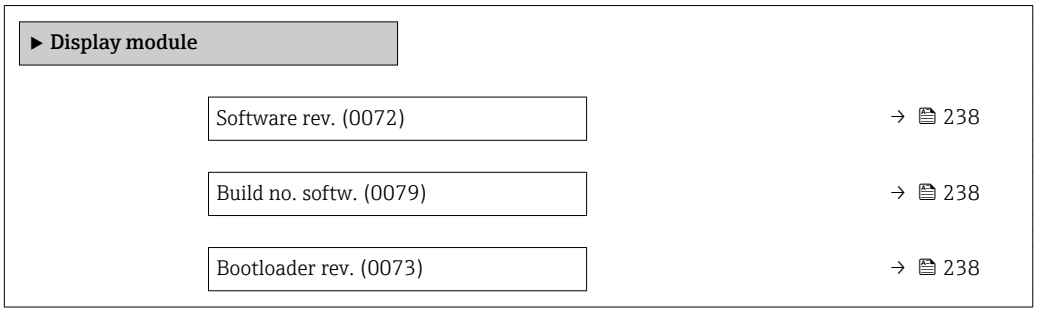
Navigation Expert → Diagnostics → I/O module 2 → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.12.8 "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.

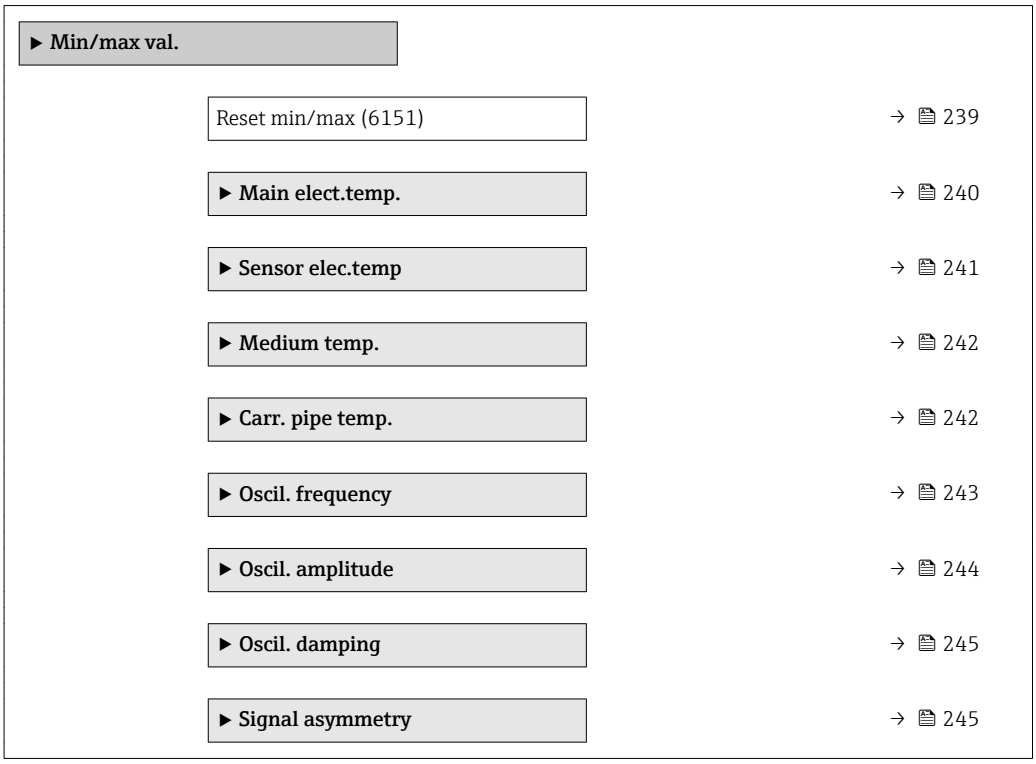
Navigation Expert → Diagnostics → Display module → Bootloader rev. (0073)

Description Use this function to display the bootloader revision of the software.

User interface Positive integer

3.12.9 "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

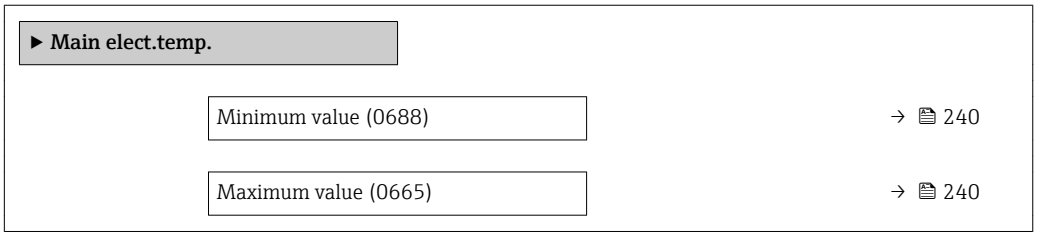
Factory setting Cancel

Additional information *Selection*

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

"Main electronic temperature" submenu

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp.



Minimum value

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp. → Minimum value (0688)

Description Displays the lowest previously measured temperature value of the electronics module in the transmitter.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Main elect.temp. → Maximum value (0665)

Description Displays the highest previously measured temperature value of the electronics module in the transmitter.

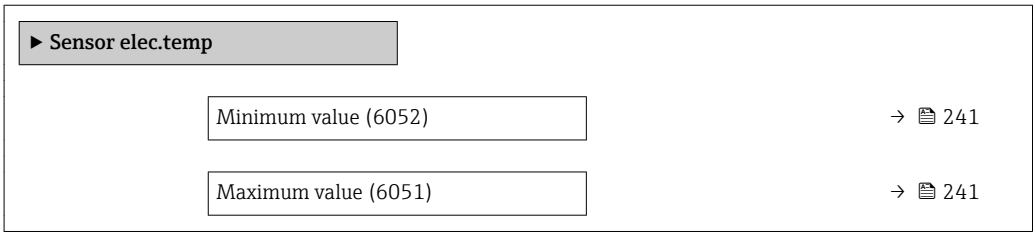
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

"Sensor electronic temperature (ISEM)" submenu

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



Maximum value

Navigation Expert → Diagnostics → Min/max val. → Sensor elec.temp → Maximum value (6051)

Description Displays the highest previously measured temperature value of the electronics module in the sensor connection housing.

User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

Minimum value

Navigation Expert → Diagnostics → Min/max val. → Sensor elec.temp → Minimum value (6052)

Description Displays the lowest previously measured temperature value of the electronics module in the sensor connection housing.

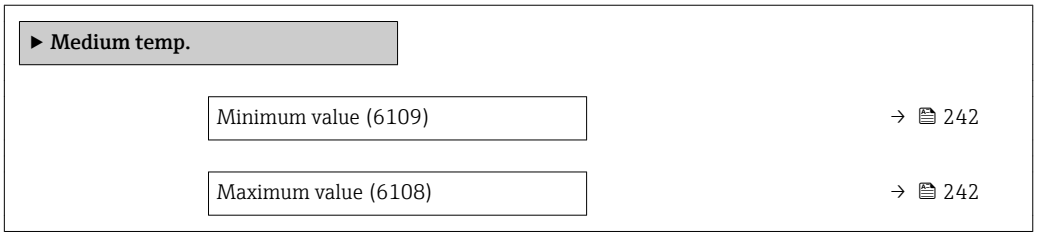
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

"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 (→ 64)

Maximum value

Navigation Expert → Diagnostics → Min/max val. → Medium temp. → Maximum value (6108)

Description Displays the highest previously measured medium temperature value.

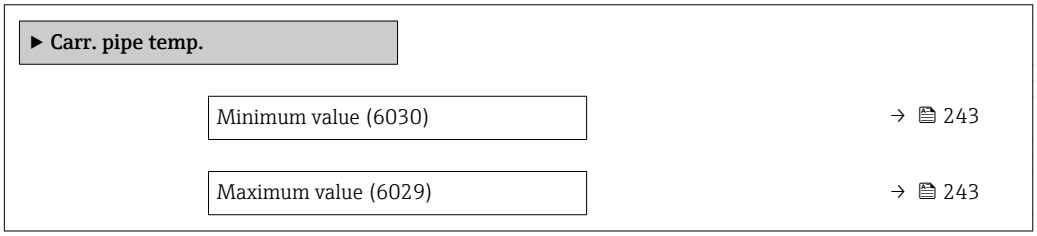
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

"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 (→ 64)

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.

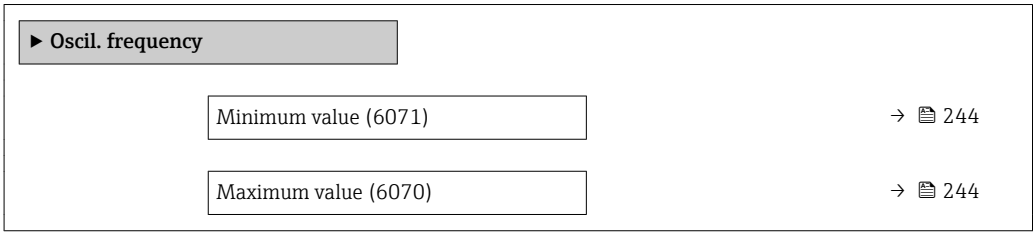
User interface Signed floating-point number

Additional information *Dependency*

The unit is taken from the **Temperature unit** parameter (→ 64)

"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

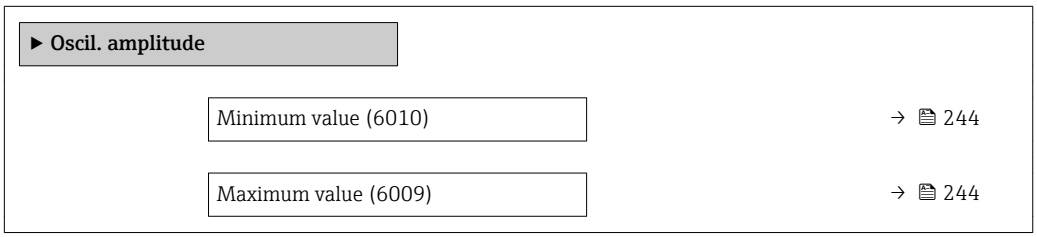
Navigation Expert → Diagnostics → Min/max val. → Oscil. frequency → Maximum value (6070)

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

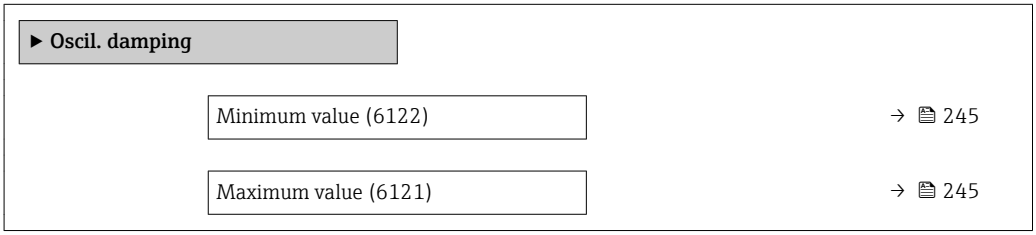
Navigation Expert → Diagnostics → Min/max val. → Oscil. amplitude → Maximum value (6009)

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

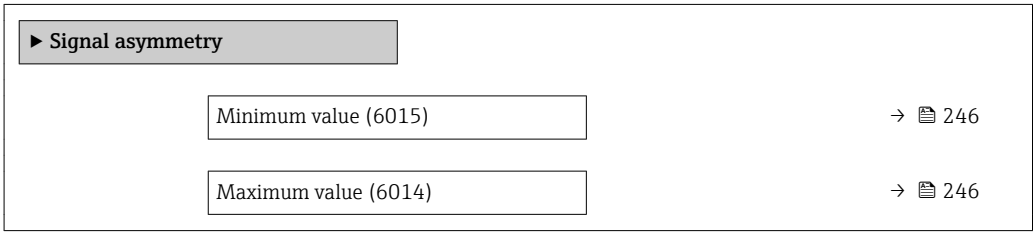
Navigation Expert → Diagnostics → Min/max val. → Oscil. damping → Maximum value (6121)

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

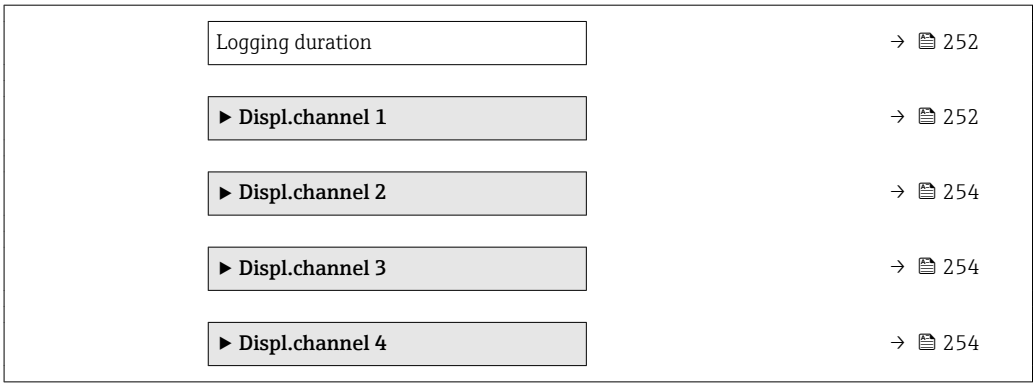
Navigation Expert → Diagnostics → Min/max val. → Signal asymmetry → Maximum value (6014)

Description Displays the highest previously measured signal asymmetry.

User interface Signed floating-point number

3.12.10 "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 (→ 44).

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

* Visibility depends on order options or device settings

- 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 *
- Curr.output 4 *
- Pressure

Factory setting Off

Additional information *Description*

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

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

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

Assign chan. 2

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

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

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

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

Selection Picklist, see **Assign channel 1** parameter (→ 247)

Factory setting Off

* Visibility depends on order options or device settings

Assign chan. 3

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

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

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

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

Selection Picklist, see **Assign channel 1** parameter (→ 247)

Factory setting Off

Assign chan. 4

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

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

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

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

Selection Picklist, see **Assign channel 1** parameter (→ 247)

Factory setting Off

Logging interval

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

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

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

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

User entry 0.1 to 3 600.0 s

Factory setting 1.0 s

Additional information

Description

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

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

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

Example

If 1 logging channel is used:
- $T_{log} = 1000 \times 1$ 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 (→ 44).

Description Use this function to clear the entire logging data.

Selection
- Cancel
- Clear data

Factory setting Cancel

Additional information

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

Data logging

Navigation Expert → Diagnostics → Data logging → Data logging (0860)

Description Use this function to select the data logging method.

Selection
- Overwriting
- Not overwriting

Factory setting Overwriting

Additional information *Selection*

- Overwriting
  The device memory applies the FIFO principle.
- Not overwriting
  Data logging is canceled if the measured value memory is full (single shot).

Logging delay

Navigation Expert → Diagnostics → Data logging → Logging delay (0859)

Prerequisite In the **Data logging** parameter (→ 250), 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 (→ 251), 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 (→ 250), 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 (→ 250), 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 (→ 250), the **Not overwriting** option is selected.

Description Displays the total logging duration.

User interface Positive floating-point number

Factory setting 0 s

"Displ.channel 1" submenu

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

Display channel 1

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

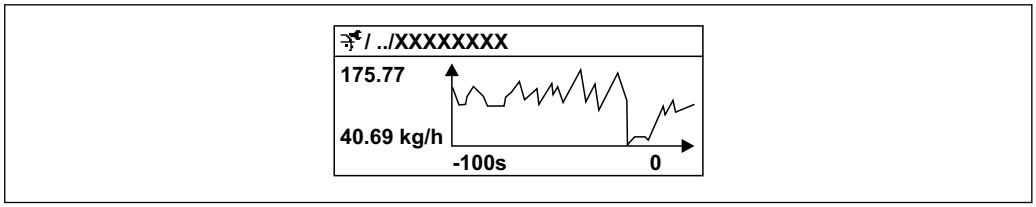
Prerequisite The **Extended HistoROM** application package is available.

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

One of the following options is selected in the **Assign chan. 1** parameter (→ 247):
- Mass flow
- Volume flow
- Correct.vol.flow
- Target mass flow *
- 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*



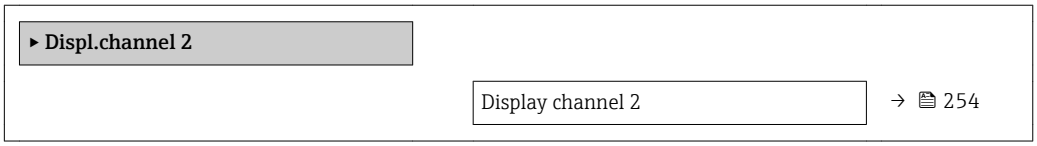
9 *Chart of a measured value trend*

- 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.

* Visibility depends on order options or device settings

"Displ.channel 2" submenu

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



Display channel 2

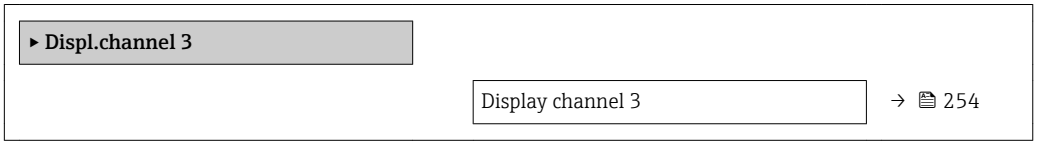
Navigation Expert → Diagnostics → Data logging → Displ.channel 2

Prerequisite A process variable is defined in the **Assign chan. 2** parameter.

Description See the **Display channel 1** parameter → 253

"Displ.channel 3" submenu

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



Display channel 3

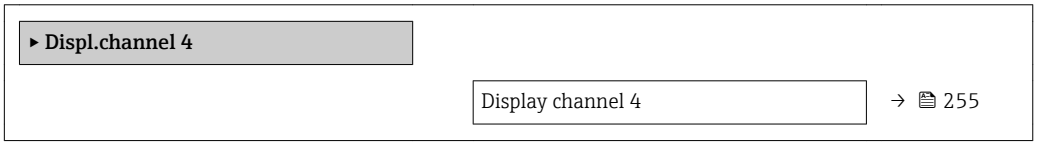
Navigation Expert → Diagnostics → Data logging → Displ.channel 3

Prerequisite A process variable is defined in the **Assign chan. 3** parameter.

Description See the **Display channel 1** parameter → 253

"Displ.channel 4" submenu

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



Display channel 4

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

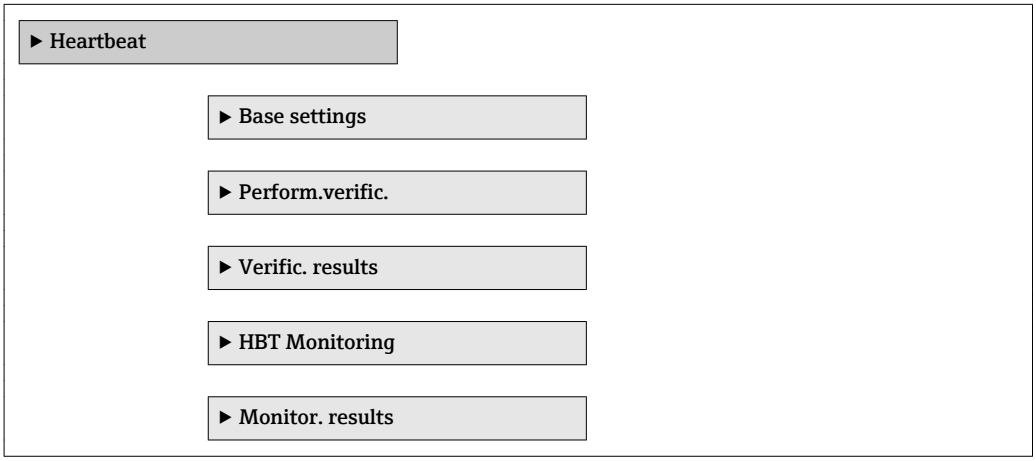
Prerequisite A process variable is defined in the **Assign chan. 4** parameter.

Description See the **Display channel 1** parameter → 253

3.12.11 "Heartbeat" submenu

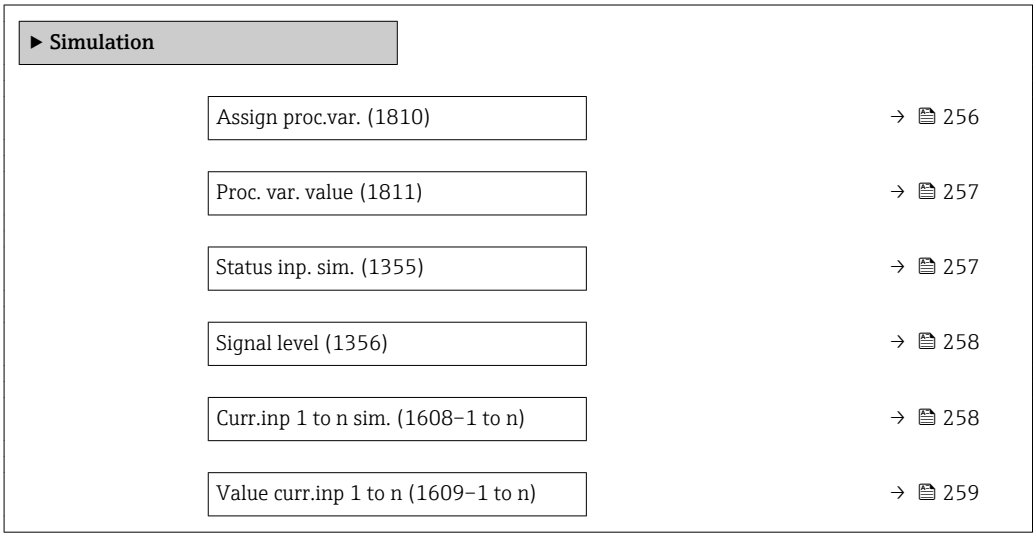
For detailed information on the parameter descriptions for the **Heartbeat Verification+Monitoring**application package, refer to the Special Documentation for the device → 7

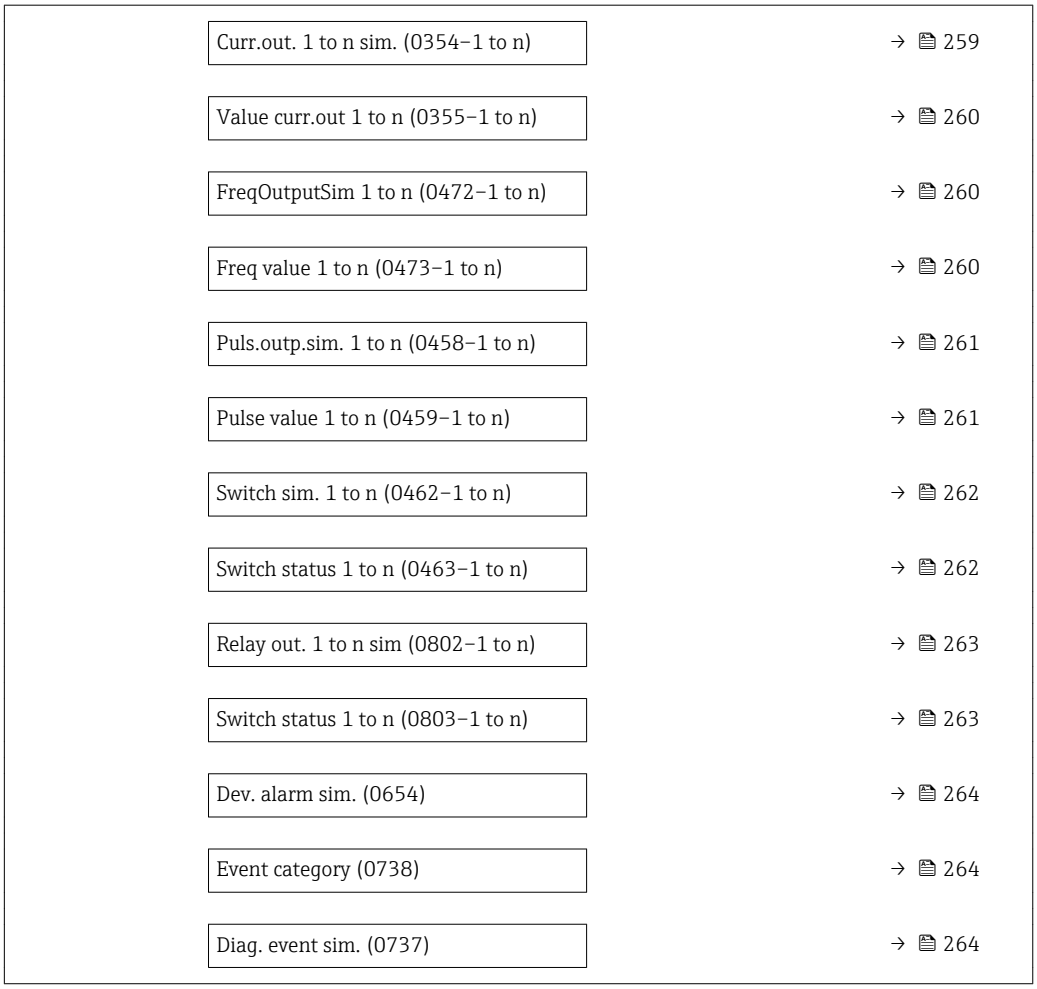
Navigation Expert → Diagnostics → Heartbeat



3.12.12 "Simulation" submenu

Navigation Expert → Diagnostics → Simulation





Assign proc.var.

Navigation Expert → Diagnostics → Simulation → Assign proc.var. (1810)

Description Use this function to select a process variable for the simulation process that is activated. The display alternates between the measured value and a diagnostic message of the "Function check" category (C) while simulation is in progress.

Selection
- Off
- 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.
- Density average
- Temp. average
- 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 (→ 257).

Proc. var. value

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

Prerequisite A process variable is selected in the **Assign proc.var.** parameter (→ 256).

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 (→ 58).

Status inp. sim.

Navigation Expert → Diagnostics → Simulation → Status inp. sim. (1355)

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.

* Visibility depends on order options or device settings

Selection
- Off
- On

Factory setting
Off

Additional information
Description

The desired simulation value is defined in the **Signal level** parameter (→ 258).

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

Navigation
Expert → Diagnostics → Simulation → Signal level (1356)

Prerequisite
In the **Status inp. sim.** parameter (→ 257), 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 (→ 101).

FreqOutputSim 1 to n

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

Prerequisite In the **Operating mode** parameter (→ 115), 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 (→ 115), 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 (→ 118).
- Down-count. val.
  The pulses specified in the **Pulse value** parameter (→ 261) 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 (→ 115), 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 (→ 264).

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 (→ 264).

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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